PUB. NO. 229
VOL. 6

SIGHT REDUCTION TABLES
FOR
MARINE NAVIGATION

LATITUDES 75°–90°, Inclusive

NATIONAL IMAGERY AND MAPPING AGENCY

INTERPOLATION TABLE

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals	Units											
	10′	20′	30′	40′	50′	⇩	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0 48.2	0.0
0.1	0.0	0.0	0.0	0.0	0.1	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.2	0.0	0.0	0.1	0.1	0.1	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.3	0.0	0.1	0.1	0.2	0.2	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.4	0.1	0.1	0.2	0.3	0.3	.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.5	0.1	0.2	0.3	0.3	0.4	.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	16.2 48.6	0.1
0.6	0.1	0.2	0.3	0.4	0.5	.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.7	0.1	0.3	0.4	0.5	0.6	.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.8	0.2	0.3	0.4	0.6	0.7	.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
0.9	0.2	0.3	0.5	0.6	0.8	.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1		
1.0	0.1	0.3	0.5	0.6	0.8	.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	8.2 24.6 41.0	0.1 0.2
1.1	0.2	0.3	0.5	0.7	0.9	.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.2	0.2	0.4	0.6	0.8	1.0	.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.3	0.2	0.4	0.6	0.9	1.1	.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.4	0.2	0.5	0.7	0.9	1.2	.4	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.5	0.3	0.5	0.8	1.0	1.3	.5	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.6	0.3	0.5	0.8	1.1	1.3	.6	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.7	0.3	0.6	0.9	1.2	1.4	.7	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.8	0.3	0.6	0.9	1.2	1.5	.8	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
1.9	0.4	0.7	1.0	1.3	1.6	.9	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2		
2.0	0.3	0.6	1.0	1.3	1.6	.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	5.0 15.0 25.0 35.1	0.1 0.2 0.3
2.1	0.3	0.7	1.0	1.4	1.7	.1	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4		
2.2	0.3	0.7	1.1	1.4	1.8	.2	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4		
2.3	0.4	0.8	1.1	1.5	1.9	.3	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4		
2.4	0.4	0.8	1.2	1.6	2.0	.4	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4		
2.5	0.4	0.8	1.3	1.7	2.1	.5	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4		
2.6	0.4	0.9	1.3	1.7	2.2	.6	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4		
2.7	0.5	0.9	1.4	1.8	2.3	.7	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4		
2.8	0.5	1.0	1.4	1.9	2.4	.8	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4		
2.9	0.5	1.0	1.5	2.0	2.5	.9	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4		
3.0	0.5	1.0	1.5	2.0	2.5	.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	3.6 10.9 18.2 25.5 32.8 40.1	0.1 0.2 0.3 0.4 0.5
3.1	0.5	1.0	1.5	2.0	2.6	.1	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5		
3.2	0.5	1.0	1.6	2.1	2.6	.2	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5		
3.3	0.5	1.1	1.6	2.2	2.7	.3	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.5		
3.4	0.6	1.1	1.7	2.3	2.8	.4	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.5		
3.5	0.6	1.2	1.8	2.3	2.9	.5	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6		
3.6	0.6	1.2	1.8	2.4	3.0	.6	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6		
3.7	0.6	1.3	1.9	2.5	3.1	.7	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6		
3.8	0.7	1.3	1.9	2.6	3.2	.8	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6		
3.9	0.7	1.3	2.0	2.6	3.3	.9	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6		
4.0	0.6	1.3	2.0	2.6	3.3	.0	0.0	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	2.9 8.6 14.4 20.2 25.9 31.7 37.5	0.1 0.2 0.3 0.4 0.5 0.6
4.1	0.7	1.3	2.0	2.7	3.4	.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7		
4.2	0.7	1.4	2.1	2.8	3.5	.2	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7		
4.3	0.7	1.4	2.1	2.9	3.6	.3	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7		
4.4	0.7	1.5	2.2	2.9	3.7	.4	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7		
4.5	0.8	1.5	2.3	3.0	3.8	.5	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7		
4.6	0.8	1.5	2.3	3.1	3.8	.6	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7		
4.7	0.8	1.6	2.4	3.2	3.9	.7	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7		
4.8	0.8	1.6	2.4	3.2	4.0	.8	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7		
4.9	0.9	1.7	2.5	3.3	4.1	.9	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7		
5.0	0.8	1.6	2.5	3.3	4.1	.0	0.0	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	2.4 7.2 12.0 16.8 21.6 26.4 31.2 36.0	0.1 0.2 0.3 0.4 0.5 0.6 0.7
5.1	0.8	1.7	2.5	3.4	4.2	.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8		
5.2	0.8	1.7	2.6	3.4	4.3	.2	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8		
5.3	0.9	1.8	2.6	3.5	4.4	.3	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.4	0.9	1.8	2.7	3.6	4.5	.4	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.5	0.9	1.8	2.8	3.7	4.6	.5	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.6	0.9	1.9	2.8	3.7	4.7	.6	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.7	1.0	1.9	2.9	3.8	4.8	.7	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.8	1.0	2.0	2.9	3.9	4.9	.8	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
5.9	1.0	2.0	3.0	4.0	5.0	.9	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9		
6.0	1.0	2.0	3.0	4.0	5.0	.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	2.1 6.2 10.4 14.5 18.6 22.8 26.9 31.1 35.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
6.1	1.0	2.0	3.0	4.0	5.1	.1	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0		
6.2	1.0	2.0	3.1	4.1	5.1	.2	0.0	0.1	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1.0		
6.3	1.0	2.1	3.1	4.2	5.2	.3	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
6.4	1.1	2.1	3.2	4.3	5.3	.4	0.0	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
6.5	1.1	2.2	3.3	4.3	5.4	.5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
6.6	1.1	2.2	3.3	4.4	5.5	.6	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
6.7	1.1	2.3	3.4	4.5	5.6	.7	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.1		
6.8	1.2	2.3	3.4	4.6	5.7	.8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.1		
6.9	1.2	2.3	3.5	4.6	5.8	.9	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1		
7.0	1.1	2.3	3.5	4.6	5.8	.0	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.8 5.5 9.1 12.8 16.5 20.1 23.8 27.4 31.1 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9
7.1	1.2	2.3	3.5	4.7	5.9	.1	0.0	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.1		
7.2	1.2	2.4	3.6	4.8	6.0	.2	0.0	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.1		
7.3	1.2	2.4	3.6	4.9	6.1	.3	0.0	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.2		
7.4	1.2	2.5	3.7	4.9	6.2	.4	0.0	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.2		
7.5	1.3	2.5	3.8	5.0	6.3	.5	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2		
7.6	1.3	2.5	3.8	5.1	6.3	.6	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2		
7.7	1.3	2.6	3.9	5.2	6.4	.7	0.1	0.2	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.2		
7.8	1.3	2.6	3.9	5.2	6.5	.8	0.1	0.2	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.2		
7.9	1.4	2.7	4.0	5.3	6.6	.9	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2		
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals	Units											
	10′	20′	30′	40′	50′	⇩	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
8.0	1.3	2.6	4.0	5.3	6.6	.0	0.0	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.6 4.8 8.0 11.2 14.5 17.7 20.9 24.1 27.3 30.5 33.7 36.9	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1
8.1	1.3	2.7	4.0	5.4	6.7	.1	0.0	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.1	1.3		
8.2	1.3	2.7	4.1	5.4	6.8	.2	0.0	0.2	0.3	0.5	0.6	0.7	0.9	1.0	1.2	1.3		
8.3	1.4	2.8	4.1	5.5	6.9	.3	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.0	1.2	1.3		
8.4	1.4	2.8	4.2	5.6	7.0	.4	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.0	1.2	1.3		
8.5	1.4	2.8	4.3	5.7	7.1	.5	0.1	0.2	0.4	0.5	0.6	0.8	0.9	1.1	1.2	1.3		
8.6	1.4	2.9	4.3	5.7	7.2	.6	0.1	0.2	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.4		
8.7	1.5	2.9	4.4	5.8	7.3	.7	0.1	0.2	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.4		
8.8	1.5	3.0	4.4	5.9	7.4	.8	0.1	0.3	0.4	0.5	0.7	0.8	1.0	1.1	1.2	1.4		
8.9	1.5	3.0	4.5	6.0	7.5	.9	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4		
9.0	1.5	3.0	4.5	6.0	7.5	.0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4		
9.1	1.5	3.0	4.5	6.0	7.6	.1	0.0	0.2	0.3	0.5	0.6	0.8	1.0	1.1	1.3	1.4		
9.2	1.5	3.0	4.6	6.1	7.6	.2	0.0	0.2	0.3	0.5	0.7	0.8	1.0	1.1	1.3	1.5		
9.3	1.5	3.1	4.6	6.2	7.7	.3	0.0	0.2	0.4	0.5	0.7	0.8	1.0	1.2	1.3	1.5		
9.4	1.6	3.1	4.7	6.3	7.8	.4	0.1	0.2	0.4	0.5	0.7	0.9	1.0	1.2	1.3	1.5		
9.5	1.6	3.2	4.8	6.3	7.9	.5	0.1	0.2	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.4 4.2 7.1 9.9 12.7 15.5 18.4 21.2 24.0 26.8 29.7 32.5 35.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2
9.6	1.6	3.2	4.8	6.4	8.0	.6	0.1	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.5		
9.7	1.6	3.3	4.9	6.5	8.1	.7	0.1	0.3	0.4	0.6	0.7	0.9	1.1	1.2	1.4	1.5		
9.8	1.7	3.3	4.9	6.6	8.2	.8	0.1	0.3	0.4	0.6	0.8	0.9	1.1	1.2	1.4	1.6		
9.9	1.7	3.3	5.0	6.6	8.3	.9	0.1	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6		
10.0	1.6	3.3	5.0	6.6	8.3	.0	0.0	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6		
10.1	1.7	3.3	5.0	6.7	8.4	.1	0.0	0.2	0.4	0.5	0.7	0.9	1.1	1.2	1.4	1.6		
10.2	1.7	3.4	5.1	6.8	8.5	.2	0.0	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.4	1.6		
10.3	1.7	3.4	5.1	6.9	8.6	.3	0.1	0.2	0.4	0.6	0.8	0.9	1.1	1.3	1.5	1.6		
10.4	1.7	3.5	5.2	6.9	8.7	.4	0.1	0.2	0.4	0.6	0.8	0.9	1.1	1.3	1.5	1.6		
10.5	1.8	3.5	5.3	7.0	8.8	.5	0.1	0.3	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7		
10.6	1.8	3.5	5.3	7.1	8.8	.6	0.1	0.3	0.5	0.6	0.8	1.0	1.2	1.3	1.5	1.7		
10.7	1.8	3.6	5.4	7.2	8.9	.7	0.1	0.3	0.5	0.6	0.8	1.0	1.2	1.3	1.5	1.7		
10.8	1.8	3.6	5.4	7.2	9.0	.8	0.1	0.3	0.5	0.7	0.8	1.0	1.2	1.4	1.5	1.7		
10.9	1.9	3.7	5.5	7.3	9.1	.9	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7		
11.0	1.8	3.6	5.5	7.3	9.1	.0	0.0	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.3 3.8 6.3 8.9 11.4 14.0 16.5 19.0 21.6 24.1 26.7 29.2 31.7 34.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3
11.1	1.8	3.7	5.5	7.4	9.2	.1	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.7		
11.2	1.8	3.7	5.6	7.4	9.3	.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8		
11.3	1.9	3.8	5.6	7.5	9.4	.3	0.1	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8		
11.4	1.9	3.8	5.7	7.6	9.5	.4	0.1	0.3	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8		
11.5	1.9	3.8	5.8	7.7	9.6	.5	0.1	0.3	0.5	0.7	0.9	1.1	1.2	1.4	1.6	1.8		
11.6	1.9	3.9	5.8	7.7	9.7	.6	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.6	1.8		
11.7	2.0	3.9	5.9	7.8	9.8	.7	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9		
11.8	2.0	4.0	5.9	7.9	9.9	.8	0.2	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9		
11.9	2.0	4.0	6.0	8.0	10.0	.9	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.7	1.9		
12.0	2.0	4.0	6.0	8.0	10.0	.0	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.9		
12.1	2.0	4.0	6.0	8.0	10.1	.1	0.0	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.7	1.9		
12.2	2.0	4.0	6.1	8.1	10.1	.2	0.0	0.2	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9		
12.3	2.0	4.1	6.1	8.2	10.2	.3	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9		
12.4	2.1	4.1	6.2	8.3	10.3	.4	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	2.0		
12.5	2.1	4.2	6.3	8.3	10.4	.5	0.1	0.3	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0	1.2 3.5 5.8 8.1 10.5 12.8 15.1 17.4 19.8 22.1 24.4 26.7 29.1 31.4 33.7 36.0	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
12.6	2.1	4.2	6.3	8.4	10.5	.6	0.1	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.0		
12.7	2.1	4.3	6.4	8.5	10.6	.7	0.1	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
12.8	2.2	4.3	6.4	8.6	10.7	.8	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
12.9	2.2	4.3	6.5	8.6	10.8	.9	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.9	2.1		
13.0	2.1	4.3	6.5	8.6	10.8	.0	0.0	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0		
13.1	2.2	4.3	6.5	8.7	10.9	.1	0.0	0.2	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0		
13.2	2.2	4.4	6.6	8.8	11.0	.2	0.0	0.3	0.5	0.7	0.9	1.2	1.4	1.6	1.8	2.1		
13.3	2.2	4.4	6.6	8.9	11.1	.3	0.1	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.9	2.1		
13.4	2.2	4.5	6.7	8.9	11.2	.4	0.1	0.3	0.5	0.8	1.0	1.2	1.4	1.7	1.9	2.1		
13.5	2.3	4.5	6.8	9.0	11.3	.5	0.1	0.3	0.6	0.8	1.0	1.2	1.5	1.7	1.9	2.1		
13.6	2.3	4.5	6.8	9.1	11.3	.6	0.1	0.4	0.6	0.8	1.0	1.3	1.5	1.7	1.9	2.2		
13.7	2.3	4.6	6.9	9.2	11.4	.7	0.2	0.4	0.6	0.8	1.1	1.3	1.5	1.7	2.0	2.2		
13.8	2.3	4.6	6.9	9.2	11.5	.8	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.8	2.0	2.2		
13.9	2.4	4.7	7.0	9.3	11.6	.9	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2		
14.0	2.3	4.6	7.0	9.3	11.6	.0	0.0	0.2	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.2	1.1 3.2 5.3 7.5 9.6 11.7 13.9 16.0 18.1 20.3 22.4 24.5 26.7 28.8 30.9 33.1 35.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6
14.1	2.3	4.7	7.0	9.4	11.7	.1	0.0	0.3	0.5	0.7	1.0	1.2	1.5	1.7	2.0	2.2		
14.2	2.3	4.7	7.1	9.4	11.8	.2	0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.7	2.0	2.2		
14.3	2.4	4.8	7.1	9.5	11.9	.3	0.1	0.3	0.6	0.8	1.0	1.3	1.5	1.8	2.0	2.3		
14.4	2.4	4.8	7.2	9.6	12.0	.4	0.1	0.3	0.6	0.8	1.1	1.3	1.5	1.8	2.0	2.3		
14.5	2.4	4.8	7.3	9.7	12.1	.5	0.1	0.4	0.6	0.8	1.1	1.3	1.6	1.8	2.1	2.3		
14.6	2.4	4.9	7.3	9.7	12.2	.6	0.1	0.4	0.6	0.9	1.1	1.4	1.6	1.8	2.1	2.3		
14.7	2.5	4.9	7.4	9.8	12.3	.7	0.2	0.4	0.7	0.9	1.1	1.4	1.6	1.9	2.1	2.3		
14.8	2.5	5.0	7.4	9.9	12.4	.8	0.2	0.4	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4		
14.9	2.5	5.0	7.5	10.0	12.5	.9	0.2	0.5	0.7	0.9	1.2	1.4	1.7	1.9	2.2	2.4		
15.0	2.5	5.0	7.5	10.0	12.5	.0	0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.1	2.3		
15.1	2.5	5.0	7.5	10.0	12.6	.1	0.0	0.3	0.5	0.8	1.1	1.3	1.6	1.8	2.1	2.4		
15.2	2.5	5.0	7.6	10.1	12.6	.2	0.1	0.3	0.6	0.8	1.1	1.3	1.6	1.9	2.1	2.4		
15.3	2.5	5.1	7.6	10.2	12.7	.3	0.1	0.3	0.6	0.9	1.1	1.4	1.6	1.9	2.1	2.4		
15.4	2.6	5.1	7.7	10.3	12.8	.4	0.1	0.4	0.6	0.9	1.1	1.4	1.7	1.9	2.2	2.4		
15.5	2.6	5.2	7.8	10.3	12.9	.5	0.1	0.4	0.6	0.9	1.2	1.4	1.7	1.9	2.2	2.5		
15.6	2.6	5.2	7.8	10.4	13.0	.6	0.2	0.4	0.7	0.9	1.2	1.4	1.7	2.0	2.2	2.5		
15.7	2.6	5.3	7.9	10.5	13.1	.7	0.2	0.4	0.7	1.0	1.2	1.5	1.7	2.0	2.2	2.5		
15.8	2.7	5.3	7.9	10.6	13.2	.8	0.2	0.5	0.7	1.0	1.2	1.5	1.8	2.0	2.3	2.5		
15.9	2.7	5.3	8.0	10.6	13.3	.9	0.2	0.5	0.7	1.0	1.3	1.5	1.8	2.0	2.3	2.6		
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals ⇓	Units											
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
16.0	2.6	5.3	8.0	10.6	13.3	**.0**	0.0	0.3	0.5	0.8	1.1	1.4	1.6	1.9	2.2	2.5	1.0 3.0 4.9 6.9 8.9 10.8 12.8 14.8 16.7 18.7 20.7 22.7 24.6 26.6 28.6 30.5 32.5 34.5	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7
16.1	2.7	5.3	8.0	10.7	13.4	**.1**	0.0	0.3	0.6	0.9	1.1	1.4	1.7	2.0	2.2	2.5		
16.2	2.7	5.4	8.1	10.8	13.5	**.2**	0.1	0.3	0.6	0.9	1.2	1.4	1.7	2.0	2.3	2.5		
16.3	2.7	5.4	8.1	10.9	13.6	**.3**	0.1	0.4	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6		
16.4	2.7	5.5	8.2	10.9	13.7	**.4**	0.1	0.4	0.7	0.9	1.2	1.5	1.8	2.0	2.3	2.6		
16.5	2.8	5.5	8.3	11.0	13.8	**.5**	0.1	0.4	0.7	1.0	1.2	1.5	1.8	2.1	2.3	2.6		
16.6	2.8	5.5	8.3	11.1	13.8	**.6**	0.2	0.4	0.7	1.0	1.3	1.5	1.8	2.1	2.4	2.6		
16.7	2.8	5.6	8.4	11.2	13.9	**.7**	0.2	0.5	0.7	1.0	1.3	1.6	1.8	2.1	2.4	2.7		
16.8	2.8	5.6	8.4	11.2	14.0	**.8**	0.2	0.5	0.8	1.0	1.3	1.6	1.9	2.1	2.4	2.7		
16.9	2.9	5.7	8.5	11.3	14.1	**.9**	0.2	0.5	0.8	1.1	1.3	1.6	1.9	2.2	2.4	2.7		
17.0	2.8	5.6	8.5	11.3	14.1	**.0**	0.0	0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6		
17.1	2.8	5.7	8.5	11.4	14.2	**.1**	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7		
17.2	2.8	5.7	8.6	11.4	14.3	**.2**	0.1	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7		
17.3	2.9	5.8	8.6	11.5	14.4	**.3**	0.1	0.4	0.7	1.0	1.3	1.5	1.8	2.1	2.4	2.7		
17.4	2.9	5.8	8.7	11.6	14.5	**.4**	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.4	2.7		
17.5	2.9	5.8	8.8	11.7	14.6	**.5**	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.5	2.8		
17.6	2.9	5.9	8.8	11.7	14.7	**.6**	0.2	0.5	0.8	1.0	1.3	1.6	1.9	2.2	2.5	2.8		
17.7	3.0	5.9	8.9	11.8	14.8	**.7**	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8		
17.8	3.0	6.0	8.9	11.9	14.9	**.8**	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9		
17.9	3.0	6.0	9.0	12.0	15.0	**.9**	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9		
18.0	3.0	6.0	9.0	12.0	15.0	**.0**	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.2	2.5	2.8	0.9 2.8 4.6 6.5 8.3 10.2 12.0 13.9 15.7 17.6 19.4 21.3 23.1 25.0 26.8 28.7 30.5 32.3 34.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8
18.1	3.0	6.0	9.0	12.0	15.1	**.1**	0.0	0.3	0.6	1.0	1.3	1.6	1.9	2.2	2.5	2.8		
18.2	3.0	6.0	9.1	12.1	15.1	**.2**	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.5	2.8		
18.3	3.0	6.1	9.1	12.2	15.2	**.3**	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.3	2.6	2.9		
18.4	3.1	6.1	9.2	12.3	15.3	**.4**	0.1	0.4	0.7	1.0	1.4	1.7	2.0	2.3	2.6	2.9		
18.5	3.1	6.2	9.3	12.3	15.4	**.5**	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9		
18.6	3.1	6.2	9.3	12.4	15.5	**.6**	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.7	3.0		
18.7	3.1	6.3	9.4	12.5	15.6	**.7**	0.2	0.5	0.8	1.1	1.4	1.8	2.1	2.4	2.7	3.0		
18.8	3.2	6.3	9.4	12.6	15.7	**.8**	0.2	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0		
18.9	3.2	6.3	9.5	12.6	15.8	**.9**	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.1		
19.0	3.1	6.3	9.5	12.6	15.8	**.0**	0.0	0.3	0.6	1.0	1.3	1.6	1.9	2.3	2.6	2.9		
19.1	3.2	6.3	9.5	12.7	15.9	**.1**	0.0	0.4	0.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0		
19.2	3.2	6.4	9.6	12.8	16.0	**.2**	0.1	0.4	0.7	1.0	1.4	1.7	2.0	2.3	2.7	3.0		
19.3	3.2	6.4	9.6	12.9	16.1	**.3**	0.1	0.4	0.7	1.1	1.4	1.7	2.0	2.4	2.7	3.0		
19.4	3.2	6.5	9.7	12.9	16.2	**.4**	0.1	0.5	0.8	1.1	1.4	1.8	2.1	2.4	2.7	3.1		
19.5	3.3	6.5	9.8	13.0	16.3	**.5**	0.2	0.5	0.8	1.1	1.5	1.8	2.1	2.4	2.8	3.1		
19.6	3.3	6.5	9.8	13.1	16.3	**.6**	0.2	0.5	0.8	1.2	1.5	1.8	2.1	2.5	2.8	3.1		
19.7	3.3	6.6	9.9	13.2	16.4	**.7**	0.2	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.2		
19.8	3.3	6.6	9.9	13.2	16.5	**.8**	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.9	3.2		
19.9	3.4	6.7	10.0	13.3	16.6	**.9**	0.3	0.6	0.9	1.3	1.6	1.9	2.2	2.6	2.9	3.2		
20.0	3.3	6.6	10.0	13.3	16.6	**.0**	0.0	0.3	0.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	0.9 2.6 4.4 6.2 7.9 9.7 11.4 13.2 14.9 16.7 18.5 20.2 22.0 23.7 25.5 27.3 29.0 30.8 32.5 34.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9
20.1	3.3	6.7	10.0	13.4	16.7	**.1**	0.0	0.4	0.7	1.1	1.4	1.7	2.1	2.4	2.8	3.1		
20.2	3.3	6.7	10.1	13.4	16.8	**.2**	0.1	0.4	0.8	1.1	1.4	1.8	2.1	2.5	2.8	3.1		
20.3	3.4	6.8	10.1	13.5	16.9	**.3**	0.1	0.4	0.8	1.1	1.5	1.8	2.2	2.5	2.8	3.2		
20.4	3.4	6.8	10.2	13.6	17.0	**.4**	0.1	0.5	0.8	1.2	1.5	1.8	2.2	2.5	2.9	3.2		
20.5	3.4	6.8	10.3	13.7	17.1	**.5**	0.2	0.5	0.9	1.2	1.5	1.9	2.2	2.6	2.9	3.2		
20.6	3.4	6.9	10.3	13.7	17.2	**.6**	0.2	0.5	0.9	1.2	1.6	1.9	2.3	2.6	2.9	3.3		
20.7	3.5	6.9	10.4	13.8	17.3	**.7**	0.2	0.6	0.9	1.3	1.6	1.9	2.3	2.6	3.0	3.3		
20.8	3.5	7.0	10.4	13.9	17.4	**.8**	0.3	0.6	1.0	1.3	1.6	2.0	2.3	2.7	3.0	3.3		
20.9	3.5	7.0	10.5	14.0	17.5	**.9**	0.3	0.6	1.0	1.3	1.7	2.0	2.4	2.7	3.0	3.4		
21.0	3.5	7.0	10.5	14.0	17.5	**.0**	0.0	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.9	3.2		
21.1	3.5	7.0	10.5	14.0	17.6	**.1**	0.0	0.4	0.8	1.1	1.5	1.8	2.2	2.5	2.9	3.3		
21.2	3.5	7.0	10.6	14.1	17.6	**.2**	0.1	0.4	0.8	1.1	1.5	1.9	2.2	2.6	2.9	3.3		
21.3	3.5	7.1	10.6	14.2	17.7	**.3**	0.1	0.5	0.8	1.2	1.5	1.9	2.3	2.6	3.0	3.3		
21.4	3.6	7.1	10.7	14.3	17.8	**.4**	0.1	0.5	0.9	1.2	1.6	1.9	2.3	2.7	3.0	3.4		
21.5	3.6	7.2	10.8	14.3	17.9	**.5**	0.2	0.5	0.9	1.3	1.6	2.0	2.3	2.7	3.0	3.4		
21.6	3.6	7.2	10.8	14.4	18.0	**.6**	0.2	0.6	0.9	1.3	1.6	2.0	2.4	2.7	3.1	3.4		
21.7	3.6	7.3	10.9	14.5	18.1	**.7**	0.3	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5		
21.8	3.7	7.3	10.9	14.6	18.2	**.8**	0.3	0.6	1.0	1.4	1.7	2.1	2.4	2.8	3.2	3.5		
21.9	3.7	7.3	11.0	14.6	18.3	**.9**	0.3	0.7	1.0	1.4	1.8	2.1	2.5	2.8	3.2	3.5		
22.0	3.6	7.3	11.0	14.6	18.3	**.0**	0.0	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	0.8 2.5 4.2 5.9 7.6 9.3 11.0 12.7 14.4 16.1 17.8 19.5 21.2 22.8 24.5 26.2 27.9 29.6 31.3 33.0 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
22.1	3.7	7.3	11.0	14.7	18.4	**.1**	0.0	0.4	0.8	1.2	1.5	1.9	2.3	2.7	3.0	3.4		
22.2	3.7	7.4	11.1	14.8	18.5	**.2**	0.1	0.4	0.8	1.2	1.6	1.9	2.3	2.7	3.1	3.4		
22.3	3.7	7.4	11.1	14.9	18.6	**.3**	0.1	0.5	0.9	1.2	1.6	2.0	2.4	2.7	3.1	3.5		
22.4	3.7	7.5	11.2	14.9	18.7	**.4**	0.1	0.5	0.9	1.3	1.6	2.0	2.4	2.8	3.1	3.5		
22.5	3.8	7.5	11.3	15.0	18.8	**.5**	0.2	0.6	0.9	1.3	1.7	2.1	2.4	2.8	3.2	3.6		
22.6	3.8	7.5	11.3	15.1	18.8	**.6**	0.2	0.6	1.0	1.3	1.7	2.1	2.5	2.8	3.2	3.6		
22.7	3.8	7.6	11.4	15.2	18.9	**.7**	0.3	0.6	1.0	1.4	1.8	2.1	2.5	2.9	3.3	3.6		
22.8	3.8	7.6	11.4	15.2	19.0	**.8**	0.3	0.7	1.0	1.4	1.8	2.2	2.5	2.9	3.3	3.7		
22.9	3.9	7.7	11.5	15.3	19.1	**.9**	0.3	0.7	1.1	1.5	1.8	2.2	2.6	3.0	3.3	3.7		
23.0	3.8	7.6	11.5	15.3	19.1	**.0**	0.0	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5		
23.1	3.8	7.7	11.5	15.4	19.2	**.1**	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6		
23.2	3.8	7.7	11.6	15.4	19.3	**.2**	0.1	0.5	0.9	1.3	1.6	2.0	2.4	2.8	3.2	3.6		
23.3	3.9	7.8	11.6	15.5	19.4	**.3**	0.1	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.6		
23.4	3.9	7.8	11.7	15.6	19.5	**.4**	0.2	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7		
23.5	3.9	7.8	11.8	15.7	19.6	**.5**	0.2	0.6	1.0	1.4	1.8	2.2	2.5	2.9	3.3	3.7		
23.6	3.9	7.9	11.8	15.7	19.7	**.6**	0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0	3.4	3.8		
23.7	4.0	7.9	11.9	15.8	19.8	**.7**	0.3	0.7	1.1	1.4	1.8	2.2	2.6	3.0	3.4	3.8		
23.8	4.0	8.0	11.9	15.9	19.9	**.8**	0.3	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.4	3.8		
23.9	4.0	8.0	12.0	16.0	20.0	**.9**	0.4	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals ⇓	Units											
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
24.0	4.0	8.0	12.0	16.0	20.0	**.0**	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.9	3.3	3.7	0.8 2.5 4.1 5.8 7.4 9.1 10.7 12.3 14.0 15.6 17.3 18.9 20.6 22.2 23.9 25.5 27.2 28.8 30.4 32.1 33.7 35.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
24.1	4.0	8.0	12.0	16.0	20.1	**.1**	0.0	0.4	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7		
24.2	4.0	8.0	12.1	16.1	20.1	**.2**	0.1	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.8		
24.3	4.0	8.1	12.1	16.2	20.2	**.3**	0.1	0.5	0.9	1.3	1.8	2.2	2.6	3.0	3.4	3.8		
24.4	4.1	8.1	12.2	16.3	20.3	**.4**	0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0	3.4	3.8		
24.5	4.1	8.2	12.3	16.3	20.4	**.5**	0.2	0.6	1.0	1.4	1.8	2.2	2.7	3.1	3.5	3.9		
24.6	4.1	8.2	12.3	16.4	20.5	**.6**	0.2	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9		
24.7	4.1	8.3	12.4	16.5	20.6	**.7**	0.3	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.6	4.0		
24.8	4.2	8.3	12.4	16.6	20.7	**.8**	0.3	0.7	1.1	1.6	2.0	2.4	2.8	3.2	3.6	4.0		
24.9	4.2	8.3	12.5	16.6	20.8	**.9**	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0		
25.0	4.1	8.3	12.5	16.6	20.8	**.0**	0.0	0.4	0.8	1.3	1.7	2.1	2.5	3.0	3.4	3.8		
25.1	4.2	8.3	12.5	16.7	20.9	**.1**	0.0	0.5	0.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9		
25.2	4.2	8.4	12.6	16.8	21.0	**.2**	0.1	0.5	0.9	1.4	1.8	2.2	2.6	3.1	3.5	3.9		
25.3	4.2	8.4	12.6	16.9	21.1	**.3**	0.1	0.6	1.0	1.4	1.8	2.3	2.7	3.1	3.5	4.0		
25.4	4.2	8.5	12.7	16.9	21.2	**.4**	0.2	0.6	1.0	1.4	1.9	2.3	2.7	3.1	3.6	4.0		
25.5	4.3	8.5	12.8	17.0	21.3	**.5**	0.2	0.6	1.1	1.5	1.9	2.3	2.8	3.2	3.6	4.0		
25.6	4.3	8.5	12.8	17.1	21.3	**.6**	0.3	0.7	1.1	1.5	2.0	2.4	2.8	3.2	3.7	4.1		
25.7	4.3	8.6	12.9	17.2	21.4	**.7**	0.3	0.7	1.1	1.6	2.0	2.4	2.8	3.3	3.7	4.1		
25.8	4.3	8.6	12.9	17.2	21.5	**.8**	0.3	0.8	1.2	1.6	2.0	2.5	2.9	3.3	3.7	4.2		
25.9	4.4	8.7	13.0	17.3	21.6	**.9**	0.4	0.8	1.2	1.7	2.1	2.5	2.9	3.4	3.8	4.2		
26.0	4.3	8.6	13.0	17.3	21.6	**.0**	0.0	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	0.8 2.4 4.0 5.7 7.3 8.9 10.5 12.1 13.7 15.4 17.0 18.6 20.2 21.8 23.4 25.1 26.7 28.3 29.9 31.5 33.1 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
26.1	4.3	8.7	13.0	17.4	21.7	**.1**	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.1	3.6	4.0		
26.2	4.3	8.7	13.1	17.4	21.8	**.2**	0.1	0.5	1.0	1.4	1.9	2.3	2.7	3.2	3.6	4.1		
26.3	4.4	8.8	13.1	17.5	21.9	**.3**	0.1	0.6	1.0	1.5	1.9	2.3	2.8	3.2	3.7	4.1		
26.4	4.4	8.8	13.2	17.6	22.0	**.4**	0.2	0.6	1.1	1.5	1.9	2.4	2.8	3.3	3.7	4.2		
26.5	4.4	8.8	13.3	17.7	22.1	**.5**	0.2	0.7	1.1	1.5	2.0	2.4	2.9	3.3	3.8	4.2		
26.6	4.4	8.9	13.3	17.7	22.2	**.6**	0.3	0.7	1.1	1.6	2.0	2.5	2.9	3.4	3.8	4.2		
26.7	4.5	8.9	13.4	17.8	22.3	**.7**	0.3	0.8	1.2	1.6	2.1	2.5	3.0	3.4	3.8	4.3		
26.8	4.5	9.0	13.4	17.9	22.4	**.8**	0.4	0.8	1.2	1.7	2.1	2.6	3.0	3.4	3.9	4.3		
26.9	4.5	9.0	13.5	18.0	22.5	**.9**	0.4	0.8	1.3	1.7	2.2	2.6	3.0	3.5	3.9	4.4		
27.0	4.5	9.0	13.5	18.0	22.5	**.0**	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1		
27.1	4.5	9.0	13.5	18.0	22.6	**.1**	0.0	0.5	1.0	1.4	1.9	2.3	2.8	3.3	3.7	4.2		
27.2	4.5	9.0	13.6	18.1	22.6	**.2**	0.1	0.5	1.0	1.5	1.9	2.4	2.8	3.3	3.8	4.2		
27.3	4.5	9.1	13.6	18.2	22.7	**.3**	0.1	0.6	1.1	1.5	2.0	2.4	2.9	3.3	3.8	4.3		
27.4	4.6	9.1	13.7	18.3	22.8	**.4**	0.2	0.6	1.1	1.6	2.0	2.5	2.9	3.4	3.8	4.3		
27.5	4.6	9.2	13.8	18.3	22.9	**.5**	0.2	0.7	1.1	1.6	2.1	2.5	3.0	3.4	3.9	4.4		
27.6	4.6	9.2	13.8	18.4	23.0	**.6**	0.3	0.7	1.2	1.6	2.1	2.6	3.0	3.5	3.9	4.4		
27.7	4.6	9.3	13.9	18.5	23.1	**.7**	0.3	0.8	1.2	1.7	2.2	2.6	3.1	3.5	4.0	4.4		
27.8	4.7	9.3	13.9	18.6	23.2	**.8**	0.4	0.8	1.3	1.7	2.2	2.7	3.1	3.6	4.0	4.5		
27.9	4.7	9.3	14.0	18.6	23.3	**.9**	0.4	0.9	1.3	1.8	2.2	2.7	3.2	3.6	4.1	4.5		
28.0	4.6	9.3	14.0	18.6	23.3	**.0**	0.0	0.5	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.3	0.8 2.4 4.0 5.6 7.2 8.8 10.4 12.0 13.6 15.2 16.8 18.4 20.0 21.6 23.2 24.8 26.4 28.0 29.6 31.2 32.8 34.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
28.1	4.7	9.3	14.0	18.7	23.4	**.1**	0.0	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.8	4.3		
28.2	4.7	9.4	14.1	18.8	23.5	**.2**	0.1	0.6	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4		
28.3	4.7	9.4	14.1	18.9	23.6	**.3**	0.1	0.6	1.1	1.6	2.0	2.5	3.0	3.5	3.9	4.4		
28.4	4.7	9.5	14.2	18.9	23.7	**.4**	0.2	0.7	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5		
28.5	4.8	9.5	14.3	19.0	23.8	**.5**	0.2	0.7	1.2	1.7	2.1	2.6	3.1	3.6	4.0	4.5		
28.6	4.8	9.5	14.3	19.1	23.8	**.6**	0.3	0.8	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6		
28.7	4.8	9.6	14.4	19.2	23.9	**.7**	0.3	0.8	1.3	1.8	2.2	2.7	3.2	3.7	4.1	4.6		
28.8	4.8	9.6	14.4	19.2	24.0	**.8**	0.4	0.9	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7		
28.9	4.9	9.7	14.5	19.3	24.1	**.9**	0.4	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7		
29.0	4.8	9.6	14.5	19.3	24.1	**.0**	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4		
29.1	4.8	9.7	14.5	19.4	24.2	**.1**	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5		
29.2	4.8	9.7	14.6	19.4	24.3	**.2**	0.1	0.6	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5		
29.3	4.9	9.8	14.6	19.5	24.4	**.3**	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6		
29.4	4.9	9.8	14.7	19.6	24.5	**.4**	0.2	0.7	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6		
29.5	4.9	9.8	14.8	19.7	24.6	**.5**	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7		
29.6	4.9	9.9	14.8	19.7	24.7	**.6**	0.3	0.8	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7		
29.7	5.0	9.9	14.9	19.8	24.8	**.7**	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8		
29.8	5.0	10.0	14.9	19.9	24.9	**.8**	0.4	0.9	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8		
29.9	5.0	10.0	15.0	20.0	25.0	**.9**	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9		
30.0	5.0	10.0	15.0	20.0	25.0	**.0**	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.6	4.1	4.6	0.8 2.4 4.0 5.6 7.2 8.8 10.4 12.0 13.6 15.2 16.8 18.4 20.0 21.6 23.2 24.8 26.4 28.0 29.6 31.2 32.8 34.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
30.1	5.0	10.0	15.0	20.0	25.1	**.1**	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6		
30.2	5.0	10.0	15.1	20.1	25.1	**.2**	0.1	0.6	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7		
30.3	5.0	10.1	15.1	20.2	25.2	**.3**	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7		
30.4	5.1	10.1	15.2	20.3	25.3	**.4**	0.2	0.7	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8		
30.5	5.1	10.2	15.3	20.3	25.4	**.5**	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8		
30.6	5.1	10.2	15.3	20.4	25.5	**.6**	0.3	0.8	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9		
30.7	5.1	10.3	15.4	20.5	25.6	**.7**	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9		
30.8	5.2	10.3	15.4	20.6	25.7	**.8**	0.4	0.9	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0		
30.9	5.2	10.3	15.5	20.6	25.8	**.9**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0		
31.0	5.1	10.3	15.5	20.6	25.8	**.0**	0.0	0.5	1.0	1.6	2.1	2.6	3.1	3.7	4.2	4.7		
31.1	5.2	10.3	15.5	20.7	25.9	**.1**	0.1	0.6	1.1	1.6	2.2	2.7	3.2	3.7	4.3	4.8		
31.2	5.2	10.4	15.6	20.8	26.0	**.2**	0.1	0.6	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8		
31.3	5.2	10.4	15.6	20.9	26.1	**.3**	0.2	0.7	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9		
31.4	5.2	10.5	15.7	20.9	26.2	**.4**	0.2	0.7	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9		
31.5	5.3	10.5	15.8	21.0	26.3	**.5**	0.3	0.8	1.3	1.8	2.4	2.9	3.4	3.9	4.5	5.0		
31.6	5.3	10.5	15.8	21.1	26.3	**.6**	0.3	0.8	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0		
31.7	5.3	10.6	15.9	21.2	26.4	**.7**	0.4	0.9	1.4	1.9	2.5	3.0	3.5	4.0	4.6	5.1		
31.8	5.3	10.6	15.9	21.2	26.5	**.8**	0.4	0.9	1.5	2.0	2.5	3.0	3.6	4.1	4.6	5.1		
31.9	5.4	10.7	16.0	21.3	26.6	**.9**	0.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.2		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals ⇓	Units											
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
28.0	4.6	9.3	14.0	18.6	23.3	**.0**	0.0	0.5	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.3	0.8 2.4 4.0 5.6 7.2 8.8 10.4 12.0 13.6 15.2 16.8 18.4 20.0 21.6 23.2 24.8 26.4 28.0 29.6 31.2 32.8 34.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
28.1	4.7	9.3	14.0	18.7	23.4	**.1**	0.0	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.8	4.3		
28.2	4.7	9.4	14.1	18.8	23.5	**.2**	0.1	0.6	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4		
28.3	4.7	9.4	14.1	18.9	23.6	**.3**	0.1	0.6	1.1	1.6	2.0	2.5	3.0	3.5	3.9	4.4		
28.4	4.7	9.5	14.2	18.9	23.7	**.4**	0.2	0.7	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5		
28.5	4.8	9.5	14.3	19.0	23.8	**.5**	0.2	0.7	1.2	1.7	2.1	2.6	3.1	3.6	4.0	4.5		
28.6	4.8	9.5	14.3	19.1	23.8	**.6**	0.3	0.8	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6		
28.7	4.8	9.6	14.4	19.2	23.9	**.7**	0.3	0.8	1.3	1.8	2.2	2.7	3.2	3.7	4.1	4.6		
28.8	4.8	9.6	14.4	19.2	24.0	**.8**	0.4	0.9	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7		
28.9	4.9	9.7	14.5	19.3	24.1	**.9**	0.4	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7		
29.0	4.8	9.6	14.5	19.3	24.1	**.0**	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4		
29.1	4.8	9.7	14.5	19.4	24.2	**.1**	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5		
29.2	4.8	9.7	14.6	19.4	24.3	**.2**	0.1	0.6	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5		
29.3	4.9	9.8	14.6	19.5	24.4	**.3**	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6		
29.4	4.9	9.8	14.7	19.6	24.5	**.4**	0.2	0.7	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6		
29.5	4.9	9.8	14.8	19.7	24.6	**.5**	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7		
29.6	4.9	9.9	14.8	19.7	24.7	**.6**	0.3	0.8	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7		
29.7	5.0	9.9	14.9	19.8	24.8	**.7**	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8		
29.8	5.0	10.0	14.9	19.9	24.9	**.8**	0.4	0.9	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8		
29.9	5.0	10.0	15.0	20.0	25.0	**.9**	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9		
30.0	5.0	10.0	15.0	20.0	25.0	**.0**	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.6	4.1	4.6	0.8 2.4 4.0 5.6 7.2 8.8 10.4 12.0 13.6 15.2 16.8 18.4 20.0 21.6 23.2 24.8 26.4 28.0 29.6 31.2 32.8 34.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
30.1	5.0	10.0	15.0	20.0	25.1	**.1**	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6		
30.2	5.0	10.0	15.1	20.1	25.1	**.2**	0.1	0.6	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7		
30.3	5.0	10.1	15.1	20.2	25.2	**.3**	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7		
30.4	5.1	10.1	15.2	20.3	25.3	**.4**	0.2	0.7	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8		
30.5	5.1	10.2	15.3	20.3	25.4	**.5**	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8		
30.6	5.1	10.2	15.3	20.4	25.5	**.6**	0.3	0.8	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9		
30.7	5.1	10.3	15.4	20.5	25.6	**.7**	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9		
30.8	5.2	10.3	15.4	20.6	25.7	**.8**	0.4	0.9	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0		
30.9	5.2	10.3	15.5	20.6	25.8	**.9**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0		
31.0	5.1	10.3	15.5	20.6	25.8	**.0**	0.0	0.5	1.0	1.6	2.1	2.6	3.1	3.7	4.2	4.7		
31.1	5.2	10.3	15.5	20.7	25.9	**.1**	0.1	0.6	1.1	1.6	2.2	2.7	3.2	3.7	4.3	4.8		
31.2	5.2	10.4	15.6	20.8	26.0	**.2**	0.1	0.6	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8		
31.3	5.2	10.4	15.6	20.9	26.1	**.3**	0.2	0.7	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9		
31.4	5.2	10.5	15.7	20.9	26.2	**.4**	0.2	0.7	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9		
31.5	5.3	10.5	15.8	21.0	26.3	**.5**	0.3	0.8	1.3	1.8	2.4	2.9	3.4	3.9	4.5	5.0		
31.6	5.3	10.5	15.8	21.1	26.3	**.6**	0.3	0.8	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0		
31.7	5.3	10.6	15.9	21.2	26.4	**.7**	0.4	0.9	1.4	1.9	2.5	3.0	3.5	4.0	4.6	5.1		
31.8	5.3	10.6	15.9	21.2	26.5	**.8**	0.4	0.9	1.5	2.0	2.5	3.0	3.6	4.1	4.6	5.1		
31.9	5.4	10.7	16.0	21.3	26.6	**.9**	0.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.2		
32.0	5.3	10.6	16.0	21.3	26.6	**.0**	0.0	0.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	0.8 2.4 4.0 5.7 7.3 8.9 10.5 12.1 13.7 15.4 17.0 18.6 20.2 21.8 23.4 25.1 26.7 28.3 29.9 31.5 33.1 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
32.1	5.3	10.7	16.0	21.4	26.7	**.1**	0.1	0.6	1.1	1.7	2.2	2.8	3.3	3.8	4.4	4.9		
32.2	5.3	10.7	16.1	21.4	26.8	**.2**	0.1	0.6	1.2	1.7	2.3	2.8	3.4	3.9	4.4	5.0		
32.3	5.4	10.8	16.1	21.5	26.9	**.3**	0.2	0.7	1.2	1.8	2.3	2.9	3.4	4.0	4.5	5.0		
32.4	5.4	10.8	16.2	21.6	27.0	**.4**	0.2	0.8	1.3	1.8	2.4	2.9	3.5	4.0	4.5	5.1		
32.5	5.4	10.8	16.3	21.7	27.1	**.5**	0.3	0.8	1.4	1.9	2.4	3.0	3.5	4.1	4.6	5.1		
32.6	5.4	10.9	16.3	21.7	27.2	**.6**	0.3	0.9	1.4	1.9	2.5	3.0	3.6	4.1	4.7	5.2		
32.7	5.5	10.9	16.4	21.8	27.3	**.7**	0.4	0.9	1.5	2.0	2.5	3.1	3.6	4.2	4.7	5.3		
32.8	5.5	11.0	16.4	21.9	27.4	**.8**	0.4	1.0	1.5	2.1	2.6	3.1	3.7	4.2	4.8	5.3		
32.9	5.5	11.0	16.5	22.0	27.5	**.9**	0.5	1.0	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.4		
33.0	5.5	11.0	16.5	22.0	27.5	**.0**	0.0	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.5	5.0		
33.1	5.5	11.0	16.5	22.0	27.6	**.1**	0.1	0.6	1.2	1.7	2.3	2.8	3.4	4.0	4.5	5.1		
33.2	5.5	11.0	16.6	22.1	27.6	**.2**	0.1	0.7	1.2	1.8	2.3	2.9	3.5	4.0	4.6	5.1		
33.3	5.5	11.1	16.6	22.2	27.7	**.3**	0.2	0.7	1.3	1.8	2.4	3.0	3.5	4.1	4.6	5.2		
33.4	5.6	11.1	16.7	22.3	27.8	**.4**	0.2	0.8	1.3	1.9	2.5	3.0	3.6	4.1	4.7	5.2		
33.5	5.6	11.2	16.8	22.3	27.9	**.5**	0.3	0.8	1.4	2.0	2.5	3.1	3.6	4.2	4.7	5.3		
33.6	5.6	11.2	16.8	22.4	28.0	**.6**	0.3	0.9	1.5	2.0	2.6	3.1	3.7	4.2	4.8	5.4		
33.7	5.6	11.3	16.9	22.5	28.1	**.7**	0.4	0.9	1.5	2.1	2.6	3.2	3.7	4.3	4.9	5.4		
33.8	5.7	11.3	16.9	22.6	28.2	**.8**	0.4	1.0	1.6	2.1	2.7	3.2	3.8	4.4	4.9	5.5		
33.9	5.7	11.3	17.0	22.6	28.3	**.9**	0.5	1.1	1.6	2.2	2.7	3.3	3.9	4.4	5.0	5.5		
34.0	5.6	11.3	17.0	22.6	28.3	**.0**	0.0	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2	0.8 2.5 4.1 5.8 7.4 9.1 10.7 12.3 14.0 15.6 17.3 18.9 20.6 22.2 23.9 25.5 27.2 28.8 30.4 32.1 33.7 35.4	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
34.1	5.7	11.3	17.0	22.7	28.4	**.1**	0.1	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.2		
34.2	5.7	11.4	17.1	22.8	28.5	**.2**	0.1	0.7	1.3	1.8	2.4	3.0	3.6	4.1	4.7	5.3		
34.3	5.7	11.4	17.1	22.9	28.6	**.3**	0.2	0.7	1.3	1.9	2.5	3.0	3.6	4.2	4.8	5.3		
34.4	5.7	11.5	17.2	22.9	28.7	**.4**	0.2	0.8	1.4	2.0	2.5	3.1	3.7	4.3	4.8	5.4		
34.5	5.8	11.5	17.3	23.0	28.8	**.5**	0.3	0.9	1.4	2.0	2.6	3.2	3.7	4.3	4.9	5.5		
34.6	5.8	11.5	17.3	23.1	28.8	**.6**	0.3	0.9	1.5	2.1	2.6	3.2	3.8	4.4	4.9	5.5		
34.7	5.8	11.6	17.4	23.2	28.9	**.7**	0.4	1.0	1.6	2.1	2.7	3.3	3.9	4.4	5.0	5.6		
34.8	5.8	11.6	17.4	23.2	29.0	**.8**	0.5	1.0	1.6	2.2	2.8	3.3	3.9	4.5	5.1	5.6		
34.9	5.9	11.7	17.5	23.3	29.1	**.9**	0.5	1.1	1.7	2.2	2.8	3.4	4.0	4.5	5.1	5.7		
35.0	5.8	11.6	17.5	23.3	29.1	**.0**	0.0	0.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3		
35.1	5.8	11.7	17.5	23.4	29.2	**.1**	0.1	0.7	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4		
35.2	5.8	11.7	17.6	23.4	29.3	**.2**	0.1	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.4		
35.3	5.9	11.8	17.6	23.5	29.4	**.3**	0.2	0.8	1.4	2.0	2.5	3.1	3.7	4.3	4.9	5.5		
35.4	5.9	11.8	17.7	23.6	29.5	**.4**	0.2	0.8	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.6		
35.5	5.9	11.8	17.8	23.7	29.6	**.5**	0.3	0.9	1.5	2.1	2.7	3.3	3.8	4.4	5.0	5.6		
35.6	5.9	11.9	17.8	23.7	29.7	**.6**	0.4	0.9	1.5	2.1	2.7	3.3	3.9	4.5	5.1	5.7		
35.7	6.0	11.9	17.9	23.8	29.8	**.7**	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.1	5.7		
35.8	6.0	12.0	17.9	23.9	29.9	**.8**	0.5	1.1	1.7	2.2	2.8	3.4	4.0	4.6	5.2	5.8		
35.9	6.0	12.0	18.0	24.0	30.0	**.9**	0.5	1.1	1.7	2.3	2.9	3.5	4.1	4.7	5.3	5.9		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals ⇓	Units											
	10′	20′	30′	40′	50′		0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
36.0	6.0	12.0	18.0	24.0	30.0	**.0**	0.0	0.6	1.2	1.8	2.4	3.0	3.6	4.3	4.9	5.5	0.8 2.5 4.2 5.9 7.6 9.3 11.0 12.7 14.4 16.1 17.8 19.5 21.2 22.8 24.5 26.2 27.9 29.6 31.3 33.0 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
36.1	6.0	12.0	18.0	24.0	30.1	**.1**	0.1	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5		
36.2	6.0	12.0	18.1	24.1	30.1	**.2**	0.1	0.7	1.3	1.9	2.6	3.2	3.8	4.4	5.0	5.6		
36.3	6.0	12.1	18.1	24.2	30.2	**.3**	0.2	0.8	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.7		
36.4	6.1	12.1	18.2	24.3	30.3	**.4**	0.2	0.9	1.5	2.1	2.7	3.3	3.9	4.5	5.1	5.7		
36.5	6.1	12.2	18.3	24.3	30.4	**.5**	0.3	0.9	1.5	2.1	2.7	3.3	4.0	4.6	5.2	5.8		
36.6	6.1	12.2	18.3	24.4	30.5	**.6**	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.2	5.8		
36.7	6.1	12.3	18.4	24.5	30.6	**.7**	0.4	1.0	1.6	2.3	2.9	3.5	4.1	4.7	5.3	5.9		
36.8	6.2	12.3	18.4	24.6	30.7	**.8**	0.5	1.1	1.7	2.3	2.9	3.5	4.1	4.7	5.4	6.0		
36.9	6.2	12.3	18.5	24.6	30.8	**.9**	0.5	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0		
37.0	6.1	12.3	18.5	24.6	30.8	**.0**	0.0	0.6	1.2	1.9	2.5	3.1	3.7	4.4	5.0	5.6		
37.1	6.2	12.3	18.5	24.7	30.9	**.1**	0.1	0.7	1.3	1.9	2.6	3.2	3.8	4.4	5.1	5.7		
37.2	6.2	12.4	18.6	24.8	31.0	**.2**	0.1	0.7	1.4	2.0	2.6	3.2	3.9	4.5	5.1	5.7		
37.3	6.2	12.4	18.6	24.9	31.1	**.3**	0.2	0.8	1.4	2.1	2.7	3.3	3.9	4.6	5.2	5.8		
37.4	6.2	12.5	18.7	24.9	31.2	**.4**	0.2	0.9	1.5	2.1	2.7	3.4	4.0	4.6	5.2	5.9		
37.5	6.3	12.5	18.8	25.0	31.3	**.5**	0.3	0.9	1.6	2.2	2.8	3.4	4.1	4.7	5.3	5.9		
37.6	6.3	12.5	18.8	25.1	31.3	**.6**	0.4	1.0	1.6	2.2	2.9	3.5	4.1	4.7	5.4	6.0		
37.7	6.3	12.6	18.9	25.2	31.4	**.7**	0.4	1.1	1.7	2.3	2.9	3.6	4.2	4.8	5.4	6.1		
37.8	6.3	12.6	18.9	25.2	31.5	**.8**	0.5	1.1	1.7	2.4	3.0	3.6	4.2	4.9	5.5	6.1		
37.9	6.4	12.7	19.0	25.3	31.6	**.9**	0.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.6	6.2		
38.0	6.3	12.6	19.0	25.3	31.6	**.0**	0.0	0.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	0.9 2.6 4.4 6.2 7.9 9.7 11.4 13.2 14.9 16.7 18.5 20.2 22.0 23.7 25.5 27.3 29.0 30.8 32.5 34.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9
38.1	6.3	12.7	19.0	25.4	31.7	**.1**	0.1	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.8		
38.2	6.3	12.7	19.1	25.4	31.8	**.2**	0.1	0.8	1.4	2.1	2.7	3.3	4.0	4.6	5.3	5.9		
38.3	6.4	12.8	19.1	25.5	31.9	**.3**	0.2	0.8	1.5	2.1	2.8	3.4	4.0	4.7	5.3	6.0		
38.4	6.4	12.8	19.2	25.6	32.0	**.4**	0.3	0.9	1.5	2.2	2.8	3.5	4.1	4.7	5.4	6.0		
38.5	6.4	12.8	19.3	25.7	32.1	**.5**	0.3	1.0	1.6	2.2	2.9	3.5	4.2	4.8	5.5	6.1		
38.6	6.4	12.9	19.3	25.7	32.2	**.6**	0.4	1.0	1.7	2.3	3.0	3.6	4.2	4.9	5.5	6.2		
38.7	6.5	12.9	19.4	25.8	32.3	**.7**	0.4	1.1	1.7	2.4	3.0	3.7	4.3	4.9	5.6	6.2		
38.8	6.5	13.0	19.4	25.9	32.4	**.8**	0.5	1.2	1.8	2.4	3.1	3.7	4.4	5.0	5.6	6.3		
38.9	6.5	13.0	19.5	26.0	32.5	**.9**	0.6	1.2	1.9	2.5	3.1	3.8	4.4	5.1	5.7	6.4		
39.0	6.5	13.0	19.5	26.0	32.5	**.0**	0.0	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.3	5.9		
39.1	6.5	13.0	19.5	26.0	32.6	**.1**	0.1	0.7	1.4	2.0	2.7	3.4	4.0	4.7	5.3	6.0		
39.2	6.5	13.0	19.6	26.1	32.6	**.2**	0.1	0.8	1.4	2.1	2.8	3.4	4.1	4.7	5.4	6.1		
39.3	6.5	13.1	19.6	26.2	32.7	**.3**	0.2	0.9	1.5	2.2	2.8	3.5	4.1	4.8	5.5	6.1		
39.4	6.6	13.1	19.7	26.3	32.8	**.4**	0.3	0.9	1.6	2.2	2.9	3.6	4.2	4.9	5.5	6.2		
39.5	6.6	13.2	19.8	26.3	32.9	**.5**	0.3	1.0	1.6	2.3	3.0	3.6	4.3	4.9	5.6	6.3		
39.6	6.6	13.2	19.8	26.4	33.0	**.6**	0.4	1.1	1.7	2.4	3.0	3.7	4.3	5.0	5.7	6.3		
39.7	6.6	13.3	19.9	26.5	33.1	**.7**	0.5	1.1	1.8	2.4	3.1	3.8	4.4	5.1	5.7	6.4		
39.8	6.7	13.3	19.9	26.6	33.2	**.8**	0.5	1.2	1.8	2.5	3.2	3.8	4.5	5.1	5.8	6.5		
39.9	6.7	13.3	20.0	26.6	33.3	**.9**	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.2	5.9	6.5		
40.0	6.6	13.3	20.0	26.6	33.3	**.0**	0.0	0.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.1	0.9 2.8 4.6 6.5 8.3 10.2 12.0 13.9 15.7 17.6 19.4 21.3 23.1 25.0 26.8 28.7 30.5 32.3 34.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8
40.1	6.7	13.3	20.0	26.7	33.4	**.1**	0.1	0.7	1.4	2.1	2.8	3.4	4.1	4.8	5.5	6.1		
40.2	6.7	13.4	20.1	26.8	33.5	**.2**	0.1	0.8	1.5	2.2	2.8	3.5	4.2	4.9	5.5	6.2		
40.3	6.7	13.4	20.1	26.9	33.6	**.3**	0.2	0.9	1.6	2.2	2.9	3.6	4.3	4.9	5.6	6.3		
40.4	6.7	13.5	20.2	26.9	33.7	**.4**	0.3	0.9	1.6	2.3	3.0	3.6	4.3	5.0	5.7	6.3		
40.5	6.8	13.5	20.3	27.0	33.8	**.5**	0.3	1.0	1.7	2.4	3.0	3.7	4.4	5.1	5.7	6.4		
40.6	6.8	13.5	20.3	27.1	33.8	**.6**	0.4	1.1	1.8	2.4	3.1	3.8	4.5	5.1	5.8	6.5		
40.7	6.8	13.6	20.4	27.2	33.9	**.7**	0.5	1.1	1.8	2.5	3.2	3.8	4.5	5.2	5.9	6.5		
40.8	6.8	13.6	20.4	27.2	34.0	**.8**	0.5	1.2	1.9	2.6	3.2	3.9	4.6	5.3	5.9	6.6		
40.9	6.9	13.7	20.5	27.3	34.1	**.9**	0.6	1.3	2.0	2.6	3.3	4.0	4.7	5.3	6.0	6.7		
41.0	6.8	13.6	20.5	27.3	34.1	**.0**	0.0	0.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2		
41.1	6.8	13.7	20.5	27.4	34.2	**.1**	0.1	0.8	1.5	2.1	2.8	3.5	4.2	4.9	5.6	6.3		
41.2	6.8	13.7	20.6	27.4	34.3	**.2**	0.1	0.8	1.5	2.2	2.9	3.6	4.3	5.0	5.7	6.4		
41.3	6.9	13.8	20.6	27.5	34.4	**.3**	0.2	0.9	1.6	2.3	3.0	3.7	4.4	5.0	5.7	6.4		
41.4	6.9	13.8	20.7	27.6	34.5	**.4**	0.3	1.0	1.7	2.4	3.0	3.7	4.4	5.1	5.8	6.5		
41.5	6.9	13.8	20.8	27.7	34.6	**.5**	0.3	1.0	1.7	2.4	3.1	3.8	4.5	5.2	5.9	6.6		
41.6	6.9	13.9	20.8	27.7	34.7	**.6**	0.4	1.1	1.8	2.5	3.2	3.9	4.6	5.3	5.9	6.6		
41.7	7.0	13.9	20.9	27.8	34.8	**.7**	0.5	1.2	1.9	2.6	3.3	3.9	4.6	5.3	6.0	6.7		
41.8	7.0	14.0	20.9	27.9	34.9	**.8**	0.6	1.2	1.9	2.6	3.3	4.0	4.7	5.4	6.1	6.8		
41.9	7.0	14.0	21.0	28.0	35.0	**.9**	0.6	1.3	2.0	2.7	3.4	4.1	4.8	5.5	6.2	6.8		
42.0	7.0	14.0	21.0	28.0	35.0	**.0**	0.0	0.7	1.4	2.1	2.8	3.5	4.2	5.0	5.7	6.4	1.0 3.0 4.9 6.9 8.9 10.8 12.8 14.8 16.7 18.7 20.7 22.7 24.6 26.6 28.6 30.5 32.5 34.5	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7
42.1	7.0	14.0	21.0	28.0	35.1	**.1**	0.1	0.8	1.5	2.2	2.9	3.6	4.3	5.0	5.7	6.4		
42.2	7.0	14.0	21.1	28.1	35.1	**.2**	0.1	0.8	1.6	2.3	3.0	3.7	4.4	5.1	5.8	6.5		
42.3	7.0	14.1	21.1	28.2	35.2	**.3**	0.2	0.9	1.6	2.3	3.0	3.8	4.5	5.2	5.9	6.6		
42.4	7.1	14.1	21.2	28.3	35.3	**.4**	0.3	1.0	1.7	2.4	3.1	3.8	4.5	5.2	5.9	6.7		
42.5	7.1	14.2	21.3	28.3	35.4	**.5**	0.4	1.1	1.8	2.5	3.2	3.9	4.6	5.3	6.0	6.7		
42.6	7.1	14.2	21.3	28.4	35.5	**.6**	0.4	1.1	1.8	2.5	3.3	4.0	4.7	5.4	6.1	6.8		
42.7	7.1	14.3	21.4	28.5	35.6	**.7**	0.5	1.2	1.9	2.6	3.3	4.0	4.7	5.5	6.2	6.9		
42.8	7.2	14.3	21.4	28.6	35.7	**.8**	0.6	1.3	2.0	2.7	3.4	4.1	4.8	5.5	6.2	6.9		
42.9	7.2	14.3	21.5	28.6	35.8	**.9**	0.6	1.3	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0		
43.0	7.1	14.3	21.5	28.6	35.8	**.0**	0.0	0.7	1.4	2.2	2.9	3.6	4.3	5.1	5.8	6.5		
43.1	7.2	14.3	21.5	28.7	35.9	**.1**	0.1	0.8	1.5	2.2	3.0	3.7	4.4	5.1	5.9	6.6		
43.2	7.2	14.4	21.6	28.8	36.0	**.2**	0.1	0.9	1.6	2.3	3.0	3.8	4.5	5.2	5.9	6.7		
43.3	7.2	14.4	21.6	28.9	36.1	**.3**	0.2	0.9	1.7	2.4	3.1	3.8	4.6	5.3	6.0	6.7		
43.4	7.2	14.5	21.7	28.9	36.2	**.4**	0.3	1.0	1.7	2.5	3.2	3.9	4.6	5.4	6.1	6.8		
43.5	7.3	14.5	21.8	29.0	36.3	**.5**	0.4	1.1	1.8	2.5	3.3	4.0	4.7	5.4	6.2	6.9		
43.6	7.3	14.5	21.8	29.1	36.3	**.6**	0.4	1.2	1.9	2.6	3.3	4.1	4.8	5.5	6.2	7.0		
43.7	7.3	14.6	21.9	29.2	36.4	**.7**	0.5	1.2	2.0	2.7	3.4	4.1	4.9	5.6	6.3	7.0		
43.8	7.3	14.6	21.9	29.2	36.5	**.8**	0.6	1.3	2.0	2.8	3.5	4.2	4.9	5.7	6.4	7.1		
43.9	7.4	14.7	22.0	29.3	36.6	**.9**	0.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.5	7.2		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals	Units											
	10′	20′	30′	40′	50′	⇓	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
44.0	7.3	14.6	22.0	29.3	36.6	**.0**	0.0	0.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	1.1 3.2 5.3 7.5 9.6 11.7 13.9 16.0 18.1 20.3 22.4 24.5 26.7 28.8 30.9 33.1 35.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6
44.1	7.3	14.7	22.0	29.4	36.7	**.1**	0.1	0.8	1.6	2.3	3.0	3.8	4.5	5.3	6.0	6.7		
44.2	7.3	14.7	22.1	29.4	36.8	**.2**	0.1	0.9	1.6	2.4	3.1	3.9	4.6	5.3	6.1	6.8		
44.3	7.4	14.8	22.1	29.5	36.9	**.3**	0.2	1.0	1.7	2.4	3.2	3.9	4.7	5.4	6.2	6.9		
44.4	7.4	14.8	22.2	29.6	37.0	**.4**	0.3	1.0	1.8	2.5	3.3	4.0	4.7	5.5	6.2	7.0		
44.5	7.4	14.8	22.3	29.7	37.1	**.5**	0.4	1.1	1.9	2.6	3.3	4.1	4.8	5.6	6.3	7.0		
44.6	7.4	14.9	22.3	29.7	37.2	**.6**	0.4	1.2	1.9	2.7	3.4	4.2	4.9	5.6	6.4	7.1		
44.7	7.5	14.9	22.4	29.8	37.3	**.7**	0.5	1.3	2.0	2.7	3.5	4.2	5.0	5.7	6.5	7.2		
44.8	7.5	15.0	22.4	29.9	37.4	**.8**	0.6	1.3	2.1	2.8	3.6	4.3	5.0	5.8	6.5	7.3		
44.9	7.5	15.0	22.5	30.0	37.5	**.9**	0.7	1.4	2.2	2.9	3.6	4.4	5.1	5.9	6.6	7.3		
45.0	7.5	15.0	22.5	30.0	37.5	**.0**	0.0	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.1	6.8		
45.1	7.5	15.0	22.5	30.0	37.6	**.1**	0.1	0.8	1.6	2.4	3.1	3.9	4.6	5.4	6.1	6.9		
45.2	7.5	15.0	22.6	30.1	37.6	**.2**	0.2	0.9	1.7	2.4	3.2	3.9	4.7	5.5	6.2	7.0		
45.3	7.5	15.1	22.6	30.2	37.7	**.3**	0.2	1.0	1.7	2.5	3.3	4.0	4.8	5.5	6.3	7.1		
45.4	7.6	15.1	22.7	30.3	37.8	**.4**	0.3	1.1	1.8	2.6	3.3	4.1	4.9	5.6	6.4	7.1		
45.5	7.6	15.2	22.8	30.3	37.9	**.5**	0.4	1.1	1.9	2.7	3.4	4.2	4.9	5.7	6.4	7.2		
45.6	7.6	15.2	22.8	30.4	38.0	**.6**	0.5	1.2	2.0	2.7	3.5	4.2	5.0	5.8	6.5	7.3		
45.7	7.6	15.3	22.9	30.5	38.1	**.7**	0.5	1.3	2.0	2.8	3.6	4.3	5.1	5.8	6.6	7.4		
45.8	7.7	15.3	22.9	30.6	38.2	**.8**	0.6	1.4	2.1	2.9	3.6	4.4	5.2	5.9	6.7	7.4		
45.9	7.7	15.3	23.0	30.6	38.3	**.9**	0.7	1.4	2.2	3.0	3.7	4.5	5.2	6.0	6.7	7.5		
46.0	7.6	15.3	23.0	30.6	38.3	**.0**	0.0	0.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	7.0	1.2 3.5 5.8 8.1 10.5 12.8 15.1 17.4 19.8 22.1 24.4 26.7 29.1 31.4 33.7 36.0	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
46.1	7.7	15.3	23.0	30.7	38.4	**.1**	0.1	0.9	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1		
46.2	7.7	15.4	23.1	30.8	38.5	**.2**	0.2	0.9	1.7	2.5	3.3	4.0	4.8	5.6	6.4	7.1		
46.3	7.7	15.4	23.1	30.9	38.6	**.3**	0.2	1.0	1.8	2.6	3.3	4.1	4.9	5.7	6.4	7.2		
46.4	7.7	15.5	23.2	30.9	38.7	**.4**	0.3	1.1	1.9	2.6	3.4	4.2	5.0	5.7	6.5	7.3		
46.5	7.8	15.5	23.3	31.0	38.8	**.5**	0.4	1.2	1.9	2.7	3.5	4.3	5.0	5.8	6.6	7.4		
46.6	7.8	15.5	23.3	31.1	38.8	**.6**	0.5	1.2	2.0	2.8	3.6	4.3	5.1	5.9	6.7	7.4		
46.7	7.8	15.6	23.4	31.2	38.9	**.7**	0.5	1.3	2.1	2.9	3.6	4.4	5.2	6.0	6.7	7.5		
46.8	7.8	15.6	23.4	31.2	39.0	**.8**	0.6	1.4	2.2	2.9	3.7	4.5	5.3	6.0	6.8	7.6		
46.9	7.9	15.7	23.5	31.3	39.1	**.9**	0.7	1.5	2.2	3.0	3.8	4.6	5.3	6.1	6.9	7.7		
47.0	7.8	15.6	23.5	31.3	39.1	**.0**	0.0	0.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1		
47.1	7.8	15.7	23.5	31.4	39.2	**.1**	0.1	0.9	1.7	2.5	3.2	4.0	4.8	5.6	6.4	7.2		
47.2	7.8	15.7	23.6	31.4	39.3	**.2**	0.2	0.9	1.7	2.5	3.3	4.1	4.9	5.7	6.5	7.3		
47.3	7.9	15.8	23.6	31.5	39.4	**.3**	0.2	1.0	1.8	2.6	3.4	4.2	5.0	5.8	6.6	7.4		
47.4	7.9	15.8	23.7	31.6	39.5	**.4**	0.3	1.1	1.9	2.7	3.5	4.3	5.1	5.9	6.6	7.4		
47.5	7.9	15.8	23.8	31.7	39.6	**.5**	0.4	1.2	2.0	2.8	3.6	4.4	5.1	5.9	6.7	7.5	1.3 3.8 6.3 8.9 11.4 14.0 16.5 19.0 21.6 24.1 26.7 29.2 31.7 34.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3
47.6	7.9	15.9	23.8	31.7	39.7	**.6**	0.5	1.3	2.1	2.8	3.6	4.4	5.2	6.0	6.8	7.6		
47.7	8.0	15.9	23.9	31.8	39.8	**.7**	0.6	1.3	2.1	2.9	3.7	4.5	5.3	6.1	6.9	7.7		
47.8	8.0	16.0	23.9	31.9	39.9	**.8**	0.6	1.4	2.2	3.0	3.8	4.6	5.4	6.2	7.0	7.8		
47.9	8.0	16.0	24.0	32.0	40.0	**.9**	0.7	1.5	2.3	3.1	3.9	4.7	5.5	6.3	7.0	7.8		
48.0	8.0	16.0	24.0	32.0	40.0	**.0**	0.0	0.8	1.6	2.4	3.2	4.0	4.8	5.7	6.5	7.3		
48.1	8.0	16.0	24.0	32.0	40.1	**.1**	0.1	0.9	1.7	2.5	3.3	4.1	4.9	5.7	6.5	7.4		
48.2	8.0	16.0	24.1	32.1	40.1	**.2**	0.2	1.0	1.8	2.6	3.4	4.2	5.0	5.8	6.6	7.4		
48.3	8.0	16.1	24.1	32.2	40.2	**.3**	0.2	1.1	1.9	2.7	3.5	4.3	5.1	5.9	6.7	7.5		
48.4	8.1	16.1	24.2	32.3	40.3	**.4**	0.3	1.1	1.9	2.7	3.6	4.4	5.2	6.0	6.8	7.6		
48.5	8.1	16.2	24.3	32.3	40.4	**.5**	0.4	1.2	2.0	2.8	3.6	4.4	5.3	6.1	6.9	7.7		
48.6	8.1	16.2	24.3	32.4	40.5	**.6**	0.5	1.3	2.1	2.9	3.7	4.5	5.3	6.1	7.0	7.8		
48.7	8.1	16.3	24.4	32.5	40.6	**.7**	0.6	1.4	2.2	3.0	3.8	4.6	5.4	6.2	7.0	7.8		
48.8	8.2	16.3	24.4	32.6	40.7	**.8**	0.6	1.5	2.3	3.1	3.9	4.7	5.5	6.3	7.1	7.9		
48.9	8.2	16.3	24.5	32.6	40.8	**.9**	0.7	1.5	2.3	3.2	4.0	4.8	5.6	6.4	7.2	8.0		
49.0	8.1	16.3	24.5	32.6	40.8	**.0**	0.0	0.8	1.6	2.5	3.3	4.1	4.9	5.8	6.6	7.4	1.4 4.2 7.1 9.9 12.7 15.5 18.4 21.2 24.0 26.8 29.7 32.5 35.3	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2
49.1	8.2	16.3	24.5	32.7	40.9	**.1**	0.1	0.9	1.7	2.6	3.4	4.2	5.0	5.9	6.7	7.5		
49.2	8.2	16.4	24.6	32.8	41.0	**.2**	0.2	1.0	1.8	2.6	3.5	4.3	5.1	5.9	6.8	7.6		
49.3	8.2	16.4	24.6	32.9	41.1	**.3**	0.2	1.1	1.9	2.7	3.5	4.4	5.2	6.0	6.8	7.7		
49.4	8.2	16.5	24.7	32.9	41.2	**.4**	0.3	1.2	2.0	2.8	3.6	4.5	5.3	6.1	6.9	7.8		
49.5	8.3	16.5	24.8	33.0	41.3	**.5**	0.4	1.2	2.1	2.9	3.7	4.5	5.4	6.2	7.0	7.8		
49.6	8.3	16.5	24.8	33.1	41.3	**.6**	0.5	1.3	2.1	3.0	3.8	4.6	5.4	6.3	7.1	7.9		
49.7	8.3	16.6	24.9	33.2	41.4	**.7**	0.6	1.4	2.2	3.1	3.9	4.7	5.5	6.4	7.2	8.0		
49.8	8.3	16.6	24.9	33.2	41.5	**.8**	0.7	1.5	2.3	3.1	4.0	4.8	5.6	6.4	7.3	8.1		
49.9	8.4	16.7	25.0	33.3	41.6	**.9**	0.7	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.2		
50.0	8.3	16.6	25.0	33.3	41.6	**.0**	0.0	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6		
50.1	8.3	16.7	25.0	33.4	41.7	**.1**	0.1	0.9	1.8	2.6	3.5	4.3	5.1	6.0	6.8	7.7		
50.2	8.3	16.7	25.1	33.4	41.8	**.2**	0.2	1.0	1.9	2.7	3.5	4.4	5.2	6.1	6.9	7.7		
50.3	8.4	16.8	25.1	33.5	41.9	**.3**	0.3	1.1	1.9	2.8	3.6	4.5	5.3	6.1	7.0	7.8		
50.4	8.4	16.8	25.2	33.6	42.0	**.4**	0.3	1.2	2.0	2.9	3.7	4.5	5.4	6.2	7.1	7.9		
50.5	8.4	16.8	25.3	33.7	42.1	**.5**	0.4	1.3	2.1	2.9	3.8	4.6	5.5	6.3	7.2	8.0	1.6 4.8 8.0 11.2 14.5 17.7 20.9 24.1 27.3 30.5 33.7 36.9	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1
50.6	8.4	16.9	25.3	33.7	42.2	**.6**	0.5	1.3	2.2	3.0	3.9	4.7	5.6	6.4	7.2	8.1		
50.7	8.5	16.9	25.4	33.8	42.3	**.7**	0.6	1.4	2.3	3.1	4.0	4.8	5.6	6.5	7.3	8.2		
50.8	8.5	17.0	25.4	33.9	42.4	**.8**	0.7	1.5	2.4	3.2	4.0	4.9	5.7	6.6	7.4	8.2		
50.9	8.5	17.0	25.5	34.0	42.5	**.9**	0.8	1.6	2.4	3.3	4.1	5.0	5.8	6.6	7.5	8.3		
51.0	8.5	17.0	25.5	34.0	42.5	**.0**	0.0	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.9	7.7		
51.1	8.5	17.0	25.5	34.0	42.6	**.1**	0.1	0.9	1.8	2.7	3.5	4.4	5.2	6.1	7.0	7.8		
51.2	8.5	17.0	25.6	34.1	42.6	**.2**	0.2	1.0	1.9	2.7	3.6	4.5	5.3	6.2	7.0	7.9		
51.3	8.5	17.1	25.6	34.2	42.7	**.3**	0.3	1.1	2.0	2.8	3.7	4.5	5.4	6.3	7.1	8.0		
51.4	8.6	17.1	25.7	34.3	42.8	**.4**	0.3	1.2	2.1	2.9	3.8	4.6	5.5	6.4	7.2	8.1		
51.5	8.6	17.2	25.8	34.3	42.9	**.5**	0.4	1.3	2.1	3.0	3.9	4.7	5.6	6.4	7.3	8.2		
51.6	8.6	17.2	25.8	34.4	43.0	**.6**	0.5	1.4	2.2	3.1	3.9	4.8	5.7	6.5	7.4	8.2		
51.7	8.6	17.3	25.9	34.5	43.1	**.7**	0.6	1.5	2.3	3.2	4.0	4.9	5.8	6.6	7.5	8.3		
51.8	8.7	17.3	25.9	34.6	43.2	**.8**	0.7	1.5	2.4	3.3	4.1	5.0	5.8	6.7	7.6	8.4		
51.9	8.7	17.3	26.0	34.6	43.3	**.9**	0.8	1.6	2.5	3.3	4.2	5.1	5.9	6.8	7.6	8.5		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals	Units											
	10′	20′	30′	40′	50′	⇓	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
52.0	8.6	17.3	26.0	34.6	43.3	**.0**	0.0	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	1.8 5.5 9.1 12.8 16.5 20.1 23.8 27.4 31.1 34.7	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9
52.1	8.7	17.3	26.0	34.7	43.4	**.1**	0.1	1.0	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0		
52.2	8.7	17.4	26.1	34.8	43.5	**.2**	0.2	1.0	1.9	2.8	3.7	4.5	5.4	6.3	7.2	8.0		
52.3	8.7	17.4	26.1	34.9	43.6	**.3**	0.3	1.1	2.0	2.9	3.8	4.6	5.5	6.4	7.3	8.1		
52.4	8.7	17.5	26.2	34.9	43.7	**.4**	0.3	1.2	2.1	3.0	3.8	4.7	5.6	6.5	7.3	8.2		
52.5	8.8	17.5	26.3	35.0	43.8	**.5**	0.4	1.3	2.2	3.1	3.9	4.8	5.7	6.6	7.4	8.3		
52.6	8.8	17.5	26.3	35.1	43.8	**.6**	0.5	1.4	2.3	3.1	4.0	4.9	5.8	6.6	7.5	8.4		
52.7	8.8	17.6	26.4	35.2	43.9	**.7**	0.6	1.5	2.4	3.2	4.1	5.0	5.9	6.7	7.6	8.5		
52.8	8.8	17.6	26.4	35.2	44.0	**.8**	0.7	1.6	2.4	3.3	4.2	5.1	5.9	6.8	7.7	8.6		
52.9	8.9	17.7	26.5	35.3	44.1	**.9**	0.8	1.7	2.5	3.4	4.3	5.2	6.0	6.9	7.8	8.7		
53.0	8.8	17.6	26.5	35.3	44.1	**.0**	0.0	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	2.1 6.2 10.4 14.5 18.6 22.8 26.9 31.1 35.2	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
53.1	8.8	17.7	26.5	35.4	44.2	**.1**	0.1	1.0	1.9	2.8	3.7	4.5	5.4	6.3	7.2	8.1		
53.2	8.8	17.7	26.6	35.4	44.3	**.2**	0.2	1.1	2.0	2.9	3.7	4.6	5.5	6.4	7.3	8.2		
53.3	8.9	17.8	26.6	35.5	44.4	**.3**	0.3	1.2	2.1	2.9	3.8	4.7	5.6	6.5	7.4	8.3		
53.4	8.9	17.8	26.7	35.6	44.5	**.4**	0.4	1.2	2.1	3.0	3.9	4.8	5.7	6.6	7.5	8.4		
53.5	8.9	17.8	26.8	35.7	44.6	**.5**	0.4	1.3	2.2	3.1	4.0	4.9	5.8	6.7	7.6	8.5		
53.6	8.9	17.9	26.8	35.7	44.7	**.6**	0.5	1.4	2.3	3.2	4.1	5.0	5.9	6.8	7.7	8.6		
53.7	9.0	17.9	26.9	35.8	44.8	**.7**	0.6	1.5	2.4	3.3	4.2	5.1	6.0	6.9	7.8	8.6		
53.8	9.0	18.0	26.9	35.9	44.9	**.8**	0.7	1.6	2.5	3.4	4.3	5.2	6.1	7.0	7.8	8.7		
53.9	9.0	18.0	27.0	36.0	45.0	**.9**	0.8	1.7	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8		
54.0	9.0	18.0	27.0	36.0	45.0	**.0**	0.0	0.9	1.8	2.7	3.6	4.5	5.4	6.4	7.3	8.2	2.4 7.2 12.0 16.8 21.6 26.4 31.2 36.0	0.1 0.2 0.3 0.4 0.5 0.6 0.7
54.1	9.0	18.0	27.0	36.0	45.1	**.1**	0.1	1.0	1.9	2.8	3.7	4.6	5.5	6.4	7.4	8.3		
54.2	9.0	18.0	27.1	36.1	45.1	**.2**	0.2	1.1	2.0	2.9	3.8	4.7	5.6	6.5	7.4	8.4		
54.3	9.0	18.1	27.1	36.2	45.2	**.3**	0.3	1.2	2.1	3.0	3.9	4.8	5.7	6.6	7.5	8.4		
54.4	9.1	18.1	27.2	36.3	45.3	**.4**	0.4	1.3	2.2	3.1	4.0	4.9	5.8	6.7	7.6	8.5		
54.5	9.1	18.2	27.3	36.3	45.4	**.5**	0.5	1.4	2.3	3.2	4.1	5.0	5.9	6.8	7.7	8.6		
54.6	9.1	18.2	27.3	36.4	45.5	**.6**	0.5	1.5	2.4	3.3	4.2	5.1	6.0	6.9	7.8	8.7		
54.7	9.1	18.3	27.4	36.5	45.6	**.7**	0.6	1.5	2.5	3.4	4.3	5.2	6.1	7.0	7.9	8.8		
54.8	9.2	18.3	27.4	36.6	45.7	**.8**	0.7	1.6	2.5	3.5	4.4	5.3	6.2	7.1	8.0	8.9		
54.9	9.2	18.3	27.5	36.6	45.8	**.9**	0.8	1.7	2.6	3.5	4.5	5.4	6.3	7.2	8.1	9.0		
55.0	9.1	18.3	27.5	36.6	45.8	**.0**	0.0	0.9	1.8	2.8	3.7	4.6	5.5	6.5	7.4	8.3	2.9 8.6 14.4 20.2 25.9 31.7 37.5	0.1 0.2 0.3 0.4 0.5 0.6
55.1	9.2	18.3	27.5	36.7	45.9	**.1**	0.1	1.0	1.9	2.9	3.8	4.7	5.6	6.6	7.5	8.4		
55.2	9.2	18.4	27.6	36.8	46.0	**.2**	0.2	1.1	2.0	3.0	3.9	4.8	5.7	6.7	7.6	8.5		
55.3	9.2	18.4	27.6	36.9	46.1	**.3**	0.3	1.2	2.1	3.1	4.0	4.9	5.8	6.8	7.7	8.6		
55.4	9.2	18.5	27.7	36.9	46.2	**.4**	0.4	1.3	2.2	3.1	4.1	5.0	5.9	6.8	7.8	8.7		
55.5	9.3	18.5	27.8	37.0	46.3	**.5**	0.5	1.4	2.3	3.2	4.2	5.1	6.0	6.9	7.9	8.8		
55.6	9.3	18.5	27.8	37.1	46.3	**.6**	0.6	1.5	2.4	3.3	4.3	5.2	6.1	7.0	8.0	8.9		
55.7	9.3	18.6	27.9	37.2	46.4	**.7**	0.6	1.6	2.5	3.4	4.3	5.3	6.2	7.1	8.0	9.0		
55.8	9.3	18.6	27.9	37.2	46.5	**.8**	0.7	1.7	2.6	3.5	4.4	5.4	6.3	7.2	8.1	9.1		
55.9	9.4	18.7	28.0	37.3	46.6	**.9**	0.8	1.8	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.2		
56.0	9.3	18.6	28.0	37.3	46.6	**.0**	0.0	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	3.6 10.9 18.2 25.5 32.8 40.1	0.1 0.2 0.3 0.4 0.5
56.1	9.3	18.7	28.0	37.4	46.7	**.1**	0.1	1.0	2.0	2.9	3.9	4.8	5.7	6.7	7.6	8.6		
56.2	9.3	18.7	28.1	37.4	46.8	**.2**	0.2	1.1	2.1	3.0	4.0	4.9	5.8	6.8	7.7	8.7		
56.3	9.4	18.8	28.1	37.5	46.9	**.3**	0.3	1.2	2.2	3.1	4.0	5.0	5.9	6.9	7.8	8.8		
56.4	9.4	18.8	28.2	37.6	47.0	**.4**	0.4	1.3	2.3	3.2	4.1	5.1	6.0	7.0	7.9	8.9		
56.5	9.4	18.8	28.3	37.7	47.1	**.5**	0.5	1.4	2.4	3.3	4.2	5.2	6.1	7.1	8.0	8.9		
56.6	9.4	18.9	28.3	37.7	47.2	**.6**	0.6	1.5	2.4	3.4	4.3	5.3	6.2	7.2	8.1	9.0		
56.7	9.5	18.9	28.4	37.8	47.3	**.7**	0.7	1.6	2.5	3.5	4.4	5.4	6.3	7.3	8.2	9.1		
56.8	9.5	19.0	28.4	37.9	47.4	**.8**	0.8	1.7	2.6	3.6	4.5	5.5	6.4	7.3	8.3	9.2		
56.9	9.5	19.0	28.5	38.0	47.5	**.9**	0.8	1.8	2.7	3.7	4.6	5.6	6.5	7.4	8.4	9.3		
57.0	9.5	19.0	28.5	38.0	47.5	**.0**	0.0	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.7	8.6	5.0 15.0 25.0 35.1	0.1 0.2 0.3
57.1	9.5	19.0	28.5	38.0	47.6	**.1**	0.1	1.1	2.0	3.0	3.9	4.9	5.8	6.8	7.8	8.7		
57.2	9.5	19.0	28.6	38.1	47.6	**.2**	0.2	1.1	2.1	3.1	4.0	5.0	5.9	6.9	7.9	8.8		
57.3	9.5	19.1	28.6	38.2	47.7	**.3**	0.3	1.2	2.2	3.2	4.1	5.1	6.0	7.0	8.0	8.9		
57.4	9.6	19.1	28.7	38.3	47.8	**.4**	0.4	1.3	2.3	3.3	4.2	5.2	6.1	7.1	8.0	9.0		
57.5	9.6	19.2	28.8	38.3	47.9	**.5**	0.5	1.4	2.4	3.4	4.3	5.3	6.2	7.2	8.1	9.1		
57.6	9.6	19.2	28.8	38.4	48.0	**.6**	0.6	1.5	2.5	3.4	4.4	5.4	6.3	7.3	8.2	9.2		
57.7	9.6	19.3	28.9	38.5	48.1	**.7**	0.7	1.6	2.6	3.5	4.5	5.5	6.4	7.4	8.3	9.3		
57.8	9.7	19.3	28.9	38.6	48.2	**.8**	0.8	1.7	2.7	3.6	4.6	5.6	6.5	7.5	8.4	9.4		
57.9	9.7	19.3	29.0	38.6	48.3	**.9**	0.9	1.8	2.8	3.7	4.7	5.7	6.6	7.6	8.5	9.5		
58.0	9.6	19.3	29.0	38.6	48.3	**.0**	0.0	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	8.2 24.6 41.0	0.1 0.2
58.1	9.7	19.3	29.0	38.7	48.4	**.1**	0.1	1.1	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9		
58.2	9.7	19.4	29.1	38.8	48.5	**.2**	0.2	1.2	2.1	3.1	4.1	5.1	6.0	7.0	8.0	9.0		
58.3	9.7	19.4	29.1	38.9	48.6	**.3**	0.3	1.3	2.2	3.2	4.2	5.2	6.1	7.1	8.1	9.1		
58.4	9.7	19.5	29.2	38.9	48.7	**.4**	0.4	1.4	2.3	3.3	4.3	5.3	6.2	7.2	8.2	9.2		
58.5	9.8	19.5	29.3	39.0	48.8	**.5**	0.5	1.5	2.4	3.4	4.4	5.4	6.3	7.3	8.3	9.3		
58.6	9.8	19.5	29.3	39.1	48.8	**.6**	0.6	1.6	2.5	3.5	4.5	5.5	6.4	7.4	8.4	9.4		
58.7	9.8	19.6	29.4	39.2	48.9	**.7**	0.7	1.7	2.6	3.6	4.6	5.6	6.5	7.5	8.5	9.5		
58.8	9.8	19.6	29.4	39.2	49.0	**.8**	0.8	1.8	2.7	3.7	4.7	5.7	6.6	7.6	8.6	9.6		
58.9	9.9	19.7	29.5	39.3	49.1	**.9**	0.9	1.9	2.8	3.8	4.8	5.8	6.7	7.7	8.7	9.7		
59.0	9.8	19.6	29.5	39.3	49.1	**.0**	0.0	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	16.2 48.6	0.1
59.1	9.8	19.7	29.5	39.4	49.2	**.1**	0.1	1.1	2.1	3.1	4.1	5.1	6.0	7.0	8.0	9.0		
59.2	9.8	19.7	29.6	39.4	49.3	**.2**	0.2	1.2	2.2	3.2	4.2	5.2	6.1	7.1	8.1	9.1		
59.3	9.9	19.8	29.6	39.5	49.4	**.3**	0.3	1.3	2.3	3.3	4.3	5.3	6.2	7.2	8.2	9.2		
59.4	9.9	19.8	29.7	39.6	49.5	**.4**	0.4	1.4	2.4	3.4	4.4	5.4	6.3	7.3	8.3	9.3		
59.5	9.9	19.8	29.8	39.7	49.6	**.5**	0.5	1.5	2.5	3.5	4.5	5.5	6.4	7.4	8.4	9.4	0.0 48.2	0.0
59.6	9.9	19.9	29.8	39.7	49.7	**.6**	0.6	1.6	2.6	3.6	4.6	5.6	6.5	7.5	8.5	9.5		
59.7	10.0	19.9	29.9	39.8	49.8	**.7**	0.7	1.7	2.7	3.7	4.7	5.7	6.6	7.6	8.6	9.6		
59.8	10.0	20.0	29.9	39.9	49.9	**.8**	0.8	1.8	2.8	3.8	4.8	5.8	6.7	7.7	8.7	9.7		
59.9	10.0	20.0	30.0	40.0	50.0	**.9**	0.9	1.9	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8		
	10′	**20′**	**30′**	**40′**	**50′**		**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

PREFACE

Many requirements exist for the solution of the general astronomical or navigational triangle, for which the navigator's needs are foremost; for upon its accurate and rapid solution depends his effectiveness in locating himself expeditiously upon the Sumner Line of Position. This six-volume series of *Sight Reduction Tables for Marine Navigation* is designed to effect all solutions of the navigational triangle, having given two sides and the included angle, to find a third side and adjacent angle. A simple method is suggested for extracting from the tables the numerical value of the parallactic or position angle, thus completing the triangle solution by providing the sixth element. The tabular data are arranged to facilitate rapid position-determination utilizing the Marcq Saint Hilaire or intercept method.

Tabulations for entering arguments of integral degrees of latitude, declination, and local hour angle include computed values of altitude, successive altitude differences with sign, and azimuth angle. The data are applicable to the solution of sights of all celestial bodies, for latitude and declination of both same and contrary name. Altitudes and their differences are tabulated to the nearest tenth of a minute, azimuth angles to the nearest tenth of a degree. The tables, intended for use with *The Nautical Almanac*, are designed for precise interpolation of altitude for declination only, utilizing convenient interpolation tables which facilitate linear interpolation and provide additionally for the effect of second differences when required. Interpolation of altitude for latitude and local hour angle may also be made by employing the diagrams provided.

The primary table entry is local hour angle—not meridian angle—which is measured westward through 360° from the local meridian to the hour circle of the body. Each volume covers 16° of latitude and is arranged in two zones of 8° each. All latitudes of a zone appear as horizontal entries above each column on every page of that section of the volume, the first degree of each volume overlapping the last degree of the preceding volume. All declinations are given as vertical arguments on each page. Altitudes are tabulated from the horizon to the zenith. Azimuth angles are tabulated through 180°, and rules appear on each opening of the tables for converting azimuth angle to true azimuth. Full explanation of the tables' concept, format, arrangement, and method of interpolation is given in the Introduction. Included examples illustrate methods and techniques employed. Peculiarities of the tables and their application to the solution of certain navigational problems are also covered. Standard navigational manuals should be consulted when more detailed information on line of position methods and techniques is desired.

These new tables, although similar to H.O. Pub. No. 214 (H.D. 486 in the United Kingdom), *Tables of Computed Altitude and Azimuth*, provide full coverage, and are compact in design, format and arrangement. Their completeness and utility suggest their possible broad application to the solution of many space-age problems in closely associated fields of science and technology. For air navigation the H.O. Pub. No. 249 (A.P. 3270 in the United Kingdom) series of tables, consisting of three volumes and entitled *Sight Reduction Tables for Air Navigation*, is recommended.

The concept, design, development, and preparation of these tables are the results of the collaborative efforts and joint accomplishments of the U.S. Naval Oceanographic Office, the U.S. Naval Observatory, and Her Majesty's Nautical Almanac Office, Royal Greenwich Observatory. The tables in identical format are being published by the British Ministry of Defence as a Hydrographic Department publication.

Users should refer corrections, additions, and comments for improving this product to:

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CONTENTS

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EXPLANATORY NOTE

The Introduction is divided into five sections as follows:

A. Description of Tables. This section contains brief notes on the purpose of the tables, their arrangement and a description of the Interpolation Table.

B. Normal Usage. For almost all purposes of marine navigation it suffices to use the tables in their simplest form; this section is therefore restricted to instructions, with illustrative examples, of that simple usage.

C. Altitude Interpolation, Special Techniques. Occasionally in marine navigation greater precision is required than that obtainable by the simple methods of section B; some other usages may require the full precision of the tables. In this section details are given of the methods that can be used to obtain this greater precision, with special reference to some pertinent solutions. A graphical means of interpolating altitude for latitude and local hour angle, i.e., making possible plotting from the DR or estimated position, is provided. Included also are methods for improving the accuracy of positioning using the usual position line and special polar plotting procedures.

D. Other Applications. The complete coverage of these tables makes them useful in the solution of many special navigational problems. Details are given in this section of some specific applications.

E. Background. This section relates to the accuracy of the tables and the reduction of sights, and some details are given concerning the production of the tables.

Most navigators need concern themselves only with sections A and B. Section C should, however, be referred to in unusual circumstances. Section D supplements and extends the usage to include some special applications and techniques.

TERMINOLOGY

Altitude—angular distance above, or below, the horizon, positive or negative, respectively.

Sextant Altitude—the altitude reading taken from the sextant, modified by application of instrument error.

Apparent Altitude (App. Alt.)—the sextant altitude modified by application of index error, personal error and dip.

Observed Altitude (Ho)—the apparent altitude corrected as necessary for semidiameter, parallax, refraction, etc.

Tabular Altitude (Tab. Alt.)—the altitude tabulated in sight reduction tables for integral degrees of latitude, declination, and local hour angle.

Calculated (or Computed) Altitude (Hc)—tabular altitude interpolated for increments of the three pertinent arguments. Should no interpolation be required for any arguments, then the tabular altitude and the calculated altitude are identical; thus the columns of tabular altitudes for integral degree arguments of latitude, declination, and local hour angle are designated Hc.

Computed Altitude (Hc)—see Calculated Altitude.

Altitude Difference (d)—the tabular difference in minutes between successive tabular altitudes given in these tables.

Second Differences—the differences between successive values of d, not tabulated.

Double-Second Difference (DSD)—a quantity used in the more precise interpolation of altitude for declination. It is the algebraic difference between the tabular values of d immediately below and immediately above that on the line defined by the integral portion of the actual declination.

Intercept—(Hc-Ho), or (Ho-Hc); Hc greater than Ho, intercept is away (A); Ho greater than Hc, intercept is toward (T).

Azimuth (Zn)—the angle between the meridian and the vertical circle through the celestial body or point, measured eastward from north through 360°.

Azimuth Angle (Z)—the angle between the meridian and vertical circle through the celestial body or point, measured eastward or westward through 180° from north or south according to the elevated pole; the tabular values included in most sight reduction tables.

Tabular Azimuth Angle (Tab. Az., Z)—the azimuth angle as tabulated in these volumes for the three entering arguments.

Tabular Declination (Tab. Dec.)—the integral degree of declination used as an argument for entering these tables.

Local Hour Angle (LHA or L.H.A., *P*°)—the angle at the pole between the meridian of the observer and the meridian of the observed body, measured westward from the meridian of the observer through 360°; one of the three arguments for entering these tables.

Meridian Angle—the angular distance of a celestial body or point measured eastward or westward from the local meridian through 180°.

Assumed (or Chosen) Latitude (aL), *Assumed (or Chosen) Longitude* (aλ)—geographical coordinates assumed to facilitate entering these tables.

Declination Increment (Dec. Inc.)—the excess of the actual declination over the tabular declination; argument for entering Interpolation Table.

Tabular Latitude (Tab. Lat.)—latitude argument for entering these tables.

Tabular Local Hour Angle (Tab. LHA)—local hour angle argument for entering these tables.

Latitude Increment—difference between the actual latitude and that used as table argument.

Local Hour Angle Increment—difference between the actual local hour angle and that used as table argument.

Argument—one of the values used for entering a table.

INTRODUCTION

A. DESCRIPTION OF TABLES

1. Purpose and Scope. The main purpose of these tables is to facilitate the practice of astronomical navigation at sea. A secondary purpose is to provide, within the limits of the navigational precision required, a fundamental table of the solutions of a spherical triangle in which two sides and the included angle are given.

The tables have been designed primarily for use with the intercept or Marcq Saint Hilaire method of sight reduction, utilizing a position assumed or chosen, such that interpolation for latitude and local hour angle is not required.

Altitudes and azimuths are tabulated for all combinations of latitude, local hour angle and declination, at a uniform interval of 1° in each of the three arguments; but interpolation, to the highest precision, is provided only when interpolating altitude for declination. Within this scope, the aim has been to achieve absolute accuracy with a high standard of design and presentation.

2. Arrangement.

(a) Format. The tables are divided into six volumes, each of which includes two eight-degree zones or sections of latitude. An overlap of 1° occurs between volumes, making 0°, 15°, 30°, 45°, 60°, 75° and 90° the first and/or last latitudes of the several volumes.

Within each of the 12 zones of 8° of latitude, for which the 182 pages of tabulations constitute a self-contained entity, the main argument is local hour angle, measured westward from the local meridian from 0° through 360°; to each integral degree of the local hour angle (LHA = P°) in the range 0° to 90° there corresponds an opening of two facing pages, which together contain the tabulations for:

(i) local hour angles, LHA = P° and 360° – P°, for latitude and declination of both same and contrary name;

(ii) local hour angles, LHA = 180° – P° and 180° + P°, for latitude and declination of same name.

These values of the local hour angle, which are the primary entering arguments, are prominently displayed at the top and bottom of each page; the horizontal argument heading each column is latitude, and the vertical argument is declination.

Within each opening, the left-hand page is always restricted to the tabulations for local hour angles LHA = P° and 360° – P°, and for declinations of the same name. The right-hand page contains: on the upper portion, the tabulations for local hour angles LHA = P° and 360° – P°, and declinations of contrary name; and, on the lower portion, the tabulations for supplementary local hour angles LHA = 180° – P° and 180° + P°, and declinations of the same name.

The two portions are separated, in each column, by a horizontal rule which, together with the vertical lines, form a configuration across the page resembling the profile of a staircase. Hereafter this line separating data of Contrary and Same name will be referred to as the C-S Line. The horizontal segments of this line indicate the degree of declination in which the horizon occurs. The tabulated altitudes are continuous across this horizontal rule, provided that those on one side are regarded as being negative, that is depressions below the horizon. Interpolation within this one-degree interval of declination is described in section C.2.

With this arrangement, the opening required for the reduction of a sight taken within a particular zone of latitude, either north or south, is determined uniquely by the value of the local hour angle. Whatever the local hour angle, tabulations for that entry and for all declinations and all latitudes within the zone are immediately available at the one opening.

(b) Tabulated Quantities. For each combination of arguments there is tabulated: the altitude Hc to 0.1′; in smaller type, the actual difference d of the tabular altitude from that declination entry to that for the next higher degree, referred to later as the altitude difference, together with its sign; the azimuth angle, Z, to 0.1°.

Rules are given at each opening for converting the tabular azimuth angle into true azimuth, measured eastward from north; the rules differ according to the hemisphere—northern or southern—and the range of local hour angle.

(c) Interpolation Table. Provision is made for interpolation of the tabular altitude for declination by the tabulation of the altitude difference, d, and by the Interpolation Table included in each volume. The Interpolation Table, abbreviated Int. Tab. in examples, is designed to make possible a reasonably high degree of precision in interpolating the altitude to the nearest 0.1′ of declination.

The main, vertical, argument of the Interpolation Table is the excess of the actual declination over that used (an integral degree) as the tabular entry. Since it is recommended that the tabular entry used should always be the integral degree of declination numerically less than or equal to the actual declination, this excess should always be the actual minutes of the declination referred to as the declination increment, abbreviated Dec. Inc. The other argument is the tabular altitude difference, d, which for convenience is divided into two parts, the first being a multiple of 10′ (10′, 20′, 30′, 40′, or 50′) and the second the remainder in the range 0.0′ to 9.9′. The minutes of this remainder appear as the horizontal argument, the decimal part as the vertical argument, in the subtable, which is given opposite each range of one minute (10 entries) of the Dec. Inc. used in entering the tables.

The right-hand column of each vertically divided half-page of the Interpolation Table contains a series of critical tables, each corresponding to the range of Dec. Inc. opposite which it is placed, which give the correction for the effect. of second differences.

The Interpolation Table was designed so that it could be printed on four pages. The inside front cover and facing page provide for the range 0.0′ to 31.9′ of the Dec. Inc., while the inside back cover and facing page provide for the range 28.0′ to 59.9′. No special table is provided for interpolation of the azimuth angle and the differences are not tabulated.

B. NORMAL USAGE

1. The Intercept Method. The standard practice at sea is to draw the position line, corresponding to the observed altitude of a heavenly body, as the perpendicular to the intercept (difference between observed and calculated altitude) plotted toward or away from the observed body, using a position so chosen as to facilitate the calculation of the altitude and azimuth. As with the *Tables of Computed Altitude and Azimuth*, H.O. Pub. No. 214—H.D. 486 in the United Kingdom—the normal function of these tables is to provide the calculated altitude and azimuth, interpolated to the declination of the observed body, for such an assumed position; interpolation for latitude and local hour angle is not required. The procedures of choosing an assumed position, and of plotting the resulting position line, are so familiar that they will not be described.

2. Entering Arguments. The entering arguments, obtained from a knowledge of position, the observed body, and the time of observation, utilizing standard procedures and data from *The Nautical Almanac*, are:

(*a*) the integral degree of latitude nearest to the estimated latitude of the observer (abbreviated Tab. Lat.);

(*b*) the integral degree of local hour angle obtained by applying to the GHA of the observed body a longitude nearest to the estimated longitude of the observer (abbreviated Tab. LHA);

(*c*) the declination of the observed body (abbreviated Dec.), labeled SAME or CONTRARY as the case may be; it is expressed as integral degrees (referred to as Tab. Dec.) together with minutes and decimal parts thereof, the minutes and decimal parts being referred to as the declination increment (Dec. Inc.).

3. Instructions for Use. Normally (probably for 99 percent of all observations) the second-difference correction in the interpolation of the altitude for declination can, and should, be ignored. It is, however, convenient to describe the application of the correction at the same time as the main part of the interpolation; the additional instructions pertaining to this correction are indicated by an asterisk (*) and can be ignored for normal usage. A further discussion of interpolation utilizing second differences is given in section C. 1.

The following instructions for use of the tables and the extracted tabular data are given in precise detail; they will be greatly simplified in practice.

(a) Choose the volume and section corresponding to the zone in which the Lat. is contained.

(b) In this section select the opening according to the LHA, then choose the page according to the following rules:

LHA 0° to 90°, 360° to 270°,	SAME NAME, enter left-hand page. CONTRARY NAME, enter right-hand page (top).
LHA 180° to 90°, 180° to 270°,	SAME NAME, enter right-hand page (bottom).

(c) For the LHA and the pertinent page, select the column headed Lat. and the line corresponding to Tab. Dec.

(d) Record:

(i) the tabular altitude, Hc;

(ii) the altitude difference, d;

*(iii) if high precision is required, or if d is printed in italic type followed by a dot, form the double-second difference by determining mentally the difference between the tabular values of d immediately below and immediately above the d which corresponds to the integral portion of the actual declination; the difference is always negative, but the sign need not be recorded.

(iv) the tabular azimuth angle, Z, interpolated mentally to the actual declination (Dec.).

(e) Convert the interpolated azimuth angle, Z, to the true azimuth, Zn, measured eastward from north, according to the rules to be found at each opening of the tables.

(f) Turn to the Interpolation Table, on the inside front cover and facing page if the Dec. Inc. is in the range 0.0′ to 31.9′, or on the inside back cover and facing page if the Dec. Inc. is in the range 28.0′ to 59.9′.

(g) Extract the two tabular parts of the interpolation correction corresponding to the Dec. Inc.:

(i) the first part: the tabular value corresponding to the Dec. Inc. and the tens of minutes of the altitude difference, d;

(ii) the second part: the tabular value corresponding to the Dec. Inc. and the remainder of d; this is to be taken from the subtable opposite (on the right-hand side of) the range of 1′ of the vertical argument in which the Dec. Inc. occurs; in this subtable the units of d form the horizontal argument and the decimals the vertical argument.

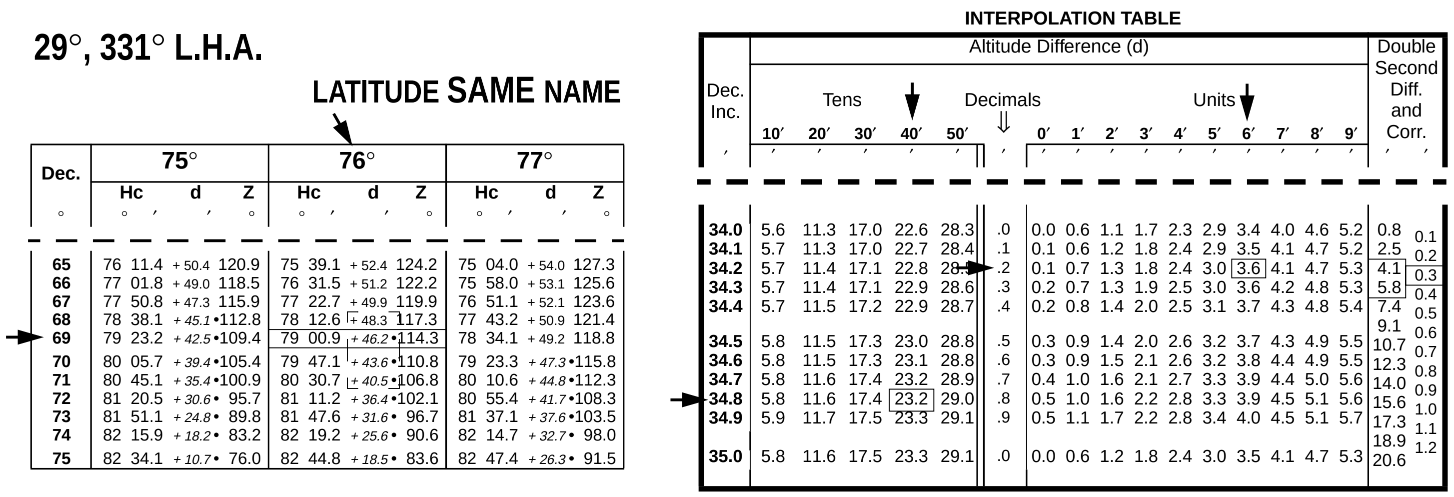
(h) Add the two parts to form the interpolation correction, and apply this to the tabular altitude, with the sign of the altitude difference, to give the altitude interpolated for declination, i.e., the calculated altitude.

**(i)* If precision is required, and if the double-second difference has been recorded, take out the second-difference correction (corr.) from the small critical table, with argument Double Second Diff. opposite the same line of the Dec. Inc. in the Interpolation Table.

**(j)* Add the second-difference correction to the altitude, interpolated for declination as in *(h)*, to obtain a more precise altitude.

4. Illustrations of Use.

(a) Primarily as an illustration of the use of the Interpolation Table, the calculated altitude and true azimuth are determined for Lat. 76° S, LHA 29°, and Dec. 69°34.8′ S. Data are exhibited in Fig. 1.



29°, 331° L.H.A.

LATITUDE SAME NAME

Dec.	75°			76°			77°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°
65	76 11.4	+ 50.4	120.9	75 39.1	+ 52.4	124.2	75 04.0	+ 54.0	127.3
66	77 01.8	+ 49.0	118.5	76 31.5	+ 51.2	122.2	75 58.0	+ 53.1	125.6
67	77 50.8	+ 47.3	115.9	77 22.7	+ 49.9	119.9	76 51.1	+ 52.1	123.6
68	78 38.1	+ *45.1*	•112.8	78 12.6	+ 48.3	117.3	77 43.2	+ 50.9	121.4
69	79 23.2	+ *42.5*	•109.4	79 00.9	+ *46.2*	•114.3	78 34.1	+ 49.2	118.8
70	80 05.7	+ *39.4*	•105.4	79 47.1	+ *43.6*	•110.8	79 23.3	+ *47.3*	•115.8
71	80 45.1	+ *35.4*	•100.9	80 30.7	+ *40.5*	•106.8	80 10.6	+ *44.8*	•112.3
72	81 20.5	+ *30.6*	• 95.7	81 11.2	+ *36.4*	•102.1	80 55.4	+ *41.7*	•108.3
73	81 51.1	+ *24.8*	• 89.8	81 47.6	+ *31.6*	• 96.7	81 37.1	+ *37.6*	•103.5
74	82 15.9	+ *18.2*	• 83.2	82 19.2	+ *25.6*	• 90.6	82 14.7	+ *32.7*	• 98.0
75	82 34.1	+ *10.7*	• 76.0	82 44.8	+ *18.5*	• 83.6	82 47.4	+ *26.3*	• 91.5

Data from page 60

INTERPOLATION TABLE

Dec. Inc.	Altitude Difference (d)																Double Second Diff. and Corr.	
	Tens					Decimals	Units											
	10′	**20′**	**30′**	**40′**	**50′**	⇓	**0′**	**1′**	**2′**	**3′**	**4′**	**5′**	**6′**	**7′**	**8′**	**9′**		
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
34.0	5.6	11.3	17.0	22.6	28.3	.0	0.0	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2	0.8	0.1
34.1	5.7	11.3	17.0	22.7	28.4	.1	0.1	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.2	2.5	0.2
34.2	5.7	11.4	17.1	22.8	28.	.2	0.1	0.7	1.3	1.8	2.4	3.0	3.6	4.1	4.7	5.3	4.1	0.3
34.3	5.7	11.4	17.1	22.9	28.6	.3	0.2	0.7	1.3	1.9	2.5	3.0	3.6	4.2	4.8	5.3	5.8	0.4
34.4	5.7	11.5	17.2	22.9	28.7	.4	0.2	0.8	1.4	2.0	2.5	3.1	3.7	4.3	4.8	5.4	7.4 9.1	0.5 0.6
34.5	5.8	11.5	17.3	23.0	28.8	.5	0.3	0.9	1.4	2.0	2.6	3.2	3.7	4.3	4.9	5.5	10.7	0.7
34.6	5.8	11.5	17.3	23.1	28.8	.6	0.3	0.9	1.5	2.1	2.6	3.2	3.8	4.4	4.9	5.5	12.3	0.8
34.7	5.8	11.6	17.4	23.2	28.9	.7	0.4	1.0	1.6	2.1	2.7	3.3	3.9	4.4	5.0	5.6	14.0	0.9
34.8	5.8	11.6	17.4	23.2	29.0	.8	0.5	1.0	1.6	2.2	2.8	3.3	3.9	4.5	5.1	5.6	15.6	1.0
34.9	5.9	11.7	17.5	23.3	29.1	.9	0.5	1.1	1.7	2.2	2.8	3.4	4.0	4.5	5.1	5.7	17.3 18.9	1.1 1.2
35.0	5.8	11.6	17.5	23.3	29.1	.0	0.0	0.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3	20.6	

Data from Interpolation Table

FIGURE 1

The latitude zone required is contained in the first half (covering latitudes 75° to 82°) of Volume **6**; the tabular entries are found on the left-hand page of the opening for LHA 29° (top of page), in the column for Lat. 76°, on the line for Dec. 69°, i.e., for latitude and declination of the SAME name. The data taken from page 60 and recorded are:

	tabular altitude, Hc		79°00.9′
	altitude difference, d		(+)46.2
*	double-second difference	(43.6′ – 48.3′)	4.7
	interpolated azimuth angle, Z	(114.3° – 2.0°)	112.3°
	true azimuth, Zn	(180° + 112.3°)	292.3°

Note that the Dec. Inc. 34.8′ is the main argument for entering the Interpolation Table to extract the first correction for tens of minutes of altitude difference, d, and that it also indicates the subtable where the second part of the correction for units and decimal parts (minutes) of altitude difference, d, is found.

		Dec. Inc.	Alt. Diff., d	Correction
Interpolation Table	1st part	34. 8′	40′	23.2′
	2nd part	34. 8′	6.2′	3.6′
First-diff. correction		34. 8′	46.2′	26.8′
*Second-diff. correction		34. 8′	DSD= 4.7′	0.3′

The interpolated altitude, using first differences only, is thus 79°00.9′ + 26.8′ = 79°27.7′, since d is positive; the correction for second differences makes this 79°28.0′, since the correction is always positive.

The Interpolation Table should always be entered with the arguments as arranged, i.e., with Dec. Inc. as vertical argument and with d as horizontal argument.

No special table is provided for interpolation of the azimuth angle, and the differences are not tabulated. The successive azimuth differences are less than 10.0° for altitudes less than 84°, and can easily be found by inspection; to this point second differences can be neglected. If formal interpolation for azimuth is necessary, treat the degrees as if minutes and obtain the correction from the unit-decimal portion of the Interpolation Table; but for most practical applications interpolation by inspection will probably suffice. In this illustration formal interpolation, using an azimuth difference of –3.5° and the right-hand block of the Interpolation Table corresponding to the Dec. Inc. of 34.8′, gives a correction of –2.0°.

(b) Required.—The altitude and azimuth for the following arguments:

		Example i			***Example ii***		
LHA		22°			22°		
Lat.		75° N			77° S		
Dec.		5°14.3′ S			2°27.6′ N		
Name		Contrary			Contrary		
		Hc	d	Z	Hc	d	Z
From page 47		8°54.6′	(–)59.7′	157.8°†	10°02.8′	(–)59.8′	157.7°†
Int. Tab.	1st part	(–)11.9			(–)23.0		
	2nd part	(–) 2.3			(–) 4.5		
Hc & Zn		8°40.4′		202.2°	9°35.3′		337.7°

		Example iii			***Example iv***		
LHA		202°			202°		
Lat.		79° N			81° S		
Dec.		65°43.2′ N			74°50.7′ S		
Name		Same			Same		
		Hc	d	Z	Hc	d	Z
From page 47		54°34.6′	(+)59.5′	15.7°†	65°25.7′	(+)59.4′	14.1°†
Int. Tab.	1st part	(+)36.0			(+)42.3		
	2nd part	(+) 6.9			(+) 7.9		
Hc & Zn		55°17.5′		015.7°	66°15.9′		165.9°

†The values of Z are interpolated mentally where necessary.

(c) Required.—The solution and fix for the following simultaneous observations made from DR position 77°43′ N, 10°12′ W, at GMT $04^{h}48^{m}17^{s}$; the observed altitudes were: *Regulus* 13°10.1′, *Vega* 28°00.3′, and *Hamal* 32°56.1′. From *The Nautical Almanac*:

	Regulus		*Vega*		*Hamal*	
GHAϒ 04^{h}	66°00.6′		66°00.6′		66°00.6′	
Inc. $48^{m}17^{s}$	12°06.2′		12°06.2′		12°06.2′	
GHAϒ $04^{h}48^{m}17^{s}$	78°06.8′		78°06.8′		78°06.8′	
SHA & Dec.	208°19.6′	12°07.4′ N	81°01.9′	38°45.4′ N	328°38.7′	23°19.0′ N
GHA ☆	286°26.4′		159°08.7′		46°45.5′	
Assumed Long. (aλ)	10°26.4′ W		10°08.7′ W		9°45.5′ W	
LHA	276°00.0′		149°00.0′		37°00.0′	

Enter Tables in Lat. 78° with LHA and Dec. as above.

		Hc	d	Z	Hc	d	Z	Hc	d	Z
Pages 170, 65, 76		12°58.9′	(+)58.6′	93.3°†	27°30.1′	(+)59.5′	27.1°†	32°20.8′	(+)59.3′	138.9°†
Int. Tab.	1st part	(+) 6.2			(+)37.8			(+)15.8		
	2nd part	(+) 1.1			(+) 7.2			(+) 3.0		
Hc		13°06.2′			28°15.1′			32°39.6′		
Ho		13°10.1′			28°00.3′			32°56.1′		
Intercept & Zn		3.9 T		093.3°	14.8 A		332.9°	16.5 T		221.1°

†Interpolated value.

The plot is shown in Figure 2.

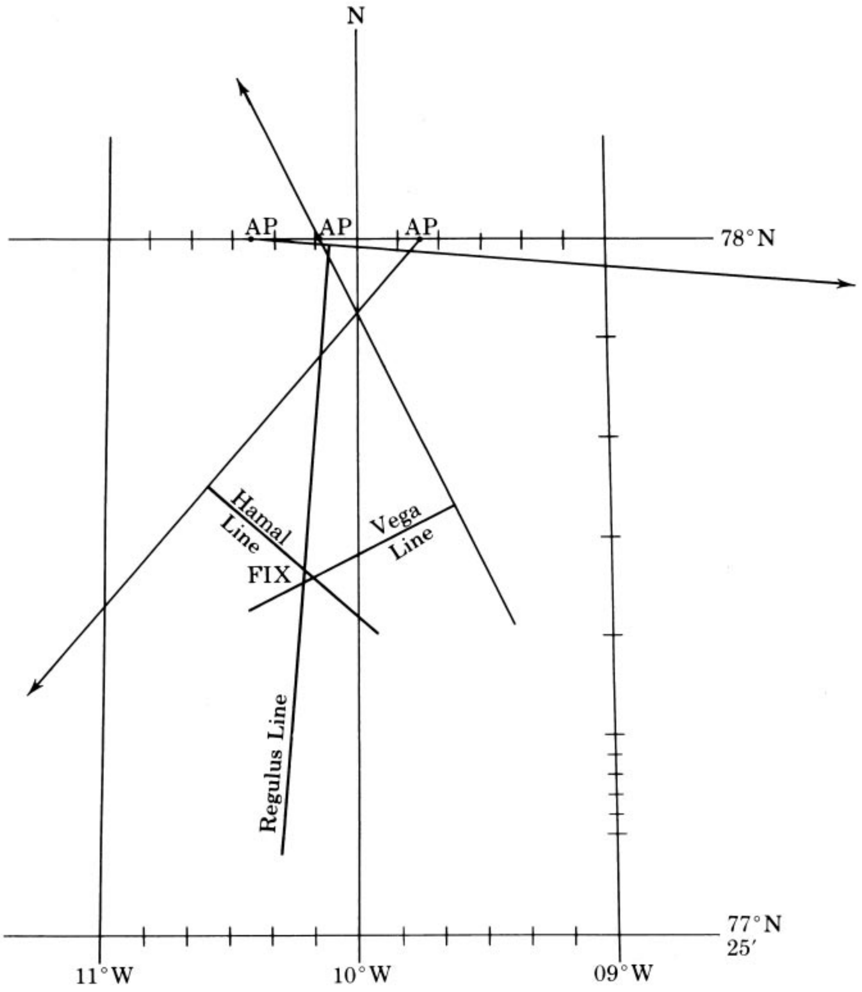


FIGURE 2

C. ALTITUDE INTERPOLATION, SPECIAL TECHNIQUES

1. Interpolation when Second Differences are Required. In section B instructions were given for the interpolation of altitude for increments of declination, and it was emphasized that normally it will not be required to include the effect of second differences in the interpolation. An illustration was included, however, exhibiting how the second-difference correction was applied when necessary. Usually the precision of the interpolation in these tables using only first differences decreases as the altitude increases. For altitudes very near the zenith, where even the inclusion of the correction for second differences is inadequate, other techniques can be employed (see section C.4). When the altitude difference, d, is printed in italic type, additionally accompanied by a small dot alongside, the second-difference correction may exceed 0.25′, and should normally be applied; if a precision better than this is required, the second-difference correction may be applied even when the altitude difference, d, is not in italic type.

To facilitate interpolation using second differences a critical table (see section A.2) is included as the last column of each half-page of the Interpolation Table, giving the correction when entered with the argument double-second difference, DSD. The DSD required for entering this critical table is, as stated in section B.3, the difference between the tabular values of d immediately below and immediately above the d which corresponds to the integral portion of the actual declination. When the tabular DSD (critical) entry corresponds to an exact tabular value always use the upper of the two possible corrections, for example with a Dec. Inc. entry between 8.0′ and 9.4′ and a DSD entry of 24.1′ the correction is 0.7′. Always use the compartment of the DSD table opposite the block of the Interpolation Table wherein was found the Dec. Inc. entry. The DSD correction is always added to the altitude already interpolated using first differences.

The following examples illustrate the interpolation of altitudes for declination when it is necessary to include the correction for second differences.

Required.—The altitude and azimuth for the following arguments:

		Example i				***Example ii***			
LHA		22°				338°			
Lat.		75° N				77° S			
Dec.		69°36.4′ N				74°10.8′ S			
Name			Same				Same		
		Hc	d	DSD	Z	Hc	d	DSD	Z
From page 46		81°01.8′	(+)45.5′	5.9′	117.9°†	83°46.8′	(+)34.5′	13.6′	106.2°†
Int. Tab.	1st part	(+)24.3				(+) 5.4			
	2nd part	(+) 3.3				(+) 0.8			
DSD Correction		(+) 0.3				(+) 0.5			
Hc & Zn		81°29.7′			242.1°	83°53.5′			073.8°

		Example iii				***Example iv***			
LHA		22°				338°			
Lat.		79° S				82° N			
Dec.		85°47.1′ S				86°52.2′ N			
Name			Same				Same		
Int. Tab.		Hc	d	DSD	Z	Hc	d	DSD	Z
From page 46		83°22.2′	(–)48.7′	6.0′	12.6°†	85°27.4′	(–)47.6′	9.5′	13.1°†
Int. Tab.	1st part	(–)31.4				(–)34.8			
	2nd part	(–) 6.9				(–) 6.6			
DSD Correction		(+) 0.3				(+) 0.3			
Hc & Zn		82°44.2′			192.6°	84°46.3′			013.1°

Note.—The second-difference correction is always positive.

†Azimuth angles are interpolated mentally.

2. Interpolation near the Horizon. This discussion is restricted to the interpolation of altitude for declination within the 1° interval containing the horizon, indicated by the horizontal segments of the C-S Line. Interpolation of altitude in the interval under consideration is accomplished by using the last tabular altitude and altitude difference appearing above the C-S Line, i.e., for this one degree of declination interval, interpolation is carried out across the C-S Line. Since the last tabular altitude above the C-S Line indicates the body's altitude above the horizon for LHA at top of page, for the pertinent latitude, and for the last integral declination above the horizontal segment of the C-S Line pertaining to that particular latitude, interpolation resulting in positive altitudes may be carried out for increments of declination of contrary name so long as the interpolated altitude correction does not exceed the last tabular altitude above the C-S Line; for the LHA at bottom of page, positive altitudes will result when interpolating altitude for increments of declination of same name so long as the interpolated altitude correction exceeds the last tabular value above the C-S Line. Interpolation for declinations and increments of declination in excess of the above limits result in negative altitudes or angles of depression—see section C.3.

The tabular azimuth angle pertinent to this one degree interval of declination is that immediately above or that immediately below the C-S Line, according as the entering arguments are contrary or same name, respectively. The difference in azimuth for the interval is determined by taking the value of tabular azimuth angle, on the same side of the C-S Line as the LHA argument, from the supplement of that on the opposite side of the line.

The following four examples illustrate variations in data and results obtained in the altitude interpolation procedure near the horizon.

		Example i			***Example i***		
LHA		22°			338°		
Lat.		75° N			78° S		
Dec.		13°16.3′ S			11°20.5′ N		
		Hc	d	Z	Hc	d	Z
From page 47		(+) 0°56.9′	(−)59.8′	158.6°†	(+) 0°08.9′	(−)59.8′	158.4°†
Int. Tab.	1st part	(−) 13.6			(−) 17.1		
	2nd part	(−) 2.7			(−) 3.3		
Total Correction		(−) 16.3			(−) 20.4		
Azimuth Angle, Z				158.6°			158.4°
Hc & Zn		(+) 0°40.6′		201.4°	(−) 0°11.5′		021.6°

		Example iii			***Example iv***		
LHA		158°			158°		
Lat.		80° N			82° S		
Dec.		9°24.6′ N			7°10.3′ S		
		Hc	d	Z	Hc	d	Z
From page 47		(−) 0°17.1′‡	(+)59.9′‡	158.3°†	(−) 0°25.4′‡	(+)59.9′‡	158.2°†
Int. Tab.	1st part	(+) 20.5			(+) 8.6		
	2nd part	(+) 4.0			(+) 1.7		
Total Correction		(+) 24.5			(+) 10.3		
Azimuth Angle, Z				21.7°*			21.8°*
Hc & Zn		(+) 0°07.4′		338.3°	(−) 0°15.1′		201.8°

***** Supplements of the tabular azimuth angles.

† Interpolated value.

‡ When entering the tables with LHA at the bottom of the page reverse the signs of the values extracted from above the C-S Line.

In example i, for latitude and declination of contrary name and LHA at top of page, the altitude correction is numerically less than the last tabular altitude above the C-S Line, so that the resulting interpolated altitude is positive. In example ii, for latitude and declination of contrary name, and LHA at top of page, the correction is numerically greater than the tabular altitude, so that the resulting altitude is negative. In example iii, for latitude and declination of same name, and LHA at bottom of page, the correction is greater than the tabular altitude, which is negative, so that the resulting altitude is positive. In example iv, for latitude and declination of same name and LHA at bottom of page, the correction is less than the tabular altitude, so that the resulting altitude is negative.

3. Negative Altitudes. This paragraph is restricted to tabular and interpolated altitudes for declinations other than one-degree intervals of declination containing the C-S Line. The latter is fully discussed in section C.2. Although negative altitudes are not tabulated as such within these volumes, they are immediately available to meet any requirement. For instance, for all local hour angles at the top of the right-hand page, all tabular or interpolated altitudes on that page for declination below the C-S Line, are negative; also for any local hour angle at the bottom of the right-hand page, all tabular or interpolated altitudes for declinations above the C-S Line, are negative; additionally, for these same local hour angles the tabular or interpolated altitudes for the left-hand page are negative. Interpolation of altitude for declination increments within these areas of negative altitude should, however, be accomplished as if the altitudes were positive, adhering strictly to the sign given d. Then, after interpolation, regard the results as negative. In all instances involving negative altitudes, except the one-degree interval of declination which includes the C-S Line, the supplement of the pertinent tabular azimuth angle is that to be converted to true azimuth by the rules to be found on each opening of the basic tables.

4. Interpolation near the Zenith. The altitude near the zenith is difficult to interpolate by the usual methods and the azimuth angle is indeterminate at the zenith.

For altitudes less than 86°—i.e., for zenith distances greater than 4°—interpolation of the tabular altitude for declination, utilizing both first and second differences and the Interpolation Table, may be made to within about 0.2′; linear interpolation for azimuth angle can be made to about 0.2°. Closer to the zenith, not only do second differences exceed the limits of the tables but higher differences are also significant. Within this region of a few degrees from the zenith, where normal interpolation methods are inadequate, the following method of using the tables for plotting a position line is recommended.

The method is based on the fact that usually both altitude and azimuth can be readily interpolated when the difference in the entering arguments, latitude ~ declination, remains constant. The position line may thus be plotted with the intercept determined by the altitude interpolated for equal intervals of latitude and declination, which is in this instance plotted from the pertinent integral latitude, increased by the increment of declination for which interpolation was made. The Interpolation Table is employed in carrying out the desired interpolation, but it should be noted that in this instance the values of altitude and azimuth extracted from the basic tables constitute data which require independent differencing; the tabular altitude difference, d, is not used.

To carry out the altitude interpolation, the basic tables are entered with the pertinent LHA and Dec. and, with the integral degree of Lat. so chosen that when increased by the declination increment, it is within 30′ of the known or DR latitude; this practice will prevent long intercepts. For these entering arguments and for a latitude and declination one degree less and one degree more than the above referenced latitude and declination, respectively, extract the tabular altitudes and azimuths. The altitudes and azimuths are then differenced and with these differences interpolation of altitude and azimuth for the desired declination is made, utilizing the Interpolation Table. The calculated altitude is then compared with that observed to determine the intercept, which together with the interpolated azimuth makes possible the construction of a position line, which is plotted from the assumed longitude, and from the latitude of the entering argument, augmented by the declination increment.

The following examples illustrate the preceding method utilizing the tabulations from page 12. Note that altitude and azimuth angle are interpolated to the required declination using the Interpolation Table but with arguments Dec. Inc. and altitude differences formed.

Example	LHA	Lat.	Dec.	Ho
i	5° 18′	76° 15′ S	75° 43.2′ S	88° 36.6′
ii	355 22	78 43 N	77 06.4 N	88 07.2
iii	4 46	80 24 N	79 52.1 N	89 01.5
iv	355 03	82 09 S	80 58.5 S	88 37.2

From page 12 (LHA = 5° or 355°, latitude and declination Same Name)

Example i

Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.
75°	74°	88°19.9′		124.4°	
			(+) 4.0′		(+) 1.8°
76°	75°	88°23.9′		126.2°	
			(+) 3.9′		(+) 1.9°
77°	76°	88°27.8′		128.1°	

Interpolate to Dec.=75° 43.2′
Dec. Inc. = 43.2′, diff. = (+)3.9′ and Z diff. = (+)1.9°

Tab. Hc		88°23.9′	Tab. Z	126.2°
Int. Tab.	1st part	0.0′		
	2nd part	(+) 2.8′		(+) 1.4′
	Hc	88°26.7′	Z	127.6°
	Ho	88°36.6′		
Intercept		9.9′ T	Zn	307.6°
		Plot from Lat. 76°43.2′ S		

Example ii

Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.
78°	76°	87°42.4′		148.2°	
			(+) 2.5′		(+) 1.9°
79°	77°	87°44.9′		150.1°	
			(+) 2.3′		(+) 1.9°
80°	78°	87°47.2′		152.0°	

Interpolate to Dec.=77° 06.4′
Dec. Inc. = 06.4′, diff. = (+)2.3′ and Z diff. = (+)1.9°

Tab. Hc		87°44.9′	Tab. Z	150.1°
Int. Tab.	1st part	0.0′		
	2nd part	(+) 0.2′		(+) 0.2′
	Hc	87°45.1′	Z	150.3°
	Ho	88°07.2′		
Intercept		22.1′ T	Zn	150.3°
		Plot from Lat. 79°06.4′ S		

Example iii

Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.
79°	78°	88°35.3′		132.6°	
			(+) 3.6′		(+) 2.6°
80°	79°	88°38.9′		135.2°	
			(+) 3.4′		(+) 2.8°
81°	80°	88°42.3′		138.0°	

Interpolate to Dec.=79° 52.1′
Dec. Inc. = 52.1′, diff. = (+)3.4′ and Z diff. = (+)2.8°

Tab. Hc		88°38.9′	Tab. Z	135.2°
Int. Tab.	1st part	0.0′		
	2nd part	(+) 3.0′		(+) 2.4′
	Hc	88°41.9′	Z	137.6°
	Ho	89°01.5′		
Intercept		19.6′ T	Zn	222.4°
		Plot from Lat. 80°52.1′ S		

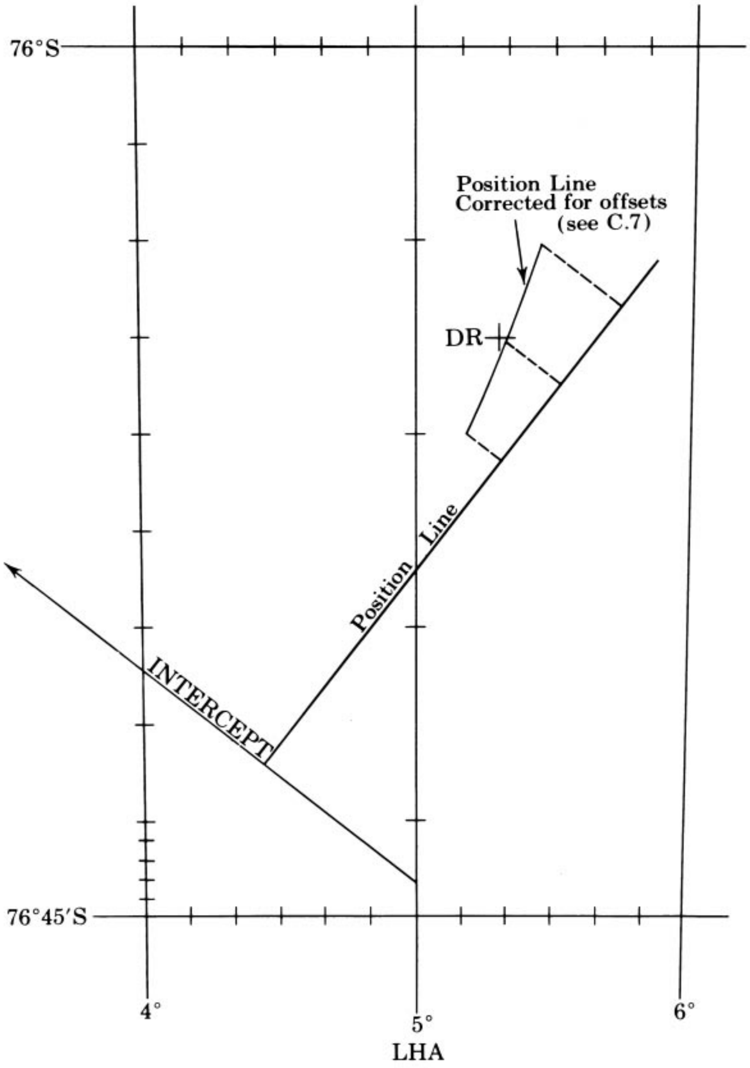
Example iv

Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.
80°	79°	88°38.9′		135.2°	
			(+) 3.4′		(+) 2.8°
81°	80°	88°42.3′		138.0°	
			(+) 3.1′		(+) 3.0°
82°	81°	88°45.4′		141.0°	

Interpolate to Dec.=80° 58.5′
Dec. Inc. = 58.5′, diff. = (+)3.1′ and Z diff. = (+)3.0°

Tab. Hc		88°42.3′	Tab. Z	138.0°
Int. Tab.	1st part	0.0′		
	2nd part	(+) 3.0′		(+) 2.9′
	Hc	88°45.3′	Z	140.9°
	Ho	88°37.2′		
Intercept		8.1′ A	Zn	039.1°
		Plot from Lat. 81°58.5′ S		

A plot of Example i is shown in Figure 3.



Plot of Example (i); the Position Line has been corrected using offsets as described in Section C.4 and Section C.7.

FIGURE 3

5. Indeterminate Azimuths. When the body is in the zenith its azimuth is indeterminate, that is when LHA = 0° and when latitude and declination are equal and have the Same Name. In these cases Z is tabulated as 90° or as one-half the preceding value. There are 91 of these cases.

When latitude = 90° and declination = 90° the altitude = 90° for all hour angles. Here the value of Z tabulated is one-half the preceding value. There are 182 of these cases, two of which are included in the previous set. In the above cases the tabulated azimuth angles are the mathematical limits of the azimuth angle when the limit is approached in a specified direction.

In the special cases when the latitude = 90°, i.e., at the poles, all directions from the North Pole are south and from the South Pole are north; the criterion adopted in these cases has been to tabulate the azimuth as equal to 180° minus LHA, i.e., the directions are tabulated as the angular directions from the lower branch of the Greenwich meridian. There are 90 × 180 of these cases not included in the previous sets.

6. Interpolation for Latitude and Local Hour Angle. Although interpolation of altitude will normally be required for declination only, there will be instances in which interpolation of altitude for latitude and local hour angle will also be required. At a tabular interval of 1°, interpolation of the altitude for latitude or local hour angle is not always linear; numerical interpolation to the full precision of the tables would be quite impracticable, even if differences or other aids to interpolation were provided. The difficulty can, however, be avoided by the use of the following method.

In principle the method consists of constructing, on a constant-scale auxiliary plotting sheet (Diagram C), the intercept between the zenith of the assumed position (which is the position for which the altitude interpolated for declination is known) and the position circle passing through the zenith of the position for which the altitude is required. This is achieved by the use of auxiliary Diagrams A and B, which are incorporated in each volume of the tables. Diagram A, which consists of a series of graduated parallels and meridians, is used in plotting the zenith of the actual position on Diagram C, in correct relationship to its center, which represents the zenith of the assumed position. Diagram B, which consists of a series of position circles for various altitudes plotted on a graduated center line, is used to place the position circle accurately through the zenith of the position for which the altitude is desired. Diagram C is a loose transparency, a copy of which is supplied with each volume of the tables.

Before effecting the interpolation of altitude for Lat. and LHA, the tabular altitude is to be interpolated to the declination of the observed body. The interpolated respondents then relate to the specific point on Diagram A defined by the intersecting parallel and meridian having the same label as the latitude and local hour angle, respectively, entering into the above solution, i.e., the parallel of the latitude entry, the central meridian P_0°.

The point for which the further interpolation is required is the intersection of another parallel and meridian, defined by coordinates differing from those of the former point by the pertinent increments of latitude and local hour angle. Instructions for this interpolation appear in Fig. 4, a composite of Diagrams A, B, and C, which illustrates the following example.

Example i. *Required.*—Determine the altitude and azimuth of *Kochab* at GMT $02^{h}17^{m}34^{s}$ in DR latitude 80°28′ N, longitude 162°24′ W.

From *The Nautical Almanac:*

GHA and Dec. of *Kochab*	316°50.4′	74°16.7′ N
Longitude	162°24.0′ W	
LHA	154°26.4′	

From page 55

		Hc	d	Z
LHA 154°, Lat. 80°, Dec. 74° (Same)		64°38.4′	(+) 59.0′	16.3°†
Int. Tab.	Dec. Inc. 16.7′, d 50.0′, 1st part	(+) 13.9′		
	Dec. Inc. 16.7′, d 9.0′, 2nd part	(+) 2.5′		
Altitude interpolated for Dec.		64°54.8′		
Corr. from A, B, C, Diagrams (see opposite page)		(+) 25.6′		
Altitude interpolated for LHA, Lat. & Dec.		65°20.4′	Zn 343.7°	
Altitude computed directly for exact coordinates		65°20.5′		

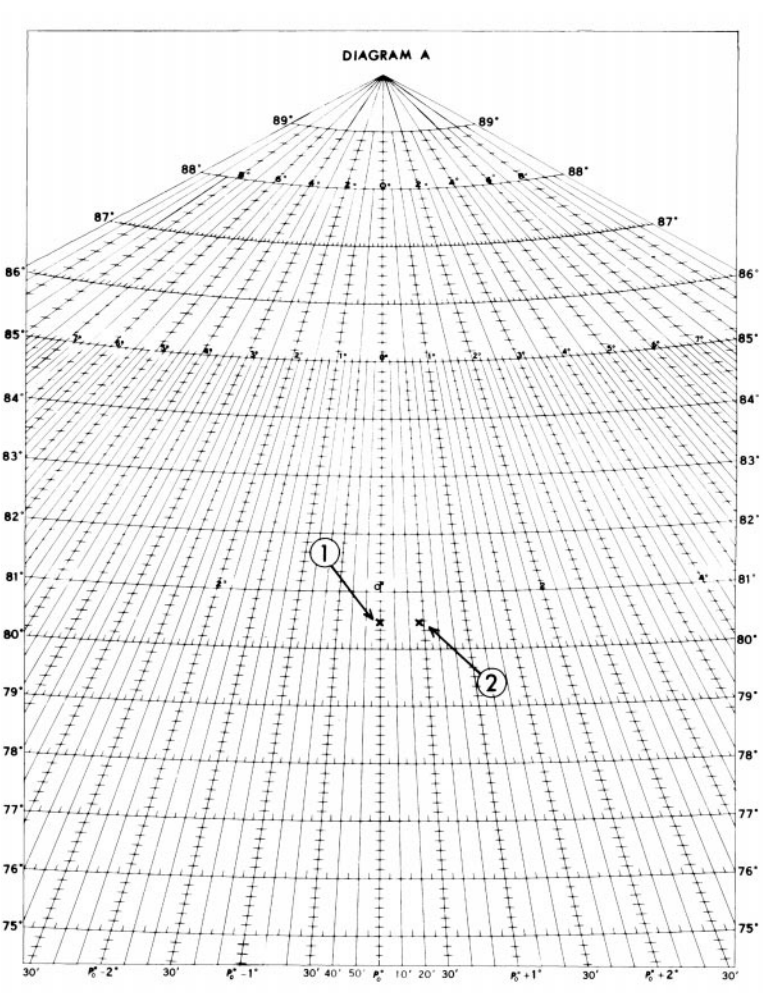
† Interpolated value.

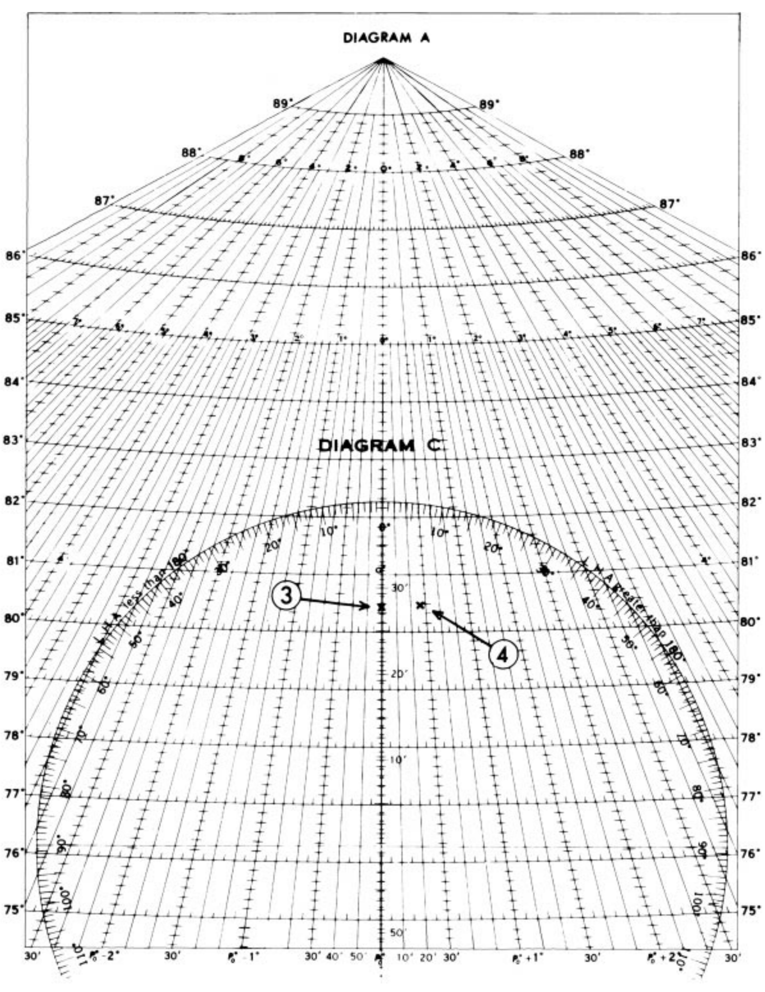
Note that the central meridian of A is taken as 154° (i.e., P_0° = 154°); the latitude (1) marked on the central meridian is 80°28′, and the increment of LHA is 26.4′; the intersection of the parallel of 80°28′ and increment of LHA is marked (2). C is superimposed on A so that the central meridians coincide, and the 28′ division on C marked (3) coincides with (1) on A; the position of (2) on A is transferred to C as (4). On the periphery of C the azimuth angle, 16.3°, marked (5), chosen to left of center line because LHA is less than 180°; C is then superimposed on B with the center of C and the indicated azimuth angle immediately over the center line of B; maintaining this orientation, C is moved vertically up or down until (4) falls upon the 65°/53° position line; the distance (7) is that from the center of C to the intersection of the position line with the center line of B. This distance, 25.6′, is the correction to be applied to the altitude to correct for the increments of latitude and LHA—added since the center of C is below the chosen position line.

Instructions for use of Diagrams A, B and C (for brevity these Diagrams are referred to as A, B and C, and ordered numbers of the instruction by their numbers). Altitude and azimuth have already been interpolated for declination

1. Mark the actual latitude on the center line of A.
2. Locate the actual L H A (right or left of the center line) and mark its intersections with the parallel defined by (1).
3. Lay C over A with the center lines in coincidence, and with the odd minutes of the actual latitude indicated on the center line of C immediately over the point (1) marked on A.
4. Trace on C the point of intersection (2) from A.
5. Remove C from A and mark on C the interpolated azimuth angle, choosing the angle to the left of 0° if the L H A is less than 180°, and to the right if greater than 180°.
6. Transfer C to B and with both the center of C and the marked azimuth angle* (5) placed in the toward direction over the center line of B, adjust C vertically to bring (4) on C immediately ove the position circle of B, the range of which includes the interpolated altitude.
7. Measure the distance (intercept) in minutes, along the center line of B, from the position circle used in 6 to the center of C. This is the altitude correction.
8. Apply the distance (7), with the sign indicated on B, to the altitude interpolated for declination and so obtain the altitude Hc interpolated now for all three arguments.

*Should (5) be beyond the range of the center line of Diagram **B** use the supplementary azimuth diametrically opposite.





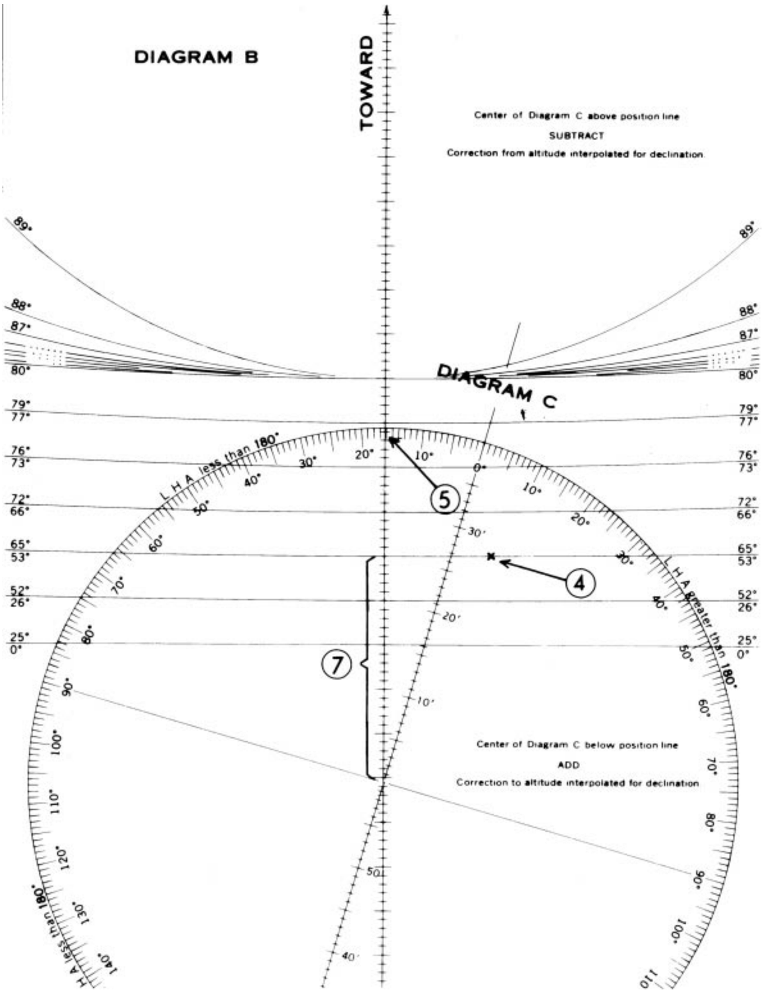


FIGURE 4

	Example ii	***Example iii***	***Example iv***
LHA	330° 35.3′	43° 25.0′	248° 27.1′
Lat.	77° 36.3′ S	85° 27.6′ N	76° 31.2′ N
Dec.	12° 50.5′ S	75° 38.7′ N	85° 57.0′ N

	Hc	d	Z	Hc	d	Z	Hc	d	Z
From page 60, 270, 139	22°24.6′	(+)59.7′	149.0°†	78°10.0′	(+)57.2′	119.6°†	74°26.0′	(+)36.6′	14.6°†
Int. Tab. 1st part	(+) 42.1			(+)32.3			(+)28.5		
Int. Tab. 2nd part	(+) 8.2			(+) 4.6			(+) 6.3		
Alt. Interpolated for Dec.	23 14.9			78 46.9			75 00.8		
A, B, C, Dia. Corr.	(+) 17.7			(–) 15.7			(–) 26.3		
Alt. Interpolated for LHA, Lat., & Dec.	23 32.6			78 31.2			74 34.5		
Computed values	23 32.4		Zn 031.0	78 31.2		Zn 240.4	74 34.5		Zn 014.6

† Interpolated value.

In example iv, although the double-second difference of the altitude is 4.9′, the correction is in this case zero.

Alternative method for interpolating altitude for latitude and local hour angle.

The table of offsets, page xxii, can also be used to determine graphically the required correction to apply to the altitude at an assumed position to give the altitude at the DR position.

In the diagram (Fig. 5):

D is the DR position.
A is the assumed position.
Zn is the azimuth of the body S.
ED is a segment of the position circle through D.
CD is part of the position line through D.

If *H* is the altitude (interpolated for declination) of S at A, then the altitude at D, which is equal to the altitude at E, is *H*–CA–EC, where CA is the distance of the position line from A and EC is the offset corresponding to the altitude of the body and the distance CD.

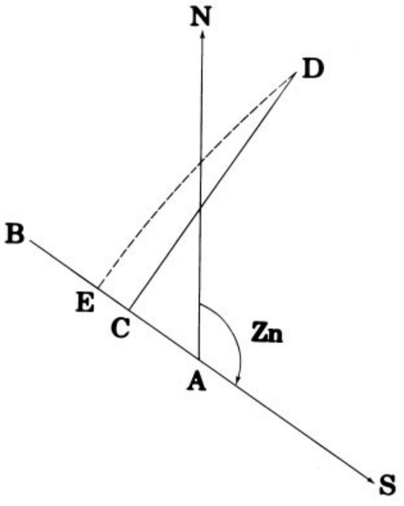


FIGURE 5

Instructions for use:

1. Draw the azimuth line from A in the azimuth, Zn.
2. Drop a perpendicular from D to AB at C.

3. Measure CA and CD in nautical miles.
4. From the table of offsets find the offset, EC, corresponding to the altitude, *H*, and the distance CD.
5. Form the altitude at D as *H* ±CA–EC; note that CA is to be added if C is toward S from A and subtracted if C is away; EC is always to be subtracted.

The above method will give highly satisfactory results except when plotting on a Mercator chart in high latitudes.

7. Position Circles and Position Lines. The navigator, working on a Mercator chart or plotting sheet, draws his position line at the extremity of an intercept and at right angles to it. Both the intercept and the position line are drawn as straight lines, rhumb lines on the Mercator projection. The intercept is in reality part of a great circle and the position line is part of a small circle with radius equal to the zenith distance of the observed body. When using these basic sight reduction tables near the equator and interpolating for declination only, the assumed or chosen position can be $(30^2+30^2)^{1/2}=42'$ from the DR position, so that the intercept can have a maximum value of 42′ (and occasionally may be greater if the DR position is in error) when the position line segment is very short; the position line segment can have a maximum value of 42′, when the intercept is very short; in latitude 75° these maxima reduce to 31′ due to the convergence of the meridians. The error in drawing the intercept (azimuth line) as a rhumb line is negligible except in high latitudes, but the error of drawing the position circle as a rhumb line can reach a maximum of 1.0′ at the equator when the altitude is 75°; in latitude 60° the maximum error for altitude 75° is 0.8′; the error diminishes directly as the tangent of the altitude and does not exceed 0.5′ when the altitude is less than 60°.

The table on page xxii gives the correction to a position line, assumed to be a great circle, to obtain the small circle corresponding to the altitude. The corrections eliminate the major portion of the error of a position line as normally drawn. The table on page xxii gives, for all altitudes and at intervals of 5′ along the position line from the intercept, the offsets required to establish the position circle in lieu of the position line. The offsets should be plotted, as in Fig. 3, from the position line in the direction of the observed body, i.e., perpendicular to the position line—usually two offsets only need be plotted and joined by a straight line to give a portion of the position circle. An extension of this table for polar plotting appears in section C.10, Volume 6 only.

An error of 0.1° in azimuth will introduce a maximum error of 0.07′ in the position line. Hence care should be taken in interpolating the azimuth and plotting the resulting line.

An error of one second in the timing of an observation can produce a maximum error of 0.25′ in the derived position line at the equator, the error depending on the azimuth of the observed body and the latitude of the observer; the error in timing diminishes as the latitude increases, so that in latitude 60° the maximum error in the position line due to an error of one second in timing is 0.12′. Observations made in azimuths near 90° or 270° require the greatest accuracy in timing.

In order to obtain the maximum precision in plotting position lines from assumed (or chosen) positions, consideration should be given to the following points:

(i) Observations should be timed to one quarter of a second if possible.
(ii) A correction for the effect of second differences should be applied when the observed altitude is high (see page xiii).
(iii) A chart or plotting sheet utilizing the stereographic, Lambert conformal, or transverse Mercator projection should be used in preference to the standard Mercator projection, when the latitude is greater than about 60°. Instructions are given on page xxiii for constructing a plotting sheet using Diagram A.
(iv) Position lines should be corrected by means of the offsets tabulated in the table on page xxiv when the observed altitude is very high; these offsets can be applied when plotting on any standard navigational chart.

DIAGRAM A

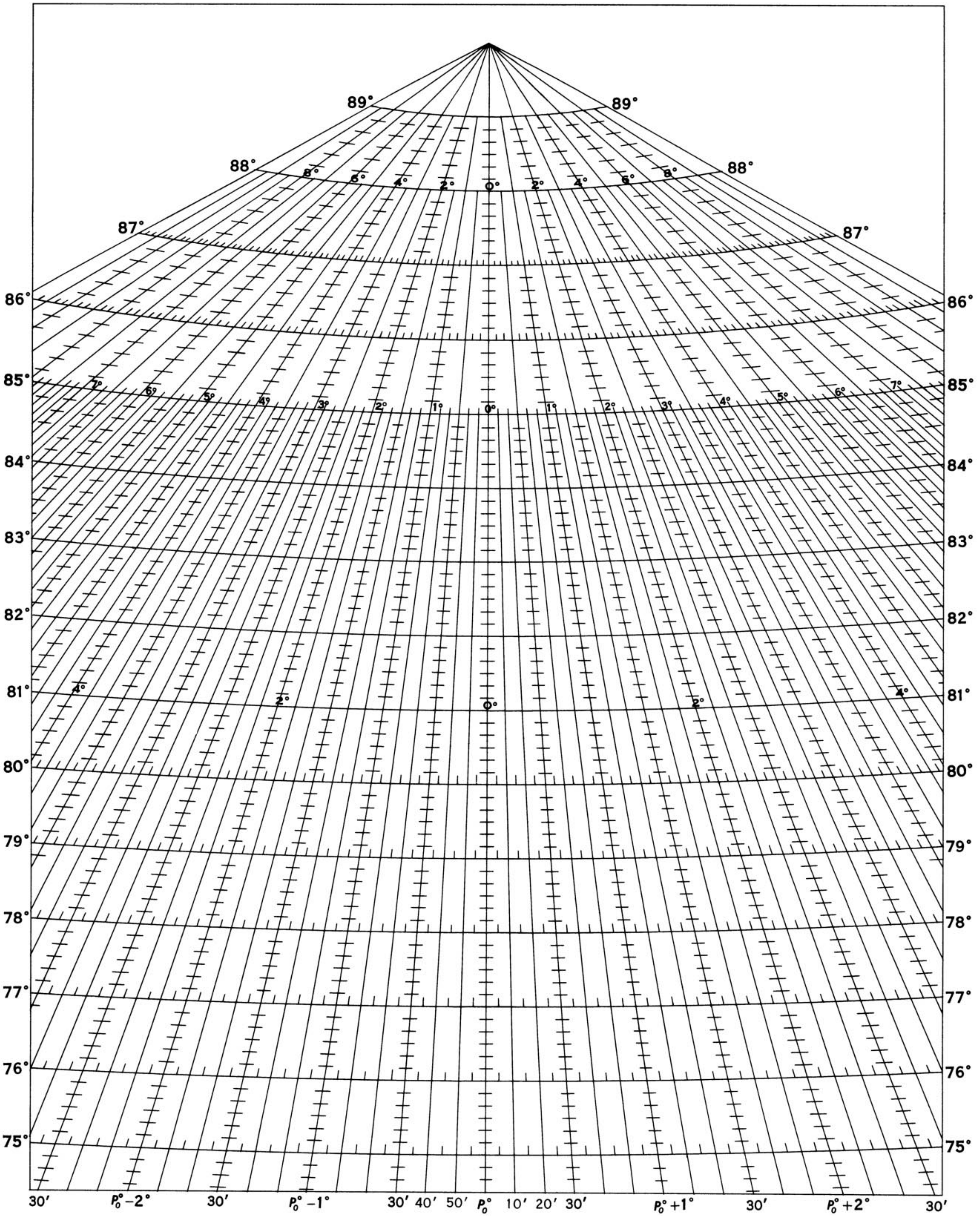
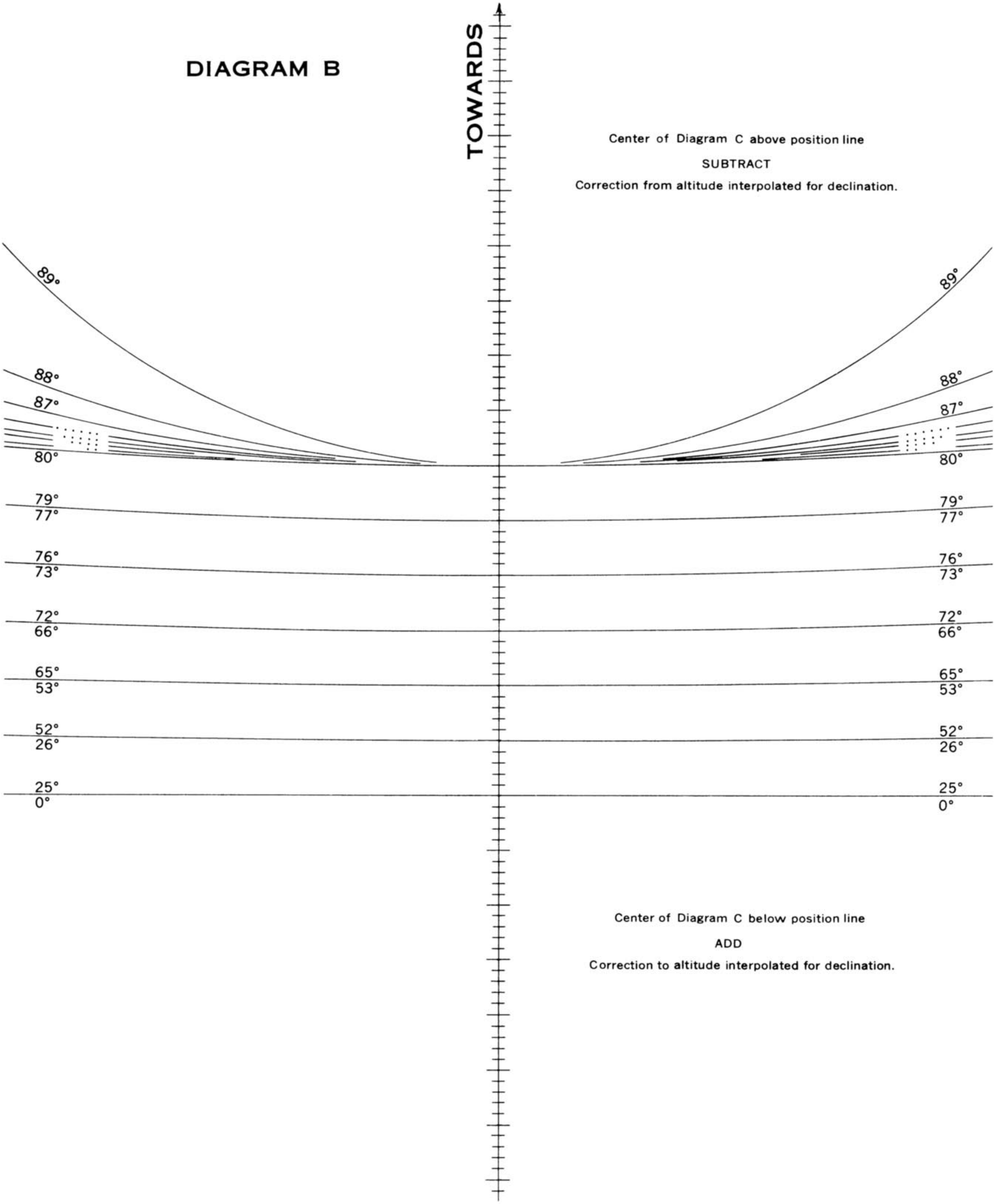

89°
88°
87°
86°
85°
84°
83°
82°
81°
80°
79°
78°
77°
76°
75°
8°
6°
4°
2°
0°
7°
5°
3°
1°
30′
$P_0^\circ - 2°$
$P_0^\circ - 1°$
40′
50′
P_0°
10′
20′
$P_0^\circ + 1°$
$P_0^\circ + 2°$

DIAGRAM B



Center of Diagram C above position line

SUBTRACT

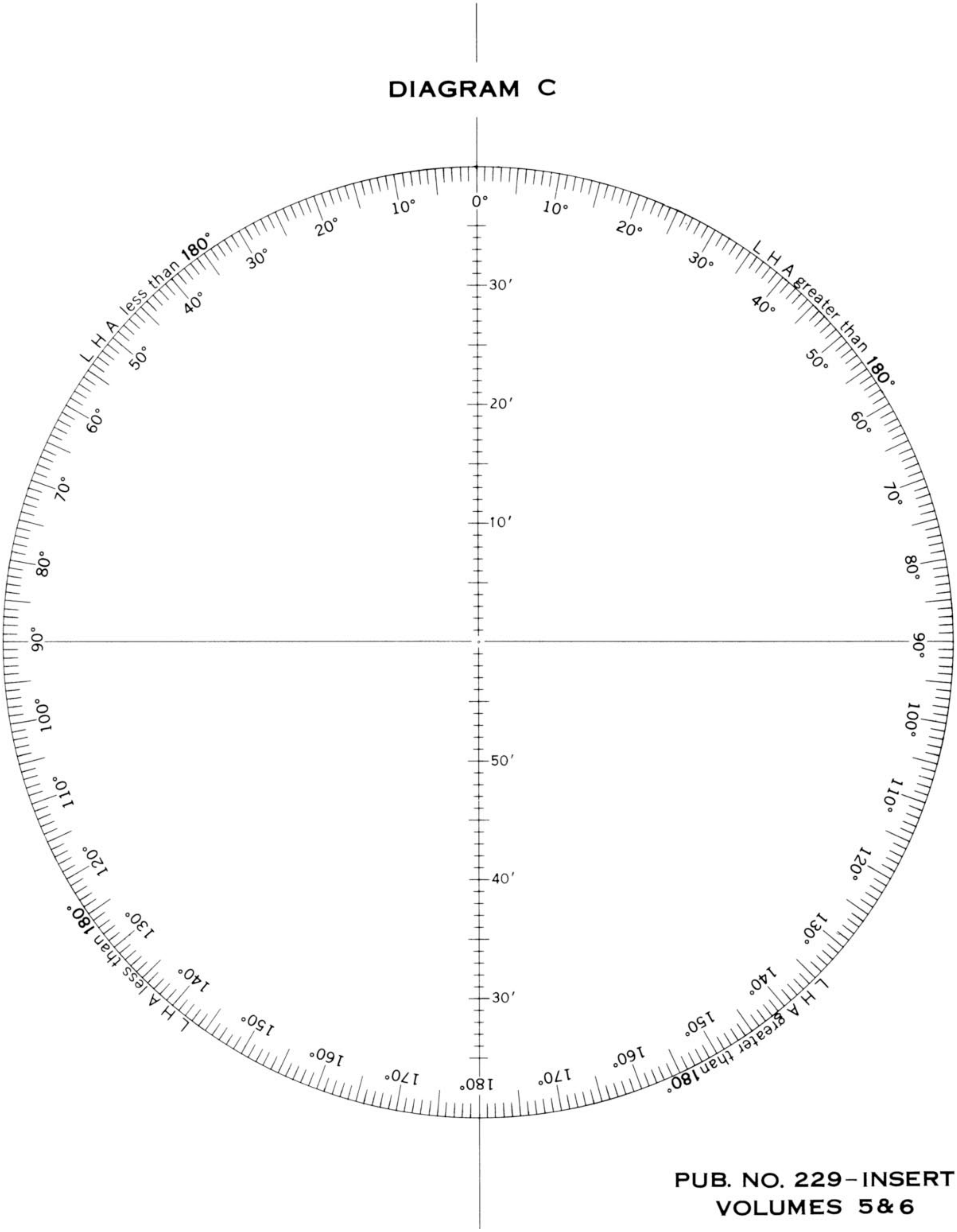
Correction from altitude interpolated for declination.

Center of Diagram C below position line

ADD

Correction to altitude interpolated for declination.

DIAGRAM C



PUB. NO. 229–INSERT
VOLUMES 5&6

TABLE OF OFFSETS (ALTITUDES 0° TO 89°)

DISTANCE ALONG LINE OF POSITION FROM INTERCEPT

	00′	05′	10′	15′	20′	25′	30′	35′	40′	45′	
ALT.	**OFFSETS**										***ALT.***
0°	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0°
30	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	30
40	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	40
50	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	50
55	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	55
60	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	60
62	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	62
64	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	64
66	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.7	66
68	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.6	0.7	68
70	0.0	0.0	0.0	0.1	0.2	0.2	0.4	0.5	0.6	0.8	70
71	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	71
72	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	72
73	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.0	73
74	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	74
75	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.7	0.9	1.1	75
76	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.2	76
77	0.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.3	77
78	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.4	78
79	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.5	79
80.0	0.0	0.0	0.1	0.2	0.3	0.5	0.7	1.0	1.3	1.7	80.0
80.5	0.0	0.0	0.1	0.2	0.3	0.5	0.8	1.1	1.4	1.8	80.5
81.0	0.0	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.5	1.9	81.0
81.5	0.0	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.6	2.0	81.5
82.0	0.0	0.0	0.1	0.2	0.4	0.6	0.9	1.3	1.7	2.1	82.0
82.5	0.0	0.0	0.1	0.2	0.4	0.7	1.0	1.4	1.8	2.2	82.5
83.0	0.0	0.0	0.1	0.3	0.5	0.7	1.1	1.5	1.9	2.4	83.0
83.5	0.0	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.0	2.6	83.5
84.0	0.0	0.0	0.1	0.3	0.5	0.9	1.2	1.7	2.2	2.8	84.0
84.5	0.0	0.0	0.2	0.3	0.6	1.0	1.4	1.9	2.4	3.1	84.5
85.0	0.0	0.0	0.2	0.4	0.7	1.0	1.5	2.1	2.7	3.4	85.0
85.5	0.0	0.0	0.2	0.4	0.7	1.2	1.7	2.3	3.0	3.8	85.5
86.0	0.0	0.1	0.2	0.5	0.8	1.3	1.9	2.6	3.4	4.3	86.0
86.5	0.0	0.1	0.2	0.5	1.0	1.5	2.2	2.9	3.8	4.9	86.5
87.0	0.0	0.1	0.3	0.6	1.1	1.7	2.5	3.4	4.5	5.7	87.0
87.5	0.0	0.1	0.3	0.8	1.3	2.1	3.0	4.1	5.4	6.9	87.5
88.0	0.0	0.1	0.4	0.9	1.7	2.7	3.8	5.2	6.9	8.8	88.0
88.5	0.0	0.2	0.6	1.3	2.3	3.5	5.1	7.1	9.4	12.1	88.5
89.0	0.0	0.3	0.8	1.9	3.4	5.5	8.0	11.3	15.3	20.3	89.0

The distance is measured along the position line from the intercept. The offsets are to be drawn at right angles to the position line in the direction of the observed body. Join the extremities of the offsets to obtain the position circle.

8. Construction of a Plotting Sheet. Although essential navigational charts and plotting sheets normally will be available, it may become necessary for the navigator to construct an accurate graticule of a particular area for immediate use. The following instructions provide a rapid method of construction utilizing Diagram A. Each parallel of this diagram is projected as if the plane of projection were tangent at that parallel; hence these parallels may be used to establish an accurate small area plotting sheet, resembling the stereographic projection.

Instructions—Draw a straight line to form the central meridian on a suitable sheet of paper and mark intervals of six inches along this line (these will be the points through which the parallels for successive integral degrees of latitude must be drawn); place a piece of tracing paper over Diagram A in the area required, and mark the intersections of the meridians and parallels; transfer the tracing to the construction sheet and superimpose the tracing paper over the central meridian, with each parallel occupying successively the points through which it is desired to draw that parallel and "mark through" sufficient intersections of each parallel with successive meridians. The indicated points can then be connected to establish the parallels, and the meridians can be drawn in as straight lines.

When using the plotting sheet, all azimuths must be measured from the local meridian; the scale will be 10 nautical miles to one inch.

9. Variation of Altitude with Time. Inspection of successive altitude differences in the basic tables reveals immediately the change in altitude due to a change of one degree in the declination argument. Frequently navigators desire to ascertain the change with time of the altitude of a celestial body. The difference between the tabular values of the altitude given for the same arguments of latitude and declination, but differing by one degree in LHA, indicates the change of the altitude over a period of four minutes of time. In general the latitude and declination need only be used to the nearest integral degree in order to obtain a good approximation of the rate of change. To determine this approximate rate of change with time, enter the tables with integral degrees of LHA, latitude, and declination, and extract the altitude; turn to the next opening—next value of LHA—and with the same arguments for latitude and declination, extract the corresponding altitude; the difference between the two altitudes divided by four is the rate of change of altitude of the body in one minute of time.

10. Polar Plotting. For navigation within a few degrees of the pole it is convenient to adopt the pole as the assumed position and plot from that geographic position or point. At the pole the declination of the observed body, and the calculated altitude, Hc, coincide, and the GHA at the time of observation coincides with the azimuth of the observed body, measured westward from the Greenwich meridian; the intercept is thus the difference between the observed altitude, Ho, and the declination. Thus the position line may be constructed without extracting data from basic sight reduction tables. This method, however, frequently involves the use of long position lines which must be modified if accurate results are required.

The table on page xxiv gives offsets in minutes of are (nautical miles) for observed altitudes to 70° at distances to 300 minutes of arc along the position line from the intercept; the offset for any altitude and any point along the position line is the distance separating the position line from the position circle; the offsets are to be plotted perpendicular to the position line and toward the observed body. Normally only two offsets, in the vicinity of the DR position, need be plotted and their extremities joined by a straight line, to give a very good approximation to that part of the position circle.

The following example illustrates the calculation and plotting procedure for a typical sight when:

(i) the pole is used as the assumed position;
(ii) an assumed position is chosen in the usual way.

TABLE OF OFFSETS (ALTITUDES 0° TO 70°)

	DISTANCE ALONG LINE OF POSITION FROM INTERCEPT														
	20′	40′	60′	80′	100′	120′	140′	160′	180′	200′	220′	240′	260′	280′	300′	
ALT.	OFFSETS															ALT.
0°	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0°
5	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	5
10	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.5	1.7	2.0	2.3	10
15	0.0	0.1	0.1	0.2	0.4	0.6	0.8	1.0	1.3	1.6	1.9	2.2	2.6	3.1	3.5	15
20	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.4	1.7	2.1	2.6	3.1	3.6	4.2	4.8	20
25	0.0	0.1	0.2	0.4	0.7	1.0	1.3	1.7	2.2	2.7	3.3	3.9	4.6	5.3	6.1	25
30	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.1	2.7	3.4	4.1	4.8	5.7	6.6	7.6	30
35	0.0	0.2	0.4	0.7	1.0	1.5	2.0	2.6	3.3	4.1	4.9	5.9	6.9	8.0	9.2	35
40	0.0	0.2	0.4	0.8	1.2	1.8	2.4	3.2	4.0	4.9	6.0	7.1	8.4	9.7	11.1	40
45	0.1	0.2	0.5	0.9	1.5	2.1	2.9	3.7	4.7	5.8	7.0	8.4	9.8	11.4	13.1	45
50	0.1	0.3	0.6	1.1	1.7	2.5	3.4	4.4	5.6	6.9	8.4	10.0	11.7	13.6	15.6	50
52	0.1	0.3	0.7	1.2	1.9	2.7	3.7	4.8	6.0	7.5	9.0	10.7	12.6	14.6	16.8	52
54	0.1	0.3	0.7	1.3	2.0	2.9	3.9	5.1	6.5	8.0	9.6	11.6	13.6	15.7	18.1	54
56	0.1	0.3	0.8	1.4	2.2	3.1	4.2	5.5	7.0	8.6	10.5	12.5	14.6	17.0	19.5	56
58	0.1	0.4	0.8	1.5	2.3	3.4	4.6	6.0	7.6	9.3	11.3	13.5	15.8	18.3	21.1	58
60	0.1	0.4	0.9	1.6	2.5	3.6	4.9	6.5	8.2	10.1	12.2	14.6	17.1	19.8	22.8	60
61	0.1	0.4	0.9	1.7	2.6	3.8	5.1	6.7	8.5	10.5	12.7	15.2	17.8	20.7	23.8	61
62	0.1	0.4	1.0	1.8	2.7	3.9	5.4	7.0	8.9	11.0	13.3	15.8	18.6	21.6	24.8	62
63	0.1	0.5	1.0	1.8	2.9	4.1	5.6	7.3	9.3	11.5	13.9	16.5	19.4	22.5	25.9	63
64	0.1	0.5	1.1	1.9	3.0	4.3	5.9	7.7	9.7	12.0	14.5	17.3	20.3	23.5	27.1	64
65	0.1	0.5	1.1	2.0	3.1	4.5	6.1	8.0	10.1	12.5	15.2	18.1	21.2	24.6	28.3	65
66	0.1	0.5	1.2	2.1	3.3	4.7	6.4	8.4	10.6	13.1	15.9	18.9	22.2	25.8	29.7	66
67	0.1	0.5	1.2	2.2	3.4	4.9	6.7	8.8	11.1	13.8	16.7	19.9	23.4	27.1	31.2	67
68	0.1	0.6	1.3	2.3	3.6	5.2	7.1	9.2	11.7	14.5	17.5	20.9	24.6	28.5	32.8	68
69	0.2	0.6	1.4	2.4	3.8	5.5	7.4	9.7	12.3	15.2	18.5	22.0	25.9	30.0	34.5	69
70	0.2	0.6	1.4	2.6	4.0	5.8	7.9	10.3	13.0	16.1	19.5	23.2	27.3	31.7	36.5	70

The distance is measured along the position line from the intercept. The offsets are to be drawn at right angles to the position line in the direction of the observed body. Join the extremities of the offsets to obtain the position circle.

Example—On a certain date in DR position 88°20′ S, 66°40′ E, the following observations of two stars were made. At GMT $12^{h}42^{m}34^{s}$ the observed altitude of *Canopus* was 51°15.6′; at $12^{h}47^{m}49^{s}$ the observed altitude of *Achernar* was 56°06.1′.

		Canopus			*Achernar*	
GHA♈	12^{h}	165°38.4′		12^{h}	165°38.4′	
Inc.	$42^{m}34^{s}$	10 40.2		$47^{m}49^{s}$	11 59.2	
SHA, Dec.		264 11.4	52°40.2′ S		335 51.1	57°23.4′ S
GHA☆	$12^{h}42^{m}34^{s}$	80 30.0		$12^{h}47^{m}49^{s}$	153 28.7	

(i) For the South Pole as the assumed position.

GHA	(Long. W)	80°30.0′	(Long. W)	153°28.7′
Dec.		52 40.2 S		57 23.4 S
Ho		51 15.6		56 06.1
Intercept		1 24.6 A		1 17.3 A

(ii) For the normal method, assumed latitude = 88° S

GHA☆	80°30.0′	153°28.7′
aλ	66°30.0′ E	66°31.3′ E
LHA	147	220

	Hc	d	Z		Hc	d	Z
From page 251	50°18.6′	(+)60.0′	31.7°†	page 265	55°26.8′	(+)60.0′	38.1°†
Alt. Corr.	(+) 40.2*				(+) 23.4*		
Hc	50 58.8				55 50.2		
Ho	51 15.6				56 06.1		
Intercept	16.8 T	Zn 211.7			15.9 T	Zn 141.9	

*When d = 60.0′ the use of the Interpolation Table is not required, for the change in altitude is equal to the change in declination, hence the altitude correction is equal to the declination increment. †Interpolated value.

The plotting sheet portraying these data was constructed using Diagram A, then reduced to scale.

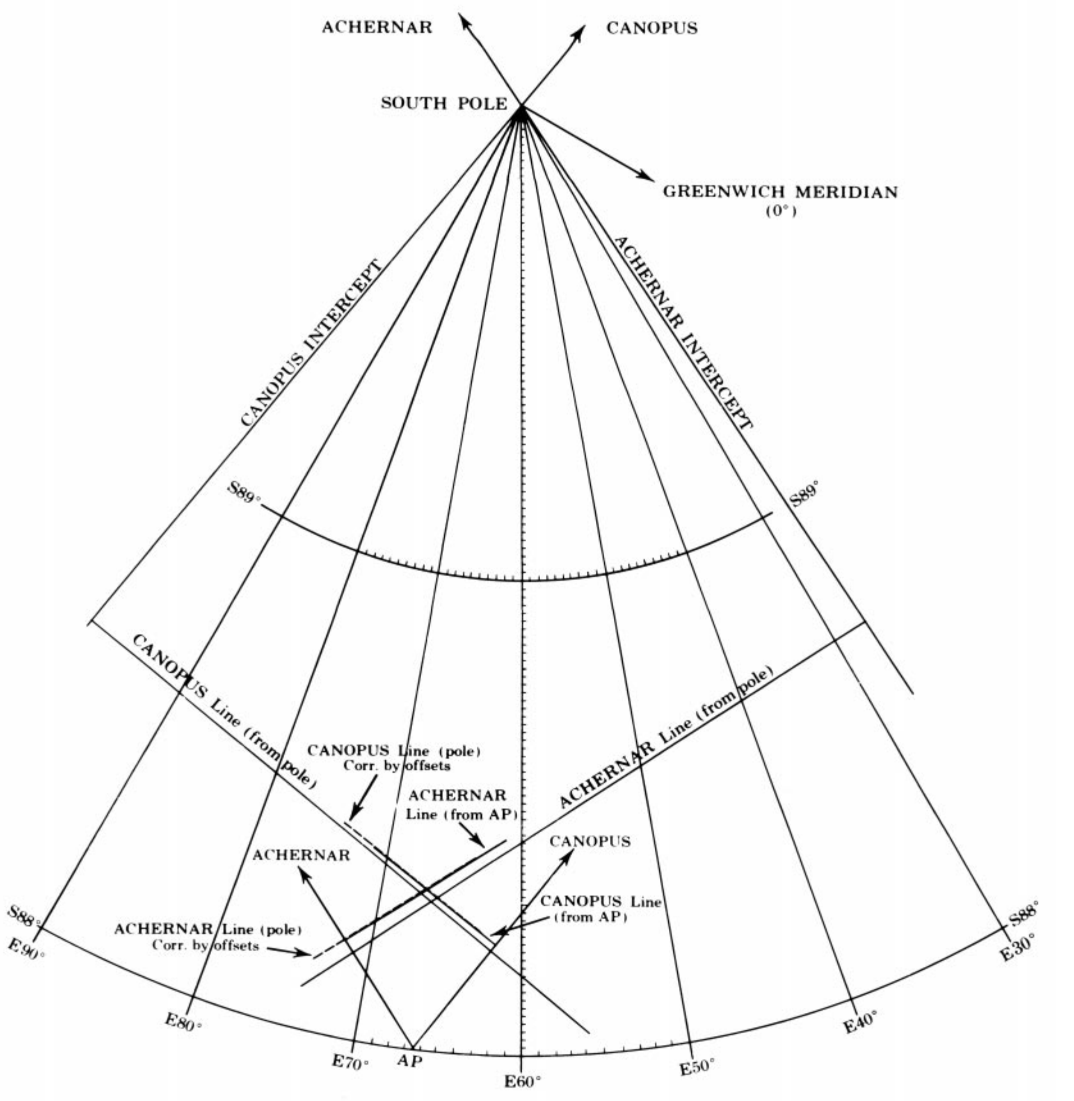


Figure 6—Plot from pole using offsets gives same fix as normal plot.

11. The Polar Grid. Because of the rapid convergence of meridians in polar areas, polar charts are often overprinted with a series of parallel lines called a GRID; by convention they are drawn parallel to the Greenwich meridian. Grid North is taken to be the direction north along the Greenwich meridian to the north pole, then south along the 180° meridian to the south pole.

A straight line on a polar chart has the same direction with reference to all the grid lines and therefore represents a constant grid direction.

The direction of grid north at any point differs from true north by the longitude of the point and is measured from TRUE NORTH as follows:

LONGITUDE	*N. HEMISPHERE*	*S. HEMISPHERE*
EAST	CLOCKWISE	COUNTERCLOCKWISE
WEST	COUNTERCLOCKWISE	CLOCKWISE

If T represents the true direction and G the grid direction, these can be converted from one to the other as follows:

N. HEMISPHERE	*S. HEMISPHERE*
G=T+Long. W	G=T–Long. W
G=T–Long. E	G=T+Long. E
T=G–Long. W	T=G+Long. W
T=G+Long. E	T=G–Long. E

The above formulas hold true only when the convergency is 1.0, but can generally be considered accurate enough for navigational purposes in polar latitudes.

D. OTHER APPLICATIONS

1. Star Identification. Since many navigators either know their stars or have preferred means of identification, including the use of star finders, star charts, star globes, etc., no formal star identification tables are included in these volumes. Nevertheless, in cloud-covered skies, an unidentified star may be the only body visible for positioning, and it then becomes necessary to identify it from its observed altitude and azimuth. A simple approach to star identification, from a knowledge of observed altitude and azimuth, is to scan the pages of the appropriate latitudes of the specific volume of these tables and observe the combination of arguments which give the altitude and azimuth of the observation. Thus the declination and LHA☆ is directly determined. From these quantities the star can be identified from *The Nautical Almanac*.

In view of the navigator's knowledge of the date and time of observation and his approximate position (latitude and longitude), another solution is available through an interchange of arguments. The procedure consists of entering the tables with the known latitude, with the observed azimuth as LHA, and the observed altitude as declination, and extracting from the tables, for these arguments, the altitude and azimuth respondents; the extracted altitude becomes the body's declination, the extracted azimuth the body's local hour angle. The tables should always be entered with integral declination of same name, nearest the observed altitude, although the respondents may come from either same or contrary name areas; in the latter case the required declination is of contrary name. The star's SHA is found from SHA☆=LHA☆–LHAϒ. The tabular arrangement, on page xxvii, offers guidance for the solution which is required only to the nearest integral degree.

D. OTHER APPLICATIONS

Entering arguments			Range of Obs. Az.	Location of Hc and Z	Star coordinates	
LAT.	LHA	DEC.			DEC.	LHA
			NORTH LATITUDE			
Lat.	Obs. Az.	Obs. Alt.	0° to 90°	Left page	Hc (North)	360°– Z
			90° to 180°	Right page, below C-S Line	Hc (North)	360°– Z
			90° to 180°	Right page, above C-S Line	Hc (South)	180° +Z
Lat.	Obs. Az.	Obs. Alt.	180° to 270°	Right page, below C-S Line	Hc (North)	Z
			180° to 270°	Right page, above C-S Line	Hc (South)	180° –Z
			270° to 360°	Left page	Hc (North)	Z
			SOUTH LATITUDE			
Lat.	180°–Obs. Az.	Obs. Alt.	0° to 90°	Right page, below C-S Line	Hc (South)	360°– Z
			0° to 90°	Right page, above C-S Line	Hc (North)	180° +Z
			90° to 180°	Left page	Hc (South)	360°– Z
Lat.	Obs. Az.–180°	Obs. Alt.	180° to 270°	Left page	Hc (South)	Z
			270° to 360°	Right page, below C-S Line	Hc (South)	Z
			270° to 360°	Right page, above C-S Line	Hc (North)	180° –Z

EXAMPLES FOR STAR IDENTIFICATION (Selection for illustration only)

Ex.	Lat.	Long.	Obs. Alt.	Obs. Az.	LHAϒ*
1	77° 15′ N	33° 55′ W	37° 41′	80°	189°
2	75 54 N	168 10 E	31 54	98	288
3	75 06 N	143 40 W	7 02	166	64
4	80 38 N	7 27 W	27 25	206	239
5	76 22 N	10 14 E	5 10	202	100
6	78 43 N	16 42 E	33 19	352	121
7	80 55 S	165 19 W	38 07	23	324
8	75 28 S	77 33 E	9 58	20	25
9	79 12 S	14 02 W	50 00	137	258
10	87 43 S	49 17 E	56 35	254	50
11	76 04 S	14 22 W	17 25	296	262
12	75 24 S	77 14 E	6 49	338	110

*LHAϒ from *The Nautical Almanac* for date and GMT of observation.

SOLUTIONS

	Entering Arguments				Star Coordinates and Identity			
Ex.	Lat.	LHA	Dec.	Page	Dec.	LHA	SHA	Name
1	77°	80°	38°	Left	39° N	360°– 90° =270°	81°	*Vega*
2	76	98	32	Right, below C-S Line	29 N	360 – 74 =286	358	*Alpheratz*
3	75	166	7	Right, above C-S Line	8 S	180 + 166 =346	282	*Rigel*
4	81	206	27	Right, below C-S Line	19 N	24	145	*Arcturus*
5	76	202	5	Right, above C-S Line	8 S	180 – 158 =22	282	*Rigel*
6	79	352	33	Left	44 N	171	50	*Deneb*
7	81	180–23=157	38	Right, below C-S Line	30 S	360 – 21 =339	15	*Fomalhaut*
8	75	180–20=160	10	Right, above C-S Line	4 N	180 + 160 =340	315	*Menkar*
9	79	180–137=43	50	Left	57 S	360 – 126 =234	336	*Achernar*
10	88	254–180=74	57	Left	57 S	103	53	*Peacock*
11	76	296–180= 116	17	Right, below C-S Line	11 S	61	159	*Spica*
12	75	338–180= 158	7	Right, above C-S Line	7 N	180 – 158 = 22	272	*Betelgeuse*

SHA☆=LHA☆–LHAϒ

2. Great-Circle Sailing. The great-circle distance between any two points on the spherical surface of the Earth and the initial great-circle course may be found by relating the problem to the solution of the navigational triangle, which solution is always available from these tables. For by entering the tables with latitude of departure as latitude, latitude of destination as declination, and difference of longitude as LHA, the altitude and azimuth angle may be extracted and converted to distance and course. The instructions below provide details of the modifications necessary to the tabular entries and the extracted data.

The tabular azimuth angle (or its supplement) becomes the initial great-circle course, named N or S for the latitude of departure, and E or W depending upon the destination being E or W of point of departure.

If all entering arguments are integral degrees, the altitude and azimuth angle are obtained directly from the tables, without interpolation. If the latitude of destination is nonintegral, interpolation for the additional minutes of latitude is done as in correcting altitude for any declination increment; if either the latitude of departure or difference in longitude, or both, are nonintegral, interpolate graphically using Diagrams A, B, and C and apply this correction additionally, as in correcting the altitude for any DR or other selected position.

Since, in the great-circle-distance solution, the latitude of destination becomes the declination entry, and all declinations appear on every page, the great-circle distance can always be found from the volume which covers the latitude belt containing the latitude of departure. Great-circle solutions belong in one of the four following categories.

It is always known if latitudes of departure and destination are of same or contrary name. In those instances when it is not known whether the great-circle distance is less than or greater than 90° (5400 nautical miles), test first Case I for latitudes of same name and Case II for latitudes of contrary name. Failing solution by these rules, consider Cases III and IV, respectively.

Case I—Latitudes of departure and destination of same name and initial great-circle distance less than 90°.

Enter the tables with latitude of departure as latitude entry, latitude of destination as declination entry of same name, and difference of longitude as local hour angle entry; extract the tabular altitude, which subtracted from 90° is the desired great-circle (zenith) distance. The azimuth angle is the initial great-circle course angle. If no such entry can be found, the distance is greater than 90°.

Case II—Latitudes of departure and destination of contrary name and great-circle distance less than 90°.

Enter tables with latitude of departure as latitude entry and latitude of destination as declination entry of contrary name, and with the difference of longitude as local hour angle entry; extract the tabular altitude, which subtracted from 90° is the required distance. The azimuth angle is the initial great-circle course angle. If no such entry can be found the distance is greater than 90°.

Case III—Latitudes of departure and destination of same name and great-circle distance greater than 90°.

Enter the tables with latitude of departure as latitude entry, latitude of destination as declination entry of opposite name to latitude of destination, and with 180° minus longitude difference as local hour angle; extract the altitude which added to 90° gives the required distance. The initial great-circle course angle is 180° minus the azimuth angle.

Case IV—Latitudes of departure and destination of contrary name and great-circle distance greater than 90°.

Enter tables with latitude of departure as latitude entry, and latitude of destination as declination entry of opposite name to latitude of destination, and with 180° minus longitude difference as local hour angle; extract the altitude which added to 90° is the required distance. The initial great-circle course angle is 180° minus the azimuth angle.

D. OTHER APPLICATIONS

The following two great-circle distance and course examples, together with their solutions, illustrate Cases I and IV.

***Example i**. Required.*—Distance and initial great-circle course from Barentsburg 78°04′ N, 14°14′ E to Straumner 66°25′ N, 23°08′ W.

Enter the tables with 78° as the latitude argument, the difference in longitude between 14°14′ E and 23°08′ W is 37°22′— use 37° as the LHA argument, and 66° as the declination argument (same name).

From page 76		Hc	d	Z
LHA 37°, Lat. 78°, Dec. 66°		73°58.2′	(+) 53.1′	116.8°†
Dec. Inc. 25′, d+53.1′	1st part	(+) 20.8		
	2nd part	(+) 1.3		
Interpolated for Dec. Inc.		74 20.3		Zn 243.2°

†Interpolated value.

Using the A, B, C Diagrams to interpolate for latitude and local hour angle (difference in longitude) increments, the correction to Hc is –6.0′, so that the corrected Hc = 74°14.3′, therefore the distance (90° – Hc) = 15°45.7′ = 945.7 nautical miles and the initial great-circle course is 243.2°.

***Example ii.** Required.*—Distance and initial great-circle course from Cape Bird 77°08′ S, 166°30′ E to San Francisco 37°49' N, 122°25′ W.

Enter the tables with latitude 77° as latitude argument, the difference in longitude between 166°30′ E and 122°25′ W is 71°05′—use 71° as LHA argument, and 37° as declination argument (of contrary name). It is found that these arguments are not available, so find the supplement 180° – LHA = 108°55′ (use 109°) for LHA argument, with declination changed to same name.

From page 145		Hc	d	Z
LHA 109°, Lat. 77°, Dec. 37°		31°51.8′	(+) 58.1′	62.6°†
Dec. Inc. 49′, d+58.1′	1st part	(+) 40.8		180°– Z = S 117.4° E
	2nd part	(+) 6.7		
Interpolated for Dec. Inc.		32 39.3		Zn 062.6°

†Interpolated value.

Using the A, B, C Diagrams to interpolate for latitude and local hour angle (difference in longitude) increments (note that in this case interpolation is for LHA 108°55′); the correction to Hc is +4.8′, hence the corrected Hc = 32°44.1′ and the distance = 90°+32°44.1′ = 122°44.1′ = 7364.1 nautical miles and the initial great-circle course is 062.6°.

3. Composite Sailing. The data from these tables are applicable to the rapid solution of problems of composite sailing, an extension of great-circle sailing. The composite track is frequently the shortest possible safe track, and usually consists of two great-circle arcs and the small-circle arc to which they are tangent. Expressed otherwise, the vertices of the great circle passing through the point of departure and of that passing through the point of destination lie upon the limiting parallel. The complete solution consists of finding the combined length of two great-circle arcs and the length of the intervening parallel. The latter is a problem in parallel sailing.

To effect solutions of the first great-circle distance, enter the tables with LHA = 90°, and with the latitude of the limiting parallel, and find that declination for which the altitude is equal to the latitude of departure; then 90° minus declination is equal to the distance from the point of departure to the point of tangency of the great circle with the parallel of limiting latitude, and the azimuth angle is the difference in longitude between the point of departure and the point of tangency. At the same opening find the corresponding quantities from the limiting parallel to the destination.

The course from point of departure can be found in two ways:

(i) Enter the tables with 90° as LHA, 90° minus distance to point of tangency as latitude, and with the limiting latitude as declination; the course is then the azimuth angle obtained from the tables, the angle being measured from the elevated pole.

(ii) Enter the tables with the difference in longitude (between point of departure and point of tangency) as LHA, latitude of departure as latitude argument, and latitude of the limiting parallel as declination argument; the course angle is then the azimuth angle as before, and 90° minus the altitude is the distance, which serves to check the previous determination. The distance along the limiting parallel is the difference in longitude between the two points of tangency multiplied by the cosine of the latitude (parallel sailing); this difference in longitude is the difference in longitude between points of departure and destination, less the sum of the differences in longitude between the point of departure and the first point of tangency, and between the second point of tangency and the destination.

Example. It is required to determine the component parts of a composite track between Valparaiso 33°02′ S, 71°37′ W and Coulman Island 73°20′ S, 170°10′ E when the limiting latitude is 75° S; it is also desired to plot the course from Valparaiso to the limiting latitude.

Enter the tables with LHA argument as 90°, with latitude argument as 75°, same name; find the declination which corresponds to an altitude, Hc, of 33.0°; the declination is found by mental interpolation to be 34.3° and the azimuth angle is 80.0°. The distance from Valparaiso to the first point of tangency is therefore 90° – 34.3° = 55.7° and the difference in longitude is 80.0°, therefore the longitude of first point of tangency is 71.6°W + 80.0° = 151.6° W. In the same column the declination and azimuth angle corresponding to an altitude of 73.3°, i.e., latitude of Coulman Island are found as 82.6° and 26.6°, respectively; the distance from the second point of tangency to Coulman Island is therefore 90° – 82.6° = 7.4°, and the longitude of the second point of tangency is 170.2°E + 26.6° = 163.2°W. The difference in longitude between the two points of tangency is then 163.2° – 151.6° = 11.6°; the distance along the 75° S parallel is therefore 11.6° cos 75° = 11.6° × 0.259 = 3.0°. The total sailing distance is therefore 55.7° + 3.0° + 7.4° = 66.1° or 3966 nautical miles, approximately.

The course angle from Valparaiso is found by entering with 90° – 55.7° = 34.3° as latitude argument, 90° as LHA argument, and 75° as declination argument; the azimuth angle interpolated mentally is then 18.0°, measured from the south.

Required are a number of points on the great-circle course between Valparaiso and the first point of tangency. In order to illustrate the use of this volume the points will be found with reference to the tangent point 75° S, 151.6° W; the points for plotting will be determined at 600 mile intervals, i.e., at arc distances of 10°, 20°, … from the latter point.

Enter the tables with latitude 75°, LHA 90°, and with successive declinations of 80°, 70°, … the latitudes and differences in longitude from first point of tangency are found as tabulated altitudes and azimuth angles, respectively. The results are as follows:

Distance n.mi. (arc)	600 (10°)	1200 (20°)	1800 (30°)	2400 (40°)	3000 (50°)
Latitude	72.0 S	65.2 S	56.8 S	47.7 S	38.4 S
Diff. in Long.	34.3	54.6	65.9	72.9	77.7
Longitude	117.3 W	97.0 W	85.7 W	78.7 W	73.9 W

Note that the longitudes are found by subtracting the difference in longitude from 151.6° W, the longitude of the first point of tangency.

4. General Spherical Triangle Solutions. Of the six parts of the spherical navigational triangle these tables utilize three as entering arguments and tabulate two as respondents. The only remaining part of the triangle is the parallactic (or position) angle, which is the angle between a body’s hour circle and its vertical circle. Values of the parallactic angle, although sometimes used by astronomers, are not essential for navigation, and, in order to keep the tabulations to a minimum, have not been included. Astronomers and other scientists having a requirement for these data have, however, an easy and rapid access to this information through the simple interchange of arguments, thus effecting a complete solution. Application of the following instructions will determine the additional part.

(a) When latitude and declination are of same name, enter the SAME NAME section of the tables with the appropriate local hour angle, with the declination as latitude argument and the latitude as declination argument, and extract the tabular azimuth angle as the parallactic angle.

(b) When latitude and declination are of contrary name, enter the CONTRARY NAME section of the tables with the appropriate local hour angle and with latitude and declination interchanged; the tabular azimuth angle is then the supplement of the parallactic angle (i.e., parallactic angle equals 180° minus the azimuth angle). This method generally requires the availability of all volumes of the series.

An approximate value of the parallactic angle, *X*, accurate enough for most navigational requirements, can be calculated directly from the formula, $\cos X = d/60'$, where d is the difference between successive tabular altitudes for the desired latitude, local hour angle and declination.

The tabular data of these tables include the solution of any spherical triangle, given two sides and the included angle, provided the two sides are regarded as the complements of the latitude and declination, respectively; and the included angle is regarded as the local hour angle; then the complement of the tabular altitude constitutes the third side and the tabular azimuth angle is the angle between the side regarded as the colatitude and the third side; by interchanging the latitude and declination entries, the third angle (position angle) is found as the azimuth angle.

In general if any three parts of a spherical triangle are given, these tables can be used to find the remaining parts; this will sometimes mean searching through the volumes to find, for example, a particular altitude in a particular latitude and a given LHA in order to find the corresponding azimuth angle and declination. The accuracy of such solutions will often be limited to 0.1°, the tabular accuracy of the azimuth angle. Since such solutions are of limited value to the navigator, except for great-circle and composite sailing (see section D.2 and D.3) and require many rules for their use, their complete coverage has been omitted.

E. BACKGROUND

1. Accuracy of Tables. The tabular values as given in these tables have maximum and probable (50%) errors of ±0.05′ and ±0.025′ in altitude and ±0.05° and ±0.025° in azimuth angle.

The maximum error arising from the use of the Interpolation Table for the first-difference correction is ±0.14′, with a probable error of ±0.03′, when used for the interpolation of altitude for declination.

The maximum error arising from the use of the correction for second-differences obtained from the Interpolation Table is ±0.12′ with a probable error of ± 0.03′.

When second differences are completely negligible, the maximum error of an interpolated altitude is ±0.19′ with a probable error of ±0.04′; when the second differences are not negligible and the second- difference correction is included in the interpolation, the maximum error of the calculated altitude will be ±0.31′ with a probable error of ±0.05′.

The largest value of the double-second difference when the value of d is not printed in italics is 3.9′, and if the correction for this value is neglected, an error of up to –0.24′ may be introduced into the computed altitude. But such an error is only possible when the altitude is greater than 60° and when the value of Dec. Inc. is close to 30′. The neglect of the second-difference correction when d is not printed in italics will rarely introduce an error as large as –0.2′.

2. Production and Printing. The method used in the production of this publication has bridged the gap between electronic data processing and automatic photocomposing for offset printing.

The calculations were performed on an IBM 1410 electronic computer, using nine significant figures in order to ensure the accuracy of the altitude to a tenth of a minute of arc and the azimuth angle to a tenth of a degree. In addition, all values of the altitude in excess of 88°30′ were recalculated using more appropriate formulas, since determinations of these high altitudes from their sines with only nine figures could introduce errors of the order of 0.0005′, which would sometimes affect the rounding off of the altitude to 0.1′. The recomputation indicated only about three altitudes per volume were thus affected.

The results of the computations for any one volume were produced on magnetic tapes, which were automatically differenced for checking in the direction of increasing declination; manual recalculations also were used in the verification of several quantities on each page.

After the computations were checked, programmed editing instructions were added and the combined data were transcribed onto a fifteen-channel paper tape which was used to operate photocomposing equipment. The data were photoset, character by character, to form a photographic positive of the final pages; photoprints were then examined for completeness and imperfections. All data on each page were punched onto cards, one line to a card, and these cards were compared automatically with the data originally produced by the computer. Before final printing a systematic examination of the proof was made and numerous independent checks were applied.

The Linofilm reproduction procedures and techniques were employed in the reproduction of Volumes 5 and 6; the Linotron method was used for the other volumes of the series.

SIGHT REDUCTION TABLES

FOR

MARINE NAVIGATION

LATITUDES 75°—90°, Inclusive

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	**0**
1	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	**1**
2	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	**2**
3	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	**3**
4	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	**4**
5	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	**5**
6	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	**6**
7	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	**7**
8	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	**8**
9	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	**9**
10	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	**10**
11	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	**11**
12	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	**12**
13	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	**13**
14	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	**14**
15	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	**15**
16	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	**16**
17	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	**17**
18	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	**18**
19	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	**19**
20	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	**20**
21	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	**21**
22	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	**22**
23	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	**23**
24	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	**24**
25	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	**25**
26	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	**26**
27	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	**27**
28	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	**28**
29	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	**29**
30	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	**30**
31	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	**31**
32	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	**32**
33	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	**33**
34	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	**34**
35	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	**35**
36	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	**36**
37	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	**37**
38	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	**38**
39	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	**39**
40	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	**40**
41	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	**41**
42	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	**42**
43	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	**43**
44	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	**44**
45	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	**45**
46	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	**46**
47	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	**47**
48	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	**48**
49	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	**49**
50	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	**50**
51	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	**51**
52	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	**52**
53	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	**53**
54	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	**54**
55	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	**55**
56	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	**56**
57	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	**57**
58	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	**58**
59	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	**59**
60	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	**60**
61	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	**61**
62	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	**62**
63	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	**63**
64	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	**64**
65	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	**65**
66	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	**66**
67	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	**67**
68	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	**68**
69	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	**69**
70	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	**70**
71	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	**71**
72	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	**72**
73	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	**73**
74	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	**74**
75	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	**75**
76	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	**76**
77	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	**77**
78	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	**78**
79	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	**79**
80	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	**80**
81	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	**81**
82	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	**82**
83	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	**83**
84	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	**84**
85	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	**85**
86	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	**86**
87	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	**87**
88	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	**88**
89	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	**89**
90	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 0°, 360°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	**0**
1	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	**1**
2	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	**2**
3	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	**3**
4	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	**4**
5	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	**5**
6	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	**6**
7	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	**7**
8	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	**8**
9	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	**9**
10	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	**10**
11	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	**11**
12	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	**12**
13	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	**13**
14	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	**14**
15	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	**15**
16	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	**16**
17	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	**17**
18	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	**18**
19	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	**19**
20	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	**20**
21	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	**21**
22	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	**22**
23	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	**23**
24	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	**24**
25	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	**25**
26	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	**26**
27	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	**27**
28	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	**28**
29	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	**29**
30	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	**30**
31	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	**31**
32	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	**32**
33	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	**33**
34	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	**34**
35	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	**35**
36	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	**36**
37	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	**37**
38	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	**38**
39	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	**39**
40	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	**40**
41	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	**41**
42	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	**42**
43	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	**43**
44	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	**44**
45	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	**45**
46	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	**46**
47	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	**47**
48	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	**48**
49	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	**49**
50	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	**50**
51	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	**51**
52	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	**52**
53	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	**53**
54	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	**54**
55	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	**55**
56	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	**56**
57	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	**57**
58	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	**58**
59	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	**59**
60	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	**60**
61	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	**61**
62	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	**62**
63	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	**63**
64	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	**64**
65	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	**65**
66	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	**66**
67	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	**67**
68	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	**68**
69	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	**69**
70	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	**70**
71	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	**71**
72	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	**72**
73	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	**73**
74	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	**74**
75	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	**75**
76	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	**76**
77	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	**77**
78	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	**78**
79	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	**79**
80	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	**80**
81	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	**81**
82	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	**82**
83	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	**83**
84	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	**84**
85	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	**85**
86	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	**86**
87	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	**87**
88	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	**88**
89	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	**89**
90	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 180°, 180°

1°, 359° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	10 59.9	+60.0	179.0	9 59.9	+60.0	179.0	8 59.9	+60.0	179.0	7 59.9	+60.0	179.0	0
1	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	10 59.9	+60.0	179.0	9 59.9	+60.0	179.0	8 59.9	+60.0	179.0	1
2	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	10 59.9	+60.0	179.0	9 59.9	+60.0	179.0	2
3	17 59.9	+60.0	178.9	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	10 59.9	+60.0	179.0	3
4	18 59.9	+60.0	178.9	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	4
5	19 59.9	+60.0	178.9	18 59.9	+60.0	178.9	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	5
6	20 59.9	+60.0	178.9	19 59.9	+60.0	178.9	18 59.9	+60.0	178.9	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	6
7	21 59.9	+60.0	178.9	20 59.9	+60.0	178.9	19 59.9	+60.0	178.9	18 59.9	+60.0	179.0	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	7
8	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	178.9	19 59.9	+60.0	178.9	18 59.9	+60.0	179.0	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	8
9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	178.9	19 59.9	+60.0	178.9	18 59.9	+60.0	179.0	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	9
10	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	178.9	19 59.9	+60.0	179.0	18 59.9	+60.0	179.0	17 59.9	+60.0	179.0	10
11	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	178.9	19 59.9	+60.0	179.0	18 59.9	+60.0	179.0	11
12	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	179.0	19 59.9	+60.0	179.0	12
13	27 59.9	+59.9	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	178.9	20 59.9	+60.0	179.0	13
14	28 59.8	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	178.9	21 59.9	+60.0	179.0	14
15	29 59.8	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	22 59.9	+60.0	179.0	15
16	30 59.8	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	23 59.9	+60.0	178.9	16
17	31 59.8	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	24 59.9	+60.0	178.9	17
18	32 59.8	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	25 59.9	+60.0	178.9	18
19	33 59.8	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	26 59.9	+60.0	178.9	19
20	34 59.8	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	20
21	35 59.8	+60.0	178.8	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	21
22	36 59.8	+60.0	178.8	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	22
23	37 59.8	+60.0	178.8	36 59.9	+60.0	178.8	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	23
24	38 59.8	+60.0	178.8	37 59.9	+60.0	178.8	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	24
25	39 59.8	+60.0	178.8	38 59.9	+60.0	178.8	37 59.9	+60.0	178.8	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	25
26	40 59.8	+60.0	178.8	39 59.9	+60.0	178.8	38 59.9	+60.0	178.8	37 59.9	+60.0	178.9	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	26
27	41 59.8	+60.0	178.8	40 59.9	+59.9	178.8	39 59.9	+60.0	178.8	38 59.9	+60.0	178.9	37 59.9	+60.0	178.9	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	27
28	42 59.8	+60.0	178.8	41 59.8	+60.0	178.8	40 59.9	+60.0	178.8	39 59.9	+60.0	178.8	38 59.9	+60.0	178.9	37 59.9	+60.0	178.9	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	28
29	43 59.8	+60.0	178.8	42 59.8	+60.0	178.8	41 59.9	+60.0	178.8	40 59.9	+60.0	178.8	39 59.9	+60.0	178.9	38 59.9	+60.0	178.9	37 59.9	+60.0	178.9	36 59.9	+60.0	178.9	29
30	44 59.8	+60.0	178.8	43 59.8	+60.0	178.8	42 59.9	+60.0	178.8	41 59.9	+60.0	178.8	40 59.9	+60.0	178.9	39 59.9	+60.0	178.9	38 59.9	+60.0	178.9	37 59.9	+60.0	178.9	30
31	45 59.8	+60.0	178.8	44 59.8	+60.0	178.8	43 59.9	+60.0	178.8	42 59.9	+60.0	178.8	41 59.9	+60.0	178.8	40 59.9	+60.0	178.9	39 59.9	+60.0	178.9	38 59.9	+60.0	178.9	31
32	46 59.8	+60.0	178.8	45 59.8	+60.0	178.8	44 59.9	+60.0	178.8	43 59.9	+60.0	178.8	42 59.9	+60.0	178.8	41 59.9	+60.0	178.9	40 59.9	+60.0	178.9	39 59.9	+60.0	178.9	32
33	47 59.8	+60.0	178.7	46 59.8	+60.0	178.8	45 59.9	+60.0	178.8	44 59.9	+60.0	178.8	43 59.9	+60.0	178.8	42 59.9	+60.0	178.9	41 59.9	+60.0	178.9	40 59.9	+60.0	178.9	33
34	48 59.8	+60.0	178.7	47 59.8	+60.0	178.8	46 59.9	+60.0	178.8	45 59.9	+60.0	178.8	44 59.9	+60.0	178.8	43 59.9	+60.0	178.8	42 59.9	+60.0	178.9	41 59.9	+60.0	178.9	34
35	49 59.8	+60.0	178.7	48 59.8	+60.0	178.8	47 59.9	+60.0	178.8	46 59.9	+60.0	178.8	45 59.9	+60.0	178.8	44 59.9	+60.0	178.8	43 59.9	+60.0	178.9	42 59.9	+60.0	178.9	35
36	50 59.8	+60.0	178.7	49 59.8	+60.0	178.7	48 59.9	+60.0	178.8	47 59.9	+60.0	178.8	46 59.9	+60.0	178.8	45 59.9	+60.0	178.8	44 59.9	+60.0	178.9	43 59.9	+60.0	178.9	36
37	51 59.8	+60.0	178.7	50 59.8	+60.0	178.7	49 59.9	+60.0	178.8	48 59.9	+60.0	178.8	47 59.9	+60.0	178.8	46 59.9	+60.0	178.8	45 59.9	+60.0	178.9	44 59.9	+60.0	178.9	37
38	52 59.8	+60.0	178.7	51 59.8	+60.0	178.7	50 59.9	+60.0	178.7	49 59.9	+60.0	178.8	48 59.9	+60.0	178.8	47 59.9	+60.0	178.8	46 59.9	+60.0	178.8	45 59.9	+60.0	178.9	38
39	53 59.8	+60.0	178.7	52 59.8	+60.0	178.7	51 59.9	+60.0	178.7	50 59.9	+60.0	178.8	49 59.9	+60.0	178.8	48 59.9	+60.0	178.8	47 59.9	+60.0	178.8	46 59.9	+60.0	178.9	39
40	54 59.8	+60.0	178.7	53 59.8	+60.0	178.7	52 59.9	+59.9	178.7	51 59.9	+60.0	178.8	50 59.9	+60.0	178.8	49 59.9	+60.0	178.8	48 59.9	+60.0	178.8	47 59.9	+60.0	178.9	40
41	55 59.8	+60.0	178.7	54 59.8	+60.0	178.7	53 59.8	+60.0	178.7	52 59.9	+60.0	178.7	51 59.9	+60.0	178.8	50 59.9	+60.0	178.8	49 59.9	+60.0	178.8	48 59.9	+60.0	178.8	41
42	56 59.8	+60.0	178.6	55 59.8	+60.0	178.7	54 59.8	+60.0	178.7	53 59.9	+60.0	178.7	52 59.9	+60.0	178.8	51 59.9	+60.0	178.8	50 59.9	+60.0	178.8	49 59.9	+60.0	178.8	42
43	57 59.8	+60.0	178.6	56 59.8	+60.0	178.7	55 59.8	+60.0	178.7	54 59.9	+60.0	178.7	53 59.9	+60.0	178.8	52 59.9	+60.0	178.8	51 59.9	+60.0	178.8	50 59.9	+60.0	178.8	43
44	58 59.8	+60.0	178.6	57 59.8	+60.0	178.6	56 59.8	+60.0	178.7	55 59.9	+60.0	178.7	54 59.9	+60.0	178.7	53 59.9	+60.0	178.8	52 59.9	+60.0	178.8	51 59.9	+60.0	178.8	44
45	59 59.8	+60.0	178.6	58 59.8	+60.0	178.6	57 59.8	+60.0	178.7	56 59.9	+60.0	178.7	55 59.9	+60.0	178.7	54 59.9	+60.0	178.8	53 59.9	+60.0	178.8	52 59.9	+60.0	178.8	45
46	60 59.8	+60.0	178.6	59 59.8	+60.0	178.6	58 59.8	+60.0	178.7	57 59.9	+60.0	178.7	56 59.9	+60.0	178.7	55 59.9	+60.0	178.8	54 59.9	+60.0	178.8	53 59.9	+60.0	178.8	46
47	61 59.8	+60.0	178.5	60 59.8	+60.0	178.6	59 59.8	+60.0	178.6	58 59.9	+60.0	178.7	57 59.9	+60.0	178.7	56 59.9	+60.0	178.7	55 59.9	+60.0	178.8	54 59.9	+60.0	178.8	47
48	62 59.8	+60.0	178.5	61 59.8	+60.0	178.6	60 59.8	+60.0	178.6	59 59.9	+60.0	178.7	58 59.9	+60.0	178.7	57 59.9	+60.0	178.7	56 59.9	+60.0	178.8	55 59.9	+60.0	178.8	48
49	63 59.8	+60.0	178.5	62 59.8	+60.0	178.6	61 59.8	+60.0	178.6	60 59.9	+60.0	178.6	59 59.9	+60.0	178.7	58 59.9	+60.0	178.7	57 59.9	+60.0	178.8	56 59.9	+60.0	178.8	49
50	64 59.8	+60.0	178.5	63 59.8	+60.0	178.5	62 59.8	+60.0	178.6	61 59.9	+59.9	178.6	60 59.9	+60.0	178.7	59 59.9	+60.0	178.7	58 59.9	+60.0	178.8	57 59.9	+60.0	178.8	50
51	65 59.8	+60.0	178.5	64 59.8	+60.0	178.5	63 59.8	+60.0	178.6	62 59.8	+60.0	178.6	61 59.9	+60.0	178.7	60 59.9	+60.0	178.7	59 59.9	+60.0	178.7	58 59.9	+60.0	178.8	51
52	66 59.8	+60.0	178.4	65 59.8	+60.0	178.5	64 59.8	+60.0	178.5	63 59.8	+60.0	178.6	62 59.9	+60.0	178.6	61 59.9	+60.0	178.7	60 59.9	+60.0	178.7	59 59.9	+60.0	178.8	52
53	67 59.8	+60.0	178.4	66 59.8	+60.0	178.5	65 59.8	+60.0	178.5	64 59.8	+60.0	178.6	63 59.9	+60.0	178.6	62 59.9	+60.0	178.7	61 59.9	+60.0	178.7	60 59.9	+60.0	178.8	53
54	68 59.8	+60.0	178.4	67 59.8	+60.0	178.4	66 59.8	+60.0	178.5	65 59.8	+60.0	178.6	64 59.9	+60.0	178.6	63 59.9	+60.0	178.7	62 59.9	+60.0	178.7	61 59.9	+60.0	178.7	54
55	69 59.8	+60.0	178.3	68 59.8	+60.0	178.4	67 59.8	+60.0	178.5	66 59.8	+60.0	178.5	65 59.9	+60.0	178.6	64 59.9	+60.0	178.6	63 59.9	+60.0	178.7	62 59.9	+60.0	178.7	55
56	70 59.8	+60.0	178.3	69 59.8	+60.0	178.4	68 59.8	+60.0	178.4	67 59.8	+60.0	178.5	66 59.9	+60.0	178.6	65 59.9	+60.0	178.6	64 59.9	+60.0	178.7	63 59.9	+60.0	178.7	56
57	71 59.8	+60.0	178.2	70 59.8	+60.0	178.3	69 59.8	+60.0	178.4	68 59.8	+60.0	178.5	67 59.9	+60.0	178.5	66 59.9	+60.0	178.6	65 59.9	+60.0	178.7	64 59.9	+60.0	178.7	57
58	72 59.8	+59.9	178.2	71 59.8	+60.0	178.3	70 59.8	+60.0	178.4	69 59.8	+60.0	178.5	68 59.9	+59.9	178.5	67 59.9	+60.0	178.6	66 59.9	+60.0	178.6	65 59.9	+60.0	178.7	58
59	73 59.7	+60.0	178.1	72 59.8	+60.0	178.2	71 59.8	+60.0	178.3	70 59.8	+60.0	178.4	69 59.8	+60.0	178.5	68 59.9	+60.0	178.6	67 59.9	+60.0	178.6	66 59.9	+60.0	178.7	59
60	74 59.7	+60.0	178.1	73 59.8	+60.0	178.2	72 59.8	+60.0	178.3	71 59.8	+60.0	178.4	70 59.8	+60.0	178.5	69 59.9	+60.0	178.5	68 59.9	+60.0	178.6	67 59.9	+60.0	178.7	60
61	75 59.7	+60.0	178.0	74 59.8	+60.0	178.1	73 59.8	+60.0	178.2	72 59.8	+60.0	178.3	71 59.8	+60.0	178.4	70 59.9	+60.0	178.5	69 59.9	+60.0	178.6	68 59.9	+60.0	178.6	61
62	76 59.7	+60.0	177.9	75 59.8	+59.9	178.1	74 59.8	+60.0	178.2	73 59.8	+60.0	178.3	72 59.8	+60.0	178.4	71 59.9	+60.0	178.5	70 59.9	+60.0	178.6	69 59.9	+60.0	178.6	62
63	77 59.7	+60.0	177.8	76 59.7	+60.0	178.0	75 59.8	+60.0	178.1	74 59.8	+60.0	178.2	73 59.8	+60.0	178.4	72 59.9	+60.0	178.4	71 59.9	+60.0	178.5	70 59.9	+60.0	178.6	63
64	78 59.7	+60.0	177.7	77 59.7	+60.0	177.9	76 59.8	+60.0	178.1	75 59.8	+60.0	178.2	74 59.8	+60.0	178.3	73 59.9	+60.0	178.4	72 59.9	+60.0	178.5	71 59.9	+60.0	178.6	64
65	79 59.7	+59.9	177.6	78 59.7	+60.0	177.8	77 59.8	+59.9	178.0	76 59.8	+60.0	178.1	75 59.8	+60.0	178.3	74 59.9	+59.9	178.4	73 59.9	+60.0	178.5	72 59.9	+60.0	178.6	65
66	80 59.6	+60.0	177.4	79 59.7	+60.0	177.7	78 59.7	+60.0	177.9	77 59.8	+60.0	178.0	76 59.8	+60.0	178.2	75 59.8	+60.0	178.3	74 59.9	+60.0	178.4	73 59.9	+60.0	178.5	66
67	81 59.6	+60.0	177.2	80 59.7	+60.0	177.5	79 59.7	+60.0	177.8	78 59.8	+60.0	178.0	77 59.8	+60.0	178.1	76 59.8	+60.0	178.3	75 59.9	+60.0	178.4	74 59.9	+60.0	178.5	67
68	82 59.6	+59.9	176.9	81 59.7	+59.9	177.3	80 59.7	+60.0	177.6	79 59.8	+60.0	177.8	78 59.8	+60.0	178.0	77 59.8	+60.0	178.2	76 59.9	+60.0	178.3	75 59.9	+60.0	178.5	68
69	83 59.5	+60.0	176.6	82 59.6	+60.0	177.1	81 59.7	+60.0	177.4	80 59.8	+59.9	177.7	79 59.8	+60.0	177.9	78 59.8	+60.0	178.1	77 59.9	+60.0	178.3	76 59.9	+60.0	178.4	69
70	84 59.5	+59.9	176.1	83 59.6	+59.9	176.7	82 59.7	+59.9	177.2	81 59.7	+60.0	177.5	80 59.8	+60.0	177.8	79 59.8	+60.0	178.0	78 59.9	+59.9	178.2	77 59.9	+60.0	178.4	70
71	85 59.4	+59.8	175.3	84 59.5	+59.9	176.3	83 59.6	+60.0	176.9	82 59.7	+60.0	177.3	81 59.8	+59.9	177.7	80 59.8	+60.0	177.9	79 59.8	+60.0	178.1	78 59.9	+60.0	178.3	71
72	86 59.2	+59.7	174.1	85 59.4	+59.9	175.6	84 59.6	+59.9	176.5	83 59.7	+59.9	177.0	82 59.7	+60.0	177.5	81 59.8	+60.0	177.8	80 59.8	+60.0	178.0	79 59.9	+60.0	178.2	72
73	87 58.9	*+59.0*	•171.7	86 59.3	+59.7	174.4	85 59.5	+59.9	175.8	84 59.6	+60.0	176.6	83 59.7	+60.0	177.2	82 59.8	+60.0	177.6	81 59.8	+60.0	177.9	80 59.9	+60.0	178.1	73
74	88 57.9	*+46.6*	•164.6	87 59.0	*+59.2*	•172.1	86 59.4	+59.7	174.7	85 59.6	+59.9	176.1	84 59.7	+59.9	176.8	83 59.8	+59.9	177.4	82 59.8	+60.0	177.7	81 59.9	+59.9	178.0	74
75	89 44.5	*–46.3*	•89.5	88 58.2	*+47.3*	•165.5	87 59.1	*+59.3*	•172.6	86 59.5	+59.7	175.1	85 59.6	+59.9	176.3	84 59.7	+60.0	177.0	83 59.8	+60.0	177.5	82 59.8	+60.0	177.9	75
76	88 58.2	*–59.1*	•13.6	89 45.5	*–47.1*	•89.5	88 58.4	*+48.1*	•166.4	87 59.2	*+59.4*	•173.1	86 59.5	+59.9	175.4	85 59.7	+59.9	176.5	84 59.8	+59.9	177.2	83 59.8	+60.0	177.7	76
77	87 59.1	–59.6	6.4	88 58.4	*–59.2*	•12.7	89 46.5	*–47.9*	•89.5	88 58.6	*+48.9*	•167.3	87 59.4	*+59.4*	•173.6	86 59.6	+59.9	175.7	85 59.7	+60.0	176.8	84 59.8	+60.0	177.4	77
78	86 59.5	–59.9	4.0	87 59.2	–59.7	5.9	88 58.6	*–59.2*	•11.7	89 47.5	*–48.7*	•89.5	88 58.8	*+49.8*	•168.2	87 59.5	*+59.5*	•174.1	86 59.7	+59.9	176.0	85 59.8	+59.9	177.0	78
79	85 59.6	–59.9	2.7	86 59.5	–59.8	3.6	87 59.4	–59.8	5.4	88 58.8	*–59.3*	•10.8	89 48.6	*–49.6*	•89.5	88 59.0	*+50.6*	•169.2	87 59.6	*+59.6*	•174.5	86 59.7	+59.9	176.4	79
80	84 59.7	–59.9	2.0	85 59.7	–59.9	2.5	86 59.6	–59.9	3.3	87 59.5	–59.8	5.0	88 59.0	*–59.4*	•9.8	89 49.6	*–50.4*	•89.5	88 59.2	*+51.4*	•170.1	87 59.6	*+59.8*	•175.0	80
81	83 59.8	–60.0	1.5	84 59.8	–60.0	1.8	85 59.7	–59.9	2.2	86 59.7	–59.9	3.0	87 59.6	–59.9	4.5	88 59.2	*–59.6*	•8.9	89 50.6	*–51.2*	•89.5	88 59.4	*+52.2*	•171.1	81
82	82 59.8	–59.9	1.1	83 59.8	–59.9	1.3	84 59.8	–59.9	1.6	85 59.8	–60.0	2.0	86 59.7	–59.9	2.7	87 59.6	–59.8	4.0	88 59.4	*–59.7*	•7.9	89 51.6	*–52.1*	•89.5	82
83	81 59.9	–60.0	0.9	82 59.9	–60.0	1.0	83 59.9	–60.0	1.2	84 59.8	–59.9	1.4	85 59.8	–59.9	1.7	86 59.8	–59.9	2.3	87 59.7	–59.9	3.5	88 59.5	*–59.7*	•6.9	83
84	80 59.9	–60.0	0.7	81 59.9	–60.0	0.8	82 59.9	–60.0	0.9	83 59.9	–60.0	1.0	84 59.9	–60.0	1.2	85 59.9	–60.0	1.5	86 59.8	–59.9	2.0	87 59.8	–59.9	3.0	84
85	79 59.9	–59.9	0.5	80 59.9	–60.0	0.6	81 59.9	–60.0	0.6	82 59.9	–60.0	0.7	83 59.9	–60.0	0.8	84 59.9	–60.0	1.0	85 59.9	–60.0	1.2	86 59.9	–60.0	1.7	85
86	79 00.0	–60.0	0.4	79 59.9	–59.9	0.4	80 59.9	–59.9	0.4	81 59.9	–59.9	0.5	82 59.9	–59.9	0.6	83 59.9	–59.9	0.7	84 59.9	–59.9	0.8	85 59.9	–59.9	1.0	86
87	78 00.0	–60.0	0.3	79 00.0	–60.0	0.3	80 00.0	–60.0	0.3	81 00.0	–60.0	0.3	82 00.0	–60.0	0.4	83 00.0	–60.0	0.4	84 00.0	–60.0	0.5	85 00.0	–60.0	0.6	87
88	77 00.0	–60.0	0.2	78 00.0	–60.0	0.2	79 00.0	–60.0	0.2	80 00.0	–60.0	0.2	81 00.0	–60.0	0.2	82 00.0	–60.0	0.3	83 00.0	–60.0	0.3	84 00.0	–60.0	0.3	88
89	76 00.0	–60.0	0.1	77 00.0	–60.0	0.1	78 00.0	–60.0	0.1	79 00.0	–60.0	0.1	80 00.0	–60.0	0.1	81 00.0	–60.0	0.1	82 00.0	–60.0	0.1	83 00.0	–60.0	0.1	89
90	75 00.0	–60.0	0.0	76 00.0	–60.0	0.0	77 00.0	–60.0	0.0	78 00.0	–60.0	0.0	79 00.0	–60.0	0.0	80 00.0	–60.0	0.0	81 00.0	–60.0	0.0	82 00.0	–60.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 1°, 359°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 59.9	−60.0	179.0	13 59.9	−60.0	179.0	12 59.9	−60.0	179.0	11 59.9	−60.0	179.0	10 59.9	−60.0	179.0	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	0
1	13 59.9	−60.0	179.0	12 59.9	−60.0	179.0	11 59.9	−60.0	179.0	10 59.9	−60.0	179.0	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	1
2	12 59.9	−60.0	179.0	11 59.9	−60.0	179.0	10 59.9	−60.0	179.0	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	2
3	11 59.9	−60.0	179.0	10 59.9	−60.0	179.0	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3
4	10 59.9	−60.0	179.0	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	4
5	9 59.9	−60.0	179.0	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	5
6	8 59.9	−60.0	179.0	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	6
7	7 59.9	−60.0	179.0	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	7
8	6 59.9	−60.0	179.0	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	8
9	5 59.9	−60.0	179.0	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	9
10	4 59.9	−60.0	179.0	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	10
11	3 59.9	−60.0	179.0	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	11
12	2 59.9	−60.0	179.0	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	12
13	1 59.9	−60.0	179.0	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	13
14	0 59.9	−60.0	179.0	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	6 00.1	+60.0	1.0	14
15	0 00.1	+60.0	1.0	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	6 00.1	+60.0	1.0	7 00.1	+60.0	1.0	15
16	1 00.1	+60.0	1.0	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	6 00.1	+60.0	1.0	7 00.1	+60.0	1.0	8 00.1	+60.0	1.0	16
17	2 00.1	+60.0	1.0	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	6 00.1	+60.0	1.0	7 00.1	+60.0	1.0	8 00.1	+60.0	1.0	9 00.1	+60.0	1.0	17
18	3 00.1	+60.0	1.0	4 00.1	+60.0	1.0	5 00.1	+60.0	1.0	6 00.1	+60.0	1.0	7 00.1	+60.0	1.0	8 00.1	+60.0	1.0	9 00.1	+60.0	1.0	10 00.1	+60.0	1.0	18
19	4 00.1	+60.0	0.9	5 00.1	+60.0	0.9	6 00.1	+60.0	1.0	7 00.1	+60.0	1.0	8 00.1	+60.0	1.0	9 00.1	+60.0	1.0	10 00.1	+60.0	1.0	11 00.1	+60.0	1.0	19
20	5 00.1	+60.0	0.9	6 00.1	+60.0	0.9	7 00.1	+60.0	0.9	8 00.1	+60.0	0.9	9 00.1	+60.0	1.0	10 00.1	+60.0	1.0	11 00.1	+60.0	1.0	12 00.1	+60.0	1.0	20
21	6 00.1	+60.0	0.9	7 00.1	+60.0	0.9	8 00.1	+60.0	0.9	9 00.1	+60.0	0.9	10 00.1	+60.0	0.9	11 00.1	+60.0	1.0	12 00.1	+60.0	1.0	13 00.1	+60.0	1.0	21
22	7 00.1	+60.0	0.9	8 00.1	+60.0	0.9	9 00.1	+60.0	0.9	10 00.1	+60.0	0.9	11 00.1	+60.0	0.9	12 00.1	+60.0	0.9	13 00.1	+60.0	1.0	14 00.1	+60.0	1.0	22
23	8 00.1	+60.0	0.9	9 00.1	+60.0	0.9	10 00.1	+60.0	0.9	11 00.1	+60.0	0.9	12 00.1	+60.0	0.9	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	1.0	23
24	9 00.1	+60.0	0.9	10 00.1	+60.0	0.9	11 00.1	+60.0	0.9	12 00.1	+60.0	0.9	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	1.0	24
25	10 00.1	+60.0	0.9	11 00.1	+60.0	0.9	12 00.1	+60.0	0.9	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	25
26	11 00.1	+60.0	0.9	12 00.1	+60.0	0.9	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	26
27	12 00.1	+60.0	0.9	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	27
28	13 00.1	+60.0	0.9	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	28
29	14 00.1	+60.0	0.9	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	29
30	15 00.1	+60.0	0.9	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	30
31	16 00.1	+60.0	0.9	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	31
32	17 00.1	+60.0	0.9	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	32
33	18 00.1	+60.0	0.9	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	33
34	19 00.1	+60.0	0.9	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	34
35	20 00.1	+60.0	0.9	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	35
36	21 00.1	+60.0	0.9	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	28 00.1	+60.0	0.9	36
37	22 00.1	+60.0	0.9	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	28 00.1	+60.0	0.9	29 00.1	+60.0	0.9	37
38	23 00.1	+60.0	0.9	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	28 00.1	+60.0	0.9	29 00.1	+60.0	0.9	30 00.1	+60.0	0.9	38
39	24 00.1	+60.0	0.9	25 00.1	+60.0	0.9	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	28 00.1	+60.0	0.9	29 00.1	+60.0	0.9	30 00.1	+60.0	0.9	31 00.1	+60.0	0.9	39
40	25 00.1	+60.0	0.8	26 00.1	+60.0	0.9	27 00.1	+60.0	0.9	28 00.1	+60.0	0.9	29 00.1	+60.0	0.9	30 00.1	+60.0	0.9	31 00.1	+60.0	0.9	32 00.1	+60.0	0.9	40
41	26 00.1	+60.0	0.8	27 00.1	+60.0	0.8	28 00.1	+60.0	0.9	29 00.1	+60.0	0.9	30 00.1	+60.0	0.9	31 00.1	+60.0	0.9	32 00.1	+60.0	0.9	33 00.1	+60.0	0.9	41
42	27 00.1	+60.0	0.8	28 00.1	+60.0	0.8	29 00.1	+60.0	0.8	30 00.1	+60.0	0.9	31 00.1	+60.0	0.9	32 00.1	+60.0	0.9	33 00.1	+60.0	0.9	34 00.1	+60.0	0.9	42
43	28 00.1	+60.0	0.8	29 00.1	+60.0	0.8	30 00.1	+60.0	0.8	31 00.1	+60.0	0.9	32 00.1	+60.0	0.9	33 00.1	+60.0	0.9	34 00.1	+60.0	0.9	35 00.1	+60.0	0.9	43
44	29 00.1	+60.0	0.8	30 00.1	+60.0	0.8	31 00.1	+60.0	0.8	32 00.1	+60.0	0.8	33 00.1	+60.0	0.9	34 00.1	+60.0	0.9	35 00.1	+60.0	0.9	36 00.1	+60.0	0.9	44
45	30 00.1	+60.0	0.8	31 00.1	+60.0	0.8	32 00.1	+60.0	0.8	33 00.1	+60.0	0.8	34 00.1	+60.0	0.9	35 00.1	+60.0	0.9	36 00.1	+60.0	0.9	37 00.1	+60.0	0.9	45
46	31 00.1	+60.0	0.8	32 00.1	+60.0	0.8	33 00.1	+60.0	0.8	34 00.1	+60.0	0.8	35 00.1	+60.0	0.8	36 00.1	+60.0	0.9	37 00.1	+60.0	0.9	38 00.1	+60.0	0.9	46
47	32 00.1	+60.0	0.8	33 00.1	+60.0	0.8	34 00.1	+60.0	0.8	35 00.1	+60.0	0.8	36 00.1	+60.0	0.8	37 00.1	+60.0	0.9	38 00.1	+60.0	0.9	39 00.1	+60.0	0.9	47
48	33 00.1	+60.0	0.8	34 00.1	+60.0	0.8	35 00.1	+60.0	0.8	36 00.1	+60.0	0.8	37 00.1	+60.0	0.8	38 00.1	+60.0	0.8	39 00.1	+60.0	0.9	40 00.1	+60.0	0.9	48
49	34 00.1	+60.0	0.8	35 00.1	+60.0	0.8	36 00.1	+60.0	0.8	37 00.1	+60.0	0.8	38 00.1	+60.0	0.8	39 00.1	+60.0	0.8	40 00.1	+60.0	0.9	41 00.1	+60.0	0.9	49
50	35 00.1	+60.0	0.8	36 00.1	+60.0	0.8	37 00.1	+60.0	0.8	38 00.1	+60.0	0.8	39 00.1	+60.0	0.8	40 00.1	+60.0	0.8	41 00.1	+60.0	0.9	42 00.1	+60.0	0.9	50
51	36 00.1	+60.0	0.8	37 00.1	+60.0	0.8	38 00.1	+60.0	0.8	39 00.1	+60.0	0.8	40 00.1	+60.0	0.8	41 00.1	+60.0	0.8	42 00.1	+60.0	0.8	43 00.1	+60.0	0.9	51
52	37 00.1	+60.0	0.8	38 00.1	+60.0	0.8	39 00.1	+60.0	0.8	40 00.1	+60.0	0.8	41 00.1	+60.0	0.8	42 00.1	+60.0	0.8	43 00.1	+60.0	0.8	44 00.1	+60.0	0.9	52
53	38 00.1	+60.0	0.8	39 00.1	+60.0	0.8	40 00.1	+60.0	0.8	41 00.1	+60.0	0.8	42 00.1	+60.0	0.8	43 00.1	+60.0	0.8	44 00.1	+60.0	0.8	45 00.1	+60.0	0.9	53
54	39 00.1	+60.0	0.8	40 00.1	+60.0	0.8	41 00.1	+60.0	0.8	42 00.1	+60.0	0.8	43 00.1	+60.0	0.8	44 00.1	+60.0	0.8	45 00.1	+60.0	0.8	46 00.1	+60.0	0.8	54
55	40 00.1	+60.0	0.7	41 00.1	+60.0	0.8	42 00.1	+60.0	0.8	43 00.1	+60.0	0.8	44 00.1	+60.0	0.8	45 00.1	+60.0	0.8	46 00.1	+60.0	0.8	47 00.1	+60.0	0.8	55
56	41 00.1	+60.0	0.7	42 00.1	+60.0	0.8	43 00.1	+60.0	0.8	44 00.1	+60.0	0.8	45 00.1	+60.0	0.8	46 00.1	+60.0	0.8	47 00.1	+60.0	0.8	48 00.1	+60.0	0.8	56
57	42 00.1	+60.0	0.7	43 00.1	+60.0	0.7	44 00.1	+60.0	0.8	45 00.1	+60.0	0.8	46 00.1	+60.0	0.8	47 00.1	+60.0	0.8	48 00.1	+60.0	0.8	49 00.1	+60.0	0.8	57
58	43 00.1	+60.0	0.7	44 00.1	+60.0	0.7	45 00.1	+60.0	0.7	46 00.1	+60.0	0.8	47 00.1	+60.0	0.8	48 00.1	+60.0	0.8	49 00.1	+60.0	0.8	50 00.1	+60.0	0.8	58
59	44 00.1	+60.0	0.7	45 00.1	+60.0	0.7	46 00.1	+60.0	0.7	47 00.1	+60.0	0.8	48 00.1	+60.0	0.8	49 00.1	+60.0	0.8	50 00.1	+60.0	0.8	51 00.1	+60.0	0.8	59
60	45 00.1	+60.0	0.7	46 00.1	+60.0	0.7	47 00.1	+60.0	0.7	48 00.1	+60.0	0.7	49 00.1	+60.0	0.8	50 00.1	+60.0	0.8	51 00.1	+60.0	0.8	52 00.1	+60.0	0.8	60
61	46 00.1	+60.0	0.7	47 00.1	+60.0	0.7	48 00.1	+60.0	0.7	49 00.1	+60.0	0.7	50 00.1	+60.0	0.8	51 00.1	+60.0	0.8	52 00.1	+60.0	0.8	53 00.1	+60.0	0.8	61
62	47 00.1	+60.0	0.7	48 00.1	+60.0	0.7	49 00.1	+60.0	0.7	50 00.1	+60.0	0.7	51 00.1	+60.0	0.7	52 00.1	+60.0	0.8	53 00.1	+60.0	0.8	54 00.1	+60.0	0.8	62
63	48 00.1	+60.0	0.7	49 00.1	+60.0	0.7	50 00.1	+60.0	0.7	51 00.1	+60.0	0.7	52 00.1	+60.0	0.7	53 00.1	+60.0	0.8	54 00.1	+60.0	0.8	55 00.1	+60.0	0.8	63
64	49 00.1	+60.0	0.7	50 00.1	+60.0	0.7	51 00.1	+60.0	0.7	52 00.1	+60.0	0.7	53 00.1	+60.0	0.7	54 00.1	+60.0	0.7	55 00.1	+60.0	0.8	56 00.1	+60.0	0.8	64
65	50 00.1	+60.0	0.7	51 00.1	+60.0	0.7	52 00.1	+60.0	0.7	53 00.1	+60.0	0.7	54 00.1	+60.0	0.7	55 00.1	+60.0	0.7	56 00.1	+60.0	0.8	57 00.1	+60.0	0.8	65
66	51 00.1	+60.0	0.6	52 00.1	+60.0	0.7	53 00.1	+60.0	0.7	54 00.1	+60.0	0.7	55 00.1	+60.0	0.7	56 00.1	+60.0	0.7	57 00.1	+60.0	0.7	58 00.1	+60.0	0.8	66
67	52 00.1	+60.0	0.6	53 00.1	+60.0	0.6	54 00.1	+60.0	0.7	55 00.1	+60.0	0.7	56 00.1	+60.0	0.7	57 00.1	+60.0	0.7	58 00.1	+60.0	0.7	59 00.1	+60.0	0.8	67
68	53 00.1	+60.0	0.6	54 00.1	+60.0	0.6	55 00.1	+60.0	0.7	56 00.1	+60.0	0.7	57 00.1	+60.0	0.7	58 00.1	+60.0	0.7	59 00.1	+60.0	0.7	60 00.1	+60.0	0.7	68
69	54 00.1	+60.0	0.6	55 00.1	+60.0	0.6	56 00.1	+60.0	0.6	57 00.1	+60.0	0.7	58 00.1	+60.0	0.7	59 00.1	+60.0	0.7	60 00.1	+60.0	0.7	61 00.1	+60.0	0.7	69
70	55 00.1	+60.0	0.6	56 00.1	+60.0	0.6	57 00.1	+60.0	0.6	58 00.1	+60.0	0.6	59 00.1	+60.0	0.7	60 00.1	+60.0	0.7	61 00.1	+60.0	0.7	62 00.1	+60.0	0.7	70
71	56 00.1	+60.0	0.6	57 00.1	+60.0	0.6	58 00.1	+60.0	0.6	59 00.1	+60.0	0.6	60 00.1	+60.0	0.7	61 00.1	+60.0	0.7	62 00.1	+60.0	0.7	63 00.1	+60.0	0.7	71
72	57 00.1	+60.0	0.6	58 00.1	+60.0	0.6	59 00.1	+60.0	0.6	60 00.1	+60.0	0.6	61 00.1	+60.0	0.6	62 00.1	+60.0	0.7	63 00.1	+60.0	0.7	64 00.1	+60.0	0.7	72
73	58 00.1	+60.0	0.6	59 00.1	+60.0	0.6	60 00.1	+60.0	0.6	61 00.1	+60.0	0.6	62 00.1	+60.0	0.6	63 00.1	+60.0	0.6	64 00.1	+60.0	0.7	65 00.1	+59.9	0.7	73
74	59 00.1	+60.0	0.5	60 00.1	+60.0	0.6	61 00.1	+60.0	0.6	62 00.1	+60.0	0.6	63 00.1	+60.0	0.6	64 00.1	+60.0	0.6	65 00.1	+60.0	0.7	66 00.0	+60.0	0.7	74
75	60 00.1	+60.0	0.5	61 00.1	+60.0	0.5	62 00.1	+60.0	0.6	63 00.1	+60.0	0.6	64 00.1	+60.0	0.6	65 00.1	+60.0	0.6	66 00.1	+60.0	0.6	67 00.0	+60.0	0.7	75
76	61 00.1	+60.0	0.5	62 00.1	+60.0	0.5	63 00.1	+60.0	0.5	64 00.1	+60.0	0.6	65 00.1	+60.0	0.6	66 00.1	+60.0	0.6	67 00.1	+59.9	0.6	68 00.0	+60.0	0.6	76
77	62 00.1	+60.0	0.5	63 00.1	+60.0	0.5	64 00.1	+60.0	0.5	65 00.1	+60.0	0.5	66 00.1	+60.0	0.6	67 00.1	+60.0	0.6	68 00.0	+60.0	0.6	69 00.0	+60.0	0.6	77
78	63 00.1	+60.0	0.5	64 00.1	+60.0	0.5	65 00.1	+60.0	0.5	66 00.1	+60.0	0.5	67 00.1	+60.0	0.5	68 00.1	+59.9	0.6	69 00.0	+60.0	0.6	70 00.0	+60.0	0.6	78
79	64 00.1	+60.0	0.4	65 00.1	+60.0	0.5	66 00.1	+60.0	0.5	67 00.1	+60.0	0.5	68 00.1	+59.9	0.5	69 00.0	+60.0	0.5	70 00.0	+60.0	0.6	71 00.0	+60.0	0.6	79
80	65 00.1	+60.0	0.4	66 00.1	+60.0	0.4	67 00.1	+59.9	0.4	68 00.1	+59.9	0.5	69 00.0	+60.0	0.5	70 00.0	+60.0	0.5	71 00.0	+60.0	0.5	72 00.0	+60.0	0.6	80
81	66 00.1	+59.9	0.4	67 00.1	+59.9	0.4	68 00.0	+60.0	0.4	69 00.0	+60.0	0.4	70 00.0	+60.0	0.5	71 00.0	+60.0	0.5	72 00.0	+60.0	0.5	73 00.0	+60.0	0.5	81
82	67 00.0	+60.0	0.4	68 00.0	+60.0	0.4	69 00.0	+60.0	0.4	70 00.0	+60.0	0.4	71 00.0	+60.0	0.4	72 00.0	+60.0	0.5	73 00.0	+60.0	0.5	74 00.0	+60.0	0.5	82
83	68 00.0	+60.0	0.3	69 00.0	+60.0	0.3	70 00.0	+60.0	0.4	71 00.0	+60.0	0.4	72 00.0	+60.0	0.4	73 00.0	+60.0	0.4	74 00.0	+60.0	0.4	75 00.0	+60.0	0.5	83
84	69 00.0	+60.0	0.3	70 00.0	+60.0	0.3	71 00.0	+60.0	0.3	72 00.0	+60.0	0.3	73 00.0	+60.0	0.4	74 00.0	+60.0	0.4	75 00.0	+60.0	0.4	76 00.0	+60.0	0.4	84
85	70 00.0	+60.0	0.3	71 00.0	+60.0	0.3	72 00.0	+60.0	0.3	73 00.0	+60.0	0.3	74 00.0	+60.0	0.3	75 00.0	+60.0	0.3	76 00.0	+60.0	0.4	77 00.0	+60.0	0.4	85
86	71 00.0	+60.0	0.2	72 00.0	+60.0	0.2	73 00.0	+60.0	0.2	74 00.0	+60.0	0.3	75 00.0	+60.0	0.3	76 00.0	+60.0	0.3	77 00.0	+60.0	0.3	78 00.0	+60.0	0.3	86
87	72 00.0	+60.0	0.2	73 00.0	+60.0	0.2	74 00.0	+60.0	0.2	75 00.0	+60.0	0.2	76 00.0	+60.0	0.2	77 00.0	+60.0	0.2	78 00.0	+60.0	0.3	79 00.0	+60.0	0.3	87
88	73 00.0	+60.0	0.1	74 00.0	+60.0	0.1	75 00.0	+60.0	0.1	76 00.0	+60.0	0.1	77 00.0	+60.0	0.2	78 00.0	+60.0	0.2	79 00.0	+60.0	0.2	80 00.0	+60.0	0.2	88
89	74 00.0	+60.0	0.1	75 00.0	+60.0	0.1	76 00.0	+60.0	0.1	77 00.0	+60.0	0.1	78 00.0	+60.0	0.1	79 00.0	+60.0	0.1	80 00.0	+60.0	0.1	81 00.0	+60.0	0.1	89
90	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 179°, 181°

2°, 358° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 59.4	+60.0	177.9	13 59.5	+60.0	177.9	12 59.5	+60.0	177.9	11 59.6	+60.0	178.0	10 59.6	+60.0	178.0	9 59.6	+60.0	178.0	8 59.7	+60.0	178.0	7 59.7	+60.0	178.0	**0**
1	15 59.4	+60.0	177.9	14 59.5	+60.0	177.9	13 59.5	+60.0	177.9	12 59.6	+60.0	177.9	11 59.6	+60.0	178.0	10 59.6	+60.0	178.0	9 59.7	+60.0	178.0	8 59.7	+60.0	178.0	**1**
2	16 59.4	+60.0	177.9	15 59.5	+60.0	177.9	14 59.5	+60.0	177.9	13 59.6	+59.9	177.9	12 59.6	+60.0	177.9	11 59.6	+60.0	178.0	10 59.7	+60.0	178.0	9 59.7	+60.0	178.0	**2**
3	17 59.4	+60.0	177.9	16 59.5	+60.0	177.9	15 59.5	+60.0	177.9	14 59.5	+60.0	177.9	13 59.6	+60.0	177.9	12 59.6	+60.0	178.0	11 59.7	+60.0	178.0	10 59.7	+60.0	178.0	**3**
4	18 59.4	+60.0	177.9	17 59.5	+60.0	177.9	16 59.5	+60.0	177.9	15 59.5	+60.0	177.9	14 59.6	+60.0	177.9	13 59.6	+60.0	177.9	12 59.7	+60.0	178.0	11 59.7	+60.0	178.0	**4**
5	19 59.4	+60.0	177.9	18 59.5	+60.0	177.9	17 59.5	+60.0	177.9	16 59.5	+60.0	177.9	15 59.6	+60.0	177.9	14 59.6	+60.0	177.9	13 59.7	+60.0	177.9	12 59.7	+60.0	178.0	**5**
6	20 59.4	+60.0	177.9	19 59.5	+60.0	177.9	18 59.5	+60.0	177.9	17 59.5	+60.0	177.9	16 59.6	+60.0	177.9	15 59.6	+60.0	177.9	14 59.7	+60.0	177.9	13 59.7	+60.0	178.0	**6**
7	21 59.4	+60.0	177.9	20 59.5	+60.0	177.9	19 59.5	+60.0	177.9	18 59.5	+60.0	177.9	17 59.6	+60.0	177.9	16 59.6	+60.0	177.9	15 59.7	+60.0	177.9	14 59.7	+60.0	177.9	**7**
8	22 59.4	+60.0	177.8	21 59.5	+60.0	177.9	20 59.5	+60.0	177.9	19 59.5	+60.0	177.9	18 59.6	+60.0	177.9	17 59.6	+60.0	177.9	16 59.7	+60.0	177.9	15 59.7	+60.0	177.9	**8**
9	23 59.4	+60.0	177.8	22 59.5	+60.0	177.9	21 59.5	+60.0	177.9	20 59.5	+60.0	177.9	19 59.6	+60.0	177.9	18 59.6	+60.0	177.9	17 59.7	+60.0	177.9	16 59.7	+60.0	177.9	**9**
10	24 59.4	+60.0	177.8	23 59.5	+60.0	177.8	22 59.5	+60.0	177.9	21 59.5	+60.0	177.9	20 59.6	+60.0	177.9	19 59.6	+60.0	177.9	18 59.7	+60.0	177.9	17 59.7	+60.0	177.9	**10**
11	25 59.4	+60.0	177.8	24 59.5	+59.9	177.8	23 59.5	+60.0	177.9	22 59.5	+60.0	177.9	21 59.6	+60.0	177.9	20 59.6	+60.0	177.9	19 59.7	+60.0	177.9	18 59.7	+60.0	177.9	**11**
12	26 59.4	+60.0	177.8	25 59.4	+60.0	177.8	24 59.5	+60.0	177.8	23 59.5	+60.0	177.9	22 59.6	+60.0	177.9	21 59.6	+60.0	177.9	20 59.7	+60.0	177.9	19 59.7	+60.0	177.9	**12**
13	27 59.4	+60.0	177.8	26 59.4	+60.0	177.8	25 59.5	+60.0	177.8	24 59.5	+60.0	177.8	23 59.6	+60.0	177.9	22 59.6	+60.0	177.9	21 59.7	+60.0	177.9	20 59.7	+60.0	177.9	**13**
14	28 59.4	+60.0	177.8	27 59.4	+60.0	177.8	26 59.5	+60.0	177.8	25 59.5	+60.0	177.8	24 59.6	+60.0	177.9	23 59.6	+60.0	177.9	22 59.7	+60.0	177.9	21 59.7	+60.0	177.9	**14**
15	29 59.4	+60.0	177.8	28 59.4	+60.0	177.8	27 59.5	+60.0	177.8	26 59.5	+60.0	177.8	25 59.6	+60.0	177.9	24 59.6	+60.0	177.9	23 59.7	+60.0	177.9	22 59.7	+60.0	177.9	**15**
16	30 59.4	+60.0	177.8	29 59.4	+60.0	177.8	28 59.5	+60.0	177.8	27 59.5	+60.0	177.8	26 59.6	+60.0	177.8	25 59.6	+60.0	177.9	24 59.7	+60.0	177.9	23 59.7	+60.0	177.9	**16**
17	31 59.4	+60.0	177.7	30 59.4	+60.0	177.8	29 59.5	+60.0	177.8	28 59.5	+60.0	177.8	27 59.6	+60.0	177.8	26 59.6	+60.0	177.9	25 59.7	+60.0	177.9	24 59.7	+60.0	177.9	**17**
18	32 59.4	+60.0	177.7	31 59.4	+60.0	177.8	30 59.5	+60.0	177.8	29 59.5	+60.0	177.8	28 59.6	+60.0	177.8	27 59.6	+60.0	177.8	26 59.7	+59.9	177.9	25 59.7	+60.0	177.9	**18**
19	33 59.4	+60.0	177.7	32 59.4	+60.0	177.7	31 59.5	+60.0	177.8	30 59.5	+60.0	177.8	29 59.6	+60.0	177.8	28 59.6	+60.0	177.8	27 59.6	+60.0	177.9	26 59.7	+60.0	177.9	**19**
20	34 59.4	+60.0	177.7	33 59.4	+60.0	177.7	32 59.5	+60.0	177.8	31 59.5	+60.0	177.8	30 59.6	+60.0	177.8	29 59.6	+60.0	177.8	28 59.6	+60.0	177.9	27 59.7	+60.0	177.9	**20**
21	35 59.4	+60.0	177.7	34 59.4	+60.0	177.7	33 59.5	+60.0	177.7	32 59.5	+60.0	177.8	31 59.6	+60.0	177.8	30 59.6	+60.0	177.8	29 59.6	+60.0	177.8	28 59.7	+60.0	177.9	**21**
22	36 59.4	+60.0	177.7	35 59.4	+60.0	177.7	34 59.5	+60.0	177.7	33 59.5	+60.0	177.8	32 59.6	+60.0	177.8	31 59.6	+60.0	177.8	30 59.6	+60.0	177.8	29 59.7	+60.0	177.9	**22**
23	37 59.4	+60.0	177.7	36 59.4	+60.0	177.7	35 59.5	+60.0	177.7	34 59.5	+60.0	177.8	33 59.6	+60.0	177.8	32 59.6	+60.0	177.8	31 59.6	+60.0	177.8	30 59.7	+60.0	177.9	**23**
24	38 59.4	+60.0	177.6	37 59.4	+60.0	177.7	36 59.5	+60.0	177.7	35 59.5	+60.0	177.7	34 59.6	+60.0	177.8	33 59.6	+60.0	177.8	32 59.6	+60.0	177.8	31 59.7	+60.0	177.8	**24**
25	39 59.4	+60.0	177.6	38 59.4	+60.0	177.7	37 59.5	+60.0	177.7	36 59.5	+60.0	177.7	35 59.6	+60.0	177.8	34 59.6	+60.0	177.8	33 59.6	+60.0	177.8	32 59.7	+60.0	177.8	**25**
26	40 59.4	+60.0	177.6	39 59.4	+60.0	177.7	38 59.5	+60.0	177.7	37 59.5	+60.0	177.7	36 59.6	+59.9	177.7	35 59.6	+60.0	177.8	34 59.6	+60.0	177.8	33 59.7	+60.0	177.8	**26**
27	41 59.4	+59.9	177.6	40 59.4	+60.0	177.6	39 59.5	+59.9	177.7	38 59.5	+60.0	177.7	37 59.5	+60.0	177.7	36 59.6	+60.0	177.8	35 59.6	+60.0	177.8	34 59.7	+60.0	177.8	**27**
28	42 59.3	+60.0	177.6	41 59.4	+60.0	177.6	40 59.4	+60.0	177.7	39 59.5	+60.0	177.7	38 59.5	+60.0	177.7	37 59.6	+60.0	177.8	36 59.6	+60.0	177.8	35 59.7	+60.0	177.8	**28**
29	43 59.3	+60.0	177.6	42 59.4	+60.0	177.6	41 59.4	+60.0	177.6	40 59.5	+60.0	177.7	39 59.5	+60.0	177.7	38 59.6	+60.0	177.7	37 59.6	+60.0	177.8	36 59.7	+60.0	177.8	**29**
30	44 59.3	+60.0	177.6	43 59.4	+60.0	177.6	42 59.4	+60.0	177.6	41 59.5	+60.0	177.7	40 59.5	+60.0	177.7	39 59.6	+60.0	177.7	38 59.6	+60.0	177.8	37 59.7	+60.0	177.8	**30**
31	45 59.3	+60.0	177.5	44 59.4	+60.0	177.6	43 59.4	+60.0	177.6	42 59.5	+60.0	177.7	41 59.5	+60.0	177.7	40 59.6	+60.0	177.7	39 59.6	+60.0	177.8	38 59.7	+60.0	177.8	**31**
32	46 59.3	+60.0	177.5	45 59.4	+60.0	177.6	44 59.4	+60.0	177.6	43 59.5	+60.0	177.6	42 59.5	+60.0	177.7	41 59.6	+60.0	177.7	40 59.6	+60.0	177.8	39 59.7	+60.0	177.8	**32**
33	47 59.3	+60.0	177.5	46 59.4	+60.0	177.5	45 59.4	+60.0	177.6	44 59.5	+60.0	177.6	43 59.5	+60.0	177.7	42 59.6	+60.0	177.7	41 59.6	+60.0	177.7	40 59.7	+60.0	177.8	**33**
34	48 59.3	+60.0	177.5	47 59.4	+60.0	177.5	46 59.4	+60.0	177.6	45 59.5	+60.0	177.6	44 59.5	+60.0	177.7	43 59.6	+60.0	177.7	42 59.6	+60.0	177.7	41 59.7	+60.0	177.8	**34**
35	49 59.3	+60.0	177.5	48 59.4	+60.0	177.5	47 59.4	+60.0	177.6	46 59.5	+60.0	177.6	45 59.5	+60.0	177.6	44 59.6	+60.0	177.7	43 59.6	+60.0	177.7	42 59.7	+60.0	177.8	**35**
36	50 59.3	+60.0	177.4	49 59.4	+60.0	177.5	48 59.4	+60.0	177.5	47 59.5	+60.0	177.6	46 59.5	+60.0	177.6	45 59.6	+60.0	177.7	44 59.6	+60.0	177.7	43 59.7	+60.0	177.8	**36**
37	51 59.3	+60.0	177.4	50 59.4	+60.0	177.5	49 59.4	+60.0	177.5	48 59.5	+60.0	177.6	47 59.5	+60.0	177.6	46 59.6	+60.0	177.7	45 59.6	+60.0	177.7	44 59.7	+60.0	177.7	**37**
38	52 59.3	+60.0	177.4	51 59.4	+59.9	177.4	50 59.4	+60.0	177.5	49 59.5	+60.0	177.5	48 59.5	+60.0	177.6	47 59.6	+60.0	177.6	46 59.6	+60.0	177.7	45 59.7	+60.0	177.7	**38**
39	53 59.3	+60.0	177.4	52 59.3	+60.0	177.4	51 59.4	+60.0	177.5	50 59.5	+60.0	177.5	49 59.5	+60.0	177.6	48 59.6	+60.0	177.6	47 59.6	+60.0	177.7	46 59.7	+60.0	177.7	**39**
40	54 59.3	+60.0	177.3	53 59.3	+60.0	177.4	52 59.4	+60.0	177.5	51 59.5	+60.0	177.5	50 59.5	+60.0	177.6	49 59.6	+60.0	177.6	48 59.6	+60.0	177.7	47 59.7	+60.0	177.7	**40**
41	55 59.3	+60.0	177.3	54 59.3	+60.0	177.4	53 59.4	+60.0	177.4	52 59.5	+59.9	177.5	51 59.5	+60.0	177.5	50 59.6	+60.0	177.6	49 59.6	+60.0	177.7	48 59.7	+60.0	177.7	**41**
42	56 59.3	+60.0	177.3	55 59.3	+60.0	177.3	54 59.4	+60.0	177.4	53 59.4	+60.0	177.5	52 59.5	+60.0	177.5	51 59.6	+60.0	177.6	50 59.6	+60.0	177.6	49 59.7	+60.0	177.7	**42**
43	57 59.3	+59.9	177.2	56 59.3	+60.0	177.3	55 59.4	+60.0	177.4	54 59.4	+60.0	177.5	53 59.5	+60.0	177.5	52 59.6	+60.0	177.6	51 59.6	+60.0	177.6	50 59.7	+60.0	177.7	**43**
44	58 59.2	+60.0	177.2	57 59.3	+60.0	177.3	56 59.4	+60.0	177.4	55 59.4	+60.0	177.4	54 59.5	+60.0	177.5	53 59.6	+60.0	177.6	52 59.6	+60.0	177.6	51 59.7	+60.0	177.7	**44**
45	59 59.2	+60.0	177.2	58 59.3	+60.0	177.3	57 59.4	+60.0	177.3	56 59.4	+60.0	177.4	55 59.5	+60.0	177.5	54 59.6	+59.9	177.5	53 59.6	+60.0	177.6	52 59.7	+60.0	177.7	**45**
46	60 59.2	+60.0	177.1	59 59.3	+60.0	177.2	58 59.4	+60.0	177.3	57 59.4	+60.0	177.4	56 59.5	+60.0	177.4	55 59.5	+60.0	177.5	54 59.6	+60.0	177.6	53 59.7	+60.0	177.6	**46**
47	61 59.2	+60.0	177.1	60 59.3	+60.0	177.2	59 59.4	+59.9	177.3	58 59.4	+60.0	177.4	57 59.5	+60.0	177.4	56 59.5	+60.0	177.5	55 59.6	+60.0	177.6	54 59.7	+60.0	177.6	**47**
48	62 59.2	+60.0	177.1	61 59.3	+60.0	177.1	60 59.3	+60.0	177.2	59 59.4	+60.0	177.3	58 59.5	+60.0	177.4	57 59.5	+60.0	177.5	56 59.6	+60.0	177.5	55 59.7	+59.9	177.6	**48**
49	63 59.2	+60.0	177.0	62 59.3	+60.0	177.1	61 59.3	+60.0	177.2	60 59.4	+60.0	177.3	59 59.5	+60.0	177.4	58 59.5	+60.0	177.5	57 59.6	+60.0	177.5	56 59.6	+60.0	177.6	**49**
50	64 59.2	+60.0	177.0	63 59.3	+59.9	177.1	62 59.3	+60.0	177.2	61 59.4	+60.0	177.3	60 59.5	+60.0	177.3	59 59.5	+60.0	177.4	58 59.6	+60.0	177.5	57 59.6	+60.0	177.6	**50**
51	65 59.2	+59.9	176.9	64 59.2	+60.0	177.0	63 59.3	+60.0	177.1	62 59.4	+60.0	177.2	61 59.5	+60.0	177.3	60 59.5	+60.0	177.4	59 59.6	+60.0	177.5	58 59.6	+60.0	177.6	**51**
52	66 59.1	+60.0	176.8	65 59.2	+60.0	177.0	64 59.3	+60.0	177.1	63 59.4	+60.0	177.2	62 59.5	+60.0	177.3	61 59.5	+60.0	177.4	60 59.6	+60.0	177.5	59 59.6	+60.0	177.5	**52**
53	67 59.1	+60.0	176.8	66 59.2	+60.0	176.9	65 59.3	+60.0	177.0	64 59.4	+60.0	177.2	63 59.5	+59.9	177.3	62 59.5	+60.0	177.3	61 59.6	+60.0	177.4	60 59.6	+60.0	177.5	**53**
54	68 59.1	+60.0	176.7	67 59.2	+60.0	176.9	66 59.3	+60.0	177.0	65 59.4	+60.0	177.1	64 59.4	+60.0	177.2	63 59.5	+60.0	177.3	62 59.6	+60.0	177.4	61 59.6	+60.0	177.5	**54**
55	69 59.1	+60.0	176.6	68 59.2	+60.0	176.8	67 59.3	+60.0	176.9	66 59.4	+60.0	177.1	65 59.4	+60.0	177.2	64 59.5	+60.0	177.3	63 59.6	+60.0	177.4	62 59.6	+60.0	177.5	**55**
56	70 59.1	+59.9	176.6	69 59.2	+60.0	176.7	68 59.3	+60.0	176.9	67 59.4	+59.9	177.0	66 59.4	+60.0	177.1	65 59.5	+60.0	177.3	64 59.6	+60.0	177.4	63 59.6	+60.0	177.4	**56**
57	71 59.0	+60.0	176.5	70 59.2	+59.9	176.7	69 59.3	+59.9	176.8	68 59.3	+60.0	177.0	67 59.4	+60.0	177.1	66 59.5	+60.0	177.2	65 59.6	+60.0	177.3	64 59.6	+60.0	177.4	**57**
58	72 59.0	+60.0	176.4	71 59.1	+60.0	176.6	70 59.2	+60.0	176.7	69 59.3	+60.0	176.9	68 59.4	+60.0	177.0	67 59.5	+60.0	177.2	66 59.6	+59.9	177.3	65 59.6	+60.0	177.4	**58**
59	73 59.0	+60.0	176.3	72 59.1	+60.0	176.5	71 59.2	+60.0	176.7	70 59.3	+60.0	176.8	69 59.4	+60.0	177.0	68 59.5	+60.0	177.1	67 59.5	+60.0	177.3	66 59.6	+60.0	177.4	**59**
60	74 59.0	+59.9	176.1	73 59.1	+60.0	176.4	72 59.2	+60.0	176.6	71 59.3	+60.0	176.8	70 59.4	+60.0	176.9	69 59.5	+60.0	177.1	68 59.5	+60.0	177.2	67 59.6	+60.0	177.3	**60**
61	75 58.9	+60.0	176.0	74 59.1	+59.9	176.3	73 59.2	+59.9	176.5	72 59.3	+60.0	176.7	71 59.4	+60.0	176.9	70 59.5	+59.9	177.0	69 59.5	+60.0	177.2	68 59.6	+60.0	177.3	**61**
62	76 58.9	+59.9	175.8	75 59.0	+60.0	176.1	74 59.1	+60.0	176.4	73 59.3	+59.9	176.6	72 59.4	+59.9	176.8	71 59.4	+60.0	177.0	70 59.5	+60.0	177.1	69 59.6	+60.0	177.3	**62**
63	77 58.8	+60.0	175.6	76 59.0	+59.9	176.0	75 59.1	+60.0	176.2	74 59.2	+60.0	176.5	73 59.3	+60.0	176.7	72 59.4	+60.0	176.9	71 59.5	+60.0	177.1	70 59.6	+60.0	177.2	**63**
64	78 58.8	+59.9	175.4	77 58.9	+60.0	175.8	76 59.1	+59.9	176.1	75 59.2	+60.0	176.4	74 59.3	+60.0	176.6	73 59.4	+60.0	176.8	72 59.5	+60.0	177.0	71 59.6	+60.0	177.2	**64**
65	79 58.7	+59.9	175.1	78 58.9	+59.9	175.6	77 59.0	+60.0	175.9	76 59.2	+59.9	176.2	75 59.3	+60.0	176.5	74 59.4	+60.0	176.7	73 59.5	+60.0	176.9	72 59.6	+60.0	177.1	**65**
66	80 58.6	+59.9	174.8	79 58.8	+59.9	175.3	78 59.0	+59.9	175.7	77 59.1	+60.0	176.1	76 59.3	+59.9	176.4	75 59.4	+60.0	176.6	74 59.5	+60.0	176.9	73 59.6	+60.0	177.0	**66**
67	81 58.5	+59.8	174.4	80 58.7	+59.9	175.0	79 58.9	+60.0	175.5	78 59.1	+60.0	175.9	77 59.2	+60.0	176.2	76 59.4	+59.9	176.5	75 59.5	+60.0	176.8	74 59.6	+59.9	177.0	**67**
68	82 58.3	+59.8	173.9	81 58.6	+59.9	174.6	80 58.9	+59.9	175.2	79 59.1	+59.9	175.7	78 59.2	+60.0	176.1	77 59.3	+60.0	176.4	76 59.5	+59.9	176.7	75 59.5	+60.0	176.9	**68**
69	83 58.1	+59.8	173.2	82 58.5	+59.8	174.1	81 58.8	+59.9	174.9	80 59.0	+59.9	175.4	79 59.2	+59.9	175.9	78 59.3	+60.0	176.2	77 59.4	+60.0	176.6	76 59.5	+60.0	176.8	**69**
70	84 57.9	+59.6	172.2	83 58.3	+59.8	173.5	82 58.7	+59.8	174.4	81 58.9	+59.9	175.1	80 59.1	+60.0	175.6	79 59.3	+59.9	176.1	78 59.4	+60.0	176.4	77 59.5	+60.0	176.7	**70**
71	85 57.5	+59.3	170.7	84 58.1	+59.7	172.6	83 58.5	+59.8	173.8	82 58.8	+59.9	174.7	81 59.1	+59.9	175.3	80 59.2	+60.0	175.8	79 59.4	+60.0	176.3	78 59.5	+60.0	176.6	**71**
72	86 56.8	+58.7	168.3	85 57.8	+59.4	171.2	84 58.3	+59.7	172.9	83 58.7	+59.8	174.1	82 59.0	+59.9	174.9	81 59.2	+59.9	175.6	80 59.4	+59.9	176.1	79 59.5	+60.0	176.4	**72**
73	87 55.5	*+56.5*	•163.6	86 57.2	+58.9	168.9	85 58.0	+59.5	171.7	84 58.5	+59.8	173.3	83 58.9	+59.8	174.4	82 59.1	+59.9	175.2	81 59.3	+60.0	175.8	80 59.5	+59.9	176.3	**73**
74	88 52.0	*+36.9*	•150.9	87 56.1	*+56.8*	•164.5	86 57.5	+59.1	169.6	85 58.3	+59.6	172.1	84 58.7	+59.8	173.7	83 59.0	+59.9	174.7	82 59.3	+59.9	175.5	81 59.4	+60.0	176.0	**74**
75	89 28.9	*–36.0*	• 89.0	88 52.9	*+38.1*	•152.4	87 56.6	*+57.2*	•165.4	86 57.9	+59.1	170.2	85 58.5	+59.7	172.6	84 58.9	+59.8	174.1	83 59.2	+59.9	175.1	82 59.4	+59.9	175.8	**75**
76	88 52.9	*–56.3*	• 25.6	89 31.0	*–37.2*	• 89.0	88 53.8	*+39.2*	•154.0	87 57.0	*+57.6*	•166.3	86 58.2	+59.3	170.8	85 58.7	+59.7	173.1	84 59.1	+59.8	174.5	83 59.3	+59.9	175.4	**76**
77	87 56.6	–58.7	12.6	88 53.8	*–56.8*	• 24.1	89 33.0	*–38.4*	• 89.0	88 54.6	*+40.5*	•155.6	87 57.5	*+57.9*	•167.3	86 58.4	+59.5	171.4	85 58.9	+59.8	173.6	84 59.2	+59.9	174.8	**77**
78	86 57.9	–59.4	7.9	87 57.0	–58.8	11.7	88 54.6	*–57.1*	• 22.4	89 35.1	*–39.7*	• 89.0	88 55.4	*+41.7*	•157.3	87 57.9	*+58.2*	•168.2	86 58.7	+59.5	172.1	85 59.1	+59.8	174.1	**78**
79	85 58.5	–59.6	5.4	86 58.2	–59.5	7.2	87 57.5	–59.1	10.8	88 55.4	*–57.5*	• 20.8	89 37.1	*–41.0*	• 89.0	88 56.1	*+43.1*	•159.0	87 58.2	*+58.6*	•169.2	86 58.9	+59.7	172.7	**79**
80	84 58.9	–59.7	4.0	85 58.7	–59.6	5.0	86 58.4	–59.5	6.6	87 57.9	–59.2	9.8	88 56.1	*–57.9*	• 19.0	89 39.2	*–42.4*	• 89.0	88 56.8	*+44.4*	•160.7	87 58.6	*+58.8*	•170.1	**80**
81	83 59.2	–59.8	3.0	84 59.1	–59.8	3.6	85 58.9	–59.7	4.5	86 58.7	–59.6	5.9	87 58.2	–59.3	8.9	88 56.8	*–58.2*	• 17.3	89 41.2	*–43.8*	• 89.0	88 57.4	*+45.9*	•162.5	**81**
82	82 59.4	–59.9	2.3	83 59.3	–59.8	2.7	84 59.2	–59.7	3.2	85 59.1	–59.7	4.0	86 58.9	–59.6	5.3	87 58.6	–59.4	7.9	88 57.4	*–58.5*	• 15.5	89 43.3	*–45.3*	• 89.0	**82**
83	81 59.5	–59.9	1.7	82 59.5	–59.9	2.0	83 59.5	–59.9	2.3	84 59.4	–59.8	2.8	85 59.3	–59.8	3.5	86 59.2	–59.7	4.6	87 58.9	–59.6	6.9	88 58.0	*–58.9*	• 13.6	**83**
84	80 59.6	–59.9	1.3	81 59.6	–59.9	1.5	82 59.6	–59.9	1.7	83 59.6	–59.9	2.0	84 59.5	–59.8	2.4	85 59.5	–59.9	3.0	86 59.3	–59.7	4.0	87 59.1	–59.6	6.0	**84**
85	79 59.7	–59.9	1.0	80 59.7	–59.9	1.1	81 59.7	–59.9	1.3	82 59.7	–59.9	1.4	83 59.7	–59.9	1.7	84 59.6	–59.8	2.0	85 59.6	–59.9	2.5	86 59.5	–59.8	3.3	**85**
86	78 59.8	–59.9	0.7	79 59.8	–59.9	0.8	80 59.8	–59.9	0.9	81 59.8	–59.9	1.0	82 59.8	–60.0	1.1	83 59.8	–60.0	1.3	84 59.7	–59.9	1.6	85 59.7	–59.9	2.0	**86**
87	77 59.9	–60.0	0.5	78 59.9	–60.0	0.5	79 59.9	–60.0	0.6	80 59.9	–60.0	0.7	81 59.8	–59.9	0.8	82 59.8	–59.9	0.9	83 59.8	–59.9	1.0	84 59.8	–59.9	1.2	**87**
88	76 59.9	–59.9	0.3	77 59.9	–59.9	0.3	78 59.9	–59.9	0.4	79 59.9	–59.9	0.4	80 59.9	–59.9	0.4	81 59.9	–59.9	0.5	82 59.9	–59.9	0.6	83 59.9	–59.9	0.7	**88**
89	76 00.0	–60.0	0.1	77 00.0	–60.0	0.2	78 00.0	–60.0	0.2	79 00.0	–60.0	0.2	80 00.0	–60.0	0.2	81 00.0	–60.0	0.2	82 00.0	–60.0	0.3	83 00.0	–60.0	0.3	**89**
90	75 00.0	–60.0	0.0	76 00.0	–60.0	0.0	77 00.0	–60.0	0.0	78 00.0	–60.0	0.0	79 00.0	–60.0	0.0	80 00.0	–60.0	0.0	81 00.0	–60.0	0.0	82 00.0	–60.0	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 2°, 358°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	14 59.4	−60.0	177.9	13 59.5	−60.0	177.9	12 59.5	−60.0	177.9	11 59.6	−60.0	178.0	10 59.6	−60.0	178.0	9 59.6	−60.0	178.0	8 59.7	−60.0	178.0	7 59.7	−60.0	178.0	0
1	13 59.4	−60.0	177.9	12 59.5	−60.0	177.9	11 59.5	−60.0	178.0	10 59.6	−60.0	178.0	9 59.6	−60.0	178.0	8 59.6	−60.0	178.0	7 59.7	−60.0	178.0	6 59.7	−60.0	178.0	1
2	12 59.4	−60.0	177.9	11 59.5	−60.0	178.0	10 59.5	−60.0	178.0	9 59.6	−60.0	178.0	8 59.6	−60.0	178.0	7 59.6	−60.0	178.0	6 59.7	−60.0	178.0	5 59.7	−60.0	178.0	2
3	11 59.4	−60.0	178.0	10 59.5	−60.0	178.0	9 59.5	−60.0	178.0	8 59.6	−60.0	178.0	7 59.6	−60.0	178.0	6 59.6	−60.0	178.0	5 59.7	−60.0	178.0	4 59.7	−60.0	178.0	3
4	10 59.4	−59.9	178.0	9 59.5	−60.0	178.0	8 59.5	−60.0	178.0	7 59.6	−60.0	178.0	6 59.6	−60.0	178.0	5 59.6	−60.0	178.0	4 59.7	−60.0	178.0	3 59.7	−60.0	178.0	4
5	9 59.5	−60.0	178.0	8 59.5	−60.0	178.0	7 59.5	−60.0	178.0	6 59.6	−60.0	178.0	5 59.6	−60.0	178.0	4 59.6	−60.0	178.0	3 59.7	−60.0	178.0	2 59.7	−60.0	178.0	5
6	8 59.5	−60.0	178.0	7 59.5	−60.0	178.0	6 59.5	−60.0	178.0	5 59.6	−60.0	178.0	4 59.6	−60.0	178.0	3 59.6	−60.0	178.0	2 59.7	−60.0	178.0	1 59.7	−60.0	178.0	6
7	7 59.5	−60.0	178.0	6 59.5	−60.0	178.0	5 59.5	−60.0	178.0	4 59.6	−60.0	178.0	3 59.6	−60.0	178.0	2 59.6	−60.0	178.0	1 59.7	−60.0	178.0	0 59.7	−60.0	178.0	7
8	6 59.5	−60.0	178.0	5 59.5	−60.0	178.0	4 59.5	−60.0	178.0	3 59.6	−60.0	178.0	2 59.6	−60.0	178.0	1 59.6	−60.0	178.0	0 59.7	−60.0	178.0	0 00.3	+60.0	2.0	8
9	5 59.5	−60.0	178.0	4 59.5	−60.0	178.0	3 59.5	−60.0	178.0	2 59.6	−60.0	178.0	1 59.6	−60.0	178.0	0 59.6	−60.0	178.0	0 00.3	+60.0	2.0	1 00.3	+60.0	2.0	9
10	4 59.5	−60.0	178.0	3 59.5	−60.0	178.0	2 59.5	−60.0	178.0	1 59.6	−60.0	178.0	0 59.6	−60.0	178.0	0 00.4	+60.0	2.0	1 00.3	+60.0	2.0	2 00.3	+60.0	2.0	10
11	3 59.5	−60.0	178.0	2 59.5	−60.0	178.0	1 59.5	−60.0	178.0	0 59.6	−60.0	178.0	0 00.4	+60.0	2.0	1 00.4	+60.0	2.0	2 00.3	+60.0	2.0	3 00.3	+60.0	2.0	11
12	2 59.5	−60.0	178.0	1 59.5	−60.0	178.0	0 59.5	−60.0	178.0	0 00.4	+60.0	2.0	1 00.4	+60.0	2.0	2 00.4	+60.0	2.0	3 00.3	+60.0	2.0	4 00.3	+60.0	2.0	12
13	1 59.5	−60.0	178.1	0 59.5	−60.0	178.1	0 00.5	+60.0	1.9	1 00.4	+60.0	1.9	2 00.4	+60.0	1.9	3 00.4	+60.0	2.0	4 00.3	+60.0	2.0	5 00.3	+60.0	2.0	13
14	0 59.5	−60.0	178.1	0 00.5	+60.0	1.9	1 00.5	+60.0	1.9	2 00.4	+60.0	1.9	3 00.4	+60.0	1.9	4 00.4	+60.0	1.9	5 00.3	+60.0	1.9	6 00.3	+60.0	2.0	14
15	0 00.5	+60.0	1.9	1 00.5	+60.0	1.9	2 00.5	+60.0	1.9	3 00.4	+60.0	1.9	4 00.4	+60.0	1.9	5 00.4	+60.0	1.9	6 00.3	+60.0	1.9	7 00.3	+60.0	1.9	15
16	1 00.5	+60.0	1.9	2 00.5	+60.0	1.9	3 00.5	+60.0	1.9	4 00.4	+60.0	1.9	5 00.4	+60.0	1.9	6 00.4	+60.0	1.9	7 00.3	+60.0	1.9	8 00.3	+60.0	1.9	16
17	2 00.5	+60.0	1.9	3 00.5	+60.0	1.9	4 00.5	+59.9	1.9	5 00.4	+60.0	1.9	6 00.4	+60.0	1.9	7 00.4	+59.9	1.9	8 00.3	+60.0	1.9	9 00.3	+60.0	1.9	17
18	3 00.5	+60.0	1.9	4 00.5	+60.0	1.9	5 00.4	+60.0	1.9	6 00.4	+60.0	1.9	7 00.4	+60.0	1.9	8 00.3	+60.0	1.9	9 00.3	+60.0	1.9	10 00.3	+60.0	1.9	18
19	4 00.5	+60.0	1.9	5 00.5	+60.0	1.9	6 00.4	+60.0	1.9	7 00.4	+60.0	1.9	8 00.4	+60.0	1.9	9 00.3	+60.0	1.9	10 00.3	+60.0	1.9	11 00.3	+60.0	1.9	19
20	5 00.5	+60.0	1.9	6 00.5	+60.0	1.9	7 00.4	+60.0	1.9	8 00.4	+60.0	1.9	9 00.4	+60.0	1.9	10 00.3	+60.0	1.9	11 00.3	+60.0	1.9	12 00.3	+60.0	1.9	20
21	6 00.5	+60.0	1.9	7 00.5	+60.0	1.9	8 00.4	+60.0	1.9	9 00.4	+60.0	1.9	10 00.4	+60.0	1.9	11 00.3	+60.0	1.9	12 00.3	+60.0	1.9	13 00.3	+60.0	1.9	21
22	7 00.5	+60.0	1.9	8 00.5	+60.0	1.9	9 00.4	+60.0	1.9	10 00.4	+60.0	1.9	11 00.4	+60.0	1.9	12 00.3	+60.0	1.9	13 00.3	+60.0	1.9	14 00.3	+60.0	1.9	22
23	8 00.5	+60.0	1.9	9 00.5	+60.0	1.9	10 00.4	+60.0	1.9	11 00.4	+60.0	1.9	12 00.4	+60.0	1.9	13 00.3	+60.0	1.9	14 00.3	+60.0	1.9	15 00.3	+60.0	1.9	23
24	9 00.5	+60.0	1.8	10 00.5	+60.0	1.9	11 00.4	+60.0	1.9	12 00.4	+60.0	1.9	13 00.4	+60.0	1.9	14 00.3	+60.0	1.9	15 00.3	+60.0	1.9	16 00.3	+60.0	1.9	24
25	10 00.5	+60.0	1.8	11 00.5	+60.0	1.8	12 00.4	+60.0	1.9	13 00.4	+60.0	1.9	14 00.4	+60.0	1.9	15 00.3	+60.0	1.9	16 00.3	+60.0	1.9	17 00.3	+60.0	1.9	25
26	11 00.5	+60.0	1.8	12 00.5	+60.0	1.8	13 00.4	+60.0	1.8	14 00.4	+60.0	1.9	15 00.4	+60.0	1.9	16 00.3	+60.0	1.9	17 00.3	+60.0	1.9	18 00.3	+60.0	1.9	26
27	12 00.5	+60.0	1.8	13 00.5	+60.0	1.8	14 00.4	+60.0	1.8	15 00.4	+60.0	1.8	16 00.4	+60.0	1.9	17 00.3	+60.0	1.9	18 00.3	+60.0	1.9	19 00.3	+60.0	1.9	27
28	13 00.5	+60.0	1.8	14 00.5	+60.0	1.8	15 00.4	+60.0	1.8	16 00.4	+60.0	1.8	17 00.4	+60.0	1.8	18 00.3	+60.0	1.9	19 00.3	+60.0	1.9	20 00.3	+60.0	1.9	28
29	14 00.5	+60.0	1.8	15 00.5	+60.0	1.8	16 00.4	+60.0	1.8	17 00.4	+60.0	1.8	18 00.4	+60.0	1.8	19 00.3	+60.0	1.9	20 00.3	+60.0	1.9	21 00.3	+60.0	1.9	29
30	15 00.5	+60.0	1.8	16 00.5	+60.0	1.8	17 00.4	+60.0	1.8	18 00.4	+60.0	1.8	19 00.4	+60.0	1.8	20 00.3	+60.0	1.8	21 00.3	+60.0	1.9	22 00.3	+60.0	1.9	30
31	16 00.5	+60.0	1.8	17 00.5	+60.0	1.8	18 00.4	+60.0	1.8	19 00.4	+60.0	1.8	20 00.4	+60.0	1.8	21 00.3	+60.0	1.8	22 00.3	+60.0	1.8	23 00.3	+60.0	1.9	31
32	17 00.5	+60.0	1.8	18 00.5	+59.9	1.8	19 00.4	+60.0	1.8	20 00.4	+60.0	1.8	21 00.4	+60.0	1.8	22 00.3	+60.0	1.8	23 00.3	+60.0	1.8	24 00.3	+60.0	1.9	32
33	18 00.5	+60.0	1.8	19 00.4	+60.0	1.8	20 00.4	+60.0	1.8	21 00.4	+60.0	1.8	22 00.4	+60.0	1.8	23 00.3	+60.0	1.8	24 00.3	+60.0	1.8	25 00.3	+60.0	1.9	33
34	19 00.5	+60.0	1.8	20 00.4	+60.0	1.8	21 00.4	+60.0	1.8	22 00.4	+60.0	1.8	23 00.4	+60.0	1.8	24 00.3	+60.0	1.8	25 00.3	+60.0	1.8	26 00.3	+60.0	1.8	34
35	20 00.5	+60.0	1.7	21 00.4	+60.0	1.8	22 00.4	+60.0	1.8	23 00.4	+60.0	1.8	24 00.4	+60.0	1.8	25 00.3	+60.0	1.8	26 00.3	+60.0	1.8	27 00.3	+60.0	1.8	35
36	21 00.5	+60.0	1.7	22 00.4	+60.0	1.7	23 00.4	+60.0	1.8	24 00.4	+60.0	1.8	25 00.4	+60.0	1.8	26 00.3	+60.0	1.8	27 00.3	+60.0	1.8	28 00.3	+60.0	1.8	36
37	22 00.5	+60.0	1.7	23 00.4	+60.0	1.7	24 00.4	+60.0	1.7	25 00.4	+60.0	1.8	26 00.4	+60.0	1.8	27 00.3	+60.0	1.8	28 00.3	+60.0	1.8	29 00.3	+60.0	1.8	37
38	23 00.5	+60.0	1.7	24 00.4	+60.0	1.7	25 00.4	+60.0	1.7	26 00.4	+60.0	1.8	27 00.4	+60.0	1.8	28 00.3	+60.0	1.8	29 00.3	+60.0	1.8	30 00.3	+60.0	1.8	38
39	24 00.5	+60.0	1.7	25 00.4	+60.0	1.7	26 00.4	+60.0	1.7	27 00.4	+60.0	1.7	28 00.4	+59.9	1.8	29 00.3	+60.0	1.8	30 00.3	+60.0	1.8	31 00.3	+60.0	1.8	39
40	25 00.5	+60.0	1.7	26 00.4	+60.0	1.7	27 00.4	+60.0	1.7	28 00.4	+60.0	1.7	29 00.3	+60.0	1.8	30 00.3	+60.0	1.8	31 00.3	+60.0	1.8	32 00.3	+60.0	1.8	40
41	26 00.5	+60.0	1.7	27 00.4	+60.0	1.7	28 00.4	+60.0	1.7	29 00.4	+60.0	1.7	30 00.3	+60.0	1.7	31 00.3	+60.0	1.8	32 00.3	+60.0	1.8	33 00.3	+60.0	1.8	41
42	27 00.5	+59.9	1.7	28 00.4	+60.0	1.7	29 00.4	+60.0	1.7	30 00.4	+60.0	1.7	31 00.3	+60.0	1.7	32 00.3	+60.0	1.8	33 00.3	+60.0	1.8	34 00.3	+60.0	1.8	42
43	28 00.4	+60.0	1.7	29 00.4	+60.0	1.7	30 00.4	+60.0	1.7	31 00.4	+60.0	1.7	32 00.3	+60.0	1.7	33 00.3	+60.0	1.7	34 00.3	+60.0	1.8	35 00.3	+60.0	1.8	43
44	29 00.4	+60.0	1.6	30 00.4	+60.0	1.7	31 00.4	+60.0	1.7	32 00.4	+60.0	1.7	33 00.3	+60.0	1.7	34 00.3	+60.0	1.7	35 00.3	+60.0	1.8	36 00.3	+60.0	1.8	44
45	30 00.4	+60.0	1.6	31 00.4	+60.0	1.6	32 00.4	+60.0	1.7	33 00.4	+60.0	1.7	34 00.3	+60.0	1.7	35 00.3	+60.0	1.7	36 00.3	+60.0	1.7	37 00.3	+60.0	1.8	45
46	31 00.4	+60.0	1.6	32 00.4	+60.0	1.6	33 00.4	+60.0	1.7	34 00.4	+60.0	1.7	35 00.3	+60.0	1.7	36 00.3	+60.0	1.7	37 00.3	+60.0	1.7	38 00.3	+60.0	1.8	46
47	32 00.4	+60.0	1.6	33 00.4	+60.0	1.6	34 00.4	+60.0	1.6	35 00.4	+60.0	1.7	36 00.3	+60.0	1.7	37 00.3	+60.0	1.7	38 00.3	+60.0	1.7	39 00.3	+60.0	1.8	47
48	33 00.4	+60.0	1.6	34 00.4	+60.0	1.6	35 00.4	+60.0	1.6	36 00.4	+60.0	1.7	37 00.3	+60.0	1.7	38 00.3	+60.0	1.7	39 00.3	+60.0	1.7	40 00.3	+60.0	1.7	48
49	34 00.4	+60.0	1.6	35 00.4	+60.0	1.6	36 00.4	+60.0	1.6	37 00.4	+60.0	1.6	38 00.3	+60.0	1.7	39 00.3	+60.0	1.7	40 00.3	+60.0	1.7	41 00.3	+60.0	1.7	49
50	35 00.4	+60.0	1.6	36 00.4	+60.0	1.6	37 00.4	+60.0	1.6	38 00.4	+60.0	1.6	39 00.3	+60.0	1.7	40 00.3	+60.0	1.7	41 00.3	+60.0	1.7	42 00.3	+60.0	1.7	50
51	36 00.4	+60.0	1.6	37 00.4	+60.0	1.6	38 00.4	+60.0	1.6	39 00.4	+59.9	1.6	40 00.3	+60.0	1.6	41 00.3	+60.0	1.7	42 00.3	+60.0	1.7	43 00.3	+59.9	1.7	51
52	37 00.4	+60.0	1.5	38 00.4	+60.0	1.6	39 00.4	+60.0	1.6	40 00.3	+60.0	1.6	41 00.3	+60.0	1.6	42 00.3	+60.0	1.7	43 00.3	+60.0	1.7	44 00.2	+60.0	1.7	52
53	38 00.4	+60.0	1.5	39 00.4	+60.0	1.5	40 00.4	+60.0	1.6	41 00.3	+60.0	1.6	42 00.3	+60.0	1.6	43 00.3	+60.0	1.6	44 00.3	+60.0	1.7	45 00.2	+60.0	1.7	53
54	39 00.4	+60.0	1.5	40 00.4	+60.0	1.5	41 00.4	+60.0	1.6	42 00.3	+60.0	1.6	43 00.3	+60.0	1.6	44 00.3	+60.0	1.6	45 00.3	+60.0	1.7	46 00.2	+60.0	1.7	54
55	40 00.4	+60.0	1.5	41 00.4	+60.0	1.5	42 00.4	+60.0	1.5	43 00.3	+60.0	1.6	44 00.3	+60.0	1.6	45 00.3	+60.0	1.6	46 00.3	+60.0	1.7	47 00.2	+60.0	1.7	55
56	41 00.4	+60.0	1.5	42 00.4	+60.0	1.5	43 00.4	+60.0	1.5	44 00.3	+60.0	1.6	45 00.3	+60.0	1.6	46 00.3	+60.0	1.6	47 00.3	+60.0	1.6	48 00.2	+60.0	1.7	56
57	42 00.4	+60.0	1.5	43 00.4	+60.0	1.5	44 00.4	+60.0	1.5	45 00.3	+60.0	1.5	46 00.3	+60.0	1.6	47 00.3	+60.0	1.6	48 00.3	+60.0	1.6	49 00.2	+60.0	1.7	57
58	43 00.4	+60.0	1.4	44 00.4	+60.0	1.5	45 00.4	+59.9	1.5	46 00.3	+60.0	1.5	47 00.3	+60.0	1.6	48 00.3	+60.0	1.6	49 00.3	+60.0	1.6	50 00.2	+60.0	1.6	58
59	44 00.4	+60.0	1.4	45 00.4	+60.0	1.5	46 00.3	+60.0	1.5	47 00.3	+60.0	1.5	48 00.3	+60.0	1.5	49 00.3	+60.0	1.6	50 00.3	+60.0	1.6	51 00.2	+60.0	1.6	59
60	45 00.4	+60.0	1.4	46 00.4	+60.0	1.4	47 00.3	+60.0	1.5	48 00.3	+60.0	1.5	49 00.3	+60.0	1.5	50 00.3	+60.0	1.6	51 00.3	+60.0	1.6	52 00.2	+60.0	1.6	60
61	46 00.4	+60.0	1.4	47 00.4	+60.0	1.4	48 00.3	+60.0	1.4	49 00.3	+60.0	1.5	50 00.3	+60.0	1.5	51 00.3	+60.0	1.5	52 00.3	+60.0	1.6	53 00.2	+60.0	1.6	61
62	47 00.4	+60.0	1.4	48 00.4	+60.0	1.4	49 00.3	+60.0	1.4	50 00.3	+60.0	1.5	51 00.3	+60.0	1.5	52 00.3	+60.0	1.5	53 00.3	+60.0	1.6	54 00.2	+60.0	1.6	62
63	48 00.4	+60.0	1.4	49 00.4	+59.9	1.4	50 00.3	+60.0	1.4	51 00.3	+60.0	1.4	52 00.3	+60.0	1.5	53 00.3	+60.0	1.5	54 00.3	+60.0	1.5	55 00.2	+60.0	1.6	63
64	49 00.4	+60.0	1.3	50 00.3	+60.0	1.4	51 00.3	+60.0	1.4	52 00.3	+60.0	1.4	53 00.3	+60.0	1.5	54 00.3	+60.0	1.5	55 00.3	+59.9	1.5	56 00.2	+60.0	1.6	64
65	50 00.4	+60.0	1.3	51 00.3	+60.0	1.3	52 00.3	+60.0	1.4	53 00.3	+60.0	1.4	54 00.3	+60.0	1.4	55 00.3	+60.0	1.5	56 00.2	+60.0	1.5	57 00.2	+60.0	1.6	65
66	51 00.4	+59.9	1.3	52 00.3	+60.0	1.3	53 00.3	+60.0	1.4	54 00.3	+60.0	1.4	55 00.3	+60.0	1.4	56 00.3	+60.0	1.5	57 00.2	+60.0	1.5	58 00.2	+60.0	1.5	66
67	52 00.3	+60.0	1.3	53 00.3	+60.0	1.3	54 00.3	+60.0	1.3	55 00.3	+60.0	1.4	56 00.3	+60.0	1.4	57 00.3	+60.0	1.4	58 00.2	+60.0	1.5	59 00.2	+60.0	1.5	67
68	53 00.3	+60.0	1.2	54 00.3	+60.0	1.3	55 00.3	+60.0	1.3	56 00.3	+60.0	1.3	57 00.3	+60.0	1.4	58 00.3	+60.0	1.4	59 00.2	+60.0	1.5	60 00.2	+60.0	1.5	68
69	54 00.3	+60.0	1.2	55 00.3	+60.0	1.2	56 00.3	+60.0	1.3	57 00.3	+60.0	1.3	58 00.3	+60.0	1.4	59 00.3	+59.9	1.4	60 00.2	+60.0	1.4	61 00.2	+60.0	1.5	69
70	55 00.3	+60.0	1.2	56 00.3	+60.0	1.2	57 00.3	+60.0	1.3	58 00.3	+60.0	1.3	59 00.3	+60.0	1.3	60 00.2	+60.0	1.4	61 00.2	+60.0	1.4	62 00.2	+60.0	1.5	70
71	56 00.3	+60.0	1.2	57 00.3	+60.0	1.2	58 00.3	+60.0	1.2	59 00.3	+60.0	1.3	60 00.3	+60.0	1.3	61 00.2	+60.0	1.3	62 00.2	+60.0	1.4	63 00.2	+60.0	1.4	71
72	57 00.3	+60.0	1.1	58 00.3	+60.0	1.2	59 00.3	+60.0	1.2	60 00.3	+60.0	1.2	61 00.3	+59.9	1.3	62 00.2	+60.0	1.3	63 00.2	+60.0	1.4	64 00.2	+60.0	1.4	72
73	58 00.3	+60.0	1.1	59 00.3	+60.0	1.1	60 00.3	+60.0	1.2	61 00.3	+60.0	1.2	62 00.2	+60.0	1.2	63 00.2	+60.0	1.3	64 00.2	+60.0	1.3	65 00.2	+60.0	1.4	73
74	59 00.3	+60.0	1.1	60 00.3	+60.0	1.1	61 00.3	+60.0	1.1	62 00.3	+59.9	1.2	63 00.2	+60.0	1.2	64 00.2	+60.0	1.3	65 00.2	+60.0	1.3	66 00.2	+60.0	1.4	74
75	60 00.3	+60.0	1.0	61 00.3	+60.0	1.1	62 00.3	+60.0	1.1	63 00.2	+60.0	1.1	64 00.2	+60.0	1.2	65 00.2	+60.0	1.2	66 00.2	+60.0	1.3	67 00.2	+60.0	1.3	75
76	61 00.3	+60.0	1.0	62 00.3	+60.0	1.0	63 00.3	+59.9	1.1	64 00.2	+60.0	1.1	65 00.2	+60.0	1.1	66 00.2	+60.0	1.2	67 00.2	+60.0	1.2	68 00.2	+60.0	1.3	76
77	62 00.3	+59.9	1.0	63 00.3	+59.9	1.0	64 00.2	+60.0	1.0	65 00.2	+60.0	1.1	66 00.2	+60.0	1.1	67 00.2	+60.0	1.2	68 00.2	+60.0	1.2	69 00.2	+60.0	1.3	77
78	63 00.2	+60.0	0.9	64 00.2	+60.0	0.9	65 00.2	+60.0	1.0	66 00.2	+60.0	1.0	67 00.2	+60.0	1.1	68 00.2	+60.0	1.1	69 00.2	+60.0	1.2	70 00.2	+60.0	1.2	78
79	64 00.2	+60.0	0.9	65 00.2	+60.0	0.9	66 00.2	+60.0	0.9	67 00.2	+60.0	1.0	68 00.2	+60.0	1.0	69 00.2	+60.0	1.1	70 00.2	+60.0	1.1	71 00.2	+60.0	1.2	79
80	65 00.2	+60.0	0.8	66 00.2	+60.0	0.9	67 00.2	+60.0	0.9	68 00.2	+60.0	0.9	69 00.2	+60.0	1.0	70 00.2	+60.0	1.0	71 00.2	+60.0	1.1	72 00.2	+60.0	1.1	80
81	66 00.2	+60.0	0.8	67 00.2	+60.0	0.8	68 00.2	+60.0	0.8	69 00.2	+60.0	0.9	70 00.2	+60.0	0.9	71 00.2	+60.0	1.0	72 00.2	+60.0	1.0	73 00.2	+59.9	1.1	81
82	67 00.2	+60.0	0.7	68 00.2	+60.0	0.7	69 00.2	+60.0	0.8	70 00.2	+60.0	0.8	71 00.2	+60.0	0.9	72 00.2	+60.0	0.9	73 00.2	+59.9	1.0	74 00.1	+60.0	1.0	82
83	68 00.2	+60.0	0.7	69 00.2	+60.0	0.7	70 00.2	+60.0	0.7	71 00.2	+59.9	0.7	72 00.2	+59.9	0.8	73 00.2	+59.9	0.8	74 00.1	+60.0	0.9	75 00.1	+60.0	0.9	83
84	69 00.2	+59.9	0.6	70 00.2	+59.9	0.6	71 00.2	+59.9	0.6	72 00.1	+60.0	0.7	73 00.1	+60.0	0.7	74 00.1	+60.0	0.8	75 00.1	+60.0	0.8	76 00.1	+60.0	0.9	84
85	70 00.1	+60.0	0.5	71 00.1	+60.0	0.5	72 00.1	+60.0	0.6	73 00.1	+60.0	0.6	74 00.1	+60.0	0.6	75 00.1	+60.0	0.7	76 00.1	+60.0	0.7	77 00.1	+60.0	0.8	85
86	71 00.1	+60.0	0.4	72 00.1	+60.0	0.5	73 00.1	+60.0	0.5	74 00.1	+60.0	0.5	75 00.1	+60.0	0.5	76 00.1	+60.0	0.6	77 00.1	+60.0	0.6	78 00.1	+60.0	0.7	86
87	72 00.1	+60.0	0.3	73 00.1	+60.0	0.4	74 00.1	+60.0	0.4	75 00.1	+60.0	0.4	76 00.1	+60.0	0.4	77 00.1	+60.0	0.5	78 00.1	+60.0	0.5	79 00.1	+60.0	0.5	87
88	73 00.1	+59.9	0.2	74 00.1	+59.9	0.3	75 00.1	+59.9	0.3	76 00.1	+59.9	0.3	77 00.1	+59.9	0.3	78 00.1	+59.9	0.3	79 00.1	+59.9	0.4	80 00.1	+59.9	0.4	88
89	74 00.0	+60.0	0.1	75 00.0	+60.0	0.1	76 00.0	+60.0	0.1	77 00.0	+60.0	0.2	78 00.0	+60.0	0.2	79 00.0	+60.0	0.2	80 00.0	+60.0	0.2	81 00.0	+60.0	0.2	89
90	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 178°, 182°

3°, 357° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 58.7	+60.0	176.9	13 58.8	+60.0	176.9	12 58.9	+60.0	176.9	11 59.0	+60.0	176.9	10 59.1	+60.0	176.9	9 59.2	+60.0	177.0	8 59.3	+60.0	177.0	7 59.3	+60.0	177.0	0
1	15 58.7	+60.0	176.9	14 58.8	+60.0	176.9	13 58.9	+60.0	176.9	12 59.0	+60.0	176.9	11 59.1	+60.0	176.9	10 59.2	+60.0	176.9	9 59.3	+59.9	177.0	8 59.3	+60.0	177.0	1
2	16 58.7	+60.0	176.9	15 58.8	+60.0	176.9	14 58.9	+60.0	176.9	13 59.0	+60.0	176.9	12 59.1	+60.0	176.9	11 59.2	+60.0	176.9	10 59.2	+60.0	176.9	9 59.3	+60.0	177.0	2
3	17 58.7	+60.0	176.9	16 58.8	+60.0	176.9	15 58.9	+60.0	176.9	14 59.0	+60.0	176.9	13 59.1	+60.0	176.9	12 59.2	+60.0	176.9	11 59.2	+60.0	176.9	10 59.3	+60.0	176.9	3
4	18 58.7	+60.0	176.8	17 58.8	+60.0	176.9	16 58.9	+60.0	176.9	15 59.0	+60.0	176.9	14 59.1	+60.0	176.9	13 59.2	+60.0	176.9	12 59.2	+60.0	176.9	11 59.3	+60.0	176.9	4
5	19 58.7	+60.0	176.8	18 58.8	+60.0	176.8	17 58.9	+60.0	176.9	16 59.0	+60.0	176.9	15 59.1	+60.0	176.9	14 59.2	+60.0	176.9	13 59.2	+60.0	176.9	12 59.3	+60.0	176.9	5
6	20 58.7	+60.0	176.8	19 58.8	+60.0	176.8	18 58.9	+60.0	176.8	17 59.0	+60.0	176.9	16 59.1	+60.0	176.9	15 59.2	+60.0	176.9	14 59.2	+60.0	176.9	13 59.3	+60.0	176.9	6
7	21 58.7	+60.0	176.8	20 58.8	+60.0	176.8	19 58.9	+60.0	176.8	18 59.0	+60.0	176.9	17 59.1	+60.0	176.9	16 59.2	+59.9	176.9	15 59.2	+60.0	176.9	14 59.3	+60.0	176.9	7
8	22 58.7	+60.0	176.8	21 58.8	+60.0	176.8	20 58.9	+60.0	176.8	19 59.0	+60.0	176.8	18 59.1	+60.0	176.9	17 59.1	+60.0	176.9	16 59.2	+60.0	176.9	15 59.3	+60.0	176.9	8
9	23 58.7	+60.0	176.8	22 58.8	+60.0	176.8	21 58.9	+60.0	176.8	20 59.0	+60.0	176.8	19 59.1	+60.0	176.8	18 59.1	+60.0	176.9	17 59.2	+60.0	176.9	16 59.3	+60.0	176.9	9
10	24 58.7	+60.0	176.7	23 58.8	+60.0	176.8	22 58.9	+60.0	176.8	21 59.0	+60.0	176.8	20 59.1	+59.9	176.8	19 59.1	+60.0	176.9	18 59.2	+60.0	176.9	17 59.3	+60.0	176.9	10
11	25 58.7	+60.0	176.7	24 58.8	+60.0	176.8	23 58.9	+60.0	176.8	22 59.0	+60.0	176.8	21 59.0	+60.0	176.8	20 59.1	+60.0	176.8	19 59.2	+60.0	176.9	18 59.3	+60.0	176.9	11
12	26 58.7	+60.0	176.7	25 58.8	+60.0	176.7	24 58.9	+60.0	176.8	23 59.0	+59.9	176.8	22 59.0	+60.0	176.8	21 59.1	+60.0	176.8	20 59.2	+60.0	176.9	19 59.3	+60.0	176.9	12
13	27 58.7	+59.9	176.7	26 58.8	+59.9	176.7	25 58.9	+59.9	176.7	24 58.9	+60.0	176.8	23 59.0	+60.0	176.8	22 59.1	+60.0	176.8	21 59.2	+60.0	176.8	20 59.3	+60.0	176.9	13
14	28 58.6	+60.0	176.7	27 58.7	+60.0	176.7	26 58.8	+60.0	176.7	25 58.9	+60.0	176.8	24 59.0	+60.0	176.8	23 59.1	+60.0	176.8	22 59.2	+60.0	176.8	21 59.3	+60.0	176.9	14
15	29 58.6	+60.0	176.7	28 58.7	+60.0	176.7	27 58.8	+60.0	176.7	26 58.9	+60.0	176.7	25 59.0	+60.0	176.8	24 59.1	+60.0	176.8	23 59.2	+60.0	176.8	22 59.3	+60.0	176.9	15
16	30 58.6	+60.0	176.6	29 58.7	+60.0	176.7	28 58.8	+60.0	176.7	27 58.9	+60.0	176.7	26 59.0	+60.0	176.8	25 59.1	+60.0	176.8	24 59.2	+60.0	176.8	23 59.3	+60.0	176.8	16
17	31 58.6	+60.0	176.6	30 58.7	+60.0	176.7	29 58.8	+60.0	176.7	28 58.9	+60.0	176.7	27 59.0	+60.0	176.8	26 59.1	+60.0	176.8	25 59.2	+60.0	176.8	24 59.3	+60.0	176.8	17
18	32 58.6	+60.0	176.6	31 58.7	+60.0	176.6	30 58.8	+60.0	176.7	29 58.9	+60.0	176.7	28 59.0	+60.0	176.7	27 59.1	+60.0	176.8	26 59.2	+60.0	176.8	25 59.3	+60.0	176.8	18
19	33 58.6	+60.0	176.6	32 58.7	+60.0	176.6	31 58.8	+60.0	176.7	30 58.9	+60.0	176.7	29 59.0	+60.0	176.7	28 59.1	+60.0	176.8	27 59.2	+60.0	176.8	26 59.3	+60.0	176.8	19
20	34 58.6	+60.0	176.6	33 58.7	+60.0	176.6	32 58.8	+60.0	176.6	31 58.9	+60.0	176.7	30 59.0	+60.0	176.7	29 59.1	+60.0	176.7	28 59.2	+60.0	176.8	27 59.3	+60.0	176.8	20
21	35 58.6	+60.0	176.5	34 58.7	+60.0	176.6	33 58.8	+60.0	176.6	32 58.9	+60.0	176.7	31 59.0	+60.0	176.7	30 59.1	+60.0	176.7	29 59.2	+60.0	176.8	28 59.3	+60.0	176.8	21
22	36 58.6	+60.0	176.5	35 58.7	+60.0	176.6	34 58.8	+60.0	176.6	33 58.9	+60.0	176.6	32 59.0	+60.0	176.7	31 59.1	+60.0	176.7	30 59.2	+60.0	176.8	29 59.3	+60.0	176.8	22
23	37 58.6	+60.0	176.5	36 58.7	+60.0	176.5	35 58.8	+60.0	176.6	34 58.9	+60.0	176.6	33 59.0	+60.0	176.7	32 59.1	+60.0	176.7	31 59.2	+60.0	176.7	30 59.3	+60.0	176.8	23
24	38 58.6	+60.0	176.5	37 58.7	+60.0	176.5	36 58.8	+60.0	176.6	35 58.9	+60.0	176.6	34 59.0	+60.0	176.7	33 59.1	+60.0	176.7	32 59.2	+60.0	176.7	31 59.3	+60.0	176.8	24
25	39 58.6	+59.9	176.5	38 58.7	+60.0	176.5	37 58.8	+60.0	176.6	36 58.9	+60.0	176.6	35 59.0	+60.0	176.6	34 59.1	+60.0	176.7	33 59.2	+60.0	176.7	32 59.3	+60.0	176.8	25
26	40 58.5	+60.0	176.4	39 58.7	+60.0	176.5	38 58.8	+60.0	176.5	37 58.9	+60.0	176.6	36 59.0	+60.0	176.6	35 59.1	+60.0	176.7	34 59.2	+60.0	176.7	33 59.3	+60.0	176.7	26
27	41 58.5	+60.0	176.4	40 58.7	+59.9	176.5	39 58.8	+60.0	176.5	38 58.9	+60.0	176.6	37 59.0	+60.0	176.6	36 59.1	+60.0	176.7	35 59.2	+60.0	176.7	34 59.3	+60.0	176.7	27
28	42 58.5	+60.0	176.4	41 58.6	+60.0	176.4	40 58.8	+60.0	176.5	39 58.9	+60.0	176.5	38 59.0	+60.0	176.6	37 59.1	+60.0	176.6	36 59.2	+60.0	176.7	35 59.3	+60.0	176.7	28
29	43 58.5	+60.0	176.4	42 58.6	+60.0	176.4	41 58.8	+59.9	176.5	40 58.9	+60.0	176.5	39 59.0	+60.0	176.6	38 59.1	+60.0	176.6	37 59.2	+60.0	176.7	36 59.3	+60.0	176.7	29
30	44 58.5	+60.0	176.3	43 58.6	+60.0	176.4	42 58.7	+60.0	176.4	41 58.9	+60.0	176.5	40 59.0	+60.0	176.6	39 59.1	+60.0	176.6	38 59.2	+60.0	176.7	37 59.3	+60.0	176.7	30
31	45 58.5	+60.0	176.3	44 58.6	+60.0	176.4	43 58.7	+60.0	176.4	42 58.9	+59.9	176.5	41 59.0	+60.0	176.5	40 59.1	+60.0	176.6	39 59.2	+60.0	176.6	38 59.3	+60.0	176.7	31
32	46 58.5	+60.0	176.3	45 58.6	+60.0	176.3	44 58.7	+60.0	176.4	43 58.8	+60.0	176.5	42 59.0	+60.0	176.5	41 59.1	+60.0	176.6	40 59.2	+60.0	176.6	39 59.3	+60.0	176.7	32
33	47 58.5	+60.0	176.2	46 58.6	+60.0	176.3	45 58.7	+60.0	176.4	44 58.8	+60.0	176.4	43 59.0	+59.9	176.5	42 59.1	+60.0	176.6	41 59.2	+60.0	176.6	40 59.3	+60.0	176.7	33
34	48 58.5	+59.9	176.2	47 58.6	+60.0	176.3	46 58.7	+60.0	176.4	45 58.8	+60.0	176.4	44 58.9	+60.0	176.5	43 59.1	+60.0	176.5	42 59.2	+60.0	176.6	41 59.3	+60.0	176.7	34
35	49 58.4	+60.0	176.2	48 58.6	+60.0	176.3	47 58.7	+60.0	176.3	46 58.8	+60.0	176.4	45 58.9	+60.0	176.5	44 59.1	+59.9	176.5	43 59.2	+60.0	176.6	42 59.3	+60.0	176.6	35
36	50 58.4	+60.0	176.1	49 58.6	+60.0	176.2	48 58.7	+60.0	176.3	47 58.8	+60.0	176.4	46 58.9	+60.0	176.4	45 59.0	+60.0	176.5	44 59.2	+60.0	176.6	43 59.3	+60.0	176.6	36
37	51 58.4	+60.0	176.1	50 58.6	+59.9	176.2	49 58.7	+60.0	176.3	48 58.8	+60.0	176.3	47 58.9	+60.0	176.4	46 59.0	+60.0	176.5	45 59.2	+59.9	176.6	44 59.3	+60.0	176.6	37
38	52 58.4	+60.0	176.1	51 58.5	+60.0	176.2	50 58.7	+60.0	176.2	49 58.8	+60.0	176.3	48 58.9	+60.0	176.4	47 59.0	+60.0	176.5	46 59.1	+60.0	176.5	45 59.3	+60.0	176.6	38
39	53 58.4	+60.0	176.0	52 58.5	+60.0	176.1	51 58.7	+60.0	176.2	50 58.8	+60.0	176.3	49 58.9	+60.0	176.4	48 59.0	+60.0	176.4	47 59.1	+60.0	176.5	46 59.3	+59.9	176.6	39
40	54 58.4	+60.0	176.0	53 58.5	+60.0	176.1	52 58.7	+59.9	176.2	51 58.8	+60.0	176.3	50 58.9	+60.0	176.3	49 59.0	+60.0	176.4	48 59.1	+60.0	176.5	47 59.2	+60.0	176.6	40
41	55 58.4	+59.9	176.0	54 58.5	+60.0	176.1	53 58.6	+60.0	176.1	52 58.8	+60.0	176.2	51 58.9	+60.0	176.3	50 59.0	+60.0	176.4	49 59.1	+60.0	176.5	48 59.2	+60.0	176.5	41
42	56 58.3	+60.0	175.9	55 58.5	+60.0	176.0	54 58.6	+60.0	176.1	53 58.8	+60.0	176.2	52 58.9	+60.0	176.3	51 59.0	+60.0	176.4	50 59.1	+60.0	176.5	49 59.2	+60.0	176.5	42
43	57 58.3	+60.0	175.9	56 58.5	+60.0	176.0	55 58.6	+60.0	176.1	54 58.8	+59.9	176.2	53 58.9	+60.0	176.3	52 59.0	+60.0	176.4	51 59.1	+60.0	176.4	50 59.2	+60.0	176.5	43
44	58 58.3	+60.0	175.8	57 58.5	+59.9	175.9	56 58.6	+60.0	176.0	55 58.7	+60.0	176.1	54 58.9	+60.0	176.2	53 59.0	+60.0	176.3	52 59.1	+60.0	176.4	51 59.2	+60.0	176.5	44
45	59 58.3	+60.0	175.8	58 58.4	+60.0	175.9	57 58.6	+60.0	176.0	56 58.7	+60.0	176.1	55 58.9	+60.0	176.2	54 59.0	+60.0	176.3	53 59.1	+60.0	176.4	52 59.2	+60.0	176.5	45
46	60 58.3	+59.9	175.7	59 58.4	+60.0	175.8	58 58.6	+60.0	176.0	57 58.7	+60.0	176.1	56 58.9	+59.9	176.2	55 59.0	+60.0	176.3	54 59.1	+60.0	176.4	53 59.2	+60.0	176.5	46
47	61 58.2	+60.0	175.6	60 58.4	+60.0	175.8	59 58.6	+59.9	175.9	58 58.7	+60.0	176.0	57 58.8	+60.0	176.1	56 59.0	+60.0	176.2	55 59.1	+60.0	176.3	54 59.2	+60.0	176.4	47
48	62 58.2	+60.0	175.6	61 58.4	+60.0	175.7	60 58.5	+60.0	175.9	59 58.7	+60.0	176.0	58 58.8	+60.0	176.1	57 59.0	+60.0	176.2	56 59.1	+60.0	176.3	55 59.2	+60.0	176.4	48
49	63 58.2	+59.9	175.5	62 58.4	+59.9	175.7	61 58.5	+60.0	175.8	60 58.7	+60.0	175.9	59 58.8	+60.0	176.1	58 59.0	+59.9	176.2	57 59.1	+60.0	176.3	56 59.2	+60.0	176.4	49
50	64 58.1	+60.0	175.4	63 58.3	+60.0	175.6	62 58.5	+60.0	175.8	61 58.7	+59.9	175.9	60 58.8	+60.0	176.0	59 58.9	+60.0	176.1	58 59.1	+60.0	176.3	57 59.2	+60.0	176.4	50
51	65 58.1	+60.0	175.4	64 58.3	+60.0	175.5	63 58.5	+60.0	175.7	62 58.6	+60.0	175.8	61 58.8	+60.0	176.0	60 58.9	+60.0	176.1	59 59.1	+60.0	176.2	58 59.2	+60.0	176.3	51
52	66 58.1	+59.9	175.3	65 58.3	+59.9	175.5	64 58.5	+59.9	175.6	63 58.6	+60.0	175.8	62 58.8	+60.0	175.9	61 58.9	+60.0	176.1	60 59.1	+60.0	176.2	59 59.2	+60.0	176.3	52
53	67 58.0	+60.0	175.2	66 58.2	+60.0	175.4	65 58.4	+60.0	175.6	64 58.6	+60.0	175.7	63 58.8	+60.0	175.9	62 58.9	+60.0	176.0	61 59.1	+59.9	176.2	60 59.2	+60.0	176.3	53
54	68 58.0	+60.0	175.1	67 58.2	+60.0	175.3	66 58.4	+60.0	175.5	65 58.6	+60.0	175.7	64 58.8	+59.9	175.8	63 58.9	+60.0	176.0	62 59.0	+60.0	176.1	61 59.2	+60.0	176.2	54
55	69 58.0	+59.9	175.0	68 58.2	+59.9	175.2	67 58.4	+59.9	175.4	66 58.6	+59.9	175.6	65 58.7	+60.0	175.8	64 58.9	+60.0	175.9	63 59.0	+60.0	176.1	62 59.2	+60.0	176.2	55
56	70 57.9	+60.0	174.9	69 58.1	+60.0	175.1	68 58.3	+60.0	175.3	67 58.5	+60.0	175.5	66 58.7	+60.0	175.7	65 58.9	+60.0	175.9	64 59.0	+60.0	176.0	63 59.2	+60.0	176.2	56
57	71 57.9	+59.9	174.7	70 58.1	+59.9	175.0	69 58.3	+60.0	175.2	68 58.5	+60.0	175.4	67 58.7	+60.0	175.6	66 58.9	+59.9	175.8	65 59.0	+60.0	176.0	64 59.2	+59.9	176.1	57
58	72 57.8	+59.9	174.6	71 58.0	+60.0	174.9	70 58.3	+59.9	175.1	69 58.5	+60.0	175.4	68 58.7	+59.9	175.6	67 58.8	+60.0	175.8	66 59.0	+60.0	175.9	65 59.1	+60.0	176.1	58
59	73 57.7	+59.9	174.4	72 58.0	+59.9	174.7	71 58.2	+60.0	175.0	70 58.5	+59.9	175.3	69 58.6	+60.0	175.5	68 58.8	+60.0	175.7	67 59.0	+60.0	175.9	66 59.1	+60.0	176.0	59
60	74 57.6	+60.0	174.2	73 57.9	+60.0	174.6	72 58.2	+59.9	174.9	71 58.4	+60.0	175.1	70 58.6	+60.0	175.4	69 58.8	+60.0	175.6	68 59.0	+60.0	175.8	67 59.1	+60.0	176.0	60
61	75 57.6	+59.9	174.0	74 57.9	+59.9	174.4	73 58.1	+60.0	174.7	72 58.4	+59.9	175.0	71 58.6	+60.0	175.3	70 58.8	+60.0	175.5	69 59.0	+59.9	175.7	68 59.1	+60.0	175.9	61
62	76 57.5	+59.8	173.7	75 57.8	+59.9	174.2	74 58.1	+59.9	174.6	73 58.3	+60.0	174.9	72 58.6	+59.9	175.2	71 58.8	+59.9	175.4	70 58.9	+60.0	175.7	69 59.1	+60.0	175.9	62
63	77 57.3	+59.9	173.5	76 57.7	+59.9	174.0	75 58.0	+59.9	174.4	74 58.3	+59.9	174.7	73 58.5	+60.0	175.1	72 58.7	+60.0	175.3	71 58.9	+60.0	175.6	70 59.1	+60.0	175.8	63
64	78 57.2	+59.8	173.1	77 57.6	+59.9	173.7	76 57.9	+59.9	174.2	75 58.2	+60.0	174.6	74 58.5	+59.9	174.9	73 58.7	+60.0	175.2	72 58.9	+60.0	175.5	71 59.1	+60.0	175.7	64
65	79 57.0	+59.8	172.7	78 57.5	+59.8	173.4	77 57.8	+59.9	173.9	76 58.2	+59.9	174.4	75 58.4	+60.0	174.8	74 58.7	+59.9	175.1	73 58.9	+59.9	175.4	72 59.1	+59.9	175.7	65
66	80 56.8	+59.8	172.2	79 57.3	+59.9	173.0	78 57.7	+59.9	173.6	77 58.1	+59.9	174.1	76 58.4	+59.9	174.6	75 58.6	+60.0	175.0	74 58.8	+60.0	175.3	73 59.0	+60.0	175.6	66
67	81 56.6	+59.7	171.6	80 57.2	+59.7	172.5	79 57.6	+59.9	173.3	78 58.0	+59.9	173.9	77 58.3	+59.9	174.4	76 58.6	+59.9	174.8	75 58.8	+60.0	175.2	74 59.0	+60.0	175.5	67
68	82 56.3	+59.5	170.8	81 56.9	+59.8	172.0	80 57.5	+59.8	172.8	79 57.9	+59.9	173.5	78 58.2	+59.9	174.1	77 58.5	+60.0	174.6	76 58.8	+59.9	175.0	75 59.0	+60.0	175.4	68
69	83 55.8	+59.5	169.8	82 56.7	+59.6	171.2	81 57.3	+59.7	172.3	80 57.8	+59.8	173.1	79 58.1	+59.9	173.8	78 58.5	+59.9	174.4	77 58.7	+60.0	174.8	76 59.0	+59.9	175.2	69
70	84 55.3	+59.1	168.3	83 56.3	+59.5	170.2	82 57.0	+59.7	171.6	81 57.6	+59.8	172.6	80 58.0	+59.9	173.5	79 58.4	+59.9	174.1	78 58.7	+59.9	174.6	77 58.9	+60.0	175.1	70
71	85 54.4	+58.5	166.2	84 55.8	+59.2	168.9	83 56.7	+59.6	170.7	82 57.4	+59.7	172.0	81 57.9	+59.8	173.0	80 58.3	+59.9	173.8	79 58.6	+59.9	174.4	78 58.9	+59.9	174.9	71
72	86 52.9	*+57.3*	•162.7	85 55.0	+58.7	166.9	84 56.3	+59.3	169.4	83 57.1	+59.6	171.2	82 57.7	+59.8	172.4	81 58.2	+59.8	173.4	80 58.5	+60.0	174.1	79 58.8	+60.0	174.7	72
73	87 50.2	*+52.9*	•156.1	86 53.7	*+57.6*	•163.6	85 55.6	+58.9	167.6	84 56.7	+59.5	170.0	83 57.5	+59.7	171.6	82 58.0	+59.8	172.8	81 58.5	+59.8	173.7	80 58.8	+59.9	174.4	73
74	88 43.1	*+30.3*	•139.8	87 51.3	*+53.7*	•157.3	86 54.5	*+57.9*	•164.5	85 56.2	+59.0	168.3	84 57.2	+59.5	170.6	83 57.8	+59.8	172.1	82 58.3	+59.9	173.2	81 58.7	+59.9	174.1	74
75	89 13.4	*–28.4*	• 88.6	88 45.0	*+31.5*	•141.6	87 52.4	*+54.4*	•158.6	86 55.2	+58.2	165.4	85 56.7	+59.2	169.0	84 57.6	+59.6	171.1	83 58.2	+59.8	172.6	82 58.6	+59.9	173.6	75
76	88 45.0	*–52.6*	• 35.5	89 16.5	*–29.7*	• 88.5	88 46.8	*+32.7*	•143.5	87 53.4	*+55.1*	•159.9	86 55.9	+58.4	166.3	85 57.2	+59.3	169.7	84 58.0	+59.6	171.7	83 58.5	+59.8	173.1	76
77	87 52.4	*–57.2*	• 18.5	88 46.8	*–53.4*	• 33.6	89 19.5	*–31.0*	• 88.5	88 48.5	*+34.1*	•145.5	87 54.3	*+55.8*	•161.2	86 56.5	+58.7	167.3	85 57.6	+59.5	170.4	84 58.3	+59.8	172.3	77
78	86 55.2	–58.5	11.7	87 53.4	*–57.5*	• 17.2	88 48.5	*–54.2*	• 31.5	89 22.6	*–32.5*	• 88.5	88 50.1	*+35.6*	•147.6	87 55.2	*+56.4*	•162.6	86 57.1	+58.9	168.2	85 58.1	+59.5	171.1	78
79	85 56.7	–59.1	8.1	86 55.9	–58.7	10.8	87 54.3	*–57.8*	• 15.9	88 50.1	*–54.9*	• 29.4	89 25.7	*–34.1*	• 88.5	88 51.6	*+37.1*	•149.9	87 56.0	*+57.1*	•163.9	86 57.6	+59.2	169.1	79
80	84 57.6	–59.4	5.9	85 57.2	–59.2	7.4	86 56.5	–58.9	9.8	87 55.2	*–58.1*	• 14.5	88 51.6	*–55.6*	• 27.2	89 28.7	*–35.6*	• 88.5	88 53.1	*+38.7*	•152.2	87 56.8	*+57.6*	•165.3	80
81	83 58.2	–59.6	4.5	84 58.0	–59.5	5.4	85 57.6	–59.3	6.7	86 57.1	–59.0	8.9	87 56.0	–58.4	13.1	88 53.1	*–56.3*	• 24.9	89 31.8	*–37.4*	• 88.5	88 54.4	*+40.6*	•154.6	81
82	82 58.6	–59.7	3.4	83 58.5	–59.6	4.0	84 58.3	–59.5	4.8	85 58.1	–59.5	5.9	86 57.6	–59.2	7.9	87 56.8	–58.7	11.7	88 54.4	*–56.9*	• 22.4	89 35.0	*–39.4*	• 88.5	82
83	81 58.9	–59.7	2.6	82 58.9	–59.8	3.0	83 58.8	–59.7	3.5	84 58.6	–59.6	4.2	85 58.4	–59.5	5.2	86 58.1	–59.3	6.9	87 57.5	–59.0	10.3	88 55.6	*–57.5*	• 19.9	83
84	80 59.2	–59.8	2.0	81 59.1	–59.7	2.2	82 59.1	–59.8	2.6	83 59.0	–59.7	3.0	84 58.9	–59.6	3.6	85 58.8	–59.6	4.5	86 58.5	–59.4	6.0	87 58.1	–59.2	8.9	84
85	79 59.4	–59.8	1.5	80 59.4	–59.9	1.7	81 59.3	–59.8	1.9	82 59.3	–59.8	2.1	83 59.3	–59.8	2.5	84 59.2	–59.7	3.0	85 59.1	–59.7	3.7	86 58.9	–59.6	5.0	85
86	78 59.6	–59.9	1.1	79 59.5	–59.8	1.2	80 59.5	–59.8	1.3	81 59.5	–59.8	1.5	82 59.5	–59.8	1.7	83 59.5	–59.9	2.0	84 59.4	–59.8	2.4	85 59.3	–59.7	3.0	86
87	77 59.7	–59.9	0.8	78 59.7	–59.9	0.8	79 59.7	–59.9	0.9	80 59.7	–59.9	1.0	81 59.7	–59.9	1.1	82 59.6	–59.8	1.3	83 59.6	–59.8	1.5	84 59.6	–59.8	1.8	87
88	76 59.8	–59.9	0.5	77 59.8	–59.9	0.5	78 59.8	–59.9	0.5	79 59.8	–59.9	0.6	80 59.8	–59.9	0.7	81 59.8	–59.9	0.8	82 59.8	–59.9	0.9	83 59.8	–59.9	1.0	88
89	75 59.9	–59.9	0.2	76 59.9	–59.9	0.2	77 59.9	–59.9	0.3	78 59.9	–59.9	0.3	79 59.9	–59.9	0.3	80 59.9	–59.9	0.3	81 59.9	–59.9	0.4	82 59.9	–59.9	0.4	89
90	75 00.0	–59.9	0.0	76 00.0	–59.9	0.0	77 00.0	–59.9	0.0	78 00.0	–59.9	0.0	79 00.0	–59.9	0.0	80 00.0	–59.9	0.0	81 00.0	–59.9	0.0	82 00.0	–59.9	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

3°, 357° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 3°, 357°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 58.7	−60.0	176.9	13 58.8	−60.0	176.9	12 58.9	−60.0	176.9	11 59.0	−60.0	176.9	10 59.1	−60.0	176.9	9 59.2	−60.0	177.0	8 59.3	−60.0	177.0	7 59.3	−60.0	177.0	**0**
1	13 58.7	−60.0	176.9	12 58.8	−60.0	176.9	11 58.9	−60.0	176.9	10 59.0	−60.0	176.9	9 59.1	−60.0	177.0	8 59.2	−60.0	177.0	7 59.3	−60.0	177.0	6 59.3	−60.0	177.0	**1**
2	12 58.7	−59.9	176.9	11 58.8	−60.0	176.9	10 58.9	−60.0	176.9	9 59.0	−60.0	177.0	8 59.1	−60.0	177.0	7 59.2	−60.0	177.0	6 59.3	−60.0	177.0	5 59.3	−60.0	177.0	**2**
3	11 58.8	−60.0	176.9	10 58.8	−60.0	176.9	9 58.9	−60.0	177.0	8 59.0	−60.0	177.0	7 59.1	−60.0	177.0	6 59.2	−60.0	177.0	5 59.3	−60.0	177.0	4 59.3	−60.0	177.0	**3**
4	10 58.8	−60.0	177.0	9 58.8	−59.9	177.0	8 58.9	−60.0	177.0	7 59.0	−60.0	177.0	6 59.1	−60.0	177.0	5 59.2	−60.0	177.0	4 59.3	−60.0	177.0	3 59.3	−60.0	177.0	**4**
5	9 58.8	−60.0	177.0	8 58.9	−60.0	177.0	7 58.9	−60.0	177.0	6 59.0	−60.0	177.0	5 59.1	−60.0	177.0	4 59.2	−60.0	177.0	3 59.3	−60.0	177.0	2 59.3	−60.0	177.0	**5**
6	8 58.8	−60.0	177.0	7 58.9	−60.0	177.0	6 58.9	−60.0	177.0	5 59.0	−60.0	177.0	4 59.1	−60.0	177.0	3 59.2	−60.0	177.0	2 59.3	−60.0	177.0	1 59.3	−60.0	177.0	**6**
7	7 58.8	−60.0	177.0	6 58.9	−60.0	177.0	5 58.9	−60.0	177.0	4 59.0	−60.0	177.0	3 59.1	−60.0	177.0	2 59.2	−60.0	177.0	1 59.3	−60.0	177.0	0 59.3	−59.9	177.0	**7**
8	6 58.8	−60.0	177.0	5 58.9	−60.0	177.0	4 58.9	−59.9	177.0	3 59.0	−60.0	177.0	2 59.1	−60.0	177.0	1 59.2	−60.0	177.0	0 59.3	−60.0	177.0	0 00.6	+60.0	3.0	**8**
9	5 58.8	−60.0	177.0	4 58.9	−60.0	177.0	3 59.0	−60.0	177.0	2 59.0	−60.0	177.0	1 59.1	−60.0	177.0	0 59.2	−60.0	177.0	0 00.7	+60.0	3.0	1 00.6	+60.0	3.0	**9**
10	4 58.8	−60.0	177.0	3 58.9	−60.0	177.0	2 59.0	−60.0	177.0	1 59.0	−60.0	177.0	0 59.1	−60.0	177.0	0 00.8	+60.0	3.0	1 00.7	+60.0	3.0	2 00.6	+60.0	3.0	**10**
11	3 58.8	−60.0	177.0	2 58.9	−60.0	177.1	1 59.0	−60.0	177.1	0 59.0	−60.0	177.1	0 00.9	+60.0	2.9	1 00.8	+60.0	2.9	2 00.7	+60.0	2.9	3 00.6	+60.0	2.9	**11**
12	2 58.8	−60.0	177.1	1 58.9	−60.0	177.1	0 59.0	−60.0	177.1	0 01.0	+60.0	2.9	1 00.9	+60.0	2.9	2 00.8	+60.0	2.9	3 00.7	+60.0	2.9	4 00.6	+60.0	2.9	**12**
13	1 58.8	−60.0	177.1	0 58.9	−60.0	177.1	0 01.0	+60.0	2.9	1 01.0	+60.0	2.9	2 00.9	+60.0	2.9	3 00.8	+60.0	2.9	4 00.7	+60.0	2.9	5 00.6	+60.0	2.9	**13**
14	0 58.8	−60.0	177.1	0 01.1	+60.0	2.9	1 01.0	+60.0	2.9	2 01.0	+59.9	2.9	3 00.9	+60.0	2.9	4 00.8	+60.0	2.9	5 00.7	+60.0	2.9	6 00.6	+60.0	2.9	**14**
15	0 01.2	+60.0	2.9	1 01.1	+60.0	2.9	2 01.0	+60.0	2.9	3 00.9	+60.0	2.9	4 00.9	+60.0	2.9	5 00.8	+60.0	2.9	6 00.7	+60.0	2.9	7 00.6	+60.0	2.9	**15**
16	1 01.2	+60.0	2.9	2 01.1	+60.0	2.9	3 01.0	+60.0	2.9	4 00.9	+60.0	2.9	5 00.9	+60.0	2.9	6 00.8	+60.0	2.9	7 00.7	+60.0	2.9	8 00.6	+60.0	2.9	**16**
17	2 01.2	+60.0	2.9	3 01.1	+60.0	2.9	4 01.0	+60.0	2.9	5 00.9	+60.0	2.9	6 00.9	+60.0	2.9	7 00.8	+60.0	2.9	8 00.7	+60.0	2.9	9 00.6	+60.0	2.9	**17**
18	3 01.2	+60.0	2.9	4 01.1	+60.0	2.9	5 01.0	+60.0	2.9	6 00.9	+60.0	2.9	7 00.9	+60.0	2.9	8 00.8	+60.0	2.9	9 00.7	+60.0	2.9	10 00.6	+60.0	2.9	**18**
19	4 01.2	+60.0	2.8	5 01.1	+60.0	2.8	6 01.0	+60.0	2.9	7 00.9	+60.0	2.9	8 00.9	+60.0	2.9	9 00.8	+60.0	2.9	10 00.7	+60.0	2.9	11 00.6	+60.0	2.9	**19**
20	5 01.2	+59.9	2.8	6 01.1	+60.0	2.8	7 01.0	+60.0	2.8	8 00.9	+60.0	2.8	9 00.9	+60.0	2.9	10 00.8	+60.0	2.9	11 00.7	+60.0	2.9	12 00.6	+60.0	2.9	**20**
21	6 01.1	+60.0	2.8	7 01.1	+60.0	2.8	8 01.0	+60.0	2.8	9 00.9	+60.0	2.8	10 00.9	+59.9	2.8	11 00.8	+60.0	2.9	12 00.7	+60.0	2.9	13 00.6	+60.0	2.9	**21**
22	7 01.1	+60.0	2.8	8 01.1	+60.0	2.8	9 01.0	+60.0	2.8	10 00.9	+60.0	2.8	11 00.8	+60.0	2.8	12 00.8	+60.0	2.8	13 00.7	+60.0	2.9	14 00.6	+60.0	2.9	**22**
23	8 01.1	+60.0	2.8	9 01.1	+60.0	2.8	10 01.0	+60.0	2.8	11 00.9	+60.0	2.8	12 00.8	+60.0	2.8	13 00.8	+60.0	2.8	14 00.7	+60.0	2.8	15 00.6	+60.0	2.9	**23**
24	9 01.1	+60.0	2.8	10 01.1	+60.0	2.8	11 01.0	+60.0	2.8	12 00.9	+60.0	2.8	13 00.8	+60.0	2.8	14 00.8	+60.0	2.8	15 00.7	+60.0	2.8	16 00.6	+60.0	2.9	**24**
25	10 01.1	+60.0	2.8	11 01.1	+59.9	2.8	12 01.0	+60.0	2.8	13 00.9	+60.0	2.8	14 00.8	+60.0	2.8	15 00.8	+60.0	2.8	16 00.7	+60.0	2.8	17 00.6	+60.0	2.8	**25**
26	11 01.1	+60.0	2.7	12 01.0	+60.0	2.8	13 01.0	+60.0	2.8	14 00.9	+60.0	2.8	15 00.8	+60.0	2.8	16 00.8	+60.0	2.8	17 00.7	+60.0	2.8	18 00.6	+60.0	2.8	**26**
27	12 01.1	+60.0	2.7	13 01.0	+60.0	2.7	14 01.0	+60.0	2.8	15 00.9	+60.0	2.8	16 00.8	+60.0	2.8	17 00.8	+60.0	2.8	18 00.7	+60.0	2.8	19 00.6	+60.0	2.8	**27**
28	13 01.1	+60.0	2.7	14 01.0	+60.0	2.7	15 01.0	+60.0	2.7	16 00.9	+60.0	2.8	17 00.8	+60.0	2.8	18 00.8	+60.0	2.8	19 00.7	+60.0	2.8	20 00.6	+60.0	2.8	**28**
29	14 01.1	+60.0	2.7	15 01.0	+60.0	2.7	16 01.0	+60.0	2.7	17 00.9	+60.0	2.7	18 00.8	+60.0	2.8	19 00.8	+60.0	2.8	20 00.7	+60.0	2.8	21 00.6	+60.0	2.8	**29**
30	15 01.1	+60.0	2.7	16 01.0	+60.0	2.7	17 01.0	+60.0	2.7	18 00.9	+60.0	2.7	19 00.8	+60.0	2.7	20 00.8	+60.0	2.8	21 00.7	+60.0	2.8	22 00.6	+60.0	2.8	**30**
31	16 01.1	+60.0	2.7	17 01.0	+60.0	2.7	18 01.0	+60.0	2.7	19 00.9	+60.0	2.7	20 00.8	+60.0	2.7	21 00.8	+59.9	2.8	22 00.7	+60.0	2.8	23 00.6	+60.0	2.8	**31**
32	17 01.1	+60.0	2.7	18 01.0	+60.0	2.7	19 01.0	+59.9	2.7	20 00.9	+60.0	2.7	21 00.8	+60.0	2.7	22 00.7	+60.0	2.7	23 00.7	+60.0	2.8	24 00.6	+60.0	2.8	**32**
33	18 01.1	+60.0	2.6	19 01.0	+60.0	2.7	20 00.9	+60.0	2.7	21 00.9	+60.0	2.7	22 00.8	+60.0	2.7	23 00.7	+60.0	2.7	24 00.7	+60.0	2.8	25 00.6	+60.0	2.8	**33**
34	19 01.1	+60.0	2.6	20 01.0	+60.0	2.6	21 00.9	+60.0	2.7	22 00.9	+60.0	2.7	23 00.8	+60.0	2.7	24 00.7	+60.0	2.7	25 00.7	+60.0	2.7	26 00.6	+60.0	2.8	**34**
35	20 01.1	+60.0	2.6	21 01.0	+60.0	2.6	22 00.9	+60.0	2.7	23 00.9	+60.0	2.7	24 00.8	+60.0	2.7	25 00.7	+60.0	2.7	26 00.7	+60.0	2.7	27 00.6	+60.0	2.8	**35**
36	21 01.1	+60.0	2.6	22 01.0	+60.0	2.6	23 00.9	+60.0	2.6	24 00.9	+60.0	2.7	25 00.8	+60.0	2.7	26 00.7	+60.0	2.7	27 00.7	+60.0	2.7	28 00.6	+60.0	2.7	**36**
37	22 01.1	+59.9	2.6	23 01.0	+60.0	2.6	24 00.9	+60.0	2.6	25 00.9	+60.0	2.6	26 00.8	+60.0	2.7	27 00.7	+60.0	2.7	28 00.7	+60.0	2.7	29 00.6	+60.0	2.7	**37**
38	23 01.0	+60.0	2.6	24 01.0	+60.0	2.6	25 00.9	+60.0	2.6	26 00.9	+60.0	2.6	27 00.8	+60.0	2.7	28 00.7	+60.0	2.7	29 00.7	+60.0	2.7	30 00.6	+60.0	2.7	**38**
39	24 01.0	+60.0	2.6	25 01.0	+60.0	2.6	26 00.9	+60.0	2.6	27 00.9	+59.9	2.6	28 00.8	+60.0	2.6	29 00.7	+60.0	2.7	30 00.7	+60.0	2.7	31 00.6	+60.0	2.7	**39**
40	25 01.0	+60.0	2.5	26 01.0	+60.0	2.6	27 00.9	+60.0	2.6	28 00.8	+60.0	2.6	29 00.8	+60.0	2.6	30 00.7	+60.0	2.7	31 00.7	+60.0	2.7	32 00.6	+60.0	2.7	**40**
41	26 01.0	+60.0	2.5	27 01.0	+60.0	2.5	28 00.9	+60.0	2.6	29 00.8	+60.0	2.6	30 00.8	+60.0	2.6	31 00.7	+60.0	2.6	32 00.7	+60.0	2.7	33 00.6	+60.0	2.7	**41**
42	27 01.0	+60.0	2.5	28 01.0	+60.0	2.5	29 00.9	+60.0	2.5	30 00.8	+60.0	2.6	31 00.8	+60.0	2.6	32 00.7	+60.0	2.6	33 00.7	+60.0	2.7	34 00.6	+60.0	2.7	**42**
43	28 01.0	+60.0	2.5	29 01.0	+59.9	2.5	30 00.9	+60.0	2.5	31 00.8	+60.0	2.6	32 00.8	+60.0	2.6	33 00.7	+60.0	2.6	34 00.7	+59.9	2.6	35 00.6	+60.0	2.7	**43**
44	29 01.0	+60.0	2.5	30 00.9	+60.0	2.5	31 00.9	+60.0	2.5	32 00.8	+60.0	2.5	33 00.8	+60.0	2.6	34 00.7	+60.0	2.6	35 00.6	+60.0	2.6	36 00.6	+60.0	2.7	**44**
45	30 01.0	+60.0	2.4	31 00.9	+60.0	2.5	32 00.9	+60.0	2.5	33 00.8	+60.0	2.5	34 00.8	+60.0	2.6	35 00.7	+60.0	2.6	36 00.6	+60.0	2.6	37 00.6	+60.0	2.7	**45**
46	31 01.0	+60.0	2.4	32 00.9	+60.0	2.5	33 00.9	+60.0	2.5	34 00.8	+60.0	2.5	35 00.8	+60.0	2.5	36 00.7	+60.0	2.6	37 00.6	+60.0	2.6	38 00.6	+60.0	2.6	**46**
47	32 01.0	+60.0	2.4	33 00.9	+60.0	2.4	34 00.9	+60.0	2.5	35 00.8	+60.0	2.5	36 00.8	+60.0	2.5	37 00.7	+60.0	2.6	38 00.6	+60.0	2.6	39 00.6	+60.0	2.6	**47**
48	33 01.0	+60.0	2.4	34 00.9	+60.0	2.4	35 00.9	+60.0	2.5	36 00.8	+60.0	2.5	37 00.8	+59.9	2.5	38 00.7	+60.0	2.5	39 00.6	+60.0	2.6	40 00.6	+60.0	2.6	**48**
49	34 01.0	+60.0	2.4	35 00.9	+60.0	2.4	36 00.9	+60.0	2.4	37 00.8	+60.0	2.5	38 00.7	+60.0	2.5	39 00.7	+60.0	2.5	40 00.6	+60.0	2.6	41 00.6	+60.0	2.6	**49**
50	35 01.0	+59.9	2.4	36 00.9	+60.0	2.4	37 00.9	+59.9	2.4	38 00.8	+60.0	2.4	39 00.7	+60.0	2.5	40 00.7	+60.0	2.5	41 00.6	+60.0	2.6	42 00.6	+60.0	2.6	**50**
51	36 00.9	+60.0	2.3	37 00.9	+60.0	2.4	38 00.8	+60.0	2.4	39 00.8	+60.0	2.4	40 00.7	+60.0	2.5	41 00.7	+60.0	2.5	42 00.6	+60.0	2.5	43 00.6	+60.0	2.6	**51**
52	37 00.9	+60.0	2.3	38 00.9	+60.0	2.3	39 00.8	+60.0	2.4	40 00.8	+60.0	2.4	41 00.7	+60.0	2.4	42 00.7	+60.0	2.5	43 00.6	+60.0	2.5	44 00.6	+60.0	2.6	**52**
53	38 00.9	+60.0	2.3	39 00.9	+60.0	2.3	40 00.8	+60.0	2.4	41 00.8	+60.0	2.4	42 00.7	+60.0	2.4	43 00.7	+60.0	2.5	44 00.6	+60.0	2.5	45 00.6	+60.0	2.6	**53**
54	39 00.9	+60.0	2.3	40 00.9	+60.0	2.3	41 00.8	+60.0	2.3	42 00.8	+60.0	2.4	43 00.7	+60.0	2.4	44 00.7	+60.0	2.5	45 00.6	+60.0	2.5	46 00.6	+60.0	2.5	**54**
55	40 00.9	+60.0	2.2	41 00.9	+60.0	2.3	42 00.8	+60.0	2.3	43 00.8	+60.0	2.4	44 00.7	+60.0	2.4	45 00.7	+60.0	2.4	46 00.6	+60.0	2.5	47 00.6	+59.9	2.5	**55**
56	41 00.9	+60.0	2.2	42 00.9	+59.9	2.3	43 00.8	+60.0	2.3	44 00.8	+60.0	2.3	45 00.7	+60.0	2.4	46 00.7	+60.0	2.4	47 00.6	+60.0	2.5	48 00.5	+60.0	2.5	**56**
57	42 00.9	+60.0	2.2	43 00.8	+60.0	2.2	44 00.8	+60.0	2.3	45 00.8	+59.9	2.3	46 00.7	+60.0	2.4	47 00.7	+59.9	2.4	48 00.6	+60.0	2.4	49 00.5	+60.0	2.5	**57**
58	43 00.9	+60.0	2.2	44 00.8	+60.0	2.2	45 00.8	+60.0	2.2	46 00.7	+60.0	2.3	47 00.7	+60.0	2.3	48 00.6	+60.0	2.4	49 00.6	+60.0	2.4	50 00.5	+60.0	2.5	**58**
59	44 00.9	+60.0	2.1	45 00.8	+60.0	2.2	46 00.8	+60.0	2.2	47 00.7	+60.0	2.3	48 00.7	+60.0	2.3	49 00.6	+60.0	2.4	50 00.6	+60.0	2.4	51 00.5	+60.0	2.5	**59**
60	45 00.9	+60.0	2.1	46 00.8	+60.0	2.2	47 00.8	+60.0	2.2	48 00.7	+60.0	2.2	49 00.7	+60.0	2.3	50 00.6	+60.0	2.3	51 00.6	+60.0	2.4	52 00.5	+60.0	2.4	**60**
61	46 00.9	+59.9	2.1	47 00.8	+60.0	2.1	48 00.8	+60.0	2.2	49 00.7	+60.0	2.2	50 00.7	+60.0	2.3	51 00.6	+60.0	2.3	52 00.6	+60.0	2.4	53 00.5	+60.0	2.4	**61**
62	47 00.8	+60.0	2.1	48 00.8	+60.0	2.1	49 00.8	+59.9	2.1	50 00.7	+60.0	2.2	51 00.7	+60.0	2.2	52 00.6	+60.0	2.3	53 00.6	+60.0	2.3	54 00.5	+60.0	2.4	**62**
63	48 00.8	+60.0	2.0	49 00.8	+60.0	2.1	50 00.7	+60.0	2.1	51 00.7	+60.0	2.2	52 00.7	+60.0	2.2	53 00.6	+60.0	2.3	54 00.6	+60.0	2.3	55 00.5	+60.0	2.4	**63**
64	49 00.8	+60.0	2.0	50 00.8	+60.0	2.0	51 00.7	+60.0	2.1	52 00.7	+60.0	2.1	53 00.7	+59.9	2.2	54 00.6	+60.0	2.2	55 00.6	+60.0	2.3	56 00.5	+60.0	2.4	**64**
65	50 00.8	+60.0	2.0	51 00.8	+60.0	2.0	52 00.7	+60.0	2.1	53 00.7	+60.0	2.1	54 00.6	+60.0	2.2	55 00.6	+60.0	2.2	56 00.6	+60.0	2.3	57 00.5	+60.0	2.3	**65**
66	51 00.8	+60.0	1.9	52 00.8	+59.9	2.0	53 00.7	+60.0	2.0	54 00.7	+60.0	2.1	55 00.6	+60.0	2.1	56 00.6	+60.0	2.2	57 00.6	+59.9	2.2	58 00.5	+60.0	2.3	**66**
67	52 00.8	+60.0	1.9	53 00.7	+60.0	1.9	54 00.7	+60.0	2.0	55 00.7	+60.0	2.0	56 00.6	+60.0	2.1	57 00.6	+60.0	2.2	58 00.5	+60.0	2.2	59 00.5	+60.0	2.3	**67**
68	53 00.8	+59.9	1.9	54 00.7	+60.0	1.9	55 00.7	+60.0	2.0	56 00.7	+59.9	2.0	57 00.6	+60.0	2.1	58 00.6	+60.0	2.1	59 00.5	+60.0	2.2	60 00.5	+60.0	2.2	**68**
69	54 00.7	+60.0	1.8	55 00.7	+60.0	1.9	56 00.7	+60.0	1.9	57 00.6	+60.0	2.0	58 00.6	+60.0	2.0	59 00.6	+60.0	2.1	60 00.5	+60.0	2.2	61 00.5	+60.0	2.2	**69**
70	55 00.7	+60.0	1.8	56 00.7	+60.0	1.8	57 00.7	+60.0	1.9	58 00.6	+60.0	1.9	59 00.6	+60.0	2.0	60 00.6	+59.9	2.1	61 00.5	+60.0	2.1	62 00.5	+60.0	2.2	**70**
71	56 00.7	+60.0	1.7	57 00.7	+60.0	1.8	58 00.7	+59.9	1.8	59 00.6	+60.0	1.9	60 00.6	+60.0	2.0	61 00.5	+60.0	2.0	62 00.5	+60.0	2.1	63 00.5	+60.0	2.2	**71**
72	57 00.7	+60.0	1.7	58 00.7	+59.9	1.7	59 00.6	+60.0	1.8	60 00.6	+60.0	1.9	61 00.6	+60.0	1.9	62 00.5	+60.0	2.0	63 00.5	+60.0	2.0	64 00.5	+60.0	2.1	**72**
73	58 00.7	+60.0	1.7	59 00.6	+60.0	1.7	60 00.6	+60.0	1.8	61 00.6	+60.0	1.8	62 00.6	+59.9	1.9	63 00.5	+60.0	1.9	64 00.5	+60.0	2.0	65 00.5	+59.9	2.1	**73**
74	59 00.7	+59.9	1.6	60 00.6	+60.0	1.7	61 00.6	+60.0	1.7	62 00.6	+60.0	1.8	63 00.5	+60.0	1.8	64 00.5	+60.0	1.9	65 00.5	+60.0	2.0	66 00.4	+60.0	2.0	**74**
75	60 00.6	+60.0	1.6	61 00.6	+60.0	1.6	62 00.6	+60.0	1.7	63 00.6	+59.9	1.7	64 00.5	+60.0	1.8	65 00.5	+60.0	1.8	66 00.5	+60.0	1.9	67 00.4	+60.0	2.0	**75**
76	61 00.6	+60.0	1.5	62 00.6	+60.0	1.5	63 00.6	+59.9	1.6	64 00.5	+60.0	1.7	65 00.5	+60.0	1.7	66 00.5	+60.0	1.8	67 00.5	+59.9	1.9	68 00.4	+60.0	1.9	**76**
77	62 00.6	+60.0	1.4	63 00.6	+59.9	1.5	64 00.5	+60.0	1.5	65 00.5	+60.0	1.6	66 00.5	+60.0	1.7	67 00.5	+60.0	1.7	68 00.4	+60.0	1.8	69 00.4	+60.0	1.9	**77**
78	63 00.6	+59.9	1.4	64 00.5	+60.0	1.4	65 00.5	+60.0	1.5	66 00.5	+60.0	1.5	67 00.5	+60.0	1.6	68 00.5	+59.9	1.7	69 00.4	+60.0	1.7	70 00.4	+60.0	1.8	**78**
79	64 00.5	+60.0	1.3	65 00.5	+60.0	1.4	66 00.5	+60.0	1.4	67 00.5	+60.0	1.5	68 00.5	+59.9	1.5	69 00.4	+60.0	1.6	70 00.4	+60.0	1.7	71 00.4	+60.0	1.8	**79**
80	65 00.5	+60.0	1.2	66 00.5	+60.0	1.3	67 00.5	+59.9	1.3	68 00.5	+59.9	1.4	69 00.4	+60.0	1.5	70 00.4	+60.0	1.5	71 00.4	+60.0	1.6	72 00.4	+60.0	1.7	**80**
81	66 00.5	+59.9	1.2	67 00.5	+59.9	1.2	68 00.4	+60.0	1.3	69 00.4	+60.0	1.3	70 00.4	+60.0	1.4	71 00.4	+60.0	1.4	72 00.4	+60.0	1.5	73 00.4	+59.9	1.6	**81**
82	67 00.4	+60.0	1.1	68 00.4	+60.0	1.1	69 00.4	+60.0	1.2	70 00.4	+60.0	1.2	71 00.4	+60.0	1.3	72 00.4	+59.9	1.4	73 00.4	+59.9	1.4	74 00.3	+60.0	1.5	**82**
83	68 00.4	+60.0	1.0	69 00.4	+59.9	1.0	70 00.4	+59.9	1.1	71 00.4	+59.9	1.1	72 00.4	+59.9	1.2	73 00.3	+60.0	1.3	74 00.3	+60.0	1.3	75 00.3	+60.0	1.4	**83**
84	69 00.4	+59.9	0.9	70 00.3	+60.0	0.9	71 00.3	+60.0	1.0	72 00.3	+60.0	1.0	73 00.3	+60.0	1.1	74 00.3	+60.0	1.1	75 00.3	+60.0	1.2	76 00.3	+60.0	1.3	**84**
85	70 00.3	+60.0	0.8	71 00.3	+60.0	0.8	72 00.3	+60.0	0.8	73 00.3	+59.9	0.9	74 00.3	+59.9	0.9	75 00.3	+59.9	1.0	76 00.3	+59.9	1.1	77 00.3	+59.9	1.2	**85**
86	71 00.3	+59.9	0.6	72 00.3	+59.9	0.7	73 00.3	+59.9	0.7	74 00.2	+60.0	0.8	75 00.2	+60.0	0.8	76 00.2	+60.0	0.9	77 00.2	+60.0	0.9	78 00.2	+60.0	1.0	**86**
87	72 00.2	+59.9	0.5	73 00.2	+59.9	0.5	74 00.2	+59.9	0.6	75 00.2	+59.9	0.6	76 00.2	+59.9	0.6	77 00.2	+59.9	0.7	78 00.2	+59.9	0.8	79 00.2	+59.9	0.8	**87**
88	73 00.1	+60.0	0.4	74 00.1	+60.0	0.4	75 00.1	+60.0	0.4	76 00.1	+60.0	0.4	77 00.1	+60.0	0.5	78 00.1	+60.0	0.5	79 00.1	+60.0	0.5	80 00.1	+60.0	0.6	**88**
89	74 00.1	+59.9	0.2	75 00.1	+59.9	0.2	76 00.1	+59.9	0.2	77 00.1	+59.9	0.2	78 00.1	+59.9	0.3	79 00.1	+59.9	0.3	80 00.1	+59.9	0.3	81 00.1	+59.9	0.3	**89**
90	75 00.0	+59.9	0.0	76 00.0	+59.9	0.0	77 00.0	+59.9	0.0	78 00.0	+59.9	0.0	79 00.0	+59.9	0.0	80 00.0	+59.9	0.0	81 00.0	+59.9	0.0	82 00.0	+59.9	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 177°, 183°

4°, 356° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 57.8	+59.9	175.9	13 57.9	+60.0	175.9	12 58.1	+60.0	175.9	11 58.2	+60.0	175.9	10 58.4	+60.0	175.9	9 58.5	+60.0	175.9	8 58.7	+60.0	176.0	7 58.8	+60.0	176.0	0
1	15 57.7	+60.0	175.8	14 57.9	+60.0	175.9	13 58.1	+60.0	175.9	12 58.2	+60.0	175.9	11 58.4	+60.0	175.9	10 58.5	+60.0	175.9	9 58.7	+60.0	175.9	8 58.8	+60.0	176.0	1
2	16 57.7	+60.0	175.8	15 57.9	+60.0	175.8	14 58.1	+59.9	175.9	13 58.2	+60.0	175.9	12 58.4	+60.0	175.9	11 58.5	+60.0	175.9	10 58.7	+60.0	175.9	9 58.8	+60.0	175.9	2
3	17 57.7	+60.0	175.8	16 57.9	+60.0	175.8	15 58.0	+60.0	175.8	14 58.2	+60.0	175.9	13 58.4	+59.9	175.9	12 58.5	+60.0	175.9	11 58.7	+60.0	175.9	10 58.8	+60.0	175.9	3
4	18 57.7	+60.0	175.8	17 57.9	+60.0	175.8	16 58.0	+60.0	175.8	15 58.2	+60.0	175.8	14 58.3	+60.0	175.9	13 58.5	+60.0	175.9	12 58.7	+60.0	175.9	11 58.8	+60.0	175.9	4
5	19 57.7	+60.0	175.8	18 57.9	+60.0	175.8	17 58.0	+60.0	175.8	16 58.2	+60.0	175.8	15 58.3	+60.0	175.9	14 58.5	+60.0	175.9	13 58.7	+60.0	175.9	12 58.8	+60.0	175.9	5
6	20 57.7	+60.0	175.7	19 57.9	+59.9	175.8	18 58.0	+60.0	175.8	17 58.2	+60.0	175.8	16 58.3	+60.0	175.8	15 58.5	+60.0	175.9	14 58.7	+59.9	175.9	13 58.8	+60.0	175.9	6
7	21 57.7	+60.0	175.7	20 57.8	+60.0	175.7	19 58.0	+60.0	175.8	18 58.2	+60.0	175.8	17 58.3	+60.0	175.8	16 58.5	+60.0	175.8	15 58.6	+60.0	175.9	14 58.8	+60.0	175.9	7
8	22 57.7	+60.0	175.7	21 57.8	+60.0	175.7	20 58.0	+60.0	175.8	19 58.2	+60.0	175.8	18 58.3	+60.0	175.8	17 58.5	+60.0	175.8	16 58.6	+60.0	175.9	15 58.8	+60.0	175.9	8
9	23 57.7	+59.9	175.7	22 57.8	+60.0	175.7	21 58.0	+60.0	175.7	20 58.2	+60.0	175.8	19 58.3	+60.0	175.8	18 58.5	+60.0	175.8	17 58.6	+60.0	175.8	16 58.8	+60.0	175.9	9
10	24 57.6	+60.0	175.7	23 57.8	+60.0	175.7	22 58.0	+60.0	175.7	21 58.2	+59.9	175.8	20 58.3	+60.0	175.8	19 58.5	+60.0	175.8	18 58.6	+60.0	175.8	17 58.8	+60.0	175.9	10
11	25 57.6	+60.0	175.6	24 57.8	+60.0	175.7	23 58.0	+60.0	175.7	22 58.1	+60.0	175.7	21 58.3	+60.0	175.8	20 58.5	+60.0	175.8	19 58.6	+60.0	175.8	18 58.8	+60.0	175.8	11
12	26 57.6	+60.0	175.6	25 57.8	+60.0	175.6	24 58.0	+60.0	175.7	23 58.1	+60.0	175.7	22 58.3	+60.0	175.7	21 58.5	+60.0	175.8	20 58.6	+60.0	175.8	19 58.8	+60.0	175.8	12
13	27 57.6	+60.0	175.6	26 57.8	+60.0	175.6	25 58.0	+59.9	175.7	24 58.1	+60.0	175.7	23 58.3	+60.0	175.7	22 58.5	+60.0	175.8	21 58.6	+60.0	175.8	20 58.8	+60.0	175.8	13
14	28 57.6	+60.0	175.6	27 57.8	+60.0	175.6	26 57.9	+60.0	175.6	25 58.1	+60.0	175.7	24 58.3	+60.0	175.7	23 58.5	+60.0	175.8	22 58.6	+60.0	175.8	21 58.8	+60.0	175.8	14
15	29 57.6	+60.0	175.5	28 57.8	+60.0	175.6	27 57.9	+60.0	175.6	26 58.1	+60.0	175.7	25 58.3	+60.0	175.7	24 58.5	+59.9	175.7	23 58.6	+60.0	175.8	22 58.8	+60.0	175.8	15
16	30 57.6	+60.0	175.5	29 57.8	+59.9	175.6	28 57.9	+60.0	175.6	27 58.1	+60.0	175.6	26 58.3	+60.0	175.7	25 58.4	+60.0	175.7	24 58.6	+60.0	175.8	23 58.8	+60.0	175.8	16
17	31 57.6	+59.9	175.5	30 57.7	+60.0	175.5	29 57.9	+60.0	175.6	28 58.1	+60.0	175.6	27 58.3	+60.0	175.7	26 58.4	+60.0	175.7	25 58.6	+60.0	175.7	24 58.8	+60.0	175.8	17
18	32 57.5	+60.0	175.5	31 57.7	+60.0	175.5	30 57.9	+60.0	175.6	29 58.1	+60.0	175.6	28 58.3	+60.0	175.7	27 58.4	+60.0	175.7	26 58.6	+60.0	175.7	25 58.8	+60.0	175.8	18
19	33 57.5	+60.0	175.4	32 57.7	+60.0	175.5	31 57.9	+60.0	175.5	30 58.1	+60.0	175.6	29 58.3	+59.9	175.6	28 58.4	+60.0	175.7	27 58.6	+60.0	175.7	26 58.8	+60.0	175.8	19
20	34 57.5	+60.0	175.4	33 57.7	+60.0	175.5	32 57.9	+60.0	175.5	31 58.1	+60.0	175.6	30 58.2	+60.0	175.6	29 58.4	+60.0	175.7	28 58.6	+60.0	175.7	27 58.8	+60.0	175.7	20
21	35 57.5	+60.0	175.4	34 57.7	+60.0	175.4	33 57.9	+60.0	175.5	32 58.1	+60.0	175.5	31 58.2	+60.0	175.6	30 58.4	+60.0	175.6	29 58.6	+60.0	175.7	28 58.8	+60.0	175.7	21
22	36 57.5	+60.0	175.4	35 57.7	+60.0	175.4	34 57.9	+60.0	175.5	33 58.1	+59.9	175.5	32 58.2	+60.0	175.6	31 58.4	+60.0	175.6	30 58.6	+60.0	175.7	29 58.8	+59.9	175.7	22
23	37 57.5	+60.0	175.3	36 57.7	+60.0	175.4	35 57.9	+59.9	175.4	34 58.0	+60.0	175.5	33 58.2	+60.0	175.6	32 58.4	+60.0	175.6	31 58.6	+60.0	175.7	30 58.7	+60.0	175.7	23
24	38 57.5	+59.9	175.3	37 57.7	+59.9	175.4	36 57.8	+60.0	175.4	35 58.0	+60.0	175.5	34 58.2	+60.0	175.5	33 58.4	+60.0	175.6	32 58.6	+60.0	175.6	31 58.7	+60.0	175.7	24
25	39 57.4	+60.0	175.3	38 57.6	+60.0	175.3	37 57.8	+60.0	175.4	36 58.0	+60.0	175.5	35 58.2	+60.0	175.5	34 58.4	+60.0	175.6	33 58.6	+60.0	175.6	32 58.7	+60.0	175.7	25
26	40 57.4	+60.0	175.2	39 57.6	+60.0	175.3	38 57.8	+60.0	175.4	37 58.0	+60.0	175.4	36 58.2	+60.0	175.5	35 58.4	+60.0	175.6	34 58.6	+60.0	175.6	33 58.7	+60.0	175.7	26
27	41 57.4	+60.0	175.2	40 57.6	+60.0	175.3	39 57.8	+60.0	175.3	38 58.0	+60.0	175.4	37 58.2	+60.0	175.5	36 58.4	+60.0	175.5	35 58.6	+60.0	175.6	34 58.7	+60.0	175.6	27
28	42 57.4	+60.0	175.2	41 57.6	+60.0	175.2	40 57.8	+60.0	175.3	39 58.0	+60.0	175.4	38 58.2	+60.0	175.5	37 58.4	+60.0	175.5	36 58.6	+59.9	175.6	35 58.7	+60.0	175.6	28
29	43 57.4	+59.9	175.1	42 57.6	+60.0	175.2	41 57.8	+60.0	175.3	40 58.0	+60.0	175.4	39 58.2	+60.0	175.4	38 58.4	+60.0	175.5	37 58.5	+60.0	175.6	36 58.7	+60.0	175.6	29
30	44 57.3	+60.0	175.1	43 57.6	+59.9	175.2	42 57.8	+60.0	175.3	41 58.0	+60.0	175.3	40 58.2	+60.0	175.4	39 58.4	+59.9	175.5	38 58.5	+60.0	175.5	37 58.7	+60.0	175.6	30
31	45 57.3	+60.0	175.1	44 57.5	+60.0	175.2	43 57.8	+59.9	175.2	42 58.0	+59.9	175.3	41 58.2	+59.9	175.4	40 58.3	+60.0	175.5	39 58.5	+60.0	175.5	38 58.7	+60.0	175.6	31
32	46 57.3	+60.0	175.0	45 57.5	+60.0	175.1	44 57.7	+60.0	175.2	43 57.9	+60.0	175.3	42 58.1	+60.0	175.4	41 58.3	+60.0	175.4	40 58.5	+60.0	175.5	39 58.7	+60.0	175.6	32
33	47 57.3	+60.0	175.0	46 57.5	+60.0	175.1	45 57.7	+60.0	175.2	44 57.9	+60.0	175.3	43 58.1	+60.0	175.3	42 58.3	+60.0	175.4	41 58.5	+60.0	175.5	40 58.7	+60.0	175.6	33
34	48 57.3	+59.9	174.9	47 57.5	+60.0	175.0	46 57.7	+60.0	175.1	45 57.9	+60.0	175.2	44 58.1	+60.0	175.3	43 58.3	+60.0	175.4	42 58.5	+60.0	175.5	41 58.7	+60.0	175.5	34
35	49 57.2	+60.0	174.9	48 57.5	+60.0	175.0	47 57.7	+60.0	175.1	46 57.9	+60.0	175.2	45 58.1	+60.0	175.3	44 58.3	+60.0	175.4	43 58.5	+60.0	175.4	42 58.7	+60.0	175.5	35
36	50 57.2	+60.0	174.9	49 57.5	+59.9	175.0	48 57.7	+60.0	175.1	47 57.9	+60.0	175.2	46 58.1	+60.0	175.3	45 58.3	+60.0	175.3	44 58.5	+60.0	175.4	43 58.7	+60.0	175.5	36
37	51 57.2	+60.0	174.8	50 57.4	+60.0	174.9	49 57.7	+59.9	175.0	48 57.9	+60.0	175.1	47 58.1	+60.0	175.2	46 58.3	+60.0	175.3	45 58.5	+60.0	175.4	44 58.7	+60.0	175.5	37
38	52 57.2	+59.9	174.8	51 57.4	+60.0	174.9	50 57.6	+60.0	175.0	49 57.9	+60.0	175.1	48 58.1	+60.0	175.2	47 58.3	+60.0	175.3	46 58.5	+60.0	175.4	45 58.7	+60.0	175.5	38
39	53 57.1	+60.0	174.7	52 57.4	+60.0	174.8	51 57.6	+60.0	175.0	50 57.9	+59.9	175.1	49 58.1	+60.0	175.2	48 58.3	+60.0	175.3	47 58.5	+60.0	175.4	46 58.7	+60.0	175.4	39
40	54 57.1	+60.0	174.7	53 57.4	+59.9	174.8	52 57.6	+60.0	174.9	51 57.8	+60.0	175.0	50 58.1	+59.9	175.1	49 58.3	+60.0	175.2	48 58.5	+60.0	175.3	47 58.7	+60.0	175.4	40
41	55 57.1	+59.9	174.6	54 57.3	+60.0	174.7	53 57.6	+60.0	174.9	52 57.8	+60.0	175.0	51 58.0	+60.0	175.1	50 58.3	+59.9	175.2	49 58.5	+60.0	175.3	48 58.7	+60.0	175.4	41
42	56 57.0	+60.0	174.5	55 57.3	+60.0	174.7	54 57.6	+59.9	174.8	53 57.8	+60.0	174.9	52 58.0	+60.0	175.1	51 58.2	+60.0	175.2	50 58.5	+59.9	175.3	49 58.7	+59.9	175.4	42
43	57 57.0	+60.0	174.5	56 57.3	+60.0	174.6	55 57.5	+60.0	174.8	54 57.8	+60.0	174.9	53 58.0	+60.0	175.0	52 58.2	+60.0	175.1	51 58.4	+60.0	175.2	50 58.6	+60.0	175.4	43
44	58 57.0	+59.9	174.4	57 57.3	+59.9	174.6	56 57.5	+60.0	174.7	55 57.8	+59.9	174.9	54 58.0	+60.0	175.0	53 58.2	+60.0	175.1	52 58.4	+60.0	175.2	51 58.6	+60.0	175.3	44
45	59 56.9	+60.0	174.3	58 57.2	+60.0	174.5	57 57.5	+60.0	174.7	56 57.7	+60.0	174.8	55 58.0	+60.0	174.9	54 58.2	+60.0	175.1	53 58.4	+60.0	175.2	52 58.6	+60.0	175.3	45
46	60 56.9	+60.0	174.3	59 57.2	+60.0	174.4	58 57.5	+59.9	174.6	57 57.7	+60.0	174.8	56 58.0	+59.9	174.9	55 58.2	+60.0	175.0	54 58.4	+60.0	175.2	53 58.6	+60.0	175.3	46
47	61 56.9	+59.9	174.2	60 57.2	+59.9	174.4	59 57.4	+60.0	174.5	58 57.7	+60.0	174.7	57 57.9	+60.0	174.9	56 58.2	+60.0	175.0	55 58.4	+60.0	175.1	54 58.6	+60.0	175.2	47
48	62 56.8	+60.0	174.1	61 57.1	+60.0	174.3	60 57.4	+60.0	174.5	59 57.7	+59.9	174.6	58 57.9	+60.0	174.8	57 58.2	+59.9	175.0	56 58.4	+60.0	175.1	55 58.6	+60.0	175.2	48
49	63 56.8	+59.9	174.0	62 57.1	+59.9	174.2	61 57.4	+59.9	174.4	60 57.6	+60.0	174.6	59 57.9	+60.0	174.8	58 58.1	+60.0	174.9	57 58.4	+60.0	175.0	56 58.6	+60.0	175.2	49
50	64 56.7	+60.0	173.9	63 57.0	+60.0	174.1	62 57.3	+60.0	174.3	61 57.6	+60.0	174.5	60 57.9	+60.0	174.7	59 58.1	+60.0	174.9	58 58.4	+60.0	175.0	57 58.6	+60.0	175.1	50
51	65 56.7	+59.9	173.8	64 57.0	+59.9	174.0	63 57.3	+60.0	174.3	62 57.6	+60.0	174.5	61 57.9	+59.9	174.6	60 58.1	+60.0	174.8	59 58.4	+59.9	175.0	58 58.6	+60.0	175.1	51
52	66 56.6	+59.9	173.7	65 56.9	+60.0	174.0	64 57.3	+59.9	174.2	63 57.6	+59.9	174.4	62 57.8	+60.0	174.6	61 58.1	+60.0	174.8	60 58.3	+60.0	174.9	59 58.6	+60.0	175.1	52
53	67 56.5	+59.9	173.6	66 56.9	+59.9	173.8	65 57.2	+60.0	174.1	64 57.5	+60.0	174.3	63 57.8	+60.0	174.5	62 58.1	+60.0	174.7	61 58.3	+60.0	174.9	60 58.6	+59.9	175.0	53
54	68 56.4	+60.0	173.4	67 56.8	+60.0	173.7	66 57.2	+59.9	174.0	65 57.5	+59.9	174.2	64 57.8	+59.9	174.4	63 58.1	+59.9	174.6	62 58.3	+60.0	174.8	61 58.5	+60.0	175.0	54
55	69 56.4	+59.9	173.3	68 56.8	+59.9	173.6	67 57.1	+60.0	173.9	66 57.4	+60.0	174.1	65 57.7	+60.0	174.4	64 58.0	+60.0	174.6	63 58.3	+60.0	174.8	62 58.5	+60.0	174.9	55
56	70 56.3	+59.9	173.1	69 56.7	+59.9	173.5	68 57.1	+59.9	173.8	67 57.4	+60.0	174.0	66 57.7	+60.0	174.3	65 58.0	+60.0	174.5	64 58.3	+59.9	174.7	63 58.5	+60.0	174.9	56
57	71 56.2	+59.9	173.0	70 56.6	+59.9	173.3	69 57.0	+59.9	173.6	68 57.4	+59.9	173.9	67 57.7	+59.9	174.2	66 58.0	+59.9	174.4	65 58.2	+60.0	174.6	64 58.5	+60.0	174.8	57
58	72 56.1	+59.9	172.8	71 56.5	+59.9	173.2	70 56.9	+60.0	173.5	69 57.3	+59.9	173.8	68 57.6	+60.0	174.1	67 57.9	+60.0	174.3	66 58.2	+60.0	174.6	65 58.5	+60.0	174.8	58
59	73 56.0	+59.8	172.5	72 56.4	+59.9	173.0	71 56.9	+59.9	173.3	70 57.2	+60.0	173.7	69 57.6	+59.9	174.0	68 57.9	+60.0	174.3	67 58.2	+60.0	174.5	66 58.5	+59.9	174.7	59
60	74 55.8	+59.9	172.3	73 56.3	+59.9	172.8	72 56.8	+59.9	173.2	71 57.2	+59.9	173.5	70 57.5	+60.0	173.9	69 57.9	+59.9	174.2	68 58.2	+59.9	174.4	67 58.4	+60.0	174.7	60
61	75 55.7	+59.8	172.0	74 56.2	+59.9	172.5	73 56.7	+59.9	173.0	72 57.1	+59.9	173.4	71 57.5	+59.9	173.7	70 57.8	+60.0	174.0	69 58.1	+60.0	174.3	68 58.4	+60.0	174.6	61
62	76 55.5	+59.8	171.7	75 56.1	+59.8	172.3	74 56.6	+59.9	172.8	73 57.0	+60.0	173.2	72 57.4	+60.0	173.6	71 57.8	+59.9	173.9	70 58.1	+60.0	174.2	69 58.4	+60.0	174.5	62
63	77 55.3	+59.7	171.3	76 55.9	+59.8	171.9	75 56.5	+59.8	172.5	74 57.0	+59.9	173.0	73 57.4	+59.9	173.4	72 57.7	+60.0	173.8	71 58.1	+59.9	174.1	70 58.4	+59.9	174.4	63
64	78 55.0	+59.7	170.8	77 55.7	+59.8	171.6	76 56.3	+59.9	172.2	75 56.9	+59.8	172.8	74 57.3	+59.9	173.2	73 57.7	+59.9	173.6	72 58.0	+60.0	174.0	71 58.3	+60.0	174.3	64
65	79 54.7	+59.7	170.3	78 55.5	+59.8	171.2	77 56.2	+59.8	171.9	76 56.7	+59.9	172.5	75 57.2	+59.9	173.0	74 57.6	+60.0	173.5	73 58.0	+59.9	173.9	72 58.3	+60.0	174.2	65
66	80 54.4	+59.6	169.7	79 55.3	+59.7	170.7	78 56.0	+59.8	171.5	77 56.6	+59.8	172.2	76 57.1	+59.9	172.8	75 57.6	+59.9	173.3	74 57.9	+60.0	173.7	73 58.3	+59.9	174.1	66
67	81 54.0	+59.4	168.8	80 55.0	+59.6	170.1	79 55.8	+59.7	171.0	78 56.4	+59.9	171.8	77 57.0	+59.9	172.5	76 57.5	+59.9	173.1	75 57.9	+59.9	173.5	74 58.2	+60.0	174.0	67
68	82 53.4	+59.2	167.8	81 54.6	+59.5	169.3	80 55.5	+59.7	170.5	79 56.3	+59.7	171.4	78 56.9	+59.8	172.2	77 57.4	+59.9	172.8	76 57.8	+59.9	173.3	75 58.2	+59.9	173.8	68
69	83 52.6	+59.0	166.4	82 54.1	+59.3	168.3	81 55.2	+59.5	169.8	80 56.0	+59.7	170.9	79 56.7	+59.8	171.8	78 57.3	+59.8	172.5	77 57.7	+60.0	173.1	76 58.1	+60.0	173.6	69
70	84 51.6	+58.5	164.6	83 53.4	+59.1	167.0	82 54.7	+59.5	168.9	81 55.7	+59.7	170.2	80 56.5	+59.8	171.3	79 57.1	+59.9	172.1	78 57.7	+59.8	172.8	77 58.1	+59.9	173.4	70
71	85 50.1	+57.5	161.8	84 52.5	+58.7	165.3	83 54.2	+59.2	167.7	82 55.4	+59.5	169.4	81 56.3	+59.7	170.7	80 57.0	+59.8	171.7	79 57.5	+59.9	172.5	78 58.0	+59.9	173.2	71
72	86 47.6	*+55.4*	•157.3	85 51.2	+57.8	162.7	84 53.4	+58.8	166.0	83 54.9	+59.3	168.3	82 56.0	+59.6	169.9	81 56.8	+59.7	171.1	80 57.4	+59.9	172.1	79 57.9	+59.9	172.9	72
73	87 43.0	*+49.2*	•149.2	86 49.0	*+55.9*	•158.5	85 52.2	+58.1	163.5	84 54.2	+59.0	166.7	83 55.6	+59.4	168.9	82 56.5	+59.7	170.4	81 57.3	+59.7	171.6	80 57.8	+59.9	172.5	73
74	88 32.2	*+25.7*	•131.2	87 44.9	*+50.2*	•150.7	86 50.3	*+56.5*	•159.6	85 53.2	+58.4	164.5	84 55.0	+59.1	167.5	83 56.2	+59.5	169.5	82 57.0	+59.8	171.0	81 57.7	+59.8	172.1	74
75	88 57.9	*−22.8*	• 88.1	88 35.1	*+26.8*	•133.0	87 46.8	*+51.1*	•152.2	86 51.6	*+56.9*	•160.8	85 54.1	+58.7	165.4	84 55.7	+59.3	168.2	83 56.8	+59.6	170.1	82 57.5	+59.8	171.5	75
76	88 35.1	*−48.3*	• 43.1	89 01.9	*−24.0*	• 88.1	88 37.9	*+28.1*	•135.0	87 48.5	*+52.2*	•153.8	86 52.8	*+57.3*	•161.9	85 55.0	+58.9	166.3	84 56.4	+59.4	169.0	83 57.3	+59.7	170.8	76
77	87 46.8	*−55.2*	• 23.9	88 37.9	*−49.4*	• 41.1	89 06.0	*−25.3*	• 88.1	88 40.7	*+29.4*	•137.2	87 50.1	*+53.2*	•155.5	86 53.9	*+57.7*	•163.1	85 55.8	+59.1	167.2	84 57.0	+59.6	169.7	77
78	86 51.6	−57.5	15.4	87 48.5	*−55.7*	• 22.3	88 40.7	*−50.6*	• 38.9	89 10.1	*−26.8*	• 88.0	88 43.3	*+30.9*	•139.5	87 51.6	*+54.2*	•157.1	86 54.9	*+58.1*	•164.4	85 56.6	+59.2	168.2	78
79	85 54.1	−58.4	10.7	86 52.8	−57.8	14.2	87 50.1	*−56.2*	• 20.6	88 43.3	*−51.7*	• 36.6	89 14.2	*−28.4*	• 88.0	88 45.8	*+32.5*	•141.9	87 53.0	*+55.1*	•158.9	86 55.8	+58.5	165.6	79
80	84 55.7	−58.9	7.9	85 55.0	−58.6	9.8	86 53.9	−58.1	12.9	87 51.6	*−56.7*	• 18.9	88 45.8	*−52.8*	• 34.1	89 18.3	*−30.2*	• 88.0	88 48.1	*+34.4*	•144.6	87 54.3	*+56.0*	•160.6	80
81	83 56.8	−59.3	5.9	84 56.4	−59.1	7.1	85 55.8	−58.8	8.8	86 54.9	−58.3	11.7	87 53.0	*−57.2*	• 17.2	88 48.1	*−53.8*	• 31.5	89 22.5	*−32.2*	• 88.0	88 50.3	*+36.3*	•147.4	81
82	82 57.5	−59.4	4.5	83 57.3	−59.3	5.3	84 57.0	−59.2	6.3	85 56.6	−59.0	7.9	86 55.8	−58.6	10.4	87 54.3	*−57.7*	• 15.4	88 50.3	*−54.8*	• 28.6	89 26.6	*−34.3*	• 88.0	82
83	81 58.1	−59.5	3.5	82 58.0	−59.5	4.0	83 57.8	−59.4	4.6	84 57.6	−59.3	5.6	85 57.2	−59.1	6.9	86 56.6	−58.8	9.2	87 55.5	*−58.1*	• 13.6	88 52.3	*−55.7*	• 25.6	83
84	80 58.6	−59.7	2.7	81 58.5	−59.6	3.0	82 58.4	−59.6	3.4	83 58.3	−59.5	4.0	84 58.1	−59.4	4.8	85 57.8	−59.3	5.9	86 57.4	−59.0	7.9	87 56.6	−58.5	11.7	84
85	79 58.9	−59.7	2.0	80 58.9	−59.7	2.2	81 58.8	−59.6	2.5	82 58.8	−59.7	2.9	83 58.7	−59.6	3.3	84 58.5	−59.5	4.0	85 58.4	−59.4	5.0	86 58.1	−59.3	6.6	85
86	78 59.2	−59.7	1.5	79 59.2	−59.8	1.6	80 59.2	−59.8	1.8	81 59.1	−59.7	2.0	82 59.1	−59.7	2.3	83 59.0	−59.6	2.7	84 59.0	−59.7	3.2	85 58.8	−59.5	4.0	86
87	77 59.5	−59.8	1.0	78 59.4	−59.7	1.1	79 59.4	−59.7	1.2	80 59.4	−59.7	1.3	81 59.4	−59.8	1.5	82 59.4	−59.8	1.7	83 59.3	−59.7	2.0	84 59.3	−59.7	2.4	87
88	76 59.7	−59.9	0.6	77 59.7	−59.9	0.7	78 59.7	−59.9	0.7	79 59.7	−59.9	0.8	80 59.6	−59.8	0.9	81 59.6	−59.8	1.0	82 59.6	−59.8	1.1	83 59.6	−59.8	1.3	88
89	75 59.8	−59.8	0.3	76 59.8	−59.8	0.3	77 59.8	−59.8	0.3	78 59.8	−59.8	0.4	79 59.8	−59.8	0.4	80 59.8	−59.8	0.4	81 59.8	−59.8	0.5	82 59.8	−59.8	0.6	89
90	75 00.0	−59.9	0.0	76 00.0	−59.9	0.0	77 00.0	−59.9	0.0	78 00.0	−59.9	0.0	79 00.0	−59.9	0.0	80 00.0	−59.9	0.0	81 00.0	−59.9	0.0	82 00.0	−59.9	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION **L.H.A. 4°, 356°**

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 57.8	−60.0	175.9	13 57.9	−60.0	175.9	12 58.1	−60.0	175.9	11 58.2	−60.0	175.9	10 58.4	−60.0	175.9	9 58.5	−60.0	175.9	8 58.7	−60.0	176.0	7 58.8	−60.0	176.0	**0**
1	13 57.8	−60.0	175.9	12 57.9	−60.0	175.9	11 58.1	−60.0	175.9	10 58.2	−60.0	175.9	9 58.4	−60.0	175.9	8 58.5	−60.0	176.0	7 58.7	−60.0	176.0	6 58.8	−60.0	176.0	**1**
2	12 57.8	−60.0	175.9	11 57.9	−60.0	175.9	10 58.1	−60.0	175.9	9 58.2	−60.0	175.9	8 58.4	−60.0	176.0	7 58.5	−60.0	176.0	6 58.7	−60.0	176.0	5 58.8	−60.0	176.0	**2**
3	11 57.8	−60.0	175.9	10 57.9	−60.0	175.9	9 58.1	−60.0	175.9	8 58.2	−60.0	176.0	7 58.4	−60.0	176.0	6 58.5	−60.0	176.0	5 58.7	−60.0	176.0	4 58.8	−60.0	176.0	**3**
4	10 57.8	−60.0	175.9	9 57.9	−59.9	175.9	8 58.1	−60.0	176.0	7 58.2	−59.9	176.0	6 58.4	−60.0	176.0	5 58.5	−60.0	176.0	4 58.7	−60.0	176.0	3 58.8	−60.0	176.0	**4**
5	9 57.8	−60.0	176.0	8 58.0	−60.0	176.0	7 58.1	−60.0	176.0	6 58.3	−60.0	176.0	5 58.4	−60.0	176.0	4 58.5	−59.9	176.0	3 58.7	−60.0	176.0	2 58.8	−60.0	176.0	**5**
6	8 57.8	−60.0	176.0	7 58.0	−60.0	176.0	6 58.1	−60.0	176.0	5 58.3	−60.0	176.0	4 58.4	−60.0	176.0	3 58.6	−60.0	176.0	2 58.7	−60.0	176.0	1 58.8	−60.0	176.0	**6**
7	7 57.8	−60.0	176.0	6 58.0	−60.0	176.0	5 58.1	−60.0	176.0	4 58.3	−60.0	176.0	3 58.4	−60.0	176.0	2 58.6	−60.0	176.0	1 58.7	−60.0	176.0	0 58.8	−60.0	176.0	**7**
8	6 57.8	−60.0	176.0	5 58.0	−60.0	176.0	4 58.1	−60.0	176.0	3 58.3	−60.0	176.0	2 58.4	−60.0	176.0	1 58.6	−60.0	176.0	0 58.7	−60.0	176.0	0 01.2	+60.0	4.0	**8**
9	5 57.8	−59.9	176.0	4 58.0	−60.0	176.0	3 58.1	−60.0	176.0	2 58.3	−60.0	176.0	1 58.4	−60.0	176.0	0 58.6	−60.0	176.0	0 01.3	+60.0	4.0	1 01.2	+59.9	4.0	**9**
10	4 57.9	−60.0	176.0	3 58.0	−60.0	176.1	2 58.1	−60.0	176.1	1 58.3	−60.0	176.1	0 58.4	−60.0	176.1	0 01.4	+60.0	3.9	1 01.3	+60.0	3.9	2 01.1	+60.0	3.9	**10**
11	3 57.9	−60.0	176.1	2 58.0	−60.0	176.1	1 58.1	−59.9	176.1	0 58.3	−60.0	176.1	0 01.6	+60.0	3.9	1 01.4	+60.0	3.9	2 01.3	+60.0	3.9	3 01.1	+60.0	3.9	**11**
12	2 57.9	−60.0	176.1	1 58.0	−60.0	176.1	0 58.2	−60.0	176.1	0 01.7	+60.0	3.9	1 01.6	+60.0	3.9	2 01.4	+60.0	3.9	3 01.3	+60.0	3.9	4 01.1	+60.0	3.9	**12**
13	1 57.9	−60.0	176.1	0 58.0	−60.0	176.1	0 01.8	+60.0	3.9	1 01.7	+60.0	3.9	2 01.6	+60.0	3.9	3 01.4	+60.0	3.9	4 01.3	+60.0	3.9	5 01.1	+60.0	3.9	**13**
14	0 57.9	−60.0	176.1	0 02.0	+60.0	3.9	1 01.8	+60.0	3.9	2 01.7	+60.0	3.9	3 01.6	+59.9	3.9	4 01.4	+60.0	3.9	5 01.3	+60.0	3.9	6 01.1	+60.0	3.9	**14**
15	0 02.1	+60.0	3.9	1 02.0	+59.9	3.9	2 01.8	+60.0	3.9	3 01.7	+60.0	3.9	4 01.5	+60.0	3.9	5 01.4	+60.0	3.9	6 01.3	+60.0	3.9	7 01.1	+60.0	3.9	**15**
16	1 02.1	+60.0	3.8	2 01.9	+60.0	3.8	3 01.8	+60.0	3.9	4 01.7	+60.0	3.9	5 01.5	+60.0	3.9	6 01.4	+60.0	3.9	7 01.3	+60.0	3.9	8 01.1	+60.0	3.9	**16**
17	2 02.1	+60.0	3.8	3 01.9	+60.0	3.8	4 01.8	+60.0	3.8	5 01.7	+60.0	3.8	6 01.5	+60.0	3.8	7 01.4	+60.0	3.9	8 01.3	+60.0	3.9	9 01.1	+60.0	3.9	**17**
18	3 02.1	+60.0	3.8	4 01.9	+60.0	3.8	5 01.8	+60.0	3.8	6 01.7	+60.0	3.8	7 01.5	+60.0	3.8	8 01.4	+60.0	3.8	9 01.3	+60.0	3.9	10 01.1	+60.0	3.9	**18**
19	4 02.1	+59.9	3.8	5 01.9	+60.0	3.8	6 01.8	+60.0	3.8	7 01.7	+60.0	3.8	8 01.5	+60.0	3.8	9 01.4	+60.0	3.8	10 01.3	+60.0	3.8	11 01.1	+60.0	3.9	**19**
20	5 02.0	+60.0	3.8	6 01.9	+60.0	3.8	7 01.8	+60.0	3.8	8 01.7	+59.9	3.8	9 01.5	+60.0	3.8	10 01.4	+60.0	3.8	11 01.3	+60.0	3.8	12 01.1	+60.0	3.8	**20**
21	6 02.0	+60.0	3.8	7 01.9	+60.0	3.8	8 01.8	+60.0	3.8	9 01.6	+60.0	3.8	10 01.5	+60.0	3.8	11 01.4	+60.0	3.8	12 01.3	+59.9	3.8	13 01.1	+60.0	3.8	**21**
22	7 02.0	+60.0	3.7	8 01.9	+60.0	3.7	9 01.8	+60.0	3.8	10 01.6	+60.0	3.8	11 01.5	+60.0	3.8	12 01.4	+60.0	3.8	13 01.2	+60.0	3.8	14 01.1	+60.0	3.8	**22**
23	8 02.0	+60.0	3.7	9 01.9	+60.0	3.7	10 01.8	+60.0	3.7	11 01.6	+60.0	3.8	12 01.5	+60.0	3.8	13 01.4	+60.0	3.8	14 01.2	+60.0	3.8	15 01.1	+60.0	3.8	**23**
24	9 02.0	+60.0	3.7	10 01.9	+60.0	3.7	11 01.8	+59.9	3.7	12 01.6	+60.0	3.7	13 01.5	+60.0	3.8	14 01.4	+60.0	3.8	15 01.2	+60.0	3.8	16 01.1	+60.0	3.8	**24**
25	10 02.0	+60.0	3.7	11 01.9	+60.0	3.7	12 01.7	+60.0	3.7	13 01.6	+60.0	3.7	14 01.5	+60.0	3.7	15 01.4	+60.0	3.8	16 01.2	+60.0	3.8	17 01.1	+60.0	3.8	**25**
26	11 02.0	+60.0	3.7	12 01.9	+60.0	3.7	13 01.7	+60.0	3.7	14 01.6	+60.0	3.7	15 01.5	+60.0	3.7	16 01.4	+60.0	3.7	17 01.2	+60.0	3.8	18 01.1	+60.0	3.8	**26**
27	12 02.0	+60.0	3.6	13 01.9	+59.9	3.7	14 01.7	+60.0	3.7	15 01.6	+60.0	3.7	16 01.5	+60.0	3.7	17 01.4	+60.0	3.7	18 01.2	+60.0	3.7	19 01.1	+60.0	3.8	**27**
28	13 02.0	+60.0	3.6	14 01.8	+60.0	3.6	15 01.7	+60.0	3.7	16 01.6	+60.0	3.7	17 01.5	+60.0	3.7	18 01.4	+59.9	3.7	19 01.2	+60.0	3.7	20 01.1	+60.0	3.8	**28**
29	14 02.0	+59.9	3.6	15 01.8	+60.0	3.6	16 01.7	+60.0	3.6	17 01.6	+60.0	3.7	18 01.5	+60.0	3.7	19 01.3	+60.0	3.7	20 01.2	+60.0	3.7	21 01.1	+60.0	3.7	**29**
30	15 01.9	+60.0	3.6	16 01.8	+60.0	3.6	17 01.7	+60.0	3.6	18 01.6	+60.0	3.6	19 01.5	+60.0	3.7	20 01.3	+60.0	3.7	21 01.2	+60.0	3.7	22 01.1	+60.0	3.7	**30**
31	16 01.9	+60.0	3.6	17 01.8	+60.0	3.6	18 01.7	+60.0	3.6	19 01.6	+60.0	3.6	20 01.5	+60.0	3.6	21 01.3	+60.0	3.7	22 01.2	+60.0	3.7	23 01.1	+60.0	3.7	**31**
32	17 01.9	+60.0	3.5	18 01.8	+60.0	3.6	19 01.7	+60.0	3.6	20 01.6	+60.0	3.6	21 01.5	+59.9	3.6	22 01.3	+60.0	3.7	23 01.2	+60.0	3.7	24 01.1	+60.0	3.7	**32**
33	18 01.9	+60.0	3.5	19 01.8	+60.0	3.5	20 01.7	+60.0	3.6	21 01.6	+60.0	3.6	22 01.4	+60.0	3.6	23 01.3	+60.0	3.6	24 01.2	+60.0	3.7	25 01.1	+60.0	3.7	**33**
34	19 01.9	+60.0	3.5	20 01.8	+60.0	3.5	21 01.7	+60.0	3.6	22 01.6	+59.9	3.6	23 01.4	+60.0	3.6	24 01.3	+60.0	3.6	25 01.2	+60.0	3.7	26 01.1	+60.0	3.7	**34**
35	20 01.9	+60.0	3.5	21 01.8	+60.0	3.5	22 01.7	+60.0	3.5	23 01.5	+60.0	3.6	24 01.4	+60.0	3.6	25 01.3	+60.0	3.6	26 01.2	+60.0	3.6	27 01.1	+60.0	3.7	**35**
36	21 01.9	+60.0	3.5	22 01.8	+60.0	3.5	23 01.7	+59.9	3.5	24 01.5	+60.0	3.5	25 01.4	+60.0	3.6	26 01.3	+60.0	3.6	27 01.2	+60.0	3.6	28 01.1	+60.0	3.7	**36**
37	22 01.9	+60.0	3.4	23 01.8	+59.9	3.5	24 01.6	+60.0	3.5	25 01.5	+60.0	3.5	26 01.4	+60.0	3.6	27 01.3	+60.0	3.6	28 01.2	+60.0	3.6	29 01.1	+60.0	3.7	**37**
38	23 01.9	+59.9	3.4	24 01.7	+60.0	3.5	25 01.6	+60.0	3.5	26 01.5	+60.0	3.5	27 01.4	+60.0	3.5	28 01.3	+60.0	3.6	29 01.2	+60.0	3.6	30 01.1	+60.0	3.6	**38**
39	24 01.8	+60.0	3.4	25 01.7	+60.0	3.4	26 01.6	+60.0	3.5	27 01.5	+60.0	3.5	28 01.4	+60.0	3.5	29 01.3	+60.0	3.6	30 01.2	+60.0	3.6	31 01.1	+60.0	3.6	**39**
40	25 01.8	+60.0	3.4	26 01.7	+60.0	3.4	27 01.6	+60.0	3.4	28 01.5	+60.0	3.5	29 01.4	+60.0	3.5	30 01.3	+60.0	3.5	31 01.2	+60.0	3.6	32 01.1	+59.9	3.6	**40**
41	26 01.8	+60.0	3.4	27 01.7	+60.0	3.4	28 01.6	+60.0	3.4	29 01.5	+60.0	3.5	30 01.4	+60.0	3.5	31 01.3	+60.0	3.5	32 01.2	+60.0	3.6	33 01.0	+60.0	3.6	**41**
42	27 01.8	+60.0	3.3	28 01.7	+60.0	3.4	29 01.6	+60.0	3.4	30 01.5	+60.0	3.4	31 01.4	+60.0	3.5	32 01.3	+60.0	3.5	33 01.2	+60.0	3.5	34 01.0	+60.0	3.6	**42**
43	28 01.8	+60.0	3.3	29 01.7	+60.0	3.3	30 01.6	+60.0	3.4	31 01.5	+60.0	3.4	32 01.4	+60.0	3.4	33 01.3	+60.0	3.5	34 01.2	+60.0	3.5	35 01.0	+60.0	3.6	**43**
44	29 01.8	+60.0	3.3	30 01.7	+60.0	3.3	31 01.6	+60.0	3.4	32 01.5	+60.0	3.4	33 01.4	+60.0	3.4	34 01.3	+60.0	3.5	35 01.2	+59.9	3.5	36 01.0	+60.0	3.6	**44**
45	30 01.8	+60.0	3.3	31 01.7	+60.0	3.3	32 01.6	+60.0	3.3	33 01.5	+60.0	3.4	34 01.4	+60.0	3.4	35 01.3	+59.9	3.5	36 01.1	+60.0	3.5	37 01.0	+60.0	3.5	**45**
46	31 01.8	+59.9	3.2	32 01.7	+59.9	3.3	33 01.6	+59.9	3.3	34 01.5	+59.9	3.4	35 01.4	+59.9	3.4	36 01.2	+60.0	3.4	37 01.1	+60.0	3.5	38 01.0	+60.0	3.5	**46**
47	32 01.7	+60.0	3.2	33 01.6	+60.0	3.3	34 01.5	+60.0	3.3	35 01.4	+60.0	3.3	36 01.3	+60.0	3.4	37 01.2	+60.0	3.4	38 01.1	+60.0	3.5	39 01.0	+60.0	3.5	**47**
48	33 01.7	+60.0	3.2	34 01.6	+60.0	3.2	35 01.5	+60.0	3.3	36 01.4	+60.0	3.3	37 01.3	+60.0	3.4	38 01.2	+60.0	3.4	39 01.1	+60.0	3.4	40 01.0	+60.0	3.5	**48**
49	34 01.7	+60.0	3.2	35 01.6	+60.0	3.2	36 01.5	+60.0	3.2	37 01.4	+60.0	3.3	38 01.3	+60.0	3.3	39 01.2	+60.0	3.4	40 01.1	+60.0	3.4	41 01.0	+60.0	3.5	**49**
50	35 01.7	+60.0	3.1	36 01.6	+60.0	3.2	37 01.5	+60.0	3.2	38 01.4	+60.0	3.3	39 01.3	+60.0	3.3	40 01.2	+60.0	3.4	41 01.1	+60.0	3.4	42 01.0	+60.0	3.5	**50**
51	36 01.7	+60.0	3.1	37 01.6	+60.0	3.2	38 01.5	+60.0	3.2	39 01.4	+60.0	3.2	40 01.3	+60.0	3.3	41 01.2	+60.0	3.3	42 01.1	+60.0	3.4	43 01.0	+60.0	3.4	**51**
52	37 01.7	+60.0	3.1	38 01.6	+60.0	3.1	39 01.5	+60.0	3.2	40 01.4	+60.0	3.2	41 01.3	+60.0	3.3	42 01.2	+60.0	3.3	43 01.1	+60.0	3.4	44 01.0	+60.0	3.4	**52**
53	38 01.7	+59.9	3.1	39 01.6	+60.0	3.1	40 01.5	+60.0	3.1	41 01.4	+60.0	3.2	42 01.3	+60.0	3.2	43 01.2	+60.0	3.3	44 01.1	+60.0	3.3	45 01.0	+60.0	3.4	**53**
54	39 01.6	+60.0	3.0	40 01.6	+59.9	3.1	41 01.5	+60.0	3.1	42 01.4	+60.0	3.2	43 01.3	+60.0	3.2	44 01.2	+60.0	3.3	45 01.1	+60.0	3.3	46 01.0	+60.0	3.4	**54**
55	40 01.6	+60.0	3.0	41 01.5	+60.0	3.0	42 01.5	+59.9	3.1	43 01.4	+60.0	3.1	44 01.3	+60.0	3.2	45 01.2	+60.0	3.2	46 01.1	+60.0	3.3	47 01.0	+60.0	3.4	**55**
56	41 01.6	+60.0	3.0	42 01.5	+60.0	3.0	43 01.4	+60.0	3.1	44 01.4	+59.9	3.1	45 01.3	+60.0	3.2	46 01.2	+60.0	3.2	47 01.1	+60.0	3.3	48 01.0	+60.0	3.3	**56**
57	42 01.6	+60.0	2.9	43 01.5	+60.0	3.0	44 01.4	+60.0	3.0	45 01.3	+60.0	3.1	46 01.3	+59.9	3.1	47 01.2	+60.0	3.2	48 01.1	+60.0	3.3	49 01.0	+60.0	3.3	**57**
58	43 01.6	+60.0	2.9	44 01.5	+60.0	2.9	45 01.4	+60.0	3.0	46 01.3	+60.0	3.1	47 01.2	+60.0	3.1	48 01.2	+59.9	3.2	49 01.1	+59.9	3.2	50 01.0	+60.0	3.3	**58**
59	44 01.6	+59.9	2.9	45 01.5	+60.0	2.9	46 01.4	+60.0	3.0	47 01.3	+60.0	3.0	48 01.2	+60.0	3.1	49 01.1	+60.0	3.1	50 01.0	+60.0	3.2	51 01.0	+59.9	3.3	**59**
60	45 01.5	+60.0	2.8	46 01.5	+59.9	2.9	47 01.4	+60.0	2.9	48 01.3	+60.0	3.0	49 01.2	+60.0	3.0	50 01.1	+60.0	3.1	51 01.0	+60.0	3.2	52 00.9	+60.0	3.2	**60**
61	46 01.5	+60.0	2.8	47 01.4	+60.0	2.8	48 01.4	+59.9	2.9	49 01.3	+60.0	3.0	50 01.2	+60.0	3.0	51 01.1	+60.0	3.1	52 01.0	+60.0	3.2	53 00.9	+60.0	3.2	**61**
62	47 01.5	+60.0	2.8	48 01.4	+60.0	2.8	49 01.3	+60.0	2.9	50 01.3	+60.0	2.9	51 01.2	+60.0	3.0	52 01.1	+60.0	3.1	53 01.0	+60.0	3.1	54 00.9	+60.0	3.2	**62**
63	48 01.5	+59.9	2.7	49 01.4	+60.0	2.8	50 01.3	+60.0	2.8	51 01.3	+59.9	2.9	52 01.2	+60.0	2.9	53 01.1	+60.0	3.0	54 01.0	+60.0	3.1	55 00.9	+60.0	3.2	**63**
64	49 01.4	+60.0	2.7	50 01.4	+60.0	2.7	51 01.3	+60.0	2.8	52 01.2	+60.0	2.8	53 01.2	+59.9	2.9	54 01.1	+60.0	3.0	55 01.0	+60.0	3.1	56 00.9	+60.0	3.1	**64**
65	50 01.4	+60.0	2.6	51 01.4	+59.9	2.7	52 01.3	+60.0	2.7	53 01.2	+60.0	2.8	54 01.1	+60.0	2.9	55 01.1	+60.0	2.9	56 01.0	+60.0	3.0	57 00.9	+60.0	3.1	**65**
66	51 01.4	+60.0	2.6	52 01.3	+60.0	2.6	53 01.3	+60.0	2.7	54 01.2	+60.0	2.8	55 01.1	+60.0	2.8	56 01.1	+59.9	2.9	57 01.0	+60.0	3.0	58 00.9	+60.0	3.1	**66**
67	52 01.4	+59.9	2.5	53 01.3	+60.0	2.6	54 01.3	+59.9	2.7	55 01.2	+60.0	2.7	56 01.1	+60.0	2.8	57 01.0	+60.0	2.9	58 01.0	+60.0	2.9	59 00.9	+60.0	3.0	**67**
68	53 01.3	+60.0	2.5	54 01.3	+60.0	2.5	55 01.2	+60.0	2.6	56 01.2	+59.9	2.7	57 01.1	+60.0	2.8	58 01.0	+60.0	2.8	59 01.0	+59.9	2.9	60 00.9	+60.0	3.0	**68**
69	54 01.3	+60.0	2.4	55 01.3	+59.9	2.5	56 01.2	+60.0	2.6	57 01.1	+60.0	2.6	58 01.1	+60.0	2.7	59 01.0	+60.0	2.8	60 00.9	+60.0	2.9	61 00.9	+59.9	3.0	**69**
70	55 01.3	+60.0	2.4	56 01.2	+60.0	2.4	57 01.2	+60.0	2.5	58 01.1	+60.0	2.6	59 01.1	+59.9	2.7	60 01.0	+60.0	2.7	61 00.9	+60.0	2.8	62 00.8	+60.0	2.9	**70**
71	56 01.3	+59.9	2.3	57 01.2	+60.0	2.4	58 01.2	+59.9	2.5	59 01.1	+60.0	2.5	60 01.0	+60.0	2.6	61 01.0	+60.0	2.7	62 00.9	+60.0	2.8	63 00.8	+60.0	2.9	**71**
72	57 01.2	+60.0	2.3	58 01.2	+60.0	2.3	59 01.1	+60.0	2.4	60 01.1	+60.0	2.5	61 01.0	+60.0	2.5	62 01.0	+59.9	2.6	63 00.9	+60.0	2.7	64 00.8	+60.0	2.8	**72**
73	58 01.2	+60.0	2.2	59 01.2	+59.9	2.3	60 01.1	+60.0	2.3	61 01.1	+59.9	2.4	62 01.0	+60.0	2.5	63 00.9	+60.0	2.6	64 00.9	+60.0	2.7	65 00.8	+60.0	2.8	**73**
74	59 01.2	+59.9	2.1	60 01.1	+60.0	2.2	61 01.1	+59.9	2.3	62 01.0	+60.0	2.3	63 01.0	+59.9	2.4	64 00.9	+60.0	2.5	65 00.9	+59.9	2.6	66 00.8	+60.0	2.7	**74**
75	60 01.1	+60.0	2.1	61 01.1	+59.9	2.1	62 01.0	+60.0	2.2	63 01.0	+60.0	2.3	64 00.9	+60.0	2.4	65 00.9	+60.0	2.4	66 00.8	+60.0	2.5	67 00.8	+60.0	2.6	**75**
76	61 01.1	+59.9	2.0	62 01.0	+60.0	2.1	63 01.0	+60.0	2.1	64 01.0	+59.9	2.2	65 00.9	+60.0	2.3	66 00.9	+59.9	2.4	67 00.8	+60.0	2.5	68 00.8	+59.9	2.6	**76**
77	62 01.0	+60.0	1.9	63 01.0	+60.0	2.0	64 01.0	+59.9	2.1	65 00.9	+60.0	2.1	66 00.9	+60.0	2.2	67 00.8	+60.0	2.3	68 00.8	+60.0	2.4	69 00.7	+60.0	2.5	**77**
78	63 01.0	+59.9	1.8	64 01.0	+59.9	1.9	65 00.9	+60.0	2.0	66 00.9	+60.0	2.0	67 00.9	+59.9	2.1	68 00.8	+60.0	2.2	69 00.8	+59.9	2.3	70 00.7	+60.0	2.4	**78**
79	64 00.9	+60.0	1.7	65 00.9	+60.0	1.8	66 00.9	+59.9	1.9	67 00.9	+59.9	2.0	68 00.8	+60.0	2.0	69 00.8	+59.9	2.1	70 00.7	+60.0	2.2	71 00.7	+60.0	2.3	**79**
80	65 00.9	+59.9	1.6	66 00.9	+59.9	1.7	67 00.8	+60.0	1.8	68 00.8	+60.0	1.9	69 00.8	+59.9	1.9	70 00.7	+60.0	2.0	71 00.7	+60.0	2.1	72 00.7	+59.9	2.2	**80**
81	66 00.8	+60.0	1.5	67 00.8	+60.0	1.6	68 00.8	+59.9	1.7	69 00.8	+59.9	1.7	70 00.7	+60.0	1.8	71 00.7	+60.0	1.9	72 00.7	+59.9	2.0	73 00.6	+60.0	2.1	**81**
82	67 00.8	+59.9	1.4	68 00.8	+59.9	1.5	69 00.7	+60.0	1.6	70 00.7	+60.0	1.6	71 00.7	+59.9	1.7	72 00.7	+59.9	1.8	73 00.6	+60.0	1.9	74 00.6	+59.9	2.0	**82**
83	68 00.7	+59.9	1.3	69 00.7	+59.9	1.4	70 00.7	+59.9	1.4	71 00.7	+59.9	1.5	72 00.6	+60.0	1.6	73 00.6	+60.0	1.7	74 00.6	+59.9	1.8	75 00.5	+60.0	1.9	**83**
84	69 00.6	+60.0	1.2	70 00.6	+59.9	1.2	71 00.6	+59.9	1.3	72 00.6	+59.9	1.4	73 00.6	+59.9	1.4	74 00.6	+59.9	1.5	75 00.5	+60.0	1.6	76 00.5	+60.0	1.7	**84**
85	70 00.6	+59.9	1.0	71 00.5	+60.0	1.1	72 00.5	+59.9	1.1	73 00.5	+59.9	1.2	74 00.5	+59.9	1.3	75 00.5	+59.9	1.3	76 00.5	+59.9	1.4	77 00.5	+59.9	1.5	**85**
86	71 00.5	+59.9	0.9	72 00.5	+59.9	0.9	73 00.4	+60.0	1.0	74 00.4	+60.0	1.0	75 00.4	+59.9	1.1	76 00.4	+59.9	1.2	77 00.4	+59.9	1.2	78 00.4	+59.9	1.3	**86**
87	72 00.4	+59.9	0.7	73 00.4	+59.9	0.7	74 00.4	+59.9	0.8	75 00.4	+59.9	0.8	76 00.3	+59.9	0.9	77 00.3	+59.9	0.9	78 00.3	+59.9	1.0	79 00.3	+59.9	1.1	**87**
88	73 00.3	+59.8	0.5	74 00.3	+59.8	0.5	75 00.3	+59.8	0.5	76 00.3	+59.8	0.6	77 00.2	+59.9	0.6	78 00.2	+59.9	0.7	79 00.2	+59.9	0.7	80 00.2	+59.9	0.8	**88**
89	74 00.1	+59.9	0.3	75 00.1	+59.9	0.3	76 00.1	+59.9	0.3	77 00.1	+59.9	0.3	78 00.1	+59.9	0.3	79 00.1	+59.9	0.4	80 00.1	+59.9	0.4	81 00.1	+59.9	0.4	**89**
90	75 00.0	+59.8	0.0	76 00.0	+59.8	0.0	77 00.0	+59.8	0.0	78 00.0	+59.8	0.0	79 00.0	+59.8	0.0	80 00.0	+59.8	0.0	81 00.0	+59.8	0.0	82 00.0	+59.8	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION **L.H.A. 176°, 184°**

5°, 355° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 56.5	+60.0	174.8	13 56.7	+60.0	174.8	12 57.0	+60.0	174.9	11 57.2	+60.0	174.9	10 57.5	+59.9	174.9	9 57.7	+60.0	174.9	8 57.9	+60.0	174.9	7 58.2	+60.0	175.0	**0**
1	15 56.5	+60.0	174.8	14 56.7	+60.0	174.8	13 57.0	+60.0	174.8	12 57.2	+60.0	174.9	11 57.4	+60.0	174.9	10 57.7	+60.0	174.9	9 57.9	+60.0	174.9	8 58.2	+60.0	174.9	**1**
2	16 56.5	+59.9	174.8	15 56.7	+60.0	174.8	14 57.0	+59.9	174.8	13 57.2	+60.0	174.9	12 57.4	+60.0	174.9	11 57.7	+60.0	174.9	10 57.9	+60.0	174.9	9 58.2	+59.9	174.9	**2**
3	17 56.4	+60.0	174.8	16 56.7	+60.0	174.8	15 56.9	+60.0	174.8	14 57.2	+60.0	174.8	13 57.4	+60.0	174.9	12 57.7	+60.0	174.9	11 57.9	+60.0	174.9	10 58.1	+60.0	174.9	**3**
4	18 56.4	+60.0	174.7	17 56.7	+60.0	174.8	16 56.9	+60.0	174.8	15 57.2	+60.0	174.8	14 57.4	+60.0	174.8	13 57.7	+60.0	174.9	12 57.9	+60.0	174.9	11 58.1	+60.0	174.9	**4**
5	19 56.4	+60.0	174.7	18 56.7	+60.0	174.7	17 56.9	+60.0	174.8	16 57.2	+60.0	174.8	15 57.4	+60.0	174.8	14 57.7	+60.0	174.8	13 57.9	+60.0	174.9	12 58.1	+60.0	174.9	**5**
6	20 56.4	+60.0	174.7	19 56.7	+59.9	174.7	18 56.9	+60.0	174.7	17 57.2	+59.9	174.8	16 57.4	+60.0	174.8	15 57.7	+59.9	174.8	14 57.9	+60.0	174.9	13 58.1	+60.0	174.9	**6**
7	21 56.4	+60.0	174.6	20 56.6	+60.0	174.7	19 56.9	+60.0	174.7	18 57.1	+60.0	174.8	17 57.4	+60.0	174.8	16 57.6	+60.0	174.8	15 57.9	+60.0	174.8	14 58.1	+60.0	174.9	**7**
8	22 56.4	+59.9	174.6	21 56.6	+60.0	174.7	20 56.9	+60.0	174.7	19 57.1	+60.0	174.7	18 57.4	+60.0	174.8	17 57.6	+60.0	174.8	16 57.9	+60.0	174.8	15 58.1	+60.0	174.8	**8**
9	23 56.3	+60.0	174.6	22 56.6	+60.0	174.6	21 56.9	+60.0	174.7	20 57.1	+60.0	174.7	19 57.4	+60.0	174.7	18 57.6	+60.0	174.8	17 57.9	+60.0	174.8	16 58.1	+60.0	174.8	**9**
10	24 56.3	+60.0	174.6	23 56.6	+60.0	174.6	22 56.9	+59.9	174.7	21 57.1	+60.0	174.7	20 57.4	+60.0	174.7	19 57.6	+60.0	174.8	18 57.9	+60.0	174.8	17 58.1	+60.0	174.8	**10**
11	25 56.3	+60.0	174.5	24 56.6	+60.0	174.6	23 56.8	+60.0	174.6	22 57.1	+60.0	174.7	21 57.4	+59.9	174.7	20 57.6	+60.0	174.7	19 57.9	+60.0	174.8	18 58.1	+60.0	174.8	**11**
12	26 56.3	+60.0	174.5	25 56.6	+59.9	174.6	24 56.8	+60.0	174.6	23 57.1	+60.0	174.6	22 57.3	+60.0	174.7	21 57.6	+60.0	174.7	20 57.9	+59.9	174.8	19 58.1	+60.0	174.8	**12**
13	27 56.3	+59.9	174.5	26 56.5	+60.0	174.5	25 56.8	+60.0	174.6	24 57.1	+60.0	174.6	23 57.3	+60.0	174.7	22 57.6	+60.0	174.7	21 57.8	+60.0	174.7	20 58.1	+60.0	174.8	**13**
14	28 56.2	+60.0	174.5	27 56.5	+60.0	174.5	26 56.8	+60.0	174.6	25 57.1	+60.0	174.6	24 57.3	+60.0	174.6	23 57.6	+60.0	174.7	22 57.8	+60.0	174.7	21 58.1	+60.0	174.8	**14**
15	29 56.2	+60.0	174.4	28 56.5	+60.0	174.5	27 56.8	+60.0	174.5	26 57.1	+59.9	174.6	25 57.3	+60.0	174.6	24 57.6	+60.0	174.7	23 57.8	+60.0	174.7	22 58.1	+60.0	174.8	**15**
16	30 56.2	+60.0	174.4	29 56.5	+60.0	174.5	28 56.8	+60.0	174.5	27 57.0	+60.0	174.6	26 57.3	+60.0	174.6	25 57.6	+60.0	174.7	24 57.8	+60.0	174.7	23 58.1	+60.0	174.7	**16**
17	31 56.2	+60.0	174.4	30 56.5	+60.0	174.4	29 56.8	+59.9	174.5	28 57.0	+60.0	174.5	27 57.3	+60.0	174.6	26 57.6	+60.0	174.6	25 57.8	+60.0	174.7	24 58.1	+60.0	174.7	**17**
18	32 56.2	+59.9	174.3	31 56.5	+59.9	174.4	30 56.7	+60.0	174.5	29 57.0	+60.0	174.5	28 57.3	+60.0	174.6	27 57.6	+59.9	174.6	26 57.8	+60.0	174.7	25 58.1	+60.0	174.7	**18**
19	33 56.1	+60.0	174.3	32 56.4	+60.0	174.4	31 56.7	+60.0	174.4	30 57.0	+60.0	174.5	29 57.3	+60.0	174.5	28 57.5	+60.0	174.6	27 57.8	+60.0	174.6	26 58.1	+60.0	174.7	**19**
20	34 56.1	+60.0	174.3	33 56.4	+60.0	174.3	32 56.7	+60.0	174.4	31 57.0	+60.0	174.5	30 57.3	+60.0	174.5	29 57.5	+60.0	174.6	28 57.8	+60.0	174.6	27 58.1	+60.0	174.7	**20**
21	35 56.1	+60.0	174.2	34 56.4	+60.0	174.3	33 56.7	+60.0	174.4	32 57.0	+60.0	174.4	31 57.3	+59.9	174.5	30 57.5	+60.0	174.6	29 57.8	+60.0	174.6	28 58.1	+60.0	174.7	**21**
22	36 56.1	+59.9	174.2	35 56.4	+60.0	174.3	34 56.7	+60.0	174.3	33 57.0	+59.9	174.4	32 57.2	+60.0	174.5	31 57.5	+60.0	174.5	30 57.8	+60.0	174.6	29 58.1	+59.9	174.6	**22**
23	37 56.0	+60.0	174.2	36 56.4	+59.9	174.2	35 56.7	+59.9	174.3	34 56.9	+60.0	174.4	33 57.2	+60.0	174.4	32 57.5	+60.0	174.5	31 57.8	+60.0	174.6	30 58.0	+60.0	174.6	**23**
24	38 56.0	+60.0	174.1	37 56.3	+60.0	174.2	36 56.6	+60.0	174.3	35 56.9	+60.0	174.4	34 57.2	+60.0	174.4	33 57.5	+60.0	174.5	32 57.8	+60.0	174.6	31 58.0	+60.0	174.6	**24**
25	39 56.0	+60.0	174.1	38 56.3	+60.0	174.2	37 56.6	+60.0	174.3	36 56.9	+60.0	174.3	35 57.2	+60.0	174.4	34 57.5	+60.0	174.5	33 57.8	+60.0	174.5	32 58.0	+60.0	174.6	**25**
26	40 56.0	+59.9	174.0	39 56.3	+60.0	174.1	38 56.6	+60.0	174.2	37 56.9	+60.0	174.3	36 57.2	+60.0	174.4	35 57.5	+60.0	174.4	34 57.8	+59.9	174.5	33 58.0	+60.0	174.6	**26**
27	41 55.9	+60.0	174.0	40 56.3	+59.9	174.1	39 56.6	+60.0	174.2	38 56.9	+60.0	174.3	37 57.2	+60.0	174.3	36 57.5	+60.0	174.4	35 57.7	+60.0	174.5	34 58.0	+60.0	174.6	**27**
28	42 55.9	+60.0	174.0	41 56.2	+60.0	174.1	40 56.6	+59.9	174.2	39 56.9	+59.9	174.2	38 57.2	+60.0	174.3	37 57.5	+59.9	174.4	36 57.7	+60.0	174.5	35 58.0	+60.0	174.5	**28**
29	43 55.9	+60.0	173.9	42 56.2	+60.0	174.0	41 56.5	+60.0	174.1	40 56.8	+60.0	174.2	39 57.2	+59.9	174.3	38 57.4	+60.0	174.4	37 57.7	+60.0	174.5	36 58.0	+60.0	174.5	**29**
30	44 55.9	+59.9	173.9	43 56.2	+60.0	174.0	42 56.5	+60.0	174.1	41 56.8	+60.0	174.2	40 57.1	+60.0	174.3	39 57.4	+60.0	174.3	38 57.7	+60.0	174.4	37 58.0	+60.0	174.5	**30**
31	45 55.8	+60.0	173.8	44 56.2	+59.9	173.9	43 56.5	+60.0	174.0	42 56.8	+60.0	174.1	41 57.1	+60.0	174.2	40 57.4	+60.0	174.3	39 57.7	+60.0	174.4	38 58.0	+60.0	174.5	**31**
32	46 55.8	+60.0	173.8	45 56.1	+60.0	173.9	44 56.5	+59.9	174.0	43 56.8	+60.0	174.1	42 57.1	+60.0	174.2	41 57.4	+60.0	174.3	40 57.7	+60.0	174.4	39 58.0	+60.0	174.5	**32**
33	47 55.8	+59.9	173.7	46 56.1	+60.0	173.9	45 56.4	+60.0	174.0	44 56.8	+60.0	174.1	43 57.1	+60.0	174.2	42 57.4	+60.0	174.3	41 57.7	+60.0	174.4	40 58.0	+60.0	174.4	**33**
34	48 55.7	+60.0	173.7	47 56.1	+60.0	173.8	46 56.4	+60.0	173.9	45 56.8	+59.9	174.0	44 57.1	+60.0	174.1	43 57.4	+60.0	174.2	42 57.7	+60.0	174.3	41 58.0	+60.0	174.4	**34**
35	49 55.7	+60.0	173.6	48 56.1	+59.9	173.8	47 56.4	+60.0	173.9	46 56.7	+60.0	174.0	45 57.1	+59.9	174.1	44 57.4	+60.0	174.2	43 57.7	+60.0	174.3	42 58.0	+60.0	174.4	**35**
36	50 55.7	+59.9	173.6	49 56.0	+60.0	173.7	48 56.4	+59.9	173.8	47 56.7	+60.0	174.0	46 57.0	+60.0	174.1	45 57.4	+59.9	174.2	44 57.7	+59.9	174.3	43 58.0	+59.9	174.4	**36**
37	51 55.6	+60.0	173.5	50 56.0	+60.0	173.7	49 56.3	+60.0	173.8	48 56.7	+60.0	173.9	47 57.0	+60.0	174.0	46 57.3	+60.0	174.1	45 57.6	+60.0	174.3	44 57.9	+60.0	174.4	**37**
38	52 55.6	+59.9	173.5	51 56.0	+59.9	173.6	50 56.3	+60.0	173.7	49 56.7	+59.9	173.9	48 57.0	+60.0	174.0	47 57.3	+60.0	174.1	46 57.6	+60.0	174.2	45 57.9	+60.0	174.3	**38**
39	53 55.5	+60.0	173.4	52 55.9	+60.0	173.5	51 56.3	+60.0	173.7	50 56.6	+60.0	173.8	49 57.0	+60.0	174.0	48 57.3	+60.0	174.1	47 57.6	+60.0	174.2	46 57.9	+60.0	174.3	**39**
40	54 55.5	+59.9	173.3	53 55.9	+59.9	173.5	52 56.3	+59.9	173.6	51 56.6	+60.0	173.8	50 57.0	+59.9	173.9	49 57.3	+60.0	174.0	48 57.6	+60.0	174.2	47 57.9	+60.0	174.3	**40**
41	55 55.4	+60.0	173.3	54 55.8	+60.0	173.4	53 56.2	+60.0	173.6	52 56.6	+60.0	173.7	51 56.9	+60.0	173.9	50 57.3	+60.0	174.0	49 57.6	+60.0	174.1	48 57.9	+60.0	174.2	**41**
42	56 55.4	+59.9	173.2	55 55.8	+60.0	173.4	54 56.2	+60.0	173.5	53 56.6	+59.9	173.7	52 56.9	+60.0	173.8	51 57.3	+59.9	174.0	50 57.6	+60.0	174.1	49 57.9	+60.0	174.2	**42**
43	57 55.3	+60.0	173.1	56 55.8	+59.9	173.3	55 56.2	+59.9	173.5	54 56.5	+60.0	173.6	53 56.9	+60.0	173.8	52 57.2	+60.0	173.9	51 57.6	+60.0	174.1	50 57.9	+60.0	174.2	**43**
44	58 55.3	+59.9	173.0	57 55.7	+60.0	173.2	56 56.1	+60.0	173.4	55 56.5	+60.0	173.6	54 56.9	+59.9	173.7	53 57.2	+60.0	173.9	52 57.6	+59.9	174.0	51 57.9	+60.0	174.2	**44**
45	59 55.2	+60.0	172.9	58 55.7	+59.9	173.1	57 56.1	+59.9	173.3	56 56.5	+59.9	173.5	55 56.8	+60.0	173.7	54 57.2	+60.0	173.8	53 57.5	+60.0	174.0	52 57.9	+59.9	174.1	**45**
46	60 55.2	+59.9	172.8	59 55.6	+60.0	173.1	58 56.0	+60.0	173.3	57 56.4	+60.0	173.5	56 56.8	+60.0	173.6	55 57.2	+60.0	173.8	54 57.5	+60.0	173.9	53 57.8	+60.0	174.1	**46**
47	61 55.1	+59.9	172.7	60 55.6	+59.9	173.0	59 56.0	+59.9	173.2	58 56.4	+60.0	173.4	57 56.8	+60.0	173.6	56 57.2	+59.9	173.7	55 57.5	+60.0	173.9	54 57.8	+60.0	174.1	**47**
48	62 55.0	+59.9	172.6	61 55.5	+59.9	172.9	60 55.9	+60.0	173.1	59 56.4	+59.9	173.3	58 56.8	+59.9	173.5	57 57.1	+60.0	173.7	56 57.5	+60.0	173.9	55 57.8	+60.0	174.0	**48**
49	63 54.9	+60.0	172.5	62 55.4	+60.0	172.8	61 55.9	+59.9	173.0	60 56.3	+60.0	173.2	59 56.7	+60.0	173.4	58 57.1	+60.0	173.6	57 57.5	+59.9	173.8	56 57.8	+60.0	174.0	**49**
50	64 54.9	+59.9	172.4	63 55.4	+59.9	172.7	62 55.8	+60.0	172.9	61 56.3	+59.9	173.2	60 56.7	+60.0	173.4	59 57.1	+60.0	173.6	58 57.4	+60.0	173.8	57 57.8	+60.0	173.9	**50**
51	65 54.8	+59.9	172.3	64 55.3	+59.9	172.6	63 55.8	+59.9	172.8	62 56.2	+60.0	173.1	61 56.7	+59.9	173.3	60 57.1	+59.9	173.5	59 57.4	+60.0	173.7	58 57.8	+60.0	173.9	**51**
52	66 54.7	+59.9	172.1	65 55.2	+59.9	172.4	64 55.7	+60.0	172.7	63 56.2	+59.9	173.0	62 56.6	+60.0	173.2	61 57.0	+60.0	173.4	60 57.4	+60.0	173.7	59 57.8	+59.9	173.8	**52**
53	67 54.6	+59.9	172.0	66 55.1	+59.9	172.3	65 55.7	+59.9	172.6	64 56.1	+60.0	172.9	63 56.6	+59.9	173.1	62 57.0	+60.0	173.4	61 57.4	+60.0	173.6	60 57.7	+60.0	173.8	**53**
54	68 54.5	+59.8	171.8	67 55.0	+59.9	172.2	66 55.6	+59.9	172.5	65 56.1	+59.9	172.8	64 56.5	+60.0	173.1	63 57.0	+59.9	173.3	62 57.4	+59.9	173.5	61 57.7	+60.0	173.7	**54**
55	69 54.3	+59.9	171.6	68 54.9	+59.9	172.0	67 55.5	+59.9	172.4	66 56.0	+59.9	172.7	65 56.5	+59.9	173.0	64 56.9	+60.0	173.2	63 57.3	+60.0	173.5	62 57.7	+60.0	173.7	**55**
56	70 54.2	+59.8	171.4	69 54.8	+59.9	171.8	68 55.4	+59.9	172.2	67 55.9	+60.0	172.5	66 56.4	+60.0	172.9	65 56.9	+59.9	173.1	64 57.3	+60.0	173.4	63 57.7	+60.0	173.6	**56**
57	71 54.0	+59.9	171.2	70 54.7	+59.9	171.7	69 55.3	+59.9	172.1	68 55.9	+59.9	172.4	67 56.4	+59.9	172.7	66 56.8	+60.0	173.0	65 57.3	+59.9	173.3	64 57.7	+59.9	173.6	**57**
58	72 53.9	+59.8	171.0	71 54.6	+59.8	171.4	70 55.2	+59.9	171.9	69 55.8	+59.9	172.3	68 56.3	+59.9	172.6	67 56.8	+59.9	172.9	66 57.2	+60.0	173.2	65 57.6	+60.0	173.5	**58**
59	73 53.7	+59.8	170.7	72 54.4	+59.9	171.2	71 55.1	+59.9	171.7	70 55.7	+59.9	172.1	69 56.2	+60.0	172.5	68 56.7	+60.0	172.8	67 57.2	+59.9	173.1	66 57.6	+60.0	173.4	**59**
60	74 53.5	+59.7	170.4	73 54.3	+59.8	171.0	72 55.0	+59.8	171.5	71 55.6	+59.9	171.9	70 56.2	+59.9	172.3	69 56.7	+59.9	172.7	68 57.1	+60.0	173.0	67 57.6	+59.9	173.3	**60**
61	75 53.2	+59.8	170.0	74 54.1	+59.8	170.7	73 54.8	+59.9	171.2	72 55.5	+59.9	171.7	71 56.1	+59.9	172.2	70 56.6	+60.0	172.6	69 57.1	+60.0	172.9	68 57.5	+60.0	173.2	**61**
62	76 53.0	+59.6	169.6	75 53.9	+59.7	170.3	74 54.7	+59.8	171.0	73 55.4	+59.8	171.5	72 56.0	+59.9	172.0	71 56.6	+59.9	172.4	70 57.1	+59.9	172.8	69 57.5	+60.0	173.1	**62**
63	77 52.6	+59.7	169.1	76 53.6	+59.8	170.0	75 54.5	+59.8	170.6	74 55.2	+59.9	171.3	73 55.9	+59.9	171.8	72 56.5	+59.9	172.2	71 57.0	+59.9	172.7	70 57.5	+59.9	173.0	**63**
64	78 52.3	+59.5	168.6	77 53.4	+59.6	169.5	76 54.3	+59.7	170.3	75 55.1	+59.8	171.0	74 55.8	+59.9	171.6	73 56.4	+59.9	172.1	72 56.9	+60.0	172.5	71 57.4	+60.0	172.9	**64**
65	79 51.8	+59.5	167.9	78 53.0	+59.6	169.0	77 54.0	+59.8	169.9	76 54.9	+59.8	170.6	75 55.7	+59.8	171.3	74 56.3	+59.9	171.9	73 56.9	+59.9	172.3	72 57.4	+59.9	172.8	**65**
66	80 51.3	+59.3	167.1	79 52.6	+59.6	168.4	78 53.8	+59.6	169.4	77 54.7	+59.8	170.3	76 55.5	+59.8	171.0	75 56.2	+59.9	171.6	74 56.8	+59.9	172.2	73 57.3	+60.0	172.6	**66**
67	81 50.6	+59.1	166.1	80 52.2	+59.4	167.6	79 53.4	+59.6	168.8	78 54.5	+59.7	169.8	77 55.3	+59.8	170.6	76 56.1	+59.8	171.3	75 56.7	+59.9	171.9	74 57.3	+59.9	172.5	**67**
68	82 49.7	+58.9	164.8	81 51.6	+59.2	166.7	80 53.0	+59.5	168.1	79 54.2	+59.6	169.3	78 55.1	+59.8	170.2	77 55.9	+59.8	171.0	76 56.6	+59.9	171.7	75 57.2	+59.9	172.3	**68**
69	83 48.6	+58.4	163.2	82 50.8	+59.0	165.5	81 52.5	+59.3	167.2	80 53.8	+59.6	168.6	79 54.9	+59.7	169.7	78 55.7	+59.8	170.6	77 56.5	+59.8	171.4	76 57.1	+59.9	172.0	**69**
70	84 47.0	+57.7	160.9	83 49.8	+58.6	163.9	82 51.8	+59.1	166.1	81 53.4	+59.4	167.8	80 54.6	+59.6	169.1	79 55.5	+59.8	170.2	78 56.3	+59.9	171.1	77 57.0	+59.9	171.8	**70**
71	85 44.7	*+56.3*	•157.5	84 48.4	+58.0	161.7	83 50.9	+58.8	164.6	82 52.8	+59.2	166.8	81 54.2	+59.5	168.4	80 55.3	+59.7	169.6	79 56.2	+59.8	170.7	78 56.9	+59.9	171.5	**71**
72	86 41.0	*+53.4*	•152.3	85 46.4	+56.7	158.6	84 49.7	+58.3	162.6	83 52.0	+59.0	165.4	82 53.7	+59.4	167.4	81 55.0	+59.6	169.0	80 56.0	+59.7	170.2	79 56.8	+59.8	171.1	**72**
73	87 34.4	*+45.5*	•143.0	86 43.1	*+54.1*	•153.6	85 48.0	+57.1	159.6	84 51.0	+58.5	163.5	83 53.1	+59.1	166.2	82 54.6	+59.5	168.1	81 55.7	+59.7	169.5	80 56.6	+59.8	170.7	**73**
74	88 19.9	*+22.5*	•124.4	87 37.2	*+46.7*	•144.7	86 45.1	*+54.8*	•154.9	85 49.5	+57.5	160.7	84 52.2	+58.7	164.4	83 54.1	+59.2	166.9	82 55.4	+59.6	168.8	81 56.4	+59.8	170.1	**74**
75	88 42.4	*−18.5*	•87.6	88 23.9	*+23.5*	•126.2	87 39.9	*+47.9*	•146.4	86 47.0	*+55.4*	•156.3	85 50.9	+57.9	161.8	84 53.3	+58.9	165.3	83 55.0	+59.4	167.7	82 56.2	+59.6	169.4	**75**
76	88 23.9	*−44.0*	•49.0	88 47.4	*−19.6*	•87.6	88 27.8	*+24.7*	•128.1	87 42.4	*+49.2*	•148.2	86 48.8	*+56.1*	•157.7	85 52.2	+58.3	163.0	84 54.4	+59.1	166.3	83 55.8	+59.5	168.5	**76**
77	87 39.9	*−52.9*	•28.8	88 27.8	*−45.4*	•47.0	88 52.5	*−20.9*	•87.6	88 31.6	*+26.0*	•130.3	87 44.9	*+50.4*	•150.1	86 50.5	*+56.7*	•159.2	85 53.5	+58.5	164.1	84 55.3	+59.3	167.2	**77**
78	86 47.0	*−56.1*	•18.8	87 42.4	*−53.6*	•26.9	88 31.6	*−46.7*	•44.8	88 57.6	*−22.3*	•87.6	88 35.3	*+27.5*	•132.6	87 47.2	*+51.7*	•152.0	86 52.0	*+57.3*	•160.6	85 54.6	+58.9	165.3	**78**
79	85 50.9	−57.6	13.3	86 48.8	*−56.6*	•17.4	87 44.9	*−54.4*	•25.0	88 35.3	*−48.1*	•42.5	89 02.8	*−23.9*	•87.5	88 38.9	*+29.0*	•135.2	87 49.3	*+53.0*	•154.1	86 53.5	*+57.8*	•162.1	**79**
80	84 53.3	−58.3	9.8	85 52.2	−57.8	12.1	86 50.5	−57.0	15.9	87 47.2	*−55.2*	•23.1	88 38.9	*−49.6*	•39.9	89 07.9	*−25.6*	•87.5	88 42.3	*+30.8*	•138.0	87 51.3	*+54.1*	•156.2	**80**
81	83 55.0	−58.8	7.4	84 54.4	−58.6	8.8	85 53.5	−58.2	11.0	86 52.0	−57.4	14.4	87 49.3	*−55.8*	•21.0	88 42.3	*−51.0*	•37.1	89 13.1	*−27.7*	•87.5	88 45.4	*+32.9*	•141.0	**81**
82	82 56.2	−59.2	5.7	83 55.8	−59.0	6.6	84 55.3	−58.7	7.9	85 54.6	−58.4	9.8	86 53.5	−57.8	12.9	87 51.3	*−56.5*	•18.9	88 45.4	*−52.3*	•34.0	89 18.3	*−29.9*	•87.5	**82**
83	81 57.0	−59.3	4.4	82 56.8	−59.2	5.0	83 56.6	−59.1	5.8	84 56.2	−58.9	6.9	85 55.7	−58.7	8.6	86 54.8	−58.2	11.4	87 53.1	*−57.1*	•16.7	88 48.4	*−53.7*	•30.7	**83**
84	80 57.7	−59.4	3.3	81 57.6	−59.4	3.7	82 57.5	−59.3	4.3	83 57.3	−59.2	5.0	84 57.0	−59.1	5.9	85 56.6	−58.9	7.4	86 56.0	−58.5	9.8	87 54.7	*−57.7*	•14.5	**84**
85	79 58.3	−59.5	2.5	80 58.2	−59.5	2.8	81 58.2	−59.5	3.1	82 58.1	−59.5	3.6	83 57.9	−59.3	4.1	84 57.7	−59.2	5.0	85 57.5	−59.1	6.2	86 57.0	−58.8	8.2	**85**
86	78 58.8	−59.7	1.8	79 58.7	−59.6	2.0	80 58.7	−59.6	2.2	81 58.6	−59.5	2.5	82 58.6	−59.5	2.8	83 58.5	−59.5	3.3	84 58.4	−59.4	4.0	85 58.2	−59.3	5.0	**86**
87	77 59.1	−59.6	1.3	78 59.1	−59.6	1.4	79 59.1	−59.6	1.5	80 59.1	−59.6	1.7	81 59.1	−59.7	1.9	82 59.0	−59.6	2.1	83 59.0	−59.6	2.5	84 58.9	−59.5	3.0	**87**
88	76 59.5	−59.7	0.8	77 59.5	−59.7	0.8	78 59.5	−59.7	0.9	79 59.5	−59.7	1.0	80 59.4	−59.7	1.1	81 59.4	−59.7	1.3	82 59.4	−59.7	1.4	83 59.4	−59.7	1.7	**88**
89	75 59.8	−59.8	0.4	76 59.8	−59.8	0.4	77 59.8	−59.8	0.4	78 59.8	−59.8	0.5	79 59.7	−59.7	0.5	80 59.7	−59.7	0.6	81 59.7	−59.7	0.6	82 59.7	−59.7	0.7	**89**
90	75 00.0	−59.8	0.0	76 00.0	−59.8	0.0	77 00.0	−59.8	0.0	78 00.0	−59.8	0.0	79 00.0	−59.8	0.0	80 00.0	−59.8	0.0	81 00.0	−59.8	0.0	82 00.0	−59.8	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 5°, 355°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 56.5	−60.0	174.8	13 56.7	−59.9	174.8	12 57.0	−60.0	174.9	11 57.2	−60.0	174.9	10 57.5	−60.0	174.9	9 57.7	−60.0	174.9	8 57.9	−60.0	174.9	7 58.2	−60.0	175.0	0
1	13 56.5	−60.0	174.8	12 56.8	−60.0	174.9	11 57.0	−60.0	174.9	10 57.2	−60.0	174.9	9 57.5	−60.0	174.9	8 57.7	−60.0	174.9	7 57.9	−60.0	175.0	6 58.2	−60.0	175.0	1
2	12 56.5	−60.0	174.9	11 56.8	−60.0	174.9	10 57.0	−60.0	174.9	9 57.2	−59.9	174.9	8 57.5	−60.0	174.9	7 57.7	−60.0	175.0	6 57.9	−60.0	175.0	5 58.2	−60.0	175.0	2
3	11 56.5	−59.9	174.9	10 56.8	−60.0	174.9	9 57.0	−60.0	174.9	8 57.3	−60.0	174.9	7 57.5	−60.0	175.0	6 57.7	−60.0	175.0	5 57.9	−59.9	175.0	4 58.2	−60.0	175.0	3
4	10 56.6	−60.0	174.9	9 56.8	−60.0	174.9	8 57.0	−60.0	175.0	7 57.3	−60.0	175.0	6 57.5	−60.0	175.0	5 57.7	−60.0	175.0	4 58.0	−60.0	175.0	3 58.2	−60.0	175.0	4
5	9 56.6	−60.0	174.9	8 56.8	−60.0	175.0	7 57.0	−59.9	175.0	6 57.3	−60.0	175.0	5 57.5	−60.0	175.0	4 57.7	−60.0	175.0	3 58.0	−60.0	175.0	2 58.2	−60.0	175.0	5
6	8 56.6	−60.0	175.0	7 56.8	−60.0	175.0	6 57.1	−60.0	175.0	5 57.3	−60.0	175.0	4 57.5	−60.0	175.0	3 57.7	−60.0	175.0	2 58.0	−60.0	175.0	1 58.2	−60.0	175.0	6
7	7 56.6	−60.0	175.0	6 56.8	−60.0	175.0	5 57.1	−60.0	175.0	4 57.3	−60.0	175.0	3 57.5	−60.0	175.0	2 57.7	−60.0	175.0	1 58.0	−60.0	175.0	0 58.2	−60.0	175.0	7
8	6 56.6	−60.0	175.0	5 56.8	−59.9	175.0	4 57.1	−60.0	175.0	3 57.3	−60.0	175.0	2 57.5	−60.0	175.0	1 57.7	−59.9	175.0	0 58.0	−60.0	175.0	0 01.8	+60.0	5.0	8
9	5 56.6	−59.9	175.0	4 56.9	−60.0	175.0	3 57.1	−60.0	175.0	2 57.3	−60.0	175.1	1 57.5	−60.0	175.1	0 57.8	−60.0	175.1	0 02.0	+60.0	4.9	1 01.8	+60.0	4.9	9
10	4 56.7	−60.0	175.1	3 56.9	−60.0	175.1	2 57.1	−60.0	175.1	1 57.3	−60.0	175.1	0 57.5	−60.0	175.1	0 02.2	+60.0	4.9	1 02.0	+60.0	4.9	2 01.8	+60.0	4.9	10
11	3 56.7	−60.0	175.1	2 56.9	−60.0	175.1	1 57.1	−60.0	175.1	0 57.3	−60.0	175.1	0 02.5	+59.9	4.9	1 02.2	+60.0	4.9	2 02.0	+60.0	4.9	3 01.8	+60.0	4.9	11
12	2 56.7	−60.0	175.1	1 56.9	−60.0	175.1	0 57.1	−60.0	175.1	0 02.7	+60.0	4.9	1 02.4	+60.0	4.9	2 02.2	+60.0	4.9	3 02.0	+60.0	4.9	4 01.8	+60.0	4.9	12
13	1 56.7	−60.0	175.1	0 56.9	−60.0	175.1	0 02.9	+60.0	4.9	1 02.7	+59.9	4.9	2 02.4	+60.0	4.9	3 02.2	+60.0	4.9	4 02.0	+60.0	4.9	5 01.8	+60.0	4.9	13
14	0 56.7	−60.0	175.1	0 03.1	+60.0	4.9	1 02.9	+59.9	4.9	2 02.6	+60.0	4.9	3 02.4	+60.0	4.9	4 02.2	+60.0	4.9	5 02.0	+60.0	4.9	6 01.8	+60.0	4.9	14
15	0 03.3	+60.0	4.8	1 03.1	+59.9	4.8	2 02.8	+60.0	4.8	3 02.6	+60.0	4.8	4 02.4	+60.0	4.8	5 02.2	+60.0	4.8	6 02.0	+60.0	4.9	7 01.8	+60.0	4.9	15
16	1 03.3	+59.9	4.8	2 03.0	+60.0	4.8	3 02.8	+60.0	4.8	4 02.6	+60.0	4.8	5 02.4	+60.0	4.8	6 02.2	+60.0	4.8	7 02.0	+60.0	4.8	8 01.8	+60.0	4.9	16
17	2 03.2	+60.0	4.8	3 03.0	+60.0	4.8	4 02.8	+60.0	4.8	5 02.6	+60.0	4.8	6 02.4	+60.0	4.8	7 02.2	+60.0	4.8	8 02.0	+60.0	4.8	9 01.8	+60.0	4.8	17
18	3 03.2	+60.0	4.8	4 03.0	+60.0	4.8	5 02.8	+60.0	4.8	6 02.6	+60.0	4.8	7 02.4	+60.0	4.8	8 02.2	+60.0	4.8	9 02.0	+60.0	4.8	10 01.8	+60.0	4.8	18
19	4 03.2	+60.0	4.7	5 03.0	+60.0	4.8	6 02.8	+60.0	4.8	7 02.6	+60.0	4.8	8 02.4	+60.0	4.8	9 02.2	+60.0	4.8	10 02.0	+60.0	4.8	11 01.8	+59.9	4.8	19
20	5 03.2	+60.0	4.7	6 03.0	+60.0	4.7	7 02.8	+60.0	4.7	8 02.6	+60.0	4.7	9 02.4	+60.0	4.8	10 02.2	+60.0	4.8	11 02.0	+60.0	4.8	12 01.7	+60.0	4.8	20
21	6 03.2	+60.0	4.7	7 03.0	+60.0	4.7	8 02.8	+60.0	4.7	9 02.6	+60.0	4.7	10 02.4	+60.0	4.7	11 02.2	+60.0	4.8	12 02.0	+59.9	4.8	13 01.7	+60.0	4.8	21
22	7 03.2	+59.9	4.7	8 03.0	+59.9	4.7	9 02.8	+60.0	4.7	10 02.6	+60.0	4.7	11 02.4	+59.9	4.7	12 02.2	+59.9	4.7	13 01.9	+60.0	4.8	14 01.7	+60.0	4.8	22
23	8 03.1	+60.0	4.6	9 02.9	+60.0	4.7	10 02.8	+59.9	4.7	11 02.6	+59.9	4.7	12 02.3	+60.0	4.7	13 02.1	+60.0	4.7	14 01.9	+60.0	4.7	15 01.7	+60.0	4.8	23
24	9 03.1	+60.0	4.6	10 02.9	+60.0	4.6	11 02.7	+60.0	4.7	12 02.5	+60.0	4.7	13 02.3	+60.0	4.7	14 02.1	+60.0	4.7	15 01.9	+60.0	4.7	16 01.7	+60.0	4.8	24
25	10 03.1	+60.0	4.6	11 02.9	+60.0	4.6	12 02.7	+60.0	4.6	13 02.5	+60.0	4.7	14 02.3	+60.0	4.7	15 02.1	+60.0	4.7	16 01.9	+60.0	4.7	17 01.7	+60.0	4.7	25
26	11 03.1	+60.0	4.6	12 02.9	+60.0	4.6	13 02.7	+60.0	4.6	14 02.5	+60.0	4.6	15 02.3	+60.0	4.7	16 02.1	+60.0	4.7	17 01.9	+60.0	4.7	18 01.7	+60.0	4.7	26
27	12 03.1	+60.0	4.6	13 02.9	+60.0	4.6	14 02.7	+60.0	4.6	15 02.5	+60.0	4.6	16 02.3	+60.0	4.6	17 02.1	+60.0	4.6	18 01.9	+60.0	4.7	19 01.7	+60.0	4.7	27
28	13 03.1	+60.0	4.5	14 02.9	+60.0	4.6	15 02.7	+60.0	4.6	16 02.5	+60.0	4.6	17 02.3	+60.0	4.6	18 02.1	+60.0	4.6	19 01.9	+60.0	4.7	20 01.7	+60.0	4.7	28
29	14 03.1	+59.9	4.5	15 02.9	+60.0	4.5	16 02.7	+60.0	4.5	17 02.5	+60.0	4.6	18 02.3	+60.0	4.6	19 02.1	+60.0	4.6	20 01.9	+60.0	4.7	21 01.7	+60.0	4.7	29
30	15 03.0	+60.0	4.5	16 02.9	+59.9	4.5	17 02.7	+60.0	4.5	18 02.5	+60.0	4.6	19 02.3	+60.0	4.6	20 02.1	+60.0	4.6	21 01.9	+60.0	4.6	22 01.7	+60.0	4.7	30
31	16 03.0	+60.0	4.5	17 02.8	+60.0	4.5	18 02.7	+59.9	4.5	19 02.5	+60.0	4.5	20 02.3	+60.0	4.6	21 02.1	+60.0	4.6	22 01.9	+60.0	4.6	23 01.7	+60.0	4.7	31
32	17 03.0	+60.0	4.4	18 02.8	+60.0	4.5	19 02.6	+60.0	4.5	20 02.5	+59.9	4.5	21 02.3	+60.0	4.5	22 02.1	+60.0	4.6	23 01.9	+60.0	4.6	24 01.7	+60.0	4.6	32
33	18 03.0	+60.0	4.4	19 02.8	+60.0	4.4	20 02.6	+60.0	4.5	21 02.4	+60.0	4.5	22 02.3	+59.9	4.5	23 02.1	+60.0	4.6	24 01.9	+60.0	4.6	25 01.7	+60.0	4.6	33
34	19 03.0	+60.0	4.4	20 02.8	+60.0	4.4	21 02.6	+60.0	4.4	22 02.4	+60.0	4.5	23 02.2	+60.0	4.5	24 02.1	+60.0	4.5	25 01.9	+60.0	4.6	26 01.7	+60.0	4.6	34
35	20 03.0	+59.9	4.4	21 02.8	+60.0	4.4	22 02.6	+60.0	4.4	23 02.4	+60.0	4.4	24 02.2	+60.0	4.5	25 02.1	+59.9	4.5	26 01.9	+60.0	4.6	27 01.7	+60.0	4.6	35
36	21 02.9	+60.0	4.3	22 02.8	+59.9	4.4	23 02.6	+60.0	4.4	24 02.4	+60.0	4.4	25 02.2	+60.0	4.5	26 02.0	+60.0	4.5	27 01.9	+60.0	4.5	28 01.7	+60.0	4.6	36
37	22 02.9	+60.0	4.3	23 02.7	+60.0	4.3	24 02.6	+60.0	4.4	25 02.4	+60.0	4.4	26 02.2	+60.0	4.4	27 02.0	+60.0	4.5	28 01.9	+59.9	4.5	29 01.7	+60.0	4.6	37
38	23 02.9	+60.0	4.3	24 02.7	+60.0	4.3	25 02.6	+59.9	4.3	26 02.4	+60.0	4.4	27 02.2	+60.0	4.4	28 02.0	+60.0	4.5	29 01.8	+60.0	4.5	30 01.7	+60.0	4.5	38
39	24 02.9	+60.0	4.3	25 02.7	+60.0	4.3	26 02.5	+60.0	4.3	27 02.4	+60.0	4.4	28 02.2	+60.0	4.4	29 02.0	+60.0	4.4	30 01.8	+60.0	4.5	31 01.7	+59.9	4.5	39
40	25 02.9	+59.9	4.2	26 02.7	+60.0	4.3	27 02.5	+60.0	4.3	28 02.4	+59.9	4.3	29 02.2	+60.0	4.4	30 02.0	+60.0	4.4	31 01.8	+60.0	4.5	32 01.6	+60.0	4.5	40
41	26 02.8	+60.0	4.2	27 02.7	+60.0	4.2	28 02.5	+60.0	4.3	29 02.3	+60.0	4.3	30 02.2	+60.0	4.4	31 02.0	+60.0	4.4	32 01.8	+60.0	4.4	33 01.6	+60.0	4.5	41
42	27 02.8	+60.0	4.2	28 02.7	+59.9	4.2	29 02.5	+60.0	4.2	30 02.3	+60.0	4.3	31 02.2	+60.0	4.3	32 02.0	+60.0	4.4	33 01.8	+60.0	4.4	34 01.6	+60.0	4.5	42
43	28 02.8	+60.0	4.1	29 02.6	+60.0	4.2	30 02.5	+60.0	4.2	31 02.3	+60.0	4.3	32 02.2	+59.9	4.3	33 02.0	+60.0	4.4	34 01.8	+60.0	4.4	35 01.6	+60.0	4.5	43
44	29 02.8	+60.0	4.1	30 02.6	+60.0	4.1	31 02.5	+60.0	4.2	32 02.3	+60.0	4.2	33 02.1	+60.0	4.3	34 02.0	+60.0	4.3	35 01.8	+60.0	4.4	36 01.6	+60.0	4.4	44
45	30 02.8	+59.9	4.1	31 02.6	+60.0	4.1	32 02.5	+59.9	4.2	33 02.3	+60.0	4.2	34 02.1	+60.0	4.3	35 02.0	+60.0	4.3	36 01.8	+60.0	4.4	37 01.6	+60.0	4.4	45
46	31 02.7	+60.0	4.1	32 02.6	+60.0	4.1	33 02.4	+60.0	4.1	34 02.3	+60.0	4.2	35 02.1	+60.0	4.2	36 02.0	+59.9	4.3	37 01.8	+60.0	4.3	38 01.6	+60.0	4.4	46
47	32 02.7	+60.0	4.0	33 02.6	+60.0	4.1	34 02.4	+60.0	4.1	35 02.3	+60.0	4.2	36 02.1	+60.0	4.2	37 01.9	+60.0	4.3	38 01.8	+60.0	4.3	39 01.6	+60.0	4.4	47
48	33 02.7	+60.0	4.0	34 02.6	+59.9	4.0	35 02.4	+60.0	4.1	36 02.3	+59.9	4.1	37 02.1	+60.0	4.2	38 01.9	+60.0	4.2	39 01.8	+60.0	4.3	40 01.6	+60.0	4.4	48
49	34 02.7	+60.0	4.0	35 02.5	+60.0	4.0	36 02.4	+60.0	4.1	37 02.2	+60.0	4.1	38 02.1	+60.0	4.2	39 01.9	+60.0	4.2	40 01.8	+59.9	4.3	41 01.6	+60.0	4.3	49
50	35 02.7	+59.9	3.9	36 02.5	+60.0	4.0	37 02.4	+60.0	4.0	38 02.2	+60.0	4.1	39 02.1	+60.0	4.1	40 01.9	+60.0	4.2	41 01.7	+60.0	4.3	42 01.6	+60.0	4.3	50
51	36 02.6	+60.0	3.9	37 02.5	+60.0	3.9	38 02.4	+59.9	4.0	39 02.2	+60.0	4.0	40 02.1	+59.9	4.1	41 01.9	+60.0	4.2	42 01.7	+60.0	4.2	43 01.6	+60.0	4.3	51
52	37 02.6	+60.0	3.9	38 02.5	+60.0	3.9	39 02.3	+60.0	4.0	40 02.2	+60.0	4.0	41 02.0	+60.0	4.1	42 01.9	+60.0	4.1	43 01.7	+60.0	4.2	44 01.6	+59.9	4.3	52
53	38 02.6	+60.0	3.8	39 02.5	+59.9	3.9	40 02.3	+60.0	3.9	41 02.2	+60.0	4.0	42 02.0	+60.0	4.0	43 01.9	+60.0	4.1	44 01.7	+60.0	4.2	45 01.5	+60.0	4.3	53
54	39 02.6	+59.9	3.8	40 02.4	+60.0	3.8	41 02.3	+60.0	3.9	42 02.2	+59.9	4.0	43 02.0	+60.0	4.0	44 01.9	+59.9	4.1	45 01.7	+60.0	4.2	46 01.5	+60.0	4.2	54
55	40 02.5	+60.0	3.7	41 02.4	+60.0	3.8	42 02.3	+60.0	3.9	43 02.1	+60.0	3.9	44 02.0	+60.0	4.0	45 01.8	+60.0	4.1	46 01.7	+60.0	4.1	47 01.5	+60.0	4.2	55
56	41 02.5	+60.0	3.7	42 02.4	+60.0	3.8	43 02.3	+59.9	3.8	44 02.1	+60.0	3.9	45 02.0	+60.0	4.0	46 01.8	+60.0	4.0	47 01.7	+60.0	4.1	48 01.5	+60.0	4.2	56
57	42 02.5	+60.0	3.7	43 02.4	+59.9	3.7	44 02.2	+60.0	3.8	45 02.1	+60.0	3.9	46 02.0	+59.9	3.9	47 01.8	+60.0	4.0	48 01.7	+60.0	4.1	49 01.5	+60.0	4.2	57
58	43 02.5	+59.9	3.6	44 02.3	+60.0	3.7	45 02.2	+60.0	3.7	46 02.1	+60.0	3.8	47 01.9	+60.0	3.9	48 01.8	+60.0	4.0	49 01.7	+59.9	4.0	50 01.5	+60.0	4.1	58
59	44 02.4	+60.0	3.6	45 02.3	+60.0	3.6	46 02.2	+60.0	3.7	47 02.1	+59.9	3.8	48 01.9	+60.0	3.8	49 01.8	+60.0	3.9	50 01.6	+60.0	4.0	51 01.5	+60.0	4.1	59
60	45 02.4	+60.0	3.5	46 02.3	+60.0	3.6	47 02.2	+59.9	3.7	48 02.0	+60.0	3.7	49 01.9	+60.0	3.8	50 01.8	+60.0	3.9	51 01.6	+60.0	4.0	52 01.5	+60.0	4.1	60
61	46 02.4	+59.9	3.5	47 02.3	+60.0	3.6	48 02.1	+60.0	3.6	49 02.0	+60.0	3.7	50 01.9	+60.0	3.8	51 01.8	+59.9	3.9	52 01.6	+60.0	3.9	53 01.5	+60.0	4.0	61
62	47 02.3	+60.0	3.4	48 02.2	+60.0	3.5	49 02.1	+60.0	3.6	50 02.0	+60.0	3.7	51 01.9	+59.9	3.7	52 01.7	+60.0	3.8	53 01.6	+60.0	3.9	54 01.5	+59.9	4.0	62
63	48 02.3	+60.0	3.4	49 02.2	+60.0	3.5	50 02.1	+60.0	3.5	51 02.0	+59.9	3.6	52 01.8	+60.0	3.7	53 01.7	+60.0	3.8	54 01.6	+60.0	3.9	55 01.4	+60.0	4.0	63
64	49 02.3	+59.9	3.3	50 02.2	+59.9	3.4	51 02.1	+59.9	3.5	52 01.9	+60.0	3.6	53 01.8	+60.0	3.6	54 01.7	+60.0	3.7	55 01.6	+59.9	3.8	56 01.4	+60.0	3.9	64
65	50 02.2	+60.0	3.3	51 02.1	+60.0	3.4	52 02.0	+60.0	3.4	53 01.9	+60.0	3.5	54 01.8	+60.0	3.6	55 01.7	+60.0	3.7	56 01.5	+60.0	3.8	57 01.4	+60.0	3.9	65
66	51 02.2	+59.9	3.2	52 02.1	+60.0	3.3	53 02.0	+60.0	3.4	54 01.9	+60.0	3.5	55 01.8	+59.9	3.5	56 01.7	+59.9	3.6	57 01.5	+60.0	3.7	58 01.4	+60.0	3.8	66
67	52 02.1	+60.0	3.2	53 02.1	+59.9	3.2	54 02.0	+59.9	3.3	55 01.9	+59.9	3.4	56 01.7	+60.0	3.5	57 01.6	+60.0	3.6	58 01.5	+60.0	3.7	59 01.4	+60.0	3.8	67
68	53 02.1	+60.0	3.1	54 02.0	+60.0	3.2	55 01.9	+60.0	3.3	56 01.8	+60.0	3.3	57 01.7	+60.0	3.4	58 01.6	+60.0	3.5	59 01.5	+60.0	3.6	60 01.4	+59.9	3.7	68
69	54 02.1	+59.9	3.0	55 02.0	+59.9	3.1	56 01.9	+59.9	3.2	57 01.8	+60.0	3.3	58 01.7	+60.0	3.4	59 01.6	+60.0	3.5	60 01.5	+59.9	3.6	61 01.3	+60.0	3.7	69
70	55 02.0	+60.0	3.0	56 01.9	+60.0	3.1	57 01.8	+60.0	3.1	58 01.8	+59.9	3.2	59 01.7	+59.9	3.3	60 01.6	+59.9	3.4	61 01.4	+60.0	3.5	62 01.3	+60.0	3.6	70
71	56 02.0	+59.9	2.9	57 01.9	+59.9	3.0	58 01.8	+60.0	3.1	59 01.7	+60.0	3.2	60 01.6	+60.0	3.3	61 01.5	+60.0	3.4	62 01.4	+60.0	3.5	63 01.3	+60.0	3.6	71
72	57 01.9	+60.0	2.8	58 01.8	+60.0	2.9	59 01.8	+59.9	3.0	60 01.7	+59.9	3.1	61 01.6	+60.0	3.2	62 01.5	+60.0	3.3	63 01.4	+60.0	3.4	64 01.3	+60.0	3.5	72
73	58 01.9	+59.9	2.8	59 01.8	+59.9	2.8	60 01.7	+60.0	2.9	61 01.6	+60.0	3.0	62 01.6	+59.9	3.1	63 01.5	+59.9	3.2	64 01.4	+59.9	3.3	65 01.3	+59.9	3.5	73
74	59 01.8	+60.0	2.7	60 01.7	+60.0	2.8	61 01.7	+59.9	2.8	62 01.6	+60.0	2.9	63 01.5	+60.0	3.0	64 01.4	+60.0	3.1	65 01.3	+60.0	3.3	66 01.2	+60.0	3.4	74
75	60 01.8	+59.9	2.6	61 01.7	+59.9	2.7	62 01.6	+60.0	2.8	63 01.6	+59.9	2.9	64 01.5	+59.9	3.0	65 01.4	+60.0	3.1	66 01.3	+60.0	3.2	67 01.2	+60.0	3.3	75
76	61 01.7	+59.9	2.5	62 01.6	+60.0	2.6	63 01.6	+59.9	2.7	64 01.5	+59.9	2.8	65 01.4	+60.0	2.9	66 01.4	+59.9	3.0	67 01.3	+59.9	3.1	68 01.2	+59.9	3.2	76
77	62 01.6	+60.0	2.4	63 01.6	+59.9	2.5	64 01.5	+59.9	2.6	65 01.4	+60.0	2.7	66 01.4	+59.9	2.8	67 01.3	+60.0	2.9	68 01.2	+60.0	3.0	69 01.1	+60.0	3.1	77
78	63 01.6	+59.9	2.3	64 01.5	+59.9	2.4	65 01.4	+60.0	2.5	66 01.4	+59.9	2.6	67 01.3	+60.0	2.7	68 01.3	+59.9	2.8	69 01.2	+59.9	2.9	70 01.1	+60.0	3.0	78
79	64 01.5	+59.9	2.2	65 01.4	+60.0	2.3	66 01.4	+59.9	2.3	67 01.3	+60.0	2.4	68 01.3	+59.9	2.5	69 01.2	+60.0	2.7	70 01.1	+60.0	2.8	71 01.1	+59.9	2.9	79
80	65 01.4	+59.9	2.1	66 01.4	+59.9	2.1	67 01.3	+59.9	2.2	68 01.3	+59.9	2.3	69 01.2	+59.9	2.4	70 01.2	+59.9	2.5	71 01.1	+59.9	2.7	72 01.0	+60.0	2.8	80
81	66 01.3	+59.9	1.9	67 01.3	+59.9	2.0	68 01.2	+59.9	2.1	69 01.2	+59.9	2.2	70 01.1	+60.0	2.3	71 01.1	+59.9	2.4	72 01.0	+60.0	2.5	73 01.0	+59.9	2.7	81
82	67 01.2	+59.9	1.8	68 01.2	+59.9	1.9	69 01.1	+59.9	1.9	70 01.1	+59.9	2.0	71 01.1	+59.9	2.1	72 01.0	+59.9	2.3	73 01.0	+59.9	2.4	74 00.9	+60.0	2.5	82
83	68 01.1	+59.9	1.6	69 01.1	+59.9	1.7	70 01.0	+59.9	1.8	71 01.0	+59.9	1.9	72 01.0	+59.9	2.0	73 00.9	+60.0	2.1	74 00.9	+59.9	2.2	75 00.9	+59.9	2.4	83
84	69 01.0	+59.9	1.5	70 01.0	+59.8	1.5	71 00.9	+59.9	1.6	72 00.9	+59.9	1.7	73 00.9	+59.9	1.8	74 00.9	+59.9	1.9	75 00.8	+59.9	2.0	76 00.8	+59.9	2.2	84
85	70 00.9	+59.8	1.3	71 00.8	+59.9	1.3	72 00.8	+59.9	1.4	73 00.8	+59.9	1.5	74 00.8	+59.9	1.6	75 00.8	+59.9	1.7	76 00.7	+59.9	1.8	77 00.7	+59.9	1.9	85
86	71 00.7	+59.9	1.1	72 00.7	+59.9	1.1	73 00.7	+59.9	1.2	74 00.7	+59.9	1.3	75 00.7	+59.8	1.3	76 00.7	+59.8	1.4	77 00.6	+59.9	1.5	78 00.6	+59.9	1.7	86
87	72 00.6	+59.8	0.8	73 00.6	+59.8	0.9	74 00.6	+59.8	0.9	75 00.6	+59.8	1.0	76 00.5	+59.9	1.1	77 00.5	+59.9	1.2	78 00.5	+59.9	1.3	79 00.5	+59.9	1.4	87
88	73 00.4	+59.8	0.6	74 00.4	+59.8	0.6	75 00.4	+59.8	0.7	76 00.4	+59.8	0.7	77 00.4	+59.8	0.8	78 00.4	+59.8	0.8	79 00.4	+59.8	0.9	80 00.4	+59.8	1.0	88
89	74 00.2	+59.8	0.3	75 00.2	+59.8	0.3	76 00.2	+59.8	0.4	77 00.2	+59.8	0.4	78 00.2	+59.8	0.4	79 00.2	+59.8	0.5	80 00.2	+59.8	0.5	81 00.2	+59.8	0.6	89
90	75 00.0	+59.8	0.0	76 00.0	+59.8	0.0	77 00.0	+59.8	0.0	78 00.0	+59.8	0.0	79 00.0	+59.7	0.0	80 00.0	+59.7	0.0	81 00.0	+59.7	0.0	82 00.0	+59.7	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 175°, 185°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 55.0	+59.9	173.8	13 55.3	+60.0	173.8	12 55.7	+59.9	173.8	11 56.0	+60.0	173.9	10 56.3	+60.0	173.9	9 56.7	+60.0	173.9	8 57.0	+60.0	173.9	7 57.4	+59.9	173.9	0
1	15 54.9	+60.0	173.8	14 55.3	+60.0	173.8	13 55.6	+60.0	173.8	12 56.0	+60.0	173.8	11 56.3	+60.0	173.9	10 56.7	+60.0	173.9	9 57.0	+60.0	173.9	8 57.3	+60.0	173.9	1
2	16 54.9	+60.0	173.7	15 55.3	+59.9	173.8	14 55.6	+60.0	173.8	13 56.0	+60.0	173.8	12 56.3	+60.0	173.8	11 56.7	+59.9	173.9	10 57.0	+60.0	173.9	9 57.3	+60.0	173.9	2
3	17 54.9	+60.0	173.7	16 55.2	+60.0	173.7	15 55.6	+60.0	173.8	14 56.0	+59.9	173.8	13 56.3	+60.0	173.8	12 56.6	+60.0	173.9	11 57.0	+60.0	173.9	10 57.3	+60.0	173.9	3
4	18 54.9	+59.9	173.7	17 55.2	+60.0	173.7	16 55.6	+60.0	173.7	15 55.9	+60.0	173.8	14 56.3	+60.0	173.8	13 56.6	+60.0	173.8	12 57.0	+60.0	173.9	11 57.3	+60.0	173.9	4
5	19 54.8	+60.0	173.6	18 55.2	+60.0	173.7	17 55.6	+59.9	173.7	16 55.9	+60.0	173.8	15 56.3	+60.0	173.8	14 56.6	+60.0	173.8	13 57.0	+60.0	173.8	12 57.3	+60.0	173.9	5
6	20 54.8	+60.0	173.6	19 55.2	+60.0	173.7	18 55.5	+60.0	173.7	17 55.9	+60.0	173.7	16 56.3	+60.0	173.8	15 56.6	+60.0	173.8	14 57.0	+60.0	173.8	13 57.3	+60.0	173.9	6
7	21 54.8	+60.0	173.6	20 55.2	+59.9	173.6	19 55.5	+60.0	173.7	18 55.9	+60.0	173.7	17 56.3	+59.9	173.7	16 56.6	+60.0	173.8	15 57.0	+59.9	173.8	14 57.3	+60.0	173.8	7
8	22 54.8	+59.9	173.5	21 55.1	+60.0	173.6	20 55.5	+60.0	173.6	19 55.9	+60.0	173.7	18 56.2	+60.0	173.7	17 56.6	+60.0	173.8	16 56.9	+60.0	173.8	15 57.3	+60.0	173.8	8
9	23 54.7	+60.0	173.5	22 55.1	+60.0	173.6	21 55.5	+60.0	173.6	20 55.9	+59.9	173.7	19 56.2	+60.0	173.7	18 56.6	+60.0	173.7	17 56.9	+60.0	173.8	16 57.3	+60.0	173.8	9
10	24 54.7	+60.0	173.5	23 55.1	+60.0	173.5	22 55.5	+59.9	173.6	21 55.8	+60.0	173.6	20 56.2	+60.0	173.7	19 56.6	+60.0	173.7	18 56.9	+60.0	173.8	17 57.3	+60.0	173.8	10
11	25 54.7	+60.0	173.4	24 55.1	+59.9	173.5	23 55.4	+60.0	173.6	22 55.8	+60.0	173.6	21 56.2	+60.0	173.6	20 56.6	+60.0	173.7	19 56.9	+60.0	173.7	18 57.3	+60.0	173.8	11
12	26 54.7	+59.9	173.4	25 55.0	+60.0	173.5	24 55.4	+60.0	173.5	23 55.8	+60.0	173.6	22 56.2	+60.0	173.6	21 56.6	+59.9	173.7	20 56.9	+60.0	173.7	19 57.3	+60.0	173.8	12
13	27 54.6	+60.0	173.4	26 55.0	+60.0	173.4	25 55.4	+60.0	173.5	24 55.8	+60.0	173.6	23 56.2	+60.0	173.6	22 56.5	+60.0	173.7	21 56.9	+60.0	173.7	20 57.3	+60.0	173.7	13
14	28 54.6	+60.0	173.3	27 55.0	+60.0	173.4	26 55.4	+60.0	173.5	25 55.8	+60.0	173.5	24 56.2	+59.9	173.6	23 56.5	+60.0	173.6	22 56.9	+60.0	173.7	21 57.3	+60.0	173.7	14
15	29 54.6	+59.9	173.3	28 55.0	+59.9	173.4	27 55.4	+59.9	173.4	26 55.8	+59.9	173.5	25 56.1	+60.0	173.6	24 56.5	+60.0	173.6	23 56.9	+60.0	173.7	22 57.3	+59.9	173.7	15
16	30 54.5	+60.0	173.3	29 54.9	+60.0	173.3	28 55.3	+60.0	173.4	27 55.7	+60.0	173.5	26 56.1	+60.0	173.5	25 56.5	+60.0	173.6	24 56.9	+60.0	173.6	23 57.2	+60.0	173.7	16
17	31 54.5	+60.0	173.2	30 54.9	+60.0	173.3	29 55.3	+60.0	173.4	28 55.7	+60.0	173.4	27 56.1	+60.0	173.5	26 56.5	+60.0	173.6	25 56.9	+60.0	173.6	24 57.2	+60.0	173.7	17
18	32 54.5	+59.9	173.2	31 54.9	+60.0	173.3	30 55.3	+60.0	173.3	29 55.7	+60.0	173.4	28 56.1	+60.0	173.5	27 56.5	+60.0	173.5	26 56.9	+59.9	173.6	25 57.2	+60.0	173.7	18
19	33 54.4	+60.0	173.2	32 54.9	+59.9	173.2	31 55.3	+60.0	173.3	30 55.7	+60.0	173.4	29 56.1	+60.0	173.5	28 56.5	+60.0	173.5	27 56.8	+60.0	173.6	26 57.2	+60.0	173.6	19
20	34 54.4	+60.0	173.1	33 54.8	+60.0	173.2	32 55.3	+59.9	173.3	31 55.7	+59.9	173.4	30 56.1	+59.9	173.4	29 56.5	+59.9	173.5	28 56.8	+60.0	173.6	27 57.2	+60.0	173.6	20
21	35 54.4	+59.9	173.1	34 54.8	+60.0	173.2	33 55.2	+60.0	173.2	32 55.6	+60.0	173.3	31 56.0	+60.0	173.4	30 56.4	+60.0	173.5	29 56.8	+60.0	173.5	28 57.2	+60.0	173.6	21
22	36 54.3	+60.0	173.0	35 54.8	+60.0	173.1	34 55.2	+60.0	173.2	33 55.6	+60.0	173.3	32 56.0	+60.0	173.4	31 56.4	+60.0	173.4	30 56.8	+60.0	173.5	29 57.2	+60.0	173.6	22
23	37 54.3	+60.0	173.0	36 54.8	+59.9	173.1	35 55.2	+60.0	173.2	34 55.6	+60.0	173.3	33 56.0	+60.0	173.3	32 56.4	+60.0	173.4	31 56.8	+60.0	173.5	30 57.2	+60.0	173.6	23
24	38 54.3	+59.9	173.0	37 54.7	+60.0	173.0	36 55.2	+59.9	173.1	35 55.6	+60.0	173.2	34 56.0	+60.0	173.3	33 56.4	+60.0	173.4	32 56.8	+60.0	173.5	31 57.2	+60.0	173.5	24
25	39 54.2	+60.0	172.9	38 54.7	+60.0	173.0	37 55.1	+60.0	173.1	36 55.6	+59.9	173.2	35 56.0	+60.0	173.3	34 56.4	+60.0	173.4	33 56.8	+60.0	173.4	32 57.2	+60.0	173.5	25
26	40 54.2	+60.0	172.9	39 54.7	+59.9	173.0	38 55.1	+60.0	173.1	37 55.5	+60.0	173.2	36 56.0	+59.9	173.3	35 56.4	+60.0	173.3	34 56.8	+60.0	173.4	33 57.2	+59.9	173.5	26
27	41 54.2	+59.9	172.8	40 54.6	+60.0	172.9	39 55.1	+59.9	173.0	38 55.5	+60.0	173.1	37 55.9	+60.0	173.2	36 56.4	+59.9	173.3	35 56.8	+59.9	173.4	34 57.1	+60.0	173.5	27
28	42 54.1	+60.0	172.8	41 54.6	+60.0	172.9	40 55.0	+60.0	173.0	39 55.5	+60.0	173.1	38 55.9	+60.0	173.2	37 56.3	+60.0	173.3	36 56.7	+60.0	173.4	35 57.1	+60.0	173.5	28
29	43 54.1	+59.9	172.7	42 54.6	+59.9	172.8	41 55.0	+60.0	172.9	40 55.5	+59.9	173.1	39 55.9	+60.0	173.2	38 56.3	+60.0	173.3	37 56.7	+60.0	173.3	36 57.1	+60.0	173.4	29
30	44 54.0	+60.0	172.7	43 54.5	+60.0	172.8	42 55.0	+60.0	172.9	41 55.4	+60.0	173.0	40 55.9	+60.0	173.1	39 56.3	+60.0	173.2	38 56.7	+60.0	173.3	37 57.1	+60.0	173.4	30
31	45 54.0	+59.9	172.6	44 54.5	+59.9	172.7	43 55.0	+59.9	172.9	42 55.4	+60.0	173.0	41 55.9	+59.9	173.1	40 56.3	+60.0	173.2	39 56.7	+60.0	173.3	38 57.1	+60.0	173.4	31
32	46 53.9	+60.0	172.5	45 54.4	+60.0	172.7	44 54.9	+60.0	172.8	43 55.4	+60.0	172.9	42 55.8	+60.0	173.0	41 56.3	+60.0	173.2	40 56.7	+60.0	173.3	39 57.1	+60.0	173.4	32
33	47 53.9	+59.9	172.5	46 54.4	+60.0	172.6	45 54.9	+60.0	172.8	44 55.4	+59.9	172.9	43 55.8	+60.0	173.0	42 56.3	+59.9	173.1	41 56.7	+60.0	173.2	40 57.1	+60.0	173.3	33
34	48 53.8	+60.0	172.4	47 54.4	+59.9	172.6	46 54.9	+59.9	172.7	45 55.3	+60.0	172.8	44 55.8	+60.0	173.0	43 56.2	+60.0	173.1	42 56.7	+59.9	173.2	41 57.1	+60.0	173.3	34
35	49 53.8	+59.9	172.4	48 54.3	+60.0	172.5	47 54.8	+60.0	172.7	46 55.3	+60.0	172.8	45 55.8	+59.9	172.9	44 56.2	+60.0	173.1	43 56.6	+60.0	173.2	42 57.1	+60.0	173.3	35
36	50 53.7	+60.0	172.3	49 54.3	+59.9	172.5	48 54.8	+59.9	172.6	47 55.3	+59.9	172.8	46 55.7	+60.0	172.9	45 56.2	+60.0	173.0	44 56.6	+60.0	173.1	43 57.1	+59.9	173.3	36
37	51 53.7	+59.9	172.2	50 54.2	+60.0	172.4	49 54.7	+60.0	172.6	48 55.2	+60.0	172.7	47 55.7	+60.0	172.8	46 56.2	+60.0	173.0	45 56.6	+60.0	173.1	44 57.0	+60.0	173.2	37
38	52 53.6	+60.0	172.2	51 54.2	+59.9	172.3	50 54.7	+60.0	172.5	49 55.2	+60.0	172.6	48 55.7	+60.0	172.8	47 56.2	+59.9	172.9	46 56.6	+60.0	173.1	45 57.0	+60.0	173.2	38
39	53 53.6	+59.9	172.1	52 54.1	+60.0	172.3	51 54.7	+59.9	172.4	50 55.2	+59.9	172.6	49 55.7	+59.9	172.8	48 56.1	+60.0	172.9	47 56.6	+60.0	173.0	46 57.0	+60.0	173.2	39
40	54 53.5	+59.9	172.0	53 54.1	+59.9	172.2	52 54.6	+60.0	172.4	51 55.1	+60.0	172.5	50 55.6	+60.0	172.7	49 56.1	+60.0	172.9	48 56.6	+59.9	173.0	47 57.0	+60.0	173.1	40
41	55 53.4	+60.0	171.9	54 54.0	+60.0	172.1	53 54.6	+59.9	172.3	52 55.1	+60.0	172.5	51 55.6	+60.0	172.7	50 56.1	+60.0	172.8	49 56.5	+60.0	173.0	48 57.0	+60.0	173.1	41
42	56 53.4	+59.9	171.8	55 54.0	+59.9	172.0	54 54.5	+60.0	172.2	53 55.1	+59.9	172.4	52 55.6	+59.9	172.6	51 56.1	+59.9	172.8	50 56.5	+60.0	172.9	49 57.0	+60.0	173.1	42
43	57 53.3	+59.9	171.7	56 53.9	+59.9	172.0	55 54.5	+59.9	172.2	54 55.0	+60.0	172.4	53 55.5	+60.0	172.5	52 56.0	+60.0	172.7	51 56.5	+60.0	172.9	50 57.0	+59.9	173.0	43
44	58 53.2	+59.9	171.6	57 53.8	+60.0	171.9	56 54.4	+60.0	172.1	55 55.0	+59.9	172.3	54 55.5	+60.0	172.5	53 56.0	+60.0	172.7	52 56.5	+60.0	172.8	51 56.9	+60.0	173.0	44
45	59 53.1	+59.9	171.5	58 53.8	+59.9	171.8	57 54.4	+59.9	172.0	56 54.9	+60.0	172.2	55 55.5	+59.9	172.4	54 56.0	+59.9	172.6	53 56.5	+59.9	172.8	52 56.9	+60.0	173.0	45
46	60 53.0	+59.9	171.4	59 53.7	+59.9	171.7	58 54.3	+59.9	171.9	57 54.9	+59.9	172.1	56 55.4	+60.0	172.4	55 55.9	+60.0	172.6	54 56.4	+60.0	172.7	53 56.9	+60.0	172.9	46
47	61 52.9	+59.9	171.3	60 53.6	+59.9	171.6	59 54.2	+60.0	171.8	58 54.8	+60.0	172.1	57 55.4	+59.9	172.3	56 55.9	+60.0	172.5	55 56.4	+60.0	172.7	54 56.9	+60.0	172.9	47
48	62 52.8	+59.9	171.2	61 53.5	+59.9	171.5	60 54.2	+59.9	171.7	59 54.8	+59.9	172.0	58 55.3	+60.0	172.2	57 55.9	+59.9	172.4	56 56.4	+60.0	172.6	55 56.9	+59.9	172.8	48
49	63 52.7	+59.9	171.0	62 53.4	+59.9	171.3	61 54.1	+59.9	171.6	60 54.7	+59.9	171.9	59 55.3	+59.9	172.1	58 55.8	+60.0	172.4	57 56.4	+59.9	172.6	56 56.8	+60.0	172.8	49
50	64 52.6	+59.9	170.9	63 53.3	+59.9	171.2	62 54.0	+59.9	171.5	61 54.6	+60.0	171.8	60 55.2	+60.0	172.1	59 55.8	+60.0	172.3	58 56.3	+60.0	172.5	57 56.8	+60.0	172.7	50
51	65 52.5	+59.8	170.7	64 53.2	+59.9	171.1	63 53.9	+59.9	171.4	62 54.6	+59.9	171.7	61 55.2	+59.9	172.0	60 55.8	+59.9	172.2	59 56.3	+60.0	172.5	58 56.8	+60.0	172.7	51
52	66 52.3	+59.9	170.6	65 53.1	+59.9	170.9	64 53.8	+59.9	171.3	63 54.5	+59.9	171.6	62 55.1	+60.0	171.9	61 55.7	+60.0	172.1	60 56.3	+59.9	172.4	59 56.8	+59.9	172.6	52
53	67 52.2	+59.8	170.4	66 53.0	+59.9	170.8	65 53.7	+59.9	171.1	64 54.4	+60.0	171.5	63 55.1	+59.9	171.8	62 55.7	+59.9	172.1	61 56.2	+60.0	172.3	60 56.7	+60.0	172.6	53
54	68 52.0	+59.9	170.2	67 52.9	+59.8	170.6	66 53.6	+59.9	171.0	65 54.4	+59.9	171.3	64 55.0	+59.9	171.7	63 55.6	+60.0	172.0	62 56.2	+59.9	172.2	61 56.7	+60.0	172.5	54
55	69 51.9	+59.8	170.0	68 52.7	+59.9	170.4	67 53.5	+59.9	170.8	66 54.3	+59.9	171.2	65 54.9	+60.0	171.6	64 55.6	+59.9	171.9	63 56.1	+60.0	172.2	62 56.7	+60.0	172.4	55
56	70 51.7	+59.7	169.7	69 52.6	+59.8	170.2	68 53.4	+59.9	170.7	67 54.2	+59.9	171.1	66 54.9	+59.9	171.4	65 55.5	+59.9	171.8	64 56.1	+60.0	172.1	63 56.7	+59.9	172.4	56
57	71 51.4	+59.8	169.5	70 52.4	+59.8	170.0	69 53.3	+59.8	170.5	68 54.1	+59.8	170.9	67 54.8	+59.9	171.3	66 55.4	+60.0	171.6	65 56.1	+59.9	172.0	64 56.6	+60.0	172.3	57
58	72 51.2	+59.7	169.2	71 52.2	+59.8	169.7	70 53.1	+59.9	170.3	69 53.9	+59.9	170.7	68 54.7	+59.9	171.1	67 55.4	+59.9	171.5	66 56.0	+60.0	171.9	65 56.6	+59.9	172.2	58
59	73 50.9	+59.7	168.8	72 52.0	+59.8	169.5	71 53.0	+59.8	170.0	70 53.8	+59.9	170.5	69 54.6	+59.9	171.0	68 55.3	+59.9	171.4	67 56.0	+59.9	171.8	66 56.5	+60.0	172.1	59
60	74 50.6	+59.7	168.5	73 51.8	+59.7	169.2	72 52.8	+59.8	169.8	71 53.7	+59.8	170.3	70 54.5	+59.9	170.8	69 55.2	+59.9	171.2	68 55.9	+59.9	171.6	67 56.5	+60.0	172.0	60
61	75 50.3	+59.6	168.0	74 51.5	+59.7	168.8	73 52.6	+59.7	169.5	72 53.5	+59.9	170.1	71 54.4	+59.8	170.6	70 55.1	+59.9	171.1	69 55.8	+60.0	171.5	68 56.5	+59.9	171.9	61
62	76 49.9	+59.5	167.6	75 51.2	+59.7	168.4	74 52.3	+59.8	169.2	73 53.4	+59.8	169.8	72 54.2	+59.9	170.4	71 55.0	+59.9	170.9	70 55.8	+59.9	171.4	69 56.4	+60.0	171.8	62
63	77 49.4	+59.5	167.0	76 50.9	+59.6	168.0	75 52.1	+59.7	168.8	74 53.2	+59.7	169.5	73 54.1	+59.8	170.1	72 54.9	+59.9	170.7	71 55.7	+59.9	171.2	70 56.4	+59.9	171.6	63
64	78 48.9	+59.4	166.3	77 50.5	+59.5	167.4	76 51.8	+59.6	168.4	75 52.9	+59.8	169.2	74 53.9	+59.8	169.9	73 54.8	+59.9	170.5	72 55.6	+59.9	171.0	71 56.3	+59.9	171.5	64
65	79 48.3	+59.2	165.5	78 50.0	+59.4	166.8	77 51.4	+59.6	167.9	76 52.7	+59.7	168.8	75 53.7	+59.8	169.6	74 54.7	+59.8	170.2	73 55.5	+59.9	170.8	72 56.2	+59.9	171.3	65
66	80 47.5	+59.0	164.6	79 49.4	+59.3	166.1	78 51.0	+59.5	167.3	77 52.4	+59.6	168.3	76 53.5	+59.8	169.2	75 54.5	+59.8	169.9	74 55.4	+59.9	170.6	73 56.1	+60.0	171.2	66
67	81 46.5	+58.8	163.4	80 48.7	+59.2	165.2	79 50.5	+59.4	166.6	78 52.0	+59.6	167.8	77 53.3	+59.7	168.8	76 54.3	+59.8	169.6	75 55.3	+59.8	170.3	74 56.1	+59.9	171.0	67
68	82 45.3	+58.4	161.9	81 47.9	+58.9	164.1	80 49.9	+59.3	165.8	79 51.6	+59.5	167.1	78 53.0	+59.6	168.3	77 54.1	+59.8	169.2	76 55.1	+59.8	170.0	75 56.0	+59.8	170.7	68
69	83 43.7	+57.7	159.9	82 46.8	+58.6	162.7	81 49.2	+59.1	164.7	80 51.1	+59.4	166.4	79 52.6	+59.6	167.7	78 53.9	+59.7	168.8	77 54.9	+59.8	169.7	76 55.8	+59.9	170.5	69
70	84 41.4	+56.8	157.3	83 45.4	+58.0	160.8	82 48.3	+58.7	163.4	81 50.5	+59.2	165.4	80 52.2	+59.5	167.0	79 53.6	+59.6	168.2	78 54.7	+59.8	169.3	77 55.7	+59.8	170.2	70
71	85 38.2	*+55.0*	•153.4	84 43.4	+57.2	158.3	83 47.0	+58.3	161.7	82 49.7	+58.9	164.2	81 51.7	+59.3	166.1	80 53.2	+59.6	167.6	79 54.5	+59.7	168.8	78 55.5	+59.9	169.8	71
72	86 33.2	*+51.2*	•147.5	85 40.6	*+55.5*	•154.6	84 45.3	+57.6	159.3	83 48.6	+58.5	162.6	82 51.0	+59.1	165.0	81 52.8	+59.4	166.8	80 54.2	+59.7	168.2	79 55.4	+59.7	169.4	72
73	87 24.4	*+42.3*	•137.5	86 36.1	*+52.1*	•149.0	85 42.9	*+56.0*	•155.9	84 47.1	+57.9	160.3	83 50.1	+58.7	163.5	82 52.2	+59.3	165.7	81 53.9	+59.5	167.5	80 55.1	+59.7	168.8	73
74	88 06.7	*+20.2*	•119.0	87 28.2	*+43.6*	•139.2	86 38.9	*+53.0*	•150.5	85 45.0	*+56.6*	•157.1	84 48.8	+58.2	161.4	83 51.5	+58.9	164.4	82 53.4	+59.4	166.5	81 54.8	+59.7	168.2	74
75	88 26.9	*–15.1*	• 87.1	88 11.8	*+21.1*	•120.7	87 31.9	*+44.9*	•141.1	86 41.6	*+53.8*	•152.0	85 47.0	+57.1	158.4	84 50.4	+58.5	162.5	83 52.8	+59.1	165.3	82 54.5	+59.5	167.3	75
76	88 11.8	*–39.9*	• 53.5	88 32.9	*–16.1*	• 87.1	88 16.8	*+22.3*	•122.6	87 35.4	*+46.3*	•143.0	86 44.1	*+54.6*	•153.6	85 48.9	+57.6	159.7	84 51.9	+58.8	163.6	83 54.0	+59.3	166.2	76
77	87 31.9	*–50.3*	• 33.1	88 16.8	*–41.4*	• 51.6	88 39.1	*–17.4*	• 87.1	88 21.7	*+23.5*	•124.6	87 38.7	*+47.8*	•145.1	86 46.5	*+55.4*	•155.3	85 50.7	+58.0	161.1	84 53.3	+59.0	164.7	77
78	86 41.6	*–54.6*	• 22.1	87 35.4	*–51.3*	• 31.1	88 21.7	*–43.0*	• 49.5	88 45.2	*–18.7*	• 87.1	88 26.5	*+24.8*	•126.9	87 41.9	*+49.3*	•147.2	86 48.7	*+56.1*	•157.0	85 52.3	+58.4	162.4	78
79	85 47.0	–56.6	15.7	86 44.1	*–55.2*	• 20.5	87 38.7	*–52.2*	• 29.0	88 26.5	*–44.6*	• 47.2	88 51.3	*–20.1*	• 87.1	88 31.2	*+26.3*	•129.5	87 44.8	*+50.8*	•149.5	86 50.7	*+56.9*	•158.8	79
80	84 50.4	–57.6	11.6	85 48.9	–57.0	14.4	86 46.5	*–55.8*	• 18.8	87 41.9	*–53.2*	• 26.9	88 31.2	*–46.4*	• 44.6	88 57.5	*–21.9*	• 87.0	88 35.6	*+28.1*	•132.3	87 47.6	*+52.3*	•151.9	80
81	83 52.8	–58.3	8.8	84 51.9	–57.9	10.5	85 50.7	–57.4	13.0	86 48.7	*–56.4*	• 17.1	87 44.8	*–54.1*	• 24.6	88 35.6	*–48.0*	• 41.8	89 03.7	*–23.8*	• 87.0	88 39.9	*+30.0*	•135.4	81
82	82 54.5	–58.7	6.8	83 54.0	–58.5	7.9	84 53.3	–58.2	9.4	85 52.3	–57.7	11.7	86 50.7	*–56.9*	• 15.3	87 47.6	*–55.1*	• 22.2	88 39.9	*–49.8*	• 38.6	89 09.9	*–26.0*	• 87.0	82
83	81 55.8	–59.0	5.2	82 55.5	–58.9	5.9	83 55.1	–58.7	6.9	84 54.6	–58.5	8.3	85 53.8	–58.1	10.3	86 52.5	–57.4	13.5	87 50.1	*–55.9*	• 19.7	88 43.9	*–51.5*	• 35.1	83
84	80 56.8	–59.2	4.0	81 56.6	–59.1	4.5	82 56.4	–59.0	5.1	83 56.1	–58.9	5.9	84 55.7	–58.7	7.1	85 55.1	–58.4	8.8	86 54.2	–57.9	11.7	87 52.4	*–56.7*	• 17.1	84
85	79 57.6	–59.4	3.0	80 57.5	–59.3	3.3	81 57.4	–59.3	3.7	82 57.2	–59.2	4.3	83 57.0	–59.1	5.0	84 56.7	–58.9	5.9	85 56.3	–58.6	7.4	86 55.7	–58.3	9.8	85
86	78 58.2	–59.4	2.2	79 58.2	–59.4	2.4	80 58.1	–59.4	2.7	81 58.0	–59.3	3.0	82 57.9	–59.2	3.4	83 57.8	–59.2	4.0	84 57.7	–59.2	4.8	85 57.4	–59.0	5.9	86
87	77 58.8	–59.6	1.5	78 58.8	–59.6	1.6	79 58.7	–59.5	1.8	80 58.7	–59.5	2.0	81 58.7	–59.5	2.2	82 58.6	–59.4	2.6	83 58.5	–59.3	3.0	84 58.4	–59.3	3.6	87
88	76 59.2	–59.6	0.9	77 59.2	–59.6	1.0	78 59.2	–59.6	1.1	79 59.2	–59.6	1.2	80 59.2	–59.6	1.3	81 59.2	–59.6	1.5	82 59.2	–59.6	1.7	83 59.1	–59.5	2.0	88
89	75 59.6	–59.6	0.4	76 59.6	–59.6	0.5	77 59.6	–59.6	0.5	78 59.6	–59.6	0.5	79 59.6	–59.6	0.6	80 59.6	–59.6	0.7	81 59.6	–59.6	0.8	82 59.6	–59.6	0.9	89
90	75 00.0	–59.7	0.0	76 00.0	–59.7	0.0	77 00.0	–59.7	0.0	78 00.0	–59.7	0.0	79 00.0	–59.7	0.0	80 00.0	–59.7	0.0	81 00.0	–59.7	0.0	82 00.0	–59.7	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 6°, 354°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 55.0	−60.0	173.8	13 55.3	−60.0	173.8	12 55.7	−60.0	173.8	11 56.0	−60.0	173.9	10 56.3	−59.9	173.9	9 56.7	−60.0	173.9	8 57.0	−60.0	173.9	7 57.4	−60.0	173.9	**0**
1	13 55.0	−60.0	173.8	12 55.3	−60.0	173.8	11 55.7	−60.0	173.9	10 56.0	−60.0	173.9	9 56.4	−60.0	173.9	8 56.7	−60.0	173.9	7 57.0	−60.0	173.9	6 57.4	−60.0	174.0	**1**
2	12 55.0	−60.0	173.8	11 55.3	−59.9	173.9	10 55.7	−60.0	173.9	9 56.0	−60.0	173.9	8 56.4	−60.0	173.9	7 56.7	−60.0	173.9	6 57.0	−60.0	174.0	5 57.4	−60.0	174.0	**2**
3	11 55.0	−60.0	173.9	10 55.4	−60.0	173.9	9 55.7	−60.0	173.9	8 56.0	−59.9	173.9	7 56.4	−60.0	174.0	6 56.7	−60.0	174.0	5 57.0	−59.9	174.0	4 57.4	−60.0	174.0	**3**
4	10 55.0	−59.9	173.9	9 55.4	−60.0	173.9	8 55.7	−60.0	173.9	7 56.1	−60.0	174.0	6 56.4	−60.0	174.0	5 56.7	−60.0	174.0	4 57.1	−60.0	174.0	3 57.4	−60.0	174.0	**4**
5	9 55.1	−60.0	173.9	8 55.4	−60.0	173.9	7 55.7	−59.9	174.0	6 56.1	−60.0	174.0	5 56.4	−60.0	174.0	4 56.7	−60.0	174.0	3 57.1	−60.0	174.0	2 57.4	−60.0	174.0	**5**
6	8 55.1	−60.0	174.0	7 55.4	−60.0	174.0	6 55.8	−60.0	174.0	5 56.1	−60.0	174.0	4 56.4	−60.0	174.0	3 56.7	−60.0	174.0	2 57.1	−60.0	174.0	1 57.4	−60.0	174.0	**6**
7	7 55.1	−60.0	174.0	6 55.4	−59.9	174.0	5 55.8	−60.0	174.0	4 56.1	−60.0	174.0	3 56.4	−60.0	174.0	2 56.7	−59.9	174.0	1 57.1	−60.0	174.0	0 57.4	−60.0	174.0	**7**
8	6 55.1	−59.9	174.0	5 55.5	−60.0	174.0	4 55.8	−60.0	174.0	3 56.1	−60.0	174.0	2 56.4	−60.0	174.1	1 56.8	−60.0	174.1	0 57.1	−60.0	174.1	0 02.6	+60.0	5.9	**8**
9	5 55.2	−60.0	174.0	4 55.5	−60.0	174.1	3 55.8	−60.0	174.1	2 56.1	−60.0	174.1	1 56.4	−59.9	174.1	0 56.8	−60.0	174.1	0 02.9	+60.0	5.9	1 02.6	+60.0	5.9	**9**
10	4 55.2	−60.0	174.1	3 55.5	−60.0	174.1	2 55.8	−60.0	174.1	1 56.1	−59.9	174.1	0 56.5	−60.0	174.1	0 03.2	+60.0	5.9	1 02.9	+60.0	5.9	2 02.6	+60.0	5.9	**10**
11	3 55.2	−60.0	174.1	2 55.5	−60.0	174.1	1 55.8	−59.9	174.1	0 56.2	−60.0	174.1	0 03.5	+60.0	5.9	1 03.2	+60.0	5.9	2 02.9	+60.0	5.9	3 02.6	+60.0	5.9	**11**
12	2 55.2	−60.0	174.1	1 55.5	−59.9	174.1	0 55.9	−60.0	174.1	0 03.8	+60.0	5.9	1 03.5	+60.0	5.9	2 03.2	+60.0	5.9	3 02.9	+60.0	5.9	4 02.6	+60.0	5.9	**12**
13	1 55.2	−59.9	174.2	0 55.6	−60.0	174.2	0 04.1	+60.0	5.8	1 03.8	+60.0	5.8	2 03.5	+60.0	5.8	3 03.2	+60.0	5.9	4 02.9	+60.0	5.9	5 02.6	+60.0	5.9	**13**
14	0 55.3	−60.0	174.2	0 04.4	+60.0	5.8	1 04.1	+60.0	5.8	2 03.8	+60.0	5.8	3 03.5	+60.0	5.8	4 03.2	+60.0	5.8	5 02.9	+60.0	5.8	6 02.6	+60.0	5.9	**14**
15	0 04.7	+60.0	5.8	1 04.4	+60.0	5.8	2 04.1	+60.0	5.8	3 03.8	+60.0	5.8	4 03.5	+60.0	5.8	5 03.2	+60.0	5.8	6 02.9	+60.0	5.8	7 02.6	+59.9	5.8	**15**
16	1 04.7	+60.0	5.8	2 04.4	+60.0	5.8	3 04.1	+60.0	5.8	4 03.8	+60.0	5.8	5 03.5	+60.0	5.8	6 03.2	+60.0	5.8	7 02.9	+59.9	5.8	8 02.5	+60.0	5.8	**16**
17	2 04.7	+59.9	5.7	3 04.4	+59.9	5.7	4 04.1	+59.9	5.8	5 03.8	+59.9	5.8	6 03.5	+59.9	5.8	7 03.2	+59.9	5.8	8 02.8	+60.0	5.8	9 02.5	+60.0	5.8	**17**
18	3 04.6	+60.0	5.7	4 04.3	+60.0	5.7	5 04.0	+60.0	5.7	6 03.7	+60.0	5.7	7 03.4	+60.0	5.7	8 03.1	+60.0	5.8	9 02.8	+60.0	5.8	10 02.5	+60.0	5.8	**18**
19	4 04.6	+60.0	5.7	5 04.3	+60.0	5.7	6 04.0	+60.0	5.7	7 03.7	+60.0	5.7	8 03.4	+60.0	5.7	9 03.1	+60.0	5.7	10 02.8	+60.0	5.8	11 02.5	+60.0	5.8	**19**
20	5 04.6	+60.0	5.7	6 04.3	+60.0	5.7	7 04.0	+60.0	5.7	8 03.7	+60.0	5.7	9 03.4	+60.0	5.7	10 03.1	+60.0	5.7	11 02.8	+60.0	5.7	12 02.5	+60.0	5.8	**20**
21	6 04.6	+60.0	5.6	7 04.3	+60.0	5.6	8 04.0	+60.0	5.7	9 03.7	+60.0	5.7	10 03.4	+60.0	5.7	11 03.1	+60.0	5.7	12 02.8	+60.0	5.7	13 02.5	+60.0	5.7	**21**
22	7 04.6	+59.9	5.6	8 04.3	+59.9	5.6	9 04.0	+60.0	5.6	10 03.7	+60.0	5.6	11 03.4	+60.0	5.7	12 03.1	+60.0	5.7	13 02.8	+60.0	5.7	14 02.5	+60.0	5.7	**22**
23	8 04.5	+60.0	5.6	9 04.2	+60.0	5.6	10 04.0	+59.9	5.6	11 03.7	+60.0	5.6	12 03.4	+60.0	5.6	13 03.1	+60.0	5.7	14 02.8	+60.0	5.7	15 02.5	+60.0	5.7	**23**
24	9 04.5	+60.0	5.5	10 04.2	+60.0	5.6	11 03.9	+60.0	5.6	12 03.7	+59.9	5.6	13 03.4	+60.0	5.6	14 03.1	+60.0	5.6	15 02.8	+60.0	5.7	16 02.5	+60.0	5.7	**24**
25	10 04.5	+60.0	5.5	11 04.2	+60.0	5.5	12 03.9	+60.0	5.6	13 03.6	+60.0	5.6	14 03.4	+59.9	5.6	15 03.1	+60.0	5.6	16 02.8	+60.0	5.7	17 02.5	+60.0	5.7	**25**
26	11 04.5	+59.9	5.5	12 04.2	+60.0	5.5	13 03.9	+60.0	5.5	14 03.6	+60.0	5.6	15 03.3	+60.0	5.6	16 03.1	+59.9	5.6	17 02.8	+60.0	5.6	18 02.5	+60.0	5.7	**26**
27	12 04.4	+60.0	5.5	13 04.2	+59.9	5.5	14 03.9	+60.0	5.5	15 03.6	+60.0	5.5	16 03.3	+60.0	5.6	17 03.0	+60.0	5.6	18 02.8	+60.0	5.6	19 02.5	+60.0	5.7	**27**
28	13 04.4	+60.0	5.4	14 04.1	+60.0	5.5	15 03.9	+60.0	5.5	16 03.6	+60.0	5.5	17 03.3	+60.0	5.5	18 03.0	+60.0	5.6	19 02.8	+59.9	5.6	20 02.5	+60.0	5.6	**28**
29	14 04.4	+60.0	5.4	15 04.1	+60.0	5.4	16 03.9	+59.9	5.5	17 03.6	+60.0	5.5	18 03.3	+60.0	5.5	19 03.0	+60.0	5.6	20 02.7	+60.0	5.6	21 02.5	+59.9	5.6	**29**
30	15 04.4	+59.9	5.4	16 04.1	+60.0	5.4	17 03.8	+60.0	5.4	18 03.6	+60.0	5.5	19 03.3	+60.0	5.5	20 03.0	+60.0	5.5	21 02.7	+60.0	5.6	22 02.4	+60.0	5.6	**30**
31	16 04.3	+60.0	5.4	17 04.1	+60.0	5.4	18 03.8	+60.0	5.4	19 03.6	+59.9	5.4	20 03.3	+60.0	5.5	21 03.0	+60.0	5.5	22 02.7	+60.0	5.5	23 02.4	+60.0	5.6	**31**
32	17 04.3	+60.0	5.3	18 04.1	+59.9	5.4	19 03.8	+60.0	5.4	20 03.5	+60.0	5.4	21 03.3	+60.0	5.5	22 03.0	+60.0	5.5	23 02.7	+60.0	5.5	24 02.4	+60.0	5.6	**32**
33	18 04.3	+60.0	5.3	19 04.0	+60.0	5.3	20 03.8	+60.0	5.4	21 03.5	+60.0	5.4	22 03.3	+59.9	5.4	23 03.0	+60.0	5.5	24 02.7	+60.0	5.5	25 02.4	+60.0	5.6	**33**
34	19 04.3	+59.9	5.3	20 04.0	+60.0	5.3	21 03.8	+59.9	5.3	22 03.5	+60.0	5.4	23 03.2	+60.0	5.4	24 03.0	+60.0	5.4	25 02.7	+60.0	5.5	26 02.4	+60.0	5.5	**34**
35	20 04.2	+60.0	5.2	21 04.0	+60.0	5.3	22 03.7	+60.0	5.3	23 03.5	+60.0	5.3	24 03.2	+60.0	5.4	25 03.0	+59.9	5.4	26 02.7	+60.0	5.5	27 02.4	+60.0	5.5	**35**
36	21 04.2	+60.0	5.2	22 04.0	+60.0	5.2	23 03.7	+60.0	5.3	24 03.5	+60.0	5.3	25 03.2	+60.0	5.4	26 02.9	+60.0	5.4	27 02.7	+60.0	5.4	28 02.4	+60.0	5.5	**36**
37	22 04.2	+60.0	5.2	23 04.0	+59.9	5.2	24 03.7	+60.0	5.2	25 03.5	+59.9	5.3	26 03.2	+60.0	5.3	27 02.9	+60.0	5.4	28 02.7	+60.0	5.4	29 02.4	+60.0	5.5	**37**
38	23 04.2	+59.9	5.1	24 03.9	+60.0	5.2	25 03.7	+60.0	5.2	26 03.4	+60.0	5.3	27 03.2	+60.0	5.3	28 02.9	+60.0	5.4	29 02.7	+59.9	5.4	30 02.4	+60.0	5.5	**38**
39	24 04.1	+60.0	5.1	25 03.9	+60.0	5.1	26 03.7	+59.9	5.2	27 03.4	+60.0	5.2	28 03.2	+59.9	5.3	29 02.9	+60.0	5.3	30 02.6	+60.0	5.4	31 02.4	+60.0	5.4	**39**
40	25 04.1	+60.0	5.1	26 03.9	+60.0	5.1	27 03.6	+60.0	5.2	28 03.4	+60.0	5.2	29 03.1	+60.0	5.3	30 02.9	+60.0	5.3	31 02.6	+60.0	5.4	32 02.4	+60.0	5.4	**40**
41	26 04.1	+60.0	5.0	27 03.9	+59.9	5.1	28 03.6	+60.0	5.1	29 03.4	+60.0	5.2	30 03.1	+60.0	5.2	31 02.9	+60.0	5.3	32 02.6	+60.0	5.3	33 02.4	+59.9	5.4	**41**
42	27 04.1	+59.9	5.0	28 03.8	+60.0	5.1	29 03.6	+60.0	5.1	30 03.4	+59.9	5.1	31 03.1	+60.0	5.2	32 02.9	+60.0	5.3	33 02.6	+60.0	5.3	34 02.3	+60.0	5.4	**42**
43	28 04.0	+60.0	5.0	29 03.8	+60.0	5.0	30 03.6	+60.0	5.1	31 03.3	+60.0	5.1	32 03.1	+60.0	5.2	33 02.9	+59.9	5.2	34 02.6	+60.0	5.3	35 02.3	+60.0	5.4	**43**
44	29 04.0	+60.0	4.9	30 03.8	+60.0	5.0	31 03.6	+59.9	5.0	32 03.3	+60.0	5.1	33 03.1	+60.0	5.1	34 02.8	+60.0	5.2	35 02.6	+60.0	5.3	36 02.3	+60.0	5.3	**44**
45	30 04.0	+60.0	4.9	31 03.8	+59.9	4.9	32 03.5	+60.0	5.0	33 03.3	+60.0	5.1	34 03.1	+59.9	5.1	35 02.8	+60.0	5.2	36 02.6	+60.0	5.2	37 02.3	+60.0	5.3	**45**
46	31 04.0	+59.9	4.9	32 03.7	+60.0	4.9	33 03.5	+60.0	5.0	34 03.3	+60.0	5.0	35 03.0	+60.0	5.1	36 02.8	+60.0	5.2	37 02.6	+60.0	5.2	38 02.3	+60.0	5.3	**46**
47	32 03.9	+60.0	4.8	33 03.7	+60.0	4.9	34 03.5	+60.0	4.9	35 03.3	+59.9	5.0	36 03.0	+60.0	5.1	37 02.8	+60.0	5.1	38 02.6	+59.9	5.2	39 02.3	+60.0	5.3	**47**
48	33 03.9	+60.0	4.8	34 03.7	+60.0	4.8	35 03.5	+59.9	4.9	36 03.2	+60.0	5.0	37 03.0	+60.0	5.0	38 02.8	+60.0	5.1	39 02.5	+60.0	5.2	40 02.3	+60.0	5.2	**48**
49	34 03.9	+59.9	4.7	35 03.7	+59.9	4.8	36 03.4	+60.0	4.9	37 03.2	+60.0	4.9	38 03.0	+60.0	5.0	39 02.8	+59.9	5.1	40 02.5	+60.0	5.1	41 02.3	+60.0	5.2	**49**
50	35 03.8	+60.0	4.7	36 03.6	+60.0	4.8	37 03.4	+60.0	4.8	38 03.2	+60.0	4.9	39 03.0	+60.0	5.0	40 02.7	+60.0	5.0	41 02.5	+60.0	5.1	42 02.3	+60.0	5.2	**50**
51	36 03.8	+60.0	4.7	37 03.6	+60.0	4.7	38 03.4	+60.0	4.8	39 03.2	+59.9	4.9	40 03.0	+59.9	4.9	41 02.7	+60.0	5.0	42 02.5	+60.0	5.1	43 02.3	+59.9	5.2	**51**
52	37 03.8	+59.9	4.6	38 03.6	+59.9	4.7	39 03.4	+59.9	4.8	40 03.1	+60.0	4.8	41 02.9	+60.0	4.9	42 02.7	+60.0	5.0	43 02.5	+60.0	5.1	44 02.2	+60.0	5.1	**52**
53	38 03.7	+60.0	4.6	39 03.5	+60.0	4.6	40 03.3	+60.0	4.7	41 03.1	+60.0	4.8	42 02.9	+60.0	4.9	43 02.7	+60.0	4.9	44 02.5	+59.9	5.0	45 02.2	+60.0	5.1	**53**
54	39 03.7	+60.0	4.5	40 03.5	+60.0	4.6	41 03.3	+60.0	4.7	42 03.1	+60.0	4.7	43 02.9	+60.0	4.8	44 02.7	+60.0	4.9	45 02.4	+60.0	5.0	46 02.2	+60.0	5.1	**54**
55	40 03.7	+59.9	4.5	41 03.5	+59.9	4.6	42 03.3	+59.9	4.6	43 03.1	+59.9	4.7	44 02.9	+59.9	4.8	45 02.7	+59.9	4.9	46 02.4	+60.0	5.0	47 02.2	+60.0	5.0	**55**
56	41 03.6	+60.0	4.4	42 03.4	+60.0	4.5	43 03.2	+60.0	4.6	44 03.0	+60.0	4.7	45 02.8	+60.0	4.7	46 02.6	+60.0	4.8	47 02.4	+60.0	4.9	48 02.2	+60.0	5.0	**56**
57	42 03.6	+59.9	4.4	43 03.4	+60.0	4.5	44 03.2	+60.0	4.5	45 03.0	+60.0	4.6	46 02.8	+60.0	4.7	47 02.6	+60.0	4.8	48 02.4	+60.0	4.9	49 02.2	+60.0	5.0	**57**
58	43 03.5	+60.0	4.3	44 03.4	+59.9	4.4	45 03.2	+59.9	4.5	46 03.0	+60.0	4.6	47 02.8	+60.0	4.7	48 02.6	+60.0	4.8	49 02.4	+60.0	4.8	50 02.2	+59.9	4.9	**58**
59	44 03.5	+59.9	4.3	45 03.3	+60.0	4.4	46 03.1	+60.0	4.4	47 03.0	+59.9	4.5	48 02.8	+59.9	4.6	49 02.6	+59.9	4.7	50 02.4	+59.9	4.8	51 02.1	+60.0	4.9	**59**
60	45 03.4	+60.0	4.2	46 03.3	+59.9	4.3	47 03.1	+60.0	4.4	48 02.9	+60.0	4.5	49 02.7	+60.0	4.6	50 02.5	+60.0	4.7	51 02.3	+60.0	4.8	52 02.1	+60.0	4.9	**60**
61	46 03.4	+60.0	4.2	47 03.2	+60.0	4.3	48 03.1	+59.9	4.3	49 02.9	+60.0	4.4	50 02.7	+60.0	4.5	51 02.5	+60.0	4.6	52 02.3	+60.0	4.7	53 02.1	+60.0	4.8	**61**
62	47 03.4	+59.9	4.1	48 03.2	+60.0	4.2	49 03.0	+60.0	4.3	50 02.9	+59.9	4.4	51 02.7	+60.0	4.5	52 02.5	+60.0	4.6	53 02.3	+60.0	4.7	54 02.1	+60.0	4.8	**62**
63	48 03.3	+60.0	4.1	49 03.2	+59.9	4.2	50 03.0	+60.0	4.2	51 02.8	+60.0	4.3	52 02.7	+59.9	4.4	53 02.5	+59.9	4.5	54 02.3	+60.0	4.6	55 02.1	+60.0	4.7	**63**
64	49 03.3	+59.9	4.0	50 03.1	+60.0	4.1	51 03.0	+59.9	4.2	52 02.8	+60.0	4.3	53 02.6	+60.0	4.4	54 02.4	+60.0	4.5	55 02.3	+59.9	4.6	56 02.1	+59.9	4.7	**64**
65	50 03.2	+60.0	3.9	51 03.1	+59.9	4.0	52 02.9	+60.0	4.1	53 02.8	+59.9	4.2	54 02.6	+59.9	4.3	55 02.4	+60.0	4.4	56 02.2	+60.0	4.5	57 02.0	+60.0	4.7	**65**
66	51 03.2	+59.9	3.9	52 03.0	+60.0	4.0	53 02.9	+59.9	4.1	54 02.7	+60.0	4.2	55 02.5	+60.0	4.3	56 02.4	+59.9	4.4	57 02.2	+60.0	4.5	58 02.0	+60.0	4.6	**66**
67	52 03.1	+59.9	3.8	53 03.0	+59.9	3.9	54 02.8	+60.0	4.0	55 02.7	+59.9	4.1	56 02.5	+60.0	4.2	57 02.3	+60.0	4.3	58 02.2	+59.9	4.4	59 02.0	+60.0	4.6	**67**
68	53 03.0	+60.0	3.7	54 02.9	+59.9	3.8	55 02.8	+59.9	3.9	56 02.6	+60.0	4.0	57 02.5	+59.9	4.1	58 02.3	+60.0	4.2	59 02.1	+60.0	4.4	60 02.0	+59.9	4.5	**68**
69	54 03.0	+59.9	3.7	55 02.8	+60.0	3.7	56 02.7	+60.0	3.8	57 02.6	+59.9	3.9	58 02.4	+60.0	4.1	59 02.3	+59.9	4.2	60 02.1	+60.0	4.3	61 01.9	+60.0	4.4	**69**
70	55 02.9	+59.9	3.6	56 02.8	+59.9	3.7	57 02.7	+59.9	3.8	58 02.5	+60.0	3.9	59 02.4	+59.9	4.0	60 02.2	+60.0	4.1	61 02.1	+59.9	4.2	62 01.9	+60.0	4.4	**70**
71	56 02.8	+60.0	3.5	57 02.7	+60.0	3.6	58 02.6	+59.9	3.7	59 02.5	+59.9	3.8	60 02.3	+60.0	3.9	61 02.2	+60.0	4.0	62 02.0	+60.0	4.2	63 01.9	+59.9	4.3	**71**
72	57 02.8	+59.9	3.4	58 02.7	+59.9	3.5	59 02.5	+60.0	3.6	60 02.4	+60.0	3.7	61 02.3	+59.9	3.8	62 02.2	+59.9	3.9	63 02.0	+60.0	4.1	64 01.8	+60.0	4.2	**72**
73	58 02.7	+59.9	3.3	59 02.6	+59.9	3.4	60 02.5	+59.9	3.5	61 02.4	+59.9	3.6	62 02.2	+60.0	3.7	63 02.1	+60.0	3.9	64 02.0	+59.9	4.0	65 01.8	+60.0	4.2	**73**
74	59 02.6	+59.9	3.2	60 02.5	+59.9	3.3	61 02.4	+59.9	3.4	62 02.3	+59.9	3.5	63 02.2	+59.9	3.6	64 02.1	+59.9	3.8	65 01.9	+60.0	3.9	66 01.8	+59.9	4.1	**74**
75	60 02.5	+59.9	3.1	61 02.4	+59.9	3.2	62 02.3	+60.0	3.3	63 02.2	+60.0	3.4	64 02.1	+60.0	3.5	65 02.0	+59.9	3.7	66 01.9	+59.9	3.8	67 01.7	+60.0	4.0	**75**
76	61 02.4	+59.9	3.0	62 02.3	+60.0	3.1	63 02.3	+59.9	3.2	64 02.2	+59.9	3.3	65 02.1	+59.9	3.4	66 01.9	+60.0	3.6	67 01.8	+60.0	3.7	68 01.7	+59.9	3.9	**76**
77	62 02.3	+59.9	2.9	63 02.3	+59.9	3.0	64 02.2	+59.9	3.1	65 02.1	+59.9	3.2	66 02.0	+59.9	3.3	67 01.9	+59.9	3.5	68 01.8	+59.9	3.6	69 01.6	+60.0	3.8	**77**
78	63 02.2	+59.9	2.7	64 02.2	+59.9	2.8	65 02.1	+59.9	3.0	66 02.0	+59.9	3.1	67 01.9	+59.9	3.2	68 01.8	+59.9	3.3	69 01.7	+59.9	3.5	70 01.6	+59.9	3.6	**78**
79	64 02.1	+59.9	2.6	65 02.1	+59.8	2.7	66 02.0	+59.9	2.8	67 01.9	+59.9	2.9	68 01.8	+59.9	3.1	69 01.7	+60.0	3.2	70 01.6	+60.0	3.3	71 01.5	+60.0	3.5	**79**
80	65 02.0	+59.9	2.5	66 01.9	+59.9	2.6	67 01.9	+59.9	2.7	68 01.8	+59.9	2.8	69 01.7	+59.9	2.9	70 01.7	+59.9	3.0	71 01.6	+59.9	3.2	72 01.5	+59.9	3.4	**80**
81	66 01.9	+59.8	2.3	67 01.8	+59.9	2.4	68 01.8	+59.8	2.5	69 01.7	+59.9	2.6	70 01.6	+59.9	2.7	71 01.6	+59.9	2.9	72 01.5	+59.9	3.0	73 01.4	+59.9	3.2	**81**
82	67 01.7	+59.9	2.1	68 01.7	+59.9	2.2	69 01.6	+59.9	2.3	70 01.6	+59.9	2.4	71 01.5	+59.9	2.6	72 01.5	+59.9	2.7	73 01.4	+59.9	2.9	74 01.3	+59.9	3.0	**82**
83	68 01.6	+59.8	2.0	69 01.6	+59.8	2.0	70 01.5	+59.9	2.1	71 01.5	+59.8	2.2	72 01.4	+59.9	2.4	73 01.4	+59.8	2.5	74 01.3	+59.9	2.7	75 01.2	+59.9	2.8	**83**
84	69 01.4	+59.8	1.7	70 01.4	+59.8	1.8	71 01.4	+59.8	1.9	72 01.3	+59.9	2.0	73 01.3	+59.8	2.1	74 01.2	+59.9	2.3	75 01.2	+59.9	2.4	76 01.1	+59.9	2.6	**84**
85	70 01.2	+59.8	1.5	71 01.2	+59.8	1.6	72 01.2	+59.8	1.7	73 01.2	+59.8	1.8	74 01.1	+59.9	1.9	75 01.1	+59.8	2.0	76 01.1	+59.8	2.2	77 01.0	+59.9	2.3	**85**
86	71 01.0	+59.8	1.3	72 01.0	+59.8	1.4	73 01.0	+59.8	1.4	74 01.0	+59.8	1.5	75 01.0	+59.8	1.6	76 00.9	+59.9	1.7	77 00.9	+59.8	1.9	78 00.9	+59.8	2.0	**86**
87	72 00.8	+59.8	1.0	73 00.8	+59.8	1.1	74 00.8	+59.8	1.1	75 00.8	+59.8	1.2	76 00.8	+59.8	1.3	77 00.8	+59.7	1.4	78 00.7	+59.8	1.5	79 00.7	+59.8	1.6	**87**
88	73 00.6	+59.7	0.7	74 00.6	+59.7	0.8	75 00.6	+59.7	0.8	76 00.6	+59.7	0.9	77 00.6	+59.7	0.9	78 00.5	+59.8	1.0	79 00.5	+59.8	1.1	80 00.5	+59.8	1.2	**88**
89	74 00.3	+59.7	0.4	75 00.3	+59.7	0.4	76 00.3	+59.7	0.4	77 00.3	+59.7	0.5	78 00.3	+59.7	0.5	79 00.3	+59.7	0.5	80 00.3	+59.7	0.6	81 00.3	+59.7	0.7	**89**
90	75 00.0	+59.6	0.0	76 00.0	+59.6	0.0	77 00.0	+59.6	0.0	78 00.0	+59.6	0.0	79 00.0	+59.6	0.0	80 00.0	+59.6	0.0	81 00.0	+59.6	0.0	82 00.0	+59.6	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 174°, 186°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 53.1	+60.0	172.8	13 53.6	+60.0	172.8	12 54.1	+60.0	172.8	11 54.6	+59.9	172.8	10 55.0	+60.0	172.9	9 55.5	+60.0	172.9	8 55.9	+60.0	172.9	7 56.4	+60.0	172.9	**0**
1	15 53.1	+60.0	172.7	14 53.6	+60.0	172.8	13 54.1	+59.9	172.8	12 54.5	+60.0	172.8	11 55.0	+60.0	172.8	10 55.5	+60.0	172.9	9 55.9	+60.0	172.9	8 56.4	+60.0	172.9	**1**
2	16 53.1	+59.9	172.7	15 53.6	+59.9	172.7	14 54.0	+60.0	172.8	13 54.5	+60.0	172.8	12 55.0	+60.0	172.8	11 55.5	+59.9	172.8	10 55.9	+60.0	172.9	9 56.4	+60.0	172.9	**2**
3	17 53.0	+60.0	172.7	16 53.5	+60.0	172.7	15 54.0	+60.0	172.7	14 54.5	+60.0	172.7	13 55.0	+60.0	172.8	12 55.4	+60.0	172.8	11 55.9	+60.0	172.9	10 56.4	+60.0	172.9	**3**
4	18 53.0	+60.0	172.6	17 53.5	+60.0	172.7	16 54.0	+60.0	172.7	15 54.5	+60.0	172.7	14 55.0	+59.9	172.8	13 55.4	+60.0	172.8	12 55.9	+60.0	172.8	11 56.4	+60.0	172.9	**4**
5	19 53.0	+59.9	172.6	18 53.5	+59.9	172.6	17 54.0	+59.9	172.7	16 54.5	+59.9	172.7	15 54.9	+60.0	172.7	14 55.4	+60.0	172.8	13 55.9	+60.0	172.8	12 56.4	+59.9	172.8	**5**
6	20 52.9	+60.0	172.5	19 53.4	+60.0	172.6	18 53.9	+60.0	172.6	17 54.4	+60.0	172.7	16 54.9	+60.0	172.7	15 55.4	+60.0	172.8	14 55.9	+60.0	172.8	13 56.3	+60.0	172.8	**6**
7	21 52.9	+60.0	172.5	20 53.4	+60.0	172.6	19 53.9	+60.0	172.6	18 54.4	+60.0	172.7	17 54.9	+60.0	172.7	16 55.4	+60.0	172.7	15 55.9	+59.9	172.8	14 56.3	+60.0	172.8	**7**
8	22 52.9	+59.9	172.5	21 53.4	+60.0	172.5	20 53.9	+60.0	172.6	19 54.4	+60.0	172.6	18 54.9	+60.0	172.7	17 55.4	+60.0	172.7	16 55.8	+60.0	172.8	15 56.3	+60.0	172.8	**8**
9	23 52.8	+60.0	172.4	22 53.4	+59.9	172.5	21 53.9	+59.9	172.5	20 54.4	+59.9	172.6	19 54.9	+59.9	172.6	18 55.4	+59.9	172.7	17 55.8	+60.0	172.7	16 56.3	+60.0	172.8	**9**
10	24 52.8	+60.0	172.4	23 53.3	+60.0	172.5	22 53.8	+60.0	172.5	21 54.3	+60.0	172.6	20 54.8	+60.0	172.6	19 55.3	+60.0	172.7	18 55.8	+60.0	172.7	17 56.3	+60.0	172.8	**10**
11	25 52.8	+59.9	172.4	24 53.3	+60.0	172.4	23 53.8	+60.0	172.5	22 54.3	+60.0	172.5	21 54.8	+60.0	172.6	20 55.3	+60.0	172.6	19 55.8	+60.0	172.7	18 56.3	+60.0	172.7	**11**
12	26 52.7	+60.0	172.3	25 53.3	+59.9	172.4	24 53.8	+60.0	172.4	23 54.3	+60.0	172.5	22 54.8	+60.0	172.6	21 55.3	+60.0	172.6	20 55.8	+60.0	172.7	19 56.3	+60.0	172.7	**12**
13	27 52.7	+59.9	172.3	26 53.2	+60.0	172.3	25 53.8	+59.9	172.4	24 54.3	+60.0	172.5	23 54.8	+60.0	172.5	22 55.3	+60.0	172.6	21 55.8	+60.0	172.6	20 56.3	+60.0	172.7	**13**
14	28 52.6	+60.0	172.2	27 53.2	+60.0	172.3	26 53.7	+60.0	172.4	25 54.3	+59.9	172.4	24 54.8	+59.9	172.5	23 55.3	+60.0	172.6	22 55.8	+60.0	172.6	21 56.3	+60.0	172.7	**14**
15	29 52.6	+60.0	172.2	28 53.2	+59.9	172.3	27 53.7	+60.0	172.3	26 54.2	+60.0	172.4	25 54.7	+60.0	172.5	24 55.3	+59.9	172.5	23 55.8	+59.9	172.6	22 56.3	+59.9	172.7	**15**
16	30 52.6	+59.9	172.2	29 53.1	+60.0	172.2	28 53.7	+59.9	172.3	27 54.2	+60.0	172.4	26 54.7	+60.0	172.5	25 55.2	+60.0	172.5	24 55.7	+60.0	172.6	23 56.2	+60.0	172.6	**16**
17	31 52.5	+60.0	172.1	30 53.1	+60.0	172.2	29 53.6	+60.0	172.3	28 54.2	+60.0	172.3	27 54.7	+60.0	172.4	26 55.2	+60.0	172.5	25 55.7	+60.0	172.6	24 56.2	+60.0	172.6	**17**
18	32 52.5	+59.9	172.1	31 53.1	+59.9	172.2	30 53.6	+60.0	172.2	29 54.2	+59.9	172.3	28 54.7	+60.0	172.4	27 55.2	+60.0	172.5	26 55.7	+60.0	172.5	25 56.2	+60.0	172.6	**18**
19	33 52.4	+60.0	172.0	32 53.0	+60.0	172.1	31 53.6	+59.9	172.2	30 54.1	+60.0	172.3	29 54.7	+59.9	172.4	28 55.2	+60.0	172.4	27 55.7	+60.0	172.5	26 56.2	+60.0	172.6	**19**
20	34 52.4	+60.0	172.0	33 53.0	+59.9	172.1	32 53.5	+60.0	172.2	31 54.1	+60.0	172.2	30 54.6	+60.0	172.3	29 55.2	+60.0	172.4	28 55.7	+60.0	172.5	27 56.2	+60.0	172.6	**20**
21	35 52.4	+59.9	171.9	34 52.9	+60.0	172.0	33 53.5	+60.0	172.1	32 54.1	+59.9	172.2	31 54.6	+60.0	172.3	30 55.2	+59.9	172.4	29 55.7	+60.0	172.5	28 56.2	+60.0	172.5	**21**
22	36 52.3	+60.0	171.9	35 52.9	+60.0	172.0	34 53.5	+59.9	172.1	33 54.0	+60.0	172.2	32 54.6	+60.0	172.3	31 55.1	+60.0	172.3	30 55.7	+60.0	172.4	29 56.2	+60.0	172.5	**22**
23	37 52.3	+59.9	171.8	36 52.9	+59.9	171.9	35 53.4	+60.0	172.0	34 54.0	+60.0	172.1	33 54.6	+60.0	172.2	32 55.1	+60.0	172.3	31 55.7	+59.9	172.4	30 56.2	+60.0	172.5	**23**
24	38 52.2	+60.0	171.8	37 52.8	+60.0	171.9	36 53.4	+60.0	172.0	35 54.0	+60.0	172.1	34 54.6	+59.9	172.2	33 55.1	+60.0	172.3	32 55.6	+60.0	172.4	31 56.2	+59.9	172.5	**24**
25	39 52.2	+59.9	171.7	38 52.8	+59.9	171.8	37 53.4	+59.9	172.0	36 54.0	+59.9	172.1	35 54.5	+60.0	172.2	34 55.1	+60.0	172.3	33 55.6	+60.0	172.4	32 56.1	+60.0	172.4	**25**
26	40 52.1	+60.0	171.7	39 52.7	+60.0	171.8	38 53.3	+60.0	171.9	37 53.9	+60.0	172.0	36 54.5	+60.0	172.1	35 55.1	+59.9	172.2	34 55.6	+60.0	172.3	33 56.1	+60.0	172.4	**26**
27	41 52.1	+59.9	171.6	40 52.7	+59.9	171.7	39 53.3	+60.0	171.9	38 53.9	+60.0	172.0	37 54.5	+59.9	172.1	36 55.0	+60.0	172.2	35 55.6	+60.0	172.3	34 56.1	+60.0	172.4	**27**
28	42 52.0	+59.9	171.6	41 52.6	+60.0	171.7	40 53.3	+59.9	171.8	39 53.9	+59.9	171.9	38 54.4	+60.0	172.1	37 55.0	+60.0	172.2	36 55.6	+60.0	172.3	35 56.1	+60.0	172.4	**28**
29	43 51.9	+60.0	171.5	42 52.6	+59.9	171.6	41 53.2	+60.0	171.8	40 53.8	+60.0	171.9	39 54.4	+60.0	172.0	38 55.0	+60.0	172.1	37 55.6	+59.9	172.2	36 56.1	+60.0	172.3	**29**
30	44 51.9	+59.9	171.4	43 52.5	+60.0	171.6	42 53.2	+59.9	171.7	41 53.8	+60.0	171.8	40 54.4	+60.0	172.0	39 55.0	+59.9	172.1	38 55.5	+60.0	172.2	37 56.1	+60.0	172.3	**30**
31	45 51.8	+60.0	171.4	44 52.5	+59.9	171.5	43 53.1	+60.0	171.7	42 53.8	+59.9	171.8	41 54.4	+59.9	171.9	40 54.9	+60.0	172.1	39 55.5	+60.0	172.2	38 56.1	+60.0	172.3	**31**
32	46 51.8	+59.9	171.3	45 52.4	+60.0	171.5	44 53.1	+59.9	171.6	43 53.7	+60.0	171.8	42 54.3	+60.0	171.9	41 54.9	+60.0	172.0	40 55.5	+60.0	172.1	39 56.1	+59.9	172.3	**32**
33	47 51.7	+59.9	171.2	46 52.4	+59.9	171.4	45 53.0	+60.0	171.6	44 53.7	+59.9	171.7	43 54.3	+60.0	171.8	42 54.9	+60.0	172.0	41 55.5	+60.0	172.1	40 56.0	+60.0	172.2	**33**
34	48 51.6	+60.0	171.2	47 52.3	+60.0	171.3	46 53.0	+60.0	171.5	45 53.6	+60.0	171.7	44 54.3	+59.9	171.8	43 54.9	+59.9	171.9	42 55.5	+59.9	172.1	41 56.0	+60.0	172.2	**34**
35	49 51.6	+59.9	171.1	48 52.3	+59.9	171.3	47 53.0	+59.9	171.4	46 53.6	+60.0	171.6	45 54.2	+60.0	171.8	44 54.8	+60.0	171.9	43 55.4	+60.0	172.0	42 56.0	+60.0	172.2	**35**
36	50 51.5	+59.9	171.0	49 52.2	+59.9	171.2	48 52.9	+59.9	171.4	47 53.6	+59.9	171.5	46 54.2	+60.0	171.7	45 54.8	+60.0	171.9	44 55.4	+60.0	172.0	43 56.0	+60.0	172.1	**36**
37	51 51.4	+59.9	170.9	50 52.1	+60.0	171.1	49 52.8	+60.0	171.3	48 53.5	+60.0	171.5	47 54.2	+59.9	171.7	46 54.8	+60.0	171.8	45 55.4	+60.0	172.0	44 56.0	+60.0	172.1	**37**
38	52 51.3	+59.9	170.8	51 52.1	+59.9	171.1	50 52.8	+59.9	171.2	49 53.5	+59.9	171.4	48 54.1	+60.0	171.6	47 54.8	+59.9	171.8	46 55.4	+59.9	171.9	45 56.0	+59.9	172.1	**38**
39	53 51.2	+60.0	170.8	52 52.0	+59.9	171.0	51 52.7	+60.0	171.2	50 53.4	+60.0	171.4	49 54.1	+60.0	171.5	48 54.7	+60.0	171.7	47 55.3	+60.0	171.9	46 55.9	+60.0	172.0	**39**
40	54 51.2	+59.9	170.7	53 51.9	+60.0	170.9	52 52.7	+59.9	171.1	51 53.4	+59.9	171.3	50 54.1	+59.9	171.5	49 54.7	+60.0	171.7	48 55.3	+60.0	171.8	47 55.9	+60.0	172.0	**40**
41	55 51.1	+59.9	170.6	54 51.9	+59.9	170.8	53 52.6	+59.9	171.0	52 53.3	+60.0	171.2	51 54.0	+60.0	171.4	50 54.7	+59.9	171.6	49 55.3	+60.0	171.8	48 55.9	+60.0	172.0	**41**
42	56 51.0	+59.9	170.5	55 51.8	+59.9	170.7	54 52.5	+60.0	170.9	53 53.3	+59.9	171.2	52 54.0	+59.9	171.4	51 54.6	+60.0	171.6	50 55.3	+59.9	171.7	49 55.9	+60.0	171.9	**42**
43	57 50.9	+59.9	170.4	56 51.7	+59.9	170.6	55 52.5	+59.9	170.9	54 53.2	+60.0	171.1	53 53.9	+60.0	171.3	52 54.6	+60.0	171.5	51 55.2	+60.0	171.7	50 55.9	+59.9	171.9	**43**
44	58 50.8	+59.8	170.2	57 51.6	+59.9	170.5	56 52.4	+59.9	170.8	55 53.2	+59.9	171.0	54 53.9	+59.9	171.2	53 54.6	+59.9	171.4	52 55.2	+60.0	171.6	51 55.8	+60.0	171.8	**44**
45	59 50.6	+59.9	170.1	58 51.5	+59.9	170.4	57 52.3	+59.9	170.7	56 53.1	+59.9	170.9	55 53.8	+60.0	171.2	54 54.5	+60.0	171.4	53 55.2	+60.0	171.6	52 55.8	+60.0	171.8	**45**
46	60 50.5	+59.9	170.0	59 51.4	+59.9	170.3	58 52.2	+60.0	170.6	57 53.0	+60.0	170.8	56 53.8	+59.9	171.1	55 54.5	+59.9	171.3	54 55.2	+59.9	171.5	53 55.8	+60.0	171.7	**46**
47	61 50.4	+59.9	169.9	60 51.3	+59.9	170.2	59 52.2	+59.9	170.5	58 53.0	+59.9	170.7	57 53.7	+60.0	171.0	56 54.4	+60.0	171.2	55 55.1	+60.0	171.5	54 55.8	+59.9	171.7	**47**
48	62 50.3	+59.8	169.7	61 51.2	+59.9	170.0	60 52.1	+59.9	170.4	59 52.9	+59.9	170.6	58 53.7	+59.9	170.9	57 54.4	+59.9	171.2	56 55.1	+59.9	171.4	55 55.7	+60.0	171.6	**48**
49	63 50.1	+59.8	169.6	62 51.1	+59.8	169.9	61 52.0	+59.9	170.2	60 52.8	+59.9	170.5	59 53.6	+59.9	170.8	58 54.3	+60.0	171.1	57 55.0	+60.0	171.3	56 55.7	+60.0	171.6	**49**
50	64 49.9	+59.9	169.4	63 50.9	+59.9	169.8	62 51.9	+59.8	170.1	61 52.7	+59.9	170.4	60 53.5	+60.0	170.7	59 54.3	+59.9	171.0	58 55.0	+60.0	171.3	57 55.7	+59.9	171.5	**50**
51	65 49.8	+59.8	169.2	64 50.8	+59.8	169.6	63 51.7	+59.9	170.0	62 52.6	+59.9	170.3	61 53.5	+59.9	170.6	60 54.2	+60.0	170.9	59 55.0	+59.9	171.2	58 55.6	+60.0	171.5	**51**
52	66 49.6	+59.8	169.0	65 50.6	+59.9	169.4	64 51.6	+59.9	169.8	63 52.5	+59.9	170.2	62 53.4	+59.9	170.5	61 54.2	+59.9	170.8	60 54.9	+60.0	171.1	59 55.6	+60.0	171.4	**52**
53	67 49.4	+59.8	168.8	66 50.5	+59.8	169.3	65 51.5	+59.9	169.7	64 52.4	+59.9	170.1	63 53.3	+59.9	170.4	62 54.1	+59.9	170.7	61 54.9	+59.9	171.0	60 55.6	+59.9	171.3	**53**
54	68 49.2	+59.7	168.6	67 50.3	+59.8	169.1	66 51.4	+59.8	169.5	65 52.3	+59.9	169.9	64 53.2	+59.9	170.3	63 54.0	+60.0	170.6	62 54.8	+60.0	170.9	61 55.5	+60.0	171.2	**54**
55	69 48.9	+59.8	168.3	68 50.1	+59.8	168.8	67 51.2	+59.8	169.3	66 52.2	+59.9	169.7	65 53.1	+59.9	170.1	64 54.0	+59.9	170.5	63 54.8	+59.9	170.9	62 55.5	+60.0	171.2	**55**
56	70 48.7	+59.7	168.0	69 49.9	+59.8	168.6	68 51.0	+59.9	169.1	67 52.1	+59.8	169.6	66 53.0	+59.9	170.0	65 53.9	+59.9	170.4	64 54.7	+59.9	170.8	63 55.5	+59.9	171.1	**56**
57	71 48.4	+59.6	167.7	70 49.7	+59.7	168.3	69 50.9	+59.8	168.9	68 51.9	+59.9	169.4	67 52.9	+59.9	169.8	66 53.8	+59.9	170.3	65 54.6	+60.0	170.6	64 55.4	+60.0	171.0	**57**
58	72 48.0	+59.7	167.4	71 49.4	+59.7	168.1	70 50.7	+59.7	168.6	69 51.8	+59.8	169.2	68 52.8	+59.9	169.7	67 53.7	+59.9	170.1	66 54.6	+59.9	170.5	65 55.4	+59.9	170.9	**58**
59	73 47.7	+59.6	167.0	72 49.1	+59.7	167.7	71 50.4	+59.8	168.4	70 51.6	+59.8	169.0	69 52.7	+59.8	169.5	68 53.6	+59.9	170.0	67 54.5	+59.9	170.4	66 55.3	+59.9	170.8	**59**
60	74 47.3	+59.5	166.6	73 48.8	+59.7	167.4	72 50.2	+59.7	168.1	71 51.4	+59.8	168.7	70 52.5	+59.9	169.3	69 53.5	+59.9	169.8	68 54.4	+59.9	170.3	67 55.2	+60.0	170.7	**60**
61	75 46.8	+59.5	166.1	74 48.5	+59.6	167.0	73 49.9	+59.7	167.7	72 51.2	+59.8	168.4	71 52.4	+59.8	169.1	70 53.4	+59.9	169.6	69 54.3	+59.9	170.1	68 55.2	+59.9	170.5	**61**
62	76 46.3	+59.4	165.5	75 48.1	+59.5	166.5	74 49.6	+59.7	167.4	73 51.0	+59.7	168.1	72 52.2	+59.8	168.8	71 53.3	+59.8	169.4	70 54.2	+59.9	169.9	69 55.1	+59.9	170.4	**62**
63	77 45.7	+59.2	164.9	76 47.6	+59.4	166.0	75 49.3	+59.5	166.9	74 50.7	+59.7	167.8	73 52.0	+59.8	168.5	72 53.1	+59.8	169.2	71 54.1	+59.9	169.7	70 55.0	+60.0	170.3	**63**
64	78 44.9	+59.2	164.1	77 47.0	+59.4	165.4	76 48.8	+59.6	166.5	75 50.4	+59.7	167.4	74 51.8	+59.7	168.2	73 52.9	+59.9	168.9	72 54.0	+59.9	169.5	71 55.0	+59.9	170.1	**64**
65	79 44.1	+58.9	163.2	78 46.4	+59.2	164.7	77 48.4	+59.4	165.9	76 50.1	+59.6	166.9	75 51.5	+59.7	167.8	74 52.8	+59.8	168.6	73 53.9	+59.8	169.3	72 54.9	+59.9	169.9	**65**
66	80 43.0	+58.7	162.1	79 45.6	+59.1	163.8	78 47.8	+59.4	165.2	77 49.7	+59.5	166.4	76 51.2	+59.7	167.4	75 52.6	+59.7	168.3	74 53.7	+59.8	169.0	73 54.8	+59.8	169.7	**66**
67	81 41.7	+58.4	160.8	80 44.7	+58.9	162.8	79 47.2	+59.2	164.4	78 49.2	+59.4	165.8	77 50.9	+59.6	166.9	76 52.3	+59.7	167.9	75 53.5	+59.9	168.7	74 54.6	+59.9	169.5	**67**
68	82 40.1	+57.8	159.0	81 43.6	+58.5	161.5	80 46.4	+59.0	163.5	79 48.6	+59.3	165.0	78 50.5	+59.5	166.4	77 52.0	+59.7	167.5	76 53.4	+59.7	168.4	75 54.5	+59.8	169.2	**68**
69	83 37.9	+57.1	156.8	82 42.1	+58.2	159.9	81 45.4	+58.7	162.3	80 47.9	+59.2	164.1	79 50.0	+59.4	165.7	78 51.7	+59.6	166.9	77 53.1	+59.8	168.0	76 54.3	+59.9	168.9	**69**
70	84 35.0	+55.8	153.8	83 40.3	+57.4	157.8	82 44.1	+58.4	160.8	81 47.1	+58.9	163.0	80 49.4	+59.3	164.8	79 51.3	+59.5	166.3	78 52.9	+59.6	167.5	77 54.2	+59.7	168.5	**70**
71	85 30.8	*+53.6*	•149.5	84 37.7	+56.2	154.9	83 42.5	+57.7	158.8	82 46.0	+58.6	161.6	81 48.7	+59.1	163.8	80 50.8	+59.4	165.6	79 52.5	+59.6	167.0	78 53.9	+59.8	168.1	**71**
72	86 24.4	*+49.1*	•143.1	85 33.9	*+54.3*	•150.8	84 40.2	+56.7	156.1	83 44.6	+58.0	159.8	82 47.8	+58.8	162.5	81 50.2	+59.3	164.6	80 52.1	+59.6	166.3	79 53.7	+59.7	167.6	**72**
73	87 13.5	*+39.3*	•132.6	86 28.2	*+50.1*	•144.6	85 36.9	*+54.9*	•152.2	84 42.6	+57.2	157.3	83 46.6	+58.3	160.8	82 49.5	+59.0	163.4	81 51.7	+59.3	165.4	80 53.4	+59.6	167.0	**73**
74	87 52.8	*+18.6*	•114.7	87 18.3	*+40.7*	•134.4	86 31.8	*+51.2*	•146.3	85 39.8	*+55.5*	•153.6	84 44.9	+57.6	158.5	83 48.5	+58.6	161.9	82 51.0	+59.2	164.3	81 53.0	+59.5	166.2	**74**
75	88 11.4	*–12.4*	•86.6	87 59.0	*+19.5*	•116.3	87 23.0	*+42.2*	•136.3	86 35.3	*+52.2*	•148.0	85 42.5	*+56.2*	•155.1	84 47.1	+57.9	159.7	83 50.2	+58.9	162.9	82 52.5	+59.3	165.3	**75**
76	87 59.0	*–36.0*	•56.9	88 18.5	*–13.3*	•86.6	88 05.2	*+20.4*	•118.0	87 27.5	*+43.7*	•138.3	86 38.7	*+53.1*	•149.8	85 45.0	+56.8	156.6	84 49.1	+58.3	160.9	83 51.8	+59.1	164.0	**76**
77	87 23.0	*–47.7*	•36.9	88 05.2	*–37.7*	•55.2	88 25.6	*–14.4*	•86.6	88 11.2	*+21.5*	•120.0	87 31.8	*+45.3*	•140.5	86 41.8	*+54.1*	•151.6	85 47.4	+57.3	158.1	84 50.9	+58.7	162.2	**77**
78	86 35.3	*–52.8*	•25.2	87 27.5	*–48.8*	•34.8	88 11.2	*–39.4*	•53.2	88 32.7	*–15.6*	•86.6	88 17.1	*+22.8*	•122.2	87 35.9	*+47.0*	•142.8	86 44.7	*+55.1*	•153.5	85 49.6	+57.8	159.6	**78**
79	85 42.5	*–55.4*	•18.1	86 38.7	*–53.7*	•23.4	87 31.8	*–50.0*	•32.7	88 17.1	*–41.2*	•51.0	88 39.9	*–17.0*	•86.6	88 22.9	*+24.2*	•124.6	87 39.8	*+48.6*	•145.2	86 47.4	*+56.0*	•155.5	**79**
80	84 47.1	–56.9	13.5	85 45.0	–55.9	16.6	86 41.8	*–54.4*	•21.5	87 35.9	*–51.2*	•30.3	88 22.9	*–43.1*	•48.5	88 47.1	*–18.7*	•86.6	88 28.4	*+25.9*	•127.4	87 43.4	*+50.4*	•147.8	**80**
81	83 50.2	–57.7	10.2	84 49.1	–57.3	12.2	85 47.4	–56.5	15.1	86 44.7	*–55.1*	•19.6	87 39.8	*–52.4*	•27.9	88 28.4	*–45.0*	•45.7	88 54.3	*–20.5*	•86.5	88 33.8	*+27.8*	•130.5	**81**
82	82 52.5	–58.3	7.9	83 51.8	–58.0	9.1	84 50.9	–57.6	10.9	85 49.6	–57.0	13.5	86 47.4	*–55.8*	•17.6	87 43.4	*–53.5*	•25.3	88 33.8	*–47.1*	•42.6	89 01.6	*–22.8*	•86.5	**82**
83	81 54.2	–58.6	6.1	82 53.8	–58.4	6.9	83 53.3	–58.2	8.0	84 52.6	–57.9	9.6	85 51.6	–57.4	11.9	86 49.9	*–56.5*	•15.6	87 46.7	*–54.5*	•22.5	88 38.8	*–49.0*	•39.0	**83**
84	80 55.6	–58.9	4.6	81 55.4	–58.8	5.2	82 55.1	–58.7	5.9	83 54.7	–58.5	6.9	84 54.2	–58.3	8.2	85 53.4	–57.8	10.2	86 52.2	–57.2	13.5	87 49.8	*–55.6*	•19.7	**84**
85	79 56.7	–59.1	3.5	80 56.6	–59.1	3.9	81 56.4	–59.0	4.3	82 56.2	–58.9	5.0	83 55.9	–58.7	5.8	84 55.6	–58.6	6.9	85 55.0	–58.2	8.6	86 54.2	–57.7	11.3	**85**
86	78 57.6	–59.3	2.5	79 57.5	–59.2	2.8	80 57.4	–59.1	3.1	81 57.3	–59.1	3.5	82 57.2	–59.0	4.0	83 57.0	–58.9	4.6	84 56.8	–58.8	5.5	85 56.5	–58.6	6.9	**86**
87	77 58.3	–59.3	1.8	78 58.3	–59.3	1.9	79 58.3	–59.4	2.1	80 58.2	–59.3	2.3	81 58.2	–59.3	2.6	82 58.1	–59.2	3.0	83 58.0	–59.1	3.5	84 57.9	–59.1	4.2	**87**
88	76 59.0	–59.5	1.1	77 59.0	–59.5	1.2	78 58.9	–59.4	1.3	79 58.9	–59.4	1.4	80 58.9	–59.4	1.6	81 58.9	–59.4	1.7	82 58.9	–59.4	2.0	83 58.8	–59.3	2.3	**88**
89	75 59.5	–59.5	0.5	76 59.5	–59.5	0.5	77 59.5	–59.5	0.6	78 59.5	–59.5	0.6	79 59.5	–59.5	0.7	80 59.5	–59.5	0.8	81 59.5	–59.5	0.9	82 59.5	–59.5	1.0	**89**
90	75 00.0	–59.6	0.0	76 00.0	–59.6	0.0	77 00.0	–59.6	0.0	78 00.0	–59.6	0.0	79 00.0	–59.6	0.0	80 00.0	–59.6	0.0	81 00.0	–59.6	0.0	82 00.0	–59.6	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 7°, 353°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 53.1	−59.9	172.8	13 53.6	−60.0	172.8	12 54.1	−60.0	172.8	11 54.6	−60.0	172.8	10 55.0	−60.0	172.9	9 55.5	−60.0	172.9	8 55.9	−59.9	172.9	7 56.4	−60.0	172.9	**0**
1	13 53.2	−60.0	172.8	12 53.6	−59.9	172.8	11 54.1	−60.0	172.8	10 54.6	−60.0	172.9	9 55.0	−59.9	172.9	8 55.5	−60.0	172.9	7 56.0	−60.0	172.9	6 56.4	−60.0	172.9	**1**
2	12 53.2	−60.0	172.8	11 53.7	−60.0	172.8	10 54.1	−59.9	172.9	9 54.6	−60.0	172.9	8 55.1	−60.0	172.9	7 55.5	−60.0	172.9	6 56.0	−60.0	173.0	5 56.4	−60.0	173.0	**2**
3	11 53.2	−59.9	172.9	10 53.7	−60.0	172.9	9 54.2	−60.0	172.9	8 54.6	−60.0	172.9	7 55.1	−60.0	172.9	6 55.5	−60.0	173.0	5 56.0	−60.0	173.0	4 56.4	−60.0	173.0	**3**
4	10 53.3	−60.0	172.9	9 53.7	−60.0	172.9	8 54.2	−60.0	172.9	7 54.6	−59.9	172.9	6 55.1	−60.0	173.0	5 55.5	−59.9	173.0	4 56.0	−60.0	173.0	3 56.4	−60.0	173.0	**4**
5	9 53.3	−60.0	172.9	8 53.7	−59.9	172.9	7 54.2	−60.0	173.0	6 54.7	−60.0	173.0	5 55.1	−60.0	173.0	4 55.6	−60.0	173.0	3 56.0	−60.0	173.0	2 56.4	−59.9	173.0	**5**
6	8 53.3	−59.9	173.0	7 53.8	−60.0	173.0	6 54.2	−60.0	173.0	5 54.7	−60.0	173.0	4 55.1	−60.0	173.0	3 55.6	−60.0	173.0	2 56.0	−60.0	173.0	1 56.5	−60.0	173.0	**6**
7	7 53.4	−60.0	173.0	6 53.8	−60.0	173.0	5 54.2	−59.9	173.0	4 54.7	−60.0	173.0	3 55.1	−59.9	173.0	2 55.6	−60.0	173.0	1 56.0	−60.0	173.0	0 56.5	−60.0	173.1	**7**
8	6 53.4	−60.0	173.0	5 53.8	−59.9	173.0	4 54.3	−60.0	173.0	3 54.7	−60.0	173.1	2 55.2	−60.0	173.1	1 55.6	−60.0	173.1	0 56.0	−60.0	173.1	0 03.5	+60.0	6.9	**8**
9	5 53.4	−60.0	173.0	4 53.9	−60.0	173.1	3 54.3	−60.0	173.1	2 54.7	−59.9	173.1	1 55.2	−60.0	173.1	0 55.6	−60.0	173.1	0 04.0	+59.9	6.9	1 03.5	+60.0	6.9	**9**
10	4 53.4	−59.9	173.1	3 53.9	−60.0	173.1	2 54.3	−60.0	173.1	1 54.8	−60.0	173.1	0 55.2	−60.0	173.1	0 04.4	+60.0	6.9	1 03.9	+60.0	6.9	2 03.5	+60.0	6.9	**10**
11	3 53.5	−60.0	173.1	2 53.9	−60.0	173.1	1 54.3	−59.9	173.1	0 54.8	−60.0	173.1	0 04.8	+60.0	6.9	1 04.4	+60.0	6.9	2 03.9	+60.0	6.9	3 03.5	+60.0	6.9	**11**
12	2 53.5	−60.0	173.1	1 53.9	−59.9	173.1	0 54.4	−60.0	173.2	0 05.2	+60.0	6.8	1 04.8	+60.0	6.8	2 04.4	+59.9	6.9	3 03.9	+60.0	6.9	4 03.5	+60.0	6.9	**12**
13	1 53.5	−59.9	173.2	0 54.0	−60.0	173.2	0 05.6	+60.0	6.8	1 05.2	+60.0	6.8	2 04.8	+60.0	6.8	3 04.3	+60.0	6.8	4 03.9	+60.0	6.8	5 03.5	+60.0	6.8	**13**
14	0 53.6	−60.0	173.2	0 06.0	+60.0	6.8	1 05.6	+60.0	6.8	2 05.2	+60.0	6.8	3 04.8	+59.9	6.8	4 04.3	+60.0	6.8	5 03.9	+60.0	6.8	6 03.5	+60.0	6.8	**14**
15	0 06.4	+60.0	6.8	1 06.0	+60.0	6.8	2 05.6	+59.9	6.8	3 05.2	+59.9	6.8	4 04.7	+60.0	6.8	5 04.3	+60.0	6.8	6 03.9	+60.0	6.8	7 03.5	+60.0	6.8	**15**
16	1 06.4	+59.9	6.7	2 06.0	+59.9	6.7	3 05.5	+60.0	6.7	4 05.1	+60.0	6.7	5 04.7	+60.0	6.8	6 04.3	+60.0	6.8	7 03.9	+60.0	6.8	8 03.5	+60.0	6.8	**16**
17	2 06.3	+60.0	6.7	3 05.9	+60.0	6.7	4 05.5	+60.0	6.7	5 05.1	+60.0	6.7	6 04.7	+60.0	6.7	7 04.3	+60.0	6.7	8 03.9	+60.0	6.8	9 03.5	+59.9	6.8	**17**
18	3 06.3	+60.0	6.7	4 05.9	+60.0	6.7	5 05.5	+60.0	6.7	6 05.1	+60.0	6.7	7 04.7	+60.0	6.7	8 04.3	+60.0	6.7	9 03.9	+59.9	6.7	10 03.4	+60.0	6.8	**18**
19	4 06.3	+60.0	6.6	5 05.9	+60.0	6.6	6 05.5	+60.0	6.7	7 05.1	+60.0	6.7	8 04.7	+60.0	6.7	9 04.3	+59.9	6.7	10 03.8	+60.0	6.7	11 03.4	+60.0	6.7	**19**
20	5 06.3	+59.9	6.6	6 05.9	+59.9	6.6	7 05.5	+59.9	6.6	8 05.1	+59.9	6.6	9 04.7	+59.9	6.7	10 04.2	+60.0	6.7	11 03.8	+60.0	6.7	12 03.4	+60.0	6.7	**20**
21	6 06.2	+60.0	6.6	7 05.8	+60.0	6.6	8 05.4	+60.0	6.6	9 05.0	+60.0	6.6	10 04.6	+60.0	6.6	11 04.2	+60.0	6.7	12 03.8	+60.0	6.7	13 03.4	+60.0	6.7	**21**
22	7 06.2	+60.0	6.5	8 05.8	+60.0	6.6	9 05.4	+60.0	6.6	10 05.0	+60.0	6.6	11 04.6	+60.0	6.6	12 04.2	+60.0	6.6	13 03.8	+60.0	6.7	14 03.4	+60.0	6.7	**22**
23	8 06.2	+59.9	6.5	9 05.8	+60.0	6.5	10 05.4	+60.0	6.5	11 05.0	+60.0	6.6	12 04.6	+60.0	6.6	13 04.2	+60.0	6.6	14 03.8	+60.0	6.6	15 03.4	+60.0	6.7	**23**
24	9 06.1	+60.0	6.5	10 05.8	+59.9	6.5	11 05.4	+59.9	6.5	12 05.0	+60.0	6.5	13 04.6	+60.0	6.6	14 04.2	+60.0	6.6	15 03.8	+60.0	6.6	16 03.4	+60.0	6.7	**24**
25	10 06.1	+60.0	6.4	11 05.7	+60.0	6.5	12 05.3	+60.0	6.5	13 05.0	+59.9	6.5	14 04.6	+60.0	6.5	15 04.2	+60.0	6.6	16 03.8	+60.0	6.6	17 03.4	+60.0	6.6	**25**
26	11 06.1	+59.9	6.4	12 05.7	+60.0	6.4	13 05.3	+60.0	6.5	14 04.9	+60.0	6.5	15 04.6	+59.9	6.5	16 04.2	+59.9	6.5	17 03.8	+60.0	6.6	18 03.4	+60.0	6.6	**26**
27	12 06.0	+60.0	6.4	13 05.7	+59.9	6.4	14 05.3	+60.0	6.4	15 04.9	+60.0	6.5	16 04.5	+60.0	6.5	17 04.1	+60.0	6.5	18 03.8	+59.9	6.6	19 03.4	+60.0	6.6	**27**
28	13 06.0	+60.0	6.3	14 05.6	+60.0	6.4	15 05.3	+59.9	6.4	16 04.9	+60.0	6.4	17 04.5	+60.0	6.5	18 04.1	+60.0	6.5	19 03.7	+60.0	6.5	20 03.4	+59.9	6.6	**28**
29	14 06.0	+59.9	6.3	15 05.6	+60.0	6.3	16 05.2	+60.0	6.4	17 04.9	+60.0	6.4	18 04.5	+60.0	6.4	19 04.1	+60.0	6.5	20 03.7	+60.0	6.5	21 03.3	+60.0	6.6	**29**
30	15 05.9	+60.0	6.3	16 05.6	+60.0	6.3	17 05.2	+60.0	6.3	18 04.9	+59.9	6.4	19 04.5	+60.0	6.4	20 04.1	+60.0	6.5	21 03.7	+60.0	6.5	22 03.3	+60.0	6.5	**30**
31	16 05.9	+60.0	6.2	17 05.6	+59.9	6.3	18 05.2	+60.0	6.3	19 04.8	+60.0	6.3	20 04.5	+59.9	6.4	21 04.1	+60.0	6.4	22 03.7	+60.0	6.5	23 03.3	+60.0	6.5	**31**
32	17 05.9	+59.9	6.2	18 05.5	+60.0	6.2	19 05.2	+59.9	6.3	20 04.8	+60.0	6.3	21 04.4	+60.0	6.4	22 04.1	+60.0	6.4	23 03.7	+60.0	6.4	24 03.3	+60.0	6.5	**32**
33	18 05.8	+60.0	6.2	19 05.5	+60.0	6.2	20 05.1	+60.0	6.2	21 04.8	+60.0	6.3	22 04.4	+60.0	6.3	23 04.1	+59.9	6.4	24 03.7	+60.0	6.4	25 03.3	+60.0	6.5	**33**
34	19 05.8	+60.0	6.1	20 05.5	+59.9	6.2	21 05.1	+60.0	6.2	22 04.8	+59.9	6.3	23 04.4	+60.0	6.3	24 04.0	+60.0	6.4	25 03.7	+60.0	6.4	26 03.3	+60.0	6.5	**34**
35	20 05.8	+59.9	6.1	21 05.4	+60.0	6.1	22 05.1	+60.0	6.2	23 04.7	+60.0	6.2	24 04.4	+60.0	6.3	25 04.0	+60.0	6.3	26 03.7	+59.9	6.4	27 03.3	+60.0	6.4	**35**
36	21 05.7	+60.0	6.1	22 05.4	+60.0	6.1	23 05.1	+59.9	6.2	24 04.7	+60.0	6.2	25 04.4	+59.9	6.2	26 04.0	+60.0	6.3	27 03.6	+60.0	6.4	28 03.3	+60.0	6.4	**36**
37	22 05.7	+60.0	6.0	23 05.4	+59.9	6.1	24 05.0	+60.0	6.1	25 04.7	+60.0	6.2	26 04.3	+60.0	6.2	27 04.0	+60.0	6.3	28 03.6	+60.0	6.3	29 03.3	+59.9	6.4	**37**
38	23 05.7	+59.9	6.0	24 05.3	+60.0	6.0	25 05.0	+60.0	6.1	26 04.7	+59.9	6.1	27 04.3	+60.0	6.2	28 04.0	+60.0	6.2	29 03.6	+60.0	6.3	30 03.2	+60.0	6.4	**38**
39	24 05.6	+60.0	6.0	25 05.3	+60.0	6.0	26 05.0	+60.0	6.1	27 04.6	+60.0	6.1	28 04.3	+60.0	6.2	29 04.0	+59.9	6.2	30 03.6	+60.0	6.3	31 03.2	+60.0	6.3	**39**
40	25 05.6	+60.0	5.9	26 05.3	+60.0	6.0	27 05.0	+59.9	6.0	28 04.6	+60.0	6.1	29 04.3	+60.0	6.1	30 03.9	+60.0	6.2	31 03.6	+60.0	6.3	32 03.2	+60.0	6.3	**40**
41	26 05.6	+59.9	5.9	27 05.3	+59.9	5.9	28 04.9	+60.0	6.0	29 04.6	+60.0	6.0	30 04.3	+59.9	6.1	31 03.9	+60.0	6.2	32 03.6	+60.0	6.2	33 03.2	+60.0	6.3	**41**
42	27 05.5	+60.0	5.8	28 05.2	+60.0	5.9	29 04.9	+60.0	5.9	30 04.6	+59.9	6.0	31 04.2	+60.0	6.1	32 03.9	+60.0	6.1	33 03.6	+59.9	6.2	34 03.2	+60.0	6.3	**42**
43	28 05.5	+60.0	5.8	29 05.2	+60.0	5.9	30 04.9	+59.9	5.9	31 04.5	+60.0	6.0	32 04.2	+60.0	6.0	33 03.9	+60.0	6.1	34 03.5	+60.0	6.2	35 03.2	+60.0	6.3	**43**
44	29 05.5	+59.9	5.8	30 05.2	+59.9	5.8	31 04.8	+60.0	5.9	32 04.5	+60.0	5.9	33 04.2	+60.0	6.0	34 03.9	+59.9	6.1	35 03.5	+60.0	6.1	36 03.2	+60.0	6.2	**44**
45	30 05.4	+60.0	5.7	31 05.1	+60.0	5.8	32 04.8	+60.0	5.8	33 04.5	+60.0	5.9	34 04.2	+59.9	6.0	35 03.8	+60.0	6.0	36 03.5	+60.0	6.1	37 03.2	+59.9	6.2	**45**
46	31 05.4	+59.9	5.7	32 05.1	+59.9	5.7	33 04.8	+59.9	5.8	34 04.5	+59.9	5.9	35 04.1	+60.0	5.9	36 03.8	+60.0	6.0	37 03.5	+60.0	6.1	38 03.1	+60.0	6.2	**46**
47	32 05.3	+60.0	5.6	33 05.0	+60.0	5.7	34 04.7	+60.0	5.8	35 04.4	+60.0	5.8	36 04.1	+60.0	5.9	37 03.8	+60.0	6.0	38 03.5	+60.0	6.1	39 03.1	+60.0	6.1	**47**
48	33 05.3	+60.0	5.6	34 05.0	+60.0	5.7	35 04.7	+60.0	5.7	36 04.4	+60.0	5.8	37 04.1	+60.0	5.9	38 03.8	+60.0	5.9	39 03.5	+59.9	6.0	40 03.1	+60.0	6.1	**48**
49	34 05.3	+59.9	5.5	35 05.0	+59.9	5.6	36 04.7	+59.9	5.7	37 04.4	+59.9	5.8	38 04.1	+59.9	5.8	39 03.8	+59.9	5.9	40 03.4	+60.0	6.0	41 03.1	+60.0	6.1	**49**
50	35 05.2	+60.0	5.5	36 04.9	+60.0	5.6	37 04.6	+60.0	5.6	38 04.3	+60.0	5.7	39 04.0	+60.0	5.8	40 03.7	+60.0	5.9	41 03.4	+60.0	6.0	42 03.1	+60.0	6.1	**50**
51	36 05.2	+59.9	5.4	37 04.9	+59.9	5.5	38 04.6	+60.0	5.6	39 04.3	+60.0	5.7	40 04.0	+60.0	5.8	41 03.7	+60.0	5.8	42 03.4	+60.0	5.9	43 03.1	+60.0	6.0	**51**
52	37 05.1	+60.0	5.4	38 04.8	+60.0	5.5	39 04.6	+59.9	5.5	40 04.3	+60.0	5.6	41 04.0	+60.0	5.7	42 03.7	+60.0	5.8	43 03.4	+60.0	5.9	44 03.1	+59.9	6.0	**52**
53	38 05.1	+59.9	5.3	39 04.8	+60.0	5.4	40 04.5	+60.0	5.5	41 04.3	+59.9	5.6	42 04.0	+59.9	5.7	43 03.7	+59.9	5.8	44 03.4	+59.9	5.9	45 03.0	+60.0	6.0	**53**
54	39 05.0	+60.0	5.3	40 04.8	+59.9	5.4	41 04.5	+60.0	5.5	42 04.2	+60.0	5.5	43 03.9	+60.0	5.6	44 03.6	+60.0	5.7	45 03.3	+60.0	5.8	46 03.0	+60.0	5.9	**54**
55	40 05.0	+59.9	5.2	41 04.7	+60.0	5.3	42 04.5	+59.9	5.4	43 04.2	+59.9	5.5	44 03.9	+60.0	5.6	45 03.6	+60.0	5.7	46 03.3	+60.0	5.8	47 03.0	+60.0	5.9	**55**
56	41 04.9	+60.0	5.2	42 04.7	+59.9	5.3	43 04.4	+60.0	5.4	44 04.1	+60.0	5.4	45 03.9	+59.9	5.5	46 03.6	+60.0	5.6	47 03.3	+60.0	5.7	48 03.0	+60.0	5.9	**56**
57	42 04.9	+59.9	5.1	43 04.6	+60.0	5.2	44 04.4	+59.9	5.3	45 04.1	+60.0	5.4	46 03.8	+60.0	5.5	47 03.6	+59.9	5.6	48 03.3	+59.9	5.7	49 03.0	+59.9	5.8	**57**
58	43 04.8	+60.0	5.1	44 04.6	+59.9	5.2	45 04.3	+60.0	5.2	46 04.1	+59.9	5.3	47 03.8	+60.0	5.4	48 03.5	+60.0	5.5	49 03.2	+60.0	5.7	50 02.9	+60.0	5.8	**58**
59	44 04.8	+59.9	5.0	45 04.5	+60.0	5.1	46 04.3	+59.9	5.2	47 04.0	+60.0	5.3	48 03.8	+59.9	5.4	49 03.5	+60.0	5.5	50 03.2	+60.0	5.6	51 02.9	+60.0	5.7	**59**
60	45 04.7	+59.9	5.0	46 04.5	+59.9	5.0	47 04.2	+60.0	5.1	48 04.0	+59.9	5.2	49 03.7	+60.0	5.3	50 03.5	+59.9	5.4	51 03.2	+60.0	5.6	52 02.9	+60.0	5.7	**60**
61	46 04.6	+60.0	4.9	47 04.4	+60.0	5.0	48 04.2	+59.9	5.1	49 03.9	+60.0	5.2	50 03.7	+59.9	5.3	51 03.4	+60.0	5.4	52 03.2	+59.9	5.5	53 02.9	+60.0	5.6	**61**
62	47 04.6	+59.9	4.8	48 04.4	+59.9	4.9	49 04.1	+60.0	5.0	50 03.9	+59.9	5.1	51 03.6	+60.0	5.2	52 03.4	+60.0	5.3	53 03.1	+60.0	5.5	54 02.9	+59.9	5.6	**62**
63	48 04.5	+59.9	4.7	49 04.3	+59.9	4.8	50 04.1	+59.9	4.9	51 03.8	+60.0	5.1	52 03.6	+60.0	5.2	53 03.4	+59.9	5.3	54 03.1	+60.0	5.4	55 02.8	+60.0	5.5	**63**
64	49 04.4	+60.0	4.7	50 04.2	+60.0	4.8	51 04.0	+60.0	4.9	52 03.8	+59.9	5.0	53 03.6	+59.9	5.1	54 03.3	+60.0	5.2	55 03.1	+59.9	5.4	56 02.8	+60.0	5.5	**64**
65	50 04.4	+59.9	4.6	51 04.2	+59.9	4.7	52 04.0	+59.9	4.8	53 03.7	+60.0	4.9	54 03.5	+60.0	5.0	55 03.3	+59.9	5.2	56 03.0	+60.0	5.3	57 02.8	+59.9	5.4	**65**
66	51 04.3	+59.9	4.5	52 04.1	+59.9	4.6	53 03.9	+59.9	4.7	54 03.7	+59.9	4.8	55 03.5	+59.9	5.0	56 03.2	+60.0	5.1	57 03.0	+60.0	5.2	58 02.7	+60.0	5.4	**66**
67	52 04.2	+59.9	4.4	53 04.0	+60.0	4.5	54 03.8	+60.0	4.7	55 03.6	+60.0	4.8	56 03.4	+60.0	4.9	57 03.2	+59.9	5.0	58 03.0	+59.9	5.2	59 02.7	+60.0	5.3	**67**
68	53 04.1	+59.9	4.4	54 04.0	+59.9	4.5	55 03.8	+59.9	4.6	56 03.6	+59.9	4.7	57 03.4	+59.9	4.8	58 03.1	+60.0	4.9	59 02.9	+60.0	5.1	60 02.7	+59.9	5.2	**68**
69	54 04.0	+60.0	4.3	55 03.9	+59.9	4.4	56 03.7	+59.9	4.5	57 03.5	+59.9	4.6	58 03.3	+59.9	4.7	59 03.1	+59.9	4.9	60 02.9	+59.9	5.0	61 02.6	+60.0	5.2	**69**
70	55 04.0	+59.9	4.2	56 03.8	+59.9	4.3	57 03.6	+59.9	4.4	58 03.4	+60.0	4.5	59 03.2	+60.0	4.6	60 03.0	+60.0	4.8	61 02.8	+60.0	4.9	62 02.6	+60.0	5.1	**70**
71	56 03.9	+59.9	4.1	57 03.7	+59.9	4.2	58 03.5	+60.0	4.3	59 03.4	+59.9	4.4	60 03.2	+59.9	4.6	61 03.0	+59.9	4.7	62 02.8	+59.9	4.9	63 02.6	+59.9	5.0	**71**
72	57 03.8	+59.9	4.0	58 03.6	+59.9	4.1	59 03.5	+59.9	4.2	60 03.3	+59.9	4.3	61 03.1	+59.9	4.5	62 02.9	+60.0	4.6	63 02.7	+60.0	4.8	64 02.5	+60.0	4.9	**72**
73	58 03.7	+59.9	3.9	59 03.5	+59.9	4.0	60 03.4	+59.9	4.1	61 03.2	+59.9	4.2	62 03.0	+60.0	4.4	63 02.9	+59.9	4.5	64 02.7	+59.9	4.7	65 02.5	+59.9	4.8	**73**
74	59 03.6	+59.8	3.7	60 03.4	+59.9	3.9	61 03.3	+59.9	4.0	62 03.1	+59.9	4.1	63 03.0	+59.9	4.3	64 02.8	+59.9	4.4	65 02.6	+60.0	4.6	66 02.4	+60.0	4.7	**74**
75	60 03.4	+59.9	3.6	61 03.3	+59.9	3.7	62 03.2	+59.9	3.9	63 03.0	+59.9	4.0	64 02.9	+59.9	4.1	65 02.7	+59.9	4.3	66 02.6	+59.9	4.5	67 02.4	+59.9	4.6	**75**
76	61 03.3	+59.9	3.5	62 03.2	+59.9	3.6	63 03.1	+59.9	3.7	64 02.9	+59.9	3.9	65 02.8	+59.9	4.0	66 02.6	+60.0	4.2	67 02.5	+59.9	4.3	68 02.3	+59.9	4.5	**76**
77	62 03.2	+59.8	3.4	63 03.1	+59.8	3.5	64 03.0	+59.8	3.6	65 02.8	+59.9	3.7	66 02.7	+59.9	3.9	67 02.6	+59.9	4.0	68 02.4	+59.9	4.2	69 02.2	+60.0	4.4	**77**
78	63 03.0	+59.9	3.2	64 02.9	+59.9	3.3	65 02.8	+59.9	3.4	66 02.7	+59.9	3.6	67 02.6	+59.9	3.7	68 02.5	+59.9	3.9	69 02.3	+59.9	4.1	70 02.2	+59.9	4.3	**78**
79	64 02.9	+59.8	3.0	65 02.8	+59.8	3.2	66 02.7	+59.9	3.3	67 02.6	+59.9	3.4	68 02.5	+59.9	3.6	69 02.4	+59.9	3.7	70 02.2	+59.9	3.9	71 02.1	+59.9	4.1	**79**
80	65 02.7	+59.9	2.9	66 02.6	+59.9	3.0	67 02.6	+59.8	3.1	68 02.5	+59.8	3.2	69 02.4	+59.8	3.4	70 02.3	+59.8	3.6	71 02.1	+59.9	3.7	72 02.0	+59.9	3.9	**80**
81	66 02.6	+59.8	2.7	67 02.5	+59.8	2.8	68 02.4	+59.8	2.9	69 02.3	+59.9	3.1	70 02.2	+59.9	3.2	71 02.1	+59.9	3.4	72 02.0	+59.9	3.5	73 01.9	+59.9	3.7	**81**
82	67 02.4	+59.8	2.5	68 02.3	+59.8	2.6	69 02.2	+59.9	2.7	70 02.2	+59.8	2.8	71 02.1	+59.8	3.0	72 02.0	+59.9	3.2	73 01.9	+59.9	3.3	74 01.8	+59.9	3.5	**82**
83	68 02.2	+59.7	2.3	69 02.1	+59.8	2.4	70 02.1	+59.8	2.5	71 02.0	+59.8	2.6	72 01.9	+59.8	2.8	73 01.9	+59.8	2.9	74 01.8	+59.8	3.1	75 01.7	+59.8	3.3	**83**
84	69 01.9	+59.8	2.0	70 01.9	+59.8	2.1	71 01.9	+59.7	2.2	72 01.8	+59.8	2.4	73 01.7	+59.8	2.5	74 01.7	+59.8	2.7	75 01.6	+59.8	2.8	76 01.5	+59.9	3.0	**84**
85	70 01.7	+59.7	1.8	71 01.7	+59.7	1.9	72 01.6	+59.8	2.0	73 01.6	+59.7	2.1	74 01.5	+59.8	2.2	75 01.5	+59.8	2.4	76 01.4	+59.8	2.5	77 01.4	+59.8	2.7	**85**
86	71 01.4	+59.7	1.5	72 01.4	+59.7	1.6	73 01.4	+59.7	1.7	74 01.3	+59.8	1.8	75 01.3	+59.8	1.9	76 01.3	+59.7	2.0	77 01.2	+59.8	2.2	78 01.2	+59.8	2.3	**86**
87	72 01.1	+59.7	1.2	73 01.1	+59.7	1.3	74 01.1	+59.7	1.3	75 01.1	+59.7	1.4	76 01.1	+59.7	1.5	77 01.0	+59.7	1.6	78 01.0	+59.7	1.8	79 01.0	+59.7	1.9	**87**
88	73 00.8	+59.6	0.8	74 00.8	+59.6	0.9	75 00.8	+59.6	0.9	76 00.8	+59.6	1.0	77 00.8	+59.6	1.1	78 00.7	+59.7	1.2	79 00.7	+59.7	1.3	80 00.7	+59.7	1.4	**88**
89	74 00.4	+59.6	0.4	75 00.4	+59.6	0.5	76 00.4	+59.6	0.5	77 00.4	+59.6	0.5	78 00.4	+59.6	0.6	79 00.4	+59.6	0.6	80 00.4	+59.6	0.7	81 00.4	+59.6	0.8	**89**
90	75 00.0	+59.5	0.0	76 00.0	+59.5	0.0	77 00.0	+59.5	0.0	78 00.0	+59.5	0.0	79 00.0	+59.5	0.0	80 00.0	+59.5	0.0	81 00.0	+59.5	0.0	82 00.0	+59.5	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 173°, 187°

8°, 352° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 51.0	+60.0	171.7	13 51.7	+59.9	171.8	12 52.3	+59.9	171.8	11 52.9	+60.0	171.8	10 53.5	+60.0	171.9	9 54.1	+60.0	171.9	8 54.7	+60.0	171.9	7 55.3	+60.0	171.9	0
1	15 51.0	+60.0	171.7	14 51.6	+60.0	171.7	13 52.2	+60.0	171.8	12 52.9	+59.9	171.8	11 53.5	+60.0	171.8	10 54.1	+60.0	171.9	9 54.7	+60.0	171.9	8 55.3	+60.0	171.9	1
2	16 51.0	+59.9	171.6	15 51.6	+60.0	171.7	14 52.2	+60.0	171.7	13 52.8	+60.0	171.8	12 53.5	+59.9	171.8	11 54.1	+59.9	171.8	10 54.7	+60.0	171.9	9 55.3	+60.0	171.9	2
3	17 50.9	+60.0	171.6	16 51.6	+59.9	171.6	15 52.2	+60.0	171.7	14 52.8	+60.0	171.7	13 53.4	+60.0	171.8	12 54.0	+60.0	171.8	11 54.7	+59.9	171.8	10 55.3	+60.0	171.9	3
4	18 50.9	+59.9	171.6	17 51.5	+60.0	171.6	16 52.2	+59.9	171.7	15 52.8	+60.0	171.7	14 53.4	+60.0	171.7	13 54.0	+60.0	171.8	12 54.6	+60.0	171.8	11 55.3	+59.9	171.8	4
5	19 50.8	+60.0	171.5	18 51.5	+59.9	171.6	17 52.1	+60.0	171.6	16 52.8	+59.9	171.7	15 53.4	+60.0	171.7	14 54.0	+60.0	171.8	13 54.6	+60.0	171.8	12 55.2	+60.0	171.8	5
6	20 50.8	+59.9	171.5	19 51.4	+60.0	171.5	18 52.1	+60.0	171.6	17 52.7	+60.0	171.6	16 53.4	+59.9	171.7	15 54.0	+60.0	171.7	14 54.6	+60.0	171.8	13 55.2	+60.0	171.8	6
7	21 50.7	+60.0	171.4	20 51.4	+60.0	171.5	19 52.1	+59.9	171.6	18 52.7	+60.0	171.6	17 53.3	+60.0	171.7	16 54.0	+60.0	171.7	15 54.6	+60.0	171.7	14 55.2	+60.0	171.8	7
8	22 50.7	+59.9	171.4	21 51.4	+59.9	171.5	20 52.0	+60.0	171.5	19 52.7	+59.9	171.6	18 53.3	+60.0	171.6	17 54.0	+59.9	171.7	16 54.6	+60.0	171.7	15 55.2	+60.0	171.8	8
9	23 50.6	+60.0	171.4	22 51.3	+60.0	171.4	21 52.0	+60.0	171.5	20 52.6	+60.0	171.5	19 53.3	+60.0	171.6	18 53.9	+60.0	171.6	17 54.6	+60.0	171.7	16 55.2	+60.0	171.7	9
10	24 50.6	+59.9	171.3	23 51.3	+59.9	171.4	22 52.0	+59.9	171.4	21 52.6	+60.0	171.5	20 53.3	+59.9	171.6	19 53.9	+60.0	171.6	18 54.6	+59.9	171.7	17 55.2	+60.0	171.7	10
11	25 50.5	+60.0	171.3	24 51.2	+60.0	171.3	23 51.9	+60.0	171.4	22 52.6	+60.0	171.5	21 53.2	+60.0	171.5	20 53.9	+60.0	171.6	19 54.5	+60.0	171.6	18 55.2	+60.0	171.7	11
12	26 50.5	+60.0	171.2	25 51.2	+60.0	171.3	24 51.9	+59.9	171.4	23 52.6	+59.9	171.4	22 53.2	+60.0	171.5	21 53.9	+60.0	171.6	20 54.5	+60.0	171.6	19 55.2	+59.9	171.7	12
13	27 50.5	+59.9	171.2	26 51.2	+59.9	171.3	25 51.8	+60.0	171.3	24 52.5	+60.0	171.4	23 53.2	+60.0	171.5	22 53.9	+59.9	171.5	21 54.5	+60.0	171.6	20 55.1	+60.0	171.7	13
14	28 50.4	+60.0	171.1	27 51.1	+60.0	171.2	26 51.8	+60.0	171.3	25 52.5	+60.0	171.4	24 53.2	+59.9	171.4	23 53.8	+60.0	171.5	22 54.5	+60.0	171.6	21 55.1	+60.0	171.6	14
15	29 50.4	+59.9	171.1	28 51.1	+59.9	171.2	27 51.8	+59.9	171.3	26 52.5	+59.9	171.3	25 53.1	+60.0	171.4	24 53.8	+60.0	171.5	23 54.5	+60.0	171.5	22 55.1	+60.0	171.6	15
16	30 50.3	+59.9	171.0	29 51.0	+60.0	171.1	28 51.7	+60.0	171.2	27 52.4	+60.0	171.3	26 53.1	+60.0	171.4	25 53.8	+60.0	171.4	24 54.5	+59.9	171.5	23 55.1	+60.0	171.6	16
17	31 50.2	+60.0	171.0	30 51.0	+59.9	171.1	29 51.7	+60.0	171.2	28 52.4	+60.0	171.3	27 53.1	+60.0	171.3	26 53.8	+59.9	171.4	25 54.4	+60.0	171.5	24 55.1	+60.0	171.6	17
18	32 50.2	+59.9	170.9	31 50.9	+60.0	171.0	30 51.7	+59.9	171.1	29 52.4	+59.9	171.2	28 53.1	+59.9	171.3	27 53.7	+60.0	171.4	26 54.4	+60.0	171.5	25 55.1	+60.0	171.5	18
19	33 50.1	+60.0	170.9	32 50.9	+59.9	171.0	31 51.6	+60.0	171.1	30 52.3	+60.0	171.2	29 53.0	+60.0	171.3	28 53.7	+60.0	171.4	27 54.4	+60.0	171.4	26 55.1	+59.9	171.5	19
20	34 50.1	+59.9	170.8	33 50.8	+60.0	170.9	32 51.6	+59.9	171.0	31 52.3	+60.0	171.1	30 53.0	+60.0	171.2	29 53.7	+60.0	171.3	28 54.4	+60.0	171.4	27 55.0	+60.0	171.5	20
21	35 50.0	+60.0	170.8	34 50.8	+59.9	170.9	33 51.5	+60.0	171.0	32 52.3	+59.9	171.1	31 53.0	+59.9	171.2	30 53.7	+60.0	171.3	29 54.4	+59.9	171.4	28 55.0	+60.0	171.5	21
22	36 50.0	+59.9	170.7	35 50.7	+60.0	170.8	34 51.5	+59.9	171.0	33 52.2	+60.0	171.1	32 52.9	+60.0	171.2	31 53.7	+59.9	171.3	30 54.3	+60.0	171.4	29 55.0	+60.0	171.4	22
23	37 49.9	+59.9	170.7	36 50.7	+59.9	170.8	35 51.4	+60.0	170.9	34 52.2	+60.0	171.0	33 52.9	+60.0	171.1	32 53.6	+60.0	171.2	31 54.3	+60.0	171.3	30 55.0	+60.0	171.4	23
24	38 49.8	+60.0	170.6	37 50.6	+60.0	170.7	36 51.4	+60.0	170.9	35 52.2	+59.9	171.0	34 52.9	+60.0	171.1	33 53.6	+60.0	171.2	32 54.3	+60.0	171.3	31 55.0	+60.0	171.4	24
25	39 49.8	+59.9	170.5	38 50.6	+59.9	170.7	37 51.4	+59.9	170.8	36 52.1	+60.0	170.9	35 52.9	+59.9	171.0	34 53.6	+60.0	171.2	33 54.3	+60.0	171.3	32 55.0	+60.0	171.4	25
26	40 49.7	+59.9	170.5	39 50.5	+60.0	170.6	38 51.3	+60.0	170.8	37 52.1	+59.9	170.9	36 52.8	+60.0	171.0	35 53.6	+59.9	171.1	34 54.3	+59.9	171.2	33 55.0	+59.9	171.3	26
27	41 49.6	+60.0	170.4	40 50.5	+59.9	170.6	39 51.3	+59.9	170.7	38 52.0	+60.0	170.8	37 52.8	+60.0	171.0	36 53.5	+60.0	171.1	35 54.2	+60.0	171.2	34 54.9	+60.0	171.3	27
28	42 49.6	+59.9	170.4	41 50.4	+59.9	170.5	40 51.2	+60.0	170.7	39 52.0	+59.9	170.8	38 52.8	+59.9	170.9	37 53.5	+60.0	171.0	36 54.2	+60.0	171.2	35 54.9	+60.0	171.3	28
29	43 49.5	+59.9	170.3	42 50.3	+60.0	170.4	41 51.2	+59.9	170.6	40 51.9	+60.0	170.7	39 52.7	+60.0	170.9	38 53.5	+59.9	171.0	37 54.2	+60.0	171.1	36 54.9	+60.0	171.2	29
30	44 49.4	+59.9	170.2	43 50.3	+59.9	170.4	42 51.1	+59.9	170.5	41 51.9	+60.0	170.7	40 52.7	+59.9	170.8	39 53.4	+60.0	171.0	38 54.2	+59.9	171.1	37 54.9	+60.0	171.2	30
31	45 49.3	+60.0	170.1	44 50.2	+59.9	170.3	43 51.0	+60.0	170.5	42 51.9	+59.9	170.6	41 52.6	+60.0	170.8	40 53.4	+60.0	170.9	39 54.1	+60.0	171.1	38 54.9	+59.9	171.2	31
32	46 49.3	+59.9	170.1	45 50.1	+60.0	170.2	44 51.0	+59.9	170.4	43 51.8	+60.0	170.6	42 52.6	+60.0	170.7	41 53.4	+59.9	170.9	40 54.1	+60.0	171.0	39 54.8	+60.0	171.1	32
33	47 49.2	+59.9	170.0	46 50.1	+59.9	170.2	45 50.9	+60.0	170.4	44 51.8	+59.9	170.5	43 52.6	+59.9	170.7	42 53.3	+60.0	170.8	41 54.1	+60.0	171.0	40 54.8	+60.0	171.1	33
34	48 49.1	+59.9	169.9	47 50.0	+59.9	170.1	46 50.9	+59.9	170.3	45 51.7	+60.0	170.5	44 52.5	+60.0	170.6	43 53.3	+60.0	170.8	42 54.1	+59.9	170.9	41 54.8	+60.0	171.1	34
35	49 49.0	+59.9	169.8	48 49.9	+59.9	170.0	47 50.8	+59.9	170.2	46 51.7	+59.9	170.4	45 52.5	+59.9	170.6	44 53.3	+59.9	170.7	43 54.0	+60.0	170.9	42 54.8	+60.0	171.0	35
36	50 48.9	+59.9	169.7	49 49.8	+59.9	169.9	48 50.7	+60.0	170.1	47 51.6	+59.9	170.3	46 52.4	+60.0	170.5	45 53.2	+60.0	170.7	44 54.0	+60.0	170.9	43 54.8	+59.9	171.0	36
37	51 48.8	+59.9	169.6	50 49.7	+60.0	169.9	49 50.7	+59.9	170.1	48 51.5	+60.0	170.3	47 52.4	+59.9	170.5	46 53.2	+60.0	170.6	45 54.0	+60.0	170.8	44 54.7	+60.0	171.0	37
38	52 48.7	+59.9	169.5	51 49.7	+59.9	169.8	50 50.6	+59.9	170.0	49 51.5	+59.9	170.2	48 52.3	+60.0	170.4	47 53.2	+59.9	170.6	46 54.0	+59.9	170.8	45 54.7	+60.0	170.9	38
39	53 48.6	+59.9	169.4	52 49.6	+59.9	169.7	51 50.5	+59.9	169.9	50 51.4	+60.0	170.1	49 52.3	+59.9	170.3	48 53.1	+60.0	170.5	47 53.9	+60.0	170.7	46 54.7	+60.0	170.9	39
40	54 48.5	+59.8	169.3	53 49.5	+59.9	169.6	52 50.4	+60.0	169.8	51 51.4	+59.9	170.1	50 52.2	+60.0	170.3	49 53.1	+59.9	170.5	48 53.9	+60.0	170.7	47 54.7	+59.9	170.8	40
41	55 48.3	+59.9	169.2	54 49.4	+59.9	169.5	53 50.4	+59.9	169.7	52 51.3	+59.9	170.0	51 52.2	+59.9	170.2	50 53.0	+60.0	170.4	49 53.9	+59.9	170.6	48 54.6	+60.0	170.8	41
42	56 48.2	+59.9	169.1	55 49.3	+59.9	169.4	54 50.3	+59.9	169.7	53 51.2	+59.9	169.9	52 52.1	+60.0	170.1	51 53.0	+59.9	170.4	50 53.8	+60.0	170.6	49 54.6	+60.0	170.8	42
43	57 48.1	+59.8	169.0	56 49.2	+59.8	169.3	55 50.2	+59.9	169.6	54 51.1	+60.0	169.8	53 52.1	+59.9	170.1	52 52.9	+60.0	170.3	51 53.8	+60.0	170.5	50 54.6	+60.0	170.7	43
44	58 47.9	+59.9	168.9	57 49.0	+59.9	169.2	56 50.1	+59.9	169.5	55 51.1	+59.9	169.7	54 52.0	+59.9	170.0	53 52.9	+59.9	170.2	52 53.8	+59.9	170.4	51 54.6	+59.9	170.7	44
45	59 47.8	+59.8	168.7	58 48.9	+59.9	169.0	57 50.0	+59.9	169.3	56 51.0	+59.9	169.6	55 51.9	+60.0	169.9	54 52.8	+60.0	170.2	53 53.7	+60.0	170.4	52 54.5	+60.0	170.6	45
46	60 47.6	+59.9	168.6	59 48.8	+59.8	168.9	58 49.9	+59.9	169.2	57 50.9	+59.9	169.5	56 51.9	+59.9	169.8	55 52.8	+59.9	170.1	54 53.7	+59.9	170.3	53 54.5	+60.0	170.6	46
47	61 47.5	+59.8	168.4	60 48.6	+59.9	168.8	59 49.8	+59.8	169.1	58 50.8	+59.9	169.4	57 51.8	+59.9	169.7	56 52.7	+60.0	170.0	55 53.6	+60.0	170.3	54 54.5	+59.9	170.5	47
48	62 47.3	+59.8	168.2	61 48.5	+59.8	168.6	60 49.6	+59.9	169.0	59 50.7	+59.9	169.3	58 51.7	+59.9	169.6	57 52.7	+59.9	169.9	56 53.6	+59.9	170.2	55 54.4	+60.0	170.4	48
49	63 47.1	+59.8	168.1	62 48.3	+59.9	168.5	61 49.5	+59.9	168.9	60 50.6	+59.9	169.2	59 51.6	+60.0	169.5	58 52.6	+59.9	169.8	57 53.5	+60.0	170.1	56 54.4	+60.0	170.4	49
50	64 46.9	+59.8	167.9	63 48.2	+59.8	168.3	62 49.4	+59.8	168.7	61 50.5	+59.9	169.1	60 51.6	+59.9	169.4	59 52.5	+60.0	169.7	58 53.5	+59.9	170.0	57 54.4	+59.9	170.3	50
51	65 46.7	+59.7	167.7	64 48.0	+59.8	168.1	63 49.2	+59.9	168.5	62 50.4	+59.9	168.9	61 51.5	+59.9	169.3	60 52.5	+59.9	169.6	59 53.4	+60.0	169.9	58 54.3	+60.0	170.2	51
52	66 46.4	+59.8	167.5	65 47.8	+59.8	167.9	64 49.1	+59.8	168.4	63 50.3	+59.8	168.8	62 51.4	+59.9	169.2	61 52.4	+59.9	169.5	60 53.4	+59.9	169.9	59 54.3	+59.9	170.2	52
53	67 46.2	+59.7	167.2	66 47.6	+59.8	167.7	65 48.9	+59.8	168.2	64 50.1	+59.9	168.6	63 51.3	+59.8	169.0	62 52.3	+59.9	169.4	61 53.3	+59.9	169.8	60 54.2	+60.0	170.1	53
54	68 45.9	+59.7	166.9	67 47.4	+59.7	167.5	66 48.7	+59.8	168.0	65 50.0	+59.8	168.5	64 51.1	+59.9	168.9	63 52.2	+59.9	169.3	62 53.2	+60.0	169.7	61 54.2	+59.9	170.0	54
55	69 45.6	+59.6	166.7	68 47.1	+59.7	167.3	67 48.5	+59.8	167.8	66 49.8	+59.9	168.3	65 51.0	+59.9	168.7	64 52.1	+59.9	169.2	63 53.2	+59.9	169.6	62 54.1	+60.0	169.9	55
56	70 45.2	+59.6	166.3	69 46.8	+59.7	167.0	68 48.3	+59.8	167.6	67 49.7	+59.8	168.1	66 50.9	+59.8	168.6	65 52.0	+59.9	169.0	64 53.1	+59.9	169.4	63 54.1	+59.9	169.8	56
57	71 44.8	+59.6	166.0	70 46.5	+59.7	166.7	69 48.1	+59.7	167.3	68 49.5	+59.8	167.9	67 50.7	+59.9	168.4	66 51.9	+59.9	168.9	65 53.0	+59.9	169.3	64 54.0	+59.9	169.7	57
58	72 44.4	+59.6	165.6	71 46.2	+59.6	166.4	70 47.8	+59.7	167.0	69 49.3	+59.7	167.7	68 50.6	+59.8	168.2	67 51.8	+59.9	168.7	66 52.9	+59.9	169.2	65 53.9	+60.0	169.6	58
59	73 44.0	+59.4	165.2	72 45.8	+59.6	166.0	71 47.5	+59.7	166.7	70 49.0	+59.8	167.4	69 50.4	+59.8	168.0	68 51.7	+59.8	168.5	67 52.8	+59.9	169.0	66 53.9	+59.9	169.5	59
60	74 43.4	+59.4	164.7	73 45.4	+59.6	165.6	72 47.2	+59.7	166.4	71 48.8	+59.7	167.1	70 50.2	+59.8	167.8	69 51.5	+59.9	168.3	68 52.7	+59.9	168.9	67 53.8	+59.9	169.3	60
61	75 42.8	+59.3	164.1	74 45.0	+59.4	165.1	73 46.9	+59.5	166.0	72 48.5	+59.7	166.8	71 50.0	+59.8	167.5	70 51.4	+59.8	168.1	69 52.6	+59.9	168.7	68 53.7	+59.9	169.2	61
62	76 42.1	+59.2	163.5	75 44.4	+59.4	164.6	74 46.4	+59.6	165.6	73 48.2	+59.7	166.5	72 49.8	+59.7	167.2	71 51.2	+59.8	167.9	70 52.5	+59.8	168.5	69 53.6	+59.9	169.0	62
63	77 41.3	+59.1	162.8	76 43.8	+59.3	164.0	75 46.0	+59.5	165.1	74 47.9	+59.6	166.1	73 49.5	+59.8	166.9	72 51.0	+59.8	167.6	71 52.3	+59.9	168.3	70 53.5	+59.9	168.9	63
64	78 40.4	+58.9	161.9	77 43.1	+59.2	163.3	76 45.5	+59.4	164.6	75 47.5	+59.5	165.6	74 49.3	+59.6	166.5	73 50.8	+59.8	167.3	72 52.2	+59.8	168.0	71 53.4	+59.9	168.7	64
65	79 39.3	+58.6	160.9	78 42.3	+59.0	162.5	77 44.9	+59.2	163.9	76 47.0	+59.5	165.1	75 48.9	+59.6	166.1	74 50.6	+59.7	167.0	73 52.0	+59.8	167.8	72 53.3	+59.9	168.5	65
66	80 37.9	+58.4	159.6	79 41.3	+58.8	161.6	78 44.1	+59.2	163.2	77 46.5	+59.4	164.5	76 48.5	+59.6	165.6	75 50.3	+59.7	166.6	74 51.8	+59.8	167.5	73 53.2	+59.8	168.2	66
67	81 36.3	+57.9	158.1	80 40.1	+58.6	160.4	79 43.3	+59.0	162.3	78 45.9	+59.3	163.8	77 48.1	+59.5	165.1	76 50.0	+59.6	166.2	75 51.6	+59.7	167.1	74 53.0	+59.8	168.0	67
68	82 34.2	+57.2	156.2	81 38.7	+58.1	159.0	80 42.3	+58.7	161.2	79 45.2	+59.1	163.0	78 47.6	+59.4	164.4	77 49.6	+59.6	165.7	76 51.3	+59.7	166.7	75 52.8	+59.8	167.7	68
69	83 31.4	+56.3	153.8	82 36.8	+57.6	157.2	81 41.0	+58.4	159.8	80 44.3	+58.9	161.9	79 47.0	+59.2	163.7	78 49.2	+59.5	165.1	77 51.0	+59.7	166.3	76 52.6	+59.8	167.3	69
70	84 27.7	*+54.8*	•150.4	83 34.4	+56.7	154.8	82 39.4	+57.9	158.1	81 43.2	+58.6	160.7	80 46.2	+59.1	162.7	79 48.7	+59.3	164.4	78 50.7	+59.6	165.8	77 52.4	+59.7	166.9	70
71	85 22.5	*+52.1*	•145.8	84 31.1	+55.4	151.7	83 37.3	+57.1	155.9	82 41.8	+58.2	159.1	81 45.3	+58.8	161.6	80 48.0	+59.3	163.5	79 50.3	+59.5	165.1	78 52.1	+59.7	166.4	71
72	86 14.6	*+47.0*	•139.0	85 26.5	*+52.9*	•147.2	84 34.4	+55.9	153.0	83 40.0	+57.5	157.1	82 44.1	+58.5	160.1	81 47.3	+59.0	162.5	80 49.8	+59.3	164.3	79 51.8	+59.6	165.9	72
73	87 01.6	*+36.9*	•128.3	86 19.4	*+48.1*	•140.6	85 30.3	*+53.7*	•148.7	84 37.5	+56.4	154.3	83 42.6	+57.8	158.2	82 46.3	+58.7	161.1	81 49.1	+59.2	163.4	80 51.4	+59.5	165.2	73
74	87 38.5	*+17.4*	•111.2	87 07.5	*+38.3*	•130.1	86 24.0	*+49.3*	•142.3	85 33.9	*+54.5*	•150.3	84 40.4	+57.0	155.6	83 45.0	+58.2	159.4	82 48.3	+59.0	162.2	81 50.9	+59.3	164.3	74
75	87 55.9	*–10.1*	•86.1	87 45.8	*+18.2*	•112.6	87 13.3	*+39.7*	•132.0	86 28.4	*+50.4*	•144.2	85 37.4	*+55.2*	•151.8	84 43.2	+57.4	157.0	83 47.3	+58.5	160.6	82 50.2	+59.2	163.2	75
76	87 45.8	*–32.5*	•59.6	88 04.0	*–11.0*	•86.1	87 53.0	*+19.1*	•114.2	87 18.8	*+41.4*	•134.1	86 32.6	*+51.6*	•146.1	85 40.6	*+56.0*	•153.5	84 45.8	+57.9	158.4	83 49.4	+58.8	161.8	76
77	87 13.3	*–44.9*	•40.2	87 53.0	*–34.2*	•58.0	88 12.1	*–11.9*	•86.1	88 00.2	*+20.1*	•116.1	87 24.2	*+43.0*	•136.3	86 36.6	*+52.7*	•148.0	85 43.7	*+56.6*	•155.1	84 48.2	+58.3	159.8	77
78	86 28.4	*–51.0*	•28.1	87 18.8	*–46.2*	•38.1	88 00.2	*–36.0*	•56.1	88 20.3	*–13.1*	•86.1	88 07.2	*+21.3*	•118.1	87 29.3	*+44.8*	•138.7	86 40.3	*+53.9*	•150.1	85 46.5	+57.3	156.9	78
79	85 37.4	*–54.2*	•20.4	86 32.6	*–52.0*	•26.1	87 24.2	*–47.6*	•35.9	88 07.2	*–37.9*	•54.0	88 28.5	*–14.4*	•86.1	88 14.1	*+22.6*	•120.5	87 34.2	*+46.6*	•141.2	86 43.8	*+54.9*	•152.3	79
80	84 43.2	–55.9	15.2	85 40.6	*–54.8*	•18.7	86 36.6	*–52.9*	•24.1	87 29.3	*–49.0*	•33.5	88 14.1	*–39.9*	•51.7	88 36.7	*–15.9*	•86.1	88 20.8	*+24.2*	•123.1	87 38.7	*+48.5*	•144.0	80
81	83 47.3	–57.1	11.6	84 45.8	–56.4	13.8	85 43.7	*–55.5*	•17.0	86 40.3	*–53.8*	•22.0	87 34.2	*–50.4*	•30.9	88 20.8	*–42.1*	•49.0	88 45.0	*–17.8*	•86.0	88 27.2	*+26.1*	•126.2	81
82	82 50.2	–57.7	8.9	83 49.4	–57.4	10.4	84 48.2	–56.9	12.3	85 46.5	–56.1	15.2	86 43.8	*–54.7*	•19.8	87 38.7	*–51.8*	•28.1	88 27.2	*–44.3*	•45.9	88 53.3	*–19.9*	•86.0	82
83	81 52.5	–58.3	6.9	82 52.0	–58.0	7.8	83 51.3	–57.7	9.1	84 50.4	–57.3	10.9	85 49.1	–56.7	13.4	86 46.9	*–55.5*	•17.6	87 42.9	*–53.1*	•25.2	88 33.4	*–46.6*	•42.3	83
84	80 54.2	–58.5	5.3	81 54.0	–58.5	5.9	82 53.6	–58.3	6.8	83 53.1	–58.0	7.8	84 52.4	–57.7	9.4	85 51.4	–57.2	11.6	86 49.8	*–56.3*	•15.3	87 46.8	*–54.4*	•22.1	84
85	79 55.7	–58.9	4.0	80 55.5	–58.7	4.4	81 55.3	–58.6	5.0	82 55.1	–58.6	5.6	83 54.7	–58.3	6.6	84 54.2	–58.1	7.8	85 53.5	–57.7	9.7	86 52.4	–57.0	12.8	85
86	78 56.8	–59.0	2.9	79 56.8	–59.0	3.2	80 56.7	–59.0	3.5	81 56.5	–58.8	4.0	82 56.4	–58.8	4.5	83 56.1	–58.6	5.3	84 55.8	–58.4	6.3	85 55.4	–58.2	7.8	86
87	77 57.8	–59.1	2.0	78 57.8	–59.2	2.2	79 57.7	–59.1	2.4	80 57.7	–59.1	2.7	81 57.6	–59.0	3.0	82 57.5	–59.0	3.4	83 57.4	–58.9	4.0	84 57.2	–58.8	4.7	87
88	76 58.7	–59.3	1.2	77 58.6	–59.2	1.3	78 58.6	–59.2	1.5	79 58.6	–59.2	1.6	80 58.6	–59.2	1.8	81 58.5	–59.1	2.0	82 58.5	–59.2	2.3	83 58.4	–59.1	2.7	88
89	75 59.4	–59.4	0.6	76 59.4	–59.4	0.6	77 59.4	–59.4	0.7	78 59.4	–59.4	0.7	79 59.4	–59.4	0.8	80 59.4	–59.4	0.9	81 59.3	–59.3	1.0	82 59.3	–59.3	1.1	89
90	75 00.0	–59.5	0.0	76 00.0	–59.5	0.0	77 00.0	–59.5	0.0	78 00.0	–59.5	0.0	79 00.0	–59.5	0.0	80 00.0	–59.5	0.0	81 00.0	–59.5	0.0	82 00.0	–59.5	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION — L.H.A. 8°, 352°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 51.0	−59.9	171.7	13 51.7	−60.0	171.8	12 52.3	−60.0	171.8	11 52.9	−60.0	171.8	10 53.5	−60.0	171.9	9 54.1	−60.0	171.9	8 54.7	−60.0	171.9	7 55.3	−60.0	171.9	0
1	13 51.1	−60.0	171.8	12 51.7	−60.0	171.8	11 52.3	−60.0	171.8	10 52.9	−60.0	171.9	9 53.5	−60.0	171.9	8 54.1	−60.0	171.9	7 54.7	−60.0	171.9	6 55.3	−60.0	171.9	1
2	12 51.1	−59.9	171.8	11 51.7	−59.9	171.8	10 52.3	−59.9	171.9	9 52.9	−59.9	171.9	8 53.5	−59.9	171.9	7 54.1	−59.9	171.9	6 54.7	−60.0	171.9	5 55.3	−60.0	172.0	2
3	11 51.2	−60.0	171.8	10 51.8	−60.0	171.9	9 52.4	−60.0	171.9	8 53.0	−60.0	171.9	7 53.6	−60.0	171.9	6 54.2	−60.0	172.0	5 54.7	−59.9	172.0	4 55.3	−60.0	172.0	3
4	10 51.2	−60.0	171.9	9 51.8	−60.0	171.9	8 52.4	−60.0	171.9	7 53.0	−60.0	171.9	6 53.6	−60.0	172.0	5 54.2	−60.0	172.0	4 54.8	−60.0	172.0	3 55.3	−59.9	172.0	4
5	9 51.2	−59.9	171.9	8 51.8	−59.9	171.9	7 52.4	−59.9	172.0	6 53.0	−60.0	172.0	5 53.6	−60.0	172.0	4 54.2	−60.0	172.0	3 54.8	−60.0	172.0	2 55.4	−60.0	172.0	5
6	8 51.3	−60.0	171.9	7 51.9	−60.0	172.0	6 52.5	−60.0	172.0	5 53.0	−59.9	172.0	4 53.6	−60.0	172.0	3 54.2	−60.0	172.0	2 54.8	−60.0	172.0	1 55.4	−60.0	172.0	6
7	7 51.3	−59.9	172.0	6 51.9	−60.0	172.0	5 52.5	−60.0	172.0	4 53.1	−60.0	172.0	3 53.6	−59.9	172.0	2 54.2	−60.0	172.0	1 54.8	−60.0	172.1	0 55.4	−60.0	172.1	7
8	6 51.4	−60.0	172.0	5 51.9	−59.9	172.0	4 52.5	−60.0	172.0	3 53.1	−60.0	172.1	2 53.7	−60.0	172.1	1 54.2	−59.9	172.1	0 54.8	−60.0	172.1	0 04.6	+60.0	7.9	8
9	5 51.4	−60.0	172.1	4 52.0	−60.0	172.1	3 52.5	−59.9	172.1	2 53.1	−60.0	172.1	1 53.7	−60.0	172.1	0 54.3	−60.0	172.1	0 05.2	+60.0	7.9	1 04.6	+60.0	7.9	9
10	4 51.4	−59.9	172.1	3 52.0	−60.0	172.1	2 52.6	−60.0	172.1	1 53.1	−59.9	172.1	0 53.7	−60.0	172.1	0 05.7	+60.0	7.9	1 05.2	+59.9	7.9	2 04.6	+60.0	7.9	10
11	3 51.5	−60.0	172.1	2 52.0	−59.9	172.1	1 52.6	−60.0	172.1	0 53.2	−60.0	172.1	0 06.3	+59.9	7.9	1 05.7	+60.0	7.9	2 05.1	+60.0	7.9	3 04.6	+60.0	7.9	11
12	2 51.5	−59.9	172.2	1 52.1	−60.0	172.2	0 52.6	−59.9	172.2	0 06.8	+60.0	7.8	1 06.2	+60.0	7.8	2 05.7	+60.0	7.8	3 05.1	+60.0	7.8	4 04.6	+60.0	7.8	12
13	1 51.6	−60.0	172.2	0 52.1	−60.0	172.2	0 07.3	+60.0	7.8	1 06.8	+60.0	7.8	2 06.2	+60.0	7.8	3 05.7	+60.0	7.8	4 05.1	+60.0	7.8	5 04.6	+59.9	7.8	13
14	0 51.6	−60.0	172.2	0 07.9	+59.9	7.8	1 07.3	+60.0	7.8	2 06.8	+59.9	7.8	3 06.2	+60.0	7.8	4 05.7	+59.9	7.8	5 05.1	+60.0	7.8	6 04.5	+60.0	7.8	14
15	0 08.4	+59.9	7.7	1 07.8	+60.0	7.7	2 07.3	+59.9	7.7	3 06.7	+60.0	7.7	4 06.2	+60.0	7.7	5 05.6	+60.0	7.8	6 05.1	+60.0	7.8	7 04.5	+60.0	7.8	15
16	1 08.3	+60.0	7.7	2 07.8	+60.0	7.7	3 07.2	+60.0	7.7	4 06.7	+60.0	7.7	5 06.2	+59.9	7.7	6 05.6	+60.0	7.7	7 05.1	+60.0	7.7	8 04.5	+60.0	7.8	16
17	2 08.3	+59.9	7.7	3 07.8	+59.9	7.7	4 07.2	+60.0	7.7	5 06.7	+60.0	7.7	6 06.1	+60.0	7.7	7 05.6	+60.0	7.7	8 05.1	+59.9	7.7	9 04.5	+60.0	7.7	17
18	3 08.2	+60.0	7.6	4 07.7	+60.0	7.6	5 07.2	+60.0	7.6	6 06.7	+59.9	7.6	7 06.1	+60.0	7.7	8 05.6	+60.0	7.7	9 05.0	+60.0	7.7	10 04.5	+60.0	7.7	18
19	4 08.2	+60.0	7.6	5 07.7	+59.9	7.6	6 07.2	+59.9	7.6	7 06.6	+60.0	7.6	8 06.1	+60.0	7.6	9 05.6	+59.9	7.7	10 05.0	+60.0	7.7	11 04.5	+60.0	7.7	19
20	5 08.2	+59.9	7.5	6 07.6	+60.0	7.6	7 07.1	+60.0	7.6	8 06.6	+60.0	7.6	9 06.1	+60.0	7.6	10 05.5	+60.0	7.6	11 05.0	+60.0	7.7	12 04.5	+60.0	7.7	20
21	6 08.1	+60.0	7.5	7 07.6	+60.0	7.5	8 07.1	+60.0	7.5	9 06.6	+59.9	7.6	10 06.1	+59.9	7.6	11 05.5	+60.0	7.6	12 05.0	+60.0	7.6	13 04.5	+59.9	7.7	21
22	7 08.1	+60.0	7.5	8 07.6	+59.9	7.5	9 07.1	+59.9	7.5	10 06.5	+60.0	7.5	11 06.0	+60.0	7.6	12 05.5	+60.0	7.6	13 05.0	+60.0	7.6	14 04.4	+60.0	7.6	22
23	8 08.1	+59.9	7.4	9 07.5	+60.0	7.5	10 07.0	+60.0	7.5	11 06.5	+60.0	7.5	12 06.0	+60.0	7.5	13 05.5	+60.0	7.6	14 05.0	+60.0	7.6	15 04.4	+60.0	7.6	23
24	9 08.0	+60.0	7.4	10 07.5	+60.0	7.4	11 07.0	+60.0	7.4	12 06.5	+60.0	7.5	13 06.0	+60.0	7.5	14 05.5	+60.0	7.5	15 05.0	+59.9	7.6	16 04.4	+60.0	7.6	24
25	10 08.0	+59.9	7.4	11 07.5	+59.9	7.4	12 07.0	+59.9	7.4	13 06.5	+59.9	7.4	14 06.0	+59.9	7.5	15 05.5	+59.9	7.5	16 04.9	+60.0	7.5	17 04.4	+60.0	7.6	25
26	11 07.9	+60.0	7.3	12 07.4	+60.0	7.4	13 06.9	+60.0	7.4	14 06.4	+60.0	7.4	15 05.9	+60.0	7.4	16 05.4	+60.0	7.5	17 04.9	+60.0	7.5	18 04.4	+60.0	7.6	26
27	12 07.9	+59.9	7.3	13 07.4	+60.0	7.3	14 06.9	+60.0	7.3	15 06.4	+60.0	7.4	16 05.9	+60.0	7.4	17 05.4	+60.0	7.5	18 04.9	+60.0	7.5	19 04.4	+60.0	7.5	27
28	13 07.8	+60.0	7.2	14 07.4	+59.9	7.3	15 06.9	+59.9	7.3	16 06.4	+60.0	7.3	17 05.9	+60.0	7.4	18 05.4	+60.0	7.4	19 04.9	+60.0	7.5	20 04.4	+60.0	7.5	28
29	14 07.8	+60.0	7.2	15 07.3	+60.0	7.2	16 06.8	+60.0	7.3	17 06.4	+59.9	7.3	18 05.9	+59.9	7.4	19 05.4	+60.0	7.4	20 04.9	+60.0	7.4	21 04.4	+60.0	7.5	29
30	15 07.8	+59.9	7.2	16 07.3	+60.0	7.2	17 06.8	+60.0	7.2	18 06.3	+60.0	7.3	19 05.8	+60.0	7.3	20 05.4	+59.9	7.4	21 04.9	+59.9	7.4	22 04.4	+59.9	7.5	30
31	16 07.7	+60.0	7.1	17 07.3	+59.9	7.2	18 06.8	+60.0	7.2	19 06.3	+60.0	7.3	20 05.8	+60.0	7.3	21 05.3	+60.0	7.3	22 04.8	+60.0	7.4	23 04.3	+60.0	7.5	31
32	17 07.7	+59.9	7.1	18 07.2	+60.0	7.1	19 06.8	+59.9	7.2	20 06.3	+60.0	7.2	21 05.8	+60.0	7.3	22 05.3	+60.0	7.3	23 04.8	+60.0	7.4	24 04.3	+60.0	7.4	32
33	18 07.6	+60.0	7.1	19 07.2	+59.9	7.1	20 06.7	+60.0	7.1	21 06.3	+59.9	7.2	22 05.8	+60.0	7.2	23 05.3	+60.0	7.3	24 04.8	+60.0	7.3	25 04.3	+60.0	7.4	33
34	19 07.6	+60.0	7.0	20 07.1	+60.0	7.1	21 06.7	+60.0	7.1	22 06.2	+60.0	7.2	23 05.8	+59.9	7.2	24 05.3	+60.0	7.3	25 04.8	+60.0	7.3	26 04.3	+60.0	7.4	34
35	20 07.6	+59.9	7.0	21 07.1	+60.0	7.0	22 06.7	+59.9	7.1	23 06.2	+60.0	7.1	24 05.7	+60.0	7.2	25 05.3	+59.9	7.2	26 04.8	+60.0	7.3	27 04.3	+60.0	7.4	35
36	21 07.5	+60.0	6.9	22 07.1	+59.9	7.0	23 06.6	+60.0	7.0	24 06.2	+59.9	7.1	25 05.7	+60.0	7.1	26 05.2	+60.0	7.2	27 04.8	+59.9	7.3	28 04.3	+60.0	7.3	36
37	22 07.5	+59.9	6.9	23 07.0	+60.0	6.9	24 06.6	+59.9	7.0	25 06.1	+60.0	7.1	26 05.7	+59.9	7.1	27 05.2	+60.0	7.2	28 04.7	+60.0	7.2	29 04.3	+59.9	7.3	37
38	23 07.4	+60.0	6.8	24 07.0	+59.9	6.9	25 06.5	+60.0	7.0	26 06.1	+60.0	7.0	27 05.6	+60.0	7.1	28 05.2	+60.0	7.1	29 04.7	+60.0	7.2	30 04.2	+60.0	7.3	38
39	24 07.4	+59.9	6.8	25 06.9	+60.0	6.9	26 06.5	+60.0	6.9	27 06.1	+59.9	7.0	28 05.6	+60.0	7.0	29 05.2	+59.9	7.1	30 04.7	+60.0	7.2	31 04.2	+60.0	7.3	39
40	25 07.3	+60.0	6.8	26 06.9	+60.0	6.8	27 06.5	+59.9	6.9	28 06.0	+60.0	6.9	29 05.6	+60.0	7.0	30 05.1	+60.0	7.1	31 04.7	+60.0	7.2	32 04.2	+60.0	7.2	40
41	26 07.3	+59.9	6.7	27 06.9	+59.9	6.8	28 06.4	+60.0	6.8	29 06.0	+60.0	6.9	30 05.6	+59.9	7.0	31 05.1	+60.0	7.0	32 04.7	+59.9	7.1	33 04.2	+60.0	7.2	41
42	27 07.2	+60.0	6.7	28 06.8	+60.0	6.7	29 06.4	+60.0	6.8	30 06.0	+59.9	6.9	31 05.5	+60.0	6.9	32 05.1	+60.0	7.0	33 04.6	+60.0	7.1	34 04.2	+60.0	7.2	42
43	28 07.2	+59.9	6.6	29 06.8	+59.9	6.7	30 06.4	+59.9	6.8	31 05.9	+60.0	6.8	32 05.5	+60.0	6.9	33 05.1	+59.9	7.0	34 04.6	+60.0	7.1	35 04.2	+59.9	7.1	43
44	29 07.1	+60.0	6.6	30 06.7	+60.0	6.6	31 06.3	+60.0	6.7	32 05.9	+60.0	6.8	33 05.5	+59.9	6.9	34 05.0	+60.0	6.9	35 04.6	+60.0	7.0	36 04.1	+60.0	7.1	44
45	30 07.1	+59.9	6.5	31 06.7	+59.9	6.6	32 06.3	+59.9	6.7	33 05.9	+59.9	6.7	34 05.4	+60.0	6.8	35 05.0	+60.0	6.9	36 04.6	+60.0	7.0	37 04.1	+60.0	7.1	45
46	31 07.0	+60.0	6.5	32 06.6	+60.0	6.6	33 06.2	+60.0	6.6	34 05.8	+60.0	6.7	35 05.4	+60.0	6.8	36 05.0	+60.0	6.9	37 04.6	+59.9	7.0	38 04.1	+60.0	7.1	46
47	32 07.0	+59.9	6.4	33 06.6	+59.9	6.5	34 06.2	+60.0	6.6	35 05.8	+60.0	6.7	36 05.4	+60.0	6.7	37 05.0	+59.9	6.8	38 04.5	+60.0	6.9	39 04.1	+60.0	7.0	47
48	33 06.9	+60.0	6.4	34 06.5	+60.0	6.5	35 06.2	+59.9	6.5	36 05.8	+59.9	6.6	37 05.4	+59.9	6.7	38 04.9	+60.0	6.8	39 04.5	+60.0	6.9	40 04.1	+59.9	7.0	48
49	34 06.9	+59.9	6.3	35 06.5	+59.9	6.4	36 06.1	+60.0	6.5	37 05.7	+60.0	6.6	38 05.3	+60.0	6.7	39 04.9	+60.0	6.8	40 04.5	+60.0	6.9	41 04.0	+60.0	7.0	49
50	35 06.8	+59.9	6.3	36 06.4	+60.0	6.4	37 06.1	+59.9	6.4	38 05.7	+59.9	6.5	39 05.3	+59.9	6.6	40 04.9	+59.9	6.7	41 04.5	+59.9	6.8	42 04.0	+60.0	6.9	50
51	36 06.7	+60.0	6.2	37 06.4	+59.9	6.3	38 06.0	+60.0	6.4	39 05.6	+60.0	6.5	40 05.2	+60.0	6.6	41 04.8	+60.0	6.7	42 04.4	+60.0	6.8	43 04.0	+60.0	6.9	51
52	37 06.7	+59.9	6.2	38 06.3	+60.0	6.3	39 06.0	+59.9	6.3	40 05.6	+60.0	6.4	41 05.2	+60.0	6.5	42 04.8	+60.0	6.6	43 04.4	+60.0	6.7	44 04.0	+60.0	6.8	52
53	38 06.6	+60.0	6.1	39 06.3	+59.9	6.2	40 05.9	+60.0	6.3	41 05.6	+59.9	6.4	42 05.2	+59.9	6.5	43 04.8	+60.0	6.6	44 04.4	+60.0	6.7	45 04.0	+59.9	6.8	53
54	39 06.6	+59.9	6.1	40 06.2	+60.0	6.1	41 05.9	+59.9	6.2	42 05.5	+60.0	6.3	43 05.1	+60.0	6.4	44 04.8	+59.9	6.5	45 04.4	+59.9	6.7	46 03.9	+60.0	6.8	54
55	40 06.5	+59.9	6.0	41 06.2	+59.9	6.1	42 05.8	+60.0	6.2	43 05.5	+59.9	6.3	44 05.1	+60.0	6.4	45 04.7	+60.0	6.5	46 04.3	+60.0	6.6	47 03.9	+60.0	6.7	55
56	41 06.4	+60.0	5.9	42 06.1	+59.9	6.0	43 05.8	+59.9	6.1	44 05.4	+60.0	6.2	45 05.1	+59.9	6.3	46 04.7	+59.9	6.4	47 04.3	+60.0	6.6	48 03.9	+60.0	6.7	56
57	42 06.4	+59.9	5.9	43 06.0	+60.0	6.0	44 05.7	+59.9	6.1	45 05.4	+59.9	6.2	46 05.0	+60.0	6.3	47 04.6	+60.0	6.4	48 04.3	+59.9	6.5	49 03.9	+59.9	6.6	57
58	43 06.3	+59.9	5.8	44 06.0	+59.9	5.9	45 05.6	+60.0	6.0	46 05.3	+60.0	6.1	47 05.0	+59.9	6.2	48 04.6	+60.0	6.3	49 04.2	+60.0	6.5	50 03.8	+60.0	6.6	58
59	44 06.2	+59.9	5.7	45 05.9	+59.9	5.8	46 05.6	+59.9	5.9	47 05.3	+59.9	6.0	48 04.9	+60.0	6.2	49 04.6	+59.9	6.3	50 04.2	+60.0	6.4	51 03.8	+60.0	6.5	59
60	45 06.1	+59.9	5.7	46 05.8	+60.0	5.8	47 05.5	+60.0	5.9	48 05.2	+59.9	6.0	49 04.9	+59.9	6.1	50 04.5	+60.0	6.2	51 04.2	+59.9	6.4	52 03.8	+60.0	6.5	60
61	46 06.0	+60.0	5.6	47 05.8	+59.9	5.7	48 05.5	+59.9	5.8	49 05.1	+60.0	5.9	50 04.8	+60.0	6.0	51 04.5	+59.9	6.2	52 04.1	+60.0	6.3	53 03.8	+59.9	6.4	61
62	47 06.0	+59.9	5.5	48 05.7	+59.9	5.6	49 05.4	+59.9	5.7	50 05.1	+59.9	5.8	51 04.8	+59.9	6.0	52 04.4	+60.0	6.1	53 04.1	+59.9	6.2	54 03.7	+60.0	6.4	62
63	48 05.9	+59.9	5.4	49 05.6	+59.9	5.5	50 05.3	+59.9	5.7	51 05.0	+60.0	5.8	52 04.7	+60.0	5.9	53 04.4	+59.9	6.0	54 04.0	+60.0	6.2	55 03.7	+60.0	6.3	63
64	49 05.8	+59.9	5.3	50 05.5	+59.9	5.5	51 05.2	+60.0	5.6	52 05.0	+59.9	5.7	53 04.7	+59.9	5.8	54 04.3	+60.0	6.0	55 04.0	+60.0	6.1	56 03.7	+59.9	6.3	64
65	50 05.7	+59.9	5.3	51 05.4	+60.0	5.4	52 05.2	+59.9	5.5	53 04.9	+59.9	5.6	54 04.6	+59.9	5.8	55 04.3	+59.9	5.9	56 04.0	+59.9	6.0	57 03.6	+60.0	6.2	65
66	51 05.6	+59.9	5.2	52 05.4	+59.9	5.3	53 05.1	+59.9	5.4	54 04.8	+59.9	5.5	55 04.5	+60.0	5.7	56 04.2	+60.0	5.8	57 03.9	+60.0	6.0	58 03.6	+59.9	6.1	66
67	52 05.5	+59.9	5.1	53 05.3	+59.9	5.2	54 05.0	+59.9	5.3	55 04.7	+60.0	5.5	56 04.5	+59.9	5.6	57 04.2	+59.9	5.7	58 03.9	+59.9	5.9	59 03.5	+60.0	6.1	67
68	53 05.4	+59.9	5.0	54 05.2	+59.9	5.1	55 04.9	+59.9	5.2	56 04.7	+59.9	5.4	57 04.4	+59.9	5.5	58 04.1	+59.9	5.7	59 03.8	+60.0	5.8	60 03.5	+59.9	6.0	68
69	54 05.3	+59.9	4.9	55 05.1	+59.9	5.0	56 04.8	+59.9	5.1	57 04.6	+59.9	5.3	58 04.3	+59.9	5.4	59 04.0	+60.0	5.6	60 03.8	+59.9	5.7	61 03.4	+60.0	5.9	69
70	55 05.2	+59.8	4.8	56 05.0	+59.8	4.9	57 04.7	+59.9	5.0	58 04.5	+59.9	5.2	59 04.2	+60.0	5.3	60 04.0	+59.9	5.5	61 03.7	+59.9	5.6	62 03.4	+59.9	5.8	70
71	56 05.0	+59.9	4.7	57 04.8	+59.9	4.8	58 04.6	+59.9	4.9	59 04.4	+59.9	5.1	60 04.2	+59.9	5.2	61 03.9	+59.9	5.4	62 03.6	+60.0	5.5	63 03.3	+60.0	5.7	71
72	57 04.9	+59.9	4.5	58 04.7	+59.9	4.7	59 04.5	+59.9	4.8	60 04.3	+59.9	4.9	61 04.1	+59.9	5.1	62 03.8	+59.9	5.3	63 03.6	+59.9	5.4	64 03.3	+59.9	5.6	72
73	58 04.8	+59.8	4.4	59 04.6	+59.9	4.5	60 04.4	+59.9	4.7	61 04.2	+59.9	4.8	62 04.0	+59.9	5.0	63 03.7	+60.0	5.2	64 03.5	+59.9	5.3	65 03.2	+60.0	5.5	73
74	59 04.6	+59.9	4.3	60 04.5	+59.8	4.4	61 04.3	+59.9	4.5	62 04.1	+59.9	4.7	63 03.9	+59.9	4.9	64 03.7	+59.9	5.0	65 03.4	+59.9	5.2	66 03.2	+59.9	5.4	74
75	60 04.5	+59.8	4.1	61 04.3	+59.9	4.3	62 04.2	+59.8	4.4	63 04.0	+59.8	4.6	64 03.8	+59.9	4.7	65 03.6	+59.9	4.9	66 03.3	+59.9	5.1	67 03.1	+59.9	5.3	75
76	61 04.3	+59.9	4.0	62 04.2	+59.8	4.1	63 04.0	+59.9	4.3	64 03.8	+59.9	4.4	65 03.7	+59.8	4.6	66 03.5	+59.8	4.8	67 03.2	+59.9	5.0	68 03.0	+59.9	5.2	76
77	62 04.2	+59.8	3.8	63 04.0	+59.8	4.0	64 03.9	+59.8	4.1	65 03.7	+59.9	4.3	66 03.5	+59.9	4.4	67 03.3	+59.9	4.6	68 03.1	+59.9	4.8	69 02.9	+59.9	5.0	77
78	63 04.0	+59.8	3.7	64 03.8	+59.9	3.8	65 03.7	+59.8	3.9	66 03.6	+59.8	4.1	67 03.4	+59.9	4.3	68 03.2	+59.9	4.4	69 03.0	+59.9	4.6	70 02.8	+59.9	4.9	78
79	64 03.8	+59.8	3.5	65 03.7	+59.8	3.6	66 03.5	+59.8	3.8	67 03.4	+59.8	3.9	68 03.3	+59.8	4.1	69 03.1	+59.9	4.3	70 02.9	+59.9	4.5	71 02.7	+59.9	4.7	79
80	65 03.6	+59.7	3.3	66 03.5	+59.7	3.4	67 03.3	+59.8	3.6	68 03.2	+59.8	3.7	69 03.1	+59.8	3.9	70 03.0	+59.8	4.1	71 02.8	+59.9	4.3	72 02.6	+59.9	4.5	80
81	66 03.3	+59.8	3.1	67 03.2	+59.8	3.2	68 03.1	+59.8	3.3	69 03.0	+59.8	3.5	70 02.9	+59.8	3.7	71 02.8	+59.8	3.8	72 02.7	+59.8	4.0	73 02.5	+59.9	4.3	81
82	67 03.1	+59.7	2.8	68 03.0	+59.8	3.0	69 02.9	+59.8	3.1	70 02.8	+59.8	3.3	71 02.7	+59.8	3.4	72 02.6	+59.8	3.6	73 02.5	+59.8	3.8	74 02.4	+59.8	4.0	82
83	68 02.8	+59.7	2.6	69 02.8	+59.7	2.7	70 02.7	+59.7	2.8	71 02.6	+59.8	3.0	72 02.5	+59.8	3.2	73 02.4	+59.8	3.3	74 02.3	+59.8	3.5	75 02.2	+59.8	3.8	83
84	69 02.5	+59.7	2.3	70 02.5	+59.7	2.4	71 02.4	+59.7	2.6	72 02.4	+59.7	2.7	73 02.3	+59.7	2.9	74 02.2	+59.8	3.0	75 02.1	+59.8	3.2	76 02.0	+59.8	3.5	84
85	70 02.2	+59.7	2.0	71 02.2	+59.6	2.1	72 02.1	+59.7	2.3	73 02.1	+59.7	2.4	74 02.0	+59.7	2.5	75 02.0	+59.7	2.7	76 01.9	+59.7	2.9	77 01.8	+59.8	3.1	85
86	71 01.9	+59.6	1.7	72 01.8	+59.6	1.8	73 01.8	+59.6	1.9	74 01.8	+59.6	2.0	75 01.7	+59.7	2.2	76 01.7	+59.7	2.3	77 01.6	+59.7	2.5	78 01.6	+59.7	2.7	86
87	72 01.5	+59.5	1.4	73 01.4	+59.6	1.4	74 01.4	+59.6	1.5	75 01.4	+59.6	1.6	76 01.4	+59.6	1.7	77 01.4	+59.6	1.9	78 01.3	+59.7	2.0	79 01.3	+59.6	2.2	87
88	73 01.0	+59.5	1.0	74 01.0	+59.5	1.0	75 01.0	+59.5	1.1	76 01.0	+59.5	1.2	77 01.0	+59.5	1.2	78 01.0	+59.5	1.3	79 01.0	+59.5	1.5	80 00.9	+59.6	1.6	88
89	74 00.5	+59.5	0.5	75 00.5	+59.5	0.5	76 00.5	+59.5	0.6	77 00.5	+59.5	0.6	78 00.5	+59.5	0.7	79 00.5	+59.5	0.7	80 00.5	+59.5	0.8	81 00.5	+59.5	0.9	89
90	75 00.0	+59.4	0.0	76 00.0	+59.4	0.0	77 00.0	+59.4	0.0	78 00.0	+59.4	0.0	79 00.0	+59.4	0.0	80 00.0	+59.4	0.0	81 00.0	+59.3	0.0	82 00.0	+59.3	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION — L.H.A. 172°, 188°

9°, 351° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 48.7	+59.9	170.7	13 49.5	+59.9	170.7	12 50.2	+60.0	170.8	11 51.0	+60.0	170.8	10 51.8	+59.9	170.8	9 52.5	+60.0	170.9	8 53.3	+60.0	170.9	7 54.1	+59.9	170.9	**0**
1	15 48.6	+60.0	170.6	14 49.4	+60.0	170.7	13 50.2	+60.0	170.7	12 51.0	+59.9	170.8	11 51.7	+60.0	170.8	10 52.5	+60.0	170.8	9 53.3	+60.0	170.9	8 54.0	+60.0	170.9	**1**
2	16 48.6	+59.9	170.6	15 49.4	+59.9	170.6	14 50.2	+59.9	170.7	13 50.9	+60.0	170.7	12 51.7	+60.0	170.8	11 52.5	+60.0	170.8	10 53.3	+59.9	170.8	9 54.0	+60.0	170.9	**2**
3	17 48.5	+59.9	170.6	16 49.3	+60.0	170.6	15 50.1	+60.0	170.7	14 50.9	+60.0	170.7	13 51.7	+60.0	170.7	12 52.5	+59.9	170.8	11 53.2	+60.0	170.8	10 54.0	+60.0	170.8	**3**
4	18 48.4	+60.0	170.5	17 49.3	+59.9	170.6	16 50.1	+59.9	170.6	15 50.9	+59.9	170.7	14 51.7	+59.9	170.7	13 52.4	+60.0	170.7	12 53.2	+60.0	170.8	11 54.0	+60.0	170.8	**4**
5	19 48.4	+59.9	170.5	18 49.2	+60.0	170.5	17 50.0	+60.0	170.6	16 50.8	+60.0	170.6	15 51.6	+60.0	170.7	14 52.4	+60.0	170.7	13 53.2	+60.0	170.8	12 54.0	+60.0	170.8	**5**
6	20 48.3	+60.0	170.4	19 49.2	+59.9	170.5	18 50.0	+59.9	170.5	17 50.8	+60.0	170.6	16 51.6	+60.0	170.6	15 52.4	+60.0	170.7	14 53.2	+60.0	170.7	13 54.0	+59.9	170.8	**6**
7	21 48.3	+59.9	170.4	20 49.1	+60.0	170.4	19 49.9	+60.0	170.5	18 50.8	+59.9	170.6	17 51.6	+59.9	170.6	16 52.4	+60.0	170.7	15 53.2	+59.9	170.7	14 53.9	+60.0	170.8	**7**
8	22 48.2	+60.0	170.3	21 49.1	+59.9	170.4	20 49.9	+60.0	170.5	19 50.7	+60.0	170.5	18 51.5	+60.0	170.6	17 52.4	+59.9	170.6	16 53.1	+60.0	170.7	15 53.9	+60.0	170.7	**8**
9	23 48.2	+59.9	170.3	22 49.0	+60.0	170.4	21 49.9	+59.9	170.4	20 50.7	+60.0	170.5	19 51.5	+60.0	170.5	18 52.3	+60.0	170.6	17 53.1	+60.0	170.7	16 53.9	+60.0	170.7	**9**
10	24 48.1	+59.9	170.2	23 49.0	+59.9	170.3	22 49.8	+60.0	170.4	21 50.7	+59.9	170.4	20 51.5	+60.0	170.5	19 52.3	+60.0	170.6	18 53.1	+60.0	170.6	17 53.9	+60.0	170.7	**10**
11	25 48.0	+60.0	170.2	24 48.9	+60.0	170.3	23 49.8	+59.9	170.3	22 50.6	+60.0	170.4	21 51.5	+59.9	170.5	20 52.3	+59.9	170.5	19 53.1	+60.0	170.6	18 53.9	+60.0	170.7	**11**
12	26 48.0	+59.9	170.1	25 48.9	+59.9	170.2	24 49.7	+60.0	170.3	23 50.6	+59.9	170.4	22 51.4	+60.0	170.4	21 52.2	+60.0	170.5	20 53.1	+59.9	170.6	19 53.9	+60.0	170.6	**12**
13	27 47.9	+60.0	170.1	26 48.8	+60.0	170.2	25 49.7	+59.9	170.3	24 50.5	+60.0	170.3	23 51.4	+60.0	170.4	22 52.2	+60.0	170.5	21 53.0	+60.0	170.5	20 53.9	+59.9	170.6	**13**
14	28 47.9	+59.9	170.0	27 48.8	+59.9	170.1	26 49.6	+60.0	170.2	25 50.5	+60.0	170.3	24 51.4	+59.9	170.4	23 52.2	+60.0	170.4	22 53.0	+60.0	170.5	21 53.8	+60.0	170.6	**14**
15	29 47.8	+59.9	170.0	28 48.7	+59.9	170.1	27 49.6	+59.9	170.2	26 50.5	+59.9	170.2	25 51.3	+60.0	170.3	24 52.2	+59.9	170.4	23 53.0	+60.0	170.5	22 53.8	+60.0	170.6	**15**
16	30 47.7	+60.0	169.9	29 48.6	+60.0	170.0	28 49.5	+60.0	170.1	27 50.4	+60.0	170.2	26 51.3	+60.0	170.3	25 52.1	+60.0	170.4	24 53.0	+60.0	170.5	23 53.8	+60.0	170.5	**16**
17	31 47.7	+59.9	169.9	30 48.6	+59.9	170.0	29 49.5	+59.9	170.1	28 50.4	+59.9	170.2	27 51.3	+59.9	170.3	26 52.1	+60.0	170.3	25 53.0	+59.9	170.4	24 53.8	+60.0	170.5	**17**
18	32 47.6	+59.9	169.8	31 48.5	+60.0	169.9	30 49.4	+60.0	170.0	29 50.3	+60.0	170.1	28 51.2	+60.0	170.2	27 52.1	+60.0	170.3	26 52.9	+60.0	170.4	25 53.8	+60.0	170.5	**18**
19	33 47.5	+59.9	169.7	32 48.5	+59.9	169.9	31 49.4	+59.9	170.0	30 50.3	+60.0	170.1	29 51.2	+60.0	170.2	28 52.1	+59.9	170.3	27 52.9	+60.0	170.4	26 53.8	+59.9	170.5	**19**
20	34 47.4	+60.0	169.7	33 48.4	+59.9	169.8	32 49.3	+60.0	169.9	31 50.3	+59.9	170.0	30 51.2	+59.9	170.1	29 52.0	+60.0	170.2	28 52.9	+60.0	170.3	27 53.7	+60.0	170.4	**20**
21	35 47.4	+59.9	169.6	34 48.3	+60.0	169.8	33 49.3	+59.9	169.9	32 50.2	+60.0	170.0	31 51.1	+60.0	170.1	30 52.0	+60.0	170.2	29 52.9	+59.9	170.3	28 53.7	+60.0	170.4	**21**
22	36 47.3	+59.9	169.6	35 48.3	+59.9	169.7	34 49.2	+60.0	169.8	33 50.2	+59.9	169.9	32 51.1	+59.9	170.1	31 52.0	+59.9	170.2	30 52.8	+60.0	170.3	29 53.7	+60.0	170.4	**22**
23	37 47.2	+59.9	169.5	36 48.2	+59.9	169.6	35 49.2	+59.9	169.8	34 50.1	+60.0	169.9	33 51.0	+60.0	170.0	32 51.9	+60.0	170.1	31 52.8	+60.0	170.2	30 53.7	+60.0	170.3	**23**
24	38 47.1	+60.0	169.4	37 48.1	+60.0	169.6	36 49.1	+60.0	169.7	35 50.1	+59.9	169.8	34 51.0	+60.0	170.0	33 51.9	+60.0	170.1	32 52.8	+60.0	170.2	31 53.7	+59.9	170.3	**24**
25	39 47.1	+59.9	169.4	38 48.1	+59.9	169.5	37 49.1	+59.9	169.7	36 50.0	+60.0	169.8	35 51.0	+59.9	169.9	34 51.9	+59.9	170.0	33 52.8	+59.9	170.2	32 53.6	+60.0	170.3	**25**
26	40 47.0	+59.9	169.3	39 48.0	+59.9	169.5	38 49.0	+59.9	169.6	37 50.0	+59.9	169.7	36 50.9	+60.0	169.9	35 51.8	+60.0	170.0	34 52.7	+60.0	170.1	33 53.6	+60.0	170.2	**26**
27	41 46.9	+59.9	169.2	40 47.9	+60.0	169.4	39 48.9	+60.0	169.5	38 49.9	+60.0	169.7	37 50.9	+59.9	169.8	36 51.8	+60.0	170.0	35 52.7	+60.0	170.1	34 53.6	+60.0	170.2	**27**
28	42 46.8	+59.9	169.2	41 47.9	+59.9	169.3	40 48.9	+59.9	169.5	39 49.9	+59.9	169.6	38 50.8	+60.0	169.8	37 51.8	+59.9	169.9	36 52.7	+60.0	170.1	35 53.6	+60.0	170.2	**28**
29	43 46.7	+59.9	169.1	42 47.8	+59.9	169.3	41 48.8	+59.9	169.4	40 49.8	+60.0	169.6	39 50.8	+59.9	169.7	38 51.7	+60.0	169.9	37 52.7	+59.9	170.0	36 53.6	+59.9	170.1	**29**
30	44 46.6	+59.9	169.0	43 47.7	+59.9	169.2	42 48.7	+60.0	169.4	41 49.8	+59.9	169.5	40 50.7	+60.0	169.7	39 51.7	+60.0	169.8	38 52.6	+60.0	170.0	37 53.5	+60.0	170.1	**30**
31	45 46.5	+59.9	168.9	44 47.6	+59.9	169.1	43 48.7	+59.9	169.3	42 49.7	+59.9	169.5	41 50.7	+59.9	169.6	40 51.7	+59.9	169.8	39 52.6	+60.0	169.9	38 53.5	+60.0	170.1	**31**
32	46 46.4	+59.9	168.8	45 47.5	+59.9	169.0	44 48.6	+59.9	169.2	43 49.6	+60.0	169.4	42 50.6	+60.0	169.6	41 51.6	+60.0	169.7	40 52.6	+59.9	169.9	39 53.5	+60.0	170.0	**32**
33	47 46.3	+59.9	168.7	46 47.4	+59.9	169.0	45 48.5	+59.9	169.2	44 49.6	+59.9	169.3	43 50.6	+59.9	169.5	42 51.6	+59.9	169.7	41 52.5	+60.0	169.9	40 53.5	+59.9	170.0	**33**
34	48 46.2	+59.9	168.7	47 47.3	+59.9	168.9	46 48.4	+60.0	169.1	45 49.5	+59.9	169.3	44 50.5	+60.0	169.5	43 51.5	+60.0	169.6	42 52.5	+60.0	169.8	41 53.4	+60.0	170.0	**34**
35	49 46.1	+59.9	168.6	48 47.2	+59.9	168.8	47 48.4	+59.9	169.0	46 49.4	+60.0	169.2	45 50.5	+59.9	169.4	44 51.5	+60.0	169.6	43 52.5	+59.9	169.8	42 53.4	+60.0	169.9	**35**
36	50 46.0	+59.8	168.5	49 47.1	+59.9	168.7	48 48.3	+59.9	168.9	47 49.4	+59.9	169.1	46 50.4	+60.0	169.3	45 51.5	+59.9	169.5	44 52.4	+60.0	169.7	43 53.4	+60.0	169.9	**36**
37	51 45.8	+59.9	168.4	50 47.0	+59.9	168.6	49 48.2	+59.9	168.8	48 49.3	+59.9	169.1	47 50.4	+59.9	169.3	46 51.4	+60.0	169.5	45 52.4	+60.0	169.7	44 53.4	+59.9	169.8	**37**
38	52 45.7	+59.9	168.2	51 46.9	+59.9	168.5	50 48.1	+59.9	168.8	49 49.2	+60.0	169.0	48 50.3	+60.0	169.2	47 51.4	+59.9	169.4	46 52.4	+59.9	169.6	45 53.3	+60.0	169.8	**38**
39	53 45.6	+59.8	168.1	52 46.8	+59.9	168.4	51 48.0	+59.9	168.7	50 49.2	+59.9	168.9	49 50.3	+59.9	169.1	48 51.3	+60.0	169.4	47 52.3	+60.0	169.6	46 53.3	+60.0	169.8	**39**
40	54 45.4	+59.9	168.0	53 46.7	+59.9	168.3	52 47.9	+59.9	168.6	51 49.1	+59.9	168.8	50 50.2	+59.9	169.1	49 51.3	+59.9	169.3	48 52.3	+59.9	169.5	47 53.3	+59.9	169.7	**40**
41	55 45.3	+59.8	167.9	54 46.6	+59.8	168.2	53 47.8	+59.9	168.5	52 49.0	+59.9	168.7	51 50.1	+59.9	169.0	50 51.2	+59.9	169.2	49 52.2	+60.0	169.4	48 53.2	+60.0	169.7	**41**
42	56 45.1	+59.8	167.8	55 46.4	+59.9	168.1	54 47.7	+59.9	168.4	53 48.9	+59.9	168.6	52 50.0	+60.0	168.9	51 51.1	+60.0	169.2	50 52.2	+59.9	169.4	49 53.2	+60.0	169.6	**42**
43	57 44.9	+59.9	167.6	56 46.3	+59.8	167.9	55 47.6	+59.9	168.3	54 48.8	+59.9	168.5	53 50.0	+59.9	168.8	52 51.1	+59.9	169.1	51 52.1	+60.0	169.3	50 53.2	+59.9	169.6	**43**
44	58 44.8	+59.8	167.5	57 46.1	+59.9	167.8	56 47.5	+59.8	168.1	55 48.7	+59.9	168.4	54 49.9	+59.9	168.7	53 51.0	+60.0	169.0	52 52.1	+59.9	169.3	51 53.1	+60.0	169.5	**44**
45	59 44.6	+59.8	167.3	58 46.0	+59.8	167.7	57 47.3	+59.9	168.0	56 48.6	+59.9	168.3	55 49.8	+59.9	168.6	54 51.0	+59.9	168.9	53 52.0	+60.0	169.2	52 53.1	+59.9	169.4	**45**
46	60 44.4	+59.8	167.2	59 45.8	+59.9	167.5	58 47.2	+59.9	167.9	57 48.5	+59.9	168.2	56 49.7	+59.9	168.5	55 50.9	+59.9	168.8	54 52.0	+59.9	169.1	53 53.0	+60.0	169.4	**46**
47	61 44.2	+59.7	167.0	60 45.7	+59.8	167.4	59 47.1	+59.8	167.8	58 48.4	+59.9	168.1	57 49.6	+59.9	168.4	56 50.8	+59.9	168.8	55 51.9	+60.0	169.0	54 53.0	+60.0	169.3	**47**
48	62 43.9	+59.8	166.8	61 45.5	+59.8	167.2	60 46.9	+59.8	167.6	59 48.3	+59.8	168.0	58 49.5	+59.9	168.3	57 50.7	+60.0	168.7	56 51.9	+59.9	169.0	55 53.0	+59.9	169.2	**48**
49	63 43.7	+59.7	166.6	62 45.3	+59.8	167.0	61 46.7	+59.9	167.5	60 48.1	+59.9	167.9	59 49.4	+59.9	168.2	58 50.7	+59.9	168.6	57 51.8	+60.0	168.9	56 52.9	+60.0	169.2	**49**
50	64 43.4	+59.7	166.4	63 45.1	+59.7	166.9	62 46.6	+59.8	167.3	61 48.0	+59.8	167.7	60 49.3	+59.9	168.1	59 50.6	+59.9	168.5	58 51.8	+59.9	168.8	57 52.9	+59.9	169.1	**50**
51	65 43.1	+59.7	166.1	64 44.8	+59.8	166.7	63 46.4	+59.8	167.1	62 47.8	+59.9	167.6	61 49.2	+59.9	168.0	60 50.5	+59.9	168.3	59 51.7	+59.9	168.7	58 52.8	+60.0	169.0	**51**
52	66 42.8	+59.7	165.9	65 44.6	+59.7	166.4	64 46.2	+59.8	166.9	63 47.7	+59.8	167.4	62 49.1	+59.8	167.8	61 50.4	+59.9	168.2	60 51.6	+59.9	168.6	59 52.8	+59.9	168.9	**52**
53	67 42.5	+59.7	165.6	66 44.3	+59.7	166.2	65 46.0	+59.7	166.7	64 47.5	+59.8	167.2	63 48.9	+59.9	167.7	62 50.3	+59.9	168.1	61 51.5	+59.9	168.5	60 52.7	+59.9	168.8	**53**
54	68 42.2	+59.6	165.3	67 44.0	+59.7	166.0	66 45.7	+59.8	166.5	65 47.3	+59.8	167.0	64 48.8	+59.9	167.5	63 50.2	+59.9	168.0	62 51.4	+60.0	168.4	61 52.6	+60.0	168.8	**54**
55	69 41.8	+59.5	165.0	68 43.7	+59.7	165.7	67 45.5	+59.7	166.3	66 47.1	+59.8	166.8	65 48.7	+59.8	167.4	64 50.1	+59.8	167.8	63 51.4	+59.9	168.3	62 52.6	+59.9	168.6	**55**
56	70 41.3	+59.6	164.7	69 43.4	+59.6	165.4	68 45.2	+59.7	166.0	67 46.9	+59.8	166.6	66 48.5	+59.8	167.2	65 49.9	+59.9	167.7	64 51.3	+59.9	168.1	63 52.5	+59.9	168.5	**56**
57	71 40.9	+59.4	164.3	70 43.0	+59.6	165.0	69 44.9	+59.7	165.8	68 46.7	+59.7	166.4	67 48.3	+59.8	167.0	66 49.8	+59.8	167.5	65 51.2	+59.8	168.0	64 52.4	+59.9	168.4	**57**
58	72 40.3	+59.4	163.8	71 42.6	+59.5	164.7	70 44.6	+59.6	165.4	69 46.4	+59.8	166.1	68 48.1	+59.8	166.7	67 49.6	+59.9	167.3	66 51.0	+59.9	167.8	65 52.3	+60.0	168.3	**58**
59	73 39.7	+59.4	163.4	72 42.1	+59.5	164.3	71 44.2	+59.6	165.1	70 46.2	+59.7	165.8	69 47.9	+59.8	166.5	68 49.5	+59.8	167.1	67 50.9	+59.9	167.7	66 52.3	+59.9	168.2	**59**
60	74 39.1	+59.2	162.8	73 41.6	+59.4	163.8	72 43.8	+59.6	164.7	71 45.9	+59.6	165.5	70 47.7	+59.7	166.2	69 49.3	+59.8	166.9	68 50.8	+59.8	167.5	67 52.2	+59.9	168.0	**60**
61	75 38.3	+59.2	162.2	74 41.0	+59.4	163.3	73 43.4	+59.5	164.3	72 45.5	+59.6	165.2	71 47.4	+59.7	166.0	70 49.1	+59.8	166.7	69 50.6	+59.9	167.3	68 52.1	+59.8	167.9	**61**
62	76 37.5	+59.0	161.5	75 40.4	+59.2	162.7	74 42.9	+59.4	163.8	73 45.1	+59.6	164.8	72 47.1	+59.7	165.6	71 48.9	+59.7	166.4	70 50.5	+59.8	167.1	69 51.9	+59.9	167.7	**62**
63	77 36.5	+58.8	160.7	76 39.6	+59.1	162.1	75 42.3	+59.4	163.3	74 44.7	+59.5	164.3	73 46.8	+59.6	165.3	72 48.6	+59.8	166.1	71 50.3	+59.8	166.8	70 51.8	+59.9	167.5	**63**
64	78 35.3	+58.6	159.7	77 38.7	+59.0	161.3	76 41.7	+59.2	162.7	75 44.2	+59.4	163.8	74 46.4	+59.6	164.9	73 48.4	+59.7	165.8	72 50.1	+59.8	166.6	71 51.7	+59.8	167.3	**64**
65	79 33.9	+58.3	158.6	78 37.7	+58.8	160.4	77 40.9	+59.1	161.9	76 43.6	+59.4	163.3	75 46.0	+59.5	164.4	74 48.1	+59.6	165.4	73 49.9	+59.8	166.3	72 51.5	+59.8	167.0	**65**
66	80 32.2	+58.0	157.2	79 36.5	+58.5	159.3	78 40.0	+58.9	161.1	77 43.0	+59.2	162.6	76 45.5	+59.5	163.9	75 47.7	+59.6	165.0	74 49.7	+59.7	165.9	73 51.3	+59.9	166.8	**66**
67	81 30.2	+57.4	155.6	80 35.0	+58.2	158.1	79 38.9	+58.8	160.1	78 42.2	+59.1	161.8	77 45.0	+59.3	163.3	76 47.3	+59.6	164.5	75 49.4	+59.6	165.5	74 51.2	+59.7	166.5	**67**
68	82 27.6	+56.6	153.5	81 33.2	+57.7	156.5	80 37.7	+58.4	158.9	79 41.3	+58.9	160.9	78 44.3	+59.3	162.5	77 46.9	+59.4	163.9	76 49.0	+59.7	165.1	75 50.9	+59.8	166.1	**68**
69	83 24.2	+55.5	150.8	82 30.9	+57.0	154.5	81 36.1	+58.0	157.4	80 40.2	+58.6	159.8	79 43.6	+59.0	161.7	78 46.3	+59.4	163.3	77 48.7	+59.5	164.6	76 50.7	+59.7	165.7	**69**
70	84 19.7	*+53.7*	•147.2	83 27.9	+56.0	152.0	82 34.1	+57.4	155.6	81 38.8	+58.3	158.4	80 42.6	+58.9	160.6	79 45.7	+59.2	162.5	78 48.2	+59.5	164.0	77 50.4	+59.6	165.3	**70**
71	85 13.4	*+50.6*	•142.3	84 23.9	*+54.4*	•148.5	83 31.5	+56.5	153.2	82 37.1	+57.8	156.6	81 41.5	+58.5	159.4	80 44.9	+59.0	161.5	79 47.7	+59.4	163.3	78 50.0	+59.6	164.8	**71**
72	86 04.0	*+45.1*	•135.2	85 18.3	*+51.5*	•143.8	84 28.0	*+54.9*	•149.9	83 34.9	+56.9	154.4	82 40.0	+58.1	157.7	81 43.9	+58.8	160.4	80 47.1	+59.2	162.4	79 49.6	+59.5	164.1	**72**
73	86 49.1	*+34.8*	•124.5	86 09.8	*+46.3*	•136.9	85 22.9	*+52.5*	•145.4	84 31.8	+55.6	151.3	83 38.1	+57.4	155.6	82 42.7	+58.4	158.9	81 46.3	+59.0	161.4	80 49.1	+59.4	163.3	**73**
74	87 23.9	*+16.5*	•108.2	86 56.1	*+36.2*	•126.2	86 15.4	*+47.5*	•138.7	85 27.4	*+53.4*	•147.0	84 35.5	+56.2	152.8	83 41.1	+57.8	156.9	82 45.3	+58.7	160.0	81 48.5	+59.2	162.4	**74**
75	87 40.4	*−8.1*	•85.7	87 32.3	*+17.2*	•109.5	87 02.9	*+37.7*	•128.1	86 20.8	*+48.8*	•140.6	85 31.7	*+54.2*	•148.7	84 38.9	+56.8	154.3	83 44.0	+58.2	158.2	82 47.7	+58.9	161.2	**75**
76	87 32.3	*−29.4*	•61.8	87 49.5	*−8.9*	•85.6	87 40.6	*+18.0*	•111.0	87 09.6	*+39.2*	•130.2	86 25.9	*+50.1*	•142.6	85 35.7	*+55.1*	•150.5	84 42.2	+57.3	155.8	83 46.6	+58.6	159.6	**76**
77	87 02.9	*−42.1*	•43.1	87 40.6	*−31.0*	•60.2	87 58.6	*−9.8*	•85.6	87 48.8	*+19.0*	•112.7	87 16.0	*+40.9*	•132.4	86 30.8	*+51.4*	•144.6	85 39.5	*+55.9*	•152.3	84 45.2	+57.8	157.4	**77**
78	86 20.8	*−49.1*	•30.7	87 09.6	*−43.7*	•41.0	87 48.8	*−32.8*	•58.5	88 07.8	*−10.9*	•85.6	87 56.9	*+20.2*	•114.7	87 22.2	*+42.7*	•134.9	86 35.4	*+52.7*	•146.9	85 43.0	+56.7	154.2	**78**
79	85 31.7	*−52.8*	•22.5	86 25.9	*−50.2*	•28.7	87 16.0	*−45.2*	•38.8	87 56.9	*−34.7*	•56.5	88 17.1	*−12.2*	•85.6	88 04.9	*+21.4*	•116.9	87 28.1	*+44.6*	•137.5	86 39.7	*+53.9*	•149.2	**79**
80	84 38.9	−54.9	16.9	85 35.7	*−53.5*	•20.7	86 30.8	*−51.3*	•26.5	87 22.2	*−46.8*	•36.3	88 04.9	*−36.8*	•54.3	88 26.3	*−13.6*	•85.6	88 12.7	*+22.9*	•119.5	87 33.6	*+46.7*	•140.4	**80**
81	83 44.0	−56.3	13.0	84 42.2	−55.6	15.4	85 39.5	*−54.3*	•18.9	86 35.4	*−52.4*	•24.3	87 28.1	*−48.4*	•33.6	88 12.7	*−39.1*	•51.7	88 35.6	*−15.3*	•85.6	88 20.3	*+24.6*	•122.4	**81**
82	82 47.7	−57.2	10.0	83 46.6	−56.7	11.6	84 45.2	−56.1	13.8	85 43.0	*−55.1*	•17.0	86 39.7	*−53.4*	•22.0	87 33.6	*−50.0*	•30.8	88 20.3	*−41.5*	•48.7	88 44.9	*−17.3*	•85.5	**82**
83	81 50.5	−57.8	7.7	82 49.9	−57.5	8.8	83 49.1	−57.2	10.2	84 47.9	−56.6	12.1	85 46.3	−55.8	15.0	86 43.6	*−54.4*	•19.5	87 38.8	*−51.6*	•27.7	88 27.6	*−44.1*	•45.2	**83**
84	80 52.7	−58.2	5.9	81 52.4	−58.1	6.6	82 51.9	−57.8	7.6	83 51.3	−57.5	8.8	84 50.5	−57.2	10.5	85 49.2	−56.5	13.0	86 47.2	*−55.3*	•17.0	87 43.5	*−53.1*	•24.3	**84**
85	79 54.5	−58.5	4.5	80 54.3	−58.4	4.9	81 54.1	−58.3	5.6	82 53.8	−58.2	6.3	83 53.3	−57.9	7.4	84 52.7	−57.6	8.8	85 51.9	−57.2	10.9	86 50.4	*−56.2*	•14.3	**85**
86	78 56.0	−58.8	3.3	79 55.9	−58.7	3.6	80 55.8	−58.7	4.0	81 55.6	−58.5	4.5	82 55.4	−58.4	5.1	83 55.1	−58.2	5.9	84 54.7	−58.0	7.1	85 54.2	−57.7	8.8	**86**
87	77 57.2	−58.9	2.2	78 57.2	−58.9	2.4	79 57.1	−58.8	2.7	80 57.1	−58.9	3.0	81 57.0	−58.8	3.4	82 56.9	−58.7	3.8	83 56.7	−58.6	4.5	84 56.5	−58.5	5.3	**87**
88	76 58.3	−59.1	1.4	77 58.3	−59.1	1.5	78 58.3	−59.1	1.6	79 58.2	−59.0	1.8	80 58.2	−59.0	2.0	81 58.2	−59.0	2.2	82 58.1	−58.9	2.6	83 58.0	−58.8	3.0	**88**
89	75 59.2	−59.2	0.6	76 59.2	−59.2	0.7	77 59.2	−59.2	0.8	78 59.2	−59.2	0.8	79 59.2	−59.2	0.9	80 59.2	−59.2	1.0	81 59.2	−59.2	1.1	82 59.2	−59.2	1.3	**89**
90	75 00.0	−59.3	0.0	76 00.0	−59.3	0.0	77 00.0	−59.3	0.0	78 00.0	−59.3	0.0	79 00.0	−59.3	0.0	80 00.0	−59.3	0.0	81 00.0	−59.3	0.0	82 00.0	−59.3	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 9°, 351°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 48.7	−60.0	170.7	13 49.5	−60.0	170.7	12 50.2	−59.9	170.8	11 51.0	−60.0	170.8	10 51.8	−60.0	170.8	9 52.5	−59.9	170.9	8 53.3	−60.0	170.9	7 54.1	−60.0	170.9	0
1	13 48.7	−59.9	170.7	12 49.5	−60.0	170.8	11 50.3	−60.0	170.8	10 51.0	−59.9	170.8	9 51.8	−60.0	170.9	8 52.6	−60.0	170.9	7 53.3	−60.0	170.9	6 54.1	−60.0	170.9	1
2	12 48.8	−60.0	170.8	11 49.5	−59.9	170.8	10 50.3	−60.0	170.8	9 51.1	−60.0	170.9	8 51.8	−59.9	170.9	7 52.6	−60.0	170.9	6 53.3	−59.9	170.9	5 54.1	−60.0	171.0	2
3	11 48.8	−59.9	170.8	10 49.6	−60.0	170.8	9 50.3	−59.9	170.9	8 51.1	−60.0	170.9	7 51.9	−60.0	170.9	6 52.6	−60.0	170.9	5 53.4	−60.0	171.0	4 54.1	−60.0	171.0	3
4	10 48.9	−60.0	170.9	9 49.6	−59.9	170.9	8 50.4	−60.0	170.9	7 51.1	−59.9	170.9	6 51.9	−60.0	171.0	5 52.6	−59.9	171.0	4 53.4	−60.0	171.0	3 54.1	−60.0	171.0	4
5	9 48.9	−59.9	170.9	8 49.7	−60.0	170.9	7 50.4	−59.9	170.9	6 51.2	−60.0	171.0	5 51.9	−60.0	171.0	4 52.7	−60.0	171.0	3 53.4	−60.0	171.0	2 54.1	−60.0	171.0	5
6	8 49.0	−60.0	170.9	7 49.7	−59.9	171.0	6 50.5	−60.0	171.0	5 51.2	−60.0	171.0	4 51.9	−59.9	171.0	3 52.7	−60.0	171.0	2 53.4	−60.0	171.0	1 54.1	−59.9	171.0	6
7	7 49.0	−59.9	171.0	6 49.8	−60.0	171.0	5 50.5	−60.0	171.0	4 51.2	−59.9	171.0	3 52.0	−60.0	171.0	2 52.7	−60.0	171.1	1 53.4	−60.0	171.1	0 54.2	−60.0	171.1	7
8	6 49.1	−60.0	171.0	5 49.8	−60.0	171.0	4 50.5	−59.9	171.1	3 51.3	−60.0	171.1	2 52.0	−60.0	171.1	1 52.7	−60.0	171.1	0 53.4	−59.9	171.1	0 05.8	+60.0	8.9	8
9	5 49.1	−59.9	171.1	4 49.8	−60.0	171.1	3 50.6	−60.0	171.1	2 51.3	−60.0	171.1	1 52.0	−60.0	171.1	0 52.7	−59.9	171.1	0 06.5	+60.0	8.9	1 05.8	+60.0	8.9	9
10	4 49.2	−60.0	171.1	3 49.9	−60.0	171.1	2 50.6	−60.0	171.1	1 51.3	−59.9	171.1	0 52.0	−59.9	171.1	0 07.2	+60.0	8.9	1 06.5	+60.0	8.8	2 05.8	+60.0	8.9	10
11	3 49.2	−59.9	171.1	2 49.9	−59.9	171.2	1 50.6	−59.9	171.2	0 51.4	−60.0	171.2	0 07.9	+60.0	8.8	1 07.2	+60.0	8.8	2 06.5	+60.0	8.8	3 05.8	+60.0	8.8	11
12	2 49.3	−60.0	171.2	1 50.0	−60.0	171.2	0 50.7	−60.0	171.2	0 08.6	+60.0	8.8	1 07.9	+60.0	8.8	2 07.2	+60.0	8.8	3 06.5	+60.0	8.8	4 05.8	+60.0	8.8	12
13	1 49.3	−59.9	171.2	0 50.0	−59.9	171.2	0 09.3	+59.9	8.8	1 08.6	+59.9	8.8	2 07.9	+59.9	8.8	3 07.2	+59.9	8.8	4 06.5	+59.9	8.8	5 05.8	+60.0	8.8	13
14	0 49.4	−60.0	171.3	0 09.9	+60.0	8.7	1 09.2	+60.0	8.7	2 08.5	+60.0	8.7	3 07.8	+60.0	8.7	4 07.1	+60.0	8.8	5 06.4	+60.0	8.8	6 05.7	+60.0	8.8	14
15	0 10.6	+59.9	8.7	1 09.9	+59.9	8.7	2 09.2	+60.0	8.7	3 08.5	+60.0	8.7	4 07.8	+60.0	8.7	5 07.1	+60.0	8.7	6 06.4	+60.0	8.7	7 05.7	+60.0	8.8	15
16	1 10.5	+60.0	8.7	2 09.8	+60.0	8.7	3 09.2	+59.9	8.7	4 08.5	+59.9	8.7	5 07.8	+60.0	8.7	6 07.1	+60.0	8.7	7 06.4	+60.0	8.7	8 05.7	+60.0	8.7	16
17	2 10.5	+59.9	8.6	3 09.8	+60.0	8.6	4 09.1	+60.0	8.6	5 08.4	+60.0	8.6	6 07.8	+59.9	8.7	7 07.1	+60.0	8.6	8 06.4	+60.0	8.7	9 05.7	+60.0	8.7	17
18	3 10.4	+60.0	8.6	4 09.8	+59.9	8.6	5 09.1	+60.0	8.6	6 08.4	+60.0	8.6	7 07.7	+60.0	8.6	8 07.1	+59.9	8.6	9 06.4	+60.0	8.7	10 05.7	+60.0	8.7	18
19	4 10.4	+59.9	8.5	5 09.7	+60.0	8.5	6 09.1	+59.9	8.6	7 08.4	+60.0	8.6	8 07.7	+60.0	8.6	9 07.0	+60.0	8.6	10 06.4	+59.9	8.6	11 05.7	+60.0	8.7	19
20	5 10.3	+60.0	8.5	6 09.7	+59.9	8.5	7 09.0	+60.0	8.5	8 08.4	+59.9	8.5	9 07.7	+60.0	8.6	10 07.0	+60.0	8.6	11 06.3	+60.0	8.6	12 05.7	+59.9	8.6	20
21	6 10.3	+59.9	8.4	7 09.6	+60.0	8.5	8 09.0	+59.9	8.5	9 08.3	+60.0	8.5	10 07.7	+59.9	8.5	11 07.0	+60.0	8.6	12 06.3	+60.0	8.6	13 05.6	+60.0	8.6	21
22	7 10.2	+60.0	8.4	8 09.6	+59.9	8.4	9 08.9	+60.0	8.4	10 08.3	+60.0	8.5	11 07.6	+60.0	8.5	12 07.0	+59.9	8.5	13 06.3	+60.0	8.6	14 05.6	+60.0	8.6	22
23	8 10.2	+59.9	8.4	9 09.5	+60.0	8.4	10 08.9	+60.0	8.4	11 08.3	+59.9	8.4	12 07.6	+60.0	8.5	13 06.9	+60.0	8.5	14 06.3	+60.0	8.5	15 05.6	+60.0	8.6	23
24	9 10.1	+60.0	8.3	10 09.5	+60.0	8.3	11 08.9	+59.9	8.4	12 08.2	+60.0	8.4	13 07.6	+59.9	8.4	14 06.9	+60.0	8.5	15 06.3	+59.9	8.5	16 05.6	+60.0	8.6	24
25	10 10.1	+59.9	8.3	11 09.5	+59.9	8.3	12 08.8	+60.0	8.3	13 08.2	+60.0	8.4	14 07.5	+60.0	8.4	15 06.9	+60.0	8.4	16 06.2	+60.0	8.5	17 05.6	+60.0	8.5	25
26	11 10.0	+60.0	8.2	12 09.4	+60.0	8.3	13 08.8	+59.9	8.3	14 08.2	+59.9	8.3	15 07.5	+60.0	8.4	16 06.9	+59.9	8.4	17 06.2	+60.0	8.5	18 05.6	+60.0	8.5	26
27	12 10.0	+59.9	8.2	13 09.4	+59.9	8.2	14 08.7	+60.0	8.3	15 08.1	+60.0	8.3	16 07.5	+60.0	8.3	17 06.8	+60.0	8.4	18 06.2	+60.0	8.4	19 05.6	+59.9	8.5	27
28	13 09.9	+60.0	8.2	14 09.3	+60.0	8.2	15 08.7	+60.0	8.2	16 08.1	+60.0	8.3	17 07.5	+59.9	8.3	18 06.8	+60.0	8.4	19 06.2	+60.0	8.4	20 05.5	+60.0	8.5	28
29	14 09.9	+59.9	8.1	15 09.3	+59.9	8.1	16 08.7	+59.9	8.2	17 08.1	+59.9	8.2	18 07.4	+60.0	8.3	19 06.8	+60.0	8.3	20 06.2	+59.9	8.4	21 05.5	+60.0	8.4	29
30	15 09.8	+60.0	8.1	16 09.2	+60.0	8.1	17 08.6	+60.0	8.2	18 08.0	+60.0	8.2	19 07.4	+60.0	8.2	20 06.8	+60.0	8.3	21 06.1	+60.0	8.3	22 05.5	+60.0	8.4	30
31	16 09.8	+59.9	8.0	17 09.2	+59.9	8.1	18 08.6	+59.9	8.1	19 08.0	+59.9	8.2	20 07.4	+59.9	8.2	21 06.8	+59.9	8.3	22 06.1	+60.0	8.3	23 05.5	+60.0	8.4	31
32	17 09.7	+60.0	8.0	18 09.1	+60.0	8.0	19 08.5	+60.0	8.1	20 07.9	+60.0	8.1	21 07.3	+60.0	8.2	22 06.7	+60.0	8.2	23 06.1	+60.0	8.3	24 05.5	+60.0	8.4	32
33	18 09.7	+59.9	7.9	19 09.1	+59.9	8.0	20 08.5	+60.0	8.0	21 07.9	+60.0	8.1	22 07.3	+60.0	8.1	23 06.7	+60.0	8.2	24 06.1	+60.0	8.3	25 05.5	+59.9	8.3	33
34	19 09.6	+60.0	7.9	20 09.0	+60.0	7.9	21 08.5	+59.9	8.0	22 07.9	+59.9	8.0	23 07.3	+59.9	8.1	24 06.7	+59.9	8.2	25 06.1	+59.9	8.2	26 05.4	+60.0	8.3	34
35	20 09.6	+59.9	7.8	21 09.0	+59.9	7.9	22 08.4	+60.0	8.0	23 07.8	+60.0	8.0	24 07.2	+60.0	8.1	25 06.6	+60.0	8.1	26 06.0	+60.0	8.2	27 05.4	+60.0	8.3	35
36	21 09.5	+59.9	7.8	22 08.9	+60.0	7.9	23 08.4	+59.9	7.9	24 07.8	+60.0	8.0	25 07.2	+60.0	8.0	26 06.6	+60.0	8.1	27 06.0	+60.0	8.2	28 05.4	+60.0	8.2	36
37	22 09.4	+60.0	7.8	23 08.9	+59.9	7.8	24 08.3	+60.0	7.9	25 07.8	+59.9	7.9	26 07.2	+59.9	8.0	27 06.6	+60.0	8.1	28 06.0	+60.0	8.1	29 05.4	+60.0	8.2	37
38	23 09.4	+59.9	7.7	24 08.8	+60.0	7.8	25 08.3	+59.9	7.8	26 07.7	+60.0	7.9	27 07.1	+60.0	8.0	28 06.6	+59.9	8.0	29 06.0	+59.9	8.1	30 05.4	+59.9	8.2	38
39	24 09.3	+60.0	7.7	25 08.8	+59.9	7.7	26 08.2	+60.0	7.8	27 07.7	+59.9	7.9	28 07.1	+60.0	7.9	29 06.5	+60.0	8.0	30 05.9	+60.0	8.1	31 05.3	+60.0	8.2	39
40	25 09.3	+59.9	7.6	26 08.7	+60.0	7.7	27 08.2	+59.9	7.7	28 07.6	+60.0	7.8	29 07.1	+59.9	7.9	30 06.5	+60.0	8.0	31 05.9	+60.0	8.0	32 05.3	+60.0	8.1	40
41	26 09.2	+59.9	7.6	27 08.7	+59.9	7.6	28 08.1	+60.0	7.7	29 07.6	+60.0	7.8	30 07.0	+60.0	7.8	31 06.5	+59.9	7.9	32 05.9	+60.0	8.0	33 05.3	+60.0	8.1	41
42	27 09.1	+60.0	7.5	28 08.6	+60.0	7.6	29 08.1	+59.9	7.6	30 07.6	+59.9	7.7	31 07.0	+60.0	7.8	32 06.4	+60.0	7.9	33 05.9	+59.9	8.0	34 05.3	+60.0	8.1	42
43	28 09.1	+59.9	7.5	29 08.6	+59.9	7.5	30 08.0	+60.0	7.6	31 07.5	+60.0	7.7	32 07.0	+59.9	7.8	33 06.4	+60.0	7.9	34 05.8	+60.0	7.9	35 05.3	+59.9	8.0	43
44	29 09.0	+60.0	7.4	30 08.5	+60.0	7.5	31 08.0	+59.9	7.6	32 07.5	+59.9	7.6	33 06.9	+60.0	7.7	34 06.4	+59.9	7.8	35 05.8	+60.0	7.9	36 05.2	+60.0	8.0	44
45	30 09.0	+59.9	7.3	31 08.5	+59.9	7.4	32 07.9	+60.0	7.5	33 07.4	+60.0	7.6	34 06.9	+60.0	7.7	35 06.3	+60.0	7.8	36 05.8	+60.0	7.9	37 05.2	+60.0	8.0	45
46	31 08.9	+59.9	7.3	32 08.4	+59.9	7.4	33 07.9	+59.9	7.5	34 07.4	+59.9	7.5	35 06.9	+59.9	7.6	36 06.3	+60.0	7.7	37 05.8	+59.9	7.8	38 05.2	+60.0	7.9	46
47	32 08.8	+59.9	7.2	33 08.3	+60.0	7.3	34 07.8	+60.0	7.4	35 07.3	+60.0	7.5	36 06.8	+60.0	7.6	37 06.3	+59.9	7.7	38 05.7	+60.0	7.8	39 05.2	+59.9	7.9	47
48	33 08.7	+60.0	7.2	34 08.3	+59.9	7.3	35 07.8	+59.9	7.4	36 07.3	+59.9	7.4	37 06.8	+59.9	7.5	38 06.2	+60.0	7.6	39 05.7	+60.0	7.8	40 05.1	+60.0	7.9	48
49	34 08.7	+59.9	7.1	35 08.2	+59.9	7.2	36 07.7	+60.0	7.3	37 07.2	+60.0	7.4	38 06.7	+60.0	7.5	39 06.2	+60.0	7.6	40 05.7	+59.9	7.7	41 05.1	+60.0	7.8	49
50	35 08.6	+59.9	7.1	36 08.1	+60.0	7.2	37 07.7	+59.9	7.2	38 07.2	+59.9	7.3	39 06.7	+59.9	7.4	40 06.2	+59.9	7.6	41 05.6	+60.0	7.7	42 05.1	+60.0	7.8	50
51	36 08.5	+60.0	7.0	37 08.1	+59.9	7.1	38 07.6	+59.9	7.2	39 07.1	+60.0	7.3	40 06.6	+60.0	7.4	41 06.1	+60.0	7.5	42 05.6	+60.0	7.6	43 05.1	+59.9	7.7	51
52	37 08.5	+59.9	6.9	38 08.0	+59.9	7.0	39 07.5	+60.0	7.1	40 07.1	+59.9	7.2	41 06.6	+59.9	7.3	42 06.1	+60.0	7.5	43 05.6	+59.9	7.6	44 05.0	+60.0	7.7	52
53	38 08.4	+59.9	6.9	39 07.9	+60.0	7.0	40 07.5	+59.9	7.1	41 07.0	+60.0	7.2	42 06.5	+60.0	7.3	43 06.1	+59.9	7.4	44 05.5	+60.0	7.5	45 05.0	+60.0	7.7	53
54	39 08.3	+59.9	6.8	40 07.9	+59.9	6.9	41 07.4	+60.0	7.0	42 07.0	+59.9	7.1	43 06.5	+59.9	7.2	44 06.0	+60.0	7.4	45 05.5	+60.0	7.5	46 05.0	+60.0	7.6	54
55	40 08.2	+59.9	6.7	41 07.8	+59.9	6.8	42 07.4	+59.9	6.9	43 06.9	+59.9	7.1	44 06.4	+60.0	7.2	45 06.0	+59.9	7.3	46 05.5	+59.9	7.4	47 05.0	+59.9	7.6	55
56	41 08.1	+59.9	6.7	42 07.7	+59.9	6.8	43 07.3	+59.9	6.9	44 06.8	+60.0	7.0	45 06.4	+59.9	7.1	46 05.9	+60.0	7.2	47 05.4	+60.0	7.4	48 04.9	+60.0	7.5	56
57	42 08.0	+59.9	6.6	43 07.6	+60.0	6.7	44 07.2	+59.9	6.8	45 06.8	+59.9	6.9	46 06.3	+60.0	7.1	47 05.9	+59.9	7.2	48 05.4	+60.0	7.3	49 04.9	+60.0	7.5	57
58	43 07.9	+60.0	6.5	44 07.6	+59.9	6.6	45 07.1	+60.0	6.7	46 06.7	+60.0	6.9	47 06.3	+59.9	7.0	48 05.8	+60.0	7.1	49 05.4	+59.9	7.3	50 04.9	+59.9	7.4	58
59	44 07.9	+59.9	6.4	45 07.5	+59.9	6.6	46 07.1	+59.9	6.7	47 06.7	+59.9	6.8	48 06.2	+60.0	6.9	49 05.8	+59.9	7.1	50 05.3	+60.0	7.2	51 04.8	+60.0	7.4	59
60	45 07.8	+59.9	6.4	46 07.4	+59.9	6.5	47 07.0	+59.9	6.6	48 06.6	+59.9	6.7	49 06.2	+59.9	6.9	50 05.7	+60.0	7.0	51 05.3	+59.9	7.2	52 04.8	+59.9	7.3	60
61	46 07.7	+59.8	6.3	47 07.3	+59.9	6.4	48 06.9	+59.9	6.5	49 06.5	+59.9	6.7	50 06.1	+59.9	6.8	51 05.7	+59.9	6.9	52 05.2	+60.0	7.1	53 04.7	+59.9	7.3	61
62	47 07.5	+59.9	6.2	48 07.2	+59.9	6.3	49 06.8	+59.9	6.4	50 06.4	+60.0	6.6	51 06.0	+60.0	6.7	52 05.6	+60.0	6.9	53 05.2	+59.9	7.0	54 04.7	+60.0	7.2	62
63	48 07.4	+59.9	6.1	49 07.1	+59.9	6.2	50 06.7	+59.9	6.4	51 06.4	+59.9	6.5	52 06.0	+59.9	6.6	53 05.6	+59.9	6.8	54 05.1	+60.0	7.0	55 04.7	+59.9	7.1	63
64	49 07.3	+59.9	6.0	50 07.0	+59.9	6.1	51 06.6	+59.9	6.3	52 06.3	+59.9	6.4	53 05.9	+59.9	6.6	54 05.5	+59.9	6.7	55 05.1	+59.9	6.9	56 04.6	+60.0	7.1	64
65	50 07.2	+59.9	5.9	51 06.9	+59.9	6.0	52 06.5	+59.9	6.2	53 06.2	+59.9	6.3	54 05.8	+59.9	6.5	55 05.4	+60.0	6.6	56 05.0	+60.0	6.8	57 04.6	+59.9	7.0	65
66	51 07.1	+59.8	5.8	52 06.8	+59.9	5.9	53 06.4	+59.9	6.1	54 06.1	+59.9	6.2	55 05.7	+59.9	6.4	56 05.4	+59.9	6.5	57 05.0	+59.9	6.7	58 04.5	+60.0	6.9	66
67	52 07.0	+59.8	5.7	53 06.7	+59.8	5.8	54 06.3	+59.9	6.0	55 06.0	+59.9	6.1	56 05.6	+60.0	6.3	57 05.3	+59.9	6.5	58 04.9	+59.9	6.6	59 04.5	+59.9	6.8	67
68	53 06.8	+59.9	5.6	54 06.5	+59.9	5.7	55 06.2	+59.9	5.9	56 05.9	+59.9	6.0	57 05.6	+59.9	6.2	58 05.2	+59.9	6.4	59 04.8	+60.0	6.5	60 04.4	+60.0	6.7	68
69	54 06.7	+59.8	5.5	55 06.4	+59.9	5.6	56 06.1	+59.9	5.8	57 05.8	+59.9	5.9	58 05.5	+59.9	6.1	59 05.1	+59.9	6.3	60 04.8	+59.9	6.5	61 04.4	+59.9	6.7	69
70	55 06.5	+59.9	5.4	56 06.3	+59.8	5.5	57 06.0	+59.9	5.7	58 05.7	+59.9	5.8	59 05.4	+59.9	6.0	60 05.0	+59.9	6.2	61 04.7	+59.9	6.4	62 04.3	+59.9	6.6	70
71	56 06.4	+59.8	5.2	57 06.1	+59.9	5.4	58 05.9	+59.8	5.5	59 05.6	+59.8	5.7	60 05.3	+59.9	5.9	61 04.9	+59.9	6.0	62 04.6	+59.9	6.2	63 04.2	+60.0	6.5	71
72	57 06.2	+59.9	5.1	58 06.0	+59.8	5.2	59 05.7	+59.9	5.4	60 05.4	+59.9	5.6	61 05.2	+59.8	5.7	62 04.8	+59.9	5.9	63 04.5	+59.9	6.1	64 04.2	+59.9	6.3	72
73	58 06.1	+59.8	5.0	59 05.8	+59.9	5.1	60 05.6	+59.8	5.3	61 05.3	+59.9	5.4	62 05.0	+59.9	5.6	63 04.7	+59.9	5.8	64 04.4	+59.9	6.0	65 04.1	+59.9	6.2	73
74	59 05.9	+59.8	4.8	60 05.7	+59.8	5.0	61 05.4	+59.9	5.1	62 05.2	+59.8	5.3	63 04.9	+59.9	5.5	64 04.6	+59.9	5.7	65 04.3	+59.9	5.9	66 04.0	+59.9	6.1	74
75	60 05.7	+59.8	4.7	61 05.5	+59.8	4.8	62 05.3	+59.8	5.0	63 05.0	+59.9	5.1	64 04.8	+59.8	5.3	65 04.5	+59.9	5.5	66 04.2	+59.9	5.7	67 03.9	+59.9	6.0	75
76	61 05.5	+59.8	4.5	62 05.3	+59.8	4.6	63 05.1	+59.8	4.8	64 04.9	+59.8	5.0	65 04.6	+59.9	5.2	66 04.4	+59.8	5.4	67 04.1	+59.9	5.6	68 03.8	+59.9	5.8	76
77	62 05.3	+59.7	4.3	63 05.1	+59.8	4.5	64 04.9	+59.8	4.6	65 04.7	+59.8	4.8	66 04.5	+59.8	5.0	67 04.2	+59.9	5.2	68 04.0	+59.8	5.4	69 03.7	+59.9	5.7	77
78	63 05.0	+59.8	4.1	64 04.9	+59.7	4.3	65 04.7	+59.8	4.4	66 04.5	+59.8	4.6	67 04.3	+59.8	4.8	68 04.1	+59.8	5.0	69 03.8	+59.9	5.2	70 03.6	+59.9	5.5	78
79	64 04.8	+59.7	3.9	65 04.6	+59.8	4.1	66 04.5	+59.7	4.2	67 04.3	+59.8	4.4	68 04.1	+59.8	4.6	69 03.9	+59.8	4.8	70 03.7	+59.8	5.0	71 03.5	+59.8	5.3	79
80	65 04.5	+59.7	3.7	66 04.4	+59.7	3.8	67 04.2	+59.8	4.0	68 04.1	+59.7	4.2	69 03.9	+59.8	4.4	70 03.7	+59.8	4.6	71 03.5	+59.9	4.8	72 03.3	+59.9	5.1	80
81	66 04.2	+59.7	3.5	67 04.1	+59.7	3.6	68 04.0	+59.7	3.8	69 03.8	+59.8	3.9	70 03.7	+59.8	4.1	71 03.5	+59.8	4.3	72 03.4	+59.8	4.6	73 03.2	+59.8	4.8	81
82	67 03.9	+59.7	3.2	68 03.8	+59.7	3.3	69 03.7	+59.7	3.5	70 03.6	+59.7	3.7	71 03.5	+59.7	3.8	72 03.3	+59.8	4.1	73 03.2	+59.7	4.3	74 03.0	+59.8	4.5	82
83	68 03.6	+59.6	2.9	69 03.5	+59.6	3.1	70 03.4	+59.7	3.2	71 03.3	+59.7	3.4	72 03.2	+59.7	3.5	73 03.1	+59.7	3.7	74 02.9	+59.8	4.0	75 02.8	+59.7	4.2	83
84	69 03.2	+59.6	2.6	70 03.1	+59.6	2.7	71 03.1	+59.6	2.9	72 03.0	+59.6	3.0	73 02.9	+59.7	3.2	74 02.8	+59.7	3.4	75 02.7	+59.7	3.6	76 02.5	+59.8	3.9	84
85	70 02.8	+59.5	2.3	71 02.7	+59.6	2.4	72 02.7	+59.6	2.5	73 02.6	+59.6	2.7	74 02.6	+59.6	2.8	75 02.5	+59.6	3.0	76 02.4	+59.7	3.2	77 02.3	+59.7	3.5	85
86	71 02.3	+59.6	1.9	72 02.3	+59.5	2.0	73 02.3	+59.5	2.1	74 02.2	+59.6	2.3	75 02.2	+59.5	2.4	76 02.1	+59.6	2.6	77 02.1	+59.6	2.8	78 02.0	+59.6	3.0	86
87	72 01.9	+59.4	1.5	73 01.8	+59.5	1.6	74 01.8	+59.5	1.7	75 01.8	+59.5	1.8	76 01.7	+59.6	1.9	77 01.7	+59.5	2.1	78 01.7	+59.5	2.3	79 01.6	+59.6	2.5	87
88	73 01.3	+59.4	1.1	74 01.3	+59.4	1.1	75 01.3	+59.4	1.2	76 01.3	+59.4	1.3	77 01.3	+59.4	1.4	78 01.2	+59.5	1.5	79 01.2	+59.5	1.6	80 01.2	+59.5	1.8	88
89	74 00.7	+59.3	0.6	75 00.7	+59.3	0.6	76 00.7	+59.3	0.6	77 00.7	+59.3	0.7	78 00.7	+59.3	0.8	79 00.7	+59.3	0.8	80 00.7	+59.3	0.9	81 00.7	+59.3	1.0	89
90	75 00.0	+59.2	0.0	76 00.0	+59.2	0.0	77 00.0	+59.2	0.0	78 00.0	+59.2	0.0	79 00.0	+59.2	0.0	80 00.0	+59.2	0.0	81 00.0	+59.2	0.0	82 00.0	+59.2	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 171°, 189°

10°, 350° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 46.0	+59.9	169.7	13 47.0	+59.9	169.7	12 47.9	+60.0	169.7	11 48.9	+60.0	169.8	10 49.9	+59.9	169.8	9 50.8	+60.0	169.8	8 51.7	+60.0	169.9	7 52.7	+59.9	169.9	**0**
1	15 45.9	+60.0	169.6	14 46.9	+60.0	169.7	13 47.9	+60.0	169.7	12 48.9	+59.9	169.7	11 49.8	+60.0	169.8	10 50.8	+59.9	169.8	9 51.7	+60.0	169.9	8 52.6	+60.0	169.9	**1**
2	16 45.9	+59.9	169.6	15 46.9	+59.9	169.6	14 47.9	+59.9	169.7	13 48.8	+60.0	169.7	12 49.8	+59.9	169.7	11 50.7	+60.0	169.8	10 51.7	+60.0	169.8	9 52.6	+60.0	169.9	**2**
3	17 45.8	+59.9	169.5	16 46.8	+60.0	169.6	15 47.8	+60.0	169.6	14 48.8	+59.9	169.7	13 49.7	+60.0	169.7	12 50.7	+60.0	169.8	11 51.7	+59.9	169.8	10 52.6	+60.0	169.8	**3**
4	18 45.7	+60.0	169.5	17 46.8	+59.9	169.5	16 47.8	+59.9	169.6	15 48.7	+60.0	169.6	14 49.7	+60.0	169.7	13 50.7	+60.0	169.7	12 51.6	+60.0	169.8	11 52.6	+60.0	169.8	**4**
5	19 45.7	+59.9	169.4	18 46.7	+59.9	169.5	17 47.7	+60.0	169.5	16 48.7	+60.0	169.6	15 49.7	+59.9	169.6	14 50.7	+59.9	169.7	13 51.6	+60.0	169.7	12 52.6	+60.0	169.8	**5**
6	20 45.6	+59.9	169.4	19 46.6	+60.0	169.4	18 47.7	+59.9	169.5	17 48.7	+59.9	169.5	16 49.6	+60.0	169.6	15 50.6	+60.0	169.7	14 51.6	+60.0	169.7	13 52.6	+59.9	169.8	**6**
7	21 45.5	+60.0	169.3	20 46.6	+59.9	169.4	19 47.6	+59.9	169.4	18 48.6	+60.0	169.5	17 49.6	+60.0	169.6	16 50.6	+60.0	169.6	15 51.6	+59.9	169.7	14 52.5	+60.0	169.7	**7**
8	22 45.5	+59.9	169.3	21 46.5	+60.0	169.3	20 47.5	+60.0	169.4	19 48.6	+59.9	169.5	18 49.6	+59.9	169.5	17 50.6	+59.9	169.6	16 51.5	+60.0	169.6	15 52.5	+60.0	169.7	**8**
9	23 45.4	+59.9	169.2	22 46.5	+59.9	169.3	21 47.5	+59.9	169.4	20 48.5	+60.0	169.4	19 49.5	+60.0	169.5	18 50.5	+60.0	169.6	17 51.5	+60.0	169.6	16 52.5	+60.0	169.7	**9**
10	24 45.3	+60.0	169.1	23 46.4	+59.9	169.2	22 47.4	+60.0	169.3	21 48.5	+59.9	169.4	20 49.5	+60.0	169.5	19 50.5	+60.0	169.5	18 51.5	+60.0	169.6	17 52.5	+60.0	169.6	**10**
11	25 45.3	+59.9	169.1	24 46.3	+60.0	169.2	23 47.4	+59.9	169.3	22 48.4	+60.0	169.3	21 49.5	+59.9	169.4	20 50.5	+59.9	169.5	19 51.5	+59.9	169.6	18 52.5	+59.9	169.6	**11**
12	26 45.2	+59.9	169.0	25 46.3	+59.9	169.1	24 47.3	+60.0	169.2	23 48.4	+59.9	169.3	22 49.4	+60.0	169.4	21 50.4	+60.0	169.5	20 51.4	+60.0	169.5	19 52.4	+60.0	169.6	**12**
13	27 45.1	+59.9	169.0	26 46.2	+59.9	169.1	25 47.3	+59.9	169.2	24 48.3	+60.0	169.3	23 49.4	+59.9	169.3	22 50.4	+60.0	169.4	21 51.4	+60.0	169.5	20 52.4	+60.0	169.6	**13**
14	28 45.0	+59.9	168.9	27 46.1	+60.0	169.0	26 47.2	+60.0	169.1	25 48.3	+59.9	169.2	24 49.3	+60.0	169.3	23 50.4	+59.9	169.4	22 51.4	+60.0	169.5	21 52.4	+60.0	169.5	**14**
15	29 44.9	+60.0	168.9	28 46.1	+59.9	169.0	27 47.2	+59.9	169.1	26 48.2	+60.0	169.2	25 49.3	+60.0	169.3	24 50.3	+60.0	169.3	23 51.4	+59.9	169.4	22 52.4	+60.0	169.5	**15**
16	30 44.9	+59.9	168.8	29 46.0	+59.9	168.9	28 47.1	+59.9	169.0	27 48.2	+59.9	169.1	26 49.3	+59.9	169.2	25 50.3	+60.0	169.3	24 51.3	+60.0	169.4	23 52.4	+59.9	169.5	**16**
17	31 44.8	+59.9	168.7	30 45.9	+59.9	168.9	29 47.0	+60.0	169.0	28 48.1	+60.0	169.1	27 49.2	+60.0	169.2	26 50.3	+59.9	169.3	25 51.3	+60.0	169.4	24 52.3	+60.0	169.5	**17**
18	32 44.7	+59.9	168.7	31 45.8	+60.0	168.8	30 47.0	+59.9	168.9	29 48.1	+59.9	169.0	28 49.2	+59.9	169.1	27 50.2	+60.0	169.2	26 51.3	+60.0	169.3	25 52.3	+60.0	169.4	**18**
19	33 44.6	+59.9	168.6	32 45.8	+59.9	168.7	31 46.9	+60.0	168.9	30 48.0	+60.0	169.0	29 49.1	+60.0	169.1	28 50.2	+60.0	169.2	27 51.3	+59.9	169.3	26 52.3	+60.0	169.4	**19**
20	34 44.5	+59.9	168.5	33 45.7	+59.9	168.7	32 46.9	+59.9	168.8	31 48.0	+59.9	168.9	30 49.1	+59.9	169.0	29 50.2	+59.9	169.2	28 51.2	+60.0	169.3	27 52.3	+59.9	169.4	**20**
21	35 44.4	+59.9	168.5	34 45.6	+59.9	168.6	33 46.8	+59.9	168.8	32 47.9	+60.0	168.9	31 49.0	+60.0	169.0	30 50.1	+60.0	169.1	29 51.2	+60.0	169.2	28 52.2	+60.0	169.3	**21**
22	36 44.3	+59.9	168.4	35 45.5	+60.0	168.6	34 46.7	+60.0	168.7	33 47.9	+59.9	168.8	32 49.0	+59.9	169.0	31 50.1	+60.0	169.1	30 51.2	+59.9	169.2	29 52.2	+60.0	169.3	**22**
23	37 44.2	+59.9	168.3	36 45.5	+59.9	168.5	35 46.7	+59.9	168.6	34 47.8	+60.0	168.8	33 48.9	+60.0	168.9	32 50.1	+59.9	169.0	31 51.1	+60.0	169.2	30 52.2	+60.0	169.3	**23**
24	38 44.1	+59.9	168.3	37 45.4	+59.9	168.4	36 46.6	+59.9	168.6	35 47.8	+59.9	168.7	34 48.9	+59.9	168.9	33 50.0	+60.0	169.0	32 51.1	+60.0	169.1	31 52.2	+60.0	169.2	**24**
25	39 44.0	+59.9	168.2	38 45.3	+59.9	168.4	37 46.5	+59.9	168.5	36 47.7	+59.9	168.7	35 48.8	+60.0	168.8	34 50.0	+59.9	168.9	33 51.1	+59.9	169.1	32 52.2	+59.9	169.2	**25**
26	40 43.9	+59.9	168.1	39 45.2	+59.9	168.3	38 46.4	+60.0	168.5	37 47.6	+60.0	168.6	36 48.8	+59.9	168.8	35 49.9	+60.0	168.9	34 51.0	+60.0	169.0	33 52.1	+60.0	169.2	**26**
27	41 43.8	+59.9	168.0	40 45.1	+59.9	168.2	39 46.4	+59.9	168.4	38 47.6	+59.9	168.6	37 48.7	+60.0	168.7	36 49.9	+59.9	168.9	35 51.0	+60.0	169.0	34 52.1	+60.0	169.1	**27**
28	42 43.7	+59.9	168.0	41 45.0	+59.9	168.1	40 46.3	+59.9	168.3	39 47.5	+59.9	168.5	38 48.7	+59.9	168.7	37 49.8	+60.0	168.8	36 51.0	+59.9	169.0	35 52.1	+59.9	169.1	**28**
29	43 43.6	+59.9	167.9	42 44.9	+59.9	168.1	41 46.2	+59.9	168.3	40 47.4	+60.0	168.4	39 48.6	+60.0	168.6	38 49.8	+60.0	168.8	37 50.9	+60.0	168.9	36 52.0	+60.0	169.1	**29**
30	44 43.5	+59.9	167.8	43 44.8	+59.9	168.0	42 46.1	+59.9	168.2	41 47.4	+59.9	168.4	40 48.6	+59.9	168.5	39 49.8	+59.9	168.7	38 50.9	+60.0	168.9	37 52.0	+60.0	169.0	**30**
31	45 43.4	+59.8	167.7	44 44.7	+59.9	167.9	43 46.0	+59.9	168.1	42 47.3	+59.9	168.3	41 48.5	+60.0	168.5	40 49.7	+60.0	168.7	39 50.9	+59.9	168.8	38 52.0	+60.0	169.0	**31**
32	46 43.2	+59.9	167.6	45 44.6	+59.9	167.8	44 45.9	+59.9	168.0	43 47.2	+59.9	168.2	42 48.5	+59.9	168.4	41 49.7	+59.9	168.6	40 50.8	+60.0	168.8	39 52.0	+59.9	168.9	**32**
33	47 43.1	+59.9	167.5	46 44.5	+59.9	167.7	45 45.8	+60.0	168.0	44 47.1	+60.0	168.2	43 48.4	+59.9	168.4	42 49.6	+60.0	168.5	41 50.8	+60.0	168.7	40 51.9	+60.0	168.9	**33**
34	48 43.0	+59.8	167.4	47 44.4	+59.9	167.6	46 45.8	+59.9	167.9	45 47.1	+59.9	168.1	44 48.3	+60.0	168.3	43 49.6	+59.9	168.5	42 50.8	+59.9	168.7	41 51.9	+60.0	168.9	**34**
35	49 42.8	+59.9	167.3	48 44.3	+59.8	167.5	47 45.7	+59.8	167.8	46 47.0	+59.9	168.0	45 48.3	+59.9	168.2	44 49.5	+60.0	168.4	43 50.7	+60.0	168.6	42 51.9	+59.9	168.8	**35**
36	50 42.7	+59.8	167.2	49 44.1	+59.9	167.4	48 45.5	+59.9	167.7	47 46.9	+59.9	167.9	46 48.2	+59.9	168.2	45 49.5	+59.9	168.4	44 50.7	+59.9	168.6	43 51.8	+60.0	168.8	**36**
37	51 42.5	+59.9	167.1	50 44.0	+59.9	167.3	49 45.4	+59.9	167.6	48 46.8	+59.9	167.9	47 48.1	+60.0	168.1	46 49.4	+59.9	168.3	45 50.6	+60.0	168.5	44 51.8	+60.0	168.7	**37**
38	52 42.4	+59.8	166.9	51 43.9	+59.8	167.2	50 45.3	+59.9	167.5	49 46.7	+59.9	167.8	48 48.1	+59.9	168.0	47 49.3	+60.0	168.2	46 50.6	+59.9	168.5	45 51.8	+59.9	168.7	**38**
39	53 42.2	+59.8	166.8	52 43.7	+59.9	167.1	51 45.2	+59.9	167.4	50 46.6	+59.9	167.7	49 48.0	+59.9	167.9	48 49.3	+59.9	168.2	47 50.5	+60.0	168.4	46 51.7	+60.0	168.6	**39**
40	54 42.0	+59.8	166.7	53 43.6	+59.8	167.0	52 45.1	+59.9	167.3	51 46.5	+59.9	167.6	50 47.9	+59.9	167.9	49 49.2	+59.9	168.1	48 50.5	+59.9	168.3	47 51.7	+60.0	168.6	**40**
41	55 41.8	+59.8	166.6	54 43.4	+59.9	166.9	53 45.0	+59.8	167.2	52 46.4	+59.9	167.5	51 47.8	+59.9	167.8	50 49.1	+60.0	168.0	49 50.4	+60.0	168.3	48 51.7	+59.9	168.5	**41**
42	56 41.6	+59.8	166.4	55 43.3	+59.8	166.8	54 44.8	+59.9	167.1	53 46.3	+59.9	167.4	52 47.7	+59.9	167.7	51 49.1	+59.9	168.0	50 50.4	+59.9	168.2	49 51.6	+60.0	168.5	**42**
43	57 41.4	+59.8	166.3	56 43.1	+59.8	166.6	55 44.7	+59.8	167.0	54 46.2	+59.9	167.3	53 47.6	+59.9	167.6	52 49.0	+59.9	167.9	51 50.3	+60.0	168.1	50 51.6	+59.9	168.4	**43**
44	58 41.2	+59.8	166.1	57 42.9	+59.8	166.5	56 44.5	+59.9	166.8	55 46.1	+59.8	167.2	54 47.5	+59.9	167.5	53 48.9	+59.9	167.8	52 50.3	+59.9	168.1	51 51.5	+60.0	168.3	**44**
45	59 41.0	+59.7	165.9	58 42.7	+59.8	166.3	57 44.4	+59.8	166.7	56 45.9	+59.9	167.1	55 47.4	+59.9	167.4	54 48.8	+60.0	167.7	53 50.2	+59.9	168.0	52 51.5	+59.9	168.3	**45**
46	60 40.7	+59.8	165.7	59 42.5	+59.8	166.2	58 44.2	+59.8	166.6	57 45.8	+59.9	166.9	56 47.3	+59.9	167.3	55 48.8	+59.9	167.6	54 50.1	+60.0	167.9	53 51.4	+60.0	168.2	**46**
47	61 40.5	+59.7	165.5	60 42.3	+59.8	166.0	59 44.0	+59.9	166.4	58 45.7	+59.8	166.8	57 47.2	+59.9	167.2	56 48.7	+59.9	167.5	55 50.1	+59.9	167.8	54 51.4	+59.9	168.1	**47**
48	62 40.2	+59.7	165.3	61 42.1	+59.7	165.8	60 43.9	+59.8	166.3	59 45.5	+59.9	166.7	58 47.1	+59.9	167.0	57 48.6	+59.9	167.4	56 50.0	+59.9	167.7	55 51.3	+60.0	168.1	**48**
49	63 39.9	+59.7	165.1	62 41.8	+59.8	165.6	61 43.7	+59.7	166.1	60 45.4	+59.8	166.5	59 47.0	+59.8	166.9	58 48.5	+59.9	167.3	57 49.9	+59.9	167.6	56 51.3	+59.9	168.0	**49**
50	64 39.6	+59.6	164.9	63 41.6	+59.7	165.4	62 43.4	+59.8	165.9	61 45.2	+59.8	166.4	60 46.8	+59.9	166.8	59 48.4	+59.9	167.2	58 49.8	+59.9	167.5	57 51.2	+59.9	167.9	**50**
51	65 39.2	+59.7	164.6	64 41.3	+59.7	165.2	63 43.2	+59.8	165.7	62 45.0	+59.8	166.2	61 46.7	+59.8	166.6	60 48.3	+59.8	167.1	59 49.7	+60.0	167.4	58 51.1	+60.0	167.8	**51**
52	66 38.9	+59.6	164.4	65 41.0	+59.7	165.0	64 43.0	+59.7	165.5	63 44.8	+59.8	166.0	62 46.5	+59.9	166.5	61 48.1	+59.9	166.9	60 49.7	+59.9	167.3	59 51.1	+59.9	167.7	**52**
53	67 38.5	+59.5	164.1	66 40.7	+59.6	164.7	65 42.7	+59.7	165.3	64 44.6	+59.8	165.8	63 46.4	+59.8	166.3	62 48.0	+59.9	166.8	61 49.6	+59.9	167.2	60 51.0	+59.9	167.6	**53**
54	68 38.0	+59.5	163.7	67 40.3	+59.6	164.4	66 42.4	+59.7	165.0	65 44.4	+59.7	165.6	64 46.2	+59.8	166.1	63 47.9	+59.8	166.6	62 49.5	+59.8	167.1	61 50.9	+59.9	167.5	**54**
55	69 37.5	+59.5	163.4	68 39.9	+59.6	164.1	67 42.1	+59.7	164.8	66 44.1	+59.8	165.4	65 46.0	+59.8	166.0	64 47.7	+59.9	166.5	63 49.3	+59.9	167.0	62 50.8	+60.0	167.4	**55**
56	70 37.0	+59.4	163.0	69 39.5	+59.5	163.8	68 41.8	+59.6	164.5	67 43.9	+59.7	165.2	66 45.8	+59.8	165.8	65 47.6	+59.8	166.3	64 49.2	+59.9	166.8	63 50.8	+59.9	167.3	**56**
57	71 36.4	+59.4	162.6	70 39.0	+59.5	163.4	69 41.4	+59.6	164.2	68 43.6	+59.7	164.9	67 45.6	+59.7	165.5	66 47.4	+59.8	166.1	65 49.1	+59.9	166.7	64 50.7	+59.9	167.1	**57**
58	72 35.8	+59.3	162.1	71 38.5	+59.5	163.0	70 41.0	+59.6	163.8	69 43.3	+59.6	164.6	68 45.3	+59.8	165.3	67 47.2	+59.8	165.9	66 49.0	+59.8	166.5	65 50.6	+59.9	167.0	**58**
59	73 35.1	+59.1	161.6	72 38.0	+59.3	162.6	71 40.6	+59.5	163.5	70 42.9	+59.7	164.3	69 45.1	+59.7	165.0	68 47.0	+59.8	165.7	67 48.8	+59.8	166.3	66 50.5	+59.8	166.9	**59**
60	74 34.2	+59.1	161.0	73 37.3	+59.3	162.1	72 40.1	+59.4	163.1	71 42.6	+59.5	163.9	70 44.8	+59.7	164.7	69 46.8	+59.8	165.5	68 48.6	+59.9	166.1	67 50.3	+59.9	166.7	**60**
61	75 33.3	+59.0	160.3	74 36.6	+59.2	161.5	73 39.5	+59.4	162.6	72 42.1	+59.6	163.6	71 44.5	+59.6	164.4	70 46.6	+59.7	165.2	69 48.5	+59.8	165.9	68 50.2	+59.9	166.5	**61**
62	76 32.3	+58.8	159.5	75 35.8	+59.1	160.9	74 38.9	+59.3	162.1	73 41.7	+59.4	163.1	72 44.1	+59.6	164.1	71 46.3	+59.7	164.9	70 48.3	+59.8	165.6	69 50.1	+59.8	166.3	**62**
63	77 31.1	+58.5	158.6	76 34.9	+58.9	160.1	75 38.2	+59.2	161.5	74 41.1	+59.4	162.6	73 43.7	+59.6	163.7	72 46.0	+59.7	164.6	71 48.1	+59.7	165.4	70 49.9	+59.8	166.1	**63**
64	78 29.6	+58.3	157.6	77 33.8	+58.8	159.3	76 37.4	+59.1	160.8	75 40.5	+59.4	162.1	74 43.3	+59.5	163.2	73 45.7	+59.6	164.2	72 47.8	+59.8	165.1	71 49.7	+59.8	165.9	**64**
65	79 27.9	+58.0	156.3	78 32.6	+58.5	158.3	77 36.5	+58.9	160.0	76 39.9	+59.2	161.4	75 42.8	+59.4	162.7	74 45.3	+59.6	163.8	73 47.6	+59.6	164.8	72 49.5	+59.8	165.6	**65**
66	80 25.9	+57.5	154.9	79 31.1	+58.2	157.2	78 35.4	+58.7	159.1	77 39.1	+59.0	160.7	76 42.2	+59.3	162.1	75 44.9	+59.5	163.3	74 47.2	+59.7	164.4	73 49.3	+59.8	165.3	**66**
67	81 23.4	+56.9	153.0	80 29.3	+57.8	155.8	79 34.1	+58.5	158.0	78 38.1	+58.9	159.9	77 41.5	+59.2	161.4	76 44.4	+59.4	162.8	75 46.9	+59.6	164.0	74 49.1	+59.7	165.0	**67**
68	82 20.3	+56.0	150.8	81 27.1	+57.3	154.0	80 32.6	+58.0	156.7	79 37.0	+58.7	158.8	78 40.7	+59.1	160.6	77 43.8	+59.4	162.2	76 46.5	+59.6	163.5	75 48.8	+59.7	164.6	**68**
69	83 16.3	+54.7	147.9	82 24.4	+56.4	151.9	81 30.6	+57.6	155.1	80 35.7	+58.3	157.6	79 39.8	+58.8	159.7	78 43.2	+59.2	161.4	77 46.1	+59.4	162.9	76 48.5	+59.6	164.2	**69**
70	84 11.0	*+52.5*	•144.1	83 20.8	+55.2	149.2	82 28.2	+56.9	153.0	81 34.0	+57.9	156.1	80 38.6	+58.6	158.6	79 42.4	+59.0	160.6	78 45.5	+59.4	162.3	77 48.1	+59.6	163.7	**70**
71	85 03.5	*+49.2*	•139.0	84 16.0	*+53.4*	•145.5	83 25.1	+55.8	150.4	82 31.9	+57.3	154.2	81 37.2	+58.2	157.2	80 41.4	+58.9	159.5	79 44.9	+59.2	161.5	78 47.7	+59.5	163.1	**71**
72	85 52.7	*+43.4*	•131.7	85 09.4	*+50.2*	•140.5	84 20.9	*+54.1*	•147.0	83 29.2	+56.3	151.8	82 35.4	+57.7	155.4	81 40.3	+58.5	158.3	80 44.1	+59.0	160.5	79 47.2	+59.4	162.4	**72**
73	86 36.1	*+33.0*	•121.1	85 59.6	*+44.6*	•133.4	85 15.0	*+51.2*	•142.2	84 25.5	*+54.9*	•148.5	83 33.1	+56.9	153.1	82 38.8	+58.0	156.6	81 43.1	+58.8	159.4	80 46.6	+59.2	161.5	**73**
74	87 09.1	*+15.8*	•105.6	86 44.2	*+34.3*	•122.8	86 06.2	*+45.9*	•135.2	85 20.4	*+52.1*	•143.9	84 30.0	+55.5	150.0	83 36.8	+57.4	154.5	82 41.9	+58.4	157.9	81 45.8	+59.0	160.5	**74**
75	87 24.9	*−6.4*	•85.2	87 18.5	*+16.5*	•106.9	86 52.1	*+35.8*	•124.7	86 12.5	*+47.3*	•137.2	85 25.5	*+53.2*	•145.7	84 34.2	+56.2	151.6	83 40.3	+57.8	155.9	82 44.8	+58.8	159.1	**75**
76	87 18.5	*−26.4*	•63.4	87 35.0	*−7.1*	•85.1	87 27.9	*+17.3*	•108.3	86 59.8	*+37.4*	•126.7	86 18.7	*+48.6*	•139.2	85 30.4	*+54.1*	•147.6	84 38.1	+56.9	153.3	83 43.6	+58.2	157.4	**76**
77	86 52.1	*−39.6*	•45.6	87 27.9	*−28.1*	•62.0	87 45.2	*−8.0*	•85.1	87 37.2	*+18.2*	•109.9	87 07.3	*+39.1*	•128.9	86 24.5	*+50.1*	•141.4	85 35.0	*+55.0*	•149.5	84 41.8	+57.4	155.0	**77**
78	86 12.5	*−47.0*	•33.1	86 59.8	*−41.1*	•43.6	87 37.2	*−29.9*	•60.4	87 55.4	*−9.0*	•85.1	87 46.4	*+19.3*	•111.7	87 14.6	*+40.9*	•131.4	86 30.0	*+51.5*	•143.7	85 39.2	*+56.0*	•151.5	**78**
79	85 25.5	*−51.3*	•24.5	86 18.7	*−48.3*	•31.0	87 07.3	*−42.8*	•41.3	87 46.4	*−31.8*	•58.5	88 05.7	*−10.2*	•85.1	87 55.5	*+20.4*	•113.8	87 21.5	*+42.9*	•134.0	86 35.2	*+52.9*	•146.2	**79**
80	84 34.2	*−53.9*	•18.6	85 30.4	*−52.3*	•22.6	86 24.5	*−49.5*	•28.8	87 14.6	*−44.6*	•38.8	87 55.5	*−34.0*	•56.4	88 15.9	*−11.5*	•85.1	88 04.4	*+21.9*	•116.2	87 28.1	*+45.0*	•137.0	**80**
81	83 40.3	−55.5	14.3	84 38.1	−54.5	16.9	85 35.0	*−53.2*	•20.7	86 30.0	*−50.8*	•26.4	87 21.5	*−46.3*	•36.1	88 04.4	*−36.3*	•53.9	88 26.3	*−13.2*	•85.1	88 13.1	*+23.5*	•119.1	**81**
82	82 44.8	−56.5	11.0	83 43.6	−56.1	12.8	84 41.8	−55.2	15.2	85 39.2	*−54.0*	•18.6	86 35.2	*−52.0*	•23.9	87 28.1	*−48.1*	•33.2	88 13.1	*−38.9*	•51.0	88 36.6	*−15.0*	•85.0	**82**
83	81 48.3	−57.3	8.5	82 47.5	−56.9	9.7	83 46.6	−56.6	11.3	84 45.2	−55.9	13.4	85 43.2	*−54.9*	•16.5	86 40.0	*−53.2*	•21.3	87 34.2	*−49.8*	•30.0	88 21.6	*−41.7*	•47.7	**83**
84	80 51.0	−57.7	6.6	81 50.6	−57.6	7.4	82 50.0	−57.3	8.4	83 49.3	−57.0	9.7	84 48.3	−56.5	11.6	85 46.8	−55.7	14.3	86 44.4	*−54.4*	•18.6	87 39.9	*−51.6*	•26.5	**84**
85	79 53.3	−58.2	4.9	80 53.0	−58.1	5.5	81 52.7	−57.9	6.1	82 52.3	−57.7	7.0	83 51.8	−57.5	8.1	84 51.1	−57.1	9.7	85 50.0	−56.5	12.0	86 48.3	*−55.5*	•15.8	**85**
86	78 55.1	−58.5	3.6	79 54.9	−58.4	4.0	80 54.8	−58.3	4.4	81 54.6	−58.2	4.9	82 54.3	−58.0	5.6	83 54.0	−57.9	6.5	84 53.5	−57.6	7.8	85 52.8	−57.1	9.7	**86**
87	77 56.6	−58.7	2.5	78 56.5	−58.6	2.7	79 56.5	−58.6	3.0	80 56.4	−58.6	3.3	81 56.3	−58.5	3.7	82 56.1	−58.4	4.2	83 55.9	−58.2	4.9	84 55.7	−58.1	5.9	**87**
88	76 57.9	−58.9	1.5	77 57.9	−58.9	1.7	78 57.9	−58.9	1.8	79 57.8	−58.8	2.0	80 57.8	−58.8	2.2	81 57.7	−58.7	2.5	82 57.7	−58.7	2.8	83 57.6	−58.6	3.3	**88**
89	75 59.0	−59.0	0.7	76 59.0	−59.0	0.8	77 59.0	−59.0	0.8	78 59.0	−59.0	0.9	79 59.0	−59.0	1.0	80 59.0	−59.0	1.1	81 59.0	−59.0	1.2	82 59.0	−59.0	1.4	**89**
90	75 00.0	−59.1	0.0	76 00.0	−59.1	0.0	77 00.0	−59.2	0.0	78 00.0	−59.2	0.0	79 00.0	−59.2	0.0	80 00.0	−59.2	0.0	81 00.0	−59.2	0.0	82 00.0	−59.2	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

10°, 350° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 10°, 350°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 46.0	−59.9	169.7	13 47.0	−60.0	169.7	12 47.9	−59.9	169.7	11 48.9	−60.0	169.8	10 49.9	−60.0	169.8	9 50.8	−60.0	169.8	8 51.7	−59.9	169.9	7 52.7	−60.0	169.9	**0**
1	13 46.1	−60.0	169.7	12 47.0	−59.9	169.7	11 48.0	−60.0	169.8	10 48.9	−59.9	169.8	9 49.9	−60.0	169.9	8 50.8	−60.0	169.9	7 51.8	−60.0	169.9	6 52.7	−60.0	169.9	**1**
2	12 46.1	−59.9	169.8	11 47.1	−59.9	169.8	10 48.0	−59.9	169.8	9 49.0	−60.0	169.9	8 49.9	−59.9	169.9	7 50.8	−59.9	169.9	6 51.8	−60.0	169.9	5 52.7	−60.0	170.0	**2**
3	11 46.2	−59.9	169.8	10 47.2	−60.0	169.8	9 48.1	−60.0	169.9	8 49.0	−59.9	169.9	7 50.0	−60.0	169.9	6 50.9	−60.0	169.9	5 51.8	−60.0	170.0	4 52.7	−60.0	170.0	**3**
4	10 46.3	−60.0	169.8	9 47.2	−59.9	169.9	8 48.1	−59.9	169.9	7 49.1	−60.0	169.9	6 50.0	−60.0	170.0	5 50.9	−60.0	170.0	4 51.8	−60.0	170.0	3 52.7	−60.0	170.0	**4**
5	9 46.3	−59.9	169.9	8 47.3	−60.0	169.9	7 48.2	−60.0	169.9	6 49.1	−60.0	170.0	5 50.0	−59.9	170.0	4 50.9	−59.9	170.0	3 51.8	−59.9	170.0	2 52.7	−59.9	170.0	**5**
6	8 46.4	−59.9	169.9	7 47.3	−59.9	170.0	6 48.2	−59.9	170.0	5 49.1	−59.9	170.0	4 50.1	−60.0	170.0	3 51.0	−60.0	170.0	2 51.9	−60.0	170.0	1 52.8	−60.0	170.0	**6**
7	7 46.5	−60.0	170.0	6 47.4	−60.0	170.0	5 48.3	−60.0	170.0	4 49.2	−60.0	170.0	3 50.1	−60.0	170.1	2 51.0	−60.0	170.1	1 51.9	−60.0	170.1	0 52.8	−60.0	170.1	**7**
8	6 46.5	−59.9	170.0	5 47.4	−59.9	170.0	4 48.3	−59.9	170.1	3 49.2	−59.9	170.1	2 50.1	−59.9	170.1	1 51.0	−60.0	170.1	0 51.9	−60.0	170.1	0 07.2	+60.0	9.9	**8**
9	5 46.6	−60.0	170.1	4 47.5	−60.0	170.1	3 48.4	−60.0	170.1	2 49.3	−60.0	170.1	1 50.2	−60.0	170.1	0 51.0	−59.9	170.1	0 08.1	+59.9	9.9	1 07.2	+60.0	9.9	**9**
10	4 46.6	−59.9	170.1	3 47.5	−59.9	170.1	2 48.4	−59.9	170.1	1 49.3	−60.0	170.1	0 50.2	−60.0	170.2	0 08.9	+60.0	9.8	1 08.0	+60.0	9.8	2 07.2	+59.9	9.9	**10**
11	3 46.7	−59.9	170.2	2 47.6	−60.0	170.2	1 48.5	−60.0	170.2	0 49.3	−59.9	170.2	0 09.8	+59.9	9.8	1 08.9	+60.0	9.8	2 08.0	+60.0	9.8	3 07.1	+60.0	9.8	**11**
12	2 46.8	−60.0	170.2	1 47.6	−59.9	170.2	0 48.5	−59.9	170.2	0 10.6	+60.0	9.8	1 09.7	+60.0	9.8	2 08.9	+59.9	9.8	3 08.0	+60.0	9.8	4 07.1	+60.0	9.8	**12**
13	1 46.8	−59.9	170.3	0 47.7	−60.0	170.3	0 11.4	+60.0	9.7	1 10.6	+59.9	9.7	2 09.7	+60.0	9.7	3 08.8	+60.0	9.8	4 08.0	+60.0	9.8	5 07.1	+60.0	9.8	**13**
14	0 46.9	−60.0	170.3	0 12.3	+59.9	9.7	1 11.4	+60.0	9.7	2 10.5	+60.0	9.7	3 09.7	+60.0	9.7	4 08.8	+60.0	9.7	5 08.0	+59.9	9.7	6 07.1	+60.0	9.8	**14**
15	0 13.1	+59.9	9.7	1 12.2	+60.0	9.7	2 11.4	+59.9	9.7	3 10.5	+60.0	9.7	4 09.7	+59.9	9.7	5 08.8	+60.0	9.7	6 07.9	+60.0	9.7	7 07.1	+60.0	9.7	**15**
16	1 13.0	+59.9	9.6	2 12.2	+59.9	9.6	3 11.3	+60.0	9.6	4 10.5	+59.9	9.6	5 09.6	+60.0	9.6	6 08.8	+59.9	9.7	7 07.9	+60.0	9.7	8 07.1	+59.9	9.7	**16**
17	2 12.9	+60.0	9.6	3 12.1	+59.9	9.6	4 11.3	+59.9	9.6	5 10.4	+60.0	9.6	6 09.6	+60.0	9.6	7 08.7	+60.0	9.6	8 07.9	+60.0	9.7	9 07.0	+60.0	9.7	**17**
18	3 12.9	+59.9	9.5	4 12.0	+60.0	9.5	5 11.2	+60.0	9.5	6 10.4	+59.9	9.6	7 09.6	+59.9	9.6	8 08.7	+60.0	9.6	9 07.9	+59.9	9.6	10 07.0	+60.0	9.7	**18**
19	4 12.8	+60.0	9.5	5 12.0	+59.9	9.5	6 11.2	+59.9	9.5	7 10.3	+60.0	9.5	8 09.5	+60.0	9.5	9 08.7	+60.0	9.6	10 07.8	+60.0	9.6	11 07.0	+60.0	9.6	**19**
20	5 12.8	+59.9	9.4	6 11.9	+60.0	9.4	7 11.1	+60.0	9.5	8 10.3	+60.0	9.5	9 09.5	+59.9	9.5	10 08.7	+59.9	9.5	11 07.8	+60.0	9.6	12 07.0	+60.0	9.6	**20**
21	6 12.7	+59.9	9.4	7 11.9	+59.9	9.4	8 11.1	+59.9	9.4	9 10.3	+59.9	9.5	10 09.4	+60.0	9.5	11 08.6	+60.0	9.5	12 07.8	+60.0	9.5	13 07.0	+59.9	9.6	**21**
22	7 12.6	+60.0	9.3	8 11.8	+60.0	9.4	9 11.0	+60.0	9.4	10 10.2	+60.0	9.4	11 09.4	+60.0	9.4	12 08.6	+60.0	9.5	13 07.8	+60.0	9.5	14 06.9	+60.0	9.6	**22**
23	8 12.6	+59.9	9.3	9 11.8	+59.9	9.3	10 11.0	+59.9	9.3	11 10.2	+59.9	9.4	12 09.4	+59.9	9.4	13 08.6	+59.9	9.4	14 07.8	+59.9	9.5	15 06.9	+60.0	9.5	**23**
24	9 12.5	+59.9	9.2	10 11.7	+60.0	9.3	11 10.9	+60.0	9.3	12 10.1	+60.0	9.3	13 09.3	+60.0	9.4	14 08.5	+60.0	9.4	15 07.7	+60.0	9.5	16 06.9	+60.0	9.5	**24**
25	10 12.4	+60.0	9.2	11 11.7	+59.9	9.2	12 10.9	+59.9	9.3	13 10.1	+60.0	9.3	14 09.3	+60.0	9.3	15 08.5	+60.0	9.4	16 07.7	+60.0	9.4	17 06.9	+60.0	9.5	**25**
26	11 12.4	+59.9	9.2	12 11.6	+60.0	9.2	13 10.8	+60.0	9.2	14 10.1	+59.9	9.3	15 09.3	+59.9	9.3	16 08.5	+60.0	9.4	17 07.7	+60.0	9.4	18 06.9	+60.0	9.5	**26**
27	12 12.3	+60.0	9.1	13 11.6	+59.9	9.1	14 10.8	+59.9	9.2	15 10.0	+60.0	9.2	16 09.2	+60.0	9.3	17 08.5	+59.9	9.3	18 07.7	+59.9	9.4	19 06.9	+59.9	9.4	**27**
28	13 12.3	+59.9	9.1	14 11.5	+59.9	9.1	15 10.7	+60.0	9.1	16 10.0	+59.9	9.2	17 09.2	+60.0	9.2	18 08.4	+60.0	9.3	19 07.6	+60.0	9.3	20 06.8	+60.0	9.4	**28**
29	14 12.2	+59.9	9.0	15 11.4	+60.0	9.1	16 10.7	+59.9	9.1	17 09.9	+60.0	9.1	18 09.2	+59.9	9.2	19 08.4	+60.0	9.3	20 07.6	+60.0	9.3	21 06.8	+60.0	9.4	**29**
30	15 12.1	+60.0	9.0	16 11.4	+59.9	9.0	17 10.6	+60.0	9.1	18 09.9	+59.9	9.1	19 09.1	+60.0	9.2	20 08.4	+59.9	9.2	21 07.6	+60.0	9.3	22 06.8	+60.0	9.3	**30**
31	16 12.1	+59.9	8.9	17 11.3	+60.0	9.0	18 10.6	+59.9	9.0	19 09.8	+60.0	9.1	20 09.1	+60.0	9.1	21 08.3	+60.0	9.2	22 07.6	+59.9	9.2	23 06.8	+60.0	9.3	**31**
32	17 12.0	+59.9	8.9	18 11.3	+59.9	8.9	19 10.5	+60.0	9.0	20 09.8	+60.0	9.0	21 09.1	+59.9	9.1	22 08.3	+60.0	9.1	23 07.5	+60.0	9.2	24 06.8	+59.9	9.3	**32**
33	18 11.9	+60.0	8.8	19 11.2	+60.0	8.9	20 10.5	+59.9	8.9	21 09.8	+59.9	9.0	22 09.0	+60.0	9.0	23 08.3	+59.9	9.1	24 07.5	+60.0	9.2	25 06.7	+60.0	9.3	**33**
34	19 11.9	+59.9	8.8	20 11.2	+59.9	8.8	21 10.4	+60.0	8.9	22 09.7	+60.0	8.9	23 09.0	+59.9	9.0	24 08.2	+60.0	9.1	25 07.5	+60.0	9.1	26 06.7	+60.0	9.2	**34**
35	20 11.8	+59.9	8.7	21 11.1	+59.9	8.8	22 10.4	+59.9	8.8	23 09.7	+59.9	8.9	24 08.9	+60.0	9.0	25 08.2	+60.0	9.0	26 07.5	+59.9	9.1	27 06.7	+60.0	9.2	**35**
36	21 11.7	+60.0	8.7	22 11.0	+60.0	8.7	23 10.3	+60.0	8.8	24 09.6	+60.0	8.9	25 08.9	+60.0	8.9	26 08.2	+59.9	9.0	27 07.4	+60.0	9.1	28 06.7	+59.9	9.2	**36**
37	22 11.7	+59.9	8.6	23 11.0	+59.9	8.7	24 10.3	+59.9	8.7	25 09.6	+59.9	8.8	26 08.9	+59.9	8.9	27 08.1	+60.0	9.0	28 07.4	+60.0	9.0	29 06.6	+60.0	9.1	**37**
38	23 11.6	+59.9	8.6	24 10.9	+59.9	8.6	25 10.2	+60.0	8.7	26 09.5	+60.0	8.8	27 08.8	+60.0	8.8	28 08.1	+60.0	8.9	29 07.4	+59.9	9.0	30 06.6	+60.0	9.1	**38**
39	24 11.5	+59.9	8.5	25 10.8	+60.0	8.6	26 10.2	+59.9	8.6	27 09.5	+59.9	8.7	28 08.8	+59.9	8.8	29 08.1	+59.9	8.9	30 07.3	+60.0	9.0	31 06.6	+60.0	9.1	**39**
40	25 11.4	+60.0	8.5	26 10.8	+59.9	8.5	27 10.1	+60.0	8.6	28 09.4	+60.0	8.7	29 08.7	+60.0	8.8	30 08.0	+60.0	8.8	31 07.3	+60.0	8.9	32 06.6	+59.9	9.0	**40**
41	26 11.4	+59.9	8.4	27 10.7	+59.9	8.5	28 10.1	+59.9	8.5	29 09.4	+59.9	8.6	30 08.7	+59.9	8.7	31 08.0	+60.0	8.8	32 07.3	+59.9	8.9	33 06.5	+60.0	9.0	**41**
42	27 11.3	+59.9	8.3	28 10.6	+60.0	8.4	29 10.0	+59.9	8.5	30 09.3	+60.0	8.6	31 08.6	+60.0	8.7	32 08.0	+59.9	8.8	33 07.2	+60.0	8.9	34 06.5	+60.0	9.0	**42**
43	28 11.2	+59.9	8.3	29 10.6	+59.9	8.4	30 09.9	+60.0	8.4	31 09.3	+59.9	8.5	32 08.6	+60.0	8.6	33 07.9	+60.0	8.7	34 07.2	+60.0	8.8	35 06.5	+60.0	8.9	**43**
44	29 11.1	+59.9	8.2	30 10.5	+59.9	8.3	31 09.9	+59.9	8.4	32 09.2	+60.0	8.5	33 08.6	+59.9	8.6	34 07.9	+59.9	8.7	35 07.2	+59.9	8.8	36 06.5	+59.9	8.9	**44**
45	30 11.0	+60.0	8.2	31 10.4	+60.0	8.3	32 09.8	+59.9	8.3	33 09.2	+59.9	8.4	34 08.5	+60.0	8.5	35 07.8	+60.0	8.6	36 07.1	+60.0	8.7	37 06.4	+60.0	8.9	**45**
46	31 11.0	+59.9	8.1	32 10.4	+59.9	8.2	33 09.7	+60.0	8.3	34 09.1	+59.9	8.4	35 08.5	+59.9	8.5	36 07.8	+60.0	8.6	37 07.1	+60.0	8.7	38 06.4	+60.0	8.8	**46**
47	32 10.9	+59.9	8.0	33 10.3	+59.9	8.1	34 09.7	+59.9	8.2	35 09.0	+60.0	8.3	36 08.4	+60.0	8.4	37 07.8	+59.9	8.5	38 07.1	+59.9	8.7	39 06.4	+60.0	8.8	**47**
48	33 10.8	+59.9	8.0	34 10.2	+59.9	8.1	35 09.6	+59.9	8.2	36 09.0	+59.9	8.3	37 08.4	+59.9	8.4	38 07.7	+60.0	8.5	39 07.0	+60.0	8.6	40 06.4	+59.9	8.7	**48**
49	34 10.7	+59.9	7.9	35 10.1	+59.9	8.0	36 09.5	+60.0	8.1	37 08.9	+60.0	8.2	38 08.3	+60.0	8.3	39 07.7	+59.9	8.4	40 07.0	+60.0	8.6	41 06.3	+60.0	8.7	**49**
50	35 10.6	+59.9	7.8	36 10.0	+60.0	7.9	37 09.5	+59.9	8.1	38 08.9	+59.9	8.2	39 08.3	+59.9	8.3	40 07.6	+60.0	8.4	41 07.0	+59.9	8.5	42 06.3	+60.0	8.7	**50**
51	36 10.5	+59.9	7.8	37 10.0	+59.9	7.9	38 09.4	+59.9	8.0	39 08.8	+59.9	8.1	40 08.2	+59.9	8.2	41 07.6	+59.9	8.3	42 06.9	+60.0	8.5	43 06.3	+59.9	8.6	**51**
52	37 10.4	+59.9	7.7	38 09.9	+59.9	7.8	39 09.3	+59.9	7.9	40 08.7	+60.0	8.0	41 08.1	+60.0	8.2	42 07.5	+60.0	8.3	43 06.9	+59.9	8.4	44 06.2	+60.0	8.6	**52**
53	38 10.3	+59.9	7.6	39 09.8	+59.9	7.7	40 09.2	+60.0	7.9	41 08.7	+59.9	8.0	42 08.1	+59.9	8.1	43 07.5	+59.9	8.2	44 06.8	+60.0	8.4	45 06.2	+60.0	8.5	**53**
54	39 10.2	+59.9	7.6	40 09.7	+59.9	7.7	41 09.2	+59.9	7.8	42 08.6	+59.9	7.9	43 08.0	+60.0	8.0	44 07.4	+60.0	8.2	45 06.8	+60.0	8.3	46 06.2	+59.9	8.5	**54**
55	40 10.1	+59.9	7.5	41 09.6	+59.9	7.6	42 09.1	+59.9	7.7	43 08.5	+60.0	7.8	44 08.0	+59.9	8.0	45 07.4	+59.9	8.1	46 06.8	+59.9	8.3	47 06.1	+60.0	8.4	**55**
56	41 10.0	+59.9	7.4	42 09.5	+59.9	7.5	43 09.0	+59.9	7.6	44 08.5	+59.9	7.8	45 07.9	+59.9	7.9	46 07.3	+60.0	8.1	47 06.7	+60.0	8.2	48 06.1	+59.9	8.4	**56**
57	42 09.9	+59.9	7.3	43 09.4	+59.9	7.4	44 08.9	+59.9	7.6	45 08.4	+59.9	7.7	46 07.8	+60.0	7.8	47 07.3	+59.9	8.0	48 06.7	+59.9	8.1	49 06.0	+60.0	8.3	**57**
58	43 09.8	+59.9	7.2	44 09.3	+59.9	7.4	45 08.8	+59.9	7.5	46 08.3	+59.9	7.6	47 07.8	+59.9	7.8	48 07.2	+59.9	7.9	49 06.6	+60.0	8.1	50 06.0	+60.0	8.2	**58**
59	44 09.7	+59.9	7.2	45 09.2	+59.9	7.3	46 08.7	+59.9	7.4	47 08.2	+59.9	7.6	48 07.7	+59.9	7.7	49 07.1	+60.0	7.9	50 06.6	+59.9	8.0	51 06.0	+59.9	8.2	**59**
60	45 09.6	+59.8	7.1	46 09.1	+59.9	7.2	47 08.6	+59.9	7.3	48 08.1	+59.9	7.5	49 07.6	+59.9	7.6	50 07.1	+59.9	7.8	51 06.5	+59.9	7.9	52 05.9	+60.0	8.1	**60**
61	46 09.4	+59.9	7.0	47 09.0	+59.9	7.1	48 08.5	+59.9	7.2	49 08.0	+59.9	7.4	50 07.5	+59.9	7.5	51 07.0	+59.9	7.7	52 06.4	+60.0	7.9	53 05.9	+59.9	8.1	**61**
62	47 09.3	+59.9	6.9	48 08.9	+59.9	7.0	49 08.4	+59.9	7.2	50 07.9	+59.9	7.3	51 07.4	+60.0	7.5	52 06.9	+60.0	7.6	53 06.4	+59.9	7.8	54 05.8	+60.0	8.0	**62**
63	48 09.2	+59.8	6.8	49 08.8	+59.8	6.9	50 08.3	+59.9	7.1	51 07.8	+59.9	7.2	52 07.4	+59.9	7.4	53 06.9	+59.9	7.5	54 06.3	+60.0	7.7	55 05.8	+59.9	7.9	**63**
64	49 09.0	+59.9	6.7	50 08.6	+59.9	6.8	51 08.2	+59.9	7.0	52 07.7	+59.9	7.1	53 07.3	+59.9	7.3	54 06.8	+59.9	7.5	55 06.3	+59.9	7.6	56 05.7	+59.9	7.8	**64**
65	50 08.9	+59.9	6.6	51 08.5	+59.9	6.7	52 08.1	+59.9	6.9	53 07.6	+59.9	7.0	54 07.2	+59.9	7.2	55 06.7	+59.9	7.4	56 06.2	+59.9	7.6	57 05.6	+60.0	7.8	**65**
66	51 08.8	+59.8	6.5	52 08.4	+59.8	6.6	53 08.0	+59.8	6.8	54 07.5	+59.9	6.9	55 07.1	+59.9	7.1	56 06.6	+59.9	7.3	57 06.1	+59.9	7.5	58 05.6	+59.9	7.7	**66**
67	52 08.6	+59.8	6.3	53 08.2	+59.9	6.5	54 07.8	+59.9	6.6	55 07.4	+59.9	6.8	56 07.0	+59.9	7.0	57 06.5	+59.9	7.2	58 06.0	+60.0	7.4	59 05.5	+60.0	7.6	**67**
68	53 08.4	+59.9	6.2	54 08.1	+59.8	6.4	55 07.7	+59.8	6.5	56 07.3	+59.9	6.7	57 06.9	+59.8	6.9	58 06.4	+59.9	7.1	59 06.0	+59.9	7.3	60 05.5	+59.9	7.5	**68**
69	54 08.3	+59.8	6.1	55 07.9	+59.8	6.2	56 07.5	+59.9	6.4	57 07.2	+59.8	6.6	58 06.7	+59.9	6.8	59 06.3	+59.9	7.0	60 05.9	+59.9	7.2	61 05.4	+59.9	7.4	**69**
70	55 08.1	+59.8	6.0	56 07.7	+59.9	6.1	57 07.4	+59.8	6.3	58 07.0	+59.9	6.5	59 06.6	+59.9	6.6	60 06.2	+59.9	6.8	61 05.8	+59.9	7.1	62 05.3	+59.9	7.3	**70**
71	56 07.9	+59.8	5.8	57 07.6	+59.8	6.0	58 07.2	+59.9	6.1	59 06.9	+59.8	6.3	60 06.5	+59.9	6.5	61 06.1	+59.9	6.7	62 05.7	+59.9	6.9	63 05.2	+59.9	7.2	**71**
72	57 07.7	+59.8	5.7	58 07.4	+59.8	5.8	59 07.1	+59.8	6.0	60 06.7	+59.9	6.2	61 06.4	+59.8	6.4	62 06.0	+59.9	6.6	63 05.6	+59.9	6.8	64 05.1	+59.9	7.1	**72**
73	58 07.5	+59.7	5.5	59 07.2	+59.8	5.7	60 06.9	+59.8	5.8	61 06.6	+59.8	6.0	62 06.2	+59.9	6.2	63 05.9	+59.8	6.4	64 05.5	+59.8	6.7	65 05.0	+59.9	6.9	**73**
74	59 07.2	+59.8	5.4	60 07.0	+59.8	5.5	61 06.7	+59.8	5.7	62 06.4	+59.8	5.9	63 06.1	+59.8	6.1	64 05.7	+59.9	6.3	65 05.3	+59.9	6.5	66 04.9	+59.9	6.8	**74**
75	60 07.0	+59.8	5.2	61 06.8	+59.7	5.3	62 06.5	+59.8	5.5	63 06.2	+59.8	5.7	64 05.9	+59.8	5.9	65 05.6	+59.8	6.1	66 05.2	+59.9	6.4	67 04.8	+59.9	6.6	**75**
76	61 06.8	+59.7	5.0	62 06.5	+59.8	5.2	63 06.3	+59.7	5.3	64 06.0	+59.8	5.5	65 05.7	+59.8	5.7	66 05.4	+59.8	5.9	67 05.1	+59.8	6.2	68 04.7	+59.9	6.5	**76**
77	62 06.5	+59.7	4.8	63 06.3	+59.7	5.0	64 06.0	+59.8	5.1	65 05.8	+59.8	5.3	66 05.5	+59.8	5.5	67 05.2	+59.8	5.8	68 04.9	+59.8	6.0	69 04.6	+59.8	6.3	**77**
78	63 06.2	+59.7	4.6	64 06.0	+59.7	4.7	65 05.8	+59.7	4.9	66 05.6	+59.7	5.1	67 05.3	+59.8	5.3	68 05.0	+59.8	5.6	69 04.7	+59.9	5.8	70 04.4	+59.9	6.1	**78**
79	64 05.9	+59.7	4.4	65 05.7	+59.7	4.5	66 05.5	+59.7	4.7	67 05.3	+59.7	4.9	68 05.1	+59.7	5.1	69 04.8	+59.8	5.3	70 04.6	+59.8	5.6	71 04.3	+59.8	5.9	**79**
80	65 05.6	+59.6	4.1	66 05.4	+59.7	4.3	67 05.2	+59.7	4.4	68 05.0	+59.7	4.6	69 04.8	+59.8	4.8	70 04.6	+59.8	5.1	71 04.4	+59.7	5.3	72 04.1	+59.8	5.6	**80**
81	66 05.2	+59.6	3.8	67 05.1	+59.6	4.0	68 04.9	+59.7	4.2	69 04.7	+59.7	4.4	70 04.6	+59.7	4.6	71 04.4	+59.7	4.8	72 04.1	+59.8	5.1	73 03.9	+59.8	5.4	**81**
82	67 04.8	+59.6	3.6	68 04.7	+59.6	3.7	69 04.6	+59.6	3.9	70 04.4	+59.7	4.1	71 04.3	+59.6	4.3	72 04.1	+59.7	4.5	73 03.9	+59.7	4.8	74 03.7	+59.7	5.0	**82**
83	68 04.4	+59.5	3.2	69 04.3	+59.6	3.4	70 04.2	+59.6	3.6	71 04.1	+59.6	3.7	72 03.9	+59.7	3.9	73 03.8	+59.6	4.2	74 03.6	+59.7	4.4	75 03.4	+59.7	4.7	**83**
84	69 03.9	+59.5	2.9	70 03.9	+59.5	3.1	71 03.8	+59.5	3.2	72 03.7	+59.5	3.4	73 03.6	+59.6	3.6	74 03.4	+59.7	3.8	75 03.3	+59.6	4.0	76 03.1	+59.7	4.3	**84**
85	70 03.4	+59.5	2.5	71 03.4	+59.5	2.7	72 03.3	+59.5	2.8	73 03.2	+59.6	3.0	74 03.2	+59.5	3.2	75 03.1	+59.5	3.4	76 02.9	+59.6	3.6	77 02.8	+59.6	3.9	**85**
86	71 02.9	+59.4	2.1	72 02.9	+59.4	2.3	73 02.8	+59.4	2.4	74 02.8	+59.4	2.5	75 02.7	+59.5	2.7	76 02.6	+59.5	2.9	77 02.5	+59.6	3.1	78 02.4	+59.6	3.4	**86**
87	72 02.3	+59.3	1.7	73 02.3	+59.3	1.8	74 02.2	+59.4	1.9	75 02.2	+59.4	2.0	76 02.2	+59.3	2.2	77 02.1	+59.4	2.3	78 02.1	+59.4	2.5	79 02.0	+59.5	2.7	**87**
88	73 01.6	+59.3	1.2	74 01.6	+59.3	1.3	75 01.6	+59.2	1.3	76 01.6	+59.2	1.4	77 01.5	+59.3	1.5	78 01.5	+59.3	1.7	79 01.5	+59.3	1.8	80 01.5	+59.3	2.0	**88**
89	74 00.9	+59.1	0.6	75 00.9	+59.1	0.7	76 00.8	+59.2	0.7	77 00.8	+59.2	0.8	78 00.8	+59.2	0.8	79 00.8	+59.2	0.9	80 00.8	+59.2	1.0	81 00.8	+59.2	1.1	**89**
90	75 00.0	+59.0	0.0	76 00.0	+59.0	0.0	77 00.0	+59.0	0.0	78 00.0	+59.0	0.0	79 00.0	+59.0	0.0	80 00.0	+59.0	0.0	81 00.0	+59.0	0.0	82 00.0	+59.0	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 170°, 190°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 43.1	+59.9	168.6	13 44.3	+59.9	168.7	12 45.4	+60.0	168.7	11 46.6	+59.9	168.8	10 47.7	+60.0	168.8	9 48.9	+59.9	168.8	8 50.0	+60.0	168.9	7 51.1	+60.0	168.9	0
1	15 43.0	+59.9	168.6	14 44.2	+59.9	168.6	13 45.4	+59.9	168.7	12 46.5	+60.0	168.7	11 47.7	+59.9	168.8	10 48.8	+60.0	168.8	9 50.0	+59.9	168.8	8 51.1	+60.0	168.9	1
2	16 42.9	+59.9	168.5	15 44.1	+60.0	168.6	14 45.3	+59.9	168.6	13 46.5	+59.9	168.7	12 47.6	+60.0	168.7	11 48.8	+60.0	168.8	10 49.9	+60.0	168.8	9 51.1	+60.0	168.8	2
3	17 42.8	+60.0	168.5	16 44.1	+59.9	168.5	15 45.2	+60.0	168.6	14 46.4	+60.0	168.6	13 47.6	+60.0	168.7	12 48.8	+59.9	168.7	11 49.9	+60.0	168.8	10 51.1	+59.9	168.8	3
4	18 42.8	+59.9	168.4	17 44.0	+59.9	168.5	16 45.2	+59.9	168.5	15 46.4	+59.9	168.6	14 47.6	+59.9	168.6	13 48.7	+60.0	168.7	12 49.9	+60.0	168.7	11 51.0	+60.0	168.8	4
5	19 42.7	+59.9	168.4	18 43.9	+59.9	168.4	17 45.1	+60.0	168.5	16 46.3	+60.0	168.5	15 47.5	+60.0	168.6	14 48.7	+60.0	168.7	13 49.9	+59.9	168.7	12 51.0	+60.0	168.8	5
6	20 42.6	+59.9	168.3	19 43.8	+60.0	168.4	18 45.1	+59.9	168.4	17 46.3	+59.9	168.5	16 47.5	+59.9	168.6	15 48.7	+59.9	168.6	14 49.8	+60.0	168.7	13 51.0	+60.0	168.7	6
7	21 42.5	+59.9	168.2	20 43.8	+59.9	168.3	19 45.0	+59.9	168.4	18 46.2	+60.0	168.5	17 47.4	+60.0	168.5	16 48.6	+60.0	168.6	15 49.8	+60.0	168.6	14 51.0	+59.9	168.7	7
8	22 42.4	+59.9	168.2	21 43.7	+59.9	168.3	20 44.9	+60.0	168.3	19 46.2	+59.9	168.4	18 47.4	+59.9	168.5	17 48.6	+59.9	168.6	16 49.8	+59.9	168.6	15 50.9	+60.0	168.7	8
9	23 42.3	+60.0	168.1	22 43.6	+59.9	168.2	21 44.9	+59.9	168.3	20 46.1	+60.0	168.4	19 47.3	+60.0	168.4	18 48.5	+60.0	168.5	17 49.7	+60.0	168.6	16 50.9	+60.0	168.6	9
10	24 42.3	+59.9	168.1	23 43.5	+60.0	168.2	22 44.8	+59.9	168.2	21 46.1	+59.9	168.3	20 47.3	+60.0	168.4	19 48.5	+60.0	168.5	18 49.7	+60.0	168.5	17 50.9	+60.0	168.6	10
11	25 42.2	+59.9	168.0	24 43.5	+59.9	168.1	23 44.7	+60.0	168.2	22 46.0	+60.0	168.3	21 47.3	+59.9	168.4	20 48.5	+59.9	168.4	19 49.7	+60.0	168.5	18 50.9	+60.0	168.6	11
12	26 42.1	+59.9	167.9	25 43.4	+59.9	168.0	24 44.7	+59.9	168.1	23 46.0	+59.9	168.2	22 47.2	+60.0	168.3	21 48.4	+60.0	168.4	20 49.7	+59.9	168.5	19 50.9	+59.9	168.6	12
13	27 42.0	+59.9	167.9	26 43.3	+59.9	168.0	25 44.6	+59.9	168.1	24 45.9	+59.9	168.2	23 47.2	+59.9	168.3	22 48.4	+60.0	168.4	21 49.6	+60.0	168.4	20 50.8	+60.0	168.5	13
14	28 41.9	+59.9	167.8	27 43.2	+59.9	167.9	26 44.5	+60.0	168.0	25 45.8	+60.0	168.1	24 47.1	+60.0	168.2	23 48.4	+59.9	168.3	22 49.6	+60.0	168.4	21 50.8	+60.0	168.5	14
15	29 41.8	+59.9	167.8	28 43.1	+60.0	167.9	27 44.5	+59.9	168.0	26 45.8	+59.9	168.1	25 47.1	+59.9	168.2	24 48.3	+60.0	168.3	23 49.6	+59.9	168.4	22 50.8	+60.0	168.5	15
16	30 41.7	+59.9	167.7	29 43.1	+59.9	167.8	28 44.4	+59.9	167.9	27 45.7	+60.0	168.0	26 47.0	+60.0	168.1	25 48.3	+59.9	168.2	24 49.5	+60.0	168.3	23 50.8	+59.9	168.4	16
17	31 41.6	+59.9	167.6	30 43.0	+59.9	167.7	29 44.3	+60.0	167.9	28 45.7	+59.9	168.0	27 47.0	+59.9	168.1	26 48.2	+60.0	168.2	25 49.5	+60.0	168.3	24 50.7	+60.0	168.4	17
18	32 41.5	+59.9	167.5	31 42.9	+59.9	167.7	30 44.3	+59.9	167.8	29 45.6	+59.9	167.9	28 46.9	+60.0	168.1	27 48.2	+60.0	168.2	26 49.5	+59.9	168.3	25 50.7	+60.0	168.4	18
19	33 41.4	+59.9	167.5	32 42.8	+59.9	167.6	31 44.2	+59.9	167.8	30 45.5	+60.0	167.9	29 46.9	+59.9	168.0	28 48.2	+59.9	168.1	27 49.4	+60.0	168.2	26 50.7	+60.0	168.3	19
20	34 41.3	+59.9	167.4	33 42.7	+59.9	167.6	32 44.1	+59.9	167.7	31 45.5	+59.9	167.8	30 46.8	+59.9	168.0	29 48.1	+60.0	168.1	28 49.4	+60.0	168.2	27 50.7	+59.9	168.3	20
21	35 41.2	+59.9	167.3	34 42.6	+59.9	167.5	33 44.0	+59.9	167.6	32 45.4	+59.9	167.8	31 46.7	+60.0	167.9	30 48.1	+59.9	168.0	29 49.4	+59.9	168.2	28 50.6	+60.0	168.3	21
22	36 41.1	+59.8	167.3	35 42.5	+59.9	167.4	34 43.9	+60.0	167.6	33 45.3	+60.0	167.7	32 46.7	+59.9	167.9	31 48.0	+60.0	168.0	30 49.3	+60.0	168.1	29 50.6	+60.0	168.2	22
23	37 40.9	+59.9	167.2	36 42.4	+59.9	167.3	35 43.9	+59.9	167.5	34 45.3	+59.9	167.7	33 46.6	+60.0	167.8	32 48.0	+59.9	167.9	31 49.3	+59.9	168.1	30 50.6	+59.9	168.2	23
24	38 40.8	+59.9	167.1	37 42.3	+59.9	167.3	36 43.8	+59.9	167.4	35 45.2	+59.9	167.6	34 46.6	+59.9	167.7	33 47.9	+60.0	167.9	32 49.2	+60.0	168.0	31 50.5	+60.0	168.2	24
25	39 40.7	+59.9	167.0	38 42.2	+59.9	167.2	37 43.7	+59.9	167.4	36 45.1	+59.9	167.5	35 46.5	+60.0	167.7	34 47.9	+59.9	167.8	33 49.2	+60.0	168.0	32 50.5	+60.0	168.1	25
26	40 40.6	+59.9	166.9	39 42.1	+59.9	167.1	38 43.6	+59.9	167.3	37 45.0	+60.0	167.5	36 46.5	+59.9	167.6	35 47.8	+60.0	167.8	34 49.2	+59.9	167.9	33 50.5	+59.9	168.1	26
27	41 40.5	+59.8	166.8	40 42.0	+59.9	167.0	39 43.5	+59.9	167.2	38 45.0	+59.9	167.4	37 46.4	+59.9	167.6	36 47.8	+59.9	167.7	35 49.1	+60.0	167.9	34 50.4	+60.0	168.0	27
28	42 40.3	+59.9	166.8	41 41.9	+59.9	167.0	40 43.4	+59.9	167.2	39 44.9	+59.9	167.3	38 46.3	+60.0	167.5	37 47.7	+60.0	167.7	36 49.1	+59.9	167.9	35 50.4	+60.0	168.0	28
29	43 40.2	+59.8	166.7	42 41.8	+59.9	166.9	41 43.3	+59.9	167.1	40 44.8	+59.9	167.3	39 46.3	+59.9	167.5	38 47.7	+59.9	167.6	37 49.0	+60.0	167.8	36 50.4	+59.9	168.0	29
30	44 40.0	+59.9	166.6	43 41.7	+59.8	166.8	42 43.2	+59.9	167.0	41 44.7	+59.9	167.2	40 46.2	+59.9	167.4	39 47.6	+60.0	167.6	38 49.0	+60.0	167.8	37 50.3	+60.0	167.9	30
31	45 39.9	+59.8	166.5	44 41.5	+59.9	166.7	43 43.1	+59.9	166.9	42 44.6	+60.0	167.1	41 46.1	+60.0	167.3	40 47.6	+59.9	167.5	39 49.0	+59.9	167.7	38 50.3	+60.0	167.9	31
32	46 39.7	+59.9	166.4	45 41.4	+59.9	166.6	44 43.0	+59.9	166.8	43 44.6	+59.9	167.1	42 46.1	+59.9	167.3	41 47.5	+59.9	167.5	40 48.9	+60.0	167.7	39 50.3	+59.9	167.8	32
33	47 39.6	+59.8	166.3	46 41.3	+59.8	166.5	45 42.9	+59.9	166.8	44 44.5	+59.9	167.0	43 46.0	+59.9	167.2	42 47.4	+60.0	167.4	41 48.9	+59.9	167.6	40 50.2	+60.0	167.8	33
34	48 39.4	+59.8	166.1	47 41.1	+59.9	166.4	46 42.8	+59.9	166.7	45 44.4	+59.9	166.9	44 45.9	+59.9	167.1	43 47.4	+59.9	167.3	42 48.8	+60.0	167.5	41 50.2	+60.0	167.7	34
35	49 39.2	+59.9	166.0	48 41.0	+59.8	166.3	47 42.7	+59.8	166.6	46 44.3	+59.9	166.8	45 45.8	+59.9	167.1	44 47.3	+60.0	167.3	43 48.8	+59.9	167.5	42 50.2	+59.9	167.7	35
36	50 39.1	+59.8	165.9	49 40.8	+59.9	166.2	48 42.5	+59.9	166.5	47 44.2	+59.9	166.7	46 45.7	+59.9	167.0	45 47.3	+59.9	167.2	44 48.7	+60.0	167.4	43 50.1	+60.0	167.6	36
37	51 38.9	+59.8	165.8	50 40.7	+59.8	166.1	49 42.4	+59.9	166.4	48 44.1	+59.8	166.6	47 45.6	+60.0	166.9	46 47.2	+59.9	167.1	45 48.7	+59.9	167.4	44 50.1	+59.9	167.6	37
38	52 38.7	+59.8	165.7	51 40.5	+59.8	166.0	50 42.3	+59.8	166.3	49 43.9	+59.9	166.5	48 45.6	+59.9	166.8	47 47.1	+59.9	167.1	46 48.6	+59.9	167.3	45 50.0	+60.0	167.5	38
39	53 38.5	+59.8	165.5	52 40.3	+59.9	165.8	51 42.1	+59.9	166.2	50 43.8	+59.9	166.5	49 45.5	+59.9	166.7	48 47.0	+60.0	167.0	47 48.5	+60.0	167.2	46 50.0	+60.0	167.5	39
40	54 38.3	+59.7	165.4	53 40.2	+59.8	165.7	52 42.0	+59.8	166.0	51 43.7	+59.9	166.4	50 45.4	+59.9	166.6	49 47.0	+59.9	166.9	48 48.5	+59.9	167.2	47 50.0	+59.9	167.4	40
41	55 38.0	+59.8	165.2	54 40.0	+59.8	165.6	53 41.8	+59.9	165.9	52 43.6	+59.9	166.2	51 45.3	+59.9	166.5	50 46.9	+59.9	166.8	49 48.4	+60.0	167.1	48 49.9	+60.0	167.4	41
42	56 37.8	+59.8	165.1	55 39.8	+59.8	165.4	54 41.7	+59.8	165.8	53 43.5	+59.8	166.1	52 45.2	+59.8	166.5	51 46.8	+59.9	166.8	50 48.4	+59.9	167.0	49 49.9	+59.9	167.3	42
43	57 37.6	+59.7	164.9	56 39.6	+59.8	165.3	55 41.5	+59.8	165.7	54 43.3	+59.9	166.0	53 45.0	+59.9	166.3	52 46.7	+59.9	166.7	51 48.3	+59.9	167.0	50 49.8	+59.9	167.2	43
44	58 37.3	+59.7	164.7	57 39.4	+59.7	165.1	56 41.3	+59.8	165.5	55 43.2	+59.8	165.9	54 44.9	+59.9	166.2	53 46.6	+59.9	166.6	52 48.2	+59.9	166.9	51 49.7	+60.0	167.2	44
45	59 37.0	+59.7	164.5	58 39.1	+59.8	165.0	57 41.1	+59.8	165.4	56 43.0	+59.9	165.8	55 44.8	+59.9	166.1	54 46.5	+59.9	166.5	53 48.1	+60.0	166.8	52 49.7	+59.9	167.1	45
46	60 36.7	+59.7	164.3	59 38.9	+59.7	164.8	58 40.9	+59.8	165.2	57 42.9	+59.8	165.6	56 44.7	+59.8	166.0	55 46.4	+59.9	166.4	54 48.1	+59.9	166.7	53 49.6	+60.0	167.0	46
47	61 36.4	+59.7	164.1	60 38.6	+59.7	164.6	59 40.7	+59.8	165.1	58 42.7	+59.8	165.5	57 44.5	+59.9	165.9	56 46.3	+59.9	166.3	55 48.0	+59.9	166.6	54 49.6	+59.9	166.9	47
48	62 36.1	+59.6	163.9	61 38.3	+59.8	164.4	60 40.5	+59.8	164.9	59 42.5	+59.8	165.3	58 44.4	+59.8	165.8	57 46.2	+59.9	166.1	56 47.9	+59.9	166.5	55 49.5	+59.9	166.9	48
49	63 35.7	+59.6	163.7	62 38.1	+59.6	164.2	61 40.3	+59.7	164.7	60 42.3	+59.8	165.2	59 44.2	+59.9	165.6	58 46.1	+59.8	166.0	57 47.8	+59.9	166.4	56 49.4	+60.0	166.8	49
50	64 35.3	+59.6	163.4	63 37.7	+59.7	164.0	62 40.0	+59.7	164.5	61 42.1	+59.8	165.0	60 44.1	+59.8	165.5	59 45.9	+59.9	165.9	58 47.7	+59.9	166.3	57 49.4	+59.9	166.7	50
51	65 34.9	+59.6	163.1	64 37.4	+59.6	163.7	63 39.7	+59.7	164.3	62 41.9	+59.8	164.8	61 43.9	+59.8	165.3	60 45.8	+59.9	165.8	59 47.6	+59.9	166.2	58 49.3	+59.9	166.6	51
52	66 34.5	+59.5	162.8	65 37.0	+59.7	163.5	64 39.4	+59.7	164.1	63 41.7	+59.7	164.6	62 43.7	+59.8	165.1	61 45.7	+59.8	165.6	60 47.5	+59.9	166.1	59 49.2	+59.9	166.5	52
53	67 34.0	+59.5	162.5	66 36.7	+59.5	163.2	65 39.1	+59.7	163.8	64 41.4	+59.7	164.4	63 43.5	+59.8	165.0	62 45.5	+59.9	165.5	61 47.4	+59.9	165.9	60 49.1	+59.9	166.4	53
54	68 33.5	+59.4	162.1	67 36.2	+59.6	162.9	66 38.8	+59.6	163.6	65 41.1	+59.7	164.2	64 43.3	+59.8	164.8	63 45.4	+59.8	165.3	62 47.3	+59.8	165.8	61 49.0	+59.9	166.3	54
55	69 32.9	+59.3	161.7	68 35.8	+59.5	162.5	67 38.4	+59.6	163.3	66 40.8	+59.7	164.0	65 43.1	+59.8	164.6	64 45.2	+59.8	165.1	63 47.1	+59.9	165.7	62 48.9	+59.9	166.1	55
56	70 32.2	+59.4	161.3	69 35.3	+59.4	162.2	68 38.0	+59.6	163.0	67 40.5	+59.7	163.7	66 42.9	+59.7	164.3	65 45.0	+59.8	164.9	64 47.0	+59.8	165.5	63 48.8	+59.9	166.0	56
57	71 31.6	+59.2	160.9	70 34.7	+59.4	161.8	69 37.6	+59.5	162.6	68 40.2	+59.6	163.4	67 42.6	+59.7	164.1	66 44.8	+59.8	164.7	65 46.8	+59.9	165.3	64 48.7	+59.9	165.9	57
58	72 30.8	+59.1	160.3	71 34.1	+59.3	161.3	70 37.1	+59.5	162.3	69 39.8	+59.6	163.1	68 42.3	+59.7	163.8	67 44.6	+59.7	164.5	66 46.7	+59.8	165.1	65 48.6	+59.9	165.7	58
59	73 29.9	+59.0	159.8	72 33.4	+59.3	160.9	71 36.6	+59.4	161.9	70 39.4	+59.6	162.7	69 42.0	+59.6	163.5	68 44.3	+59.8	164.3	67 46.5	+59.8	164.9	66 48.5	+59.8	165.5	59
60	74 28.9	+58.9	159.1	73 32.7	+59.1	160.3	72 36.0	+59.3	161.4	71 39.0	+59.4	162.4	70 41.6	+59.6	163.2	69 44.1	+59.7	164.0	68 46.3	+59.8	164.7	67 48.3	+59.9	165.4	60
61	75 27.8	+58.8	158.4	74 31.8	+59.0	159.7	73 35.3	+59.3	160.9	72 38.4	+59.5	161.9	71 41.2	+59.6	162.9	70 43.8	+59.7	163.7	69 46.1	+59.7	164.5	68 48.2	+59.8	165.2	61
62	76 26.6	+58.5	157.5	75 30.8	+58.9	159.0	74 34.6	+59.1	160.3	73 37.9	+59.3	161.5	72 40.8	+59.5	162.5	71 43.5	+59.6	163.4	70 45.8	+59.8	164.2	69 48.0	+59.8	165.0	62
63	77 25.1	+58.3	156.6	76 29.7	+58.8	158.2	75 33.7	+59.1	159.7	74 37.2	+59.3	160.9	73 40.3	+59.5	162.1	72 43.1	+59.6	163.0	71 45.6	+59.7	163.9	70 47.8	+59.8	164.7	63
64	78 23.4	+58.0	155.4	77 28.5	+58.5	157.3	76 32.8	+58.9	158.9	75 36.5	+59.2	160.3	74 39.8	+59.4	161.6	73 42.7	+59.6	162.6	72 45.3	+59.7	163.6	71 47.6	+59.8	164.5	64
65	79 21.4	+57.6	154.1	78 27.0	+58.2	156.3	77 31.7	+58.7	158.1	76 35.7	+59.0	159.6	75 39.2	+59.3	161.0	74 42.3	+59.5	162.2	73 45.0	+59.6	163.3	72 47.4	+59.7	164.2	65
66	80 19.0	+57.1	152.5	79 25.2	+57.9	155.0	78 30.4	+58.4	157.1	77 34.7	+58.9	158.8	76 38.5	+59.2	160.4	75 41.8	+59.4	161.7	74 44.6	+59.6	162.8	73 47.1	+59.7	163.9	66
67	81 16.1	+56.3	150.6	80 23.1	+57.4	153.5	79 28.8	+58.2	155.9	78 33.6	+58.7	157.9	77 37.7	+59.0	159.6	76 41.2	+59.3	161.1	75 44.2	+59.5	162.4	74 46.8	+59.7	163.5	67
68	82 12.4	+55.3	148.2	81 20.5	+56.7	151.7	80 27.0	+57.7	154.5	79 32.3	+58.4	156.8	78 36.7	+58.9	158.8	77 40.5	+59.2	160.4	76 43.7	+59.5	161.9	75 46.5	+59.6	163.1	68
69	83 07.7	+53.8	145.1	82 17.2	+55.9	149.4	81 24.7	+57.1	152.7	80 30.7	+58.0	155.5	79 35.6	+58.7	157.8	78 39.7	+59.1	159.6	77 43.2	+59.3	161.2	76 46.1	+59.6	162.6	69
70	84 01.5	*+51.5*	•141.2	83 13.1	+54.4	146.5	82 21.8	+56.4	150.6	81 28.7	+57.6	153.9	80 34.3	+58.3	156.5	79 38.8	+58.8	158.7	78 42.5	+59.2	160.5	77 45.7	+59.5	162.1	70
71	84 53.0	*+47.9*	•135.8	84 07.5	*+52.3*	•142.6	83 18.2	+55.1	147.8	82 26.3	+56.8	151.8	81 32.6	+57.9	155.0	80 37.6	+58.6	157.6	79 41.7	+59.1	159.7	78 45.2	+59.4	161.4	71
72	85 40.9	*+41.7*	•128.5	84 59.8	*+48.9*	•137.5	84 13.3	*+53.1*	•144.2	83 23.1	+55.7	149.2	82 30.5	+57.2	153.1	81 36.2	+58.3	156.2	80 40.8	+58.9	158.6	79 44.6	+59.2	160.7	72
73	86 22.6	*+31.4*	•118.0	85 48.7	*+43.0*	•130.2	85 06.4	*+50.0*	•139.2	84 18.8	*+54.0*	•145.7	83 27.7	+56.3	150.7	82 34.5	+57.7	154.4	81 39.7	+58.5	157.4	80 43.8	+59.1	159.7	73
74	86 54.0	*+15.4*	•103.4	86 31.7	*+32.8*	•119.7	85 56.4	*+44.4*	•132.0	85 12.8	*+51.0*	•140.9	84 24.0	*+54.8*	•147.4	83 32.2	+56.8	152.1	82 38.2	+58.1	155.8	81 42.9	+58.8	158.6	74
75	87 09.4	*−4.9*	•84.7	87 04.5	*+16.1*	•104.6	86 40.8	*+34.2*	•121.5	86 03.8	*+45.8*	•134.0	85 18.8	*+52.2*	•142.8	84 29.0	+55.6	149.1	83 36.3	+57.4	153.7	82 41.7	+58.5	157.1	75
76	87 04.5	*−23.7*	•64.8	87 20.6	*−5.6*	•84.7	87 15.0	*+16.7*	•105.9	86 49.6	*+35.8*	•123.5	86 11.0	*+47.2*	•136.1	85 24.6	*+53.2*	•144.8	84 33.7	+56.3	150.9	83 40.2	+57.9	155.2	76
77	86 40.8	*−37.0*	•47.8	87 15.0	*−25.4*	•63.4	87 31.7	*−6.3*	•84.6	87 25.4	*+17.6*	•107.3	86 58.2	*+37.5*	•125.7	86 17.8	*+48.8*	•138.4	85 30.0	*+54.3*	•146.8	84 38.1	+57.0	152.7	77
78	86 03.8	*−45.0*	•35.3	86 49.6	*−38.6*	•45.8	87 25.4	*−27.2*	•61.9	87 43.0	*−7.3*	•84.6	87 35.7	*+18.6*	•109.1	87 06.6	*+39.3*	•128.1	86 24.3	*+50.3*	•140.8	85 35.1	*+55.3*	•149.0	78
79	85 18.8	*−49.8*	•26.5	86 11.0	*−46.4*	•33.2	86 58.2	*−40.4*	•43.5	87 35.7	*−29.1*	•60.2	87 54.3	*−8.4*	•84.6	87 45.9	*+19.7*	•111.0	87 14.6	*+41.3*	•130.8	86 30.4	*+51.8*	•143.3	79
80	84 29.0	*−52.7*	•20.2	85 24.6	*−50.9*	•24.5	86 17.8	*−47.8*	•30.9	87 06.6	*−42.3*	•41.1	87 45.9	*−31.3*	•58.1	88 05.6	*−9.7*	•84.6	87 55.9	*+21.0*	•113.3	87 22.2	*+43.5*	•133.8	80
81	83 36.3	−54.6	15.5	84 33.7	*−53.5*	•18.4	85 30.0	*−51.9*	•22.4	86 24.3	*−49.2*	•28.4	87 14.6	*−44.2*	•38.4	87 55.9	*−33.7*	•55.8	88 16.9	*−11.2*	•84.6	88 05.7	*+22.6*	•116.1	81
82	82 41.7	−55.8	12.1	83 40.2	−55.2	13.9	84 38.1	−54.3	16.5	85 35.1	*−52.9*	•20.2	86 30.4	*−50.6*	•25.8	87 22.2	*−46.1*	•35.4	88 05.7	*−36.3*	•53.0	88 28.3	*−13.0*	•84.6	82
83	81 45.9	−56.7	9.3	82 45.0	−56.3	10.6	83 43.8	−55.8	12.3	84 42.2	−55.1	14.6	85 39.8	*−53.9*	•17.9	86 36.1	*−52.0*	•23.1	87 29.4	*−48.2*	•32.1	88 15.3	*−39.2*	•49.8	83
84	80 49.2	−57.4	7.2	81 48.7	−57.1	8.0	82 48.0	−56.8	9.2	83 47.1	−56.4	10.6	84 45.9	−55.8	12.6	85 44.1	*−54.9*	•15.6	86 41.2	*−53.2*	•20.2	87 36.1	*−50.2*	•28.5	84
85	79 51.8	−57.7	5.4	80 51.6	−57.7	6.0	81 51.2	−57.5	6.7	82 50.7	−57.2	7.7	83 50.1	−56.9	8.9	84 49.2	−56.4	10.6	85 48.0	−55.8	13.1	86 45.9	*−54.5*	•17.1	85
86	78 54.1	−58.2	4.0	79 53.9	−58.1	4.4	80 53.7	−58.0	4.8	81 53.5	−57.9	5.4	82 53.2	−57.7	6.2	83 52.8	−57.5	7.2	84 52.2	−57.1	8.6	85 51.4	−56.6	10.6	86
87	77 55.9	−58.4	2.7	78 55.8	−58.4	3.0	79 55.7	−58.3	3.3	80 55.6	−58.2	3.6	81 55.5	−58.2	4.1	82 55.3	−58.0	4.6	83 55.1	−57.9	5.4	84 54.8	−57.7	6.5	87
88	76 57.5	−58.7	1.7	77 57.4	−58.6	1.8	78 57.4	−58.6	2.0	79 57.4	−58.6	2.2	80 57.3	−58.5	2.4	81 57.3	−58.5	2.7	82 57.2	−58.4	3.1	83 57.1	−58.4	3.6	88
89	75 58.8	−58.8	0.8	76 58.8	−58.8	0.8	77 58.8	−58.8	0.9	78 58.8	−58.8	1.0	79 58.8	−58.8	1.1	80 58.8	−58.8	1.2	81 58.8	−58.8	1.4	82 58.7	−58.7	1.6	89
90	75 00.0	−59.0	0.0	76 00.0	−59.0	0.0	77 00.0	−59.0	0.0	78 00.0	−59.0	0.0	79 00.0	−59.0	0.0	80 00.0	−59.0	0.0	81 00.0	−59.0	0.0	82 00.0	−59.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 11°, 349°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec. °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	**Dec.** °
0	14 43.1	–59.9	168.6	13 44.3	–60.0	168.7	12 45.4	–59.9	168.7	11 46.6	–60.0	168.8	10 47.7	–59.9	168.8	9 48.9	–60.0	168.8	8 50.0	–60.0	168.9	7 51.1	–60.0	168.9	**0**
1	13 43.2	–60.0	168.7	12 44.3	–59.9	168.7	11 45.5	–60.0	168.8	10 46.6	–59.9	168.8	9 47.8	–60.0	168.8	8 48.9	–60.0	168.9	7 50.0	–59.9	168.9	6 51.1	–59.9	168.9	**1**
2	12 43.2	–59.9	168.7	11 44.4	–59.9	168.8	10 45.5	–59.9	168.8	9 46.7	–60.0	168.8	8 47.8	–60.0	168.9	7 48.9	–59.9	168.9	6 50.1	–60.0	168.9	5 51.2	–60.0	168.9	**2**
3	11 43.3	–59.9	168.8	10 44.5	–60.0	168.8	9 45.6	–59.9	168.9	8 46.7	–59.9	168.9	7 47.8	–59.9	168.9	6 49.0	–60.0	168.9	5 50.1	–60.0	169.0	4 51.2	–60.0	169.0	**3**
4	10 43.4	–59.9	168.8	9 44.5	–59.9	168.9	8 45.7	–60.0	168.9	7 46.8	–60.0	168.9	6 47.9	–60.0	168.9	5 49.0	–60.0	169.0	4 50.1	–60.0	169.0	3 51.2	–60.0	169.0	**4**
5	9 43.5	–60.0	168.9	8 44.6	–59.9	168.9	7 45.7	–59.9	168.9	6 46.8	–59.9	169.0	5 47.9	–59.9	169.0	4 49.0	–59.9	169.0	3 50.1	–59.9	169.0	2 51.2	–59.9	169.0	**5**
6	8 43.5	–59.9	168.9	7 44.7	–60.0	169.0	6 45.8	–60.0	169.0	5 46.9	–60.0	169.0	4 48.0	–60.0	169.0	3 49.1	–60.0	169.0	2 50.2	–60.0	169.0	1 51.3	–60.0	169.1	**6**
7	7 43.6	–59.9	169.0	6 44.7	–59.9	169.0	5 45.8	–59.9	169.0	4 46.9	–59.9	169.0	3 48.0	–59.9	169.1	2 49.1	–60.0	169.1	1 50.2	–60.0	169.1	0 51.3	–60.0	169.1	**7**
8	6 43.7	–59.9	169.0	5 44.8	–59.9	169.1	4 45.9	–60.0	169.1	3 47.0	–60.0	169.1	2 48.1	–60.0	169.1	1 49.1	–59.9	169.1	0 50.2	–60.0	169.1	0 08.7	+60.0	10.9	**8**
9	5 43.8	–60.0	169.1	4 44.9	–60.0	169.1	3 45.9	–59.9	169.1	2 47.0	–59.9	169.1	1 48.1	–60.0	169.1	0 49.2	–60.0	169.1	0 09.8	+59.9	10.9	1 08.7	+60.0	10.9	**9**
10	4 43.8	–59.9	169.1	3 44.9	–59.9	169.1	2 46.0	–60.0	169.2	1 47.1	–60.0	169.2	0 48.1	–59.9	169.2	0 10.8	+60.0	10.8	1 09.7	+60.0	10.8	2 08.7	+59.9	10.8	**10**
11	3 43.9	–59.9	169.2	2 45.0	–60.0	169.2	1 46.0	–59.9	169.2	0 47.1	–59.9	169.2	0 11.8	+60.0	10.8	1 10.8	+59.9	10.8	2 09.7	+60.0	10.8	3 08.6	+60.0	10.8	**11**
12	2 44.0	–59.9	169.2	1 45.0	–59.9	169.2	0 46.1	–59.9	169.2	0 12.8	+60.0	10.8	1 11.8	+60.0	10.8	2 10.7	+60.0	10.8	3 09.7	+60.0	10.8	4 08.6	+60.0	10.8	**12**
13	1 44.1	–60.0	169.3	0 45.1	–59.9	169.3	0 13.8	+60.0	10.7	1 12.8	+60.0	10.7	2 11.8	+59.9	10.7	3 10.7	+60.0	10.7	4 09.7	+59.9	10.7	5 08.6	+60.0	10.8	**13**
14	0 44.1	–59.9	169.3	0 14.8	+60.0	10.7	1 13.8	+59.9	10.7	2 12.8	+59.9	10.7	3 11.7	+60.0	10.7	4 10.7	+59.9	10.7	5 09.6	+60.0	10.7	6 08.6	+60.0	10.7	**14**
15	0 15.8	+59.9	10.6	1 14.8	+59.9	10.6	2 13.7	+60.0	10.6	3 12.7	+60.0	10.6	4 11.7	+59.9	10.6	5 10.6	+60.0	10.7	6 09.6	+60.0	10.7	7 08.6	+59.9	10.7	**15**
16	1 15.7	+59.9	10.6	2 14.7	+59.9	10.6	3 13.7	+59.9	10.6	4 12.7	+59.9	10.6	5 11.6	+60.0	10.6	6 10.6	+60.0	10.6	7 09.6	+59.9	10.7	8 08.5	+60.0	10.7	**16**
17	2 15.6	+60.0	10.5	3 14.6	+60.0	10.5	4 13.6	+60.0	10.5	5 12.6	+60.0	10.6	6 11.6	+60.0	10.6	7 10.6	+59.9	10.6	8 09.5	+60.0	10.6	9 08.5	+60.0	10.7	**17**
18	3 15.6	+59.9	10.5	4 14.6	+59.9	10.5	5 13.6	+59.9	10.5	6 12.6	+59.9	10.5	7 11.6	+59.9	10.5	8 10.5	+60.0	10.6	9 09.5	+60.0	10.6	10 08.5	+60.0	10.6	**18**
19	4 15.5	+59.9	10.4	5 14.5	+59.9	10.4	6 13.5	+60.0	10.5	7 12.5	+60.0	10.5	8 11.5	+60.0	10.5	9 10.5	+60.0	10.5	10 09.5	+60.0	10.6	11 08.5	+59.9	10.6	**19**
20	5 15.4	+59.9	10.4	6 14.4	+60.0	10.4	7 13.5	+59.9	10.4	8 12.5	+59.9	10.4	9 11.5	+59.9	10.5	10 10.5	+59.9	10.5	11 09.5	+59.9	10.5	12 08.4	+60.0	10.6	**20**
21	6 15.3	+60.0	10.3	7 14.4	+59.9	10.3	8 13.4	+59.9	10.4	9 12.4	+60.0	10.4	10 11.4	+60.0	10.4	11 10.4	+60.0	10.5	12 09.4	+60.0	10.5	13 08.4	+60.0	10.5	**21**
22	7 15.3	+59.9	10.3	8 14.3	+59.9	10.3	9 13.3	+60.0	10.3	10 12.4	+59.9	10.4	11 11.4	+59.9	10.4	12 10.4	+60.0	10.4	13 09.4	+60.0	10.5	14 08.4	+60.0	10.5	**22**
23	8 15.2	+59.9	10.2	9 14.2	+60.0	10.3	10 13.3	+59.9	10.3	11 12.3	+60.0	10.3	12 11.3	+60.0	10.4	13 10.4	+59.9	10.4	14 09.4	+59.9	10.4	15 08.4	+60.0	10.5	**23**
24	9 15.1	+60.0	10.2	10 14.2	+59.9	10.2	11 13.2	+60.0	10.2	12 12.3	+59.9	10.3	13 11.3	+60.0	10.3	14 10.3	+60.0	10.4	15 09.3	+60.0	10.4	16 08.4	+59.9	10.5	**24**
25	10 15.1	+59.9	10.1	11 14.1	+59.9	10.2	12 13.2	+59.9	10.2	13 12.2	+60.0	10.2	14 11.3	+59.9	10.3	15 10.3	+60.0	10.3	16 09.3	+60.0	10.4	17 08.3	+60.0	10.4	**25**
26	11 15.0	+59.9	10.1	12 14.0	+60.0	10.1	13 13.1	+60.0	10.1	14 12.2	+59.9	10.2	15 11.2	+60.0	10.2	16 10.3	+59.9	10.3	17 09.3	+60.0	10.3	18 08.3	+60.0	10.4	**26**
27	12 14.9	+59.9	10.0	13 14.0	+59.9	10.1	14 13.1	+59.9	10.1	15 12.1	+60.0	10.1	16 11.2	+59.9	10.2	17 10.2	+60.0	10.2	18 09.3	+59.9	10.3	19 08.3	+60.0	10.4	**27**
28	13 14.8	+59.9	10.0	14 13.9	+59.9	10.0	15 13.0	+59.9	10.1	16 12.1	+59.9	10.1	17 11.1	+60.0	10.2	18 10.2	+60.0	10.2	19 09.2	+60.0	10.3	20 08.3	+59.9	10.3	**28**
29	14 14.7	+60.0	9.9	15 13.8	+60.0	10.0	16 12.9	+60.0	10.0	17 12.0	+60.0	10.1	18 11.1	+59.9	10.1	19 10.2	+59.9	10.2	20 09.2	+60.0	10.2	21 08.2	+60.0	10.3	**29**
30	15 14.7	+59.9	9.9	16 13.8	+59.9	9.9	17 12.9	+59.9	10.0	18 12.0	+59.9	10.0	19 11.0	+60.0	10.1	20 10.1	+60.0	10.1	21 09.2	+59.9	10.2	22 08.2	+60.0	10.3	**30**
31	16 14.6	+59.9	9.8	17 13.7	+59.9	9.9	18 12.8	+60.0	9.9	19 11.9	+60.0	10.0	20 11.0	+60.0	10.0	21 10.1	+59.9	10.1	22 09.1	+60.0	10.2	23 08.2	+60.0	10.2	**31**
32	17 14.5	+59.9	9.8	18 13.6	+60.0	9.8	19 12.8	+59.9	9.9	20 11.9	+59.9	9.9	21 11.0	+59.9	10.0	22 10.0	+60.0	10.1	23 09.1	+60.0	10.1	24 08.2	+59.9	10.2	**32**
33	18 14.4	+59.9	9.7	19 13.6	+59.9	9.8	20 12.7	+59.9	9.8	21 11.8	+60.0	9.9	22 10.9	+60.0	10.0	23 10.0	+60.0	10.0	24 09.1	+59.9	10.1	25 08.1	+60.0	10.2	**33**
34	19 14.3	+60.0	9.6	20 13.5	+59.9	9.7	21 12.6	+60.0	9.8	22 11.8	+59.9	9.8	23 10.9	+59.9	9.9	24 10.0	+59.9	10.0	25 09.0	+60.0	10.1	26 08.1	+60.0	10.1	**34**
35	20 14.3	+59.9	9.6	21 13.4	+59.9	9.7	22 12.6	+59.9	9.7	23 11.7	+59.9	9.8	24 10.8	+60.0	9.9	25 09.9	+60.0	9.9	26 09.0	+60.0	10.0	27 08.1	+60.0	10.1	**35**
36	21 14.2	+59.9	9.5	22 13.3	+60.0	9.6	23 12.5	+59.9	9.7	24 11.6	+60.0	9.7	25 10.8	+59.9	9.8	26 09.9	+59.9	9.9	27 09.0	+59.9	10.0	28 08.1	+59.9	10.1	**36**
37	22 14.1	+59.9	9.5	23 13.3	+59.9	9.5	24 12.4	+60.0	9.6	25 11.6	+59.9	9.7	26 10.7	+60.0	9.8	27 09.8	+60.0	9.9	28 08.9	+60.0	10.0	29 08.0	+60.0	10.0	**37**
38	23 14.0	+59.9	9.4	24 13.2	+59.9	9.5	25 12.4	+59.9	9.6	26 11.5	+60.0	9.6	27 10.7	+59.9	9.7	28 09.8	+60.0	9.8	29 08.9	+60.0	9.9	30 08.0	+60.0	10.0	**38**
39	24 13.9	+59.9	9.4	25 13.1	+59.9	9.4	26 12.3	+59.9	9.5	27 11.5	+59.9	9.6	28 10.6	+60.0	9.7	29 09.8	+59.9	9.8	30 08.9	+59.9	9.9	31 08.0	+59.9	10.0	**39**
40	25 13.8	+59.9	9.3	26 13.0	+60.0	9.4	27 12.2	+60.0	9.5	28 11.4	+59.9	9.5	29 10.6	+59.9	9.6	30 09.7	+60.0	9.7	31 08.8	+60.0	9.8	32 07.9	+60.0	9.9	**40**
41	26 13.7	+59.9	9.2	27 13.0	+59.9	9.3	28 12.2	+59.9	9.4	29 11.3	+60.0	9.5	30 10.5	+60.0	9.6	31 09.7	+59.9	9.7	32 08.8	+60.0	9.8	33 07.9	+60.0	9.9	**41**
42	27 13.6	+60.0	9.2	28 12.9	+59.9	9.3	29 12.1	+59.9	9.3	30 11.3	+59.9	9.4	31 10.5	+59.9	9.5	32 09.6	+60.0	9.6	33 08.8	+59.9	9.8	34 07.9	+60.0	9.9	**42**
43	28 13.6	+59.9	9.1	29 12.8	+59.9	9.2	30 12.0	+59.9	9.3	31 11.2	+60.0	9.4	32 10.4	+59.9	9.5	33 09.6	+59.9	9.6	34 08.7	+60.0	9.7	35 07.9	+59.9	9.8	**43**
44	29 13.5	+59.9	9.0	30 12.7	+59.9	9.1	31 11.9	+60.0	9.2	32 11.2	+59.9	9.3	33 10.3	+60.0	9.4	34 09.5	+60.0	9.5	35 08.7	+59.9	9.7	36 07.8	+60.0	9.8	**44**
45	30 13.4	+59.9	9.0	31 12.6	+59.9	9.1	32 11.9	+59.9	9.2	33 11.1	+59.9	9.3	34 10.3	+59.9	9.4	35 09.5	+59.9	9.5	36 08.6	+60.0	9.6	37 07.8	+60.0	9.7	**45**
46	31 13.3	+59.9	8.9	32 12.5	+59.9	9.0	33 11.8	+59.9	9.1	34 11.0	+59.9	9.2	35 10.2	+60.0	9.3	36 09.4	+60.0	9.4	37 08.6	+60.0	9.6	38 07.8	+59.9	9.7	**46**
47	32 13.2	+59.9	8.8	33 12.4	+59.9	8.9	34 11.7	+59.9	9.1	35 10.9	+60.0	9.2	36 10.2	+59.9	9.3	37 09.4	+59.9	9.4	38 08.6	+59.9	9.5	39 07.7	+60.0	9.7	**47**
48	33 13.1	+59.9	8.8	34 12.3	+60.0	8.9	35 11.6	+59.9	9.0	36 10.9	+59.9	9.1	37 10.1	+59.9	9.2	38 09.3	+60.0	9.3	39 08.5	+60.0	9.5	40 07.7	+59.9	9.6	**48**
49	34 13.0	+59.8	8.7	35 12.3	+59.9	8.8	36 11.5	+59.9	8.9	37 10.8	+59.9	9.0	38 10.0	+60.0	9.2	39 09.3	+59.9	9.3	40 08.5	+59.9	9.4	41 07.6	+60.0	9.6	**49**
50	35 12.8	+59.9	8.6	36 12.2	+59.9	8.7	37 11.4	+60.0	8.9	38 10.7	+59.9	9.0	39 10.0	+59.9	9.1	40 09.2	+60.0	9.2	41 08.4	+60.0	9.4	42 07.6	+60.0	9.5	**50**
51	36 12.7	+59.9	8.6	37 12.1	+59.9	8.7	38 11.4	+59.9	8.8	39 10.6	+60.0	8.9	40 09.9	+59.9	9.0	41 09.2	+59.9	9.2	42 08.4	+59.9	9.3	43 07.6	+59.9	9.5	**51**
52	37 12.6	+59.9	8.5	38 12.0	+59.8	8.6	39 11.3	+59.9	8.7	40 10.6	+59.9	8.8	41 09.8	+60.0	9.0	42 09.1	+59.9	9.1	43 08.3	+60.0	9.3	44 07.5	+60.0	9.4	**52**
53	38 12.5	+59.9	8.4	39 11.8	+59.9	8.5	40 11.2	+59.9	8.6	41 10.5	+59.9	8.8	42 09.8	+59.9	8.9	43 09.0	+60.0	9.1	44 08.3	+59.9	9.2	45 07.5	+59.9	9.4	**53**
54	39 12.4	+59.9	8.3	40 11.7	+59.9	8.4	41 11.1	+59.9	8.6	42 10.4	+59.9	8.7	43 09.7	+59.9	8.8	44 09.0	+59.9	9.0	45 08.2	+60.0	9.1	46 07.4	+60.0	9.3	**54**
55	40 12.3	+59.8	8.2	41 11.6	+59.9	8.4	42 11.0	+59.9	8.5	43 10.3	+59.9	8.6	44 09.6	+59.9	8.8	45 08.9	+59.9	8.9	46 08.2	+59.9	9.1	47 07.4	+60.0	9.3	**55**
56	41 12.1	+59.9	8.2	42 11.5	+59.9	8.3	43 10.9	+59.9	8.4	44 10.2	+59.9	8.6	45 09.5	+60.0	8.7	46 08.8	+60.0	8.9	47 08.1	+60.0	9.0	48 07.4	+59.9	9.2	**56**
57	42 12.0	+59.9	8.1	43 11.4	+59.9	8.2	44 10.8	+59.9	8.3	45 10.1	+59.9	8.5	46 09.5	+59.9	8.6	47 08.8	+59.9	8.8	48 08.1	+59.9	9.0	49 07.3	+60.0	9.1	**57**
58	43 11.9	+59.8	8.0	44 11.3	+59.8	8.1	45 10.7	+59.9	8.2	46 10.0	+59.9	8.4	47 09.4	+59.9	8.6	48 08.7	+59.9	8.7	49 08.0	+59.9	8.9	50 07.3	+59.9	9.1	**58**
59	44 11.7	+59.9	7.9	45 11.1	+59.9	8.0	46 10.6	+59.8	8.2	47 09.9	+59.9	8.3	48 09.3	+59.9	8.5	49 08.6	+59.9	8.6	50 07.9	+60.0	8.8	51 07.2	+59.9	9.0	**59**
60	45 11.6	+59.8	7.8	46 11.0	+59.9	7.9	47 10.4	+59.9	8.1	48 09.8	+59.9	8.2	49 09.2	+59.9	8.4	50 08.5	+60.0	8.6	51 07.9	+59.9	8.7	52 07.1	+60.0	8.9	**60**
61	46 11.4	+59.9	7.7	47 10.9	+59.8	7.8	48 10.3	+59.9	8.0	49 09.7	+59.9	8.1	50 09.1	+59.9	8.3	51 08.5	+59.9	8.5	52 07.8	+59.9	8.7	53 07.1	+59.9	8.9	**61**
62	47 11.3	+59.8	7.6	48 10.7	+59.9	7.7	49 10.2	+59.9	7.9	50 09.6	+59.9	8.0	51 09.0	+59.9	8.2	52 08.4	+59.9	8.4	53 07.7	+59.9	8.6	54 07.0	+60.0	8.8	**62**
63	48 11.1	+59.8	7.5	49 10.6	+59.8	7.6	50 10.1	+59.8	7.8	51 09.5	+59.9	7.9	52 08.9	+59.9	8.1	53 08.3	+59.9	8.3	54 07.6	+60.0	8.5	55 07.0	+59.9	8.7	**63**
64	49 10.9	+59.9	7.4	50 10.4	+59.9	7.5	51 09.9	+59.9	7.7	52 09.4	+59.8	7.8	53 08.8	+59.9	8.0	54 08.2	+59.9	8.2	55 07.6	+59.9	8.4	56 06.9	+59.9	8.6	**64**
65	50 10.8	+59.8	7.2	51 10.3	+59.8	7.4	52 09.8	+59.8	7.6	53 09.2	+59.9	7.7	54 08.7	+59.9	7.9	55 08.1	+59.9	8.1	56 07.5	+59.9	8.3	57 06.8	+60.0	8.5	**65**
66	51 10.6	+59.8	7.1	52 10.1	+59.8	7.3	53 09.6	+59.9	7.4	54 09.1	+59.9	7.6	55 08.6	+59.8	7.8	56 08.0	+59.9	8.0	57 07.4	+59.9	8.2	58 06.8	+59.9	8.4	**66**
67	52 10.4	+59.8	7.0	53 09.9	+59.9	7.1	54 09.5	+59.8	7.3	55 09.0	+59.8	7.5	56 08.4	+59.9	7.7	57 07.9	+59.9	7.9	58 07.3	+59.9	8.1	59 06.7	+59.9	8.4	**67**
68	53 10.2	+59.8	6.8	54 09.8	+59.8	7.0	55 09.3	+59.8	7.2	56 08.8	+59.9	7.4	57 08.3	+59.9	7.6	58 07.8	+59.8	7.8	59 07.2	+59.9	8.0	60 06.6	+59.9	8.2	**68**
69	54 10.0	+59.8	6.7	55 09.6	+59.8	6.9	56 09.1	+59.8	7.1	57 08.7	+59.8	7.2	58 08.2	+59.8	7.4	59 07.6	+59.9	7.7	60 07.1	+59.9	7.9	61 06.5	+59.9	8.1	**69**
70	55 09.8	+59.7	6.6	56 09.4	+59.8	6.7	57 08.9	+59.8	6.9	58 08.5	+59.8	7.1	59 08.0	+59.9	7.3	60 07.5	+59.9	7.5	61 07.0	+59.9	7.8	62 06.4	+59.9	8.0	**70**
71	56 09.5	+59.8	6.4	57 09.2	+59.7	6.6	58 08.7	+59.8	6.8	59 08.3	+59.8	7.0	60 07.9	+59.8	7.2	61 07.4	+59.8	7.4	62 06.9	+59.8	7.6	63 06.3	+59.9	7.9	**71**
72	57 09.3	+59.7	6.2	58 08.9	+59.8	6.4	59 08.5	+59.8	6.6	60 08.1	+59.8	6.8	61 07.7	+59.8	7.0	62 07.2	+59.9	7.2	63 06.7	+59.9	7.5	64 06.2	+59.9	7.8	**72**
73	58 09.0	+59.8	6.1	59 08.7	+59.7	6.2	60 08.3	+59.8	6.4	61 07.9	+59.8	6.6	62 07.5	+59.8	6.9	63 07.1	+59.8	7.1	64 06.6	+59.9	7.3	65 06.1	+59.9	7.6	**73**
74	59 08.8	+59.7	5.9	60 08.4	+59.8	6.1	61 08.1	+59.7	6.3	62 07.7	+59.8	6.5	63 07.3	+59.8	6.7	64 06.9	+59.8	6.9	65 06.5	+59.8	7.2	66 06.0	+59.8	7.5	**74**
75	60 08.5	+59.7	5.7	61 08.2	+59.7	5.9	62 07.8	+59.8	6.1	63 07.5	+59.8	6.3	64 07.1	+59.8	6.5	65 06.7	+59.8	6.7	66 06.3	+59.8	7.0	67 05.8	+59.9	7.3	**75**
76	61 08.2	+59.6	5.5	62 07.9	+59.7	5.7	63 07.6	+59.7	5.9	64 07.3	+59.7	6.1	65 06.9	+59.8	6.3	66 06.5	+59.8	6.5	67 06.1	+59.8	6.8	68 05.7	+59.8	7.1	**76**
77	62 07.8	+59.7	5.3	63 07.6	+59.7	5.4	64 07.3	+59.7	5.6	65 07.0	+59.7	5.9	66 06.7	+59.7	6.1	67 06.3	+59.8	6.3	68 05.9	+59.8	6.6	69 05.5	+59.9	6.9	**77**
78	63 07.5	+59.6	5.0	64 07.3	+59.6	5.2	65 07.0	+59.7	5.4	66 06.7	+59.7	5.6	67 06.4	+59.8	5.9	68 06.1	+59.8	6.1	69 05.7	+59.8	6.4	70 05.4	+59.8	6.7	**78**
79	64 07.1	+59.6	4.8	65 06.9	+59.6	5.0	66 06.7	+59.6	5.2	67 06.4	+59.7	5.4	68 06.2	+59.7	5.6	69 05.9	+59.7	5.9	70 05.5	+59.8	6.1	71 05.2	+59.8	6.4	**79**
80	65 06.7	+59.6	4.5	66 06.5	+59.6	4.7	67 06.3	+59.6	4.9	68 06.1	+59.6	5.1	69 05.9	+59.6	5.3	70 05.6	+59.7	5.6	71 05.3	+59.7	5.9	72 05.0	+59.7	6.2	**80**
81	66 06.3	+59.5	4.2	67 06.1	+59.6	4.4	68 05.9	+59.6	4.6	69 05.7	+59.7	4.8	70 05.5	+59.7	5.0	71 05.3	+59.7	5.3	72 05.0	+59.7	5.6	73 04.7	+59.7	5.9	**81**
82	67 05.8	+59.5	3.9	68 05.7	+59.5	4.1	69 05.5	+59.6	4.3	70 05.4	+59.5	4.5	71 05.2	+59.6	4.7	72 05.0	+59.6	5.0	73 04.7	+59.7	5.2	74 04.4	+59.7	5.6	**82**
83	68 05.3	+59.5	3.6	69 05.2	+59.5	3.7	70 05.1	+59.5	3.9	71 04.9	+59.6	4.1	72 04.8	+59.5	4.3	73 04.6	+59.6	4.6	74 04.4	+59.6	4.9	75 04.1	+59.7	5.2	**83**
84	69 04.8	+59.4	3.2	70 04.7	+59.4	3.4	71 04.6	+59.4	3.5	72 04.5	+59.4	3.7	73 04.3	+59.5	3.9	74 04.2	+59.5	4.2	75 04.0	+59.6	4.4	76 03.8	+59.6	4.8	**84**
85	70 04.2	+59.3	2.8	71 04.1	+59.4	2.9	72 04.0	+59.4	3.1	73 03.9	+59.4	3.3	74 03.8	+59.5	3.5	75 03.7	+59.5	3.7	76 03.6	+59.5	4.0	77 03.4	+59.6	4.3	**85**
86	71 03.5	+59.3	2.4	72 03.5	+59.2	2.5	73 03.4	+59.3	2.6	74 03.3	+59.4	2.8	75 03.3	+59.3	3.0	76 03.2	+59.4	3.2	77 03.1	+59.4	3.4	78 03.0	+59.4	3.7	**86**
87	72 02.8	+59.2	1.9	73 02.7	+59.2	2.0	74 02.7	+59.2	2.1	75 02.7	+59.2	2.2	76 02.6	+59.3	2.4	77 02.6	+59.2	2.6	78 02.5	+59.3	2.8	79 02.4	+59.4	3.0	**87**
88	73 02.0	+59.0	1.3	74 01.9	+59.1	1.4	75 01.9	+59.1	1.5	76 01.9	+59.1	1.6	77 01.9	+59.1	1.7	78 01.8	+59.2	1.8	79 01.8	+59.2	2.0	80 01.8	+59.2	2.2	**88**
89	74 01.0	+59.0	0.7	75 01.0	+59.0	0.7	76 01.0	+59.0	0.8	77 01.0	+59.0	0.8	78 01.0	+59.0	0.9	79 01.0	+59.0	1.0	80 01.0	+59.0	1.1	81 01.0	+59.0	1.2	**89**
90	75 00.0	+58.8	0.0	76 00.0	+58.8	0.0	77 00.0	+58.8	0.0	78 00.0	+58.8	0.0	79 00.0	+58.8	0.0	80 00.0	+58.8	0.0	81 00.0	+58.8	0.0	82 00.0	+58.7	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 169°, 191°

12°, 348° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 39.9	+59.9	167.6	13 41.3	+59.9	167.6	12 42.7	+59.9	167.7	11 44.0	+60.0	167.7	10 45.4	+60.0	167.8	9 46.8	+59.9	167.8	8 48.1	+60.0	167.9	7 49.4	+60.0	167.9	**0**
1	15 39.8	+59.9	167.5	14 41.2	+59.9	167.6	13 42.6	+59.9	167.6	12 44.0	+59.9	167.7	11 45.4	+59.9	167.7	10 46.7	+60.0	167.8	9 48.1	+59.9	167.8	8 49.4	+60.0	167.9	**1**
2	16 39.7	+59.9	167.5	15 41.1	+59.9	167.5	14 42.5	+60.0	167.6	13 43.9	+60.0	167.6	12 45.3	+60.0	167.7	11 46.7	+59.9	167.7	10 48.0	+60.0	167.8	9 49.4	+60.0	167.8	**2**
3	17 39.6	+59.9	167.4	16 41.0	+60.0	167.5	15 42.5	+59.9	167.5	14 43.9	+59.9	167.6	13 45.3	+59.9	167.7	12 46.6	+60.0	167.7	11 48.0	+60.0	167.8	10 49.4	+59.9	167.8	**3**
4	18 39.5	+59.9	167.4	17 41.0	+59.9	167.4	16 42.4	+59.9	167.5	15 43.8	+59.9	167.6	14 45.2	+60.0	167.6	13 46.6	+60.0	167.7	12 48.0	+59.9	167.7	11 49.3	+60.0	167.8	**4**
5	19 39.4	+59.9	167.3	18 40.9	+59.9	167.4	17 42.3	+59.9	167.4	16 43.7	+60.0	167.5	15 45.2	+59.9	167.6	14 46.6	+59.9	167.6	13 47.9	+60.0	167.7	12 49.3	+60.0	167.7	**5**
6	20 39.3	+59.9	167.2	19 40.8	+59.9	167.3	18 42.2	+60.0	167.4	17 43.7	+59.9	167.5	16 45.1	+60.0	167.5	15 46.5	+60.0	167.6	14 47.9	+60.0	167.7	13 49.3	+60.0	167.7	**6**
7	21 39.2	+59.9	167.2	20 40.7	+59.9	167.3	19 42.2	+59.9	167.3	18 43.6	+60.0	167.4	17 45.1	+59.9	167.5	16 46.5	+59.9	167.6	15 47.9	+59.9	167.6	14 49.3	+59.9	167.7	**7**
8	22 39.1	+59.9	167.1	21 40.6	+59.9	167.2	20 42.1	+59.9	167.3	19 43.6	+59.9	167.4	18 45.0	+59.9	167.4	17 46.4	+60.0	167.5	16 47.8	+60.0	167.6	15 49.2	+60.0	167.6	**8**
9	23 39.0	+59.9	167.0	22 40.5	+59.9	167.1	21 42.0	+59.9	167.2	20 43.5	+59.9	167.3	19 44.9	+60.0	167.4	18 46.4	+59.9	167.5	17 47.8	+60.0	167.5	16 49.2	+60.0	167.6	**9**
10	24 38.9	+59.9	167.0	23 40.4	+59.9	167.1	22 41.9	+60.0	167.2	21 43.4	+60.0	167.3	20 44.9	+59.9	167.4	19 46.3	+60.0	167.4	18 47.8	+59.9	167.5	17 49.2	+60.0	167.6	**10**
11	25 38.8	+59.9	166.9	24 40.3	+59.9	167.0	23 41.9	+59.9	167.1	22 43.4	+59.9	167.2	21 44.8	+60.0	167.3	20 46.3	+59.9	167.4	19 47.7	+60.0	167.5	18 49.2	+59.9	167.5	**11**
12	26 38.7	+59.9	166.8	25 40.2	+60.0	167.0	24 41.8	+59.9	167.1	23 43.3	+59.9	167.2	22 44.8	+59.9	167.3	21 46.2	+60.0	167.4	20 47.7	+60.0	167.4	19 49.1	+60.0	167.5	**12**
13	27 38.6	+59.9	166.8	26 40.2	+59.9	166.9	25 41.7	+59.9	167.0	24 43.2	+60.0	167.1	23 44.7	+60.0	167.2	22 46.2	+60.0	167.3	21 47.7	+59.9	167.4	20 49.1	+60.0	167.5	**13**
14	28 38.5	+59.9	166.7	27 40.1	+59.9	166.8	26 41.6	+59.9	166.9	25 43.2	+59.9	167.1	24 44.7	+59.9	167.2	23 46.2	+59.9	167.3	22 47.6	+60.0	167.4	21 49.1	+59.9	167.4	**14**
15	29 38.4	+59.8	166.6	28 40.0	+59.9	166.8	27 41.5	+60.0	166.9	26 43.1	+59.9	167.0	25 44.6	+60.0	167.1	24 46.1	+60.0	167.2	23 47.6	+59.9	167.3	22 49.0	+60.0	167.4	**15**
16	30 38.2	+59.9	166.6	29 39.9	+59.9	166.7	28 41.5	+59.9	166.8	27 43.0	+59.9	167.0	26 44.6	+59.9	167.1	25 46.1	+59.9	167.2	24 47.5	+60.0	167.3	23 49.0	+60.0	167.4	**16**
17	31 38.1	+59.9	166.5	30 39.8	+59.9	166.6	29 41.4	+59.9	166.8	28 42.9	+60.0	166.9	27 44.5	+59.9	167.0	26 46.0	+60.0	167.1	25 47.5	+60.0	167.2	24 49.0	+59.9	167.3	**17**
18	32 38.0	+59.9	166.4	31 39.7	+59.9	166.6	30 41.3	+59.9	166.7	29 42.9	+59.9	166.8	28 44.4	+60.0	167.0	27 46.0	+59.9	167.1	26 47.5	+59.9	167.2	25 48.9	+60.0	167.3	**18**
19	33 37.9	+59.8	166.3	32 39.6	+59.8	166.5	31 41.2	+59.9	166.6	30 42.8	+59.9	166.8	29 44.4	+59.9	166.9	28 45.9	+60.0	167.0	27 47.4	+60.0	167.2	26 48.9	+60.0	167.3	**19**
20	34 37.7	+59.9	166.3	33 39.4	+59.9	166.4	32 41.1	+59.9	166.6	31 42.7	+59.9	166.7	30 44.3	+59.9	166.9	29 45.9	+59.9	167.0	28 47.4	+59.9	167.1	27 48.9	+60.0	167.2	**20**
21	35 37.6	+59.9	166.2	34 39.3	+59.9	166.4	33 41.0	+59.9	166.5	32 42.6	+60.0	166.7	31 44.2	+60.0	166.8	30 45.8	+60.0	166.9	29 47.3	+60.0	167.1	28 48.9	+59.9	167.2	**21**
22	36 37.5	+59.8	166.1	35 39.2	+59.9	166.3	34 40.9	+59.9	166.4	33 42.6	+59.9	166.6	32 44.2	+59.9	166.8	31 45.8	+59.9	166.9	30 47.3	+60.0	167.0	29 48.8	+60.0	167.2	**22**
23	37 37.3	+59.9	166.0	36 39.1	+59.9	166.2	35 40.8	+59.9	166.4	34 42.5	+59.9	166.5	33 44.1	+59.9	166.7	32 45.7	+59.9	166.8	31 47.3	+59.9	167.0	30 48.8	+59.9	167.1	**23**
24	38 37.2	+59.9	165.9	37 39.0	+59.9	166.1	36 40.7	+59.9	166.3	35 42.4	+59.9	166.5	34 44.0	+60.0	166.6	33 45.6	+60.0	166.8	32 47.2	+60.0	166.9	31 48.7	+60.0	167.1	**24**
25	39 37.1	+59.8	165.8	38 38.9	+59.8	166.0	37 40.6	+59.9	166.2	36 42.3	+59.9	166.4	35 44.0	+59.9	166.6	34 45.6	+59.9	166.7	33 47.2	+59.9	166.9	32 48.7	+60.0	167.0	**25**
26	40 36.9	+59.9	165.7	39 38.7	+59.9	166.0	38 40.5	+59.9	166.2	37 42.2	+59.9	166.3	36 43.9	+59.9	166.5	35 45.5	+60.0	166.7	34 47.1	+60.0	166.8	33 48.7	+59.9	167.0	**26**
27	41 36.8	+59.8	165.7	40 38.6	+59.9	165.9	39 40.4	+59.9	166.1	38 42.1	+59.9	166.3	37 43.8	+59.9	166.5	36 45.5	+59.9	166.6	35 47.1	+59.9	166.8	34 48.6	+60.0	167.0	**27**
28	42 36.6	+59.8	165.6	41 38.5	+59.8	165.8	40 40.3	+59.9	166.0	39 42.0	+59.9	166.2	38 43.7	+60.0	166.4	37 45.4	+59.9	166.6	36 47.0	+60.0	166.7	35 48.6	+60.0	166.9	**28**
29	43 36.4	+59.9	165.5	42 38.3	+59.9	165.7	41 40.2	+59.8	165.9	40 41.9	+59.9	166.1	39 43.7	+59.9	166.3	38 45.3	+60.0	166.5	37 47.0	+59.9	166.7	36 48.6	+59.9	166.9	**29**
30	44 36.3	+59.8	165.4	43 38.2	+59.8	165.6	42 40.0	+59.9	165.8	41 41.8	+59.9	166.0	40 43.6	+59.9	166.3	39 45.3	+59.9	166.5	38 46.9	+60.0	166.6	37 48.5	+60.0	166.8	**30**
31	45 36.1	+59.8	165.2	44 38.0	+59.9	165.5	43 39.9	+59.9	165.7	42 41.7	+59.9	166.0	41 43.5	+59.9	166.2	40 45.2	+59.9	166.4	39 46.9	+59.9	166.6	38 48.5	+59.9	166.8	**31**
32	46 35.9	+59.8	165.1	45 37.9	+59.8	165.4	44 39.8	+59.9	165.6	43 41.6	+59.9	165.9	42 43.4	+59.9	166.1	41 45.1	+60.0	166.3	40 46.8	+60.0	166.5	39 48.4	+60.0	166.7	**32**
33	47 35.7	+59.8	165.0	46 37.7	+59.9	165.3	45 39.7	+59.8	165.6	44 41.5	+59.9	165.8	43 43.3	+59.9	166.0	42 45.1	+59.9	166.3	41 46.8	+59.9	166.5	40 48.4	+60.0	166.7	**33**
34	48 35.5	+59.8	164.9	47 37.6	+59.8	165.2	46 39.5	+59.9	165.5	45 41.4	+59.9	165.7	44 43.2	+59.9	166.0	43 45.0	+59.9	166.2	42 46.7	+59.9	166.4	41 48.4	+59.9	166.6	**34**
35	49 35.3	+59.8	164.8	48 37.4	+59.8	165.1	47 39.4	+59.8	165.4	46 41.3	+59.9	165.6	45 43.1	+59.9	165.9	44 44.9	+59.9	166.1	43 46.6	+60.0	166.4	42 48.3	+60.0	166.6	**35**
36	50 35.1	+59.8	164.6	49 37.2	+59.8	165.0	48 39.2	+59.9	165.2	47 41.2	+59.8	165.5	46 43.0	+59.9	165.8	45 44.8	+60.0	166.1	44 46.6	+59.9	166.3	43 48.3	+59.9	166.5	**36**
37	51 34.9	+59.8	164.5	50 37.0	+59.8	164.8	49 39.1	+59.8	165.1	48 41.0	+59.9	165.4	47 42.9	+59.9	165.7	46 44.8	+59.9	166.0	45 46.5	+60.0	166.2	44 48.2	+60.0	166.5	**37**
38	52 34.7	+59.7	164.4	51 36.8	+59.8	164.7	50 38.9	+59.9	165.0	49 40.9	+59.9	165.3	48 42.8	+59.9	165.6	47 44.7	+59.9	165.9	46 46.5	+59.9	166.2	45 48.2	+59.9	166.4	**38**
39	53 34.4	+59.8	164.2	52 36.6	+59.8	164.6	51 38.8	+59.8	164.9	50 40.8	+59.8	165.2	49 42.7	+59.9	165.5	48 44.6	+59.9	165.8	47 46.4	+59.9	166.1	46 48.1	+60.0	166.3	**39**
40	54 34.2	+59.7	164.1	53 36.4	+59.8	164.4	52 38.6	+59.8	164.8	51 40.6	+59.9	165.1	50 42.6	+59.9	165.4	49 44.5	+59.9	165.7	48 46.3	+59.9	166.0	47 48.1	+59.9	166.3	**40**
41	55 33.9	+59.7	163.9	54 36.2	+59.8	164.3	53 38.4	+59.8	164.7	52 40.5	+59.8	165.0	51 42.5	+59.9	165.3	50 44.4	+59.9	165.6	49 46.2	+60.0	165.9	48 48.0	+59.9	166.2	**41**
42	56 33.6	+59.7	163.7	55 36.0	+59.7	164.1	54 38.2	+59.8	164.5	53 40.3	+59.9	164.9	52 42.4	+59.8	165.2	51 44.3	+59.9	165.6	50 46.2	+59.9	165.9	49 47.9	+60.0	166.2	**42**
43	57 33.3	+59.7	163.5	56 35.7	+59.8	164.0	55 38.0	+59.8	164.4	54 40.2	+59.8	164.8	53 42.2	+59.9	165.1	52 44.2	+59.9	165.5	51 46.1	+59.9	165.8	50 47.9	+59.9	166.1	**43**
44	58 33.0	+59.7	163.3	57 35.5	+59.7	163.8	56 37.8	+59.8	164.2	55 40.0	+59.8	164.6	54 42.1	+59.8	165.0	53 44.1	+59.9	165.4	52 46.0	+59.9	165.7	51 47.8	+59.9	166.0	**44**
45	59 32.7	+59.6	163.1	58 35.2	+59.7	163.6	57 37.6	+59.7	164.1	56 39.8	+59.8	164.5	55 41.9	+59.9	164.9	54 44.0	+59.9	165.2	53 45.9	+59.9	165.6	52 47.7	+60.0	165.9	**45**
46	60 32.3	+59.7	162.9	59 34.9	+59.7	163.4	58 37.3	+59.8	163.9	57 39.6	+59.8	164.3	56 41.8	+59.8	164.7	55 43.9	+59.8	165.1	54 45.8	+59.9	165.5	53 47.7	+59.9	165.8	**46**
47	61 32.0	+59.6	162.7	60 34.6	+59.7	163.2	59 37.1	+59.7	163.7	58 39.4	+59.8	164.2	57 41.6	+59.9	164.6	56 43.7	+59.9	165.0	55 45.7	+59.9	165.4	54 47.6	+59.9	165.8	**47**
48	62 31.6	+59.5	162.4	61 34.3	+59.6	163.0	60 36.8	+59.7	163.5	59 39.2	+59.8	164.0	58 41.5	+59.8	164.5	57 43.6	+59.8	164.9	56 45.6	+59.9	165.3	55 47.5	+59.9	165.7	**48**
49	63 31.1	+59.6	162.2	62 33.9	+59.7	162.8	61 36.5	+59.7	163.3	60 39.0	+59.7	163.8	59 41.3	+59.8	164.3	58 43.4	+59.9	164.8	57 45.5	+59.9	165.2	56 47.4	+60.0	165.6	**49**
50	64 30.7	+59.5	161.9	63 33.6	+59.6	162.5	62 36.2	+59.7	163.1	61 38.7	+59.8	163.7	60 41.1	+59.8	164.2	59 43.3	+59.8	164.6	58 45.4	+59.9	165.1	57 47.4	+59.9	165.5	**50**
51	65 30.2	+59.5	161.6	64 33.2	+59.5	162.3	63 35.9	+59.7	162.9	62 38.5	+59.7	163.5	61 40.9	+59.8	164.0	60 43.1	+59.9	164.5	59 45.3	+59.8	164.9	58 47.3	+59.9	165.4	**51**
52	66 29.7	+59.4	161.3	65 32.7	+59.6	162.0	64 35.6	+59.6	162.6	63 38.2	+59.7	163.2	62 40.7	+59.7	163.8	61 43.0	+59.8	164.3	60 45.1	+59.9	164.8	59 47.2	+59.9	165.3	**52**
53	67 29.1	+59.4	160.9	66 32.3	+59.5	161.7	65 35.2	+59.6	162.4	64 37.9	+59.7	163.0	63 40.4	+59.8	163.6	62 42.8	+59.8	164.2	61 45.0	+59.9	164.7	60 47.1	+59.9	165.1	**53**
54	68 28.5	+59.3	160.5	67 31.8	+59.4	161.4	66 34.8	+59.6	162.1	65 37.6	+59.6	162.8	64 40.2	+59.7	163.4	63 42.6	+59.8	164.0	62 44.9	+59.8	164.5	61 47.0	+59.8	165.0	**54**
55	69 27.8	+59.3	160.1	68 31.2	+59.4	161.0	67 34.4	+59.5	161.8	66 37.2	+59.7	162.5	65 39.9	+59.7	163.2	64 42.4	+59.8	163.8	63 44.7	+59.8	164.4	62 46.8	+59.9	164.9	**55**
56	70 27.1	+59.1	159.7	69 30.6	+59.4	160.6	68 33.9	+59.5	161.4	67 36.9	+59.6	162.2	66 39.6	+59.7	162.9	65 42.2	+59.7	163.6	64 44.5	+59.8	164.2	63 46.7	+59.9	164.7	**56**
57	71 26.2	+59.1	159.2	70 30.0	+59.3	160.2	69 33.4	+59.4	161.1	68 36.5	+59.5	161.9	67 39.3	+59.7	162.7	66 41.9	+59.8	163.4	65 44.3	+59.8	164.0	64 46.6	+59.8	164.6	**57**
58	72 25.3	+59.0	158.6	71 29.3	+59.2	159.7	70 32.8	+59.4	160.7	69 36.0	+59.5	161.6	68 39.0	+59.6	162.4	67 41.7	+59.7	163.1	66 44.1	+59.8	163.8	65 46.4	+59.9	164.4	**58**
59	73 24.3	+58.9	158.0	72 28.5	+59.1	159.2	71 32.2	+59.3	160.2	70 35.5	+59.5	161.2	69 38.6	+59.6	162.1	68 41.4	+59.7	162.9	67 43.9	+59.8	163.6	66 46.3	+59.8	164.2	**59**
60	74 23.2	+58.7	157.3	73 27.6	+59.0	158.6	72 31.5	+59.2	159.7	71 35.0	+59.4	160.8	70 38.2	+59.5	161.7	69 41.1	+59.6	162.6	68 43.7	+59.8	163.3	67 46.1	+59.8	164.1	**60**
61	75 21.9	+58.5	156.5	74 26.6	+58.8	157.9	73 30.7	+59.1	159.2	72 34.4	+59.3	160.3	71 37.7	+59.5	161.3	70 40.7	+59.7	162.3	69 43.5	+59.7	163.1	68 45.9	+59.8	163.8	**61**
62	76 20.4	+58.3	155.6	75 25.4	+58.7	157.2	74 29.8	+59.1	158.6	73 33.7	+59.3	159.8	72 37.2	+59.5	160.9	71 40.4	+59.5	161.9	70 43.2	+59.7	162.8	69 45.7	+59.8	163.6	**62**
63	77 18.7	+58.0	154.5	76 24.1	+58.5	156.3	75 28.9	+58.8	157.9	74 33.0	+59.2	159.2	73 36.7	+59.3	160.5	72 39.9	+59.6	161.5	71 42.9	+59.6	162.5	70 45.5	+59.8	163.4	**63**
64	78 16.7	+57.7	153.3	77 22.6	+58.3	155.4	76 27.7	+58.7	157.1	75 32.2	+59.0	158.6	74 36.0	+59.3	159.9	73 39.5	+59.4	161.1	72 42.5	+59.6	162.1	71 45.3	+59.7	163.1	**64**
65	79 14.4	+57.2	151.9	78 20.9	+57.9	154.2	77 26.4	+58.5	156.2	76 31.2	+58.9	157.9	75 35.3	+59.2	159.3	74 38.9	+59.4	160.6	73 42.1	+59.6	161.8	72 45.0	+59.7	162.8	**65**
66	80 11.6	+56.6	150.2	79 18.8	+57.6	152.9	78 24.9	+58.2	155.1	77 30.1	+58.6	157.0	76 34.5	+59.0	158.6	75 38.3	+59.4	160.1	74 41.7	+59.5	161.3	73 44.7	+59.6	162.4	**66**
67	81 08.2	+55.8	148.2	80 16.4	+56.9	151.3	79 23.1	+57.8	153.8	78 28.7	+58.5	156.0	77 33.5	+58.9	157.8	76 37.7	+59.2	159.4	75 41.2	+59.5	160.8	74 44.3	+59.7	162.0	**67**
68	82 04.0	+54.6	145.7	81 13.3	+56.3	149.3	80 20.9	+57.4	152.3	79 27.2	+58.1	154.8	78 32.4	+58.7	156.9	77 36.9	+59.0	158.7	76 40.7	+59.3	160.2	75 44.0	+59.5	161.6	**68**
69	82 58.6	*+52.9*	•142.5	82 09.6	+55.2	146.9	81 18.3	+56.7	150.5	80 25.3	+57.7	153.4	79 31.1	+58.4	155.8	78 35.9	+58.9	157.9	77 40.0	+59.3	159.6	76 43.5	+59.5	161.1	**69**
70	83 51.5	*+50.4*	•138.3	83 04.8	+53.6	143.8	82 15.0	+55.7	148.2	81 23.0	+57.2	151.7	80 29.5	+58.1	154.5	79 34.8	+58.7	156.8	78 39.3	+59.1	158.8	77 43.0	+59.4	160.5	**70**
71	84 41.9	*+46.5*	•132.9	83 58.4	*+51.4*	•139.9	83 10.7	+54.4	145.3	82 20.2	+56.2	149.5	81 27.6	+57.5	152.9	80 33.5	+58.4	155.6	79 38.4	+58.9	157.9	78 42.4	+59.3	159.8	**71**
72	85 28.4	*+40.3*	•125.5	84 49.8	*+47.6*	•134.5	84 05.1	*+52.2*	•141.4	83 16.4	+55.1	146.7	82 25.1	+56.8	150.9	81 31.9	+57.9	154.1	80 37.3	+58.6	156.8	79 41.7	+59.1	159.0	**72**
73	86 08.7	*+30.2*	•115.3	85 37.4	*+41.6*	•127.2	84 57.3	*+48.8*	•136.3	84 11.5	*+53.2*	•143.1	83 21.9	+55.7	148.3	82 29.8	+57.3	152.3	81 35.9	+58.3	155.4	80 40.8	+58.9	158.0	**73**
74	86 38.9	*+15.1*	•101.5	86 19.0	*+31.4*	•116.9	85 46.1	*+43.0*	•129.0	85 04.7	*+49.9*	•138.1	84 17.6	*+54.1*	•144.8	83 27.1	+56.4	149.8	82 34.2	+57.8	153.7	81 39.7	+58.7	156.7	**74**
75	86 54.0	*–3.6*	•84.2	86 50.4	*+15.7*	•102.5	86 29.1	*+32.8*	•118.6	85 54.6	*+44.4*	•131.0	85 11.7	*+51.1*	•140.0	84 23.5	*+54.9*	•146.6	83 32.0	+57.0	151.5	82 38.4	+58.2	155.2	**75**
76	86 50.4	*–21.3*	•65.8	87 06.1	*–4.2*	•84.2	87 01.9	*+16.4*	•103.7	86 39.0	*+34.4*	•120.6	86 02.8	*+45.9*	•133.1	85 18.4	*+52.3*	•142.1	84 29.0	+55.7	148.5	83 36.6	+57.5	153.1	**76**
77	86 29.1	*–34.5*	•49.7	87 01.9	*–22.9*	•64.6	87 18.3	*–4.9*	•84.2	87 13.4	*+17.2*	•105.1	86 48.7	*+36.1*	•122.7	86 10.7	*+47.5*	•135.4	85 24.7	*+53.5*	•144.2	84 34.1	+56.5	150.4	**77**
78	85 54.6	*–42.9*	•37.3	86 39.0	*–36.2*	•47.7	87 13.4	*–24.7*	•63.2	87 30.6	*–5.8*	•84.1	87 24.8	*+18.1*	•106.7	86 58.2	*+37.9*	•125.1	86 18.2	*+49.1*	•137.9	85 30.6	*+54.6*	•146.5	**78**
79	85 11.7	*–48.2*	•28.3	86 02.8	*–44.4*	•35.1	86 48.7	*–38.0*	•45.5	87 24.8	*–26.6*	•61.5	87 42.9	*–6.8*	•84.1	87 36.1	*+19.1*	•108.6	87 07.3	*+39.9*	•127.8	86 25.2	*+50.8*	•140.5	**79**
80	84 23.5	*–51.5*	•21.7	85 18.4	*–49.4*	•26.2	86 10.7	*–46.0*	•32.8	86 58.2	*–40.0*	•43.1	87 36.1	*–28.8*	•59.6	87 55.2	*–8.0*	•84.1	87 47.2	*+20.4*	•110.8	87 16.0	*+42.2*	•130.8	**80**
81	83 32.0	–53.6	16.8	84 29.0	*–52.4*	•19.8	85 24.7	*–50.6*	•24.0	86 18.2	*–47.6*	•30.3	87 07.3	*–42.1*	•40.4	87 47.2	*–31.2*	•57.4	88 07.6	*–9.4*	•84.1	87 58.2	*+21.8*	•113.4	**81**
82	82 38.4	–55.1	13.1	83 36.6	–54.4	15.1	84 34.1	*–53.3*	•17.8	85 30.6	*–51.7*	•21.7	86 25.2	*–49.1*	•27.6	87 16.0	*–44.2*	•37.4	87 58.2	*–33.9*	•54.7	88 20.0	*–11.2*	•84.1	**82**
83	81 43.3	–56.1	10.1	82 42.2	–55.7	11.5	83 40.8	–55.1	13.3	84 38.9	*–54.2*	•15.8	85 36.1	*–52.8*	•19.3	86 31.8	*–50.6*	•24.8	87 24.3	*–46.4*	•34.0	88 08.8	*–36.8*	•51.6	**83**
84	80 47.2	–56.9	7.8	81 46.5	–56.5	8.7	82 45.7	–56.2	9.9	83 44.7	–55.7	11.5	84 43.3	–55.1	13.7	85 41.2	*–54.0*	•16.8	86 37.9	*–52.2*	•21.7	87 32.0	*–48.6*	•30.3	**84**
85	79 50.3	–57.4	5.9	80 50.0	–57.3	6.5	81 49.5	–57.0	7.3	82 49.0	–56.8	8.3	83 48.2	–56.3	9.7	84 47.2	–55.8	11.5	85 45.7	*–55.0*	•14.2	86 43.4	*–53.6*	•18.5	**85**
86	78 52.9	–57.8	4.3	79 52.7	–57.7	4.7	80 52.5	–57.6	5.2	81 52.2	–57.4	5.9	82 51.9	–57.3	6.7	83 51.4	–57.0	7.8	84 50.7	–56.5	9.3	85 49.8	–56.0	11.5	**86**
87	77 55.1	–58.1	3.0	78 55.0	–58.0	3.2	79 54.9	–58.0	3.6	80 54.8	–57.9	4.0	81 54.6	–57.8	4.4	82 54.4	–57.7	5.1	83 54.2	–57.6	5.9	84 53.8	–57.3	7.0	**87**
88	76 57.0	–58.4	1.8	77 57.0	–58.4	2.0	78 56.9	–58.3	2.2	79 56.9	–58.3	2.4	80 56.8	–58.2	2.6	81 56.7	–58.2	3.0	82 56.6	–58.1	3.4	83 56.5	–58.0	3.9	**88**
89	75 58.6	–58.6	0.9	76 58.6	–58.6	0.9	77 58.6	–58.6	1.0	78 58.6	–58.6	1.1	79 58.6	–58.6	1.2	80 58.5	–58.5	1.3	81 58.5	–58.5	1.5	82 58.5	–58.5	1.7	**89**
90	75 00.0	–58.8	0.0	76 00.0	–58.8	0.0	77 00.0	–58.8	0.0	78 00.0	–58.8	0.0	79 00.0	–58.8	0.0	80 00.0	–58.8	0.0	81 00.0	–58.8	0.0	82 00.0	–58.8	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 12°, 348°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 39.9	−59.9	167.6	13 41.3	−59.9	167.6	12 42.7	−60.0	167.7	11 44.0	−59.9	167.7	10 45.4	−59.9	167.8	9 46.8	−60.0	167.8	8 48.1	−60.0	167.9	7 49.4	−59.9	167.9	0
1	13 40.0	−59.9	167.6	12 41.4	−60.0	167.7	11 42.7	−59.9	167.7	10 44.1	−59.9	167.8	9 45.5	−60.0	167.8	8 46.8	−60.0	167.9	7 48.1	−59.9	167.9	6 49.5	−60.0	167.9	1
2	12 40.1	−59.9	167.7	11 41.4	−59.9	167.7	10 42.8	−59.9	167.8	9 44.2	−60.0	167.8	8 45.5	−60.0	167.9	7 46.8	−59.9	167.9	6 48.2	−60.0	167.9	5 49.5	−60.0	167.9	2
3	11 40.2	−59.9	167.8	10 41.5	−59.9	167.8	9 42.9	−60.0	167.8	8 44.2	−59.9	167.9	7 45.5	−59.9	167.9	6 46.9	−60.0	167.9	5 48.2	−60.0	168.0	4 49.5	−60.0	168.0	3
4	10 40.3	−60.0	167.8	9 41.6	−59.9	167.9	8 42.9	−59.9	167.9	7 44.3	−60.0	167.9	6 45.6	−60.0	167.9	5 46.9	−59.9	168.0	4 48.2	−59.9	168.0	3 49.5	−59.9	168.0	4
5	9 40.3	−59.9	167.9	8 41.7	−59.9	167.9	7 43.0	−59.9	167.9	6 44.3	−59.9	168.0	5 45.6	−59.9	168.0	4 47.0	−60.0	168.0	3 48.3	−60.0	168.0	2 49.6	−60.0	168.0	5
6	8 40.4	−59.9	167.9	7 41.8	−60.0	168.0	6 43.1	−60.0	168.0	5 44.4	−60.0	168.0	4 45.7	−60.0	168.0	3 47.0	−60.0	168.0	2 48.3	−60.0	168.1	1 49.6	−60.0	168.1	6
7	7 40.5	−59.9	168.0	6 41.8	−59.9	168.0	5 43.1	−59.9	168.0	4 44.4	−59.9	168.0	3 45.7	−59.9	168.1	2 47.0	−59.9	168.1	1 48.3	−59.9	168.1	0 49.6	−60.0	168.1	7
8	6 40.6	−59.9	168.0	5 41.9	−59.9	168.1	4 43.2	−59.9	168.1	3 44.5	−59.9	168.1	2 45.8	−60.0	168.1	1 47.1	−60.0	168.1	0 48.4	−60.0	168.1	0 10.4	+59.9	11.9	8
9	5 40.7	−59.9	168.1	4 42.0	−59.9	168.1	3 43.3	−60.0	168.1	2 44.6	−60.0	168.1	1 45.8	−59.9	168.1	0 47.1	−59.9	168.1	0 11.6	+60.0	11.9	1 10.3	+60.0	11.9	9
10	4 40.8	−59.9	168.1	3 42.1	−60.0	168.2	2 43.3	−59.9	168.2	1 44.6	−59.9	168.2	0 45.9	−60.0	168.2	0 12.8	+60.0	11.8	1 11.6	+59.9	11.8	2 10.3	+60.0	11.8	10
11	3 40.9	−59.9	168.2	2 42.1	−59.9	168.2	1 43.4	−59.9	168.2	0 44.7	−60.0	168.2	0 14.1	+59.9	11.8	1 12.8	+60.0	11.8	2 11.5	+60.0	11.8	3 10.3	+60.0	11.8	11
12	2 41.0	−60.0	168.3	1 42.2	−59.9	168.3	0 43.5	−60.0	168.3	0 15.3	+59.9	11.7	1 14.0	+60.0	11.7	2 12.8	+59.9	11.7	3 11.5	+60.0	11.8	4 10.3	+59.9	11.8	12
13	1 41.0	−59.9	168.3	0 42.3	−59.9	168.3	0 16.5	+59.9	11.7	1 15.2	+60.0	11.7	2 14.0	+59.9	11.7	3 12.7	+60.0	11.7	4 11.5	+59.9	11.7	5 10.2	+60.0	11.7	13
14	0 41.1	−59.9	168.4	0 17.6	+60.0	11.6	1 16.4	+59.9	11.6	2 15.2	+59.9	11.6	3 13.9	+60.0	11.7	4 12.7	+60.0	11.7	5 11.4	+60.0	11.7	6 10.2	+60.0	11.7	14
15	0 18.8	+59.9	11.6	1 17.6	+59.9	11.6	2 16.3	+60.0	11.6	3 15.1	+60.0	11.6	4 13.9	+59.9	11.6	5 12.7	+59.9	11.6	6 11.4	+60.0	11.7	7 10.2	+60.0	11.7	15
16	1 18.7	+59.9	11.5	2 17.5	+59.9	11.5	3 16.3	+59.9	11.5	4 15.1	+59.9	11.6	5 13.8	+60.0	11.6	6 12.6	+60.0	11.6	7 11.4	+60.0	11.6	8 10.2	+59.9	11.6	16
17	2 18.6	+59.9	11.5	3 17.4	+59.9	11.5	4 16.2	+59.9	11.5	5 15.0	+59.9	11.5	6 13.8	+59.9	11.5	7 12.6	+59.9	11.6	8 11.4	+59.9	11.6	9 10.1	+60.0	11.6	17
18	3 18.5	+59.9	11.4	4 17.3	+60.0	11.4	5 16.1	+60.0	11.5	6 14.9	+60.0	11.5	7 13.7	+60.0	11.5	8 12.5	+60.0	11.5	9 11.3	+60.0	11.6	10 10.1	+60.0	11.6	18
19	4 18.4	+59.9	11.4	5 17.3	+59.9	11.4	6 16.1	+59.9	11.4	7 14.9	+59.9	11.4	8 13.7	+59.9	11.5	9 12.5	+60.0	11.5	10 11.3	+60.0	11.5	11 10.1	+59.9	11.6	19
20	5 18.3	+60.0	11.3	6 17.2	+59.9	11.3	7 16.0	+59.9	11.4	8 14.8	+60.0	11.4	9 13.6	+60.0	11.4	10 12.5	+59.9	11.5	11 11.3	+59.9	11.5	12 10.0	+60.0	11.5	20
21	6 18.3	+59.9	11.3	7 17.1	+59.9	11.3	8 15.9	+60.0	11.3	9 14.8	+59.9	11.3	10 13.6	+59.9	11.4	11 12.4	+60.0	11.4	12 11.2	+60.0	11.5	13 10.0	+60.0	11.5	21
22	7 18.2	+59.9	11.2	8 17.0	+59.9	11.2	9 15.9	+59.9	11.3	10 14.7	+60.0	11.3	11 13.5	+60.0	11.3	12 12.4	+59.9	11.4	13 11.2	+60.0	11.4	14 10.0	+60.0	11.5	22
23	8 18.1	+59.9	11.2	9 16.9	+60.0	11.2	10 15.8	+59.9	11.2	11 14.7	+59.9	11.3	12 13.5	+59.9	11.3	13 12.3	+60.0	11.3	14 11.2	+59.9	11.4	15 10.0	+59.9	11.4	23
24	9 18.0	+59.9	11.1	10 16.9	+59.9	11.1	11 15.7	+60.0	11.2	12 14.6	+59.9	11.2	13 13.4	+60.0	11.3	14 12.3	+59.9	11.3	15 11.1	+60.0	11.4	16 09.9	+60.0	11.4	24
25	10 17.9	+59.9	11.0	11 16.8	+59.9	11.1	12 15.7	+59.9	11.1	13 14.5	+60.0	11.2	14 13.4	+59.9	11.2	15 12.2	+60.0	11.3	16 11.1	+60.0	11.3	17 09.9	+60.0	11.4	25
26	11 17.8	+59.9	11.0	12 16.7	+59.9	11.0	13 15.6	+59.9	11.1	14 14.5	+59.9	11.1	15 13.3	+60.0	11.2	16 12.2	+60.0	11.2	17 11.1	+59.9	11.3	18 09.9	+60.0	11.3	26
27	12 17.7	+59.9	10.9	13 16.6	+59.9	11.0	14 15.5	+60.0	11.0	15 14.4	+60.0	11.1	16 13.3	+59.9	11.1	17 12.2	+59.9	11.2	18 11.0	+60.0	11.2	19 09.9	+59.9	11.3	27
28	13 17.6	+59.9	10.9	14 16.5	+60.0	10.9	15 15.5	+59.9	11.0	16 14.4	+59.9	11.0	17 13.2	+60.0	11.1	18 12.1	+60.0	11.1	19 11.0	+59.9	11.2	20 09.8	+60.0	11.3	28
29	14 17.5	+59.9	10.8	15 16.5	+59.9	10.9	16 15.4	+59.9	10.9	17 14.3	+59.9	11.0	18 13.2	+59.9	11.0	19 12.1	+59.9	11.1	20 10.9	+60.0	11.2	21 09.8	+60.0	11.2	29
30	15 17.4	+60.0	10.8	16 16.4	+59.9	10.8	17 15.3	+59.9	10.9	18 14.2	+60.0	10.9	19 13.1	+60.0	11.0	20 12.0	+60.0	11.1	21 10.9	+60.0	11.1	22 09.8	+59.9	11.2	30
31	16 17.4	+59.9	10.7	17 16.3	+59.9	10.8	18 15.2	+60.0	10.8	19 14.2	+59.9	10.9	20 13.1	+59.9	10.9	21 12.0	+59.9	11.0	22 10.9	+59.9	11.1	23 09.7	+60.0	11.2	31
32	17 17.3	+59.9	10.6	18 16.2	+59.9	10.7	19 15.2	+59.9	10.8	20 14.1	+59.9	10.8	21 13.0	+60.0	10.9	22 11.9	+60.0	11.0	23 10.8	+60.0	11.1	24 09.7	+60.0	11.1	32
33	18 17.2	+59.9	10.6	19 16.1	+59.9	10.6	20 15.1	+59.9	10.7	21 14.0	+60.0	10.8	22 13.0	+59.9	10.9	23 11.9	+59.9	10.9	24 10.8	+60.0	11.0	25 09.7	+60.0	11.1	33
34	19 17.1	+59.9	10.5	20 16.0	+60.0	10.6	21 15.0	+59.9	10.7	22 14.0	+59.9	10.7	23 12.9	+60.0	10.8	24 11.8	+60.0	10.9	25 10.8	+59.9	11.0	26 09.7	+59.9	11.1	34
35	20 17.0	+59.9	10.5	21 16.0	+59.9	10.5	22 14.9	+60.0	10.6	23 13.9	+59.9	10.7	24 12.9	+59.9	10.8	25 11.8	+60.0	10.8	26 10.7	+60.0	10.9	27 09.6	+60.0	11.0	35
36	21 16.9	+59.9	10.4	22 15.9	+59.9	10.5	23 14.9	+59.9	10.5	24 13.8	+60.0	10.6	25 12.8	+59.9	10.7	26 11.8	+59.9	10.8	27 10.7	+59.9	10.9	28 09.6	+60.0	11.0	36
37	22 16.8	+59.9	10.3	23 15.8	+59.9	10.4	24 14.8	+59.9	10.5	25 13.8	+59.9	10.6	26 12.7	+60.0	10.7	27 11.7	+60.0	10.8	28 10.6	+60.0	10.9	29 09.6	+59.9	11.0	37
38	23 16.7	+59.9	10.3	24 15.7	+59.9	10.4	25 14.7	+59.9	10.4	26 13.7	+59.9	10.5	27 12.7	+59.9	10.6	28 11.7	+59.9	10.7	29 10.6	+60.0	10.8	30 09.5	+60.0	10.9	38
39	24 16.6	+59.9	10.2	25 15.6	+59.9	10.3	26 14.6	+59.9	10.4	27 13.6	+60.0	10.5	28 12.6	+60.0	10.6	29 11.6	+60.0	10.7	30 10.6	+59.9	10.8	31 09.5	+60.0	10.9	39
40	25 16.5	+59.8	10.1	26 15.5	+59.9	10.2	27 14.5	+60.0	10.3	28 13.6	+59.9	10.4	29 12.6	+59.9	10.5	30 11.6	+59.9	10.6	31 10.5	+60.0	10.7	32 09.5	+59.9	10.8	40
41	26 16.3	+59.9	10.1	27 15.4	+59.9	10.2	28 14.5	+59.9	10.3	29 13.5	+59.9	10.4	30 12.5	+59.9	10.5	31 11.5	+59.9	10.6	32 10.5	+59.9	10.7	33 09.4	+60.0	10.8	41
42	27 16.2	+59.9	10.0	28 15.3	+59.9	10.1	29 14.4	+59.9	10.2	30 13.4	+59.9	10.3	31 12.4	+60.0	10.4	32 11.4	+60.0	10.5	33 10.4	+60.0	10.6	34 09.4	+59.9	10.8	42
43	28 16.1	+59.9	9.9	29 15.2	+59.9	10.0	30 14.3	+59.9	10.1	31 13.3	+60.0	10.2	32 12.4	+59.9	10.4	33 11.4	+59.9	10.5	34 10.4	+59.9	10.6	35 09.3	+60.0	10.7	43
44	29 16.0	+59.9	9.9	30 15.1	+59.9	10.0	31 14.2	+59.9	10.1	32 13.3	+59.9	10.2	33 12.3	+59.9	10.3	34 11.3	+60.0	10.4	35 10.3	+60.0	10.5	36 09.3	+60.0	10.7	44
45	30 15.9	+59.9	9.8	31 15.0	+59.9	9.9	32 14.1	+59.9	10.0	33 13.2	+59.9	10.1	34 12.2	+60.0	10.2	35 11.3	+59.9	10.4	36 10.3	+59.9	10.5	37 09.3	+59.9	10.6	45
46	31 15.8	+59.9	9.7	32 14.9	+59.9	9.8	33 14.0	+59.9	9.9	34 13.1	+59.9	10.1	35 12.2	+59.9	10.2	36 11.2	+60.0	10.3	37 10.2	+60.0	10.4	38 09.2	+60.0	10.6	46
47	32 15.7	+59.8	9.7	33 14.8	+59.9	9.8	34 13.9	+59.9	9.9	35 13.0	+59.9	10.0	36 12.1	+59.9	10.1	37 11.2	+59.9	10.3	38 10.2	+59.9	10.4	39 09.2	+59.9	10.5	47
48	33 15.5	+59.9	9.6	34 14.7	+59.9	9.7	35 13.8	+59.9	9.8	36 12.9	+59.9	9.9	37 12.0	+60.0	10.1	38 11.1	+59.9	10.2	39 10.1	+60.0	10.3	40 09.1	+60.0	10.5	48
49	34 15.4	+59.9	9.5	35 14.6	+59.9	9.6	36 13.7	+59.9	9.7	37 12.8	+60.0	9.9	38 12.0	+59.9	10.0	39 11.0	+60.0	10.1	40 10.1	+59.9	10.3	41 09.1	+60.0	10.4	49
50	35 15.3	+59.8	9.4	36 14.5	+59.8	9.5	37 13.6	+59.9	9.7	38 12.8	+59.9	9.8	39 11.9	+59.9	9.9	40 11.0	+59.9	10.1	41 10.0	+60.0	10.2	42 09.1	+59.9	10.4	50
51	36 15.1	+59.9	9.3	37 14.3	+59.9	9.5	38 13.5	+59.9	9.6	39 12.7	+59.9	9.7	40 11.8	+59.9	9.9	41 10.9	+59.9	10.0	42 10.0	+59.9	10.2	43 09.0	+60.0	10.3	51
52	37 15.0	+59.9	9.3	38 14.2	+59.9	9.4	39 13.4	+59.9	9.5	40 12.6	+59.9	9.6	41 11.7	+59.9	9.8	42 10.8	+60.0	9.9	43 09.9	+59.9	10.1	44 09.0	+59.9	10.3	52
53	38 14.9	+59.8	9.2	39 14.1	+59.9	9.3	40 13.3	+59.9	9.4	41 12.5	+59.9	9.6	42 11.6	+59.9	9.7	43 10.8	+59.9	9.9	44 09.8	+60.0	10.0	45 08.9	+60.0	10.2	53
54	39 14.7	+59.9	9.1	40 14.0	+59.8	9.2	41 13.2	+59.9	9.4	42 12.4	+59.9	9.5	43 11.5	+59.9	9.6	44 10.7	+59.9	9.8	45 09.8	+59.9	10.0	46 08.9	+59.9	10.2	54
55	40 14.6	+59.8	9.0	41 13.8	+59.9	9.1	42 13.1	+59.8	9.3	43 12.3	+59.9	9.4	44 11.4	+60.0	9.6	45 10.6	+59.9	9.7	46 09.7	+60.0	9.9	47 08.8	+59.9	10.1	55
56	41 14.4	+59.9	8.9	42 13.7	+59.9	9.0	43 12.9	+59.9	9.2	44 12.2	+59.9	9.3	45 11.4	+59.9	9.5	46 10.5	+59.9	9.7	47 09.7	+59.9	9.8	48 08.7	+60.0	10.0	56
57	42 14.3	+59.8	8.8	43 13.6	+59.8	8.9	44 12.8	+59.9	9.1	45 12.1	+59.8	9.2	46 11.3	+59.9	9.4	47 10.4	+59.9	9.6	48 09.6	+59.9	9.8	49 08.7	+59.9	10.0	57
58	43 14.1	+59.8	8.7	44 13.4	+59.9	8.8	45 12.7	+59.9	9.0	46 11.9	+59.9	9.2	47 11.2	+59.9	9.3	48 10.3	+60.0	9.5	49 09.5	+59.9	9.7	50 08.6	+60.0	9.9	58
59	44 13.9	+59.9	8.6	45 13.3	+59.8	8.7	46 12.6	+59.8	8.9	47 11.8	+59.9	9.1	48 11.1	+59.8	9.2	49 10.3	+59.9	9.4	50 09.4	+60.0	9.6	51 08.6	+59.9	9.8	59
60	45 13.8	+59.8	8.5	46 13.1	+59.8	8.6	47 12.4	+59.9	8.8	48 11.7	+59.9	9.0	49 10.9	+59.9	9.2	50 10.2	+59.9	9.3	51 09.4	+59.9	9.5	52 08.5	+59.9	9.8	60
61	46 13.6	+59.8	8.4	47 12.9	+59.9	8.5	48 12.3	+59.8	8.7	49 11.6	+59.8	8.9	50 10.8	+59.9	9.1	51 10.1	+59.9	9.3	52 09.3	+59.9	9.5	53 08.4	+60.0	9.7	61
62	47 13.4	+59.8	8.3	48 12.8	+59.8	8.4	49 12.1	+59.9	8.6	50 11.4	+59.9	8.8	51 10.7	+59.9	9.0	52 10.0	+59.9	9.2	53 09.2	+59.9	9.4	54 08.4	+59.9	9.6	62
63	48 13.2	+59.8	8.1	49 12.6	+59.8	8.3	50 12.0	+59.8	8.5	51 11.3	+59.8	8.7	52 10.6	+59.9	8.9	53 09.9	+59.8	9.1	54 09.1	+59.9	9.3	55 08.3	+59.9	9.5	63
64	49 13.0	+59.8	8.0	50 12.4	+59.8	8.2	51 11.8	+59.8	8.4	52 11.1	+59.9	8.5	53 10.5	+59.8	8.7	54 09.7	+59.9	9.0	55 09.0	+59.9	9.2	56 08.2	+59.9	9.4	64
65	50 12.8	+59.8	7.9	51 12.2	+59.8	8.1	52 11.6	+59.8	8.2	53 11.0	+59.8	8.4	54 10.3	+59.9	8.6	55 09.6	+59.9	8.8	56 08.9	+59.9	9.1	57 08.1	+59.9	9.3	65
66	51 12.6	+59.8	7.8	52 12.0	+59.8	7.9	53 11.4	+59.9	8.1	54 10.8	+59.9	8.3	55 10.2	+59.8	8.5	56 09.5	+59.9	8.7	57 08.8	+59.9	9.0	58 08.0	+59.9	9.2	66
67	52 12.4	+59.7	7.6	53 11.8	+59.8	7.8	54 11.3	+59.8	8.0	55 10.7	+59.8	8.2	56 10.0	+59.9	8.4	57 09.4	+59.8	8.6	58 08.7	+59.9	8.9	59 07.9	+59.9	9.1	67
68	53 12.1	+59.8	7.5	54 11.6	+59.8	7.7	55 11.1	+59.8	7.8	56 10.5	+59.8	8.0	57 09.9	+59.8	8.3	58 09.2	+59.9	8.5	59 08.6	+59.8	8.7	60 07.8	+59.9	9.0	68
69	54 11.9	+59.7	7.3	55 11.4	+59.7	7.5	56 10.9	+59.7	7.7	57 10.3	+59.8	7.9	58 09.7	+59.8	8.1	59 09.1	+59.8	8.4	60 08.4	+59.9	8.6	61 07.7	+59.9	8.9	69
70	55 11.6	+59.7	7.2	56 11.1	+59.8	7.3	57 10.6	+59.8	7.5	58 10.1	+59.8	7.7	59 09.5	+59.9	8.0	60 08.9	+59.9	8.2	61 08.3	+59.9	8.5	62 07.6	+59.9	8.7	70
71	56 11.3	+59.8	7.0	57 10.9	+59.7	7.2	58 10.4	+59.8	7.4	59 09.9	+59.8	7.6	60 09.4	+59.8	7.8	61 08.8	+59.8	8.1	62 08.2	+59.8	8.3	63 07.5	+59.9	8.6	71
72	57 11.1	+59.7	6.8	58 10.6	+59.7	7.0	59 10.2	+59.7	7.2	60 09.7	+59.7	7.4	61 09.2	+59.7	7.7	62 08.6	+59.8	7.9	63 08.0	+59.9	8.2	64 07.4	+59.8	8.5	72
73	58 10.8	+59.6	6.6	59 10.3	+59.7	6.8	60 09.9	+59.7	7.0	61 09.4	+59.8	7.2	62 08.9	+59.8	7.5	63 08.4	+59.8	7.7	64 07.9	+59.8	8.0	65 07.2	+59.9	8.3	73
74	59 10.4	+59.7	6.4	60 10.0	+59.7	6.6	61 09.6	+59.7	6.8	62 09.2	+59.7	7.0	63 08.7	+59.8	7.3	64 08.2	+59.8	7.5	65 07.7	+59.8	7.8	66 07.1	+59.8	8.1	74
75	60 10.1	+59.6	6.2	61 09.7	+59.7	6.4	62 09.3	+59.7	6.6	63 08.9	+59.7	6.8	64 08.5	+59.7	7.1	65 08.0	+59.8	7.4	66 07.5	+59.8	7.6	67 06.9	+59.9	8.0	75
76	61 09.7	+59.6	6.0	62 09.4	+59.6	6.2	63 09.0	+59.7	6.4	64 08.6	+59.7	6.6	65 08.2	+59.7	6.9	66 07.8	+59.7	7.1	67 07.3	+59.8	7.4	68 06.8	+59.8	7.8	76
77	62 09.3	+59.6	5.7	63 09.0	+59.6	5.9	64 08.7	+59.6	6.2	65 08.3	+59.7	6.4	66 07.9	+59.7	6.6	67 07.5	+59.8	6.9	68 07.1	+59.7	7.2	69 06.6	+59.8	7.5	77
78	63 08.9	+59.6	5.5	64 08.6	+59.6	5.7	65 08.3	+59.6	5.9	66 08.0	+59.6	6.1	67 07.6	+59.7	6.4	68 07.3	+59.7	6.7	69 06.8	+59.8	7.0	70 06.4	+59.7	7.3	78
79	64 08.5	+59.5	5.2	65 08.2	+59.6	5.4	66 07.9	+59.6	5.6	67 07.6	+59.7	5.9	68 07.3	+59.7	6.1	69 07.0	+59.6	6.4	70 06.6	+59.7	6.7	71 06.1	+59.8	7.0	79
80	65 08.0	+59.5	4.9	66 07.8	+59.5	5.1	67 07.5	+59.6	5.3	68 07.3	+59.5	5.6	69 07.0	+59.6	5.8	70 06.6	+59.7	6.1	71 06.3	+59.7	6.4	72 05.9	+59.7	6.7	80
81	66 07.5	+59.4	4.6	67 07.3	+59.5	4.8	68 07.1	+59.5	5.0	69 06.8	+59.6	5.2	70 06.6	+59.5	5.5	71 06.3	+59.6	5.8	72 06.0	+59.6	6.1	73 05.6	+59.7	6.4	81
82	67 06.9	+59.4	4.3	68 06.8	+59.4	4.5	69 06.6	+59.4	4.7	70 06.4	+59.5	4.9	71 06.1	+59.6	5.1	72 05.9	+59.6	5.4	73 05.6	+59.6	5.7	74 05.3	+59.6	6.1	82
83	68 06.3	+59.4	3.9	69 06.2	+59.4	4.1	70 06.0	+59.4	4.3	71 05.9	+59.4	4.5	72 05.7	+59.4	4.7	73 05.5	+59.5	5.0	74 05.2	+59.6	5.3	75 04.9	+59.6	5.6	83
84	69 05.7	+59.3	3.5	70 05.6	+59.3	3.7	71 05.4	+59.4	3.8	72 05.3	+59.4	4.1	73 05.1	+59.4	4.3	74 05.0	+59.4	4.5	75 04.8	+59.4	4.8	76 04.5	+59.6	5.2	84
85	70 05.0	+59.2	3.0	71 04.9	+59.2	3.2	72 04.8	+59.2	3.4	73 04.7	+59.3	3.6	74 04.5	+59.4	3.8	75 04.4	+59.4	4.0	76 04.2	+59.5	4.3	77 04.1	+59.4	4.6	85
86	71 04.2	+59.1	2.6	72 04.1	+59.2	2.7	73 04.0	+59.2	2.9	74 04.0	+59.2	3.0	75 03.9	+59.2	3.2	76 03.8	+59.2	3.5	77 03.7	+59.3	3.7	78 03.5	+59.4	4.0	86
87	72 03.3	+59.0	2.0	73 03.3	+59.0	2.1	74 03.2	+59.1	2.3	75 03.2	+59.1	2.4	76 03.1	+59.1	2.6	77 03.0	+59.2	2.8	78 03.0	+59.2	3.0	79 02.9	+59.2	3.3	87
88	73 02.3	+58.9	1.4	74 02.3	+58.9	1.5	75 02.3	+58.9	1.6	76 02.3	+58.9	1.7	77 02.2	+59.0	1.9	78 02.2	+59.0	2.0	79 02.2	+59.0	2.2	80 02.1	+59.1	2.4	88
89	74 01.2	+58.8	0.8	75 01.2	+58.8	0.8	76 01.2	+58.8	0.9	77 01.2	+58.8	0.9	78 01.2	+58.8	1.0	79 01.2	+58.8	1.1	80 01.2	+58.8	1.2	81 01.2	+58.8	1.3	89
90	75 00.0	+58.6	0.0	76 00.0	+58.6	0.0	77 00.0	+58.6	0.0	78 00.0	+58.6	0.0	79 00.0	+58.6	0.0	80 00.0	+58.5	0.0	81 00.0	+58.5	0.0	82 00.0	+58.5	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 168°, 192°

13°, 347° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 36.4	+59.9	166.6	13 38.0	+60.0	166.6	12 39.7	+59.9	166.7	11 41.3	+59.9	166.7	10 42.9	+59.9	166.8	9 44.5	+59.9	166.8	8 46.0	+60.0	166.8	7 47.6	+60.0	166.9	**0**
1	15 36.3	+59.9	166.5	14 38.0	+59.9	166.6	13 39.6	+59.9	166.6	12 41.2	+59.9	166.7	11 42.8	+60.0	166.7	10 44.4	+60.0	166.8	9 46.0	+60.0	166.8	8 47.6	+60.0	166.8	**1**
2	16 36.2	+59.9	166.4	15 37.9	+59.9	166.5	14 39.5	+59.9	166.6	13 41.1	+60.0	166.6	12 42.8	+59.9	166.7	11 44.4	+59.9	166.7	10 46.0	+59.9	166.8	9 47.6	+59.9	166.8	**2**
3	17 36.1	+59.9	166.4	16 37.8	+59.9	166.4	15 39.4	+59.9	166.5	14 41.1	+59.9	166.6	13 42.7	+59.9	166.6	12 44.3	+60.0	166.7	11 45.9	+60.0	166.7	10 47.5	+60.0	166.8	**3**
4	18 36.0	+59.9	166.3	17 37.7	+59.9	166.4	16 39.3	+60.0	166.5	15 41.0	+59.9	166.5	14 42.6	+60.0	166.6	13 44.3	+59.9	166.6	12 45.9	+60.0	166.7	11 47.5	+60.0	166.7	**4**
5	19 35.9	+59.8	166.2	18 37.6	+59.9	166.3	17 39.3	+59.9	166.4	16 40.9	+60.0	166.5	15 42.6	+59.9	166.5	14 44.2	+60.0	166.6	13 45.9	+59.9	166.7	12 47.5	+59.9	166.7	**5**
6	20 35.7	+59.9	166.2	19 37.5	+59.9	166.3	18 39.2	+59.9	166.3	17 40.9	+59.9	166.4	16 42.5	+60.0	166.5	15 44.2	+59.9	166.6	14 45.8	+60.0	166.6	13 47.4	+60.0	166.7	**6**
7	21 35.6	+59.9	166.1	20 37.4	+59.9	166.2	19 39.1	+59.9	166.3	18 40.8	+59.9	166.4	17 42.5	+59.9	166.4	16 44.1	+60.0	166.5	15 45.8	+59.9	166.6	14 47.4	+60.0	166.6	**7**
8	22 35.5	+59.9	166.0	21 37.3	+59.9	166.1	20 39.0	+59.9	166.2	19 40.7	+59.9	166.3	18 42.4	+59.9	166.4	17 44.1	+59.9	166.5	16 45.7	+60.0	166.5	15 47.4	+59.9	166.6	**8**
9	23 35.4	+59.9	166.0	22 37.2	+59.9	166.1	21 38.9	+59.9	166.2	20 40.6	+60.0	166.3	19 42.3	+60.0	166.3	18 44.0	+60.0	166.4	17 45.7	+60.0	166.5	16 47.3	+60.0	166.6	**9**
10	24 35.3	+59.8	165.9	23 37.1	+59.8	166.0	22 38.8	+59.9	166.1	21 40.6	+59.9	166.2	20 42.3	+59.9	166.3	19 44.0	+59.9	166.4	18 45.7	+59.9	166.5	17 47.3	+60.0	166.5	**10**
11	25 35.1	+59.9	165.8	24 36.9	+59.9	165.9	23 38.7	+59.9	166.1	22 40.5	+59.9	166.2	21 42.2	+60.0	166.3	20 43.9	+60.0	166.3	19 45.6	+60.0	166.4	18 47.3	+59.9	166.5	**11**
12	26 35.0	+59.9	165.8	25 36.8	+59.9	165.9	24 38.6	+59.9	166.0	23 40.4	+59.9	166.1	22 42.2	+59.9	166.2	21 43.9	+59.9	166.3	20 45.6	+59.9	166.4	19 47.2	+60.0	166.5	**12**
13	27 34.9	+59.9	165.7	26 36.7	+59.9	165.8	25 38.5	+60.0	165.9	24 40.3	+60.0	166.0	23 42.1	+59.9	166.2	22 43.8	+60.0	166.3	21 45.5	+60.0	166.3	20 47.2	+60.0	166.4	**13**
14	28 34.8	+59.8	165.6	27 36.6	+59.9	165.7	26 38.5	+59.9	165.9	25 40.3	+59.9	166.0	24 42.0	+60.0	166.1	23 43.8	+59.9	166.2	22 45.5	+59.9	166.3	21 47.2	+59.9	166.4	**14**
15	29 34.6	+59.9	165.5	28 36.5	+59.9	165.7	27 38.4	+59.9	165.8	26 40.2	+59.9	165.9	25 42.0	+59.9	166.0	24 43.7	+60.0	166.2	23 45.4	+60.0	166.3	22 47.1	+60.0	166.4	**15**
16	30 34.5	+59.8	165.5	29 36.4	+59.9	165.6	28 38.3	+59.9	165.7	27 40.1	+59.9	165.9	26 41.9	+59.9	166.0	25 43.7	+59.9	166.1	24 45.4	+59.9	166.2	23 47.1	+60.0	166.3	**16**
17	31 34.3	+59.9	165.4	30 36.3	+59.8	165.5	29 38.2	+59.9	165.7	28 40.0	+59.9	165.8	27 41.8	+59.9	165.9	26 43.6	+59.9	166.1	25 45.3	+60.0	166.2	24 47.1	+59.9	166.3	**17**
18	32 34.2	+59.9	165.3	31 36.1	+59.9	165.5	30 38.1	+59.8	165.6	29 39.9	+59.9	165.7	28 41.7	+60.0	165.9	27 43.5	+60.0	166.0	26 45.3	+60.0	166.1	25 47.0	+60.0	166.3	**18**
19	33 34.1	+59.8	165.2	32 36.0	+59.9	165.4	31 37.9	+59.9	165.5	30 39.8	+59.9	165.7	29 41.7	+59.9	165.8	28 43.5	+59.9	166.0	27 45.3	+59.9	166.1	26 47.0	+60.0	166.2	**19**
20	34 33.9	+59.9	165.1	33 35.9	+59.9	165.3	32 37.8	+59.9	165.5	31 39.7	+59.9	165.6	30 41.6	+59.9	165.8	29 43.4	+60.0	165.9	28 45.2	+60.0	166.0	27 47.0	+59.9	166.2	**20**
21	35 33.8	+59.8	165.0	34 35.8	+59.8	165.2	33 37.7	+59.9	165.4	32 39.6	+60.0	165.6	31 41.5	+59.9	165.7	30 43.4	+59.9	165.9	29 45.2	+59.9	166.0	28 46.9	+60.0	166.1	**21**
22	36 33.6	+59.8	164.9	35 35.6	+59.9	165.1	34 37.6	+59.9	165.3	33 39.6	+59.9	165.5	32 41.4	+60.0	165.7	31 43.3	+59.9	165.8	30 45.1	+60.0	166.0	29 46.9	+59.9	166.1	**22**
23	37 33.4	+59.9	164.9	36 35.5	+59.9	165.1	35 37.5	+59.9	165.2	34 39.5	+59.9	165.4	33 41.4	+59.9	165.6	32 43.2	+60.0	165.8	31 45.1	+59.9	165.9	30 46.8	+60.0	166.1	**23**
24	38 33.3	+59.8	164.8	37 35.4	+59.8	165.0	36 37.4	+59.9	165.2	35 39.4	+59.9	165.3	34 41.3	+59.9	165.5	33 43.2	+59.9	165.7	32 45.0	+60.0	165.9	31 46.8	+60.0	166.0	**24**
25	39 33.1	+59.8	164.7	38 35.2	+59.9	164.9	37 37.3	+59.8	165.1	36 39.3	+59.9	165.3	35 41.2	+59.9	165.5	34 43.1	+59.9	165.6	33 45.0	+59.9	165.8	32 46.8	+59.9	166.0	**25**
26	40 32.9	+59.9	164.6	39 35.1	+59.8	164.8	38 37.1	+59.9	165.0	37 39.2	+59.8	165.2	36 41.1	+59.9	165.4	35 43.0	+60.0	165.6	34 44.9	+59.9	165.8	33 46.7	+60.0	165.9	**26**
27	41 32.8	+59.8	164.5	40 34.9	+59.9	164.7	39 37.0	+59.9	164.9	38 39.0	+59.9	165.1	37 41.0	+59.9	165.3	36 43.0	+59.9	165.5	35 44.8	+60.0	165.7	34 46.7	+59.9	165.9	**27**
28	42 32.6	+59.8	164.4	41 34.8	+59.8	164.6	40 36.9	+59.8	164.8	39 38.9	+59.9	165.1	38 40.9	+59.9	165.3	37 42.9	+59.9	165.5	36 44.8	+59.9	165.6	35 46.6	+60.0	165.8	**28**
29	43 32.4	+59.8	164.3	42 34.6	+59.8	164.5	41 36.7	+59.9	164.7	40 38.8	+59.9	165.0	39 40.8	+60.0	165.2	38 42.8	+59.9	165.4	37 44.7	+60.0	165.6	36 46.6	+59.9	165.8	**29**
30	44 32.2	+59.8	164.1	43 34.4	+59.9	164.4	42 36.6	+59.9	164.7	41 38.7	+59.9	164.9	40 40.8	+59.9	165.1	39 42.7	+60.0	165.3	38 44.7	+59.9	165.5	37 46.5	+60.0	165.7	**30**
31	45 32.0	+59.8	164.0	44 34.3	+59.8	164.3	43 36.5	+59.8	164.6	42 38.6	+59.9	164.8	41 40.7	+59.9	165.0	40 42.7	+59.9	165.3	39 44.6	+59.9	165.5	38 46.5	+59.9	165.7	**31**
32	46 31.8	+59.7	163.9	45 34.1	+59.8	164.2	44 36.3	+59.9	164.5	43 38.5	+59.8	164.7	42 40.6	+59.9	165.0	41 42.6	+59.9	165.2	40 44.5	+60.0	165.4	39 46.4	+60.0	165.6	**32**
33	47 31.5	+59.8	163.8	46 33.9	+59.8	164.1	45 36.2	+59.8	164.4	44 38.3	+59.9	164.6	43 40.5	+59.8	164.9	42 42.5	+59.9	165.1	41 44.5	+59.9	165.4	40 46.4	+59.9	165.6	**33**
34	48 31.3	+59.8	163.6	47 33.7	+59.8	164.0	46 36.0	+59.8	164.3	45 38.2	+59.9	164.5	44 40.3	+59.9	164.8	43 42.4	+59.9	165.0	42 44.4	+59.9	165.3	41 46.3	+60.0	165.5	**34**
35	49 31.1	+59.7	163.5	48 33.5	+59.8	163.8	47 35.8	+59.9	164.1	46 38.1	+59.8	164.4	45 40.2	+59.9	164.7	44 42.3	+59.9	165.0	43 44.3	+60.0	165.2	42 46.3	+59.9	165.5	**35**
36	50 30.8	+59.8	163.4	49 33.3	+59.8	163.7	48 35.7	+59.8	164.0	47 37.9	+59.9	164.3	46 40.1	+59.9	164.6	45 42.2	+59.9	164.9	44 44.3	+59.9	165.2	43 46.2	+60.0	165.4	**36**
37	51 30.6	+59.7	163.2	50 33.1	+59.8	163.6	49 35.5	+59.8	163.9	48 37.8	+59.8	164.2	47 40.0	+59.9	164.5	46 42.1	+59.9	164.8	45 44.2	+59.9	165.1	44 46.2	+59.9	165.3	**37**
38	52 30.3	+59.7	163.1	51 32.9	+59.7	163.4	50 35.3	+59.8	163.8	49 37.6	+59.9	164.1	48 39.9	+59.8	164.4	47 42.0	+59.9	164.7	46 44.1	+59.9	165.0	45 46.1	+60.0	165.3	**38**
39	53 30.0	+59.7	162.9	52 32.6	+59.8	163.3	51 35.1	+59.8	163.7	50 37.5	+59.8	164.0	49 39.7	+59.9	164.3	48 41.9	+59.9	164.6	47 44.0	+59.9	164.9	46 46.1	+59.9	165.2	**39**
40	54 29.7	+59.7	162.7	53 32.4	+59.7	163.1	52 34.9	+59.8	163.5	51 37.3	+59.8	163.9	50 39.6	+59.9	164.2	49 41.8	+59.9	164.5	48 43.9	+60.0	164.9	47 46.0	+59.9	165.1	**40**
41	55 29.4	+59.7	162.6	54 32.1	+59.7	163.0	53 34.7	+59.8	163.4	52 37.1	+59.8	163.8	51 39.5	+59.8	164.1	50 41.7	+59.9	164.5	49 43.9	+59.9	164.8	48 45.9	+60.0	165.1	**41**
42	56 29.1	+59.7	162.4	55 31.8	+59.8	162.8	54 34.5	+59.7	163.2	53 36.9	+59.9	163.6	52 39.3	+59.9	164.0	51 41.6	+59.9	164.4	50 43.8	+59.9	164.7	49 45.9	+59.9	165.0	**42**
43	57 28.8	+59.6	162.2	56 31.6	+59.7	162.6	55 34.2	+59.8	163.1	54 36.8	+59.8	163.5	53 39.2	+59.8	163.9	52 41.5	+59.8	164.3	51 43.7	+59.9	164.6	50 45.8	+59.9	164.9	**43**
44	58 28.4	+59.6	162.0	57 31.3	+59.6	162.5	56 34.0	+59.7	162.9	55 36.6	+59.7	163.4	54 39.0	+59.8	163.8	53 41.3	+59.9	164.1	52 43.6	+59.9	164.5	51 45.7	+59.9	164.8	**44**
45	59 28.0	+59.6	161.8	58 30.9	+59.7	162.3	57 33.7	+59.7	162.7	56 36.3	+59.8	163.2	55 38.8	+59.9	163.6	54 41.2	+59.9	164.0	53 43.5	+59.9	164.4	52 45.6	+59.9	164.8	**45**
46	60 27.6	+59.6	161.5	59 30.6	+59.6	162.1	58 33.4	+59.7	162.6	57 36.1	+59.8	163.0	56 38.7	+59.8	163.5	55 41.1	+59.8	163.9	54 43.4	+59.9	164.3	53 45.5	+60.0	164.7	**46**
47	61 27.2	+59.5	161.3	60 30.2	+59.7	161.8	59 33.1	+59.7	162.4	58 35.9	+59.7	162.9	57 38.5	+59.8	163.3	56 40.9	+59.9	163.8	55 43.3	+59.8	164.2	54 45.5	+59.9	164.6	**47**
48	62 26.7	+59.5	161.0	61 29.9	+59.6	161.6	60 32.8	+59.7	162.2	59 35.6	+59.8	162.7	58 38.3	+59.8	163.2	57 40.8	+59.8	163.6	56 43.1	+59.9	164.1	55 45.4	+59.9	164.5	**48**
49	63 26.2	+59.5	160.7	62 29.5	+59.5	161.4	61 32.5	+59.7	162.0	60 35.4	+59.7	162.5	59 38.1	+59.7	163.0	58 40.6	+59.8	163.5	57 43.0	+59.9	164.0	56 45.3	+59.9	164.4	**49**
50	64 25.7	+59.4	160.4	63 29.0	+59.6	161.1	62 32.2	+59.6	161.7	61 35.1	+59.7	162.3	60 37.8	+59.8	162.9	59 40.4	+59.8	163.4	58 42.9	+59.8	163.8	57 45.2	+59.9	164.3	**50**
51	65 25.1	+59.4	160.1	64 28.6	+59.5	160.8	63 31.8	+59.6	161.5	62 34.8	+59.7	162.1	61 37.6	+59.7	162.7	60 40.2	+59.8	163.2	59 42.7	+59.9	163.7	58 45.1	+59.9	164.2	**51**
52	66 24.5	+59.3	159.8	65 28.1	+59.4	160.5	64 31.4	+59.5	161.2	63 34.5	+59.6	161.9	62 37.3	+59.8	162.5	61 40.0	+59.8	163.0	60 42.6	+59.8	163.6	59 45.0	+59.8	164.0	**52**
53	67 23.8	+59.3	159.4	66 27.5	+59.4	160.2	65 30.9	+59.6	160.9	64 34.1	+59.7	161.6	63 37.1	+59.7	162.3	62 39.8	+59.8	162.9	61 42.4	+59.8	163.4	60 44.8	+59.9	163.9	**53**
54	68 23.1	+59.2	159.0	67 26.9	+59.4	159.8	66 30.5	+59.5	160.6	65 33.8	+59.6	161.4	64 36.8	+59.7	162.0	63 39.6	+59.8	162.7	62 42.2	+59.9	163.2	61 44.7	+59.9	163.8	**54**
55	69 22.3	+59.2	158.5	68 26.3	+59.3	159.4	67 30.0	+59.4	160.3	66 33.4	+59.5	161.1	65 36.5	+59.6	161.8	64 39.4	+59.7	162.5	63 42.1	+59.8	163.1	62 44.6	+59.8	163.6	**55**
56	70 21.5	+59.0	158.0	69 25.6	+59.3	159.0	68 29.4	+59.4	159.9	67 32.9	+59.5	160.8	66 36.1	+59.7	161.5	65 39.1	+59.7	162.2	64 41.9	+59.8	162.9	63 44.4	+59.9	163.5	**56**
57	71 20.5	+58.9	157.5	70 24.9	+59.1	158.6	69 28.8	+59.4	159.5	68 32.4	+59.5	160.4	67 35.8	+59.6	161.2	66 38.8	+59.7	162.0	65 41.7	+59.7	162.7	64 44.3	+59.8	163.3	**57**
58	72 19.4	+58.9	156.9	71 24.0	+59.1	158.1	70 28.2	+59.2	159.1	69 31.9	+59.5	160.1	68 35.4	+59.5	160.9	67 38.5	+59.7	161.7	66 41.4	+59.8	162.5	65 44.1	+59.8	163.1	**58**
59	73 18.3	+58.7	156.2	72 23.1	+59.0	157.5	71 27.4	+59.2	158.6	70 31.4	+59.3	159.7	69 34.9	+59.6	160.6	68 38.2	+59.6	161.5	67 41.2	+59.7	162.2	66 43.9	+59.8	162.9	**59**
60	74 17.0	+58.5	155.5	73 22.1	+58.8	156.9	72 26.6	+59.1	158.1	71 30.7	+59.3	159.2	70 34.5	+59.4	160.2	69 37.8	+59.6	161.1	68 40.9	+59.7	162.0	67 43.7	+59.8	162.7	**60**
61	75 15.5	+58.3	154.6	74 20.9	+58.7	156.2	73 25.7	+59.0	157.5	72 30.0	+59.3	158.7	71 33.9	+59.4	159.8	70 37.4	+59.6	160.8	69 40.6	+59.7	161.7	68 43.5	+59.8	162.5	**61**
62	76 13.8	+58.0	153.7	75 19.6	+58.5	155.4	74 24.7	+58.9	156.9	73 29.3	+59.1	158.2	72 33.3	+59.4	159.4	71 37.0	+59.5	160.4	70 40.3	+59.6	161.4	69 43.3	+59.7	162.3	**62**
63	77 11.8	+57.7	152.6	76 18.1	+58.3	154.5	75 23.6	+58.7	156.1	74 28.4	+59.0	157.6	73 32.7	+59.3	158.9	72 36.5	+59.5	160.0	71 39.9	+59.6	161.1	70 43.0	+59.7	162.0	**63**
64	78 09.5	+57.3	151.3	77 16.4	+57.9	153.4	76 22.3	+58.5	155.3	75 27.4	+58.9	156.9	74 32.0	+59.1	158.3	73 36.0	+59.3	159.6	72 39.5	+59.6	160.7	71 42.7	+59.7	161.7	**64**
65	79 06.8	+56.8	149.8	78 14.3	+57.7	152.2	77 20.8	+58.2	154.3	76 26.3	+58.7	156.1	75 31.1	+59.1	157.7	74 35.3	+59.4	159.0	73 39.1	+59.5	160.3	72 42.4	+59.7	161.3	**65**
66	80 03.6	+56.1	148.0	79 12.0	+57.1	150.8	78 19.0	+57.9	153.1	77 25.0	+58.5	155.2	76 30.2	+58.9	156.9	75 34.7	+59.2	158.4	74 38.6	+59.4	159.8	73 42.1	+59.6	161.0	**66**
67	80 59.7	+55.2	145.8	80 09.1	+56.6	149.1	79 16.9	+57.5	151.8	78 23.5	+58.2	154.1	77 29.1	+58.7	156.1	76 33.9	+59.0	157.8	75 38.0	+59.4	159.3	74 41.7	+59.5	160.6	**67**
68	81 54.9	+53.9	143.2	81 05.7	+55.7	147.0	80 14.4	+57.0	150.2	79 21.7	+57.8	152.8	78 27.8	+58.4	155.1	77 32.9	+59.0	157.0	76 37.4	+59.2	158.6	75 41.2	+59.5	160.1	**68**
69	82 48.8	*+52.1*	•139.9	82 01.4	+54.5	144.5	81 11.4	+56.2	148.2	80 19.5	+57.4	151.3	79 26.2	+58.2	153.9	78 31.9	+58.7	156.1	77 36.6	+59.1	157.9	76 40.7	+59.4	159.5	**69**
70	83 40.9	*+49.4*	•135.6	82 55.9	*+52.9*	•141.3	82 07.6	+55.2	145.8	81 16.9	+56.7	149.5	80 24.4	+57.8	152.5	79 30.6	+58.4	155.0	78 35.7	+59.0	157.1	77 40.1	+59.3	158.9	**70**
71	84 30.3	*+45.3*	•130.1	83 48.8	*+50.4*	•137.2	83 02.8	+53.6	142.8	82 13.6	+55.8	147.2	81 22.2	+57.1	150.8	80 29.0	+58.1	153.7	79 34.7	+58.7	156.1	78 39.4	+59.2	158.1	**71**
72	85 15.6	*+38.9*	•122.7	84 39.2	*+46.4*	•131.8	83 56.4	*+51.4*	•138.8	83 09.4	+54.4	144.3	82 19.3	+56.4	148.6	81 27.1	+57.7	152.1	80 33.4	+58.5	154.9	79 38.6	+58.9	157.3	**72**
73	85 54.5	*+29.1*	•112.8	85 25.6	*+40.3*	•124.4	84 47.8	*+47.6*	•133.5	84 03.8	*+52.3*	•140.5	83 15.7	+55.1	145.9	82 24.8	+56.9	150.1	81 31.9	+58.0	153.5	80 37.5	+58.8	156.2	**73**
74	86 23.6	*+14.9*	•99.7	86 05.9	*+30.3*	•114.3	85 35.4	*+41.7*	•126.2	84 56.1	*+48.9*	•135.4	84 10.8	*+53.3*	•142.3	83 21.7	+55.9	147.6	82 29.9	+57.4	151.6	81 36.3	+58.4	154.9	**74**
75	86 38.5	*–2.3*	•83.7	86 36.2	*+15.5*	•100.7	86 17.1	*+31.6*	•116.0	85 45.0	*+43.1*	•128.2	85 04.1	*+50.2*	•137.4	84 17.6	*+54.2*	•144.2	83 27.3	+56.6	149.3	82 34.7	+58.0	153.2	**75**
76	86 36.2	*–19.1*	•66.7	86 51.7	*–3.0*	•83.7	86 48.7	*+16.2*	•101.8	86 28.1	*+33.2*	•117.9	85 54.3	*+44.7*	•130.4	85 11.8	*+51.4*	•139.5	84 23.9	+55.1	146.1	83 32.7	+57.2	151.1	**76**
77	86 17.1	*–32.1*	•51.3	86 48.7	*–20.6*	•65.5	87 04.9	*–3.6*	•83.7	87 01.3	*+16.9*	•103.1	86 39.0	*+34.8*	•120.0	86 03.2	*+46.3*	•132.7	85 19.0	*+52.7*	•141.7	84 29.9	+56.0	148.1	**77**
78	85 45.0	*–40.9*	•39.1	86 28.1	*–33.8*	•49.4	87 01.3	*–22.3*	•64.2	87 18.2	*–4.4*	•83.6	87 13.8	*+17.7*	•104.6	86 49.5	*+36.6*	•122.4	86 11.7	*+48.1*	•135.2	85 25.9	*+53.9*	•144.0	**78**
79	85 04.1	*–46.5*	•30.0	85 54.3	*–42.5*	•36.9	86 39.0	*–35.8*	•47.3	87 13.8	*–24.3*	•62.6	87 31.5	*–5.4*	•83.6	87 26.1	*+18.7*	•106.4	86 59.8	*+38.6*	•125.0	86 19.8	*+49.8*	•137.9	**79**
80	84 17.6	*–50.3*	•23.1	85 11.8	*–47.9*	•27.8	86 03.2	*–44.2*	•34.6	86 49.5	*–37.8*	•44.9	87 26.1	*–26.3*	•60.8	87 44.8	*–6.4*	•83.6	87 38.4	*+19.8*	•108.5	87 09.6	*+40.8*	•128.0	**80**
81	83 27.3	*–52.6*	•18.0	84 23.9	*–51.2*	•21.1	85 19.0	*–49.1*	•25.5	86 11.7	*–45.8*	•32.0	86 59.8	*–40.0*	•42.2	87 38.4	*–28.8*	•58.7	87 58.2	*–7.8*	•83.6	87 50.4	*+21.3*	•111.0	**81**
82	82 34.7	–54.3	14.0	83 32.7	–53.5	16.2	84 29.9	*–52.3*	•19.1	85 25.9	*–50.5*	•23.1	86 19.8	*–47.6*	•29.3	87 09.6	*–42.3*	•39.2	87 50.4	*–31.5*	•56.2	88 11.7	*–9.5*	•83.6	**82**
83	81 40.4	–55.4	10.9	82 39.2	–55.0	12.4	83 37.6	–54.3	14.3	84 35.4	*–53.3*	•16.9	85 32.2	*–51.7*	•20.6	86 27.3	*–49.2*	•26.3	87 18.9	*–44.6*	•35.8	88 02.2	*–34.6*	•53.2	**83**
84	80 45.0	–56.3	8.4	81 44.2	–55.9	9.4	82 43.3	–55.6	10.7	83 42.1	–55.0	12.4	84 40.5	*–54.3*	•14.7	85 38.1	*–53.0*	•18.0	86 34.3	*–50.9*	•23.2	87 27.6	*–47.0*	•32.1	**84**
85	79 48.7	–57.0	6.4	80 48.3	–56.8	7.0	81 47.7	–56.5	7.9	82 47.1	–56.2	9.0	83 46.2	–55.7	10.4	84 45.1	–55.2	12.4	85 43.4	*–54.2*	•15.2	86 40.6	*–52.6*	•19.8	**85**
86	78 51.7	–57.4	4.7	79 51.5	–57.3	5.1	80 51.2	–57.1	5.7	81 50.9	–57.0	6.4	82 50.5	–56.8	7.2	83 49.9	–56.4	8.4	84 49.2	–56.0	10.0	85 48.0	*–55.3*	•12.4	**86**
87	77 54.3	–57.8	3.2	78 54.2	–57.8	3.5	79 54.1	–57.7	3.8	80 53.9	–57.6	4.3	81 53.7	–57.4	4.8	82 53.5	–57.3	5.5	83 53.2	–57.1	6.3	84 52.7	–56.8	7.6	**87**
88	76 56.5	–58.1	2.0	77 56.4	–58.1	2.2	78 56.4	–58.1	2.3	79 56.3	–58.0	2.6	80 56.3	–58.0	2.9	81 56.2	–57.9	3.2	82 56.1	–57.8	3.7	83 55.9	–57.7	4.3	**88**
89	75 58.4	–58.4	0.9	76 58.3	–58.3	1.0	77 58.3	–58.3	1.1	78 58.3	–58.3	1.2	79 58.3	–58.3	1.3	80 58.3	–58.3	1.4	81 58.3	–58.3	1.6	82 58.2	–58.2	1.8	**89**
90	75 00.0	–58.6	0.0	76 00.0	–58.6	0.0	77 00.0	–58.6	0.0	78 00.0	–58.6	0.0	79 00.0	–58.6	0.0	80 00.0	–58.6	0.0	81 00.0	–58.6	0.0	82 00.0	–58.6	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 13°, 347°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 36.4	−59.9	166.6	13 38.0	−59.9	166.6	12 39.7	−59.9	166.7	11 41.3	−59.9	166.7	10 42.9	−60.0	166.8	9 44.5	−60.0	166.8	8 46.0	−59.9	166.8	7 47.6	−59.9	166.9	**0**
1	13 36.5	−59.9	166.6	12 38.1	−59.9	166.7	11 39.8	−60.0	166.7	10 41.4	−60.0	166.8	9 42.9	−59.9	166.8	8 44.5	−59.9	166.8	7 46.1	−60.0	166.9	6 47.7	−60.0	166.9	**1**
2	12 36.6	−59.9	166.7	11 38.2	−59.9	166.7	10 39.8	−59.9	166.8	9 41.4	−59.9	166.8	8 43.0	−59.9	166.9	7 44.6	−60.0	166.9	6 46.1	−59.9	166.9	5 47.7	−60.0	166.9	**2**
3	11 36.7	−59.9	166.7	10 38.3	−59.9	166.8	9 39.9	−59.9	166.8	8 41.5	−59.9	166.9	7 43.1	−60.0	166.9	6 44.6	−59.9	167.0	5 46.2	−60.0	167.0	4 47.7	−60.0	167.0	**3**
4	10 36.8	−59.9	166.8	9 38.4	−59.9	166.8	8 40.0	−59.9	166.9	7 41.6	−60.0	166.9	6 43.1	−59.9	166.9	5 44.7	−60.0	167.0	4 46.2	−60.0	167.0	3 47.7	−59.9	167.0	**4**
5	9 36.9	−59.9	166.9	8 38.5	−59.9	166.9	7 40.1	−60.0	166.9	6 41.6	−59.9	167.0	5 43.2	−60.0	167.0	4 44.7	−60.0	167.0	3 46.2	−59.9	167.0	2 47.8	−60.0	167.0	**5**
6	8 37.0	−59.8	166.9	7 38.6	−59.9	167.0	6 40.1	−59.9	167.0	5 41.7	−59.9	167.0	4 43.2	−59.9	167.0	3 44.7	−59.9	167.0	2 46.3	−60.0	167.1	1 47.8	−60.0	167.1	**6**
7	7 37.2	−59.9	167.0	6 38.7	−59.9	167.0	5 40.2	−59.9	167.0	4 41.8	−60.0	167.1	3 43.3	−60.0	167.1	2 44.8	−60.0	167.1	1 46.3	−60.0	167.1	0 47.8	−59.9	167.1	**7**
8	6 37.3	−59.9	167.0	5 38.8	−59.9	167.1	4 40.3	−59.9	167.1	3 41.8	−59.9	167.1	2 43.3	−59.9	167.1	1 44.8	−59.9	167.1	0 46.3	−59.9	167.1	0 12.1	+60.0	12.9	**8**
9	5 37.4	−59.9	167.1	4 38.9	−59.9	167.1	3 40.4	−59.9	167.1	2 41.9	−60.0	167.1	1 43.4	−60.0	167.2	0 44.9	−60.0	167.2	0 13.6	+60.0	12.8	1 12.1	+60.0	12.8	**9**
10	4 37.5	−59.9	167.2	3 39.0	−59.9	167.2	2 40.5	−60.0	167.2	1 41.9	−59.9	167.2	0 43.4	−59.9	167.2	0 15.1	+59.9	12.8	1 13.6	+59.9	12.8	2 12.1	+60.0	12.8	**10**
11	3 37.6	−59.9	167.2	2 39.1	−60.0	167.2	1 40.5	−59.9	167.2	0 42.0	−59.9	167.2	0 16.5	+59.9	12.8	1 15.0	+60.0	12.8	2 13.5	+60.0	12.8	3 12.1	+59.9	12.8	**11**
12	2 37.7	−59.9	167.3	1 39.1	−59.9	167.3	0 40.6	−59.9	167.3	0 17.9	+60.0	12.7	1 16.4	+60.0	12.7	2 15.0	+59.9	12.7	3 13.5	+60.0	12.7	4 12.0	+60.0	12.7	**12**
13	1 37.8	−59.9	167.3	0 39.2	−59.9	167.3	0 19.3	+59.9	12.7	1 17.9	+59.9	12.7	2 16.4	+59.9	12.7	3 14.9	+60.0	12.7	4 13.5	+59.9	12.7	5 12.0	+60.0	12.7	**13**
14	0 37.9	−59.9	167.4	0 20.7	+59.9	12.6	1 19.2	+60.0	12.6	2 17.8	+59.9	12.6	3 16.3	+60.0	12.6	4 14.9	+59.9	12.6	5 13.4	+60.0	12.7	6 12.0	+59.9	12.7	**14**
15	0 22.0	+59.9	12.5	1 20.6	+59.9	12.6	2 19.2	+59.9	12.6	3 17.7	+60.0	12.6	4 16.3	+59.9	12.6	5 14.8	+60.0	12.6	6 13.4	+60.0	12.6	7 11.9	+60.0	12.7	**15**
16	1 21.9	+59.9	12.5	2 20.5	+59.9	12.5	3 19.1	+59.9	12.5	4 17.7	+59.9	12.5	5 16.2	+60.0	12.5	6 14.8	+59.9	12.6	7 13.4	+59.9	12.6	8 11.9	+60.0	12.6	**16**
17	2 21.8	+59.9	12.4	3 20.4	+59.9	12.4	4 19.0	+59.9	12.5	5 17.6	+59.9	12.5	6 16.2	+59.9	12.5	7 14.7	+60.0	12.5	8 13.3	+60.0	12.6	9 11.9	+59.9	12.6	**17**
18	3 21.7	+59.9	12.4	4 20.3	+59.9	12.4	5 18.9	+59.9	12.4	6 17.5	+60.0	12.4	7 16.1	+60.0	12.5	8 14.7	+60.0	12.5	9 13.3	+59.9	12.5	10 11.8	+60.0	12.6	**18**
19	4 21.6	+59.9	12.3	5 20.2	+59.9	12.3	6 18.8	+60.0	12.4	7 17.5	+59.9	12.4	8 16.1	+59.9	12.4	9 14.7	+59.9	12.4	10 13.2	+60.0	12.5	11 11.8	+60.0	12.5	**19**
20	5 21.5	+59.9	12.3	6 20.1	+60.0	12.3	7 18.8	+59.9	12.3	8 17.4	+59.9	12.3	9 16.0	+59.9	12.4	10 14.6	+60.0	12.4	11 13.2	+60.0	12.4	12 11.8	+60.0	12.5	**20**
21	6 21.4	+59.9	12.2	7 20.1	+59.9	12.2	8 18.7	+59.9	12.3	9 17.3	+60.0	12.3	10 15.9	+60.0	12.3	11 14.6	+59.9	12.4	12 13.2	+59.9	12.4	13 11.8	+59.9	12.5	**21**
22	7 21.3	+59.9	12.1	8 20.0	+59.9	12.2	9 18.6	+59.9	12.2	10 17.3	+59.9	12.2	11 15.9	+59.9	12.3	12 14.5	+60.0	12.3	13 13.1	+60.0	12.4	14 11.7	+60.0	12.4	**22**
23	8 21.2	+59.9	12.1	9 19.9	+59.9	12.1	10 18.5	+60.0	12.1	11 17.2	+59.9	12.2	12 15.8	+60.0	12.2	13 14.5	+59.9	12.3	14 13.1	+59.9	12.3	15 11.7	+60.0	12.4	**23**
24	9 21.1	+59.9	12.0	10 19.8	+59.9	12.1	11 18.5	+59.9	12.1	12 17.1	+59.9	12.1	13 15.8	+59.9	12.2	14 14.4	+60.0	12.2	15 13.0	+60.0	12.3	16 11.7	+59.9	12.4	**24**
25	10 21.0	+59.9	12.0	11 19.7	+59.9	12.0	12 18.4	+59.9	12.0	13 17.0	+60.0	12.1	14 15.7	+60.0	12.1	15 14.4	+59.9	12.2	16 13.0	+60.0	12.2	17 11.6	+60.0	12.3	**25**
26	11 20.9	+59.9	11.9	12 19.6	+59.9	11.9	13 18.3	+59.9	12.0	14 17.0	+59.9	12.0	15 15.7	+59.9	12.1	16 14.3	+60.0	12.2	17 13.0	+59.9	12.2	18 11.6	+60.0	12.3	**26**
27	12 20.8	+59.9	11.8	13 19.5	+59.9	11.9	14 18.2	+59.9	11.9	15 16.9	+59.9	12.0	16 15.6	+59.9	12.1	17 14.3	+59.9	12.1	18 12.9	+60.0	12.2	19 11.6	+59.9	12.3	**27**
28	13 20.7	+59.9	11.8	14 19.4	+59.9	11.8	15 18.1	+59.9	11.9	16 16.8	+60.0	11.9	17 15.5	+60.0	12.0	18 14.2	+60.0	12.1	19 12.9	+59.9	12.1	20 11.5	+60.0	12.2	**28**
29	14 20.6	+59.9	11.7	15 19.3	+59.9	11.8	16 18.0	+60.0	11.8	17 16.8	+59.9	11.9	18 15.5	+59.9	12.0	19 14.2	+59.9	12.0	20 12.8	+60.0	12.1	21 11.5	+60.0	12.2	**29**
30	15 20.5	+59.9	11.7	16 19.2	+59.9	11.7	17 18.0	+59.9	11.8	18 16.7	+59.9	11.8	19 15.4	+59.9	11.9	20 14.1	+60.0	12.0	21 12.8	+60.0	12.1	22 11.5	+59.9	12.1	**30**
31	16 20.4	+59.8	11.6	17 19.1	+59.9	11.7	18 17.9	+59.9	11.7	19 16.6	+59.9	11.8	20 15.3	+60.0	11.9	21 14.1	+59.9	11.9	22 12.8	+59.9	12.0	23 11.4	+60.0	12.1	**31**
32	17 20.2	+59.9	11.5	18 19.0	+59.9	11.6	19 17.8	+59.9	11.7	20 16.5	+60.0	11.7	21 15.3	+59.9	11.8	22 14.0	+60.0	11.9	23 12.7	+60.0	12.0	24 11.4	+60.0	12.1	**32**
33	18 20.1	+59.9	11.5	19 18.9	+59.9	11.5	20 17.7	+59.9	11.6	21 16.5	+59.9	11.7	22 15.2	+60.0	11.8	23 14.0	+59.9	11.8	24 12.7	+59.9	11.9	25 11.4	+59.9	12.0	**33**
34	19 20.0	+59.9	11.4	20 18.8	+59.9	11.5	21 17.6	+59.9	11.5	22 16.4	+59.9	11.6	23 15.2	+59.9	11.7	24 13.9	+59.9	11.8	25 12.6	+60.0	11.9	26 11.3	+60.0	12.0	**34**
35	20 19.9	+59.9	11.3	21 18.7	+59.9	11.4	22 17.5	+59.9	11.5	23 16.3	+59.9	11.6	24 15.1	+59.9	11.7	25 13.8	+60.0	11.8	26 12.6	+59.9	11.9	27 11.3	+59.9	12.0	**35**
36	21 19.8	+59.9	11.3	22 18.6	+59.9	11.3	23 17.4	+59.9	11.4	24 16.2	+60.0	11.5	25 15.0	+60.0	11.6	26 13.8	+59.9	11.7	27 12.5	+60.0	11.8	28 11.2	+60.0	11.9	**36**
37	22 19.7	+59.8	11.2	23 18.5	+59.9	11.3	24 17.3	+60.0	11.4	25 16.2	+59.9	11.5	26 15.0	+59.9	11.6	27 13.7	+60.0	11.7	28 12.5	+59.9	11.8	29 11.2	+60.0	11.9	**37**
38	23 19.5	+59.9	11.1	24 18.4	+59.9	11.2	25 17.3	+59.9	11.3	26 16.1	+59.9	11.4	27 14.9	+59.9	11.5	28 13.7	+59.9	11.6	29 12.4	+60.0	11.7	30 11.2	+59.9	11.8	**38**
39	24 19.4	+59.9	11.1	25 18.3	+59.9	11.1	26 17.2	+59.9	11.2	27 16.0	+59.9	11.3	28 14.8	+59.9	11.4	29 13.6	+59.9	11.6	30 12.4	+59.9	11.7	31 11.1	+60.0	11.8	**39**
40	25 19.3	+59.9	11.0	26 18.2	+59.9	11.1	27 17.1	+59.9	11.2	28 15.9	+59.9	11.3	29 14.7	+60.0	11.4	30 13.5	+60.0	11.5	31 12.3	+60.0	11.6	32 11.1	+59.9	11.7	**40**
41	26 19.2	+59.8	10.9	27 18.1	+59.9	11.0	28 17.0	+59.9	11.1	29 15.8	+59.9	11.2	30 14.7	+59.9	11.3	31 13.5	+59.9	11.5	32 12.3	+59.9	11.6	33 11.0	+60.0	11.7	**41**
42	27 19.0	+59.9	10.8	28 18.0	+59.8	10.9	29 16.9	+59.9	11.0	30 15.7	+60.0	11.2	31 14.6	+59.9	11.3	32 13.4	+60.0	11.4	33 12.2	+60.0	11.5	34 11.0	+60.0	11.7	**42**
43	28 18.9	+59.9	10.8	29 17.8	+59.9	10.9	30 16.8	+59.9	11.0	31 15.7	+59.9	11.1	32 14.5	+59.9	11.2	33 13.4	+59.9	11.3	34 12.2	+59.9	11.5	35 11.0	+59.9	11.6	**43**
44	29 18.8	+59.8	10.7	30 17.7	+59.9	10.8	31 16.7	+59.9	10.9	32 15.6	+59.9	11.0	33 14.4	+60.0	11.2	34 13.3	+59.9	11.3	35 12.1	+60.0	11.4	36 10.9	+60.0	11.6	**44**
45	30 18.6	+59.9	10.6	31 17.6	+59.9	10.7	32 16.6	+59.8	10.8	33 15.5	+59.9	11.0	34 14.4	+59.9	11.1	35 13.2	+60.0	11.2	36 12.1	+59.9	11.4	37 10.9	+59.9	11.5	**45**
46	31 18.5	+59.9	10.5	32 17.5	+59.9	10.7	33 16.4	+59.9	10.8	34 15.4	+59.9	10.9	35 14.3	+59.9	11.0	36 13.2	+59.9	11.2	37 12.0	+59.9	11.3	38 10.8	+60.0	11.5	**46**
47	32 18.4	+59.8	10.5	33 17.4	+59.8	10.6	34 16.3	+59.9	10.7	35 15.3	+59.9	10.8	36 14.2	+59.9	11.0	37 13.1	+59.9	11.1	38 11.9	+60.0	11.3	39 10.8	+59.9	11.4	**47**
48	33 18.2	+59.9	10.4	34 17.2	+59.9	10.5	35 16.2	+59.9	10.6	36 15.2	+59.9	10.8	37 14.1	+59.9	10.9	38 13.0	+59.9	11.0	39 11.9	+59.9	11.2	40 10.7	+60.0	11.4	**48**
49	34 18.1	+59.8	10.3	35 17.1	+59.9	10.4	36 16.1	+59.9	10.5	37 15.1	+59.9	10.7	38 14.0	+59.9	10.8	39 12.9	+60.0	11.0	40 11.8	+60.0	11.1	41 10.7	+59.9	11.3	**49**
50	35 17.9	+59.9	10.2	36 17.0	+59.8	10.3	37 16.0	+59.9	10.5	38 15.0	+59.9	10.6	39 13.9	+59.9	10.8	40 12.9	+59.9	10.9	41 11.8	+59.9	11.1	42 10.6	+60.0	11.3	**50**
51	36 17.8	+59.8	10.1	37 16.8	+59.9	10.2	38 15.9	+59.8	10.4	39 14.9	+59.8	10.5	40 13.8	+59.9	10.7	41 12.8	+59.9	10.8	42 11.7	+59.9	11.0	43 10.6	+59.9	11.2	**51**
52	37 17.6	+59.9	10.0	38 16.7	+59.8	10.2	39 15.7	+59.9	10.3	40 14.7	+59.9	10.5	41 13.7	+59.9	10.6	42 12.7	+59.9	10.8	43 11.6	+60.0	11.0	44 10.5	+60.0	11.1	**52**
53	38 17.5	+59.8	9.9	39 16.5	+59.9	10.1	40 15.6	+59.9	10.2	41 14.6	+59.9	10.4	42 13.6	+59.9	10.5	43 12.6	+59.9	10.7	44 11.6	+59.9	10.9	45 10.5	+59.9	11.1	**53**
54	39 17.3	+59.8	9.8	40 16.4	+59.8	10.0	41 15.5	+59.8	10.1	42 14.5	+59.9	10.3	43 13.5	+59.9	10.5	44 12.5	+59.9	10.6	45 11.5	+59.9	10.8	46 10.4	+59.9	11.0	**54**
55	40 17.1	+59.8	9.7	41 16.2	+59.9	9.9	42 15.3	+59.9	10.0	43 14.4	+59.9	10.2	44 13.4	+59.9	10.4	45 12.4	+59.9	10.6	46 11.4	+59.9	10.7	47 10.3	+60.0	10.9	**55**
56	41 16.9	+59.8	9.6	42 16.1	+59.8	9.8	43 15.2	+59.8	9.9	44 14.3	+59.8	10.1	45 13.3	+59.9	10.3	46 12.3	+59.9	10.5	47 11.3	+59.9	10.7	48 10.3	+59.9	10.9	**56**
57	42 16.7	+59.9	9.5	43 15.9	+59.8	9.7	44 15.0	+59.9	9.8	45 14.1	+59.9	10.0	46 13.2	+59.9	10.2	47 12.2	+59.9	10.4	48 11.2	+60.0	10.6	49 10.2	+59.9	10.8	**57**
58	43 16.6	+59.8	9.4	44 15.7	+59.9	9.6	45 14.9	+59.8	9.7	46 14.0	+59.9	9.9	47 13.1	+59.9	10.1	48 12.1	+59.9	10.3	49 11.2	+59.9	10.5	50 10.1	+60.0	10.7	**58**
59	44 16.4	+59.8	9.3	45 15.6	+59.8	9.5	46 14.7	+59.9	9.6	47 13.9	+59.8	9.8	48 13.0	+59.8	10.0	49 12.0	+59.9	10.2	50 11.1	+59.9	10.4	51 10.1	+59.9	10.6	**59**
60	45 16.2	+59.8	9.2	46 15.4	+59.8	9.4	47 14.6	+59.8	9.5	48 13.7	+59.9	9.7	49 12.8	+59.9	9.9	50 11.9	+59.9	10.1	51 11.0	+59.9	10.3	52 10.0	+59.9	10.6	**60**
61	46 16.0	+59.7	9.1	47 15.2	+59.8	9.2	48 14.4	+59.8	9.4	49 13.6	+59.8	9.6	50 12.7	+59.9	9.8	51 11.8	+59.9	10.0	52 10.9	+59.9	10.2	53 09.9	+59.9	10.5	**61**
62	47 15.7	+59.8	9.0	48 15.0	+59.8	9.1	49 14.2	+59.8	9.3	50 13.4	+59.8	9.5	51 12.6	+59.8	9.7	52 11.7	+59.9	9.9	53 10.8	+59.9	10.1	54 09.8	+59.9	10.4	**62**
63	48 15.5	+59.8	8.8	49 14.8	+59.8	9.0	50 14.0	+59.8	9.2	51 13.2	+59.9	9.4	52 12.4	+59.9	9.6	53 11.6	+59.8	9.8	54 10.7	+59.9	10.0	55 09.7	+59.9	10.3	**63**
64	49 15.3	+59.7	8.7	50 14.6	+59.8	8.9	51 13.8	+59.8	9.1	52 13.1	+59.8	9.3	53 12.3	+59.8	9.5	54 11.4	+59.9	9.7	55 10.6	+59.8	9.9	56 09.6	+59.9	10.2	**64**
65	50 15.0	+59.8	8.6	51 14.4	+59.7	8.7	52 13.6	+59.8	8.9	53 12.9	+59.8	9.1	54 12.1	+59.9	9.4	55 11.3	+59.9	9.6	56 10.4	+59.9	9.8	57 09.5	+59.9	10.1	**65**
66	51 14.8	+59.7	8.4	52 14.1	+59.8	8.6	53 13.4	+59.8	8.8	54 12.7	+59.8	9.0	55 12.0	+59.8	9.2	56 11.2	+59.8	9.5	57 10.3	+59.9	9.7	58 09.4	+59.9	10.0	**66**
67	52 14.5	+59.7	8.3	53 13.9	+59.7	8.4	54 13.2	+59.8	8.6	55 12.5	+59.8	8.9	56 11.8	+59.8	9.1	57 11.0	+59.8	9.3	58 10.2	+59.8	9.6	59 09.3	+59.9	9.9	**67**
68	53 14.2	+59.7	8.1	54 13.6	+59.8	8.3	55 13.0	+59.7	8.5	56 12.3	+59.8	8.7	57 11.6	+59.8	8.9	58 10.8	+59.9	9.2	59 10.0	+59.9	9.5	60 09.2	+59.9	9.7	**68**
69	54 13.9	+59.7	7.9	55 13.4	+59.7	8.1	56 12.7	+59.8	8.3	57 12.1	+59.8	8.6	58 11.4	+59.8	8.8	59 10.7	+59.8	9.1	60 09.9	+59.8	9.3	61 09.1	+59.9	9.6	**69**
70	55 13.6	+59.7	7.8	56 13.1	+59.7	8.0	57 12.5	+59.7	8.2	58 11.9	+59.7	8.4	59 11.2	+59.8	8.6	60 10.5	+59.8	8.9	61 09.7	+59.9	9.2	62 09.0	+59.8	9.5	**70**
71	56 13.3	+59.7	7.6	57 12.8	+59.7	7.8	58 12.2	+59.7	8.0	59 11.6	+59.8	8.2	60 11.0	+59.7	8.5	61 10.3	+59.8	8.7	62 09.6	+59.8	9.0	63 08.8	+59.9	9.3	**71**
72	57 13.0	+59.6	7.4	58 12.5	+59.6	7.6	59 11.9	+59.7	7.8	60 11.4	+59.7	8.0	61 10.7	+59.8	8.3	62 10.1	+59.8	8.6	63 09.4	+59.8	8.9	64 08.7	+59.8	9.2	**72**
73	58 12.6	+59.6	7.2	59 12.1	+59.7	7.4	60 11.6	+59.7	7.6	61 11.1	+59.7	7.8	62 10.5	+59.7	8.1	63 09.9	+59.7	8.4	64 09.2	+59.8	8.7	65 08.5	+59.8	9.0	**73**
74	59 12.2	+59.6	7.0	60 11.8	+59.6	7.2	61 11.3	+59.7	7.4	62 10.8	+59.7	7.6	63 10.2	+59.8	7.9	64 09.6	+59.8	8.2	65 09.0	+59.8	8.5	66 08.3	+59.8	8.8	**74**
75	60 11.8	+59.6	6.7	61 11.4	+59.6	6.9	62 11.0	+59.6	7.2	63 10.5	+59.6	7.4	64 10.0	+59.7	7.7	65 09.4	+59.7	8.0	66 08.8	+59.8	8.3	67 08.1	+59.8	8.6	**75**
76	61 11.4	+59.6	6.5	62 11.0	+59.6	6.7	63 10.6	+59.6	6.9	64 10.1	+59.7	7.2	65 09.7	+59.6	7.4	66 09.1	+59.7	7.7	67 08.6	+59.7	8.1	68 07.9	+59.8	8.4	**76**
77	62 11.0	+59.5	6.2	63 10.6	+59.5	6.4	64 10.2	+59.6	6.7	65 09.8	+59.6	6.9	66 09.3	+59.7	7.2	67 08.8	+59.7	7.5	68 08.3	+59.7	7.8	69 07.7	+59.8	8.2	**77**
78	63 10.5	+59.5	5.9	64 10.1	+59.6	6.2	65 09.8	+59.5	6.4	66 09.4	+59.6	6.6	67 09.0	+59.6	6.9	68 08.5	+59.7	7.2	69 08.0	+59.7	7.5	70 07.5	+59.7	7.9	**78**
79	64 10.0	+59.4	5.7	65 09.7	+59.4	5.9	66 09.3	+59.5	6.1	67 09.0	+59.5	6.3	68 08.6	+59.6	6.6	69 08.2	+59.6	6.9	70 07.7	+59.7	7.3	71 07.2	+59.7	7.6	**79**
80	65 09.4	+59.4	5.3	66 09.1	+59.5	5.5	67 08.8	+59.5	5.8	68 08.5	+59.5	6.0	69 08.2	+59.5	6.3	70 07.8	+59.6	6.6	71 07.4	+59.6	6.9	72 06.9	+59.7	7.3	**80**
81	66 08.8	+59.3	5.0	67 08.6	+59.3	5.2	68 08.3	+59.4	5.4	69 08.0	+59.5	5.7	70 07.7	+59.5	5.9	71 07.4	+59.5	6.2	72 07.0	+59.6	6.6	73 06.6	+59.6	7.0	**81**
82	67 08.1	+59.3	4.6	68 07.9	+59.4	4.8	69 07.7	+59.4	5.0	70 07.5	+59.4	5.3	71 07.2	+59.5	5.6	72 06.9	+59.5	5.9	73 06.6	+59.5	6.2	74 06.2	+59.6	6.6	**82**
83	68 07.4	+59.3	4.2	69 07.3	+59.2	4.4	70 07.1	+59.3	4.6	71 06.9	+59.3	4.9	72 06.7	+59.3	5.1	73 06.4	+59.4	5.4	74 06.1	+59.5	5.7	75 05.8	+59.5	6.1	**83**
84	69 06.7	+59.1	3.8	70 06.5	+59.2	4.0	71 06.4	+59.2	4.2	72 06.2	+59.3	4.4	73 06.0	+59.3	4.6	74 05.8	+59.4	4.9	75 05.6	+59.4	5.2	76 05.3	+59.5	5.6	**84**
85	70 05.8	+59.1	3.3	71 05.7	+59.1	3.5	72 05.6	+59.1	3.7	73 05.5	+59.1	3.9	74 05.3	+59.2	4.1	75 05.2	+59.2	4.4	76 05.0	+59.3	4.7	77 04.8	+59.3	5.0	**85**
86	71 04.9	+59.0	2.8	72 04.8	+59.0	2.9	73 04.7	+59.1	3.1	74 04.6	+59.1	3.3	75 04.5	+59.1	3.5	76 04.4	+59.2	3.7	77 04.3	+59.2	4.0	78 04.1	+59.3	4.4	**86**
87	72 03.9	+58.8	2.2	73 03.8	+58.9	2.3	74 03.8	+58.9	2.5	75 03.7	+58.9	2.6	76 03.6	+59.0	2.8	77 03.6	+59.0	3.0	78 03.5	+59.0	3.3	79 03.4	+59.1	3.6	**87**
88	73 02.7	+58.7	1.5	74 02.7	+58.7	1.6	75 02.7	+58.7	1.7	76 02.6	+58.8	1.9	77 02.6	+58.8	2.0	78 02.6	+58.8	2.2	79 02.5	+58.9	2.4	80 02.5	+58.9	2.6	**88**
89	74 01.4	+58.6	0.8	75 01.4	+58.6	0.9	76 01.4	+58.6	0.9	77 01.4	+58.6	1.0	78 01.4	+58.6	1.1	79 01.4	+58.6	1.2	80 01.4	+58.6	1.3	81 01.4	+58.6	1.4	**89**
90	75 00.0	+58.4	0.0	76 00.0	+58.3	0.0	77 00.0	+58.3	0.0	78 00.0	+58.3	0.0	79 00.0	+58.3	0.0	80 00.0	+58.3	0.0	81 00.0	+58.3	0.0	82 00.0	+58.2	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 167°, 193°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 32.7	+59.8	165.5	13 34.6	+59.9	165.6	12 36.4	+59.9	165.6	11 38.3	+59.9	165.7	10 40.2	+59.9	165.7	9 42.0	+59.9	165.8	8 43.8	+60.0	165.8	7 45.7	+59.9	165.9	**0**
1	15 32.5	+59.9	165.5	14 34.5	+59.8	165.5	13 36.3	+60.0	165.6	12 38.2	+59.9	165.6	11 40.1	+59.9	165.7	10 41.9	+60.0	165.7	9 43.8	+59.9	165.8	8 45.6	+60.0	165.8	**1**
2	16 32.4	+59.9	165.4	15 34.3	+59.9	165.5	14 36.3	+59.9	165.5	13 38.1	+60.0	165.6	12 40.0	+60.0	165.7	11 41.9	+59.9	165.7	10 43.7	+60.0	165.8	9 45.6	+59.9	165.8	**2**
3	17 32.3	+59.9	165.3	16 34.2	+59.9	165.4	15 36.2	+59.9	165.5	14 38.1	+59.9	165.5	13 40.0	+59.9	165.6	12 41.8	+60.0	165.7	11 43.7	+60.0	165.7	10 45.5	+60.0	165.8	**3**
4	18 32.2	+59.8	165.3	17 34.1	+59.9	165.3	16 36.1	+59.9	165.4	15 38.0	+59.9	165.5	14 39.9	+59.9	165.6	13 41.8	+59.9	165.6	12 43.7	+59.9	165.7	11 45.5	+60.0	165.7	**4**
5	19 32.0	+59.9	165.2	18 34.0	+59.9	165.3	17 36.0	+59.9	165.4	16 37.9	+59.9	165.4	15 39.8	+60.0	165.5	14 41.7	+60.0	165.6	13 43.6	+60.0	165.6	12 45.5	+59.9	165.7	**5**
6	20 31.9	+59.9	165.1	19 33.9	+59.9	165.2	18 35.9	+59.9	165.3	17 37.8	+59.9	165.4	16 39.8	+59.9	165.5	15 41.7	+59.9	165.5	14 43.6	+59.9	165.6	13 45.4	+60.0	165.7	**6**
7	21 31.8	+59.8	165.0	20 33.8	+59.9	165.1	19 35.8	+59.9	165.2	18 37.7	+60.0	165.3	17 39.7	+59.9	165.4	16 41.6	+60.0	165.5	15 43.5	+60.0	165.6	14 45.4	+60.0	165.6	**7**
8	22 31.6	+59.9	165.0	21 33.7	+59.8	165.1	20 35.7	+59.9	165.2	19 37.7	+59.9	165.3	18 39.6	+59.9	165.4	17 41.6	+59.9	165.4	16 43.5	+59.9	165.5	15 45.4	+59.9	165.6	**8**
9	23 31.5	+59.8	164.9	22 33.5	+59.9	165.0	21 35.6	+59.9	165.1	20 37.6	+59.9	165.2	19 39.5	+60.0	165.3	18 41.5	+59.9	165.4	17 43.4	+60.0	165.5	16 45.3	+60.0	165.5	**9**
10	24 31.3	+59.9	164.8	23 33.4	+59.9	164.9	22 35.5	+59.9	165.0	21 37.5	+59.9	165.2	20 39.5	+59.9	165.2	19 41.4	+60.0	165.3	18 43.4	+59.9	165.4	17 45.3	+60.0	165.5	**10**
11	25 31.2	+59.8	164.7	24 33.3	+59.9	164.9	23 35.4	+59.8	165.0	22 37.4	+59.9	165.1	21 39.4	+59.9	165.2	20 41.4	+59.9	165.3	19 43.3	+60.0	165.4	18 45.3	+59.9	165.5	**11**
12	26 31.0	+59.9	164.7	25 33.2	+59.8	164.8	24 35.2	+59.9	164.9	23 37.3	+59.9	165.0	22 39.3	+59.9	165.1	21 41.3	+60.0	165.2	20 43.3	+59.9	165.3	19 45.2	+60.0	165.4	**12**
13	27 30.9	+59.8	164.6	26 33.0	+59.9	164.7	25 35.1	+59.9	164.8	24 37.2	+59.9	165.0	23 39.2	+60.0	165.1	22 41.3	+59.9	165.2	21 43.2	+60.0	165.3	20 45.2	+59.9	165.4	**13**
14	28 30.7	+59.9	164.5	27 32.9	+59.9	164.6	26 35.0	+59.9	164.8	25 37.1	+59.9	164.9	24 39.2	+59.9	165.0	23 41.2	+59.9	165.1	22 43.2	+59.9	165.3	21 45.1	+60.0	165.4	**14**
15	29 30.6	+59.8	164.4	28 32.8	+59.8	164.6	27 34.9	+59.9	164.7	26 37.0	+59.9	164.8	25 39.1	+59.9	165.0	24 41.1	+60.0	165.1	23 43.1	+60.0	165.2	22 45.1	+60.0	165.3	**15**
16	30 30.4	+59.9	164.3	29 32.6	+59.9	164.5	28 34.8	+59.9	164.6	27 36.9	+59.9	164.8	26 39.0	+59.9	164.9	25 41.1	+59.9	165.0	24 43.1	+59.9	165.2	23 45.1	+59.9	165.3	**16**
17	31 30.3	+59.8	164.3	30 32.5	+59.9	164.4	29 34.7	+59.9	164.6	28 36.8	+59.9	164.7	27 38.9	+59.9	164.9	26 41.0	+59.9	165.0	25 43.0	+60.0	165.1	24 45.0	+60.0	165.2	**17**
18	32 30.1	+59.8	164.2	31 32.4	+59.8	164.3	30 34.6	+59.8	164.5	29 36.7	+59.9	164.7	28 38.8	+60.0	164.8	27 40.9	+60.0	164.9	26 43.0	+59.9	165.1	25 45.0	+59.9	165.2	**18**
19	33 29.9	+59.9	164.1	32 32.2	+59.9	164.3	31 34.4	+59.9	164.4	30 36.6	+59.9	164.6	29 38.8	+59.9	164.7	28 40.9	+59.9	164.9	27 42.9	+60.0	165.0	26 44.9	+60.0	165.2	**19**
20	34 29.8	+59.8	164.0	33 32.1	+59.8	164.2	32 34.3	+59.9	164.3	31 36.5	+59.9	164.5	30 38.7	+59.9	164.7	29 40.8	+59.9	164.8	28 42.9	+59.9	165.0	27 44.9	+59.9	165.1	**20**
21	35 29.6	+59.8	163.9	34 31.9	+59.9	164.1	33 34.2	+59.9	164.3	32 36.4	+59.9	164.4	31 38.6	+59.9	164.6	30 40.7	+59.9	164.8	29 42.8	+59.9	164.9	28 44.8	+60.0	165.1	**21**
22	36 29.4	+59.8	163.8	35 31.8	+59.8	164.0	34 34.1	+59.8	164.2	33 36.3	+59.9	164.4	32 38.5	+59.9	164.6	31 40.6	+60.0	164.7	30 42.7	+60.0	164.9	29 44.8	+60.0	165.0	**22**
23	37 29.2	+59.8	163.7	36 31.6	+59.9	163.9	35 33.9	+59.9	164.1	34 36.2	+59.9	164.3	33 38.4	+59.9	164.5	32 40.6	+59.9	164.7	31 42.7	+59.9	164.8	30 44.8	+59.9	165.0	**23**
24	38 29.0	+59.8	163.6	37 31.5	+59.8	163.8	36 33.8	+59.9	164.0	35 36.1	+59.9	164.2	34 38.3	+59.9	164.4	33 40.5	+59.9	164.6	32 42.6	+60.0	164.8	31 44.7	+60.0	164.9	**24**
25	39 28.8	+59.8	163.5	38 31.3	+59.8	163.7	37 33.7	+59.8	163.9	36 36.0	+59.9	164.2	35 38.2	+59.9	164.3	34 40.4	+59.9	164.5	33 42.6	+59.9	164.7	32 44.7	+59.9	164.9	**25**
26	40 28.6	+59.8	163.4	39 31.1	+59.8	163.6	38 33.5	+59.9	163.9	37 35.9	+59.8	164.1	36 38.1	+59.9	164.3	35 40.3	+60.0	164.5	34 42.5	+59.9	164.7	33 44.6	+60.0	164.8	**26**
27	41 28.4	+59.8	163.3	40 30.9	+59.9	163.5	39 33.4	+59.8	163.8	38 35.7	+59.9	164.0	37 38.0	+59.9	164.2	36 40.3	+59.9	164.4	35 42.4	+60.0	164.6	34 44.6	+59.9	164.8	**27**
28	42 28.2	+59.8	163.2	41 30.8	+59.8	163.4	40 33.2	+59.9	163.7	39 35.6	+59.9	163.9	38 37.9	+59.9	164.1	37 40.2	+59.9	164.3	36 42.4	+59.9	164.5	35 44.5	+60.0	164.7	**28**
29	43 28.0	+59.8	163.1	42 30.6	+59.8	163.3	41 33.1	+59.8	163.6	40 35.5	+59.8	163.8	39 37.8	+59.9	164.1	38 40.1	+59.9	164.3	37 42.3	+59.9	164.5	36 44.5	+59.9	164.7	**29**
30	44 27.8	+59.7	162.9	43 30.4	+59.8	163.2	42 32.9	+59.8	163.5	41 35.3	+59.9	163.7	40 37.7	+59.9	164.0	39 40.0	+59.9	164.2	38 42.2	+60.0	164.4	37 44.4	+60.0	164.6	**30**
31	45 27.5	+59.8	162.8	44 30.2	+59.8	163.1	43 32.7	+59.9	163.4	42 35.2	+59.9	163.6	41 37.6	+59.9	163.9	40 39.9	+59.9	164.1	39 42.2	+59.9	164.4	38 44.4	+59.9	164.6	**31**
32	46 27.3	+59.7	162.7	45 30.0	+59.8	163.0	44 32.6	+59.8	163.3	43 35.1	+59.8	163.5	42 37.5	+59.9	163.8	41 39.8	+59.9	164.1	40 42.1	+59.9	164.3	39 44.3	+59.9	164.5	**32**
33	47 27.0	+59.8	162.5	46 29.8	+59.7	162.9	45 32.4	+59.8	163.2	44 34.9	+59.9	163.4	43 37.4	+59.8	163.7	42 39.7	+59.9	164.0	41 42.0	+59.9	164.2	40 44.2	+60.0	164.5	**33**
34	48 26.8	+59.7	162.4	47 29.5	+59.8	162.7	46 32.2	+59.8	163.0	45 34.8	+59.8	163.3	44 37.2	+59.9	163.6	43 39.6	+59.9	163.9	42 41.9	+60.0	164.2	41 44.2	+59.9	164.4	**34**
35	49 26.5	+59.7	162.3	48 29.3	+59.8	162.6	47 32.0	+59.8	162.9	46 34.6	+59.8	163.2	45 37.1	+59.9	163.5	44 39.5	+59.9	163.8	43 41.9	+59.9	164.1	42 44.1	+60.0	164.3	**35**
36	50 26.2	+59.7	162.1	49 29.1	+59.7	162.5	48 31.8	+59.8	162.8	47 34.4	+59.9	163.1	46 37.0	+59.8	163.4	45 39.4	+59.9	163.7	44 41.8	+59.9	164.0	43 44.1	+59.9	164.3	**36**
37	51 25.9	+59.7	161.9	50 28.8	+59.8	162.3	49 31.6	+59.8	162.7	48 34.3	+59.8	163.0	47 36.8	+59.9	163.3	46 39.3	+59.9	163.7	45 41.7	+59.9	163.9	44 44.0	+59.9	164.2	**37**
38	52 25.6	+59.7	161.8	51 28.6	+59.7	162.2	50 31.4	+59.8	162.6	49 34.1	+59.8	162.9	48 36.7	+59.8	163.2	47 39.2	+59.9	163.6	46 41.6	+59.9	163.9	45 43.9	+59.9	164.2	**38**
39	53 25.3	+59.7	161.6	52 28.3	+59.7	162.0	51 31.2	+59.7	162.4	50 33.9	+59.8	162.8	49 36.5	+59.9	163.1	48 39.1	+59.8	163.5	47 41.5	+59.9	163.8	46 43.8	+60.0	164.1	**39**
40	54 25.0	+59.6	161.4	53 28.0	+59.7	161.9	52 30.9	+59.8	162.3	51 33.7	+59.8	162.7	50 36.4	+59.8	163.0	49 38.9	+59.9	163.4	48 41.4	+59.9	163.7	47 43.8	+59.9	164.0	**40**
41	55 24.6	+59.6	161.2	54 27.7	+59.7	161.7	53 30.7	+59.7	162.1	52 33.5	+59.8	162.5	51 36.2	+59.9	162.9	50 38.8	+59.9	163.3	49 41.3	+59.9	163.6	48 43.7	+59.9	163.9	**41**
42	56 24.2	+59.6	161.0	55 27.4	+59.7	161.5	54 30.4	+59.7	162.0	53 33.3	+59.8	162.4	52 36.1	+59.8	162.8	51 38.7	+59.8	163.2	50 41.2	+59.9	163.5	49 43.6	+59.9	163.9	**42**
43	57 23.8	+59.6	160.8	56 27.1	+59.6	161.3	55 30.1	+59.8	161.8	54 33.1	+59.7	162.2	53 35.9	+59.8	162.7	52 38.5	+59.9	163.0	51 41.1	+59.9	163.4	50 43.5	+59.9	163.8	**43**
44	58 23.4	+59.6	160.6	57 26.7	+59.7	161.1	56 29.9	+59.7	161.6	55 32.8	+59.8	162.1	54 35.7	+59.8	162.5	53 38.4	+59.8	162.9	52 41.0	+59.9	163.3	51 43.4	+60.0	163.7	**44**
45	59 23.0	+59.5	160.4	58 26.4	+59.6	160.9	57 29.6	+59.6	161.4	56 32.6	+59.7	161.9	55 35.5	+59.8	162.4	54 38.2	+59.9	162.8	53 40.9	+59.8	163.2	52 43.4	+59.9	163.6	**45**
46	60 22.5	+59.5	160.1	59 26.0	+59.6	160.7	58 29.2	+59.7	161.2	57 32.3	+59.8	161.8	56 35.3	+59.8	162.2	55 38.1	+59.8	162.7	54 40.7	+59.9	163.1	53 43.3	+59.9	163.5	**46**
47	61 22.0	+59.5	159.9	60 25.6	+59.5	160.5	59 28.9	+59.7	161.0	58 32.1	+59.7	161.6	57 35.1	+59.7	162.1	56 37.9	+59.8	162.5	55 40.6	+59.9	163.0	54 43.2	+59.9	163.4	**47**
48	62 21.5	+59.4	159.6	61 25.1	+59.6	160.2	60 28.6	+59.6	160.8	59 31.8	+59.7	161.4	58 34.8	+59.8	161.9	57 37.7	+59.8	162.4	56 40.5	+59.8	162.9	55 43.1	+59.8	163.3	**48**
49	63 20.9	+59.4	159.3	62 24.7	+59.5	160.0	61 28.2	+59.6	160.6	60 31.5	+59.7	161.2	59 34.6	+59.7	161.7	58 37.5	+59.8	162.3	57 40.3	+59.9	162.7	56 42.9	+59.9	163.2	**49**
50	64 20.3	+59.3	159.0	63 24.2	+59.4	159.7	62 27.8	+59.5	160.3	61 31.2	+59.6	161.0	60 34.3	+59.8	161.5	59 37.3	+59.8	162.1	58 40.2	+59.8	162.6	57 42.8	+59.9	163.1	**50**
51	65 19.6	+59.3	158.6	64 23.6	+59.5	159.4	63 27.3	+59.6	160.1	62 30.8	+59.6	160.7	61 34.1	+59.7	161.4	60 37.1	+59.8	161.9	59 40.0	+59.8	162.5	58 42.7	+59.9	163.0	**51**
52	66 18.9	+59.3	158.2	65 23.1	+59.3	159.0	64 26.9	+59.5	159.8	63 30.4	+59.6	160.5	62 33.8	+59.7	161.1	61 36.9	+59.7	161.7	60 39.8	+59.8	162.3	59 42.6	+59.8	162.8	**52**
53	67 18.2	+59.1	157.8	66 22.4	+59.4	158.7	65 26.4	+59.4	159.5	64 30.0	+59.6	160.2	63 33.5	+59.6	160.9	62 36.6	+59.8	161.5	61 39.6	+59.8	162.1	60 42.4	+59.9	162.7	**53**
54	68 17.3	+59.1	157.4	67 21.8	+59.2	158.3	66 25.8	+59.5	159.2	65 29.6	+59.6	160.0	64 33.1	+59.7	160.7	63 36.4	+59.7	161.3	62 39.4	+59.8	162.0	61 42.3	+59.8	162.5	**54**
55	69 16.4	+59.0	156.9	68 21.0	+59.2	157.9	67 25.3	+59.3	158.8	66 29.2	+59.5	159.6	65 32.8	+59.6	160.4	64 36.1	+59.7	161.1	63 39.2	+59.8	161.8	62 42.1	+59.9	162.4	**55**
56	70 15.4	+58.9	156.4	69 20.2	+59.2	157.5	68 24.6	+59.3	158.4	67 28.7	+59.4	159.3	66 32.4	+59.6	160.1	65 35.8	+59.7	160.9	64 39.0	+59.8	161.6	63 42.0	+59.8	162.2	**56**
57	71 14.3	+58.8	155.8	70 19.4	+59.0	157.0	69 23.9	+59.3	158.0	68 28.1	+59.4	159.0	67 32.0	+59.5	159.8	66 35.5	+59.6	160.6	65 38.8	+59.7	161.4	64 41.8	+59.8	162.0	**57**
58	72 13.1	+58.7	155.2	71 18.4	+58.9	156.4	70 23.2	+59.1	157.5	69 27.5	+59.4	158.6	68 31.5	+59.5	159.5	67 35.1	+59.7	160.4	66 38.5	+59.7	161.1	65 41.6	+59.8	161.9	**58**
59	73 11.8	+58.5	154.5	72 17.3	+58.9	155.8	71 22.3	+59.1	157.0	70 26.9	+59.3	158.1	69 31.0	+59.4	159.1	68 34.8	+59.5	160.1	67 38.2	+59.7	160.9	66 41.4	+59.8	161.6	**59**
60	74 10.3	+58.3	153.7	73 16.2	+58.6	155.2	72 21.4	+59.0	156.5	71 26.2	+59.2	157.7	70 30.4	+59.4	158.7	69 34.3	+59.6	159.7	68 37.9	+59.7	160.6	67 41.2	+59.7	161.4	**60**
61	75 08.6	+58.0	152.8	74 14.8	+58.5	154.4	73 20.4	+58.8	155.9	72 25.4	+59.1	157.1	71 29.8	+59.4	158.3	70 33.9	+59.5	159.4	69 37.6	+59.6	160.3	68 40.9	+59.7	161.2	**61**
62	76 06.6	+57.8	151.8	75 13.3	+58.3	153.6	74 19.2	+58.7	155.1	73 24.5	+59.0	156.6	72 29.2	+59.2	157.8	71 33.4	+59.4	159.0	70 37.2	+59.6	160.0	69 40.6	+59.7	160.9	**62**
63	77 04.4	+57.4	150.6	76 11.6	+58.0	152.6	75 17.9	+58.5	154.4	74 23.5	+58.9	155.9	73 28.4	+59.2	157.3	72 32.8	+59.4	158.5	71 36.8	+59.5	159.6	70 40.3	+59.7	160.6	**63**
64	78 01.8	+57.0	149.2	77 09.6	+57.8	151.5	76 16.4	+58.3	153.5	75 22.4	+58.7	155.2	74 27.6	+59.0	156.7	73 32.2	+59.3	158.0	72 36.3	+59.5	159.2	71 40.0	+59.7	160.3	**64**
65	78 58.8	+56.3	147.7	78 07.4	+57.3	150.2	77 14.7	+58.0	152.4	76 21.1	+58.5	154.3	75 26.6	+58.9	156.0	74 31.5	+59.2	157.5	73 35.8	+59.4	158.8	72 39.7	+59.5	159.9	**65**
66	79 55.1	+55.7	145.8	79 04.7	+56.7	148.7	78 12.7	+57.6	151.2	77 19.6	+58.3	153.4	76 25.5	+58.8	155.2	75 30.7	+59.1	156.8	74 35.2	+59.4	158.3	73 39.2	+59.6	159.5	**66**
67	80 50.8	+54.6	143.5	80 01.4	+56.1	146.9	79 10.3	+57.2	149.8	78 17.9	+57.9	152.2	77 24.3	+58.5	154.3	76 29.8	+58.9	156.1	75 34.6	+59.2	157.7	74 38.8	+59.5	159.1	**67**
68	81 45.4	+53.2	140.8	80 57.5	+55.2	144.8	80 07.5	+56.6	148.1	79 15.8	+57.6	150.9	78 22.8	+58.2	153.3	77 28.7	+58.8	155.3	76 33.8	+59.2	157.0	75 38.3	+59.4	158.6	**68**
69	82 38.6	*+51.2*	•137.4	81 52.7	+53.9	142.1	81 04.1	+55.7	146.1	80 13.4	+57.0	149.3	79 21.0	+57.9	152.0	78 27.5	+58.5	154.3	77 33.0	+59.0	156.3	76 37.7	+59.3	158.0	**69**
70	83 29.8	*+48.4*	•133.1	82 46.6	*+52.1*	•138.8	81 59.8	+54.6	143.5	81 10.4	+56.3	147.4	80 18.9	+57.5	150.5	79 26.0	+58.3	153.2	78 32.0	+58.8	155.4	77 37.0	+59.2	157.3	**70**
71	84 18.2	*+44.1*	•127.5	83 38.7	*+49.4*	•134.6	82 54.4	*+52.9*	•140.4	82 06.7	+55.2	145.0	81 16.4	+56.8	148.7	80 24.3	+57.8	151.8	79 30.8	+58.5	154.4	78 36.2	+59.0	156.5	**71**
72	85 02.3	*+37.8*	•120.2	84 28.1	*+45.4*	•129.1	83 47.3	*+50.5*	•136.3	83 01.9	+53.8	142.0	82 13.2	+55.9	146.5	81 22.1	+57.3	150.1	80 29.3	+58.2	153.1	79 35.2	+58.9	155.6	**72**
73	85 40.1	*+28.2*	•110.5	85 13.5	*+39.0*	•121.8	84 37.8	*+46.6*	•130.9	83 55.7	*+51.4*	•138.0	83 09.1	+54.6	143.6	82 19.4	+56.5	148.0	81 27.5	+57.8	151.6	80 34.1	+58.5	154.4	**73**
74	86 08.3	*+14.8*	•98.1	85 52.5	*+29.4*	•112.0	85 24.4	*+40.4*	•123.6	84 47.1	*+47.9*	•132.8	84 03.7	*+52.5*	•139.9	83 15.9	+55.4	145.3	82 25.3	+57.1	149.6	81 32.6	+58.2	153.0	**74**
75	86 23.1	*−1.2*	•83.2	86 21.9	*+15.4*	•99.1	86 04.8	*+30.7*	•113.6	85 35.0	*+42.0*	•125.6	84 56.2	*+49.2*	•134.8	84 11.3	*+53.5*	•141.8	83 22.4	+56.1	147.1	82 30.8	+57.7	151.3	**75**
76	86 21.9	*−17.1*	•67.4	86 37.3	*−1.8*	•83.2	86 35.5	*+16.0*	•100.1	86 17.0	*+32.1*	•115.5	85 45.4	*+43.5*	•127.7	85 04.8	*+50.6*	•137.0	84 18.5	*+54.6*	•143.8	83 28.5	+56.8	149.0	**76**
77	86 04.8	*−29.8*	•52.8	86 35.5	*−18.5*	•66.3	86 51.5	*−2.4*	•83.2	86 49.1	*+16.7*	•101.3	86 28.9	*+33.7*	•117.5	85 55.4	*+45.2*	•130.1	85 13.1	*+51.8*	•139.2	84 25.3	+55.5	146.0	**77**
78	85 35.0	*−38.8*	•40.8	86 17.0	*−31.6*	•50.9	86 49.1	*−20.2*	•65.0	87 05.8	*−3.2*	•83.2	87 02.6	*+17.5*	•102.8	86 40.6	*+35.5*	•119.8	86 04.9	*+47.0*	•132.6	85 20.8	*+53.2*	•141.7	**78**
79	84 56.2	*−44.9*	•31.5	85 45.4	*−40.6*	•38.6	86 28.9	*−33.5*	•48.8	87 02.6	*−22.0*	•63.5	87 20.1	*−4.0*	•83.1	87 16.1	*+18.4*	•104.4	86 51.9	*+37.5*	•122.4	86 14.0	*+48.9*	•135.3	**79**
80	84 11.3	*−48.9*	•24.5	85 04.8	*−46.3*	•29.3	85 55.4	*−42.3*	•36.2	86 40.6	*−35.7*	•46.4	87 16.1	*−24.2*	•61.8	87 34.5	*−5.1*	•83.1	87 29.4	*+19.5*	•106.4	87 02.9	*+39.7*	•125.3	**80**
81	83 22.4	*−51.6*	•19.1	84 18.5	*−50.0*	•22.4	85 13.1	*−47.8*	•27.0	86 04.9	*−44.1*	•33.6	86 51.9	*−37.9*	•43.8	87 29.4	*−26.5*	•59.8	87 48.9	*−6.3*	•83.1	87 42.6	*+20.8*	•108.8	**81**
82	82 30.8	−53.4	15.0	83 28.5	*−52.5*	•17.2	84 25.3	*−51.2*	•20.3	85 20.8	*−49.2*	•24.5	86 14.0	*−45.9*	•30.8	87 02.9	*−40.3*	•40.8	87 42.6	*−29.3*	•57.4	88 03.4	*−7.9*	•83.1	**82**
83	81 37.4	−54.8	11.7	82 36.0	−54.2	13.2	83 34.1	−53.4	15.3	84 31.6	*−52.2*	•18.0	85 28.1	*−50.6*	•21.9	86 22.6	*−47.8*	•27.8	87 13.3	*−42.8*	•37.5	87 55.5	*−32.4*	•54.5	**83**
84	80 42.6	−55.7	9.0	81 41.8	−55.4	10.1	82 40.7	−54.9	11.4	83 39.4	−54.3	13.2	84 37.5	*−53.4*	•15.7	85 34.8	*−52.0*	•19.2	86 30.5	*−49.7*	•24.5	87 23.1	*−45.4*	•33.7	**84**
85	79 46.9	−56.5	6.8	80 46.4	−56.2	7.6	81 45.8	−55.9	8.5	82 45.1	−55.6	9.6	83 44.1	−55.1	11.1	84 42.8	−54.4	13.2	85 40.8	*−53.3*	•16.3	86 37.7	*−51.5*	•21.0	**85**
86	78 50.4	−57.0	5.0	79 50.2	−56.9	5.5	80 49.9	−56.8	6.1	81 49.5	−56.6	6.8	82 49.0	−56.3	7.8	83 48.4	−55.9	9.0	84 47.5	−55.4	10.7	85 46.2	*−54.6*	•13.2	**86**
87	77 53.4	−57.5	3.5	78 53.3	−57.4	3.8	79 53.1	−57.3	4.1	80 52.9	−57.2	4.6	81 52.7	−57.0	5.1	82 52.5	−56.9	5.9	83 52.1	−56.7	6.8	84 51.6	−56.3	8.1	**87**
88	76 55.9	−57.8	2.1	77 55.9	−57.8	2.3	78 55.8	−57.7	2.5	79 55.7	−57.6	2.8	80 55.7	−57.7	3.1	81 55.6	−57.6	3.4	82 55.4	−57.4	3.9	83 55.3	−57.3	4.6	**88**
89	75 58.1	−58.1	1.0	76 58.1	−58.1	1.1	77 58.1	−58.1	1.2	78 58.1	−58.1	1.3	79 58.0	−58.0	1.4	80 58.0	−58.0	1.5	81 58.0	−58.0	1.7	82 58.0	−58.0	2.0	**89**
90	75 00.0	−58.3	0.0	76 00.0	−58.3	0.0	77 00.0	−58.3	0.0	78 00.0	−58.4	0.0	79 00.0	−58.4	0.0	80 00.0	−58.4	0.0	81 00.0	−58.4	0.0	82 00.0	−58.4	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 14°, 346°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 32.7	–59.9	165.5	13 34.6	–59.9	165.6	12 36.4	–59.9	165.6	11 38.3	–59.9	165.7	10 40.2	–60.0	165.7	9 42.0	–59.9	165.8	8 43.8	–59.9	165.8	7 45.7	–60.0	165.9	0
1	13 32.8	–59.9	165.6	12 34.7	–59.9	165.7	11 36.5	–59.9	165.7	10 38.4	–59.9	165.8	9 40.2	–59.9	165.8	8 42.1	–60.0	165.8	7 43.9	–60.0	165.9	6 45.7	–60.0	165.9	1
2	12 32.9	–59.9	165.7	11 34.8	–59.9	165.7	10 36.6	–59.9	165.8	9 38.5	–60.0	165.8	8 40.3	–59.9	165.8	7 42.1	–59.9	165.9	6 43.9	–59.9	165.9	5 45.7	–59.9	165.9	2
3	11 33.0	–59.8	165.7	10 34.9	–59.9	165.8	9 36.7	–59.9	165.8	8 38.5	–59.9	165.9	7 40.4	–60.0	165.9	6 42.2	–60.0	165.9	5 44.0	–60.0	165.9	4 45.8	–60.0	166.0	3
4	10 33.2	–59.9	165.8	9 35.0	–59.9	165.8	8 36.8	–59.9	165.9	7 38.6	–59.9	165.9	6 40.4	–59.9	165.9	5 42.2	–59.9	166.0	4 44.0	–59.9	166.0	3 45.8	–60.0	166.0	4
5	9 33.3	–59.9	165.9	8 35.1	–59.9	165.9	7 36.9	–59.9	165.9	6 38.7	–59.9	166.0	5 40.5	–59.9	166.0	4 42.3	–60.0	166.0	3 44.1	–60.0	166.0	2 45.8	–59.9	166.0	5
6	8 33.4	–59.9	165.9	7 35.2	–59.9	166.0	6 37.0	–59.9	166.0	5 38.8	–59.9	166.0	4 40.6	–60.0	166.0	3 42.3	–59.9	166.0	2 44.1	–60.0	166.1	1 45.9	–60.0	166.1	6
7	7 33.5	–59.9	166.0	6 35.3	–59.9	166.0	5 37.1	–59.9	166.0	4 38.9	–60.0	166.1	3 40.6	–59.9	166.1	2 42.4	–60.0	166.1	1 44.1	–59.9	166.1	0 45.9	–60.0	166.1	7
8	6 33.6	–59.8	166.0	5 35.4	–59.9	166.1	4 37.2	–59.9	166.1	3 38.9	–59.9	166.1	2 40.7	–60.0	166.1	1 42.4	–59.9	166.1	0 44.2	–60.0	166.1	0 14.1	+59.9	13.9	8
9	5 33.8	–59.9	166.1	4 35.5	–59.9	166.1	3 37.3	–59.9	166.1	2 39.0	–59.9	166.2	1 40.7	–59.9	166.2	0 42.5	–60.0	166.2	0 15.8	+59.9	13.8	1 14.0	+60.0	13.8	9
10	4 33.9	–59.9	166.2	3 35.6	–59.9	166.2	2 37.4	–60.0	166.2	1 39.1	–59.9	166.2	0 40.8	–59.9	166.2	0 17.5	+59.9	13.8	1 15.7	+60.0	13.8	2 14.0	+60.0	13.8	10
11	3 34.0	–59.9	166.2	2 35.7	–59.9	166.2	1 37.4	–59.9	166.3	0 39.2	–60.0	166.3	0 19.1	+60.0	13.7	1 17.4	+60.0	13.7	2 15.7	+59.9	13.7	3 14.0	+59.9	13.8	11
12	2 34.1	–59.9	166.3	1 35.8	–59.9	166.3	0 37.5	–59.9	166.3	0 20.8	+59.9	13.7	1 19.1	+59.9	13.7	2 17.4	+59.9	13.7	3 15.6	+60.0	13.7	4 13.9	+60.0	13.7	12
13	1 34.2	–59.8	166.4	0 35.9	–59.9	166.4	0 22.4	+59.9	13.6	1 20.7	+59.9	13.6	2 19.0	+59.9	13.6	3 17.3	+60.0	13.7	4 15.6	+60.0	13.7	5 13.9	+60.0	13.7	13
14	0 34.4	–59.9	166.4	0 24.0	+59.9	13.6	1 22.3	+59.9	13.6	2 20.6	+59.9	13.6	3 18.9	+60.0	13.6	4 17.3	+59.9	13.6	5 15.6	+59.9	13.6	6 13.9	+59.9	13.7	14
15	0 25.5	+59.9	13.5	1 23.9	+59.9	13.5	2 22.2	+59.9	13.5	3 20.5	+60.0	13.5	4 18.9	+59.9	13.6	5 17.2	+59.9	13.6	6 15.5	+60.0	13.6	7 13.8	+60.0	13.6	15
16	1 25.4	+59.9	13.5	2 23.8	+59.9	13.5	3 22.1	+59.9	13.5	4 20.5	+59.9	13.5	5 18.8	+59.9	13.5	6 17.1	+60.0	13.5	7 15.5	+59.9	13.6	8 13.8	+60.0	13.6	16
17	2 25.3	+59.9	13.4	3 23.7	+59.9	13.4	4 22.0	+59.9	13.4	5 20.4	+59.9	13.4	6 18.7	+60.0	13.5	7 17.1	+59.9	13.5	8 15.4	+60.0	13.5	9 13.8	+59.9	13.6	17
18	3 25.2	+59.9	13.3	4 23.6	+59.9	13.3	5 21.9	+59.9	13.4	6 20.3	+59.9	13.4	7 18.7	+59.9	13.4	8 17.0	+60.0	13.4	9 15.4	+59.9	13.5	10 13.7	+60.0	13.5	18
19	4 25.1	+59.8	13.3	5 23.5	+59.9	13.3	6 21.8	+60.0	13.3	7 20.2	+60.0	13.3	8 18.6	+59.9	13.4	9 17.0	+59.9	13.4	10 15.3	+60.0	13.4	11 13.7	+60.0	13.5	19
20	5 24.9	+59.9	13.2	6 23.4	+59.8	13.2	7 21.8	+59.9	13.3	8 20.2	+59.9	13.3	9 18.5	+60.0	13.3	10 16.9	+60.0	13.4	11 15.3	+60.0	13.4	12 13.7	+59.9	13.5	20
21	6 24.8	+59.9	13.1	7 23.2	+59.9	13.2	8 21.7	+59.9	13.2	9 20.1	+59.9	13.2	10 18.5	+59.9	13.3	11 16.9	+59.9	13.3	12 15.3	+59.9	13.4	13 13.6	+60.0	13.4	21
22	7 24.7	+59.9	13.1	8 23.1	+59.9	13.1	9 21.6	+59.9	13.1	10 20.0	+59.9	13.2	11 18.4	+59.9	13.2	12 16.8	+60.0	13.3	13 15.2	+60.0	13.3	14 13.6	+60.0	13.4	22
23	8 24.6	+59.9	13.0	9 23.0	+59.9	13.0	10 21.5	+59.9	13.1	11 19.9	+59.9	13.1	12 18.3	+60.0	13.2	13 16.8	+59.9	13.2	14 15.2	+59.9	13.3	15 13.6	+59.9	13.3	23
24	9 24.5	+59.8	12.9	10 22.9	+59.9	13.0	11 21.4	+59.9	13.0	12 19.8	+60.0	13.1	13 18.3	+59.9	13.1	14 16.7	+59.9	13.2	15 15.1	+60.0	13.2	16 13.5	+60.0	13.3	24
25	10 24.3	+59.9	12.9	11 22.8	+59.9	12.9	12 21.3	+59.9	13.0	13 19.8	+59.9	13.0	14 18.2	+59.9	13.1	15 16.6	+60.0	13.1	16 15.1	+59.9	13.2	17 13.5	+59.9	13.3	25
26	11 24.2	+59.9	12.8	12 22.7	+59.9	12.9	13 21.2	+59.9	12.9	14 19.7	+59.9	13.0	15 18.1	+60.0	13.0	16 16.6	+59.9	13.1	17 15.0	+60.0	13.2	18 13.4	+60.0	13.2	26
27	12 24.1	+59.9	12.8	13 22.6	+59.9	12.8	14 21.1	+59.9	12.9	15 19.6	+59.9	12.9	16 18.1	+59.9	13.0	17 16.5	+60.0	13.0	18 15.0	+59.9	13.1	19 13.4	+60.0	13.2	27
28	13 24.0	+59.8	12.7	14 22.5	+59.9	12.7	15 21.0	+59.9	12.8	16 19.5	+59.9	12.9	17 18.0	+59.9	12.9	18 16.5	+59.9	13.0	19 14.9	+60.0	13.1	20 13.4	+59.9	13.2	28
29	14 23.8	+59.9	12.6	15 22.4	+59.9	12.7	16 20.9	+59.9	12.7	17 19.4	+60.0	12.8	18 17.9	+60.0	12.9	19 16.4	+60.0	13.0	20 14.9	+59.9	13.0	21 13.3	+60.0	13.1	29
30	15 23.7	+59.9	12.6	16 22.3	+59.9	12.6	17 20.8	+59.9	12.7	18 19.4	+59.9	12.8	19 17.9	+59.9	12.8	20 16.4	+59.9	12.9	21 14.8	+60.0	13.0	22 13.3	+59.9	13.1	30
31	16 23.6	+59.9	12.5	17 22.2	+59.9	12.5	18 20.7	+59.9	12.6	19 19.3	+59.9	12.7	20 17.8	+59.9	12.8	21 16.3	+59.9	12.9	22 14.8	+59.9	12.9	23 13.2	+60.0	13.0	31
32	17 23.5	+59.8	12.4	18 22.1	+59.8	12.5	19 20.6	+59.9	12.6	20 19.2	+59.9	12.6	21 17.7	+59.9	12.7	22 16.2	+60.0	12.8	23 14.7	+60.0	12.9	24 13.2	+60.0	13.0	32
33	18 23.3	+59.9	12.3	19 21.9	+59.9	12.4	20 20.5	+59.9	12.5	21 19.1	+59.9	12.6	22 17.6	+60.0	12.7	23 16.2	+59.9	12.8	24 14.7	+59.9	12.9	25 13.2	+59.9	13.0	33
34	19 23.2	+59.9	12.3	20 21.8	+59.9	12.4	21 20.4	+59.9	12.4	22 19.0	+59.9	12.5	23 17.6	+59.9	12.6	24 16.1	+59.9	12.7	25 14.6	+60.0	12.8	26 13.1	+60.0	12.9	34
35	20 23.1	+59.8	12.2	21 21.7	+59.9	12.3	22 20.3	+59.9	12.4	23 18.9	+59.9	12.5	24 17.5	+59.9	12.6	25 16.0	+60.0	12.7	26 14.6	+59.9	12.8	27 13.1	+59.9	12.9	35
36	21 22.9	+59.9	12.1	22 21.6	+59.9	12.2	23 20.2	+59.9	12.3	24 18.8	+59.9	12.4	25 17.4	+59.9	12.5	26 16.0	+59.9	12.6	27 14.5	+60.0	12.7	28 13.0	+60.0	12.8	36
37	22 22.8	+59.9	12.1	23 21.5	+59.8	12.1	24 20.1	+59.9	12.2	25 18.7	+59.9	12.3	26 17.3	+60.0	12.4	27 15.9	+59.9	12.6	28 14.5	+59.9	12.7	29 13.0	+59.9	12.8	37
38	23 22.7	+59.8	12.0	24 21.3	+59.9	12.1	25 20.0	+59.9	12.2	26 18.6	+59.9	12.3	27 17.3	+59.9	12.4	28 15.8	+60.0	12.5	29 14.4	+60.0	12.6	30 12.9	+60.0	12.7	38
39	24 22.5	+59.9	11.9	25 21.2	+59.9	12.0	26 19.9	+59.9	12.1	27 18.5	+59.9	12.2	28 17.2	+59.9	12.3	29 15.8	+59.9	12.4	30 14.4	+59.9	12.6	31 12.9	+60.0	12.7	39
40	25 22.4	+59.8	11.8	26 21.1	+59.9	11.9	27 19.8	+59.9	12.0	28 18.4	+59.9	12.2	29 17.1	+59.9	12.3	30 15.7	+59.9	12.4	31 14.3	+59.9	12.5	32 12.9	+59.9	12.7	40
41	26 22.2	+59.9	11.8	27 21.0	+59.8	11.9	28 19.7	+59.8	12.0	29 18.3	+59.9	12.1	30 17.0	+59.9	12.2	31 15.6	+60.0	12.3	32 14.2	+60.0	12.5	33 12.8	+60.0	12.6	41
42	27 22.1	+59.8	11.7	28 20.8	+59.9	11.8	29 19.5	+59.9	11.9	30 18.2	+59.9	12.0	31 16.9	+59.9	12.1	32 15.6	+59.9	12.3	33 14.2	+59.9	12.4	34 12.8	+59.9	12.6	42
43	28 21.9	+59.9	11.6	29 20.7	+59.9	11.7	30 19.4	+59.9	11.8	31 18.1	+59.9	12.0	32 16.8	+59.9	12.1	33 15.5	+59.9	12.2	34 14.1	+59.9	12.4	35 12.7	+60.0	12.5	43
44	29 21.8	+59.8	11.5	30 20.6	+59.8	11.6	31 19.3	+59.9	11.8	32 18.0	+59.9	11.9	33 16.7	+59.9	12.0	34 15.4	+59.9	12.2	35 14.0	+60.0	12.3	36 12.7	+59.9	12.5	44
45	30 21.6	+59.9	11.4	31 20.4	+59.9	11.6	32 19.2	+59.9	11.7	33 17.9	+59.9	11.8	34 16.6	+60.0	11.9	35 15.3	+60.0	12.1	36 14.0	+59.9	12.2	37 12.6	+59.9	12.4	45
46	31 21.5	+59.8	11.3	32 20.3	+59.8	11.5	33 19.1	+59.8	11.6	34 17.8	+59.9	11.7	35 16.6	+59.9	11.9	36 15.3	+59.9	12.0	37 13.9	+59.9	12.2	38 12.5	+60.0	12.3	46
47	32 21.3	+59.8	11.3	33 20.1	+59.9	11.4	34 18.9	+59.9	11.5	35 17.7	+59.9	11.7	36 16.5	+59.9	11.8	37 15.2	+59.9	12.0	38 13.8	+60.0	12.1	39 12.5	+59.9	12.3	47
48	33 21.1	+59.9	11.2	34 20.0	+59.8	11.3	35 18.8	+59.9	11.4	36 17.6	+59.9	11.6	37 16.4	+59.9	11.7	38 15.1	+59.9	11.9	39 13.8	+59.9	12.1	40 12.4	+60.0	12.2	48
49	34 21.0	+59.8	11.1	35 19.8	+59.9	11.2	36 18.7	+59.8	11.4	37 17.5	+59.9	11.5	38 16.3	+59.8	11.7	39 15.0	+59.9	11.8	40 13.7	+59.9	12.0	41 12.4	+59.9	12.2	49
50	35 20.8	+59.8	11.0	36 19.7	+59.8	11.1	37 18.5	+59.9	11.3	38 17.4	+59.8	11.4	39 16.1	+59.9	11.6	40 14.9	+59.9	11.8	41 13.6	+60.0	11.9	42 12.3	+59.9	12.1	50
51	36 20.6	+59.8	10.9	37 19.5	+59.8	11.0	38 18.4	+59.8	11.2	39 17.2	+59.9	11.3	40 16.0	+59.9	11.5	41 14.8	+59.9	11.7	42 13.6	+59.9	11.9	43 12.2	+60.0	12.1	51
52	37 20.4	+59.8	10.8	38 19.3	+59.9	10.9	39 18.2	+59.9	11.1	40 17.1	+59.9	11.3	41 15.9	+59.9	11.4	42 14.7	+59.9	11.6	43 13.5	+59.9	11.8	44 12.2	+59.9	12.0	52
53	38 20.2	+59.8	10.7	39 19.2	+59.8	10.8	40 18.1	+59.8	11.0	41 17.0	+59.8	11.2	42 15.8	+59.9	11.3	43 14.6	+59.9	11.5	44 13.4	+59.9	11.7	45 12.1	+59.9	11.9	53
54	39 20.0	+59.8	10.6	40 19.0	+59.8	10.7	41 17.9	+59.9	10.9	42 16.8	+59.9	11.1	43 15.7	+59.9	11.3	44 14.5	+59.9	11.4	45 13.3	+59.9	11.6	46 12.0	+60.0	11.9	54
55	40 19.8	+59.8	10.5	41 18.8	+59.8	10.6	42 17.8	+59.8	10.8	43 16.7	+59.8	11.0	44 15.6	+59.8	11.2	45 14.4	+59.9	11.4	46 13.2	+59.9	11.6	47 12.0	+59.9	11.8	55
56	41 19.6	+59.8	10.4	42 18.6	+59.8	10.5	43 17.6	+59.8	10.7	44 16.5	+59.9	10.9	45 15.4	+59.9	11.1	46 14.3	+59.9	11.3	47 13.1	+59.9	11.5	48 11.9	+59.9	11.7	56
57	42 19.4	+59.8	10.3	43 18.4	+59.8	10.4	44 17.4	+59.9	10.6	45 16.4	+59.8	10.8	46 15.3	+59.9	11.0	47 14.2	+59.9	11.2	48 13.0	+59.9	11.4	49 11.8	+59.9	11.6	57
58	43 19.2	+59.8	10.1	44 18.2	+59.8	10.3	45 17.3	+59.8	10.5	46 16.2	+59.9	10.7	47 15.2	+59.8	10.9	48 14.1	+59.9	11.1	49 12.9	+59.9	11.3	50 11.7	+60.0	11.6	58
59	44 19.0	+59.7	10.0	45 18.0	+59.8	10.2	46 17.1	+59.8	10.4	47 16.1	+59.8	10.6	48 15.0	+59.9	10.8	49 14.0	+59.8	11.0	50 12.8	+59.9	11.2	51 11.7	+59.9	11.5	59
60	45 18.7	+59.8	9.9	46 17.8	+59.8	10.1	47 16.9	+59.8	10.3	48 15.9	+59.8	10.5	49 14.9	+59.8	10.7	50 13.8	+59.9	10.9	51 12.7	+59.9	11.1	52 11.6	+59.9	11.4	60
61	46 18.5	+59.7	9.8	47 17.6	+59.8	10.0	48 16.7	+59.8	10.2	49 15.7	+59.8	10.4	50 14.7	+59.9	10.6	51 13.7	+59.9	10.8	52 12.6	+59.9	11.0	53 11.5	+59.9	11.3	61
62	47 18.2	+59.8	9.6	48 17.4	+59.7	9.8	49 16.5	+59.8	10.0	50 15.5	+59.9	10.2	51 14.6	+59.8	10.5	52 13.6	+59.8	10.7	53 12.5	+59.9	10.9	54 11.4	+59.9	11.2	62
63	48 18.0	+59.7	9.5	49 17.1	+59.8	9.7	50 16.3	+59.7	9.9	51 15.4	+59.8	10.1	52 14.4	+59.8	10.3	53 13.4	+59.9	10.6	54 12.4	+59.8	10.8	55 11.3	+59.9	11.1	63
64	49 17.7	+59.7	9.4	50 16.9	+59.7	9.6	51 16.0	+59.8	9.8	52 15.2	+59.8	10.0	53 14.2	+59.8	10.2	54 13.3	+59.8	10.5	55 12.2	+59.9	10.7	56 11.2	+59.9	11.0	64
65	50 17.4	+59.7	9.2	51 16.6	+59.8	9.4	52 15.8	+59.8	9.6	53 15.0	+59.7	9.8	54 14.0	+59.9	10.1	55 13.1	+59.8	10.3	56 12.1	+59.9	10.6	57 11.1	+59.8	10.9	65
66	51 17.1	+59.7	9.1	52 16.4	+59.7	9.3	53 15.6	+59.7	9.5	54 14.7	+59.8	9.7	55 13.9	+59.8	9.9	56 12.9	+59.9	10.2	57 12.0	+59.8	10.5	58 10.9	+59.9	10.8	66
67	52 16.8	+59.7	8.9	53 16.1	+59.7	9.1	54 15.3	+59.7	9.3	55 14.5	+59.8	9.5	56 13.7	+59.7	9.8	57 12.8	+59.8	10.1	58 11.8	+59.9	10.3	59 10.8	+59.9	10.6	67
68	53 16.5	+59.7	8.7	54 15.8	+59.7	8.9	55 15.0	+59.8	9.1	56 14.3	+59.7	9.4	57 13.4	+59.8	9.6	58 12.6	+59.8	9.9	59 11.7	+59.8	10.2	60 10.7	+59.8	10.5	68
69	54 16.2	+59.6	8.5	55 15.5	+59.7	8.8	56 14.8	+59.7	9.0	57 14.0	+59.7	9.2	58 13.2	+59.8	9.5	59 12.4	+59.8	9.7	60 11.5	+59.8	10.0	61 10.5	+59.9	10.4	69
70	55 15.8	+59.6	8.3	56 15.2	+59.6	8.6	57 14.5	+59.7	8.8	58 13.7	+59.8	9.0	59 13.0	+59.7	9.3	60 12.2	+59.7	9.6	61 11.3	+59.8	9.9	62 10.4	+59.8	10.2	70
71	56 15.4	+59.6	8.2	57 14.8	+59.7	8.4	58 14.2	+59.6	8.6	59 13.5	+59.7	8.9	60 12.7	+59.8	9.1	61 11.9	+59.8	9.4	62 11.1	+59.8	9.7	63 10.2	+59.8	10.0	71
72	57 15.0	+59.6	7.9	58 14.5	+59.6	8.2	59 13.8	+59.7	8.4	60 13.2	+59.6	8.7	61 12.5	+59.7	8.9	62 11.7	+59.8	9.2	63 10.9	+59.8	9.5	64 10.0	+59.9	9.9	72
73	58 14.6	+59.6	7.7	59 14.1	+59.6	7.9	60 13.5	+59.6	8.2	61 12.8	+59.7	8.4	62 12.2	+59.7	8.7	63 11.5	+59.7	9.0	64 10.7	+59.8	9.3	65 09.9	+59.8	9.7	73
74	59 14.2	+59.5	7.5	60 13.7	+59.5	7.7	61 13.1	+59.6	8.0	62 12.5	+59.6	8.2	63 11.9	+59.6	8.5	64 11.2	+59.7	8.8	65 10.5	+59.7	9.1	66 09.7	+59.7	9.5	74
75	60 13.7	+59.5	7.2	61 13.2	+59.6	7.5	62 12.7	+59.6	7.7	63 12.1	+59.7	8.0	64 11.5	+59.7	8.3	65 10.9	+59.7	8.6	66 10.2	+59.7	8.9	67 09.4	+59.8	9.3	75
76	61 13.2	+59.5	7.0	62 12.8	+59.5	7.2	63 12.3	+59.5	7.5	64 11.8	+59.5	7.7	65 11.2	+59.6	8.0	66 10.6	+59.6	8.3	67 09.9	+59.7	8.7	68 09.2	+59.8	9.0	76
77	62 12.7	+59.4	6.7	63 12.3	+59.5	6.9	64 11.8	+59.5	7.2	65 11.3	+59.6	7.5	66 10.8	+59.6	7.7	67 10.2	+59.7	8.1	68 09.6	+59.7	8.4	69 09.0	+59.7	8.8	77
78	63 12.1	+59.4	6.4	64 11.8	+59.4	6.6	65 11.3	+59.5	6.9	66 10.9	+59.5	7.2	67 10.4	+59.6	7.4	68 09.9	+59.6	7.8	69 09.3	+59.6	8.1	70 08.7	+59.7	8.5	78
79	64 11.5	+59.4	6.1	65 11.2	+59.4	6.3	66 10.8	+59.4	6.6	67 10.4	+59.5	6.8	68 10.0	+59.5	7.1	69 09.5	+59.5	7.5	70 08.9	+59.7	7.8	71 08.4	+59.6	8.2	79
80	65 10.9	+59.3	5.7	66 10.6	+59.3	6.0	67 10.2	+59.4	6.2	68 09.9	+59.4	6.5	69 09.5	+59.4	6.8	70 09.0	+59.6	7.1	71 08.6	+59.5	7.5	72 08.0	+59.6	7.9	80
81	66 10.2	+59.2	5.4	67 09.9	+59.3	5.6	68 09.6	+59.4	5.8	69 09.3	+59.4	6.1	70 08.9	+59.5	6.4	71 08.6	+59.4	6.7	72 08.1	+59.5	7.1	73 07.6	+59.6	7.5	81
82	67 09.4	+59.2	5.0	68 09.2	+59.2	5.2	69 09.0	+59.2	5.4	70 08.7	+59.3	5.7	71 08.4	+59.3	6.0	72 08.0	+59.4	6.3	73 07.6	+59.5	6.7	74 07.2	+59.5	7.1	82
83	68 08.6	+59.1	4.5	69 08.4	+59.2	4.7	70 08.2	+59.2	5.0	71 08.0	+59.2	5.2	72 07.7	+59.3	5.5	73 07.4	+59.3	5.8	74 07.1	+59.4	6.2	75 06.7	+59.5	6.6	83
84	69 07.7	+59.1	4.1	70 07.6	+59.0	4.3	71 07.4	+59.1	4.5	72 07.2	+59.1	4.7	73 07.0	+59.2	5.0	74 06.7	+59.3	5.3	75 06.5	+59.3	5.6	76 06.2	+59.3	6.0	84
85	70 06.8	+58.9	3.6	71 06.6	+59.0	3.7	72 06.5	+59.0	3.9	73 06.3	+59.1	4.2	74 06.2	+59.1	4.4	75 06.0	+59.1	4.7	76 05.8	+59.2	5.0	77 05.5	+59.3	5.4	85
86	71 05.7	+58.8	3.0	72 05.6	+58.8	3.1	73 05.5	+58.9	3.3	74 05.4	+58.9	3.5	75 05.3	+58.9	3.8	76 05.1	+59.0	4.0	77 05.0	+59.0	4.3	78 04.8	+59.1	4.7	86
87	72 04.5	+58.7	2.4	73 04.4	+58.7	2.5	74 04.4	+58.7	2.6	75 04.3	+58.8	2.8	76 04.2	+58.8	3.0	77 04.1	+58.9	3.2	78 04.0	+58.9	3.5	79 03.9	+59.0	3.8	87
88	73 03.2	+58.5	1.7	74 03.1	+58.6	1.8	75 03.1	+58.6	1.9	76 03.1	+58.5	2.0	77 03.0	+58.6	2.2	78 03.0	+58.6	2.3	79 02.9	+58.7	2.5	80 02.9	+58.7	2.8	88
89	74 01.7	+58.3	0.9	75 01.7	+58.3	0.9	76 01.7	+58.3	1.0	77 01.6	+58.4	1.1	78 01.6	+58.4	1.2	79 01.6	+58.4	1.3	80 01.6	+58.4	1.4	81 01.6	+58.4	1.6	89
90	75 00.0	+58.1	0.0	76 00.0	+58.1	0.0	77 00.0	+58.1	0.0	78 00.0	+58.1	0.0	79 00.0	+58.0	0.0	80 00.0	+58.0	0.0	81 00.0	+58.0	0.0	82 00.0	+58.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 166°, 194°

15°, 345° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 28.7	+59.8	164.5	13 30.8	+59.9	164.6	12 33.0	+59.9	164.6	11 35.1	+59.9	164.7	10 37.2	+60.0	164.7	9 39.4	+59.9	164.8	8 41.5	+59.9	164.8	7 43.5	+60.0	164.9	0
1	15 28.5	+59.9	164.4	14 30.7	+59.9	164.5	13 32.9	+59.9	164.6	12 35.0	+59.9	164.6	11 37.2	+59.9	164.7	10 39.3	+59.9	164.7	9 41.4	+60.0	164.8	8 43.5	+60.0	164.8	1
2	16 28.4	+59.8	164.4	15 30.6	+59.8	164.4	14 32.8	+59.9	164.5	13 34.9	+59.9	164.6	12 37.1	+59.9	164.6	11 39.2	+60.0	164.7	10 41.4	+59.9	164.7	9 43.5	+59.9	164.8	2
3	17 28.2	+59.9	164.3	16 30.4	+59.9	164.4	15 32.7	+59.8	164.4	14 34.8	+60.0	164.5	13 37.0	+59.9	164.6	12 39.2	+59.9	164.6	11 41.3	+60.0	164.7	10 43.4	+60.0	164.7	3
4	18 28.1	+59.8	164.2	17 30.3	+59.9	164.3	16 32.5	+59.9	164.4	15 34.8	+59.9	164.5	14 36.9	+60.0	164.5	13 39.1	+59.9	164.6	12 41.3	+59.9	164.7	11 43.4	+59.9	164.7	4
5	19 27.9	+59.9	164.1	18 30.2	+59.9	164.2	17 32.4	+59.9	164.3	16 34.7	+59.9	164.4	15 36.9	+59.9	164.5	14 39.0	+60.0	164.5	13 41.2	+59.9	164.6	12 43.3	+60.0	164.7	5
6	20 27.8	+59.8	164.1	19 30.1	+59.8	164.2	18 32.3	+59.9	164.2	17 34.6	+59.9	164.3	16 36.8	+59.9	164.4	15 39.0	+59.9	164.5	14 41.1	+60.0	164.6	13 43.3	+60.0	164.6	6
7	21 27.6	+59.8	164.0	20 29.9	+59.9	164.1	19 32.2	+59.9	164.2	18 34.5	+59.9	164.3	17 36.7	+59.9	164.4	16 38.9	+59.9	164.4	15 41.1	+59.9	164.5	14 43.3	+59.9	164.6	7
8	22 27.4	+59.9	163.9	21 29.8	+59.8	164.0	20 32.1	+59.9	164.1	19 34.4	+59.9	164.2	18 36.6	+59.9	164.3	17 38.8	+60.0	164.4	16 41.0	+60.0	164.5	15 43.2	+60.0	164.6	8
9	23 27.3	+59.8	163.8	22 29.6	+59.9	163.9	21 32.0	+59.9	164.0	20 34.3	+59.9	164.2	19 36.5	+60.0	164.3	18 38.8	+59.9	164.3	17 41.0	+59.9	164.4	16 43.2	+59.9	164.5	9
10	24 27.1	+59.9	163.7	23 29.5	+59.9	163.9	22 31.9	+59.8	164.0	21 34.2	+59.9	164.1	20 36.5	+59.9	164.2	19 38.7	+59.9	164.3	18 40.9	+60.0	164.4	17 43.1	+60.0	164.5	10
11	25 27.0	+59.8	163.7	24 29.4	+59.8	163.8	23 31.7	+59.9	163.9	22 34.1	+59.9	164.0	21 36.4	+59.9	164.1	20 38.6	+60.0	164.2	19 40.9	+59.9	164.3	18 43.1	+59.9	164.4	11
12	26 26.8	+59.8	163.6	25 29.2	+59.9	163.7	24 31.6	+59.9	163.8	23 34.0	+59.9	164.0	22 36.3	+59.9	164.1	21 38.6	+59.9	164.2	20 40.8	+60.0	164.3	19 43.0	+60.0	164.4	12
13	27 26.6	+59.9	163.5	26 29.1	+59.8	163.6	25 31.5	+59.9	163.8	24 33.9	+59.9	163.9	23 36.2	+59.9	164.0	22 38.5	+59.9	164.1	21 40.8	+59.9	164.3	20 43.0	+60.0	164.4	13
14	28 26.5	+59.8	163.4	27 28.9	+59.9	163.6	26 31.4	+59.8	163.7	25 33.8	+59.8	163.8	24 36.1	+59.9	164.0	23 38.4	+60.0	164.1	22 40.7	+59.9	164.2	21 43.0	+59.9	164.3	14
15	29 26.3	+59.8	163.3	28 28.8	+59.8	163.5	27 31.2	+59.9	163.6	26 33.6	+59.9	163.8	25 36.0	+59.9	163.9	24 38.4	+59.9	164.0	23 40.6	+60.0	164.2	22 42.9	+60.0	164.3	15
16	30 26.1	+59.8	163.2	29 28.6	+59.9	163.4	28 31.1	+59.9	163.6	27 33.5	+59.9	163.7	26 35.9	+59.9	163.8	25 38.3	+59.9	164.0	24 40.6	+59.9	164.1	23 42.9	+59.9	164.2	16
17	31 25.9	+59.8	163.1	30 28.5	+59.8	163.3	29 31.0	+59.8	163.5	28 33.4	+59.9	163.6	27 35.8	+59.9	163.8	26 38.2	+59.9	163.9	25 40.5	+60.0	164.1	24 42.8	+60.0	164.2	17
18	32 25.7	+59.8	163.0	31 28.3	+59.8	163.2	30 30.8	+59.9	163.4	29 33.3	+59.9	163.6	28 35.7	+59.9	163.7	27 38.1	+59.9	163.9	26 40.5	+59.9	164.0	25 42.8	+59.9	164.1	18
19	33 25.5	+59.8	162.9	32 28.1	+59.9	163.1	31 30.7	+59.9	163.3	30 33.2	+59.9	163.5	29 35.6	+59.9	163.7	28 38.0	+60.0	163.8	27 40.4	+59.9	164.0	26 42.7	+60.0	164.1	19
20	34 25.3	+59.8	162.9	33 28.0	+59.8	163.0	32 30.6	+59.8	163.2	31 33.1	+59.9	163.4	30 35.5	+59.9	163.6	29 38.0	+59.9	163.8	28 40.3	+60.0	163.9	27 42.7	+59.9	164.1	20
21	35 25.1	+59.8	162.8	34 27.8	+59.8	163.0	33 30.4	+59.9	163.2	32 33.0	+59.8	163.3	31 35.4	+59.9	163.5	30 37.9	+59.9	163.7	29 40.3	+59.9	163.9	28 42.6	+60.0	164.0	21
22	36 24.9	+59.8	162.7	35 27.6	+59.9	162.9	34 30.3	+59.8	163.1	33 32.8	+59.9	163.3	32 35.3	+59.9	163.5	31 37.8	+59.9	163.6	30 40.2	+59.9	163.8	29 42.6	+59.9	164.0	22
23	37 24.7	+59.8	162.5	36 27.5	+59.8	162.8	35 30.1	+59.9	163.0	34 32.7	+59.9	163.2	33 35.2	+59.9	163.4	32 37.7	+59.9	163.6	31 40.1	+60.0	163.7	30 42.5	+60.0	163.9	23
24	38 24.5	+59.8	162.4	37 27.3	+59.8	162.7	36 30.0	+59.8	162.9	35 32.6	+59.8	163.1	34 35.1	+59.9	163.3	33 37.6	+59.9	163.5	32 40.1	+59.9	163.7	31 42.5	+59.9	163.9	24
25	39 24.3	+59.8	162.3	38 27.1	+59.8	162.6	37 29.8	+59.8	162.8	36 32.4	+59.9	163.0	35 35.0	+59.9	163.2	34 37.5	+60.0	163.4	33 40.0	+59.9	163.6	32 42.4	+60.0	163.8	25
26	40 24.1	+59.7	162.2	39 26.9	+59.8	162.5	38 29.6	+59.9	162.7	37 32.3	+59.9	162.9	36 34.9	+59.9	163.2	35 37.5	+59.9	163.4	34 39.9	+60.0	163.6	33 42.4	+59.9	163.8	26
27	41 23.8	+59.8	162.1	40 26.7	+59.8	162.4	39 29.5	+59.8	162.6	38 32.2	+59.8	162.9	37 34.8	+59.9	163.1	36 37.4	+59.9	163.3	35 39.9	+59.9	163.5	34 42.3	+59.9	163.7	27
28	42 23.6	+59.7	162.0	41 26.5	+59.8	162.3	40 29.3	+59.8	162.5	39 32.0	+59.9	162.8	38 34.7	+59.9	163.0	37 37.3	+59.9	163.2	36 39.8	+59.9	163.4	35 42.2	+60.0	163.7	28
29	43 23.3	+59.8	161.9	42 26.3	+59.7	162.1	41 29.1	+59.8	162.4	40 31.9	+59.8	162.7	39 34.6	+59.8	162.9	38 37.2	+59.9	163.2	37 39.7	+59.9	163.4	36 42.2	+59.9	163.6	29
30	44 23.1	+59.7	161.7	43 26.0	+59.8	162.0	42 28.9	+59.8	162.3	41 31.7	+59.9	162.6	40 34.4	+59.9	162.8	39 37.1	+59.9	163.1	38 39.6	+59.9	163.3	37 42.1	+60.0	163.5	30
31	45 22.8	+59.7	161.6	44 25.8	+59.8	161.9	43 28.7	+59.8	162.2	42 31.6	+59.8	162.5	41 34.3	+59.9	162.7	40 37.0	+59.9	163.0	39 39.5	+60.0	163.3	38 42.1	+59.9	163.5	31
32	46 22.5	+59.7	161.4	45 25.6	+59.7	161.8	44 28.5	+59.8	162.1	43 31.4	+59.8	162.4	42 34.2	+59.8	162.7	41 36.9	+59.8	162.9	40 39.5	+59.9	163.2	39 42.0	+59.9	163.4	32
33	47 22.2	+59.7	161.3	46 25.3	+59.8	161.6	45 28.3	+59.8	162.0	44 31.2	+59.9	162.3	43 34.0	+59.9	162.6	42 36.7	+59.9	162.8	41 39.4	+59.9	163.1	40 41.9	+60.0	163.4	33
34	48 21.9	+59.7	161.2	47 25.1	+59.7	161.5	46 28.1	+59.8	161.8	45 31.1	+59.8	162.2	44 33.9	+59.8	162.5	43 36.6	+59.9	162.8	42 39.3	+59.9	163.0	41 41.9	+59.9	163.3	34
35	49 21.6	+59.7	161.0	48 24.8	+59.8	161.4	47 27.9	+59.8	161.7	46 30.9	+59.8	162.1	45 33.7	+59.9	162.4	44 36.5	+59.9	162.7	43 39.2	+59.9	163.0	42 41.8	+59.9	163.2	35
36	50 21.3	+59.7	160.8	49 24.6	+59.7	161.2	48 27.7	+59.7	161.6	47 30.7	+59.8	161.9	46 33.6	+59.8	162.3	45 36.4	+59.9	162.6	44 39.1	+59.9	162.9	43 41.7	+59.9	163.2	36
37	51 21.0	+59.6	160.7	50 24.3	+59.7	161.1	49 27.4	+59.8	161.5	48 30.5	+59.8	161.8	47 33.4	+59.9	162.2	46 36.3	+59.8	162.5	45 39.0	+59.9	162.8	44 41.6	+60.0	163.1	37
38	52 20.6	+59.6	160.5	51 24.0	+59.7	160.9	50 27.2	+59.7	161.3	49 30.3	+59.8	161.7	48 33.3	+59.8	162.1	47 36.1	+59.9	162.4	46 38.9	+59.9	162.7	45 41.6	+59.9	163.0	38
39	53 20.2	+59.6	160.3	52 23.7	+59.6	160.8	51 26.9	+59.8	161.2	50 30.1	+59.8	161.6	49 33.1	+59.8	161.9	48 36.0	+59.9	162.3	47 38.8	+59.9	162.6	46 41.5	+59.9	162.9	39
40	54 19.8	+59.6	160.1	53 23.3	+59.7	160.6	52 26.7	+59.7	161.0	51 29.9	+59.7	161.4	50 32.9	+59.8	161.8	49 35.9	+59.8	162.2	48 38.7	+59.9	162.5	47 41.4	+59.9	162.9	40
41	55 19.4	+59.6	159.9	54 23.0	+59.6	160.4	53 26.4	+59.7	160.9	52 29.6	+59.8	161.3	51 32.7	+59.8	161.7	50 35.7	+59.9	162.1	49 38.6	+59.8	162.4	48 41.3	+59.9	162.8	41
42	56 19.0	+59.6	159.7	55 22.6	+59.7	160.2	54 26.1	+59.7	160.7	53 29.4	+59.7	161.1	52 32.5	+59.8	161.6	51 35.6	+59.8	162.0	50 38.4	+59.9	162.3	49 41.2	+59.9	162.7	42
43	57 18.6	+59.5	159.5	56 22.3	+59.6	160.0	55 25.8	+59.7	160.5	54 29.1	+59.8	161.0	53 32.3	+59.8	161.4	52 35.4	+59.8	161.8	51 38.3	+59.9	162.2	50 41.1	+59.9	162.6	43
44	58 18.1	+59.5	159.2	57 21.9	+59.6	159.8	56 25.5	+59.6	160.3	55 28.9	+59.7	160.8	54 32.1	+59.8	161.3	53 35.2	+59.9	161.7	52 38.2	+59.9	162.1	51 41.0	+59.9	162.5	44
45	59 17.6	+59.4	159.0	58 21.5	+59.5	159.6	57 25.1	+59.7	160.1	56 28.6	+59.7	160.6	55 31.9	+59.8	161.1	54 35.1	+59.8	161.6	53 38.1	+59.8	162.0	52 40.9	+59.9	162.4	45
46	60 17.0	+59.5	158.7	59 21.0	+59.5	159.3	58 24.8	+59.6	159.9	57 28.3	+59.7	160.5	56 31.7	+59.7	161.0	55 34.9	+59.8	161.5	54 37.9	+59.9	161.9	53 40.8	+59.9	162.3	46
47	61 16.5	+59.4	158.5	60 20.5	+59.5	159.1	59 24.4	+59.6	159.7	58 28.0	+59.7	160.3	57 31.4	+59.8	160.8	56 34.7	+59.8	161.3	55 37.8	+59.8	161.8	54 40.7	+59.9	162.2	47
48	62 15.9	+59.3	158.2	61 20.0	+59.5	158.8	60 24.0	+59.5	159.5	59 27.7	+59.6	160.1	58 31.2	+59.7	160.6	57 34.5	+59.7	161.2	56 37.6	+59.8	161.6	55 40.6	+59.8	162.1	48
49	63 15.2	+59.3	157.8	62 19.5	+59.4	158.6	61 23.5	+59.6	159.2	60 27.3	+59.7	159.9	59 30.9	+59.7	160.4	58 34.2	+59.8	161.0	57 37.4	+59.9	161.5	56 40.4	+59.9	162.0	49
50	64 14.5	+59.3	157.5	63 18.9	+59.4	158.3	62 23.1	+59.5	159.0	61 27.0	+59.6	159.6	60 30.6	+59.7	160.2	59 34.0	+59.8	160.8	58 37.3	+59.8	161.4	57 40.3	+59.9	161.9	50
51	65 13.8	+59.2	157.1	64 18.3	+59.4	157.9	63 22.6	+59.5	158.7	62 26.6	+59.5	159.4	61 30.3	+59.6	160.0	60 33.8	+59.7	160.6	59 37.1	+59.8	161.2	58 40.2	+59.8	161.7	51
52	66 13.0	+59.1	156.7	65 17.7	+59.3	157.6	64 22.1	+59.4	158.4	63 26.1	+59.6	159.1	62 29.9	+59.7	159.8	61 33.5	+59.7	160.5	60 36.9	+59.8	161.1	59 40.0	+59.9	161.6	52
53	67 12.1	+59.1	156.3	66 17.0	+59.2	157.2	65 21.5	+59.4	158.1	64 25.7	+59.5	158.8	63 29.6	+59.6	159.6	62 33.2	+59.7	160.2	61 36.7	+59.7	160.9	60 39.9	+59.8	161.5	53
54	68 11.2	+58.9	155.8	67 16.2	+59.2	156.8	66 20.9	+59.3	157.7	65 25.2	+59.5	158.5	64 29.2	+59.6	159.3	63 32.9	+59.7	160.0	62 36.4	+59.8	160.7	61 39.7	+59.8	161.3	54
55	69 10.1	+58.9	155.3	68 15.4	+59.1	156.4	67 20.2	+59.3	157.3	66 24.7	+59.4	158.2	65 28.8	+59.6	159.0	64 32.6	+59.7	159.8	63 36.2	+59.7	160.5	62 39.5	+59.8	161.1	55
56	70 09.0	+58.8	154.8	69 14.5	+59.0	155.9	68 19.5	+59.2	156.9	67 24.1	+59.4	157.9	66 28.4	+59.5	158.7	65 32.3	+59.6	159.5	64 35.9	+59.8	160.3	63 39.3	+59.8	161.0	56
57	71 07.8	+58.6	154.2	70 13.5	+58.9	155.4	69 18.7	+59.2	156.5	68 23.5	+59.3	157.5	67 27.9	+59.5	158.4	66 31.9	+59.6	159.3	65 35.7	+59.7	160.1	64 39.1	+59.8	160.8	57
58	72 06.4	+58.5	153.5	71 12.4	+58.8	154.8	70 17.9	+59.0	156.0	69 22.8	+59.3	157.1	68 27.4	+59.4	158.1	67 31.5	+59.6	159.0	66 35.4	+59.6	159.8	65 38.9	+59.8	160.6	58
59	73 04.9	+58.3	152.7	72 11.2	+58.7	154.2	71 16.9	+59.0	155.5	70 22.1	+59.2	156.6	69 26.8	+59.4	157.7	68 31.1	+59.5	158.7	67 35.0	+59.7	159.5	66 38.7	+59.7	160.4	59
60	74 03.2	+58.1	151.9	73 09.9	+58.5	153.5	72 15.9	+58.8	154.9	71 21.3	+59.1	156.1	70 26.2	+59.3	157.3	69 30.6	+59.5	158.3	68 34.7	+59.6	159.2	67 38.4	+59.7	160.1	60
61	75 01.3	+57.8	151.0	74 08.4	+58.3	152.7	73 14.7	+58.7	154.2	72 20.4	+59.0	155.6	71 25.5	+59.2	156.8	70 30.1	+59.4	157.9	69 34.3	+59.6	158.9	68 38.1	+59.7	159.9	61
62	75 59.1	+57.5	149.9	75 06.7	+58.0	151.8	74 13.4	+58.5	153.5	73 19.4	+58.8	155.0	72 24.7	+59.1	156.3	71 29.5	+59.4	157.5	70 33.9	+59.5	158.6	69 37.8	+59.7	159.6	62
63	76 56.6	+57.0	148.7	76 04.7	+57.8	150.8	75 11.9	+58.3	152.6	74 18.2	+58.7	154.3	73 23.8	+59.1	155.7	72 28.9	+59.3	157.0	71 33.4	+59.5	158.2	70 37.5	+59.6	159.3	63
64	77 53.6	+56.6	147.2	77 02.5	+57.4	149.6	76 10.2	+58.1	151.7	75 16.9	+58.6	153.5	74 22.9	+58.9	155.1	73 28.2	+59.2	156.5	72 32.9	+59.4	157.8	71 37.1	+59.6	158.9	64
65	78 50.2	+56.0	145.6	77 59.9	+57.0	148.3	77 08.3	+57.7	150.6	76 15.5	+58.3	152.6	75 21.8	+58.8	154.3	74 27.4	+59.1	155.9	73 32.3	+59.3	157.3	72 36.7	+59.5	158.5	65
66	79 46.2	+55.1	143.6	78 56.9	+56.4	146.7	78 06.0	+57.4	149.3	77 13.8	+58.1	151.6	76 20.6	+58.5	153.5	75 26.5	+58.9	155.2	74 31.6	+59.3	156.8	73 36.2	+59.5	158.1	66
67	80 41.3	+54.0	141.3	79 53.3	+55.6	144.8	79 03.4	+56.8	147.8	78 11.9	+57.7	150.4	77 19.1	+58.4	152.6	76 25.4	+58.8	154.5	75 30.9	+59.1	156.2	74 35.7	+59.4	157.6	67
68	81 35.3	+52.5	138.5	80 48.9	+54.7	142.6	80 00.2	+56.1	146.0	79 09.6	+57.2	149.0	78 17.5	+58.0	151.5	77 24.2	+58.6	153.6	76 30.0	+59.1	155.5	75 35.1	+59.3	157.1	68
69	82 27.8	*+50.4*	•135.0	81 43.6	+53.2	139.9	80 56.3	+55.3	143.9	80 06.8	+56.7	147.3	79 15.5	+57.6	150.2	78 22.8	+58.4	152.6	77 29.1	+58.8	154.7	76 34.4	+59.3	156.5	69
70	83 18.2	*+47.5*	•130.6	82 36.8	*+51.4*	•136.5	81 51.6	+54.0	141.3	81 03.5	+55.8	145.3	80 13.1	+57.2	148.6	79 21.2	+58.0	151.4	78 27.9	+58.7	153.7	77 33.7	+59.0	155.7	70
71	84 05.7	*+43.1*	•125.0	83 28.2	*+48.5*	•132.2	82 45.6	*+52.2*	•138.0	81 59.3	+54.7	142.8	81 10.3	+56.4	146.7	80 19.2	+57.6	149.9	79 26.6	+58.3	152.6	78 32.7	+59.0	154.9	71
72	84 48.8	*+36.6*	•117.8	84 16.7	*+44.3*	•126.7	83 37.8	*+49.6*	•133.9	82 54.0	*+53.1*	•139.7	82 06.7	+55.4	144.4	81 16.8	+56.9	148.2	80 24.9	+58.0	151.3	79 31.7	+58.6	153.9	72
73	85 25.4	*+27.5*	•108.5	85 01.0	*+38.0*	•119.4	84 27.4	*+45.6*	•128.4	83 47.1	*+50.7*	•135.7	83 02.1	+54.0	141.4	82 13.7	+56.1	146.0	81 22.9	+57.5	149.7	80 30.3	+58.4	152.7	73
74	85 52.9	*+14.8*	• 96.7	85 39.0	*+28.5*	•109.9	85 13.0	*+39.4*	•121.2	84 37.8	*+46.9*	•130.3	83 56.1	*+51.8*	•137.5	83 09.8	+54.9	143.2	82 20.4	+56.8	147.6	81 28.7	+58.0	151.2	74
75	86 07.7	*−0.2*	• 82.8	86 07.5	*+15.4*	• 97.6	85 52.4	*+29.8*	•111.4	85 24.7	*+40.9*	•123.1	84 47.9	*+48.3*	•132.4	84 04.7	*+52.9*	•139.5	83 17.2	+55.6	145.0	82 26.7	+57.4	149.4	75
76	86 07.5	*−15.1*	• 67.9	86 22.9	*−0.7*	• 82.7	86 22.2	*+15.9*	• 98.6	86 05.6	*+31.2*	•113.2	85 36.2	*+42.5*	•125.2	84 57.6	*+49.7*	•134.6	84 12.8	*+54.0*	•141.6	83 24.1	+56.4	147.0	76
77	85 52.4	*−27.7*	• 54.0	86 22.2	*−16.6*	• 66.9	86 38.1	*−1.3*	• 82.7	86 36.8	*+16.6*	• 99.7	86 18.7	*+32.7*	•115.2	85 47.3	*+44.2*	•127.6	85 06.8	*+51.1*	•136.9	84 20.5	+55.0	143.8	77
78	85 24.7	*−36.8*	• 42.3	86 05.6	*−29.4*	• 52.2	86 36.8	*−18.1*	• 65.6	86 53.4	*−2.0*	• 82.7	86 51.4	*+17.3*	•101.0	86 31.5	*+34.5*	•117.4	85 57.9	*+46.0*	•130.1	85 15.5	*+52.6*	•139.4	78
79	84 47.9	*−43.2*	• 33.0	85 36.2	*−38.6*	• 40.1	86 18.7	*−31.4*	• 50.1	86 51.4	*−19.9*	• 64.3	87 08.7	*−2.7*	• 82.6	87 06.0	*+18.1*	•102.6	86 43.9	*+36.5*	•120.0	86 08.1	*+47.9*	•132.9	79
80	84 04.7	*−47.5*	• 25.8	84 57.6	*−44.8*	• 30.8	85 47.3	*−40.5*	• 37.7	86 31.5	*−33.6*	• 47.8	87 06.0	*−22.1*	• 62.6	87 24.1	*−3.7*	• 82.6	87 20.4	*+19.2*	•104.5	86 56.0	*+38.6*	•122.9	80
81	83 17.2	*−50.5*	• 20.3	84 12.8	*−48.7*	• 23.7	85 06.8	*−46.3*	• 28.4	85 57.9	*−42.4*	• 35.1	86 43.9	*−35.8*	• 45.3	87 20.4	*−24.4*	• 60.7	87 39.6	*−5.0*	• 82.6	87 34.6	*+20.5*	•106.7	81
82	82 26.7	−52.6	15.9	83 24.1	*−51.5*	• 18.3	84 20.5	*−50.0*	• 21.4	85 15.5	*−47.8*	• 25.8	86 08.1	*−44.4*	• 32.3	86 56.0	*−38.4*	• 42.3	87 34.6	*−27.1*	• 58.4	87 55.1	*−6.5*	• 82.6	82
83	81 34.1	−54.0	12.4	82 32.6	−53.4	14.1	83 30.5	*−52.5*	• 16.2	84 27.7	*−51.3*	• 19.1	85 23.7	*−49.4*	• 23.1	86 17.6	*−46.4*	• 29.2	87 07.5	*−41.0*	• 39.0	87 48.6	*−30.2*	• 55.6	83
84	80 40.1	−55.1	9.6	81 39.2	−54.8	10.7	82 38.0	−54.2	12.2	83 36.4	−53.5	14.1	84 34.3	*−52.5*	• 16.6	85 31.2	*−50.9*	• 20.3	86 26.5	*−48.4*	• 25.8	87 18.4	*−43.8*	• 35.1	84
85	79 45.0	−56.0	7.3	80 44.4	−55.7	8.1	81 43.8	−55.4	9.0	82 42.9	−55.0	10.2	83 41.8	−54.4	11.9	84 40.3	*−53.6*	• 14.1	85 38.1	*−52.4*	• 17.2	86 34.6	*−50.4*	• 22.2	85
86	78 49.0	−56.6	5.3	79 48.7	−56.4	5.9	80 48.4	−56.3	6.5	81 47.9	−56.0	7.3	82 47.4	−55.7	8.3	83 46.7	−55.3	9.6	84 45.7	−54.8	11.4	85 44.2	*−53.8*	• 14.1	86
87	77 52.4	−57.1	3.7	78 52.3	−57.0	4.0	79 52.1	−56.9	4.4	80 51.9	−56.8	4.9	81 51.7	−56.7	5.5	82 51.4	−56.5	6.3	83 50.9	−56.1	7.3	84 50.4	−55.8	8.7	87
88	76 55.3	−57.5	2.3	77 55.3	−57.5	2.5	78 55.2	−57.4	2.7	79 55.1	−57.3	3.0	80 55.0	−57.2	3.3	81 54.9	−57.2	3.7	82 54.8	−57.1	4.2	83 54.6	−56.9	4.9	88
89	75 57.8	−57.8	1.1	76 57.8	−57.8	1.1	77 57.8	−57.8	1.2	78 57.8	−57.8	1.4	79 57.8	−57.8	1.5	80 57.7	−57.7	1.6	81 57.7	−57.7	1.9	82 57.7	−57.7	2.1	89
90	75 00.0	−58.1	0.0	76 00.0	−58.1	0.0	77 00.0	−58.1	0.0	78 00.0	−58.1	0.0	79 00.0	−58.1	0.0	80 00.0	−58.1	0.0	81 00.0	−58.2	0.0	82 00.0	−58.2	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 15°, 345°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 28.7	−59.9	164.5	13 30.8	−59.9	164.6	12 33.0	−59.9	164.6	11 35.1	−59.9	164.7	10 37.2	−59.9	164.7	9 39.4	−60.0	164.8	8 41.5	−60.0	164.8	7 43.5	−59.9	164.9	0
1	13 28.8	−59.9	164.6	12 30.9	−59.8	164.6	11 33.1	−59.9	164.7	10 35.2	−59.9	164.7	9 37.3	−59.9	164.8	8 39.4	−59.9	164.8	7 41.5	−59.9	164.9	6 43.6	−60.0	164.9	1
2	12 28.9	−59.8	164.6	11 31.1	−59.9	164.7	10 33.2	−59.9	164.7	9 35.3	−59.9	164.8	8 37.4	−59.9	164.8	7 39.5	−60.0	164.9	6 41.6	−60.0	164.9	5 43.6	−59.9	164.9	2
3	11 29.1	−59.9	164.7	10 31.2	−59.9	164.8	9 33.3	−59.9	164.8	8 35.4	−59.9	164.8	7 37.5	−60.0	164.9	6 39.5	−59.9	164.9	5 41.6	−59.9	164.9	4 43.7	−60.0	165.0	3
4	10 29.2	−59.8	164.8	9 31.3	−59.9	164.8	8 33.4	−59.9	164.9	7 35.5	−59.9	164.9	6 37.5	−59.9	164.9	5 39.6	−59.9	165.0	4 41.7	−60.0	165.0	3 43.7	−60.0	165.0	4
5	9 29.4	−59.9	164.8	8 31.4	−59.8	164.9	7 33.5	−59.9	164.9	6 35.6	−59.9	165.0	5 37.6	−59.9	165.0	4 39.7	−60.0	165.0	3 41.7	−59.9	165.0	2 43.7	−59.9	165.0	5
6	8 29.5	−59.9	164.9	7 31.6	−59.9	165.0	6 33.6	−59.9	165.0	5 35.7	−60.0	165.0	4 37.7	−59.9	165.0	3 39.7	−59.9	165.1	2 41.8	−60.0	165.1	1 43.8	−60.0	165.1	6
7	7 29.6	−59.8	165.0	6 31.7	−59.9	165.0	5 33.7	−59.9	165.0	4 35.7	−59.9	165.1	3 37.8	−60.0	165.1	2 39.8	−60.0	165.1	1 41.8	−59.9	165.1	0 43.8	−59.9	165.1	7
8	6 29.8	−59.9	165.1	5 31.8	−59.9	165.1	4 33.8	−59.9	165.1	3 35.8	−59.9	165.1	2 37.8	−59.9	165.1	1 39.8	−59.9	165.1	0 41.9	−60.0	165.1	0 16.1	+60.0	14.9	8
9	5 29.9	−59.9	165.1	4 31.9	−59.9	165.1	3 33.9	−59.9	165.2	2 35.9	−59.9	165.2	1 37.9	−59.9	165.2	0 39.9	−59.9	165.2	0 18.1	+59.9	14.8	1 16.1	+60.0	14.8	9
10	4 30.0	−59.8	165.2	3 32.0	−59.9	165.2	2 34.0	−59.9	165.2	1 36.0	−59.9	165.2	0 38.0	−59.9	165.2	0 20.0	+60.0	14.8	1 18.0	+60.0	14.8	2 16.1	+59.9	14.8	10
11	3 30.2	−59.9	165.3	2 32.1	−59.8	165.3	1 34.1	−59.9	165.3	0 36.1	−59.9	165.3	0 21.9	+60.0	14.7	1 20.0	+59.9	14.7	2 18.0	+60.0	14.7	3 16.0	+60.0	14.7	11
12	2 30.3	−59.9	165.3	1 32.3	−59.9	165.3	0 34.2	−59.9	165.3	0 23.8	+59.9	14.7	1 21.9	+59.9	14.7	2 19.9	+59.9	14.7	3 18.0	+59.9	14.7	4 16.0	+59.9	14.7	12
13	1 30.4	−59.8	165.4	0 32.4	−59.9	165.4	0 25.7	+59.9	14.6	1 23.7	+59.9	14.6	2 21.8	+59.9	14.6	3 19.8	+60.0	14.6	4 17.9	+60.0	14.6	5 15.9	+60.0	14.7	13
14	0 30.6	−59.9	165.5	0 27.5	+59.9	14.5	1 25.6	+59.9	14.5	2 23.6	+60.0	14.6	3 21.7	+59.9	14.6	4 19.8	+59.9	14.6	5 17.9	+59.9	14.6	6 15.9	+60.0	14.6	14
15	0 29.3	+59.9	14.5	1 27.4	+59.9	14.5	2 25.5	+59.9	14.5	3 23.6	+59.9	14.5	4 21.6	+60.0	14.5	5 19.7	+60.0	14.5	6 17.8	+60.0	14.6	7 15.9	+59.9	14.6	15
16	1 29.2	+59.8	14.4	2 27.3	+59.8	14.4	3 25.4	+59.9	14.4	4 23.5	+59.9	14.4	5 21.6	+59.9	14.5	6 19.7	+59.9	14.5	7 17.8	+59.9	14.5	8 15.8	+60.0	14.6	16
17	2 29.0	+59.9	14.3	3 27.1	+59.9	14.4	4 25.3	+59.9	14.4	5 23.4	+59.9	14.4	6 21.5	+59.9	14.4	7 19.6	+59.9	14.5	8 17.7	+60.0	14.5	9 15.8	+60.0	14.5	17
18	3 28.9	+59.8	14.3	4 27.0	+59.9	14.3	5 25.2	+59.9	14.3	6 23.3	+59.9	14.3	7 21.4	+60.0	14.4	8 19.5	+60.0	14.4	9 17.7	+59.9	14.4	10 15.8	+59.9	14.5	18
19	4 28.7	+59.9	14.2	5 26.9	+59.9	14.2	6 25.1	+59.9	14.3	7 23.2	+59.9	14.3	8 21.4	+59.9	14.3	9 19.5	+59.9	14.4	10 17.6	+60.0	14.4	11 15.7	+60.0	14.4	19
20	5 28.6	+59.9	14.1	6 26.8	+59.9	14.2	7 25.0	+59.9	14.2	8 23.1	+59.9	14.2	9 21.3	+59.9	14.3	10 19.4	+60.0	14.3	11 17.6	+59.9	14.4	12 15.7	+59.9	14.4	20
21	6 28.5	+59.8	14.1	7 26.7	+59.8	14.1	8 24.9	+59.9	14.1	9 23.0	+59.9	14.2	10 21.2	+59.9	14.2	11 19.4	+59.9	14.3	12 17.5	+59.9	14.3	13 15.6	+60.0	14.4	21
22	7 28.3	+59.9	14.0	8 26.5	+59.9	14.0	9 24.8	+59.8	14.1	10 22.9	+60.0	14.1	11 21.1	+59.9	14.2	12 19.3	+59.9	14.2	13 17.4	+60.0	14.3	14 15.6	+59.9	14.3	22
23	8 28.2	+59.9	13.9	9 26.4	+59.9	14.0	10 24.6	+59.9	14.0	11 22.9	+59.9	14.1	12 21.0	+60.0	14.1	13 19.2	+60.0	14.2	14 17.4	+59.9	14.2	15 15.5	+60.0	14.3	23
24	9 28.1	+59.8	13.9	10 26.3	+59.9	13.9	11 24.5	+59.9	14.0	12 22.8	+59.9	14.0	13 21.0	+59.9	14.1	14 19.2	+59.9	14.1	15 17.3	+60.0	14.2	16 15.5	+60.0	14.3	24
25	10 27.9	+59.9	13.8	11 26.2	+59.9	13.8	12 24.4	+59.9	13.9	13 22.7	+59.9	14.0	14 20.9	+59.9	14.0	15 19.1	+59.9	14.1	16 17.3	+59.9	14.1	17 15.5	+59.9	14.2	25
26	11 27.8	+59.8	13.7	12 26.1	+59.8	13.8	13 24.3	+59.9	13.8	14 22.6	+59.9	13.9	15 20.8	+59.9	14.0	16 19.0	+60.0	14.0	17 17.2	+60.0	14.1	18 15.4	+60.0	14.2	26
27	12 27.6	+59.9	13.7	13 25.9	+59.9	13.7	14 24.2	+59.9	13.8	15 22.5	+59.9	13.8	16 20.7	+60.0	13.9	17 19.0	+59.9	14.0	18 17.2	+59.9	14.1	19 15.4	+59.9	14.1	27
28	13 27.5	+59.9	13.6	14 25.8	+59.9	13.6	15 24.1	+59.9	13.7	16 22.4	+59.9	13.8	17 20.7	+59.9	13.9	18 18.9	+59.9	13.9	19 17.1	+60.0	14.0	20 15.3	+60.0	14.1	28
29	14 27.4	+59.8	13.5	15 25.7	+59.9	13.6	16 24.0	+59.9	13.6	17 22.3	+59.9	13.7	18 20.6	+59.9	13.8	19 18.8	+60.0	13.9	20 17.1	+59.9	14.0	21 15.3	+59.9	14.1	29
30	15 27.2	+59.9	13.4	16 25.6	+59.8	13.5	17 23.9	+59.9	13.6	18 22.2	+59.9	13.7	19 20.5	+59.9	13.7	20 18.8	+59.9	13.8	21 17.0	+60.0	13.9	22 15.2	+60.0	14.0	30
31	16 27.1	+59.8	13.4	17 25.4	+59.9	13.4	18 23.8	+59.9	13.5	19 22.1	+59.9	13.6	20 20.4	+59.9	13.7	21 18.7	+59.9	13.8	22 17.0	+59.9	13.9	23 15.2	+59.9	14.0	31
32	17 26.9	+59.9	13.3	18 25.3	+59.9	13.4	19 23.7	+59.8	13.5	20 22.0	+59.9	13.5	21 20.3	+59.9	13.6	22 18.6	+60.0	13.7	23 16.9	+59.9	13.8	24 15.1	+60.0	13.9	32
33	18 26.8	+59.8	13.2	19 25.2	+59.8	13.3	20 23.5	+59.9	13.4	21 21.9	+59.9	13.5	22 20.2	+60.0	13.6	23 18.6	+59.9	13.7	24 16.8	+60.0	13.8	25 15.1	+60.0	13.9	33
34	19 26.6	+59.9	13.2	20 25.0	+59.9	13.2	21 23.4	+59.9	13.3	22 21.8	+59.9	13.4	23 20.2	+59.9	13.5	24 18.5	+59.9	13.6	25 16.8	+59.9	13.7	26 15.1	+59.9	13.8	34
35	20 26.5	+59.8	13.1	21 24.9	+59.9	13.2	22 23.3	+59.9	13.3	23 21.7	+59.9	13.4	24 20.1	+59.9	13.5	25 18.4	+59.9	13.6	26 16.7	+60.0	13.7	27 15.0	+60.0	13.8	35
36	21 26.3	+59.9	13.0	22 24.8	+59.8	13.1	23 23.2	+59.9	13.2	24 21.6	+59.9	13.3	25 20.0	+59.9	13.4	26 18.3	+60.0	13.5	27 16.7	+59.9	13.6	28 15.0	+59.9	13.8	36
37	22 26.2	+59.8	12.9	23 24.6	+59.9	13.0	24 23.1	+59.8	13.1	25 21.5	+59.9	13.2	26 19.9	+59.9	13.3	27 18.3	+59.9	13.5	28 16.6	+59.9	13.6	29 14.9	+60.0	13.7	37
38	23 26.0	+59.8	12.8	24 24.5	+59.8	12.9	25 22.9	+59.9	13.0	26 21.4	+59.9	13.2	27 19.8	+59.9	13.3	28 18.2	+59.9	13.4	29 16.5	+60.0	13.5	30 14.9	+59.9	13.7	38
39	24 25.8	+59.9	12.8	25 24.3	+59.9	12.9	26 22.8	+59.9	13.0	27 21.3	+59.9	13.1	28 19.7	+59.9	13.2	29 18.1	+59.9	13.3	30 16.5	+59.9	13.5	31 14.8	+59.9	13.6	39
40	25 25.7	+59.8	12.7	26 24.2	+59.8	12.8	27 22.7	+59.9	12.9	28 21.2	+59.9	13.0	29 19.6	+59.9	13.1	30 18.0	+59.9	13.3	31 16.4	+59.9	13.4	32 14.7	+60.0	13.6	40
41	26 25.5	+59.8	12.6	27 24.0	+59.9	12.7	28 22.6	+59.8	12.8	29 21.1	+59.8	12.9	30 19.5	+59.9	13.1	31 17.9	+60.0	13.2	32 16.3	+60.0	13.4	33 14.7	+59.9	13.5	41
42	27 25.3	+59.9	12.5	28 23.9	+59.8	12.6	29 22.4	+59.9	12.8	30 20.9	+59.9	12.9	31 19.4	+59.9	13.0	32 17.9	+59.9	13.2	33 16.3	+59.9	13.3	34 14.6	+60.0	13.5	42
43	28 25.2	+59.8	12.4	29 23.7	+59.9	12.5	30 22.3	+59.9	12.7	31 20.8	+59.9	12.8	32 19.3	+59.9	12.9	33 17.8	+59.9	13.1	34 16.2	+59.9	13.2	35 14.6	+59.9	13.4	43
44	29 25.0	+59.8	12.3	30 23.6	+59.8	12.5	31 22.2	+59.8	12.6	32 20.7	+59.9	12.7	33 19.2	+59.9	12.9	34 17.7	+59.9	13.0	35 16.1	+59.9	13.2	36 14.5	+60.0	13.3	44
45	30 24.8	+59.8	12.3	31 23.4	+59.9	12.4	32 22.0	+59.9	12.5	33 20.6	+59.8	12.7	34 19.1	+59.9	12.8	35 17.6	+59.9	13.0	36 16.0	+60.0	13.1	37 14.5	+59.9	13.3	45
46	31 24.6	+59.8	12.2	32 23.3	+59.8	12.3	33 21.9	+59.8	12.4	34 20.4	+59.9	12.6	35 19.0	+59.9	12.7	36 17.5	+59.9	12.9	37 16.0	+59.9	13.1	38 14.4	+59.9	13.2	46
47	32 24.4	+59.8	12.1	33 23.1	+59.8	12.2	34 21.7	+59.9	12.3	35 20.3	+59.9	12.5	36 18.9	+59.9	12.7	37 17.4	+59.9	12.8	38 15.9	+59.9	13.0	39 14.3	+60.0	13.2	47
48	33 24.2	+59.8	12.0	34 22.9	+59.8	12.1	35 21.6	+59.8	12.3	36 20.2	+59.9	12.4	37 18.8	+59.8	12.6	38 17.3	+59.9	12.7	39 15.8	+59.9	12.9	40 14.3	+59.9	13.1	48
49	34 24.0	+59.8	11.9	35 22.7	+59.9	12.0	36 21.4	+59.9	12.2	37 20.1	+59.8	12.3	38 18.6	+59.9	12.5	39 17.2	+59.9	12.7	40 15.7	+59.9	12.9	41 14.2	+59.9	13.0	49
50	35 23.8	+59.8	11.8	36 22.6	+59.8	11.9	37 21.3	+59.8	12.1	38 19.9	+59.9	12.2	39 18.5	+59.9	12.4	40 17.1	+59.9	12.6	41 15.6	+59.9	12.8	42 14.1	+60.0	13.0	50
51	36 23.6	+59.8	11.7	37 22.4	+59.8	11.8	38 21.1	+59.8	12.0	39 19.8	+59.8	12.2	40 18.4	+59.9	12.3	41 17.0	+59.9	12.5	42 15.5	+60.0	12.7	43 14.1	+59.9	12.9	51
52	37 23.4	+59.8	11.6	38 22.2	+59.8	11.7	39 20.9	+59.9	11.9	40 19.6	+59.9	12.1	41 18.3	+59.8	12.2	42 16.9	+59.9	12.4	43 15.5	+59.9	12.6	44 14.0	+59.9	12.8	52
53	38 23.2	+59.8	11.5	39 22.0	+59.8	11.6	40 20.8	+59.8	11.8	41 19.5	+59.8	12.0	42 18.1	+59.9	12.2	43 16.8	+59.9	12.4	44 15.4	+59.9	12.6	45 13.9	+59.9	12.8	53
54	39 23.0	+59.8	11.4	40 21.8	+59.8	11.5	41 20.6	+59.8	11.7	42 19.3	+59.9	11.9	43 18.0	+59.9	12.1	44 16.7	+59.8	12.3	45 15.3	+59.9	12.5	46 13.8	+59.9	12.7	54
55	40 22.8	+59.7	11.2	41 21.6	+59.8	11.4	42 20.4	+59.8	11.6	43 19.2	+59.8	11.8	44 17.9	+59.8	12.0	45 16.5	+59.9	12.2	46 15.2	+59.9	12.4	47 13.7	+60.0	12.6	55
56	41 22.5	+59.8	11.1	42 21.4	+59.8	11.3	43 20.2	+59.8	11.5	44 19.0	+59.8	11.7	45 17.7	+59.9	11.9	46 16.4	+59.9	12.1	47 15.1	+59.9	12.3	48 13.7	+59.9	12.5	56
57	42 22.3	+59.7	11.0	43 21.2	+59.7	11.2	44 20.0	+59.8	11.4	45 18.8	+59.8	11.6	46 17.6	+59.8	11.8	47 16.3	+59.9	12.0	48 15.0	+59.8	12.2	49 13.6	+59.9	12.5	57
58	43 22.0	+59.8	10.9	44 20.9	+59.8	11.1	45 19.8	+59.8	11.3	46 18.6	+59.8	11.5	47 17.4	+59.9	11.7	48 16.2	+59.8	11.9	49 14.8	+59.9	12.1	50 13.5	+59.9	12.4	58
59	44 21.8	+59.7	10.7	45 20.7	+59.8	10.9	46 19.6	+59.8	11.1	47 18.4	+59.9	11.3	48 17.3	+59.8	11.6	49 16.0	+59.9	11.8	50 14.7	+59.9	12.0	51 13.4	+59.9	12.3	59
60	45 21.5	+59.7	10.6	46 20.5	+59.7	10.8	47 19.4	+59.8	11.0	48 18.3	+59.8	11.2	49 17.1	+59.8	11.4	50 15.9	+59.8	11.7	51 14.6	+59.9	11.9	52 13.3	+59.9	12.2	60
61	46 21.2	+59.7	10.5	47 20.2	+59.7	10.7	48 19.2	+59.7	10.9	49 18.1	+59.7	11.1	50 16.9	+59.8	11.3	51 15.7	+59.9	11.6	52 14.5	+59.8	11.8	53 13.2	+59.9	12.1	61
62	47 20.9	+59.7	10.3	48 19.9	+59.8	10.5	49 18.9	+59.8	10.7	50 17.8	+59.8	11.0	51 16.7	+59.8	11.2	52 15.6	+59.8	11.5	53 14.3	+59.9	11.7	54 13.1	+59.8	12.0	62
63	48 20.6	+59.7	10.2	49 19.7	+59.7	10.4	50 18.7	+59.7	10.6	51 17.6	+59.8	10.8	52 16.5	+59.8	11.1	53 15.4	+59.8	11.3	54 14.2	+59.8	11.6	55 12.9	+59.9	11.9	63
64	49 20.3	+59.7	10.0	50 19.4	+59.7	10.2	51 18.4	+59.7	10.5	52 17.4	+59.8	10.7	53 16.3	+59.8	10.9	54 15.2	+59.8	11.2	55 14.0	+59.9	11.5	56 12.8	+59.9	11.8	64
65	50 20.0	+59.7	9.9	51 19.1	+59.7	10.1	52 18.1	+59.8	10.3	53 17.2	+59.7	10.5	54 16.1	+59.8	10.8	55 15.0	+59.8	11.1	56 13.9	+59.8	11.3	57 12.7	+59.8	11.7	65
66	51 19.7	+59.6	9.7	52 18.8	+59.7	9.9	53 17.9	+59.7	10.1	54 16.9	+59.7	10.4	55 15.9	+59.8	10.6	56 14.8	+59.8	10.9	57 13.7	+59.9	11.2	58 12.5	+59.9	11.5	66
67	52 19.3	+59.6	9.5	53 18.5	+59.6	9.7	54 17.6	+59.7	10.0	55 16.6	+59.8	10.2	56 15.7	+59.7	10.5	57 14.6	+59.8	10.8	58 13.6	+59.8	11.1	59 12.4	+59.9	11.4	67
68	53 18.9	+59.7	9.3	54 18.1	+59.7	9.6	55 17.3	+59.6	9.8	56 16.4	+59.7	10.1	57 15.4	+59.8	10.3	58 14.4	+59.8	10.6	59 13.4	+59.8	10.9	60 12.3	+59.8	11.3	68
69	54 18.6	+59.5	9.1	55 17.8	+59.6	9.4	56 16.9	+59.7	9.6	57 16.1	+59.7	9.9	58 15.2	+59.7	10.2	59 14.2	+59.8	10.4	60 13.2	+59.8	10.8	61 12.1	+59.8	11.1	69
70	55 18.1	+59.6	8.9	56 17.4	+59.6	9.2	57 16.6	+59.7	9.4	58 15.8	+59.7	9.7	59 14.9	+59.7	10.0	60 14.0	+59.7	10.3	61 13.0	+59.8	10.6	62 11.9	+59.8	10.9	70
71	56 17.7	+59.6	8.7	57 17.0	+59.6	9.0	58 16.3	+59.6	9.2	59 15.5	+59.6	9.5	60 14.6	+59.7	9.8	61 13.7	+59.7	10.1	62 12.8	+59.7	10.4	63 11.7	+59.8	10.8	71
72	57 17.3	+59.5	8.5	58 16.6	+59.5	8.7	59 15.9	+59.6	9.0	60 15.1	+59.6	9.3	61 14.3	+59.7	9.6	62 13.4	+59.7	9.9	63 12.5	+59.8	10.2	64 11.5	+59.8	10.6	72
73	58 16.8	+59.5	8.3	59 16.1	+59.6	8.5	60 15.5	+59.5	8.8	61 14.7	+59.7	9.1	62 14.0	+59.6	9.3	63 13.1	+59.7	9.7	64 12.3	+59.7	10.0	65 11.3	+59.8	10.4	73
74	59 16.3	+59.5	8.0	60 15.7	+59.5	8.3	61 15.0	+59.6	8.5	62 14.4	+59.5	8.8	63 13.6	+59.6	9.1	64 12.8	+59.7	9.4	65 12.0	+59.7	9.8	66 11.1	+59.7	10.2	74
75	60 15.8	+59.4	7.8	61 15.2	+59.5	8.0	62 14.6	+59.5	8.3	63 13.9	+59.6	8.6	64 13.2	+59.6	8.9	65 12.5	+59.6	9.2	66 11.7	+59.7	9.6	67 10.8	+59.8	9.9	75
76	61 15.2	+59.4	7.5	62 14.7	+59.4	7.7	63 14.1	+59.5	8.0	64 13.5	+59.5	8.3	65 12.8	+59.6	8.6	66 12.1	+59.7	8.9	67 11.4	+59.6	9.3	68 10.6	+59.7	9.7	76
77	62 14.6	+59.3	7.2	63 14.1	+59.4	7.4	64 13.6	+59.4	7.7	65 13.0	+59.5	8.0	66 12.4	+59.5	8.3	67 11.8	+59.5	8.6	68 11.0	+59.7	9.0	69 10.3	+59.6	9.4	77
78	63 13.9	+59.3	6.9	64 13.5	+59.3	7.1	65 13.0	+59.4	7.4	66 12.5	+59.4	7.7	67 11.9	+59.5	8.0	68 11.3	+59.6	8.3	69 10.7	+59.6	8.7	70 09.9	+59.7	9.1	78
79	64 13.2	+59.3	6.5	65 12.8	+59.3	6.8	66 12.4	+59.4	7.0	67 11.9	+59.4	7.3	68 11.4	+59.5	7.6	69 10.9	+59.5	8.0	70 10.3	+59.5	8.4	71 09.6	+59.6	8.8	79
80	65 12.5	+59.2	6.2	66 12.1	+59.3	6.4	67 11.8	+59.2	6.7	68 11.3	+59.4	6.9	69 10.9	+59.4	7.3	70 10.4	+59.4	7.6	71 09.8	+59.5	8.0	72 09.2	+59.6	8.4	80
81	66 11.7	+59.1	5.8	67 11.4	+59.2	6.0	68 11.0	+59.3	6.3	69 10.7	+59.2	6.5	70 10.3	+59.3	6.9	71 09.8	+59.4	7.2	72 09.3	+59.5	7.6	73 08.8	+59.5	8.0	81
82	67 10.8	+59.1	5.3	68 10.6	+59.1	5.6	69 10.3	+59.1	5.8	70 09.9	+59.3	6.1	71 09.6	+59.2	6.4	72 09.2	+59.3	6.7	73 08.8	+59.3	7.1	74 08.3	+59.4	7.6	82
83	68 09.9	+59.0	4.9	69 09.7	+59.0	5.1	70 09.4	+59.1	5.3	71 09.2	+59.1	5.6	72 08.8	+59.2	5.9	73 08.5	+59.2	6.2	74 08.1	+59.3	6.6	75 07.7	+59.4	7.1	83
84	69 08.9	+58.8	4.4	70 08.7	+58.9	4.6	71 08.5	+59.0	4.8	72 08.3	+59.0	5.1	73 08.0	+59.1	5.4	74 07.7	+59.2	5.7	75 07.4	+59.2	6.0	76 07.1	+59.2	6.5	84
85	70 07.7	+58.8	3.8	71 07.6	+58.8	4.0	72 07.5	+58.8	4.2	73 07.3	+58.9	4.5	74 07.1	+58.9	4.7	75 06.9	+59.0	5.0	76 06.6	+59.1	5.4	77 06.3	+59.2	5.8	85
86	71 06.5	+58.6	3.2	72 06.4	+58.7	3.4	73 06.3	+58.7	3.6	74 06.2	+58.7	3.8	75 06.0	+58.8	4.0	76 05.9	+58.8	4.3	77 05.7	+58.9	4.6	78 05.5	+59.0	5.0	86
87	72 05.1	+58.5	2.5	73 05.1	+58.5	2.7	74 05.0	+58.6	2.8	75 04.9	+58.6	3.0	76 04.8	+58.7	3.2	77 04.7	+58.7	3.5	78 04.6	+58.8	3.8	79 04.5	+58.8	4.1	87
88	73 03.6	+58.3	1.8	74 03.6	+58.3	1.9	75 03.6	+58.3	2.0	76 03.5	+58.4	2.1	77 03.5	+58.4	2.3	78 03.4	+58.5	2.5	79 03.4	+58.4	2.7	80 03.3	+58.5	3.0	88
89	74 01.9	+58.1	0.9	75 01.9	+58.1	1.0	76 01.9	+58.1	1.1	77 01.9	+58.1	1.2	78 01.9	+58.1	1.2	79 01.9	+58.1	1.4	80 01.8	+58.2	1.5	81 01.8	+58.2	1.7	89
90	75 00.0	+57.8	0.0	76 00.0	+57.8	0.0	77 00.0	+57.8	0.0	78 00.0	+57.8	0.0	79 00.0	+57.8	0.0	80 00.0	+57.7	0.0	81 00.0	+57.7	0.0	82 00.0	+57.7	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 165°, 195°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 24.4	+59.8	163.5	13 26.8	+59.9	163.5	12 29.3	+59.9	163.6	11 31.7	+59.9	163.7	10 34.1	+59.9	163.7	9 36.5	+60.0	163.8	8 38.9	+60.0	163.8	7 41.3	+59.9	163.9	0
1	15 24.2	+59.8	163.4	14 26.7	+59.9	163.5	13 29.2	+59.8	163.5	12 31.6	+59.9	163.6	11 34.0	+60.0	163.7	10 36.5	+59.9	163.7	9 38.9	+59.9	163.8	8 41.2	+60.0	163.8	1
2	16 24.0	+59.9	163.3	15 26.6	+59.8	163.4	14 29.0	+59.9	163.5	13 31.5	+59.9	163.5	12 34.0	+59.9	163.6	11 36.4	+59.9	163.7	10 38.8	+59.9	163.7	9 41.2	+60.0	163.8	2
3	17 23.9	+59.8	163.2	16 26.4	+59.9	163.3	15 28.9	+59.9	163.4	14 31.4	+59.9	163.5	13 33.9	+59.9	163.6	12 36.3	+59.9	163.6	11 38.7	+60.0	163.7	10 41.2	+59.9	163.7	3
4	18 23.7	+59.8	163.2	17 26.3	+59.8	163.2	16 28.8	+59.9	163.3	15 31.3	+59.9	163.4	14 33.8	+59.9	163.5	13 36.2	+60.0	163.6	12 38.7	+59.9	163.6	11 41.1	+60.0	163.7	4
5	19 23.5	+59.9	163.1	18 26.1	+59.9	163.2	17 28.7	+59.8	163.3	16 31.2	+59.9	163.4	15 33.7	+59.9	163.4	14 36.2	+59.9	163.5	13 38.6	+60.0	163.6	12 41.1	+59.9	163.7	5
6	20 23.4	+59.8	163.0	19 26.0	+59.8	163.1	18 28.5	+59.9	163.2	17 31.1	+59.9	163.3	16 33.6	+59.9	163.4	15 36.1	+59.9	163.5	14 38.6	+59.9	163.5	13 41.0	+60.0	163.6	6
7	21 23.2	+59.8	162.9	20 25.8	+59.9	163.0	19 28.4	+59.9	163.1	18 31.0	+59.9	163.2	17 33.5	+59.9	163.3	16 36.0	+59.9	163.4	15 38.5	+59.9	163.5	14 41.0	+59.9	163.6	7
8	22 23.0	+59.8	162.8	21 25.7	+59.8	162.9	20 28.3	+59.8	163.1	19 30.9	+59.9	163.2	18 33.4	+59.9	163.3	17 35.9	+60.0	163.4	16 38.4	+60.0	163.4	15 40.9	+60.0	163.5	8
9	23 22.8	+59.8	162.7	22 25.5	+59.8	162.9	21 28.1	+59.9	163.0	20 30.8	+59.8	163.1	19 33.3	+59.9	163.2	18 35.9	+59.9	163.3	17 38.4	+59.9	163.4	16 40.9	+59.9	163.5	9
10	24 22.6	+59.9	162.7	23 25.3	+59.9	162.8	22 28.0	+59.9	162.9	21 30.6	+59.9	163.0	20 33.2	+59.9	163.1	19 35.8	+59.9	163.3	18 38.3	+60.0	163.4	17 40.8	+60.0	163.4	10
11	25 22.5	+59.8	162.6	24 25.2	+59.8	162.7	23 27.9	+59.8	162.8	22 30.5	+59.9	163.0	21 33.1	+59.9	163.1	20 35.7	+59.9	163.2	19 38.3	+59.9	163.3	18 40.8	+59.9	163.4	11
12	26 22.3	+59.8	162.5	25 25.0	+59.9	162.6	24 27.7	+59.9	162.8	23 30.4	+59.9	162.9	22 33.0	+59.9	163.0	21 35.6	+60.0	163.1	20 38.2	+59.9	163.3	19 40.7	+60.0	163.4	12
13	27 22.1	+59.8	162.4	26 24.9	+59.8	162.5	25 27.6	+59.9	162.7	24 30.3	+59.9	162.8	23 32.9	+59.9	163.0	22 35.6	+59.9	163.1	21 38.1	+60.0	163.2	20 40.7	+59.9	163.3	13
14	28 21.9	+59.8	162.3	27 24.7	+59.8	162.5	26 27.5	+59.8	162.6	25 30.2	+59.8	162.8	24 32.8	+59.9	162.9	23 35.5	+59.9	163.0	22 38.1	+59.9	163.2	21 40.6	+60.0	163.3	14
15	29 21.7	+59.8	162.2	28 24.5	+59.8	162.4	27 27.3	+59.9	162.5	26 30.0	+59.9	162.7	25 32.7	+59.9	162.8	24 35.4	+59.9	163.0	23 38.0	+59.9	163.1	22 40.6	+59.9	163.2	15
16	30 21.5	+59.8	162.1	29 24.3	+59.9	162.3	28 27.2	+59.8	162.5	27 29.9	+59.9	162.6	26 32.6	+59.9	162.8	25 35.3	+59.9	162.9	24 37.9	+60.0	163.1	23 40.5	+60.0	163.2	16
17	31 21.3	+59.8	162.0	30 24.2	+59.8	162.2	29 27.0	+59.9	162.4	28 29.8	+59.9	162.5	27 32.5	+59.9	162.7	26 35.2	+59.9	162.9	25 37.9	+59.9	163.0	24 40.5	+59.9	163.1	17
18	32 21.1	+59.7	161.9	31 24.0	+59.8	162.1	30 26.9	+59.8	162.3	29 29.7	+59.8	162.5	28 32.4	+59.9	162.6	27 35.1	+60.0	162.8	26 37.8	+59.9	162.9	25 40.4	+60.0	163.1	18
19	33 20.8	+59.8	161.8	32 23.8	+59.8	162.0	31 26.7	+59.8	162.2	30 29.5	+59.9	162.4	29 32.3	+59.9	162.6	28 35.1	+59.9	162.7	27 37.7	+60.0	162.9	26 40.4	+59.9	163.0	19
20	34 20.6	+59.8	161.7	33 23.6	+59.8	161.9	32 26.5	+59.9	162.1	31 29.4	+59.9	162.3	30 32.2	+59.9	162.5	29 35.0	+59.9	162.7	28 37.7	+59.9	162.8	27 40.3	+59.9	163.0	20
21	35 20.4	+59.8	161.6	34 23.4	+59.8	161.8	33 26.4	+59.8	162.0	32 29.3	+59.8	162.2	31 32.1	+59.9	162.4	30 34.9	+59.9	162.6	29 37.6	+59.9	162.8	28 40.2	+60.0	162.9	21
22	36 20.2	+59.7	161.5	35 23.2	+59.8	161.7	34 26.2	+59.8	161.9	33 29.1	+59.9	162.2	32 32.0	+59.9	162.4	31 34.8	+59.9	162.5	30 37.5	+59.9	162.7	29 40.2	+59.9	162.9	22
23	37 19.9	+59.8	161.4	36 23.0	+59.8	161.6	35 26.0	+59.9	161.9	34 29.0	+59.8	162.1	33 31.9	+59.8	162.3	32 34.7	+59.9	162.5	31 37.4	+60.0	162.7	30 40.1	+60.0	162.8	23
24	38 19.7	+59.7	161.3	37 22.8	+59.8	161.5	36 25.9	+59.8	161.8	35 28.8	+59.9	162.0	34 31.7	+59.9	162.2	33 34.6	+59.9	162.4	32 37.4	+59.9	162.6	31 40.1	+59.9	162.8	24
25	39 19.4	+59.8	161.2	38 22.6	+59.8	161.4	37 25.7	+59.8	161.7	36 28.7	+59.8	161.9	35 31.6	+59.9	162.1	34 34.5	+59.9	162.3	33 37.3	+59.9	162.5	32 40.0	+59.9	162.7	25
26	40 19.2	+59.7	161.0	39 22.4	+59.7	161.3	38 25.5	+59.8	161.6	37 28.5	+59.9	161.8	36 31.5	+59.9	162.0	35 34.4	+59.9	162.3	34 37.2	+59.9	162.5	33 39.9	+60.0	162.7	26
27	41 18.9	+59.7	160.9	40 22.1	+59.8	161.2	39 25.3	+59.8	161.5	38 28.4	+59.8	161.7	37 31.4	+59.8	162.0	36 34.3	+59.9	162.2	35 37.1	+59.9	162.4	34 39.9	+59.9	162.6	27
28	42 18.6	+59.7	160.8	41 21.9	+59.8	161.1	40 25.1	+59.8	161.4	39 28.2	+59.8	161.6	38 31.2	+59.9	161.9	37 34.2	+59.9	162.1	36 37.0	+59.9	162.3	35 39.8	+59.9	162.6	28
29	43 18.3	+59.7	160.7	42 21.7	+59.7	161.0	41 24.9	+59.8	161.2	40 28.0	+59.9	161.5	39 31.1	+59.8	161.8	38 34.1	+59.8	162.0	37 36.9	+59.9	162.3	36 39.7	+60.0	162.5	29
30	44 18.0	+59.7	160.5	43 21.4	+59.8	160.8	42 24.7	+59.8	161.1	41 27.9	+59.8	161.4	40 30.9	+59.9	161.7	39 33.9	+59.9	162.0	38 36.8	+60.0	162.2	37 39.7	+59.9	162.4	30
31	45 17.7	+59.7	160.4	44 21.2	+59.7	160.7	43 24.5	+59.8	161.0	42 27.7	+59.8	161.3	41 30.8	+59.9	161.6	40 33.8	+59.9	161.9	39 36.8	+59.9	162.1	38 39.6	+59.9	162.4	31
32	46 17.4	+59.7	160.2	45 20.9	+59.7	160.6	44 24.3	+59.7	160.9	43 27.5	+59.8	161.2	42 30.7	+59.8	161.5	41 33.7	+59.9	161.8	40 36.7	+59.9	162.1	39 39.5	+60.0	162.3	32
33	47 17.1	+59.7	160.1	46 20.6	+59.7	160.4	45 24.0	+59.8	160.8	44 27.3	+59.8	161.1	43 30.5	+59.8	161.4	42 33.6	+59.8	161.7	41 36.6	+59.9	162.0	40 39.5	+59.9	162.3	33
34	48 16.8	+59.6	159.9	47 20.3	+59.7	160.3	46 23.8	+59.7	160.6	45 27.1	+59.8	161.0	44 30.3	+59.9	161.3	43 33.4	+59.9	161.6	42 36.5	+59.9	161.9	41 39.4	+59.9	162.2	34
35	49 16.4	+59.6	159.8	48 20.0	+59.7	160.1	47 23.5	+59.8	160.5	46 26.9	+59.8	160.9	45 30.2	+59.8	161.2	44 33.3	+59.9	161.5	43 36.4	+59.8	161.8	42 39.3	+59.9	162.1	35
36	50 16.0	+59.7	159.6	49 19.7	+59.7	160.0	48 23.3	+59.7	160.4	47 26.7	+59.8	160.7	46 30.0	+59.8	161.1	45 33.2	+59.8	161.4	44 36.2	+59.9	161.7	43 39.2	+59.9	162.0	36
37	51 15.7	+59.6	159.4	50 19.4	+59.7	159.8	49 23.0	+59.7	160.2	48 26.5	+59.8	160.6	47 29.8	+59.8	161.0	46 33.0	+59.9	161.3	45 36.1	+59.9	161.7	44 39.1	+59.9	162.0	37
38	52 15.3	+59.5	159.2	51 19.1	+59.6	159.7	50 22.7	+59.7	160.1	49 26.3	+59.7	160.5	48 29.6	+59.8	160.9	47 32.9	+59.8	161.2	46 36.0	+59.9	161.6	45 39.0	+59.9	161.9	38
39	53 14.8	+59.6	159.0	52 18.7	+59.7	159.5	51 22.4	+59.7	159.9	50 26.0	+59.8	160.3	49 29.4	+59.8	160.7	48 32.7	+59.9	161.1	47 35.9	+59.9	161.5	46 38.9	+60.0	161.8	39
40	54 14.4	+59.5	158.8	53 18.4	+59.6	159.3	52 22.1	+59.7	159.8	51 25.8	+59.7	160.2	50 29.2	+59.8	160.6	49 32.6	+59.8	161.0	48 35.8	+59.8	161.4	47 38.9	+59.9	161.7	40
41	55 13.9	+59.6	158.6	54 18.0	+59.6	159.1	53 21.8	+59.7	159.6	52 25.5	+59.7	160.1	51 29.0	+59.8	160.5	50 32.4	+59.8	160.9	49 35.6	+59.9	161.3	48 38.8	+59.9	161.6	41
42	56 13.5	+59.4	158.4	55 17.6	+59.5	158.9	54 21.5	+59.6	159.4	53 25.2	+59.8	159.9	52 28.8	+59.8	160.3	51 32.2	+59.8	160.8	50 35.5	+59.9	161.2	49 38.7	+59.8	161.6	42
43	57 12.9	+59.5	158.1	56 17.1	+59.6	158.7	55 21.1	+59.7	159.2	54 25.0	+59.7	159.7	53 28.6	+59.7	160.2	52 32.0	+59.9	160.6	51 35.4	+59.8	161.1	50 38.5	+59.9	161.5	43
44	58 12.4	+59.4	157.9	57 16.7	+59.5	158.5	56 20.8	+59.6	159.0	55 24.7	+59.6	159.6	54 28.3	+59.8	160.0	53 31.9	+59.8	160.5	52 35.2	+59.9	161.0	51 38.4	+59.9	161.4	44
45	59 11.8	+59.4	157.6	58 16.2	+59.5	158.2	57 20.4	+59.6	158.8	56 24.3	+59.7	159.4	55 28.1	+59.7	159.9	54 31.7	+59.7	160.4	53 35.1	+59.8	160.8	52 38.3	+59.9	161.3	45
46	60 11.2	+59.4	157.3	59 15.7	+59.5	158.0	58 20.0	+59.5	158.6	57 24.0	+59.7	159.2	56 27.8	+59.7	159.7	55 31.4	+59.8	160.2	54 34.9	+59.8	160.7	53 38.2	+59.9	161.2	46
47	61 10.6	+59.3	157.1	60 15.2	+59.4	157.7	59 19.5	+59.6	158.4	58 23.7	+59.6	159.0	57 27.5	+59.7	159.5	56 31.2	+59.8	160.1	55 34.7	+59.9	160.6	54 38.1	+59.8	161.0	47
48	62 09.9	+59.3	156.7	61 14.6	+59.4	157.5	60 19.1	+59.5	158.1	59 23.3	+59.6	158.8	58 27.2	+59.7	159.4	57 31.0	+59.7	159.9	56 34.6	+59.8	160.4	55 37.9	+59.9	160.9	48
49	63 09.2	+59.2	156.4	62 14.0	+59.4	157.2	61 18.6	+59.5	157.9	60 22.9	+59.6	158.5	59 26.9	+59.7	159.2	58 30.7	+59.8	159.7	57 34.4	+59.8	160.3	56 37.8	+59.8	160.8	49
50	64 08.4	+59.2	156.0	63 13.4	+59.3	156.8	62 18.1	+59.4	157.6	61 22.5	+59.5	158.3	60 26.6	+59.6	159.0	59 30.5	+59.7	159.6	58 34.2	+59.7	160.1	57 37.6	+59.9	160.7	50
51	65 07.6	+59.1	155.6	64 12.7	+59.3	156.5	63 17.5	+59.4	157.3	62 22.0	+59.6	158.0	61 26.2	+59.7	158.7	60 30.2	+59.7	159.4	59 33.9	+59.8	160.0	58 37.5	+59.8	160.5	51
52	66 06.7	+59.0	155.2	65 12.0	+59.2	156.1	64 16.9	+59.4	157.0	63 21.6	+59.4	157.8	62 25.9	+59.6	158.5	61 29.9	+59.7	159.2	60 33.7	+59.8	159.8	59 37.3	+59.8	160.4	52
53	67 05.7	+58.9	154.8	66 11.2	+59.1	155.7	65 16.3	+59.3	156.6	64 21.0	+59.5	157.5	63 25.5	+59.5	158.2	62 29.6	+59.7	159.0	61 33.5	+59.7	159.6	60 37.1	+59.8	160.2	53
54	68 04.6	+58.9	154.3	67 10.3	+59.1	155.3	66 15.6	+59.3	156.3	65 20.5	+59.4	157.1	64 25.0	+59.6	158.0	63 29.3	+59.6	158.7	62 33.2	+59.8	159.4	61 36.9	+59.8	160.1	54
55	69 03.5	+58.7	153.7	68 09.4	+59.0	154.9	67 14.9	+59.2	155.9	66 19.9	+59.4	156.8	65 24.6	+59.5	157.7	64 28.9	+59.6	158.5	63 33.0	+59.7	159.2	62 36.7	+59.8	159.9	55
56	70 02.2	+58.6	153.2	69 08.4	+58.9	154.4	68 14.1	+59.1	155.4	67 19.3	+59.3	156.4	66 24.1	+59.4	157.4	65 28.5	+59.6	158.2	64 32.7	+59.7	159.0	63 36.5	+59.8	159.7	56
57	71 00.8	+58.5	152.5	70 07.3	+58.8	153.8	69 13.2	+59.0	155.0	68 18.6	+59.2	156.0	67 23.5	+59.4	157.0	66 28.1	+59.6	157.9	65 32.4	+59.6	158.7	64 36.3	+59.7	159.5	57
58	71 59.3	+58.3	151.8	71 06.1	+58.6	153.2	70 12.2	+58.9	154.5	69 17.8	+59.2	155.6	68 22.9	+59.4	156.6	67 27.7	+59.5	157.6	66 32.0	+59.6	158.5	65 36.0	+59.8	159.3	58
59	72 57.6	+58.1	151.0	72 04.7	+58.5	152.5	71 11.1	+58.9	153.9	70 17.0	+59.1	155.1	69 22.3	+59.3	156.2	68 27.2	+59.4	157.3	67 31.6	+59.6	158.2	66 35.8	+59.7	159.1	59
60	73 55.7	+57.8	150.1	73 03.2	+58.3	151.8	72 10.0	+58.6	153.3	71 16.1	+58.9	154.6	70 21.6	+59.2	155.8	69 26.6	+59.5	156.9	68 31.2	+59.6	157.9	67 35.5	+59.7	158.8	60
61	74 53.5	+57.6	149.2	74 01.5	+58.1	151.0	73 08.6	+58.6	152.6	72 15.0	+58.9	154.0	71 20.8	+59.2	155.3	70 26.1	+59.3	156.5	69 30.8	+59.5	157.6	68 35.2	+59.6	158.5	61
62	75 51.1	+57.2	148.0	74 59.6	+57.8	150.0	74 07.2	+58.3	151.8	73 13.9	+58.7	153.3	72 20.0	+59.0	154.8	71 25.4	+59.3	156.0	70 30.3	+59.5	157.2	69 34.8	+59.6	158.2	62
63	76 48.3	+56.7	146.8	75 57.4	+57.6	149.0	75 05.5	+58.1	150.9	74 12.6	+58.6	152.6	73 19.0	+58.9	154.2	72 24.7	+59.2	155.5	71 29.8	+59.4	156.8	70 34.4	+59.6	157.9	63
64	77 45.0	+56.2	145.3	76 55.0	+57.1	147.7	76 03.6	+57.8	149.9	75 11.2	+58.4	151.8	74 17.9	+58.8	153.5	73 23.9	+59.1	155.0	72 29.2	+59.4	156.3	71 34.0	+59.5	157.5	64
65	78 41.2	+55.5	143.6	77 52.1	+56.6	146.3	77 01.4	+57.5	148.7	76 09.6	+58.1	150.9	75 16.7	+58.6	152.7	74 23.0	+59.0	154.4	73 28.6	+59.2	155.8	72 33.5	+59.5	157.1	65
66	79 36.7	+54.7	141.6	78 48.7	+56.0	144.7	77 58.9	+57.1	147.4	77 07.7	+57.8	149.8	76 15.3	+58.4	151.8	75 22.0	+58.8	153.7	74 27.8	+59.2	155.3	73 33.0	+59.4	156.7	66
67	80 31.4	+53.4	139.2	79 44.7	+55.2	142.8	78 56.0	+56.4	145.9	78 05.5	+57.5	148.5	77 13.7	+58.1	150.8	76 20.8	+58.7	152.9	75 27.0	+59.0	154.6	74 32.4	+59.4	156.2	67
68	81 24.8	+51.8	136.2	80 39.9	+54.1	140.5	79 52.4	+55.8	144.0	79 03.0	+56.9	147.1	78 11.8	+57.8	149.7	77 19.5	+58.4	151.9	76 26.0	+58.9	153.9	75 31.8	+59.2	155.6	68
69	82 16.6	+49.6	•132.7	81 34.0	+52.6	137.7	80 48.2	+54.8	141.8	79 59.9	+56.3	145.3	79 09.6	+57.4	148.3	78 17.9	+58.1	150.9	77 24.9	+58.7	153.0	76 31.0	+59.1	154.9	69
70	83 06.2	+46.6	•128.3	82 26.6	+50.6	•134.2	81 43.0	+53.4	139.1	80 56.2	+55.4	143.2	80 07.0	+56.8	146.7	79 16.0	+57.8	149.6	78 23.6	+58.5	152.1	77 30.1	+59.0	154.2	70
71	83 52.8	+42.1	•122.7	83 17.2	+47.6	•129.9	82 36.4	+51.5	•135.8	81 51.6	+54.2	140.7	81 03.8	+56.1	144.7	80 13.8	+57.3	148.1	79 22.1	+58.2	150.9	78 29.1	+58.8	153.3	71
72	84 34.9	+35.7	•115.6	84 04.8	+43.4	•124.3	83 27.9	+48.7	•131.6	82 45.8	+52.4	•137.5	81 59.9	+54.9	142.3	81 11.1	+56.7	146.2	80 20.3	+57.8	149.5	79 27.9	+58.5	152.2	72
73	85 10.6	+26.8	•106.6	84 48.2	+37.0	•117.2	84 16.6	+44.7	•126.1	83 38.2	+49.9	•133.4	82 54.8	+53.4	139.2	82 07.8	+55.6	143.9	81 18.1	+57.2	147.8	80 26.4	+58.2	151.0	73
74	85 37.4	+14.9	•95.4	85 25.2	+27.9	•107.9	85 01.3	+38.4	•118.9	84 28.1	+46.0	•128.0	83 48.2	+51.1	•135.3	83 03.4	+54.4	141.1	82 15.3	+56.4	145.7	81 24.6	+57.7	149.4	74
75	85 52.3	+0.8	•82.3	85 53.1	+15.4	•96.2	85 39.7	+29.1	•109.4	85 14.1	+40.0	•120.8	84 39.3	+47.4	•130.0	83 57.8	+52.2	•137.3	83 11.7	+55.2	143.0	82 22.3	+57.1	147.5	75
76	85 53.1	−13.4	•68.3	86 08.5	+0.3	•82.2	86 08.8	+15.9	•97.1	85 54.1	+30.4	•111.1	85 26.7	+41.5	•122.9	84 50.0	+48.9	•132.2	84 06.9	+53.3	•139.4	83 19.4	+56.1	145.0	76
77	85 39.7	−25.6	•55.1	86 08.8	−14.7	•67.3	86 24.7	−0.2	•82.2	86 24.5	+16.5	•98.2	86 08.2	+32.0	•113.0	85 38.9	+43.2	•125.2	85 00.2	+50.4	•134.6	84 15.5	+54.5	•141.7	77
78	85 14.1	−34.8	•43.6	85 54.1	−27.4	•53.3	86 24.5	−16.3	•66.2	86 41.0	−0.8	•82.2	86 40.2	+17.2	•99.5	86 22.1	+33.7	•115.2	85 50.6	+45.1	•127.8	85 10.0	+51.8	•137.2	78
79	84 39.3	−41.5	•34.4	85 26.7	−36.7	•41.5	86 08.2	−29.3	•51.3	86 40.2	−18.1	•64.9	86 57.4	−1.6	•82.1	86 55.8	+18.0	•100.9	86 35.7	+35.5	•117.7	86 01.8	+47.1	•130.6	79
80	83 57.8	−46.1	•27.1	84 50.0	−43.1	•32.1	85 38.9	−38.7	•39.1	86 22.1	−31.5	•49.1	86 55.8	−20.1	•63.3	87 13.8	−2.6	•82.1	87 11.2	+19.1	•102.7	86 48.9	+37.7	•120.5	80
81	83 11.7	−49.4	•21.3	84 06.9	−47.5	•24.9	85 00.2	−44.7	•29.7	85 50.6	−40.6	•36.5	86 35.7	−33.9	•46.5	87 11.2	−22.3	•61.5	87 30.3	−3.7	•82.1	87 26.6	+20.2	•104.9	81
82	82 22.3	−51.6	16.8	83 19.4	−50.5	•19.3	84 15.5	−48.9	•22.5	85 10.0	−46.5	•27.1	86 01.8	−42.7	•33.7	86 48.9	−36.5	•43.7	87 26.6	−25.1	•59.3	87 46.8	−5.1	•82.1	82
83	81 30.7	−53.3	13.2	82 28.9	−52.5	14.9	83 26.6	−51.6	•17.1	84 23.5	−50.2	•20.1	85 19.1	−48.2	•24.3	86 12.4	−44.9	•30.5	87 01.5	−39.2	•40.3	87 41.7	−28.2	•56.6	83
84	80 37.4	−54.5	10.2	81 36.4	−54.1	11.4	82 35.0	−53.4	12.9	83 33.3	−52.7	•14.9	84 30.9	−51.5	•17.5	85 27.5	−49.8	•21.3	86 22.3	−47.1	•27.1	87 13.5	−42.1	•36.5	84
85	79 42.9	−55.4	7.7	80 42.3	−55.1	8.6	81 41.6	−54.8	9.6	82 40.6	−54.3	10.9	83 39.4	−53.7	12.6	84 37.7	−52.8	•14.9	85 35.2	−51.4	•18.2	86 31.4	−49.3	•23.3	85
86	78 47.5	−56.1	5.7	79 47.2	−56.0	6.2	80 46.8	−55.8	6.9	81 46.3	−55.5	7.7	82 45.7	−55.2	8.8	83 44.9	−54.7	10.2	84 43.8	−54.1	•12.1	85 42.1	−53.0	•14.9	86
87	77 51.4	−56.7	3.9	78 51.2	−56.6	4.3	79 51.0	−56.5	4.7	80 50.8	−56.3	5.2	81 50.5	−56.1	5.8	82 50.2	−56.0	6.6	83 49.7	−55.6	7.7	84 49.1	−55.2	9.2	87
88	76 54.7	−57.2	2.4	77 54.6	−57.1	2.6	78 54.5	−57.0	2.9	79 54.5	−57.0	3.1	80 54.4	−56.9	3.5	81 54.2	−56.8	3.9	82 54.1	−56.7	4.5	83 53.9	−56.5	5.2	88
89	75 57.5	−57.5	1.1	76 57.5	−57.5	1.2	77 57.5	−57.5	1.3	78 57.5	−57.5	1.4	79 57.5	−57.5	1.6	80 57.4	−57.4	1.8	81 57.4	−57.4	2.0	82 57.4	−57.4	2.2	89
90	75 00.0	−57.8	0.0	76 00.0	−57.8	0.0	77 00.0	−57.8	0.0	78 00.0	−57.8	0.0	79 00.0	−57.9	0.0	80 00.0	−57.9	0.0	81 00.0	−57.9	0.0	82 00.0	−57.9	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 16°, 344°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 24.4	−59.9	163.5	13 26.8	−59.8	163.5	12 29.3	−59.9	163.6	11 31.7	−59.9	163.7	10 34.1	−59.9	163.7	9 36.5	−59.9	163.8	8 38.9	−59.9	163.8	7 41.3	−60.0	163.9	**0**
1	13 24.5	−59.8	163.5	12 27.0	−59.9	163.6	11 29.4	−59.9	163.7	10 31.8	−59.9	163.7	9 34.2	−59.9	163.8	8 36.6	−59.9	163.8	7 39.0	−60.0	163.9	6 41.3	−59.9	163.9	**1**
2	12 24.7	−59.9	163.6	11 27.1	−59.8	163.7	10 29.5	−59.9	163.7	9 31.9	−59.9	163.8	8 34.3	−59.9	163.8	7 36.7	−60.0	163.9	6 39.0	−59.9	163.9	5 41.4	−60.0	163.9	**2**
3	11 24.8	−59.8	163.7	10 27.3	−59.9	163.7	9 29.6	−59.8	163.8	8 32.0	−59.9	163.8	7 34.4	−59.9	163.9	6 36.7	−59.9	163.9	5 39.1	−60.0	163.9	4 41.4	−59.9	164.0	**3**
4	10 25.0	−59.8	163.8	9 27.4	−59.9	163.8	8 29.8	−59.9	163.9	7 32.1	−59.9	163.9	6 34.5	−59.9	163.9	5 36.8	−59.9	164.0	4 39.1	−59.9	164.0	3 41.5	−60.0	164.0	**4**
5	9 25.2	−59.9	163.8	8 27.5	−59.8	163.9	7 29.9	−59.9	163.9	6 32.2	−59.9	164.0	5 34.6	−60.0	164.0	4 36.9	−59.9	164.0	3 39.2	−59.9	164.0	2 41.5	−59.9	164.0	**5**
6	8 25.3	−59.8	163.9	7 27.7	−59.9	164.0	6 30.0	−59.9	164.0	5 32.3	−59.9	164.0	4 34.6	−59.9	164.0	3 37.0	−60.0	164.1	2 39.3	−60.0	164.1	1 41.6	−60.0	164.1	**6**
7	7 25.5	−59.9	164.0	6 27.8	−59.9	164.0	5 30.1	−59.9	164.0	4 32.4	−59.9	164.1	3 34.7	−59.9	164.1	2 37.0	−59.9	164.1	1 39.3	−59.9	164.1	0 41.6	−60.0	164.1	**7**
8	6 25.6	−59.8	164.1	5 27.9	−59.8	164.1	4 30.2	−59.9	164.1	3 32.5	−59.9	164.1	2 34.8	−59.9	164.1	1 37.1	−59.9	164.2	0 39.4	−60.0	164.2	0 18.4	+59.9	15.8	**8**
9	5 25.8	−59.9	164.1	4 28.1	−59.9	164.2	3 30.3	−59.8	164.2	2 32.6	−59.9	164.2	1 34.9	−59.9	164.2	0 37.2	−60.0	164.2	0 20.6	+59.9	15.8	1 18.3	+60.0	15.8	**9**
10	4 25.9	−59.8	164.2	3 28.2	−59.9	164.2	2 30.5	−59.9	164.2	1 32.7	−59.9	164.2	0 35.0	−59.9	164.2	0 22.8	+59.9	15.8	1 20.5	+60.0	15.8	2 18.3	+59.9	15.8	**10**
11	3 26.1	−59.9	164.3	2 28.3	−59.8	164.3	1 30.6	−59.9	164.3	0 32.8	−59.9	164.3	0 24.9	+60.0	15.7	1 22.7	+59.9	15.7	2 20.5	+59.9	15.7	3 18.2	+60.0	15.7	**11**
12	2 26.2	−59.8	164.3	1 28.5	−59.9	164.4	0 30.7	−59.9	164.4	0 27.1	+59.9	15.6	1 24.9	+59.9	15.6	2 22.6	+60.0	15.7	3 20.4	+60.0	15.7	4 18.2	+59.9	15.7	**12**
13	1 26.4	−59.8	164.4	0 28.6	−59.9	164.4	0 29.2	+59.9	15.6	1 27.0	+59.9	15.6	2 24.8	+59.9	15.6	3 22.6	+59.9	15.6	4 20.4	+59.9	15.6	5 18.1	+60.0	15.6	**13**
14	0 26.6	−59.9	164.5	0 31.3	+59.8	15.5	1 29.1	+59.9	15.5	2 26.9	+59.9	15.5	3 24.7	+59.9	15.5	4 22.5	+59.9	15.6	5 20.3	+59.9	15.6	6 18.1	+59.9	15.6	**14**
15	0 33.3	+59.8	15.4	1 31.1	+59.9	15.4	2 29.0	+59.8	15.5	3 26.8	+59.9	15.5	4 24.6	+59.9	15.5	5 22.4	+60.0	15.5	6 20.2	+60.0	15.5	7 18.0	+60.0	15.6	**15**
16	1 33.1	+59.9	15.4	2 31.0	+59.9	15.4	3 28.8	+59.9	15.4	4 26.7	+59.9	15.4	5 24.5	+59.9	15.4	6 22.4	+59.9	15.5	7 20.2	+59.9	15.5	8 18.0	+60.0	15.5	**16**
17	2 33.0	+59.8	15.3	3 30.9	+59.8	15.3	4 28.7	+59.9	15.3	5 26.6	+59.9	15.4	6 24.4	+60.0	15.4	7 22.3	+59.9	15.4	8 20.1	+60.0	15.5	9 18.0	+59.9	15.5	**17**
18	3 32.8	+59.9	15.2	4 30.7	+59.9	15.2	5 28.6	+59.9	15.3	6 26.5	+59.9	15.3	7 24.4	+59.9	15.3	8 22.2	+59.9	15.4	9 20.1	+59.9	15.4	10 17.9	+60.0	15.5	**18**
19	4 32.7	+59.8	15.2	5 30.6	+59.9	15.2	6 28.5	+59.9	15.2	7 26.4	+59.9	15.2	8 24.3	+59.9	15.3	9 22.1	+60.0	15.3	10 20.0	+60.0	15.4	11 17.9	+59.9	15.4	**19**
20	5 32.5	+59.9	15.1	6 30.5	+59.8	15.1	7 28.4	+59.9	15.1	8 26.3	+59.9	15.2	9 24.2	+59.9	15.2	10 22.1	+59.9	15.3	11 20.0	+59.9	15.3	12 17.8	+60.0	15.4	**20**
21	6 32.4	+59.8	15.0	7 30.3	+59.9	15.0	8 28.3	+59.8	15.1	9 26.2	+59.9	15.1	10 24.1	+59.9	15.2	11 22.0	+59.9	15.2	12 19.9	+59.9	15.3	13 17.8	+59.9	15.3	**21**
22	7 32.2	+59.9	14.9	8 30.2	+59.8	15.0	9 28.1	+59.9	15.0	10 26.1	+59.9	15.1	11 24.0	+59.9	15.1	12 21.9	+60.0	15.2	13 19.8	+60.0	15.2	14 17.7	+60.0	15.3	**22**
23	8 32.1	+59.8	14.9	9 30.0	+59.9	14.9	10 28.0	+59.9	15.0	11 26.0	+59.9	15.0	12 23.9	+59.9	15.1	13 21.9	+59.9	15.1	14 19.8	+59.9	15.2	15 17.7	+59.9	15.3	**23**
24	9 31.9	+59.8	14.8	10 29.9	+59.9	14.8	11 27.9	+59.9	14.9	12 25.9	+59.9	14.9	13 23.8	+60.0	15.0	14 21.8	+59.9	15.1	15 19.7	+60.0	15.1	16 17.6	+60.0	15.2	**24**
25	10 31.7	+59.9	14.7	11 29.8	+59.8	14.8	12 27.8	+59.9	14.8	13 25.8	+59.9	14.9	14 23.8	+59.9	14.9	15 21.7	+59.9	15.0	16 19.7	+59.9	15.1	17 17.6	+59.9	15.2	**25**
26	11 31.6	+59.8	14.6	12 29.6	+59.9	14.7	13 27.7	+59.8	14.8	14 25.7	+59.9	14.8	15 23.7	+59.9	14.9	16 21.6	+60.0	15.0	17 19.6	+59.9	15.0	18 17.5	+60.0	15.1	**26**
27	12 31.4	+59.9	14.6	13 29.5	+59.8	14.6	14 27.5	+59.9	14.7	15 25.6	+59.9	14.8	16 23.6	+59.9	14.8	17 21.6	+59.9	14.9	18 19.5	+60.0	15.0	19 17.5	+59.9	15.1	**27**
28	13 31.3	+59.8	14.5	14 29.3	+59.9	14.6	15 27.4	+59.9	14.6	16 25.5	+59.9	14.7	17 23.5	+59.9	14.8	18 21.5	+59.9	14.9	19 19.5	+59.9	14.9	20 17.4	+60.0	15.0	**28**
29	14 31.1	+59.8	14.4	15 29.2	+59.9	14.5	16 27.3	+59.9	14.6	17 25.4	+59.8	14.6	18 23.4	+59.9	14.7	19 21.4	+59.9	14.8	20 19.4	+59.9	14.9	21 17.4	+59.9	15.0	**29**
30	15 30.9	+59.9	14.3	16 29.1	+59.8	14.4	17 27.2	+59.8	14.5	18 25.2	+59.9	14.6	19 23.3	+59.9	14.7	20 21.3	+60.0	14.8	21 19.3	+60.0	14.8	22 17.3	+60.0	15.0	**30**
31	16 30.8	+59.8	14.3	17 28.9	+59.9	14.3	18 27.0	+59.9	14.4	19 25.1	+59.9	14.5	20 23.2	+59.9	14.6	21 21.3	+59.9	14.7	22 19.3	+59.9	14.8	23 17.3	+59.9	14.9	**31**
32	17 30.6	+59.8	14.2	18 28.8	+59.8	14.3	19 26.9	+59.9	14.4	20 25.0	+59.9	14.4	21 23.1	+59.9	14.5	22 21.2	+59.9	14.6	23 19.2	+59.9	14.7	24 17.2	+60.0	14.9	**32**
33	18 30.4	+59.9	14.1	19 28.6	+59.9	14.2	20 26.8	+59.8	14.3	21 24.9	+59.9	14.4	22 23.0	+59.9	14.5	23 21.1	+59.9	14.6	24 19.1	+60.0	14.7	25 17.2	+59.9	14.8	**33**
34	19 30.3	+59.8	14.0	20 28.5	+59.8	14.1	21 26.6	+59.9	14.2	22 24.8	+59.9	14.3	23 22.9	+59.9	14.4	24 21.0	+59.9	14.5	25 19.1	+59.9	14.6	26 17.1	+60.0	14.8	**34**
35	20 30.1	+59.8	13.9	21 28.3	+59.9	14.0	22 26.5	+59.9	14.1	23 24.7	+59.9	14.2	24 22.8	+59.9	14.4	25 20.9	+59.9	14.5	26 19.0	+59.9	14.6	27 17.1	+59.9	14.7	**35**
36	21 29.9	+59.8	13.9	22 28.2	+59.8	14.0	23 26.4	+59.8	14.1	24 24.6	+59.8	14.2	25 22.7	+59.9	14.3	26 20.8	+60.0	14.4	27 18.9	+60.0	14.5	28 17.0	+59.9	14.7	**36**
37	22 29.7	+59.9	13.8	23 28.0	+59.8	13.9	24 26.2	+59.9	14.0	25 24.4	+59.9	14.1	26 22.6	+59.9	14.2	27 20.8	+59.9	14.3	28 18.9	+59.9	14.5	29 16.9	+60.0	14.6	**37**
38	23 29.6	+59.8	13.7	24 27.8	+59.9	13.8	25 26.1	+59.9	13.9	26 24.3	+59.9	14.0	27 22.5	+59.9	14.2	28 20.7	+59.9	14.3	29 18.8	+59.9	14.4	30 16.9	+59.9	14.6	**38**
39	24 29.4	+59.8	13.6	25 27.7	+59.8	13.7	26 26.0	+59.8	13.8	27 24.2	+59.9	14.0	28 22.4	+59.9	14.1	29 20.6	+59.9	14.2	30 18.7	+59.9	14.4	31 16.8	+60.0	14.5	**39**
40	25 29.2	+59.8	13.5	26 27.5	+59.8	13.6	27 25.8	+59.9	13.8	28 24.1	+59.8	13.9	29 22.3	+59.9	14.0	30 20.5	+59.9	14.2	31 18.6	+60.0	14.3	32 16.8	+59.9	14.5	**40**
41	26 29.0	+59.8	13.4	27 27.3	+59.9	13.6	28 25.7	+59.8	13.7	29 23.9	+59.9	13.8	30 22.2	+59.9	14.0	31 20.4	+59.9	14.1	32 18.6	+59.9	14.2	33 16.7	+59.9	14.4	**41**
42	27 28.8	+59.8	13.3	28 27.2	+59.8	13.5	29 25.5	+59.9	13.6	30 23.8	+59.9	13.7	31 22.1	+59.9	13.9	32 20.3	+59.9	14.0	33 18.5	+59.9	14.2	34 16.6	+60.0	14.4	**42**
43	28 28.6	+59.8	13.3	29 27.0	+59.8	13.4	30 25.4	+59.8	13.5	31 23.7	+59.8	13.7	32 22.0	+59.8	13.8	33 20.2	+59.9	14.0	34 18.4	+59.9	14.1	35 16.6	+59.9	14.3	**43**
44	29 28.4	+59.8	13.2	30 26.8	+59.8	13.3	31 25.2	+59.8	13.4	32 23.5	+59.9	13.6	33 21.8	+59.9	13.7	34 20.1	+59.9	13.9	35 18.3	+59.9	14.1	36 16.5	+59.9	14.2	**44**
45	30 28.2	+59.8	13.1	31 26.6	+59.9	13.2	32 25.0	+59.9	13.3	33 23.4	+59.9	13.5	34 21.7	+59.9	13.7	35 20.0	+59.9	13.8	36 18.2	+60.0	14.0	37 16.4	+60.0	14.2	**45**
46	31 28.0	+59.8	13.0	32 26.5	+59.8	13.1	33 24.9	+59.8	13.3	34 23.3	+59.8	13.4	35 21.6	+59.9	13.6	36 19.9	+59.9	13.7	37 18.2	+59.9	13.9	38 16.4	+59.9	14.1	**46**
47	32 27.8	+59.8	12.9	33 26.3	+59.8	13.0	34 24.7	+59.8	13.2	35 23.1	+59.9	13.3	36 21.5	+59.8	13.5	37 19.8	+59.9	13.7	38 18.1	+59.9	13.9	39 16.3	+59.9	14.1	**47**
48	33 27.6	+59.7	12.8	34 26.1	+59.8	12.9	35 24.5	+59.9	13.1	36 23.0	+59.8	13.2	37 21.3	+59.9	13.4	38 19.7	+59.9	13.6	39 18.0	+59.9	13.8	40 16.2	+59.9	14.0	**48**
49	34 27.3	+59.8	12.7	35 25.9	+59.8	12.8	36 24.4	+59.8	13.0	37 22.8	+59.8	13.2	38 21.2	+59.9	13.3	39 19.6	+59.9	13.5	40 17.9	+59.9	13.7	41 16.1	+60.0	13.9	**49**
50	35 27.1	+59.8	12.6	36 25.7	+59.8	12.7	37 24.2	+59.8	12.9	38 22.6	+59.9	13.1	39 21.1	+59.8	13.2	40 19.5	+59.8	13.4	41 17.8	+59.9	13.6	42 16.1	+59.9	13.9	**50**
51	36 26.9	+59.7	12.5	37 25.5	+59.7	12.6	38 24.0	+59.8	12.8	39 22.5	+59.8	13.0	40 20.9	+59.9	13.2	41 19.3	+59.9	13.4	42 17.7	+59.9	13.6	43 16.0	+59.9	13.8	**51**
52	37 26.6	+59.8	12.3	38 25.2	+59.8	12.5	39 23.8	+59.8	12.7	40 22.3	+59.8	12.9	41 20.8	+59.8	13.1	42 19.2	+59.9	13.3	43 17.6	+59.9	13.5	44 15.9	+59.9	13.7	**52**
53	38 26.4	+59.7	12.2	39 25.0	+59.8	12.4	40 23.6	+59.8	12.6	41 22.1	+59.9	12.8	42 20.6	+59.9	13.0	43 19.1	+59.8	13.2	44 17.5	+59.9	13.4	45 15.8	+59.9	13.6	**53**
54	39 26.1	+59.8	12.1	40 24.8	+59.8	12.3	41 23.4	+59.8	12.5	42 22.0	+59.8	12.7	43 20.5	+59.8	12.9	44 18.9	+59.9	13.1	45 17.4	+59.8	13.3	46 15.7	+59.9	13.6	**54**
55	40 25.9	+59.7	12.0	41 24.6	+59.7	12.2	42 23.2	+59.8	12.4	43 21.8	+59.8	12.6	44 20.3	+59.9	12.8	45 18.8	+59.9	13.0	46 17.2	+59.9	13.2	47 15.6	+59.9	13.5	**55**
56	41 25.6	+59.7	11.9	42 24.3	+59.8	12.0	43 23.0	+59.8	12.2	44 21.6	+59.8	12.4	45 20.2	+59.8	12.7	46 18.7	+59.8	12.9	47 17.1	+59.9	13.1	48 15.5	+59.9	13.4	**56**
57	42 25.3	+59.8	11.7	43 24.1	+59.7	11.9	44 22.8	+59.7	12.1	45 21.4	+59.8	12.3	46 20.0	+59.8	12.6	47 18.5	+59.9	12.8	48 17.0	+59.9	13.0	49 15.4	+59.9	13.3	**57**
58	43 25.1	+59.7	11.6	44 23.8	+59.7	11.8	45 22.5	+59.8	12.0	46 21.2	+59.8	12.2	47 19.8	+59.8	12.4	48 18.4	+59.8	12.7	49 16.9	+59.8	12.9	50 15.3	+59.9	13.2	**58**
59	44 24.8	+59.7	11.5	45 23.5	+59.8	11.7	46 22.3	+59.7	11.9	47 21.0	+59.8	12.1	48 19.6	+59.8	12.3	49 18.2	+59.8	12.6	50 16.7	+59.9	12.8	51 15.2	+59.9	13.1	**59**
60	45 24.5	+59.6	11.3	46 23.3	+59.7	11.5	47 22.0	+59.8	11.7	48 20.8	+59.7	12.0	49 19.4	+59.8	12.2	50 18.0	+59.9	12.5	51 16.6	+59.9	12.7	52 15.1	+59.9	13.0	**60**
61	46 24.1	+59.7	11.2	47 23.0	+59.7	11.4	48 21.8	+59.7	11.6	49 20.5	+59.8	11.8	50 19.2	+59.8	12.1	51 17.9	+59.8	12.3	52 16.5	+59.8	12.6	53 15.0	+59.8	12.9	**61**
62	47 23.8	+59.7	11.0	48 22.7	+59.7	11.2	49 21.5	+59.7	11.5	50 20.3	+59.7	11.7	51 19.0	+59.8	11.9	52 17.7	+59.8	12.2	53 16.3	+59.8	12.5	54 14.8	+59.9	12.8	**62**
63	48 23.5	+59.6	10.9	49 22.4	+59.7	11.1	50 21.2	+59.7	11.3	51 20.0	+59.8	11.6	52 18.8	+59.8	11.8	53 17.5	+59.8	12.1	54 16.1	+59.9	12.4	55 14.7	+59.9	12.7	**63**
64	49 23.1	+59.7	10.7	50 22.1	+59.6	10.9	51 20.9	+59.7	11.2	52 19.8	+59.7	11.4	53 18.6	+59.7	11.7	54 17.3	+59.8	11.9	55 16.0	+59.8	12.2	56 14.6	+59.8	12.6	**64**
65	50 22.8	+59.6	10.5	51 21.7	+59.7	10.8	52 20.6	+59.7	11.0	53 19.5	+59.7	11.2	54 18.3	+59.8	11.5	55 17.1	+59.8	11.8	56 15.8	+59.8	12.1	57 14.4	+59.9	12.4	**65**
66	51 22.4	+59.6	10.3	52 21.4	+59.6	10.6	53 20.3	+59.7	10.8	54 19.2	+59.7	11.1	55 18.1	+59.7	11.4	56 16.9	+59.8	11.7	57 15.6	+59.8	12.0	58 14.3	+59.8	12.3	**66**
67	52 22.0	+59.5	10.2	53 21.0	+59.6	10.4	54 20.0	+59.6	10.6	55 18.9	+59.7	10.9	56 17.8	+59.7	11.2	57 16.7	+59.7	11.5	58 15.4	+59.8	11.8	59 14.1	+59.8	12.2	**67**
68	53 21.5	+59.6	10.0	54 20.6	+59.6	10.2	55 19.6	+59.7	10.5	56 18.6	+59.7	10.7	57 17.5	+59.8	11.0	58 16.4	+59.8	11.3	59 15.2	+59.8	11.7	60 13.9	+59.8	12.0	**68**
69	54 21.1	+59.5	9.8	55 20.2	+59.6	10.0	56 19.3	+59.6	10.3	57 18.3	+59.6	10.5	58 17.3	+59.6	10.8	59 16.2	+59.7	11.1	60 15.0	+59.8	11.5	61 13.7	+59.9	11.8	**69**
70	55 20.6	+59.6	9.5	56 19.8	+59.5	9.8	57 18.9	+59.6	10.1	58 17.9	+59.7	10.3	59 16.9	+59.7	10.6	60 15.9	+59.7	11.0	61 14.8	+59.7	11.3	62 13.6	+59.7	11.7	**70**
71	56 20.2	+59.4	9.3	57 19.3	+59.6	9.6	58 18.5	+59.6	9.8	59 17.6	+59.6	10.1	60 16.6	+59.7	10.4	61 15.6	+59.7	10.8	62 14.5	+59.7	11.1	63 13.3	+59.8	11.5	**71**
72	57 19.6	+59.5	9.1	58 18.9	+59.5	9.3	59 18.1	+59.5	9.6	60 17.2	+59.6	9.9	61 16.3	+59.6	10.2	62 15.3	+59.7	10.5	63 14.2	+59.8	10.9	64 13.1	+59.8	11.3	**72**
73	58 19.1	+59.4	8.8	59 18.4	+59.4	9.1	60 17.6	+59.5	9.4	61 16.8	+59.5	9.7	62 15.9	+59.6	10.0	63 15.0	+59.6	10.3	64 14.0	+59.6	10.7	65 12.9	+59.7	11.1	**73**
74	59 18.5	+59.4	8.6	60 17.8	+59.5	8.8	61 17.1	+59.5	9.1	62 16.3	+59.6	9.4	63 15.5	+59.6	9.7	64 14.6	+59.6	10.1	65 13.6	+59.7	10.4	66 12.6	+59.7	10.9	**74**
75	60 17.9	+59.4	8.3	61 17.3	+59.4	8.5	62 16.6	+59.4	8.8	63 15.9	+59.5	9.1	64 15.1	+59.5	9.5	65 14.2	+59.6	9.8	66 13.3	+59.7	10.2	67 12.3	+59.7	10.6	**75**
76	61 17.3	+59.3	8.0	62 16.7	+59.3	8.2	63 16.0	+59.4	8.5	64 15.4	+59.4	8.8	65 14.6	+59.5	9.2	66 13.8	+59.6	9.5	67 13.0	+59.6	9.9	68 12.0	+59.7	10.3	**76**
77	62 16.6	+59.3	7.7	63 16.0	+59.4	7.9	64 15.4	+59.4	8.2	65 14.8	+59.4	8.5	66 14.1	+59.5	8.9	67 13.4	+59.5	9.2	68 12.6	+59.5	9.6	69 11.7	+59.6	10.1	**77**
78	63 15.9	+59.2	7.3	64 15.4	+59.2	7.6	65 14.8	+59.3	7.9	66 14.2	+59.4	8.2	67 13.6	+59.4	8.5	68 12.9	+59.5	8.9	69 12.1	+59.6	9.3	70 11.3	+59.6	9.7	**78**
79	64 15.1	+59.1	7.0	65 14.6	+59.2	7.2	66 14.1	+59.3	7.5	67 13.6	+59.3	7.8	68 13.0	+59.4	8.1	69 12.4	+59.4	8.5	70 11.7	+59.5	8.9	71 10.9	+59.6	9.4	**79**
80	65 14.2	+59.1	6.6	66 13.8	+59.2	6.8	67 13.4	+59.2	7.1	68 12.9	+59.2	7.4	69 12.4	+59.3	7.7	70 11.8	+59.4	8.1	71 11.2	+59.4	8.5	72 10.5	+59.5	9.0	**80**
81	66 13.3	+59.0	6.1	67 13.0	+59.0	6.4	68 12.6	+59.1	6.7	69 12.1	+59.2	7.0	70 11.7	+59.2	7.3	71 11.2	+59.3	7.7	72 10.6	+59.4	8.1	73 10.0	+59.4	8.6	**81**
82	67 12.3	+59.0	5.7	68 12.0	+59.0	5.9	69 11.7	+59.0	6.2	70 11.3	+59.1	6.5	71 10.9	+59.2	6.8	72 10.5	+59.2	7.2	73 10.0	+59.3	7.6	74 09.4	+59.4	8.1	**82**
83	68 11.3	+58.8	5.2	69 11.0	+58.9	5.4	70 10.7	+59.0	5.7	71 10.4	+59.0	6.0	72 10.1	+59.0	6.3	73 09.7	+59.1	6.7	74 09.3	+59.2	7.1	75 08.8	+59.2	7.5	**83**
84	69 10.1	+58.7	4.6	70 09.9	+58.8	4.9	71 09.7	+58.8	5.1	72 09.4	+58.9	5.4	73 09.1	+59.0	5.7	74 08.8	+59.0	6.1	75 08.5	+59.0	6.5	76 08.0	+59.2	6.9	**84**
85	70 08.8	+58.6	4.1	71 08.7	+58.6	4.3	72 08.5	+58.7	4.5	73 08.3	+58.7	4.8	74 08.1	+58.8	5.0	75 07.8	+58.9	5.4	76 07.5	+59.0	5.7	77 07.2	+59.0	6.2	**85**
86	71 07.4	+58.5	3.4	72 07.3	+58.5	3.6	73 07.2	+58.5	3.8	74 07.0	+58.6	4.0	75 06.9	+58.6	4.3	76 06.7	+58.7	4.6	77 06.5	+58.8	4.9	78 06.2	+58.9	5.4	**86**
87	72 05.9	+58.2	2.7	73 05.8	+58.3	2.8	74 05.7	+58.3	3.0	75 05.6	+58.4	3.2	76 05.5	+58.5	3.4	77 05.4	+58.5	3.7	78 05.3	+58.5	4.0	79 05.1	+58.6	4.4	**87**
88	73 04.1	+58.1	1.9	74 04.1	+58.1	2.0	75 04.0	+58.2	2.1	76 04.0	+58.2	2.3	77 04.0	+58.1	2.5	78 03.9	+58.2	2.7	79 03.8	+58.3	2.9	80 03.7	+58.4	3.2	**88**
89	74 02.2	+57.8	1.0	75 02.2	+57.8	1.1	76 02.2	+57.8	1.1	77 02.2	+57.8	1.2	78 02.1	+57.9	1.3	79 02.1	+57.9	1.4	80 02.1	+57.9	1.6	81 02.1	+57.9	1.8	**89**
90	75 00.0	+57.5	0.0	76 00.0	+57.5	0.0	77 00.0	+57.5	0.0	78 00.0	+57.5	0.0	79 00.0	+57.5	0.0	80 00.0	+57.4	0.0	81 00.0	+57.4	0.0	82 00.0	+57.4	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 164°, 196°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 19.8	+59.8	162.4	13 22.6	+59.8	162.5	12 25.4	+59.8	162.6	11 28.1	+59.9	162.6	10 30.8	+59.9	162.7	9 33.5	+60.0	162.8	8 36.2	+60.0	162.8	7 38.9	+59.9	162.8	**0**
1	15 19.6	+59.8	162.4	14 22.4	+59.9	162.4	13 25.2	+59.9	162.5	12 28.0	+59.9	162.6	11 30.7	+59.9	162.6	10 33.5	+59.9	162.7	9 36.2	+59.9	162.8	8 38.8	+60.0	162.8	**1**
2	16 19.4	+59.9	162.3	15 22.3	+59.8	162.4	14 25.1	+59.8	162.4	13 27.9	+59.9	162.5	12 30.6	+59.9	162.6	11 33.4	+59.9	162.6	10 36.1	+59.9	162.7	9 38.8	+59.9	162.8	**2**
3	17 19.3	+59.8	162.2	16 22.1	+59.9	162.3	15 24.9	+59.9	162.4	14 27.8	+59.8	162.5	13 30.5	+59.9	162.5	12 33.3	+59.9	162.6	11 36.0	+60.0	162.7	10 38.7	+60.0	162.7	**3**
4	18 19.1	+59.8	162.1	17 22.0	+59.8	162.2	16 24.8	+59.9	162.3	15 27.6	+59.9	162.4	14 30.4	+59.9	162.5	13 33.2	+59.9	162.5	12 36.0	+59.9	162.6	11 38.7	+59.9	162.7	**4**
5	19 18.9	+59.8	162.0	18 21.8	+59.8	162.1	17 24.7	+59.8	162.2	16 27.5	+59.9	162.3	15 30.3	+59.9	162.4	14 33.1	+59.9	162.5	13 35.9	+59.9	162.6	12 38.6	+60.0	162.6	**5**
6	20 18.7	+59.8	161.9	19 21.6	+59.8	162.0	18 24.5	+59.9	162.2	17 27.4	+59.9	162.3	16 30.2	+59.9	162.3	15 33.0	+60.0	162.4	14 35.8	+60.0	162.5	13 38.6	+59.9	162.6	**6**
7	21 18.5	+59.8	161.9	20 21.4	+59.9	162.0	19 24.4	+59.8	162.1	18 27.3	+59.8	162.2	17 30.1	+59.9	162.3	16 33.0	+59.9	162.4	15 35.8	+59.9	162.5	14 38.5	+60.0	162.5	**7**
8	22 18.3	+59.8	161.8	21 21.3	+59.8	161.9	20 24.2	+59.9	162.0	19 27.1	+59.9	162.1	18 30.0	+59.9	162.2	17 32.9	+59.9	162.3	16 35.7	+59.9	162.4	15 38.5	+59.9	162.5	**8**
9	23 18.1	+59.8	161.7	22 21.1	+59.8	161.8	21 24.1	+59.8	161.9	20 27.0	+59.9	162.0	19 29.9	+59.9	162.2	18 32.8	+59.9	162.3	17 35.6	+60.0	162.4	16 38.4	+60.0	162.5	**9**
10	24 17.9	+59.8	161.6	23 20.9	+59.8	161.7	22 23.9	+59.9	161.9	21 26.9	+59.9	162.0	20 29.8	+59.9	162.1	19 32.7	+59.9	162.2	18 35.6	+59.9	162.3	17 38.4	+59.9	162.4	**10**
11	25 17.7	+59.8	161.5	24 20.7	+59.9	161.6	23 23.8	+59.8	161.8	22 26.8	+59.8	161.9	21 29.7	+59.9	162.0	20 32.6	+59.9	162.2	19 35.5	+59.9	162.3	18 38.3	+60.0	162.4	**11**
12	26 17.5	+59.7	161.4	25 20.6	+59.8	161.6	24 23.6	+59.9	161.7	23 26.6	+59.9	161.8	22 29.6	+59.9	162.0	21 32.5	+59.9	162.1	20 35.4	+59.9	162.2	19 38.3	+59.9	162.3	**12**
13	27 17.2	+59.8	161.3	26 20.4	+59.8	161.5	25 23.5	+59.8	161.6	24 26.5	+59.9	161.8	23 29.5	+59.9	161.9	22 32.4	+59.9	162.0	21 35.3	+60.0	162.2	20 38.2	+60.0	162.3	**13**
14	28 17.0	+59.8	161.2	27 20.2	+59.8	161.4	26 23.3	+59.8	161.5	25 26.4	+59.8	161.7	24 29.4	+59.9	161.8	23 32.3	+60.0	162.0	22 35.3	+59.9	162.1	21 38.2	+59.9	162.2	**14**
15	29 16.8	+59.8	161.1	28 20.0	+59.8	161.3	27 23.1	+59.9	161.5	26 26.2	+59.9	161.6	25 29.3	+59.8	161.8	24 32.3	+59.9	161.9	23 35.2	+59.9	162.1	22 38.1	+59.9	162.2	**15**
16	30 16.6	+59.7	161.0	29 19.8	+59.8	161.2	28 23.0	+59.8	161.4	27 26.1	+59.8	161.5	26 29.1	+59.9	161.7	25 32.2	+59.9	161.9	24 35.1	+59.9	162.0	23 38.0	+60.0	162.1	**16**
17	31 16.3	+59.8	160.9	30 19.6	+59.8	161.1	29 22.8	+59.8	161.3	28 25.9	+59.9	161.5	27 29.0	+59.9	161.6	26 32.1	+59.9	161.8	25 35.0	+60.0	161.9	24 38.0	+59.9	162.1	**17**
18	32 16.1	+59.7	160.8	31 19.4	+59.8	161.0	30 22.6	+59.9	161.2	29 25.8	+59.9	161.4	28 28.9	+59.9	161.6	27 32.0	+59.9	161.7	26 35.0	+59.9	161.9	25 37.9	+60.0	162.0	**18**
19	33 15.8	+59.8	160.7	32 19.2	+59.8	160.9	31 22.5	+59.8	161.1	30 25.7	+59.8	161.3	29 28.8	+59.9	161.5	28 31.9	+59.9	161.7	27 34.9	+59.9	161.8	26 37.9	+59.9	162.0	**19**
20	34 15.6	+59.7	160.6	33 19.0	+59.8	160.8	32 22.3	+59.8	161.0	31 25.5	+59.8	161.2	30 28.7	+59.8	161.4	29 31.8	+59.9	161.6	28 34.8	+59.9	161.8	27 37.8	+59.9	161.9	**20**
21	35 15.3	+59.8	160.5	34 18.8	+59.7	160.7	33 22.1	+59.8	160.9	32 25.3	+59.9	161.1	31 28.5	+59.9	161.3	30 31.7	+59.9	161.5	29 34.7	+59.9	161.7	28 37.7	+60.0	161.9	**21**
22	36 15.1	+59.7	160.4	35 18.5	+59.8	160.6	34 21.9	+59.8	160.8	33 25.2	+59.8	161.0	32 28.4	+59.9	161.3	31 31.6	+59.8	161.5	30 34.6	+60.0	161.6	29 37.7	+59.9	161.8	**22**
23	37 14.8	+59.7	160.2	36 18.3	+59.8	160.5	35 21.7	+59.8	160.7	34 25.0	+59.9	161.0	33 28.3	+59.8	161.2	32 31.4	+59.9	161.4	31 34.6	+59.9	161.6	30 37.6	+59.9	161.8	**23**
24	38 14.5	+59.8	160.1	37 18.1	+59.7	160.4	36 21.5	+59.8	160.6	35 24.9	+59.8	160.9	34 28.1	+59.9	161.1	33 31.3	+59.9	161.3	32 34.5	+59.9	161.5	31 37.5	+60.0	161.7	**24**
25	39 14.3	+59.7	160.0	38 17.8	+59.8	160.3	37 21.3	+59.8	160.5	36 24.7	+59.8	160.8	35 28.0	+59.9	161.0	34 31.2	+59.9	161.2	33 34.4	+59.9	161.5	32 37.5	+59.9	161.7	**25**
26	40 14.0	+59.7	159.9	39 17.6	+59.7	160.2	38 21.1	+59.8	160.4	37 24.5	+59.8	160.7	36 27.9	+59.8	160.9	35 31.1	+59.9	161.2	34 34.3	+59.9	161.4	33 37.4	+59.9	161.6	**26**
27	41 13.7	+59.7	159.7	40 17.3	+59.8	160.0	39 20.9	+59.8	160.3	38 24.3	+59.9	160.6	37 27.7	+59.9	160.8	36 31.0	+59.9	161.1	35 34.2	+59.9	161.3	34 37.3	+59.9	161.5	**27**
28	42 13.4	+59.6	159.6	41 17.1	+59.7	159.9	40 20.7	+59.7	160.2	39 24.2	+59.8	160.5	38 27.6	+59.8	160.8	37 30.9	+59.8	161.0	36 34.1	+59.9	161.3	35 37.2	+60.0	161.5	**28**
29	43 13.0	+59.7	159.5	42 16.8	+59.7	159.8	41 20.4	+59.8	160.1	40 24.0	+59.8	160.4	39 27.4	+59.8	160.7	38 30.7	+59.9	160.9	37 34.0	+59.9	161.2	36 37.2	+59.9	161.4	**29**
30	44 12.7	+59.7	159.3	43 16.5	+59.7	159.6	42 20.2	+59.8	160.0	41 23.8	+59.8	160.3	40 27.2	+59.9	160.6	39 30.6	+59.9	160.8	38 33.9	+59.9	161.1	37 37.1	+59.9	161.4	**30**
31	45 12.4	+59.6	159.2	44 16.2	+59.7	159.5	43 20.0	+59.7	159.8	42 23.6	+59.8	160.2	41 27.1	+59.8	160.5	40 30.5	+59.8	160.8	39 33.8	+59.9	161.0	38 37.0	+59.9	161.3	**31**
32	46 12.0	+59.6	159.0	45 15.9	+59.7	159.4	44 19.7	+59.8	159.7	43 23.4	+59.8	160.1	42 26.9	+59.8	160.4	41 30.3	+59.9	160.7	40 33.7	+59.9	161.0	39 36.9	+59.9	161.2	**32**
33	47 11.6	+59.7	158.8	46 15.6	+59.7	159.2	45 19.5	+59.7	159.6	44 23.2	+59.7	159.9	43 26.7	+59.9	160.3	42 30.2	+59.9	160.6	41 33.6	+59.9	160.9	40 36.8	+59.9	161.2	**33**
34	48 11.3	+59.6	158.7	47 15.3	+59.7	159.1	46 19.2	+59.7	159.5	45 22.9	+59.8	159.8	44 26.6	+59.8	160.2	43 30.1	+59.8	160.5	42 33.5	+59.8	160.8	41 36.7	+60.0	161.1	**34**
35	49 10.9	+59.6	158.5	48 15.0	+59.6	158.9	47 18.9	+59.7	159.3	46 22.7	+59.8	159.7	45 26.4	+59.8	160.0	44 29.9	+59.9	160.4	43 33.3	+59.9	160.7	42 36.7	+59.9	161.0	**35**
36	50 10.5	+59.5	158.3	49 14.6	+59.7	158.8	48 18.6	+59.7	159.2	47 22.5	+59.7	159.6	46 26.2	+59.8	159.9	45 29.8	+59.8	160.3	44 33.2	+59.9	160.6	43 36.6	+59.9	160.9	**36**
37	51 10.0	+59.6	158.1	50 14.3	+59.6	158.6	49 18.3	+59.7	159.0	48 22.2	+59.8	159.4	47 26.0	+59.8	159.8	46 29.6	+59.8	160.2	45 33.1	+59.9	160.5	44 36.5	+59.9	160.9	**37**
38	52 09.6	+59.5	157.9	51 13.9	+59.6	158.4	50 18.0	+59.7	158.9	49 22.0	+59.7	159.3	48 25.8	+59.8	159.7	47 29.4	+59.9	160.1	46 33.0	+59.8	160.4	45 36.4	+59.9	160.8	**38**
39	53 09.1	+59.5	157.7	52 13.5	+59.6	158.2	51 17.7	+59.6	158.7	50 21.7	+59.7	159.1	49 25.6	+59.7	159.6	48 29.3	+59.8	160.0	47 32.8	+59.9	160.3	46 36.3	+59.9	160.7	**39**
40	54 08.6	+59.5	157.5	53 13.1	+59.5	158.0	52 17.3	+59.7	158.5	51 21.4	+59.7	159.0	50 25.3	+59.8	159.4	49 29.1	+59.8	159.8	48 32.7	+59.8	160.2	47 36.2	+59.8	160.6	**40**
41	55 08.1	+59.5	157.3	54 12.6	+59.6	157.8	53 17.0	+59.6	158.3	52 21.1	+59.7	158.8	51 25.1	+59.7	159.3	50 28.9	+59.8	159.7	49 32.5	+59.9	160.1	48 36.0	+59.9	160.5	**41**
42	56 07.6	+59.4	157.1	55 12.2	+59.5	157.6	54 16.6	+59.6	158.2	53 20.8	+59.7	158.7	52 24.8	+59.8	159.1	51 28.7	+59.8	159.6	50 32.4	+59.8	160.0	49 35.9	+59.9	160.4	**42**
43	57 07.0	+59.4	156.8	56 11.7	+59.5	157.4	55 16.2	+59.6	158.0	54 20.5	+59.7	158.5	53 24.6	+59.7	159.0	52 28.5	+59.8	159.4	51 32.2	+59.9	159.9	50 35.8	+59.9	160.3	**43**
44	58 06.4	+59.4	156.5	57 11.2	+59.5	157.2	56 15.8	+59.6	157.7	55 20.2	+59.6	158.3	54 24.3	+59.7	158.8	53 28.3	+59.8	159.3	52 32.1	+59.8	159.8	51 35.7	+59.9	160.2	**44**
45	59 05.8	+59.3	156.3	58 10.7	+59.4	156.9	57 15.4	+59.5	157.5	56 19.8	+59.6	158.1	55 24.0	+59.7	158.6	54 28.1	+59.7	159.2	53 31.9	+59.8	159.6	52 35.6	+59.8	160.1	**45**
46	60 05.1	+59.3	156.0	59 10.1	+59.4	156.7	58 14.9	+59.5	157.3	57 19.4	+59.6	157.9	56 23.7	+59.7	158.5	55 27.8	+59.8	159.0	54 31.7	+59.8	159.5	53 35.4	+59.9	160.0	**46**
47	61 04.4	+59.2	155.7	60 09.5	+59.4	156.4	59 14.4	+59.5	157.1	58 19.0	+59.6	157.7	57 23.4	+59.7	158.3	56 27.6	+59.7	158.8	55 31.5	+59.8	159.4	54 35.3	+59.8	159.9	**47**
48	62 03.6	+59.2	155.3	61 08.9	+59.3	156.1	60 13.9	+59.5	156.8	59 18.6	+59.6	157.5	58 23.1	+59.6	158.1	57 27.3	+59.7	158.7	56 31.3	+59.8	159.2	55 35.1	+59.9	159.7	**48**
49	63 02.8	+59.1	155.0	62 08.2	+59.3	155.8	61 13.4	+59.4	156.5	60 18.2	+59.5	157.2	59 22.7	+59.7	157.9	58 27.0	+59.7	158.5	57 31.1	+59.8	159.1	56 35.0	+59.8	159.6	**49**
50	64 01.9	+59.1	154.6	63 07.5	+59.3	155.4	62 12.8	+59.4	156.2	61 17.7	+59.5	157.0	60 22.4	+59.6	157.7	59 26.7	+59.7	158.3	58 30.9	+59.7	158.9	57 34.8	+59.8	159.5	**50**
51	65 01.0	+59.0	154.2	64 06.8	+59.1	155.1	63 12.2	+59.3	155.9	62 17.2	+59.5	156.7	61 22.0	+59.6	157.4	60 26.4	+59.7	158.1	59 30.6	+59.8	158.7	58 34.6	+59.8	159.3	**51**
52	66 00.0	+58.9	153.7	65 05.9	+59.2	154.7	64 11.5	+59.3	155.6	63 16.7	+59.4	156.4	62 21.6	+59.5	157.2	61 26.1	+59.7	157.9	60 30.4	+59.7	158.6	59 34.4	+59.8	159.2	**52**
53	66 58.9	+58.8	153.3	66 05.1	+59.0	154.3	65 10.8	+59.2	155.2	64 16.1	+59.4	156.1	63 21.1	+59.5	156.9	62 25.8	+59.6	157.7	61 30.1	+59.7	158.4	60 34.2	+59.8	159.0	**53**
54	67 57.7	+58.7	152.7	67 04.1	+59.0	153.8	66 10.0	+59.2	154.8	65 15.5	+59.4	155.8	64 20.6	+59.5	156.6	63 25.4	+59.6	157.4	62 29.8	+59.7	158.2	61 34.0	+59.8	158.8	**54**
55	68 56.4	+58.6	152.2	68 03.1	+58.8	153.3	67 09.2	+59.1	154.4	66 14.9	+59.2	155.4	65 20.1	+59.4	156.3	64 25.0	+59.5	157.1	63 29.5	+59.7	157.9	62 33.8	+59.7	158.7	**55**
56	69 55.0	+58.5	151.6	69 01.9	+58.8	152.8	68 08.3	+59.0	154.0	67 14.1	+59.3	155.0	66 19.5	+59.4	156.0	65 24.5	+59.6	156.9	64 29.2	+59.7	157.7	63 33.5	+59.8	158.5	**56**
57	70 53.5	+58.2	150.9	70 00.7	+58.6	152.2	69 07.3	+58.9	153.5	68 13.4	+59.1	154.6	67 18.9	+59.4	155.6	66 24.1	+59.5	156.6	65 28.9	+59.6	157.4	64 33.3	+59.7	158.2	**57**
58	71 51.7	+58.1	150.2	70 59.3	+58.5	151.6	70 06.2	+58.8	152.9	69 12.5	+59.1	154.1	68 18.3	+59.3	155.2	67 23.6	+59.4	156.2	66 28.5	+59.6	157.2	65 33.0	+59.7	158.0	**58**
59	72 49.8	+57.9	149.3	71 57.8	+58.3	150.9	71 05.0	+58.7	152.3	70 11.6	+59.0	153.6	69 17.6	+59.2	154.8	68 23.0	+59.4	155.9	67 28.1	+59.5	156.9	66 32.7	+59.7	157.8	**59**
60	73 47.7	+57.6	148.4	72 56.1	+58.2	150.1	72 03.7	+58.6	151.7	71 10.6	+58.8	153.1	70 16.8	+59.1	154.3	69 22.4	+59.4	155.5	68 27.6	+59.5	156.5	67 32.4	+59.6	157.5	**60**
61	74 45.3	+57.3	147.4	73 54.3	+57.9	149.3	73 02.3	+58.3	150.9	72 09.4	+58.8	152.4	71 15.9	+59.0	153.8	70 21.8	+59.3	155.1	69 27.1	+59.5	156.2	68 32.0	+59.6	157.2	**61**
62	75 42.6	+56.9	146.2	74 52.2	+57.6	148.3	74 00.6	+58.2	150.1	73 08.2	+58.6	151.8	72 14.9	+59.0	153.2	71 21.1	+59.1	154.6	70 26.6	+59.4	155.8	69 31.6	+59.6	156.9	**62**
63	76 39.5	+56.5	144.9	75 49.8	+57.2	147.2	74 58.8	+57.9	149.2	74 06.8	+58.4	151.0	73 13.9	+58.8	152.6	72 20.2	+59.2	154.1	71 26.0	+59.3	155.4	70 31.2	+59.5	156.5	**63**
64	77 36.0	+55.8	143.4	76 47.0	+56.8	145.9	75 56.7	+57.6	148.1	75 05.2	+58.1	150.1	74 12.7	+58.6	151.9	73 19.4	+58.9	153.5	72 25.3	+59.3	154.9	71 30.7	+59.5	156.2	**64**
65	78 31.8	+55.1	141.6	77 43.8	+56.3	144.4	76 54.3	+57.2	147.0	76 03.3	+58.0	149.2	75 11.3	+58.5	151.1	74 18.3	+58.9	152.8	73 24.6	+59.2	154.4	72 30.2	+59.4	155.7	**65**
66	79 26.9	+54.1	139.5	78 40.1	+55.6	142.8	77 51.5	+56.7	145.6	77 01.3	+57.5	148.0	76 09.8	+58.2	150.2	75 17.2	+58.7	152.1	74 23.8	+59.1	153.8	73 29.6	+59.4	155.3	**66**
67	80 21.0	+52.8	137.0	79 35.7	+54.8	140.8	78 48.2	+56.1	144.0	77 58.8	+57.2	146.7	77 08.0	+57.9	149.1	76 15.9	+58.5	151.2	75 22.9	+58.9	153.1	74 29.0	+59.2	154.7	**67**
68	81 13.8	+51.2	134.1	80 30.5	+53.5	138.4	79 44.3	+55.4	142.1	78 56.0	+56.6	145.2	78 05.9	+57.6	147.9	77 14.4	+58.3	150.3	76 21.8	+58.8	152.3	75 28.2	+59.2	154.1	**68**
69	82 05.0	*+48.9*	•130.5	81 24.0	+52.0	135.5	80 39.7	+54.2	139.8	79 52.6	+55.9	143.4	79 03.5	+57.1	146.5	78 12.7	+57.9	149.1	77 20.6	+58.5	151.4	76 27.4	+59.0	153.4	**69**
70	82 53.9	*+45.6*	•126.0	82 16.0	*+49.9*	•132.0	81 33.9	+52.9	137.0	80 48.5	+55.0	141.2	80 00.6	+56.4	144.8	79 10.6	+57.6	147.8	78 19.1	+58.3	150.4	77 26.4	+58.8	152.6	**70**
71	83 39.5	*+41.3*	•120.5	83 05.9	*+46.8*	•127.6	82 26.8	*+50.8*	•133.6	81 43.5	+53.7	138.6	80 57.0	+55.7	142.8	80 08.2	+57.0	146.2	79 17.4	+58.0	149.2	78 25.2	+58.7	151.7	**71**
72	84 20.8	*+34.9*	•113.5	83 52.7	*+42.5*	•122.1	83 17.6	*+48.0*	•129.3	82 37.2	*+51.8*	•135.3	81 52.7	+54.5	140.2	81 05.2	+56.3	144.3	80 15.4	+57.5	147.7	79 23.9	+58.3	150.6	**72**
73	84 55.7	*+26.2*	•104.8	84 35.2	*+36.2*	•115.0	84 05.6	*+43.8*	•123.8	83 29.0	*+49.2*	•131.1	82 47.2	*+52.8*	•137.1	82 01.5	+55.2	142.0	81 12.9	+56.9	146.0	80 22.2	+58.0	149.3	**73**
74	85 21.9	*+15.0*	• 94.1	85 11.4	*+27.3*	•106.1	84 49.4	*+37.5*	•116.7	84 18.2	*+45.1*	•125.7	83 40.0	*+50.4*	•133.1	82 56.7	+53.9	139.0	82 09.8	+56.1	143.8	81 20.2	+57.5	147.7	**74**
75	85 36.9	*+1.8*	• 81.8	85 38.7	*+15.4*	• 94.9	85 26.9	*+28.5*	•107.5	85 03.3	*+39.1*	•118.6	84 30.4	*+46.6*	•127.8	83 50.6	*+51.5*	•135.1	83 05.9	+54.7	141.0	82 17.7	+56.8	145.6	**75**
76	85 38.7	*–11.8*	• 68.6	85 54.1	*+1.3*	• 81.7	85 55.4	*+15.9*	• 95.8	85 42.4	*+29.7*	•109.1	85 17.0	*+40.6*	•120.7	84 42.1	*+48.1*	•130.0	84 00.6	*+52.8*	•137.3	83 14.5	+55.7	143.1	**76**
77	85 26.9	*–23.6*	• 56.0	85 55.4	*–13.0*	• 67.7	86 11.3	*+0.8*	• 81.7	86 12.1	*+16.6*	• 96.8	85 57.6	*+31.2*	•111.0	85 30.2	*+42.4*	•123.0	84 53.4	*+49.7*	•132.4	84 10.2	*+54.0*	•139.7	**77**
78	85 03.3	*–32.9*	• 44.8	85 42.4	*–25.4*	• 54.3	86 12.1	*–14.5*	• 66.6	86 28.7	*+0.1*	• 81.7	86 28.8	*+17.3*	• 98.0	86 12.6	*+32.9*	•113.1	85 43.1	*+44.2*	•125.5	85 04.2	*+51.2*	•135.0	**78**
79	84 30.4	*–39.8*	• 35.6	85 17.0	*–34.9*	• 42.7	85 57.6	*–27.4*	• 52.4	86 28.8	*–16.2*	• 65.3	86 46.1	*–0.6*	• 81.7	86 45.5	*+18.0*	• 99.4	86 27.3	*+34.8*	•115.5	85 55.4	*+46.2*	•128.3	**79**
80	83 50.6	*–44.7*	• 28.3	84 42.1	*–41.5*	• 33.4	85 30.2	*–36.8*	• 40.4	86 12.6	*–29.5*	• 50.2	86 45.5	*–18.2*	• 63.9	87 03.5	*–1.4*	• 81.6	87 02.1	*+18.9*	•101.1	86 41.6	*+36.9*	•118.3	**80**
81	83 05.9	*–48.2*	• 22.4	84 00.6	*–46.1*	• 26.0	84 53.4	*–43.2*	• 30.9	85 43.1	*–38.9*	• 37.8	86 27.3	*–31.9*	• 47.7	87 02.1	*–20.5*	• 62.1	87 21.0	*–2.5*	• 81.6	87 18.5	*+20.1*	•103.1	**81**
82	82 17.7	*–50.6*	• 17.7	83 14.5	*–49.4*	• 20.2	84 10.2	*–47.7*	• 23.6	85 04.2	*–45.1*	• 28.3	85 55.4	*–41.1*	• 34.9	86 41.6	*–34.6*	• 44.9	87 18.5	*–23.2*	• 60.0	87 38.6	*–3.9*	• 81.6	**82**
83	81 27.1	–52.5	13.9	82 25.1	–51.7	15.7	83 22.5	*–50.6*	• 18.0	84 19.1	*–49.1*	• 21.1	85 14.3	*–46.9*	• 25.4	86 07.0	*–43.3*	• 31.7	86 55.3	*–37.3*	• 41.6	87 34.7	*–26.2*	• 57.5	**83**
84	80 34.6	–53.8	10.8	81 33.4	–53.3	12.0	82 31.9	–52.6	13.6	83 30.0	*–51.8*	• 15.7	84 27.4	*–50.6*	• 18.4	85 23.7	*–48.7*	• 22.4	86 18.0	*–45.8*	• 28.3	87 08.5	*–40.5*	• 37.8	**84**
85	79 40.8	–54.9	8.2	80 40.1	–54.5	9.0	81 39.3	–54.2	10.1	82 38.2	–53.6	11.5	83 36.8	*–52.9*	• 13.2	84 35.0	*–52.0*	• 15.7	85 32.2	*–50.5*	• 19.1	86 28.0	*–48.1*	• 24.4	**85**
86	78 45.9	–55.6	6.0	79 45.6	–55.5	6.6	80 45.1	–55.2	7.3	81 44.6	–55.0	8.2	82 43.9	–54.6	9.3	83 43.0	–54.1	10.7	84 41.7	*–53.3*	• 12.7	85 39.9	*–52.2*	• 15.7	**86**
87	77 50.3	–56.3	4.2	78 50.1	–56.2	4.5	79 49.9	–56.1	5.0	80 49.6	–55.8	5.5	81 49.3	–55.7	6.2	82 48.9	–55.4	7.0	83 48.4	–55.1	8.2	84 47.7	–54.6	9.7	**87**
88	76 54.0	–56.8	2.6	77 53.9	–56.7	2.8	78 53.8	–56.6	3.0	79 53.8	–56.7	3.3	80 53.6	–56.5	3.7	81 53.5	–56.4	4.1	82 53.3	–56.2	4.7	83 53.1	–56.1	5.5	**88**
89	75 57.2	–57.2	1.2	76 57.2	–57.2	1.3	77 57.2	–57.2	1.4	78 57.1	–57.1	1.5	79 57.1	–57.1	1.7	80 57.1	–57.1	1.9	81 57.1	–57.1	2.1	82 57.0	–57.0	2.4	**89**
90	75 00.0	–57.5	0.0	76 00.0	–57.5	0.0	77 00.0	–57.6	0.0	78 00.0	–57.6	0.0	79 00.0	–57.6	0.0	80 00.0	–57.6	0.0	81 00.0	–57.6	0.0	82 00.0	–57.7	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 17°, 343°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 19.8	–59.8	162.4	13 22.6	–59.8	162.5	12 25.4	–59.9	162.6	11 28.1	–59.9	162.6	10 30.8	–59.9	162.7	9 33.5	–59.9	162.8	8 36.2	–59.9	162.8	7 38.9	–60.0	162.8	0
1	13 20.0	–59.8	162.5	12 22.8	–59.9	162.6	11 25.5	–59.9	162.6	10 28.2	–59.9	162.7	9 30.9	–59.9	162.8	8 33.6	–59.9	162.8	7 36.3	–60.0	162.8	6 38.9	–59.9	162.9	1
2	12 20.2	–59.8	162.6	11 22.9	–59.8	162.7	10 25.6	–59.8	162.7	9 28.3	–59.9	162.8	8 31.0	–59.9	162.8	7 33.7	–59.9	162.9	6 36.3	–59.9	162.9	5 39.0	–60.0	162.9	2
3	11 20.4	–59.9	162.7	10 23.1	–59.9	162.7	9 25.8	–59.9	162.8	8 28.4	–59.8	162.8	7 31.1	–59.9	162.9	6 33.8	–60.0	162.9	5 36.4	–59.9	162.9	4 39.0	–59.9	163.0	3
4	10 20.5	–59.8	162.8	9 23.2	–59.8	162.8	8 25.9	–59.9	162.9	7 28.6	–59.9	162.9	6 31.2	–59.9	162.9	5 33.8	–59.9	163.0	4 36.5	–60.0	163.0	3 39.1	–60.0	163.0	4
5	9 20.7	–59.8	162.8	8 23.4	–59.9	162.9	7 26.0	–59.8	162.9	6 28.7	–59.9	163.0	5 31.3	–59.9	163.0	4 33.9	–59.9	163.0	3 36.5	–59.9	163.0	2 39.1	–59.9	163.0	5
6	8 20.9	–59.8	162.9	7 23.5	–59.8	162.9	6 26.2	–59.9	163.0	5 28.8	–59.9	163.0	4 31.4	–59.9	163.0	3 34.0	–59.9	163.1	2 36.6	–59.9	163.1	1 39.2	–60.0	163.1	6
7	7 21.1	–59.9	163.0	6 23.7	–59.9	163.0	5 26.3	–59.9	163.1	4 28.9	–59.9	163.1	3 31.5	–59.9	163.1	2 34.1	–59.9	163.1	1 36.7	–60.0	163.1	0 39.2	–59.9	163.1	7
8	6 21.2	–59.8	163.1	5 23.8	–59.8	163.1	4 26.4	–59.8	163.1	3 29.0	–59.9	163.1	2 31.6	–59.9	163.2	1 34.2	–60.0	163.2	0 36.7	–59.9	163.2	0 20.7	+60.0	16.8	8
9	5 21.4	–59.8	163.1	4 24.0	–59.9	163.2	3 26.6	–59.9	163.2	2 29.1	–59.9	163.2	1 31.7	–59.9	163.2	0 34.2	–59.9	163.2	0 23.2	+59.9	16.8	1 20.7	+59.9	16.8	9
10	4 21.6	–59.8	163.2	3 24.1	–59.8	163.2	2 26.7	–59.9	163.3	1 29.2	–59.9	163.3	0 31.8	–59.9	163.3	0 25.7	+59.9	16.7	1 23.1	+60.0	16.7	2 20.6	+60.0	16.7	10
11	3 21.8	–59.9	163.3	2 24.3	–59.9	163.3	1 26.8	–59.9	163.3	0 29.3	–59.8	163.3	0 28.1	+59.9	16.7	1 25.6	+59.9	16.7	2 23.1	+59.9	16.7	3 20.6	+59.9	16.7	11
12	2 21.9	–59.8	163.4	1 24.4	–59.8	163.4	0 26.9	–59.8	163.4	0 30.5	+59.9	16.6	1 28.0	+59.9	16.6	2 25.5	+60.0	16.6	3 23.0	+60.0	16.6	4 20.5	+60.0	16.7	12
13	1 22.1	–59.8	163.4	0 24.6	–59.9	163.4	0 32.9	+59.9	16.6	1 30.4	+59.9	16.6	2 27.9	+60.0	16.6	3 25.5	+59.9	16.6	4 23.0	+59.9	16.6	5 20.5	+59.9	16.6	13
14	0 22.3	–59.9	163.5	0 35.3	+59.8	16.5	1 32.8	+59.9	16.5	2 30.3	+59.9	16.5	3 27.9	+59.9	16.5	4 25.4	+59.9	16.5	5 22.9	+59.9	16.6	6 20.4	+60.0	16.6	14
15	0 37.6	+59.8	16.4	1 35.1	+59.9	16.4	2 32.7	+59.8	16.4	3 30.2	+59.9	16.4	4 27.8	+59.9	16.5	5 25.3	+59.9	16.5	6 22.8	+60.0	16.5	7 20.4	+59.9	16.5	15
16	1 37.4	+59.8	16.3	2 35.0	+59.8	16.3	3 32.5	+59.9	16.4	4 30.1	+59.9	16.4	5 27.7	+59.9	16.4	6 25.2	+59.9	16.4	7 22.8	+59.9	16.5	8 20.3	+60.0	16.5	16
17	2 37.2	+59.8	16.3	3 34.8	+59.9	16.3	4 32.4	+59.9	16.3	5 30.0	+59.9	16.3	6 27.6	+59.9	16.3	7 25.1	+60.0	16.4	8 22.7	+59.9	16.4	9 20.3	+59.9	16.5	17
18	3 37.0	+59.9	16.2	4 34.7	+59.8	16.2	5 32.3	+59.8	16.2	6 29.9	+59.9	16.3	7 27.5	+59.9	16.3	8 25.1	+59.9	16.3	9 22.6	+60.0	16.4	10 20.2	+59.9	16.4	18
19	4 36.9	+59.8	16.1	5 34.5	+59.9	16.1	6 32.1	+59.9	16.2	7 29.8	+59.9	16.2	8 27.4	+59.9	16.2	9 25.0	+59.9	16.3	10 22.6	+59.9	16.3	11 20.1	+60.0	16.4	19
20	5 36.7	+59.8	16.0	6 34.4	+59.8	16.1	7 32.0	+59.9	16.1	8 29.7	+59.8	16.1	9 27.3	+59.9	16.2	10 24.9	+59.9	16.2	11 22.5	+59.9	16.3	12 20.1	+59.9	16.3	20
21	6 36.5	+59.8	15.9	7 34.2	+59.8	16.0	8 31.9	+59.8	16.0	9 29.5	+59.9	16.1	10 27.2	+59.9	16.1	11 24.8	+59.9	16.2	12 22.4	+60.0	16.2	13 20.0	+60.0	16.3	21
22	7 36.3	+59.9	15.9	8 34.0	+59.9	15.9	9 31.7	+59.9	16.0	10 29.4	+59.9	16.0	11 27.1	+59.9	16.1	12 24.7	+60.0	16.1	13 22.4	+59.9	16.2	14 20.0	+59.9	16.2	22
23	8 36.2	+59.8	15.8	9 33.9	+59.8	15.8	10 31.6	+59.9	15.9	11 29.3	+59.9	15.9	12 27.0	+59.9	16.0	13 24.7	+59.9	16.1	14 22.3	+59.9	16.1	15 19.9	+60.0	16.2	23
24	9 36.0	+59.8	15.7	10 33.7	+59.9	15.8	11 31.5	+59.8	15.8	12 29.2	+59.9	15.9	13 26.9	+59.9	15.9	14 24.6	+59.9	16.0	15 22.2	+60.0	16.1	16 19.9	+59.9	16.2	24
25	10 35.8	+59.8	15.6	11 33.6	+59.8	15.7	12 31.3	+59.9	15.7	13 29.1	+59.9	15.8	14 26.8	+59.9	15.9	15 24.5	+59.9	16.0	16 22.2	+59.9	16.0	17 19.8	+60.0	16.1	25
26	11 35.6	+59.9	15.6	12 33.4	+59.9	15.6	13 31.2	+59.9	15.7	14 29.0	+59.8	15.7	15 26.7	+59.9	15.8	16 24.4	+59.9	15.9	17 22.1	+59.9	16.0	18 19.8	+59.9	16.1	26
27	12 35.5	+59.8	15.5	13 33.3	+59.8	15.5	14 31.1	+59.8	15.6	15 28.8	+59.9	15.7	16 26.6	+59.9	15.8	17 24.3	+59.9	15.8	18 22.0	+60.0	15.9	19 19.7	+60.0	16.0	27
28	13 35.3	+59.8	15.4	14 33.1	+59.8	15.5	15 30.9	+59.9	15.5	16 28.7	+59.9	15.6	17 26.5	+59.9	15.7	18 24.2	+60.0	15.8	19 22.0	+59.9	15.9	20 19.7	+59.9	16.0	28
29	14 35.1	+59.8	15.3	15 32.9	+59.9	15.4	16 30.8	+59.8	15.5	17 28.6	+59.9	15.6	18 26.4	+59.9	15.6	19 24.2	+59.9	15.7	20 21.9	+59.9	15.8	21 19.6	+59.9	15.9	29
30	15 34.9	+59.8	15.2	16 32.8	+59.8	15.3	17 30.6	+59.9	15.4	18 28.5	+59.9	15.5	19 26.3	+59.9	15.6	20 24.1	+59.9	15.7	21 21.8	+60.0	15.8	22 19.5	+60.0	15.9	30
31	16 34.7	+59.8	15.2	17 32.6	+59.9	15.2	18 30.5	+59.9	15.3	19 28.4	+59.8	15.4	20 26.2	+59.9	15.5	21 24.0	+59.9	15.6	22 21.8	+59.9	15.7	23 19.5	+59.9	15.8	31
32	17 34.5	+59.8	15.1	18 32.5	+59.8	15.2	19 30.4	+59.8	15.3	20 28.2	+59.9	15.3	21 26.1	+59.9	15.4	22 23.9	+59.9	15.6	23 21.7	+59.9	15.7	24 19.4	+60.0	15.8	32
33	18 34.3	+59.8	15.0	19 32.3	+59.8	15.1	20 30.2	+59.9	15.2	21 28.1	+59.9	15.3	22 26.0	+59.9	15.4	23 23.8	+59.9	15.5	24 21.6	+59.9	15.6	25 19.4	+59.9	15.7	33
34	19 34.1	+59.9	14.9	20 32.1	+59.8	15.0	21 30.1	+59.8	15.1	22 28.0	+59.8	15.2	23 25.9	+59.8	15.3	24 23.7	+59.9	15.4	25 21.5	+59.9	15.6	26 19.3	+59.9	15.7	34
35	20 34.0	+59.8	14.8	21 31.9	+59.9	14.9	22 29.9	+59.9	15.0	23 27.8	+59.9	15.1	24 25.7	+59.9	15.3	25 23.6	+59.9	15.4	26 21.4	+60.0	15.5	27 19.2	+60.0	15.6	35
36	21 33.8	+59.8	14.7	22 31.8	+59.8	14.8	23 29.8	+59.8	14.9	24 27.7	+59.9	15.1	25 25.6	+59.9	15.2	26 23.5	+59.9	15.3	27 21.4	+59.9	15.4	28 19.2	+59.9	15.6	36
37	22 33.6	+59.8	14.6	23 31.6	+59.8	14.8	24 29.6	+59.8	14.9	25 27.6	+59.8	15.0	26 25.5	+59.9	15.1	27 23.4	+59.9	15.2	28 21.3	+59.9	15.4	29 19.1	+60.0	15.5	37
38	23 33.4	+59.7	14.6	24 31.4	+59.8	14.7	25 29.4	+59.9	14.8	26 27.4	+59.9	14.9	27 25.4	+59.9	15.0	28 23.3	+59.9	15.2	29 21.2	+59.9	15.3	30 19.1	+59.9	15.5	38
39	24 33.1	+59.8	14.5	25 31.2	+59.8	14.6	26 29.3	+59.8	14.7	27 27.3	+59.9	14.8	28 25.3	+59.9	15.0	29 23.2	+59.9	15.1	30 21.1	+59.9	15.3	31 19.0	+59.9	15.4	39
40	25 32.9	+59.8	14.4	26 31.0	+59.9	14.5	27 29.1	+59.8	14.6	28 27.2	+59.8	14.8	29 25.2	+59.8	14.9	30 23.1	+59.9	15.0	31 21.0	+60.0	15.2	32 18.9	+59.9	15.4	40
41	26 32.7	+59.8	14.3	27 30.9	+59.8	14.4	28 28.9	+59.9	14.5	29 27.0	+59.9	14.7	30 25.0	+59.9	14.8	31 23.0	+59.9	15.0	32 21.0	+59.9	15.1	33 18.8	+60.0	15.3	41
42	27 32.5	+59.8	14.2	28 30.7	+59.8	14.3	29 28.8	+59.8	14.5	30 26.9	+59.8	14.6	31 24.9	+59.9	14.7	32 22.9	+59.9	14.9	33 20.9	+59.9	15.1	34 18.8	+59.9	15.3	42
43	28 32.3	+59.8	14.1	29 30.5	+59.8	14.2	30 28.6	+59.8	14.4	31 26.7	+59.9	14.5	32 24.8	+59.8	14.7	33 22.8	+59.9	14.8	34 20.8	+59.9	15.0	35 18.7	+59.9	15.2	43
44	29 32.1	+59.7	14.0	30 30.3	+59.8	14.1	31 28.4	+59.8	14.3	32 26.6	+59.8	14.4	33 24.6	+59.9	14.6	34 22.7	+59.9	14.8	35 20.7	+59.9	14.9	36 18.6	+59.9	15.1	44
45	30 31.8	+59.8	13.9	31 30.1	+59.7	14.0	32 28.2	+59.9	14.2	33 26.4	+59.8	14.3	34 24.5	+59.9	14.5	35 22.6	+59.9	14.7	36 20.6	+59.9	14.9	37 18.5	+60.0	15.1	45
46	31 31.6	+59.8	13.8	32 29.8	+59.8	13.9	33 28.1	+59.8	14.1	34 26.2	+59.9	14.3	35 24.4	+59.8	14.4	36 22.5	+59.8	14.6	37 20.5	+59.9	14.8	38 18.5	+59.9	15.0	46
47	32 31.4	+59.7	13.7	33 29.6	+59.8	13.8	34 27.9	+59.8	14.0	35 26.1	+59.8	14.2	36 24.2	+59.9	14.3	37 22.3	+59.9	14.5	38 20.4	+59.9	14.7	39 18.4	+59.9	14.9	47
48	33 31.1	+59.8	13.6	34 29.4	+59.8	13.7	35 27.7	+59.8	13.9	36 25.9	+59.8	14.1	37 24.1	+59.8	14.3	38 22.2	+59.9	14.4	39 20.3	+59.9	14.7	40 18.3	+59.9	14.9	48
49	34 30.9	+59.7	13.5	35 29.2	+59.8	13.6	36 27.5	+59.8	13.8	37 25.7	+59.8	14.0	38 23.9	+59.9	14.2	39 22.1	+59.8	14.4	40 20.2	+59.9	14.6	41 18.2	+59.9	14.8	49
50	35 30.6	+59.7	13.3	36 29.0	+59.7	13.5	37 27.3	+59.8	13.7	38 25.5	+59.9	13.9	39 23.8	+59.8	14.1	40 21.9	+59.9	14.3	41 20.1	+59.9	14.5	42 18.1	+59.9	14.7	50
51	36 30.3	+59.8	13.2	37 28.7	+59.8	13.4	38 27.1	+59.8	13.6	39 25.4	+59.8	13.8	40 23.6	+59.9	14.0	41 21.8	+59.9	14.2	42 20.0	+59.8	14.4	43 18.0	+59.9	14.6	51
52	37 30.1	+59.7	13.1	38 28.5	+59.7	13.3	39 26.9	+59.7	13.5	40 25.2	+59.8	13.7	41 23.5	+59.8	13.9	42 21.7	+59.8	14.1	43 19.8	+59.9	14.3	44 17.9	+59.9	14.6	52
53	38 29.8	+59.7	13.0	39 28.2	+59.8	13.2	40 26.6	+59.8	13.4	41 25.0	+59.8	13.6	42 23.3	+59.8	13.8	43 21.5	+59.9	14.0	44 19.7	+59.9	14.2	45 17.8	+59.9	14.5	53
54	39 29.5	+59.7	12.9	40 28.0	+59.7	13.1	41 26.4	+59.8	13.3	42 24.8	+59.8	13.5	43 23.1	+59.8	13.7	44 21.4	+59.8	13.9	45 19.6	+59.9	14.1	46 17.7	+59.9	14.4	54
55	40 29.2	+59.7	12.7	41 27.7	+59.7	12.9	42 26.2	+59.7	13.1	43 24.6	+59.8	13.3	44 22.9	+59.8	13.6	45 21.2	+59.9	13.8	46 19.5	+59.8	14.1	47 17.6	+59.9	14.3	55
56	41 28.9	+59.7	12.6	42 27.4	+59.8	12.8	43 25.9	+59.8	13.0	44 24.4	+59.7	13.2	45 22.7	+59.8	13.5	46 21.1	+59.8	13.7	47 19.3	+59.9	14.0	48 17.5	+59.9	14.2	56
57	42 28.6	+59.7	12.5	43 27.2	+59.7	12.7	44 25.7	+59.7	12.9	45 24.1	+59.8	13.1	46 22.5	+59.8	13.3	47 20.9	+59.8	13.6	48 19.2	+59.8	13.9	49 17.4	+59.9	14.1	57
58	43 28.3	+59.6	12.3	44 26.9	+59.7	12.5	45 25.4	+59.7	12.8	46 23.9	+59.8	13.0	47 22.3	+59.8	13.2	48 20.7	+59.8	13.5	49 19.0	+59.9	13.7	50 17.3	+59.9	14.0	58
59	44 27.9	+59.7	12.2	45 26.6	+59.7	12.4	46 25.1	+59.8	12.6	47 23.7	+59.7	12.9	48 22.1	+59.8	13.1	49 20.5	+59.9	13.4	50 18.9	+59.8	13.6	51 17.2	+59.8	13.9	59
60	45 27.6	+59.6	12.0	46 26.3	+59.6	12.2	47 24.9	+59.7	12.5	48 23.4	+59.8	12.7	49 21.9	+59.8	13.0	50 20.4	+59.8	13.2	51 18.7	+59.9	13.5	52 17.0	+59.9	13.8	60
61	46 27.2	+59.7	11.9	47 25.9	+59.7	12.1	48 24.6	+59.7	12.3	49 23.2	+59.7	12.6	50 21.7	+59.8	12.8	51 20.2	+59.8	13.1	52 18.6	+59.8	13.4	53 16.9	+59.9	13.7	61
62	47 26.9	+59.6	11.7	48 25.6	+59.7	11.9	49 24.3	+59.7	12.2	50 22.9	+59.7	12.4	51 21.5	+59.7	12.7	52 20.0	+59.8	13.0	53 18.4	+59.8	13.3	54 16.8	+59.8	13.6	62
63	48 26.5	+59.6	11.5	49 25.3	+59.6	11.8	50 24.0	+59.6	12.0	51 22.6	+59.7	12.3	52 21.2	+59.8	12.6	53 19.8	+59.7	12.8	54 18.2	+59.8	13.1	55 16.6	+59.8	13.5	63
64	49 26.1	+59.6	11.4	50 24.9	+59.6	11.6	51 23.6	+59.7	11.9	52 22.3	+59.7	12.1	53 21.0	+59.7	12.4	54 19.5	+59.8	12.7	55 18.0	+59.8	13.0	56 16.4	+59.9	13.3	64
65	50 25.7	+59.5	11.2	51 24.5	+59.6	11.4	52 23.3	+59.6	11.7	53 22.0	+59.7	12.0	54 20.7	+59.7	12.2	55 19.3	+59.8	12.5	56 17.8	+59.8	12.9	57 16.3	+59.8	13.2	65
66	51 25.2	+59.6	11.0	52 24.1	+59.6	11.2	53 22.9	+59.7	11.5	54 21.7	+59.7	11.8	55 20.4	+59.7	12.1	56 19.1	+59.7	12.4	57 17.6	+59.8	12.7	58 16.1	+59.8	13.1	66
67	52 24.8	+59.5	10.8	53 23.7	+59.6	11.0	54 22.6	+59.6	11.3	55 21.4	+59.6	11.6	56 20.1	+59.7	11.9	57 18.8	+59.7	12.2	58 17.4	+59.8	12.6	59 15.9	+59.8	12.9	67
68	53 24.3	+59.5	10.6	54 23.3	+59.5	10.8	55 22.2	+59.6	11.1	56 21.0	+59.6	11.4	57 19.8	+59.7	11.7	58 18.5	+59.7	12.0	59 17.2	+59.7	12.4	60 15.7	+59.8	12.8	68
69	54 23.8	+59.5	10.4	55 22.8	+59.5	10.6	56 21.8	+59.5	10.9	57 20.6	+59.7	11.2	58 19.5	+59.6	11.5	59 18.2	+59.7	11.8	60 16.9	+59.8	12.2	61 15.5	+59.8	12.6	69
70	55 23.3	+59.4	10.1	56 22.3	+59.5	10.4	57 21.3	+59.6	10.7	58 20.3	+59.5	11.0	59 19.1	+59.7	11.3	60 17.9	+59.7	11.6	61 16.7	+59.7	12.0	62 15.3	+59.8	12.4	70
71	56 22.7	+59.5	9.9	57 21.8	+59.5	10.2	58 20.9	+59.5	10.5	59 19.8	+59.6	10.8	60 18.8	+59.6	11.1	61 17.6	+59.7	11.4	62 16.4	+59.7	11.8	63 15.1	+59.7	12.2	71
72	57 22.2	+59.4	9.6	58 21.3	+59.4	9.9	59 20.4	+59.5	10.2	60 19.4	+59.5	10.5	61 18.4	+59.5	10.8	62 17.3	+59.6	11.2	63 16.1	+59.6	11.6	64 14.8	+59.7	12.0	72
73	58 21.6	+59.3	9.4	59 20.7	+59.4	9.7	60 19.9	+59.4	9.9	61 18.9	+59.5	10.3	62 17.9	+59.6	10.6	63 16.9	+59.6	11.0	64 15.7	+59.7	11.4	65 14.5	+59.7	11.8	73
74	59 20.9	+59.3	9.1	60 20.1	+59.4	9.4	61 19.3	+59.4	9.7	62 18.4	+59.5	10.0	63 17.5	+59.5	10.3	64 16.5	+59.6	10.7	65 15.4	+59.6	11.1	66 14.2	+59.7	11.5	74
75	60 20.2	+59.3	8.8	61 19.5	+59.3	9.1	62 18.7	+59.4	9.4	63 17.9	+59.4	9.7	64 17.0	+59.5	10.0	65 16.1	+59.5	10.4	66 15.0	+59.6	10.8	67 13.9	+59.7	11.3	75
76	61 19.5	+59.2	8.5	62 18.8	+59.3	8.8	63 18.1	+59.3	9.1	64 17.3	+59.4	9.4	65 16.5	+59.4	9.7	66 15.6	+59.5	10.1	67 14.6	+59.6	10.5	68 13.6	+59.6	11.0	76
77	62 18.7	+59.2	8.1	63 18.1	+59.2	8.4	64 17.4	+59.3	8.7	65 16.7	+59.3	9.0	66 15.9	+59.4	9.4	67 15.1	+59.5	9.8	68 14.2	+59.5	10.2	69 13.2	+59.6	10.7	77
78	63 17.9	+59.1	7.8	64 17.3	+59.2	8.1	65 16.7	+59.2	8.4	66 16.0	+59.3	8.7	67 15.3	+59.4	9.0	68 14.6	+59.4	9.4	69 13.7	+59.5	9.9	70 12.8	+59.5	10.3	78
79	64 17.0	+59.1	7.4	65 16.5	+59.1	7.7	66 15.9	+59.2	8.0	67 15.3	+59.3	8.3	68 14.7	+59.3	8.7	69 14.0	+59.3	9.1	70 13.2	+59.4	9.5	71 12.3	+59.5	10.0	79
80	65 16.1	+58.9	7.0	66 15.6	+59.0	7.2	67 15.1	+59.1	7.5	68 14.6	+59.1	7.9	69 14.0	+59.2	8.2	70 13.3	+59.3	8.6	71 12.6	+59.4	9.1	72 11.8	+59.4	9.6	80
81	66 15.0	+58.9	6.5	67 14.6	+59.0	6.8	68 14.2	+59.0	7.1	69 13.7	+59.1	7.4	70 13.2	+59.1	7.8	71 12.6	+59.2	8.2	72 12.0	+59.2	8.6	73 11.2	+59.4	9.1	81
82	67 13.9	+58.8	6.0	68 13.6	+58.8	6.3	69 13.2	+58.9	6.6	70 12.8	+58.9	6.9	71 12.3	+59.1	7.3	72 11.8	+59.1	7.6	73 11.2	+59.2	8.1	74 10.6	+59.3	8.6	82
83	68 12.7	+58.7	5.5	69 12.4	+58.8	5.8	70 12.1	+58.8	6.0	71 11.7	+58.9	6.3	72 11.4	+58.9	6.7	73 10.9	+59.0	7.1	74 10.4	+59.1	7.5	75 09.9	+59.2	8.0	83
84	69 11.4	+58.5	4.9	70 11.2	+58.6	5.2	71 10.9	+58.7	5.4	72 10.6	+58.8	5.7	73 10.3	+58.8	6.1	74 09.9	+58.9	6.4	75 09.5	+59.0	6.9	76 09.1	+59.0	7.3	84
85	70 09.9	+58.5	4.3	71 09.8	+58.4	4.5	72 09.6	+58.5	4.8	73 09.4	+58.5	5.0	74 09.1	+58.7	5.4	75 08.8	+58.8	5.7	76 08.5	+58.8	6.1	77 08.1	+58.9	6.6	85
86	71 08.4	+58.2	3.6	72 08.2	+58.3	3.8	73 08.1	+58.3	4.0	74 07.9	+58.4	4.3	75 07.8	+58.4	4.6	76 07.6	+58.5	4.9	77 07.3	+58.6	5.3	78 07.0	+58.8	5.7	86
87	72 06.6	+58.1	2.9	73 06.5	+58.1	3.0	74 06.4	+58.2	3.2	75 06.3	+58.2	3.4	76 06.2	+58.3	3.7	77 06.1	+58.3	3.9	78 05.9	+58.4	4.3	79 05.8	+58.4	4.6	87
88	73 04.7	+57.8	2.0	74 04.6	+57.9	2.1	75 04.6	+57.8	2.3	76 04.5	+57.9	2.4	77 04.5	+57.9	2.6	78 04.4	+58.0	2.8	79 04.3	+58.1	3.1	80 04.2	+58.1	3.4	88
89	74 02.5	+57.5	1.1	75 02.5	+57.5	1.1	76 02.4	+57.6	1.2	77 02.4	+57.6	1.3	78 02.4	+57.6	1.4	79 02.4	+57.6	1.5	80 02.4	+57.6	1.7	81 02.3	+57.7	1.9	89
90	75 00.0	+57.2	0.0	76 00.0	+57.2	0.0	77 00.0	+57.2	0.0	78 00.0	+57.1	0.0	79 00.0	+57.1	0.0	80 00.0	+57.1	0.0	81 00.0	+57.1	0.0	82 00.0	+57.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 163°, 197°

18°, 342° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 15.0	+59.8	161.4	13 18.1	+59.8	161.5	12 21.2	+59.9	161.6	11 24.3	+59.8	161.6	10 27.3	+59.9	161.7	9 30.4	+59.9	161.7	8 33.4	+59.9	161.8	7 36.4	+59.9	161.8	**0**
1	15 14.8	+59.8	161.3	14 17.9	+59.9	161.4	13 21.1	+59.8	161.5	12 24.1	+59.9	161.6	11 27.2	+59.9	161.6	10 30.3	+59.9	161.7	9 33.3	+59.9	161.7	8 36.3	+60.0	161.8	**1**
2	16 14.6	+59.8	161.2	15 17.8	+59.8	161.3	14 20.9	+59.8	161.4	13 24.0	+59.9	161.5	12 27.1	+59.9	161.6	11 30.2	+59.9	161.6	10 33.2	+59.9	161.7	9 36.3	+59.9	161.7	**2**
3	17 14.4	+59.8	161.1	16 17.6	+59.8	161.2	15 20.7	+59.9	161.3	14 23.9	+59.9	161.4	13 27.0	+59.9	161.5	12 30.1	+59.9	161.6	11 33.1	+60.0	161.6	10 36.2	+59.9	161.7	**3**
4	18 14.2	+59.7	161.1	17 17.4	+59.8	161.2	16 20.6	+59.8	161.3	15 23.8	+59.8	161.4	14 26.9	+59.9	161.4	13 30.0	+59.9	161.5	12 33.1	+59.9	161.6	11 36.1	+60.0	161.7	**4**
5	19 13.9	+59.8	161.0	18 17.2	+59.8	161.1	17 20.4	+59.9	161.2	16 23.6	+59.9	161.3	15 26.8	+59.9	161.4	14 29.9	+59.9	161.5	13 33.0	+59.9	161.5	12 36.1	+59.9	161.6	**5**
6	20 13.7	+59.8	160.9	19 17.0	+59.8	161.0	18 20.3	+59.8	161.1	17 23.5	+59.8	161.2	16 26.7	+59.8	161.3	15 29.8	+59.9	161.4	14 32.9	+60.0	161.5	13 36.0	+60.0	161.6	**6**
7	21 13.5	+59.8	160.8	20 16.8	+59.8	160.9	19 20.1	+59.8	161.0	18 23.3	+59.9	161.1	17 26.5	+59.9	161.2	16 29.7	+59.9	161.3	15 32.9	+59.9	161.4	14 36.0	+59.9	161.5	**7**
8	22 13.3	+59.8	160.7	21 16.6	+59.8	160.8	20 19.9	+59.9	161.0	19 23.2	+59.9	161.1	18 26.4	+59.9	161.2	17 29.6	+59.9	161.3	16 32.8	+59.9	161.4	15 35.9	+59.9	161.5	**8**
9	23 13.1	+59.7	160.6	22 16.4	+59.8	160.7	21 19.8	+59.8	160.9	20 23.1	+59.8	161.0	19 26.3	+59.9	161.1	18 29.5	+59.9	161.2	17 32.7	+59.9	161.3	16 35.8	+60.0	161.4	**9**
10	24 12.8	+59.8	160.5	23 16.2	+59.8	160.7	22 19.6	+59.8	160.8	21 22.9	+59.9	160.9	20 26.2	+59.9	161.0	19 29.4	+59.9	161.2	18 32.6	+59.9	161.3	17 35.8	+59.9	161.4	**10**
11	25 12.6	+59.8	160.4	24 16.0	+59.8	160.6	23 19.4	+59.9	160.7	22 22.8	+59.8	160.8	21 26.1	+59.9	161.0	20 29.3	+59.9	161.1	19 32.5	+60.0	161.2	18 35.7	+60.0	161.3	**11**
12	26 12.4	+59.7	160.3	25 15.8	+59.8	160.5	24 19.3	+59.8	160.6	23 22.6	+59.9	160.8	22 26.0	+59.8	160.9	21 29.2	+59.9	161.0	20 32.5	+59.9	161.2	19 35.7	+59.9	161.3	**12**
13	27 12.1	+59.8	160.2	26 15.6	+59.8	160.4	25 19.1	+59.8	160.5	24 22.5	+59.8	160.7	23 25.8	+59.9	160.8	22 29.1	+59.9	161.0	21 32.4	+59.9	161.1	20 35.6	+59.9	161.2	**13**
14	28 11.9	+59.7	160.1	27 15.4	+59.8	160.3	26 18.9	+59.8	160.5	25 22.3	+59.9	160.6	24 25.7	+59.9	160.8	23 29.0	+59.9	160.9	22 32.3	+59.9	161.1	21 35.5	+60.0	161.2	**14**
15	29 11.6	+59.8	160.0	28 15.2	+59.8	160.2	27 18.7	+59.8	160.4	26 22.2	+59.8	160.5	25 25.6	+59.9	160.7	24 28.9	+59.9	160.9	23 32.2	+59.9	161.0	22 35.5	+59.9	161.1	**15**
16	30 11.4	+59.7	159.9	29 15.0	+59.8	160.1	28 18.5	+59.8	160.3	27 22.0	+59.9	160.5	26 25.5	+59.8	160.6	25 28.8	+59.9	160.8	24 32.1	+60.0	160.9	23 35.4	+59.9	161.1	**16**
17	31 11.1	+59.7	159.8	30 14.8	+59.7	160.0	29 18.3	+59.9	160.2	28 21.9	+59.8	160.4	27 25.3	+59.9	160.6	26 28.7	+59.9	160.7	25 32.1	+59.9	160.9	24 35.3	+60.0	161.0	**17**
18	32 10.8	+59.8	159.7	31 14.5	+59.8	159.9	30 18.2	+59.8	160.1	29 21.7	+59.8	160.3	28 25.2	+59.9	160.5	27 28.6	+59.9	160.7	26 32.0	+59.9	160.8	25 35.3	+59.9	161.0	**18**
19	33 10.6	+59.7	159.6	32 14.3	+59.8	159.8	31 18.0	+59.8	160.0	30 21.5	+59.9	160.2	29 25.1	+59.8	160.4	28 28.5	+59.9	160.6	27 31.9	+59.9	160.8	26 35.2	+59.9	160.9	**19**
20	34 10.3	+59.7	159.5	33 14.1	+59.7	159.7	32 17.8	+59.8	159.9	31 21.4	+59.8	160.1	30 24.9	+59.9	160.3	29 28.4	+59.9	160.5	28 31.8	+59.9	160.7	27 35.1	+60.0	160.9	**20**
21	35 10.0	+59.7	159.3	34 13.8	+59.8	159.6	33 17.6	+59.7	159.8	32 21.2	+59.8	160.0	31 24.8	+59.8	160.2	30 28.3	+59.8	160.4	29 31.7	+59.9	160.6	28 35.1	+59.9	160.8	**21**
22	36 09.7	+59.7	159.2	35 13.6	+59.7	159.5	34 17.3	+59.8	159.7	33 21.0	+59.8	159.9	32 24.6	+59.9	160.2	31 28.1	+59.9	160.4	30 31.6	+59.9	160.6	29 35.0	+59.9	160.8	**22**
23	37 09.4	+59.7	159.1	36 13.3	+59.8	159.4	35 17.1	+59.8	159.6	34 20.8	+59.9	159.8	33 24.5	+59.8	160.1	32 28.0	+59.9	160.3	31 31.5	+59.9	160.5	30 34.9	+59.9	160.7	**23**
24	38 09.1	+59.7	159.0	37 13.1	+59.7	159.2	36 16.9	+59.8	159.5	35 20.7	+59.8	159.8	34 24.3	+59.9	160.0	33 27.9	+59.9	160.2	32 31.4	+59.9	160.4	31 34.8	+60.0	160.6	**24**
25	39 08.8	+59.7	158.8	38 12.8	+59.7	159.1	37 16.7	+59.7	159.4	36 20.5	+59.8	159.7	35 24.2	+59.8	159.9	34 27.8	+59.9	160.1	33 31.3	+59.9	160.4	32 34.8	+59.9	160.6	**25**
26	40 08.5	+59.6	158.7	39 12.5	+59.7	159.0	38 16.4	+59.8	159.3	37 20.3	+59.8	159.6	36 24.0	+59.8	159.8	35 27.7	+59.8	160.1	34 31.2	+59.9	160.3	33 34.7	+59.9	160.5	**26**
27	41 08.1	+59.7	158.6	40 12.2	+59.7	158.9	39 16.2	+59.8	159.2	38 20.1	+59.8	159.5	37 23.8	+59.9	159.7	36 27.5	+59.9	160.0	35 31.1	+59.9	160.2	34 34.6	+59.9	160.5	**27**
28	42 07.8	+59.6	158.4	41 11.9	+59.7	158.7	40 16.0	+59.7	159.0	39 19.9	+59.8	159.3	38 23.7	+59.8	159.6	37 27.4	+59.8	159.9	36 31.0	+59.9	160.2	35 34.5	+59.9	160.4	**28**
29	43 07.4	+59.7	158.3	42 11.6	+59.7	158.6	41 15.7	+59.7	158.9	40 19.7	+59.7	159.2	39 23.5	+59.8	159.5	38 27.2	+59.9	159.8	37 30.9	+59.9	160.1	36 34.4	+59.9	160.3	**29**
30	44 07.1	+59.6	158.1	43 11.3	+59.7	158.5	42 15.4	+59.8	158.8	41 19.4	+59.8	159.1	40 23.3	+59.8	159.4	39 27.1	+59.9	159.7	38 30.8	+59.9	160.0	37 34.3	+59.9	160.3	**30**
31	45 06.7	+59.6	158.0	44 11.0	+59.7	158.3	43 15.2	+59.7	158.7	42 19.2	+59.8	159.0	41 23.1	+59.9	159.3	40 27.0	+59.8	159.6	39 30.7	+59.8	159.9	38 34.2	+60.0	160.2	**31**
32	46 06.3	+59.6	157.8	45 10.7	+59.6	158.2	44 14.9	+59.7	158.5	43 19.0	+59.8	158.9	42 23.0	+59.8	159.2	41 26.8	+59.8	159.5	40 30.5	+59.9	159.8	39 34.2	+59.9	160.1	**32**
33	47 05.9	+59.6	157.6	46 10.3	+59.7	158.0	45 14.6	+59.7	158.4	44 18.8	+59.7	158.8	43 22.8	+59.8	159.1	42 26.6	+59.9	159.4	41 30.4	+59.9	159.8	40 34.1	+59.9	160.1	**33**
34	48 05.5	+59.5	157.4	47 10.0	+59.6	157.9	46 14.3	+59.7	158.3	45 18.5	+59.8	158.6	44 22.6	+59.8	159.0	43 26.5	+59.8	159.3	42 30.3	+59.9	159.7	41 34.0	+59.9	160.0	**34**
35	49 05.0	+59.6	157.3	48 09.6	+59.6	157.7	47 14.0	+59.7	158.1	46 18.3	+59.7	158.5	45 22.4	+59.7	158.9	44 26.3	+59.8	159.2	43 30.2	+59.8	159.6	42 33.9	+59.9	159.9	**35**
36	50 04.6	+59.5	157.1	49 09.2	+59.6	157.5	48 13.7	+59.6	158.0	47 18.0	+59.7	158.4	46 22.1	+59.8	158.8	45 26.1	+59.9	159.1	44 30.0	+59.9	159.5	43 33.8	+59.9	159.8	**36**
37	51 04.1	+59.5	156.9	50 08.8	+59.6	157.3	49 13.3	+59.7	157.8	48 17.7	+59.7	158.2	47 21.9	+59.8	158.6	46 26.0	+59.8	159.0	45 29.9	+59.8	159.4	44 33.7	+59.8	159.7	**37**
38	52 03.6	+59.5	156.7	51 08.4	+59.6	157.2	50 13.0	+59.6	157.6	49 17.4	+59.7	158.1	48 21.7	+59.7	158.5	47 25.8	+59.8	158.9	46 29.7	+59.9	159.3	45 33.5	+59.9	159.6	**38**
39	53 03.1	+59.4	156.5	52 08.0	+59.5	157.0	51 12.6	+59.7	157.5	50 17.1	+59.7	157.9	49 21.4	+59.8	158.4	48 25.6	+59.8	158.8	47 29.6	+59.8	159.2	46 33.4	+59.9	159.6	**39**
40	54 02.5	+59.5	156.2	53 07.5	+59.5	156.8	52 12.3	+59.6	157.3	51 16.8	+59.7	157.8	50 21.2	+59.7	158.2	49 25.4	+59.8	158.7	48 29.4	+59.9	159.1	47 33.3	+59.9	159.5	**40**
41	55 02.0	+59.3	156.0	54 07.0	+59.5	156.6	53 11.9	+59.5	157.1	52 16.5	+59.7	157.6	51 20.9	+59.8	158.1	50 25.2	+59.8	158.5	49 29.3	+59.8	159.0	48 33.2	+59.9	159.4	**41**
42	56 01.3	+59.4	155.7	55 06.5	+59.5	156.3	54 11.4	+59.6	156.9	53 16.2	+59.6	157.4	52 20.7	+59.7	157.9	51 25.0	+59.7	158.4	50 29.1	+59.8	158.8	49 33.1	+59.8	159.3	**42**
43	57 00.7	+59.3	155.5	56 06.0	+59.4	156.1	55 11.0	+59.6	156.7	54 15.8	+59.6	157.2	53 20.4	+59.7	157.8	52 24.7	+59.8	158.3	51 28.9	+59.8	158.7	50 32.9	+59.9	159.2	**43**
44	58 00.0	+59.3	155.2	57 05.4	+59.4	155.8	56 10.6	+59.5	156.5	55 15.4	+59.6	157.0	54 20.1	+59.7	157.6	53 24.5	+59.7	158.1	52 28.7	+59.8	158.6	51 32.8	+59.8	159.1	**44**
45	58 59.3	+59.3	154.9	58 04.8	+59.4	155.6	57 10.1	+59.5	156.2	56 15.0	+59.6	156.8	55 19.8	+59.6	157.4	54 24.2	+59.8	158.0	53 28.5	+59.8	158.5	52 32.6	+59.9	158.9	**45**
46	59 58.6	+59.2	154.6	59 04.2	+59.4	155.3	58 09.6	+59.4	156.0	57 14.6	+59.6	156.6	56 19.4	+59.7	157.2	55 24.0	+59.7	157.8	54 28.3	+59.8	158.3	53 32.5	+59.8	158.8	**46**
47	60 57.8	+59.1	154.3	60 03.6	+59.3	155.0	59 09.0	+59.5	155.7	58 14.2	+59.5	156.4	57 19.1	+59.6	157.0	56 23.7	+59.7	157.6	55 28.1	+59.8	158.2	54 32.3	+59.8	158.7	**47**
48	61 56.9	+59.1	153.9	61 02.9	+59.2	154.7	60 08.5	+59.3	155.5	59 13.7	+59.5	156.2	58 18.7	+59.6	156.8	57 23.4	+59.7	157.4	56 27.9	+59.8	158.0	55 32.1	+59.9	158.6	**48**
49	62 56.0	+59.1	153.5	62 02.1	+59.2	154.4	61 07.8	+59.4	155.2	60 13.2	+59.5	155.9	59 18.3	+59.6	156.6	58 23.1	+59.7	157.2	57 27.7	+59.7	157.9	56 32.0	+59.8	158.4	**49**
50	63 55.1	+58.9	153.1	63 01.3	+59.2	154.0	62 07.2	+59.3	154.9	61 12.7	+59.5	155.6	60 17.9	+59.6	156.4	59 22.8	+59.6	157.0	58 27.4	+59.7	157.7	57 31.8	+59.8	158.3	**50**
51	64 54.0	+58.9	152.7	64 00.5	+59.1	153.7	63 06.5	+59.3	154.5	62 12.2	+59.4	155.4	61 17.5	+59.5	156.1	60 22.4	+59.7	156.8	59 27.1	+59.8	157.5	58 31.6	+59.8	158.1	**51**
52	65 52.9	+58.8	152.3	64 59.6	+59.0	153.3	64 05.8	+59.2	154.2	63 11.6	+59.3	155.0	62 17.0	+59.5	155.9	61 22.1	+59.6	156.6	60 26.9	+59.7	157.3	59 31.4	+59.7	158.0	**52**
53	66 51.7	+58.7	151.8	65 58.6	+58.9	152.8	65 05.0	+59.1	153.8	64 10.9	+59.4	154.7	63 16.5	+59.5	155.6	62 21.7	+59.6	156.4	61 26.6	+59.6	157.1	60 31.1	+59.8	157.8	**53**
54	67 50.4	+58.6	151.2	66 57.5	+58.9	152.3	66 04.1	+59.1	153.4	65 10.3	+59.2	154.4	64 16.0	+59.4	155.3	63 21.3	+59.5	156.1	62 26.2	+59.7	156.9	61 30.9	+59.8	157.6	**54**
55	68 49.0	+58.4	150.6	67 56.4	+58.7	151.8	67 03.2	+59.0	153.0	66 09.5	+59.2	154.0	65 15.4	+59.4	154.9	64 20.8	+59.5	155.8	63 25.9	+59.6	156.7	62 30.7	+59.7	157.4	**55**
56	69 47.4	+58.3	150.0	68 55.1	+58.7	151.3	68 02.2	+58.9	152.5	67 08.7	+59.2	153.6	66 14.8	+59.3	154.6	65 20.3	+59.5	155.5	64 25.5	+59.7	156.4	63 30.4	+59.7	157.2	**56**
57	70 45.7	+58.1	149.3	69 53.8	+58.4	150.7	69 01.1	+58.8	152.0	68 07.9	+59.0	153.1	67 14.1	+59.2	154.2	66 19.8	+59.5	155.2	65 25.2	+59.5	156.1	64 30.1	+59.7	157.0	**57**
58	71 43.8	+57.9	148.5	70 52.2	+58.4	150.0	69 59.9	+58.7	151.4	69 06.9	+59.0	152.7	68 13.3	+59.3	153.8	67 19.3	+59.4	154.9	66 24.7	+59.6	155.8	65 29.8	+59.7	156.7	**58**
59	72 41.7	+57.7	147.7	71 50.6	+58.1	149.3	70 58.6	+58.5	150.8	70 05.9	+58.9	152.1	69 12.6	+59.1	153.4	68 18.7	+59.3	154.5	67 24.3	+59.5	155.5	66 29.5	+59.6	156.5	**59**
60	73 39.4	+57.4	146.7	72 48.7	+58.0	148.5	71 57.1	+58.4	150.1	71 04.8	+58.7	151.5	70 11.7	+59.0	152.9	69 18.0	+59.3	154.1	68 23.8	+59.4	155.2	67 29.1	+59.6	156.2	**60**
61	74 36.8	+57.0	145.6	73 46.7	+57.6	147.6	72 55.5	+58.2	149.3	72 03.5	+58.6	150.9	71 10.7	+59.0	152.3	70 17.3	+59.2	153.6	69 23.2	+59.4	154.8	68 28.7	+59.6	155.9	**61**
62	75 33.8	+56.6	144.4	74 44.3	+57.4	146.6	73 53.7	+58.0	148.5	73 02.1	+58.5	150.2	72 09.7	+58.8	151.7	71 16.5	+59.1	153.1	70 22.6	+59.4	154.4	69 28.3	+59.5	155.6	**62**
63	76 30.4	+56.1	143.0	75 41.7	+57.0	145.4	74 51.7	+57.7	147.5	74 00.6	+58.2	149.4	73 08.5	+58.6	151.1	72 15.6	+59.0	152.6	71 22.0	+59.2	154.0	70 27.8	+59.5	155.2	**63**
64	77 26.5	+55.4	141.5	76 38.7	+56.5	144.1	75 49.4	+57.3	146.4	74 58.8	+58.0	148.5	74 07.1	+58.5	150.3	73 14.6	+58.9	152.0	72 21.2	+59.2	153.5	71 27.3	+59.4	154.8	**64**
65	78 21.9	+54.7	139.6	77 35.2	+56.0	142.6	76 46.7	+57.0	145.2	75 56.8	+57.7	147.5	75 05.6	+58.3	149.5	74 13.5	+58.7	151.3	73 20.4	+59.1	152.9	72 26.7	+59.3	154.3	**65**
66	79 16.6	+53.6	137.5	78 31.2	+55.2	140.8	77 43.7	+56.4	143.7	76 54.5	+57.3	146.3	76 03.9	+58.1	148.5	75 12.2	+58.6	150.5	74 19.5	+59.0	152.3	73 26.0	+59.3	153.8	**66**
67	80 10.2	+52.3	135.0	79 26.4	+54.2	138.8	78 40.1	+55.8	142.1	77 51.8	+56.9	144.9	77 02.0	+57.7	147.4	76 10.8	+58.3	149.6	75 18.5	+58.8	151.6	74 25.3	+59.2	153.3	**67**
68	81 02.5	*+50.5*	•132.0	80 20.6	+53.1	136.4	79 35.9	+54.9	140.1	78 48.7	+56.3	143.4	77 59.7	+57.3	146.2	77 09.1	+58.1	148.6	76 17.3	+58.7	150.8	75 24.5	+59.0	152.6	**68**
69	81 53.0	*+48.1*	•128.3	81 13.7	*+51.4*	•133.4	80 30.8	+53.8	137.8	79 45.0	+55.6	141.5	78 57.0	+56.8	144.7	78 07.2	+57.8	147.5	77 16.0	+58.4	149.8	76 23.5	+58.9	151.9	**69**
70	82 41.1	*+44.9*	•123.9	82 05.1	*+49.1*	•129.9	81 24.6	+52.2	135.0	80 40.6	+54.5	139.3	79 53.8	+56.2	143.0	79 05.0	+57.3	146.1	78 14.4	+58.1	148.8	77 22.4	+58.8	151.1	**70**
71	83 26.0	*+40.4*	•118.4	82 54.2	*+46.1*	•125.5	82 16.8	*+50.2*	•131.5	81 35.1	+53.1	136.6	80 50.0	+55.2	140.8	80 02.3	+56.7	144.4	79 12.5	+57.8	147.5	78 21.2	+58.5	150.1	**71**
72	84 06.4	*+34.2*	•111.6	83 40.3	*+41.6*	•120.0	83 07.0	*+47.2*	•127.2	82 28.2	*+51.2*	•133.2	81 45.2	+54.0	138.3	80 59.0	+55.9	142.5	80 10.3	+57.3	146.0	79 19.7	+58.2	149.0	**72**
73	84 40.6	*+25.8*	•103.1	84 21.9	*+35.4*	•113.1	83 54.2	*+43.0*	•121.7	83 19.4	*+48.5*	•129.0	82 39.2	*+52.3*	•135.0	81 54.9	+54.9	140.0	81 07.6	+56.6	144.1	80 17.9	+57.8	147.6	**73**
74	85 06.4	*+15.1*	• 93.0	84 57.3	*+26.9*	•104.4	84 37.2	*+36.8*	•114.7	84 07.9	*+44.4*	•123.6	83 31.5	*+49.7*	•131.0	82 49.8	*+53.3*	•137.0	82 04.2	+55.6	141.9	81 15.7	+57.2	145.9	**74**
75	85 21.5	*+2.7*	• 81.3	85 24.2	*+15.5*	• 93.7	85 14.0	*+28.0*	•105.8	84 52.3	*+38.2*	•116.5	84 21.2	*+45.8*	•125.6	83 43.1	*+50.9*	•133.0	82 59.8	+54.3	139.0	82 12.9	+56.5	143.8	**75**
76	85 24.2	*–10.2*	• 68.9	85 39.7	*+2.3*	• 81.3	85 42.0	*+16.0*	• 94.5	85 30.5	*+29.2*	•107.3	85 07.0	*+39.9*	•118.6	84 34.0	*+47.4*	•127.9	83 54.1	*+52.3*	•135.3	83 09.4	+55.3	141.1	**76**
77	85 14.0	*–21.7*	• 56.8	85 42.0	*–11.5*	• 68.0	85 58.0	*+1.7*	• 81.2	85 59.7	*+16.6*	• 95.5	85 46.9	*+30.6*	•109.1	85 21.4	*+41.6*	•120.8	84 46.4	*+48.9*	•130.3	84 04.7	*+53.5*	•137.6	**77**
78	84 52.3	*–31.1*	• 45.9	85 30.5	*–23.5*	• 55.1	85 59.7	*–12.8*	• 66.9	86 16.3	*+1.2*	• 81.2	86 17.5	*+17.2*	• 96.6	86 03.0	*+32.2*	•111.2	85 35.3	*+43.5*	•123.4	84 58.2	*+50.5*	•132.9	**78**
79	84 21.2	*–38.1*	• 36.8	85 07.0	*–33.0*	• 43.8	85 46.9	*–25.5*	• 53.3	86 17.5	*–14.5*	• 65.7	86 34.7	*+0.5*	• 81.2	86 35.2	*+18.0*	• 98.0	86 18.8	*+34.0*	•113.5	85 48.7	*+45.5*	•126.2	**79**
80	83 43.1	*–43.3*	• 29.4	84 34.0	*–39.9*	• 34.5	85 21.4	*–35.0*	• 41.5	86 03.0	*–27.7*	• 51.2	86 35.2	*–16.4*	• 64.3	86 53.2	*–0.4*	• 81.1	86 52.8	*+18.9*	• 99.6	86 34.2	*+36.1*	•116.3	**80**
81	82 59.8	*–46.9*	• 23.4	83 54.1	*–44.7*	• 27.1	84 46.4	*–41.7*	• 32.0	85 35.3	*–37.1*	• 38.9	86 18.8	*–30.1*	• 48.7	86 52.8	*–18.6*	• 62.7	87 11.7	*–1.4*	• 81.1	87 10.3	*+20.0*	•101.5	**81**
82	82 12.9	*–49.6*	• 18.5	83 09.4	*–48.3*	• 21.2	84 04.7	*–46.4*	• 24.6	84 58.2	*–43.7*	• 29.4	85 48.7	*–39.4*	• 36.1	86 34.2	*–32.7*	• 45.9	87 10.3	*–21.3*	• 60.7	87 30.3	*–2.7*	• 81.1	**82**
83	81 23.3	–51.7	14.6	82 21.1	*–50.8*	• 16.4	83 18.3	*–49.6*	• 18.8	84 14.5	*–47.9*	• 22.0	85 09.3	*–45.6*	• 26.5	86 01.5	*–41.9*	• 32.9	86 49.0	*–35.6*	• 42.7	87 27.6	*–24.3*	• 58.2	**83**
84	80 31.6	–53.1	11.3	81 30.3	–52.5	12.6	82 28.7	–51.8	14.3	83 26.6	*–50.9*	• 16.4	84 23.7	*–49.5*	• 19.3	85 19.6	*–47.5*	• 23.4	86 13.4	*–44.3*	• 29.4	87 03.3	*–38.8*	• 38.9	**84**
85	79 38.5	–54.2	8.6	80 37.8	–53.9	9.5	81 36.9	–53.5	10.6	82 35.7	–52.9	12.1	83 34.2	*–52.2*	• 13.9	84 32.1	*–51.1*	• 16.4	85 29.1	*–49.5*	• 20.0	86 24.5	*–46.9*	• 25.5	**85**
86	78 44.3	–55.2	6.3	79 43.9	–55.0	6.9	80 43.4	–54.7	7.7	81 42.8	–54.4	8.6	82 42.0	–53.9	9.8	83 41.0	–53.4	11.3	84 39.6	*–52.5*	• 13.4	85 37.6	*–51.3*	• 16.4	**86**
87	77 49.1	–55.8	4.4	78 48.9	–55.7	4.8	79 48.7	–55.6	5.2	80 48.4	–55.4	5.8	81 48.1	–55.2	6.5	82 47.6	–54.9	7.4	83 47.1	–54.6	8.6	84 46.3	*–54.0*	• 10.2	**87**
88	76 53.3	–56.4	2.7	77 53.2	–56.4	2.9	78 53.1	–56.3	3.2	79 53.0	–56.2	3.5	80 52.9	–56.1	3.9	81 52.7	–55.9	4.4	82 52.5	–55.8	5.0	83 52.3	–55.6	5.8	**88**
89	75 56.9	–56.9	1.3	76 56.8	–56.8	1.4	77 56.8	–56.8	1.5	78 56.8	–56.8	1.6	79 56.8	–56.8	1.8	80 56.8	–56.8	2.0	81 56.7	–56.7	2.2	82 56.7	–56.7	2.5	**89**
90	75 00.0	–57.2	0.0	76 00.0	–57.3	0.0	77 00.0	–57.3	0.0	78 00.0	–57.3	0.0	79 00.0	–57.3	0.0	80 00.0	–57.3	0.0	81 00.0	–57.3	0.0	82 00.0	–57.4	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 18°, 342°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 15.0	−59.8	161.4	13 18.1	−59.8	161.5	12 21.2	−59.8	161.6	11 24.3	−59.9	161.6	10 27.3	−59.9	161.7	9 30.4	−60.0	161.7	8 33.4	−60.0	161.8	7 36.4	−60.0	161.8	0
1	13 15.2	−59.8	161.5	12 18.3	−59.8	161.6	11 21.4	−59.9	161.6	10 24.4	−59.9	161.7	9 27.4	−59.9	161.7	8 30.4	−59.9	161.8	7 33.4	−59.9	161.8	6 36.4	−59.9	161.9	1
2	12 15.4	−59.8	161.6	11 18.5	−59.9	161.6	10 21.5	−59.8	161.7	9 24.5	−59.8	161.8	8 27.5	−59.9	161.8	7 30.5	−59.9	161.9	6 33.5	−59.9	161.9	5 36.5	−60.0	161.9	2
3	11 15.6	−59.8	161.7	10 18.6	−59.8	161.7	9 21.7	−59.9	161.8	8 24.7	−59.9	161.8	7 27.6	−59.8	161.9	6 30.6	−59.9	161.9	5 33.6	−59.9	161.9	4 36.5	−59.9	162.0	3
4	10 15.8	−59.8	161.7	9 18.8	−59.8	161.8	8 21.8	−59.8	161.8	7 24.8	−59.9	161.9	6 27.8	−59.9	161.9	5 30.7	−59.9	162.0	4 33.7	−60.0	162.0	3 36.6	−60.0	162.0	4
5	9 16.0	−59.8	161.8	8 19.0	−59.8	161.9	7 22.0	−59.9	161.9	6 24.9	−59.9	162.0	5 27.9	−59.9	162.0	4 30.8	−59.9	162.0	3 33.7	−59.9	162.0	2 36.6	−59.9	162.1	5
6	8 16.2	−59.8	161.9	7 19.2	−59.9	161.9	6 22.1	−59.9	162.0	5 25.0	−59.8	162.0	4 28.0	−59.9	162.0	3 30.9	−59.9	162.1	2 33.8	−59.9	162.1	1 36.7	−59.9	162.1	6
7	7 16.4	−59.8	162.0	6 19.3	−59.8	162.0	5 22.2	−59.8	162.1	4 25.2	−59.9	162.1	3 28.1	−59.9	162.1	2 31.0	−59.9	162.1	1 33.9	−60.0	162.1	0 36.8	−60.0	162.1	7
8	6 16.6	−59.8	162.1	5 19.5	−59.8	162.1	4 22.4	−59.9	162.1	3 25.3	−59.9	162.1	2 28.2	−59.9	162.2	1 31.1	−60.0	162.2	0 33.9	−59.9	162.2	0 23.2	+59.9	17.8	8
9	5 16.8	−59.8	162.2	4 19.7	−59.9	162.2	3 22.5	−59.8	162.2	2 25.4	−59.9	162.2	1 28.3	−59.9	162.2	0 31.1	−59.9	162.2	0 26.0	+59.9	17.8	1 23.1	+60.0	17.8	9
10	4 17.0	−59.8	162.2	3 19.8	−59.8	162.3	2 22.7	−59.9	162.3	1 25.5	−59.8	162.3	0 28.4	−59.9	162.3	0 28.8	+59.9	17.7	1 25.9	+60.0	17.7	2 23.1	+59.9	17.7	10
11	3 17.2	−59.8	162.3	2 20.0	−59.8	162.3	1 22.8	−59.8	162.3	0 25.7	−59.9	162.3	0 31.5	+59.9	17.7	1 28.7	+59.9	17.7	2 25.9	+59.9	17.7	3 23.0	+60.0	17.7	11
12	2 17.4	−59.8	162.4	1 20.2	−59.9	162.4	0 23.0	−59.9	162.4	0 34.2	+59.9	17.6	1 31.4	+59.9	17.6	2 28.6	+59.9	17.6	3 25.8	+59.9	17.6	4 23.0	+59.9	17.6	12
13	1 17.6	−59.9	162.5	0 20.3	−59.8	162.5	0 36.9	+59.8	17.5	1 34.1	+59.9	17.5	2 31.3	+59.9	17.5	3 28.5	+59.9	17.6	4 25.7	+59.9	17.6	5 22.9	+60.0	17.6	13
14	0 17.7	−59.8	162.6	0 39.5	+59.8	17.4	1 36.7	+59.9	17.5	2 34.0	+59.8	17.5	3 31.2	+59.9	17.5	4 28.4	+59.9	17.5	5 25.6	+60.0	17.5	6 22.9	+59.9	17.6	14
15	0 42.1	+59.8	17.4	1 39.3	+59.9	17.4	2 36.6	+59.8	17.4	3 33.8	+59.9	17.4	4 31.1	+59.9	17.4	5 28.3	+60.0	17.4	6 25.6	+59.9	17.5	7 22.8	+59.9	17.5	15
16	1 41.9	+59.8	17.3	2 39.2	+59.8	17.3	3 36.4	+59.9	17.3	4 33.7	+59.9	17.3	5 31.0	+59.9	17.4	6 28.3	+59.9	17.4	7 25.5	+59.9	17.4	8 22.7	+60.0	17.5	16
17	2 41.7	+59.8	17.2	3 39.0	+59.8	17.2	4 36.3	+59.9	17.2	5 33.6	+59.9	17.3	6 30.9	+59.9	17.3	7 28.2	+59.9	17.3	8 25.4	+60.0	17.4	9 22.7	+59.9	17.4	17
18	3 41.5	+59.8	17.1	4 38.8	+59.9	17.1	5 36.2	+59.8	17.2	6 33.5	+59.8	17.2	7 30.8	+59.9	17.2	8 28.1	+59.9	17.3	9 25.4	+59.9	17.3	10 22.6	+60.0	17.4	18
19	4 41.3	+59.8	17.0	5 38.7	+59.8	17.1	6 36.0	+59.9	17.1	7 33.3	+59.9	17.1	8 30.7	+59.9	17.2	9 28.0	+59.9	17.2	10 25.3	+59.9	17.3	11 22.6	+59.9	17.3	19
20	5 41.1	+59.8	17.0	6 38.5	+59.8	17.0	7 35.9	+59.8	17.0	8 33.2	+59.9	17.1	9 30.6	+59.9	17.1	10 27.9	+59.9	17.2	11 25.2	+59.9	17.2	12 22.5	+60.0	17.3	20
21	6 40.9	+59.8	16.9	7 38.3	+59.8	16.9	8 35.7	+59.9	17.0	9 33.1	+59.9	17.0	10 30.5	+59.9	17.1	11 27.8	+59.9	17.1	12 25.1	+60.0	17.2	13 22.5	+59.9	17.2	21
22	7 40.7	+59.8	16.8	8 38.1	+59.9	16.8	9 35.6	+59.8	16.9	10 33.0	+59.8	16.9	11 30.4	+59.9	17.0	12 27.7	+59.9	17.1	13 25.1	+59.9	17.1	14 22.4	+59.9	17.2	22
23	8 40.5	+59.8	16.7	9 38.0	+59.8	16.8	10 35.4	+59.9	16.8	11 32.8	+59.9	16.9	12 30.2	+59.9	16.9	13 27.6	+59.9	17.0	14 25.0	+59.9	17.1	15 22.3	+60.0	17.2	23
24	9 40.3	+59.8	16.6	10 37.8	+59.8	16.7	11 35.3	+59.8	16.7	12 32.7	+59.9	16.8	13 30.1	+59.9	16.9	14 27.5	+59.9	16.9	15 24.9	+59.9	17.0	16 22.3	+59.9	17.1	24
25	10 40.1	+59.8	16.6	11 37.6	+59.8	16.6	12 35.1	+59.9	16.7	13 32.6	+59.8	16.7	14 30.0	+59.9	16.8	15 27.4	+59.9	16.9	16 24.8	+60.0	17.0	17 22.2	+60.0	17.1	25
26	11 39.9	+59.8	16.5	12 37.4	+59.9	16.5	13 35.0	+59.8	16.6	14 32.4	+59.9	16.7	15 29.9	+59.9	16.8	16 27.3	+60.0	16.8	17 24.8	+59.9	16.9	18 22.2	+59.9	17.0	26
27	12 39.7	+59.8	16.4	13 37.3	+59.8	16.5	14 34.8	+59.8	16.5	15 32.3	+59.9	16.6	16 29.8	+59.9	16.7	17 27.3	+59.9	16.8	18 24.7	+59.9	16.9	19 22.1	+59.9	17.0	27
28	13 39.5	+59.8	16.3	14 37.1	+59.8	16.4	15 34.6	+59.9	16.5	16 32.2	+59.8	16.5	17 29.7	+59.9	16.6	18 27.2	+59.9	16.7	19 24.6	+59.9	16.8	20 22.0	+60.0	16.9	28
29	14 39.3	+59.8	16.2	15 36.9	+59.8	16.3	16 34.5	+59.8	16.4	17 32.0	+59.9	16.5	18 29.6	+59.8	16.6	19 27.1	+59.9	16.7	20 24.5	+59.9	16.8	21 22.0	+59.9	16.9	29
30	15 39.1	+59.8	16.1	16 36.7	+59.8	16.2	17 34.3	+59.9	16.3	18 31.9	+59.9	16.4	19 29.4	+59.9	16.5	20 27.0	+59.9	16.6	21 24.4	+60.0	16.7	22 21.9	+59.9	16.8	30
31	16 38.9	+59.8	16.0	17 36.5	+59.9	16.1	18 34.2	+59.8	16.2	19 31.8	+59.9	16.3	20 29.3	+59.9	16.4	21 26.9	+59.9	16.5	22 24.4	+59.9	16.6	23 21.8	+60.0	16.8	31
32	17 38.7	+59.8	16.0	18 36.4	+59.8	16.1	19 34.0	+59.8	16.1	20 31.6	+59.9	16.2	21 29.2	+59.9	16.4	22 26.8	+59.9	16.5	23 24.3	+59.9	16.6	24 21.8	+59.9	16.7	32
33	18 38.5	+59.8	15.9	19 36.2	+59.8	16.0	20 33.8	+59.9	16.1	21 31.5	+59.8	16.2	22 29.1	+59.9	16.3	23 26.7	+59.9	16.4	24 24.2	+59.9	16.5	25 21.7	+59.9	16.7	33
34	19 38.3	+59.7	15.8	20 36.0	+59.8	15.9	21 33.7	+59.8	16.0	22 31.3	+59.9	16.1	23 29.0	+59.8	16.2	24 26.6	+59.9	16.3	25 24.1	+59.9	16.5	26 21.6	+60.0	16.6	34
35	20 38.0	+59.8	15.7	21 35.8	+59.8	15.8	22 33.5	+59.8	15.9	23 31.2	+59.8	16.0	24 28.8	+59.9	16.1	25 26.5	+59.8	16.3	26 24.0	+59.9	16.4	27 21.6	+59.9	16.6	35
36	21 37.8	+59.8	15.6	22 35.6	+59.8	15.7	23 33.3	+59.9	15.8	24 31.0	+59.9	15.9	25 28.7	+59.9	16.1	26 26.3	+59.9	16.2	27 23.9	+60.0	16.4	28 21.5	+59.9	16.5	36
37	22 37.6	+59.8	15.5	23 35.4	+59.8	15.6	24 33.2	+59.8	15.7	25 30.9	+59.8	15.9	26 28.6	+59.9	16.0	27 26.2	+59.9	16.1	28 23.9	+59.9	16.3	29 21.4	+59.9	16.4	37
38	23 37.4	+59.7	15.4	24 35.2	+59.8	15.5	25 33.0	+59.8	15.7	26 30.7	+59.9	15.8	27 28.5	+59.8	15.9	28 26.1	+59.9	16.1	29 23.8	+59.9	16.2	30 21.3	+60.0	16.4	38
39	24 37.1	+59.8	15.3	25 35.0	+59.8	15.4	26 32.8	+59.8	15.6	27 30.6	+59.8	15.7	28 28.3	+59.9	15.9	29 26.0	+59.9	16.0	30 23.7	+59.9	16.2	31 21.3	+59.9	16.3	39
40	25 36.9	+59.8	15.2	26 34.8	+59.8	15.3	27 32.6	+59.8	15.5	28 30.4	+59.9	15.6	29 28.2	+59.8	15.8	30 25.9	+59.9	15.9	31 23.6	+59.9	16.1	32 21.2	+59.9	16.3	40
41	26 36.7	+59.7	15.1	27 34.6	+59.8	15.3	28 32.4	+59.8	15.4	29 30.3	+59.8	15.5	30 28.0	+59.9	15.7	31 25.8	+59.9	15.9	32 23.5	+59.9	16.0	33 21.1	+59.9	16.2	41
42	27 36.4	+59.8	15.0	28 34.4	+59.7	15.2	29 32.2	+59.9	15.3	30 30.1	+59.8	15.5	31 27.9	+59.9	15.6	32 25.7	+59.8	15.8	33 23.4	+59.9	16.0	34 21.0	+60.0	16.2	42
43	28 36.2	+59.7	14.9	29 34.1	+59.8	15.1	30 32.1	+59.8	15.2	31 29.9	+59.9	15.4	32 27.8	+59.8	15.5	33 25.5	+59.9	15.7	34 23.3	+59.9	15.9	35 21.0	+59.9	16.1	43
44	29 35.9	+59.8	14.8	30 33.9	+59.8	15.0	31 31.9	+59.8	15.1	32 29.8	+59.8	15.3	33 27.6	+59.9	15.5	34 25.4	+59.9	15.6	35 23.2	+59.9	15.8	36 20.9	+59.9	16.0	44
45	30 35.7	+59.7	14.7	31 33.7	+59.7	14.9	32 31.7	+59.7	15.0	33 29.6	+59.8	15.2	34 27.5	+59.8	15.4	35 25.3	+59.9	15.6	36 23.1	+59.9	15.7	37 20.8	+59.9	16.0	45
46	31 35.4	+59.7	14.6	32 33.4	+59.8	14.8	33 31.4	+59.8	14.9	34 29.4	+59.8	15.1	35 27.3	+59.8	15.3	36 25.2	+59.8	15.5	37 23.0	+59.8	15.7	38 20.7	+59.9	15.9	46
47	32 35.1	+59.8	14.5	33 33.2	+59.8	14.6	34 31.2	+59.8	14.8	35 29.2	+59.8	15.0	36 27.1	+59.9	15.2	37 25.0	+59.9	15.4	38 22.8	+59.9	15.6	39 20.6	+59.9	15.8	47
48	33 34.9	+59.7	14.4	34 33.0	+59.7	14.5	35 31.0	+59.8	14.7	36 29.0	+59.8	14.9	37 27.0	+59.8	15.1	38 24.9	+59.8	15.3	39 22.7	+59.9	15.5	40 20.5	+59.9	15.7	48
49	34 34.6	+59.7	14.3	35 32.7	+59.8	14.4	36 30.8	+59.8	14.6	37 28.8	+59.8	14.8	38 26.8	+59.8	15.0	39 24.7	+59.9	15.2	40 22.6	+59.9	15.4	41 20.4	+59.9	15.7	49
50	35 34.3	+59.7	14.1	36 32.5	+59.7	14.3	37 30.6	+59.7	14.5	38 28.6	+59.8	14.7	39 26.6	+59.9	14.9	40 24.6	+59.8	15.1	41 22.5	+59.9	15.3	42 20.3	+59.9	15.6	50
51	36 34.0	+59.7	14.0	37 32.2	+59.7	14.2	38 30.3	+59.8	14.4	39 28.4	+59.8	14.6	40 26.5	+59.8	14.8	41 24.4	+59.9	15.0	42 22.4	+59.8	15.3	43 20.2	+59.9	15.5	51
52	37 33.7	+59.7	13.9	38 31.9	+59.7	14.1	39 30.1	+59.7	14.3	40 28.2	+59.8	14.5	41 26.3	+59.8	14.7	42 24.3	+59.8	14.9	43 22.2	+59.9	15.2	44 20.1	+59.9	15.4	52
53	38 33.4	+59.7	13.8	39 31.6	+59.8	14.0	40 29.8	+59.8	14.2	41 28.0	+59.8	14.4	42 26.1	+59.8	14.6	43 24.1	+59.9	14.8	44 22.1	+59.8	15.1	45 20.0	+59.9	15.3	53
54	39 33.1	+59.6	13.6	40 31.4	+59.7	13.8	41 29.6	+59.7	14.0	42 27.8	+59.7	14.3	43 25.9	+59.8	14.5	44 24.0	+59.8	14.7	45 21.9	+59.9	15.0	46 19.9	+59.9	15.3	54
55	40 32.7	+59.7	13.5	41 31.1	+59.7	13.7	42 29.3	+59.8	13.9	43 27.5	+59.8	14.1	44 25.7	+59.8	14.4	45 23.8	+59.8	14.6	46 21.8	+59.9	14.9	47 19.8	+59.8	15.2	55
56	41 32.4	+59.7	13.3	42 30.8	+59.6	13.6	43 29.1	+59.7	13.8	44 27.3	+59.8	14.0	45 25.5	+59.8	14.3	46 23.6	+59.8	14.5	47 21.7	+59.8	14.8	48 19.6	+59.9	15.1	56
57	42 32.1	+59.6	13.2	43 30.4	+59.7	13.4	44 28.8	+59.7	13.6	45 27.1	+59.7	13.9	46 25.3	+59.7	14.1	47 23.4	+59.8	14.4	48 21.5	+59.8	14.7	49 19.5	+59.9	15.0	57
58	43 31.7	+59.6	13.1	44 30.1	+59.7	13.3	45 28.5	+59.7	13.5	46 26.8	+59.7	13.7	47 25.0	+59.8	14.0	48 23.2	+59.8	14.3	49 21.3	+59.9	14.6	50 19.4	+59.8	14.9	58
59	44 31.3	+59.6	12.9	45 29.8	+59.6	13.1	46 28.2	+59.7	13.4	47 26.5	+59.8	13.6	48 24.8	+59.8	13.9	49 23.0	+59.8	14.2	50 21.2	+59.8	14.4	51 19.2	+59.9	14.8	59
60	45 30.9	+59.6	12.7	46 29.4	+59.7	13.0	47 27.9	+59.6	13.2	48 26.3	+59.7	13.5	49 24.6	+59.7	13.7	50 22.8	+59.8	14.0	51 21.0	+59.8	14.3	52 19.1	+59.8	14.6	60
61	46 30.5	+59.6	12.6	47 29.1	+59.6	12.8	48 27.5	+59.7	13.1	49 26.0	+59.7	13.3	50 24.3	+59.8	13.6	51 22.6	+59.8	13.9	52 20.8	+59.8	14.2	53 18.9	+59.9	14.5	61
62	47 30.1	+59.6	12.4	48 28.7	+59.6	12.6	49 27.2	+59.7	12.9	50 25.7	+59.7	13.2	51 24.1	+59.7	13.4	52 22.4	+59.7	13.7	53 20.6	+59.8	14.1	54 18.8	+59.8	14.4	62
63	48 29.7	+59.5	12.2	49 28.3	+59.6	12.5	50 26.9	+59.6	12.7	51 25.4	+59.6	13.0	52 23.8	+59.7	13.3	53 22.1	+59.8	13.6	54 20.4	+59.8	13.9	55 18.6	+59.8	14.3	63
64	49 29.2	+59.6	12.0	50 27.9	+59.6	12.3	51 26.5	+59.6	12.6	52 25.0	+59.7	12.8	53 23.5	+59.7	13.1	54 21.9	+59.7	13.4	55 20.2	+59.8	13.8	56 18.4	+59.8	14.1	64
65	50 28.8	+59.5	11.8	51 27.5	+59.5	12.1	52 26.1	+59.6	12.4	53 24.7	+59.6	12.7	54 23.2	+59.7	13.0	55 21.6	+59.7	13.3	56 20.0	+59.7	13.6	57 18.2	+59.8	14.0	65
66	51 28.3	+59.5	11.6	52 27.0	+59.6	11.9	53 25.7	+59.6	12.2	54 24.3	+59.6	12.5	55 22.9	+59.6	12.8	56 21.3	+59.8	13.1	57 19.7	+59.8	13.5	58 18.0	+59.8	13.8	66
67	52 27.8	+59.5	11.4	53 26.6	+59.5	11.7	54 25.3	+59.5	12.0	55 23.9	+59.7	12.3	56 22.5	+59.7	12.6	57 21.1	+59.7	12.9	58 19.5	+59.7	13.3	59 17.8	+59.8	13.7	67
68	53 27.3	+59.4	11.2	54 26.1	+59.5	11.5	55 24.8	+59.6	11.8	56 23.6	+59.5	12.1	57 22.2	+59.6	12.4	58 20.8	+59.6	12.7	59 19.2	+59.8	13.1	60 17.6	+59.8	13.5	68
69	54 26.7	+59.4	11.0	55 25.6	+59.4	11.3	56 24.4	+59.5	11.5	57 23.1	+59.6	11.9	58 21.8	+59.6	12.2	59 20.4	+59.7	12.5	60 19.0	+59.7	12.9	61 17.4	+59.7	13.3	69
70	55 26.1	+59.4	10.7	56 25.0	+59.5	11.0	57 23.9	+59.5	11.3	58 22.7	+59.5	11.6	59 21.4	+59.6	12.0	60 20.1	+59.6	12.3	61 18.7	+59.6	12.7	62 17.1	+59.8	13.1	70
71	56 25.5	+59.3	10.5	57 24.5	+59.4	10.8	58 23.4	+59.4	11.1	59 22.2	+59.5	11.4	60 21.0	+59.6	11.7	61 19.7	+59.6	12.1	62 18.3	+59.7	12.5	63 16.9	+59.7	12.9	71
72	57 24.8	+59.4	10.2	58 23.9	+59.3	10.5	59 22.8	+59.5	10.8	60 21.7	+59.5	11.1	61 20.6	+59.5	11.5	62 19.3	+59.6	11.9	63 18.0	+59.6	12.3	64 16.6	+59.7	12.7	72
73	58 24.2	+59.2	9.9	59 23.2	+59.4	10.2	60 22.3	+59.3	10.5	61 21.2	+59.5	10.9	62 20.1	+59.5	11.2	63 18.9	+59.6	11.6	64 17.6	+59.7	12.0	65 16.3	+59.7	12.5	73
74	59 23.4	+59.3	9.6	60 22.6	+59.3	9.9	61 21.6	+59.4	10.2	62 20.7	+59.4	10.6	63 19.6	+59.5	10.9	64 18.5	+59.5	11.3	65 17.3	+59.5	11.8	66 16.0	+59.6	12.2	74
75	60 22.7	+59.2	9.3	61 21.9	+59.2	9.6	62 21.0	+59.3	9.9	63 20.1	+59.3	10.3	64 19.1	+59.4	10.6	65 18.0	+59.5	11.0	66 16.8	+59.6	11.5	67 15.6	+59.6	11.9	75
76	61 21.9	+59.1	9.0	62 21.1	+59.2	9.3	63 20.3	+59.2	9.6	64 19.4	+59.3	9.9	65 18.5	+59.4	10.3	66 17.5	+59.4	10.7	67 16.4	+59.5	11.2	68 15.2	+59.6	11.6	76
77	62 21.0	+59.1	8.6	63 20.3	+59.1	8.9	64 19.5	+59.2	9.2	65 18.7	+59.3	9.6	66 17.9	+59.3	10.0	67 16.9	+59.4	10.4	68 15.9	+59.5	10.8	69 14.8	+59.5	11.3	77
78	63 20.1	+59.0	8.2	64 19.4	+59.1	8.5	65 18.7	+59.2	8.8	66 18.0	+59.2	9.2	67 17.2	+59.3	9.6	68 16.3	+59.3	10.0	69 15.4	+59.4	10.5	70 14.3	+59.5	11.0	78
79	64 19.1	+58.9	7.8	65 18.5	+59.0	8.1	66 17.9	+59.0	8.4	67 17.2	+59.1	8.8	68 16.5	+59.1	9.2	69 15.6	+59.3	9.6	70 14.8	+59.3	10.0	71 13.8	+59.4	10.6	79
80	65 18.0	+58.8	7.4	66 17.5	+58.9	7.7	67 16.9	+59.0	8.0	68 16.3	+59.1	8.3	69 15.6	+59.2	8.7	70 14.9	+59.2	9.1	71 14.1	+59.3	9.6	72 13.2	+59.4	10.1	80
81	66 16.8	+58.8	6.9	67 16.4	+58.8	7.2	68 15.9	+58.9	7.5	69 15.4	+58.9	7.8	70 14.8	+59.0	8.2	71 14.1	+59.1	8.6	72 13.4	+59.2	9.1	73 12.6	+59.3	9.6	81
82	67 15.6	+58.6	6.4	68 15.2	+58.7	6.7	69 14.8	+58.8	7.0	70 14.3	+58.9	7.3	71 13.8	+58.9	7.7	72 13.2	+59.0	8.1	73 12.6	+59.1	8.6	74 11.9	+59.2	9.1	82
83	68 14.2	+58.6	5.8	69 13.9	+58.6	6.1	70 13.6	+58.6	6.4	71 13.2	+58.7	6.7	72 12.7	+58.8	7.1	73 12.2	+58.9	7.5	74 11.7	+59.0	7.9	75 11.1	+59.1	8.5	83
84	69 12.8	+58.3	5.2	70 12.5	+58.4	5.5	71 12.2	+58.5	5.8	72 11.9	+58.6	6.1	73 11.5	+58.7	6.4	74 11.1	+58.8	6.8	75 10.7	+58.8	7.3	76 10.2	+58.9	7.8	84
85	70 11.1	+58.3	4.6	71 10.9	+58.3	4.8	72 10.7	+58.4	5.0	73 10.5	+58.4	5.3	74 10.2	+58.5	5.7	75 09.9	+58.6	6.0	76 09.5	+58.7	6.5	77 09.1	+58.8	7.0	85
86	71 09.4	+58.0	3.8	72 09.2	+58.1	4.0	73 09.1	+58.1	4.3	74 08.9	+58.2	4.5	75 08.7	+58.3	4.8	76 08.5	+58.3	5.2	77 08.2	+58.5	5.6	78 07.9	+58.6	6.0	86
87	72 07.4	+57.8	3.0	73 07.3	+57.9	3.2	74 07.2	+57.9	3.4	75 07.1	+58.0	3.6	76 07.0	+58.0	3.9	77 06.8	+58.1	4.2	78 06.7	+58.1	4.5	79 06.5	+58.2	4.9	87
88	73 05.2	+57.6	2.1	74 05.2	+57.5	2.3	75 05.1	+57.6	2.4	76 05.1	+57.6	2.6	77 05.0	+57.7	2.8	78 04.9	+57.8	3.0	79 04.8	+57.9	3.3	80 04.7	+57.9	3.6	88
89	74 02.8	+57.2	1.1	75 02.7	+57.3	1.2	76 02.7	+57.3	1.3	77 02.7	+57.3	1.4	78 02.7	+57.3	1.5	79 02.7	+57.3	1.6	80 02.7	+57.3	1.8	81 02.6	+57.4	2.0	89
90	75 00.0	+56.9	0.0	76 00.0	+56.8	0.0	77 00.0	+56.8	0.0	78 00.0	+56.8	0.0	79 00.0	+56.8	0.0	80 00.0	+56.8	0.0	81 00.0	+56.7	0.0	82 00.0	+56.7	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 162°, 198°

19°, 341° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 09.9	+59.8	160.4	13 13.4	+59.8	160.5	12 16.8	+59.9	160.5	11 20.2	+59.9	160.6	10 23.6	+59.9	160.7	9 27.0	+59.9	160.7	8 30.4	+59.9	160.8	7 33.7	+59.9	160.8	0
1	15 09.7	+59.8	160.3	14 13.2	+59.8	160.4	13 16.7	+59.8	160.5	12 20.1	+59.8	160.5	11 23.5	+59.9	160.6	10 26.9	+59.9	160.7	9 30.3	+59.9	160.7	8 33.6	+60.0	160.8	1
2	16 09.5	+59.7	160.2	15 13.0	+59.8	160.3	14 16.5	+59.8	160.4	13 19.9	+59.9	160.5	12 23.4	+59.9	160.5	11 26.8	+59.9	160.6	10 30.2	+59.9	160.7	9 33.6	+59.9	160.7	2
3	17 09.2	+59.8	160.1	16 12.8	+59.8	160.2	15 16.3	+59.8	160.3	14 19.8	+59.9	160.4	13 23.3	+59.8	160.5	12 26.7	+59.9	160.6	11 30.1	+59.9	160.6	10 33.5	+59.9	160.7	3
4	18 09.0	+59.7	160.0	17 12.6	+59.8	160.1	16 16.1	+59.9	160.2	15 19.7	+59.8	160.3	14 23.1	+59.9	160.4	13 26.6	+59.9	160.5	12 30.0	+60.0	160.6	11 33.4	+60.0	160.6	4
5	19 08.7	+59.8	159.9	18 12.4	+59.8	160.0	17 16.0	+59.8	160.1	16 19.5	+59.9	160.2	15 23.0	+59.9	160.3	14 26.5	+59.9	160.4	13 30.0	+59.9	160.5	12 33.4	+59.9	160.6	5
6	20 08.5	+59.8	159.8	19 12.2	+59.8	159.9	18 15.8	+59.8	160.1	17 19.4	+59.8	160.2	16 22.9	+59.9	160.3	15 26.4	+59.9	160.4	14 29.9	+59.9	160.5	13 33.3	+59.9	160.5	6
7	21 08.3	+59.7	159.7	20 12.0	+59.7	159.9	19 15.6	+59.8	160.0	18 19.2	+59.9	160.1	17 22.8	+59.8	160.2	16 26.3	+59.9	160.3	15 29.8	+59.9	160.4	14 33.2	+60.0	160.5	7
8	22 08.0	+59.8	159.6	21 11.7	+59.8	159.8	20 15.4	+59.8	159.9	19 19.1	+59.8	160.0	18 22.6	+59.9	160.1	17 26.2	+59.9	160.2	16 29.7	+59.9	160.4	15 33.2	+59.9	160.4	8
9	23 07.8	+59.7	159.5	22 11.5	+59.8	159.7	21 15.2	+59.8	159.8	20 18.9	+59.8	159.9	19 22.5	+59.9	160.1	18 26.1	+59.9	160.2	17 29.6	+59.9	160.3	16 33.1	+59.9	160.4	9
10	24 07.5	+59.8	159.4	23 11.3	+59.8	159.6	22 15.0	+59.9	159.7	21 18.7	+59.9	159.9	20 22.4	+59.8	160.0	19 26.0	+59.9	160.1	18 29.5	+59.9	160.2	17 33.0	+60.0	160.3	10
11	25 07.3	+59.7	159.3	24 11.1	+59.8	159.5	23 14.9	+59.8	159.6	22 18.6	+59.8	159.8	21 22.2	+59.9	159.9	20 25.9	+59.9	160.1	19 29.4	+60.0	160.2	18 33.0	+59.9	160.3	11
12	26 07.0	+59.7	159.2	25 10.9	+59.7	159.4	24 14.7	+59.8	159.6	23 18.4	+59.9	159.7	22 22.1	+59.9	159.9	21 25.8	+59.8	160.0	20 29.4	+59.9	160.1	19 32.9	+59.9	160.2	12
13	27 06.7	+59.8	159.1	26 10.6	+59.8	159.3	25 14.5	+59.8	159.5	24 18.3	+59.8	159.6	23 22.0	+59.8	159.8	22 25.6	+59.9	159.9	21 29.3	+59.9	160.1	20 32.8	+60.0	160.2	13
14	28 06.5	+59.7	159.0	27 10.4	+59.8	159.2	26 14.3	+59.8	159.4	25 18.1	+59.8	159.5	24 21.8	+59.9	159.7	23 25.5	+59.9	159.9	22 29.2	+59.9	160.0	21 32.8	+59.9	160.1	14
15	29 06.2	+59.7	158.9	28 10.2	+59.7	159.1	27 14.1	+59.8	159.3	26 17.9	+59.8	159.5	25 21.7	+59.9	159.6	24 25.4	+59.9	159.8	23 29.1	+59.9	159.9	22 32.7	+59.9	160.1	15
16	30 05.9	+59.7	158.8	29 09.9	+59.8	159.0	28 13.9	+59.8	159.2	27 17.7	+59.9	159.4	26 21.6	+59.8	159.6	25 25.3	+59.9	159.7	24 29.0	+59.9	159.9	23 32.6	+59.9	160.0	16
17	31 05.6	+59.7	158.7	30 09.7	+59.7	158.9	29 13.7	+59.7	159.1	28 17.6	+59.8	159.3	27 21.4	+59.9	159.5	26 25.2	+59.9	159.7	25 28.9	+59.9	159.8	24 32.5	+60.0	160.0	17
18	32 05.3	+59.7	158.6	31 09.4	+59.8	158.8	30 13.4	+59.8	159.0	29 17.4	+59.8	159.2	28 21.3	+59.9	159.4	27 25.1	+59.8	159.6	26 28.8	+59.9	159.8	25 32.5	+59.9	159.9	18
19	33 05.0	+59.7	158.4	32 09.2	+59.7	158.7	31 13.2	+59.8	158.9	30 17.2	+59.8	159.1	29 21.1	+59.9	159.3	28 24.9	+59.9	159.5	27 28.7	+59.9	159.7	26 32.4	+59.9	159.9	19
20	34 04.7	+59.7	158.3	33 08.9	+59.7	158.6	32 13.0	+59.8	158.8	31 17.0	+59.8	159.0	30 21.0	+59.8	159.2	29 24.8	+59.9	159.4	28 28.6	+59.9	159.6	27 32.3	+59.9	159.8	20
21	35 04.4	+59.7	158.2	34 08.6	+59.8	158.5	33 12.8	+59.7	158.7	32 16.8	+59.8	158.9	31 20.8	+59.8	159.2	30 24.7	+59.9	159.4	29 28.5	+59.9	159.6	28 32.2	+60.0	159.8	21
22	36 04.1	+59.6	158.1	35 08.4	+59.7	158.3	34 12.5	+59.8	158.6	33 16.6	+59.8	158.8	32 20.6	+59.9	159.1	31 24.6	+59.8	159.3	30 28.4	+59.9	159.5	29 32.2	+59.9	159.7	22
23	37 03.7	+59.7	157.9	36 08.1	+59.7	158.2	35 12.3	+59.8	158.5	34 16.4	+59.8	158.7	33 20.5	+59.8	159.0	32 24.4	+59.9	159.2	31 28.3	+59.9	159.4	30 32.1	+59.9	159.6	23
24	38 03.4	+59.6	157.8	37 07.8	+59.7	158.1	36 12.1	+59.7	158.4	35 16.2	+59.8	158.6	34 20.3	+59.8	158.9	33 24.3	+59.8	159.1	32 28.2	+59.9	159.4	31 32.0	+59.9	159.6	24
25	39 03.0	+59.7	157.7	38 07.5	+59.7	158.0	37 11.8	+59.7	158.3	36 16.0	+59.8	158.5	35 20.1	+59.9	158.8	34 24.1	+59.9	159.0	33 28.1	+59.9	159.3	32 31.9	+59.9	159.5	25
26	40 02.7	+59.6	157.5	39 07.2	+59.7	157.8	38 11.5	+59.8	158.1	37 15.8	+59.8	158.4	36 20.0	+59.8	158.7	35 24.0	+59.9	159.0	34 28.0	+59.8	159.2	33 31.8	+59.9	159.4	26
27	41 02.3	+59.6	157.4	40 06.9	+59.6	157.7	39 11.3	+59.7	158.0	38 15.6	+59.8	158.3	37 19.8	+59.8	158.6	36 23.9	+59.8	158.9	35 27.8	+59.9	159.1	34 31.7	+59.9	159.4	27
28	42 01.9	+59.6	157.2	41 06.5	+59.7	157.6	40 11.0	+59.7	157.9	39 15.4	+59.7	158.2	38 19.6	+59.8	158.5	37 23.7	+59.9	158.8	36 27.7	+59.9	159.1	35 31.6	+59.9	159.3	28
29	43 01.5	+59.6	157.1	42 06.2	+59.7	157.4	41 10.7	+59.7	157.8	40 15.1	+59.8	158.1	39 19.4	+59.8	158.4	38 23.6	+59.8	158.7	37 27.6	+59.9	159.0	36 31.5	+59.9	159.2	29
30	44 01.1	+59.6	156.9	43 05.9	+59.6	157.3	42 10.4	+59.7	157.6	41 14.9	+59.7	158.0	40 19.2	+59.8	158.3	39 23.4	+59.8	158.6	38 27.5	+59.8	158.9	37 31.4	+59.9	159.2	30
31	45 00.7	+59.6	156.8	44 05.5	+59.6	157.1	43 10.1	+59.7	157.5	42 14.6	+59.8	157.9	41 19.0	+59.8	158.2	40 23.2	+59.9	158.5	39 27.3	+59.9	158.8	38 31.3	+59.9	159.1	31
32	46 00.3	+59.5	156.6	45 05.1	+59.7	157.0	44 09.8	+59.7	157.4	43 14.4	+59.7	157.7	42 18.8	+59.8	158.1	41 23.1	+59.8	158.4	40 27.2	+59.9	158.7	39 31.2	+59.9	159.0	32
33	46 59.8	+59.6	156.4	46 04.8	+59.6	156.8	45 09.5	+59.7	157.2	44 14.1	+59.7	157.6	43 18.6	+59.8	158.0	42 22.9	+59.8	158.3	41 27.1	+59.8	158.6	40 31.1	+59.9	159.0	33
34	47 59.4	+59.5	156.2	47 04.4	+59.5	156.7	46 09.2	+59.6	157.1	45 13.8	+59.8	157.5	44 18.4	+59.7	157.8	43 22.7	+59.8	158.2	42 26.9	+59.9	158.5	41 31.0	+59.9	158.9	34
35	48 58.9	+59.5	156.0	48 03.9	+59.6	156.5	47 08.8	+59.7	156.9	46 13.6	+59.7	157.3	45 18.1	+59.8	157.7	44 22.5	+59.8	158.1	43 26.8	+59.8	158.4	42 30.9	+59.9	158.8	35
36	49 58.4	+59.4	155.8	49 03.5	+59.6	156.3	48 08.5	+59.6	156.8	47 13.3	+59.7	157.2	46 17.9	+59.7	157.6	45 22.3	+59.8	158.0	44 26.6	+59.9	158.4	43 30.8	+59.9	158.7	36
37	50 57.8	+59.5	155.6	50 03.1	+59.5	156.1	49 08.1	+59.6	156.6	48 13.0	+59.6	157.0	47 17.6	+59.8	157.5	46 22.1	+59.8	157.9	45 26.5	+59.8	158.2	44 30.7	+59.9	158.6	37
38	51 57.3	+59.4	155.4	51 02.6	+59.5	155.9	50 07.7	+59.6	156.4	49 12.6	+59.7	156.9	48 17.4	+59.7	157.3	47 21.9	+59.8	157.7	46 26.3	+59.9	158.1	45 30.6	+59.8	158.5	38
39	52 56.7	+59.4	155.2	52 02.1	+59.5	155.7	51 07.3	+59.6	156.2	50 12.3	+59.7	156.7	49 17.1	+59.7	157.2	48 21.7	+59.8	157.6	47 26.2	+59.8	158.0	46 30.4	+59.9	158.4	39
40	53 56.1	+59.4	154.9	53 01.6	+59.5	155.5	52 06.9	+59.6	156.0	51 12.0	+59.6	156.5	50 16.8	+59.7	157.0	49 21.5	+59.8	157.5	48 26.0	+59.8	157.9	47 30.3	+59.9	158.3	40
41	54 55.5	+59.3	154.7	54 01.1	+59.4	155.3	53 06.5	+59.5	155.8	52 11.6	+59.6	156.4	51 16.5	+59.7	156.9	50 21.3	+59.7	157.3	49 25.8	+59.8	157.8	48 30.2	+59.8	158.2	41
42	55 54.8	+59.3	154.4	55 00.5	+59.5	155.0	54 06.0	+59.5	155.6	53 11.2	+59.6	156.2	52 16.2	+59.7	156.7	51 21.0	+59.8	157.2	50 25.6	+59.8	157.7	49 30.0	+59.9	158.1	42
43	56 54.1	+59.3	154.1	56 00.0	+59.3	154.8	55 05.5	+59.5	155.4	54 10.8	+59.6	156.0	53 15.9	+59.7	156.5	52 20.8	+59.7	157.1	51 25.4	+59.8	157.6	50 29.9	+59.8	158.0	43
44	57 53.4	+59.2	153.9	56 59.3	+59.4	154.5	56 05.0	+59.5	155.2	55 10.4	+59.6	155.8	54 15.6	+59.6	156.4	53 20.5	+59.7	156.9	52 25.2	+59.8	157.4	51 29.7	+59.9	157.9	44
45	58 52.6	+59.2	153.6	57 58.7	+59.3	154.3	57 04.5	+59.4	154.9	56 10.0	+59.5	155.6	55 15.2	+59.7	156.2	54 20.2	+59.7	156.7	53 25.0	+59.8	157.3	52 29.6	+59.8	157.8	45
46	59 51.8	+59.1	153.2	58 58.0	+59.3	154.0	58 03.9	+59.4	154.7	57 09.5	+59.6	155.4	56 14.9	+59.6	156.0	55 19.9	+59.7	156.6	54 24.8	+59.7	157.1	53 29.4	+59.8	157.7	46
47	60 50.9	+59.0	152.9	59 57.3	+59.2	153.7	59 03.3	+59.4	154.4	58 09.1	+59.5	155.1	57 14.5	+59.6	155.8	56 19.6	+59.7	156.4	55 24.5	+59.8	157.0	54 29.2	+59.8	157.5	47
48	61 49.9	+59.1	152.5	60 56.5	+59.2	153.4	60 02.7	+59.3	154.1	59 08.6	+59.4	154.9	58 14.1	+59.5	155.6	57 19.3	+59.7	156.2	56 24.3	+59.7	156.8	55 29.0	+59.8	157.4	48
49	62 49.0	+58.9	152.1	61 55.7	+59.1	153.0	61 02.0	+59.3	153.8	60 08.0	+59.4	154.6	59 13.6	+59.6	155.3	58 19.0	+59.6	156.0	57 24.0	+59.8	156.6	56 28.8	+59.8	157.2	49
50	63 47.9	+58.8	151.7	62 54.8	+59.1	152.6	62 01.3	+59.3	153.5	61 07.4	+59.4	154.3	60 13.2	+59.5	155.1	59 18.6	+59.6	155.8	58 23.8	+59.7	156.5	57 28.6	+59.8	157.1	50
51	64 46.7	+58.8	151.3	63 53.9	+59.0	152.2	63 00.6	+59.2	153.2	62 06.8	+59.4	154.0	61 12.7	+59.5	154.8	60 18.2	+59.6	155.6	59 23.5	+59.6	156.3	58 28.4	+59.8	156.9	51
52	65 45.5	+58.7	150.8	64 52.9	+58.9	151.8	63 59.8	+59.1	152.8	63 06.2	+59.3	153.7	62 12.2	+59.4	154.5	61 17.8	+59.6	155.3	60 23.1	+59.7	156.1	59 28.2	+59.7	156.8	52
53	66 44.2	+58.5	150.3	65 51.8	+58.8	151.4	64 58.9	+59.0	152.4	64 05.5	+59.2	153.4	63 11.6	+59.4	154.2	62 17.4	+59.5	155.1	61 22.8	+59.7	155.9	60 27.9	+59.8	156.6	53
54	67 42.7	+58.5	149.7	66 50.6	+58.8	150.9	65 57.9	+59.0	152.0	65 04.7	+59.2	153.0	64 11.0	+59.4	153.9	63 16.9	+59.6	154.8	62 22.5	+59.6	155.6	61 27.7	+59.7	156.4	54
55	68 41.2	+58.3	149.1	67 49.4	+58.6	150.3	66 56.9	+58.9	151.5	66 03.9	+59.1	152.6	65 10.4	+59.3	153.6	64 16.5	+59.4	154.5	63 22.1	+59.6	155.4	62 27.4	+59.7	156.2	55
56	69 39.5	+58.1	148.4	68 48.0	+58.5	149.8	67 55.8	+58.8	151.0	67 03.0	+59.1	152.2	66 09.7	+59.3	153.2	65 15.9	+59.4	154.2	64 21.7	+59.6	155.1	63 27.1	+59.7	156.0	56
57	70 37.6	+57.9	147.7	69 46.5	+58.3	149.1	68 54.6	+58.7	150.5	68 02.1	+59.0	151.7	67 09.0	+59.2	152.8	66 15.3	+59.4	153.9	65 21.3	+59.5	154.8	64 26.8	+59.6	155.7	57
58	71 35.5	+57.7	146.9	70 44.8	+58.2	148.5	69 53.3	+58.6	149.9	69 01.1	+58.8	151.2	68 08.2	+59.1	152.4	67 14.7	+59.4	153.5	66 20.8	+59.5	154.5	65 26.4	+59.6	155.5	58
59	72 33.2	+57.5	146.0	71 43.0	+58.0	147.7	70 51.9	+58.4	149.2	69 59.9	+58.8	150.6	69 07.3	+59.0	151.9	68 14.1	+59.2	153.1	67 20.3	+59.4	154.2	66 26.0	+59.6	155.2	59
60	73 30.7	+57.1	145.0	72 41.0	+57.7	146.8	71 50.3	+58.2	148.5	70 58.7	+58.6	150.0	70 06.3	+59.0	151.4	69 13.3	+59.2	152.7	68 19.7	+59.4	153.8	67 25.6	+59.6	154.9	60
61	74 27.8	+56.8	143.9	73 38.7	+57.5	145.9	72 48.5	+58.0	147.7	71 57.3	+58.5	149.4	71 05.3	+58.8	150.9	70 12.5	+59.1	152.2	69 19.1	+59.4	153.5	68 25.2	+59.5	154.6	61
62	75 24.6	+56.3	142.6	74 36.2	+57.1	144.9	73 46.5	+57.8	146.8	72 55.8	+58.3	148.6	72 04.1	+58.7	150.2	71 11.6	+59.1	151.7	70 18.5	+59.3	153.0	69 24.7	+59.5	154.2	62
63	76 20.9	+55.7	141.2	75 33.3	+56.7	143.7	74 44.3	+57.4	145.8	73 54.1	+58.0	147.8	73 02.8	+58.5	149.5	72 10.7	+58.9	151.1	71 17.8	+59.2	152.6	70 24.2	+59.4	153.9	63
64	77 16.6	+55.1	139.6	76 30.0	+56.2	142.3	75 41.7	+57.2	144.7	74 52.1	+57.8	146.9	74 01.3	+58.4	148.8	73 09.6	+58.7	150.5	72 17.0	+59.1	152.0	71 23.6	+59.4	153.4	64
65	78 11.7	+54.2	137.7	77 26.2	+55.6	140.8	76 38.9	+56.6	143.4	75 49.9	+57.5	145.8	74 59.7	+58.1	147.9	74 08.3	+58.7	149.8	73 16.1	+59.0	151.5	72 23.0	+59.3	153.0	65
66	79 05.9	+53.1	135.6	78 21.8	+54.8	139.0	77 35.5	+56.1	142.0	76 47.4	+57.1	144.6	75 57.8	+57.9	146.9	75 07.0	+58.4	149.0	74 15.1	+58.8	150.8	73 22.3	+59.2	152.4	66
67	79 59.0	+51.8	133.0	79 16.6	+53.8	136.9	78 31.6	+55.4	140.2	77 44.5	+56.6	143.2	76 55.7	+57.5	145.8	76 05.4	+58.2	148.1	75 13.9	+58.7	150.1	74 21.5	+59.0	151.8	67
68	80 50.8	*+49.8*	•130.0	80 10.4	+52.6	134.4	79 27.0	+54.5	138.2	78 41.1	+56.0	141.6	77 53.2	+57.1	144.5	77 03.6	+57.9	147.0	76 12.6	+58.5	149.2	75 20.5	+59.0	151.2	68
69	81 40.6	*+47.5*	•126.3	81 03.0	*+50.8*	•131.4	80 21.5	+53.3	135.8	79 37.1	+55.2	139.7	78 50.3	+56.5	142.9	78 01.5	+57.5	145.8	77 11.1	+58.3	148.3	76 19.5	+58.8	150.4	69
70	82 28.1	*+44.1*	•121.8	81 53.8	*+48.4*	•127.8	81 14.8	+51.8	133.0	80 32.3	+54.0	137.4	79 46.8	+55.8	141.1	78 59.0	+57.1	144.4	78 09.4	+58.0	147.1	77 18.3	+58.6	149.6	70
71	83 12.2	*+39.7*	•116.4	82 42.2	*+45.4*	•123.4	82 06.6	*+49.5*	•129.5	81 26.3	+52.7	134.6	80 42.6	+54.8	139.0	79 56.1	+56.4	142.7	79 07.4	+57.5	145.8	78 16.9	+58.4	148.5	71
72	83 51.9	*+33.5*	•109.7	83 27.6	*+40.9*	•118.0	82 56.1	*+46.5*	•125.1	82 19.0	*+50.6*	•131.2	81 37.4	+53.6	136.3	80 52.5	+55.6	140.6	80 04.9	+57.0	144.3	79 15.3	+58.0	147.3	72
73	84 25.4	*+25.5*	•101.6	84 08.5	*+34.7*	•111.2	83 42.6	*+42.2*	•119.7	83 09.6	*+47.8*	•126.9	82 31.0	*+51.7*	•133.0	81 48.1	+54.4	138.1	81 01.9	+56.3	142.4	80 13.3	+57.6	145.9	73
74	84 50.9	*+15.3*	• 91.9	84 43.2	*+26.5*	•102.8	84 24.8	*+36.2*	•112.8	83 57.4	*+43.6*	•121.5	83 22.7	*+49.1*	•128.9	82 42.5	*+52.8*	•135.0	81 58.2	+55.4	140.0	81 10.9	+57.0	144.2	74
75	85 06.2	*+3.5*	• 80.8	85 09.7	*+15.7*	• 92.6	85 01.0	*+27.5*	•104.1	84 41.0	*+37.6*	•114.6	84 11.8	*+45.1*	•123.6	83 35.3	*+50.4*	•131.0	82 53.6	+53.8	137.1	82 07.9	+56.1	142.0	75
76	85 09.7	*–8.7*	• 69.0	85 25.4	*+3.1*	• 80.8	85 28.5	*+16.2*	• 93.3	85 18.6	*+28.7*	•105.6	84 56.9	*+39.1*	•116.6	84 25.7	*+46.6*	•125.8	83 47.4	*+51.7*	•133.3	83 04.0	+54.9	139.3	76
77	85 01.0	*–20.0*	• 57.5	85 28.5	*–9.9*	• 68.2	85 44.7	*+2.6*	• 80.7	85 47.3	*+16.7*	• 94.3	85 36.0	*+30.1*	•107.3	85 12.3	*+40.9*	•118.8	84 39.1	*+48.3*	•128.2	83 58.9	*+53.0*	•135.7	77
78	84 41.0	*–29.2*	• 46.9	85 18.6	*–21.7*	• 55.9	85 47.3	*–11.3*	• 67.2	86 04.0	*+2.1*	• 80.7	86 06.1	*+17.3*	• 95.3	85 53.2	*+31.7*	•109.3	85 27.4	*+42.7*	•121.3	84 51.9	*+50.0*	•130.9	78
79	84 11.8	*–36.5*	• 37.9	84 56.9	*–31.2*	• 44.9	85 36.0	*–23.7*	• 54.1	86 06.1	*–12.9*	• 66.0	86 23.4	*+1.5*	• 80.7	86 24.9	*+18.0*	• 96.6	86 10.1	*+33.5*	•111.6	85 41.9	*+44.7*	•124.1	79
80	83 35.3	*–41.7*	• 30.4	84 25.7	*–38.3*	• 35.6	85 12.3	*–33.2*	• 42.6	85 53.2	*–25.8*	• 52.0	86 24.9	*–14.8*	• 64.7	86 42.9	*+0.7*	• 80.6	86 43.6	*+18.9*	• 98.2	86 26.6	*+35.5*	•114.3	80
81	82 53.6	*–45.7*	• 24.3	83 47.4	*–43.4*	• 28.1	84 39.1	*–40.2*	• 33.1	85 27.4	*–35.5*	• 40.0	86 10.1	*–28.2*	• 49.7	86 43.6	*–17.0*	• 63.1	87 02.5	*–0.4*	• 80.6	87 02.1	*+20.0*	•100.0	81
82	82 07.9	*–48.6*	• 19.3	83 04.0	*–47.1*	• 22.0	83 58.9	*–45.1*	• 25.6	84 51.9	*–42.2*	• 30.4	85 41.9	*–37.8*	• 37.2	86 26.6	*–30.9*	• 46.9	87 02.1	*–19.5*	• 61.2	87 22.1	*–1.6*	• 80.6	82
83	81 19.3	–50.8	15.2	82 16.9	*–49.8*	• 17.2	83 13.8	*–48.5*	• 19.7	84 09.7	*–46.7*	• 23.0	85 04.1	*–44.3*	• 27.5	85 55.7	*–40.3*	• 34.0	86 42.6	*–33.8*	• 43.7	87 20.5	*–22.5*	• 58.8	83
84	80 28.5	–52.4	11.9	81 27.1	–51.8	13.2	82 25.3	*–51.0*	• 15.0	83 23.0	*–50.0*	• 17.2	84 19.8	*–48.5*	• 20.1	85 15.4	*–46.3*	• 24.3	86 08.8	*–43.0*	• 30.4	86 58.0	*–37.2*	• 40.0	84
85	79 36.1	–53.6	9.0	80 35.3	–53.2	10.0	81 34.3	–52.8	11.2	82 33.0	–52.1	12.6	83 31.3	*–51.3*	• 14.6	84 29.1	*–50.2*	• 17.2	85 25.8	*–48.4*	• 20.9	86 20.8	*–45.6*	• 26.4	85
86	78 42.5	–54.6	6.7	79 42.1	–54.4	7.3	80 41.5	–54.1	8.1	81 40.9	–53.8	9.0	82 40.0	–53.3	10.2	83 38.9	*–52.6*	• 11.8	84 37.4	*–51.8*	• 14.0	85 35.2	*–50.5*	• 17.2	86
87	77 47.9	–55.4	4.6	78 47.7	–55.3	5.0	79 47.4	–55.1	5.5	80 47.1	–54.9	6.1	81 46.7	–54.6	6.8	82 46.3	–54.4	7.8	83 45.6	–53.9	9.0	84 44.7	*–53.3*	• 10.7	87
88	76 52.5	–56.0	2.9	77 52.4	–55.9	3.1	78 52.3	–55.8	3.4	79 52.2	–55.8	3.7	80 52.1	–55.7	4.1	81 51.9	–55.5	4.6	82 51.7	–55.4	5.2	83 51.4	–55.1	6.1	88
89	75 56.5	–56.5	1.3	76 56.5	–56.5	1.4	77 56.5	–56.5	1.6	78 56.4	–56.4	1.7	79 56.4	–56.4	1.9	80 56.4	–56.4	2.1	81 56.3	–56.3	2.3	82 56.3	–56.3	2.6	89
90	75 00.0	–56.9	0.0	76 00.0	–56.9	0.0	77 00.0	–57.0	0.0	78 00.0	–57.0	0.0	79 00.0	–57.0	0.0	80 00.0	–57.0	0.0	81 00.0	–57.0	0.0	82 00.0	–57.1	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 19°, 341°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 09.9	–59.8	160.4	13 13.4	–59.8	160.5	12 16.8	–59.8	160.5	11 20.2	–59.8	160.6	10 23.6	–59.8	160.7	9 27.0	–59.9	160.7	8 30.4	–60.0	160.8	7 33.7	–59.9	160.8	**0**
1	13 10.1	–59.7	160.5	12 13.6	–59.8	160.5	11 17.0	–59.8	160.6	10 20.4	–59.9	160.7	9 23.8	–59.9	160.7	8 27.1	–59.9	160.8	7 30.4	–59.9	160.8	6 33.8	–60.0	160.9	**1**
2	12 10.4	–59.8	160.6	11 13.8	–59.8	160.6	10 17.2	–59.9	160.7	9 20.5	–59.8	160.7	8 23.9	–59.9	160.8	7 27.2	–59.9	160.8	6 30.5	–59.9	160.9	5 33.8	–59.9	160.9	**2**
3	11 10.6	–59.8	160.6	10 14.0	–59.8	160.7	9 17.3	–59.8	160.8	8 20.7	–59.9	160.8	7 24.0	–59.9	160.9	6 27.3	–59.9	160.9	5 30.6	–59.9	160.9	4 33.9	–60.0	161.0	**3**
4	10 10.8	–59.8	160.7	9 14.2	–59.9	160.8	8 17.5	–59.8	160.8	7 20.8	–59.9	160.9	6 24.1	–59.9	160.9	5 27.4	–59.9	161.0	4 30.7	–60.0	161.0	3 33.9	–59.9	161.0	**4**
5	9 11.0	–59.8	160.8	8 14.3	–59.8	160.9	7 17.7	–59.9	160.9	6 20.9	–59.8	161.0	5 24.2	–59.9	161.0	4 27.5	–59.9	161.0	3 30.7	–59.9	161.0	2 34.0	–59.9	161.1	**5**
6	8 11.2	–59.7	160.9	7 14.5	–59.8	161.0	6 17.8	–59.8	161.0	5 21.1	–59.9	161.0	4 24.3	–59.8	161.0	3 27.6	–59.9	161.1	2 30.8	–59.9	161.1	1 34.1	–60.0	161.1	**6**
7	7 11.5	–59.8	161.0	6 14.7	–59.8	161.0	5 18.0	–59.9	161.1	4 21.2	–59.8	161.1	3 24.5	–59.9	161.1	2 27.7	–59.9	161.1	1 30.9	–59.9	161.1	0 34.1	–59.9	161.1	**7**
8	6 11.7	–59.8	161.1	5 14.9	–59.8	161.1	4 18.1	–59.8	161.1	3 21.4	–59.9	161.2	2 24.6	–59.9	161.2	1 27.8	–59.9	161.2	0 31.0	–59.9	161.2	0 25.8	+60.0	18.8	**8**
9	5 11.9	–59.8	161.2	4 15.1	–59.8	161.2	3 18.3	–59.8	161.2	2 21.5	–59.9	161.2	1 24.7	–59.9	161.2	0 27.9	–59.9	161.2	0 28.9	+60.0	18.8	1 25.8	+59.9	18.8	**9**
10	4 12.1	–59.8	161.2	3 15.3	–59.8	161.3	2 18.5	–59.9	161.3	1 21.6	–59.8	161.3	0 24.8	–59.9	161.3	0 32.0	+59.9	18.7	1 28.9	+59.9	18.7	2 25.7	+59.9	18.7	**10**
11	3 12.3	–59.8	161.3	2 15.5	–59.8	161.3	1 18.6	–59.8	161.4	0 21.8	–59.9	161.4	0 35.1	+59.9	18.6	1 31.9	+59.9	18.6	2 28.8	+59.9	18.7	3 25.6	+60.0	18.7	**11**
12	2 12.5	–59.8	161.4	1 15.7	–59.9	161.4	0 18.8	–59.9	161.4	0 38.1	+59.9	18.6	1 35.0	+59.8	18.6	2 31.8	+59.9	18.6	3 28.7	+59.9	18.6	4 25.6	+59.9	18.6	**12**
13	1 12.7	–59.7	161.5	0 15.8	–59.8	161.5	0 41.1	+59.8	18.5	1 38.0	+59.8	18.5	2 34.8	+59.9	18.5	3 31.7	+59.9	18.5	4 28.6	+59.9	18.6	5 25.5	+59.9	18.6	**13**
14	0 13.0	–59.8	161.6	0 44.0	+59.8	18.4	1 40.9	+59.8	18.4	2 37.8	+59.9	18.4	3 34.7	+59.9	18.5	4 31.6	+59.9	18.5	5 28.5	+60.0	18.5	6 25.4	+60.0	18.5	**14**
15	0 46.8	+59.8	18.3	1 43.8	+59.8	18.3	2 40.7	+59.9	18.3	3 37.7	+59.8	18.4	4 34.6	+59.9	18.4	5 31.5	+60.0	18.4	6 28.5	+59.9	18.5	7 25.4	+59.9	18.5	**15**
16	1 46.6	+59.8	18.2	2 43.6	+59.8	18.3	3 40.6	+59.8	18.3	4 37.5	+59.9	18.3	5 34.5	+59.9	18.3	6 31.5	+59.9	18.4	7 28.4	+59.9	18.4	8 25.3	+60.0	18.4	**16**
17	2 46.4	+59.8	18.2	3 43.4	+59.8	18.2	4 40.4	+59.8	18.2	5 37.4	+59.9	18.2	6 34.4	+59.9	18.3	7 31.4	+59.9	18.3	8 28.3	+59.9	18.3	9 25.3	+59.9	18.4	**17**
18	3 46.2	+59.8	18.1	4 43.2	+59.8	18.1	5 40.2	+59.9	18.1	6 37.3	+59.8	18.2	7 34.3	+59.8	18.2	8 31.3	+59.9	18.2	9 28.2	+60.0	18.3	10 25.2	+59.9	18.4	**18**
19	4 46.0	+59.8	18.0	5 43.0	+59.8	18.0	6 40.1	+59.8	18.1	7 37.1	+59.9	18.1	8 34.1	+59.9	18.1	9 31.2	+59.9	18.2	10 28.2	+59.9	18.2	11 25.1	+60.0	18.3	**19**
20	5 45.8	+59.7	17.9	6 42.8	+59.9	17.9	7 39.9	+59.9	18.0	8 37.0	+59.8	18.0	9 34.0	+59.9	18.1	10 31.1	+59.9	18.1	11 28.1	+59.9	18.2	12 25.1	+59.9	18.3	**20**
21	6 45.5	+59.8	17.8	7 42.7	+59.8	17.9	8 39.8	+59.8	17.9	9 36.8	+59.9	18.0	10 33.9	+59.9	18.0	11 31.0	+59.9	18.1	12 28.0	+59.9	18.1	13 25.0	+59.9	18.2	**21**
22	7 45.3	+59.8	17.7	8 42.5	+59.8	17.8	9 39.6	+59.8	17.8	10 36.7	+59.9	17.9	11 33.8	+59.9	17.9	12 30.9	+59.9	18.0	13 27.9	+59.9	18.1	14 24.9	+60.0	18.2	**22**
23	8 45.1	+59.8	17.7	9 42.3	+59.8	17.7	10 39.4	+59.9	17.8	11 36.6	+59.8	17.8	12 33.7	+59.8	17.9	13 30.8	+59.9	18.0	14 27.8	+59.9	18.0	15 24.9	+59.9	18.1	**23**
24	9 44.9	+59.8	17.6	10 42.1	+59.8	17.6	11 39.3	+59.8	17.7	12 36.4	+59.9	17.7	13 33.5	+59.9	17.8	14 30.7	+59.9	17.9	15 27.7	+60.0	18.0	16 24.8	+59.9	18.1	**24**
25	10 44.7	+59.7	17.5	11 41.9	+59.8	17.5	12 39.1	+59.8	17.6	13 36.3	+59.8	17.7	14 33.4	+59.9	17.7	15 30.6	+59.8	17.8	16 27.7	+59.9	17.9	17 24.7	+60.0	18.0	**25**
26	11 44.4	+59.8	17.4	12 41.7	+59.8	17.5	13 38.9	+59.8	17.5	14 36.1	+59.9	17.6	15 33.3	+59.9	17.7	16 30.4	+59.9	17.8	17 27.6	+59.9	17.9	18 24.7	+59.9	18.0	**26**
27	12 44.2	+59.8	17.3	13 41.5	+59.8	17.4	14 38.7	+59.9	17.4	15 36.0	+59.8	17.5	16 33.2	+59.8	17.6	17 30.3	+59.9	17.7	18 27.5	+59.9	17.8	19 24.6	+59.9	17.9	**27**
28	13 44.0	+59.8	17.2	14 41.3	+59.8	17.3	15 38.6	+59.8	17.4	16 35.8	+59.9	17.5	17 33.0	+59.9	17.5	18 30.2	+59.9	17.6	19 27.4	+59.9	17.8	20 24.5	+60.0	17.9	**28**
29	14 43.8	+59.7	17.1	15 41.1	+59.8	17.2	16 38.4	+59.8	17.3	17 35.7	+59.8	17.4	18 32.9	+59.9	17.5	19 30.1	+59.9	17.6	20 27.3	+59.9	17.7	21 24.5	+59.9	17.8	**29**
30	15 43.5	+59.8	17.0	16 40.9	+59.8	17.1	17 38.2	+59.8	17.2	18 35.5	+59.9	17.3	19 32.8	+59.9	17.4	20 30.0	+59.9	17.5	21 27.2	+59.9	17.6	22 24.4	+59.9	17.8	**30**
31	16 43.3	+59.8	16.9	17 40.7	+59.8	17.0	18 38.0	+59.9	17.1	19 35.4	+59.8	17.2	20 32.7	+59.8	17.3	21 29.9	+59.9	17.5	22 27.1	+59.9	17.6	23 24.3	+59.9	17.7	**31**
32	17 43.1	+59.7	16.8	18 40.5	+59.8	16.9	19 37.9	+59.8	17.0	20 35.2	+59.9	17.2	21 32.5	+59.9	17.3	22 29.8	+59.9	17.4	23 27.0	+59.9	17.5	24 24.2	+60.0	17.6	**32**
33	18 42.8	+59.8	16.8	19 40.3	+59.8	16.9	20 37.7	+59.8	17.0	21 35.1	+59.8	17.1	22 32.4	+59.9	17.2	23 29.7	+59.9	17.3	24 26.9	+60.0	17.5	25 24.2	+59.9	17.6	**33**
34	19 42.6	+59.8	16.7	20 40.1	+59.7	16.8	21 37.5	+59.8	16.9	22 34.9	+59.8	17.0	23 32.3	+59.8	17.1	24 29.6	+59.9	17.3	25 26.9	+59.9	17.4	26 24.1	+59.9	17.5	**34**
35	20 42.4	+59.7	16.6	21 39.8	+59.8	16.7	22 37.3	+59.8	16.8	23 34.7	+59.9	16.9	24 32.1	+59.9	17.0	25 29.5	+59.8	17.2	26 26.8	+59.9	17.3	27 24.0	+59.9	17.5	**35**
36	21 42.1	+59.8	16.5	22 39.6	+59.8	16.6	23 37.1	+59.8	16.7	24 34.6	+59.8	16.8	25 32.0	+59.8	17.0	26 29.3	+59.9	17.1	27 26.7	+59.9	17.3	28 23.9	+59.9	17.4	**36**
37	22 41.9	+59.7	16.4	23 39.4	+59.8	16.5	24 36.9	+59.8	16.6	25 34.4	+59.8	16.8	26 31.8	+59.9	16.9	27 29.2	+59.9	17.0	28 26.6	+59.9	17.2	29 23.8	+60.0	17.4	**37**
38	23 41.6	+59.7	16.3	24 39.2	+59.8	16.4	25 36.7	+59.8	16.5	26 34.2	+59.9	16.7	27 31.7	+59.8	16.8	28 29.1	+59.9	17.0	29 26.5	+59.9	17.1	30 23.8	+59.9	17.3	**38**
39	24 41.3	+59.8	16.2	25 39.0	+59.7	16.3	26 36.5	+59.8	16.4	27 34.1	+59.8	16.6	28 31.5	+59.9	16.7	29 29.0	+59.8	16.9	30 26.4	+59.8	17.1	31 23.7	+59.9	17.2	**39**
40	25 41.1	+59.7	16.1	26 38.7	+59.8	16.2	27 36.3	+59.8	16.3	28 33.9	+59.8	16.5	29 31.4	+59.8	16.7	30 28.8	+59.9	16.8	31 26.2	+59.9	17.0	32 23.6	+59.9	17.2	**40**
41	26 40.8	+59.8	16.0	27 38.5	+59.8	16.1	28 36.1	+59.8	16.3	29 33.7	+59.8	16.4	30 31.2	+59.9	16.6	31 28.7	+59.9	16.7	32 26.1	+59.9	16.9	33 23.5	+59.9	17.1	**41**
42	27 40.6	+59.7	15.9	28 38.3	+59.7	16.0	29 35.9	+59.8	16.2	30 33.5	+59.8	16.3	31 31.1	+59.8	16.5	32 28.6	+59.8	16.7	33 26.0	+59.9	16.9	34 23.4	+59.9	17.0	**42**
43	28 40.3	+59.7	15.7	29 38.0	+59.8	15.9	30 35.7	+59.8	16.1	31 33.3	+59.8	16.2	32 30.9	+59.8	16.4	33 28.4	+59.9	16.6	34 25.9	+59.9	16.8	35 23.3	+59.9	17.0	**43**
44	29 40.0	+59.7	15.6	30 37.8	+59.7	15.8	31 35.5	+59.7	16.0	32 33.1	+59.8	16.1	33 30.7	+59.9	16.3	34 28.3	+59.9	16.5	35 25.8	+59.9	16.7	36 23.2	+59.9	16.9	**44**
45	30 39.7	+59.7	15.5	31 37.5	+59.7	15.7	32 35.2	+59.8	15.9	33 32.9	+59.8	16.0	34 30.6	+59.8	16.2	35 28.2	+59.8	16.4	36 25.7	+59.9	16.6	37 23.1	+59.9	16.8	**45**
46	31 39.4	+59.7	15.4	32 37.2	+59.8	15.6	33 35.0	+59.8	15.8	34 32.7	+59.8	15.9	35 30.4	+59.8	16.1	36 28.0	+59.9	16.3	37 25.6	+59.8	16.5	38 23.0	+59.9	16.8	**46**
47	32 39.1	+59.7	15.3	33 37.0	+59.7	15.5	34 34.8	+59.7	15.6	35 32.5	+59.8	15.8	36 30.2	+59.8	16.0	37 27.9	+59.8	16.2	38 25.4	+59.9	16.5	39 22.9	+59.9	16.7	**47**
48	33 38.8	+59.7	15.2	34 36.7	+59.7	15.3	35 34.5	+59.8	15.5	36 32.3	+59.8	15.7	37 30.0	+59.9	15.9	38 27.7	+59.8	16.2	39 25.3	+59.9	16.4	40 22.8	+59.9	16.6	**48**
49	34 38.5	+59.7	15.0	35 36.4	+59.7	15.2	36 34.3	+59.7	15.4	37 32.1	+59.8	15.6	38 29.9	+59.8	15.8	39 27.5	+59.9	16.1	40 25.2	+59.8	16.3	41 22.7	+59.9	16.5	**49**
50	35 38.2	+59.7	14.9	36 36.1	+59.7	15.1	37 34.0	+59.8	15.3	38 31.9	+59.8	15.5	39 29.7	+59.8	15.7	40 27.4	+59.8	16.0	41 25.0	+59.9	16.2	42 22.6	+59.9	16.5	**50**
51	36 37.9	+59.6	14.8	37 35.8	+59.7	15.0	38 33.8	+59.7	15.2	39 31.7	+59.7	15.4	40 29.5	+59.8	15.6	41 27.2	+59.8	15.9	42 24.9	+59.8	16.1	43 22.5	+59.9	16.4	**51**
52	37 37.5	+59.7	14.7	38 35.5	+59.7	14.9	39 33.5	+59.7	15.1	40 31.4	+59.8	15.3	41 29.3	+59.8	15.5	42 27.0	+59.9	15.8	43 24.7	+59.9	16.0	44 22.4	+59.9	16.3	**52**
53	38 37.2	+59.6	14.5	39 35.2	+59.7	14.7	40 33.2	+59.8	14.9	41 31.2	+59.7	15.2	42 29.1	+59.7	15.4	43 26.9	+59.8	15.7	44 24.6	+59.8	15.9	45 22.3	+59.8	16.2	**53**
54	39 36.8	+59.7	14.4	40 34.9	+59.7	14.6	41 33.0	+59.7	14.8	42 30.9	+59.8	15.0	43 28.8	+59.8	15.3	44 26.7	+59.8	15.5	45 24.4	+59.9	15.8	46 22.1	+59.9	16.1	**54**
55	40 36.5	+59.6	14.2	41 34.6	+59.6	14.5	42 32.7	+59.7	14.7	43 30.7	+59.7	14.9	44 28.6	+59.8	15.2	45 26.5	+59.8	15.4	46 24.3	+59.8	15.7	47 22.0	+59.9	16.0	**55**
56	41 36.1	+59.6	14.1	42 34.2	+59.7	14.3	43 32.4	+59.6	14.5	44 30.4	+59.7	14.8	45 28.4	+59.7	15.0	46 26.3	+59.8	15.3	47 24.1	+59.8	15.6	48 21.9	+59.8	15.9	**56**
57	42 35.7	+59.6	13.9	43 33.9	+59.6	14.2	44 32.0	+59.7	14.4	45 30.1	+59.7	14.7	46 28.1	+59.8	14.9	47 26.1	+59.8	15.2	48 23.9	+59.9	15.5	49 21.7	+59.9	15.8	**57**
58	43 35.3	+59.6	13.8	44 33.5	+59.7	14.0	45 31.7	+59.7	14.3	46 29.8	+59.7	14.5	47 27.9	+59.7	14.8	48 25.9	+59.7	15.1	49 23.8	+59.8	15.4	50 21.6	+59.8	15.7	**58**
59	44 34.9	+59.6	13.6	45 33.2	+59.6	13.9	46 31.4	+59.6	14.1	47 29.5	+59.7	14.4	48 27.6	+59.8	14.6	49 25.6	+59.8	14.9	50 23.6	+59.8	15.2	51 21.4	+59.9	15.6	**59**
60	45 34.5	+59.5	13.4	46 32.8	+59.6	13.7	47 31.0	+59.7	13.9	48 29.2	+59.7	14.2	49 27.4	+59.7	14.5	50 25.4	+59.8	14.8	51 23.4	+59.8	15.1	52 21.3	+59.8	15.5	**60**
61	46 34.0	+59.5	13.3	47 32.4	+59.6	13.5	48 30.7	+59.6	13.8	49 28.9	+59.7	14.1	50 27.1	+59.7	14.4	51 25.2	+59.7	14.7	52 23.2	+59.8	15.0	53 21.1	+59.8	15.3	**61**
62	47 33.5	+59.6	13.1	48 32.0	+59.5	13.3	49 30.3	+59.6	13.6	50 28.6	+59.6	13.9	51 26.8	+59.7	14.2	52 24.9	+59.8	14.5	53 23.0	+59.7	14.8	54 20.9	+59.8	15.2	**62**
63	48 33.1	+59.5	12.9	49 31.5	+59.6	13.2	50 29.9	+59.6	13.4	51 28.2	+59.7	13.7	52 26.5	+59.7	14.0	53 24.7	+59.7	14.4	54 22.7	+59.8	14.7	55 20.7	+59.8	15.1	**63**
64	49 32.6	+59.4	12.7	50 31.1	+59.5	13.0	51 29.5	+59.6	13.3	52 27.9	+59.6	13.5	53 26.2	+59.6	13.9	54 24.4	+59.7	14.2	55 22.5	+59.8	14.5	56 20.5	+59.8	14.9	**64**
65	50 32.0	+59.5	12.5	51 30.6	+59.5	12.8	52 29.1	+59.5	13.1	53 27.5	+59.6	13.4	54 25.8	+59.7	13.7	55 24.1	+59.7	14.0	56 22.3	+59.7	14.4	57 20.3	+59.8	14.8	**65**
66	51 31.5	+59.4	12.3	52 30.1	+59.5	12.6	53 28.6	+59.6	12.9	54 27.1	+59.6	13.2	55 25.5	+59.6	13.5	56 23.8	+59.7	13.8	57 22.0	+59.7	14.2	58 20.1	+59.8	14.6	**66**
67	52 30.9	+59.5	12.1	53 29.6	+59.4	12.3	54 28.2	+59.5	12.6	55 26.7	+59.5	13.0	56 25.1	+59.6	13.3	57 23.5	+59.6	13.7	58 21.7	+59.7	14.0	59 19.9	+59.7	14.4	**67**
68	53 30.4	+59.3	11.8	54 29.0	+59.5	12.1	55 27.7	+59.5	12.4	56 26.2	+59.6	12.7	57 24.7	+59.6	13.1	58 23.1	+59.7	13.5	59 21.4	+59.7	13.8	60 19.6	+59.8	14.3	**68**
69	54 29.7	+59.4	11.6	55 28.5	+59.4	11.9	56 27.2	+59.4	12.2	57 25.8	+59.5	12.5	58 24.3	+59.6	12.9	59 22.8	+59.6	13.2	60 21.1	+59.7	13.6	61 19.4	+59.7	14.1	**69**
70	55 29.1	+59.3	11.3	56 27.9	+59.4	11.6	57 26.6	+59.4	11.9	58 25.3	+59.5	12.3	59 23.9	+59.5	12.6	60 22.4	+59.6	13.0	61 20.8	+59.6	13.4	62 19.1	+59.7	13.9	**70**
71	56 28.4	+59.3	11.1	57 27.3	+59.3	11.4	58 26.0	+59.4	11.7	59 24.8	+59.4	12.0	60 23.4	+59.5	12.4	61 22.0	+59.5	12.8	62 20.4	+59.7	13.2	63 18.8	+59.7	13.7	**71**
72	57 27.7	+59.2	10.8	58 26.6	+59.3	11.1	59 25.4	+59.4	11.4	60 24.2	+59.4	11.8	61 22.9	+59.5	12.1	62 21.5	+59.6	12.5	63 20.1	+59.6	13.0	64 18.5	+59.6	13.4	**72**
73	58 26.9	+59.2	10.5	59 25.9	+59.2	10.8	60 24.8	+59.3	11.1	61 23.6	+59.4	11.5	62 22.4	+59.4	11.8	63 21.1	+59.5	12.3	64 19.7	+59.5	12.7	65 18.1	+59.7	13.2	**73**
74	59 26.1	+59.2	10.2	60 25.1	+59.2	10.5	61 24.1	+59.3	10.8	62 23.0	+59.3	11.2	63 21.8	+59.4	11.5	64 20.6	+59.4	12.0	65 19.2	+59.6	12.4	66 17.8	+59.6	12.9	**74**
75	60 25.3	+59.0	9.8	61 24.3	+59.2	10.1	62 23.4	+59.2	10.5	63 22.3	+59.3	10.8	64 21.2	+59.4	11.2	65 20.0	+59.5	11.6	66 18.8	+59.5	12.1	67 17.4	+59.5	12.6	**75**
76	61 24.3	+59.1	9.5	62 23.5	+59.1	9.8	63 22.6	+59.2	10.1	64 21.6	+59.3	10.5	65 20.6	+59.3	10.9	66 19.5	+59.3	11.3	67 18.3	+59.4	11.8	68 16.9	+59.6	12.3	**76**
77	62 23.4	+58.9	9.1	63 22.6	+59.0	9.4	64 21.8	+59.1	9.7	65 20.9	+59.1	10.1	66 19.9	+59.2	10.5	67 18.8	+59.4	10.9	68 17.7	+59.4	11.4	69 16.5	+59.4	11.9	**77**
78	63 22.3	+58.9	8.7	64 21.6	+59.0	9.0	65 20.9	+59.0	9.3	66 20.0	+59.1	9.7	67 19.1	+59.2	10.1	68 18.2	+59.2	10.5	69 17.1	+59.4	11.0	70 15.9	+59.5	11.6	**78**
79	64 21.2	+58.8	8.3	65 20.6	+58.9	8.6	66 19.9	+58.9	8.9	67 19.1	+59.1	9.3	68 18.3	+59.1	9.7	69 17.4	+59.2	10.1	70 16.5	+59.2	10.6	71 15.4	+59.3	11.1	**79**
80	65 20.0	+58.8	7.8	66 19.5	+58.8	8.1	67 18.8	+58.9	8.4	68 18.2	+58.9	8.8	69 17.4	+59.1	9.2	70 16.6	+59.1	9.6	71 15.7	+59.2	10.1	72 14.7	+59.3	10.7	**80**
81	66 18.8	+58.6	7.3	67 18.3	+58.6	7.6	68 17.7	+58.8	7.9	69 17.1	+58.8	8.3	70 16.5	+58.9	8.7	71 15.7	+59.0	9.1	72 14.9	+59.1	9.6	73 14.0	+59.3	10.2	**81**
82	67 17.4	+58.5	6.7	68 16.9	+58.6	7.0	69 16.5	+58.6	7.4	70 15.9	+58.8	7.7	71 15.4	+58.8	8.1	72 14.7	+58.9	8.5	73 14.0	+59.0	9.0	74 13.3	+59.1	9.6	**82**
83	68 15.9	+58.3	6.2	69 15.5	+58.4	6.4	70 15.1	+58.5	6.7	71 14.7	+58.6	7.1	72 14.2	+58.7	7.5	73 13.6	+58.8	7.9	74 13.0	+58.9	8.4	75 12.4	+58.9	8.9	**83**
84	69 14.2	+58.2	5.5	70 13.9	+58.3	5.8	71 13.6	+58.3	6.1	72 13.3	+58.4	6.4	73 12.9	+58.5	6.8	74 12.4	+58.6	7.2	75 11.9	+58.7	7.7	76 11.3	+58.9	8.2	**84**
85	70 12.4	+58.0	4.8	71 12.2	+58.1	5.1	72 11.9	+58.2	5.3	73 11.7	+58.2	5.6	74 11.4	+58.3	6.0	75 11.0	+58.4	6.4	76 10.6	+58.5	6.8	77 10.2	+58.6	7.3	**85**
86	71 10.4	+57.8	4.0	72 10.3	+57.8	4.3	73 10.1	+57.9	4.5	74 09.9	+58.0	4.8	75 09.7	+58.1	5.1	76 09.4	+58.2	5.4	77 09.1	+58.3	5.9	78 08.8	+58.4	6.3	**86**
87	72 08.2	+57.6	3.2	73 08.1	+57.7	3.4	74 08.0	+57.7	3.6	75 07.9	+57.7	3.8	76 07.8	+57.8	4.1	77 07.6	+57.9	4.4	78 07.4	+58.0	4.7	79 07.2	+58.1	5.2	**87**
88	73 05.8	+57.3	2.2	74 05.8	+57.3	2.4	75 05.7	+57.3	2.5	76 05.6	+57.4	2.7	77 05.6	+57.4	2.9	78 05.5	+57.5	3.2	79 05.4	+57.6	3.4	80 05.3	+57.6	3.8	**88**
89	74 03.1	+56.9	1.2	75 03.1	+56.9	1.3	76 03.0	+57.0	1.4	77 03.0	+57.0	1.5	78 03.0	+57.0	1.6	79 03.0	+57.0	1.7	80 03.0	+57.0	1.9	81 02.9	+57.1	2.1	**89**
90	75 00.0	+56.5	0.0	76 00.0	+56.5	0.0	77 00.0	+56.5	0.0	78 00.0	+56.4	0.0	79 00.0	+56.4	0.0	80 00.0	+56.4	0.0	81 00.0	+56.3	0.0	82 00.0	+56.3	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 161°, 199°

20°, 340° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 04.6	+59.7	159.4	13 08.4	+59.8	159.4	12 12.2	+59.8	159.5	11 16.0	+59.8	159.6	10 19.7	+59.9	159.7	9 23.5	+59.9	159.7	8 27.2	+59.9	159.8	7 30.9	+59.9	159.8	0
1	15 04.3	+59.8	159.3	14 08.2	+59.8	159.4	13 12.0	+59.8	159.4	12 15.8	+59.9	159.5	11 19.6	+59.9	159.6	10 23.4	+59.9	159.7	9 27.1	+59.9	159.7	8 30.8	+59.9	159.8	1
2	16 04.1	+59.7	159.2	15 08.0	+59.7	159.3	14 11.8	+59.8	159.4	13 15.7	+59.8	159.4	12 19.5	+59.8	159.5	11 23.3	+59.8	159.6	10 27.0	+59.9	159.7	9 30.7	+60.0	159.7	2
3	17 03.8	+59.7	159.1	16 07.7	+59.8	159.2	15 11.6	+59.9	159.3	14 15.5	+59.8	159.4	13 19.3	+59.9	159.5	12 23.1	+59.9	159.5	11 26.9	+59.9	159.6	10 30.7	+59.9	159.7	3
4	18 03.5	+59.8	159.0	17 07.5	+59.8	159.1	16 11.5	+59.8	159.2	15 15.3	+59.9	159.3	14 19.2	+59.9	159.4	13 23.0	+59.9	159.5	12 26.8	+59.9	159.5	11 30.6	+59.9	159.6	4
5	19 03.3	+59.7	158.9	18 07.3	+59.8	159.0	17 11.3	+59.8	159.1	16 15.2	+59.8	159.2	15 19.1	+59.8	159.3	14 22.9	+59.9	159.4	13 26.7	+60.0	159.5	12 30.5	+60.0	159.6	5
6	20 03.0	+59.7	158.8	19 07.1	+59.7	158.9	18 11.1	+59.8	159.0	17 15.0	+59.9	159.1	16 18.9	+59.9	159.2	15 22.8	+59.9	159.3	14 26.7	+59.9	159.4	13 30.5	+59.9	159.5	6
7	21 02.7	+59.8	158.7	20 06.8	+59.8	158.8	19 10.9	+59.8	158.9	18 14.9	+59.8	159.1	17 18.8	+59.9	159.2	16 22.7	+59.9	159.3	15 26.6	+59.9	159.4	14 30.4	+59.9	159.5	7
8	22 02.5	+59.7	158.6	21 06.6	+59.8	158.7	20 10.7	+59.8	158.8	19 14.7	+59.8	159.0	18 18.7	+59.8	159.1	17 22.6	+59.9	159.2	16 26.5	+59.9	159.3	15 30.3	+59.9	159.4	8
9	23 02.2	+59.7	158.5	22 06.4	+59.7	158.6	21 10.5	+59.8	158.8	20 14.5	+59.8	158.9	19 18.5	+59.9	159.0	18 22.5	+59.8	159.1	17 26.4	+59.9	159.3	16 30.2	+60.0	159.4	9
10	24 01.9	+59.7	158.4	23 06.1	+59.8	158.5	22 10.3	+59.7	158.7	21 14.3	+59.9	158.8	20 18.4	+59.8	159.0	19 22.3	+59.9	159.1	18 26.3	+59.9	159.2	17 30.2	+59.9	159.3	10
11	25 01.6	+59.7	158.3	24 05.9	+59.7	158.4	23 10.0	+59.8	158.6	22 14.2	+59.8	158.7	21 18.2	+59.9	158.9	20 22.2	+59.9	159.0	19 26.2	+59.9	159.1	18 30.1	+59.9	159.3	11
12	26 01.3	+59.8	158.1	25 05.6	+59.8	158.3	24 09.8	+59.8	158.5	23 14.0	+59.8	158.6	22 18.1	+59.8	158.8	21 22.1	+59.9	158.9	20 26.1	+59.9	159.1	19 30.0	+59.9	159.2	12
13	27 01.1	+59.7	158.0	26 05.4	+59.7	158.2	25 09.6	+59.8	158.4	24 13.8	+59.8	158.6	23 17.9	+59.9	158.7	22 22.0	+59.9	158.9	21 26.0	+59.9	159.0	20 29.9	+60.0	159.2	13
14	28 00.8	+59.6	157.9	27 05.1	+59.8	158.1	26 09.4	+59.8	158.3	25 13.6	+59.8	158.5	24 17.8	+59.8	158.6	23 21.9	+59.8	158.8	22 25.9	+59.9	159.0	21 29.9	+59.9	159.1	14
15	29 00.4	+59.7	157.8	28 04.9	+59.7	158.0	27 09.2	+59.8	158.2	26 13.4	+59.8	158.4	25 17.6	+59.9	158.6	24 21.7	+59.9	158.7	23 25.8	+59.9	158.9	22 29.8	+59.9	159.0	15
16	30 00.1	+59.7	157.7	29 04.6	+59.7	157.9	28 09.0	+59.7	158.1	27 13.2	+59.8	158.3	26 17.5	+59.8	158.5	25 21.6	+59.9	158.7	24 25.7	+59.9	158.8	23 29.7	+59.9	159.0	16
17	30 59.8	+59.7	157.6	30 04.3	+59.7	157.8	29 08.7	+59.8	158.0	28 13.0	+59.8	158.2	27 17.3	+59.8	158.4	26 21.5	+59.8	158.6	25 25.6	+59.9	158.8	24 29.6	+59.9	158.9	17
18	31 59.5	+59.7	157.4	31 04.0	+59.8	157.7	30 08.5	+59.7	157.9	29 12.8	+59.8	158.1	28 17.1	+59.9	158.3	27 21.3	+59.9	158.5	26 25.5	+59.9	158.7	25 29.5	+59.9	158.9	18
19	32 59.2	+59.6	157.3	32 03.8	+59.7	157.6	31 08.2	+59.8	157.8	30 12.6	+59.8	158.0	29 17.0	+59.8	158.2	28 21.2	+59.9	158.4	27 25.4	+59.9	158.6	26 29.4	+60.0	158.8	19
20	33 58.8	+59.7	157.2	33 03.5	+59.7	157.5	32 08.0	+59.7	157.7	31 12.4	+59.8	157.9	30 16.8	+59.8	158.2	29 21.1	+59.8	158.4	28 25.3	+59.8	158.6	27 29.4	+59.9	158.8	20
21	34 58.5	+59.6	157.1	34 03.2	+59.7	157.3	33 07.7	+59.8	157.6	32 12.2	+59.8	157.8	31 16.6	+59.8	158.1	30 20.9	+59.9	158.3	29 25.1	+59.9	158.5	28 29.3	+59.9	158.7	21
22	35 58.1	+59.7	156.9	35 02.9	+59.6	157.2	34 07.5	+59.7	157.5	33 12.0	+59.8	157.7	32 16.4	+59.9	158.0	31 20.8	+59.8	158.2	30 25.0	+59.9	158.4	29 29.2	+59.9	158.6	22
23	36 57.8	+59.6	156.8	36 02.5	+59.7	157.1	35 07.2	+59.8	157.4	34 11.8	+59.8	157.6	33 16.3	+59.8	157.9	32 20.6	+59.9	158.1	31 24.9	+59.9	158.4	30 29.1	+59.9	158.6	23
24	37 57.4	+59.6	156.7	37 02.2	+59.7	157.0	36 07.0	+59.7	157.2	35 11.6	+59.7	157.5	34 16.1	+59.8	157.8	33 20.5	+59.8	158.0	32 24.8	+59.9	158.3	31 29.0	+59.9	158.5	24
25	38 57.0	+59.6	156.5	38 01.9	+59.7	156.8	37 06.7	+59.7	157.1	36 11.3	+59.8	157.4	35 15.9	+59.8	157.7	34 20.3	+59.9	158.0	33 24.7	+59.8	158.2	32 28.9	+59.9	158.4	25
26	39 56.6	+59.6	156.4	39 01.6	+59.6	156.7	38 06.4	+59.7	157.0	37 11.1	+59.8	157.3	36 15.7	+59.8	157.6	35 20.2	+59.8	157.9	34 24.5	+59.9	158.1	33 28.8	+59.9	158.4	26
27	40 56.2	+59.6	156.2	40 01.2	+59.7	156.6	39 06.1	+59.7	156.9	38 10.9	+59.7	157.2	37 15.5	+59.8	157.5	36 20.0	+59.8	157.8	35 24.4	+59.9	158.0	34 28.7	+59.9	158.3	27
28	41 55.8	+59.5	156.1	41 00.9	+59.6	156.4	40 05.8	+59.7	156.7	39 10.6	+59.8	157.1	38 15.3	+59.8	157.4	37 19.8	+59.9	157.7	36 24.3	+59.8	158.0	35 28.6	+59.9	158.2	28
29	42 55.3	+59.6	155.9	42 00.5	+59.6	156.3	41 05.5	+59.7	156.6	40 10.4	+59.7	157.0	39 15.1	+59.8	157.3	38 19.7	+59.8	157.6	37 24.1	+59.9	157.9	36 28.5	+59.9	158.2	29
30	43 54.9	+59.5	155.7	43 00.1	+59.6	156.1	42 05.2	+59.7	156.5	41 10.1	+59.7	156.8	40 14.9	+59.7	157.2	39 19.5	+59.8	157.5	38 24.0	+59.9	157.8	37 28.4	+59.9	158.1	30
31	44 54.4	+59.6	155.5	43 59.7	+59.6	156.0	43 04.9	+59.6	156.3	42 09.8	+59.7	156.7	41 14.6	+59.8	157.1	40 19.3	+59.8	157.4	39 23.9	+59.8	157.7	38 28.3	+59.9	158.0	31
32	45 54.0	+59.5	155.4	44 59.3	+59.6	155.8	44 04.5	+59.7	156.2	43 09.5	+59.7	156.6	42 14.4	+59.8	156.9	41 19.1	+59.8	157.3	40 23.7	+59.9	157.6	39 28.2	+59.9	157.9	32
33	46 53.5	+59.4	155.2	45 58.9	+59.6	155.6	45 04.2	+59.6	156.0	44 09.2	+59.7	156.4	43 14.2	+59.7	156.8	42 18.9	+59.8	157.2	41 23.6	+59.8	157.5	40 28.1	+59.8	157.8	33
34	47 52.9	+59.5	155.0	46 58.5	+59.5	155.4	46 03.8	+59.6	155.9	45 08.9	+59.7	156.3	44 13.9	+59.8	156.7	43 18.7	+59.8	157.1	42 23.4	+59.9	157.4	41 27.9	+59.9	157.8	34
35	48 52.4	+59.4	154.8	47 58.0	+59.5	155.3	47 03.4	+59.6	155.7	46 08.6	+59.7	156.1	45 13.7	+59.7	156.6	44 18.5	+59.8	157.0	43 23.3	+59.8	157.3	42 27.8	+59.9	157.7	35
36	49 51.8	+59.5	154.6	48 57.5	+59.6	155.1	48 03.0	+59.6	155.5	47 08.3	+59.7	156.0	46 13.4	+59.7	156.4	45 18.3	+59.8	156.8	44 23.1	+59.8	157.2	43 27.7	+59.9	157.6	36
37	50 51.3	+59.4	154.4	49 57.1	+59.4	154.9	49 02.6	+59.6	155.4	48 08.0	+59.6	155.8	47 13.1	+59.8	156.3	46 18.1	+59.8	156.7	45 22.9	+59.8	157.1	44 27.6	+59.8	157.5	37
38	51 50.7	+59.3	154.1	50 56.5	+59.5	154.7	50 02.2	+59.6	155.2	49 07.6	+59.7	155.7	48 12.9	+59.7	156.1	47 17.9	+59.8	156.6	46 22.7	+59.9	157.0	45 27.4	+59.9	157.4	38
39	52 50.0	+59.4	153.9	51 56.0	+59.5	154.5	51 01.8	+59.5	155.0	50 07.3	+59.6	155.5	49 12.6	+59.7	156.0	48 17.7	+59.7	156.5	47 22.6	+59.8	156.9	46 27.3	+59.8	157.3	39
40	53 49.4	+59.3	153.6	52 55.5	+59.4	154.2	52 01.3	+59.5	154.8	51 06.9	+59.6	155.3	50 12.3	+59.6	155.8	49 17.4	+59.8	156.3	48 22.4	+59.8	156.8	47 27.1	+59.9	157.2	40
41	54 48.7	+59.2	153.4	53 54.9	+59.4	154.0	53 00.8	+59.5	154.6	52 06.5	+59.6	155.1	51 11.9	+59.7	155.7	50 17.2	+59.7	156.2	49 22.2	+59.8	156.6	48 27.0	+59.8	157.1	41
42	55 47.9	+59.3	153.1	54 54.3	+59.3	153.8	54 00.3	+59.5	154.4	53 06.1	+59.5	155.0	52 11.6	+59.7	155.5	51 16.9	+59.7	156.0	50 22.0	+59.7	156.5	49 26.8	+59.9	157.0	42
43	56 47.2	+59.2	152.8	55 53.6	+59.4	153.5	54 59.8	+59.4	154.1	54 05.6	+59.6	154.8	53 11.3	+59.6	155.3	52 16.6	+59.7	155.9	51 21.7	+59.8	156.4	50 26.7	+59.8	156.9	43
44	57 46.4	+59.1	152.5	56 53.0	+59.2	153.2	55 59.2	+59.4	153.9	55 05.2	+59.5	154.5	54 10.9	+59.6	155.1	53 16.3	+59.7	155.7	52 21.5	+59.8	156.2	51 26.5	+59.8	156.8	44
45	58 45.5	+59.1	152.2	57 52.2	+59.3	153.0	56 58.6	+59.4	153.7	56 04.7	+59.5	154.3	55 10.5	+59.6	154.9	54 16.0	+59.7	155.5	53 21.3	+59.7	156.1	52 26.3	+59.8	156.6	45
46	59 44.6	+59.0	151.9	58 51.5	+59.2	152.7	57 58.0	+59.4	153.4	57 04.2	+59.5	154.1	56 10.1	+59.6	154.7	55 15.7	+59.7	155.4	54 21.0	+59.8	155.9	53 26.1	+59.8	156.5	46
47	60 43.6	+59.0	151.5	59 50.7	+59.2	152.3	58 57.4	+59.3	153.1	58 03.7	+59.4	153.8	57 09.7	+59.5	154.5	56 15.4	+59.6	155.2	55 20.8	+59.7	155.8	54 25.9	+59.8	156.4	47
48	61 42.6	+58.9	151.1	60 49.9	+59.1	152.0	59 56.7	+59.2	152.8	59 03.1	+59.4	153.6	58 09.2	+59.6	154.3	57 15.0	+59.6	155.0	56 20.5	+59.7	155.6	55 25.7	+59.8	156.2	48
49	62 41.5	+58.9	150.7	61 49.0	+59.0	151.6	60 55.9	+59.3	152.5	60 02.5	+59.4	153.3	59 08.8	+59.5	154.1	58 14.6	+59.6	154.8	57 20.2	+59.7	155.4	56 25.5	+59.8	156.1	49
50	63 40.4	+58.7	150.3	62 48.0	+59.0	151.3	61 55.2	+59.1	152.2	61 01.9	+59.3	153.0	60 08.3	+59.4	153.8	59 14.2	+59.6	154.5	58 19.9	+59.7	155.2	57 25.3	+59.7	155.9	50
51	64 39.1	+58.7	149.8	63 47.0	+58.9	150.8	62 54.3	+59.1	151.8	62 01.2	+59.3	152.7	61 07.7	+59.4	153.5	60 13.8	+59.6	154.3	59 19.6	+59.6	155.0	58 25.0	+59.8	155.7	51
52	65 37.8	+58.5	149.3	64 45.9	+58.8	150.4	63 53.4	+59.1	151.4	63 00.5	+59.2	152.4	62 07.1	+59.4	153.2	61 13.4	+59.5	154.1	60 19.2	+59.7	154.8	59 24.8	+59.7	155.6	52
53	66 36.3	+58.4	148.8	65 44.7	+58.7	149.9	64 52.5	+58.9	151.0	63 59.7	+59.2	152.0	63 06.5	+59.4	152.9	62 12.9	+59.5	153.8	61 18.9	+59.6	154.6	60 24.5	+59.7	155.4	53
54	67 34.7	+58.3	148.2	66 43.4	+58.6	149.4	65 51.4	+58.9	150.6	64 58.9	+59.1	151.6	64 05.9	+59.3	152.6	63 12.4	+59.5	153.5	62 18.5	+59.6	154.4	61 24.2	+59.7	155.2	54
55	68 33.0	+58.2	147.6	67 42.0	+58.5	148.9	66 50.3	+58.8	150.1	65 58.0	+59.1	151.2	65 05.2	+59.2	152.2	64 11.9	+59.4	153.2	63 18.1	+59.5	154.1	62 23.9	+59.7	154.9	55
56	69 31.2	+57.9	146.9	68 40.5	+58.4	148.3	67 49.1	+58.7	149.6	66 57.1	+58.9	150.8	66 04.4	+59.2	151.9	65 11.3	+59.4	152.9	64 17.6	+59.6	153.8	63 23.6	+59.6	154.7	56
57	70 29.1	+57.8	146.1	69 38.9	+58.2	147.6	68 47.8	+58.6	149.0	67 56.0	+58.9	150.3	67 03.6	+59.1	151.4	66 10.7	+59.3	152.5	65 17.2	+59.5	153.5	64 23.2	+59.7	154.5	57
58	71 26.9	+57.5	145.3	70 37.1	+58.0	146.9	69 46.4	+58.4	148.4	68 54.9	+58.8	149.7	68 02.7	+59.1	151.0	67 10.0	+59.2	152.2	66 16.7	+59.4	153.2	65 22.9	+59.5	154.2	58
59	72 24.4	+57.2	144.4	71 35.1	+57.8	146.1	70 44.8	+58.3	147.7	69 53.7	+58.6	149.2	69 01.8	+58.9	150.5	68 09.2	+59.2	151.7	67 16.1	+59.4	152.9	66 22.4	+59.6	153.9	59
60	73 21.6	+56.9	143.3	72 32.9	+57.5	145.2	71 43.1	+58.0	147.0	70 52.3	+58.5	148.5	70 00.7	+58.8	150.0	69 08.4	+59.2	151.3	68 15.5	+59.3	152.5	67 22.0	+59.5	153.6	60
61	74 18.5	+56.4	142.2	73 30.4	+57.2	144.3	72 41.1	+57.9	146.1	71 50.8	+58.3	147.8	70 59.6	+58.7	149.4	70 07.6	+59.0	150.8	69 14.8	+59.3	152.1	68 21.5	+59.5	153.3	61
62	75 14.9	+56.1	140.9	74 27.6	+56.9	143.2	73 39.0	+57.5	145.2	72 49.1	+58.2	147.1	71 58.3	+58.6	148.7	71 06.6	+58.9	150.3	70 14.1	+59.2	151.7	69 21.0	+59.4	152.9	62
63	76 11.0	+55.4	139.4	75 24.5	+56.4	142.0	74 36.5	+57.3	144.2	73 47.3	+57.9	146.2	72 56.9	+58.4	148.0	72 05.5	+58.8	149.7	71 13.3	+59.1	151.2	70 20.4	+59.4	152.5	63
64	77 06.4	+54.7	137.8	76 20.9	+56.0	140.6	75 33.8	+56.9	143.0	74 45.2	+57.6	145.2	73 55.3	+58.2	147.2	73 04.3	+58.7	149.0	72 12.4	+59.1	150.6	71 19.8	+59.3	152.1	64
65	78 01.1	+53.7	135.9	77 16.9	+55.2	139.0	76 30.7	+56.3	141.7	75 42.8	+57.2	144.1	74 53.5	+57.9	146.3	74 03.0	+58.5	148.3	73 11.5	+58.9	150.0	72 19.1	+59.2	151.6	65
66	78 54.8	+52.7	133.7	78 12.1	+54.4	137.1	77 27.0	+55.8	140.2	76 40.0	+56.9	142.9	75 51.4	+57.7	145.3	75 01.5	+58.3	147.4	74 10.4	+58.7	149.3	73 18.3	+59.1	151.0	66
67	79 47.5	+51.2	131.1	79 06.5	+53.4	135.0	78 22.8	+55.1	138.4	77 36.9	+56.3	141.5	76 49.1	+57.3	144.1	75 59.8	+58.0	146.5	75 09.1	+58.6	148.6	74 17.4	+59.0	150.4	67
68	80 38.7	*+49.3*	•128.0	79 59.9	+52.0	132.5	79 17.9	+54.1	136.4	78 33.2	+55.7	139.8	77 46.4	+56.8	142.8	76 57.8	+57.7	145.4	76 07.7	+58.4	147.7	75 16.4	+58.9	149.7	68
69	81 28.0	*+46.8*	•124.3	80 51.9	*+50.2*	•129.5	80 12.0	+52.8	133.9	79 28.9	+54.8	137.8	78 43.2	+56.3	141.2	77 55.5	+57.3	144.1	77 06.1	+58.1	146.7	76 15.3	+58.7	148.9	69
70	82 14.8	*+43.4*	•119.9	81 42.1	*+47.9*	•125.8	81 04.8	+51.2	131.0	80 23.7	+53.6	135.5	79 39.5	+55.4	139.3	78 52.8	+56.8	142.7	78 04.2	+57.8	145.5	77 14.0	+58.5	148.0	70
71	82 58.2	*+39.0*	•114.5	82 30.0	*+44.6*	•121.5	81 56.0	*+48.9*	•127.5	81 17.3	+52.2	132.7	80 34.9	+54.5	137.1	79 49.6	+56.2	140.9	79 02.0	+57.3	144.2	78 12.5	+58.2	147.0	71
72	83 37.2	*+33.0*	•108.0	83 14.6	*+40.2*	•116.1	82 44.9	*+45.9*	•123.1	82 09.5	*+50.0*	•129.2	81 29.4	+53.1	134.4	80 45.8	+55.2	138.8	79 59.3	+56.8	142.6	79 10.7	+57.8	145.7	72
73	84 10.2	*+25.2*	•100.1	83 54.8	*+34.2*	•109.4	83 30.8	*+41.5*	•117.7	82 59.5	*+47.1*	•125.0	82 22.5	*+51.2*	•131.1	81 41.0	+54.0	136.3	80 56.1	+56.0	140.6	80 08.5	+57.4	144.3	73
74	84 35.4	*+15.5*	• 90.8	84 29.0	*+26.2*	•101.3	84 12.3	*+35.5*	•111.0	83 46.6	*+43.0*	•119.6	83 13.7	*+48.4*	•126.9	82 35.0	*+52.3*	•133.1	81 52.1	+55.0	138.2	81 05.9	+56.7	142.5	74
75	84 50.9	*+4.3*	• 80.3	84 55.2	*+15.9*	• 91.5	84 47.8	*+27.2*	•102.5	84 29.6	*+36.9*	•112.7	84 02.1	*+44.4*	•121.6	83 27.3	*+49.8*	•129.0	82 47.1	+53.4	135.2	82 02.6	+55.9	140.2	75
76	84 55.2	*−7.4*	• 69.1	85 11.1	*+3.9*	• 80.3	85 15.0	*+16.4*	• 92.2	85 06.5	*+28.4*	•104.0	84 46.5	*+38.5*	•114.7	84 17.1	*+46.0*	•123.8	83 40.5	*+51.1*	•131.3	82 58.5	+54.5	137.4	76
77	84 47.8	*−18.2*	• 58.0	85 15.0	*−8.5*	• 68.3	85 31.4	*+3.5*	• 80.3	85 34.9	*+16.8*	• 93.1	85 25.0	*+29.7*	•105.7	85 03.1	*+40.2*	•116.9	84 31.6	*+47.7*	•126.2	83 53.0	*+52.5*	•133.8	77
78	84 29.6	*−27.5*	• 47.8	85 06.5	*−20.0*	• 56.5	85 34.9	*−9.9*	• 67.4	85 51.7	*+3.0*	• 80.2	85 54.7	*+17.4*	• 94.1	85 43.3	*+31.2*	•107.6	85 19.3	*+42.0*	•119.3	84 45.5	*+49.4*	•128.9	78
79	84 02.1	*−34.8*	• 38.9	84 46.5	*−29.4*	• 45.8	85 25.0	*−21.9*	• 54.8	85 54.7	*−11.4*	• 66.3	86 12.1	*+2.4*	• 80.2	86 14.5	*+18.1*	• 95.4	86 01.3	*+32.9*	•109.8	85 34.9	*+44.0*	•122.1	79
80	83 27.3	*−40.2*	• 31.4	84 17.1	*−36.6*	• 36.6	85 03.1	*−31.5*	• 43.5	85 43.3	*−24.0*	• 52.8	86 14.5	*−13.2*	• 65.0	86 32.6	*+1.6*	• 80.1	86 34.2	*+19.0*	• 96.8	86 18.9	*+35.0*	•112.4	80
81	82 47.1	*−44.5*	• 25.2	83 40.5	*−42.0*	• 29.1	84 31.6	*−38.6*	• 34.1	85 19.3	*−33.8*	• 41.0	86 01.3	*−26.4*	• 50.5	86 34.2	*−15.3*	• 63.4	86 53.2	*+0.7*	• 80.1	86 53.9	*+19.9*	• 98.6	81
82	82 02.6	*−47.5*	• 20.1	82 58.5	*−46.0*	• 22.9	83 53.0	*−43.8*	• 26.5	84 45.5	*−40.7*	• 31.4	85 34.9	*−36.2*	• 38.2	86 18.9	*−29.1*	• 47.8	86 53.9	*−17.8*	• 61.6	87 13.8	*−0.5*	• 80.1	82
83	81 15.1	*−49.8*	• 15.9	82 12.5	*−48.8*	• 17.9	83 09.2	*−47.5*	• 20.5	84 04.8	*−45.6*	• 23.8	84 58.7	*−42.9*	• 28.4	85 49.8	*−38.8*	• 35.0	86 36.1	*−32.2*	• 44.7	87 13.3	*−20.8*	• 59.3	83
84	80 25.3	−51.7	12.4	81 23.7	−51.0	13.8	82 21.7	*−50.1*	• 15.6	83 19.2	*−49.0*	• 17.9	84 15.8	*−47.4*	• 21.0	85 11.0	*−45.1*	• 25.2	86 03.9	*−41.5*	• 31.4	86 52.5	*−35.4*	• 41.0	84
85	79 33.6	−52.9	9.5	80 32.7	−52.5	10.5	81 31.6	−52.0	11.7	82 30.2	*−51.3*	• 13.2	83 28.4	*−50.5*	• 15.2	84 25.9	*−49.2*	• 17.9	85 22.4	*−47.3*	• 21.7	86 17.1	*−44.4*	• 27.4	85
86	78 40.7	−54.1	7.0	79 40.2	−53.8	7.6	80 39.6	−53.5	8.5	81 38.9	−53.1	9.5	82 37.9	−52.6	10.7	83 36.7	*−51.9*	• 12.4	84 35.1	*−51.0*	• 14.6	85 32.7	*−49.6*	• 17.9	86
87	77 46.6	−54.9	4.8	78 46.4	−54.8	5.3	79 46.1	−54.6	5.8	80 45.8	−54.4	6.4	81 45.3	−54.1	7.2	82 44.8	−53.7	8.2	83 44.1	−53.3	9.4	84 43.1	*−52.6*	• 11.2	87
88	76 51.7	−55.6	3.0	77 51.6	−55.5	3.3	78 51.5	−55.4	3.5	79 51.4	−55.3	3.9	80 51.2	−55.2	4.3	81 51.1	−55.1	4.8	82 50.8	−54.9	5.5	83 50.5	−54.6	6.4	88
89	75 56.1	−56.1	1.4	76 56.1	−56.1	1.5	77 56.1	−56.1	1.6	78 56.1	−56.1	1.8	79 56.0	−56.0	2.0	80 56.0	−56.0	2.2	81 55.9	−55.9	2.4	82 55.9	−55.9	2.8	89
90	75 00.0	−56.6	0.0	76 00.0	−56.6	0.0	77 00.0	−56.6	0.0	78 00.0	−56.6	0.0	79 00.0	−56.7	0.0	80 00.0	−56.7	0.0	81 00.0	−56.7	0.0	82 00.0	−56.8	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 20°, 340°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 04.6	−59.8	159.4	13 08.4	−59.8	159.4	12 12.2	−59.8	159.5	11 16.0	−59.9	159.6	10 19.7	−59.8	159.7	9 23.5	−59.9	159.7	8 27.2	−59.9	159.8	7 30.9	−60.0	159.8	0
1	13 04.8	−59.7	159.4	12 08.6	−59.8	159.5	11 12.4	−59.8	159.6	10 16.1	−59.8	159.7	9 19.9	−59.9	159.7	8 23.6	−59.9	159.8	7 27.3	−59.9	159.8	6 30.9	−59.9	159.9	1
2	12 05.1	−59.8	159.5	11 08.8	−59.8	159.6	10 12.6	−59.8	159.7	9 16.3	−59.8	159.7	8 20.0	−59.9	159.8	7 23.7	−59.9	159.8	6 27.4	−60.0	159.9	5 31.0	−59.9	159.9	2
3	11 05.3	−59.7	159.6	10 09.0	−59.7	159.7	9 12.8	−59.9	159.8	8 16.5	−59.9	159.8	7 20.1	−59.8	159.9	6 23.8	−59.9	159.9	5 27.4	−59.9	159.9	4 31.1	−59.9	160.0	3
4	10 05.6	−59.8	159.7	9 09.3	−59.8	159.8	8 12.9	−59.8	159.8	7 16.6	−59.8	159.9	6 20.3	−59.9	159.9	5 23.9	−59.9	160.0	4 27.5	−59.9	160.0	3 31.2	−60.0	160.0	4
5	9 05.8	−59.8	159.8	8 09.5	−59.8	159.9	7 13.1	−59.8	159.9	6 16.8	−59.9	160.0	5 20.4	−59.9	160.0	4 24.0	−59.9	160.0	3 27.6	−59.9	160.0	2 31.2	−59.9	160.1	5
6	8 06.0	−59.7	159.9	7 09.7	−59.8	160.0	6 13.3	−59.8	160.0	5 16.9	−59.8	160.0	4 20.5	−59.8	160.1	3 24.1	−59.9	160.1	2 27.7	−59.9	160.1	1 31.3	−59.9	160.1	6
7	7 06.3	−59.8	160.0	6 09.9	−59.8	160.0	5 13.5	−59.8	160.1	4 17.1	−59.9	160.1	3 20.7	−59.9	160.1	2 24.2	−59.9	160.1	1 27.8	−59.9	160.1	0 31.4	−60.0	160.2	7
8	6 06.5	−59.7	160.1	5 10.1	−59.8	160.1	4 13.7	−59.9	160.1	3 17.2	−59.8	160.2	2 20.8	−59.9	160.2	1 24.3	−59.9	160.2	0 27.9	−59.9	160.2	0 28.6	+59.9	19.8	8
9	5 06.8	−59.8	160.2	4 10.3	−59.8	160.2	3 13.8	−59.8	160.2	2 17.4	−59.9	160.2	1 20.9	−59.9	160.3	0 24.4	−59.9	160.3	0 32.0	+59.9	19.7	1 28.5	+59.9	19.8	9
10	4 07.0	−59.8	160.3	3 10.5	−59.8	160.3	2 14.0	−59.8	160.3	1 17.5	−59.8	160.3	0 21.0	−59.8	160.3	0 35.5	+59.8	19.7	1 31.9	+60.0	19.7	2 28.4	+60.0	19.7	10
11	3 07.2	−59.7	160.4	2 10.7	−59.8	160.4	1 14.2	−59.8	160.4	0 17.7	−59.9	160.4	0 38.8	+59.9	19.6	1 35.3	+59.9	19.6	2 31.9	+59.9	19.6	3 28.4	+59.9	19.7	11
12	2 07.5	−59.8	160.4	1 10.9	−59.8	160.5	0 14.4	−59.8	160.5	0 42.2	+59.8	19.5	1 38.7	+59.9	19.6	2 35.2	+59.9	19.6	3 31.8	+59.9	19.6	4 28.3	+59.9	19.6	12
13	1 07.7	−59.8	160.5	0 11.1	−59.8	160.5	0 45.4	+59.9	19.5	1 42.0	+59.9	19.5	2 38.6	+59.8	19.5	3 35.1	+59.9	19.5	4 31.7	+59.9	19.5	5 28.2	+60.0	19.6	13
14	0 07.9	−59.7	160.6	0 48.7	+59.8	19.4	1 45.3	+59.8	19.4	2 41.9	+59.8	19.4	3 38.4	+59.9	19.4	4 35.0	+59.9	19.4	5 31.6	+59.9	19.5	6 28.2	+59.9	19.5	14
15	0 51.8	+59.8	19.3	1 48.5	+59.8	19.3	2 45.1	+59.8	19.3	3 41.7	+59.9	19.3	4 38.3	+59.9	19.4	5 34.9	+59.9	19.4	6 31.5	+59.9	19.4	7 28.1	+59.9	19.5	15
16	1 51.6	+59.8	19.2	2 48.3	+59.7	19.2	3 44.9	+59.8	19.2	4 41.6	+59.8	19.3	5 38.2	+59.9	19.3	6 34.8	+59.9	19.3	7 31.4	+59.9	19.4	8 28.0	+60.0	19.4	16
17	2 51.4	+59.7	19.1	3 48.0	+59.8	19.1	4 44.7	+59.9	19.2	5 41.4	+59.8	19.2	6 38.1	+59.8	19.2	7 34.7	+59.9	19.3	8 31.3	+60.0	19.3	9 28.0	+59.9	19.4	17
18	3 51.1	+59.8	19.0	4 47.8	+59.8	19.1	5 44.6	+59.8	19.1	6 41.2	+59.9	19.1	7 37.9	+59.9	19.2	8 34.6	+59.9	19.2	9 31.3	+59.9	19.3	10 27.9	+59.9	19.3	18
19	4 50.9	+59.7	18.9	5 47.6	+59.8	19.0	6 44.4	+59.8	19.0	7 41.1	+59.8	19.0	8 37.8	+59.9	19.1	9 34.5	+59.9	19.1	10 31.2	+59.9	19.2	11 27.8	+59.9	19.3	19
20	5 50.6	+59.8	18.8	6 47.4	+59.8	18.9	7 44.2	+59.8	18.9	8 40.9	+59.9	19.0	9 37.7	+59.8	19.0	10 34.4	+59.9	19.1	11 31.1	+59.9	19.1	12 27.7	+60.0	19.2	20
21	6 50.4	+59.8	18.8	7 47.2	+59.8	18.8	8 44.0	+59.8	18.8	9 40.8	+59.8	18.9	10 37.5	+59.9	19.0	11 34.3	+59.9	19.0	12 31.0	+59.9	19.1	13 27.7	+59.9	19.2	21
22	7 50.2	+59.7	18.7	8 47.0	+59.8	18.7	9 43.8	+59.8	18.8	10 40.6	+59.9	18.8	11 37.4	+59.9	18.9	12 34.2	+59.9	19.0	13 30.9	+59.9	19.0	14 27.6	+59.9	19.1	22
23	8 49.9	+59.8	18.6	9 46.8	+59.8	18.6	10 43.6	+59.9	18.7	11 40.5	+59.8	18.8	12 37.3	+59.8	18.8	13 34.1	+59.8	18.9	14 30.8	+59.9	19.0	15 27.5	+60.0	19.1	23
24	9 49.7	+59.7	18.5	10 46.6	+59.8	18.5	11 43.5	+59.8	18.6	12 40.3	+59.8	18.7	13 37.1	+59.9	18.8	14 33.9	+59.9	18.8	15 30.7	+59.9	18.9	16 27.5	+59.9	19.0	24
25	10 49.4	+59.8	18.4	11 46.4	+59.8	18.5	12 43.3	+59.8	18.5	13 40.1	+59.9	18.6	14 37.0	+59.9	18.7	15 33.8	+59.9	18.8	16 30.6	+59.9	18.9	17 27.4	+59.9	19.0	25
26	11 49.2	+59.8	18.3	12 46.2	+59.7	18.4	13 43.1	+59.8	18.4	14 40.0	+59.8	18.5	15 36.9	+59.8	18.6	16 33.7	+59.9	18.7	17 30.5	+59.9	18.8	18 27.3	+59.9	18.9	26
27	12 49.0	+59.7	18.2	13 45.9	+59.8	18.3	14 42.9	+59.8	18.4	15 39.8	+59.9	18.5	16 36.7	+59.9	18.5	17 33.6	+59.9	18.6	18 30.4	+59.9	18.7	19 27.2	+60.0	18.9	27
28	13 48.7	+59.8	18.1	14 45.7	+59.8	18.2	15 42.7	+59.8	18.3	16 39.7	+59.8	18.4	17 36.6	+59.8	18.5	18 33.5	+59.9	18.6	19 30.3	+59.9	18.7	20 27.2	+59.9	18.8	28
29	14 48.5	+59.7	18.0	15 45.5	+59.8	18.1	16 42.5	+59.8	18.2	17 39.5	+59.8	18.3	18 36.4	+59.9	18.4	19 33.4	+59.8	18.5	20 30.2	+59.9	18.6	21 27.1	+59.9	18.7	29
30	15 48.2	+59.7	17.9	16 45.3	+59.7	18.0	17 42.3	+59.8	18.1	18 39.3	+59.9	18.2	19 36.3	+59.9	18.3	20 33.2	+59.9	18.4	21 30.1	+59.9	18.6	22 27.0	+59.9	18.7	30
31	16 47.9	+59.8	17.8	17 45.0	+59.8	17.9	18 42.1	+59.8	18.0	19 39.2	+59.8	18.1	20 36.2	+59.8	18.3	21 33.1	+59.9	18.4	22 30.0	+59.9	18.5	23 26.9	+59.9	18.6	31
32	17 47.7	+59.7	17.7	18 44.8	+59.8	17.8	19 41.9	+59.8	17.9	20 39.0	+59.8	18.1	21 36.0	+59.9	18.2	22 33.0	+59.9	18.3	23 29.9	+59.9	18.4	24 26.8	+59.9	18.6	32
33	18 47.4	+59.8	17.6	19 44.6	+59.8	17.7	20 41.7	+59.8	17.9	21 38.8	+59.8	18.0	22 35.9	+59.8	18.1	23 32.9	+59.8	18.2	24 29.8	+59.9	18.4	25 26.7	+60.0	18.5	33
34	19 47.2	+59.7	17.5	20 44.4	+59.7	17.6	21 41.5	+59.8	17.8	22 38.6	+59.9	17.9	23 35.7	+59.9	18.0	24 32.7	+59.9	18.2	25 29.7	+59.9	18.3	26 26.7	+59.9	18.5	34
35	20 46.9	+59.7	17.4	21 44.1	+59.8	17.6	22 41.3	+59.8	17.7	23 38.5	+59.8	17.8	24 35.6	+59.8	17.9	25 32.6	+59.9	18.1	26 29.6	+59.9	18.2	27 26.6	+59.9	18.4	35
36	21 46.6	+59.7	17.3	22 43.9	+59.7	17.5	23 41.1	+59.8	17.6	24 38.3	+59.8	17.7	25 35.4	+59.8	17.9	26 32.5	+59.8	18.0	27 29.5	+59.9	18.2	28 26.5	+59.9	18.3	36
37	22 46.3	+59.8	17.2	23 43.6	+59.8	17.4	24 40.9	+59.8	17.5	25 38.1	+59.8	17.6	26 35.2	+59.9	17.8	27 32.3	+59.9	17.9	28 29.4	+59.9	18.1	29 26.4	+59.9	18.3	37
38	23 46.1	+59.7	17.1	24 43.4	+59.7	17.3	25 40.7	+59.7	17.4	26 37.9	+59.8	17.5	27 35.1	+59.8	17.7	28 32.2	+59.9	17.9	29 29.3	+59.9	18.0	30 26.3	+59.9	18.2	38
39	24 45.8	+59.7	17.0	25 43.1	+59.8	17.2	26 40.4	+59.8	17.3	27 37.7	+59.8	17.5	28 34.9	+59.8	17.6	29 32.1	+59.8	17.8	30 29.2	+59.9	18.0	31 26.2	+59.9	18.2	39
40	25 45.5	+59.7	16.9	26 42.9	+59.7	17.1	27 40.2	+59.8	17.2	28 37.5	+59.8	17.4	29 34.7	+59.9	17.5	30 31.9	+59.9	17.7	31 29.1	+59.8	17.9	32 26.1	+59.9	18.1	40
41	26 45.2	+59.7	16.8	27 42.6	+59.8	17.0	28 40.0	+59.8	17.1	29 37.3	+59.8	17.3	30 34.6	+59.8	17.4	31 31.8	+59.8	17.6	32 28.9	+59.9	17.8	33 26.0	+59.9	18.0	41
42	27 44.9	+59.7	16.7	28 42.4	+59.7	16.8	29 39.8	+59.7	17.0	30 37.1	+59.8	17.2	31 34.4	+59.8	17.4	32 31.6	+59.9	17.5	33 28.8	+59.9	17.7	34 25.9	+59.9	17.9	42
43	28 44.6	+59.7	16.6	29 42.1	+59.7	16.7	30 39.5	+59.8	16.9	31 36.9	+59.8	17.1	32 34.2	+59.8	17.3	33 31.5	+59.8	17.5	34 28.7	+59.9	17.7	35 25.8	+59.9	17.9	43
44	29 44.3	+59.7	16.5	30 41.8	+59.7	16.6	31 39.3	+59.7	16.8	32 36.7	+59.8	17.0	33 34.0	+59.9	17.2	34 31.3	+59.9	17.4	35 28.6	+59.8	17.6	36 25.7	+59.9	17.8	44
45	30 44.0	+59.7	16.3	31 41.5	+59.7	16.5	32 39.0	+59.8	16.7	33 36.5	+59.7	16.9	34 33.9	+59.8	17.1	35 31.2	+59.8	17.3	36 28.4	+59.9	17.5	37 25.6	+59.9	17.7	45
46	31 43.7	+59.6	16.2	32 41.2	+59.7	16.4	33 38.8	+59.7	16.6	34 36.2	+59.8	16.8	35 33.7	+59.8	17.0	36 31.0	+59.8	17.2	37 28.3	+59.9	17.4	38 25.5	+59.9	17.7	46
47	32 43.3	+59.7	16.1	33 40.9	+59.7	16.3	34 38.5	+59.7	16.5	35 36.0	+59.8	16.7	36 33.5	+59.8	16.9	37 30.8	+59.9	17.1	38 28.2	+59.8	17.3	39 25.4	+59.9	17.6	47
48	33 43.0	+59.6	16.0	34 40.6	+59.7	16.2	35 38.2	+59.8	16.4	36 35.8	+59.7	16.6	37 33.3	+59.8	16.8	38 30.7	+59.8	17.0	39 28.0	+59.9	17.2	40 25.3	+59.9	17.5	48
49	34 42.6	+59.7	15.8	35 40.3	+59.7	16.0	36 38.0	+59.7	16.2	37 35.5	+59.8	16.5	38 33.1	+59.7	16.7	39 30.5	+59.8	16.9	40 27.9	+59.8	17.2	41 25.2	+59.8	17.4	49
50	35 42.3	+59.6	15.7	36 40.0	+59.7	15.9	37 37.7	+59.7	16.1	38 35.3	+59.8	16.3	39 32.8	+59.8	16.6	40 30.3	+59.8	16.8	41 27.7	+59.9	17.1	42 25.0	+59.9	17.3	50
51	36 41.9	+59.7	15.6	37 39.7	+59.7	15.8	38 37.4	+59.7	16.0	39 35.1	+59.7	16.2	40 32.6	+59.8	16.5	41 30.1	+59.8	16.7	42 27.6	+59.8	17.0	43 24.9	+59.9	17.2	51
52	37 41.6	+59.6	15.4	38 39.4	+59.6	15.6	39 37.1	+59.7	15.9	40 34.8	+59.7	16.1	41 32.4	+59.8	16.3	42 29.9	+59.8	16.6	43 27.4	+59.8	16.9	44 24.8	+59.8	17.1	52
53	38 41.2	+59.6	15.3	39 39.0	+59.7	15.5	40 36.8	+59.7	15.7	41 34.5	+59.7	16.0	42 32.2	+59.7	16.2	43 29.7	+59.8	16.5	44 27.2	+59.9	16.8	45 24.6	+59.9	17.0	53
54	39 40.8	+59.6	15.1	40 38.7	+59.6	15.4	41 36.5	+59.7	15.6	42 34.2	+59.8	15.8	43 31.9	+59.8	16.1	44 29.5	+59.8	16.4	45 27.1	+59.8	16.7	46 24.5	+59.9	17.0	54
55	40 40.4	+59.6	15.0	41 38.3	+59.6	15.2	42 36.2	+59.6	15.5	43 34.0	+59.7	15.7	44 31.7	+59.7	16.0	45 29.3	+59.8	16.3	46 26.9	+59.8	16.5	47 24.4	+59.8	16.8	55
56	41 40.0	+59.5	14.8	42 37.9	+59.6	15.1	43 35.8	+59.7	15.3	44 33.7	+59.7	15.6	45 31.4	+59.8	15.8	46 29.1	+59.8	16.1	47 26.7	+59.8	16.4	48 24.2	+59.9	16.7	56
57	42 39.5	+59.6	14.7	43 37.5	+59.6	14.9	44 35.5	+59.6	15.2	45 33.4	+59.6	15.4	46 31.2	+59.7	15.7	47 28.9	+59.7	16.0	48 26.5	+59.8	16.3	49 24.1	+59.8	16.6	57
58	43 39.1	+59.5	14.5	44 37.1	+59.6	14.8	45 35.1	+59.7	15.0	46 33.0	+59.7	15.3	47 30.9	+59.7	15.6	48 28.6	+59.8	15.9	49 26.3	+59.8	16.2	50 23.9	+59.8	16.5	58
59	44 38.6	+59.6	14.3	45 36.7	+59.6	14.6	46 34.8	+59.6	14.8	47 32.7	+59.7	15.1	48 30.6	+59.7	15.4	49 28.4	+59.7	15.7	50 26.1	+59.8	16.1	51 23.7	+59.8	16.4	59
60	45 38.2	+59.5	14.2	46 36.3	+59.6	14.4	47 34.4	+59.6	14.7	48 32.4	+59.6	15.0	49 30.3	+59.7	15.3	50 28.1	+59.8	15.6	51 25.9	+59.8	15.9	52 23.5	+59.8	16.3	60
61	46 37.7	+59.5	14.0	47 35.9	+59.5	14.2	48 34.0	+59.6	14.5	49 32.0	+59.7	14.8	50 30.0	+59.7	15.1	51 27.9	+59.7	15.4	52 25.7	+59.7	15.8	53 23.3	+59.9	16.1	61
62	47 37.2	+59.4	13.8	48 35.4	+59.5	14.0	49 33.6	+59.5	14.3	50 31.7	+59.6	14.6	51 29.7	+59.6	14.9	52 27.6	+59.7	15.3	53 25.4	+59.8	15.6	54 23.2	+59.7	16.0	62
63	48 36.6	+59.5	13.6	49 34.9	+59.5	13.9	50 33.1	+59.6	14.1	51 31.3	+59.6	14.5	52 29.3	+59.7	14.8	53 27.3	+59.7	15.1	54 25.2	+59.7	15.5	55 22.9	+59.8	15.9	63
64	49 36.1	+59.4	13.4	50 34.4	+59.5	13.7	51 32.7	+59.5	14.0	52 30.9	+59.5	14.3	53 29.0	+59.6	14.6	54 27.0	+59.7	14.9	55 24.9	+59.7	15.3	56 22.7	+59.8	15.7	64
65	50 35.5	+59.4	13.2	51 33.9	+59.4	13.4	52 32.2	+59.5	13.7	53 30.4	+59.6	14.1	54 28.6	+59.6	14.4	55 26.7	+59.6	14.8	56 24.6	+59.8	15.1	57 22.5	+59.8	15.6	65
66	51 34.9	+59.4	12.9	52 33.3	+59.5	13.2	53 31.7	+59.5	13.5	54 30.0	+59.5	13.9	55 28.2	+59.6	14.2	56 26.3	+59.7	14.6	57 24.4	+59.6	15.0	58 22.3	+59.7	15.4	66
67	52 34.3	+59.3	12.7	53 32.8	+59.4	13.0	54 31.2	+59.5	13.3	55 29.5	+59.6	13.6	56 27.8	+59.6	14.0	57 26.0	+59.6	14.4	58 24.0	+59.7	14.8	59 22.0	+59.7	15.2	67
68	53 33.6	+59.3	12.5	54 32.2	+59.3	12.8	55 30.7	+59.4	13.1	56 29.1	+59.4	13.4	57 27.4	+59.5	13.8	58 25.6	+59.6	14.2	59 23.7	+59.7	14.6	60 21.7	+59.7	15.0	68
69	54 32.9	+59.3	12.2	55 31.5	+59.4	12.5	56 30.1	+59.4	12.8	57 28.5	+59.5	13.2	58 26.9	+59.5	13.5	59 25.2	+59.6	13.9	60 23.4	+59.6	14.4	61 21.4	+59.7	14.8	69
70	55 32.2	+59.3	11.9	56 30.9	+59.3	12.2	57 29.5	+59.3	12.6	58 28.0	+59.4	12.9	59 26.4	+59.5	13.3	60 24.8	+59.5	13.7	61 23.0	+59.6	14.1	62 21.1	+59.7	14.6	70
71	56 31.5	+59.2	11.6	57 30.2	+59.2	12.0	58 28.8	+59.4	12.3	59 27.4	+59.4	12.7	60 25.9	+59.5	13.0	61 24.3	+59.6	13.5	62 22.6	+59.6	13.9	63 20.8	+59.7	14.4	71
72	57 30.7	+59.1	11.3	58 29.4	+59.3	11.7	59 28.2	+59.3	12.0	60 26.8	+59.4	12.4	61 25.4	+59.4	12.8	62 23.9	+59.4	13.2	63 22.2	+59.6	13.6	64 20.5	+59.6	14.1	72
73	58 29.8	+59.1	11.0	59 28.7	+59.1	11.4	60 27.5	+59.2	11.7	61 26.2	+59.3	12.1	62 24.8	+59.4	12.5	63 23.3	+59.5	12.9	64 21.8	+59.5	13.4	65 20.1	+59.6	13.9	73
74	59 28.9	+59.1	10.7	60 27.8	+59.2	11.0	61 26.7	+59.2	11.4	62 25.5	+59.2	11.8	63 24.2	+59.3	12.2	64 22.8	+59.4	12.6	65 21.3	+59.5	13.1	66 19.7	+59.5	13.6	74
75	60 28.0	+59.0	10.3	61 27.0	+59.0	10.7	62 25.9	+59.1	11.0	63 24.7	+59.3	11.4	64 23.5	+59.3	11.8	65 22.2	+59.4	12.3	66 20.8	+59.4	12.7	67 19.2	+59.6	13.3	75
76	61 27.0	+58.9	10.0	62 26.0	+59.0	10.3	63 25.0	+59.1	10.7	64 24.0	+59.1	11.0	65 22.8	+59.2	11.5	66 21.6	+59.3	11.9	67 20.2	+59.4	12.4	68 18.8	+59.4	12.9	76
77	62 25.9	+58.8	9.6	63 25.0	+59.0	9.9	64 24.1	+59.0	10.3	65 23.1	+59.1	10.6	66 22.0	+59.2	11.1	67 20.9	+59.2	11.5	68 19.6	+59.4	12.0	69 18.2	+59.5	12.6	77
78	63 24.7	+58.8	9.1	64 24.0	+58.8	9.5	65 23.1	+58.9	9.8	66 22.2	+59.0	10.2	67 21.2	+59.1	10.6	68 20.1	+59.2	11.1	69 19.0	+59.2	11.6	70 17.7	+59.3	12.2	78
79	64 23.5	+58.7	8.7	65 22.8	+58.8	9.0	66 22.0	+58.9	9.4	67 21.2	+58.9	9.8	68 20.3	+59.0	10.2	69 19.3	+59.1	10.7	70 18.2	+59.2	11.2	71 17.0	+59.3	11.7	79
80	65 22.2	+58.6	8.2	66 21.6	+58.6	8.5	67 20.9	+58.7	8.9	68 20.1	+58.9	9.3	69 19.3	+58.9	9.7	70 18.4	+59.0	10.2	71 17.4	+59.1	10.7	72 16.3	+59.3	11.2	80
81	66 20.8	+58.4	7.7	67 20.2	+58.6	8.0	68 19.6	+58.6	8.3	69 19.0	+58.7	8.7	70 18.2	+58.8	9.1	71 17.4	+58.9	9.6	72 16.5	+59.1	10.1	73 15.6	+59.1	10.7	81
82	67 19.2	+58.4	7.1	68 18.8	+58.4	7.4	69 18.2	+58.5	7.7	70 17.7	+58.5	8.1	71 17.0	+58.7	8.5	72 16.3	+58.8	9.0	73 15.6	+58.8	9.5	74 14.7	+59.0	10.1	82
83	68 17.6	+58.1	6.5	69 17.2	+58.2	6.8	70 16.7	+58.4	7.1	71 16.2	+58.5	7.5	72 15.7	+58.5	7.9	73 15.1	+58.6	8.3	74 14.4	+58.8	8.8	75 13.7	+58.9	9.4	83
84	69 15.7	+58.0	5.8	70 15.4	+58.1	6.1	71 15.1	+58.1	6.4	72 14.7	+58.2	6.7	73 14.2	+58.4	7.1	74 13.7	+58.5	7.6	75 13.2	+58.6	8.1	76 12.6	+58.7	8.6	84
85	70 13.7	+57.9	5.1	71 13.5	+57.9	5.3	72 13.2	+58.0	5.6	73 12.9	+58.1	5.9	74 12.6	+58.1	6.3	75 12.2	+58.2	6.7	76 11.8	+58.3	7.2	77 11.3	+58.4	7.7	85
86	71 11.6	+57.5	4.2	72 11.4	+57.6	4.5	73 11.2	+57.7	4.7	74 11.0	+57.8	5.0	75 10.7	+57.9	5.4	76 10.4	+58.0	5.7	77 10.1	+58.1	6.2	78 09.7	+58.3	6.7	86
87	72 09.1	+57.3	3.3	73 09.0	+57.4	3.5	74 08.9	+57.4	3.8	75 08.8	+57.4	4.0	76 08.6	+57.6	4.3	77 08.4	+57.7	4.6	78 08.2	+57.8	5.0	79 08.0	+57.8	5.4	87
88	73 06.4	+57.0	2.4	74 06.4	+57.0	2.5	75 06.3	+57.1	2.7	76 06.2	+57.2	2.8	77 06.2	+57.1	3.1	78 06.1	+57.2	3.3	79 06.0	+57.3	3.6	80 05.8	+57.4	4.0	88
89	74 03.4	+56.6	1.2	75 03.4	+56.6	1.3	76 03.4	+56.6	1.4	77 03.4	+56.6	1.5	78 03.3	+56.7	1.7	79 03.3	+56.7	1.8	80 03.3	+56.7	2.0	81 03.2	+56.8	2.2	89
90	75 00.0	+56.1	0.0	76 00.0	+56.1	0.0	77 00.0	+56.1	0.0	78 00.0	+56.1	0.0	79 00.0	+56.0	0.0	80 00.0	+56.0	0.0	81 00.0	+55.9	0.0	82 00.0	+55.9	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 160°, 200°

21°, 339° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 59.0	+59.7	158.3	13 03.2	+59.7	158.4	12 07.4	+59.8	158.5	11 11.5	+59.9	158.6	10 15.7	+59.8	158.6	9 19.8	+59.9	158.7	8 23.9	+59.9	158.8	7 27.9	+60.0	158.8	**0**
1	14 58.7	+59.7	158.2	14 02.9	+59.8	158.3	13 07.2	+59.8	158.4	12 11.4	+59.8	158.5	11 15.5	+59.9	158.6	10 19.7	+59.8	158.6	9 23.8	+59.9	158.7	8 27.9	+59.9	158.8	**1**
2	15 58.4	+59.7	158.1	15 02.7	+59.8	158.2	14 07.0	+59.8	158.3	13 11.2	+59.8	158.4	12 15.4	+59.8	158.5	11 19.5	+59.9	158.6	10 23.7	+59.9	158.6	9 27.8	+59.9	158.7	**2**
3	16 58.1	+59.7	158.0	16 02.5	+59.7	158.1	15 06.8	+59.7	158.2	14 11.0	+59.8	158.3	13 15.2	+59.9	158.4	12 19.4	+59.9	158.5	11 23.6	+59.9	158.6	10 27.7	+59.9	158.7	**3**
4	17 57.8	+59.8	157.9	17 02.2	+59.8	158.0	16 06.5	+59.8	158.2	15 10.8	+59.9	158.3	14 15.1	+59.8	158.4	13 19.3	+59.9	158.4	12 23.5	+59.9	158.5	11 27.6	+59.9	158.6	**4**
5	18 57.6	+59.7	157.8	18 02.0	+59.7	157.9	17 06.3	+59.8	158.1	16 10.7	+59.8	158.2	15 14.9	+59.9	158.3	14 19.2	+59.8	158.4	13 23.4	+59.9	158.5	12 27.5	+60.0	158.6	**5**
6	19 57.3	+59.7	157.7	19 01.7	+59.8	157.9	18 06.1	+59.8	158.0	17 10.5	+59.8	158.1	16 14.8	+59.8	158.2	15 19.0	+59.9	158.3	14 23.3	+59.9	158.4	13 27.5	+59.9	158.5	**6**
7	20 57.0	+59.7	157.6	20 01.5	+59.7	157.8	19 05.9	+59.8	157.9	18 10.3	+59.8	158.0	17 14.6	+59.9	158.1	16 18.9	+59.9	158.2	15 23.2	+59.9	158.4	14 27.4	+59.9	158.4	**7**
8	21 56.7	+59.7	157.5	21 01.2	+59.7	157.7	20 05.7	+59.8	157.8	19 10.1	+59.8	157.9	18 14.5	+59.8	158.1	17 18.8	+59.9	158.2	16 23.1	+59.9	158.3	15 27.3	+59.9	158.4	**8**
9	22 56.4	+59.7	157.4	22 00.9	+59.8	157.6	21 05.5	+59.7	157.7	20 09.9	+59.8	157.8	19 14.3	+59.9	158.0	18 18.7	+59.8	158.1	17 23.0	+59.9	158.2	16 27.2	+59.9	158.3	**9**
10	23 56.1	+59.6	157.3	23 00.7	+59.7	157.5	22 05.2	+59.8	157.6	21 09.7	+59.8	157.8	20 14.2	+59.8	157.9	19 18.5	+59.9	158.0	18 22.9	+59.9	158.2	17 27.1	+60.0	158.3	**10**
11	24 55.7	+59.7	157.2	24 00.4	+59.7	157.4	23 05.0	+59.8	157.5	22 09.5	+59.8	157.7	21 14.0	+59.8	157.8	20 18.4	+59.9	158.0	19 22.8	+59.9	158.1	18 27.1	+59.9	158.2	**11**
12	25 55.4	+59.7	157.1	25 00.1	+59.8	157.2	24 04.8	+59.7	157.4	23 09.3	+59.8	157.6	22 13.8	+59.9	157.7	21 18.3	+59.8	157.9	20 22.7	+59.8	158.0	19 27.0	+59.9	158.2	**12**
13	26 55.1	+59.7	156.9	25 59.9	+59.7	157.1	25 04.5	+59.8	157.3	24 09.1	+59.8	157.5	23 13.7	+59.8	157.7	22 18.1	+59.9	157.8	21 22.5	+59.9	158.0	20 26.9	+59.9	158.1	**13**
14	27 54.8	+59.6	156.8	26 59.6	+59.7	157.0	26 04.3	+59.7	157.2	25 08.9	+59.8	157.4	24 13.5	+59.8	157.6	23 18.0	+59.9	157.8	22 22.4	+59.9	157.9	21 26.8	+59.9	158.1	**14**
15	28 54.4	+59.7	156.7	27 59.3	+59.7	156.9	27 04.0	+59.8	157.1	26 08.7	+59.8	157.3	25 13.3	+59.9	157.5	24 17.9	+59.8	157.7	23 22.3	+59.9	157.8	22 26.7	+59.9	158.0	**15**
16	29 54.1	+59.7	156.6	28 59.0	+59.7	156.8	28 03.8	+59.7	157.0	27 08.5	+59.8	157.2	26 13.2	+59.8	157.4	25 17.7	+59.9	157.6	24 22.2	+59.9	157.8	23 26.6	+59.9	157.9	**16**
17	30 53.8	+59.6	156.5	29 58.7	+59.7	156.7	29 03.5	+59.8	156.9	28 08.3	+59.8	157.1	27 13.0	+59.8	157.3	26 17.6	+59.8	157.5	25 22.1	+59.9	157.7	24 26.5	+60.0	157.9	**17**
18	31 53.4	+59.6	156.3	30 58.4	+59.7	156.6	30 03.3	+59.7	156.8	29 08.1	+59.8	157.0	28 12.8	+59.8	157.2	27 17.4	+59.9	157.4	26 22.0	+59.9	157.6	25 26.5	+59.9	157.8	**18**
19	32 53.0	+59.7	156.2	31 58.1	+59.7	156.5	31 03.0	+59.8	156.7	30 07.9	+59.7	156.9	29 12.6	+59.8	157.2	28 17.3	+59.8	157.4	27 21.9	+59.8	157.6	26 26.4	+59.9	157.8	**19**
20	33 52.7	+59.6	156.1	32 57.8	+59.6	156.3	32 02.8	+59.7	156.6	31 07.6	+59.8	156.8	30 12.4	+59.8	157.1	29 17.1	+59.9	157.3	28 21.7	+59.9	157.5	27 26.3	+59.9	157.7	**20**
21	34 52.3	+59.6	155.9	33 57.4	+59.7	156.2	33 02.5	+59.7	156.5	32 07.4	+59.8	156.7	31 12.2	+59.8	157.0	30 17.0	+59.8	157.2	29 21.6	+59.9	157.4	28 26.2	+59.9	157.6	**21**
22	35 51.9	+59.6	155.8	34 57.1	+59.7	156.1	34 02.2	+59.7	156.4	33 07.2	+59.7	156.6	32 12.0	+59.9	156.9	31 16.8	+59.9	157.1	30 21.5	+59.9	157.4	29 26.1	+59.9	157.6	**22**
23	36 51.5	+59.6	155.7	35 56.8	+59.6	156.0	35 01.9	+59.7	156.2	34 06.9	+59.8	156.5	33 11.9	+59.7	156.8	32 16.7	+59.8	157.0	31 21.4	+59.8	157.3	30 26.0	+59.9	157.5	**23**
24	37 51.1	+59.6	155.5	36 56.4	+59.7	155.8	36 01.6	+59.7	156.1	35 06.7	+59.7	156.4	34 11.6	+59.8	156.7	33 16.5	+59.8	156.9	32 21.2	+59.9	157.2	31 25.9	+59.9	157.4	**24**
25	38 50.7	+59.5	155.4	37 56.1	+59.6	155.7	37 01.3	+59.7	156.0	36 06.4	+59.8	156.3	35 11.4	+59.8	156.6	34 16.3	+59.9	156.9	33 21.1	+59.9	157.1	32 25.8	+59.9	157.4	**25**
26	39 50.2	+59.6	155.2	38 55.7	+59.6	155.5	38 01.0	+59.7	155.9	37 06.2	+59.7	156.2	36 11.2	+59.8	156.5	35 16.2	+59.8	156.8	34 21.0	+59.8	157.0	33 25.7	+59.9	157.3	**26**
27	40 49.8	+59.5	155.0	39 55.3	+59.6	155.4	39 00.7	+59.7	155.7	38 05.9	+59.7	156.1	37 11.0	+59.8	156.4	36 16.0	+59.8	156.7	35 20.8	+59.9	157.0	34 25.6	+59.8	157.2	**27**
28	41 49.3	+59.6	154.9	40 54.9	+59.6	155.2	40 00.4	+59.6	155.6	39 05.6	+59.8	155.9	38 10.8	+59.8	156.3	37 15.8	+59.8	156.6	36 20.7	+59.8	156.9	35 25.4	+59.9	157.2	**28**
29	42 48.9	+59.5	154.7	41 54.5	+59.6	155.1	41 00.0	+59.7	155.5	40 05.4	+59.7	155.8	39 10.6	+59.7	156.2	38 15.6	+59.8	156.5	37 20.5	+59.9	156.8	36 25.3	+59.9	157.1	**29**
30	43 48.4	+59.5	154.5	42 54.1	+59.6	154.9	41 59.7	+59.6	155.3	41 05.1	+59.7	155.7	40 10.3	+59.8	156.0	39 15.4	+59.8	156.4	38 20.4	+59.8	156.7	37 25.2	+59.9	157.0	**30**
31	44 47.9	+59.4	154.3	43 53.7	+59.5	154.8	42 59.3	+59.6	155.2	42 04.8	+59.7	155.6	41 10.1	+59.7	155.9	40 15.2	+59.8	156.3	39 20.2	+59.9	156.6	38 25.1	+59.9	156.9	**31**
32	45 47.3	+59.5	154.2	44 53.2	+59.6	154.6	43 58.9	+59.7	155.0	43 04.5	+59.6	155.4	42 09.8	+59.8	155.8	41 15.0	+59.8	156.2	40 20.1	+59.8	156.5	39 25.0	+59.8	156.8	**32**
33	46 46.8	+59.4	154.0	45 52.8	+59.5	154.4	44 58.6	+59.6	154.9	44 04.1	+59.7	155.3	43 09.6	+59.7	155.7	42 14.8	+59.8	156.0	41 19.9	+59.8	156.4	40 24.8	+59.9	156.7	**33**
34	47 46.2	+59.4	153.8	46 52.3	+59.5	154.2	45 58.2	+59.5	154.7	45 03.8	+59.7	155.1	44 09.3	+59.7	155.5	43 14.6	+59.8	155.9	42 19.7	+59.9	156.3	41 24.7	+59.9	156.7	**34**
35	48 45.6	+59.4	153.6	47 51.8	+59.5	154.1	46 57.7	+59.6	154.5	46 03.5	+59.6	155.0	45 09.0	+59.7	155.4	44 14.4	+59.7	155.8	43 19.6	+59.8	156.2	42 24.6	+59.8	156.6	**35**
36	49 45.0	+59.4	153.3	48 51.3	+59.5	153.9	47 57.3	+59.6	154.3	47 03.1	+59.7	154.8	46 08.7	+59.7	155.3	45 14.1	+59.8	155.7	44 19.4	+59.8	156.1	43 24.4	+59.9	156.5	**36**
37	50 44.4	+59.3	153.1	49 50.8	+59.4	153.7	48 56.9	+59.5	154.2	48 02.8	+59.6	154.7	47 08.4	+59.7	155.1	46 13.9	+59.8	155.6	45 19.2	+59.8	156.0	44 24.3	+59.8	156.4	**37**
38	51 43.7	+59.3	152.9	50 50.2	+59.4	153.4	49 56.4	+59.5	154.0	49 02.4	+59.6	154.5	48 08.1	+59.7	155.0	47 13.7	+59.7	155.4	46 19.0	+59.8	155.9	45 24.1	+59.9	156.3	**38**
39	52 43.0	+59.3	152.6	51 49.6	+59.4	153.2	50 55.9	+59.5	153.8	50 02.0	+59.6	154.3	49 07.8	+59.7	154.8	48 13.4	+59.7	155.3	47 18.8	+59.8	155.7	46 24.0	+59.8	156.2	**39**
40	53 42.3	+59.3	152.4	52 49.0	+59.4	153.0	51 55.4	+59.5	153.6	51 01.6	+59.5	154.1	50 07.5	+59.6	154.6	49 13.1	+59.7	155.1	48 18.6	+59.8	155.6	47 23.8	+59.9	156.1	**40**
41	54 41.6	+59.2	152.1	53 48.4	+59.3	152.7	52 54.9	+59.4	153.4	52 01.1	+59.6	153.9	51 07.1	+59.6	154.5	50 12.8	+59.8	155.0	49 18.4	+59.7	155.5	48 23.7	+59.8	156.0	**41**
42	55 40.8	+59.1	151.8	54 47.7	+59.3	152.5	53 54.3	+59.5	153.1	53 00.7	+59.5	153.7	52 06.7	+59.7	154.3	51 12.6	+59.7	154.8	50 18.1	+59.8	155.4	49 23.5	+59.8	155.8	**42**
43	56 39.9	+59.1	151.5	55 47.0	+59.3	152.2	54 53.8	+59.4	152.9	54 00.2	+59.5	153.5	53 06.4	+59.6	154.1	52 12.3	+59.6	154.7	51 17.9	+59.8	155.2	50 23.3	+59.8	155.7	**43**
44	57 39.0	+59.1	151.2	56 46.3	+59.2	151.9	55 53.2	+59.3	152.6	54 59.7	+59.5	153.3	54 06.0	+59.5	153.9	53 11.9	+59.7	154.5	52 17.7	+59.7	155.1	51 23.1	+59.8	155.6	**44**
45	58 38.1	+59.0	150.9	57 45.5	+59.2	151.6	56 52.5	+59.3	152.4	55 59.2	+59.4	153.1	55 05.5	+59.6	153.7	54 11.6	+59.7	154.3	53 17.4	+59.7	154.9	52 22.9	+59.8	155.5	**45**
46	59 37.1	+59.0	150.5	58 44.7	+59.1	151.3	57 51.8	+59.3	152.1	56 58.6	+59.5	152.8	56 05.1	+59.5	153.5	55 11.3	+59.6	154.1	54 17.1	+59.7	154.8	53 22.7	+59.8	155.3	**46**
47	60 36.1	+58.9	150.1	59 43.8	+59.1	151.0	58 51.1	+59.3	151.8	57 58.1	+59.4	152.6	57 04.6	+59.5	153.3	56 10.9	+59.6	154.0	55 16.8	+59.7	154.6	54 22.5	+59.8	155.2	**47**
48	61 35.0	+58.8	149.7	60 42.9	+59.0	150.6	59 50.4	+59.2	151.5	58 57.5	+59.3	152.3	58 04.1	+59.5	153.0	57 10.5	+59.6	153.7	56 16.5	+59.7	154.4	55 22.3	+59.7	155.0	**48**
49	62 33.8	+58.7	149.3	61 41.9	+59.0	150.3	60 49.6	+59.1	151.2	59 56.8	+59.3	152.0	59 03.6	+59.5	152.8	58 10.1	+59.6	153.5	57 16.2	+59.7	154.2	56 22.0	+59.8	154.9	**49**
50	63 32.5	+58.6	148.9	62 40.9	+58.8	149.9	61 48.7	+59.1	150.8	60 56.1	+59.3	151.7	60 03.1	+59.4	152.5	59 09.7	+59.5	153.3	58 15.9	+59.6	154.0	57 21.8	+59.7	154.7	**50**
51	64 31.1	+58.6	148.4	63 39.7	+58.8	149.4	62 47.8	+59.0	150.4	61 55.4	+59.2	151.4	61 02.5	+59.4	152.2	60 09.2	+59.5	153.1	59 15.5	+59.7	153.8	58 21.5	+59.7	154.5	**51**
52	65 29.7	+58.4	147.9	64 38.5	+58.8	149.0	63 46.8	+59.0	150.0	62 54.6	+59.2	151.0	62 01.9	+59.3	151.9	61 08.7	+59.5	152.8	60 15.2	+59.6	153.6	59 21.2	+59.8	154.4	**52**
53	66 28.1	+58.3	147.3	65 37.3	+58.6	148.5	64 45.8	+58.9	149.6	63 53.8	+59.1	150.6	63 01.2	+59.3	151.6	62 08.2	+59.5	152.5	61 14.8	+59.5	153.4	60 21.0	+59.6	154.2	**53**
54	67 26.4	+58.1	146.7	66 35.9	+58.5	148.0	65 44.7	+58.8	149.2	64 52.9	+59.0	150.2	64 00.5	+59.2	151.3	63 07.7	+59.4	152.2	62 14.3	+59.6	153.1	61 20.6	+59.7	153.9	**54**
55	68 24.5	+58.0	146.0	67 34.4	+58.3	147.4	66 43.5	+58.6	148.7	65 51.9	+59.0	149.8	64 59.7	+59.2	150.9	64 07.1	+59.3	151.9	63 13.9	+59.5	152.8	62 20.3	+59.6	153.7	**55**
56	69 22.5	+57.8	145.3	68 32.7	+58.2	146.8	67 42.1	+58.6	148.1	66 50.9	+58.8	149.4	65 58.9	+59.1	150.5	65 06.4	+59.3	151.6	64 13.4	+59.5	152.6	63 19.9	+59.7	153.5	**56**
57	70 20.3	+57.5	144.5	69 30.9	+58.1	146.1	68 40.7	+58.4	147.5	67 49.7	+58.8	148.9	66 58.0	+59.1	150.1	66 05.7	+59.3	151.2	65 12.9	+59.4	152.3	64 19.6	+59.5	153.2	**57**
58	71 17.8	+57.3	143.7	70 29.0	+57.8	145.4	69 39.1	+58.3	146.9	68 48.5	+58.6	148.3	67 57.1	+58.9	149.6	67 05.0	+59.2	150.8	66 12.3	+59.4	151.9	65 19.1	+59.6	152.9	**58**
59	72 15.1	+57.0	142.7	71 26.8	+57.6	144.5	70 37.4	+58.1	146.2	69 47.1	+58.6	147.7	68 56.0	+58.9	149.1	68 04.2	+59.1	150.4	67 11.7	+59.4	151.6	66 18.7	+59.5	152.7	**59**
60	73 12.1	+56.7	141.7	72 24.4	+57.4	143.6	71 35.5	+57.9	145.4	70 45.7	+58.3	147.1	69 54.9	+58.7	148.5	69 03.3	+59.1	149.9	68 11.1	+59.3	151.2	67 18.2	+59.5	152.3	**60**
61	74 08.8	+56.2	140.5	73 21.8	+57.0	142.6	72 33.4	+57.7	144.6	71 44.0	+58.2	146.3	70 53.6	+58.6	147.9	70 02.4	+58.9	149.4	69 10.4	+59.2	150.7	68 17.7	+59.4	152.0	**61**
62	75 05.0	+55.7	139.2	74 18.8	+56.6	141.5	73 31.1	+57.4	143.6	72 42.2	+58.0	145.5	71 52.2	+58.5	147.3	71 01.3	+58.8	148.8	70 09.6	+59.1	150.3	69 17.1	+59.4	151.6	**62**
63	76 00.7	+55.1	137.7	75 15.4	+56.2	140.3	74 28.5	+57.0	142.6	73 40.2	+57.7	144.6	72 50.7	+58.2	146.5	72 00.1	+58.7	148.2	71 08.7	+59.0	149.8	70 16.5	+59.3	151.2	**63**
64	76 55.8	+54.3	136.0	76 11.6	+55.6	138.8	75 25.5	+56.6	141.4	74 37.9	+57.4	143.6	73 48.9	+58.1	145.7	72 58.8	+58.6	147.5	72 07.7	+59.0	149.2	71 15.8	+59.2	150.7	**64**
65	77 50.1	+53.3	134.1	77 07.2	+54.9	137.2	76 22.1	+56.1	140.0	75 35.3	+57.1	142.5	74 47.0	+57.8	144.8	73 57.4	+58.3	146.8	73 06.7	+58.8	148.6	72 15.0	+59.2	150.2	**65**
66	78 43.4	+52.2	131.8	78 02.1	+54.0	135.3	77 18.2	+55.5	138.5	76 32.4	+56.6	141.2	75 44.8	+57.5	143.7	74 55.7	+58.2	145.9	74 05.5	+58.6	147.9	73 14.2	+59.0	149.6	**66**
67	79 35.6	+50.7	129.2	78 56.1	+52.9	133.1	78 13.7	+54.7	136.7	77 29.0	+56.0	139.8	76 42.3	+57.0	142.5	75 53.9	+57.8	144.9	75 04.1	+58.5	147.1	74 13.2	+58.9	149.0	**67**
68	80 26.3	*+48.7*	•126.1	79 49.0	+51.6	130.6	79 08.4	+53.7	134.6	78 25.0	+55.4	138.0	77 39.3	+56.6	141.1	76 51.7	+57.6	143.8	76 02.6	+58.2	146.2	75 12.1	+58.8	148.3	**68**
69	81 15.0	*+46.2*	•122.4	80 40.6	*+49.6*	•127.6	80 02.1	+52.4	132.1	79 20.4	+54.4	136.0	78 35.9	+56.0	139.5	77 49.3	+57.1	142.5	77 00.8	+58.0	145.1	76 10.9	+58.6	147.5	**69**
70	82 01.2	*+42.8*	•118.0	81 30.2	*+47.3*	•123.9	80 54.5	*+50.6*	•129.1	80 14.8	+53.2	133.7	79 31.9	+55.1	137.6	78 46.4	+56.5	141.0	77 58.8	+57.6	143.9	77 09.5	+58.3	146.5	**70**
71	82 44.0	*+38.3*	•112.7	82 17.5	*+44.0*	•119.6	81 45.1	*+48.4*	•125.6	81 08.0	+51.7	130.8	80 27.0	+54.1	135.3	79 42.9	+55.9	139.2	78 56.4	+57.1	142.5	78 07.8	+58.1	145.4	**71**
72	83 22.3	*+32.6*	•106.4	83 01.5	*+39.6*	•114.2	82 33.5	*+45.2*	•121.2	81 59.7	*+49.5*	•127.3	81 21.1	+52.6	132.6	80 38.8	+54.9	137.0	79 53.5	+56.5	140.9	79 05.9	+57.6	144.2	**72**
73	83 54.9	*+25.0*	• 98.8	83 41.1	*+33.7*	•107.7	83 18.7	*+40.9*	•115.9	82 49.2	*+46.5*	•123.0	82 13.7	*+50.7*	•129.2	81 33.7	+53.6	134.4	80 50.0	+55.7	138.9	80 03.5	+57.2	142.6	**73**
74	84 19.9	*+15.7*	• 89.9	84 14.8	*+25.9*	• 99.8	83 59.6	*+35.0*	•109.3	83 35.7	*+42.3*	•117.7	83 04.4	*+47.9*	•125.0	82 27.3	*+51.8*	•131.2	81 45.7	+54.6	136.4	81 00.7	+56.5	140.8	**74**
75	84 35.6	*+5.1*	• 79.9	84 40.7	*+16.1*	• 90.5	84 34.6	*+26.9*	•101.1	84 18.0	*+36.3*	•111.0	83 52.3	*+43.8*	•119.7	83 19.1	*+49.3*	•127.1	82 40.3	+53.0	133.3	81 57.2	+55.5	138.5	**75**
76	84 40.7	*−6.1*	• 69.2	84 56.8	*+4.7*	• 79.8	85 01.5	*+16.6*	• 91.2	84 54.3	*+28.1*	•102.5	84 36.1	*+37.8*	•112.9	84 08.4	*+45.4*	•121.9	83 33.3	*+50.7*	•129.4	82 52.7	+54.2	135.6	**76**
77	84 34.6	*−16.6*	• 58.5	85 01.5	*−7.2*	• 68.4	85 18.1	*+4.3*	• 79.8	85 22.4	*+17.0*	• 92.0	85 13.9	*+29.4*	•104.1	84 53.8	*+39.5*	•115.0	84 24.0	*+47.0*	•124.3	83 46.9	*+52.0*	•131.9	**77**
78	84 18.0	*−25.7*	• 48.6	84 54.3	*−18.2*	• 57.0	85 22.4	*−8.5*	• 67.5	85 39.4	*+3.9*	• 79.7	85 43.3	*+17.6*	• 93.0	85 33.3	*+30.8*	•106.0	85 11.0	*+41.4*	•117.4	84 38.9	*+48.8*	•127.0	**78**
79	83 52.3	*−33.2*	• 39.8	84 36.1	*−27.7*	• 46.6	85 13.9	*−20.1*	• 55.4	85 43.3	*−10.0*	• 66.4	86 00.9	*+3.2*	• 79.7	86 04.1	*+18.3*	• 94.2	85 52.4	*+32.5*	•108.1	85 27.7	*+43.5*	•120.2	**79**
80	83 19.1	*−38.8*	• 32.3	84 08.4	*−35.1*	• 37.6	84 53.8	*−29.8*	• 44.4	85 33.3	*−22.3*	• 53.4	86 04.1	*−11.7*	• 65.2	86 22.4	*+2.5*	• 79.7	86 24.9	*+19.1*	• 95.6	86 11.2	*+34.4*	•110.7	**80**
81	82 40.3	*−43.1*	• 26.1	83 33.3	*−40.6*	• 30.0	84 24.0	*−37.1*	• 35.1	85 11.0	*−32.1*	• 41.9	85 52.4	*−24.7*	• 51.2	86 24.9	*−13.7*	• 63.7	86 44.0	*+1.6*	• 79.6	86 45.6	*+20.0*	• 97.3	**81**
82	81 57.2	*−46.4*	• 20.9	82 52.7	*−44.7*	• 23.7	83 46.9	*−42.5*	• 27.4	84 38.9	*−39.2*	• 32.3	85 27.7	*−34.5*	• 39.1	86 11.2	*−27.4*	• 48.6	86 45.6	*−16.2*	• 61.9	87 05.6	*+0.5*	• 79.6	**82**
83	81 10.8	*−49.0*	• 16.5	82 08.0	*−47.8*	• 18.6	83 04.4	*−46.4*	• 21.2	83 59.7	*−44.4*	• 24.7	84 53.2	*−41.6*	• 29.3	85 43.8	*−37.3*	• 35.9	86 29.4	*−30.4*	• 45.5	87 06.1	*−19.1*	• 59.8	**83**
84	80 21.8	−50.8	12.9	81 20.2	*−50.2*	• 14.4	82 18.0	*−49.2*	• 16.2	83 15.3	*−48.0*	• 18.6	84 11.6	*−46.3*	• 21.7	85 06.5	*−43.8*	• 26.1	85 59.0	*−40.1*	• 32.3	86 47.0	*−33.8*	• 41.9	**84**
85	79 31.0	−52.3	9.9	80 30.0	−51.8	10.9	81 28.8	−51.2	12.2	82 27.3	*−50.5*	• 13.8	83 25.3	*−49.5*	• 15.8	84 22.7	*−48.3*	• 18.6	85 18.9	*−46.2*	• 22.5	86 13.2	*−43.1*	• 28.3	**85**
86	78 38.7	−53.4	7.3	79 38.2	−53.2	8.0	80 37.6	−52.9	8.8	81 36.8	−52.5	9.9	82 35.8	*−51.9*	• 11.2	83 34.4	*−51.1*	• 12.9	84 32.7	*−50.2*	• 15.2	85 30.1	*−48.6*	• 18.6	**86**
87	77 45.3	−54.4	5.1	78 45.0	−54.2	5.5	79 44.7	−54.0	6.0	80 44.3	−53.8	6.7	81 43.9	−53.5	7.5	82 43.3	−53.1	8.5	83 42.5	*−52.6*	• 9.9	84 41.5	*−52.0*	• 11.7	**87**
88	76 50.9	−55.2	3.2	77 50.8	−55.1	3.4	78 50.7	−55.0	3.7	79 50.5	−54.8	4.1	80 50.4	−54.8	4.5	81 50.2	−54.6	5.1	82 49.9	−54.4	5.8	83 49.5	−54.0	6.7	**88**
89	75 55.7	−55.7	1.5	76 55.7	−55.7	1.6	77 55.7	−55.7	1.7	78 55.7	−55.7	1.9	79 55.6	−55.6	2.0	80 55.6	−55.6	2.3	81 55.5	−55.5	2.6	82 55.5	−55.5	2.9	**89**
90	75 00.0	−56.3	0.0	76 00.0	−56.3	0.0	77 00.0	−56.3	0.0	78 00.0	−56.3	0.0	79 00.0	−56.3	0.0	80 00.0	−56.4	0.0	81 00.0	−56.4	0.0	82 00.0	−56.4	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 21°, 339°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 59.0	– 59.8	158.3	13 03.2	– 59.8	158.4	12 07.4	– 59.8	158.5	11 11.5	– 59.8	158.6	10 15.7	– 59.9	158.6	9 19.8	– 59.9	158.7	8 23.9	– 59.9	158.8	7 27.9	– 59.9	158.8	0
1	12 59.2	– 59.7	158.4	12 03.4	– 59.7	158.5	11 07.6	– 59.8	158.6	10 11.7	– 59.8	158.7	9 15.8	– 59.8	158.7	8 19.9	– 59.9	158.8	7 24.0	– 59.9	158.8	6 28.0	– 59.9	158.9	1
2	11 59.5	– 59.7	158.5	11 03.7	– 59.8	158.6	10 07.8	– 59.8	158.7	9 11.9	– 59.8	158.7	8 16.0	– 59.9	158.8	7 20.0	– 59.9	158.8	6 24.1	– 59.9	158.9	5 28.1	– 59.9	158.9	2
3	10 59.8	– 59.8	158.6	10 03.9	– 59.8	158.7	9 08.0	– 59.8	158.7	8 12.1	– 59.9	158.8	7 16.1	– 59.9	158.9	6 20.1	– 59.8	158.9	5 24.2	– 60.0	158.9	4 28.2	– 60.0	159.0	3
4	10 00.0	– 59.7	158.7	9 04.1	– 59.7	158.8	8 08.2	– 59.8	158.8	7 12.2	– 59.8	158.9	6 16.2	– 59.8	158.9	5 20.3	– 59.9	159.0	4 24.2	– 59.9	159.0	3 28.2	– 59.9	159.0	4
5	9 00.3	– 59.7	158.8	8 04.4	– 59.8	158.9	7 08.4	– 59.8	158.9	6 12.4	– 59.8	159.0	5 16.4	– 59.9	159.0	4 20.4	– 59.9	159.0	3 24.3	– 59.9	159.0	2 28.3	– 59.9	159.1	5
6	8 00.6	– 59.8	158.9	7 04.6	– 59.8	159.0	6 08.6	– 59.8	159.0	5 12.6	– 59.9	159.0	4 16.5	– 59.8	159.1	3 20.5	– 59.9	159.1	2 24.4	– 59.9	159.1	1 28.4	– 59.9	159.1	6
7	7 00.8	– 59.7	159.0	6 04.8	– 59.8	159.0	5 08.8	– 59.8	159.1	4 12.7	– 59.8	159.1	3 16.7	– 59.9	159.1	2 20.6	– 59.9	159.1	1 24.5	– 59.9	159.2	0 28.5	– 60.0	159.2	7
8	6 01.1	– 59.7	159.1	5 05.0	– 59.7	159.1	4 09.0	– 59.8	159.2	3 12.9	– 59.8	159.2	2 16.8	– 59.8	159.2	1 20.7	– 59.9	159.2	0 24.6	– 59.9	159.2	0 31.5	+ 59.9	20.8	8
9	5 01.4	– 59.8	159.2	4 05.3	– 59.8	159.2	3 09.2	– 59.8	159.2	2 13.1	– 59.9	159.3	1 17.0	– 59.9	159.3	0 20.8	– 59.8	159.3	0 35.3	+ 59.9	20.7	1 31.4	+ 59.9	20.7	9
10	4 01.6	– 59.7	159.3	3 05.5	– 59.8	159.3	2 09.4	– 59.8	159.3	1 13.2	– 59.8	159.3	0 17.1	– 59.9	159.3	0 39.0	+ 59.9	20.7	1 35.2	+ 59.9	20.7	2 31.3	+ 59.9	20.7	10
11	3 01.9	– 59.8	159.4	2 05.7	– 59.8	159.4	1 09.6	– 59.8	159.4	0 13.4	– 59.8	159.4	0 42.8	+ 59.8	20.6	1 38.9	+ 59.9	20.6	2 35.1	+ 59.9	20.6	3 31.2	+ 60.0	20.6	11
12	2 02.1	– 59.7	159.5	1 05.9	– 59.7	159.5	0 09.8	– 59.8	159.5	0 46.4	+ 59.9	20.5	1 42.6	+ 59.9	20.5	2 38.8	+ 59.9	20.5	3 35.0	+ 59.9	20.6	4 31.2	+ 59.9	20.6	12
13	1 02.4	– 59.7	159.6	0 06.2	– 59.8	159.6	0 50.0	+ 59.9	20.4	1 46.3	+ 59.8	20.4	2 42.5	+ 59.8	20.5	3 38.7	+ 59.9	20.5	4 34.9	+ 59.9	20.5	5 31.1	+ 59.9	20.5	13
14	0 02.7	– 59.8	159.7	0 53.6	+ 59.8	20.4	1 49.9	+ 59.8	20.4	2 46.1	+ 59.8	20.4	3 42.3	+ 59.9	20.4	4 38.6	+ 59.9	20.4	5 34.8	+ 59.9	20.4	6 31.0	+ 59.9	20.5	14
15	0 57.1	+ 59.7	20.3	1 53.4	+ 59.7	20.3	2 49.7	+ 59.8	20.3	3 45.9	+ 59.9	20.3	4 42.2	+ 59.9	20.3	5 38.5	+ 59.8	20.4	6 34.7	+ 59.9	20.4	7 30.9	+ 60.0	20.4	15
16	1 56.8	+ 59.8	20.2	2 53.1	+ 59.8	20.2	3 49.5	+ 59.8	20.2	4 45.8	+ 59.8	20.2	5 42.1	+ 59.8	20.3	6 38.3	+ 59.9	20.3	7 34.6	+ 59.9	20.3	8 30.9	+ 59.9	20.4	16
17	2 56.6	+ 59.7	20.1	3 52.9	+ 59.8	20.1	4 49.3	+ 59.8	20.1	5 45.6	+ 59.8	20.1	6 41.9	+ 59.9	20.2	7 38.2	+ 59.9	20.2	8 34.5	+ 59.9	20.3	9 30.8	+ 59.9	20.3	17
18	3 56.3	+ 59.7	20.0	4 52.7	+ 59.8	20.0	5 49.1	+ 59.8	20.0	6 45.4	+ 59.9	20.1	7 41.8	+ 59.8	20.1	8 38.1	+ 59.9	20.2	9 34.4	+ 59.9	20.2	10 30.7	+ 59.9	20.3	18
19	4 56.0	+ 59.8	19.9	5 52.5	+ 59.7	19.9	6 48.9	+ 59.8	20.0	7 45.3	+ 59.8	20.0	8 41.6	+ 59.9	20.0	9 38.0	+ 59.9	20.1	10 34.3	+ 59.9	20.2	11 30.6	+ 60.0	20.2	19
20	5 55.8	+ 59.7	19.8	6 52.2	+ 59.8	19.8	7 48.7	+ 59.8	19.9	8 45.1	+ 59.8	19.9	9 41.5	+ 59.8	20.0	10 37.9	+ 59.9	20.0	11 34.2	+ 59.9	20.1	12 30.6	+ 59.9	20.2	20
21	6 55.5	+ 59.8	19.7	7 52.0	+ 59.8	19.7	8 48.5	+ 59.8	19.8	9 44.9	+ 59.8	19.8	10 41.3	+ 59.9	19.9	11 37.8	+ 59.8	20.0	12 34.1	+ 59.9	20.0	13 30.5	+ 59.9	20.1	21
22	7 55.3	+ 59.7	19.6	8 51.8	+ 59.7	19.7	9 48.3	+ 59.8	19.7	10 44.7	+ 59.9	19.8	11 41.2	+ 59.9	19.8	12 37.6	+ 59.9	19.9	13 34.0	+ 59.9	20.0	14 30.4	+ 59.9	20.1	22
23	8 55.0	+ 59.7	19.5	9 51.5	+ 59.8	19.6	10 48.1	+ 59.8	19.6	11 44.6	+ 59.8	19.7	12 41.1	+ 59.8	19.8	13 37.5	+ 59.9	19.8	14 33.9	+ 59.9	19.9	15 30.3	+ 59.9	20.0	23
24	9 54.7	+ 59.8	19.4	10 51.3	+ 59.8	19.5	11 47.9	+ 59.8	19.5	12 44.4	+ 59.8	19.6	13 40.9	+ 59.9	19.7	14 37.4	+ 59.9	19.8	15 33.8	+ 59.9	19.9	16 30.2	+ 60.0	20.0	24
25	10 54.5	+ 59.7	19.3	11 51.1	+ 59.7	19.4	12 47.7	+ 59.8	19.5	13 44.2	+ 59.8	19.5	14 40.8	+ 59.8	19.6	15 37.3	+ 59.8	19.7	16 33.7	+ 59.9	19.8	17 30.2	+ 59.9	19.9	25
26	11 54.2	+ 59.7	19.2	12 50.8	+ 59.8	19.3	13 47.5	+ 59.7	19.4	14 44.0	+ 59.9	19.5	15 40.6	+ 59.9	19.5	16 37.1	+ 59.9	19.6	17 33.6	+ 59.9	19.7	18 30.1	+ 59.9	19.9	26
27	12 53.9	+ 59.8	19.1	13 50.6	+ 59.8	19.2	14 47.2	+ 59.8	19.3	15 43.9	+ 59.8	19.4	16 40.5	+ 59.8	19.5	17 37.0	+ 59.9	19.6	18 33.5	+ 59.9	19.7	19 30.0	+ 59.9	19.8	27
28	13 53.7	+ 59.7	19.0	14 50.4	+ 59.7	19.1	15 47.0	+ 59.8	19.2	16 43.7	+ 59.8	19.3	17 40.3	+ 59.8	19.4	18 36.9	+ 59.8	19.5	19 33.4	+ 59.9	19.6	20 29.9	+ 59.9	19.7	28
29	14 53.4	+ 59.7	18.9	15 50.1	+ 59.8	19.0	16 46.8	+ 59.8	19.1	17 43.5	+ 59.8	19.2	18 40.1	+ 59.9	19.3	19 36.7	+ 59.9	19.4	20 33.3	+ 59.9	19.6	21 29.8	+ 59.9	19.7	29
30	15 53.1	+ 59.7	18.8	16 49.9	+ 59.7	18.9	17 46.6	+ 59.8	19.0	18 43.3	+ 59.8	19.1	19 40.0	+ 59.8	19.2	20 36.6	+ 59.9	19.4	21 33.2	+ 59.9	19.5	22 29.7	+ 59.9	19.6	30
31	16 52.8	+ 59.7	18.7	17 49.6	+ 59.8	18.8	18 46.4	+ 59.8	18.9	19 43.1	+ 59.8	19.0	20 39.8	+ 59.9	19.2	21 36.5	+ 59.8	19.3	22 33.1	+ 59.9	19.4	23 29.6	+ 60.0	19.6	31
32	17 52.5	+ 59.7	18.6	18 49.4	+ 59.7	18.7	19 46.2	+ 59.8	18.8	20 42.9	+ 59.9	19.0	21 39.7	+ 59.8	19.1	22 36.3	+ 59.9	19.2	23 33.0	+ 59.9	19.4	24 29.6	+ 59.9	19.5	32
33	18 52.2	+ 59.8	18.5	19 49.1	+ 59.8	18.6	20 46.0	+ 59.7	18.7	21 42.8	+ 59.8	18.9	22 39.5	+ 59.8	19.0	23 36.2	+ 59.9	19.1	24 32.9	+ 59.8	19.3	25 29.5	+ 59.9	19.4	33
34	19 52.0	+ 59.7	18.4	20 48.9	+ 59.7	18.5	21 45.7	+ 59.8	18.7	22 42.6	+ 59.8	18.8	23 39.3	+ 59.9	18.9	24 36.1	+ 59.8	19.1	25 32.7	+ 59.9	19.2	26 29.4	+ 59.9	19.4	34
35	20 51.7	+ 59.7	18.3	21 48.6	+ 59.7	18.4	22 45.5	+ 59.8	18.6	23 42.4	+ 59.8	18.7	24 39.2	+ 59.8	18.8	25 35.9	+ 59.9	19.0	26 32.6	+ 59.9	19.2	27 29.3	+ 59.9	19.3	35
36	21 51.4	+ 59.7	18.2	22 48.3	+ 59.8	18.3	23 45.3	+ 59.7	18.5	24 42.2	+ 59.8	18.6	25 39.0	+ 59.8	18.8	26 35.8	+ 59.8	18.9	27 32.5	+ 59.9	19.1	28 29.2	+ 59.9	19.3	36
37	22 51.1	+ 59.7	18.1	23 48.1	+ 59.7	18.2	24 45.0	+ 59.8	18.4	25 42.0	+ 59.7	18.5	26 38.8	+ 59.8	18.7	27 35.6	+ 59.9	18.8	28 32.4	+ 59.9	19.0	29 29.1	+ 59.9	19.2	37
38	23 50.8	+ 59.6	18.0	24 47.8	+ 59.7	18.1	25 44.8	+ 59.8	18.3	26 41.7	+ 59.8	18.4	27 38.6	+ 59.9	18.6	28 35.5	+ 59.8	18.8	29 32.3	+ 59.8	18.9	30 29.0	+ 59.9	19.1	38
39	24 50.4	+ 59.7	17.9	25 47.5	+ 59.7	18.0	26 44.6	+ 59.7	18.2	27 41.5	+ 59.8	18.3	28 38.5	+ 59.8	18.5	29 35.3	+ 59.9	18.7	30 32.1	+ 59.9	18.9	31 28.9	+ 59.9	19.1	39
40	25 50.1	+ 59.7	17.8	26 47.2	+ 59.8	17.9	27 44.3	+ 59.8	18.1	28 41.3	+ 59.8	18.2	29 38.3	+ 59.8	18.4	30 35.2	+ 59.8	18.6	31 32.0	+ 59.9	18.8	32 28.8	+ 59.9	19.0	40
41	26 49.8	+ 59.7	17.6	27 47.0	+ 59.7	17.8	28 44.1	+ 59.7	18.0	29 41.1	+ 59.8	18.1	30 38.1	+ 59.8	18.3	31 35.0	+ 59.9	18.5	32 31.9	+ 59.8	18.7	33 28.7	+ 59.9	18.9	41
42	27 49.5	+ 59.6	17.5	28 46.7	+ 59.7	17.7	29 43.8	+ 59.7	17.9	30 40.9	+ 59.8	18.0	31 37.9	+ 59.8	18.2	32 34.9	+ 59.8	18.4	33 31.7	+ 59.9	18.6	34 28.6	+ 59.9	18.8	42
43	28 49.1	+ 59.7	17.4	29 46.4	+ 59.7	17.6	30 43.5	+ 59.8	17.8	31 40.7	+ 59.7	17.9	32 37.7	+ 59.8	18.1	33 34.7	+ 59.8	18.3	34 31.6	+ 59.9	18.5	35 28.5	+ 59.8	18.8	43
44	29 48.8	+ 59.7	17.3	30 46.1	+ 59.7	17.5	31 43.3	+ 59.7	17.6	32 40.4	+ 59.8	17.8	33 37.5	+ 59.8	18.0	34 34.5	+ 59.8	18.2	35 31.5	+ 59.8	18.5	36 28.3	+ 59.9	18.7	44
45	30 48.5	+ 59.6	17.2	31 45.8	+ 59.6	17.3	32 43.0	+ 59.7	17.5	33 40.2	+ 59.7	17.7	34 37.3	+ 59.8	17.9	35 34.3	+ 59.9	18.2	36 31.3	+ 59.9	18.4	37 28.2	+ 59.9	18.6	45
46	31 48.1	+ 59.6	17.0	32 45.4	+ 59.7	17.2	33 42.7	+ 59.7	17.4	34 39.9	+ 59.8	17.6	35 37.1	+ 59.8	17.8	36 34.2	+ 59.8	18.1	37 31.2	+ 59.8	18.3	38 28.1	+ 59.9	18.5	46
47	32 47.7	+ 59.7	16.9	33 45.1	+ 59.7	17.1	34 42.4	+ 59.7	17.3	35 39.7	+ 59.7	17.5	36 36.9	+ 59.8	17.7	37 34.0	+ 59.8	18.0	38 31.0	+ 59.9	18.2	39 28.0	+ 59.9	18.5	47
48	33 47.4	+ 59.6	16.8	34 44.8	+ 59.6	17.0	35 42.1	+ 59.7	17.2	36 39.4	+ 59.8	17.4	37 36.7	+ 59.7	17.6	38 33.8	+ 59.8	17.9	39 30.9	+ 59.8	18.1	40 27.9	+ 59.8	18.4	48
49	34 47.0	+ 59.6	16.6	35 44.4	+ 59.7	16.8	36 41.8	+ 59.7	17.1	37 39.2	+ 59.7	17.3	38 36.4	+ 59.8	17.5	39 33.6	+ 59.8	17.8	40 30.7	+ 59.8	18.0	41 27.7	+ 59.9	18.3	49
50	35 46.6	+ 59.6	16.5	36 44.1	+ 59.6	16.7	37 41.5	+ 59.7	16.9	38 38.9	+ 59.7	17.2	39 36.2	+ 59.8	17.4	40 33.4	+ 59.8	17.6	41 30.5	+ 59.9	17.9	42 27.6	+ 59.8	18.2	50
51	36 46.2	+ 59.6	16.4	37 43.7	+ 59.7	16.6	38 41.2	+ 59.7	16.8	39 38.6	+ 59.7	17.0	40 36.0	+ 59.7	17.3	41 33.2	+ 59.8	17.5	42 30.4	+ 59.8	17.8	43 27.4	+ 59.9	18.1	51
52	37 45.8	+ 59.6	16.2	38 43.4	+ 59.6	16.4	39 40.9	+ 59.7	16.7	40 38.3	+ 59.7	16.9	41 35.7	+ 59.7	17.2	42 33.0	+ 59.8	17.4	43 30.2	+ 59.8	17.7	44 27.3	+ 59.9	18.0	52
53	38 45.4	+ 59.5	16.1	39 43.0	+ 59.6	16.3	40 40.6	+ 59.6	16.5	41 38.0	+ 59.7	16.8	42 35.4	+ 59.8	17.0	43 32.8	+ 59.7	17.3	44 30.0	+ 59.8	17.6	45 27.2	+ 59.8	17.9	53
54	39 44.9	+ 59.6	15.9	40 42.6	+ 59.6	16.1	41 40.2	+ 59.7	16.4	42 37.7	+ 59.7	16.6	43 35.2	+ 59.7	16.9	44 32.5	+ 59.8	17.2	45 29.8	+ 59.8	17.5	46 27.0	+ 59.8	17.8	54
55	40 44.5	+ 59.5	15.7	41 42.2	+ 59.6	16.0	42 39.9	+ 59.6	16.2	43 37.4	+ 59.7	16.5	44 34.9	+ 59.7	16.8	45 32.3	+ 59.8	17.1	46 29.6	+ 59.8	17.4	47 26.8	+ 59.9	17.7	55
56	41 44.0	+ 59.6	15.6	42 41.8	+ 59.6	15.8	43 39.5	+ 59.6	16.1	44 37.1	+ 59.7	16.4	45 34.6	+ 59.7	16.6	46 32.1	+ 59.7	16.9	47 29.4	+ 59.8	17.3	48 26.7	+ 59.8	17.6	56
57	42 43.6	+ 59.5	15.4	43 41.4	+ 59.5	15.7	44 39.1	+ 59.6	15.9	45 36.8	+ 59.6	16.2	46 34.3	+ 59.7	16.5	47 31.8	+ 59.8	16.8	48 29.2	+ 59.8	17.1	49 26.5	+ 59.8	17.5	57
58	43 43.1	+ 59.5	15.2	44 40.9	+ 59.6	15.5	45 38.7	+ 59.6	15.8	46 36.4	+ 59.7	16.0	47 34.0	+ 59.7	16.3	48 31.6	+ 59.7	16.7	49 29.0	+ 59.8	17.0	50 26.3	+ 59.8	17.3	58
59	44 42.6	+ 59.4	15.1	45 40.5	+ 59.5	15.3	46 38.3	+ 59.6	15.6	47 36.1	+ 59.6	15.9	48 33.7	+ 59.7	16.2	49 31.3	+ 59.7	16.5	50 28.8	+ 59.7	16.9	51 26.1	+ 59.8	17.2	59
60	45 42.0	+ 59.5	14.9	46 40.0	+ 59.5	15.1	47 37.9	+ 59.5	15.4	48 35.7	+ 59.6	15.7	49 33.4	+ 59.7	16.0	50 31.0	+ 59.7	16.4	51 28.5	+ 59.8	16.7	52 25.9	+ 59.8	17.1	60
61	46 41.5	+ 59.4	14.7	47 39.5	+ 59.5	14.9	48 37.4	+ 59.6	15.2	49 35.3	+ 59.6	15.5	50 33.1	+ 59.6	15.9	51 30.7	+ 59.7	16.2	52 28.3	+ 59.7	16.6	53 25.7	+ 59.8	17.0	61
62	47 40.9	+ 59.5	14.5	48 39.0	+ 59.5	14.8	49 37.0	+ 59.5	15.1	50 34.9	+ 59.6	15.4	51 32.7	+ 59.6	15.7	52 30.4	+ 59.7	16.0	53 28.0	+ 59.7	16.4	54 25.5	+ 59.8	16.8	62
63	48 40.4	+ 59.4	14.3	49 38.5	+ 59.4	14.6	50 36.5	+ 59.5	14.9	51 34.5	+ 59.5	15.2	52 32.3	+ 59.6	15.5	53 30.1	+ 59.6	15.9	54 27.7	+ 59.8	16.3	55 25.3	+ 59.7	16.7	63
64	49 39.8	+ 59.3	14.0	50 37.9	+ 59.4	14.3	51 36.0	+ 59.5	14.7	52 34.0	+ 59.6	15.0	53 31.9	+ 59.6	15.3	54 29.7	+ 59.7	15.7	55 27.5	+ 59.7	16.1	56 25.0	+ 59.8	16.5	64
65	50 39.1	+ 59.4	13.8	51 37.3	+ 59.4	14.1	52 35.5	+ 59.5	14.4	53 33.6	+ 59.5	14.8	54 31.5	+ 59.6	15.1	55 29.4	+ 59.6	15.5	56 27.2	+ 59.6	15.9	57 24.8	+ 59.7	16.3	65
66	51 38.5	+ 59.3	13.6	52 36.7	+ 59.4	13.9	53 35.0	+ 59.4	14.2	54 33.1	+ 59.5	14.6	55 31.1	+ 59.5	14.9	56 29.0	+ 59.6	15.3	57 26.8	+ 59.7	15.7	58 24.5	+ 59.8	16.2	66
67	52 37.8	+ 59.3	13.3	53 36.1	+ 59.4	13.6	54 34.4	+ 59.4	14.0	55 32.6	+ 59.4	14.3	56 30.6	+ 59.6	14.7	57 28.6	+ 59.6	15.1	58 26.5	+ 59.6	15.5	59 24.3	+ 59.7	16.0	67
68	53 37.1	+ 59.2	13.1	54 35.5	+ 59.3	13.4	55 33.8	+ 59.4	13.7	56 32.0	+ 59.5	14.1	57 30.2	+ 59.5	14.5	58 28.2	+ 59.6	14.9	59 26.1	+ 59.7	15.3	60 24.0	+ 59.6	15.8	68
69	54 36.3	+ 59.2	12.8	55 34.8	+ 59.2	13.1	56 33.2	+ 59.3	13.5	57 31.5	+ 59.4	13.8	58 29.7	+ 59.4	14.2	59 27.8	+ 59.5	14.6	60 25.8	+ 59.6	15.1	61 23.6	+ 59.7	15.6	69
70	55 35.5	+ 59.2	12.5	56 34.0	+ 59.3	12.9	57 32.5	+ 59.3	13.2	58 30.9	+ 59.3	13.6	59 29.1	+ 59.5	14.0	60 27.3	+ 59.5	14.4	61 25.4	+ 59.5	14.8	62 23.3	+ 59.6	15.3	70
71	56 34.7	+ 59.1	12.2	57 33.3	+ 59.2	12.6	58 31.8	+ 59.3	12.9	59 30.2	+ 59.4	13.3	60 28.6	+ 59.4	13.7	61 26.8	+ 59.5	14.1	62 24.9	+ 59.6	14.6	63 22.9	+ 59.7	15.1	71
72	57 33.8	+ 59.1	11.9	58 32.5	+ 59.1	12.3	59 31.1	+ 59.2	12.6	60 29.6	+ 59.2	13.0	61 28.0	+ 59.3	13.4	62 26.3	+ 59.4	13.8	63 24.5	+ 59.5	14.3	64 22.6	+ 59.5	14.8	72
73	58 32.9	+ 59.0	11.6	59 31.6	+ 59.1	11.9	60 30.3	+ 59.1	12.3	61 28.8	+ 59.3	12.7	62 27.3	+ 59.4	13.1	63 25.7	+ 59.4	13.5	64 24.0	+ 59.5	14.0	65 22.1	+ 59.6	14.6	73
74	59 31.9	+ 58.9	11.2	60 30.7	+ 59.0	11.6	61 29.4	+ 59.1	11.9	62 28.1	+ 59.2	12.3	63 26.7	+ 59.2	12.8	64 25.1	+ 59.4	13.2	65 23.5	+ 59.4	13.7	66 21.7	+ 59.5	14.3	74
75	60 30.8	+ 58.9	10.9	61 29.7	+ 59.0	11.2	62 28.5	+ 59.1	11.6	63 27.3	+ 59.1	12.0	64 25.9	+ 59.2	12.4	65 24.5	+ 59.3	12.9	66 22.9	+ 59.4	13.4	67 21.2	+ 59.5	13.9	75
76	61 29.7	+ 58.8	10.5	62 28.7	+ 58.9	10.8	63 27.6	+ 59.0	11.2	64 26.4	+ 59.1	11.6	65 25.1	+ 59.2	12.0	66 23.8	+ 59.2	12.5	67 22.3	+ 59.3	13.0	68 20.7	+ 59.4	13.6	76
77	62 28.5	+ 58.8	10.0	63 27.6	+ 58.8	10.4	64 26.6	+ 58.9	10.8	65 25.5	+ 59.0	11.2	66 24.3	+ 59.1	11.6	67 23.0	+ 59.2	12.1	68 21.6	+ 59.3	12.6	69 20.1	+ 59.4	13.2	77
78	63 27.3	+ 58.6	9.6	64 26.4	+ 58.7	9.9	65 25.5	+ 58.8	10.3	66 24.5	+ 58.9	10.7	67 23.4	+ 59.0	11.2	68 22.2	+ 59.1	11.7	69 20.9	+ 59.2	12.2	70 19.5	+ 59.3	12.8	78
79	64 25.9	+ 58.6	9.1	65 25.1	+ 58.7	9.5	66 24.3	+ 58.7	9.8	67 23.4	+ 58.8	10.2	68 22.4	+ 58.9	10.7	69 21.3	+ 59.0	11.2	70 20.1	+ 59.1	11.7	71 18.8	+ 59.2	12.3	79
80	65 24.5	+ 58.4	8.6	66 23.8	+ 58.5	8.9	67 23.0	+ 58.6	9.3	68 22.2	+ 58.7	9.7	69 21.3	+ 58.8	10.2	70 20.3	+ 58.9	10.7	71 19.2	+ 59.0	11.2	72 18.0	+ 59.1	11.8	80
81	66 22.9	+ 58.3	8.0	67 22.3	+ 58.4	8.4	68 21.6	+ 58.5	8.7	69 20.9	+ 58.6	9.1	70 20.1	+ 58.7	9.6	71 19.2	+ 58.8	10.1	72 18.2	+ 58.9	10.6	73 17.1	+ 59.1	11.2	81
82	67 21.2	+ 58.2	7.4	68 20.7	+ 58.2	7.8	69 20.1	+ 58.3	8.1	70 19.5	+ 58.4	8.5	71 18.8	+ 58.5	9.0	72 18.0	+ 58.7	9.4	73 17.1	+ 58.8	10.0	74 16.2	+ 58.9	10.6	82
83	68 19.4	+ 58.0	6.8	69 18.9	+ 58.1	7.1	70 18.4	+ 58.2	7.4	71 17.9	+ 58.3	7.8	72 17.3	+ 58.4	8.3	73 16.7	+ 58.5	8.7	74 15.9	+ 58.6	9.3	75 15.1	+ 58.7	9.9	83
84	69 17.4	+ 57.8	6.1	70 17.0	+ 57.9	6.4	71 16.6	+ 58.0	6.7	72 16.2	+ 58.0	7.1	73 15.7	+ 58.2	7.5	74 15.2	+ 58.2	7.9	75 14.5	+ 58.5	8.5	76 13.8	+ 58.6	9.1	84
85	70 15.2	+ 57.5	5.3	71 14.9	+ 57.6	5.6	72 14.6	+ 57.7	5.9	73 14.2	+ 57.9	6.2	74 13.9	+ 57.9	6.6	75 13.4	+ 58.1	7.0	76 13.0	+ 58.2	7.5	77 12.4	+ 58.3	8.1	85
86	71 12.7	+ 57.4	4.5	72 12.5	+ 57.4	4.7	73 12.3	+ 57.5	5.0	74 12.1	+ 57.6	5.3	75 11.8	+ 57.7	5.6	76 11.5	+ 57.8	6.0	77 11.2	+ 57.8	6.5	78 10.7	+ 58.1	7.0	86
87	72 10.1	+ 57.0	3.5	73 09.9	+ 57.1	3.7	74 09.8	+ 57.2	3.9	75 09.7	+ 57.2	4.2	76 09.5	+ 57.3	4.5	77 09.3	+ 57.4	4.8	78 09.0	+ 57.6	5.2	79 08.8	+ 57.6	5.7	87
88	73 07.1	+ 56.6	2.5	74 07.0	+ 56.7	2.6	75 07.0	+ 56.7	2.8	76 06.9	+ 56.8	3.0	77 06.8	+ 56.9	3.2	78 06.7	+ 56.9	3.5	79 06.6	+ 57.0	3.8	80 06.4	+ 57.2	4.2	88
89	74 03.7	+ 56.3	1.3	75 03.7	+ 56.3	1.4	76 03.7	+ 56.3	1.5	77 03.7	+ 56.3	1.6	78 03.7	+ 56.3	1.7	79 03.6	+ 56.4	1.9	80 03.6	+ 56.4	2.1	81 03.6	+ 56.4	2.3	89
90	75 00.0	+ 55.7	0.0	76 00.0	+ 55.7	0.0	77 00.0	+ 55.7	0.0	78 00.0	+ 55.7	0.0	79 00.0	+ 55.6	0.0	80 00.0	+ 55.6	0.0	81 00.0	+ 55.5	0.0	82 00.0	+ 55.5	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 159°, 201°

22°, 338° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 53.1	+59.7	157.3	12 57.7	+59.8	157.4	12 02.3	+59.8	157.5	11 06.9	+59.8	157.6	10 11.4	+59.8	157.6	9 15.9	+59.9	157.7	8 20.4	+59.9	157.8	7 24.8	+60.0	157.8	**0**
1	14 52.8	+59.7	157.2	13 57.5	+59.7	157.3	13 02.1	+59.8	157.4	12 06.7	+59.8	157.5	11 11.2	+59.9	157.6	10 15.8	+59.8	157.6	9 20.3	+59.9	157.7	8 24.8	+59.9	157.8	**1**
2	15 52.5	+59.7	157.1	14 57.2	+59.7	157.2	14 01.9	+59.7	157.3	13 06.5	+59.8	157.4	12 11.1	+59.8	157.5	11 15.6	+59.9	157.6	10 20.2	+59.9	157.6	9 24.7	+59.9	157.7	**2**
3	16 52.2	+59.7	157.0	15 56.9	+59.8	157.1	15 01.6	+59.8	157.2	14 06.3	+59.8	157.3	13 10.9	+59.9	157.4	12 15.5	+59.9	157.5	11 20.1	+59.9	157.6	10 24.6	+59.9	157.6	**3**
4	17 51.9	+59.7	156.9	16 56.7	+59.7	157.0	16 01.4	+59.8	157.1	15 06.1	+59.8	157.2	14 10.8	+59.8	157.3	13 15.4	+59.8	157.4	12 20.0	+59.9	157.5	11 24.5	+59.9	157.6	**4**
5	18 51.6	+59.6	156.8	17 56.4	+59.7	156.9	17 01.2	+59.7	157.0	16 05.9	+59.8	157.1	15 10.6	+59.8	157.3	14 15.2	+59.9	157.4	13 19.9	+59.8	157.4	12 24.4	+59.9	157.5	**5**
6	19 51.2	+59.7	156.7	18 56.1	+59.7	156.8	18 00.9	+59.8	156.9	17 05.7	+59.8	157.1	16 10.4	+59.9	157.2	15 15.1	+59.9	157.3	14 19.7	+59.9	157.4	13 24.3	+60.0	157.5	**6**
7	20 50.9	+59.7	156.6	19 55.8	+59.8	156.7	19 00.7	+59.8	156.8	18 05.5	+59.8	157.0	17 10.3	+59.8	157.1	16 15.0	+59.8	157.2	15 19.6	+59.9	157.3	14 24.3	+59.9	157.4	**7**
8	21 50.6	+59.7	156.4	20 55.6	+59.7	156.6	20 00.5	+59.7	156.7	19 05.3	+59.8	156.9	18 10.1	+59.8	157.0	17 14.8	+59.9	157.1	16 19.5	+59.9	157.3	15 24.2	+59.9	157.4	**8**
9	22 50.3	+59.6	156.3	21 55.3	+59.7	156.5	21 00.2	+59.8	156.7	20 05.1	+59.8	156.8	19 09.9	+59.9	156.9	18 14.7	+59.9	157.1	17 19.4	+59.9	157.2	16 24.1	+59.9	157.3	**9**
10	23 49.9	+59.7	156.2	22 55.0	+59.7	156.4	22 00.0	+59.7	156.6	21 04.9	+59.8	156.7	20 09.8	+59.8	156.9	19 14.6	+59.8	157.0	18 19.3	+59.9	157.1	17 24.0	+59.9	157.3	**10**
11	24 49.6	+59.6	156.1	23 54.7	+59.7	156.3	22 59.7	+59.8	156.5	22 04.7	+59.8	156.6	21 09.6	+59.8	156.8	20 14.4	+59.9	156.9	19 19.2	+59.9	157.1	18 23.9	+59.9	157.2	**11**
12	25 49.2	+59.7	156.0	24 54.4	+59.7	156.2	23 59.5	+59.7	156.4	23 04.5	+59.8	156.5	22 09.4	+59.8	156.7	21 14.3	+59.8	156.9	20 19.1	+59.8	157.0	19 23.8	+59.9	157.1	**12**
13	26 48.9	+59.6	155.9	25 54.1	+59.7	156.1	24 59.2	+59.8	156.3	24 04.3	+59.7	156.4	23 09.2	+59.8	156.6	22 14.1	+59.9	156.8	21 18.9	+59.9	156.9	20 23.7	+59.9	157.1	**13**
14	27 48.5	+59.7	155.7	26 53.8	+59.7	155.9	25 59.0	+59.7	156.1	25 04.0	+59.8	156.3	24 09.0	+59.9	156.5	23 14.0	+59.8	156.7	22 18.8	+59.9	156.9	21 23.6	+59.9	157.0	**14**
15	28 48.2	+59.6	155.6	27 53.5	+59.7	155.8	26 58.7	+59.7	156.0	26 03.8	+59.8	156.2	25 08.9	+59.8	156.4	24 13.8	+59.9	156.6	23 18.7	+59.9	156.8	22 23.5	+59.9	157.0	**15**
16	29 47.8	+59.6	155.5	28 53.2	+59.6	155.7	27 58.4	+59.7	155.9	27 03.6	+59.8	156.1	26 08.7	+59.8	156.4	25 13.7	+59.8	156.5	24 18.6	+59.9	156.7	23 23.4	+59.9	156.9	**16**
17	30 47.4	+59.6	155.4	29 52.8	+59.7	155.6	28 58.1	+59.8	155.8	28 03.4	+59.7	156.0	27 08.5	+59.8	156.3	26 13.5	+59.8	156.5	25 18.5	+59.8	156.7	24 23.3	+59.9	156.8	**17**
18	31 47.0	+59.6	155.2	30 52.5	+59.7	155.5	29 57.9	+59.7	155.7	29 03.1	+59.8	155.9	28 08.3	+59.8	156.2	27 13.3	+59.9	156.4	26 18.3	+59.9	156.6	25 23.2	+59.9	156.8	**18**
19	32 46.6	+59.6	155.1	31 52.2	+59.6	155.4	30 57.6	+59.7	155.6	30 02.9	+59.7	155.8	29 08.1	+59.8	156.1	28 13.2	+59.8	156.3	27 18.2	+59.9	156.5	26 23.1	+59.9	156.7	**19**
20	33 46.2	+59.6	154.9	32 51.8	+59.7	155.2	31 57.3	+59.7	155.5	31 02.6	+59.8	155.7	30 07.9	+59.8	156.0	29 13.0	+59.8	156.2	28 18.1	+59.8	156.4	27 23.0	+59.9	156.6	**20**
21	34 45.8	+59.6	154.8	33 51.5	+59.6	155.1	32 57.0	+59.7	155.4	32 02.4	+59.7	155.6	31 07.7	+59.8	155.9	30 12.8	+59.9	156.1	29 17.9	+59.9	156.4	28 22.9	+59.9	156.6	**21**
22	35 45.4	+59.6	154.7	34 51.1	+59.6	155.0	33 56.7	+59.7	155.2	33 02.1	+59.8	155.5	32 07.5	+59.7	155.8	31 12.7	+59.8	156.0	30 17.8	+59.9	156.3	29 22.8	+59.9	156.5	**22**
23	36 45.0	+59.5	154.5	35 50.7	+59.6	154.8	34 56.4	+59.6	155.1	34 01.9	+59.7	155.4	33 07.2	+59.8	155.7	32 12.5	+59.8	155.9	31 17.7	+59.8	156.2	30 22.7	+59.9	156.4	**23**
24	37 44.5	+59.5	154.4	36 50.3	+59.6	154.7	35 56.0	+59.7	155.0	35 01.6	+59.7	155.3	34 07.0	+59.8	155.6	33 12.3	+59.8	155.9	32 17.5	+59.9	156.1	31 22.6	+59.9	156.4	**24**
25	38 44.0	+59.6	154.2	37 49.9	+59.6	154.5	36 55.7	+59.7	154.9	36 01.3	+59.7	155.2	35 06.8	+59.8	155.5	34 12.1	+59.9	155.8	33 17.4	+59.8	156.0	32 22.5	+59.9	156.3	**25**
26	39 43.6	+59.5	154.0	38 49.5	+59.6	154.4	37 55.4	+59.6	154.7	37 01.0	+59.7	155.1	36 06.6	+59.7	155.4	35 12.0	+59.8	155.7	34 17.2	+59.9	156.0	33 22.4	+59.9	156.2	**26**
27	40 43.1	+59.5	153.9	39 49.1	+59.6	154.2	38 55.0	+59.7	154.6	38 00.7	+59.7	154.9	37 06.3	+59.8	155.3	36 11.8	+59.8	155.6	35 17.1	+59.8	155.9	34 22.3	+59.8	156.1	**27**
28	41 42.6	+59.5	153.7	40 48.7	+59.6	154.1	39 54.7	+59.6	154.5	39 00.4	+59.7	154.8	38 06.1	+59.7	155.1	37 11.6	+59.8	155.5	36 16.9	+59.8	155.8	35 22.1	+59.9	156.1	**28**
29	42 42.1	+59.4	153.5	41 48.3	+59.5	153.9	40 54.3	+59.6	154.3	40 00.1	+59.7	154.7	39 05.8	+59.8	155.0	38 11.4	+59.7	155.4	37 16.7	+59.9	155.7	36 22.0	+59.9	156.0	**29**
30	43 41.5	+59.5	153.3	42 47.8	+59.6	153.8	41 53.9	+59.6	154.2	40 59.8	+59.7	154.5	40 05.6	+59.7	154.9	39 11.1	+59.8	155.3	38 16.6	+59.8	155.6	37 21.9	+59.8	155.9	**30**
31	44 41.0	+59.4	153.2	43 47.4	+59.5	153.6	42 53.5	+59.6	154.0	41 59.5	+59.7	154.4	41 05.3	+59.7	154.8	40 10.9	+59.8	155.1	39 16.4	+59.8	155.5	38 21.7	+59.9	155.8	**31**
32	45 40.4	+59.4	153.0	44 46.9	+59.5	153.4	43 53.1	+59.6	153.8	42 59.2	+59.6	154.3	42 05.0	+59.7	154.7	41 10.7	+59.8	155.0	40 16.2	+59.9	155.4	39 21.6	+59.9	155.7	**32**
33	46 39.8	+59.4	152.8	45 46.4	+59.5	153.2	44 52.7	+59.6	153.7	43 58.8	+59.7	154.1	43 04.7	+59.7	154.5	42 10.5	+59.7	154.9	41 16.1	+59.8	155.3	40 21.5	+59.8	155.7	**33**
34	47 39.2	+59.4	152.5	46 45.9	+59.4	153.0	45 52.3	+59.5	153.5	44 58.5	+59.6	154.0	44 04.4	+59.7	154.4	43 10.2	+59.8	154.8	42 15.9	+59.8	155.2	41 21.3	+59.9	155.6	**34**
35	48 38.6	+59.3	152.3	47 45.3	+59.5	152.8	46 51.8	+59.5	153.3	45 58.1	+59.6	153.8	45 04.1	+59.7	154.2	44 10.0	+59.8	154.7	43 15.7	+59.8	155.1	42 21.2	+59.8	155.5	**35**
36	49 37.9	+59.3	152.1	48 44.8	+59.4	152.6	47 51.3	+59.6	153.1	46 57.7	+59.6	153.6	46 03.8	+59.7	154.1	45 09.8	+59.7	154.5	44 15.5	+59.8	155.0	43 21.0	+59.9	155.4	**36**
37	50 37.2	+59.3	151.9	49 44.2	+59.4	152.4	48 50.9	+59.5	153.0	47 57.3	+59.6	153.5	47 03.5	+59.7	154.0	46 09.5	+59.7	154.4	45 15.3	+59.8	154.9	44 20.9	+59.8	155.3	**37**
38	51 36.5	+59.3	151.6	50 43.6	+59.3	152.2	49 50.4	+59.4	152.8	48 56.9	+59.6	153.3	48 03.2	+59.6	153.8	47 09.2	+59.7	154.3	46 15.1	+59.7	154.7	45 20.7	+59.8	155.2	**38**
39	52 35.8	+59.2	151.4	51 42.9	+59.4	152.0	50 49.8	+59.5	152.6	49 56.5	+59.5	153.1	49 02.8	+59.7	153.6	48 08.9	+59.8	154.1	47 14.8	+59.8	154.6	46 20.5	+59.9	155.1	**39**
40	53 35.0	+59.1	151.1	52 42.3	+59.3	151.7	51 49.3	+59.4	152.3	50 56.0	+59.5	152.9	50 02.5	+59.6	153.5	49 08.7	+59.6	154.0	48 14.6	+59.8	154.5	47 20.4	+59.8	154.9	**40**
41	54 34.1	+59.2	150.8	53 41.6	+59.3	151.5	52 48.7	+59.4	152.1	51 55.5	+59.5	152.7	51 02.1	+59.6	153.3	50 08.3	+59.7	153.8	49 14.4	+59.7	154.3	48 20.2	+59.8	154.8	**41**
42	55 33.3	+59.1	150.5	54 40.9	+59.2	151.2	53 48.1	+59.4	151.9	52 55.0	+59.5	152.5	52 01.7	+59.6	153.1	51 08.0	+59.7	153.7	50 14.1	+59.8	154.2	49 20.0	+59.8	154.7	**42**
43	56 32.4	+59.0	150.2	55 40.1	+59.2	150.9	54 47.5	+59.3	151.6	53 54.5	+59.5	152.3	53 01.3	+59.5	152.9	52 07.7	+59.7	153.5	51 13.9	+59.7	154.1	50 19.8	+59.8	154.6	**43**
44	57 31.4	+59.0	149.9	56 39.3	+59.2	150.6	55 46.8	+59.3	151.4	54 54.0	+59.4	152.1	54 00.8	+59.6	152.7	53 07.4	+59.6	153.3	52 13.6	+59.7	153.9	51 19.6	+59.8	154.5	**44**
45	58 30.4	+58.9	149.5	57 38.5	+59.1	150.3	56 46.1	+59.3	151.1	55 53.4	+59.4	151.8	55 00.4	+59.5	152.5	54 07.0	+59.6	153.1	53 13.3	+59.7	153.7	52 19.4	+59.8	154.3	**45**
46	59 29.3	+58.9	149.2	58 37.6	+59.0	150.0	57 45.4	+59.2	150.8	56 52.8	+59.4	151.6	55 59.9	+59.5	152.3	55 06.6	+59.6	152.9	54 13.0	+59.7	153.6	53 19.2	+59.7	154.2	**46**
47	60 28.2	+58.8	148.8	59 36.6	+59.0	149.7	58 44.6	+59.2	150.5	57 52.2	+59.3	151.3	56 59.4	+59.4	152.0	56 06.2	+59.6	152.7	55 12.7	+59.7	153.4	54 18.9	+59.8	154.0	**47**
48	61 27.0	+58.7	148.4	60 35.6	+59.0	149.3	59 43.8	+59.1	150.2	58 51.5	+59.3	151.0	57 58.8	+59.5	151.8	57 05.8	+59.6	152.5	56 12.4	+59.7	153.2	55 18.7	+59.7	153.9	**48**
49	62 25.7	+58.6	147.9	61 34.6	+58.8	148.9	60 42.9	+59.1	149.8	59 50.8	+59.3	150.7	58 58.3	+59.4	151.5	58 05.4	+59.5	152.3	57 12.1	+59.6	153.0	56 18.4	+59.7	153.7	**49**
50	63 24.3	+58.5	147.5	62 33.4	+58.8	148.5	61 42.0	+59.0	149.5	60 50.1	+59.2	150.4	59 57.7	+59.4	151.2	59 04.9	+59.5	152.1	58 11.7	+59.6	152.8	57 18.1	+59.8	153.5	**50**
51	64 22.8	+58.4	147.0	63 32.2	+58.7	148.1	62 41.0	+59.0	149.1	61 49.3	+59.1	150.1	60 57.1	+59.3	151.0	60 04.4	+59.5	151.8	59 11.3	+59.6	152.6	58 17.9	+59.7	153.3	**51**
52	65 21.2	+58.3	146.4	64 30.9	+58.6	147.6	63 40.0	+58.8	148.7	62 48.4	+59.1	149.7	61 56.4	+59.3	150.6	61 03.9	+59.4	151.5	60 10.9	+59.6	152.4	59 17.6	+59.6	153.2	**52**
53	66 19.5	+58.2	145.8	65 29.5	+58.5	147.1	64 38.8	+58.8	148.2	63 47.5	+59.0	149.3	62 55.7	+59.2	150.3	62 03.3	+59.4	151.2	61 10.5	+59.5	152.1	60 17.2	+59.7	152.9	**53**
54	67 17.7	+58.0	145.2	66 28.0	+58.4	146.5	65 37.6	+58.7	147.8	64 46.5	+59.0	148.9	63 54.9	+59.2	149.9	63 02.7	+59.3	150.9	62 10.0	+59.5	151.9	61 16.9	+59.6	152.7	**54**
55	68 15.7	+57.8	144.5	67 26.4	+58.2	145.9	66 36.3	+58.6	147.2	65 45.5	+58.9	148.4	64 54.1	+59.1	149.6	64 02.0	+59.4	150.6	63 09.5	+59.5	151.6	62 16.5	+59.6	152.5	**55**
56	69 13.5	+57.6	143.8	68 24.6	+58.1	145.3	67 34.9	+58.4	146.7	66 44.4	+58.7	148.0	65 53.2	+59.0	149.2	65 01.4	+59.2	150.3	64 09.0	+59.4	151.3	63 16.1	+59.6	152.2	**56**
57	70 11.1	+57.4	143.0	69 22.7	+57.9	144.6	68 33.3	+58.3	146.1	67 43.1	+58.7	147.4	66 52.2	+59.0	148.7	66 00.6	+59.2	149.9	65 08.4	+59.4	151.0	64 15.7	+59.6	152.0	**57**
58	71 08.5	+57.1	142.1	70 20.6	+57.6	143.8	69 31.6	+58.2	145.4	68 41.8	+58.5	146.9	67 51.2	+58.8	148.2	66 59.8	+59.1	149.5	66 07.8	+59.4	150.6	65 15.3	+59.5	151.7	**58**
59	72 05.6	+56.7	141.1	71 18.2	+57.5	143.0	70 29.8	+57.9	144.7	69 40.3	+58.4	146.3	68 50.0	+58.8	147.7	67 58.9	+59.1	149.0	67 07.2	+59.2	150.2	66 14.8	+59.5	151.4	**59**
60	73 02.3	+56.4	140.1	72 15.7	+57.1	142.1	71 27.7	+57.8	143.9	70 38.7	+58.3	145.6	69 48.8	+58.6	147.1	68 58.0	+58.9	148.5	68 06.4	+59.3	149.8	67 14.3	+59.4	151.0	**60**
61	73 58.7	+56.0	138.9	73 12.8	+56.8	141.0	72 25.5	+57.5	143.0	71 37.0	+58.0	144.8	70 47.4	+58.5	146.5	69 56.9	+58.9	148.0	69 05.7	+59.1	149.4	68 13.7	+59.4	150.7	**61**
62	74 54.7	+55.4	137.5	74 09.6	+56.4	139.9	73 23.0	+57.1	142.1	72 35.0	+57.8	144.0	71 45.9	+58.3	145.8	70 55.8	+58.7	147.4	70 04.8	+59.1	148.9	69 13.1	+59.3	150.3	**62**
63	75 50.1	+54.7	136.0	75 06.0	+55.8	138.6	74 20.1	+56.8	141.0	73 32.8	+57.6	143.1	72 44.2	+58.2	145.0	71 54.5	+58.6	146.8	71 03.9	+58.9	148.4	70 12.4	+59.2	149.9	**63**
64	76 44.8	+53.9	134.3	76 01.8	+55.3	137.1	75 16.9	+56.4	139.7	74 30.4	+57.2	142.1	73 42.4	+57.9	144.2	72 53.1	+58.5	146.1	72 02.8	+58.9	147.8	71 11.6	+59.2	149.4	**64**
65	77 38.7	+53.0	132.3	76 57.1	+54.6	135.5	76 13.3	+55.8	138.3	75 27.6	+56.8	140.9	74 40.3	+57.6	143.2	73 51.6	+58.2	145.3	73 01.7	+58.7	147.2	72 10.8	+59.1	148.8	**65**
66	78 31.7	+51.7	130.0	77 51.7	+53.7	133.6	77 09.1	+55.2	136.7	76 24.4	+56.4	139.6	75 37.9	+57.3	142.1	74 49.8	+58.0	144.4	74 00.4	+58.5	146.4	73 09.9	+58.9	148.3	**66**
67	79 23.4	+50.2	127.3	78 45.4	+52.5	131.4	78 04.3	+54.4	134.9	77 20.8	+55.7	138.1	76 35.2	+56.8	140.9	75 47.8	+57.7	143.4	74 58.9	+58.4	145.6	74 08.8	+58.9	147.6	**67**
68	80 13.6	*+48.2*	•124.2	79 37.9	+51.0	128.8	78 58.7	+53.2	132.8	78 16.5	+55.1	136.3	77 32.0	+56.3	139.5	76 45.5	+57.3	142.2	75 57.3	+58.1	144.7	75 07.7	+58.6	146.9	**68**
69	81 01.8	*+45.5*	•120.6	80 28.9	*+49.2*	•125.7	79 51.9	+52.0	130.3	79 11.6	+54.0	134.3	78 28.3	+55.7	137.8	77 42.8	+56.9	140.9	76 55.4	+57.7	143.6	76 06.3	+58.5	146.0	**69**
70	81 47.3	*+42.3*	•116.2	81 18.1	*+46.7*	•122.1	80 43.9	*+50.1*	•127.3	80 05.6	+52.8	131.9	79 24.0	+54.8	135.9	78 39.7	+56.3	139.3	77 53.1	+57.5	142.4	77 04.8	+58.2	145.0	**70**
71	82 29.6	*+37.8*	•111.0	82 04.8	*+43.4*	•117.7	81 34.0	*+47.9*	•123.7	80 58.4	+51.2	129.0	80 18.8	+53.7	133.5	79 36.0	+55.6	137.5	78 50.6	+56.9	140.9	78 03.0	+57.9	143.9	**71**
72	83 07.4	*+32.1*	•104.8	82 48.2	*+39.0*	•112.5	82 21.9	*+44.6*	•119.4	81 49.6	*+49.0*	•125.5	81 12.5	+52.3	130.8	80 31.6	+54.5	135.3	79 47.5	+56.2	139.2	79 00.9	+57.5	142.6	**72**
73	83 39.5	*+24.8*	• 97.5	83 27.2	*+33.2*	•106.1	83 06.5	*+40.3*	•114.1	82 38.6	*+45.9*	•121.2	82 04.8	*+50.1*	•127.4	81 26.1	+53.3	132.7	80 43.7	+55.5	137.2	79 58.4	+56.9	141.0	**73**
74	84 04.3	*+16.0*	• 88.9	84 00.4	*+25.8*	• 98.5	83 46.8	*+34.5*	•107.6	83 24.5	*+41.8*	•115.9	82 54.9	*+47.3*	•123.2	82 19.4	*+51.3*	•129.4	81 39.2	+54.2	134.7	80 55.3	+56.3	139.1	**74**
75	84 20.3	*+5.9*	• 79.4	84 26.2	*+16.3*	• 89.5	84 21.3	*+26.7*	• 99.7	84 06.3	*+35.8*	•109.3	83 42.2	*+43.2*	•117.9	83 10.7	*+48.7*	•125.3	82 33.4	*+52.6*	•131.5	81 51.6	+55.2	136.8	**75**
76	84 26.2	*−4.9*	• 69.2	84 42.5	*+5.5*	• 79.3	84 48.0	*+16.8*	• 90.2	84 42.1	*+27.8*	•101.0	84 25.4	*+37.4*	•111.1	83 59.4	*+44.9*	•120.0	83 26.0	*+50.1*	•127.6	82 46.8	+53.8	133.9	**76**
77	84 21.3	*−15.0*	• 59.0	84 48.0	*−5.9*	• 68.4	85 04.8	*+5.1*	• 79.3	85 09.9	*+17.3*	• 91.0	85 02.8	*+29.0*	•102.6	84 44.3	*+39.0*	•113.3	84 16.1	*+46.5*	•122.4	83 40.6	*+51.6*	•130.1	**77**
78	84 06.3	*−24.1*	• 49.3	84 42.1	*−16.7*	• 57.5	85 09.9	*−7.1*	• 67.5	85 27.2	*+4.6*	• 79.2	85 31.8	*+17.8*	• 91.9	85 23.3	*+30.4*	•104.4	85 02.6	*+40.9*	•115.6	84 32.2	*+48.3*	•125.1	**78**
79	83 42.2	*−31.5*	• 40.7	84 25.4	*−26.0*	• 47.4	85 02.8	*−18.5*	• 55.9	85 31.8	*−8.5*	• 66.5	85 49.6	*+4.1*	• 79.2	85 53.7	*+18.4*	• 93.0	85 43.5	*+32.1*	•106.5	85 20.5	*+42.8*	•118.4	**79**
80	83 10.7	*−37.3*	• 33.2	83 59.4	*−33.4*	• 38.4	84 44.3	*−28.2*	• 45.2	85 23.3	*−20.7*	• 54.0	85 53.7	*−10.2*	• 65.3	86 12.1	*+3.5*	• 79.2	86 15.6	*+19.1*	• 94.4	86 03.3	*+34.0*	•109.0	**80**
81	82 33.4	*−41.8*	• 26.9	83 26.0	*−39.2*	• 30.8	84 16.1	*−35.5*	• 35.9	85 02.6	*−30.4*	• 42.7	85 43.5	*−23.0*	• 51.8	86 15.6	*−12.3*	• 63.9	86 34.7	*+2.6*	• 79.1	86 37.3	*+20.1*	• 96.0	**81**
82	81 51.6	*−45.3*	• 21.6	82 46.8	*−43.5*	• 24.5	83 40.6	*−41.2*	• 28.2	84 32.2	*−37.8*	• 33.2	85 20.5	*−33.0*	• 39.9	86 03.3	*−25.7*	• 49.3	86 37.3	*−14.6*	• 62.2	86 57.4	*+1.5*	• 79.1	**82**
83	81 06.3	*−48.0*	• 17.2	82 03.3	*−46.8*	• 19.3	82 59.4	*−45.2*	• 22.0	83 54.4	*−43.2*	• 25.5	84 47.5	*−40.2*	• 30.2	85 37.6	*−35.7*	• 36.8	86 22.7	*−28.8*	• 46.3	86 58.9	*−17.5*	• 60.1	**83**
84	80 18.3	−50.0	13.4	81 16.5	*−49.3*	• 15.0	82 14.2	*−48.3*	• 16.9	83 11.2	*−46.9*	• 19.3	84 07.3	*−45.1*	• 22.5	85 01.9	*−42.6*	• 26.9	85 53.9	*−38.7*	• 33.2	86 41.4	*−32.2*	• 42.7	**84**
85	79 28.3	−51.6	10.3	80 27.2	−51.1	11.4	81 25.9	−50.5	12.7	82 24.3	*−49.7*	• 14.3	83 22.2	*−48.7*	• 16.4	84 19.3	*−47.2*	• 19.3	85 15.2	*−45.1*	• 23.2	86 09.2	*−41.8*	• 29.1	**85**
86	78 36.7	−52.8	7.6	79 36.1	−52.5	8.3	80 35.4	−52.1	9.2	81 34.6	−51.7	10.3	82 33.5	*−51.1*	• 11.6	83 32.1	*−50.4*	• 13.4	84 30.1	*−49.2*	• 15.8	85 27.4	*−47.6*	• 19.3	**86**
87	77 43.9	−53.9	5.3	78 43.6	−53.7	5.8	79 43.3	−53.5	6.3	80 42.9	−53.3	7.0	81 42.4	−53.0	7.8	82 41.7	−52.5	8.9	83 40.9	*−52.0*	• 10.3	84 39.8	*−51.3*	• 12.2	**87**
88	76 50.0	−54.7	3.3	77 49.9	−54.6	3.6	78 49.8	−54.5	3.9	79 49.6	−54.3	4.2	80 49.4	−54.2	4.7	81 49.2	−54.0	5.3	82 48.9	−53.8	6.0	83 48.5	−53.5	7.0	**88**
89	75 55.3	−55.3	1.5	76 55.3	−55.3	1.7	77 55.3	−55.3	1.8	78 55.3	−55.3	1.9	79 55.2	−55.2	2.1	80 55.2	−55.2	2.4	81 55.1	−55.1	2.7	82 55.0	−55.0	3.0	**89**
90	75 00.0	−55.9	0.0	76 00.0	−55.9	0.0	77 00.0	−55.9	0.0	78 00.0	−56.0	0.0	79 00.0	−56.0	0.0	80 00.0	−56.0	0.0	81 00.0	−56.1	0.0	82 00.0	−56.1	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 22°, 338°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 53.1	−59.7	157.3	12 57.7	−59.7	157.4	12 02.3	−59.8	157.5	11 06.9	−59.8	157.6	10 11.4	−59.8	157.6	9 15.9	−59.9	157.7	8 20.4	−59.9	157.8	7 24.8	−59.9	157.8	0
1	12 53.4	−59.7	157.4	11 58.0	−59.8	157.5	11 02.5	−59.7	157.6	10 07.1	−59.8	157.6	9 11.6	−59.9	157.7	8 16.0	−59.8	157.8	7 20.5	−59.9	157.8	6 24.9	−59.9	157.9	1
2	11 53.7	−59.7	157.5	10 58.2	−59.7	157.6	10 02.8	−59.8	157.7	9 07.3	−59.9	157.7	8 11.7	−59.8	157.8	7 16.2	−59.9	157.8	6 20.6	−59.9	157.9	5 25.0	−59.9	157.9	2
3	10 54.0	−59.7	157.6	9 58.5	−59.8	157.7	9 03.0	−59.8	157.7	8 07.4	−59.8	157.8	7 11.9	−59.9	157.8	6 16.3	−59.9	157.9	5 20.7	−59.9	157.9	4 25.1	−59.9	158.0	3
4	9 54.3	−59.7	157.7	8 58.7	−59.7	157.8	8 03.2	−59.8	157.8	7 07.6	−59.8	157.9	6 12.0	−59.8	157.9	5 16.4	−59.8	158.0	4 20.8	−59.9	158.0	3 25.2	−59.9	158.0	4
5	8 54.6	−59.7	157.8	7 59.0	−59.7	157.9	7 03.4	−59.8	157.9	6 07.8	−59.8	158.0	5 12.2	−59.9	158.0	4 16.6	−59.9	158.0	3 20.9	−59.9	158.0	2 25.3	−60.0	158.1	5
6	7 54.9	−59.8	157.9	6 59.3	−59.8	158.0	6 03.6	−59.8	158.0	5 08.0	−59.8	158.0	4 12.3	−59.8	158.1	3 16.7	−59.9	158.1	2 21.0	−59.9	158.1	1 25.3	−59.9	158.1	6
7	6 55.1	−59.7	158.0	5 59.5	−59.7	158.0	5 03.8	−59.7	158.1	4 08.2	−59.8	158.1	3 12.5	−59.8	158.1	2 16.8	−59.9	158.2	1 21.1	−59.9	158.2	0 25.4	−59.9	158.2	7
8	5 55.4	−59.7	158.1	4 59.8	−59.8	158.1	4 04.1	−59.8	158.2	3 08.4	−59.9	158.2	2 12.7	−59.9	158.2	1 16.9	−59.8	158.2	0 21.2	−59.9	158.2	0 34.5	+59.9	21.8	8
9	4 55.7	−59.7	158.2	4 00.0	−59.8	158.2	3 04.3	−59.8	158.3	2 08.5	−59.8	158.3	1 12.8	−59.8	158.3	0 17.1	−59.9	158.3	0 38.7	+59.9	21.7	1 34.4	+59.9	21.7	9
10	3 56.0	−59.7	158.3	3 00.2	−59.7	158.3	2 04.5	−59.8	158.3	1 08.7	−59.8	158.3	0 13.0	−59.9	158.4	0 42.8	+59.9	21.7	1 38.6	+59.9	21.7	2 34.3	+60.0	21.7	10
11	2 56.3	−59.7	158.4	2 00.5	−59.8	158.4	1 04.7	−59.8	158.4	0 08.9	−59.8	158.4	0 46.9	+59.8	21.6	1 42.7	+59.9	21.6	2 38.5	+59.9	21.6	3 34.3	+59.9	21.6	11
12	1 56.6	−59.7	158.5	1 00.7	−59.7	158.5	0 04.9	−59.8	158.5	0 50.9	+59.8	21.5	1 46.7	+59.9	21.5	2 42.6	+59.8	21.5	3 38.4	+59.9	21.5	4 34.2	+59.9	21.6	12
13	0 56.9	−59.8	158.6	0 01.0	−59.8	158.6	0 54.9	+59.8	21.4	1 50.7	+59.8	21.4	2 46.6	+59.8	21.4	3 42.4	+59.9	21.5	4 38.3	+59.9	21.5	5 34.1	+59.9	21.5	13
14	0 02.9	+59.7	21.3	0 58.8	+59.7	21.3	1 54.7	+59.7	21.3	2 50.5	+59.9	21.3	3 46.4	+59.9	21.4	4 42.3	+59.9	21.4	5 38.2	+59.9	21.4	6 34.0	+59.9	21.5	14
15	1 02.6	+59.7	21.2	1 58.5	+59.8	21.2	2 54.4	+59.8	21.2	3 50.4	+59.8	21.3	4 46.3	+59.8	21.3	5 42.2	+59.8	21.3	6 38.1	+59.9	21.4	7 33.9	+59.9	21.4	15
16	2 02.3	+59.7	21.1	2 58.3	+59.7	21.1	3 54.2	+59.8	21.2	4 50.2	+59.8	21.2	5 46.1	+59.9	21.2	6 42.0	+59.9	21.3	7 38.0	+59.8	21.3	8 33.8	+60.0	21.4	16
17	3 02.0	+59.7	21.0	3 58.0	+59.8	21.0	4 54.0	+59.8	21.1	5 50.0	+59.8	21.1	6 46.0	+59.8	21.1	7 41.9	+59.9	21.2	8 37.8	+59.9	21.2	9 33.8	+59.9	21.3	17
18	4 01.7	+59.7	20.9	4 57.8	+59.7	21.0	5 53.8	+59.8	21.0	6 49.8	+59.8	21.0	7 45.8	+59.8	21.1	8 41.8	+59.9	21.1	9 37.7	+59.9	21.2	10 33.7	+59.9	21.2	18
19	5 01.4	+59.8	20.8	5 57.5	+59.8	20.9	6 53.6	+59.8	20.9	7 49.6	+59.8	20.9	8 45.6	+59.9	21.0	9 41.7	+59.8	21.1	10 37.6	+59.9	21.1	11 33.6	+59.9	21.2	19
20	6 01.2	+59.7	20.7	6 57.3	+59.7	20.8	7 53.4	+59.7	20.8	8 49.4	+59.9	20.9	9 45.5	+59.8	20.9	10 41.5	+59.9	21.0	11 37.5	+59.9	21.1	12 33.5	+59.9	21.1	20
21	7 00.9	+59.7	20.6	7 57.0	+59.8	20.7	8 53.1	+59.8	20.7	9 49.3	+59.8	20.8	10 45.3	+59.9	20.9	11 41.4	+59.9	20.9	12 37.4	+59.9	21.0	13 33.4	+59.9	21.1	21
22	8 00.6	+59.7	20.5	8 56.8	+59.7	20.6	9 52.9	+59.8	20.6	10 49.1	+59.8	20.7	11 45.2	+59.8	20.8	12 41.3	+59.8	20.9	13 37.3	+59.9	20.9	14 33.3	+59.9	21.0	22
23	9 00.3	+59.7	20.4	9 56.5	+59.8	20.5	10 52.7	+59.8	20.6	11 48.9	+59.8	20.6	12 45.0	+59.9	20.7	13 41.1	+59.9	20.8	14 37.2	+59.9	20.9	15 33.2	+60.0	21.0	23
24	10 00.0	+59.7	20.3	10 56.3	+59.7	20.4	11 52.5	+59.8	20.5	12 48.7	+59.8	20.5	13 44.9	+59.8	20.6	14 41.0	+59.9	20.7	15 37.1	+59.9	20.8	16 33.2	+59.9	20.9	24
25	10 59.7	+59.7	20.2	11 56.0	+59.7	20.3	12 52.3	+59.7	20.4	13 48.5	+59.8	20.5	14 44.7	+59.8	20.6	15 40.9	+59.8	20.6	16 37.0	+59.9	20.8	17 33.1	+59.9	20.9	25
26	11 59.4	+59.7	20.1	12 55.7	+59.8	20.2	13 52.0	+59.8	20.3	14 48.3	+59.8	20.4	15 44.5	+59.9	20.5	16 40.7	+59.9	20.6	17 36.9	+59.9	20.7	18 33.0	+59.9	20.8	26
27	12 59.1	+59.7	20.0	13 55.5	+59.7	20.1	14 51.8	+59.8	20.2	15 48.1	+59.8	20.3	16 44.4	+59.8	20.4	17 40.6	+59.8	20.5	18 36.8	+59.8	20.6	19 32.9	+59.9	20.7	27
28	13 58.8	+59.7	19.9	14 55.2	+59.8	20.0	15 51.6	+59.7	20.1	16 47.9	+59.8	20.2	17 44.2	+59.8	20.3	18 40.4	+59.9	20.4	19 36.6	+59.9	20.6	20 32.8	+59.9	20.7	28
29	14 58.5	+59.7	19.8	15 55.0	+59.7	19.9	16 51.3	+59.8	20.0	17 47.7	+59.8	20.1	18 44.0	+59.8	20.2	19 40.3	+59.8	20.4	20 36.5	+59.9	20.5	21 32.7	+59.9	20.6	29
30	15 58.2	+59.7	19.7	16 54.7	+59.7	19.8	17 51.1	+59.8	19.9	18 47.5	+59.8	20.0	19 43.8	+59.9	20.2	20 40.1	+59.9	20.3	21 36.4	+59.9	20.4	22 32.6	+59.9	20.6	30
31	16 57.9	+59.7	19.6	17 54.4	+59.7	19.7	18 50.9	+59.7	19.8	19 47.3	+59.8	20.0	20 43.7	+59.8	20.1	21 40.0	+59.9	20.2	22 36.3	+59.9	20.4	23 32.5	+59.9	20.5	31
32	17 57.6	+59.7	19.5	18 54.1	+59.8	19.6	19 50.6	+59.8	19.7	20 47.1	+59.8	19.9	21 43.5	+59.8	20.0	22 39.9	+59.8	20.1	23 36.2	+59.8	20.3	24 32.4	+59.9	20.4	32
33	18 57.3	+59.7	19.4	19 53.9	+59.7	19.5	20 50.4	+59.7	19.6	21 46.9	+59.8	19.8	22 43.3	+59.8	19.9	23 39.7	+59.8	20.1	24 36.0	+59.9	20.2	25 32.3	+59.9	20.4	33
34	19 57.0	+59.7	19.3	20 53.6	+59.7	19.4	21 50.1	+59.8	19.5	22 46.7	+59.7	19.7	23 43.1	+59.8	19.8	24 39.5	+59.9	20.0	25 35.9	+59.9	20.1	26 32.2	+59.9	20.3	34
35	20 56.7	+59.6	19.2	21 53.3	+59.7	19.3	22 49.9	+59.7	19.4	23 46.4	+59.8	19.6	24 42.9	+59.9	19.7	25 39.4	+59.8	19.9	26 35.8	+59.9	20.1	27 32.1	+59.9	20.2	35
36	21 56.3	+59.7	19.1	22 53.0	+59.7	19.2	23 49.6	+59.8	19.3	24 46.2	+59.8	19.5	25 42.8	+59.8	19.7	26 39.2	+59.9	19.8	27 35.7	+59.8	20.0	28 32.0	+59.9	20.2	36
37	22 56.0	+59.7	19.0	23 52.7	+59.7	19.1	24 49.4	+59.7	19.2	25 46.0	+59.8	19.4	26 42.6	+59.8	19.6	27 39.1	+59.8	19.7	28 35.5	+59.9	19.9	29 31.9	+59.9	20.1	37
38	23 55.7	+59.6	18.8	24 52.4	+59.7	19.0	25 49.1	+59.8	19.1	26 45.8	+59.7	19.3	27 42.4	+59.8	19.5	28 38.9	+59.8	19.7	29 35.4	+59.8	19.8	30 31.8	+59.9	20.0	38
39	24 55.3	+59.7	18.7	25 52.1	+59.7	18.9	26 48.9	+59.7	19.0	27 45.5	+59.8	19.2	28 42.2	+59.8	19.4	29 38.7	+59.9	19.6	30 35.2	+59.9	19.8	31 31.7	+59.9	20.0	39
40	25 55.0	+59.6	18.6	26 51.8	+59.7	18.8	27 48.6	+59.7	18.9	28 45.3	+59.8	19.1	29 42.0	+59.8	19.3	30 38.6	+59.8	19.5	31 35.1	+59.9	19.7	32 31.6	+59.8	19.9	40
41	26 54.6	+59.7	18.5	27 51.5	+59.7	18.6	28 48.3	+59.7	18.8	29 45.1	+59.7	19.0	30 41.8	+59.8	19.2	31 38.4	+59.8	19.4	32 35.0	+59.8	19.6	33 31.4	+59.9	19.8	41
42	27 54.3	+59.6	18.4	28 51.2	+59.6	18.5	29 48.0	+59.7	18.7	30 44.8	+59.8	18.9	31 41.6	+59.7	19.1	32 38.2	+59.8	19.3	33 34.8	+59.9	19.5	34 31.3	+59.9	19.7	42
43	28 53.9	+59.6	18.2	29 50.8	+59.7	18.4	30 47.7	+59.8	18.6	31 44.6	+59.7	18.8	32 41.3	+59.8	19.0	33 38.0	+59.9	19.2	34 34.7	+59.8	19.4	35 31.2	+59.9	19.7	43
44	29 53.5	+59.6	18.1	30 50.5	+59.7	18.3	31 47.5	+59.7	18.5	32 44.3	+59.8	18.7	33 41.1	+59.8	18.9	34 37.9	+59.8	19.1	35 34.5	+59.9	19.3	36 31.1	+59.9	19.6	44
45	30 53.1	+59.7	18.0	31 50.2	+59.6	18.2	32 47.2	+59.6	18.4	33 44.1	+59.7	18.6	34 40.9	+59.8	18.8	35 37.7	+59.8	19.0	36 34.4	+59.8	19.3	37 31.0	+59.8	19.5	45
46	31 52.8	+59.6	17.8	32 49.8	+59.7	18.0	33 46.8	+59.7	18.2	34 43.8	+59.7	18.5	35 40.7	+59.7	18.7	36 37.5	+59.8	18.9	37 34.2	+59.8	19.2	38 30.8	+59.9	19.4	46
47	32 52.4	+59.5	17.7	33 49.5	+59.6	17.9	34 46.5	+59.7	18.1	35 43.5	+59.7	18.3	36 40.4	+59.8	18.6	37 37.3	+59.8	18.8	38 34.0	+59.9	19.1	39 30.7	+59.8	19.3	47
48	33 51.9	+59.6	17.6	34 49.1	+59.6	17.8	35 46.2	+59.7	18.0	36 43.2	+59.8	18.2	37 40.2	+59.7	18.5	38 37.1	+59.8	18.7	39 33.9	+59.8	19.0	40 30.5	+59.9	19.2	48
49	34 51.5	+59.6	17.4	35 48.7	+59.7	17.6	36 45.9	+59.7	17.9	37 43.0	+59.7	18.1	38 39.9	+59.8	18.3	39 36.9	+59.7	18.6	40 33.7	+59.8	18.9	41 30.4	+59.9	19.2	49
50	35 51.1	+59.6	17.3	36 48.4	+59.6	17.5	37 45.6	+59.6	17.7	38 42.7	+59.7	18.0	39 39.7	+59.7	18.2	40 36.6	+59.8	18.5	41 33.5	+59.8	18.8	42 30.3	+59.8	19.1	50
51	36 50.7	+59.5	17.1	37 48.0	+59.6	17.4	38 45.2	+59.6	17.6	39 42.4	+59.6	17.8	40 39.4	+59.8	18.1	41 36.4	+59.8	18.4	42 33.3	+59.8	18.7	43 30.1	+59.8	19.0	51
52	37 50.2	+59.6	17.0	38 47.6	+59.6	17.2	39 44.8	+59.7	17.5	40 42.0	+59.7	17.7	41 39.2	+59.7	18.0	42 36.2	+59.7	18.3	43 33.1	+59.8	18.6	44 29.9	+59.9	18.9	52
53	38 49.8	+59.5	16.8	39 47.2	+59.5	17.1	40 44.5	+59.6	17.3	41 41.7	+59.7	17.6	42 38.9	+59.7	17.8	43 35.9	+59.8	18.1	44 32.9	+59.8	18.4	45 29.8	+59.8	18.8	53
54	39 49.3	+59.5	16.7	40 46.7	+59.6	16.9	41 44.1	+59.6	17.2	42 41.4	+59.6	17.4	43 38.6	+59.7	17.7	44 35.7	+59.7	18.0	45 32.7	+59.8	18.3	46 29.6	+59.8	18.7	54
55	40 48.8	+59.5	16.5	41 46.3	+59.5	16.7	42 43.7	+59.6	17.0	43 41.0	+59.7	17.3	44 38.3	+59.7	17.6	45 35.4	+59.8	17.9	46 32.5	+59.8	18.2	47 29.4	+59.9	18.5	55
56	41 48.3	+59.5	16.3	42 45.8	+59.6	16.6	43 43.3	+59.6	16.8	44 40.7	+59.6	17.1	45 38.0	+59.7	17.4	46 35.2	+59.7	17.7	47 32.3	+59.7	18.1	48 29.3	+59.8	18.4	56
57	42 47.8	+59.4	16.1	43 45.4	+59.5	16.4	44 42.9	+59.6	16.7	45 40.3	+59.6	17.0	46 37.7	+59.6	17.3	47 34.9	+59.7	17.6	48 32.0	+59.8	17.9	49 29.1	+59.8	18.3	57
58	43 47.2	+59.5	16.0	44 44.9	+59.5	16.2	45 42.5	+59.5	16.5	46 39.9	+59.6	16.8	47 37.3	+59.7	17.1	48 34.6	+59.7	17.5	49 31.8	+59.7	17.8	50 28.9	+59.8	18.2	58
59	44 46.7	+59.4	15.8	45 44.4	+59.5	16.0	46 42.0	+59.6	16.3	47 39.5	+59.6	16.6	48 37.0	+59.6	17.0	49 34.3	+59.7	17.3	50 31.5	+59.8	17.7	51 28.7	+59.7	18.0	59
60	45 46.1	+59.4	15.6	46 43.9	+59.4	15.9	47 41.6	+59.5	16.2	48 39.1	+59.6	16.5	49 36.6	+59.7	16.8	50 34.0	+59.7	17.2	51 31.3	+59.7	17.5	52 28.4	+59.8	17.9	60
61	46 45.5	+59.4	15.4	47 43.3	+59.5	15.7	48 41.1	+59.5	16.0	49 38.7	+59.6	16.3	50 36.3	+59.6	16.6	51 33.7	+59.7	17.0	52 31.0	+59.7	17.4	53 28.2	+59.8	17.8	61
62	47 44.9	+59.4	15.2	48 42.8	+59.4	15.5	49 40.6	+59.5	15.8	50 38.3	+59.5	16.1	51 35.9	+59.6	16.4	52 33.4	+59.6	16.8	53 30.7	+59.7	17.2	54 28.0	+59.7	17.6	62
63	48 44.3	+59.3	14.9	49 42.2	+59.4	15.2	50 40.1	+59.4	15.6	51 37.8	+59.5	15.9	52 35.5	+59.5	16.3	53 33.0	+59.6	16.6	54 30.4	+59.7	17.0	55 27.7	+59.8	17.5	63
64	49 43.6	+59.3	14.7	50 41.6	+59.4	15.0	51 39.5	+59.4	15.4	52 37.3	+59.5	15.7	53 35.0	+59.6	16.1	54 32.6	+59.6	16.4	55 30.1	+59.7	16.9	56 27.5	+59.7	17.3	64
65	50 42.9	+59.3	14.5	51 41.0	+59.3	14.8	52 38.9	+59.4	15.1	53 36.8	+59.5	15.5	54 34.6	+59.5	15.9	55 32.2	+59.6	16.2	56 29.8	+59.6	16.7	57 27.2	+59.7	17.1	65
66	51 42.2	+59.2	14.2	52 40.3	+59.3	14.6	53 38.3	+59.4	14.9	54 36.3	+59.4	15.3	55 34.1	+59.5	15.6	56 31.8	+59.6	16.0	57 29.4	+59.7	16.5	58 26.9	+59.7	16.9	66
67	52 41.4	+59.2	14.0	53 39.6	+59.3	14.3	54 37.7	+59.4	14.6	55 35.7	+59.4	15.0	56 33.6	+59.5	15.4	57 31.4	+59.6	15.8	58 29.1	+59.6	16.3	59 26.6	+59.7	16.7	67
68	53 40.6	+59.2	13.7	54 38.9	+59.2	14.0	55 37.1	+59.3	14.4	56 35.1	+59.4	14.8	57 33.1	+59.4	15.2	58 31.0	+59.5	15.6	59 28.7	+59.6	16.0	60 26.3	+59.6	16.5	68
69	54 39.8	+59.1	13.4	55 38.1	+59.2	13.8	56 36.4	+59.2	14.1	57 34.5	+59.4	14.5	58 32.5	+59.5	14.9	59 30.5	+59.5	15.3	60 28.3	+59.5	15.8	61 25.9	+59.7	16.3	69
70	55 38.9	+59.1	13.1	56 37.3	+59.2	13.5	57 35.6	+59.3	13.8	58 33.9	+59.3	14.2	59 32.0	+59.3	14.6	60 30.0	+59.4	15.1	61 27.8	+59.6	15.6	62 25.6	+59.6	16.1	70
71	56 38.0	+59.1	12.8	57 36.5	+59.1	13.2	58 34.9	+59.2	13.5	59 33.2	+59.2	13.9	60 31.3	+59.4	14.4	61 29.4	+59.4	14.8	62 27.4	+59.5	15.3	63 25.2	+59.5	15.8	71
72	57 37.1	+58.9	12.5	58 35.6	+59.1	12.8	59 34.1	+59.1	13.2	60 32.4	+59.2	13.6	61 30.7	+59.3	14.0	62 28.8	+59.4	14.5	63 26.9	+59.4	15.0	64 24.7	+59.6	15.5	72
73	58 36.0	+59.0	12.1	59 34.7	+59.0	12.5	60 33.2	+59.1	12.9	61 31.6	+59.2	13.3	62 30.0	+59.2	13.7	63 28.2	+59.4	14.2	64 26.3	+59.4	14.7	65 24.3	+59.5	15.3	73
74	59 35.0	+58.8	11.8	60 33.7	+58.9	12.1	61 32.3	+59.0	12.5	62 30.8	+59.1	12.9	63 29.2	+59.2	13.4	64 27.6	+59.2	13.9	65 25.7	+59.4	14.4	66 23.8	+59.5	14.9	74
75	60 33.8	+58.8	11.4	61 32.6	+58.9	11.7	62 31.3	+59.0	12.1	63 29.9	+59.1	12.5	64 28.4	+59.2	13.0	65 26.8	+59.3	13.5	66 25.1	+59.4	14.0	67 23.3	+59.4	14.6	75
76	61 32.6	+58.7	11.0	62 31.5	+58.8	11.3	63 30.3	+58.8	11.7	64 29.0	+58.9	12.1	65 27.6	+59.0	12.6	66 26.1	+59.1	13.1	67 24.5	+59.2	13.6	68 22.7	+59.4	14.2	76
77	62 31.3	+58.6	10.5	63 30.3	+58.7	10.9	64 29.1	+58.8	11.3	65 27.9	+58.9	11.7	66 26.6	+59.0	12.2	67 25.2	+59.1	12.7	68 23.7	+59.2	13.2	69 22.1	+59.3	13.8	77
78	63 29.9	+58.5	10.1	64 29.0	+58.6	10.4	65 27.9	+58.7	10.8	66 26.8	+58.8	11.2	67 25.6	+58.9	11.7	68 24.3	+59.1	12.2	69 22.9	+59.1	12.8	70 21.4	+59.2	13.4	78
79	64 28.4	+58.4	9.5	65 27.6	+58.5	9.9	66 26.6	+58.6	10.3	67 25.6	+58.7	10.7	68 24.5	+58.9	11.2	69 23.4	+58.9	11.7	70 22.0	+59.1	12.3	71 20.6	+59.2	12.9	79
80	65 26.8	+58.3	9.0	66 26.1	+58.4	9.4	67 25.2	+58.5	9.8	68 24.3	+58.6	10.2	69 23.4	+58.6	10.6	70 22.3	+58.8	11.2	71 21.1	+58.9	11.7	72 19.8	+59.0	12.4	80
81	66 25.1	+58.2	8.4	67 24.5	+58.2	8.8	68 23.7	+58.4	9.2	69 22.9	+58.5	9.6	70 22.0	+58.6	10.0	71 21.1	+58.7	10.6	72 20.0	+58.8	11.1	73 18.8	+59.0	11.8	81
82	67 23.3	+57.9	7.8	68 22.7	+58.1	8.1	69 22.1	+58.1	8.5	70 21.4	+58.2	8.9	71 20.6	+58.4	9.4	72 19.8	+58.5	9.9	73 18.8	+58.7	10.5	74 17.8	+58.8	11.1	82
83	68 21.2	+57.8	7.1	69 20.8	+57.8	7.4	70 20.2	+58.0	7.8	71 19.6	+58.1	8.2	72 19.0	+58.2	8.6	73 18.3	+58.3	9.1	74 17.5	+58.5	9.7	75 16.6	+58.6	10.3	83
84	69 19.0	+57.6	6.4	70 18.6	+57.7	6.7	71 18.2	+57.8	7.0	72 17.7	+57.9	7.4	73 17.2	+58.0	7.8	74 16.6	+58.2	8.3	75 16.0	+58.2	8.9	76 15.2	+58.4	9.5	84
85	70 16.6	+57.4	5.6	71 16.3	+57.5	5.8	72 16.0	+57.5	6.2	73 15.6	+57.7	6.5	74 15.2	+57.8	6.9	75 14.8	+57.8	7.4	76 14.2	+58.0	7.9	77 13.6	+58.2	8.5	85
86	71 14.0	+57.0	4.7	72 13.8	+57.1	4.9	73 13.5	+57.3	5.2	74 13.3	+57.3	5.5	75 13.0	+57.4	5.9	76 12.6	+57.6	6.3	77 12.2	+57.7	6.8	78 11.8	+57.8	7.3	86
87	72 11.0	+56.8	3.7	73 10.9	+56.8	3.9	74 10.8	+56.8	4.1	75 10.6	+56.9	4.4	76 10.4	+57.0	4.7	77 10.2	+57.1	5.1	78 09.9	+57.3	5.5	79 09.6	+57.4	6.0	87
88	73 07.8	+56.3	2.6	74 07.7	+56.4	2.7	75 07.6	+56.5	2.9	76 07.5	+56.5	3.1	77 07.4	+56.6	3.4	78 07.3	+56.7	3.6	79 07.2	+56.7	4.0	80 07.0	+56.9	4.4	88
89	74 04.1	+55.9	1.4	75 04.1	+55.9	1.5	76 04.1	+55.9	1.6	77 04.0	+56.0	1.7	78 04.0	+56.0	1.8	79 04.0	+56.0	2.0	80 03.9	+56.1	2.2	81 03.9	+56.1	2.4	89
90	75 00.0	+55.3	0.0	76 00.0	+55.3	0.0	77 00.0	+55.3	0.0	78 00.0	+55.3	0.0	79 00.0	+55.2	0.0	80 00.0	+55.2	0.0	81 00.0	+55.1	0.0	82 00.0	+55.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 158°, 202°

23°, 337° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 47.0	+59.6	156.3	12 52.0	+59.7	156.4	11 57.0	+59.8	156.5	11 02.0	+59.8	156.5	10 07.0	+59.8	156.6	9 11.9	+59.8	156.7	8 16.8	+59.8	156.7	7 21.6	+59.9	156.8	**0**
1	14 46.6	+59.7	156.2	13 51.7	+59.8	156.3	12 56.8	+59.7	156.4	12 01.8	+59.8	156.5	11 06.8	+59.8	156.5	10 11.7	+59.9	156.6	9 16.6	+59.9	156.7	8 21.5	+59.9	156.7	**1**
2	15 46.3	+59.7	156.1	14 51.5	+59.7	156.2	13 56.5	+59.8	156.3	13 01.6	+59.8	156.4	12 06.6	+59.8	156.5	11 11.6	+59.8	156.5	10 16.5	+59.9	156.6	9 21.4	+59.9	156.7	**2**
3	16 46.0	+59.6	156.0	15 51.2	+59.7	156.1	14 56.3	+59.8	156.2	14 01.4	+59.8	156.3	13 06.4	+59.9	156.4	12 11.4	+59.9	156.5	11 16.4	+59.9	156.6	10 21.3	+60.0	156.6	**3**
4	17 45.6	+59.7	155.8	16 50.9	+59.7	156.0	15 56.1	+59.7	156.1	15 01.2	+59.8	156.2	14 06.3	+59.8	156.3	13 11.3	+59.8	156.4	12 16.3	+59.9	156.5	11 21.3	+59.9	156.6	**4**
5	18 45.3	+59.7	155.7	17 50.6	+59.7	155.9	16 55.8	+59.7	156.0	16 01.0	+59.7	156.1	15 06.1	+59.8	156.2	14 11.1	+59.9	156.3	13 16.2	+59.9	156.4	12 21.2	+59.9	156.5	**5**
6	19 45.0	+59.6	155.6	18 50.3	+59.7	155.8	17 55.5	+59.8	155.9	17 00.7	+59.8	156.0	16 05.9	+59.8	156.1	15 11.0	+59.9	156.3	14 16.1	+59.8	156.4	13 21.1	+59.9	156.5	**6**
7	20 44.6	+59.7	155.5	19 50.0	+59.7	155.7	18 55.3	+59.7	155.8	18 00.5	+59.8	155.9	17 05.7	+59.8	156.1	16 10.9	+59.8	156.2	15 15.9	+59.9	156.3	14 21.0	+59.9	156.4	**7**
8	21 44.3	+59.6	155.4	20 49.7	+59.7	155.5	19 55.0	+59.8	155.7	19 00.3	+59.8	155.8	18 05.5	+59.8	156.0	17 10.7	+59.8	156.1	16 15.8	+59.9	156.2	15 20.9	+59.9	156.3	**8**
9	22 43.9	+59.6	155.3	21 49.4	+59.7	155.4	20 54.8	+59.7	155.6	20 00.1	+59.8	155.8	19 05.3	+59.9	155.9	18 10.5	+59.9	156.0	17 15.7	+59.9	156.2	16 20.8	+59.9	156.3	**9**
10	23 43.5	+59.7	155.1	22 49.1	+59.6	155.3	21 54.5	+59.7	155.5	20 59.9	+59.7	155.7	20 05.2	+59.8	155.8	19 10.4	+59.8	156.0	18 15.6	+59.8	156.1	17 20.7	+59.9	156.2	**10**
11	24 43.2	+59.6	155.0	23 48.7	+59.7	155.2	22 54.2	+59.7	155.4	21 59.6	+59.8	155.6	21 05.0	+59.8	155.7	20 10.2	+59.9	155.9	19 15.4	+59.9	156.0	18 20.6	+59.9	156.2	**11**
12	25 42.8	+59.6	154.9	24 48.4	+59.7	155.1	23 53.9	+59.8	155.3	22 59.4	+59.8	155.5	22 04.8	+59.8	155.6	21 10.1	+59.8	155.8	20 15.3	+59.9	156.0	19 20.5	+59.9	156.1	**12**
13	26 42.4	+59.6	154.8	25 48.1	+59.6	155.0	24 53.7	+59.7	155.2	23 59.2	+59.7	155.4	23 04.6	+59.8	155.6	22 09.9	+59.9	155.7	21 15.2	+59.9	155.9	20 20.4	+59.9	156.0	**13**
14	27 42.0	+59.6	154.6	26 47.7	+59.7	154.9	25 53.4	+59.7	155.1	24 58.9	+59.8	155.3	24 04.4	+59.8	155.5	23 09.8	+59.8	155.6	22 15.1	+59.8	155.8	21 20.3	+59.9	156.0	**14**
15	28 41.6	+59.6	154.5	27 47.4	+59.7	154.7	26 53.1	+59.7	155.0	25 58.7	+59.7	155.2	25 04.2	+59.8	155.4	24 09.6	+59.8	155.6	23 14.9	+59.9	155.7	22 20.2	+59.9	155.9	**15**
16	29 41.2	+59.6	154.4	28 47.1	+59.6	154.6	27 52.8	+59.7	154.9	26 58.4	+59.8	155.1	26 04.0	+59.8	155.3	25 09.4	+59.9	155.5	24 14.8	+59.9	155.7	23 20.1	+59.9	155.9	**16**
17	30 40.8	+59.6	154.2	29 46.7	+59.6	154.5	28 52.5	+59.7	154.7	27 58.2	+59.7	155.0	27 03.8	+59.8	155.2	26 09.3	+59.8	155.4	25 14.7	+59.8	155.6	24 20.0	+59.9	155.8	**17**
18	31 40.4	+59.6	154.1	30 46.3	+59.7	154.4	29 52.2	+59.7	154.6	28 57.9	+59.8	154.9	28 03.6	+59.7	155.1	27 09.1	+59.8	155.3	26 14.5	+59.9	155.5	25 19.9	+59.9	155.7	**18**
19	32 40.0	+59.5	154.0	31 46.0	+59.6	154.2	30 51.9	+59.7	154.5	29 57.7	+59.7	154.8	29 03.3	+59.8	155.0	28 08.9	+59.8	155.2	27 14.4	+59.8	155.4	26 19.8	+59.8	155.7	**19**
20	33 39.5	+59.6	153.8	32 45.6	+59.6	154.1	31 51.6	+59.6	154.4	30 57.4	+59.7	154.6	30 03.1	+59.8	154.9	29 08.7	+59.8	155.1	28 14.2	+59.9	155.4	27 19.6	+59.9	155.6	**20**
21	34 39.1	+59.5	153.7	33 45.2	+59.6	154.0	32 51.2	+59.7	154.3	31 57.1	+59.7	154.5	31 02.9	+59.8	154.8	30 08.5	+59.9	155.1	29 14.1	+59.8	155.3	28 19.5	+59.9	155.5	**21**
22	35 38.6	+59.5	153.5	34 44.8	+59.6	153.8	33 50.9	+59.7	154.1	32 56.8	+59.8	154.4	32 02.7	+59.7	154.7	31 08.4	+59.8	155.0	30 13.9	+59.9	155.2	29 19.4	+59.9	155.4	**22**
23	36 38.1	+59.5	153.4	35 44.4	+59.6	153.7	34 50.6	+59.6	154.0	33 56.6	+59.7	154.3	33 02.4	+59.8	154.6	32 08.2	+59.8	154.9	31 13.8	+59.8	155.1	30 19.3	+59.9	155.4	**23**
24	37 37.6	+59.5	153.2	36 44.0	+59.6	153.6	35 50.2	+59.6	153.9	34 56.3	+59.7	154.2	34 02.2	+59.7	154.5	33 08.0	+59.8	154.8	32 13.6	+59.9	155.0	31 19.2	+59.9	155.3	**24**
25	38 37.1	+59.5	153.0	37 43.6	+59.5	153.4	36 49.8	+59.7	153.7	35 56.0	+59.7	154.1	35 01.9	+59.8	154.4	34 07.8	+59.8	154.7	33 13.5	+59.8	155.0	32 19.1	+59.8	155.2	**25**
26	39 36.6	+59.5	152.9	38 43.1	+59.6	153.2	37 49.5	+59.6	153.6	36 55.7	+59.6	153.9	36 01.7	+59.7	154.3	35 07.6	+59.8	154.6	34 13.3	+59.8	154.9	33 18.9	+59.9	155.1	**26**
27	40 36.1	+59.5	152.7	39 42.7	+59.5	153.1	38 49.1	+59.6	153.5	37 55.3	+59.7	153.8	37 01.4	+59.8	154.1	36 07.4	+59.7	154.5	35 13.1	+59.9	154.8	34 18.8	+59.9	155.1	**27**
28	41 35.6	+59.4	152.5	40 42.2	+59.6	152.9	39 48.7	+59.6	153.3	38 55.0	+59.7	153.7	38 01.2	+59.7	154.0	37 07.1	+59.8	154.4	36 13.0	+59.8	154.7	35 18.7	+59.8	155.0	**28**
29	42 35.0	+59.4	152.3	41 41.8	+59.5	152.8	40 48.3	+59.6	153.2	39 54.7	+59.6	153.5	39 00.9	+59.7	153.9	38 06.9	+59.8	154.3	37 12.8	+59.8	154.6	36 18.5	+59.9	154.9	**29**
30	43 34.4	+59.4	152.2	42 41.3	+59.5	152.6	41 47.9	+59.6	153.0	40 54.3	+59.7	153.4	40 00.6	+59.7	153.8	39 06.7	+59.8	154.1	38 12.6	+59.8	154.5	37 18.4	+59.9	154.8	**30**
31	44 33.8	+59.4	152.0	43 40.8	+59.4	152.4	42 47.5	+59.5	152.8	41 54.0	+59.6	153.3	41 00.3	+59.7	153.7	40 06.5	+59.7	154.0	39 12.4	+59.8	154.4	38 18.3	+59.8	154.7	**31**
32	45 33.2	+59.4	151.8	44 40.2	+59.5	152.2	43 47.0	+59.6	152.7	42 53.6	+59.7	153.1	42 00.0	+59.7	153.5	41 06.2	+59.8	153.9	40 12.2	+59.9	154.3	39 18.1	+59.9	154.6	**32**
33	46 32.6	+59.3	151.5	45 39.7	+59.4	152.0	44 46.6	+59.5	152.5	43 53.3	+59.6	153.0	42 59.7	+59.7	153.4	42 06.0	+59.7	153.8	41 12.1	+59.8	154.2	40 18.0	+59.8	154.6	**33**
34	47 31.9	+59.3	151.3	46 39.1	+59.5	151.8	45 46.1	+59.5	152.3	44 52.9	+59.6	152.8	43 59.4	+59.7	153.2	43 05.7	+59.8	153.7	42 11.9	+59.7	154.1	41 17.8	+59.8	154.5	**34**
35	48 31.2	+59.3	151.1	47 38.6	+59.3	151.6	46 45.6	+59.5	152.1	45 52.5	+59.5	152.6	44 59.1	+59.6	153.1	44 05.5	+59.7	153.5	43 11.6	+59.8	154.0	42 17.6	+59.9	154.4	**35**
36	49 30.5	+59.3	150.9	48 37.9	+59.4	151.4	47 45.1	+59.5	152.0	46 52.0	+59.6	152.5	45 58.7	+59.7	152.9	45 05.2	+59.7	153.4	44 11.4	+59.8	153.8	43 17.5	+59.8	154.3	**36**
37	50 29.8	+59.2	150.6	49 37.3	+59.4	151.2	48 44.6	+59.5	151.8	47 51.6	+59.6	152.3	46 58.4	+59.6	152.8	46 04.9	+59.7	153.3	45 11.2	+59.8	153.7	44 17.3	+59.8	154.2	**37**
38	51 29.0	+59.2	150.4	50 36.7	+59.3	151.0	49 44.1	+59.4	151.6	48 51.2	+59.5	152.1	47 58.0	+59.6	152.6	47 04.6	+59.7	153.1	46 11.0	+59.7	153.6	45 17.1	+59.8	154.0	**38**
39	52 28.2	+59.1	150.1	51 36.0	+59.3	150.7	50 43.5	+59.4	151.3	49 50.7	+59.5	151.9	48 57.6	+59.6	152.5	48 04.3	+59.7	153.0	47 10.7	+59.8	153.5	46 16.9	+59.9	153.9	**39**
40	53 27.3	+59.1	149.8	52 35.3	+59.2	150.5	51 42.9	+59.4	151.1	50 50.2	+59.5	151.7	49 57.2	+59.6	152.3	49 04.0	+59.7	152.8	48 10.5	+59.7	153.3	47 16.8	+59.8	153.8	**40**
41	54 26.4	+59.1	149.5	53 34.5	+59.2	150.2	52 42.3	+59.3	150.9	51 49.7	+59.5	151.5	50 56.8	+59.6	152.1	50 03.7	+59.6	152.7	49 10.2	+59.8	153.2	48 16.6	+59.8	153.7	**41**
42	55 25.5	+59.0	149.2	54 33.7	+59.2	149.9	53 41.6	+59.3	150.6	52 49.2	+59.4	151.3	51 56.4	+59.5	151.9	51 03.3	+59.7	152.5	50 10.0	+59.7	153.0	49 16.4	+59.7	153.6	**42**
43	56 24.5	+59.0	148.9	55 32.9	+59.1	149.7	54 40.9	+59.3	150.4	53 48.6	+59.4	151.1	52 55.9	+59.6	151.7	52 03.0	+59.6	152.3	51 09.7	+59.7	152.9	50 16.1	+59.8	153.4	**43**
44	57 23.5	+58.9	148.6	56 32.0	+59.1	149.4	55 40.2	+59.3	150.1	54 48.0	+59.4	150.8	53 55.5	+59.5	151.5	53 02.6	+59.6	152.1	52 09.4	+59.7	152.7	51 15.9	+59.8	153.3	**44**
45	58 22.4	+58.8	148.2	57 31.1	+59.1	149.0	56 39.5	+59.2	149.8	55 47.4	+59.4	150.6	54 55.0	+59.4	151.3	54 02.2	+59.6	151.9	53 09.1	+59.7	152.6	52 15.7	+59.7	153.2	**45**
46	59 21.2	+58.8	147.8	58 30.2	+59.0	148.7	57 38.7	+59.1	149.5	56 46.8	+59.3	150.3	55 54.4	+59.5	151.0	55 01.8	+59.5	151.7	54 08.8	+59.6	152.4	53 15.4	+59.8	153.0	**46**
47	60 20.0	+58.7	147.4	59 29.2	+58.9	148.3	58 37.8	+59.2	149.2	57 46.1	+59.3	150.0	56 53.9	+59.4	150.8	56 01.3	+59.6	151.5	55 08.4	+59.7	152.2	54 15.2	+59.7	152.9	**47**
48	61 18.7	+58.6	147.0	60 28.1	+58.8	148.0	59 37.0	+59.0	148.9	58 45.4	+59.2	149.7	57 53.3	+59.4	150.5	57 00.9	+59.5	151.3	56 08.1	+59.6	152.0	55 14.9	+59.7	152.7	**48**
49	62 17.3	+58.5	146.5	61 26.9	+58.8	147.6	60 36.0	+59.0	148.5	59 44.6	+59.2	149.4	58 52.7	+59.4	150.3	58 00.4	+59.5	151.1	57 07.7	+59.6	151.8	56 14.6	+59.7	152.5	**49**
50	63 15.8	+58.4	146.1	62 25.7	+58.7	147.1	61 35.0	+58.9	148.1	60 43.8	+59.1	149.1	59 52.1	+59.3	150.0	58 59.9	+59.5	150.8	58 07.3	+59.6	151.6	57 14.3	+59.7	152.3	**50**
51	64 14.2	+58.3	145.5	63 24.4	+58.6	146.7	62 33.9	+58.9	147.7	61 42.9	+59.1	148.7	60 51.4	+59.3	149.7	59 59.4	+59.4	150.6	59 06.9	+59.6	151.4	58 14.0	+59.7	152.2	**51**
52	65 12.5	+58.2	145.0	64 23.0	+58.5	146.2	63 32.8	+58.8	147.3	62 42.0	+59.0	148.4	61 50.7	+59.2	149.3	60 58.8	+59.4	150.3	60 06.5	+59.5	151.1	59 13.7	+59.7	152.0	**52**
53	66 10.7	+58.0	144.4	65 21.5	+58.4	145.7	64 31.6	+58.7	146.9	63 41.0	+59.0	148.0	62 49.9	+59.1	149.0	61 58.2	+59.3	150.0	61 06.0	+59.5	150.9	60 13.4	+59.6	151.7	**53**
54	67 08.7	+57.8	143.8	66 19.9	+58.2	145.1	65 30.3	+58.6	146.4	64 40.0	+58.8	147.5	63 49.0	+59.1	148.6	62 57.5	+59.3	149.7	62 05.5	+59.5	150.6	61 13.0	+59.6	151.5	**54**
55	68 06.5	+57.7	143.1	67 18.1	+58.1	144.5	66 28.9	+58.4	145.8	65 38.8	+58.8	147.1	64 48.1	+59.1	148.2	63 56.8	+59.3	149.3	63 05.0	+59.4	150.3	62 12.6	+59.6	151.3	**55**
56	69 04.2	+57.4	142.3	68 16.2	+57.9	143.8	67 27.3	+58.4	145.3	66 37.6	+58.7	146.6	65 47.2	+58.9	147.8	64 56.1	+59.2	149.0	64 04.4	+59.4	150.0	63 12.2	+59.5	151.0	**56**
57	70 01.6	+57.2	141.5	69 14.1	+57.7	143.1	68 25.7	+58.1	144.6	67 36.3	+58.6	146.0	66 46.1	+58.9	147.3	65 55.3	+59.1	148.6	65 03.8	+59.3	149.7	64 11.7	+59.5	150.7	**57**
58	70 58.8	+56.9	140.6	70 11.8	+57.5	142.3	69 23.8	+58.0	144.0	68 34.9	+58.4	145.5	67 45.0	+58.8	146.8	66 54.4	+59.1	148.1	66 03.1	+59.3	149.3	65 11.2	+59.5	150.4	**58**
59	71 55.7	+56.5	139.6	71 09.3	+57.3	141.5	70 21.8	+57.8	143.2	69 33.3	+58.3	144.8	68 43.8	+58.7	146.3	67 53.5	+58.9	147.7	67 02.4	+59.2	148.9	66 10.7	+59.4	150.1	**59**
60	72 52.2	+56.1	138.4	72 06.6	+56.9	140.5	71 19.6	+57.6	142.4	70 31.6	+58.1	144.1	69 42.5	+58.5	145.7	68 52.4	+58.9	147.2	68 01.6	+59.2	148.5	67 10.1	+59.4	149.8	**60**
61	73 48.3	+55.7	137.2	73 03.5	+56.6	139.5	72 17.2	+57.3	141.5	71 29.7	+57.8	143.4	70 41.0	+58.4	145.1	69 51.3	+58.8	146.6	69 00.8	+59.1	148.1	68 09.5	+59.3	149.4	**61**
62	74 44.0	+55.1	135.8	74 00.1	+56.1	138.3	73 14.5	+57.0	140.5	72 27.5	+57.7	142.5	71 39.4	+58.2	144.3	70 50.1	+58.6	146.0	69 59.9	+59.0	147.6	69 08.8	+59.3	149.0	**62**
63	75 39.1	+54.4	134.3	74 56.2	+55.6	137.0	74 11.5	+56.6	139.4	73 25.2	+57.4	141.6	72 37.6	+57.9	143.6	71 48.7	+58.5	145.4	70 58.9	+58.8	147.0	70 08.1	+59.2	148.5	**63**
64	76 33.5	+53.6	132.5	75 51.8	+55.0	135.5	75 08.1	+56.1	138.1	74 22.6	+57.0	140.5	73 35.5	+57.8	142.7	72 47.2	+58.3	144.6	71 57.7	+58.8	146.4	71 07.3	+59.1	148.0	**64**
65	77 27.1	+52.5	130.5	76 46.8	+54.2	133.8	76 04.2	+55.6	136.7	75 19.6	+56.6	139.3	74 33.3	+57.4	141.7	73 45.5	+58.1	143.8	72 56.5	+58.6	145.7	72 06.4	+59.0	147.5	**65**
66	78 19.6	+51.3	128.2	77 41.0	+53.3	131.8	76 59.8	+54.8	135.1	76 16.2	+56.1	138.0	75 30.7	+57.1	140.6	74 43.6	+57.9	142.9	73 55.1	+58.4	145.0	73 05.4	+58.9	146.9	**66**
67	79 10.9	+49.7	125.6	78 34.3	+52.1	129.6	77 54.6	+54.0	133.2	77 12.3	+55.5	136.4	76 27.8	+56.6	139.3	75 41.5	+57.5	141.9	74 53.5	+58.2	144.1	74 04.3	+58.7	146.2	**67**
68	80 00.6	*+47.7*	•122.5	79 26.4	+50.6	127.0	78 48.6	+52.9	131.0	78 07.8	+54.7	134.6	77 24.4	+56.1	137.8	76 39.0	+57.1	140.7	75 51.7	+58.0	143.2	75 03.0	+58.6	145.4	**68**
69	80 48.3	*+45.0*	•118.8	80 17.0	*+48.7*	•123.9	79 41.5	+51.5	128.5	79 02.5	+53.7	132.6	78 20.5	+55.4	136.1	77 36.1	+56.7	139.3	76 49.7	+57.6	142.1	76 01.6	+58.3	144.6	**69**
70	81 33.3	*+41.7*	•114.5	81 05.7	*+46.1*	•120.3	80 33.0	*+49.7*	•125.5	79 56.2	+52.4	130.1	79 15.9	+54.5	134.2	78 32.8	+56.1	137.7	77 47.3	+57.2	140.8	76 59.9	+58.1	143.6	**70**
71	82 15.0	*+37.3*	•109.4	81 51.8	*+42.9*	•116.0	81 22.7	*+47.3*	•121.9	80 48.6	*+50.8*	•127.2	80 10.4	+53.4	131.8	79 28.9	+55.2	135.8	78 44.5	+56.7	139.3	77 58.0	+57.7	142.4	**71**
72	82 52.3	*+31.8*	•103.3	82 34.7	*+38.5*	•110.8	82 10.0	*+44.1*	•117.6	81 39.4	*+48.4*	•123.7	81 03.8	+51.7	129.0	80 24.1	+54.3	133.6	79 41.2	+56.1	137.6	78 55.7	+57.3	141.0	**72**
73	83 24.1	*+24.7*	•96.2	83 13.2	*+32.9*	•104.6	82 54.1	*+39.8*	•112.4	82 27.8	*+45.4*	•119.4	81 55.5	*+49.7*	•125.6	81 18.4	+52.8	130.9	80 37.3	+55.1	135.5	79 53.0	+56.8	139.4	**73**
74	83 48.8	*+16.3*	•88.0	83 46.1	*+25.5*	•97.2	83 33.9	*+34.1*	•106.1	83 13.2	*+41.2*	•114.2	82 45.2	*+46.8*	•121.4	82 11.2	*+50.9*	•127.6	81 32.4	+53.9	132.9	80 49.8	+56.0	137.5	**74**
75	84 05.1	*+6.5*	•78.9	84 11.6	*+16.7*	•88.6	84 08.0	*+26.5*	•98.4	83 54.4	*+35.5*	•107.7	83 32.0	*+42.7*	•116.1	83 02.1	*+48.2*	•123.5	82 26.3	*+52.2*	•129.8	81 45.8	+54.9	135.1	**75**
76	84 11.6	*−3.6*	•69.1	84 28.3	*+6.2*	•78.8	84 34.5	*+17.0*	•89.2	84 29.9	*+27.5*	•99.7	84 14.7	*+36.9*	•109.5	83 50.3	*+44.3*	•118.3	83 18.5	*+49.6*	•125.8	82 40.7	+53.4	132.1	**76**
77	84 08.0	*−13.6*	•59.3	84 34.5	*−4.6*	•68.4	84 51.5	*+5.9*	•78.8	84 57.4	*+17.5*	•90.0	84 51.6	*+28.8*	•101.2	84 34.6	*+38.5*	•111.6	84 08.1	*+46.0*	•120.7	83 34.1	*+51.2*	•128.3	**77**
78	83 54.4	*−22.4*	•49.9	84 29.9	*−15.2*	•57.9	84 57.4	*−5.8*	•67.6	85 14.9	*+5.5*	•78.7	85 20.4	*+18.0*	•90.9	85 13.1	*+30.2*	•102.9	84 54.1	*+40.3*	•113.9	84 25.3	*+47.8*	•123.3	**78**
79	83 32.0	*−29.9*	•41.5	84 14.7	*−24.4*	•48.0	84 51.6	*−17.0*	•56.3	85 20.4	*−7.3*	•66.6	85 38.4	*+4.9*	•78.7	85 43.3	*+18.6*	•91.9	85 34.4	*+31.8*	•105.0	85 13.1	*+42.3*	•116.6	**79**
80	83 02.1	*−35.8*	•34.0	83 50.3	*−31.8*	•39.2	84 34.6	*−26.5*	•45.9	85 13.1	*−19.0*	•54.5	85 43.3	*−8.9*	•65.4	86 01.9	*+4.3*	•78.7	86 06.2	*+19.3*	•93.2	85 55.4	*+33.6*	•107.4	**80**
81	82 26.3	*−40.5*	•27.7	83 18.5	*−37.8*	•31.6	84 08.1	*−34.0*	•36.7	84 54.1	*−28.8*	•43.5	85 34.4	*−21.3*	•52.4	86 06.2	*−10.8*	•64.1	86 25.5	*+3.5*	•78.6	86 29.0	*+20.2*	•94.8	**81**
82	81 45.8	*−44.2*	•22.3	82 40.7	*−42.3*	•25.3	83 34.1	*−39.8*	•29.0	84 25.3	*−36.4*	•34.0	85 13.1	*−31.4*	•40.7	85 55.4	*−24.1*	•49.9	86 29.0	*−13.1*	•62.4	86 49.2	*+2.4*	•78.6	**82**
83	81 01.6	*−47.0*	•17.8	81 58.4	*−45.7*	•19.9	82 54.3	*−44.1*	•22.7	83 48.9	*−41.8*	•26.2	84 41.7	*−38.8*	•31.0	85 31.3	*−34.2*	•37.6	86 15.9	*−27.2*	•47.0	86 51.6	*−15.9*	•60.4	**83**
84	80 14.6	−49.1	13.9	81 12.7	*−48.4*	•15.5	82 10.2	*−47.3*	•17.4	83 07.1	*−45.9*	•19.9	84 02.9	*−44.0*	•23.2	84 57.1	*−41.3*	•27.7	85 48.7	*−37.2*	•34.0	86 35.7	*−30.7*	•43.4	**84**
85	79 25.5	−50.9	10.7	80 24.3	−50.3	11.8	81 22.9	*−49.7*	•13.1	82 21.2	*−48.9*	•14.8	83 18.9	*−47.8*	•17.0	84 15.8	*−46.2*	•19.9	85 11.5	*−44.0*	•24.0	86 05.0	*−40.4*	•29.9	**85**
86	78 34.6	−52.2	7.9	79 34.0	−51.9	8.7	80 33.2	−51.5	9.6	81 32.3	−51.0	10.7	82 31.1	*−50.3*	•12.1	83 29.6	*−49.5*	•13.9	84 27.5	*−48.3*	•16.4	85 24.6	*−46.6*	•19.9	**86**
87	77 42.4	−53.3	5.5	78 42.1	−53.1	6.0	79 41.7	−52.9	6.6	80 41.3	−52.6	7.3	81 40.8	−52.3	8.1	82 40.1	*−51.9*	•9.2	83 39.2	*−51.3*	•10.7	84 38.0	*−50.5*	•12.6	**87**
88	76 49.1	−54.2	3.4	77 49.0	−54.1	3.7	78 48.8	−53.9	4.0	79 48.7	−53.9	4.4	80 48.5	−53.7	4.9	81 48.2	−53.5	5.5	82 47.9	−53.2	6.2	83 47.5	*−52.9*	•7.2	**88**
89	75 54.9	−54.9	1.6	76 54.9	−54.9	1.7	77 54.9	−54.9	1.9	78 54.8	−54.8	2.0	79 54.8	−54.8	2.2	80 54.7	−54.7	2.5	81 54.7	−54.7	2.8	82 54.6	−54.6	3.2	**89**
90	75 00.0	−55.5	0.0	76 00.0	−55.5	0.0	77 00.0	−55.6	0.0	78 00.0	−55.6	0.0	79 00.0	−55.6	0.0	80 00.0	−55.6	0.0	81 00.0	−55.7	0.0	82 00.0	−55.7	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

23°, 337° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 23°, 337°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 47.0	−59.7	156.3	12 52.0	−59.7	156.4	11 57.0	−59.7	156.5	11 02.0	−59.8	156.5	10 07.0	−59.9	156.6	9 11.9	−59.9	156.7	8 16.8	−59.9	156.7	7 21.6	−59.9	156.8	0
1	12 47.3	−59.7	156.4	11 52.3	−59.7	156.5	10 57.3	−59.8	156.6	10 02.2	−59.8	156.6	9 07.1	−59.8	156.7	8 12.0	−59.8	156.8	7 16.9	−59.9	156.8	6 21.7	−59.9	156.9	1
2	11 47.6	−59.7	156.5	10 52.6	−59.7	156.6	9 57.5	−59.7	156.6	9 02.4	−59.8	156.7	8 07.3	−59.8	156.8	7 12.2	−59.9	156.8	6 17.0	−59.9	156.9	5 21.8	−59.9	156.9	2
3	10 47.9	−59.6	156.6	9 52.9	−59.8	156.7	8 57.8	−59.8	156.7	8 02.6	−59.8	156.8	7 07.5	−59.9	156.8	6 12.3	−59.9	156.9	5 17.1	−59.9	156.9	4 21.9	−59.9	157.0	3
4	9 48.3	−59.7	156.7	8 53.1	−59.7	156.8	7 58.0	−59.8	156.8	7 02.8	−59.8	156.9	6 07.6	−59.8	156.9	5 12.4	−59.8	157.0	4 17.2	−59.9	157.0	3 22.0	−59.9	157.0	4
5	8 48.6	−59.7	156.8	7 53.4	−59.7	156.9	6 58.2	−59.7	156.9	6 03.0	−59.8	157.0	5 07.8	−59.8	157.0	4 12.6	−59.9	157.0	3 17.3	−59.9	157.1	2 22.1	−59.9	157.1	5
6	7 48.9	−59.7	156.9	6 53.7	−59.7	157.0	5 58.5	−59.8	157.0	5 03.2	−59.8	157.0	4 08.0	−59.9	157.1	3 12.7	−59.9	157.1	2 17.4	−59.9	157.1	1 22.2	−60.0	157.1	6
7	6 49.2	−59.7	157.0	5 54.0	−59.8	157.1	4 58.7	−59.8	157.1	4 03.4	−59.8	157.1	3 08.1	−59.8	157.1	2 12.8	−59.8	157.2	1 17.5	−59.8	157.2	0 22.2	−59.9	157.2	7
8	5 49.5	−59.7	157.1	4 54.2	−59.7	157.1	3 58.9	−59.7	157.2	3 03.6	−59.8	157.2	2 08.3	−59.8	157.2	1 13.0	−59.9	157.2	0 17.7	−59.9	157.2	0 37.7	+59.9	22.8	8
9	4 49.8	−59.7	157.2	3 54.5	−59.7	157.2	2 59.2	−59.8	157.3	2 03.8	−59.8	157.3	1 08.5	−59.9	157.3	0 13.1	−59.8	157.3	0 42.2	+59.9	22.7	1 37.6	+59.9	22.7	9
10	3 50.1	−59.7	157.3	2 54.8	−59.8	157.3	1 59.4	−59.8	157.4	1 04.0	−59.8	157.4	0 08.6	−59.8	157.4	0 46.7	+59.9	22.6	1 42.1	+59.9	22.6	2 37.5	+59.9	22.7	10
11	2 50.4	−59.6	157.4	1 55.0	−59.7	157.4	0 59.6	−59.7	157.4	0 04.2	−59.8	157.4	0 51.2	+59.8	22.6	1 46.6	+59.9	22.6	2 42.0	+59.9	22.6	3 37.4	+59.9	22.6	11
12	1 50.8	−59.7	157.5	0 55.3	−59.7	157.5	0 00.1	+59.8	22.5	0 55.6	+59.8	22.5	1 51.0	+59.9	22.5	2 46.5	+59.8	22.5	3 41.9	+59.9	22.5	4 37.3	+59.9	22.5	12
13	0 51.1	−59.7	157.6	0 04.4	+59.8	22.4	0 59.9	+59.8	22.4	1 55.4	+59.8	22.4	2 50.9	+59.8	22.4	3 46.3	+59.9	22.4	4 41.8	+59.9	22.5	5 37.2	+59.9	22.5	13
14	0 08.6	+59.7	22.3	1 04.2	+59.7	22.3	1 59.7	+59.7	22.3	2 55.2	+59.8	22.3	3 50.7	+59.8	22.3	4 46.2	+59.8	22.4	5 41.7	+59.8	22.4	6 37.1	+59.9	22.4	14
15	1 08.3	+59.7	22.2	2 03.9	+59.7	22.2	2 59.4	+59.8	22.2	3 55.0	+59.8	22.2	4 50.5	+59.9	22.3	5 46.0	+59.9	22.3	6 41.5	+59.9	22.3	7 37.0	+59.9	22.4	15
16	2 08.0	+59.7	22.1	3 03.6	+59.7	22.1	3 59.2	+59.8	22.1	4 54.8	+59.8	22.1	5 50.4	+59.8	22.2	6 45.9	+59.9	22.2	7 41.4	+59.9	22.3	8 36.9	+60.0	22.3	16
17	3 07.7	+59.7	22.0	4 03.3	+59.8	22.0	4 59.0	+59.7	22.0	5 54.6	+59.8	22.1	6 50.2	+59.8	22.1	7 45.8	+59.8	22.2	8 41.3	+59.9	22.2	9 36.9	+59.9	22.3	17
18	4 07.4	+59.7	21.9	5 03.1	+59.7	21.9	5 58.7	+59.8	21.9	6 54.4	+59.8	22.0	7 50.0	+59.8	22.0	8 45.6	+59.9	22.1	9 41.2	+59.9	22.1	10 36.8	+59.9	22.2	18
19	5 07.1	+59.7	21.8	6 02.8	+59.7	21.8	6 58.5	+59.8	21.9	7 54.2	+59.8	21.9	8 49.8	+59.9	22.0	9 45.5	+59.8	22.0	10 41.1	+59.9	22.1	11 36.7	+59.9	22.2	19
20	6 06.8	+59.7	21.7	7 02.5	+59.8	21.7	7 58.3	+59.7	21.8	8 54.0	+59.8	21.8	9 49.7	+59.8	21.9	10 45.3	+59.9	21.9	11 41.0	+59.9	22.0	12 36.6	+59.9	22.1	20
21	7 06.5	+59.7	21.6	8 02.3	+59.7	21.6	8 58.0	+59.8	21.7	9 53.8	+59.8	21.7	10 49.5	+59.8	21.8	11 45.2	+59.8	21.9	12 40.9	+59.8	22.0	13 36.5	+59.9	22.0	21
22	8 06.2	+59.6	21.5	9 02.0	+59.7	21.5	9 57.8	+59.7	21.6	10 53.6	+59.8	21.6	11 49.3	+59.8	21.7	12 45.0	+59.9	21.8	13 40.7	+59.9	21.9	14 36.4	+59.9	22.0	22
23	9 05.8	+59.7	21.4	10 01.7	+59.7	21.4	10 57.5	+59.8	21.5	11 53.4	+59.8	21.6	12 49.1	+59.9	21.6	13 44.9	+59.9	21.7	14 40.6	+59.9	21.8	15 36.3	+59.9	21.9	23
24	10 05.5	+59.7	21.3	11 01.4	+59.7	21.3	11 57.3	+59.8	21.4	12 53.2	+59.7	21.5	13 49.0	+59.8	21.6	14 44.8	+59.8	21.7	15 40.5	+59.9	21.8	16 36.2	+59.9	21.9	24
25	11 05.2	+59.7	21.2	12 01.1	+59.8	21.2	12 57.1	+59.7	21.3	13 52.9	+59.8	21.4	14 48.8	+59.8	21.5	15 44.6	+59.9	21.6	16 40.4	+59.9	21.7	17 36.1	+59.9	21.8	25
26	12 04.9	+59.7	21.0	13 00.9	+59.7	21.1	13 56.8	+59.8	21.2	14 52.7	+59.8	21.3	15 48.6	+59.8	21.4	16 44.5	+59.8	21.5	17 40.3	+59.8	21.6	18 36.0	+59.9	21.7	26
27	13 04.6	+59.6	20.9	14 00.6	+59.7	21.0	14 56.6	+59.7	21.1	15 52.5	+59.8	21.2	16 48.4	+59.9	21.3	17 44.3	+59.9	21.4	18 40.1	+59.9	21.6	19 35.9	+59.9	21.7	27
28	14 04.2	+59.7	20.8	15 00.3	+59.7	20.9	15 56.3	+59.8	21.0	16 52.3	+59.8	21.1	17 48.3	+59.8	21.2	18 44.2	+59.8	21.4	19 40.0	+59.9	21.5	20 35.8	+59.9	21.6	28
29	15 03.9	+59.7	20.7	16 00.0	+59.7	20.8	16 56.1	+59.7	20.9	17 52.1	+59.8	21.0	18 48.1	+59.8	21.2	19 44.0	+59.8	21.3	20 39.9	+59.8	21.4	21 35.7	+59.9	21.6	29
30	16 03.6	+59.6	20.6	16 59.7	+59.7	20.7	17 55.8	+59.8	20.8	18 51.9	+59.7	21.0	19 47.9	+59.8	21.1	20 43.8	+59.9	21.2	21 39.7	+59.9	21.4	22 35.6	+59.9	21.5	30
31	17 03.2	+59.7	20.5	17 59.4	+59.7	20.6	18 55.6	+59.7	20.7	19 51.6	+59.8	20.9	20 47.7	+59.8	21.0	21 43.7	+59.8	21.1	22 39.6	+59.9	21.3	23 35.5	+59.9	21.4	31
32	18 02.9	+59.7	20.4	18 59.1	+59.7	20.5	19 55.3	+59.7	20.6	20 51.4	+59.8	20.8	21 47.5	+59.8	20.9	22 43.5	+59.9	21.1	23 39.5	+59.8	21.2	24 35.4	+59.9	21.4	32
33	19 02.6	+59.6	20.3	19 58.8	+59.7	20.4	20 55.0	+59.8	20.5	21 51.2	+59.8	20.7	22 47.3	+59.8	20.8	23 43.4	+59.8	21.0	24 39.3	+59.9	21.1	25 35.3	+59.9	21.3	33
34	20 02.2	+59.7	20.2	20 58.5	+59.7	20.3	21 54.8	+59.7	20.4	22 51.0	+59.7	20.6	23 47.1	+59.8	20.7	24 43.2	+59.8	20.9	25 39.2	+59.9	21.1	26 35.2	+59.9	21.2	34
35	21 01.9	+59.6	20.1	21 58.2	+59.7	20.2	22 54.5	+59.7	20.3	23 50.7	+59.8	20.5	24 46.9	+59.8	20.6	25 43.0	+59.8	20.8	26 39.1	+59.8	21.0	27 35.1	+59.8	21.2	35
36	22 01.5	+59.6	19.9	22 57.9	+59.7	20.1	23 54.2	+59.7	20.2	24 50.5	+59.7	20.4	25 46.7	+59.8	20.6	26 42.8	+59.9	20.7	27 38.9	+59.9	20.9	28 34.9	+59.9	21.1	36
37	23 01.1	+59.7	19.8	23 57.6	+59.6	20.0	24 53.9	+59.7	20.1	25 50.2	+59.8	20.3	26 46.5	+59.8	20.5	27 42.7	+59.8	20.6	28 38.8	+59.8	20.8	29 34.8	+59.9	21.0	37
38	24 00.8	+59.6	19.7	24 57.2	+59.7	19.9	25 53.6	+59.8	20.0	26 50.0	+59.7	20.2	27 46.3	+59.8	20.4	28 42.5	+59.8	20.6	29 38.6	+59.9	20.7	30 34.7	+59.9	21.0	38
39	25 00.4	+59.6	19.6	25 56.9	+59.7	19.7	26 53.4	+59.7	19.9	27 49.7	+59.8	20.1	28 46.1	+59.7	20.3	29 42.3	+59.8	20.5	30 38.5	+59.8	20.7	31 34.6	+59.9	20.9	39
40	26 00.0	+59.6	19.5	26 56.6	+59.6	19.6	27 53.1	+59.7	19.8	28 49.5	+59.7	20.0	29 45.8	+59.8	20.2	30 42.1	+59.8	20.4	31 38.3	+59.9	20.6	32 34.5	+59.8	20.8	40
41	26 59.6	+59.7	19.3	27 56.2	+59.7	19.5	28 52.8	+59.7	19.7	29 49.2	+59.8	19.9	30 45.6	+59.8	20.1	31 41.9	+59.8	20.3	32 38.2	+59.8	20.5	33 34.3	+59.9	20.7	41
42	27 59.3	+59.6	19.2	28 55.9	+59.6	19.4	29 52.5	+59.6	19.6	30 49.0	+59.7	19.8	31 45.4	+59.8	20.0	32 41.7	+59.8	20.2	33 38.0	+59.9	20.4	34 34.2	+59.9	20.6	42
43	28 58.9	+59.6	19.1	29 55.5	+59.7	19.3	30 52.1	+59.7	19.4	31 48.7	+59.7	19.7	32 45.2	+59.7	19.9	33 41.5	+59.8	20.1	34 37.9	+59.8	20.3	35 34.1	+59.8	20.6	43
44	29 58.5	+59.5	18.9	30 55.2	+59.6	19.1	31 51.8	+59.7	19.3	32 48.4	+59.7	19.5	33 44.9	+59.8	19.8	34 41.3	+59.8	20.0	35 37.7	+59.8	20.2	36 33.9	+59.9	20.5	44
45	30 58.0	+59.6	18.8	31 54.8	+59.6	19.0	32 51.5	+59.7	19.2	33 48.1	+59.7	19.4	34 44.7	+59.7	19.6	35 41.1	+59.8	19.9	36 37.5	+59.8	20.1	37 33.8	+59.9	20.4	45
46	31 57.6	+59.6	18.7	32 54.4	+59.6	18.9	33 51.2	+59.6	19.1	34 47.8	+59.7	19.3	35 44.4	+59.8	19.5	36 40.9	+59.8	19.8	37 37.3	+59.9	20.0	38 33.7	+59.8	20.3	46
47	32 57.2	+59.5	18.5	33 54.0	+59.6	18.7	34 50.8	+59.7	18.9	35 47.5	+59.7	19.2	36 44.2	+59.7	19.4	37 40.7	+59.8	19.7	38 37.2	+59.8	19.9	39 33.5	+59.9	20.2	47
48	33 56.7	+59.6	18.4	34 53.6	+59.6	18.6	35 50.5	+59.6	18.8	36 47.2	+59.7	19.1	37 43.9	+59.7	19.3	38 40.5	+59.8	19.6	39 37.0	+59.8	19.8	40 33.4	+59.8	20.1	48
49	34 56.3	+59.5	18.2	35 53.2	+59.6	18.4	36 50.1	+59.7	18.7	37 46.9	+59.7	18.9	38 43.6	+59.8	19.2	39 40.3	+59.7	19.5	40 36.8	+59.8	19.7	41 33.2	+59.8	20.0	49
50	35 55.8	+59.5	18.1	36 52.8	+59.6	18.3	37 49.8	+59.6	18.5	38 46.6	+59.7	18.8	39 43.4	+59.7	19.1	40 40.0	+59.8	19.3	41 36.6	+59.8	19.6	42 33.0	+59.9	19.9	50
51	36 55.3	+59.6	17.9	37 52.4	+59.6	18.2	38 49.4	+59.6	18.4	39 46.3	+59.6	18.7	40 43.1	+59.7	18.9	41 39.8	+59.7	19.2	42 36.4	+59.8	19.5	43 32.9	+59.8	19.8	51
52	37 54.9	+59.5	17.8	38 52.0	+59.5	18.0	39 49.0	+59.6	18.3	40 45.9	+59.7	18.5	41 42.8	+59.7	18.8	42 39.5	+59.8	19.1	43 36.2	+59.7	19.4	44 32.7	+59.8	19.7	52
53	38 54.4	+59.4	17.6	39 51.5	+59.5	17.8	40 48.6	+59.6	18.1	41 45.6	+59.6	18.4	42 42.5	+59.7	18.7	43 39.3	+59.7	19.0	44 35.9	+59.8	19.3	45 32.5	+59.8	19.6	53
54	39 53.8	+59.5	17.4	40 51.0	+59.6	17.7	41 48.2	+59.5	17.9	42 45.2	+59.6	18.2	43 42.2	+59.6	18.5	44 39.0	+59.7	18.8	45 35.7	+59.8	19.2	46 32.3	+59.8	19.5	54
55	40 53.3	+59.5	17.2	41 50.6	+59.5	17.5	42 47.7	+59.6	17.8	43 44.8	+59.6	18.1	44 41.8	+59.7	18.4	45 38.7	+59.7	18.7	46 35.5	+59.7	19.0	47 32.1	+59.9	19.4	55
56	41 52.8	+59.4	17.1	42 50.1	+59.5	17.3	43 47.3	+59.6	17.6	44 44.4	+59.6	17.9	45 41.5	+59.6	18.2	46 38.4	+59.7	18.6	47 35.2	+59.8	18.9	48 32.0	+59.7	19.3	56
57	42 52.2	+59.4	16.9	43 49.6	+59.4	17.2	44 46.9	+59.5	17.4	45 44.0	+59.6	17.8	46 41.1	+59.7	18.1	47 38.1	+59.7	18.4	48 35.0	+59.7	18.8	49 31.7	+59.8	19.1	57
58	43 51.6	+59.4	16.7	44 49.0	+59.5	17.0	45 46.4	+59.5	17.3	46 43.6	+59.6	17.6	47 40.8	+59.6	17.9	48 37.8	+59.7	18.3	49 34.7	+59.8	18.6	50 31.5	+59.8	19.0	58
59	44 51.0	+59.4	16.5	45 48.5	+59.4	16.8	46 45.9	+59.5	17.1	47 43.2	+59.6	17.4	48 40.4	+59.6	17.7	49 37.5	+59.7	18.1	50 34.5	+59.7	18.5	51 31.3	+59.8	18.9	59
60	45 50.4	+59.3	16.3	46 47.9	+59.4	16.6	47 45.4	+59.5	16.9	48 42.8	+59.5	17.2	49 40.0	+59.6	17.6	50 37.2	+59.6	17.9	51 34.2	+59.7	18.3	52 31.1	+59.7	18.7	60
61	46 49.7	+59.4	16.1	47 47.3	+59.4	16.4	48 44.9	+59.4	16.7	49 42.3	+59.5	17.0	50 39.6	+59.6	17.4	51 36.8	+59.6	17.8	52 33.9	+59.7	18.2	53 30.8	+59.8	18.6	61
62	47 49.1	+59.3	15.9	48 46.7	+59.4	16.2	49 44.3	+59.5	16.5	50 41.8	+59.5	16.8	51 39.2	+59.5	17.2	52 36.4	+59.7	17.6	53 33.6	+59.6	18.0	54 30.6	+59.7	18.4	62
63	48 48.4	+59.2	15.6	49 46.1	+59.3	15.9	50 43.8	+59.4	16.3	51 41.3	+59.5	16.6	52 38.7	+59.6	17.0	53 36.1	+59.5	17.4	54 33.2	+59.7	17.8	55 30.3	+59.7	18.3	63
64	49 47.6	+59.3	15.4	50 45.4	+59.4	15.7	51 43.2	+59.3	16.1	52 40.8	+59.4	16.4	53 38.3	+59.5	16.8	54 35.6	+59.6	17.2	55 32.9	+59.6	17.6	56 30.0	+59.7	18.1	64
65	50 46.9	+59.2	15.1	51 44.8	+59.2	15.5	52 42.5	+59.4	15.8	53 40.2	+59.4	16.2	54 37.8	+59.5	16.6	55 35.2	+59.6	17.0	56 32.5	+59.7	17.4	57 29.7	+59.7	17.9	65
66	51 46.1	+59.2	14.9	52 44.0	+59.3	15.2	53 41.9	+59.3	15.6	54 39.6	+59.4	15.9	55 37.3	+59.4	16.3	56 34.8	+59.5	16.8	57 32.2	+59.6	17.2	58 29.4	+59.7	17.7	66
67	52 45.3	+59.1	14.6	53 43.3	+59.2	15.0	54 41.2	+59.3	15.3	55 39.0	+59.4	15.7	56 36.7	+59.5	16.1	57 34.3	+59.5	16.5	58 31.8	+59.5	17.0	59 29.1	+59.6	17.5	67
68	53 44.4	+59.1	14.3	54 42.5	+59.2	14.7	55 40.5	+59.2	15.0	56 38.4	+59.3	15.4	57 36.2	+59.4	15.9	58 33.8	+59.5	16.3	59 31.3	+59.6	16.8	60 28.7	+59.6	17.3	68
69	54 43.5	+59.1	14.0	55 41.7	+59.1	14.4	56 39.7	+59.2	14.8	57 37.7	+59.3	15.2	58 35.6	+59.3	15.6	59 33.3	+59.4	16.0	60 30.9	+59.5	16.5	61 28.3	+59.6	17.0	69
70	55 42.6	+59.0	13.7	56 40.8	+59.1	14.1	57 38.9	+59.2	14.5	58 37.0	+59.2	14.9	59 34.9	+59.3	15.3	60 32.7	+59.4	15.8	61 30.4	+59.5	16.3	62 27.9	+59.6	16.8	70
71	56 41.6	+58.9	13.4	57 39.9	+59.0	13.8	58 38.1	+59.1	14.1	59 36.2	+59.2	14.6	60 34.2	+59.3	15.0	61 32.1	+59.4	15.5	62 29.9	+59.4	16.0	63 27.5	+59.5	16.5	71
72	57 40.5	+58.9	13.1	58 38.9	+59.0	13.4	59 37.2	+59.1	13.8	60 35.4	+59.2	14.2	61 33.5	+59.3	14.7	62 31.5	+59.3	15.2	63 29.3	+59.5	15.7	64 27.0	+59.5	16.3	72
73	58 39.4	+58.8	12.7	59 37.9	+58.9	13.1	60 36.3	+59.0	13.5	61 34.6	+59.1	13.9	62 32.8	+59.2	14.3	63 30.8	+59.3	14.8	64 28.8	+59.3	15.4	65 26.5	+59.5	16.0	73
74	59 38.2	+58.8	12.3	60 36.8	+58.8	12.7	61 35.3	+58.9	13.1	62 33.7	+59.0	13.5	63 32.0	+59.1	14.0	64 30.1	+59.2	14.5	65 28.1	+59.4	15.0	66 26.0	+59.4	15.6	74
75	60 37.0	+58.6	11.9	61 35.6	+58.8	12.3	62 34.2	+58.9	12.7	63 32.7	+59.0	13.1	64 31.1	+59.0	13.6	65 29.3	+59.2	14.1	66 27.5	+59.2	14.7	67 25.4	+59.4	15.3	75
76	61 35.6	+58.6	11.5	62 34.4	+58.7	11.8	63 33.1	+58.7	12.3	64 31.7	+58.8	12.7	65 30.1	+59.0	13.2	66 28.5	+59.1	13.7	67 26.7	+59.2	14.3	68 24.8	+59.3	14.9	76
77	62 34.2	+58.5	11.0	63 33.1	+58.6	11.4	64 31.8	+58.7	11.8	65 30.5	+58.8	12.2	66 29.1	+58.9	12.7	67 27.6	+59.0	13.3	68 25.9	+59.1	13.8	69 24.1	+59.2	14.5	77
78	63 32.7	+58.4	10.5	64 31.7	+58.4	10.9	65 30.5	+58.6	11.3	66 29.3	+58.7	11.7	67 28.0	+58.8	12.2	68 26.6	+58.9	12.8	69 25.0	+59.1	13.4	70 23.3	+59.2	14.0	78
79	64 31.1	+58.2	10.0	65 30.1	+58.4	10.4	66 29.1	+58.5	10.8	67 28.0	+58.6	11.2	68 26.8	+58.7	11.7	69 25.5	+58.8	12.2	70 24.1	+58.9	12.8	71 22.5	+59.1	13.5	79
80	65 29.3	+58.2	9.4	66 28.5	+58.2	9.8	67 27.6	+58.3	10.2	68 26.6	+58.4	10.6	69 25.5	+58.6	11.1	70 24.3	+58.7	11.7	71 23.0	+58.9	12.3	72 21.6	+59.0	12.9	80
81	66 27.5	+57.9	8.8	67 26.7	+58.1	9.2	68 25.9	+58.2	9.6	69 25.0	+58.3	10.0	70 24.1	+58.4	10.5	71 23.0	+58.6	11.0	72 21.9	+58.7	11.6	73 20.6	+58.8	12.3	81
82	67 25.4	+57.8	8.1	68 24.8	+57.9	8.5	69 24.1	+58.0	8.9	70 23.3	+58.2	9.3	71 22.5	+58.3	9.8	72 21.6	+58.4	10.3	73 20.6	+58.5	10.9	74 19.4	+58.7	11.6	82
83	68 23.2	+57.6	7.4	69 22.7	+57.7	7.8	70 22.1	+57.8	8.1	71 21.5	+57.9	8.6	72 20.8	+58.0	9.0	73 20.0	+58.2	9.6	74 19.1	+58.3	10.1	75 18.1	+58.5	10.8	83
84	69 20.8	+57.4	6.6	70 20.4	+57.4	7.0	71 19.9	+57.6	7.3	72 19.4	+57.7	7.7	73 18.8	+57.8	8.2	74 18.2	+57.9	8.7	75 17.4	+58.1	9.3	76 16.6	+58.3	9.9	84
85	70 18.2	+57.1	5.8	71 17.8	+57.2	6.1	72 17.5	+57.3	6.4	73 17.1	+57.4	6.8	74 16.6	+57.6	7.2	75 16.1	+57.7	7.7	76 15.5	+57.9	8.2	77 14.9	+58.0	8.9	85
86	71 15.3	+56.7	4.9	72 15.0	+56.9	5.1	73 14.8	+56.9	5.4	74 14.5	+57.1	5.8	75 14.2	+57.2	6.1	76 13.8	+57.3	6.6	77 13.4	+57.4	7.1	78 12.9	+57.6	7.7	86
87	72 12.0	+56.5	3.8	73 11.9	+56.5	4.1	74 11.7	+56.6	4.3	75 11.6	+56.6	4.6	76 11.4	+56.7	4.9	77 11.1	+56.9	5.3	78 10.8	+57.1	5.7	79 10.5	+57.2	6.3	87
88	73 08.5	+56.0	2.7	74 08.4	+56.1	2.9	75 08.3	+56.1	3.0	76 08.2	+56.2	3.3	77 08.1	+56.3	3.5	78 08.0	+56.4	3.8	79 07.9	+56.4	4.1	80 07.7	+56.6	4.6	88
89	74 04.5	+55.5	1.4	75 04.5	+55.5	1.5	76 04.4	+55.6	1.6	77 04.4	+55.6	1.7	78 04.4	+55.6	1.9	79 04.4	+55.6	2.1	80 04.3	+55.7	2.3	81 04.3	+55.7	2.5	89
90	75 00.0	+54.9	0.0	76 00.0	+54.9	0.0	77 00.0	+54.9	0.0	78 00.0	+54.8	0.0	79 00.0	+54.8	0.0	80 00.0	+54.7	0.0	81 00.0	+54.7	0.0	82 00.0	+54.6	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 157°, 203°

24°, 336° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 40.6	+59.6	155.3	12 46.1	+59.7	155.4	11 51.5	+59.8	155.4	10 56.9	+59.8	155.5	10 02.3	+59.8	155.6	9 07.7	+59.8	155.7	8 13.0	+59.9	155.7	7 18.3	+59.9	155.8	**0**
1	14 40.2	+59.7	155.1	13 45.8	+59.7	155.2	12 51.3	+59.7	155.3	11 56.7	+59.8	155.4	11 02.1	+59.8	155.5	10 07.5	+59.9	155.6	9 12.9	+59.8	155.7	8 18.2	+59.9	155.7	**1**
2	15 39.9	+59.6	155.0	14 45.5	+59.7	155.1	13 51.0	+59.7	155.2	12 56.5	+59.8	155.3	12 01.9	+59.9	155.4	11 07.4	+59.8	155.5	10 12.7	+59.9	155.6	9 18.1	+59.9	155.7	**2**
3	16 39.5	+59.7	154.9	15 45.2	+59.6	155.0	14 50.7	+59.8	155.2	13 56.3	+59.7	155.3	13 01.8	+59.8	155.4	12 07.2	+59.8	155.5	11 12.6	+59.9	155.5	10 18.0	+59.9	155.6	**3**
4	17 39.2	+59.6	154.8	16 44.8	+59.7	154.9	15 50.5	+59.7	155.1	14 56.0	+59.8	155.2	14 01.6	+59.8	155.3	13 07.0	+59.9	155.4	12 12.5	+59.8	155.5	11 17.9	+59.9	155.6	**4**
5	18 38.8	+59.6	154.7	17 44.5	+59.7	154.8	16 50.2	+59.7	155.0	15 55.8	+59.8	155.1	15 01.4	+59.8	155.2	14 06.9	+59.8	155.3	13 12.3	+59.9	155.4	12 17.8	+59.9	155.5	**5**
6	19 38.4	+59.6	154.6	18 44.2	+59.7	154.7	17 49.9	+59.7	154.9	16 55.6	+59.7	155.0	16 01.2	+59.8	155.1	15 06.7	+59.9	155.2	14 12.2	+59.9	155.3	13 17.7	+59.9	155.4	**6**
7	20 38.0	+59.7	154.4	19 43.9	+59.6	154.6	18 49.6	+59.8	154.8	17 55.3	+59.8	154.9	17 01.0	+59.8	155.0	16 06.6	+59.8	155.2	15 12.1	+59.9	155.3	14 17.6	+59.9	155.4	**7**
8	21 37.7	+59.6	154.3	20 43.5	+59.7	154.5	19 49.4	+59.7	154.6	18 55.1	+59.8	154.8	18 00.8	+59.8	154.9	17 06.4	+59.8	155.1	16 12.0	+59.8	155.2	15 17.5	+59.9	155.3	**8**
9	22 37.3	+59.6	154.2	21 43.2	+59.7	154.4	20 49.1	+59.7	154.5	19 54.9	+59.7	154.7	19 00.6	+59.8	154.9	18 06.2	+59.9	155.0	17 11.8	+59.9	155.1	16 17.4	+59.9	155.3	**9**
10	23 36.9	+59.6	154.1	22 42.9	+59.6	154.3	21 48.8	+59.7	154.4	20 54.6	+59.8	154.6	20 00.4	+59.8	154.8	19 06.1	+59.8	154.9	18 11.7	+59.9	155.1	17 17.3	+59.8	155.2	**10**
11	24 36.5	+59.6	154.0	23 42.5	+59.7	154.1	22 48.5	+59.7	154.3	21 54.4	+59.7	154.5	21 00.2	+59.8	154.7	20 05.9	+59.8	154.8	19 11.6	+59.8	155.0	18 17.1	+59.9	155.1	**11**
12	25 36.1	+59.6	153.8	24 42.2	+59.6	154.0	23 48.2	+59.7	154.2	22 54.1	+59.8	154.4	22 00.0	+59.7	154.6	21 05.7	+59.9	154.8	20 11.4	+59.9	154.9	19 17.0	+59.9	155.1	**12**
13	26 35.7	+59.5	153.7	25 41.8	+59.7	153.9	24 47.9	+59.7	154.1	23 53.9	+59.7	154.3	22 59.7	+59.8	154.5	22 05.6	+59.8	154.7	21 11.3	+59.8	154.8	20 16.9	+59.9	155.0	**13**
14	27 35.2	+59.6	153.6	26 41.5	+59.6	153.8	25 47.6	+59.7	154.0	24 53.6	+59.7	154.2	23 59.5	+59.8	154.4	23 05.4	+59.8	154.6	22 11.1	+59.9	154.8	21 16.8	+59.9	154.9	**14**
15	28 34.8	+59.6	153.4	27 41.1	+59.6	153.7	26 47.3	+59.6	153.9	25 53.3	+59.8	154.1	24 59.3	+59.8	154.3	24 05.2	+59.8	154.5	23 11.0	+59.8	154.7	22 16.7	+59.9	154.9	**15**
16	29 34.4	+59.5	153.3	28 40.7	+59.6	153.5	27 46.9	+59.7	153.8	26 53.1	+59.7	154.0	25 59.1	+59.8	154.2	25 05.0	+59.8	154.4	24 10.8	+59.9	154.6	23 16.6	+59.9	154.8	**16**
17	30 33.9	+59.6	153.1	29 40.3	+59.6	153.4	28 46.6	+59.7	153.7	27 52.8	+59.7	153.9	26 58.9	+59.7	154.1	26 04.8	+59.8	154.3	25 10.7	+59.9	154.5	24 16.5	+59.9	154.7	**17**
18	31 33.5	+59.5	153.0	30 39.9	+59.6	153.3	29 46.3	+59.7	153.5	28 52.5	+59.7	153.8	27 58.6	+59.8	154.0	27 04.6	+59.9	154.2	26 10.6	+59.8	154.5	25 16.4	+59.8	154.7	**18**
19	32 33.0	+59.5	152.9	31 39.5	+59.6	153.1	30 46.0	+59.6	153.4	29 52.2	+59.7	153.7	28 58.4	+59.8	153.9	28 04.5	+59.8	154.2	27 10.4	+59.8	154.4	26 16.2	+59.9	154.6	**19**
20	33 32.5	+59.5	152.7	32 39.1	+59.6	153.0	31 45.6	+59.7	153.3	30 51.9	+59.8	153.6	29 58.2	+59.7	153.8	29 04.3	+59.8	154.1	28 10.2	+59.9	154.3	27 16.1	+59.9	154.5	**20**
21	34 32.0	+59.5	152.6	33 38.7	+59.6	152.9	32 45.3	+59.6	153.2	31 51.7	+59.6	153.4	30 57.9	+59.8	153.7	30 04.1	+59.8	154.0	29 10.1	+59.8	154.2	28 16.0	+59.9	154.5	**21**
22	35 31.5	+59.5	152.4	34 38.3	+59.6	152.7	33 44.9	+59.6	153.0	32 51.3	+59.7	153.3	31 57.7	+59.7	153.6	31 03.9	+59.8	153.9	30 09.9	+59.9	154.1	29 15.9	+59.8	154.4	**22**
23	36 31.0	+59.5	152.2	35 37.9	+59.5	152.6	34 44.5	+59.6	152.9	33 51.0	+59.7	153.2	32 57.4	+59.8	153.5	32 03.7	+59.7	153.8	31 09.8	+59.8	154.1	30 15.7	+59.9	154.3	**23**
24	37 30.5	+59.5	152.1	36 37.4	+59.6	152.4	35 44.1	+59.7	152.8	34 50.7	+59.7	153.1	33 57.2	+59.7	153.4	33 03.4	+59.8	153.7	32 09.6	+59.8	154.0	31 15.6	+59.9	154.2	**24**
25	38 30.0	+59.4	151.9	37 37.0	+59.5	152.3	36 43.8	+59.6	152.6	35 50.4	+59.7	153.0	34 56.9	+59.7	153.3	34 03.2	+59.8	153.6	33 09.4	+59.8	153.9	32 15.5	+59.9	154.2	**25**
26	39 29.4	+59.4	151.7	38 36.5	+59.5	152.1	37 43.4	+59.6	152.5	36 50.1	+59.6	152.8	35 56.6	+59.7	153.2	35 03.0	+59.8	153.5	34 09.2	+59.9	153.8	33 15.4	+59.8	154.1	**26**
27	40 28.8	+59.5	151.5	39 36.0	+59.5	151.9	38 43.0	+59.5	152.3	37 49.7	+59.7	152.7	36 56.3	+59.7	153.0	36 02.8	+59.7	153.4	35 09.1	+59.8	153.7	34 15.2	+59.9	154.0	**27**
28	41 28.3	+59.4	151.4	40 35.5	+59.5	151.8	39 42.5	+59.6	152.2	38 49.4	+59.6	152.6	37 56.0	+59.8	152.9	37 02.5	+59.8	153.3	36 08.9	+59.8	153.6	35 15.1	+59.8	153.9	**28**
29	42 27.7	+59.3	151.2	41 35.0	+59.5	151.6	40 42.1	+59.6	152.0	39 49.0	+59.7	152.4	38 55.8	+59.6	152.8	38 02.3	+59.8	153.1	37 08.7	+59.8	153.5	36 14.9	+59.9	153.8	**29**
30	43 27.0	+59.4	151.0	42 34.5	+59.4	151.4	41 41.7	+59.5	151.9	40 48.7	+59.6	152.3	39 55.4	+59.7	152.7	39 02.1	+59.7	153.0	38 08.5	+59.8	153.4	37 14.8	+59.8	153.7	**30**
31	44 26.4	+59.3	150.8	43 33.9	+59.4	151.2	42 41.2	+59.5	151.7	41 48.3	+59.6	152.1	40 55.1	+59.7	152.5	40 01.8	+59.7	152.9	39 08.3	+59.8	153.3	38 14.6	+59.9	153.6	**31**
32	45 25.7	+59.3	150.6	44 33.3	+59.5	151.0	43 40.7	+59.5	151.5	42 47.9	+59.6	152.0	41 54.8	+59.7	152.4	41 01.5	+59.8	152.8	40 08.1	+59.8	153.2	39 14.5	+59.8	153.6	**32**
33	46 25.0	+59.3	150.3	45 32.8	+59.4	150.9	44 40.2	+59.5	151.3	43 47.5	+59.5	151.8	42 54.5	+59.6	152.2	42 01.3	+59.7	152.7	41 07.9	+59.8	153.1	40 14.3	+59.8	153.5	**33**
34	47 24.3	+59.3	150.1	46 32.2	+59.3	150.6	45 39.7	+59.5	151.2	44 47.0	+59.6	151.6	43 54.1	+59.7	152.1	43 01.0	+59.7	152.5	42 07.7	+59.7	153.0	41 14.1	+59.9	153.4	**34**
35	48 23.6	+59.2	149.9	47 31.5	+59.4	150.4	46 39.2	+59.5	151.0	45 46.6	+59.6	151.5	44 53.8	+59.6	151.9	44 00.7	+59.7	152.4	43 07.4	+59.8	152.8	42 14.0	+59.8	153.3	**35**
36	49 22.8	+59.2	149.6	48 30.9	+59.3	150.2	47 38.7	+59.4	150.8	46 46.2	+59.5	151.3	45 53.4	+59.6	151.8	45 00.4	+59.7	152.3	44 07.2	+59.8	152.7	43 13.8	+59.8	153.2	**36**
37	50 22.0	+59.1	149.4	49 30.2	+59.3	150.0	48 38.1	+59.4	150.6	47 45.7	+59.5	151.1	46 53.0	+59.6	151.6	46 00.1	+59.7	152.1	45 07.0	+59.7	152.6	44 13.6	+59.8	153.0	**37**
38	51 21.1	+59.2	149.1	50 29.5	+59.2	149.7	49 37.5	+59.4	150.3	48 45.2	+59.5	150.9	47 52.6	+59.6	151.5	46 59.8	+59.7	152.0	46 06.7	+59.8	152.5	45 13.4	+59.8	152.9	**38**
39	52 20.3	+59.1	148.8	51 28.7	+59.3	149.5	50 36.9	+59.3	150.1	49 44.7	+59.5	150.7	48 52.2	+59.6	151.3	47 59.5	+59.6	151.8	47 06.5	+59.7	152.3	46 13.2	+59.8	152.8	**39**
40	53 19.4	+59.0	148.6	52 28.0	+59.2	149.2	51 36.2	+59.4	149.9	50 44.2	+59.4	150.5	49 51.8	+59.6	151.1	48 59.1	+59.7	151.7	48 06.2	+59.7	152.2	47 13.0	+59.8	152.7	**40**
41	54 18.4	+59.0	148.3	53 27.2	+59.1	149.0	52 35.6	+59.3	149.6	51 43.6	+59.5	150.3	50 51.4	+59.5	150.9	49 58.8	+59.6	151.5	49 05.9	+59.7	152.0	48 12.8	+59.8	152.6	**41**
42	55 17.4	+58.9	147.9	54 26.3	+59.1	148.7	53 34.9	+59.2	149.4	52 43.1	+59.4	150.1	51 50.9	+59.5	150.7	50 58.4	+59.6	151.3	50 05.6	+59.7	151.9	49 12.6	+59.7	152.4	**42**
43	56 16.3	+58.9	147.6	55 25.4	+59.1	148.4	54 34.1	+59.3	149.1	53 42.5	+59.3	149.8	52 50.4	+59.5	150.5	51 58.0	+59.6	151.1	51 05.3	+59.7	151.7	50 12.3	+59.8	152.3	**43**
44	57 15.2	+58.8	147.3	56 24.5	+59.0	148.1	55 33.4	+59.2	148.8	54 41.8	+59.4	149.6	53 49.9	+59.5	150.3	52 57.6	+59.6	150.9	52 05.0	+59.7	151.6	51 12.1	+59.7	152.2	**44**
45	58 14.0	+58.8	146.9	57 23.5	+59.0	147.7	56 32.6	+59.1	148.6	55 41.2	+59.3	149.3	54 49.4	+59.4	150.1	53 57.2	+59.5	150.7	53 04.7	+59.6	151.4	52 11.8	+59.8	152.0	**45**
46	59 12.8	+58.7	146.5	58 22.5	+58.9	147.4	57 31.7	+59.1	148.2	56 40.5	+59.2	149.1	55 48.8	+59.4	149.8	54 56.7	+59.6	150.5	54 04.3	+59.7	151.2	53 11.6	+59.7	151.9	**46**
47	60 11.5	+58.6	146.1	59 21.4	+58.8	147.0	58 30.8	+59.0	147.9	57 39.7	+59.3	148.8	56 48.2	+59.4	149.6	55 56.3	+59.5	150.3	55 04.0	+59.6	151.0	54 11.3	+59.7	151.7	**47**
48	61 10.1	+58.5	145.6	60 20.2	+58.8	146.6	59 29.8	+59.0	147.6	58 39.0	+59.1	148.5	57 47.6	+59.3	149.3	56 55.8	+59.5	150.1	56 03.6	+59.6	150.8	55 11.0	+59.7	151.5	**48**
49	62 08.6	+58.4	145.2	61 19.0	+58.7	146.2	60 28.8	+59.0	147.2	59 38.1	+59.2	148.1	58 46.9	+59.3	149.0	57 55.3	+59.4	149.8	57 03.2	+59.6	150.6	56 10.7	+59.7	151.4	**49**
50	63 07.0	+58.3	144.7	62 17.7	+58.6	145.8	61 27.8	+58.8	146.8	60 37.3	+59.0	147.8	59 46.2	+59.3	148.7	58 54.7	+59.4	149.6	58 02.8	+59.5	150.4	57 10.4	+59.7	151.2	**50**
51	64 05.3	+58.1	144.1	63 16.3	+58.5	145.3	62 26.6	+58.8	146.4	61 36.3	+59.0	147.4	60 45.5	+59.2	148.4	59 54.1	+59.4	149.3	59 02.3	+59.5	150.2	58 10.1	+59.6	151.0	**51**
52	65 03.4	+58.1	143.6	64 14.8	+58.4	144.8	63 25.4	+58.7	146.0	62 35.3	+59.0	147.0	61 44.7	+59.2	148.1	60 53.5	+59.4	149.0	60 01.8	+59.5	149.9	59 09.7	+59.6	150.8	**52**
53	66 01.5	+57.8	143.0	65 13.2	+58.2	144.3	64 24.1	+58.6	145.5	63 34.3	+58.9	146.6	62 43.9	+59.1	147.7	61 52.9	+59.3	148.7	61 01.3	+59.5	149.7	60 09.3	+59.6	150.5	**53**
54	66 59.3	+57.7	142.3	66 11.4	+58.1	143.7	65 22.7	+58.4	145.0	64 33.2	+58.7	146.2	63 43.0	+59.0	147.3	62 52.2	+59.2	148.4	62 00.8	+59.4	149.4	61 08.9	+59.6	150.3	**54**
55	67 57.0	+57.5	141.6	67 09.5	+58.0	143.1	66 21.1	+58.4	144.4	65 31.9	+58.7	145.7	64 42.0	+59.0	146.9	63 51.4	+59.2	148.0	63 00.2	+59.4	149.1	62 08.5	+59.5	150.0	**55**
56	68 54.5	+57.3	140.8	68 07.5	+57.8	142.4	67 19.5	+58.2	143.8	66 30.6	+58.6	145.2	65 41.0	+58.9	146.5	64 50.6	+59.1	147.7	63 59.6	+59.4	148.8	63 08.0	+59.5	149.8	**56**
57	69 51.8	+56.9	139.9	69 05.3	+57.5	141.6	68 17.7	+58.1	143.2	67 29.2	+58.5	144.7	66 39.9	+58.7	146.0	65 49.7	+59.1	147.2	64 59.0	+59.2	148.4	64 07.5	+59.5	149.5	**57**
58	70 48.7	+56.7	139.0	70 02.8	+57.3	140.8	69 15.8	+57.8	142.5	68 27.7	+58.3	144.1	67 38.6	+58.7	145.5	66 48.8	+59.0	146.8	65 58.2	+59.3	148.0	65 07.0	+59.5	149.2	**58**
59	71 45.4	+56.3	138.0	71 00.1	+57.1	139.9	70 13.6	+57.7	141.7	69 26.0	+58.1	143.4	68 37.3	+58.6	144.9	67 47.8	+58.9	146.3	66 57.5	+59.1	147.6	66 06.5	+59.3	148.9	**59**
60	72 41.7	+55.9	136.9	71 57.2	+56.7	139.0	71 11.3	+57.4	140.9	70 24.1	+58.0	142.7	69 35.9	+58.4	144.3	68 46.7	+58.8	145.8	67 56.6	+59.1	147.2	67 05.8	+59.4	148.5	**60**
61	73 37.6	+55.4	135.6	72 53.9	+56.4	137.9	72 08.7	+57.1	140.0	71 22.1	+57.7	141.9	70 34.3	+58.3	143.6	69 45.5	+58.7	145.3	68 55.7	+59.1	146.7	68 05.2	+59.3	148.1	**61**
62	74 33.0	+54.8	134.2	73 50.3	+55.8	136.7	73 05.8	+56.8	138.9	72 19.8	+57.5	141.0	71 32.6	+58.0	142.9	70 44.2	+58.5	144.6	69 54.8	+58.9	146.2	69 04.5	+59.2	147.7	**62**
63	75 27.8	+54.1	132.6	74 46.1	+55.4	135.3	74 02.6	+56.3	137.8	73 17.3	+57.2	140.0	72 30.6	+57.9	142.1	71 42.7	+58.4	144.0	70 53.7	+58.8	145.7	70 03.7	+59.1	147.2	**63**
64	76 21.9	+53.2	130.9	75 41.5	+54.7	133.8	74 58.9	+55.9	136.5	74 14.5	+56.8	139.0	73 28.5	+57.6	141.2	72 41.1	+58.2	143.2	71 52.5	+58.6	145.0	71 02.8	+59.0	146.7	**64**
65	77 15.1	+52.2	128.8	76 36.2	+53.9	132.1	75 54.8	+55.3	135.1	75 11.3	+56.4	137.7	74 26.1	+57.2	140.2	73 39.3	+57.9	142.4	72 51.1	+58.5	144.3	72 01.8	+58.9	146.1	**65**
66	78 07.3	+50.9	126.5	77 30.1	+52.9	130.1	76 50.1	+54.5	133.4	76 07.7	+55.9	136.4	75 23.3	+56.9	139.0	74 37.2	+57.7	141.4	73 49.6	+58.3	143.6	73 00.7	+58.8	145.5	**66**
67	78 58.2	+49.2	123.8	78 23.0	+51.7	127.9	77 44.6	+53.7	131.5	77 03.6	+55.2	134.8	76 20.2	+56.4	137.7	75 34.9	+57.4	140.3	74 47.9	+58.1	142.7	73 59.5	+58.7	144.8	**67**
68	79 47.4	*+47.1*	•120.7	79 14.7	+50.1	125.3	78 38.3	+52.5	129.3	77 58.8	+54.4	133.0	77 16.6	+55.9	136.2	76 32.3	+56.9	139.1	75 46.0	+57.8	141.7	74 58.2	+58.4	144.0	**68**
69	80 34.5	*+44.6*	•117.1	80 04.8	*+48.2*	•122.2	79 30.8	+51.1	126.8	78 53.2	+53.3	130.9	78 12.5	+55.1	134.5	77 29.2	+56.5	137.7	76 43.8	+57.5	140.6	75 56.6	+58.3	143.1	**69**
70	81 19.1	*+41.2*	•112.8	80 53.0	*+45.7*	•118.6	80 21.9	*+49.2*	•123.8	79 46.5	+52.1	128.4	79 07.6	+54.2	132.5	78 25.7	+55.8	136.1	77 41.3	+57.0	139.3	76 54.9	+57.9	142.1	**70**
71	82 00.3	*+36.9*	•107.8	81 38.7	*+42.3*	•114.3	81 11.1	*+46.9*	•120.2	80 38.6	*+50.3*	•125.5	80 01.8	+53.0	130.1	79 21.5	+55.0	134.2	78 38.3	+56.5	137.8	77 52.8	+57.6	140.9	**71**
72	82 37.2	*+31.4*	•101.9	82 21.0	*+38.1*	•109.2	81 58.0	*+43.6*	•115.9	81 28.9	*+48.0*	•122.0	80 54.8	+51.3	127.3	80 16.5	+53.9	131.9	79 34.8	+55.8	136.0	78 50.4	+57.1	139.5	**72**
73	83 08.6	*+24.7*	•95.0	82 59.1	*+32.5*	•103.2	82 41.6	*+39.3*	•110.8	82 16.9	*+44.9*	•117.7	81 46.1	*+49.3*	•123.8	81 10.4	+52.5	129.2	80 30.6	+54.8	133.8	79 47.5	+56.5	137.9	**73**
74	83 33.3	*+16.5*	•87.2	83 31.6	*+25.5*	•96.0	83 20.9	*+33.7*	•104.6	83 01.8	*+40.7*	•112.5	82 35.4	*+46.3*	•119.6	82 02.9	*+50.5*	•125.9	81 25.4	+53.6	131.3	80 44.0	+55.8	135.9	**74**
75	83 49.8	*+7.3*	•78.4	83 57.1	*+16.9*	•87.7	83 54.6	*+26.4*	•97.1	83 42.5	*+35.0*	•106.1	83 21.7	*+42.2*	•114.4	82 53.4	*+47.7*	•121.7	82 19.0	*+51.8*	•128.1	81 39.8	+54.6	133.4	**75**
76	83 57.1	*−2.5*	•69.1	84 14.0	*+7.0*	•78.3	84 21.0	*+17.3*	•88.3	84 17.5	*+27.5*	•98.3	84 03.9	*+36.4*	•107.9	83 41.1	*+43.8*	•116.5	83 10.8	*+49.2*	•124.1	82 34.4	+53.1	130.4	**76**
77	83 54.6	*−12.1*	•59.6	84 21.0	*−3.5*	•68.3	84 38.3	*+6.7*	•78.3	84 45.0	*+17.7*	•89.0	84 40.3	*+28.6*	•99.8	84 24.9	*+38.1*	•109.9	84 00.0	*+45.5*	•118.9	83 27.5	*+50.7*	•126.6	**77**
78	83 42.5	*−20.8*	•50.5	84 17.5	*−13.6*	•58.2	84 45.0	*−4.7*	•67.5	85 02.7	*+6.2*	•78.3	85 08.9	*+18.3*	•89.9	85 03.0	*+29.9*	•101.5	84 45.5	*+39.8*	•112.2	84 18.2	*+47.3*	•121.6	**78**
79	83 21.7	*−28.3*	•42.2	84 03.9	*−22.8*	•48.6	84 40.3	*−15.4*	•56.7	85 08.9	*−5.9*	•66.6	85 27.2	*+5.7*	•78.2	85 32.9	*+18.8*	•90.9	85 25.3	*+31.5*	•103.5	85 05.5	*+41.9*	•114.9	**79**
80	82 53.4	*−34.4*	•34.8	83 41.1	*−30.3*	•39.9	84 24.9	*−24.9*	•46.5	85 03.0	*−17.5*	•54.9	85 32.9	*−7.6*	•65.5	85 51.7	*+5.1*	•78.2	85 56.8	*+19.5*	•92.1	85 47.4	*+33.3*	•105.8	**80**
81	82 19.0	*−39.2*	•28.4	83 10.8	*−36.4*	•32.4	84 00.0	*−32.5*	•37.5	84 45.5	*−27.3*	•44.1	85 25.3	*−19.8*	•52.9	85 56.8	*−9.4*	•64.2	86 16.3	*+4.4*	•78.1	86 20.7	*+20.3*	•93.7	**81**
82	81 39.8	*−43.0*	•23.0	82 34.4	*−41.0*	•26.0	83 27.5	*−38.5*	•29.8	84 18.2	*−34.8*	•34.8	85 05.5	*−29.8*	•41.4	85 47.4	*−22.5*	•50.4	86 20.7	*−11.7*	•62.6	86 41.0	*+3.4*	•78.1	**82**
83	80 56.8	*−46.0*	•18.4	81 53.4	*−44.7*	•20.6	82 49.0	*−42.9*	•23.4	83 43.4	*−40.7*	•27.0	84 35.7	*−37.4*	•31.8	85 24.9	*−32.7*	•38.3	86 09.0	*−25.6*	•47.6	86 44.4	*−14.5*	•60.6	**83**
84	80 10.8	*−48.3*	•14.4	81 08.7	*−47.4*	•16.0	82 06.1	*−46.3*	•18.0	83 02.7	*−44.8*	•20.6	83 58.3	*−42.8*	•23.9	84 52.2	*−40.0*	•28.4	85 43.4	*−35.8*	•34.8	86 29.9	*−29.1*	•44.1	**84**
85	79 22.5	−50.1	11.1	80 21.3	−49.5	12.2	81 19.8	*−48.8*	•13.6	82 17.9	*−47.9*	•15.3	83 15.5	*−46.8*	•17.6	84 12.2	*−45.1*	•20.5	85 07.6	*−42.8*	•24.7	86 00.8	*−39.1*	•30.7	**85**
86	78 32.4	−51.5	8.2	79 31.8	−51.2	9.0	80 31.0	−50.8	9.9	81 30.0	*−50.3*	•11.1	82 28.7	*−49.6*	•12.5	83 27.1	*−48.7*	•14.4	84 24.8	*−47.4*	•16.9	85 21.7	*−45.6*	•20.5	**86**
87	77 40.9	−52.7	5.7	78 40.6	−52.6	6.2	79 40.2	−52.3	6.8	80 39.7	−52.0	7.5	81 39.1	−51.6	8.4	82 38.4	*−51.2*	•9.6	83 37.4	*−50.5*	•11.1	84 36.1	*−49.7*	•13.1	**87**
88	76 48.2	−53.7	3.6	77 48.0	−53.6	3.9	78 47.9	−53.5	4.2	79 47.7	−53.3	4.6	80 47.5	−53.2	5.1	81 47.2	−52.9	5.7	82 46.9	−52.7	6.5	83 46.4	*−52.3*	•7.5	**88**
89	75 54.5	−54.5	1.7	76 54.4	−54.4	1.8	77 54.4	−54.4	1.9	78 54.4	−54.4	2.1	79 54.3	−54.3	2.3	80 54.3	−54.3	2.6	81 54.2	−54.2	2.9	82 54.1	−54.1	3.3	**89**
90	75 00.0	−55.1	0.0	76 00.0	−55.1	0.0	77 00.0	−55.2	0.0	78 00.0	−55.2	0.0	79 00.0	−55.2	0.0	80 00.0	−55.3	0.0	81 00.0	−55.3	0.0	82 00.0	−55.4	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 24°, 336°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 40.6	–59.6	155.3	12 46.1	–59.7	155.4	11 51.5	–59.7	155.4	10 56.9	–59.7	155.5	10 02.3	–59.8	155.6	9 07.7	–59.9	155.7	8 13.0	–59.9	155.7	7 18.3	–59.9	155.8	0
1	12 41.0	–59.7	155.4	11 46.4	–59.7	155.5	10 51.8	–59.7	155.5	9 57.2	–59.8	155.6	9 02.5	–59.8	155.7	8 07.8	–59.8	155.7	7 13.1	–59.9	155.8	6 18.4	–59.9	155.8	1
2	11 41.3	–59.7	155.5	10 46.7	–59.7	155.6	9 52.1	–59.8	155.6	8 57.4	–59.8	155.7	8 02.7	–59.8	155.8	7 08.0	–59.9	155.8	6 13.2	–59.9	155.9	5 18.5	–59.9	155.9	2
3	10 41.6	–59.6	155.6	9 47.0	–59.7	155.7	8 52.3	–59.7	155.7	7 57.6	–59.8	155.8	7 02.9	–59.8	155.8	6 08.1	–59.8	155.9	5 13.3	–59.8	155.9	4 18.6	–59.9	156.0	3
4	9 42.0	–59.7	155.7	8 47.3	–59.7	155.8	7 52.6	–59.8	155.8	6 57.8	–59.8	155.9	6 03.1	–59.9	155.9	5 08.3	–59.9	156.0	4 13.5	–59.9	156.0	3 18.7	–60.0	156.0	4
5	8 42.3	–59.6	155.8	7 47.6	–59.7	155.9	6 52.8	–59.7	155.9	5 58.0	–59.7	156.0	5 03.2	–59.8	156.0	4 08.4	–59.8	156.0	3 13.6	–59.9	156.1	2 18.7	–59.9	156.1	5
6	7 42.7	–59.7	155.9	6 47.9	–59.7	156.0	5 53.1	–59.8	156.0	4 58.3	–59.8	156.0	4 03.4	–59.8	156.1	3 08.6	–59.9	156.1	2 13.7	–59.9	156.1	1 18.8	–59.9	156.1	6
7	6 43.0	–59.6	156.0	5 48.2	–59.7	156.1	4 53.3	–59.7	156.1	3 58.5	–59.8	156.1	3 03.6	–59.8	156.2	2 08.7	–59.8	156.2	1 13.8	–59.8	156.2	0 18.9	–59.9	156.2	7
8	5 43.4	–59.7	156.1	4 48.5	–59.7	156.2	3 53.6	–59.8	156.2	2 58.7	–59.8	156.2	2 03.8	–59.8	156.2	1 08.9	–59.9	156.2	0 14.0	–59.9	156.2	0 41.0	+59.9	23.8	8
9	4 43.7	–59.7	156.2	3 48.8	–59.7	156.3	2 53.8	–59.7	156.3	1 58.9	–59.8	156.3	1 04.0	–59.9	156.3	0 09.0	–59.8	156.3	0 45.9	+59.9	23.7	1 40.9	+59.9	23.7	9
10	3 44.0	–59.6	156.3	2 49.1	–59.7	156.4	1 54.1	–59.8	156.4	0 59.1	–59.8	156.4	0 04.1	–59.8	156.4	0 50.8	+59.9	23.6	1 45.8	+59.9	23.6	2 40.8	+59.9	23.6	10
11	2 44.4	–59.7	156.4	1 49.4	–59.8	156.5	0 54.3	–59.7	156.5	0 00.7	+59.7	23.5	0 55.7	+59.8	23.5	1 50.7	+59.8	23.5	2 45.7	+59.9	23.6	3 40.7	+59.9	23.6	11
12	1 44.7	–59.7	156.5	0 49.6	–59.7	156.6	0 05.4	+59.7	23.4	1 00.4	+59.8	23.4	1 55.5	+59.8	23.5	2 50.5	+59.9	23.5	3 45.6	+59.8	23.5	4 40.6	+59.9	23.5	12
13	0 45.0	–59.6	156.7	0 10.1	+59.7	23.3	1 05.1	+59.8	23.4	2 00.2	+59.8	23.4	2 55.3	+59.8	23.4	3 50.4	+59.8	23.4	4 45.4	+59.9	23.4	5 40.5	+59.9	23.5	13
14	0 14.6	+59.7	23.2	1 09.8	+59.7	23.2	2 04.9	+59.7	23.3	3 00.0	+59.8	23.3	3 55.1	+59.8	23.3	4 50.2	+59.9	23.3	5 45.3	+59.9	23.4	6 40.4	+59.9	23.4	14
15	1 14.3	+59.7	23.1	2 09.5	+59.7	23.2	3 04.6	+59.8	23.2	3 59.8	+59.8	23.2	4 54.9	+59.9	23.2	5 50.1	+59.8	23.3	6 45.2	+59.9	23.3	7 40.3	+59.9	23.4	15
16	2 14.0	+59.6	23.0	3 09.2	+59.7	23.1	4 04.4	+59.7	23.1	4 59.6	+59.8	23.1	5 54.8	+59.8	23.1	6 49.9	+59.9	23.2	7 45.1	+59.8	23.2	8 40.2	+59.9	23.3	16
17	3 13.6	+59.7	22.9	4 08.9	+59.7	23.0	5 04.1	+59.8	23.0	5 59.4	+59.7	23.0	6 54.6	+59.8	23.1	7 49.8	+59.8	23.1	8 44.9	+59.9	23.2	9 40.1	+59.9	23.2	17
18	4 13.3	+59.7	22.8	5 08.6	+59.7	22.9	6 03.9	+59.7	22.9	6 59.1	+59.8	22.9	7 54.4	+59.8	23.0	8 49.6	+59.9	23.0	9 44.8	+59.9	23.1	10 40.0	+59.9	23.2	18
19	5 13.0	+59.6	22.7	6 08.3	+59.7	22.8	7 03.6	+59.8	22.8	7 58.9	+59.8	22.9	8 54.2	+59.8	22.9	9 49.5	+59.8	23.0	10 44.7	+59.9	23.0	11 39.9	+59.9	23.1	19
20	6 12.6	+59.7	22.6	7 08.0	+59.7	22.7	8 03.4	+59.7	22.7	8 58.7	+59.8	22.8	9 54.0	+59.8	22.8	10 49.3	+59.9	22.9	11 44.6	+59.8	23.0	12 39.8	+59.9	23.1	20
21	7 12.3	+59.7	22.5	8 07.7	+59.7	22.6	9 03.1	+59.8	22.6	9 58.5	+59.8	22.7	10 53.8	+59.8	22.7	11 49.2	+59.8	22.8	12 44.4	+59.9	22.9	13 39.7	+59.9	23.0	21
22	8 12.0	+59.6	22.4	9 07.4	+59.7	22.5	10 02.9	+59.7	22.5	10 58.3	+59.7	22.6	11 53.6	+59.9	22.7	12 49.0	+59.8	22.8	13 44.3	+59.9	22.8	14 39.6	+59.9	22.9	22
23	9 11.6	+59.7	22.3	10 07.1	+59.7	22.4	11 02.6	+59.7	22.4	11 58.0	+59.8	22.5	12 53.5	+59.8	22.6	13 48.8	+59.9	22.7	14 44.2	+59.8	22.8	15 39.5	+59.9	22.9	23
24	10 11.3	+59.6	22.2	11 06.8	+59.7	22.3	12 02.3	+59.8	22.3	12 57.8	+59.8	22.4	13 53.3	+59.8	22.5	14 48.7	+59.8	22.6	15 44.0	+59.9	22.7	16 39.4	+59.9	22.8	24
25	11 10.9	+59.7	22.1	12 06.5	+59.7	22.1	13 02.1	+59.7	22.2	13 57.6	+59.8	22.3	14 53.1	+59.8	22.4	15 48.5	+59.9	22.5	16 43.9	+59.9	22.6	17 39.3	+59.9	22.8	25
26	12 10.6	+59.6	22.0	13 06.2	+59.7	22.0	14 01.8	+59.7	22.1	14 57.4	+59.7	22.2	15 52.9	+59.8	22.3	16 48.4	+59.8	22.5	17 43.8	+59.8	22.6	18 39.2	+59.9	22.7	26
27	13 10.2	+59.7	21.9	14 05.9	+59.7	21.9	15 01.5	+59.8	22.0	15 57.1	+59.8	22.1	16 52.7	+59.8	22.3	17 48.2	+59.8	22.4	18 43.6	+59.9	22.5	19 39.1	+59.8	22.6	27
28	14 09.9	+59.6	21.7	15 05.6	+59.7	21.8	16 01.3	+59.7	21.9	16 56.9	+59.8	22.1	17 52.5	+59.8	22.2	18 48.0	+59.9	22.3	19 43.5	+59.9	22.4	20 38.9	+59.9	22.6	28
29	15 09.5	+59.7	21.6	16 05.3	+59.7	21.7	17 01.0	+59.7	21.8	17 56.7	+59.7	22.0	18 52.3	+59.8	22.1	19 47.9	+59.8	22.2	20 43.4	+59.8	22.4	21 38.8	+59.9	22.5	29
30	16 09.2	+59.6	21.5	17 05.0	+59.6	21.6	18 00.7	+59.7	21.7	18 56.4	+59.8	21.9	19 52.1	+59.8	22.0	20 47.7	+59.8	22.1	21 43.2	+59.9	22.3	22 38.7	+59.9	22.4	30
31	17 08.8	+59.6	21.4	18 04.6	+59.7	21.5	19 00.4	+59.7	21.6	19 56.2	+59.7	21.8	20 51.9	+59.8	21.9	21 47.5	+59.8	22.1	22 43.1	+59.8	22.2	23 38.6	+59.9	22.4	31
32	18 08.4	+59.7	21.3	19 04.3	+59.7	21.4	20 00.1	+59.8	21.5	20 55.9	+59.8	21.7	21 51.7	+59.8	21.8	22 47.3	+59.9	22.0	23 42.9	+59.9	22.1	24 38.5	+59.9	22.3	32
33	19 08.1	+59.6	21.2	20 04.0	+59.7	21.3	20 59.9	+59.7	21.4	21 55.7	+59.7	21.6	22 51.5	+59.7	21.7	23 47.2	+59.8	21.9	24 42.8	+59.9	22.1	25 38.4	+59.9	22.2	33
34	20 07.7	+59.6	21.0	21 03.7	+59.6	21.2	21 59.6	+59.7	21.3	22 55.4	+59.8	21.5	23 51.2	+59.8	21.6	24 47.0	+59.8	21.8	25 42.7	+59.8	22.0	26 38.3	+59.8	22.2	34
35	21 07.3	+59.6	20.9	22 03.3	+59.7	21.1	22 59.3	+59.7	21.2	23 55.2	+59.7	21.4	24 51.0	+59.8	21.5	25 46.8	+59.8	21.7	26 42.5	+59.8	21.9	27 38.1	+59.9	22.1	35
36	22 06.9	+59.6	20.8	23 03.0	+59.6	21.0	23 59.0	+59.7	21.1	24 54.9	+59.8	21.3	25 50.8	+59.8	21.4	26 46.6	+59.8	21.6	27 42.3	+59.9	21.8	28 38.0	+59.9	22.0	36
37	23 06.5	+59.6	20.7	24 02.6	+59.7	20.8	24 58.7	+59.7	21.0	25 54.7	+59.7	21.2	26 50.6	+59.7	21.3	27 46.4	+59.8	21.5	28 42.2	+59.8	21.7	29 37.9	+59.9	21.9	37
38	24 06.1	+59.6	20.6	25 02.3	+59.6	20.7	25 58.4	+59.7	20.9	26 54.4	+59.7	21.1	27 50.3	+59.8	21.3	28 46.2	+59.8	21.4	29 42.0	+59.9	21.7	30 37.8	+59.8	21.9	38
39	25 05.7	+59.6	20.4	26 01.9	+59.7	20.6	26 58.1	+59.6	20.8	27 54.1	+59.7	21.0	28 50.1	+59.8	21.2	29 46.0	+59.8	21.4	30 41.9	+59.8	21.6	31 37.6	+59.9	21.8	39
40	26 05.3	+59.6	20.3	27 01.6	+59.6	20.5	27 57.7	+59.7	20.7	28 53.8	+59.8	20.8	29 49.9	+59.7	21.0	30 45.8	+59.8	21.3	31 41.7	+59.8	21.5	32 37.5	+59.9	21.7	40
41	27 04.9	+59.6	20.2	28 01.2	+59.6	20.3	28 57.4	+59.7	20.5	29 53.6	+59.7	20.7	30 49.6	+59.8	20.9	31 45.6	+59.8	21.2	32 41.5	+59.9	21.4	33 37.4	+59.8	21.6	41
42	28 04.5	+59.5	20.0	29 00.8	+59.6	20.2	29 57.1	+59.6	20.4	30 53.3	+59.7	20.6	31 49.4	+59.7	20.8	32 45.4	+59.8	21.1	33 41.4	+59.8	21.3	34 37.2	+59.9	21.5	42
43	29 04.0	+59.6	19.9	30 00.4	+59.6	20.1	30 56.7	+59.7	20.3	31 53.0	+59.7	20.5	32 49.1	+59.8	20.7	33 45.2	+59.8	21.0	34 41.2	+59.8	21.2	35 37.1	+59.8	21.5	43
44	30 03.6	+59.5	19.8	31 00.0	+59.6	20.0	31 56.4	+59.6	20.2	32 52.7	+59.7	20.4	33 48.9	+59.7	20.6	34 45.0	+59.8	20.9	35 41.0	+59.8	21.1	36 36.9	+59.9	21.4	44
45	31 03.1	+59.6	19.6	31 59.6	+59.6	19.8	32 56.0	+59.7	20.0	33 52.4	+59.6	20.3	34 48.6	+59.7	20.5	35 44.8	+59.7	20.8	36 40.8	+59.8	21.0	37 36.8	+59.8	21.3	45
46	32 02.7	+59.5	19.5	32 59.2	+59.6	19.7	33 55.7	+59.6	19.9	34 52.0	+59.7	20.1	35 48.3	+59.8	20.4	36 44.5	+59.8	20.6	37 40.6	+59.8	20.9	38 36.6	+59.9	21.2	46
47	33 02.2	+59.5	19.3	33 58.8	+59.6	19.5	34 55.3	+59.6	19.8	35 51.7	+59.7	20.0	36 48.1	+59.7	20.3	37 44.3	+59.7	20.5	38 40.4	+59.8	20.8	39 36.5	+59.8	21.1	47
48	34 01.7	+59.5	19.2	34 58.4	+59.5	19.4	35 54.9	+59.6	19.6	36 51.4	+59.6	19.9	37 47.8	+59.7	20.1	38 44.0	+59.8	20.4	39 40.2	+59.8	20.7	40 36.3	+59.8	21.0	48
49	35 01.2	+59.5	19.0	35 57.9	+59.6	19.3	36 54.5	+59.6	19.5	37 51.0	+59.7	19.8	38 47.5	+59.7	20.0	39 43.8	+59.7	20.3	40 40.0	+59.8	20.6	41 36.1	+59.8	20.9	49
50	36 00.7	+59.5	18.9	36 57.5	+59.5	19.1	37 54.1	+59.6	19.3	38 50.7	+59.6	19.6	39 47.2	+59.7	19.9	40 43.5	+59.8	20.2	41 39.8	+59.8	20.5	42 35.9	+59.9	20.8	50
51	37 00.2	+59.5	18.7	37 57.0	+59.5	18.9	38 53.7	+59.6	19.2	39 50.3	+59.7	19.5	40 46.9	+59.6	19.8	41 43.3	+59.7	20.1	42 39.6	+59.7	20.4	43 35.8	+59.8	20.7	51
52	37 59.7	+59.4	18.5	38 56.5	+59.6	18.8	39 53.3	+59.6	19.0	40 50.0	+59.6	19.3	41 46.5	+59.7	19.6	42 43.0	+59.7	19.9	43 39.3	+59.8	20.2	44 35.6	+59.8	20.6	52
53	38 59.1	+59.5	18.4	39 56.1	+59.4	18.6	40 52.9	+59.5	18.9	41 49.6	+59.6	19.2	42 46.2	+59.7	19.5	43 42.7	+59.7	19.8	44 39.1	+59.8	20.1	45 35.4	+59.8	20.5	53
54	39 58.6	+59.4	18.2	40 55.5	+59.5	18.4	41 52.4	+59.6	18.7	42 49.2	+59.6	19.0	43 45.9	+59.6	19.3	44 42.4	+59.7	19.7	45 38.9	+59.7	20.0	46 35.2	+59.8	20.4	54
55	40 58.0	+59.4	18.0	41 55.0	+59.5	18.3	42 52.0	+59.5	18.6	43 48.8	+59.6	18.9	44 45.5	+59.6	19.2	45 42.1	+59.7	19.5	46 38.6	+59.8	19.9	47 35.0	+59.8	20.2	55
56	41 57.4	+59.4	17.8	42 54.5	+59.4	18.1	43 51.5	+59.5	18.4	44 48.4	+59.5	18.7	45 45.1	+59.7	19.0	46 41.8	+59.7	19.4	47 38.4	+59.7	19.7	48 34.8	+59.7	20.1	56
57	42 56.8	+59.4	17.6	43 53.9	+59.5	17.9	44 51.0	+59.5	18.2	45 47.9	+59.6	18.5	46 44.8	+59.6	18.9	47 41.5	+59.6	19.2	48 38.1	+59.7	19.6	49 34.5	+59.8	20.0	57
58	43 56.2	+59.3	17.4	44 53.4	+59.4	17.7	45 50.5	+59.4	18.0	46 47.5	+59.5	18.3	47 44.4	+59.6	18.7	48 41.1	+59.7	19.1	49 37.8	+59.7	19.4	50 34.3	+59.8	19.8	58
59	44 55.5	+59.3	17.2	45 52.8	+59.4	17.5	46 49.9	+59.5	17.8	47 47.0	+59.5	18.2	48 44.0	+59.5	18.5	49 40.8	+59.6	18.9	50 37.5	+59.7	19.3	51 34.1	+59.7	19.7	59
60	45 54.8	+59.3	17.0	46 52.2	+59.3	17.3	47 49.4	+59.4	17.6	48 46.5	+59.5	18.0	49 43.5	+59.6	18.3	50 40.4	+59.6	18.7	51 37.2	+59.7	19.1	52 33.8	+59.7	19.5	60
61	46 54.1	+59.3	16.8	47 51.5	+59.4	17.1	48 48.8	+59.4	17.4	49 46.0	+59.5	17.8	50 43.1	+59.5	18.1	51 40.0	+59.6	18.5	52 36.9	+59.6	19.0	53 33.5	+59.8	19.4	61
62	47 53.4	+59.2	16.5	48 50.9	+59.3	16.9	49 48.2	+59.4	17.2	50 45.5	+59.4	17.6	51 42.6	+59.6	17.9	52 39.6	+59.6	18.4	53 36.5	+59.7	18.8	54 33.3	+59.7	19.2	62
63	48 52.6	+59.3	16.3	49 50.2	+59.3	16.6	50 47.6	+59.4	17.0	51 44.9	+59.5	17.4	52 42.2	+59.4	17.7	53 39.2	+59.6	18.2	54 36.2	+59.6	18.6	55 33.0	+59.7	19.1	63
64	49 51.9	+59.1	16.1	50 49.5	+59.2	16.4	51 47.0	+59.3	16.8	52 44.4	+59.4	17.1	53 41.6	+59.5	17.5	54 38.8	+59.5	17.9	55 35.8	+59.6	18.4	56 32.7	+59.6	18.9	64
65	50 51.0	+59.2	15.8	51 48.7	+59.2	16.1	52 46.3	+59.3	16.5	53 43.8	+59.3	16.9	54 41.1	+59.5	17.3	55 38.3	+59.5	17.7	56 35.4	+59.6	18.2	57 32.3	+59.7	18.7	65
66	51 50.2	+59.1	15.5	52 47.9	+59.2	15.9	53 45.6	+59.2	16.3	54 43.1	+59.4	16.6	55 40.6	+59.4	17.1	56 37.8	+59.5	17.5	57 35.0	+59.6	18.0	58 32.0	+59.6	18.5	66
67	52 49.3	+59.0	15.2	53 47.1	+59.2	15.6	54 44.8	+59.3	16.0	55 42.5	+59.3	16.4	56 40.0	+59.4	16.8	57 37.3	+59.5	17.3	58 34.6	+59.5	17.7	59 31.6	+59.6	18.3	67
68	53 48.3	+59.0	15.0	54 46.3	+59.1	15.3	55 44.1	+59.2	15.7	56 41.8	+59.2	16.1	57 39.4	+59.3	16.5	58 36.8	+59.4	17.0	59 34.1	+59.5	17.5	60 31.2	+59.6	18.0	68
69	54 47.3	+59.0	14.6	55 45.4	+59.0	15.0	56 43.3	+59.1	15.4	57 41.0	+59.3	15.8	58 38.7	+59.3	16.3	59 36.2	+59.4	16.7	60 33.6	+59.5	17.3	61 30.8	+59.6	17.8	69
70	55 46.3	+58.9	14.3	56 44.4	+59.0	14.7	57 42.4	+59.1	15.1	58 40.3	+59.1	15.5	59 38.0	+59.3	16.0	60 35.6	+59.4	16.5	61 33.1	+59.4	17.0	62 30.4	+59.5	17.5	70
71	56 45.2	+58.9	14.0	57 43.4	+58.9	14.4	58 41.5	+59.0	14.8	59 39.4	+59.2	15.2	60 37.3	+59.2	15.7	61 35.0	+59.3	16.2	62 32.5	+59.4	16.7	63 29.9	+59.5	17.3	71
72	57 44.1	+58.8	13.6	58 42.3	+58.9	14.0	59 40.5	+59.0	14.4	60 38.6	+59.0	14.9	61 36.5	+59.2	15.3	62 34.3	+59.3	15.8	63 31.9	+59.4	16.4	64 29.4	+59.5	17.0	72
73	58 42.9	+58.7	13.2	59 41.2	+58.8	13.6	60 39.5	+58.9	14.0	61 37.6	+59.0	14.5	62 35.7	+59.1	15.0	63 33.6	+59.2	15.5	64 31.3	+59.3	16.0	65 28.9	+59.4	16.7	73
74	59 41.6	+58.6	12.8	60 40.0	+58.8	13.2	61 38.4	+58.8	13.7	62 36.6	+59.0	14.1	63 34.8	+59.0	14.6	64 32.8	+59.1	15.1	65 30.6	+59.3	15.7	66 28.3	+59.4	16.3	74
75	60 40.2	+58.6	12.4	61 38.8	+58.6	12.8	62 37.2	+58.8	13.2	63 35.6	+58.9	13.7	64 33.8	+59.0	14.2	65 31.9	+59.1	14.7	66 29.9	+59.2	15.3	67 27.7	+59.3	15.9	75
76	61 38.8	+58.4	12.0	62 37.4	+58.6	12.4	63 36.0	+58.7	12.8	64 34.5	+58.7	13.2	65 32.8	+58.9	13.8	66 31.0	+59.0	14.3	67 29.1	+59.1	14.9	68 27.0	+59.2	15.5	76
77	62 37.2	+58.4	11.5	63 36.0	+58.5	11.9	64 34.7	+58.5	12.3	65 33.2	+58.7	12.8	66 31.7	+58.8	13.3	67 30.0	+58.9	13.8	68 28.2	+59.1	14.4	69 26.2	+59.2	15.1	77
78	63 35.6	+58.2	11.0	64 34.5	+58.3	11.4	65 33.2	+58.5	11.8	66 31.9	+58.6	12.3	67 30.5	+58.7	12.8	68 28.9	+58.9	13.3	69 27.3	+58.9	13.9	70 25.4	+59.1	14.6	78
79	64 33.8	+58.1	10.4	65 32.8	+58.2	10.8	66 31.7	+58.3	11.2	67 30.5	+58.4	11.7	68 29.2	+58.6	12.2	69 27.8	+58.7	12.8	70 26.2	+58.9	13.4	71 24.5	+59.0	14.1	79
80	65 31.9	+58.0	9.8	66 31.0	+58.1	10.2	67 30.0	+58.2	10.6	68 28.9	+58.4	11.1	69 27.8	+58.4	11.6	70 26.5	+58.6	12.2	71 25.1	+58.7	12.8	72 23.5	+58.9	13.5	80
81	66 29.9	+57.8	9.2	67 29.1	+57.9	9.6	68 28.2	+58.0	10.0	69 27.3	+58.1	10.4	70 26.2	+58.3	11.0	71 25.1	+58.4	11.5	72 23.8	+58.6	12.1	73 22.4	+58.7	12.8	81
82	67 27.7	+57.6	8.5	68 27.0	+57.7	8.9	69 26.2	+57.9	9.3	70 25.4	+58.0	9.7	71 24.5	+58.1	10.2	72 23.5	+58.2	10.8	73 22.4	+58.4	11.4	74 21.1	+58.6	12.1	82
83	68 25.3	+57.3	7.7	69 24.7	+57.5	8.1	70 24.1	+57.6	8.5	71 23.4	+57.7	8.9	72 22.6	+57.9	9.4	73 21.7	+58.1	10.0	74 20.8	+58.2	10.6	75 19.7	+58.4	11.3	83
84	69 22.6	+57.2	6.9	70 22.2	+57.2	7.3	71 21.7	+57.3	7.6	72 21.1	+57.5	8.1	73 20.5	+57.6	8.5	74 19.8	+57.7	9.1	75 19.0	+57.9	9.7	76 18.1	+58.1	10.3	84
85	70 19.8	+56.8	6.0	71 19.4	+57.0	6.4	72 19.0	+57.1	6.7	73 18.6	+57.2	7.1	74 18.1	+57.3	7.5	75 17.5	+57.5	8.0	76 16.9	+57.7	8.6	77 16.2	+57.8	9.3	85
86	71 16.6	+56.5	5.1	72 16.4	+56.6	5.3	73 16.1	+56.7	5.7	74 15.8	+56.8	6.0	75 15.4	+57.0	6.4	76 15.0	+57.1	6.9	77 14.6	+57.2	7.4	78 14.0	+57.4	8.0	86
87	72 13.1	+56.1	4.0	73 13.0	+56.1	4.2	74 12.8	+56.3	4.5	75 12.6	+56.4	4.8	76 12.4	+56.4	5.1	77 12.1	+56.6	5.5	78 11.8	+56.8	6.0	79 11.4	+57.0	6.5	87
88	73 09.2	+55.7	2.8	74 09.1	+55.8	3.0	75 09.1	+55.7	3.2	76 09.0	+55.8	3.4	77 08.8	+56.0	3.7	78 08.7	+56.0	4.0	79 08.6	+56.1	4.3	80 08.4	+56.2	4.8	88
89	74 04.9	+55.1	1.5	75 04.9	+55.1	1.6	76 04.8	+55.2	1.7	77 04.8	+55.2	1.8	78 04.8	+55.2	2.0	79 04.7	+55.3	2.1	80 04.7	+55.3	2.4	81 04.6	+55.4	2.6	89
90	75 00.0	+54.5	0.0	76 00.0	+54.4	0.0	77 00.0	+54.4	0.0	78 00.0	+54.4	0.0	79 00.0	+54.3	0.0	80 00.0	+54.3	0.0	81 00.0	+54.2	0.0	82 00.0	+54.1	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 156°, 204°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 34.0	+59.6	154.2	12 39.9	+59.7	154.3	11 45.8	+59.7	154.4	10 51.7	+59.7	154.5	9 57.5	+59.8	154.6	9 03.3	+59.8	154.7	8 09.0	+59.9	154.7	7 14.8	+59.9	154.8	0
1	14 33.6	+59.6	154.1	13 39.6	+59.7	154.2	12 45.5	+59.7	154.3	11 51.4	+59.8	154.4	10 57.3	+59.8	154.5	10 03.1	+59.9	154.6	9 08.9	+59.9	154.7	8 14.7	+59.9	154.7	1
2	15 33.2	+59.6	154.0	14 39.3	+59.6	154.1	13 45.2	+59.8	154.2	12 51.2	+59.7	154.3	11 57.1	+59.8	154.4	11 03.0	+59.8	154.5	10 08.8	+59.8	154.6	9 14.6	+59.9	154.7	2
3	16 32.8	+59.6	153.9	15 38.9	+59.7	154.0	14 45.0	+59.7	154.1	13 50.9	+59.8	154.2	12 56.9	+59.8	154.3	12 02.8	+59.8	154.4	11 08.6	+59.9	154.5	10 14.5	+59.8	154.6	3
4	17 32.4	+59.6	153.8	16 38.6	+59.6	153.9	15 44.7	+59.7	154.0	14 50.7	+59.8	154.1	13 56.7	+59.8	154.3	13 02.6	+59.8	154.4	12 08.5	+59.9	154.5	11 14.3	+59.9	154.5	4
5	18 32.0	+59.6	153.6	17 38.2	+59.7	153.8	16 44.4	+59.7	153.9	15 50.5	+59.7	154.0	14 56.5	+59.8	154.2	14 02.4	+59.9	154.3	13 08.4	+59.8	154.4	12 14.2	+59.9	154.5	5
6	19 31.6	+59.6	153.5	18 37.9	+59.6	153.7	17 44.1	+59.7	153.8	16 50.2	+59.7	154.0	15 56.3	+59.8	154.1	15 02.3	+59.8	154.2	14 08.2	+59.9	154.3	13 14.1	+59.9	154.4	6
7	20 31.2	+59.6	153.4	19 37.5	+59.7	153.6	18 43.8	+59.7	153.7	17 49.9	+59.8	153.9	16 56.1	+59.7	154.0	16 02.1	+59.8	154.1	15 08.1	+59.8	154.2	14 14.0	+59.9	154.4	7
8	21 30.8	+59.6	153.3	20 37.2	+59.6	153.4	19 43.5	+59.7	153.6	18 49.7	+59.7	153.8	17 55.8	+59.8	153.9	17 01.9	+59.8	154.0	16 07.9	+59.9	154.2	15 13.9	+59.9	154.3	8
9	22 30.4	+59.6	153.1	21 36.8	+59.6	153.3	20 43.2	+59.6	153.5	19 49.4	+59.8	153.7	18 55.6	+59.8	153.8	18 01.7	+59.9	154.0	17 07.8	+59.9	154.1	16 13.8	+59.9	154.2	9
10	23 30.0	+59.5	153.0	22 36.4	+59.7	153.2	21 42.8	+59.7	153.4	20 49.2	+59.7	153.6	19 55.4	+59.8	153.7	19 01.6	+59.8	153.9	18 07.7	+59.8	154.0	17 13.7	+59.9	154.2	10
11	24 29.5	+59.6	152.9	23 36.1	+59.6	153.1	22 42.5	+59.7	153.3	21 48.9	+59.7	153.5	20 55.2	+59.8	153.6	20 01.4	+59.8	153.8	19 07.5	+59.9	154.0	18 13.6	+59.9	154.1	11
12	25 29.1	+59.5	152.7	24 35.7	+59.6	153.0	23 42.2	+59.7	153.2	22 48.6	+59.7	153.4	21 55.0	+59.7	153.5	21 01.2	+59.8	153.7	20 07.4	+59.8	153.9	19 13.5	+59.8	154.0	12
13	26 28.6	+59.6	152.6	25 35.3	+59.6	152.8	24 41.9	+59.6	153.0	23 48.3	+59.8	153.3	22 54.7	+59.8	153.4	22 01.0	+59.8	153.6	21 07.2	+59.9	153.8	20 13.3	+59.9	154.0	13
14	27 28.2	+59.5	152.5	26 34.9	+59.6	152.7	25 41.5	+59.7	152.9	24 48.1	+59.7	153.1	23 54.5	+59.8	153.3	23 00.8	+59.8	153.5	22 07.1	+59.8	153.7	21 13.2	+59.9	153.9	14
15	28 27.7	+59.6	152.3	27 34.5	+59.6	152.6	26 41.2	+59.7	152.8	25 47.8	+59.7	153.0	24 54.3	+59.7	153.3	24 00.6	+59.8	153.5	23 06.9	+59.8	153.7	22 13.1	+59.9	153.8	15
16	29 27.3	+59.5	152.2	28 34.1	+59.6	152.4	27 40.9	+59.6	152.7	26 47.5	+59.7	152.9	25 54.0	+59.8	153.2	25 00.4	+59.8	153.4	24 06.7	+59.9	153.6	23 13.0	+59.9	153.8	16
17	30 26.8	+59.5	152.0	29 33.7	+59.6	152.3	28 40.5	+59.7	152.6	27 47.2	+59.7	152.8	26 53.8	+59.7	153.1	26 00.2	+59.8	153.3	25 06.6	+59.8	153.5	24 12.9	+59.8	153.7	17
18	31 26.3	+59.5	151.9	30 33.3	+59.6	152.2	29 40.2	+59.6	152.4	28 46.9	+59.7	152.7	27 53.5	+59.8	153.0	27 00.0	+59.8	153.2	26 06.4	+59.9	153.4	25 12.7	+59.9	153.6	18
19	32 25.8	+59.5	151.7	31 32.9	+59.5	152.0	30 39.8	+59.6	152.3	29 46.6	+59.7	152.6	28 53.3	+59.7	152.8	27 59.8	+59.8	153.1	27 06.3	+59.8	153.3	26 12.6	+59.9	153.6	19
20	33 25.3	+59.4	151.6	32 32.4	+59.6	151.9	31 39.4	+59.6	152.2	30 46.3	+59.7	152.5	29 53.0	+59.8	152.7	28 59.6	+59.8	153.0	28 06.1	+59.8	153.2	27 12.5	+59.8	153.5	20
21	34 24.7	+59.5	151.4	33 32.0	+59.5	151.7	32 39.0	+59.7	152.1	31 46.0	+59.6	152.4	30 52.8	+59.7	152.6	29 59.4	+59.8	152.9	29 05.9	+59.9	153.2	28 12.3	+59.9	153.4	21
22	35 24.2	+59.5	151.3	34 31.5	+59.5	151.6	33 38.7	+59.6	151.9	32 45.6	+59.7	152.2	31 52.5	+59.7	152.5	30 59.2	+59.8	152.8	30 05.8	+59.8	153.1	29 12.2	+59.9	153.3	22
23	36 23.7	+59.4	151.1	35 31.0	+59.6	151.4	34 38.3	+59.6	151.8	33 45.3	+59.7	152.1	32 52.2	+59.7	152.4	31 59.0	+59.7	152.7	31 05.6	+59.8	153.0	30 12.1	+59.8	153.2	23
24	37 23.1	+59.4	150.9	36 30.6	+59.5	151.3	35 37.9	+59.5	151.6	34 45.0	+59.6	152.0	33 51.9	+59.7	152.3	32 58.7	+59.8	152.6	32 05.4	+59.8	152.9	31 11.9	+59.9	153.2	24
25	38 22.5	+59.4	150.8	37 30.1	+59.5	151.1	36 37.4	+59.6	151.5	35 44.6	+59.7	151.8	34 51.6	+59.7	152.2	33 58.5	+59.8	152.5	33 05.2	+59.8	152.8	32 11.8	+59.8	153.1	25
26	39 21.9	+59.4	150.6	38 29.6	+59.4	151.0	37 37.0	+59.6	151.3	36 44.3	+59.6	151.7	35 51.3	+59.7	152.1	34 58.3	+59.7	152.4	34 05.0	+59.8	152.7	33 11.6	+59.9	153.0	26
27	40 21.3	+59.4	150.4	39 29.0	+59.5	150.8	38 36.6	+59.5	151.2	37 43.9	+59.6	151.6	36 51.0	+59.7	151.9	35 58.0	+59.8	152.3	35 04.8	+59.8	152.6	34 11.5	+59.8	152.9	27
28	41 20.7	+59.3	150.2	40 28.5	+59.5	150.6	39 36.1	+59.6	151.0	38 43.5	+59.6	151.4	37 50.7	+59.7	151.8	36 57.8	+59.7	152.2	36 04.6	+59.8	152.5	35 11.3	+59.9	152.8	28
29	42 20.0	+59.4	150.0	41 28.0	+59.4	150.4	40 35.7	+59.5	150.9	39 43.1	+59.6	151.3	38 50.4	+59.7	151.7	37 57.5	+59.7	152.0	37 04.4	+59.8	152.4	36 11.2	+59.8	152.7	29
30	43 19.4	+59.3	149.8	42 27.4	+59.4	150.3	41 35.2	+59.5	150.7	40 42.7	+59.6	151.1	39 50.1	+59.7	151.5	38 57.2	+59.8	151.9	38 04.2	+59.8	152.3	37 11.0	+59.8	152.7	30
31	44 18.7	+59.2	149.6	43 26.8	+59.4	150.1	42 34.7	+59.5	150.5	41 42.3	+59.6	151.0	40 49.8	+59.6	151.4	39 57.0	+59.7	151.8	39 04.0	+59.8	152.2	38 10.8	+59.9	152.6	31
32	45 17.9	+59.3	149.4	44 26.2	+59.4	149.9	43 34.2	+59.4	150.4	42 41.9	+59.6	150.8	41 49.4	+59.6	151.3	40 56.7	+59.7	151.7	40 03.8	+59.8	152.1	39 10.7	+59.8	152.5	32
33	46 17.2	+59.2	149.1	45 25.6	+59.3	149.7	44 33.6	+59.5	150.2	43 41.5	+59.5	150.6	42 49.0	+59.7	151.1	41 56.4	+59.7	151.5	41 03.6	+59.7	152.0	40 10.5	+59.8	152.4	33
34	47 16.4	+59.2	148.9	46 24.9	+59.3	149.5	45 33.1	+59.4	150.0	44 41.0	+59.5	150.5	43 48.7	+59.6	151.0	42 56.1	+59.7	151.4	42 03.3	+59.8	151.8	41 10.3	+59.8	152.3	34
35	48 15.6	+59.2	148.7	47 24.2	+59.3	149.2	46 32.5	+59.4	149.8	45 40.5	+59.6	150.3	44 48.3	+59.6	150.8	43 55.8	+59.7	151.3	43 03.1	+59.7	151.7	42 10.1	+59.8	152.2	35
36	49 14.8	+59.1	148.4	48 23.5	+59.3	149.0	47 31.9	+59.4	149.6	46 40.1	+59.5	150.1	45 47.9	+59.6	150.6	44 55.5	+59.7	151.1	44 02.8	+59.8	151.6	43 09.9	+59.8	152.0	36
37	50 13.9	+59.1	148.2	49 22.8	+59.2	148.8	48 31.3	+59.4	149.4	47 39.6	+59.4	149.9	46 47.5	+59.6	150.5	45 55.2	+59.6	151.0	45 02.6	+59.7	151.5	44 09.7	+59.8	151.9	37
38	51 13.0	+59.1	147.9	50 22.0	+59.2	148.5	49 30.7	+59.3	149.1	48 39.0	+59.5	149.7	47 47.1	+59.5	150.3	46 54.8	+59.7	150.8	46 02.3	+59.7	151.3	45 09.5	+59.8	151.8	38
39	52 12.1	+59.0	147.6	51 21.2	+59.2	148.3	50 30.0	+59.3	148.9	49 38.5	+59.4	149.5	48 46.6	+59.6	150.1	47 54.5	+59.6	150.7	47 02.0	+59.7	151.2	46 09.3	+59.8	151.7	39
40	53 11.1	+59.0	147.3	52 20.4	+59.2	148.0	51 29.3	+59.3	148.7	50 37.9	+59.4	149.3	49 46.2	+59.5	149.9	48 54.1	+59.6	150.5	48 01.7	+59.7	151.0	47 09.1	+59.8	151.6	40
41	54 10.1	+58.9	147.0	53 19.6	+59.0	147.7	52 28.6	+59.3	148.4	51 37.3	+59.4	149.1	50 45.7	+59.5	149.7	49 53.7	+59.6	150.3	49 01.4	+59.7	150.9	48 08.9	+59.7	151.4	41
42	55 09.0	+58.9	146.7	54 18.6	+59.1	147.4	53 27.9	+59.2	148.2	52 36.7	+59.4	148.9	51 45.2	+59.5	149.5	50 53.3	+59.6	150.1	50 01.1	+59.7	150.7	49 08.6	+59.8	151.3	42
43	56 07.9	+58.8	146.3	55 17.7	+59.0	147.1	54 27.1	+59.2	147.9	53 36.1	+59.3	148.6	52 44.7	+59.4	149.3	51 52.9	+59.6	150.0	51 00.8	+59.7	150.6	50 08.4	+59.7	151.2	43
44	57 06.7	+58.7	146.0	56 16.7	+58.9	146.8	55 26.3	+59.1	147.6	54 35.4	+59.3	148.4	53 44.1	+59.4	149.1	52 52.5	+59.5	149.8	52 00.5	+59.6	150.4	51 08.1	+59.8	151.0	44
45	58 05.4	+58.7	145.6	57 15.6	+58.9	146.5	56 25.4	+59.1	147.3	55 34.7	+59.2	148.1	54 43.5	+59.4	148.8	53 52.0	+59.5	149.5	53 00.1	+59.6	150.2	52 07.9	+59.7	150.9	45
46	59 04.1	+58.5	145.2	58 14.5	+58.9	146.1	57 24.5	+59.0	147.0	56 33.9	+59.2	147.8	55 42.9	+59.4	148.6	54 51.5	+59.5	149.3	53 59.7	+59.6	150.0	53 07.6	+59.7	150.7	46
47	60 02.6	+58.5	144.7	59 13.4	+58.7	145.7	58 23.5	+59.0	146.6	57 33.1	+59.2	147.5	56 42.3	+59.3	148.3	55 51.0	+59.5	149.1	54 59.3	+59.6	149.8	54 07.3	+59.7	150.5	47
48	61 01.1	+58.4	144.3	60 12.1	+58.7	145.3	59 22.5	+58.9	146.3	58 32.3	+59.1	147.2	57 41.6	+59.3	148.1	56 50.5	+59.4	148.9	55 58.9	+59.6	149.6	55 07.0	+59.6	150.4	48
49	61 59.5	+58.3	143.8	61 10.8	+58.6	144.9	60 21.4	+58.8	145.9	59 31.4	+59.1	146.9	58 40.9	+59.3	147.8	57 49.9	+59.4	148.6	56 58.5	+59.5	149.4	56 06.6	+59.7	150.2	49
50	62 57.8	+58.2	143.3	62 09.4	+58.5	144.4	61 20.2	+58.8	145.5	60 30.5	+59.0	146.5	59 40.2	+59.2	147.5	58 49.3	+59.4	148.3	57 58.0	+59.6	149.2	57 06.3	+59.6	150.0	50
51	63 56.0	+58.1	142.8	63 07.9	+58.4	144.0	62 19.0	+58.7	145.1	61 29.5	+58.9	146.1	60 39.4	+59.1	147.1	59 48.7	+59.4	148.1	58 57.6	+59.5	149.0	58 05.9	+59.6	149.8	51
52	64 54.1	+57.8	142.2	64 06.3	+58.2	143.4	63 17.7	+58.6	144.6	62 28.4	+58.9	145.7	61 38.5	+59.1	146.8	60 48.1	+59.3	147.8	59 57.1	+59.4	148.7	59 05.5	+59.6	149.6	52
53	65 51.9	+57.8	141.5	65 04.5	+58.2	142.9	64 16.3	+58.5	144.1	63 27.3	+58.8	145.3	62 37.6	+59.1	146.4	61 47.4	+59.2	147.4	60 56.5	+59.4	148.4	60 05.1	+59.6	149.3	53
54	66 49.7	+57.5	140.9	66 02.7	+58.0	142.3	65 14.8	+58.4	143.6	64 26.1	+58.7	144.9	63 36.7	+58.9	146.0	62 46.6	+59.2	147.1	61 55.9	+59.4	148.1	61 04.7	+59.6	149.1	54
55	67 47.2	+57.3	140.1	67 00.7	+57.8	141.6	66 13.2	+58.2	143.0	65 24.8	+58.6	144.4	64 35.6	+58.9	145.6	63 45.8	+59.1	146.7	62 55.3	+59.4	147.8	62 04.3	+59.5	148.8	55
56	68 44.5	+57.1	139.3	67 58.5	+57.6	140.9	67 11.4	+58.1	142.4	66 23.4	+58.5	143.8	65 34.5	+58.8	145.1	64 44.9	+59.1	146.4	63 54.7	+59.3	147.5	63 03.8	+59.4	148.6	56
57	69 41.6	+56.8	138.5	68 56.1	+57.4	140.2	68 09.5	+57.9	141.8	67 21.9	+58.3	143.3	66 33.3	+58.7	144.7	65 44.0	+59.0	145.9	64 54.0	+59.2	147.1	64 03.2	+59.5	148.3	57
58	70 38.4	+56.5	137.5	69 53.5	+57.2	139.4	69 07.4	+57.7	141.1	68 20.2	+58.2	142.7	67 32.0	+58.6	144.1	66 43.0	+58.9	145.5	65 53.2	+59.2	146.8	65 02.7	+59.4	147.9	58
59	71 34.9	+56.1	136.5	70 50.7	+56.8	138.4	70 05.1	+57.5	140.3	69 18.4	+58.0	142.0	68 30.6	+58.5	143.5	67 41.9	+58.8	145.0	66 52.4	+59.1	146.3	66 02.1	+59.3	147.6	59
60	72 31.0	+55.6	135.3	71 47.5	+56.5	137.4	71 02.6	+57.3	139.4	70 16.4	+57.9	141.2	69 29.1	+58.3	142.9	68 40.7	+58.7	144.5	67 51.5	+59.0	145.9	67 01.4	+59.3	147.2	60
61	73 26.6	+55.1	134.0	72 44.0	+56.2	136.3	71 59.9	+56.9	138.5	71 14.3	+57.6	140.4	70 27.4	+58.1	142.2	69 39.4	+58.6	143.9	68 50.5	+58.9	145.4	68 00.7	+59.2	146.8	61
62	74 21.7	+54.6	132.6	73 40.2	+55.6	135.1	72 56.8	+56.6	137.4	72 11.9	+57.3	139.5	71 25.5	+58.0	141.5	70 38.0	+58.5	143.2	69 49.4	+58.9	144.9	68 59.9	+59.2	146.4	62
63	75 16.3	+53.7	131.0	74 35.8	+55.1	133.8	73 53.4	+56.1	136.3	73 09.2	+57.0	138.5	72 23.5	+57.7	140.6	71 36.5	+58.2	142.5	70 48.3	+58.7	144.3	69 59.1	+59.0	145.9	63
64	76 10.0	+52.9	129.2	75 30.9	+54.4	132.2	74 49.5	+55.6	134.9	74 06.2	+56.6	137.4	73 21.2	+57.4	139.7	72 34.7	+58.1	141.8	71 47.0	+58.6	143.7	70 58.1	+59.0	145.4	64
65	77 02.9	+51.8	127.2	76 25.3	+53.5	130.5	75 45.1	+55.0	133.5	75 02.8	+56.2	136.2	74 18.6	+57.1	138.7	73 32.8	+57.8	140.9	72 45.6	+58.4	142.9	71 57.1	+58.8	144.8	65
66	77 54.7	+50.4	124.8	77 18.8	+52.6	128.5	76 40.1	+54.3	131.8	75 59.0	+55.6	134.8	75 15.7	+56.7	137.5	74 30.6	+57.6	139.9	73 44.0	+58.1	142.1	72 55.9	+58.7	144.2	66
67	78 45.1	+48.8	122.2	78 11.4	+51.3	126.2	77 34.4	+53.3	129.9	76 54.6	+54.9	133.2	76 12.4	+56.2	136.2	75 28.2	+57.1	138.8	74 42.1	+58.0	141.3	73 54.6	+58.6	143.4	67
68	79 33.9	+46.7	•119.1	79 02.7	+49.7	123.6	78 27.7	+52.2	127.7	77 49.5	+54.1	131.3	77 08.6	+55.6	134.6	76 25.3	+56.8	137.6	75 40.1	+57.7	140.2	74 53.2	+58.3	142.6	68
69	80 20.6	+44.1	•115.5	79 52.4	+47.8	•120.5	79 19.9	+50.7	125.1	78 43.6	+53.1	129.2	78 04.2	+54.8	132.9	77 22.1	+56.2	136.2	76 37.8	+57.3	139.1	75 51.5	+58.1	141.7	69
70	81 04.7	+40.7	•111.2	80 40.2	+45.2	•116.9	80 10.6	+48.8	•122.1	79 36.7	+51.6	126.7	78 59.0	+53.9	130.8	78 18.3	+55.6	134.5	77 35.1	+56.8	137.8	76 49.6	+57.8	140.6	70
71	81 45.4	+36.5	•106.3	81 25.4	+41.9	•112.7	80 59.4	+46.3	•118.5	80 28.3	+49.9	•123.8	79 52.9	+52.6	128.4	79 13.9	+54.7	132.6	78 31.9	+56.3	136.2	77 47.4	+57.5	139.4	71
72	82 21.9	+31.2	•100.6	82 07.3	+37.6	•107.7	81 45.7	+43.2	•114.3	81 18.2	+47.5	•120.3	80 45.5	+51.0	125.6	80 08.6	+53.6	130.3	79 28.2	+55.5	134.4	78 44.9	+56.9	138.0	72
73	82 53.1	+24.7	• 93.9	82 44.9	+32.3	•101.8	82 28.9	+38.9	•109.2	82 05.7	+44.5	•116.0	81 36.5	+48.8	•122.1	81 02.2	+52.1	127.5	80 23.7	+54.6	132.2	79 41.8	+56.3	136.3	73
74	83 17.8	+16.8	• 86.3	83 17.2	+25.4	• 94.8	83 07.8	+33.4	•103.1	82 50.2	+40.3	•110.9	82 25.3	+45.9	•117.9	81 54.3	+50.1	•124.2	81 18.3	+53.2	129.6	80 38.1	+55.5	134.3	74
75	83 34.6	+8.0	• 77.9	83 42.6	+17.2	• 86.8	83 41.2	+26.3	• 95.9	83 30.5	+34.7	•104.7	83 11.2	+41.7	•112.8	82 44.4	+47.3	•120.0	82 11.5	+51.4	•126.4	81 33.6	+54.4	131.8	75
76	83 42.6	−1.4	• 69.0	83 59.8	+7.7	• 77.9	84 07.5	+17.6	• 87.4	84 05.2	+27.3	• 97.1	83 52.9	+36.1	•106.4	83 31.7	+43.3	•114.9	83 02.9	+48.8	•122.4	82 28.0	+52.7	•128.8	76
77	83 41.2	−10.7	• 59.8	84 07.5	−2.3	• 68.3	84 25.1	+7.4	• 77.8	84 32.5	+18.0	• 88.1	84 29.0	+28.5	• 98.5	84 15.0	+37.7	•108.4	83 51.7	+45.0	•117.2	83 20.7	+50.4	•124.9	77
78	83 30.5	−19.3	• 51.0	84 05.2	−12.3	• 58.5	84 32.5	−3.5	• 67.5	84 50.5	+7.0	• 77.8	84 57.5	+18.5	• 88.9	84 52.7	+29.8	•100.1	84 36.7	+39.5	•110.6	84 11.1	+46.8	•119.9	78
79	83 11.2	−26.8	• 42.8	83 52.9	−21.2	• 49.2	84 29.0	−14.0	• 57.0	84 57.5	−4.8	• 66.6	85 16.0	+6.5	• 77.7	85 22.5	+19.0	• 89.9	85 16.2	+31.2	•102.1	84 57.9	+41.4	•113.2	79
80	82 44.4	−32.9	• 35.5	83 31.7	−28.8	• 40.6	84 15.0	−23.3	• 47.1	84 52.7	−16.0	• 55.3	85 22.5	−6.3	• 65.5	85 41.5	+5.9	• 77.7	85 47.4	+19.8	• 91.1	85 39.3	+33.0	•104.4	80
81	82 11.5	−37.9	• 29.1	83 02.9	−34.9	• 33.1	83 51.7	−31.0	• 38.2	84 36.7	−25.6	• 44.8	85 16.2	−18.3	• 53.3	85 47.4	−8.1	• 64.3	86 07.2	+5.1	• 77.6	86 12.3	+20.6	• 92.5	81
82	81 33.6	−41.8	• 23.6	82 28.0	−39.8	• 26.7	83 20.7	−37.1	• 30.5	84 11.1	−33.5	• 35.5	84 57.9	−28.3	• 42.1	85 39.3	−20.9	• 50.9	86 12.3	−10.3	• 62.7	86 32.9	+4.2	• 77.6	82
83	80 51.8	−44.9	• 18.9	81 48.2	−43.6	• 21.2	82 43.6	−41.7	• 24.0	83 37.6	−39.3	• 27.6	84 29.6	−36.0	• 32.5	85 18.4	−31.2	• 39.0	86 02.0	−24.0	• 48.1	86 37.1	−13.0	• 60.8	83
84	80 06.9	−47.4	• 14.9	81 04.6	−46.4	• 16.5	82 01.9	−45.3	• 18.6	82 58.3	−43.7	• 21.2	83 53.6	−41.7	• 24.5	84 47.2	−38.7	• 29.1	85 38.0	−34.4	• 35.5	86 24.1	−27.6	• 44.7	84
85	79 19.5	−49.3	11.5	80 18.2	−48.7	• 12.6	81 16.6	−48.0	• 14.1	82 14.6	−47.1	• 15.8	83 11.9	−45.7	• 18.1	84 08.5	−44.1	• 21.2	85 03.6	−41.5	• 25.3	85 56.5	−37.8	• 31.4	85
86	78 30.2	−50.9	8.5	79 29.5	−50.5	9.3	80 28.6	−50.1	10.3	81 27.5	−49.5	• 11.4	82 26.2	−48.8	• 12.9	83 24.4	−47.8	• 14.9	84 22.1	−46.5	• 17.5	85 18.7	−44.5	• 21.1	86
87	77 39.3	−52.1	5.9	78 39.0	−52.0	6.5	79 38.5	−51.6	7.1	80 38.0	−51.3	7.8	81 37.4	−50.9	8.7	82 36.6	−50.4	• 9.9	83 35.6	−49.8	• 11.4	84 34.2	−48.9	• 13.5	87
88	76 47.2	−53.2	3.7	77 47.0	−53.0	4.0	78 46.9	−53.0	4.3	79 46.7	−52.8	4.8	80 46.5	−52.6	5.3	81 46.2	−52.4	5.9	82 45.8	−52.1	6.7	83 45.3	−51.7	• 7.8	88
89	75 54.0	−54.0	1.7	76 54.0	−54.0	1.9	77 53.9	−53.9	2.0	78 53.9	−53.9	2.2	79 53.9	−53.9	2.4	80 53.8	−53.8	2.7	81 53.7	−53.7	3.0	82 53.6	−53.6	3.4	89
90	75 00.0	−54.7	0.0	76 00.0	−54.7	0.0	77 00.0	−54.8	0.0	78 00.0	−54.8	0.0	79 00.0	−54.8	0.0	80 00.0	−54.9	0.0	81 00.0	−54.9	0.0	82 00.0	−55.0	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 25°, 335°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 34.0	−59.6	154.2	12 39.9	−59.7	154.3	11 45.8	−59.7	154.4	10 51.7	−59.8	154.5	9 57.5	−59.8	154.6	9 03.3	−59.8	154.7	8 09.0	−59.8	154.7	7 14.8	−59.9	154.8	0
1	12 34.4	−59.7	154.3	11 40.2	−59.6	154.4	10 46.1	−59.7	154.5	9 51.9	−59.7	154.6	8 57.7	−59.8	154.7	8 03.5	−59.9	154.7	7 09.2	−59.9	154.8	6 14.9	−59.9	154.8	1
2	11 34.7	−59.6	154.5	10 40.6	−59.7	154.5	9 46.4	−59.7	154.6	8 52.2	−59.8	154.7	7 57.9	−59.8	154.8	7 03.6	−59.8	154.8	6 09.3	−59.9	154.9	5 15.0	−59.9	154.9	2
3	10 35.1	−59.6	154.6	9 40.9	−59.7	154.7	8 46.7	−59.8	154.7	7 52.4	−59.8	154.8	6 58.1	−59.8	154.8	6 03.8	−59.9	154.9	5 09.4	−59.8	154.9	4 15.1	−59.9	155.0	3
4	9 35.5	−59.7	154.7	8 41.2	−59.7	154.8	7 46.9	−59.7	154.8	6 52.6	−59.7	154.9	5 58.3	−59.8	154.9	5 03.9	−59.8	155.0	4 09.6	−59.9	155.0	3 15.2	−59.9	155.0	4
5	8 35.8	−59.6	154.8	7 41.5	−59.6	154.9	6 47.2	−59.7	154.9	5 52.9	−59.8	155.0	4 58.5	−59.8	155.0	4 04.1	−59.8	155.0	3 09.7	−59.9	155.1	2 15.3	−59.9	155.1	5
6	7 36.2	−59.6	154.9	6 41.9	−59.7	155.0	5 47.5	−59.7	155.0	4 53.1	−59.8	155.0	3 58.7	−59.8	155.1	3 04.3	−59.9	155.1	2 09.8	−59.8	155.1	1 15.4	−59.9	155.1	6
7	6 36.6	−59.7	155.0	5 42.2	−59.7	155.1	4 47.8	−59.8	155.1	3 53.3	−59.7	155.1	2 58.9	−59.8	155.2	2 04.4	−59.8	155.2	1 10.0	−59.9	155.2	0 15.5	−59.9	155.2	7
8	5 36.9	−59.6	155.1	4 42.5	−59.7	155.2	3 48.0	−59.7	155.2	2 53.6	−59.8	155.2	1 59.1	−59.8	155.2	1 04.6	−59.8	155.3	0 10.1	−59.9	155.3	0 44.4	+59.9	24.7	8
9	4 37.3	−59.6	155.2	3 42.8	−59.7	155.3	2 48.3	−59.7	155.3	1 53.8	−59.8	155.3	0 59.3	−59.8	155.3	0 04.8	−59.9	155.3	0 49.8	+59.8	24.7	1 44.3	+59.9	24.7	9
10	3 37.7	−59.7	155.4	2 43.1	−59.7	155.4	1 48.6	−59.7	155.4	0 54.0	−59.7	155.4	0 00.5	+59.8	24.6	0 55.1	+59.8	24.6	1 49.6	+59.9	24.6	2 44.2	+59.9	24.6	10
11	2 38.0	−59.6	155.5	1 43.4	−59.6	155.5	0 48.9	−59.8	155.5	0 05.7	+59.8	24.5	1 00.3	+59.8	24.5	1 54.9	+59.9	24.5	2 49.5	+59.9	24.5	3 44.1	+59.9	24.6	11
12	1 38.4	−59.7	155.6	0 43.8	−59.7	155.6	0 10.9	+59.7	24.4	1 05.5	+59.8	24.4	2 00.1	+59.8	24.4	2 54.8	+59.8	24.5	3 49.4	+59.8	24.5	4 44.0	+59.9	24.5	12
13	0 38.7	−59.6	155.7	0 15.9	+59.7	24.3	1 10.6	+59.7	24.3	2 05.3	+59.7	24.3	2 59.9	+59.8	24.4	3 54.6	+59.8	24.4	4 49.2	+59.9	24.4	5 43.9	+59.9	24.4	13
14	0 20.9	+59.6	24.2	1 15.6	+59.7	24.2	2 10.3	+59.8	24.2	3 05.0	+59.8	24.2	3 59.7	+59.8	24.3	4 54.4	+59.9	24.3	5 49.1	+59.9	24.3	6 43.8	+59.9	24.4	14
15	1 20.5	+59.7	24.1	2 15.3	+59.7	24.1	3 10.1	+59.7	24.1	4 04.8	+59.8	24.2	4 59.5	+59.9	24.2	5 54.3	+59.8	24.2	6 49.0	+59.8	24.3	7 43.7	+59.9	24.3	15
16	2 20.2	+59.6	24.0	3 15.0	+59.7	24.0	4 09.8	+59.7	24.0	5 04.6	+59.7	24.1	5 59.4	+59.8	24.1	6 54.1	+59.8	24.2	7 48.8	+59.9	24.2	8 43.6	+59.8	24.3	16
17	3 19.8	+59.6	23.9	4 14.7	+59.6	23.9	5 09.5	+59.7	23.9	6 04.3	+59.8	24.0	6 59.2	+59.8	24.0	7 53.9	+59.9	24.1	8 48.7	+59.9	24.1	9 43.4	+59.9	24.2	17
18	4 19.4	+59.7	23.8	5 14.3	+59.7	23.8	6 09.2	+59.8	23.8	7 04.1	+59.8	23.9	7 59.0	+59.8	23.9	8 53.8	+59.8	24.0	9 48.6	+59.8	24.1	10 43.3	+59.9	24.1	18
19	5 19.1	+59.6	23.7	6 14.0	+59.7	23.7	7 09.0	+59.7	23.7	8 03.9	+59.7	23.8	8 58.8	+59.8	23.9	9 53.6	+59.8	23.9	10 48.4	+59.9	24.0	11 43.2	+59.9	24.1	19
20	6 18.7	+59.7	23.6	7 13.7	+59.7	23.6	8 08.7	+59.7	23.7	9 03.6	+59.8	23.7	9 58.6	+59.8	23.8	10 53.4	+59.9	23.9	11 48.3	+59.9	23.9	12 43.1	+59.9	24.0	20
21	7 18.4	+59.6	23.4	8 13.4	+59.7	23.5	9 08.4	+59.7	23.6	10 03.4	+59.8	23.6	10 58.4	+59.7	23.7	11 53.3	+59.8	23.8	12 48.2	+59.8	23.9	13 43.0	+59.9	24.0	21
22	8 18.0	+59.6	23.3	9 13.1	+59.6	23.4	10 08.1	+59.7	23.5	11 03.2	+59.7	23.5	11 58.1	+59.8	23.6	12 53.1	+59.8	23.7	13 48.0	+59.9	23.8	14 42.9	+59.9	23.9	22
23	9 17.6	+59.6	23.2	10 12.7	+59.7	23.3	11 07.8	+59.8	23.4	12 02.9	+59.8	23.4	12 57.9	+59.8	23.5	13 52.9	+59.9	23.6	14 47.9	+59.8	23.7	15 42.8	+59.9	23.8	23
24	10 17.2	+59.7	23.1	11 12.4	+59.7	23.2	12 07.6	+59.7	23.3	13 02.7	+59.7	23.3	13 57.7	+59.8	23.4	14 52.8	+59.8	23.5	15 47.7	+59.9	23.7	16 42.7	+59.9	23.8	24
25	11 16.9	+59.6	23.0	12 12.1	+59.7	23.1	13 07.3	+59.7	23.2	14 02.4	+59.8	23.3	14 57.5	+59.8	23.4	15 52.6	+59.8	23.5	16 47.6	+59.9	23.6	17 42.6	+59.8	23.7	25
26	12 16.5	+59.6	22.9	13 11.8	+59.6	23.0	14 07.0	+59.7	23.1	15 02.2	+59.7	23.2	15 57.3	+59.8	23.3	16 52.4	+59.8	23.4	17 47.5	+59.8	23.5	18 42.4	+59.9	23.6	26
27	13 16.1	+59.6	22.8	14 11.4	+59.7	22.9	15 06.7	+59.7	23.0	16 01.9	+59.8	23.1	16 57.1	+59.8	23.2	17 52.2	+59.9	23.3	18 47.3	+59.9	23.4	19 42.3	+59.9	23.6	27
28	14 15.7	+59.7	22.6	15 11.1	+59.7	22.7	16 06.4	+59.7	22.9	17 01.7	+59.7	23.0	17 56.9	+59.8	23.1	18 52.1	+59.8	23.2	19 47.2	+59.8	23.4	20 42.2	+59.9	23.5	28
29	15 15.4	+59.6	22.5	16 10.8	+59.6	22.6	17 06.1	+59.7	22.8	18 01.4	+59.8	22.9	18 56.7	+59.8	23.0	19 51.9	+59.8	23.1	20 47.0	+59.9	23.3	21 42.1	+59.9	23.4	29
30	16 15.0	+59.6	22.4	17 10.4	+59.7	22.5	18 05.8	+59.7	22.6	19 01.2	+59.7	22.8	19 56.5	+59.7	22.9	20 51.7	+59.8	23.1	21 46.9	+59.8	23.2	22 42.0	+59.9	23.4	30
31	17 14.6	+59.6	22.3	18 10.1	+59.6	22.4	19 05.5	+59.7	22.5	20 00.9	+59.7	22.7	20 56.2	+59.8	22.8	21 51.5	+59.8	23.0	22 46.7	+59.9	23.1	23 41.9	+59.8	23.3	31
32	18 14.2	+59.6	22.2	19 09.7	+59.7	22.3	20 05.2	+59.7	22.4	21 00.6	+59.8	22.6	21 56.0	+59.8	22.7	22 51.3	+59.8	22.9	23 46.6	+59.8	23.1	24 41.7	+59.9	23.2	32
33	19 13.8	+59.6	22.0	20 09.4	+59.6	22.2	21 04.9	+59.7	22.3	22 00.4	+59.7	22.5	22 55.8	+59.7	22.6	23 51.1	+59.8	22.8	24 46.4	+59.8	23.0	25 41.6	+59.9	23.2	33
34	20 13.4	+59.6	21.9	21 09.0	+59.6	22.1	22 04.6	+59.7	22.2	23 00.1	+59.7	22.4	23 55.5	+59.8	22.5	24 50.9	+59.8	22.7	25 46.2	+59.9	22.9	26 41.5	+59.8	23.1	34
35	21 13.0	+59.5	21.8	22 08.6	+59.7	21.9	23 04.3	+59.6	22.1	23 59.8	+59.7	22.3	24 55.3	+59.8	22.4	25 50.7	+59.8	22.6	26 46.1	+59.8	22.8	27 41.3	+59.9	23.0	35
36	22 12.5	+59.6	21.7	23 08.3	+59.6	21.8	24 03.9	+59.7	22.0	24 59.5	+59.8	22.2	25 55.1	+59.7	22.3	26 50.5	+59.8	22.5	27 45.9	+59.8	22.7	28 41.2	+59.9	22.9	36
37	23 12.1	+59.6	21.5	24 07.9	+59.6	21.7	25 03.6	+59.7	21.9	25 59.3	+59.7	22.1	26 54.8	+59.8	22.2	27 50.3	+59.8	22.4	28 45.7	+59.9	22.6	29 41.1	+59.8	22.9	37
38	24 11.7	+59.6	21.4	25 07.5	+59.6	21.6	26 03.3	+59.6	21.8	26 59.0	+59.7	21.9	27 54.6	+59.7	22.1	28 50.1	+59.8	22.3	29 45.6	+59.8	22.6	30 40.9	+59.9	22.8	38
39	25 11.3	+59.5	21.3	26 07.1	+59.6	21.5	27 02.9	+59.7	21.6	27 58.7	+59.7	21.8	28 54.3	+59.8	22.0	29 49.9	+59.8	22.2	30 45.4	+59.8	22.5	31 40.8	+59.8	22.7	39
40	26 10.8	+59.6	21.1	27 06.7	+59.6	21.3	28 02.6	+59.6	21.5	28 58.4	+59.7	21.7	29 54.1	+59.7	21.9	30 49.7	+59.8	22.1	31 45.2	+59.8	22.4	32 40.6	+59.9	22.6	40
41	27 10.4	+59.5	21.0	28 06.3	+59.6	21.2	29 02.2	+59.7	21.4	29 58.1	+59.6	21.6	30 53.8	+59.7	21.8	31 49.5	+59.7	22.0	32 45.0	+59.8	22.3	33 40.5	+59.8	22.5	41
42	28 09.9	+59.5	20.9	29 05.9	+59.6	21.1	30 01.9	+59.6	21.3	30 57.7	+59.7	21.5	31 53.5	+59.8	21.7	32 49.2	+59.8	21.9	33 44.8	+59.8	22.2	34 40.3	+59.9	22.5	42
43	29 09.4	+59.6	20.7	30 05.5	+59.6	20.9	31 01.5	+59.6	21.1	31 57.4	+59.7	21.4	32 53.3	+59.7	21.6	33 49.0	+59.8	21.8	34 44.6	+59.8	22.1	35 40.2	+59.8	22.4	43
44	30 09.0	+59.5	20.6	31 05.1	+59.5	20.8	32 01.1	+59.7	21.0	32 57.1	+59.7	21.2	33 53.0	+59.7	21.5	34 48.8	+59.7	21.7	35 44.4	+59.8	22.0	36 40.0	+59.9	22.3	44
45	31 08.5	+59.5	20.4	32 04.6	+59.6	20.7	33 00.8	+59.6	20.9	33 56.8	+59.6	21.1	34 52.7	+59.7	21.4	35 48.5	+59.8	21.6	36 44.2	+59.8	21.9	37 39.9	+59.8	22.2	45
46	32 08.0	+59.5	20.3	33 04.2	+59.6	20.5	34 00.4	+59.6	20.7	34 56.4	+59.7	21.0	35 52.4	+59.7	21.2	36 48.3	+59.7	21.5	37 44.0	+59.8	21.8	38 39.7	+59.8	22.1	46
47	33 07.5	+59.4	20.1	34 03.8	+59.5	20.4	35 00.0	+59.5	20.6	35 56.1	+59.6	20.9	36 52.1	+59.7	21.1	37 48.0	+59.8	21.4	38 43.8	+59.8	21.7	39 39.5	+59.8	22.0	47
48	34 06.9	+59.5	20.0	35 03.3	+59.5	20.2	35 59.5	+59.6	20.5	36 55.7	+59.6	20.7	37 51.8	+59.7	21.0	38 47.8	+59.7	21.3	39 43.6	+59.8	21.6	40 39.3	+59.9	21.9	48
49	35 06.4	+59.5	19.8	36 02.8	+59.5	20.1	36 59.1	+59.6	20.3	37 55.3	+59.7	20.6	38 51.5	+59.6	20.9	39 47.5	+59.7	21.2	40 43.4	+59.8	21.5	41 39.2	+59.8	21.8	49
50	36 05.9	+59.4	19.6	37 02.3	+59.5	19.9	37 58.7	+59.6	20.2	38 55.0	+59.6	20.4	39 51.1	+59.7	20.7	40 47.2	+59.7	21.0	41 43.2	+59.7	21.3	42 39.0	+59.8	21.7	50
51	37 05.3	+59.4	19.5	38 01.8	+59.5	19.7	38 58.3	+59.5	20.0	39 54.6	+59.6	20.3	40 50.8	+59.7	20.6	41 46.9	+59.7	20.9	42 42.9	+59.8	21.2	43 38.8	+59.8	21.6	51
52	38 04.7	+59.4	19.3	39 01.3	+59.5	19.6	39 57.8	+59.5	19.8	40 54.2	+59.6	20.1	41 50.5	+59.6	20.4	42 46.6	+59.7	20.8	43 42.7	+59.7	21.1	44 38.6	+59.8	21.5	52
53	39 04.1	+59.4	19.1	40 00.8	+59.4	19.4	40 57.3	+59.5	19.7	41 53.8	+59.5	20.0	42 50.1	+59.6	20.3	43 46.3	+59.7	20.6	44 42.4	+59.7	21.0	45 38.4	+59.7	21.3	53
54	40 03.5	+59.4	18.9	41 00.2	+59.5	19.2	41 56.8	+59.5	19.5	42 53.3	+59.6	19.8	43 49.7	+59.6	20.1	44 46.0	+59.7	20.5	45 42.1	+59.8	20.8	46 38.1	+59.8	21.2	54
55	41 02.9	+59.4	18.7	41 59.7	+59.4	19.0	42 56.3	+59.5	19.3	43 52.9	+59.5	19.7	44 49.3	+59.7	20.0	45 45.7	+59.6	20.3	46 41.9	+59.7	20.7	47 37.9	+59.8	21.1	55
56	42 02.3	+59.3	18.6	42 59.1	+59.4	18.8	43 55.8	+59.5	19.2	44 52.4	+59.6	19.5	45 49.0	+59.5	19.8	46 45.3	+59.7	20.2	47 41.6	+59.7	20.6	48 37.7	+59.7	21.0	56
57	43 01.6	+59.3	18.4	43 58.5	+59.4	18.7	44 55.3	+59.4	19.0	45 52.0	+59.5	19.3	46 48.5	+59.6	19.7	47 45.0	+59.6	20.0	48 41.3	+59.7	20.4	49 37.4	+59.8	20.8	57
58	44 00.9	+59.3	18.1	44 57.9	+59.3	18.5	45 54.7	+59.5	18.8	46 51.5	+59.5	19.1	47 48.1	+59.6	19.5	48 44.6	+59.6	19.9	49 41.0	+59.7	20.3	50 37.2	+59.7	20.7	58
59	45 00.2	+59.3	17.9	45 57.2	+59.4	18.2	46 54.2	+59.4	18.6	47 51.0	+59.5	18.9	48 47.7	+59.5	19.3	49 44.2	+59.6	19.7	50 40.7	+59.6	20.1	51 36.9	+59.8	20.5	59
60	45 59.5	+59.2	17.7	46 56.6	+59.3	18.0	47 53.6	+59.4	18.4	48 50.5	+59.4	18.7	49 47.2	+59.5	19.1	50 43.8	+59.6	19.5	51 40.3	+59.7	19.9	52 36.7	+59.7	20.4	60
61	46 58.7	+59.2	17.5	47 55.9	+59.3	17.8	48 53.0	+59.3	18.2	49 49.9	+59.4	18.5	50 46.7	+59.5	18.9	51 43.4	+59.6	19.3	52 40.0	+59.6	19.7	53 36.4	+59.7	20.2	61
62	47 57.9	+59.2	17.2	48 55.2	+59.2	17.6	49 52.3	+59.3	17.9	50 49.3	+59.4	18.3	51 46.2	+59.5	18.7	52 43.0	+59.5	19.1	53 39.6	+59.6	19.6	54 36.1	+59.6	20.0	62
63	48 57.1	+59.1	17.0	49 54.4	+59.2	17.3	50 51.6	+59.3	17.7	51 48.7	+59.4	18.1	52 45.7	+59.5	18.5	53 42.5	+59.6	18.9	54 39.2	+59.6	19.4	55 35.7	+59.7	19.9	63
64	49 56.2	+59.1	16.7	50 53.6	+59.2	17.1	51 50.9	+59.3	17.5	52 48.1	+59.4	17.8	53 45.2	+59.4	18.3	54 42.1	+59.5	18.7	55 38.8	+59.6	19.2	56 35.4	+59.7	19.7	64
65	50 55.3	+59.1	16.5	51 52.8	+59.2	16.8	52 50.2	+59.2	17.2	53 47.5	+59.3	17.6	54 44.6	+59.4	18.0	55 41.6	+59.4	18.5	56 38.4	+59.6	19.0	57 35.1	+59.6	19.5	65
66	51 54.4	+59.0	16.2	52 52.0	+59.1	16.5	53 49.4	+59.2	16.9	54 46.8	+59.3	17.3	55 44.0	+59.3	17.8	56 41.0	+59.5	18.2	57 38.0	+59.5	18.7	58 34.7	+59.6	19.3	66
67	52 53.4	+59.0	15.9	53 51.1	+59.1	16.3	54 48.6	+59.2	16.7	55 46.1	+59.2	17.1	56 43.3	+59.4	17.5	57 40.5	+59.4	18.0	58 37.5	+59.5	18.5	59 34.3	+59.6	19.0	67
68	53 52.4	+59.0	15.6	54 50.2	+59.0	16.0	55 47.8	+59.1	16.4	56 45.3	+59.2	16.8	57 42.7	+59.3	17.2	58 39.9	+59.4	17.7	59 37.0	+59.4	18.2	60 33.9	+59.5	18.8	68
69	54 51.4	+58.8	15.3	55 49.2	+59.0	15.6	56 46.9	+59.1	16.0	57 44.5	+59.2	16.5	58 42.0	+59.2	16.9	59 39.3	+59.3	17.4	60 36.4	+59.5	18.0	61 33.4	+59.6	18.5	69
70	55 50.2	+58.9	14.9	56 48.2	+58.9	15.3	57 46.0	+59.0	15.7	58 43.7	+59.1	16.2	59 41.2	+59.2	16.6	60 38.6	+59.3	17.1	61 35.9	+59.4	17.7	62 33.0	+59.4	18.3	70
71	56 49.1	+58.7	14.6	57 47.1	+58.8	15.0	58 45.0	+58.9	15.4	59 42.8	+59.0	15.8	60 40.4	+59.2	16.3	61 37.9	+59.3	16.8	62 35.3	+59.3	17.4	63 32.4	+59.5	18.0	71
72	57 47.8	+58.7	14.2	58 45.9	+58.8	14.6	59 43.9	+58.9	15.0	60 41.8	+59.0	15.5	61 39.6	+59.1	16.0	62 37.2	+59.2	16.5	63 34.6	+59.3	17.1	64 31.9	+59.4	17.7	72
73	58 46.5	+58.6	13.8	59 44.7	+58.7	14.2	60 42.8	+58.9	14.6	61 40.8	+59.0	15.1	62 38.7	+59.0	15.6	63 36.4	+59.1	16.1	64 33.9	+59.3	16.7	65 31.3	+59.4	17.4	73
74	59 45.1	+58.5	13.4	60 43.4	+58.7	13.8	61 41.7	+58.7	14.2	62 39.8	+58.8	14.7	63 37.7	+59.0	15.2	64 35.5	+59.1	15.8	65 33.2	+59.2	16.3	66 30.7	+59.3	17.0	74
75	60 43.6	+58.5	12.9	61 42.1	+58.5	13.3	62 40.4	+58.6	13.8	63 38.6	+58.8	14.3	64 36.7	+58.9	14.8	65 34.6	+59.0	15.3	66 32.4	+59.1	15.9	67 30.0	+59.3	16.6	75
76	61 42.1	+58.3	12.5	62 40.6	+58.4	12.9	63 39.0	+58.6	13.3	64 37.4	+58.7	13.8	65 35.6	+58.8	14.3	66 33.6	+59.0	14.9	67 31.5	+59.1	15.5	68 29.3	+59.1	16.2	76
77	62 40.4	+58.2	12.0	63 39.0	+58.4	12.4	64 37.6	+58.5	12.8	65 36.1	+58.5	13.3	66 34.4	+58.7	13.8	67 32.6	+58.8	14.4	68 30.6	+59.0	15.0	69 28.4	+59.2	15.7	77
78	63 38.6	+58.1	11.4	64 37.4	+58.2	11.8	65 36.1	+58.3	12.3	66 34.6	+58.5	12.8	67 33.1	+58.6	13.3	68 31.4	+58.7	13.9	69 29.6	+58.8	14.5	70 27.6	+59.0	15.2	78
79	64 36.7	+57.9	10.8	65 35.6	+58.0	11.3	66 34.4	+58.2	11.7	67 33.1	+58.3	12.2	68 31.7	+58.4	12.7	69 30.1	+58.6	13.3	70 28.4	+58.8	14.0	71 26.6	+58.9	14.7	79
80	65 34.6	+57.8	10.2	66 33.6	+57.9	10.6	67 32.6	+58.0	11.1	68 31.4	+58.2	11.6	69 30.1	+58.3	12.1	70 28.7	+58.5	12.7	71 27.2	+58.6	13.3	72 25.5	+58.8	14.1	80
81	66 32.4	+57.6	9.6	67 31.5	+57.8	10.0	68 30.6	+57.8	10.4	69 29.6	+58.0	10.9	70 28.4	+58.2	11.4	71 27.2	+58.3	12.0	72 25.8	+58.5	12.7	73 24.3	+58.6	13.4	81
82	67 30.0	+57.4	8.8	68 29.3	+57.5	9.2	69 28.4	+57.7	9.7	70 27.6	+57.7	10.1	71 26.6	+57.9	10.7	72 25.5	+58.1	11.2	73 24.3	+58.2	11.9	74 22.9	+58.5	12.6	82
83	68 27.4	+57.1	8.1	69 26.8	+57.2	8.4	70 26.1	+57.4	8.8	71 25.3	+57.6	9.3	72 24.5	+57.7	9.8	73 23.6	+57.8	10.4	74 22.5	+58.1	11.0	75 21.4	+58.2	11.8	83
84	69 24.5	+56.9	7.2	70 24.0	+57.0	7.6	71 23.5	+57.1	8.0	72 22.9	+57.3	8.4	73 22.2	+57.4	8.9	74 21.4	+57.6	9.4	75 20.6	+57.7	10.1	76 19.6	+58.0	10.8	84
85	70 21.4	+56.6	6.3	71 21.0	+56.7	6.6	72 20.6	+56.8	7.0	73 20.2	+56.9	7.4	74 19.6	+57.1	7.8	75 19.0	+57.3	8.4	76 18.3	+57.5	9.0	77 17.6	+57.6	9.6	85
86	71 18.0	+56.2	5.3	72 17.7	+56.3	5.6	73 17.4	+56.5	5.9	74 17.1	+56.5	6.2	75 16.7	+56.7	6.7	76 16.3	+56.8	7.1	77 15.8	+57.0	7.7	78 15.2	+57.2	8.3	86
87	72 14.2	+55.8	4.2	73 14.0	+55.9	4.4	74 13.9	+55.9	4.7	75 13.6	+56.1	5.0	76 13.4	+56.2	5.3	77 13.1	+56.3	5.7	78 12.8	+56.5	6.2	79 12.4	+56.7	6.8	87
88	73 10.0	+55.3	2.9	74 09.9	+55.4	3.1	75 09.8	+55.4	3.3	76 09.7	+55.5	3.5	77 09.6	+55.6	3.8	78 09.4	+55.7	4.1	79 09.3	+55.8	4.5	80 09.1	+55.9	4.9	88
89	74 05.3	+54.7	1.5	75 05.3	+54.7	1.6	76 05.2	+54.8	1.8	77 05.2	+54.8	1.9	78 05.2	+54.8	2.0	79 05.1	+54.9	2.2	80 05.1	+54.9	2.5	81 05.0	+55.0	2.7	89
90	75 00.0	+54.0	0.0	76 00.0	+54.0	0.0	77 00.0	+53.9	0.0	78 00.0	+53.9	0.0	79 00.0	+53.9	0.0	80 00.0	+53.8	0.0	81 00.0	+53.7	0.0	82 00.0	+53.6	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 155°, 205°

26°, 334° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	13 27.1	+59.6	153.2	12 33.5	+59.7	153.3	11 39.9	+59.7	153.4	10 46.2	+59.8	153.5
1	14 26.7	+59.6	153.1	13 33.2	+59.6	153.2	12 39.6	+59.7	153.3	11 46.0	+59.7	153.4
2	15 26.3	+59.6	153.0	14 32.8	+59.6	153.1	13 39.3	+59.7	153.2	12 45.7	+59.7	153.3
3	16 25.9	+59.5	152.8	15 32.4	+59.7	153.0	14 39.0	+59.6	153.1	13 45.4	+59.8	153.2
4	17 25.4	+59.6	152.7	16 32.1	+59.6	152.9	15 38.6	+59.7	153.0	14 45.2	+59.7	153.1
5	18 25.0	+59.6	152.6	17 31.7	+59.6	152.7	16 38.3	+59.7	152.9	15 44.9	+59.7	153.0
6	19 24.6	+59.5	152.5	18 31.3	+59.6	152.6	17 38.0	+59.7	152.8	16 44.6	+59.7	152.9
7	20 24.1	+59.6	152.3	19 30.9	+59.7	152.5	18 37.7	+59.7	152.7	17 44.3	+59.8	152.8
8	21 23.7	+59.5	152.2	20 30.6	+59.6	152.4	19 37.4	+59.6	152.6	18 44.1	+59.7	152.7
9	22 23.2	+59.6	152.1	21 30.2	+59.6	152.3	20 37.0	+59.7	152.4	19 43.8	+59.7	152.6
10	23 22.8	+59.5	151.9	22 29.8	+59.6	152.1	21 36.7	+59.6	152.3	20 43.5	+59.7	152.5
11	24 22.3	+59.5	151.8	23 29.4	+59.6	152.0	22 36.3	+59.7	152.2	21 43.2	+59.7	152.4
12	25 21.8	+59.6	151.7	24 29.0	+59.6	151.9	23 36.0	+59.7	152.1	22 42.9	+59.7	152.3
13	26 21.4	+59.5	151.5	25 28.6	+59.5	151.8	24 35.7	+59.6	152.0	23 42.6	+59.7	152.2
14	27 20.9	+59.5	151.4	26 28.1	+59.6	151.6	25 35.3	+59.6	151.9	24 42.3	+59.7	152.1
15	28 20.4	+59.5	151.2	27 27.7	+59.6	151.5	26 34.9	+59.7	151.7	25 42.0	+59.7	152.0
16	29 19.9	+59.5	151.1	28 27.3	+59.5	151.4	27 34.6	+59.6	151.6	26 41.7	+59.7	151.9
17	30 19.4	+59.4	150.9	29 26.8	+59.6	151.2	28 34.2	+59.6	151.5	27 41.4	+59.7	151.7
18	31 18.8	+59.5	150.8	30 26.4	+59.5	151.1	29 33.8	+59.6	151.4	28 41.1	+59.6	151.6
19	32 18.3	+59.5	150.6	31 25.9	+59.6	150.9	30 33.4	+59.6	151.2	29 40.7	+59.7	151.5
20	33 17.8	+59.4	150.5	32 25.5	+59.5	150.8	31 33.0	+59.6	151.1	30 40.4	+59.7	151.4
21	34 17.2	+59.4	150.3	33 25.0	+59.5	150.6	32 32.6	+59.6	151.0	31 40.1	+59.6	151.3
22	35 16.6	+59.4	150.1	34 24.5	+59.5	150.5	33 32.2	+59.6	150.8	32 39.7	+59.7	151.1
23	36 16.0	+59.4	150.0	35 24.0	+59.5	150.3	34 31.8	+59.5	150.7	33 39.4	+59.6	151.0
24	37 15.4	+59.4	149.8	36 23.5	+59.4	150.2	35 31.3	+59.6	150.5	34 39.0	+59.6	150.9
25	38 14.8	+59.4	149.6	37 22.9	+59.5	150.0	36 30.9	+59.5	150.4	35 38.6	+59.6	150.7
26	39 14.2	+59.3	149.4	38 22.4	+59.4	149.8	37 30.4	+59.5	150.2	36 38.2	+59.7	150.6
27	40 13.5	+59.3	149.2	39 21.8	+59.5	149.7	38 29.9	+59.6	150.1	37 37.9	+59.5	150.4
28	41 12.8	+59.3	149.0	40 21.3	+59.4	149.5	39 29.5	+59.5	149.9	38 37.4	+59.6	150.3
29	42 12.1	+59.3	148.8	41 20.7	+59.4	149.3	40 29.0	+59.4	149.7	39 37.0	+59.6	150.2
30	43 11.4	+59.3	148.6	42 20.1	+59.3	149.1	41 28.4	+59.5	149.6	40 36.6	+59.6	150.0
31	44 10.7	+59.2	148.4	43 19.4	+59.4	148.9	42 27.9	+59.5	149.4	41 36.2	+59.5	149.8
32	45 09.9	+59.2	148.2	44 18.8	+59.3	148.7	43 27.4	+59.4	149.2	42 35.7	+59.5	149.7
33	46 09.1	+59.2	147.9	45 18.1	+59.3	148.5	44 26.8	+59.4	149.0	43 35.2	+59.6	149.5
34	47 08.3	+59.1	147.7	46 17.4	+59.3	148.3	45 26.2	+59.4	148.8	44 34.8	+59.5	149.3
35	48 07.4	+59.1	147.5	47 16.7	+59.2	148.0	46 25.6	+59.4	148.6	45 34.3	+59.4	149.1
36	49 06.5	+59.1	147.2	48 15.9	+59.2	147.8	47 25.0	+59.3	148.4	46 33.7	+59.5	148.9
37	50 05.6	+59.0	146.9	49 15.1	+59.2	147.6	48 24.3	+59.4	148.2	47 33.2	+59.4	148.8
38	51 04.6	+59.0	146.6	50 14.3	+59.2	147.3	49 23.7	+59.2	147.9	48 32.6	+59.5	148.5
39	52 03.6	+59.0	146.4	51 13.5	+59.1	147.0	50 22.9	+59.3	147.7	49 32.1	+59.3	148.3
40	53 02.6	+58.9	146.0	52 12.6	+59.1	146.8	51 22.2	+59.2	147.5	50 31.4	+59.4	148.1
41	54 01.5	+58.8	145.7	53 11.7	+59.0	146.5	52 21.4	+59.2	147.2	51 30.8	+59.3	147.9
42	55 00.3	+58.8	145.4	54 10.7	+59.0	146.2	53 20.6	+59.2	146.9	52 30.1	+59.4	147.6
43	55 59.1	+58.7	145.0	55 09.7	+58.9	145.9	54 19.8	+59.1	146.6	53 29.5	+59.2	147.4
44	56 57.8	+58.7	144.7	56 08.6	+58.9	145.5	55 18.9	+59.1	146.3	54 28.7	+59.3	147.1
45	57 56.5	+58.5	144.3	57 07.5	+58.8	145.2	56 18.0	+59.0	146.0	55 28.0	+59.2	146.9
46	58 55.0	+58.5	143.9	58 06.3	+58.7	144.8	57 17.0	+59.0	145.7	56 27.2	+59.1	146.6
47	59 53.5	+58.4	143.4	59 05.0	+58.7	144.4	58 16.0	+58.9	145.4	57 26.3	+59.1	146.3
48	60 51.9	+58.3	143.0	60 03.7	+58.6	144.0	59 14.9	+58.8	145.0	58 25.4	+59.1	145.9
49	61 50.2	+58.2	142.5	61 02.3	+58.5	143.6	60 13.7	+58.8	144.6	59 24.5	+59.0	145.6
50	62 48.4	+58.1	141.9	62 00.8	+58.4	143.1	61 12.5	+58.7	144.2	60 23.5	+58.9	145.2
51	63 46.5	+57.9	141.4	62 59.2	+58.3	142.6	62 11.2	+58.6	143.8	61 22.4	+58.9	144.8
52	64 44.4	+57.7	140.8	63 57.5	+58.1	142.1	63 09.8	+58.5	143.3	62 21.3	+58.8	144.4
53	65 42.1	+57.6	140.1	64 55.6	+58.0	141.5	64 08.3	+58.3	142.8	63 20.1	+58.7	144.0
54	66 39.7	+57.4	139.4	65 53.6	+57.9	140.9	65 06.6	+58.3	142.2	64 18.8	+58.6	143.5
55	67 37.1	+57.2	138.7	66 51.5	+57.7	140.2	66 04.9	+58.1	141.7	65 17.4	+58.5	143.0
56	68 34.3	+56.9	137.9	67 49.2	+57.5	139.5	67 03.0	+58.0	141.0	66 15.9	+58.4	142.5
57	69 31.2	+56.6	137.0	68 46.7	+57.2	138.7	68 01.0	+57.8	140.4	67 14.3	+58.2	141.9
58	70 27.8	+56.2	136.0	69 43.9	+57.0	137.9	68 58.8	+57.6	139.6	68 12.5	+58.1	141.3
59	71 24.0	+55.9	134.9	70 40.9	+56.7	137.0	69 56.4	+57.3	138.8	69 10.6	+57.9	140.6
60	72 19.9	+55.4	133.8	71 37.6	+56.3	135.9	70 53.7	+57.1	138.0	70 08.5	+57.7	139.8
61	73 15.3	+54.9	132.5	72 33.9	+55.9	134.8	71 50.8	+56.7	137.0	71 06.2	+57.4	139.0
62	74 10.2	+54.2	131.0	73 29.8	+55.4	133.6	72 47.5	+56.4	135.9	72 03.6	+57.2	138.1
63	75 04.4	+53.5	129.4	74 25.2	+54.8	132.2	73 43.9	+55.9	134.7	73 00.8	+56.8	137.1
64	75 57.9	+52.5	127.6	75 20.0	+54.1	130.6	74 39.8	+55.4	133.4	73 57.6	+56.5	135.9
65	76 50.4	+51.4	125.5	76 14.1	+53.3	128.9	75 35.2	+54.8	131.9	74 54.1	+55.9	134.7
66	77 41.8	+50.1	123.2	77 07.4	+52.2	126.9	76 30.0	+53.9	130.2	75 50.0	+55.4	133.2
67	78 31.9	+48.3	120.5	77 59.6	+50.9	124.6	77 23.9	+53.0	128.3	76 45.4	+54.7	131.6
68	79 20.2	*+46.3*	•117.4	78 50.5	+49.3	121.9	78 16.9	+51.8	126.0	77 40.1	+53.8	129.7
69	80 06.5	*+43.6*	•113.9	79 39.8	*+47.3*	•118.9	79 08.7	+50.3	123.5	78 33.9	+52.6	127.6
70	80 50.1	*+40.4*	•109.7	80 27.1	*+44.8*	•115.3	79 59.0	*+48.4*	•120.5	79 26.5	+51.3	125.1
71	81 30.5	*+36.1*	•104.9	81 11.9	*+41.5*	•111.1	80 47.4	*+46.0*	•116.9	80 17.8	*+49.5*	•122.1
72	82 06.6	*+31.0*	•99.3	81 53.4	*+37.3*	•106.2	81 33.4	*+42.7*	•112.7	81 07.3	*+47.2*	•118.6
73	82 37.6	*+24.7*	•92.8	82 30.7	*+32.0*	•100.4	82 16.1	*+38.5*	•107.7	81 54.5	*+44.0*	•114.4
74	83 02.3	*+17.2*	•85.5	83 02.7	*+25.5*	•93.7	82 54.6	*+33.2*	•101.8	82 38.5	*+39.9*	•109.4
75	83 19.5	*+8.7*	•77.4	83 28.2	*+17.4*	•86.0	83 27.8	*+26.3*	•94.7	83 18.4	*+34.4*	•103.2
76	83 28.2	*−0.4*	•68.8	83 45.6	*+8.5*	•77.4	83 54.1	*+17.8*	•86.5	83 52.8	*+27.2*	•95.9
77	83 27.8	*−9.4*	•60.0	83 54.1	*−1.3*	•68.1	84 11.9	*+8.1*	•77.3	84 20.0	*+18.3*	•87.2
78	83 18.4	*−17.8*	•51.4	83 52.8	*−10.9*	•58.7	84 20.0	*−2.3*	•67.4	84 38.3	*+7.7*	•77.3
79	83 00.6	*−25.3*	•43.4	83 41.9	*−19.7*	•49.6	84 17.7	*−12.6*	•57.3	84 46.0	*−3.5*	•66.5
80	82 35.3	*−31.4*	•36.2	83 22.2	*−27.3*	•41.2	84 05.1	*−21.8*	•47.6	84 42.5	*−14.6*	•55.6
81	82 03.9	*−36.6*	•29.8	82 54.9	*−33.5*	•33.8	83 43.3	*−29.5*	•38.8	84 27.9	*−24.1*	•45.3
82	81 27.3	*−40.6*	•24.2	82 21.4	*−38.5*	•27.3	83 13.8	*−35.8*	•31.2	84 03.8	*−32.0*	•36.1
83	80 46.7	*−43.9*	•19.5	81 42.9	*−42.5*	•21.8	82 38.0	*−40.5*	•24.6	83 31.8	*−38.1*	•28.3
84	80 02.8	*−46.4*	•15.4	81 00.4	*−45.4*	•17.0	81 57.5	*−44.3*	•19.1	82 53.7	*−42.6*	•21.7
85	79 16.4	−48.5	11.8	80 15.0	*−47.9*	•13.0	81 13.2	*−47.0*	•14.5	82 11.1	*−46.1*	•16.3
86	78 27.9	−50.2	8.8	79 27.1	−49.8	9.6	80 26.2	*−49.3*	•10.6	81 25.0	*−48.7*	•11.8
87	77 37.7	−51.5	6.1	78 37.3	−51.3	6.7	79 36.9	−51.1	7.3	80 36.3	−50.7	8.1
88	76 46.2	−52.7	3.8	77 46.0	−52.5	4.1	78 45.8	−52.3	4.5	79 45.6	−52.2	4.9
89	75 53.5	−53.5	1.8	76 53.5	−53.5	1.9	77 53.5	−53.5	2.1	78 53.4	−53.4	2.3
90	75 00.0	−54.3	0.0	76 00.0	−54.3	0.0	77 00.0	−54.3	0.0	78 00.0	−54.4	0.0
	75°			76°			77°			78°		

79°			80°			81°			82°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
9 52.5	+59.8	153.6	8 58.7	+59.9	153.7	8 05.0	+59.8	153.7	7 11.2	+59.8	153.8	0
10 52.3	+59.8	153.5	9 58.6	+59.8	153.6	9 04.8	+59.9	153.6	8 11.0	+59.9	153.7	1
11 52.1	+59.7	153.4	10 58.4	+59.8	153.5	10 04.7	+59.8	153.6	9 10.9	+59.9	153.7	2
12 51.8	+59.8	153.3	11 58.2	+59.8	153.4	11 04.5	+59.9	153.5	10 10.8	+59.9	153.6	3
13 51.6	+59.8	153.2	12 58.0	+59.8	153.3	12 04.4	+59.8	153.4	11 10.7	+59.9	153.5	4
14 51.4	+59.8	153.1	13 57.8	+59.9	153.3	13 04.2	+59.9	153.4	12 10.6	+59.9	153.5	5
15 51.2	+59.7	153.1	14 57.7	+59.8	153.2	14 04.1	+59.8	153.3	13 10.5	+59.8	153.4	6
16 50.9	+59.8	153.0	15 57.5	+59.8	153.1	15 03.9	+59.9	153.2	14 10.3	+59.9	153.3	7
17 50.7	+59.8	152.9	16 57.3	+59.8	153.0	16 03.8	+59.8	153.1	15 10.2	+59.9	153.3	8
18 50.5	+59.7	152.8	17 57.1	+59.8	152.9	17 03.6	+59.9	153.1	16 10.1	+59.9	153.2	9
19 50.2	+59.8	152.7	18 56.9	+59.8	152.8	18 03.5	+59.8	153.0	17 10.0	+59.9	153.1	10
20 50.0	+59.8	152.6	19 56.7	+59.8	152.8	19 03.3	+59.9	152.9	18 09.9	+59.8	153.1	11
21 49.8	+59.7	152.5	20 56.5	+59.8	152.7	20 03.2	+59.8	152.8	19 09.7	+59.9	153.0	12
22 49.5	+59.8	152.4	21 56.3	+59.8	152.6	21 03.0	+59.8	152.8	20 09.6	+59.9	152.9	13
23 49.3	+59.7	152.3	22 56.1	+59.8	152.5	22 02.8	+59.9	152.7	21 09.5	+59.8	152.9	14
24 49.0	+59.8	152.2	23 55.9	+59.8	152.4	23 02.7	+59.8	152.6	22 09.3	+59.9	152.8	15
25 48.8	+59.7	152.1	24 55.7	+59.8	152.3	24 02.5	+59.8	152.5	23 09.2	+59.9	152.7	16
26 48.5	+59.7	152.0	25 55.5	+59.7	152.2	25 02.3	+59.9	152.4	24 09.1	+59.8	152.6	17
27 48.2	+59.8	151.9	26 55.2	+59.8	152.1	26 02.2	+59.8	152.4	25 08.9	+59.9	152.6	18
28 48.0	+59.7	151.8	27 55.0	+59.8	152.0	27 02.0	+59.8	152.3	26 08.8	+59.9	152.5	19
29 47.7	+59.7	151.7	28 54.8	+59.8	151.9	28 01.8	+59.8	152.2	27 08.7	+59.8	152.4	20
30 47.4	+59.7	151.5	29 54.6	+59.7	151.8	29 01.6	+59.8	152.1	28 08.5	+59.9	152.3	21
31 47.1	+59.7	151.4	30 54.3	+59.8	151.7	30 01.4	+59.8	152.0	29 08.4	+59.8	152.3	22
32 46.8	+59.7	151.3	31 54.1	+59.8	151.6	31 01.2	+59.8	151.9	30 08.2	+59.9	152.2	23
33 46.5	+59.7	151.2	32 53.9	+59.7	151.5	32 01.0	+59.8	151.8	31 08.1	+59.8	152.1	24
34 46.2	+59.7	151.1	33 53.6	+59.7	151.4	33 00.8	+59.8	151.7	32 07.9	+59.9	152.0	25
35 45.9	+59.7	150.9	34 53.3	+59.8	151.3	34 00.6	+59.8	151.6	33 07.8	+59.8	151.9	26
36 45.6	+59.6	150.8	35 53.1	+59.7	151.2	35 00.4	+59.8	151.5	34 07.6	+59.8	151.8	27
37 45.2	+59.7	150.7	36 52.8	+59.7	151.1	36 00.2	+59.8	151.4	35 07.4	+59.9	151.8	28
38 44.9	+59.6	150.6	37 52.5	+59.8	150.9	37 00.0	+59.8	151.3	36 07.3	+59.8	151.7	29
39 44.5	+59.7	150.4	38 52.3	+59.7	150.8	37 59.8	+59.7	151.2	37 07.1	+59.8	151.6	30
40 44.2	+59.6	150.3	39 52.0	+59.7	150.7	38 59.5	+59.8	151.1	38 06.9	+59.8	151.5	31
41 43.8	+59.6	150.1	40 51.7	+59.7	150.6	39 59.3	+59.8	151.0	39 06.7	+59.9	151.4	32
42 43.4	+59.6	150.0	41 51.4	+59.6	150.4	40 59.1	+59.7	150.9	40 06.6	+59.8	151.3	33
43 43.0	+59.6	149.8	42 51.0	+59.7	150.3	41 58.8	+59.7	150.7	41 06.4	+59.8	151.2	34
44 42.6	+59.6	149.6	43 50.7	+59.7	150.1	42 58.5	+59.8	150.6	42 06.2	+59.8	151.1	35
45 42.2	+59.5	149.5	44 50.4	+59.6	150.0	43 58.3	+59.7	150.5	43 06.0	+59.7	150.9	36
46 41.7	+59.6	149.3	45 50.0	+59.6	149.8	44 58.0	+59.7	150.3	44 05.7	+59.8	150.8	37
47 41.3	+59.5	149.1	46 49.6	+59.7	149.7	45 57.7	+59.7	150.2	45 05.5	+59.8	150.7	38
48 40.8	+59.5	148.9	47 49.3	+59.6	149.5	46 57.4	+59.7	150.1	46 05.3	+59.8	150.6	39
49 40.3	+59.5	148.7	48 48.9	+59.6	149.3	47 57.1	+59.7	149.9	47 05.1	+59.7	150.5	40
50 39.8	+59.5	148.5	49 48.5	+59.5	149.2	48 56.8	+59.7	149.8	48 04.8	+59.7	150.3	41
51 39.3	+59.4	148.3	50 48.0	+59.6	149.0	49 56.5	+59.6	149.6	49 04.5	+59.8	150.2	42
52 38.7	+59.4	148.1	51 47.6	+59.5	148.8	50 56.1	+59.6	149.4	50 04.3	+59.7	150.0	43
53 38.1	+59.4	147.9	52 47.1	+59.5	148.6	51 55.7	+59.7	149.2	51 04.0	+59.7	149.9	44
54 37.5	+59.4	147.6	53 46.6	+59.5	148.4	52 55.4	+59.6	149.1	52 03.7	+59.7	149.7	45
55 36.9	+59.3	147.4	54 46.1	+59.5	148.1	53 55.0	+59.5	148.9	53 03.4	+59.7	149.6	46
56 36.2	+59.3	147.1	55 45.6	+59.4	147.9	54 54.5	+59.6	148.7	54 03.1	+59.7	149.4	47
57 35.5	+59.2	146.8	56 45.0	+59.4	147.7	55 54.1	+59.5	148.5	55 02.8	+59.6	149.2	48
58 34.7	+59.2	146.5	57 44.4	+59.4	147.4	56 53.6	+59.6	148.2	56 02.4	+59.6	149.0	49
59 33.9	+59.2	146.2	58 43.8	+59.3	147.1	57 53.2	+59.4	148.0	57 02.0	+59.7	148.8	50
60 33.1	+59.1	145.9	59 43.1	+59.3	146.8	58 52.6	+59.5	147.7	58 01.7	+59.5	148.6	51
61 32.2	+59.0	145.5	60 42.4	+59.3	146.5	59 52.1	+59.4	147.5	59 01.2	+59.6	148.4	52
62 31.2	+59.0	145.1	61 41.7	+59.2	146.2	60 51.5	+59.4	147.2	60 00.8	+59.5	148.1	53
63 30.2	+58.9	144.7	62 40.9	+59.1	145.8	61 50.9	+59.3	146.9	61 00.3	+59.6	147.9	54
64 29.1	+58.8	144.3	63 40.0	+59.1	145.5	62 50.2	+59.3	146.6	61 59.9	+59.4	147.6	55
65 27.9	+58.7	143.8	64 39.1	+59.0	145.1	63 49.5	+59.3	146.2	62 59.3	+59.5	147.3	56
66 26.6	+58.6	143.3	65 38.1	+58.9	144.6	64 48.8	+59.2	145.9	63 58.8	+59.4	147.0	57
67 25.2	+58.5	142.8	66 37.0	+58.8	144.2	65 48.0	+59.1	145.5	64 58.2	+59.3	146.7	58
68 23.7	+58.4	142.2	67 35.8	+58.8	143.7	66 47.1	+59.0	145.1	65 57.5	+59.3	146.3	59
69 22.1	+58.2	141.5	68 34.6	+58.6	143.1	67 46.1	+59.0	144.6	66 56.8	+59.2	146.0	60
70 20.3	+58.0	140.8	69 33.2	+58.5	142.5	68 45.1	+58.9	144.1	67 56.0	+59.2	145.5	61
71 18.3	+57.8	140.1	70 31.7	+58.3	141.9	69 44.0	+58.7	143.6	68 55.2	+59.1	145.1	62
72 16.1	+57.6	139.2	71 30.0	+58.2	141.2	70 42.7	+58.6	143.0	69 54.3	+59.0	144.6	63
73 13.7	+57.2	138.2	72 28.2	+57.9	140.4	71 41.3	+58.5	142.3	70 53.3	+58.9	144.1	64
74 10.9	+57.0	137.2	73 26.1	+57.7	139.5	72 39.8	+58.3	141.6	71 52.2	+58.8	143.5	65
75 07.9	+56.5	136.0	74 23.8	+57.4	138.5	73 38.1	+58.1	140.7	72 51.0	+58.6	142.8	66
76 04.4	+56.0	134.6	75 21.2	+57.0	137.4	74 36.2	+57.8	139.8	73 49.6	+58.4	142.1	67
77 00.4	+55.3	133.1	76 18.2	+56.6	136.1	75 34.0	+57.5	138.8	74 48.0	+58.3	141.2	68
77 55.7	+54.6	131.3	77 14.8	+56.0	134.6	76 31.5	+57.2	137.6	75 46.3	+58.0	140.3	69
78 50.3	+53.5	129.2	78 10.8	+55.3	132.9	77 28.7	+56.6	136.2	76 44.3	+57.6	139.2	70
79 43.8	+52.3	126.8	79 06.1	+54.5	131.0	78 25.3	+56.1	134.7	77 41.9	+57.3	137.9	71
80 36.1	+50.7	123.9	80 00.6	+53.3	128.7	79 21.4	+55.3	132.8	78 39.2	+56.8	136.5	72
81 26.8	*+48.4*	•120.5	80 53.9	+51.7	125.9	80 16.7	+54.3	130.6	79 36.0	+56.1	134.8	73
82 15.2	*+45.4*	•116.3	81 45.6	*+49.7*	•122.5	81 11.0	+52.9	128.0	80 32.1	+55.2	132.7	74
83 00.6	*+41.3*	•111.2	82 35.3	*+46.9*	•118.4	82 03.9	*+51.0*	•124.7	81 27.3	+54.1	130.2	75
83 41.9	*+35.8*	•104.9	83 22.2	*+42.9*	•113.3	82 54.9	*+48.4*	•120.7	82 21.4	*+52.4*	•127.1	76
84 17.7	*+28.3*	•97.3	84 05.1	*+37.4*	•106.9	83 43.3	*+44.6*	•115.6	83 13.8	*+50.0*	•123.2	77
84 46.0	*+18.8*	•88.0	84 42.5	*+29.6*	•98.8	84 27.9	*+39.1*	•109.1	84 03.8	*+46.4*	•118.2	78
85 04.8	*+7.3*	•77.2	85 12.1	*+19.3*	•88.9	85 07.0	*+31.1*	•100.7	84 50.2	*+41.0*	•111.7	79
85 12.1	*−5.1*	•65.5	85 31.4	*+6.7*	•77.2	85 38.1	*+19.9*	•90.1	85 31.2	*+32.8*	•102.9	80
85 07.0	*−16.8*	•53.7	85 38.1	*−6.9*	•64.3	85 58.0	*+6.0*	•77.2	86 04.0	*+20.7*	•91.5	81
84 50.2	*−26.8*	•42.7	85 31.2	*−19.4*	•51.4	86 04.0	*−9.0*	•62.8	86 24.7	*+5.1*	•77.1	82
84 23.4	*−34.6*	•33.1	85 11.8	*−29.7*	•39.6	85 55.0	*−22.5*	•48.6	86 29.8	*−11.6*	•61.0	83
83 48.8	*−40.5*	•25.2	84 42.1	*−37.4*	•29.7	85 32.5	*−32.9*	•36.1	86 18.2	*−26.1*	•45.3	84
83 08.3	*−44.7*	•18.7	84 04.7	*−43.0*	•21.7	84 59.6	*−40.4*	•26.0	85 52.1	*−36.4*	•32.0	85
82 23.6	*−48.0*	•13.4	83 21.7	*−46.9*	•15.3	84 19.2	*−45.5*	•18.0	85 15.7	*−43.5*	•21.7	86
81 35.6	*−50.2*	•9.0	82 34.8	*−49.7*	•10.2	83 33.7	*−49.0*	•11.8	84 32.2	*−48.0*	•13.9	87
80 45.4	−52.0	5.5	81 45.1	−51.8	6.1	82 44.7	*−51.5*	•7.0	83 44.2	*−51.1*	•8.1	88
79 53.4	−53.4	2.5	80 53.3	−53.3	2.8	81 53.2	−53.2	3.1	82 53.1	−53.1	3.5	89
79 00.0	−54.4	0.0	80 00.0	−54.5	0.0	81 00.0	−54.5	0.0	82 00.0	−54.6	0.0	90
79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 26°, 334°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 27.1	−59.6	153.2	12 33.5	−59.6	153.3	11 39.9	−59.7	153.4	10 46.2	−59.7	153.5	9 52.5	−59.8	153.6	8 58.7	−59.8	153.7	8 05.0	−59.9	153.7	7 11.2	−59.9	153.8	0
1	12 27.5	−59.6	153.3	11 33.9	−59.7	153.4	10 40.2	−59.7	153.5	9 46.5	−59.8	153.6	8 52.7	−59.8	153.7	7 58.9	−59.8	153.7	7 05.1	−59.9	153.8	6 11.3	−59.9	153.8	1
2	11 27.9	−59.6	153.4	10 34.2	−59.6	153.5	9 40.5	−59.7	153.6	8 46.7	−59.7	153.7	7 52.9	−59.8	153.8	6 59.1	−59.8	153.8	6 05.2	−59.8	153.9	5 11.4	−59.9	153.9	2
3	10 28.3	−59.6	153.6	9 34.6	−59.7	153.6	8 40.8	−59.7	153.7	7 47.0	−59.8	153.8	6 53.1	−59.7	153.8	5 59.3	−59.8	153.9	5 05.4	−59.9	153.9	4 11.5	−59.9	154.0	3
4	9 28.7	−59.6	153.7	8 34.9	−59.6	153.8	7 41.1	−59.7	153.8	6 47.2	−59.7	153.9	5 53.4	−59.8	153.9	4 59.5	−59.9	154.0	4 05.5	−59.8	154.0	3 11.6	−59.9	154.0	4
5	8 29.1	−59.6	153.8	7 35.3	−59.7	153.9	6 41.4	−59.7	153.9	5 47.5	−59.8	154.0	4 53.6	−59.8	154.0	3 59.6	−59.8	154.0	3 05.7	−59.9	154.1	2 11.7	−59.9	154.1	5
6	7 29.5	−59.6	153.9	6 35.6	−59.7	154.0	5 41.7	−59.7	154.0	4 47.7	−59.7	154.1	3 53.8	−59.8	154.1	2 59.8	−59.8	154.1	2 05.8	−59.8	154.1	1 11.8	−59.9	154.1	6
7	6 29.9	−59.6	154.0	5 35.9	−59.6	154.1	4 42.0	−59.7	154.1	3 48.0	−59.8	154.1	2 54.0	−59.8	154.2	2 00.0	−59.8	154.2	1 06.0	−59.9	154.2	0 11.9	−59.9	154.2	7
8	5 30.3	−59.6	154.1	4 36.3	−59.7	154.2	3 42.3	−59.7	154.2	2 48.2	−59.7	154.2	1 54.2	−59.8	154.3	1 00.2	−59.9	154.3	0 06.1	−59.9	154.3	0 48.0	+59.8	25.7	8
9	4 30.7	−59.6	154.3	3 36.6	−59.6	154.3	2 42.6	−59.7	154.3	1 48.5	−59.8	154.3	0 54.4	−59.8	154.3	0 00.3	−59.8	154.3	0 53.8	+59.8	25.7	1 47.8	+59.9	25.7	9
10	3 31.1	−59.6	154.4	2 37.0	−59.6	154.4	1 42.9	−59.8	154.4	0 48.7	−59.7	154.4	0 05.4	+59.8	25.6	0 59.5	+59.8	25.6	1 53.6	+59.9	25.6	2 47.7	+59.9	25.6	10
11	2 31.5	−59.7	154.5	1 37.3	−59.7	154.5	0 43.1	−59.7	154.5	0 11.0	+59.8	25.5	1 05.2	+59.8	25.5	1 59.3	+59.9	25.5	2 53.5	+59.8	25.5	3 47.6	+59.9	25.5	11
12	1 31.8	−59.6	154.6	0 37.6	−59.6	154.6	0 16.6	+59.7	25.4	1 10.8	+59.7	25.4	2 05.0	+59.7	25.4	2 59.2	+59.8	25.4	3 53.3	+59.9	25.5	4 47.5	+59.9	25.5	12
13	0 32.2	−59.6	154.7	0 22.0	+59.7	25.3	1 16.3	+59.7	25.3	2 10.5	+59.8	25.3	3 04.7	+59.8	25.3	3 59.0	+59.8	25.4	4 53.2	+59.8	25.4	5 47.4	+59.9	25.4	13
14	0 27.4	+59.6	25.2	1 21.7	+59.6	25.2	2 16.0	+59.7	25.2	3 10.3	+59.7	25.2	4 04.5	+59.8	25.2	4 58.8	+59.8	25.3	5 53.0	+59.9	25.3	6 47.3	+59.9	25.4	14
15	1 27.0	+59.6	25.1	2 21.3	+59.7	25.1	3 15.7	+59.7	25.1	4 10.0	+59.8	25.1	5 04.3	+59.8	25.2	5 58.6	+59.9	25.2	6 52.9	+59.9	25.2	7 47.2	+59.8	25.3	15
16	2 26.6	+59.6	24.9	3 21.0	+59.7	25.0	4 15.4	+59.7	25.0	5 09.8	+59.7	25.0	6 04.1	+59.8	25.1	6 58.5	+59.8	25.1	7 52.8	+59.8	25.2	8 47.0	+59.9	25.2	16
17	3 26.2	+59.6	24.8	4 20.7	+59.6	24.9	5 15.1	+59.7	24.9	6 09.5	+59.8	24.9	7 03.9	+59.8	25.0	7 58.3	+59.8	25.0	8 52.6	+59.9	25.1	9 46.9	+59.9	25.2	17
18	4 25.8	+59.6	24.7	5 20.3	+59.7	24.8	6 14.8	+59.7	24.8	7 09.3	+59.7	24.8	8 03.7	+59.8	24.9	8 58.1	+59.8	25.0	9 52.5	+59.8	25.0	10 46.8	+59.9	25.1	18
19	5 25.4	+59.6	24.6	6 20.0	+59.6	24.6	7 14.5	+59.7	24.7	8 09.0	+59.8	24.8	9 03.5	+59.8	24.8	9 57.9	+59.8	24.9	10 52.3	+59.9	25.0	11 46.7	+59.9	25.0	19
20	6 25.0	+59.6	24.5	7 19.6	+59.7	24.5	8 14.2	+59.7	24.6	9 08.7	+59.8	24.7	10 03.3	+59.7	24.7	10 57.7	+59.9	24.8	11 52.2	+59.8	24.9	12 46.6	+59.9	25.0	20
21	7 24.6	+59.7	24.4	8 19.3	+59.6	24.4	9 13.9	+59.7	24.5	10 08.5	+59.7	24.6	11 03.0	+59.8	24.6	11 57.6	+59.8	24.7	12 52.0	+59.9	24.8	13 46.5	+59.8	24.9	21
22	8 24.3	+59.6	24.3	9 18.9	+59.7	24.3	10 13.6	+59.7	24.4	11 08.2	+59.8	24.5	12 02.8	+59.8	24.6	12 57.4	+59.8	24.6	13 51.9	+59.8	24.7	14 46.3	+59.9	24.9	22
23	9 23.9	+59.6	24.1	10 18.6	+59.6	24.2	11 13.3	+59.7	24.3	12 08.0	+59.7	24.4	13 02.6	+59.8	24.5	13 57.2	+59.8	24.6	14 51.7	+59.9	24.7	15 46.2	+59.9	24.8	23
24	10 23.5	+59.6	24.0	11 18.2	+59.7	24.1	12 13.0	+59.7	24.2	13 07.7	+59.7	24.3	14 02.4	+59.8	24.4	14 57.0	+59.8	24.5	15 51.6	+59.8	24.6	16 46.1	+59.9	24.7	24
25	11 23.1	+59.6	23.9	12 17.9	+59.6	24.0	13 12.7	+59.7	24.1	14 07.4	+59.8	24.2	15 02.2	+59.7	24.3	15 56.8	+59.8	24.4	16 51.4	+59.9	24.5	17 46.0	+59.9	24.7	25
26	12 22.7	+59.5	23.8	13 17.5	+59.7	23.9	14 12.4	+59.7	24.0	15 07.2	+59.7	24.1	16 01.9	+59.8	24.2	16 56.6	+59.8	24.3	17 51.3	+59.8	24.5	18 45.9	+59.8	24.6	26
27	13 22.2	+59.6	23.7	14 17.2	+59.6	23.8	15 12.1	+59.6	23.9	16 06.9	+59.7	24.0	17 01.7	+59.8	24.1	17 56.4	+59.8	24.2	18 51.1	+59.9	24.4	19 45.7	+59.9	24.5	27
28	14 21.8	+59.6	23.5	15 16.8	+59.6	23.7	16 11.7	+59.7	23.8	17 06.6	+59.8	23.9	18 01.5	+59.7	24.0	18 56.2	+59.8	24.2	19 51.0	+59.8	24.3	20 45.6	+59.9	24.5	28
29	15 21.4	+59.6	23.4	16 16.4	+59.7	23.5	17 11.4	+59.7	23.7	18 06.4	+59.7	23.8	19 01.2	+59.8	23.9	19 56.0	+59.8	24.1	20 50.8	+59.8	24.2	21 45.5	+59.8	24.4	29
30	16 21.0	+59.6	23.3	17 16.1	+59.6	23.4	18 11.1	+59.7	23.6	19 06.1	+59.7	23.7	20 01.0	+59.8	23.8	20 55.8	+59.8	24.0	21 50.6	+59.9	24.1	22 45.3	+59.9	24.3	30
31	17 20.6	+59.5	23.2	18 15.7	+59.6	23.3	19 10.8	+59.7	23.4	20 05.8	+59.7	23.6	21 00.8	+59.7	23.7	21 55.6	+59.8	23.9	22 50.5	+59.8	24.1	23 45.2	+59.9	24.2	31
32	18 20.1	+59.6	23.1	19 15.3	+59.6	23.2	20 10.5	+59.6	23.3	21 05.5	+59.7	23.5	22 00.5	+59.8	23.6	22 55.4	+59.8	23.8	23 50.3	+59.8	24.0	24 45.1	+59.8	24.2	32
33	19 19.7	+59.6	22.9	20 14.9	+59.7	23.1	21 10.1	+59.7	23.2	22 05.2	+59.7	23.4	23 00.3	+59.7	23.5	23 55.2	+59.8	23.7	24 50.1	+59.9	23.9	25 44.9	+59.9	24.1	33
34	20 19.3	+59.5	22.8	21 14.6	+59.6	22.9	22 09.8	+59.6	23.1	23 04.9	+59.7	23.3	24 00.0	+59.8	23.4	24 55.0	+59.8	23.6	25 50.0	+59.8	23.8	26 44.8	+59.9	24.0	34
35	21 18.8	+59.6	22.7	22 14.2	+59.6	22.8	23 09.4	+59.7	23.0	24 04.6	+59.7	23.2	24 59.8	+59.7	23.3	25 54.8	+59.8	23.5	26 49.8	+59.8	23.7	27 44.7	+59.8	23.9	35
36	22 18.4	+59.5	22.5	23 13.8	+59.6	22.7	24 09.1	+59.6	22.9	25 04.3	+59.7	23.1	25 59.5	+59.7	23.2	26 54.6	+59.8	23.4	27 49.6	+59.8	23.6	28 44.5	+59.9	23.9	36
37	23 17.9	+59.6	22.4	24 13.4	+59.6	22.6	25 08.7	+59.7	22.8	26 04.0	+59.7	22.9	26 59.2	+59.8	23.1	27 54.4	+59.7	23.3	28 49.4	+59.8	23.6	29 44.4	+59.8	23.8	37
38	24 17.5	+59.5	22.3	25 13.0	+59.5	22.4	26 08.4	+59.6	22.6	27 03.7	+59.7	22.8	27 59.0	+59.7	23.0	28 54.1	+59.8	23.2	29 49.2	+59.8	23.5	30 44.2	+59.9	23.7	38
39	25 17.0	+59.5	22.1	26 12.5	+59.6	22.3	27 08.0	+59.6	22.5	28 03.4	+59.7	22.7	28 58.7	+59.7	22.9	29 53.9	+59.8	23.1	30 49.0	+59.9	23.4	31 44.1	+59.8	23.6	39
40	26 16.5	+59.5	22.0	27 12.1	+59.6	22.2	28 07.6	+59.7	22.4	29 03.1	+59.6	22.6	29 58.4	+59.7	22.8	30 53.7	+59.7	23.0	31 48.9	+59.8	23.3	32 43.9	+59.9	23.5	40
41	27 16.0	+59.5	21.9	28 11.7	+59.5	22.0	29 07.3	+59.6	22.3	30 02.7	+59.7	22.5	30 58.1	+59.8	22.7	31 53.4	+59.8	22.9	32 48.7	+59.8	23.2	33 43.8	+59.9	23.4	41
42	28 15.5	+59.5	21.7	29 11.2	+59.6	21.9	30 06.9	+59.6	22.1	31 02.4	+59.7	22.3	31 57.9	+59.7	22.6	32 53.2	+59.8	22.8	33 48.5	+59.7	23.1	34 43.6	+59.8	23.4	42
43	29 15.0	+59.5	21.6	30 10.8	+59.5	21.8	31 06.5	+59.6	22.0	32 02.1	+59.6	22.2	32 57.6	+59.7	22.5	33 53.0	+59.7	22.7	34 48.2	+59.8	23.0	35 43.4	+59.9	23.3	43
44	30 14.5	+59.5	21.4	31 10.3	+59.6	21.6	32 06.1	+59.6	21.9	33 01.7	+59.6	22.1	33 57.3	+59.6	22.3	34 52.7	+59.7	22.6	35 48.0	+59.8	22.9	36 43.3	+59.8	23.2	44
45	31 14.0	+59.5	21.3	32 09.9	+59.5	21.5	33 05.7	+59.5	21.7	34 01.3	+59.7	22.0	34 56.9	+59.7	22.2	35 52.4	+59.8	22.5	36 47.8	+59.8	22.8	37 43.1	+59.8	23.1	45
46	32 13.5	+59.4	21.1	33 09.4	+59.5	21.3	34 05.2	+59.6	21.6	35 01.0	+59.6	21.8	35 56.6	+59.7	22.1	36 52.2	+59.7	22.4	37 47.6	+59.8	22.7	38 42.9	+59.8	23.0	46
47	33 12.9	+59.4	20.9	34 08.9	+59.5	21.2	35 04.8	+59.6	21.4	36 00.6	+59.6	21.7	36 56.3	+59.7	22.0	37 51.9	+59.7	22.3	38 47.4	+59.7	22.6	39 42.7	+59.8	22.9	47
48	34 12.3	+59.5	20.8	35 08.4	+59.5	21.0	36 04.4	+59.5	21.3	37 00.2	+59.6	21.5	37 56.0	+59.6	21.8	38 51.6	+59.7	22.1	39 47.1	+59.8	22.4	40 42.5	+59.8	22.8	48
49	35 11.8	+59.4	20.6	36 07.9	+59.5	20.9	37 03.9	+59.5	21.1	37 59.8	+59.6	21.4	38 55.6	+59.7	21.7	39 51.3	+59.7	22.0	40 46.9	+59.7	22.3	41 42.3	+59.8	22.7	49
50	36 11.2	+59.4	20.4	37 07.4	+59.4	20.7	38 03.4	+59.6	21.0	38 59.4	+59.6	21.3	39 55.3	+59.6	21.6	40 51.0	+59.7	21.9	41 46.6	+59.8	22.2	42 42.1	+59.8	22.5	50
51	37 10.6	+59.4	20.3	38 06.8	+59.5	20.5	39 03.0	+59.5	20.8	39 59.0	+59.6	21.1	40 54.9	+59.6	21.4	41 50.7	+59.7	21.7	42 46.4	+59.7	22.1	43 41.9	+59.8	22.4	51
52	38 10.0	+59.3	20.1	39 06.3	+59.4	20.4	40 02.5	+59.5	20.6	40 58.6	+59.5	20.9	41 54.5	+59.6	21.3	42 50.4	+59.7	21.6	43 46.1	+59.7	21.9	44 41.7	+59.8	22.3	52
53	39 09.3	+59.4	19.9	40 05.7	+59.4	20.2	41 02.0	+59.4	20.5	41 58.1	+59.6	20.8	42 54.1	+59.6	21.1	43 50.1	+59.6	21.5	44 45.8	+59.7	21.8	45 41.5	+59.7	22.2	53
54	40 08.7	+59.3	19.7	41 05.1	+59.4	20.0	42 01.4	+59.5	20.3	42 57.7	+59.5	20.6	43 53.7	+59.6	21.0	44 49.7	+59.7	21.3	45 45.5	+59.7	21.7	46 41.2	+59.8	22.1	54
55	41 08.0	+59.3	19.5	42 04.5	+59.4	19.8	43 00.9	+59.4	20.1	43 57.2	+59.5	20.4	44 53.3	+59.6	20.8	45 49.4	+59.6	21.1	46 45.2	+59.7	21.5	47 41.0	+59.7	21.9	55
56	42 07.3	+59.3	19.3	43 03.9	+59.3	19.6	44 00.3	+59.5	19.9	44 56.7	+59.5	20.3	45 52.9	+59.6	20.6	46 49.0	+59.6	21.0	47 44.9	+59.7	21.4	48 40.7	+59.8	21.8	56
57	43 06.6	+59.2	19.1	44 03.2	+59.4	19.4	44 59.8	+59.4	19.7	45 56.2	+59.5	20.1	46 52.5	+59.5	20.4	47 48.6	+59.6	20.8	48 44.6	+59.7	21.2	49 40.5	+59.7	21.7	57
58	44 05.8	+59.3	18.9	45 02.6	+59.3	19.2	45 59.2	+59.3	19.5	46 55.7	+59.4	19.9	47 52.0	+59.5	20.3	48 48.2	+59.6	20.7	49 44.3	+59.6	21.1	50 40.2	+59.7	21.5	58
59	45 05.1	+59.2	18.6	46 01.9	+59.2	19.0	46 58.5	+59.4	19.3	47 55.1	+59.4	19.7	48 51.5	+59.5	20.1	49 47.8	+59.6	20.5	50 43.9	+59.7	20.9	51 39.9	+59.7	21.3	59
60	46 04.3	+59.2	18.4	47 01.1	+59.3	18.8	47 57.9	+59.3	19.1	48 54.5	+59.4	19.5	49 51.0	+59.5	19.9	50 47.4	+59.5	20.3	51 43.6	+59.6	20.7	52 39.6	+59.7	21.2	60
61	47 03.5	+59.1	18.2	48 00.4	+59.2	18.5	48 57.2	+59.3	18.9	49 53.9	+59.4	19.3	50 50.5	+59.5	19.7	51 46.9	+59.6	20.1	52 43.2	+59.6	20.5	53 39.3	+59.7	21.0	61
62	48 02.6	+59.1	17.9	48 59.6	+59.2	18.3	49 56.5	+59.3	18.7	50 53.3	+59.4	19.0	51 50.0	+59.4	19.5	52 46.5	+59.5	19.9	53 42.8	+59.6	20.3	54 39.0	+59.6	20.8	62
63	49 01.7	+59.1	17.7	49 58.8	+59.2	18.0	50 55.8	+59.3	18.4	51 52.7	+59.3	18.8	52 49.4	+59.4	19.2	53 46.0	+59.5	19.7	54 42.4	+59.6	20.1	55 38.6	+59.7	20.6	63
64	50 00.8	+59.0	17.4	50 58.0	+59.1	17.8	51 55.1	+59.2	18.2	52 52.0	+59.3	18.6	53 48.8	+59.4	19.0	54 45.5	+59.4	19.5	55 42.0	+59.5	19.9	56 38.3	+59.6	20.5	64
65	50 59.8	+59.0	17.1	51 57.1	+59.1	17.5	52 54.3	+59.1	17.9	53 51.3	+59.3	18.3	54 48.2	+59.3	18.7	55 44.9	+59.5	19.2	56 41.5	+59.5	19.7	57 37.9	+59.6	20.2	65
66	51 58.8	+59.0	16.8	52 56.2	+59.0	17.2	53 53.4	+59.2	17.6	54 50.6	+59.2	18.0	55 47.5	+59.4	18.5	56 44.4	+59.4	19.0	57 41.0	+59.5	19.5	58 37.5	+59.6	20.0	66
67	52 57.8	+58.9	16.5	53 55.2	+59.0	16.9	54 52.6	+59.1	17.3	55 49.8	+59.2	17.8	56 46.9	+59.2	18.2	57 43.8	+59.3	18.7	58 40.5	+59.5	19.2	59 37.1	+59.5	19.8	67
68	53 56.7	+58.8	16.2	54 54.2	+59.0	16.6	55 51.7	+59.0	17.0	56 49.0	+59.1	17.5	57 46.1	+59.3	17.9	58 43.1	+59.4	18.4	59 40.0	+59.4	19.0	60 36.6	+59.5	19.5	68
69	54 55.5	+58.8	15.9	55 53.2	+58.9	16.3	56 50.7	+59.0	16.7	57 48.1	+59.1	17.1	58 45.4	+59.2	17.6	59 42.5	+59.3	18.1	60 39.4	+59.4	18.7	61 36.1	+59.5	19.3	69
70	55 54.3	+58.7	15.5	56 52.1	+58.8	15.9	57 49.7	+58.9	16.4	58 47.2	+59.0	16.8	59 44.6	+59.1	17.3	60 41.8	+59.2	17.8	61 38.8	+59.3	18.4	62 35.6	+59.5	19.0	70
71	56 53.0	+58.7	15.1	57 50.9	+58.8	15.6	58 48.6	+58.9	16.0	59 46.2	+59.0	16.5	60 43.7	+59.1	17.0	61 41.0	+59.2	17.5	62 38.1	+59.3	18.1	63 35.1	+59.4	18.7	71
72	57 51.7	+58.6	14.8	58 49.7	+58.6	15.2	59 47.5	+58.8	15.6	60 45.2	+58.9	16.1	61 42.8	+59.0	16.6	62 40.2	+59.2	17.2	63 37.4	+59.3	17.8	64 34.5	+59.4	18.4	72
73	58 50.3	+58.5	14.3	59 48.3	+58.7	14.8	60 46.3	+58.7	15.2	61 44.1	+58.9	15.7	62 41.8	+59.0	16.2	63 39.4	+59.0	16.8	64 36.7	+59.2	17.4	65 33.9	+59.3	18.0	73
74	59 48.8	+58.4	13.9	60 47.0	+58.5	14.3	61 45.0	+58.7	14.8	62 43.0	+58.7	15.3	63 40.8	+58.9	15.8	64 38.4	+59.0	16.4	65 35.9	+59.1	17.0	66 33.2	+59.2	17.7	74
75	60 47.2	+58.3	13.4	61 45.5	+58.4	13.9	62 43.7	+58.5	14.3	63 41.7	+58.7	14.8	64 39.7	+58.8	15.4	65 37.4	+59.0	16.0	66 35.0	+59.1	16.6	67 32.4	+59.2	17.3	75
76	61 45.5	+58.2	13.0	62 43.9	+58.3	13.4	63 42.2	+58.5	13.9	64 40.4	+58.6	14.4	65 38.5	+58.7	14.9	66 36.4	+58.8	15.5	67 34.1	+59.0	16.1	68 31.6	+59.2	16.8	76
77	62 43.7	+58.0	12.4	63 42.2	+58.2	12.9	64 40.7	+58.3	13.3	65 39.0	+58.4	13.8	66 37.2	+58.6	14.4	67 35.2	+58.7	15.0	68 33.1	+58.9	15.6	69 30.8	+59.0	16.4	77
78	63 41.7	+58.0	11.9	64 40.4	+58.1	12.3	65 39.0	+58.2	12.8	66 37.4	+58.4	13.3	67 35.8	+58.4	13.8	68 33.9	+58.7	14.4	69 32.0	+58.7	15.1	70 29.8	+58.9	15.8	78
79	64 39.7	+57.7	11.3	65 38.5	+57.9	11.7	66 37.2	+58.0	12.2	67 35.8	+58.1	12.7	68 34.2	+58.4	13.2	69 32.6	+58.5	13.8	70 30.7	+58.7	14.5	71 28.7	+58.8	15.3	79
80	65 37.4	+57.6	10.6	66 36.4	+57.7	11.1	67 35.2	+57.9	11.5	68 33.9	+58.1	12.0	69 32.6	+58.1	12.6	70 31.1	+58.3	13.2	71 29.4	+58.5	13.9	72 27.5	+58.7	14.6	80
81	66 35.0	+57.4	9.9	67 34.1	+57.5	10.4	68 33.1	+57.7	10.8	69 32.0	+57.8	11.3	70 30.7	+58.0	11.9	71 29.4	+58.1	12.5	72 27.9	+58.3	13.2	73 26.2	+58.6	13.9	81
82	67 32.4	+57.2	9.2	68 31.6	+57.3	9.6	69 30.8	+57.4	10.0	70 29.8	+57.6	10.5	71 28.7	+57.8	11.1	72 27.5	+58.0	11.7	73 26.2	+58.2	12.4	74 24.8	+58.3	13.1	82
83	68 29.6	+56.9	8.4	69 28.9	+57.1	8.8	70 28.2	+57.2	9.2	71 27.4	+57.3	9.7	72 26.5	+57.5	10.2	73 25.5	+57.7	10.8	74 24.4	+57.9	11.5	75 23.1	+58.1	12.2	83
84	69 26.5	+56.7	7.5	70 26.0	+56.8	7.9	71 25.4	+56.9	8.3	72 24.7	+57.1	8.7	73 24.0	+57.2	9.2	74 23.2	+57.4	9.8	75 22.3	+57.5	10.5	76 21.2	+57.8	11.2	84
85	70 23.2	+56.3	6.5	71 22.8	+56.4	6.9	72 22.3	+56.5	7.2	73 21.8	+56.7	7.7	74 21.2	+56.9	8.1	75 20.6	+57.0	8.7	76 19.8	+57.3	9.3	77 19.0	+57.4	10.0	85
86	71 19.5	+55.9	5.5	72 19.2	+56.0	5.8	73 18.8	+56.2	6.1	74 18.5	+56.2	6.5	75 18.1	+56.4	6.9	76 17.6	+56.6	7.4	77 17.1	+56.7	8.0	78 16.4	+57.0	8.7	86
87	72 15.4	+55.4	4.3	73 15.2	+55.5	4.6	74 15.0	+55.6	4.8	75 14.7	+55.8	5.2	76 14.5	+55.9	5.5	77 14.2	+56.0	6.0	78 13.8	+56.2	6.5	79 13.4	+56.4	7.0	87
88	73 10.8	+54.9	3.0	74 10.7	+55.0	3.2	75 10.6	+55.1	3.4	76 10.5	+55.1	3.7	77 10.4	+55.2	4.0	78 10.2	+55.3	4.3	79 10.0	+55.5	4.7	80 09.8	+55.6	5.1	88
89	74 05.7	+54.3	1.6	75 05.7	+54.3	1.7	76 05.7	+54.3	1.8	77 05.6	+54.4	2.0	78 05.6	+54.4	2.1	79 05.5	+54.5	2.3	80 05.5	+54.5	2.5	81 05.4	+54.6	2.8	89
90	75 00.0	+53.5	0.0	76 00.0	+53.5	0.0	77 00.0	+53.5	0.0	78 00.0	+53.4	0.0	79 00.0	+53.4	0.0	80 00.0	+53.3	0.0	81 00.0	+53.2	0.0	82 00.0	+53.1	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 154°, 206°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 20.0	+59.5	152.2	12 26.9	+59.6	152.3	11 33.7	+59.7	152.4	10 40.5	+59.8	152.5	9 47.3	+59.8	152.6	8 54.0	+59.8	152.6	8 00.7	+59.9	152.7	7 07.4	+59.9	152.8	0
1	14 19.5	+59.6	152.1	13 26.5	+59.6	152.2	12 33.4	+59.7	152.3	11 40.3	+59.7	152.4	10 47.1	+59.7	152.5	9 53.8	+59.9	152.6	9 00.6	+59.8	152.6	8 07.3	+59.9	152.7	1
2	15 19.1	+59.5	151.9	14 26.1	+59.6	152.1	13 33.1	+59.6	152.2	12 40.0	+59.7	152.3	11 46.8	+59.8	152.4	10 53.7	+59.8	152.5	10 00.4	+59.9	152.6	9 07.2	+59.8	152.6	2
3	16 18.6	+59.6	151.8	15 25.7	+59.6	151.9	14 32.7	+59.7	152.1	13 39.7	+59.7	152.2	12 46.6	+59.8	152.3	11 53.5	+59.8	152.4	11 00.3	+59.8	152.5	10 07.0	+59.9	152.6	3
4	17 18.2	+59.5	151.7	16 25.3	+59.6	151.8	15 32.4	+59.7	152.0	14 39.4	+59.7	152.1	13 46.4	+59.7	152.2	12 53.3	+59.8	152.3	12 00.1	+59.8	152.4	11 06.9	+59.9	152.5	4
5	18 17.7	+59.6	151.6	17 24.9	+59.6	151.7	16 32.1	+59.6	151.9	15 39.1	+59.7	152.0	14 46.1	+59.8	152.1	13 53.1	+59.8	152.2	12 59.9	+59.9	152.3	12 06.8	+59.9	152.4	5
6	19 17.3	+59.5	151.4	18 24.5	+59.6	151.6	17 31.7	+59.7	151.7	16 38.8	+59.7	151.9	15 45.9	+59.7	152.0	14 52.9	+59.8	152.1	13 59.8	+59.8	152.3	13 06.7	+59.8	152.4	6
7	20 16.8	+59.5	151.3	19 24.1	+59.6	151.5	18 31.4	+59.6	151.6	17 38.5	+59.8	151.8	16 45.6	+59.8	151.9	15 52.7	+59.8	152.1	14 59.6	+59.9	152.2	14 06.5	+59.9	152.3	7
8	21 16.3	+59.5	151.2	20 23.7	+59.6	151.3	19 31.0	+59.7	151.5	18 38.3	+59.7	151.7	17 45.4	+59.7	151.8	16 52.5	+59.8	152.0	15 59.5	+59.8	152.1	15 06.4	+59.9	152.2	8
9	22 15.8	+59.5	151.0	21 23.3	+59.6	151.2	20 30.7	+59.6	151.4	19 38.0	+59.6	151.6	18 45.1	+59.8	151.7	17 52.3	+59.8	151.9	16 59.3	+59.8	152.0	16 06.3	+59.8	152.2	9
10	23 15.3	+59.6	150.9	22 22.9	+59.6	151.1	21 30.3	+59.6	151.3	20 37.6	+59.7	151.5	19 44.9	+59.7	151.6	18 52.1	+59.7	151.8	17 59.1	+59.9	152.0	17 06.1	+59.9	152.1	10
11	24 14.9	+59.4	150.7	23 22.5	+59.5	151.0	22 29.9	+59.7	151.2	21 37.3	+59.7	151.4	20 44.6	+59.8	151.5	19 51.8	+59.8	151.7	18 59.0	+59.8	151.9	18 06.0	+59.9	152.0	11
12	25 14.3	+59.5	150.6	24 22.0	+59.6	150.8	23 29.6	+59.6	151.0	22 37.0	+59.7	151.2	21 44.4	+59.7	151.4	20 51.6	+59.8	151.6	19 58.8	+59.8	151.8	19 05.9	+59.8	152.0	12
13	26 13.8	+59.5	150.5	25 21.6	+59.5	150.7	24 29.2	+59.6	150.9	23 36.7	+59.7	151.1	22 44.1	+59.7	151.3	21 51.4	+59.8	151.5	20 58.6	+59.8	151.7	20 05.7	+59.9	151.9	13
14	27 13.3	+59.5	150.3	26 21.1	+59.6	150.6	25 28.8	+59.6	150.8	24 36.4	+59.7	151.0	23 43.8	+59.8	151.2	22 51.2	+59.8	151.4	21 58.4	+59.9	151.6	21 05.6	+59.9	151.8	14
15	28 12.8	+59.4	150.2	27 20.7	+59.5	150.4	26 28.4	+59.6	150.7	25 36.1	+59.6	150.9	24 43.6	+59.7	151.1	23 51.0	+59.7	151.3	22 58.3	+59.8	151.6	22 05.5	+59.8	151.8	15
16	29 12.2	+59.5	150.0	28 20.2	+59.5	150.3	27 28.0	+59.6	150.5	26 35.7	+59.7	150.8	25 43.3	+59.7	151.0	24 50.7	+59.8	151.3	23 58.1	+59.8	151.5	23 05.3	+59.9	151.7	16
17	30 11.7	+59.4	149.8	29 19.7	+59.6	150.1	28 27.6	+59.6	150.4	27 35.4	+59.6	150.7	26 43.0	+59.7	150.9	25 50.5	+59.8	151.2	24 57.9	+59.8	151.4	24 05.2	+59.8	151.6	17
18	31 11.1	+59.5	149.7	30 19.3	+59.5	150.0	29 27.2	+59.6	150.3	28 35.0	+59.7	150.5	27 42.7	+59.7	150.8	26 50.3	+59.8	151.1	25 57.7	+59.8	151.3	25 05.0	+59.9	151.5	18
19	32 10.6	+59.4	149.5	31 18.8	+59.5	149.8	30 26.8	+59.6	150.1	29 34.7	+59.6	150.4	28 42.4	+59.7	150.7	27 50.1	+59.7	151.0	26 57.5	+59.8	151.2	26 04.9	+59.8	151.5	19
20	33 10.0	+59.4	149.4	32 18.3	+59.4	149.7	31 26.4	+59.5	150.0	30 34.3	+59.7	150.3	29 42.1	+59.7	150.6	28 49.8	+59.8	150.9	27 57.3	+59.8	151.1	27 04.7	+59.9	151.4	20
21	34 09.4	+59.4	149.2	33 17.7	+59.5	149.5	32 25.9	+59.6	149.9	31 34.0	+59.6	150.2	30 41.8	+59.7	150.5	29 49.6	+59.7	150.8	28 57.1	+59.8	151.0	28 04.6	+59.8	151.3	21
22	35 08.8	+59.3	149.0	34 17.2	+59.5	149.4	33 25.5	+59.5	149.7	32 33.6	+59.6	150.0	31 41.5	+59.7	150.3	30 49.3	+59.8	150.6	29 56.9	+59.8	150.9	29 04.4	+59.9	151.2	22
23	36 08.1	+59.4	148.8	35 16.7	+59.4	149.2	34 25.0	+59.6	149.6	33 33.2	+59.6	149.9	32 41.2	+59.7	150.2	31 49.1	+59.7	150.5	30 56.7	+59.8	150.8	30 04.3	+59.8	151.1	23
24	37 07.5	+59.3	148.7	36 16.1	+59.5	149.0	35 24.6	+59.5	149.4	34 32.8	+59.6	149.8	33 40.9	+59.7	150.1	32 48.8	+59.7	150.4	31 56.5	+59.8	150.7	31 04.1	+59.8	151.0	24
25	38 06.8	+59.3	148.5	37 15.6	+59.4	148.9	36 24.1	+59.5	149.3	35 32.4	+59.6	149.6	34 40.6	+59.6	150.0	33 48.5	+59.8	150.3	32 56.3	+59.8	150.6	32 03.9	+59.9	151.0	25
26	39 06.1	+59.3	148.3	38 15.0	+59.4	148.7	37 23.6	+59.5	149.1	36 32.0	+59.6	149.5	35 40.2	+59.7	149.8	34 48.3	+59.7	150.2	33 56.1	+59.8	150.5	33 03.8	+59.8	150.9	26
27	40 05.4	+59.3	148.1	39 14.4	+59.4	148.5	38 23.1	+59.5	148.9	37 31.6	+59.6	149.3	36 39.9	+59.6	149.7	35 48.0	+59.7	150.1	34 55.9	+59.7	150.4	34 03.6	+59.8	150.8	27
28	41 04.7	+59.3	147.9	40 13.8	+59.3	148.3	39 22.6	+59.4	148.8	38 31.2	+59.5	149.2	37 39.5	+59.7	149.6	36 47.7	+59.7	150.0	35 55.6	+59.8	150.3	35 03.4	+59.8	150.7	28
29	42 04.0	+59.2	147.7	41 13.1	+59.4	148.1	40 22.0	+59.5	148.6	39 30.7	+59.6	149.0	38 39.2	+59.6	149.4	37 47.4	+59.7	149.8	36 55.4	+59.8	150.2	36 03.2	+59.9	150.6	29
30	43 03.2	+59.2	147.4	42 12.5	+59.3	147.9	41 21.5	+59.4	148.4	40 30.3	+59.5	148.9	39 38.8	+59.6	149.3	38 47.1	+59.7	149.7	37 55.2	+59.7	150.1	37 03.1	+59.8	150.5	30
31	44 02.4	+59.2	147.2	43 11.8	+59.3	147.7	42 20.9	+59.4	148.2	41 29.8	+59.5	148.7	40 38.4	+59.6	149.1	39 46.8	+59.7	149.6	38 54.9	+59.8	150.0	38 02.9	+59.8	150.4	31
32	45 01.6	+59.1	147.0	44 11.1	+59.3	147.5	43 20.3	+59.4	148.0	42 29.3	+59.5	148.5	41 38.0	+59.6	149.0	40 46.5	+59.6	149.4	39 54.7	+59.7	149.9	39 02.7	+59.8	150.3	32
33	46 00.7	+59.1	146.8	45 10.4	+59.2	147.3	44 19.7	+59.4	147.8	43 28.8	+59.5	148.4	42 37.6	+59.6	148.8	41 46.1	+59.7	149.3	40 54.4	+59.7	149.7	40 02.5	+59.8	150.2	33
34	46 59.8	+59.1	146.5	46 09.6	+59.3	147.1	45 19.1	+59.4	147.6	44 28.3	+59.4	148.2	43 37.2	+59.5	148.7	42 45.8	+59.6	149.2	41 54.1	+59.8	149.6	41 02.3	+59.7	150.1	34
35	47 58.9	+59.1	146.2	47 08.9	+59.2	146.9	46 18.5	+59.3	147.4	45 27.7	+59.5	148.0	44 36.7	+59.6	148.5	43 45.4	+59.7	149.0	42 53.9	+59.7	149.5	42 02.0	+59.8	150.0	35
36	48 58.0	+59.0	146.0	48 08.1	+59.1	146.6	47 17.8	+59.3	147.2	46 27.2	+59.4	147.8	45 36.3	+59.5	148.3	44 45.1	+59.6	148.9	43 53.6	+59.7	149.4	43 01.8	+59.8	149.8	36
37	49 57.0	+59.0	145.7	49 07.2	+59.2	146.4	48 17.1	+59.3	147.0	47 26.6	+59.4	147.6	46 35.8	+59.5	148.2	45 44.7	+59.6	148.7	44 53.3	+59.7	149.2	44 01.6	+59.8	149.7	37
38	50 56.0	+58.9	145.4	50 06.4	+59.1	146.1	49 16.4	+59.2	146.7	48 26.0	+59.4	147.4	47 35.3	+59.5	148.0	46 44.3	+59.6	148.5	45 53.0	+59.7	149.1	45 01.4	+59.7	149.6	38
39	51 54.9	+58.9	145.1	51 05.5	+59.0	145.8	50 15.6	+59.2	146.5	49 25.4	+59.3	147.2	48 34.8	+59.5	147.8	47 43.9	+59.6	148.4	46 52.7	+59.6	148.9	46 01.1	+59.8	149.5	39
40	52 53.8	+58.8	144.8	52 04.5	+59.0	145.5	51 14.8	+59.2	146.2	50 24.7	+59.4	146.9	49 34.3	+59.4	147.6	48 43.5	+59.5	148.2	47 52.3	+59.7	148.8	47 00.9	+59.7	149.3	40
41	53 52.6	+58.8	144.5	53 03.5	+59.0	145.2	52 14.0	+59.1	146.0	51 24.1	+59.3	146.7	50 33.7	+59.5	147.4	49 43.0	+59.6	148.0	48 52.0	+59.6	148.6	48 00.6	+59.7	149.2	41
42	54 51.4	+58.7	144.1	54 02.5	+58.9	144.9	53 13.1	+59.1	145.7	52 23.4	+59.2	146.4	51 33.2	+59.4	147.1	50 42.6	+59.5	147.8	49 51.6	+59.6	148.4	49 00.3	+59.7	149.0	42
43	55 50.1	+58.6	143.8	55 01.4	+58.9	144.6	54 12.2	+59.1	145.4	53 22.6	+59.3	146.2	52 32.6	+59.3	146.9	51 42.1	+59.5	147.6	50 51.2	+59.7	148.3	50 00.0	+59.7	148.9	43
44	56 48.7	+58.6	143.4	56 00.3	+58.8	144.3	55 11.3	+59.0	145.1	54 21.9	+59.1	145.9	53 31.9	+59.4	146.7	52 41.6	+59.5	147.4	51 50.9	+59.5	148.1	50 59.7	+59.7	148.7	44
45	57 47.3	+58.4	143.0	56 59.1	+58.7	143.9	56 10.3	+59.0	144.8	55 21.0	+59.2	145.6	54 31.3	+59.3	146.4	53 41.1	+59.4	147.2	52 50.4	+59.6	147.9	51 59.4	+59.7	148.6	45
46	58 45.7	+58.4	142.5	57 57.8	+58.7	143.5	57 09.3	+58.9	144.4	56 20.2	+59.1	145.3	55 30.6	+59.3	146.2	54 40.5	+59.5	146.9	53 50.0	+59.6	147.7	52 59.1	+59.7	148.4	46
47	59 44.1	+58.3	142.1	58 56.5	+58.5	143.1	58 08.2	+58.8	144.1	57 19.3	+59.0	145.0	56 29.9	+59.2	145.9	55 40.0	+59.3	146.7	54 49.6	+59.5	147.5	53 58.8	+59.6	148.2	47
48	60 42.4	+58.2	141.6	59 55.0	+58.5	142.7	59 07.0	+58.8	143.7	58 18.3	+59.0	144.7	57 29.1	+59.2	145.6	56 39.3	+59.4	146.5	55 49.1	+59.5	147.3	54 58.4	+59.6	148.0	48
49	61 40.6	+58.1	141.1	60 53.5	+58.4	142.2	60 05.8	+58.6	143.3	59 17.3	+59.0	144.3	58 28.3	+59.1	145.3	57 38.7	+59.3	146.2	56 48.6	+59.5	147.0	55 58.0	+59.6	147.8	49
50	62 38.7	+57.9	140.6	61 51.9	+58.3	141.8	61 04.4	+58.7	142.9	60 16.3	+58.8	144.0	59 27.4	+59.1	145.0	58 38.0	+59.3	145.9	57 48.1	+59.4	146.8	56 57.6	+59.6	147.6	50
51	63 36.6	+57.8	140.0	62 50.2	+58.2	141.3	62 03.1	+58.5	142.4	61 15.1	+58.8	143.6	60 26.5	+59.1	144.6	59 37.3	+59.3	145.6	58 47.5	+59.5	146.5	57 57.2	+59.6	147.4	51
52	64 34.4	+57.6	139.4	63 48.4	+58.1	140.7	63 01.6	+58.4	142.0	62 13.9	+58.7	143.1	61 25.6	+59.0	144.2	60 36.6	+59.2	145.3	59 47.0	+59.3	146.3	58 56.8	+59.5	147.2	52
53	65 32.0	+57.5	138.7	64 46.5	+57.9	140.1	64 00.0	+58.3	141.4	63 12.6	+58.7	142.7	62 24.6	+58.9	143.8	61 35.8	+59.1	144.9	60 46.3	+59.4	146.0	59 56.3	+59.5	146.9	53
54	66 29.5	+57.2	138.0	65 44.4	+57.7	139.5	64 58.3	+58.1	140.9	64 11.3	+58.5	142.2	63 23.5	+58.8	143.4	62 34.9	+59.1	144.6	61 45.7	+59.3	145.7	60 55.8	+59.5	146.7	54
55	67 26.7	+57.0	137.2	66 42.1	+57.5	138.8	65 56.4	+58.0	140.3	65 09.8	+58.4	141.7	64 22.3	+58.7	143.0	63 34.0	+59.0	144.2	62 45.0	+59.2	145.3	61 55.3	+59.4	146.4	55
56	68 23.7	+56.7	136.4	67 39.6	+57.4	138.1	66 54.4	+57.9	139.7	66 08.2	+58.3	141.1	65 21.0	+58.7	142.5	64 33.0	+59.0	143.8	63 44.2	+59.2	145.0	62 54.7	+59.4	146.1	56
57	69 20.4	+56.4	135.5	68 37.0	+57.0	137.3	67 52.3	+57.6	139.0	67 06.5	+58.1	140.5	66 19.7	+58.5	142.0	65 32.0	+58.8	143.3	64 43.4	+59.2	144.6	63 54.1	+59.4	145.8	57
58	70 16.8	+56.1	134.5	69 34.0	+56.9	136.4	68 49.9	+57.5	138.2	68 04.6	+58.0	139.9	67 18.2	+58.4	141.4	66 30.8	+58.8	142.9	65 42.6	+59.0	144.2	64 53.5	+59.3	145.5	58
59	71 12.9	+55.6	133.4	70 30.9	+56.4	135.5	69 47.4	+57.1	137.4	69 02.6	+57.7	139.2	68 16.6	+58.3	140.8	67 29.6	+58.6	142.4	66 41.6	+59.0	143.8	65 52.8	+59.3	145.1	59
60	72 08.5	+55.2	132.2	71 27.3	+56.2	134.5	70 44.5	+56.9	136.5	70 00.3	+57.6	138.4	69 14.9	+58.0	140.2	68 28.2	+58.6	141.8	67 40.6	+58.9	143.3	66 52.1	+59.1	144.7	60
61	73 03.7	+54.6	130.9	72 23.5	+55.6	133.3	71 41.4	+56.6	135.5	70 57.9	+57.3	137.6	70 12.9	+57.9	139.4	69 26.8	+58.4	141.2	68 39.5	+58.8	142.8	67 51.2	+59.2	144.3	61
62	73 58.3	+54.0	129.5	73 19.1	+55.2	132.1	72 38.0	+56.2	134.4	71 55.2	+57.0	136.6	71 10.8	+57.7	138.6	70 25.2	+58.2	140.5	69 38.3	+58.7	142.2	68 50.4	+59.0	143.8	62
63	74 52.3	+53.1	127.8	74 14.3	+54.5	130.6	73 34.2	+55.7	133.2	72 52.2	+56.6	135.6	72 08.5	+57.4	137.8	71 23.4	+58.0	139.8	70 37.0	+58.5	141.6	69 49.4	+58.9	143.3	63
64	75 45.4	+52.2	126.0	75 08.8	+53.9	129.1	74 29.9	+55.1	131.9	73 48.8	+56.3	134.4	73 05.9	+57.2	136.8	72 21.4	+57.9	139.0	71 35.5	+58.4	140.9	70 48.3	+58.8	142.7	64
65	76 37.6	+51.1	123.9	76 02.7	+52.9	127.3	75 25.0	+54.5	130.4	74 45.1	+55.7	133.2	74 03.1	+56.7	135.7	73 19.3	+57.5	138.0	72 33.9	+58.2	140.2	71 47.1	+58.7	142.1	65
66	77 28.7	+49.7	121.6	76 55.6	+51.9	125.3	76 19.5	+53.7	128.6	75 40.8	+55.2	131.7	74 59.8	+56.3	134.5	74 16.8	+57.2	137.0	73 32.1	+57.9	139.3	72 45.8	+58.6	141.5	66
67	78 18.4	+48.0	118.9	77 47.5	+50.6	123.0	77 13.2	+52.7	126.7	76 36.0	+54.4	130.1	75 56.1	+55.8	133.1	75 14.0	+56.9	135.9	74 30.0	+57.7	138.4	73 44.4	+58.3	140.7	67
68	79 06.4	+45.8•	115.9	78 38.1	+48.9	120.3	78 05.9	+51.5	124.4	77 30.4	+53.5	128.2	76 51.9	+55.1	131.6	76 10.9	+56.4	134.6	75 27.7	+57.4	137.4	74 42.7	+58.2	139.8	68
69	79 52.2	+43.3•	112.3	79 27.0	+46.9•	117.3	78 57.4	+49.9	121.9	78 23.9	+52.3	126.0	77 47.0	+54.3	129.7	77 07.3	+55.8	133.1	76 25.1	+57.0	136.1	75 40.9	+57.8	138.9	69
70	80 35.5	+39.9•	108.2	80 13.9	+44.4•	113.8	79 47.3	+48.0•	118.9	79 16.2	+51.0	123.5	78 41.3	+53.3	127.7	78 03.1	+55.1	131.4	77 22.1	+56.5	134.8	76 38.7	+57.6	137.8	70
71	81 15.4	+35.9•	103.5	80 58.3	+41.1•	109.6	80 35.3	+45.5•	115.3	80 07.2	+49.1•	120.5	79 34.6	+52.0	125.2	78 58.2	+54.2	129.4	78 18.6	+55.8	133.2	77 36.3	+57.1	136.5	71
72	81 51.3	+30.8•	98.0	81 39.4	+37.0•	104.8	81 20.8	+42.4•	111.2	80 56.3	+46.7•	117.0	80 26.6	+50.2•	122.3	79 52.4	+52.9	127.1	79 14.4	+55.1	131.3	78 33.4	+56.6	135.0	72
73	82 22.1	+24.7•	91.8	82 16.4	+31.8•	99.2	82 03.2	+38.2•	106.3	81 43.0	+43.7•	112.9	81 16.8	+48.0•	118.9	80 45.3	+51.5	124.3	80 09.5	+54.0	129.1	79 30.0	+55.9	133.3	73
74	82 46.8	+17.5•	84.7	82 48.2	+25.5•	92.6	82 41.4	+32.9•	100.4	82 26.7	+39.5•	107.9	82 04.8	+45.0•	114.7	81 36.8	+49.3•	120.9	81 03.5	+52.6	126.4	80 25.9	+55.0	131.2	74
75	83 04.3	+9.4•	76.9	83 13.7	+17.8•	85.2	83 14.3	+26.3•	93.6	83 06.2	+34.2•	101.9	82 49.8	+41.0•	109.7	82 26.1	+46.5•	116.8	81 56.1	+50.7•	123.1	81 20.9	+53.8	128.6	75
76	83 13.7	+0.6•	68.7	83 31.5	+9.1•	76.9	83 40.6	+18.2•	85.7	83 40.4	+27.2•	94.7	83 30.8	+35.5•	103.5	83 12.6	+42.5•	111.7	82 46.8	+48.0•	119.1	82 14.7	+52.0•	125.5	76
77	83 14.3	–8.1•	60.2	83 40.6	–0.2•	68.0	83 58.8	+8.8•	76.8	84 07.6	+18.6•	86.3	84 06.3	+28.3•	96.1	83 55.1	+37.0•	105.4	83 34.8	+44.2•	114.0	83 06.7	+49.6•	121.6	77
78	83 06.2	–16.4•	51.8	83 40.4	–9.6•	58.9	84 07.6	–1.3•	67.3	84 26.2	+8.4•	76.8	84 34.6	+19.0•	87.1	84 32.1	+29.5•	97.6	84 19.0	+38.8•	107.6	83 56.3	+46.1•	116.6	78
79	82 49.8	–23.7•	44.0	83 30.8	–18.2•	50.1	84 06.3	–11.2•	57.5	84 34.6	–2.5•	66.4	84 53.6	+8.0•	76.7	85 01.6	+19.6•	88.0	84 57.8	+30.9•	99.4	84 42.4	+40.7•	110.1	79
80	82 26.1	–30.0•	36.8	83 12.6	–25.8•	41.8	83 55.1	–20.3•	48.1	84 32.1	–13.1•	55.9	85 01.6	–3.8•	65.4	85 21.2	+7.5•	76.7	85 28.7	+20.2•	89.1	85 23.1	+32.5•	101.6	80
81	81 56.1	–35.2•	30.4	82 46.8	–32.1•	34.4	83 34.8	–28.1•	39.4	84 19.0	–22.7•	45.8	84 57.8	–15.4•	54.0	85 28.7	–5.6•	64.3	85 48.9	+6.7•	76.7	85 55.6	+21.0•	90.5	81
82	81 20.9	–39.4•	24.8	82 14.7	–37.3•	27.9	83 06.7	–34.3•	31.8	83 56.3	–30.5•	36.8	84 42.4	–25.3•	43.2	85 23.1	–18.0•	51.7	85 55.6	–7.7•	62.8	86 16.6	+5.9•	76.6	82
83	80 41.5	–42.8•	20.0	81 37.4	–41.3•	22.3	82 32.4	–39.4•	25.2	83 25.8	–36.7•	28.9	84 17.1	–33.2•	33.8	85 05.1	–28.2•	40.2	85 47.9	–21.0•	49.0	86 22.5	–10.3•	61.0	83
84	79 58.7	–45.6•	15.8	80 56.1	–44.5•	17.5	81 53.0	–43.2•	19.6	82 49.1	–41.6•	22.3	83 43.9	–39.3•	25.8	84 36.9	–36.1•	30.4	85 26.9	–31.5•	36.7	86 12.2	–24.5•	45.8	84
85	79 13.1	–47.7	12.2	80 11.6	–47.0•	13.4	81 09.8	–46.2•	14.9	82 07.5	–45.1•	16.8	83 04.6	–43.7•	19.2	84 00.8	–41.9•	22.3	84 55.4	–39.1•	26.6	85 47.7	–35.2•	32.7	85
86	78 25.4	–49.4	9.1	79 24.6	–49.0	9.9	80 23.6	–48.5•	10.9	81 22.4	–47.9•	12.2	82 20.9	–47.1•	13.8	83 18.9	–46.0•	15.8	84 16.3	–44.5•	18.5	85 12.5	–42.3•	22.3	86
87	77 36.0	–50.9	6.4	78 35.6	–50.7	6.9	79 35.1	–50.3	7.6	80 34.5	–50.0	8.3	81 33.8	–49.5•	9.3	82 32.9	–48.9•	10.6	83 31.8	–48.3•	12.2	84 30.2	–47.2•	14.4	87
88	76 45.1	–52.1	4.0	77 44.9	–51.9	4.3	78 44.8	–51.8	4.7	79 44.5	–51.6	5.1	80 44.3	–51.4	5.6	81 44.0	–51.2	6.3	82 43.5	–50.8•	7.2	83 43.0	–50.4•	8.3	88
89	75 53.0	–53.0	1.9	76 53.0	–53.0	2.0	77 53.0	–53.0	2.2	78 52.9	–52.9	2.4	79 52.9	–52.9	2.6	80 52.8	–52.8	2.9	81 52.7	–52.7	3.2	82 52.6	–52.6	3.7	89
90	75 00.0	–53.8	0.0	76 00.0	–53.9	0.0	77 00.0	–53.9	0.0	78 00.0	–53.9	0.0	79 00.0	–54.0	0.0	80 00.0	–54.0	0.0	81 00.0	–54.1	0.0	82 00.0	–54.2	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 27°, 333°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 20.0	−59.6	152.2	12 26.9	−59.6	152.3	11 33.7	−59.6	152.4	10 40.5	−59.7	152.5	9 47.3	−59.8	152.6	8 54.0	−59.8	152.6	8 00.7	−59.8	152.7	7 07.4	−59.9	152.8	0
1	12 20.4	−59.6	152.3	11 27.3	−59.7	152.4	10 34.1	−59.7	152.5	9 40.8	−59.7	152.6	8 47.5	−59.7	152.7	7 54.2	−59.8	152.7	7 00.9	−59.9	152.8	6 07.5	−59.9	152.8	1
2	11 20.8	−59.5	152.4	10 27.6	−59.6	152.5	9 34.4	−59.7	152.6	8 41.1	−59.7	152.7	7 47.8	−59.8	152.7	6 54.4	−59.8	152.8	6 01.0	−59.8	152.9	5 07.6	−59.8	152.9	2
3	10 21.3	−59.6	152.6	9 28.0	−59.6	152.6	8 34.7	−59.7	152.7	7 41.4	−59.8	152.8	6 48.0	−59.8	152.8	5 54.6	−59.8	152.9	5 01.2	−59.9	152.9	4 07.8	−59.9	153.0	3
4	9 21.7	−59.6	152.7	8 28.4	−59.6	152.7	7 35.0	−59.7	152.8	6 41.6	−59.7	152.9	5 48.2	−59.7	152.9	4 54.8	−59.8	153.0	4 01.3	−59.8	153.0	3 07.9	−59.9	153.0	4
5	8 22.1	−59.5	152.8	7 28.8	−59.7	152.9	6 35.3	−59.6	152.9	5 41.9	−59.7	153.0	4 48.5	−59.8	153.0	3 55.0	−59.8	153.0	3 01.5	−59.9	153.1	2 08.0	−59.9	153.1	5
6	7 22.6	−59.6	152.9	6 29.1	−59.6	153.0	5 35.7	−59.7	153.0	4 42.2	−59.7	153.1	3 48.7	−59.8	153.1	2 55.2	−59.8	153.1	2 01.6	−59.8	153.1	1 08.1	−59.9	153.2	6
7	6 23.0	−59.6	153.0	5 29.5	−59.6	153.1	4 36.0	−59.7	153.1	3 42.5	−59.8	153.2	2 48.9	−59.8	153.2	1 55.4	−59.9	153.2	1 01.8	−59.8	153.2	0 08.2	−59.8	153.2	7
8	5 23.4	−59.6	153.2	4 29.9	−59.7	153.2	3 36.3	−59.7	153.2	2 42.7	−59.7	153.3	1 49.1	−59.7	153.3	0 55.5	−59.8	153.3	0 02.0	−59.9	153.3	0 51.6	+59.9	26.7	8
9	4 23.8	−59.6	153.3	3 30.2	−59.6	153.3	2 36.6	−59.7	153.3	1 43.0	−59.7	153.3	0 49.4	−59.8	153.4	0 04.3	+59.8	26.6	0 57.9	+59.8	26.6	1 51.5	+59.9	26.7	9
10	3 24.2	−59.5	153.4	2 30.6	−59.7	153.4	1 36.9	−59.7	153.4	0 43.3	−59.8	153.4	0 10.4	+59.8	26.6	1 04.1	+59.8	26.6	1 57.7	+59.9	26.6	2 51.4	+59.9	26.6	10
11	2 24.7	−59.6	153.5	1 30.9	−59.6	153.5	0 37.2	−59.6	153.5	0 16.5	+59.7	26.5	1 10.2	+59.8	26.5	2 03.9	+59.8	26.5	2 57.6	+59.8	26.5	3 51.3	+59.9	26.5	11
12	1 25.1	−59.6	153.6	0 31.3	−59.6	153.6	0 22.4	+59.7	26.4	1 16.2	+59.7	26.4	2 10.0	+59.7	26.4	3 03.7	+59.8	26.4	3 57.4	+59.9	26.4	4 51.2	+59.8	26.5	12
13	0 25.5	−59.6	153.7	0 28.3	+59.7	26.3	1 22.1	+59.7	26.3	2 15.9	+59.8	26.3	3 09.7	+59.8	26.3	4 03.5	+59.8	26.3	4 57.3	+59.8	26.4	5 51.0	+59.9	26.4	13
14	0 34.1	+59.6	26.1	1 28.0	+59.6	26.1	2 21.8	+59.7	26.2	3 15.7	+59.7	26.2	4 09.5	+59.8	26.2	5 03.3	+59.8	26.2	5 57.1	+59.9	26.3	6 50.9	+59.9	26.3	14
15	1 33.7	+59.6	26.0	2 27.6	+59.6	26.0	3 21.5	+59.7	26.1	4 15.4	+59.7	26.1	5 09.3	+59.8	26.1	6 03.1	+59.9	26.2	6 57.0	+59.8	26.2	7 50.8	+59.9	26.3	15
16	2 33.3	+59.6	25.9	3 27.2	+59.7	25.9	4 21.2	+59.7	26.0	5 15.1	+59.8	26.0	6 09.1	+59.7	26.0	7 03.0	+59.8	26.1	7 56.8	+59.9	26.1	8 50.7	+59.9	26.2	16
17	3 32.9	+59.5	25.8	4 26.9	+59.6	25.8	5 20.9	+59.7	25.9	6 14.9	+59.7	25.9	7 08.8	+59.8	25.9	8 02.8	+59.8	26.0	8 56.7	+59.8	26.1	9 50.6	+59.8	26.1	17
18	4 32.4	+59.6	25.7	5 26.5	+59.6	25.7	6 20.6	+59.6	25.7	7 14.6	+59.7	25.8	8 08.6	+59.8	25.9	9 02.6	+59.8	25.9	9 56.5	+59.9	26.0	10 50.4	+59.9	26.1	18
19	5 32.0	+59.6	25.5	6 26.1	+59.7	25.6	7 20.2	+59.7	25.6	8 14.3	+59.7	25.7	9 08.4	+59.7	25.8	10 02.4	+59.8	25.8	10 56.4	+59.8	25.9	11 50.3	+59.9	26.0	19
20	6 31.6	+59.6	25.4	7 25.8	+59.6	25.5	8 19.9	+59.7	25.5	9 14.0	+59.8	25.6	10 08.1	+59.8	25.7	11 02.2	+59.8	25.8	11 56.2	+59.8	25.9	12 50.2	+59.8	25.9	20
21	7 31.2	+59.5	25.3	8 25.4	+59.6	25.4	9 19.6	+59.7	25.4	10 13.8	+59.7	25.5	11 07.9	+59.8	25.6	12 02.0	+59.8	25.7	12 56.0	+59.9	25.8	13 50.0	+59.9	25.9	21
22	8 30.7	+59.6	25.2	9 25.0	+59.7	25.3	10 19.3	+59.7	25.3	11 13.5	+59.7	25.4	12 07.7	+59.7	25.5	13 01.8	+59.8	25.6	13 55.9	+59.8	25.7	14 49.9	+59.9	25.8	22
23	9 30.3	+59.6	25.1	10 24.7	+59.6	25.1	11 19.0	+59.6	25.2	12 13.2	+59.7	25.3	13 07.4	+59.8	25.4	14 01.6	+59.8	25.5	14 55.7	+59.9	25.6	15 49.8	+59.9	25.7	23
24	10 29.9	+59.6	24.9	11 24.3	+59.6	25.0	12 18.6	+59.7	25.1	13 12.9	+59.7	25.2	14 07.2	+59.7	25.3	15 01.4	+59.8	25.4	15 55.6	+59.8	25.5	16 49.7	+59.8	25.7	24
25	11 29.5	+59.5	24.8	12 23.9	+59.6	24.9	13 18.3	+59.7	25.0	14 12.6	+59.8	25.1	15 06.9	+59.8	25.2	16 01.2	+59.8	25.3	16 55.4	+59.8	25.5	17 49.5	+59.9	25.6	25
26	12 29.0	+59.6	24.7	13 23.5	+59.6	24.8	14 18.0	+59.6	24.9	15 12.4	+59.7	25.0	16 06.7	+59.8	25.1	17 01.0	+59.8	25.3	17 55.2	+59.9	25.4	18 49.4	+59.9	25.5	26
27	13 28.6	+59.5	24.6	14 23.1	+59.6	24.7	15 17.6	+59.7	24.8	16 12.1	+59.7	24.9	17 06.5	+59.7	25.0	18 00.8	+59.8	25.2	18 55.1	+59.8	25.3	19 49.3	+59.8	25.5	27
28	14 28.1	+59.6	24.5	15 22.7	+59.6	24.6	16 17.3	+59.6	24.7	17 11.8	+59.7	24.8	18 06.2	+59.8	24.9	19 00.6	+59.8	25.1	19 54.9	+59.8	25.2	20 49.1	+59.9	25.4	28
29	15 27.7	+59.6	24.3	16 22.3	+59.7	24.4	17 16.9	+59.7	24.6	18 11.5	+59.7	24.7	19 06.0	+59.7	24.8	20 00.4	+59.8	25.0	20 54.7	+59.8	25.2	21 49.0	+59.8	25.3	29
30	16 27.3	+59.5	24.2	17 22.0	+59.6	24.3	18 16.6	+59.6	24.5	19 11.2	+59.7	24.6	20 05.7	+59.7	24.7	21 00.2	+59.7	24.9	21 54.5	+59.9	25.1	22 48.8	+59.9	25.2	30
31	17 26.8	+59.5	24.1	18 21.6	+59.5	24.2	19 16.2	+59.7	24.3	20 10.9	+59.7	24.5	21 05.4	+59.8	24.7	21 59.9	+59.8	24.8	22 54.4	+59.8	25.0	23 48.7	+59.9	25.2	31
32	18 26.3	+59.6	23.9	19 21.1	+59.6	24.1	20 15.9	+59.6	24.2	21 10.6	+59.7	24.4	22 05.2	+59.7	24.6	22 59.7	+59.8	24.7	23 54.2	+59.8	24.9	24 48.6	+59.8	25.1	32
33	19 25.9	+59.5	23.8	20 20.7	+59.6	24.0	21 15.5	+59.7	24.1	22 10.3	+59.6	24.3	23 04.9	+59.8	24.4	23 59.5	+59.8	24.6	24 54.0	+59.8	24.8	25 48.4	+59.9	25.0	33
34	20 25.4	+59.5	23.7	21 20.3	+59.6	23.8	22 15.2	+59.6	24.0	23 09.9	+59.7	24.2	24 04.7	+59.7	24.3	24 59.3	+59.7	24.5	25 53.8	+59.8	24.7	26 48.3	+59.8	24.9	34
35	21 24.9	+59.5	23.5	22 19.9	+59.6	23.7	23 14.8	+59.6	23.9	24 09.6	+59.7	24.1	25 04.4	+59.7	24.2	25 59.0	+59.8	24.4	26 53.6	+59.8	24.6	27 48.1	+59.9	24.9	35
36	22 24.4	+59.6	23.4	23 19.5	+59.5	23.6	24 14.4	+59.6	23.8	25 09.3	+59.7	23.9	26 04.1	+59.7	24.1	26 58.8	+59.8	24.3	27 53.4	+59.8	24.6	28 48.0	+59.8	24.8	36
37	23 24.0	+59.5	23.3	24 19.0	+59.6	23.4	25 14.0	+59.7	23.6	26 09.0	+59.6	23.8	27 03.8	+59.7	24.0	27 58.6	+59.7	24.2	28 53.2	+59.8	24.5	29 47.8	+59.8	24.7	37
38	24 23.5	+59.5	23.1	25 18.6	+59.5	23.3	26 13.7	+59.6	23.5	27 08.6	+59.7	23.7	28 03.5	+59.7	23.9	28 58.3	+59.8	24.1	29 53.0	+59.8	24.4	30 47.6	+59.9	24.6	38
39	25 23.0	+59.4	23.0	26 18.1	+59.6	23.2	27 13.3	+59.6	23.4	28 08.3	+59.6	23.6	29 03.2	+59.7	23.8	29 58.1	+59.7	24.0	30 52.8	+59.8	24.3	31 47.5	+59.8	24.5	39
40	26 22.4	+59.5	22.8	27 17.7	+59.5	23.0	28 12.9	+59.6	23.2	29 07.9	+59.7	23.5	30 02.9	+59.7	23.7	30 57.8	+59.8	23.9	31 52.6	+59.8	24.2	32 47.3	+59.8	24.4	40
41	27 21.9	+59.5	22.7	28 17.2	+59.6	22.9	29 12.5	+59.5	23.1	30 07.6	+59.6	23.3	31 02.6	+59.7	23.6	31 57.6	+59.7	23.8	32 52.4	+59.8	24.1	33 47.1	+59.9	24.3	41
42	28 21.4	+59.4	22.5	29 16.8	+59.5	22.8	30 12.0	+59.6	23.0	31 07.2	+59.7	23.2	32 02.3	+59.7	23.5	32 57.3	+59.7	23.7	33 52.2	+59.8	24.0	34 47.0	+59.8	24.3	42
43	29 20.8	+59.5	22.4	30 16.3	+59.5	22.6	31 11.6	+59.6	22.8	32 06.9	+59.6	23.1	33 02.0	+59.7	23.3	33 57.0	+59.8	23.6	34 52.0	+59.7	23.9	35 46.8	+59.8	24.2	43
44	30 20.3	+59.4	22.2	31 15.8	+59.5	22.5	32 11.2	+59.5	22.7	33 06.5	+59.6	22.9	34 01.7	+59.7	23.2	34 56.8	+59.7	23.5	35 51.7	+59.8	23.8	36 46.6	+59.8	24.1	44
45	31 19.7	+59.4	22.1	32 15.3	+59.5	22.3	33 10.7	+59.6	22.6	34 06.1	+59.6	22.8	35 01.4	+59.6	23.1	35 56.5	+59.7	23.4	36 51.5	+59.8	23.7	37 46.4	+59.8	24.0	45
46	32 19.1	+59.5	21.9	33 14.8	+59.4	22.2	34 10.3	+59.5	22.4	35 05.7	+59.6	22.7	36 01.0	+59.7	22.9	36 56.2	+59.7	23.2	37 51.3	+59.7	23.5	38 46.2	+59.8	23.9	46
47	33 18.6	+59.4	21.7	34 14.2	+59.5	22.0	35 09.8	+59.5	22.3	36 05.3	+59.6	22.5	37 00.7	+59.6	22.8	37 55.9	+59.7	23.1	38 51.0	+59.8	23.4	39 46.0	+59.8	23.8	47
48	34 18.0	+59.3	21.6	35 13.7	+59.4	21.8	36 09.3	+59.6	22.1	37 04.9	+59.6	22.4	38 00.3	+59.6	22.7	38 55.6	+59.7	23.0	39 50.8	+59.7	23.3	40 45.8	+59.8	23.6	48
49	35 17.3	+59.4	21.4	36 13.1	+59.5	21.7	37 08.9	+59.5	21.9	38 04.5	+59.5	22.2	38 59.9	+59.7	22.5	39 55.3	+59.7	22.9	40 50.5	+59.7	23.2	41 45.6	+59.8	23.5	49
50	36 16.7	+59.4	21.2	37 12.6	+59.4	21.5	38 08.4	+59.4	21.8	39 04.0	+59.6	22.1	39 59.6	+59.6	22.4	40 55.0	+59.6	22.7	41 50.2	+59.8	23.1	42 45.4	+59.7	23.4	50
51	37 16.1	+59.3	21.0	38 12.0	+59.4	21.3	39 07.8	+59.5	21.6	40 03.6	+59.5	21.9	40 59.2	+59.6	22.2	41 54.6	+59.7	22.6	42 50.0	+59.7	22.9	43 45.1	+59.8	23.3	51
52	38 15.4	+59.3	20.9	39 11.4	+59.4	21.1	40 07.3	+59.5	21.4	41 03.1	+59.5	21.8	41 58.8	+59.5	22.1	42 54.3	+59.6	22.4	43 49.7	+59.7	22.8	44 44.9	+59.8	23.2	52
53	39 14.7	+59.3	20.7	40 10.8	+59.4	21.0	41 06.8	+59.4	21.3	42 02.6	+59.5	21.6	42 58.3	+59.6	21.9	43 53.9	+59.7	22.3	44 49.4	+59.7	22.7	45 44.7	+59.7	23.0	53
54	40 14.0	+59.3	20.5	41 10.2	+59.3	20.8	42 06.2	+59.4	21.1	43 02.1	+59.5	21.4	43 57.9	+59.6	21.8	44 53.6	+59.6	22.1	45 49.1	+59.7	22.5	46 44.4	+59.8	22.9	54
55	41 13.3	+59.2	20.3	42 09.5	+59.3	20.6	43 05.6	+59.4	20.9	44 01.6	+59.5	21.2	44 57.5	+59.5	21.6	45 53.2	+59.6	22.0	46 48.8	+59.6	22.4	47 44.2	+59.7	22.8	55
56	42 12.5	+59.3	20.0	43 08.8	+59.3	20.4	44 05.0	+59.4	20.7	45 01.1	+59.4	21.0	45 57.0	+59.5	21.4	46 52.8	+59.6	21.8	47 48.4	+59.7	22.2	48 43.9	+59.7	22.6	56
57	43 11.8	+59.2	19.8	44 08.1	+59.3	20.2	45 04.4	+59.4	20.5	46 00.5	+59.5	20.9	46 56.5	+59.5	21.2	47 52.4	+59.6	21.6	48 48.1	+59.6	22.0	49 43.6	+59.7	22.5	57
58	44 11.0	+59.1	19.6	45 07.4	+59.3	19.9	46 03.8	+59.3	20.3	47 00.0	+59.4	20.7	47 56.0	+59.5	21.0	48 52.0	+59.5	21.5	49 47.7	+59.7	21.9	50 43.3	+59.7	22.3	58
59	45 10.1	+59.2	19.4	46 06.7	+59.2	19.7	47 03.1	+59.3	20.1	47 59.4	+59.4	20.4	48 55.5	+59.5	20.8	49 51.5	+59.6	21.3	50 47.4	+59.6	21.7	51 43.0	+59.7	22.2	59
60	46 09.3	+59.1	19.1	47 05.9	+59.2	19.5	48 02.4	+59.3	19.8	48 58.8	+59.3	20.2	49 55.0	+59.4	20.6	50 51.1	+59.5	21.1	51 47.0	+59.6	21.5	52 42.7	+59.7	22.0	60
61	47 08.4	+59.1	18.9	48 05.1	+59.2	19.2	49 01.7	+59.2	19.6	49 58.1	+59.4	20.0	50 54.4	+59.5	20.4	51 50.6	+59.5	20.9	52 46.6	+59.5	21.3	53 42.4	+59.6	21.8	61
62	48 07.5	+59.0	18.6	49 04.3	+59.1	19.0	50 00.9	+59.3	19.4	50 57.5	+59.3	19.8	51 53.9	+59.4	20.2	52 50.1	+59.5	20.7	53 46.1	+59.6	21.1	54 42.0	+59.6	21.6	62
63	49 06.5	+59.0	18.4	50 03.4	+59.1	18.7	51 00.2	+59.1	19.1	51 56.8	+59.3	19.5	52 53.3	+59.3	20.0	53 49.6	+59.4	20.4	54 45.7	+59.5	20.9	55 41.6	+59.6	21.4	63
64	50 05.5	+59.0	18.1	51 02.5	+59.1	18.5	51 59.3	+59.2	18.9	52 56.1	+59.2	19.3	53 52.6	+59.3	19.7	54 49.0	+59.4	20.2	55 45.2	+59.5	20.7	56 41.2	+59.6	21.2	64
65	51 04.5	+58.9	17.8	52 01.6	+59.0	18.2	52 58.5	+59.1	18.6	53 55.3	+59.2	19.0	54 51.9	+59.3	19.5	55 48.4	+59.4	20.0	56 44.7	+59.5	20.5	57 40.8	+59.6	21.0	65
66	52 03.4	+58.9	17.5	53 00.6	+58.9	17.9	53 57.6	+59.1	18.3	54 54.5	+59.2	18.7	55 51.2	+59.3	19.2	56 47.8	+59.4	19.7	57 44.2	+59.5	20.2	58 40.4	+59.5	20.8	66
67	53 02.3	+58.8	17.2	53 59.5	+59.0	17.6	54 56.7	+59.0	18.0	55 53.7	+59.1	18.4	56 50.5	+59.2	18.9	57 47.2	+59.3	19.4	58 43.7	+59.4	20.0	59 39.9	+59.6	20.6	67
68	54 01.1	+58.7	16.8	54 58.5	+58.8	17.2	55 55.7	+59.0	17.7	56 52.8	+59.1	18.1	57 49.7	+59.2	18.6	58 46.5	+59.3	19.2	59 43.1	+59.4	19.7	60 39.5	+59.4	20.3	68
69	54 59.8	+58.7	16.5	55 57.3	+58.8	16.9	56 54.7	+58.9	17.3	57 51.9	+59.0	17.8	58 48.9	+59.1	18.3	59 45.8	+59.2	18.8	60 42.5	+59.3	19.4	61 38.9	+59.5	20.0	69
70	55 58.5	+58.7	16.1	56 56.1	+58.8	16.5	57 53.6	+58.8	17.0	58 50.9	+58.9	17.5	59 48.0	+59.1	18.0	60 45.0	+59.2	18.5	61 41.8	+59.3	19.1	62 38.4	+59.4	19.7	70
71	56 57.2	+58.5	15.7	57 54.9	+58.6	16.2	58 52.4	+58.8	16.6	59 49.8	+58.9	17.1	60 47.1	+59.0	17.6	61 44.2	+59.1	18.2	62 41.1	+59.3	18.8	63 37.8	+59.4	19.4	71
72	57 55.7	+58.5	15.3	58 53.5	+58.6	15.8	59 51.2	+58.7	16.2	60 48.7	+58.9	16.7	61 46.1	+59.0	17.3	62 43.3	+59.1	17.8	63 40.4	+59.2	18.4	64 37.2	+59.3	19.1	72
73	58 54.2	+58.4	14.9	59 52.1	+58.5	15.3	60 49.9	+58.6	15.8	61 47.6	+58.7	16.3	62 45.1	+58.9	16.9	63 42.4	+59.0	17.4	64 39.6	+59.1	18.1	65 36.5	+59.3	18.7	73
74	59 52.6	+58.3	14.4	60 50.6	+58.4	14.9	61 48.5	+58.6	15.4	62 46.3	+58.7	15.9	63 44.0	+58.8	16.4	64 41.4	+59.0	17.0	65 38.7	+59.1	17.7	66 35.8	+59.2	18.4	74
75	60 50.9	+58.1	14.0	61 49.0	+58.3	14.4	62 47.1	+58.4	14.9	63 45.0	+58.6	15.4	64 42.8	+58.7	16.0	65 40.4	+58.8	16.6	66 37.8	+59.0	17.2	67 35.0	+59.1	17.9	75
76	61 49.0	+58.1	13.4	62 47.3	+58.2	13.9	63 45.5	+58.3	14.4	64 43.6	+58.4	14.9	65 41.5	+58.6	15.5	66 39.2	+58.8	16.1	67 36.8	+58.9	16.8	68 34.1	+59.0	17.5	76
77	62 47.1	+57.9	12.9	63 45.5	+58.1	13.4	64 43.8	+58.2	13.8	65 42.0	+58.4	14.4	66 40.1	+58.5	14.9	67 38.0	+58.6	15.6	68 35.7	+58.8	16.2	69 33.1	+59.0	17.0	77
78	63 45.0	+57.8	12.3	64 43.6	+57.9	12.8	65 42.0	+58.1	13.3	66 40.4	+58.2	13.8	67 38.6	+58.3	14.4	68 36.6	+58.5	15.0	69 34.5	+58.6	15.7	70 32.1	+58.9	16.5	78
79	64 42.8	+57.6	11.7	65 41.5	+57.7	12.1	66 40.1	+57.9	12.6	67 38.6	+58.0	13.2	68 36.9	+58.2	13.7	69 35.1	+58.4	14.4	70 33.1	+58.6	15.1	71 31.0	+58.7	15.9	79
80	65 40.4	+57.4	11.0	66 39.2	+57.6	11.5	67 38.0	+57.7	12.0	68 36.6	+57.9	12.5	69 35.1	+58.0	13.1	70 33.5	+58.2	13.7	71 31.7	+58.4	14.4	72 29.7	+58.6	15.2	80
81	66 37.8	+57.2	10.3	67 36.8	+57.3	10.7	68 35.7	+57.4	11.2	69 34.5	+57.6	11.7	70 33.1	+57.9	12.3	71 31.7	+58.0	13.0	72 30.1	+58.2	13.7	73 28.3	+58.4	14.5	81
82	67 35.0	+56.9	9.5	68 34.1	+57.1	10.0	69 33.1	+57.3	10.4	70 32.1	+57.4	10.9	71 31.0	+57.6	11.5	72 29.7	+57.8	12.1	73 28.3	+58.0	12.8	74 26.7	+58.2	13.6	82
83	68 31.9	+56.7	8.7	69 31.2	+56.8	9.1	70 30.4	+57.0	9.5	71 29.5	+57.2	10.0	72 28.6	+57.3	10.6	73 27.5	+57.5	11.2	74 26.3	+57.7	11.9	75 24.9	+57.9	12.7	83
84	69 28.6	+56.4	7.8	70 28.0	+56.5	8.2	71 27.4	+56.6	8.6	72 26.7	+56.8	9.1	73 25.9	+57.0	9.6	74 25.0	+57.2	10.2	75 24.0	+57.4	10.9	76 22.8	+57.7	11.6	84
85	70 25.0	+56.0	6.8	71 24.5	+56.2	7.1	72 24.0	+56.3	7.5	73 23.5	+56.4	8.0	74 22.9	+56.6	8.5	75 22.2	+56.8	9.0	76 21.4	+57.0	9.7	77 20.5	+57.2	10.4	85
86	71 21.0	+55.5	5.7	72 20.7	+55.7	6.0	73 20.3	+55.8	6.3	74 19.9	+56.0	6.7	75 19.5	+56.1	7.2	76 19.0	+56.3	7.7	77 18.4	+56.5	8.3	78 17.7	+56.8	9.0	86
87	72 16.5	+55.1	4.5	73 16.4	+55.1	4.7	74 16.1	+55.3	5.0	75 15.9	+55.4	5.4	76 15.6	+55.6	5.7	77 15.3	+55.7	6.2	78 14.9	+55.9	6.7	79 14.5	+56.1	7.3	87
88	73 11.6	+54.6	3.1	74 11.5	+54.6	3.3	75 11.4	+54.7	3.6	76 11.3	+54.8	3.8	77 11.2	+54.8	4.1	78 11.0	+55.0	4.4	79 10.8	+55.1	4.8	80 10.6	+55.2	5.3	88
89	74 06.2	+53.8	1.7	75 06.1	+53.9	1.8	76 06.1	+53.9	1.9	77 06.1	+53.9	2.0	78 06.0	+54.0	2.2	79 06.0	+54.0	2.4	80 05.9	+54.1	2.6	81 05.8	+54.2	2.9	89
90	75 00.0	+53.0	0.0	76 00.0	+53.0	0.0	77 00.0	+53.0	0.0	78 00.0	+52.9	0.0	79 00.0	+52.9	0.0	80 00.0	+52.8	0.0	81 00.0	+52.7	0.0	82 00.0	+52.6	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 153°, 207°

28°, 332° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 12.6	+59.5	151.2	12 20.0	+59.6	151.3	11 27.4	+59.6	151.4	10 34.7	+59.7	151.5	9 41.9	+59.8	151.6	8 49.2	+59.8	151.6	7 56.4	+59.8	151.7	7 03.5	+59.9	151.8	**0**
1	14 12.1	+59.6	151.0	13 19.6	+59.6	151.2	12 27.0	+59.7	151.3	11 34.4	+59.7	151.4	10 41.7	+59.7	151.5	9 49.0	+59.8	151.6	8 56.2	+59.8	151.6	8 03.4	+59.8	151.7	**1**
2	15 11.7	+59.5	150.9	14 19.2	+59.6	151.0	13 26.7	+59.6	151.2	12 34.1	+59.7	151.3	11 41.4	+59.8	151.4	10 48.8	+59.8	151.5	9 56.0	+59.9	151.6	9 03.2	+59.9	151.6	**2**
3	16 11.2	+59.5	150.8	15 18.8	+59.6	150.9	14 26.3	+59.7	151.0	13 33.8	+59.7	151.2	12 41.2	+59.7	151.3	11 48.6	+59.7	151.4	10 55.9	+59.8	151.5	10 03.1	+59.9	151.6	**3**
4	17 10.7	+59.5	150.6	16 18.4	+59.5	150.8	15 26.0	+59.6	150.9	14 33.5	+59.7	151.1	13 40.9	+59.8	151.2	12 48.3	+59.8	151.3	11 55.7	+59.8	151.4	11 03.0	+59.8	151.5	**4**
5	18 10.2	+59.5	150.5	17 17.9	+59.6	150.7	16 25.6	+59.6	150.8	15 33.2	+59.7	151.0	14 40.7	+59.7	151.1	13 48.1	+59.8	151.2	12 55.5	+59.8	151.3	12 02.8	+59.9	151.4	**5**
6	19 09.7	+59.5	150.4	18 17.5	+59.6	150.5	17 25.2	+59.7	150.7	16 32.9	+59.6	150.9	15 40.4	+59.8	151.0	14 47.9	+59.8	151.1	13 55.3	+59.9	151.2	13 02.7	+59.9	151.4	**6**
7	20 09.2	+59.5	150.2	19 17.1	+59.5	150.4	18 24.9	+59.6	150.6	17 32.5	+59.7	150.7	16 40.2	+59.7	150.9	15 47.7	+59.8	151.0	14 55.2	+59.8	151.2	14 02.6	+59.8	151.3	**7**
8	21 08.7	+59.5	150.1	20 16.6	+59.6	150.3	19 24.5	+59.6	150.5	18 32.2	+59.7	150.6	17 39.9	+59.7	150.8	16 47.5	+59.8	150.9	15 55.0	+59.8	151.1	15 02.4	+59.9	151.2	**8**
9	22 08.2	+59.5	150.0	21 16.2	+59.5	150.2	20 24.1	+59.6	150.3	19 31.9	+59.7	150.5	18 39.6	+59.8	150.7	17 47.3	+59.7	150.9	16 54.8	+59.8	151.0	16 02.3	+59.9	151.2	**9**
10	23 07.7	+59.4	149.8	22 15.7	+59.6	150.0	21 23.7	+59.6	150.2	20 31.6	+59.7	150.4	19 39.4	+59.7	150.6	18 47.0	+59.8	150.8	17 54.6	+59.9	150.9	17 02.2	+59.8	151.1	**10**
11	24 07.1	+59.5	149.7	23 15.3	+59.5	149.9	22 23.3	+59.6	150.1	21 31.3	+59.6	150.3	20 39.1	+59.7	150.5	19 46.8	+59.8	150.7	18 54.5	+59.8	150.8	18 02.0	+59.9	151.0	**11**
12	25 06.6	+59.5	149.5	24 14.8	+59.6	149.8	23 22.9	+59.6	150.0	22 30.9	+59.7	150.2	21 38.8	+59.7	150.4	20 46.6	+59.8	150.6	19 54.3	+59.8	150.8	19 01.9	+59.8	150.9	**12**
13	26 06.1	+59.4	149.4	25 14.4	+59.5	149.6	24 22.5	+59.6	149.9	23 30.6	+59.6	150.1	22 38.5	+59.7	150.3	21 46.4	+59.7	150.5	20 54.1	+59.8	150.7	20 01.7	+59.9	150.9	**13**
14	27 05.5	+59.4	149.2	26 13.9	+59.5	149.5	25 22.1	+59.6	149.7	24 30.2	+59.7	150.0	23 38.2	+59.8	150.2	22 46.1	+59.8	150.4	21 53.9	+59.8	150.6	21 01.6	+59.8	150.8	**14**
15	28 04.9	+59.5	149.1	27 13.4	+59.5	149.3	26 21.7	+59.6	149.6	25 29.9	+59.6	149.8	24 38.0	+59.7	150.1	23 45.9	+59.8	150.3	22 53.7	+59.8	150.5	22 01.4	+59.9	150.7	**15**
16	29 04.4	+59.4	148.9	28 12.9	+59.5	149.2	27 21.3	+59.6	149.5	26 29.5	+59.7	149.7	25 37.7	+59.7	150.0	24 45.7	+59.7	150.2	23 53.5	+59.8	150.4	23 01.3	+59.8	150.6	**16**
17	30 03.8	+59.4	148.8	29 12.4	+59.5	149.0	28 20.9	+59.5	149.3	27 29.2	+59.6	149.6	26 37.4	+59.7	149.9	25 45.4	+59.8	150.1	24 53.3	+59.8	150.3	24 01.1	+59.9	150.6	**17**
18	31 03.2	+59.3	148.6	30 11.9	+59.4	148.9	29 20.4	+59.6	149.2	28 28.8	+59.6	149.5	27 37.1	+59.6	149.7	26 45.2	+59.7	150.0	25 53.1	+59.8	150.2	25 01.0	+59.8	150.5	**18**
19	32 02.5	+59.4	148.4	31 11.3	+59.5	148.7	30 20.0	+59.5	149.0	29 28.4	+59.7	149.3	28 36.7	+59.7	149.6	27 44.9	+59.8	149.9	26 52.9	+59.8	150.2	26 00.8	+59.9	150.4	**19**
20	33 01.9	+59.4	148.3	32 10.8	+59.5	148.6	31 19.5	+59.6	148.9	30 28.1	+59.6	149.2	29 36.4	+59.7	149.5	28 44.7	+59.7	149.8	27 52.7	+59.8	150.1	27 00.7	+59.8	150.3	**20**
21	34 01.3	+59.3	148.1	33 10.3	+59.4	148.4	32 19.1	+59.5	148.8	31 27.7	+59.6	149.1	30 36.1	+59.7	149.4	29 44.4	+59.7	149.7	28 52.5	+59.8	150.0	28 00.5	+59.8	150.2	**21**
22	35 00.6	+59.4	147.9	34 09.7	+59.4	148.3	33 18.6	+59.5	148.6	32 27.3	+59.6	148.9	31 35.8	+59.6	149.3	30 44.1	+59.7	149.6	29 52.3	+59.8	149.9	29 00.3	+59.9	150.2	**22**
23	36 00.0	+59.3	147.7	35 09.1	+59.4	148.1	34 18.1	+59.5	148.5	33 26.9	+59.5	148.8	32 35.4	+59.7	149.1	31 43.8	+59.8	149.5	30 52.1	+59.8	149.8	30 00.2	+59.8	150.1	**23**
24	36 59.3	+59.3	147.5	36 08.5	+59.4	147.9	35 17.6	+59.5	148.3	34 26.4	+59.6	148.7	33 35.1	+59.6	149.0	32 43.6	+59.7	149.3	31 51.9	+59.7	149.7	31 00.0	+59.8	150.0	**24**
25	37 58.6	+59.2	147.3	37 07.9	+59.4	147.7	36 17.1	+59.5	148.1	35 26.0	+59.6	148.5	34 34.7	+59.7	148.9	33 43.3	+59.7	149.2	32 51.6	+59.8	149.6	31 59.8	+59.8	149.9	**25**
26	38 57.8	+59.3	147.1	38 07.3	+59.4	147.6	37 16.6	+59.4	148.0	36 25.6	+59.5	148.4	35 34.4	+59.6	148.7	34 43.0	+59.7	149.1	33 51.4	+59.8	149.5	32 59.6	+59.9	149.8	**26**
27	39 57.1	+59.2	146.9	39 06.7	+59.3	147.4	38 16.0	+59.5	147.8	37 25.1	+59.6	148.2	36 34.0	+59.6	148.6	35 42.7	+59.7	149.0	34 51.2	+59.7	149.4	33 59.5	+59.8	149.7	**27**
28	40 56.3	+59.2	146.7	40 06.0	+59.3	147.2	39 15.5	+59.4	147.6	38 24.7	+59.5	148.1	37 33.6	+59.6	148.5	36 42.4	+59.7	148.9	35 50.9	+59.8	149.2	34 59.3	+59.8	149.6	**28**
29	41 55.5	+59.2	146.5	41 05.3	+59.3	147.0	40 14.9	+59.4	147.5	39 24.2	+59.5	147.9	38 33.2	+59.6	148.3	37 42.1	+59.6	148.7	36 50.7	+59.7	149.1	35 59.1	+59.8	149.5	**29**
30	42 54.7	+59.2	146.3	42 04.6	+59.3	146.8	41 14.3	+59.4	147.3	40 23.7	+59.5	147.7	39 32.8	+59.6	148.2	38 41.7	+59.7	148.6	37 50.4	+59.8	149.0	36 58.9	+59.8	149.4	**30**
31	43 53.9	+59.1	146.1	43 03.9	+59.3	146.6	42 13.7	+59.4	147.1	41 23.2	+59.5	147.6	40 32.4	+59.6	148.0	39 41.4	+59.7	148.5	38 50.2	+59.7	148.9	37 58.7	+59.8	149.3	**31**
32	44 53.0	+59.1	145.8	44 03.2	+59.2	146.4	43 13.1	+59.3	146.9	42 22.7	+59.5	147.4	41 32.0	+59.6	147.9	40 41.1	+59.6	148.3	39 49.9	+59.7	148.8	38 58.5	+59.7	149.2	**32**
33	45 52.1	+59.0	145.6	45 02.4	+59.2	146.1	44 12.4	+59.4	146.7	43 22.2	+59.4	147.2	42 31.6	+59.5	147.7	41 40.7	+59.7	148.2	40 49.6	+59.7	148.6	39 58.2	+59.8	149.1	**33**
34	46 51.1	+59.1	145.3	46 01.6	+59.2	145.9	45 11.8	+59.3	146.5	44 21.6	+59.4	147.0	43 31.1	+59.6	147.5	42 40.4	+59.6	148.0	41 49.3	+59.7	148.5	40 58.0	+59.8	149.0	**34**
35	47 50.2	+59.0	145.0	47 00.8	+59.1	145.7	46 11.1	+59.3	146.3	45 21.0	+59.4	146.8	44 30.7	+59.5	147.4	43 40.0	+59.6	147.9	42 49.0	+59.7	148.4	41 57.8	+59.8	148.9	**35**
36	48 49.2	+58.9	144.8	47 59.9	+59.2	145.4	47 10.4	+59.2	146.0	46 20.4	+59.4	146.6	45 30.2	+59.5	147.2	44 39.6	+59.6	147.7	43 48.7	+59.7	148.2	42 57.6	+59.7	148.7	**36**
37	49 48.1	+58.9	144.5	48 59.1	+59.0	145.2	48 09.6	+59.3	145.8	47 19.8	+59.4	146.4	46 29.7	+59.4	147.0	45 39.2	+59.6	147.6	44 48.4	+59.7	148.1	43 57.3	+59.8	148.6	**37**
38	50 47.0	+58.9	144.2	49 58.1	+59.1	144.9	49 08.9	+59.2	145.6	48 19.2	+59.3	146.2	47 29.1	+59.5	146.8	46 38.8	+59.5	147.4	45 48.1	+59.6	148.0	44 57.1	+59.7	148.5	**38**
39	51 45.9	+58.8	143.9	50 57.2	+59.0	144.6	50 08.1	+59.1	145.3	49 18.5	+59.3	146.0	48 28.6	+59.4	146.6	47 38.3	+59.6	147.2	46 47.7	+59.7	147.8	45 56.8	+59.7	148.4	**39**
40	52 44.7	+58.7	143.6	51 56.2	+58.9	144.3	51 07.2	+59.1	145.0	50 17.8	+59.3	145.7	49 28.0	+59.5	146.4	48 37.9	+59.5	147.0	47 47.4	+59.6	147.6	46 56.5	+59.8	148.2	**40**
41	53 43.4	+58.7	143.2	52 55.1	+58.9	144.0	52 06.3	+59.1	144.8	51 17.1	+59.3	145.5	50 27.5	+59.4	146.2	49 37.4	+59.5	146.8	48 47.0	+59.6	147.5	47 56.3	+59.7	148.1	**41**
42	54 42.1	+58.6	142.9	53 54.0	+58.9	143.7	53 05.4	+59.1	144.5	52 16.4	+59.2	145.2	51 26.9	+59.3	146.0	50 36.9	+59.5	146.6	49 46.6	+59.6	147.3	48 56.0	+59.7	147.9	**42**
43	55 40.7	+58.6	142.5	54 52.9	+58.8	143.4	54 04.5	+59.0	144.2	53 15.6	+59.1	145.0	52 26.2	+59.3	145.7	51 36.4	+59.5	146.4	50 46.2	+59.6	147.1	49 55.7	+59.6	147.8	**43**
44	56 39.3	+58.5	142.1	55 51.7	+58.7	143.0	55 03.5	+58.9	143.9	54 14.7	+59.2	144.7	53 25.5	+59.3	145.5	52 35.9	+59.4	146.2	51 45.8	+59.6	146.9	50 55.3	+59.7	147.6	**44**
45	57 37.8	+58.4	141.7	56 50.4	+58.6	142.6	56 02.4	+58.9	143.5	55 13.9	+59.1	144.4	54 24.8	+59.3	145.2	53 35.3	+59.5	146.0	52 45.4	+59.5	146.7	51 55.0	+59.7	147.4	**45**
46	58 36.2	+58.3	141.2	57 49.0	+58.6	142.2	57 01.3	+58.8	143.2	56 13.0	+59.0	144.1	55 24.1	+59.2	144.9	54 34.8	+59.3	145.8	53 44.9	+59.6	146.5	52 54.7	+59.6	147.3	**46**
47	59 34.5	+58.1	140.8	58 47.6	+58.5	141.8	58 00.1	+58.8	142.8	57 12.0	+59.0	143.8	56 23.3	+59.2	144.7	55 34.1	+59.4	145.5	54 44.5	+59.5	146.3	53 54.3	+59.6	147.1	**47**
48	60 32.6	+58.1	140.3	59 46.1	+58.4	141.4	58 58.9	+58.7	142.4	58 11.0	+58.9	143.4	57 22.5	+59.2	144.4	56 33.5	+59.3	145.2	55 44.0	+59.4	146.1	54 53.9	+59.6	146.9	**48**
49	61 30.7	+58.0	139.8	60 44.5	+58.3	140.9	59 57.6	+58.6	142.0	59 09.9	+58.9	143.1	58 21.7	+59.1	144.0	57 32.8	+59.3	145.0	56 43.4	+59.5	145.9	55 53.5	+59.6	146.7	**49**
50	62 28.7	+57.8	139.2	61 42.8	+58.2	140.4	60 56.2	+58.5	141.6	60 08.8	+58.8	142.7	59 20.8	+59.0	143.7	58 32.1	+59.2	144.7	57 42.9	+59.4	145.6	56 53.1	+59.6	146.5	**50**
51	63 26.5	+57.7	138.6	62 41.0	+58.1	139.9	61 54.7	+58.4	141.1	61 07.6	+58.7	142.3	60 19.8	+59.0	143.4	59 31.3	+59.2	144.4	58 42.3	+59.4	145.3	57 52.7	+59.5	146.2	**51**
52	64 24.2	+57.5	138.0	63 39.1	+57.9	139.4	62 53.1	+58.3	140.6	62 06.3	+58.7	141.8	61 18.8	+58.9	143.0	60 30.5	+59.2	144.0	59 41.7	+59.3	145.1	58 52.2	+59.5	146.0	**52**
53	65 21.7	+57.2	137.3	64 37.0	+57.8	138.8	63 51.4	+58.2	140.1	63 05.0	+58.5	141.4	62 17.7	+58.8	142.6	61 29.7	+59.1	143.7	60 41.0	+59.3	144.8	59 51.7	+59.5	145.8	**53**
54	66 18.9	+57.1	136.6	65 34.8	+57.6	138.1	64 49.6	+58.1	139.6	64 03.5	+58.4	140.9	63 16.5	+58.8	142.1	62 28.8	+59.0	143.3	61 40.3	+59.3	144.4	60 51.2	+59.4	145.5	**54**
55	67 16.0	+56.8	135.8	66 32.4	+57.4	137.4	65 47.7	+57.9	138.9	65 01.9	+58.3	140.4	64 15.3	+58.7	141.7	63 27.8	+59.0	142.9	62 39.6	+59.2	144.1	61 50.6	+59.4	145.2	**55**
56	68 12.8	+56.6	135.0	67 29.8	+57.2	136.7	66 45.6	+57.7	138.3	66 00.2	+58.2	139.8	65 14.0	+58.5	141.2	64 26.8	+58.8	142.5	63 38.8	+59.1	143.7	62 50.0	+59.4	144.9	**56**
57	69 09.4	+56.2	134.1	68 27.0	+56.9	135.9	67 43.3	+57.5	137.6	66 58.4	+58.0	139.2	66 12.5	+58.5	140.7	65 25.6	+58.8	142.1	64 37.9	+59.1	143.4	63 49.4	+59.3	144.6	**57**
58	70 05.6	+55.9	133.1	69 23.9	+56.6	135.0	68 40.8	+57.3	136.8	67 56.4	+57.9	138.5	67 11.0	+58.3	140.1	66 24.4	+58.7	141.6	65 37.0	+59.0	142.9	64 48.7	+59.3	144.2	**58**
59	71 01.5	+55.4	132.0	70 20.5	+56.3	134.0	69 38.1	+57.0	136.0	68 54.3	+57.6	137.8	68 09.3	+58.1	139.5	67 23.1	+58.6	141.0	66 36.0	+58.9	142.5	65 48.0	+59.2	143.9	**59**
60	71 56.9	+54.9	130.8	71 16.8	+56.0	133.0	70 35.1	+56.8	135.1	69 51.9	+57.5	137.0	69 07.4	+58.0	138.8	68 21.7	+58.4	140.5	67 34.9	+58.8	142.0	66 47.2	+59.1	143.5	**60**
61	72 51.8	+54.4	129.4	72 12.8	+55.4	131.8	71 31.9	+56.4	134.1	70 49.4	+57.1	136.1	70 05.4	+57.8	138.1	69 20.1	+58.3	139.8	68 33.7	+58.8	141.5	67 46.3	+59.0	143.0	**61**
62	73 46.2	+53.7	127.9	73 08.2	+55.0	130.6	72 28.3	+55.9	133.0	71 46.5	+56.8	135.2	71 03.2	+57.5	137.2	70 18.4	+58.2	139.2	69 32.5	+58.6	140.9	68 45.3	+59.0	142.5	**62**
63	74 39.9	+52.8	126.3	74 03.2	+54.3	129.1	73 24.2	+55.5	131.7	72 43.3	+56.5	134.1	72 00.7	+57.3	136.4	71 16.6	+57.9	138.4	70 31.1	+58.4	140.3	69 44.3	+58.9	142.0	**63**
64	75 32.7	+51.9	124.5	74 57.5	+53.5	127.5	74 19.7	+54.9	130.4	73 39.8	+56.1	133.0	72 58.0	+57.0	135.4	72 14.5	+57.7	137.6	71 29.5	+58.3	139.6	70 43.2	+58.7	141.4	**64**
65	76 24.6	+50.8	122.4	75 51.0	+52.7	125.7	75 14.6	+54.3	128.8	74 35.9	+55.5	131.7	73 55.0	+56.5	134.3	73 12.2	+57.4	136.6	72 27.8	+58.1	138.8	71 41.9	+58.7	140.8	**65**
66	77 15.4	+49.3	120.0	76 43.7	+51.5	123.7	76 08.9	+53.4	127.1	75 31.4	+54.9	130.2	74 51.5	+56.2	133.0	74 09.6	+57.1	135.6	73 25.9	+57.8	138.0	72 40.6	+58.4	140.1	**66**
67	78 04.7	+47.6	117.4	77 35.2	+50.3	121.4	77 02.3	+52.4	125.1	76 26.3	+54.2	128.5	75 47.7	+55.5	131.6	75 06.7	+56.7	134.4	74 23.7	+57.6	137.0	73 39.0	+58.3	139.3	**67**
68	78 52.3	*+45.5*	•114.3	78 25.5	+48.5	118.8	77 54.7	+51.1	122.9	77 20.5	+53.2	126.6	76 43.2	+54.9	130.0	76 03.4	+56.2	133.1	75 21.3	+57.2	135.9	74 37.3	+58.0	138.5	**68**
69	79 37.8	*+42.9*	•110.8	79 14.0	*+46.6*	•115.8	78 45.8	+49.6	120.3	78 13.7	+52.0	124.4	77 38.1	+54.1	128.2	76 59.6	+55.6	131.6	76 18.5	+56.8	134.7	75 35.3	+57.7	137.5	**69**
70	80 20.7	*+39.6*	•106.8	80 00.6	*+44.0*	•112.2	79 35.4	*+47.6*	•117.3	79 05.7	+50.7	121.9	78 32.2	+52.9	126.1	77 55.2	+54.9	129.9	77 15.3	+56.3	133.3	76 33.0	+57.4	136.3	**70**
71	81 00.3	*+35.6*	•102.2	80 44.6	*+40.7*	•108.2	80 23.0	*+45.2*	•113.8	79 56.4	*+48.7*	•119.0	79 25.1	+51.7	123.7	78 50.1	+53.9	127.9	78 11.6	+55.7	131.7	77 30.4	+57.0	135.0	**71**
72	81 35.9	*+30.7*	• 96.8	81 25.3	*+36.7*	•103.4	81 08.2	*+42.0*	•109.7	80 45.1	*+46.4*	•115.5	80 16.8	*+49.9*	•120.8	79 44.0	+52.7	125.5	79 07.3	+54.8	129.8	78 27.4	+56.4	133.5	**72**
73	82 06.6	*+24.8*	• 90.8	82 02.0	*+31.7*	• 97.9	81 50.2	*+37.9*	•104.9	81 31.5	*+43.2*	•111.4	81 06.7	*+47.7*	•117.3	80 36.7	+51.1	122.7	80 02.1	+53.8	127.5	79 23.8	+55.7	131.8	**73**
74	82 31.4	*+17.8*	• 84.0	82 33.7	*+25.5*	• 91.6	82 28.1	*+32.7*	• 99.2	82 14.7	*+39.3*	•106.4	81 54.4	*+44.6*	•113.2	81 27.8	*+48.9*	•119.3	80 55.9	+52.3	124.8	80 19.5	+54.8	129.6	**74**
75	82 49.2	*+10.0*	• 76.5	82 59.2	*+18.2*	• 84.4	83 00.8	*+26.3*	• 92.5	82 54.0	*+33.9*	•100.6	82 39.0	*+40.6*	•108.2	82 16.7	*+46.1*	•115.3	81 48.2	*+50.3*	•121.5	81 14.3	+53.5	127.1	**75**
76	82 59.2	*+1.6*	• 68.5	83 17.4	*+9.7*	• 76.4	83 27.1	*+18.5*	• 84.9	83 27.9	*+27.2*	• 93.6	83 19.6	*+35.3*	•102.2	83 02.8	*+42.2*	•110.2	82 38.5	*+47.7*	•117.5	82 07.8	*+51.7*	•124.0	**76**
77	83 00.8	*−6.8*	• 60.3	83 27.1	*+0.8*	• 67.8	83 45.6	*+9.5*	• 76.3	83 55.1	*+18.9*	• 85.5	83 54.9	*+28.3*	• 94.9	83 45.0	*+36.8*	•104.0	83 26.2	*+43.8*	•112.5	82 59.5	*+49.3*	•120.0	**77**
78	82 54.0	*−15.0*	• 52.2	83 27.9	*−8.3*	• 59.1	83 55.1	*−0.2*	• 67.1	84 14.0	*+9.2*	• 76.3	84 23.2	*+19.3*	• 86.2	84 21.8	*+29.4*	• 96.4	84 10.0	*+38.5*	•106.2	83 48.8	*+45.7*	•115.1	**78**
79	82 39.0	*−22.3*	• 44.4	83 19.6	*−16.8*	• 50.4	83 54.9	*−9.9*	• 57.7	84 23.2	*−1.4*	• 66.3	84 42.5	*+8.7*	• 76.2	84 51.2	*+19.9*	• 87.1	84 48.5	*+30.8*	• 98.2	84 34.5	*+40.4*	•108.6	**79**
80	82 16.7	*−28.5*	• 37.4	83 02.8	*−24.3*	• 42.3	83 45.0	*−18.8*	• 48.5	84 21.8	*−11.8*	• 56.1	84 51.2	*−2.7*	• 65.4	85 11.1	*+8.2*	• 76.2	85 19.3	*+20.4*	• 88.2	85 14.9	*+32.4*	•100.3	**80**
81	81 48.2	*−33.9*	• 31.0	82 38.5	*−30.7*	• 35.0	83 26.2	*−26.7*	• 40.0	84 10.0	*−21.2*	• 46.3	84 48.5	*−14.0*	• 54.2	85 19.3	*−4.4*	• 64.2	85 39.7	*+7.6*	• 76.2	85 47.3	*+21.2*	• 89.5	**81**
82	81 14.3	*−38.2*	• 25.4	82 07.8	*−36.0*	• 28.5	82 59.5	*−33.0*	• 32.4	83 48.8	*−29.1*	• 37.3	84 34.5	*−23.8*	• 43.7	85 14.9	*−16.6*	• 52.1	85 47.3	*−6.5*	• 62.8	86 08.5	*+6.7*	• 76.1	**82**
83	80 36.1	*−41.7*	• 20.5	81 31.8	*−40.1*	• 22.9	82 26.5	*−38.1*	• 25.8	83 19.7	*−35.4*	• 29.5	84 10.7	*−31.8*	• 34.3	84 58.3	*−26.7*	• 40.8	85 40.8	*−19.5*	• 49.4	86 15.2	*−9.0*	• 61.1	**83**
84	79 54.4	*−44.6*	• 16.3	80 51.7	*−43.5*	• 18.0	81 48.4	*−42.1*	• 20.1	82 44.3	*−40.4*	• 22.8	83 38.9	*−38.1*	• 26.3	84 31.6	*−34.8*	• 31.0	85 21.3	*−30.1*	• 37.3	86 06.2	*−23.1*	• 46.2	**84**
85	79 09.8	*−46.8*	• 12.6	80 08.2	*−46.1*	• 13.8	81 06.3	*−45.3*	• 15.3	82 03.9	*−44.2*	• 17.2	83 00.8	*−42.7*	• 19.7	83 56.8	*−40.8*	• 22.8	84 51.2	*−38.0*	• 27.1	85 43.1	*−33.8*	• 33.2	**85**
86	78 23.0	−48.8	9.4	79 22.1	−48.3	10.2	80 21.0	*−47.7*	• 11.3	81 19.7	*−47.0*	• 12.5	82 18.1	*−46.2*	• 14.2	83 16.0	*−45.0*	• 16.2	84 13.2	*−43.5*	• 19.0	85 09.3	*−41.2*	• 22.8	**86**
87	77 34.2	−50.2	6.6	78 33.8	−50.0	7.1	79 33.3	−49.7	7.8	80 32.7	*−49.3*	• 8.6	81 31.9	*−48.8*	• 9.6	82 31.0	*−48.2*	• 10.9	83 29.7	*−47.4*	• 12.5	84 28.1	*−46.3*	• 14.8	**87**
88	76 44.0	−51.5	4.1	77 43.8	−51.3	4.4	78 43.6	−51.2	4.8	79 43.4	−51.0	5.3	80 43.1	−50.8	5.8	81 42.8	*−50.5*	• 6.5	82 42.3	*−50.1*	• 7.4	83 41.8	*−49.7*	• 8.6	**88**
89	75 52.5	−52.5	1.9	76 52.5	−52.5	2.1	77 52.4	−52.4	2.2	78 52.4	−52.4	2.4	79 52.3	−52.3	2.7	80 52.3	−52.3	3.0	81 52.2	−52.2	3.3	82 52.1	*−52.1*	• 3.8	**89**
90	75 00.0	−53.4	0.0	76 00.0	−53.4	0.0	77 00.0	−53.4	0.0	78 00.0	−53.5	0.0	79 00.0	−53.5	0.0	80 00.0	−53.6	0.0	81 00.0	−53.6	0.0	82 00.0	−53.7	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 28°, 332°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 12.6	–59.5	151.2	12 20.0	–59.6	151.3	11 27.4	–59.7	151.4	10 34.7	–59.7	151.5	9 41.9	–59.7	151.6	8 49.2	–59.8	151.6	7 56.4	–59.9	151.7	7 03.5	–59.9	151.8	**0**
1	12 13.1	–59.6	151.3	11 20.4	–59.6	151.4	10 27.7	–59.6	151.5	9 35.0	–59.7	151.6	8 42.2	–59.8	151.6	7 49.4	–59.8	151.7	6 56.5	–59.8	151.8	6 03.6	–59.8	151.8	**1**
2	11 13.5	–59.5	151.4	10 20.8	–59.6	151.5	9 28.1	–59.7	151.6	8 35.3	–59.7	151.7	7 42.4	–59.7	151.7	6 49.6	–59.8	151.8	5 56.7	–59.9	151.9	5 03.8	–59.9	151.9	**2**
3	10 14.0	–59.5	151.5	9 21.2	–59.6	151.6	8 28.4	–59.6	151.7	7 35.6	–59.7	151.8	6 42.7	–59.8	151.8	5 49.8	–59.8	151.9	4 56.8	–59.8	151.9	4 03.9	–59.9	152.0	**3**
4	9 14.5	–59.6	151.7	8 21.6	–59.6	151.7	7 28.8	–59.7	151.8	6 35.9	–59.8	151.9	5 42.9	–59.7	151.9	4 50.0	–59.8	152.0	3 57.0	–59.8	152.0	3 04.0	–59.8	152.0	**4**
5	8 14.9	–59.5	151.8	7 22.0	–59.6	151.9	6 29.1	–59.7	151.9	5 36.1	–59.7	152.0	4 43.2	–59.8	152.0	3 50.2	–59.8	152.0	2 57.2	–59.9	152.1	2 04.2	–59.9	152.1	**5**
6	7 15.4	–59.6	151.9	6 22.4	–59.6	152.0	5 29.4	–59.6	152.0	4 36.4	–59.7	152.1	3 43.4	–59.7	152.1	2 50.4	–59.8	152.1	1 57.3	–59.8	152.1	1 04.3	–59.9	152.2	**6**
7	6 15.8	–59.5	152.0	5 22.8	–59.6	152.1	4 29.8	–59.7	152.1	3 36.7	–59.7	152.2	2 43.7	–59.8	152.2	1 50.6	–59.8	152.2	0 57.5	–59.8	152.2	0 04.4	–59.9	152.2	**7**
8	5 16.3	–59.6	152.2	4 23.2	–59.6	152.2	3 30.1	–59.7	152.2	2 37.0	–59.7	152.3	1 43.9	–59.8	152.3	0 50.8	–59.8	152.3	0 02.3	+59.9	27.7	0 55.5	+59.8	27.7	**8**
9	4 16.7	–59.5	152.3	3 23.6	–59.6	152.3	2 30.4	–59.6	152.3	1 37.3	–59.7	152.4	0 44.1	–59.7	152.4	0 09.0	+59.8	27.6	1 02.2	+59.8	27.6	1 55.3	+59.9	27.6	**9**
10	3 17.2	–59.6	152.4	2 24.0	–59.6	152.4	1 30.8	–59.7	152.5	0 37.6	–59.7	152.5	0 15.6	+59.8	27.5	1 08.8	+59.8	27.5	2 02.0	+59.9	27.6	2 55.2	+59.9	27.6	**10**
11	2 17.6	–59.5	152.5	1 24.4	–59.6	152.5	0 31.1	–59.6	152.6	0 22.1	+59.7	27.4	1 15.4	+59.7	27.4	2 08.6	+59.8	27.5	3 01.9	+59.8	27.5	3 55.1	+59.8	27.5	**11**
12	1 18.1	–59.6	152.7	0 24.8	–59.7	152.7	0 28.5	+59.7	27.3	1 21.8	+59.8	27.3	2 15.1	+59.8	27.4	3 08.4	+59.8	27.4	4 01.7	+59.8	27.4	4 54.9	+59.9	27.4	**12**
13	0 18.5	–59.6	152.8	0 34.9	+59.6	27.2	1 28.2	+59.7	27.2	2 21.6	+59.7	27.2	3 14.9	+59.8	27.3	4 08.2	+59.8	27.3	5 01.5	+59.9	27.3	5 54.8	+59.9	27.4	**13**
14	0 41.1	+59.5	27.1	1 34.5	+59.6	27.1	2 27.9	+59.6	27.1	3 21.3	+59.7	27.1	4 14.7	+59.7	27.2	5 08.0	+59.8	27.2	6 01.4	+59.8	27.3	6 54.7	+59.9	27.3	**14**
15	1 40.6	+59.6	27.0	2 34.1	+59.6	27.0	3 27.5	+59.7	27.0	4 21.0	+59.7	27.1	5 14.4	+59.8	27.1	6 07.8	+59.8	27.1	7 01.2	+59.8	27.2	7 54.6	+59.8	27.2	**15**
16	2 40.2	+59.5	26.9	3 33.7	+59.6	26.9	4 27.2	+59.7	26.9	5 20.7	+59.7	27.0	6 14.2	+59.7	27.0	7 07.6	+59.8	27.1	8 01.0	+59.9	27.1	8 54.4	+59.9	27.2	**16**
17	3 39.7	+59.6	26.7	4 33.3	+59.6	26.8	5 26.9	+59.6	26.8	6 20.4	+59.7	26.9	7 13.9	+59.8	26.9	8 07.4	+59.8	27.0	9 00.9	+59.8	27.0	9 54.3	+59.9	27.1	**17**
18	4 39.3	+59.5	26.6	5 32.9	+59.6	26.7	6 26.5	+59.7	26.7	7 20.1	+59.7	26.8	8 13.7	+59.7	26.8	9 07.2	+59.8	26.9	10 00.7	+59.8	27.0	10 54.2	+59.8	27.0	**18**
19	5 38.8	+59.6	26.5	6 32.5	+59.6	26.5	7 26.2	+59.6	26.6	8 19.8	+59.7	26.7	9 13.4	+59.8	26.7	10 07.0	+59.8	26.8	11 00.5	+59.9	26.9	11 54.0	+59.9	27.0	**19**
20	6 38.4	+59.5	26.4	7 32.1	+59.6	26.4	8 25.8	+59.7	26.5	9 19.5	+59.7	26.6	10 13.2	+59.7	26.6	11 06.8	+59.8	26.7	12 00.4	+59.8	26.8	12 53.9	+59.9	26.9	**20**
21	7 37.9	+59.6	26.2	8 31.7	+59.6	26.3	9 25.5	+59.7	26.4	10 19.2	+59.7	26.5	11 12.9	+59.8	26.5	12 06.6	+59.8	26.6	13 00.2	+59.8	26.7	13 53.8	+59.8	26.8	**21**
22	8 37.5	+59.5	26.1	9 31.3	+59.6	26.2	10 25.2	+59.6	26.3	11 18.9	+59.7	26.4	12 12.7	+59.7	26.4	13 06.4	+59.8	26.5	14 00.0	+59.9	26.7	14 53.6	+59.9	26.8	**22**
23	9 37.0	+59.6	26.0	10 30.9	+59.6	26.1	11 24.8	+59.7	26.2	12 18.6	+59.7	26.3	13 12.4	+59.8	26.4	14 06.2	+59.8	26.5	14 59.9	+59.8	26.6	15 53.5	+59.8	26.7	**23**
24	10 36.6	+59.5	25.9	11 30.5	+59.6	26.0	12 24.5	+59.6	26.0	13 18.3	+59.7	26.1	14 12.2	+59.7	26.3	15 06.0	+59.7	26.4	15 59.7	+59.8	26.5	16 53.3	+59.9	26.6	**24**
25	11 36.1	+59.5	25.7	12 30.1	+59.6	25.8	13 24.1	+59.6	25.9	14 18.0	+59.7	26.0	15 11.9	+59.7	26.2	16 05.7	+59.8	26.3	16 59.5	+59.8	26.4	17 53.2	+59.9	26.6	**25**
26	12 35.6	+59.6	25.6	13 29.7	+59.6	25.7	14 23.7	+59.7	25.8	15 17.7	+59.7	25.9	16 11.6	+59.8	26.1	17 05.5	+59.8	26.2	17 59.3	+59.8	26.3	18 53.1	+59.8	26.5	**26**
27	13 35.2	+59.5	25.5	14 29.3	+59.6	25.6	15 23.4	+59.6	25.7	16 17.4	+59.7	25.8	17 11.4	+59.7	26.0	18 05.3	+59.8	26.1	18 59.1	+59.9	26.3	19 52.9	+59.9	26.4	**27**
28	14 34.7	+59.5	25.4	15 28.9	+59.6	25.5	16 23.0	+59.7	25.6	17 17.1	+59.7	25.7	18 11.1	+59.8	25.9	19 05.1	+59.8	26.0	19 59.0	+59.8	26.2	20 52.8	+59.8	26.3	**28**
29	15 34.2	+59.5	25.2	16 28.5	+59.5	25.4	17 22.7	+59.6	25.5	18 16.8	+59.7	25.6	19 10.9	+59.7	25.8	20 04.9	+59.7	25.9	20 58.8	+59.8	26.1	21 52.6	+59.9	26.3	**29**
30	16 33.7	+59.5	25.1	17 28.0	+59.6	25.2	18 22.3	+59.6	25.4	19 16.5	+59.6	25.5	20 10.6	+59.7	25.7	21 04.6	+59.8	25.8	21 58.6	+59.8	26.0	22 52.5	+59.8	26.2	**30**
31	17 33.2	+59.6	25.0	18 27.6	+59.6	25.1	19 21.9	+59.6	25.2	20 16.1	+59.7	25.4	21 10.3	+59.7	25.6	22 04.4	+59.8	25.7	22 58.4	+59.8	25.9	23 52.3	+59.9	26.1	**31**
32	18 32.8	+59.5	24.8	19 27.2	+59.5	25.0	20 21.5	+59.6	25.1	21 15.8	+59.7	25.3	22 10.0	+59.7	25.5	23 04.2	+59.7	25.6	23 58.2	+59.8	25.8	24 52.2	+59.8	26.0	**32**
33	19 32.3	+59.5	24.7	20 26.7	+59.6	24.8	21 21.1	+59.7	25.0	22 15.5	+59.6	25.2	23 09.7	+59.8	25.4	24 03.9	+59.8	25.5	24 58.0	+59.8	25.7	25 52.0	+59.8	25.9	**33**
34	20 31.8	+59.4	24.6	21 26.3	+59.5	24.7	22 20.8	+59.6	24.9	23 15.1	+59.7	25.1	24 09.5	+59.7	25.2	25 03.7	+59.7	25.4	25 57.8	+59.8	25.7	26 51.8	+59.9	25.9	**34**
35	21 31.2	+59.5	24.4	22 25.8	+59.6	24.6	23 20.4	+59.6	24.8	24 14.8	+59.7	24.9	25 09.2	+59.7	25.1	26 03.4	+59.8	25.3	26 57.6	+59.8	25.6	27 51.7	+59.8	25.8	**35**
36	22 30.7	+59.5	24.3	23 25.4	+59.5	24.5	24 20.0	+59.6	24.6	25 14.5	+59.6	24.8	26 08.9	+59.7	25.0	27 03.2	+59.7	25.2	27 57.4	+59.8	25.5	28 51.5	+59.9	25.7	**36**
37	23 30.2	+59.5	24.1	24 24.9	+59.5	24.3	25 19.6	+59.5	24.5	26 14.1	+59.6	24.7	27 08.6	+59.7	24.9	28 02.9	+59.8	25.1	28 57.2	+59.8	25.4	29 51.4	+59.8	25.6	**37**
38	24 29.7	+59.4	24.0	25 24.4	+59.6	24.2	26 19.1	+59.6	24.4	27 13.7	+59.7	24.6	28 08.3	+59.6	24.8	29 02.7	+59.7	25.0	29 57.0	+59.8	25.3	30 51.2	+59.8	25.5	**38**
39	25 29.1	+59.5	23.8	26 24.0	+59.5	24.0	27 18.7	+59.6	24.2	28 13.4	+59.6	24.5	29 07.9	+59.7	24.7	30 02.4	+59.7	24.9	30 56.8	+59.7	25.2	31 51.0	+59.8	25.4	**39**
40	26 28.6	+59.4	23.7	27 23.5	+59.5	23.9	28 18.3	+59.5	24.1	29 13.0	+59.6	24.3	30 07.6	+59.7	24.6	31 02.1	+59.8	24.8	31 56.5	+59.8	25.1	32 50.8	+59.8	25.3	**40**
41	27 28.0	+59.4	23.5	28 23.0	+59.5	23.7	29 17.8	+59.6	24.0	30 12.6	+59.6	24.2	31 07.3	+59.7	24.4	32 01.9	+59.7	24.7	32 56.3	+59.8	25.0	33 50.6	+59.9	25.3	**41**
42	28 27.4	+59.5	23.4	29 22.5	+59.5	23.6	30 17.4	+59.5	23.8	31 12.2	+59.6	24.1	32 07.0	+59.6	24.3	33 01.6	+59.7	24.6	33 56.1	+59.7	24.9	34 50.5	+59.8	25.2	**42**
43	29 26.9	+59.4	23.2	30 22.0	+59.4	23.4	31 16.9	+59.6	23.7	32 11.8	+59.6	23.9	33 06.6	+59.7	24.2	34 01.3	+59.7	24.5	34 55.8	+59.8	24.8	35 50.3	+59.8	25.1	**43**
44	30 26.3	+59.4	23.1	31 21.4	+59.5	23.3	32 16.5	+59.5	23.5	33 11.4	+59.6	23.8	34 06.3	+59.6	24.1	35 01.0	+59.7	24.4	35 55.6	+59.7	24.6	36 50.1	+59.8	25.0	**44**
45	31 25.7	+59.3	22.9	32 20.9	+59.4	23.1	33 16.0	+59.5	23.4	34 11.0	+59.6	23.7	35 05.9	+59.7	23.9	36 00.7	+59.7	24.2	36 55.3	+59.8	24.5	37 49.9	+59.8	24.9	**45**
46	32 25.0	+59.4	22.7	33 20.3	+59.5	23.0	34 15.5	+59.5	23.2	35 10.6	+59.6	23.5	36 05.6	+59.6	23.8	37 00.4	+59.7	24.1	37 55.1	+59.7	24.4	38 49.7	+59.7	24.7	**46**
47	33 24.4	+59.4	22.6	34 19.8	+59.4	22.8	35 15.0	+59.5	23.1	36 10.2	+59.5	23.4	37 05.2	+59.6	23.7	38 00.1	+59.6	24.0	38 54.8	+59.8	24.3	39 49.4	+59.8	24.6	**47**
48	34 23.8	+59.3	22.4	35 19.2	+59.4	22.6	36 14.5	+59.5	22.9	37 09.7	+59.6	23.2	38 04.8	+59.6	23.5	38 59.7	+59.7	23.8	39 54.6	+59.7	24.2	40 49.2	+59.8	24.5	**48**
49	35 23.1	+59.3	22.2	36 18.6	+59.4	22.5	37 14.0	+59.5	22.8	38 09.3	+59.5	23.1	39 04.4	+59.6	23.4	39 59.4	+59.7	23.7	40 54.3	+59.7	24.0	41 49.0	+59.8	24.4	**49**
50	36 22.4	+59.3	22.0	37 18.0	+59.4	22.3	38 13.5	+59.4	22.6	39 08.8	+59.5	22.9	40 04.0	+59.6	23.2	40 59.1	+59.6	23.6	41 54.0	+59.7	23.9	42 48.8	+59.7	24.3	**50**
51	37 21.7	+59.3	21.8	38 17.4	+59.3	22.1	39 12.9	+59.4	22.4	40 08.3	+59.5	22.7	41 03.6	+59.5	23.1	41 58.7	+59.6	23.4	42 53.7	+59.7	23.8	43 48.5	+59.8	24.2	**51**
52	38 21.0	+59.3	21.6	39 16.7	+59.4	21.9	40 12.3	+59.4	22.2	41 07.8	+59.5	22.6	42 03.1	+59.6	22.9	42 58.3	+59.7	23.3	43 53.4	+59.7	23.6	44 48.3	+59.7	24.0	**52**
53	39 20.3	+59.2	21.4	40 16.1	+59.3	21.7	41 11.7	+59.4	22.1	42 07.3	+59.5	22.4	43 02.7	+59.5	22.7	43 58.0	+59.6	23.1	44 53.1	+59.6	23.5	45 48.0	+59.7	23.9	**53**
54	40 19.5	+59.2	21.2	41 15.4	+59.3	21.5	42 11.1	+59.4	21.9	43 06.8	+59.4	22.2	44 02.2	+59.6	22.6	44 57.6	+59.6	23.0	45 52.7	+59.7	23.4	46 47.7	+59.8	23.8	**54**
55	41 18.7	+59.2	21.0	42 14.7	+59.3	21.3	43 10.5	+59.4	21.7	44 06.2	+59.4	22.0	45 01.8	+59.5	22.4	45 57.2	+59.5	22.8	46 52.4	+59.6	23.2	47 47.5	+59.7	23.6	**55**
56	42 17.9	+59.2	20.8	43 14.0	+59.2	21.1	44 09.9	+59.3	21.5	45 05.6	+59.5	21.8	46 01.3	+59.5	22.2	46 56.7	+59.6	22.6	47 52.0	+59.7	23.0	48 47.2	+59.7	23.5	**56**
57	43 17.1	+59.2	20.6	44 13.2	+59.3	20.9	45 09.2	+59.3	21.3	46 05.1	+59.4	21.6	47 00.8	+59.4	22.0	47 56.3	+59.5	22.4	48 51.7	+59.6	22.9	49 46.9	+59.6	23.3	**57**
58	44 16.3	+59.1	20.3	45 12.5	+59.2	20.7	46 08.5	+59.3	21.0	47 04.5	+59.3	21.4	48 00.2	+59.5	21.8	48 55.8	+59.6	22.3	49 51.3	+59.6	22.7	50 46.5	+59.7	23.2	**58**
59	45 15.4	+59.1	20.1	46 11.7	+59.1	20.4	47 07.8	+59.3	20.8	48 03.8	+59.4	21.2	48 59.7	+59.4	21.6	49 55.4	+59.5	22.1	50 50.9	+59.6	22.5	51 46.2	+59.7	23.0	**59**
60	46 14.5	+59.0	19.8	47 10.8	+59.2	20.2	48 07.1	+59.2	20.6	49 03.2	+59.3	21.0	49 59.1	+59.4	21.4	50 54.9	+59.5	21.9	51 50.5	+59.5	22.3	52 45.9	+59.6	22.8	**60**
61	47 13.5	+59.0	19.6	48 10.0	+59.1	20.0	49 06.3	+59.2	20.3	50 02.5	+59.3	20.8	50 58.5	+59.4	21.2	51 54.4	+59.4	21.6	52 50.0	+59.6	22.1	53 45.5	+59.6	22.6	**61**
62	48 12.5	+59.0	19.3	49 09.1	+59.0	19.7	50 05.5	+59.2	20.1	51 01.8	+59.2	20.5	51 57.9	+59.3	21.0	52 53.8	+59.5	21.4	53 49.6	+59.5	21.9	54 45.1	+59.6	22.5	**62**
63	49 11.5	+58.9	19.0	50 08.1	+59.1	19.4	51 04.7	+59.1	19.8	52 01.0	+59.2	20.3	52 57.2	+59.3	20.7	53 53.3	+59.4	21.2	54 49.1	+59.5	21.7	55 44.7	+59.6	22.3	**63**
64	50 10.4	+58.9	18.7	51 07.2	+59.0	19.1	52 03.8	+59.1	19.6	53 00.2	+59.2	20.0	53 56.5	+59.3	20.5	54 52.7	+59.3	21.0	55 48.6	+59.5	21.5	56 44.3	+59.6	22.0	**64**
65	51 09.3	+58.9	18.4	52 06.2	+58.9	18.8	53 02.9	+59.0	19.3	53 59.4	+59.2	19.7	54 55.8	+59.3	20.2	55 52.0	+59.4	20.7	56 48.1	+59.4	21.2	57 43.9	+59.5	21.8	**65**
66	52 08.2	+58.7	18.1	53 05.1	+58.9	18.5	54 01.9	+59.0	19.0	54 58.6	+59.1	19.4	55 55.1	+59.2	19.9	56 51.4	+59.3	20.4	57 47.5	+59.4	21.0	58 43.4	+59.5	21.6	**66**
67	53 06.9	+58.8	17.8	54 04.0	+58.8	18.2	55 00.9	+59.0	18.7	55 57.7	+59.0	19.1	56 54.3	+59.2	19.6	57 50.7	+59.3	20.2	58 46.9	+59.4	20.7	59 42.9	+59.5	21.3	**67**
68	54 05.7	+58.6	17.5	55 02.8	+58.8	17.9	55 59.9	+58.9	18.3	56 56.7	+59.0	18.8	57 53.5	+59.1	19.3	58 50.0	+59.2	19.9	59 46.3	+59.3	20.4	60 42.4	+59.5	21.1	**68**
69	55 04.3	+58.6	17.1	56 01.6	+58.7	17.5	56 58.8	+58.8	18.0	57 55.7	+59.0	18.5	58 52.6	+59.0	19.0	59 49.2	+59.2	19.6	60 45.6	+59.3	20.1	61 41.9	+59.4	20.8	**69**
70	56 02.9	+58.6	16.7	57 00.3	+58.7	17.1	57 57.6	+58.8	17.6	58 54.7	+58.9	18.1	59 51.6	+59.0	18.7	60 48.4	+59.1	19.2	61 44.9	+59.3	19.8	62 41.3	+59.3	20.5	**70**
71	57 01.5	+58.4	16.3	57 59.0	+58.5	16.8	58 56.4	+58.6	17.2	59 53.6	+58.8	17.7	60 50.6	+59.0	18.3	61 47.5	+59.1	18.9	62 44.2	+59.2	19.5	63 40.6	+59.4	20.2	**71**
72	57 59.9	+58.4	15.9	58 57.5	+58.5	16.3	59 55.0	+58.7	16.8	60 52.4	+58.7	17.3	61 49.6	+58.9	17.9	62 46.6	+59.0	18.5	63 43.4	+59.1	19.1	64 40.0	+59.2	19.8	**72**
73	58 58.3	+58.2	15.4	59 56.0	+58.4	15.9	60 53.7	+58.5	16.4	61 51.1	+58.7	16.9	62 48.5	+58.8	17.5	63 45.6	+58.9	18.1	64 42.5	+59.1	18.7	65 39.2	+59.2	19.4	**73**
74	59 56.5	+58.2	15.0	60 54.4	+58.3	15.4	61 52.2	+58.4	15.9	62 49.8	+58.6	16.5	63 47.3	+58.7	17.0	64 44.5	+58.9	17.7	65 41.6	+59.0	18.3	66 38.4	+59.2	19.0	**74**
75	60 54.7	+58.0	14.5	61 52.7	+58.2	14.9	62 50.6	+58.3	15.4	63 48.4	+58.4	16.0	64 46.0	+58.6	16.6	65 43.4	+58.7	17.2	66 40.6	+58.9	17.9	67 37.6	+59.1	18.6	**75**
76	61 52.7	+57.9	13.9	62 50.9	+58.0	14.4	63 48.9	+58.2	14.9	64 46.8	+58.4	15.5	65 44.6	+58.5	16.0	66 42.1	+58.7	16.7	67 39.5	+58.8	17.4	68 36.7	+58.9	18.1	**76**
77	62 50.6	+57.8	13.4	63 48.9	+57.9	13.8	64 47.1	+58.1	14.4	65 45.2	+58.2	14.9	66 43.1	+58.3	15.5	67 40.8	+58.5	16.1	68 38.3	+58.7	16.9	69 35.6	+58.9	17.6	**77**
78	63 48.4	+57.6	12.8	64 46.8	+57.8	13.2	65 45.2	+57.9	13.7	66 43.4	+58.0	14.3	67 41.4	+58.3	14.9	68 39.3	+58.4	15.6	69 37.0	+58.6	16.3	70 34.5	+58.8	17.1	**78**
79	64 46.0	+57.4	12.1	65 44.6	+57.5	12.6	66 43.1	+57.7	13.1	67 41.4	+57.9	13.6	68 39.7	+58.0	14.3	69 37.7	+58.3	14.9	70 35.6	+58.5	15.6	71 33.3	+58.6	16.4	**79**
80	65 43.4	+57.2	11.4	66 42.1	+57.4	11.9	67 40.8	+57.5	12.4	68 39.3	+57.7	12.9	69 37.7	+57.9	13.5	70 36.0	+58.1	14.2	71 34.1	+58.2	14.9	72 31.9	+58.5	15.8	**80**
81	66 40.6	+57.0	10.7	67 39.5	+57.2	11.1	68 38.3	+57.3	11.6	69 37.0	+57.5	12.2	70 35.6	+57.7	12.8	71 34.1	+57.8	13.4	72 32.3	+58.1	14.2	73 30.4	+58.3	15.0	**81**
82	67 37.6	+56.7	9.9	68 36.7	+56.8	10.3	69 35.6	+57.1	10.8	70 34.5	+57.2	11.3	71 33.3	+57.4	11.9	72 31.9	+57.6	12.6	73 30.4	+57.8	13.3	74 28.7	+58.1	14.1	**82**
83	68 34.3	+56.4	9.0	69 33.5	+56.6	9.4	70 32.7	+56.7	9.9	71 31.7	+57.0	10.4	72 30.7	+57.1	11.0	73 29.5	+57.4	11.6	74 28.2	+57.6	12.3	75 26.8	+57.7	13.2	**83**
84	69 30.7	+56.1	8.1	70 30.1	+56.3	8.5	71 29.4	+56.4	8.9	72 28.7	+56.5	9.4	73 27.8	+56.8	9.9	74 26.9	+56.9	10.5	75 25.8	+57.2	11.2	76 24.5	+57.5	12.1	**84**
85	70 26.8	+55.7	7.0	71 26.4	+55.8	7.4	72 25.8	+56.0	7.8	73 25.2	+56.2	8.2	74 24.6	+56.3	8.8	75 23.8	+56.6	9.3	76 23.0	+56.8	10.0	77 22.0	+57.0	10.8	**85**
86	71 22.5	+55.3	5.9	72 22.2	+55.4	6.2	73 21.8	+55.5	6.6	74 21.4	+55.7	7.0	75 20.9	+55.9	7.4	76 20.4	+56.0	8.0	77 19.8	+56.2	8.6	78 19.0	+56.5	9.3	**86**
87	72 17.8	+54.7	4.6	73 17.6	+54.8	4.9	74 17.3	+55.0	5.2	75 17.1	+55.1	5.6	76 16.8	+55.2	5.9	77 16.4	+55.4	6.4	78 16.0	+55.6	6.9	79 15.5	+55.9	7.6	**87**
88	73 12.5	+54.1	3.3	74 12.4	+54.2	3.5	75 12.3	+54.3	3.7	76 12.2	+54.3	3.9	77 12.0	+54.5	4.2	78 11.8	+54.6	4.6	79 11.6	+54.8	5.0	80 11.4	+54.9	5.5	**88**
89	74 06.6	+53.4	1.7	75 06.6	+53.4	1.8	76 06.6	+53.4	2.0	77 06.5	+53.5	2.1	78 06.5	+53.5	2.3	79 06.4	+53.6	2.5	80 06.4	+53.6	2.7	81 06.3	+53.7	3.0	**89**
90	75 00.0	+52.5	0.0	76 00.0	+52.5	0.0	77 00.0	+52.4	0.0	78 00.0	+52.4	0.0	79 00.0	+52.3	0.0	80 00.0	+52.3	0.0	81 00.0	+52.2	0.0	82 00.0	*+52.1* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 152°, 208°

29°, 331° L.H.A. **LATITUDE SAME NAME AS DECLINATION**

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 05.0	+59.5	150.2	12 12.9	+59.6	150.3	11 20.8	+59.6	150.4	10 28.6	+59.7	150.5	9 36.4	+59.7	150.5	8 44.1	+59.8	150.6	7 51.8	+59.9	150.7	6 59.5	+59.9	150.8	**0**
1	14 04.5	+59.5	150.0	13 12.5	+59.6	150.1	12 20.4	+59.7	150.3	11 28.3	+59.7	150.4	10 36.1	+59.8	150.5	9 43.9	+59.8	150.5	8 51.7	+59.8	150.6	7 59.4	+59.8	150.7	**1**
2	15 04.0	+59.5	149.9	14 12.1	+59.5	150.0	13 20.1	+59.6	150.1	12 28.0	+59.7	150.3	11 35.9	+59.7	150.4	10 43.7	+59.8	150.5	9 51.5	+59.8	150.5	8 59.2	+59.9	150.6	**2**
3	16 03.5	+59.5	149.7	15 11.6	+59.6	149.9	14 19.7	+59.6	150.0	13 27.7	+59.6	150.1	12 35.6	+59.7	150.3	11 43.5	+59.8	150.4	10 51.3	+59.8	150.5	9 59.1	+59.8	150.6	**3**
4	17 03.0	+59.4	149.6	16 11.2	+59.5	149.8	15 19.3	+59.6	149.9	14 27.3	+59.7	150.0	13 35.3	+59.8	150.2	12 43.3	+59.7	150.3	11 51.1	+59.8	150.4	10 58.9	+59.9	150.5	**4**
5	18 02.4	+59.5	149.5	17 10.7	+59.6	149.6	16 18.9	+59.6	149.8	15 27.0	+59.7	149.9	14 35.1	+59.7	150.1	13 43.0	+59.8	150.2	12 50.9	+59.9	150.3	11 58.8	+59.8	150.4	**5**
6	19 01.9	+59.5	149.3	18 10.3	+59.5	149.5	17 18.5	+59.6	149.7	16 26.7	+59.7	149.8	15 34.8	+59.7	150.0	14 42.8	+59.8	150.1	13 50.8	+59.8	150.2	12 58.6	+59.9	150.3	**6**
7	20 01.4	+59.4	149.2	19 09.8	+59.5	149.4	18 18.1	+59.6	149.5	17 26.4	+59.6	149.7	16 34.5	+59.7	149.9	15 42.6	+59.7	150.0	14 50.6	+59.8	150.1	13 58.5	+59.9	150.3	**7**
8	21 00.8	+59.5	149.0	20 09.3	+59.6	149.2	19 17.7	+59.6	149.4	18 26.0	+59.7	149.6	17 34.2	+59.7	149.8	16 42.3	+59.8	149.9	15 50.4	+59.8	150.1	14 58.4	+59.8	150.2	**8**
9	22 00.3	+59.4	148.9	21 08.9	+59.5	149.1	20 17.3	+59.6	149.3	19 25.7	+59.6	149.5	18 33.9	+59.8	149.7	17 42.1	+59.8	149.8	16 50.2	+59.8	150.0	15 58.2	+59.9	150.1	**9**
10	22 59.7	+59.5	148.8	22 08.4	+59.5	149.0	21 16.9	+59.6	149.2	20 25.3	+59.7	149.4	19 33.7	+59.7	149.6	18 41.9	+59.7	149.7	17 50.0	+59.8	149.9	16 58.1	+59.8	150.1	**10**
11	23 59.2	+59.4	148.6	23 07.9	+59.5	148.8	22 16.5	+59.6	149.1	21 25.0	+59.6	149.3	20 33.4	+59.7	149.5	19 41.6	+59.8	149.6	18 49.8	+59.8	149.8	17 57.9	+59.9	150.0	**11**
12	24 58.6	+59.4	148.5	24 07.4	+59.5	148.7	23 16.1	+59.5	148.9	22 24.6	+59.7	149.1	21 33.1	+59.7	149.3	20 41.4	+59.8	149.5	19 49.6	+59.8	149.7	18 57.8	+59.8	149.9	**12**
13	25 58.0	+59.4	148.3	25 06.9	+59.5	148.6	24 15.6	+59.6	148.8	23 24.3	+59.6	149.0	22 32.8	+59.7	149.2	21 41.2	+59.7	149.4	20 49.4	+59.8	149.6	19 57.6	+59.8	149.8	**13**
14	26 57.4	+59.4	148.1	26 06.4	+59.5	148.4	25 15.2	+59.6	148.7	24 23.9	+59.6	148.9	23 32.5	+59.7	149.1	22 40.9	+59.7	149.3	21 49.2	+59.8	149.6	20 57.4	+59.9	149.8	**14**
15	27 56.8	+59.4	148.0	27 05.9	+59.4	148.3	26 14.8	+59.5	148.5	25 23.5	+59.6	148.8	24 32.2	+59.6	149.0	23 40.6	+59.8	149.2	22 49.0	+59.8	149.5	21 57.3	+59.8	149.7	**15**
16	28 56.2	+59.4	147.8	28 05.3	+59.5	148.1	27 14.3	+59.6	148.4	26 23.1	+59.7	148.7	25 31.8	+59.7	148.9	24 40.4	+59.7	149.1	23 48.8	+59.8	149.4	22 57.1	+59.9	149.6	**16**
17	29 55.6	+59.3	147.7	29 04.8	+59.5	148.0	28 13.9	+59.5	148.2	27 22.8	+59.6	148.5	26 31.5	+59.7	148.8	25 40.1	+59.8	149.0	24 48.6	+59.8	149.3	23 57.0	+59.8	149.5	**17**
18	30 54.9	+59.4	147.5	30 04.3	+59.4	147.8	29 13.4	+59.5	148.1	28 22.4	+59.6	148.4	27 31.2	+59.7	148.7	26 39.9	+59.7	148.9	25 48.4	+59.8	149.2	24 56.8	+59.8	149.4	**18**
19	31 54.3	+59.3	147.3	31 03.7	+59.4	147.6	30 12.9	+59.5	148.0	29 22.0	+59.6	148.3	28 30.9	+59.6	148.6	27 39.6	+59.7	148.8	26 48.2	+59.8	149.1	25 56.6	+59.9	149.4	**19**
20	32 53.6	+59.3	147.1	32 03.1	+59.4	147.5	31 12.4	+59.5	147.8	30 21.6	+59.6	148.1	29 30.5	+59.7	148.4	28 39.3	+59.7	148.7	27 48.0	+59.7	149.0	26 56.5	+59.8	149.3	**20**
21	33 52.9	+59.3	147.0	33 02.5	+59.4	147.3	32 11.9	+59.5	147.7	31 21.2	+59.5	148.0	30 30.2	+59.6	148.3	29 39.0	+59.8	148.6	28 47.7	+59.8	148.9	27 56.3	+59.8	149.2	**21**
22	34 52.2	+59.3	146.8	34 01.9	+59.4	147.2	33 11.4	+59.5	147.5	32 20.7	+59.6	147.9	31 29.8	+59.7	148.2	30 38.8	+59.7	148.5	29 47.5	+59.8	148.8	28 56.1	+59.8	149.1	**22**
23	35 51.5	+59.3	146.6	35 01.3	+59.4	147.0	34 10.9	+59.5	147.4	33 20.3	+59.6	147.7	32 29.5	+59.6	148.1	31 38.5	+59.7	148.4	30 47.3	+59.8	148.7	29 55.9	+59.9	149.0	**23**
24	36 50.8	+59.2	146.4	36 00.7	+59.4	146.8	35 10.4	+59.4	147.2	34 19.9	+59.5	147.6	33 29.1	+59.6	147.9	32 38.2	+59.7	148.3	31 47.1	+59.7	148.6	30 55.8	+59.8	148.9	**24**
25	37 50.0	+59.3	146.2	37 00.1	+59.3	146.6	36 09.8	+59.5	147.0	35 19.4	+59.5	147.4	34 28.7	+59.7	147.8	33 37.9	+59.7	148.1	32 46.8	+59.8	148.5	31 55.6	+59.8	148.8	**25**
26	38 49.3	+59.2	146.0	37 59.4	+59.3	146.4	37 09.3	+59.4	146.9	36 18.9	+59.6	147.3	35 28.4	+59.6	147.7	34 37.6	+59.6	148.0	33 46.6	+59.7	148.4	32 55.4	+59.8	148.7	**26**
27	39 48.5	+59.2	145.8	38 58.7	+59.3	146.2	38 08.7	+59.4	146.7	37 18.5	+59.5	147.1	36 28.0	+59.6	147.5	35 37.2	+59.7	147.9	34 46.3	+59.7	148.3	33 55.2	+59.8	148.6	**27**
28	40 47.7	+59.1	145.6	39 58.0	+59.3	146.0	39 08.1	+59.4	146.5	38 18.0	+59.5	146.9	37 27.6	+59.5	147.4	36 36.9	+59.7	147.8	35 46.0	+59.8	148.2	34 55.0	+59.8	148.5	**28**
29	41 46.8	+59.1	145.3	40 57.3	+59.3	145.8	40 07.5	+59.4	146.3	39 17.5	+59.4	146.8	38 27.1	+59.6	147.2	37 36.6	+59.6	147.6	36 45.8	+59.7	148.0	35 54.8	+59.8	148.4	**29**
30	42 45.9	+59.2	145.1	41 56.6	+59.2	145.6	41 06.9	+59.4	146.1	40 16.9	+59.5	146.6	39 26.7	+59.6	147.1	38 36.2	+59.7	147.5	37 45.5	+59.7	147.9	36 54.6	+59.7	148.3	**30**
31	43 45.1	+59.0	144.9	42 55.8	+59.2	145.4	42 06.3	+59.3	145.9	41 16.4	+59.5	146.4	40 26.3	+59.5	146.9	39 35.9	+59.6	147.4	38 45.2	+59.7	147.8	37 54.3	+59.8	148.2	**31**
32	44 44.1	+59.1	144.6	43 55.0	+59.2	145.2	43 05.6	+59.3	145.7	42 15.9	+59.4	146.3	41 25.8	+59.6	146.7	40 35.5	+59.6	147.2	39 44.9	+59.7	147.7	38 54.1	+59.8	148.1	**32**
33	45 43.2	+59.0	144.4	44 54.2	+59.2	145.0	44 04.9	+59.3	145.5	43 15.3	+59.4	146.1	42 25.4	+59.5	146.6	41 35.1	+59.7	147.1	40 44.6	+59.7	147.5	39 53.9	+59.8	148.0	**33**
34	46 42.2	+58.9	144.1	45 53.4	+59.1	144.7	45 04.2	+59.3	145.3	44 14.7	+59.4	145.9	43 24.9	+59.5	146.4	42 34.8	+59.6	146.9	41 44.3	+59.7	147.4	40 53.7	+59.7	147.9	**34**
35	47 41.1	+59.0	143.8	46 52.5	+59.1	144.5	46 03.5	+59.2	145.1	45 14.1	+59.4	145.7	44 24.4	+59.5	146.2	43 34.4	+59.5	146.8	42 44.0	+59.7	147.3	41 53.4	+59.8	147.8	**35**
36	48 40.1	+58.9	143.6	47 51.6	+59.0	144.2	47 02.7	+59.2	144.9	46 13.5	+59.3	145.5	45 23.9	+59.4	146.0	44 33.9	+59.6	146.6	43 43.7	+59.7	147.1	42 53.2	+59.7	147.6	**36**
37	49 39.0	+58.8	143.3	48 50.6	+59.1	144.0	48 01.9	+59.2	144.6	47 12.8	+59.3	145.2	46 23.3	+59.5	145.9	45 33.5	+59.6	146.4	44 43.4	+59.6	147.0	43 52.9	+59.7	147.5	**37**
38	50 37.8	+58.8	143.0	49 49.7	+58.9	143.7	49 01.1	+59.2	144.4	48 12.1	+59.3	145.0	47 22.8	+59.4	145.7	46 33.1	+59.5	146.3	45 43.0	+59.6	146.8	44 52.6	+59.8	147.4	**38**
39	51 36.6	+58.7	142.6	50 48.6	+59.0	143.4	50 00.3	+59.1	144.1	49 11.4	+59.3	144.8	48 22.2	+59.4	145.4	47 32.6	+59.5	146.1	46 42.6	+59.7	146.7	45 52.4	+59.7	147.2	**39**
40	52 35.3	+58.7	142.3	51 47.6	+58.9	143.1	50 59.4	+59.0	143.8	50 10.7	+59.2	144.6	49 21.6	+59.4	145.2	48 32.1	+59.5	145.9	47 42.3	+59.6	146.5	46 52.1	+59.7	147.1	**40**
41	53 34.0	+58.6	142.0	52 46.5	+58.8	142.8	51 58.4	+59.1	143.6	51 09.9	+59.2	144.3	50 21.0	+59.3	145.0	49 31.6	+59.5	145.7	48 41.9	+59.6	146.3	47 51.8	+59.7	147.0	**41**
42	54 32.6	+58.5	141.6	53 45.3	+58.8	142.5	52 57.5	+59.0	143.3	52 09.1	+59.2	144.0	51 20.3	+59.4	144.8	50 31.1	+59.5	145.5	49 41.5	+59.6	146.2	48 51.5	+59.6	146.8	**42**
43	55 31.1	+58.5	141.2	54 44.1	+58.7	142.1	53 56.5	+58.9	143.0	53 08.3	+59.1	143.8	52 19.7	+59.3	144.5	51 30.6	+59.4	145.3	50 41.1	+59.5	146.0	49 51.1	+59.7	146.6	**43**
44	56 29.6	+58.4	140.8	55 42.8	+58.6	141.8	54 55.4	+58.9	142.6	54 07.4	+59.1	143.5	53 19.0	+59.2	144.3	52 30.0	+59.4	145.0	51 40.6	+59.6	145.8	50 50.8	+59.6	146.5	**44**
45	57 28.0	+58.3	140.4	56 41.4	+58.6	141.4	55 54.3	+58.8	142.3	55 06.5	+59.1	143.2	54 18.2	+59.2	144.0	53 29.4	+59.4	144.8	52 40.2	+59.5	145.6	51 50.4	+59.7	146.3	**45**
46	58 26.3	+58.2	140.0	57 40.0	+58.5	141.0	56 53.1	+58.8	141.9	56 05.6	+58.9	142.9	55 17.4	+59.2	143.7	54 28.8	+59.4	144.6	53 39.7	+59.5	145.4	52 50.1	+59.6	146.1	**46**
47	59 24.5	+58.1	139.5	58 38.5	+58.4	140.6	57 51.9	+58.6	141.6	57 04.5	+59.0	142.5	56 16.6	+59.2	143.4	55 28.2	+59.3	144.3	54 39.2	+59.4	145.1	53 49.7	+59.6	145.9	**47**
48	60 22.6	+58.0	139.0	59 36.9	+58.4	140.1	58 50.5	+58.7	141.2	58 03.5	+58.8	142.2	57 15.8	+59.1	143.1	56 27.5	+59.3	144.0	55 38.6	+59.5	144.9	54 49.3	+59.6	145.7	**48**
49	61 20.6	+57.8	138.5	60 35.3	+58.2	139.6	59 49.2	+58.5	140.8	59 02.3	+58.8	141.8	58 14.9	+59.0	142.8	57 26.8	+59.2	143.8	56 38.1	+59.4	144.7	55 48.9	+59.5	145.5	**49**
50	62 18.4	+57.7	137.9	61 33.5	+58.1	139.1	60 47.7	+58.4	140.3	60 01.1	+58.8	141.4	59 13.9	+59.0	142.5	58 26.0	+59.2	143.5	57 37.5	+59.4	144.4	56 48.4	+59.6	145.3	**50**
51	63 16.1	+57.5	137.3	62 31.6	+57.9	138.6	61 46.1	+58.3	139.8	60 59.9	+58.6	141.0	60 12.9	+58.9	142.1	59 25.2	+59.1	143.2	58 36.9	+59.3	144.1	57 48.0	+59.5	145.1	**51**
52	64 13.6	+57.4	136.6	63 29.5	+57.8	138.0	62 44.4	+58.3	139.3	61 58.5	+58.6	140.6	61 11.8	+58.8	141.7	60 24.3	+59.1	142.8	59 36.2	+59.3	143.9	58 47.5	+59.4	144.8	**52**
53	65 11.0	+57.1	136.0	64 27.3	+57.7	137.4	63 42.7	+58.0	138.8	62 57.1	+58.4	140.1	62 10.6	+58.8	141.3	61 23.4	+59.1	142.5	60 35.5	+59.3	143.5	59 46.9	+59.5	144.6	**53**
54	66 08.1	+57.0	135.2	65 25.0	+57.5	136.8	64 40.7	+58.0	138.2	63 55.5	+58.4	139.6	63 09.4	+58.7	140.9	62 22.5	+58.9	142.1	61 34.8	+59.2	143.2	60 46.4	+59.4	144.3	**54**
55	67 05.1	+56.6	134.4	66 22.5	+57.2	136.1	65 38.7	+57.8	137.6	64 53.9	+58.2	139.0	64 08.1	+58.6	140.4	63 21.4	+58.9	141.7	62 34.0	+59.1	142.9	61 45.8	+59.3	144.0	**55**
56	68 01.7	+56.4	133.6	67 19.7	+57.1	135.3	66 36.5	+57.6	136.9	65 52.1	+58.1	138.5	65 06.7	+58.5	139.9	64 20.3	+58.8	141.2	63 33.1	+59.1	142.5	62 45.1	+59.4	143.7	**56**
57	68 58.1	+56.0	132.6	68 16.8	+56.7	134.5	67 34.1	+57.4	136.2	66 50.2	+57.9	137.8	66 05.2	+58.3	139.4	65 19.1	+58.8	140.8	64 32.2	+59.0	142.1	63 44.5	+59.2	143.4	**57**
58	69 54.1	+55.7	131.6	69 13.5	+56.5	133.6	68 31.5	+57.1	135.4	67 48.1	+57.7	137.2	67 03.5	+58.2	138.8	66 17.9	+58.6	140.3	65 31.2	+59.0	141.7	64 43.7	+59.3	143.0	**58**
59	70 49.8	+55.2	130.5	70 10.0	+56.1	132.6	69 28.6	+56.9	134.6	68 45.8	+57.5	136.4	68 01.7	+58.1	138.1	67 16.5	+58.5	139.7	66 30.2	+58.8	141.2	65 43.0	+59.1	142.6	**59**
60	71 45.0	+54.7	129.3	71 06.1	+55.7	131.5	70 25.5	+56.6	133.7	69 43.3	+57.3	135.6	68 59.8	+57.8	137.4	68 15.0	+58.3	139.1	67 29.0	+58.8	140.7	66 42.1	+59.1	142.2	**60**
61	72 39.7	+54.1	127.9	72 01.8	+55.3	130.4	71 22.1	+56.2	132.6	70 40.6	+57.0	134.7	69 57.6	+57.7	136.7	69 13.3	+58.2	138.5	68 27.8	+58.7	140.2	67 41.2	+59.0	141.8	**61**
62	73 33.8	+53.4	126.4	72 57.1	+54.7	129.1	72 18.3	+55.7	131.5	71 37.6	+56.7	133.8	70 55.3	+57.4	135.9	70 11.5	+58.1	137.8	69 26.5	+58.5	139.6	68 40.2	+58.9	141.3	**62**
63	74 27.2	+52.6	124.8	73 51.8	+54.0	127.6	73 14.0	+55.3	130.3	72 34.3	+56.3	132.7	71 52.7	+57.2	135.0	71 09.6	+57.8	137.0	70 25.0	+58.3	139.0	69 39.1	+58.8	140.7	**63**
64	75 19.8	+51.6	122.9	74 45.8	+53.3	126.0	74 09.3	+54.7	128.9	73 30.6	+55.8	131.5	72 49.9	+56.8	133.9	72 07.4	+57.5	136.2	71 23.3	+58.2	138.2	70 37.9	+58.7	140.1	**64**
65	76 11.4	+50.4	120.9	75 39.1	+52.4	124.2	75 04.0	+54.0	127.3	74 26.4	+55.4	130.2	73 46.7	+56.4	132.8	73 04.9	+57.3	135.2	72 21.5	+58.0	137.5	71 36.6	+58.5	139.5	**65**
66	77 01.8	+49.0	118.5	76 31.5	+51.2	122.2	75 58.0	+53.1	125.6	75 21.8	+54.6	128.7	74 43.1	+55.9	131.6	74 02.2	+57.0	134.2	73 19.5	+57.7	136.6	72 35.1	+58.4	138.8	**66**
67	77 50.8	+47.3	115.9	77 22.7	+49.9	119.9	76 51.1	+52.1	123.6	76 16.4	+53.9	127.0	75 39.0	+55.4	130.2	74 59.2	+56.5	133.0	74 17.2	+57.5	135.6	73 33.5	+58.2	138.0	**67**
68	78 38.1	*+45.1*	•112.8	78 12.6	+48.3	117.3	77 43.2	+50.9	121.4	77 10.3	+53.0	125.1	76 34.4	+54.6	128.5	75 55.7	+56.0	131.7	75 14.7	+57.1	134.5	74 31.7	+57.9	137.1	**68**
69	79 23.2	*+42.5*	•109.4	79 00.9	*+46.2*	•114.3	78 34.1	+49.2	118.8	78 03.3	+51.8	122.9	77 29.0	+53.8	126.7	76 51.7	+55.4	130.1	76 11.8	+56.6	133.3	75 29.6	+57.6	136.1	**69**
70	80 05.7	*+39.4*	•105.4	79 47.1	*+43.6*	•110.8	79 23.3	*+47.3*	•115.8	78 55.1	+50.3	120.4	78 22.8	+52.7	124.6	77 47.1	+54.6	128.4	77 08.4	+56.2	131.8	76 27.2	+57.3	134.9	**70**
71	80 45.1	*+35.4*	•100.9	80 30.7	*+40.5*	•106.8	80 10.6	*+44.8*	•112.3	79 45.4	*+48.4*	•117.4	79 15.5	+51.4	122.1	78 41.7	+53.7	126.4	78 04.6	+55.4	130.2	77 24.5	+56.8	133.6	**71**
72	81 20.5	*+30.6*	• 95.7	81 11.2	*+36.4*	•102.1	80 55.4	*+41.7*	•108.3	80 33.8	*+46.0*	•114.0	80 06.9	*+49.6*	•119.2	79 35.4	+52.4	124.0	79 00.0	+54.6	128.3	78 21.3	+56.2	132.1	**72**
73	81 51.1	*+24.8*	• 89.8	81 47.6	*+31.6*	• 96.7	81 37.1	*+37.6*	•103.5	81 19.8	*+42.9*	•109.9	80 56.5	*+47.3*	•115.8	80 27.8	+50.8	121.2	79 54.6	+53.5	126.0	79 17.5	+55.5	130.3	**73**
74	82 15.9	*+18.2*	• 83.2	82 19.2	*+25.6*	• 90.6	82 14.7	*+32.7*	• 98.0	82 02.7	*+39.0*	•105.1	81 43.8	*+44.3*	•111.7	81 18.6	*+48.7*	•117.8	80 48.1	+52.0	123.3	80 13.0	+54.6	128.1	**74**
75	82 34.1	*+10.7*	• 76.0	82 44.8	*+18.5*	• 83.6	82 47.4	*+26.3*	• 91.5	82 41.7	*+33.8*	• 99.3	82 28.1	*+40.3*	•106.8	82 07.3	*+45.7*	•113.7	81 40.1	*+50.0*	•120.0	81 07.6	+53.2	125.6	**75**
76	82 44.8	*+2.6*	• 68.3	83 03.3	*+10.4*	• 75.9	83 13.7	*+18.8*	• 84.1	83 15.5	*+27.2*	• 92.6	83 08.4	*+35.1*	•100.9	82 53.0	*+41.9*	•108.8	82 30.1	*+47.3*	•116.0	82 00.8	*+51.5*	•122.4	**76**
77	82 47.4	*−5.7*	• 60.3	83 13.7	*+1.8*	• 67.7	83 32.5	*+10.2*	• 75.9	83 42.7	*+19.2*	• 84.7	83 43.5	*+28.3*	• 93.8	83 34.9	*+36.5*	•102.7	83 17.4	*+43.6*	•111.0	82 52.3	*+48.9*	•118.5	**77**
78	82 41.7	*−13.6*	• 52.4	83 15.5	*−7.1*	• 59.2	83 42.7	*+0.8*	• 67.0	84 01.9	*+9.9*	• 75.8	84 11.8	*+19.6*	• 85.4	84 11.4	*+29.4*	• 95.2	84 01.0	*+38.2*	•104.8	83 41.2	*+45.4*	•113.6	**78**
79	82 28.1	*−20.8*	• 44.9	83 08.4	*−15.4*	• 50.8	83 43.5	*−8.6*	• 57.8	84 11.8	*−0.4*	• 66.2	84 31.4	*+9.4*	• 75.8	84 40.8	*+20.2*	• 86.2	84 39.2	*+30.7*	• 96.9	84 26.6	*+40.0*	•107.2	**79**
80	82 07.3	*−27.2*	• 37.9	82 53.0	*−22.9*	• 42.8	83 34.9	*−17.5*	• 48.9	84 11.4	*−10.4*	• 56.3	84 40.8	*−1.6*	• 65.2	85 01.0	*+8.9*	• 75.7	85 09.9	*+20.7*	• 87.2	85 06.6	*+32.3*	• 99.0	**80**
81	81 40.1	*−32.5*	• 31.6	82 30.1	*−29.3*	• 35.5	83 17.4	*−25.1*	• 40.5	84 01.0	*−19.8*	• 46.7	84 39.2	*−12.6*	• 54.5	85 09.9	*−3.3*	• 64.1	85 30.6	*+8.3*	• 75.7	85 38.9	*+21.5*	• 88.5	**81**
82	81 07.6	*−37.0*	• 25.9	82 00.8	*−34.7*	• 29.1	82 52.3	*−31.7*	• 32.9	83 41.2	*−27.7*	• 37.9	84 26.6	*−22.4*	• 44.2	85 06.6	*−15.1*	• 52.3	85 38.9	*−5.2*	• 62.8	86 00.4	*+7.5*	• 75.6	**82**
83	80 30.6	*−40.6*	• 21.0	81 26.1	*−38.9*	• 23.4	82 20.6	*−36.9*	• 26.3	83 13.5	*−34.1*	• 30.1	84 04.2	*−30.5*	• 34.9	84 51.5	*−25.3*	• 41.2	85 33.7	*−18.1*	• 49.8	86 07.9	*−7.8*	• 61.1	**83**
84	79 50.0	*−43.6*	• 16.7	80 47.2	*−42.5*	• 18.5	81 43.7	*−41.0*	• 20.6	82 39.4	*−39.2*	• 23.4	83 33.7	*−36.8*	• 26.9	84 26.2	*−33.5*	• 31.5	85 15.6	*−28.7*	• 37.8	86 00.1	*−21.6*	• 46.6	**84**
85	79 06.4	*−46.0*	• 12.9	80 04.7	*−45.2*	• 14.2	81 02.7	*−44.3*	• 15.8	82 00.2	*−43.2*	• 17.7	82 56.9	*−41.6*	• 20.1	83 52.7	*−39.6*	• 23.3	84 46.9	*−36.7*	• 27.7	85 38.5	*−32.4*	• 33.8	**85**
86	78 20.4	−48.0	9.6	79 19.5	*−47.5*	• 10.5	80 18.4	*−47.0*	• 11.6	81 17.0	*−46.2*	• 12.9	82 15.3	*−45.3*	• 14.5	83 13.1	*−44.1*	• 16.6	84 10.2	*−42.5*	• 19.4	85 06.1	*−40.2*	• 23.3	**86**
87	77 32.4	−49.5	6.8	78 32.0	−49.3	7.3	79 31.4	−48.9	8.0	80 30.8	*−48.6*	• 8.9	81 30.0	*−48.0*	• 9.9	82 29.0	*−47.4*	• 11.2	83 27.7	*−46.6*	• 12.9	84 25.9	*−45.4*	• 15.2	**87**
88	76 42.9	−50.9	4.2	77 42.7	−50.7	4.6	78 42.5	−50.6	5.0	79 42.2	−50.3	5.4	80 42.0	−50.2	6.0	81 41.6	*−49.9*	• 6.7	82 41.1	*−49.5*	• 7.6	83 40.5	*−49.0*	• 8.8	**88**
89	75 52.0	−52.0	2.0	76 52.0	−52.0	2.1	77 51.9	−51.9	2.3	78 51.9	−51.9	2.5	79 51.8	−51.8	2.8	80 51.7	−51.7	3.1	81 51.6	−51.6	3.4	82 51.5	*−51.5*	• 3.9	**89**
90	75 00.0	−52.9	0.0	76 00.0	−52.9	0.0	77 00.0	−53.0	0.0	78 00.0	−53.0	0.0	79 00.0	−53.1	0.0	80 00.0	−53.1	0.0	81 00.0	−53.2	0.0	82 00.0	−53.3	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 29°, 331°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	13 05.0	–59.5	150.2	12 12.9	–59.5	150.3	11 20.8	–59.6	150.4	10 28.6	–59.7	150.5	9 36.4	–59.7	150.5	8 44.1	–59.7	150.6	7 51.8	–59.8	150.7	6 59.5	–59.9	150.8	**0**
1	12 05.5	–59.5	150.3	11 13.4	–59.6	150.4	10 21.2	–59.7	150.5	9 28.9	–59.6	150.6	8 36.7	–59.8	150.6	7 44.4	–59.8	150.7	6 52.0	–59.8	150.8	5 59.6	–59.8	150.8	**1**
2	11 06.0	–59.5	150.4	10 13.8	–59.6	150.5	9 21.5	–59.6	150.6	8 29.3	–59.7	150.7	7 36.9	–59.7	150.7	6 44.6	–59.8	150.8	5 52.2	–59.8	150.9	4 59.8	–59.9	150.9	**2**
3	10 06.5	–59.5	150.5	9 14.2	–59.6	150.6	8 21.9	–59.6	150.7	7 29.6	–59.7	150.8	6 37.2	–59.7	150.8	5 44.8	–59.8	150.9	4 52.4	–59.9	150.9	3 59.9	–59.9	151.0	**3**
4	9 07.0	–59.5	150.7	8 14.6	–59.5	150.7	7 22.3	–59.7	150.8	6 29.9	–59.7	150.9	5 37.5	–59.8	150.9	4 45.0	–59.8	151.0	3 52.5	–59.8	151.0	3 00.0	–59.8	151.0	**4**
5	8 07.5	–59.6	150.8	7 15.1	–59.6	150.9	6 22.6	–59.6	150.9	5 30.2	–59.7	151.0	4 37.7	–59.7	151.0	3 45.2	–59.8	151.1	2 52.7	–59.8	151.1	2 00.2	–59.9	151.1	**5**
6	7 07.9	–59.5	150.9	6 15.5	–59.6	151.0	5 23.0	–59.6	151.0	4 30.5	–59.7	151.1	3 38.0	–59.8	151.1	2 45.4	–59.8	151.1	1 52.9	–59.8	151.2	1 00.3	–59.8	151.2	**6**
7	6 08.4	–59.5	151.1	5 15.9	–59.6	151.1	4 23.4	–59.7	151.1	3 30.8	–59.7	151.2	2 38.2	–59.7	151.2	1 45.6	–59.7	151.2	0 53.1	–59.9	151.2	0 00.5	–59.9	151.2	**7**
8	5 08.9	–59.5	151.2	4 16.3	–59.6	151.2	3 23.7	–59.6	151.3	2 31.1	–59.7	151.3	1 38.5	–59.8	151.3	0 45.9	–59.8	151.3	0 06.8	+59.8	28.7	0 59.4	+59.9	28.7	**8**
9	4 09.4	–59.5	151.3	3 16.7	–59.5	151.3	2 24.1	–59.7	151.4	1 31.4	–59.7	151.4	0 38.7	–59.7	151.4	0 13.9	+59.8	28.6	1 06.6	+59.8	28.6	1 59.3	+59.8	28.6	**9**
10	3 09.9	–59.6	151.4	2 17.2	–59.6	151.5	1 24.4	–59.6	151.5	0 31.7	–59.7	151.5	0 21.0	+59.7	28.5	1 13.7	+59.8	28.5	2 06.4	+59.9	28.5	2 59.1	+59.9	28.6	**10**
11	2 10.3	–59.5	151.6	1 17.6	–59.6	151.6	0 24.8	–59.6	151.6	0 28.0	+59.7	28.4	1 20.7	+59.8	28.4	2 13.5	+59.8	28.4	3 06.3	+59.8	28.5	3 59.0	+59.9	28.5	**11**
12	1 10.8	–59.5	151.7	0 18.0	–59.6	151.7	0 34.8	+59.7	28.3	1 27.7	+59.7	28.3	2 20.5	+59.7	28.3	3 13.3	+59.8	28.4	4 06.1	+59.8	28.4	4 58.9	+59.8	28.4	**12**
13	0 11.3	–59.5	151.8	0 41.6	+59.6	28.2	1 34.5	+59.6	28.2	2 27.4	+59.7	28.2	3 20.2	+59.8	28.2	4 13.1	+59.8	28.3	5 05.9	+59.8	28.3	5 58.7	+59.9	28.4	**13**
14	0 48.2	+59.6	28.1	1 41.2	+59.6	28.1	2 34.1	+59.7	28.1	3 27.1	+59.6	28.1	4 20.0	+59.7	28.1	5 12.9	+59.7	28.2	6 05.7	+59.9	28.2	6 58.6	+59.8	28.3	**14**
15	1 47.8	+59.5	27.9	2 40.8	+59.6	28.0	3 33.8	+59.6	28.0	4 26.7	+59.7	28.0	5 19.7	+59.7	28.1	6 12.6	+59.8	28.1	7 05.6	+59.8	28.2	7 58.4	+59.9	28.2	**15**
16	2 47.3	+59.5	27.8	3 40.4	+59.5	27.8	4 33.4	+59.6	27.9	5 26.4	+59.7	27.9	6 19.4	+59.8	28.0	7 12.4	+59.8	28.0	8 05.4	+59.8	28.1	8 58.3	+59.9	28.2	**16**
17	3 46.8	+59.5	27.7	4 39.9	+59.6	27.7	5 33.0	+59.7	27.8	6 26.1	+59.7	27.8	7 19.2	+59.7	27.9	8 12.2	+59.8	27.9	9 05.2	+59.8	28.0	9 58.2	+59.8	28.1	**17**
18	4 46.3	+59.6	27.6	5 39.5	+59.6	27.6	6 32.7	+59.6	27.7	7 25.8	+59.7	27.7	8 18.9	+59.8	27.8	9 12.0	+59.8	27.8	10 05.0	+59.8	27.9	10 58.0	+59.9	28.0	**18**
19	5 45.9	+59.5	27.4	6 39.1	+59.6	27.5	7 32.3	+59.7	27.5	8 25.5	+59.7	27.6	9 18.7	+59.7	27.7	10 11.8	+59.8	27.8	11 04.8	+59.9	27.8	11 57.9	+59.8	27.9	**19**
20	6 45.4	+59.5	27.3	7 38.7	+59.6	27.4	8 32.0	+59.6	27.4	9 25.2	+59.7	27.5	10 18.4	+59.7	27.6	11 11.6	+59.7	27.7	12 04.7	+59.8	27.8	12 57.7	+59.9	27.9	**20**
21	7 44.9	+59.5	27.2	8 38.3	+59.5	27.2	9 31.6	+59.6	27.3	10 24.9	+59.7	27.4	11 18.1	+59.8	27.5	12 11.3	+59.8	27.6	13 04.5	+59.8	27.7	13 57.6	+59.8	27.8	**21**
22	8 44.4	+59.5	27.1	9 37.8	+59.6	27.1	10 31.2	+59.7	27.2	11 24.6	+59.6	27.3	12 17.9	+59.7	27.4	13 11.1	+59.8	27.5	14 04.3	+59.8	27.6	14 57.4	+59.9	27.7	**22**
23	9 43.9	+59.5	26.9	10 37.4	+59.6	27.0	11 30.9	+59.6	27.1	12 24.2	+59.7	27.2	13 17.6	+59.7	27.3	14 10.9	+59.8	27.4	15 04.1	+59.8	27.5	15 57.3	+59.8	27.7	**23**
24	10 43.4	+59.6	26.8	11 37.0	+59.5	26.9	12 30.5	+59.6	27.0	13 23.9	+59.7	27.1	14 17.3	+59.7	27.2	15 10.7	+59.7	27.3	16 03.9	+59.8	27.4	16 57.1	+59.9	27.6	**24**
25	11 43.0	+59.5	26.7	12 36.5	+59.6	26.8	13 30.1	+59.6	26.9	14 23.6	+59.7	27.0	15 17.0	+59.8	27.1	16 10.4	+59.8	27.2	17 03.7	+59.9	27.4	17 57.0	+59.8	27.5	**25**
26	12 42.5	+59.5	26.5	13 36.1	+59.6	26.6	14 29.7	+59.6	26.7	15 23.3	+59.6	26.9	16 16.8	+59.7	27.0	17 10.2	+59.8	27.1	18 03.6	+59.8	27.3	18 56.8	+59.9	27.4	**26**
27	13 42.0	+59.5	26.4	14 35.7	+59.5	26.5	15 29.3	+59.6	26.6	16 22.9	+59.7	26.8	17 16.5	+59.7	26.9	18 10.0	+59.7	27.0	19 03.4	+59.8	27.2	19 56.7	+59.8	27.4	**27**
28	14 41.5	+59.4	26.3	15 35.2	+59.6	26.4	16 28.9	+59.7	26.5	17 22.6	+59.7	26.6	18 16.2	+59.7	26.8	19 09.7	+59.8	26.9	20 03.2	+59.8	27.1	20 56.5	+59.9	27.3	**28**
29	15 40.9	+59.5	26.1	16 34.8	+59.5	26.3	17 28.6	+59.6	26.4	18 22.3	+59.6	26.5	19 15.9	+59.7	26.7	20 09.5	+59.7	26.9	21 03.0	+59.8	27.0	21 56.4	+59.8	27.2	**29**
30	16 40.4	+59.5	26.0	17 34.3	+59.6	26.1	18 28.2	+59.6	26.3	19 21.9	+59.7	26.4	20 15.6	+59.7	26.6	21 09.2	+59.8	26.8	22 02.8	+59.8	26.9	22 56.2	+59.9	27.1	**30**
31	17 39.9	+59.5	25.9	18 33.9	+59.5	26.0	19 27.8	+59.6	26.2	20 21.6	+59.6	26.3	21 15.3	+59.7	26.5	22 09.0	+59.7	26.7	23 02.6	+59.8	26.8	23 56.1	+59.8	27.0	**31**
32	18 39.4	+59.5	25.7	19 33.4	+59.5	25.9	20 27.4	+59.5	26.0	21 21.2	+59.7	26.2	22 15.0	+59.7	26.4	23 08.7	+59.8	26.6	24 02.4	+59.8	26.8	24 55.9	+59.8	27.0	**32**
33	19 38.9	+59.4	25.6	20 32.9	+59.6	25.7	21 26.9	+59.6	25.9	22 20.9	+59.6	26.1	23 14.7	+59.7	26.3	24 08.5	+59.7	26.5	25 02.2	+59.7	26.7	25 55.7	+59.9	26.9	**33**
34	20 38.3	+59.5	25.4	21 32.5	+59.5	25.6	22 26.5	+59.6	25.8	23 20.5	+59.7	26.0	24 14.4	+59.7	26.2	25 08.2	+59.8	26.4	26 01.9	+59.8	26.6	26 55.6	+59.8	26.8	**34**
35	21 37.8	+59.4	25.3	22 32.0	+59.5	25.5	23 26.1	+59.6	25.6	24 20.2	+59.6	25.8	25 14.1	+59.7	26.0	26 08.0	+59.7	26.3	27 01.7	+59.8	26.5	27 55.4	+59.8	26.7	**35**
36	22 37.2	+59.5	25.1	23 31.5	+59.5	25.3	24 25.7	+59.5	25.5	25 19.8	+59.6	25.7	26 13.8	+59.7	25.9	27 07.7	+59.7	26.1	28 01.5	+59.8	26.4	28 55.2	+59.8	26.6	**36**
37	23 36.7	+59.4	25.0	24 31.0	+59.5	25.2	25 25.2	+59.6	25.4	26 19.4	+59.6	25.6	27 13.5	+59.6	25.8	28 07.4	+59.8	26.0	29 01.3	+59.8	26.3	29 55.0	+59.8	26.5	**37**
38	24 36.1	+59.4	24.8	25 30.5	+59.5	25.0	26 24.8	+59.5	25.2	27 19.0	+59.6	25.5	28 13.1	+59.7	25.7	29 07.2	+59.7	25.9	30 01.1	+59.7	26.2	30 54.8	+59.9	26.4	**38**
39	25 35.5	+59.4	24.7	26 30.0	+59.5	24.9	27 24.3	+59.6	25.1	28 18.6	+59.6	25.3	29 12.8	+59.7	25.6	30 06.9	+59.7	25.8	31 00.8	+59.8	26.1	31 54.7	+59.8	26.3	**39**
40	26 34.9	+59.4	24.5	27 29.5	+59.4	24.7	28 23.9	+59.5	25.0	29 18.2	+59.6	25.2	30 12.5	+59.6	25.5	31 06.6	+59.7	25.7	32 00.6	+59.7	26.0	32 54.5	+59.8	26.3	**40**
41	27 34.3	+59.4	24.4	28 28.9	+59.5	24.6	29 23.4	+59.5	24.8	30 17.8	+59.6	25.1	31 12.1	+59.7	25.3	32 06.3	+59.7	25.6	33 00.3	+59.8	25.9	33 54.3	+59.8	26.2	**41**
42	28 33.7	+59.4	24.2	29 28.4	+59.4	24.4	30 22.9	+59.6	24.7	31 17.4	+59.6	24.9	32 11.8	+59.6	25.2	33 06.0	+59.7	25.5	34 00.1	+59.7	25.8	34 54.1	+59.8	26.1	**42**
43	29 33.1	+59.4	24.1	30 27.8	+59.5	24.3	31 22.5	+59.5	24.5	32 17.0	+59.6	24.8	33 11.4	+59.6	25.1	34 05.7	+59.7	25.4	34 59.8	+59.8	25.6	35 53.9	+59.7	26.0	**43**
44	30 32.5	+59.3	23.9	31 27.3	+59.4	24.1	32 22.0	+59.5	24.4	33 16.6	+59.5	24.7	34 11.0	+59.6	24.9	35 05.4	+59.6	25.2	35 59.6	+59.7	25.5	36 53.6	+59.8	25.9	**44**
45	31 31.8	+59.3	23.7	32 26.7	+59.4	24.0	33 21.5	+59.4	24.2	34 16.1	+59.6	24.5	35 10.6	+59.7	24.8	36 05.0	+59.7	25.1	36 59.3	+59.7	25.4	37 53.4	+59.8	25.7	**45**
46	32 31.1	+59.4	23.5	33 26.1	+59.4	23.8	34 20.9	+59.5	24.1	35 15.7	+59.5	24.4	36 10.3	+59.6	24.7	37 04.7	+59.7	25.0	37 59.0	+59.8	25.3	38 53.2	+59.8	25.6	**46**
47	33 30.5	+59.3	23.4	34 25.5	+59.4	23.6	35 20.4	+59.5	23.9	36 15.2	+59.5	24.2	37 09.9	+59.5	24.5	38 04.4	+59.6	24.8	38 58.8	+59.7	25.2	39 53.0	+59.7	25.5	**47**
48	34 29.8	+59.3	23.2	35 24.9	+59.3	23.5	36 19.9	+59.4	23.7	37 14.7	+59.5	24.0	38 09.4	+59.6	24.4	39 04.0	+59.7	24.7	39 58.5	+59.7	25.0	40 52.7	+59.8	25.4	**48**
49	35 29.1	+59.2	23.0	36 24.2	+59.4	23.3	37 19.3	+59.4	23.6	38 14.2	+59.5	23.9	39 09.0	+59.6	24.2	40 03.7	+59.6	24.6	40 58.2	+59.7	24.9	41 52.5	+59.7	25.3	**49**
50	36 28.3	+59.3	22.8	37 23.6	+59.3	23.1	38 18.7	+59.4	23.4	39 13.7	+59.5	23.7	40 08.6	+59.5	24.1	41 03.3	+59.6	24.4	41 57.9	+59.6	24.8	42 52.2	+59.8	25.2	**50**
51	37 27.6	+59.2	22.6	38 22.9	+59.3	22.9	39 18.1	+59.4	23.2	40 13.2	+59.5	23.6	41 08.1	+59.6	23.9	42 02.9	+59.6	24.3	42 57.5	+59.7	24.6	43 52.0	+59.7	25.0	**51**
52	38 26.8	+59.2	22.4	39 22.2	+59.3	22.7	40 17.5	+59.4	23.0	41 12.7	+59.4	23.4	42 07.7	+59.5	23.7	43 02.5	+59.6	24.1	43 57.2	+59.7	24.5	44 51.7	+59.7	24.9	**52**
53	39 26.0	+59.2	22.2	40 21.5	+59.3	22.5	41 16.9	+59.4	22.8	42 12.1	+59.5	23.2	43 07.2	+59.5	23.6	44 02.1	+59.6	23.9	44 56.9	+59.6	24.3	45 51.4	+59.8	24.8	**53**
54	40 25.2	+59.2	22.0	41 20.8	+59.3	22.3	42 16.3	+59.3	22.6	43 11.6	+59.4	23.0	44 06.7	+59.5	23.4	45 01.7	+59.6	23.8	45 56.5	+59.7	24.2	46 51.2	+59.7	24.6	**54**
55	41 24.4	+59.1	21.8	42 20.1	+59.2	22.1	43 15.6	+59.3	22.4	44 11.0	+59.4	22.8	45 06.2	+59.5	23.2	46 01.3	+59.5	23.6	46 56.2	+59.6	24.0	47 50.9	+59.6	24.5	**55**
56	42 23.5	+59.2	21.5	43 19.3	+59.2	21.9	44 14.9	+59.3	22.2	45 10.4	+59.3	22.6	46 05.7	+59.4	23.0	47 00.8	+59.5	23.4	47 55.8	+59.6	23.9	48 50.5	+59.7	24.3	**56**
57	43 22.7	+59.0	21.3	44 18.5	+59.2	21.7	45 14.2	+59.3	22.0	46 09.7	+59.4	22.4	47 05.1	+59.5	22.8	48 00.3	+59.6	23.2	48 55.4	+59.6	23.7	49 50.2	+59.7	24.2	**57**
58	44 21.7	+59.1	21.1	45 17.7	+59.1	21.4	46 13.5	+59.2	21.8	47 09.1	+59.3	22.2	48 04.6	+59.4	22.6	48 59.9	+59.5	23.1	49 55.0	+59.5	23.5	50 49.9	+59.6	24.0	**58**
59	45 20.8	+59.0	20.8	46 16.8	+59.1	21.2	47 12.7	+59.2	21.6	48 08.4	+59.3	22.0	49 04.0	+59.4	22.4	49 59.4	+59.4	22.9	50 54.5	+59.6	23.3	51 49.5	+59.7	23.8	**59**
60	46 19.8	+59.0	20.6	47 15.9	+59.1	20.9	48 11.9	+59.2	21.3	49 07.7	+59.3	21.7	50 03.4	+59.3	22.2	50 58.8	+59.5	22.6	51 54.1	+59.5	23.1	52 49.2	+59.6	23.6	**60**
61	47 18.8	+58.9	20.3	48 15.0	+59.1	20.7	49 11.1	+59.1	21.1	50 07.0	+59.2	21.5	51 02.7	+59.3	22.0	51 58.3	+59.4	22.4	52 53.6	+59.5	22.9	53 48.8	+59.6	23.5	**61**
62	48 17.7	+58.9	20.0	49 14.1	+59.0	20.4	50 10.2	+59.1	20.8	51 06.2	+59.2	21.3	52 02.0	+59.4	21.7	52 57.7	+59.4	22.2	53 53.1	+59.5	22.7	54 48.4	+59.6	23.3	**62**
63	49 16.6	+58.9	19.7	50 13.1	+58.9	20.1	51 09.3	+59.1	20.5	52 05.4	+59.2	21.0	53 01.4	+59.2	21.5	53 57.1	+59.4	22.0	54 52.6	+59.5	22.5	55 48.0	+59.5	23.1	**63**
64	50 15.5	+58.8	19.4	51 12.0	+58.9	19.8	52 08.4	+59.0	20.3	53 04.6	+59.1	20.7	54 00.6	+59.3	21.2	54 56.5	+59.3	21.7	55 52.1	+59.4	22.3	56 47.5	+59.5	22.8	**64**
65	51 14.3	+58.8	19.1	52 10.9	+58.9	19.5	53 07.4	+59.0	20.0	54 03.7	+59.1	20.4	54 59.9	+59.1	20.9	55 55.8	+59.3	21.5	56 51.5	+59.4	22.0	57 47.0	+59.5	22.6	**65**
66	52 13.1	+58.7	18.8	53 09.8	+58.8	19.2	54 06.4	+58.9	19.7	55 02.8	+59.0	20.1	55 59.0	+59.2	20.6	56 55.1	+59.3	21.2	57 50.9	+59.4	21.7	58 46.5	+59.5	22.4	**66**
67	53 11.8	+58.6	18.4	54 08.6	+58.8	18.9	55 05.3	+58.9	19.3	56 01.8	+59.0	19.8	56 58.2	+59.1	20.3	57 54.4	+59.2	20.9	58 50.3	+59.3	21.5	59 46.0	+59.5	22.1	**67**
68	54 10.4	+58.6	18.1	55 07.4	+58.7	18.5	56 04.2	+58.8	19.0	57 00.8	+59.0	19.5	57 57.3	+59.1	20.0	58 53.6	+59.2	20.6	59 49.6	+59.3	21.2	60 45.5	+59.4	21.8	**68**
69	55 09.0	+58.5	17.7	56 06.1	+58.6	18.2	57 03.0	+58.7	18.6	57 59.8	+58.8	19.1	58 56.4	+59.0	19.7	59 52.8	+59.1	20.3	60 48.9	+59.3	20.9	61 44.9	+59.3	21.5	**69**
70	56 07.5	+58.4	17.3	57 04.7	+58.5	17.8	58 01.7	+58.7	18.2	58 58.6	+58.8	18.8	59 55.4	+58.9	19.3	60 51.9	+59.0	19.9	61 48.2	+59.2	20.5	62 44.2	+59.4	21.2	**70**
71	57 05.9	+58.3	16.9	58 03.2	+58.5	17.4	59 00.4	+58.6	17.8	59 57.4	+58.8	18.4	60 54.3	+58.9	18.9	61 50.9	+59.1	19.5	62 47.4	+59.1	20.2	63 43.6	+59.2	20.9	**71**
72	58 04.2	+58.3	16.5	59 01.7	+58.4	16.9	59 59.0	+58.5	17.4	60 56.2	+58.6	18.0	61 53.2	+58.8	18.5	62 50.0	+58.9	19.2	63 46.5	+59.1	19.8	64 42.8	+59.3	20.5	**72**
73	59 02.5	+58.1	16.0	60 00.1	+58.2	16.5	60 57.5	+58.5	17.0	61 54.8	+58.6	17.5	62 52.0	+58.7	18.1	63 48.9	+58.8	18.7	64 45.6	+59.0	19.4	65 42.1	+59.1	20.1	**73**
74	60 00.6	+58.0	15.5	60 58.3	+58.2	16.0	61 56.0	+58.3	16.5	62 53.4	+58.5	17.1	63 50.7	+58.6	17.6	64 47.7	+58.8	18.3	65 44.6	+58.9	19.0	66 41.2	+59.1	19.7	**74**
75	60 58.6	+57.9	15.0	61 56.5	+58.0	15.5	62 54.3	+58.2	16.0	63 51.9	+58.3	16.6	64 49.3	+58.5	17.2	65 46.5	+58.7	17.8	66 43.5	+58.9	18.5	67 40.3	+59.0	19.3	**75**
76	61 56.5	+57.8	14.4	62 54.5	+58.0	14.9	63 52.5	+58.0	15.4	64 50.2	+58.2	16.0	65 47.8	+58.4	16.6	66 45.2	+58.5	17.3	67 42.4	+58.7	18.0	68 39.3	+58.9	18.8	**76**
77	62 54.3	+57.6	13.9	63 52.5	+57.7	14.3	64 50.5	+57.9	14.9	65 48.4	+58.1	15.4	66 46.2	+58.2	16.1	67 43.7	+58.5	16.7	68 41.1	+58.6	17.5	69 38.2	+58.8	18.3	**77**
78	63 51.9	+57.4	13.2	64 50.2	+57.6	13.7	65 48.4	+57.8	14.2	66 46.5	+57.9	14.8	67 44.4	+58.1	15.4	68 42.2	+58.3	16.1	69 39.7	+58.5	16.9	70 37.0	+58.7	17.7	**78**
79	64 49.3	+57.2	12.6	65 47.8	+57.4	13.0	66 46.2	+57.5	13.6	67 44.4	+57.8	14.1	68 42.5	+58.0	14.8	69 40.5	+58.1	15.4	70 38.2	+58.3	16.2	71 35.7	+58.5	17.0	**79**
80	65 46.5	+57.0	11.8	66 45.2	+57.2	12.3	67 43.7	+57.4	12.8	68 42.2	+57.5	13.4	69 40.5	+57.7	14.0	70 38.6	+57.9	14.7	71 36.5	+58.2	15.5	72 34.2	+58.4	16.3	**80**
81	66 43.5	+56.8	11.1	67 42.4	+56.9	11.5	68 41.1	+57.1	12.0	69 39.7	+57.3	12.6	70 38.2	+57.5	13.2	71 36.5	+57.7	13.9	72 34.7	+57.9	14.7	73 32.6	+58.2	15.5	**81**
82	67 40.3	+56.5	10.2	68 39.3	+56.7	10.7	69 38.2	+56.8	11.2	70 37.0	+57.0	11.7	71 35.7	+57.2	12.3	72 34.2	+57.5	13.0	73 32.6	+57.7	13.8	74 30.8	+57.9	14.6	**82**
83	68 36.8	+56.2	9.3	69 36.0	+56.3	9.8	70 35.0	+56.6	10.2	71 34.0	+56.7	10.8	72 32.9	+56.9	11.4	73 31.7	+57.1	12.0	74 30.3	+57.3	12.8	75 28.7	+57.6	13.6	**83**
84	69 33.0	+55.8	8.3	70 32.3	+56.0	8.7	71 31.6	+56.1	9.2	72 30.7	+56.4	9.7	73 29.8	+56.6	10.3	74 28.8	+56.8	10.9	75 27.6	+57.0	11.6	76 26.3	+57.3	12.5	**84**
85	70 28.8	+55.3	7.3	71 28.3	+55.5	7.6	72 27.7	+55.7	8.1	73 27.1	+55.8	8.5	74 26.4	+56.0	9.1	75 25.6	+56.3	9.7	76 24.6	+56.6	10.4	77 23.6	+56.8	11.2	**85**
86	71 24.1	+55.0	6.1	72 23.8	+55.0	6.4	73 23.4	+55.2	6.8	74 22.9	+55.4	7.2	75 22.4	+55.6	7.7	76 21.9	+55.7	8.2	77 21.2	+56.0	8.9	78 20.4	+56.3	9.6	**86**
87	72 19.1	+54.3	4.8	73 18.8	+54.5	5.1	74 18.6	+54.6	5.4	75 18.3	+54.7	5.7	76 18.0	+54.9	6.1	77 17.6	+55.1	6.6	78 17.2	+55.2	7.2	79 16.7	+55.5	7.8	**87**
88	73 13.4	+53.7	3.4	74 13.3	+53.8	3.6	75 13.2	+53.8	3.8	76 13.0	+54.0	4.1	77 12.9	+54.0	4.4	78 12.7	+54.2	4.8	79 12.4	+54.4	5.2	80 12.2	+54.5	5.7	**88**
89	74 07.1	+52.9	1.8	75 07.1	+52.9	1.9	76 07.0	+53.0	2.0	77 07.0	+53.0	2.2	78 06.9	+53.1	2.4	79 06.9	+53.1	2.6	80 06.8	+53.2	2.8	81 06.7	+53.3	3.1	**89**
90	75 00.0	+52.0	0.0	76 00.0	+52.0	0.0	77 00.0	+51.9	0.0	78 00.0	+51.9	0.0	79 00.0	+51.8	0.0	80 00.0	+51.7	0.0	81 00.0	+51.6	0.0	82 00.0	*+51.5*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 151°, 209°

30°, 330° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 57.2	+59.4	149.1	12 05.6	+59.6	149.2	11 14.0	+59.6	149.4	10 22.4	+59.6	149.4	9 30.7	+59.7	149.5	8 38.9	+59.8	149.6	7 47.2	+59.8	149.7	6 55.4	+59.8	149.8	**0**
1	13 56.6	+59.5	149.0	13 05.2	+59.5	149.1	12 13.6	+59.6	149.2	11 22.0	+59.7	149.3	10 30.4	+59.7	149.4	9 38.7	+59.8	149.5	8 47.0	+59.8	149.6	7 55.2	+59.9	149.7	**1**
2	14 56.1	+59.4	148.9	14 04.7	+59.5	149.0	13 13.2	+59.6	149.1	12 21.7	+59.7	149.2	11 30.1	+59.7	149.3	10 38.5	+59.7	149.4	9 46.8	+59.8	149.5	8 55.1	+59.8	149.6	**2**
3	15 55.5	+59.5	148.7	15 04.2	+59.5	148.9	14 12.8	+59.6	149.0	13 21.4	+59.6	149.1	12 29.8	+59.7	149.2	11 38.2	+59.8	149.3	10 46.6	+59.8	149.5	9 54.9	+59.9	149.5	**3**
4	16 55.0	+59.4	148.6	16 03.7	+59.6	148.7	15 12.4	+59.6	148.9	14 21.0	+59.7	149.0	13 29.5	+59.8	149.1	12 38.0	+59.8	149.3	11 46.4	+59.8	149.4	10 54.8	+59.8	149.5	**4**
5	17 54.4	+59.5	148.4	17 03.3	+59.5	148.6	16 12.0	+59.6	148.8	15 20.7	+59.6	148.9	14 29.3	+59.7	149.0	13 37.8	+59.7	149.2	12 46.2	+59.8	149.3	11 54.6	+59.9	149.4	**5**
6	18 53.9	+59.4	148.3	18 02.8	+59.5	148.5	17 11.6	+59.6	148.6	16 20.3	+59.7	148.8	15 29.0	+59.7	148.9	14 37.5	+59.8	149.1	13 46.0	+59.8	149.2	12 54.5	+59.8	149.3	**6**
7	19 53.3	+59.4	148.1	19 02.3	+59.5	148.3	18 11.2	+59.6	148.5	17 20.0	+59.6	148.7	16 28.7	+59.7	148.8	15 37.3	+59.7	149.0	14 45.8	+59.8	149.1	13 54.3	+59.8	149.3	**7**
8	20 52.7	+59.4	148.0	20 01.8	+59.5	148.2	19 10.8	+59.5	148.4	18 19.6	+59.6	148.6	17 28.4	+59.7	148.7	16 37.0	+59.8	148.9	15 45.6	+59.8	149.0	14 54.1	+59.9	149.2	**8**
9	21 52.1	+59.5	147.8	21 01.3	+59.5	148.1	20 10.3	+59.6	148.3	19 19.2	+59.7	148.4	18 28.1	+59.7	148.6	17 36.8	+59.7	148.8	16 45.4	+59.8	149.0	15 54.0	+59.8	149.1	**9**
10	22 51.6	+59.4	147.7	22 00.8	+59.5	147.9	21 09.9	+59.5	148.1	20 18.9	+59.6	148.3	19 27.8	+59.7	148.5	18 36.5	+59.8	148.7	17 45.2	+59.8	148.9	16 53.8	+59.9	149.0	**10**
11	23 51.0	+59.4	147.5	23 00.3	+59.4	147.8	22 09.4	+59.6	148.0	21 18.5	+59.6	148.2	20 27.5	+59.6	148.4	19 36.3	+59.7	148.6	18 45.0	+59.8	148.8	17 53.7	+59.8	149.0	**11**
12	24 50.4	+59.3	147.4	23 59.7	+59.5	147.6	23 09.0	+59.5	147.9	22 18.1	+59.6	148.1	21 27.1	+59.7	148.3	20 36.0	+59.8	148.5	19 44.8	+59.8	148.7	18 53.5	+59.8	148.9	**12**
13	25 49.7	+59.4	147.2	24 59.2	+59.5	147.5	24 08.5	+59.6	147.7	23 17.7	+59.7	148.0	22 26.8	+59.7	148.2	21 35.8	+59.7	148.4	20 44.6	+59.8	148.6	19 53.3	+59.9	148.8	**13**
14	26 49.1	+59.4	147.1	25 58.7	+59.4	147.3	25 08.1	+59.5	147.6	24 17.4	+59.6	147.8	23 26.5	+59.7	148.1	22 35.5	+59.7	148.3	21 44.4	+59.8	148.5	20 53.2	+59.8	148.7	**14**
15	27 48.5	+59.3	146.9	26 58.1	+59.5	147.2	26 07.6	+59.5	147.5	25 17.0	+59.6	147.7	24 26.2	+59.6	148.0	23 35.2	+59.8	148.2	22 44.2	+59.8	148.4	21 53.0	+59.8	148.6	**15**
16	28 47.8	+59.3	146.7	27 57.6	+59.4	147.0	27 07.1	+59.6	147.3	26 16.6	+59.6	147.6	25 25.8	+59.7	147.8	24 35.0	+59.7	148.1	23 44.0	+59.7	148.3	22 52.8	+59.9	148.6	**16**
17	29 47.1	+59.4	146.6	28 57.0	+59.4	146.9	28 06.7	+59.5	147.2	27 16.2	+59.5	147.5	26 25.5	+59.7	147.7	25 34.7	+59.7	148.0	24 43.7	+59.8	148.2	23 52.7	+59.8	148.5	**17**
18	30 46.5	+59.3	146.4	29 56.4	+59.4	146.7	29 06.2	+59.5	147.0	28 15.7	+59.6	147.3	27 25.2	+59.6	147.6	26 34.4	+59.7	147.9	25 43.5	+59.8	148.1	24 52.5	+59.8	148.4	**18**
19	31 45.8	+59.3	146.2	30 55.8	+59.4	146.6	30 05.7	+59.4	146.9	29 15.3	+59.6	147.2	28 24.8	+59.6	147.5	27 34.1	+59.7	147.8	26 43.3	+59.8	148.0	25 52.3	+59.8	148.3	**19**
20	32 45.1	+59.3	146.0	31 55.2	+59.4	146.4	31 05.1	+59.5	146.7	30 14.9	+59.5	147.1	29 24.4	+59.7	147.4	28 33.8	+59.7	147.7	27 43.1	+59.7	147.9	26 52.1	+59.8	148.2	**20**
21	33 44.4	+59.2	145.9	32 54.6	+59.4	146.2	32 04.6	+59.5	146.6	31 14.4	+59.6	146.9	30 24.1	+59.6	147.2	29 33.5	+59.7	147.5	28 42.8	+59.8	147.8	27 51.9	+59.9	148.1	**21**
22	34 43.6	+59.3	145.7	33 54.0	+59.3	146.0	33 04.1	+59.4	146.4	32 14.0	+59.5	146.8	31 23.7	+59.6	147.1	30 33.2	+59.7	147.4	29 42.6	+59.7	147.7	28 51.8	+59.8	148.0	**22**
23	35 42.9	+59.2	145.5	34 53.3	+59.3	145.9	34 03.5	+59.5	146.3	33 13.5	+59.6	146.6	32 23.3	+59.6	147.0	31 32.9	+59.7	147.3	30 42.3	+59.8	147.6	29 51.6	+59.8	147.9	**23**
24	36 42.1	+59.2	145.3	35 52.6	+59.4	145.7	35 03.0	+59.4	146.1	34 13.1	+59.5	146.5	33 22.9	+59.6	146.8	32 32.6	+59.7	147.2	31 42.1	+59.7	147.5	30 51.4	+59.8	147.9	**24**
25	37 41.3	+59.2	145.1	36 52.0	+59.3	145.5	36 02.4	+59.4	145.9	35 12.6	+59.5	146.3	34 22.5	+59.6	146.7	33 32.3	+59.7	147.1	32 41.8	+59.8	147.4	31 51.2	+59.8	147.8	**25**
26	38 40.5	+59.1	144.9	37 51.3	+59.2	145.3	37 01.8	+59.4	145.7	36 12.1	+59.5	146.2	35 22.1	+59.6	146.6	34 32.0	+59.6	146.9	33 41.6	+59.7	147.3	32 51.0	+59.8	147.7	**26**
27	39 39.6	+59.2	144.6	38 50.5	+59.3	145.1	38 01.2	+59.4	145.6	37 11.6	+59.5	146.0	36 21.7	+59.6	146.4	35 31.6	+59.7	146.8	34 41.3	+59.7	147.2	33 50.8	+59.7	147.6	**27**
28	40 38.8	+59.1	144.4	39 49.8	+59.2	144.9	39 00.6	+59.3	145.4	38 11.1	+59.4	145.8	37 21.3	+59.5	146.3	36 31.3	+59.6	146.7	35 41.0	+59.7	147.1	34 50.5	+59.8	147.5	**28**
29	41 37.9	+59.0	144.2	40 49.0	+59.3	144.7	39 59.9	+59.4	145.2	39 10.5	+59.5	145.7	38 20.8	+59.6	146.1	37 30.9	+59.7	146.5	36 40.7	+59.7	147.0	35 50.3	+59.8	147.4	**29**
30	42 36.9	+59.1	144.0	41 48.3	+59.2	144.5	40 59.3	+59.3	145.0	40 10.0	+59.4	145.5	39 20.4	+59.5	146.0	38 30.6	+59.6	146.4	37 40.4	+59.8	146.8	36 50.1	+59.8	147.2	**30**
31	43 36.0	+59.0	143.7	42 47.5	+59.1	144.3	41 58.6	+59.3	144.8	41 09.4	+59.4	145.3	40 19.9	+59.6	145.8	39 30.2	+59.6	146.3	38 40.2	+59.6	146.7	37 49.9	+59.7	147.1	**31**
32	44 35.0	+59.0	143.5	43 46.6	+59.2	144.0	42 57.9	+59.3	144.6	42 08.8	+59.4	145.1	41 19.5	+59.5	145.6	40 29.8	+59.6	146.1	39 39.8	+59.7	146.6	38 49.6	+59.8	147.0	**32**
33	45 34.0	+58.9	143.2	44 45.8	+59.1	143.8	43 57.2	+59.2	144.4	43 08.2	+59.4	144.9	42 19.0	+59.5	145.5	41 29.4	+59.6	146.0	40 39.5	+59.7	146.4	39 49.4	+59.7	146.9	**33**
34	46 32.9	+58.9	142.9	45 44.9	+59.0	143.6	44 56.4	+59.2	144.2	44 07.6	+59.4	144.7	43 18.5	+59.4	145.3	42 29.0	+59.6	145.8	41 39.2	+59.7	146.3	40 49.1	+59.8	146.8	**34**
35	47 31.8	+58.9	142.7	46 43.9	+59.1	143.3	45 55.6	+59.2	143.9	45 07.0	+59.3	144.5	44 17.9	+59.5	145.1	43 28.6	+59.5	145.6	42 38.9	+59.6	146.2	41 48.9	+59.7	146.7	**35**
36	48 30.7	+58.8	142.4	47 43.0	+59.0	143.0	46 54.8	+59.2	143.7	46 06.3	+59.3	144.3	45 17.4	+59.4	144.9	44 28.1	+59.6	145.5	43 38.5	+59.7	146.0	42 48.6	+59.7	146.5	**36**
37	49 29.5	+58.8	142.1	48 42.0	+58.9	142.8	47 54.0	+59.1	143.4	47 05.6	+59.3	144.1	46 16.8	+59.4	144.7	45 27.7	+59.5	145.3	44 38.2	+59.6	145.9	43 48.3	+59.8	146.4	**37**
38	50 28.3	+58.7	141.8	49 40.9	+59.0	142.5	48 53.1	+59.1	143.2	48 04.9	+59.2	143.9	47 16.2	+59.4	144.5	46 27.2	+59.5	145.1	45 37.8	+59.6	145.7	44 48.1	+59.7	146.3	**38**
39	51 27.0	+58.7	141.4	50 39.9	+58.8	142.2	49 52.2	+59.1	142.9	49 04.1	+59.3	143.6	48 15.6	+59.4	144.3	47 26.7	+59.5	144.9	46 37.4	+59.6	145.5	45 47.8	+59.7	146.1	**39**
40	52 25.7	+58.6	141.1	51 38.7	+58.9	141.9	50 51.3	+59.0	142.6	50 03.4	+59.2	143.4	49 15.0	+59.3	144.1	48 26.2	+59.5	144.7	47 37.0	+59.6	145.4	46 47.5	+59.6	146.0	**40**
41	53 24.3	+58.5	140.7	52 37.6	+58.7	141.6	51 50.3	+59.0	142.4	51 02.6	+59.1	143.1	50 14.3	+59.3	143.8	49 25.7	+59.4	144.5	48 36.6	+59.6	145.2	47 47.1	+59.7	145.8	**41**
42	54 22.8	+58.5	140.4	53 36.3	+58.7	141.2	52 49.3	+58.9	142.1	52 01.7	+59.1	142.8	51 13.6	+59.3	143.6	50 25.1	+59.5	144.3	49 36.2	+59.5	145.0	48 46.8	+59.7	145.7	**42**
43	55 21.3	+58.4	140.0	54 35.0	+58.7	140.9	53 48.2	+58.9	141.7	53 00.8	+59.1	142.6	52 12.9	+59.3	143.4	51 24.6	+59.4	144.1	50 35.7	+59.6	144.8	49 46.5	+59.6	145.5	**43**
44	56 19.7	+58.3	139.6	55 33.7	+58.6	140.5	54 47.1	+58.8	141.4	53 59.9	+59.0	142.3	53 12.2	+59.2	143.1	52 24.0	+59.3	143.9	51 35.3	+59.5	144.6	50 46.1	+59.6	145.3	**44**
45	57 18.0	+58.2	139.1	56 32.3	+58.5	140.1	55 45.9	+58.8	141.1	54 58.9	+59.0	142.0	54 11.4	+59.2	142.8	53 23.3	+59.4	143.6	52 34.8	+59.5	144.4	51 45.7	+59.7	145.2	**45**
46	58 16.2	+58.1	138.7	57 30.8	+58.4	139.7	56 44.7	+58.6	140.7	55 57.9	+58.9	141.6	55 10.6	+59.1	142.5	54 22.7	+59.3	143.4	53 34.3	+59.4	144.2	52 45.4	+59.5	145.0	**46**
47	59 14.3	+58.0	138.2	58 29.2	+58.3	139.3	57 43.3	+58.7	140.3	56 56.8	+58.9	141.3	56 09.7	+59.1	142.2	55 22.0	+59.3	143.1	54 33.7	+59.5	144.0	53 44.9	+59.6	144.8	**47**
48	60 12.3	+57.8	137.7	59 27.5	+58.2	138.8	58 42.0	+58.5	139.9	57 55.7	+58.8	140.9	57 08.8	+59.0	141.9	56 21.3	+59.2	142.9	55 33.2	+59.4	143.7	54 44.5	+59.6	144.6	**48**
49	61 10.1	+57.8	137.1	60 25.7	+58.1	138.3	59 40.5	+58.4	139.5	58 54.5	+58.8	140.6	58 07.8	+59.0	141.6	57 20.5	+59.2	142.6	56 32.6	+59.3	143.5	55 44.1	+59.5	144.4	**49**
50	62 07.9	+57.5	136.6	61 23.8	+58.0	137.8	60 38.9	+58.4	139.0	59 53.3	+58.6	140.2	59 06.8	+58.9	141.2	58 19.7	+59.2	142.3	57 31.9	+59.4	143.2	56 43.6	+59.5	144.1	**50**
51	63 05.4	+57.4	136.0	62 21.8	+57.9	137.3	61 37.3	+58.2	138.5	60 51.9	+58.6	139.7	60 05.7	+58.9	140.9	59 18.9	+59.1	141.9	58 31.3	+59.3	142.9	57 43.1	+59.5	143.9	**51**
52	64 02.8	+57.3	135.3	63 19.7	+57.7	136.7	62 35.5	+58.2	138.0	61 50.5	+58.5	139.3	61 04.6	+58.8	140.5	60 18.0	+59.0	141.6	59 30.6	+59.3	142.6	58 42.6	+59.4	143.7	**52**
53	65 00.1	+57.0	134.6	64 17.4	+57.5	136.1	63 33.7	+57.9	137.5	62 49.0	+58.3	138.8	62 03.4	+58.7	140.0	61 17.0	+59.0	141.2	60 29.9	+59.2	142.3	59 42.0	+59.4	143.4	**53**
54	65 57.1	+56.7	133.8	65 14.9	+57.4	135.4	64 31.6	+57.9	136.9	63 47.3	+58.3	138.3	63 02.1	+58.6	139.6	62 16.0	+58.9	140.8	61 29.1	+59.1	142.0	60 41.4	+59.4	143.1	**54**
55	66 53.8	+56.5	133.0	66 12.3	+57.1	134.7	65 29.5	+57.6	136.3	64 45.6	+58.1	137.7	64 00.7	+58.5	139.1	63 14.9	+58.8	140.4	62 28.2	+59.1	141.6	61 40.8	+59.3	142.8	**55**
56	67 50.3	+56.2	132.2	67 09.4	+56.9	133.9	66 27.1	+57.5	135.6	65 43.7	+58.0	137.1	64 59.2	+58.4	138.6	64 13.7	+58.8	140.0	63 27.3	+59.1	141.3	62 40.1	+59.3	142.5	**56**
57	68 46.5	+55.9	131.2	68 06.3	+56.6	133.1	67 24.6	+57.3	134.9	66 41.7	+57.8	136.5	65 57.6	+58.3	138.1	65 12.5	+58.6	139.5	64 26.4	+58.9	140.9	63 39.4	+59.2	142.1	**57**
58	69 42.4	+55.5	130.2	69 02.9	+56.3	132.2	68 21.9	+57.0	134.1	67 39.5	+57.6	135.8	66 55.9	+58.1	137.5	66 11.1	+58.6	139.0	65 25.3	+58.9	140.4	64 38.6	+59.2	141.8	**58**
59	70 37.9	+55.0	129.1	69 59.2	+55.9	131.2	69 18.9	+56.7	133.2	68 37.1	+57.4	135.1	67 54.0	+57.9	136.8	67 09.7	+58.4	138.4	66 24.2	+58.8	140.0	65 37.8	+59.1	141.4	**59**
60	71 32.9	+54.5	127.8	70 55.1	+55.5	130.1	70 15.6	+56.4	132.3	69 34.5	+57.1	134.2	68 51.9	+57.8	136.1	68 08.1	+58.2	137.8	67 23.0	+58.7	139.5	66 36.9	+59.1	141.0	**60**
61	72 27.4	+53.8	126.5	71 50.6	+55.1	128.9	71 12.0	+56.0	131.2	70 31.6	+56.9	133.4	69 49.7	+57.5	135.3	69 06.3	+58.1	137.2	68 21.7	+58.6	138.9	67 36.0	+58.9	140.5	**61**
62	73 21.2	+53.2	125.0	72 45.7	+54.5	127.6	72 08.0	+55.6	130.1	71 28.5	+56.5	132.4	70 47.2	+57.3	134.5	70 04.4	+58.0	136.5	69 20.3	+58.4	138.3	68 34.9	+58.8	140.0	**62**
63	74 14.4	+52.3	123.3	73 40.2	+53.8	126.2	73 03.6	+55.1	128.8	72 25.0	+56.1	131.3	71 44.5	+57.0	133.6	71 02.4	+57.7	135.7	70 18.7	+58.3	137.6	69 33.7	+58.8	139.5	**63**
64	75 06.7	+51.3	121.5	74 34.0	+53.0	124.6	73 58.7	+54.5	127.4	73 21.1	+55.7	130.1	72 41.5	+56.7	132.5	72 00.1	+57.4	134.8	71 17.0	+58.1	136.9	70 32.5	+58.6	138.9	**64**
65	75 58.0	+50.1	119.4	75 27.0	+52.1	122.7	74 53.2	+53.7	125.9	74 16.8	+55.1	128.7	73 38.2	+56.2	131.4	72 57.5	+57.2	133.9	72 15.1	+57.9	136.1	71 31.1	+58.5	138.2	**65**
66	76 48.1	+48.7	117.0	76 19.1	+51.0	120.7	75 46.9	+52.9	124.1	75 11.9	+54.5	127.2	74 34.4	+55.8	130.1	73 54.7	+56.8	132.8	73 13.0	+57.6	135.2	72 29.6	+58.2	137.5	**66**
67	77 36.8	+46.9	114.4	77 10.1	+49.6	118.4	76 39.8	+51.8	122.1	76 06.4	+53.6	125.5	75 30.2	+55.1	128.7	74 51.5	+56.3	131.6	74 10.6	+57.3	134.2	73 27.8	+58.1	136.7	**67**
68	78 23.7	*+44.8*	•111.4	77 59.7	+47.9	115.8	77 31.6	+50.6	119.9	77 00.0	+52.7	123.6	76 25.3	+54.5	127.1	75 47.8	+55.9	130.2	75 07.9	+57.0	133.1	74 25.9	+57.8	135.7	**68**
69	79 08.5	*+42.2*	•108.0	78 47.6	*+45.8*	•112.8	78 22.2	+48.9	117.3	77 52.7	+51.5	121.4	77 19.8	+53.5	125.2	76 43.7	+55.2	128.7	76 04.9	+56.5	131.9	75 23.7	+57.5	134.7	**69**
70	79 50.7	*+39.1*	•104.1	79 33.4	*+43.4*	•109.4	79 11.1	*+47.0*	•114.3	78 44.2	+50.0	118.9	78 13.3	+52.5	123.1	77 38.9	+54.4	126.9	77 01.4	+55.9	130.4	76 21.2	+57.1	133.5	**70**
71	80 29.8	*+35.2*	• 99.6	80 16.8	*+40.1*	•105.4	79 58.1	*+44.5*	•110.9	79 34.2	*+48.1*	•115.9	79 05.8	+51.0	120.6	78 33.3	+53.4	124.9	77 57.3	+55.3	128.7	77 18.3	+56.7	132.2	**71**
72	81 05.0	*+30.5*	• 94.6	80 56.9	*+36.3*	•100.8	80 42.6	*+41.3*	•106.9	80 22.3	*+45.7*	•112.5	79 56.8	*+49.3*	•117.7	79 26.7	+52.1	122.5	78 52.6	+54.3	126.8	78 15.0	+56.1	130.6	**72**
73	81 35.5	*+25.0*	• 88.8	81 33.2	*+31.5*	• 95.6	81 23.9	*+37.4*	•102.2	81 08.0	*+42.7*	•108.5	80 46.1	*+47.0*	•114.3	80 18.8	+50.5	119.7	79 46.9	+53.3	124.5	79 11.1	+55.3	128.8	**73**
74	82 00.5	*+18.6*	• 82.5	82 04.7	*+25.7*	• 89.6	82 01.3	*+32.6*	• 96.8	81 50.7	*+38.6*	•103.7	81 33.1	*+44.0*	•110.3	81 09.3	*+48.4*	•116.3	80 40.2	+51.7	121.8	80 06.4	+54.3	126.7	**74**
75	82 19.1	*+11.3*	• 75.5	82 30.4	*+18.8*	• 82.9	82 33.9	*+26.4*	• 90.5	82 29.3	*+33.7*	• 98.1	82 17.1	*+40.1*	•105.4	81 57.7	*+45.4*	•112.3	81 31.9	*+49.7*	•118.5	81 00.7	+53.0	124.1	**75**
76	82 30.4	*+3.5*	• 68.0	82 49.2	*+11.1*	• 75.4	83 00.3	*+19.2*	• 83.3	83 03.0	*+27.3*	• 91.5	82 57.2	*+34.9*	• 99.6	82 43.1	*+41.6*	•107.4	82 21.6	*+47.0*	•114.5	81 53.7	*+51.2*	•120.9	**76**
77	82 33.9	*−4.6*	• 60.4	83 00.3	*+2.7*	• 67.5	83 19.5	*+10.8*	• 75.4	83 30.3	*+19.5*	• 83.9	83 32.1	*+28.3*	• 92.7	83 24.7	*+36.4*	•101.4	83 08.6	*+43.3*	•109.6	82 44.9	*+48.6*	•117.0	**77**
78	82 29.3	*−12.2*	• 52.7	83 03.0	*−5.8*	• 59.2	83 30.3	*+1.8*	• 66.8	83 49.8	*+10.6*	• 75.3	84 00.4	*+19.9*	• 84.6	84 01.1	*+29.3*	• 94.1	83 51.9	*+37.9*	•103.4	83 33.5	*+45.1*	•112.1	**78**
79	82 17.1	*−19.4*	• 45.3	82 57.2	*−14.1*	• 51.0	83 32.1	*−7.4*	• 57.9	84 00.4	*+0.7*	• 66.0	84 20.3	*+10.1*	• 75.3	84 30.4	*+20.5*	• 85.4	84 29.8	*+30.7*	• 95.8	84 18.6	*+39.8*	•105.8	**79**
80	81 57.7	*−25.8*	• 38.4	82 43.1	*−21.5*	• 43.2	83 24.7	*−16.1*	• 49.2	84 01.1	*−9.2*	• 56.4	84 30.4	*−0.6*	• 65.1	84 50.9	*+9.6*	• 75.2	85 00.5	*+21.0*	• 86.4	84 58.4	*+32.2*	• 97.8	**80**
81	81 31.9	*−31.2*	• 32.1	82 21.6	*−27.9*	• 36.0	83 08.6	*−23.7*	• 40.9	83 51.9	*−18.4*	• 47.0	84 29.8	*−11.2*	• 54.7	85 00.5	*−2.1*	• 64.0	85 21.5	*+9.1*	• 75.2	85 30.6	*+21.7*	• 87.6	**81**
82	81 00.7	*−35.7*	• 26.4	81 53.7	*−33.4*	• 29.6	82 44.9	*−30.3*	• 33.5	83 33.5	*−26.3*	• 38.3	84 18.6	*−21.0*	• 44.6	84 58.4	*−13.8*	• 52.6	85 30.6	*−4.1*	• 62.7	85 52.3	*+8.3*	• 75.1	**82**
83	80 25.0	*−39.6*	• 21.5	81 20.3	*−37.8*	• 23.9	82 14.6	*−35.7*	• 26.8	83 07.2	*−32.8*	• 30.6	83 57.6	*−29.1*	• 35.4	84 44.6	*−23.9*	• 41.7	85 26.5	*−16.7*	• 50.1	86 00.6	*−6.5*	• 61.1	**83**
84	79 45.4	*−42.5*	• 17.1	80 42.5	*−41.4*	• 18.9	81 38.9	*−39.9*	• 21.1	82 34.4	*−38.1*	• 23.8	83 28.5	*−35.6*	• 27.4	84 20.7	*−32.2*	• 32.0	85 09.8	*−27.3*	• 38.3	85 54.1	*−20.3*	• 47.0	**84**
85	79 02.9	*−45.1*	• 13.3	80 01.1	*−44.3*	• 14.6	80 59.0	*−43.4*	• 16.1	81 56.3	*−42.1*	• 18.1	82 52.9	*−40.5*	• 20.6	83 48.5	*−38.4*	• 23.8	84 42.5	*−35.5*	• 28.2	85 33.8	*−31.1*	• 34.3	**85**
86	78 17.8	−47.2	9.9	79 16.8	*−46.7*	• 10.8	80 15.6	*−46.1*	• 11.9	81 14.2	*−45.3*	• 13.2	82 12.4	*−44.4*	• 14.9	83 10.1	*−43.2*	• 17.0	84 07.0	*−41.4*	• 19.9	85 02.7	*−39.0*	• 23.8	**86**
87	77 30.6	−48.9	6.9	78 30.1	−48.6	7.5	79 29.5	−48.2	8.2	80 28.9	*−47.8*	• 9.1	81 28.0	*−47.3*	• 10.2	82 26.9	*−46.6*	• 11.5	83 25.6	*−45.8*	• 13.2	84 23.7	*−44.5*	• 15.5	**87**
88	76 41.7	−50.3	4.3	77 41.5	−50.1	4.7	78 41.3	−49.9	5.1	79 41.1	−49.8	5.6	80 40.7	−49.5	6.2	81 40.3	*−49.2*	• 6.9	82 39.8	*−48.8*	• 7.9	83 39.2	*−48.3*	• 9.1	**88**
89	75 51.4	−51.4	2.0	76 51.4	−51.4	2.2	77 51.4	−51.4	2.4	78 51.3	−51.3	2.6	79 51.2	−51.2	2.8	80 51.1	−51.1	3.1	81 51.0	−51.0	3.5	82 50.9	*−50.9*	• 4.0	**89**
90	75 00.0	−52.4	0.0	76 00.0	−52.5	0.0	77 00.0	−52.5	0.0	78 00.0	−52.5	0.0	79 00.0	−52.6	0.0	80 00.0	−52.6	0.0	81 00.0	−52.7	0.0	82 00.0	−52.8	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 30°, 330°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 57.2	−59.5	149.1	12 05.6	−59.5	149.2	11 14.0	−59.6	149.4	10 22.4	−59.7	149.4	9 30.7	−59.7	149.5	8 38.9	−59.7	149.6	7 47.2	−59.8	149.7	6 55.4	−59.9	149.8	**0**
1	11 57.7	−59.5	149.3	11 06.1	−59.6	149.4	10 14.4	−59.6	149.5	9 22.7	−59.6	149.6	8 31.0	−59.8	149.6	7 39.2	−59.8	149.7	6 47.4	−59.9	149.8	5 55.5	−59.9	149.8	**1**
2	10 58.2	−59.5	149.4	10 06.5	−59.5	149.5	9 14.8	−59.6	149.6	8 23.1	−59.7	149.7	7 31.2	−59.7	149.7	6 39.4	−59.8	149.8	5 47.5	−59.8	149.9	4 55.6	−59.8	149.9	**2**
3	9 58.7	−59.5	149.5	9 07.0	−59.6	149.6	8 15.2	−59.6	149.7	7 23.4	−59.7	149.8	6 31.5	−59.7	149.8	5 39.6	−59.7	149.9	4 47.7	−59.8	149.9	3 55.8	−59.9	150.0	**3**
4	8 59.2	−59.4	149.7	8 07.4	−59.5	149.7	7 15.6	−59.6	149.8	6 23.7	−59.7	149.9	5 31.8	−59.7	149.9	4 39.9	−59.8	150.0	3 47.9	−59.8	150.0	2 55.9	−59.8	150.0	**4**
5	7 59.8	−59.5	149.8	7 07.9	−59.6	149.9	6 16.0	−59.6	149.9	5 24.0	−59.6	150.0	4 32.1	−59.7	150.0	3 40.1	−59.8	150.1	2 48.1	−59.8	150.1	1 56.1	−59.9	150.1	**5**
6	7 00.3	−59.5	149.9	6 08.3	−59.5	150.0	5 16.4	−59.7	150.0	4 24.4	−59.7	150.1	3 32.4	−59.8	150.1	2 40.3	−59.7	150.1	1 48.3	−59.8	150.2	0 56.2	−59.8	150.2	**6**
7	6 00.8	−59.5	150.1	5 08.8	−59.6	150.1	4 16.7	−59.6	150.2	3 24.7	−59.7	150.2	2 32.6	−59.7	150.2	1 40.6	−59.8	150.2	0 48.5	−59.9	150.2	0 03.6	+59.9	29.8	**7**
8	5 01.3	−59.5	150.2	4 09.2	−59.5	150.2	3 17.1	−59.6	150.3	2 25.0	−59.7	150.3	1 32.9	−59.7	150.3	0 40.8	−59.8	150.3	0 11.4	+59.8	29.7	1 03.5	+59.8	29.7	**8**
9	4 01.8	−59.5	150.3	3 09.7	−59.6	150.4	2 17.5	−59.6	150.4	1 25.3	−59.6	150.4	0 33.2	−59.7	150.4	0 19.0	+59.8	29.6	1 11.2	+59.8	29.6	2 03.3	+59.9	29.6	**9**
10	3 02.3	−59.5	150.5	2 10.1	−59.6	150.5	1 17.9	−59.6	150.5	0 25.7	−59.7	150.5	0 26.5	+59.8	29.5	1 18.8	+59.7	29.5	2 11.0	+59.8	29.5	3 03.2	+59.8	29.5	**10**
11	2 02.8	−59.5	150.6	1 10.5	−59.5	150.6	0 18.3	−59.6	150.6	0 34.0	+59.7	29.4	1 26.3	+59.7	29.4	2 18.5	+59.8	29.4	3 10.8	+59.8	29.4	4 03.0	+59.9	29.5	**11**
12	1 03.3	−59.5	150.7	0 11.0	−59.6	150.7	0 41.3	+59.7	29.3	1 33.7	+59.7	29.3	2 26.0	+59.7	29.3	3 18.3	+59.8	29.3	4 10.6	+59.8	29.4	5 02.9	+59.8	29.4	**12**
13	0 03.8	−59.5	150.8	0 48.6	+59.5	29.2	1 41.0	+59.6	29.2	2 33.4	+59.6	29.2	3 25.7	+59.8	29.2	4 18.1	+59.8	29.2	5 10.4	+59.8	29.3	6 02.7	+59.9	29.3	**13**
14	0 55.7	+59.5	29.0	1 48.1	+59.6	29.0	2 40.6	+59.6	29.1	3 33.0	+59.7	29.1	4 25.5	+59.7	29.1	5 17.9	+59.7	29.2	6 10.2	+59.9	29.2	7 02.6	+59.9	29.3	**14**
15	1 55.2	+59.5	28.9	2 47.7	+59.5	28.9	3 40.2	+59.6	28.9	4 32.7	+59.7	29.0	5 25.2	+59.7	29.0	6 17.6	+59.8	29.1	7 10.1	+59.8	29.1	8 02.5	+59.8	29.2	**15**
16	2 54.7	+59.5	28.8	3 47.2	+59.6	28.8	4 39.8	+59.6	28.8	5 32.4	+59.6	28.9	6 24.9	+59.7	28.9	7 17.4	+59.8	29.0	8 09.9	+59.8	29.0	9 02.3	+59.9	29.1	**16**
17	3 54.2	+59.4	28.6	4 46.8	+59.6	28.7	5 39.4	+59.6	28.7	6 32.0	+59.7	28.8	7 24.6	+59.7	28.8	8 17.2	+59.7	28.9	9 09.7	+59.8	29.0	10 02.2	+59.8	29.1	**17**
18	4 53.6	+59.5	28.5	5 46.4	+59.5	28.6	6 39.0	+59.7	28.6	7 31.7	+59.7	28.7	8 24.3	+59.8	28.7	9 16.9	+59.8	28.8	10 09.5	+59.8	28.9	11 02.0	+59.9	29.0	**18**
19	5 53.1	+59.5	28.4	6 45.9	+59.6	28.4	7 38.7	+59.6	28.5	8 31.4	+59.6	28.6	9 24.1	+59.7	28.6	10 16.7	+59.8	28.7	11 09.3	+59.8	28.8	12 01.9	+59.8	28.9	**19**
20	6 52.6	+59.5	28.2	7 45.5	+59.5	28.3	8 38.3	+59.6	28.4	9 31.0	+59.7	28.5	10 23.8	+59.7	28.5	11 16.5	+59.7	28.6	12 09.1	+59.8	28.7	13 01.7	+59.8	28.8	**20**
21	7 52.1	+59.5	28.1	8 45.0	+59.6	28.2	9 37.9	+59.6	28.3	10 30.7	+59.7	28.3	11 23.5	+59.7	28.4	12 16.2	+59.8	28.5	13 08.9	+59.8	28.6	14 01.5	+59.9	28.8	**21**
22	8 51.6	+59.5	28.0	9 44.6	+59.5	28.1	10 37.5	+59.6	28.1	11 30.4	+59.6	28.2	12 23.2	+59.7	28.3	13 16.0	+59.8	28.4	14 08.7	+59.8	28.6	15 01.4	+59.8	28.7	**22**
23	9 51.1	+59.5	27.8	10 44.1	+59.6	27.9	11 37.1	+59.6	28.0	12 30.0	+59.7	28.1	13 22.9	+59.7	28.2	14 15.8	+59.7	28.4	15 08.5	+59.8	28.5	16 01.2	+59.9	28.6	**23**
24	10 50.6	+59.4	27.7	11 43.7	+59.5	27.8	12 36.7	+59.6	27.9	13 29.7	+59.6	28.0	14 22.6	+59.7	28.1	15 15.5	+59.8	28.3	16 08.3	+59.8	28.4	17 01.1	+59.8	28.5	**24**
25	11 50.0	+59.5	27.6	12 43.2	+59.5	27.7	13 36.3	+59.6	27.8	14 29.3	+59.7	27.9	15 22.3	+59.7	28.0	16 15.3	+59.7	28.2	17 08.1	+59.8	28.3	18 00.9	+59.9	28.5	**25**
26	12 49.5	+59.5	27.4	13 42.7	+59.6	27.6	14 35.9	+59.6	27.7	15 29.0	+59.6	27.8	16 22.0	+59.7	27.9	17 15.0	+59.8	28.1	18 07.9	+59.8	28.2	19 00.8	+59.8	28.4	**26**
27	13 49.0	+59.4	27.3	14 42.3	+59.5	27.4	15 35.5	+59.6	27.6	16 28.6	+59.7	27.7	17 21.7	+59.7	27.8	18 14.8	+59.7	28.0	19 07.7	+59.8	28.1	20 00.6	+59.8	28.3	**27**
28	14 48.4	+59.5	27.2	15 41.8	+59.5	27.3	16 35.1	+59.6	27.4	17 28.3	+59.6	27.6	18 21.4	+59.7	27.7	19 14.5	+59.8	27.9	20 07.5	+59.8	28.0	21 00.4	+59.9	28.2	**28**
29	15 47.9	+59.4	27.0	16 41.3	+59.5	27.2	17 34.7	+59.5	27.3	18 27.9	+59.7	27.5	19 21.1	+59.7	27.6	20 14.3	+59.7	27.8	21 07.3	+59.8	28.0	22 00.3	+59.8	28.1	**29**
30	16 47.3	+59.5	26.9	17 40.8	+59.5	27.0	18 34.2	+59.6	27.2	19 27.6	+59.6	27.3	20 20.8	+59.7	27.5	21 14.0	+59.7	27.7	22 07.1	+59.8	27.9	23 00.1	+59.8	28.1	**30**
31	17 46.8	+59.4	26.7	18 40.3	+59.5	26.9	19 33.8	+59.6	27.1	20 27.2	+59.6	27.2	21 20.5	+59.7	27.4	22 13.7	+59.8	27.6	23 06.9	+59.8	27.8	23 59.9	+59.8	28.0	**31**
32	18 46.2	+59.5	26.6	19 39.8	+59.5	26.8	20 33.4	+59.5	26.9	21 26.8	+59.6	27.1	22 20.2	+59.7	27.3	23 13.5	+59.7	27.5	24 06.7	+59.7	27.7	24 59.7	+59.9	27.9	**32**
33	19 45.7	+59.4	26.5	20 39.3	+59.5	26.6	21 32.9	+59.6	26.8	22 26.4	+59.7	27.0	23 19.9	+59.6	27.2	24 13.2	+59.7	27.4	25 06.4	+59.8	27.6	25 59.6	+59.8	27.8	**33**
34	20 45.1	+59.4	26.3	21 38.8	+59.5	26.5	22 32.5	+59.5	26.7	23 26.1	+59.6	26.9	24 19.5	+59.7	27.1	25 12.9	+59.7	27.3	26 06.2	+59.8	27.5	26 59.4	+59.8	27.7	**34**
35	21 44.5	+59.4	26.2	22 38.3	+59.5	26.3	23 32.0	+59.6	26.5	24 25.7	+59.6	26.7	25 19.2	+59.7	26.9	26 12.6	+59.8	27.2	27 06.0	+59.7	27.4	27 59.2	+59.8	27.6	**35**
36	22 43.9	+59.4	26.0	23 37.8	+59.5	26.2	24 31.6	+59.5	26.4	25 25.3	+59.6	26.6	26 18.9	+59.6	26.8	27 12.4	+59.7	27.1	28 05.7	+59.8	27.3	28 59.0	+59.8	27.5	**36**
37	23 43.3	+59.4	25.9	24 37.3	+59.4	26.1	25 31.1	+59.6	26.3	26 24.9	+59.6	26.5	27 18.5	+59.7	26.7	28 12.1	+59.7	26.9	29 05.5	+59.8	27.2	29 58.8	+59.8	27.5	**37**
38	24 42.7	+59.4	25.7	25 36.7	+59.5	25.9	26 30.7	+59.5	26.1	27 24.5	+59.6	26.3	28 18.2	+59.6	26.6	29 11.8	+59.7	26.8	30 05.3	+59.7	27.1	30 58.6	+59.8	27.4	**38**
39	25 42.1	+59.4	25.5	26 36.2	+59.4	25.8	27 30.2	+59.5	26.0	28 24.1	+59.5	26.2	29 17.8	+59.7	26.5	30 11.5	+59.7	26.7	31 05.0	+59.8	27.0	31 58.4	+59.8	27.3	**39**
40	26 41.5	+59.3	25.4	27 35.6	+59.5	25.6	28 29.7	+59.5	25.8	29 23.6	+59.6	26.1	30 17.5	+59.6	26.3	31 11.2	+59.7	26.6	32 04.8	+59.7	26.9	32 58.2	+59.8	27.2	**40**
41	27 40.8	+59.4	25.2	28 35.1	+59.4	25.5	29 29.2	+59.5	25.7	30 23.2	+59.6	25.9	31 17.1	+59.6	26.2	32 10.9	+59.6	26.5	33 04.5	+59.7	26.8	33 58.0	+59.8	27.1	**41**
42	28 40.2	+59.3	25.1	29 34.5	+59.4	25.3	30 28.7	+59.5	25.5	31 22.8	+59.5	25.8	32 16.7	+59.6	26.1	33 10.5	+59.7	26.4	34 04.2	+59.8	26.7	34 57.8	+59.8	27.0	**42**
43	29 39.5	+59.3	24.9	30 33.9	+59.4	25.1	31 28.2	+59.4	25.4	32 22.3	+59.5	25.7	33 16.3	+59.6	25.9	34 10.2	+59.7	26.2	35 04.0	+59.7	26.5	35 57.6	+59.7	26.9	**43**
44	30 38.8	+59.4	24.7	31 33.3	+59.4	25.0	32 27.6	+59.5	25.2	33 21.8	+59.6	25.5	34 15.9	+59.6	25.8	35 09.9	+59.6	26.1	36 03.7	+59.7	26.4	36 57.3	+59.8	26.7	**44**
45	31 38.2	+59.2	24.5	32 32.7	+59.3	24.8	33 27.1	+59.4	25.1	34 21.4	+59.5	25.4	35 15.5	+59.6	25.7	36 09.5	+59.7	26.0	37 03.4	+59.7	26.3	37 57.1	+59.8	26.6	**45**
46	32 37.4	+59.3	24.4	33 32.0	+59.4	24.6	34 26.5	+59.5	24.9	35 20.9	+59.5	25.2	36 15.1	+59.6	25.5	37 09.2	+59.6	25.8	38 03.1	+59.7	26.2	38 56.9	+59.7	26.5	**46**
47	33 36.7	+59.3	24.2	34 31.4	+59.3	24.4	35 26.0	+59.4	24.7	36 20.4	+59.5	25.0	37 14.7	+59.5	25.4	38 08.8	+59.6	25.7	39 02.8	+59.7	26.0	39 56.6	+59.8	26.4	**47**
48	34 36.0	+59.2	24.0	35 30.7	+59.4	24.3	36 25.4	+59.4	24.6	37 19.9	+59.5	24.9	38 14.2	+59.6	25.2	39 08.4	+59.7	25.6	40 02.5	+59.7	25.9	40 56.4	+59.7	26.3	**48**
49	35 35.2	+59.3	23.8	36 30.1	+59.3	24.1	37 24.8	+59.4	24.4	38 19.4	+59.4	24.7	39 13.8	+59.5	25.1	40 08.1	+59.6	25.4	41 02.2	+59.7	25.8	41 56.1	+59.8	26.2	**49**
50	36 34.5	+59.2	23.6	37 29.4	+59.3	23.9	38 24.2	+59.3	24.2	39 18.8	+59.5	24.5	40 13.3	+59.5	24.9	41 07.7	+59.6	25.3	42 01.9	+59.6	25.6	42 55.9	+59.7	26.0	**50**
51	37 33.7	+59.1	23.4	38 28.7	+59.2	23.7	39 23.5	+59.4	24.0	40 18.3	+59.4	24.4	41 12.8	+59.6	24.7	42 07.3	+59.5	25.1	43 01.5	+59.7	25.5	43 55.6	+59.7	25.9	**51**
52	38 32.8	+59.2	23.2	39 27.9	+59.3	23.5	40 22.9	+59.3	23.8	41 17.7	+59.4	24.2	42 12.4	+59.4	24.6	43 06.8	+59.6	24.9	44 01.2	+59.6	25.3	44 55.3	+59.7	25.8	**52**
53	39 32.0	+59.1	23.0	40 27.2	+59.2	23.3	41 22.2	+59.3	23.6	42 17.1	+59.4	24.0	43 11.8	+59.5	24.4	44 06.4	+59.6	24.8	45 00.8	+59.6	25.2	45 55.0	+59.7	25.6	**53**
54	40 31.1	+59.2	22.7	41 26.4	+59.2	23.1	42 21.5	+59.3	23.4	43 16.5	+59.4	23.8	44 11.3	+59.5	24.2	45 06.0	+59.5	24.6	46 00.4	+59.6	25.0	46 54.7	+59.7	25.5	**54**
55	41 30.3	+59.0	22.5	42 25.6	+59.2	22.9	43 20.8	+59.3	23.2	44 15.9	+59.3	23.6	45 10.8	+59.4	24.0	46 05.5	+59.5	24.4	47 00.0	+59.6	24.9	47 54.4	+59.6	25.3	**55**
56	42 29.3	+59.1	22.3	43 24.8	+59.1	22.6	44 20.1	+59.2	23.0	45 15.2	+59.4	23.4	46 10.2	+59.4	23.8	47 05.0	+59.5	24.2	47 59.6	+59.6	24.7	48 54.0	+59.7	25.2	**56**
57	43 28.4	+59.0	22.0	44 23.9	+59.2	22.4	45 19.3	+59.2	22.8	46 14.6	+59.3	23.2	47 09.6	+59.4	23.6	48 04.5	+59.5	24.1	48 59.2	+59.6	24.5	49 53.7	+59.6	25.0	**57**
58	44 27.4	+59.0	21.8	45 23.1	+59.0	22.2	46 18.5	+59.2	22.6	47 13.9	+59.3	23.0	48 09.0	+59.4	23.4	49 04.0	+59.5	23.9	49 58.8	+59.5	24.3	50 53.3	+59.7	24.8	**58**
59	45 26.4	+59.0	21.5	46 22.1	+59.1	21.9	47 17.7	+59.2	22.3	48 13.2	+59.2	22.7	49 08.4	+59.3	23.2	50 03.5	+59.4	23.6	50 58.3	+59.5	24.1	51 53.0	+59.6	24.7	**59**
60	46 25.4	+58.9	21.3	47 21.2	+59.0	21.7	48 16.9	+59.1	22.1	49 12.4	+59.2	22.5	50 07.7	+59.4	23.0	51 02.9	+59.4	23.4	51 57.8	+59.6	23.9	52 52.6	+59.6	24.5	**60**
61	47 24.3	+58.8	21.0	48 20.2	+59.0	21.4	49 16.0	+59.1	21.8	50 11.6	+59.2	22.2	51 07.1	+59.3	22.7	52 02.3	+59.4	23.2	52 57.4	+59.4	23.7	53 52.2	+59.5	24.3	**61**
62	48 23.1	+58.9	20.7	49 19.2	+58.9	21.1	50 15.1	+59.0	21.5	51 10.8	+59.2	22.0	52 06.4	+59.2	22.5	53 01.7	+59.4	23.0	53 56.8	+59.5	23.5	54 51.7	+59.6	24.1	**62**
63	49 22.0	+58.7	20.4	50 18.1	+58.9	20.8	51 14.1	+59.0	21.3	52 10.0	+59.1	21.7	53 05.6	+59.2	22.2	54 01.1	+59.3	22.7	54 56.3	+59.4	23.3	55 51.3	+59.5	23.9	**63**
64	50 20.7	+58.8	20.1	51 17.0	+58.9	20.5	52 13.1	+59.0	21.0	53 09.1	+59.0	21.4	54 04.8	+59.2	21.9	55 00.4	+59.3	22.5	55 55.7	+59.4	23.0	56 50.8	+59.5	23.6	**64**
65	51 19.5	+58.6	19.8	52 15.9	+58.8	20.2	53 12.1	+58.9	20.7	54 08.1	+59.1	21.1	55 04.0	+59.2	21.7	55 59.7	+59.2	22.2	56 55.1	+59.4	22.8	57 50.3	+59.5	23.4	**65**
66	52 18.1	+58.7	19.4	53 14.7	+58.7	19.9	54 11.0	+58.9	20.3	55 07.2	+58.9	20.8	56 03.2	+59.0	21.4	56 58.9	+59.2	21.9	57 54.5	+59.3	22.5	58 49.8	+59.4	23.1	**66**
67	53 16.8	+58.5	19.1	54 13.4	+58.7	19.5	55 09.9	+58.7	20.0	56 06.1	+59.0	20.5	57 02.2	+59.1	21.0	57 58.1	+59.2	21.6	58 53.8	+59.3	22.2	59 49.2	+59.4	22.9	**67**
68	54 15.3	+58.5	18.7	55 12.1	+58.6	19.2	56 08.6	+58.8	19.6	57 05.1	+58.8	20.2	58 01.3	+59.0	20.7	58 57.3	+59.1	21.3	59 53.1	+59.2	21.9	60 48.6	+59.4	22.6	**68**
69	55 13.8	+58.4	18.3	56 10.7	+58.5	18.8	57 07.4	+58.6	19.3	58 03.9	+58.8	19.8	59 00.3	+58.9	20.4	59 56.4	+59.1	21.0	60 52.3	+59.2	21.6	61 48.0	+59.3	22.3	**69**
70	56 12.2	+58.3	17.9	57 09.2	+58.4	18.4	58 06.0	+58.6	18.9	59 02.7	+58.7	19.4	59 59.2	+58.9	20.0	60 55.5	+59.0	20.6	61 51.5	+59.2	21.3	62 47.3	+59.3	22.0	**70**
71	57 10.5	+58.2	17.5	58 07.6	+58.4	18.0	59 04.6	+58.5	18.5	60 01.4	+58.7	19.0	60 58.1	+58.8	19.6	61 54.5	+58.9	20.2	62 50.7	+59.0	20.9	63 46.6	+59.2	21.6	**71**
72	58 08.7	+58.1	17.0	59 06.0	+58.3	17.5	60 03.1	+58.4	18.0	61 00.1	+58.6	18.6	61 56.9	+58.7	19.2	62 53.4	+58.9	19.8	63 49.7	+59.1	20.5	64 45.8	+59.2	21.2	**72**
73	59 06.8	+58.0	16.5	60 04.3	+58.1	17.0	61 01.5	+58.3	17.6	61 58.7	+58.4	18.1	62 55.6	+58.6	18.7	63 52.3	+58.8	19.4	64 48.8	+58.9	20.1	65 45.0	+59.1	20.8	**73**
74	60 04.8	+57.9	16.0	61 02.4	+58.0	16.5	61 59.8	+58.2	17.1	62 57.1	+58.4	17.6	63 54.2	+58.5	18.3	64 51.1	+58.7	18.9	65 47.7	+58.9	19.6	66 44.1	+59.0	20.4	**74**
75	61 02.7	+57.7	15.5	62 00.4	+58.0	16.0	62 58.0	+58.1	16.5	63 55.5	+58.2	17.1	64 52.7	+58.4	17.7	65 49.8	+58.5	18.4	66 46.6	+58.7	19.2	67 43.1	+58.9	20.0	**75**
76	62 00.4	+57.6	14.9	62 58.4	+57.7	15.4	63 56.1	+57.9	16.0	64 53.7	+58.1	16.6	65 51.1	+58.3	17.2	66 48.3	+58.5	17.9	67 45.3	+58.7	18.6	68 42.0	+58.9	19.5	**76**
77	62 58.0	+57.5	14.3	63 56.1	+57.6	14.8	64 54.0	+57.8	15.4	65 51.8	+58.0	16.0	66 49.4	+58.1	16.6	67 46.8	+58.3	17.3	68 44.0	+58.5	18.1	69 40.9	+58.7	18.9	**77**
78	63 55.5	+57.2	13.7	64 53.7	+57.4	14.2	65 51.8	+57.6	14.7	66 49.8	+57.7	15.3	67 47.5	+58.0	16.0	68 45.1	+58.2	16.7	69 42.5	+58.4	17.4	70 39.6	+58.6	18.3	**78**
79	64 52.7	+57.1	13.0	65 51.1	+57.2	13.5	66 49.4	+57.4	14.0	67 47.5	+57.6	14.6	68 45.5	+57.8	15.3	69 43.3	+58.0	16.0	70 40.9	+58.2	16.8	71 38.2	+58.4	17.6	**79**
80	65 49.8	+56.8	12.2	66 48.3	+57.0	12.7	67 46.8	+57.2	13.3	68 45.1	+57.4	13.9	69 43.3	+57.6	14.5	70 41.3	+57.8	15.2	71 39.1	+58.0	16.0	72 36.6	+58.3	16.9	**80**
81	66 46.6	+56.5	11.4	67 45.3	+56.7	11.9	68 44.0	+56.9	12.5	69 42.5	+57.1	13.0	70 40.9	+57.3	13.7	71 39.1	+57.5	14.4	72 37.1	+57.8	15.2	73 34.9	+58.0	16.1	**81**
82	67 43.1	+56.2	10.6	68 42.0	+56.5	11.0	69 40.9	+56.6	11.6	70 39.6	+56.8	12.1	71 38.2	+57.0	12.8	72 36.6	+57.3	13.5	73 34.9	+57.5	14.3	74 32.9	+57.8	15.1	**82**
83	68 39.3	+55.9	9.6	69 38.5	+56.0	10.1	70 37.5	+56.2	10.6	71 36.4	+56.5	11.1	72 35.2	+56.7	11.7	73 33.9	+56.9	12.4	74 32.4	+57.2	13.2	75 30.7	+57.5	14.1	**83**
84	69 35.2	+55.6	8.6	70 34.5	+55.7	9.0	71 33.7	+55.9	9.5	72 32.9	+56.0	10.0	73 31.9	+56.3	10.6	74 30.8	+56.5	11.3	75 29.6	+56.8	12.0	76 28.2	+57.0	12.9	**84**
85	70 30.8	+55.0	7.5	71 30.2	+55.2	7.9	72 29.6	+55.4	8.3	73 28.9	+55.6	8.8	74 28.2	+55.8	9.4	75 27.3	+56.1	10.0	76 26.4	+56.3	10.7	77 25.2	+56.6	11.5	**85**
86	71 25.8	+54.6	6.3	72 25.4	+54.7	6.6	73 25.0	+54.9	7.0	74 24.5	+55.1	7.5	75 24.0	+55.2	8.0	76 23.4	+55.4	8.5	77 22.7	+55.7	9.2	78 21.8	+56.0	10.0	**86**
87	72 20.4	+53.9	4.9	73 20.1	+54.1	5.2	74 19.9	+54.2	5.6	75 19.6	+54.3	5.9	76 19.2	+54.6	6.4	77 18.8	+54.8	6.8	78 18.4	+54.9	7.4	79 17.8	+55.2	8.1	**87**
88	73 14.3	+53.3	3.5	74 14.2	+53.3	3.7	75 14.1	+53.4	3.9	76 13.9	+53.6	4.2	77 13.8	+53.6	4.5	78 13.6	+53.8	4.9	79 13.3	+54.0	5.4	80 13.0	+54.2	5.9	**88**
89	74 07.6	+52.4	1.8	75 07.5	+52.5	1.9	76 07.5	+52.5	2.1	77 07.5	+52.5	2.2	78 07.4	+52.6	2.4	79 07.4	+52.6	2.7	80 07.3	+52.7	2.9	81 07.2	+52.8	3.2	**89**
90	75 00.0	+51.4	0.0	76 00.0	+51.4	0.0	77 00.0	+51.4	0.0	78 00.0	+51.3	0.0	79 00.0	+51.2	0.0	80 00.0	+51.1	0.0	81 00.0	+51.0	0.0	82 00.0	*+50.9* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 150°, 210°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 49.1	+59.4	148.1	11 58.1	+59.5	148.2	11 07.0	+59.6	148.3	10 15.9	+59.7	148.4	9 24.8	+59.7	148.5	8 33.6	+59.8	148.6	7 42.4	+59.8	148.7	6 51.1	+59.8	148.8	**0**
1	13 48.5	+59.4	148.0	12 57.6	+59.5	148.1	12 06.6	+59.6	148.2	11 15.6	+59.6	148.3	10 24.5	+59.7	148.4	9 33.4	+59.7	148.5	8 42.2	+59.8	148.6	7 50.9	+59.9	148.7	**1**
2	14 47.9	+59.5	147.8	13 57.1	+59.5	148.0	13 06.2	+59.6	148.1	12 15.2	+59.7	148.2	11 24.2	+59.7	148.3	10 33.1	+59.8	148.4	9 42.0	+59.8	148.5	8 50.8	+59.8	148.6	**2**
3	15 47.4	+59.4	147.7	14 56.6	+59.5	147.8	14 05.8	+59.5	148.0	13 14.9	+59.6	148.1	12 23.9	+59.7	148.2	11 32.9	+59.7	148.3	10 41.8	+59.8	148.4	9 50.6	+59.9	148.5	**3**
4	16 46.8	+59.4	147.5	15 56.1	+59.5	147.7	15 05.3	+59.6	147.9	14 14.5	+59.6	148.0	13 23.6	+59.7	148.1	12 32.6	+59.8	148.2	11 41.6	+59.8	148.4	10 50.5	+59.8	148.5	**4**
5	17 46.2	+59.4	147.4	16 55.6	+59.5	147.6	16 04.9	+59.6	147.7	15 14.1	+59.7	147.9	14 23.3	+59.7	148.0	13 32.4	+59.7	148.1	12 41.4	+59.7	148.3	11 50.3	+59.8	148.4	**5**
6	18 45.6	+59.4	147.3	17 55.1	+59.5	147.4	17 04.5	+59.5	147.6	16 13.8	+59.6	147.8	15 23.0	+59.7	147.9	14 32.1	+59.7	148.1	13 41.1	+59.8	148.2	12 50.1	+59.9	148.3	**6**
7	19 45.0	+59.4	147.1	18 54.6	+59.4	147.3	18 04.0	+59.6	147.5	17 13.4	+59.6	147.6	16 22.7	+59.6	147.8	15 31.8	+59.8	148.0	14 40.9	+59.8	148.1	13 50.0	+59.8	148.2	**7**
8	20 44.4	+59.4	147.0	19 54.0	+59.5	147.2	19 03.6	+59.5	147.3	18 13.0	+59.6	147.5	17 22.3	+59.7	147.7	16 31.6	+59.7	147.9	15 40.7	+59.8	148.0	14 49.8	+59.8	148.2	**8**
9	21 43.8	+59.3	146.8	20 53.5	+59.5	147.0	20 03.1	+59.6	147.2	19 12.6	+59.6	147.4	18 22.0	+59.7	147.6	17 31.3	+59.8	147.8	16 40.5	+59.8	147.9	15 49.6	+59.9	148.1	**9**
10	22 43.1	+59.4	146.6	21 53.0	+59.4	146.9	21 02.7	+59.5	147.1	20 12.2	+59.6	147.3	19 21.7	+59.7	147.5	18 31.1	+59.7	147.7	17 40.3	+59.8	147.8	16 49.5	+59.8	148.0	**10**
11	23 42.5	+59.4	146.5	22 52.4	+59.5	146.7	22 02.2	+59.5	146.9	21 11.8	+59.6	147.2	20 21.4	+59.6	147.4	19 30.8	+59.7	147.6	18 40.1	+59.8	147.7	17 49.3	+59.8	147.9	**11**
12	24 41.9	+59.3	146.3	23 51.9	+59.4	146.6	23 01.7	+59.5	146.8	22 11.4	+59.6	147.0	21 21.0	+59.7	147.3	20 30.5	+59.7	147.5	19 39.9	+59.8	147.7	18 49.1	+59.9	147.8	**12**
13	25 41.2	+59.3	146.2	24 51.3	+59.4	146.4	24 01.2	+59.5	146.7	23 11.0	+59.6	146.9	22 20.7	+59.7	147.1	21 30.2	+59.8	147.4	20 39.7	+59.7	147.6	19 49.0	+59.8	147.8	**13**
14	26 40.5	+59.4	146.0	25 50.7	+59.4	146.3	25 00.7	+59.5	146.5	24 10.6	+59.6	146.8	23 20.4	+59.6	147.0	22 30.0	+59.7	147.3	21 39.4	+59.8	147.5	20 48.8	+59.8	147.7	**14**
15	27 39.9	+59.3	145.8	26 50.1	+59.4	146.1	26 00.2	+59.5	146.4	25 10.2	+59.6	146.7	24 20.0	+59.7	146.9	23 29.7	+59.7	147.1	22 39.2	+59.8	147.4	21 48.6	+59.8	147.6	**15**
16	28 39.2	+59.3	145.7	27 49.5	+59.4	146.0	26 59.7	+59.5	146.2	26 09.8	+59.5	146.5	25 19.7	+59.6	146.8	24 29.4	+59.7	147.0	23 39.0	+59.7	147.3	22 48.4	+59.8	147.5	**16**
17	29 38.5	+59.3	145.5	28 48.9	+59.4	145.8	27 59.2	+59.5	146.1	27 09.3	+59.6	146.4	26 19.3	+59.6	146.7	25 29.1	+59.7	146.9	24 38.7	+59.8	147.2	23 48.2	+59.9	147.4	**17**
18	30 37.8	+59.2	145.3	29 48.3	+59.4	145.6	28 58.7	+59.5	145.9	28 08.9	+59.6	146.3	27 18.9	+59.7	146.5	26 28.8	+59.7	146.8	25 38.5	+59.8	147.1	24 48.1	+59.8	147.3	**18**
19	31 37.0	+59.3	145.1	30 47.7	+59.4	145.5	29 58.2	+59.4	145.8	29 08.5	+59.5	146.1	28 18.6	+59.6	146.4	27 28.5	+59.7	146.7	26 38.3	+59.7	147.0	25 47.9	+59.8	147.3	**19**
20	32 36.3	+59.2	144.9	31 47.1	+59.3	145.3	30 57.6	+59.5	145.6	30 08.0	+59.5	146.0	29 18.2	+59.6	146.3	28 28.2	+59.7	146.6	27 38.0	+59.8	146.9	26 47.7	+59.8	147.2	**20**
21	33 35.5	+59.2	144.7	32 46.4	+59.3	145.1	31 57.1	+59.4	145.5	31 07.5	+59.6	145.8	30 17.8	+59.6	146.2	29 27.9	+59.6	146.5	28 37.8	+59.7	146.8	27 47.5	+59.8	147.1	**21**
22	34 34.7	+59.2	144.5	33 45.7	+59.3	144.9	32 56.5	+59.4	145.3	32 07.1	+59.5	145.7	31 17.4	+59.6	146.0	30 27.5	+59.7	146.4	29 37.5	+59.7	146.7	28 47.3	+59.8	147.0	**22**
23	35 33.9	+59.2	144.4	34 45.0	+59.3	144.8	33 55.9	+59.4	145.2	33 06.6	+59.5	145.5	32 17.0	+59.6	145.9	31 27.2	+59.7	146.2	30 37.2	+59.8	146.6	29 47.1	+59.8	146.9	**23**
24	36 33.1	+59.2	144.1	35 44.3	+59.3	144.6	34 55.3	+59.4	145.0	34 06.1	+59.5	145.4	33 16.6	+59.6	145.8	32 26.9	+59.6	146.1	31 37.0	+59.7	146.5	30 46.9	+59.8	146.8	**24**
25	37 32.3	+59.1	143.9	36 43.6	+59.3	144.4	35 54.7	+59.4	144.8	35 05.6	+59.4	145.2	34 16.2	+59.5	145.6	33 26.5	+59.7	146.0	32 36.7	+59.7	146.3	31 46.7	+59.7	146.7	**25**
26	38 31.4	+59.1	143.7	37 42.9	+59.2	144.2	36 54.1	+59.4	144.6	36 05.0	+59.5	145.1	35 15.7	+59.6	145.5	34 26.2	+59.6	145.9	33 36.4	+59.7	146.2	32 46.4	+59.8	146.6	**26**
27	39 30.5	+59.1	143.5	38 42.1	+59.2	144.0	37 53.5	+59.3	144.4	37 04.5	+59.5	144.9	36 15.3	+59.5	145.3	35 25.8	+59.7	145.7	34 36.1	+59.7	146.1	33 46.2	+59.8	146.5	**27**
28	40 29.6	+59.0	143.3	39 41.3	+59.2	143.8	38 52.8	+59.3	144.3	38 04.0	+59.4	144.7	37 14.8	+59.6	145.2	36 25.5	+59.6	145.6	35 35.8	+59.7	146.0	34 46.0	+59.8	146.4	**28**
29	41 28.6	+59.1	143.0	40 40.5	+59.2	143.6	39 52.1	+59.3	144.1	39 03.4	+59.4	144.5	38 14.4	+59.5	145.0	37 25.1	+59.6	145.4	36 35.5	+59.7	145.9	35 45.8	+59.7	146.3	**29**
30	42 27.7	+59.0	142.8	41 39.7	+59.2	143.3	40 51.4	+59.3	143.9	40 02.8	+59.4	144.4	39 13.9	+59.5	144.8	38 24.7	+59.6	145.3	37 35.2	+59.7	145.7	36 45.5	+59.8	146.2	**30**
31	43 26.7	+58.9	142.6	42 38.9	+59.1	143.1	41 50.7	+59.3	143.7	41 02.2	+59.4	144.2	40 13.4	+59.5	144.7	39 24.3	+59.6	145.2	38 34.9	+59.7	145.6	37 45.3	+59.7	146.1	**31**
32	44 25.6	+59.0	142.3	43 38.0	+59.1	142.9	42 50.0	+59.2	143.4	42 01.6	+59.4	144.0	41 12.9	+59.5	144.5	40 23.9	+59.6	145.0	39 34.6	+59.7	145.5	38 45.0	+59.8	145.9	**32**
33	45 24.6	+58.9	142.0	44 37.1	+59.0	142.6	43 49.2	+59.2	143.2	43 01.0	+59.3	143.8	42 12.4	+59.4	144.3	41 23.5	+59.5	144.8	40 34.3	+59.6	145.3	39 44.8	+59.7	145.8	**33**
34	46 23.5	+58.8	141.8	45 36.1	+59.0	142.4	44 48.4	+59.2	143.0	44 00.3	+59.3	143.6	43 11.8	+59.5	144.1	42 23.0	+59.6	144.7	41 33.9	+59.7	145.2	40 44.5	+59.7	145.7	**34**
35	47 22.3	+58.8	141.5	46 35.1	+59.0	142.1	45 47.6	+59.1	142.8	44 59.6	+59.3	143.4	44 11.3	+59.4	144.0	43 22.6	+59.5	144.5	42 33.6	+59.6	145.1	41 44.2	+59.7	145.6	**35**
36	48 21.1	+58.8	141.2	47 34.1	+59.0	141.9	46 46.7	+59.1	142.5	45 58.9	+59.3	143.2	45 10.7	+59.4	143.8	44 22.1	+59.5	144.3	43 33.2	+59.6	144.9	42 43.9	+59.8	145.4	**36**
37	49 19.9	+58.7	140.9	48 33.1	+58.9	141.6	47 45.8	+59.1	142.3	46 58.2	+59.2	142.9	46 10.1	+59.4	143.6	45 21.6	+59.6	144.2	44 32.8	+59.6	144.7	43 43.7	+59.7	145.3	**37**
38	50 18.6	+58.6	140.5	49 32.0	+58.8	141.3	48 44.9	+59.1	142.0	47 57.4	+59.2	142.7	47 09.5	+59.3	143.4	46 21.2	+59.4	144.0	45 32.4	+59.6	144.6	44 43.4	+59.6	145.2	**38**
39	51 17.2	+58.6	140.2	50 30.8	+58.9	141.0	49 44.0	+59.0	141.7	48 56.6	+59.2	142.5	48 08.8	+59.4	143.1	47 20.6	+59.5	143.8	46 32.0	+59.6	144.4	45 43.0	+59.7	145.0	**39**
40	52 15.8	+58.5	139.9	51 29.7	+58.7	140.7	50 43.0	+59.0	141.5	49 55.8	+59.2	142.2	49 08.2	+59.3	142.9	48 20.1	+59.4	143.6	47 31.6	+59.6	144.2	46 42.7	+59.7	144.9	**40**
41	53 14.3	+58.5	139.5	52 28.4	+58.7	140.3	51 42.0	+58.9	141.2	50 55.0	+59.1	141.9	50 07.5	+59.3	142.7	49 19.5	+59.5	143.4	48 31.2	+59.5	144.1	47 42.4	+59.6	144.7	**41**
42	54 12.8	+58.4	139.1	53 27.1	+58.7	140.0	52 40.9	+58.8	140.9	51 54.1	+59.0	141.7	51 06.8	+59.2	142.4	50 19.0	+59.4	143.2	49 30.7	+59.5	143.9	48 42.0	+59.7	144.6	**42**
43	55 11.2	+58.3	138.7	54 25.8	+58.5	139.6	53 39.7	+58.9	140.5	52 53.1	+59.1	141.4	52 06.0	+59.2	142.2	51 18.4	+59.3	142.9	50 30.2	+59.5	143.7	49 41.7	+59.6	144.4	**43**
44	56 09.5	+58.2	138.3	55 24.3	+58.5	139.3	54 38.6	+58.7	140.2	53 52.2	+58.9	141.1	53 05.2	+59.2	141.9	52 17.7	+59.4	142.7	51 29.7	+59.5	143.5	50 41.3	+59.6	144.2	**44**
45	57 07.7	+58.1	137.9	56 22.8	+58.5	138.9	55 37.3	+58.7	139.8	54 51.1	+59.0	140.8	54 04.4	+59.1	141.6	53 17.1	+59.3	142.5	52 29.2	+59.5	143.3	51 40.9	+59.6	144.0	**45**
46	58 05.8	+58.0	137.4	57 21.3	+58.3	138.5	56 36.0	+58.6	139.5	55 50.1	+58.8	140.4	55 03.5	+59.1	141.3	54 16.4	+59.3	142.2	53 28.7	+59.4	143.0	52 40.5	+59.6	143.8	**46**
47	59 03.8	+57.9	136.9	58 19.6	+58.2	138.0	57 34.6	+58.6	139.1	56 48.9	+58.9	140.1	56 02.6	+59.0	141.0	55 15.7	+59.2	141.9	54 28.1	+59.4	142.8	53 40.1	+59.5	143.6	**47**
48	60 01.7	+57.7	136.4	59 17.8	+58.2	137.5	58 33.2	+58.4	138.7	57 47.8	+58.7	139.7	57 01.6	+59.0	140.7	56 14.9	+59.2	141.7	55 27.5	+59.4	142.6	54 39.6	+59.5	143.4	**48**
49	60 59.4	+57.7	135.8	60 16.0	+58.0	137.1	59 31.6	+58.4	138.2	58 46.5	+58.7	139.3	58 00.6	+59.0	140.4	57 14.1	+59.1	141.4	56 26.9	+59.4	142.3	55 39.1	+59.5	143.2	**49**
50	61 57.1	+57.4	135.2	61 14.0	+57.9	136.5	60 30.0	+58.2	137.8	59 45.2	+58.5	138.9	58 59.6	+58.8	140.0	58 13.2	+59.1	141.1	57 26.3	+59.3	142.0	56 38.6	+59.5	143.0	**50**
51	62 54.5	+57.3	134.6	62 11.9	+57.7	136.0	61 28.2	+58.2	137.3	60 43.7	+58.5	138.5	59 58.4	+58.8	139.6	59 12.3	+59.1	140.7	58 25.6	+59.2	141.8	57 38.1	+59.5	142.7	**51**
52	63 51.8	+57.1	134.0	63 09.6	+57.6	135.4	62 26.4	+58.0	136.7	61 42.2	+58.4	138.0	60 57.2	+58.7	139.2	60 11.4	+59.0	140.4	59 24.8	+59.2	141.5	58 37.6	+59.4	142.5	**52**
53	64 48.9	+56.8	133.2	64 07.2	+57.4	134.8	63 24.4	+57.9	136.2	62 40.6	+58.3	137.5	61 55.9	+58.7	138.8	61 10.4	+58.9	140.0	60 24.0	+59.2	141.1	59 37.0	+59.3	142.2	**53**
54	65 45.7	+56.7	132.5	65 04.6	+57.2	134.1	64 22.3	+57.7	135.6	63 38.9	+58.2	137.0	62 54.6	+58.5	138.3	62 09.3	+58.9	139.6	61 23.2	+59.1	140.8	60 36.3	+59.4	141.9	**54**
55	66 42.4	+56.3	131.7	66 01.8	+57.0	133.4	65 20.0	+57.6	134.9	64 37.1	+58.0	136.4	63 53.1	+58.4	137.8	63 08.2	+58.7	139.2	62 22.3	+59.1	140.4	61 35.7	+59.3	141.6	**55**
56	67 38.7	+56.0	130.8	66 58.8	+56.8	132.6	66 17.6	+57.3	134.2	65 35.1	+57.9	135.8	64 51.5	+58.3	137.3	64 06.9	+58.7	138.7	63 21.4	+59.0	140.0	62 35.0	+59.2	141.3	**56**
57	68 34.7	+55.7	129.8	67 55.6	+56.4	131.7	67 14.9	+57.2	133.5	66 33.0	+57.7	135.2	65 49.8	+58.2	136.8	65 05.6	+58.6	138.2	64 20.4	+58.9	139.6	63 34.2	+59.2	140.9	**57**
58	69 30.4	+55.3	128.8	68 52.0	+56.1	130.8	68 12.1	+56.8	132.7	67 30.7	+57.5	134.5	66 48.0	+58.0	136.1	66 04.2	+58.5	137.7	65 19.3	+58.8	139.2	64 33.4	+59.1	140.6	**58**
59	70 25.7	+54.8	127.6	69 48.1	+55.8	129.8	69 08.9	+56.6	131.8	68 28.2	+57.3	133.7	67 46.0	+57.9	135.5	67 02.7	+58.3	137.1	66 18.1	+58.7	138.7	65 32.5	+59.1	140.2	**59**
60	71 20.5	+54.2	126.4	70 43.9	+55.3	128.7	70 05.5	+56.3	130.9	69 25.5	+57.0	132.9	68 43.9	+57.7	134.8	68 01.0	+58.2	136.5	67 16.8	+58.7	138.2	66 31.6	+59.0	139.7	**60**
61	72 14.7	+53.7	125.0	71 39.2	+54.9	127.5	71 01.8	+55.8	129.8	70 22.5	+56.7	132.0	69 41.6	+57.4	134.0	68 59.2	+58.0	135.9	68 15.5	+58.5	137.6	67 30.6	+58.9	139.3	**61**
62	73 08.4	+52.9	123.5	72 34.1	+54.2	126.2	71 57.6	+55.4	128.7	71 19.2	+56.3	131.0	70 39.0	+57.1	133.1	69 57.2	+57.8	135.1	69 14.0	+58.3	137.0	68 29.5	+58.8	138.7	**62**
63	74 01.3	+52.0	121.9	73 28.3	+53.6	124.7	72 53.0	+54.9	127.4	72 15.5	+56.0	129.9	71 36.1	+56.9	132.2	70 55.0	+57.6	134.3	70 12.3	+58.2	136.3	69 28.3	+58.6	138.2	**63**
64	74 53.3	+51.1	120.0	74 21.9	+52.8	123.1	73 47.9	+54.2	126.0	73 11.5	+55.5	128.7	72 33.0	+56.5	131.2	71 52.6	+57.3	133.5	71 10.5	+58.0	135.6	70 26.9	+58.6	137.6	**64**
65	75 44.4	+49.8	117.9	75 14.7	+51.8	121.3	74 42.1	+53.6	124.4	74 07.0	+54.9	127.3	73 29.5	+56.1	130.0	72 49.9	+57.0	132.5	72 08.5	+57.8	134.8	71 25.5	+58.3	136.9	**65**
66	76 34.2	+48.3	115.6	76 06.5	+50.7	119.2	75 35.7	+52.6	122.6	75 01.9	+54.2	125.8	74 25.6	+55.5	128.7	73 46.9	+56.7	131.4	73 06.3	+57.5	133.9	72 23.8	+58.2	136.2	**66**
67	77 22.5	+46.7	113.0	76 57.2	+49.3	116.9	76 28.3	+51.5	120.7	75 56.1	+53.5	124.1	75 21.1	+55.0	127.3	74 43.6	+56.2	130.2	74 03.8	+57.2	132.9	73 22.0	+58.0	135.3	**67**
68	78 09.2	+44.5•	110.0	77 46.5	+47.6	114.3	77 19.8	+50.3	118.4	76 49.6	+52.4	122.2	76 16.1	+54.2	125.6	75 39.8	+55.6	128.8	75 01.0	+56.8	131.7	74 20.0	+57.7	134.4	**68**
69	78 53.7	+41.9•	106.6	78 34.1	+45.6•	111.4	78 10.1	+48.6	115.8	77 42.0	+51.2	120.0	77 10.3	+53.3	123.8	76 35.4	+55.1	127.3	75 57.8	+56.3	130.4	75 17.7	+57.4	133.4	**69**
70	79 35.6	+38.8•	102.8	79 19.7	+43.0•	108.0	78 58.7	+46.7•	112.9	78 33.2	+49.7	117.4	78 03.6	+52.2	121.6	77 30.5	+54.2	125.5	76 54.1	+55.8	129.0	76 15.1	+57.0	132.2	**70**
71	80 14.4	+35.1•	98.4	80 02.7	+39.9•	104.1	79 45.4	+44.2•	109.5	79 22.9	+47.8•	114.5	78 55.8	+50.8	119.2	78 24.7	+53.1	123.4	77 49.9	+55.1	127.3	77 12.1	+56.5	130.8	**71**
72	80 49.5	+30.5•	93.5	80 42.6	+36.1•	99.6	80 29.6	+41.1•	105.5	80 10.7	+45.4•	111.1	79 46.6	+49.0•	116.3	79 17.8	+51.9	121.0	78 45.0	+54.1	125.3	78 08.6	+55.9	129.2	**72**
73	81 20.0	+25.2•	87.9	81 18.7	+31.5•	94.5	81 10.7	+37.2•	100.9	80 56.1	+42.4•	107.1	80 35.6	+46.7•	112.9	80 09.7	+50.2	118.2	79 39.1	+53.0	123.0	79 04.5	+55.1	127.4	**73**
74	81 45.2	+18.9•	81.8	81 50.2	+25.8•	88.7	81 47.9	+32.5•	95.6	81 38.5	+38.5•	102.4	81 22.3	+43.7•	108.9	80 59.9	+48.1•	114.9	80 32.1	+51.5	120.3	79 59.6	+54.1	125.2	**74**
75	82 04.1	+11.9•	75.0	82 16.0	+19.2•	82.1	82 20.4	+26.5•	89.5	82 17.0	+33.5•	96.9	82 06.0	+39.9•	104.1	81 48.0	+45.1•	110.8	81 23.6	+49.4•	117.0	80 53.7	+52.8	122.6	**75**
76	82 16.0	+4.4•	67.8	82 35.2	+11.7•	74.9	82 46.9	+19.5•	82.6	82 50.5	+27.4•	90.5	82 45.9	+34.7•	98.4	82 33.1	+41.4•	106.0	82 13.0	+46.8•	113.1	81 46.5	+50.9•	119.4	**76**
77	82 20.4	−3.4•	60.4	82 46.9	+3.6•	67.2	83 06.4	+11.5•	74.9	83 17.9	+19.9•	83.1	83 20.6	+28.4•	91.7	83 14.5	+36.2•	100.1	82 59.8	+42.9•	108.2	82 37.4	+48.3•	115.5	**77**
78	82 17.0	−11.0•	52.9	82 50.5	−4.6•	59.2	83 17.9	+2.7•	66.6	83 37.8	+11.2•	74.8	83 49.0	+20.3•	83.8	83 50.7	+29.4•	93.0	83 42.7	+37.8•	102.1	83 25.7	+44.8•	110.6	**78**
79	82 06.0	−18.0•	45.6	82 45.9	−12.8•	51.3	83 20.6	−6.1•	58.0	83 49.0	+1.7•	65.8	84 09.3	+10.8•	74.8	84 20.1	+20.7•	84.5	84 20.5	+30.7•	94.6	84 10.5	+39.6•	104.5	**79**
80	81 48.0	−24.4•	38.8	82 33.1	−20.1•	43.6	83 14.5	−14.7•	49.5	83 50.7	−8.0•	56.5	84 20.1	+0.4•	65.0	84 40.8	+10.4•	74.7	84 51.2	+21.3•	85.5	84 50.1	+32.2•	96.6	**80**
81	81 23.6	−29.9•	32.6	82 13.0	−26.5•	36.5	82 59.8	−22.4•	41.4	83 42.7	−17.0•	47.4	84 20.5	−10.0•	54.8	84 51.2	−1.1•	63.9	85 12.5	+9.8•	74.7	85 22.3	+21.9•	86.7	**81**
82	80 53.7	−34.5•	26.9	81 46.5	−32.1•	30.1	82 37.4	−29.0•	33.9	83 25.7	−24.9•	38.8	84 10.5	−19.6•	44.9	84 50.1	−12.5•	52.8	85 22.3	−3.0•	62.6	85 44.2	+9.0•	74.6	**82**
83	80 19.2	−38.4•	21.9	81 14.4	−36.6•	24.3	82 08.4	−34.4•	27.3	83 00.8	−31.5•	31.1	83 50.9	−27.7•	35.9	84 37.6	−22.5•	42.1	85 19.3	−15.4•	50.3	85 53.2	−5.3•	61.1	**83**
84	79 40.8	−41.5•	17.5	80 37.8	−40.4•	19.3	81 34.0	−38.8•	21.5	82 29.3	−36.9•	24.3	83 23.2	−34.3•	27.9	84 15.1	−30.8•	32.5	85 03.9	−25.9•	38.7	85 47.9	−18.8•	47.3	**84**
85	78 59.3	−44.2•	13.6	79 57.4	−43.4•	14.9	80 55.2	−42.4•	16.5	81 52.4	−41.1•	18.5	82 48.9	−39.5•	21.0	83 44.3	−37.3•	24.3	84 38.0	−34.2•	28.7	85 29.1	−29.8•	34.8	**85**
86	78 15.1	−46.4•	10.2	79 14.0	−45.8•	11.1	80 12.8	−45.2•	12.2	81 11.3	−44.4•	13.6	82 09.4	−43.4•	15.3	83 07.0	−42.2•	17.4	84 03.8	−40.4•	20.3	84 59.3	−37.9•	24.3	**86**
87	77 28.7	−48.2	7.1	78 28.2	−47.9	7.7	79 27.6	−47.5•	8.5	80 26.9	−47.1•	9.3	81 26.0	−46.5•	10.4	82 24.8	−45.7•	11.8	83 23.4	−44.9•	13.5	84 21.4	−43.5•	15.9	**87**
88	76 40.5	−49.6	4.5	77 40.3	−49.5	4.8	78 40.1	−49.3	5.2	79 39.8	−49.1	5.7	80 39.5	−48.8•	6.4	81 39.1	−48.5•	7.1	82 38.5	−48.0•	8.1	83 37.9	−47.6•	9.3	**88**
89	75 50.9	−50.9	2.1	76 50.8	−50.8	2.3	77 50.8	−50.8	2.4	78 50.7	−50.7	2.7	79 50.7	−50.7	2.9	80 50.6	−50.6	3.2	81 50.5	−50.5•	3.6	82 50.3	−50.3•	4.1	**89**
90	75 00.0	−51.9	0.0	76 00.0	−52.0	0.0	77 00.0	−52.0	0.0	78 00.0	−52.0	0.0	79 00.0	−52.1	0.0	80 00.0	−52.2	0.0	81 00.0	−52.2	0.0	82 00.0	−52.3	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 31°, 329°

Dec.	75° Hc	d	Z	76° Hc	d	Z	77° Hc	d	Z	78° Hc	d	Z	79° Hc	d	Z	80° Hc	d	Z	81° Hc	d	Z	82° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 49.1	−59.5	148.1	11 58.1	−59.5	148.2	11 07.0	−59.5	148.3	10 15.9	−59.6	148.4	9 24.8	−59.7	148.5	8 33.6	−59.8	148.6	7 42.4	−59.8	148.7	6 51.1	−59.9	148.8	0
1	11 49.6	−59.4	148.3	10 58.6	−59.5	148.4	10 07.5	−59.6	148.5	9 16.3	−59.6	148.5	8 25.1	−59.7	148.6	7 33.8	−59.7	148.7	6 42.6	−59.8	148.8	5 51.2	−59.8	148.8	1
2	10 50.2	−59.5	148.4	9 59.1	−59.6	148.5	9 07.9	−59.6	148.6	8 16.7	−59.7	148.7	7 25.4	−59.7	148.7	6 34.1	−59.8	148.8	5 42.8	−59.8	148.8	4 51.4	−59.8	148.9	2
3	9 50.7	−59.4	148.5	8 59.5	−59.5	148.6	8 08.3	−59.6	148.7	7 17.0	−59.6	148.8	6 25.7	−59.7	148.8	5 34.3	−59.7	148.9	4 43.0	−59.8	148.9	3 51.6	−59.9	149.0	3
4	8 51.3	−59.5	148.7	8 00.0	−59.5	148.7	7 08.7	−59.6	148.8	6 17.4	−59.7	148.9	5 26.0	−59.7	148.9	4 34.6	−59.8	149.0	3 43.2	−59.9	149.0	2 51.7	−59.8	149.0	4
5	7 51.8	−59.4	148.8	7 00.5	−59.5	148.9	6 09.1	−59.6	148.9	5 17.7	−59.6	149.0	4 26.3	−59.7	149.0	3 34.8	−59.7	149.1	2 43.3	−59.8	149.1	1 51.9	−59.9	149.1	5
6	6 52.4	−59.5	148.9	6 01.0	−59.6	149.0	5 09.5	−59.6	149.0	4 18.1	−59.7	149.1	3 26.6	−59.7	149.1	2 35.1	−59.8	149.2	1 43.5	−59.8	149.2	0 52.0	−59.8	149.2	6
7	5 52.9	−59.4	149.1	5 01.4	−59.5	149.1	4 09.9	−59.6	149.2	3 18.4	−59.7	149.2	2 26.9	−59.8	149.2	1 35.3	−59.8	149.2	0 43.7	−59.8	149.3	0 07.8	+59.9	30.7	7
8	4 53.5	−59.5	149.2	4 01.9	−59.5	149.3	3 10.3	−59.6	149.3	2 18.7	−59.6	149.3	1 27.1	−59.7	149.3	0 35.5	−59.7	149.3	0 16.1	+59.8	30.7	1 07.7	+59.8	30.7	8
9	3 54.0	−59.5	149.3	3 02.4	−59.6	149.4	2 10.7	−59.6	149.4	1 19.1	−59.7	149.4	0 27.4	−59.7	149.4	0 24.2	+59.8	30.6	1 15.9	+59.8	30.6	2 07.5	+59.9	30.6	9
10	2 54.5	−59.4	149.5	2 02.8	−59.5	149.5	1 11.1	−59.6	149.5	0 19.4	−59.6	149.5	0 32.3	+59.7	30.5	1 24.0	+59.7	30.5	2 15.7	+59.8	30.5	3 07.4	+59.8	30.5	10
11	1 55.1	−59.5	149.6	1 03.3	−59.5	149.6	0 11.5	−59.5	149.6	0 40.2	+59.7	30.4	1 32.0	+59.7	30.4	2 23.7	+59.8	30.4	3 15.5	+59.8	30.4	4 07.2	+59.9	30.5	11
12	0 55.6	−59.5	149.7	0 03.8	−59.6	149.7	0 48.0	+59.6	30.3	1 39.9	+59.6	30.3	2 31.7	+59.7	30.3	3 23.5	+59.8	30.3	4 15.3	+59.8	30.3	5 07.1	+59.8	30.4	12
13	0 03.9	+59.4	30.1	0 55.8	+59.5	30.1	1 47.6	+59.6	30.1	2 39.5	+59.7	30.2	3 31.4	+59.7	30.2	4 23.3	+59.7	30.2	5 15.1	+59.8	30.3	6 06.9	+59.8	30.3	13
14	1 03.3	+59.5	30.0	1 55.3	+59.5	30.0	2 47.2	+59.6	30.0	3 39.2	+59.6	30.1	4 31.1	+59.7	30.1	5 23.0	+59.8	30.1	6 14.9	+59.8	30.2	7 06.7	+59.9	30.2	14
15	2 02.8	+59.4	29.9	2 54.8	+59.5	29.9	3 46.8	+59.6	29.9	4 38.8	+59.7	29.9	5 30.8	+59.7	30.0	6 22.8	+59.7	30.0	7 14.7	+59.8	30.1	8 06.6	+59.8	30.2	15
16	3 02.2	+59.5	29.7	3 54.3	+59.6	29.8	4 46.4	+59.6	29.8	5 38.5	+59.6	29.8	6 30.5	+59.7	29.9	7 22.5	+59.8	29.9	8 14.5	+59.8	30.0	9 06.4	+59.9	30.1	16
17	4 01.7	+59.5	29.6	4 53.9	+59.5	29.6	5 46.0	+59.6	29.7	6 38.1	+59.7	29.7	7 30.2	+59.7	29.8	8 22.3	+59.7	29.9	9 14.3	+59.8	29.9	10 06.3	+59.8	30.0	17
18	5 01.2	+59.4	29.5	5 53.4	+59.5	29.5	6 45.6	+59.6	29.6	7 37.8	+59.6	29.6	8 29.9	+59.7	29.7	9 22.0	+59.8	29.8	10 14.1	+59.8	29.9	11 06.1	+59.9	29.9	18
19	6 00.6	+59.5	29.3	6 52.9	+59.6	29.4	7 45.2	+59.6	29.4	8 37.4	+59.7	29.5	9 29.6	+59.7	29.6	10 21.8	+59.7	29.7	11 13.9	+59.8	29.8	12 06.0	+59.8	29.9	19
20	7 00.1	+59.4	29.2	7 52.5	+59.5	29.2	8 44.8	+59.6	29.3	9 37.1	+59.6	29.4	10 29.3	+59.7	29.5	11 21.5	+59.8	29.6	12 13.7	+59.8	29.7	13 05.8	+59.8	29.8	20
21	7 59.5	+59.5	29.0	8 52.0	+59.5	29.1	9 44.4	+59.6	29.2	10 36.7	+59.7	29.3	11 29.0	+59.7	29.4	12 21.3	+59.7	29.5	13 13.5	+59.8	29.6	14 05.6	+59.9	29.7	21
22	8 59.0	+59.4	28.9	9 51.5	+59.5	29.0	10 44.0	+59.5	29.1	11 36.4	+59.6	29.2	12 28.7	+59.7	29.3	13 21.0	+59.8	29.4	14 13.3	+59.8	29.5	15 05.5	+59.8	29.6	22
23	9 58.4	+59.5	28.8	10 51.0	+59.5	28.9	11 43.5	+59.6	29.0	12 36.0	+59.6	29.1	13 28.4	+59.7	29.2	14 20.8	+59.7	29.3	15 13.1	+59.8	29.4	16 05.3	+59.8	29.6	23
24	10 57.9	+59.4	28.6	11 50.5	+59.5	28.7	12 43.1	+59.6	28.8	13 35.6	+59.7	29.0	14 28.1	+59.7	29.1	15 20.5	+59.8	29.2	16 12.9	+59.7	29.3	17 05.1	+59.9	29.5	24
25	11 57.3	+59.5	28.5	12 50.0	+59.5	28.6	13 42.7	+59.6	28.7	14 35.3	+59.6	28.8	15 27.8	+59.7	29.0	16 20.3	+59.7	29.1	17 12.6	+59.8	29.3	18 05.0	+59.8	29.4	25
26	12 56.8	+59.4	28.4	13 49.5	+59.5	28.5	14 42.3	+59.5	28.6	15 34.9	+59.6	28.7	16 27.5	+59.7	28.9	17 20.0	+59.7	29.0	18 12.4	+59.8	29.2	19 04.8	+59.8	29.3	26
27	13 56.2	+59.4	28.2	14 49.0	+59.5	28.3	15 41.8	+59.6	28.5	16 34.5	+59.7	28.6	17 27.2	+59.6	28.8	18 19.7	+59.8	28.9	19 12.2	+59.8	29.1	20 04.6	+59.8	29.2	27
28	14 55.6	+59.5	28.1	15 48.5	+59.5	28.2	16 41.4	+59.5	28.3	17 34.2	+59.6	28.5	18 26.8	+59.7	28.6	19 19.5	+59.7	28.8	20 12.0	+59.8	29.0	21 04.4	+59.9	29.2	28
29	15 55.1	+59.4	27.9	16 48.0	+59.5	28.1	17 40.9	+59.6	28.2	18 33.8	+59.6	28.4	19 26.5	+59.7	28.5	20 19.2	+59.7	28.7	21 11.8	+59.7	28.9	22 04.3	+59.8	29.1	29
30	16 54.5	+59.4	27.8	17 47.5	+59.5	27.9	18 40.5	+59.5	28.1	19 33.4	+59.6	28.3	20 26.2	+59.7	28.4	21 18.9	+59.7	28.6	22 11.5	+59.8	28.8	23 04.1	+59.8	29.0	30
31	17 53.9	+59.4	27.6	18 47.0	+59.5	27.8	19 40.0	+59.6	28.0	20 33.0	+59.6	28.1	21 25.9	+59.6	28.3	22 18.6	+59.8	28.5	23 11.3	+59.8	28.7	24 03.9	+59.8	28.9	31
32	18 53.3	+59.4	27.5	19 46.5	+59.4	27.7	20 39.6	+59.5	27.8	21 32.6	+59.6	28.0	22 25.5	+59.7	28.2	23 18.4	+59.7	28.4	24 11.1	+59.7	28.6	25 03.7	+59.8	28.8	32
33	19 52.7	+59.4	27.3	20 45.9	+59.5	27.5	21 39.1	+59.5	27.7	22 32.2	+59.6	27.9	23 25.2	+59.6	28.1	24 18.1	+59.7	28.3	25 10.8	+59.8	28.5	26 03.5	+59.8	28.7	33
34	20 52.1	+59.4	27.2	21 45.4	+59.5	27.4	22 38.6	+59.6	27.6	23 31.8	+59.6	27.8	24 24.8	+59.7	28.0	25 17.8	+59.7	28.2	26 10.6	+59.8	28.4	27 03.3	+59.8	28.6	34
35	21 51.5	+59.3	27.0	22 44.9	+59.4	27.2	23 38.2	+59.5	27.4	24 31.4	+59.6	27.6	25 24.5	+59.6	27.8	26 17.5	+59.7	28.1	27 10.4	+59.7	28.3	28 03.1	+59.8	28.6	35
36	22 50.8	+59.4	26.9	23 44.3	+59.4	27.1	24 37.7	+59.5	27.3	25 31.0	+59.5	27.5	26 24.1	+59.7	27.7	27 17.2	+59.7	28.0	28 10.1	+59.8	28.2	29 02.9	+59.8	28.5	36
37	23 50.2	+59.4	26.7	24 43.7	+59.5	26.9	25 37.2	+59.5	27.1	26 30.5	+59.6	27.4	27 23.8	+59.6	27.6	28 16.9	+59.7	27.8	29 09.9	+59.7	28.1	30 02.7	+59.8	28.4	37
38	24 49.6	+59.3	26.6	25 43.2	+59.4	26.8	26 36.7	+59.5	27.0	27 30.1	+59.5	27.2	28 23.4	+59.6	27.5	29 16.6	+59.6	27.7	30 09.6	+59.7	28.0	31 02.5	+59.8	28.3	38
39	25 48.9	+59.3	26.4	26 42.6	+59.4	26.6	27 36.2	+59.5	26.9	28 29.6	+59.6	27.1	29 23.0	+59.6	27.3	30 16.2	+59.7	27.6	31 09.3	+59.8	27.9	32 02.3	+59.8	28.2	39
40	26 48.2	+59.4	26.2	27 42.0	+59.4	26.5	28 35.7	+59.4	26.7	29 29.2	+59.5	27.0	30 22.6	+59.6	27.2	31 15.9	+59.7	27.5	32 09.1	+59.7	27.8	33 02.1	+59.8	28.1	40
41	27 47.6	+59.3	26.1	28 41.4	+59.4	26.3	29 35.1	+59.5	26.6	30 28.7	+59.6	26.8	31 22.2	+59.6	27.1	32 15.6	+59.6	27.4	33 08.8	+59.7	27.7	34 01.9	+59.7	28.0	41
42	28 46.9	+59.3	25.9	29 40.8	+59.4	26.1	30 34.6	+59.4	26.4	31 28.3	+59.5	26.7	32 21.8	+59.6	26.9	33 15.2	+59.7	27.2	34 08.5	+59.7	27.5	35 01.6	+59.8	27.9	42
43	29 46.2	+59.2	25.7	30 40.2	+59.3	26.0	31 34.0	+59.5	26.2	32 27.8	+59.5	26.5	33 21.4	+59.6	26.8	34 14.9	+59.6	27.1	35 08.2	+59.7	27.4	36 01.4	+59.8	27.8	43
44	30 45.4	+59.3	25.5	31 39.5	+59.4	25.8	32 33.5	+59.4	26.1	33 27.3	+59.5	26.4	34 21.0	+59.6	26.7	35 14.5	+59.7	27.0	36 07.9	+59.7	27.3	37 01.2	+59.7	27.6	44
45	31 44.7	+59.3	25.4	32 38.9	+59.3	25.6	33 32.9	+59.4	25.9	34 26.8	+59.5	26.2	35 20.6	+59.5	26.5	36 14.2	+59.6	26.8	37 07.6	+59.7	27.2	38 00.9	+59.8	27.5	45
46	32 44.0	+59.2	25.2	33 38.2	+59.3	25.5	34 32.3	+59.4	25.7	35 26.3	+59.5	26.0	36 20.1	+59.6	26.4	37 13.8	+59.6	26.7	38 07.3	+59.7	27.1	39 00.7	+59.7	27.4	46
47	33 43.2	+59.2	25.0	34 37.5	+59.3	25.3	35 31.7	+59.4	25.6	36 25.8	+59.4	25.9	37 19.7	+59.5	26.2	38 13.4	+59.6	26.6	39 07.0	+59.7	26.9	40 00.4	+59.7	27.3	47
48	34 42.4	+59.2	24.8	35 36.8	+59.3	25.1	36 31.1	+59.3	25.4	37 25.2	+59.5	25.7	38 19.2	+59.5	26.1	39 13.0	+59.6	26.4	40 06.7	+59.6	26.8	41 00.1	+59.8	27.2	48
49	35 41.6	+59.2	24.6	36 36.1	+59.3	24.9	37 30.4	+59.4	25.2	38 24.7	+59.4	25.5	39 18.7	+59.5	25.9	40 12.6	+59.6	26.3	41 06.3	+59.7	26.6	41 59.9	+59.7	27.0	49
50	36 40.8	+59.1	24.4	37 35.4	+59.2	24.7	38 29.8	+59.3	25.0	39 24.1	+59.4	25.4	40 18.2	+59.5	25.7	41 12.2	+59.6	26.1	42 06.0	+59.6	26.5	42 59.6	+59.7	26.9	50
51	37 39.9	+59.2	24.2	38 34.6	+59.2	24.5	39 29.1	+59.3	24.8	40 23.5	+59.4	25.2	41 17.7	+59.5	25.6	42 11.8	+59.5	25.9	43 05.6	+59.6	26.4	43 59.3	+59.7	26.8	51
52	38 39.1	+59.1	24.0	39 33.8	+59.2	24.3	40 28.4	+59.3	24.6	41 22.9	+59.4	25.0	42 17.2	+59.4	25.4	43 11.3	+59.5	25.8	44 05.2	+59.7	26.2	44 59.0	+59.7	26.6	52
53	39 38.2	+59.0	23.7	40 33.0	+59.2	24.1	41 27.7	+59.3	24.4	42 22.3	+59.3	24.8	43 16.6	+59.5	25.2	44 10.8	+59.6	25.6	45 04.9	+59.6	26.0	45 58.7	+59.6	26.5	53
54	40 37.2	+59.1	23.5	41 32.2	+59.1	23.9	42 27.0	+59.2	24.2	43 21.6	+59.4	24.6	44 16.1	+59.4	25.0	45 10.4	+59.5	25.4	46 04.5	+59.5	25.9	46 58.3	+59.7	26.3	54
55	41 36.3	+59.0	23.3	42 31.3	+59.2	23.6	43 26.2	+59.3	24.0	44 21.0	+59.3	24.4	45 15.5	+59.4	24.8	46 09.9	+59.5	25.2	47 04.0	+59.6	25.7	47 58.0	+59.6	26.2	55
56	42 35.3	+59.0	23.0	43 30.5	+59.1	23.4	44 25.5	+59.1	23.8	45 20.3	+59.3	24.2	46 14.9	+59.4	24.6	47 09.4	+59.4	25.1	48 03.6	+59.6	25.5	48 57.6	+59.7	26.0	56
57	43 34.3	+59.0	22.8	44 29.6	+59.0	23.2	45 24.6	+59.2	23.6	46 19.6	+59.2	24.0	47 14.3	+59.4	24.4	48 08.8	+59.5	24.9	49 03.2	+59.5	25.3	49 57.3	+59.6	25.8	57
58	44 33.3	+58.9	22.5	45 28.6	+59.0	22.9	46 23.8	+59.1	23.3	47 18.8	+59.3	23.7	48 13.7	+59.3	24.2	49 08.3	+59.4	24.7	50 02.7	+59.5	25.2	50 56.9	+59.6	25.7	58
59	45 32.2	+58.9	22.3	46 27.6	+59.0	22.6	47 22.9	+59.1	23.1	48 18.1	+59.2	23.5	49 13.0	+59.3	24.0	50 07.7	+59.4	24.4	51 02.2	+59.5	25.0	51 56.5	+59.6	25.5	59
60	46 31.1	+58.8	22.0	47 26.6	+59.0	22.4	48 22.0	+59.1	22.8	49 17.3	+59.1	23.3	50 12.3	+59.3	23.7	51 07.1	+59.4	24.2	52 01.7	+59.5	24.7	52 56.1	+59.6	25.3	60
61	47 29.9	+58.8	21.7	48 25.6	+58.9	22.1	49 21.1	+59.0	22.5	50 16.4	+59.2	23.0	51 11.6	+59.2	23.5	52 06.5	+59.3	24.0	53 01.2	+59.4	24.5	53 55.7	+59.5	25.1	61
62	48 28.7	+58.8	21.4	49 24.5	+58.9	21.8	50 20.1	+59.0	22.3	51 15.6	+59.1	22.7	52 10.8	+59.2	23.2	53 05.8	+59.3	23.7	54 00.6	+59.5	24.3	54 55.2	+59.5	24.9	62
63	49 27.5	+58.7	21.1	50 23.4	+58.8	21.5	51 19.1	+58.9	22.0	52 14.7	+59.0	22.5	53 10.0	+59.2	23.0	54 05.1	+59.3	23.5	55 00.1	+59.3	24.1	55 54.7	+59.5	24.7	63
64	50 26.2	+58.6	20.8	51 22.2	+58.8	21.2	52 18.0	+58.9	21.7	53 13.7	+59.0	22.2	54 09.2	+59.1	22.7	55 04.4	+59.3	23.2	55 59.4	+59.4	23.8	56 54.2	+59.5	24.4	64
65	51 24.8	+58.6	20.4	52 21.0	+58.7	20.9	53 16.9	+58.9	21.3	54 12.7	+59.0	21.9	55 08.3	+59.1	22.4	56 03.7	+59.2	22.9	56 58.8	+59.3	23.5	57 53.7	+59.4	24.2	65
66	52 23.4	+58.5	20.1	53 19.7	+58.6	20.5	54 15.8	+58.7	21.0	55 11.7	+58.9	21.5	56 07.4	+59.0	22.1	57 02.9	+59.1	22.7	57 58.1	+59.3	23.3	58 53.1	+59.4	23.9	66
67	53 21.9	+58.5	19.7	54 18.3	+58.6	20.2	55 14.5	+58.8	20.7	56 10.6	+58.8	21.2	57 06.4	+59.0	21.8	58 02.0	+59.1	22.3	58 57.4	+59.2	23.0	59 52.5	+59.4	23.6	67
68	54 20.4	+58.3	19.3	55 16.9	+58.5	19.8	56 13.3	+58.6	20.3	57 09.4	+58.8	20.8	58 05.4	+58.9	21.4	59 01.1	+59.1	22.0	59 56.6	+59.2	22.7	60 51.9	+59.3	23.3	68
69	55 18.7	+58.3	18.9	56 15.4	+58.4	19.4	57 11.9	+58.6	19.9	58 08.2	+58.7	20.5	59 04.3	+58.9	21.0	60 00.2	+59.0	21.7	60 55.8	+59.2	22.3	61 51.2	+59.3	23.0	69
70	56 17.0	+58.2	18.5	57 13.8	+58.4	19.0	58 10.5	+58.5	19.5	59 06.9	+58.7	20.1	60 03.2	+58.8	20.7	60 59.2	+58.9	21.3	61 55.0	+59.1	22.0	62 50.5	+59.2	22.7	70
71	57 15.2	+58.1	18.1	58 12.2	+58.2	18.6	59 09.0	+58.4	19.1	60 05.6	+58.5	19.7	61 02.0	+58.7	20.3	61 58.1	+58.9	20.9	62 54.1	+59.0	21.6	63 49.7	+59.2	22.3	71
72	58 13.3	+58.0	17.6	59 10.4	+58.2	18.1	60 07.4	+58.3	18.6	61 04.1	+58.5	19.2	62 00.7	+58.6	19.8	62 57.0	+58.8	20.5	63 53.1	+58.9	21.2	64 48.9	+59.1	22.0	72
73	59 11.3	+57.9	17.1	60 08.6	+58.0	17.6	61 05.7	+58.2	18.2	62 02.6	+58.4	18.7	62 59.3	+58.5	19.4	63 55.8	+58.7	20.0	64 52.0	+58.9	20.8	65 48.0	+59.0	21.6	73
74	60 09.2	+57.7	16.6	61 06.6	+57.9	17.1	62 03.9	+58.0	17.6	63 01.0	+58.2	18.2	63 57.8	+58.5	18.9	64 54.5	+58.6	19.6	65 50.9	+58.8	20.3	66 47.0	+59.0	21.1	74
75	61 06.9	+57.6	16.0	62 04.5	+57.8	16.5	63 01.9	+58.0	17.1	63 59.2	+58.1	17.7	64 56.3	+58.3	18.3	65 53.1	+58.5	19.0	66 49.7	+58.7	19.8	67 46.0	+58.9	20.6	75
76	62 04.5	+57.4	15.4	63 02.3	+57.6	16.0	63 59.9	+57.8	16.5	64 57.3	+58.0	17.1	65 54.6	+58.1	17.8	66 51.6	+58.3	18.5	67 48.4	+58.5	19.3	68 44.9	+58.7	20.1	76
77	63 01.9	+57.3	14.8	63 59.9	+57.4	15.3	64 57.7	+57.6	15.9	65 55.3	+57.8	16.5	66 52.7	+58.0	17.2	67 49.9	+58.3	17.9	68 46.9	+58.4	18.7	69 43.6	+58.7	19.5	77
78	63 59.2	+57.1	14.1	64 57.3	+57.3	14.7	65 55.3	+57.4	15.2	66 53.1	+57.6	15.8	67 50.7	+57.9	16.5	68 48.2	+58.0	17.2	69 45.3	+58.3	18.0	70 42.3	+58.5	18.9	78
79	64 56.3	+56.8	13.4	65 54.6	+57.0	13.9	66 52.7	+57.2	14.5	67 50.7	+57.5	15.1	68 48.6	+57.6	15.8	69 46.2	+57.9	16.5	70 43.6	+58.1	17.3	71 40.8	+58.3	18.2	79
80	65 53.1	+56.6	12.6	66 51.6	+56.8	13.2	67 49.9	+57.0	13.7	68 48.2	+57.1	14.3	69 46.2	+57.4	15.0	70 44.1	+57.6	15.7	71 41.7	+57.9	16.5	72 39.1	+58.1	17.5	80
81	66 49.7	+56.3	11.8	67 48.4	+56.5	12.3	68 46.9	+56.7	12.9	69 45.3	+57.0	13.5	70 43.6	+57.2	14.1	71 41.7	+57.4	14.9	72 39.6	+57.6	15.7	73 37.2	+57.9	16.6	81
82	67 46.0	+56.0	10.9	68 44.9	+56.1	11.4	69 43.6	+56.4	11.9	70 42.3	+56.6	12.5	71 40.8	+56.8	13.2	72 39.1	+57.1	13.9	73 37.2	+57.4	14.7	74 35.1	+57.7	15.6	82
83	68 42.0	+55.6	10.0	69 41.0	+55.8	10.4	70 40.0	+56.0	10.9	71 38.9	+56.2	11.5	72 37.6	+56.4	12.1	73 36.2	+56.7	12.8	74 34.6	+57.0	13.7	75 32.8	+57.3	14.6	83
84	69 37.6	+55.2	8.9	70 36.8	+55.4	9.3	71 36.0	+55.6	9.8	72 35.1	+55.8	10.4	73 34.0	+56.1	11.0	74 32.9	+56.3	11.7	75 31.6	+56.5	12.4	76 30.1	+56.8	13.3	84
85	70 32.8	+54.8	7.7	71 32.2	+54.9	8.1	72 31.6	+55.1	8.6	73 30.9	+55.3	9.1	74 30.1	+55.5	9.7	75 29.2	+55.7	10.3	76 28.1	+56.1	11.1	77 26.9	+56.4	11.9	85
86	71 27.6	+54.1	6.5	72 27.1	+54.4	6.8	73 26.7	+54.5	7.2	74 26.2	+54.7	7.7	75 25.6	+54.9	8.2	76 24.9	+55.2	8.8	77 24.2	+55.4	9.5	78 23.3	+55.7	10.3	86
87	72 21.7	+53.6	5.1	73 21.5	+53.7	5.4	74 21.2	+53.8	5.7	75 20.9	+54.0	6.1	76 20.5	+54.2	6.6	77 20.1	+54.4	7.1	78 19.6	+54.6	7.7	79 19.0	+54.9	8.4	87
88	73 15.3	+52.8	3.6	74 15.2	+52.8	3.8	75 15.0	+53.0	4.0	76 14.9	+53.1	4.3	77 14.7	+53.2	4.7	78 14.5	+53.3	5.1	79 14.2	+53.6	5.5	80 13.9	+53.8	6.1	88
89	74 08.1	+51.9	1.9	75 08.0	+52.0	2.0	76 08.0	+52.0	2.1	77 08.0	+52.0	2.3	78 07.9	+52.1	2.5	79 07.8	+52.2	2.7	80 07.8	+52.2	3.0	81 07.7	+52.3	3.3	89
90	75 00.0	+50.9	0.0	76 00.0	+50.8	0.0	77 00.0	+50.8	0.0	78 00.0	+50.7	0.0	79 00.0	+50.7	0.0	80 00.0	+50.6	0.0	81 00.0	+50.5•	0.0	82 00.0	+50.3•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 149°, 211°

32°, 328° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 40.7	+59.5	147.1	11 50.3	+59.5	147.2	10 59.9	+59.5	147.3	10 09.3	+59.6	147.4	9 18.7	+59.7	147.5	8 28.1	+59.7	147.6	7 37.4	+59.8	147.7	6 46.7	+59.8	147.7	**0**
1	13 40.2	+59.3	147.0	12 49.8	+59.5	147.1	11 59.4	+59.6	147.2	11 08.9	+59.7	147.3	10 18.4	+59.7	147.4	9 27.8	+59.8	147.5	8 37.2	+59.8	147.6	7 46.5	+59.9	147.7	**1**
2	14 39.5	+59.4	146.8	13 49.3	+59.5	146.9	12 59.0	+59.5	147.1	12 08.6	+59.6	147.2	11 18.1	+59.7	147.3	10 27.6	+59.7	147.4	9 37.0	+59.8	147.5	8 46.4	+59.8	147.6	**2**
3	15 38.9	+59.4	146.7	14 48.8	+59.4	146.8	13 58.5	+59.6	147.0	13 08.2	+59.6	147.1	12 17.8	+59.7	147.2	11 27.3	+59.7	147.3	10 36.8	+59.8	147.4	9 46.2	+59.8	147.5	**3**
4	16 38.3	+59.4	146.5	15 48.2	+59.5	146.7	14 58.1	+59.5	146.8	14 07.8	+59.6	147.0	13 17.5	+59.6	147.1	12 27.0	+59.8	147.2	11 36.6	+59.7	147.3	10 46.0	+59.9	147.4	**4**
5	17 37.7	+59.4	146.4	16 47.7	+59.5	146.5	15 57.6	+59.5	146.7	15 07.4	+59.6	146.8	14 17.1	+59.7	147.0	13 26.8	+59.7	147.1	12 36.3	+59.8	147.3	11 45.9	+59.8	147.4	**5**
6	18 37.1	+59.3	146.2	17 47.2	+59.4	146.4	16 57.1	+59.6	146.6	16 07.0	+59.6	146.7	15 16.8	+59.7	146.9	14 26.5	+59.7	147.0	13 36.1	+59.8	147.2	12 45.7	+59.8	147.3	**6**
7	19 36.4	+59.4	146.1	18 46.6	+59.4	146.3	17 56.7	+59.5	146.4	17 06.6	+59.6	146.6	16 16.5	+59.6	146.8	15 26.2	+59.8	146.9	14 35.9	+59.8	147.1	13 45.5	+59.8	147.2	**7**
8	20 35.8	+59.3	145.9	19 46.0	+59.5	146.1	18 56.2	+59.5	146.3	18 06.2	+59.6	146.5	17 16.1	+59.7	146.7	16 26.0	+59.7	146.8	15 35.7	+59.8	147.0	14 45.3	+59.9	147.1	**8**
9	21 35.1	+59.4	145.7	20 45.5	+59.4	146.0	19 55.7	+59.5	146.2	19 05.8	+59.6	146.4	18 15.8	+59.7	146.6	17 25.7	+59.7	146.7	16 35.5	+59.7	146.9	15 45.2	+59.8	147.1	**9**
10	22 34.5	+59.3	145.6	21 44.9	+59.4	145.8	20 55.2	+59.5	146.0	20 05.4	+59.6	146.2	19 15.5	+59.6	146.4	18 25.4	+59.7	146.6	17 35.2	+59.8	146.8	16 45.0	+59.8	147.0	**10**
11	23 33.8	+59.3	145.4	22 44.3	+59.5	145.7	21 54.7	+59.5	145.9	21 05.0	+59.6	146.1	20 15.1	+59.7	146.3	19 25.1	+59.7	146.5	18 35.0	+59.8	146.7	17 44.8	+59.8	146.9	**11**
12	24 33.1	+59.3	145.3	23 43.8	+59.4	145.5	22 54.2	+59.5	145.8	22 04.6	+59.5	146.0	21 14.8	+59.6	146.2	20 24.8	+59.7	146.4	19 34.8	+59.7	146.6	18 44.6	+59.8	146.8	**12**
13	25 32.4	+59.3	145.1	24 43.2	+59.3	145.4	23 53.7	+59.5	145.6	23 04.1	+59.6	145.9	22 14.4	+59.6	146.1	21 24.5	+59.7	146.3	20 34.5	+59.8	146.5	19 44.4	+59.9	146.7	**13**
14	26 31.7	+59.3	144.9	25 42.5	+59.4	145.2	24 53.2	+59.5	145.5	24 03.7	+59.5	145.7	23 14.0	+59.7	146.0	22 24.2	+59.7	146.2	21 34.3	+59.8	146.4	20 44.3	+59.8	146.6	**14**
15	27 31.0	+59.3	144.7	26 41.9	+59.4	145.0	25 52.7	+59.4	145.3	25 03.2	+59.6	145.6	24 13.7	+59.6	145.9	23 23.9	+59.7	146.1	22 34.1	+59.7	146.3	21 44.1	+59.8	146.6	**15**
16	28 30.3	+59.3	144.6	27 41.3	+59.4	144.9	26 52.1	+59.5	145.2	26 02.8	+59.5	145.5	25 13.3	+59.6	145.7	24 23.6	+59.7	146.0	23 33.8	+59.8	146.2	22 43.9	+59.8	146.5	**16**
17	29 29.6	+59.2	144.4	28 40.7	+59.3	144.7	27 51.6	+59.4	145.0	27 02.3	+59.6	145.3	26 12.9	+59.6	145.6	25 23.3	+59.7	145.9	24 33.6	+59.7	146.1	23 43.7	+59.8	146.4	**17**
18	30 28.8	+59.2	144.2	29 40.0	+59.4	144.5	28 51.0	+59.5	144.9	28 01.9	+59.5	145.2	27 12.5	+59.6	145.5	26 23.0	+59.7	145.8	25 33.3	+59.8	146.0	24 43.5	+59.8	146.3	**18**
19	31 28.0	+59.2	144.0	30 39.4	+59.3	144.4	29 50.5	+59.4	144.7	29 01.4	+59.5	145.0	28 12.1	+59.6	145.4	27 22.7	+59.7	145.6	26 33.1	+59.7	145.9	25 43.3	+59.8	146.2	**19**
20	32 27.2	+59.2	143.8	31 38.7	+59.3	144.2	30 49.9	+59.4	144.6	30 00.9	+59.5	144.9	29 11.7	+59.6	145.2	28 22.4	+59.6	145.5	27 32.8	+59.7	145.8	26 43.1	+59.8	146.1	**20**
21	33 26.4	+59.2	143.6	32 38.0	+59.3	144.0	31 49.3	+59.4	144.4	31 00.4	+59.5	144.7	30 11.3	+59.6	145.1	29 22.0	+59.7	145.4	28 32.5	+59.8	145.7	27 42.9	+59.8	146.0	**21**
22	34 25.6	+59.2	143.4	33 37.3	+59.3	143.8	32 48.7	+59.4	144.2	31 59.9	+59.5	144.6	31 10.9	+59.6	144.9	30 21.7	+59.6	145.3	29 32.3	+59.7	145.6	28 42.7	+59.7	145.9	**22**
23	35 24.8	+59.1	143.2	34 36.6	+59.2	143.7	33 48.1	+59.4	144.1	32 59.4	+59.5	144.4	32 10.5	+59.6	144.8	31 21.3	+59.7	145.2	30 32.0	+59.7	145.5	29 42.4	+59.8	145.8	**23**
24	36 23.9	+59.1	143.0	35 35.8	+59.3	143.5	34 47.5	+59.3	143.9	33 58.9	+59.4	144.3	33 10.1	+59.5	144.7	32 21.0	+59.6	145.0	31 31.7	+59.7	145.4	30 42.2	+59.8	145.7	**24**
25	37 23.0	+59.1	142.8	36 35.1	+59.2	143.3	35 46.8	+59.4	143.7	34 58.3	+59.5	144.1	34 09.6	+59.6	144.5	33 20.6	+59.7	144.9	32 31.4	+59.7	145.3	31 42.0	+59.8	145.6	**25**
26	38 22.1	+59.0	142.6	37 34.3	+59.2	143.1	36 46.2	+59.3	143.5	35 57.8	+59.4	144.0	35 09.2	+59.5	144.4	34 20.3	+59.6	144.8	33 31.1	+59.7	145.2	32 41.8	+59.7	145.5	**26**
27	39 21.1	+59.1	142.4	38 33.5	+59.2	142.9	37 45.5	+59.3	143.3	36 57.2	+59.4	143.8	36 08.7	+59.5	144.2	35 19.9	+59.6	144.6	34 30.8	+59.7	145.0	33 41.5	+59.8	145.4	**27**
28	40 20.2	+59.0	142.1	39 32.7	+59.1	142.6	38 44.8	+59.3	143.1	37 56.6	+59.5	143.6	37 08.2	+59.5	144.1	36 19.5	+59.6	144.5	35 30.5	+59.7	144.9	34 41.3	+59.8	145.3	**28**
29	41 19.2	+59.0	141.9	40 31.8	+59.1	142.4	39 44.1	+59.3	142.9	38 56.1	+59.3	143.4	38 07.7	+59.5	143.9	37 19.1	+59.6	144.4	36 30.2	+59.7	144.8	35 41.1	+59.7	145.2	**29**
30	42 18.2	+58.9	141.6	41 30.9	+59.1	142.2	40 43.4	+59.2	142.7	39 55.4	+59.4	143.2	39 07.2	+59.5	143.7	38 18.7	+59.6	144.2	37 29.9	+59.7	144.7	36 40.8	+59.8	145.1	**30**
31	43 17.1	+58.9	141.4	42 30.0	+59.1	142.0	41 42.6	+59.2	142.5	40 54.8	+59.4	143.1	40 06.7	+59.5	143.6	39 18.3	+59.5	144.1	38 29.6	+59.6	144.5	37 40.6	+59.7	145.0	**31**
32	44 16.0	+58.9	141.1	43 29.1	+59.0	141.7	42 41.8	+59.2	142.3	41 54.2	+59.3	142.9	41 06.2	+59.4	143.4	40 17.8	+59.6	143.9	39 29.2	+59.7	144.4	38 40.3	+59.7	144.9	**32**
33	45 14.9	+58.8	140.9	44 28.1	+59.0	141.5	43 41.0	+59.2	142.1	42 53.5	+59.3	142.7	42 05.6	+59.4	143.2	41 17.4	+59.5	143.7	40 28.9	+59.6	144.2	39 40.0	+59.7	144.7	**33**
34	46 13.7	+58.8	140.6	45 27.1	+59.0	141.2	44 40.2	+59.1	141.8	43 52.8	+59.3	142.4	43 05.0	+59.5	143.0	42 16.9	+59.6	143.6	41 28.5	+59.6	144.1	40 39.7	+59.7	144.6	**34**
35	47 12.5	+58.7	140.3	46 26.1	+59.0	141.0	45 39.3	+59.1	141.6	44 52.1	+59.2	142.2	44 04.5	+59.3	142.8	43 16.5	+59.5	143.4	42 28.1	+59.6	144.0	41 39.4	+59.7	144.5	**35**
36	48 11.2	+58.7	140.0	47 25.1	+58.8	140.7	46 38.4	+59.1	141.4	45 51.3	+59.3	142.0	45 03.8	+59.4	142.6	44 16.0	+59.5	143.2	43 27.7	+59.6	143.8	42 39.1	+59.7	144.3	**36**
37	49 09.9	+58.7	139.7	48 23.9	+58.9	140.4	47 37.5	+59.0	141.1	46 50.6	+59.2	141.8	46 03.2	+59.4	142.4	45 15.5	+59.4	143.0	44 27.3	+59.6	143.6	43 38.8	+59.7	144.2	**37**
38	50 08.6	+58.6	139.3	49 22.8	+58.8	140.1	48 36.5	+59.0	140.8	47 49.8	+59.1	141.5	47 02.6	+59.3	142.2	46 14.9	+59.5	142.9	45 26.9	+59.6	143.5	44 38.5	+59.7	144.1	**38**
39	51 07.2	+58.5	139.0	50 21.6	+58.7	139.8	49 35.5	+59.0	140.6	48 48.9	+59.2	141.3	48 01.9	+59.3	142.0	47 14.4	+59.4	142.7	46 26.5	+59.5	143.3	45 38.2	+59.7	143.9	**39**
40	52 05.7	+58.4	138.6	51 20.3	+58.7	139.5	50 34.5	+58.9	140.3	49 48.1	+59.1	141.0	49 01.2	+59.3	141.8	48 13.8	+59.4	142.5	47 26.0	+59.6	143.1	46 37.9	+59.6	143.8	**40**
41	53 04.1	+58.4	138.3	52 19.0	+58.7	139.1	51 33.4	+58.8	140.0	50 47.2	+59.0	140.8	50 00.5	+59.2	141.5	49 13.2	+59.4	142.2	48 25.6	+59.5	142.9	47 37.5	+59.6	143.6	**41**
42	54 02.5	+58.3	137.9	53 17.7	+58.5	138.8	52 32.2	+58.9	139.7	51 46.2	+59.1	140.5	50 59.7	+59.2	141.3	50 12.6	+59.4	142.0	49 25.1	+59.5	142.7	48 37.1	+59.6	143.4	**42**
43	55 00.8	+58.2	137.5	54 16.2	+58.5	138.4	53 31.1	+58.7	139.3	52 45.3	+58.9	140.2	51 58.9	+59.2	141.0	51 12.0	+59.3	141.8	50 24.6	+59.5	142.5	49 36.7	+59.7	143.3	**43**
44	55 59.0	+58.1	137.0	55 14.7	+58.5	138.0	54 29.8	+58.7	139.0	53 44.2	+59.0	139.9	52 58.1	+59.1	140.7	52 11.3	+59.3	141.6	51 24.1	+59.4	142.3	50 36.4	+59.5	143.1	**44**
45	56 57.1	+58.1	136.6	56 13.2	+58.3	137.6	55 28.5	+58.6	138.6	54 43.2	+58.8	139.6	53 57.2	+59.1	140.4	53 10.6	+59.3	141.3	52 23.5	+59.5	142.1	51 35.9	+59.6	142.9	**45**
46	57 55.2	+57.9	136.1	57 11.5	+58.3	137.2	56 27.1	+58.6	138.2	55 42.0	+58.8	139.2	54 56.3	+59.0	140.1	54 09.9	+59.2	141.0	53 23.0	+59.4	141.9	52 35.5	+59.5	142.7	**46**
47	58 53.1	+57.7	135.6	58 09.8	+58.1	136.8	57 25.7	+58.4	137.8	56 40.8	+58.8	138.9	55 55.3	+59.0	139.8	55 09.1	+59.2	140.8	54 22.4	+59.4	141.7	53 35.0	+59.6	142.5	**47**
48	59 50.8	+57.7	135.1	59 07.9	+58.0	136.3	58 24.1	+58.4	137.4	57 39.6	+58.7	138.5	56 54.3	+58.9	139.5	56 08.3	+59.2	140.5	55 21.8	+59.3	141.4	54 34.6	+59.5	142.3	**48**
49	60 48.5	+57.5	134.5	60 05.9	+58.0	135.8	59 22.5	+58.3	137.0	58 38.3	+58.6	138.1	57 53.2	+58.9	139.2	57 07.5	+59.1	140.2	56 21.1	+59.3	141.1	55 34.1	+59.4	142.1	**49**
50	61 46.0	+57.3	133.9	61 03.9	+57.8	135.2	60 20.8	+58.2	136.5	59 36.9	+58.5	137.7	58 52.1	+58.8	138.8	58 06.6	+59.1	139.9	57 20.4	+59.3	140.9	56 33.5	+59.5	141.8	**50**
51	62 43.3	+57.2	133.3	62 01.7	+57.6	134.7	61 19.0	+58.0	136.0	60 35.4	+58.4	137.2	59 50.9	+58.8	138.4	59 05.7	+59.0	139.5	58 19.7	+59.2	140.6	57 33.0	+59.4	141.6	**51**
52	63 40.5	+56.9	132.6	62 59.3	+57.5	134.1	62 17.0	+58.0	135.5	61 33.8	+58.3	136.8	60 49.7	+58.6	138.0	60 04.7	+58.9	139.2	59 18.9	+59.2	140.3	58 32.4	+59.4	141.3	**52**
53	64 37.4	+56.8	131.9	63 56.8	+57.3	133.4	63 15.0	+57.7	134.9	62 32.1	+58.2	136.3	61 48.3	+58.6	137.5	61 03.6	+58.9	138.8	60 18.1	+59.1	139.9	59 31.8	+59.3	141.0	**53**
54	65 34.2	+56.4	131.1	64 54.1	+57.1	132.8	64 12.7	+57.7	134.3	63 30.3	+58.1	135.7	62 46.9	+58.4	137.1	62 02.5	+58.8	138.4	61 17.2	+59.1	139.6	60 31.1	+59.3	140.7	**54**
55	66 30.6	+56.2	130.3	65 51.2	+56.8	132.0	65 10.4	+57.4	133.6	64 28.4	+57.9	135.1	63 45.3	+58.4	136.6	63 01.3	+58.7	137.9	62 16.3	+59.0	139.2	61 30.4	+59.3	140.4	**55**
56	67 26.8	+55.9	129.4	66 48.0	+56.6	131.2	66 07.8	+57.2	132.9	65 26.3	+57.8	134.5	64 43.7	+58.2	136.0	64 00.0	+58.6	137.5	63 15.3	+58.9	138.8	62 29.7	+59.2	140.1	**56**
57	68 22.7	+55.5	128.4	67 44.6	+56.3	130.4	67 05.0	+57.0	132.2	66 24.1	+57.6	133.9	65 41.9	+58.1	135.5	64 58.6	+58.5	137.0	64 14.2	+58.9	138.4	63 28.9	+59.1	139.7	**57**
58	69 18.2	+55.1	127.4	68 40.9	+56.0	129.4	68 02.0	+56.8	131.3	67 21.7	+57.4	133.2	66 40.0	+57.9	134.8	65 57.1	+58.4	136.4	65 13.1	+58.7	137.9	64 28.0	+59.1	139.3	**58**
59	70 13.3	+54.6	126.2	69 36.9	+55.6	128.4	68 58.8	+56.4	130.5	68 19.1	+57.1	132.4	67 37.9	+57.8	134.2	66 55.5	+58.2	135.9	66 11.8	+58.7	137.4	65 27.1	+59.0	138.9	**59**
60	71 07.9	+54.0	125.0	70 32.5	+55.1	127.3	69 55.2	+56.1	129.5	69 16.2	+56.9	131.5	68 35.7	+57.5	133.4	67 53.7	+58.1	135.2	67 10.5	+58.6	136.9	66 26.1	+59.0	138.5	**60**
61	72 01.9	+53.4	123.6	71 27.6	+54.7	126.1	70 51.3	+55.7	128.4	70 13.1	+56.6	130.6	69 33.2	+57.3	132.7	68 51.8	+58.0	134.6	68 09.1	+58.4	136.3	67 25.1	+58.8	138.0	**61**
62	72 55.3	+52.7	122.1	72 22.3	+54.0	124.8	71 47.0	+55.2	127.3	71 09.7	+56.2	129.6	70 30.5	+57.1	131.8	69 49.8	+57.7	133.8	69 07.5	+58.3	135.7	68 23.9	+58.7	137.5	**62**
63	73 48.0	+51.8	120.4	73 16.3	+53.4	123.3	72 42.2	+54.7	126.0	72 05.9	+55.8	128.5	71 27.6	+56.7	130.8	70 47.5	+57.5	133.0	70 05.8	+58.1	135.0	69 22.6	+58.6	136.9	**63**
64	74 39.8	+50.7	118.6	74 09.7	+52.5	121.7	73 36.9	+54.0	124.6	73 01.7	+55.3	127.3	72 24.3	+56.3	129.8	71 45.0	+57.2	132.1	71 03.9	+57.9	134.3	70 21.2	+58.5	136.3	**64**
65	75 30.5	+49.6	116.5	75 02.2	+51.6	119.8	74 30.9	+53.3	123.0	73 57.0	+54.7	125.9	73 20.6	+55.9	128.6	72 42.2	+56.8	131.1	72 01.8	+57.6	133.5	71 19.7	+58.3	135.6	**65**
66	76 20.1	+48.1	114.2	75 53.8	+50.4	117.8	75 24.2	+52.4	121.2	74 51.7	+54.0	124.4	74 16.5	+55.4	127.3	73 39.0	+56.5	130.0	72 59.4	+57.4	132.5	72 18.0	+58.1	134.9	**66**
67	77 08.2	+46.3	111.6	76 44.2	+49.0	115.5	76 16.6	+51.3	119.2	75 45.7	+53.2	122.7	75 11.9	+54.8	125.9	74 35.5	+56.1	128.8	73 56.8	+57.1	131.5	73 16.1	+57.9	134.0	**67**
68	77 54.5	*+44.2*	•108.6	77 33.2	+47.3	112.9	77 07.9	+50.0	117.0	76 38.9	+52.2	120.7	76 06.7	+54.0	124.2	75 31.6	+55.5	127.4	74 53.9	+56.7	130.4	74 14.0	+57.6	133.1	**68**
69	78 38.7	*+41.7*	•105.3	78 20.5	*+45.3*	•110.0	77 57.9	+48.3	114.4	77 31.1	+51.0	118.5	77 00.7	+53.1	122.3	76 27.1	+54.8	125.8	75 50.6	+56.2	129.1	75 11.6	+57.2	132.0	**69**
70	79 20.4	*+38.7*	•101.5	79 05.8	*+42.8*	•106.6	78 46.2	*+46.4*	•111.5	78 22.1	+49.4	116.0	77 53.8	+52.0	120.2	77 21.9	+54.0	124.0	76 46.8	+55.6	127.6	76 08.8	+56.9	130.8	**70**
71	79 59.1	*+34.9*	• 97.3	79 48.6	*+39.7*	•102.8	79 32.6	*+43.9*	•108.1	79 11.5	*+47.5*	•113.1	78 45.8	+50.5	117.7	78 15.9	+52.9	122.0	77 42.4	+54.8	125.9	77 05.7	+56.4	129.4	**71**
72	80 34.0	*+30.5*	• 92.4	80 28.3	*+36.0*	• 98.4	80 16.5	*+40.9*	•104.2	79 59.0	*+45.2*	•109.7	79 36.3	*+48.7*	•114.8	79 08.8	+51.7	119.6	78 37.2	+54.0	123.9	78 02.1	+55.7	127.8	**72**
73	81 04.5	*+25.3*	• 87.0	81 04.3	*+31.4*	• 93.4	80 57.4	*+37.1*	• 99.7	80 44.2	*+42.1*	•105.8	80 25.0	*+46.4*	•111.5	80 00.5	+49.9	116.8	79 31.2	+52.8	121.6	78 57.8	+54.9	126.0	**73**
74	81 29.8	*+19.3*	• 81.0	81 35.7	*+25.9*	• 87.7	81 34.5	*+32.4*	• 94.5	81 26.3	*+38.3*	•101.1	81 11.4	*+43.5*	•107.5	80 50.4	*+47.8*	•113.4	80 24.0	+51.2	118.9	79 52.7	+53.9	123.8	**74**
75	81 49.1	*+12.5*	• 74.5	82 01.6	*+19.6*	• 81.4	82 06.9	*+26.6*	• 88.6	82 04.6	*+33.5*	• 95.8	81 54.9	*+39.6*	•102.8	81 38.2	*+44.9*	•109.4	81 15.2	*+49.2*	•115.6	80 46.6	+52.6	121.2	**75**
76	82 01.6	*+5.3*	• 67.6	82 21.2	*+12.3*	• 74.5	82 33.5	*+19.9*	• 81.8	82 38.1	*+27.4*	• 89.5	82 34.5	*+34.7*	• 97.2	82 23.1	*+41.1*	•104.7	82 04.4	*+46.4*	•111.6	81 39.2	*+50.6*	•118.0	**76**
77	82 06.9	*–2.3*	• 60.3	82 33.5	*+4.6*	• 67.0	82 53.4	*+12.1*	• 74.4	83 05.5	*+20.3*	• 82.4	83 09.2	*+28.4*	• 90.6	83 04.2	*+36.0*	• 98.9	82 50.8	*+42.7*	•106.8	82 29.8	*+48.1*	•114.1	**77**
78	82 04.6	*–9.7*	• 53.1	82 38.1	*–3.6*	• 59.2	83 05.5	*+3.7*	• 66.4	83 25.8	*+11.8*	• 74.3	83 37.6	*+20.6*	• 83.0	83 40.2	*+29.5*	• 92.0	83 33.5	*+37.6*	•100.9	83 17.9	*+44.5*	•109.2	**78**
79	81 54.9	*–16.7*	• 46.0	82 34.5	*–11.4*	• 51.5	83 09.2	*–5.0*	• 58.0	83 37.6	*+2.6*	• 65.6	83 58.2	*+11.5*	• 74.3	84 09.7	*+21.1*	• 83.7	84 11.1	*+30.7*	• 93.5	84 02.4	*+39.4*	•103.2	**79**
80	81 38.2	*–23.0*	• 39.2	82 23.1	*–18.7*	• 44.0	83 04.2	*–13.4*	• 49.7	83 40.2	*–6.7*	• 56.6	84 09.7	*+1.4*	• 64.8	84 30.8	*+11.0*	• 74.2	84 41.8	*+21.6*	• 84.7	84 41.8	*+32.1*	• 95.4	**80**
81	81 15.2	*–28.6*	• 33.0	82 04.4	*–25.2*	• 36.9	82 50.8	*–21.0*	• 41.7	83 33.5	*–15.6*	• 47.6	84 11.1	*–8.7*	• 54.9	84 41.8	*0.0*	• 63.8	85 03.4	*+10.5*	• 74.2	85 13.9	*+22.3*	• 85.8	**81**
82	80 46.6	*–33.2*	• 27.4	81 39.2	*–30.8*	• 30.5	82 29.8	*–27.6*	• 34.4	83 17.9	*–23.5*	• 39.2	84 02.4	*–18.2*	• 45.3	84 41.8	*–11.2*	• 52.9	85 13.9	*–1.9*	• 62.5	85 36.2	*+9.7*	• 74.1	**82**
83	80 13.4	*–37.3*	• 22.4	81 08.4	*–35.5*	• 24.8	82 02.2	*–33.2*	• 27.8	82 54.4	*–30.3*	• 31.5	83 44.2	*–26.4*	• 36.3	84 30.6	*–21.1*	• 42.5	85 12.0	*–14.0*	• 50.5	85 45.9	*–4.1*	• 61.0	**83**
84	79 36.1	*–40.5*	• 17.9	80 32.9	*–39.3*	• 19.7	81 29.0	*–37.7*	• 22.0	82 24.1	*–35.7*	• 24.8	83 17.8	*–33.1*	• 28.3	84 09.5	*–29.6*	• 33.0	84 58.0	*–24.5*	• 39.2	85 41.8	*–17.5*	• 47.6	**84**
85	78 55.6	*–43.3*	• 13.9	79 53.6	*–42.4*	• 15.3	80 51.3	*–41.4*	• 16.9	81 48.4	*–40.1*	• 18.9	82 44.7	*–38.3*	• 21.5	83 39.9	*–36.1*	• 24.7	84 33.5	*–33.0*	• 29.1	85 24.3	*–28.4*	• 35.2	**85**
86	78 12.3	*–45.6*	• 10.4	79 11.2	*–45.0*	• 11.4	80 09.9	*–44.3*	• 12.5	81 08.3	*–43.5*	• 13.9	82 06.4	*–42.5*	• 15.6	83 03.8	*–41.1*	• 17.8	84 00.5	*–39.3*	• 20.7	84 55.9	*–36.8*	• 24.7	**86**
87	77 26.7	–47.4	7.3	78 26.2	–47.1	8.0	79 25.6	*–46.8*	• 8.7	80 24.8	*–46.2*	• 9.6	81 23.9	*–45.7*	• 10.7	82 22.7	*–44.9*	• 12.1	83 21.2	*–44.0*	• 13.9	84 19.1	*–42.6*	• 16.3	**87**
88	76 39.3	–49.0	4.6	77 39.1	–48.8	5.0	78 38.8	–48.6	5.4	79 38.6	–48.5	5.9	80 38.2	*–48.1*	• 6.5	81 37.8	*–47.8*	• 7.3	82 37.2	*–47.3*	• 8.3	83 36.5	*–46.8*	• 9.6	**88**
89	75 50.3	–50.3	2.2	76 50.3	–50.3	2.3	77 50.2	–50.2	2.5	78 50.1	–50.1	2.7	79 50.1	–50.1	3.0	80 50.0	–50.0	3.3	81 49.9	*–49.9*	• 3.7	82 49.7	*–49.7*	• 4.2	**89**
90	75 00.0	–51.4	0.0	76 00.0	–51.4	0.0	77 00.0	–51.5	0.0	78 00.0	–51.5	0.0	79 00.0	–51.6	0.0	80 00.0	–51.7	0.0	81 00.0	–51.7	0.0	82 00.0	–51.8	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 32°, 328°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 40.7	– 59.4	147.1	11 50.3	– 59.4	147.2	10 59.9	– 59.6	147.3	10 09.3	– 59.6	147.4	9 18.7	– 59.6	147.5	8 28.1	– 59.7	147.6	7 37.4	– 59.8	147.7	6 46.7	– 59.8	147.7	**0**
1	11 41.3	– 59.4	147.2	10 50.9	– 59.5	147.4	10 00.3	– 59.6	147.5	9 09.7	– 59.6	147.5	8 19.1	– 59.7	147.6	7 28.4	– 59.8	147.7	6 37.6	– 59.8	147.8	5 46.9	– 59.9	147.8	**1**
2	10 41.9	– 59.4	147.4	9 51.4	– 59.5	147.5	9 00.7	– 59.5	147.6	8 10.1	– 59.7	147.7	7 19.4	– 59.7	147.7	6 28.6	– 59.7	147.8	5 37.8	– 59.8	147.8	4 47.0	– 59.8	147.9	**2**
3	9 42.5	– 59.4	147.5	8 51.9	– 59.5	147.6	8 01.2	– 59.6	147.7	7 10.4	– 59.6	147.8	6 19.7	– 59.7	147.8	5 28.9	– 59.8	147.9	4 38.0	– 59.8	147.9	3 47.2	– 59.9	148.0	**3**
4	8 43.1	– 59.4	147.7	7 52.4	– 59.5	147.7	7 01.6	– 59.6	147.8	6 10.8	– 59.6	147.9	5 20.0	– 59.7	147.9	4 29.1	– 59.7	148.0	3 38.2	– 59.7	148.0	2 47.3	– 59.8	148.0	**4**
5	7 43.7	– 59.4	147.8	6 52.9	– 59.5	147.9	6 02.0	– 59.5	147.9	5 11.2	– 59.6	148.0	4 20.3	– 59.7	148.0	3 29.4	– 59.8	148.1	2 38.5	– 59.8	148.1	1 47.5	– 59.8	148.1	**5**
6	6 44.3	– 59.5	147.9	5 53.4	– 59.5	148.0	5 02.5	– 59.6	148.1	4 11.6	– 59.7	148.1	3 20.6	– 59.7	148.1	2 29.6	– 59.7	148.2	1 38.7	– 59.8	148.2	0 47.7	– 59.9	148.2	**6**
7	5 44.8	– 59.4	148.1	4 53.9	– 59.5	148.1	4 02.9	– 59.6	148.2	3 11.9	– 59.6	148.2	2 20.9	– 59.7	148.2	1 29.9	– 59.8	148.3	0 38.9	– 59.8	148.3	0 12.2	+ 59.8	31.7	**7**
8	4 45.4	– 59.4	148.2	3 54.4	– 59.5	148.3	3 03.3	– 59.5	148.3	2 12.3	– 59.6	148.3	1 21.2	– 59.7	148.3	0 30.1	– 59.7	148.3	0 20.9	+ 59.8	31.7	1 12.0	+ 59.8	31.7	**8**
9	3 46.0	– 59.5	148.4	2 54.9	– 59.5	148.4	2 03.8	– 59.6	148.4	1 12.7	– 59.7	148.4	0 21.5	– 59.7	148.4	0 29.6	+ 59.7	31.6	1 20.7	+ 59.8	31.6	2 11.8	+ 59.9	31.6	**9**
10	2 46.5	– 59.4	148.5	1 55.4	– 59.5	148.5	1 04.2	– 59.6	148.5	0 13.0	– 59.6	148.5	0 38.2	+ 59.7	31.5	1 29.3	+ 59.8	31.5	2 20.5	+ 59.8	31.5	3 11.7	+ 59.8	31.5	**10**
11	1 47.1	– 59.4	148.6	0 55.9	– 59.5	148.7	0 04.6	– 59.5	148.7	0 46.6	+ 59.7	31.3	1 37.9	+ 59.6	31.4	2 29.1	+ 59.7	31.4	3 20.3	+ 59.8	31.4	4 11.5	+ 59.8	31.4	**11**
12	0 47.7	– 59.5	148.8	0 03.6	+ 59.5	31.2	0 54.9	+ 59.6	31.2	1 46.3	+ 59.6	31.2	2 37.5	+ 59.7	31.3	3 28.8	+ 59.8	31.3	4 20.1	+ 59.8	31.3	5 11.3	+ 59.9	31.4	**12**
13	0 11.8	+ 59.4	31.1	1 03.1	+ 59.5	31.1	1 54.5	+ 59.6	31.1	2 45.9	+ 59.6	31.1	3 37.2	+ 59.7	31.2	4 28.6	+ 59.7	31.2	5 19.9	+ 59.8	31.2	6 11.2	+ 59.8	31.3	**13**
14	1 11.2	+ 59.4	30.9	2 02.6	+ 59.5	31.0	2 54.1	+ 59.6	31.0	3 45.5	+ 59.7	31.0	4 36.9	+ 59.7	31.1	5 28.3	+ 59.8	31.1	6 19.7	+ 59.8	31.2	7 11.0	+ 59.8	31.2	**14**
15	2 10.6	+ 59.5	30.8	3 02.1	+ 59.6	30.8	3 53.7	+ 59.5	30.9	4 45.2	+ 59.6	30.9	5 36.6	+ 59.7	31.0	6 28.1	+ 59.7	31.0	7 19.5	+ 59.8	31.1	8 10.8	+ 59.9	31.1	**15**
16	3 10.1	+ 59.4	30.7	4 01.7	+ 59.5	30.7	4 53.2	+ 59.6	30.7	5 44.8	+ 59.6	30.8	6 36.3	+ 59.7	30.9	7 27.8	+ 59.7	30.9	8 19.3	+ 59.7	31.0	9 10.7	+ 59.8	31.1	**16**
17	4 09.5	+ 59.4	30.5	5 01.2	+ 59.5	30.6	5 52.8	+ 59.6	30.6	6 44.4	+ 59.6	30.7	7 36.0	+ 59.7	30.7	8 27.5	+ 59.8	30.8	9 19.0	+ 59.8	30.9	10 10.5	+ 59.8	31.0	**17**
18	5 08.9	+ 59.4	30.4	6 00.7	+ 59.5	30.4	6 52.4	+ 59.5	30.5	7 44.0	+ 59.7	30.6	8 35.7	+ 59.7	30.6	9 27.3	+ 59.7	30.7	10 18.8	+ 59.8	30.8	11 10.3	+ 59.9	30.9	**18**
19	6 08.3	+ 59.5	30.3	7 00.2	+ 59.4	30.3	7 51.9	+ 59.6	30.4	8 43.7	+ 59.6	30.5	9 35.4	+ 59.7	30.5	10 27.0	+ 59.8	30.6	11 18.6	+ 59.8	30.7	12 10.2	+ 59.8	30.8	**19**
20	7 07.8	+ 59.4	30.1	7 59.6	+ 59.5	30.2	8 51.5	+ 59.6	30.3	9 43.3	+ 59.6	30.3	10 35.1	+ 59.6	30.4	11 26.8	+ 59.7	30.5	12 18.4	+ 59.8	30.6	13 10.0	+ 59.8	30.8	**20**
21	8 07.2	+ 59.4	30.0	8 59.1	+ 59.5	30.1	9 51.1	+ 59.5	30.1	10 42.9	+ 59.6	30.2	11 34.7	+ 59.7	30.3	12 26.5	+ 59.7	30.4	13 18.2	+ 59.8	30.6	14 09.8	+ 59.9	30.7	**21**
22	9 06.6	+ 59.4	29.8	9 58.6	+ 59.5	29.9	10 50.6	+ 59.6	30.0	11 42.5	+ 59.7	30.1	12 34.4	+ 59.7	30.2	13 26.2	+ 59.8	30.3	14 18.0	+ 59.7	30.5	15 09.7	+ 59.8	30.6	**22**
23	10 06.0	+ 59.4	29.7	10 58.1	+ 59.5	29.8	11 50.2	+ 59.5	29.9	12 42.2	+ 59.6	30.0	13 34.1	+ 59.7	30.1	14 26.0	+ 59.7	30.2	15 17.7	+ 59.8	30.4	16 09.5	+ 59.8	30.5	**23**
24	11 05.4	+ 59.5	29.6	11 57.6	+ 59.5	29.7	12 49.7	+ 59.6	29.8	13 41.8	+ 59.6	29.9	14 33.8	+ 59.6	30.0	15 25.7	+ 59.7	30.1	16 17.5	+ 59.8	30.3	17 09.3	+ 59.8	30.4	**24**
25	12 04.9	+ 59.4	29.4	12 57.1	+ 59.5	29.5	13 49.3	+ 59.5	29.6	14 41.4	+ 59.6	29.8	15 33.4	+ 59.7	29.9	16 25.4	+ 59.7	30.0	17 17.3	+ 59.8	30.2	18 09.1	+ 59.8	30.4	**25**
26	13 04.3	+ 59.4	29.3	13 56.6	+ 59.4	29.4	14 48.8	+ 59.5	29.5	15 41.0	+ 59.6	29.7	16 33.1	+ 59.7	29.8	17 25.1	+ 59.7	29.9	18 17.1	+ 59.7	30.1	19 08.9	+ 59.9	30.3	**26**
27	14 03.7	+ 59.3	29.1	14 56.0	+ 59.5	29.3	15 48.3	+ 59.6	29.4	16 40.6	+ 59.6	29.5	17 32.8	+ 59.6	29.7	18 24.8	+ 59.8	29.8	19 16.8	+ 59.8	30.0	20 08.8	+ 59.8	30.2	**27**
28	15 03.0	+ 59.4	29.0	15 55.5	+ 59.5	29.1	16 47.9	+ 59.5	29.3	17 40.2	+ 59.6	29.4	18 32.4	+ 59.7	29.6	19 24.6	+ 59.7	29.7	20 16.6	+ 59.8	29.9	21 08.6	+ 59.8	30.1	**28**
29	16 02.4	+ 59.4	28.8	16 55.0	+ 59.4	29.0	17 47.4	+ 59.5	29.1	18 39.8	+ 59.6	29.3	19 32.1	+ 59.6	29.5	20 24.3	+ 59.7	29.6	21 16.4	+ 59.7	29.8	22 08.4	+ 59.8	30.0	**29**
30	17 01.8	+ 59.4	28.7	17 54.4	+ 59.5	28.8	18 46.9	+ 59.6	29.0	19 39.4	+ 59.6	29.2	20 31.7	+ 59.7	29.3	21 24.0	+ 59.7	29.5	22 16.1	+ 59.8	29.7	23 08.2	+ 59.8	29.9	**30**
31	18 01.2	+ 59.4	28.5	18 53.9	+ 59.4	28.7	19 46.5	+ 59.5	28.9	20 39.0	+ 59.5	29.0	21 31.4	+ 59.6	29.2	22 23.7	+ 59.7	29.4	23 15.9	+ 59.7	29.6	24 08.0	+ 59.8	29.9	**31**
32	19 00.6	+ 59.3	28.4	19 53.3	+ 59.4	28.5	20 46.0	+ 59.5	28.7	21 38.5	+ 59.6	28.9	22 31.0	+ 59.7	29.1	23 23.4	+ 59.7	29.3	24 15.6	+ 59.8	29.5	25 07.8	+ 59.8	29.8	**32**
33	19 59.9	+ 59.4	28.2	20 52.7	+ 59.5	28.4	21 45.5	+ 59.5	28.6	22 38.1	+ 59.6	28.8	23 30.7	+ 59.6	29.0	24 23.1	+ 59.7	29.2	25 15.4	+ 59.7	29.4	26 07.6	+ 59.8	29.7	**33**
34	20 59.3	+ 59.3	28.1	21 52.2	+ 59.4	28.3	22 45.0	+ 59.5	28.4	23 37.7	+ 59.5	28.7	24 30.3	+ 59.6	28.9	25 22.8	+ 59.7	29.1	26 15.1	+ 59.8	29.3	27 07.4	+ 59.8	29.6	**34**
35	21 58.6	+ 59.4	27.9	22 51.6	+ 59.4	28.1	23 44.5	+ 59.5	28.3	24 37.2	+ 59.6	28.5	25 29.9	+ 59.6	28.7	26 22.5	+ 59.6	29.0	27 14.9	+ 59.7	29.2	28 07.2	+ 59.8	29.5	**35**
36	22 58.0	+ 59.3	27.8	23 51.0	+ 59.4	28.0	24 44.0	+ 59.4	28.2	25 36.8	+ 59.5	28.4	26 29.5	+ 59.6	28.6	27 22.1	+ 59.7	28.9	28 14.6	+ 59.7	29.1	29 07.0	+ 59.7	29.4	**36**
37	23 57.3	+ 59.3	27.6	24 50.4	+ 59.4	27.8	25 43.4	+ 59.5	28.0	26 36.3	+ 59.6	28.3	27 29.1	+ 59.6	28.5	28 21.8	+ 59.7	28.7	29 14.3	+ 59.8	29.0	30 06.7	+ 59.8	29.3	**37**
38	24 56.6	+ 59.3	27.4	25 49.8	+ 59.4	27.6	26 42.9	+ 59.5	27.9	27 35.9	+ 59.5	28.1	28 28.7	+ 59.6	28.4	29 21.5	+ 59.6	28.6	30 14.1	+ 59.7	28.9	31 06.5	+ 59.8	29.2	**38**
39	25 55.9	+ 59.3	27.3	26 49.2	+ 59.4	27.5	27 42.4	+ 59.4	27.7	28 35.4	+ 59.5	28.0	29 28.3	+ 59.6	28.2	30 21.1	+ 59.7	28.5	31 13.8	+ 59.7	28.8	32 06.3	+ 59.8	29.1	**39**
40	26 55.2	+ 59.3	27.1	27 48.6	+ 59.3	27.3	28 41.8	+ 59.4	27.6	29 34.9	+ 59.5	27.8	30 27.9	+ 59.6	28.1	31 20.8	+ 59.6	28.4	32 13.5	+ 59.7	28.7	33 06.1	+ 59.7	29.0	**40**
41	27 54.5	+ 59.2	26.9	28 47.9	+ 59.4	27.2	29 41.2	+ 59.5	27.4	30 34.4	+ 59.5	27.7	31 27.5	+ 59.6	28.0	32 20.4	+ 59.7	28.3	33 13.2	+ 59.7	28.6	34 05.8	+ 59.8	28.9	**41**
42	28 53.7	+ 59.3	26.7	29 47.3	+ 59.3	27.0	30 40.7	+ 59.4	27.3	31 33.9	+ 59.5	27.5	32 27.1	+ 59.5	27.8	33 20.1	+ 59.6	28.1	34 12.9	+ 59.7	28.4	35 05.6	+ 59.7	28.8	**42**
43	29 53.0	+ 59.2	26.6	30 46.6	+ 59.3	26.8	31 40.1	+ 59.4	27.1	32 33.4	+ 59.5	27.4	33 26.6	+ 59.6	27.7	34 19.7	+ 59.6	28.0	35 12.6	+ 59.7	28.3	36 05.3	+ 59.8	28.7	**43**
44	30 52.2	+ 59.3	26.4	31 45.9	+ 59.3	26.6	32 39.5	+ 59.4	26.9	33 32.9	+ 59.5	27.2	34 26.2	+ 59.5	27.5	35 19.3	+ 59.6	27.9	36 12.3	+ 59.7	28.2	37 05.1	+ 59.7	28.5	**44**
45	31 51.5	+ 59.2	26.2	32 45.2	+ 59.3	26.5	33 38.9	+ 59.4	26.8	34 32.4	+ 59.4	27.1	35 25.7	+ 59.6	27.4	36 18.9	+ 59.6	27.7	37 12.0	+ 59.6	28.1	38 04.8	+ 59.8	28.4	**45**
46	32 50.7	+ 59.1	26.0	33 44.5	+ 59.3	26.3	34 38.3	+ 59.3	26.6	35 31.8	+ 59.5	26.9	36 25.3	+ 59.5	27.2	37 18.5	+ 59.6	27.6	38 11.6	+ 59.7	27.9	39 04.6	+ 59.7	28.3	**46**
47	33 49.8	+ 59.2	25.8	34 43.8	+ 59.3	26.1	35 37.6	+ 59.4	26.4	36 31.3	+ 59.4	26.7	37 24.8	+ 59.5	27.1	38 18.1	+ 59.6	27.4	39 11.3	+ 59.7	27.8	40 04.3	+ 59.7	28.2	**47**
48	34 49.0	+ 59.2	25.6	35 43.1	+ 59.2	25.9	36 37.0	+ 59.3	26.2	37 30.7	+ 59.4	26.6	38 24.3	+ 59.5	26.9	39 17.7	+ 59.6	27.3	40 11.0	+ 59.6	27.7	41 04.0	+ 59.7	28.1	**48**
49	35 48.2	+ 59.1	25.4	36 42.3	+ 59.2	25.7	37 36.3	+ 59.3	26.0	38 30.1	+ 59.4	26.4	39 23.8	+ 59.5	26.7	40 17.3	+ 59.5	27.1	41 10.6	+ 59.6	27.5	42 03.7	+ 59.7	27.9	**49**
50	36 47.3	+ 59.1	25.2	37 41.5	+ 59.2	25.5	38 35.6	+ 59.3	25.8	39 29.5	+ 59.4	26.2	40 23.3	+ 59.4	26.6	41 16.8	+ 59.6	27.0	42 10.2	+ 59.6	27.4	43 03.4	+ 59.7	27.8	**50**
51	37 46.4	+ 59.1	25.0	38 40.7	+ 59.2	25.3	39 34.9	+ 59.2	25.6	40 28.9	+ 59.3	26.0	41 22.7	+ 59.5	26.4	42 16.4	+ 59.5	26.8	43 09.8	+ 59.6	27.2	44 03.1	+ 59.7	27.6	**51**
52	38 45.5	+ 59.0	24.7	39 39.9	+ 59.1	25.1	40 34.1	+ 59.3	25.4	41 28.2	+ 59.4	25.8	42 22.2	+ 59.4	26.2	43 15.9	+ 59.5	26.6	44 09.4	+ 59.6	27.0	45 02.8	+ 59.6	27.5	**52**
53	39 44.5	+ 59.0	24.5	40 39.0	+ 59.2	24.9	41 33.4	+ 59.2	25.2	42 27.6	+ 59.3	25.6	43 21.6	+ 59.4	26.0	44 15.4	+ 59.5	26.4	45 09.0	+ 59.6	26.9	46 02.4	+ 59.7	27.4	**53**
54	40 43.5	+ 59.0	24.3	41 38.2	+ 59.1	24.6	42 32.6	+ 59.2	25.0	43 26.9	+ 59.3	25.4	44 21.0	+ 59.4	25.8	45 14.9	+ 59.5	26.3	46 08.6	+ 59.6	26.7	47 02.1	+ 59.6	27.2	**54**
55	41 42.5	+ 59.0	24.0	42 37.3	+ 59.0	24.4	43 31.8	+ 59.2	24.8	44 26.2	+ 59.3	25.2	45 20.4	+ 59.4	25.6	46 14.4	+ 59.4	26.1	47 08.2	+ 59.5	26.5	48 01.7	+ 59.7	27.0	**55**
56	42 41.5	+ 58.9	23.8	43 36.3	+ 59.1	24.2	44 31.0	+ 59.1	24.6	45 25.5	+ 59.2	25.0	46 19.8	+ 59.3	25.4	47 13.8	+ 59.5	25.9	48 07.7	+ 59.5	26.4	49 01.4	+ 59.6	26.9	**56**
57	43 40.4	+ 58.9	23.5	44 35.4	+ 59.0	23.9	45 30.1	+ 59.1	24.3	46 24.7	+ 59.2	24.7	47 19.1	+ 59.3	25.2	48 13.3	+ 59.4	25.7	49 07.2	+ 59.6	26.2	50 01.0	+ 59.6	26.7	**57**
58	44 39.3	+ 58.9	23.3	45 34.4	+ 58.9	23.7	46 29.2	+ 59.1	24.1	47 23.9	+ 59.2	24.5	48 18.4	+ 59.3	25.0	49 12.7	+ 59.4	25.5	50 06.8	+ 59.4	26.0	51 00.6	+ 59.6	26.5	**58**
59	45 38.2	+ 58.8	23.0	46 33.3	+ 59.0	23.4	47 28.3	+ 59.0	23.8	48 23.1	+ 59.2	24.3	49 17.7	+ 59.3	24.7	50 12.1	+ 59.3	25.2	51 06.2	+ 59.5	25.8	52 00.2	+ 59.5	26.3	**59**
60	46 37.0	+ 58.8	22.7	47 32.3	+ 58.8	23.1	48 27.3	+ 59.1	23.5	49 22.3	+ 59.1	24.0	50 17.0	+ 59.2	24.5	51 11.4	+ 59.4	25.0	52 05.7	+ 59.4	25.5	52 59.7	+ 59.5	26.1	**60**
61	47 35.8	+ 58.7	22.4	48 31.1	+ 58.9	22.8	49 26.4	+ 58.9	23.3	50 21.4	+ 59.1	23.7	51 16.2	+ 59.2	24.2	52 10.8	+ 59.3	24.8	53 05.1	+ 59.5	25.3	53 59.2	+ 59.6	25.9	**61**
62	48 34.5	+ 58.6	22.1	49 30.0	+ 58.8	22.5	50 25.3	+ 58.9	23.0	51 20.5	+ 59.0	23.5	52 15.4	+ 59.1	24.0	53 10.1	+ 59.3	24.5	54 04.6	+ 59.3	25.1	54 58.8	+ 59.5	25.7	**62**
63	49 33.1	+ 58.7	21.8	50 28.8	+ 58.7	22.2	51 24.2	+ 58.9	22.7	52 19.5	+ 59.0	23.2	53 14.5	+ 59.2	23.7	54 09.4	+ 59.2	24.3	55 03.9	+ 59.4	24.8	55 58.3	+ 59.4	25.5	**63**
64	50 31.8	+ 58.5	21.4	51 27.5	+ 58.7	21.9	52 23.1	+ 58.8	22.4	53 18.5	+ 58.9	22.9	54 13.7	+ 59.0	23.4	55 08.6	+ 59.2	24.0	56 03.3	+ 59.3	24.6	56 57.7	+ 59.4	25.2	**64**
65	51 30.3	+ 58.5	21.1	52 26.2	+ 58.6	21.6	53 21.9	+ 58.8	22.0	54 17.4	+ 58.9	22.6	55 12.7	+ 59.1	23.1	56 07.8	+ 59.1	23.7	57 02.6	+ 59.3	24.3	57 57.1	+ 59.4	25.0	**65**
66	52 28.8	+ 58.4	20.7	53 24.8	+ 58.6	21.2	54 20.7	+ 58.7	21.7	55 16.3	+ 58.9	22.2	56 11.8	+ 58.9	22.8	57 06.9	+ 59.2	23.4	58 01.9	+ 59.2	24.0	58 56.5	+ 59.4	24.7	**66**
67	53 27.2	+ 58.4	20.3	54 23.4	+ 58.5	20.8	55 19.4	+ 58.6	21.3	56 15.2	+ 58.7	21.9	57 10.7	+ 58.9	22.5	58 06.1	+ 59.0	23.1	59 01.1	+ 59.2	23.7	59 55.9	+ 59.3	24.4	**67**
68	54 25.6	+ 58.2	20.0	55 21.9	+ 58.4	20.4	56 18.0	+ 58.6	21.0	57 13.9	+ 58.8	21.5	58 09.6	+ 58.9	22.1	59 05.1	+ 59.0	22.7	60 00.3	+ 59.2	23.4	60 55.2	+ 59.3	24.1	**68**
69	55 23.8	+ 58.2	19.5	56 20.3	+ 58.3	20.0	57 16.6	+ 58.5	20.6	58 12.7	+ 58.6	21.1	59 08.5	+ 58.8	21.7	60 04.1	+ 59.0	22.4	60 59.5	+ 59.1	23.1	61 54.5	+ 59.3	23.8	**69**
70	56 22.0	+ 58.1	19.1	57 18.6	+ 58.3	19.6	58 15.1	+ 58.4	20.1	59 11.3	+ 58.5	20.7	60 07.3	+ 58.7	21.3	61 03.1	+ 58.8	22.0	61 58.6	+ 59.0	22.7	62 53.8	+ 59.1	23.4	**70**
71	57 20.1	+ 58.0	18.6	58 16.9	+ 58.1	19.2	59 13.5	+ 58.3	19.7	60 09.8	+ 58.5	20.3	61 06.0	+ 58.6	20.9	62 01.9	+ 58.8	21.6	62 57.6	+ 58.9	22.3	63 52.9	+ 59.2	23.1	**71**
72	58 18.1	+ 57.8	18.2	59 15.0	+ 58.0	18.7	60 11.8	+ 58.1	19.2	61 08.3	+ 58.4	19.8	62 04.6	+ 58.6	20.5	63 00.7	+ 58.7	21.2	63 56.5	+ 58.9	21.9	64 52.1	+ 59.0	22.7	**72**
73	59 15.9	+ 57.8	17.6	60 13.0	+ 57.9	18.2	61 09.9	+ 58.1	18.7	62 06.7	+ 58.2	19.3	63 03.2	+ 58.4	20.0	63 59.4	+ 58.6	20.7	64 55.4	+ 58.8	21.4	65 51.1	+ 59.0	22.3	**73**
74	60 13.7	+ 57.6	17.1	61 10.9	+ 57.8	17.6	62 08.0	+ 58.0	18.2	63 04.9	+ 58.2	18.8	64 01.6	+ 58.3	19.5	64 58.0	+ 58.6	20.2	65 54.2	+ 58.7	21.0	66 50.1	+ 58.9	21.8	**74**
75	61 11.3	+ 57.4	16.5	62 08.7	+ 57.6	17.1	63 06.0	+ 57.8	17.6	64 03.1	+ 58.0	18.3	64 59.9	+ 58.2	18.9	65 56.6	+ 58.3	19.7	66 52.9	+ 58.6	20.4	67 49.0	+ 58.8	21.3	**75**
76	62 08.7	+ 57.3	15.9	63 06.3	+ 57.5	16.5	64 03.8	+ 57.6	17.0	65 01.1	+ 57.8	17.7	65 58.1	+ 58.1	18.3	66 54.9	+ 58.3	19.1	67 51.5	+ 58.5	19.9	68 47.8	+ 58.7	20.8	**76**
77	63 06.0	+ 57.1	15.3	64 03.8	+ 57.3	15.8	65 01.4	+ 57.5	16.4	65 58.9	+ 57.7	17.0	66 56.2	+ 57.8	17.7	67 53.2	+ 58.1	18.5	68 50.0	+ 58.3	19.3	69 46.5	+ 58.5	20.2	**77**
78	64 03.1	+ 56.8	14.6	65 01.1	+ 57.0	15.1	65 58.9	+ 57.3	15.7	66 56.6	+ 57.4	16.3	67 54.0	+ 57.7	17.0	68 51.3	+ 57.9	17.8	69 48.3	+ 58.2	18.6	70 45.0	+ 58.4	19.5	**78**
79	64 59.9	+ 56.7	13.8	65 58.1	+ 56.8	14.4	66 56.2	+ 57.0	15.0	67 54.0	+ 57.3	15.6	68 51.7	+ 57.5	16.3	69 49.2	+ 57.7	17.0	70 46.5	+ 57.9	17.9	71 43.4	+ 58.2	18.8	**79**
80	65 56.6	+ 56.3	13.0	66 54.9	+ 56.6	13.6	67 53.2	+ 56.8	14.1	68 51.3	+ 57.0	14.8	69 49.2	+ 57.3	15.5	70 46.9	+ 57.5	16.2	71 44.4	+ 57.8	17.1	72 41.6	+ 58.0	18.0	**80**
81	66 52.9	+ 56.1	12.2	67 51.5	+ 56.3	12.7	68 50.0	+ 56.5	13.3	69 48.3	+ 56.7	13.9	70 46.5	+ 56.9	14.6	71 44.4	+ 57.2	15.3	72 42.2	+ 57.4	16.2	73 39.6	+ 57.8	17.1	**81**
82	67 49.0	+ 55.7	11.3	68 47.8	+ 55.9	11.8	69 46.5	+ 56.1	12.3	70 45.0	+ 56.4	12.9	71 43.4	+ 56.6	13.6	72 41.6	+ 56.9	14.4	73 39.6	+ 57.2	15.2	74 37.4	+ 57.5	16.1	**82**
83	68 44.7	+ 55.3	10.3	69 43.7	+ 55.5	10.7	70 42.6	+ 55.7	11.3	71 41.4	+ 56.0	11.9	72 40.0	+ 56.3	12.5	73 38.5	+ 56.5	13.3	74 36.8	+ 56.8	14.1	75 34.9	+ 57.1	15.0	**83**
84	69 40.0	+ 54.9	9.2	70 39.2	+ 55.1	9.6	71 38.3	+ 55.3	10.1	72 37.4	+ 55.5	10.7	73 36.3	+ 55.7	11.3	74 35.0	+ 56.1	12.0	75 33.6	+ 56.4	12.8	76 32.0	+ 56.7	13.8	**84**
85	70 34.9	+ 54.4	8.0	71 34.3	+ 54.6	8.4	72 33.6	+ 54.8	8.9	73 32.9	+ 55.0	9.4	74 32.0	+ 55.3	10.0	75 31.1	+ 55.5	10.6	76 30.0	+ 55.8	11.4	77 28.7	+ 56.1	12.3	**85**
86	71 29.3	+ 53.8	6.7	72 28.9	+ 54.0	7.1	73 28.4	+ 54.2	7.5	74 27.9	+ 54.3	7.9	75 27.3	+ 54.5	8.5	76 26.6	+ 54.8	9.1	77 25.8	+ 55.1	9.8	78 24.8	+ 55.4	10.6	**86**
87	72 23.1	+ 53.2	5.3	73 22.9	+ 53.2	5.6	74 22.6	+ 53.4	5.9	75 22.2	+ 53.6	6.3	76 21.8	+ 53.8	6.8	77 21.4	+ 54.0	7.3	78 20.9	+ 54.2	7.9	79 20.2	+ 54.6	8.6	**87**
88	73 16.3	+ 52.3	3.7	74 16.1	+ 52.5	3.9	75 16.0	+ 52.5	4.2	76 15.8	+ 52.7	4.5	77 15.6	+ 52.8	4.8	78 15.4	+ 52.9	5.2	79 15.1	+ 53.2	5.7	80 14.8	+ 53.4	6.3	**88**
89	74 08.6	+ 51.4	1.9	75 08.6	+ 51.4	2.1	76 08.5	+ 51.5	2.2	77 08.5	+ 51.5	2.4	78 08.4	+ 51.6	2.6	79 08.3	+ 51.7	2.8	80 08.3	+ 51.7	3.1	81 08.2	+ 51.8	3.4	**89**
90	75 00.0	+ 50.3	0.0	76 00.0	+ 50.3	0.0	77 00.0	+ 50.2	0.0	78 00.0	+ 50.1	0.0	79 00.0	+ 50.1	0.0	80 00.0	+ 50.0	0.0	81 00.0	*+ 49.9* •	0.0	82 00.0	*+ 49.7* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 148°, 212°

33°, 327° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°		
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °
0	12 32.2	+59.4	146.1	11 42.4	+59.4	146.2	10 52.5	+59.5	146.3	10 02.5	+59.6	146.4
1	13 31.6	+59.3	145.9	12 41.8	+59.5	146.1	11 52.0	+59.5	146.2	11 02.1	+59.6	146.3
2	14 30.9	+59.4	145.8	13 41.3	+59.4	145.9	12 51.5	+59.6	146.1	12 01.7	+59.6	146.2
3	15 30.3	+59.3	145.6	14 40.7	+59.5	145.8	13 51.1	+59.5	145.9	13 01.3	+59.6	146.1
4	16 29.6	+59.4	145.5	15 40.2	+59.4	145.6	14 50.6	+59.5	145.8	14 00.9	+59.6	145.9
5	17 29.0	+59.3	145.3	16 39.6	+59.4	145.5	15 50.1	+59.5	145.7	15 00.5	+59.6	145.8
6	18 28.3	+59.4	145.2	17 39.0	+59.4	145.4	16 49.6	+59.5	145.5	16 00.1	+59.6	145.7
7	19 27.7	+59.3	145.0	18 38.4	+59.4	145.2	17 49.1	+59.5	145.4	16 59.7	+59.5	145.6
8	20 27.0	+59.3	144.9	19 37.8	+59.5	145.1	18 48.6	+59.5	145.3	17 59.2	+59.6	145.5
9	21 26.3	+59.3	144.7	20 37.3	+59.4	144.9	19 48.1	+59.5	145.1	18 58.8	+59.6	145.3
10	22 25.6	+59.3	144.5	21 36.7	+59.3	144.8	20 47.6	+59.5	145.0	19 58.4	+59.5	145.2
11	23 24.9	+59.3	144.4	22 36.0	+59.4	144.6	21 47.1	+59.4	144.8	20 57.9	+59.6	145.1
12	24 24.2	+59.2	144.2	23 35.4	+59.4	144.5	22 46.5	+59.5	144.7	21 57.5	+59.5	144.9
13	25 23.4	+59.3	144.0	24 34.8	+59.4	144.3	23 46.0	+59.4	144.6	22 57.0	+59.6	144.8
14	26 22.7	+59.2	143.9	25 34.2	+59.3	144.1	24 45.4	+59.5	144.4	23 56.6	+59.5	144.7
15	27 21.9	+59.3	143.7	26 33.5	+59.3	144.0	25 44.9	+59.4	144.3	24 56.1	+59.5	144.5
16	28 21.2	+59.2	143.5	27 32.8	+59.4	143.8	26 44.3	+59.5	144.1	25 55.6	+59.5	144.4
17	29 20.4	+59.2	143.3	28 32.2	+59.3	143.6	27 43.8	+59.4	144.0	26 55.1	+59.6	144.3
18	30 19.6	+59.2	143.1	29 31.5	+59.3	143.5	28 43.2	+59.4	143.8	27 54.7	+59.5	144.1
19	31 18.8	+59.1	142.9	30 30.8	+59.3	143.3	29 42.6	+59.4	143.6	28 54.2	+59.5	144.0
20	32 17.9	+59.2	142.7	31 30.1	+59.2	143.1	30 42.0	+59.4	143.5	29 53.7	+59.4	143.8
21	33 17.1	+59.1	142.5	32 29.3	+59.3	142.9	31 41.4	+59.3	143.3	30 53.1	+59.5	143.7
22	34 16.2	+59.1	142.3	33 28.6	+59.2	142.7	32 40.7	+59.4	143.1	31 52.6	+59.5	143.5
23	35 15.3	+59.1	142.1	34 27.8	+59.3	142.5	33 40.1	+59.3	143.0	32 52.1	+59.4	143.4
24	36 14.4	+59.1	141.9	35 27.1	+59.2	142.4	34 39.4	+59.3	142.8	33 51.5	+59.4	143.2
25	37 13.5	+59.0	141.7	36 26.3	+59.1	142.2	35 38.7	+59.3	142.6	34 50.9	+59.5	143.0
26	38 12.5	+59.0	141.5	37 25.4	+59.2	141.9	36 38.0	+59.3	142.4	35 50.4	+59.4	142.9
27	39 11.5	+59.0	141.2	38 24.6	+59.1	141.7	37 37.3	+59.3	142.2	36 49.8	+59.4	142.7
28	40 10.5	+59.0	141.0	39 23.7	+59.1	141.5	38 36.6	+59.2	142.0	37 49.2	+59.3	142.5
29	41 09.5	+58.9	140.8	40 22.8	+59.1	141.3	39 35.8	+59.3	141.8	38 48.5	+59.4	142.3
30	42 08.4	+58.9	140.5	41 21.9	+59.1	141.1	40 35.1	+59.2	141.6	39 47.9	+59.3	142.1
31	43 07.3	+58.8	140.2	42 21.0	+59.0	140.8	41 34.3	+59.2	141.4	40 47.2	+59.3	141.9
32	44 06.1	+58.9	140.0	43 20.0	+59.0	140.6	42 33.5	+59.1	141.2	41 46.5	+59.3	141.7
33	45 05.0	+58.7	139.7	44 19.0	+58.9	140.3	43 32.6	+59.1	140.9	42 45.8	+59.3	141.5
34	46 03.7	+58.8	139.4	45 17.9	+59.0	140.1	44 31.7	+59.1	140.7	43 45.1	+59.2	141.3
35	47 02.5	+58.6	139.1	46 16.9	+58.8	139.8	45 30.8	+59.1	140.5	44 44.3	+59.3	141.1
36	48 01.1	+58.7	138.8	47 15.7	+58.9	139.5	46 29.9	+59.0	140.2	45 43.6	+59.1	140.9
37	48 59.8	+58.5	138.5	48 14.6	+58.8	139.2	47 28.9	+59.0	139.9	46 42.7	+59.2	140.6
38	49 58.3	+58.5	138.1	49 13.4	+58.7	138.9	48 27.9	+58.9	139.7	47 41.9	+59.1	140.4
39	50 56.8	+58.5	137.8	50 12.1	+58.7	138.6	49 26.8	+58.9	139.4	48 41.0	+59.1	140.1
40	51 55.3	+58.4	137.4	51 10.8	+58.6	138.3	50 25.7	+58.9	139.1	49 40.1	+59.1	139.9
41	52 53.7	+58.3	137.1	52 09.4	+58.6	137.9	51 24.6	+58.8	138.8	50 39.2	+59.0	139.6
42	53 52.0	+58.2	136.7	53 08.0	+58.5	137.6	52 23.4	+58.7	138.5	51 38.2	+59.0	139.3
43	54 50.2	+58.1	136.2	54 06.5	+58.4	137.2	53 22.1	+58.7	138.1	52 37.2	+58.9	139.0
44	55 48.3	+58.0	135.8	55 04.9	+58.4	136.8	54 20.8	+58.7	137.8	53 36.1	+58.9	138.7
45	56 46.3	+58.0	135.3	56 03.3	+58.2	136.4	55 19.5	+58.5	137.4	54 35.0	+58.8	138.4
46	57 44.3	+57.8	134.9	57 01.5	+58.2	136.0	56 18.0	+58.5	137.0	55 33.8	+58.7	138.0
47	58 42.1	+57.7	134.4	57 59.7	+58.1	135.5	57 16.5	+58.4	136.6	56 32.5	+58.7	137.6
48	59 39.8	+57.5	133.8	58 57.8	+57.9	135.0	58 14.9	+58.3	136.2	57 31.2	+58.6	137.3
49	60 37.3	+57.4	133.3	59 55.7	+57.8	134.5	59 13.2	+58.2	135.7	58 29.8	+58.6	136.9
50	61 34.7	+57.2	132.6	60 53.5	+57.7	134.0	60 11.4	+58.1	135.2	59 28.4	+58.4	136.4
51	62 31.9	+57.0	132.0	61 51.2	+57.6	133.4	61 09.5	+58.0	134.7	60 26.8	+58.4	136.0
52	63 28.9	+56.9	131.3	62 48.8	+57.3	132.8	62 07.5	+57.8	134.2	61 25.2	+58.2	135.5
53	64 25.8	+56.6	130.6	63 46.1	+57.2	132.1	63 05.3	+57.7	133.6	62 23.4	+58.1	135.0
54	65 22.4	+56.3	129.8	64 43.3	+57.0	131.4	64 03.0	+57.5	133.0	63 21.5	+58.0	134.4
55	66 18.7	+56.0	129.0	65 40.3	+56.7	130.7	65 00.5	+57.3	132.3	64 19.5	+57.8	133.9
56	67 14.7	+55.7	128.1	66 37.0	+56.4	129.9	65 57.8	+57.1	131.6	65 17.3	+57.7	133.2
57	68 10.4	+55.3	127.1	67 33.4	+56.2	129.0	66 54.9	+56.9	130.8	66 15.0	+57.5	132.6
58	69 05.7	+54.9	126.0	68 29.6	+55.8	128.1	67 51.8	+56.6	130.0	67 12.5	+57.3	131.8
59	70 00.6	+54.4	124.9	69 25.4	+55.4	127.0	68 48.4	+56.3	129.1	68 09.8	+57.0	131.1
60	70 55.0	+53.9	123.6	70 20.8	+55.0	125.9	69 44.7	+55.9	128.1	69 06.8	+56.7	130.2
61	71 48.9	+53.2	122.2	71 15.8	+54.4	124.7	70 40.6	+55.5	127.1	70 03.5	+56.5	129.3
62	72 42.1	+52.4	120.7	72 10.2	+53.9	123.4	71 36.1	+55.1	125.9	71 00.0	+56.0	128.2
63	73 34.5	+51.6	119.0	73 04.1	+53.1	121.9	72 31.2	+54.5	124.6	71 56.0	+55.6	127.1
64	74 26.1	+50.5	117.2	73 57.2	+52.3	120.3	73 25.7	+53.8	123.2	72 51.6	+55.2	125.9
65	75 16.6	+49.2	115.1	74 49.5	+51.4	118.4	74 19.5	+53.1	121.6	73 46.8	+54.5	124.5
66	76 05.8	+47.9	112.8	75 40.9	+50.1	116.4	75 12.6	+52.1	119.8	74 41.3	+53.8	123.0
67	76 53.7	+46.0	110.2	76 31.0	+48.8	114.1	76 04.7	+51.1	117.8	75 35.1	+53.0	121.3
68	77 39.7	*+44.0*	•107.3	77 19.8	+47.0	111.5	76 55.8	+49.7	115.6	76 28.1	+52.0	119.3
69	78 23.7	*+41.5*	•104.0	78 06.8	*+45.1*	•108.6	77 45.5	+48.1	113.0	77 20.1	+50.7	117.1
70	79 05.2	*+38.4*	•100.3	78 51.9	*+42.5*	•105.3	78 33.6	*+46.1*	•110.1	78 10.8	+49.2	114.6
71	79 43.6	*+34.9*	•96.1	79 34.4	*+39.5*	•101.5	79 19.7	*+43.7*	•106.7	79 00.0	*+47.2*	•111.7
72	80 18.5	*+30.5*	•91.4	80 13.9	*+35.9*	•97.2	80 03.4	*+40.7*	•102.9	79 47.2	*+44.9*	•108.3
73	80 49.0	*+25.5*	•86.2	80 49.8	*+31.4*	•92.4	80 44.1	*+36.9*	•98.5	80 32.1	*+41.9*	•104.4
74	81 14.5	*+19.6*	•80.4	81 21.2	*+26.1*	•86.9	81 21.0	*+32.4*	•93.4	81 14.0	*+38.2*	•99.9
75	81 34.1	*+13.2*	•74.0	81 47.3	*+19.9*	•80.7	81 53.4	*+26.8*	•87.6	81 52.2	*+33.4*	•94.7
76	81 47.3	*+6.1*	•67.3	82 07.2	*+13.0*	•74.0	82 20.2	*+20.2*	•81.1	82 25.6	*+27.6*	•88.6
77	81 53.4	*–1.2*	•60.3	82 20.2	*+5.4*	•66.7	82 40.4	*+12.8*	•73.9	82 53.2	*+20.6*	•81.6
78	81 52.2	*–8.5*	•53.2	82 25.6	*–2.5*	•59.2	82 53.2	*+4.5*	•66.1	83 13.8	*+12.4*	•73.8
79	81 43.7	*–15.4*	•46.2	82 23.1	*–10.1*	•51.7	82 57.7	*–3.8*	•58.0	83 26.2	*+3.6*	•65.4
80	81 28.3	*–21.6*	•39.6	82 13.0	*–17.4*	•44.3	82 53.9	*–12.1*	•49.9	83 29.8	*–5.5*	•56.6
81	81 06.7	*–27.3*	•33.5	81 55.6	*–23.9*	•37.3	82 41.8	*–19.7*	•42.1	83 24.3	*–14.3*	•47.9
82	80 39.4	*–32.0*	•27.8	81 31.7	*–29.5*	•31.0	82 22.1	*–26.3*	•34.8	83 10.0	*–22.2*	•39.6
83	80 07.4	*–36.1*	•22.8	81 02.2	*–34.2*	•25.2	81 55.8	*–31.9*	•28.2	82 47.8	*–29.0*	•32.0
84	79 31.3	*–39.5*	•18.2	80 28.0	*–38.2*	•20.1	81 23.9	*–36.6*	•22.4	82 18.8	*–34.5*	•25.2
85	78 51.8	*–42.4*	•14.2	79 49.8	*–41.5*	•15.6	80 47.3	*–40.4*	•17.2	81 44.3	*–39.0*	•19.3
86	78 09.4	*–44.7*	•10.7	79 08.3	*–44.1*	•11.6	80 06.9	*–43.4*	•12.8	81 05.3	*–42.6*	•14.2
87	77 24.7	–46.7	7.5	78 24.2	*–46.4*	•8.2	79 23.5	*–45.9*	•8.9	80 22.7	*–45.4*	•9.8
88	76 38.0	–48.3	4.7	77 37.8	–48.1	5.1	78 37.6	–48.0	5.5	79 37.3	*–47.8*	•6.1
89	75 49.7	–49.7	2.2	76 49.7	–49.7	2.4	77 49.6	–49.6	2.6	78 49.5	–49.5	2.8
90	75 00.0	–50.9	0.0	76 00.0	–50.9	0.0	77 00.0	–51.0	0.0	78 00.0	–51.0	0.0
	75°			76°			77°			78°		

79°			80°			81°			82°			Dec.
Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
9 12.5	+59.7	146.5	8 22.4	+59.8	146.6	7 32.3	+59.8	146.7	6 42.2	+59.8	146.7	0
10 12.2	+59.6	146.4	9 22.2	+59.7	146.5	8 32.1	+59.8	146.6	7 42.0	+59.8	146.7	1
11 11.8	+59.7	146.3	10 21.9	+59.7	146.4	9 31.9	+59.8	146.5	8 41.8	+59.8	146.6	2
12 11.5	+59.7	146.2	11 21.6	+59.7	146.3	10 31.7	+59.7	146.4	9 41.6	+59.9	146.5	3
13 11.2	+59.6	146.1	12 21.3	+59.7	146.2	11 31.4	+59.8	146.3	10 41.5	+59.8	146.4	4
14 10.8	+59.7	146.0	13 21.0	+59.8	146.1	12 31.2	+59.8	146.2	11 41.3	+59.8	146.4	5
15 10.5	+59.6	145.9	14 20.8	+59.7	146.0	13 31.0	+59.7	146.1	12 41.1	+59.8	146.3	6
16 10.1	+59.7	145.7	15 20.5	+59.7	145.9	14 30.7	+59.8	146.1	13 40.9	+59.8	146.2	7
17 09.8	+59.6	145.6	16 20.2	+59.7	145.8	15 30.5	+59.8	146.0	14 40.7	+59.9	146.1	8
18 09.4	+59.6	145.5	17 19.9	+59.7	145.7	16 30.3	+59.7	145.9	15 40.6	+59.8	146.0	9
19 09.0	+59.7	145.4	18 19.6	+59.7	145.6	17 30.0	+59.8	145.8	16 40.4	+59.8	146.0	10
20 08.7	+59.6	145.3	19 19.3	+59.7	145.5	18 29.8	+59.7	145.7	17 40.2	+59.8	145.9	11
21 08.3	+59.6	145.2	20 19.0	+59.7	145.4	19 29.5	+59.8	145.6	18 40.0	+59.8	145.8	12
22 07.9	+59.6	145.0	21 18.7	+59.7	145.3	20 29.3	+59.7	145.5	19 39.8	+59.8	145.7	13
23 07.5	+59.7	144.9	22 18.4	+59.6	145.2	21 29.0	+59.8	145.4	20 39.6	+59.8	145.6	14
24 07.2	+59.6	144.8	23 18.0	+59.7	145.1	22 28.8	+59.7	145.3	21 39.4	+59.8	145.5	15
25 06.8	+59.6	144.7	24 17.7	+59.7	144.9	23 28.5	+59.8	145.2	22 39.2	+59.8	145.4	16
26 06.4	+59.6	144.5	25 17.4	+59.7	144.8	24 28.3	+59.7	145.1	23 39.0	+59.8	145.3	17
27 06.0	+59.5	144.4	26 17.1	+59.6	144.7	25 28.0	+59.7	145.0	24 38.8	+59.8	145.3	18
28 05.5	+59.6	144.3	27 16.7	+59.7	144.6	26 27.7	+59.8	144.9	25 38.6	+59.8	145.2	19
29 05.1	+59.6	144.2	28 16.4	+59.6	144.5	27 27.5	+59.7	144.8	26 38.4	+59.7	145.1	20
30 04.7	+59.6	144.0	29 16.0	+59.7	144.3	28 27.2	+59.7	144.7	27 38.1	+59.8	145.0	21
31 04.3	+59.5	143.9	30 15.7	+59.6	144.2	29 26.9	+59.7	144.6	28 37.9	+59.8	144.9	22
32 03.8	+59.5	143.7	31 15.3	+59.6	144.1	30 26.6	+59.7	144.4	29 37.7	+59.8	144.8	23
33 03.3	+59.6	143.6	32 14.9	+59.7	144.0	31 26.3	+59.7	144.3	30 37.5	+59.7	144.7	24
34 02.9	+59.5	143.4	33 14.6	+59.6	143.8	32 26.0	+59.7	144.2	31 37.2	+59.8	144.6	25
35 02.4	+59.5	143.3	34 14.2	+59.6	143.7	33 25.7	+59.7	144.1	32 37.0	+59.7	144.5	26
36 01.9	+59.5	143.1	35 13.8	+59.6	143.6	34 25.4	+59.7	144.0	33 36.7	+59.8	144.4	27
37 01.4	+59.5	143.0	36 13.4	+59.5	143.4	35 25.1	+59.6	143.8	34 36.5	+59.7	144.2	28
38 00.9	+59.5	142.8	37 12.9	+59.6	143.3	36 24.7	+59.7	143.7	35 36.2	+59.8	144.1	29
39 00.4	+59.4	142.6	38 12.5	+59.6	143.1	37 24.4	+59.6	143.6	36 36.0	+59.7	144.0	30
39 59.8	+59.4	142.5	39 12.1	+59.5	143.0	38 24.0	+59.7	143.4	37 35.7	+59.7	143.9	31
40 59.2	+59.5	142.3	40 11.6	+59.5	142.8	39 23.7	+59.6	143.3	38 35.4	+59.7	143.8	32
41 58.7	+59.4	142.1	41 11.1	+59.6	142.6	40 23.3	+59.6	143.2	39 35.1	+59.7	143.7	33
42 58.1	+59.3	141.9	42 10.7	+59.5	142.5	41 22.9	+59.6	143.0	40 34.8	+59.7	143.5	34
43 57.4	+59.4	141.7	43 10.2	+59.5	142.3	42 22.5	+59.6	142.8	41 34.5	+59.7	143.4	35
44 56.8	+59.3	141.5	44 09.7	+59.4	142.1	43 22.1	+59.6	142.7	42 34.2	+59.7	143.3	36
45 56.1	+59.4	141.3	45 09.1	+59.5	141.9	44 21.7	+59.6	142.5	43 33.9	+59.7	143.1	37
46 55.5	+59.2	141.1	46 08.6	+59.4	141.7	45 21.3	+59.5	142.4	44 33.6	+59.6	143.0	38
47 54.7	+59.3	140.8	47 08.0	+59.4	141.5	46 20.8	+59.5	142.2	45 33.2	+59.7	142.8	39
48 54.0	+59.2	140.6	48 07.4	+59.4	141.3	47 20.3	+59.6	142.0	46 32.9	+59.6	142.7	40
49 53.2	+59.2	140.4	49 06.8	+59.3	141.1	48 19.9	+59.5	141.8	47 32.5	+59.6	142.5	41
50 52.4	+59.2	140.1	50 06.1	+59.4	140.9	49 19.4	+59.4	141.6	48 32.1	+59.6	142.3	42
51 51.6	+59.1	139.8	51 05.5	+59.3	140.6	50 18.8	+59.5	141.4	49 31.7	+59.6	142.1	43
52 50.7	+59.1	139.6	52 04.8	+59.2	140.4	51 18.3	+59.4	141.2	50 31.3	+59.5	142.0	44
53 49.8	+59.0	139.3	53 04.0	+59.3	140.1	52 17.7	+59.4	141.0	51 30.8	+59.6	141.8	45
54 48.8	+59.0	139.0	54 03.3	+59.2	139.9	53 17.1	+59.4	140.7	52 30.4	+59.5	141.6	46
55 47.8	+59.0	138.6	55 02.5	+59.1	139.6	54 16.5	+59.3	140.5	53 29.9	+59.5	141.4	47
56 46.8	+58.9	138.3	56 01.6	+59.1	139.3	55 15.8	+59.3	140.2	54 29.4	+59.5	141.1	48
57 45.7	+58.8	137.9	57 00.7	+59.1	139.0	56 15.1	+59.3	140.0	55 28.9	+59.4	140.9	49
58 44.5	+58.7	137.6	57 59.8	+59.0	138.7	57 14.4	+59.2	139.7	56 28.3	+59.4	140.7	50
59 43.2	+58.7	137.2	58 58.8	+59.0	138.3	58 13.6	+59.2	139.4	57 27.7	+59.4	140.4	51
60 41.9	+58.6	136.8	59 57.8	+58.9	137.9	59 12.8	+59.2	139.1	58 27.1	+59.4	140.1	52
61 40.5	+58.5	136.3	60 56.7	+58.8	137.6	60 12.0	+59.0	138.7	59 26.5	+59.3	139.9	53
62 39.0	+58.4	135.8	61 55.5	+58.7	137.1	61 11.0	+59.1	138.4	60 25.8	+59.2	139.6	54
63 37.4	+58.2	135.3	62 54.2	+58.6	136.7	62 10.1	+58.9	138.0	61 25.0	+59.3	139.2	55
64 35.6	+58.2	134.8	63 52.8	+58.6	136.2	63 09.0	+58.9	137.6	62 24.3	+59.1	138.9	56
65 33.8	+58.0	134.2	64 51.4	+58.4	135.7	64 07.9	+58.8	137.2	63 23.4	+59.1	138.5	57
66 31.8	+57.8	133.6	65 49.8	+58.3	135.2	65 06.7	+58.7	136.7	64 22.5	+59.1	138.1	58
67 29.6	+57.7	132.9	66 48.1	+58.2	134.6	66 05.4	+58.6	136.2	65 21.6	+58.9	137.7	59
68 27.3	+57.4	132.1	67 46.3	+58.0	134.0	67 04.0	+58.5	135.7	66 20.5	+58.9	137.3	60
69 24.7	+57.2	131.3	68 44.3	+57.9	133.3	68 02.5	+58.4	135.1	67 19.4	+58.8	136.8	61
70 21.9	+56.9	130.5	69 42.2	+57.6	132.5	69 00.9	+58.2	134.4	68 18.2	+58.6	136.2	62
71 18.8	+56.6	129.5	70 39.8	+57.3	131.7	69 59.1	+58.0	133.7	69 16.8	+58.6	135.7	63
72 15.4	+56.2	128.4	71 37.1	+57.1	130.8	70 57.1	+57.8	133.0	70 15.4	+58.4	135.0	64
73 11.6	+55.8	127.2	72 34.2	+56.8	129.8	71 54.9	+57.6	132.1	71 13.8	+58.2	134.3	65
74 07.4	+55.2	125.9	73 31.0	+56.3	128.7	72 52.5	+57.2	131.2	72 12.0	+58.0	133.6	66
75 02.6	+54.6	124.5	74 27.3	+55.9	127.4	73 49.7	+57.0	130.2	73 10.0	+57.8	132.7	67
75 57.2	+53.8	122.8	75 23.2	+55.4	126.0	74 46.7	+56.5	129.0	74 07.8	+57.5	131.7	68
76 51.0	+52.8	120.9	76 18.6	+54.6	124.4	75 43.2	+56.1	127.7	75 05.3	+57.2	130.7	69
77 43.8	+51.8	118.8	77 13.2	+53.8	122.6	76 39.3	+55.4	126.2	76 02.5	+56.7	129.4	70
78 35.6	+50.2	116.3	78 07.0	+52.7	120.6	77 34.7	+54.7	124.5	76 59.2	+56.2	128.1	71
79 25.8	*+48.5*	•113.4	78 59.7	+51.4	118.2	78 29.4	+53.7	122.5	77 55.4	+55.6	126.4	72
80 14.3	*+46.2*	•110.1	79 51.1	+49.7	115.3	79 23.1	+52.6	120.2	78 51.0	+54.7	124.6	73
81 00.5	*+43.2*	•106.2	80 40.8	*+47.5*	•112.0	80 15.7	+51.0	117.4	79 45.7	+53.7	122.4	74
81 43.7	*+39.4*	•101.5	81 28.3	*+44.7*	•108.1	81 06.7	*+48.9*	•114.2	80 39.4	+52.3	119.7	75
82 23.1	*+34.6*	•96.1	82 13.0	*+40.9*	•103.4	81 55.6	*+46.2*	•110.2	81 31.7	*+50.4*	•116.6	76
82 57.7	*+28.5*	•89.7	82 53.9	*+35.9*	•97.7	82 41.8	*+42.5*	•105.5	82 22.1	*+47.9*	•112.7	77
83 26.2	*+21.0*	•82.2	83 29.8	*+29.6*	•90.9	83 24.3	*+37.5*	•99.6	83 10.0	*+44.2*	•107.9	78
83 47.2	*+12.2*	•73.8	83 59.4	*+21.4*	•82.9	84 01.8	*+30.7*	•92.5	83 54.2	*+39.3*	•101.9	79
83 59.4	*+2.4*	•64.6	84 20.8	*+11.7*	•73.7	84 32.5	*+21.9*	•83.8	84 33.5	*+32.1*	•94.3	80
84 01.8	*–7.6*	•55.0	84 32.5	*+1.0*	•63.6	84 54.4	*+11.2*	•73.7	85 05.6	*+22.6*	•84.9	81
83 54.2	*–16.8*	•45.5	84 33.5	*–9.9*	•53.1	85 05.6	*–0.8*	•62.4	85 28.2	*+10.4*	•73.7	82
83 37.4	*–25.1*	•36.7	84 23.6	*–19.8*	•42.8	85 04.8	*–12.7*	•50.7	85 38.6	*–3.0*	•60.9	83
83 12.3	*–31.8*	•28.8	84 03.8	*–28.3*	•33.4	84 52.1	*–23.2*	•39.5	85 35.6	*–16.1*	•47.8	84
82 40.5	*–37.3*	•21.9	83 35.5	*–34.9*	•25.2	84 28.9	*–31.8*	•29.6	85 19.5	*–27.2*	•35.6	85
82 03.2	*–41.5*	•16.0	83 00.6	*–40.1*	•18.2	83 57.1	*–38.2*	•21.1	84 52.3	*–35.5*	•25.2	86
81 21.7	*–44.8*	•10.9	82 20.5	*–44.1*	•12.4	83 18.9	*–43.1*	•14.2	84 16.8	*–41.7*	•16.6	87
80 36.9	*–47.4*	•6.7	81 36.4	*–47.0*	•7.5	82 35.8	*–46.6*	•8.5	83 35.1	*–46.0*	•9.8	88
79 49.5	–49.5	3.1	80 49.4	*–49.4*	•3.4	81 49.2	*–49.2*	•3.8	82 49.1	*–49.1*	•4.4	89
79 00.0	–51.1	0.0	80 00.0	–51.1	0.0	81 00.0	–51.2	0.0	82 00.0	–51.3	0.0	90
79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 33°, 327°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	12 32.2	−59.4	146.1	11 42.4	−59.5	146.2	10 52.5	−59.6	146.3	10 02.5	−59.6	146.4	9 12.5	−59.7	146.5	8 22.4	−59.7	146.6	7 32.3	−59.8	146.7	6 42.2	−59.9	146.7	0
1	11 32.8	−59.4	146.2	10 42.9	−59.4	146.3	9 52.9	−59.5	146.4	9 02.9	−59.6	146.5	8 12.8	−59.6	146.6	7 22.7	−59.7	146.7	6 32.5	−59.7	146.8	5 42.3	−59.8	146.8	1
2	10 33.4	−59.3	146.4	9 43.5	−59.5	146.5	8 53.4	−59.5	146.6	8 03.3	−59.6	146.7	7 13.2	−59.7	146.7	6 23.0	−59.7	146.8	5 32.8	−59.8	146.8	4 42.5	−59.8	146.9	2
3	9 34.1	−59.4	146.5	8 44.0	−59.5	146.6	7 53.9	−59.6	146.7	7 03.7	−59.6	146.8	6 13.5	−59.7	146.8	5 23.3	−59.8	146.9	4 33.0	−59.8	146.9	3 42.7	−59.8	147.0	3
4	8 34.7	−59.4	146.7	7 44.5	−59.4	146.7	6 54.3	−59.5	146.8	6 04.1	−59.6	146.9	5 13.8	−59.6	146.9	4 23.5	−59.7	147.0	3 33.2	−59.8	147.0	2 42.9	−59.9	147.0	4
5	7 35.3	−59.4	146.8	6 45.1	−59.5	146.9	5 54.8	−59.6	146.9	5 04.5	−59.6	147.0	4 14.2	−59.7	147.0	3 23.8	−59.7	147.1	2 33.4	−59.8	147.1	1 43.0	−59.8	147.1	5
6	6 35.9	−59.4	147.0	5 45.6	−59.5	147.0	4 55.2	−59.5	147.1	4 04.9	−59.6	147.1	3 14.5	−59.7	147.1	2 24.1	−59.8	147.2	1 33.6	−59.7	147.2	0 43.2	−59.8	147.2	6
7	5 36.5	−59.4	147.1	4 46.1	−59.5	147.1	3 55.7	−59.5	147.2	3 05.3	−59.7	147.2	2 14.8	−59.7	147.2	1 24.3	−59.7	147.3	0 33.9	−59.8	147.3	0 16.6	+59.8	32.7	7
8	4 37.1	−59.4	147.2	3 46.6	−59.4	147.3	2 56.2	−59.6	147.3	2 05.6	−59.6	147.3	1 15.1	−59.6	147.4	0 24.6	−59.7	147.4	0 25.9	+59.8	32.6	1 16.4	+59.9	32.6	8
9	3 37.7	−59.4	147.4	2 47.2	−59.5	147.4	1 56.6	−59.5	147.4	1 06.0	−59.6	147.5	0 15.5	−59.7	147.5	0 35.1	+59.8	32.5	1 25.7	+59.8	32.6	2 16.3	+59.8	32.6	9
10	2 38.3	−59.4	147.5	1 47.7	−59.5	147.5	0 57.1	−59.6	147.6	0 06.4	−59.6	147.6	0 44.2	+59.7	32.4	1 34.9	+59.7	32.5	2 25.5	+59.8	32.5	3 16.1	+59.8	32.5	10
11	1 38.9	−59.4	147.7	0 48.2	−59.5	147.7	0 02.5	+59.5	32.3	0 53.2	+59.6	32.3	1 43.9	+59.7	32.3	2 34.6	+59.7	32.4	3 25.3	+59.7	32.4	4 15.9	+59.8	32.4	11
12	0 39.5	−59.4	147.8	0 11.3	+59.4	32.2	1 02.0	+59.6	32.2	1 52.8	+59.6	32.2	2 43.6	+59.6	32.2	3 34.3	+59.7	32.3	4 25.0	+59.8	32.3	5 15.7	+59.9	32.3	12
13	0 19.9	+59.4	32.1	1 10.7	+59.5	32.1	2 01.6	+59.5	32.1	2 52.4	+59.6	32.1	3 43.2	+59.7	32.1	4 34.0	+59.8	32.2	5 24.8	+59.8	32.2	6 15.6	+59.8	32.3	13
14	1 19.3	+59.4	31.9	2 10.2	+59.5	31.9	3 01.1	+59.6	32.0	3 52.0	+59.6	32.0	4 42.9	+59.7	32.0	5 33.8	+59.7	32.1	6 24.6	+59.8	32.1	7 15.4	+59.8	32.2	14
15	2 18.7	+59.4	31.8	3 09.7	+59.5	31.8	4 00.7	+59.5	31.8	4 51.6	+59.7	31.9	5 42.6	+59.7	31.9	6 33.5	+59.7	32.0	7 24.4	+59.8	32.0	8 15.2	+59.8	32.1	15
16	3 18.1	+59.4	31.6	4 09.2	+59.4	31.7	5 00.2	+59.6	31.7	5 51.3	+59.6	31.8	6 42.3	+59.6	31.8	7 33.2	+59.8	31.9	8 24.2	+59.7	32.0	9 15.0	+59.9	32.0	16
17	4 17.5	+59.4	31.5	5 08.6	+59.5	31.5	5 59.8	+59.5	31.6	6 50.9	+59.6	31.6	7 41.9	+59.7	31.7	8 33.0	+59.7	31.8	9 23.9	+59.8	31.9	10 14.9	+59.8	32.0	17
18	5 16.9	+59.4	31.3	6 08.1	+59.5	31.4	6 59.3	+59.6	31.5	7 50.5	+59.6	31.5	8 41.6	+59.7	31.6	9 32.7	+59.7	31.7	10 23.7	+59.8	31.8	11 14.7	+59.8	31.9	18
19	6 16.3	+59.4	31.2	7 07.6	+59.5	31.3	7 58.9	+59.5	31.3	8 50.1	+59.6	31.4	9 41.3	+59.6	31.5	10 32.4	+59.7	31.6	11 23.5	+59.8	31.7	12 14.5	+59.8	31.8	19
20	7 15.7	+59.4	31.1	8 07.1	+59.4	31.1	8 58.4	+59.5	31.2	9 49.7	+59.6	31.3	10 40.9	+59.7	31.4	11 32.1	+59.7	31.5	12 23.3	+59.7	31.6	13 14.3	+59.8	31.7	20
21	8 15.1	+59.3	30.9	9 06.5	+59.5	31.0	9 57.9	+59.6	31.1	10 49.3	+59.6	31.2	11 40.6	+59.7	31.3	12 31.8	+59.8	31.4	13 23.0	+59.8	31.5	14 14.1	+59.9	31.6	21
22	9 14.4	+59.4	30.8	10 06.0	+59.4	30.9	10 57.5	+59.5	31.0	11 48.9	+59.6	31.1	12 40.3	+59.6	31.2	13 31.6	+59.7	31.3	14 22.8	+59.8	31.4	15 14.0	+59.8	31.6	22
23	10 13.8	+59.4	30.6	11 05.4	+59.5	30.7	11 57.0	+59.5	30.8	12 48.5	+59.6	30.9	13 39.9	+59.7	31.1	14 31.3	+59.7	31.2	15 22.6	+59.7	31.3	16 13.8	+59.8	31.5	23
24	11 13.2	+59.4	30.5	12 04.9	+59.4	30.6	12 56.5	+59.5	30.7	13 48.1	+59.6	30.8	14 39.6	+59.6	31.0	15 31.0	+59.7	31.1	16 22.3	+59.8	31.2	17 13.6	+59.8	31.4	24
25	12 12.6	+59.4	30.3	13 04.3	+59.5	30.4	13 56.0	+59.6	30.6	14 47.7	+59.5	30.7	15 39.2	+59.7	30.8	16 30.7	+59.7	31.0	17 22.1	+59.7	31.1	18 13.4	+59.8	31.3	25
26	13 12.0	+59.3	30.2	14 03.8	+59.4	30.3	14 55.6	+59.5	30.4	15 47.2	+59.6	30.6	16 38.9	+59.6	30.7	17 30.4	+59.7	30.9	18 21.8	+59.8	31.0	19 13.2	+59.8	31.2	26
27	14 11.3	+59.4	30.0	15 03.2	+59.5	30.2	15 55.1	+59.5	30.3	16 46.8	+59.6	30.5	17 38.5	+59.6	30.6	18 30.1	+59.7	30.8	19 21.6	+59.8	31.0	20 13.0	+59.8	31.1	27
28	15 10.7	+59.3	29.9	16 02.7	+59.4	30.0	16 54.6	+59.5	30.2	17 46.4	+59.6	30.3	18 38.1	+59.7	30.5	19 29.8	+59.7	30.7	20 21.4	+59.7	30.9	21 12.8	+59.8	31.1	28
29	16 10.0	+59.4	29.7	17 02.1	+59.4	29.9	17 54.1	+59.5	30.0	18 46.0	+59.5	30.2	19 37.8	+59.6	30.4	20 29.5	+59.7	30.6	21 21.1	+59.8	30.8	22 12.6	+59.8	31.0	29
30	17 09.4	+59.3	29.6	18 01.5	+59.4	29.7	18 53.6	+59.5	29.9	19 45.5	+59.6	30.1	20 37.4	+59.6	30.3	21 29.2	+59.7	30.5	22 20.9	+59.7	30.7	23 12.4	+59.8	30.9	30
31	18 08.7	+59.4	29.4	19 00.9	+59.4	29.6	19 53.1	+59.5	29.8	20 45.1	+59.6	29.9	21 37.0	+59.7	30.1	22 28.9	+59.7	30.3	23 20.6	+59.7	30.6	24 12.2	+59.8	30.8	31
32	19 08.1	+59.3	29.3	20 00.3	+59.5	29.4	20 52.6	+59.4	29.6	21 44.7	+59.5	29.8	22 36.7	+59.6	30.0	23 28.6	+59.6	30.2	24 20.3	+59.8	30.5	25 12.0	+59.8	30.7	32
33	20 07.4	+59.3	29.1	20 59.8	+59.3	29.3	21 52.0	+59.5	29.5	22 44.2	+59.6	29.7	23 36.3	+59.6	29.9	24 28.2	+59.7	30.1	25 20.1	+59.7	30.4	26 11.8	+59.8	30.6	33
34	21 06.7	+59.3	28.9	21 59.1	+59.4	29.1	22 51.5	+59.5	29.3	23 43.8	+59.5	29.6	24 35.9	+59.6	29.8	25 27.9	+59.7	30.0	26 19.8	+59.7	30.3	27 11.6	+59.7	30.5	34
35	22 06.0	+59.3	28.8	22 58.5	+59.4	29.0	23 51.0	+59.4	29.2	24 43.3	+59.5	29.4	25 35.5	+59.6	29.6	26 27.6	+59.6	29.9	27 19.5	+59.7	30.1	28 11.3	+59.8	30.4	35
36	23 05.3	+59.3	28.6	23 57.9	+59.4	28.8	24 50.4	+59.5	29.0	25 42.8	+59.5	29.3	26 35.1	+59.6	29.5	27 27.2	+59.7	29.8	28 19.2	+59.8	30.0	29 11.1	+59.8	30.3	36
37	24 04.6	+59.3	28.5	24 57.3	+59.3	28.7	25 49.9	+59.4	28.9	26 42.3	+59.5	29.1	27 34.7	+59.6	29.4	28 26.9	+59.6	29.7	29 19.0	+59.7	29.9	30 10.9	+59.8	30.2	37
38	25 03.9	+59.2	28.3	25 56.6	+59.4	28.5	26 49.3	+59.4	28.7	27 41.8	+59.6	29.0	28 34.3	+59.5	29.3	29 26.5	+59.7	29.5	30 18.7	+59.7	29.8	31 10.7	+59.7	30.1	38
39	26 03.1	+59.3	28.1	26 56.0	+59.3	28.3	27 48.7	+59.4	28.6	28 41.4	+59.4	28.8	29 33.8	+59.6	29.1	30 26.2	+59.6	29.4	31 18.4	+59.7	29.7	32 10.4	+59.8	30.0	39
40	27 02.4	+59.2	27.9	27 55.3	+59.3	28.2	28 48.1	+59.5	28.4	29 40.8	+59.5	28.7	30 33.4	+59.6	29.0	31 25.8	+59.6	29.3	32 18.1	+59.7	29.6	33 10.2	+59.7	29.9	40
41	28 01.6	+59.2	27.8	28 54.6	+59.4	28.0	29 47.6	+59.3	28.3	30 40.3	+59.5	28.5	31 33.0	+59.5	28.8	32 25.4	+59.7	29.1	33 17.8	+59.7	29.5	34 09.9	+59.8	29.8	41
42	29 00.8	+59.2	27.6	29 54.0	+59.2	27.8	30 46.9	+59.4	28.1	31 39.8	+59.5	28.4	32 32.5	+59.5	28.7	33 25.1	+59.6	29.0	34 17.5	+59.6	29.3	35 09.7	+59.7	29.7	42
43	30 00.0	+59.2	27.4	30 53.2	+59.3	27.7	31 46.3	+59.4	27.9	32 39.3	+59.4	28.2	33 32.0	+59.6	28.5	34 24.7	+59.6	28.9	35 17.1	+59.7	29.2	36 09.4	+59.7	29.6	43
44	30 59.2	+59.2	27.2	31 52.5	+59.3	27.5	32 45.7	+59.3	27.8	33 38.7	+59.4	28.1	34 31.6	+59.5	28.4	35 24.3	+59.6	28.7	36 16.8	+59.7	29.1	37 09.1	+59.8	29.4	44
45	31 58.4	+59.2	27.0	32 51.8	+59.2	27.3	33 45.0	+59.4	27.6	34 38.1	+59.5	27.9	35 31.1	+59.5	28.2	36 23.9	+59.5	28.6	37 16.5	+59.6	28.9	38 08.9	+59.7	29.3	45
46	32 57.6	+59.1	26.8	33 51.0	+59.3	27.1	34 44.4	+59.3	27.4	35 37.6	+59.4	27.7	36 30.6	+59.5	28.1	37 23.4	+59.6	28.4	38 16.1	+59.6	28.8	39 08.6	+59.7	29.2	46
47	33 56.7	+59.1	26.6	34 50.3	+59.2	26.9	35 43.7	+59.3	27.2	36 37.0	+59.4	27.6	37 30.1	+59.5	27.9	38 23.0	+59.6	28.3	39 15.7	+59.7	28.7	40 08.3	+59.7	29.1	47
48	34 55.8	+59.1	26.4	35 49.5	+59.2	26.7	36 43.0	+59.3	27.0	37 36.4	+59.3	27.4	38 29.6	+59.4	27.8	39 22.6	+59.5	28.1	40 15.4	+59.6	28.5	41 08.0	+59.7	28.9	48
49	35 54.9	+59.1	26.2	36 48.7	+59.2	26.5	37 42.3	+59.3	26.8	38 35.7	+59.4	27.2	39 29.0	+59.5	27.6	40 22.1	+59.5	28.0	41 15.0	+59.6	28.4	42 07.7	+59.7	28.8	49
50	36 54.0	+59.0	26.0	37 47.9	+59.1	26.3	38 41.6	+59.2	26.6	39 35.1	+59.3	27.0	40 28.5	+59.4	27.4	41 21.6	+59.5	27.8	42 14.6	+59.6	28.2	43 07.4	+59.6	28.7	50
51	37 53.0	+59.1	25.7	38 47.0	+59.1	26.1	39 40.8	+59.2	26.4	40 34.4	+59.4	26.8	41 27.9	+59.4	27.2	42 21.1	+59.5	27.6	43 14.2	+59.6	28.1	44 07.0	+59.7	28.5	51
52	38 52.1	+58.9	25.5	39 46.1	+59.1	25.9	40 40.0	+59.2	26.2	41 33.8	+59.3	26.6	42 27.3	+59.4	27.0	43 20.6	+59.5	27.5	44 13.8	+59.5	27.9	45 06.7	+59.6	28.4	52
53	39 51.0	+59.0	25.3	40 45.2	+59.1	25.6	41 39.2	+59.2	26.0	42 33.1	+59.2	26.4	43 26.7	+59.4	26.8	44 20.1	+59.5	27.3	45 13.3	+59.6	27.7	46 06.3	+59.7	28.2	53
54	40 50.0	+58.9	25.0	41 44.3	+59.0	25.4	42 38.4	+59.2	25.8	43 32.3	+59.3	26.2	44 26.1	+59.3	26.6	45 19.6	+59.4	27.1	46 12.9	+59.5	27.6	47 06.0	+59.6	28.1	54
55	41 48.9	+58.9	24.8	42 43.3	+59.0	25.2	43 37.6	+59.1	25.6	44 31.6	+59.2	26.0	45 25.4	+59.3	26.4	46 19.0	+59.5	26.9	47 12.4	+59.6	27.4	48 05.6	+59.6	27.9	55
56	42 47.8	+58.9	24.5	43 42.3	+59.0	24.9	44 36.7	+59.1	25.3	45 30.8	+59.2	25.8	46 24.7	+59.3	26.2	47 18.5	+59.4	26.7	48 12.0	+59.4	27.2	49 05.2	+59.6	27.7	56
57	43 46.7	+58.8	24.3	44 41.3	+59.0	24.7	45 35.8	+59.0	25.1	46 30.0	+59.2	25.5	47 24.0	+59.3	26.0	48 17.9	+59.3	26.5	49 11.4	+59.5	27.0	50 04.8	+59.6	27.5	57
58	44 45.5	+58.8	24.0	45 40.3	+58.9	24.4	46 34.8	+59.0	24.8	47 29.2	+59.1	25.3	48 23.3	+59.3	25.8	49 17.2	+59.4	26.3	50 10.9	+59.5	26.8	51 04.4	+59.5	27.3	58
59	45 44.3	+58.8	23.7	46 39.2	+58.8	24.1	47 33.8	+59.0	24.6	48 28.3	+59.1	25.0	49 22.6	+59.2	25.5	50 16.6	+59.3	26.0	51 10.4	+59.4	26.6	52 03.9	+59.5	27.1	59
60	46 43.1	+58.7	23.4	47 38.0	+58.9	23.8	48 32.8	+59.0	24.3	49 27.4	+59.1	24.8	50 21.8	+59.2	25.3	51 15.9	+59.3	25.8	52 09.8	+59.4	26.4	53 03.4	+59.5	26.9	60
61	47 41.8	+58.6	23.1	48 36.9	+58.7	23.5	49 31.8	+58.9	24.0	50 26.5	+59.0	24.5	51 21.0	+59.1	25.0	52 15.2	+59.3	25.6	53 09.2	+59.4	26.1	54 02.9	+59.5	26.7	61
62	48 40.4	+58.6	22.8	49 35.6	+58.7	23.2	50 30.7	+58.8	23.7	51 25.5	+59.0	24.2	52 20.1	+59.1	24.7	53 14.5	+59.2	25.3	54 08.6	+59.3	25.9	55 02.4	+59.5	26.5	62
63	49 39.0	+58.5	22.5	50 34.3	+58.7	22.9	51 29.5	+58.8	23.4	52 24.5	+58.9	23.9	53 19.2	+59.1	24.5	54 13.7	+59.2	25.0	55 07.9	+59.4	25.6	56 01.9	+59.4	26.3	63
64	50 37.5	+58.5	22.1	51 33.0	+58.6	22.6	52 28.3	+58.8	23.1	53 23.4	+58.9	23.6	54 18.3	+59.0	24.2	55 12.9	+59.1	24.7	56 07.3	+59.2	25.4	57 01.3	+59.4	26.0	64
65	51 36.0	+58.4	21.8	52 31.6	+58.6	22.2	53 27.1	+58.6	22.7	54 22.3	+58.8	23.3	55 17.3	+59.0	23.8	56 12.0	+59.1	24.4	57 06.5	+59.3	25.1	58 00.7	+59.4	25.8	65
66	52 34.4	+58.3	21.4	53 30.2	+58.4	21.9	54 25.7	+58.7	22.4	55 21.1	+58.8	22.9	56 16.3	+58.9	23.5	57 11.1	+59.1	24.1	58 05.8	+59.2	24.8	59 00.1	+59.3	25.5	66
67	53 32.7	+58.3	21.0	54 28.6	+58.4	21.5	55 24.4	+58.5	22.0	56 19.9	+58.7	22.6	57 15.2	+58.8	23.2	58 10.2	+59.0	23.8	59 05.0	+59.1	24.5	59 59.4	+59.3	25.2	67
68	54 31.0	+58.1	20.6	55 27.0	+58.4	21.1	56 22.9	+58.5	21.6	57 18.6	+58.6	22.2	58 14.0	+58.8	22.8	59 09.2	+58.9	23.4	60 04.1	+59.1	24.1	60 58.7	+59.2	24.9	68
69	55 29.1	+58.1	20.1	56 25.4	+58.2	20.7	57 21.4	+58.4	21.2	58 17.2	+58.6	21.8	59 12.8	+58.7	22.4	60 08.1	+58.9	23.1	61 03.2	+59.0	23.8	61 57.9	+59.2	24.5	69
70	56 27.2	+57.9	19.7	57 23.6	+58.1	20.2	58 19.8	+58.3	20.8	59 15.8	+58.4	21.4	60 11.5	+58.7	22.0	61 07.0	+58.8	22.7	62 02.2	+59.0	23.4	62 57.1	+59.2	24.2	70
71	57 25.1	+57.9	19.2	58 21.7	+58.0	19.8	59 18.1	+58.2	20.3	60 14.2	+58.4	20.9	61 10.2	+58.5	21.6	62 05.8	+58.7	22.3	63 01.2	+58.9	23.0	63 56.3	+59.0	23.8	71
72	58 23.0	+57.7	18.7	59 19.7	+57.9	19.3	60 16.3	+58.1	19.8	61 12.6	+58.3	20.5	62 08.7	+58.4	21.1	63 04.5	+58.7	21.8	64 00.1	+58.8	22.6	64 55.3	+59.0	23.4	72
73	59 20.7	+57.6	18.2	60 17.6	+57.8	18.7	61 14.4	+57.9	19.3	62 10.9	+58.1	20.0	63 07.1	+58.4	20.6	64 03.2	+58.5	21.3	64 58.9	+58.7	22.1	65 54.3	+58.9	23.0	73
74	60 18.3	+57.5	17.6	61 15.4	+57.6	18.2	62 12.3	+57.8	18.8	63 09.0	+58.0	19.4	64 05.5	+58.2	20.1	65 01.7	+58.4	20.8	65 57.6	+58.6	21.6	66 53.2	+58.9	22.5	74
75	61 15.8	+57.2	17.0	62 13.0	+57.5	17.6	63 10.1	+57.7	18.2	64 07.0	+57.9	18.8	65 03.7	+58.1	19.5	66 00.1	+58.3	20.3	66 56.2	+58.5	21.1	67 52.1	+58.7	22.0	75
76	62 13.0	+57.1	16.4	63 10.5	+57.3	17.0	64 07.8	+57.5	17.6	65 04.9	+57.7	18.2	66 01.8	+57.9	18.9	66 58.4	+58.1	19.7	67 54.7	+58.4	20.5	68 50.8	+58.6	21.4	76
77	63 10.1	+56.9	15.7	64 07.8	+57.1	16.3	65 05.3	+57.3	16.9	66 02.6	+57.5	17.6	66 59.7	+57.7	18.3	67 56.5	+58.0	19.0	68 53.1	+58.2	19.9	69 49.4	+58.4	20.8	77
78	64 07.0	+56.7	15.0	65 04.9	+56.9	15.6	66 02.6	+57.1	16.2	67 00.1	+57.3	16.8	67 57.4	+57.6	17.6	68 54.5	+57.8	18.3	69 51.3	+58.1	19.2	70 47.8	+58.3	20.1	78
79	65 03.7	+56.4	14.3	66 01.8	+56.6	14.8	66 59.7	+56.8	15.4	67 57.4	+57.1	16.1	68 55.0	+57.3	16.8	69 52.3	+57.6	17.6	70 49.4	+57.8	18.4	71 46.1	+58.2	19.4	79
80	66 00.1	+56.1	13.4	66 58.4	+56.3	14.0	67 56.5	+56.6	14.6	68 54.5	+56.8	15.2	69 52.3	+57.1	16.0	70 49.9	+57.3	16.7	71 47.2	+57.6	17.6	72 44.3	+57.8	18.6	80
81	66 56.2	+55.9	12.6	67 54.7	+56.1	13.1	68 53.1	+56.3	13.7	69 51.3	+56.5	14.3	70 49.4	+56.7	15.0	71 47.2	+57.1	15.8	72 44.8	+57.3	16.7	73 42.1	+57.7	17.7	81
82	67 52.1	+55.4	11.6	68 50.8	+55.6	12.1	69 49.4	+55.9	12.7	70 47.8	+56.2	13.3	71 46.1	+56.4	14.0	72 44.3	+56.6	14.8	73 42.1	+57.0	15.7	74 39.8	+57.3	16.7	82
83	68 47.5	+55.1	10.6	69 46.4	+55.3	11.1	70 45.3	+55.5	11.6	71 44.0	+55.7	12.2	72 42.5	+56.0	12.9	73 40.9	+56.3	13.7	74 39.1	+56.6	14.5	75 37.1	+56.9	15.5	83
84	69 42.6	+54.5	9.4	70 41.7	+54.8	9.9	71 40.8	+55.0	10.4	72 39.7	+55.3	11.0	73 38.5	+55.5	11.7	74 37.2	+55.8	12.4	75 35.7	+56.1	13.2	76 34.0	+56.5	14.2	84
85	70 37.1	+54.1	8.2	71 36.5	+54.2	8.7	72 35.8	+54.4	9.1	73 35.0	+54.6	9.7	74 34.0	+55.0	10.3	75 33.0	+55.2	11.0	76 31.8	+55.6	11.8	77 30.5	+55.9	12.7	85
86	71 31.2	+53.4	6.9	72 30.7	+53.6	7.3	73 30.2	+53.8	7.7	74 29.6	+54.0	8.2	75 29.0	+54.2	8.7	76 28.2	+54.5	9.3	77 27.4	+54.8	10.1	78 26.4	+55.1	10.9	86
87	72 24.6	+52.7	5.4	73 24.3	+52.8	5.7	74 24.0	+53.0	6.1	75 23.6	+53.2	6.5	76 23.2	+53.4	7.0	77 22.7	+53.6	7.5	78 22.2	+53.9	8.1	79 21.5	+54.2	8.9	87
88	73 17.3	+51.8	3.8	74 17.1	+52.0	4.0	75 17.0	+52.0	4.3	76 16.8	+52.2	4.6	77 16.6	+52.3	5.0	78 16.3	+52.6	5.4	79 16.1	+52.7	5.9	80 15.7	+53.0	6.5	88
89	74 09.1	+50.9	2.0	75 09.1	+50.9	2.1	76 09.0	+51.0	2.3	77 09.0	+51.0	2.4	78 08.9	+51.1	2.7	79 08.9	+51.1	2.9	80 08.8	+51.2	3.2	81 08.7	+51.3	3.5	89
90	75 00.0	+49.7	0.0	76 00.0	+49.7	0.0	77 00.0	+49.6	0.0	78 00.0	+49.5	0.0	79 00.0	+49.5	0.0	80 00.0	*+49.4* •	0.0	81 00.0	*+49.2* •	0.0	82 00.0	*+49.1* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 147°, 213°

34°, 326° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 23.4	+59.4	145.1	11 34.2	+59.4	145.2	10 44.9	+59.5	145.3	9 55.5	+59.6	145.4	9 06.1	+59.7	145.5	8 16.6	+59.7	145.6	7 27.1	+59.8	145.7	6 37.5	+59.8	145.7	0
1	13 22.8	+59.3	144.9	12 33.6	+59.4	145.1	11 44.4	+59.5	145.2	10 55.1	+59.6	145.3	10 05.8	+59.6	145.4	9 16.3	+59.7	145.5	8 26.9	+59.7	145.6	7 37.3	+59.9	145.7	1
2	14 22.1	+59.3	144.8	13 33.0	+59.4	144.9	12 43.9	+59.5	145.0	11 54.7	+59.6	145.2	11 05.4	+59.6	145.3	10 16.0	+59.8	145.4	9 26.6	+59.8	145.5	8 37.2	+59.8	145.6	2
3	15 21.4	+59.3	144.6	14 32.4	+59.5	144.8	13 43.4	+59.5	144.9	12 54.3	+59.5	145.0	12 05.0	+59.7	145.2	11 15.8	+59.7	145.3	10 26.4	+59.8	145.4	9 37.0	+59.8	145.5	3
4	16 20.7	+59.3	144.5	15 31.9	+59.4	144.6	14 42.9	+59.5	144.8	13 53.8	+59.6	144.9	13 04.7	+59.6	145.1	12 15.5	+59.7	145.2	11 26.2	+59.7	145.3	10 36.8	+59.8	145.4	4
5	17 20.0	+59.3	144.3	16 31.3	+59.4	144.5	15 42.4	+59.5	144.6	14 53.4	+59.6	144.8	14 04.3	+59.7	144.9	13 15.2	+59.7	145.1	12 25.9	+59.8	145.2	11 36.6	+59.8	145.3	5
6	18 19.3	+59.3	144.1	17 30.7	+59.3	144.3	16 41.9	+59.4	144.5	15 53.0	+59.5	144.7	15 04.0	+59.6	144.8	14 14.9	+59.7	145.0	13 25.7	+59.7	145.1	12 36.4	+59.8	145.3	6
7	19 18.6	+59.3	144.0	18 30.0	+59.4	144.2	17 41.3	+59.5	144.4	16 52.5	+59.6	144.5	16 03.6	+59.6	144.7	15 14.6	+59.6	144.9	14 25.4	+59.8	145.0	13 36.2	+59.8	145.2	7
8	20 17.9	+59.3	143.8	19 29.4	+59.4	144.0	18 40.8	+59.5	144.2	17 52.1	+59.5	144.4	17 03.2	+59.6	144.6	16 14.2	+59.7	144.8	15 25.2	+59.7	144.9	14 36.0	+59.8	145.1	8
9	21 17.2	+59.3	143.6	20 28.8	+59.4	143.9	19 40.3	+59.4	144.1	18 51.6	+59.6	144.3	18 02.8	+59.7	144.5	17 13.9	+59.7	144.7	16 24.9	+59.8	144.8	15 35.8	+59.8	145.0	9
10	22 16.5	+59.2	143.5	21 28.2	+59.3	143.7	20 39.7	+59.5	143.9	19 51.2	+59.5	144.2	19 02.5	+59.6	144.4	18 13.6	+59.7	144.6	17 24.7	+59.7	144.8	16 35.6	+59.8	144.9	10
11	23 15.7	+59.3	143.3	22 27.5	+59.4	143.6	21 39.2	+59.4	143.8	20 50.7	+59.5	144.0	20 02.1	+59.6	144.2	19 13.3	+59.7	144.5	18 24.4	+59.8	144.7	17 35.4	+59.8	144.8	11
12	24 15.0	+59.2	143.1	23 26.9	+59.3	143.4	22 38.6	+59.5	143.7	21 50.2	+59.5	143.9	21 01.7	+59.6	144.1	20 13.0	+59.7	144.3	19 24.2	+59.7	144.6	18 35.2	+59.8	144.8	12
13	25 14.2	+59.2	143.0	24 26.2	+59.3	143.2	23 38.1	+59.4	143.5	22 49.7	+59.6	143.8	22 01.3	+59.6	144.0	21 12.7	+59.6	144.2	20 23.9	+59.7	144.5	19 35.0	+59.8	144.7	13
14	26 13.4	+59.2	142.8	25 25.5	+59.4	143.1	24 37.5	+59.4	143.4	23 49.3	+59.5	143.6	23 00.9	+59.6	143.9	22 12.3	+59.7	144.1	21 23.6	+59.8	144.4	20 34.8	+59.8	144.6	14
15	27 12.6	+59.2	142.6	26 24.9	+59.3	142.9	25 36.9	+59.4	143.2	24 48.8	+59.5	143.5	24 00.5	+59.6	143.8	23 12.0	+59.7	144.0	22 23.4	+59.7	144.3	21 34.6	+59.8	144.5	15
16	28 11.8	+59.2	142.4	27 24.2	+59.3	142.7	26 36.3	+59.4	143.0	25 48.3	+59.5	143.3	25 00.1	+59.5	143.6	24 11.7	+59.6	143.9	23 23.1	+59.7	144.2	22 34.4	+59.8	144.4	16
17	29 11.0	+59.2	142.2	28 23.5	+59.2	142.6	27 35.7	+59.4	142.9	26 47.8	+59.5	143.2	25 59.6	+59.6	143.5	25 11.3	+59.7	143.8	24 22.8	+59.8	144.0	23 34.2	+59.8	144.3	17
18	30 10.2	+59.1	142.0	29 22.7	+59.3	142.4	28 35.1	+59.4	142.7	27 47.3	+59.4	143.0	26 59.2	+59.6	143.4	26 11.0	+59.6	143.7	25 22.6	+59.7	143.9	24 34.0	+59.7	144.2	18
19	31 09.3	+59.1	141.8	30 22.0	+59.3	142.2	29 34.5	+59.3	142.6	28 46.7	+59.5	142.9	27 58.8	+59.5	143.2	27 10.6	+59.7	143.5	26 22.3	+59.7	143.8	25 33.7	+59.8	144.1	19
20	32 08.4	+59.1	141.6	31 21.3	+59.2	142.0	30 33.8	+59.4	142.4	29 46.2	+59.4	142.7	28 58.3	+59.6	143.1	28 10.3	+59.6	143.4	27 22.0	+59.7	143.7	26 33.5	+59.8	144.0	20
21	33 07.5	+59.1	141.4	32 20.5	+59.2	141.8	31 33.2	+59.3	142.2	30 45.6	+59.5	142.6	29 57.9	+59.5	142.9	29 09.9	+59.6	143.3	28 21.7	+59.7	143.6	27 33.3	+59.8	143.9	21
22	34 06.6	+59.1	141.2	33 19.7	+59.2	141.6	32 32.5	+59.3	142.0	31 45.1	+59.4	142.4	30 57.4	+59.5	142.8	30 09.5	+59.6	143.2	29 21.4	+59.7	143.5	28 33.1	+59.7	143.8	22
23	35 05.7	+59.0	141.0	34 18.9	+59.2	141.4	33 31.8	+59.3	141.9	32 44.5	+59.4	142.3	31 56.9	+59.6	142.7	31 09.1	+59.6	143.0	30 21.1	+59.7	143.4	29 32.8	+59.8	143.7	23
24	36 04.7	+59.0	140.8	35 18.1	+59.1	141.2	34 31.1	+59.3	141.7	33 43.9	+59.4	142.1	32 56.5	+59.5	142.5	32 08.7	+59.6	142.9	31 20.8	+59.6	143.3	30 32.6	+59.7	143.6	24
25	37 03.7	+59.0	140.6	36 17.2	+59.2	141.0	35 30.4	+59.3	141.5	34 43.3	+59.4	141.9	33 56.0	+59.5	142.4	33 08.3	+59.6	142.8	32 20.4	+59.7	143.1	31 32.3	+59.8	143.5	25
26	38 02.7	+59.0	140.3	37 16.4	+59.1	140.8	36 29.7	+59.3	141.3	35 42.7	+59.4	141.8	34 55.5	+59.4	142.2	34 07.9	+59.6	142.6	33 20.1	+59.7	143.0	32 32.1	+59.7	143.4	26
27	39 01.7	+58.9	140.1	38 15.5	+59.1	140.6	37 29.0	+59.2	141.1	36 42.1	+59.4	141.6	35 54.9	+59.5	142.0	35 07.5	+59.6	142.5	34 19.8	+59.6	142.9	33 31.8	+59.7	143.3	27
28	40 00.6	+58.9	139.9	39 14.6	+59.1	140.4	38 28.2	+59.2	140.9	37 41.5	+59.3	141.4	36 54.4	+59.5	141.9	36 07.1	+59.5	142.3	35 19.4	+59.7	142.8	34 31.5	+59.8	143.2	28
29	40 59.5	+58.9	139.6	40 13.7	+59.0	140.2	39 27.4	+59.2	140.7	38 40.8	+59.3	141.2	37 53.9	+59.4	141.7	37 06.6	+59.6	142.2	36 19.1	+59.6	142.6	35 31.3	+59.7	143.1	29
30	41 58.4	+58.8	139.4	41 12.7	+59.0	139.9	40 26.6	+59.1	140.5	39 40.1	+59.3	141.0	38 53.3	+59.4	141.5	38 06.2	+59.5	142.0	37 18.7	+59.7	142.5	36 31.0	+59.7	142.9	30
31	42 57.2	+58.8	139.1	42 11.7	+59.0	139.7	41 25.7	+59.2	140.3	40 39.4	+59.3	140.8	39 52.7	+59.5	141.3	39 05.7	+59.5	141.9	38 18.4	+59.6	142.4	37 30.7	+59.7	142.8	31
32	43 56.0	+58.8	138.8	43 10.7	+58.9	139.4	42 24.9	+59.1	140.0	41 38.7	+59.3	140.6	40 52.2	+59.3	141.2	40 05.2	+59.5	141.7	39 18.0	+59.6	142.2	38 30.4	+59.7	142.7	32
33	44 54.8	+58.7	138.5	44 09.6	+58.9	139.2	43 24.0	+59.1	139.8	42 38.0	+59.2	140.4	41 51.5	+59.4	141.0	41 04.7	+59.5	141.5	40 17.6	+59.6	142.1	39 30.1	+59.7	142.6	33
34	45 53.5	+58.7	138.2	45 08.5	+58.9	138.9	44 23.1	+59.0	139.6	43 37.2	+59.2	140.2	42 50.9	+59.4	140.8	42 04.2	+59.5	141.4	41 17.2	+59.6	141.9	40 29.8	+59.7	142.4	34
35	46 52.2	+58.6	137.9	46 07.4	+58.8	138.6	45 22.1	+59.0	139.3	44 36.4	+59.2	140.0	43 50.3	+59.3	140.6	43 03.7	+59.5	141.2	42 16.8	+59.6	141.7	41 29.5	+59.7	142.3	35
36	47 50.8	+58.5	137.6	47 06.2	+58.8	138.3	46 21.1	+59.0	139.0	45 35.6	+59.1	139.7	44 49.6	+59.3	140.4	44 03.2	+59.4	141.0	43 16.4	+59.5	141.6	42 29.2	+59.6	142.2	36
37	48 49.3	+58.5	137.3	48 05.0	+58.7	138.0	47 20.1	+58.9	138.8	46 34.7	+59.2	139.5	45 48.9	+59.3	140.2	45 02.6	+59.4	140.8	44 15.9	+59.6	141.4	43 28.8	+59.7	142.0	37
38	49 47.8	+58.5	136.9	49 03.7	+58.7	137.7	48 19.0	+58.9	138.5	47 33.9	+59.0	139.2	46 48.2	+59.2	139.9	46 02.0	+59.4	140.6	45 15.5	+59.5	141.2	44 28.5	+59.6	141.9	38
39	50 46.3	+58.4	136.6	50 02.4	+58.6	137.4	49 17.9	+58.9	138.2	48 32.9	+59.1	139.0	47 47.4	+59.3	139.7	47 01.4	+59.4	140.4	46 15.0	+59.5	141.1	45 28.1	+59.6	141.7	39
40	51 44.7	+58.3	136.2	51 01.0	+58.6	137.1	50 16.8	+58.8	137.9	49 32.0	+59.0	138.7	48 46.7	+59.1	139.5	48 00.8	+59.4	140.2	47 14.5	+59.5	140.9	46 27.7	+59.6	141.5	40
41	52 43.0	+58.2	135.8	51 59.6	+58.5	136.7	51 15.6	+58.7	137.6	50 31.0	+59.0	138.4	49 45.8	+59.2	139.2	49 00.2	+59.3	140.0	48 14.0	+59.5	140.7	47 27.3	+59.6	141.4	41
42	53 41.2	+58.1	135.4	52 58.1	+58.4	136.4	52 14.3	+58.7	137.3	51 30.0	+58.9	138.1	50 45.0	+59.1	138.9	49 59.5	+59.3	139.7	49 13.5	+59.4	140.5	48 26.9	+59.6	141.2	42
43	54 39.3	+58.1	135.0	53 56.5	+58.4	136.0	53 13.0	+58.7	136.9	52 28.9	+58.9	137.8	51 44.1	+59.1	138.7	50 58.8	+59.3	139.5	50 12.9	+59.4	140.3	49 26.5	+59.6	141.0	43
44	55 37.4	+57.9	134.6	54 54.9	+58.3	135.6	54 11.7	+58.5	136.6	53 27.8	+58.8	137.5	52 43.2	+59.0	138.4	51 58.1	+59.2	139.2	51 12.3	+59.4	140.1	50 26.1	+59.5	140.8	44
45	56 35.3	+57.8	134.1	55 53.2	+58.1	135.2	55 10.2	+58.5	136.2	54 26.6	+58.7	137.2	53 42.2	+59.0	138.1	52 57.3	+59.2	139.0	52 11.7	+59.4	139.8	51 25.6	+59.5	140.6	45
46	57 33.1	+57.8	133.6	56 51.3	+58.1	134.7	56 08.7	+58.4	135.8	55 25.3	+58.7	136.8	54 41.2	+59.0	137.8	53 56.5	+59.1	138.7	53 11.1	+59.3	139.6	52 25.1	+59.5	140.4	46
47	58 30.9	+57.5	133.1	57 49.4	+58.0	134.3	57 07.1	+58.3	135.4	56 24.0	+58.7	136.4	55 40.2	+58.9	137.5	54 55.6	+59.2	138.4	54 10.4	+59.3	139.3	53 24.6	+59.5	140.2	47
48	59 28.4	+57.5	132.6	58 47.4	+57.9	133.8	58 05.4	+58.3	134.9	57 22.7	+58.5	136.0	56 39.1	+58.8	137.1	55 54.8	+59.0	138.1	55 09.7	+59.3	139.1	54 24.1	+59.4	140.0	48
49	60 25.9	+57.3	132.0	59 45.3	+57.7	133.3	59 03.7	+58.1	134.5	58 21.2	+58.5	135.6	57 37.9	+58.8	136.7	56 53.8	+59.0	137.8	56 09.0	+59.3	138.8	55 23.5	+59.5	139.8	49
50	61 23.2	+57.1	131.4	60 43.0	+57.6	132.7	60 01.8	+58.0	134.0	59 19.7	+58.3	135.2	58 36.7	+58.7	136.4	57 52.8	+59.0	137.5	57 08.3	+59.2	138.5	56 23.0	+59.3	139.5	50
51	62 20.3	+56.9	130.7	61 40.6	+57.4	132.1	60 59.8	+57.9	133.5	60 18.0	+58.3	134.7	59 35.4	+58.6	136.0	58 51.8	+58.9	137.1	58 07.5	+59.1	138.2	57 22.3	+59.4	139.3	51
52	63 17.2	+56.7	130.0	62 38.0	+57.2	131.5	61 57.7	+57.7	132.9	61 16.3	+58.2	134.3	60 34.0	+58.5	135.5	59 50.7	+58.8	136.7	59 06.6	+59.1	137.9	58 21.7	+59.3	139.0	52
53	64 13.9	+56.4	129.3	63 35.2	+57.1	130.8	62 55.4	+57.6	132.3	62 14.5	+58.0	133.7	61 32.5	+58.4	135.1	60 49.5	+58.8	136.3	60 05.7	+59.0	137.5	59 21.0	+59.3	138.7	53
54	65 10.3	+56.2	128.5	64 32.3	+56.8	130.1	63 53.0	+57.4	131.7	63 12.5	+57.9	133.2	62 30.9	+58.3	134.6	61 48.3	+58.7	135.9	61 04.7	+59.0	137.2	60 20.3	+59.2	138.4	54
55	66 06.5	+55.9	127.6	65 29.1	+56.6	129.4	64 50.4	+57.2	131.0	64 10.4	+57.8	132.6	63 29.2	+58.2	134.1	62 47.0	+58.6	135.5	62 03.7	+58.9	136.8	61 19.5	+59.2	138.1	55
56	67 02.4	+55.5	126.7	66 25.7	+56.4	128.6	65 47.6	+57.0	130.3	65 08.2	+57.5	132.0	64 27.4	+58.1	133.5	63 45.6	+58.4	135.0	63 02.6	+58.9	136.4	62 18.7	+59.1	137.7	56
57	67 57.9	+55.2	125.7	67 22.1	+56.0	127.7	66 44.6	+56.8	129.5	66 05.7	+57.4	131.3	65 25.5	+57.9	132.9	64 44.0	+58.4	134.5	64 01.5	+58.7	135.9	63 17.8	+59.1	137.3	57
58	68 53.1	+54.7	124.7	68 18.1	+55.6	126.7	67 41.4	+56.4	128.7	67 03.1	+57.2	130.5	66 23.4	+57.8	132.3	65 42.4	+58.2	133.9	65 00.2	+58.7	135.5	64 16.9	+59.0	136.9	58
59	69 47.8	+54.2	123.5	69 13.7	+55.3	125.7	68 37.8	+56.2	127.8	68 00.3	+56.9	129.7	67 21.2	+57.5	131.6	66 40.6	+58.1	133.3	65 58.9	+58.5	135.0	65 15.9	+58.9	136.5	59
60	70 42.0	+53.6	122.2	70 09.0	+54.8	124.6	69 34.0	+55.7	126.8	68 57.2	+56.6	128.9	68 18.7	+57.3	130.8	67 38.7	+58.0	132.7	66 57.4	+58.4	134.4	66 14.8	+58.8	136.0	60
61	71 35.6	+53.0	120.8	71 03.8	+54.2	123.3	70 29.7	+55.4	125.7	69 53.8	+56.3	127.9	69 16.0	+57.1	130.0	68 36.7	+57.7	132.0	67 55.8	+58.3	133.8	67 13.6	+58.7	135.5	61
62	72 28.6	+52.2	119.3	71 58.0	+53.7	122.0	71 25.1	+54.9	124.5	70 50.1	+55.9	126.9	70 13.1	+56.8	129.1	69 34.4	+57.5	131.2	68 54.1	+58.1	133.2	68 12.3	+58.6	135.0	62
63	73 20.8	+51.4	117.6	72 51.7	+52.9	120.5	72 20.0	+54.3	123.2	71 46.0	+55.5	125.8	71 09.9	+56.4	128.2	70 31.9	+57.3	130.4	69 52.2	+57.9	132.5	69 10.9	+58.5	134.4	63
64	74 12.2	+50.2	115.8	73 44.6	+52.1	118.9	73 14.3	+53.6	121.8	72 41.5	+54.9	124.5	72 06.3	+56.1	127.1	71 29.2	+56.9	129.5	70 50.1	+57.8	131.7	70 09.4	+58.3	133.8	64
65	75 02.4	+49.0	113.7	74 36.7	+51.1	117.1	74 07.9	+52.9	120.2	73 36.4	+54.4	123.1	73 02.4	+55.6	125.9	72 26.1	+56.7	128.5	71 47.9	+57.4	130.8	71 07.7	+58.2	133.1	65
66	75 51.4	+47.6	111.4	75 27.8	+49.9	115.0	75 00.8	+51.9	118.4	74 30.8	+53.6	121.6	73 58.0	+55.1	124.6	73 22.8	+56.2	127.3	72 45.3	+57.2	129.9	72 05.9	+57.9	132.3	66
67	76 39.0	+45.8	108.9	76 17.7	+48.5	112.7	75 52.7	+50.8	116.4	75 24.4	+52.8	119.9	74 53.1	+54.4	123.1	74 19.0	+55.7	126.1	73 42.5	+56.8	128.8	73 03.8	+57.7	131.4	67
68	77 24.8	+43.8•	106.0	77 06.2	+46.8	110.2	76 43.5	+49.5	114.2	76 17.2	+51.7	117.9	75 47.5	+53.6	121.4	75 14.7	+55.2	124.7	74 39.3	+56.4	127.7	74 01.5	+57.4	130.4	68
69	78 08.6	+41.3•	102.8	77 53.0	+44.8•	107.3	77 33.0	+47.9	111.6	77 08.9	+50.5	115.7	76 41.1	+52.6	119.5	76 09.9	+54.5	123.1	75 35.7	+55.9	126.3	74 58.9	+57.0	129.3	69
70	78 49.9	+38.3•	99.1	78 37.8	+42.4•	104.0	78 20.9	+45.9•	108.7	77 59.4	+48.9	113.2	77 33.7	+51.5	117.4	77 04.4	+53.5	121.3	76 31.6	+55.3	124.8	75 55.9	+56.7	128.1	70
71	79 28.2	+34.7•	95.0	79 20.2	+39.3•	100.3	79 06.8	+43.4•	105.4	78 48.3	+47.1•	110.3	78 25.2	+50.1	114.9	77 57.9	+52.6	119.2	77 26.9	+54.5	123.1	76 52.6	+56.0	126.7	71
72	80 02.9	+30.6•	90.4	79 59.5	+35.8•	96.1	79 50.2	+40.5•	101.7	79 35.4	+44.6•	107.0	79 15.3	+48.2•	112.1	78 50.5	+51.1	116.8	78 21.4	+53.6	121.1	77 48.6	+55.5	125.1	72
73	80 33.5	+25.7•	85.3	80 35.3	+31.4•	91.3	80 30.7	+36.8•	97.3	80 20.0	+41.7•	103.2	80 03.5	+45.9•	108.7	79 41.6	+49.5	114.0	79 15.0	+52.3	118.8	78 44.1	+54.5	123.2	73
74	80 59.2	+20.0•	79.7	81 06.7	+26.3•	86.0	81 07.5	+32.4•	92.4	81 01.7	+38.0•	98.7	80 49.4	+43.1•	104.9	80 31.1	+47.3•	110.7	80 07.3	+50.8	116.0	79 38.6	+53.5	121.0	74
75	81 19.2	+13.8•	73.5	81 33.0	+20.3•	80.0	81 39.9	+27.0•	86.8	81 39.7	+33.4•	93.6	81 32.5	+39.2•	100.3	81 18.4	+44.4•	106.8	80 58.1	+48.7•	112.8	80 32.1	+52.1	118.3	75
76	81 33.0	+6.9•	67.0	81 53.3	+13.6•	73.5	82 06.9	+20.6•	80.4	82 13.1	+27.7•	87.6	82 11.7	+34.6•	95.0	82 02.8	+40.7•	102.1	81 46.8	+45.9•	108.9	81 24.2	+50.2•	115.2	76
77	81 39.9	–0.2•	60.2	82 06.9	+6.2•	66.5	82 27.5	+13.3•	73.4	82 40.8	+21.0•	80.9	82 46.3	+28.6•	88.7	82 43.5	+35.9•	96.6	82 32.7	+42.3•	104.2	82 14.4	+47.6•	111.3	77
78	81 39.7	–7.2•	53.3	82 13.1	–1.4•	59.2	82 40.8	+5.5•	65.9	83 01.8	+13.1•	73.4	83 14.9	+21.3•	81.5	83 19.4	+29.6•	89.9	83 15.0	+37.4•	98.4	83 02.0	+44.1•	106.6	78
79	81 32.5	–14.1•	46.5	82 11.7	–8.9•	51.8	82 46.3	–2.8•	58.0	83 14.9	+4.5•	65.2	83 36.2	+12.8•	73.3	83 49.0	+21.8•	82.2	83 52.4	+30.8•	91.4	83 46.1	+39.0•	100.6	79
80	81 18.4	–20.3•	40.0	82 02.8	–16.0•	44.6	82 43.5	–10.8•	50.1	83 19.4	–4.4•	56.6	83 49.0	+3.4•	64.4	84 10.8	+12.4•	73.2	84 23.2	+22.2•	83.0	84 25.1	+32.2•	93.2	80
81	80 58.1	–26.0•	33.9	81 46.8	–22.6•	37.7	82 32.7	–18.3•	42.4	83 15.0	–13.0•	48.1	83 52.4	–6.3•	55.0	84 23.2	+1.9•	63.4	84 45.4	+11.9•	73.2	84 57.3	+22.9•	84.1	81
82	80 32.1	–30.8•	28.2	81 24.2	–28.2•	31.4	82 14.4	–25.0•	35.2	83 02.0	–20.9•	39.9	83 46.1	–15.6•	45.8	84 25.1	–8.6•	53.1	84 57.3	+0.2•	62.2	85 20.2	+11.1•	73.2	82
83	80 01.3	–34.9•	23.2	80 56.0	–33.1•	25.6	81 49.4	–30.7•	28.6	82 41.1	–27.6•	32.4	83 30.5	–23.7•	37.1	84 16.5	–18.5•	43.1	84 57.5	–11.4•	50.9	85 31.3	–1.9•	60.8	83
84	79 26.4	–38.5•	18.6	80 22.9	–37.1•	20.5	81 18.7	–35.4•	22.8	82 13.5	–33.3•	25.6	83 06.8	–30.6•	29.2	83 58.0	–26.9•	33.8	84 46.1	–21.9•	39.9	85 29.4	–14.8•	48.0	84
85	78 47.9	–41.4•	14.5	79 45.8	–40.5•	15.9	80 43.3	–39.4•	17.6	81 40.2	–38.0•	19.7	82 36.2	–36.1•	22.2	83 31.1	–33.8•	25.6	84 24.2	–30.5•	30.0	85 14.6	–25.8•	36.0	85
86	78 06.5	–43.8•	10.9	79 05.3	–43.2•	11.9	80 03.9	–42.5•	13.1	81 02.2	–41.7•	14.5	82 00.1	–40.6•	16.3	82 57.3	–39.1•	18.5	83 53.7	–37.1•	21.5	84 48.8	–34.5•	25.6	86
87	77 22.7	–46.0	7.7	78 22.1	–45.6•	8.3	79 21.4	–45.2•	9.1	80 20.5	–44.6•	10.0	81 19.5	–44.0•	11.2	82 18.2	–43.1•	12.6	83 16.6	–42.2•	14.5	84 14.3	–40.6•	17.0	87
88	76 36.7	–47.6	4.8	77 36.5	–47.5	5.2	78 36.2	–47.2	5.7	79 35.9	–47.0•	6.2	80 35.5	–46.7•	6.9	81 35.1	–46.4•	7.7	82 34.4	–45.8•	8.7	83 33.7	–45.3•	10.0	88
89	75 49.1	–49.1	2.3	76 49.0	–49.0	2.5	77 49.0	–49.0	2.7	78 48.9	–48.9	2.9	79 48.8	–48.8	3.2	80 48.7	–48.7•	3.5	81 48.6	–48.6•	3.9	82 48.4	–48.4•	4.5	89
90	75 00.0	–50.3	0.0	76 00.0	–50.4	0.0	77 00.0	–50.4	0.0	78 00.0	–50.5	0.0	79 00.0	–50.5	0.0	80 00.0	–50.6	0.0	81 00.0	–50.7	0.0	82 00.0	–50.8•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 34°, 326°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 23.4	– 59.3	145.1	11 34.2	– 59.4	145.2	10 44.9	– 59.5	145.3	9 55.5	– 59.6	145.4	9 06.1	– 59.6	145.5	8 16.6	– 59.7	145.6	7 27.1	– 59.8	145.7	6 37.5	– 59.8	145.7	**0**
1	11 24.1	– 59.4	145.2	10 34.8	– 59.5	145.3	9 45.4	– 59.5	145.4	8 55.9	– 59.5	145.5	8 06.5	– 59.7	145.6	7 16.9	– 59.7	145.7	6 27.3	– 59.7	145.8	5 37.7	– 59.8	145.8	**1**
2	10 24.7	– 59.3	145.4	9 35.3	– 59.4	145.5	8 45.9	– 59.5	145.6	7 56.4	– 59.6	145.6	7 06.8	– 59.7	145.7	6 17.2	– 59.7	145.8	5 27.6	– 59.8	145.8	4 37.9	– 59.8	145.9	**2**
3	9 25.4	– 59.4	145.5	8 35.9	– 59.4	145.6	7 46.4	– 59.6	145.7	6 56.8	– 59.6	145.8	6 07.1	– 59.6	145.8	5 17.5	– 59.7	145.9	4 27.8	– 59.8	145.9	3 38.1	– 59.8	146.0	**3**
4	8 26.0	– 59.3	145.7	7 36.5	– 59.5	145.8	6 46.8	– 59.5	145.8	5 57.2	– 59.6	145.9	5 07.5	– 59.7	145.9	4 17.8	– 59.7	146.0	3 28.0	– 59.7	146.0	2 38.3	– 59.9	146.1	**4**
5	7 26.7	– 59.4	145.8	6 37.0	– 59.4	145.9	5 47.3	– 59.5	145.9	4 57.6	– 59.6	146.0	4 07.8	– 59.6	146.0	3 18.1	– 59.8	146.1	2 28.3	– 59.8	146.1	1 38.4	– 59.8	146.1	**5**
6	6 27.3	– 59.3	146.0	5 37.6	– 59.5	146.0	4 47.8	– 59.5	146.1	3 58.0	– 59.6	146.1	3 08.2	– 59.7	146.2	2 18.3	– 59.7	146.2	1 28.5	– 59.8	146.2	0 38.6	– 59.8	146.2	**6**
7	5 28.0	– 59.4	146.1	4 38.1	– 59.4	146.2	3 48.3	– 59.5	146.2	2 58.4	– 59.6	146.2	2 08.5	– 59.6	146.3	1 18.6	– 59.7	146.3	0 28.7	– 59.7	146.3	0 21.2	+ 59.8	33.7	**7**
8	4 28.6	– 59.4	146.3	3 38.7	– 59.5	146.3	2 48.8	– 59.6	146.3	1 58.8	– 59.6	146.4	1 08.9	– 59.7	146.4	0 18.9	– 59.7	146.4	0 31.0	+ 59.8	33.6	1 21.0	+ 59.8	33.6	**8**
9	3 29.2	– 59.3	146.4	2 39.2	– 59.4	146.4	1 49.2	– 59.5	146.5	0 59.2	– 59.6	146.5	0 09.2	– 59.6	146.5	0 40.8	+ 59.7	33.5	1 30.8	+ 59.8	33.5	2 20.8	+ 59.8	33.6	**9**
10	2 29.9	– 59.4	146.5	1 39.8	– 59.5	146.6	0 49.7	– 59.5	146.6	0 00.4	+ 59.6	33.4	0 50.4	+ 59.7	33.4	1 40.5	+ 59.7	33.4	2 30.6	+ 59.8	33.5	3 20.6	+ 59.9	33.5	**10**
11	1 30.5	– 59.4	146.7	0 40.3	– 59.4	146.7	0 09.8	+ 59.5	33.3	1 00.0	+ 59.5	33.3	1 50.1	+ 59.7	33.3	2 40.2	+ 59.8	33.3	3 30.4	+ 59.7	33.4	4 20.5	+ 59.8	33.4	**11**
12	0 31.1	– 59.3	146.8	0 19.1	+ 59.4	33.2	1 09.3	+ 59.6	33.2	1 59.5	+ 59.6	33.2	2 49.8	+ 59.6	33.2	3 40.0	+ 59.7	33.2	4 30.1	+ 59.8	33.3	5 20.3	+ 59.8	33.3	**12**
13	0 28.2	+ 59.4	33.0	1 18.5	+ 59.5	33.0	2 08.9	+ 59.5	33.0	2 59.1	+ 59.6	33.1	3 49.4	+ 59.7	33.1	4 39.7	+ 59.7	33.1	5 29.9	+ 59.8	33.2	6 20.1	+ 59.8	33.2	**13**
14	1 27.6	+ 59.4	32.9	2 18.0	+ 59.4	32.9	3 08.4	+ 59.5	32.9	3 58.7	+ 59.6	32.9	4 49.1	+ 59.6	33.0	5 39.4	+ 59.7	33.0	6 29.7	+ 59.7	33.1	7 19.9	+ 59.8	33.2	**14**
15	2 27.0	+ 59.3	32.7	3 17.4	+ 59.5	32.8	4 07.9	+ 59.5	32.8	4 58.3	+ 59.6	32.8	5 48.7	+ 59.7	32.9	6 39.1	+ 59.7	32.9	7 29.4	+ 59.8	33.0	8 19.7	+ 59.8	33.1	**15**
16	3 26.3	+ 59.4	32.6	4 16.9	+ 59.4	32.6	5 07.4	+ 59.5	32.7	5 57.9	+ 59.6	32.7	6 48.4	+ 59.6	32.8	7 38.8	+ 59.7	32.8	8 29.2	+ 59.8	32.9	9 19.5	+ 59.8	33.0	**16**
17	4 25.7	+ 59.4	32.4	5 16.3	+ 59.5	32.5	6 06.9	+ 59.6	32.5	6 57.5	+ 59.6	32.6	7 48.0	+ 59.7	32.7	8 38.5	+ 59.7	32.7	9 29.0	+ 59.7	32.8	10 19.3	+ 59.9	32.9	**17**
18	5 25.1	+ 59.3	32.3	6 15.8	+ 59.4	32.3	7 06.5	+ 59.5	32.4	7 57.1	+ 59.6	32.5	8 47.7	+ 59.6	32.6	9 38.2	+ 59.7	32.6	10 28.7	+ 59.8	32.7	11 19.2	+ 59.8	32.8	**18**
19	6 24.4	+ 59.4	32.1	7 15.2	+ 59.5	32.2	8 06.0	+ 59.5	32.3	8 56.7	+ 59.6	32.4	9 47.3	+ 59.7	32.4	10 37.9	+ 59.7	32.5	11 28.5	+ 59.7	32.7	12 19.0	+ 59.8	32.8	**19**
20	7 23.8	+ 59.3	32.0	8 14.7	+ 59.4	32.1	9 05.5	+ 59.5	32.2	9 56.3	+ 59.5	32.2	10 47.0	+ 59.6	32.3	11 37.6	+ 59.7	32.4	12 28.2	+ 59.8	32.6	13 18.8	+ 59.8	32.7	**20**
21	8 23.1	+ 59.4	31.8	9 14.1	+ 59.4	31.9	10 05.0	+ 59.5	32.0	10 55.8	+ 59.6	32.1	11 46.6	+ 59.7	32.2	12 37.3	+ 59.7	32.3	13 28.0	+ 59.8	32.5	14 18.6	+ 59.8	32.6	**21**
22	9 22.5	+ 59.3	31.7	10 13.5	+ 59.5	31.8	11 04.5	+ 59.5	31.9	11 55.4	+ 59.6	32.0	12 46.3	+ 59.6	32.1	13 37.0	+ 59.7	32.2	14 27.8	+ 59.7	32.4	15 18.4	+ 59.8	32.5	**22**
23	10 21.8	+ 59.4	31.6	11 13.0	+ 59.4	31.7	12 04.0	+ 59.5	31.8	12 55.0	+ 59.6	31.9	13 45.9	+ 59.6	32.0	14 36.7	+ 59.7	32.1	15 27.5	+ 59.8	32.3	16 18.2	+ 59.8	32.4	**23**
24	11 21.2	+ 59.3	31.4	12 12.4	+ 59.4	31.5	13 03.5	+ 59.5	31.6	13 54.6	+ 59.5	31.8	14 45.5	+ 59.7	31.9	15 36.4	+ 59.7	32.0	16 27.3	+ 59.7	32.2	17 18.0	+ 59.8	32.3	**24**
25	12 20.5	+ 59.4	31.3	13 11.8	+ 59.4	31.4	14 03.0	+ 59.5	31.5	14 54.1	+ 59.6	31.6	15 45.2	+ 59.6	31.8	16 36.1	+ 59.7	31.9	17 27.0	+ 59.8	32.1	18 17.8	+ 59.8	32.3	**25**
26	13 19.9	+ 59.3	31.1	14 11.2	+ 59.4	31.2	15 02.5	+ 59.5	31.4	15 53.7	+ 59.5	31.5	16 44.8	+ 59.6	31.7	17 35.8	+ 59.7	31.8	18 26.8	+ 59.7	32.0	19 17.6	+ 59.8	32.2	**26**
27	14 19.2	+ 59.3	30.9	15 10.6	+ 59.4	31.1	16 02.0	+ 59.5	31.2	16 53.2	+ 59.6	31.4	17 44.4	+ 59.6	31.5	18 35.5	+ 59.7	31.7	19 26.5	+ 59.7	31.9	20 17.4	+ 59.8	32.1	**27**
28	15 18.5	+ 59.3	30.8	16 10.0	+ 59.4	30.9	17 01.5	+ 59.4	31.1	17 52.8	+ 59.5	31.3	18 44.0	+ 59.7	31.4	19 35.2	+ 59.7	31.6	20 26.2	+ 59.8	31.8	21 17.2	+ 59.8	32.0	**28**
29	16 17.8	+ 59.4	30.6	17 09.4	+ 59.4	30.8	18 00.9	+ 59.5	31.0	18 52.3	+ 59.6	31.1	19 43.7	+ 59.6	31.3	20 34.9	+ 59.6	31.5	21 26.0	+ 59.7	31.7	22 17.0	+ 59.8	31.9	**29**
30	17 17.2	+ 59.3	30.5	18 08.8	+ 59.4	30.6	19 00.4	+ 59.5	30.8	19 51.9	+ 59.5	31.0	20 43.3	+ 59.6	31.2	21 34.5	+ 59.7	31.4	22 25.7	+ 59.7	31.6	23 16.8	+ 59.7	31.8	**30**
31	18 16.5	+ 59.2	30.3	19 08.2	+ 59.4	30.5	19 59.9	+ 59.4	30.7	20 51.4	+ 59.5	30.9	21 42.9	+ 59.6	31.1	22 34.2	+ 59.7	31.3	23 25.4	+ 59.8	31.5	24 16.5	+ 59.8	31.7	**31**
32	19 15.7	+ 59.3	30.2	20 07.6	+ 59.4	30.3	20 59.3	+ 59.5	30.5	21 50.9	+ 59.6	30.7	22 42.5	+ 59.6	30.9	23 33.9	+ 59.6	31.2	24 25.2	+ 59.7	31.4	25 16.3	+ 59.8	31.6	**32**
33	20 15.0	+ 59.3	30.0	21 07.0	+ 59.3	30.2	21 58.8	+ 59.4	30.4	22 50.5	+ 59.5	30.6	23 42.1	+ 59.6	30.8	24 33.5	+ 59.7	31.0	25 24.9	+ 59.7	31.3	26 16.1	+ 59.8	31.5	**33**
34	21 14.3	+ 59.3	29.8	22 06.3	+ 59.4	30.0	22 58.2	+ 59.4	30.2	23 50.0	+ 59.5	30.5	24 41.7	+ 59.5	30.7	25 33.2	+ 59.6	30.9	26 24.6	+ 59.7	31.2	27 15.9	+ 59.7	31.4	**34**
35	22 13.6	+ 59.2	29.7	23 05.7	+ 59.3	29.9	23 57.6	+ 59.5	30.1	24 49.5	+ 59.5	30.3	25 41.2	+ 59.6	30.6	26 32.8	+ 59.7	30.8	27 24.3	+ 59.7	31.1	28 15.6	+ 59.8	31.3	**35**
36	23 12.8	+ 59.3	29.5	24 05.0	+ 59.3	29.7	24 57.1	+ 59.4	29.9	25 49.0	+ 59.5	30.2	26 40.8	+ 59.6	30.4	27 32.5	+ 59.6	30.7	28 24.0	+ 59.7	31.0	29 15.4	+ 59.8	31.2	**36**
37	24 12.1	+ 59.2	29.3	25 04.3	+ 59.4	29.5	25 56.5	+ 59.4	29.8	26 48.5	+ 59.5	30.0	27 40.4	+ 59.5	30.3	28 32.1	+ 59.6	30.6	29 23.7	+ 59.7	30.8	30 15.2	+ 59.7	31.1	**37**
38	25 11.3	+ 59.2	29.1	26 03.7	+ 59.3	29.4	26 55.9	+ 59.4	29.6	27 48.0	+ 59.5	29.9	28 39.9	+ 59.6	30.1	29 31.7	+ 59.7	30.4	30 23.4	+ 59.7	30.7	31 14.9	+ 59.8	31.0	**38**
39	26 10.5	+ 59.2	29.0	27 03.0	+ 59.3	29.2	27 55.3	+ 59.4	29.5	28 47.5	+ 59.4	29.7	29 39.5	+ 59.5	30.0	30 31.4	+ 59.6	30.3	31 23.1	+ 59.7	30.6	32 14.7	+ 59.7	30.9	**39**
40	27 09.7	+ 59.2	28.8	28 02.3	+ 59.3	29.0	28 54.7	+ 59.3	29.3	29 46.9	+ 59.5	29.6	30 39.0	+ 59.6	29.9	31 31.0	+ 59.6	30.2	32 22.8	+ 59.6	30.5	33 14.4	+ 59.7	30.8	**40**
41	28 08.9	+ 59.2	28.6	29 01.6	+ 59.2	28.9	29 54.0	+ 59.4	29.1	30 46.4	+ 59.4	29.4	31 38.6	+ 59.5	29.7	32 30.6	+ 59.6	30.0	33 22.4	+ 59.7	30.4	34 14.1	+ 59.8	30.7	**41**
42	29 08.1	+ 59.2	28.4	30 00.8	+ 59.3	28.7	30 53.4	+ 59.3	29.0	31 45.8	+ 59.4	29.3	32 38.1	+ 59.5	29.6	33 30.2	+ 59.6	29.9	34 22.1	+ 59.7	30.2	35 13.9	+ 59.7	30.6	**42**
43	30 07.3	+ 59.1	28.2	31 00.1	+ 59.2	28.5	31 52.7	+ 59.4	28.8	32 45.2	+ 59.5	29.1	33 37.6	+ 59.5	29.4	34 29.8	+ 59.5	29.8	35 21.8	+ 59.6	30.1	36 13.6	+ 59.7	30.5	**43**
44	31 06.4	+ 59.2	28.0	31 59.3	+ 59.2	28.3	32 52.1	+ 59.3	28.6	33 44.7	+ 59.4	28.9	34 37.1	+ 59.5	29.3	35 29.3	+ 59.6	29.6	36 21.4	+ 59.7	30.0	37 13.3	+ 59.7	30.3	**44**
45	32 05.6	+ 59.1	27.8	32 58.5	+ 59.2	28.1	33 51.4	+ 59.3	28.4	34 44.1	+ 59.4	28.8	35 36.6	+ 59.5	29.1	36 28.9	+ 59.6	29.5	37 21.1	+ 59.6	29.8	38 13.0	+ 59.7	30.2	**45**
46	33 04.7	+ 59.0	27.6	33 57.7	+ 59.2	27.9	34 50.7	+ 59.3	28.2	35 43.5	+ 59.3	28.6	36 36.1	+ 59.4	28.9	37 28.5	+ 59.5	29.3	38 20.7	+ 59.6	29.7	39 12.7	+ 59.7	30.1	**46**
47	34 03.7	+ 59.1	27.4	34 56.9	+ 59.2	27.7	35 50.0	+ 59.2	28.1	36 42.8	+ 59.4	28.4	37 35.5	+ 59.5	28.8	38 28.0	+ 59.5	29.1	39 20.3	+ 59.6	29.5	40 12.4	+ 59.7	30.0	**47**
48	35 02.8	+ 59.1	27.2	35 56.1	+ 59.1	27.5	36 49.2	+ 59.3	27.9	37 42.2	+ 59.3	28.2	38 35.0	+ 59.4	28.6	39 27.5	+ 59.6	29.0	40 19.9	+ 59.6	29.4	41 12.1	+ 59.7	29.8	**48**
49	36 01.9	+ 59.0	27.0	36 55.2	+ 59.2	27.3	37 48.5	+ 59.2	27.7	38 41.5	+ 59.3	28.0	39 34.4	+ 59.4	28.4	40 27.1	+ 59.5	28.8	41 19.5	+ 59.6	29.2	42 11.8	+ 59.6	29.7	**49**
50	37 00.9	+ 59.0	26.8	37 54.4	+ 59.1	27.1	38 47.7	+ 59.2	27.5	39 40.8	+ 59.3	27.8	40 33.8	+ 59.4	28.2	41 26.6	+ 59.4	28.7	42 19.1	+ 59.6	29.1	43 11.4	+ 59.7	29.5	**50**
51	37 59.9	+ 58.9	26.5	38 53.5	+ 59.0	26.9	39 46.9	+ 59.2	27.3	40 40.1	+ 59.3	27.6	41 33.2	+ 59.4	28.1	42 26.0	+ 59.5	28.5	43 18.7	+ 59.5	28.9	44 11.1	+ 59.6	29.4	**51**
52	38 58.8	+ 59.0	26.3	39 52.5	+ 59.1	26.7	40 46.1	+ 59.1	27.0	41 39.4	+ 59.3	27.4	42 32.6	+ 59.3	27.9	43 25.5	+ 59.5	28.3	44 18.2	+ 59.6	28.8	45 10.7	+ 59.6	29.2	**52**
53	39 57.8	+ 58.9	26.0	40 51.6	+ 59.0	26.4	41 45.2	+ 59.2	26.8	42 38.7	+ 59.2	27.2	43 31.9	+ 59.4	27.7	44 25.0	+ 59.4	28.1	45 17.8	+ 59.5	28.6	46 10.3	+ 59.7	29.1	**53**
54	40 56.7	+ 58.8	25.8	41 50.6	+ 59.0	26.2	42 44.4	+ 59.1	26.6	43 37.9	+ 59.2	27.0	44 31.3	+ 59.3	27.5	45 24.4	+ 59.4	27.9	46 17.3	+ 59.5	28.4	47 10.0	+ 59.6	28.9	**54**
55	41 55.5	+ 58.9	25.5	42 49.6	+ 58.9	25.9	43 43.5	+ 59.0	26.3	44 37.1	+ 59.2	26.8	45 30.6	+ 59.3	27.2	46 23.8	+ 59.4	27.7	47 16.8	+ 59.5	28.2	48 09.6	+ 59.5	28.7	**55**
56	42 54.4	+ 58.8	25.3	43 48.5	+ 59.0	25.7	44 42.5	+ 59.1	26.1	45 36.3	+ 59.2	26.5	46 29.9	+ 59.2	27.0	47 23.2	+ 59.4	27.5	48 16.3	+ 59.5	28.0	49 09.1	+ 59.6	28.6	**56**
57	43 53.2	+ 58.7	25.0	44 47.5	+ 58.8	25.4	45 41.6	+ 59.0	25.8	46 35.5	+ 59.1	26.3	47 29.1	+ 59.3	26.8	48 22.6	+ 59.3	27.3	49 15.8	+ 59.4	27.8	50 08.7	+ 59.5	28.4	**57**
58	44 51.9	+ 58.8	24.7	45 46.3	+ 58.9	25.1	46 40.6	+ 58.9	25.6	47 34.6	+ 59.1	26.1	48 28.4	+ 59.2	26.5	49 21.9	+ 59.3	27.1	50 15.2	+ 59.4	27.6	51 08.2	+ 59.6	28.2	**58**
59	45 50.7	+ 58.6	24.4	46 45.2	+ 58.8	24.9	47 39.5	+ 59.0	25.3	48 33.7	+ 59.0	25.8	49 27.6	+ 59.1	26.3	50 21.2	+ 59.3	26.8	51 14.6	+ 59.4	27.4	52 07.8	+ 59.5	28.0	**59**
60	46 49.3	+ 58.6	24.1	47 44.0	+ 58.7	24.6	48 38.5	+ 58.8	25.0	49 32.7	+ 59.0	25.5	50 26.7	+ 59.2	26.0	51 20.5	+ 59.3	26.6	52 14.0	+ 59.4	27.2	53 07.3	+ 59.5	27.8	**60**
61	47 47.9	+ 58.6	23.8	48 42.7	+ 58.7	24.3	49 37.3	+ 58.9	24.7	50 31.7	+ 59.0	25.2	51 25.9	+ 59.1	25.8	52 19.8	+ 59.2	26.3	53 13.4	+ 59.3	26.9	54 06.8	+ 59.4	27.5	**61**
62	48 46.5	+ 58.5	23.5	49 41.4	+ 58.7	23.9	50 36.2	+ 58.8	24.4	51 30.7	+ 58.9	24.9	52 25.0	+ 59.0	25.5	53 19.0	+ 59.2	26.1	54 12.7	+ 59.4	26.7	55 06.2	+ 59.4	27.3	**62**
63	49 45.0	+ 58.4	23.1	50 40.1	+ 58.6	23.6	51 35.0	+ 58.7	24.1	52 29.6	+ 58.9	24.6	53 24.0	+ 59.0	25.2	54 18.2	+ 59.1	25.8	55 12.1	+ 59.2	26.4	56 05.6	+ 59.4	27.1	**63**
64	50 43.4	+ 58.4	22.8	51 38.7	+ 58.5	23.3	52 33.7	+ 58.7	23.8	53 28.5	+ 58.8	24.3	54 23.0	+ 59.0	24.9	55 17.3	+ 59.1	25.5	56 11.3	+ 59.3	26.1	57 05.0	+ 59.4	26.8	**64**
65	51 41.8	+ 58.3	22.4	52 37.2	+ 58.4	22.9	53 32.4	+ 58.6	23.4	54 27.3	+ 58.7	24.0	55 22.0	+ 58.9	24.6	56 16.4	+ 59.1	25.2	57 10.6	+ 59.2	25.8	58 04.4	+ 59.3	26.5	**65**
66	52 40.1	+ 58.3	22.0	53 35.6	+ 58.4	22.5	54 31.0	+ 58.5	23.1	55 26.0	+ 58.7	23.6	56 20.9	+ 58.8	24.2	57 15.5	+ 59.0	24.9	58 09.8	+ 59.1	25.5	59 03.7	+ 59.3	26.3	**66**
67	53 38.4	+ 58.1	21.6	54 34.0	+ 58.3	22.1	55 29.5	+ 58.5	22.7	56 24.7	+ 58.7	23.3	57 19.7	+ 58.8	23.9	58 14.5	+ 58.9	24.5	59 08.9	+ 59.1	25.2	60 03.0	+ 59.3	26.0	**67**
68	54 36.5	+ 58.0	21.2	55 32.3	+ 58.2	21.7	56 28.0	+ 58.3	22.3	57 23.4	+ 58.5	22.9	58 18.5	+ 58.7	23.5	59 13.4	+ 58.9	24.2	60 08.0	+ 59.0	24.9	61 02.3	+ 59.2	25.6	**68**
69	55 34.5	+ 58.0	20.8	56 30.5	+ 58.2	21.3	57 26.3	+ 58.3	21.9	58 21.9	+ 58.5	22.5	59 17.2	+ 58.7	23.1	60 12.3	+ 58.8	23.8	61 07.0	+ 59.0	24.5	62 01.5	+ 59.1	25.3	**69**
70	56 32.5	+ 57.8	20.3	57 28.7	+ 58.0	20.8	58 24.6	+ 58.2	21.4	59 20.4	+ 58.4	22.0	60 15.9	+ 58.5	22.7	61 11.1	+ 58.7	23.4	62 06.0	+ 58.9	24.1	63 00.6	+ 59.1	24.9	**70**
71	57 30.3	+ 57.8	19.8	58 26.7	+ 57.9	20.4	59 22.8	+ 58.1	20.9	60 18.8	+ 58.2	21.6	61 14.4	+ 58.5	22.2	62 09.8	+ 58.7	22.9	63 04.9	+ 58.8	23.7	63 59.7	+ 59.0	24.5	**71**
72	58 28.1	+ 57.5	19.3	59 24.6	+ 57.8	19.9	60 20.9	+ 58.0	20.4	61 17.0	+ 58.2	21.1	62 12.9	+ 58.3	21.8	63 08.5	+ 58.5	22.5	64 03.7	+ 58.8	23.3	64 58.7	+ 58.9	24.1	**72**
73	59 25.6	+ 57.5	18.7	60 22.4	+ 57.6	19.3	61 18.9	+ 57.8	19.9	62 15.2	+ 58.0	20.6	63 11.2	+ 58.3	21.3	64 07.0	+ 58.5	22.0	65 02.5	+ 58.6	22.8	65 57.6	+ 58.9	23.7	**73**
74	60 23.1	+ 57.3	18.2	61 20.0	+ 57.5	18.7	62 16.7	+ 57.7	19.4	63 13.2	+ 57.9	20.0	64 09.5	+ 58.1	20.7	65 05.5	+ 58.3	21.5	66 01.1	+ 58.6	22.3	66 56.5	+ 58.7	23.2	**74**
75	61 20.4	+ 57.1	17.6	62 17.5	+ 57.3	18.1	63 14.4	+ 57.5	18.8	64 11.1	+ 57.8	19.4	65 07.6	+ 57.9	20.1	66 03.8	+ 58.2	20.9	66 59.7	+ 58.4	21.7	67 55.2	+ 58.7	22.6	**75**
76	62 17.5	+ 56.9	16.9	63 14.8	+ 57.1	17.5	64 11.9	+ 57.4	18.1	65 08.9	+ 57.5	18.8	66 05.5	+ 57.8	19.5	67 02.0	+ 58.0	20.3	67 58.1	+ 58.3	21.1	68 53.9	+ 58.5	22.1	**76**
77	63 14.4	+ 56.7	16.2	64 11.9	+ 57.0	16.8	65 09.3	+ 57.1	17.4	66 06.4	+ 57.4	18.1	67 03.3	+ 57.6	18.8	68 00.0	+ 57.9	19.6	68 56.4	+ 58.1	20.5	69 52.4	+ 58.4	21.4	**77**
78	64 11.1	+ 56.5	15.5	65 08.9	+ 56.6	16.1	66 06.4	+ 56.9	16.7	67 03.8	+ 57.1	17.4	68 00.9	+ 57.4	18.1	68 57.9	+ 57.6	18.9	69 54.5	+ 57.9	19.8	70 50.8	+ 58.2	20.8	**78**
79	65 07.6	+ 56.2	14.7	66 05.5	+ 56.5	15.3	67 03.3	+ 56.7	15.9	68 00.9	+ 57.0	16.6	68 58.3	+ 57.2	17.3	69 55.5	+ 57.4	18.1	70 52.4	+ 57.7	19.0	71 49.0	+ 58.0	20.0	**79**
80	66 03.8	+ 55.9	13.8	67 02.0	+ 56.1	14.4	68 00.0	+ 56.4	15.0	68 57.9	+ 56.6	15.7	69 55.5	+ 56.9	16.4	70 52.9	+ 57.2	17.2	71 50.1	+ 57.5	18.1	72 47.0	+ 57.7	19.2	**80**
81	66 59.7	+ 55.5	12.9	67 58.1	+ 55.8	13.5	68 56.4	+ 56.0	14.1	69 54.5	+ 56.3	14.8	70 52.4	+ 56.6	15.5	71 50.1	+ 56.9	16.3	72 47.6	+ 57.1	17.2	73 44.7	+ 57.5	18.2	**81**
82	67 55.2	+ 55.2	11.9	68 53.9	+ 55.4	12.5	69 52.4	+ 55.6	13.1	70 50.8	+ 55.9	13.7	71 49.0	+ 56.1	14.4	72 47.0	+ 56.4	15.2	73 44.7	+ 56.8	16.1	74 42.2	+ 57.2	17.2	**82**
83	68 50.4	+ 54.7	10.9	69 49.3	+ 54.9	11.4	70 48.0	+ 55.2	12.0	71 46.7	+ 55.4	12.6	72 45.1	+ 55.8	13.3	73 43.4	+ 56.1	14.1	74 41.5	+ 56.4	15.0	75 39.4	+ 56.7	16.0	**83**
84	69 45.1	+ 54.3	9.7	70 44.2	+ 54.5	10.2	71 43.2	+ 54.7	10.7	72 42.1	+ 55.0	11.3	73 40.9	+ 55.2	12.0	74 39.5	+ 55.5	12.8	75 37.9	+ 55.9	13.6	76 36.1	+ 56.3	14.6	**84**
85	70 39.4	+ 53.7	8.5	71 38.7	+ 53.9	8.9	72 37.9	+ 54.1	9.4	73 37.1	+ 54.3	10.0	74 36.1	+ 54.6	10.6	75 35.0	+ 55.0	11.3	76 33.8	+ 55.2	12.1	77 32.4	+ 55.6	13.1	**85**
86	71 33.1	+ 53.0	7.1	72 32.6	+ 53.2	7.5	73 32.0	+ 53.4	7.9	74 31.4	+ 53.7	8.4	75 30.7	+ 53.9	9.0	76 30.0	+ 54.1	9.6	77 29.0	+ 54.5	10.4	78 28.0	+ 54.8	11.3	**86**
87	72 26.1	+ 52.2	5.6	73 25.8	+ 52.4	5.9	74 25.4	+ 52.6	6.3	75 25.1	+ 52.7	6.7	76 24.6	+ 53.0	7.2	77 24.1	+ 53.2	7.7	78 23.5	+ 53.5	8.4	79 22.8	+ 53.9	9.1	**87**
88	73 18.3	+ 51.4	3.9	74 18.2	+ 51.4	4.1	75 18.0	+ 51.6	4.4	76 17.8	+ 51.7	4.7	77 17.6	+ 51.9	5.1	78 17.3	+ 52.1	5.5	79 17.0	+ 52.3	6.0	80 16.7	+ 52.5	6.6	**88**
89	74 09.7	+ 50.3	2.0	75 09.6	+ 50.4	2.2	76 09.6	+ 50.4	2.3	77 09.5	+ 50.5	2.5	78 09.5	+ 50.5	2.7	79 09.4	+ 50.6	3.0	80 09.3	+ 50.7	3.3	81 09.2	*+ 50.8* •	3.6	**89**
90	75 00.0	+ 49.1	0.0	76 00.0	+ 49.0	0.0	77 00.0	+ 49.0	0.0	78 00.0	+ 48.9	0.0	79 00.0	+ 48.8	0.0	80 00.0	*+ 48.7* •	0.0	81 00.0	*+ 48.6* •	0.0	82 00.0	*+ 48.4* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 146°, 214°

35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 14.4	+59.3	144.1	11 25.8	+59.4	144.2	10 37.1	+59.5	144.3	9 48.4	+59.5	144.4	8 59.5	+59.7	144.5	8 10.7	+59.7	144.6	7 21.7	+59.8	144.7	6 32.8	+59.8	144.7	**0**
1	13 13.7	+59.3	143.9	12 25.2	+59.4	144.0	11 36.6	+59.5	144.2	10 47.9	+59.6	144.3	9 59.2	+59.6	144.4	9 10.4	+59.7	144.5	8 21.5	+59.7	144.6	7 32.6	+59.8	144.7	**1**
2	14 13.0	+59.3	143.7	13 24.6	+59.4	143.9	12 36.1	+59.4	144.0	11 47.5	+59.5	144.2	10 58.8	+59.6	144.3	10 10.1	+59.6	144.4	9 21.2	+59.8	144.5	8 32.4	+59.8	144.6	**2**
3	15 12.3	+59.3	143.6	14 24.0	+59.3	143.7	13 35.5	+59.5	143.9	12 47.0	+59.6	144.0	11 58.4	+59.6	144.2	11 09.7	+59.7	144.3	10 21.0	+59.7	144.4	9 32.2	+59.8	144.5	**3**
4	16 11.6	+59.3	143.4	15 23.3	+59.4	143.6	14 35.0	+59.5	143.8	13 46.6	+59.5	143.9	12 58.0	+59.7	144.0	12 09.4	+59.7	144.2	11 20.7	+59.8	144.3	10 32.0	+59.8	144.4	**4**
5	17 10.9	+59.2	143.3	16 22.7	+59.4	143.4	15 34.5	+59.4	143.6	14 46.1	+59.6	143.8	13 57.7	+59.6	143.9	13 09.1	+59.7	144.1	12 20.5	+59.7	144.2	11 31.8	+59.8	144.3	**5**
6	18 10.1	+59.3	143.1	17 22.1	+59.3	143.3	16 33.9	+59.5	143.5	15 45.7	+59.5	143.6	14 57.3	+59.6	143.8	14 08.8	+59.7	144.0	13 20.2	+59.8	144.1	12 31.6	+59.8	144.2	**6**
7	19 09.4	+59.2	142.9	18 21.4	+59.4	143.1	17 33.4	+59.4	143.3	16 45.2	+59.5	143.5	15 56.9	+59.6	143.7	15 08.5	+59.7	143.9	14 20.0	+59.7	144.0	13 31.4	+59.8	144.2	**7**
8	20 08.6	+59.3	142.8	19 20.8	+59.3	143.0	18 32.8	+59.5	143.2	17 44.7	+59.5	143.4	16 56.5	+59.6	143.6	16 08.2	+59.6	143.8	15 19.7	+59.8	143.9	14 31.2	+59.8	144.1	**8**
9	21 07.9	+59.2	142.6	20 20.1	+59.4	142.8	19 32.3	+59.4	143.0	18 44.2	+59.6	143.3	17 56.1	+59.6	143.5	17 07.8	+59.7	143.6	16 19.5	+59.7	143.8	15 31.0	+59.8	144.0	**9**
10	22 07.1	+59.2	142.4	21 19.5	+59.3	142.7	20 31.7	+59.4	142.9	19 43.8	+59.5	143.1	18 55.7	+59.6	143.3	18 07.5	+59.7	143.5	17 19.2	+59.7	143.7	16 30.8	+59.8	143.9	**10**
11	23 06.3	+59.2	142.3	22 18.8	+59.3	142.5	21 31.1	+59.4	142.8	20 43.3	+59.5	143.0	19 55.3	+59.6	143.2	19 07.2	+59.6	143.4	18 18.9	+59.8	143.6	17 30.6	+59.7	143.8	**11**
12	24 05.5	+59.2	142.1	23 18.1	+59.3	142.3	22 30.5	+59.4	142.6	21 42.8	+59.5	142.9	20 54.9	+59.6	143.1	20 06.8	+59.7	143.3	19 18.7	+59.7	143.5	18 30.3	+59.8	143.7	**12**
13	25 04.7	+59.2	141.9	24 17.4	+59.3	142.2	23 29.9	+59.4	142.5	22 42.3	+59.5	142.7	21 54.5	+59.5	143.0	21 06.5	+59.7	143.2	20 18.4	+59.7	143.4	19 30.1	+59.8	143.6	**13**
14	26 03.9	+59.2	141.7	25 16.7	+59.3	142.0	24 29.3	+59.4	142.3	23 41.8	+59.5	142.6	22 54.0	+59.6	142.8	22 06.2	+59.6	143.1	21 18.1	+59.7	143.3	20 29.9	+59.8	143.5	**14**
15	27 03.1	+59.1	141.5	26 16.0	+59.3	141.8	25 28.7	+59.4	142.1	24 41.3	+59.4	142.4	23 53.6	+59.6	142.7	23 05.8	+59.6	143.0	22 17.8	+59.7	143.2	21 29.7	+59.8	143.5	**15**
16	28 02.2	+59.2	141.3	27 15.3	+59.2	141.7	26 28.1	+59.4	142.0	25 40.7	+59.5	142.3	24 53.2	+59.5	142.6	24 05.4	+59.7	142.8	23 17.5	+59.8	143.1	22 29.5	+59.7	143.4	**16**
17	29 01.4	+59.1	141.1	28 14.5	+59.3	141.5	27 27.5	+59.3	141.8	26 40.2	+59.5	142.1	25 52.7	+59.6	142.4	25 05.1	+59.6	142.7	24 17.3	+59.7	143.0	23 29.2	+59.8	143.3	**17**
18	30 00.5	+59.1	141.0	29 13.8	+59.2	141.3	28 26.8	+59.4	141.7	27 39.7	+59.4	142.0	26 52.3	+59.5	142.3	26 04.7	+59.6	142.6	25 17.0	+59.7	142.9	24 29.0	+59.8	143.2	**18**
19	30 59.6	+59.1	140.8	30 13.0	+59.2	141.1	29 26.2	+59.3	141.5	28 39.1	+59.4	141.8	27 51.8	+59.6	142.2	27 04.3	+59.7	142.5	26 16.7	+59.7	142.8	25 28.8	+59.7	143.1	**19**
20	31 58.7	+59.0	140.5	31 12.2	+59.2	140.9	30 25.5	+59.3	141.3	29 38.5	+59.5	141.7	28 51.4	+59.5	142.0	28 04.0	+59.6	142.4	27 16.4	+59.6	142.7	26 28.5	+59.8	143.0	**20**
21	32 57.7	+59.1	140.3	32 11.4	+59.2	140.7	31 24.8	+59.3	141.1	30 38.0	+59.4	141.5	29 50.9	+59.5	141.9	29 03.6	+59.6	142.2	28 16.0	+59.7	142.6	27 28.3	+59.8	142.9	**21**
22	33 56.8	+59.0	140.1	33 10.6	+59.1	140.6	32 24.1	+59.3	141.0	31 37.4	+59.4	141.4	30 50.4	+59.5	141.7	30 03.2	+59.6	142.1	29 15.7	+59.7	142.4	28 28.1	+59.7	142.8	**22**
23	34 55.8	+59.0	139.9	34 09.7	+59.2	140.4	33 23.4	+59.3	140.8	32 36.8	+59.4	141.2	31 49.9	+59.5	141.6	31 02.8	+59.6	142.0	30 15.4	+59.7	142.3	29 27.8	+59.8	142.7	**23**
24	35 54.8	+59.0	139.7	35 08.9	+59.1	140.1	34 22.7	+59.2	140.6	33 36.2	+59.4	141.0	32 49.4	+59.5	141.4	32 02.4	+59.6	141.8	31 15.1	+59.6	142.2	30 27.6	+59.7	142.6	**24**
25	36 53.8	+58.9	139.5	36 08.0	+59.1	139.9	35 21.9	+59.3	140.4	34 35.6	+59.3	140.8	33 48.9	+59.5	141.3	33 02.0	+59.5	141.7	32 14.7	+59.7	142.1	31 27.3	+59.7	142.5	**25**
26	37 52.7	+58.9	139.2	37 07.1	+59.1	139.7	36 21.2	+59.2	140.2	35 34.9	+59.4	140.7	34 48.4	+59.4	141.1	34 01.5	+59.6	141.5	33 14.4	+59.7	141.9	32 27.0	+59.8	142.3	**26**
27	38 51.6	+58.9	139.0	38 06.2	+59.0	139.5	37 20.4	+59.2	140.0	36 34.3	+59.3	140.5	35 47.8	+59.5	140.9	35 01.1	+59.5	141.4	34 14.1	+59.6	141.8	33 26.8	+59.7	142.2	**27**
28	39 50.5	+58.9	138.7	39 05.2	+59.0	139.3	38 19.6	+59.1	139.8	37 33.6	+59.3	140.3	36 47.3	+59.4	140.8	36 00.6	+59.6	141.2	35 13.7	+59.6	141.7	34 26.5	+59.7	142.1	**28**
29	40 49.4	+58.8	138.5	40 04.2	+59.0	139.0	39 18.7	+59.2	139.6	38 32.9	+59.3	140.1	37 46.7	+59.4	140.6	37 00.2	+59.5	141.1	36 13.3	+59.7	141.5	35 26.2	+59.7	142.0	**29**
30	41 48.2	+58.8	138.2	41 03.2	+59.0	138.8	40 17.9	+59.1	139.4	39 32.2	+59.2	139.9	38 46.1	+59.4	140.4	37 59.7	+59.5	140.9	37 13.0	+59.6	141.4	36 25.9	+59.7	141.9	**30**
31	42 47.0	+58.7	137.9	42 02.2	+58.9	138.6	41 17.0	+59.1	139.1	40 31.4	+59.3	139.7	39 45.5	+59.4	140.2	38 59.2	+59.5	140.8	38 12.6	+59.6	141.3	37 25.6	+59.7	141.7	**31**
32	43 45.7	+58.7	137.7	43 01.1	+58.9	138.3	42 16.1	+59.1	138.9	41 30.7	+59.2	139.5	40 44.9	+59.3	140.1	39 58.7	+59.5	140.6	39 12.2	+59.6	141.1	38 25.3	+59.7	141.6	**32**
33	44 44.4	+58.6	137.4	44 00.0	+58.9	138.0	43 15.2	+59.0	138.7	42 29.9	+59.2	139.3	41 44.2	+59.4	139.9	40 58.2	+59.5	140.4	40 11.8	+59.5	141.0	39 25.0	+59.7	141.5	**33**
34	45 43.0	+58.6	137.1	44 58.9	+58.8	137.8	44 14.2	+59.0	138.4	43 29.1	+59.2	139.1	42 43.6	+59.3	139.7	41 57.7	+59.4	140.2	41 11.3	+59.6	140.8	40 24.7	+59.6	141.4	**34**
35	46 41.6	+58.6	136.8	45 57.7	+58.8	137.5	45 13.2	+59.0	138.2	44 28.3	+59.1	138.8	43 42.9	+59.3	139.5	42 57.1	+59.4	140.1	42 10.9	+59.6	140.7	41 24.3	+59.7	141.2	**35**
36	47 40.2	+58.5	136.4	46 56.5	+58.7	137.2	46 12.2	+58.9	137.9	45 27.4	+59.1	138.6	44 42.2	+59.3	139.2	43 56.5	+59.5	139.9	43 10.5	+59.5	140.5	42 24.0	+59.6	141.1	**36**
37	48 38.7	+58.4	136.1	47 55.2	+58.6	136.9	47 11.1	+58.9	137.6	46 26.5	+59.1	138.3	45 41.5	+59.2	139.0	44 56.0	+59.3	139.7	44 10.0	+59.5	140.3	43 23.6	+59.6	140.9	**37**
38	49 37.1	+58.4	135.8	48 53.8	+58.7	136.6	48 10.0	+58.8	137.3	47 25.6	+59.1	138.1	46 40.7	+59.2	138.8	45 55.3	+59.4	139.5	45 09.5	+59.5	140.1	44 23.2	+59.7	140.8	**38**
39	50 35.5	+58.3	135.4	49 52.5	+58.5	136.2	49 08.8	+58.8	137.0	48 24.7	+59.0	137.8	47 39.9	+59.2	138.6	46 54.7	+59.4	139.3	46 09.0	+59.5	140.0	45 22.9	+59.6	140.6	**39**
40	51 33.8	+58.2	135.0	50 51.0	+58.5	135.9	50 07.6	+58.8	136.7	49 23.7	+58.9	137.5	48 39.1	+59.2	138.3	47 54.1	+59.3	139.1	47 08.5	+59.5	139.8	46 22.5	+59.6	140.4	**40**
41	52 32.0	+58.2	134.6	51 49.5	+58.5	135.5	51 06.4	+58.7	136.4	50 22.6	+58.9	137.3	49 38.3	+59.1	138.1	48 53.4	+59.3	138.8	48 08.0	+59.4	139.6	47 22.1	+59.5	140.3	**41**
42	53 30.2	+58.0	134.2	52 48.0	+58.3	135.2	52 05.1	+58.6	136.1	51 21.5	+58.9	137.0	50 37.4	+59.1	137.8	49 52.7	+59.2	138.6	49 07.4	+59.4	139.4	48 21.6	+59.6	140.1	**42**
43	54 28.2	+58.0	133.8	53 46.3	+58.3	134.8	53 03.7	+58.6	135.7	52 20.4	+58.8	136.6	51 36.5	+59.0	137.5	50 51.9	+59.3	138.3	50 06.8	+59.4	139.1	49 21.2	+59.5	139.9	**43**
44	55 26.2	+57.8	133.3	54 44.6	+58.2	134.4	54 02.3	+58.5	135.4	53 19.2	+58.8	136.3	52 35.5	+59.0	137.2	51 51.2	+59.2	138.1	51 06.2	+59.4	138.9	50 20.7	+59.5	139.7	**44**
45	56 24.0	+57.8	132.9	55 42.8	+58.1	133.9	55 00.8	+58.4	135.0	54 18.0	+58.7	136.0	53 34.5	+59.0	136.9	52 50.4	+59.1	137.8	52 05.6	+59.3	138.7	51 20.2	+59.5	139.5	**45**
46	57 21.8	+57.6	132.4	56 40.9	+58.0	133.5	55 59.2	+58.3	134.6	55 16.7	+58.6	135.6	54 33.5	+58.9	136.6	53 49.5	+59.1	137.5	53 04.9	+59.4	138.4	52 19.7	+59.5	139.3	**46**
47	58 19.4	+57.5	131.8	57 38.9	+57.9	133.0	56 57.5	+58.3	134.2	56 15.3	+58.6	135.2	55 32.4	+58.8	136.3	54 48.6	+59.1	137.3	54 04.3	+59.2	138.2	53 19.2	+59.5	139.1	**47**
48	59 16.9	+57.3	131.3	58 36.8	+57.8	132.5	57 55.8	+58.1	133.7	57 13.9	+58.5	134.8	56 31.2	+58.8	135.9	55 47.7	+59.0	136.9	55 03.5	+59.3	137.9	54 18.7	+59.4	138.9	**48**
49	60 14.2	+57.2	130.7	59 34.6	+57.6	132.0	58 53.9	+58.1	133.2	58 12.4	+58.4	134.4	57 30.0	+58.7	135.5	56 46.7	+59.0	136.6	56 02.8	+59.2	137.6	55 18.1	+59.4	138.6	**49**
50	61 11.4	+57.0	130.1	60 32.2	+57.5	131.4	59 52.0	+57.9	132.7	59 10.8	+58.3	134.0	58 28.7	+58.6	135.2	57 45.7	+58.9	136.3	57 02.0	+59.1	137.3	56 17.5	+59.3	138.4	**50**
51	62 08.4	+56.8	129.4	61 29.7	+57.3	130.9	60 49.9	+57.8	132.2	60 09.1	+58.2	133.5	59 27.3	+58.6	134.7	58 44.6	+58.9	135.9	58 01.1	+59.1	137.0	57 16.8	+59.4	138.1	**51**
52	63 05.2	+56.5	128.7	62 27.0	+57.2	130.2	61 47.7	+57.6	131.7	61 07.3	+58.1	133.0	60 25.9	+58.4	134.3	59 43.5	+58.8	135.5	59 00.2	+59.1	136.7	58 16.2	+59.2	137.8	**52**
53	64 01.7	+56.4	128.0	63 24.2	+56.9	129.6	62 45.3	+57.5	131.1	62 05.4	+57.9	132.5	61 24.3	+58.4	133.8	60 42.3	+58.7	135.1	59 59.3	+59.0	136.4	59 15.4	+59.3	137.5	**53**
54	64 58.1	+56.0	127.2	64 21.1	+56.7	128.8	63 42.8	+57.3	130.4	63 03.3	+57.8	131.9	62 22.7	+58.2	133.4	61 41.0	+58.6	134.7	60 58.3	+58.9	136.0	60 14.7	+59.2	137.2	**54**
55	65 54.1	+55.7	126.3	65 17.8	+56.5	128.1	64 40.1	+57.1	129.7	64 01.1	+57.7	131.3	63 20.9	+58.1	132.8	62 39.6	+58.5	134.2	61 57.2	+58.9	135.6	61 13.9	+59.1	136.9	**55**
56	66 49.8	+55.4	125.4	66 14.3	+56.2	127.2	65 37.2	+56.9	129.0	64 58.8	+57.5	130.7	64 19.0	+58.0	132.3	63 38.1	+58.4	133.8	62 56.1	+58.8	135.2	62 13.0	+59.1	136.5	**56**
57	67 45.2	+55.0	124.4	67 10.5	+55.8	126.4	66 34.1	+56.6	128.2	65 56.3	+57.2	130.0	65 17.0	+57.9	131.7	64 36.5	+58.3	133.2	63 54.9	+58.6	134.7	63 12.1	+59.0	136.1	**57**
58	68 40.2	+54.5	123.3	68 06.3	+55.5	125.4	67 30.7	+56.4	127.4	66 53.5	+57.1	129.2	66 14.9	+57.6	131.0	65 34.8	+58.2	132.7	64 53.5	+58.6	134.2	64 11.1	+59.0	135.7	**58**
59	69 34.7	+54.1	122.1	69 01.8	+55.1	124.4	68 27.1	+56.0	126.5	67 50.6	+56.8	128.4	67 12.5	+57.5	130.3	66 33.0	+58.0	132.1	65 52.1	+58.5	133.7	65 10.1	+58.8	135.3	**59**
60	70 28.8	+53.4	120.9	69 56.9	+54.6	123.2	69 23.1	+55.6	125.5	68 47.4	+56.5	127.6	68 10.0	+57.2	129.5	67 31.0	+57.8	131.4	66 50.6	+58.4	133.2	66 08.9	+58.8	134.8	**60**
61	71 22.2	+52.8	119.5	70 51.5	+54.1	122.0	70 18.7	+55.2	124.4	69 43.9	+56.1	126.6	69 07.2	+56.9	128.7	68 28.8	+57.7	130.7	67 49.0	+58.2	132.6	67 07.7	+58.7	134.3	**61**
62	72 15.0	+52.0	118.0	71 45.6	+53.5	120.6	71 13.9	+54.7	123.2	70 40.0	+55.8	125.6	70 04.1	+56.7	127.8	69 26.5	+57.4	129.9	68 47.2	+58.0	131.9	68 06.4	+58.5	133.8	**62**
63	73 07.0	+51.1	116.3	72 39.1	+52.7	119.2	72 08.6	+54.1	121.9	71 35.8	+55.3	124.4	71 00.8	+56.3	126.8	70 23.9	+57.2	129.1	69 45.2	+57.9	131.2	69 04.9	+58.4	133.2	**63**
64	73 58.1	+50.0	114.4	73 31.8	+51.9	117.5	73 02.7	+53.5	120.4	72 31.1	+54.8	123.2	71 57.1	+56.0	125.7	71 21.1	+56.8	128.2	70 43.1	+57.6	130.4	70 03.3	+58.3	132.5	**64**
65	74 48.1	+48.8	112.4	74 23.7	+50.8	115.7	73 56.2	+52.6	118.8	73 25.9	+54.2	121.8	72 53.1	+55.4	124.5	72 17.9	+56.5	127.1	71 40.7	+57.4	129.5	71 01.6	+58.0	131.8	**65**
66	75 36.9	+47.4	110.1	75 14.5	+49.7	113.7	74 48.8	+51.8	117.1	74 20.1	+53.4	120.2	73 48.5	+54.9	123.2	73 14.4	+56.1	126.0	72 38.1	+57.0	128.6	71 59.6	+57.9	131.0	**66**
67	76 24.3	+45.6	107.6	76 04.2	+48.3	111.4	75 40.6	+50.6	115.1	75 13.5	+52.6	118.5	74 43.4	+54.2	121.7	74 10.5	+55.6	124.7	73 35.1	+56.7	127.5	72 57.5	+57.6	130.1	**67**
68	77 09.9	*+43.5*	•104.7	76 52.5	+46.6	108.9	76 31.2	+49.2	112.8	76 06.1	+51.5	116.6	75 37.6	+53.5	120.1	75 06.1	+55.0	123.3	74 31.8	+56.3	126.3	73 55.1	+57.3	129.1	**68**
69	77 53.4	*+41.1*	•101.5	77 39.1	*+44.6*	•106.0	77 20.4	+47.7	110.3	76 57.6	+50.3	114.4	76 31.1	+52.4	118.2	76 01.1	+54.3	121.7	75 28.1	+55.8	125.0	74 52.4	+56.9	128.0	**69**
70	78 34.5	*+38.2*	•98.0	78 23.7	*+42.2*	•102.8	78 08.1	*+45.6*	•107.4	77 47.9	+48.7	111.9	77 23.5	+51.3	116.0	76 55.4	+53.4	119.9	76 23.9	+55.1	123.5	75 49.3	+56.5	126.8	**70**
71	79 12.7	*+34.7*	•93.9	79 05.9	*+39.2*	•99.1	78 53.7	*+43.3*	•104.2	78 36.6	*+46.8*	•109.0	78 14.8	+49.8	113.5	77 48.8	+52.3	117.8	77 19.0	+54.3	121.7	76 45.8	+55.9	125.4	**71**
72	79 47.4	*+30.6*	•89.5	79 45.1	*+35.7*	•95.0	79 37.0	*+40.3*	•100.5	79 23.4	*+44.4*	•105.7	79 04.6	*+48.0*	•110.7	78 41.1	+51.0	115.4	78 13.3	+53.4	119.7	77 41.7	+55.3	123.7	**72**
73	80 18.0	*+25.9*	•84.5	80 20.8	*+31.4*	•90.4	80 17.3	*+36.7*	•96.2	80 07.8	*+41.6*	•101.9	79 52.6	*+45.7*	•107.4	79 32.1	+49.2	112.6	79 06.7	+52.1	117.4	78 37.0	+54.4	121.8	**73**
74	80 43.9	*+20.4*	•79.0	80 52.2	*+26.5*	•85.1	80 54.0	*+32.4*	•91.4	80 49.4	*+37.9*	•97.6	80 38.3	*+42.9*	•103.6	80 21.3	*+47.1*	•109.3	79 58.8	+50.6	114.7	79 31.4	+53.3	119.6	**74**
75	81 04.3	*+14.4*	•73.1	81 18.7	*+20.7*	•79.3	81 26.4	*+27.2*	•85.9	81 27.3	*+33.4*	•92.5	81 21.2	*+39.1*	•99.1	81 08.4	*+44.2*	•105.5	80 49.4	*+48.4*	•111.4	80 24.7	+51.9	117.0	**75**
76	81 18.7	*+7.7*	•66.7	81 39.4	*+14.2*	•73.0	81 53.6	*+21.0*	•79.7	82 00.7	*+27.8*	•86.7	82 00.3	*+34.6*	•93.9	81 52.6	*+40.6*	•100.9	81 37.8	*+45.8*	•107.6	81 16.6	*+50.0*	•113.8	**76**
77	81 26.4	*+0.9*	•60.1	81 53.6	*+7.1*	•66.2	82 14.6	*+13.9*	•72.9	82 28.5	*+21.4*	•80.2	82 34.9	*+28.7*	•87.8	82 33.2	*+35.8*	•95.4	82 23.6	*+42.1*	•102.9	82 06.6	*+47.4*	•110.0	**77**
78	81 27.3	*–6.1*	•53.4	82 00.7	*–0.4*	•59.1	82 28.5	*+6.4*	•65.6	82 49.9	*+13.7*	•72.9	83 03.6	*+21.7*	•80.7	83 09.0	*+29.7*	•89.0	83 05.7	*+37.3*	•97.3	82 54.0	*+43.8*	•105.3	**78**
79	81 21.2	*–12.8*	•46.7	82 00.3	*–7.7*	•51.9	82 34.9	*–1.7*	•57.9	83 03.6	*+5.4*	•64.9	83 25.3	*+13.4*	•72.8	83 38.7	*+22.1*	•81.4	83 43.0	*+30.9*	•90.4	83 37.8	*+39.0*	•99.4	**79**
80	81 08.4	*–19.0*	•40.3	81 52.6	*–14.8*	•44.8	82 33.2	*–9.6*	•50.2	83 09.0	*–3.3*	•56.6	83 38.7	*+4.3*	•64.1	84 00.8	*+13.1*	•72.7	84 13.9	*+22.6*	•82.2	84 16.8	*+32.2*	•92.2	**80**
81	80 49.4	*–24.7*	•34.2	81 37.8	*–21.2*	•38.1	82 23.6	*–17.0*	•42.7	83 05.7	*–11.7*	•48.3	83 43.0	*–5.2*	•55.1	84 13.9	*+2.9*	•63.2	84 36.5	*+12.5*	•72.7	84 49.0	*+23.2*	•83.3	**81**
82	80 24.7	*–29.5*	•28.6	81 16.6	*–26.9*	•31.8	82 06.6	*–23.7*	•35.6	82 54.0	*–19.6*	•40.2	83 37.8	*–14.2*	•46.0	84 16.8	*–7.5*	•53.2	84 49.0	*+1.2*	•62.1	85 12.2	*+11.9*	•72.7	**82**
83	79 55.2	*–33.8*	•23.5	80 49.7	*–31.9*	•26.0	81 42.9	*–29.4*	•29.0	82 34.4	*–26.3*	•32.7	83 23.6	*–22.4*	•37.4	84 09.3	*–17.1*	•43.4	84 50.2	*–10.1*	•51.0	85 24.1	*–0.9*	•60.7	**83**
84	79 21.4	*–37.4*	•18.9	80 17.8	*–36.0*	•20.8	81 13.5	*–34.3*	•23.1	82 08.1	*–32.2*	•26.0	83 01.2	*–29.4*	•29.6	83 52.2	*–25.7*	•34.2	84 40.1	*–20.6*	•40.2	85 23.2	*–13.5*	•48.2	**84**
85	78 44.0	*–40.4*	•14.8	79 41.8	*–39.5*	•16.2	80 39.2	*–38.4*	•17.9	81 35.9	*–36.8*	•20.0	82 31.8	*–35.0*	•22.6	83 26.5	*–32.5*	•26.0	84 19.5	*–29.3*	•30.4	85 09.7	*–24.6*	•36.3	**85**
86	78 03.6	*–43.0*	•11.2	79 02.3	*–42.4*	•12.1	80 00.8	*–41.6*	•13.3	80 59.1	*–40.8*	•14.8	81 56.8	*–39.5*	•16.6	82 54.0	*–38.1*	•18.9	83 50.2	*–36.0*	•21.9	84 45.1	*–33.2*	•25.9	**86**
87	77 20.6	–45.2	7.9	78 19.9	*–44.7*	•8.5	79 19.2	*–44.3*	•9.3	80 18.3	*–43.7*	•10.3	81 17.3	*–43.2*	•11.4	82 15.9	*–42.3*	•12.9	83 14.2	*–41.2*	•14.8	84 11.9	*–39.7*	•17.3	**87**
88	76 35.4	–46.9	5.0	77 35.2	–46.8	5.3	78 34.9	*–46.5*	•5.8	79 34.6	*–46.3*	•6.4	80 34.1	*–45.9*	•7.0	81 33.6	*–45.5*	•7.8	82 33.0	*–45.0*	•8.9	83 32.2	*–44.4*	•10.2	**88**
89	75 48.5	–48.5	2.3	76 48.4	–48.4	2.5	77 48.4	–48.4	2.7	78 48.3	–48.3	3.0	79 48.2	*–48.2*	•3.2	80 48.1	*–48.1*	•3.6	81 48.0	*–48.0*	•4.0	82 47.8	*–47.8*	•4.6	**89**
90	75 00.0	–49.8	0.0	76 00.0	–49.8	0.0	77 00.0	–49.9	0.0	78 00.0	–49.9	0.0	79 00.0	–50.0	0.0	80 00.0	–50.1	0.0	81 00.0	–50.1	0.0	82 00.0	*–50.3*	•0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 35°, 325°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 14.4	–59.3	144.1	11 25.8	–59.4	144.2	10 37.1	–59.5	144.3	9 48.4	–59.6	144.4	8 59.5	–59.6	144.5	8 10.7	–59.7	144.6	7 21.7	–59.7	144.7	6 32.8	–59.8	144.7	**0**
1	11 15.1	–59.3	144.2	10 26.4	–59.4	144.3	9 37.6	–59.5	144.4	8 48.8	–59.6	144.5	7 59.9	–59.6	144.6	7 11.0	–59.7	144.7	6 22.0	–59.8	144.8	5 33.0	–59.8	144.8	**1**
2	10 15.8	–59.3	144.4	9 27.0	–59.4	144.5	8 38.1	–59.4	144.6	7 49.2	–59.5	144.6	7 00.3	–59.7	144.7	6 11.3	–59.7	144.8	5 22.2	–59.7	144.8	4 33.2	–59.9	144.9	**2**
3	9 16.5	–59.3	144.5	8 27.6	–59.4	144.6	7 38.7	–59.5	144.7	6 49.7	–59.6	144.8	6 00.6	–59.6	144.8	5 11.6	–59.7	144.9	4 22.5	–59.8	144.9	3 33.3	–59.8	145.0	**3**
4	8 17.2	–59.4	144.7	7 28.2	–59.4	144.8	6 39.2	–59.5	144.8	5 50.1	–59.6	144.9	5 01.0	–59.6	144.9	4 11.9	–59.7	145.0	3 22.7	–59.7	145.0	2 33.5	–59.8	145.1	**4**
5	7 17.8	–59.3	144.8	6 28.8	–59.4	144.9	5 39.7	–59.5	145.0	4 50.5	–59.5	145.0	4 01.4	–59.7	145.1	3 12.2	–59.7	145.1	2 23.0	–59.8	145.1	1 33.7	–59.8	145.1	**5**
6	6 18.5	–59.3	145.0	5 29.4	–59.5	145.0	4 40.2	–59.5	145.1	3 51.0	–59.6	145.1	3 01.7	–59.6	145.2	2 12.5	–59.7	145.2	1 23.2	–59.8	145.2	0 33.9	–59.8	145.2	**6**
7	5 19.2	–59.3	145.1	4 29.9	–59.4	145.2	3 40.7	–59.5	145.2	2 51.4	–59.6	145.2	2 02.1	–59.7	145.3	1 12.8	–59.7	145.3	0 23.4	–59.7	145.3	0 25.9	+59.8	34.7	**7**
8	4 19.9	–59.4	145.3	3 30.5	–59.4	145.3	2 41.2	–59.5	145.3	1 51.8	–59.5	145.4	1 02.4	–59.6	145.4	0 13.1	–59.7	145.4	0 36.3	+59.8	34.6	1 25.7	+59.8	34.6	**8**
9	3 20.5	–59.3	145.4	2 31.1	–59.4	145.5	1 41.7	–59.5	145.5	0 52.3	–59.6	145.5	0 02.8	–59.6	145.5	0 46.6	+59.7	34.5	1 36.1	+59.7	34.5	2 25.5	+59.8	34.5	**9**
10	2 21.2	–59.3	145.6	1 31.7	–59.4	145.6	0 42.2	–59.5	145.6	0 07.3	+59.6	34.4	0 56.8	+59.7	34.4	1 46.3	+59.7	34.4	2 35.8	+59.8	34.4	3 25.3	+59.8	34.5	**10**
11	1 21.9	–59.4	145.7	0 32.3	–59.4	145.7	0 17.3	+59.5	34.3	1 06.9	+59.6	34.3	1 56.5	+59.6	34.3	2 46.0	+59.7	34.3	3 35.6	+59.7	34.3	4 25.1	+59.8	34.4	**11**
12	0 22.5	–59.3	145.9	0 27.1	+59.5	34.1	1 16.8	+59.5	34.1	2 06.5	+59.5	34.2	2 56.1	+59.6	34.2	3 45.7	+59.7	34.2	4 35.3	+59.8	34.3	5 24.9	+59.8	34.3	**12**
13	0 36.8	+59.3	34.0	1 26.6	+59.4	34.0	2 16.3	+59.5	34.0	3 06.0	+59.6	34.0	3 55.7	+59.7	34.1	4 45.4	+59.7	34.1	5 35.1	+59.8	34.2	6 24.7	+59.8	34.2	**13**
14	1 36.1	+59.4	33.8	2 26.0	+59.4	33.9	3 15.8	+59.5	33.9	4 05.6	+59.6	33.9	4 55.4	+59.6	34.0	5 45.1	+59.7	34.0	6 34.9	+59.7	34.1	7 24.5	+59.8	34.1	**14**
15	2 35.5	+59.3	33.7	3 25.4	+59.4	33.7	4 15.3	+59.5	33.7	5 05.2	+59.5	33.8	5 55.0	+59.7	33.8	6 44.8	+59.7	33.9	7 34.6	+59.8	34.0	8 24.3	+59.8	34.1	**15**
16	3 34.8	+59.3	33.5	4 24.8	+59.4	33.6	5 14.8	+59.5	33.6	6 04.7	+59.6	33.7	6 54.7	+59.6	33.7	7 44.5	+59.7	33.8	8 34.4	+59.7	33.9	9 24.1	+59.8	34.0	**16**
17	4 34.1	+59.4	33.4	5 24.2	+59.4	33.4	6 14.3	+59.5	33.5	7 04.3	+59.6	33.6	7 54.3	+59.6	33.6	8 44.2	+59.7	33.7	9 34.1	+59.8	33.8	10 23.9	+59.8	33.9	**17**
18	5 33.5	+59.3	33.2	6 23.6	+59.5	33.3	7 13.8	+59.5	33.4	8 03.9	+59.5	33.4	8 53.9	+59.7	33.5	9 43.9	+59.7	33.6	10 33.9	+59.7	33.7	11 23.7	+59.8	33.8	**18**
19	6 32.8	+59.3	33.1	7 23.1	+59.4	33.2	8 13.3	+59.5	33.2	9 03.4	+59.6	33.3	9 53.6	+59.6	33.4	10 43.6	+59.7	33.5	11 33.6	+59.8	33.6	12 23.5	+59.8	33.7	**19**
20	7 32.1	+59.3	32.9	8 22.5	+59.4	33.0	9 12.8	+59.4	33.1	10 03.0	+59.6	33.2	10 53.2	+59.6	33.3	11 43.3	+59.7	33.4	12 33.4	+59.7	33.5	13 23.3	+59.8	33.6	**20**
21	8 31.4	+59.4	32.8	9 21.9	+59.4	32.9	10 12.2	+59.5	33.0	11 02.6	+59.5	33.1	11 52.8	+59.6	33.2	12 43.0	+59.7	33.3	13 33.1	+59.7	33.4	14 23.1	+59.8	33.6	**21**
22	9 30.8	+59.3	32.6	10 21.3	+59.4	32.7	11 11.7	+59.5	32.8	12 02.1	+59.6	32.9	12 52.4	+59.6	33.1	13 42.7	+59.7	33.2	14 32.8	+59.8	33.3	15 22.9	+59.8	33.5	**22**
23	10 30.1	+59.3	32.5	11 20.7	+59.4	32.6	12 11.2	+59.5	32.7	13 01.7	+59.5	32.8	13 52.0	+59.7	32.9	14 42.4	+59.6	33.1	15 32.6	+59.7	33.2	16 22.7	+59.8	33.4	**23**
24	11 29.4	+59.3	32.3	12 20.1	+59.4	32.4	13 10.7	+59.4	32.6	14 01.2	+59.5	32.7	14 51.7	+59.6	32.8	15 42.0	+59.7	33.0	16 32.3	+59.8	33.1	17 22.5	+59.8	33.3	**24**
25	12 28.7	+59.3	32.2	13 19.5	+59.3	32.3	14 10.1	+59.5	32.4	15 00.7	+59.6	32.6	15 51.3	+59.6	32.7	16 41.7	+59.7	32.9	17 32.1	+59.7	33.0	18 22.3	+59.8	33.2	**25**
26	13 28.0	+59.3	32.0	14 18.8	+59.4	32.1	15 09.6	+59.5	32.3	16 00.3	+59.5	32.4	16 50.9	+59.6	32.6	17 41.4	+59.7	32.8	18 31.8	+59.7	32.9	19 22.1	+59.8	33.1	**26**
27	14 27.3	+59.3	31.9	15 18.2	+59.4	32.0	16 09.1	+59.4	32.1	16 59.8	+59.5	32.3	17 50.5	+59.6	32.5	18 41.1	+59.6	32.6	19 31.5	+59.7	32.8	20 21.9	+59.8	33.0	**27**
28	15 26.6	+59.3	31.7	16 17.6	+59.4	31.8	17 08.5	+59.5	32.0	17 59.3	+59.6	32.2	18 50.1	+59.6	32.4	19 40.7	+59.7	32.5	20 31.2	+59.8	32.7	21 21.7	+59.7	32.9	**28**
29	16 25.9	+59.2	31.5	17 17.0	+59.3	31.7	18 08.0	+59.4	31.9	18 58.9	+59.5	32.0	19 49.7	+59.6	32.2	20 40.4	+59.6	32.4	21 31.0	+59.7	32.6	22 21.4	+59.8	32.8	**29**
30	17 25.1	+59.3	31.4	18 16.3	+59.4	31.5	19 07.4	+59.4	31.7	19 58.4	+59.5	31.9	20 49.3	+59.6	32.1	21 40.0	+59.7	32.3	22 30.7	+59.7	32.5	23 21.2	+59.8	32.8	**30**
31	18 24.4	+59.3	31.2	19 15.7	+59.3	31.4	20 06.8	+59.5	31.6	20 57.9	+59.5	31.8	21 48.9	+59.5	32.0	22 39.7	+59.6	32.2	23 30.4	+59.7	32.4	24 21.0	+59.8	32.7	**31**
32	19 23.7	+59.2	31.0	20 15.0	+59.3	31.2	21 06.3	+59.4	31.4	21 57.4	+59.5	31.6	22 48.4	+59.6	31.8	23 39.3	+59.7	32.1	24 30.1	+59.7	32.3	25 20.8	+59.7	32.6	**32**
33	20 22.9	+59.2	30.9	21 14.3	+59.4	31.1	22 05.7	+59.4	31.3	22 56.9	+59.5	31.5	23 48.0	+59.6	31.7	24 39.0	+59.6	32.0	25 29.8	+59.7	32.2	26 20.5	+59.8	32.5	**33**
34	21 22.1	+59.3	30.7	22 13.7	+59.3	30.9	23 05.1	+59.4	31.1	23 56.4	+59.5	31.4	24 47.6	+59.5	31.6	25 38.6	+59.6	31.8	26 29.5	+59.7	32.1	27 20.3	+59.7	32.4	**34**
35	22 21.4	+59.2	30.5	23 13.0	+59.3	30.7	24 04.5	+59.4	31.0	24 55.9	+59.5	31.2	25 47.1	+59.6	31.5	26 38.2	+59.7	31.7	27 29.2	+59.7	32.0	28 20.0	+59.8	32.3	**35**
36	23 20.6	+59.2	30.4	24 12.3	+59.3	30.6	25 03.9	+59.4	30.8	25 55.4	+59.4	31.1	26 46.7	+59.5	31.3	27 37.9	+59.6	31.6	28 28.9	+59.7	31.9	29 19.8	+59.7	32.2	**36**
37	24 19.8	+59.2	30.2	25 11.6	+59.3	30.4	26 03.3	+59.3	30.7	26 54.8	+59.5	30.9	27 46.2	+59.6	31.2	28 37.5	+59.6	31.5	29 28.6	+59.7	31.7	30 19.5	+59.8	32.1	**37**
38	25 19.0	+59.2	30.0	26 10.9	+59.3	30.2	27 02.6	+59.4	30.5	27 54.3	+59.4	30.8	28 45.8	+59.5	31.0	29 37.1	+59.6	31.3	30 28.3	+59.6	31.6	31 19.3	+59.7	31.9	**38**
39	26 18.2	+59.1	29.8	27 10.2	+59.2	30.1	28 02.0	+59.4	30.3	28 53.7	+59.5	30.6	29 45.3	+59.5	30.9	30 36.7	+59.6	31.2	31 27.9	+59.7	31.5	32 19.0	+59.7	31.8	**39**
40	27 17.3	+59.2	29.6	28 09.4	+59.3	29.9	29 01.4	+59.3	30.2	29 53.2	+59.4	30.4	30 44.8	+59.5	30.7	31 36.3	+59.6	31.1	32 27.6	+59.7	31.4	33 18.7	+59.8	31.7	**40**
41	28 16.5	+59.1	29.4	29 08.7	+59.2	29.7	30 00.7	+59.3	30.0	30 52.6	+59.4	30.3	31 44.3	+59.5	30.6	32 35.9	+59.5	30.9	33 27.3	+59.6	31.3	34 18.5	+59.7	31.6	**41**
42	29 15.6	+59.1	29.2	30 07.9	+59.2	29.5	31 00.0	+59.3	29.8	31 52.0	+59.4	30.1	32 43.8	+59.5	30.4	33 35.4	+59.6	30.8	34 26.9	+59.6	31.1	35 18.2	+59.7	31.5	**42**
43	30 14.7	+59.1	29.1	31 07.1	+59.2	29.3	31 59.3	+59.3	29.6	32 51.4	+59.4	30.0	33 43.3	+59.5	30.3	34 35.0	+59.6	30.6	35 26.5	+59.7	31.0	36 17.9	+59.7	31.4	**43**
44	31 13.8	+59.1	28.8	32 06.3	+59.2	29.1	32 58.6	+59.3	29.5	33 50.8	+59.3	29.8	34 42.8	+59.4	30.1	35 34.6	+59.5	30.5	36 26.2	+59.6	30.9	37 17.6	+59.7	31.2	**44**
45	32 12.9	+59.1	28.6	33 05.5	+59.1	29.0	33 57.9	+59.3	29.3	34 50.1	+59.4	29.6	35 42.2	+59.5	30.0	36 34.1	+59.5	30.3	37 25.8	+59.6	30.7	38 17.3	+59.7	31.1	**45**
46	33 12.0	+59.0	28.4	34 04.6	+59.2	28.8	34 57.2	+59.2	29.1	35 49.5	+59.3	29.4	36 41.7	+59.4	29.8	37 33.6	+59.6	30.2	38 25.4	+59.6	30.6	39 17.0	+59.6	31.0	**46**
47	34 11.0	+59.0	28.2	35 03.8	+59.1	28.5	35 56.4	+59.2	28.9	36 48.8	+59.4	29.2	37 41.1	+59.4	29.6	38 33.2	+59.5	30.0	39 25.0	+59.6	30.4	40 16.6	+59.7	30.8	**47**
48	35 10.0	+59.0	28.0	36 02.9	+59.1	28.3	36 55.6	+59.2	28.7	37 48.2	+59.3	29.1	38 40.5	+59.4	29.4	39 32.7	+59.4	29.8	40 24.6	+59.6	30.3	41 16.3	+59.7	30.7	**48**
49	36 09.0	+59.0	27.8	37 02.0	+59.1	28.1	37 54.8	+59.2	28.5	38 47.5	+59.3	28.9	39 39.9	+59.4	29.3	40 32.1	+59.5	29.7	41 24.2	+59.5	30.1	42 16.0	+59.6	30.6	**49**
50	37 08.0	+58.9	27.5	38 01.1	+59.0	27.9	38 54.0	+59.2	28.3	39 46.8	+59.2	28.7	40 39.3	+59.4	29.1	41 31.6	+59.5	29.5	42 23.7	+59.6	29.9	43 15.6	+59.6	30.4	**50**
51	38 06.9	+58.9	27.3	39 00.1	+59.0	27.7	39 53.2	+59.1	28.1	40 46.0	+59.3	28.5	41 38.7	+59.3	28.9	42 31.1	+59.4	29.3	43 23.3	+59.5	29.8	44 15.2	+59.6	30.3	**51**
52	39 05.8	+58.9	27.1	39 59.1	+59.0	27.4	40 52.3	+59.1	27.8	41 45.3	+59.2	28.3	42 38.0	+59.3	28.7	43 30.5	+59.4	29.1	44 22.8	+59.5	29.6	45 14.8	+59.7	30.1	**52**
53	40 04.7	+58.8	26.8	40 58.1	+59.0	27.2	41 51.4	+59.1	27.6	42 44.5	+59.2	28.0	43 37.3	+59.3	28.5	44 29.9	+59.4	28.9	45 22.3	+59.5	29.4	46 14.5	+59.5	29.9	**53**
54	41 03.5	+58.8	26.6	41 57.1	+58.9	27.0	42 50.5	+59.0	27.4	43 43.7	+59.1	27.8	44 36.6	+59.3	28.3	45 29.3	+59.4	28.7	46 21.8	+59.5	29.2	47 14.0	+59.6	29.8	**54**
55	42 02.3	+58.8	26.3	42 56.0	+58.9	26.7	43 49.5	+59.0	27.1	44 42.8	+59.2	27.6	45 35.9	+59.2	28.0	46 28.7	+59.4	28.5	47 21.3	+59.5	29.1	48 13.6	+59.6	29.6	**55**
56	43 01.1	+58.7	26.0	43 54.9	+58.9	26.4	44 48.5	+59.0	26.9	45 42.0	+59.1	27.3	46 35.1	+59.3	27.8	47 28.1	+59.3	28.3	48 20.8	+59.4	28.9	49 13.2	+59.5	29.4	**56**
57	43 59.8	+58.7	25.7	44 53.8	+58.8	26.2	45 47.5	+59.0	26.6	46 41.1	+59.0	27.1	47 34.4	+59.2	27.6	48 27.4	+59.3	28.1	49 20.2	+59.4	28.6	50 12.7	+59.5	29.2	**57**
58	44 58.5	+58.7	25.4	45 52.6	+58.8	25.9	46 46.5	+58.9	26.3	47 40.1	+59.1	26.8	48 33.6	+59.1	27.3	49 26.7	+59.3	27.9	50 19.6	+59.4	28.4	51 12.2	+59.5	29.0	**58**
59	45 57.2	+58.6	25.1	46 51.4	+58.7	25.6	47 45.4	+58.8	26.1	48 39.2	+59.0	26.6	49 32.7	+59.1	27.1	50 26.0	+59.2	27.6	51 19.0	+59.4	28.2	52 11.7	+59.5	28.8	**59**
60	46 55.8	+58.5	24.8	47 50.1	+58.7	25.3	48 44.2	+58.9	25.8	49 38.2	+58.9	26.3	50 31.8	+59.1	26.8	51 25.2	+59.3	27.4	52 18.4	+59.3	28.0	53 11.2	+59.5	28.6	**60**
61	47 54.3	+58.5	24.5	48 48.8	+58.6	25.0	49 43.1	+58.7	25.5	50 37.1	+58.9	26.0	51 30.9	+59.1	26.5	52 24.5	+59.1	27.1	53 17.7	+59.3	27.7	54 10.7	+59.4	28.4	**61**
62	48 52.8	+58.4	24.2	49 47.4	+58.6	24.7	50 41.8	+58.7	25.2	51 36.0	+58.9	25.7	52 30.0	+59.0	26.3	53 23.6	+59.2	26.8	54 17.0	+59.3	27.5	55 10.1	+59.4	28.1	**62**
63	49 51.2	+58.3	23.8	50 46.0	+58.5	24.3	51 40.5	+58.7	24.8	52 34.9	+58.8	25.4	53 29.0	+58.9	26.0	54 22.8	+59.1	26.6	55 16.3	+59.2	27.2	56 09.5	+59.4	27.9	**63**
64	50 49.5	+58.3	23.5	51 44.5	+58.4	24.0	52 39.2	+58.6	24.5	53 33.7	+58.7	25.0	54 27.9	+58.9	25.6	55 21.9	+59.0	26.3	56 15.5	+59.2	26.9	57 08.9	+59.3	27.6	**64**
65	51 47.8	+58.2	23.1	52 42.9	+58.4	23.6	53 37.8	+58.5	24.1	54 32.4	+58.7	24.7	55 26.8	+58.9	25.3	56 20.9	+59.0	25.9	57 14.7	+59.2	26.6	58 08.2	+59.3	27.3	**65**
66	52 46.0	+58.2	22.7	53 41.3	+58.3	23.2	54 36.3	+58.5	23.8	55 31.1	+58.6	24.3	56 25.7	+58.7	25.0	57 19.9	+59.0	25.6	58 13.9	+59.1	26.3	59 07.5	+59.2	27.0	**66**
67	53 44.2	+58.0	22.3	54 39.6	+58.2	22.8	55 34.8	+58.4	23.4	56 29.7	+58.6	24.0	57 24.4	+58.7	24.6	58 18.9	+58.8	25.3	59 13.0	+59.0	26.0	60 06.7	+59.2	26.7	**67**
68	54 42.2	+57.9	21.8	55 37.8	+58.1	22.4	56 33.2	+58.2	22.9	57 28.3	+58.4	23.6	58 23.1	+58.7	24.2	59 17.7	+58.8	24.9	60 12.0	+59.0	25.6	61 05.9	+59.2	26.4	**68**
69	55 40.1	+57.9	21.4	56 35.9	+58.0	21.9	57 31.4	+58.2	22.5	58 26.7	+58.4	23.1	59 21.8	+58.5	23.8	60 16.5	+58.8	24.5	61 11.0	+58.9	25.2	62 05.1	+59.1	26.0	**69**
70	56 38.0	+57.7	20.9	57 33.9	+57.9	21.5	58 29.6	+58.1	22.0	59 25.1	+58.3	22.7	60 20.3	+58.5	23.4	61 15.3	+58.6	24.1	62 09.9	+58.8	24.8	63 04.2	+59.0	25.7	**70**
71	57 35.7	+57.6	20.4	58 31.8	+57.8	21.0	59 27.7	+58.0	21.6	60 23.4	+58.2	22.2	61 18.8	+58.4	22.9	62 13.9	+58.6	23.6	63 08.7	+58.8	24.4	64 03.2	+58.9	25.3	**71**
72	58 33.3	+57.4	19.9	59 29.6	+57.6	20.4	60 25.7	+57.8	21.0	61 21.6	+58.0	21.7	62 17.2	+58.2	22.4	63 12.5	+58.5	23.2	64 07.5	+58.7	24.0	65 02.1	+58.9	24.8	**72**
73	59 30.7	+57.3	19.3	60 27.2	+57.5	19.9	61 23.5	+57.8	20.5	62 19.6	+57.9	21.2	63 15.4	+58.2	21.9	64 11.0	+58.3	22.6	65 06.2	+58.5	23.5	66 01.0	+58.8	24.4	**73**
74	60 28.0	+57.1	18.7	61 24.7	+57.4	19.3	62 21.3	+57.5	19.9	63 17.5	+57.8	20.6	64 13.6	+58.0	21.3	65 09.3	+58.2	22.1	66 04.7	+58.5	22.9	66 59.8	+58.7	23.9	**74**
75	61 25.1	+57.0	18.1	62 22.1	+57.1	18.7	63 18.8	+57.4	19.3	64 15.3	+57.6	20.0	65 11.6	+57.8	20.7	66 07.5	+58.1	21.5	67 03.2	+58.3	22.4	67 58.5	+58.6	23.3	**75**
76	62 22.1	+56.7	17.4	63 19.2	+57.0	18.0	64 16.2	+57.2	18.6	65 12.9	+57.5	19.3	66 09.4	+57.7	20.1	67 05.6	+57.9	20.9	68 01.5	+58.2	21.8	68 57.1	+58.4	22.7	**76**
77	63 18.8	+56.5	16.7	64 16.2	+56.7	17.3	65 13.4	+57.0	17.9	66 10.4	+57.2	18.6	67 07.1	+57.5	19.4	68 03.5	+57.8	20.2	68 59.7	+58.0	21.1	69 55.5	+58.3	22.1	**77**
78	64 15.3	+56.3	15.9	65 12.9	+56.5	16.5	66 10.4	+56.7	17.2	67 07.6	+57.0	17.9	68 04.6	+57.2	18.6	69 01.3	+57.5	19.5	69 57.7	+57.8	20.4	70 53.8	+58.0	21.4	**78**
79	65 11.6	+55.9	15.1	66 09.4	+56.2	15.7	67 07.1	+56.4	16.3	68 04.6	+56.7	17.0	69 01.8	+57.0	17.8	69 58.8	+57.3	18.6	70 55.5	+57.6	19.6	71 51.8	+57.9	20.6	**79**
80	66 07.5	+55.7	14.2	67 05.6	+55.9	14.8	68 03.5	+56.2	15.5	69 01.3	+56.4	16.2	69 58.8	+56.7	16.9	70 56.1	+57.0	17.8	71 53.1	+57.3	18.7	72 49.7	+57.7	19.7	**80**
81	67 03.2	+55.3	13.3	68 01.5	+55.6	13.9	68 59.7	+55.8	14.5	69 57.7	+56.1	15.2	70 55.5	+56.3	15.9	71 53.1	+56.6	16.8	72 50.4	+57.0	17.7	73 47.4	+57.3	18.7	**81**
82	67 58.5	+54.9	12.3	68 57.1	+55.1	12.8	69 55.5	+55.4	13.4	70 53.8	+55.6	14.1	71 51.8	+56.0	14.9	72 49.7	+56.3	15.7	73 47.4	+56.6	16.6	74 44.7	+57.0	17.7	**82**
83	68 53.4	+54.4	11.2	69 52.2	+54.6	11.7	70 50.9	+54.9	12.3	71 49.4	+55.2	12.9	72 47.8	+55.5	13.7	73 46.0	+55.8	14.5	74 44.0	+56.2	15.4	75 41.7	+56.5	16.4	**83**
84	69 47.8	+53.9	10.0	70 46.8	+54.2	10.5	71 45.8	+54.4	11.0	72 44.6	+54.7	11.7	73 43.3	+55.0	12.4	74 41.8	+55.3	13.1	75 40.2	+55.6	14.0	76 38.2	+56.1	15.0	**84**
85	70 41.7	+53.3	8.7	71 41.0	+53.5	9.2	72 40.2	+53.7	9.7	73 39.3	+54.0	10.2	74 38.3	+54.2	10.9	75 37.1	+54.6	11.6	76 35.8	+55.0	12.5	77 34.3	+55.3	13.4	**85**
86	71 35.0	+52.6	7.3	72 34.5	+52.8	7.7	73 33.9	+53.0	8.1	74 33.3	+53.2	8.6	75 32.5	+53.6	9.2	76 31.7	+53.8	9.9	77 30.8	+54.1	10.7	78 29.6	+54.6	11.6	**86**
87	72 27.6	+51.8	5.7	73 27.3	+51.9	6.1	74 26.9	+52.2	6.4	75 26.5	+52.4	6.9	76 26.1	+52.5	7.4	77 25.5	+52.9	7.9	78 24.9	+53.1	8.6	79 24.2	+53.4	9.4	**87**
88	73 19.4	+50.8	4.0	74 19.2	+51.0	4.2	75 19.1	+51.0	4.5	76 18.9	+51.2	4.9	77 18.6	+51.4	5.2	78 18.4	+51.5	5.7	79 18.0	+51.9	6.2	80 17.6	+52.1	6.8	**88**
89	74 10.2	+49.8	2.1	75 10.2	+49.8	2.2	76 10.1	+49.9	2.4	77 10.1	+49.9	2.6	78 10.0	+50.0	2.8	79 09.9	+50.1	3.1	80 09.9	+50.1	3.4	81 09.7	*+50.3* •	3.7	**89**
90	75 00.0	+48.5	0.0	76 00.0	+48.4	0.0	77 00.0	+48.4	0.0	78 00.0	+48.3	0.0	79 00.0	*+48.2* •	0.0	80 00.0	*+48.1* •	0.0	81 00.0	*+48.0* •	0.0	82 00.0	*+47.8* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 145°, 215°

36°, 324° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 05.2	+59.3	143.1	11 17.2	+59.4	143.2	10 29.1	+59.5	143.3	9 41.0	+59.5	143.4	8 52.8	+59.6	143.5	8 04.6	+59.6	143.6	7 16.2	+59.8	143.7	6 27.9	+59.8	143.7	**0**
1	13 04.5	+59.2	142.9	12 16.6	+59.3	143.0	11 28.6	+59.4	143.2	10 40.5	+59.6	143.3	9 52.4	+59.6	143.4	9 04.2	+59.7	143.5	8 16.0	+59.7	143.6	7 27.7	+59.8	143.7	**1**
2	14 03.7	+59.3	142.7	13 15.9	+59.4	142.9	12 28.0	+59.5	143.0	11 40.1	+59.5	143.1	10 52.0	+59.6	143.3	10 03.9	+59.7	143.4	9 15.7	+59.8	143.5	8 27.5	+59.8	143.6	**2**
3	15 03.0	+59.2	142.6	14 15.3	+59.3	142.7	13 27.5	+59.4	142.9	12 39.6	+59.5	143.0	11 51.6	+59.6	143.1	11 03.6	+59.7	143.3	10 15.5	+59.7	143.4	9 27.3	+59.8	143.5	**3**
4	16 02.2	+59.3	142.4	15 14.6	+59.4	142.6	14 26.9	+59.5	142.7	13 39.1	+59.5	142.9	12 51.2	+59.6	143.0	12 03.3	+59.6	143.2	11 15.2	+59.7	143.3	10 27.1	+59.8	143.4	**4**
5	17 01.5	+59.2	142.2	16 14.0	+59.3	142.4	15 26.4	+59.4	142.6	14 38.6	+59.6	142.8	13 50.8	+59.6	142.9	13 02.9	+59.7	143.1	12 14.9	+59.8	143.2	11 26.9	+59.7	143.3	**5**
6	18 00.7	+59.2	142.1	17 13.3	+59.3	142.3	16 25.8	+59.4	142.5	15 38.2	+59.5	142.6	14 50.4	+59.6	142.8	14 02.6	+59.7	142.9	13 14.7	+59.7	143.1	12 26.6	+59.8	143.2	**6**
7	18 59.9	+59.2	141.9	18 12.6	+59.4	142.1	17 25.2	+59.4	142.3	16 37.7	+59.5	142.5	15 50.0	+59.6	142.7	15 02.3	+59.6	142.8	14 14.4	+59.7	143.0	13 26.4	+59.8	143.1	**7**
8	19 59.1	+59.2	141.7	19 12.0	+59.3	142.0	18 24.6	+59.4	142.2	17 37.2	+59.5	142.4	16 49.6	+59.6	142.5	16 01.9	+59.7	142.7	15 14.1	+59.8	142.9	14 26.2	+59.8	143.1	**8**
9	20 58.3	+59.2	141.6	20 11.3	+59.3	141.8	19 24.0	+59.4	142.0	18 36.7	+59.5	142.2	17 49.2	+59.6	142.4	17 01.6	+59.6	142.6	16 13.9	+59.7	142.8	15 26.0	+59.8	143.0	**9**
10	21 57.5	+59.2	141.4	21 10.6	+59.3	141.6	20 23.4	+59.4	141.9	19 36.2	+59.5	142.1	18 48.8	+59.6	142.3	18 01.2	+59.7	142.5	17 13.6	+59.7	142.7	16 25.8	+59.8	142.9	**10**
11	22 56.7	+59.2	141.2	22 09.9	+59.2	141.5	21 22.8	+59.4	141.7	20 35.7	+59.5	141.9	19 48.4	+59.5	142.2	19 00.9	+59.6	142.4	18 13.3	+59.7	142.6	17 25.6	+59.7	142.8	**11**
12	23 55.9	+59.1	141.0	23 09.1	+59.3	141.3	22 22.2	+59.4	141.6	21 35.2	+59.4	141.8	20 47.9	+59.6	142.0	20 00.5	+59.7	142.3	19 13.0	+59.7	142.5	18 25.3	+59.8	142.7	**12**
13	24 55.0	+59.2	140.8	24 08.4	+59.3	141.1	23 21.6	+59.4	141.4	22 34.6	+59.5	141.7	21 47.5	+59.5	141.9	21 00.2	+59.6	142.2	20 12.7	+59.7	142.4	19 25.1	+59.8	142.6	**13**
14	25 54.2	+59.1	140.7	25 07.7	+59.2	141.0	24 21.0	+59.3	141.2	23 34.1	+59.5	141.5	22 47.0	+59.6	141.8	21 59.8	+59.7	142.0	21 12.4	+59.7	142.3	20 24.9	+59.8	142.5	**14**
15	26 53.3	+59.1	140.5	26 06.9	+59.3	140.8	25 20.3	+59.4	141.1	24 33.6	+59.4	141.4	23 46.6	+59.5	141.7	22 59.5	+59.6	141.9	22 12.1	+59.7	142.2	21 24.7	+59.7	142.4	**15**
16	27 52.4	+59.1	140.3	27 06.2	+59.2	140.6	26 19.7	+59.3	140.9	25 33.0	+59.5	141.2	24 46.1	+59.6	141.5	23 59.1	+59.6	141.8	23 11.8	+59.7	142.1	22 24.4	+59.8	142.3	**16**
17	28 51.5	+59.1	140.1	28 05.4	+59.2	140.4	27 19.0	+59.4	140.8	26 32.5	+59.4	141.1	25 45.7	+59.5	141.4	24 58.7	+59.6	141.7	24 11.5	+59.7	142.0	23 24.2	+59.8	142.2	**17**
18	29 50.6	+59.1	139.9	29 04.6	+59.2	140.2	28 18.4	+59.3	140.6	27 31.9	+59.4	140.9	26 45.2	+59.5	141.2	25 58.3	+59.6	141.6	25 11.2	+59.7	141.8	24 24.0	+59.7	142.1	**18**
19	30 49.7	+59.0	139.7	30 03.8	+59.2	140.0	29 17.7	+59.3	140.4	28 31.3	+59.4	140.8	27 44.7	+59.5	141.1	26 57.9	+59.6	141.4	26 10.9	+59.7	141.7	25 23.7	+59.8	142.0	**19**
20	31 48.7	+59.0	139.5	31 03.0	+59.1	139.9	30 17.0	+59.3	140.2	29 30.7	+59.4	140.6	28 44.2	+59.5	141.0	27 57.5	+59.6	141.3	27 10.6	+59.7	141.6	26 23.5	+59.7	141.9	**20**
21	32 47.7	+59.0	139.2	32 02.1	+59.2	139.7	31 16.3	+59.2	140.1	30 30.1	+59.4	140.4	29 43.7	+59.5	140.8	28 57.1	+59.6	141.2	28 10.3	+59.6	141.5	27 23.2	+59.8	141.8	**21**
22	33 46.7	+59.0	139.0	33 01.3	+59.1	139.5	32 15.5	+59.3	139.9	31 29.5	+59.4	140.3	30 43.2	+59.5	140.7	29 56.7	+59.6	141.0	29 09.9	+59.7	141.4	28 23.0	+59.7	141.7	**22**
23	34 45.7	+58.9	138.8	34 00.4	+59.1	139.3	33 14.8	+59.2	139.7	32 28.9	+59.3	140.1	31 42.7	+59.5	140.5	30 56.3	+59.6	140.9	30 09.6	+59.7	141.3	29 22.7	+59.7	141.6	**23**
24	35 44.6	+59.0	138.6	34 59.5	+59.1	139.0	34 14.0	+59.2	139.5	33 28.2	+59.4	139.9	32 42.2	+59.4	140.3	31 55.9	+59.5	140.8	31 09.3	+59.6	141.1	30 22.4	+59.7	141.5	**24**
25	36 43.6	+58.9	138.3	35 58.6	+59.0	138.8	35 13.2	+59.2	139.3	34 27.6	+59.3	139.8	33 41.6	+59.5	140.2	32 55.4	+59.6	140.6	32 08.9	+59.7	141.0	31 22.1	+59.8	141.4	**25**
26	37 42.5	+58.8	138.1	36 57.6	+59.0	138.6	36 12.4	+59.2	139.1	35 26.9	+59.3	139.6	34 41.1	+59.4	140.0	33 55.0	+59.5	140.5	33 08.6	+59.6	140.9	32 21.9	+59.7	141.3	**26**
27	38 41.3	+58.9	137.9	37 56.6	+59.0	138.4	37 11.6	+59.2	138.9	36 26.2	+59.3	139.4	35 40.5	+59.4	139.9	34 54.5	+59.5	140.3	34 08.2	+59.6	140.7	33 21.6	+59.7	141.2	**27**
28	39 40.2	+58.8	137.6	38 55.6	+59.0	138.2	38 10.8	+59.1	138.7	37 25.5	+59.3	139.2	36 39.9	+59.4	139.7	35 54.0	+59.5	140.2	35 07.8	+59.6	140.6	34 21.3	+59.7	141.0	**28**
29	40 39.0	+58.7	137.3	39 54.6	+59.0	137.9	39 09.9	+59.1	138.5	38 24.8	+59.3	139.0	37 39.3	+59.4	139.5	36 53.5	+59.5	140.0	36 07.4	+59.6	140.5	35 21.0	+59.7	140.9	**29**
30	41 37.7	+58.7	137.1	40 53.6	+58.9	137.7	40 09.0	+59.1	138.2	39 24.1	+59.2	138.8	38 38.7	+59.4	139.3	37 53.0	+59.5	139.8	37 07.0	+59.6	140.3	36 20.7	+59.7	140.8	**30**
31	42 36.4	+58.7	136.8	41 52.5	+58.9	137.4	41 08.1	+59.0	138.0	40 23.3	+59.2	138.6	39 38.1	+59.3	139.1	38 52.5	+59.5	139.7	38 06.6	+59.6	140.2	37 20.4	+59.6	140.7	**31**
32	43 35.1	+58.7	136.5	42 51.4	+58.8	137.2	42 07.1	+59.1	137.8	41 22.5	+59.2	138.4	40 37.4	+59.4	138.9	39 52.0	+59.5	139.5	39 06.2	+59.6	140.0	38 20.0	+59.7	140.5	**32**
33	44 33.8	+58.6	136.2	43 50.2	+58.8	136.9	43 06.2	+59.0	137.5	42 21.7	+59.1	138.2	41 36.8	+59.3	138.7	40 51.5	+59.4	139.3	40 05.8	+59.5	139.9	39 19.7	+59.7	140.4	**33**
34	45 32.4	+58.5	135.9	44 49.0	+58.8	136.6	44 05.2	+58.9	137.3	43 20.8	+59.2	137.9	42 36.1	+59.3	138.5	41 50.9	+59.4	139.1	41 05.3	+59.6	139.7	40 19.4	+59.6	140.3	**34**
35	46 30.9	+58.5	135.6	45 47.8	+58.7	136.3	45 04.1	+58.9	137.0	44 20.0	+59.1	137.7	43 35.4	+59.2	138.3	42 50.3	+59.4	139.0	42 04.9	+59.5	139.6	41 19.0	+59.7	140.1	**35**
36	47 29.4	+58.4	135.3	46 46.5	+58.6	136.0	46 03.0	+58.9	136.8	45 19.1	+59.1	137.4	44 34.6	+59.3	138.1	43 49.7	+59.4	138.8	43 04.4	+59.5	139.4	42 18.7	+59.6	140.0	**36**
37	48 27.8	+58.4	134.9	47 45.1	+58.7	135.7	47 01.9	+58.9	136.5	46 18.2	+59.0	137.2	45 33.9	+59.2	137.9	44 49.1	+59.4	138.6	44 03.9	+59.5	139.2	43 18.3	+59.6	139.8	**37**
38	49 26.2	+58.3	134.6	48 43.8	+58.5	135.4	48 00.8	+58.7	136.2	47 17.2	+59.0	136.9	46 33.1	+59.2	137.7	45 48.5	+59.3	138.4	45 03.4	+59.5	139.0	44 17.9	+59.6	139.7	**38**
39	50 24.5	+58.2	134.2	49 42.3	+58.5	135.1	48 59.5	+58.8	135.9	48 16.2	+58.9	136.7	47 32.3	+59.1	137.4	46 47.8	+59.4	138.1	46 02.9	+59.5	138.8	45 17.5	+59.6	139.5	**39**
40	51 22.7	+58.2	133.8	50 40.8	+58.5	134.7	49 58.3	+58.7	135.6	49 15.1	+59.0	136.4	48 31.4	+59.1	137.2	47 47.2	+59.2	137.9	47 02.4	+59.4	138.6	46 17.1	+59.6	139.3	**40**
41	52 20.9	+58.0	133.4	51 39.3	+58.3	134.4	50 57.0	+58.6	135.2	50 14.1	+58.8	136.1	49 30.5	+59.1	136.9	48 46.4	+59.3	137.7	48 01.8	+59.4	138.4	47 16.7	+59.5	139.2	**41**
42	53 18.9	+58.0	133.0	52 37.6	+58.3	134.0	51 55.6	+58.6	134.9	51 12.9	+58.9	135.8	50 29.6	+59.1	136.6	49 45.7	+59.2	137.5	49 01.2	+59.4	138.2	48 16.2	+59.5	139.0	**42**
43	54 16.9	+57.9	132.6	53 35.9	+58.2	133.6	52 54.2	+58.5	134.5	52 11.8	+58.7	135.5	51 28.7	+59.0	136.4	50 44.9	+59.2	137.2	50 00.6	+59.4	138.0	49 15.7	+59.6	138.8	**43**
44	55 14.8	+57.7	132.1	54 34.1	+58.2	133.2	53 52.7	+58.4	134.2	53 10.5	+58.7	135.1	52 27.7	+58.9	136.1	51 44.1	+59.2	136.9	51 00.0	+59.3	137.8	50 15.3	+59.5	138.6	**44**
45	56 12.5	+57.7	131.6	55 32.3	+58.0	132.7	54 51.1	+58.4	133.8	54 09.2	+58.7	134.8	53 26.6	+58.9	135.7	52 43.3	+59.1	136.7	51 59.3	+59.3	137.6	51 14.8	+59.4	138.4	**45**
46	57 10.2	+57.5	131.1	56 30.3	+57.9	132.3	55 49.5	+58.3	133.4	55 07.9	+58.6	134.4	54 25.5	+58.9	135.4	53 42.4	+59.1	136.4	52 58.6	+59.3	137.3	52 14.2	+59.5	138.2	**46**
47	58 07.7	+57.4	130.6	57 28.2	+57.8	131.8	56 47.8	+58.1	132.9	56 06.5	+58.5	134.0	55 24.4	+58.7	135.1	54 41.5	+59.0	136.1	53 57.9	+59.3	137.0	53 13.7	+59.4	138.0	**47**
48	59 05.1	+57.2	130.0	58 26.0	+57.7	131.3	57 45.9	+58.1	132.5	57 05.0	+58.4	133.6	56 23.1	+58.8	134.7	55 40.5	+59.0	135.8	54 57.2	+59.2	136.8	54 13.1	+59.4	137.7	**48**
49	60 02.3	+57.1	129.5	59 23.7	+57.5	130.8	58 44.0	+58.0	132.0	58 03.4	+58.3	133.2	57 21.9	+58.6	134.4	56 39.5	+58.9	135.4	55 56.4	+59.1	136.5	55 12.5	+59.4	137.5	**49**
50	60 59.4	+56.9	128.8	60 21.2	+57.4	130.2	59 42.0	+57.8	131.5	59 01.7	+58.2	132.8	58 20.5	+58.6	134.0	57 38.4	+58.9	135.1	56 55.5	+59.2	136.2	56 11.9	+59.3	137.2	**50**
51	61 56.3	+56.6	128.2	61 18.6	+57.2	129.6	60 39.8	+57.7	131.0	59 59.9	+58.2	132.3	59 19.1	+58.5	133.5	58 37.3	+58.8	134.7	57 54.7	+59.0	135.9	57 11.2	+59.3	137.0	**51**
52	62 52.9	+56.5	127.4	62 15.8	+57.1	129.0	61 37.5	+57.6	130.4	60 58.1	+58.0	131.8	60 17.6	+58.4	133.1	59 36.1	+58.7	134.3	58 53.7	+59.0	135.5	58 10.5	+59.2	136.7	**52**
53	63 49.4	+56.2	126.7	63 12.9	+56.8	128.3	62 35.1	+57.4	129.8	61 56.1	+57.8	131.2	61 16.0	+58.3	132.6	60 34.8	+58.7	133.9	59 52.7	+59.0	135.2	59 09.7	+59.3	136.4	**53**
54	64 45.6	+55.9	125.9	64 09.7	+56.6	127.6	63 32.5	+57.2	129.2	62 53.9	+57.8	130.7	62 14.3	+58.1	132.1	61 33.5	+58.5	133.5	60 51.7	+58.9	134.8	60 09.0	+59.1	136.0	**54**
55	65 41.5	+55.6	125.0	65 06.3	+56.3	126.8	64 29.7	+56.9	128.5	63 51.7	+57.5	130.1	63 12.4	+58.1	131.6	62 32.0	+58.5	133.0	61 50.6	+58.8	134.4	61 08.1	+59.1	135.7	**55**
56	66 37.1	+55.2	124.1	66 02.6	+56.1	126.0	65 26.6	+56.8	127.7	64 49.2	+57.4	129.4	64 10.5	+57.9	131.0	63 30.5	+58.4	132.5	62 49.4	+58.7	134.0	62 07.2	+59.1	135.3	**56**
57	67 32.3	+54.8	123.1	66 58.7	+55.7	125.1	66 23.4	+56.5	126.9	65 46.6	+57.2	128.7	65 08.4	+57.7	130.4	64 28.9	+58.2	132.0	63 48.1	+58.7	133.5	63 06.3	+58.9	135.0	**57**
58	68 27.1	+54.4	122.0	67 54.4	+55.4	124.1	67 19.9	+56.2	126.1	66 43.8	+56.9	128.0	66 06.1	+57.6	129.7	65 27.1	+58.1	131.4	64 46.8	+58.5	133.0	64 05.2	+58.9	134.5	**58**
59	69 21.5	+53.9	120.8	68 49.8	+54.9	123.0	68 16.1	+55.9	125.2	67 40.7	+56.7	127.1	67 03.7	+57.3	129.0	66 25.2	+57.9	130.8	65 45.3	+58.4	132.5	65 04.1	+58.8	134.1	**59**
60	70 15.4	+53.2	119.5	69 44.7	+54.4	121.9	69 12.0	+55.5	124.1	68 37.4	+56.4	126.3	68 01.0	+57.2	128.3	67 23.1	+57.8	130.2	66 43.7	+58.3	131.9	66 02.9	+58.8	133.6	**60**
61	71 08.6	+52.6	118.2	70 39.1	+53.9	120.7	70 07.5	+55.0	123.1	69 33.8	+56.0	125.3	68 58.2	+56.8	127.4	68 20.9	+57.5	129.4	67 42.0	+58.1	131.3	67 01.7	+58.6	133.1	**61**
62	72 01.2	+51.8	116.6	71 33.0	+53.3	119.3	71 02.5	+54.6	121.9	70 29.8	+55.6	124.3	69 55.0	+56.6	126.5	69 18.4	+57.3	128.7	68 40.1	+58.0	130.7	68 00.3	+58.5	132.5	**62**
63	72 53.0	+50.9	115.0	72 26.3	+52.6	117.8	71 57.1	+53.9	120.5	71 25.4	+55.2	123.1	70 51.6	+56.2	125.5	70 15.7	+57.1	127.8	69 38.1	+57.7	129.9	68 58.8	+58.3	131.9	**63**
64	73 43.9	+49.8	113.1	73 18.9	+51.6	116.2	72 51.0	+53.3	119.1	72 20.6	+54.6	121.8	71 47.8	+55.8	124.4	71 12.8	+56.7	126.9	70 35.8	+57.6	129.1	69 57.1	+58.2	131.3	**64**
65	74 33.7	+48.6	111.1	74 10.5	+50.7	114.4	73 44.3	+52.4	117.5	73 15.2	+54.0	120.4	72 43.6	+55.3	123.2	72 09.5	+56.4	125.8	71 33.4	+57.3	128.3	70 55.3	+58.0	130.5	**65**
66	75 22.3	+47.1	108.8	75 01.2	+49.5	112.3	74 36.7	+51.6	115.7	74 09.2	+53.3	118.9	73 38.9	+54.7	121.9	73 05.9	+56.0	124.7	72 30.7	+56.9	127.3	71 53.3	+57.7	129.7	**66**
67	76 09.4	+45.4	106.3	75 50.7	+48.0	110.1	75 28.3	+50.4	113.7	75 02.5	+52.4	117.2	74 33.6	+54.0	120.4	74 01.9	+55.4	123.4	73 27.6	+56.6	126.2	72 51.0	+57.6	128.8	**67**
68	76 54.8	*+43.4*•	103.5	76 38.7	+46.4	107.6	76 18.7	+49.0	111.5	75 54.9	+51.3	115.2	75 27.6	+53.3	118.7	74 57.3	+54.9	122.0	74 24.2	+56.1	125.0	73 48.6	+57.2	127.8	**68**
69	77 38.2	*+40.9*•	100.3	77 25.1	*+44.4*•	104.8	77 07.7	+47.4	109.0	76 46.2	+50.0	113.0	76 20.9	+52.3	116.8	75 52.2	+54.1	120.4	75 20.3	+55.7	123.7	74 45.8	+56.8	126.7	**69**
70	78 19.1	*+38.1*•	96.8	78 09.5	*+42.0*•	101.6	77 55.1	*+45.5*•	106.2	77 36.2	+48.5	110.5	77 13.2	+51.1	114.7	76 46.3	+53.2	118.5	76 16.0	+54.9	122.1	75 42.6	+56.3	125.5	**70**
71	78 57.2	*+34.7*•	92.9	78 51.5	*+39.1*•	98.0	78 40.6	*+43.1*•	102.9	78 24.7	*+46.6*•	107.7	78 04.3	+49.6	112.2	77 39.5	+52.1	116.4	77 10.9	+54.2	120.4	76 38.9	+55.9	124.0	**71**
72	79 31.9	*+30.7*•	88.5	79 30.6	*+35.6*•	93.9	79 23.7	*+40.2*•	99.3	79 11.3	*+44.3*•	104.4	78 53.9	*+47.8*•	109.4	78 31.6	+50.8	114.0	78 05.1	+53.2	118.4	77 34.8	+55.1	122.4	**72**
73	80 02.6	*+26.1*•	83.7	80 06.2	*+31.6*•	89.4	80 03.9	*+36.7*•	95.1	79 55.6	*+41.4*•	100.7	79 41.7	*+45.5*•	106.1	79 22.4	*+49.1*•	111.3	78 58.3	+51.9	116.1	78 29.9	+54.2	120.5	**73**
74	80 28.7	*+20.8*•	78.4	80 37.8	*+26.6*•	84.3	80 40.6	*+32.4*•	90.4	80 37.0	*+37.8*•	96.4	80 27.2	*+42.6*•	102.4	80 11.5	*+46.8*•	108.0	79 50.2	+50.4	113.3	79 24.1	+53.2	118.2	**74**
75	80 49.5	*+14.9*•	72.6	81 04.4	*+21.1*•	78.7	81 13.0	*+27.3*•	85.0	81 14.8	*+33.4*•	91.5	81 09.8	*+39.1*•	97.9	80 58.3	*+44.1*•	104.2	80 40.6	*+48.3*•	110.1	80 17.3	+51.6	115.6	**75**
76	81 04.4	*+8.6*•	66.4	81 25.5	*+14.8*•	72.5	81 40.3	*+21.4*•	79.0	81 48.2	*+28.1*•	85.9	81 48.9	*+34.5*•	92.8	81 42.4	*+40.4*•	99.7	81 28.9	*+45.5*•	106.3	81 08.9	*+49.8*•	112.5	**76**
77	81 13.0	*+1.8*•	60.0	81 40.3	*+7.9*•	65.9	82 01.7	*+14.6*•	72.4	82 16.3	*+21.7*•	79.5	82 23.4	*+28.9*•	86.9	82 22.8	*+35.8*•	94.3	82 14.4	*+42.0*•	101.7	81 58.7	*+47.2*•	108.6	**77**
78	81 14.8	*–5.0*•	53.4	81 48.2	*+0.7*•	59.0	82 16.3	*+7.1*•	65.3	82 38.0	*+14.3*•	72.4	82 52.3	*+22.1*•	80.0	82 58.6	*+29.8*•	88.0	82 56.4	*+37.2*•	96.1	82 45.9	*+43.7*•	104.0	**78**
79	81 09.8	*–11.5*•	46.9	81 48.9	*–6.5*•	52.0	82 23.4	*–0.6*•	57.9	82 52.3	*+6.3*•	64.7	83 14.4	*+14.0*•	72.3	83 28.4	*+22.5*•	80.7	83 33.6	*+31.0*•	89.4	83 29.6	*+38.8*•	98.2	**79**
80	80 58.3	*–17.7*•	40.6	81 42.4	*–13.5*•	45.0	82 22.8	*–8.4*•	50.3	82 58.6	*–2.2*•	56.6	83 28.4	*+5.2*•	63.9	83 50.9	*+13.7*•	72.3	84 04.6	*+22.9*•	81.5	84 08.4	*+32.3*•	91.2	**80**
81	80 40.6	*–23.3*•	34.6	81 28.9	*–20.0*•	38.4	82 14.4	*–15.7*•	42.9	82 56.4	*–10.5*•	48.4	83 33.6	*–4.0*•	55.1	84 04.6	*+3.8*•	63.0	84 27.5	*+13.2*•	72.2	84 40.7	*+23.5*•	82.5	**81**
82	80 17.3	*–28.4*•	29.0	81 08.9	*–25.6*•	32.1	81 58.7	*–22.4*•	35.9	82 45.9	*–18.2*•	40.5	83 29.6	*–13.0*•	46.2	84 08.4	*–6.2*•	53.3	84 40.7	*+2.2*•	61.9	85 04.2	*+12.6*•	72.2	**82**
83	79 48.9	*–32.6*•	23.9	80 43.3	*–30.7*•	26.4	81 36.3	*–28.2*•	29.4	82 27.7	*–25.1*•	33.1	83 16.6	*–21.1*•	37.7	84 02.2	*–15.9*•	43.6	84 42.9	*–8.9*•	51.1	85 16.8	*+0.2*•	60.5	**83**
84	79 16.3	*–36.3*•	19.3	80 12.6	*–34.9*•	21.2	81 08.1	*–33.1*•	23.5	82 02.6	*–31.0*•	26.3	82 55.5	*–28.1*•	29.9	83 46.3	*–24.3*•	34.5	84 34.0	*–19.3*•	40.5	85 17.0	*–12.3*•	48.3	**84**
85	78 40.0	*–39.5*•	15.1	79 37.7	*–38.5*•	16.5	80 35.0	*–37.3*•	18.2	81 31.6	*–35.8*•	20.3	82 27.4	*–33.9*•	23.0	83 22.0	*–31.4*•	26.3	84 14.7	*–28.0*•	30.7	85 04.7	*–23.2*•	36.7	**85**
86	78 00.5	*–42.1*•	11.4	78 59.2	*–41.4*•	12.4	79 57.7	*–40.7*•	13.6	80 55.8	*–39.7*•	15.1	81 53.5	*–38.5*•	16.9	82 50.6	*–37.0*•	19.2	83 46.7	*–34.9*•	22.2	84 41.5	*–32.1*•	26.3	**86**
87	77 18.4	*–44.3*•	8.0	78 17.8	*–44.0*•	8.7	79 17.0	*–43.5*•	9.5	80 16.1	*–42.9*•	10.5	81 15.0	*–42.3*•	11.7	82 13.6	*–41.4*•	13.1	83 11.8	*–40.3*•	15.1	84 09.4	*–38.7*•	17.6	**87**
88	76 34.1	–46.3	5.1	77 33.8	–46.0	5.5	78 33.5	*–45.8*•	5.9	79 33.2	*–45.6*•	6.5	80 32.7	*–45.2*•	7.2	81 32.2	*–44.8*•	8.0	82 31.5	*–44.2*•	9.1	83 30.7	*–43.6*•	10.5	**88**
89	75 47.8	–47.8	2.4	76 47.8	–47.8	2.6	77 47.7	–47.7	2.8	78 47.6	–47.6	3.0	79 47.5	*–47.5*•	3.3	80 47.4	*–47.4*•	3.7	81 47.3	*–47.3*•	4.1	82 47.1	*–47.1*•	4.7	**89**
90	75 00.0	–49.2	0.0	76 00.0	–49.2	0.0	77 00.0	–49.3	0.0	78 00.0	–49.3	0.0	79 00.0	–49.4	0.0	80 00.0	–49.5	0.0	81 00.0	*–49.6*•	0.0	82 00.0	*–49.7*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 36°, 324°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	12 05.2	−59.3	143.1	11 17.2	−59.4	143.2	10 29.1	−59.4	143.3	9 41.0	−59.5	143.4	8 52.8	−59.6	143.5	8 04.6	−59.7	143.6	7 16.2	−59.7	143.7	6 27.9	−59.8	143.7	**0**
1	11 05.9	−59.3	143.2	10 17.8	−59.3	143.3	9 29.7	−59.5	143.4	8 41.5	−59.6	143.5	7 53.2	−59.6	143.6	7 04.9	−59.7	143.7	6 16.5	−59.7	143.8	5 28.1	−59.8	143.8	**1**
2	10 06.6	−59.2	143.4	9 18.5	−59.4	143.5	8 30.2	−59.4	143.6	7 41.9	−59.5	143.6	6 53.6	−59.6	143.7	6 05.2	−59.7	143.8	5 16.8	−59.8	143.8	4 28.3	−59.8	143.9	**2**
3	9 07.4	−59.3	143.5	8 19.1	−59.4	143.6	7 30.8	−59.5	143.7	6 42.4	−59.6	143.8	5 54.0	−59.7	143.8	5 05.5	−59.7	143.9	4 17.0	−59.7	143.9	3 28.5	−59.8	144.0	**3**
4	8 08.1	−59.3	143.7	7 19.7	−59.4	143.8	6 31.3	−59.5	143.8	5 42.8	−59.5	143.9	4 54.3	−59.6	143.9	4 05.8	−59.7	144.0	3 17.3	−59.8	144.0	2 28.7	−59.8	144.1	**4**
5	7 08.8	−59.3	143.8	6 20.3	−59.4	143.9	5 31.8	−59.4	144.0	4 43.3	−59.6	144.0	3 54.7	−59.6	144.1	3 06.1	−59.7	144.1	2 17.5	−59.7	144.1	1 28.9	−59.8	144.1	**5**
6	6 09.5	−59.3	144.0	5 20.9	−59.3	144.0	4 32.4	−59.5	144.1	3 43.7	−59.5	144.1	2 55.1	−59.6	144.2	2 06.4	−59.6	144.2	1 17.8	−59.8	144.2	0 29.1	−59.8	144.2	**6**
7	5 10.2	−59.3	144.1	4 21.6	−59.4	144.2	3 32.9	−59.5	144.2	2 44.2	−59.6	144.3	1 55.5	−59.6	144.3	1 06.8	−59.7	144.3	0 18.0	−59.7	144.3	0 30.7	+59.8	35.7	**7**
8	4 10.9	−59.3	144.3	3 22.2	−59.4	144.3	2 33.4	−59.5	144.4	1 44.6	−59.5	144.4	0 55.9	−59.7	144.4	0 07.1	−59.7	144.4	0 41.7	+59.8	35.6	1 30.5	+59.8	35.6	**8**
9	3 11.6	−59.3	144.4	2 22.8	−59.4	144.5	1 33.9	−59.4	144.5	0 45.1	−59.6	144.5	0 03.8	+59.6	35.5	0 52.6	+59.7	35.5	1 41.5	+59.7	35.5	2 30.3	+59.8	35.5	**9**
10	2 12.3	−59.3	144.6	1 23.4	−59.4	144.6	0 34.5	−59.5	144.6	0 14.5	+59.5	35.4	1 03.4	+59.6	35.4	1 52.3	+59.7	35.4	2 41.2	+59.7	35.4	3 30.1	+59.8	35.4	**10**
11	1 13.0	−59.3	144.8	0 24.0	−59.4	144.8	0 25.0	+59.5	35.2	1 14.0	+59.6	35.2	2 03.0	+59.6	35.3	2 52.0	+59.7	35.3	3 40.9	+59.8	35.3	4 29.9	+59.8	35.4	**11**
12	0 13.7	−59.3	144.9	0 35.4	+59.4	35.1	1 24.5	+59.4	35.1	2 13.6	+59.5	35.1	3 02.6	+59.6	35.2	3 51.7	+59.7	35.2	4 40.7	+59.7	35.2	5 29.7	+59.8	35.3	**12**
13	0 45.6	+59.3	34.9	1 34.8	+59.4	35.0	2 23.9	+59.5	35.0	3 13.1	+59.6	35.0	4 02.2	+59.7	35.0	4 51.4	+59.6	35.1	5 40.4	+59.8	35.1	6 29.5	+59.8	35.2	**13**
14	1 44.9	+59.3	34.8	2 34.2	+59.4	34.8	3 23.4	+59.5	34.8	4 12.7	+59.5	34.9	5 01.9	+59.6	34.9	5 51.0	+59.7	35.0	6 40.2	+59.7	35.0	7 29.3	+59.8	35.1	**14**
15	2 44.2	+59.3	34.6	3 33.6	+59.3	34.7	4 22.9	+59.5	34.7	5 12.2	+59.5	34.8	6 01.5	+59.6	34.8	6 50.7	+59.7	34.9	7 39.9	+59.8	35.0	8 29.1	+59.8	35.0	**15**
16	3 43.5	+59.3	34.5	4 32.9	+59.4	34.5	5 22.4	+59.4	34.6	6 11.7	+59.6	34.6	7 01.1	+59.6	34.7	7 50.4	+59.7	34.8	8 39.7	+59.7	34.9	9 28.9	+59.8	34.9	**16**
17	4 42.8	+59.3	34.3	5 32.3	+59.4	34.4	6 21.8	+59.5	34.4	7 11.3	+59.5	34.5	8 00.7	+59.6	34.6	8 50.1	+59.7	34.7	9 39.4	+59.7	34.8	10 28.7	+59.8	34.9	**17**
18	5 42.1	+59.3	34.2	6 31.7	+59.4	34.2	7 21.3	+59.5	34.3	8 10.8	+59.6	34.4	9 00.3	+59.6	34.5	9 49.8	+59.6	34.6	10 39.1	+59.8	34.7	11 28.5	+59.7	34.8	**18**
19	6 41.4	+59.3	34.0	7 31.1	+59.4	34.1	8 20.8	+59.4	34.2	9 10.4	+59.5	34.3	9 59.9	+59.6	34.4	10 49.4	+59.7	34.5	11 38.9	+59.7	34.6	12 28.2	+59.8	34.7	**19**
20	7 40.7	+59.3	33.9	8 30.5	+59.3	34.0	9 20.2	+59.5	34.0	10 09.9	+59.5	34.1	10 59.5	+59.6	34.2	11 49.1	+59.7	34.4	12 38.6	+59.7	34.5	13 28.0	+59.8	34.6	**20**
21	8 40.0	+59.2	33.7	9 29.8	+59.4	33.8	10 19.7	+59.4	33.9	11 09.4	+59.6	34.0	11 59.1	+59.7	34.1	12 48.8	+59.7	34.2	13 38.3	+59.8	34.4	14 27.8	+59.8	34.5	**21**
22	9 39.2	+59.3	33.6	10 29.2	+59.4	33.7	11 19.1	+59.5	33.8	12 09.0	+59.5	33.9	12 58.8	+59.6	34.0	13 48.5	+59.6	34.1	14 38.1	+59.7	34.3	15 27.6	+59.8	34.4	**22**
23	10 38.5	+59.3	33.4	11 28.6	+59.3	33.5	12 18.6	+59.4	33.6	13 08.5	+59.5	33.8	13 58.3	+59.6	33.9	14 48.1	+59.7	34.0	15 37.8	+59.7	34.2	16 27.4	+59.8	34.3	**23**
24	11 37.8	+59.3	33.2	12 27.9	+59.4	33.4	13 18.0	+59.5	33.5	14 08.0	+59.5	33.6	14 57.9	+59.6	33.8	15 47.8	+59.6	33.9	16 37.5	+59.7	34.1	17 27.2	+59.7	34.3	**24**
25	12 37.1	+59.2	33.1	13 27.3	+59.4	33.2	14 17.5	+59.4	33.3	15 07.5	+59.6	33.5	15 57.5	+59.6	33.6	16 47.4	+59.7	33.8	17 37.2	+59.8	34.0	18 26.9	+59.8	34.2	**25**
26	13 36.3	+59.3	32.9	14 26.7	+59.3	33.1	15 16.9	+59.4	33.2	16 07.1	+59.5	33.4	16 57.1	+59.6	33.5	17 47.1	+59.6	33.7	18 37.0	+59.7	33.9	19 26.7	+59.8	34.1	**26**
27	14 35.6	+59.2	32.8	15 26.0	+59.3	32.9	16 16.3	+59.5	33.1	17 06.6	+59.5	33.2	17 56.7	+59.6	33.4	18 46.7	+59.7	33.6	19 36.7	+59.7	33.8	20 26.5	+59.8	34.0	**27**
28	15 34.8	+59.3	32.6	16 25.3	+59.4	32.8	17 15.8	+59.4	32.9	18 06.1	+59.5	33.1	18 56.3	+59.6	33.3	19 46.4	+59.6	33.5	20 36.4	+59.7	33.7	21 26.3	+59.7	33.9	**28**
29	16 34.1	+59.2	32.4	17 24.7	+59.3	32.6	18 15.2	+59.4	32.8	19 05.6	+59.5	33.0	19 55.9	+59.5	33.2	20 46.0	+59.7	33.4	21 36.1	+59.7	33.6	22 26.0	+59.8	33.8	**29**
30	17 33.3	+59.2	32.3	18 24.0	+59.3	32.4	19 14.6	+59.4	32.6	20 05.1	+59.5	32.8	20 55.4	+59.6	33.0	21 45.7	+59.6	33.2	22 35.8	+59.7	33.5	23 25.8	+59.7	33.7	**30**
31	18 32.5	+59.3	32.1	19 23.3	+59.3	32.3	20 14.0	+59.4	32.5	21 04.6	+59.4	32.7	21 55.0	+59.6	32.9	22 45.3	+59.6	33.1	23 35.5	+59.7	33.4	24 25.5	+59.8	33.6	**31**
32	19 31.8	+59.2	31.9	20 22.6	+59.3	32.1	21 13.4	+59.4	32.3	22 04.0	+59.5	32.5	22 54.6	+59.5	32.8	23 44.9	+59.7	33.0	24 35.2	+59.7	33.2	25 25.3	+59.8	33.5	**32**
33	20 31.0	+59.2	31.8	21 21.9	+59.3	32.0	22 12.8	+59.4	32.2	23 03.5	+59.5	32.4	23 54.1	+59.5	32.6	24 44.6	+59.6	32.9	25 34.9	+59.7	33.1	26 25.1	+59.7	33.4	**33**
34	21 30.2	+59.2	31.6	22 21.2	+59.3	31.8	23 12.2	+59.3	32.0	24 03.0	+59.4	32.3	24 53.6	+59.6	32.5	25 44.2	+59.6	32.7	26 34.6	+59.6	33.0	27 24.8	+59.7	33.3	**34**
35	22 29.4	+59.1	31.4	23 20.5	+59.3	31.6	24 11.5	+59.4	31.9	25 02.4	+59.5	32.1	25 53.2	+59.5	32.4	26 43.8	+59.6	32.6	27 34.2	+59.7	32.9	28 24.5	+59.8	33.2	**35**
36	23 28.5	+59.2	31.2	24 19.8	+59.2	31.5	25 10.9	+59.3	31.7	26 01.9	+59.4	32.0	26 52.7	+59.5	32.2	27 43.4	+59.6	32.5	28 33.9	+59.7	32.8	29 24.3	+59.7	33.1	**36**
37	24 27.7	+59.1	31.0	25 19.0	+59.3	31.3	26 10.2	+59.4	31.5	27 01.3	+59.4	31.8	27 52.2	+59.5	32.1	28 43.0	+59.6	32.4	29 33.6	+59.6	32.7	30 24.0	+59.7	33.0	**37**
38	25 26.8	+59.2	30.9	26 18.3	+59.2	31.1	27 09.6	+59.3	31.4	28 00.7	+59.5	31.6	28 51.7	+59.5	31.9	29 42.6	+59.6	32.2	30 33.2	+59.7	32.5	31 23.7	+59.8	32.9	**38**
39	26 26.0	+59.1	30.7	27 17.5	+59.2	30.9	28 08.9	+59.3	31.2	29 00.2	+59.4	31.5	29 51.2	+59.5	31.8	30 42.2	+59.5	32.1	31 32.9	+59.6	32.4	32 23.5	+59.7	32.7	**39**
40	27 25.1	+59.1	30.5	28 16.7	+59.2	30.7	29 08.2	+59.3	31.0	29 59.6	+59.4	31.3	30 50.7	+59.5	31.6	31 41.7	+59.6	32.0	32 32.5	+59.7	32.3	33 23.2	+59.7	32.6	**40**
41	28 24.2	+59.1	30.3	29 15.9	+59.2	30.6	30 07.5	+59.3	30.9	30 59.0	+59.3	31.2	31 50.2	+59.5	31.5	32 41.3	+59.5	31.8	33 32.2	+59.6	32.2	34 22.9	+59.7	32.5	**41**
42	29 23.3	+59.1	30.1	30 15.1	+59.2	30.4	31 06.8	+59.3	30.7	31 58.3	+59.4	31.0	32 49.7	+59.4	31.3	33 40.8	+59.6	31.7	34 31.8	+59.6	32.0	35 22.6	+59.7	32.4	**42**
43	30 22.4	+59.0	29.9	31 14.3	+59.2	30.2	32 06.1	+59.2	30.5	32 57.7	+59.4	30.8	33 49.1	+59.5	31.2	34 40.4	+59.5	31.5	35 31.4	+59.6	31.9	36 22.3	+59.7	32.3	**43**
44	31 21.4	+59.0	29.7	32 13.5	+59.1	30.0	33 05.3	+59.3	30.3	33 57.1	+59.3	30.6	34 48.6	+59.4	31.0	35 39.9	+59.5	31.4	36 31.0	+59.6	31.7	37 22.0	+59.6	32.1	**44**
45	32 20.4	+59.0	29.5	33 12.6	+59.1	29.8	34 04.6	+59.2	30.1	34 56.4	+59.3	30.5	35 48.0	+59.4	30.8	36 39.4	+59.5	31.2	37 30.6	+59.6	31.6	38 21.6	+59.7	32.0	**45**
46	33 19.4	+59.0	29.3	34 11.7	+59.1	29.6	35 03.8	+59.2	29.9	35 55.7	+59.3	30.3	36 47.4	+59.4	30.7	37 38.9	+59.5	31.0	38 30.2	+59.6	31.5	39 21.3	+59.7	31.9	**46**
47	34 18.4	+59.0	29.0	35 10.8	+59.1	29.4	36 03.0	+59.2	29.7	36 55.0	+59.3	30.1	37 46.8	+59.4	30.5	38 38.4	+59.5	30.9	39 29.8	+59.6	31.3	40 21.0	+59.6	31.7	**47**
48	35 17.4	+58.9	28.8	36 09.9	+59.0	29.2	37 02.2	+59.1	29.5	37 54.3	+59.3	29.9	38 46.2	+59.4	30.3	39 37.9	+59.5	30.7	40 29.4	+59.5	31.1	41 20.6	+59.7	31.6	**48**
49	36 16.3	+58.9	28.6	37 08.9	+59.1	28.9	38 01.3	+59.2	29.3	38 53.6	+59.2	29.7	39 45.6	+59.3	30.1	40 37.4	+59.4	30.5	41 28.9	+59.6	31.0	42 20.3	+59.6	31.4	**49**
50	37 15.2	+58.9	28.3	38 08.0	+59.0	28.7	39 00.5	+59.1	29.1	39 52.8	+59.2	29.5	40 44.9	+59.4	29.9	41 36.8	+59.5	30.4	42 28.5	+59.5	30.8	43 19.9	+59.6	31.3	**50**
51	38 14.1	+58.9	28.1	39 07.0	+58.9	28.5	39 59.6	+59.1	28.9	40 52.0	+59.2	29.3	41 44.3	+59.3	29.7	42 36.3	+59.4	30.2	43 28.0	+59.5	30.6	44 19.5	+59.6	31.1	**51**
52	39 13.0	+58.8	27.8	40 05.9	+59.0	28.2	40 58.7	+59.0	28.6	41 51.2	+59.2	29.1	42 43.6	+59.3	29.5	43 35.7	+59.4	30.0	44 27.5	+59.5	30.5	45 19.1	+59.6	31.0	**52**
53	40 11.8	+58.8	27.6	41 04.9	+58.9	28.0	41 57.7	+59.1	28.4	42 50.4	+59.2	28.8	43 42.9	+59.3	29.3	44 35.1	+59.3	29.8	45 27.0	+59.5	30.3	46 18.7	+59.5	30.8	**53**
54	41 10.6	+58.7	27.3	42 03.8	+58.8	27.7	42 56.8	+59.0	28.2	43 49.6	+59.1	28.6	44 42.1	+59.2	29.1	45 34.4	+59.4	29.6	46 26.5	+59.4	30.1	47 18.2	+59.6	30.6	**54**
55	42 09.3	+58.7	27.1	43 02.6	+58.9	27.5	43 55.8	+58.9	27.9	44 48.7	+59.1	28.4	45 41.3	+59.3	28.9	46 33.8	+59.3	29.4	47 25.9	+59.5	29.9	48 17.8	+59.5	30.4	**55**
56	43 08.0	+58.7	26.8	44 01.5	+58.8	27.2	44 54.7	+59.0	27.7	45 47.8	+59.0	28.1	46 40.6	+59.1	28.6	47 33.1	+59.3	29.1	48 25.4	+59.4	29.7	49 17.3	+59.6	30.3	**56**
57	44 06.7	+58.6	26.5	45 00.3	+58.7	26.9	45 53.7	+58.8	27.4	46 46.8	+59.0	27.9	47 39.7	+59.2	28.4	48 32.4	+59.3	28.9	49 24.8	+59.4	29.5	50 16.9	+59.4	30.1	**57**
58	45 05.3	+58.5	26.2	45 59.0	+58.7	26.6	46 52.5	+58.9	27.1	47 45.8	+59.0	27.6	48 38.9	+59.1	28.1	49 31.7	+59.2	28.7	50 24.2	+59.3	29.3	51 16.3	+59.5	29.9	**58**
59	46 03.8	+58.6	25.9	46 57.7	+58.7	26.3	47 51.4	+58.8	26.8	48 44.8	+59.0	27.3	49 38.0	+59.1	27.9	50 30.9	+59.2	28.4	51 23.5	+59.3	29.0	52 15.8	+59.5	29.6	**59**
60	47 02.4	+58.4	25.5	47 56.4	+58.6	26.0	48 50.2	+58.7	26.5	49 43.8	+58.9	27.0	50 37.1	+59.0	27.6	51 30.1	+59.2	28.2	52 22.8	+59.3	28.8	53 15.3	+59.4	29.4	**60**
61	48 00.8	+58.4	25.2	48 55.0	+58.5	25.7	49 48.9	+58.7	26.2	50 42.7	+58.8	26.7	51 36.1	+59.0	27.3	52 29.3	+59.1	27.9	53 22.1	+59.3	28.5	54 14.7	+59.4	29.2	**61**
62	48 59.2	+58.3	24.9	49 53.5	+58.5	25.4	50 47.6	+58.7	25.9	51 41.5	+58.8	26.4	52 35.1	+58.9	27.0	53 28.4	+59.1	27.6	54 21.4	+59.2	28.3	55 14.1	+59.3	28.9	**62**
63	49 57.5	+58.3	24.5	50 52.0	+58.5	25.0	51 46.3	+58.6	25.5	52 40.3	+58.7	26.1	53 34.0	+58.9	26.7	54 27.5	+59.0	27.3	55 20.6	+59.2	28.0	56 13.4	+59.4	28.7	**63**
64	50 55.8	+58.2	24.1	51 50.5	+58.3	24.6	52 44.9	+58.5	25.2	53 39.0	+58.7	25.8	54 32.9	+58.9	26.4	55 26.5	+59.0	27.0	56 19.8	+59.2	27.7	57 12.8	+59.3	28.4	**64**
65	51 54.0	+58.1	23.7	52 48.8	+58.3	24.3	53 43.4	+58.4	24.8	54 37.7	+58.6	25.4	55 31.8	+58.7	26.0	56 25.5	+59.0	26.7	57 19.0	+59.1	27.4	58 12.1	+59.2	28.1	**65**
66	52 52.1	+58.0	23.3	53 47.1	+58.2	23.9	54 41.8	+58.4	24.4	55 36.3	+58.6	25.0	56 30.5	+58.8	25.7	57 24.5	+58.9	26.3	58 18.1	+59.0	27.1	59 11.3	+59.2	27.8	**66**
67	53 50.1	+57.9	22.9	54 45.3	+58.1	23.5	55 40.2	+58.3	24.0	56 34.9	+58.4	24.6	57 29.3	+58.6	25.3	58 23.4	+58.8	26.0	59 17.1	+59.0	26.7	60 10.5	+59.2	27.5	**67**
68	54 48.0	+57.9	22.5	55 43.4	+58.0	23.0	56 38.5	+58.2	23.6	57 33.3	+58.4	24.2	58 27.9	+58.6	24.9	59 22.2	+58.7	25.6	60 16.1	+58.9	26.4	61 09.7	+59.1	27.2	**68**
69	55 45.9	+57.7	22.0	56 41.4	+57.9	22.6	57 36.7	+58.1	23.2	58 31.7	+58.3	23.8	59 26.5	+58.4	24.5	60 20.9	+58.7	25.2	61 15.0	+58.9	26.0	62 08.8	+59.0	26.8	**69**
70	56 43.6	+57.6	21.5	57 39.3	+57.8	22.1	58 34.8	+58.0	22.7	59 30.0	+58.2	23.3	60 24.9	+58.4	24.0	61 19.6	+58.6	24.8	62 13.9	+58.8	25.6	63 07.8	+59.0	26.4	**70**
71	57 41.2	+57.4	21.0	58 37.1	+57.6	21.6	59 32.8	+57.8	22.2	60 28.2	+58.0	22.8	61 23.3	+58.3	23.6	62 18.2	+58.5	24.3	63 12.7	+58.7	25.1	64 06.8	+58.9	26.0	**71**
72	58 38.6	+57.3	20.4	59 34.7	+57.5	21.0	60 30.6	+57.7	21.7	61 26.2	+58.0	22.3	62 21.6	+58.2	23.0	63 16.7	+58.3	23.8	64 11.4	+58.6	24.7	65 05.7	+58.8	25.6	**72**
73	59 35.9	+57.1	19.9	60 32.2	+57.4	20.5	61 28.3	+57.6	21.1	62 24.2	+57.8	21.8	63 19.8	+58.0	22.5	64 15.0	+58.3	23.3	65 10.0	+58.5	24.2	66 04.5	+58.7	25.1	**73**
74	60 33.0	+57.0	19.2	61 29.6	+57.2	19.8	62 25.9	+57.4	20.5	63 22.0	+57.6	21.2	64 17.8	+57.9	21.9	65 13.3	+58.1	22.7	66 08.5	+58.3	23.6	67 03.2	+58.6	24.6	**74**
75	61 30.0	+56.8	18.6	62 26.8	+57.0	19.2	63 23.3	+57.3	19.9	64 19.6	+57.5	20.6	65 15.7	+57.7	21.3	66 11.4	+58.0	22.1	67 06.8	+58.2	23.0	68 01.8	+58.5	24.0	**75**
76	62 26.8	+56.5	17.9	63 23.8	+56.8	18.5	64 20.6	+57.0	19.2	65 17.1	+57.3	19.9	66 13.4	+57.5	20.7	67 09.4	+57.8	21.5	68 05.0	+58.1	22.4	69 00.3	+58.4	23.4	**76**
77	63 23.3	+56.3	17.2	64 20.6	+56.5	17.8	65 17.6	+56.8	18.4	66 14.4	+57.0	19.2	67 10.9	+57.4	19.9	68 07.2	+57.6	20.8	69 03.1	+57.9	21.7	69 58.7	+58.1	22.7	**77**
78	64 19.6	+56.1	16.4	65 17.1	+56.3	17.0	66 14.4	+56.5	17.7	67 11.4	+56.9	18.4	68 08.3	+57.1	19.2	69 04.8	+57.4	20.0	70 01.0	+57.7	21.0	70 56.8	+58.0	22.0	**78**
79	65 15.7	+55.7	15.5	66 13.4	+56.0	16.2	67 10.9	+56.3	16.8	68 08.3	+56.5	17.5	69 05.4	+56.8	18.3	70 02.2	+57.1	19.2	70 58.7	+57.4	20.1	71 54.8	+57.8	21.2	**79**
80	66 11.4	+55.4	14.6	67 09.4	+55.6	15.2	68 07.2	+55.9	15.9	69 04.8	+56.2	16.6	70 02.2	+56.5	17.4	70 59.3	+56.8	18.3	71 56.1	+57.2	19.2	72 52.6	+57.5	20.3	**80**
81	67 06.8	+55.0	13.7	68 05.0	+55.3	14.3	69 03.1	+55.6	14.9	70 01.0	+55.8	15.6	70 58.7	+56.1	16.4	71 56.1	+56.5	17.2	72 53.3	+56.8	18.2	73 50.1	+57.2	19.3	**81**
82	68 01.8	+54.6	12.6	69 00.3	+54.9	13.2	69 58.7	+55.1	13.8	70 56.8	+55.5	14.5	71 54.8	+55.8	15.3	72 52.6	+56.0	16.1	73 50.1	+56.4	17.1	74 47.3	+56.8	18.2	**82**
83	68 56.4	+54.1	11.5	69 55.2	+54.3	12.0	70 53.8	+54.6	12.6	71 52.3	+54.9	13.3	72 50.6	+55.2	14.1	73 48.6	+55.6	14.9	74 46.5	+56.0	15.8	75 44.1	+56.3	16.9	**83**
84	69 50.5	+53.6	10.3	70 49.5	+53.8	10.8	71 48.4	+54.1	11.3	72 47.2	+54.3	12.0	73 45.8	+54.6	12.7	74 44.2	+55.0	13.5	75 42.5	+55.3	14.4	76 40.4	+55.8	15.5	**84**
85	70 44.1	+52.9	8.9	71 43.3	+53.1	9.4	72 42.5	+53.3	9.9	73 41.5	+53.7	10.5	74 40.4	+54.0	11.2	75 39.2	+54.3	11.9	76 37.8	+54.7	12.8	77 36.2	+55.1	13.8	**85**
86	71 37.0	+52.2	7.5	72 36.4	+52.4	7.9	73 35.8	+52.7	8.3	74 35.2	+52.8	8.9	75 34.4	+53.1	9.5	76 33.5	+53.5	10.2	77 32.5	+53.8	11.0	78 31.3	+54.3	11.9	**86**
87	72 29.2	+51.3	5.9	73 28.8	+51.5	6.2	74 28.5	+51.6	6.6	75 28.0	+51.9	7.0	76 27.5	+52.2	7.5	77 27.0	+52.4	8.1	78 26.3	+52.8	8.8	79 25.6	+53.1	9.7	**87**
88	73 20.5	+50.3	4.1	74 20.3	+50.5	4.4	75 20.1	+50.6	4.6	76 19.9	+50.8	5.0	77 19.7	+50.9	5.4	78 19.4	+51.1	5.8	79 19.1	+51.3	6.4	80 18.7	+51.6	7.0	**88**
89	74 10.8	+49.2	2.2	75 10.8	+49.2	2.3	76 10.7	+49.3	2.5	77 10.7	+49.3	2.6	78 10.6	+49.4	2.9	79 10.5	+49.5	3.1	80 10.4	*+49.6*•	3.4	81 10.3	*+49.7*•	3.8	**89**
90	75 00.0	+47.8	0.0	76 00.0	+47.8	0.0	77 00.0	+47.7	0.0	78 00.0	+47.6	0.0	79 00.0	*+47.5*•	0.0	80 00.0	*+47.4*•	0.0	81 00.0	*+47.3*•	0.0	82 00.0	*+47.1*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 144°, 216°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 55.7	+59.3	142.0	11 08.4	+59.3	142.2	10 21.0	+59.4	142.3	9 33.5	+59.5	142.4	8 45.9	+59.6	142.5	7 58.3	+59.7	142.6	7 10.6	+59.7	142.7	6 22.9	+59.8	142.7	0
1	12 55.0	+59.2	141.9	12 07.7	+59.4	142.0	11 20.4	+59.4	142.1	10 33.0	+59.5	142.3	9 45.5	+59.6	142.4	8 58.0	+59.6	142.5	8 10.3	+59.8	142.6	7 22.7	+59.8	142.6	1
2	13 54.2	+59.2	141.7	13 07.1	+59.3	141.9	12 19.8	+59.4	142.0	11 32.5	+59.5	142.1	10 45.1	+59.6	142.3	9 57.6	+59.7	142.4	9 10.1	+59.7	142.5	8 22.5	+59.7	142.6	2
3	14 53.4	+59.2	141.5	14 06.4	+59.3	141.7	13 19.2	+59.5	141.9	12 32.0	+59.5	142.0	11 44.7	+59.6	142.1	10 57.3	+59.6	142.3	10 09.8	+59.7	142.4	9 22.2	+59.8	142.5	3
4	15 52.6	+59.2	141.4	15 05.7	+59.3	141.6	14 18.7	+59.4	141.7	13 31.5	+59.5	141.9	12 44.3	+59.6	142.0	11 56.9	+59.7	142.1	11 09.5	+59.7	142.3	10 22.0	+59.8	142.4	4
5	16 51.8	+59.2	141.2	16 05.0	+59.3	141.4	15 18.1	+59.4	141.6	14 31.0	+59.5	141.7	13 43.9	+59.5	141.9	12 56.6	+59.6	142.0	12 09.2	+59.8	142.2	11 21.8	+59.8	142.3	5
6	17 51.0	+59.2	141.0	17 04.3	+59.3	141.2	16 17.5	+59.4	141.4	15 30.5	+59.5	141.6	14 43.4	+59.6	141.8	13 56.2	+59.7	141.9	13 09.0	+59.7	142.1	12 21.6	+59.8	142.2	6
7	18 50.2	+59.2	140.9	18 03.6	+59.3	141.1	17 16.9	+59.4	141.3	16 30.0	+59.5	141.5	15 43.0	+59.6	141.6	14 55.9	+59.6	141.8	14 08.7	+59.7	142.0	13 21.4	+59.7	142.1	7
8	19 49.4	+59.2	140.7	19 02.9	+59.3	140.9	18 16.3	+59.3	141.1	17 29.5	+59.5	141.3	16 42.6	+59.5	141.5	15 55.5	+59.7	141.7	15 08.4	+59.7	141.9	14 21.1	+59.8	142.0	8
9	20 48.6	+59.1	140.5	20 02.2	+59.3	140.8	19 15.6	+59.4	141.0	18 29.0	+59.4	141.2	17 42.1	+59.6	141.4	16 55.2	+59.6	141.6	16 08.1	+59.7	141.8	15 20.9	+59.8	141.9	9
10	21 47.7	+59.2	140.3	21 01.5	+59.2	140.6	20 15.0	+59.4	140.8	19 28.4	+59.5	141.1	18 41.7	+59.6	141.3	17 54.8	+59.7	141.5	17 07.8	+59.7	141.7	16 20.7	+59.8	141.9	10
11	22 46.9	+59.1	140.2	22 00.7	+59.3	140.4	21 14.4	+59.3	140.7	20 27.9	+59.5	140.9	19 41.3	+59.5	141.1	18 54.5	+59.6	141.4	18 07.5	+59.7	141.6	17 20.5	+59.7	141.8	11
12	23 46.0	+59.1	140.0	23 00.0	+59.2	140.2	22 13.7	+59.4	140.5	21 27.4	+59.4	140.8	20 40.8	+59.5	141.0	19 54.1	+59.6	141.2	19 07.2	+59.7	141.5	18 20.2	+59.8	141.7	12
13	24 45.1	+59.1	139.8	23 59.2	+59.2	140.1	23 13.1	+59.3	140.4	22 26.8	+59.5	140.6	21 40.3	+59.6	140.9	20 53.7	+59.6	141.1	20 06.9	+59.7	141.4	19 20.0	+59.8	141.6	13
14	25 44.2	+59.1	139.6	24 58.4	+59.2	139.9	24 12.4	+59.4	140.2	23 26.3	+59.4	140.5	22 39.9	+59.5	140.7	21 53.3	+59.7	141.0	21 06.6	+59.7	141.2	20 19.8	+59.7	141.5	14
15	26 43.3	+59.1	139.4	25 57.6	+59.2	139.7	25 11.8	+59.3	140.0	24 25.7	+59.4	140.3	23 39.4	+59.5	140.6	22 53.0	+59.6	140.9	22 06.3	+59.7	141.1	21 19.5	+59.8	141.4	15
16	27 42.4	+59.0	139.2	26 56.8	+59.2	139.5	26 11.1	+59.3	139.9	25 25.1	+59.4	140.2	24 38.9	+59.5	140.5	23 52.6	+59.6	140.8	23 06.0	+59.7	141.0	22 19.3	+59.7	141.3	16
17	28 41.4	+59.1	139.0	27 56.0	+59.2	139.4	27 10.4	+59.3	139.7	26 24.5	+59.4	140.0	25 38.4	+59.6	140.3	24 52.2	+59.6	140.6	24 05.7	+59.7	140.9	23 19.0	+59.8	141.2	17
18	29 40.5	+59.0	138.8	28 55.2	+59.2	139.2	28 09.7	+59.3	139.5	27 23.9	+59.4	139.9	26 38.0	+59.5	140.2	25 51.8	+59.6	140.5	25 05.4	+59.6	140.8	24 18.8	+59.7	141.1	18
19	30 39.5	+59.0	138.6	29 54.4	+59.1	139.0	29 09.0	+59.2	139.3	28 23.3	+59.4	139.7	27 37.5	+59.4	140.0	26 51.4	+59.5	140.4	26 05.0	+59.7	140.7	25 18.5	+59.8	141.0	19
20	31 38.5	+59.0	138.4	30 53.5	+59.1	138.8	30 08.2	+59.3	139.2	29 22.7	+59.4	139.5	28 36.9	+59.5	139.9	27 50.9	+59.6	140.2	27 04.7	+59.7	140.6	26 18.3	+59.7	140.9	20
21	32 37.5	+58.9	138.2	31 52.6	+59.1	138.6	31 07.5	+59.2	139.0	30 22.1	+59.3	139.4	29 36.4	+59.5	139.7	28 50.5	+59.6	140.1	28 04.4	+59.6	140.4	27 18.0	+59.7	140.8	21
22	33 36.4	+58.9	137.9	32 51.7	+59.1	138.4	32 06.7	+59.2	138.8	31 21.4	+59.4	139.2	30 35.9	+59.5	139.6	29 50.1	+59.5	140.0	29 04.0	+59.7	140.3	28 17.7	+59.7	140.7	22
23	34 35.3	+59.0	137.7	33 50.8	+59.1	138.2	33 05.9	+59.2	138.6	32 20.8	+59.3	139.0	31 35.4	+59.4	139.4	30 49.6	+59.6	139.8	30 03.7	+59.6	140.2	29 17.4	+59.8	140.6	23
24	35 34.3	+58.8	137.5	34 49.9	+59.0	137.9	34 05.1	+59.2	138.4	33 20.1	+59.3	138.8	32 34.8	+59.4	139.3	31 49.2	+59.5	139.7	31 03.3	+59.6	140.1	30 17.2	+59.7	140.5	24
25	36 33.1	+58.9	137.2	35 48.9	+59.0	137.7	35 04.3	+59.2	138.2	34 19.4	+59.3	138.7	33 34.2	+59.5	139.1	32 48.7	+59.6	139.5	32 02.9	+59.7	139.9	31 16.9	+59.7	140.3	25
26	37 32.0	+58.8	137.0	36 47.9	+59.0	137.5	36 03.5	+59.1	138.0	35 18.7	+59.3	138.5	34 33.7	+59.4	138.9	33 48.3	+59.5	139.4	33 02.6	+59.6	139.8	32 16.6	+59.7	140.2	26
27	38 30.8	+58.8	136.7	37 46.9	+59.0	137.3	37 02.6	+59.2	137.8	36 18.0	+59.3	138.3	35 33.1	+59.4	138.8	34 47.8	+59.5	139.2	34 02.2	+59.6	139.7	33 16.3	+59.7	140.1	27
28	39 29.6	+58.7	136.5	38 45.9	+58.9	137.0	38 01.8	+59.1	137.6	37 17.3	+59.2	138.1	36 32.5	+59.3	138.6	35 47.3	+59.5	139.1	35 01.8	+59.6	139.5	34 16.0	+59.7	140.0	28
29	40 28.3	+58.7	136.2	39 44.8	+58.9	136.8	39 00.9	+59.0	137.4	38 16.5	+59.2	137.9	37 31.8	+59.4	138.4	36 46.8	+59.5	138.9	36 01.4	+59.6	139.4	35 15.7	+59.6	139.9	29
30	41 27.0	+58.7	135.9	40 43.7	+58.9	136.5	39 59.9	+59.1	137.1	39 15.7	+59.2	137.7	38 31.2	+59.3	138.2	37 46.3	+59.4	138.8	37 01.0	+59.5	139.3	36 15.3	+59.7	139.7	30
31	42 25.7	+58.6	135.7	41 42.6	+58.8	136.3	40 59.0	+59.0	136.9	40 14.9	+59.2	137.5	39 30.5	+59.3	138.0	38 45.7	+59.5	138.6	38 00.5	+59.6	139.1	37 15.0	+59.7	139.6	31
32	43 24.3	+58.6	135.4	42 41.4	+58.8	136.0	41 58.0	+59.0	136.7	41 14.1	+59.2	137.3	40 29.8	+59.3	137.8	39 45.2	+59.4	138.4	39 00.1	+59.6	138.9	38 14.7	+59.6	139.5	32
33	44 22.9	+58.5	135.1	43 40.2	+58.7	135.8	42 57.0	+58.9	136.4	42 13.3	+59.1	137.0	41 29.1	+59.3	137.6	40 44.6	+59.4	138.2	39 59.7	+59.5	138.8	39 14.3	+59.7	139.3	33
34	45 21.4	+58.5	134.8	44 38.9	+58.7	135.5	43 55.9	+58.9	136.1	43 12.4	+59.1	136.8	42 28.4	+59.3	137.4	41 44.0	+59.4	138.0	40 59.2	+59.5	138.6	40 14.0	+59.6	139.2	34
35	46 19.9	+58.4	134.4	45 37.6	+58.7	135.2	44 54.8	+58.9	135.9	44 11.5	+59.1	136.6	43 27.7	+59.2	137.2	42 43.4	+59.4	137.9	41 58.7	+59.5	138.5	41 13.6	+59.6	139.0	35
36	47 18.3	+58.4	134.1	46 36.3	+58.6	134.9	45 53.7	+58.8	135.6	45 10.6	+59.0	136.3	44 26.9	+59.2	137.0	43 42.8	+59.4	137.7	42 58.2	+59.5	138.3	42 13.2	+59.6	138.9	36
37	48 16.7	+58.3	133.8	47 34.9	+58.6	134.6	46 52.5	+58.8	135.3	46 09.6	+59.0	136.1	45 26.1	+59.2	136.8	44 42.2	+59.3	137.5	43 57.7	+59.5	138.1	43 12.8	+59.6	138.7	37
38	49 15.0	+58.2	133.4	48 33.5	+58.5	134.2	47 51.3	+58.8	135.0	47 08.6	+58.9	135.8	46 25.3	+59.1	136.5	45 41.5	+59.3	137.2	44 57.2	+59.5	137.9	44 12.4	+59.6	138.6	38
39	50 13.2	+58.2	133.0	49 32.0	+58.4	133.9	48 50.1	+58.6	134.7	48 07.5	+59.0	135.5	47 24.4	+59.2	136.3	46 40.8	+59.3	137.0	45 56.7	+59.4	137.7	45 12.0	+59.6	138.4	39
40	51 11.4	+58.1	132.6	50 30.4	+58.4	133.5	49 48.7	+58.7	134.4	49 06.5	+58.8	135.2	48 23.6	+59.0	136.0	47 40.1	+59.3	136.8	46 56.1	+59.4	137.5	46 11.6	+59.5	138.2	40
41	52 09.5	+58.0	132.2	51 28.8	+58.3	133.2	50 47.4	+58.6	134.1	50 05.3	+58.8	134.9	49 22.6	+59.1	135.8	48 39.4	+59.2	136.6	47 55.5	+59.4	137.3	47 11.1	+59.6	138.1	41
42	53 07.5	+57.9	131.8	52 27.1	+58.2	132.8	51 46.0	+58.5	133.7	51 04.1	+58.8	134.6	50 21.7	+59.0	135.5	49 38.6	+59.2	136.3	48 54.9	+59.4	137.1	48 10.7	+59.5	137.9	42
43	54 05.4	+57.8	131.4	53 25.3	+58.1	132.4	52 44.5	+58.4	133.4	52 02.9	+58.7	134.3	51 20.7	+58.9	135.2	50 37.8	+59.1	136.1	49 54.3	+59.3	136.9	49 10.2	+59.5	137.7	43
44	55 03.2	+57.6	130.9	54 23.4	+58.1	132.0	53 42.9	+58.4	133.0	53 01.6	+58.7	134.0	52 19.6	+58.9	134.9	51 36.9	+59.2	135.8	50 53.6	+59.3	136.7	50 09.7	+59.5	137.5	44
45	56 00.8	+57.6	130.4	55 21.5	+57.9	131.5	54 41.3	+58.3	132.6	54 00.3	+58.6	133.6	53 18.5	+58.9	134.6	52 36.1	+59.1	135.5	51 52.9	+59.3	136.4	51 09.2	+59.4	137.3	45
46	56 58.4	+57.4	129.9	56 19.4	+57.9	131.1	55 39.6	+58.2	132.2	54 58.9	+58.5	133.2	54 17.4	+58.8	134.3	53 35.2	+59.0	135.2	52 52.2	+59.3	136.2	52 08.6	+59.4	137.1	46
47	57 55.8	+57.3	129.4	57 17.3	+57.7	130.6	56 37.8	+58.1	131.7	55 57.4	+58.4	132.8	55 16.2	+58.7	133.9	54 34.2	+59.0	134.9	53 51.5	+59.2	135.9	53 08.0	+59.4	136.8	47
48	58 53.1	+57.1	128.8	58 15.0	+57.6	130.1	57 35.9	+58.0	131.3	56 55.8	+58.4	132.4	56 14.9	+58.7	133.5	55 33.2	+58.9	134.6	54 50.7	+59.1	135.6	54 07.4	+59.4	136.6	48
49	59 50.2	+57.0	128.2	59 12.6	+57.4	129.5	58 33.9	+57.9	130.8	57 54.2	+58.3	132.0	57 13.6	+58.6	133.2	56 32.1	+58.9	134.3	55 49.8	+59.2	135.3	55 06.8	+59.3	136.3	49
50	60 47.2	+56.8	127.6	60 10.0	+57.3	129.0	59 31.8	+57.7	130.3	58 52.5	+58.1	131.6	58 12.2	+58.5	132.8	57 31.0	+58.8	133.9	56 49.0	+59.1	135.0	56 06.1	+59.3	136.1	50
51	61 44.0	+56.5	126.9	61 07.3	+57.1	128.4	60 29.5	+57.6	129.7	59 50.6	+58.1	131.1	59 10.7	+58.4	132.3	58 29.8	+58.8	133.5	57 48.1	+59.0	134.7	57 05.4	+59.3	135.8	51
52	62 40.5	+56.3	126.2	62 04.4	+57.0	127.7	61 27.1	+57.5	129.2	60 48.7	+57.9	130.6	60 09.1	+58.4	131.9	59 28.6	+58.7	133.2	58 47.1	+59.0	134.4	58 04.7	+59.2	135.5	52
53	63 36.8	+56.1	125.4	63 01.4	+56.7	127.0	62 24.6	+57.3	128.6	61 46.6	+57.8	130.0	61 07.5	+58.2	131.4	60 27.3	+58.6	132.7	59 46.1	+58.9	134.0	59 03.9	+59.2	135.2	53
54	64 32.9	+55.8	124.6	63 58.1	+56.5	126.3	63 21.9	+57.1	127.9	62 44.4	+57.6	129.4	62 05.7	+58.1	130.9	61 25.9	+58.5	132.3	60 45.0	+58.8	133.6	60 03.1	+59.1	134.9	54
55	65 28.7	+55.4	123.7	64 54.6	+56.2	125.5	64 19.0	+56.9	127.2	63 42.0	+57.5	128.8	63 03.8	+58.0	130.4	62 24.4	+58.4	131.8	61 43.8	+58.8	133.2	61 02.2	+59.1	134.5	55
56	66 24.1	+55.1	122.8	65 50.8	+55.9	124.7	65 15.9	+56.6	126.5	64 39.5	+57.3	128.2	64 01.8	+57.8	129.8	63 22.8	+58.2	131.3	62 42.6	+58.6	132.8	62 01.3	+59.0	134.2	56
57	67 19.2	+54.7	121.8	66 46.7	+55.6	123.8	66 12.5	+56.4	125.7	65 36.8	+57.1	127.5	64 59.6	+57.6	129.2	64 21.0	+58.2	130.8	63 41.2	+58.6	132.3	63 00.3	+58.9	133.8	57
58	68 13.9	+54.2	120.7	67 42.3	+55.2	122.8	67 08.9	+56.1	124.8	66 33.9	+56.8	126.7	65 57.2	+57.5	128.5	65 19.2	+58.0	130.2	64 39.8	+58.5	131.8	63 59.2	+58.9	133.4	58
59	69 08.1	+53.7	119.5	68 37.5	+54.8	121.7	68 05.0	+55.7	123.9	67 30.7	+56.5	125.9	66 54.7	+57.3	127.8	66 17.2	+57.9	129.6	65 38.3	+58.4	131.3	64 58.1	+58.7	132.9	59
60	70 01.8	+53.0	118.2	69 32.3	+54.3	120.6	69 00.7	+55.4	122.8	68 27.2	+56.3	125.0	67 52.0	+57.0	127.0	67 15.1	+57.6	128.9	66 36.7	+58.2	130.7	65 56.8	+58.7	132.4	60
61	70 54.8	+52.4	116.8	70 26.6	+53.7	119.4	69 56.1	+54.9	121.7	69 23.5	+55.9	124.0	68 49.0	+56.7	126.2	68 12.7	+57.5	128.2	67 34.9	+58.0	130.1	66 55.5	+58.6	131.9	61
62	71 47.2	+51.6	115.3	71 20.3	+53.1	118.0	70 51.0	+54.4	120.5	70 19.4	+55.5	123.0	69 45.7	+56.5	125.2	69 10.2	+57.2	127.4	68 32.9	+57.9	129.4	67 54.1	+58.4	131.3	62
63	72 38.8	+50.7	113.6	72 13.4	+52.4	116.5	71 45.4	+53.7	119.2	71 14.9	+55.0	121.8	70 42.2	+56.1	124.2	70 07.4	+57.0	126.5	69 30.8	+57.7	128.7	68 52.5	+58.3	130.7	63
64	73 29.5	+49.6	111.8	73 05.8	+51.4	114.9	72 39.1	+53.1	117.8	72 09.9	+54.5	120.5	71 38.3	+55.6	123.1	71 04.4	+56.6	125.6	70 28.5	+57.4	127.9	69 50.8	+58.1	130.0	64
65	74 19.1	+48.4	109.8	73 57.2	+50.5	113.1	73 32.2	+52.3	116.2	73 04.4	+53.8	119.1	72 33.9	+55.2	121.9	72 01.0	+56.3	124.5	71 25.9	+57.2	127.0	70 48.9	+57.9	129.3	65
66	75 07.5	+47.0	107.5	74 47.7	+49.3	111.0	74 24.5	+51.3	114.4	73 58.2	+53.1	117.6	73 29.1	+54.5	120.6	72 57.3	+55.8	123.4	72 23.1	+56.9	126.0	71 46.8	+57.7	128.5	66
67	75 54.5	+45.2	105.0	75 37.0	+47.9	108.8	75 15.8	+50.2	112.4	74 51.3	+52.2	115.8	74 23.6	+53.9	119.1	73 53.1	+55.3	122.1	73 20.0	+56.5	124.9	72 44.5	+57.4	127.6	67
68	76 39.7	+43.2•	102.3	76 24.9	+46.2	106.3	76 06.0	+48.9	110.2	75 43.5	+51.2	113.9	75 17.5	+53.1	117.4	74 48.4	+54.7	120.7	74 16.5	+56.0	123.7	73 41.9	+57.1	126.6	68
69	77 22.9	+40.8•	99.2	77 11.1	+44.2•	103.5	76 54.9	+47.2	107.7	76 34.7	+49.8	111.7	76 10.6	+52.1	115.5	75 43.1	+54.0	119.0	75 12.5	+55.5	122.4	74 39.0	+56.7	125.4	69
70	78 03.7	+38.0•	95.7	77 55.3	+41.8•	100.4	77 42.1	+45.3•	104.9	77 24.5	+48.3	109.2	77 02.7	+50.9	113.3	76 37.1	+53.0	117.2	76 08.0	+54.8	120.8	75 35.7	+56.3	124.2	70
71	78 41.7	+34.7•	91.9	78 37.1	+39.0•	96.9	78 27.4	+42.9•	101.7	78 12.8	+46.4•	106.4	77 53.6	+49.4	110.9	77 30.1	+52.0	115.1	77 02.8	+54.0	119.1	76 32.0	+55.6	122.7	71
72	79 16.4	+30.8•	87.6	79 16.1	+35.6•	92.9	79 10.3	+40.1•	98.1	78 59.2	+44.1•	103.2	78 43.0	+47.6•	108.1	78 22.1	+50.6	112.7	77 56.8	+53.0	117.1	77 27.6	+55.0	121.1	72
73	79 47.2	+26.3•	82.9	79 51.7	+31.6•	88.4	79 50.4	+36.7•	94.0	79 43.3	+41.3•	99.5	79 30.6	+45.4•	104.9	79 12.7	+48.8	110.0	78 49.8	+51.8	114.7	78 22.6	+54.1	119.1	73
74	80 13.5	+21.2•	77.7	80 23.3	+26.9•	83.5	80 27.1	+32.4•	89.4	80 24.6	+37.7•	95.3	80 16.0	+42.5•	101.1	80 01.5	+46.7•	106.7	79 41.6	+50.1	112.0	79 16.7	+53.0	116.9	74
75	80 34.7	+15.5•	72.1	80 50.2	+21.5•	78.0	80 59.5	+27.6•	84.2	81 02.3	+33.5•	90.5	80 58.5	+39.0•	96.8	80 48.2	+43.9•	103.0	80 31.7	+48.1•	108.8	80 09.7	+51.5	114.3	75
76	80 50.2	+9.3•	66.1	81 11.7	+15.4•	72.0	81 27.1	+21.7•	78.4	81 35.8	+28.2•	85.0	81 37.5	+34.5•	91.8	81 32.1	+40.3•	98.5	81 19.8	+45.4•	105.0	81 01.2	+49.6•	111.1	76
77	80 59.5	+2.8•	59.8	81 27.1	+8.7•	65.6	81 48.8	+15.2•	71.9	82 04.0	+22.1•	78.8	82 12.0	+29.0•	86.0	82 12.4	+35.8•	93.3	82 05.2	+41.9•	100.5	81 50.8	+47.0•	107.4	77
78	81 02.3	–3.8•	53.4	81 35.8	+1.7•	58.9	82 04.0	+8.0•	65.0	82 26.1	+14.9•	71.9	82 41.0	+22.5•	79.3	82 48.2	+30.0•	87.1	82 47.1	+37.1•	95.0	82 37.8	+43.5•	102.7	78
79	80 58.5	–10.3•	47.1	81 37.5	–5.4•	52.0	82 12.0	+0.4•	57.8	82 41.0	+7.2•	64.4	83 03.5	+14.7•	71.8	83 18.2	+22.8•	79.9	83 24.2	+31.1•	88.5	83 21.3	+38.8•	97.1	79
80	80 48.2	–16.5•	40.8	81 32.1	–12.3•	45.2	82 12.4	–7.2•	50.4	82 48.2	–1.1•	56.5	83 18.2	+6.0•	63.6	83 41.0	+14.3•	71.8	83 55.3	+23.3•	80.7	84 00.1	+32.3•	90.1	80
81	80 31.7	–22.0•	34.9	81 19.8	–18.6•	38.7	82 05.2	–14.4•	43.1	82 47.1	–9.3•	48.5	83 24.2	–2.9•	55.0	83 55.3	+4.8•	62.8	84 18.6	+13.8•	71.7	84 32.4	+23.9•	81.7	81
82	80 09.7	–27.1•	29.4	81 01.2	–24.4•	32.5	81 50.8	–21.1•	36.2	82 37.8	–17.0•	40.8	83 21.3	–11.7•	46.4	84 00.1	–5.1•	53.3	84 32.4	+3.2•	61.7	84 56.3	+13.2•	71.7	82
83	79 42.6	–31.5•	24.2	80 36.8	–29.5•	26.7	81 29.7	–27.0•	29.7	82 20.8	–23.8•	33.4	83 09.6	–19.8•	38.0	83 55.0	–14.6•	43.8	84 35.6	–7.7•	51.1	85 09.5	+1.2•	60.3	83
84	79 11.1	–35.2•	19.6	80 07.3	–33.7•	21.5	81 02.7	–32.0•	23.8	81 57.0	–29.8•	26.7	82 49.8	–26.9•	30.3	83 40.4	–23.1•	34.8	84 27.9	–18.0•	40.7	85 10.7	–11.0•	48.5	84
85	78 35.9	–38.5•	15.4	79 33.6	–37.5•	16.8	80 30.7	–36.2•	18.6	81 27.2	–34.6•	20.7	82 22.9	–32.7•	23.3	83 17.3	–30.2•	26.7	84 09.9	–26.8•	31.1	84 59.7	–22.0•	37.0	85
86	77 57.4	–41.2•	11.6	78 56.1	–40.6•	12.6	79 54.5	–39.7•	13.9	80 52.6	–38.8•	15.4	81 50.2	–37.6•	17.2	82 47.1	–35.9•	19.5	83 43.1	–33.8•	22.6	84 37.7	–30.9•	26.6	86
87	77 16.2	–43.5•	8.2	78 15.5	–43.1•	8.9	79 14.8	–42.7•	9.7	80 13.8	–42.1•	10.7	81 12.6	–41.3•	11.9	82 11.2	–40.5•	13.4	83 09.3	–39.2•	15.3	84 06.8	–37.6•	17.9	87
88	76 32.7	–45.5	5.2	77 32.4	–45.3•	5.6	78 32.1	–45.1•	6.1	79 31.7	–44.7•	6.6	80 31.3	–44.4•	7.3	81 30.7	–43.9•	8.2	82 30.1	–43.5•	9.3	83 29.2	–42.8•	10.7	88
89	75 47.2	–47.2	2.5	76 47.1	–47.1	2.6	77 47.0	–47.0	2.8	78 47.0	–47.0•	3.1	79 46.9	–46.9•	3.4	80 46.8	–46.8•	3.8	81 46.6	–46.6•	4.2	82 46.4	–46.4•	4.8	89
90	75 00.0	–48.6	0.0	76 00.0	–48.6	0.0	77 00.0	–48.7	0.0	78 00.0	–48.8	0.0	79 00.0	–48.8	0.0	80 00.0	–48.9	0.0	81 00.0	–49.0•	0.0	82 00.0	–49.1•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 37°, 323°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 55.7	−59.2	142.0	11 08.4	−59.3	142.2	10 21.0	−59.5	142.3	9 33.5	−59.5	142.4	8 45.9	−59.6	142.5	7 58.3	−59.7	142.6	7 10.6	−59.7	142.7	6 22.9	−59.8	142.7	**0**
1	10 56.5	−59.2	142.2	10 09.1	−59.4	142.3	9 21.5	−59.4	142.4	8 34.0	−59.6	142.5	7 46.3	−59.6	142.6	6 58.6	−59.6	142.7	6 10.9	−59.7	142.8	5 23.1	−59.8	142.8	**1**
2	9 57.3	−59.3	142.4	9 09.7	−59.3	142.5	8 22.1	−59.4	142.6	7 34.4	−59.5	142.6	6 46.7	−59.6	142.7	5 59.0	−59.7	142.8	5 11.2	−59.8	142.8	4 23.3	−59.8	142.9	**2**
3	8 58.0	−59.2	142.5	8 10.4	−59.4	142.6	7 22.7	−59.5	142.7	6 34.9	−59.5	142.8	5 47.1	−59.6	142.8	4 59.3	−59.7	142.9	4 11.4	−59.7	142.9	3 23.5	−59.8	143.0	**3**
4	7 58.8	−59.3	142.7	7 11.0	−59.3	142.8	6 23.2	−59.4	142.8	5 35.4	−59.5	142.9	4 47.5	−59.6	143.0	3 59.6	−59.6	143.0	3 11.7	−59.7	143.0	2 23.7	−59.7	143.1	**4**
5	6 59.5	−59.2	142.8	6 11.7	−59.4	142.9	5 23.8	−59.5	143.0	4 35.9	−59.6	143.0	3 47.9	−59.6	143.1	3 00.0	−59.7	143.1	2 12.0	−59.8	143.1	1 24.0	−59.8	143.2	**5**
6	6 00.3	−59.3	143.0	5 12.3	−59.3	143.1	4 24.3	−59.4	143.1	3 36.3	−59.5	143.2	2 48.3	−59.6	143.2	2 00.3	−59.7	143.2	1 12.2	−59.7	143.2	0 24.2	−59.8	143.2	**6**
7	5 01.0	−59.3	143.2	4 13.0	−59.4	143.2	3 24.9	−59.4	143.2	2 36.8	−59.5	143.3	1 48.7	−59.6	143.3	1 00.6	−59.6	143.3	0 12.5	−59.7	143.3	0 35.6	+59.8	36.7	**7**
8	4 01.7	−59.2	143.3	3 13.6	−59.4	143.4	2 25.5	−59.5	143.4	1 37.3	−59.5	143.4	0 49.1	−59.6	143.4	0 00.9	−59.6	143.4	0 47.2	+59.8	36.6	1 35.4	+59.8	36.6	**8**
9	3 02.5	−59.3	143.5	2 14.2	−59.3	143.5	1 26.0	−59.4	143.5	0 37.8	−59.6	143.5	0 10.5	+59.6	36.5	0 58.7	+59.7	36.5	1 47.0	+59.7	36.5	2 35.2	+59.8	36.5	**9**
10	2 03.2	−59.3	143.6	1 14.9	−59.4	143.6	0 26.6	−59.5	143.7	0 21.8	+59.5	36.3	1 10.1	+59.6	36.4	1 58.4	+59.7	36.4	2 46.7	+59.7	36.4	3 35.0	+59.8	36.4	**10**
11	1 03.9	−59.2	143.8	0 15.5	−59.3	143.8	0 32.9	+59.4	36.2	1 21.3	+59.5	36.2	2 09.7	+59.6	36.2	2 58.1	+59.6	36.3	3 46.4	+59.8	36.3	4 34.8	+59.8	36.3	**11**
12	0 04.7	−59.3	143.9	0 43.8	+59.4	36.1	1 32.3	+59.5	36.1	2 20.8	+59.5	36.1	3 09.3	+59.6	36.1	3 57.7	+59.7	36.2	4 46.2	+59.7	36.2	5 34.6	+59.8	36.3	**12**
13	0 54.6	+59.3	35.9	1 43.2	+59.4	35.9	2 31.8	+59.4	35.9	3 20.3	+59.6	36.0	4 08.9	+59.6	36.0	4 57.4	+59.7	36.1	5 45.9	+59.7	36.1	6 34.4	+59.7	36.2	**13**
14	1 53.9	+59.2	35.8	2 42.6	+59.3	35.8	3 31.2	+59.5	35.8	4 19.9	+59.5	35.8	5 08.5	+59.6	35.9	5 57.1	+59.6	36.0	6 45.6	+59.8	36.0	7 34.1	+59.8	36.1	**14**
15	2 53.1	+59.3	35.6	3 41.9	+59.4	35.6	4 30.7	+59.4	35.7	5 19.4	+59.5	35.7	6 08.1	+59.6	35.8	6 56.7	+59.7	35.8	7 45.4	+59.7	35.9	8 33.9	+59.8	36.0	**15**
16	3 52.4	+59.3	35.4	4 41.3	+59.3	35.5	5 30.1	+59.5	35.5	6 18.9	+59.5	35.6	7 07.7	+59.6	35.7	7 56.4	+59.7	35.7	8 45.1	+59.7	35.8	9 33.7	+59.8	35.9	**16**
17	4 51.7	+59.2	35.3	5 40.6	+59.4	35.3	6 29.6	+59.4	35.4	7 18.4	+59.6	35.5	8 07.3	+59.6	35.5	8 56.1	+59.6	35.6	9 44.8	+59.7	35.7	10 33.5	+59.8	35.8	**17**
18	5 50.9	+59.3	35.1	6 40.0	+59.3	35.2	7 29.0	+59.4	35.3	8 18.0	+59.5	35.3	9 06.9	+59.6	35.4	9 55.7	+59.7	35.5	10 44.5	+59.8	35.6	11 33.3	+59.8	35.7	**18**
19	6 50.2	+59.2	35.0	7 39.3	+59.4	35.0	8 28.4	+59.5	35.1	9 17.5	+59.5	35.2	10 06.5	+59.6	35.3	10 55.4	+59.7	35.4	11 44.3	+59.7	35.5	12 33.1	+59.7	35.7	**19**
20	7 49.4	+59.3	34.8	8 38.7	+59.3	34.9	9 27.9	+59.4	35.0	10 17.0	+59.5	35.1	11 06.1	+59.5	35.2	11 55.1	+59.6	35.3	12 44.0	+59.7	35.4	13 32.8	+59.8	35.6	**20**
21	8 48.7	+59.2	34.6	9 38.0	+59.4	34.7	10 27.3	+59.4	34.8	11 16.5	+59.5	35.0	12 05.6	+59.6	35.1	12 54.7	+59.7	35.2	13 43.7	+59.7	35.3	14 32.6	+59.8	35.5	**21**
22	9 47.9	+59.3	34.5	10 37.4	+59.3	34.6	11 26.7	+59.4	34.7	12 16.0	+59.5	34.8	13 05.2	+59.6	35.0	13 54.4	+59.6	35.1	14 43.4	+59.7	35.2	15 32.4	+59.8	35.4	**22**
23	10 47.2	+59.2	34.3	11 36.7	+59.3	34.4	12 26.1	+59.5	34.6	13 15.5	+59.5	34.7	14 04.8	+59.6	34.8	14 54.0	+59.7	35.0	15 43.1	+59.7	35.1	16 32.2	+59.7	35.3	**23**
24	11 46.4	+59.3	34.2	12 36.0	+59.4	34.3	13 25.6	+59.4	34.4	14 15.0	+59.5	34.6	15 04.4	+59.6	34.7	15 53.7	+59.6	34.9	16 42.8	+59.8	35.0	17 31.9	+59.8	35.2	**24**
25	12 45.7	+59.2	34.0	13 35.4	+59.3	34.1	14 25.0	+59.4	34.3	15 14.5	+59.5	34.4	16 04.0	+59.5	34.6	16 53.3	+59.6	34.8	17 42.6	+59.7	34.9	18 31.7	+59.8	35.1	**25**
26	13 44.9	+59.2	33.8	14 34.7	+59.3	34.0	15 24.4	+59.4	34.1	16 14.0	+59.5	34.3	17 03.5	+59.6	34.5	17 52.9	+59.7	34.6	18 42.3	+59.7	34.8	19 31.5	+59.7	35.0	**26**
27	14 44.1	+59.2	33.7	15 34.0	+59.3	33.8	16 23.8	+59.4	34.0	17 13.5	+59.5	34.2	18 03.1	+59.5	34.3	18 52.6	+59.6	34.5	19 42.0	+59.7	34.7	20 31.2	+59.8	34.9	**27**
28	15 43.3	+59.2	33.5	16 33.3	+59.3	33.7	17 23.2	+59.4	33.8	18 13.0	+59.4	34.0	19 02.6	+59.6	34.2	19 52.2	+59.6	34.4	20 41.7	+59.6	34.6	21 31.0	+59.7	34.8	**28**
29	16 42.5	+59.2	33.3	17 32.6	+59.3	33.5	18 22.6	+59.4	33.7	19 12.4	+59.5	33.9	20 02.2	+59.5	34.1	20 51.8	+59.7	34.3	21 41.3	+59.7	34.5	22 30.7	+59.8	34.7	**29**
30	17 41.7	+59.2	33.2	18 31.9	+59.3	33.3	19 22.0	+59.3	33.5	20 11.9	+59.5	33.7	21 01.7	+59.6	33.9	21 51.5	+59.6	34.2	22 41.0	+59.7	34.4	23 30.5	+59.7	34.6	**30**
31	18 40.9	+59.2	33.0	19 31.2	+59.2	33.2	20 21.3	+59.4	33.4	21 11.4	+59.4	33.6	22 01.3	+59.5	33.8	22 51.1	+59.6	34.0	23 40.7	+59.7	34.3	24 30.2	+59.8	34.5	**31**
32	19 40.1	+59.1	32.8	20 30.4	+59.3	33.0	21 20.7	+59.4	33.2	22 10.8	+59.5	33.4	23 00.8	+59.6	33.7	23 50.7	+59.6	33.9	24 40.4	+59.7	34.2	25 30.0	+59.7	34.4	**32**
33	20 39.2	+59.2	32.6	21 29.7	+59.3	32.9	22 20.1	+59.3	33.1	23 10.3	+59.4	33.3	24 00.4	+59.5	33.5	24 50.3	+59.6	33.8	25 40.1	+59.6	34.1	26 29.7	+59.7	34.3	**33**
34	21 38.4	+59.2	32.5	22 29.0	+59.2	32.7	23 19.4	+59.3	32.9	24 09.7	+59.4	33.2	24 59.9	+59.5	33.4	25 49.9	+59.6	33.7	26 39.7	+59.7	33.9	27 29.4	+59.8	34.2	**34**
35	22 37.6	+59.1	32.3	23 28.2	+59.2	32.5	24 18.7	+59.4	32.7	25 09.1	+59.5	33.0	25 59.4	+59.5	33.3	26 49.5	+59.6	33.5	27 39.4	+59.7	33.8	28 29.2	+59.7	34.1	**35**
36	23 36.7	+59.1	32.1	24 27.4	+59.3	32.3	25 18.1	+59.3	32.6	26 08.6	+59.4	32.8	26 58.9	+59.5	33.1	27 49.1	+59.5	33.4	28 39.1	+59.6	33.7	29 28.9	+59.7	34.0	**36**
37	24 35.8	+59.1	31.9	25 26.7	+59.2	32.2	26 17.4	+59.3	32.4	27 08.0	+59.4	32.7	27 58.4	+59.5	33.0	28 48.6	+59.6	33.3	29 38.7	+59.7	33.6	30 28.6	+59.7	33.9	**37**
38	25 34.9	+59.1	31.7	26 25.9	+59.2	32.0	27 16.7	+59.3	32.2	28 07.4	+59.4	32.5	28 57.9	+59.4	32.8	29 48.2	+59.6	33.1	30 38.4	+59.6	33.4	31 28.3	+59.7	33.8	**38**
39	26 34.0	+59.1	31.5	27 25.1	+59.2	31.8	28 16.0	+59.3	32.1	29 06.8	+59.3	32.4	29 57.3	+59.5	32.7	30 47.8	+59.5	33.0	31 38.0	+59.6	33.3	32 28.0	+59.7	33.7	**39**
40	27 33.1	+59.0	31.3	28 24.3	+59.1	31.6	29 15.3	+59.2	31.9	30 06.1	+59.4	32.2	30 56.8	+59.5	32.5	31 47.3	+59.6	32.8	32 37.6	+59.6	33.2	33 27.7	+59.7	33.5	**40**
41	28 32.1	+59.1	31.1	29 23.4	+59.2	31.4	30 14.5	+59.3	31.7	31 05.5	+59.3	32.0	31 56.3	+59.4	32.4	32 46.9	+59.5	32.7	33 37.2	+59.7	33.1	34 27.4	+59.7	33.4	**41**
42	29 31.2	+59.0	30.9	30 22.6	+59.1	31.2	31 13.8	+59.2	31.5	32 04.8	+59.4	31.9	32 55.7	+59.4	32.2	33 46.4	+59.5	32.5	34 36.9	+59.6	32.9	35 27.1	+59.7	33.3	**42**
43	30 30.2	+59.0	30.7	31 21.7	+59.1	31.0	32 13.0	+59.2	31.3	33 04.2	+59.3	31.7	33 55.1	+59.5	32.0	34 45.9	+59.5	32.4	35 36.5	+59.5	32.8	36 26.8	+59.7	33.2	**43**
44	31 29.2	+59.0	30.5	32 20.8	+59.1	30.8	33 12.2	+59.2	31.2	34 03.5	+59.3	31.5	34 54.6	+59.4	31.9	35 45.4	+59.5	32.2	36 36.0	+59.6	32.6	37 26.5	+59.6	33.0	**44**
45	32 28.2	+58.9	30.3	33 19.9	+59.1	30.6	34 11.4	+59.2	31.0	35 02.8	+59.3	31.3	35 54.0	+59.3	31.7	36 44.9	+59.5	32.1	37 35.6	+59.6	32.5	38 26.1	+59.7	32.9	**45**
46	33 27.1	+59.0	30.1	34 19.0	+59.0	30.4	35 10.6	+59.2	30.8	36 02.1	+59.3	31.1	36 53.3	+59.4	31.5	37 44.4	+59.4	31.9	38 35.2	+59.6	32.3	39 25.8	+59.6	32.8	**46**
47	34 26.1	+58.9	29.8	35 18.0	+59.0	30.2	36 09.8	+59.1	30.6	37 01.4	+59.2	30.9	37 52.7	+59.4	31.3	38 43.8	+59.5	31.7	39 34.8	+59.5	32.2	40 25.4	+59.6	32.6	**47**
48	35 25.0	+58.9	29.6	36 17.0	+59.0	30.0	37 08.9	+59.1	30.3	38 00.6	+59.2	30.7	38 52.1	+59.3	31.1	39 43.3	+59.4	31.6	40 34.3	+59.5	32.0	41 25.0	+59.7	32.5	**48**
49	36 23.9	+58.8	29.4	37 16.0	+59.0	29.7	38 08.0	+59.1	30.1	38 59.8	+59.2	30.5	39 51.4	+59.3	31.0	40 42.7	+59.5	31.4	41 33.8	+59.5	31.8	42 24.7	+59.6	32.3	**49**
50	37 22.7	+58.8	29.1	38 15.0	+59.0	29.5	39 07.1	+59.1	29.9	39 59.0	+59.2	30.3	40 50.7	+59.3	30.8	41 42.2	+59.4	31.2	42 33.3	+59.5	31.7	43 24.3	+59.6	32.2	**50**
51	38 21.5	+58.8	28.9	39 14.0	+58.9	29.3	40 06.2	+59.0	29.7	40 58.2	+59.2	30.1	41 50.0	+59.3	30.6	42 41.6	+59.3	31.0	43 32.8	+59.5	31.5	44 23.9	+59.5	32.0	**51**
52	39 20.3	+58.8	28.6	40 12.9	+58.9	29.0	41 05.2	+59.0	29.4	41 57.4	+59.1	29.9	42 49.3	+59.2	30.3	43 40.9	+59.4	30.8	44 32.3	+59.5	31.3	45 23.4	+59.6	31.8	**52**
53	40 19.1	+58.7	28.4	41 11.8	+58.8	28.8	42 04.2	+59.0	29.2	42 56.5	+59.1	29.7	43 48.5	+59.2	30.1	44 40.3	+59.3	30.6	45 31.8	+59.4	31.1	46 23.0	+59.6	31.7	**53**
54	41 17.8	+58.7	28.1	42 10.6	+58.8	28.5	43 03.2	+59.0	29.0	43 55.6	+59.1	29.4	44 47.7	+59.2	29.9	45 39.6	+59.3	30.4	46 31.2	+59.5	30.9	47 22.6	+59.5	31.5	**54**
55	42 16.5	+58.6	27.8	43 09.4	+58.8	28.2	44 02.2	+58.9	28.7	44 54.7	+59.0	29.2	45 46.9	+59.2	29.7	46 38.9	+59.3	30.2	47 30.7	+59.4	30.7	48 22.1	+59.5	31.3	**55**
56	43 15.1	+58.6	27.5	44 08.2	+58.7	28.0	45 01.1	+58.8	28.4	45 53.7	+59.0	28.9	46 46.1	+59.1	29.4	47 38.2	+59.3	30.0	48 30.1	+59.3	30.5	49 21.6	+59.5	31.1	**56**
57	44 13.7	+58.5	27.2	45 06.9	+58.7	27.7	45 59.9	+58.9	28.2	46 52.7	+59.0	28.7	47 45.2	+59.1	29.2	48 37.5	+59.2	29.7	49 29.4	+59.4	30.3	50 21.1	+59.5	30.9	**57**
58	45 12.2	+58.5	26.9	46 05.6	+58.7	27.4	46 58.8	+58.8	27.9	47 51.7	+58.9	28.4	48 44.3	+59.1	28.9	49 36.7	+59.2	29.5	50 28.8	+59.3	30.1	51 20.6	+59.4	30.7	**58**
59	46 10.7	+58.4	26.6	47 04.3	+58.5	27.1	47 57.6	+58.7	27.6	48 50.6	+58.9	28.1	49 43.4	+59.0	28.6	50 35.9	+59.2	29.2	51 28.1	+59.3	29.8	52 20.0	+59.4	30.5	**59**
60	47 09.1	+58.4	26.3	48 02.8	+58.6	26.8	48 56.3	+58.7	27.3	49 49.5	+58.8	27.8	50 42.4	+59.0	28.4	51 35.1	+59.1	29.0	52 27.4	+59.3	29.6	53 19.4	+59.4	30.3	**60**
61	48 07.5	+58.3	25.9	49 01.4	+58.4	26.4	49 55.0	+58.6	26.9	50 48.3	+58.8	27.5	51 41.4	+59.0	28.1	52 34.2	+59.1	28.7	53 26.7	+59.2	29.3	54 18.8	+59.4	30.0	**61**
62	49 05.8	+58.3	25.6	49 59.8	+58.4	26.1	50 53.6	+58.6	26.6	51 47.1	+58.8	27.2	52 40.4	+58.8	27.8	53 33.3	+59.0	28.4	54 25.9	+59.2	29.1	55 18.2	+59.3	29.8	**62**
63	50 04.1	+58.1	25.2	50 58.2	+58.4	25.7	51 52.2	+58.5	26.3	52 45.9	+58.6	26.8	53 39.2	+58.9	27.5	54 32.3	+59.0	28.1	55 25.1	+59.1	28.8	56 17.5	+59.3	29.5	**63**
64	51 02.2	+58.1	24.8	51 56.6	+58.3	25.3	52 50.7	+58.4	25.9	53 44.5	+58.6	26.5	54 38.1	+58.8	27.1	55 31.3	+59.0	27.8	56 24.2	+59.1	28.5	57 16.8	+59.3	29.2	**64**
65	52 00.3	+58.0	24.4	52 54.9	+58.1	24.9	53 49.1	+58.4	25.5	54 43.1	+58.6	26.1	55 36.9	+58.7	26.8	56 30.3	+58.9	27.4	57 23.3	+59.1	28.2	58 16.1	+59.2	28.9	**65**
66	52 58.3	+57.9	24.0	53 53.0	+58.1	24.5	54 47.5	+58.3	25.1	55 41.7	+58.4	25.7	56 35.6	+58.6	26.4	57 29.2	+58.8	27.1	58 22.4	+59.0	27.8	59 15.3	+59.1	28.6	**66**
67	53 56.2	+57.9	23.5	54 51.1	+58.0	24.1	55 45.8	+58.2	24.7	56 40.1	+58.4	25.3	57 34.2	+58.6	26.0	58 28.0	+58.7	26.7	59 21.4	+58.9	27.5	60 14.4	+59.1	28.3	**67**
68	54 54.1	+57.7	23.1	55 49.1	+57.9	23.7	56 44.0	+58.1	24.3	57 38.5	+58.3	24.9	58 32.8	+58.5	25.6	59 26.7	+58.7	26.3	60 20.3	+58.9	27.1	61 13.5	+59.1	27.9	**68**
69	55 51.8	+57.5	22.6	56 47.0	+57.8	23.2	57 42.1	+57.9	23.8	58 36.8	+58.2	24.5	59 31.3	+58.4	25.2	60 25.4	+58.6	25.9	61 19.2	+58.8	26.7	62 12.6	+59.0	27.6	**69**
70	56 49.3	+57.5	22.1	57 44.8	+57.7	22.7	58 40.0	+57.9	23.3	59 35.0	+58.1	24.0	60 29.7	+58.3	24.7	61 24.0	+58.5	25.5	62 18.0	+58.7	26.3	63 11.6	+58.9	27.2	**70**
71	57 46.8	+57.3	21.6	58 42.5	+57.5	22.2	59 37.9	+57.8	22.8	60 33.1	+57.9	23.5	61 28.0	+58.1	24.2	62 22.5	+58.4	25.0	63 16.7	+58.6	25.8	64 10.5	+58.9	26.7	**71**
72	58 44.1	+57.2	21.0	59 40.0	+57.4	21.6	60 35.7	+57.6	22.3	61 31.0	+57.9	23.0	62 26.1	+58.1	23.7	63 20.9	+58.3	24.5	64 15.3	+58.6	25.4	65 09.4	+58.7	26.3	**72**
73	59 41.3	+56.9	20.4	60 37.4	+57.2	21.0	61 33.3	+57.4	21.7	62 28.9	+57.7	22.4	63 24.2	+57.9	23.1	64 19.2	+58.2	24.0	65 13.9	+58.4	24.8	66 08.1	+58.6	25.8	**73**
74	60 38.2	+56.8	19.8	61 34.6	+57.0	20.4	62 30.7	+57.3	21.1	63 26.6	+57.5	21.8	64 22.1	+57.8	22.5	65 17.4	+58.0	23.4	66 12.3	+58.2	24.3	67 06.7	+58.6	25.2	**74**
75	61 35.0	+56.6	19.1	62 31.6	+56.8	19.7	63 28.0	+57.1	20.4	64 24.1	+57.3	21.1	65 19.9	+57.6	21.9	66 15.4	+57.9	22.8	67 10.5	+58.2	23.7	68 05.3	+58.4	24.7	**75**
76	62 31.6	+56.4	18.4	63 28.4	+56.7	19.0	64 25.1	+56.8	19.7	65 21.4	+57.1	20.4	66 17.5	+57.4	21.2	67 13.3	+57.6	22.1	68 08.7	+57.9	23.0	69 03.7	+58.2	24.0	**76**
77	63 28.0	+56.1	17.6	64 25.1	+56.3	18.3	65 21.9	+56.6	19.0	66 18.5	+56.9	19.7	67 14.9	+57.2	20.5	68 10.9	+57.5	21.4	69 06.6	+57.8	22.3	70 01.9	+58.1	23.4	**77**
78	64 24.1	+55.8	16.8	65 21.4	+56.1	17.5	66 18.5	+56.4	18.1	67 15.4	+56.7	18.9	68 12.1	+56.9	19.7	69 08.4	+57.2	20.6	70 04.4	+57.6	21.5	71 00.0	+57.9	22.6	**78**
79	65 19.9	+55.5	16.0	66 17.5	+55.8	16.6	67 14.9	+56.0	17.3	68 12.1	+56.3	18.0	69 09.0	+56.6	18.8	70 05.6	+57.0	19.7	71 02.0	+57.2	20.7	71 57.9	+57.6	21.8	**79**
80	66 15.4	+55.1	15.0	67 13.3	+55.4	15.7	68 10.9	+55.7	16.3	69 08.4	+56.0	17.1	70 05.6	+56.4	17.9	71 02.6	+56.6	18.8	71 59.2	+57.0	19.8	72 55.5	+57.4	20.8	**80**
81	67 10.5	+54.8	14.0	68 08.7	+55.0	14.6	69 06.6	+55.3	15.3	70 04.4	+55.6	16.0	71 02.0	+55.9	16.8	71 59.2	+56.3	17.7	72 56.2	+56.7	18.7	73 52.9	+57.0	19.8	**81**
82	68 05.3	+54.3	13.0	69 03.7	+54.5	13.6	70 01.9	+54.9	14.2	71 00.0	+55.2	14.9	71 57.9	+55.5	15.7	72 55.5	+55.9	16.6	73 52.9	+56.2	17.6	74 49.9	+56.6	18.7	**82**
83	68 59.6	+53.7	11.8	69 58.2	+54.1	12.4	70 56.8	+54.3	13.0	71 55.2	+54.6	13.7	72 53.4	+54.9	14.4	73 51.4	+55.3	15.3	74 49.1	+55.7	16.3	75 46.5	+56.2	17.4	**83**
84	69 53.3	+53.2	10.5	70 52.3	+53.4	11.1	71 51.1	+53.7	11.7	72 49.8	+54.0	12.3	73 48.3	+54.4	13.0	74 46.7	+54.7	13.9	75 44.8	+55.1	14.8	76 42.7	+55.5	15.9	**84**
85	70 46.5	+52.5	9.2	71 45.7	+52.8	9.6	72 44.8	+53.0	10.2	73 43.8	+53.3	10.8	74 42.7	+53.6	11.5	75 41.4	+54.0	12.3	76 39.9	+54.4	13.1	77 38.2	+54.9	14.2	**85**
86	71 39.0	+51.8	7.7	72 38.5	+51.9	8.1	73 37.8	+52.2	8.6	74 37.1	+52.5	9.1	75 36.3	+52.8	9.7	76 35.4	+53.1	10.4	77 34.3	+53.5	11.2	78 33.1	+53.9	12.2	**86**
87	72 30.8	+50.8	6.0	73 30.4	+51.0	6.4	74 30.0	+51.2	6.8	75 29.6	+51.4	7.2	76 29.1	+51.7	7.7	77 28.5	+52.0	8.4	78 27.8	+52.3	9.1	79 27.0	+52.7	9.9	**87**
88	73 21.6	+49.8	4.2	74 21.4	+50.0	4.5	75 21.2	+50.1	4.8	76 21.0	+50.2	5.1	77 20.8	+50.4	5.5	78 20.5	+50.6	6.0	79 20.1	+50.9	6.5	80 19.7	+51.2	7.2	**88**
89	74 11.4	+48.6	2.2	75 11.4	+48.6	2.4	76 11.3	+48.7	2.5	77 11.2	+48.8	2.7	78 11.2	+48.8	2.9	79 11.1	+48.9	3.2	80 11.0	*+49.0* •	3.5	81 10.9	*+49.1* •	3.9	**89**
90	75 00.0	+47.2	0.0	76 00.0	+47.1	0.0	77 00.0	+47.0	0.0	78 00.0	*+47.0* •	0.0	79 00.0	*+46.9* •	0.0	80 00.0	*+46.8* •	0.0	81 00.0	*+46.6* •	0.0	82 00.0	*+46.4* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 143°, 217°

38°, 322° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 46.1	+59.2	141.0	10 59.4	+59.3	141.2	10 12.6	+59.4	141.3	9 25.8	+59.5	141.4	8 38.9	+59.5	141.5	7 51.9	+59.6	141.6	7 04.9	+59.7	141.7	6 17.8	+59.8	141.7	0
1	12 45.3	+59.2	140.9	11 58.7	+59.3	141.0	11 12.0	+59.4	141.1	10 25.3	+59.5	141.3	9 38.4	+59.6	141.4	8 51.5	+59.7	141.5	8 04.6	+59.7	141.6	7 17.6	+59.7	141.6	1
2	13 44.5	+59.2	140.7	12 58.0	+59.3	140.8	12 11.4	+59.4	141.0	11 24.8	+59.4	141.1	10 38.0	+59.6	141.2	9 51.2	+59.6	141.4	9 04.3	+59.7	141.5	8 17.3	+59.8	141.6	2
3	14 43.7	+59.1	140.5	13 57.3	+59.3	140.7	13 10.8	+59.4	140.8	12 24.2	+59.5	141.0	11 37.6	+59.5	141.1	10 50.8	+59.7	141.2	10 04.0	+59.7	141.4	9 17.1	+59.8	141.5	3
4	15 42.8	+59.2	140.4	14 56.6	+59.3	140.5	14 10.2	+59.4	140.7	13 23.7	+59.5	140.9	12 37.1	+59.6	141.0	11 50.5	+59.6	141.1	11 03.7	+59.7	141.3	10 16.9	+59.7	141.4	4
5	16 42.0	+59.2	140.2	15 55.9	+59.2	140.4	15 09.6	+59.4	140.5	14 23.2	+59.5	140.7	13 36.7	+59.6	140.9	12 50.1	+59.6	141.0	12 03.4	+59.7	141.2	11 16.6	+59.8	141.3	5
6	17 41.2	+59.1	140.0	16 55.1	+59.3	140.2	16 09.0	+59.3	140.4	15 22.7	+59.4	140.6	14 36.3	+59.5	140.7	13 49.7	+59.7	140.9	13 03.1	+59.7	141.1	12 16.4	+59.8	141.2	6
7	18 40.3	+59.2	139.8	17 54.4	+59.2	140.0	17 08.3	+59.4	140.2	16 22.1	+59.5	140.4	15 35.8	+59.6	140.6	14 49.4	+59.6	140.8	14 02.8	+59.7	141.0	13 16.2	+59.8	141.1	7
8	19 39.5	+59.1	139.7	18 53.6	+59.3	139.9	18 07.7	+59.3	140.1	17 21.6	+59.5	140.3	16 35.4	+59.5	140.5	15 49.0	+59.6	140.7	15 02.5	+59.7	140.9	14 16.0	+59.7	141.0	8
9	20 38.6	+59.1	139.5	19 52.9	+59.2	139.7	19 07.0	+59.4	139.9	18 21.1	+59.4	140.2	17 34.9	+59.6	140.4	16 48.6	+59.7	140.6	16 02.2	+59.7	140.8	15 15.7	+59.8	140.9	9
10	21 37.7	+59.1	139.3	20 52.1	+59.3	139.5	20 06.4	+59.3	139.8	19 20.5	+59.4	140.0	18 34.5	+59.5	140.2	17 48.3	+59.6	140.4	17 01.9	+59.7	140.6	16 15.5	+59.7	140.8	10
11	22 36.8	+59.1	139.1	21 51.4	+59.2	139.4	21 05.7	+59.4	139.6	20 19.9	+59.5	139.9	19 34.0	+59.5	140.1	18 47.9	+59.6	140.3	18 01.6	+59.7	140.5	17 15.2	+59.8	140.7	11
12	23 35.9	+59.1	138.9	22 50.6	+59.2	139.2	22 05.1	+59.3	139.5	21 19.4	+59.4	139.7	20 33.5	+59.5	140.0	19 47.5	+59.6	140.2	19 01.3	+59.7	140.4	18 15.0	+59.7	140.6	12
13	24 35.0	+59.0	138.7	23 49.8	+59.2	139.0	23 04.4	+59.3	139.3	22 18.8	+59.4	139.6	21 33.0	+59.6	139.8	20 47.1	+59.6	140.1	20 01.0	+59.7	140.3	19 14.7	+59.8	140.6	13
14	25 34.0	+59.1	138.5	24 49.0	+59.2	138.8	24 03.7	+59.3	139.1	23 18.2	+59.4	139.4	22 32.6	+59.5	139.7	21 46.7	+59.6	140.0	21 00.7	+59.7	140.2	20 14.5	+59.7	140.5	14
15	26 33.1	+59.0	138.3	25 48.2	+59.1	138.7	25 03.0	+59.3	139.0	24 17.6	+59.4	139.3	23 32.1	+59.5	139.6	22 46.3	+59.6	139.8	22 00.4	+59.6	140.1	21 14.2	+59.8	140.4	15
16	27 32.1	+59.0	138.1	26 47.3	+59.2	138.5	26 02.3	+59.3	138.8	25 17.0	+59.4	139.1	24 31.6	+59.5	139.4	23 45.9	+59.6	139.7	23 00.0	+59.7	140.0	22 14.0	+59.7	140.3	16
17	28 31.1	+59.0	137.9	27 46.5	+59.1	138.3	27 01.6	+59.2	138.6	26 16.4	+59.4	139.0	25 31.1	+59.4	139.3	24 45.5	+59.6	139.6	23 59.7	+59.7	139.9	23 13.7	+59.8	140.2	17
18	29 30.1	+59.0	137.7	28 45.6	+59.1	138.1	28 00.8	+59.3	138.5	27 15.8	+59.4	138.8	26 30.5	+59.5	139.1	25 45.1	+59.5	139.5	24 59.4	+59.6	139.8	24 13.5	+59.7	140.1	18
19	30 29.1	+59.0	137.5	29 44.7	+59.1	137.9	29 00.1	+59.2	138.3	28 15.2	+59.3	138.6	27 30.0	+59.5	139.0	26 44.6	+59.6	139.3	25 59.0	+59.7	139.6	25 13.2	+59.7	140.0	19
20	31 28.1	+58.9	137.3	30 43.8	+59.1	137.7	29 59.3	+59.2	138.1	29 14.5	+59.4	138.5	28 29.5	+59.4	138.8	27 44.2	+59.6	139.2	26 58.7	+59.6	139.5	26 12.9	+59.7	139.8	20
21	32 27.0	+58.9	137.1	31 42.9	+59.1	137.5	30 58.5	+59.2	137.9	30 13.9	+59.3	138.3	29 28.9	+59.5	138.7	28 43.8	+59.5	139.0	27 58.3	+59.7	139.4	27 12.6	+59.8	139.7	21
22	33 25.9	+58.9	136.8	32 42.0	+59.0	137.3	31 57.7	+59.2	137.7	31 13.2	+59.3	138.1	30 28.4	+59.4	138.5	29 43.3	+59.5	138.9	28 58.0	+59.6	139.3	28 12.4	+59.7	139.6	22
23	34 24.8	+58.8	136.6	33 41.0	+59.0	137.1	32 56.9	+59.2	137.5	32 12.5	+59.3	137.9	31 27.8	+59.4	138.4	30 42.8	+59.6	138.8	29 57.6	+59.6	139.1	29 12.1	+59.7	139.5	23
24	35 23.6	+58.9	136.4	34 40.0	+59.0	136.9	33 56.1	+59.1	137.3	33 11.8	+59.3	137.8	32 27.2	+59.5	138.2	31 42.4	+59.5	138.6	30 57.2	+59.6	139.0	30 11.8	+59.7	139.4	24
25	36 22.5	+58.8	136.1	35 39.0	+59.0	136.6	34 55.2	+59.2	137.1	34 11.1	+59.3	137.6	33 26.7	+59.4	138.0	32 41.9	+59.5	138.5	31 56.8	+59.6	138.9	31 11.5	+59.7	139.3	25
26	37 21.3	+58.7	135.9	36 38.0	+58.9	136.4	35 54.4	+59.1	136.9	35 10.4	+59.2	137.4	34 26.1	+59.3	137.9	33 41.4	+59.5	138.3	32 56.4	+59.6	138.7	32 11.2	+59.7	139.2	26
27	38 20.0	+58.8	135.6	37 36.9	+59.0	136.2	36 53.5	+59.1	136.7	36 09.6	+59.3	137.2	35 25.4	+59.4	137.7	34 40.9	+59.5	138.2	33 56.0	+59.6	138.6	33 10.9	+59.7	139.0	27
28	39 18.8	+58.7	135.4	38 35.9	+58.8	135.9	37 52.6	+59.0	136.5	37 08.9	+59.2	137.0	36 24.8	+59.3	137.5	35 40.4	+59.5	138.0	34 55.6	+59.6	138.5	34 10.6	+59.6	138.9	28
29	40 17.5	+58.6	135.1	39 34.7	+58.9	135.7	38 51.6	+59.0	136.2	38 08.1	+59.2	136.8	37 24.1	+59.4	137.3	36 39.9	+59.4	137.8	35 55.2	+59.6	138.3	35 10.2	+59.7	138.8	29
30	41 16.1	+58.6	134.8	40 33.6	+58.8	135.4	39 50.6	+59.0	136.0	39 07.3	+59.1	136.6	38 23.5	+59.3	137.1	37 39.3	+59.5	137.7	36 54.8	+59.5	138.2	36 09.9	+59.6	138.7	30
31	42 14.7	+58.6	134.5	41 32.4	+58.8	135.2	40 49.6	+59.0	135.8	40 06.4	+59.2	136.4	39 22.8	+59.3	136.9	38 38.8	+59.4	137.5	37 54.3	+59.6	138.0	37 09.5	+59.7	138.5	31
32	43 13.3	+58.5	134.2	42 31.2	+58.7	134.9	41 48.6	+59.0	135.5	41 05.6	+59.1	136.1	40 22.1	+59.3	136.7	39 38.2	+59.4	137.3	38 53.9	+59.5	137.9	38 09.2	+59.6	138.4	32
33	44 11.8	+58.5	133.9	43 29.9	+58.7	134.6	42 47.6	+58.9	135.3	42 04.7	+59.1	135.9	41 21.4	+59.2	136.5	40 37.6	+59.4	137.1	39 53.4	+59.5	137.7	39 08.8	+59.7	138.3	33
34	45 10.3	+58.4	133.6	44 28.6	+58.7	134.3	43 46.5	+58.8	135.0	43 03.8	+59.0	135.7	42 20.6	+59.2	136.3	41 37.0	+59.4	136.9	40 52.9	+59.5	137.5	40 08.5	+59.6	138.1	34
35	46 08.7	+58.4	133.3	45 27.3	+58.6	134.0	44 45.3	+58.9	134.7	44 02.8	+59.1	135.4	43 19.8	+59.2	136.1	42 36.4	+59.3	136.7	41 52.4	+59.5	137.4	41 08.1	+59.6	138.0	35
36	47 07.1	+58.3	133.0	46 25.9	+58.6	133.7	45 44.2	+58.7	134.5	45 01.9	+58.9	135.2	44 19.0	+59.2	135.9	43 35.7	+59.3	136.5	42 51.9	+59.5	137.2	42 07.7	+59.6	137.8	36
37	48 05.4	+58.2	132.6	47 24.5	+58.5	133.4	46 42.9	+58.8	134.2	46 00.8	+59.0	134.9	45 18.2	+59.1	135.6	44 35.0	+59.4	136.3	43 51.4	+59.4	137.0	43 07.3	+59.6	137.7	37
38	49 03.6	+58.2	132.2	48 23.0	+58.4	133.1	47 41.7	+58.7	133.9	46 59.8	+58.9	134.7	46 17.3	+59.2	135.4	45 34.4	+59.2	136.1	44 50.8	+59.5	136.8	44 06.9	+59.5	137.5	38
39	50 01.8	+58.1	131.9	49 21.4	+58.4	132.7	48 40.4	+58.6	133.6	47 58.7	+58.9	134.4	47 16.5	+59.0	135.2	46 33.6	+59.3	135.9	45 50.3	+59.4	136.6	45 06.4	+59.6	137.3	39
40	50 59.9	+58.0	131.5	50 19.8	+58.3	132.4	49 39.0	+58.6	133.2	48 57.6	+58.8	134.1	48 15.5	+59.1	134.9	47 32.9	+59.2	135.7	46 49.7	+59.4	136.4	46 06.0	+59.5	137.1	40
41	51 57.9	+57.9	131.1	51 18.1	+58.2	132.0	50 37.6	+58.5	132.9	49 56.4	+58.8	133.8	49 14.6	+59.0	134.6	48 32.1	+59.2	135.4	47 49.1	+59.4	136.2	47 05.5	+59.5	137.0	41
42	52 55.8	+57.8	130.6	52 16.3	+58.2	131.6	51 36.1	+58.5	132.6	50 55.2	+58.7	133.5	50 13.6	+58.9	134.3	49 31.3	+59.2	135.2	48 48.5	+59.3	136.0	48 05.0	+59.5	136.8	42
43	53 53.6	+57.7	130.2	53 14.5	+58.0	131.2	52 34.6	+58.4	132.2	51 53.9	+58.7	133.1	51 12.5	+58.9	134.1	50 30.5	+59.1	134.9	49 47.8	+59.3	135.8	49 04.5	+59.5	136.6	43
44	54 51.3	+57.6	129.7	54 12.5	+58.0	130.8	53 33.0	+58.3	131.8	52 52.6	+58.6	132.8	52 11.4	+58.9	133.7	51 29.6	+59.1	134.7	50 47.1	+59.3	135.5	50 04.0	+59.4	136.4	44
45	55 48.9	+57.5	129.2	55 10.5	+57.9	130.3	54 31.3	+58.2	131.4	53 51.2	+58.5	132.4	53 10.3	+58.8	133.4	52 28.7	+59.0	134.4	51 46.4	+59.2	135.3	51 03.4	+59.5	136.2	45
46	56 46.4	+57.3	128.7	56 08.4	+57.7	129.9	55 29.5	+58.1	131.0	54 49.7	+58.5	132.1	54 09.1	+58.8	133.1	53 27.7	+59.0	134.1	52 45.6	+59.3	135.0	52 02.9	+59.4	135.9	46
47	57 43.7	+57.2	128.2	57 06.1	+57.7	129.4	56 27.6	+58.0	130.5	55 48.2	+58.4	131.7	55 07.9	+58.6	132.7	54 26.7	+59.0	133.8	53 44.9	+59.1	134.8	53 02.3	+59.3	135.7	47
48	58 40.9	+57.0	127.6	58 03.8	+57.5	128.9	57 25.6	+58.0	130.1	56 46.6	+58.2	131.2	56 06.5	+58.7	132.4	55 25.7	+58.9	133.4	54 44.0	+59.2	134.5	54 01.6	+59.4	135.5	48
49	59 37.9	+56.9	127.0	59 01.3	+57.3	128.3	58 23.6	+57.8	129.6	57 44.8	+58.2	130.8	57 05.2	+58.5	132.0	56 24.6	+58.8	133.1	55 43.2	+59.1	134.2	55 01.0	+59.3	135.2	49
50	60 34.8	+56.6	126.3	59 58.6	+57.2	127.7	59 21.4	+57.7	129.1	58 43.0	+58.1	130.3	58 03.7	+58.5	131.6	57 23.4	+58.8	132.7	56 42.3	+59.0	133.9	56 00.3	+59.3	134.9	50
51	61 31.4	+56.5	125.6	60 55.8	+57.1	127.1	60 19.1	+57.5	128.5	59 41.1	+58.0	129.9	59 02.2	+58.3	131.1	58 22.2	+58.7	132.4	57 41.3	+59.0	133.5	56 59.6	+59.2	134.7	51
52	62 27.9	+56.2	124.9	61 52.9	+56.8	126.5	61 16.6	+57.4	127.9	60 39.1	+57.9	129.3	60 00.5	+58.3	130.7	59 20.9	+58.6	132.0	58 40.3	+58.9	133.2	57 58.8	+59.2	134.4	52
53	63 24.1	+55.9	124.2	62 49.7	+56.6	125.8	62 14.0	+57.2	127.3	61 37.0	+57.7	128.8	60 58.8	+58.2	130.2	60 19.5	+58.6	131.5	59 39.2	+58.9	132.8	58 58.0	+59.1	134.1	53
54	64 20.0	+55.6	123.3	63 46.3	+56.4	125.0	63 11.2	+57.0	126.7	62 34.7	+57.5	128.2	61 57.0	+58.0	129.7	61 18.1	+58.4	131.1	60 38.1	+58.8	132.4	59 57.1	+59.1	133.7	54
55	65 15.6	+55.4	122.5	64 42.7	+56.1	124.2	64 08.2	+56.7	126.0	63 32.2	+57.4	127.6	62 55.0	+57.9	129.1	62 16.5	+58.4	130.6	61 36.9	+58.7	132.0	60 56.2	+59.0	133.4	55
56	66 11.0	+54.9	121.5	65 38.8	+55.7	123.4	65 04.9	+56.6	125.2	64 29.6	+57.2	126.9	63 52.9	+57.7	128.6	63 14.9	+58.2	130.1	62 35.6	+58.6	131.6	61 55.2	+59.0	133.0	56
57	67 05.9	+54.5	120.5	66 34.5	+55.5	122.5	66 01.5	+56.2	124.4	65 26.8	+57.0	126.2	64 50.6	+57.6	127.9	64 13.1	+58.1	129.6	63 34.2	+58.6	131.1	62 54.2	+58.9	132.6	57
58	68 00.4	+54.1	119.4	67 30.0	+55.1	121.5	66 57.7	+56.0	123.5	66 23.8	+56.7	125.4	65 48.2	+57.4	127.3	65 11.2	+57.9	129.0	64 32.8	+58.4	130.6	63 53.1	+58.8	132.2	58
59	68 54.5	+53.5	118.2	68 25.1	+54.6	120.5	67 53.7	+55.6	122.6	67 20.5	+56.4	124.6	66 45.6	+57.2	126.5	66 09.1	+57.8	128.3	65 31.2	+58.3	130.1	64 51.9	+58.7	131.7	59
60	69 48.0	+52.9	116.9	69 19.7	+54.1	119.3	68 49.3	+55.2	121.6	68 16.9	+56.2	123.7	67 42.8	+56.9	125.7	67 06.9	+57.6	127.7	66 29.5	+58.1	129.5	65 50.6	+58.6	131.2	60
61	70 40.9	+52.2	115.5	70 13.8	+53.6	118.1	69 44.5	+54.8	120.5	69 13.1	+55.7	122.7	68 39.7	+56.6	124.9	68 04.5	+57.4	126.9	67 27.6	+58.0	128.9	66 49.2	+58.5	130.7	61
62	71 33.1	+51.4	114.0	71 07.4	+52.9	116.7	70 39.3	+54.2	119.2	70 08.8	+55.4	121.7	69 36.3	+56.3	124.0	69 01.9	+57.1	126.1	68 25.6	+57.8	128.2	67 47.7	+58.4	130.1	62
63	72 24.5	+50.5	112.4	72 00.3	+52.2	115.2	71 33.5	+53.6	117.9	71 04.2	+54.9	120.5	70 32.6	+56.0	122.9	69 59.0	+56.8	125.3	69 23.4	+57.6	127.4	68 46.1	+58.2	129.5	63
64	73 15.0	+49.5	110.5	72 52.5	+51.3	113.6	72 27.1	+53.0	116.5	71 59.1	+54.3	119.2	71 28.6	+55.5	121.8	70 55.8	+56.6	124.3	70 21.0	+57.4	126.6	69 44.3	+58.1	128.8	64
65	74 04.5	+48.2	108.5	73 43.8	+50.3	111.8	73 20.1	+52.1	114.9	72 53.4	+53.7	117.8	72 24.1	+55.0	120.6	71 52.4	+56.1	123.3	71 18.4	+57.1	125.7	70 42.4	+57.8	128.1	65
66	74 52.7	+46.7	106.3	74 34.1	+49.1	109.8	74 12.2	+51.1	113.1	73 47.1	+52.9	116.3	73 19.1	+54.5	119.3	72 48.5	+55.7	122.1	72 15.5	+56.7	124.7	71 40.2	+57.6	127.2	66
67	75 39.4	+45.1	103.8	75 23.2	+47.7	107.5	75 03.3	+50.0	111.1	74 40.0	+52.1	114.5	74 13.6	+53.7	117.8	73 44.2	+55.2	120.8	73 12.2	+56.4	123.6	72 37.8	+57.3	126.3	67
68	76 24.5	+43.0•	101.1	76 10.9	+46.0	105.1	75 53.3	+48.7	108.9	75 32.1	+50.9	112.6	75 07.3	+52.9	116.1	74 39.4	+54.6	119.4	74 08.6	+55.9	122.4	73 35.1	+57.0	125.3	68
69	77 07.5	+40.7•	98.0	76 56.9	+44.1•	102.3	76 42.0	+47.0	106.5	76 23.0	+49.7	110.4	76 00.2	+51.9	114.2	75 34.0	+53.8	117.7	75 04.5	+55.3	121.1	74 32.1	+56.7	124.2	69
70	77 48.2	+38.0•	94.6	77 41.0	+41.7•	99.2	77 29.0	+45.2•	103.7	77 12.7	+48.1	108.0	76 52.1	+50.8	112.0	76 27.8	+52.8	115.9	75 59.8	+54.7	119.5	75 28.8	+56.1	122.9	70
71	78 26.2	+34.7•	90.9	78 22.7	+38.9•	95.8	78 14.2	+42.8•	100.5	78 00.8	+46.3•	105.2	77 42.9	+49.2	109.6	77 20.6	+51.8	113.8	76 54.5	+53.9	117.8	76 24.9	+55.5	121.4	71
72	79 00.9	+30.9•	86.7	79 01.6	+35.6•	91.9	78 57.0	+40.0•	97.0	78 47.1	+43.9•	102.0	78 32.1	+47.4•	106.8	78 12.4	+50.4	111.4	77 48.4	+52.9	115.7	77 20.4	+54.9	119.8	72
73	79 31.8	+26.6•	82.1	79 37.2	+31.7•	87.5	79 37.0	+36.6•	93.0	79 31.0	+41.1•	98.4	79 19.5	+45.2•	103.6	79 02.8	+48.7	108.7	78 41.3	+51.5	113.4	78 15.3	+53.9	117.8	73
74	79 58.4	+21.6•	77.1	80 08.9	+27.1•	82.7	80 13.6	+32.5•	88.4	80 12.1	+37.7•	94.2	80 04.7	+42.4•	100.0	79 51.5	+46.5•	105.5	79 32.8	+50.0	110.7	79 09.2	+52.8	115.6	74
75	80 20.0	+16.0•	71.6	80 36.0	+21.9•	77.3	80 46.1	+27.8•	83.4	80 49.8	+33.6•	89.5	80 47.1	+38.9•	95.7	80 38.0	+43.8•	101.7	80 22.8	+47.9•	107.5	80 02.0	+51.4	113.0	75
76	80 36.0	+10.1•	65.8	80 57.9	+16.0•	71.5	81 13.9	+22.1•	77.7	81 23.4	+28.4•	84.1	81 26.0	+34.6•	90.8	81 21.8	+40.2•	97.4	81 10.7	+45.3•	103.8	80 53.4	+49.4•	109.8	76
77	80 46.1	+3.7•	59.7	81 13.9	+9.5•	65.3	81 36.0	+15.8•	71.5	81 51.8	+22.4•	78.1	82 00.6	+29.2•	85.1	82 02.0	+35.8•	92.2	81 56.0	+41.7•	99.3	81 42.8	+46.8•	106.1	77
78	80 49.8	–2.7•	53.4	81 23.4	+2.6•	58.8	81 51.8	+8.8•	64.7	82 14.2	+15.6•	71.4	82 29.8	+22.8•	78.6	82 37.8	+30.1•	86.2	82 37.7	+37.1•	93.9	82 29.6	+43.4•	101.5	78
79	80 47.1	–9.1•	47.2	81 26.0	–4.2•	52.1	82 00.6	+1.4•	57.7	82 29.8	+8.0•	64.1	82 52.6	+15.3•	71.3	83 07.9	+23.2•	79.2	83 14.8	+31.2•	87.5	83 13.0	+38.7•	96.0	79
80	80 38.0	–15.2•	41.1	81 21.8	–11.1•	45.4	82 02.0	–6.0•	50.5	82 37.8	–0.1•	56.4	83 07.9	+6.9•	63.4	83 31.1	+14.9•	71.3	83 46.0	+23.7•	80.0	83 51.7	+32.5•	89.2	80
81	80 22.8	–20.8•	35.2	81 10.7	–17.3•	38.9	81 56.0	–13.2•	43.3	82 37.7	–8.1•	48.6	83 14.8	–1.8•	55.0	83 46.0	+5.7•	62.5	84 09.7	+14.5•	71.2	84 24.2	+24.2•	80.9	81
82	80 02.0	–25.8•	29.7	80 53.4	–23.2•	32.8	81 42.8	–19.9•	36.5	82 29.6	–15.7•	41.0	83 13.0	–10.5•	46.5	83 51.7	–3.9•	53.3	84 24.2	+4.1•	61.5	84 48.4	+13.9•	71.2	82
83	79 36.2	–30.3•	24.6	80 30.2	–28.2•	27.1	81 22.9	–25.7•	30.0	82 13.9	–22.5•	33.7	83 02.5	–18.5•	38.3	83 47.8	–13.4•	44.0	84 28.3	–6.6•	51.2	85 02.3	+2.2•	60.2	83
84	79 05.9	–34.2•	19.9	80 02.0	–32.7•	21.8	80 57.2	–30.8•	24.2	81 51.4	–28.6•	27.0	82 44.0	–25.7•	30.6	83 34.4	–21.8•	35.1	84 21.7	–16.7•	40.9	85 04.5	–9.8•	48.5	84
85	78 31.7	–37.4•	15.7	79 29.3	–36.4•	17.1	80 26.4	–35.2•	18.8	81 22.8	–33.6•	21.0	82 18.3	–31.5•	23.6	83 12.6	–29.0•	27.0	84 05.0	–25.5•	31.4	84 54.7	–20.7•	37.2	85
86	77 54.3	–40.3•	11.8	78 52.9	–39.6•	12.9	79 51.2	–38.7•	14.1	80 49.2	–37.7•	15.6	81 46.8	–36.5•	17.5	82 43.6	–34.8•	19.8	83 39.5	–32.7•	22.9	84 34.0	–29.7•	27.0	86
87	77 14.0	–42.7•	8.4	78 13.3	–42.3•	9.1	79 12.5	–41.8•	9.9	80 11.5	–41.2•	10.9	81 10.3	–40.5•	12.1	82 08.8	–39.6•	13.6	83 06.8	–38.3•	15.6	84 04.3	–36.7•	18.2	87
88	76 31.3	–44.8	5.3	77 31.0	–44.6•	5.7	78 30.7	–44.3•	6.2	79 30.3	–44.0•	6.8	80 29.8	–43.6•	7.5	81 29.2	–43.1•	8.3	82 28.5	–42.6•	9.4	83 27.6	–41.9•	10.9	88
89	75 46.5	–46.5	2.5	76 46.4	–46.4	2.7	77 46.4	–46.4	2.9	78 46.3	–46.3•	3.2	79 46.2	–46.2•	3.5	80 46.1	–46.1•	3.8	81 45.9	–45.9•	4.3	82 45.7	–45.7•	4.9	89
90	75 00.0	–48.0	0.0	76 00.0	–48.0	0.0	77 00.0	–48.1	0.0	78 00.0	–48.2	0.0	79 00.0	–48.2	0.0	80 00.0	–48.3•	0.0	81 00.0	–48.4•	0.0	82 00.0	–48.6•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 38°, 322°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	11 46.1	−59.2	141.0	10 59.4	−59.3	141.2	10 12.6	−59.4	141.3	9 25.8	−59.5	141.4	8 38.9	−59.6	141.5	7 51.9	−59.7	141.6	7 04.9	−59.8	141.7	6 17.8	−59.8	141.7	0
1	10 46.9	−59.2	141.2	10 00.1	−59.3	141.3	9 13.2	−59.4	141.4	8 26.3	−59.5	141.5	7 39.3	−59.6	141.6	6 52.2	−59.6	141.7	6 05.1	−59.7	141.8	5 18.0	−59.8	141.8	1
2	9 47.7	−59.2	141.4	9 00.8	−59.3	141.5	8 13.8	−59.4	141.6	7 26.8	−59.5	141.6	6 39.7	−59.6	141.7	5 52.6	−59.7	141.8	5 05.4	−59.7	141.8	4 18.2	−59.8	141.9	2
3	8 48.5	−59.3	141.5	8 01.5	−59.4	141.6	7 14.4	−59.4	141.7	6 27.3	−59.5	141.8	5 40.1	−59.5	141.8	4 52.9	−59.6	141.9	4 05.7	−59.7	141.9	3 18.4	−59.7	142.0	3
4	7 49.2	−59.2	141.7	7 02.1	−59.3	141.8	6 15.0	−59.4	141.8	5 27.8	−59.5	141.9	4 40.6	−59.6	142.0	3 53.3	−59.7	142.0	3 06.0	−59.7	142.0	2 18.7	−59.8	142.1	4
5	6 50.0	−59.2	141.9	6 02.8	−59.3	141.9	5 15.6	−59.4	142.0	4 28.3	−59.5	142.0	3 41.0	−59.6	142.1	2 53.6	−59.6	142.1	2 06.3	−59.8	142.1	1 18.9	−59.8	142.2	5
6	5 50.8	−59.2	142.0	5 03.5	−59.3	142.1	4 16.2	−59.5	142.1	3 28.8	−59.5	142.2	2 41.4	−59.6	142.2	1 54.0	−59.7	142.2	1 06.5	−59.7	142.2	0 19.1	−59.8	142.2	6
7	4 51.6	−59.2	142.2	4 04.2	−59.4	142.2	3 16.7	−59.4	142.3	2 29.3	−59.5	142.3	1 41.8	−59.6	142.3	0 54.3	−59.6	142.3	0 06.8	−59.7	142.3	0 40.7	+59.8	37.7	7
8	3 52.4	−59.3	142.3	3 04.8	−59.3	142.4	2 17.3	−59.4	142.4	1 29.8	−59.5	142.4	0 42.2	−59.6	142.4	0 05.3	+59.7	37.6	0 52.9	+59.7	37.6	1 40.5	+59.7	37.6	8
9	2 53.1	−59.2	142.5	2 05.5	−59.3	142.5	1 17.9	−59.4	142.5	0 30.3	−59.5	142.5	0 17.4	+59.6	37.5	1 05.0	+59.7	37.5	1 52.6	+59.7	37.5	2 40.2	+59.8	37.5	9
10	1 53.9	−59.2	142.7	1 06.2	−59.3	142.7	0 18.5	−59.4	142.7	0 29.2	+59.5	37.3	1 17.0	+59.5	37.3	2 04.7	+59.6	37.4	2 52.3	+59.8	37.4	3 40.0	+59.8	37.4	10
11	0 54.7	−59.3	142.8	0 06.9	−59.4	142.8	0 40.9	+59.5	37.2	1 28.7	+59.6	37.2	2 16.5	+59.6	37.2	3 04.3	+59.7	37.2	3 52.1	+59.7	37.3	4 39.8	+59.8	37.3	11
12	0 04.6	+59.2	37.0	0 52.5	+59.3	37.0	1 40.4	+59.4	37.0	2 28.3	+59.5	37.1	3 16.1	+59.6	37.1	4 04.0	+59.6	37.1	4 51.8	+59.7	37.2	5 39.6	+59.7	37.2	12
13	1 03.8	+59.2	36.9	1 51.8	+59.3	36.9	2 39.8	+59.4	36.9	3 27.8	+59.5	36.9	4 15.7	+59.6	37.0	5 03.6	+59.7	37.0	5 51.5	+59.7	37.1	6 39.3	+59.8	37.2	13
14	2 03.0	+59.3	36.7	2 51.1	+59.4	36.7	3 39.2	+59.4	36.8	4 27.3	+59.5	36.8	5 15.3	+59.6	36.9	6 03.3	+59.6	36.9	6 51.2	+59.7	37.0	7 39.1	+59.8	37.1	14
15	3 02.3	+59.2	36.5	3 50.5	+59.3	36.6	4 38.6	+59.4	36.6	5 26.8	+59.5	36.7	6 14.9	+59.5	36.7	7 02.9	+59.7	36.8	7 50.9	+59.7	36.9	8 38.9	+59.8	37.0	15
16	4 01.5	+59.2	36.4	4 49.8	+59.3	36.4	5 38.0	+59.5	36.5	6 26.3	+59.5	36.6	7 14.4	+59.6	36.6	8 02.6	+59.6	36.7	8 50.6	+59.8	36.8	9 38.7	+59.7	36.9	16
17	5 00.7	+59.3	36.2	5 49.1	+59.3	36.3	6 37.5	+59.4	36.4	7 25.8	+59.5	36.4	8 14.0	+59.6	36.5	9 02.2	+59.7	36.6	9 50.4	+59.7	36.7	10 38.4	+59.8	36.8	17
18	6 00.0	+59.2	36.1	6 48.4	+59.4	36.1	7 36.9	+59.4	36.2	8 25.3	+59.5	36.3	9 13.6	+59.6	36.4	10 01.9	+59.6	36.5	10 50.1	+59.7	36.6	11 38.2	+59.8	36.7	18
19	6 59.2	+59.2	35.9	7 47.8	+59.3	36.0	8 36.3	+59.4	36.1	9 24.8	+59.4	36.2	10 13.2	+59.5	36.3	11 01.5	+59.7	36.4	11 49.8	+59.7	36.5	12 38.0	+59.7	36.6	19
20	7 58.4	+59.2	35.7	8 47.1	+59.3	35.8	9 35.7	+59.4	35.9	10 24.2	+59.5	36.0	11 12.7	+59.6	36.1	12 01.2	+59.6	36.3	12 49.5	+59.7	36.4	13 37.7	+59.8	36.5	20
21	8 57.6	+59.2	35.6	9 46.4	+59.3	35.7	10 35.1	+59.4	35.8	11 23.7	+59.5	35.9	12 12.3	+59.6	36.0	13 00.8	+59.6	36.2	13 49.2	+59.7	36.3	14 37.5	+59.8	36.4	21
22	9 56.8	+59.2	35.4	10 45.7	+59.3	35.5	11 34.5	+59.4	35.6	12 23.2	+59.5	35.8	13 11.9	+59.5	35.9	14 00.4	+59.7	36.0	14 48.9	+59.7	36.2	15 37.3	+59.7	36.4	22
23	10 56.0	+59.2	35.3	11 45.0	+59.3	35.4	12 33.9	+59.4	35.5	13 22.7	+59.5	35.6	14 11.4	+59.6	35.8	15 00.1	+59.6	35.9	15 48.6	+59.7	36.1	16 37.0	+59.8	36.3	23
24	11 55.2	+59.2	35.1	12 44.3	+59.3	35.2	13 33.3	+59.4	35.3	14 22.2	+59.4	35.5	15 11.0	+59.5	35.6	15 59.7	+59.6	35.8	16 48.3	+59.7	36.0	17 36.8	+59.7	36.2	24
25	12 54.4	+59.2	34.9	13 43.6	+59.3	35.1	14 32.7	+59.3	35.2	15 21.6	+59.5	35.4	16 10.5	+59.6	35.5	16 59.3	+59.6	35.7	17 48.0	+59.7	35.9	18 36.5	+59.8	36.1	25
26	13 53.6	+59.2	34.8	14 42.9	+59.3	34.9	15 32.0	+59.4	35.1	16 21.1	+59.5	35.2	17 10.1	+59.5	35.4	17 58.9	+59.7	35.6	18 47.7	+59.7	35.8	19 36.3	+59.8	36.0	26
27	14 52.8	+59.2	34.6	15 42.2	+59.2	34.7	16 31.4	+59.4	34.9	17 20.6	+59.4	35.1	18 09.6	+59.6	35.3	18 58.6	+59.6	35.5	19 47.4	+59.7	35.7	20 36.1	+59.7	35.9	27
28	15 52.0	+59.2	34.4	16 41.4	+59.3	34.6	17 30.8	+59.3	34.8	18 20.0	+59.5	34.9	19 09.2	+59.5	35.1	19 58.2	+59.6	35.3	20 47.1	+59.6	35.6	21 35.8	+59.7	35.8	28
29	16 51.2	+59.1	34.2	17 40.7	+59.3	34.4	18 30.1	+59.4	34.6	19 19.5	+59.4	34.8	20 08.7	+59.5	35.0	20 57.8	+59.6	35.2	21 46.7	+59.7	35.4	22 35.5	+59.8	35.7	29
30	17 50.3	+59.2	34.1	18 40.0	+59.2	34.2	19 29.5	+59.3	34.4	20 18.9	+59.5	34.6	21 08.2	+59.5	34.9	21 57.4	+59.6	35.1	22 46.4	+59.7	35.3	23 35.3	+59.7	35.6	30
31	18 49.5	+59.1	33.9	19 39.2	+59.3	34.1	20 28.8	+59.4	34.3	21 18.4	+59.4	34.5	22 07.7	+59.5	34.7	22 57.0	+59.6	35.0	23 46.1	+59.6	35.2	24 35.0	+59.7	35.5	31
32	19 48.6	+59.1	33.7	20 38.5	+59.2	33.9	21 28.2	+59.3	34.1	22 17.8	+59.4	34.4	23 07.2	+59.6	34.6	23 56.6	+59.6	34.8	24 45.7	+59.7	35.1	25 34.7	+59.8	35.4	32
33	20 47.7	+59.1	33.5	21 37.7	+59.2	33.7	22 27.5	+59.3	34.0	23 17.2	+59.4	34.2	24 06.8	+59.4	34.5	24 56.2	+59.5	34.7	25 45.4	+59.6	35.0	26 34.5	+59.7	35.3	33
34	21 46.8	+59.1	33.3	22 36.9	+59.2	33.6	23 26.8	+59.3	33.8	24 16.6	+59.4	34.1	25 06.2	+59.5	34.3	25 55.7	+59.6	34.6	26 45.0	+59.7	34.9	27 34.2	+59.7	35.2	34
35	22 45.9	+59.1	33.2	23 36.1	+59.2	33.4	24 26.1	+59.3	33.6	25 16.0	+59.4	33.9	26 05.7	+59.5	34.2	26 55.3	+59.6	34.4	27 44.7	+59.6	34.7	28 33.9	+59.7	35.0	35
36	23 45.0	+59.1	33.0	24 35.3	+59.2	33.2	25 25.4	+59.3	33.5	26 15.4	+59.4	33.7	27 05.2	+59.5	34.0	27 54.9	+59.5	34.3	28 44.3	+59.7	34.6	29 33.6	+59.7	34.9	36
37	24 44.1	+59.1	32.8	25 34.5	+59.2	33.0	26 24.7	+59.3	33.3	27 14.8	+59.4	33.6	28 04.7	+59.5	33.9	28 54.4	+59.6	34.2	29 44.0	+59.6	34.5	30 33.3	+59.7	34.8	37
38	25 43.2	+59.0	32.6	26 33.7	+59.1	32.8	27 24.0	+59.2	33.1	28 14.2	+59.3	33.4	29 04.2	+59.4	33.7	29 54.0	+59.5	34.0	30 43.6	+59.6	34.4	31 33.0	+59.7	34.7	38
39	26 42.2	+59.0	32.4	27 32.8	+59.2	32.7	28 23.2	+59.3	32.9	29 13.5	+59.4	33.2	30 03.6	+59.4	33.6	30 53.5	+59.5	33.9	31 43.2	+59.6	34.2	32 32.7	+59.7	34.6	39
40	27 41.2	+59.1	32.2	28 32.0	+59.1	32.5	29 22.5	+59.2	32.8	30 12.9	+59.3	33.1	31 03.0	+59.5	33.4	31 53.0	+59.5	33.7	32 42.8	+59.6	34.1	33 32.4	+59.7	34.5	40
41	28 40.3	+59.0	32.0	29 31.1	+59.1	32.3	30 21.7	+59.2	32.6	31 12.2	+59.3	32.9	32 02.5	+59.4	33.2	32 52.5	+59.6	33.6	33 42.4	+59.6	34.0	34 32.1	+59.7	34.3	41
42	29 39.3	+58.9	31.8	30 30.2	+59.1	32.1	31 20.9	+59.2	32.4	32 11.5	+59.3	32.7	33 01.9	+59.4	33.1	33 52.1	+59.5	33.4	34 42.0	+59.6	33.8	35 31.8	+59.6	34.2	42
43	30 38.2	+59.0	31.6	31 29.3	+59.0	31.9	32 20.1	+59.2	32.2	33 10.8	+59.3	32.5	34 01.3	+59.4	32.9	34 51.6	+59.4	33.3	35 41.6	+59.6	33.7	36 31.4	+59.7	34.1	43
44	31 37.2	+58.9	31.3	32 28.3	+59.1	31.7	33 19.3	+59.2	32.0	34 10.1	+59.3	32.4	35 00.7	+59.3	32.7	35 51.0	+59.5	33.1	36 41.2	+59.5	33.5	37 31.1	+59.6	33.9	44
45	32 36.1	+58.9	31.1	33 27.4	+59.0	31.5	34 18.5	+59.1	31.8	35 09.4	+59.2	32.2	36 00.0	+59.4	32.6	36 50.5	+59.5	33.0	37 40.7	+59.6	33.4	38 30.7	+59.6	33.8	45
46	33 35.0	+58.9	30.9	34 26.4	+59.0	31.2	35 17.6	+59.1	31.6	36 08.6	+59.2	32.0	36 59.4	+59.3	32.4	37 50.0	+59.4	32.8	38 40.3	+59.5	33.2	39 30.3	+59.7	33.7	46
47	34 33.9	+58.8	30.7	35 25.4	+59.0	31.0	36 16.7	+59.1	31.4	37 07.8	+59.3	31.8	37 58.7	+59.4	32.2	38 49.4	+59.4	32.6	39 39.8	+59.5	33.1	40 30.0	+59.6	33.5	47
48	35 32.7	+58.9	30.4	36 24.4	+58.9	30.8	37 15.8	+59.1	31.2	38 07.1	+59.1	31.6	38 58.1	+59.3	32.0	39 48.8	+59.4	32.4	40 39.3	+59.5	32.9	41 29.6	+59.6	33.4	48
49	36 31.6	+58.8	30.2	37 23.3	+59.0	30.6	38 14.9	+59.0	31.0	39 06.2	+59.2	31.4	39 57.4	+59.2	31.8	40 48.2	+59.4	32.2	41 38.8	+59.5	32.7	42 29.2	+59.6	33.2	49
50	37 30.4	+58.7	29.9	38 22.3	+58.8	30.3	39 13.9	+59.1	30.7	40 05.4	+59.2	31.2	40 56.6	+59.3	31.6	41 47.6	+59.4	32.1	42 38.3	+59.5	32.5	43 28.8	+59.5	33.1	50
51	38 29.1	+58.7	29.7	39 21.1	+58.9	30.1	40 13.0	+59.0	30.5	41 04.6	+59.1	30.9	41 55.9	+59.2	31.4	42 47.0	+59.3	31.9	43 37.8	+59.5	32.4	44 28.3	+59.6	32.9	51
52	39 27.8	+58.7	29.4	40 20.0	+58.8	29.8	41 12.0	+58.9	30.2	42 03.7	+59.1	30.7	42 55.1	+59.2	31.2	43 46.3	+59.4	31.7	44 37.3	+59.4	32.2	45 27.9	+59.5	32.7	52
53	40 26.5	+58.7	29.1	41 18.8	+58.8	29.6	42 10.9	+58.9	30.0	43 02.8	+59.0	30.5	43 54.3	+59.2	30.9	44 45.7	+59.3	31.5	45 36.7	+59.4	32.0	46 27.4	+59.6	32.5	53
54	41 25.2	+58.6	28.9	42 17.6	+58.8	29.3	43 09.8	+58.9	29.7	44 01.8	+59.0	30.2	44 53.5	+59.2	30.7	45 45.0	+59.2	31.2	46 36.1	+59.4	31.8	47 27.0	+59.5	32.4	54
55	42 23.8	+58.6	28.6	43 16.4	+58.7	29.0	44 08.7	+58.9	29.5	45 00.8	+59.0	30.0	45 52.7	+59.1	30.5	46 44.2	+59.3	31.0	47 35.5	+59.4	31.6	48 26.5	+59.5	32.2	55
56	43 22.4	+58.5	28.3	44 15.1	+58.7	28.7	45 07.6	+58.8	29.2	45 59.8	+59.0	29.7	46 51.8	+59.1	30.2	47 43.5	+59.2	30.8	48 34.9	+59.3	31.4	49 26.0	+59.4	32.0	56
57	44 20.9	+58.4	28.0	45 13.8	+58.6	28.4	46 06.4	+58.8	28.9	46 58.8	+58.9	29.4	47 50.9	+59.1	30.0	48 42.7	+59.2	30.5	49 34.2	+59.4	31.1	50 25.4	+59.5	31.8	57
58	45 19.3	+58.4	27.6	46 12.4	+58.5	28.1	47 05.2	+58.7	28.6	47 57.7	+58.9	29.2	48 50.0	+59.0	29.7	49 41.9	+59.2	30.3	50 33.6	+59.3	30.9	51 24.9	+59.4	31.5	58
59	46 17.7	+58.4	27.3	47 10.9	+58.6	27.8	48 03.9	+58.7	28.3	48 56.6	+58.8	28.9	49 49.0	+58.9	29.4	50 41.1	+59.1	30.0	51 32.9	+59.2	30.7	52 24.3	+59.4	31.3	59
60	47 16.1	+58.3	27.0	48 09.5	+58.4	27.5	49 02.6	+58.6	28.0	49 55.4	+58.8	28.6	50 47.9	+59.0	29.1	51 40.2	+59.1	29.8	52 32.1	+59.2	30.4	53 23.7	+59.3	31.1	60
61	48 14.4	+58.2	26.6	49 07.9	+58.4	27.1	50 01.2	+58.5	27.7	50 54.2	+58.7	28.2	51 46.9	+58.9	28.8	52 39.3	+59.0	29.5	53 31.3	+59.2	30.1	54 23.0	+59.4	30.8	61
62	49 12.6	+58.2	26.3	50 06.3	+58.3	26.8	50 59.7	+58.5	27.3	51 52.9	+58.7	27.9	52 45.8	+58.8	28.5	53 38.3	+59.0	29.2	54 30.5	+59.2	29.9	55 22.4	+59.3	30.6	62
63	50 10.8	+58.0	25.9	51 04.6	+58.3	26.4	51 58.2	+58.5	27.0	52 51.6	+58.6	27.6	53 44.6	+58.8	28.2	54 37.3	+58.9	28.9	55 29.7	+59.1	29.6	56 21.7	+59.2	30.3	63
64	51 08.8	+58.0	25.5	52 02.9	+58.2	26.0	52 56.7	+58.3	26.6	53 50.2	+58.5	27.2	54 43.4	+58.7	27.9	55 36.2	+58.9	28.5	56 28.8	+59.0	29.3	57 20.9	+59.2	30.0	64
65	52 06.8	+57.9	25.1	53 01.1	+58.0	25.6	53 55.0	+58.3	26.2	54 48.7	+58.5	26.8	55 42.1	+58.6	27.5	56 35.1	+58.9	28.2	57 27.8	+59.0	28.9	58 20.1	+59.2	29.7	65
66	53 04.7	+57.8	24.6	53 59.1	+58.0	25.2	54 53.3	+58.2	25.8	55 47.2	+58.3	26.4	56 40.7	+58.6	27.1	57 34.0	+58.7	27.8	58 26.8	+59.0	28.6	59 19.3	+59.1	29.4	66
67	54 02.5	+57.7	24.2	54 57.1	+57.9	24.8	55 51.5	+58.1	25.4	56 45.5	+58.3	26.0	57 39.3	+58.5	26.7	58 32.7	+58.7	27.5	59 25.8	+58.9	28.2	60 18.4	+59.1	29.1	67
68	55 00.2	+57.6	23.7	55 55.0	+57.8	24.3	56 49.6	+58.0	24.9	57 43.8	+58.2	25.6	58 37.8	+58.4	26.3	59 31.4	+58.6	27.0	60 24.7	+58.8	27.8	61 17.5	+59.0	28.7	68
69	55 57.8	+57.5	23.2	56 52.8	+57.7	23.8	57 47.6	+57.9	24.5	58 42.0	+58.1	25.1	59 36.2	+58.3	25.9	60 30.0	+58.5	26.6	61 23.5	+58.7	27.4	62 16.5	+59.0	28.3	69
70	56 55.3	+57.3	22.7	57 50.5	+57.5	23.3	58 45.5	+57.7	24.0	59 40.1	+58.0	24.6	60 34.5	+58.2	25.4	61 28.5	+58.5	26.2	62 22.2	+58.7	27.0	63 15.5	+58.8	27.9	70
71	57 52.6	+57.1	22.1	58 48.0	+57.4	22.8	59 43.2	+57.6	23.4	60 38.1	+57.9	24.1	61 32.7	+58.1	24.9	62 27.0	+58.3	25.7	63 20.9	+58.5	26.5	64 14.3	+58.8	27.5	71
72	58 49.7	+57.0	21.6	59 45.4	+57.2	22.2	60 40.8	+57.5	22.9	61 36.0	+57.7	23.6	62 30.8	+58.0	24.3	63 25.3	+58.2	25.2	64 19.4	+58.4	26.0	65 13.1	+58.7	27.0	72
73	59 46.7	+56.9	21.0	60 42.6	+57.1	21.6	61 38.3	+57.3	22.3	62 33.7	+57.5	23.0	63 28.8	+57.8	23.8	64 23.5	+58.1	24.6	65 17.8	+58.4	25.5	66 11.8	+58.6	26.5	73
74	60 43.6	+56.6	20.3	61 39.7	+56.9	20.9	62 35.6	+57.1	21.6	63 31.2	+57.4	22.4	64 26.6	+57.6	23.2	65 21.6	+57.9	24.0	66 16.2	+58.2	24.9	67 10.4	+58.4	25.9	74
75	61 40.2	+56.4	19.6	62 36.6	+56.6	20.3	63 32.7	+57.0	21.0	64 28.6	+57.2	21.7	65 24.2	+57.5	22.5	66 19.5	+57.7	23.4	67 14.4	+58.0	24.3	68 08.8	+58.3	25.3	75
76	62 36.6	+56.1	18.9	63 33.2	+56.5	19.5	64 29.7	+56.7	20.2	65 25.8	+57.0	21.0	66 21.7	+57.2	21.8	67 17.2	+57.6	22.7	68 12.4	+57.8	23.7	69 07.1	+58.2	24.7	76
77	63 32.7	+55.9	18.1	64 29.7	+56.1	18.8	65 26.4	+56.4	19.5	66 22.8	+56.7	20.2	67 18.9	+57.1	21.0	68 14.8	+57.3	21.9	69 10.2	+57.7	22.9	70 05.3	+58.0	24.0	77
78	64 28.6	+55.6	17.3	65 25.8	+55.9	17.9	66 22.8	+56.1	18.6	67 19.5	+56.5	19.4	68 16.0	+56.7	20.2	69 12.1	+57.1	21.1	70 07.9	+57.4	22.1	71 03.3	+57.7	23.2	78
79	65 24.2	+55.3	16.4	66 21.7	+55.5	17.0	67 18.9	+55.9	17.7	68 16.0	+56.1	18.5	69 12.7	+56.5	19.3	70 09.2	+56.8	20.2	71 05.3	+57.2	21.3	72 01.0	+57.5	22.4	79
80	66 19.5	+54.9	15.4	67 17.2	+55.2	16.1	68 14.8	+55.4	16.8	69 12.1	+55.8	17.5	70 09.2	+56.1	18.4	71 06.0	+56.5	19.3	72 02.5	+56.8	20.3	72 58.5	+57.2	21.4	80
81	67 14.4	+54.4	14.4	68 12.4	+54.7	15.0	69 10.2	+55.1	15.7	70 07.9	+55.4	16.5	71 05.3	+55.7	17.3	72 02.5	+56.0	18.2	72 59.3	+56.4	19.2	73 55.7	+56.9	20.4	81
82	68 08.8	+54.0	13.3	69 07.1	+54.3	13.9	70 05.3	+54.5	14.6	71 03.3	+54.8	15.3	72 01.0	+55.3	16.1	72 58.5	+55.6	17.0	73 55.7	+56.1	18.0	74 52.6	+56.5	19.2	82
83	69 02.8	+53.4	12.1	70 01.4	+53.7	12.7	70 59.8	+54.1	13.3	71 58.1	+54.4	14.0	72 56.3	+54.7	14.8	73 54.1	+55.1	15.7	74 51.8	+55.5	16.7	75 49.1	+55.9	17.8	83
84	69 56.2	+52.8	10.8	70 55.1	+53.1	11.4	71 53.9	+53.3	12.0	72 52.5	+53.7	12.6	73 51.0	+54.0	13.4	74 49.2	+54.4	14.2	75 47.3	+54.8	15.2	76 45.0	+55.3	16.3	84
85	70 49.0	+52.1	9.4	71 48.2	+52.3	9.9	72 47.2	+52.7	10.4	73 46.2	+52.9	11.1	74 45.0	+53.3	11.8	75 43.6	+53.7	12.6	76 42.1	+54.1	13.5	77 40.3	+54.6	14.6	85
86	71 41.1	+51.3	7.9	72 40.5	+51.5	8.3	73 39.9	+51.7	8.8	74 39.1	+52.1	9.3	75 38.3	+52.3	10.0	76 37.3	+52.7	10.7	77 36.2	+53.1	11.5	78 34.9	+53.5	12.5	86
87	72 32.4	+50.4	6.2	73 32.0	+50.6	6.5	74 31.6	+50.8	6.9	75 31.2	+50.9	7.4	76 30.6	+51.3	7.9	77 30.0	+51.6	8.6	78 29.3	+51.9	9.3	79 28.4	+52.3	10.2	87
88	73 22.8	+49.2	4.3	74 22.6	+49.4	4.6	75 22.4	+49.5	4.9	76 22.1	+49.7	5.2	77 21.9	+49.9	5.6	78 21.6	+50.1	6.1	79 21.2	+50.4	6.7	80 20.7	+50.7	7.4	88
89	74 12.0	+48.0	2.3	75 12.0	+48.0	2.4	76 11.9	+48.1	2.6	77 11.8	+48.2	2.8	78 11.8	+48.2	3.0	79 11.7	*+48.3* •	3.3	80 11.6	*+48.4* •	3.6	81 11.4	*+48.6* •	4.0	89
90	75 00.0	+46.5	0.0	76 00.0	+46.4	0.0	77 00.0	+46.4	0.0	78 00.0	*+46.3* •	0.0	79 00.0	*+46.2* •	0.0	80 00.0	*+46.1* •	0.0	81 00.0	*+45.9* •	0.0	82 00.0	*+45.7* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 142°, 218°

39°, 321° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 36.2	+59.2	140.0	10 50.2	+59.3	140.2	10 04.1	+59.4	140.3	9 17.9	+59.5	140.4	8 31.7	+59.5	140.5	7 45.3	+59.7	140.6	6 59.0	+59.7	140.7	6 12.5	+59.8	140.7	0
1	12 35.4	+59.1	139.9	11 49.5	+59.2	140.0	11 03.5	+59.3	140.1	10 17.4	+59.4	140.2	9 31.2	+59.6	140.4	8 45.0	+59.6	140.5	7 58.7	+59.7	140.6	7 12.3	+59.8	140.6	1
2	13 34.5	+59.2	139.7	12 48.7	+59.3	139.8	12 02.8	+59.4	140.0	11 16.8	+59.5	140.1	10 30.8	+59.5	140.2	9 44.6	+59.6	140.3	8 58.4	+59.7	140.5	8 12.1	+59.7	140.5	2
3	14 33.7	+59.1	139.5	13 48.0	+59.3	139.7	13 02.2	+59.4	139.8	12 16.3	+59.5	140.0	11 30.3	+59.6	140.1	10 44.2	+59.7	140.2	9 58.1	+59.7	140.4	9 11.8	+59.8	140.5	3
4	15 32.8	+59.2	139.3	14 47.3	+59.2	139.5	14 01.6	+59.3	139.7	13 15.8	+59.4	139.8	12 29.9	+59.5	140.0	11 43.9	+59.6	140.1	10 57.8	+59.7	140.2	10 11.6	+59.8	140.4	4
5	16 32.0	+59.1	139.2	15 46.5	+59.2	139.3	15 00.9	+59.4	139.5	14 15.2	+59.5	139.7	13 29.4	+59.5	139.9	12 43.5	+59.6	140.0	11 57.5	+59.7	140.1	11 11.4	+59.7	140.3	5
6	17 31.1	+59.1	139.0	16 45.7	+59.3	139.2	16 00.3	+59.3	139.4	15 14.7	+59.4	139.6	14 28.9	+59.6	139.7	13 43.1	+59.6	139.9	12 57.2	+59.7	140.0	12 11.1	+59.8	140.2	6
7	18 30.2	+59.1	138.8	17 45.0	+59.2	139.0	16 59.6	+59.3	139.2	16 14.1	+59.4	139.4	15 28.5	+59.5	139.6	14 42.7	+59.6	139.8	13 56.9	+59.6	139.9	13 10.9	+59.7	140.1	7
8	19 29.3	+59.1	138.6	18 44.2	+59.2	138.8	17 58.9	+59.4	139.1	17 13.5	+59.5	139.3	16 28.0	+59.5	139.5	15 42.3	+59.6	139.7	14 56.5	+59.7	139.8	14 10.6	+59.8	140.0	8
9	20 28.4	+59.1	138.4	19 43.4	+59.2	138.7	18 58.3	+59.3	138.9	18 13.0	+59.4	139.1	17 27.5	+59.6	139.3	16 41.9	+59.7	139.5	15 56.2	+59.7	139.7	15 10.4	+59.7	139.9	9
10	21 27.5	+59.0	138.2	20 42.6	+59.2	138.5	19 57.6	+59.3	138.7	19 12.4	+59.4	139.0	18 27.1	+59.5	139.2	17 41.6	+59.6	139.4	16 55.9	+59.7	139.6	16 10.1	+59.8	139.8	10
11	22 26.5	+59.1	138.1	21 41.8	+59.2	138.3	20 56.9	+59.3	138.6	20 11.8	+59.4	138.8	19 26.6	+59.5	139.1	18 41.2	+59.6	139.3	17 55.6	+59.7	139.5	17 09.9	+59.7	139.7	11
12	23 25.6	+59.0	137.9	22 41.0	+59.2	138.2	21 56.2	+59.3	138.4	21 11.2	+59.4	138.7	20 26.1	+59.5	138.9	19 40.8	+59.5	139.2	18 55.3	+59.6	139.4	18 09.6	+59.8	139.6	12
13	24 24.6	+59.1	137.7	23 40.2	+59.1	138.0	22 55.5	+59.3	138.3	22 10.6	+59.4	138.5	21 25.6	+59.5	138.8	20 40.3	+59.6	139.1	19 54.9	+59.7	139.3	19 09.4	+59.7	139.5	13
14	25 23.7	+59.0	137.5	24 39.3	+59.2	137.8	23 54.8	+59.2	138.1	23 10.0	+59.4	138.4	22 25.1	+59.5	138.7	21 39.9	+59.6	138.9	20 54.6	+59.7	139.2	20 09.1	+59.8	139.4	14
15	26 22.7	+59.0	137.3	25 38.5	+59.1	137.6	24 54.0	+59.3	137.9	24 09.4	+59.4	138.2	23 24.6	+59.4	138.5	22 39.5	+59.6	138.8	21 54.3	+59.6	139.1	21 08.9	+59.7	139.3	15
16	27 21.7	+58.9	137.1	26 37.6	+59.1	137.4	25 53.3	+59.3	137.7	25 08.8	+59.3	138.1	24 24.0	+59.5	138.4	23 39.1	+59.6	138.7	22 53.9	+59.7	139.0	22 08.6	+59.7	139.2	16
17	28 20.6	+59.0	136.9	27 36.7	+59.1	137.2	26 52.6	+59.2	137.6	26 08.1	+59.4	137.9	25 23.5	+59.5	138.2	24 38.7	+59.5	138.5	23 53.6	+59.6	138.8	23 08.3	+59.7	139.1	17
18	29 19.6	+58.9	136.6	28 35.8	+59.1	137.0	27 51.8	+59.2	137.4	27 07.5	+59.3	137.7	26 23.0	+59.4	138.1	25 38.2	+59.6	138.4	24 53.2	+59.7	138.7	24 08.0	+59.8	139.0	18
19	30 18.5	+58.9	136.4	29 34.9	+59.1	136.8	28 51.0	+59.2	137.2	28 06.8	+59.4	137.6	27 22.4	+59.5	137.9	26 37.8	+59.5	138.3	25 52.9	+59.6	138.6	25 07.8	+59.7	138.9	19
20	31 17.4	+58.9	136.2	30 34.0	+59.0	136.6	29 50.2	+59.2	137.0	29 06.2	+59.3	137.4	28 21.9	+59.4	137.8	27 37.3	+59.6	138.1	26 52.5	+59.6	138.5	26 07.5	+59.7	138.8	20
21	32 16.3	+58.9	136.0	31 33.0	+59.0	136.4	30 49.4	+59.2	136.8	30 05.5	+59.3	137.2	29 21.3	+59.4	137.6	28 36.9	+59.5	138.0	27 52.1	+59.7	138.3	27 07.2	+59.7	138.7	21
22	33 15.2	+58.8	135.8	32 32.0	+59.0	136.2	31 48.6	+59.1	136.6	31 04.8	+59.3	137.1	30 20.7	+59.4	137.5	29 36.4	+59.5	137.8	28 51.8	+59.6	138.2	28 06.9	+59.7	138.6	22
23	34 14.0	+58.8	135.5	33 31.0	+59.0	136.0	32 47.7	+59.2	136.4	32 04.1	+59.3	136.9	31 20.1	+59.4	137.3	30 35.9	+59.5	137.7	29 51.4	+59.6	138.1	29 06.6	+59.7	138.5	23
24	35 12.8	+58.8	135.3	34 30.0	+59.0	135.8	33 46.9	+59.1	136.2	33 03.4	+59.2	136.7	32 19.5	+59.4	137.1	31 35.4	+59.5	137.6	30 51.0	+59.6	138.0	30 06.3	+59.7	138.4	24
25	36 11.6	+58.8	135.0	35 29.0	+58.9	135.5	34 46.0	+59.1	136.0	34 02.6	+59.2	136.5	33 18.9	+59.4	137.0	32 34.9	+59.5	137.4	31 50.6	+59.6	137.8	31 06.0	+59.7	138.2	25
26	37 10.4	+58.7	134.8	36 27.9	+58.9	135.3	35 45.1	+59.0	135.8	35 01.8	+59.3	136.3	34 18.3	+59.3	136.8	33 34.4	+59.5	137.2	32 50.2	+59.6	137.7	32 05.7	+59.6	138.1	26
27	38 09.1	+58.7	134.5	37 26.8	+58.9	135.1	36 44.1	+59.1	135.6	36 01.1	+59.2	136.1	35 17.6	+59.4	136.6	34 33.9	+59.4	137.1	33 49.8	+59.5	137.5	33 05.3	+59.7	138.0	27
28	39 07.8	+58.6	134.2	38 25.7	+58.8	134.8	37 43.2	+59.0	135.4	37 00.3	+59.1	135.9	36 17.0	+59.3	136.4	35 33.3	+59.5	136.9	34 49.3	+59.6	137.4	34 05.0	+59.7	137.9	28
29	40 06.4	+58.6	134.0	39 24.5	+58.8	134.6	38 42.2	+59.0	135.1	37 59.4	+59.2	135.7	37 16.3	+59.3	136.2	36 32.8	+59.4	136.8	35 48.9	+59.6	137.3	35 04.7	+59.6	137.7	29
30	41 05.0	+58.6	133.7	40 23.3	+58.8	134.3	39 41.2	+58.9	134.9	38 58.6	+59.1	135.5	38 15.6	+59.3	136.0	37 32.2	+59.4	136.6	36 48.5	+59.5	137.1	36 04.3	+59.7	137.6	30
31	42 03.6	+58.5	133.4	41 22.1	+58.7	134.0	40 40.1	+59.0	134.7	39 57.7	+59.1	135.3	39 14.9	+59.3	135.8	38 31.6	+59.4	136.4	37 48.0	+59.5	136.9	37 04.0	+59.6	137.5	31
32	43 02.1	+58.4	133.1	42 20.8	+58.7	133.8	41 39.1	+58.9	134.4	40 56.8	+59.1	135.0	40 14.2	+59.2	135.6	39 31.0	+59.4	136.2	38 47.5	+59.5	136.8	38 03.6	+59.6	137.3	32
33	44 00.5	+58.5	132.8	43 19.5	+58.7	133.5	42 38.0	+58.8	134.2	41 55.9	+59.1	134.8	41 13.4	+59.2	135.4	40 30.4	+59.4	136.0	39 47.0	+59.5	136.6	39 03.2	+59.6	137.2	33
34	44 59.0	+58.3	132.5	44 18.2	+58.6	133.2	43 36.8	+58.8	133.9	42 55.0	+59.0	134.6	42 12.6	+59.2	135.2	41 29.8	+59.3	135.8	40 46.5	+59.5	136.5	40 02.8	+59.6	137.0	34
35	45 57.3	+58.3	132.1	45 16.8	+58.5	132.9	44 35.6	+58.8	133.6	43 54.0	+59.0	134.3	43 11.8	+59.2	135.0	42 29.1	+59.4	135.6	41 46.0	+59.5	136.3	41 02.4	+59.6	136.9	35
36	46 55.6	+58.2	131.8	46 15.3	+58.5	132.6	45 34.4	+58.8	133.3	44 53.0	+58.9	134.1	44 11.0	+59.1	134.8	43 28.5	+59.3	135.4	42 45.5	+59.4	136.1	42 02.0	+59.6	136.7	36
37	47 53.8	+58.2	131.4	47 13.8	+58.5	132.3	46 33.2	+58.7	133.0	45 51.9	+58.9	133.8	45 10.1	+59.1	134.5	44 27.8	+59.3	135.2	43 44.9	+59.5	135.9	43 01.6	+59.6	136.6	37
38	48 52.0	+58.1	131.1	48 12.3	+58.3	131.9	47 31.9	+58.6	132.7	46 50.8	+58.9	133.5	46 09.2	+59.1	134.3	45 27.1	+59.2	135.0	44 44.4	+59.4	135.7	44 01.2	+59.5	136.4	38
39	49 50.1	+58.0	130.7	49 10.6	+58.4	131.6	48 30.5	+58.6	132.4	47 49.7	+58.8	133.2	47 08.3	+59.0	134.0	46 26.3	+59.2	134.8	45 43.8	+59.4	135.5	45 00.7	+59.5	136.2	39
40	50 48.1	+58.0	130.3	50 09.0	+58.2	131.2	49 29.1	+58.5	132.1	48 48.5	+58.8	132.9	48 07.3	+59.0	133.8	47 25.5	+59.2	134.6	46 43.2	+59.3	135.3	46 00.2	+59.5	136.0	40
41	51 46.1	+57.8	129.9	51 07.2	+58.2	130.8	50 27.6	+58.5	131.7	49 47.3	+58.7	132.6	49 06.3	+59.0	133.5	48 24.7	+59.2	134.3	47 42.5	+59.4	135.1	46 59.7	+59.5	135.9	41
42	52 43.9	+57.7	129.4	52 05.4	+58.1	130.4	51 26.1	+58.4	131.4	50 46.0	+58.7	132.3	50 05.3	+58.9	133.2	49 23.9	+59.1	134.1	48 41.9	+59.3	134.9	47 59.2	+59.5	135.7	42
43	53 41.6	+57.7	129.0	53 03.5	+58.0	130.0	52 24.5	+58.3	131.0	51 44.7	+58.6	132.0	51 04.2	+58.9	132.9	50 23.0	+59.1	133.8	49 41.2	+59.3	134.7	48 58.7	+59.5	135.5	43
44	54 39.3	+57.5	128.5	54 01.5	+57.9	129.6	53 22.8	+58.2	130.6	52 43.3	+58.6	131.6	52 03.1	+58.8	132.6	51 22.1	+59.1	133.5	50 40.5	+59.2	134.4	49 58.2	+59.4	135.3	44
45	55 36.8	+57.4	128.0	54 59.4	+57.8	129.1	54 21.0	+58.2	130.2	53 41.9	+58.5	131.3	53 01.9	+58.8	132.3	52 21.2	+59.0	133.2	51 39.7	+59.2	134.2	50 57.6	+59.4	135.0	45
46	56 34.2	+57.2	127.5	55 57.2	+57.6	128.7	55 19.2	+58.1	129.8	54 40.4	+58.4	130.9	54 00.7	+58.7	131.9	53 20.2	+58.9	132.9	52 38.9	+59.2	133.9	51 57.0	+59.4	134.8	46
47	57 31.4	+57.1	126.9	56 54.8	+57.6	128.2	56 17.3	+57.9	129.3	55 38.8	+58.3	130.5	54 59.4	+58.6	131.6	54 19.1	+59.0	132.6	53 38.1	+59.2	133.6	52 56.4	+59.3	134.6	47
48	58 28.5	+56.9	126.4	57 52.4	+57.4	127.6	57 15.2	+57.9	128.9	56 37.1	+58.2	130.1	55 58.0	+58.6	131.2	55 18.1	+58.8	132.3	54 37.3	+59.1	133.3	53 55.7	+59.3	134.3	48
49	59 25.4	+56.8	125.7	58 49.8	+57.3	127.1	58 13.1	+57.7	128.4	57 35.3	+58.2	129.6	56 56.6	+58.5	130.8	56 16.9	+58.8	131.9	55 36.4	+59.0	133.0	54 55.0	+59.3	134.1	49
50	60 22.2	+56.5	125.1	59 47.1	+57.1	126.5	59 10.8	+57.6	127.9	58 33.5	+58.0	129.2	57 55.1	+58.4	130.4	57 15.7	+58.7	131.6	56 35.4	+59.0	132.7	55 54.3	+59.3	133.8	50
51	61 18.7	+56.3	124.4	60 44.2	+56.9	125.9	60 08.4	+57.5	127.3	59 31.5	+57.9	128.7	58 53.5	+58.3	130.0	58 14.4	+58.7	131.2	57 34.4	+59.0	132.4	56 53.6	+59.2	133.5	51
52	62 15.0	+56.1	123.7	61 41.1	+56.7	125.2	61 05.9	+57.2	126.7	60 29.4	+57.8	128.1	59 51.8	+58.2	129.5	59 13.1	+58.6	130.8	58 33.4	+58.9	132.0	57 52.8	+59.1	133.2	52
53	63 11.1	+55.8	122.9	62 37.8	+56.5	124.5	62 03.1	+57.1	126.1	61 27.2	+57.6	127.6	60 50.0	+58.1	129.0	60 11.7	+58.5	130.4	59 32.3	+58.8	131.7	58 51.9	+59.1	132.9	53
54	64 06.9	+55.6	122.1	63 34.3	+56.3	123.8	63 00.2	+56.9	125.4	62 24.8	+57.5	127.0	61 48.1	+57.9	128.5	61 10.2	+58.3	129.9	60 31.1	+58.8	131.3	59 51.0	+59.1	132.6	54
55	65 02.5	+55.1	121.2	64 30.6	+56.0	123.0	63 57.1	+56.7	124.7	63 22.3	+57.3	126.4	62 46.0	+57.9	127.9	62 08.5	+58.3	129.4	61 29.9	+58.6	130.8	60 50.1	+59.0	132.2	55
56	65 57.6	+54.8	120.2	65 26.6	+55.6	122.1	64 53.8	+56.5	124.0	64 19.6	+57.1	125.7	63 43.9	+57.6	127.3	63 06.8	+58.2	128.9	62 28.5	+58.6	130.4	61 49.1	+58.9	131.8	56
57	66 52.4	+54.4	119.2	66 22.2	+55.3	121.2	65 50.3	+56.1	123.1	65 16.7	+56.8	125.0	64 41.5	+57.5	126.7	64 05.0	+58.0	128.4	63 27.1	+58.5	129.9	62 48.0	+58.8	131.4	57
58	67 46.8	+53.9	118.1	67 17.5	+55.0	120.2	66 46.4	+55.8	122.3	66 13.5	+56.7	124.2	65 39.0	+57.3	126.0	65 03.0	+57.9	127.8	64 25.6	+58.3	129.4	63 46.8	+58.8	131.0	58
59	68 40.7	+53.4	116.9	68 12.5	+54.5	119.2	67 42.2	+55.5	121.3	67 10.2	+56.3	123.3	66 36.3	+57.1	125.3	66 00.9	+57.7	127.1	65 23.9	+58.3	128.9	64 45.6	+58.7	130.5	59
60	69 34.1	+52.7	115.7	69 07.0	+54.0	118.0	68 37.7	+55.1	120.3	68 06.5	+56.0	122.4	67 33.4	+56.8	124.5	66 58.6	+57.5	126.4	66 22.2	+58.1	128.3	65 44.3	+58.5	130.0	60
61	70 26.8	+52.1	114.3	70 01.0	+53.4	116.8	69 32.8	+54.6	119.2	69 02.5	+55.7	121.5	68 30.2	+56.6	123.6	67 56.1	+57.3	125.7	67 20.3	+57.9	127.6	66 42.8	+58.5	129.5	61
62	71 18.9	+51.2	112.8	70 54.4	+52.7	115.4	70 27.4	+54.1	118.0	69 58.2	+55.2	120.4	69 26.8	+56.2	122.7	68 53.4	+57.0	124.9	68 18.2	+57.7	127.0	67 41.3	+58.3	128.9	62
63	72 10.1	+50.3	111.1	71 47.1	+52.0	113.9	71 21.5	+53.5	116.6	70 53.4	+54.7	119.2	70 23.0	+55.8	121.7	69 50.4	+56.8	124.0	69 15.9	+57.5	126.2	68 39.6	+58.2	128.3	63
64	73 00.4	+49.3	109.3	72 39.1	+51.2	112.3	72 15.0	+52.7	115.2	71 48.1	+54.2	117.9	71 18.8	+55.4	120.6	70 47.2	+56.4	123.0	70 13.4	+57.3	125.4	69 37.8	+57.9	127.6	64
65	73 49.7	+48.0	107.3	73 30.3	+50.1	110.5	73 07.7	+52.0	113.6	72 42.3	+53.6	116.5	72 14.2	+54.9	119.3	71 43.6	+56.0	122.0	71 10.7	+57.0	124.5	70 35.7	+57.8	126.8	65
66	74 37.7	+46.6	105.1	74 20.4	+48.9	108.5	73 59.7	+51.0	111.8	73 35.9	+52.7	115.0	73 09.1	+54.3	118.0	72 39.6	+55.6	120.8	72 07.7	+56.7	123.5	71 33.5	+57.5	126.0	66
67	75 24.3	+44.9	102.6	75 09.3	+47.5	106.3	74 50.7	+49.8	109.9	74 28.6	+51.9	113.2	74 03.4	+53.6	116.5	73 35.2	+55.1	119.5	73 04.4	+56.2	122.4	72 31.0	+57.3	125.1	67
68	76 09.2	+42.9•	99.9	75 56.8	+45.9	103.9	75 40.5	+48.5	107.7	75 20.5	+50.8	111.3	74 57.0	+52.7	114.8	74 30.3	+54.4	118.1	74 00.6	+55.8	121.2	73 28.3	+56.9	124.0	68
69	76 52.1	+40.6•	96.9	76 42.7	+43.9•	101.1	76 29.0	+46.9	105.2	76 11.3	+49.5	109.1	75 49.7	+51.8	112.9	75 24.7	+53.6	116.4	74 56.4	+55.2	119.8	74 25.2	+56.5	122.9	69
70	77 32.7	+37.9•	93.6	77 26.6	+41.6•	98.1	77 15.9	+45.0•	102.5	77 00.8	+47.9	106.7	76 41.5	+50.5	110.8	76 18.3	+52.8	114.6	75 51.6	+54.6	118.2	75 21.7	+56.0	121.6	70
71	78 10.6	+34.8•	89.9	78 08.2	+38.9•	94.7	78 00.9	+42.7•	99.4	77 48.7	+46.1•	104.0	77 32.0	+49.1	108.3	77 11.1	+51.6	112.5	76 46.2	+53.7	116.5	76 17.7	+55.5	120.1	71
72	78 45.4	+31.0•	85.8	78 47.1	+35.6•	90.9	78 43.6	+39.9•	95.9	78 34.8	+43.9•	100.8	78 21.1	+47.3•	105.6	78 02.7	+50.2	110.1	77 39.9	+52.7	114.4	77 13.2	+54.7	118.5	72
73	79 16.4	+26.8•	81.3	79 22.7	+31.8•	86.6	79 23.5	+36.6•	92.0	79 18.7	+41.0•	97.3	79 08.4	+45.0•	102.4	78 52.9	+48.5	107.4	78 32.6	+51.4	112.1	78 07.9	+53.8	116.5	73
74	79 43.2	+22.0•	76.4	79 54.5	+27.4•	81.9	80 00.1	+32.6•	87.5	79 59.7	+37.7•	93.2	79 53.4	+42.3•	98.8	79 41.4	+46.4•	104.2	79 24.0	+49.8	109.4	79 01.7	+52.6	114.3	74
75	80 05.2	+16.7•	71.1	80 21.9	+22.3•	76.7	80 32.7	+28.0•	82.5	80 37.4	+33.6•	88.6	80 35.7	+38.9•	94.6	80 27.8	+43.6•	100.6	80 13.8	+47.8•	106.3	79 54.3	+51.2	111.7	75
76	80 21.9	+10.8•	65.5	80 44.2	+16.5•	71.0	81 00.7	+22.5•	77.0	81 11.0	+28.6•	83.3	81 14.6	+34.6•	89.8	81 11.4	+40.2•	96.2	81 01.6	+45.1•	102.6	80 45.5	+49.2•	108.6	76
77	80 32.7	+4.7•	59.5	81 00.7	+10.3•	65.0	81 23.2	+16.4•	71.0	81 39.6	+22.8•	77.4	81 49.2	+29.4•	84.2	81 51.6	+35.8•	91.2	81 46.7	+41.6•	98.1	81 34.7	+46.7•	104.8	77
78	80 37.4	−1.7•	53.4	81 11.0	+3.6•	58.6	81 39.6	+9.6•	64.4	82 02.4	+16.2•	70.9	82 18.6	+23.2•	77.9	82 27.4	+30.3•	85.3	82 28.3	+37.2•	92.9	82 21.4	+43.3•	100.3	78
79	80 35.7	−7.9•	47.3	81 14.6	−3.2•	52.1	81 49.2	+2.4•	57.6	82 18.6	+8.8•	63.8	82 41.8	+15.9•	70.8	82 57.7	+23.5•	78.5	83 05.5	+31.3•	86.6	83 04.7	+38.7•	94.9	79
80	80 27.8	−14.0•	41.3	81 11.4	−9.8•	45.5	81 51.6	−4.9•	50.5	82 27.4	+0.9•	56.3	82 57.7	+7.8•	63.1	83 21.2	+15.6•	70.8	83 36.8	+24.0•	79.2	83 43.4	+32.5•	88.2	80
81	80 13.8	−19.5•	35.5	81 01.6	−16.1•	39.1	81 46.7	−12.0•	43.5	82 28.3	−6.9•	48.7	83 05.5	−0.8•	54.9	83 36.8	+6.6•	62.3	84 00.8	+15.1•	70.7	84 15.9	+24.6•	80.2	81
82	79 54.3	−24.6•	30.0	80 45.5	−21.9•	33.0	81 34.7	−18.5•	36.7	82 21.4	−14.4•	41.2	83 04.7	−9.3•	46.6	83 43.4	−2.9•	53.2	84 15.9	+5.1•	61.2	84 40.5	+14.5•	70.7	82
83	79 29.7	−29.1•	24.9	80 23.6	−27.1•	27.4	81 16.2	−24.5•	30.3	82 07.0	−21.3•	34.0	82 55.4	−17.3•	38.5	83 40.5	−12.1•	44.1	84 21.0	−5.4•	51.2	84 55.0	+3.2•	60.0	83
84	79 00.6	−33.1•	20.2	79 56.5	−31.5•	22.1	80 51.7	−29.7•	24.5	81 45.7	−27.4•	27.3	82 38.1	−24.4•	30.9	83 28.4	−20.5•	35.4	84 15.6	−15.5•	41.1	84 58.2	−8.6•	48.6	84
85	78 27.5	−36.4•	15.9	79 25.0	−35.4•	17.4	80 22.0	−34.1•	19.1	81 18.3	−32.5•	21.3	82 13.7	−30.4•	23.9	83 07.9	−27.8•	27.3	84 00.1	−24.3•	31.7	84 49.6	−19.4•	37.5	85
86	77 51.1	−39.4•	12.0	78 49.6	−38.6•	13.1	79 47.9	−37.8•	14.4	80 45.8	−36.7•	15.9	81 43.3	−35.5•	17.8	82 40.1	−33.8•	20.1	83 35.8	−31.5•	23.2	84 30.2	−28.6•	27.3	86
87	77 11.7	−41.9•	8.5	78 11.0	−41.5•	9.3	79 10.1	−40.9•	10.1	80 09.1	−40.3•	11.1	81 07.8	−39.5•	12.3	82 06.3	−38.6•	13.9	83 04.3	−37.3•	15.8	84 01.6	−35.6•	18.5	87
88	76 29.8	−44.0	5.4	77 29.5	−43.8•	5.8	78 29.2	−43.5•	6.3	79 28.8	−43.2•	6.9	80 28.3	−42.8•	7.6	81 27.7	−42.3•	8.5	82 27.0	−41.8•	9.6	83 26.0	−41.0•	11.1	88
89	75 45.8	−45.8	2.6	76 45.7	−45.7	2.7	77 45.7	−45.7•	3.0	78 45.6	−45.6•	3.2	79 45.5	−45.5•	3.5	80 45.4	−45.4•	3.9	81 45.2	−45.2•	4.4	82 45.0	−45.0•	5.0	89
90	75 00.0	−47.4	0.0	76 00.0	−47.4	0.0	77 00.0	−47.5	0.0	78 00.0	−47.5	0.0	79 00.0	−47.6	0.0	80 00.0	−47.7•	0.0	81 00.0	−47.8•	0.0	82 00.0	−48.0•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 39°, 321°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 36.2	– 59.1	140.0	10 50.2	– 59.3	140.2	10 04.1	– 59.4	140.3	9 17.9	– 59.5	140.4	8 31.7	– 59.6	140.5	7 45.3	– 59.6	140.6	6 59.0	– 59.7	140.7	6 12.5	– 59.7	140.7	**0**
1	10 37.1	– 59.2	140.2	9 50.9	– 59.3	140.3	9 04.7	– 59.4	140.4	8 18.4	– 59.4	140.5	7 32.1	– 59.6	140.6	6 45.7	– 59.6	140.7	5 59.3	– 59.7	140.8	5 12.8	– 59.8	140.8	**1**
2	9 37.9	– 59.2	140.4	8 51.6	– 59.2	140.5	8 05.3	– 59.4	140.6	7 19.0	– 59.5	140.6	6 32.5	– 59.5	140.7	5 46.1	– 59.7	140.8	4 59.6	– 59.7	140.9	4 13.0	– 59.8	140.9	**2**
3	8 38.7	– 59.2	140.5	7 52.4	– 59.3	140.6	7 05.9	– 59.3	140.7	6 19.5	– 59.5	140.8	5 33.0	– 59.6	140.8	4 46.4	– 59.6	140.9	3 59.9	– 59.8	141.0	3 13.2	– 59.7	141.0	**3**
4	7 39.5	– 59.2	140.7	6 53.1	– 59.3	140.8	6 06.6	– 59.4	140.8	5 20.0	– 59.5	140.9	4 33.4	– 59.5	141.0	3 46.8	– 59.6	141.0	3 00.1	– 59.7	141.0	2 13.5	– 59.8	141.1	**4**
5	6 40.3	– 59.2	140.9	5 53.8	– 59.3	140.9	5 07.2	– 59.4	141.0	4 20.5	– 59.5	141.0	3 33.9	– 59.6	141.1	2 47.2	– 59.7	141.1	2 00.4	– 59.7	141.1	1 13.7	– 59.8	141.2	**5**
6	5 41.1	– 59.1	141.0	4 54.5	– 59.3	141.1	4 07.8	– 59.4	141.1	3 21.0	– 59.4	141.2	2 34.3	– 59.6	141.2	1 47.5	– 59.6	141.2	1 00.7	– 59.7	141.2	0 13.9	– 59.7	141.3	**6**
7	4 42.0	– 59.2	141.2	3 55.2	– 59.3	141.2	3 08.4	– 59.4	141.3	2 21.6	– 59.5	141.3	1 34.7	– 59.5	141.3	0 47.9	– 59.7	141.3	0 01.0	– 59.7	141.3	0 45.8	+ 59.8	38.7	**7**
8	3 42.8	– 59.2	141.4	2 55.9	– 59.3	141.4	2 09.0	– 59.4	141.4	1 22.1	– 59.5	141.4	0 35.2	– 59.6	141.4	0 11.8	+ 59.6	38.6	0 58.7	+ 59.7	38.6	1 45.6	+ 59.8	38.6	**8**
9	2 43.6	– 59.2	141.5	1 56.6	– 59.3	141.5	1 09.6	– 59.4	141.6	0 22.6	– 59.5	141.6	0 24.4	+ 59.6	38.4	1 11.4	+ 59.6	38.4	1 58.4	+ 59.7	38.5	2 45.4	+ 59.7	38.5	**9**
10	1 44.4	– 59.2	141.7	0 57.3	– 59.3	141.7	0 10.2	– 59.4	141.7	0 36.9	+ 59.5	38.3	1 24.0	+ 59.5	38.3	2 11.0	+ 59.7	38.3	2 58.1	+ 59.7	38.4	3 45.1	+ 59.8	38.4	**10**
11	0 45.2	– 59.2	141.8	0 02.0	+ 59.3	38.2	0 49.2	+ 59.4	38.2	1 36.4	+ 59.5	38.2	2 23.5	+ 59.6	38.2	3 10.7	+ 59.6	38.2	3 57.8	+ 59.7	38.3	4 44.9	+ 59.8	38.3	**11**
12	0 14.0	+ 59.2	38.0	1 01.3	+ 59.3	38.0	1 48.6	+ 59.4	38.0	2 35.9	+ 59.4	38.0	3 23.1	+ 59.6	38.1	4 10.3	+ 59.7	38.1	4 57.5	+ 59.7	38.2	5 44.7	+ 59.7	38.2	**12**
13	1 13.2	+ 59.2	37.8	2 00.6	+ 59.3	37.8	2 48.0	+ 59.4	37.9	3 35.3	+ 59.5	37.9	4 22.7	+ 59.5	38.0	5 10.0	+ 59.6	38.0	5 57.2	+ 59.7	38.1	6 44.4	+ 59.8	38.1	**13**
14	2 12.4	+ 59.2	37.7	2 59.9	+ 59.3	37.7	3 47.4	+ 59.4	37.7	4 34.8	+ 59.5	37.8	5 22.2	+ 59.6	37.8	6 09.6	+ 59.6	37.9	6 56.9	+ 59.7	38.0	7 44.2	+ 59.8	38.0	**14**
15	3 11.6	+ 59.2	37.5	3 59.2	+ 59.3	37.5	4 46.8	+ 59.4	37.6	5 34.3	+ 59.5	37.6	6 21.8	+ 59.5	37.7	7 09.2	+ 59.7	37.8	7 56.6	+ 59.7	37.9	8 44.0	+ 59.7	38.0	**15**
16	4 10.8	+ 59.2	37.3	4 58.5	+ 59.3	37.4	5 46.2	+ 59.4	37.4	6 33.8	+ 59.5	37.5	7 21.3	+ 59.6	37.6	8 08.9	+ 59.6	37.7	8 56.3	+ 59.7	37.8	9 43.7	+ 59.8	37.9	**16**
17	5 10.0	+ 59.2	37.2	5 57.8	+ 59.3	37.2	6 45.6	+ 59.3	37.3	7 33.3	+ 59.4	37.4	8 20.9	+ 59.6	37.5	9 08.5	+ 59.6	37.6	9 56.0	+ 59.7	37.7	10 43.5	+ 59.8	37.8	**17**
18	6 09.2	+ 59.2	37.0	6 57.1	+ 59.3	37.1	7 44.9	+ 59.4	37.2	8 32.7	+ 59.5	37.2	9 20.5	+ 59.5	37.3	10 08.1	+ 59.7	37.4	10 55.7	+ 59.7	37.6	11 43.3	+ 59.7	37.7	**18**
19	7 08.4	+ 59.2	36.8	7 56.4	+ 59.3	36.9	8 44.3	+ 59.4	37.0	9 32.2	+ 59.5	37.1	10 20.0	+ 59.6	37.2	11 07.8	+ 59.6	37.3	11 55.4	+ 59.7	37.5	12 43.0	+ 59.8	37.6	**19**
20	8 07.6	+ 59.2	36.7	8 55.7	+ 59.3	36.8	9 43.7	+ 59.4	36.9	10 31.7	+ 59.4	37.0	11 19.6	+ 59.5	37.1	12 07.4	+ 59.6	37.2	12 55.1	+ 59.7	37.4	13 42.8	+ 59.7	37.5	**20**
21	9 06.8	+ 59.1	36.5	9 55.0	+ 59.2	36.6	10 43.1	+ 59.3	36.7	11 31.1	+ 59.5	36.8	12 19.1	+ 59.6	37.0	13 07.0	+ 59.6	37.1	13 54.8	+ 59.7	37.2	14 42.5	+ 59.8	37.4	**21**
22	10 05.9	+ 59.2	36.3	10 54.2	+ 59.3	36.5	11 42.4	+ 59.4	36.6	12 30.6	+ 59.5	36.7	13 18.7	+ 59.5	36.8	14 06.6	+ 59.6	37.0	14 54.5	+ 59.7	37.1	15 42.3	+ 59.7	37.3	**22**
23	11 05.1	+ 59.2	36.2	11 53.5	+ 59.3	36.3	12 41.8	+ 59.4	36.4	13 30.1	+ 59.4	36.6	14 18.2	+ 59.5	36.7	15 06.2	+ 59.7	36.9	15 54.2	+ 59.7	37.0	16 42.0	+ 59.8	37.2	**23**
24	12 04.3	+ 59.1	36.0	12 52.8	+ 59.2	36.1	13 41.2	+ 59.3	36.3	14 29.5	+ 59.4	36.4	15 17.7	+ 59.6	36.6	16 05.9	+ 59.6	36.8	16 53.9	+ 59.7	36.9	17 41.8	+ 59.7	37.1	**24**
25	13 03.4	+ 59.2	35.8	13 52.0	+ 59.3	36.0	14 40.5	+ 59.4	36.1	15 28.9	+ 59.5	36.3	16 17.3	+ 59.5	36.5	17 05.5	+ 59.6	36.6	17 53.6	+ 59.6	36.8	18 41.5	+ 59.8	37.0	**25**
26	14 02.6	+ 59.1	35.7	14 51.3	+ 59.2	35.8	15 39.9	+ 59.3	36.0	16 28.4	+ 59.4	36.1	17 16.8	+ 59.5	36.3	18 05.1	+ 59.6	36.5	18 53.2	+ 59.7	36.7	19 41.3	+ 59.7	36.9	**26**
27	15 01.7	+ 59.2	35.5	15 50.5	+ 59.3	35.7	16 39.2	+ 59.4	35.8	17 27.8	+ 59.5	36.0	18 16.3	+ 59.5	36.2	19 04.7	+ 59.6	36.4	19 52.9	+ 59.7	36.6	20 41.0	+ 59.7	36.8	**27**
28	16 00.9	+ 59.1	35.3	16 49.8	+ 59.2	35.5	17 38.6	+ 59.3	35.7	18 27.3	+ 59.4	35.9	19 15.8	+ 59.5	36.1	20 04.3	+ 59.6	36.3	20 52.6	+ 59.6	36.5	21 40.7	+ 59.8	36.7	**28**
29	17 00.0	+ 59.1	35.1	17 49.0	+ 59.2	35.3	18 37.9	+ 59.3	35.5	19 26.7	+ 59.4	35.7	20 15.3	+ 59.5	35.9	21 03.9	+ 59.5	36.1	21 52.2	+ 59.7	36.4	22 40.5	+ 59.7	36.6	**29**
30	17 59.1	+ 59.1	35.0	18 48.2	+ 59.2	35.2	19 37.2	+ 59.3	35.4	20 26.1	+ 59.4	35.6	21 14.8	+ 59.5	35.8	22 03.4	+ 59.6	36.0	22 51.9	+ 59.6	36.3	23 40.2	+ 59.7	36.5	**30**
31	18 58.2	+ 59.1	34.8	19 47.4	+ 59.2	35.0	20 36.5	+ 59.3	35.2	21 25.5	+ 59.4	35.4	22 14.3	+ 59.5	35.6	23 03.0	+ 59.6	35.9	23 51.5	+ 59.7	36.1	24 39.9	+ 59.7	36.4	**31**
32	19 57.3	+ 59.1	34.6	20 46.6	+ 59.2	34.8	21 35.8	+ 59.3	35.0	22 24.9	+ 59.4	35.3	23 13.8	+ 59.5	35.5	24 02.6	+ 59.6	35.8	24 51.2	+ 59.6	36.0	25 39.6	+ 59.7	36.3	**32**
33	20 56.4	+ 59.1	34.4	21 45.8	+ 59.2	34.6	22 35.1	+ 59.3	34.9	23 24.3	+ 59.4	35.1	24 13.3	+ 59.5	35.4	25 02.2	+ 59.5	35.6	25 50.8	+ 59.7	35.9	26 39.3	+ 59.8	36.2	**33**
34	21 55.5	+ 59.0	34.2	22 45.0	+ 59.2	34.5	23 34.4	+ 59.3	34.7	24 23.7	+ 59.4	35.0	25 12.8	+ 59.4	35.2	26 01.7	+ 59.6	35.5	26 50.5	+ 59.6	35.8	27 39.1	+ 59.7	36.1	**34**
35	22 54.5	+ 59.1	34.0	23 44.2	+ 59.1	34.3	24 33.7	+ 59.3	34.5	25 23.1	+ 59.3	34.8	26 12.2	+ 59.5	35.1	27 01.3	+ 59.5	35.4	27 50.1	+ 59.6	35.7	28 38.8	+ 59.7	36.0	**35**
36	23 53.6	+ 59.0	33.8	24 43.3	+ 59.2	34.1	25 33.0	+ 59.2	34.4	26 22.4	+ 59.4	34.6	27 11.7	+ 59.4	34.9	28 00.8	+ 59.5	35.2	28 49.7	+ 59.6	35.5	29 38.5	+ 59.6	35.9	**36**
37	24 52.6	+ 59.0	33.6	25 42.5	+ 59.1	33.9	26 32.2	+ 59.2	34.2	27 21.8	+ 59.3	34.5	28 11.1	+ 59.5	34.8	29 00.3	+ 59.6	35.1	29 49.3	+ 59.7	35.4	30 38.1	+ 59.7	35.7	**37**
38	25 51.6	+ 59.0	33.4	26 41.6	+ 59.1	33.7	27 31.4	+ 59.3	34.0	28 21.1	+ 59.3	34.3	29 10.6	+ 59.4	34.6	29 59.9	+ 59.5	34.9	30 49.0	+ 59.6	35.3	31 37.8	+ 59.7	35.6	**38**
39	26 50.6	+ 59.0	33.2	27 40.7	+ 59.1	33.5	28 30.7	+ 59.2	33.8	29 20.4	+ 59.3	34.1	30 10.0	+ 59.4	34.4	30 59.4	+ 59.5	34.8	31 48.6	+ 59.5	35.1	32 37.5	+ 59.7	35.5	**39**
40	27 49.6	+ 59.0	33.0	28 39.8	+ 59.1	33.3	29 29.9	+ 59.2	33.6	30 19.7	+ 59.3	34.0	31 09.4	+ 59.4	34.3	31 58.9	+ 59.5	34.6	32 48.1	+ 59.6	35.0	33 37.2	+ 59.6	35.4	**40**
41	28 48.6	+ 58.9	32.8	29 38.9	+ 59.1	33.1	30 29.1	+ 59.1	33.4	31 19.0	+ 59.3	33.8	32 08.8	+ 59.4	34.1	32 58.4	+ 59.5	34.5	33 47.7	+ 59.6	34.9	34 36.8	+ 59.7	35.2	**41**
42	29 47.5	+ 58.9	32.6	30 38.0	+ 59.0	32.9	31 28.2	+ 59.2	33.3	32 18.3	+ 59.3	33.6	33 08.2	+ 59.4	34.0	33 57.9	+ 59.4	34.3	34 47.3	+ 59.6	34.7	35 36.5	+ 59.6	35.1	**42**
43	30 46.4	+ 58.9	32.4	31 37.0	+ 59.0	32.7	32 27.4	+ 59.1	33.1	33 17.6	+ 59.2	33.4	34 07.6	+ 59.3	33.8	34 57.3	+ 59.5	34.2	35 46.9	+ 59.5	34.6	36 36.1	+ 59.7	35.0	**43**
44	31 45.3	+ 58.9	32.2	32 36.0	+ 59.0	32.5	33 26.5	+ 59.2	32.9	34 16.8	+ 59.3	33.2	35 06.9	+ 59.4	33.6	35 56.8	+ 59.4	34.0	36 46.4	+ 59.6	34.4	37 35.8	+ 59.6	34.8	**44**
45	32 44.2	+ 58.9	31.9	33 35.0	+ 59.0	32.3	34 25.7	+ 59.1	32.6	35 16.1	+ 59.2	33.0	36 06.3	+ 59.3	33.4	36 56.2	+ 59.5	33.8	37 46.0	+ 59.5	34.3	38 35.4	+ 59.6	34.7	**45**
46	33 43.1	+ 58.8	31.7	34 34.0	+ 59.0	32.1	35 24.8	+ 59.0	32.4	36 15.3	+ 59.2	32.8	37 05.6	+ 59.3	33.2	37 55.7	+ 59.4	33.7	38 45.5	+ 59.5	34.1	39 35.0	+ 59.6	34.6	**46**
47	34 41.9	+ 58.8	31.5	35 33.0	+ 58.9	31.8	36 23.8	+ 59.1	32.2	37 14.5	+ 59.2	32.6	38 04.9	+ 59.3	33.0	38 55.1	+ 59.4	33.5	39 45.0	+ 59.5	33.9	40 34.6	+ 59.6	34.4	**47**
48	35 40.7	+ 58.8	31.2	36 31.9	+ 58.9	31.6	37 22.9	+ 59.0	32.0	38 13.7	+ 59.1	32.4	39 04.2	+ 59.3	32.8	39 54.5	+ 59.4	33.3	40 44.5	+ 59.5	33.8	41 34.2	+ 59.6	34.3	**48**
49	36 39.5	+ 58.7	31.0	37 30.8	+ 58.9	31.4	38 21.9	+ 59.0	31.8	39 12.8	+ 59.1	32.2	40 03.5	+ 59.2	32.6	40 53.9	+ 59.3	33.1	41 44.0	+ 59.4	33.6	42 33.8	+ 59.6	34.1	**49**
50	37 38.2	+ 58.7	30.7	38 29.7	+ 58.8	31.1	39 20.9	+ 59.0	31.5	40 11.9	+ 59.1	32.0	41 02.7	+ 59.2	32.4	41 53.2	+ 59.4	32.9	42 43.4	+ 59.5	33.4	43 33.4	+ 59.5	33.9	**50**
51	38 36.9	+ 58.7	30.5	39 28.5	+ 58.8	30.9	40 19.9	+ 58.9	31.3	41 11.0	+ 59.1	31.8	42 01.9	+ 59.2	32.2	42 52.6	+ 59.3	32.7	43 42.9	+ 59.4	33.2	44 32.9	+ 59.6	33.8	**51**
52	39 35.6	+ 58.6	30.2	40 27.3	+ 58.8	30.6	41 18.8	+ 58.9	31.1	42 10.1	+ 59.1	31.5	43 01.1	+ 59.2	32.0	43 51.9	+ 59.3	32.5	44 42.3	+ 59.4	33.0	45 32.5	+ 59.5	33.6	**52**
53	40 34.2	+ 58.6	29.9	41 26.1	+ 58.7	30.3	42 17.7	+ 58.9	30.8	43 09.2	+ 59.0	31.3	44 00.3	+ 59.1	31.8	44 51.2	+ 59.2	32.3	45 41.7	+ 59.4	32.8	46 32.0	+ 59.5	33.4	**53**
54	41 32.8	+ 58.5	29.6	42 24.8	+ 58.7	30.1	43 16.6	+ 58.9	30.5	44 08.2	+ 58.9	31.0	44 59.4	+ 59.2	31.5	45 50.4	+ 59.3	32.1	46 41.1	+ 59.4	32.6	47 31.5	+ 59.5	33.2	**54**
55	42 31.3	+ 58.5	29.3	43 23.5	+ 58.6	29.8	44 15.5	+ 58.7	30.3	45 07.1	+ 59.0	30.8	45 58.6	+ 59.0	31.3	46 49.7	+ 59.2	31.8	47 40.5	+ 59.3	32.4	48 31.0	+ 59.4	33.0	**55**
56	43 29.8	+ 58.4	29.0	44 22.1	+ 58.6	29.5	45 14.2	+ 58.8	30.0	46 06.1	+ 58.9	30.5	46 57.6	+ 59.1	31.0	47 48.9	+ 59.2	31.6	48 39.8	+ 59.4	32.2	49 30.4	+ 59.5	32.8	**56**
57	44 28.2	+ 58.4	28.7	45 20.7	+ 58.6	29.2	46 13.0	+ 58.7	29.7	47 05.0	+ 58.8	30.2	47 56.7	+ 59.0	30.8	48 48.1	+ 59.1	31.4	49 39.2	+ 59.2	32.0	50 29.9	+ 59.4	32.6	**57**
58	45 26.6	+ 58.4	28.4	46 19.3	+ 58.5	28.9	47 11.7	+ 58.7	29.4	48 03.8	+ 58.9	29.9	48 55.7	+ 59.0	30.5	49 47.2	+ 59.1	31.1	50 38.4	+ 59.3	31.7	51 29.3	+ 59.4	32.4	**58**
59	46 25.0	+ 58.2	28.0	47 17.8	+ 58.4	28.5	48 10.4	+ 58.6	29.1	49 02.7	+ 58.7	29.6	49 54.7	+ 58.9	30.2	50 46.3	+ 59.1	30.8	51 37.7	+ 59.2	31.5	52 28.7	+ 59.3	32.2	**59**
60	47 23.2	+ 58.2	27.7	48 16.2	+ 58.4	28.2	49 09.0	+ 58.5	28.8	50 01.4	+ 58.7	29.3	50 53.6	+ 58.9	29.9	51 45.4	+ 59.1	30.6	52 36.9	+ 59.2	31.2	53 28.0	+ 59.4	31.9	**60**
61	48 21.4	+ 58.2	27.3	49 14.6	+ 58.3	27.9	50 07.5	+ 58.5	28.4	51 00.1	+ 58.7	29.0	51 52.5	+ 58.8	29.6	52 44.5	+ 59.0	30.3	53 36.1	+ 59.2	30.9	54 27.4	+ 59.3	31.7	**61**
62	49 19.6	+ 58.0	27.0	50 12.9	+ 58.3	27.5	51 06.0	+ 58.4	28.1	51 58.8	+ 58.6	28.7	52 51.3	+ 58.8	29.3	53 43.5	+ 58.9	30.0	54 35.3	+ 59.1	30.7	55 26.7	+ 59.2	31.4	**62**
63	50 17.6	+ 58.0	26.6	51 11.2	+ 58.1	27.1	52 04.4	+ 58.4	27.7	52 57.4	+ 58.5	28.3	53 50.1	+ 58.7	29.0	54 42.4	+ 58.9	29.6	55 34.4	+ 59.0	30.4	56 25.9	+ 59.3	31.1	**63**
64	51 15.6	+ 57.9	26.2	52 09.3	+ 58.1	26.7	53 02.8	+ 58.3	27.3	53 55.9	+ 58.5	27.9	54 48.8	+ 58.6	28.6	55 41.3	+ 58.8	29.3	56 33.4	+ 59.0	30.0	57 25.2	+ 59.1	30.8	**64**
65	52 13.5	+ 57.8	25.7	53 07.4	+ 58.0	26.3	54 01.1	+ 58.1	26.9	54 54.4	+ 58.4	27.6	55 47.4	+ 58.6	28.2	56 40.1	+ 58.8	28.9	57 32.4	+ 59.0	29.7	58 24.3	+ 59.2	30.5	**65**
66	53 11.3	+ 57.7	25.3	54 05.4	+ 57.9	25.9	54 59.2	+ 58.1	26.5	55 52.8	+ 58.3	27.2	56 46.0	+ 58.5	27.8	57 38.9	+ 58.7	28.6	58 31.4	+ 58.9	29.4	59 23.5	+ 59.0	30.2	**66**
67	54 09.0	+ 57.5	24.8	55 03.3	+ 57.8	25.4	55 57.3	+ 58.0	26.1	56 51.1	+ 58.2	26.7	57 44.5	+ 58.4	27.4	58 37.6	+ 58.6	28.2	59 30.3	+ 58.8	29.0	60 22.5	+ 59.1	29.8	**67**
68	55 06.5	+ 57.5	24.3	56 01.1	+ 57.7	24.9	56 55.3	+ 57.9	25.6	57 49.3	+ 58.1	26.3	58 42.9	+ 58.4	27.0	59 36.2	+ 58.6	27.8	60 29.1	+ 58.8	28.6	61 21.6	+ 58.9	29.5	**68**
69	56 04.0	+ 57.3	23.8	56 58.8	+ 57.5	24.4	57 53.2	+ 57.8	25.1	58 47.4	+ 58.0	25.8	59 41.3	+ 58.2	26.5	60 34.8	+ 58.4	27.3	61 27.9	+ 58.6	28.2	62 20.5	+ 58.9	29.1	**69**
70	57 01.3	+ 57.2	23.3	57 56.3	+ 57.4	23.9	58 51.0	+ 57.6	24.6	59 45.4	+ 57.9	25.3	60 39.5	+ 58.1	26.1	61 33.2	+ 58.3	26.9	62 26.5	+ 58.6	27.7	63 19.4	+ 58.8	28.6	**70**
71	57 58.5	+ 57.0	22.7	58 53.7	+ 57.3	23.4	59 48.6	+ 57.5	24.0	60 43.3	+ 57.7	24.8	61 37.6	+ 58.0	25.5	62 31.5	+ 58.3	26.4	63 25.1	+ 58.5	27.3	64 18.2	+ 58.7	28.2	**71**
72	58 55.5	+ 56.9	22.1	59 51.0	+ 57.1	22.8	60 46.1	+ 57.4	23.5	61 41.0	+ 57.6	24.2	62 35.6	+ 57.8	25.0	63 29.8	+ 58.1	25.8	64 23.6	+ 58.3	26.7	65 16.9	+ 58.6	27.7	**72**
73	59 52.4	+ 56.6	21.5	60 48.1	+ 56.9	22.2	61 43.5	+ 57.2	22.9	62 38.6	+ 57.5	23.6	63 33.4	+ 57.7	24.4	64 27.9	+ 58.0	25.3	65 21.9	+ 58.3	26.2	66 15.5	+ 58.6	27.2	**73**
74	60 49.0	+ 56.5	20.8	61 45.0	+ 56.7	21.5	62 40.7	+ 56.9	22.2	63 36.1	+ 57.2	23.0	64 31.1	+ 57.6	23.8	65 25.9	+ 57.8	24.7	66 20.2	+ 58.1	25.6	67 14.1	+ 58.3	26.6	**74**
75	61 45.5	+ 56.2	20.1	62 41.7	+ 56.5	20.8	63 37.6	+ 56.8	21.5	64 33.3	+ 57.0	22.3	65 28.7	+ 57.3	23.1	66 23.7	+ 57.6	24.0	67 18.3	+ 57.9	25.0	68 12.4	+ 58.3	26.0	**75**
76	62 41.7	+ 55.9	19.4	63 38.2	+ 56.2	20.1	64 34.4	+ 56.5	20.8	65 30.3	+ 56.9	21.5	66 26.0	+ 57.1	22.4	67 21.3	+ 57.4	23.3	68 16.2	+ 57.7	24.3	69 10.7	+ 58.0	25.4	**76**
77	63 37.6	+ 55.7	18.6	64 34.4	+ 55.9	19.3	65 30.9	+ 56.3	20.0	66 27.2	+ 56.5	20.8	67 23.1	+ 56.9	21.6	68 18.7	+ 57.2	22.5	69 13.9	+ 57.6	23.5	70 08.7	+ 57.9	24.6	**77**
78	64 33.3	+ 55.4	17.7	65 30.3	+ 55.7	18.4	66 27.2	+ 55.9	19.1	67 23.7	+ 56.3	19.9	68 20.0	+ 56.6	20.8	69 15.9	+ 56.9	21.7	70 11.5	+ 57.3	22.7	71 06.6	+ 57.6	23.8	**78**
79	65 28.7	+ 55.0	16.8	66 26.0	+ 55.3	17.5	67 23.1	+ 55.6	18.2	68 20.0	+ 55.9	19.0	69 16.6	+ 56.2	19.8	70 12.8	+ 56.7	20.8	71 08.8	+ 57.0	21.8	72 04.2	+ 57.4	23.0	**79**
80	66 23.7	+ 54.6	15.8	67 21.3	+ 54.9	16.5	68 18.7	+ 55.2	17.2	69 15.9	+ 55.6	18.0	70 12.8	+ 56.0	18.8	71 09.5	+ 56.3	19.8	72 05.8	+ 56.6	20.8	73 01.6	+ 57.1	22.0	**80**
81	67 18.3	+ 54.1	14.8	68 16.2	+ 54.5	15.4	69 13.9	+ 54.8	16.1	70 11.5	+ 55.1	16.9	71 08.8	+ 55.4	17.7	72 05.8	+ 55.8	18.7	73 02.4	+ 56.3	19.7	73 58.7	+ 56.7	20.9	**81**
82	68 12.4	+ 53.7	13.6	69 10.7	+ 53.9	14.3	70 08.7	+ 54.3	14.9	71 06.6	+ 54.6	15.7	72 04.2	+ 55.0	16.5	73 01.6	+ 55.4	17.5	73 58.7	+ 55.8	18.5	74 55.4	+ 56.3	19.7	**82**
83	69 06.1	+ 53.1	12.4	70 04.6	+ 53.4	13.0	71 03.0	+ 53.7	13.7	72 01.2	+ 54.0	14.4	72 59.2	+ 54.4	15.2	73 57.0	+ 54.8	16.1	74 54.5	+ 55.2	17.1	75 51.7	+ 55.7	18.3	**83**
84	69 59.2	+ 52.4	11.1	70 58.0	+ 52.7	11.6	71 56.7	+ 53.0	12.3	72 55.2	+ 53.4	12.9	73 53.6	+ 53.8	13.7	74 51.8	+ 54.1	14.6	75 49.7	+ 54.6	15.6	76 47.4	+ 55.0	16.7	**84**
85	70 51.6	+ 51.7	9.6	71 50.7	+ 52.0	10.1	72 49.7	+ 52.3	10.7	73 48.6	+ 52.6	11.3	74 47.4	+ 52.9	12.1	75 45.9	+ 53.4	12.9	76 44.3	+ 53.8	13.8	77 42.4	+ 54.3	14.9	**85**
86	71 43.3	+ 50.8	8.0	72 42.7	+ 51.0	8.5	73 42.0	+ 51.3	9.0	74 41.2	+ 51.6	9.6	75 40.3	+ 51.9	10.2	76 39.3	+ 52.3	11.0	77 38.1	+ 52.7	11.8	78 36.7	+ 53.2	12.8	**86**
87	72 34.1	+ 49.8	6.3	73 33.7	+ 50.1	6.7	74 33.3	+ 50.2	7.1	75 32.8	+ 50.5	7.6	76 32.2	+ 50.8	8.1	77 31.6	+ 51.1	8.8	78 30.8	+ 51.5	9.5	79 29.9	+ 51.9	10.4	**87**
88	73 23.9	+ 48.7	4.4	74 23.8	+ 48.8	4.7	75 23.5	+ 49.0	5.0	76 23.3	+ 49.2	5.4	77 23.0	+ 49.4	5.8	78 22.7	+ 49.6	6.3	79 22.3	+ 49.9	6.8	80 21.8	+ 50.2	7.5	**88**
89	74 12.6	+ 47.4	2.3	75 12.6	+ 47.4	2.5	76 12.5	+ 47.5	2.6	77 12.5	+ 47.5	2.8	78 12.4	+ 47.6	3.1	79 12.3	*+ 47.7* •	3.4	80 12.2	*+ 47.8* •	3.7	81 12.0	*+ 48.0* •	4.1	**89**
90	75 00.0	+ 45.8	0.0	76 00.0	+ 45.7	0.0	77 00.0	*+ 45.7* •	0.0	78 00.0	*+ 45.6* •	0.0	79 00.0	*+ 45.5* •	0.0	80 00.0	*+ 45.4* •	0.0	81 00.0	*+ 45.2* •	0.0	82 00.0	*+ 45.0* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 141°, 219°

40°, 320° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°		
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	11 26.1	+59.2	139.0	10 40.8	+59.2	139.1	9 55.4	+59.3	139.3	9 09.9	+59.4	139.4
1	12 25.3	+59.1	138.8	11 40.0	+59.3	139.0	10 54.7	+59.4	139.1	10 09.3	+59.5	139.2
2	13 24.4	+59.1	138.7	12 39.3	+59.2	138.8	11 54.1	+59.3	139.0	11 08.8	+59.4	139.1
3	14 23.5	+59.1	138.5	13 38.5	+59.2	138.7	12 53.4	+59.3	138.8	12 08.2	+59.4	139.0
4	15 22.6	+59.1	138.3	14 37.7	+59.2	138.5	13 52.7	+59.4	138.7	13 07.6	+59.5	138.8
5	16 21.7	+59.1	138.1	15 36.9	+59.3	138.3	14 52.1	+59.3	138.5	14 07.1	+59.4	138.7
6	17 20.8	+59.1	138.0	16 36.2	+59.2	138.2	15 51.4	+59.3	138.4	15 06.5	+59.4	138.5
7	18 19.9	+59.0	137.8	17 35.4	+59.1	138.0	16 50.7	+59.3	138.2	16 05.9	+59.4	138.4
8	19 18.9	+59.1	137.6	18 34.5	+59.2	137.8	17 50.0	+59.3	138.0	17 05.3	+59.4	138.2
9	20 18.0	+59.0	137.4	19 33.7	+59.2	137.6	18 49.3	+59.3	137.9	18 04.7	+59.4	138.1
10	21 17.0	+59.1	137.2	20 32.9	+59.2	137.5	19 48.6	+59.3	137.7	19 04.1	+59.4	138.0
11	22 16.1	+59.0	137.0	21 32.1	+59.1	137.3	20 47.9	+59.3	137.5	20 03.5	+59.4	137.8
12	23 15.1	+59.0	136.8	22 31.2	+59.1	137.1	21 47.2	+59.2	137.4	21 02.9	+59.4	137.6
13	24 14.1	+59.0	136.6	23 30.3	+59.2	136.9	22 46.4	+59.3	137.2	22 02.3	+59.4	137.5
14	25 13.1	+58.9	136.4	24 29.5	+59.1	136.7	23 45.7	+59.2	137.0	23 01.7	+59.3	137.3
15	26 12.0	+59.0	136.2	25 28.6	+59.1	136.5	24 44.9	+59.2	136.9	24 01.0	+59.4	137.2
16	27 11.0	+58.9	136.0	26 27.7	+59.1	136.4	25 44.1	+59.3	136.7	25 00.4	+59.3	137.0
17	28 09.9	+58.9	135.8	27 26.8	+59.0	136.2	26 43.4	+59.2	136.5	25 59.7	+59.3	136.9
18	29 08.8	+58.9	135.6	28 25.8	+59.1	136.0	27 42.6	+59.1	136.3	26 59.0	+59.3	136.7
19	30 07.7	+58.9	135.4	29 24.9	+59.0	135.8	28 41.7	+59.2	136.1	27 58.3	+59.3	136.5
20	31 06.6	+58.8	135.1	30 23.9	+59.0	135.5	29 40.9	+59.2	136.0	28 57.6	+59.3	136.3
21	32 05.4	+58.8	134.9	31 22.9	+59.0	135.3	30 40.1	+59.1	135.8	29 56.9	+59.3	136.2
22	33 04.2	+58.8	134.7	32 21.9	+58.9	135.1	31 39.2	+59.1	135.6	30 56.2	+59.3	136.0
23	34 03.0	+58.8	134.4	33 20.8	+59.0	134.9	32 38.3	+59.1	135.4	31 55.5	+59.2	135.8
24	35 01.8	+58.7	134.2	34 19.8	+58.9	134.7	33 37.4	+59.1	135.2	32 54.7	+59.2	135.6
25	36 00.5	+58.7	133.9	35 18.7	+58.9	134.4	34 36.5	+59.1	134.9	33 53.9	+59.2	135.4
26	36 59.2	+58.7	133.7	36 17.6	+58.8	134.2	35 35.6	+59.0	134.7	34 53.1	+59.2	135.2
27	37 57.9	+58.6	133.4	37 16.4	+58.9	134.0	36 34.6	+59.0	134.5	35 52.3	+59.2	135.0
28	38 56.5	+58.6	133.1	38 15.3	+58.8	133.7	37 33.6	+59.0	134.3	36 51.5	+59.1	134.8
29	39 55.1	+58.6	132.9	39 14.1	+58.7	133.5	38 32.6	+58.9	134.0	37 50.6	+59.2	134.6
30	40 53.7	+58.5	132.6	40 12.8	+58.8	133.2	39 31.5	+58.9	133.8	38 49.8	+59.1	134.4
31	41 52.2	+58.4	132.3	41 11.6	+58.6	132.9	40 30.4	+58.9	133.6	39 48.9	+59.0	134.2
32	42 50.6	+58.4	132.0	42 10.2	+58.7	132.7	41 29.3	+58.9	133.3	40 47.9	+59.1	133.9
33	43 49.0	+58.4	131.7	43 08.9	+58.6	132.4	42 28.2	+58.8	133.0	41 47.0	+59.0	133.7
34	44 47.4	+58.3	131.3	44 07.5	+58.5	132.1	43 27.0	+58.8	132.8	42 46.0	+59.0	133.5
35	45 45.7	+58.2	131.0	45 06.0	+58.5	131.8	44 25.8	+58.7	132.5	43 45.0	+58.9	133.2
36	46 43.9	+58.2	130.6	46 04.5	+58.5	131.4	45 24.5	+58.7	132.2	44 43.9	+58.9	132.9
37	47 42.1	+58.1	130.3	47 03.0	+58.4	131.1	46 23.2	+58.7	131.9	45 42.8	+58.9	132.7
38	48 40.2	+58.0	129.9	48 01.4	+58.3	130.8	47 21.9	+58.5	131.6	46 41.7	+58.8	132.4
39	49 38.2	+58.0	129.5	48 59.7	+58.2	130.4	48 20.4	+58.6	131.3	47 40.5	+58.8	132.1
40	50 36.2	+57.8	129.1	49 57.9	+58.2	130.0	49 19.0	+58.5	130.9	48 39.3	+58.8	131.8
41	51 34.0	+57.8	128.7	50 56.1	+58.1	129.7	50 17.5	+58.4	130.6	49 38.1	+58.6	131.5
42	52 31.8	+57.7	128.3	51 54.2	+58.0	129.3	51 15.9	+58.3	130.2	50 36.7	+58.7	131.2
43	53 29.5	+57.5	127.8	52 52.2	+58.0	128.8	52 14.2	+58.3	129.9	51 35.4	+58.5	130.8
44	54 27.0	+57.4	127.3	53 50.2	+57.8	128.4	53 12.5	+58.2	129.5	52 33.9	+58.5	130.5
45	55 24.4	+57.3	126.8	54 48.0	+57.7	128.0	54 10.7	+58.0	129.1	53 32.4	+58.4	130.1
46	56 21.7	+57.2	126.3	55 45.7	+57.6	127.5	55 08.7	+58.0	128.6	54 30.8	+58.4	129.7
47	57 18.9	+57.0	125.7	56 43.3	+57.5	127.0	56 06.7	+57.9	128.2	55 29.2	+58.3	129.3
48	58 15.9	+56.8	125.1	57 40.8	+57.3	126.4	57 04.6	+57.8	127.7	56 27.5	+58.1	128.9
49	59 12.7	+56.7	124.5	58 38.1	+57.2	125.9	58 02.4	+57.7	127.2	57 25.6	+58.1	128.4
50	60 09.4	+56.4	123.9	59 35.3	+57.0	125.3	59 00.1	+57.5	126.7	58 23.7	+58.0	128.0
51	61 05.8	+56.2	123.2	60 32.3	+56.9	124.7	59 57.6	+57.3	126.1	59 21.7	+57.8	127.5
52	62 02.0	+56.0	122.4	61 29.2	+56.6	124.0	60 54.9	+57.2	125.5	60 19.5	+57.7	126.9
53	62 58.0	+55.7	121.7	62 25.8	+56.4	123.3	61 52.1	+57.1	124.9	61 17.2	+57.6	126.4
54	63 53.7	+55.4	120.8	63 22.2	+56.1	122.6	62 49.2	+56.8	124.2	62 14.8	+57.3	125.8
55	64 49.1	+55.0	119.9	64 18.3	+55.9	121.8	63 46.0	+56.5	123.5	63 12.1	+57.3	125.1
56	65 44.1	+54.7	119.0	65 14.2	+55.5	120.9	64 42.5	+56.4	122.7	64 09.4	+57.0	124.5
57	66 38.8	+54.2	118.0	66 09.7	+55.2	120.0	65 38.9	+56.0	121.9	65 06.4	+56.7	123.7
58	67 33.0	+53.8	116.9	67 04.9	+54.8	119.0	66 34.9	+55.7	121.0	66 03.1	+56.6	122.9
59	68 26.8	+53.2	115.7	67 59.7	+54.4	117.9	67 30.6	+55.4	120.1	66 59.7	+56.2	122.1
60	69 20.0	+52.6	114.4	68 54.1	+53.8	116.8	68 26.0	+54.9	119.0	67 55.9	+55.9	121.2
61	70 12.6	+51.9	113.0	69 47.9	+53.3	115.5	69 20.9	+54.5	117.9	68 51.8	+55.5	120.2
62	71 04.5	+51.1	111.5	70 41.2	+52.6	114.2	70 15.4	+54.0	116.7	69 47.3	+55.1	119.1
63	71 55.6	+50.1	109.8	71 33.8	+51.9	112.7	71 09.4	+53.3	115.4	70 42.4	+54.7	118.0
64	72 45.7	+49.1	108.0	72 25.7	+50.9	111.0	72 02.7	+52.6	113.9	71 37.1	+54.0	116.7
65	73 34.8	+47.9	106.0	73 16.6	+50.0	109.3	72 55.3	+51.8	112.3	72 31.1	+53.4	115.3
66	74 22.7	+46.4	103.9	74 06.6	+48.7	107.3	73 47.1	+50.8	110.6	73 24.5	+52.6	113.7
67	75 09.1	+44.8	101.5	74 55.3	+47.4	105.1	74 37.9	+49.7	108.6	74 17.1	+51.7	112.0
68	75 53.9	*+42.8* •	98.8	75 42.7	+45.7	102.7	75 27.6	+48.3	106.4	75 08.8	+50.6	110.1
69	76 36.7	*+40.5* •	95.8	76 28.4	*+43.8* •	100.0	76 15.9	+46.8	104.0	75 59.4	+49.4	107.9
70	77 17.2	*+37.9* •	92.6	77 12.2	*+41.5* •	97.0	77 02.7	*+44.8* •	101.3	76 48.8	+47.8	105.5
71	77 55.1	*+34.8* •	89.0	77 53.7	*+38.9* •	93.6	77 47.5	*+42.6* •	98.2	77 36.6	*+46.0* •	102.8
72	78 29.9	*+31.2* •	85.0	78 32.6	*+35.6* •	89.9	78 30.1	*+39.9* •	94.8	78 22.6	*+43.7* •	99.7
73	79 01.1	*+27.1* •	80.6	79 08.2	*+32.0* •	85.7	79 10.0	*+36.6* •	90.9	79 06.3	*+40.9* •	96.1
74	79 28.2	*+22.4* •	75.8	79 40.2	*+27.6* •	81.1	79 46.6	*+32.7* •	86.6	79 47.2	*+37.7* •	92.2
75	79 50.6	*+17.2* •	70.6	80 07.8	*+22.7* •	76.1	80 19.3	*+28.3* •	81.8	80 24.9	*+33.7* •	87.6
76	80 07.8	*+11.5* •	65.1	80 30.5	*+17.1* •	70.5	80 47.6	*+22.9* •	76.4	80 58.6	*+28.8* •	82.5
77	80 19.3	*+5.6* •	59.3	80 47.6	*+11.0* •	64.6	81 10.5	*+16.9* •	70.5	81 27.4	*+23.3* •	76.8
78	80 24.9	*–0.6* •	53.4	80 58.6	*+4.5* •	58.4	81 27.4	*+10.4* •	64.1	81 50.7	*+16.7* •	70.4
79	80 24.3	*–6.8* •	47.4	81 03.1	*–2.1* •	52.1	81 37.8	*+3.4* •	57.4	82 07.4	*+9.6* •	63.5
80	80 17.5	*–12.7* •	41.4	81 01.0	*–8.6* •	45.6	81 41.2	*–3.8* •	50.5	82 17.0	*+2.0* •	56.2
81	80 04.8	*–18.3* •	35.7	80 52.4	*–14.9* •	39.3	81 37.4	*–10.8* •	43.6	82 19.0	*–5.8* •	48.8
82	79 46.5	*–23.4* •	30.3	80 37.5	*–20.6* •	33.3	81 26.6	*–17.3* •	37.0	82 13.2	*–13.2* •	41.4
83	79 23.1	*–27.9* •	25.2	80 16.9	*–25.9* •	27.6	81 09.3	*–23.3* •	30.6	82 00.0	*–20.1* •	34.3
84	78 55.2	*–32.0* •	20.5	79 51.0	*–30.4* •	22.4	80 46.0	*–28.5* •	24.8	81 39.9	*–26.1* •	27.6
85	78 23.2	*–35.4* •	16.2	79 20.6	*–34.3* •	17.6	80 17.5	*–33.0* •	19.4	81 13.8	*–31.4* •	21.6
86	77 47.8	*–38.4* •	12.2	78 46.3	*–37.7* •	13.3	79 44.5	*–36.8* •	14.6	80 42.4	*–35.7* •	16.1
87	77 09.4	*–41.1* •	8.7	78 08.6	*–40.6* •	9.4	79 07.7	*–40.0* •	10.3	80 06.7	*–39.4* •	11.3
88	76 28.3	*–43.2* •	5.5	77 28.0	*–43.0* •	5.9	78 27.7	*–42.7* •	6.4	79 27.3	*–42.4* •	7.0
89	75 45.1	–45.1	2.6	76 45.0	–45.0	2.8	77 45.0	*–45.0* •	3.0	78 44.9	*–44.9* •	3.3
90	75 00.0	–46.7	0.0	76 00.0	–46.8	0.0	77 00.0	–46.8	0.0	78 00.0	–46.9	0.0
	75°			76°			77°			78°		

79°			80°			81°			82°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
8 24.3	+59.5	139.5	7 38.7	+59.6	139.6	6 53.0	+59.6	139.7	6 07.2	+59.8	139.7	**0**
9 23.8	+59.6	139.4	8 38.3	+59.6	139.5	7 52.6	+59.7	139.5	7 07.0	+59.7	139.6	**1**
10 23.4	+59.5	139.2	9 37.9	+59.6	139.3	8 52.3	+59.7	139.4	8 06.7	+59.8	139.5	**2**
11 22.9	+59.5	139.1	10 37.5	+59.6	139.2	9 52.0	+59.7	139.3	9 06.5	+59.7	139.5	**3**
12 22.4	+59.5	139.0	11 37.1	+59.6	139.1	10 51.7	+59.7	139.2	10 06.2	+59.8	139.4	**4**
13 21.9	+59.6	138.8	12 36.7	+59.6	139.0	11 51.4	+59.7	139.1	11 06.0	+59.7	139.3	**5**
14 21.5	+59.5	138.7	13 36.3	+59.6	138.9	12 51.1	+59.7	139.0	12 05.7	+59.8	139.2	**6**
15 21.0	+59.5	138.6	14 35.9	+59.6	138.8	13 50.8	+59.6	138.9	13 05.5	+59.7	139.1	**7**
16 20.5	+59.5	138.4	15 35.5	+59.6	138.6	14 50.4	+59.7	138.8	14 05.2	+59.8	139.0	**8**
17 20.0	+59.5	138.3	16 35.1	+59.6	138.5	15 50.1	+59.7	138.7	15 05.0	+59.7	138.9	**9**
18 19.5	+59.5	138.2	17 34.7	+59.6	138.4	16 49.8	+59.6	138.6	16 04.7	+59.7	138.8	**10**
19 19.0	+59.5	138.0	18 34.3	+59.6	138.3	17 49.4	+59.7	138.5	17 04.4	+59.8	138.7	**11**
20 18.5	+59.5	137.9	19 33.9	+59.5	138.1	18 49.1	+59.7	138.4	18 04.2	+59.7	138.6	**12**
21 18.0	+59.4	137.8	20 33.4	+59.6	138.0	19 48.8	+59.6	138.3	19 03.9	+59.7	138.5	**13**
22 17.4	+59.5	137.6	21 33.0	+59.6	137.9	20 48.4	+59.7	138.1	20 03.6	+59.8	138.4	**14**
23 16.9	+59.5	137.5	22 32.6	+59.5	137.8	21 48.1	+59.6	138.0	21 03.4	+59.7	138.3	**15**
24 16.4	+59.4	137.3	23 32.1	+59.6	137.6	22 47.7	+59.6	137.9	22 03.1	+59.7	138.2	**16**
25 15.8	+59.4	137.2	24 31.7	+59.5	137.5	23 47.3	+59.7	137.8	23 02.8	+59.7	138.1	**17**
26 15.2	+59.5	137.0	25 31.2	+59.6	137.4	24 47.0	+59.6	137.7	24 02.5	+59.7	138.0	**18**
27 14.7	+59.4	136.9	26 30.8	+59.5	137.2	25 46.6	+59.6	137.6	25 02.2	+59.7	137.9	**19**
28 14.1	+59.4	136.7	27 30.3	+59.5	137.1	26 46.2	+59.6	137.4	26 01.9	+59.7	137.8	**20**
29 13.5	+59.4	136.6	28 29.8	+59.5	136.9	27 45.8	+59.7	137.3	27 01.6	+59.7	137.6	**21**
30 12.9	+59.4	136.4	29 29.3	+59.5	136.8	28 45.5	+59.6	137.2	28 01.3	+59.7	137.5	**22**
31 12.3	+59.4	136.2	30 28.8	+59.5	136.6	29 45.1	+59.5	137.0	29 01.0	+59.7	137.4	**23**
32 11.7	+59.3	136.1	31 28.3	+59.5	136.5	30 44.6	+59.6	136.9	30 00.7	+59.7	137.3	**24**
33 11.0	+59.4	135.9	32 27.8	+59.5	136.3	31 44.2	+59.6	136.8	31 00.4	+59.6	137.2	**25**
34 10.4	+59.3	135.7	33 27.3	+59.4	136.2	32 43.8	+59.6	136.6	32 00.0	+59.7	137.1	**26**
35 09.7	+59.3	135.5	34 26.7	+59.5	136.0	33 43.4	+59.5	136.5	32 59.7	+59.7	136.9	**27**
36 09.0	+59.3	135.3	35 26.2	+59.4	135.8	34 42.9	+59.6	136.3	33 59.4	+59.6	136.8	**28**
37 08.3	+59.3	135.2	36 25.6	+59.4	135.7	35 42.5	+59.5	136.2	34 59.0	+59.6	136.7	**29**
38 07.6	+59.2	135.0	37 25.0	+59.4	135.5	36 42.0	+59.5	136.0	35 58.6	+59.7	136.5	**30**
39 06.8	+59.3	134.8	38 24.4	+59.4	135.3	37 41.5	+59.5	135.9	36 58.3	+59.6	136.4	**31**
40 06.1	+59.2	134.5	39 23.8	+59.3	135.1	38 41.0	+59.5	135.7	37 57.9	+59.6	136.3	**32**
41 05.3	+59.2	134.3	40 23.1	+59.4	134.9	39 40.5	+59.5	135.5	38 57.5	+59.6	136.1	**33**
42 04.5	+59.1	134.1	41 22.5	+59.3	134.8	40 40.0	+59.5	135.4	39 57.1	+59.6	136.0	**34**
43 03.6	+59.2	133.9	42 21.8	+59.3	134.6	41 39.5	+59.4	135.2	40 56.7	+59.5	135.8	**35**
44 02.8	+59.1	133.7	43 21.1	+59.3	134.3	42 38.9	+59.4	135.0	41 56.2	+59.6	135.6	**36**
45 01.9	+59.1	133.4	44 20.4	+59.2	134.1	43 38.3	+59.4	134.8	42 55.8	+59.5	135.5	**37**
46 01.0	+59.0	133.2	45 19.6	+59.2	133.9	44 37.7	+59.4	134.6	43 55.3	+59.6	135.3	**38**
47 00.0	+59.0	132.9	46 18.8	+59.2	133.7	45 37.1	+59.4	134.4	44 54.9	+59.5	135.1	**39**
47 59.0	+59.0	132.6	47 18.0	+59.2	133.4	46 36.5	+59.3	134.2	45 54.4	+59.5	135.0	**40**
48 58.0	+58.9	132.4	48 17.2	+59.1	133.2	47 35.8	+59.4	134.0	46 53.9	+59.4	134.8	**41**
49 56.9	+58.9	132.1	49 16.3	+59.1	132.9	48 35.2	+59.2	133.8	47 53.3	+59.5	134.6	**42**
50 55.8	+58.8	131.8	50 15.4	+59.1	132.7	49 34.4	+59.3	133.5	48 52.8	+59.4	134.4	**43**
51 54.6	+58.8	131.5	51 14.5	+59.0	132.4	50 33.7	+59.2	133.3	49 52.2	+59.4	134.2	**44**
52 53.4	+58.7	131.1	52 13.5	+59.0	132.1	51 32.9	+59.2	133.0	50 51.6	+59.4	133.9	**45**
53 52.1	+58.6	130.8	53 12.5	+58.9	131.8	52 32.1	+59.2	132.8	51 51.0	+59.4	133.7	**46**
54 50.7	+58.6	130.4	54 11.4	+58.9	131.5	53 31.3	+59.1	132.5	52 50.4	+59.3	133.5	**47**
55 49.3	+58.5	130.0	55 10.3	+58.8	131.1	54 30.4	+59.1	132.2	53 49.7	+59.3	133.2	**48**
56 47.8	+58.5	129.6	56 09.1	+58.7	130.8	55 29.5	+59.0	131.9	54 49.0	+59.2	133.0	**49**
57 46.3	+58.3	129.2	57 07.8	+58.7	130.4	56 28.5	+59.0	131.6	55 48.2	+59.2	132.7	**50**
58 44.6	+58.3	128.8	58 06.5	+58.6	130.0	57 27.5	+58.9	131.2	56 47.4	+59.2	132.4	**51**
59 42.9	+58.1	128.3	59 05.1	+58.6	129.6	58 26.4	+58.8	130.9	57 46.6	+59.1	132.1	**52**
60 41.0	+58.0	127.8	60 03.7	+58.4	129.2	59 25.2	+58.8	130.5	58 45.7	+59.1	131.8	**53**
61 39.0	+57.9	127.3	61 02.1	+58.3	128.7	60 24.0	+58.7	130.1	59 44.8	+59.0	131.4	**54**
62 36.9	+57.8	126.7	62 00.4	+58.2	128.2	61 22.7	+58.6	129.7	60 43.8	+59.0	131.1	**55**
63 34.7	+57.6	126.1	62 58.6	+58.1	127.7	62 21.3	+58.5	129.2	61 42.8	+58.9	130.7	**56**
64 32.3	+57.4	125.5	63 56.7	+58.0	127.1	63 19.8	+58.5	128.7	62 41.7	+58.8	130.3	**57**
65 29.7	+57.2	124.8	64 54.7	+57.8	126.6	64 18.3	+58.3	128.2	63 40.5	+58.7	129.8	**58**
66 26.9	+57.0	124.1	65 52.5	+57.6	125.9	65 16.6	+58.1	127.7	64 39.2	+58.6	129.3	**59**
67 23.9	+56.7	123.3	66 50.1	+57.5	125.2	66 14.7	+58.1	127.1	65 37.8	+58.5	128.8	**60**
68 20.6	+56.5	122.4	67 47.6	+57.2	124.5	67 12.8	+57.8	126.4	66 36.3	+58.4	128.3	**61**
69 17.1	+56.1	121.4	68 44.8	+56.9	123.6	68 10.6	+57.7	125.7	67 34.7	+58.3	127.7	**62**
70 13.2	+55.7	120.4	69 41.7	+56.7	122.8	69 08.3	+57.4	125.0	68 33.0	+58.1	127.1	**63**
71 08.9	+55.3	119.3	70 38.4	+56.3	121.8	70 05.7	+57.2	124.1	69 31.1	+57.9	126.4	**64**
72 04.2	+54.7	118.1	71 34.7	+55.9	120.7	71 02.9	+56.9	123.2	70 29.0	+57.7	125.6	**65**
72 58.9	+54.2	116.7	72 30.6	+55.5	119.5	71 59.8	+56.6	122.2	71 26.7	+57.4	124.8	**66**
73 53.1	+53.4	115.2	73 26.1	+54.9	118.2	72 56.4	+56.1	121.1	72 24.1	+57.2	123.8	**67**
74 46.5	+52.6	113.5	74 21.0	+54.3	116.8	73 52.5	+55.7	119.9	73 21.3	+56.8	122.8	**68**
75 39.1	+51.6	111.6	75 15.3	+53.5	115.2	74 48.2	+55.1	118.5	74 18.1	+56.4	121.6	**69**
76 30.7	+50.4	109.5	76 08.8	+52.6	113.3	75 43.3	+54.4	117.0	75 14.5	+55.9	120.3	**70**
77 21.1	+49.0	107.1	77 01.4	+51.5	111.3	76 37.7	+53.6	115.2	76 10.4	+55.4	118.9	**71**
78 10.1	*+47.1* •	104.4	77 52.9	+50.0	108.9	77 31.3	+52.6	113.2	77 05.8	+54.5	117.2	**72**
78 57.2	*+44.9* •	101.3	78 42.9	+48.4	106.2	78 23.9	+51.2	110.9	78 00.3	+53.7	115.3	**73**
79 42.1	*+42.2* •	97.7	79 31.3	*+46.2* •	103.0	79 15.1	+49.7	108.2	78 54.0	+52.5	113.0	**74**
80 24.3	*+38.8* •	93.5	80 17.5	*+43.5* •	99.4	80 04.8	*+47.6* •	105.0	79 46.5	+51.0	110.4	**75**
81 03.1	*+34.7* •	88.8	81 01.0	*+40.2* •	95.2	80 52.4	*+45.0* •	101.4	80 37.5	*+49.1* •	107.3	**76**
81 37.8	*+29.6* •	83.4	81 41.2	*+35.8* •	90.2	81 37.4	*+41.6* •	97.0	81 26.6	*+46.6* •	103.6	**77**
82 07.4	*+23.6* •	77.2	82 17.0	*+30.5* •	84.4	82 19.0	*+37.1* •	91.8	82 13.2	*+43.2* •	99.2	**78**
82 31.0	*+16.5* •	70.3	82 47.5	*+23.9* •	77.8	82 56.1	*+31.5* •	85.7	82 56.4	*+38.6* •	93.8	**79**
82 47.5	*+8.6* •	62.8	83 11.4	*+16.2* •	70.3	83 27.6	*+24.4* •	78.5	83 35.0	*+32.7* •	87.3	**80**
82 56.1	*+0.3* •	54.8	83 27.6	*+7.4* •	62.0	83 52.0	*+15.7* •	70.2	84 07.7	*+24.9* •	79.4	**81**
82 56.4	*–8.2* •	46.7	83 35.0	*–1.7* •	53.2	84 07.7	*+6.0* •	61.0	84 32.6	*+15.2* •	70.2	**82**
82 48.2	*–16.0* •	38.7	83 33.3	*–11.0* •	44.2	84 13.7	*–4.3* •	51.2	84 47.8	*+4.1* •	59.7	**83**
82 32.2	*–23.1* •	31.2	83 22.3	*–19.2* •	35.6	84 09.4	*–14.2* •	41.3	84 51.9	*–7.4* •	48.7	**84**
82 09.1	*–29.3* •	24.2	83 03.1	*–26.7* •	27.6	83 55.2	*–23.1* •	31.9	84 44.5	*–18.2* •	37.7	**85**
81 39.8	*–34.4* •	18.0	82 36.4	*–32.6* •	20.4	83 32.1	*–30.4* •	23.5	84 26.3	*–27.3* •	27.6	**86**
81 05.4	*–38.6* •	12.5	82 03.8	*–37.6* •	14.1	83 01.7	*–36.3* •	16.1	83 59.0	*–34.6* •	18.7	**87**
80 26.8	*–42.0* •	7.8	81 26.2	*–41.6* •	8.7	82 25.4	*–40.9* •	9.8	83 24.4	*–40.1* •	11.3	**88**
79 44.8	*–44.8* •	3.6	80 44.6	*–44.6* •	4.0	81 44.5	*–44.5* •	4.5	82 44.3	*–44.3* •	5.1	**89**
79 00.0	*–47.0* •	0.0	80 00.0	*–47.1* •	0.0	81 00.0	*–47.2* •	0.0	82 00.0	*–47.4* •	0.0	**90**
79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 40°, 320°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 26.1	– 59.1	139.0	10 40.8	– 59.2	139.1	9 55.4	– 59.4	139.3	9 09.9	– 59.5	139.4	8 24.3	– 59.5	139.5	7 38.7	– 59.7	139.6	6 53.0	– 59.7	139.7	6 07.2	– 59.8	139.7	**0**
1	10 27.0	– 59.1	139.2	9 41.6	– 59.3	139.3	8 56.0	– 59.3	139.4	8 10.4	– 59.4	139.5	7 24.8	– 59.6	139.6	6 39.0	– 59.6	139.7	5 53.3	– 59.7	139.8	5 07.4	– 59.7	139.8	**1**
2	9 27.9	– 59.2	139.4	8 42.3	– 59.3	139.5	7 56.7	– 59.4	139.6	7 11.0	– 59.5	139.6	6 25.2	– 59.5	139.7	5 39.4	– 59.6	139.8	4 53.6	– 59.7	139.9	4 07.7	– 59.8	139.9	**2**
3	8 28.7	– 59.1	139.5	7 43.0	– 59.2	139.6	6 57.3	– 59.4	139.7	6 11.5	– 59.4	139.8	5 25.7	– 59.6	139.8	4 39.8	– 59.6	139.9	3 53.9	– 59.7	140.0	3 07.9	– 59.7	140.0	**3**
4	7 29.6	– 59.2	139.7	6 43.8	– 59.3	139.8	5 57.9	– 59.3	139.9	5 12.1	– 59.5	139.9	4 26.1	– 59.5	140.0	3 40.2	– 59.7	140.0	2 54.2	– 59.7	140.1	2 08.2	– 59.8	140.1	**4**
5	6 30.4	– 59.1	139.9	5 44.5	– 59.2	139.9	4 58.6	– 59.4	140.0	4 12.6	– 59.5	140.1	3 26.6	– 59.6	140.1	2 40.5	– 59.6	140.1	1 54.5	– 59.7	140.2	1 08.4	– 59.7	140.2	**5**
6	5 31.3	– 59.2	140.0	4 45.3	– 59.3	140.1	3 59.2	– 59.4	140.1	3 13.1	– 59.4	140.2	2 27.0	– 59.5	140.2	1 40.9	– 59.6	140.2	0 54.8	– 59.7	140.3	0 08.7	– 59.8	140.3	**6**
7	4 32.1	– 59.1	140.2	3 46.0	– 59.3	140.3	2 59.8	– 59.3	140.3	2 13.7	– 59.5	140.3	1 27.5	– 59.6	140.3	0 41.3	– 59.6	140.4	0 04.9	+ 59.7	39.6	0 51.1	+ 59.8	39.6	**7**
8	3 33.0	– 59.2	140.4	2 46.7	– 59.2	140.4	2 00.5	– 59.4	140.4	1 14.2	– 59.4	140.5	0 27.9	– 59.5	140.5	0 18.3	+ 59.7	39.5	1 04.6	+ 59.7	39.5	1 50.9	+ 59.7	39.6	**8**
9	2 33.8	– 59.2	140.5	1 47.5	– 59.3	140.6	1 01.1	– 59.4	140.6	0 14.8	– 59.5	140.6	0 31.6	+ 59.5	39.4	1 18.0	+ 59.6	39.4	2 04.3	+ 59.7	39.4	2 50.6	+ 59.8	39.5	**9**
10	1 34.6	– 59.1	140.7	0 48.2	– 59.3	140.7	0 01.7	– 59.3	140.7	0 44.7	+ 59.5	39.3	1 31.1	+ 59.6	39.3	2 17.6	+ 59.6	39.3	3 04.0	+ 59.7	39.3	3 50.4	+ 59.7	39.4	**10**
11	0 35.5	– 59.2	140.9	0 11.1	+ 59.3	39.1	0 57.6	+ 59.4	39.1	1 44.2	+ 59.4	39.1	2 30.7	+ 59.5	39.2	3 17.2	+ 59.6	39.2	4 03.7	+ 59.7	39.2	4 50.1	+ 59.8	39.3	**11**
12	0 23.7	+ 59.2	39.0	1 10.4	+ 59.2	39.0	1 57.0	+ 59.4	39.0	2 43.6	+ 59.5	39.0	3 30.2	+ 59.6	39.0	4 16.8	+ 59.6	39.1	5 03.4	+ 59.7	39.1	5 49.9	+ 59.8	39.2	**12**
13	1 22.9	+ 59.1	38.8	2 09.6	+ 59.3	38.8	2 56.4	+ 59.3	38.8	3 43.1	+ 59.4	38.9	4 29.8	+ 59.5	38.9	5 16.4	+ 59.7	39.0	6 03.1	+ 59.7	39.0	6 49.7	+ 59.7	39.1	**13**
14	2 22.0	+ 59.2	38.6	3 08.9	+ 59.3	38.7	3 55.7	+ 59.4	38.7	4 42.5	+ 59.5	38.7	5 29.3	+ 59.6	38.8	6 16.1	+ 59.6	38.9	7 02.8	+ 59.7	38.9	7 49.4	+ 59.8	39.0	**14**
15	3 21.2	+ 59.1	38.5	4 08.2	+ 59.2	38.5	4 55.1	+ 59.4	38.5	5 42.0	+ 59.5	38.6	6 28.9	+ 59.5	38.7	7 15.7	+ 59.6	38.7	8 02.5	+ 59.6	38.8	8 49.2	+ 59.7	38.9	**15**
16	4 20.3	+ 59.2	38.3	5 07.4	+ 59.3	38.3	5 54.5	+ 59.3	38.4	6 41.5	+ 59.4	38.5	7 28.4	+ 59.5	38.5	8 15.3	+ 59.6	38.6	9 02.1	+ 59.7	38.7	9 48.9	+ 59.8	38.8	**16**
17	5 19.5	+ 59.2	38.1	6 06.7	+ 59.2	38.2	6 53.8	+ 59.4	38.3	7 40.9	+ 59.5	38.3	8 27.9	+ 59.6	38.4	9 14.9	+ 59.6	38.5	10 01.8	+ 59.7	38.6	10 48.7	+ 59.7	38.7	**17**
18	6 18.7	+ 59.1	38.0	7 05.9	+ 59.3	38.0	7 53.2	+ 59.3	38.1	8 40.4	+ 59.4	38.2	9 27.5	+ 59.5	38.3	10 14.5	+ 59.6	38.4	11 01.5	+ 59.7	38.5	11 48.4	+ 59.8	38.6	**18**
19	7 17.8	+ 59.2	37.8	8 05.2	+ 59.3	37.9	8 52.5	+ 59.4	38.0	9 39.8	+ 59.5	38.1	10 27.0	+ 59.5	38.2	11 14.1	+ 59.7	38.3	12 01.2	+ 59.7	38.4	12 48.2	+ 59.7	38.6	**19**
20	8 17.0	+ 59.1	37.6	9 04.5	+ 59.2	37.7	9 51.9	+ 59.3	37.8	10 39.3	+ 59.4	37.9	11 26.5	+ 59.6	38.0	12 13.8	+ 59.6	38.2	13 00.9	+ 59.7	38.3	13 47.9	+ 59.8	38.5	**20**
21	9 16.1	+ 59.1	37.4	10 03.7	+ 59.2	37.6	10 51.2	+ 59.4	37.7	11 38.7	+ 59.4	37.8	12 26.1	+ 59.5	37.9	13 13.4	+ 59.6	38.1	14 00.6	+ 59.6	38.2	14 47.7	+ 59.7	38.4	**21**
22	10 15.2	+ 59.2	37.3	11 02.9	+ 59.3	37.4	11 50.6	+ 59.3	37.5	12 38.1	+ 59.5	37.6	13 25.6	+ 59.5	37.8	14 13.0	+ 59.6	37.9	15 00.2	+ 59.7	38.1	15 47.4	+ 59.7	38.3	**22**
23	11 14.4	+ 59.1	37.1	12 02.2	+ 59.2	37.2	12 49.9	+ 59.4	37.4	13 37.6	+ 59.4	37.5	14 25.1	+ 59.5	37.7	15 12.6	+ 59.6	37.8	15 59.9	+ 59.7	38.0	16 47.1	+ 59.8	38.2	**23**
24	12 13.5	+ 59.1	36.9	13 01.4	+ 59.2	37.1	13 49.3	+ 59.3	37.2	14 37.0	+ 59.4	37.4	15 24.6	+ 59.5	37.5	16 12.2	+ 59.6	37.7	16 59.6	+ 59.6	37.9	17 46.9	+ 59.7	38.1	**24**
25	13 12.6	+ 59.1	36.8	14 00.6	+ 59.3	36.9	14 48.6	+ 59.3	37.1	15 36.4	+ 59.4	37.2	16 24.1	+ 59.5	37.4	17 11.8	+ 59.5	37.6	17 59.2	+ 59.7	37.8	18 46.6	+ 59.7	38.0	**25**
26	14 11.7	+ 59.1	36.6	14 59.9	+ 59.2	36.7	15 47.9	+ 59.3	36.9	16 35.8	+ 59.4	37.1	17 23.6	+ 59.5	37.3	18 11.3	+ 59.6	37.5	18 58.9	+ 59.7	37.7	19 46.3	+ 59.8	37.9	**26**
27	15 10.8	+ 59.1	36.4	15 59.1	+ 59.2	36.6	16 47.2	+ 59.3	36.7	17 35.2	+ 59.4	36.9	18 23.1	+ 59.5	37.1	19 10.9	+ 59.6	37.3	19 58.6	+ 59.6	37.5	20 46.1	+ 59.7	37.8	**27**
28	16 09.9	+ 59.1	36.2	16 58.3	+ 59.2	36.4	17 46.5	+ 59.3	36.6	18 34.6	+ 59.4	36.8	19 22.6	+ 59.5	37.0	20 10.5	+ 59.6	37.2	20 58.2	+ 59.7	37.4	21 45.8	+ 59.7	37.7	**28**
29	17 09.0	+ 59.1	36.0	17 57.5	+ 59.2	36.2	18 45.8	+ 59.3	36.4	19 34.0	+ 59.4	36.6	20 22.1	+ 59.5	36.8	21 10.1	+ 59.5	37.1	21 57.9	+ 59.6	37.3	22 45.5	+ 59.7	37.6	**29**
30	18 08.1	+ 59.1	35.9	18 56.7	+ 59.2	36.1	19 45.1	+ 59.3	36.3	20 33.4	+ 59.4	36.5	21 21.6	+ 59.5	36.7	22 09.6	+ 59.6	36.9	22 57.5	+ 59.6	37.2	23 45.2	+ 59.7	37.5	**30**
31	19 07.2	+ 59.0	35.7	19 55.9	+ 59.1	35.9	20 44.4	+ 59.3	36.1	21 32.8	+ 59.4	36.3	22 21.1	+ 59.4	36.6	23 09.2	+ 59.5	36.8	23 57.1	+ 59.7	37.1	24 44.9	+ 59.7	37.4	**31**
32	20 06.2	+ 59.1	35.5	20 55.0	+ 59.2	35.7	21 43.7	+ 59.2	35.9	22 32.2	+ 59.4	36.2	23 20.5	+ 59.5	36.4	24 08.7	+ 59.6	36.7	24 56.8	+ 59.6	37.0	25 44.6	+ 59.7	37.2	**32**
33	21 05.3	+ 59.0	35.3	21 54.2	+ 59.1	35.5	22 42.9	+ 59.3	35.8	23 31.6	+ 59.3	36.0	24 20.0	+ 59.5	36.3	25 08.3	+ 59.5	36.5	25 56.4	+ 59.6	36.8	26 44.3	+ 59.7	37.1	**33**
34	22 04.3	+ 59.0	35.1	22 53.3	+ 59.2	35.3	23 42.2	+ 59.2	35.6	24 30.9	+ 59.3	35.9	25 19.5	+ 59.4	36.1	26 07.8	+ 59.6	36.4	26 56.0	+ 59.6	36.7	27 44.0	+ 59.7	37.0	**34**
35	23 03.3	+ 59.0	34.9	23 52.5	+ 59.1	35.2	24 41.4	+ 59.3	35.4	25 30.2	+ 59.4	35.7	26 18.9	+ 59.4	36.0	27 07.4	+ 59.5	36.3	27 55.6	+ 59.6	36.6	28 43.7	+ 59.7	36.9	**35**
36	24 02.3	+ 59.0	34.7	24 51.6	+ 59.1	35.0	25 40.7	+ 59.2	35.2	26 29.6	+ 59.3	35.5	27 18.3	+ 59.4	35.8	28 06.9	+ 59.5	36.1	28 55.2	+ 59.6	36.4	29 43.4	+ 59.7	36.8	**36**
37	25 01.3	+ 59.0	34.5	25 50.7	+ 59.1	34.8	26 39.9	+ 59.2	35.1	27 28.9	+ 59.3	35.4	28 17.7	+ 59.5	35.7	29 06.4	+ 59.5	36.0	29 54.8	+ 59.6	36.3	30 43.1	+ 59.7	36.7	**37**
38	26 00.3	+ 58.9	34.3	26 49.8	+ 59.0	34.6	27 39.1	+ 59.2	34.9	28 28.2	+ 59.3	35.2	29 17.2	+ 59.4	35.5	30 05.9	+ 59.5	35.8	30 54.4	+ 59.6	36.2	31 42.8	+ 59.6	36.5	**38**
39	26 59.2	+ 59.0	34.1	27 48.8	+ 59.1	34.4	28 38.3	+ 59.1	34.7	29 27.5	+ 59.3	35.0	30 16.6	+ 59.3	35.3	31 05.4	+ 59.5	35.7	31 54.0	+ 59.6	36.0	32 42.4	+ 59.7	36.4	**39**
40	27 58.2	+ 58.9	33.9	28 47.9	+ 59.0	34.2	29 37.4	+ 59.2	34.5	30 26.8	+ 59.3	34.8	31 15.9	+ 59.4	35.2	32 04.9	+ 59.4	35.5	32 53.6	+ 59.6	35.9	33 42.1	+ 59.6	36.3	**40**
41	28 57.1	+ 58.9	33.7	29 46.9	+ 59.1	34.0	30 36.6	+ 59.1	34.3	31 26.1	+ 59.2	34.6	32 15.3	+ 59.4	35.0	33 04.3	+ 59.5	35.4	33 53.2	+ 59.5	35.8	34 41.7	+ 59.7	36.2	**41**
42	29 56.0	+ 58.9	33.5	30 46.0	+ 59.0	33.8	31 35.7	+ 59.2	34.1	32 25.3	+ 59.2	34.5	33 14.7	+ 59.3	34.8	34 03.8	+ 59.5	35.2	34 52.7	+ 59.5	35.6	35 41.4	+ 59.6	36.0	**42**
43	30 54.9	+ 58.8	33.2	31 45.0	+ 58.9	33.6	32 34.9	+ 59.1	33.9	33 24.5	+ 59.3	34.3	34 14.0	+ 59.3	34.7	35 03.3	+ 59.4	35.0	35 52.2	+ 59.6	35.5	36 41.0	+ 59.6	35.9	**43**
44	31 53.7	+ 58.8	33.0	32 43.9	+ 59.0	33.3	33 34.0	+ 59.0	33.7	34 23.8	+ 59.2	34.1	35 13.3	+ 59.4	34.5	36 02.7	+ 59.4	34.9	36 51.8	+ 59.5	35.3	37 40.6	+ 59.6	35.7	**44**
45	32 52.5	+ 58.8	32.8	33 42.9	+ 58.9	33.1	34 33.0	+ 59.1	33.5	35 23.0	+ 59.1	33.9	36 12.7	+ 59.2	34.3	37 02.1	+ 59.4	34.7	37 51.3	+ 59.5	35.1	38 40.2	+ 59.6	35.6	**45**
46	33 51.3	+ 58.8	32.5	34 41.8	+ 58.9	32.9	35 32.1	+ 59.0	33.3	36 22.1	+ 59.2	33.7	37 11.9	+ 59.3	34.1	38 01.5	+ 59.4	34.5	38 50.8	+ 59.5	35.0	39 39.8	+ 59.6	35.5	**46**
47	34 50.1	+ 58.7	32.3	35 40.7	+ 58.9	32.7	36 31.1	+ 59.0	33.1	37 21.3	+ 59.1	33.5	38 11.2	+ 59.3	33.9	39 00.9	+ 59.4	34.3	39 50.3	+ 59.5	34.8	40 39.4	+ 59.6	35.3	**47**
48	35 48.8	+ 58.7	32.0	36 39.6	+ 58.8	32.4	37 30.1	+ 59.0	32.8	38 20.4	+ 59.1	33.3	39 10.5	+ 59.2	33.7	40 00.3	+ 59.3	34.2	40 49.8	+ 59.4	34.6	41 39.0	+ 59.5	35.1	**48**
49	36 47.5	+ 58.7	31.8	37 38.4	+ 58.9	32.2	38 29.1	+ 59.0	32.6	39 19.5	+ 59.1	33.0	40 09.7	+ 59.2	33.5	40 59.6	+ 59.3	34.0	41 49.2	+ 59.5	34.5	42 38.5	+ 59.6	35.0	**49**
50	37 46.2	+ 58.7	31.5	38 37.3	+ 58.7	31.9	39 28.1	+ 58.9	32.4	40 18.6	+ 59.1	32.8	41 08.9	+ 59.2	33.3	41 58.9	+ 59.3	33.8	42 48.7	+ 59.4	34.3	43 38.1	+ 59.5	34.8	**50**
51	38 44.9	+ 58.6	31.2	39 36.0	+ 58.8	31.7	40 27.0	+ 58.9	32.1	41 17.7	+ 59.0	32.6	42 08.1	+ 59.2	33.1	42 58.2	+ 59.3	33.6	43 48.1	+ 59.4	34.1	44 37.6	+ 59.5	34.6	**51**
52	39 43.5	+ 58.5	31.0	40 34.8	+ 58.7	31.4	41 25.9	+ 58.8	31.9	42 16.7	+ 59.0	32.3	43 07.3	+ 59.1	32.8	43 57.5	+ 59.3	33.4	44 47.5	+ 59.4	33.9	45 37.1	+ 59.5	34.5	**52**
53	40 42.0	+ 58.5	30.7	41 33.5	+ 58.7	31.1	42 24.7	+ 58.9	31.6	43 15.7	+ 59.0	32.1	44 06.4	+ 59.1	32.6	44 56.8	+ 59.2	33.1	45 46.9	+ 59.3	33.7	46 36.6	+ 59.5	34.3	**53**
54	41 40.5	+ 58.5	30.4	42 32.2	+ 58.6	30.8	43 23.6	+ 58.7	31.3	44 14.7	+ 58.9	31.8	45 05.5	+ 59.1	32.4	45 56.0	+ 59.2	32.9	46 46.2	+ 59.4	33.5	47 36.1	+ 59.5	34.1	**54**
55	42 39.0	+ 58.4	30.1	43 30.8	+ 58.6	30.6	44 22.3	+ 58.8	31.0	45 13.6	+ 58.9	31.6	46 04.6	+ 59.0	32.1	46 55.2	+ 59.2	32.7	47 45.6	+ 59.3	33.3	48 35.6	+ 59.4	33.9	**55**
56	43 37.4	+ 58.4	29.8	44 29.4	+ 58.5	30.3	45 21.1	+ 58.7	30.8	46 12.5	+ 58.8	31.3	47 03.6	+ 59.0	31.8	47 54.4	+ 59.2	32.4	48 44.9	+ 59.3	33.0	49 35.0	+ 59.4	33.7	**56**
57	44 35.8	+ 58.3	29.4	45 27.9	+ 58.5	29.9	46 19.8	+ 58.6	30.5	47 11.3	+ 58.8	31.0	48 02.6	+ 59.0	31.6	48 53.6	+ 59.1	32.2	49 44.2	+ 59.2	32.8	50 34.4	+ 59.4	33.5	**57**
58	45 34.1	+ 58.3	29.1	46 26.4	+ 58.4	29.6	47 18.4	+ 58.6	30.2	48 10.1	+ 58.8	30.7	49 01.6	+ 58.9	31.3	49 52.7	+ 59.1	31.9	50 43.4	+ 59.3	32.6	51 33.8	+ 59.4	33.2	**58**
59	46 32.4	+ 58.1	28.8	47 24.8	+ 58.4	29.3	48 17.0	+ 58.5	29.8	49 08.9	+ 58.7	30.4	50 00.5	+ 58.9	31.0	50 51.8	+ 59.0	31.6	51 42.7	+ 59.1	32.3	52 33.2	+ 59.3	33.0	**59**
60	47 30.5	+ 58.2	28.4	48 23.2	+ 58.3	28.9	49 15.5	+ 58.5	29.5	50 07.6	+ 58.7	30.1	50 59.4	+ 58.8	30.7	51 50.8	+ 59.0	31.3	52 41.8	+ 59.2	32.0	53 32.5	+ 59.3	32.7	**60**
61	48 28.7	+ 58.0	28.0	49 21.5	+ 58.2	28.6	50 14.0	+ 58.4	29.2	51 06.3	+ 58.6	29.8	51 58.2	+ 58.8	30.4	52 49.8	+ 58.9	31.0	53 41.0	+ 59.1	31.7	54 31.8	+ 59.3	32.5	**61**
62	49 26.7	+ 58.0	27.7	50 19.7	+ 58.2	28.2	51 12.4	+ 58.4	28.8	52 04.9	+ 58.5	29.4	52 57.0	+ 58.7	30.1	53 48.7	+ 58.9	30.7	54 40.1	+ 59.1	31.5	55 31.1	+ 59.2	32.2	**62**
63	50 24.7	+ 57.8	27.3	51 17.9	+ 58.0	27.8	52 10.8	+ 58.2	28.4	53 03.4	+ 58.5	29.0	53 55.7	+ 58.6	29.7	54 47.6	+ 58.8	30.4	55 39.2	+ 59.0	31.1	56 30.3	+ 59.2	31.9	**63**
64	51 22.5	+ 57.8	26.8	52 15.9	+ 58.0	27.4	53 09.0	+ 58.2	28.0	54 01.9	+ 58.3	28.7	54 54.3	+ 58.6	29.3	55 46.4	+ 58.8	30.1	56 38.2	+ 58.9	30.8	57 29.5	+ 59.1	31.6	**64**
65	52 20.3	+ 57.7	26.4	53 13.9	+ 57.9	27.0	54 07.2	+ 58.1	27.6	55 00.2	+ 58.3	28.3	55 52.9	+ 58.5	29.0	56 45.2	+ 58.7	29.7	57 37.1	+ 58.9	30.5	58 28.6	+ 59.1	31.3	**65**
66	53 18.0	+ 57.6	25.9	54 11.8	+ 57.8	26.5	55 05.3	+ 58.0	27.2	55 58.5	+ 58.3	27.9	56 51.4	+ 58.5	28.6	57 43.9	+ 58.7	29.3	58 36.0	+ 58.9	30.1	59 27.7	+ 59.0	31.0	**66**
67	54 15.6	+ 57.4	25.5	55 09.6	+ 57.7	26.1	56 03.3	+ 57.9	26.7	56 56.8	+ 58.1	27.4	57 49.9	+ 58.3	28.1	58 42.6	+ 58.5	28.9	59 34.9	+ 58.7	29.7	60 26.7	+ 59.0	30.6	**67**
68	55 13.0	+ 57.3	25.0	56 07.3	+ 57.5	25.6	57 01.2	+ 57.8	26.3	57 54.9	+ 58.0	27.0	58 48.2	+ 58.2	27.7	59 41.1	+ 58.5	28.5	60 33.6	+ 58.7	29.3	61 25.7	+ 58.9	30.2	**68**
69	56 10.3	+ 57.2	24.4	57 04.8	+ 57.5	25.1	57 59.0	+ 57.7	25.8	58 52.9	+ 57.9	26.5	59 46.4	+ 58.2	27.2	60 39.6	+ 58.4	28.0	61 32.3	+ 58.6	28.9	62 24.6	+ 58.9	29.8	**69**
70	57 07.5	+ 57.1	23.9	58 02.3	+ 57.2	24.5	58 56.7	+ 57.5	25.2	59 50.8	+ 57.8	26.0	60 44.6	+ 58.0	26.7	61 38.0	+ 58.2	27.6	62 30.9	+ 58.6	28.4	63 23.5	+ 58.7	29.4	**70**
71	58 04.6	+ 56.8	23.3	58 59.5	+ 57.2	24.0	59 54.2	+ 57.4	24.7	60 48.6	+ 57.6	25.4	61 42.6	+ 57.9	26.2	62 36.2	+ 58.2	27.1	63 29.5	+ 58.4	28.0	64 22.2	+ 58.7	28.9	**71**
72	59 01.4	+ 56.7	22.7	59 56.7	+ 56.9	23.4	60 51.6	+ 57.2	24.1	61 46.2	+ 57.5	24.8	62 40.5	+ 57.7	25.6	63 34.4	+ 58.0	26.5	64 27.9	+ 58.2	27.4	65 20.9	+ 58.5	28.4	**72**
73	59 58.1	+ 56.5	22.1	60 53.6	+ 56.7	22.7	61 48.8	+ 57.0	23.4	62 43.7	+ 57.3	24.2	63 38.2	+ 57.6	25.0	64 32.4	+ 57.9	25.9	65 26.1	+ 58.2	26.9	66 19.4	+ 58.4	27.9	**73**
74	60 54.6	+ 56.3	21.4	61 50.3	+ 56.6	22.0	62 45.8	+ 56.8	22.8	63 41.0	+ 57.1	23.6	64 35.8	+ 57.4	24.4	65 30.3	+ 57.7	25.3	66 24.3	+ 58.0	26.3	67 17.8	+ 58.3	27.3	**74**
75	61 50.9	+ 56.0	20.6	62 46.9	+ 56.3	21.3	63 42.6	+ 56.6	22.1	64 38.1	+ 56.9	22.9	65 33.2	+ 57.2	23.7	66 28.0	+ 57.5	24.6	67 22.3	+ 57.8	25.6	68 16.1	+ 58.2	26.7	**75**
76	62 46.9	+ 55.7	19.9	63 43.2	+ 56.0	20.6	64 39.2	+ 56.4	21.3	65 35.0	+ 56.6	22.1	66 30.4	+ 57.0	23.0	67 25.5	+ 57.3	23.9	68 20.1	+ 57.6	24.9	69 14.3	+ 57.9	26.0	**76**
77	63 42.6	+ 55.5	19.1	64 39.2	+ 55.8	19.7	65 35.6	+ 56.0	20.5	66 31.6	+ 56.4	21.3	67 27.4	+ 56.7	22.2	68 22.8	+ 57.0	23.1	69 17.7	+ 57.4	24.1	70 12.2	+ 57.8	25.3	**77**
78	64 38.1	+ 55.1	18.2	65 35.0	+ 55.4	18.9	66 31.6	+ 55.8	19.6	67 28.0	+ 56.1	20.4	68 24.1	+ 56.4	21.3	69 19.8	+ 56.8	22.2	70 15.1	+ 57.2	23.3	71 10.0	+ 57.5	24.5	**78**
79	65 33.2	+ 54.8	17.2	66 30.4	+ 55.1	17.9	67 27.4	+ 55.4	18.7	68 24.1	+ 55.7	19.5	69 20.5	+ 56.1	20.3	70 16.6	+ 56.4	21.3	71 12.3	+ 56.8	22.4	72 07.5	+ 57.3	23.6	**79**
80	66 28.0	+ 54.3	16.2	67 25.5	+ 54.6	16.9	68 22.8	+ 54.9	17.6	69 19.8	+ 55.3	18.4	70 16.6	+ 55.7	19.3	71 13.0	+ 56.1	20.3	72 09.1	+ 56.5	21.4	73 04.8	+ 56.9	22.6	**80**
81	67 22.3	+ 53.8	15.1	68 20.1	+ 54.2	15.8	69 17.7	+ 54.5	16.5	70 15.1	+ 54.9	17.3	71 12.3	+ 55.2	18.2	72 09.1	+ 55.7	19.2	73 05.6	+ 56.1	20.2	74 01.7	+ 56.5	21.4	**81**
82	68 16.1	+ 53.4	14.0	69 14.3	+ 53.6	14.6	70 12.2	+ 54.0	15.3	71 10.0	+ 54.3	16.1	72 07.5	+ 54.8	16.9	73 04.8	+ 55.1	17.9	74 01.7	+ 55.6	19.0	74 58.2	+ 56.1	20.2	**82**
83	69 09.5	+ 52.7	12.7	70 07.9	+ 53.1	13.3	71 06.2	+ 53.4	14.0	72 04.3	+ 53.8	14.7	73 02.3	+ 54.1	15.6	73 59.9	+ 54.6	16.5	74 57.3	+ 55.0	17.6	75 54.3	+ 55.5	18.8	**83**
84	70 02.2	+ 52.0	11.3	71 01.0	+ 52.3	11.9	71 59.6	+ 52.7	12.6	72 58.1	+ 53.0	13.3	73 56.4	+ 53.4	14.1	74 54.5	+ 53.8	15.0	75 52.3	+ 54.3	16.0	76 49.8	+ 54.8	17.2	**84**
85	70 54.2	+ 51.3	9.9	71 53.3	+ 51.5	10.4	72 52.3	+ 51.8	11.0	73 51.1	+ 52.2	11.6	74 49.8	+ 52.5	12.4	75 48.3	+ 53.0	13.2	76 46.6	+ 53.4	14.2	77 44.6	+ 54.0	15.3	**85**
86	71 45.5	+ 50.3	8.2	72 44.8	+ 50.6	8.7	73 44.1	+ 50.9	9.2	74 43.3	+ 51.2	9.8	75 42.3	+ 51.6	10.5	76 41.3	+ 51.9	11.2	77 40.0	+ 52.4	12.1	78 38.6	+ 52.8	13.2	**86**
87	72 35.8	+ 49.3	6.5	73 35.4	+ 49.6	6.8	74 35.0	+ 49.7	7.3	75 34.5	+ 50.0	7.8	76 33.9	+ 50.3	8.3	77 33.2	+ 50.6	9.0	78 32.4	+ 51.0	9.7	79 31.4	+ 51.5	10.7	**87**
88	73 25.1	+ 48.2	4.5	74 25.0	+ 48.2	4.8	75 24.7	+ 48.5	5.1	76 24.5	+ 48.6	5.5	77 24.2	+ 48.8	5.9	78 23.8	+ 49.1	6.4	79 23.4	+ 49.4	7.0	80 22.9	*+ 49.7* •	7.7	**88**
89	74 13.3	+ 46.7	2.4	75 13.2	+ 46.8	2.5	76 13.2	+ 46.8	2.7	77 13.1	+ 46.9	2.9	78 13.0	*+ 47.0* •	3.1	79 12.9	*+ 47.1* •	3.4	80 12.8	*+ 47.2* •	3.8	81 12.6	*+ 47.4* •	4.2	**89**
90	75 00.0	+ 45.1	0.0	76 00.0	+ 45.0	0.0	77 00.0	*+ 45.0* •	0.0	78 00.0	*+ 44.9* •	0.0	79 00.0	*+ 44.8* •	0.0	80 00.0	*+ 44.6* •	0.0	81 00.0	*+ 44.5* •	0.0	82 00.0	*+ 44.3* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 140°, 220°

41°, 319° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 15.9	+59.0	138.0	10 31.2	+59.2	138.1	9 46.5	+59.3	138.3	9 01.7	+59.4	138.4	8 16.8	+59.5	138.5	7 31.8	+59.6	138.6	6 46.8	+59.7	138.6	6 01.8	+59.7	138.7	0
1	12 14.9	+59.1	137.8	11 30.4	+59.2	138.0	10 45.8	+59.3	138.1	10 01.1	+59.4	138.2	9 16.3	+59.5	138.3	8 31.4	+59.6	138.4	7 46.5	+59.7	138.5	7 01.5	+59.7	138.6	1
2	13 14.0	+59.1	137.7	12 29.6	+59.2	137.8	11 45.1	+59.3	138.0	11 00.5	+59.4	138.1	10 15.8	+59.5	138.2	9 31.0	+59.6	138.3	8 46.2	+59.6	138.4	8 01.2	+59.8	138.5	2
3	14 13.1	+59.1	137.5	13 28.8	+59.2	137.6	12 44.4	+59.3	137.8	11 59.9	+59.4	137.9	11 15.3	+59.5	138.1	10 30.6	+59.6	138.2	9 45.8	+59.7	138.3	9 01.0	+59.7	138.4	3
4	15 12.2	+59.0	137.3	14 28.0	+59.2	137.5	13 43.7	+59.3	137.6	12 59.3	+59.4	137.8	12 14.8	+59.5	138.0	11 30.2	+59.6	138.1	10 45.5	+59.7	138.2	10 00.7	+59.8	138.3	4
5	16 11.2	+59.1	137.1	15 27.2	+59.2	137.3	14 43.0	+59.3	137.5	13 58.7	+59.4	137.7	13 14.3	+59.5	137.8	12 29.8	+59.6	138.0	11 45.2	+59.7	138.1	11 00.5	+59.7	138.3	5
6	17 10.3	+59.0	136.9	16 26.4	+59.1	137.1	15 42.3	+59.3	137.3	14 58.1	+59.4	137.5	14 13.8	+59.5	137.7	13 29.4	+59.6	137.9	12 44.9	+59.6	138.0	12 00.2	+59.7	138.2	6
7	18 09.3	+59.0	136.7	17 25.5	+59.2	137.0	16 41.6	+59.3	137.2	15 57.5	+59.4	137.4	15 13.3	+59.5	137.6	14 29.0	+59.6	137.7	13 44.5	+59.7	137.9	12 59.9	+59.8	138.1	7
8	19 08.3	+59.1	136.6	18 24.7	+59.2	136.8	17 40.9	+59.3	137.0	16 56.9	+59.4	137.2	16 12.8	+59.5	137.4	15 28.6	+59.5	137.6	14 44.2	+59.6	137.8	13 59.7	+59.7	138.0	8
9	20 07.4	+59.0	136.4	19 23.9	+59.1	136.6	18 40.2	+59.2	136.8	17 56.3	+59.4	137.1	17 12.3	+59.5	137.3	16 28.1	+59.6	137.5	15 43.8	+59.7	137.7	14 59.4	+59.7	137.9	9
10	21 06.4	+59.0	136.2	20 23.0	+59.1	136.4	19 39.4	+59.3	136.7	18 55.7	+59.4	136.9	18 11.8	+59.5	137.1	17 27.7	+59.6	137.4	16 43.5	+59.7	137.6	15 59.1	+59.8	137.8	10
11	22 05.4	+58.9	136.0	21 22.1	+59.1	136.2	20 38.7	+59.2	136.5	19 55.1	+59.3	136.8	19 11.3	+59.4	137.0	18 27.3	+59.6	137.2	17 43.2	+59.6	137.5	16 58.9	+59.7	137.7	11
12	23 04.3	+59.0	135.8	22 21.2	+59.1	136.1	21 37.9	+59.3	136.3	20 54.4	+59.4	136.6	20 10.7	+59.5	136.9	19 26.9	+59.5	137.1	18 42.8	+59.6	137.3	17 58.6	+59.7	137.6	12
13	24 03.3	+58.9	135.6	23 20.3	+59.1	135.9	22 37.2	+59.2	136.2	21 53.8	+59.3	136.5	21 10.2	+59.4	136.7	20 26.4	+59.6	137.0	19 42.4	+59.7	137.2	18 58.3	+59.7	137.5	13
14	25 02.2	+59.0	135.4	24 19.4	+59.1	135.7	23 36.4	+59.2	136.0	22 53.1	+59.4	136.3	22 09.6	+59.5	136.6	21 26.0	+59.5	136.9	20 42.1	+59.6	137.1	19 58.0	+59.7	137.4	14
15	26 01.2	+58.9	135.2	25 18.5	+59.1	135.5	24 35.6	+59.2	135.8	23 52.5	+59.3	136.1	23 09.1	+59.4	136.4	22 25.5	+59.5	136.7	21 41.7	+59.7	137.0	20 57.7	+59.8	137.3	15
16	27 00.1	+58.9	134.9	26 17.6	+59.0	135.3	25 34.8	+59.2	135.6	24 51.8	+59.3	136.0	24 08.5	+59.5	136.3	23 25.0	+59.6	136.6	22 41.4	+59.6	136.9	21 57.5	+59.7	137.2	16
17	27 59.0	+58.8	134.7	27 16.6	+59.0	135.1	26 34.0	+59.1	135.5	25 51.1	+59.3	135.8	25 08.0	+59.4	136.1	24 24.6	+59.5	136.5	23 41.0	+59.6	136.8	22 57.2	+59.7	137.1	17
18	28 57.8	+58.9	134.5	28 15.6	+59.0	134.9	27 33.1	+59.2	135.3	26 50.4	+59.3	135.6	26 07.4	+59.4	136.0	25 24.1	+59.5	136.3	24 40.6	+59.6	136.6	23 56.9	+59.7	136.9	18
19	29 56.7	+58.8	134.3	29 14.6	+59.0	134.7	28 32.3	+59.1	135.1	27 49.7	+59.3	135.5	27 06.8	+59.4	135.8	26 23.6	+59.5	136.2	25 40.2	+59.6	136.5	24 56.6	+59.7	136.8	19
20	30 55.5	+58.8	134.1	30 13.6	+59.0	134.5	29 31.4	+59.2	134.9	28 49.0	+59.2	135.3	28 06.2	+59.4	135.7	27 23.1	+59.5	136.0	26 39.8	+59.6	136.4	25 56.3	+59.6	136.7	20
21	31 54.3	+58.8	133.8	31 12.6	+58.9	134.3	30 30.6	+59.1	134.7	29 48.2	+59.3	135.1	29 05.6	+59.3	135.5	28 22.6	+59.5	135.9	27 39.4	+59.6	136.3	26 55.9	+59.7	136.6	21
22	32 53.1	+58.7	133.6	32 11.5	+59.0	134.0	31 29.7	+59.1	134.5	30 47.5	+59.2	134.9	30 04.9	+59.4	135.3	29 22.1	+59.5	135.7	28 39.0	+59.6	136.1	27 55.6	+59.7	136.5	22
23	33 51.8	+58.8	133.3	33 10.5	+58.9	133.8	32 28.8	+59.0	134.3	31 46.7	+59.2	134.7	31 04.3	+59.3	135.2	30 21.6	+59.5	135.6	29 38.6	+59.6	136.0	28 55.3	+59.7	136.4	23
24	34 50.6	+58.6	133.1	34 09.4	+58.8	133.6	33 27.8	+59.1	134.1	32 45.9	+59.2	134.5	32 03.6	+59.4	135.0	31 21.1	+59.4	135.4	30 38.2	+59.5	135.8	29 55.0	+59.6	136.3	24
25	35 49.2	+58.7	132.8	35 08.2	+58.9	133.4	34 26.9	+59.0	133.9	33 45.1	+59.2	134.3	33 03.0	+59.3	134.8	32 20.5	+59.5	135.3	31 37.7	+59.6	135.7	30 54.6	+59.7	136.1	25
26	36 47.9	+58.6	132.6	36 07.1	+58.8	133.1	35 25.9	+59.0	133.6	34 44.3	+59.1	134.1	34 02.3	+59.3	134.6	33 20.0	+59.4	135.1	32 37.3	+59.5	135.6	31 54.3	+59.6	136.0	26
27	37 46.5	+58.6	132.3	37 05.9	+58.8	132.9	36 24.9	+58.9	133.4	35 43.4	+59.2	133.9	35 01.6	+59.3	134.5	34 19.4	+59.4	134.9	33 36.8	+59.6	135.4	32 53.9	+59.7	135.9	27
28	38 45.1	+58.5	132.0	38 04.7	+58.7	132.6	37 23.8	+59.0	133.2	36 42.6	+59.1	133.7	36 00.9	+59.3	134.3	35 18.8	+59.4	134.8	34 36.4	+59.5	135.3	33 53.6	+59.6	135.7	28
29	39 43.6	+58.5	131.7	39 03.4	+58.8	132.4	38 22.8	+58.9	132.9	37 41.7	+59.1	133.5	37 00.2	+59.2	134.1	36 18.2	+59.4	134.6	35 35.9	+59.5	135.1	34 53.2	+59.6	135.6	29
30	40 42.1	+58.5	131.5	40 02.2	+58.6	132.1	39 21.7	+58.9	132.7	38 40.8	+59.0	133.3	37 59.4	+59.2	133.9	37 17.6	+59.4	134.4	36 35.4	+59.5	135.0	35 52.8	+59.6	135.5	30
31	41 40.6	+58.4	131.2	41 00.8	+58.7	131.8	40 20.6	+58.8	132.5	39 39.8	+59.1	133.1	38 58.6	+59.2	133.7	38 17.0	+59.3	134.2	37 34.9	+59.5	134.8	36 52.4	+59.6	135.3	31
32	42 39.0	+58.3	130.8	41 59.5	+58.6	131.5	41 19.4	+58.8	132.2	40 38.9	+59.0	132.8	39 57.8	+59.2	133.5	39 16.3	+59.4	134.1	38 34.4	+59.5	134.6	37 52.0	+59.6	135.2	32
33	43 37.3	+58.3	130.5	42 58.1	+58.5	131.2	42 18.2	+58.8	131.9	41 37.9	+59.0	132.6	40 57.0	+59.2	133.2	40 15.7	+59.3	133.9	39 33.9	+59.4	134.5	38 51.6	+59.6	135.0	33
34	44 35.6	+58.3	130.2	43 56.6	+58.5	130.9	43 17.0	+58.7	131.7	42 36.9	+58.9	132.3	41 56.2	+59.1	133.0	41 15.0	+59.3	133.7	40 33.3	+59.5	134.3	39 51.2	+59.6	134.9	34
35	45 33.9	+58.2	129.9	44 55.1	+58.5	130.6	44 15.7	+58.7	131.4	43 35.8	+58.9	132.1	42 55.3	+59.1	132.8	42 14.3	+59.3	133.5	41 32.8	+59.4	134.1	40 50.8	+59.5	134.7	35
36	46 32.1	+58.1	129.5	45 53.6	+58.3	130.3	45 14.4	+58.7	131.1	44 34.7	+58.9	131.8	43 54.4	+59.1	132.5	43 13.6	+59.2	133.2	42 32.2	+59.4	133.9	41 50.3	+59.6	134.6	36
37	47 30.2	+58.0	129.1	46 51.9	+58.4	130.0	46 13.1	+58.6	130.8	45 33.6	+58.8	131.6	44 53.5	+59.0	132.3	44 12.8	+59.2	133.0	43 31.6	+59.4	133.7	42 49.9	+59.5	134.4	37
38	48 28.2	+58.0	128.8	47 50.3	+58.2	129.6	47 11.7	+58.5	130.5	46 32.4	+58.8	131.3	45 52.5	+59.0	132.1	45 12.0	+59.2	132.8	44 31.0	+59.4	133.5	43 49.4	+59.5	134.2	38
39	49 26.2	+57.8	128.4	48 48.5	+58.2	129.3	48 10.2	+58.5	130.1	47 31.2	+58.7	131.0	46 51.5	+59.0	131.8	46 11.2	+59.2	132.6	45 30.4	+59.3	133.3	44 48.9	+59.5	134.1	39
40	50 24.0	+57.8	128.0	49 46.7	+58.2	128.9	49 08.7	+58.4	129.8	48 29.9	+58.7	130.7	47 50.5	+58.9	131.5	47 10.4	+59.1	132.3	46 29.7	+59.3	133.1	45 48.4	+59.5	133.9	40
41	51 21.8	+57.7	127.5	50 44.9	+58.0	128.5	50 07.1	+58.4	129.4	49 28.6	+58.7	130.4	48 49.4	+58.9	131.2	48 09.5	+59.1	132.1	47 29.0	+59.3	132.9	46 47.9	+59.4	133.7	41
42	52 19.5	+57.6	127.1	51 42.9	+58.0	128.1	51 05.5	+58.3	129.1	50 27.3	+58.5	130.0	49 48.3	+58.8	130.9	49 08.6	+59.1	131.8	48 28.3	+59.3	132.7	47 47.3	+59.5	133.5	42
43	53 17.1	+57.5	126.6	52 40.9	+57.8	127.7	52 03.8	+58.2	128.7	51 25.8	+58.6	129.7	50 47.1	+58.8	130.6	50 07.7	+59.0	131.5	49 27.6	+59.2	132.4	48 46.8	+59.4	133.3	43
44	54 14.6	+57.3	126.1	53 38.7	+57.8	127.2	53 02.0	+58.1	128.3	52 24.4	+58.4	129.3	51 45.9	+58.8	130.3	51 06.7	+59.0	131.3	50 26.8	+59.2	132.2	49 46.2	+59.4	133.1	44
45	55 11.9	+57.2	125.6	54 36.5	+57.6	126.8	54 00.1	+58.0	127.9	53 22.8	+58.4	128.9	52 44.7	+58.6	130.0	52 05.7	+59.0	131.0	51 26.0	+59.2	131.9	50 45.6	+59.3	132.8	45
46	56 09.1	+57.1	125.1	55 34.1	+57.5	126.3	54 58.1	+57.9	127.4	54 21.2	+58.3	128.6	53 43.3	+58.6	129.6	53 04.7	+58.8	130.7	52 25.2	+59.1	131.6	51 44.9	+59.4	132.6	46
47	57 06.2	+56.9	124.5	56 31.6	+57.4	125.8	55 56.0	+57.9	127.0	55 19.5	+58.2	128.1	54 41.9	+58.6	129.3	54 03.5	+58.9	130.3	53 24.3	+59.1	131.4	52 44.3	+59.2	132.4	47
48	58 03.1	+56.7	123.9	57 29.0	+57.3	125.2	56 53.9	+57.7	126.5	56 17.7	+58.1	127.7	55 40.5	+58.4	128.9	55 02.4	+58.7	130.0	54 23.4	+59.0	131.1	53 43.5	+59.3	132.1	48
49	58 59.8	+56.6	123.3	58 26.3	+57.1	124.7	57 51.6	+57.6	126.0	57 15.8	+58.0	127.3	56 38.9	+58.4	128.5	56 01.1	+58.7	129.6	55 22.4	+59.0	130.8	54 42.8	+59.2	131.8	49
50	59 56.4	+56.3	122.7	59 23.4	+56.9	124.1	58 49.2	+57.4	125.5	58 13.8	+57.9	126.8	57 37.3	+58.3	128.0	56 59.8	+58.7	129.3	56 21.4	+58.9	130.4	55 42.0	+59.2	131.6	50
51	60 52.7	+56.1	122.0	60 20.3	+56.7	123.5	59 46.6	+57.3	124.9	59 11.7	+57.7	126.3	58 35.6	+58.2	127.6	57 58.5	+58.5	128.9	57 20.3	+58.9	130.1	56 41.2	+59.2	131.3	51
52	61 48.8	+55.9	121.2	61 17.0	+56.6	122.8	60 43.9	+57.1	124.3	60 09.4	+57.7	125.7	59 33.8	+58.1	127.1	58 57.0	+58.5	128.5	58 19.2	+58.8	129.7	57 40.4	+59.1	130.9	52
53	62 44.7	+55.6	120.4	62 13.6	+56.3	122.1	61 41.0	+56.9	123.7	61 07.1	+57.5	125.2	60 31.9	+58.0	126.6	59 55.5	+58.4	128.0	59 18.0	+58.8	129.3	58 39.5	+59.0	130.6	53
54	63 40.3	+55.2	119.6	63 09.9	+56.0	121.3	62 37.9	+56.7	123.0	62 04.6	+57.3	124.6	61 29.9	+57.8	126.1	60 53.9	+58.3	127.5	60 16.8	+58.6	128.9	59 38.5	+59.0	130.3	54
55	64 35.5	+55.0	118.7	64 05.9	+55.7	120.5	63 34.6	+56.5	122.3	63 01.9	+57.1	123.9	62 27.7	+57.7	125.5	61 52.2	+58.1	127.0	61 15.4	+58.6	128.5	60 37.5	+58.9	129.9	55
56	65 30.5	+54.5	117.8	65 01.6	+55.5	119.7	64 31.1	+56.2	121.5	63 59.0	+56.9	123.2	63 25.4	+57.5	124.9	62 50.3	+58.1	126.5	62 14.0	+58.5	128.1	61 36.4	+58.9	129.5	56
57	66 25.0	+54.1	116.7	65 57.1	+55.1	118.7	65 27.3	+56.0	120.7	64 55.9	+56.7	122.5	64 22.9	+57.3	124.3	63 48.4	+57.9	126.0	63 12.5	+58.3	127.6	62 35.3	+58.7	129.1	57
58	67 19.1	+53.6	115.6	66 52.2	+54.6	117.7	66 23.3	+55.6	119.8	65 52.6	+56.4	121.7	65 20.2	+57.2	123.6	64 46.3	+57.7	125.3	64 10.8	+58.3	127.0	63 34.0	+58.7	128.6	58
59	68 12.7	+53.1	114.4	67 46.8	+54.3	116.7	67 18.9	+55.2	118.8	66 49.0	+56.2	120.9	66 17.4	+56.9	122.8	65 44.0	+57.6	124.7	65 09.1	+58.1	126.5	64 32.7	+58.6	128.2	59
60	69 05.8	+52.4	113.2	68 41.1	+53.7	115.5	68 14.1	+54.9	117.8	67 45.2	+55.7	120.0	67 14.3	+56.6	122.0	66 41.6	+57.3	124.0	66 07.2	+58.0	125.9	65 31.3	+58.4	127.7	60
61	69 58.2	+51.8	111.8	69 34.8	+53.1	114.3	69 09.0	+54.3	116.7	68 40.9	+55.5	119.0	68 10.9	+56.3	121.2	67 38.9	+57.1	123.2	67 05.2	+57.7	125.2	66 29.7	+58.4	127.1	61
62	70 50.0	+50.9	110.3	70 27.9	+52.5	112.9	70 03.3	+53.8	115.5	69 36.4	+55.0	117.9	69 07.2	+56.0	120.2	68 36.0	+56.9	122.4	68 02.9	+57.6	124.5	67 28.1	+58.2	126.5	62
63	71 40.9	+50.0	108.6	71 20.4	+51.7	111.4	70 57.1	+53.2	114.1	70 31.4	+54.4	116.7	70 03.2	+55.6	119.2	69 32.9	+56.6	121.5	69 00.5	+57.4	123.8	68 26.3	+58.0	125.9	63
64	72 30.9	+49.0	106.8	72 12.1	+50.8	109.8	71 50.3	+52.5	112.7	71 25.8	+54.0	115.4	70 58.8	+55.2	118.1	70 29.5	+56.2	120.5	69 57.9	+57.1	122.9	69 24.3	+57.9	125.2	64
65	73 19.9	+47.7	104.9	73 02.9	+49.8	108.0	72 42.8	+51.6	111.1	72 19.8	+53.2	114.0	71 54.0	+54.6	116.8	71 25.7	+55.8	119.5	70 55.0	+56.8	122.0	70 22.2	+57.6	124.4	65
66	74 07.6	+46.3	102.7	73 52.7	+48.6	106.1	73 34.4	+50.7	109.3	73 13.0	+52.5	112.5	72 48.6	+54.1	115.5	72 21.5	+55.4	118.3	71 51.8	+56.5	121.0	71 19.8	+57.4	123.5	66
67	74 53.9	+44.6	100.3	74 41.3	+47.2	103.9	74 25.1	+49.5	107.4	74 05.5	+51.5	110.7	73 42.7	+53.3	113.9	73 16.9	+54.8	117.0	72 48.3	+56.0	119.9	72 17.2	+57.0	122.6	67
68	75 38.5	*+42.7* •	97.7	75 28.5	+45.6	101.5	75 14.6	+48.2	105.2	74 57.0	+50.5	108.8	74 36.0	+52.5	112.3	74 11.7	+54.1	115.5	73 44.3	+55.6	118.6	73 14.2	+56.8	121.6	68
69	76 21.2	*+40.5* •	94.8	76 14.1	*+43.7* •	98.8	76 02.8	+46.6	102.8	75 47.5	+49.2	106.7	75 28.5	+51.4	110.4	75 05.8	+53.4	113.9	74 39.9	+55.0	117.2	74 11.0	+56.3	120.4	69
70	77 01.7	*+37.9* •	91.6	76 57.8	*+41.5* •	95.9	76 49.4	*+44.8* •	100.1	76 36.7	+47.7	104.3	76 19.9	+50.3	108.3	75 59.2	+52.5	112.1	75 34.9	+54.3	115.7	75 07.3	+55.8	119.1	70
71	77 39.6	*+34.8* •	88.0	77 39.3	*+38.8* •	92.6	77 34.2	*+42.5* •	97.1	77 24.4	*+45.8* •	101.6	77 10.2	+48.7	105.9	76 51.7	+51.3	110.0	76 29.2	+53.4	113.9	76 03.1	+55.2	117.6	71
72	78 14.4	*+31.4* •	84.1	78 18.1	*+35.7* •	88.9	78 16.7	*+39.8* •	93.8	78 10.2	*+43.6* •	98.5	77 58.9	+47.0	103.2	77 43.0	+49.9	107.7	77 22.6	+52.5	111.9	76 58.3	+54.5	115.9	72
73	78 45.8	*+27.3* •	79.8	78 53.8	*+32.0* •	84.9	78 56.5	*+36.6* •	90.0	78 53.8	*+41.0* •	95.1	78 45.9	*+44.8* •	100.1	78 32.9	+48.2	105.0	78 15.1	+51.1	109.6	77 52.8	+53.5	114.0	73
74	79 13.1	*+22.8* •	75.2	79 25.8	*+27.9* •	80.4	79 33.1	*+32.9* •	85.7	79 34.8	*+37.6* •	91.1	79 30.7	*+42.2* •	96.6	79 21.1	*+46.1* •	101.9	79 06.2	+49.5	106.9	78 46.3	+52.4	111.8	74
75	79 35.9	*+17.8* •	70.1	79 53.7	*+23.1* •	75.4	80 06.0	*+28.5* •	81.0	80 12.4	*+33.8* •	86.7	80 12.9	*+38.8* •	92.5	80 07.2	*+43.5* •	98.3	79 55.7	*+47.5* •	103.8	79 38.7	+50.8	109.2	75
76	79 53.7	*+12.3* •	64.8	80 16.8	*+17.7* •	70.1	80 34.5	*+23.3* •	75.7	80 46.2	*+29.1* •	81.7	80 51.7	*+34.7* •	87.9	80 50.7	*+40.0* •	94.1	80 43.2	*+44.9* •	100.2	80 29.5	*+49.0* •	106.1	76
77	80 06.0	*+6.4* •	59.1	80 34.5	*+11.7* •	64.3	80 57.8	*+17.5* •	70.0	81 15.3	*+23.6* •	76.1	81 26.4	*+29.9* •	82.6	81 30.7	*+35.9* •	89.2	81 28.1	*+41.5* •	95.9	81 18.5	*+46.4* •	102.4	77
78	80 12.4	*+0.5* •	53.3	80 46.2	*+5.5* •	58.3	81 15.3	*+11.1* •	63.8	81 38.9	*+17.4* •	69.9	81 56.3	*+23.9* •	76.6	82 06.6	*+30.7* •	83.6	82 09.6	*+37.2* •	90.8	82 04.9	*+43.1* •	98.0	78
79	80 12.9	*−5.7* •	47.4	80 51.7	*−1.0* •	52.0	81 26.4	*+4.3* •	57.3	81 56.3	*+10.3* •	63.2	82 20.2	*+17.1* •	69.8	82 37.3	*+24.3* •	77.1	82 46.8	*+31.6* •	84.8	82 48.0	*+38.7* •	92.7	79
80	80 07.2	*−11.5* •	41.6	80 50.7	*−7.5* •	45.7	81 30.7	*−2.6* •	50.5	82 06.6	*+3.0* •	56.1	82 37.3	*+9.5* •	62.5	83 01.6	*+16.8* •	69.8	83 18.4	*+24.7* •	77.8	83 26.7	*+32.8* •	86.3	80
81	79 55.7	*−17.0* •	35.9	80 43.2	*−13.7* •	39.5	81 28.1	*−9.6* •	43.8	82 09.6	*−4.7* •	48.8	82 46.8	*+1.2* •	54.7	83 18.4	*+8.3* •	61.7	83 43.1	*+16.4* •	69.7	83 59.5	*+25.3* •	78.7	81
82	79 38.7	*−22.2* •	30.5	80 29.5	*−19.4* •	33.6	81 18.5	*−16.1* •	37.2	82 04.9	*−12.0* •	41.5	82 48.0	*−6.9* •	46.8	83 26.7	*−0.7* •	53.1	83 59.5	*+6.9* •	60.7	84 24.8	*+15.8* •	69.7	82
83	79 16.5	*−26.8* •	25.4	80 10.1	*−24.6* •	27.9	81 02.4	*−22.0* •	30.9	81 52.9	*−18.8* •	34.5	82 41.1	*−14.8* •	38.9	83 26.0	*−9.7* •	44.4	84 06.4	*−3.2* •	51.1	84 40.6	*+5.1* •	59.5	83
84	78 49.7	*−30.8* •	20.7	79 45.5	*−29.3* •	22.7	80 40.4	*−27.4* •	25.0	81 34.1	*−24.9* •	27.9	82 26.3	*−22.0* •	31.4	83 16.3	*−18.1* •	35.8	84 03.2	*−13.0* •	41.4	84 45.7	*−6.3* •	48.7	84
85	78 18.9	*−34.4* •	16.4	79 16.2	*−33.3* •	17.9	80 13.0	*−31.9* •	19.7	81 09.2	*−30.3* •	21.8	82 04.3	*−28.1* •	24.5	82 58.2	*−25.4* •	27.9	83 50.2	*−21.8* •	32.2	84 39.4	*−17.0* •	37.9	85
86	77 44.5	*−37.5* •	12.4	78 42.9	*−36.7* •	13.5	79 41.1	*−35.8* •	14.8	80 38.9	*−34.7* •	16.4	81 36.2	*−33.3* •	18.3	82 32.8	*−31.6* •	20.7	83 28.4	*−29.3* •	23.7	84 22.4	*−26.1* •	27.8	86
87	77 07.0	*−40.2* •	8.9	78 06.2	*−39.7* •	9.6	79 05.3	*−39.1* •	10.5	80 04.2	*−38.5* •	11.5	81 02.9	*−37.7* •	12.7	82 01.2	*−36.6* •	14.3	82 59.1	*−35.3* •	16.3	83 56.3	*−33.6* •	19.0	87
88	76 26.8	*−42.4* •	5.6	77 26.5	*−42.2* •	6.0	78 26.2	*−42.0* •	6.6	79 25.7	*−41.5* •	7.2	80 25.2	*−41.2* •	7.9	81 24.6	*−40.7* •	8.8	82 23.8	*−40.1* •	10.0	83 22.7	*−39.2* •	11.5	88
89	75 44.4	−44.4	2.7	76 44.3	−44.3	2.9	77 44.2	*−44.2* •	3.1	78 44.2	*−44.2* •	3.4	79 44.0	*−44.0* •	3.7	80 43.9	*−43.9* •	4.1	81 43.7	*−43.7* •	4.6	82 43.5	*−43.5* •	5.2	89
90	75 00.0	−46.1	0.0	76 00.0	−46.1	0.0	77 00.0	−46.2	0.0	78 00.0	−46.3	0.0	79 00.0	*−46.4* •	0.0	80 00.0	*−46.5* •	0.0	81 00.0	*−46.6* •	0.0	82 00.0	*−46.7* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 41°, 319°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 15.9	−59.1	138.0	10 31.2	−59.2	138.1	9 46.5	−59.3	138.3	9 01.7	−59.5	138.4	8 16.8	−59.5	138.5	7 31.8	−59.6	138.6	6 46.8	−59.7	138.6	6 01.8	−59.8	138.7	**0**
1	10 16.8	−59.1	138.2	9 32.0	−59.2	138.3	8 47.2	−59.4	138.4	8 02.2	−59.4	138.5	7 17.3	−59.6	138.6	6 32.2	−59.6	138.7	5 47.1	−59.6	138.8	5 02.0	−59.7	138.8	**1**
2	9 17.7	−59.2	138.4	8 32.8	−59.3	138.5	7 47.8	−59.3	138.6	7 02.8	−59.4	138.7	6 17.7	−59.5	138.7	5 32.6	−59.6	138.8	4 47.5	−59.7	138.9	4 02.3	−59.8	138.9	**2**
3	8 18.5	−59.1	138.5	7 33.5	−59.2	138.6	6 48.5	−59.3	138.7	6 03.4	−59.5	138.8	5 18.2	−59.5	138.9	4 33.0	−59.6	138.9	3 47.8	−59.7	139.0	3 02.5	−59.7	139.0	**3**
4	7 19.4	−59.1	138.7	6 34.3	−59.2	138.8	5 49.2	−59.4	138.9	5 03.9	−59.4	138.9	4 18.7	−59.5	139.0	3 33.4	−59.6	139.0	2 48.1	−59.7	139.1	2 02.8	−59.8	139.1	**4**
5	6 20.3	−59.1	138.9	5 35.1	−59.2	139.0	4 49.8	−59.3	139.0	4 04.5	−59.4	139.1	3 19.2	−59.6	139.1	2 33.8	−59.6	139.1	1 48.4	−59.7	139.2	1 03.0	−59.7	139.2	**5**
6	5 21.2	−59.1	139.1	4 35.9	−59.3	139.1	3 50.5	−59.4	139.2	3 05.1	−59.5	139.2	2 19.6	−59.5	139.2	1 34.2	−59.6	139.3	0 48.7	−59.7	139.3	0 03.3	−59.8	139.3	**6**
7	4 22.1	−59.2	139.2	3 36.6	−59.2	139.3	2 51.1	−59.3	139.3	2 05.6	−59.4	139.3	1 20.1	−59.5	139.4	0 34.6	−59.6	139.4	0 11.0	+59.6	40.6	0 56.5	+59.7	40.6	**7**
8	3 22.9	−59.1	139.4	2 37.4	−59.3	139.4	1 51.8	−59.3	139.5	1 06.2	−59.4	139.5	0 20.6	−59.5	139.5	0 25.0	+59.6	40.5	1 10.6	+59.7	40.5	1 56.2	+59.8	40.5	**8**
9	2 23.8	−59.1	139.6	1 38.1	−59.2	139.6	0 52.5	−59.4	139.6	0 06.8	−59.5	139.6	0 38.9	+59.6	40.4	1 24.6	+59.6	40.4	2 10.3	+59.7	40.4	2 56.0	+59.7	40.5	**9**
10	1 24.7	−59.1	139.7	0 38.9	−59.2	139.7	0 06.9	+59.3	40.2	0 52.7	+59.4	40.3	1 38.5	+59.5	40.3	2 24.2	+59.7	40.3	3 10.0	+59.7	40.3	3 55.7	+59.8	40.4	**10**
11	0 25.6	−59.2	139.9	0 20.3	+59.3	40.1	1 06.2	+59.4	40.1	1 52.1	+59.5	40.1	2 38.0	+59.5	40.1	3 23.9	+59.6	40.2	4 09.7	+59.7	40.2	4 55.5	+59.7	40.3	**11**
12	0 33.6	+59.1	39.9	1 19.6	+59.2	39.9	2 05.6	+59.3	40.0	2 51.6	+59.4	40.0	3 37.5	+59.6	40.0	4 23.5	+59.6	40.1	5 09.4	+59.6	40.1	5 55.2	+59.8	40.2	**12**
13	1 32.7	+59.1	39.8	2 18.8	+59.2	39.8	3 04.9	+59.4	39.8	3 51.0	+59.4	39.8	4 37.1	+59.5	39.9	5 23.1	+59.6	39.9	6 09.0	+59.7	40.0	6 55.0	+59.7	40.1	**13**
14	2 31.8	+59.1	39.6	3 18.0	+59.3	39.6	4 04.3	+59.3	39.7	4 50.4	+59.5	39.7	5 36.6	+59.5	39.8	6 22.7	+59.6	39.8	7 08.7	+59.7	39.9	7 54.7	+59.8	40.0	**14**
15	3 30.9	+59.2	39.4	4 17.3	+59.2	39.5	5 03.6	+59.3	39.5	5 49.9	+59.4	39.6	6 36.1	+59.5	39.6	7 22.3	+59.6	39.7	8 08.4	+59.7	39.8	8 54.5	+59.7	39.9	**15**
16	4 30.1	+59.1	39.2	5 16.5	+59.3	39.3	6 02.9	+59.4	39.4	6 49.3	+59.4	39.4	7 35.6	+59.5	39.5	8 21.9	+59.6	39.6	9 08.1	+59.7	39.7	9 54.2	+59.7	39.8	**16**
17	5 29.2	+59.1	39.1	6 15.8	+59.2	39.1	7 02.3	+59.3	39.2	7 48.7	+59.5	39.3	8 35.1	+59.6	39.4	9 21.5	+59.6	39.5	10 07.8	+59.6	39.6	10 53.9	+59.8	39.7	**17**
18	6 28.3	+59.1	38.9	7 15.0	+59.2	39.0	8 01.6	+59.3	39.1	8 48.2	+59.4	39.2	9 34.7	+59.5	39.3	10 21.1	+59.6	39.4	11 07.4	+59.7	39.5	11 53.7	+59.7	39.6	**18**
19	7 27.4	+59.1	38.7	8 14.2	+59.2	38.8	9 00.9	+59.4	38.9	9 47.6	+59.4	39.0	10 34.2	+59.5	39.1	11 20.7	+59.6	39.2	12 07.1	+59.7	39.4	12 53.4	+59.8	39.5	**19**
20	8 26.5	+59.1	38.6	9 13.4	+59.2	38.7	10 00.3	+59.3	38.8	10 47.0	+59.4	38.9	11 33.7	+59.5	39.0	12 20.3	+59.6	39.1	13 06.8	+59.6	39.3	13 53.2	+59.7	39.4	**20**
21	9 25.6	+59.1	38.4	10 12.6	+59.3	38.5	10 59.6	+59.3	38.6	11 46.4	+59.4	38.7	12 33.2	+59.5	38.9	13 19.9	+59.5	39.0	14 06.4	+59.7	39.2	14 52.9	+59.7	39.3	**21**
22	10 24.7	+59.1	38.2	11 11.9	+59.2	38.3	11 58.9	+59.3	38.5	12 45.8	+59.4	38.6	13 32.7	+59.5	38.7	14 19.4	+59.6	38.9	15 06.1	+59.6	39.1	15 52.6	+59.8	39.2	**22**
23	11 23.8	+59.1	38.0	12 11.1	+59.2	38.2	12 58.2	+59.3	38.3	13 45.2	+59.4	38.4	14 32.2	+59.5	38.6	15 19.0	+59.6	38.8	16 05.7	+59.7	38.9	16 52.4	+59.7	39.1	**23**
24	12 22.9	+59.1	37.9	13 10.3	+59.2	38.0	13 57.5	+59.3	38.1	14 44.6	+59.4	38.3	15 31.7	+59.5	38.5	16 18.6	+59.6	38.6	17 05.4	+59.7	38.8	17 52.1	+59.7	39.0	**24**
25	13 22.0	+59.1	37.7	14 09.5	+59.1	37.8	14 56.8	+59.3	38.0	15 44.0	+59.4	38.2	16 31.2	+59.4	38.3	17 18.2	+59.5	38.5	18 05.1	+59.6	38.7	18 51.8	+59.7	38.9	**25**
26	14 21.1	+59.1	37.5	15 08.6	+59.2	37.7	15 56.1	+59.3	37.8	16 43.4	+59.4	38.0	17 30.6	+59.5	38.2	18 17.7	+59.6	38.4	19 04.7	+59.6	38.6	19 51.5	+59.7	38.8	**26**
27	15 20.2	+59.0	37.3	16 07.8	+59.2	37.5	16 55.4	+59.3	37.7	17 42.8	+59.4	37.9	18 30.1	+59.5	38.1	19 17.3	+59.6	38.3	20 04.3	+59.7	38.5	20 51.2	+59.7	38.7	**27**
28	16 19.2	+59.1	37.1	17 07.0	+59.2	37.3	17 54.7	+59.2	37.5	18 42.2	+59.4	37.7	19 29.6	+59.5	37.9	20 16.9	+59.5	38.1	21 04.0	+59.6	38.4	21 50.9	+59.7	38.6	**28**
29	17 18.3	+59.0	36.9	18 06.2	+59.1	37.1	18 53.9	+59.3	37.3	19 41.6	+59.3	37.5	20 29.1	+59.4	37.8	21 16.4	+59.6	38.0	22 03.6	+59.6	38.3	22 50.6	+59.8	38.5	**29**
30	18 17.3	+59.0	36.8	19 05.3	+59.2	37.0	19 53.2	+59.2	37.2	20 40.9	+59.4	37.4	21 28.5	+59.5	37.6	22 16.0	+59.5	37.9	23 03.2	+59.7	38.1	23 50.4	+59.6	38.4	**30**
31	19 16.3	+59.0	36.6	20 04.5	+59.1	36.8	20 52.4	+59.3	37.0	21 40.3	+59.3	37.2	22 28.0	+59.4	37.5	23 15.5	+59.5	37.7	24 02.9	+59.6	38.0	24 50.0	+59.7	38.3	**31**
32	20 15.3	+59.0	36.4	21 03.6	+59.1	36.6	21 51.7	+59.2	36.8	22 39.6	+59.4	37.1	23 27.4	+59.5	37.3	24 15.0	+59.6	37.6	25 02.5	+59.6	37.9	25 49.7	+59.7	38.2	**32**
33	21 14.3	+59.0	36.2	22 02.7	+59.1	36.4	22 50.9	+59.2	36.7	23 39.0	+59.3	36.9	24 26.9	+59.4	37.2	25 14.6	+59.5	37.5	26 02.1	+59.6	37.8	26 49.4	+59.7	38.1	**33**
34	22 13.3	+59.0	36.0	23 01.8	+59.1	36.2	23 50.1	+59.2	36.5	24 38.3	+59.3	36.8	25 26.3	+59.4	37.0	26 14.1	+59.5	37.3	27 01.7	+59.6	37.6	27 49.1	+59.7	37.9	**34**
35	23 12.3	+59.0	35.8	24 00.9	+59.1	36.0	24 49.3	+59.2	36.3	25 37.6	+59.3	36.6	26 25.7	+59.4	36.9	27 13.6	+59.5	37.2	28 01.3	+59.6	37.5	28 48.8	+59.7	37.8	**35**
36	24 11.3	+58.9	35.6	25 00.0	+59.1	35.8	25 48.5	+59.2	36.1	26 36.9	+59.3	36.4	27 25.1	+59.4	36.7	28 13.1	+59.5	37.0	29 00.9	+59.6	37.4	29 48.5	+59.6	37.7	**36**
37	25 10.2	+58.9	35.4	25 59.1	+59.0	35.7	26 47.7	+59.2	35.9	27 36.2	+59.3	36.2	28 24.5	+59.4	36.6	29 12.6	+59.5	36.9	30 00.5	+59.5	37.2	30 48.1	+59.7	37.6	**37**
38	26 09.1	+58.9	35.2	26 58.1	+59.0	35.5	27 46.9	+59.1	35.8	28 35.5	+59.2	36.1	29 23.9	+59.3	36.4	30 12.1	+59.4	36.7	31 00.0	+59.6	37.1	31 47.8	+59.6	37.5	**38**
39	27 08.0	+58.9	35.0	27 57.1	+59.0	35.3	28 46.0	+59.2	35.6	29 34.7	+59.3	35.9	30 23.2	+59.4	36.2	31 11.5	+59.5	36.6	31 59.6	+59.6	37.0	32 47.4	+59.7	37.3	**39**
40	28 06.9	+58.9	34.7	28 56.1	+59.0	35.0	29 45.2	+59.1	35.4	30 34.0	+59.2	35.7	31 22.6	+59.3	36.1	32 11.0	+59.4	36.4	32 59.2	+59.5	36.8	33 47.1	+59.6	37.2	**40**
41	29 05.8	+58.8	34.5	29 55.1	+59.0	34.8	30 44.3	+59.1	35.2	31 33.2	+59.2	35.5	32 21.9	+59.4	35.9	33 10.4	+59.5	36.3	33 58.7	+59.5	36.7	34 46.7	+59.6	37.1	**41**
42	30 04.6	+58.9	34.3	30 54.1	+59.0	34.6	31 43.4	+59.1	35.0	32 32.4	+59.2	35.3	33 21.3	+59.3	35.7	34 09.9	+59.4	36.1	34 58.2	+59.6	36.5	35 46.3	+59.6	36.9	**42**
43	31 03.5	+58.8	34.1	31 53.1	+58.9	34.4	32 42.5	+59.0	34.8	33 31.6	+59.2	35.1	34 20.6	+59.3	35.5	35 09.3	+59.4	35.9	35 57.8	+59.5	36.4	36 45.9	+59.6	36.8	**43**
44	32 02.3	+58.7	33.8	32 52.0	+58.9	34.2	33 41.5	+59.1	34.6	34 30.8	+59.2	34.9	35 19.9	+59.3	35.3	36 08.7	+59.4	35.8	36 57.3	+59.5	36.2	37 45.5	+59.6	36.7	**44**
45	33 01.0	+58.8	33.6	33 50.9	+58.9	34.0	34 40.6	+59.0	34.3	35 30.0	+59.1	34.7	36 19.2	+59.2	35.2	37 08.1	+59.4	35.6	37 56.8	+59.4	36.0	38 45.1	+59.6	36.5	**45**
46	33 59.8	+58.7	33.3	34 49.8	+58.8	33.7	35 39.6	+59.0	34.1	36 29.1	+59.2	34.5	37 18.4	+59.3	35.0	38 07.5	+59.3	35.4	38 56.2	+59.5	35.9	39 44.7	+59.6	36.4	**46**
47	34 58.5	+58.7	33.1	35 48.6	+58.9	33.5	36 38.6	+58.9	33.9	37 28.3	+59.0	34.3	38 17.7	+59.2	34.8	39 06.8	+59.4	35.2	39 55.7	+59.5	35.7	40 44.3	+59.5	36.2	**47**
48	35 57.2	+58.6	32.8	36 47.5	+58.8	33.2	37 37.5	+59.0	33.7	38 27.3	+59.1	34.1	39 16.9	+59.2	34.6	40 06.2	+59.3	35.0	40 55.2	+59.4	35.5	41 43.8	+59.6	36.0	**48**
49	36 55.8	+58.6	32.6	37 46.3	+58.7	33.0	38 36.5	+58.9	33.4	39 26.4	+59.1	33.9	40 16.1	+59.2	34.3	41 05.5	+59.3	34.8	41 54.6	+59.4	35.3	42 43.4	+59.5	35.9	**49**
50	37 54.4	+58.6	32.3	38 45.0	+58.8	32.7	39 35.4	+58.8	33.2	40 25.5	+59.0	33.6	41 15.3	+59.1	34.1	42 04.8	+59.3	34.6	42 54.0	+59.4	35.1	43 42.9	+59.5	35.7	**50**
51	38 53.0	+58.5	32.0	39 43.8	+58.6	32.5	40 34.2	+58.9	32.9	41 24.5	+59.0	33.4	42 14.4	+59.1	33.9	43 04.1	+59.2	34.4	43 53.4	+59.4	35.0	44 42.4	+59.5	35.5	**51**
52	39 51.5	+58.5	31.7	40 42.4	+58.7	32.2	41 33.1	+58.8	32.7	42 23.5	+58.9	33.2	43 13.5	+59.1	33.7	44 03.3	+59.3	34.2	44 52.8	+59.3	34.8	45 41.9	+59.5	35.3	**52**
53	40 50.0	+58.5	31.5	41 41.1	+58.6	31.9	42 31.9	+58.8	32.4	43 22.4	+58.9	32.9	44 12.6	+59.1	33.4	45 02.6	+59.2	34.0	45 52.1	+59.4	34.5	46 41.4	+59.4	35.1	**53**
54	41 48.5	+58.4	31.2	42 39.7	+58.6	31.6	43 30.7	+58.7	32.1	44 21.3	+58.9	32.6	45 11.7	+59.0	33.2	46 01.8	+59.1	33.7	46 51.5	+59.3	34.3	47 40.8	+59.5	34.9	**54**
55	42 46.9	+58.3	30.8	43 38.3	+58.5	31.3	44 29.4	+58.7	31.8	45 20.2	+58.8	32.4	46 10.7	+59.0	32.9	47 00.9	+59.2	33.5	47 50.8	+59.3	34.1	48 40.3	+59.4	34.7	**55**
56	43 45.2	+58.3	30.5	44 36.8	+58.4	31.0	45 28.1	+58.6	31.5	46 19.0	+58.8	32.1	47 09.7	+59.0	32.7	48 00.1	+59.1	33.2	48 50.1	+59.2	33.9	49 39.7	+59.4	34.5	**56**
57	44 43.5	+58.2	30.2	45 35.2	+58.4	30.7	46 26.7	+58.6	31.2	47 17.8	+58.8	31.8	48 08.7	+58.9	32.4	48 59.2	+59.0	33.0	49 49.3	+59.2	33.6	50 39.1	+59.3	34.3	**57**
58	45 41.7	+58.2	29.9	46 33.6	+58.4	30.4	47 25.3	+58.5	30.9	48 16.6	+58.7	31.5	49 07.6	+58.9	32.1	49 58.2	+59.1	32.7	50 48.5	+59.2	33.4	51 38.4	+59.4	34.1	**58**
59	46 39.9	+58.1	29.5	47 32.0	+58.3	30.0	48 23.8	+58.5	30.6	49 15.3	+58.6	31.2	50 06.5	+58.8	31.8	50 57.3	+59.0	32.4	51 47.7	+59.2	33.1	52 37.8	+59.3	33.8	**59**
60	47 38.0	+58.0	29.1	48 30.3	+58.2	29.7	49 22.3	+58.4	30.2	50 13.9	+58.6	30.9	51 05.3	+58.7	31.5	51 56.3	+58.9	32.1	52 46.9	+59.1	32.8	53 37.1	+59.2	33.6	**60**
61	48 36.0	+58.0	28.7	49 28.5	+58.1	29.3	50 20.7	+58.3	29.9	51 12.5	+58.6	30.5	52 04.0	+58.8	31.2	52 55.2	+58.9	31.8	53 46.0	+59.1	32.6	54 36.3	+59.3	33.3	**61**
62	49 34.0	+57.9	28.4	50 26.6	+58.1	28.9	51 19.0	+58.3	29.5	52 11.1	+58.4	30.2	53 02.8	+58.6	30.8	53 54.1	+58.8	31.5	54 45.1	+59.0	32.3	55 35.6	+59.2	33.0	**62**
63	50 31.9	+57.7	27.9	51 24.7	+58.0	28.5	52 17.3	+58.2	29.1	53 09.5	+58.4	29.8	54 01.4	+58.6	30.5	54 52.9	+58.8	31.2	55 44.1	+58.9	31.9	56 34.8	+59.1	32.7	**63**
64	51 29.6	+57.7	27.5	52 22.7	+57.9	28.1	53 15.5	+58.1	28.7	54 07.9	+58.3	29.4	55 00.0	+58.5	30.1	55 51.7	+58.7	30.8	56 43.0	+59.0	31.6	57 33.9	+59.1	32.4	**64**
65	52 27.3	+57.6	27.1	53 20.6	+57.8	27.7	54 13.6	+58.0	28.3	55 06.2	+58.2	29.0	55 58.5	+58.5	29.7	56 50.4	+58.7	30.5	57 42.0	+58.8	31.3	58 33.0	+59.1	32.1	**65**
66	53 24.9	+57.4	26.6	54 18.4	+57.7	27.2	55 11.6	+57.9	27.9	56 04.4	+58.2	28.6	56 57.0	+58.3	29.3	57 49.1	+58.6	30.1	58 40.8	+58.8	30.9	59 32.1	+58.9	31.8	**66**
67	54 22.3	+57.4	26.1	55 16.1	+57.5	26.7	56 09.5	+57.8	27.4	57 02.6	+58.0	28.1	57 55.3	+58.3	28.9	58 47.7	+58.5	29.7	59 39.6	+58.7	30.5	60 31.0	+59.0	31.4	**67**
68	55 19.7	+57.1	25.6	56 13.6	+57.5	26.2	57 07.3	+57.7	26.9	58 00.6	+57.9	27.6	58 53.6	+58.1	28.4	59 46.2	+58.3	29.2	60 38.3	+58.6	30.1	61 30.0	+58.8	31.0	**68**
69	56 16.8	+57.1	25.1	57 11.1	+57.3	25.7	58 05.0	+57.5	26.4	58 58.5	+57.8	27.1	59 51.7	+58.1	27.9	60 44.5	+58.3	28.8	61 36.9	+58.6	29.6	62 28.8	+58.8	30.6	**69**
70	57 13.9	+56.9	24.5	58 08.4	+57.1	25.2	59 02.5	+57.4	25.9	59 56.3	+57.7	26.6	60 49.8	+57.9	27.4	61 42.8	+58.2	28.3	62 35.5	+58.4	29.2	63 27.6	+58.7	30.1	**70**
71	58 10.8	+56.7	23.9	59 05.5	+57.0	24.6	59 59.9	+57.3	25.3	60 54.0	+57.5	26.1	61 47.7	+57.8	26.9	62 41.0	+58.1	27.7	63 33.9	+58.3	28.7	64 26.3	+58.6	29.7	**71**
72	59 07.5	+56.5	23.3	60 02.5	+56.8	24.0	60 57.2	+57.0	24.7	61 51.5	+57.4	25.5	62 45.5	+57.6	26.3	63 39.1	+57.9	27.2	64 32.2	+58.2	28.1	65 24.9	+58.5	29.2	**72**
73	60 04.0	+56.3	22.6	60 59.3	+56.6	23.3	61 54.2	+56.9	24.0	62 48.9	+57.1	24.8	63 43.1	+57.5	25.7	64 37.0	+57.8	26.6	65 30.4	+58.1	27.6	66 23.4	+58.3	28.6	**73**
74	61 00.3	+56.1	21.9	61 55.9	+56.3	22.6	62 51.1	+56.7	23.3	63 46.0	+57.0	24.1	64 40.6	+57.3	25.0	65 34.8	+57.5	25.9	66 28.5	+57.9	26.9	67 21.7	+58.2	28.0	**74**
75	61 56.4	+55.8	21.2	62 52.2	+56.2	21.9	63 47.8	+56.4	22.6	64 43.0	+56.7	23.4	65 37.9	+57.0	24.3	66 32.3	+57.4	25.2	67 26.4	+57.7	26.3	68 19.9	+58.1	27.4	**75**
76	62 52.2	+55.6	20.4	63 48.4	+55.8	21.1	64 44.2	+56.2	21.8	65 39.7	+56.5	22.7	66 34.9	+56.8	23.5	67 29.7	+57.2	24.5	68 24.1	+57.5	25.5	69 18.0	+57.9	26.7	**76**
77	63 47.8	+55.2	19.5	64 44.2	+55.5	20.2	65 40.4	+55.8	21.0	66 36.2	+56.2	21.8	67 31.7	+56.6	22.7	68 26.9	+56.9	23.7	69 21.6	+57.3	24.8	70 15.9	+57.6	25.9	**77**
78	64 43.0	+54.9	18.6	65 39.7	+55.2	19.3	66 36.2	+55.5	20.1	67 32.4	+55.9	20.9	68 28.3	+56.2	21.8	69 23.8	+56.6	22.8	70 18.9	+57.0	23.9	71 13.5	+57.4	25.1	**78**
79	65 37.9	+54.4	17.7	66 34.9	+54.8	18.4	67 31.7	+55.2	19.1	68 28.3	+55.5	19.9	69 24.5	+55.9	20.9	70 20.4	+56.3	21.8	71 15.9	+56.7	22.9	72 10.9	+57.1	24.1	**79**
80	66 32.3	+54.1	16.6	67 29.7	+54.4	17.3	68 26.9	+54.7	18.1	69 23.8	+55.1	18.9	70 20.4	+55.5	19.8	71 16.7	+55.9	20.8	72 12.6	+56.3	21.9	73 08.0	+56.8	23.1	**80**
81	67 26.4	+53.5	15.5	68 24.1	+53.9	16.2	69 21.6	+54.3	16.9	70 18.9	+54.6	17.7	71 15.9	+55.0	18.6	72 12.6	+55.4	19.6	73 08.9	+55.9	20.7	74 04.8	+56.4	22.0	**81**
82	68 19.9	+53.0	14.3	69 18.0	+53.3	15.0	70 15.9	+53.6	15.7	71 13.5	+54.1	16.5	72 10.9	+54.5	17.4	73 08.0	+54.9	18.3	74 04.8	+55.4	19.4	75 01.2	+55.8	20.7	**82**
83	69 12.9	+52.4	13.0	70 11.3	+52.7	13.6	71 09.5	+53.1	14.3	72 07.6	+53.4	15.1	73 05.4	+53.8	16.0	74 02.9	+54.3	16.9	75 00.2	+54.7	18.0	75 57.0	+55.3	19.2	**83**
84	70 05.3	+51.6	11.6	71 04.0	+51.9	12.2	72 02.6	+52.2	12.9	73 01.0	+52.6	13.6	73 59.2	+53.1	14.4	74 57.2	+53.5	15.3	75 54.9	+54.0	16.4	76 52.3	+54.6	17.6	**84**
85	70 56.9	+50.8	10.1	71 55.9	+51.1	10.6	72 54.8	+51.5	11.2	73 53.6	+51.8	11.9	74 52.3	+52.1	12.7	75 50.7	+52.6	13.5	76 48.9	+53.1	14.5	77 46.9	+53.6	15.7	**85**
86	71 47.7	+49.9	8.4	72 47.0	+50.2	8.9	73 46.3	+50.4	9.4	74 45.4	+50.8	10.0	75 44.4	+51.1	10.7	76 43.3	+51.5	11.5	77 42.0	+52.0	12.4	78 40.5	+52.5	13.5	**86**
87	72 37.6	+48.8	6.6	73 37.2	+49.0	7.0	74 36.7	+49.2	7.4	75 36.2	+49.5	7.9	76 35.5	+49.9	8.5	77 34.8	+50.2	9.2	78 34.0	+50.6	10.0	79 33.0	+51.1	10.9	**87**
88	73 26.4	+47.5	4.6	74 26.2	+47.7	4.9	75 25.9	+47.9	5.2	76 25.7	+48.0	5.6	77 25.4	+48.2	6.0	78 25.0	+48.5	6.5	79 24.6	*+48.8* •	7.2	80 24.1	*+49.2* •	7.9	**88**
89	74 13.9	+46.1	2.4	75 13.9	+46.1	2.6	76 13.8	+46.2	2.8	77 13.7	+46.3	3.0	78 13.6	*+46.4* •	3.2	79 13.5	*+46.5* •	3.5	80 13.4	*+46.6* •	3.9	81 13.3	*+46.7* •	4.3	**89**
90	75 00.0	+44.4	0.0	76 00.0	+44.3	0.0	77 00.0	*+44.2* •	0.0	78 00.0	*+44.2* •	0.0	79 00.0	*+44.0* •	0.0	80 00.0	*+43.9* •	0.0	81 00.0	*+43.7* •	0.0	82 00.0	*+43.5* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 139°, 221°

42°, 318° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 05.4	+59.0	137.0	10 21.4	+59.2	137.1	9 37.4	+59.3	137.3	8 53.3	+59.4	137.4	8 09.1	+59.5	137.5	7 24.9	+59.6	137.6	6 40.6	+59.6	137.6	5 56.2	+59.7	137.7	**0**
1	12 04.4	+59.1	136.8	11 20.6	+59.2	137.0	10 36.7	+59.3	137.1	9 52.7	+59.4	137.2	9 08.6	+59.5	137.3	8 24.5	+59.5	137.4	7 40.2	+59.7	137.5	6 55.9	+59.8	137.6	**1**
2	13 03.5	+59.0	136.6	12 19.8	+59.1	136.8	11 36.0	+59.3	136.9	10 52.1	+59.4	137.1	10 08.1	+59.5	137.2	9 24.0	+59.6	137.3	8 39.9	+59.6	137.4	7 55.7	+59.7	137.5	**2**
3	14 02.5	+59.0	136.5	13 18.9	+59.2	136.6	12 35.3	+59.3	136.8	11 51.5	+59.4	136.9	11 07.6	+59.5	137.1	10 23.6	+59.6	137.2	9 39.5	+59.7	137.3	8 55.4	+59.7	137.4	**3**
4	15 01.5	+59.1	136.3	14 18.1	+59.2	136.5	13 34.6	+59.2	136.6	12 50.9	+59.4	136.8	12 07.1	+59.5	136.9	11 23.2	+59.6	137.1	10 39.2	+59.7	137.2	9 55.1	+59.8	137.3	**4**
5	16 00.6	+59.0	136.1	15 17.3	+59.1	136.3	14 33.8	+59.3	136.5	13 50.3	+59.3	136.6	13 06.6	+59.5	136.8	12 22.8	+59.5	137.0	11 38.9	+59.6	137.1	10 54.9	+59.7	137.2	**5**
6	16 59.6	+59.0	135.9	16 16.4	+59.1	136.1	15 33.1	+59.3	136.3	14 49.6	+59.4	136.5	14 06.1	+59.4	136.7	13 22.3	+59.6	136.8	12 38.5	+59.7	137.0	11 54.6	+59.7	137.1	**6**
7	17 58.6	+59.0	135.7	17 15.5	+59.2	135.9	16 32.4	+59.2	136.1	15 49.0	+59.4	136.3	15 05.5	+59.5	136.5	14 21.9	+59.6	136.7	13 38.2	+59.6	136.9	12 54.3	+59.7	137.1	**7**
8	18 57.6	+58.9	135.5	18 14.7	+59.1	135.8	17 31.6	+59.2	136.0	16 48.4	+59.3	136.2	16 05.0	+59.5	136.4	15 21.5	+59.5	136.6	14 37.8	+59.7	136.8	13 54.0	+59.8	137.0	**8**
9	19 56.5	+59.0	135.3	19 13.8	+59.1	135.6	18 30.8	+59.3	135.8	17 47.7	+59.4	136.0	17 04.5	+59.4	136.3	16 21.0	+59.6	136.5	15 37.5	+59.6	136.7	14 53.8	+59.7	136.9	**9**
10	20 55.5	+59.0	135.1	20 12.9	+59.1	135.4	19 30.1	+59.2	135.6	18 47.1	+59.3	135.9	18 03.9	+59.5	136.1	17 20.6	+59.5	136.3	16 37.1	+59.6	136.6	15 53.5	+59.7	136.8	**10**
11	21 54.5	+58.9	134.9	21 12.0	+59.1	135.2	20 29.3	+59.2	135.5	19 46.4	+59.4	135.7	19 03.4	+59.4	136.0	18 20.1	+59.6	136.2	17 36.7	+59.7	136.4	16 53.2	+59.7	136.7	**11**
12	22 53.4	+58.9	134.7	22 11.1	+59.0	135.0	21 28.5	+59.2	135.3	20 45.8	+59.3	135.6	20 02.8	+59.5	135.8	19 19.7	+59.5	136.1	18 36.4	+59.6	136.3	17 52.9	+59.7	136.5	**12**
13	23 52.3	+58.9	134.5	23 10.1	+59.1	134.8	22 27.7	+59.2	135.1	21 45.1	+59.3	135.4	21 02.3	+59.4	135.7	20 19.2	+59.6	136.0	19 36.0	+59.6	136.2	18 52.6	+59.7	136.4	**13**
14	24 51.2	+58.9	134.3	24 09.2	+59.0	134.6	23 26.9	+59.2	135.0	22 44.4	+59.3	135.3	22 01.7	+59.4	135.5	21 18.8	+59.5	135.8	20 35.6	+59.7	136.1	19 52.3	+59.7	136.3	**14**
15	25 50.1	+58.9	134.1	25 08.2	+59.1	134.4	24 26.1	+59.2	134.8	23 43.7	+59.3	135.1	23 01.1	+59.4	135.4	22 18.3	+59.5	135.7	21 35.3	+59.6	136.0	20 52.0	+59.7	136.2	**15**
16	26 49.0	+58.8	133.9	26 07.3	+59.0	134.2	25 25.3	+59.1	134.6	24 43.0	+59.3	134.9	24 00.5	+59.4	135.2	23 17.8	+59.5	135.5	22 34.9	+59.6	135.8	21 51.7	+59.7	136.1	**16**
17	27 47.8	+58.9	133.7	27 06.3	+59.0	134.0	26 24.4	+59.2	134.4	25 42.3	+59.3	134.8	24 59.9	+59.4	135.1	24 17.3	+59.5	135.4	23 34.5	+59.6	135.7	22 51.4	+59.7	136.0	**17**
18	28 46.7	+58.8	133.4	28 05.3	+58.9	133.8	27 23.6	+59.1	134.2	26 41.6	+59.2	134.6	25 59.3	+59.4	134.9	25 16.8	+59.5	135.3	24 34.1	+59.6	135.6	23 51.1	+59.7	135.9	**18**
19	29 45.5	+58.8	133.2	29 04.2	+59.0	133.6	28 22.7	+59.1	134.0	27 40.8	+59.3	134.4	26 58.7	+59.4	134.8	26 16.3	+59.5	135.1	25 33.7	+59.6	135.5	24 50.8	+59.7	135.8	**19**
20	30 44.3	+58.7	133.0	30 03.2	+58.9	133.4	29 21.8	+59.1	133.8	28 40.1	+59.2	134.2	27 58.1	+59.4	134.6	27 15.8	+59.5	135.0	26 33.3	+59.6	135.3	25 50.5	+59.7	135.7	**20**
21	31 43.0	+58.7	132.7	31 02.1	+58.9	133.2	30 20.9	+59.1	133.6	29 39.3	+59.2	134.0	28 57.5	+59.3	134.4	28 15.3	+59.5	134.8	27 32.9	+59.5	135.2	26 50.2	+59.6	135.6	**21**
22	32 41.7	+58.7	132.5	32 01.0	+58.9	133.0	31 20.0	+59.0	133.4	30 38.5	+59.2	133.9	29 56.8	+59.4	134.3	29 14.8	+59.4	134.7	28 32.4	+59.6	135.1	27 49.8	+59.7	135.4	**22**
23	33 40.4	+58.7	132.3	32 59.9	+58.9	132.7	32 19.0	+59.0	133.2	31 37.7	+59.2	133.7	30 56.2	+59.3	134.1	30 14.2	+59.5	134.5	29 32.0	+59.6	134.9	28 49.5	+59.6	135.3	**23**
24	34 39.1	+58.7	132.0	33 58.8	+58.8	132.5	33 18.0	+59.0	133.0	32 36.9	+59.2	133.5	31 55.5	+59.3	133.9	31 13.7	+59.4	134.4	30 31.6	+59.5	134.8	29 49.1	+59.7	135.2	**24**
25	35 37.8	+58.6	131.7	34 57.6	+58.8	132.3	34 17.0	+59.0	132.8	33 36.1	+59.1	133.3	32 54.8	+59.3	133.7	32 13.1	+59.4	134.2	31 31.1	+59.6	134.7	30 48.8	+59.6	135.1	**25**
26	36 36.4	+58.5	131.5	35 56.4	+58.8	132.0	35 16.0	+59.0	132.6	34 35.2	+59.2	133.1	33 54.1	+59.3	133.6	33 12.5	+59.5	134.0	32 30.7	+59.5	134.5	31 48.4	+59.7	135.0	**26**
27	37 34.9	+58.6	131.2	36 55.2	+58.7	131.8	36 15.0	+58.9	132.3	35 34.4	+59.1	132.9	34 53.4	+59.2	133.4	34 12.0	+59.4	133.9	33 30.2	+59.5	134.4	32 48.1	+59.6	134.8	**27**
28	38 33.5	+58.4	130.9	37 53.9	+58.7	131.5	37 13.9	+58.9	132.1	36 33.5	+59.1	132.6	35 52.6	+59.3	133.2	35 11.4	+59.3	133.7	34 29.7	+59.5	134.2	33 47.7	+59.6	134.7	**28**
29	39 31.9	+58.5	130.6	38 52.6	+58.7	131.3	38 12.8	+58.9	131.9	37 32.6	+59.0	132.4	36 51.9	+59.2	133.0	36 10.7	+59.4	133.5	35 29.2	+59.5	134.0	34 47.3	+59.6	134.6	**29**
30	40 30.4	+58.4	130.3	39 51.3	+58.6	131.0	39 11.7	+58.8	131.6	38 31.6	+59.0	132.2	37 51.1	+59.2	132.8	37 10.1	+59.4	133.3	36 28.7	+59.5	133.9	35 46.9	+59.6	134.4	**30**
31	41 28.8	+58.3	130.0	40 49.9	+58.6	130.7	40 10.5	+58.8	131.4	39 30.6	+59.0	132.0	38 50.3	+59.2	132.6	38 09.5	+59.3	133.2	37 28.2	+59.5	133.7	36 46.5	+59.6	134.3	**31**
32	42 27.1	+58.3	129.7	41 48.5	+58.6	130.4	41 09.3	+58.8	131.1	40 29.6	+59.0	131.7	39 49.5	+59.1	132.4	39 08.8	+59.3	133.0	38 27.7	+59.4	133.6	37 46.1	+59.6	134.1	**32**
33	43 25.4	+58.3	129.4	42 47.1	+58.5	130.1	42 08.1	+58.7	130.8	41 28.6	+59.0	131.5	40 48.6	+59.1	132.1	40 08.1	+59.3	132.8	39 27.1	+59.5	133.4	38 45.7	+59.5	134.0	**33**
34	44 23.7	+58.2	129.1	43 45.6	+58.4	129.8	43 06.8	+58.7	130.5	42 27.6	+58.9	131.2	41 47.7	+59.1	131.9	41 07.4	+59.3	132.6	40 26.6	+59.4	133.2	39 45.2	+59.6	133.8	**34**
35	45 21.9	+58.1	128.7	44 44.0	+58.4	129.5	44 05.5	+58.7	130.3	43 26.5	+58.8	131.0	42 46.8	+59.1	131.7	42 06.7	+59.2	132.4	41 26.0	+59.4	133.0	40 44.8	+59.5	133.7	**35**
36	46 20.0	+58.0	128.4	45 42.4	+58.3	129.2	45 04.2	+58.6	130.0	44 25.3	+58.9	130.7	43 45.9	+59.0	131.4	43 05.9	+59.2	132.2	42 25.4	+59.4	132.8	41 44.3	+59.6	133.5	**36**
37	47 18.0	+58.0	128.0	46 40.7	+58.3	128.8	46 02.8	+58.5	129.7	45 24.2	+58.8	130.4	44 44.9	+59.1	131.2	44 05.1	+59.2	131.9	43 24.8	+59.3	132.6	42 43.9	+59.5	133.3	**37**
38	48 16.0	+57.9	127.6	47 39.0	+58.2	128.5	47 01.3	+58.5	129.3	46 23.0	+58.7	130.2	45 44.0	+58.9	130.9	45 04.3	+59.2	131.7	44 24.1	+59.4	132.4	43 43.4	+59.5	133.1	**38**
39	49 13.9	+57.8	127.2	48 37.2	+58.2	128.1	47 59.8	+58.4	129.0	47 21.7	+58.7	129.9	46 42.9	+59.0	130.7	46 03.5	+59.1	131.5	45 23.5	+59.3	132.2	44 42.9	+59.4	133.0	**39**
40	50 11.7	+57.7	126.8	49 35.4	+58.0	127.7	48 58.2	+58.4	128.7	48 20.4	+58.6	129.5	47 41.9	+58.8	130.4	47 02.6	+59.1	131.2	46 22.8	+59.3	132.0	45 42.3	+59.5	132.8	**40**
41	51 09.4	+57.6	126.4	50 33.4	+58.0	127.4	49 56.6	+58.3	128.3	49 19.0	+58.6	129.2	48 40.7	+58.9	130.1	48 01.7	+59.1	131.0	47 22.1	+59.2	131.8	46 41.8	+59.4	132.6	**41**
42	52 07.0	+57.5	125.9	51 31.4	+57.9	126.9	50 54.9	+58.2	127.9	50 17.6	+58.6	128.9	49 39.6	+58.8	129.8	49 00.8	+59.0	130.7	48 21.3	+59.3	131.6	47 41.2	+59.4	132.4	**42**
43	53 04.5	+57.4	125.5	52 29.3	+57.8	126.5	51 53.1	+58.2	127.5	51 16.2	+58.4	128.5	50 38.4	+58.7	129.5	49 59.8	+59.0	130.4	49 20.6	+59.2	131.3	48 40.6	+59.4	132.2	**43**
44	54 01.9	+57.3	125.0	53 27.1	+57.7	126.1	52 51.3	+58.0	127.1	52 14.6	+58.4	128.2	51 37.1	+58.7	129.2	50 58.8	+59.0	130.1	50 19.8	+59.2	131.1	49 40.0	+59.4	132.0	**44**
45	54 59.2	+57.1	124.4	54 24.8	+57.5	125.6	53 49.3	+58.0	126.7	53 13.0	+58.3	127.8	52 35.8	+58.6	128.8	51 57.8	+58.9	129.8	51 19.0	+59.1	130.8	50 39.4	+59.3	131.7	**45**
46	55 56.3	+57.0	123.9	55 22.3	+57.5	125.1	54 47.3	+57.9	126.3	54 11.3	+58.3	127.4	53 34.4	+58.6	128.5	52 56.7	+58.8	129.5	52 18.1	+59.1	130.5	51 38.7	+59.3	131.5	**46**
47	56 53.3	+56.8	123.3	56 19.8	+57.3	124.6	55 45.2	+57.7	125.8	55 09.6	+58.1	127.0	54 33.0	+58.5	128.1	53 55.5	+58.8	129.2	53 17.2	+59.0	130.2	52 38.0	+59.3	131.2	**47**
48	57 50.1	+56.7	122.7	57 17.1	+57.2	124.1	56 42.9	+57.7	125.3	56 07.7	+58.1	126.5	55 31.5	+58.4	127.7	54 54.3	+58.8	128.9	54 16.2	+59.0	129.9	53 37.3	+59.2	131.0	**48**
49	58 46.8	+56.4	122.1	58 14.3	+57.0	123.5	57 40.6	+57.5	124.8	57 05.8	+57.9	126.1	56 29.9	+58.3	127.3	55 53.1	+58.6	128.5	55 15.2	+59.0	129.6	54 36.5	+59.2	130.7	**49**
50	59 43.2	+56.3	121.5	59 11.3	+56.8	122.9	58 38.1	+57.3	124.3	58 03.7	+57.8	125.6	57 28.2	+58.3	126.9	56 51.7	+58.6	128.1	56 14.2	+58.9	129.3	55 35.7	+59.2	130.4	**50**
51	60 39.5	+56.0	120.8	60 08.1	+56.7	122.3	59 35.4	+57.2	123.7	59 01.5	+57.7	125.1	58 26.5	+58.1	126.4	57 50.3	+58.5	127.7	57 13.1	+58.8	128.9	56 34.9	+59.1	130.1	**51**
52	61 35.5	+55.7	120.0	61 04.8	+56.4	121.6	60 32.6	+57.1	123.1	59 59.2	+57.6	124.6	59 24.6	+58.0	126.0	58 48.8	+58.4	127.3	58 11.9	+58.8	128.6	57 34.0	+59.1	129.8	**52**
53	62 31.2	+55.5	119.2	62 01.2	+56.2	120.9	61 29.7	+56.8	122.5	60 56.8	+57.4	124.0	60 22.6	+57.9	125.4	59 47.2	+58.4	126.8	59 10.7	+58.7	128.2	58 33.1	+59.0	129.5	**53**
54	63 26.7	+55.1	118.4	62 57.4	+55.9	120.1	62 26.5	+56.6	121.8	61 54.2	+57.2	123.4	61 20.5	+57.8	124.9	60 45.6	+58.2	126.4	60 09.4	+58.6	127.8	59 32.1	+58.9	129.1	**54**
55	64 21.8	+54.8	117.5	63 53.3	+55.7	119.3	63 23.1	+56.4	121.0	62 51.4	+57.1	122.7	62 18.3	+57.6	124.3	61 43.8	+58.1	125.9	61 08.0	+58.5	127.3	60 31.0	+58.9	128.8	**55**
56	65 16.6	+54.5	116.5	64 49.0	+55.3	118.4	64 19.5	+56.2	120.3	63 48.5	+56.8	122.0	63 15.9	+57.5	123.7	62 41.9	+58.0	125.3	62 06.5	+58.5	126.9	61 29.9	+58.8	128.4	**56**
57	66 11.1	+53.9	115.5	65 44.3	+54.9	117.5	65 15.7	+55.8	119.4	64 45.3	+56.6	121.3	64 13.4	+57.2	123.1	63 39.9	+57.8	124.8	63 05.0	+58.3	126.4	62 28.7	+58.7	127.9	**57**
58	67 05.0	+53.5	114.4	66 39.2	+54.6	116.5	66 11.5	+55.5	118.6	65 41.9	+56.3	120.5	65 10.6	+57.1	122.4	64 37.7	+57.7	124.2	64 03.3	+58.2	125.9	63 27.4	+58.7	127.5	**58**
59	67 58.5	+53.0	113.2	67 33.8	+54.1	115.5	67 07.0	+55.1	117.6	66 38.2	+56.1	119.6	66 07.7	+56.8	121.6	65 35.4	+57.5	123.5	65 01.5	+58.0	125.3	64 26.1	+58.5	127.0	**59**
60	68 51.5	+52.3	111.9	68 27.9	+53.6	114.3	68 02.1	+54.7	116.6	67 34.3	+55.7	118.7	67 04.5	+56.5	120.8	66 32.9	+57.2	122.8	65 59.5	+57.9	124.7	65 24.6	+58.4	126.5	**60**
61	69 43.8	+51.6	110.6	69 21.5	+53.0	113.0	68 56.8	+54.3	115.4	68 30.0	+55.3	117.7	68 01.0	+56.3	119.9	67 30.1	+57.1	122.0	66 57.4	+57.8	124.0	66 23.0	+58.3	125.9	**61**
62	70 35.4	+50.7	109.1	70 14.5	+52.3	111.7	69 51.1	+53.6	114.2	69 25.3	+54.9	116.7	68 57.3	+55.9	119.0	68 27.2	+56.8	121.2	67 55.2	+57.5	123.3	67 21.3	+58.2	125.3	**62**
63	71 26.1	+49.9	107.4	71 06.8	+51.5	110.2	70 44.7	+53.1	112.9	70 20.2	+54.3	115.5	69 53.2	+55.5	117.9	69 24.0	+56.4	120.3	68 52.7	+57.3	122.5	68 19.5	+57.9	124.7	**63**
64	72 16.0	+48.8	105.6	71 58.3	+50.7	108.6	71 37.8	+52.3	111.4	71 14.5	+53.8	114.2	70 48.7	+55.0	116.8	70 20.4	+56.2	119.3	69 50.0	+57.0	121.7	69 17.4	+57.8	124.0	**64**
65	73 04.8	+47.6	103.7	72 49.0	+49.7	106.8	72 30.1	+51.5	109.9	72 08.3	+53.1	112.8	71 43.7	+54.5	115.6	71 16.6	+55.7	118.2	70 47.0	+56.7	120.8	70 15.2	+57.6	123.2	**65**
66	73 52.4	+46.2	101.5	73 38.7	+48.5	104.9	73 21.6	+50.6	108.1	73 01.4	+52.4	111.2	72 38.2	+54.0	114.2	72 12.3	+55.2	117.1	71 43.7	+56.4	119.8	71 12.8	+57.3	122.3	**66**
67	74 38.6	+44.5	99.2	74 27.2	+47.1	102.7	74 12.2	+49.4	106.2	73 53.8	+51.4	109.5	73 32.2	+53.1	112.7	73 07.5	+54.7	115.8	72 40.1	+55.9	118.6	72 10.1	+57.0	121.4	**67**
68	75 23.1	*+42.6*•	96.6	75 14.3	+45.4	100.4	75 01.6	+48.0	104.0	74 45.2	+50.3	107.6	74 25.3	+52.4	111.0	74 02.2	+54.1	114.3	73 36.0	+55.5	117.4	73 07.1	+56.6	120.3	**68**
69	76 05.7	*+40.5*•	93.7	75 59.7	*+43.7*•	97.7	75 49.6	+46.5	101.7	75 35.5	+49.1	105.5	75 17.7	+51.3	109.2	74 56.3	+53.2	112.7	74 31.5	+54.9	116.0	74 03.7	+56.2	119.2	**69**
70	76 46.2	*+37.9*•	90.6	76 43.4	*+41.3*•	94.8	76 36.1	*+44.7*•	99.0	76 24.6	+47.6	103.1	76 09.0	+50.1	107.1	75 49.5	+52.3	110.8	75 26.4	+54.2	114.4	74 59.9	+55.8	117.8	**70**
71	77 24.1	*+34.9*•	87.1	77 24.7	*+38.9*•	91.6	77 20.8	*+42.4*•	96.0	77 12.2	*+45.7*•	100.4	76 59.1	+48.7	104.7	76 41.8	+51.2	108.8	76 20.6	+53.3	112.7	75 55.7	+55.0	116.4	**71**
72	77 59.0	*+31.5*•	83.3	78 03.6	*+35.7*•	88.0	78 03.2	*+39.8*•	92.7	77 57.9	*+43.5*•	97.4	77 47.8	*+46.8*•	102.0	77 33.0	+49.8	106.4	77 13.9	+52.3	110.7	76 50.7	+54.4	114.7	**72**
73	78 30.5	*+27.6*•	79.1	78 39.3	*+32.3*•	84.0	78 43.0	*+36.7*•	89.0	78 41.4	*+40.9*•	94.0	78 34.6	*+44.7*•	99.0	78 22.8	+48.1	103.8	78 06.2	+51.0	108.4	77 45.1	+53.4	112.8	**73**
74	78 58.1	*+23.3*•	74.6	79 11.6	*+28.1*•	79.6	79 19.7	*+33.0*•	84.8	79 22.3	*+37.7*•	90.2	79 19.3	*+42.1*•	95.5	79 10.9	*+46.0*•	100.7	78 57.2	+49.4	105.7	78 38.5	+52.2	110.5	**74**
75	79 21.4	*+18.3*•	69.7	79 39.7	*+23.5*•	74.8	79 52.7	*+28.7*•	80.2	80 00.0	*+33.9*•	85.8	80 01.4	*+38.8*•	91.5	79 56.9	*+43.4*•	97.1	79 46.6	*+47.3*•	102.6	79 30.7	+50.8	107.9	**75**
76	79 39.7	*+13.0*•	64.4	80 03.2	*+18.2*•	69.6	80 21.4	*+23.7*•	75.1	80 33.9	*+29.3*•	80.9	80 40.2	*+34.9*•	86.9	80 40.3	*+40.0*•	93.0	80 33.9	*+44.8*•	99.0	80 21.5	*+48.8*•	104.9	**76**
77	79 52.7	*+7.3*•	58.9	80 21.4	*+12.5*•	64.0	80 45.1	*+18.1*•	69.5	81 03.2	*+24.0*•	75.5	81 15.1	*+30.1*•	81.8	81 20.3	*+36.0*•	88.3	81 18.7	*+41.5*•	94.8	81 10.3	*+46.3*•	101.2	**77**
78	80 00.0	*+1.4*•	53.2	80 33.9	*+6.3*•	58.1	81 03.2	*+11.9*•	63.5	81 27.2	*+18.0*•	69.4	81 45.2	*+24.3*•	75.9	81 56.3	*+30.9*•	82.8	82 00.2	*+37.2*•	89.8	81 56.6	*+43.1*•	96.9	**78**
79	80 01.4	*−4.5*•	47.5	80 40.2	*+0.1*•	52.0	81 15.1	*+5.2*•	57.1	81 45.2	*+11.1*•	62.9	82 09.5	*+17.7*•	69.4	82 27.2	*+24.7*•	76.4	82 37.4	*+31.8*•	84.0	82 39.7	*+38.7*•	91.7	**79**
80	79 56.9	*−10.3*•	41.7	80 40.3	*−6.4*•	45.8	81 20.3	*−1.6*•	50.5	81 56.3	*+3.9*•	55.9	82 27.2	*+10.2*•	62.2	82 51.9	*+17.3*•	69.3	83 09.2	*+25.2*•	77.1	83 18.4	*+32.9*•	85.4	**80**
81	79 46.6	*−15.9*•	36.1	80 33.9	*−12.4*•	39.7	81 18.7	*−8.4*•	43.9	82 00.2	*−3.6*•	48.8	82 37.4	*+2.3*•	54.6	83 09.2	*+9.2*•	61.4	83 34.4	*+16.9*•	69.2	83 51.3	*+25.6*•	78.0	**81**
82	79 30.7	*−20.9*•	30.8	80 21.5	*−18.2*•	33.8	81 10.3	*−14.9*•	37.4	81 56.6	*−10.8*•	41.6	82 39.7	*−5.8*•	46.8	83 18.4	*+0.3*•	53.0	83 51.3	*+7.8*•	60.5	84 16.9	*+16.5*•	69.2	**82**
83	79 09.8	*−25.6*•	25.7	80 03.3	*−23.5*•	28.2	80 55.4	*−20.8*•	31.1	81 45.8	*−17.6*•	34.7	82 33.9	*−13.6*•	39.1	83 18.7	*−8.5*•	44.4	83 59.1	*−2.1*•	51.1	84 33.4	*+6.0*•	59.3	**83**
84	78 44.2	*−29.7*•	21.0	79 39.8	*−28.1*•	22.9	80 34.6	*−26.1*•	25.3	81 28.2	*−23.7*•	28.1	82 20.3	*−20.7*•	31.6	83 10.2	*−16.9*•	36.0	83 57.0	*−11.8*•	41.6	84 39.4	*−5.1*•	48.7	**84**
85	78 14.5	*−33.4*•	16.6	79 11.7	*−32.2*•	18.1	80 08.5	*−30.9*•	19.9	81 04.5	*−29.1*•	22.1	81 59.6	*−27.0*•	24.7	82 53.3	*−24.2*•	28.1	83 45.2	*−20.6*•	32.4	84 34.3	*−15.8*•	38.1	**85**
86	77 41.1	*−36.5*•	12.6	78 39.5	*−35.7*•	13.7	79 37.6	*−34.8*•	15.0	80 35.4	*−33.7*•	16.6	81 32.6	*−32.3*•	18.5	82 29.1	*−30.5*•	20.9	83 24.6	*−28.2*•	24.0	84 18.5	*−25.0*•	28.1	**86**
87	77 04.6	*−39.3*•	9.0	78 03.8	*−38.8*•	9.7	79 02.8	*−38.2*•	10.6	80 01.7	*−37.5*•	11.7	81 00.3	*−36.7*•	12.9	81 58.6	*−35.6*•	14.5	82 56.4	*−34.3*•	16.6	83 53.5	*−32.4*•	19.2	**87**
88	76 25.3	*−41.6*•	5.7	77 25.0	*−41.4*•	6.2	78 24.6	*−41.1*•	6.7	79 24.2	*−40.8*•	7.3	80 23.6	*−40.3*•	8.0	81 23.0	*−39.8*•	9.0	82 22.1	*−39.1*•	10.1	83 21.1	*−38.3*•	11.6	**88**
89	75 43.7	−43.7	2.7	76 43.6	*−43.6*•	2.9	77 43.5	*−43.5*•	3.1	78 43.4	*−43.4*•	3.4	79 43.3	*−43.3*•	3.8	80 43.2	*−43.2*•	4.2	81 43.0	*−43.0*•	4.6	82 42.8	*−42.8*•	5.3	**89**
90	75 00.0	−45.4	0.0	76 00.0	−45.5	0.0	77 00.0	−45.5	0.0	78 00.0	*−45.6*•	0.0	79 00.0	*−45.7*•	0.0	80 00.0	*−45.8*•	0.0	81 00.0	*−46.0*•	0.0	82 00.0	*−46.1*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	11 05.4	–59.1	137.0	10 21.4	–59.2	137.1	9 37.4	–59.3	137.3	8 53.3	–59.4	137.4	8 09.1	–59.5	137.5	7 24.9	–59.6	137.6	6 40.6	–59.7	137.6	5 56.2	–59.7	137.7	**0**
1	10 06.3	–59.1	137.2	9 22.2	–59.1	137.3	8 38.1	–59.3	137.4	7 53.9	–59.4	137.5	7 09.6	–59.5	137.6	6 25.3	–59.6	137.7	5 40.9	–59.7	137.8	4 56.5	–59.8	137.8	**1**
2	9 07.2	–59.0	137.4	8 23.1	–59.2	137.5	7 38.8	–59.3	137.6	6 54.5	–59.4	137.7	6 10.1	–59.5	137.7	5 25.7	–59.6	137.8	4 41.2	–59.6	137.9	3 56.7	–59.7	137.9	**2**
3	8 08.2	–59.1	137.5	7 23.9	–59.2	137.6	6 39.5	–59.3	137.7	5 55.1	–59.4	137.8	5 10.6	–59.5	137.9	4 26.1	–59.6	137.9	3 41.6	–59.7	138.0	2 57.0	–59.8	138.0	**3**
4	7 09.1	–59.1	137.7	6 24.7	–59.2	137.8	5 40.2	–59.3	137.9	4 55.7	–59.4	137.9	4 11.1	–59.5	138.0	3 26.5	–59.6	138.0	2 41.9	–59.7	138.1	1 57.2	–59.7	138.1	**4**
5	6 10.0	–59.1	137.9	5 25.5	–59.2	138.0	4 40.9	–59.3	138.0	3 56.3	–59.5	138.1	3 11.6	–59.5	138.1	2 26.9	–59.6	138.1	1 42.2	–59.7	138.2	0 57.5	–59.7	138.2	**5**
6	5 10.9	–59.1	138.1	4 26.3	–59.2	138.1	3 41.6	–59.3	138.2	2 56.8	–59.4	138.2	2 12.1	–59.5	138.2	1 27.3	–59.6	138.3	0 42.5	–59.6	138.3	0 02.2	+59.8	41.7	**6**
7	4 11.8	–59.1	138.2	3 27.1	–59.3	138.3	2 42.3	–59.4	138.3	1 57.4	–59.4	138.4	1 12.6	–59.5	138.4	0 27.7	–59.6	138.4	0 17.1	+59.7	41.6	1 02.0	+59.7	41.6	**7**
8	3 12.7	–59.0	138.4	2 27.8	–59.2	138.5	1 42.9	–59.3	138.5	0 58.0	–59.4	138.5	0 13.1	–59.5	138.5	0 31.9	+59.6	41.5	1 16.8	+59.7	41.5	2 01.7	+59.8	41.5	**8**
9	2 13.7	–59.1	138.6	1 28.6	–59.2	138.6	0 43.6	–59.3	138.6	0 01.4	+59.4	41.4	0 46.4	+59.5	41.4	1 31.5	+59.6	41.4	2 16.5	+59.6	41.4	3 01.5	+59.7	41.4	**9**
10	1 14.6	–59.1	138.8	0 29.4	–59.2	138.8	0 15.7	+59.3	41.2	1 00.8	+59.4	41.2	1 45.9	+59.6	41.2	2 31.1	+59.5	41.3	3 16.1	+59.7	41.3	4 01.2	+59.7	41.3	**10**
11	0 15.5	–59.1	138.9	0 29.8	+59.2	41.1	1 15.0	+59.3	41.1	2 00.2	+59.5	41.1	2 45.5	+59.5	41.1	3 30.6	+59.6	41.2	4 15.8	+59.7	41.2	5 00.9	+59.8	41.3	**11**
12	0 43.6	+59.1	40.9	1 29.0	+59.2	40.9	2 14.3	+59.3	40.9	2 59.7	+59.4	41.0	3 45.0	+59.5	41.0	4 30.2	+59.6	41.0	5 15.5	+59.6	41.1	6 00.7	+59.7	41.2	**12**
13	1 42.7	+59.1	40.7	2 28.2	+59.2	40.7	3 13.6	+59.4	40.8	3 59.1	+59.4	40.8	4 44.5	+59.5	40.9	5 29.8	+59.6	40.9	6 15.1	+59.7	41.0	7 00.4	+59.7	41.1	**13**
14	2 41.8	+59.1	40.5	3 27.4	+59.2	40.6	4 13.0	+59.3	40.6	4 58.5	+59.4	40.7	5 44.0	+59.5	40.7	6 29.4	+59.6	40.8	7 14.8	+59.7	40.9	8 00.1	+59.8	41.0	**14**
15	3 40.9	+59.1	40.4	4 26.6	+59.2	40.4	5 12.3	+59.3	40.5	5 57.9	+59.4	40.5	6 43.5	+59.5	40.6	7 29.0	+59.6	40.7	8 14.5	+59.6	40.8	8 59.9	+59.7	40.9	**15**
16	4 40.0	+59.1	40.2	5 25.8	+59.2	40.2	6 11.6	+59.3	40.3	6 57.3	+59.4	40.4	7 43.0	+59.5	40.5	8 28.6	+59.6	40.6	9 14.1	+59.7	40.7	9 59.6	+59.7	40.8	**16**
17	5 39.1	+59.1	40.0	6 25.0	+59.2	40.1	7 10.9	+59.3	40.2	7 56.7	+59.4	40.2	8 42.5	+59.5	40.3	9 28.2	+59.6	40.4	10 13.8	+59.7	40.6	10 59.3	+59.8	40.7	**17**
18	6 38.2	+59.0	39.8	7 24.2	+59.2	39.9	8 10.2	+59.3	40.0	8 56.1	+59.4	40.1	9 42.0	+59.5	40.2	10 27.8	+59.5	40.3	11 13.5	+59.6	40.5	11 59.1	+59.7	40.6	**18**
19	7 37.2	+59.1	39.7	8 23.4	+59.2	39.8	9 09.5	+59.3	39.9	9 55.5	+59.4	40.0	10 41.5	+59.5	40.1	11 27.3	+59.6	40.2	12 13.1	+59.7	40.3	12 58.8	+59.7	40.5	**19**
20	8 36.3	+59.1	39.5	9 22.6	+59.2	39.6	10 08.8	+59.3	39.7	10 54.9	+59.4	39.8	11 41.0	+59.4	39.9	12 26.9	+59.6	40.1	13 12.8	+59.6	40.2	13 58.5	+59.7	40.4	**20**
21	9 35.4	+59.0	39.3	10 21.8	+59.1	39.4	11 08.1	+59.3	39.5	11 54.3	+59.4	39.7	12 40.4	+59.5	39.8	13 26.5	+59.5	40.0	14 12.4	+59.7	40.1	14 58.2	+59.8	40.3	**21**
22	10 34.4	+59.1	39.1	11 20.9	+59.2	39.3	12 07.4	+59.2	39.4	12 53.7	+59.4	39.5	13 39.9	+59.5	39.7	14 26.0	+59.6	39.8	15 12.1	+59.6	40.0	15 58.0	+59.7	40.2	**22**
23	11 33.5	+59.1	39.0	12 20.1	+59.2	39.1	13 06.6	+59.3	39.2	13 53.1	+59.4	39.4	14 39.4	+59.5	39.5	15 25.6	+59.6	39.7	16 11.7	+59.6	39.9	16 57.7	+59.7	40.1	**23**
24	12 32.6	+59.0	38.8	13 19.3	+59.2	38.9	14 05.9	+59.3	39.1	14 52.5	+59.3	39.2	15 38.9	+59.4	39.4	16 25.2	+59.5	39.6	17 11.3	+59.7	39.8	17 57.4	+59.7	40.0	**24**
25	13 31.6	+59.0	38.6	14 18.5	+59.1	38.7	15 05.2	+59.3	38.9	15 51.8	+59.4	39.1	16 38.3	+59.5	39.3	17 24.7	+59.6	39.5	18 11.0	+59.6	39.7	18 57.1	+59.7	39.9	**25**
26	14 30.6	+59.1	38.4	15 17.6	+59.1	38.6	16 04.5	+59.2	38.7	16 51.2	+59.4	38.9	17 37.8	+59.5	39.1	18 24.3	+59.5	39.3	19 10.6	+59.6	39.5	19 56.8	+59.7	39.8	**26**
27	15 29.7	+59.0	38.2	16 16.7	+59.2	38.4	17 03.7	+59.3	38.6	17 50.6	+59.3	38.8	18 37.3	+59.4	39.0	19 23.8	+59.6	39.2	20 10.2	+59.7	39.4	20 56.5	+59.7	39.7	**27**
28	16 28.7	+59.0	38.0	17 15.9	+59.1	38.2	18 03.0	+59.2	38.4	18 49.9	+59.3	38.6	19 36.7	+59.4	38.8	20 23.4	+59.5	39.1	21 09.9	+59.6	39.3	21 56.2	+59.7	39.6	**28**
29	17 27.7	+59.0	37.8	18 15.0	+59.1	38.0	19 02.2	+59.2	38.2	19 49.2	+59.4	38.5	20 36.1	+59.5	38.7	21 22.9	+59.5	38.9	22 09.5	+59.6	39.2	22 55.9	+59.7	39.5	**29**
30	18 26.7	+59.0	37.7	19 14.1	+59.1	37.9	20 01.4	+59.2	38.1	20 48.6	+59.3	38.3	21 35.6	+59.4	38.6	22 22.4	+59.5	38.8	23 09.1	+59.6	39.1	23 55.6	+59.7	39.3	**30**
31	19 25.7	+58.9	37.5	20 13.2	+59.1	37.7	21 00.6	+59.3	37.9	21 47.9	+59.3	38.2	22 35.0	+59.4	38.4	23 21.9	+59.6	38.7	24 08.7	+59.6	38.9	24 55.3	+59.7	39.2	**31**
32	20 24.6	+59.0	37.3	21 12.3	+59.1	37.5	21 59.9	+59.2	37.7	22 47.2	+59.3	38.0	23 34.4	+59.4	38.3	24 21.5	+59.5	38.5	25 08.3	+59.6	38.8	25 55.0	+59.6	39.1	**32**
33	21 23.6	+59.0	37.1	22 11.4	+59.1	37.3	22 59.1	+59.1	37.6	23 46.5	+59.3	37.8	24 33.8	+59.4	38.1	25 21.0	+59.5	38.4	26 07.9	+59.6	38.7	26 54.6	+59.7	39.0	**33**
34	22 22.6	+58.9	36.9	23 10.5	+59.0	37.1	23 58.2	+59.2	37.4	24 45.8	+59.3	37.7	25 33.2	+59.4	37.9	26 20.5	+59.5	38.2	27 07.5	+59.6	38.6	27 54.3	+59.7	38.9	**34**
35	23 21.5	+58.9	36.7	24 09.5	+59.1	36.9	24 57.4	+59.2	37.2	25 45.1	+59.3	37.5	26 32.6	+59.4	37.8	27 20.0	+59.4	38.1	28 07.1	+59.5	38.4	28 54.0	+59.6	38.8	**35**
36	24 20.4	+58.9	36.5	25 08.6	+59.0	36.7	25 56.6	+59.1	37.0	26 44.4	+59.3	37.3	27 32.0	+59.4	37.6	28 19.4	+59.5	37.9	29 06.6	+59.6	38.3	29 53.6	+59.7	38.6	**36**
37	25 19.3	+58.9	36.2	26 07.6	+59.0	36.5	26 55.7	+59.2	36.8	27 43.7	+59.2	37.1	28 31.4	+59.3	37.5	29 18.9	+59.5	37.8	30 06.2	+59.6	38.1	30 53.3	+59.6	38.5	**37**
38	26 18.2	+58.8	36.0	27 06.6	+59.0	36.3	27 54.9	+59.1	36.6	28 42.9	+59.2	37.0	29 30.7	+59.4	37.3	30 18.4	+59.4	37.6	31 05.8	+59.5	38.0	31 52.9	+59.6	38.4	**38**
39	27 17.0	+58.9	35.8	28 05.6	+59.0	36.1	28 54.0	+59.1	36.4	29 42.1	+59.3	36.8	30 30.1	+59.3	37.1	31 17.8	+59.4	37.5	32 05.3	+59.5	37.9	32 52.5	+59.7	38.3	**39**
40	28 15.9	+58.8	35.6	29 04.6	+58.9	35.9	29 53.1	+59.0	36.2	30 41.4	+59.2	36.6	31 29.4	+59.3	36.9	32 17.2	+59.5	37.3	33 04.8	+59.6	37.7	33 52.2	+59.6	38.1	**40**
41	29 14.7	+58.8	35.4	30 03.5	+59.0	35.7	30 52.1	+59.1	36.0	31 40.6	+59.1	36.4	32 28.7	+59.3	36.8	33 16.7	+59.4	37.2	34 04.4	+59.5	37.6	34 51.8	+59.6	38.0	**41**
42	30 13.5	+58.8	35.1	31 02.5	+58.9	35.5	31 51.2	+59.0	35.8	32 39.7	+59.2	36.2	33 28.0	+59.3	36.6	34 16.1	+59.4	37.0	35 03.9	+59.5	37.4	35 51.4	+59.6	37.8	**42**
43	31 12.3	+58.7	34.9	32 01.4	+58.8	35.3	32 50.2	+59.1	35.6	33 38.9	+59.1	36.0	34 27.3	+59.3	36.4	35 15.5	+59.4	36.8	36 03.4	+59.5	37.3	36 51.0	+59.6	37.7	**43**
44	32 11.0	+58.7	34.7	33 00.2	+58.9	35.0	33 49.3	+59.0	35.4	34 38.0	+59.2	35.8	35 26.6	+59.2	36.2	36 14.9	+59.3	36.6	37 02.9	+59.4	37.1	37 50.6	+59.6	37.6	**44**
45	33 09.7	+58.7	34.4	33 59.1	+58.8	34.8	34 48.3	+58.9	35.2	35 37.2	+59.1	35.6	36 25.8	+59.3	36.0	37 14.2	+59.4	36.5	38 02.3	+59.5	36.9	38 50.2	+59.5	37.4	**45**
46	34 08.4	+58.7	34.2	34 57.9	+58.8	34.6	35 47.2	+59.0	35.0	36 36.3	+59.1	35.4	37 25.1	+59.2	35.8	38 13.6	+59.3	36.3	39 01.8	+59.4	36.8	39 49.7	+59.6	37.2	**46**
47	35 07.1	+58.6	33.9	35 56.7	+58.8	34.3	36 46.2	+58.9	34.7	37 35.4	+59.0	35.2	38 24.3	+59.2	35.6	39 12.9	+59.3	36.1	40 01.2	+59.5	36.6	40 49.3	+59.5	37.1	**47**
48	36 05.7	+58.6	33.6	36 55.5	+58.8	34.1	37 45.1	+58.9	34.5	38 34.4	+59.0	34.9	39 23.5	+59.1	35.4	40 12.2	+59.3	35.9	41 00.7	+59.4	36.4	41 48.8	+59.5	36.9	**48**
49	37 04.3	+58.5	33.4	37 54.3	+58.7	33.8	38 44.0	+58.8	34.2	39 33.4	+59.0	34.7	40 22.6	+59.2	35.2	41 11.5	+59.3	35.7	42 00.1	+59.4	36.2	42 48.3	+59.5	36.8	**49**
50	38 02.8	+58.5	33.1	38 53.0	+58.6	33.5	39 42.8	+58.9	34.0	40 32.4	+59.0	34.5	41 21.8	+59.1	35.0	42 10.8	+59.2	35.5	42 59.5	+59.3	36.0	43 47.8	+59.5	36.6	**50**
51	39 01.3	+58.5	32.8	39 51.6	+58.7	33.3	40 41.7	+58.7	33.7	41 31.4	+59.0	34.2	42 20.9	+59.1	34.7	43 10.0	+59.2	35.3	43 58.8	+59.4	35.8	44 47.3	+59.5	36.4	**51**
52	39 59.8	+58.4	32.5	40 50.3	+58.5	33.0	41 40.4	+58.8	33.5	42 30.4	+58.9	34.0	43 20.0	+59.0	34.5	44 09.2	+59.2	35.0	44 58.2	+59.3	35.6	45 46.8	+59.5	36.2	**52**
53	40 58.2	+58.4	32.2	41 48.8	+58.6	32.7	42 39.2	+58.7	33.2	43 29.3	+58.8	33.7	44 19.0	+59.0	34.3	45 08.4	+59.2	34.8	45 57.5	+59.3	35.4	46 46.3	+59.4	36.0	**53**
54	41 56.6	+58.3	31.9	42 47.4	+58.5	32.4	43 37.9	+58.7	32.9	44 28.1	+58.9	33.4	45 18.0	+59.0	34.0	46 07.6	+59.1	34.6	46 56.8	+59.3	35.2	47 45.7	+59.4	35.8	**54**
55	42 54.9	+58.3	31.6	43 45.9	+58.4	32.1	44 36.6	+58.6	32.6	45 27.0	+58.7	33.2	46 17.0	+59.0	33.7	47 06.7	+59.1	34.3	47 56.1	+59.3	34.9	48 45.1	+59.4	35.6	**55**
56	43 53.2	+58.2	31.3	44 44.3	+58.4	31.8	45 35.2	+58.6	32.3	46 25.7	+58.8	32.9	47 16.0	+58.9	33.5	48 05.8	+59.1	34.1	48 55.4	+59.2	34.7	49 44.5	+59.3	35.4	**56**
57	44 51.4	+58.2	30.9	45 42.7	+58.4	31.5	46 33.8	+58.5	32.0	47 24.5	+58.7	32.6	48 14.9	+58.8	33.2	49 04.9	+59.0	33.8	49 54.6	+59.2	34.5	50 43.8	+59.4	35.2	**57**
58	45 49.6	+58.0	30.6	46 41.1	+58.2	31.1	47 32.3	+58.4	31.7	48 23.2	+58.6	32.3	49 13.7	+58.9	32.9	50 03.9	+59.0	33.5	50 53.8	+59.1	34.2	51 43.2	+59.3	34.9	**58**
59	46 47.6	+58.1	30.2	47 39.3	+58.3	30.8	48 30.7	+58.4	31.3	49 21.8	+58.6	31.9	50 12.6	+58.7	32.6	51 02.9	+59.0	33.2	51 52.9	+59.1	33.9	52 42.5	+59.2	34.7	**59**
60	47 45.7	+57.9	29.8	48 37.6	+58.1	30.4	49 29.1	+58.4	31.0	50 20.4	+58.5	31.6	51 11.3	+58.7	32.3	52 01.9	+58.9	32.9	52 52.0	+59.1	33.7	53 41.7	+59.3	34.4	**60**
61	48 43.6	+57.8	29.5	49 35.7	+58.0	30.0	50 27.5	+58.2	30.6	51 18.9	+58.5	31.3	52 10.0	+58.7	31.9	53 00.8	+58.8	32.6	53 51.1	+59.0	33.4	54 41.0	+59.2	34.1	**61**
62	49 41.4	+57.8	29.1	50 33.7	+58.0	29.6	51 25.7	+58.2	30.3	52 17.4	+58.4	30.9	53 08.7	+58.6	31.6	53 59.6	+58.8	32.3	54 50.1	+59.0	33.1	55 40.2	+59.1	33.8	**62**
63	50 39.2	+57.7	28.6	51 31.7	+57.9	29.2	52 23.9	+58.1	29.9	53 15.8	+58.3	30.5	54 07.3	+58.5	31.2	54 58.4	+58.7	32.0	55 49.1	+58.9	32.7	56 39.3	+59.1	33.5	**63**
64	51 36.9	+57.5	28.2	52 29.6	+57.8	28.8	53 22.0	+58.0	29.4	54 14.1	+58.2	30.1	55 05.8	+58.5	30.8	55 57.1	+58.7	31.6	56 48.0	+58.9	32.4	57 38.4	+59.1	33.2	**64**
65	52 34.4	+57.5	27.7	53 27.4	+57.7	28.4	54 20.0	+58.0	29.0	55 12.3	+58.2	29.7	56 04.3	+58.3	30.4	56 55.8	+58.6	31.2	57 46.9	+58.8	32.0	58 37.5	+59.0	32.9	**65**
66	53 31.9	+57.3	27.3	54 25.1	+57.6	27.9	55 18.0	+57.8	28.6	56 10.5	+58.0	29.3	57 02.6	+58.3	30.0	57 54.4	+58.5	30.8	58 45.7	+58.7	31.7	59 36.5	+58.9	32.5	**66**
67	54 29.2	+57.2	26.7	55 22.7	+57.4	27.4	56 15.8	+57.7	28.1	57 08.5	+58.0	28.8	58 00.9	+58.2	29.6	58 52.9	+58.4	30.4	59 44.4	+58.7	31.3	60 35.4	+58.9	32.2	**67**
68	55 26.4	+57.1	26.2	56 20.1	+57.3	26.9	57 13.5	+57.5	27.6	58 06.5	+57.8	28.3	58 59.1	+58.1	29.1	59 51.3	+58.3	29.9	60 43.1	+58.5	30.8	61 34.3	+58.8	31.8	**68**
69	56 23.5	+56.9	25.7	57 17.4	+57.2	26.3	58 11.0	+57.5	27.1	59 04.3	+57.7	27.8	59 57.2	+57.9	28.6	60 49.6	+58.2	29.5	61 41.6	+58.5	30.4	62 33.1	+58.7	31.3	**69**
70	57 20.4	+56.7	25.1	58 14.6	+57.0	25.8	59 08.5	+57.2	26.5	60 02.0	+57.5	27.3	60 55.1	+57.8	28.1	61 47.8	+58.1	29.0	62 40.1	+58.4	29.9	63 31.8	+58.7	30.9	**70**
71	58 17.1	+56.6	24.5	59 11.6	+56.8	25.2	60 05.7	+57.2	25.9	60 59.5	+57.4	26.7	61 52.9	+57.7	27.5	62 45.9	+58.0	28.4	63 38.5	+58.2	29.4	64 30.5	+58.5	30.4	**71**
72	59 13.7	+56.4	23.8	60 08.4	+56.7	24.5	61 02.9	+56.9	25.3	61 56.9	+57.3	26.1	62 50.6	+57.5	26.9	63 43.9	+57.8	27.9	64 36.7	+58.1	28.8	65 29.0	+58.4	29.9	**72**
73	60 10.1	+56.1	23.2	61 05.1	+56.4	23.9	61 59.8	+56.7	24.6	62 54.2	+57.0	25.4	63 48.1	+57.4	26.3	64 41.7	+57.7	27.2	65 34.8	+58.0	28.2	66 27.4	+58.3	29.3	**73**
74	61 06.2	+55.9	22.4	62 01.5	+56.2	23.2	62 56.5	+56.5	23.9	63 51.2	+56.8	24.7	64 45.5	+57.1	25.6	65 39.4	+57.4	26.6	66 32.8	+57.8	27.6	67 25.7	+58.1	28.7	**74**
75	62 02.1	+55.6	21.7	62 57.7	+55.9	22.4	63 53.0	+56.3	23.2	64 48.0	+56.6	24.0	65 42.6	+57.0	24.9	66 36.8	+57.3	25.9	67 30.6	+57.6	26.9	68 23.8	+58.0	28.1	**75**
76	62 57.7	+55.3	20.9	63 53.6	+55.7	21.6	64 49.3	+55.9	22.4	65 44.6	+56.3	23.2	66 39.6	+56.6	24.1	67 34.1	+57.0	25.1	68 28.2	+57.4	26.2	69 21.8	+57.7	27.3	**76**
77	63 53.0	+55.0	20.0	64 49.3	+55.3	20.7	65 45.2	+55.7	21.5	66 40.9	+56.0	22.3	67 36.2	+56.4	23.3	68 31.1	+56.8	24.3	69 25.6	+57.1	25.4	70 19.5	+57.6	26.6	**77**
78	64 48.0	+54.6	19.1	65 44.6	+55.0	19.8	66 40.9	+55.3	20.6	67 36.9	+55.7	21.4	68 32.6	+56.1	22.4	69 27.9	+56.4	23.4	70 22.7	+56.9	24.5	71 17.1	+57.3	25.7	**78**
79	65 42.6	+54.2	18.1	66 39.6	+54.5	18.8	67 36.2	+54.9	19.6	68 32.6	+55.3	20.4	69 28.7	+55.6	21.4	70 24.3	+56.1	22.4	71 19.6	+56.5	23.5	72 14.4	+56.9	24.7	**79**
80	66 36.8	+53.8	17.0	67 34.1	+54.1	17.7	68 31.1	+54.5	18.5	69 27.9	+54.8	19.3	70 24.3	+55.3	20.3	71 20.4	+55.7	21.3	72 16.1	+56.2	22.4	73 11.3	+56.7	23.7	**80**
81	67 30.6	+53.2	15.9	68 28.2	+53.6	16.6	69 25.6	+53.9	17.3	70 22.7	+54.4	18.2	71 19.6	+54.8	19.1	72 16.1	+55.2	20.1	73 12.3	+55.7	21.2	74 08.0	+56.1	22.5	**81**
82	68 23.8	+52.7	14.7	69 21.8	+53.0	15.3	70 19.5	+53.4	16.1	71 17.1	+53.7	16.9	72 14.4	+54.2	17.8	73 11.3	+54.7	18.8	74 08.0	+55.1	19.9	75 04.1	+55.7	21.2	**82**
83	69 16.5	+51.9	13.3	70 14.8	+52.3	14.0	71 12.9	+52.7	14.7	72 10.8	+53.1	15.5	73 08.6	+53.5	16.3	74 06.0	+54.0	17.3	75 03.1	+54.5	18.4	75 59.8	+55.1	19.7	**83**
84	70 08.4	+51.3	11.9	71 07.1	+51.5	12.5	72 05.6	+51.9	13.1	73 03.9	+52.3	13.9	74 02.1	+52.7	14.7	75 00.0	+53.2	15.7	75 57.6	+53.7	16.8	76 54.9	+54.2	18.0	**84**
85	70 59.7	+50.3	10.3	71 58.6	+50.7	10.9	72 57.5	+51.0	11.5	73 56.2	+51.4	12.2	74 54.8	+51.8	12.9	75 53.2	+52.2	13.8	76 51.3	+52.8	14.9	77 49.1	+53.4	16.0	**85**
86	71 50.0	+49.4	8.6	72 49.3	+49.7	9.1	73 48.5	+50.0	9.6	74 47.6	+50.3	10.3	75 46.6	+50.7	11.0	76 45.4	+51.1	11.8	77 44.1	+51.5	12.7	78 42.5	+52.1	13.8	**86**
87	72 39.4	+48.2	6.7	73 39.0	+48.4	7.1	74 38.5	+48.7	7.6	75 37.9	+49.0	8.1	76 37.3	+49.3	8.7	77 36.5	+49.7	9.4	78 35.6	+50.2	10.2	79 34.6	+50.6	11.2	**87**
88	73 27.6	+47.0	4.7	74 27.4	+47.1	5.0	75 27.2	+47.3	5.3	76 26.9	+47.5	5.7	77 26.6	+47.7	6.2	78 26.2	+48.0	6.7	79 25.8	*+48.2* •	7.3	80 25.2	*+48.7* •	8.1	**88**
89	74 14.6	+45.4	2.5	75 14.5	+45.5	2.6	76 14.5	+45.5	2.8	77 14.4	*+45.6* •	3.0	78 14.3	*+45.7* •	3.3	79 14.2	*+45.8* •	3.6	80 14.0	*+46.0* •	3.9	81 13.9	*+46.1* •	4.4	**89**
90	75 00.0	+43.7	0.0	76 00.0	*+43.6* •	0.0	77 00.0	*+43.5* •	0.0	78 00.0	*+43.4* •	0.0	79 00.0	*+43.3* •	0.0	80 00.0	*+43.2* •	0.0	81 00.0	*+43.0* •	0.0	82 00.0	*+42.8* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

43°, 317° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 54.7	+59.0	136.0	10 11.5	+59.1	136.1	9 28.2	+59.2	136.3	8 44.8	+59.3	136.4	8 01.3	+59.5	136.5	7 17.8	+59.5	136.6	6 34.2	+59.6	136.6	5 50.5	+59.7	136.7	**0**
1	11 53.7	+59.0	135.8	11 10.6	+59.2	136.0	10 27.4	+59.3	136.1	9 44.1	+59.4	136.2	9 00.8	+59.5	136.3	8 17.3	+59.6	136.4	7 33.8	+59.7	136.5	6 50.2	+59.8	136.6	**1**
2	12 52.7	+59.0	135.6	12 09.8	+59.1	135.8	11 26.7	+59.2	135.9	10 43.5	+59.4	136.1	10 00.3	+59.4	136.2	9 16.9	+59.6	136.3	8 33.5	+59.6	136.4	7 50.0	+59.7	136.5	**2**
3	13 51.7	+59.0	135.5	13 08.9	+59.1	135.6	12 25.9	+59.3	135.8	11 42.9	+59.4	135.9	10 59.7	+59.5	136.1	10 16.5	+59.5	136.2	9 33.1	+59.7	136.3	8 49.7	+59.7	136.4	**3**
4	14 50.7	+59.0	135.3	14 08.0	+59.1	135.4	13 25.2	+59.2	135.6	12 42.3	+59.3	135.8	11 59.2	+59.5	135.9	11 16.0	+59.6	136.1	10 32.8	+59.6	136.2	9 49.4	+59.7	136.3	**4**
5	15 49.7	+59.0	135.1	15 07.1	+59.2	135.3	14 24.4	+59.3	135.5	13 41.6	+59.4	135.6	12 58.7	+59.4	135.8	12 15.6	+59.6	136.0	11 32.4	+59.7	136.1	10 49.1	+59.8	136.2	**5**
6	16 48.7	+58.9	134.9	16 06.3	+59.1	135.1	15 23.7	+59.2	135.3	14 41.0	+59.3	135.5	13 58.1	+59.5	135.7	13 15.2	+59.5	135.8	12 32.1	+59.6	136.0	11 48.9	+59.7	136.1	**6**
7	17 47.6	+59.0	134.7	17 05.4	+59.0	134.9	16 22.9	+59.2	135.1	15 40.3	+59.4	135.3	14 57.6	+59.4	135.5	14 14.7	+59.6	135.7	13 31.7	+59.6	135.9	12 48.6	+59.7	136.0	**7**
8	18 46.6	+58.9	134.5	18 04.4	+59.1	134.7	17 22.1	+59.3	135.0	16 39.7	+59.3	135.2	15 57.0	+59.5	135.4	15 14.3	+59.5	135.6	14 31.3	+59.7	135.8	13 48.3	+59.7	135.9	**8**
9	19 45.5	+59.0	134.3	19 03.5	+59.1	134.5	18 21.4	+59.2	134.8	17 39.0	+59.3	135.0	16 56.5	+59.4	135.2	16 13.8	+59.5	135.4	15 31.0	+59.6	135.6	14 48.0	+59.7	135.8	**9**
10	20 44.5	+58.9	134.1	20 02.6	+59.1	134.4	19 20.6	+59.2	134.6	18 38.3	+59.3	134.9	17 55.9	+59.4	135.1	17 13.3	+59.6	135.3	16 30.6	+59.6	135.5	15 47.7	+59.7	135.7	**10**
11	21 43.4	+58.9	133.9	21 01.7	+59.0	134.2	20 19.8	+59.1	134.4	19 37.6	+59.4	134.7	18 55.3	+59.5	135.0	18 12.9	+59.5	135.2	17 30.2	+59.6	135.4	16 47.4	+59.7	135.6	**11**
12	22 42.3	+58.9	133.7	22 00.7	+59.1	134.0	21 18.9	+59.2	134.3	20 37.0	+59.3	134.5	19 54.8	+59.4	134.8	19 12.4	+59.5	135.1	18 29.8	+59.7	135.3	17 47.1	+59.7	135.5	**12**
13	23 41.2	+58.8	133.5	22 59.8	+59.0	133.8	22 18.1	+59.2	134.1	21 36.3	+59.3	134.4	20 54.2	+59.4	134.7	20 11.9	+59.5	134.9	19 29.5	+59.6	135.2	18 46.8	+59.7	135.4	**13**
14	24 40.0	+58.9	133.3	23 58.8	+59.0	133.6	23 17.3	+59.1	133.9	22 35.6	+59.2	134.2	21 53.6	+59.4	134.5	21 11.4	+59.5	134.8	20 29.1	+59.6	135.1	19 46.5	+59.7	135.3	**14**
15	25 38.9	+58.8	133.0	24 57.8	+59.0	133.4	24 16.4	+59.2	133.7	23 34.8	+59.3	134.0	22 53.0	+59.4	134.4	22 10.9	+59.6	134.6	21 28.7	+59.6	134.9	20 46.2	+59.7	135.2	**15**
16	26 37.7	+58.8	132.8	25 56.8	+58.9	133.2	25 15.6	+59.1	133.5	24 34.1	+59.3	133.9	23 52.4	+59.4	134.2	23 10.5	+59.4	134.5	22 28.3	+59.6	134.8	21 45.9	+59.7	135.1	**16**
17	27 36.5	+58.8	132.6	26 55.7	+59.0	133.0	26 14.7	+59.1	133.4	25 33.4	+59.2	133.7	24 51.8	+59.4	134.0	24 09.9	+59.5	134.4	23 27.9	+59.6	134.7	22 45.6	+59.6	135.0	**17**
18	28 35.3	+58.8	132.4	27 54.7	+58.9	132.8	27 13.8	+59.1	133.2	26 32.6	+59.3	133.5	25 51.2	+59.3	133.9	25 09.4	+59.5	134.2	24 27.5	+59.5	134.6	23 45.2	+59.7	134.9	**18**
19	29 34.1	+58.7	132.2	28 53.6	+58.9	132.6	28 12.9	+59.1	133.0	27 31.9	+59.2	133.3	26 50.5	+59.4	133.7	26 08.9	+59.5	134.1	25 27.0	+59.6	134.4	24 44.9	+59.7	134.8	**19**
20	30 32.8	+58.7	131.9	29 52.5	+58.9	132.3	29 12.0	+59.0	132.8	28 31.1	+59.2	133.2	27 49.9	+59.3	133.6	27 08.4	+59.5	133.9	26 26.6	+59.6	134.3	25 44.6	+59.7	134.6	**20**
21	31 31.5	+58.7	131.7	30 51.4	+58.9	132.1	30 11.0	+59.1	132.6	29 30.3	+59.2	133.0	28 49.2	+59.3	133.4	28 07.9	+59.4	133.8	27 26.2	+59.6	134.2	26 44.3	+59.6	134.5	**21**
22	32 30.2	+58.7	131.4	31 50.3	+58.9	131.9	31 10.1	+59.0	132.4	30 29.5	+59.1	132.8	29 48.5	+59.4	133.2	29 07.3	+59.4	133.6	28 25.8	+59.5	134.0	27 43.9	+59.7	134.4	**22**
23	33 28.9	+58.6	131.2	32 49.2	+58.8	131.7	32 09.1	+59.0	132.1	31 28.6	+59.2	132.6	30 47.9	+59.3	133.0	30 06.7	+59.5	133.5	29 25.3	+59.5	133.9	28 43.6	+59.6	134.3	**23**
24	34 27.5	+58.6	130.9	33 48.0	+58.8	131.4	33 08.1	+58.9	131.9	32 27.8	+59.1	132.4	31 47.2	+59.2	132.9	31 06.2	+59.4	133.3	30 24.8	+59.6	133.7	29 43.2	+59.6	134.2	**24**
25	35 26.1	+58.5	130.7	34 46.8	+58.7	131.2	34 07.0	+59.0	131.7	33 26.9	+59.2	132.2	32 46.4	+59.3	132.7	32 05.6	+59.4	133.1	31 24.4	+59.5	133.6	30 42.8	+59.7	134.0	**25**
26	36 24.6	+58.5	130.4	35 45.5	+58.8	130.9	35 06.0	+58.9	131.5	34 26.1	+59.0	132.0	33 45.7	+59.3	132.5	33 05.0	+59.4	133.0	32 23.9	+59.5	133.4	31 42.5	+59.6	133.9	**26**
27	37 23.1	+58.5	130.1	36 44.3	+58.7	130.7	36 04.9	+58.9	131.2	35 25.1	+59.1	131.8	34 45.0	+59.2	132.3	34 04.4	+59.4	132.8	33 23.4	+59.5	133.3	32 42.1	+59.6	133.8	**27**
28	38 21.6	+58.5	129.8	37 43.0	+58.6	130.4	37 03.8	+58.9	131.0	36 24.2	+59.1	131.6	35 44.2	+59.2	132.1	35 03.8	+59.3	132.6	34 22.9	+59.5	133.1	33 41.7	+59.6	133.6	**28**
29	39 20.1	+58.4	129.5	38 41.6	+58.6	130.2	38 02.7	+58.8	130.8	37 23.3	+59.0	131.3	36 43.4	+59.2	131.9	36 03.1	+59.4	132.5	35 22.4	+59.5	133.0	34 41.3	+59.6	133.5	**29**
30	40 18.5	+58.3	129.2	39 40.2	+58.6	129.9	39 01.5	+58.8	130.5	38 22.3	+59.0	131.1	37 42.6	+59.2	131.7	37 02.5	+59.3	132.3	36 21.9	+59.5	132.8	35 40.9	+59.6	133.4	**30**
31	41 16.8	+58.3	128.9	40 38.8	+58.6	129.6	40 00.3	+58.8	130.3	39 21.3	+59.0	130.9	38 41.8	+59.1	131.5	38 01.8	+59.3	132.1	37 21.4	+59.4	132.7	36 40.5	+59.6	133.2	**31**
32	42 15.1	+58.2	128.6	41 37.4	+58.5	129.3	40 59.1	+58.7	130.0	40 20.3	+58.9	130.6	39 40.9	+59.1	131.3	39 01.1	+59.3	131.9	38 20.8	+59.4	132.5	37 40.1	+59.5	133.1	**32**
33	43 13.3	+58.2	128.3	42 35.9	+58.4	129.0	41 57.8	+58.7	129.7	41 19.2	+58.9	130.4	40 40.0	+59.1	131.1	40 00.4	+59.3	131.7	39 20.2	+59.5	132.3	38 39.6	+59.6	132.9	**33**
34	44 11.5	+58.1	127.9	43 34.3	+58.4	128.7	42 56.5	+58.6	129.4	42 18.1	+58.9	130.1	41 39.1	+59.1	130.8	40 59.7	+59.2	131.5	40 19.7	+59.4	132.1	39 39.2	+59.5	132.7	**34**
35	45 09.6	+58.1	127.6	44 32.7	+58.4	128.4	43 55.1	+58.6	129.1	43 17.0	+58.8	129.9	42 38.2	+59.1	130.6	41 58.9	+59.2	131.3	41 19.1	+59.3	131.9	40 38.7	+59.5	132.6	**35**
36	46 07.7	+58.0	127.2	45 31.1	+58.2	128.1	44 53.7	+58.6	128.8	44 15.8	+58.8	129.6	43 37.3	+59.0	130.3	42 58.1	+59.2	131.1	42 18.4	+59.4	131.7	41 38.2	+59.5	132.4	**36**
37	47 05.7	+57.9	126.9	46 29.3	+58.3	127.7	45 52.3	+58.5	128.5	45 14.6	+58.7	129.3	44 36.3	+58.9	130.1	43 57.3	+59.2	130.8	43 17.8	+59.3	131.6	42 37.7	+59.5	132.2	**37**
38	48 03.6	+57.8	126.5	47 27.6	+58.1	127.4	46 50.8	+58.4	128.2	46 13.3	+58.7	129.0	45 35.2	+59.0	129.8	44 56.5	+59.1	130.6	44 17.1	+59.4	131.3	43 37.2	+59.5	132.1	**38**
39	49 01.4	+57.8	126.1	48 25.7	+58.1	127.0	47 49.2	+58.4	127.9	47 12.0	+58.7	128.7	46 34.2	+58.9	129.6	45 55.6	+59.1	130.4	45 16.5	+59.3	131.1	44 36.7	+59.5	131.9	**39**
40	49 59.2	+57.6	125.7	49 23.8	+58.0	126.6	48 47.6	+58.3	127.5	48 10.7	+58.6	128.4	47 33.1	+58.8	129.3	46 54.7	+59.1	130.1	46 15.8	+59.2	130.9	45 36.2	+59.4	131.7	**40**
41	50 56.8	+57.6	125.2	50 21.8	+57.9	126.2	49 45.9	+58.3	127.2	49 09.3	+58.5	128.1	48 31.9	+58.8	129.0	47 53.8	+59.0	129.9	47 15.0	+59.3	130.7	46 35.6	+59.4	131.5	**41**
42	51 54.4	+57.4	124.8	51 19.7	+57.8	125.8	50 44.2	+58.2	126.8	50 07.8	+58.5	127.8	49 30.7	+58.8	128.7	48 52.8	+59.0	129.6	48 14.3	+59.2	130.5	47 35.0	+59.4	131.3	**42**
43	52 51.8	+57.3	124.3	52 17.5	+57.7	125.4	51 42.4	+58.0	126.4	51 06.3	+58.4	127.4	50 29.5	+58.7	128.4	49 51.8	+59.0	129.3	49 13.5	+59.2	130.2	48 34.4	+59.4	131.1	**43**
44	53 49.1	+57.2	123.8	53 15.2	+57.7	124.9	52 40.4	+58.0	126.0	52 04.7	+58.4	127.0	51 28.2	+58.6	128.0	50 50.8	+58.9	129.0	50 12.7	+59.1	130.0	49 33.8	+59.3	130.9	**44**
45	54 46.3	+57.1	123.3	54 12.9	+57.5	124.4	53 38.4	+58.0	125.6	53 03.1	+58.3	126.7	52 26.8	+58.6	127.7	51 49.7	+58.9	128.7	51 11.8	+59.1	129.7	50 33.1	+59.3	130.6	**45**
46	55 43.4	+56.8	122.7	55 10.4	+57.3	123.9	54 36.4	+57.8	125.1	54 01.4	+58.1	126.3	53 25.4	+58.5	127.3	52 48.6	+58.8	128.4	52 10.9	+59.1	129.4	51 32.4	+59.3	130.4	**46**
47	56 40.2	+56.8	122.2	56 07.7	+57.3	123.4	55 34.2	+57.6	124.7	54 59.5	+58.1	125.8	54 23.9	+58.5	127.0	53 47.4	+58.7	128.1	53 10.0	+59.0	129.1	52 31.7	+59.2	130.1	**47**
48	57 37.0	+56.5	121.6	57 05.0	+57.1	122.9	56 31.8	+57.6	124.2	55 57.6	+58.0	125.4	55 22.4	+58.3	126.6	54 46.1	+58.7	127.7	54 09.0	+59.0	128.8	53 30.9	+59.3	129.9	**48**
49	58 33.5	+56.4	120.9	58 02.1	+56.9	122.3	57 29.4	+57.5	123.6	56 55.6	+57.9	124.9	56 20.7	+58.3	126.2	55 44.8	+58.7	127.3	55 08.0	+58.9	128.5	54 30.2	+59.1	129.6	**49**
50	59 29.9	+56.1	120.3	58 59.0	+56.8	121.7	58 26.9	+57.2	123.1	57 53.5	+57.8	124.4	57 19.0	+58.2	125.7	56 43.5	+58.5	127.0	56 06.9	+58.8	128.2	55 29.3	+59.2	129.3	**50**
51	60 26.0	+56.0	119.6	59 55.8	+56.5	121.1	59 24.1	+57.2	122.5	58 51.3	+57.6	123.9	58 17.2	+58.1	125.3	57 42.0	+58.5	126.6	57 05.7	+58.8	127.8	56 28.5	+59.0	129.0	**51**
52	61 22.0	+55.6	118.8	60 52.3	+56.3	120.4	60 21.3	+56.9	121.9	59 48.9	+57.5	123.4	59 15.3	+57.9	124.8	58 40.5	+58.3	126.1	58 04.5	+58.8	127.4	57 27.5	+59.1	128.7	**52**
53	62 17.6	+55.4	118.0	61 48.6	+56.1	119.7	61 18.2	+56.8	121.3	60 46.4	+57.3	122.8	60 13.2	+57.9	124.3	59 38.8	+58.3	125.7	59 03.3	+58.6	127.0	58 26.6	+58.9	128.3	**53**
54	63 13.0	+55.0	117.2	62 44.7	+55.9	118.9	62 15.0	+56.5	120.6	61 43.7	+57.2	122.2	61 11.1	+57.7	123.7	60 37.1	+58.2	125.2	60 01.9	+58.6	126.6	59 25.5	+59.0	128.0	**54**
55	64 08.0	+54.7	116.3	63 40.6	+55.5	118.1	63 11.5	+56.3	119.8	62 40.9	+56.9	121.5	62 08.8	+57.5	123.1	61 35.3	+58.0	124.7	61 00.5	+58.5	126.2	60 24.5	+58.8	127.6	**55**
56	65 02.7	+54.3	115.3	64 36.1	+55.2	117.2	64 07.8	+56.0	119.1	63 37.8	+56.8	120.8	63 06.3	+57.4	122.5	62 33.3	+58.0	124.2	61 59.0	+58.4	125.7	61 23.3	+58.8	127.2	**56**
57	65 57.0	+53.8	114.3	65 31.3	+54.9	116.3	65 03.8	+55.8	118.2	64 34.6	+56.5	120.1	64 03.7	+57.2	121.9	63 31.3	+57.7	123.6	62 57.4	+58.2	125.2	62 22.1	+58.7	126.8	**57**
58	66 50.8	+53.4	113.2	66 26.2	+54.4	115.3	65 59.6	+55.4	117.3	65 31.1	+56.2	119.3	65 00.9	+57.0	121.2	64 29.0	+57.6	123.0	63 55.6	+58.2	124.7	63 20.8	+58.6	126.3	**58**
59	67 44.2	+52.8	112.0	67 20.6	+54.0	114.2	66 55.0	+55.0	116.4	66 27.3	+56.0	118.4	65 57.9	+56.7	120.4	65 26.6	+57.4	122.3	64 53.8	+58.0	124.1	64 19.4	+58.4	125.8	**59**
60	68 37.0	+52.2	110.7	68 14.6	+53.5	113.1	67 50.0	+54.6	115.3	67 23.3	+55.6	117.5	66 54.6	+56.4	119.6	66 24.0	+57.2	121.6	65 51.8	+57.8	123.5	65 17.8	+58.4	125.3	**60**
61	69 29.2	+51.4	109.4	69 08.1	+52.8	111.8	68 44.6	+54.1	114.2	68 18.9	+55.2	116.5	67 51.0	+56.2	118.7	67 21.2	+57.0	120.8	66 49.6	+57.7	122.8	66 16.2	+58.3	124.8	**61**
62	70 20.6	+50.7	107.9	70 00.9	+52.2	110.5	69 38.7	+53.6	113.0	69 14.1	+54.7	115.4	68 47.2	+55.8	117.8	68 18.2	+56.7	120.0	67 47.3	+57.4	122.1	67 14.5	+58.0	124.1	**62**
63	71 11.3	+49.7	106.2	70 53.1	+51.4	109.0	70 32.3	+52.9	111.7	70 08.8	+54.3	114.3	69 43.0	+55.4	116.7	69 14.9	+56.4	119.1	68 44.7	+57.2	121.3	68 12.5	+58.0	123.5	**63**
64	72 01.0	+48.7	104.5	71 44.5	+50.6	107.4	71 25.2	+52.2	110.2	71 03.1	+53.7	113.0	70 38.4	+54.9	115.6	70 11.3	+56.0	118.1	69 41.9	+57.0	120.5	69 10.5	+57.7	122.8	**64**
65	72 49.7	+47.4	102.5	72 35.1	+49.5	105.6	72 17.4	+51.4	108.7	71 56.8	+53.0	111.6	71 33.3	+54.5	114.4	71 07.3	+55.7	117.0	70 38.9	+56.6	119.6	70 08.2	+57.5	122.0	**65**
66	73 37.1	+46.1	100.4	73 24.6	+48.4	103.7	73 08.8	+50.4	106.9	72 49.8	+52.2	110.0	72 27.8	+53.7	113.0	72 03.0	+55.1	115.8	71 35.5	+56.3	118.5	71 05.7	+57.2	121.1	**66**
67	74 23.2	+44.5	98.1	74 13.0	+46.9	101.6	73 59.2	+49.2	105.0	73 42.0	+51.3	108.3	73 21.5	+53.1	111.5	72 58.1	+54.6	114.5	72 31.8	+55.9	117.4	72 02.9	+56.9	120.2	**67**
68	75 07.7	*+42.5*•	95.5	74 59.9	+45.4	99.2	74 48.4	+48.0	102.9	74 33.3	+50.2	106.4	74 14.6	+52.2	109.8	73 52.7	+53.9	113.1	73 27.7	+55.3	116.2	72 59.8	+56.6	119.1	**68**
69	75 50.2	*+40.4*•	92.7	75 45.3	*+43.6*•	96.6	75 36.4	+46.4	100.5	75 23.5	+48.9	104.3	75 06.8	+51.2	107.9	74 46.6	+53.1	111.4	74 23.0	+54.8	114.8	73 56.4	+56.1	117.9	**69**
70	76 30.6	*+38.0*•	89.6	76 28.9	*+41.3*•	93.8	76 22.8	*+44.5*•	97.9	76 12.4	+47.5	101.9	75 58.0	+50.0	105.9	75 39.7	+52.2	109.6	75 17.8	+54.1	113.2	74 52.5	+55.6	116.6	**70**
71	77 08.6	*+35.0*•	86.2	77 10.2	*+38.9*•	90.6	77 07.3	*+42.4*•	95.0	76 59.9	*+45.6*•	99.3	76 48.0	+48.5	103.5	76 31.9	+51.1	107.6	76 11.9	+53.2	111.5	75 48.1	+55.0	115.1	**71**
72	77 43.6	*+31.7*•	82.5	77 49.1	*+35.8*•	87.1	77 49.7	*+39.8*•	91.7	77 45.5	*+43.5*•	96.3	77 36.5	+46.8	100.8	77 23.0	+49.7	105.2	77 05.1	+52.2	109.5	76 43.1	+54.3	113.5	**72**
73	78 15.3	*+27.9*•	78.4	78 24.9	*+32.4*•	83.2	78 29.5	*+36.7*•	88.1	78 29.0	*+40.8*•	93.0	78 23.3	*+44.6*•	97.8	78 12.7	+48.0	102.6	77 57.3	+50.8	107.2	77 37.4	+53.3	111.5	**73**
74	78 43.2	*+23.6*•	74.0	78 57.3	*+28.4*•	78.9	79 06.2	*+33.2*•	84.0	79 09.8	*+37.8*•	89.2	79 07.9	*+42.1*•	94.4	79 00.7	*+45.8*•	99.5	78 48.1	+49.3	104.5	78 30.7	+52.1	109.3	**74**
75	79 06.8	*+18.9*•	69.2	79 25.7	*+23.9*•	74.2	79 39.4	*+29.0*•	79.5	79 47.6	*+34.0*•	84.9	79 50.0	*+38.8*•	90.5	79 46.5	*+43.4*•	96.0	79 37.4	*+47.3*•	101.5	79 22.8	+50.6	106.7	**75**
76	79 25.7	*+13.7*•	64.1	79 49.6	*+18.8*•	69.1	80 08.4	*+24.1*•	74.5	80 21.6	*+29.6*•	80.1	80 28.8	*+35.0*•	86.0	80 29.9	*+40.0*•	92.0	80 24.7	*+44.7*•	97.9	80 13.4	*+48.7*•	103.7	**76**
77	79 39.4	*+8.2*•	58.7	80 08.4	*+13.2*•	63.6	80 32.5	*+18.7*•	69.0	80 51.2	*+24.4*•	74.8	81 03.8	*+30.3*•	81.0	81 09.9	*+36.1*•	87.3	81 09.4	*+41.4*•	93.8	81 02.1	*+46.2*•	100.1	**77**
78	79 47.6	*+2.4*•	53.1	80 21.6	*+7.2*•	57.9	80 51.2	*+12.6*•	63.1	81 15.6	*+18.5*•	68.9	81 34.1	*+24.7*•	75.2	81 46.0	*+31.1*•	81.9	81 50.8	*+37.3*•	88.9	81 48.3	*+43.0*•	95.8	**78**
79	79 50.0	*−3.5*•	47.5	80 28.8	*+1.1*•	51.9	81 03.8	*+6.1*•	56.9	81 34.1	*+11.9*•	62.6	81 58.8	*+18.3*•	68.9	82 17.1	*+25.0*•	75.8	82 28.1	*+32.0*•	83.1	82 31.3	*+38.8*•	90.7	**79**
80	79 46.5	*−9.1*•	41.9	80 29.9	*−5.2*•	45.8	81 09.9	*−0.5*•	50.5	81 46.0	*+4.8*•	55.8	82 17.1	*+11.0*•	61.9	82 42.1	*+18.0*•	68.8	83 00.1	*+25.5*•	76.4	83 10.1	*+33.1*•	84.6	**80**
81	79 37.4	*−14.6*•	36.3	80 24.7	*−11.3*•	39.8	81 09.4	*−7.3*•	43.9	81 50.8	*−2.5*•	48.8	82 28.1	*+3.2*•	54.5	83 00.1	*+10.0*•	61.1	83 25.6	*+17.6*•	68.7	83 43.2	*+25.9*•	77.2	**81**
82	79 22.8	*−19.8*•	31.0	80 13.4	*−17.0*•	34.0	81 02.1	*−13.7*•	37.5	81 48.3	*−9.6*•	41.8	82 31.3	*−4.7*•	46.8	83 10.1	*+1.3*•	52.9	83 43.2	*+8.6*•	60.2	84 09.1	*+17.2*•	68.7	**82**
83	79 03.0	*−24.4*•	25.9	79 56.4	*−22.2*•	28.4	80 48.4	*−19.6*•	31.4	81 38.7	*−16.4*•	34.9	82 26.6	*−12.3*•	39.2	83 11.4	*−7.4*•	44.5	83 51.8	*−1.1*•	51.0	84 26.3	*+6.8*•	59.0	**83**
84	78 38.6	*−28.6*•	21.2	79 34.2	*−27.0*•	23.2	80 28.8	*−25.0*•	25.5	81 22.3	*−22.5*•	28.4	82 14.3	*−19.6*•	31.9	83 04.0	*−15.6*•	36.2	83 50.7	*−10.6*•	41.7	84 33.1	*−4.0*•	48.7	**84**
85	78 10.0	*−32.3*•	16.8	79 07.2	*−31.1*•	18.4	80 03.8	*−29.7*•	20.2	80 59.8	*−28.0*•	22.3	81 54.7	*−25.8*•	25.0	82 48.4	*−23.0*•	28.3	83 40.1	*−19.4*•	32.6	84 29.1	*−14.5*•	38.2	**85**
86	77 37.7	*−35.6*•	12.8	78 36.1	*−34.8*•	13.9	79 34.1	*−33.8*•	15.2	80 31.8	*−32.6*•	16.8	81 28.9	*−31.2*•	18.7	82 25.4	*−29.4*•	21.1	83 20.7	*−27.0*•	24.2	84 14.6	*−23.8*•	28.3	**86**
87	77 02.1	*−38.4*•	9.2	78 01.3	*−37.9*•	9.9	79 00.3	*−37.3*•	10.8	79 59.2	*−36.6*•	11.8	80 57.7	*−35.7*•	13.1	81 56.0	*−34.7*•	14.7	82 53.7	*−33.2*•	16.8	83 50.8	*−31.4*•	19.4	**87**
88	76 23.7	*−40.8*•	5.8	77 23.4	*−40.5*•	6.3	78 23.0	*−40.2*•	6.8	79 22.6	*−39.9*•	7.4	80 22.0	*−39.5*•	8.2	81 21.3	*−38.9*•	9.1	82 20.5	*−38.3*•	10.3	83 19.4	*−37.4*•	11.8	**88**
89	75 42.9	−42.9	2.8	76 42.9	*−42.9*•	3.0	77 42.8	*−42.8*•	3.2	78 42.7	*−42.7*•	3.5	79 42.5	*−42.5*•	3.8	80 42.4	*−42.4*•	4.2	81 42.2	*−42.2*•	4.7	82 42.0	*−42.0*•	5.4	**89**
90	75 00.0	−44.7	0.0	76 00.0	−44.8	0.0	77 00.0	−44.9	0.0	78 00.0	*−45.0*•	0.0	79 00.0	*−45.1*•	0.0	80 00.0	*−45.2*•	0.0	81 00.0	*−45.3*•	0.0	82 00.0	*−45.5*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 43°, 317°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 54.7	−59.1	136.0	10 11.5	−59.2	136.1	9 28.2	−59.3	136.3	8 44.8	−59.4	136.4	8 01.3	−59.5	136.5	7 17.8	−59.6	136.6	6 34.2	−59.7	136.6	5 50.5	−59.7	136.7	**0**
1	9 55.6	−59.0	136.2	9 12.3	−59.2	136.3	8 28.9	−59.3	136.4	7 45.4	−59.4	136.5	7 01.8	−59.5	136.6	6 18.2	−59.6	136.7	5 34.5	−59.6	136.8	4 50.8	−59.7	136.8	**1**
2	8 56.6	−59.0	136.4	8 13.1	−59.1	136.5	7 29.6	−59.3	136.6	6 46.0	−59.4	136.7	6 02.3	−59.4	136.7	5 18.6	−59.5	136.8	4 34.9	−59.7	136.9	3 51.1	−59.8	136.9	**2**
3	7 57.6	−59.1	136.6	7 14.0	−59.2	136.6	6 30.3	−59.3	136.7	5 46.6	−59.4	136.8	5 02.9	−59.5	136.9	4 19.1	−59.6	136.9	3 35.2	−59.6	137.0	2 51.3	−59.7	137.0	**3**
4	6 58.5	−59.0	136.7	6 14.8	−59.1	136.8	5 31.0	−59.2	136.9	4 47.2	−59.4	136.9	4 03.4	−59.5	137.0	3 19.5	−59.6	137.0	2 35.6	−59.7	137.1	1 51.6	−59.7	137.1	**4**
5	5 59.5	−59.1	136.9	5 15.7	−59.2	137.0	4 31.8	−59.3	137.0	3 47.8	−59.4	137.1	3 03.9	−59.5	137.1	2 19.9	−59.6	137.2	1 35.9	−59.7	137.2	0 51.9	−59.8	137.2	**5**
6	5 00.4	−59.0	137.1	4 16.5	−59.2	137.1	3 32.5	−59.3	137.2	2 48.4	−59.3	137.2	2 04.4	−59.5	137.3	1 20.3	−59.6	137.3	0 36.2	−59.6	137.3	0 07.9	+59.7	42.7	**6**
7	4 01.4	−59.1	137.3	3 17.3	−59.2	137.3	2 33.2	−59.3	137.3	1 49.1	−59.4	137.4	1 04.9	−59.5	137.4	0 20.7	−59.5	137.4	0 23.4	+59.7	42.6	1 07.6	+59.7	42.6	**7**
8	3 02.3	−59.0	137.4	2 18.1	−59.1	137.5	1 33.9	−59.3	137.5	0 49.7	−59.4	137.5	0 05.4	−59.5	137.5	0 38.8	+59.6	42.5	1 23.1	+59.6	42.5	2 07.3	+59.7	42.5	**8**
9	2 03.3	−59.1	137.6	1 19.0	−59.2	137.6	0 34.6	−59.3	137.7	0 09.7	+59.4	42.3	0 54.1	+59.5	42.4	1 38.4	+59.6	42.4	2 22.7	+59.7	42.4	3 07.0	+59.8	42.4	**9**
10	1 04.2	−59.0	137.8	0 19.8	−59.2	137.8	0 24.7	+59.3	42.2	1 09.1	+59.4	42.2	1 53.6	+59.5	42.2	2 38.0	+59.6	42.2	3 22.4	+59.6	42.3	4 06.8	+59.7	42.3	**10**
11	0 05.2	−59.1	138.0	0 39.4	+59.2	42.0	1 24.0	+59.3	42.0	2 08.5	+59.4	42.1	2 53.1	+59.4	42.1	3 37.6	+59.5	42.1	4 22.0	+59.7	42.2	5 06.5	+59.7	42.2	**11**
12	0 53.9	+59.0	41.8	1 38.6	+59.2	41.9	2 23.3	+59.2	41.9	3 07.9	+59.4	41.9	3 52.5	+59.5	42.0	4 37.1	+59.6	42.0	5 21.7	+59.7	42.1	6 06.2	+59.7	42.1	**12**
13	1 52.9	+59.1	41.7	2 37.8	+59.1	41.7	3 22.5	+59.3	41.7	4 07.3	+59.4	41.8	4 52.0	+59.5	41.8	5 36.7	+59.6	41.9	6 21.4	+59.6	42.0	7 05.9	+59.8	42.0	**13**
14	2 52.0	+59.1	41.5	3 36.9	+59.2	41.5	4 21.8	+59.3	41.6	5 06.7	+59.4	41.6	5 51.5	+59.5	41.7	6 36.3	+59.6	41.8	7 21.0	+59.7	41.9	8 05.7	+59.7	41.9	**14**
15	3 51.1	+59.0	41.3	4 36.1	+59.2	41.4	5 21.1	+59.3	41.4	6 06.1	+59.4	41.5	6 51.0	+59.5	41.6	7 35.9	+59.5	41.7	8 20.7	+59.6	41.7	9 05.4	+59.7	41.8	**15**
16	4 50.1	+59.1	41.1	5 35.3	+59.1	41.2	6 20.4	+59.3	41.3	7 05.5	+59.3	41.3	7 50.5	+59.5	41.4	8 35.4	+59.6	41.5	9 20.3	+59.7	41.6	10 05.1	+59.7	41.7	**16**
17	5 49.2	+59.0	41.0	6 34.4	+59.2	41.0	7 19.7	+59.3	41.1	8 04.8	+59.4	41.2	8 50.0	+59.4	41.3	9 35.0	+59.6	41.4	10 20.0	+59.6	41.5	11 04.8	+59.8	41.7	**17**
18	6 48.2	+59.0	40.8	7 33.6	+59.2	40.9	8 19.0	+59.2	41.0	9 04.2	+59.4	41.1	9 49.4	+59.5	41.2	10 34.6	+59.5	41.3	11 19.6	+59.6	41.4	12 04.6	+59.7	41.6	**18**
19	7 47.2	+59.1	40.6	8 32.8	+59.1	40.7	9 18.2	+59.3	40.8	10 03.6	+59.4	40.9	10 48.9	+59.5	41.0	11 34.1	+59.6	41.2	12 19.2	+59.7	41.3	13 04.3	+59.7	41.5	**19**
20	8 46.3	+59.0	40.4	9 31.9	+59.2	40.5	10 17.5	+59.3	40.6	11 03.0	+59.3	40.8	11 48.4	+59.4	40.9	12 33.7	+59.5	41.0	13 18.9	+59.6	41.2	14 04.0	+59.7	41.4	**20**
21	9 45.3	+59.0	40.2	10 31.1	+59.1	40.4	11 16.8	+59.2	40.5	12 02.3	+59.4	40.6	12 47.8	+59.5	40.8	13 33.2	+59.6	40.9	14 18.5	+59.7	41.1	15 03.7	+59.7	41.3	**21**
22	10 44.3	+59.1	40.1	11 30.2	+59.2	40.2	12 16.0	+59.3	40.3	13 01.7	+59.4	40.5	13 47.3	+59.5	40.6	14 32.8	+59.6	40.8	15 18.2	+59.6	41.0	16 03.4	+59.7	41.1	**22**
23	11 43.4	+59.0	39.9	12 29.4	+59.1	40.0	13 15.3	+59.2	40.2	14 01.1	+59.3	40.3	14 46.8	+59.4	40.5	15 32.3	+59.6	40.7	16 17.8	+59.6	40.8	17 03.1	+59.7	41.0	**23**
24	12 42.4	+59.0	39.7	13 28.5	+59.1	39.8	14 14.5	+59.3	40.0	15 00.4	+59.4	40.2	15 46.2	+59.5	40.3	16 31.9	+59.5	40.5	17 17.4	+59.6	40.7	18 02.8	+59.7	40.9	**24**
25	13 41.4	+59.0	39.5	14 27.6	+59.1	39.7	15 13.8	+59.2	39.8	15 59.8	+59.3	40.0	16 45.7	+59.4	40.2	17 31.4	+59.5	40.4	18 17.0	+59.7	40.6	19 02.5	+59.7	40.8	**25**
26	14 40.4	+59.0	39.3	15 26.7	+59.2	39.5	16 13.0	+59.2	39.7	16 59.1	+59.3	39.9	17 45.1	+59.4	40.1	18 30.9	+59.6	40.3	19 16.7	+59.6	40.5	20 02.2	+59.7	40.7	**26**
27	15 39.4	+58.9	39.1	16 25.9	+59.1	39.3	17 12.2	+59.2	39.5	17 58.4	+59.4	39.7	18 44.5	+59.5	39.9	19 30.5	+59.5	40.1	20 16.3	+59.6	40.4	21 01.9	+59.7	40.6	**27**
28	16 38.3	+59.0	38.9	17 25.0	+59.0	39.1	18 11.4	+59.2	39.3	18 57.8	+59.3	39.5	19 44.0	+59.4	39.8	20 30.0	+59.5	40.0	21 15.9	+59.6	40.3	22 01.6	+59.7	40.5	**28**
29	17 37.3	+59.0	38.7	18 24.0	+59.1	38.9	19 10.6	+59.2	39.2	19 57.1	+59.3	39.4	20 43.4	+59.4	39.6	21 29.5	+59.5	39.9	22 15.5	+59.6	40.1	23 01.3	+59.6	40.4	**29**
30	18 36.3	+58.9	38.5	19 23.1	+59.1	38.8	20 09.8	+59.2	39.0	20 56.4	+59.3	39.2	21 42.8	+59.4	39.5	22 29.0	+59.5	39.7	23 15.1	+59.6	40.0	24 00.9	+59.7	40.3	**30**
31	19 35.2	+58.9	38.4	20 22.2	+59.1	38.6	21 09.0	+59.2	38.8	21 55.7	+59.3	39.1	22 42.2	+59.4	39.3	23 28.5	+59.5	39.6	24 14.7	+59.5	39.9	25 00.6	+59.7	40.2	**31**
32	20 34.1	+59.0	38.2	21 21.3	+59.0	38.4	22 08.2	+59.2	38.6	22 55.0	+59.3	38.9	23 41.6	+59.4	39.2	24 28.0	+59.5	39.5	25 14.2	+59.6	39.7	26 00.3	+59.6	40.1	**32**
33	21 33.1	+58.9	37.9	22 20.3	+59.0	38.2	23 07.4	+59.1	38.5	23 54.3	+59.2	38.7	24 41.0	+59.4	39.0	25 27.5	+59.5	39.3	26 13.8	+59.6	39.6	26 59.9	+59.7	39.9	**33**
34	22 32.0	+58.9	37.7	23 19.3	+59.0	38.0	24 06.5	+59.2	38.3	24 53.5	+59.3	38.6	25 40.4	+59.3	38.9	26 27.0	+59.4	39.2	27 13.4	+59.6	39.5	27 59.6	+59.6	39.8	**34**
35	23 30.9	+58.8	37.5	24 18.3	+59.0	37.8	25 05.7	+59.1	38.1	25 52.8	+59.2	38.4	26 39.7	+59.4	38.7	27 26.4	+59.5	39.0	28 13.0	+59.5	39.3	28 59.2	+59.7	39.7	**35**
36	24 29.7	+58.9	37.3	25 17.3	+59.0	37.6	26 04.8	+59.1	37.9	26 52.0	+59.3	38.2	27 39.1	+59.3	38.5	28 25.9	+59.5	38.9	29 12.5	+59.6	39.2	29 58.9	+59.6	39.6	**36**
37	25 28.6	+58.8	37.1	26 16.3	+59.0	37.4	27 03.9	+59.1	37.7	27 51.3	+59.2	38.0	28 38.4	+59.3	38.4	29 25.4	+59.4	38.7	30 12.1	+59.5	39.1	30 58.5	+59.6	39.4	**37**
38	26 27.4	+58.8	36.9	27 15.3	+58.9	37.2	28 03.0	+59.1	37.5	28 50.5	+59.2	37.8	29 37.7	+59.4	38.2	30 24.8	+59.4	38.5	31 11.6	+59.5	38.9	31 58.1	+59.7	39.3	**38**
39	27 26.2	+58.8	36.7	28 14.2	+59.0	37.0	29 02.1	+59.0	37.3	29 49.7	+59.2	37.7	30 37.1	+59.3	38.0	31 24.2	+59.4	38.4	32 11.1	+59.5	38.8	32 57.8	+59.6	39.2	**39**
40	28 25.0	+58.8	36.4	29 13.2	+58.9	36.8	30 01.1	+59.1	37.1	30 48.9	+59.1	37.5	31 36.4	+59.3	37.8	32 23.6	+59.4	38.2	33 10.6	+59.5	38.6	33 57.4	+59.6	39.0	**40**
41	29 23.8	+58.7	36.2	30 12.1	+58.9	36.6	31 00.2	+59.0	36.9	31 48.0	+59.2	37.3	32 35.7	+59.2	37.7	33 23.0	+59.4	38.1	34 10.1	+59.5	38.5	34 57.0	+59.6	38.9	**41**
42	30 22.5	+58.7	36.0	31 11.0	+58.8	36.3	31 59.2	+59.0	36.7	32 47.2	+59.1	37.1	33 34.9	+59.3	37.5	34 22.4	+59.4	37.9	35 09.6	+59.5	38.3	35 56.6	+59.6	38.8	**42**
43	31 21.2	+58.7	35.7	32 09.8	+58.9	36.1	32 58.2	+59.0	36.5	33 46.3	+59.1	36.9	34 34.2	+59.2	37.3	35 21.8	+59.3	37.7	36 09.1	+59.5	38.1	36 56.2	+59.5	38.6	**43**
44	32 19.9	+58.7	35.5	33 08.7	+58.8	35.9	33 57.2	+58.9	36.3	34 45.4	+59.1	36.7	35 33.4	+59.2	37.1	36 21.1	+59.4	37.5	37 08.6	+59.4	38.0	37 55.7	+59.6	38.5	**44**
45	33 18.6	+58.6	35.2	34 07.5	+58.8	35.6	34 56.1	+58.9	36.0	35 44.5	+59.1	36.5	36 32.6	+59.2	36.9	37 20.5	+59.3	37.3	38 08.0	+59.5	37.8	38 55.3	+59.5	38.3	**45**
46	34 17.2	+58.6	35.0	35 06.3	+58.7	35.4	35 55.0	+58.9	35.8	36 43.6	+59.0	36.2	37 31.8	+59.2	36.7	38 19.8	+59.3	37.2	39 07.5	+59.4	37.6	39 54.8	+59.6	38.1	**46**
47	35 15.8	+58.6	34.7	36 05.0	+58.7	35.1	36 53.9	+58.9	35.6	37 42.6	+59.0	36.0	38 31.0	+59.2	36.5	39 19.1	+59.3	37.0	40 06.9	+59.4	37.5	40 54.4	+59.5	38.0	**47**
48	36 14.4	+58.5	34.5	37 03.7	+58.7	34.9	37 52.8	+58.9	35.3	38 41.6	+59.0	35.8	39 30.2	+59.1	36.3	40 18.4	+59.3	36.8	41 06.3	+59.4	37.3	41 53.9	+59.5	37.8	**48**
49	37 12.9	+58.5	34.2	38 02.4	+58.7	34.6	38 51.7	+58.8	35.1	39 40.6	+59.0	35.5	40 29.3	+59.1	36.0	41 17.7	+59.2	36.5	42 05.7	+59.4	37.1	42 53.4	+59.5	37.6	**49**
50	38 11.4	+58.4	33.9	39 01.1	+58.6	34.3	39 50.5	+58.7	34.8	40 39.6	+58.9	35.3	41 28.4	+59.1	35.8	42 16.9	+59.2	36.3	43 05.1	+59.3	36.9	43 52.9	+59.4	37.5	**50**
51	39 09.8	+58.4	33.6	39 59.7	+58.5	34.1	40 49.2	+58.8	34.6	41 38.5	+58.9	35.1	42 27.5	+59.0	35.6	43 16.1	+59.2	36.1	44 04.4	+59.3	36.7	44 52.3	+59.5	37.3	**51**
52	40 08.2	+58.4	33.3	40 58.2	+58.6	33.8	41 48.0	+58.7	34.3	42 37.4	+58.9	34.8	43 26.5	+59.0	35.3	44 15.3	+59.2	35.9	45 03.7	+59.3	36.5	45 51.8	+59.4	37.1	**52**
53	41 06.6	+58.3	33.0	41 56.8	+58.5	33.5	42 46.7	+58.6	34.0	43 36.3	+58.8	34.5	44 25.5	+59.0	35.1	45 14.5	+59.1	35.7	46 03.0	+59.3	36.3	46 51.2	+59.4	36.9	**53**
54	42 04.9	+58.3	32.7	42 55.3	+58.4	33.2	43 45.3	+58.6	33.7	44 35.1	+58.8	34.3	45 24.5	+58.9	34.8	46 13.6	+59.1	35.4	47 02.3	+59.2	36.0	47 50.6	+59.4	36.7	**54**
55	43 03.2	+58.1	32.4	43 53.7	+58.4	32.9	44 43.9	+58.6	33.4	45 33.9	+58.7	34.0	46 23.4	+58.9	34.6	47 12.7	+59.0	35.2	48 01.5	+59.3	35.8	48 50.0	+59.4	36.5	**55**
56	44 01.3	+58.2	32.0	44 52.1	+58.3	32.6	45 42.5	+58.5	33.1	46 32.6	+58.7	33.7	47 22.3	+58.9	34.3	48 11.7	+59.1	34.9	49 00.8	+59.1	35.6	49 49.4	+59.3	36.2	**56**
57	44 59.5	+58.0	31.7	45 50.4	+58.3	32.2	46 41.0	+58.4	32.8	47 31.3	+58.6	33.4	48 21.2	+58.8	34.0	49 10.8	+59.0	34.6	49 59.9	+59.2	35.3	50 48.7	+59.3	36.0	**57**
58	45 57.5	+58.0	31.3	46 48.7	+58.1	31.9	47 39.4	+58.4	32.4	48 29.9	+58.6	33.1	49 20.0	+58.8	33.7	50 09.8	+58.9	34.3	50 59.1	+59.1	35.0	51 48.0	+59.3	35.8	**58**
59	46 55.5	+58.0	31.0	47 46.8	+58.2	31.5	48 37.8	+58.4	32.1	49 28.5	+58.5	32.7	50 18.8	+58.7	33.4	51 08.7	+58.9	34.0	51 58.2	+59.1	34.8	52 47.3	+59.2	35.5	**59**
60	47 53.5	+57.8	30.6	48 45.0	+58.0	31.1	49 36.2	+58.2	31.7	50 27.0	+58.5	32.4	51 17.5	+58.7	33.0	52 07.6	+58.8	33.7	52 57.3	+59.0	34.5	53 46.5	+59.2	35.2	**60**
61	48 51.3	+57.8	30.2	49 43.0	+58.0	30.8	50 34.4	+58.2	31.4	51 25.5	+58.4	32.0	52 16.2	+58.6	32.7	53 06.4	+58.8	33.4	53 56.3	+59.0	34.2	54 45.7	+59.2	35.0	**61**
62	49 49.1	+57.6	29.8	50 41.0	+57.9	30.4	51 32.6	+58.1	31.0	52 23.9	+58.3	31.7	53 14.8	+58.5	32.3	54 05.2	+58.8	33.1	54 55.3	+58.9	33.9	55 44.9	+59.1	34.7	**62**
63	50 46.7	+57.6	29.3	51 38.9	+57.8	29.9	52 30.7	+58.0	30.6	53 22.2	+58.2	31.3	54 13.3	+58.4	32.0	55 04.0	+58.6	32.7	55 54.2	+58.9	33.5	56 44.0	+59.1	34.4	**63**
64	51 44.3	+57.5	28.9	52 36.7	+57.7	29.5	53 28.7	+58.0	30.2	54 20.4	+58.2	30.9	55 11.7	+58.4	31.6	56 02.6	+58.6	32.4	56 53.1	+58.8	33.2	57 43.1	+59.0	34.0	**64**
65	52 41.8	+57.3	28.4	53 34.4	+57.6	29.0	54 26.7	+57.8	29.7	55 18.6	+58.0	30.4	56 10.1	+58.3	31.2	57 01.2	+58.6	32.0	57 51.9	+58.8	32.8	58 42.1	+58.9	33.7	**65**
66	53 39.1	+57.2	27.9	54 32.0	+57.4	28.6	55 24.5	+57.7	29.2	56 16.6	+58.0	30.0	57 08.4	+58.2	30.7	57 59.8	+58.4	31.6	58 50.7	+58.6	32.4	59 41.0	+58.9	33.3	**66**
67	54 36.3	+57.1	27.4	55 29.4	+57.3	28.1	56 22.2	+57.6	28.8	57 14.6	+57.8	29.5	58 06.6	+58.1	30.3	58 58.2	+58.4	31.1	59 49.3	+58.6	32.0	60 39.9	+58.9	33.0	**67**
68	55 33.4	+56.9	26.9	56 26.7	+57.2	27.5	57 19.8	+57.4	28.2	58 12.4	+57.8	29.0	59 04.7	+58.0	29.8	59 56.6	+58.2	30.7	60 47.9	+58.5	31.6	61 38.8	+58.7	32.5	**68**
69	56 30.3	+56.8	26.3	57 23.9	+57.1	27.0	58 17.2	+57.4	27.7	59 10.2	+57.6	28.5	60 02.7	+57.9	29.3	60 54.8	+58.1	30.2	61 46.4	+58.4	31.1	62 37.5	+58.7	32.1	**69**
70	57 27.1	+56.6	25.7	58 21.0	+56.8	26.4	59 14.6	+57.1	27.1	60 07.8	+57.4	27.9	61 00.6	+57.7	28.8	61 52.9	+58.0	29.7	62 44.8	+58.3	30.6	63 36.2	+58.5	31.6	**70**
71	58 23.7	+56.4	25.1	59 17.8	+56.7	25.8	60 11.7	+57.0	26.5	61 05.2	+57.3	27.3	61 58.3	+57.6	28.2	62 50.9	+57.9	29.1	63 43.1	+58.2	30.1	64 34.7	+58.5	31.1	**71**
72	59 20.1	+56.1	24.4	60 14.5	+56.5	25.1	61 08.7	+56.8	25.9	62 02.5	+57.1	26.7	62 55.9	+57.4	27.6	63 48.8	+57.7	28.5	64 41.3	+58.0	29.5	65 33.2	+58.3	30.6	**72**
73	60 16.2	+56.0	23.7	61 11.0	+56.3	24.4	62 05.5	+56.6	25.2	62 59.6	+56.9	26.0	63 53.3	+57.2	26.9	64 46.5	+57.6	27.9	65 39.3	+57.9	28.9	66 31.5	+58.2	30.0	**73**
74	61 12.2	+55.7	23.0	62 07.3	+56.0	23.7	63 02.1	+56.3	24.5	63 56.5	+56.6	25.3	64 50.5	+57.0	26.2	65 44.1	+57.3	27.2	66 37.2	+57.7	28.3	67 29.7	+58.1	29.4	**74**
75	62 07.9	+55.4	22.2	63 03.3	+55.7	22.9	63 58.4	+56.1	23.7	64 53.1	+56.5	24.6	65 47.5	+56.8	25.5	66 41.4	+57.2	26.5	67 34.9	+57.5	27.6	68 27.8	+57.9	28.7	**75**
76	63 03.3	+55.1	21.4	63 59.0	+55.5	22.1	64 54.5	+55.8	22.9	65 49.6	+56.1	23.8	66 44.3	+56.5	24.7	67 38.6	+56.9	25.7	68 32.4	+57.3	26.8	69 25.7	+57.6	28.0	**76**
77	63 58.4	+54.7	20.5	64 54.5	+55.1	21.2	65 50.3	+55.4	22.0	66 45.7	+55.8	22.9	67 40.8	+56.2	23.8	68 35.5	+56.6	24.9	69 29.7	+57.0	26.0	70 23.3	+57.4	27.2	**77**
78	64 53.1	+54.4	19.5	65 49.6	+54.7	20.3	66 45.7	+55.1	21.1	67 41.5	+55.5	21.9	68 37.0	+55.9	22.9	69 32.1	+56.3	23.9	70 26.7	+56.7	25.1	71 20.7	+57.2	26.3	**78**
79	65 47.5	+53.9	18.5	66 44.3	+54.3	19.2	67 40.8	+54.7	20.0	68 37.0	+55.1	20.9	69 32.9	+55.5	21.9	70 28.4	+55.9	22.9	71 23.4	+56.4	24.1	72 17.9	+56.8	25.3	**79**
80	66 41.4	+53.5	17.4	67 38.6	+53.8	18.1	68 35.5	+54.2	18.9	69 32.1	+54.6	19.8	70 28.4	+55.0	20.8	71 24.3	+55.5	21.8	72 19.8	+55.9	23.0	73 14.7	+56.5	24.3	**80**
81	67 34.9	+52.9	16.2	68 32.4	+53.3	17.0	69 29.7	+53.6	17.7	70 26.7	+54.0	18.6	71 23.4	+54.5	19.5	72 19.8	+54.9	20.6	73 15.7	+55.5	21.7	74 11.2	+56.0	23.0	**81**
82	68 27.8	+52.3	15.0	69 25.7	+52.6	15.7	70 23.3	+53.1	16.4	71 20.7	+53.5	17.3	72 17.9	+53.9	18.2	73 14.7	+54.4	19.2	74 11.2	+54.9	20.4	75 07.2	+55.5	21.7	**82**
83	69 20.1	+51.6	13.6	70 18.3	+52.0	14.3	71 16.4	+52.3	15.0	72 14.2	+52.8	15.8	73 11.8	+53.2	16.7	74 09.1	+53.7	17.7	75 06.1	+54.2	18.9	76 02.7	+54.8	20.2	**83**
84	70 11.7	+50.8	12.1	71 10.3	+51.1	12.8	72 08.7	+51.5	13.4	73 07.0	+51.9	14.2	74 05.0	+52.4	15.1	75 02.8	+52.9	16.0	76 00.3	+53.4	17.1	76 57.5	+54.0	18.4	**84**
85	71 02.5	+49.9	10.5	72 01.4	+50.2	11.1	73 00.2	+50.6	11.7	73 58.9	+51.0	12.4	74 57.4	+51.4	13.2	75 55.7	+51.9	14.2	76 53.7	+52.4	15.2	77 51.5	+53.0	16.4	**85**
86	71 52.4	+48.8	8.8	72 51.6	+49.2	9.3	73 50.8	+49.5	9.8	74 49.9	+49.8	10.5	75 48.8	+50.2	11.2	76 47.6	+50.6	12.0	77 46.1	+51.2	13.0	78 44.5	+51.7	14.1	**86**
87	72 41.2	+47.7	6.9	73 40.8	+47.9	7.3	74 40.3	+48.2	7.8	75 39.7	+48.5	8.3	76 39.0	+48.8	8.9	77 38.2	+49.2	9.6	78 37.3	+49.7	10.4	79 36.2	+50.2	11.4	**87**
88	73 28.9	+46.4	4.8	74 28.7	+46.5	5.1	75 28.5	+46.6	5.4	76 28.2	+46.8	5.8	77 27.8	+47.1	6.3	78 27.4	*+47.4* •	6.8	79 27.0	*+47.7* •	7.5	80 26.4	*+48.1* •	8.2	**88**
89	74 15.3	+44.7	2.5	75 15.2	+44.8	2.7	76 15.1	+44.9	2.9	77 15.0	*+45.0* •	3.1	78 14.9	*+45.1* •	3.4	79 14.8	*+45.2* •	3.7	80 14.7	*+45.3* •	4.0	81 14.5	*+45.5* •	4.5	**89**
90	75 00.0	+42.9	0.0	76 00.0	*+42.9* •	0.0	77 00.0	*+42.8* •	0.0	78 00.0	*+42.7* •	0.0	79 00.0	*+42.5* •	0.0	80 00.0	*+42.4* •	0.0	81 00.0	*+42.2* •	0.0	82 00.0	*+42.0* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 137°, 223°

44°, 316° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 43.8	+59.0	135.0	10 01.3	+59.1	135.1	9 18.7	+59.3	135.3	8 36.1	+59.3	135.4	7 53.3	+59.5	135.5	7 10.5	+59.6	135.6	6 27.7	+59.6	135.6	5 44.7	+59.8	135.7	0
1	11 42.8	+59.0	134.8	11 00.4	+59.1	135.0	10 18.0	+59.2	135.1	9 35.4	+59.4	135.2	8 52.8	+59.5	135.3	8 10.1	+59.5	135.4	7 27.3	+59.6	135.5	6 44.5	+59.7	135.6	1
2	12 41.8	+58.9	134.6	11 59.5	+59.1	134.8	11 17.2	+59.2	134.9	10 34.8	+59.3	135.1	9 52.3	+59.4	135.2	9 09.6	+59.6	135.3	8 26.9	+59.7	135.4	7 44.2	+59.7	135.5	2
3	13 40.7	+59.0	134.4	12 58.6	+59.1	134.6	12 16.4	+59.3	134.8	11 34.1	+59.4	134.9	10 51.7	+59.5	135.1	10 09.2	+59.5	135.2	9 26.6	+59.6	135.3	8 43.9	+59.7	135.4	3
4	14 39.7	+58.9	134.3	13 57.7	+59.1	134.4	13 15.7	+59.2	134.6	12 33.5	+59.3	134.8	11 51.2	+59.4	134.9	11 08.7	+59.6	135.1	10 26.2	+59.6	135.2	9 43.6	+59.7	135.3	4
5	15 38.6	+59.0	134.1	14 56.8	+59.1	134.3	14 14.9	+59.2	134.4	13 32.8	+59.3	134.6	12 50.6	+59.5	134.8	12 08.3	+59.5	134.9	11 25.8	+59.7	135.1	10 43.3	+59.7	135.2	5
6	16 37.6	+58.9	133.9	15 55.9	+59.1	134.1	15 14.1	+59.2	134.3	14 32.1	+59.4	134.5	13 50.1	+59.4	134.6	13 07.8	+59.6	134.8	12 25.5	+59.6	135.0	11 43.0	+59.7	135.1	6
7	17 36.5	+58.9	133.7	16 55.0	+59.0	133.9	16 13.3	+59.2	134.1	15 31.5	+59.3	134.3	14 49.5	+59.4	134.5	14 07.4	+59.5	134.7	13 25.1	+59.6	134.9	12 42.7	+59.7	135.0	7
8	18 35.4	+58.9	133.5	17 54.0	+59.1	133.7	17 12.5	+59.2	133.9	16 30.8	+59.3	134.2	15 48.9	+59.4	134.4	15 06.9	+59.5	134.6	14 24.7	+59.6	134.7	13 42.4	+59.7	134.9	8
9	19 34.3	+58.9	133.3	18 53.1	+59.0	133.5	18 11.7	+59.2	133.8	17 30.1	+59.3	134.0	16 48.3	+59.5	134.2	16 06.4	+59.5	134.4	15 24.3	+59.7	134.6	14 42.1	+59.7	134.8	9
10	20 33.2	+58.9	133.1	19 52.1	+59.1	133.3	19 10.9	+59.1	133.6	18 29.4	+59.3	133.8	17 47.8	+59.4	134.1	17 05.9	+59.6	134.3	16 24.0	+59.6	134.5	15 41.8	+59.7	134.7	10
11	21 32.1	+58.8	132.9	20 51.2	+59.0	133.1	20 10.0	+59.2	133.4	19 28.7	+59.3	133.7	18 47.2	+59.4	133.9	18 05.5	+59.5	134.2	17 23.6	+59.6	134.4	16 41.5	+59.7	134.6	11
12	22 30.9	+58.9	132.6	21 50.2	+59.0	132.9	21 09.2	+59.1	133.2	20 28.0	+59.3	133.5	19 46.6	+59.4	133.8	19 05.0	+59.5	134.0	18 23.2	+59.6	134.3	17 41.2	+59.7	134.5	12
13	23 29.8	+58.8	132.4	22 49.2	+59.0	132.7	22 08.3	+59.2	133.1	21 27.3	+59.2	133.3	20 46.0	+59.4	133.6	20 04.5	+59.5	133.9	19 22.8	+59.6	134.2	18 40.9	+59.7	134.4	13
14	24 28.6	+58.8	132.2	23 48.2	+58.9	132.6	23 07.5	+59.1	132.9	22 26.5	+59.3	133.2	21 45.4	+59.3	133.5	21 04.0	+59.5	133.8	20 22.4	+59.6	134.0	19 40.6	+59.7	134.3	14
15	25 27.4	+58.8	132.0	24 47.1	+59.0	132.3	24 06.6	+59.1	132.7	23 25.8	+59.2	133.0	22 44.7	+59.4	133.3	22 03.5	+59.5	133.6	21 22.0	+59.6	133.9	20 40.3	+59.6	134.2	15
16	26 26.2	+58.8	131.8	25 46.1	+58.9	132.1	25 05.7	+59.1	132.5	24 25.0	+59.3	132.8	23 44.1	+59.4	133.2	23 03.0	+59.4	133.5	22 21.6	+59.5	133.8	21 39.9	+59.7	134.1	16
17	27 25.0	+58.7	131.6	26 45.0	+59.0	131.9	26 04.8	+59.1	132.3	25 24.3	+59.2	132.7	24 43.5	+59.3	133.0	24 02.4	+59.5	133.3	23 21.1	+59.6	133.6	22 39.6	+59.7	134.0	17
18	28 23.7	+58.7	131.3	27 44.0	+58.8	131.7	27 03.9	+59.0	132.1	26 23.5	+59.2	132.5	25 42.8	+59.4	132.8	25 01.9	+59.5	133.2	24 20.7	+59.6	133.5	23 39.3	+59.6	133.8	18
19	29 22.4	+58.7	131.1	28 42.8	+58.9	131.5	28 02.9	+59.1	131.9	27 22.7	+59.2	132.3	26 42.2	+59.3	132.7	26 01.4	+59.4	133.0	25 20.3	+59.5	133.4	24 38.9	+59.7	133.7	19
20	30 21.1	+58.7	130.8	29 41.7	+58.9	131.3	29 02.0	+59.0	131.7	28 21.9	+59.2	132.1	27 41.5	+59.3	132.5	27 00.8	+59.5	132.9	26 19.8	+59.6	133.3	25 38.6	+59.6	133.6	20
21	31 19.8	+58.7	130.6	30 40.6	+58.8	131.1	30 01.0	+59.0	131.5	29 21.1	+59.1	131.9	28 40.8	+59.3	132.3	28 00.3	+59.4	132.7	27 19.4	+59.5	133.1	26 38.2	+59.7	133.5	21
22	32 18.5	+58.6	130.4	31 39.4	+58.8	130.8	31 00.0	+59.0	131.3	30 20.2	+59.2	131.7	29 40.1	+59.3	132.2	28 59.7	+59.4	132.6	28 18.9	+59.6	133.0	27 37.9	+59.6	133.4	22
23	33 17.1	+58.5	130.1	32 38.2	+58.8	130.6	31 59.0	+58.9	131.1	31 19.4	+59.1	131.5	30 39.4	+59.3	132.0	29 59.1	+59.4	132.4	29 18.5	+59.5	132.8	28 37.5	+59.7	133.2	23
24	34 15.6	+58.6	129.8	33 37.0	+58.8	130.4	32 57.9	+59.0	130.9	32 18.5	+59.1	131.3	31 38.7	+59.3	131.8	30 58.5	+59.4	132.3	30 18.0	+59.5	132.7	29 37.2	+59.6	133.1	24
25	35 14.2	+58.5	129.6	34 35.8	+58.7	130.1	33 56.9	+58.9	130.6	33 17.6	+59.1	131.1	32 38.0	+59.2	131.6	31 57.9	+59.4	132.1	31 17.5	+59.5	132.5	30 36.8	+59.6	133.0	25
26	36 12.7	+58.5	129.3	35 34.5	+58.7	129.9	34 55.8	+58.9	130.4	34 16.7	+59.1	130.9	33 37.2	+59.2	131.4	32 57.3	+59.4	131.9	32 17.0	+59.5	132.4	31 36.4	+59.6	132.9	26
27	37 11.2	+58.4	129.0	36 33.2	+58.6	129.6	35 54.7	+58.8	130.2	35 15.8	+59.0	130.7	34 36.4	+59.2	131.2	33 56.7	+59.3	131.7	33 16.5	+59.5	132.2	32 36.0	+59.6	132.7	27
28	38 09.6	+58.4	128.7	37 31.8	+58.6	129.3	36 53.5	+58.9	129.9	36 14.8	+59.0	130.5	35 35.6	+59.2	131.0	34 56.0	+59.4	131.6	34 16.0	+59.5	132.1	33 35.6	+59.6	132.6	28
29	39 08.0	+58.3	128.4	38 30.4	+58.6	129.1	37 52.4	+58.8	129.7	37 13.8	+59.0	130.3	36 34.8	+59.2	130.8	35 55.4	+59.3	131.4	35 15.5	+59.4	131.9	34 35.2	+59.6	132.4	29
30	40 06.3	+58.3	128.1	39 29.0	+58.6	128.8	38 51.2	+58.7	129.4	38 12.8	+59.0	130.0	37 34.0	+59.1	130.6	36 54.7	+59.3	131.2	36 14.9	+59.5	131.8	35 34.8	+59.5	132.3	30
31	41 04.6	+58.3	127.8	40 27.6	+58.5	128.5	39 49.9	+58.8	129.2	39 11.8	+58.9	129.8	38 33.1	+59.2	130.4	37 54.0	+59.3	131.0	37 14.4	+59.4	131.6	36 34.3	+59.6	132.1	31
32	42 02.9	+58.2	127.5	41 26.1	+58.4	128.2	40 48.7	+58.6	128.9	40 10.7	+58.9	129.6	39 32.3	+59.0	130.2	38 53.3	+59.2	130.8	38 13.8	+59.4	131.4	37 33.9	+59.6	132.0	32
33	43 01.1	+58.1	127.2	42 24.5	+58.4	127.9	41 47.3	+58.7	128.6	41 09.6	+58.9	129.3	40 31.3	+59.1	130.0	39 52.5	+59.3	130.6	39 13.2	+59.4	131.2	38 33.5	+59.5	131.8	33
34	43 59.2	+58.1	126.8	43 22.9	+58.3	127.6	42 46.0	+58.6	128.3	42 08.5	+58.8	129.0	41 30.4	+59.0	129.7	40 51.8	+59.2	130.4	40 12.6	+59.4	131.1	39 33.0	+59.5	131.7	34
35	44 57.3	+57.9	126.5	44 21.2	+58.3	127.3	43 44.6	+58.6	128.0	43 07.3	+58.8	128.8	42 29.4	+59.1	129.5	41 51.0	+59.2	130.2	41 12.0	+59.4	130.9	40 32.5	+59.5	131.5	35
36	45 55.2	+58.0	126.1	45 19.5	+58.3	126.9	44 43.2	+58.5	127.7	44 06.1	+58.8	128.5	43 28.5	+58.9	129.2	42 50.2	+59.2	130.0	42 11.4	+59.3	130.7	41 32.0	+59.5	131.3	36
37	46 53.2	+57.8	125.7	46 17.8	+58.1	126.6	45 41.7	+58.4	127.4	45 04.9	+58.7	128.2	44 27.4	+59.0	129.0	43 49.4	+59.1	129.7	43 10.7	+59.3	130.5	42 31.5	+59.5	131.2	37
38	47 51.0	+57.8	125.3	47 15.9	+58.1	126.2	46 40.1	+58.4	127.1	46 03.6	+58.6	127.9	45 26.4	+58.9	128.7	44 48.5	+59.1	129.5	44 10.0	+59.3	130.3	43 31.0	+59.4	131.0	38
39	48 48.8	+57.7	124.9	48 14.0	+58.0	125.9	47 38.5	+58.3	126.8	47 02.2	+58.6	127.6	46 25.3	+58.8	128.5	45 47.6	+59.1	129.3	45 09.3	+59.3	130.0	44 30.4	+59.5	130.8	39
40	49 46.5	+57.5	124.5	49 12.0	+58.0	125.5	48 36.8	+58.3	126.4	48 00.8	+58.6	127.3	47 24.1	+58.8	128.2	46 46.7	+59.0	129.0	46 08.6	+59.2	129.8	45 29.9	+59.4	130.6	40
41	50 44.0	+57.5	124.1	50 10.0	+57.8	125.1	49 35.1	+58.2	126.0	48 59.4	+58.5	127.0	48 22.9	+58.8	127.9	47 45.7	+59.1	128.7	47 07.8	+59.3	129.6	46 29.3	+59.4	130.4	41
42	51 41.5	+57.4	123.6	51 07.8	+57.8	124.7	50 33.3	+58.1	125.7	49 57.9	+58.4	126.6	49 21.7	+58.7	127.6	48 44.8	+58.9	128.5	48 07.1	+59.1	129.4	47 28.7	+59.3	130.2	42
43	52 38.9	+57.2	123.1	52 05.6	+57.7	124.2	51 31.4	+58.0	125.3	50 56.3	+58.4	126.3	50 20.4	+58.7	127.2	49 43.7	+58.9	128.2	49 06.2	+59.2	129.1	48 28.0	+59.4	130.0	43
44	53 36.1	+57.1	122.6	53 03.3	+57.5	123.8	52 29.4	+58.0	124.8	51 54.7	+58.3	125.9	51 19.1	+58.6	126.9	50 42.6	+58.9	127.9	50 05.4	+59.1	128.8	49 27.4	+59.3	129.8	44
45	54 33.2	+57.0	122.1	54 00.8	+57.4	123.3	53 27.4	+57.8	124.4	52 53.0	+58.2	125.5	52 17.7	+58.5	126.6	51 41.5	+58.9	127.6	51 04.5	+59.1	128.6	50 26.7	+59.3	129.5	45
46	55 30.2	+56.8	121.6	54 58.2	+57.4	122.8	54 25.2	+57.8	124.0	53 51.2	+58.1	125.1	53 16.2	+58.5	126.2	52 40.4	+58.7	127.3	52 03.6	+59.0	128.3	51 26.0	+59.3	129.3	46
47	56 27.0	+56.7	121.0	55 55.6	+57.1	122.3	55 23.0	+57.6	123.5	54 49.3	+58.1	124.7	54 14.7	+58.4	125.8	53 39.1	+58.7	126.9	53 02.6	+59.0	128.0	52 25.3	+59.2	129.0	47
48	57 23.7	+56.4	120.4	56 52.7	+57.0	121.7	56 20.6	+57.5	123.0	55 47.4	+57.9	124.2	55 13.1	+58.3	125.4	54 37.8	+58.7	126.6	54 01.6	+59.0	127.7	53 24.5	+59.2	128.8	48
49	58 20.1	+56.3	119.8	57 49.7	+56.9	121.1	57 18.1	+57.4	122.5	56 45.3	+57.8	123.8	56 11.4	+58.3	125.0	55 36.5	+58.6	126.2	55 00.6	+58.8	127.4	54 23.7	+59.1	128.5	49
50	59 16.4	+56.1	119.1	58 46.6	+56.6	120.5	58 15.5	+57.2	121.9	57 43.1	+57.7	123.3	57 09.7	+58.1	124.6	56 35.1	+58.5	125.8	55 59.4	+58.9	127.0	55 22.8	+59.1	128.2	50
51	60 12.5	+55.8	118.4	59 43.2	+56.5	119.9	59 12.7	+57.0	121.3	58 40.8	+57.6	122.8	58 07.8	+58.0	124.1	57 33.6	+58.4	125.4	56 58.3	+58.7	126.7	56 21.9	+59.1	127.9	51
52	61 08.3	+55.5	117.6	60 39.7	+56.3	119.2	60 09.7	+56.9	120.7	59 38.4	+57.4	122.2	59 05.8	+57.9	123.6	58 32.0	+58.3	125.0	57 57.0	+58.7	126.3	57 21.0	+59.0	127.6	52
53	62 03.8	+55.3	116.8	61 36.0	+56.0	118.5	61 06.6	+56.7	120.1	60 35.8	+57.3	121.6	60 03.7	+57.8	123.1	59 30.3	+58.2	124.5	58 55.7	+58.6	125.9	58 20.0	+58.9	127.2	53
54	62 59.1	+54.9	116.0	62 32.0	+55.7	117.7	62 03.3	+56.4	119.4	61 33.1	+57.1	121.0	61 01.5	+57.6	122.6	60 28.5	+58.2	124.0	59 54.3	+58.6	125.5	59 18.9	+58.9	126.9	54
55	63 54.0	+54.6	115.1	63 27.7	+55.4	116.9	62 59.7	+56.2	118.7	62 30.2	+56.9	120.3	61 59.1	+57.5	122.0	61 26.7	+58.0	123.5	60 52.9	+58.4	125.0	60 17.8	+58.8	126.5	55
56	64 48.6	+54.2	114.1	64 23.1	+55.2	116.0	63 55.9	+56.0	117.9	63 27.1	+56.6	119.6	62 56.6	+57.3	121.4	62 24.7	+57.8	123.0	61 51.3	+58.3	124.6	61 16.6	+58.7	126.1	56
57	65 42.8	+53.7	113.1	65 18.3	+54.7	115.1	64 51.9	+55.6	117.0	64 23.7	+56.5	118.9	63 53.9	+57.1	120.7	63 22.5	+57.7	122.4	62 49.6	+58.2	124.1	62 15.3	+58.7	125.6	57
58	66 36.5	+53.2	112.0	66 13.0	+54.3	114.1	65 47.5	+55.3	116.1	65 20.2	+56.1	118.1	64 51.0	+56.9	120.0	64 20.2	+57.6	121.8	63 47.8	+58.1	123.5	63 14.0	+58.5	125.2	58
59	67 29.7	+52.7	110.8	67 07.3	+53.9	113.0	66 42.8	+54.9	115.2	66 16.3	+55.9	117.2	65 47.9	+56.7	119.2	65 17.8	+57.3	121.1	64 45.9	+58.0	122.9	64 12.5	+58.5	124.7	59
60	68 22.4	+52.1	109.5	68 01.2	+53.3	111.9	67 37.7	+54.5	114.1	67 12.2	+55.4	116.3	66 44.6	+56.3	118.4	66 15.1	+57.1	120.4	65 43.9	+57.8	122.3	65 11.0	+58.3	124.2	60
61	69 14.5	+51.3	108.2	68 54.5	+52.8	110.6	68 32.2	+54.0	113.0	68 07.6	+55.2	115.3	67 40.9	+56.1	117.5	67 12.2	+56.9	119.6	66 41.7	+57.6	121.7	66 09.3	+58.2	123.6	61
62	70 05.8	+50.5	106.7	69 47.3	+52.0	109.3	69 26.2	+53.5	111.8	69 02.8	+54.6	114.2	68 37.0	+55.7	116.6	68 09.1	+56.7	118.8	67 39.3	+57.3	120.9	67 07.5	+58.0	123.0	62
63	70 56.3	+49.6	105.1	70 39.3	+51.3	107.8	70 19.7	+52.8	110.5	69 57.4	+54.2	113.0	69 32.7	+55.3	115.5	69 05.8	+56.3	117.9	68 36.6	+57.2	120.1	68 05.5	+57.9	122.3	63
64	71 45.9	+48.6	103.3	71 30.6	+50.5	106.2	71 12.5	+52.1	109.0	70 51.6	+53.5	111.8	70 28.0	+54.9	114.4	70 02.1	+55.9	116.9	69 33.8	+56.9	119.3	69 03.4	+57.7	121.6	64
65	72 34.5	+47.3	101.4	72 21.1	+49.4	104.5	72 04.6	+51.2	107.5	71 45.1	+52.9	110.4	71 22.9	+54.3	113.1	70 58.0	+55.5	115.8	70 30.7	+56.5	118.4	70 01.1	+57.4	120.8	65
66	73 21.8	+46.0	99.3	73 10.5	+48.2	102.5	72 55.8	+50.3	105.7	72 38.0	+52.1	108.8	72 17.2	+53.7	111.8	71 53.5	+55.1	114.6	71 27.2	+56.2	117.3	70 58.5	+57.1	119.9	66
67	74 07.8	+44.4	97.0	73 58.7	+46.9	100.4	73 46.1	+49.2	103.8	73 30.1	+51.2	107.1	73 10.9	+52.9	110.3	72 48.6	+54.4	113.3	72 23.4	+55.8	116.2	71 55.6	+56.9	119.0	67
68	74 52.2	+42.5 •	94.5	74 45.6	+45.3	98.1	74 35.3	+47.8	101.7	74 21.3	+50.1	105.2	74 03.8	+52.1	108.6	73 43.0	+53.9	111.9	73 19.2	+55.3	115.0	72 52.5	+56.5	117.9	68
69	75 34.7	+40.4 •	91.7	75 30.9	+43.5 •	95.6	75 23.1	+46.3	99.4	75 11.4	+48.8	103.1	74 55.9	+51.1	106.7	74 36.9	+53.0	110.2	74 14.5	+54.6	113.6	73 49.0	+56.0	116.7	69
70	76 15.1	+38.0 •	88.7	76 14.4	+41.3 •	92.7	76 09.4	+44.5 •	96.8	76 00.2	+47.3	100.8	75 47.0	+49.8	104.7	75 29.9	+52.1	108.4	75 09.1	+54.0	112.0	74 45.0	+55.5	115.4	70
71	76 53.1	+35.1 •	85.3	76 55.7	+38.9 •	89.6	76 53.9	+42.3 •	93.9	76 47.5	+45.6	98.2	76 36.8	+48.5	102.3	76 22.0	+50.9	106.4	76 03.1	+53.1	110.2	75 40.5	+54.9	113.9	71
72	77 28.2	+31.9 •	81.7	77 34.6	+35.9 •	86.2	77 36.2	+39.8 •	90.7	77 33.1	+43.4 •	95.2	77 25.3	+46.7 •	99.7	77 12.9	+49.6	104.1	76 56.2	+52.1	108.2	76 35.4	+54.2	112.2	72
73	78 00.1	+28.2 •	77.7	78 10.5	+32.6 •	82.3	78 16.0	+36.8 •	87.1	78 16.5	+40.9 •	91.9	78 12.0	+44.5 •	96.7	78 02.5	+47.9	101.4	77 48.3	+50.7	106.0	77 29.6	+53.1	110.3	73
74	78 28.3	+24.0 •	73.3	78 43.1	+28.7 •	78.2	78 52.8	+33.4 •	83.1	78 57.4	+37.7 •	88.2	78 56.5	+42.0 •	93.4	78 50.4	+45.8 •	98.4	78 39.0	+49.2	103.4	78 22.7	+52.0	108.1	74
75	78 52.3	+19.5 •	68.7	79 11.8	+24.2 •	73.6	79 26.2	+29.2 •	78.7	79 35.1	+34.2 •	84.1	79 38.5	+38.9 •	89.5	79 36.2	+43.2 •	95.0	79 28.2	+47.1 •	100.3	79 14.7	+50.6	105.5	75
76	79 11.8	+14.4 •	63.7	79 36.0	+19.4 •	68.6	79 55.4	+24.5 •	73.8	80 09.3	+29.8 •	79.4	80 17.4	+35.1 •	85.1	80 19.4	+40.1 •	91.0	80 15.3	+44.7 •	96.8	80 05.3	+48.6 •	102.5	76
77	79 26.2	+8.9 •	58.5	79 55.4	+13.9 •	63.3	80 19.9	+19.2 •	68.5	80 39.1	+24.9 •	74.2	80 52.5	+30.5 •	80.2	80 59.5	+36.2 •	86.4	81 00.0	+41.4 •	92.7	80 53.9	+46.1 •	99.0	77
78	79 35.1	+3.4 •	53.0	80 09.3	+8.1 •	57.6	80 39.1	+13.4 •	62.8	81 04.0	+19.0 •	68.4	81 23.0	+25.1 •	74.6	81 35.7	+31.3 •	81.1	81 41.4	+37.4 •	87.9	81 40.0	+43.0 •	94.7	78
79	79 38.5	−2.3 •	47.5	80 17.4	+2.0 •	51.8	80 52.5	+7.0 •	56.7	81 23.0	+12.7 •	62.2	81 48.1	+18.9 •	68.4	82 07.0	+25.4 •	75.1	82 18.8	+32.2 •	82.3	82 23.0	+38.8 •	89.7	79
80	79 36.2	−8.0 •	41.9	80 19.4	−4.1 •	45.9	80 59.5	+0.5 •	50.4	81 35.7	+5.7 •	55.6	82 07.0	+11.8 •	61.6	82 32.4	+18.6 •	68.3	82 51.0	+25.9 •	75.7	83 01.8	+33.3 •	83.7	80
81	79 28.2	−13.5 •	36.5	80 15.3	−10.0 •	39.9	81 00.0	−6.1 •	44.0	81 41.4	−1.4 •	48.8	82 18.8	+4.2 •	54.3	82 51.0	+10.8 •	60.8	83 16.9	+18.2 •	68.2	83 35.1	+26.3 •	76.5	81
82	79 14.7	−18.5 •	31.2	80 05.3	−15.8 •	34.2	80 53.9	−12.5 •	37.7	81 40.0	−8.4 •	41.8	82 23.0	−3.6 •	46.8	83 01.8	+2.3 •	52.8	83 35.1	+9.4 •	59.9	84 01.4	+17.7 •	68.2	82
83	78 56.2	−23.3 •	26.2	79 49.5	−21.1 •	28.6	80 41.4	−18.4 •	31.6	81 31.6	−15.2 •	35.1	82 19.4	−11.2 •	39.3	83 04.1	−6.3 •	44.5	83 44.5	0.0 •	50.9	84 19.1	+7.7 •	58.8	83
84	78 32.9	−27.4 •	21.5	79 28.4	−25.8 •	23.4	80 23.0	−23.8 •	25.8	81 16.4	−21.4 •	28.6	82 08.2	−18.3 •	32.1	82 57.8	−14.4 •	36.4	83 44.5	−9.4 •	41.8	84 26.8	−2.9 •	48.6	84
85	78 05.5	−31.3 •	17.1	79 02.6	−30.1 •	18.6	79 59.2	−28.6 •	20.4	80 55.0	−26.8 •	22.6	81 49.9	−24.7 •	25.2	82 43.4	−21.8 •	28.6	83 35.1	−18.2 •	32.8	84 23.9	−13.3 •	38.3	85
86	77 34.2	−34.6 •	13.0	78 32.5	−33.7 •	14.1	79 30.6	−32.8 •	15.4	80 28.2	−31.6 •	17.0	81 25.2	−30.1 •	19.0	82 21.6	−28.3 •	21.4	83 16.9	−25.9 •	24.5	84 10.6	−22.6 •	28.5	86
87	76 59.6	−37.4 •	9.3	77 58.8	−37.0 •	10.1	78 57.8	−36.4 •	10.9	79 56.6	−35.7 •	12.0	80 55.1	−34.7 •	13.3	81 53.3	−33.6 •	14.9	82 51.0	−32.2 •	17.0	83 48.0	−30.4 •	19.7	87
88	76 22.2	−40.0 •	5.9	77 21.8	−39.7 •	6.4	78 21.4	−39.4 •	6.9	79 20.9	−39.0 •	7.5	80 20.4	−38.6 •	8.3	81 19.7	−38.1 •	9.3	82 18.8	−37.4 •	10.4	83 17.6	−36.4 •	12.0	88
89	75 42.2	−42.2 •	2.8	76 42.1	−42.1 •	3.0	77 42.0	−42.0 •	3.3	78 41.9	−41.9 •	3.5	79 41.8	−41.8 •	3.9	80 41.6	−41.6 •	4.3	81 41.4	−41.4 •	4.8	82 41.2	−41.2 •	5.5	89
90	75 00.0	−44.1	0.0	76 00.0	−44.1	0.0	77 00.0	−44.2 •	0.0	78 00.0	−44.3 •	0.0	79 00.0	−44.4 •	0.0	80 00.0	−44.5 •	0.0	81 00.0	−44.6 •	0.0	82 00.0	−44.8 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 44°, 316°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 43.8	−59.0	135.0	10 01.3	−59.1	135.1	9 18.7	−59.2	135.3	8 36.1	−59.4	135.4	7 53.3	−59.4	135.5	7 10.5	−59.5	135.6	6 27.7	−59.7	135.6	5 44.7	−59.7	135.7	0
1	9 44.8	−59.0	135.2	9 02.2	−59.1	135.3	8 19.5	−59.3	135.4	7 36.7	−59.3	135.5	6 53.9	−59.5	135.6	6 11.0	−59.6	135.7	5 28.0	−59.6	135.8	4 45.0	−59.7	135.8	1
2	8 45.8	−59.0	135.4	8 03.1	−59.2	135.5	7 20.2	−59.2	135.6	6 37.4	−59.4	135.7	5 54.4	−59.4	135.7	5 11.4	−59.5	135.8	4 28.4	−59.7	135.9	3 45.3	−59.7	135.9	2
3	7 46.8	−59.0	135.6	7 03.9	−59.1	135.7	6 21.0	−59.3	135.7	5 38.0	−59.4	135.8	4 55.0	−59.5	135.9	4 11.9	−59.6	135.9	3 28.7	−59.6	136.0	2 45.6	−59.7	136.0	3
4	6 47.8	−59.0	135.7	6 04.8	−59.1	135.8	5 21.7	−59.2	135.9	4 38.6	−59.3	136.0	3 55.5	−59.5	136.0	3 12.3	−59.6	136.0	2 29.1	−59.6	136.1	1 45.9	−59.7	136.1	4
5	5 48.8	−59.0	135.9	5 05.7	−59.2	136.0	4 22.5	−59.3	136.0	3 39.3	−59.4	136.1	2 56.0	−59.4	136.1	2 12.7	−59.5	136.2	1 29.5	−59.7	136.2	0 46.2	−59.8	136.2	5
6	4 49.8	−59.0	136.1	4 06.5	−59.1	136.2	3 23.2	−59.2	136.2	2 39.9	−59.4	136.2	1 56.6	−59.5	136.3	1 13.2	−59.6	136.3	0 29.8	−59.6	136.3	0 13.6	+59.7	43.7	6
7	3 50.8	−59.1	136.3	3 07.4	−59.2	136.3	2 24.0	−59.3	136.4	1 40.5	−59.3	136.4	0 57.1	−59.5	136.4	0 13.6	−59.5	136.4	0 29.8	+59.7	43.6	1 13.3	+59.7	43.6	7
8	2 51.7	−59.0	136.5	2 08.2	−59.1	136.5	1 24.7	−59.3	136.5	0 41.2	−59.4	136.5	0 02.4	+59.5	43.5	0 45.9	+59.6	43.5	1 29.5	+59.6	43.5	2 13.0	+59.7	43.5	8
9	1 52.7	−59.0	136.6	1 09.1	−59.2	136.7	0 25.4	−59.2	136.7	0 18.2	+59.4	43.3	1 01.9	+59.4	43.3	1 45.5	+59.6	43.3	2 29.1	+59.7	43.4	3 12.7	+59.7	43.4	9
10	0 53.7	−59.0	136.8	0 09.9	−59.1	136.8	0 33.8	+59.3	43.2	1 17.6	+59.4	43.2	2 01.3	+59.5	43.2	2 45.1	+59.5	43.2	3 28.8	+59.6	43.3	4 12.4	+59.8	43.3	10
11	0 05.3	+59.0	43.0	0 49.2	+59.2	43.0	1 33.1	+59.3	43.0	2 17.0	+59.3	43.0	3 00.8	+59.5	43.1	3 44.6	+59.6	43.1	4 28.4	+59.7	43.2	5 12.2	+59.7	43.2	11
12	1 04.3	+59.1	42.8	1 48.4	+59.1	42.8	2 32.4	+59.2	42.9	3 16.3	+59.4	42.9	4 00.3	+59.4	42.9	4 44.2	+59.5	43.0	5 28.1	+59.6	43.0	6 11.9	+59.7	43.1	12
13	2 03.4	+59.0	42.6	2 47.5	+59.1	42.7	3 31.6	+59.3	42.7	4 15.7	+59.4	42.7	4 59.7	+59.5	42.8	5 43.7	+59.6	42.9	6 27.7	+59.6	42.9	7 11.6	+59.7	43.0	13
14	3 02.4	+59.0	42.5	3 46.6	+59.2	42.5	4 30.9	+59.2	42.5	5 15.1	+59.3	42.6	5 59.2	+59.5	42.7	6 43.3	+59.6	42.7	7 27.3	+59.7	42.8	8 11.3	+59.7	42.9	14
15	4 01.4	+59.0	42.3	4 45.8	+59.1	42.3	5 30.1	+59.3	42.4	6 14.4	+59.4	42.5	6 58.7	+59.4	42.5	7 42.9	+59.5	42.6	8 27.0	+59.6	42.7	9 11.0	+59.7	42.8	15
16	5 00.4	+59.0	42.1	5 44.9	+59.2	42.2	6 29.4	+59.2	42.2	7 13.8	+59.3	42.3	7 58.1	+59.5	42.4	8 42.4	+59.6	42.5	9 26.6	+59.6	42.6	10 10.7	+59.7	42.7	16
17	5 59.4	+59.0	41.9	6 44.1	+59.1	42.0	7 28.6	+59.3	42.1	8 13.1	+59.4	42.2	8 57.6	+59.4	42.3	9 42.0	+59.5	42.4	10 26.2	+59.7	42.5	11 10.4	+59.7	42.6	17
18	6 58.4	+59.1	41.7	7 43.2	+59.1	41.8	8 27.9	+59.2	41.9	9 12.5	+59.4	42.0	9 57.0	+59.5	42.1	10 41.5	+59.5	42.2	11 25.9	+59.6	42.4	12 10.1	+59.7	42.5	18
19	7 57.5	+59.0	41.5	8 42.3	+59.1	41.6	9 27.1	+59.3	41.7	10 11.9	+59.3	41.9	10 56.5	+59.4	42.0	11 41.0	+59.6	42.1	12 25.5	+59.6	42.3	13 09.8	+59.7	42.4	19
20	8 56.5	+58.9	41.4	9 41.4	+59.2	41.5	10 26.4	+59.2	41.6	11 11.2	+59.3	41.7	11 55.9	+59.5	41.8	12 40.6	+59.5	42.0	13 25.1	+59.6	42.2	14 09.5	+59.7	42.3	20
21	9 55.4	+59.0	41.2	10 40.6	+59.1	41.3	11 25.6	+59.2	41.4	12 10.5	+59.4	41.6	12 55.4	+59.4	41.7	13 40.1	+59.6	41.9	14 24.7	+59.7	42.0	15 09.2	+59.7	42.2	21
22	10 54.4	+59.0	41.0	11 39.7	+59.1	41.1	12 24.8	+59.3	41.3	13 09.9	+59.3	41.4	13 54.8	+59.5	41.6	14 39.7	+59.5	41.7	15 24.4	+59.6	41.9	16 08.9	+59.7	42.1	22
23	11 53.4	+59.0	40.8	12 38.8	+59.1	40.9	13 24.1	+59.2	41.1	14 09.2	+59.3	41.3	14 54.3	+59.4	41.4	15 39.2	+59.5	41.6	16 24.0	+59.6	41.8	17 08.6	+59.7	42.0	23
24	12 52.4	+59.0	40.6	13 37.9	+59.1	40.8	14 23.3	+59.2	40.9	15 08.5	+59.4	41.1	15 53.7	+59.4	41.3	16 38.7	+59.5	41.5	17 23.6	+59.6	41.7	18 08.3	+59.7	41.9	24
25	13 51.4	+58.9	40.4	14 37.0	+59.1	40.6	15 22.5	+59.2	40.8	16 07.9	+59.3	40.9	16 53.1	+59.4	41.1	17 38.2	+59.5	41.3	18 23.2	+59.6	41.6	19 08.0	+59.7	41.8	25
26	14 50.3	+59.0	40.2	15 36.1	+59.0	40.4	16 21.7	+59.2	40.6	17 07.2	+59.3	40.8	17 52.5	+59.4	41.0	18 37.7	+59.6	41.2	19 22.8	+59.6	41.4	20 07.7	+59.7	41.7	26
27	15 49.3	+58.9	40.0	16 35.1	+59.1	40.2	17 20.9	+59.2	40.4	18 06.5	+59.3	40.6	18 51.9	+59.5	40.9	19 37.3	+59.5	41.1	20 22.4	+59.6	41.3	21 07.4	+59.7	41.6	27
28	16 48.2	+58.9	39.8	17 34.2	+59.1	40.0	18 20.1	+59.1	40.3	19 05.8	+59.3	40.5	19 51.4	+59.4	40.7	20 36.8	+59.5	40.9	21 22.0	+59.6	41.2	22 07.1	+59.6	41.5	28
29	17 47.1	+58.9	39.6	18 33.3	+59.0	39.9	19 19.2	+59.2	40.1	20 05.1	+59.3	40.3	20 50.8	+59.3	40.6	21 36.3	+59.4	40.8	22 21.6	+59.6	41.1	23 06.7	+59.7	41.3	29
30	18 46.0	+58.9	39.4	19 32.3	+59.0	39.7	20 18.4	+59.2	39.9	21 04.4	+59.2	40.1	21 50.1	+59.4	40.4	22 35.7	+59.5	40.7	23 21.2	+59.5	40.9	24 06.4	+59.6	41.2	30
31	19 44.9	+58.9	39.2	20 31.3	+59.1	39.5	21 17.6	+59.1	39.7	22 03.6	+59.3	40.0	22 49.5	+59.4	40.2	23 35.2	+59.5	40.5	24 20.7	+59.6	40.8	25 06.0	+59.7	41.1	31
32	20 43.8	+58.9	39.0	21 30.4	+59.0	39.3	22 16.7	+59.1	39.5	23 02.9	+59.2	39.8	23 48.9	+59.4	40.1	24 34.7	+59.5	40.4	25 20.3	+59.6	40.7	26 05.7	+59.7	41.0	32
33	21 42.7	+58.9	38.8	22 29.4	+59.0	39.1	23 15.8	+59.2	39.4	24 02.1	+59.3	39.6	24 48.3	+59.3	39.9	25 34.2	+59.4	40.2	26 19.9	+59.5	40.5	27 05.4	+59.6	40.9	33
34	22 41.6	+58.8	38.6	23 28.4	+58.9	38.9	24 15.0	+59.1	39.2	25 01.4	+59.2	39.5	25 47.6	+59.3	39.8	26 33.6	+59.5	40.1	27 19.4	+59.6	40.4	28 05.0	+59.6	40.7	34
35	23 40.4	+58.8	38.4	24 27.3	+59.0	38.7	25 14.1	+59.1	39.0	26 00.6	+59.2	39.3	26 46.9	+59.4	39.6	27 33.1	+59.4	39.9	28 19.0	+59.5	40.3	29 04.6	+59.7	40.6	35
36	24 39.2	+58.8	38.2	25 26.3	+58.9	38.5	26 13.2	+59.0	38.8	26 59.8	+59.2	39.1	27 46.3	+59.3	39.4	28 32.5	+59.4	39.8	29 18.5	+59.5	40.1	30 04.3	+59.6	40.5	36
37	25 38.0	+58.8	38.0	26 25.2	+59.0	38.3	27 12.2	+59.1	38.6	27 59.0	+59.2	38.9	28 45.6	+59.3	39.3	29 31.9	+59.4	39.6	30 18.0	+59.5	40.0	31 03.9	+59.6	40.4	37
38	26 36.8	+58.8	37.8	27 24.2	+58.9	38.1	28 11.3	+59.0	38.4	28 58.2	+59.2	38.7	29 44.9	+59.3	39.1	30 31.3	+59.5	39.5	31 17.5	+59.6	39.8	32 03.5	+59.6	40.2	38
39	27 35.6	+58.7	37.5	28 23.1	+58.8	37.9	29 10.3	+59.1	38.2	29 57.4	+59.1	38.5	30 44.2	+59.3	38.9	31 30.8	+59.3	39.3	32 17.1	+59.5	39.7	33 03.1	+59.6	40.1	39
40	28 34.3	+58.7	37.3	29 21.9	+58.9	37.6	30 09.4	+59.0	38.0	30 56.5	+59.2	38.3	31 43.5	+59.2	38.7	32 30.1	+59.4	39.1	33 16.6	+59.4	39.5	34 02.7	+59.6	40.0	40
41	29 33.0	+58.7	37.1	30 20.8	+58.9	37.4	31 08.4	+58.9	37.8	31 55.7	+59.1	38.1	32 42.7	+59.3	38.5	33 29.5	+59.4	39.0	34 16.0	+59.5	39.4	35 02.3	+59.5	39.8	41
42	30 31.7	+58.7	36.8	31 19.7	+58.8	37.2	32 07.3	+59.0	37.6	32 54.8	+59.1	37.9	33 42.0	+59.2	38.4	34 28.9	+59.3	38.8	35 15.5	+59.5	39.2	36 01.8	+59.6	39.7	42
43	31 30.4	+58.6	36.6	32 18.5	+58.8	36.9	33 06.3	+58.9	37.3	33 53.9	+59.0	37.7	34 41.2	+59.2	38.2	35 28.2	+59.4	38.6	36 15.0	+59.4	39.0	37 01.4	+59.6	39.5	43
44	32 29.0	+58.6	36.3	33 17.3	+58.7	36.7	34 05.2	+58.9	37.1	34 52.9	+59.1	37.5	35 40.4	+59.2	38.0	36 27.6	+59.3	38.4	37 14.4	+59.4	38.9	38 01.0	+59.5	39.4	44
45	33 27.6	+58.6	36.1	34 16.0	+58.7	36.5	35 04.1	+58.9	36.9	35 52.0	+59.0	37.3	36 39.6	+59.1	37.8	37 26.9	+59.3	38.2	38 13.8	+59.5	38.7	39 00.5	+59.5	39.2	45
46	34 26.2	+58.6	35.8	35 14.7	+58.7	36.2	36 03.0	+58.9	36.6	36 51.0	+59.0	37.1	37 38.7	+59.2	37.5	38 26.2	+59.2	38.0	39 13.3	+59.4	38.5	40 00.0	+59.5	39.0	46
47	35 24.8	+58.5	35.5	36 13.4	+58.7	36.0	37 01.9	+58.8	36.4	37 50.0	+59.0	36.9	38 37.9	+59.1	37.3	39 25.4	+59.3	37.8	40 12.7	+59.3	38.3	40 59.5	+59.5	38.9	47
48	36 23.3	+58.4	35.3	37 12.1	+58.6	35.7	38 00.7	+58.8	36.2	38 49.0	+58.9	36.6	39 37.0	+59.1	37.1	40 24.7	+59.2	37.6	41 12.0	+59.4	38.2	41 59.0	+59.5	38.7	48
49	37 21.7	+58.4	35.0	38 10.7	+58.6	35.4	38 59.5	+58.7	35.9	39 47.9	+59.0	36.4	40 36.1	+59.1	36.9	41 23.9	+59.2	37.4	42 11.4	+59.3	38.0	42 58.5	+59.5	38.5	49
50	38 20.1	+58.4	34.7	39 09.3	+58.6	35.2	39 58.2	+58.8	35.6	40 46.9	+58.8	36.1	41 35.2	+59.0	36.7	42 23.1	+59.2	37.2	43 10.7	+59.4	37.8	43 58.0	+59.4	38.3	50
51	39 18.5	+58.4	34.4	40 07.9	+58.5	34.9	40 57.0	+58.7	35.4	41 45.7	+58.9	35.9	42 34.2	+59.0	36.4	43 22.3	+59.2	37.0	44 10.1	+59.3	37.5	44 57.4	+59.5	38.2	51
52	40 16.9	+58.2	34.1	41 06.4	+58.5	34.6	41 55.7	+58.6	35.1	42 44.6	+58.8	35.6	43 33.2	+59.0	36.2	44 21.5	+59.1	36.7	45 09.4	+59.2	37.3	45 56.9	+59.4	38.0	52
53	41 15.1	+58.3	33.8	42 04.9	+58.4	34.3	42 54.3	+58.6	34.8	43 43.4	+58.8	35.3	44 32.2	+58.9	35.9	45 20.6	+59.1	36.5	46 08.6	+59.3	37.1	46 56.3	+59.4	37.8	53
54	42 13.4	+58.2	33.5	43 03.3	+58.4	34.0	43 52.9	+58.5	34.5	44 42.2	+58.7	35.1	45 31.1	+58.9	35.6	46 19.7	+59.0	36.2	47 07.9	+59.2	36.9	47 55.7	+59.3	37.5	54
55	43 11.6	+58.1	33.1	44 01.7	+58.3	33.7	44 51.4	+58.5	34.2	45 40.9	+58.7	34.8	46 30.0	+58.9	35.4	47 18.7	+59.1	36.0	48 07.1	+59.2	36.6	48 55.0	+59.4	37.3	55
56	44 09.7	+58.0	32.8	45 00.0	+58.2	33.3	45 49.9	+58.5	33.9	46 39.6	+58.6	34.5	47 28.9	+58.8	35.1	48 17.8	+59.0	35.7	49 06.3	+59.1	36.4	49 54.4	+59.3	37.1	56
57	45 07.7	+58.0	32.4	45 58.2	+58.2	33.0	46 48.4	+58.4	33.6	47 38.2	+58.6	34.2	48 27.7	+58.7	34.8	49 16.8	+58.9	35.4	50 05.4	+59.1	36.1	50 53.7	+59.2	36.9	57
58	46 05.7	+57.9	32.1	46 56.4	+58.1	32.6	47 46.8	+58.3	33.2	48 36.8	+58.5	33.8	49 26.4	+58.7	34.5	50 15.7	+58.9	35.2	51 04.5	+59.1	35.9	51 52.9	+59.3	36.6	58
59	47 03.6	+57.8	31.7	47 54.5	+58.1	32.3	48 45.1	+58.2	32.9	49 35.3	+58.5	33.5	50 25.1	+58.7	34.2	51 14.6	+58.8	34.9	52 03.6	+59.0	35.6	52 52.2	+59.2	36.3	59
60	48 01.4	+57.8	31.3	48 52.6	+57.9	31.9	49 43.3	+58.2	32.5	50 33.8	+58.4	33.1	51 23.8	+58.6	33.8	52 13.4	+58.8	34.5	53 02.6	+59.0	35.3	53 51.4	+59.2	36.1	60
61	48 59.2	+57.7	30.9	49 50.5	+57.9	31.5	50 41.5	+58.1	32.1	51 32.2	+58.3	32.8	52 22.4	+58.5	33.5	53 12.2	+58.8	34.2	54 01.6	+59.0	35.0	54 50.6	+59.1	35.8	61
62	49 56.9	+57.5	30.5	50 48.4	+57.8	31.1	51 39.6	+58.1	31.7	52 30.5	+58.2	32.4	53 20.9	+58.5	33.1	54 11.0	+58.7	33.9	55 00.6	+58.9	34.7	55 49.7	+59.1	35.5	62
63	50 54.4	+57.5	30.0	51 46.2	+57.7	30.6	52 37.7	+57.9	31.3	53 28.7	+58.2	32.0	54 19.4	+58.4	32.7	55 09.7	+58.6	33.5	55 59.5	+58.8	34.3	56 48.8	+59.0	35.2	63
64	51 51.9	+57.3	29.5	52 43.9	+57.6	30.2	53 35.6	+57.8	30.9	54 26.9	+58.1	31.6	55 17.8	+58.3	32.3	56 08.3	+58.5	33.1	56 58.3	+58.7	34.0	57 47.8	+59.0	34.8	64
65	52 49.2	+57.2	29.1	53 41.5	+57.5	29.7	54 33.4	+57.7	30.4	55 25.0	+57.9	31.1	56 16.1	+58.2	31.9	57 06.8	+58.5	32.7	57 57.0	+58.7	33.6	58 46.8	+58.9	34.5	65
66	53 46.4	+57.1	28.6	54 39.0	+57.3	29.2	55 31.1	+57.7	29.9	56 22.9	+57.9	30.7	57 14.3	+58.2	31.5	58 05.3	+58.3	32.3	58 55.7	+58.7	33.2	59 45.7	+58.8	34.1	66
67	54 43.5	+57.0	28.0	55 36.3	+57.2	28.7	56 28.8	+57.4	29.4	57 20.8	+57.8	30.2	58 12.5	+58.0	31.0	59 03.6	+58.3	31.9	59 54.4	+58.5	32.8	60 44.5	+58.8	33.7	67
68	55 40.5	+56.8	27.5	56 33.5	+57.1	28.2	57 26.2	+57.4	28.9	58 18.6	+57.6	29.7	59 10.5	+57.9	30.5	60 01.9	+58.2	31.4	60 52.9	+58.4	32.3	61 43.3	+58.7	33.3	68
69	56 37.3	+56.6	26.9	57 30.6	+56.9	27.6	58 23.6	+57.2	28.4	59 16.2	+57.5	29.2	60 08.4	+57.7	30.0	61 00.1	+58.0	30.9	61 51.3	+58.4	31.9	62 42.0	+58.6	32.9	69
70	57 33.9	+56.4	26.3	58 27.5	+56.7	27.0	59 20.8	+57.0	27.8	60 13.7	+57.3	28.6	61 06.1	+57.7	29.4	61 58.1	+58.0	30.4	62 49.7	+58.2	31.3	63 40.6	+58.5	32.4	70
71	58 30.3	+56.2	25.7	59 24.2	+56.6	26.4	60 17.8	+56.8	27.2	61 11.0	+57.1	28.0	62 03.8	+57.4	28.9	62 56.1	+57.7	29.8	63 47.9	+58.1	30.8	64 39.1	+58.4	31.9	71
72	59 26.5	+56.0	25.0	60 20.8	+56.3	25.7	61 14.6	+56.7	26.5	62 08.1	+57.0	27.3	63 01.2	+57.3	28.2	63 53.8	+57.7	29.2	64 46.0	+57.9	30.2	65 37.5	+58.3	31.3	72
73	60 22.5	+55.8	24.3	61 17.1	+56.1	25.0	62 11.3	+56.4	25.8	63 05.1	+56.8	26.7	63 58.5	+57.1	27.6	64 51.5	+57.4	28.6	65 43.9	+57.8	29.6	66 35.8	+58.1	30.8	73
74	61 18.3	+55.5	23.5	62 13.2	+55.8	24.3	63 07.7	+56.2	25.1	64 01.9	+56.5	25.9	64 55.6	+56.9	26.9	65 48.9	+57.2	27.9	66 41.7	+57.6	28.9	67 33.9	+57.9	30.1	74
75	62 13.8	+55.2	22.7	63 09.0	+55.6	23.5	64 03.9	+55.9	24.3	64 58.4	+56.2	25.2	65 52.5	+56.6	26.1	66 46.1	+57.0	27.1	67 39.3	+57.4	28.2	68 31.8	+57.8	29.4	75
76	63 09.0	+54.9	21.8	64 04.6	+55.2	22.6	64 59.8	+55.6	23.4	65 54.6	+56.0	24.3	66 49.1	+56.4	25.3	67 43.1	+56.8	26.3	68 36.7	+57.1	27.4	69 29.6	+57.6	28.7	76
77	64 03.9	+54.5	20.9	64 59.8	+54.8	21.7	65 55.4	+55.2	22.5	66 50.6	+55.6	23.4	67 45.5	+56.0	24.4	68 39.9	+56.4	25.4	69 33.8	+56.9	26.6	70 27.2	+57.3	27.8	77
78	64 58.4	+54.1	20.0	65 54.6	+54.5	20.7	66 50.6	+54.9	21.5	67 46.2	+55.3	22.4	68 41.5	+55.7	23.4	69 36.3	+56.2	24.5	70 30.7	+56.6	25.7	71 24.5	+57.0	26.9	78
79	65 52.5	+53.6	18.9	66 49.1	+54.0	19.7	67 45.5	+54.4	20.5	68 41.5	+54.8	21.4	69 37.2	+55.3	22.4	70 32.5	+55.7	23.4	71 27.3	+56.2	24.6	72 21.5	+56.7	25.9	79
80	66 46.1	+53.2	17.8	67 43.1	+53.6	18.6	68 39.9	+53.9	19.4	69 36.3	+54.4	20.3	70 32.5	+54.8	21.2	71 28.2	+55.3	22.3	72 23.5	+55.7	23.5	73 18.2	+56.3	24.8	80
81	67 39.3	+52.5	16.6	68 36.7	+52.9	17.3	69 33.8	+53.4	18.1	70 30.7	+53.8	19.0	71 27.3	+54.2	20.0	72 23.5	+54.7	21.1	73 19.2	+55.3	22.2	74 14.5	+55.8	23.6	81
82	68 31.8	+52.0	15.3	69 29.6	+52.3	16.0	70 27.2	+52.7	16.8	71 24.5	+53.1	17.7	72 21.5	+53.6	18.6	73 18.2	+54.1	19.7	74 14.5	+54.7	20.9	75 10.3	+55.3	22.2	82
83	69 23.8	+51.2	13.9	70 21.9	+51.6	14.6	71 19.9	+52.0	15.3	72 17.6	+52.5	16.2	73 15.1	+52.9	17.1	74 12.3	+53.4	18.1	75 09.2	+53.9	19.3	76 05.6	+54.5	20.6	83
84	70 15.0	+50.3	12.4	71 13.5	+50.7	13.0	72 11.9	+51.1	13.7	73 10.1	+51.5	14.5	74 08.0	+52.0	15.4	75 05.7	+52.6	16.4	76 03.1	+53.1	17.5	77 00.1	+53.8	18.8	84
85	71 05.3	+49.5	10.8	72 04.2	+49.8	11.3	73 03.0	+50.1	12.0	74 01.6	+50.5	12.7	75 00.0	+51.0	13.5	75 58.3	+51.5	14.5	76 56.2	+52.1	15.5	77 53.9	+52.6	16.8	85
86	71 54.8	+48.3	9.0	72 54.0	+48.6	9.5	73 53.1	+49.0	10.1	74 52.1	+49.4	10.7	75 51.0	+49.8	11.4	76 49.8	+50.2	12.3	77 48.3	+50.7	13.3	78 46.5	+51.4	14.4	86
87	72 43.1	+47.1	7.0	73 42.6	+47.4	7.4	74 42.1	+47.6	7.9	75 41.5	+47.9	8.5	76 40.8	+48.3	9.1	77 40.0	+48.7	9.8	78 39.0	+49.2	10.6	79 37.9	+49.7	11.7	87
88	73 30.2	+45.7	4.9	74 30.0	+45.9	5.2	75 29.7	+46.1	5.6	76 29.4	+46.3	6.0	77 29.1	+46.5	6.4	78 28.7	*+46.8* •	7.0	79 28.2	*+47.2* •	7.6	80 27.6	*+47.6* •	8.4	88
89	74 15.9	+44.1	2.6	75 15.9	+44.1	2.7	76 15.8	*+44.2* •	2.9	77 15.7	*+44.3* •	3.2	78 15.6	*+44.4* •	3.4	79 15.5	*+44.5* •	3.7	80 15.4	*+44.6* •	4.1	81 15.2	*+44.8* •	4.6	89
90	75 00.0	*+42.2* •	0.0	76 00.0	*+42.1* •	0.0	77 00.0	*+42.0* •	0.0	78 00.0	*+41.9* •	0.0	79 00.0	*+41.8* •	0.0	80 00.0	*+41.6* •	0.0	81 00.0	*+41.4* •	0.0	82 00.0	*+41.2* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 136°, 224°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 32.7	+59.0	134.0	9 51.0	+59.1	134.1	9 09.2	+59.2	134.3	8 27.2	+59.4	134.4	7 45.2	+59.5	134.5	7 03.2	+59.5	134.6	6 21.0	+59.7	134.6	5 38.9	+59.7	134.7	0
1	11 31.7	+58.9	133.8	10 50.1	+59.0	134.0	10 08.4	+59.2	134.1	9 26.6	+59.3	134.2	8 44.7	+59.4	134.3	8 02.7	+59.6	134.4	7 20.7	+59.6	134.5	6 38.6	+59.7	134.6	1
2	12 30.6	+58.9	133.6	11 49.1	+59.1	133.8	11 07.6	+59.2	133.9	10 25.9	+59.3	134.1	9 44.1	+59.5	134.2	9 02.3	+59.5	134.3	8 20.3	+59.6	134.4	7 38.3	+59.7	134.5	2
3	13 29.5	+59.0	133.4	12 48.2	+59.1	133.6	12 06.8	+59.2	133.8	11 25.2	+59.3	133.9	10 43.6	+59.4	134.1	10 01.8	+59.5	134.2	9 19.9	+59.6	134.3	8 38.0	+59.7	134.4	3
4	14 28.5	+58.9	133.2	13 47.3	+59.0	133.4	13 06.0	+59.2	133.6	12 24.5	+59.4	133.8	11 43.0	+59.4	133.9	11 01.3	+59.5	134.1	10 19.5	+59.7	134.2	9 37.7	+59.7	134.3	4
5	15 27.4	+58.9	133.0	14 46.3	+59.1	133.2	14 05.2	+59.2	133.4	13 23.9	+59.3	133.6	12 42.4	+59.4	133.8	12 00.8	+59.6	133.9	11 19.2	+59.6	134.1	10 37.4	+59.7	134.2	5
6	16 26.3	+58.9	132.8	15 45.4	+59.0	133.1	15 04.4	+59.1	133.3	14 23.2	+59.3	133.4	13 41.8	+59.4	133.6	13 00.4	+59.5	133.8	12 18.8	+59.6	134.0	11 37.1	+59.7	134.1	6
7	17 25.2	+58.8	132.6	16 44.4	+59.1	132.9	16 03.5	+59.2	133.1	15 22.5	+59.3	133.3	14 41.2	+59.5	133.5	13 59.9	+59.5	133.7	13 18.4	+59.6	133.8	12 36.8	+59.7	134.0	7
8	18 24.0	+58.9	132.4	17 43.5	+59.0	132.7	17 02.7	+59.2	132.9	16 21.8	+59.2	133.1	15 40.7	+59.4	133.3	14 59.4	+59.5	133.5	14 18.0	+59.6	133.7	13 36.5	+59.6	133.9	8
9	19 22.9	+58.9	132.2	18 42.5	+59.0	132.5	18 01.9	+59.1	132.7	17 21.0	+59.3	133.0	16 40.1	+59.4	133.2	15 58.9	+59.5	133.4	15 17.6	+59.6	133.6	14 36.1	+59.7	133.8	9
10	20 21.8	+58.8	132.0	19 41.5	+59.0	132.3	19 01.0	+59.1	132.6	18 20.3	+59.3	132.8	17 39.5	+59.4	133.0	16 58.4	+59.5	133.3	16 17.2	+59.6	133.5	15 35.8	+59.7	133.7	10
11	21 20.6	+58.8	131.8	20 40.5	+59.0	132.1	20 00.1	+59.2	132.4	19 19.6	+59.3	132.6	18 38.9	+59.3	132.9	17 57.9	+59.5	133.1	17 16.8	+59.6	133.4	16 35.5	+59.7	133.6	11
12	22 19.4	+58.8	131.6	21 39.5	+58.9	131.9	20 59.3	+59.1	132.2	20 18.9	+59.2	132.5	19 38.2	+59.4	132.7	18 57.4	+59.5	133.0	18 16.4	+59.6	133.2	17 35.2	+59.7	133.5	12
13	23 18.2	+58.8	131.4	22 38.4	+59.0	131.7	21 58.4	+59.1	132.0	21 18.1	+59.3	132.3	20 37.6	+59.4	132.6	19 56.9	+59.5	132.9	19 16.0	+59.6	133.1	18 34.9	+59.7	133.4	13
14	24 17.0	+58.8	131.2	23 37.4	+58.9	131.5	22 57.5	+59.1	131.8	22 17.4	+59.2	132.1	21 37.0	+59.3	132.4	20 56.4	+59.5	132.7	20 15.6	+59.6	133.0	19 34.6	+59.6	133.3	14
15	25 15.8	+58.7	131.0	24 36.3	+58.9	131.3	23 56.6	+59.1	131.6	23 16.6	+59.2	132.0	22 36.3	+59.4	132.3	21 55.9	+59.4	132.6	21 15.2	+59.5	132.9	20 34.2	+59.7	133.2	15
16	26 14.5	+58.8	130.7	25 35.2	+58.9	131.1	24 55.7	+59.0	131.4	24 15.8	+59.2	131.8	23 35.7	+59.3	132.1	22 55.3	+59.5	132.4	22 14.7	+59.6	132.7	21 33.9	+59.6	133.0	16
17	27 13.3	+58.7	130.5	26 34.1	+58.9	130.9	25 54.7	+59.1	131.3	25 15.0	+59.2	131.6	24 35.0	+59.4	132.0	23 54.8	+59.4	132.3	23 14.3	+59.6	132.6	22 33.5	+59.7	132.9	17
18	28 12.0	+58.6	130.3	27 33.0	+58.9	130.7	26 53.8	+59.0	131.1	26 14.2	+59.2	131.4	25 34.4	+59.3	131.8	24 54.2	+59.5	132.1	24 13.9	+59.5	132.5	23 33.2	+59.7	132.8	18
19	29 10.6	+58.7	130.0	28 31.9	+58.8	130.4	27 52.8	+59.0	130.9	27 13.4	+59.2	131.2	26 33.7	+59.3	131.6	25 53.7	+59.4	132.0	25 13.4	+59.6	132.3	24 32.9	+59.6	132.7	19
20	30 09.3	+58.6	129.8	29 30.7	+58.8	130.2	28 51.8	+59.0	130.6	28 12.6	+59.1	131.1	27 33.0	+59.3	131.5	26 53.1	+59.4	131.8	26 13.0	+59.5	132.2	25 32.5	+59.6	132.6	20
21	31 07.9	+58.6	129.5	30 29.5	+58.8	130.0	29 50.8	+59.0	130.4	29 11.7	+59.2	130.9	28 32.3	+59.3	131.3	27 52.5	+59.5	131.7	27 12.5	+59.5	132.1	26 32.1	+59.7	132.4	21
22	32 06.5	+58.6	129.3	31 28.3	+58.8	129.8	30 49.8	+58.9	130.2	30 10.9	+59.1	130.7	29 31.6	+59.2	131.1	28 52.0	+59.4	131.5	28 12.0	+59.5	131.9	27 31.8	+59.6	132.3	22
23	33 05.1	+58.5	129.0	32 27.1	+58.8	129.5	31 48.7	+59.0	130.0	31 10.0	+59.1	130.5	30 30.8	+59.3	130.9	29 51.4	+59.3	131.4	29 11.5	+59.6	131.8	28 31.4	+59.6	132.2	23
24	34 03.6	+58.5	128.8	33 25.9	+58.7	129.3	32 47.7	+58.9	129.8	32 09.1	+59.0	130.3	31 30.1	+59.2	130.7	30 50.7	+59.4	131.2	30 11.1	+59.5	131.6	29 31.0	+59.6	132.1	24
25	35 02.1	+58.5	128.5	34 24.6	+58.6	129.0	33 46.6	+58.8	129.6	33 08.1	+59.1	130.1	32 29.3	+59.2	130.6	31 50.1	+59.4	131.0	31 10.6	+59.4	131.5	30 30.6	+59.6	131.9	25
26	36 00.6	+58.4	128.2	35 23.2	+58.7	128.8	34 45.4	+58.9	129.3	34 07.2	+59.0	129.9	33 28.5	+59.2	130.4	32 49.5	+59.3	130.9	32 10.0	+59.5	131.3	31 30.2	+59.6	131.8	26
27	36 59.0	+58.4	127.9	36 21.9	+58.6	128.5	35 44.3	+58.8	129.1	35 06.2	+59.0	129.6	34 27.7	+59.2	130.2	33 48.8	+59.4	130.7	33 09.5	+59.5	131.2	32 29.8	+59.6	131.7	27
28	37 57.4	+58.3	127.6	37 20.5	+58.6	128.3	36 43.1	+58.8	128.8	36 05.2	+59.0	129.4	35 26.9	+59.2	130.0	34 48.2	+59.3	130.5	34 09.0	+59.4	131.0	33 29.4	+59.6	131.5	28
29	38 55.7	+58.3	127.3	38 19.1	+58.5	128.0	37 41.9	+58.8	128.6	37 04.2	+59.0	129.2	36 26.1	+59.1	129.8	35 47.5	+59.3	130.3	35 08.4	+59.5	130.9	34 29.0	+59.6	131.4	29
30	39 54.0	+58.3	127.0	39 17.6	+58.5	127.7	38 40.7	+58.7	128.3	38 03.2	+58.9	129.0	37 25.2	+59.1	129.6	36 46.8	+59.3	130.1	36 07.9	+59.4	130.7	35 28.6	+59.5	131.2	30
31	40 52.3	+58.2	126.7	40 16.1	+58.5	127.4	39 39.4	+58.7	128.1	39 02.1	+58.9	128.7	38 24.3	+59.1	129.3	37 46.1	+59.2	129.9	37 07.3	+59.4	130.5	36 28.1	+59.5	131.1	31
32	41 50.5	+58.1	126.4	41 14.6	+58.4	127.1	40 38.1	+58.6	127.8	40 01.0	+58.9	128.5	39 23.4	+59.1	129.1	38 45.3	+59.3	129.7	38 06.7	+59.4	130.3	37 27.6	+59.6	130.9	32
33	42 48.6	+58.1	126.1	42 13.0	+58.3	126.8	41 36.7	+58.6	127.5	40 59.9	+58.8	128.2	40 22.5	+59.0	128.9	39 44.6	+59.2	129.5	39 06.1	+59.4	130.2	38 27.2	+59.5	130.8	33
34	43 46.7	+58.0	125.7	43 11.3	+58.3	126.5	42 35.3	+58.6	127.2	41 58.7	+58.8	127.9	41 21.5	+59.0	128.6	40 43.8	+59.2	129.3	40 05.5	+59.4	130.0	39 26.7	+59.5	130.6	34
35	44 44.7	+57.9	125.4	44 09.6	+58.3	126.2	43 33.9	+58.5	126.9	42 57.5	+58.8	127.7	42 20.5	+59.0	128.4	41 43.0	+59.2	129.1	41 04.9	+59.3	129.8	40 26.2	+59.5	130.4	35
36	45 42.6	+57.9	125.0	45 07.9	+58.1	125.8	44 32.4	+58.5	126.6	43 56.3	+58.7	127.4	43 19.5	+59.0	128.2	42 42.2	+59.1	128.9	42 04.2	+59.3	129.6	41 25.7	+59.5	130.3	36
37	46 40.5	+57.8	124.6	46 06.0	+58.1	125.5	45 30.9	+58.4	126.3	44 55.0	+58.7	127.1	44 18.5	+58.9	127.9	43 41.3	+59.1	128.7	43 03.5	+59.3	129.4	42 25.2	+59.4	130.1	37
38	47 38.3	+57.7	124.2	47 04.1	+58.1	125.1	46 29.3	+58.3	126.0	45 53.7	+58.6	126.8	45 17.4	+58.8	127.6	44 40.4	+59.1	128.4	44 02.8	+59.3	129.2	43 24.6	+59.5	129.9	38
39	48 36.0	+57.6	123.8	48 02.2	+57.9	124.7	47 27.6	+58.3	125.6	46 52.3	+58.6	126.5	46 16.2	+58.9	127.3	45 39.5	+59.0	128.2	45 02.1	+59.2	129.0	44 24.1	+59.4	129.7	39
40	49 33.6	+57.5	123.4	49 00.1	+57.9	124.3	48 25.9	+58.2	125.3	47 50.9	+58.5	126.2	47 15.1	+58.7	127.1	46 38.5	+59.1	127.9	46 01.3	+59.3	128.7	45 23.5	+59.4	129.5	40
41	50 31.1	+57.4	122.9	49 58.0	+57.8	123.9	49 24.1	+58.2	124.9	48 49.4	+58.4	125.8	48 13.8	+58.8	126.8	47 37.6	+58.9	127.6	47 00.6	+59.1	128.5	46 22.9	+59.3	129.3	41
42	51 28.5	+57.3	122.5	50 55.8	+57.7	123.5	50 22.3	+58.0	124.5	49 47.8	+58.4	125.5	49 12.6	+58.7	126.5	48 36.5	+59.0	127.4	47 59.7	+59.2	128.3	47 22.2	+59.4	129.1	42
43	52 25.8	+57.2	122.0	51 53.5	+57.6	123.1	51 20.3	+58.0	124.1	50 46.2	+58.3	125.1	50 11.3	+58.6	126.1	49 35.5	+58.9	127.1	48 58.9	+59.1	128.0	48 21.6	+59.3	128.9	43
44	53 23.0	+57.0	121.5	52 51.1	+57.5	122.6	52 18.3	+57.9	123.7	51 44.5	+58.3	124.8	51 09.9	+58.5	125.8	50 34.4	+58.8	126.8	49 58.0	+59.1	127.7	49 20.9	+59.3	128.7	44
45	54 20.0	+56.9	121.0	53 48.6	+57.4	122.1	53 16.2	+57.8	123.3	52 42.8	+58.1	124.4	52 08.4	+58.5	125.4	51 33.2	+58.8	126.5	50 57.1	+59.1	127.5	50 20.2	+59.3	128.4	45
46	55 16.9	+56.7	120.4	54 46.0	+57.2	121.6	54 14.0	+57.6	122.8	53 40.9	+58.1	124.0	53 06.9	+58.5	125.1	52 32.0	+58.7	126.1	51 56.2	+59.0	127.2	51 19.5	+59.2	128.2	46
47	56 13.6	+56.6	119.8	55 43.2	+57.1	121.1	55 11.6	+57.6	122.3	54 39.0	+58.0	123.5	54 05.4	+58.3	124.7	53 30.7	+58.7	125.8	52 55.2	+58.9	126.9	52 18.7	+59.2	127.9	47
48	57 10.2	+56.4	119.2	56 40.3	+56.9	120.6	56 09.2	+57.4	121.8	55 37.0	+57.9	123.1	55 03.7	+58.3	124.3	54 29.4	+58.6	125.5	53 54.1	+58.9	126.6	53 17.9	+59.2	127.7	48
49	58 06.6	+56.2	118.6	57 37.2	+56.8	120.0	57 06.6	+57.3	121.3	56 34.9	+57.7	122.6	56 02.0	+58.2	123.9	55 28.0	+58.6	125.1	54 53.0	+58.9	126.2	54 17.1	+59.1	127.4	49
50	59 02.8	+55.9	117.9	58 34.0	+56.6	119.4	58 03.9	+57.2	120.8	57 32.6	+57.7	122.1	57 00.2	+58.0	123.4	56 26.6	+58.4	124.7	55 51.9	+58.8	125.9	55 16.2	+59.1	127.1	50
51	59 58.7	+55.7	117.2	59 30.6	+56.4	118.7	59 01.1	+57.0	120.2	58 30.3	+57.5	121.6	57 58.2	+58.0	123.0	57 25.0	+58.4	124.3	56 50.7	+58.7	125.5	56 15.3	+59.0	126.8	51
52	60 54.4	+55.5	116.4	60 27.0	+56.1	118.0	59 58.1	+56.8	119.6	59 27.8	+57.3	121.0	58 56.2	+57.9	122.5	58 23.4	+58.3	123.8	57 49.4	+58.7	125.2	57 14.3	+59.0	126.4	52
53	61 49.9	+55.1	115.7	61 23.1	+55.9	117.3	60 54.9	+56.6	118.9	60 25.1	+57.2	120.5	59 54.1	+57.7	121.9	59 21.7	+58.2	123.4	58 48.1	+58.5	124.8	58 13.3	+58.9	126.1	53
54	62 45.0	+54.9	114.8	62 19.0	+55.7	116.5	61 51.5	+56.3	118.2	61 22.3	+57.1	119.8	60 51.8	+57.6	121.4	60 19.9	+58.0	122.9	59 46.6	+58.5	124.3	59 12.2	+58.8	125.7	54
55	63 39.9	+54.4	113.9	63 14.7	+55.3	115.7	62 47.8	+56.1	117.5	62 19.4	+56.8	119.2	61 49.4	+57.4	120.8	61 17.9	+58.0	122.4	60 45.1	+58.4	123.9	60 11.0	+58.8	125.3	55
56	64 34.3	+54.1	112.9	64 10.0	+55.0	114.8	63 43.9	+55.9	116.7	63 16.2	+56.6	118.5	62 46.8	+57.2	120.2	62 15.9	+57.8	121.8	61 43.5	+58.3	123.4	61 09.8	+58.7	124.9	56
57	65 28.4	+53.6	111.9	65 05.0	+54.7	113.9	64 39.8	+55.5	115.8	64 12.8	+56.3	117.7	63 44.0	+57.1	119.5	63 13.7	+57.6	121.2	62 41.8	+58.2	122.9	62 08.5	+58.6	124.5	57
58	66 22.0	+53.2	110.8	65 59.7	+54.2	112.9	65 35.3	+55.2	115.0	65 09.1	+56.1	116.9	64 41.1	+56.8	118.8	64 11.3	+57.5	120.6	63 40.0	+58.0	122.4	63 07.1	+58.5	124.0	58
59	67 15.2	+52.5	109.6	66 53.9	+53.8	111.8	66 30.5	+54.9	114.0	66 05.2	+55.7	116.0	65 37.9	+56.5	118.0	65 08.8	+57.3	119.9	64 38.0	+57.9	121.8	64 05.6	+58.4	123.5	59
60	68 07.7	+52.0	108.4	67 47.7	+53.2	110.7	67 25.4	+54.3	112.9	67 00.9	+55.4	115.1	66 34.4	+56.3	117.2	66 06.1	+57.0	119.2	65 35.9	+57.7	121.2	65 04.0	+58.3	123.0	60
61	68 59.7	+51.2	107.0	68 40.9	+52.6	109.4	68 19.7	+53.9	111.8	67 56.3	+55.0	114.1	67 30.7	+56.0	116.3	67 03.1	+56.9	118.4	66 33.6	+57.6	120.5	66 02.3	+58.1	122.4	61
62	69 50.9	+50.4	105.5	69 33.5	+52.0	108.1	69 13.6	+53.4	110.6	68 51.3	+54.6	113.0	68 26.7	+55.6	115.4	68 00.0	+56.5	117.6	67 31.2	+57.3	119.8	67 00.4	+58.0	121.8	62
63	70 41.3	+49.5	103.9	70 25.5	+51.2	106.6	70 07.0	+52.7	109.3	69 45.9	+54.0	111.9	69 22.3	+55.3	114.3	68 56.5	+56.2	116.7	68 28.5	+57.1	119.0	67 58.4	+57.8	121.1	63
64	71 30.8	+48.4	102.2	71 16.7	+50.3	105.0	70 59.7	+51.9	107.9	70 39.9	+53.5	110.6	70 17.6	+54.7	113.2	69 52.7	+55.9	115.7	69 25.6	+56.8	118.1	68 56.2	+57.6	120.4	64
65	72 19.2	+47.3	100.3	72 07.0	+49.3	103.3	71 51.6	+51.2	106.3	71 33.4	+52.7	109.2	71 12.3	+54.2	111.9	70 48.6	+55.4	114.6	70 22.4	+56.5	117.2	69 53.8	+57.4	119.6	65
66	73 06.5	+45.9	98.2	72 56.3	+48.1	101.4	72 42.8	+50.2	104.6	72 26.1	+52.0	107.6	72 06.5	+53.6	110.6	71 44.0	+55.0	113.4	71 18.9	+56.1	116.1	70 51.2	+57.1	118.7	66
67	73 52.4	+44.3	95.9	73 44.4	+46.8	99.3	73 33.0	+49.0	102.7	73 18.1	+51.1	105.9	73 00.1	+52.8	109.1	72 39.0	+54.3	112.1	72 15.0	+55.7	115.0	71 48.3	+56.8	117.8	67
68	74 36.7	+42.5	93.4	74 31.2	+45.2	97.0	74 22.0	+47.8	100.6	74 09.2	+50.0	104.1	73 52.9	+52.0	107.4	73 33.3	+53.7	110.7	73 10.7	+55.1	113.8	72 45.1	+56.4	116.7	68
69	75 19.2	+40.4•	90.7	75 16.4	+43.5	94.5	75 09.8	+46.2	98.3	74 59.2	+48.7	102.0	74 44.9	+51.0	105.6	74 27.0	+53.0	109.0	74 05.8	+54.6	112.4	73 41.5	+55.9	115.5	69
70	75 59.6	+38.0•	87.7	75 59.9	+41.3•	91.7	75 56.0	+44.4	95.7	75 47.9	+47.3	99.7	75 35.9	+49.7	103.5	75 20.0	+51.9	107.2	75 00.4	+53.9	110.8	74 37.4	+55.5	114.2	70
71	76 37.6	+35.2•	84.5	76 41.2	+38.9•	88.7	76 40.4	+42.3•	92.9	76 35.2	+45.5•	97.1	76 25.6	+48.4	101.2	76 11.9	+50.9	105.2	75 54.3	+53.0	109.0	75 32.9	+54.8	112.7	71
72	77 12.8	+32.1•	80.9	77 20.1	+36.0•	85.3	77 22.7	+39.8•	89.7	77 20.7	+43.3•	94.2	77 14.0	+46.6	98.6	77 02.8	+49.4	102.9	76 47.3	+51.9	107.1	76 27.7	+54.0	111.0	72
73	77 44.9	+28.5•	77.0	77 56.1	+32.8•	81.5	78 02.5	+36.9•	86.2	78 04.0	+40.9•	90.9	78 00.6	+44.5•	95.7	77 52.2	+47.8	100.3	77 39.2	+50.7	104.8	77 21.7	+53.1	109.1	73
74	78 13.4	+24.5•	72.7	78 28.9	+29.0•	77.4	78 39.4	+33.5•	82.3	78 44.9	+37.9•	87.3	78 45.1	+42.0•	92.3	78 40.0	+45.8•	97.3	78 29.9	+49.0	102.2	78 14.8	+51.9	106.9	74
75	78 37.9	+20.0•	68.2	78 57.9	+24.7•	73.0	79 12.9	+29.5•	78.0	79 22.8	+34.3•	83.2	79 27.1	+38.9•	88.5	79 25.8	+43.2•	93.9	79 18.9	+47.1•	99.2	79 06.7	+50.4	104.3	75
76	78 57.9	+15.0•	63.3	79 22.6	+19.8•	68.1	79 42.4	+25.0•	73.2	79 57.1	+30.1•	78.6	80 06.0	+35.2•	84.3	80 09.0	+40.1•	90.0	80 06.0	+44.6•	95.7	79 57.1	+48.5•	101.4	76
77	79 12.9	+9.9•	58.2	79 42.4	+14.7•	62.9	80 07.4	+19.8•	68.0	80 27.2	+25.2•	73.5	80 41.2	+30.8•	79.4	80 49.1	+36.3•	85.5	80 50.6	+41.4•	91.7	80 45.6	+46.1•	97.8	77
78	79 22.8	+4.3•	52.9	79 57.1	+8.9•	57.4	80 27.2	+14.0•	62.4	80 52.4	+19.6•	67.9	81 12.0	+25.5•	73.9	81 25.4	+31.5•	80.3	81 32.0	+37.5•	87.0	81 31.7	+42.9•	93.7	78
79	79 27.1	−1.3•	47.5	80 06.0	+3.0•	51.7	80 41.2	+7.9•	56.5	81 12.0	+13.4•	61.9	81 37.5	+19.4•	67.9	81 56.9	+25.9•	74.4	82 09.5	+32.4•	81.4	82 14.6	+38.9•	88.7	79
80	79 25.8	−6.9•	42.0	80 09.0	−3.0•	45.9	80 49.1	+1.5•	50.3	81 25.4	+6.6•	55.4	81 56.9	+12.6•	61.2	82 22.8	+19.1•	67.8	82 41.9	+26.3•	75.1	82 53.5	+33.4•	82.8	80
81	79 18.9	−12.2•	36.6	80 06.0	−8.9•	40.0	80 50.6	−5.0•	44.0	81 32.0	−0.3•	48.7	82 09.5	+5.1•	54.2	82 41.9	+11.6•	60.5	83 08.2	+18.7•	67.7	83 26.9	+26.7•	75.8	81
82	79 06.7	−17.4•	31.4	79 57.1	−14.6•	34.3	80 45.6	−11.3•	37.8	81 31.7	−7.3•	41.9	82 14.6	−2.5•	46.8	82 53.5	+3.3•	52.7	83 26.9	+10.3•	59.6	83 53.6	+18.4•	67.7	82
83	78 49.3	−22.1•	26.4	79 42.5	−19.9•	28.8	80 34.3	−17.2•	31.7	81 24.4	−14.0•	35.2	82 12.1	−10.0•	39.4	82 56.8	−5.1•	44.6	83 37.2	+1.0•	50.9	84 12.0	+8.6•	58.5	83
84	78 27.2	−26.3•	21.7	79 22.6	−24.7•	23.6	80 17.1	−22.7•	26.0	81 10.4	−20.2•	28.8	82 02.1	−17.1•	32.2	82 51.7	−13.3•	36.5	83 38.2	−8.2•	41.8	84 20.6	−1.9•	48.6	84
85	78 00.9	−30.2•	17.3	78 57.9	−28.9•	18.8	79 54.4	−27.5•	20.6	80 50.2	−25.7•	22.8	81 45.0	−23.5•	25.4	82 38.4	−20.6•	28.8	83 30.0	−17.0•	33.0	84 18.7	−12.1•	38.5	85
86	77 30.7	−33.6•	13.2	78 29.0	−32.8•	14.3	79 26.9	−31.7•	15.6	80 24.5	−30.5•	17.2	81 21.5	−29.0•	19.2	82 17.8	−27.2•	21.6	83 13.0	−24.7•	24.7	84 06.6	−21.4•	28.7	86
87	76 57.1	−36.6•	9.4	77 56.2	−36.0•	10.2	78 55.2	−35.4•	11.1	79 54.0	−34.7•	12.2	80 52.5	−33.8•	13.5	81 50.6	−32.6•	15.1	82 48.3	−31.2•	17.2	83 45.2	−29.3•	19.9	87
88	76 20.5	−39.1•	6.0	77 20.2	−38.9•	6.5	78 19.8	−38.6•	7.0	79 19.3	−38.2•	7.7	80 18.7	−37.7•	8.4	81 18.0	−37.2•	9.4	82 17.1	−36.5•	10.6	83 15.9	−35.5•	12.1	88
89	75 41.4	−41.4•	2.9	76 41.3	−41.3•	3.1	77 41.2	−41.2•	3.3	78 41.1	−41.1•	3.6	79 41.0	−41.0•	4.0	80 40.8	−40.8•	4.4	81 40.6	−40.6•	4.9	82 40.4	−40.4•	5.6	89
90	75 00.0	−43.4	0.0	76 00.0	−43.4•	0.0	77 00.0	−43.5•	0.0	78 00.0	−43.6•	0.0	79 00.0	−43.7•	0.0	80 00.0	−43.8•	0.0	81 00.0	−44.0•	0.0	82 00.0	−44.1•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 45°, 315°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	10 32.7	– 58.9	134.0	9 51.0	– 59.1	134.1	9 09.2	– 59.3	134.3	8 27.2	– 59.3	134.4	7 45.2	– 59.4	134.5	7 03.2	– 59.6	134.6	6 21.0	– 59.6	134.6	5 38.9	– 59.7	134.7	**0**
1	9 33.8	– 59.0	134.2	8 51.9	– 59.1	134.3	8 09.9	– 59.2	134.4	7 27.9	– 59.3	134.5	6 45.8	– 59.4	134.6	6 03.6	– 59.5	134.7	5 21.4	– 59.6	134.8	4 39.2	– 59.8	134.8	**1**
2	8 34.8	– 59.0	134.4	7 52.8	– 59.1	134.5	7 10.7	– 59.2	134.6	6 28.6	– 59.4	134.7	5 46.4	– 59.5	134.7	5 04.1	– 59.5	134.8	4 21.8	– 59.6	134.9	3 39.4	– 59.7	134.9	**2**
3	7 35.8	– 58.9	134.6	6 53.7	– 59.1	134.7	6 11.5	– 59.2	134.7	5 29.2	– 59.3	134.8	4 46.9	– 59.4	134.9	4 04.6	– 59.6	134.9	3 22.2	– 59.7	135.0	2 39.7	– 59.7	135.0	**3**
4	6 36.9	– 59.0	134.8	5 54.6	– 59.1	134.8	5 12.3	– 59.3	134.9	4 29.9	– 59.4	135.0	3 47.5	– 59.5	135.0	3 05.0	– 59.5	135.1	2 22.5	– 59.6	135.1	1 40.0	– 59.7	135.1	**4**
5	5 37.9	– 59.0	134.9	4 55.5	– 59.1	135.0	4 13.0	– 59.2	135.1	3 30.5	– 59.3	135.1	2 48.0	– 59.4	135.1	2 05.5	– 59.6	135.2	1 22.9	– 59.6	135.2	0 40.3	– 59.7	135.2	**5**
6	4 38.9	– 59.0	135.1	3 56.4	– 59.1	135.2	3 13.8	– 59.2	135.2	2 31.2	– 59.4	135.3	1 48.6	– 59.5	135.3	1 05.9	– 59.5	135.3	0 23.3	– 59.7	135.3	0 19.4	+ 59.7	44.7	**6**
7	3 39.9	– 59.0	135.3	2 57.3	– 59.2	135.4	2 14.6	– 59.3	135.4	1 31.8	– 59.3	135.4	0 49.1	– 59.4	135.4	0 06.4	– 59.6	135.4	0 36.4	+ 59.6	44.6	1 19.1	+ 59.7	44.6	**7**
8	2 40.9	– 58.9	135.5	1 58.1	– 59.1	135.5	1 15.3	– 59.2	135.5	0 32.5	– 59.3	135.6	0 10.3	+ 59.5	44.4	0 53.2	+ 59.5	44.5	1 36.0	+ 59.6	44.5	2 18.8	+ 59.7	44.5	**8**
9	1 42.0	– 59.0	135.7	0 59.0	– 59.1	135.7	0 16.1	– 59.2	135.7	0 26.8	+ 59.4	44.3	1 09.8	+ 59.4	44.3	1 52.7	+ 59.6	44.3	2 35.6	+ 59.7	44.4	3 18.5	+ 59.7	44.4	**9**
10	0 43.0	– 59.0	135.9	0 00.1	+ 59.1	44.1	0 43.1	+ 59.3	44.1	1 26.2	+ 59.3	44.2	2 09.2	+ 59.5	44.2	2 52.3	+ 59.5	44.2	3 35.3	+ 59.6	44.2	4 18.2	+ 59.7	44.3	**10**
11	0 16.0	+ 59.0	44.0	0 59.2	+ 59.1	44.0	1 42.4	+ 59.2	44.0	2 25.5	+ 59.4	44.0	3 08.7	+ 59.4	44.0	3 51.8	+ 59.5	44.1	4 34.9	+ 59.6	44.1	5 17.9	+ 59.7	44.2	**11**
12	1 15.0	+ 59.0	43.8	1 58.3	+ 59.1	43.8	2 41.6	+ 59.2	43.8	3 24.9	+ 59.3	43.9	4 08.1	+ 59.5	43.9	4 51.3	+ 59.6	44.0	5 34.5	+ 59.6	44.0	6 17.6	+ 59.7	44.1	**12**
13	2 14.0	+ 59.0	43.6	2 57.4	+ 59.1	43.6	3 40.8	+ 59.3	43.7	4 24.2	+ 59.4	43.7	5 07.6	+ 59.4	43.8	5 50.9	+ 59.5	43.8	6 34.1	+ 59.7	43.9	7 17.3	+ 59.7	44.0	**13**
14	3 13.0	+ 58.9	43.4	3 56.5	+ 59.2	43.5	4 40.1	+ 59.2	43.5	5 23.6	+ 59.3	43.6	6 07.0	+ 59.5	43.6	6 50.4	+ 59.6	43.7	7 33.8	+ 59.6	43.8	8 17.0	+ 59.7	43.9	**14**
15	4 11.9	+ 59.0	43.2	4 55.7	+ 59.1	43.3	5 39.3	+ 59.2	43.3	6 22.9	+ 59.4	43.4	7 06.5	+ 59.4	43.5	7 50.0	+ 59.5	43.6	8 33.4	+ 59.6	43.7	9 16.7	+ 59.7	43.8	**15**
16	5 10.9	+ 59.0	43.0	5 54.8	+ 59.1	43.1	6 38.5	+ 59.3	43.2	7 22.3	+ 59.3	43.3	8 05.9	+ 59.5	43.4	8 49.5	+ 59.5	43.5	9 33.0	+ 59.6	43.6	10 16.4	+ 59.7	43.7	**16**
17	6 09.9	+ 59.0	42.9	6 53.9	+ 59.1	42.9	7 37.8	+ 59.2	43.0	8 21.6	+ 59.3	43.1	9 05.4	+ 59.4	43.2	9 49.0	+ 59.6	43.3	10 32.6	+ 59.7	43.5	11 16.1	+ 59.7	43.6	**17**
18	7 08.9	+ 58.9	42.7	7 53.0	+ 59.1	42.8	8 37.0	+ 59.2	42.9	9 20.9	+ 59.4	43.0	10 04.8	+ 59.4	43.1	10 48.6	+ 59.5	43.2	11 32.3	+ 59.6	43.3	12 15.8	+ 59.7	43.5	**18**
19	8 07.8	+ 59.0	42.5	8 52.1	+ 59.1	42.6	9 36.2	+ 59.2	42.7	10 20.3	+ 59.3	42.8	11 04.2	+ 59.5	42.9	11 48.1	+ 59.5	43.1	12 31.9	+ 59.6	43.2	13 15.5	+ 59.7	43.4	**19**
20	9 06.8	+ 59.0	42.3	9 51.2	+ 59.0	42.4	10 35.4	+ 59.2	42.5	11 19.6	+ 59.3	42.7	12 03.7	+ 59.4	42.8	12 47.6	+ 59.5	43.0	13 31.5	+ 59.6	43.1	14 15.2	+ 59.7	43.3	**20**
21	10 05.8	+ 58.9	42.1	10 50.2	+ 59.1	42.2	11 34.6	+ 59.2	42.4	12 18.9	+ 59.3	42.5	13 03.1	+ 59.4	42.7	13 47.1	+ 59.6	42.8	14 31.1	+ 59.6	43.0	15 14.9	+ 59.7	43.2	**21**
22	11 04.7	+ 59.0	41.9	11 49.3	+ 59.1	42.1	12 33.8	+ 59.2	42.2	13 18.2	+ 59.3	42.4	14 02.5	+ 59.4	42.5	14 46.7	+ 59.5	42.7	15 30.7	+ 59.6	42.9	16 14.6	+ 59.7	43.1	**22**
23	12 03.7	+ 58.9	41.7	12 48.4	+ 59.1	41.9	13 33.0	+ 59.2	42.0	14 17.5	+ 59.3	42.2	15 01.9	+ 59.4	42.4	15 46.2	+ 59.5	42.6	16 30.3	+ 59.6	42.8	17 14.3	+ 59.7	43.0	**23**
24	13 02.6	+ 58.9	41.5	13 47.5	+ 59.0	41.7	14 32.2	+ 59.2	41.9	15 16.8	+ 59.3	42.0	16 01.3	+ 59.4	42.2	16 45.7	+ 59.5	42.4	17 29.9	+ 59.6	42.6	18 14.0	+ 59.6	42.9	**24**
25	14 01.5	+ 58.9	41.3	14 46.5	+ 59.1	41.5	15 31.4	+ 59.2	41.7	16 16.1	+ 59.3	41.9	17 00.7	+ 59.4	42.1	17 45.2	+ 59.5	42.3	18 29.5	+ 59.6	42.5	19 13.6	+ 59.7	42.7	**25**
26	15 00.4	+ 59.0	41.1	15 45.6	+ 59.0	41.3	16 30.6	+ 59.1	41.5	17 15.4	+ 59.3	41.7	18 00.1	+ 59.4	41.9	18 44.7	+ 59.5	42.2	19 29.1	+ 59.6	42.4	20 13.3	+ 59.7	42.6	**26**
27	15 59.4	+ 58.8	40.9	16 44.6	+ 59.0	41.1	17 29.7	+ 59.2	41.3	18 14.7	+ 59.3	41.6	18 59.5	+ 59.4	41.8	19 44.2	+ 59.5	42.0	20 28.7	+ 59.5	42.3	21 13.0	+ 59.6	42.5	**27**
28	16 58.2	+ 58.9	40.8	17 43.6	+ 59.1	41.0	18 28.9	+ 59.1	41.2	19 14.0	+ 59.2	41.4	19 58.9	+ 59.4	41.6	20 43.7	+ 59.4	41.9	21 28.2	+ 59.6	42.1	22 12.6	+ 59.7	42.4	**28**
29	17 57.1	+ 58.9	40.5	18 42.7	+ 59.0	40.8	19 28.0	+ 59.2	41.0	20 13.2	+ 59.3	41.2	20 58.3	+ 59.3	41.5	21 43.1	+ 59.5	41.7	22 27.8	+ 59.6	42.0	23 12.3	+ 59.6	42.3	**29**
30	18 56.0	+ 58.9	40.3	19 41.7	+ 59.0	40.6	20 27.2	+ 59.1	40.8	21 12.5	+ 59.2	41.1	21 57.6	+ 59.4	41.3	22 42.6	+ 59.5	41.6	23 27.4	+ 59.5	41.9	24 11.9	+ 59.7	42.2	**30**
31	19 54.9	+ 58.8	40.1	20 40.7	+ 58.9	40.4	21 26.3	+ 59.1	40.6	22 11.7	+ 59.3	40.9	22 57.0	+ 59.3	41.2	23 42.1	+ 59.4	41.4	24 26.9	+ 59.6	41.7	25 11.6	+ 59.6	42.1	**31**
32	20 53.7	+ 58.8	39.9	21 39.6	+ 59.0	40.2	22 25.4	+ 59.1	40.4	23 11.0	+ 59.2	40.7	23 56.3	+ 59.4	41.0	24 41.5	+ 59.5	41.3	25 26.5	+ 59.5	41.6	26 11.2	+ 59.7	41.9	**32**
33	21 52.5	+ 58.9	39.7	22 38.6	+ 59.0	40.0	23 24.5	+ 59.1	40.3	24 10.2	+ 59.2	40.5	24 55.7	+ 59.3	40.8	25 41.0	+ 59.4	41.2	26 26.0	+ 59.6	41.5	27 10.9	+ 59.6	41.8	**33**
34	22 51.4	+ 58.7	39.5	23 37.6	+ 58.9	39.8	24 23.6	+ 59.0	40.1	25 09.4	+ 59.2	40.4	25 55.0	+ 59.3	40.7	26 40.4	+ 59.4	41.0	27 25.6	+ 59.5	41.3	28 10.5	+ 59.6	41.7	**34**
35	23 50.1	+ 58.8	39.3	24 36.5	+ 58.9	39.6	25 22.6	+ 59.1	39.9	26 08.6	+ 59.2	40.2	26 54.3	+ 59.3	40.5	27 39.8	+ 59.4	40.8	28 25.1	+ 59.5	41.2	29 10.1	+ 59.6	41.6	**35**
36	24 48.9	+ 58.8	39.1	25 35.4	+ 58.9	39.4	26 21.7	+ 59.0	39.7	27 07.8	+ 59.1	40.0	27 53.6	+ 59.3	40.3	28 39.2	+ 59.4	40.7	29 24.6	+ 59.5	41.0	30 09.7	+ 59.6	41.4	**36**
37	25 47.7	+ 58.7	38.8	26 34.3	+ 58.9	39.2	27 20.7	+ 59.1	39.5	28 06.9	+ 59.2	39.8	28 52.9	+ 59.3	40.2	29 38.6	+ 59.4	40.5	30 24.1	+ 59.5	40.9	31 09.3	+ 59.6	41.3	**37**
38	26 46.4	+ 58.7	38.6	27 33.2	+ 58.9	38.9	28 19.8	+ 59.0	39.3	29 06.1	+ 59.1	39.6	29 52.2	+ 59.2	40.0	30 38.0	+ 59.4	40.4	31 23.6	+ 59.5	40.8	32 08.9	+ 59.6	41.2	**38**
39	27 45.1	+ 58.7	38.4	28 32.1	+ 58.8	38.7	29 18.8	+ 58.9	39.1	30 05.2	+ 59.1	39.4	30 51.4	+ 59.3	39.8	31 37.4	+ 59.4	40.2	32 23.1	+ 59.5	40.6	33 08.5	+ 59.6	41.0	**39**
40	28 43.8	+ 58.7	38.2	29 30.9	+ 58.8	38.5	30 17.7	+ 59.0	38.9	31 04.3	+ 59.1	39.2	31 50.7	+ 59.2	39.6	32 36.8	+ 59.3	40.0	33 22.6	+ 59.5	40.4	34 08.1	+ 59.6	40.9	**40**
41	29 42.5	+ 58.6	37.9	30 29.7	+ 58.8	38.3	31 16.7	+ 58.9	38.6	32 03.4	+ 59.1	39.0	32 49.9	+ 59.2	39.4	33 36.1	+ 59.4	39.8	34 22.1	+ 59.4	40.3	35 07.7	+ 59.5	40.7	**41**
42	30 41.1	+ 58.6	37.7	31 28.5	+ 58.8	38.0	32 15.6	+ 59.0	38.4	33 02.5	+ 59.1	38.8	33 49.1	+ 59.2	39.2	34 35.5	+ 59.3	39.7	35 21.5	+ 59.4	40.1	36 07.2	+ 59.6	40.6	**42**
43	31 39.7	+ 58.6	37.4	32 27.3	+ 58.7	37.8	33 14.6	+ 58.9	38.2	34 01.6	+ 59.0	38.6	34 48.3	+ 59.2	39.0	35 34.8	+ 59.3	39.5	36 20.9	+ 59.5	39.9	37 06.8	+ 59.5	40.4	**43**
44	32 38.3	+ 58.6	37.2	33 26.0	+ 58.7	37.6	34 13.5	+ 58.8	38.0	35 00.6	+ 59.0	38.4	35 47.5	+ 59.2	38.8	36 34.1	+ 59.3	39.3	37 20.4	+ 59.4	39.8	38 06.3	+ 59.5	40.3	**44**
45	33 36.9	+ 58.5	36.9	34 24.7	+ 58.7	37.3	35 12.3	+ 58.9	37.7	35 59.6	+ 59.0	38.2	36 46.7	+ 59.1	38.6	37 33.4	+ 59.2	39.1	38 19.8	+ 59.4	39.6	39 05.8	+ 59.5	40.1	**45**
46	34 35.4	+ 58.5	36.6	35 23.4	+ 58.7	37.1	36 11.2	+ 58.8	37.5	36 58.6	+ 59.0	37.9	37 45.8	+ 59.1	38.4	38 32.6	+ 59.3	38.9	39 19.2	+ 59.3	39.4	40 05.3	+ 59.5	39.9	**46**
47	35 33.9	+ 58.4	36.4	36 22.1	+ 58.6	36.8	37 10.0	+ 58.7	37.2	37 57.6	+ 58.9	37.7	38 44.9	+ 59.1	38.2	39 31.9	+ 59.2	38.7	40 18.5	+ 59.4	39.2	41 04.8	+ 59.5	39.8	**47**
48	36 32.3	+ 58.4	36.1	37 20.7	+ 58.5	36.5	38 08.7	+ 58.8	37.0	38 56.5	+ 58.9	37.5	39 44.0	+ 59.0	38.0	40 31.1	+ 59.2	38.5	41 17.9	+ 59.3	39.0	42 04.3	+ 59.5	39.6	**48**
49	37 30.7	+ 58.4	35.8	38 19.2	+ 58.6	36.2	39 07.5	+ 58.7	36.7	39 55.4	+ 58.9	37.2	40 43.0	+ 59.1	37.7	41 30.3	+ 59.2	38.3	42 17.2	+ 59.3	38.8	43 03.8	+ 59.4	39.4	**49**
50	38 29.1	+ 58.3	35.5	39 17.8	+ 58.5	36.0	40 06.2	+ 58.7	36.5	40 54.3	+ 58.8	37.0	41 42.1	+ 59.0	37.5	42 29.5	+ 59.1	38.1	43 16.5	+ 59.3	38.6	44 03.2	+ 59.4	39.2	**50**
51	39 27.4	+ 58.3	35.2	40 16.3	+ 58.4	35.7	41 04.9	+ 58.6	36.2	41 53.1	+ 58.8	36.7	42 41.1	+ 58.9	37.3	43 28.6	+ 59.2	37.8	44 15.8	+ 59.3	38.4	45 02.6	+ 59.5	39.0	**51**
52	40 25.7	+ 58.2	34.9	41 14.7	+ 58.4	35.4	42 03.5	+ 58.6	35.9	42 51.9	+ 58.8	36.4	43 40.0	+ 59.0	37.0	44 27.8	+ 59.0	37.6	45 15.1	+ 59.2	38.2	46 02.1	+ 59.3	38.8	**52**
53	41 23.9	+ 58.1	34.6	42 13.1	+ 58.4	35.1	43 02.1	+ 58.5	35.6	43 50.7	+ 58.7	36.2	44 39.0	+ 58.8	36.7	45 26.8	+ 59.1	37.3	46 14.3	+ 59.3	38.0	47 01.4	+ 59.4	38.6	**53**
54	42 22.0	+ 58.1	34.2	43 11.5	+ 58.3	34.8	44 00.6	+ 58.5	35.3	44 49.4	+ 58.7	35.9	45 37.8	+ 58.9	36.5	46 25.9	+ 59.0	37.1	47 13.6	+ 59.1	37.7	48 00.8	+ 59.3	38.4	**54**
55	43 20.1	+ 58.1	33.9	44 09.8	+ 58.2	34.4	44 59.1	+ 58.4	35.0	45 48.1	+ 58.6	35.6	46 36.7	+ 58.8	36.2	47 24.9	+ 59.0	36.8	48 12.7	+ 59.2	37.5	49 00.1	+ 59.3	38.2	**55**
56	44 18.2	+ 57.9	33.5	45 08.0	+ 58.2	34.1	45 57.5	+ 58.4	34.7	46 46.7	+ 58.6	35.3	47 35.5	+ 58.8	35.9	48 23.9	+ 59.0	36.6	49 11.9	+ 59.1	37.2	49 59.4	+ 59.3	38.0	**56**
57	45 16.1	+ 57.9	33.2	46 06.2	+ 58.1	33.7	46 55.9	+ 58.3	34.3	47 45.3	+ 58.5	34.9	48 34.3	+ 58.7	35.6	49 22.9	+ 58.9	36.3	50 11.0	+ 59.1	37.0	50 58.7	+ 59.3	37.7	**57**
58	46 14.0	+ 57.9	32.8	47 04.3	+ 58.0	33.4	47 54.2	+ 58.3	34.0	48 43.8	+ 58.5	34.6	49 33.0	+ 58.6	35.3	50 21.8	+ 58.8	36.0	51 10.1	+ 59.0	36.7	51 58.0	+ 59.2	37.5	**58**
59	47 11.9	+ 57.7	32.4	48 02.3	+ 58.0	33.0	48 52.5	+ 58.2	33.6	49 42.3	+ 58.4	34.3	50 31.6	+ 58.6	35.0	51 20.6	+ 58.8	35.7	52 09.1	+ 59.0	36.4	52 57.2	+ 59.1	37.2	**59**
60	48 09.6	+ 57.6	32.0	49 00.3	+ 57.9	32.6	49 50.7	+ 58.1	33.2	50 40.7	+ 58.3	33.9	51 30.2	+ 58.6	34.6	52 19.4	+ 58.8	35.3	53 08.1	+ 59.0	36.1	53 56.3	+ 59.2	36.9	**60**
61	49 07.2	+ 57.6	31.6	49 58.2	+ 57.8	32.2	50 48.8	+ 58.0	32.9	51 39.0	+ 58.2	33.5	52 28.8	+ 58.5	34.3	53 18.2	+ 58.6	35.0	54 07.1	+ 58.9	35.8	54 55.5	+ 59.1	36.6	**61**
62	50 04.8	+ 57.5	31.2	50 56.0	+ 57.7	31.8	51 46.8	+ 57.9	32.5	52 37.2	+ 58.2	33.1	53 27.3	+ 58.4	33.9	54 16.8	+ 58.7	34.7	55 06.0	+ 58.8	35.5	55 54.6	+ 59.0	36.3	**62**
63	51 02.3	+ 57.3	30.7	51 53.7	+ 57.6	31.3	52 44.7	+ 57.9	32.0	53 35.4	+ 58.1	32.7	54 25.7	+ 58.3	33.5	55 15.5	+ 58.5	34.3	56 04.8	+ 58.8	35.1	56 53.6	+ 59.0	36.0	**63**
64	51 59.6	+ 57.2	30.2	52 51.3	+ 57.5	30.9	53 42.6	+ 57.7	31.6	54 33.5	+ 58.0	32.3	55 24.0	+ 58.2	33.1	56 14.0	+ 58.5	33.9	57 03.6	+ 58.7	34.8	57 52.6	+ 58.9	35.7	**64**
65	52 56.8	+ 57.1	29.7	53 48.8	+ 57.3	30.4	54 40.3	+ 57.7	31.1	55 31.5	+ 57.9	31.9	56 22.2	+ 58.2	32.7	57 12.5	+ 58.4	33.5	58 02.3	+ 58.6	34.4	58 51.5	+ 58.9	35.3	**65**
66	53 53.9	+ 57.0	29.2	54 46.1	+ 57.3	29.9	55 38.0	+ 57.5	30.6	56 29.4	+ 57.8	31.4	57 20.4	+ 58.0	32.2	58 10.9	+ 58.3	33.1	59 00.9	+ 58.6	34.0	59 50.4	+ 58.8	34.9	**66**
67	54 50.9	+ 56.8	28.7	55 43.4	+ 57.1	29.4	56 35.5	+ 57.3	30.1	57 27.2	+ 57.6	30.9	58 18.4	+ 57.9	31.7	59 09.2	+ 58.2	32.6	59 59.5	+ 58.5	33.5	60 49.2	+ 58.7	34.5	**67**
68	55 47.7	+ 56.7	28.1	56 40.5	+ 56.9	28.8	57 32.8	+ 57.3	29.6	58 24.8	+ 57.5	30.4	59 16.3	+ 57.9	31.2	60 07.4	+ 58.1	32.1	60 58.0	+ 58.3	33.1	61 47.9	+ 58.7	34.1	**68**
69	56 44.4	+ 56.4	27.5	57 37.4	+ 56.8	28.2	58 30.1	+ 57.0	29.0	59 22.3	+ 57.4	29.8	60 14.2	+ 57.6	30.7	61 05.5	+ 58.0	31.6	61 56.3	+ 58.3	32.6	62 46.6	+ 58.5	33.6	**69**
70	57 40.8	+ 56.3	26.9	58 34.2	+ 56.5	27.6	59 27.1	+ 56.9	28.4	60 19.7	+ 57.2	29.2	61 11.8	+ 57.5	30.1	62 03.5	+ 57.8	31.1	62 54.6	+ 58.1	32.1	63 45.1	+ 58.5	33.2	**70**
71	58 37.1	+ 56.1	26.2	59 30.7	+ 56.4	27.0	60 24.0	+ 56.7	27.8	61 16.9	+ 57.0	28.6	62 09.3	+ 57.4	29.5	63 01.3	+ 57.7	30.5	63 52.7	+ 58.0	31.5	64 43.6	+ 58.3	32.6	**71**
72	59 33.2	+ 55.8	25.5	60 27.1	+ 56.2	26.3	61 20.7	+ 56.5	27.1	62 13.9	+ 56.9	28.0	63 06.7	+ 57.2	28.9	63 59.0	+ 57.5	29.9	64 50.7	+ 57.9	30.9	65 41.9	+ 58.2	32.1	**72**
73	60 29.0	+ 55.6	24.8	61 23.3	+ 55.9	25.6	62 17.2	+ 56.3	26.4	63 10.8	+ 56.6	27.3	64 03.9	+ 56.9	28.2	64 56.5	+ 57.3	29.2	65 48.6	+ 57.7	30.3	66 40.1	+ 58.0	31.5	**73**
74	61 24.6	+ 55.3	24.0	62 19.2	+ 55.6	24.8	63 13.5	+ 56.0	25.6	64 07.4	+ 56.3	26.5	65 00.8	+ 56.8	27.5	65 53.8	+ 57.1	28.5	66 46.3	+ 57.5	29.6	67 38.1	+ 57.9	30.8	**74**
75	62 19.9	+ 54.9	23.2	63 14.8	+ 55.4	24.0	64 09.5	+ 55.7	24.8	65 03.7	+ 56.1	25.7	65 57.6	+ 56.5	26.7	66 50.9	+ 56.9	27.7	67 43.8	+ 57.2	28.9	68 36.0	+ 57.7	30.1	**75**
76	63 14.8	+ 54.7	22.3	64 10.2	+ 55.0	23.1	65 05.2	+ 55.4	24.0	65 59.8	+ 55.8	24.9	66 54.1	+ 56.1	25.9	67 47.8	+ 56.6	26.9	68 41.0	+ 57.1	28.1	69 33.7	+ 57.4	29.3	**76**
77	64 09.5	+ 54.2	21.4	65 05.2	+ 54.6	22.2	66 00.6	+ 55.0	23.0	66 55.6	+ 55.5	23.9	67 50.2	+ 55.9	24.9	68 44.4	+ 56.3	26.0	69 38.1	+ 56.7	27.2	70 31.1	+ 57.2	28.5	**77**
78	65 03.7	+ 53.9	20.4	65 59.8	+ 54.3	21.2	66 55.6	+ 54.6	22.0	67 51.1	+ 55.0	23.0	68 46.1	+ 55.5	24.0	69 40.7	+ 55.9	25.0	70 34.8	+ 56.4	26.2	71 28.3	+ 56.9	27.6	**78**
79	65 57.6	+ 53.3	19.3	66 54.1	+ 53.7	20.1	67 50.2	+ 54.2	21.0	68 46.1	+ 54.6	21.9	69 41.6	+ 55.0	22.9	70 36.6	+ 55.6	24.0	71 31.2	+ 56.0	25.2	72 25.2	+ 56.5	26.5	**79**
80	66 50.9	+ 52.9	18.2	67 47.8	+ 53.2	19.0	68 44.4	+ 53.7	19.8	69 40.7	+ 54.1	20.7	70 36.6	+ 54.6	21.7	71 32.2	+ 55.0	22.8	72 27.2	+ 55.6	24.0	73 21.7	+ 56.2	25.4	**80**
81	67 43.8	+ 52.2	17.0	68 41.0	+ 52.7	17.7	69 38.1	+ 53.0	18.5	70 34.8	+ 53.5	19.4	71 31.2	+ 54.0	20.4	72 27.2	+ 54.5	21.5	73 22.8	+ 55.1	22.8	74 17.9	+ 55.6	24.1	**81**
82	68 36.0	+ 51.5	15.6	69 33.7	+ 51.9	16.4	70 31.1	+ 52.4	17.2	71 28.3	+ 52.9	18.0	72 25.2	+ 53.3	19.0	73 21.7	+ 53.9	20.1	74 17.9	+ 54.4	21.3	75 13.5	+ 55.0	22.7	**82**
83	69 27.5	+ 50.8	14.2	70 25.6	+ 51.2	14.9	71 23.5	+ 51.6	15.7	72 21.2	+ 52.0	16.5	73 18.5	+ 52.6	17.5	74 15.6	+ 53.1	18.5	75 12.3	+ 53.7	19.7	76 08.5	+ 54.4	21.1	**83**
84	70 18.3	+ 50.0	12.7	71 16.8	+ 50.3	13.3	72 15.1	+ 50.7	14.0	73 13.2	+ 51.2	14.8	74 11.1	+ 51.6	15.7	75 08.7	+ 52.2	16.8	76 06.0	+ 52.8	17.9	77 02.9	+ 53.4	19.3	**84**
85	71 08.3	+ 48.9	11.0	72 07.1	+ 49.3	11.6	73 05.8	+ 49.7	12.2	74 04.4	+ 50.1	13.0	75 02.7	+ 50.6	13.8	76 00.9	+ 51.1	14.8	76 58.8	+ 51.6	15.9	77 56.3	+ 52.3	17.2	**85**
86	71 57.2	+ 47.8	9.2	72 56.4	+ 48.1	9.7	73 55.5	+ 48.5	10.3	74 54.5	+ 48.9	10.9	75 53.3	+ 49.3	11.7	76 52.0	+ 49.8	12.5	77 50.4	+ 50.4	13.5	78 48.6	+ 51.0	14.7	**86**
87	72 45.0	+ 46.6	7.2	73 44.5	+ 46.8	7.6	74 44.0	+ 47.1	8.1	75 43.4	+ 47.4	8.6	76 42.6	+ 47.8	9.3	77 41.8	+ 48.2	10.0	78 40.8	+ 48.7	10.9	79 39.6	*+ 49.3* •	11.9	**87**
88	73 31.6	+ 45.0	5.0	74 31.3	+ 45.3	5.3	75 31.1	+ 45.4	5.7	76 30.8	+ 45.6	6.1	77 30.4	*+ 45.9* •	6.6	78 30.0	*+ 46.2* •	7.1	79 29.5	*+ 46.5* •	7.8	80 28.9	*+ 47.0* •	8.6	**88**
89	74 16.6	+ 43.4	2.6	75 16.6	*+ 43.4* •	2.8	76 16.5	*+ 43.5* •	3.0	77 16.4	*+ 43.6* •	3.2	78 16.3	*+ 43.7* •	3.5	79 16.2	*+ 43.8* •	3.8	80 16.0	*+ 44.0* •	4.2	81 15.9	*+ 44.1* •	4.7	**89**
90	75 00.0	*+ 41.4* •	0.0	76 00.0	*+ 41.3* •	0.0	77 00.0	*+ 41.2* •	0.0	78 00.0	*+ 41.1* •	0.0	79 00.0	*+ 41.0* •	0.0	80 00.0	*+ 40.8* •	0.0	81 00.0	*+ 40.6* •	0.0	82 00.0	*+ 40.4* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 135°, 225°

46°, 314° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 21.5	+58.9	133.0	9 40.5	+59.0	133.1	8 59.4	+59.2	133.3	8 18.2	+59.4	133.4	7 37.0	+59.4	133.5	6 55.7	+59.5	133.6	6 14.3	+59.6	133.6	5 32.9	+59.7	133.7	0
1	11 20.4	+58.9	132.8	10 39.5	+59.1	133.0	9 58.6	+59.2	133.1	9 17.6	+59.3	133.2	8 36.4	+59.4	133.3	7 55.2	+59.5	133.4	7 13.9	+59.6	133.5	6 32.6	+59.7	133.6	1
2	12 19.3	+58.9	132.6	11 38.6	+59.0	132.8	10 57.8	+59.2	132.9	10 16.9	+59.3	133.1	9 35.8	+59.5	133.2	8 54.7	+59.6	133.3	8 13.5	+59.6	133.4	7 32.3	+59.7	133.5	2
3	13 18.2	+58.9	132.4	12 37.6	+59.1	132.6	11 57.0	+59.1	132.8	11 16.2	+59.3	132.9	10 35.3	+59.4	133.0	9 54.3	+59.5	133.2	9 13.1	+59.7	133.3	8 32.0	+59.6	133.4	3
4	14 17.1	+58.8	132.2	13 36.7	+59.0	132.4	12 56.1	+59.2	132.6	12 15.5	+59.2	132.7	11 34.7	+59.4	132.9	10 53.8	+59.5	133.0	10 12.8	+59.6	133.2	9 31.6	+59.7	133.3	4
5	15 15.9	+58.9	132.0	14 35.7	+59.0	132.2	13 55.3	+59.1	132.4	13 14.7	+59.3	132.6	12 34.1	+59.4	132.8	11 53.3	+59.5	132.9	11 12.4	+59.6	133.1	10 31.3	+59.7	133.2	5
6	16 14.8	+58.9	131.8	15 34.7	+59.0	132.0	14 54.4	+59.2	132.2	14 14.0	+59.3	132.4	13 33.5	+59.4	132.6	12 52.8	+59.5	132.8	12 12.0	+59.6	133.0	11 31.0	+59.7	133.1	6
7	17 13.7	+58.8	131.6	16 33.7	+59.0	131.9	15 53.6	+59.1	132.1	15 13.3	+59.3	132.3	14 32.9	+59.4	132.5	13 52.3	+59.5	132.7	13 11.6	+59.6	132.8	12 30.7	+59.7	133.0	7
8	18 12.5	+58.8	131.4	17 32.7	+59.0	131.7	16 52.7	+59.2	131.9	16 12.6	+59.2	132.1	15 32.3	+59.4	132.3	14 51.8	+59.5	132.5	14 11.2	+59.6	132.7	13 30.4	+59.7	132.9	8
9	19 11.3	+58.8	131.2	18 31.7	+59.0	131.5	17 51.9	+59.1	131.7	17 11.8	+59.3	131.9	16 31.7	+59.3	132.2	15 51.3	+59.5	132.4	15 10.8	+59.5	132.6	14 30.1	+59.6	132.8	9
10	20 10.1	+58.8	131.0	19 30.7	+58.9	131.3	18 51.0	+59.1	131.5	18 11.1	+59.3	131.8	17 31.0	+59.4	132.0	16 50.8	+59.5	132.3	16 10.3	+59.6	132.5	15 29.7	+59.7	132.7	10
11	21 08.9	+58.8	130.8	20 29.6	+59.0	131.1	19 50.1	+59.1	131.4	19 10.4	+59.2	131.6	18 30.4	+59.4	131.9	17 50.3	+59.4	132.1	17 09.9	+59.6	132.4	16 29.4	+59.7	132.6	11
12	22 07.7	+58.8	130.6	21 28.6	+58.9	130.9	20 49.2	+59.1	131.2	20 09.6	+59.2	131.4	19 29.8	+59.3	131.7	18 49.7	+59.5	132.0	18 09.5	+59.6	132.2	17 29.1	+59.7	132.5	12
13	23 06.5	+58.7	130.4	22 27.5	+58.9	130.7	21 48.3	+59.1	131.0	21 08.8	+59.2	131.3	20 29.1	+59.4	131.6	19 49.2	+59.5	131.8	19 09.1	+59.6	132.1	18 28.8	+59.6	132.4	13
14	24 05.2	+58.8	130.1	23 26.4	+58.9	130.5	22 47.4	+59.0	130.8	22 08.0	+59.2	131.1	21 28.5	+59.3	131.4	20 48.7	+59.4	131.7	20 08.7	+59.5	132.0	19 28.4	+59.7	132.2	14
15	25 04.0	+58.7	129.9	24 25.3	+58.9	130.3	23 46.4	+59.1	130.6	23 07.2	+59.2	130.9	22 27.8	+59.3	131.2	21 48.1	+59.5	131.6	21 08.2	+59.6	131.8	20 28.1	+59.6	132.1	15
16	26 02.7	+58.7	129.7	25 24.2	+58.9	130.0	24 45.5	+59.0	130.4	24 06.4	+59.2	130.8	23 27.1	+59.4	131.1	22 47.6	+59.4	131.4	22 07.8	+59.5	131.7	21 27.7	+59.7	132.0	16
17	27 01.4	+58.6	129.4	26 23.1	+58.8	129.8	25 44.5	+59.0	130.2	25 05.6	+59.2	130.6	24 26.5	+59.3	130.9	23 47.0	+59.5	131.3	23 07.3	+59.6	131.6	22 27.4	+59.6	131.9	17
18	28 00.0	+58.7	129.2	27 21.9	+58.9	129.6	26 43.5	+59.0	130.0	26 04.8	+59.1	130.4	25 25.8	+59.3	130.8	24 46.5	+59.4	131.1	24 06.9	+59.5	131.4	23 27.0	+59.7	131.8	18
19	28 58.7	+58.6	129.0	28 20.8	+58.8	129.4	27 42.5	+59.0	129.8	27 03.9	+59.2	130.2	26 25.1	+59.2	130.6	25 45.9	+59.4	131.0	25 06.4	+59.5	131.3	24 26.7	+59.6	131.7	19
20	29 57.3	+58.6	128.7	29 19.6	+58.7	129.2	28 41.5	+59.0	129.6	28 03.1	+59.1	130.0	27 24.3	+59.3	130.4	26 45.3	+59.4	130.8	26 05.9	+59.6	131.2	25 26.3	+59.6	131.5	20
21	30 55.9	+58.5	128.5	30 18.3	+58.8	128.9	29 40.5	+58.9	129.4	29 02.2	+59.1	129.8	28 23.6	+59.3	130.2	27 44.7	+59.4	130.6	27 05.5	+59.5	131.0	26 25.9	+59.6	131.4	21
22	31 54.4	+58.5	128.2	31 17.1	+58.7	128.7	30 39.4	+58.9	129.2	30 01.3	+59.1	129.6	29 22.9	+59.2	130.1	28 44.1	+59.4	130.5	28 05.0	+59.5	130.9	27 25.5	+59.7	131.3	22
23	32 52.9	+58.5	128.0	32 15.8	+58.7	128.5	31 38.3	+58.9	128.9	31 00.4	+59.1	129.4	30 22.1	+59.3	129.9	29 43.5	+59.3	130.3	29 04.5	+59.5	130.7	28 25.2	+59.6	131.2	23
24	33 51.4	+58.5	127.7	33 14.5	+58.7	128.2	32 37.2	+58.9	128.7	31 59.5	+59.0	129.2	31 21.4	+59.2	129.7	30 42.8	+59.4	130.1	30 04.0	+59.5	130.6	29 24.8	+59.6	131.0	24
25	34 49.9	+58.4	127.4	34 13.2	+58.6	128.0	33 36.1	+58.8	128.5	32 58.5	+59.1	129.0	32 20.6	+59.2	129.5	31 42.2	+59.3	130.0	31 03.5	+59.4	130.4	30 24.4	+59.6	130.9	25
26	35 48.3	+58.4	127.1	35 11.8	+58.6	127.7	34 34.9	+58.8	128.3	33 57.6	+59.0	128.8	33 19.8	+59.1	129.3	32 41.5	+59.4	129.8	32 02.9	+59.5	130.3	31 24.0	+59.5	130.8	26
27	36 46.7	+58.3	126.8	36 10.4	+58.6	127.4	35 33.7	+58.8	128.0	34 56.6	+58.9	128.6	34 18.9	+59.2	129.1	33 40.9	+59.3	129.6	33 02.4	+59.5	130.1	32 23.5	+59.6	130.6	27
28	37 45.0	+58.3	126.6	37 09.0	+58.6	127.2	36 32.5	+58.8	127.8	35 55.5	+59.0	128.3	35 18.1	+59.1	128.9	34 40.2	+59.3	129.4	34 01.9	+59.4	130.0	33 23.1	+59.6	130.5	28
29	38 43.3	+58.2	126.3	38 07.6	+58.4	126.9	37 31.3	+58.7	127.5	36 54.5	+58.9	128.1	36 17.2	+59.1	128.7	35 39.5	+59.3	129.3	35 01.3	+59.4	129.8	34 22.7	+59.5	130.3	29
30	39 41.5	+58.2	125.9	39 06.0	+58.5	126.6	38 30.0	+58.7	127.2	37 53.4	+58.9	127.9	37 16.3	+59.1	128.5	36 38.8	+59.2	129.1	36 00.7	+59.4	129.6	35 22.2	+59.6	130.2	30
31	40 39.7	+58.2	125.6	40 04.5	+58.4	126.3	39 28.7	+58.6	127.0	38 52.3	+58.9	127.6	38 15.4	+59.1	128.3	37 38.0	+59.3	128.9	37 00.1	+59.4	129.5	36 21.8	+59.5	130.0	31
32	41 37.9	+58.1	125.3	41 02.9	+58.4	126.0	40 27.3	+58.6	126.7	39 51.2	+58.8	127.4	39 14.5	+59.0	128.0	38 37.3	+59.2	128.7	37 59.5	+59.4	129.3	37 21.3	+59.5	129.9	32
33	42 36.0	+58.0	125.0	42 01.3	+58.3	125.7	41 25.9	+58.6	126.4	40 50.0	+58.8	127.1	40 13.5	+59.0	127.8	39 36.5	+59.2	128.5	38 58.9	+59.4	129.1	38 20.8	+59.5	129.7	33
34	43 34.0	+57.9	124.6	42 59.6	+58.2	125.4	42 24.5	+58.5	126.1	41 48.8	+58.8	126.9	41 12.5	+59.0	127.6	40 35.7	+59.1	128.2	39 58.3	+59.3	128.9	39 20.3	+59.5	129.5	34
35	44 31.9	+57.9	124.2	43 57.8	+58.2	125.1	43 23.0	+58.5	125.8	42 47.6	+58.7	126.6	42 11.5	+59.0	127.3	41 34.8	+59.2	128.0	40 57.6	+59.3	128.7	40 19.8	+59.5	129.4	35
36	45 29.8	+57.8	123.9	44 56.0	+58.1	124.7	44 21.5	+58.4	125.5	43 46.3	+58.7	126.3	43 10.5	+58.9	127.1	42 34.0	+59.1	127.8	41 56.9	+59.3	128.5	41 19.3	+59.4	129.2	36
37	46 27.6	+57.7	123.5	45 54.1	+58.1	124.4	45 19.9	+58.4	125.2	44 45.0	+58.6	126.0	44 09.4	+58.8	126.8	43 33.1	+59.1	127.6	42 56.2	+59.3	128.3	42 18.7	+59.5	129.0	37
38	47 25.3	+57.7	123.1	46 52.2	+58.0	124.0	46 18.3	+58.3	124.9	45 43.6	+58.6	125.7	45 08.2	+58.9	126.5	44 32.2	+59.0	127.3	43 55.5	+59.2	128.1	43 18.2	+59.4	128.8	38
39	48 23.0	+57.5	122.7	47 50.2	+57.9	123.6	47 16.6	+58.2	124.5	46 42.2	+58.5	125.4	46 07.1	+58.8	126.2	45 31.2	+59.1	127.1	44 54.7	+59.3	127.9	44 17.6	+59.4	128.6	39
40	49 20.5	+57.5	122.2	48 48.1	+57.8	123.2	48 14.8	+58.2	124.2	47 40.7	+58.5	125.1	47 05.9	+58.7	126.0	46 30.3	+58.9	126.8	45 54.0	+59.2	127.6	45 17.0	+59.4	128.4	40
41	50 18.0	+57.3	121.8	49 45.9	+57.7	122.8	49 13.0	+58.1	123.8	48 39.2	+58.4	124.7	48 04.6	+58.7	125.7	47 29.2	+59.0	126.5	46 53.2	+59.1	127.4	46 16.4	+59.3	128.2	41
42	51 15.3	+57.2	121.3	50 43.6	+57.7	122.4	50 11.1	+58.0	123.4	49 37.6	+58.3	124.4	49 03.3	+58.6	125.3	48 28.2	+58.9	126.3	47 52.3	+59.2	127.2	47 15.7	+59.3	128.0	42
43	52 12.5	+57.1	120.8	51 41.3	+57.5	121.9	51 09.1	+57.9	123.0	50 35.9	+58.3	124.0	50 01.9	+58.6	125.0	49 27.1	+58.9	126.0	48 51.5	+59.1	126.9	48 15.0	+59.4	127.8	43
44	53 09.6	+57.0	120.3	52 38.8	+57.4	121.5	52 07.0	+57.8	122.6	51 34.2	+58.2	123.6	51 00.5	+58.5	124.7	50 26.0	+58.8	125.7	49 50.6	+59.0	126.6	49 14.4	+59.2	127.6	44
45	54 06.6	+56.8	119.8	53 36.2	+57.3	121.0	53 04.8	+57.8	122.1	52 32.4	+58.1	123.2	51 59.0	+58.5	124.3	51 24.8	+58.7	125.4	50 49.6	+59.0	126.4	50 13.6	+59.3	127.3	45
46	55 03.4	+56.7	119.3	54 33.5	+57.2	120.5	54 02.6	+57.6	121.7	53 30.5	+58.1	122.8	52 57.5	+58.4	124.0	52 23.5	+58.7	125.0	51 48.6	+59.0	126.1	51 12.9	+59.2	127.1	46
47	56 00.1	+56.5	118.7	55 30.7	+57.0	120.0	55 00.2	+57.5	121.2	54 28.6	+57.9	122.4	53 55.9	+58.3	123.6	53 22.2	+58.7	124.7	52 47.6	+58.9	125.8	52 12.1	+59.2	126.8	47
48	56 56.6	+56.3	118.1	56 27.7	+56.9	119.4	55 57.7	+57.3	120.7	55 26.5	+57.8	121.9	54 54.2	+58.2	123.2	54 20.9	+58.5	124.3	53 46.5	+58.9	125.5	53 11.3	+59.1	126.6	48
49	57 52.9	+56.1	117.4	57 24.6	+56.7	118.8	56 55.0	+57.3	120.2	56 24.3	+57.7	121.5	55 52.4	+58.1	122.7	55 19.4	+58.5	124.0	54 45.4	+58.8	125.1	54 10.4	+59.1	126.3	49
50	58 49.0	+55.8	116.7	58 21.3	+56.5	118.2	57 52.3	+57.1	119.6	57 22.0	+57.6	121.0	56 50.5	+58.1	122.3	56 17.9	+58.5	123.6	55 44.2	+58.8	124.8	55 09.5	+59.0	126.0	50
51	59 44.8	+55.7	116.0	59 17.8	+56.3	117.6	58 49.4	+56.9	119.0	58 19.6	+57.4	120.4	57 48.6	+57.9	121.8	57 16.4	+58.3	123.1	56 43.0	+58.7	124.4	56 08.5	+59.0	125.7	51
52	60 40.5	+55.3	115.3	60 14.1	+56.1	116.9	59 46.3	+56.7	118.4	59 17.0	+57.3	119.9	58 46.5	+57.8	121.3	58 14.7	+58.2	122.7	57 41.7	+58.6	124.0	57 07.5	+59.0	125.3	52
53	61 35.8	+55.1	114.5	61 10.2	+55.8	116.1	60 43.0	+56.5	117.7	60 14.3	+57.2	119.3	59 44.3	+57.7	120.8	59 12.9	+58.2	122.2	58 40.3	+58.5	123.6	58 06.5	+58.9	125.0	53
54	62 30.9	+54.7	113.6	62 06.0	+55.5	115.4	61 39.5	+56.3	117.0	61 11.5	+56.9	118.7	60 42.0	+57.5	120.2	60 11.1	+58.0	121.7	59 38.8	+58.5	123.2	59 05.4	+58.8	124.6	54
55	63 25.6	+54.4	112.7	63 01.5	+55.3	114.5	62 35.8	+56.0	116.3	62 08.4	+56.7	118.0	61 39.5	+57.3	119.6	61 09.1	+57.9	121.2	60 37.3	+58.3	122.7	60 04.2	+58.7	124.2	55
56	64 20.0	+53.9	111.8	63 56.8	+54.9	113.7	63 31.8	+55.8	115.5	63 05.1	+56.6	117.3	62 36.8	+57.2	119.0	62 07.0	+57.7	120.7	61 35.6	+58.3	122.3	61 02.9	+58.7	123.8	56
57	65 13.9	+53.6	110.7	64 51.7	+54.6	112.7	64 27.6	+55.4	114.7	64 01.7	+56.2	116.5	63 34.0	+57.0	118.3	63 04.7	+57.6	120.1	62 33.9	+58.1	121.8	62 01.6	+58.6	123.4	57
58	66 07.5	+53.0	109.6	65 46.3	+54.1	111.7	65 23.0	+55.2	113.8	64 57.9	+56.0	115.7	64 31.0	+56.7	117.6	64 02.3	+57.4	119.5	63 32.0	+58.0	121.2	63 00.2	+58.4	122.9	58
59	67 00.5	+52.4	108.5	66 40.4	+53.6	110.7	66 18.2	+54.7	112.8	65 53.9	+55.7	114.9	65 27.7	+56.5	116.9	64 59.7	+57.2	118.8	64 30.0	+57.8	120.6	63 58.6	+58.4	122.4	59
60	67 52.9	+51.9	107.2	67 34.0	+53.2	109.5	67 12.9	+54.3	111.8	66 49.6	+55.3	113.9	66 24.2	+56.2	116.0	65 56.9	+57.0	118.1	65 27.8	+57.7	120.0	64 57.0	+58.2	121.8	60
61	68 44.8	+51.1	105.8	68 27.2	+52.5	108.3	68 07.2	+53.7	110.6	67 44.9	+54.9	112.9	67 20.4	+55.9	115.1	66 53.9	+56.8	117.3	66 25.5	+57.5	119.3	65 55.2	+58.1	121.3	61
62	69 35.9	+50.3	104.4	69 19.7	+51.8	106.9	69 00.9	+53.3	109.4	68 39.8	+54.5	111.9	68 16.3	+55.6	114.2	67 50.7	+56.4	116.4	67 23.0	+57.2	118.6	66 53.3	+57.9	120.6	62
63	70 26.2	+49.4	102.8	70 11.5	+51.1	105.5	69 54.2	+52.6	108.1	69 34.3	+53.9	110.7	69 11.9	+55.1	113.1	68 47.1	+56.2	115.5	68 20.2	+57.0	117.8	67 51.2	+57.8	120.0	63
64	71 15.6	+48.3	101.0	71 02.6	+50.2	103.9	70 46.8	+51.9	106.7	70 28.2	+53.3	109.4	70 07.0	+54.6	112.0	69 43.3	+55.8	114.5	69 17.2	+56.8	116.9	68 49.0	+57.5	119.2	64
65	72 03.9	+47.2	99.2	71 52.8	+49.2	102.2	71 38.7	+51.0	105.1	71 21.5	+52.7	108.0	71 01.6	+54.1	110.8	70 39.1	+55.3	113.4	70 14.0	+56.4	116.0	69 46.5	+57.3	118.4	65
66	72 51.1	+45.8	97.1	72 42.0	+48.1	100.3	72 29.7	+50.1	103.4	72 14.2	+51.9	106.5	71 55.7	+53.5	109.4	71 34.4	+54.9	112.2	71 10.4	+56.0	115.0	70 43.8	+57.1	117.6	66
67	73 36.9	+44.3	94.9	73 30.1	+46.7	98.2	73 19.8	+48.9	101.5	73 06.1	+51.0	104.8	72 49.2	+52.8	107.9	72 29.3	+54.3	110.9	72 06.4	+55.6	113.8	71 40.9	+56.7	116.6	67
68	74 21.2	+42.5	92.4	74 16.8	+45.2	96.0	74 08.7	+47.7	99.5	73 57.1	+49.9	102.9	73 42.0	+51.8	106.2	73 23.6	+53.6	109.5	73 02.0	+55.1	112.6	72 37.6	+56.3	115.5	68
69	75 03.7	+40.4 •	89.7	75 02.0	+43.4	93.5	74 56.4	+46.1	97.2	74 47.0	+48.6	100.8	74 33.8	+50.9	104.4	74 17.2	+52.8	107.9	73 57.1	+54.5	111.2	73 33.9	+55.9	114.3	69
70	75 44.1	+38.1 •	86.8	75 45.4	+41.3 •	90.7	75 42.5	+44.4	94.7	75 35.6	+47.2	98.6	75 24.7	+49.7	102.4	75 10.0	+51.9	106.1	74 51.6	+53.8	109.6	74 29.8	+55.3	113.0	70
71	76 22.2	+35.3 •	83.6	76 26.7	+38.9 •	87.7	76 26.9	+42.3 •	91.9	76 22.8	+45.4	96.0	76 14.4	+48.2	100.1	76 01.9	+50.7	104.0	75 45.4	+52.9	107.9	75 25.1	+54.7	111.5	71
72	76 57.5	+32.3 •	80.1	77 05.6	+36.2 •	84.4	77 09.2	+39.9 •	88.8	77 08.2	+43.4 •	93.2	77 02.6	+46.6	97.5	76 52.6	+49.4	101.8	76 38.3	+51.8	105.9	76 19.8	+54.0	109.8	72
73	77 29.8	+28.8 •	76.3	77 41.8	+32.9 •	80.7	77 49.1	+37.0 •	85.3	77 51.6	+40.8 •	90.0	77 49.2	+44.4 •	94.6	77 42.0	+47.7	99.2	77 30.1	+50.6	103.6	77 13.8	+53.0	107.9	73
74	77 58.6	+24.9 •	72.2	78 14.7	+29.3 •	76.7	78 26.1	+33.7 •	81.5	78 32.4	+38.0 •	86.4	78 33.6	+42.0 •	91.3	78 29.7	+45.7 •	96.2	78 20.7	+49.0	101.1	78 06.8	+51.8	105.7	74
75	78 23.5	+20.5 •	67.7	78 44.0	+25.1 •	72.4	78 59.8	+29.7 •	77.3	79 10.4	+34.4 •	82.4	79 15.6	+39.0 •	87.6	79 15.4	+43.2 •	92.9	79 09.7	+47.0 •	98.1	78 58.6	+50.3	103.2	75
76	78 44.0	+15.8 •	63.0	79 09.1	+20.4 •	67.6	79 29.5	+25.4 •	72.6	79 44.8	+30.4 •	77.9	79 54.6	+35.4 •	83.4	79 58.6	+40.1 •	89.0	79 56.7	+44.5 •	94.7	79 48.9	+48.4 •	100.2	76
77	78 59.8	+10.6 •	58.0	79 29.5	+15.3 •	62.5	79 54.9	+20.3 •	67.5	80 15.2	+25.6 •	72.9	80 30.0	+31.0 •	78.6	80 38.7	+36.4 •	84.6	80 41.2	+41.5 •	90.7	80 37.3	+46.1 •	96.7	77
78	79 10.4	+5.2 •	52.8	79 44.8	+9.8 •	57.2	80 15.2	+14.8 •	62.1	80 40.8	+20.2 •	67.5	81 01.0	+25.9 •	73.3	81 15.1	+31.8 •	79.5	81 22.7	+37.5 •	86.0	81 23.4	+42.9 •	92.6	78
79	79 15.6	–0.2 •	47.4	79 54.6	+4.0 •	51.6	80 30.0	+8.7 •	56.3	81 01.0	+14.1 •	61.5	81 26.9	+20.0 •	67.4	81 46.9	+26.2 •	73.8	82 00.2	+32.7 •	80.6	82 06.3	+38.9 •	87.8	79
80	79 15.4	–5.7 •	42.1	79 58.6	–1.9 •	45.9	80 38.7	+2.5 •	50.2	81 15.1	+7.6 •	55.2	81 46.9	+13.3 •	60.9	82 13.1	+19.8 •	67.3	82 32.9	+26.6 •	74.4	82 45.2	+33.7 •	82.0	80
81	79 09.7	–11.1 •	36.8	79 56.7	–7.8 •	40.1	80 41.2	–3.9 •	44.1	81 22.7	+0.7 •	48.6	82 00.2	+6.1 •	54.0	82 32.9	+12.3 •	60.2	82 59.5	+19.4 •	67.3	83 18.9	+27.0 •	75.1	81
82	78 58.6	–16.2 •	31.6	79 48.9	–13.4 •	34.5	80 37.3	–10.1 •	37.9	81 23.4	–6.2 •	42.0	82 06.3	–1.4 •	46.8	82 45.2	+4.3 •	52.5	83 18.9	+11.0 •	59.3	83 45.9	+19.0 •	67.2	82
83	78 42.4	–20.9 •	26.6	79 35.5	–18.7 •	29.0	80 27.2	–16.0 •	31.9	81 17.2	–12.8 •	35.4	82 04.9	–8.9 •	39.5	82 49.5	–4.0 •	44.6	83 29.9	+2.1 •	50.7	84 04.9	+9.4 •	58.2	83
84	78 21.5	–25.3 •	21.9	79 16.8	–23.6 •	23.8	80 11.2	–21.5 •	26.2	81 04.4	–19.0 •	29.0	81 56.0	–15.9 •	32.4	82 45.5	–12.1 •	36.6	83 32.0	–7.2 •	41.9	84 14.3	–0.8 •	48.5	84
85	77 56.2	–29.1 •	17.5	78 53.2	–27.8 •	19.0	79 49.7	–26.4 •	20.8	80 45.4	–24.6 •	23.0	81 40.1	–22.4 •	25.6	82 33.4	–19.5 •	28.9	83 24.8	–15.8 •	33.1	84 13.5	–10.9 •	38.5	85
86	77 27.1	–32.6 •	13.4	78 25.4	–31.8 •	14.5	79 23.3	–30.7 •	15.8	80 20.8	–29.5 •	17.4	81 17.7	–27.9 •	19.4	82 13.9	–26.0 •	21.8	83 09.0	–23.5 •	24.9	84 02.6	–20.3 •	28.9	86
87	76 54.5	–35.6 •	9.6	77 53.6	–35.1 •	10.3	78 52.6	–34.5 •	11.3	79 51.3	–33.7 •	12.3	80 49.8	–32.8 •	13.7	81 47.9	–31.6 •	15.3	82 45.5	–30.2 •	17.4	83 42.3	–28.2 •	20.1	87
88	76 18.9	–38.3 •	6.1	77 18.5	–38.0 •	6.6	78 18.1	–37.7 •	7.1	79 17.6	–37.3 •	7.8	80 17.0	–36.8 •	8.6	81 16.3	–36.3 •	9.5	82 15.3	–35.5 •	10.7	83 14.1	–34.5 •	12.3	88
89	75 40.6	–40.6 •	2.9	76 40.5	–40.5 •	3.1	77 40.4	–40.4 •	3.4	78 40.3	–40.3 •	3.7	79 40.2	–40.2 •	4.0	80 40.0	–40.0 •	4.4	81 39.8	–39.8 •	5.0	82 39.6	–39.6 •	5.6	89
90	75 00.0	–42.6	0.0	76 00.0	–42.7 •	0.0	77 00.0	–42.8 •	0.0	78 00.0	–42.9 •	0.0	79 00.0	–43.0 •	0.0	80 00.0	–43.1 •	0.0	81 00.0	–43.3 •	0.0	82 00.0	–43.5 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 46°, 314°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 21.5	– 59.0	133.0	9 40.5	– 59.1	133.1	8 59.4	– 59.2	133.3	8 18.2	– 59.3	133.4	7 37.0	– 59.4	133.5	6 55.7	– 59.5	133.6	6 14.3	– 59.6	133.6	5 32.9	– 59.7	133.7	**0**
1	9 22.5	– 58.9	133.2	8 41.4	– 59.0	133.3	8 00.2	– 59.2	133.4	7 18.9	– 59.3	133.5	6 37.6	– 59.4	133.6	5 56.2	– 59.6	133.7	5 14.7	– 59.6	133.8	4 33.2	– 59.7	133.8	**1**
2	8 23.6	– 58.9	133.4	7 42.4	– 59.1	133.5	7 01.0	– 59.2	133.6	6 19.6	– 59.3	133.7	5 38.2	– 59.5	133.7	4 56.6	– 59.5	133.8	4 15.1	– 59.6	133.9	3 33.5	– 59.7	133.9	**2**
3	7 24.7	– 59.0	133.6	6 43.3	– 59.1	133.7	6 01.8	– 59.2	133.8	5 20.3	– 59.3	133.8	4 38.7	– 59.4	133.9	3 57.1	– 59.5	133.9	3 15.5	– 59.7	134.0	2 33.8	– 59.7	134.0	**3**
4	6 25.7	– 58.9	133.8	5 44.2	– 59.1	133.8	5 02.6	– 59.2	133.9	4 21.0	– 59.3	134.0	3 39.3	– 59.4	134.0	2 57.6	– 59.5	134.1	2 15.8	– 59.6	134.1	1 34.1	– 59.7	134.1	**4**
5	5 26.8	– 58.9	134.0	4 45.1	– 59.0	134.0	4 03.4	– 59.2	134.1	3 21.7	– 59.4	134.1	2 39.9	– 59.5	134.2	1 58.1	– 59.6	134.2	1 16.2	– 59.6	134.2	0 34.4	– 59.7	134.2	**5**
6	4 27.9	– 59.0	134.1	3 46.1	– 59.1	134.2	3 04.2	– 59.2	134.2	2 22.3	– 59.3	134.3	1 40.4	– 59.4	134.3	0 58.5	– 59.5	134.3	0 16.6	– 59.6	134.3	0 25.3	+ 59.7	45.7	**6**
7	3 28.9	– 58.9	134.3	2 47.0	– 59.1	134.4	2 05.0	– 59.2	134.4	1 23.0	– 59.3	134.4	0 41.0	– 59.4	134.4	0 01.0	+ 59.5	45.6	0 43.0	+ 59.6	45.6	1 25.0	+ 59.7	45.6	**7**
8	2 30.0	– 59.0	134.5	1 47.9	– 59.1	134.5	1 05.8	– 59.2	134.6	0 23.7	– 59.3	134.6	0 18.4	+ 59.5	45.4	1 00.5	+ 59.6	45.4	1 42.6	+ 59.6	45.5	2 24.7	+ 59.7	45.5	**8**
9	1 31.0	– 58.9	134.7	0 48.8	– 59.1	134.7	0 06.6	– 59.2	134.7	0 35.6	+ 59.4	45.3	1 17.9	+ 59.4	45.3	2 00.1	+ 59.5	45.3	2 42.2	+ 59.7	45.3	3 24.4	+ 59.7	45.4	**9**
10	0 32.1	– 59.0	134.9	0 10.3	+ 59.1	45.1	0 52.6	+ 59.2	45.1	1 35.0	+ 59.3	45.1	2 17.3	+ 59.4	45.2	2 59.6	+ 59.5	45.2	3 41.9	+ 59.6	45.2	4 24.1	+ 59.7	45.3	**10**
11	0 26.9	+ 58.9	44.9	1 09.4	+ 59.0	44.9	1 51.8	+ 59.2	45.0	2 34.3	+ 59.3	45.0	3 16.7	+ 59.4	45.0	3 59.1	+ 59.5	45.1	4 41.5	+ 59.6	45.1	5 23.8	+ 59.7	45.2	**11**
12	1 25.8	+ 59.0	44.7	2 08.4	+ 59.1	44.8	2 51.0	+ 59.2	44.8	3 33.6	+ 59.3	44.8	4 16.1	+ 59.5	44.9	4 58.6	+ 59.6	44.9	5 41.1	+ 59.6	45.0	6 23.5	+ 59.7	45.1	**12**
13	2 24.8	+ 58.9	44.5	3 07.5	+ 59.1	44.6	3 50.2	+ 59.3	44.6	4 32.9	+ 59.4	44.7	5 15.6	+ 59.4	44.7	5 58.2	+ 59.5	44.8	6 40.7	+ 59.6	44.9	7 23.2	+ 59.7	45.0	**13**
14	3 23.7	+ 59.0	44.4	4 06.6	+ 59.1	44.4	4 49.5	+ 59.2	44.5	5 32.3	+ 59.3	44.5	6 15.0	+ 59.4	44.6	6 57.7	+ 59.5	44.7	7 40.3	+ 59.6	44.8	8 22.9	+ 59.7	44.9	**14**
15	4 22.7	+ 58.9	44.2	5 05.7	+ 59.1	44.2	5 48.7	+ 59.2	44.3	6 31.6	+ 59.3	44.4	7 14.4	+ 59.4	44.5	7 57.2	+ 59.5	44.6	8 39.9	+ 59.6	44.7	9 22.6	+ 59.7	44.8	**15**
16	5 21.6	+ 59.0	44.0	6 04.8	+ 59.0	44.1	6 47.9	+ 59.2	44.1	7 30.9	+ 59.3	44.2	8 13.8	+ 59.5	44.3	8 56.7	+ 59.6	44.4	9 39.5	+ 59.6	44.5	10 22.3	+ 59.7	44.7	**16**
17	6 20.6	+ 58.9	43.8	7 03.8	+ 59.1	43.9	7 47.1	+ 59.1	44.0	8 30.2	+ 59.3	44.1	9 13.3	+ 59.4	44.2	9 56.3	+ 59.5	44.3	10 39.1	+ 59.7	44.4	11 22.0	+ 59.6	44.6	**17**
18	7 19.5	+ 58.9	43.6	8 02.9	+ 59.1	43.7	8 46.2	+ 59.2	43.8	9 29.5	+ 59.3	43.9	10 12.7	+ 59.4	44.0	10 55.8	+ 59.5	44.2	11 38.8	+ 59.6	44.3	12 21.6	+ 59.7	44.5	**18**
19	8 18.4	+ 59.0	43.4	9 02.0	+ 59.0	43.5	9 45.4	+ 59.2	43.6	10 28.8	+ 59.3	43.8	11 12.1	+ 59.4	43.9	11 55.3	+ 59.5	44.0	12 38.4	+ 59.6	44.2	13 21.3	+ 59.7	44.4	**19**
20	9 17.4	+ 58.9	43.2	10 01.0	+ 59.1	43.3	10 44.6	+ 59.2	43.5	11 28.1	+ 59.3	43.6	12 11.5	+ 59.4	43.8	12 54.8	+ 59.5	43.9	13 38.0	+ 59.5	44.1	14 21.0	+ 59.7	44.2	**20**
21	10 16.3	+ 58.9	43.0	11 00.1	+ 59.0	43.2	11 43.8	+ 59.2	43.3	12 27.4	+ 59.3	43.5	13 10.9	+ 59.4	43.6	13 54.3	+ 59.5	43.8	14 37.5	+ 59.6	44.0	15 20.7	+ 59.7	44.1	**21**
22	11 15.2	+ 58.9	42.8	11 59.1	+ 59.1	43.0	12 43.0	+ 59.1	43.1	13 26.7	+ 59.3	43.3	14 10.3	+ 59.4	43.5	14 53.8	+ 59.5	43.6	15 37.1	+ 59.6	43.8	16 20.4	+ 59.6	44.0	**22**
23	12 14.1	+ 58.9	42.7	12 58.2	+ 59.0	42.8	13 42.1	+ 59.2	43.0	14 26.0	+ 59.3	43.1	15 09.7	+ 59.4	43.3	15 53.3	+ 59.5	43.5	16 36.7	+ 59.6	43.7	17 20.0	+ 59.7	43.9	**23**
24	13 13.0	+ 58.9	42.5	13 57.2	+ 59.0	42.6	14 41.3	+ 59.1	42.8	15 25.3	+ 59.2	43.0	16 09.1	+ 59.4	43.2	16 52.8	+ 59.5	43.4	17 36.3	+ 59.6	43.6	18 19.7	+ 59.7	43.8	**24**
25	14 11.9	+ 58.9	42.3	14 56.2	+ 59.0	42.4	15 40.4	+ 59.2	42.6	16 24.5	+ 59.3	42.8	17 08.5	+ 59.3	43.0	17 52.3	+ 59.4	43.2	18 35.9	+ 59.6	43.5	19 19.4	+ 59.6	43.7	**25**
26	15 10.8	+ 58.8	42.1	15 55.2	+ 59.0	42.2	16 39.6	+ 59.1	42.4	17 23.8	+ 59.2	42.7	18 07.8	+ 59.4	42.9	18 51.7	+ 59.5	43.1	19 35.5	+ 59.5	43.3	20 19.0	+ 59.7	43.6	**26**
27	16 09.6	+ 58.9	41.9	16 54.2	+ 59.0	42.1	17 38.7	+ 59.1	42.3	18 23.0	+ 59.3	42.5	19 07.2	+ 59.4	42.7	19 51.2	+ 59.5	43.0	20 35.0	+ 59.6	43.2	21 18.7	+ 59.6	43.5	**27**
28	17 08.5	+ 58.8	41.7	17 53.2	+ 59.0	41.9	18 37.8	+ 59.2	42.1	19 22.3	+ 59.2	42.3	20 06.6	+ 59.3	42.6	20 50.7	+ 59.4	42.8	21 34.6	+ 59.5	43.1	22 18.3	+ 59.7	43.4	**28**
29	18 07.3	+ 58.9	41.5	18 52.2	+ 59.0	41.7	19 37.0	+ 59.1	41.9	20 21.5	+ 59.2	42.1	21 05.9	+ 59.4	42.4	21 50.1	+ 59.5	42.7	22 34.1	+ 59.6	42.9	23 18.0	+ 59.6	43.2	**29**
30	19 06.2	+ 58.8	41.2	19 51.2	+ 58.9	41.5	20 36.1	+ 59.0	41.7	21 20.7	+ 59.3	42.0	22 05.3	+ 59.3	42.2	22 49.6	+ 59.4	42.5	23 33.7	+ 59.5	42.8	24 17.6	+ 59.6	43.1	**30**
31	20 05.0	+ 58.8	41.0	20 50.1	+ 59.0	41.3	21 35.1	+ 59.1	41.5	22 20.0	+ 59.2	41.8	23 04.6	+ 59.3	42.1	23 49.0	+ 59.5	42.4	24 33.2	+ 59.6	42.7	25 17.2	+ 59.7	43.0	**31**
32	21 03.8	+ 58.8	40.8	21 49.1	+ 58.9	41.1	22 34.2	+ 59.1	41.3	23 19.2	+ 59.2	41.6	24 03.9	+ 59.3	41.9	24 48.5	+ 59.4	42.2	25 32.8	+ 59.5	42.5	26 16.9	+ 59.6	42.9	**32**
33	22 02.6	+ 58.7	40.6	22 48.0	+ 58.9	40.9	23 33.3	+ 59.0	41.2	24 18.4	+ 59.1	41.4	25 03.2	+ 59.3	41.8	25 47.9	+ 59.4	42.1	26 32.3	+ 59.5	42.4	27 16.5	+ 59.6	42.7	**33**
34	23 01.3	+ 58.8	40.4	23 46.9	+ 58.9	40.7	24 32.3	+ 59.1	41.0	25 17.5	+ 59.2	41.3	26 02.5	+ 59.3	41.6	26 47.3	+ 59.4	41.9	27 31.8	+ 59.5	42.3	28 16.1	+ 59.6	42.6	**34**
35	24 00.1	+ 58.7	40.2	24 45.8	+ 58.9	40.5	25 31.4	+ 59.0	40.8	26 16.7	+ 59.2	41.1	27 01.8	+ 59.3	41.4	27 46.7	+ 59.4	41.8	28 31.3	+ 59.5	42.1	29 15.7	+ 59.6	42.5	**35**
36	24 58.8	+ 58.7	39.9	25 44.7	+ 58.9	40.2	26 30.4	+ 59.0	40.6	27 15.9	+ 59.1	40.9	28 01.1	+ 59.3	41.2	28 46.1	+ 59.4	41.6	29 30.8	+ 59.5	42.0	30 15.3	+ 59.6	42.4	**36**
37	25 57.5	+ 58.7	39.7	26 43.6	+ 58.8	40.0	27 29.4	+ 59.0	40.4	28 15.0	+ 59.1	40.7	29 00.4	+ 59.2	41.1	29 45.5	+ 59.3	41.4	30 30.3	+ 59.5	41.8	31 14.9	+ 59.6	42.2	**37**
38	26 56.2	+ 58.7	39.5	27 42.4	+ 58.8	39.8	28 28.4	+ 58.9	40.2	29 14.1	+ 59.1	40.5	29 59.6	+ 59.2	40.9	30 44.8	+ 59.4	41.3	31 29.8	+ 59.5	41.7	32 14.5	+ 59.6	42.1	**38**
39	27 54.9	+ 58.6	39.2	28 41.2	+ 58.8	39.6	29 27.3	+ 59.0	39.9	30 13.2	+ 59.1	40.3	30 58.8	+ 59.3	40.7	31 44.2	+ 59.3	41.1	32 29.3	+ 59.4	41.5	33 14.1	+ 59.5	41.9	**39**
40	28 53.5	+ 58.6	39.0	29 40.0	+ 58.8	39.4	30 26.3	+ 58.9	39.7	31 12.3	+ 59.1	40.1	31 58.1	+ 59.2	40.5	32 43.5	+ 59.4	40.9	33 28.7	+ 59.5	41.3	34 13.6	+ 59.6	41.8	**40**
41	29 52.1	+ 58.6	38.8	30 38.8	+ 58.7	39.1	31 25.2	+ 58.9	39.5	32 11.4	+ 59.0	39.9	32 57.3	+ 59.1	40.3	33 42.9	+ 59.3	40.7	34 28.2	+ 59.4	41.2	35 13.2	+ 59.5	41.6	**41**
42	30 50.7	+ 58.6	38.5	31 37.5	+ 58.8	38.9	32 24.1	+ 58.9	39.3	33 10.4	+ 59.0	39.7	33 56.4	+ 59.2	40.1	34 42.2	+ 59.3	40.6	35 27.6	+ 59.4	41.0	36 12.7	+ 59.5	41.5	**42**
43	31 49.3	+ 58.5	38.3	32 36.3	+ 58.6	38.6	33 23.0	+ 58.8	39.1	34 09.4	+ 59.0	39.5	34 55.6	+ 59.2	39.9	35 41.5	+ 59.3	40.4	36 27.0	+ 59.4	40.8	37 12.2	+ 59.6	41.3	**43**
44	32 47.8	+ 58.5	38.0	33 34.9	+ 58.7	38.4	34 21.8	+ 58.9	38.8	35 08.4	+ 59.0	39.3	35 54.8	+ 59.1	39.7	36 40.8	+ 59.2	40.2	37 26.4	+ 59.4	40.7	38 11.8	+ 59.5	41.2	**44**
45	33 46.3	+ 58.4	37.7	34 33.6	+ 58.6	38.1	35 20.7	+ 58.7	38.6	36 07.4	+ 59.0	39.0	36 53.9	+ 59.1	39.5	37 40.0	+ 59.2	40.0	38 25.8	+ 59.4	40.5	39 11.3	+ 59.5	41.0	**45**
46	34 44.7	+ 58.5	37.5	35 32.2	+ 58.6	37.9	36 19.4	+ 58.8	38.3	37 06.4	+ 58.9	38.8	37 53.0	+ 59.0	39.3	38 39.2	+ 59.3	39.8	39 25.2	+ 59.3	40.3	40 10.8	+ 59.4	40.8	**46**
47	35 43.2	+ 58.3	37.2	36 30.8	+ 58.6	37.6	37 18.2	+ 58.7	38.1	38 05.3	+ 58.9	38.6	38 52.0	+ 59.1	39.1	39 38.5	+ 59.2	39.6	40 24.5	+ 59.4	40.1	41 10.2	+ 59.5	40.7	**47**
48	36 41.5	+ 58.4	36.9	37 29.4	+ 58.5	37.3	38 16.9	+ 58.7	37.8	39 04.2	+ 58.8	38.3	39 51.1	+ 59.0	38.8	40 37.7	+ 59.1	39.4	41 23.9	+ 59.3	39.9	42 09.7	+ 59.4	40.5	**48**
49	37 39.9	+ 58.3	36.6	38 27.9	+ 58.5	37.1	39 15.6	+ 58.7	37.6	40 03.0	+ 58.9	38.1	40 50.1	+ 59.0	38.6	41 36.8	+ 59.2	39.1	42 23.2	+ 59.3	39.7	43 09.1	+ 59.5	40.3	**49**
50	38 38.2	+ 58.2	36.3	39 26.4	+ 58.4	36.8	40 14.3	+ 58.6	37.3	41 01.9	+ 58.8	37.8	41 49.1	+ 59.0	38.3	42 36.0	+ 59.1	38.9	43 22.5	+ 59.2	39.5	44 08.6	+ 59.4	40.1	**50**
51	39 36.4	+ 58.2	36.0	40 24.8	+ 58.4	36.5	41 12.9	+ 58.6	37.0	42 00.7	+ 58.7	37.5	42 48.1	+ 58.9	38.1	43 35.1	+ 59.1	38.7	44 21.7	+ 59.3	39.3	45 08.0	+ 59.3	39.9	**51**
52	40 34.6	+ 58.2	35.7	41 23.2	+ 58.3	36.2	42 11.5	+ 58.5	36.7	42 59.4	+ 58.7	37.3	43 47.0	+ 58.9	37.8	44 34.2	+ 59.0	38.4	45 21.0	+ 59.2	39.1	46 07.3	+ 59.4	39.7	**52**
53	41 32.8	+ 58.0	35.3	42 21.5	+ 58.3	35.9	43 10.0	+ 58.5	36.4	43 58.1	+ 58.7	37.0	44 45.9	+ 58.8	37.6	45 33.2	+ 59.0	38.2	46 20.2	+ 59.2	38.8	47 06.7	+ 59.3	39.5	**53**
54	42 30.8	+ 58.1	35.0	43 19.8	+ 58.3	35.5	44 08.5	+ 58.4	36.1	44 56.8	+ 58.6	36.7	45 44.7	+ 58.8	37.3	46 32.2	+ 59.0	37.9	47 19.4	+ 59.1	38.6	48 06.0	+ 59.3	39.3	**54**
55	43 28.9	+ 57.9	34.7	44 18.1	+ 58.1	35.2	45 06.9	+ 58.4	35.8	45 55.4	+ 58.6	36.4	46 43.5	+ 58.8	37.0	47 31.2	+ 59.0	37.7	48 18.5	+ 59.1	38.3	49 05.3	+ 59.3	39.1	**55**
56	44 26.8	+ 57.9	34.3	45 16.2	+ 58.1	34.9	46 05.3	+ 58.3	35.4	46 54.0	+ 58.5	36.1	47 42.3	+ 58.7	36.7	48 30.2	+ 58.9	37.4	49 17.6	+ 59.1	38.1	50 04.6	+ 59.3	38.8	**56**
57	45 24.7	+ 57.8	33.9	46 14.3	+ 58.1	34.5	47 03.6	+ 58.3	35.1	47 52.5	+ 58.5	35.7	48 41.0	+ 58.7	36.4	49 29.1	+ 58.8	37.1	50 16.7	+ 59.1	37.8	51 03.9	+ 59.2	38.6	**57**
58	46 22.5	+ 57.8	33.5	47 12.4	+ 57.9	34.1	48 01.9	+ 58.1	34.8	48 51.0	+ 58.4	35.4	49 39.7	+ 58.6	36.1	50 27.9	+ 58.8	36.8	51 15.8	+ 59.0	37.5	52 03.1	+ 59.2	38.3	**58**
59	47 20.3	+ 57.6	33.1	48 10.3	+ 57.9	33.7	49 00.0	+ 58.1	34.4	49 49.4	+ 58.3	35.0	50 38.3	+ 58.5	35.7	51 26.7	+ 58.8	36.5	52 14.8	+ 58.9	37.2	53 02.3	+ 59.1	38.0	**59**
60	48 17.9	+ 57.6	32.7	49 08.2	+ 57.8	33.3	49 58.1	+ 58.1	34.0	50 47.7	+ 58.2	34.7	51 36.8	+ 58.5	35.4	52 25.5	+ 58.7	36.1	53 13.7	+ 58.9	36.9	54 01.4	+ 59.1	37.8	**60**
61	49 15.5	+ 57.4	32.3	50 06.0	+ 57.7	32.9	50 56.2	+ 57.9	33.6	51 45.9	+ 58.2	34.3	52 35.3	+ 58.4	35.0	53 24.2	+ 58.6	35.8	54 12.6	+ 58.9	36.6	55 00.5	+ 59.1	37.5	**61**
62	50 12.9	+ 57.4	31.9	51 03.7	+ 57.6	32.5	51 54.1	+ 57.9	33.2	52 44.1	+ 58.1	33.9	53 33.7	+ 58.3	34.7	54 22.8	+ 58.6	35.4	55 11.5	+ 58.8	36.3	55 59.6	+ 59.0	37.1	**62**
63	51 10.3	+ 57.2	31.4	52 01.3	+ 57.5	32.1	52 52.0	+ 57.7	32.7	53 42.2	+ 58.0	33.5	54 32.0	+ 58.3	34.3	55 21.4	+ 58.5	35.1	56 10.3	+ 58.7	35.9	56 58.6	+ 58.9	36.8	**63**
64	52 07.5	+ 57.1	30.9	52 58.8	+ 57.4	31.6	53 49.7	+ 57.7	32.3	54 40.2	+ 57.9	33.0	55 30.3	+ 58.2	33.8	56 19.9	+ 58.4	34.7	57 09.0	+ 58.6	35.5	57 57.5	+ 58.9	36.5	**64**
65	53 04.6	+ 57.0	30.4	53 56.2	+ 57.2	31.1	54 47.4	+ 57.5	31.8	55 38.1	+ 57.8	32.6	56 28.5	+ 58.0	33.4	57 18.3	+ 58.3	34.2	58 07.6	+ 58.6	35.2	58 56.4	+ 58.8	36.1	**65**
66	54 01.6	+ 56.8	29.9	54 53.4	+ 57.2	30.6	55 44.9	+ 57.4	31.3	56 35.9	+ 57.7	32.1	57 26.5	+ 58.0	32.9	58 16.6	+ 58.3	33.8	59 06.2	+ 58.5	34.7	59 55.2	+ 58.8	35.7	**66**
67	54 58.4	+ 56.7	29.3	55 50.6	+ 56.9	30.0	56 42.3	+ 57.3	30.8	57 33.6	+ 57.6	31.6	58 24.5	+ 57.8	32.4	59 14.9	+ 58.1	33.3	60 04.7	+ 58.4	34.3	60 54.0	+ 58.7	35.3	**67**
68	55 55.1	+ 56.5	28.7	56 47.5	+ 56.8	29.5	57 39.6	+ 57.1	30.2	58 31.2	+ 57.4	31.1	59 22.3	+ 57.8	31.9	60 13.0	+ 58.0	32.9	61 03.1	+ 58.3	33.8	61 52.7	+ 58.6	34.9	**68**
69	56 51.6	+ 56.3	28.1	57 44.3	+ 56.7	28.9	58 36.7	+ 56.9	29.7	59 28.6	+ 57.3	30.5	60 20.1	+ 57.5	31.4	61 11.0	+ 57.9	32.3	62 01.4	+ 58.2	33.3	62 51.3	+ 58.4	34.4	**69**
70	57 47.9	+ 56.1	27.5	58 41.0	+ 56.4	28.3	59 33.6	+ 56.8	29.1	60 25.9	+ 57.0	29.9	61 17.6	+ 57.4	30.8	62 08.9	+ 57.7	31.8	62 59.6	+ 58.1	32.8	63 49.7	+ 58.4	33.9	**70**
71	58 44.0	+ 55.9	26.8	59 37.4	+ 56.2	27.6	60 30.4	+ 56.5	28.4	61 22.9	+ 56.9	29.3	62 15.0	+ 57.3	30.2	63 06.6	+ 57.6	31.2	63 57.7	+ 57.9	32.2	64 48.1	+ 58.3	33.4	**71**
72	59 39.9	+ 55.7	26.1	60 33.6	+ 56.0	26.9	61 26.9	+ 56.4	27.7	62 19.8	+ 56.7	28.6	63 12.3	+ 57.0	29.5	64 04.2	+ 57.4	30.6	64 55.6	+ 57.8	31.6	65 46.4	+ 58.1	32.8	**72**
73	60 35.6	+ 55.4	25.4	61 29.6	+ 55.8	26.1	62 23.3	+ 56.1	27.0	63 16.5	+ 56.5	27.9	64 09.3	+ 56.9	28.8	65 01.6	+ 57.2	29.9	65 53.4	+ 57.6	31.0	66 44.5	+ 57.9	32.2	**73**
74	61 31.0	+ 55.0	24.6	62 25.4	+ 55.4	25.4	63 19.4	+ 55.8	26.2	64 13.0	+ 56.2	27.1	65 06.2	+ 56.6	28.1	65 58.8	+ 57.0	29.2	66 51.0	+ 57.3	30.3	67 42.4	+ 57.8	31.5	**74**
75	62 26.0	+ 54.8	23.7	63 20.8	+ 55.1	24.5	64 15.2	+ 55.5	25.4	65 09.2	+ 55.9	26.3	66 02.8	+ 56.3	27.3	66 55.8	+ 56.8	28.4	67 48.3	+ 57.2	29.5	68 40.2	+ 57.6	30.8	**75**
76	63 20.8	+ 54.4	22.8	64 15.9	+ 54.8	23.6	65 10.7	+ 55.2	24.5	66 05.1	+ 55.6	25.4	66 59.1	+ 56.0	26.4	67 52.6	+ 56.4	27.5	68 45.5	+ 56.9	28.7	69 37.8	+ 57.3	30.0	**76**
77	64 15.2	+ 54.0	21.9	65 10.7	+ 54.4	22.7	66 05.9	+ 54.8	23.5	67 00.7	+ 55.3	24.5	67 55.1	+ 55.7	25.5	68 49.0	+ 56.2	26.6	69 42.4	+ 56.6	27.8	70 35.1	+ 57.1	29.1	**77**
78	65 09.2	+ 53.6	20.9	66 05.1	+ 54.0	21.7	67 00.7	+ 54.4	22.5	67 56.0	+ 54.8	23.5	68 50.8	+ 55.3	24.5	69 45.2	+ 55.7	25.6	70 39.0	+ 56.2	26.8	71 32.2	+ 56.8	28.2	**78**
79	66 02.8	+ 53.0	19.8	66 59.1	+ 53.5	20.6	67 55.1	+ 53.9	21.4	68 50.8	+ 54.4	22.4	69 46.1	+ 54.8	23.4	70 40.9	+ 55.4	24.5	71 35.2	+ 55.9	25.8	72 29.0	+ 56.4	27.1	**79**
80	66 55.8	+ 52.5	18.6	67 52.6	+ 52.9	19.4	68 49.0	+ 53.4	20.2	69 45.2	+ 53.8	21.2	70 40.9	+ 54.3	22.2	71 36.3	+ 54.8	23.3	72 31.1	+ 55.4	24.6	73 25.4	+ 55.9	26.0	**80**
81	67 48.3	+ 51.9	17.3	68 45.5	+ 52.3	18.1	69 42.4	+ 52.7	18.9	70 39.0	+ 53.2	19.9	71 35.2	+ 53.8	20.9	72 31.1	+ 54.3	22.0	73 26.5	+ 54.8	23.3	74 21.3	+ 55.5	24.7	**81**
82	68 40.2	+ 51.2	16.0	69 37.8	+ 51.6	16.7	70 35.1	+ 52.1	17.5	71 32.2	+ 52.5	18.4	72 29.0	+ 53.0	19.4	73 25.4	+ 53.6	20.5	74 21.3	+ 54.2	21.8	75 16.8	+ 54.8	23.2	**82**
83	69 31.4	+ 50.4	14.5	70 29.4	+ 50.8	15.2	71 27.2	+ 51.2	16.0	72 24.7	+ 51.7	16.9	73 22.0	+ 52.2	17.8	74 19.0	+ 52.7	18.9	75 15.5	+ 53.4	20.2	76 11.6	+ 54.0	21.6	**83**
84	70 21.8	+ 49.5	12.9	71 20.2	+ 49.9	13.6	72 18.4	+ 50.3	14.3	73 16.4	+ 50.8	15.1	74 14.2	+ 51.3	16.1	75 11.7	+ 51.9	17.1	76 08.9	+ 52.5	18.3	77 05.6	+ 53.2	19.7	**84**
85	71 11.3	+ 48.4	11.2	72 10.1	+ 48.8	11.8	73 08.7	+ 49.2	12.5	74 07.2	+ 49.7	13.2	75 05.5	+ 50.2	14.1	76 03.6	+ 50.7	15.1	77 01.4	+ 51.3	16.2	77 58.8	+ 52.0	17.5	**85**
86	71 59.7	+ 47.3	9.3	72 58.9	+ 47.6	9.9	73 57.9	+ 48.0	10.5	74 56.9	+ 48.3	11.1	75 55.7	+ 48.8	11.9	76 54.3	+ 49.3	12.8	77 52.7	+ 49.9	13.8	78 50.8	+ 50.6	15.0	**86**
87	72 47.0	+ 45.9	7.3	73 46.5	+ 46.2	7.7	74 45.9	+ 46.5	8.2	75 45.2	+ 46.9	8.8	76 44.5	+ 47.2	9.4	77 43.6	+ 47.7	10.2	78 42.6	+ 48.1	11.1	79 41.4	*+ 48.7* •	12.1	**87**
88	73 32.9	+ 44.5	5.1	74 32.7	+ 44.6	5.4	75 32.4	+ 44.8	5.8	76 32.1	*+ 45.0* •	6.2	77 31.7	*+ 45.3* •	6.7	78 31.3	*+ 45.6* •	7.2	79 30.7	*+ 46.0* •	7.9	80 30.1	*+ 46.4* •	8.8	**88**
89	74 17.4	+ 42.6	2.7	75 17.3	*+ 42.7* •	2.8	76 17.2	*+ 42.8* •	3.0	77 17.1	*+ 42.9* •	3.3	78 17.0	*+ 43.0* •	3.5	79 16.9	*+ 43.1* •	3.9	80 16.7	*+ 43.3* •	4.3	81 16.5	*+ 43.5* •	4.7	**89**
90	75 00.0	+ 40.6	0.0	76 00.0	*+ 40.5* •	0.0	77 00.0	*+ 40.4* •	0.0	78 00.0	*+ 40.3* •	0.0	79 00.0	*+ 40.2* •	0.0	80 00.0	*+ 40.0* •	0.0	81 00.0	*+ 39.8* •	0.0	82 00.0	*+ 39.6* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 134°, 226°

47°, 313° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	10 10.0	+58.9	132.0	9 29.8	+59.0	132.1	8 49.5	+59.2	132.3	8 09.1	+59.3	132.4	7 28.6	+59.4	132.5	6 48.1	+59.5	132.6	6 07.5	+59.6	132.6	5 26.8	+59.7	132.7	**0**
1	11 08.9	+58.9	131.8	10 28.8	+59.0	132.0	9 48.7	+59.1	132.1	9 08.4	+59.3	132.2	8 28.0	+59.4	132.3	7 47.6	+59.5	132.4	7 07.1	+59.6	132.5	6 26.5	+59.7	132.6	**1**
2	12 07.8	+58.8	131.6	11 27.8	+59.1	131.8	10 47.8	+59.2	131.9	10 07.7	+59.3	132.1	9 27.4	+59.4	132.2	8 47.1	+59.5	132.3	8 06.7	+59.6	132.4	7 26.2	+59.6	132.5	**2**
3	13 06.6	+58.9	131.4	12 26.9	+59.0	131.6	11 47.0	+59.1	131.7	11 07.0	+59.2	131.9	10 26.8	+59.4	132.0	9 46.6	+59.5	132.2	9 06.3	+59.6	132.3	8 25.8	+59.7	132.4	**3**
4	14 05.5	+58.8	131.2	13 25.9	+58.9	131.4	12 46.1	+59.1	131.6	12 06.2	+59.3	131.7	11 26.2	+59.4	131.9	10 46.1	+59.5	132.0	10 05.9	+59.5	132.2	9 25.5	+59.7	132.3	**4**
5	15 04.3	+58.8	131.0	14 24.8	+59.0	131.2	13 45.2	+59.2	131.4	13 05.5	+59.3	131.6	12 25.6	+59.4	131.8	11 45.6	+59.5	131.9	11 05.4	+59.6	132.1	10 25.2	+59.7	132.2	**5**
6	16 03.1	+58.9	130.8	15 23.8	+59.0	131.0	14 44.4	+59.1	131.2	14 04.8	+59.2	131.4	13 25.0	+59.4	131.6	12 45.1	+59.5	131.8	12 05.0	+59.6	131.9	11 24.9	+59.7	132.1	**6**
7	17 02.0	+58.8	130.6	16 22.8	+59.0	130.8	15 43.5	+59.1	131.1	15 04.0	+59.3	131.3	14 24.4	+59.3	131.5	13 44.6	+59.4	131.6	13 04.6	+59.6	131.8	12 24.6	+59.6	132.0	**7**
8	18 00.8	+58.8	130.4	17 21.8	+58.9	130.6	16 42.6	+59.1	130.9	16 03.3	+59.2	131.1	15 23.7	+59.4	131.3	14 44.0	+59.5	131.5	14 04.2	+59.6	131.7	13 24.2	+59.7	131.9	**8**
9	18 59.6	+58.7	130.2	18 20.7	+59.0	130.4	17 41.7	+59.1	130.7	17 02.5	+59.2	130.9	16 23.1	+59.4	131.2	15 43.5	+59.5	131.4	15 03.8	+59.6	131.6	14 23.9	+59.7	131.8	**9**
10	19 58.3	+58.8	130.0	19 19.7	+58.9	130.2	18 40.8	+59.1	130.5	18 01.7	+59.3	130.8	17 22.5	+59.3	131.0	16 43.0	+59.5	131.2	16 03.4	+59.5	131.5	15 23.6	+59.6	131.7	**10**
11	20 57.1	+58.7	129.8	20 18.6	+58.9	130.0	19 39.9	+59.1	130.3	19 01.0	+59.2	130.6	18 21.8	+59.4	130.8	17 42.5	+59.4	131.1	17 02.9	+59.6	131.3	16 23.2	+59.7	131.6	**11**
12	21 55.8	+58.8	129.5	21 17.5	+58.9	129.8	20 39.0	+59.0	130.1	20 00.2	+59.2	130.4	19 21.2	+59.3	130.7	18 41.9	+59.5	131.0	18 02.5	+59.6	131.2	17 22.9	+59.6	131.4	**12**
13	22 54.6	+58.7	129.3	22 16.4	+58.9	129.6	21 38.0	+59.1	129.9	20 59.4	+59.2	130.2	20 20.5	+59.3	130.5	19 41.4	+59.4	130.8	19 02.1	+59.5	131.1	18 22.5	+59.7	131.3	**13**
14	23 53.3	+58.7	129.1	23 15.3	+58.9	129.4	22 37.1	+59.0	129.8	21 58.6	+59.1	130.1	21 19.8	+59.3	130.4	20 40.8	+59.5	130.7	20 01.6	+59.6	130.9	19 22.2	+59.6	131.2	**14**
15	24 52.0	+58.6	128.9	24 14.2	+58.8	129.2	23 36.1	+59.0	129.6	22 57.7	+59.2	129.9	22 19.1	+59.3	130.2	21 40.3	+59.4	130.5	21 01.2	+59.5	130.8	20 21.8	+59.7	131.1	**15**
16	25 50.6	+58.7	128.6	25 13.0	+58.9	129.0	24 35.1	+59.0	129.4	23 56.9	+59.2	129.7	23 18.4	+59.3	130.0	22 39.7	+59.4	130.4	22 00.7	+59.6	130.7	21 21.5	+59.6	131.0	**16**
17	26 49.3	+58.6	128.4	26 11.9	+58.8	128.8	25 34.1	+59.0	129.2	24 56.1	+59.1	129.5	24 17.7	+59.3	129.9	23 39.1	+59.4	130.2	23 00.3	+59.5	130.6	22 21.1	+59.6	130.9	**17**
18	27 47.9	+58.6	128.2	27 10.7	+58.8	128.6	26 33.1	+59.0	129.0	25 55.2	+59.1	129.3	25 17.0	+59.3	129.7	24 38.5	+59.5	130.1	23 59.8	+59.5	130.4	23 20.7	+59.7	130.7	**18**
19	28 46.5	+58.6	127.9	28 09.5	+58.7	128.3	27 32.1	+58.9	128.8	26 54.3	+59.2	129.2	26 16.3	+59.3	129.5	25 38.0	+59.3	129.9	24 59.3	+59.5	130.3	24 20.4	+59.6	130.6	**19**
20	29 45.1	+58.5	127.7	29 08.2	+58.8	128.1	28 31.0	+58.9	128.5	27 53.5	+59.1	129.0	27 15.6	+59.2	129.4	26 37.3	+59.4	129.8	25 58.8	+59.5	130.1	25 20.0	+59.6	130.5	**20**
21	30 43.6	+58.5	127.4	30 07.0	+58.7	127.9	29 29.9	+59.0	128.3	28 52.6	+59.0	128.8	28 14.8	+59.2	129.2	27 36.7	+59.4	129.6	26 58.3	+59.5	130.0	26 19.6	+59.6	130.4	**21**
22	31 42.1	+58.5	127.2	31 05.7	+58.7	127.6	30 28.9	+58.8	128.1	29 51.6	+59.1	128.6	29 14.0	+59.3	129.0	28 36.1	+59.4	129.4	27 57.8	+59.5	129.8	27 19.2	+59.6	130.2	**22**
23	32 40.6	+58.5	126.9	32 04.4	+58.6	127.4	31 27.7	+58.9	127.9	30 50.7	+59.0	128.4	30 13.3	+59.2	128.8	29 35.5	+59.3	129.3	28 57.3	+59.5	129.7	28 18.8	+59.6	130.1	**23**
24	33 39.1	+58.4	126.6	33 03.0	+58.7	127.1	32 26.6	+58.8	127.7	31 49.7	+59.1	128.2	31 12.5	+59.2	128.6	30 34.8	+59.4	129.1	29 56.8	+59.5	129.5	29 18.4	+59.6	130.0	**24**
25	34 37.5	+58.3	126.3	34 01.7	+58.6	126.9	33 25.4	+58.8	127.4	32 48.8	+59.0	127.9	32 11.7	+59.1	128.4	31 34.2	+59.3	128.9	30 56.3	+59.4	129.4	30 18.0	+59.6	129.9	**25**
26	35 35.8	+58.4	126.1	35 00.3	+58.5	126.6	34 24.2	+58.8	127.2	33 47.8	+58.9	127.7	33 10.8	+59.2	128.2	32 33.5	+59.3	128.7	31 55.7	+59.5	129.2	31 17.6	+59.5	129.7	**26**
27	36 34.2	+58.3	125.8	35 58.8	+58.6	126.4	35 23.0	+58.8	126.9	34 46.7	+59.0	127.5	34 10.0	+59.1	128.0	33 32.8	+59.3	128.6	32 55.2	+59.4	129.1	32 17.1	+59.6	129.6	**27**
28	37 32.5	+58.2	125.5	36 57.4	+58.5	126.1	36 21.8	+58.7	126.7	35 45.7	+58.9	127.3	35 09.1	+59.1	127.8	34 32.1	+59.3	128.4	33 54.6	+59.4	128.9	33 16.7	+59.6	129.4	**28**
29	38 30.7	+58.2	125.2	37 55.9	+58.4	125.8	37 20.5	+58.7	126.4	36 44.6	+58.9	127.0	36 08.2	+59.1	127.6	35 31.4	+59.2	128.2	34 54.0	+59.4	128.7	34 16.3	+59.5	129.3	**29**
30	39 28.9	+58.1	124.9	38 54.3	+58.4	125.5	38 19.2	+58.6	126.2	37 43.5	+58.9	126.8	37 07.3	+59.1	127.4	36 30.6	+59.2	128.0	35 53.4	+59.4	128.6	35 15.8	+59.5	129.1	**30**
31	40 27.0	+58.1	124.5	39 52.7	+58.4	125.2	39 17.8	+58.6	125.9	38 42.4	+58.8	126.6	38 06.4	+59.0	127.2	37 29.8	+59.3	127.8	36 52.8	+59.4	128.4	36 15.3	+59.5	129.0	**31**
32	41 25.1	+58.0	124.2	40 51.1	+58.3	124.9	40 16.4	+58.6	125.6	39 41.2	+58.8	126.3	39 05.4	+59.0	127.0	38 29.1	+59.2	127.6	37 52.2	+59.4	128.2	37 14.8	+59.5	128.8	**32**
33	42 23.1	+58.0	123.9	41 49.4	+58.2	124.6	41 15.0	+58.5	125.3	40 40.0	+58.8	126.0	40 04.4	+59.0	126.7	39 28.3	+59.1	127.4	38 51.6	+59.3	128.0	38 14.3	+59.5	128.7	**33**
34	43 21.1	+57.9	123.5	42 47.6	+58.2	124.3	42 13.5	+58.5	125.0	41 38.8	+58.7	125.8	41 03.4	+58.9	126.5	40 27.4	+59.2	127.2	39 50.9	+59.3	127.8	39 13.8	+59.5	128.5	**34**
35	44 19.0	+57.8	123.1	43 45.8	+58.2	123.9	43 12.0	+58.4	124.7	42 37.5	+58.7	125.5	42 02.3	+59.0	126.2	41 26.6	+59.1	126.9	40 50.2	+59.3	127.6	40 13.3	+59.4	128.3	**35**
36	45 16.8	+57.8	122.8	44 44.0	+58.1	123.6	44 10.4	+58.4	124.4	43 36.2	+58.6	125.2	43 01.3	+58.8	126.0	42 25.7	+59.1	126.7	41 49.5	+59.3	127.4	41 12.7	+59.5	128.1	**36**
37	46 14.6	+57.6	122.4	45 42.1	+58.0	123.2	45 08.8	+58.3	124.1	44 34.8	+58.6	124.9	44 00.1	+58.9	125.7	43 24.8	+59.0	126.5	42 48.8	+59.2	127.2	42 12.2	+59.4	128.0	**37**
38	47 12.2	+57.6	122.0	46 40.1	+57.9	122.9	46 07.1	+58.3	123.8	45 33.4	+58.5	124.6	44 59.0	+58.8	125.4	44 23.8	+59.1	126.2	43 48.0	+59.3	127.0	43 11.6	+59.4	127.8	**38**
39	48 09.8	+57.5	121.6	47 38.0	+57.9	122.5	47 05.4	+58.2	123.4	46 31.9	+58.5	124.3	45 57.8	+58.7	125.1	45 22.9	+59.0	126.0	44 47.3	+59.2	126.8	44 11.0	+59.4	127.6	**39**
40	49 07.3	+57.4	121.1	48 35.9	+57.7	122.1	48 03.6	+58.1	123.0	47 30.4	+58.5	124.0	46 56.5	+58.7	124.9	46 21.9	+58.9	125.7	45 46.5	+59.1	126.6	45 10.4	+59.4	127.4	**40**
41	50 04.7	+57.3	120.7	49 33.6	+57.7	121.7	49 01.7	+58.0	122.7	48 28.9	+58.3	123.6	47 55.2	+58.7	124.6	47 20.8	+58.9	125.4	46 45.6	+59.2	126.3	46 09.8	+59.3	127.2	**41**
42	51 02.0	+57.1	120.2	50 31.3	+57.6	121.3	49 59.7	+58.0	122.3	49 27.2	+58.3	123.3	48 53.9	+58.6	124.2	48 19.7	+58.9	125.2	47 44.8	+59.1	126.1	47 09.1	+59.3	126.9	**42**
43	51 59.1	+57.1	119.7	51 28.9	+57.5	120.8	50 57.7	+57.8	121.9	50 25.5	+58.3	122.9	49 52.5	+58.5	123.9	49 18.6	+58.8	124.9	48 43.9	+59.1	125.8	48 08.4	+59.3	126.7	**43**
44	52 56.2	+56.9	119.2	52 26.4	+57.3	120.3	51 55.5	+57.8	121.4	51 23.8	+58.1	122.5	50 51.0	+58.5	123.6	50 17.4	+58.8	124.6	49 43.0	+59.0	125.5	49 07.7	+59.2	126.5	**44**
45	53 53.1	+56.7	118.7	53 23.7	+57.3	119.9	52 53.3	+57.7	121.0	52 21.9	+58.1	122.1	51 49.5	+58.4	123.2	51 16.2	+58.7	124.3	50 42.0	+59.0	125.3	50 06.9	+59.3	126.2	**45**
46	54 49.8	+56.6	118.1	54 21.0	+57.1	119.3	53 51.0	+57.6	120.5	53 20.0	+58.0	121.7	52 47.9	+58.4	122.8	52 14.9	+58.7	123.9	51 41.0	+58.9	125.0	51 06.2	+59.2	126.0	**46**
47	55 46.4	+56.4	117.5	55 18.1	+56.9	118.8	54 48.6	+57.4	120.1	54 18.0	+57.8	121.3	53 46.3	+58.3	122.4	53 13.6	+58.6	123.6	52 39.9	+58.9	124.7	52 05.4	+59.1	125.7	**47**
48	56 42.8	+56.2	116.9	56 15.0	+56.8	118.3	55 46.0	+57.3	119.6	55 15.8	+57.8	120.8	54 44.6	+58.1	122.0	54 12.2	+58.5	123.2	53 38.8	+58.9	124.4	53 04.5	+59.1	125.5	**48**
49	57 39.0	+56.0	116.3	57 11.8	+56.6	117.7	56 43.3	+57.2	119.0	56 13.6	+57.7	120.3	55 42.7	+58.1	121.6	55 10.7	+58.5	122.8	54 37.7	+58.8	124.0	54 03.6	+59.1	125.2	**49**
50	58 35.0	+55.8	115.6	58 08.4	+56.5	117.0	57 40.5	+57.0	118.5	57 11.3	+57.5	119.8	56 40.8	+58.0	121.2	56 09.2	+58.4	122.4	55 36.5	+58.7	123.7	55 02.7	+59.0	124.9	**50**
51	59 30.8	+55.6	114.9	59 04.9	+56.2	116.4	58 37.5	+56.8	117.9	58 08.8	+57.4	119.3	57 38.8	+57.9	120.7	57 07.6	+58.3	122.0	56 35.2	+58.7	123.3	56 01.7	+59.0	124.5	**51**
52	60 26.4	+55.2	114.1	60 01.1	+56.0	115.7	59 34.3	+56.7	117.2	59 06.2	+57.2	118.7	58 36.7	+57.7	120.2	58 05.9	+58.2	121.6	57 33.9	+58.5	122.9	57 00.7	+58.9	124.2	**52**
53	61 21.6	+55.0	113.3	60 57.1	+55.7	115.0	60 31.0	+56.4	116.6	60 03.4	+57.1	118.1	59 34.4	+57.6	119.6	59 04.1	+58.0	121.1	58 32.4	+58.5	122.5	57 59.6	+58.8	123.9	**53**
54	62 16.6	+54.6	112.5	61 52.8	+55.5	114.2	61 27.4	+56.2	115.9	61 00.5	+56.8	117.5	60 32.0	+57.5	119.1	60 02.1	+58.0	120.6	59 30.9	+58.4	122.1	58 58.4	+58.8	123.5	**54**
55	63 11.2	+54.3	111.6	62 48.3	+55.1	113.4	62 23.6	+56.0	115.1	61 57.3	+56.7	116.8	61 29.5	+57.3	118.5	61 00.1	+57.8	120.1	60 29.3	+58.3	121.6	59 57.2	+58.7	123.1	**55**
56	64 05.5	+53.9	110.6	63 43.4	+54.9	112.5	63 19.6	+55.7	114.4	62 54.0	+56.4	116.1	62 26.8	+57.1	117.9	61 57.9	+57.7	119.5	61 27.6	+58.2	121.1	60 55.9	+58.7	122.7	**56**
57	64 59.4	+53.4	109.6	64 38.3	+54.4	111.6	64 15.3	+55.3	113.5	63 50.4	+56.2	115.4	63 23.9	+56.9	117.2	62 55.6	+57.6	118.9	62 25.8	+58.1	120.6	61 54.6	+58.5	122.2	**57**
58	65 52.8	+52.9	108.5	65 32.7	+54.0	110.6	65 10.6	+55.1	112.6	64 46.6	+55.9	114.6	64 20.8	+56.7	116.5	63 53.2	+57.3	118.3	63 23.9	+58.0	120.1	62 53.1	+58.4	121.8	**58**
59	66 45.7	+52.4	107.3	66 26.7	+53.6	109.5	66 05.7	+54.6	111.6	65 42.5	+55.6	113.7	65 17.5	+56.4	115.7	64 50.5	+57.2	117.6	64 21.9	+57.7	119.5	63 51.5	+58.3	121.2	**59**
60	67 38.1	+51.7	106.1	67 20.3	+53.0	108.4	67 00.3	+54.2	110.6	66 38.1	+55.2	112.8	66 13.9	+56.1	114.9	65 47.7	+56.9	116.9	65 19.6	+57.7	118.8	64 49.8	+58.2	120.7	**60**
61	68 29.8	+51.0	104.7	68 13.3	+52.4	107.1	67 54.5	+53.7	109.5	67 33.3	+54.9	111.8	67 10.0	+55.8	114.0	66 44.6	+56.7	116.1	66 17.3	+57.4	118.2	65 48.0	+58.1	120.1	**61**
62	69 20.8	+50.2	103.2	69 05.7	+51.8	105.8	68 48.2	+53.1	108.3	68 28.2	+54.3	110.7	68 05.8	+55.5	113.0	67 41.3	+56.4	115.3	67 14.7	+57.2	117.4	66 46.1	+57.9	119.5	**62**
63	70 11.0	+49.3	101.7	69 57.5	+51.0	104.3	69 41.3	+52.5	107.0	69 22.5	+53.9	109.5	69 01.3	+55.0	112.0	68 37.7	+56.1	114.3	68 11.9	+56.9	116.6	67 44.0	+57.7	118.8	**63**
64	71 00.3	+48.3	99.9	70 48.5	+50.1	102.8	70 33.8	+51.8	105.5	70 16.4	+53.2	108.2	69 56.3	+54.6	110.8	69 33.8	+55.7	113.3	69 08.8	+56.7	115.8	68 41.7	+57.4	118.1	**64**
65	71 48.6	+47.1	98.1	71 38.6	+49.1	101.1	71 25.6	+50.9	104.0	71 09.6	+52.6	106.8	70 50.9	+54.0	109.6	70 29.5	+55.2	112.3	70 05.5	+56.3	114.8	69 39.1	+57.3	117.3	**65**
66	72 35.7	+45.7	96.0	72 27.7	+48.0	99.2	72 16.5	+50.0	102.3	72 02.2	+51.8	105.3	71 44.9	+53.4	108.2	71 24.7	+54.8	111.1	71 01.8	+56.0	113.8	70 36.4	+57.0	116.4	**66**
67	73 21.4	+44.3	93.8	73 15.7	+46.6	97.2	73 06.5	+48.9	100.4	72 54.0	+50.9	103.6	72 38.3	+52.6	106.7	72 19.5	+54.2	109.7	71 57.8	+55.5	112.6	71 33.4	+56.6	115.4	**67**
68	74 05.7	+42.4	91.4	74 02.3	+45.2	94.9	73 55.4	+47.6	98.4	73 44.9	+49.8	101.8	73 30.9	+51.8	105.1	73 13.7	+53.5	108.3	72 53.3	+55.0	111.4	72 30.0	+56.3	114.3	**68**
69	74 48.1	*+40.5* •	88.8	74 47.5	+43.4	92.5	74 43.0	+46.1	96.1	74 34.7	+48.6	99.7	74 22.7	+50.8	103.3	74 07.2	+52.7	106.7	73 48.3	+54.4	110.0	73 26.3	+55.8	113.2	**69**
70	75 28.6	*+38.1* •	85.9	75 30.9	*+41.3* •	89.8	75 29.1	+44.3	93.6	75 23.3	+47.1	97.5	75 13.5	+49.6	101.2	74 59.9	+51.8	104.9	74 42.7	+53.7	108.4	74 22.1	+55.2	111.8	**70**
71	76 06.7	*+35.6* •	82.8	76 12.2	*+39.0* •	86.8	76 13.4	*+42.3* •	90.9	76 10.4	+45.3	94.9	76 03.1	+48.2	99.0	75 51.7	+50.7	102.9	75 36.4	+52.8	106.7	75 17.3	+54.7	110.3	**71**
72	76 42.3	*+32.5* •	79.3	76 51.2	*+36.3* •	83.5	76 55.7	*+39.9* •	87.8	76 55.7	*+43.4* •	92.1	76 51.3	+46.5	96.4	76 42.4	+49.3	100.6	76 29.2	+51.8	104.7	76 12.0	+53.8	108.7	**72**
73	77 14.8	*+29.1* •	75.6	77 27.5	*+33.1* •	80.0	77 35.6	*+37.1* •	84.4	77 39.1	*+40.9* •	89.0	77 37.8	*+44.4* •	93.5	77 31.7	+47.6	98.1	77 21.0	+50.4	102.5	77 05.8	+52.9	106.8	**73**
74	77 43.9	*+25.3* •	71.6	78 00.6	*+29.6* •	76.0	78 12.7	*+33.9* •	80.7	78 20.0	*+38.0* •	85.5	78 22.2	*+42.0* •	90.3	78 19.3	*+45.7* •	95.2	78 11.4	+48.9	99.9	77 58.7	+51.7	104.6	**74**
75	78 09.2	*+21.0* •	67.2	78 30.2	*+25.5* •	71.8	78 46.6	*+30.1* •	76.5	78 58.0	*+34.7* •	81.5	79 04.2	*+39.1* •	86.7	79 05.0	*+43.2* •	91.8	79 00.3	*+47.0* •	97.0	78 50.4	+50.3	102.0	**75**
76	78 30.2	*+16.4* •	62.6	78 55.7	*+21.0* •	67.1	79 16.7	*+25.7* •	72.0	79 32.7	*+30.6* •	77.2	79 43.3	*+35.5* •	82.5	79 48.2	*+40.2* •	88.1	79 47.3	*+44.5* •	93.6	79 40.7	*+48.3* •	99.1	**76**
77	78 46.6	*+11.4* •	57.7	79 16.7	*+16.0* •	62.2	79 42.4	*+20.9* •	67.0	80 03.3	*+26.0* •	72.3	80 18.8	*+31.3* •	77.9	80 28.4	*+36.5* •	83.7	80 31.8	*+41.5* •	89.7	80 29.0	*+46.0* •	95.7	**77**
78	78 58.0	*+6.2* •	52.6	79 32.7	*+10.6* •	56.9	80 03.3	*+15.5* •	61.7	80 29.3	*+20.8* •	67.0	80 50.1	*+26.3* •	72.7	81 04.9	*+32.0* •	78.8	81 13.3	*+37.7* •	85.1	81 15.0	*+42.9* •	91.6	**78**
79	79 04.2	*+0.8* •	47.4	79 43.3	*+4.9* •	51.4	80 18.8	*+9.6* •	56.0	80 50.1	*+14.8* •	61.2	81 16.4	*+20.5* •	66.9	81 36.9	*+26.6* •	73.1	81 51.0	*+32.8* •	79.8	81 57.9	*+39.0* •	86.8	**79**
80	79 05.0	*−4.7* •	42.1	79 48.2	*−0.9* •	45.8	80 28.4	*+3.4* •	50.1	81 04.9	*+8.4* •	55.0	81 36.9	*+14.1* •	60.6	82 03.5	*+20.3* •	66.8	82 23.8	*+27.0* •	73.7	82 36.9	*+33.9* •	81.1	**80**
81	79 00.3	*−9.9* •	36.9	79 47.3	*−6.6* •	40.2	80 31.8	*−2.8* •	44.1	81 13.3	*+1.7* •	48.6	81 51.0	*+6.9* •	53.8	82 23.8	*+13.1* •	59.9	82 50.8	*+20.0* •	66.8	83 10.8	*+27.4* •	74.5	**81**
82	78 50.4	*−15.0* •	31.7	79 40.7	*−12.3* •	34.6	80 29.0	*−8.9* •	38.0	81 15.0	*−5.0* •	42.0	81 57.9	*−0.3* •	46.7	82 36.9	*+5.2* •	52.4	83 10.8	*+11.9* •	59.0	83 38.2	*+19.6* •	66.7	**82**
83	78 35.4	*−19.7* •	26.8	79 28.4	*−17.5* •	29.2	80 20.1	*−14.9* •	32.1	81 10.0	*−11.7* •	35.5	81 57.6	*−7.8* •	39.6	82 42.1	*−2.9* •	44.6	83 22.7	*+3.0* •	50.6	83 57.8	*+10.3* •	57.9	**83**
84	78 15.7	*−24.1* •	22.1	79 10.9	*−22.4* •	24.0	80 05.2	*−20.3* •	26.4	80 58.3	*−17.8* •	29.2	81 49.8	*−14.7* •	32.5	82 39.2	*−10.9* •	36.7	83 25.7	*−6.0* •	41.9	84 08.1	*+0.2* •	48.4	**84**
85	77 51.6	*−28.1* •	17.6	78 48.5	*−26.8* •	19.2	79 44.9	*−25.3* •	21.0	80 40.5	*−23.5* •	23.2	81 35.1	*−21.2* •	25.8	82 28.3	*−18.3* •	29.1	83 19.7	*−14.6* •	33.3	84 08.3	*−9.8* •	38.6	**85**
86	77 23.5	*−31.6* •	13.5	78 21.7	*−30.7* •	14.6	79 19.6	*−29.7* •	16.0	80 17.0	*−28.4* •	17.6	81 13.9	*−26.8* •	19.6	82 10.0	*−24.9* •	22.0	83 05.1	*−22.5* •	25.1	83 58.5	*−19.1* •	29.1	**86**
87	76 51.9	*−34.6* •	9.7	77 51.0	*−34.1* •	10.5	78 49.9	*−33.5* •	11.4	79 48.6	*−32.7* •	12.5	80 47.1	*−31.8* •	13.8	81 45.1	*−30.6* •	15.5	82 42.6	*−29.0* •	17.6	83 39.4	*−27.1* •	20.3	**87**
88	76 17.3	*−37.5* •	6.2	77 16.9	*−37.2* •	6.7	78 16.4	*−36.8* •	7.2	79 15.9	*−36.4* •	7.9	80 15.3	*−35.9* •	8.7	81 14.5	*−35.3* •	9.7	82 13.6	*−34.6* •	10.9	83 12.3	*−33.6* •	12.5	**88**
89	75 39.8	*−39.8* •	3.0	76 39.7	*−39.7* •	3.2	77 39.6	*−39.6* •	3.4	78 39.5	*−39.5* •	3.7	79 39.4	*−39.4* •	4.1	80 39.2	*−39.2* •	4.5	81 39.0	*−39.0* •	5.0	82 38.7	*−38.7* •	5.7	**89**
90	75 00.0	*−41.9* •	0.0	76 00.0	*−42.0* •	0.0	77 00.0	*−42.1* •	0.0	78 00.0	*−42.2* •	0.0	79 00.0	*−42.3* •	0.0	80 00.0	*−42.4* •	0.0	81 00.0	*−42.6* •	0.0	82 00.0	*−42.8* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 47°, 313°

Dec.	75°			76°			77°			78°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	10 10.0	– 58.9	132.0	9 29.8	– 59.0	132.1	8 49.5	– 59.2	132.3	8 09.1	– 59.3	132.4
1	9 11.1	– 58.9	132.2	8 30.8	– 59.1	132.3	7 50.3	– 59.1	132.4	7 09.8	– 59.3	132.5
2	8 12.2	– 58.9	132.4	7 31.7	– 59.0	132.5	6 51.2	– 59.2	132.6	6 10.5	– 59.3	132.7
3	7 13.3	– 58.9	132.6	6 32.7	– 59.0	132.7	5 52.0	– 59.2	132.8	5 11.2	– 59.3	132.8
4	6 14.4	– 58.9	132.8	5 33.7	– 59.1	132.9	4 52.8	– 59.2	132.9	4 11.9	– 59.3	133.0
5	5 15.5	– 58.9	133.0	4 34.6	– 59.0	133.0	3 53.6	– 59.1	133.1	3 12.6	– 59.3	133.1
6	4 16.6	– 58.9	133.2	3 35.6	– 59.1	133.2	2 54.5	– 59.2	133.3	2 13.3	– 59.3	133.3
7	3 17.7	– 58.9	133.4	2 36.5	– 59.0	133.4	1 55.3	– 59.2	133.4	1 14.0	– 59.3	133.4
8	2 18.8	– 58.9	133.5	1 37.5	– 59.1	133.6	0 56.1	– 59.2	133.6	0 14.7	– 59.3	133.6
9	1 19.9	– 58.9	133.7	0 38.4	– 59.0	133.7	0 03.1	+ 59.2	46.2	0 44.6	+ 59.3	46.3
10	0 21.0	– 58.9	133.9	0 20.6	+ 59.1	46.1	1 02.3	+ 59.1	46.1	1 43.9	+ 59.3	46.1
11	0 37.9	+ 59.0	45.9	1 19.7	+ 59.1	45.9	2 01.4	+ 59.2	45.9	2 43.2	+ 59.3	45.9
12	1 36.9	+ 58.9	45.7	2 18.8	+ 59.0	45.7	3 00.6	+ 59.2	45.8	3 42.5	+ 59.3	45.8
13	2 35.8	+ 58.9	45.5	3 17.8	+ 59.1	45.5	3 59.8	+ 59.2	45.6	4 41.8	+ 59.3	45.6
14	3 34.7	+ 58.9	45.3	4 16.9	+ 59.0	45.4	4 59.0	+ 59.2	45.4	5 41.1	+ 59.3	45.5
15	4 33.6	+ 58.9	45.1	5 15.9	+ 59.0	45.2	5 58.2	+ 59.1	45.3	6 40.4	+ 59.3	45.3
16	5 32.5	+ 58.9	44.9	6 14.9	+ 59.1	45.0	6 57.3	+ 59.2	45.1	7 39.7	+ 59.2	45.2
17	6 31.4	+ 58.9	44.7	7 14.0	+ 59.0	44.8	7 56.5	+ 59.2	44.9	8 38.9	+ 59.3	45.0
18	7 30.3	+ 58.9	44.6	8 13.0	+ 59.1	44.6	8 55.7	+ 59.1	44.8	9 38.2	+ 59.3	44.9
19	8 29.2	+ 58.9	44.4	9 12.1	+ 59.0	44.5	9 54.8	+ 59.2	44.6	10 37.5	+ 59.3	44.7
20	9 28.1	+ 58.9	44.2	10 11.1	+ 59.0	44.3	10 54.0	+ 59.1	44.4	11 36.8	+ 59.3	44.6
21	10 27.0	+ 58.8	44.0	11 10.1	+ 59.0	44.1	11 53.1	+ 59.2	44.2	12 36.1	+ 59.2	44.4
22	11 25.8	+ 58.9	43.8	12 09.1	+ 59.0	43.9	12 52.3	+ 59.1	44.1	13 35.3	+ 59.3	44.2
23	12 24.7	+ 58.9	43.6	13 08.1	+ 59.0	43.7	13 51.4	+ 59.1	43.9	14 34.6	+ 59.2	44.1
24	13 23.6	+ 58.8	43.4	14 07.1	+ 59.0	43.5	14 50.5	+ 59.2	43.7	15 33.8	+ 59.3	43.9
25	14 22.4	+ 58.8	43.2	15 06.1	+ 59.0	43.4	15 49.7	+ 59.1	43.5	16 33.1	+ 59.2	43.7
26	15 21.2	+ 58.9	43.0	16 05.1	+ 58.9	43.2	16 48.8	+ 59.1	43.4	17 32.3	+ 59.2	43.6
27	16 20.1	+ 58.8	42.8	17 04.0	+ 59.0	43.0	17 47.9	+ 59.1	43.2	18 31.5	+ 59.3	43.4
28	17 18.9	+ 58.8	42.6	18 03.0	+ 59.0	42.8	18 47.0	+ 59.0	43.0	19 30.8	+ 59.2	43.2
29	18 17.7	+ 58.8	42.4	19 02.0	+ 58.9	42.6	19 46.0	+ 59.1	42.8	20 30.0	+ 59.2	43.1
30	19 16.5	+ 58.8	42.1	20 00.9	+ 58.9	42.4	20 45.1	+ 59.1	42.6	21 29.2	+ 59.2	42.9
31	20 15.3	+ 58.7	41.9	20 59.8	+ 58.9	42.2	21 44.2	+ 59.0	42.4	22 28.4	+ 59.1	42.7
32	21 14.0	+ 58.8	41.7	21 58.7	+ 58.9	42.0	22 43.2	+ 59.0	42.3	23 27.5	+ 59.2	42.5
33	22 12.8	+ 58.7	41.5	22 57.6	+ 58.9	41.8	23 42.2	+ 59.1	42.1	24 26.7	+ 59.1	42.4
34	23 11.5	+ 58.7	41.3	23 56.5	+ 58.8	41.6	24 41.3	+ 59.0	41.9	25 25.8	+ 59.2	42.2
35	24 10.2	+ 58.7	41.0	24 55.3	+ 58.9	41.3	25 40.3	+ 58.9	41.7	26 25.0	+ 59.1	42.0
36	25 08.9	+ 58.6	40.8	25 54.2	+ 58.8	41.1	26 39.2	+ 59.0	41.5	27 24.1	+ 59.1	41.8
37	26 07.5	+ 58.7	40.6	26 53.0	+ 58.8	40.9	27 38.2	+ 59.0	41.2	28 23.2	+ 59.1	41.6
38	27 06.2	+ 58.6	40.3	27 51.8	+ 58.8	40.7	28 37.2	+ 58.9	41.0	29 22.3	+ 59.1	41.4
39	28 04.8	+ 58.6	40.1	28 50.6	+ 58.7	40.5	29 36.1	+ 58.9	40.8	30 21.4	+ 59.0	41.2
40	29 03.4	+ 58.5	39.9	29 49.3	+ 58.7	40.2	30 35.0	+ 58.9	40.6	31 20.4	+ 59.0	41.0
41	30 01.9	+ 58.6	39.6	30 48.0	+ 58.7	40.0	31 33.9	+ 58.8	40.4	32 19.4	+ 59.1	40.8
42	31 00.5	+ 58.5	39.4	31 46.7	+ 58.7	39.7	32 32.7	+ 58.9	40.1	33 18.5	+ 58.9	40.6
43	31 59.0	+ 58.4	39.1	32 45.4	+ 58.6	39.5	33 31.6	+ 58.8	39.9	34 17.4	+ 59.0	40.3
44	32 57.4	+ 58.5	38.8	33 44.0	+ 58.7	39.2	34 30.4	+ 58.8	39.7	35 16.4	+ 58.9	40.1
45	33 55.9	+ 58.4	38.6	34 42.7	+ 58.5	39.0	35 29.2	+ 58.7	39.4	36 15.3	+ 59.0	39.9
46	34 54.3	+ 58.3	38.3	35 41.2	+ 58.6	38.7	36 27.9	+ 58.7	39.2	37 14.3	+ 58.8	39.7
47	35 52.6	+ 58.4	38.0	36 39.8	+ 58.5	38.4	37 26.6	+ 58.7	38.9	38 13.1	+ 58.9	39.4
48	36 51.0	+ 58.2	37.7	37 38.3	+ 58.4	38.2	38 25.3	+ 58.6	38.7	39 12.0	+ 58.8	39.2
49	37 49.2	+ 58.3	37.4	38 36.7	+ 58.5	37.9	39 23.9	+ 58.6	38.4	40 10.8	+ 58.8	38.9
50	38 47.5	+ 58.1	37.1	39 35.2	+ 58.3	37.6	40 22.5	+ 58.6	38.1	41 09.6	+ 58.7	38.6
51	39 45.6	+ 58.2	36.8	40 33.5	+ 58.4	37.3	41 21.1	+ 58.5	37.8	42 08.3	+ 58.7	38.4
52	40 43.8	+ 58.0	36.5	41 31.9	+ 58.2	37.0	42 19.6	+ 58.5	37.5	43 07.0	+ 58.7	38.1
53	41 41.8	+ 58.0	36.1	42 30.1	+ 58.3	36.7	43 18.1	+ 58.4	37.2	44 05.7	+ 58.6	37.8
54	42 39.8	+ 58.0	35.8	43 28.4	+ 58.1	36.3	44 16.5	+ 58.4	36.9	45 04.3	+ 58.6	37.5
55	43 37.8	+ 57.9	35.4	44 26.5	+ 58.1	36.0	45 14.9	+ 58.3	36.6	46 02.9	+ 58.5	37.2
56	44 35.7	+ 57.8	35.1	45 24.6	+ 58.0	35.6	46 13.2	+ 58.2	36.2	47 01.4	+ 58.5	36.9
57	45 33.5	+ 57.7	34.7	46 22.6	+ 58.0	35.3	47 11.4	+ 58.2	35.9	47 59.9	+ 58.4	36.5
58	46 31.2	+ 57.6	34.3	47 20.6	+ 57.9	34.9	48 09.6	+ 58.1	35.5	48 58.3	+ 58.3	36.2
59	47 28.8	+ 57.6	33.9	48 18.5	+ 57.8	34.5	49 07.7	+ 58.1	35.1	49 56.6	+ 58.3	35.8
60	48 26.4	+ 57.4	33.5	49 16.3	+ 57.7	34.1	50 05.8	+ 57.9	34.8	50 54.9	+ 58.1	35.5
61	49 23.8	+ 57.4	33.0	50 14.0	+ 57.6	33.7	51 03.7	+ 57.9	34.3	51 53.0	+ 58.2	35.1
62	50 21.2	+ 57.2	32.6	51 11.6	+ 57.5	33.2	52 01.6	+ 57.7	33.9	52 51.2	+ 58.0	34.7
63	51 18.4	+ 57.2	32.1	52 09.1	+ 57.4	32.8	52 59.3	+ 57.7	33.5	53 49.2	+ 57.9	34.2
64	52 15.6	+ 57.0	31.6	53 06.5	+ 57.3	32.3	53 57.0	+ 57.6	33.0	54 47.1	+ 57.8	33.8
65	53 12.6	+ 56.8	31.1	54 03.8	+ 57.1	31.8	54 54.6	+ 57.4	32.5	55 44.9	+ 57.7	33.3
66	54 09.4	+ 56.7	30.5	55 00.9	+ 57.0	31.3	55 52.0	+ 57.3	32.0	56 42.6	+ 57.6	32.8
67	55 06.1	+ 56.5	30.0	55 57.9	+ 56.8	30.7	56 49.3	+ 57.1	31.5	57 40.2	+ 57.5	32.3
68	56 02.6	+ 56.4	29.4	56 54.7	+ 56.7	30.1	57 46.4	+ 57.0	30.9	58 37.7	+ 57.3	31.8
69	56 59.0	+ 56.2	28.8	57 51.4	+ 56.5	29.5	58 43.4	+ 56.8	30.3	59 35.0	+ 57.1	31.2
70	57 55.2	+ 55.9	28.1	58 47.9	+ 56.3	28.9	59 40.2	+ 56.7	29.7	60 32.1	+ 57.0	30.6
71	58 51.1	+ 55.7	27.4	59 44.2	+ 56.1	28.2	60 36.9	+ 56.4	29.0	61 29.1	+ 56.8	29.9
72	59 46.8	+ 55.5	26.7	60 40.3	+ 55.8	27.5	61 33.3	+ 56.2	28.3	62 25.9	+ 56.5	29.2
73	60 42.3	+ 55.2	25.9	61 36.1	+ 55.5	26.7	62 29.5	+ 55.9	27.6	63 22.4	+ 56.4	28.5
74	61 37.5	+ 54.9	25.1	62 31.6	+ 55.3	25.9	63 25.4	+ 55.7	26.8	64 18.8	+ 56.0	27.7
75	62 32.4	+ 54.5	24.2	63 26.9	+ 54.9	25.1	64 21.1	+ 55.3	25.9	65 14.8	+ 55.7	26.9
76	63 26.9	+ 54.2	23.3	64 21.8	+ 54.6	24.1	65 16.4	+ 55.0	25.0	66 10.5	+ 55.5	26.0
77	64 21.1	+ 53.7	22.3	65 16.4	+ 54.1	23.2	66 11.4	+ 54.6	24.0	67 06.0	+ 55.0	25.0
78	65 14.8	+ 53.3	21.3	66 10.5	+ 53.7	22.1	67 06.0	+ 54.1	23.0	68 01.0	+ 54.6	24.0
79	66 08.1	+ 52.7	20.2	67 04.2	+ 53.2	21.0	68 00.1	+ 53.6	21.9	68 55.6	+ 54.1	22.8
80	67 00.8	+ 52.2	19.0	67 57.4	+ 52.7	19.8	68 53.7	+ 53.1	20.7	69 49.7	+ 53.6	21.6
81	67 53.0	+ 51.5	17.7	68 50.1	+ 51.9	18.5	69 46.8	+ 52.4	19.3	70 43.3	+ 52.9	20.3
82	68 44.5	+ 50.8	16.3	69 42.0	+ 51.2	17.1	70 39.2	+ 51.7	17.9	71 36.2	+ 52.2	18.8
83	69 35.3	+ 50.0	14.8	70 33.2	+ 50.4	15.5	71 30.9	+ 50.9	16.3	72 28.4	+ 51.3	17.2
84	70 25.3	+ 49.0	13.2	71 23.6	+ 49.5	13.9	72 21.8	+ 49.9	14.6	73 19.7	+ 50.4	15.5
85	71 14.3	+ 48.0	11.4	72 13.1	+ 48.3	12.0	73 11.7	+ 48.7	12.7	74 10.1	+ 49.2	13.5
86	72 02.3	+ 46.7	9.5	73 01.4	+ 47.1	10.1	74 00.4	+ 47.5	10.7	74 59.3	+ 47.9	11.4
87	72 49.0	+ 45.3	7.4	73 48.5	+ 45.6	7.9	74 47.9	+ 45.9	8.4	75 47.2	+ 46.2	9.0
88	73 34.3	+ 43.8	5.2	74 34.1	+ 43.9	5.5	75 33.8	+ 44.1	5.9	76 33.4	*+ 44.4* •	6.3
89	74 18.1	*+ 41.9* •	2.7	75 18.0	*+ 42.0* •	2.9	76 17.9	*+ 42.1* •	3.1	77 17.8	*+ 42.2* •	3.3
90	75 00.0	*+ 39.8* •	0.0	76 00.0	*+ 39.7* •	0.0	77 00.0	*+ 39.6* •	0.0	78 00.0	*+ 39.5* •	0.0
	75°			76°			77°			78°		

79°			80°			81°			82°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
7 28.6	– 59.4	132.5	6 48.1	– 59.5	132.6	6 07.5	– 59.6	132.6	5 26.8	– 59.7	132.7	0
6 29.2	– 59.4	132.6	5 48.6	– 59.5	132.7	5 07.9	– 59.6	132.8	4 27.1	– 59.7	132.8	1
5 29.8	– 59.4	132.8	4 49.1	– 59.5	132.8	4 08.3	– 59.6	132.9	3 27.4	– 59.7	132.9	2
4 30.4	– 59.4	132.9	3 49.6	– 59.6	132.9	3 08.7	– 59.6	133.0	2 27.7	– 59.7	133.0	3
3 31.0	– 59.4	133.0	2 50.0	– 59.5	133.1	2 09.1	– 59.7	133.1	1 28.0	– 59.6	133.1	4
2 31.6	– 59.4	133.2	1 50.5	– 59.5	133.2	1 09.4	– 59.6	133.2	0 28.4	– 59.7	133.2	5
1 32.2	– 59.4	133.3	0 51.0	– 59.5	133.3	0 09.8	– 59.6	133.3	0 31.3	+ 59.7	46.7	6
0 32.8	– 59.4	133.5	0 08.5	+ 59.5	46.5	0 49.8	+ 59.6	46.6	1 31.0	+ 59.7	46.6	7
0 26.6	+ 59.5	46.4	1 08.0	+ 59.5	46.4	1 49.4	+ 59.6	46.4	2 30.7	+ 59.7	46.5	8
1 26.1	+ 59.4	46.3	2 07.5	+ 59.5	46.3	2 49.0	+ 59.6	46.3	3 30.4	+ 59.7	46.4	9
2 25.5	+ 59.4	46.1	3 07.0	+ 59.6	46.2	3 48.6	+ 59.6	46.2	4 30.1	+ 59.7	46.3	10
3 24.9	+ 59.4	46.0	4 06.6	+ 59.5	46.0	4 48.2	+ 59.6	46.1	5 29.8	+ 59.7	46.2	11
4 24.3	+ 59.4	45.8	5 06.1	+ 59.5	45.9	5 47.8	+ 59.6	46.0	6 29.5	+ 59.6	46.1	12
5 23.7	+ 59.4	45.7	6 05.6	+ 59.5	45.8	6 47.4	+ 59.6	45.9	7 29.1	+ 59.7	46.0	13
6 23.1	+ 59.4	45.6	7 05.1	+ 59.5	45.7	7 47.0	+ 59.6	45.7	8 28.8	+ 59.7	45.8	14
7 22.5	+ 59.4	45.4	8 04.6	+ 59.5	45.5	8 46.6	+ 59.6	45.6	9 28.5	+ 59.7	45.7	15
8 21.9	+ 59.4	45.3	9 04.1	+ 59.5	45.4	9 46.2	+ 59.6	45.5	10 28.2	+ 59.7	45.6	16
9 21.3	+ 59.4	45.1	10 03.6	+ 59.5	45.3	10 45.8	+ 59.6	45.4	11 27.9	+ 59.6	45.5	17
10 20.7	+ 59.4	45.0	11 03.1	+ 59.5	45.1	11 45.4	+ 59.6	45.3	12 27.5	+ 59.7	45.4	18
11 20.1	+ 59.4	44.9	12 02.6	+ 59.5	45.0	12 45.0	+ 59.5	45.2	13 27.2	+ 59.7	45.3	19
12 19.5	+ 59.4	44.7	13 02.1	+ 59.5	44.9	13 44.5	+ 59.6	45.0	14 26.9	+ 59.6	45.2	20
13 18.9	+ 59.3	44.6	14 01.6	+ 59.4	44.7	14 44.1	+ 59.6	44.9	15 26.5	+ 59.7	45.1	21
14 18.2	+ 59.4	44.4	15 01.0	+ 59.5	44.6	15 43.7	+ 59.6	44.8	16 26.2	+ 59.7	45.0	22
15 17.6	+ 59.4	44.3	16 00.5	+ 59.5	44.5	16 43.3	+ 59.5	44.7	17 25.9	+ 59.6	44.9	23
16 17.0	+ 59.3	44.1	17 00.0	+ 59.5	44.3	17 42.8	+ 59.6	44.5	18 25.5	+ 59.7	44.8	24
17 16.3	+ 59.4	44.0	17 59.5	+ 59.4	44.2	18 42.4	+ 59.6	44.4	19 25.2	+ 59.6	44.7	25
18 15.7	+ 59.3	43.8	18 58.9	+ 59.5	44.0	19 42.0	+ 59.5	44.3	20 24.8	+ 59.7	44.5	26
19 15.0	+ 59.4	43.6	19 58.4	+ 59.4	43.9	20 41.5	+ 59.6	44.2	21 24.5	+ 59.6	44.4	27
20 14.4	+ 59.3	43.5	20 57.8	+ 59.5	43.8	21 41.1	+ 59.5	44.0	22 24.1	+ 59.6	44.3	28
21 13.7	+ 59.3	43.3	21 57.3	+ 59.4	43.6	22 40.6	+ 59.5	43.9	23 23.7	+ 59.7	44.2	29
22 13.0	+ 59.3	43.2	22 56.7	+ 59.4	43.5	23 40.1	+ 59.6	43.8	24 23.4	+ 59.6	44.1	30
23 12.3	+ 59.3	43.0	23 56.1	+ 59.4	43.3	24 39.7	+ 59.5	43.6	25 23.0	+ 59.6	43.9	31
24 11.6	+ 59.3	42.8	24 55.5	+ 59.4	43.2	25 39.2	+ 59.5	43.5	26 22.6	+ 59.6	43.8	32
25 10.9	+ 59.3	42.7	25 54.9	+ 59.4	43.0	26 38.7	+ 59.5	43.3	27 22.2	+ 59.6	43.7	33
26 10.2	+ 59.3	42.5	26 54.3	+ 59.4	42.8	27 38.2	+ 59.5	43.2	28 21.8	+ 59.6	43.6	34
27 09.5	+ 59.2	42.3	27 53.7	+ 59.4	42.7	28 37.7	+ 59.5	43.0	29 21.4	+ 59.6	43.4	35
28 08.7	+ 59.2	42.1	28 53.1	+ 59.3	42.5	29 37.2	+ 59.4	42.9	30 21.0	+ 59.6	43.3	36
29 07.9	+ 59.3	42.0	29 52.4	+ 59.4	42.3	30 36.6	+ 59.5	42.7	31 20.6	+ 59.5	43.1	37
30 07.2	+ 59.2	41.8	30 51.8	+ 59.3	42.2	31 36.1	+ 59.4	42.6	32 20.1	+ 59.6	43.0	38
31 06.4	+ 59.2	41.6	31 51.1	+ 59.3	42.0	32 35.5	+ 59.5	42.4	33 19.7	+ 59.5	42.9	39
32 05.6	+ 59.1	41.4	32 50.4	+ 59.3	41.8	33 35.0	+ 59.4	42.3	34 19.2	+ 59.6	42.7	40
33 04.7	+ 59.2	41.2	33 49.7	+ 59.3	41.6	34 34.4	+ 59.4	42.1	35 18.8	+ 59.5	42.6	41
34 03.9	+ 59.1	41.0	34 49.0	+ 59.3	41.5	35 33.8	+ 59.4	41.9	36 18.3	+ 59.5	42.4	42
35 03.0	+ 59.1	40.8	35 48.3	+ 59.2	41.3	36 33.2	+ 59.4	41.7	37 17.8	+ 59.5	42.3	43
36 02.1	+ 59.1	40.6	36 47.5	+ 59.3	41.1	37 32.6	+ 59.4	41.6	38 17.3	+ 59.5	42.1	44
37 01.2	+ 59.1	40.4	37 46.8	+ 59.2	40.9	38 32.0	+ 59.3	41.4	39 16.8	+ 59.5	41.9	45
38 00.3	+ 59.0	40.1	38 46.0	+ 59.2	40.7	39 31.3	+ 59.3	41.2	40 16.3	+ 59.4	41.7	46
38 59.3	+ 59.0	39.9	39 45.2	+ 59.1	40.4	40 30.6	+ 59.3	41.0	41 15.7	+ 59.5	41.6	47
39 58.3	+ 59.0	39.7	40 44.3	+ 59.2	40.2	41 29.9	+ 59.3	40.8	42 15.2	+ 59.4	41.4	48
40 57.3	+ 59.0	39.4	41 43.5	+ 59.1	40.0	42 29.2	+ 59.3	40.6	43 14.6	+ 59.4	41.2	49
41 56.3	+ 58.9	39.2	42 42.6	+ 59.1	39.8	43 28.5	+ 59.2	40.4	44 14.0	+ 59.4	41.0	50
42 55.2	+ 58.9	38.9	43 41.7	+ 59.0	39.5	44 27.7	+ 59.2	40.2	45 13.4	+ 59.3	40.8	51
43 54.1	+ 58.8	38.7	44 40.7	+ 59.0	39.3	45 26.9	+ 59.2	39.9	46 12.7	+ 59.4	40.6	52
44 52.9	+ 58.8	38.4	45 39.7	+ 59.0	39.0	46 26.1	+ 59.2	39.7	47 12.1	+ 59.3	40.4	53
45 51.7	+ 58.8	38.1	46 38.7	+ 59.0	38.8	47 25.3	+ 59.1	39.4	48 11.4	+ 59.3	40.2	54
46 50.5	+ 58.7	37.8	47 37.7	+ 58.9	38.5	48 24.4	+ 59.1	39.2	49 10.7	+ 59.2	39.9	55
47 49.2	+ 58.7	37.5	48 36.6	+ 58.8	38.2	49 23.5	+ 59.0	38.9	50 09.9	+ 59.2	39.7	56
48 47.9	+ 58.6	37.2	49 35.4	+ 58.8	37.9	50 22.5	+ 59.0	38.7	51 09.1	+ 59.2	39.4	57
49 46.5	+ 58.5	36.9	50 34.2	+ 58.8	37.6	51 21.5	+ 59.0	38.4	52 08.3	+ 59.2	39.2	58
50 45.0	+ 58.5	36.5	51 33.0	+ 58.7	37.3	52 20.5	+ 58.9	38.1	53 07.5	+ 59.1	38.9	59
51 43.5	+ 58.4	36.2	52 31.7	+ 58.6	36.9	53 19.4	+ 58.9	37.8	54 06.6	+ 59.0	38.6	60
52 41.9	+ 58.4	35.8	53 30.3	+ 58.6	36.6	54 18.3	+ 58.8	37.4	55 05.6	+ 59.1	38.3	61
53 40.3	+ 58.3	35.4	54 28.9	+ 58.5	36.2	55 17.1	+ 58.7	37.1	56 04.7	+ 58.9	38.0	62
54 38.6	+ 58.1	35.0	55 27.4	+ 58.5	35.8	56 15.8	+ 58.7	36.7	57 03.6	+ 58.9	37.6	63
55 36.7	+ 58.1	34.6	56 25.9	+ 58.3	35.4	57 14.5	+ 58.6	36.3	58 02.5	+ 58.9	37.3	64
56 34.8	+ 58.0	34.1	57 24.2	+ 58.3	35.0	58 13.1	+ 58.5	35.9	59 01.4	+ 58.8	36.9	65
57 32.8	+ 57.9	33.7	58 22.5	+ 58.2	34.6	59 11.6	+ 58.5	35.5	60 00.2	+ 58.7	36.5	66
58 30.7	+ 57.8	33.2	59 20.7	+ 58.0	34.1	60 10.1	+ 58.3	35.1	60 58.9	+ 58.6	36.1	67
59 28.5	+ 57.6	32.6	60 18.7	+ 57.9	33.6	61 08.4	+ 58.2	34.6	61 57.5	+ 58.5	35.6	68
60 26.1	+ 57.4	32.1	61 16.6	+ 57.8	33.1	62 06.6	+ 58.2	34.1	62 56.0	+ 58.4	35.2	69
61 23.5	+ 57.4	31.5	62 14.4	+ 57.7	32.5	63 04.8	+ 57.9	33.5	63 54.4	+ 58.4	34.7	70
62 20.9	+ 57.1	30.9	63 12.1	+ 57.5	31.9	64 02.7	+ 57.9	33.0	64 52.8	+ 58.1	34.1	71
63 18.0	+ 56.9	30.2	64 09.6	+ 57.3	31.2	65 00.6	+ 57.7	32.3	65 50.9	+ 58.1	33.5	72
64 14.9	+ 56.7	29.5	65 06.9	+ 57.1	30.5	65 58.3	+ 57.4	31.7	66 49.0	+ 57.9	32.9	73
65 11.6	+ 56.5	28.7	66 04.0	+ 56.8	29.8	66 55.7	+ 57.3	31.0	67 46.9	+ 57.6	32.2	74
66 08.1	+ 56.1	27.9	67 00.8	+ 56.6	29.0	67 53.0	+ 57.1	30.2	68 44.5	+ 57.5	31.5	75
67 04.2	+ 55.9	27.0	67 57.4	+ 56.3	28.1	68 50.1	+ 56.7	29.3	69 42.0	+ 57.2	30.7	76
68 00.1	+ 55.5	26.1	68 53.7	+ 56.0	27.2	69 46.8	+ 56.5	28.4	70 39.2	+ 57.0	29.8	77
68 55.6	+ 55.1	25.0	69 49.7	+ 55.6	26.2	70 43.3	+ 56.1	27.4	71 36.2	+ 56.6	28.8	78
69 50.7	+ 54.6	23.9	70 45.3	+ 55.1	25.0	71 39.4	+ 55.6	26.3	72 32.8	+ 56.3	27.7	79
70 45.3	+ 54.1	22.7	71 40.4	+ 54.6	23.8	72 35.0	+ 55.2	25.1	73 29.1	+ 55.7	26.5	80
71 39.4	+ 53.4	21.3	72 35.0	+ 54.1	22.5	73 30.2	+ 54.6	23.8	74 24.8	+ 55.3	25.2	81
72 32.8	+ 52.7	19.8	73 29.1	+ 53.3	21.0	74 24.8	+ 54.0	22.3	75 20.1	+ 54.6	23.7	82
73 25.5	+ 51.9	18.2	74 22.4	+ 52.4	19.3	75 18.8	+ 53.1	20.6	76 14.7	+ 53.8	22.0	83
74 17.4	+ 50.9	16.4	75 14.8	+ 51.5	17.5	76 11.9	+ 52.1	18.7	77 08.5	+ 52.8	20.1	84
75 08.3	+ 49.8	14.4	76 06.3	+ 50.3	15.4	77 04.0	+ 50.9	16.5	78 01.3	+ 51.7	17.9	85
75 58.1	+ 48.3	12.1	76 56.6	+ 48.9	13.1	77 54.9	+ 49.5	14.1	78 53.0	+ 50.1	15.3	86
76 46.4	+ 46.7	9.6	77 45.5	+ 47.1	10.4	78 44.4	*+ 47.6* •	11.3	79 43.1	*+ 48.3* •	12.4	87
77 33.1	*+ 44.6* •	6.8	78 32.6	*+ 45.0* •	7.4	79 32.0	*+ 45.4* •	8.1	80 31.4	*+ 45.8* •	8.9	88
78 17.7	*+ 42.3* •	3.6	79 17.6	*+ 42.4* •	3.9	80 17.4	*+ 42.6* •	4.3	81 17.2	*+ 42.8* •	4.8	89
79 00.0	*+ 39.4* •	0.0	80 00.0	*+ 39.2* •	0.0	81 00.0	*+ 39.0* •	0.0	82 00.0	*+ 38.7* •	0.0	90
79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 133°, 227°

48°, 312° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 58.4	+58.8	131.0	9 19.0	+58.9	131.1	8 39.4	+59.2	131.3	7 59.8	+59.3	131.4	7 20.1	+59.4	131.5	6 40.3	+59.5	131.6	6 00.5	+59.6	131.6	5 20.6	+59.7	131.7	0
1	10 57.2	+58.9	130.8	10 17.9	+59.0	131.0	9 38.6	+59.1	131.1	8 59.1	+59.2	131.2	8 19.5	+59.4	131.3	7 39.8	+59.5	131.4	7 00.1	+59.6	131.5	6 20.3	+59.7	131.6	1
2	11 56.1	+58.8	130.6	11 16.9	+59.0	130.8	10 37.7	+59.1	130.9	9 58.3	+59.3	131.1	9 18.9	+59.4	131.2	8 39.3	+59.5	131.3	7 59.7	+59.6	131.4	7 20.0	+59.6	131.5	2
3	12 54.9	+58.8	130.4	12 15.9	+59.0	130.6	11 36.8	+59.1	130.7	10 57.6	+59.2	130.9	10 18.3	+59.3	131.0	9 38.8	+59.5	131.2	8 59.3	+59.5	131.3	8 19.6	+59.7	131.4	3
4	13 53.7	+58.8	130.2	13 14.9	+58.9	130.4	12 35.9	+59.1	130.6	11 56.8	+59.3	130.7	11 17.6	+59.4	130.9	10 38.3	+59.5	131.0	9 58.8	+59.6	131.2	9 19.3	+59.7	131.3	4
5	14 52.5	+58.8	130.0	14 13.8	+59.0	130.2	13 35.0	+59.1	130.4	12 56.1	+59.2	130.6	12 17.0	+59.4	130.7	11 37.8	+59.4	130.9	10 58.4	+59.6	131.1	10 19.0	+59.6	131.2	5
6	15 51.3	+58.8	129.8	15 12.8	+58.9	130.0	14 34.1	+59.1	130.2	13 55.3	+59.3	130.4	13 16.4	+59.3	130.6	12 37.2	+59.5	130.8	11 58.0	+59.6	130.9	11 18.6	+59.7	131.1	6
7	16 50.1	+58.7	129.6	16 11.7	+59.0	129.8	15 33.2	+59.1	130.0	14 54.6	+59.2	130.2	14 15.7	+59.4	130.4	13 36.7	+59.5	130.6	12 57.6	+59.5	130.8	12 18.3	+59.7	131.0	7
8	17 48.8	+58.8	129.4	17 10.7	+58.9	129.6	16 32.3	+59.1	129.9	15 53.8	+59.2	130.1	15 15.1	+59.3	130.3	14 36.2	+59.4	130.5	13 57.1	+59.6	130.7	13 18.0	+59.6	130.9	8
9	18 47.6	+58.7	129.2	18 09.6	+58.9	129.4	17 31.4	+59.1	129.7	16 53.0	+59.2	129.9	16 14.4	+59.3	130.1	15 35.6	+59.5	130.4	14 56.7	+59.6	130.6	14 17.6	+59.7	130.8	9
10	19 46.3	+58.8	128.9	19 08.5	+58.9	129.2	18 30.5	+59.0	129.5	17 52.2	+59.2	129.7	17 13.7	+59.4	130.0	16 35.1	+59.5	130.2	15 56.3	+59.5	130.4	15 17.3	+59.6	130.7	10
11	20 45.1	+58.7	128.7	20 07.4	+58.9	129.0	19 29.5	+59.1	129.3	18 51.4	+59.2	129.6	18 13.1	+59.3	129.8	17 34.6	+59.4	130.1	16 55.8	+59.6	130.3	16 16.9	+59.7	130.5	11
12	21 43.8	+58.7	128.5	21 06.3	+58.9	128.8	20 28.6	+59.0	129.1	19 50.6	+59.2	129.4	19 12.4	+59.3	129.7	18 34.0	+59.4	129.9	17 55.4	+59.5	130.2	17 16.6	+59.6	130.4	12
13	22 42.5	+58.6	128.3	22 05.2	+58.8	128.6	21 27.6	+59.0	128.9	20 49.8	+59.1	129.2	20 11.7	+59.3	129.5	19 33.4	+59.5	129.8	18 54.9	+59.6	130.1	18 16.2	+59.7	130.3	13
14	23 41.1	+58.7	128.1	23 04.0	+58.8	128.4	22 26.6	+59.0	128.7	21 48.9	+59.2	129.0	21 11.0	+59.3	129.3	20 32.9	+59.4	129.6	19 54.5	+59.5	129.9	19 15.9	+59.6	130.2	14
15	24 39.8	+58.6	127.8	24 02.8	+58.9	128.2	23 25.6	+59.0	128.5	22 48.1	+59.1	128.9	22 10.3	+59.3	129.2	21 32.3	+59.4	129.5	20 54.0	+59.5	129.8	20 15.5	+59.6	130.1	15
16	25 38.4	+58.6	127.6	25 01.7	+58.8	128.0	24 24.6	+59.0	128.3	23 47.2	+59.2	128.7	23 09.6	+59.3	129.0	22 31.7	+59.4	129.3	21 53.5	+59.6	129.7	21 15.1	+59.7	130.0	16
17	26 37.0	+58.6	127.4	26 00.5	+58.7	127.7	25 23.6	+58.9	128.1	24 46.4	+59.1	128.5	24 08.9	+59.3	128.8	23 31.1	+59.4	129.2	22 53.1	+59.5	129.5	22 14.8	+59.6	129.8	17
18	27 35.6	+58.6	127.1	26 59.2	+58.8	127.5	26 22.5	+59.0	127.9	25 45.5	+59.1	128.3	25 08.2	+59.2	128.7	24 30.5	+59.4	129.0	23 52.6	+59.5	129.4	23 14.4	+59.6	129.7	18
19	28 34.2	+58.5	126.9	27 58.0	+58.7	127.3	27 21.5	+58.9	127.7	26 44.6	+59.1	128.1	26 07.4	+59.2	128.5	25 29.9	+59.4	128.9	24 52.1	+59.5	129.2	24 14.0	+59.6	129.6	19
20	29 32.7	+58.5	126.6	28 56.7	+58.7	127.1	28 20.4	+58.9	127.5	27 43.7	+59.1	127.9	27 06.6	+59.3	128.3	26 29.3	+59.3	128.7	25 51.6	+59.5	129.1	25 13.6	+59.6	129.5	20
21	30 31.2	+58.5	126.4	29 55.4	+58.7	126.8	29 19.3	+58.9	127.3	28 42.8	+59.0	127.7	28 05.9	+59.2	128.1	27 28.6	+59.4	128.6	26 51.1	+59.5	129.0	26 13.2	+59.6	129.3	21
22	31 29.7	+58.4	126.1	30 54.1	+58.7	126.6	30 18.2	+58.8	127.1	29 41.8	+59.0	127.5	29 05.1	+59.2	128.0	28 28.0	+59.3	128.4	27 50.6	+59.4	128.8	27 12.8	+59.6	129.2	22
23	32 28.1	+58.4	125.8	31 52.8	+58.6	126.3	31 17.0	+58.8	126.8	30 40.8	+59.1	127.3	30 04.3	+59.2	127.8	29 27.3	+59.4	128.2	28 50.0	+59.5	128.7	28 12.4	+59.6	129.1	23
24	33 26.5	+58.4	125.6	32 51.4	+58.6	126.1	32 15.8	+58.8	126.6	31 39.9	+58.9	127.1	31 03.5	+59.1	127.6	30 26.7	+59.3	128.0	29 49.5	+59.5	128.5	29 12.0	+59.5	128.9	24
25	34 24.9	+58.3	125.3	33 50.0	+58.5	125.8	33 14.6	+58.8	126.4	32 38.8	+59.0	126.9	32 02.6	+59.2	127.4	31 26.0	+59.3	127.9	30 49.0	+59.4	128.3	30 11.5	+59.6	128.8	25
26	35 23.2	+58.3	125.0	34 48.5	+58.6	125.6	34 13.4	+58.8	126.1	33 37.8	+59.0	126.7	33 01.8	+59.1	127.2	32 25.3	+59.3	127.7	31 48.4	+59.4	128.2	31 11.1	+59.6	128.7	26
27	36 21.5	+58.2	124.7	35 47.1	+58.5	125.3	35 12.2	+58.7	125.9	34 36.8	+58.9	126.4	34 00.9	+59.1	127.0	33 24.6	+59.3	127.5	32 47.8	+59.4	128.0	32 10.7	+59.5	128.5	27
28	37 19.7	+58.2	124.4	36 45.6	+58.4	125.0	36 10.9	+58.7	125.6	35 35.7	+58.9	126.2	35 00.0	+59.1	126.8	34 23.9	+59.2	127.3	33 47.2	+59.5	127.9	33 10.2	+59.5	128.4	28
29	38 17.9	+58.2	124.1	37 44.0	+58.4	124.7	37 09.6	+58.6	125.4	36 34.6	+58.8	126.0	35 59.1	+59.0	126.6	35 23.1	+59.2	127.1	34 46.7	+59.3	127.7	34 09.7	+59.6	128.2	29
30	39 16.1	+58.1	123.8	38 42.4	+58.4	124.4	38 08.2	+58.6	125.1	37 33.4	+58.9	125.7	36 58.1	+59.1	126.3	36 22.3	+59.3	126.9	35 46.0	+59.4	127.5	35 09.3	+59.5	128.1	30
31	40 14.2	+58.0	123.4	39 40.8	+58.3	124.1	39 06.8	+58.6	124.8	38 32.3	+58.8	125.5	37 57.2	+59.0	126.1	37 21.6	+59.1	126.7	36 45.4	+59.4	127.3	36 08.8	+59.5	127.9	31
32	41 12.2	+58.0	123.1	40 39.1	+58.3	123.8	40 05.4	+58.5	124.5	39 31.1	+58.7	125.2	38 56.2	+59.0	125.9	38 20.7	+59.2	126.5	37 44.8	+59.3	127.2	37 08.3	+59.5	127.8	32
33	42 10.2	+57.9	122.8	41 37.4	+58.2	123.5	41 03.9	+58.5	124.2	40 29.8	+58.8	125.0	39 55.2	+58.9	125.6	39 19.9	+59.2	126.3	38 44.1	+59.3	127.0	38 07.8	+59.4	127.6	33
34	43 08.1	+57.8	122.4	42 35.6	+58.1	123.2	42 02.4	+58.4	123.9	41 28.6	+58.7	124.7	40 54.1	+58.9	125.4	40 19.1	+59.1	126.1	39 43.4	+59.3	126.8	39 07.2	+59.5	127.4	34
35	44 05.9	+57.8	122.0	43 33.7	+58.1	122.9	43 00.8	+58.4	123.6	42 27.3	+58.6	124.4	41 53.0	+58.9	125.1	41 18.2	+59.1	125.9	40 42.7	+59.3	126.6	40 06.7	+59.4	127.3	35
36	45 03.7	+57.7	121.7	44 31.8	+58.0	122.5	43 59.2	+58.3	123.3	43 25.9	+58.6	124.1	42 51.9	+58.9	124.9	42 17.3	+59.0	125.6	41 42.0	+59.3	126.4	41 06.1	+59.5	127.1	36
37	46 01.4	+57.6	121.3	45 29.8	+58.0	122.1	44 57.5	+58.3	123.0	44 24.5	+58.6	123.8	43 50.8	+58.8	124.6	43 16.3	+59.1	125.4	42 41.3	+59.2	126.2	42 05.6	+59.4	126.9	37
38	46 59.0	+57.5	120.9	46 27.8	+57.9	121.8	45 55.8	+58.2	122.7	45 23.1	+58.5	123.5	44 49.6	+58.7	124.3	44 15.4	+59.0	125.2	43 40.5	+59.2	125.9	43 05.0	+59.3	126.7	38
39	47 56.5	+57.4	120.4	47 25.7	+57.8	121.4	46 54.0	+58.2	122.3	46 21.6	+58.4	123.2	45 48.3	+58.8	124.1	45 14.4	+58.9	124.9	44 39.7	+59.2	125.7	44 04.3	+59.4	126.5	39
40	48 53.9	+57.4	120.0	48 23.5	+57.7	121.0	47 52.2	+58.0	121.9	47 20.0	+58.4	122.9	46 47.1	+58.6	123.8	46 13.3	+59.0	124.6	45 38.9	+59.1	125.5	45 03.7	+59.4	126.3	40
41	49 51.3	+57.2	119.6	49 21.2	+57.6	120.6	48 50.2	+58.0	121.6	48 18.4	+58.3	122.5	47 45.7	+58.7	123.5	47 12.3	+58.9	124.4	46 38.0	+59.2	125.2	46 03.1	+59.3	126.1	41
42	50 48.5	+57.1	119.1	50 18.8	+57.5	120.1	49 48.2	+57.9	121.2	49 16.7	+58.3	122.2	48 44.4	+58.5	123.1	48 11.2	+58.8	124.1	47 37.2	+59.0	125.0	47 02.4	+59.3	125.9	42
43	51 45.6	+56.9	118.6	51 16.3	+57.5	119.7	50 46.1	+57.9	120.8	50 15.0	+58.2	121.8	49 42.9	+58.5	122.8	49 10.0	+58.8	123.8	48 36.2	+59.1	124.7	48 01.7	+59.2	125.6	43
44	52 42.5	+56.9	118.1	52 13.8	+57.3	119.2	51 44.0	+57.7	120.3	51 13.2	+58.1	121.4	50 41.4	+58.5	122.5	50 08.8	+58.7	123.5	49 35.3	+59.0	124.5	49 00.9	+59.3	125.4	44
45	53 39.4	+56.6	117.5	53 11.1	+57.1	118.7	52 41.7	+57.6	119.9	52 11.3	+58.0	121.0	51 39.9	+58.4	122.1	51 07.5	+58.7	123.1	50 34.3	+59.0	124.2	50 00.2	+59.2	125.2	45
46	54 36.0	+56.5	117.0	54 08.2	+57.1	118.2	53 39.3	+57.5	119.4	53 09.3	+57.9	120.6	52 38.3	+58.3	121.7	52 06.2	+58.7	122.8	51 33.3	+58.9	123.9	50 59.4	+59.1	124.9	46
47	55 32.5	+56.4	116.4	55 05.3	+56.9	117.7	54 36.8	+57.4	118.9	54 07.2	+57.9	120.1	53 36.6	+58.2	121.3	53 04.9	+58.5	122.5	52 32.2	+58.8	123.6	51 58.5	+59.2	124.6	47
48	56 28.9	+56.1	115.8	56 02.2	+56.7	117.1	55 34.2	+57.2	118.4	55 05.1	+57.7	119.7	54 34.8	+58.1	120.9	54 03.4	+58.5	122.1	53 31.0	+58.9	123.2	52 57.7	+59.0	124.4	48
49	57 25.0	+56.0	115.1	56 58.9	+56.5	116.5	56 31.4	+57.1	117.9	56 02.8	+57.6	119.2	55 32.9	+58.1	120.5	55 01.9	+58.4	121.7	54 29.9	+58.7	122.9	53 56.7	+59.1	124.1	49
50	58 21.0	+55.7	114.4	57 55.4	+56.4	115.9	57 28.5	+57.0	117.3	57 00.4	+57.4	118.7	56 31.0	+57.9	120.0	56 00.3	+58.4	121.3	55 28.6	+58.7	122.6	54 55.8	+59.0	123.8	50
51	59 16.7	+55.4	113.7	58 51.8	+56.1	115.3	58 25.5	+56.8	116.7	57 57.8	+57.4	118.2	57 28.9	+57.8	119.5	56 58.7	+58.2	120.9	56 27.3	+58.6	122.2	55 54.8	+58.9	123.4	51
52	60 12.1	+55.2	113.0	59 47.9	+56.0	114.6	59 22.3	+56.5	116.1	58 55.2	+57.1	117.6	58 26.7	+57.7	119.0	57 56.9	+58.2	120.4	57 25.9	+58.6	121.8	56 53.7	+58.9	123.1	52
53	61 07.3	+54.9	112.2	60 43.9	+55.6	113.8	60 18.8	+56.4	115.4	59 52.3	+57.0	117.0	59 24.4	+57.5	118.5	58 55.1	+58.0	120.0	58 24.5	+58.4	121.4	57 52.6	+58.8	122.7	53
54	62 02.2	+54.5	111.3	61 39.5	+55.4	113.1	61 15.2	+56.2	114.7	60 49.3	+56.8	116.4	60 21.9	+57.4	117.9	59 53.1	+57.9	119.5	59 22.9	+58.4	120.9	58 51.4	+58.8	122.4	54
55	62 56.7	+54.2	110.4	62 34.9	+55.1	112.2	62 11.4	+55.8	114.0	61 46.1	+56.6	115.7	61 19.3	+57.3	117.3	60 51.0	+57.8	118.9	60 21.3	+58.3	120.5	59 50.2	+58.7	122.0	55
56	63 50.9	+53.8	109.5	63 30.0	+54.7	111.4	63 07.2	+55.6	113.2	62 42.7	+56.4	115.0	62 16.6	+57.0	116.7	61 48.8	+57.7	118.4	61 19.6	+58.1	120.0	60 48.9	+58.6	121.5	56
57	64 44.7	+53.3	108.4	64 24.7	+54.4	110.4	64 02.8	+55.3	112.4	63 39.1	+56.1	114.2	63 13.6	+56.9	116.0	62 46.5	+57.4	117.8	62 17.7	+58.0	119.5	61 47.5	+58.5	121.1	57
58	65 38.0	+52.8	107.3	65 19.1	+53.9	109.4	64 58.1	+55.0	111.5	64 35.2	+55.9	113.4	64 10.5	+56.6	115.3	63 43.9	+57.3	117.1	63 15.7	+57.9	118.9	62 46.0	+58.3	120.6	58
59	66 30.8	+52.3	106.2	66 13.0	+53.5	108.4	65 53.1	+54.5	110.5	65 31.1	+55.5	112.5	65 07.1	+56.3	114.5	64 41.2	+57.1	116.5	64 13.6	+57.8	118.3	63 44.3	+58.3	120.1	59
60	67 23.1	+51.6	104.9	67 06.5	+52.9	107.2	66 47.6	+54.1	109.4	66 26.6	+55.1	111.6	66 03.4	+56.1	113.7	65 38.3	+56.9	115.7	65 11.4	+57.5	117.7	64 42.6	+58.2	119.6	60
61	68 14.7	+50.9	103.6	67 59.4	+52.3	106.0	67 41.7	+53.6	108.3	67 21.7	+54.8	110.6	66 59.5	+55.8	112.8	66 35.2	+56.6	114.9	66 08.9	+57.4	117.0	65 40.8	+58.0	119.0	61
62	69 05.6	+50.2	102.1	68 51.7	+51.7	104.6	68 35.3	+53.1	107.1	68 16.5	+54.2	109.5	67 55.3	+55.3	111.8	67 31.8	+56.4	114.1	67 06.3	+57.1	116.3	66 38.8	+57.8	118.3	62
63	69 55.8	+49.2	100.5	69 43.4	+50.9	103.2	69 28.4	+52.4	105.8	69 10.7	+53.8	108.3	68 50.6	+55.0	110.8	68 28.2	+56.0	113.2	68 03.4	+56.9	115.5	67 36.6	+57.7	117.7	63
64	70 45.0	+48.2	98.8	70 34.3	+50.0	101.7	70 20.8	+51.7	104.4	70 04.5	+53.2	107.1	69 45.6	+54.5	109.7	69 24.2	+55.6	112.2	69 00.3	+56.6	114.6	68 34.3	+57.4	116.9	64
65	71 33.2	+47.0	97.0	71 24.3	+49.1	100.0	71 12.5	+50.8	102.9	70 57.7	+52.5	105.7	70 40.1	+53.9	108.4	70 19.8	+55.2	111.1	69 56.9	+56.3	113.6	69 31.7	+57.2	116.1	65
66	72 20.2	+45.7	95.0	72 13.4	+47.9	98.1	72 03.3	+49.9	101.2	71 50.2	+51.7	104.2	71 34.0	+53.3	107.1	71 15.0	+54.7	109.9	70 53.2	+55.9	112.6	70 28.9	+56.9	115.2	66
67	73 05.9	+44.2	92.8	73 01.3	+46.6	96.1	72 53.2	+48.8	99.3	72 41.9	+50.7	102.5	72 27.3	+52.6	105.6	72 09.7	+54.1	108.6	71 49.1	+55.4	111.5	71 25.8	+56.6	114.2	67
68	73 50.1	+42.5	90.4	73 47.9	+45.1	93.9	73 42.0	+47.5	97.3	73 32.6	+49.8	100.7	73 19.9	+51.7	103.9	73 03.8	+53.4	107.1	72 44.5	+55.0	110.2	72 22.4	+56.1	113.2	68
69	74 32.6	+40.5•	87.8	74 33.0	+43.3	91.5	74 29.5	+46.1	95.1	74 22.4	+48.5	98.6	74 11.6	+50.7	102.1	73 57.2	+52.6	105.5	73 39.5	+54.3	108.8	73 18.5	+55.8	112.0	69
70	75 13.1	+38.2•	85.0	75 16.3	+41.4•	88.8	75 15.6	+44.3	92.6	75 10.9	+47.0	96.4	75 02.3	+49.5	100.1	74 49.8	+51.7	103.8	74 33.8	+53.6	107.3	74 14.3	+55.2	110.7	70
71	75 51.3	+35.7•	81.9	75 57.7	+39.1•	85.9	75 59.9	+42.3•	89.9	75 57.9	+45.4	93.9	75 51.8	+48.1	97.9	75 41.5	+50.6	101.8	75 27.4	+52.7	105.5	75 09.5	+54.5	109.2	71
72	76 27.0	+32.7•	78.6	76 36.8	+36.4•	82.7	76 42.2	+40.0•	86.9	76 43.3	+43.3•	91.1	76 39.9	+46.4	95.3	76 32.1	+49.2	99.5	76 20.1	+51.7	103.6	76 04.0	+53.8	107.5	72
73	76 59.7	+29.5•	74.9	77 13.2	+33.4•	79.2	77 22.2	+37.2•	83.6	77 26.6	+41.0•	88.0	77 26.3	+44.4•	92.5	77 21.3	+47.6	97.0	77 11.8	+50.4	101.4	76 57.8	+52.8	105.6	73
74	77 29.2	+25.7•	71.0	77 46.6	+29.8•	75.3	77 59.4	+34.1•	79.9	78 07.6	+38.1•	84.6	78 10.7	+42.1•	89.3	78 08.9	+45.7•	94.1	78 02.2	+48.8	98.8	77 50.6	+51.6	103.4	74
75	77 54.9	+21.5•	66.7	78 16.4	+26.0•	71.2	78 33.5	+30.4•	75.8	78 45.7	+34.8•	80.7	78 52.8	+39.1•	85.7	78 54.6	+43.2•	90.8	78 51.0	+46.9•	95.9	78 42.2	+50.2	100.9	75
76	78 16.4	+17.1•	62.2	78 42.4	+21.5•	66.6	79 03.9	+26.1•	71.4	79 20.5	+31.0•	76.4	79 31.9	+35.7•	81.7	79 37.8	+40.2•	87.1	79 37.9	+44.5•	92.6	79 32.4	+48.3•	98.0	76
77	78 33.5	+12.2•	57.4	79 03.9	+16.6•	61.8	79 30.0	+21.5•	66.5	79 51.5	+26.4•	71.7	80 07.6	+31.6•	77.1	80 18.0	+36.7•	82.9	80 22.4	+41.6•	88.7	80 20.7	+46.0•	94.6	77
78	78 45.7	+7.1•	52.4	79 20.5	+11.4•	56.7	79 51.5	+16.1•	61.3	80 17.9	+21.3•	66.5	80 39.2	+26.7•	72.0	80 54.7	+32.3•	78.0	81 04.0	+37.7•	84.2	81 06.7	+42.9•	90.6	78
79	78 52.8	+1.8•	47.3	79 31.9	+5.9•	51.3	80 07.6	+10.4•	55.8	80 39.2	+15.5•	60.8	81 05.9	+21.1•	66.4	81 27.0	+27.0•	72.5	81 41.7	+33.1•	79.0	81 49.6	+39.1•	85.9	79
80	78 54.6	−3.6•	42.1	79 37.8	+0.1•	45.8	80 18.0	+4.4•	50.0	80 54.7	+9.3•	54.8	81 27.0	+14.7•	60.2	81 54.0	+20.8•	66.3	82 14.8	+27.4•	73.1	82 28.7	+34.1•	80.3	80
81	78 51.0	−8.8•	37.0	79 37.9	−5.5•	40.2	80 22.4	−1.7•	44.0	81 04.0	+2.7•	48.5	81 41.7	+7.9•	53.6	82 14.8	+13.9•	59.5	82 42.2	+20.6•	66.3	83 02.8	+27.8•	73.8	81
82	78 42.2	−13.8•	31.9	79 32.4	−11.1•	34.7	80 20.7	−7.8•	38.1	81 06.7	−4.0•	42.0	81 49.6	+0.7•	46.7	82 28.7	+6.1•	52.2	83 02.8	+12.6•	58.7	83 30.6	+20.1•	66.2	82
83	78 28.4	−18.6•	27.0	79 21.3	−16.3•	29.4	80 12.9	−13.7•	32.2	81 02.7	−10.5•	35.6	81 50.3	−6.6•	39.6	82 34.8	−1.8•	44.5	83 15.4	+4.0•	50.5	83 50.7	+11.1•	57.6	83
84	78 09.8	−23.0•	22.3	79 05.0	−21.3•	24.2	79 59.2	−19.2•	26.5	80 52.2	−16.7•	29.3	81 43.7	−13.6•	32.7	82 33.0	−9.7•	36.8	83 19.4	−4.9•	41.9	84 01.8	+1.3•	48.3	84
85	77 46.8	−26.9•	17.8	78 43.7	−25.7•	19.4	79 40.0	−24.2•	21.2	80 35.5	−22.3•	23.3	81 30.1	−20.0•	26.0	82 23.3	−17.2•	29.3	83 14.5	−13.4•	33.4	84 03.1	−8.6•	38.7	85
86	77 19.9	−30.6•	13.7	78 18.0	−29.6•	14.8	79 15.8	−28.6•	16.2	80 13.2	−27.3•	17.8	81 10.1	−25.8•	19.7	82 06.1	−23.8•	22.2	83 01.1	−21.3•	25.2	83 54.5	−18.0•	29.2	86
87	76 49.3	−33.7•	9.8	77 48.4	−33.2•	10.6	78 47.2	−32.5•	11.5	79 45.9	−31.7•	12.6	80 44.3	−30.7•	14.0	81 42.3	−29.5•	15.6	82 39.8	−28.0•	17.7	83 36.5	−26.0•	20.4	87
88	76 15.6	−36.6•	6.3	77 15.2	−36.3•	6.8	78 14.7	−35.9•	7.3	79 14.2	−35.5•	8.0	80 13.6	−35.0•	8.8	81 12.8	−34.4•	9.8	82 11.8	−33.6•	11.0	83 10.5	−32.6•	12.6	88
89	75 39.0	−39.0•	3.0	76 38.9	−38.9•	3.2	77 38.8	−38.8•	3.5	78 38.7	−38.7•	3.8	79 38.6	−38.6•	4.1	80 38.4	−38.4•	4.6	81 38.2	−38.2•	5.1	82 37.9	−37.9•	5.8	89
90	75 00.0	−41.2•	0.0	76 00.0	−41.3•	0.0	77 00.0	−41.3•	0.0	78 00.0	−41.4•	0.0	79 00.0	−41.5•	0.0	80 00.0	−41.7•	0.0	81 00.0	−41.8•	0.0	82 00.0	−42.0•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 48°, 312°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 58.4	−58.9	131.0	9 19.0	−59.0	131.1	8 39.4	−59.1	131.3	7 59.8	−59.3	131.4	7 20.1	−59.4	131.5	6 40.3	−59.4	131.6	6 00.5	−59.6	131.6	5 20.6	−59.7	131.7	**0**
1	8 59.5	−58.8	131.2	8 20.0	−59.0	131.3	7 40.3	−59.2	131.4	7 00.5	−59.2	131.5	6 20.7	−59.4	131.6	5 40.9	−59.5	131.7	5 00.9	−59.6	131.8	4 20.9	−59.6	131.8	**1**
2	8 00.7	−58.9	131.4	7 21.0	−59.1	131.5	6 41.1	−59.1	131.6	6 01.3	−59.3	131.7	5 21.3	−59.3	131.8	4 41.4	−59.5	131.8	4 01.3	−59.6	131.9	3 21.3	−59.7	131.9	**2**
3	7 01.8	−58.8	131.6	6 21.9	−59.0	131.7	5 42.0	−59.1	131.8	5 02.0	−59.3	131.8	4 22.0	−59.4	131.9	3 41.9	−59.5	132.0	3 01.7	−59.6	132.0	2 21.6	−59.7	132.0	**3**
4	6 03.0	−58.9	131.8	5 22.9	−59.0	131.9	4 42.9	−59.2	131.9	4 02.7	−59.2	132.0	3 22.6	−59.4	132.0	2 42.4	−59.5	132.1	2 02.1	−59.5	132.1	1 21.9	−59.7	132.1	**4**
5	5 04.1	−58.9	132.0	4 23.9	−59.0	132.1	3 43.7	−59.1	132.1	3 03.5	−59.3	132.2	2 23.2	−59.4	132.2	1 42.9	−59.5	132.2	1 02.6	−59.6	132.2	0 22.2	−59.7	132.2	**5**
6	4 05.2	−58.9	132.2	3 24.9	−59.0	132.2	2 44.6	−59.2	132.3	2 04.2	−59.3	132.3	1 23.8	−59.4	132.3	0 43.4	−59.5	132.3	0 03.0	−59.6	132.3	0 37.5	+59.6	47.7	**6**
7	3 06.3	−58.8	132.4	2 25.9	−59.0	132.4	1 45.4	−59.2	132.4	1 04.9	−59.3	132.5	0 24.4	−59.4	132.5	0 16.1	+59.5	47.5	0 56.6	+59.6	47.5	1 37.1	+59.7	47.6	**7**
8	2 07.5	−58.9	132.6	1 26.9	−59.1	132.6	0 46.2	−59.1	132.6	0 05.6	−59.3	132.6	0 35.0	+59.4	47.4	1 15.6	+59.5	47.4	1 56.2	+59.6	47.4	2 36.8	+59.7	47.4	**8**
9	1 08.6	−58.9	132.8	0 27.8	−59.0	132.8	0 12.9	+59.2	47.2	0 53.7	+59.2	47.2	1 34.4	+59.4	47.2	2 15.1	+59.5	47.3	2 55.8	+59.6	47.3	3 36.5	+59.7	47.3	**9**
10	0 09.7	−58.9	133.0	0 31.2	+59.0	47.0	1 12.1	+59.1	47.1	1 52.9	+59.3	47.1	2 33.8	+59.4	47.1	3 14.6	+59.5	47.1	3 55.4	+59.6	47.2	4 36.2	+59.6	47.2	**10**
11	0 49.2	+58.9	46.9	1 30.2	+59.0	46.9	2 11.2	+59.2	46.9	2 52.2	+59.3	46.9	3 33.2	+59.4	47.0	4 14.1	+59.5	47.0	4 55.0	+59.6	47.1	5 35.8	+59.7	47.1	**11**
12	1 48.1	+58.8	46.7	2 29.2	+59.1	46.7	3 10.4	+59.1	46.7	3 51.5	+59.3	46.8	4 32.6	+59.4	46.8	5 13.6	+59.5	46.9	5 54.6	+59.6	47.0	6 35.5	+59.7	47.0	**12**
13	2 46.9	+58.9	46.5	3 28.3	+59.0	46.5	4 09.5	+59.2	46.6	4 50.8	+59.2	46.6	5 32.0	+59.4	46.7	6 13.1	+59.5	46.8	6 54.2	+59.6	46.8	7 35.2	+59.7	46.9	**13**
14	3 45.8	+58.9	46.3	4 27.3	+59.0	46.3	5 08.7	+59.1	46.4	5 50.0	+59.3	46.5	6 31.4	+59.3	46.5	7 12.6	+59.5	46.6	7 53.8	+59.6	46.7	8 34.9	+59.6	46.8	**14**
15	4 44.7	+58.9	46.1	5 26.3	+59.0	46.1	6 07.8	+59.2	46.2	6 49.3	+59.3	46.3	7 30.7	+59.4	46.4	8 12.1	+59.5	46.5	8 53.4	+59.5	46.6	9 34.5	+59.7	46.7	**15**
16	5 43.6	+58.8	45.9	6 25.3	+59.0	46.0	7 07.0	+59.1	46.0	7 48.6	+59.2	46.1	8 30.1	+59.4	46.2	9 11.6	+59.5	46.4	9 52.9	+59.6	46.5	10 34.2	+59.7	46.6	**16**
17	6 42.4	+58.9	45.7	7 24.3	+59.0	45.8	8 06.1	+59.1	45.9	8 47.8	+59.3	46.0	9 29.5	+59.4	46.1	10 11.1	+59.4	46.2	10 52.5	+59.6	46.4	11 33.9	+59.6	46.5	**17**
18	7 41.3	+58.8	45.5	8 23.3	+59.0	45.6	9 05.2	+59.2	45.7	9 47.1	+59.3	45.8	10 28.9	+59.3	46.0	11 10.5	+59.5	46.1	11 52.1	+59.6	46.2	12 33.5	+59.7	46.4	**18**
19	8 40.1	+58.9	45.3	9 22.3	+59.0	45.4	10 04.4	+59.1	45.5	10 46.4	+59.2	45.7	11 28.2	+59.4	45.8	12 10.0	+59.5	46.0	12 51.7	+59.5	46.1	13 33.2	+59.7	46.3	**19**
20	9 39.0	+58.8	45.1	10 21.3	+59.0	45.2	11 03.5	+59.1	45.4	11 45.6	+59.3	45.5	12 27.6	+59.4	45.7	13 09.5	+59.5	45.8	13 51.2	+59.6	46.0	14 32.9	+59.6	46.2	**20**
21	10 37.8	+58.9	44.9	11 20.3	+59.0	45.0	12 02.6	+59.1	45.2	12 44.9	+59.2	45.3	13 27.0	+59.3	45.5	14 09.0	+59.4	45.7	14 50.8	+59.6	45.9	15 32.5	+59.7	46.1	**21**
22	11 36.7	+58.8	44.7	12 19.3	+58.9	44.9	13 01.7	+59.1	45.0	13 44.1	+59.2	45.2	14 26.3	+59.4	45.4	15 08.4	+59.5	45.5	15 50.4	+59.5	45.7	16 32.2	+59.6	46.0	**22**
23	12 35.5	+58.8	44.5	13 18.2	+59.0	44.7	14 00.8	+59.1	44.8	14 43.3	+59.3	45.0	15 25.7	+59.3	45.2	16 07.9	+59.4	45.4	16 49.9	+59.6	45.6	17 31.8	+59.6	45.8	**23**
24	13 34.3	+58.8	44.3	14 17.2	+59.0	44.5	14 59.9	+59.1	44.7	15 42.6	+59.2	44.8	16 25.0	+59.4	45.1	17 07.3	+59.5	45.3	17 49.5	+59.5	45.5	18 31.4	+59.7	45.7	**24**
25	14 33.1	+58.8	44.1	15 16.2	+58.9	44.3	15 59.0	+59.1	44.5	16 41.8	+59.2	44.7	17 24.4	+59.3	44.9	18 06.8	+59.4	45.1	18 49.0	+59.6	45.4	19 31.1	+59.6	45.6	**25**
26	15 31.9	+58.8	43.9	16 15.1	+58.9	44.1	16 58.1	+59.1	44.3	17 41.0	+59.2	44.5	18 23.7	+59.3	44.7	19 06.2	+59.5	45.0	19 48.6	+59.5	45.2	20 30.7	+59.7	45.5	**26**
27	16 30.7	+58.8	43.7	17 14.0	+58.9	43.9	17 57.2	+59.0	44.1	18 40.2	+59.2	44.3	19 23.0	+59.3	44.6	20 05.7	+59.4	44.8	20 48.1	+59.5	45.1	21 30.4	+59.6	45.4	**27**
28	17 29.5	+58.7	43.5	18 12.9	+59.0	43.7	18 56.2	+59.1	43.9	19 39.4	+59.2	44.2	20 22.3	+59.3	44.4	21 05.1	+59.4	44.7	21 47.6	+59.6	45.0	22 30.0	+59.6	45.3	**28**
29	18 28.2	+58.8	43.3	19 11.9	+58.9	43.5	19 55.3	+59.0	43.7	20 38.6	+59.1	44.0	21 21.6	+59.3	44.3	22 04.5	+59.4	44.5	22 47.2	+59.5	44.8	23 29.6	+59.6	45.1	**29**
30	19 27.0	+58.7	43.0	20 10.8	+58.8	43.3	20 54.3	+59.1	43.5	21 37.7	+59.2	43.8	22 20.9	+59.3	44.1	23 03.9	+59.4	44.4	23 46.7	+59.5	44.7	24 29.2	+59.6	45.0	**30**
31	20 25.7	+58.7	42.8	21 09.6	+58.9	43.1	21 53.4	+59.0	43.4	22 36.9	+59.1	43.6	23 20.2	+59.3	43.9	24 03.3	+59.4	44.2	24 46.2	+59.5	44.6	25 28.8	+59.6	44.9	**31**
32	21 24.4	+58.7	42.6	22 08.5	+58.9	42.9	22 52.4	+59.0	43.2	23 36.0	+59.2	43.5	24 19.5	+59.2	43.8	25 02.7	+59.4	44.1	25 45.7	+59.5	44.4	26 28.4	+59.6	44.8	**32**
33	22 23.1	+58.7	42.4	23 07.4	+58.8	42.7	23 51.4	+59.0	43.0	24 35.2	+59.1	43.3	25 18.7	+59.3	43.6	26 02.1	+59.4	43.9	26 45.2	+59.5	44.3	27 28.0	+59.6	44.6	**33**
34	23 21.8	+58.7	42.2	24 06.2	+58.8	42.4	24 50.4	+58.9	42.8	25 34.3	+59.1	43.1	26 18.0	+59.2	43.4	27 01.5	+59.3	43.8	27 44.7	+59.4	44.1	28 27.6	+59.6	44.5	**34**
35	24 20.5	+58.6	41.9	25 05.0	+58.8	42.2	25 49.3	+59.0	42.6	26 33.4	+59.1	42.9	27 17.2	+59.3	43.2	28 00.8	+59.4	43.6	28 44.1	+59.5	44.0	29 27.2	+59.6	44.4	**35**
36	25 19.1	+58.6	41.7	26 03.8	+58.8	42.0	26 48.3	+58.9	42.3	27 32.5	+59.1	42.7	28 16.5	+59.2	43.1	29 00.2	+59.3	43.4	29 43.6	+59.5	43.8	30 26.8	+59.5	44.2	**36**
37	26 17.7	+58.6	41.5	27 02.6	+58.7	41.8	27 47.2	+58.9	42.1	28 31.6	+59.0	42.5	29 15.7	+59.2	42.9	29 59.5	+59.3	43.3	30 43.1	+59.4	43.7	31 26.3	+59.6	44.1	**37**
38	27 16.3	+58.6	41.2	28 01.3	+58.8	41.6	28 46.1	+58.9	41.9	29 30.6	+59.1	42.3	30 14.9	+59.1	42.7	30 58.8	+59.3	43.1	31 42.5	+59.4	43.5	32 25.9	+59.5	43.9	**38**
39	28 14.9	+58.5	41.0	29 00.1	+58.7	41.3	29 45.0	+58.9	41.7	30 29.7	+59.0	42.1	31 14.0	+59.2	42.5	31 58.1	+59.3	42.9	32 41.9	+59.5	43.3	33 25.4	+59.5	43.8	**39**
40	29 13.4	+58.5	40.7	29 58.8	+58.6	41.1	30 43.9	+58.8	41.5	31 28.7	+59.0	41.9	32 13.2	+59.1	42.3	32 57.4	+59.3	42.7	33 41.4	+59.4	43.2	34 24.9	+59.6	43.6	**40**
41	30 11.9	+58.5	40.5	30 57.4	+58.7	40.8	31 42.7	+58.8	41.2	32 27.7	+58.9	41.7	33 12.3	+59.2	42.1	33 56.7	+59.3	42.5	34 40.8	+59.3	43.0	35 24.5	+59.5	43.5	**41**
42	31 10.4	+58.5	40.2	31 56.1	+58.6	40.6	32 41.5	+58.8	41.0	33 26.6	+59.0	41.4	34 11.5	+59.1	41.9	34 56.0	+59.2	42.3	35 40.1	+59.4	42.8	36 24.0	+59.5	43.3	**42**
43	32 08.9	+58.4	39.9	32 54.7	+58.6	40.3	33 40.3	+58.8	40.8	34 25.6	+58.9	41.2	35 10.6	+59.0	41.7	35 55.2	+59.2	42.2	36 39.5	+59.4	42.6	37 23.5	+59.5	43.2	**43**
44	33 07.3	+58.3	39.7	33 53.3	+58.6	40.1	34 39.1	+58.7	40.5	35 24.5	+58.9	41.0	36 09.6	+59.1	41.5	36 54.4	+59.2	42.0	37 38.9	+59.3	42.5	38 23.0	+59.4	43.0	**44**
45	34 05.6	+58.4	39.4	34 51.9	+58.5	39.8	35 37.8	+58.7	40.3	36 23.4	+58.9	40.8	37 08.7	+59.0	41.2	37 53.6	+59.2	41.8	38 38.2	+59.3	42.3	39 22.4	+59.5	42.8	**45**
46	35 04.0	+58.3	39.1	35 50.4	+58.5	39.6	36 36.5	+58.7	40.0	37 22.3	+58.8	40.5	38 07.7	+59.0	41.0	38 52.8	+59.2	41.5	39 37.5	+59.3	42.1	40 21.9	+59.4	42.7	**46**
47	36 02.3	+58.2	38.8	36 48.9	+58.4	39.3	37 35.2	+58.6	39.8	38 21.1	+58.8	40.3	39 06.7	+59.0	40.8	39 52.0	+59.1	41.3	40 36.8	+59.3	41.9	41 21.3	+59.4	42.5	**47**
48	37 00.5	+58.2	38.5	37 47.3	+58.4	39.0	38 33.8	+58.6	39.5	39 19.9	+58.8	40.0	40 05.7	+59.0	40.5	40 51.1	+59.1	41.1	41 36.1	+59.3	41.7	42 20.7	+59.4	42.3	**48**
49	37 58.7	+58.2	38.2	38 45.7	+58.4	38.7	39 32.4	+58.5	39.2	40 18.7	+58.7	39.7	41 04.7	+58.9	40.3	41 50.2	+59.1	40.9	42 35.4	+59.2	41.5	43 20.1	+59.4	42.1	**49**
50	38 56.9	+58.1	37.9	39 44.1	+58.3	38.4	40 30.9	+58.6	38.9	41 17.4	+58.7	39.5	42 03.6	+58.8	40.0	42 49.3	+59.0	40.6	43 34.6	+59.2	41.3	44 19.5	+59.4	41.9	**50**
51	39 55.0	+58.1	37.6	40 42.4	+58.3	38.1	41 29.5	+58.4	38.6	42 16.1	+58.7	39.2	43 02.4	+58.9	39.8	43 48.3	+59.1	40.4	44 33.8	+59.2	41.0	45 18.9	+59.3	41.7	**51**
52	40 53.1	+58.0	37.2	41 40.7	+58.2	37.8	42 27.9	+58.4	38.3	43 14.8	+58.6	38.9	44 01.3	+58.8	39.5	44 47.4	+58.9	40.1	45 33.0	+59.2	40.8	46 18.2	+59.3	41.5	**52**
53	41 51.1	+57.9	36.9	42 38.9	+58.1	37.4	43 26.3	+58.4	38.0	44 13.4	+58.6	38.6	45 00.1	+58.7	39.2	45 46.3	+59.0	39.9	46 32.2	+59.1	40.6	47 17.5	+59.3	41.3	**53**
54	42 49.0	+57.9	36.5	43 37.0	+58.1	37.1	44 24.7	+58.3	37.7	45 12.0	+58.5	38.3	45 58.8	+58.8	38.9	46 45.3	+58.9	39.6	47 31.3	+59.1	40.3	48 16.8	+59.3	41.0	**54**
55	43 46.9	+57.8	36.2	44 35.1	+58.0	36.8	45 23.0	+58.2	37.4	46 10.5	+58.4	38.0	46 57.6	+58.6	38.6	47 44.2	+58.9	39.3	48 30.4	+59.0	40.0	49 16.1	+59.2	40.8	**55**
56	44 44.7	+57.7	35.8	45 33.1	+58.0	36.4	46 21.2	+58.2	37.0	47 08.9	+58.4	37.7	47 56.2	+58.6	38.3	48 43.1	+58.8	39.0	49 29.4	+59.0	39.8	50 15.3	+59.2	40.5	**56**
57	45 42.4	+57.6	35.4	46 31.1	+57.9	36.0	47 19.4	+58.1	36.7	48 07.3	+58.4	37.3	48 54.8	+58.6	38.0	49 41.9	+58.7	38.7	50 28.4	+59.0	39.5	51 14.5	+59.1	40.3	**57**
58	46 40.0	+57.6	35.0	47 29.0	+57.8	35.6	48 17.5	+58.1	36.3	49 05.7	+58.3	37.0	49 53.4	+58.5	37.7	50 40.6	+58.8	38.4	51 27.4	+58.9	39.2	52 13.6	+59.2	40.0	**58**
59	47 37.6	+57.4	34.6	48 26.8	+57.7	35.2	49 15.6	+57.9	35.9	50 04.0	+58.2	36.6	50 51.9	+58.4	37.3	51 39.4	+58.6	38.1	52 26.3	+58.9	38.9	53 12.8	+59.0	39.7	**59**
60	48 35.0	+57.4	34.2	49 24.5	+57.6	34.8	50 13.5	+57.9	35.5	51 02.2	+58.1	36.2	51 50.3	+58.4	37.0	52 38.0	+58.6	37.8	53 25.2	+58.8	38.6	54 11.8	+59.1	39.4	**60**
61	49 32.4	+57.2	33.7	50 22.1	+57.5	34.4	51 11.4	+57.8	35.1	52 00.3	+58.0	35.8	52 48.7	+58.3	36.6	53 36.6	+58.5	37.4	54 24.0	+58.8	38.2	55 10.9	+58.9	39.1	**61**
62	50 29.6	+57.2	33.3	51 19.6	+57.4	33.9	52 09.2	+57.7	34.7	52 58.3	+58.0	35.4	53 47.0	+58.2	36.2	54 35.1	+58.5	37.0	55 22.8	+58.7	37.9	56 09.8	+59.0	38.8	**62**
63	51 26.8	+57.0	32.8	52 17.0	+57.3	33.5	53 06.9	+57.5	34.2	53 56.3	+57.8	35.0	54 45.2	+58.1	35.8	55 33.6	+58.4	36.6	56 21.5	+58.6	37.5	57 08.8	+58.8	38.5	**63**
64	52 23.8	+56.8	32.3	53 14.3	+57.2	33.0	54 04.4	+57.5	33.7	54 54.1	+57.7	34.5	55 43.3	+58.0	35.3	56 32.0	+58.3	36.2	57 20.1	+58.6	37.1	58 07.6	+58.8	38.1	**64**
65	53 20.6	+56.8	31.7	54 11.5	+57.0	32.5	55 01.9	+57.3	33.2	55 51.8	+57.7	34.0	56 41.3	+57.9	34.9	57 30.3	+58.2	35.8	58 18.7	+58.4	36.7	59 06.4	+58.8	37.7	**65**
66	54 17.4	+56.5	31.2	55 08.5	+56.9	31.9	55 59.2	+57.2	32.7	56 49.5	+57.5	33.5	57 39.2	+57.8	34.4	58 28.5	+58.1	35.3	59 17.1	+58.4	36.3	60 05.2	+58.6	37.3	**66**
67	55 13.9	+56.4	30.6	56 05.4	+56.7	31.4	56 56.4	+57.0	32.2	57 47.0	+57.3	33.0	58 37.0	+57.7	33.9	59 26.6	+57.9	34.8	60 15.5	+58.3	35.8	61 03.8	+58.6	36.9	**67**
68	56 10.3	+56.2	30.0	57 02.1	+56.5	30.8	57 53.4	+56.9	31.6	58 44.3	+57.2	32.4	59 34.7	+57.5	33.4	60 24.5	+57.9	34.3	61 13.8	+58.2	35.3	62 02.4	+58.5	36.4	**68**
69	57 06.5	+56.1	29.4	57 58.6	+56.4	30.1	58 50.3	+56.7	31.0	59 41.5	+57.0	31.9	60 32.2	+57.4	32.8	61 22.4	+57.7	33.8	62 12.0	+58.0	34.8	63 00.9	+58.3	35.9	**69**
70	58 02.6	+55.7	28.7	58 55.0	+56.1	29.5	59 47.0	+56.5	30.3	60 38.5	+56.9	31.2	61 29.6	+57.2	32.2	62 20.1	+57.5	33.2	63 10.0	+57.9	34.3	63 59.2	+58.3	35.4	**70**
71	58 58.3	+55.6	28.0	59 51.1	+55.9	28.8	60 43.5	+56.3	29.7	61 35.4	+56.6	30.6	62 26.8	+57.0	31.5	63 17.6	+57.4	32.6	64 07.9	+57.7	33.7	64 57.5	+58.1	34.9	**71**
72	59 53.9	+55.3	27.3	60 47.0	+55.7	28.1	61 39.8	+56.0	28.9	62 32.0	+56.4	29.9	63 23.8	+56.8	30.9	64 15.0	+57.2	31.9	65 05.6	+57.6	33.0	65 55.6	+58.0	34.3	**72**
73	60 49.2	+54.9	26.5	61 42.7	+55.3	27.3	62 35.8	+55.7	28.2	63 28.4	+56.2	29.1	64 20.6	+56.6	30.1	65 12.2	+57.0	31.2	66 03.2	+57.4	32.4	66 53.6	+57.7	33.6	**73**
74	61 44.1	+54.7	25.6	62 38.0	+55.1	26.5	63 31.5	+55.5	27.4	64 24.6	+55.9	28.3	65 17.2	+56.3	29.3	66 09.2	+56.7	30.4	67 00.6	+57.2	31.6	67 51.3	+57.6	32.9	**74**
75	62 38.8	+54.3	24.7	63 33.1	+54.7	25.6	64 27.0	+55.2	26.5	65 20.5	+55.6	27.5	66 13.5	+56.0	28.5	67 05.9	+56.5	29.6	67 57.8	+56.9	30.8	68 48.9	+57.4	32.2	**75**
76	63 33.1	+53.9	23.8	64 27.8	+54.4	24.6	65 22.2	+54.7	25.6	66 16.1	+55.2	26.5	67 09.5	+55.7	27.6	68 02.4	+56.2	28.7	68 54.7	+56.6	30.0	69 46.3	+57.1	31.3	**76**
77	64 27.0	+53.5	22.8	65 22.2	+53.9	23.6	66 16.9	+54.4	24.6	67 11.3	+54.8	25.5	68 05.2	+55.3	26.6	68 58.6	+55.8	27.8	69 51.3	+56.3	29.0	70 43.4	+56.9	30.4	**77**
78	65 20.5	+53.0	21.7	66 16.1	+53.4	22.6	67 11.3	+53.9	23.5	68 06.1	+54.4	24.5	69 00.5	+54.9	25.6	69 54.4	+55.3	26.7	70 47.6	+56.0	28.0	71 40.3	+56.4	29.4	**78**
79	66 13.5	+52.4	20.6	67 09.5	+52.9	21.4	68 05.2	+53.4	22.3	69 00.5	+53.9	23.3	69 55.4	+54.3	24.4	70 49.7	+55.0	25.6	71 43.6	+55.5	26.9	72 36.7	+56.1	28.3	**79**
80	67 05.9	+51.9	19.4	68 02.4	+52.3	20.2	68 58.6	+52.7	21.1	69 54.4	+53.2	22.1	70 49.7	+53.9	23.1	71 44.7	+54.4	24.3	72 39.1	+54.9	25.6	73 32.8	+55.6	27.1	**80**
81	67 57.8	+51.1	18.0	68 54.7	+51.6	18.9	69 51.3	+52.1	19.7	70 47.6	+52.7	20.7	71 43.6	+53.1	21.8	72 39.1	+53.7	22.9	73 34.0	+54.4	24.3	74 28.4	+55.1	25.7	**81**
82	68 48.9	+50.4	16.6	69 46.3	+50.9	17.4	70 43.4	+51.4	18.3	71 40.3	+51.8	19.2	72 36.7	+52.5	20.2	73 32.8	+53.0	21.4	74 28.4	+53.7	22.7	75 23.5	+54.3	24.2	**82**
83	69 39.3	+49.6	15.1	70 37.2	+49.9	15.8	71 34.8	+50.4	16.7	72 32.1	+51.0	17.6	73 29.2	+51.5	18.6	74 25.8	+52.2	19.7	75 22.1	+52.8	21.0	76 17.8	+53.6	22.5	**83**
84	70 28.9	+48.5	13.4	71 27.1	+49.0	14.1	72 25.2	+49.5	14.9	73 23.1	+49.9	15.8	74 20.7	+50.5	16.7	75 18.0	+51.1	17.8	76 14.9	+51.8	19.1	77 11.4	+52.5	20.5	**84**
85	71 17.4	+47.5	11.6	72 16.1	+47.9	12.3	73 14.7	+48.2	13.0	74 13.0	+48.8	13.8	75 11.2	+49.3	14.7	76 09.1	+49.9	15.7	77 06.7	+50.5	16.9	78 03.9	+51.3	18.3	**85**
86	72 04.9	+46.1	9.7	73 04.0	+46.5	10.3	74 02.9	+46.9	10.9	75 01.8	+47.3	11.6	76 00.5	+47.8	12.4	76 59.0	+48.4	13.3	77 57.2	+49.1	14.4	78 55.2	+49.7	15.6	**86**
87	72 51.0	+44.7	7.6	73 50.5	+45.0	8.0	74 49.8	+45.4	8.5	75 49.1	+45.7	9.1	76 48.3	+46.1	9.8	77 47.4	*+46.5* •	10.6	78 46.3	*+47.1* •	11.5	79 44.9	*+47.8* •	12.6	**87**
88	73 35.7	+43.1	5.3	74 35.5	+43.2	5.6	75 35.2	*+43.5* •	6.0	76 34.8	*+43.8* •	6.4	77 34.4	*+44.1* •	6.9	78 33.9	*+44.4* •	7.5	79 33.4	*+44.8* •	8.2	80 32.7	*+45.3* •	9.1	**88**
89	74 18.8	*+41.2* •	2.7	75 18.7	*+41.3* •	2.9	76 18.7	*+41.3* •	3.1	77 18.6	*+41.4* •	3.4	78 18.5	*+41.5* •	3.7	79 18.3	*+41.7* •	4.0	80 18.2	*+41.8* •	4.4	81 18.0	*+42.0* •	4.9	**89**
90	75 00.0	*+39.0* •	0.0	76 00.0	*+38.9* •	0.0	77 00.0	*+38.8* •	0.0	78 00.0	*+38.7* •	0.0	79 00.0	*+38.6* •	0.0	80 00.0	*+38.4* •	0.0	81 00.0	*+38.2* •	0.0	82 00.0	*+37.9* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 132°, 228°

49°, 311° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 46.6	+58.8	130.0	9 07.9	+59.0	130.1	8 29.2	+59.1	130.3	7 50.4	+59.2	130.4	7 11.5	+59.3	130.5	6 32.5	+59.5	130.6	5 53.4	+59.6	130.6	5 14.3	+59.7	130.7	0
1	10 45.4	+58.8	129.8	10 06.9	+59.0	130.0	9 28.3	+59.1	130.1	8 49.6	+59.3	130.2	8 10.8	+59.4	130.3	7 32.0	+59.4	130.4	6 53.0	+59.6	130.5	6 14.0	+59.7	130.6	1
2	11 44.2	+58.8	129.6	11 05.9	+58.9	129.8	10 27.4	+59.1	129.9	9 48.9	+59.2	130.1	9 10.2	+59.4	130.2	8 31.4	+59.5	130.3	7 52.6	+59.6	130.4	7 13.7	+59.6	130.5	2
3	12 43.0	+58.7	129.4	12 04.8	+58.9	129.6	11 26.5	+59.1	129.7	10 48.1	+59.2	129.9	10 09.6	+59.3	130.0	9 30.9	+59.5	130.2	8 52.2	+59.5	130.3	8 13.3	+59.7	130.4	3
4	13 41.7	+58.8	129.2	13 03.7	+59.0	129.4	12 25.6	+59.1	129.6	11 47.3	+59.2	129.7	11 08.9	+59.4	129.9	10 30.4	+59.4	130.0	9 51.7	+59.6	130.2	9 13.0	+59.6	130.3	4
5	14 40.5	+58.8	129.0	14 02.7	+58.9	129.2	13 24.7	+59.1	129.4	12 46.5	+59.3	129.6	12 08.3	+59.3	129.7	11 29.8	+59.5	129.9	10 51.3	+59.6	130.0	10 12.6	+59.7	130.2	5
6	15 39.3	+58.7	128.8	15 01.6	+58.9	129.0	14 23.8	+59.0	129.2	13 45.8	+59.2	129.4	13 07.6	+59.3	129.6	12 29.3	+59.5	129.8	11 50.9	+59.5	129.9	11 12.3	+59.6	130.1	6
7	16 38.0	+58.8	128.6	16 00.5	+58.9	128.8	15 22.8	+59.1	129.0	14 45.0	+59.2	129.2	14 06.9	+59.4	129.4	13 28.8	+59.4	129.6	12 50.4	+59.6	129.8	12 11.9	+59.7	130.0	7
8	17 36.8	+58.7	128.4	16 59.4	+58.9	128.6	16 21.9	+59.0	128.8	15 44.2	+59.2	129.1	15 06.3	+59.3	129.3	14 28.2	+59.4	129.5	13 50.0	+59.5	129.7	13 11.6	+59.6	129.9	8
9	18 35.5	+58.7	128.1	17 58.3	+58.9	128.4	17 20.9	+59.1	128.7	16 43.4	+59.1	128.9	16 05.6	+59.3	129.1	15 27.6	+59.5	129.3	14 49.5	+59.6	129.5	14 11.2	+59.7	129.7	9
10	19 34.2	+58.7	127.9	18 57.2	+58.8	128.2	18 20.0	+59.0	128.5	17 42.5	+59.2	128.7	17 04.9	+59.3	129.0	16 27.1	+59.4	129.2	15 49.1	+59.5	129.4	15 10.9	+59.6	129.6	10
11	20 32.9	+58.6	127.7	19 56.0	+58.9	128.0	19 19.0	+59.0	128.3	18 41.7	+59.2	128.5	18 04.2	+59.3	128.8	17 26.5	+59.4	129.1	16 48.6	+59.6	129.3	16 10.5	+59.7	129.5	11
12	21 31.5	+58.7	127.5	20 54.9	+58.8	127.8	20 18.0	+59.0	128.1	19 40.9	+59.1	128.4	19 03.5	+59.3	128.6	18 25.9	+59.5	128.9	17 48.2	+59.5	129.2	17 10.2	+59.6	129.4	12
13	22 30.2	+58.6	127.3	21 53.7	+58.9	127.6	21 17.0	+59.0	127.9	20 40.0	+59.2	128.2	20 02.8	+59.3	128.5	19 25.4	+59.4	128.8	18 47.7	+59.5	129.0	18 09.8	+59.6	129.3	13
14	23 28.8	+58.6	127.0	22 52.6	+58.8	127.4	22 16.0	+59.0	127.7	21 39.2	+59.1	128.0	21 02.1	+59.3	128.3	20 24.8	+59.4	128.6	19 47.2	+59.5	128.9	19 09.4	+59.7	129.2	14
15	24 27.4	+58.6	126.8	23 51.4	+58.7	127.1	23 15.0	+58.9	127.5	22 38.3	+59.1	127.8	22 01.4	+59.3	128.2	21 24.2	+59.4	128.5	20 46.7	+59.6	128.8	20 09.1	+59.6	129.1	15
16	25 26.0	+58.6	126.6	24 50.1	+58.8	126.9	24 13.9	+59.0	127.3	23 37.4	+59.1	127.6	23 00.7	+59.2	128.0	22 23.6	+59.4	128.3	21 46.3	+59.5	128.6	21 08.7	+59.6	128.9	16
17	26 24.6	+58.5	126.3	25 48.9	+58.7	126.7	25 12.9	+58.9	127.1	24 36.5	+59.1	127.5	23 59.9	+59.3	127.8	23 23.0	+59.4	128.2	22 45.8	+59.5	128.5	22 08.3	+59.6	128.8	17
18	27 23.1	+58.6	126.1	26 47.6	+58.8	126.5	26 11.8	+58.9	126.9	25 35.6	+59.1	127.3	24 59.2	+59.2	127.6	24 22.4	+59.3	128.0	23 45.3	+59.5	128.4	23 07.9	+59.6	128.7	18
19	28 21.7	+58.4	125.8	27 46.4	+58.7	126.2	27 10.7	+58.9	126.7	26 34.7	+59.1	127.1	25 58.4	+59.2	127.5	25 21.7	+59.4	127.8	24 44.8	+59.5	128.2	24 07.5	+59.6	128.6	19
20	29 20.1	+58.5	125.6	28 45.1	+58.6	126.0	28 09.6	+58.9	126.4	27 33.8	+59.0	126.9	26 57.6	+59.2	127.3	26 21.1	+59.3	127.7	25 44.3	+59.4	128.1	25 07.1	+59.6	128.4	20
21	30 18.6	+58.4	125.3	29 43.7	+58.7	125.8	29 08.5	+58.8	126.2	28 32.8	+59.0	126.7	27 56.8	+59.2	127.1	27 20.4	+59.4	127.5	26 43.7	+59.5	127.9	26 06.7	+59.6	128.3	21
22	31 17.0	+58.4	125.0	30 42.4	+58.6	125.5	30 07.3	+58.8	126.0	29 31.8	+59.1	126.5	28 56.0	+59.2	126.9	28 19.8	+59.3	127.3	27 43.2	+59.5	127.8	27 06.3	+59.6	128.2	22
23	32 15.4	+58.4	124.8	31 41.0	+58.6	125.3	31 06.1	+58.8	125.8	30 30.9	+58.9	126.3	29 55.2	+59.1	126.7	29 19.1	+59.3	127.2	28 42.7	+59.4	127.6	28 05.9	+59.5	128.0	23
24	33 13.8	+58.3	124.5	32 39.6	+58.5	125.0	32 04.9	+58.8	125.5	31 29.8	+59.0	126.0	30 54.3	+59.2	126.5	30 18.4	+59.3	127.0	29 42.1	+59.4	127.5	29 05.4	+59.6	127.9	24
25	34 12.1	+58.3	124.2	33 38.1	+58.6	124.8	33 03.7	+58.7	125.3	32 28.8	+58.9	125.8	31 53.5	+59.1	126.3	31 17.7	+59.3	126.8	30 41.5	+59.5	127.3	30 05.0	+59.5	127.8	25
26	35 10.4	+58.2	123.9	34 36.7	+58.4	124.5	34 02.4	+58.8	125.1	33 27.7	+59.0	125.6	32 52.6	+59.1	126.1	32 17.0	+59.3	126.6	31 41.0	+59.4	127.1	31 04.5	+59.6	127.6	26
27	36 08.6	+58.2	123.6	35 35.1	+58.5	124.2	35 01.2	+58.6	124.8	34 26.7	+58.8	125.4	33 51.7	+59.1	125.9	33 16.3	+59.2	126.5	32 40.4	+59.4	127.0	32 04.1	+59.5	127.5	27
28	37 06.8	+58.2	123.3	36 33.6	+58.4	123.9	35 59.8	+58.7	124.5	35 25.5	+58.9	125.1	34 50.8	+59.0	125.7	34 15.5	+59.2	126.3	33 39.8	+59.4	126.8	33 03.6	+59.5	127.3	28
29	38 05.0	+58.1	123.0	37 32.0	+58.4	123.7	36 58.5	+58.6	124.3	36 24.4	+58.8	124.9	35 49.8	+59.1	125.5	35 14.7	+59.3	126.1	34 39.2	+59.3	126.6	34 03.1	+59.5	127.2	29
30	39 03.1	+58.0	122.7	38 30.4	+58.3	123.4	37 57.1	+58.6	124.0	37 23.2	+58.8	124.7	36 48.9	+59.0	125.3	36 14.0	+59.1	125.9	35 38.5	+59.4	126.5	35 02.6	+59.5	127.0	30
31	40 01.1	+58.0	122.4	39 28.7	+58.3	123.1	38 55.7	+58.5	123.7	38 22.0	+58.8	124.4	37 47.9	+59.0	125.0	37 13.1	+59.2	125.7	36 37.9	+59.3	126.3	36 02.1	+59.5	126.9	31
32	40 59.1	+57.9	122.0	40 27.0	+58.2	122.7	39 54.2	+58.5	123.5	39 20.8	+58.8	124.1	38 46.9	+58.9	124.8	38 12.3	+59.2	125.5	37 37.2	+59.4	126.1	37 01.6	+59.5	126.7	32
33	41 57.0	+57.9	121.7	41 25.2	+58.2	122.4	40 52.7	+58.4	123.2	40 19.6	+58.6	123.9	39 45.8	+58.9	124.6	39 11.5	+59.1	125.2	38 36.6	+59.3	125.9	38 01.1	+59.5	126.5	33
34	42 54.9	+57.8	121.3	42 23.4	+58.1	122.1	41 51.1	+58.4	122.9	41 18.2	+58.7	123.6	40 44.7	+58.9	124.3	40 10.6	+59.1	125.0	39 35.9	+59.2	125.7	39 00.6	+59.4	126.4	34
35	43 52.7	+57.7	120.9	43 21.5	+58.0	121.8	42 49.5	+58.4	122.6	42 16.9	+58.6	123.3	41 43.6	+58.9	124.1	41 09.7	+59.1	124.8	40 35.1	+59.3	125.5	40 00.0	+59.4	126.2	35
36	44 50.4	+57.6	120.6	44 19.5	+58.0	121.4	43 47.9	+58.3	122.2	43 15.5	+58.6	123.0	42 42.5	+58.8	123.8	42 08.8	+59.0	124.6	41 34.4	+59.2	125.3	40 59.4	+59.4	126.0	36
37	45 48.0	+57.6	120.2	45 17.5	+57.9	121.0	44 46.2	+58.2	121.9	44 14.1	+58.5	122.7	43 41.3	+58.8	123.5	43 07.8	+59.0	124.3	42 33.6	+59.2	125.1	41 58.8	+59.4	125.8	37
38	46 45.6	+57.5	119.8	46 15.4	+57.8	120.7	45 44.4	+58.2	121.6	45 12.6	+58.5	122.4	44 40.1	+58.7	123.3	44 06.8	+59.0	124.1	43 32.8	+59.2	124.9	42 58.2	+59.4	125.6	38
39	47 43.1	+57.3	119.3	47 13.2	+57.8	120.3	46 42.6	+58.1	121.2	46 11.1	+58.4	122.1	45 38.8	+58.7	123.0	45 05.8	+58.9	123.8	44 32.0	+59.2	124.6	43 57.6	+59.3	125.4	39
40	48 40.4	+57.3	118.9	48 11.0	+57.6	119.9	47 40.7	+58.0	120.8	47 09.5	+58.3	121.8	46 37.5	+58.6	122.7	46 04.7	+58.9	123.5	45 31.2	+59.1	124.4	44 56.9	+59.4	125.2	40
41	49 37.7	+57.1	118.4	49 08.6	+57.6	119.5	48 38.7	+57.9	120.5	48 07.8	+58.3	121.4	47 36.1	+58.6	122.4	47 03.6	+58.9	123.3	46 30.3	+59.1	124.2	45 56.3	+59.3	125.0	41
42	50 34.8	+57.1	118.0	50 06.2	+57.5	119.0	49 36.6	+57.9	120.1	49 06.1	+58.2	121.1	48 34.7	+58.6	122.0	48 02.5	+58.8	123.0	47 29.4	+59.1	123.9	46 55.6	+59.2	124.8	42
43	51 31.9	+56.9	117.5	51 03.7	+57.3	118.6	50 34.5	+57.7	119.6	50 04.3	+58.2	120.7	49 33.3	+58.4	121.7	49 01.3	+58.8	122.7	48 28.5	+59.0	123.6	47 54.8	+59.3	124.6	43
44	52 28.8	+56.7	117.0	52 01.0	+57.3	118.1	51 32.2	+57.7	119.2	51 02.5	+58.0	120.3	50 31.7	+58.4	121.3	50 00.1	+58.7	122.4	49 27.5	+59.0	123.4	48 54.1	+59.2	124.3	44
45	53 25.5	+56.6	116.4	52 58.3	+57.1	117.6	52 29.9	+57.6	118.8	52 00.5	+58.0	119.9	51 30.1	+58.4	121.0	50 58.8	+58.6	122.0	50 26.5	+58.9	123.1	49 53.3	+59.2	124.1	45
46	54 22.1	+56.5	115.9	53 55.4	+56.9	117.1	53 27.5	+57.4	118.3	52 58.5	+57.9	119.5	52 28.5	+58.2	120.6	51 57.4	+58.6	121.7	51 25.4	+58.9	122.8	50 52.5	+59.1	123.8	46
47	55 18.6	+56.2	115.3	54 52.3	+56.9	116.6	54 24.9	+57.4	117.8	53 56.4	+57.8	119.0	53 26.7	+58.2	120.2	52 56.0	+58.6	121.4	52 24.3	+58.8	122.5	51 51.6	+59.1	123.5	47
48	56 14.8	+56.1	114.6	55 49.2	+56.6	116.0	55 22.3	+57.2	117.3	54 54.2	+57.6	118.6	54 24.9	+58.1	119.8	53 54.6	+58.4	121.0	53 23.1	+58.8	122.1	52 50.7	+59.1	123.3	48
49	57 10.9	+55.9	114.0	56 45.8	+56.5	115.4	56 19.5	+57.0	116.8	55 51.8	+57.6	118.1	55 23.0	+58.0	119.4	54 53.0	+58.4	120.6	54 21.9	+58.7	121.8	53 49.8	+59.0	123.0	49
50	58 06.8	+55.6	113.3	57 42.3	+56.3	114.8	57 16.5	+56.9	116.2	56 49.4	+57.4	117.6	56 21.0	+57.9	118.9	55 51.4	+58.3	120.2	55 20.6	+58.7	121.4	54 48.8	+59.0	122.7	50
51	59 02.4	+55.4	112.6	58 38.6	+56.1	114.1	58 13.4	+56.7	115.6	57 46.8	+57.3	117.0	57 18.9	+57.7	118.4	56 49.7	+58.2	119.8	56 19.3	+58.6	121.1	55 47.8	+58.9	122.3	51
52	59 57.8	+55.1	111.8	59 34.7	+55.8	113.4	59 10.1	+56.5	115.0	58 44.1	+57.1	116.5	58 16.6	+57.7	117.9	57 47.9	+58.1	119.3	57 17.9	+58.5	120.7	56 46.7	+58.8	122.0	52
53	60 52.9	+54.8	111.0	60 30.5	+55.6	112.7	60 06.6	+56.3	114.3	59 41.2	+56.9	115.9	59 14.3	+57.5	117.4	58 46.0	+58.0	118.8	58 16.4	+58.4	120.3	57 45.5	+58.8	121.6	53
54	61 47.7	+54.4	110.2	61 26.1	+55.3	111.9	61 02.9	+56.1	113.6	60 38.1	+56.7	115.2	60 11.8	+57.3	116.8	59 44.0	+57.9	118.3	59 14.8	+58.4	119.8	58 44.3	+58.8	121.3	54
55	62 42.1	+54.1	109.3	62 21.4	+55.0	111.1	61 59.0	+55.8	112.8	61 34.8	+56.6	114.6	61 09.1	+57.2	116.2	60 41.9	+57.7	117.8	60 13.2	+58.2	119.4	59 43.1	+58.6	120.9	55
56	63 36.2	+53.7	108.3	63 16.4	+54.7	110.2	62 54.8	+55.5	112.1	62 31.4	+56.3	113.8	62 06.3	+57.0	115.6	61 39.6	+57.6	117.2	61 11.4	+58.1	118.9	60 41.7	+58.6	120.4	56
57	64 29.9	+53.2	107.3	64 11.1	+54.2	109.3	63 50.3	+55.2	111.2	63 27.7	+56.0	113.1	63 03.3	+56.8	114.9	62 37.2	+57.4	116.6	62 09.5	+58.0	118.3	61 40.3	+58.4	120.0	57
58	65 23.1	+52.8	106.2	65 05.3	+53.9	108.3	64 45.5	+54.9	110.3	64 23.7	+55.8	112.3	64 00.1	+56.5	114.2	63 34.6	+57.3	116.0	63 07.5	+57.8	117.8	62 38.7	+58.4	119.5	58
59	66 15.9	+52.1	105.1	65 59.2	+53.4	107.2	65 40.4	+54.4	109.3	65 19.5	+55.4	111.4	64 56.6	+56.3	113.4	64 31.9	+57.0	115.3	64 05.3	+57.7	117.2	63 37.1	+58.2	119.0	59
60	67 08.0	+51.6	103.8	66 52.6	+52.8	106.1	66 34.8	+54.1	108.3	66 14.9	+55.1	110.5	65 52.9	+56.0	112.6	65 28.9	+56.8	114.6	65 03.0	+57.5	116.5	64 35.3	+58.1	118.4	60
61	67 59.6	+50.8	102.5	67 45.4	+52.3	104.9	67 28.9	+53.5	107.2	67 10.0	+54.7	109.5	66 48.9	+55.7	111.7	66 25.7	+56.6	113.8	66 00.5	+57.3	115.9	65 33.4	+58.0	117.8	61
62	68 50.4	+50.1	101.0	68 37.7	+51.5	103.5	68 22.4	+52.9	106.0	68 04.7	+54.2	108.4	67 44.6	+55.3	110.7	67 22.3	+56.2	112.9	66 57.8	+57.1	115.1	66 31.4	+57.8	117.2	62
63	69 40.5	+49.1	99.5	69 29.2	+50.9	102.1	69 15.3	+52.4	104.7	68 58.9	+53.6	107.2	68 39.9	+54.9	109.7	68 18.5	+56.0	112.0	67 54.9	+56.9	114.3	67 29.2	+57.6	116.5	63
64	70 29.6	+48.1	97.8	70 20.1	+49.9	100.5	70 07.7	+51.6	103.3	69 52.5	+53.1	105.9	69 34.8	+54.4	108.5	69 14.5	+55.5	111.0	68 51.8	+56.5	113.4	68 26.8	+57.4	115.8	64
65	71 17.7	+47.0	96.0	71 10.0	+49.0	98.9	70 59.3	+50.7	101.7	70 45.6	+52.4	104.5	70 29.2	+53.8	107.3	70 10.0	+55.1	109.9	69 48.3	+56.2	112.5	69 24.2	+57.1	115.0	65
66	72 04.7	+45.7	94.0	71 59.0	+47.8	97.0	71 50.0	+49.9	100.1	71 38.0	+51.6	103.0	71 23.0	+53.2	105.9	71 05.1	+54.6	108.7	70 44.5	+55.8	111.5	70 21.3	+56.8	114.1	66
67	72 50.4	+44.2	91.8	72 46.8	+46.6	95.0	72 39.9	+48.7	98.2	72 29.6	+50.8	101.4	72 16.2	+52.5	104.5	71 59.7	+54.1	107.4	71 40.3	+55.4	110.3	71 18.1	+56.5	113.1	67
68	73 34.6	+42.5	89.5	73 33.4	+45.1	92.9	73 28.6	+47.5	96.2	73 20.4	+49.6	99.6	73 08.7	+51.6	102.8	72 53.8	+53.3	106.0	72 35.7	+54.9	109.1	72 14.6	+56.2	112.0	68
69	74 17.1	+40.5 •	86.9	74 18.5	+43.3	90.5	74 16.1	+46.0	94.0	74 10.0	+48.5	97.6	74 00.3	+50.7	101.0	73 47.1	+52.6	104.4	73 30.6	+54.2	107.7	73 10.8	+55.6	110.8	69
70	74 57.6	+38.4 •	84.1	75 01.8	+41.4 •	87.9	75 02.1	+44.3	91.6	74 58.5	+47.0	95.3	74 51.0	+49.4	99.0	74 39.7	+51.6	102.6	74 24.8	+53.5	106.1	74 06.4	+55.2	109.5	70
71	75 36.0	+35.8 •	81.1	75 43.2	+39.2 •	85.0	75 46.4	+42.4 •	88.9	75 45.5	+45.3	92.9	75 40.4	+48.1	96.8	75 31.3	+50.5	100.6	75 18.3	+52.7	104.4	75 01.6	+54.4	108.0	71
72	76 11.8	+33.0 •	77.8	76 22.4	+36.6 •	81.9	76 28.8	+40.0 •	86.0	76 30.8	+43.3 •	90.1	76 28.5	+46.4	94.3	76 21.8	+49.2	98.4	76 11.0	+51.6	102.4	75 56.0	+53.7	106.3	72
73	76 44.8	+29.7 •	74.2	76 59.0	+33.5 •	78.4	77 08.8	+37.4 •	82.7	77 14.1	+41.1 •	87.1	77 14.9	+44.4 •	91.5	77 11.0	+47.5	95.9	77 02.6	+50.3	100.2	76 49.7	+52.8	104.4	73
74	77 14.5	+26.1 •	70.4	77 32.5	+30.2 •	74.7	77 46.2	+34.2 •	79.1	77 55.2	+38.2 •	83.7	77 59.3	+42.1 •	88.4	77 58.5	+45.6 •	93.1	77 52.9	+48.8	97.7	77 42.5	+51.5	102.3	74
75	77 40.6	+22.1 •	66.2	78 02.7	+26.4 •	70.6	78 20.4	+30.7 •	75.1	78 33.4	+35.0 •	79.9	78 41.4	+39.2 •	84.8	78 44.1	+43.3 •	89.9	78 41.7	+46.9 •	94.9	78 34.0	+50.1	99.8	75
76	78 02.7	+17.7 •	61.8	78 29.1	+22.0 •	66.1	78 51.1	+26.6 •	70.8	79 08.4	+31.2 •	75.7	79 20.6	+35.9 •	80.9	79 27.4	+40.3 •	86.2	79 28.6	+44.5 •	91.6	79 24.1	+48.3 •	96.9	76
77	78 20.4	+13.0 •	57.1	78 51.1	+17.3 •	61.4	79 17.7	+21.9 •	66.1	79 39.6	+26.9 •	71.1	79 56.5	+31.8 •	76.4	80 07.7	+36.8 •	82.0	80 13.1	+41.5 •	87.8	80 12.4	+45.9 •	93.6	77
78	78 33.4	+8.0 •	52.3	79 08.4	+12.2 •	56.4	79 39.6	+16.9 •	61.0	80 06.5	+21.8 •	66.0	80 28.3	+27.1 •	71.4	80 44.5	+32.5 •	77.2	80 54.6	+37.9 •	83.4	80 58.3	+43.0 •	89.6	78
79	78 41.4	+2.7 •	47.2	79 20.6	+6.8 •	51.1	79 56.5	+11.2 •	55.5	80 28.3	+16.2 •	60.4	80 55.4	+21.6 •	65.9	81 17.0	+27.5 •	71.9	81 32.5	+33.4 •	78.3	81 41.3	+39.2 •	85.0	79
80	78 44.1	−2.4 •	42.1	79 27.4	+1.2 •	45.7	80 07.7	+5.4 •	49.9	80 44.5	+10.1 •	54.5	81 17.0	+15.5 •	59.9	81 44.5	+21.4 •	65.8	82 05.9	+27.8 •	72.4	82 20.5	+34.3 •	79.5	80
81	78 41.7	−7.7 •	37.0	79 28.6	−4.5 •	40.3	80 13.1	−0.7 •	44.0	80 54.6	+3.7 •	48.4	81 32.5	+8.8 •	53.4	82 05.9	+14.6 •	59.2	82 33.7	+21.1 •	65.8	82 54.8	+28.2 •	73.1	81
82	78 34.0	−12.7 •	32.0	79 24.1	−9.9 •	34.8	80 12.4	−6.7 •	38.1	80 58.3	−2.9 •	42.0	81 41.3	+1.7 •	46.6	82 20.5	+7.0 •	52.0	82 54.8	+13.4 •	58.4	83 23.0	+20.7 •	65.7	82
83	78 21.3	−17.4 •	27.1	79 14.2	−15.2 •	29.5	80 05.7	−12.6 •	32.3	80 55.4	−9.3 •	35.7	81 43.0	−5.5 •	39.7	82 27.5	−0.7 •	44.5	83 08.2	+5.0 •	50.3	83 43.7	+11.9 •	57.3	83
84	78 03.9	−21.8 •	22.4	78 59.0	−20.1 •	24.4	79 53.1	−18.0 •	26.7	80 46.1	−15.5 •	29.5	81 37.5	−12.4 •	32.8	82 26.8	−8.6 •	36.9	83 13.2	−3.8 •	41.9	83 55.6	+2.3 •	48.2	84
85	77 42.1	−25.9 •	18.0	78 38.9	−24.6 •	19.5	79 35.1	−23.0 •	21.3	80 30.6	−21.2 •	23.5	81 25.1	−18.9 •	26.2	82 18.2	−16.0 •	29.4	83 09.4	−12.3 •	33.5	83 57.9	−7.5 •	38.7	85
86	77 16.2	−29.6 •	13.8	78 14.3	−28.6 •	15.0	79 12.1	−27.6 •	16.3	80 09.4	−26.2 •	17.9	81 06.2	−24.7 •	19.9	82 02.2	−22.7 •	22.3	82 57.1	−20.2 •	25.4	83 50.4	−16.8 •	29.4	86
87	76 46.6	−32.7 •	9.9	77 45.7	−32.2 •	10.7	78 44.5	−31.5 •	11.7	79 43.2	−30.7 •	12.8	80 41.5	−29.7 •	14.1	81 39.5	−28.5 •	15.8	82 36.9	−26.9 •	17.9	83 33.6	−24.9 •	20.6	87
88	76 13.9	−35.7 •	6.4	77 13.5	−35.4 •	6.8	78 13.0	−35.0 •	7.4	79 12.5	−34.6 •	8.1	80 11.8	−34.1 •	8.9	81 11.0	−33.4 •	9.9	82 10.0	−32.7 •	11.1	83 08.7	−31.6 •	12.7	88
89	75 38.2	−38.2 •	3.0	76 38.1	−38.1 •	3.3	77 38.0	−38.0 •	3.5	78 37.9	−37.9 •	3.8	79 37.7	−37.7 •	4.2	80 37.6	−37.6 •	4.6	81 37.3	−37.3 •	5.2	82 37.1	−37.1 •	5.9	89
90	75 00.0	−40.4 •	0.0	76 00.0	−40.5 •	0.0	77 00.0	−40.6 •	0.0	78 00.0	−40.7 •	0.0	79 00.0	−40.8 •	0.0	80 00.0	−40.9 •	0.0	81 00.0	−41.1 •	0.0	82 00.0	−41.3 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 49°, 311°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 46.6	–58.8	130.0	9 07.9	–58.9	130.1	8 29.2	–59.1	130.3	7 50.4	–59.3	130.4	7 11.5	–59.4	130.5	6 32.5	–59.5	130.6	5 53.4	–59.5	130.6	5 14.3	–59.6	130.7	**0**
1	8 47.8	–58.9	130.2	8 09.0	–59.0	130.3	7 30.1	–59.1	130.4	6 51.1	–59.2	130.5	6 12.1	–59.4	130.6	5 33.0	–59.5	130.7	4 53.9	–59.6	130.8	4 14.7	–59.7	130.8	**1**
2	7 48.9	–58.8	130.4	7 10.0	–59.0	130.5	6 31.0	–59.1	130.6	5 51.9	–59.3	130.7	5 12.7	–59.3	130.8	4 33.5	–59.4	130.8	3 54.3	–59.6	130.9	3 15.0	–59.7	130.9	**2**
3	6 50.1	–58.8	130.6	6 11.0	–59.0	130.7	5 31.9	–59.2	130.8	4 52.6	–59.2	130.9	4 13.4	–59.4	130.9	3 34.1	–59.5	131.0	2 54.7	–59.6	131.0	2 15.3	–59.6	131.0	**3**
4	5 51.3	–58.8	130.8	5 12.0	–58.9	130.9	4 32.7	–59.1	131.0	3 53.4	–59.3	131.0	3 14.0	–59.4	131.1	2 34.6	–59.5	131.1	1 55.1	–59.6	131.1	1 15.7	–59.7	131.1	**4**
5	4 52.5	–58.9	131.0	4 13.1	–59.0	131.1	3 33.6	–59.1	131.1	2 54.1	–59.2	131.2	2 14.6	–59.3	131.2	1 35.1	–59.5	131.2	0 55.5	–59.5	131.2	0 16.0	–59.7	131.2	**5**
6	3 53.6	–58.8	131.2	3 14.1	–59.0	131.3	2 34.5	–59.1	131.3	1 54.9	–59.3	131.3	1 15.3	–59.4	131.3	0 35.6	–59.5	131.4	0 04.0	+59.6	48.6	0 43.7	+59.6	48.6	**6**
7	2 54.8	–58.9	131.4	2 15.1	–59.0	131.4	1 35.4	–59.2	131.5	0 55.6	–59.2	131.5	0 15.9	–59.4	131.5	0 23.9	+59.5	48.5	1 03.6	+59.6	48.5	1 43.3	+59.7	48.5	**7**
8	1 55.9	–58.8	131.6	1 16.1	–59.0	131.6	0 36.2	–59.1	131.6	0 03.6	+59.3	48.4	0 43.5	+59.4	48.4	1 23.4	+59.4	48.4	2 03.2	+59.6	48.4	2 43.0	+59.7	48.4	**8**
9	0 57.1	–58.9	131.8	0 17.1	–59.0	131.8	0 22.9	+59.1	48.2	1 02.9	+59.2	48.2	1 42.9	+59.3	48.2	2 22.8	+59.5	48.3	3 02.8	+59.6	48.3	3 42.7	+59.6	48.3	**9**
10	0 01.8	+58.8	48.0	0 41.9	+59.0	48.0	1 22.0	+59.2	48.0	2 02.1	+59.3	48.0	2 42.2	+59.4	48.1	3 22.3	+59.5	48.1	4 02.4	+59.5	48.2	4 42.3	+59.7	48.2	**10**
11	1 00.6	+58.8	47.8	1 40.9	+59.0	47.8	2 21.2	+59.1	47.9	3 01.4	+59.3	47.9	3 41.6	+59.4	47.9	4 21.8	+59.5	48.0	5 01.9	+59.6	48.0	5 42.0	+59.7	48.1	**11**
12	1 59.4	+58.9	47.6	2 39.9	+59.0	47.6	3 20.3	+59.1	47.7	4 00.7	+59.2	47.7	4 41.0	+59.4	47.8	5 21.3	+59.5	47.9	6 01.5	+59.6	47.9	6 41.7	+59.6	48.0	**12**
13	2 58.3	+58.8	47.4	3 38.9	+58.9	47.5	4 19.4	+59.1	47.5	4 59.9	+59.3	47.6	5 40.4	+59.3	47.6	6 20.8	+59.4	47.7	7 01.1	+59.6	47.8	7 41.3	+59.7	47.9	**13**
14	3 57.1	+58.9	47.2	4 37.8	+59.0	47.3	5 18.5	+59.1	47.3	5 59.2	+59.2	47.4	6 39.7	+59.4	47.5	7 20.2	+59.5	47.6	8 00.7	+59.5	47.7	8 41.0	+59.7	47.8	**14**
15	4 56.0	+58.8	47.0	5 36.8	+59.0	47.1	6 17.6	+59.2	47.2	6 58.4	+59.2	47.3	7 39.1	+59.4	47.4	8 19.7	+59.5	47.5	9 00.2	+59.6	47.6	9 40.7	+59.6	47.7	**15**
16	5 54.8	+58.8	46.8	6 35.8	+59.0	46.9	7 16.8	+59.1	47.0	7 57.6	+59.3	47.1	8 38.5	+59.3	47.2	9 19.2	+59.4	47.3	9 59.8	+59.6	47.4	10 40.3	+59.7	47.6	**16**
17	6 53.6	+58.8	46.6	7 34.8	+59.0	46.7	8 15.9	+59.1	46.8	8 56.9	+59.2	46.9	9 37.8	+59.4	47.1	10 18.6	+59.5	47.2	10 59.4	+59.5	47.3	11 40.0	+59.6	47.5	**17**
18	7 52.4	+58.9	46.4	8 33.8	+58.9	46.5	9 15.0	+59.1	46.7	9 56.1	+59.3	46.8	10 37.2	+59.3	46.9	11 18.1	+59.5	47.1	11 58.9	+59.6	47.2	12 39.6	+59.7	47.4	**18**
19	8 51.3	+58.8	46.2	9 32.7	+59.0	46.4	10 14.1	+59.1	46.5	10 55.4	+59.2	46.6	11 36.5	+59.4	46.8	12 17.6	+59.4	46.9	12 58.5	+59.5	47.1	13 39.3	+59.6	47.3	**19**
20	9 50.1	+58.8	46.0	10 31.7	+58.9	46.2	11 13.2	+59.1	46.3	11 54.6	+59.2	46.5	12 35.9	+59.3	46.6	13 17.0	+59.5	46.8	13 58.0	+59.6	47.0	14 38.9	+59.7	47.1	**20**
21	10 48.9	+58.8	45.8	11 30.6	+59.0	46.0	12 12.3	+59.1	46.1	12 53.8	+59.2	46.3	13 35.2	+59.3	46.5	14 16.5	+59.4	46.6	14 57.6	+59.5	46.8	15 38.6	+59.6	47.0	**21**
22	11 47.7	+58.8	45.6	12 29.6	+58.9	45.8	13 11.4	+59.0	45.9	13 53.0	+59.2	46.1	14 34.5	+59.4	46.3	15 15.9	+59.5	46.5	15 57.1	+59.6	46.7	16 38.2	+59.6	46.9	**22**
23	12 46.5	+58.8	45.4	13 28.5	+58.9	45.6	14 10.4	+59.1	45.8	14 52.2	+59.2	46.0	15 33.9	+59.3	46.2	16 15.4	+59.4	46.4	16 56.7	+59.5	46.6	17 37.8	+59.7	46.8	**23**
24	13 45.3	+58.7	45.2	14 27.4	+59.0	45.4	15 09.5	+59.1	45.6	15 51.4	+59.2	45.8	16 33.2	+59.3	46.0	17 14.8	+59.4	46.2	17 56.2	+59.6	46.4	18 37.5	+59.6	46.7	**24**
25	14 44.0	+58.8	45.0	15 26.4	+58.9	45.2	16 08.6	+59.0	45.4	16 50.6	+59.2	45.6	17 32.5	+59.3	45.8	18 14.2	+59.4	46.1	18 55.8	+59.5	46.3	19 37.1	+59.6	46.6	**25**
26	15 42.8	+58.7	44.8	16 25.3	+58.9	45.0	17 07.6	+59.1	45.2	17 49.8	+59.2	45.4	18 31.8	+59.3	45.7	19 13.6	+59.5	45.9	19 55.3	+59.5	46.2	20 36.7	+59.6	46.4	**26**
27	16 41.5	+58.8	44.6	17 24.2	+58.9	44.8	18 06.7	+59.0	45.0	18 49.0	+59.1	45.3	19 31.1	+59.3	45.5	20 13.1	+59.4	45.8	20 54.8	+59.5	46.0	21 36.3	+59.7	46.3	**27**
28	17 40.3	+58.7	44.4	18 23.1	+58.8	44.6	19 05.7	+59.0	44.8	19 48.1	+59.2	45.1	20 30.4	+59.3	45.4	21 12.5	+59.4	45.6	21 54.3	+59.5	45.9	22 36.0	+59.6	46.2	**28**
29	18 39.0	+58.7	44.2	19 21.9	+58.9	44.4	20 04.7	+59.0	44.7	20 47.3	+59.1	44.9	21 29.7	+59.3	45.2	22 11.9	+59.4	45.5	22 53.8	+59.5	45.8	23 35.6	+59.6	46.1	**29**
30	19 37.7	+58.7	43.9	20 20.8	+58.8	44.2	21 03.7	+59.0	44.5	21 46.4	+59.2	44.7	22 29.0	+59.2	45.0	23 11.3	+59.3	45.3	23 53.3	+59.5	45.6	24 35.2	+59.6	46.0	**30**
31	20 36.4	+58.6	43.7	21 19.6	+58.9	44.0	22 02.7	+59.0	44.3	22 45.6	+59.1	44.6	23 28.2	+59.3	44.9	24 10.6	+59.4	45.2	24 52.8	+59.5	45.5	25 34.8	+59.6	45.8	**31**
32	21 35.0	+58.7	43.5	22 18.5	+58.8	43.8	23 01.7	+58.9	44.1	23 44.7	+59.1	44.4	24 27.5	+59.2	44.7	25 10.0	+59.4	45.0	25 52.3	+59.5	45.3	26 34.4	+59.5	45.7	**32**
33	22 33.7	+58.6	43.3	23 17.3	+58.8	43.6	24 00.6	+59.0	43.9	24 43.8	+59.1	44.2	25 26.7	+59.2	44.5	26 09.4	+59.3	44.8	26 51.8	+59.5	45.2	27 33.9	+59.6	45.6	**33**
34	23 32.3	+58.6	43.0	24 16.1	+58.7	43.3	24 59.6	+58.9	43.7	25 42.9	+59.1	44.0	26 25.9	+59.2	44.3	27 08.7	+59.4	44.7	27 51.3	+59.4	45.0	28 33.5	+59.6	45.4	**34**
35	24 30.9	+58.6	42.8	25 14.8	+58.8	43.1	25 58.5	+58.9	43.4	26 42.0	+59.0	43.8	27 25.1	+59.2	44.1	28 08.1	+59.3	44.5	28 50.7	+59.5	44.9	29 33.1	+59.5	45.3	**35**
36	25 29.5	+58.6	42.6	26 13.6	+58.7	42.9	26 57.4	+58.9	43.2	27 41.0	+59.1	43.6	28 24.3	+59.2	44.0	29 07.4	+59.3	44.3	29 50.2	+59.4	44.7	30 32.6	+59.6	45.1	**36**
37	26 28.1	+58.5	42.3	27 12.3	+58.7	42.7	27 56.3	+58.9	43.0	28 40.1	+59.0	43.4	29 23.5	+59.2	43.8	30 06.7	+59.3	44.2	30 49.6	+59.4	44.6	31 32.2	+59.5	45.0	**37**
38	27 26.6	+58.5	42.1	28 11.0	+58.7	42.4	28 55.2	+58.8	42.8	29 39.1	+59.0	43.2	30 22.7	+59.1	43.6	31 06.0	+59.3	44.0	31 49.0	+59.4	44.4	32 31.7	+59.5	44.9	**38**
39	28 25.1	+58.5	41.8	29 09.7	+58.7	42.2	29 54.0	+58.9	42.6	30 38.1	+59.0	43.0	31 21.8	+59.2	43.4	32 05.3	+59.3	43.8	32 48.4	+59.4	44.3	33 31.2	+59.6	44.7	**39**
40	29 23.6	+58.5	41.6	30 08.4	+58.6	42.0	30 52.9	+58.8	42.3	31 37.1	+58.9	42.8	32 21.0	+59.1	43.2	33 04.6	+59.2	43.6	33 47.8	+59.4	44.1	34 30.8	+59.5	44.6	**40**
41	30 22.1	+58.4	41.3	31 07.0	+58.6	41.7	31 51.7	+58.7	42.1	32 36.0	+59.0	42.5	33 20.1	+59.1	43.0	34 03.8	+59.3	43.4	34 47.2	+59.4	43.9	35 30.3	+59.5	44.4	**41**
42	31 20.5	+58.4	41.0	32 05.6	+58.6	41.5	32 50.4	+58.8	41.9	33 35.0	+58.9	42.3	34 19.2	+59.0	42.8	35 03.1	+59.2	43.2	35 46.6	+59.3	43.7	36 29.8	+59.4	44.2	**42**
43	32 18.9	+58.4	40.8	33 04.2	+58.5	41.2	33 49.2	+58.7	41.6	34 33.9	+58.9	42.1	35 18.2	+59.1	42.6	36 02.3	+59.2	43.0	36 45.9	+59.4	43.6	37 29.2	+59.5	44.1	**43**
44	33 17.3	+58.3	40.5	34 02.7	+58.5	40.9	34 47.9	+58.7	41.4	35 32.8	+58.8	41.9	36 17.3	+59.0	42.3	37 01.5	+59.1	42.8	37 45.3	+59.3	43.4	38 28.7	+59.4	43.9	**44**
45	34 15.6	+58.3	40.2	35 01.2	+58.5	40.7	35 46.6	+58.7	41.1	36 31.6	+58.9	41.6	37 16.3	+59.0	42.1	38 00.6	+59.2	42.6	38 44.6	+59.3	43.2	39 28.1	+59.5	43.7	**45**
46	35 13.9	+58.2	39.9	35 59.7	+58.5	40.4	36 45.3	+58.6	40.9	37 30.5	+58.8	41.4	38 15.3	+59.0	41.9	38 59.8	+59.1	42.4	39 43.9	+59.3	43.0	40 27.6	+59.4	43.6	**46**
47	36 12.1	+58.2	39.6	36 58.2	+58.3	40.1	37 43.9	+58.6	40.6	38 29.3	+58.7	41.1	39 14.3	+58.9	41.6	39 58.9	+59.1	42.2	40 43.2	+59.2	42.8	41 27.0	+59.4	43.4	**47**
48	37 10.3	+58.1	39.3	37 56.5	+58.4	39.8	38 42.5	+58.5	40.3	39 28.0	+58.8	40.9	40 13.2	+58.9	41.4	40 58.0	+59.1	42.0	41 42.4	+59.3	42.6	42 26.4	+59.4	43.2	**48**
49	38 08.4	+58.1	39.0	38 54.9	+58.3	39.5	39 41.0	+58.5	40.0	40 26.8	+58.6	40.6	41 12.1	+58.9	41.2	41 57.1	+59.0	41.7	42 41.7	+59.2	42.4	43 25.8	+59.3	43.0	**49**
50	39 06.5	+58.1	38.7	39 53.2	+58.2	39.2	40 39.5	+58.5	39.8	41 25.4	+58.7	40.3	42 11.0	+58.8	40.9	42 56.1	+59.1	41.5	43 40.9	+59.1	42.1	44 25.1	+59.4	42.8	**50**
51	40 04.6	+58.0	38.4	40 51.4	+58.2	38.9	41 38.0	+58.4	39.5	42 24.1	+58.6	40.0	43 09.8	+58.8	40.6	43 55.2	+58.9	41.3	44 40.0	+59.2	41.9	45 24.5	+59.3	42.6	**51**
52	41 02.6	+57.9	38.0	41 49.6	+58.2	38.6	42 36.4	+58.3	39.1	43 22.7	+58.6	39.7	44 08.6	+58.8	40.4	44 54.1	+59.0	41.0	45 39.2	+59.1	41.7	46 23.8	+59.3	42.4	**52**
53	42 00.5	+57.8	37.7	42 47.8	+58.1	38.2	43 34.7	+58.3	38.8	44 21.3	+58.5	39.4	45 07.4	+58.7	40.1	45 53.1	+58.9	40.7	46 38.3	+59.1	41.4	47 23.1	+59.2	42.1	**53**
54	42 58.3	+57.8	37.3	43 45.9	+58.0	37.9	44 33.0	+58.3	38.5	45 19.8	+58.4	39.1	46 06.1	+58.7	39.8	46 52.0	+58.9	40.5	47 37.4	+59.1	41.2	48 22.3	+59.3	41.9	**54**
55	43 56.1	+57.7	37.0	44 43.9	+57.9	37.5	45 31.3	+58.1	38.2	46 18.2	+58.4	38.8	47 04.8	+58.6	39.5	47 50.9	+58.8	40.2	48 36.5	+59.0	40.9	49 21.6	+59.2	41.7	**55**
56	44 53.8	+57.7	36.6	45 41.8	+57.9	37.2	46 29.4	+58.2	37.8	47 16.6	+58.4	38.5	48 03.4	+58.6	39.2	48 49.7	+58.8	39.9	49 35.5	+59.0	40.6	50 20.8	+59.1	41.4	**56**
57	45 51.5	+57.5	36.2	46 39.7	+57.8	36.8	47 27.6	+58.0	37.4	48 15.0	+58.3	38.1	49 02.0	+58.5	38.8	49 48.5	+58.7	39.6	50 34.5	+58.9	40.3	51 19.9	+59.2	41.1	**57**
58	46 49.0	+57.5	35.8	47 37.5	+57.7	36.4	48 25.6	+58.0	37.1	49 13.3	+58.2	37.8	50 00.5	+58.4	38.5	50 47.2	+58.7	39.2	51 33.4	+58.9	40.0	52 19.1	+59.0	40.9	**58**
59	47 46.5	+57.3	35.3	48 35.2	+57.6	36.0	49 23.6	+57.8	36.7	50 11.5	+58.1	37.4	50 58.9	+58.4	38.1	51 45.9	+58.6	38.9	52 32.3	+58.8	39.7	53 18.1	+59.1	40.6	**59**
60	48 43.8	+57.3	34.9	49 32.8	+57.6	35.6	50 21.4	+57.8	36.3	51 09.6	+58.0	37.0	51 57.3	+58.3	37.8	52 44.5	+58.5	38.6	53 31.1	+58.8	39.4	54 17.2	+59.0	40.3	**60**
61	49 41.1	+57.1	34.4	50 30.4	+57.4	35.1	51 19.2	+57.7	35.8	52 07.6	+58.0	36.6	52 55.6	+58.2	37.4	53 43.0	+58.5	38.2	54 29.9	+58.7	39.1	55 16.2	+58.9	40.0	**61**
62	50 38.2	+57.1	34.0	51 27.8	+57.3	34.7	52 16.9	+57.6	35.4	53 05.6	+57.9	36.2	53 53.8	+58.1	37.0	54 41.5	+58.4	37.8	55 28.6	+58.6	38.7	56 15.1	+58.9	39.6	**62**
63	51 35.3	+56.8	33.5	52 25.1	+57.2	34.2	53 14.5	+57.5	34.9	54 03.5	+57.7	35.7	54 51.9	+58.1	36.5	55 39.9	+58.3	37.4	56 27.2	+58.6	38.3	57 14.0	+58.8	39.3	**63**
64	52 32.1	+56.8	33.0	53 22.3	+57.0	33.7	54 12.0	+57.3	34.4	55 01.2	+57.7	35.2	55 50.0	+57.9	36.1	56 38.2	+58.2	37.0	57 25.8	+58.5	37.9	58 12.8	+58.8	38.9	**64**
65	53 28.9	+56.6	32.4	54 19.3	+56.9	33.2	55 09.3	+57.3	33.9	55 58.9	+57.5	34.8	56 47.9	+57.9	35.6	57 36.4	+58.1	36.5	58 24.3	+58.4	37.5	59 11.6	+58.7	38.5	**65**
66	54 25.5	+56.4	31.8	55 16.2	+56.8	32.6	56 06.6	+57.0	33.4	56 56.4	+57.4	34.2	57 45.8	+57.7	35.1	58 34.5	+58.1	36.1	59 22.7	+58.4	37.1	60 10.3	+58.6	38.1	**66**
67	55 21.9	+56.3	31.3	56 13.0	+56.6	32.0	57 03.6	+57.0	32.8	57 53.8	+57.3	33.7	58 43.5	+57.5	34.6	59 32.6	+57.9	35.6	60 21.1	+58.2	36.6	61 08.9	+58.5	37.7	**67**
68	56 18.2	+56.0	30.6	57 09.6	+56.4	31.4	58 00.6	+56.7	32.3	58 51.1	+57.1	33.1	59 41.0	+57.5	34.1	60 30.5	+57.7	35.0	61 19.3	+58.1	36.1	62 07.4	+58.4	37.2	**68**
69	57 14.2	+55.9	30.0	58 06.0	+56.2	30.8	58 57.3	+56.6	31.6	59 48.2	+56.9	32.5	60 38.5	+57.2	33.5	61 28.2	+57.6	34.5	62 17.4	+57.9	35.6	63 05.8	+58.3	36.7	**69**
70	58 10.1	+55.6	29.3	59 02.2	+56.0	30.1	59 53.9	+56.3	31.0	60 45.1	+56.7	31.9	61 35.7	+57.1	32.9	62 25.8	+57.5	33.9	63 15.3	+57.9	35.0	64 04.1	+58.2	36.2	**70**
71	59 05.7	+55.4	28.6	59 58.2	+55.7	29.4	60 50.2	+56.1	30.3	61 41.8	+56.5	31.2	62 32.8	+56.9	32.2	63 23.3	+57.3	33.3	64 13.2	+57.6	34.4	65 02.3	+58.0	35.6	**71**
72	60 01.1	+55.0	27.8	60 53.9	+55.5	28.7	61 46.3	+55.9	29.5	62 38.3	+56.3	30.5	63 29.7	+56.7	31.5	64 20.6	+57.1	32.6	65 10.8	+57.5	33.8	66 00.3	+57.9	35.0	**72**
73	60 56.1	+54.8	27.0	61 49.4	+55.2	27.9	62 42.2	+55.6	28.8	63 34.6	+56.0	29.7	64 26.4	+56.4	30.8	65 17.7	+56.8	31.9	66 08.3	+57.3	33.1	66 58.2	+57.7	34.3	**73**
74	61 50.9	+54.5	26.2	62 44.6	+54.8	27.0	63 37.8	+55.3	27.9	64 30.6	+55.7	28.9	65 22.8	+56.2	30.0	66 14.5	+56.6	31.1	67 05.6	+57.0	32.3	67 55.9	+57.5	33.6	**74**
75	62 45.4	+54.0	25.3	63 39.4	+54.5	26.1	64 33.1	+54.9	27.0	65 26.3	+55.4	28.0	66 19.0	+55.9	29.1	67 11.1	+56.4	30.2	68 02.6	+56.8	31.5	68 53.4	+57.3	32.8	**75**
76	63 39.4	+53.7	24.3	64 33.9	+54.1	25.2	65 28.0	+54.6	26.1	66 21.7	+55.0	27.1	67 14.9	+55.5	28.2	68 07.5	+56.0	29.3	68 59.4	+56.5	30.6	69 50.7	+57.0	32.0	**76**
77	64 33.1	+53.2	23.3	65 28.0	+53.7	24.1	66 22.6	+54.1	25.1	67 16.7	+54.6	26.1	68 10.4	+55.1	27.2	69 03.5	+55.6	28.4	69 55.9	+56.2	29.7	70 47.7	+56.7	31.1	**77**
78	65 26.3	+52.7	22.2	66 21.7	+53.2	23.0	67 16.7	+53.7	24.0	68 11.3	+54.2	25.0	69 05.5	+54.6	26.1	69 59.1	+55.2	27.3	70 52.1	+55.8	28.6	71 44.4	+56.3	30.1	**78**
79	66 19.0	+52.1	21.0	67 14.9	+52.6	21.9	68 10.4	+53.1	22.8	69 05.5	+53.6	23.8	70 00.1	+54.2	24.9	70 54.3	+54.7	26.1	71 47.9	+55.3	27.5	72 40.7	+56.0	28.9	**79**
80	67 11.1	+51.5	19.8	68 07.5	+51.9	20.6	69 03.5	+52.4	21.5	69 59.1	+53.0	22.5	70 54.3	+53.6	23.6	71 49.0	+54.2	24.8	72 43.2	+54.7	26.2	73 36.7	+55.4	27.7	**80**
81	68 02.6	+50.8	18.4	68 59.4	+51.3	19.2	69 55.9	+51.8	20.1	70 52.1	+52.3	21.1	71 47.9	+52.8	22.2	72 43.2	+53.5	23.4	73 37.9	+54.2	24.8	74 32.1	+54.8	26.3	**81**
82	68 53.4	+50.0	17.0	69 50.7	+50.5	17.7	70 47.7	+51.0	18.6	71 44.4	+51.5	19.6	72 40.7	+52.1	20.7	73 36.7	+52.7	21.9	74 32.1	+53.4	23.2	75 26.9	+54.2	24.7	**82**
83	69 43.4	+49.1	15.4	70 41.2	+49.5	16.1	71 38.7	+50.0	17.0	72 35.9	+50.6	17.9	73 32.8	+51.2	19.0	74 29.4	+51.8	20.1	75 25.5	+52.5	21.4	76 21.1	+53.2	22.9	**83**
84	70 32.5	+48.1	13.7	71 30.7	+48.5	14.4	72 28.7	+49.0	15.2	73 26.5	+49.5	16.1	74 24.0	+50.1	17.1	75 21.2	+50.8	18.2	76 18.0	+51.5	19.5	77 14.3	+52.3	20.9	**84**
85	71 20.6	+46.9	11.9	72 19.2	+47.4	12.5	73 17.7	+47.8	13.2	74 16.0	+48.3	14.0	75 14.1	+48.9	15.0	76 12.0	+49.4	16.0	77 09.5	+50.1	17.2	78 06.6	+50.9	18.6	**85**
86	72 07.5	+45.6	9.9	73 06.6	+45.9	10.4	74 05.5	+46.4	11.1	75 04.3	+46.8	11.8	76 03.0	+47.3	12.6	77 01.4	+47.9	13.6	77 59.6	+48.5	14.7	78 57.5	+49.3	16.0	**86**
87	72 53.1	+44.1	7.7	73 52.5	+44.4	8.2	74 51.9	+44.7	8.7	75 51.1	+45.1	9.3	76 50.3	+45.5	10.0	77 49.3	*+46.0* •	10.8	78 48.1	*+46.6* •	11.7	79 46.8	*+47.2* •	12.9	**87**
88	73 37.2	+42.4	5.4	74 36.9	+42.6	5.7	75 36.6	*+42.8* •	6.1	76 36.2	*+43.1* •	6.5	77 35.8	*+43.4* •	7.0	78 35.3	*+43.8* •	7.7	79 34.7	*+44.2* •	8.4	80 34.0	*+44.7* •	9.2	**88**
89	74 19.6	*+40.4* •	2.8	75 19.5	*+40.5* •	3.0	76 19.4	*+40.6* •	3.2	77 19.3	*+40.7* •	3.4	78 19.2	*+40.8* •	3.7	79 19.1	*+40.9* •	4.1	80 18.9	*+41.1* •	4.5	81 18.7	*+41.3* •	5.0	**89**
90	75 00.0	*+38.2* •	0.0	76 00.0	*+38.1* •	0.0	77 00.0	*+38.0* •	0.0	78 00.0	*+37.9* •	0.0	79 00.0	*+37.7* •	0.0	80 00.0	*+37.6* •	0.0	81 00.0	*+37.3* •	0.0	82 00.0	*+37.1* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 131°, 229°

50°, 310° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 34.6	+58.8	129.0	8 56.8	+58.9	129.2	8 18.8	+59.1	129.3	7 40.8	+59.2	129.4	7 02.7	+59.3	129.5	6 24.5	+59.5	129.6	5 46.3	+59.5	129.7	5 07.9	+59.7	129.7	**0**
1	10 33.4	+58.7	128.8	9 55.7	+58.9	129.0	9 17.9	+59.1	129.1	8 40.0	+59.2	129.2	8 02.0	+59.4	129.3	7 24.0	+59.4	129.4	6 45.8	+59.6	129.5	6 07.6	+59.7	129.6	**1**
2	11 32.1	+58.8	128.6	10 54.6	+58.9	128.8	10 17.0	+59.1	128.9	9 39.2	+59.3	129.1	9 01.4	+59.3	129.2	8 23.4	+59.5	129.3	7 45.4	+59.5	129.4	7 07.3	+59.6	129.5	**2**
3	12 30.9	+58.7	128.4	11 53.5	+58.9	128.6	11 16.1	+59.0	128.7	10 38.5	+59.2	128.9	10 00.7	+59.4	129.0	9 22.9	+59.4	129.2	8 44.9	+59.6	129.3	8 06.9	+59.7	129.4	**3**
4	13 29.6	+58.8	128.2	12 52.4	+58.9	128.4	12 15.1	+59.1	128.6	11 37.7	+59.2	128.7	11 00.1	+59.3	128.9	10 22.3	+59.5	129.0	9 44.5	+59.6	129.2	9 06.6	+59.6	129.3	**4**
5	14 28.4	+58.7	128.0	13 51.3	+58.9	128.2	13 14.2	+59.0	128.4	12 36.9	+59.1	128.6	11 59.4	+59.3	128.7	11 21.8	+59.4	128.9	10 44.1	+59.5	129.0	10 06.2	+59.7	129.2	**5**
6	15 27.1	+58.7	127.8	14 50.2	+58.9	128.0	14 13.2	+59.1	128.2	13 36.0	+59.2	128.4	12 58.7	+59.3	128.6	12 21.2	+59.5	128.7	11 43.6	+59.6	128.9	11 05.9	+59.6	129.1	**6**
7	16 25.8	+58.7	127.6	15 49.1	+58.9	127.8	15 12.3	+59.0	128.0	14 35.2	+59.2	128.2	13 58.0	+59.3	128.4	13 20.7	+59.4	128.6	12 43.2	+59.5	128.8	12 05.5	+59.6	129.0	**7**
8	17 24.5	+58.7	127.3	16 48.0	+58.9	127.6	16 11.3	+59.0	127.8	15 34.4	+59.2	128.0	14 57.3	+59.3	128.3	14 20.1	+59.4	128.5	13 42.7	+59.5	128.7	13 05.1	+59.7	128.8	**8**
9	18 23.2	+58.6	127.1	17 46.9	+58.8	127.4	17 10.3	+59.0	127.6	16 33.6	+59.1	127.9	15 56.6	+59.3	128.1	15 19.5	+59.5	128.3	14 42.2	+59.6	128.5	14 04.8	+59.6	128.7	**9**
10	19 21.8	+58.7	126.9	18 45.7	+58.8	127.2	18 09.3	+59.0	127.4	17 32.7	+59.2	127.7	16 55.9	+59.3	127.9	16 19.0	+59.4	128.2	15 41.8	+59.5	128.4	15 04.4	+59.6	128.6	**10**
11	20 20.5	+58.6	126.7	19 44.5	+58.8	127.0	19 08.3	+59.0	127.3	18 31.9	+59.1	127.5	17 55.2	+59.3	127.8	17 18.4	+59.4	128.0	16 41.3	+59.5	128.3	16 04.0	+59.7	128.5	**11**
12	21 19.1	+58.6	126.5	20 43.3	+58.9	126.8	20 07.3	+59.0	127.1	19 31.0	+59.2	127.3	18 54.5	+59.3	127.6	18 17.8	+59.4	127.9	17 40.8	+59.6	128.1	17 03.7	+59.6	128.4	**12**
13	22 17.7	+58.6	126.2	21 42.2	+58.7	126.5	21 06.3	+58.9	126.9	20 30.2	+59.1	127.2	19 53.8	+59.3	127.5	19 17.2	+59.4	127.7	18 40.4	+59.5	128.0	18 03.3	+59.6	128.3	**13**
14	23 16.3	+58.6	126.0	22 40.9	+58.8	126.3	22 05.2	+59.0	126.7	21 29.3	+59.1	127.0	20 53.1	+59.2	127.3	20 16.6	+59.4	127.6	19 39.9	+59.5	127.9	19 02.9	+59.6	128.2	**14**
15	24 14.9	+58.6	125.8	23 39.7	+58.8	126.1	23 04.2	+58.9	126.5	22 28.4	+59.1	126.8	21 52.3	+59.3	127.1	21 16.0	+59.4	127.4	20 39.4	+59.5	127.7	20 02.5	+59.6	128.0	**15**
16	25 13.5	+58.5	125.5	24 38.5	+58.7	125.9	24 03.1	+58.9	126.3	23 27.5	+59.1	126.6	22 51.6	+59.2	127.0	22 15.4	+59.3	127.3	21 38.9	+59.5	127.6	21 02.1	+59.6	127.9	**16**
17	26 12.0	+58.5	125.3	25 37.2	+58.7	125.7	25 02.0	+58.9	126.0	24 26.6	+59.0	126.4	23 50.8	+59.2	126.8	23 14.7	+59.4	127.1	22 38.4	+59.5	127.5	22 01.7	+59.6	127.8	**17**
18	27 10.5	+58.5	125.0	26 35.9	+58.7	125.4	26 00.9	+58.9	125.8	25 25.6	+59.1	126.2	24 50.0	+59.2	126.6	24 14.1	+59.3	127.0	23 37.9	+59.4	127.3	23 01.3	+59.6	127.7	**18**
19	28 09.0	+58.4	124.8	27 34.6	+58.6	125.2	26 59.8	+58.9	125.6	26 24.7	+59.0	126.0	25 49.2	+59.2	126.4	25 13.4	+59.4	126.8	24 37.3	+59.5	127.2	24 00.9	+59.6	127.5	**19**
20	29 07.4	+58.4	124.5	28 33.2	+58.7	125.0	27 58.7	+58.8	125.4	27 23.7	+59.0	125.8	26 48.4	+59.2	126.2	26 12.8	+59.3	126.6	25 36.8	+59.5	127.0	25 00.5	+59.6	127.4	**20**
21	30 05.8	+58.4	124.2	29 31.9	+58.6	124.7	28 57.5	+58.8	125.2	28 22.7	+59.0	125.6	27 47.6	+59.2	126.1	27 12.1	+59.3	126.5	26 36.3	+59.4	126.9	26 00.1	+59.6	127.3	**21**
22	31 04.2	+58.4	124.0	30 30.5	+58.6	124.5	29 56.3	+58.8	125.0	29 21.7	+59.0	125.4	28 46.8	+59.1	125.9	28 11.4	+59.3	126.3	27 35.7	+59.5	126.7	26 59.7	+59.5	127.1	**22**
23	32 02.6	+58.3	123.7	31 29.1	+58.5	124.2	30 55.1	+58.8	124.7	30 20.7	+59.0	125.2	29 45.9	+59.2	125.7	29 10.7	+59.3	126.1	28 35.2	+59.4	126.6	27 59.2	+59.6	127.0	**23**
24	33 00.9	+58.3	123.4	32 27.6	+58.5	124.0	31 53.9	+58.7	124.5	31 19.7	+58.9	125.0	30 45.1	+59.1	125.5	30 10.0	+59.3	126.0	29 34.6	+59.4	126.4	28 58.8	+59.5	126.9	**24**
25	33 59.2	+58.2	123.1	33 26.1	+58.5	123.7	32 52.6	+58.7	124.2	32 18.6	+58.9	124.8	31 44.2	+59.1	125.3	31 09.3	+59.3	125.8	30 34.0	+59.4	126.3	29 58.3	+59.6	126.7	**25**
26	34 57.4	+58.2	122.9	34 24.6	+58.5	123.4	33 51.3	+58.7	124.0	33 17.5	+58.9	124.5	32 43.3	+59.1	125.1	32 08.6	+59.2	125.6	31 33.4	+59.4	126.1	30 57.9	+59.5	126.6	**26**
27	35 55.6	+58.2	122.6	35 23.1	+58.4	123.2	34 50.0	+58.6	123.7	34 16.4	+58.9	124.3	33 42.4	+59.0	124.9	33 07.8	+59.3	125.4	32 32.8	+59.4	125.9	31 57.4	+59.5	126.4	**27**
28	36 53.8	+58.1	122.2	36 21.5	+58.3	122.9	35 48.6	+58.7	123.5	35 15.3	+58.8	124.1	34 41.4	+59.0	124.7	34 07.1	+59.2	125.2	33 32.2	+59.4	125.8	32 56.9	+59.5	126.3	**28**
29	37 51.9	+58.0	121.9	37 19.8	+58.4	122.6	36 47.3	+58.5	123.2	36 14.1	+58.8	123.8	35 40.4	+59.1	124.4	35 06.3	+59.2	125.0	34 31.6	+59.3	125.6	33 56.4	+59.5	126.1	**29**
30	38 49.9	+58.0	121.6	38 18.2	+58.3	122.3	37 45.8	+58.6	122.9	37 12.9	+58.8	123.6	36 39.5	+58.9	124.2	36 05.5	+59.1	124.8	35 30.9	+59.4	125.4	34 55.9	+59.5	126.0	**30**
31	39 47.9	+58.0	121.3	39 16.5	+58.2	122.0	38 44.4	+58.5	122.7	38 11.7	+58.7	123.3	37 38.4	+59.0	124.0	37 04.6	+59.2	124.6	36 30.3	+59.3	125.2	35 55.4	+59.5	125.8	**31**
32	40 45.9	+57.8	120.9	40 14.7	+58.2	121.7	39 42.9	+58.4	122.4	39 10.4	+58.7	123.1	38 37.4	+58.9	123.7	38 03.8	+59.1	124.4	37 29.6	+59.3	125.0	36 54.9	+59.4	125.7	**32**
33	41 43.7	+57.8	120.6	41 12.9	+58.1	121.3	40 41.3	+58.4	122.1	40 09.1	+58.7	122.8	39 36.3	+58.9	123.5	39 02.9	+59.1	124.2	38 28.9	+59.3	124.8	37 54.3	+59.5	125.5	**33**
34	42 41.5	+57.8	120.2	42 11.0	+58.0	121.0	41 39.7	+58.4	121.8	41 07.8	+58.6	122.5	40 35.2	+58.9	123.3	40 02.0	+59.1	124.0	39 28.2	+59.3	124.6	38 53.8	+59.4	125.3	**34**
35	43 39.3	+57.6	119.9	43 09.0	+58.0	120.7	42 38.1	+58.3	121.5	42 06.4	+58.6	122.2	41 34.1	+58.8	123.0	41 01.1	+59.0	123.7	40 27.5	+59.2	124.4	39 53.2	+59.4	125.1	**35**
36	44 36.9	+57.6	119.5	44 07.0	+58.0	120.3	43 36.4	+58.2	121.1	43 05.0	+58.5	121.9	42 32.9	+58.8	122.7	42 00.1	+59.0	123.5	41 26.7	+59.2	124.2	40 52.6	+59.4	125.0	**36**
37	45 34.5	+57.5	119.1	45 05.0	+57.8	120.0	44 34.6	+58.2	120.8	44 03.5	+58.5	121.6	43 31.7	+58.7	122.5	42 59.1	+59.0	123.2	42 25.9	+59.2	124.0	41 52.0	+59.4	124.8	**37**
38	46 32.0	+57.4	118.7	46 02.8	+57.8	119.6	45 32.8	+58.1	120.5	45 02.0	+58.4	121.3	44 30.4	+58.7	122.2	43 58.1	+59.0	123.0	43 25.1	+59.2	123.8	42 51.4	+59.3	124.6	**38**
39	47 29.4	+57.3	118.2	47 00.6	+57.7	119.2	46 30.9	+58.1	120.1	46 00.4	+58.4	121.0	45 29.1	+58.7	121.9	44 57.1	+58.9	122.7	44 24.3	+59.1	123.6	43 50.7	+59.4	124.4	**39**
40	48 26.7	+57.3	117.8	47 58.3	+57.6	118.8	47 29.0	+58.0	119.7	46 58.8	+58.3	120.7	46 27.8	+58.6	121.6	45 56.0	+58.9	122.5	45 23.4	+59.1	123.3	44 50.1	+59.3	124.2	**40**
41	49 24.0	+57.0	117.3	48 55.9	+57.5	118.4	48 27.0	+57.9	119.4	47 57.1	+58.3	120.3	47 26.4	+58.6	121.3	46 54.9	+58.8	122.2	46 22.5	+59.1	123.1	45 49.4	+59.3	123.9	**41**
42	50 21.0	+57.0	116.9	49 53.4	+57.5	117.9	49 24.9	+57.8	119.0	48 55.4	+58.1	120.0	48 25.0	+58.5	120.9	47 53.7	+58.8	121.9	47 21.6	+59.0	122.8	46 48.7	+59.2	123.7	**42**
43	51 18.0	+56.8	116.4	50 50.9	+57.3	117.5	50 22.7	+57.7	118.5	49 53.5	+58.1	119.6	49 23.5	+58.4	120.6	48 52.5	+58.7	121.6	48 20.6	+59.0	122.6	47 47.9	+59.2	123.5	**43**
44	52 14.8	+56.7	115.8	51 48.2	+57.1	117.0	51 20.4	+57.6	118.1	50 51.6	+58.1	119.2	50 21.9	+58.4	120.2	49 51.2	+58.7	121.3	49 19.6	+59.0	122.3	48 47.1	+59.2	123.2	**44**
45	53 11.5	+56.6	115.3	52 45.3	+57.1	116.5	52 18.0	+57.5	117.7	51 49.7	+57.9	118.8	51 20.3	+58.3	119.9	50 49.9	+58.6	120.9	50 18.6	+58.9	122.0	49 46.3	+59.2	123.0	**45**
46	54 08.1	+56.4	114.7	53 42.4	+56.9	116.0	53 15.5	+57.4	117.2	52 47.6	+57.8	118.4	52 18.6	+58.2	119.5	51 48.5	+58.6	120.6	51 17.5	+58.8	121.7	50 45.5	+59.1	122.7	**46**
47	55 04.5	+56.1	114.1	54 39.3	+56.8	115.4	54 12.9	+57.3	116.7	53 45.4	+57.7	117.9	53 16.8	+58.1	119.1	52 47.1	+58.5	120.2	52 16.3	+58.8	121.4	51 44.6	+59.1	122.5	**47**
48	56 00.6	+56.0	113.5	55 36.1	+56.6	114.9	55 10.2	+57.1	116.2	54 43.1	+57.7	117.4	54 14.9	+58.1	118.7	53 45.6	+58.4	119.9	53 15.1	+58.8	121.0	52 43.7	+59.0	122.2	**48**
49	56 56.6	+55.8	112.9	56 32.7	+56.4	114.3	56 07.3	+57.0	115.6	55 40.8	+57.5	117.0	55 13.0	+57.9	118.2	54 44.0	+58.3	119.5	54 13.9	+58.7	120.7	53 42.7	+59.0	121.9	**49**
50	57 52.4	+55.6	112.2	57 29.1	+56.2	113.6	57 04.3	+56.8	115.1	56 38.3	+57.3	116.4	56 10.9	+57.8	117.8	55 42.3	+58.3	119.1	55 12.6	+58.6	120.3	54 41.7	+59.0	121.6	**50**
51	58 48.0	+55.3	111.5	58 25.3	+56.0	113.0	58 01.1	+56.7	114.5	57 35.6	+57.2	115.9	57 08.7	+57.8	117.3	56 40.6	+58.2	118.7	56 11.2	+58.6	120.0	55 40.7	+58.9	121.2	**51**
52	59 43.3	+55.0	110.7	59 21.3	+55.8	112.3	58 57.8	+56.4	113.8	58 32.8	+57.1	115.3	58 06.5	+57.6	116.8	57 38.8	+58.0	118.2	57 09.8	+58.5	119.6	56 39.6	+58.8	120.9	**52**
53	60 38.3	+54.7	109.9	60 17.1	+55.5	111.6	59 54.2	+56.3	113.2	59 29.9	+56.9	114.7	59 04.1	+57.4	116.2	58 36.8	+58.0	117.7	58 08.3	+58.3	119.2	57 38.4	+58.8	120.5	**53**
54	61 33.0	+54.4	109.1	61 12.6	+55.2	110.8	60 50.5	+56.0	112.5	60 26.8	+56.6	114.1	60 01.5	+57.3	115.7	59 34.8	+57.8	117.2	59 06.6	+58.3	118.7	58 37.2	+58.6	120.2	**54**
55	62 27.4	+54.0	108.2	62 07.8	+54.9	110.0	61 46.5	+55.7	111.7	61 23.4	+56.5	113.4	60 58.8	+57.1	115.1	60 32.6	+57.7	116.7	60 04.9	+58.2	118.2	59 35.8	+58.7	119.7	**55**
56	63 21.4	+53.6	107.2	63 02.7	+54.6	109.1	62 42.2	+55.5	110.9	62 19.9	+56.3	112.7	61 55.9	+57.0	114.4	61 30.3	+57.5	116.1	61 03.1	+58.1	117.7	60 34.5	+58.5	119.3	**56**
57	64 15.0	+53.2	106.2	63 57.3	+54.2	108.2	63 37.7	+55.1	110.1	63 16.2	+55.9	111.9	62 52.9	+56.7	113.8	62 27.8	+57.4	115.5	62 01.2	+57.9	117.2	61 33.0	+58.4	118.9	**57**
58	65 08.2	+52.6	105.1	64 51.5	+53.8	107.2	64 32.8	+54.8	109.2	64 12.1	+55.7	111.1	63 49.6	+56.5	113.0	63 25.2	+57.2	114.9	62 59.1	+57.8	116.7	62 31.4	+58.3	118.4	**58**
59	66 00.8	+52.1	103.9	65 45.3	+53.3	106.1	65 27.6	+54.4	108.2	65 07.8	+55.4	110.3	64 46.1	+56.2	112.3	64 22.4	+57.0	114.2	63 56.9	+57.7	116.1	63 29.7	+58.2	117.9	**59**
60	66 52.9	+51.5	102.7	66 38.6	+52.8	105.0	66 22.0	+53.9	107.2	66 03.2	+55.0	109.3	65 42.3	+55.9	111.4	65 19.4	+56.8	113.4	64 54.6	+57.4	115.4	64 27.9	+58.1	117.3	**60**
61	67 44.4	+50.8	101.4	67 31.4	+52.1	103.7	67 15.9	+53.5	106.1	66 58.2	+54.6	108.3	66 38.2	+55.6	110.5	66 16.2	+56.4	112.7	65 52.0	+57.3	114.7	65 26.0	+57.9	116.7	**61**
62	68 35.2	+49.9	99.9	68 23.5	+51.5	102.4	68 09.4	+52.9	104.9	67 52.8	+54.1	107.2	67 33.8	+55.3	109.6	67 12.6	+56.2	111.8	66 49.3	+57.0	114.0	66 23.9	+57.8	116.1	**62**
63	69 25.1	+49.1	98.4	69 15.0	+50.8	101.0	69 02.3	+52.2	103.6	68 46.9	+53.6	106.1	68 29.1	+54.8	108.5	68 08.8	+55.9	110.9	67 46.3	+56.8	113.2	67 21.7	+57.5	115.4	**63**
64	70 14.2	+48.1	96.7	70 05.8	+49.8	99.5	69 54.5	+51.5	102.2	69 40.5	+53.0	104.8	69 23.9	+54.3	107.4	69 04.7	+55.5	109.9	68 43.1	+56.5	112.3	68 19.2	+57.3	114.6	**64**
65	71 02.3	+46.9	94.9	70 55.6	+49.0	97.8	70 46.0	+50.7	100.6	70 33.5	+52.3	103.4	70 18.2	+53.8	106.1	70 00.2	+55.0	108.8	69 39.6	+56.1	111.3	69 16.5	+57.1	113.8	**65**
66	71 49.2	+45.7	93.0	71 44.6	+47.8	96.0	71 36.7	+49.8	99.0	71 25.8	+51.6	101.9	71 12.0	+53.1	104.8	70 55.2	+54.6	107.6	70 35.7	+55.8	110.3	70 13.6	+56.8	112.9	**66**
67	72 34.9	+44.2	90.8	72 32.4	+46.5	94.0	72 26.5	+48.7	97.2	72 17.4	+50.6	100.3	72 05.1	+52.4	103.3	71 49.8	+53.9	106.3	71 31.5	+55.3	109.2	71 10.4	+56.5	111.9	**67**
68	73 19.1	+42.5	88.5	73 18.9	+45.0	91.9	73 15.2	+47.4	95.2	73 08.0	+49.6	98.5	72 57.5	+51.6	101.7	72 43.7	+53.3	104.9	72 26.8	+54.8	107.9	72 06.9	+56.0	110.9	**68**
69	74 01.6	+40.6•	86.0	74 03.9	+43.4	89.5	74 02.6	+46.0	93.0	73 57.6	+48.4	96.5	73 49.1	+50.5	99.9	73 37.0	+52.5	103.3	73 21.6	+54.2	106.5	73 02.9	+55.6	109.7	**69**
70	74 42.2	+38.5•	83.3	74 47.3	+41.5•	86.9	74 48.6	+44.3	90.6	74 46.0	+47.0	94.3	74 39.6	+49.4	97.9	74 29.5	+51.6	101.5	74 15.8	+53.4	105.0	73 58.5	+55.1	108.4	**70**
71	75 20.7	+36.0•	80.3	75 28.8	+39.3•	84.1	75 32.9	+42.4•	88.0	75 33.0	+45.3	91.9	75 29.0	+48.1	95.7	75 21.1	+50.4	99.5	75 09.2	+52.6	103.3	74 53.6	+54.4	106.9	**71**
72	75 56.7	+33.2•	77.1	76 08.1	+36.7•	81.0	76 15.3	+40.1•	85.1	76 18.3	+43.4•	89.2	76 17.1	+46.3	93.3	76 11.5	+49.1	97.3	76 01.8	+51.5	101.3	75 48.0	+53.6	105.2	**72**
73	76 29.9	+30.0•	73.6	76 44.8	+33.8•	77.7	76 55.4	+37.5•	81.9	77 01.7	+41.1•	86.2	77 03.4	+44.5•	90.5	77 00.6	+47.5	94.9	76 53.3	+50.3	99.1	76 41.6	+52.7	103.3	**73**
74	76 59.9	+26.5•	69.8	77 18.6	+30.5•	74.0	77 32.9	+34.5•	78.3	77 42.8	+38.3•	82.8	77 47.9	+42.1•	87.4	77 48.1	+45.6•	92.1	77 43.6	+48.7	96.7	77 34.3	+51.5	101.2	**74**
75	77 26.4	+22.7•	65.8	77 49.1	+26.7•	70.0	78 07.4	+31.0•	74.4	78 21.1	+35.2•	79.1	78 30.0	+39.3•	84.0	78 33.7	+43.3•	88.9	78 32.3	+46.9•	93.8	78 25.8	+50.0	98.7	**75**
76	77 49.1	+18.3•	61.4	78 15.8	+22.6•	65.7	78 38.4	+27.0•	70.2	78 56.3	+31.6•	75.0	79 09.3	+36.0•	80.1	79 17.0	+40.4•	85.3	79 19.2	+44.5•	90.6	79 15.8	+48.2•	95.8	**76**
77	78 07.4	+13.7•	56.9	78 38.4	+17.9•	61.0	79 05.4	+22.5•	65.6	79 27.9	+27.2•	70.5	79 45.3	+32.2•	75.7	79 57.4	+37.0•	81.2	80 03.7	+41.6•	86.8	80 04.0	+46.0•	92.5	**77**
78	78 21.1	+8.9•	52.1	78 56.3	+13.0•	56.1	79 27.9	+17.4•	60.6	79 55.1	+22.4•	65.5	80 17.5	+27.5•	70.8	80 34.4	+32.8•	76.5	80 45.3	+38.1•	82.5	80 50.0	+43.0•	88.6	**78**
79	78 30.0	+3.7•	47.1	79 09.3	+7.7•	51.0	79 45.3	+12.1•	55.3	80 17.5	+16.9•	60.1	80 45.0	+22.2•	65.4	81 07.2	+27.8•	71.2	81 23.4	+33.5•	77.5	81 33.0	+39.3•	84.1	**79**
80	78 33.7	−1.4•	42.1	79 17.0	+2.2•	45.7	79 57.4	+6.3•	49.7	80 34.4	+10.9•	54.3	81 07.2	+16.2•	59.5	81 35.0	+21.9•	65.3	81 56.9	+28.2•	71.8	82 12.3	+34.5•	78.7	**80**
81	78 32.3	−6.5•	37.1	79 19.2	−3.4•	40.3	80 03.7	+0.3•	44.0	80 45.3	+4.7•	48.2	81 23.4	+9.6•	53.2	81 56.9	+15.4•	58.8	82 25.1	+21.7•	65.3	82 46.8	+28.6•	72.5	**81**
82	78 25.8	−11.6•	32.1	79 15.8	−8.8•	34.9	80 04.0	−5.6•	38.2	80 50.0	−1.8•	42.0	81 33.0	+2.7•	46.5	82 12.3	+7.9•	51.8	82 46.8	+14.2•	58.0	83 15.4	+21.3•	65.2	**82**
83	78 14.2	−16.2•	27.3	79 07.0	−14.0•	29.6	79 58.4	−11.3•	32.4	80 48.2	−8.3•	35.7	81 35.7	−4.4•	39.7	82 20.2	+0.3•	44.4	83 01.0	+5.9•	50.2	83 36.7	+12.7•	57.0	**83**
84	77 58.0	−20.8•	22.6	78 53.0	−19.0•	24.5	79 47.1	−16.9•	26.8	80 39.9	−14.3•	29.6	81 31.3	−11.3•	32.9	82 20.5	−7.5•	36.9	83 06.9	−2.7•	41.9	83 49.4	+3.3•	48.1	**84**
85	77 37.2	−24.8•	18.1	78 34.0	−23.5•	19.7	79 30.2	−21.9•	21.5	80 25.6	−20.0•	23.7	81 20.0	−17.7•	26.3	82 13.0	−14.8•	29.5	83 04.2	−11.2•	33.6	83 52.7	−6.4•	38.8	**85**
86	77 12.4	−28.5•	14.0	78 10.5	−27.5•	15.1	79 08.3	−26.5•	16.5	80 05.6	−25.2•	18.1	81 02.3	−23.6•	20.1	81 58.2	−21.6•	22.5	82 53.0	−19.0•	25.6	83 46.3	−15.7•	29.5	**86**
87	76 43.9	−31.8•	10.1	77 43.0	−31.3•	10.9	78 41.8	−30.5•	11.8	79 40.4	−29.7•	12.9	80 38.7	−28.7•	14.3	81 36.6	−27.4•	15.9	82 34.0	−25.8•	18.1	83 30.6	−23.8•	20.8	**87**
88	76 12.1	−34.7•	6.4	77 11.7	−34.4•	6.9	78 11.3	−34.1•	7.5	79 10.7	−33.7•	8.2	80 10.0	−33.1•	9.0	81 09.2	−32.5•	10.0	82 08.2	−31.7•	11.3	83 06.8	−30.6•	12.9	**88**
89	75 37.4	−37.4•	3.1	76 37.3	−37.3•	3.3	77 37.2	−37.2•	3.6	78 37.0	−37.0•	3.9	79 36.9	−36.9•	4.3	80 36.7	−36.7•	4.7	81 36.5	−36.5•	5.3	82 36.2	−36.2•	6.0	**89**
90	75 00.0	−39.7•	0.0	76 00.0	−39.7•	0.0	77 00.0	−39.8•	0.0	78 00.0	−39.9•	0.0	79 00.0	−40.1•	0.0	80 00.0	−40.2•	0.0	81 00.0	−40.4•	0.0	82 00.0	−40.6•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 50°, 310°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 34.6	−58.8	129.0	8 56.8	−59.0	129.2	8 18.8	−59.1	129.3	7 40.8	−59.2	129.4	7 02.7	−59.3	129.5	6 24.5	−59.4	129.6	5 46.3	−59.6	129.7	5 07.9	−59.6	129.7	**0**
1	8 35.8	−58.8	129.2	7 57.8	−58.9	129.3	7 19.7	−59.0	129.4	6 41.6	−59.2	129.5	6 03.4	−59.4	129.6	5 25.1	−59.5	129.7	4 46.7	−59.6	129.8	4 08.3	−59.7	129.8	**1**
2	7 37.0	−58.8	129.4	6 58.9	−59.0	129.5	6 20.7	−59.1	129.6	5 42.4	−59.3	129.7	5 04.0	−59.3	129.8	4 25.6	−59.5	129.8	3 47.1	−59.5	129.9	3 08.6	−59.6	129.9	**2**
3	6 38.2	−58.8	129.6	5 59.9	−58.9	129.7	5 21.6	−59.1	129.8	4 43.1	−59.2	129.9	4 04.7	−59.4	129.9	3 26.1	−59.4	130.0	2 47.6	−59.6	130.0	2 09.0	−59.7	130.0	**3**
4	5 39.4	−58.8	129.8	5 01.0	−59.0	129.9	4 22.5	−59.1	130.0	3 43.9	−59.2	130.0	3 05.3	−59.4	130.1	2 26.7	−59.5	130.1	1 48.0	−59.6	130.1	1 09.3	−59.6	130.2	**4**
5	4 40.6	−58.8	130.0	4 02.0	−58.9	130.1	3 23.4	−59.1	130.1	2 44.7	−59.3	130.2	2 05.9	−59.3	130.2	1 27.2	−59.5	130.2	0 48.4	−59.5	130.3	0 09.7	−59.7	130.3	**5**
6	3 41.8	−58.8	130.2	3 03.1	−59.0	130.3	2 24.3	−59.1	130.3	1 45.4	−59.2	130.3	1 06.6	−59.4	130.4	0 27.7	−59.4	130.4	0 11.1	+59.6	49.6	0 50.0	+59.7	49.6	**6**
7	2 43.0	−58.8	130.4	2 04.1	−58.9	130.5	1 25.2	−59.1	130.5	0 46.2	−59.2	130.5	0 07.2	−59.3	130.5	0 31.7	+59.5	49.5	1 10.7	+59.6	49.5	1 49.7	+59.6	49.5	**7**
8	1 44.2	−58.8	130.6	1 05.2	−59.0	130.6	0 26.1	−59.1	130.7	0 13.0	+59.3	49.3	0 52.1	+59.4	49.3	1 31.2	+59.5	49.4	2 10.3	+59.5	49.4	2 49.3	+59.7	49.4	**8**
9	0 45.4	−58.8	130.8	0 06.2	−59.0	130.8	0 33.0	+59.1	49.2	1 12.3	+59.2	49.2	1 51.5	+59.3	49.2	2 30.7	+59.4	49.2	3 09.8	+59.6	49.3	3 49.0	+59.6	49.3	**9**
10	0 13.4	+58.8	49.0	0 52.8	+58.9	49.0	1 32.1	+59.1	49.0	2 11.5	+59.2	49.0	2 50.8	+59.4	49.1	3 30.1	+59.5	49.1	4 09.4	+59.6	49.1	4 48.6	+59.7	49.2	**10**
11	1 12.2	+58.8	48.8	1 51.7	+59.0	48.8	2 31.2	+59.1	48.8	3 10.7	+59.3	48.9	3 50.2	+59.3	48.9	4 29.6	+59.5	49.0	5 09.0	+59.5	49.0	5 48.3	+59.6	49.1	**11**
12	2 11.0	+58.8	48.6	2 50.7	+58.9	48.6	3 30.3	+59.1	48.7	4 10.0	+59.2	48.7	4 49.5	+59.4	48.8	5 29.1	+59.4	48.8	6 08.5	+59.6	48.9	6 47.9	+59.7	49.0	**12**
13	3 09.8	+58.8	48.4	3 49.6	+59.0	48.4	4 29.4	+59.1	48.5	5 09.2	+59.2	48.5	5 48.9	+59.3	48.6	6 28.5	+59.5	48.7	7 08.1	+59.5	48.8	7 47.6	+59.6	48.9	**13**
14	4 08.6	+58.8	48.2	4 48.6	+58.9	48.2	5 28.5	+59.1	48.3	6 08.4	+59.2	48.4	6 48.2	+59.4	48.5	7 28.0	+59.4	48.6	8 07.6	+59.6	48.7	8 47.2	+59.7	48.8	**14**
15	5 07.4	+58.8	48.0	5 47.5	+59.0	48.1	6 27.6	+59.1	48.1	7 07.6	+59.3	48.2	7 47.6	+59.3	48.3	8 27.4	+59.5	48.4	9 07.2	+59.6	48.5	9 46.9	+59.6	48.7	**15**
16	6 06.2	+58.8	47.8	6 46.5	+58.9	47.9	7 26.7	+59.1	48.0	8 06.9	+59.2	48.1	8 46.9	+59.4	48.2	9 26.9	+59.4	48.3	10 06.8	+59.5	48.4	10 46.5	+59.7	48.6	**16**
17	7 05.0	+58.8	47.6	7 45.4	+59.0	47.7	8 25.8	+59.1	47.8	9 06.1	+59.2	47.9	9 46.3	+59.3	48.0	10 26.3	+59.5	48.2	11 06.3	+59.6	48.3	11 46.2	+59.6	48.4	**17**
18	8 03.8	+58.8	47.4	8 44.4	+58.9	47.5	9 24.9	+59.1	47.6	10 05.3	+59.2	47.7	10 45.6	+59.3	47.9	11 25.8	+59.4	48.0	12 05.9	+59.5	48.2	12 45.8	+59.7	48.3	**18**
19	9 02.6	+58.7	47.2	9 43.3	+58.9	47.3	10 24.0	+59.0	47.4	11 04.5	+59.2	47.6	11 44.9	+59.3	47.7	12 25.2	+59.5	47.9	13 05.4	+59.6	48.0	13 45.5	+59.6	48.2	**19**
20	10 01.3	+58.8	47.0	10 42.2	+59.0	47.1	11 23.0	+59.1	47.2	12 03.7	+59.2	47.4	12 44.2	+59.4	47.6	13 24.7	+59.4	47.7	14 05.0	+59.5	47.9	14 45.1	+59.6	48.1	**20**
21	11 00.1	+58.8	46.8	11 41.2	+58.9	46.9	12 22.1	+59.0	47.1	13 02.9	+59.2	47.2	13 43.6	+59.3	47.4	14 24.1	+59.4	47.6	15 04.5	+59.5	47.8	15 44.7	+59.7	48.0	**21**
22	11 58.9	+58.7	46.6	12 40.1	+58.9	46.7	13 21.1	+59.1	46.9	14 02.1	+59.2	47.1	14 42.9	+59.3	47.3	15 23.5	+59.5	47.5	16 04.0	+59.6	47.7	16 44.4	+59.6	47.9	**22**
23	12 57.6	+58.8	46.4	13 39.0	+58.9	46.5	14 20.2	+59.0	46.7	15 01.3	+59.1	46.9	15 42.2	+59.3	47.1	16 23.0	+59.4	47.3	17 03.6	+59.5	47.5	17 44.0	+59.6	47.8	**23**
24	13 56.4	+58.7	46.1	14 37.9	+58.8	46.3	15 19.2	+59.1	46.5	16 00.4	+59.2	46.7	16 41.5	+59.3	46.9	17 22.4	+59.4	47.2	18 03.1	+59.5	47.4	18 43.6	+59.6	47.6	**24**
25	14 55.1	+58.7	45.9	15 36.7	+58.9	46.1	16 18.3	+59.0	46.3	16 59.6	+59.2	46.5	17 40.8	+59.3	46.8	18 21.8	+59.4	47.0	19 02.6	+59.5	47.3	19 43.2	+59.6	47.5	**25**
26	15 53.8	+58.7	45.7	16 35.6	+58.9	45.9	17 17.3	+59.0	46.1	17 58.8	+59.1	46.4	18 40.1	+59.2	46.6	19 21.2	+59.4	46.9	20 02.1	+59.5	47.1	20 42.8	+59.6	47.4	**26**
27	16 52.5	+58.7	45.5	17 34.5	+58.8	45.7	18 16.3	+59.0	46.0	18 57.9	+59.1	46.2	19 39.3	+59.3	46.5	20 20.6	+59.4	46.7	21 01.6	+59.5	47.0	21 42.4	+59.6	47.3	**27**
28	17 51.2	+58.7	45.3	18 33.3	+58.9	45.5	19 15.3	+59.0	45.8	19 57.0	+59.2	46.0	20 38.6	+59.3	46.3	21 20.0	+59.4	46.6	22 01.1	+59.5	46.9	22 42.0	+59.6	47.2	**28**
29	18 49.9	+58.6	45.1	19 32.2	+58.8	45.3	20 14.3	+58.9	45.6	20 56.2	+59.1	45.8	21 37.9	+59.2	46.1	22 19.4	+59.3	46.4	23 00.6	+59.5	46.7	23 41.6	+59.6	47.0	**29**
30	19 48.5	+58.7	44.8	20 31.0	+58.8	45.1	21 13.2	+59.0	45.4	21 55.3	+59.1	45.7	22 37.1	+59.3	45.9	23 18.7	+59.4	46.3	24 00.1	+59.5	46.6	24 41.2	+59.6	46.9	**30**
31	20 47.2	+58.6	44.6	21 29.8	+58.8	44.9	22 12.2	+58.9	45.2	22 54.4	+59.1	45.5	23 36.4	+59.2	45.8	24 18.1	+59.3	46.1	24 59.6	+59.4	46.4	25 40.8	+59.6	46.8	**31**
32	21 45.8	+58.6	44.4	22 28.6	+58.8	44.7	23 11.1	+59.0	45.0	23 53.5	+59.1	45.3	24 35.6	+59.2	45.6	25 17.4	+59.4	45.9	25 59.0	+59.5	46.3	26 40.4	+59.5	46.6	**32**
33	22 44.4	+58.6	44.2	23 27.4	+58.7	44.5	24 10.1	+58.9	44.8	24 52.6	+59.0	45.1	25 34.8	+59.2	45.4	26 16.8	+59.3	45.8	26 58.5	+59.5	46.1	27 39.9	+59.6	46.5	**33**
34	23 43.0	+58.6	43.9	24 26.1	+58.7	44.2	25 09.0	+58.9	44.6	25 51.6	+59.1	44.9	26 34.0	+59.2	45.2	27 16.1	+59.3	45.6	27 58.0	+59.4	46.0	28 39.5	+59.6	46.4	**34**
35	24 41.6	+58.5	43.7	25 24.8	+58.8	44.0	26 07.9	+58.9	44.3	26 50.7	+59.0	44.7	27 33.2	+59.2	45.1	28 15.4	+59.3	45.4	28 57.4	+59.4	45.8	29 39.1	+59.5	46.2	**35**
36	25 40.1	+58.5	43.4	26 23.6	+58.6	43.8	27 06.8	+58.8	44.1	27 49.7	+59.0	44.5	28 32.4	+59.1	44.9	29 14.7	+59.3	45.3	29 56.8	+59.4	45.7	30 38.6	+59.5	46.1	**36**
37	26 38.6	+58.5	43.2	27 22.2	+58.7	43.5	28 05.6	+58.8	43.9	28 48.7	+59.0	44.3	29 31.5	+59.1	44.7	30 14.0	+59.3	45.1	30 56.2	+59.4	45.5	31 38.1	+59.6	45.9	**37**
38	27 37.1	+58.5	42.9	28 20.9	+58.7	43.3	29 04.4	+58.9	43.7	29 47.7	+59.0	44.1	30 30.6	+59.2	44.5	31 13.3	+59.3	44.9	31 55.6	+59.4	45.3	32 37.7	+59.5	45.8	**38**
39	28 35.6	+58.4	42.7	29 19.6	+58.6	43.1	30 03.3	+58.7	43.5	30 46.7	+58.9	43.9	31 29.8	+59.1	44.3	32 12.6	+59.2	44.7	32 55.0	+59.4	45.2	33 37.2	+59.5	45.6	**39**
40	29 34.0	+58.4	42.4	30 18.2	+58.6	42.8	31 02.0	+58.8	43.2	31 45.6	+58.9	43.6	32 28.9	+59.1	44.1	33 11.8	+59.2	44.5	33 54.4	+59.4	45.0	34 36.7	+59.5	45.5	**40**
41	30 32.4	+58.4	42.2	31 16.8	+58.5	42.6	32 00.8	+58.7	43.0	32 44.5	+58.9	43.4	33 28.0	+59.0	43.9	34 11.0	+59.2	44.3	34 53.8	+59.3	44.8	35 36.2	+59.4	45.3	**41**
42	31 30.8	+58.3	41.9	32 15.3	+58.5	42.3	32 59.5	+58.7	42.7	33 43.4	+58.9	43.2	34 27.0	+59.1	43.7	35 10.2	+59.2	44.1	35 53.1	+59.4	44.6	36 35.6	+59.5	45.2	**42**
43	32 29.1	+58.3	41.6	33 13.8	+58.5	42.0	33 58.2	+58.7	42.5	34 42.3	+58.9	43.0	35 26.1	+59.0	43.4	36 09.4	+59.2	43.9	36 52.5	+59.3	44.5	37 35.1	+59.4	45.0	**43**
44	33 27.4	+58.3	41.3	34 12.3	+58.5	41.8	34 56.9	+58.7	42.2	35 41.2	+58.8	42.7	36 25.1	+59.0	43.2	37 08.6	+59.2	43.7	37 51.8	+59.3	44.3	38 34.5	+59.5	44.8	**44**
45	34 25.7	+58.2	41.0	35 10.8	+58.4	41.5	35 55.6	+58.6	42.0	36 40.0	+58.8	42.5	37 24.1	+58.9	43.0	38 07.8	+59.1	43.5	38 51.1	+59.2	44.1	39 34.0	+59.4	44.6	**45**
46	35 23.9	+58.2	40.8	36 09.2	+58.4	41.2	36 54.2	+58.5	41.7	37 38.8	+58.7	42.2	38 23.0	+59.0	42.8	39 06.9	+59.1	43.3	39 50.3	+59.3	43.9	40 33.4	+59.4	44.5	**46**
47	36 22.1	+58.1	40.5	37 07.6	+58.3	40.9	37 52.7	+58.6	41.4	38 37.5	+58.8	42.0	39 22.0	+58.9	42.5	40 06.0	+59.1	43.1	40 49.6	+59.2	43.7	41 32.8	+59.4	44.3	**47**
48	37 20.2	+58.1	40.1	38 05.9	+58.3	40.6	38 51.3	+58.5	41.2	39 36.3	+58.6	41.7	40 20.9	+58.8	42.3	41 05.1	+59.0	42.8	41 48.8	+59.2	43.5	42 32.2	+59.3	44.1	**48**
49	38 18.3	+58.0	39.8	39 04.2	+58.2	40.3	39 49.8	+58.4	40.9	40 34.9	+58.7	41.4	41 19.7	+58.9	42.0	42 04.1	+59.0	42.6	42 48.0	+59.2	43.2	43 31.5	+59.4	43.9	**49**
50	39 16.3	+58.0	39.5	40 02.4	+58.2	40.0	40 48.2	+58.4	40.6	41 33.6	+58.6	41.2	42 18.6	+58.8	41.7	43 03.1	+59.0	42.4	43 47.2	+59.2	43.0	44 30.9	+59.3	43.7	**50**
51	40 14.3	+57.9	39.2	41 00.6	+58.2	39.7	41 46.6	+58.4	40.3	42 32.2	+58.5	40.9	43 17.4	+58.7	41.5	44 02.1	+58.9	42.1	44 46.4	+59.1	42.8	45 30.2	+59.3	43.5	**51**
52	41 12.2	+57.9	38.8	41 58.8	+58.0	39.4	42 45.0	+58.3	40.0	43 30.7	+58.6	40.6	44 16.1	+58.7	41.2	45 01.0	+58.9	41.8	45 45.5	+59.1	42.5	46 29.5	+59.2	43.2	**52**
53	42 10.1	+57.7	38.5	42 56.8	+58.1	39.0	43 43.3	+58.2	39.6	44 29.3	+58.4	40.3	45 14.8	+58.7	40.9	45 59.9	+58.9	41.6	46 44.6	+59.0	42.3	47 28.7	+59.3	43.0	**53**
54	43 07.8	+57.7	38.1	43 54.9	+57.9	38.7	44 41.5	+58.2	39.3	45 27.7	+58.4	39.9	46 13.5	+58.6	40.6	46 58.8	+58.8	41.3	47 43.6	+59.1	42.0	48 28.0	+59.2	42.8	**54**
55	44 05.5	+57.7	37.7	44 52.8	+57.9	38.3	45 39.7	+58.1	39.0	46 26.1	+58.4	39.6	47 12.1	+58.6	40.3	47 57.6	+58.8	41.0	48 42.7	+58.9	41.7	49 27.2	+59.1	42.5	**55**
56	45 03.2	+57.5	37.3	45 50.7	+57.8	37.9	46 37.8	+58.0	38.6	47 24.5	+58.2	39.3	48 10.7	+58.5	40.0	48 56.4	+58.8	40.7	49 41.6	+59.0	41.5	50 26.3	+59.2	42.3	**56**
57	46 00.7	+57.5	36.9	46 48.5	+57.7	37.6	47 35.8	+58.0	38.2	48 22.7	+58.3	38.9	49 09.2	+58.4	39.6	49 55.2	+58.6	40.4	50 40.6	+58.9	41.2	51 25.5	+59.1	42.0	**57**
58	46 58.2	+57.3	36.5	47 46.2	+57.6	37.2	48 33.8	+57.9	37.8	49 21.0	+58.1	38.5	50 07.6	+58.4	39.3	50 53.8	+58.7	40.1	51 39.5	+58.8	40.9	52 24.6	+59.0	41.7	**58**
59	47 55.5	+57.3	36.1	48 43.8	+57.6	36.7	49 31.7	+57.8	37.4	50 19.1	+58.1	38.2	51 06.0	+58.4	38.9	51 52.5	+58.5	39.7	52 38.3	+58.8	40.6	53 23.6	+59.0	41.4	**59**
60	48 52.8	+57.2	35.6	49 41.4	+57.4	36.3	50 29.5	+57.7	37.0	51 17.2	+57.9	37.8	52 04.4	+58.2	38.5	52 51.0	+58.5	39.4	53 37.1	+58.7	40.2	54 22.6	+59.0	41.1	**60**
61	49 50.0	+57.0	35.2	50 38.8	+57.3	35.9	51 27.2	+57.6	36.6	52 15.1	+57.9	37.3	53 02.6	+58.1	38.2	53 49.5	+58.4	39.0	54 35.8	+58.7	39.9	55 21.6	+58.9	40.8	**61**
62	50 47.0	+56.9	34.7	51 36.1	+57.2	35.4	52 24.8	+57.5	36.1	53 13.0	+57.8	36.9	54 00.7	+58.1	37.7	54 47.9	+58.4	38.6	55 34.5	+58.6	39.5	56 20.5	+58.8	40.5	**62**
63	51 43.9	+56.8	34.2	52 33.3	+57.1	34.9	53 22.3	+57.4	35.7	54 10.8	+57.7	36.5	54 58.8	+58.0	37.3	55 46.3	+58.2	38.2	56 33.1	+58.5	39.1	57 19.3	+58.8	40.1	**63**
64	52 40.7	+56.6	33.6	53 30.4	+56.9	34.4	54 19.7	+57.3	35.2	55 08.5	+57.6	36.0	55 56.8	+57.9	36.8	56 44.5	+58.2	37.8	57 31.6	+58.5	38.7	58 18.1	+58.7	39.7	**64**
65	53 37.3	+56.5	33.1	54 27.3	+56.8	33.8	55 17.0	+57.1	34.6	56 06.1	+57.4	35.5	56 54.7	+57.7	36.4	57 42.7	+58.0	37.3	58 30.1	+58.3	38.3	59 16.8	+58.7	39.3	**65**
66	54 33.8	+56.3	32.5	55 24.1	+56.7	33.3	56 14.1	+56.9	34.1	57 03.5	+57.3	35.0	57 52.4	+57.6	35.9	58 40.7	+58.0	36.8	59 28.4	+58.3	37.8	60 15.5	+58.5	38.9	**66**
67	55 30.1	+56.1	31.9	56 20.8	+56.4	32.7	57 11.0	+56.8	33.5	58 00.8	+57.1	34.4	58 50.0	+57.5	35.3	59 38.7	+57.8	36.3	60 26.7	+58.1	37.4	61 14.0	+58.5	38.5	**67**
68	56 26.2	+55.9	31.3	57 17.2	+56.3	32.1	58 07.8	+56.7	32.9	58 57.9	+57.0	33.8	59 47.5	+57.3	34.8	60 36.5	+57.7	35.8	61 24.8	+58.1	36.9	62 12.5	+58.4	38.0	**68**
69	57 22.1	+55.7	30.6	58 13.5	+56.0	31.4	59 04.5	+56.4	32.3	59 54.9	+56.8	33.2	60 44.8	+57.2	34.2	61 34.2	+57.5	35.2	62 22.9	+57.9	36.3	63 10.9	+58.2	37.5	**69**
70	58 17.8	+55.4	29.9	59 09.5	+55.9	30.7	60 00.9	+56.2	31.6	60 51.7	+56.6	32.6	61 42.0	+57.0	33.5	62 31.7	+57.4	34.6	63 20.8	+57.7	35.7	64 09.1	+58.1	36.9	**70**
71	59 13.2	+55.2	29.2	60 05.4	+55.5	30.0	60 57.1	+56.0	30.9	61 48.3	+56.4	31.9	62 39.0	+56.8	32.9	63 29.1	+57.2	34.0	64 18.5	+57.6	35.1	65 07.2	+58.0	36.4	**71**
72	60 08.4	+54.9	28.4	61 00.9	+55.3	29.2	61 53.1	+55.7	30.2	62 44.7	+56.1	31.1	63 35.8	+56.5	32.2	64 26.3	+56.9	33.3	65 16.1	+57.4	34.5	66 05.2	+57.8	35.7	**72**
73	61 03.3	+54.5	27.6	61 56.2	+55.0	28.4	62 48.8	+55.4	29.4	63 40.8	+55.9	30.3	64 32.3	+56.3	31.4	65 23.2	+56.8	32.5	66 13.5	+57.1	33.7	67 03.0	+57.6	35.1	**73**
74	61 57.8	+54.2	26.7	62 51.2	+54.7	27.6	63 44.2	+55.1	28.5	64 36.7	+55.5	29.5	65 28.6	+56.0	30.6	66 20.0	+56.4	31.7	67 10.6	+57.0	33.0	68 00.6	+57.4	34.3	**74**
75	62 52.0	+53.9	25.8	63 45.9	+54.3	26.6	64 39.3	+54.7	27.6	65 32.2	+55.2	28.6	66 24.6	+55.7	29.7	67 16.4	+56.2	30.9	68 07.6	+56.7	32.2	68 58.0	+57.2	33.5	**75**
76	63 45.9	+53.4	24.8	64 40.2	+53.8	25.7	65 34.0	+54.4	26.6	66 27.4	+54.9	27.6	67 20.3	+55.3	28.8	68 12.6	+55.8	30.0	69 04.3	+56.3	31.3	69 55.2	+56.9	32.7	**76**
77	64 39.3	+52.9	23.7	65 34.0	+53.4	24.6	66 28.4	+53.9	25.6	67 22.3	+54.3	26.6	68 15.6	+55.0	27.7	69 08.4	+55.5	28.9	70 00.6	+56.0	30.3	70 52.1	+56.5	31.7	**77**
78	65 32.2	+52.4	22.6	66 27.4	+52.9	23.5	67 22.3	+53.3	24.5	68 16.6	+54.0	25.5	69 10.6	+54.4	26.6	70 03.9	+55.0	27.8	70 56.6	+55.6	29.2	71 48.6	+56.2	30.7	**78**
79	66 24.6	+51.8	21.4	67 20.3	+52.3	22.3	68 15.6	+52.8	23.2	69 10.6	+53.3	24.3	70 05.0	+53.9	25.4	70 58.9	+54.5	26.7	71 52.2	+55.1	28.0	72 44.8	+55.8	29.5	**79**
80	67 16.4	+51.2	20.1	68 12.6	+51.7	21.0	69 08.4	+52.2	21.9	70 03.9	+52.7	23.0	70 58.9	+53.3	24.1	71 53.4	+53.9	25.3	72 47.3	+54.6	26.7	73 40.6	+55.2	28.2	**80**
81	68 07.6	+50.4	18.8	69 04.3	+50.9	19.6	70 00.6	+51.5	20.5	70 56.6	+52.0	21.5	71 52.2	+52.6	22.7	72 47.3	+53.3	23.9	73 41.9	+53.9	25.3	74 35.8	+54.7	26.8	**81**
82	68 58.0	+49.6	17.3	69 55.2	+50.0	18.1	70 52.1	+50.6	19.0	71 48.6	+51.2	20.0	72 44.8	+51.8	21.1	73 40.6	+52.4	22.3	74 35.8	+53.2	23.7	75 30.5	+53.8	25.2	**82**
83	69 47.6	+48.6	15.7	70 45.2	+49.2	16.5	71 42.7	+49.6	17.3	72 39.8	+50.2	18.3	73 36.6	+50.8	19.3	74 33.0	+51.5	20.5	75 29.0	+52.2	21.9	76 24.3	+53.0	23.4	**83**
84	70 36.2	+47.6	14.0	71 34.4	+48.0	14.7	72 32.3	+48.5	15.5	73 30.0	+49.1	16.4	74 27.4	+49.7	17.4	75 24.5	+50.4	18.5	76 21.2	+51.1	19.8	77 17.3	+51.9	21.3	**84**
85	71 23.8	+46.4	12.1	72 22.4	+46.8	12.7	73 20.8	+47.3	13.5	74 19.1	+47.8	14.3	75 17.1	+48.4	15.2	76 14.9	+49.0	16.3	77 12.3	+49.7	17.5	78 09.2	+50.6	19.0	**85**
86	72 10.2	+45.0	10.1	73 09.2	+45.4	10.6	74 08.1	+45.8	11.3	75 06.9	+46.3	12.0	76 05.5	+46.8	12.8	77 03.9	+47.4	13.8	78 02.0	+48.1	14.9	78 59.8	+48.8	16.3	**86**
87	72 55.2	+43.4	7.8	73 54.6	+43.8	8.3	74 53.9	+44.1	8.9	75 53.2	+44.5	9.5	76 52.3	*+44.9*•	10.2	77 51.3	*+45.4*•	11.0	78 50.1	*+46.0*•	11.9	79 48.6	*+46.8*•	13.1	**87**
88	73 38.6	+41.7	5.4	74 38.4	*+41.9*•	5.8	75 38.0	*+42.2*•	6.2	76 37.7	*+42.4*•	6.6	77 37.2	*+42.7*•	7.2	78 36.7	*+43.1*•	7.8	79 36.1	*+43.5*•	8.5	80 35.4	*+44.0*•	9.4	**88**
89	74 20.3	*+39.7*•	2.8	75 20.3	*+39.7*•	3.0	76 20.2	*+39.8*•	3.2	77 20.1	*+39.9*•	3.5	78 19.9	*+40.1*•	3.8	79 19.8	*+40.2*•	4.1	80 19.6	*+40.4*•	4.6	81 19.4	*+40.6*•	5.1	**89**
90	75 00.0	*+37.4*•	0.0	76 00.0	*+37.3*•	0.0	77 00.0	*+37.2*•	0.0	78 00.0	*+37.0*•	0.0	79 00.0	*+36.9*•	0.0	80 00.0	*+36.7*•	0.0	81 00.0	*+36.5*•	0.0	82 00.0	*+36.2*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 130°, 230°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 22.4	+58.8	128.0	8 45.4	+58.9	128.2	8 08.3	+59.1	128.3	7 31.1	+59.2	128.4	6 53.8	+59.3	128.5	6 16.4	+59.5	128.6	5 39.0	+59.5	128.7	5 01.5	+59.6	128.7	0
1	10 21.2	+58.7	127.8	9 44.3	+58.9	128.0	9 07.4	+59.0	128.1	8 30.3	+59.2	128.2	7 53.1	+59.4	128.3	7 15.9	+59.4	128.4	6 38.5	+59.6	128.5	6 01.1	+59.7	128.6	1
2	11 19.9	+58.7	127.6	10 43.2	+58.9	127.8	10 06.4	+59.1	127.9	9 29.5	+59.2	128.1	8 52.5	+59.3	128.2	8 15.3	+59.5	128.3	7 38.1	+59.5	128.4	7 00.8	+59.6	128.5	2
3	12 18.6	+58.7	127.4	11 42.1	+58.9	127.6	11 05.5	+59.0	127.7	10 28.7	+59.2	127.9	9 51.8	+59.3	128.0	9 14.8	+59.4	128.2	8 37.6	+59.6	128.3	8 00.4	+59.6	128.4	3
4	13 17.3	+58.7	127.2	12 41.0	+58.9	127.4	12 04.5	+59.0	127.6	11 27.9	+59.1	127.7	10 51.1	+59.3	127.9	10 14.2	+59.4	128.0	9 37.2	+59.5	128.2	9 00.0	+59.7	128.3	4
5	14 16.0	+58.7	127.0	13 39.9	+58.8	127.2	13 03.5	+59.0	127.4	12 27.0	+59.2	127.5	11 50.4	+59.3	127.7	11 13.6	+59.4	127.9	10 36.7	+59.6	128.0	9 59.7	+59.6	128.2	5
6	15 14.7	+58.7	126.8	14 38.7	+58.9	127.0	14 02.5	+59.1	127.2	13 26.2	+59.2	127.4	12 49.7	+59.3	127.6	12 13.0	+59.5	127.7	11 36.3	+59.5	127.9	10 59.3	+59.7	128.1	6
7	16 13.4	+58.7	126.5	15 37.6	+58.8	126.8	15 01.6	+59.0	127.0	14 25.4	+59.1	127.2	13 49.0	+59.3	127.4	13 12.5	+59.4	127.6	12 35.8	+59.5	127.8	11 59.0	+59.6	128.0	7
8	17 12.1	+58.6	126.3	16 36.4	+58.8	126.6	16 00.6	+59.0	126.8	15 24.5	+59.2	127.0	14 48.3	+59.3	127.2	14 11.9	+59.4	127.5	13 35.3	+59.5	127.7	12 58.6	+59.6	127.8	8
9	18 10.7	+58.6	126.1	17 35.2	+58.9	126.4	16 59.6	+58.9	126.6	16 23.7	+59.1	126.9	15 47.6	+59.3	127.1	15 11.3	+59.4	127.3	14 34.8	+59.6	127.5	13 58.2	+59.6	127.7	9
10	19 09.3	+58.7	125.9	18 34.1	+58.8	126.2	17 58.5	+59.0	126.4	17 22.8	+59.1	126.7	16 46.9	+59.2	126.9	16 10.7	+59.4	127.2	15 34.4	+59.5	127.4	14 57.8	+59.7	127.6	10
11	20 08.0	+58.6	125.7	19 32.9	+58.7	126.0	18 57.5	+59.0	126.2	18 21.9	+59.2	126.5	17 46.1	+59.3	126.8	17 10.1	+59.4	127.0	16 33.9	+59.5	127.3	15 57.5	+59.6	127.5	11
12	21 06.6	+58.5	125.4	20 31.6	+58.8	125.7	19 56.5	+58.9	126.0	19 21.1	+59.1	126.3	18 45.4	+59.2	126.6	18 09.5	+59.4	126.9	17 33.4	+59.5	127.1	16 57.1	+59.6	127.4	12
13	22 05.1	+58.6	125.2	21 30.4	+58.8	125.5	20 55.4	+59.0	125.8	20 20.2	+59.1	126.1	19 44.6	+59.3	126.4	19 08.9	+59.4	126.7	18 32.9	+59.5	127.0	17 56.7	+59.6	127.3	13
14	23 03.7	+58.5	125.0	22 29.2	+58.7	125.3	21 54.4	+58.9	125.6	21 19.3	+59.0	126.0	20 43.9	+59.2	126.3	20 08.3	+59.3	126.6	19 32.4	+59.5	126.9	18 56.3	+59.6	127.1	14
15	24 02.2	+58.5	124.7	23 27.9	+58.7	125.1	22 53.3	+58.9	125.4	22 18.3	+59.1	125.8	21 43.1	+59.3	126.1	21 07.6	+59.4	126.4	20 31.9	+59.5	126.7	19 55.9	+59.6	127.0	15
16	25 00.7	+58.5	124.5	24 26.6	+58.7	124.9	23 52.2	+58.9	125.2	23 17.4	+59.1	125.6	22 42.4	+59.2	125.9	22 07.0	+59.4	126.3	21 31.4	+59.5	126.6	20 55.5	+59.6	126.9	16
17	25 59.2	+58.5	124.2	25 25.3	+58.7	124.6	24 51.1	+58.8	125.0	24 16.5	+59.0	125.4	23 41.6	+59.2	125.7	23 06.4	+59.3	126.1	22 30.9	+59.4	126.4	21 55.1	+59.6	126.8	17
18	26 57.7	+58.4	124.0	26 24.0	+58.6	124.4	25 49.9	+58.9	124.8	25 15.5	+59.0	125.2	24 40.8	+59.2	125.6	24 05.7	+59.3	125.9	23 30.3	+59.5	126.3	22 54.7	+59.6	126.6	18
19	27 56.1	+58.5	123.7	27 22.6	+58.7	124.2	26 48.8	+58.8	124.6	26 14.5	+59.0	125.0	25 40.0	+59.1	125.4	25 05.0	+59.4	125.8	24 29.8	+59.5	126.1	23 54.3	+59.5	126.5	19
20	28 54.6	+58.3	123.5	28 21.3	+58.6	123.9	27 47.6	+58.8	124.4	27 13.5	+59.0	124.8	26 39.1	+59.2	125.2	26 04.4	+59.3	125.6	25 29.3	+59.4	126.0	24 53.8	+59.6	126.4	20
21	29 52.9	+58.4	123.2	29 19.9	+58.5	123.7	28 46.4	+58.8	124.1	28 12.5	+59.0	124.6	27 38.3	+59.1	125.0	27 03.7	+59.3	125.4	26 28.7	+59.5	125.8	25 53.4	+59.6	126.2	21
22	30 51.3	+58.3	122.9	30 18.4	+58.6	123.4	29 45.2	+58.7	123.9	29 11.5	+59.0	124.4	28 37.4	+59.2	124.8	28 03.0	+59.3	125.3	27 28.2	+59.4	125.7	26 53.0	+59.5	126.1	22
23	31 49.6	+58.3	122.7	31 17.0	+58.5	123.2	30 43.9	+58.8	123.7	30 10.5	+58.9	124.2	29 36.6	+59.1	124.6	29 02.3	+59.2	125.1	28 27.6	+59.4	125.5	27 52.5	+59.6	126.0	23
24	32 47.9	+58.2	122.4	32 15.5	+58.5	122.9	31 42.7	+58.7	123.4	31 09.4	+58.9	123.9	30 35.7	+59.1	124.4	30 01.5	+59.3	124.9	29 27.0	+59.4	125.4	28 52.1	+59.5	125.8	24
25	33 46.1	+58.2	122.1	33 14.0	+58.4	122.6	32 41.4	+58.7	123.2	32 08.3	+58.9	123.7	31 34.8	+59.1	124.2	31 00.8	+59.3	124.7	30 26.4	+59.4	125.2	29 51.6	+59.5	125.7	25
26	34 44.3	+58.2	121.8	34 12.4	+58.4	122.4	33 40.1	+58.6	122.9	33 07.2	+58.9	123.5	32 33.9	+59.0	124.0	32 00.1	+59.2	124.5	31 25.8	+59.4	125.1	30 51.1	+59.5	125.5	26
27	35 42.5	+58.1	121.5	35 10.8	+58.4	122.1	34 38.7	+58.6	122.7	34 06.1	+58.8	123.3	33 32.9	+59.0	123.8	32 59.3	+59.2	124.4	32 25.2	+59.4	124.9	31 50.6	+59.6	125.4	27
28	36 40.6	+58.0	121.2	36 09.2	+58.3	121.8	35 37.3	+58.6	122.4	35 04.9	+58.8	123.0	34 31.9	+59.0	123.6	33 58.5	+59.2	124.2	33 24.6	+59.3	124.7	32 50.2	+59.5	125.2	28
29	37 38.6	+58.0	120.9	37 07.5	+58.3	121.5	36 35.9	+58.5	122.2	36 03.7	+58.8	122.8	35 30.9	+59.0	123.4	34 57.7	+59.1	124.0	34 23.9	+59.3	124.5	33 49.7	+59.4	125.1	29
30	38 36.6	+58.0	120.5	38 05.8	+58.3	121.2	37 34.4	+58.5	121.9	37 02.5	+58.7	122.5	36 29.9	+59.0	123.2	35 56.8	+59.2	123.8	35 23.2	+59.4	124.4	34 49.1	+59.5	124.9	30
31	39 34.6	+57.9	120.2	39 04.1	+58.2	120.9	38 32.9	+58.5	121.6	38 01.2	+58.7	122.3	37 28.9	+58.9	122.9	36 56.0	+59.1	123.6	36 22.6	+59.3	124.2	35 48.6	+59.5	124.8	31
32	40 32.5	+57.8	119.9	40 02.3	+58.1	120.6	39 31.4	+58.4	121.3	38 59.9	+58.7	122.0	38 27.8	+58.9	122.7	37 55.1	+59.1	123.3	37 21.9	+59.3	124.0	36 48.1	+59.4	124.6	32
33	41 30.3	+57.8	119.5	41 00.4	+58.1	120.3	40 29.8	+58.4	121.0	39 58.6	+58.6	121.7	39 26.7	+58.9	122.4	38 54.2	+59.1	123.1	38 21.2	+59.2	123.8	37 47.5	+59.4	124.4	33
34	42 28.1	+57.6	119.1	41 58.5	+58.0	119.9	41 28.2	+58.3	120.7	40 57.2	+58.6	121.5	40 25.6	+58.8	122.2	39 53.3	+59.1	122.9	39 20.4	+59.3	123.6	38 46.9	+59.4	124.3	34
35	43 25.7	+57.7	118.8	42 56.5	+57.9	119.6	42 26.5	+58.3	120.4	41 55.8	+58.5	121.2	41 24.4	+58.8	121.9	40 52.4	+59.0	122.7	40 19.7	+59.2	123.4	39 46.3	+59.4	124.1	35
36	44 23.4	+57.5	118.4	43 54.4	+57.9	119.2	43 24.8	+58.2	120.1	42 54.3	+58.5	120.9	42 23.2	+58.8	121.7	41 51.4	+59.0	122.4	41 18.9	+59.2	123.2	40 45.7	+59.4	123.9	36
37	45 20.9	+57.4	118.0	44 52.3	+57.8	118.9	44 23.0	+58.1	119.7	43 52.8	+58.5	120.6	43 22.0	+58.7	121.4	42 50.4	+58.9	122.2	42 18.1	+59.1	122.9	41 45.1	+59.4	123.7	37
38	46 18.3	+57.4	117.6	45 50.1	+57.8	118.5	45 21.1	+58.1	119.4	44 51.3	+58.4	120.2	44 20.7	+58.7	121.1	43 49.3	+59.0	121.9	43 17.2	+59.2	122.7	42 44.5	+59.3	123.5	38
39	47 15.7	+57.2	117.1	46 47.9	+57.6	118.1	46 19.2	+58.0	119.0	45 49.7	+58.3	119.9	45 19.4	+58.6	120.8	44 48.3	+58.8	121.7	44 16.4	+59.1	122.5	43 43.8	+59.3	123.3	39
40	48 12.9	+57.2	116.7	47 45.5	+57.6	117.7	47 17.2	+57.9	118.6	46 48.0	+58.3	119.6	46 18.0	+58.6	120.5	45 47.1	+58.9	121.4	45 15.5	+59.1	122.2	44 43.1	+59.3	123.1	40
41	49 10.1	+57.0	116.2	48 43.1	+57.5	117.3	48 15.1	+57.9	118.3	47 46.3	+58.2	119.2	47 16.6	+58.5	120.2	46 46.0	+58.8	121.1	46 14.6	+59.0	122.0	45 42.4	+59.3	122.9	41
42	50 07.1	+56.9	115.7	49 40.6	+57.3	116.8	49 13.0	+57.8	117.9	48 44.5	+58.1	118.9	48 15.1	+58.4	119.8	47 44.8	+58.7	120.8	47 13.6	+59.0	121.7	46 41.7	+59.2	122.6	42
43	51 04.0	+56.8	115.2	50 37.9	+57.3	116.4	50 10.8	+57.6	117.4	49 42.6	+58.1	118.5	49 13.5	+58.4	119.5	48 43.5	+58.7	120.5	48 12.6	+59.0	121.5	47 40.9	+59.2	122.4	43
44	52 00.8	+56.6	114.7	51 35.2	+57.1	115.9	51 08.4	+57.6	117.0	50 40.7	+58.0	118.1	50 11.9	+58.4	119.2	49 42.2	+58.7	120.2	49 11.6	+59.0	121.2	48 40.1	+59.2	122.2	44
45	52 57.4	+56.5	114.2	52 32.3	+57.0	115.4	52 06.0	+57.5	116.5	51 38.7	+57.8	117.7	51 10.3	+58.2	118.8	50 40.9	+58.6	119.9	50 10.6	+58.8	120.9	49 39.3	+59.1	121.9	45
46	53 53.9	+56.3	113.6	53 29.3	+56.8	114.9	53 03.5	+57.3	116.1	52 36.5	+57.8	117.3	52 08.5	+58.2	118.4	51 39.5	+58.5	119.5	51 09.4	+58.9	120.6	50 38.4	+59.1	121.7	46
47	54 50.2	+56.2	113.0	54 26.1	+56.7	114.3	54 00.8	+57.2	115.6	53 34.3	+57.7	116.8	53 06.7	+58.1	118.0	52 38.0	+58.5	119.2	52 08.3	+58.8	120.3	51 37.5	+59.1	121.4	47
48	55 46.4	+55.9	112.4	55 22.8	+56.6	113.7	54 58.0	+57.1	115.1	54 32.0	+57.6	116.3	54 04.8	+58.0	117.6	53 36.5	+58.4	118.8	53 07.1	+58.7	120.0	52 36.6	+59.0	121.1	48
49	56 42.3	+55.7	111.8	56 19.4	+56.3	113.2	55 55.1	+56.9	114.5	55 29.6	+57.4	115.8	55 02.8	+57.9	117.1	54 34.9	+58.3	118.4	54 05.8	+58.7	119.6	53 35.6	+59.0	120.8	49
50	57 38.0	+55.5	111.1	57 15.7	+56.2	112.5	56 52.0	+56.8	113.9	56 27.0	+57.3	115.3	56 00.7	+57.8	116.7	55 33.2	+58.2	118.0	55 04.5	+58.5	119.2	54 34.6	+58.9	120.5	50
51	58 33.5	+55.2	110.4	58 11.9	+55.9	111.9	57 48.8	+56.6	113.3	57 24.3	+57.2	114.8	56 58.5	+57.7	116.2	56 31.4	+58.1	117.5	56 03.0	+58.6	118.9	55 33.5	+58.9	120.1	51
52	59 28.7	+55.0	109.6	59 07.8	+55.7	111.2	58 45.4	+56.4	112.7	58 21.5	+57.0	114.2	57 56.2	+57.5	115.7	57 29.5	+58.1	117.1	57 01.6	+58.4	118.5	56 32.4	+58.8	119.8	52
53	60 23.7	+54.6	108.8	60 03.5	+55.5	110.4	59 41.8	+56.2	112.0	59 18.5	+56.8	113.6	58 53.7	+57.4	115.1	58 27.6	+57.9	116.6	58 00.0	+58.4	118.0	57 31.2	+58.7	119.4	53
54	61 18.3	+54.3	107.9	60 59.0	+55.1	109.7	60 38.0	+55.9	111.3	60 15.3	+56.7	113.0	59 51.1	+57.3	114.6	59 25.5	+57.8	116.1	58 58.4	+58.2	117.6	58 29.9	+58.7	119.0	54
55	62 12.6	+54.0	107.0	61 54.1	+54.9	108.8	61 33.9	+55.7	110.6	61 12.0	+56.4	112.3	60 48.4	+57.1	114.0	60 23.3	+57.6	115.6	59 56.6	+58.2	117.1	59 28.6	+58.5	118.6	55
56	63 06.6	+53.5	106.1	62 49.0	+54.5	108.0	62 29.6	+55.4	109.8	62 08.4	+56.1	111.6	61 45.5	+56.8	113.3	61 20.9	+57.5	115.0	60 54.8	+58.0	116.6	60 27.1	+58.5	118.2	56
57	64 00.1	+53.1	105.1	63 43.5	+54.1	107.0	63 25.0	+55.0	108.9	63 04.5	+56.0	110.8	62 42.3	+56.7	112.6	62 18.4	+57.3	114.4	61 52.8	+57.9	116.1	61 25.6	+58.4	117.8	57
58	64 53.2	+52.5	104.0	64 37.6	+53.7	106.0	64 20.0	+54.7	108.0	64 00.5	+55.6	110.0	63 39.0	+56.4	111.9	63 15.7	+57.2	113.7	62 50.7	+57.8	115.5	62 24.0	+58.3	117.3	58
59	65 45.7	+52.0	102.8	65 31.3	+53.2	105.0	65 14.7	+54.3	107.1	64 56.1	+55.3	109.1	64 35.4	+56.2	111.1	64 12.9	+56.9	113.1	63 48.5	+57.6	114.9	63 22.3	+58.2	116.7	59
60	66 37.7	+51.4	101.6	66 24.5	+52.7	103.9	66 09.0	+53.9	106.0	65 51.4	+54.9	108.2	65 31.6	+55.9	110.3	65 09.8	+56.7	112.3	64 46.1	+57.4	114.3	64 20.5	+58.0	116.2	60
61	67 29.1	+50.7	100.3	67 17.2	+52.1	102.6	67 02.9	+53.4	104.9	66 46.3	+54.5	107.2	66 27.5	+55.5	109.4	66 06.5	+56.4	111.5	65 43.5	+57.2	113.6	65 18.5	+57.9	115.6	61
62	68 19.8	+49.9	98.9	68 09.3	+51.4	101.3	67 56.3	+52.8	103.7	67 40.8	+54.1	106.1	67 23.0	+55.2	108.4	67 02.9	+56.2	110.7	66 40.7	+57.0	112.8	66 16.4	+57.7	114.9	62
63	69 09.7	+49.1	97.3	69 00.7	+50.7	99.9	68 49.1	+52.2	102.5	68 34.9	+53.5	105.0	68 18.2	+54.7	107.4	67 59.1	+55.8	109.7	67 37.7	+56.7	112.0	67 14.1	+57.5	114.2	63
64	69 58.8	+48.0	95.7	69 51.4	+49.8	98.4	69 41.3	+51.4	101.1	69 28.4	+53.0	103.7	69 12.9	+54.3	106.3	68 54.9	+55.4	108.7	68 34.4	+56.4	111.2	68 11.6	+57.3	113.5	64
65	70 46.8	+46.9	93.9	70 41.2	+48.9	96.7	70 32.7	+50.7	99.6	70 21.4	+52.2	102.3	70 07.2	+53.7	105.0	69 50.3	+55.0	107.7	69 30.8	+56.1	110.2	69 08.9	+57.0	112.7	65
66	71 33.7	+45.7	92.0	71 30.1	+47.8	94.9	71 23.4	+49.7	97.9	71 13.6	+51.5	100.8	71 00.9	+53.1	103.7	70 45.3	+54.4	106.5	70 26.9	+55.7	109.2	70 05.9	+56.7	111.8	66
67	72 19.4	+44.2	89.9	72 17.9	+46.5	93.0	72 13.1	+48.6	96.1	72 05.1	+50.6	99.2	71 54.0	+52.3	102.2	71 39.7	+53.9	105.2	71 22.6	+55.2	108.0	71 02.6	+56.4	110.8	67
68	73 03.6	+42.5	87.6	73 04.4	+45.0	90.9	73 01.7	+47.4	94.2	72 55.7	+49.5	97.4	72 46.3	+51.5	100.6	72 33.6	+53.3	103.7	72 17.8	+54.8	106.8	71 59.0	+56.0	109.7	68
69	73 46.1	+40.7	85.1	73 49.4	+43.4	88.6	73 49.1	+46.0	92.0	73 45.2	+48.4	95.4	73 37.8	+50.5	98.8	73 26.9	+52.4	102.2	73 12.6	+54.1	105.4	72 55.0	+55.6	108.5	69
70	74 26.8	*+38.6*•	82.4	74 32.8	*+41.6*•	86.0	74 35.1	+44.3	89.6	74 33.6	+46.9	93.3	74 28.3	+49.3	96.9	74 19.3	+51.5	100.4	74 06.7	+53.3	103.9	73 50.6	+55.0	107.2	70
71	75 05.4	*+36.1*•	79.5	75 14.4	*+39.3*•	83.3	75 19.4	*+42.5*•	87.0	75 20.5	+45.4	90.9	75 17.6	+48.0	94.7	75 10.8	+50.4	98.4	75 00.0	+52.6	102.1	74 45.6	+54.3	105.7	71
72	75 41.5	*+33.5*•	76.4	75 53.7	*+36.9*•	80.2	76 01.9	*+40.2*•	84.2	76 05.9	*+43.4*•	88.2	76 05.6	+46.4	92.2	76 01.2	+49.0	96.3	75 52.6	+51.4	100.2	75 39.9	+53.6	104.1	72
73	76 15.0	*+30.4*•	72.9	76 30.6	*+34.0*•	76.9	76 42.1	*+37.6*•	81.0	76 49.3	*+41.1*•	85.3	76 52.0	*+44.4*•	89.5	76 50.2	+47.5	93.8	76 44.0	+50.2	98.0	76 33.5	+52.6	102.2	73
74	76 45.4	*+26.9*•	69.2	77 04.6	*+30.9*•	73.3	77 19.7	*+34.7*•	77.6	77 30.4	*+38.5*•	82.0	77 36.4	*+42.2*•	86.5	77 37.7	*+45.6*•	91.0	77 34.2	+48.7	95.6	77 26.1	+51.4	100.1	74
75	77 12.3	*+23.2*•	65.3	77 35.5	*+27.1*•	69.4	77 54.4	*+31.3*•	73.8	78 08.9	*+35.4*•	78.3	78 18.6	*+39.4*•	83.1	78 23.3	*+43.3*•	87.9	78 22.9	*+46.9*•	92.8	78 17.5	+50.0	97.6	75
76	77 35.5	*+18.9*•	61.0	78 02.6	*+23.1*•	65.2	78 25.7	*+27.4*•	69.6	78 44.3	*+31.8*•	74.3	78 58.0	*+36.3*•	79.3	79 06.6	*+40.5*•	84.4	79 09.8	*+44.5*•	89.6	79 07.5	*+48.2*•	94.8	76
77	77 54.4	*+14.5*•	56.6	78 25.7	*+18.6*•	60.6	78 53.1	*+23.0*•	65.1	79 16.1	*+27.7*•	69.9	79 34.3	*+32.4*•	75.0	79 47.1	*+37.1*•	80.3	79 54.3	*+41.7*•	85.9	79 55.7	*+45.9*•	91.5	77
78	78 08.9	*+9.7*•	51.9	78 44.3	*+13.7*•	55.8	79 16.1	*+18.2*•	60.2	79 43.8	*+22.9*•	65.0	80 06.7	*+27.9*•	70.2	80 24.2	*+33.1*•	75.8	80 36.0	*+38.2*•	81.6	80 41.6	*+43.1*•	87.7	78
79	78 18.6	*+4.7*•	47.0	78 58.0	*+8.6*•	50.8	79 34.3	*+12.8*•	55.0	80 06.7	*+17.5*•	59.7	80 34.6	*+22.7*•	64.9	80 57.3	*+28.2*•	70.6	81 14.2	*+33.9*•	76.7	81 24.7	*+39.4*•	83.2	79
80	78 23.3	*−0.4*•	42.1	79 06.6	*+3.2*•	45.6	79 47.1	*+7.2*•	49.6	80 24.2	*+11.8*•	54.1	80 57.3	*+16.9*•	59.1	81 25.5	*+22.6*•	64.8	81 48.1	*+28.5*•	71.1	82 04.1	*+34.7*•	77.9	80
81	78 22.9	*−5.4*•	37.1	79 09.8	*−2.3*•	40.3	79 54.3	*+1.4*•	43.9	80 36.0	*+5.6*•	48.1	81 14.2	*+10.5*•	52.9	81 48.1	*+16.0*•	58.5	82 16.6	*+22.2*•	64.8	82 38.8	*+29.0*•	71.8	81
82	78 17.5	*−10.4*•	32.2	79 07.5	*−7.7*•	35.0	79 55.7	*−4.5*•	38.2	80 41.6	*−0.7*•	42.0	81 24.7	*+3.6*•	46.4	82 04.1	*+8.8*•	51.6	82 38.8	*+15.0*•	57.7	83 07.8	*+21.9*•	64.7	82
83	78 07.1	*−15.1*•	27.4	78 59.8	*−12.9*•	29.8	79 51.2	*−10.3*•	32.5	80 40.9	*−7.1*•	35.8	81 28.3	*−3.3*•	39.7	82 12.9	*+1.3*•	44.4	82 53.8	*+6.8*•	50.0	83 29.7	*+13.5*•	56.7	83
84	77 52.0	*−19.6*•	22.7	78 46.9	*−17.8*•	24.7	79 40.9	*−15.7*•	27.0	80 33.8	*−13.2*•	29.7	81 25.0	*−10.1*•	33.0	82 14.2	*−6.3*•	37.0	83 00.6	*−1.6*•	41.9	83 43.2	*+4.2*•	48.0	84
85	77 32.4	*−23.7*•	18.3	78 29.1	*−22.4*•	19.8	79 25.2	*−20.8*•	21.6	80 20.6	*−18.9*•	23.8	81 14.9	*−16.6*•	26.4	82 07.9	*−13.7*•	29.7	82 59.0	*−10.0*•	33.7	83 47.4	*−5.3*•	38.8	85
86	77 08.7	*−27.5*•	14.1	78 06.7	*−26.5*•	15.3	79 04.4	*−25.4*•	16.6	80 01.7	*−24.1*•	18.2	80 58.3	*−22.4*•	20.2	81 54.2	*−20.4*•	22.6	82 49.0	*−17.9*•	25.7	83 42.1	*−14.4*•	29.6	86
87	76 41.2	*−30.8*•	10.2	77 40.2	*−30.2*•	11.0	78 39.0	*−29.5*•	11.9	79 37.6	*−28.7*•	13.1	80 35.9	*−27.7*•	14.4	81 33.8	*−26.4*•	16.1	82 31.1	*−24.8*•	18.2	83 27.7	*−22.7*•	20.9	87
88	76 10.4	*−33.9*•	6.5	77 10.0	*−33.6*•	7.0	78 09.5	*−33.2*•	7.6	79 08.9	*−32.7*•	8.3	80 08.2	*−32.2*•	9.1	81 07.4	*−31.6*•	10.1	82 06.3	*−30.7*•	11.4	83 05.0	*−29.7*•	13.0	88
89	75 36.5	*−36.5*•	3.1	76 36.4	*−36.4*•	3.4	77 36.3	*−36.3*•	3.6	78 36.2	*−36.2*•	3.9	79 36.0	*−36.0*•	4.3	80 35.8	*−35.8*•	4.8	81 35.6	*−35.6*•	5.3	82 35.3	*−35.3*•	6.0	89
90	75 00.0	*−38.9*•	0.0	76 00.0	*−39.0*•	0.0	77 00.0	*−39.1*•	0.0	78 00.0	*−39.2*•	0.0	79 00.0	*−39.3*•	0.0	80 00.0	*−39.4*•	0.0	81 00.0	*−39.6*•	0.0	82 00.0	*−39.8*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 51°, 309°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 22.4	−58.7	128.0	8 45.4	−58.9	128.2	8 08.3	−59.0	128.3	7 31.1	−59.2	128.4	6 53.8	−59.3	128.5	6 16.4	−59.4	128.6	5 39.0	−59.6	128.7	5 01.5	−59.7	128.7	**0**
1	8 23.7	−58.7	128.2	7 46.5	−58.9	128.3	7 09.3	−59.1	128.5	6 31.9	−59.2	128.5	5 54.5	−59.4	128.6	5 17.0	−59.5	128.7	4 39.4	−59.5	128.8	4 01.8	−59.6	128.8	**1**
2	7 25.0	−58.8	128.4	6 47.6	−58.9	128.5	6 10.2	−59.1	128.6	5 32.7	−59.2	128.7	4 55.1	−59.3	128.8	4 17.5	−59.4	128.8	3 39.9	−59.6	128.9	3 02.2	−59.7	128.9	**2**
3	6 26.2	−58.8	128.6	5 48.7	−58.9	128.7	5 11.1	−59.0	128.8	4 33.5	−59.2	128.9	3 55.8	−59.3	128.9	3 18.1	−59.5	129.0	2 40.3	−59.5	129.0	2 02.5	−59.6	129.1	**3**
4	5 27.4	−58.7	128.9	4 49.8	−59.0	128.9	4 12.1	−59.1	129.0	3 34.3	−59.2	129.0	2 56.5	−59.4	129.1	2 18.6	−59.4	129.1	1 40.8	−59.6	129.1	1 02.9	−59.7	129.2	**4**
5	4 28.7	−58.8	129.1	3 50.8	−58.9	129.1	3 13.0	−59.1	129.2	2 35.1	−59.2	129.2	1 57.1	−59.3	129.2	1 19.2	−59.5	129.2	0 41.2	−59.5	129.3	0 03.2	−59.6	129.3	**5**
6	3 29.9	−58.8	129.3	2 51.9	−58.9	129.3	2 13.9	−59.1	129.3	1 35.9	−59.2	129.4	0 57.8	−59.3	129.4	0 19.7	−59.4	129.4	0 18.3	+59.6	50.6	0 56.4	+59.7	50.6	**6**
7	2 31.1	−58.7	129.5	1 53.0	−58.9	129.5	1 14.8	−59.0	129.5	0 36.7	−59.3	129.5	0 01.5	+59.4	50.5	0 39.7	+59.5	50.5	1 17.9	+59.5	50.5	1 56.1	+59.6	50.5	**7**
8	1 32.4	−58.8	129.7	0 54.1	−59.0	129.7	0 15.8	−59.1	129.7	0 22.6	+59.2	50.3	1 00.9	+59.3	50.3	1 39.2	+59.4	50.3	2 17.4	+59.6	50.4	2 55.7	+59.6	50.4	**8**
9	0 33.6	−58.8	129.9	0 04.9	+58.9	50.1	0 43.3	+59.1	50.1	1 21.8	+59.2	50.2	2 00.2	+59.3	50.2	2 38.6	+59.5	50.2	3 17.0	+59.6	50.2	3 55.3	+59.7	50.3	**9**
10	0 25.2	+58.8	49.9	1 03.8	+58.9	49.9	1 42.4	+59.1	50.0	2 21.0	+59.2	50.0	2 59.5	+59.4	50.0	3 38.1	+59.4	50.1	4 16.6	+59.5	50.1	4 55.0	+59.6	50.2	**10**
11	1 24.0	+58.7	49.7	2 02.7	+59.0	49.8	2 41.5	+59.0	49.8	3 20.2	+59.2	49.8	3 58.9	+59.3	49.9	4 37.5	+59.5	49.9	5 16.1	+59.6	50.0	5 54.6	+59.7	50.1	**11**
12	2 22.7	+58.8	49.5	3 01.7	+58.9	49.6	3 40.5	+59.1	49.6	4 19.4	+59.2	49.7	4 58.2	+59.3	49.7	5 37.0	+59.4	49.8	6 15.7	+59.5	49.9	6 54.3	+59.6	50.0	**12**
13	3 21.5	+58.8	49.3	4 00.6	+58.9	49.4	4 39.6	+59.1	49.4	5 18.6	+59.2	49.5	5 57.5	+59.4	49.6	6 36.4	+59.4	49.7	7 15.2	+59.5	49.8	7 53.9	+59.7	49.9	**13**
14	4 20.3	+58.7	49.1	4 59.5	+58.9	49.2	5 38.7	+59.1	49.3	6 17.8	+59.2	49.3	6 56.9	+59.3	49.4	7 35.8	+59.5	49.5	8 14.7	+59.6	49.6	8 53.6	+59.6	49.8	**14**
15	5 19.0	+58.8	48.9	5 58.4	+58.9	49.0	6 37.8	+59.0	49.1	7 17.0	+59.2	49.2	7 56.2	+59.3	49.3	8 35.3	+59.4	49.4	9 14.3	+59.5	49.5	9 53.2	+59.6	49.6	**15**
16	6 17.8	+58.8	48.7	6 57.3	+59.0	48.8	7 36.8	+59.1	48.9	8 16.2	+59.2	49.0	8 55.5	+59.3	49.1	9 34.7	+59.5	49.3	10 13.8	+59.6	49.4	10 52.8	+59.7	49.5	**16**
17	7 16.6	+58.7	48.5	7 56.3	+58.9	48.6	8 35.9	+59.0	48.7	9 15.4	+59.2	48.9	9 54.8	+59.3	49.0	10 34.2	+59.4	49.1	11 13.4	+59.5	49.3	11 52.5	+59.6	49.4	**17**
18	8 15.3	+58.7	48.3	8 55.2	+58.9	48.4	9 34.9	+59.1	48.6	10 14.6	+59.2	48.7	10 54.1	+59.4	48.8	11 33.6	+59.4	49.0	12 12.9	+59.5	49.1	12 52.1	+59.6	49.3	**18**
19	9 14.0	+58.8	48.1	9 54.1	+58.9	48.2	10 34.0	+59.0	48.4	11 13.8	+59.1	48.5	11 53.5	+59.3	48.7	12 33.0	+59.4	48.8	13 12.4	+59.6	49.0	13 51.7	+59.7	49.2	**19**
20	10 12.8	+58.7	47.9	10 53.0	+58.8	48.0	11 33.0	+59.0	48.2	12 12.9	+59.2	48.3	12 52.8	+59.3	48.5	13 32.4	+59.5	48.7	14 12.0	+59.5	48.9	14 51.4	+59.6	49.1	**20**
21	11 11.5	+58.7	47.7	11 51.8	+58.9	47.8	12 32.0	+59.1	48.0	13 12.1	+59.2	48.2	13 52.1	+59.3	48.4	14 31.9	+59.4	48.5	15 11.5	+59.5	48.7	15 51.0	+59.6	49.0	**21**
22	12 10.2	+58.7	47.5	12 50.7	+58.9	47.7	13 31.1	+59.0	47.8	14 11.3	+59.1	48.0	14 51.4	+59.2	48.2	15 31.3	+59.4	48.4	16 11.0	+59.5	48.6	16 50.6	+59.6	48.8	**22**
23	13 08.9	+58.7	47.3	13 49.6	+58.8	47.5	14 30.1	+59.0	47.6	15 10.4	+59.2	47.8	15 50.6	+59.3	48.0	16 30.7	+59.4	48.3	17 10.5	+59.5	48.5	17 50.2	+59.6	48.7	**23**
24	14 07.6	+58.7	47.1	14 48.4	+58.9	47.3	15 29.1	+59.0	47.5	16 09.6	+59.1	47.7	16 49.9	+59.3	47.9	17 30.1	+59.4	48.1	18 10.0	+59.5	48.3	18 49.8	+59.6	48.6	**24**
25	15 06.3	+58.7	46.8	15 47.3	+58.8	47.0	16 28.1	+59.0	47.3	17 08.7	+59.2	47.5	17 49.2	+59.3	47.7	18 29.5	+59.3	48.0	19 09.5	+59.5	48.2	19 49.4	+59.6	48.5	**25**
26	16 05.0	+58.7	46.6	16 46.1	+58.9	46.8	17 27.1	+59.0	47.1	18 07.9	+59.1	47.3	18 48.5	+59.2	47.6	19 28.8	+59.4	47.8	20 09.0	+59.5	48.1	20 49.0	+59.6	48.4	**26**
27	17 03.7	+58.6	46.4	17 45.0	+58.8	46.6	18 26.1	+58.9	46.9	19 07.0	+59.1	47.1	19 47.7	+59.3	47.4	20 28.2	+59.4	47.7	21 08.5	+59.5	47.9	21 48.6	+59.6	48.2	**27**
28	18 02.3	+58.7	46.2	18 43.8	+58.8	46.4	19 25.0	+59.0	46.7	20 06.1	+59.1	46.9	20 47.0	+59.2	47.2	21 27.6	+59.4	47.5	22 08.0	+59.5	47.8	22 48.2	+59.6	48.1	**28**
29	19 01.0	+58.6	46.0	19 42.6	+58.8	46.2	20 24.0	+58.9	46.5	21 05.2	+59.1	46.8	21 46.2	+59.2	47.0	22 27.0	+59.3	47.3	23 07.5	+59.5	47.7	23 47.8	+59.6	48.0	**29**
30	19 59.6	+58.6	45.7	20 41.4	+58.7	46.0	21 22.9	+58.9	46.3	22 04.3	+59.1	46.6	22 45.4	+59.2	46.9	23 26.3	+59.4	47.2	24 07.0	+59.4	47.5	24 47.4	+59.5	47.8	**30**
31	20 58.2	+58.6	45.5	21 40.1	+58.8	45.8	22 21.8	+59.0	46.1	23 03.4	+59.0	46.4	23 44.6	+59.2	46.7	24 25.7	+59.3	47.0	25 06.4	+59.5	47.4	25 46.9	+59.6	47.7	**31**
32	21 56.8	+58.5	45.3	22 38.9	+58.7	45.6	23 20.8	+58.9	45.9	24 02.4	+59.1	46.2	24 43.8	+59.2	46.5	25 25.0	+59.3	46.9	26 05.9	+59.4	47.2	26 46.5	+59.5	47.6	**32**
33	22 55.3	+58.6	45.0	23 37.6	+58.7	45.3	24 19.7	+58.8	45.7	25 01.5	+59.0	46.0	25 43.0	+59.2	46.3	26 24.3	+59.3	46.7	27 05.3	+59.5	47.1	27 46.0	+59.6	47.4	**33**
34	23 53.9	+58.5	44.8	24 36.3	+58.7	45.1	25 18.5	+58.9	45.5	26 00.5	+59.0	45.8	26 42.2	+59.1	46.2	27 23.6	+59.3	46.5	28 04.8	+59.4	46.9	28 45.6	+59.5	47.3	**34**
35	24 52.4	+58.5	44.6	25 35.0	+58.7	44.9	26 17.4	+58.8	45.2	26 59.5	+59.0	45.6	27 41.3	+59.2	46.0	28 22.9	+59.3	46.4	29 04.2	+59.4	46.7	29 45.1	+59.6	47.2	**35**
36	25 50.9	+58.4	44.3	26 33.7	+58.6	44.7	27 16.2	+58.8	45.0	27 58.5	+59.0	45.4	28 40.5	+59.1	45.8	29 22.2	+59.3	46.2	30 03.6	+59.4	46.6	30 44.7	+59.5	47.0	**36**
37	26 49.3	+58.5	44.1	27 32.3	+58.7	44.4	28 15.0	+58.8	44.8	28 57.5	+58.9	45.2	29 39.6	+59.1	45.6	30 21.5	+59.2	46.0	31 03.0	+59.4	46.4	31 44.2	+59.5	46.9	**37**
38	27 47.8	+58.4	43.8	28 31.0	+58.5	44.2	29 13.8	+58.8	44.6	29 56.4	+59.0	45.0	30 38.7	+59.1	45.4	31 20.7	+59.3	45.8	32 02.4	+59.3	46.3	32 43.7	+59.5	46.7	**38**
39	28 46.2	+58.4	43.6	29 29.5	+58.6	43.9	30 12.6	+58.8	44.3	30 55.4	+58.9	44.8	31 37.8	+59.1	45.2	32 20.0	+59.2	45.6	33 01.7	+59.4	46.1	33 43.2	+59.5	46.6	**39**
40	29 44.6	+58.3	43.3	30 28.1	+58.6	43.7	31 11.4	+58.7	44.1	31 54.3	+58.9	44.5	32 36.9	+59.1	45.0	33 19.2	+59.2	45.4	34 01.1	+59.3	45.9	34 42.7	+59.4	46.4	**40**
41	30 42.9	+58.4	43.0	31 26.7	+58.5	43.4	32 10.1	+58.7	43.9	32 53.2	+58.8	44.3	33 36.0	+59.0	44.8	34 18.4	+59.2	45.2	35 00.4	+59.4	45.7	35 42.1	+59.5	46.2	**41**
42	31 41.3	+58.2	42.7	32 25.2	+58.4	43.2	33 08.8	+58.6	43.6	33 52.0	+58.9	44.1	34 35.0	+59.0	44.5	35 17.6	+59.1	45.0	35 59.8	+59.3	45.5	36 41.6	+59.4	46.1	**42**
43	32 39.5	+58.3	42.5	33 23.6	+58.5	42.9	34 07.4	+58.7	43.4	34 50.9	+58.8	43.8	35 34.0	+59.0	44.3	36 16.7	+59.2	44.8	36 59.1	+59.3	45.4	37 41.0	+59.5	45.9	**43**
44	33 37.8	+58.2	42.2	34 22.1	+58.4	42.6	35 06.1	+58.6	43.1	35 49.7	+58.8	43.6	36 33.0	+58.9	44.1	37 15.9	+59.1	44.6	37 58.4	+59.2	45.2	38 40.5	+59.4	45.7	**44**
45	34 36.0	+58.1	41.9	35 20.5	+58.4	42.4	36 04.7	+58.5	42.8	36 48.5	+58.7	43.3	37 31.9	+59.0	43.9	38 15.0	+59.1	44.4	38 57.6	+59.3	45.0	39 39.9	+59.4	45.5	**45**
46	35 34.1	+58.2	41.6	36 18.9	+58.3	42.1	37 03.2	+58.5	42.6	37 47.2	+58.7	43.1	38 30.9	+58.9	43.6	39 14.1	+59.1	44.2	39 56.9	+59.2	44.8	40 39.3	+59.4	45.4	**46**
47	36 32.3	+58.0	41.3	37 17.2	+58.3	41.8	38 01.7	+58.5	42.3	38 45.9	+58.7	42.8	39 29.8	+58.8	43.4	40 13.2	+59.0	44.0	40 56.1	+59.2	44.6	41 38.7	+59.3	45.2	**47**
48	37 30.3	+58.0	41.0	38 15.5	+58.2	41.5	39 00.2	+58.5	42.0	39 44.6	+58.7	42.6	40 28.6	+58.8	43.1	41 12.2	+59.0	43.7	41 55.3	+59.2	44.3	42 38.0	+59.4	45.0	**48**
49	38 28.3	+58.0	40.6	39 13.7	+58.2	41.2	39 58.7	+58.4	41.7	40 43.3	+58.6	42.3	41 27.4	+58.8	42.9	42 11.2	+59.0	43.5	42 54.5	+59.2	44.1	43 37.4	+59.3	44.8	**49**
50	39 26.3	+57.9	40.3	40 11.9	+58.1	40.8	40 57.1	+58.3	41.4	41 41.9	+58.5	42.0	42 26.2	+58.8	42.6	43 10.2	+58.9	43.2	43 53.7	+59.1	43.9	44 36.7	+59.3	44.6	**50**
51	40 24.2	+57.8	40.0	41 10.0	+58.1	40.5	41 55.4	+58.3	41.1	42 40.4	+58.5	41.7	43 25.0	+58.7	42.3	44 09.1	+58.9	43.0	44 52.8	+59.1	43.6	45 36.0	+59.2	44.3	**51**
52	41 22.0	+57.8	39.6	42 08.1	+58.0	40.2	42 53.7	+58.2	40.8	43 38.9	+58.5	41.4	44 23.7	+58.7	42.0	45 08.0	+58.9	42.7	45 51.9	+59.1	43.4	46 35.2	+59.3	44.1	**52**
53	42 19.8	+57.7	39.2	43 06.1	+57.9	39.8	43 51.9	+58.2	40.4	44 37.4	+58.4	41.1	45 22.4	+58.6	41.7	46 06.9	+58.8	42.4	46 51.0	+59.0	43.1	47 34.5	+59.2	43.9	**53**
54	43 17.5	+57.6	38.9	44 04.0	+57.9	39.5	44 50.1	+58.1	40.1	45 35.8	+58.3	40.8	46 21.0	+58.6	41.4	47 05.7	+58.8	42.1	47 50.0	+59.0	42.9	48 33.7	+59.1	43.6	**54**
55	44 15.1	+57.6	38.5	45 01.9	+57.8	39.1	45 48.2	+58.1	39.7	46 34.1	+58.3	40.4	47 19.6	+58.5	41.1	48 04.5	+58.8	41.8	48 49.0	+58.9	42.6	49 32.8	+59.2	43.4	**55**
56	45 12.7	+57.4	38.1	45 59.7	+57.7	38.7	46 46.3	+58.0	39.4	47 32.4	+58.3	40.1	48 18.1	+58.5	40.8	49 03.3	+58.7	41.5	49 47.9	+58.9	42.3	50 32.0	+59.1	43.1	**56**
57	46 10.1	+57.4	37.7	46 57.4	+57.6	38.3	47 44.3	+57.9	39.0	48 30.7	+58.1	39.7	49 16.6	+58.4	40.4	50 02.0	+58.6	41.2	50 46.8	+58.9	42.0	51 31.1	+59.1	42.9	**57**
58	47 07.5	+57.3	37.2	47 55.0	+57.6	37.9	48 42.2	+57.8	38.6	49 28.8	+58.1	39.3	50 15.0	+58.3	40.1	51 00.6	+58.6	40.9	51 45.7	+58.8	41.7	52 30.2	+59.0	42.6	**58**
59	48 04.8	+57.1	36.8	48 52.6	+57.4	37.5	49 40.0	+57.7	38.2	50 26.9	+58.0	38.9	51 13.3	+58.2	39.7	51 59.2	+58.5	40.5	52 44.5	+58.7	41.4	53 29.2	+59.0	42.3	**59**
60	49 01.9	+57.1	36.3	49 50.0	+57.4	37.0	50 37.7	+57.6	37.8	51 24.9	+57.9	38.5	52 11.5	+58.2	39.3	52 57.7	+58.4	40.2	53 43.2	+58.7	41.0	54 28.2	+58.9	42.0	**60**
61	49 59.0	+56.9	35.9	50 47.4	+57.2	36.6	51 35.3	+57.5	37.3	52 22.8	+57.8	38.1	53 09.7	+58.1	38.9	53 56.1	+58.4	39.8	54 41.9	+58.6	40.7	55 27.1	+58.9	41.6	**61**
62	50 55.9	+56.8	35.4	51 44.6	+57.1	36.1	52 32.8	+57.5	36.9	53 20.6	+57.7	37.7	54 07.8	+58.0	38.5	54 54.5	+58.3	39.4	55 40.5	+58.6	40.3	56 26.0	+58.8	41.3	**62**
63	51 52.7	+56.6	34.9	52 41.7	+57.0	35.6	53 30.3	+57.2	36.4	54 18.3	+57.6	37.2	55 05.8	+57.9	38.1	55 52.8	+58.2	39.0	56 39.1	+58.5	39.9	57 24.8	+58.7	40.9	**63**
64	52 49.3	+56.5	34.3	53 38.7	+56.8	35.1	54 27.5	+57.2	35.9	55 15.9	+57.5	36.7	56 03.7	+57.8	37.6	56 51.0	+58.0	38.5	57 37.6	+58.4	39.5	58 23.5	+58.7	40.5	**64**
65	53 45.8	+56.4	33.8	54 35.5	+56.7	34.5	55 24.7	+57.0	35.3	56 13.4	+57.3	36.2	57 01.5	+57.7	37.1	57 49.0	+58.0	38.1	58 36.0	+58.3	39.1	59 22.2	+58.6	40.1	**65**
66	54 42.2	+56.1	33.2	55 32.2	+56.5	34.0	56 21.7	+56.9	34.8	57 10.7	+57.2	35.7	57 59.2	+57.5	36.6	58 47.0	+57.9	37.6	59 34.3	+58.1	38.6	60 20.8	+58.5	39.7	**66**
67	55 38.3	+56.0	32.5	56 28.7	+56.3	33.4	57 18.6	+56.6	34.2	58 07.9	+57.0	35.1	58 56.7	+57.4	36.1	59 44.9	+57.7	37.1	60 32.4	+58.1	38.1	61 19.3	+58.4	39.3	**67**
68	56 34.3	+55.7	31.9	57 25.0	+56.1	32.7	58 15.2	+56.5	33.6	59 04.9	+56.9	34.5	59 54.1	+57.2	35.5	60 42.6	+57.6	36.5	61 30.5	+58.0	37.6	62 17.7	+58.3	38.8	**68**
69	57 30.0	+55.6	31.2	58 21.1	+55.9	32.1	59 11.7	+56.3	32.9	60 01.8	+56.7	33.9	60 51.3	+57.1	34.9	61 40.2	+57.5	35.9	62 28.5	+57.8	37.1	63 16.0	+58.2	38.3	**69**
70	58 25.6	+55.2	30.5	59 17.0	+55.7	31.4	60 08.0	+56.1	32.3	60 58.5	+56.5	33.2	61 48.4	+56.9	34.2	62 37.7	+57.2	35.3	63 26.3	+57.7	36.5	64 14.2	+58.0	37.7	**70**
71	59 20.8	+55.0	29.8	60 12.7	+55.4	30.6	61 04.1	+55.8	31.5	61 55.0	+56.2	32.5	62 45.3	+56.6	33.6	63 34.9	+57.1	34.7	64 24.0	+57.4	35.8	65 12.2	+57.9	37.1	**71**
72	60 15.8	+54.7	29.0	61 08.1	+55.1	29.8	61 59.9	+55.5	30.8	62 51.2	+56.0	31.8	63 41.9	+56.4	32.8	64 32.0	+56.9	34.0	65 21.4	+57.3	35.2	66 10.1	+57.7	36.5	**72**
73	61 10.5	+54.4	28.1	62 03.2	+54.8	29.0	62 55.4	+55.3	29.9	63 47.2	+55.7	31.0	64 38.3	+56.2	32.0	65 28.9	+56.6	33.2	66 18.7	+57.1	34.4	67 07.8	+57.5	35.8	**73**
74	62 04.9	+54.0	27.2	62 58.0	+54.5	28.1	63 50.7	+54.9	29.1	64 42.9	+55.3	30.1	65 34.5	+55.8	31.2	66 25.5	+56.3	32.4	67 15.8	+56.8	33.7	68 05.3	+57.4	35.0	**74**
75	62 58.9	+53.6	26.3	63 52.5	+54.0	27.2	64 45.6	+54.5	28.1	65 38.2	+55.1	29.2	66 30.3	+55.6	30.3	67 21.8	+56.1	31.5	68 12.6	+56.6	32.8	69 02.7	+57.0	34.2	**75**
76	63 52.5	+53.1	25.3	64 46.5	+53.6	26.2	65 40.1	+54.1	27.1	66 33.3	+54.6	28.2	67 25.9	+55.1	29.3	68 17.9	+55.6	30.6	69 09.2	+56.2	31.9	69 59.7	+56.8	33.3	**76**
77	64 45.6	+52.6	24.2	65 40.1	+53.2	25.1	66 34.2	+53.7	26.1	67 27.9	+54.2	27.1	68 21.0	+54.7	28.3	69 13.5	+55.3	29.5	70 05.4	+55.8	30.9	70 56.5	+56.4	32.4	**77**
78	65 38.2	+52.1	23.1	66 33.3	+52.6	24.0	67 27.9	+53.1	24.9	68 22.1	+53.6	26.0	69 15.7	+54.3	27.1	70 08.8	+54.8	28.4	71 01.2	+55.5	29.8	71 52.9	+56.1	31.3	**78**
79	66 30.3	+51.5	21.8	67 25.9	+52.0	22.7	68 21.0	+52.5	23.7	69 15.7	+53.1	24.8	70 10.0	+53.6	25.9	71 03.6	+54.3	27.2	71 56.7	+54.9	28.6	72 49.0	+55.6	30.1	**79**
80	67 21.8	+50.8	20.5	68 17.9	+51.3	21.4	69 13.5	+51.9	22.4	70 08.8	+52.4	23.4	71 03.6	+53.1	24.6	71 57.9	+53.7	25.8	72 51.6	+54.4	27.3	73 44.6	+55.0	28.8	**80**
81	68 12.6	+50.1	19.1	69 09.2	+50.5	20.0	70 05.4	+51.1	20.9	71 01.2	+51.7	22.0	71 56.7	+52.3	23.1	72 51.6	+53.0	24.4	73 46.0	+53.6	25.8	74 39.6	+54.4	27.4	**81**
82	69 02.7	+49.1	17.6	69 59.7	+49.7	18.4	70 56.5	+50.2	19.3	71 52.9	+50.8	20.4	72 49.0	+51.4	21.5	73 44.6	+52.1	22.7	74 39.6	+52.9	24.1	75 34.0	+53.7	25.7	**82**
83	69 51.8	+48.2	16.0	70 49.4	+48.7	16.8	71 46.7	+49.2	17.6	72 43.7	+49.8	18.6	73 40.4	+50.5	19.7	74 36.7	+51.1	20.9	75 32.5	+51.9	22.3	76 27.7	+52.7	23.9	**83**
84	70 40.0	+47.1	14.2	71 38.1	+47.5	14.9	72 35.9	+48.1	15.8	73 33.5	+48.7	16.7	74 30.9	+49.2	17.7	75 27.8	+50.0	18.9	76 24.4	+50.7	20.2	77 20.4	+51.6	21.8	**84**
85	71 27.1	+45.8	12.3	72 25.6	+46.3	13.0	73 24.0	+46.8	13.7	74 22.2	+47.3	14.6	75 20.1	+48.0	15.5	76 17.8	+48.6	16.6	77 15.1	+49.3	17.9	78 12.0	+50.1	19.3	**85**
86	72 12.9	+44.4	10.2	73 11.9	+44.8	10.8	74 10.8	+45.2	11.5	75 09.5	+45.7	12.2	76 08.1	+46.2	13.1	77 06.4	+46.9	14.1	78 04.4	+47.6	15.2	79 02.1	+48.5	16.6	**86**
87	72 57.3	+42.8	8.0	73 56.7	+43.1	8.5	74 56.0	+43.5	9.0	75 55.2	*+43.9* •	9.6	76 54.3	*+44.4* •	10.3	77 53.3	*+44.8* •	11.2	78 52.0	*+45.5* •	12.2	79 50.6	*+46.2* •	13.3	**87**
88	73 40.1	+41.0	5.5	74 39.8	*+41.2* •	5.9	75 39.5	*+41.4* •	6.3	76 39.1	*+41.7* •	6.7	77 38.7	*+42.0* •	7.3	78 38.1	*+42.5* •	7.9	79 37.5	*+42.9* •	8.7	80 36.8	*+43.4* •	9.6	**88**
89	74 21.1	*+38.9* •	2.9	75 21.0	*+39.0* •	3.1	76 20.9	*+39.1* •	3.3	77 20.8	*+39.2* •	3.6	78 20.7	*+39.3* •	3.8	79 20.6	*+39.4* •	4.2	80 20.4	*+39.6* •	4.6	81 20.2	*+39.8* •	5.2	**89**
90	75 00.0	*+36.5* •	0.0	76 00.0	*+36.4* •	0.0	77 00.0	*+36.3* •	0.0	78 00.0	*+36.2* •	0.0	79 00.0	*+36.0* •	0.0	80 00.0	*+35.8* •	0.0	81 00.0	*+35.6* •	0.0	82 00.0	*+35.3* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 129°, 231°

52°, 308° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 10.1	+ 58.7	127.0	8 33.9	+ 58.9	127.2	7 57.6	+ 59.1	127.3	7 21.3	+ 59.1	127.4	6 44.8	+ 59.3	127.5	6 08.2	+ 59.5	127.6	5 31.6	+ 59.5	127.7	4 54.9	+ 59.7	127.7	**0**
1	10 08.8	+ 58.7	126.8	9 32.8	+ 58.9	127.0	8 56.7	+ 59.0	127.1	8 20.4	+ 59.2	127.2	7 44.1	+ 59.3	127.3	7 07.7	+ 59.4	127.4	6 31.1	+ 59.6	127.5	5 54.6	+ 59.6	127.6	**1**
2	11 07.5	+ 58.7	126.6	10 31.7	+ 58.8	126.8	9 55.7	+ 59.0	126.9	9 19.6	+ 59.2	127.1	8 43.4	+ 59.3	127.2	8 07.1	+ 59.4	127.3	7 30.7	+ 59.5	127.4	6 54.2	+ 59.6	127.5	**2**
3	12 06.2	+ 58.7	126.4	11 30.5	+ 58.9	126.6	10 54.7	+ 59.0	126.7	10 18.8	+ 59.1	126.9	9 42.7	+ 59.3	127.0	9 06.5	+ 59.4	127.2	8 30.2	+ 59.5	127.3	7 53.8	+ 59.7	127.4	**3**
4	13 04.9	+ 58.7	126.2	12 29.4	+ 58.8	126.4	11 53.7	+ 59.0	126.5	11 17.9	+ 59.2	126.7	10 42.0	+ 59.3	126.9	10 05.9	+ 59.4	127.0	9 29.7	+ 59.6	127.2	8 53.5	+ 59.6	127.3	**4**
5	14 03.6	+ 58.6	126.0	13 28.2	+ 58.9	126.2	12 52.7	+ 59.0	126.4	12 17.1	+ 59.1	126.5	11 41.3	+ 59.3	126.7	11 05.3	+ 59.5	126.9	10 29.3	+ 59.5	127.0	9 53.1	+ 59.6	127.2	**5**
6	15 02.2	+ 58.6	125.8	14 27.1	+ 58.8	126.0	13 51.7	+ 59.0	126.2	13 16.2	+ 59.2	126.4	12 40.6	+ 59.2	126.6	12 04.8	+ 59.4	126.7	11 28.8	+ 59.5	126.9	10 52.7	+ 59.6	127.1	**6**
7	16 00.8	+ 58.7	125.5	15 25.9	+ 58.8	125.8	14 50.7	+ 59.0	126.0	14 15.4	+ 59.1	126.2	13 39.8	+ 59.3	126.4	13 04.2	+ 59.4	126.6	12 28.3	+ 59.5	126.8	11 52.3	+ 59.6	126.9	**7**
8	16 59.5	+ 58.6	125.3	16 24.7	+ 58.8	125.6	15 49.7	+ 59.0	125.8	15 14.5	+ 59.1	126.0	14 39.1	+ 59.3	126.2	14 03.6	+ 59.4	126.4	13 27.8	+ 59.5	126.6	12 51.9	+ 59.7	126.8	**8**
9	17 58.1	+ 58.6	125.1	17 23.5	+ 58.8	125.4	16 48.7	+ 58.9	125.6	16 13.6	+ 59.1	125.8	15 38.4	+ 59.2	126.1	15 03.0	+ 59.3	126.3	14 27.3	+ 59.6	126.5	13 51.6	+ 59.6	126.7	**9**
10	18 56.7	+ 58.6	124.9	18 22.3	+ 58.7	125.1	17 47.6	+ 59.0	125.4	17 12.7	+ 59.1	125.7	16 37.6	+ 59.3	125.9	16 02.3	+ 59.4	126.2	15 26.9	+ 59.5	126.4	14 51.2	+ 59.6	126.6	**10**
11	19 55.3	+ 58.5	124.6	19 21.0	+ 58.8	124.9	18 46.6	+ 58.9	125.2	18 11.8	+ 59.1	125.5	17 36.9	+ 59.2	125.7	17 01.7	+ 59.4	126.0	16 26.4	+ 59.5	126.2	15 50.8	+ 59.6	126.5	**11**
12	20 53.8	+ 58.6	124.4	20 19.8	+ 58.7	124.7	19 45.5	+ 58.9	125.0	19 10.9	+ 59.1	125.3	18 36.1	+ 59.3	125.6	18 01.1	+ 59.4	125.9	17 25.9	+ 59.5	126.1	16 50.4	+ 59.6	126.4	**12**
13	21 52.4	+ 58.5	124.2	21 18.5	+ 58.7	124.5	20 44.4	+ 58.9	124.8	20 10.0	+ 59.1	125.1	19 35.4	+ 59.2	125.4	19 00.5	+ 59.4	125.7	18 25.4	+ 59.4	126.0	17 50.0	+ 59.6	126.2	**13**
14	22 50.9	+ 58.5	123.9	22 17.2	+ 58.8	124.3	21 43.3	+ 58.9	124.6	21 09.1	+ 59.1	124.9	20 34.6	+ 59.2	125.2	19 59.9	+ 59.3	125.5	19 24.8	+ 59.5	125.8	18 49.6	+ 59.6	126.1	**14**
15	23 49.4	+ 58.5	123.7	23 16.0	+ 58.6	124.1	22 42.2	+ 58.9	124.4	22 08.2	+ 59.0	124.7	21 33.8	+ 59.2	125.1	20 59.2	+ 59.4	125.4	20 24.3	+ 59.5	125.7	19 49.2	+ 59.6	126.0	**15**
16	24 47.9	+ 58.4	123.4	24 14.6	+ 58.7	123.8	23 41.1	+ 58.8	124.2	23 07.2	+ 59.0	124.5	22 33.0	+ 59.2	124.9	21 58.6	+ 59.3	125.2	21 23.8	+ 59.5	125.6	20 48.8	+ 59.6	125.9	**16**
17	25 46.3	+ 58.5	123.2	25 13.3	+ 58.6	123.6	24 39.9	+ 58.9	124.0	24 06.2	+ 59.1	124.4	23 32.2	+ 59.2	124.7	22 57.9	+ 59.3	125.1	22 23.3	+ 59.4	125.4	21 48.4	+ 59.5	125.7	**17**
18	26 44.8	+ 58.4	122.9	26 11.9	+ 58.7	123.4	25 38.8	+ 58.8	123.8	25 05.3	+ 59.0	124.2	24 31.4	+ 59.2	124.5	23 57.2	+ 59.3	124.9	23 22.7	+ 59.5	125.3	22 47.9	+ 59.6	125.6	**18**
19	27 43.2	+ 58.3	122.7	27 10.6	+ 58.6	123.1	26 37.6	+ 58.8	123.5	26 04.3	+ 58.9	124.0	25 30.6	+ 59.1	124.4	24 56.5	+ 59.3	124.7	24 22.2	+ 59.4	125.1	23 47.5	+ 59.6	125.5	**19**
20	28 41.5	+ 58.4	122.4	28 09.2	+ 58.5	122.9	27 36.4	+ 58.8	123.3	27 03.2	+ 59.0	123.8	26 29.7	+ 59.2	124.2	25 55.8	+ 59.3	124.6	25 21.6	+ 59.5	125.0	24 47.1	+ 59.5	125.4	**20**
21	29 39.9	+ 58.3	122.2	29 07.7	+ 58.6	122.6	28 35.2	+ 58.7	123.1	28 02.2	+ 59.0	123.5	27 28.9	+ 59.1	124.0	26 55.1	+ 59.3	124.4	26 21.1	+ 59.4	124.8	25 46.6	+ 59.6	125.2	**21**
22	30 38.2	+ 58.2	121.9	30 06.3	+ 58.5	122.4	29 33.9	+ 58.7	122.9	29 01.2	+ 58.9	123.3	28 28.0	+ 59.1	123.8	27 54.4	+ 59.3	124.2	27 20.5	+ 59.4	124.7	26 46.2	+ 59.5	125.1	**22**
23	31 36.4	+ 58.3	121.6	31 04.8	+ 58.4	122.1	30 32.6	+ 58.7	122.6	30 00.1	+ 58.9	123.1	29 27.1	+ 59.1	123.6	28 53.7	+ 59.3	124.1	28 19.9	+ 59.4	124.5	27 45.7	+ 59.6	124.9	**23**
24	32 34.7	+ 58.2	121.3	32 03.2	+ 58.5	121.9	31 31.3	+ 58.7	122.4	30 59.0	+ 58.9	122.9	30 26.2	+ 59.1	123.4	29 53.0	+ 59.2	123.9	29 19.3	+ 59.4	124.3	28 45.3	+ 59.5	124.8	**24**
25	33 32.9	+ 58.1	121.0	33 01.7	+ 58.4	121.6	32 30.0	+ 58.7	122.1	31 57.9	+ 58.8	122.7	31 25.3	+ 59.0	123.2	30 52.2	+ 59.2	123.7	30 18.7	+ 59.4	124.2	29 44.8	+ 59.5	124.7	**25**
26	34 31.0	+ 58.1	120.7	34 00.1	+ 58.4	121.3	33 28.7	+ 58.6	121.9	32 56.7	+ 58.9	122.4	32 24.3	+ 59.0	123.0	31 51.4	+ 59.2	123.5	31 18.1	+ 59.3	124.0	30 44.3	+ 59.5	124.5	**26**
27	35 29.1	+ 58.1	120.4	34 58.5	+ 58.3	121.0	34 27.3	+ 58.6	121.6	33 55.6	+ 58.8	122.2	33 23.3	+ 59.0	122.8	32 50.6	+ 59.2	123.3	32 17.4	+ 59.4	123.8	31 43.8	+ 59.5	124.4	**27**
28	36 27.2	+ 58.0	120.1	35 56.8	+ 58.3	120.7	35 25.9	+ 58.5	121.4	34 54.4	+ 58.7	122.0	34 22.3	+ 59.0	122.5	33 49.8	+ 59.2	123.1	33 16.8	+ 59.3	123.7	32 43.3	+ 59.5	124.2	**28**
29	37 25.2	+ 58.0	119.8	36 55.1	+ 58.2	120.5	36 24.4	+ 58.5	121.1	35 53.1	+ 58.8	121.7	35 21.3	+ 59.0	122.3	34 49.0	+ 59.1	122.9	34 16.1	+ 59.3	123.5	33 42.8	+ 59.4	124.1	**29**
30	38 23.2	+ 57.9	119.5	37 53.3	+ 58.2	120.1	37 22.9	+ 58.5	120.8	36 51.9	+ 58.7	121.5	36 20.3	+ 58.9	122.1	35 48.1	+ 59.2	122.7	35 15.4	+ 59.4	123.3	34 42.2	+ 59.5	123.9	**30**
31	39 21.1	+ 57.8	119.1	38 51.5	+ 58.2	119.8	38 21.4	+ 58.4	120.5	37 50.6	+ 58.7	121.2	37 19.2	+ 58.9	121.9	36 47.3	+ 59.1	122.5	36 14.8	+ 59.2	123.1	35 41.7	+ 59.4	123.7	**31**
32	40 18.9	+ 57.8	118.8	39 49.7	+ 58.1	119.5	39 19.8	+ 58.4	120.2	38 49.3	+ 58.6	120.9	38 18.1	+ 58.9	121.6	37 46.4	+ 59.1	122.3	37 14.0	+ 59.3	122.9	36 41.1	+ 59.5	123.6	**32**
33	41 16.7	+ 57.7	118.4	40 47.8	+ 58.0	119.2	40 18.2	+ 58.3	119.9	39 47.9	+ 58.6	120.7	39 17.0	+ 58.8	121.4	38 45.5	+ 59.0	122.1	38 13.3	+ 59.3	122.7	37 40.6	+ 59.4	123.4	**33**
34	42 14.4	+ 57.7	118.1	41 45.8	+ 58.0	118.9	41 16.5	+ 58.3	119.6	40 46.5	+ 58.6	120.4	40 15.8	+ 58.8	121.1	39 44.5	+ 59.0	121.8	39 12.6	+ 59.2	122.5	38 40.0	+ 59.4	123.2	**34**
35	43 12.1	+ 57.5	117.7	42 43.8	+ 57.9	118.5	42 14.8	+ 58.2	119.3	41 45.1	+ 58.5	120.1	41 14.6	+ 58.8	120.9	40 43.5	+ 59.0	121.6	40 11.8	+ 59.2	122.3	39 39.4	+ 59.4	123.0	**35**
36	44 09.6	+ 57.5	117.3	43 41.7	+ 57.9	118.1	43 13.0	+ 58.2	119.0	42 43.6	+ 58.4	119.8	42 13.4	+ 58.7	120.6	41 42.5	+ 59.0	121.4	41 11.0	+ 59.2	122.1	40 38.8	+ 59.3	122.8	**36**
37	45 07.1	+ 57.4	116.9	44 39.6	+ 57.7	117.8	44 11.2	+ 58.1	118.6	43 42.0	+ 58.5	119.5	43 12.1	+ 58.7	120.3	42 41.5	+ 58.9	121.1	42 10.2	+ 59.1	121.9	41 38.1	+ 59.4	122.6	**37**
38	46 04.5	+ 57.3	116.5	45 37.3	+ 57.7	117.4	45 09.3	+ 58.0	118.3	44 40.5	+ 58.3	119.2	44 10.8	+ 58.7	120.0	43 40.4	+ 58.9	120.8	43 09.3	+ 59.1	121.7	42 37.5	+ 59.3	122.4	**38**
39	47 01.8	+ 57.2	116.0	46 35.0	+ 57.6	117.0	46 07.3	+ 58.0	117.9	45 38.8	+ 58.3	118.8	45 09.5	+ 58.6	119.7	44 39.3	+ 58.9	120.6	44 08.4	+ 59.1	121.4	43 36.8	+ 59.3	122.2	**39**
40	47 59.0	+ 57.1	115.6	47 32.6	+ 57.5	116.6	47 05.3	+ 57.9	117.6	46 37.1	+ 58.2	118.5	46 08.1	+ 58.5	119.4	45 38.2	+ 58.8	120.3	45 07.5	+ 59.1	121.2	44 36.1	+ 59.3	122.0	**40**
41	48 56.1	+ 57.0	115.1	48 30.1	+ 57.4	116.2	48 03.2	+ 57.8	117.2	47 35.3	+ 58.2	118.1	47 06.6	+ 58.5	119.1	46 37.0	+ 58.8	120.0	46 06.6	+ 59.0	120.9	45 35.4	+ 59.2	121.8	**41**
42	49 53.1	+ 56.8	114.7	49 27.5	+ 57.3	115.7	49 01.0	+ 57.7	116.8	48 33.5	+ 58.1	117.8	48 05.1	+ 58.4	118.8	47 35.8	+ 58.7	119.7	47 05.6	+ 59.0	120.7	46 34.6	+ 59.2	121.6	**42**
43	50 49.9	+ 56.7	114.2	50 24.8	+ 57.2	115.3	49 58.7	+ 57.7	116.3	49 31.6	+ 58.0	117.4	49 03.5	+ 58.4	118.4	48 34.5	+ 58.7	119.4	48 04.6	+ 58.9	120.4	47 33.8	+ 59.2	121.3	**43**
44	51 46.6	+ 56.6	113.6	51 22.0	+ 57.1	114.8	50 56.4	+ 57.5	115.9	50 29.6	+ 58.0	117.0	50 01.9	+ 58.3	118.1	49 33.2	+ 58.6	119.1	49 03.5	+ 59.0	120.1	48 33.0	+ 59.2	121.1	**44**
45	52 43.2	+ 56.4	113.1	52 19.1	+ 56.9	114.3	51 53.9	+ 57.4	115.4	51 27.6	+ 57.8	116.6	51 00.2	+ 58.2	117.7	50 31.8	+ 58.6	118.8	50 02.5	+ 58.8	119.8	49 32.2	+ 59.1	120.8	**45**
46	53 39.6	+ 56.3	112.5	53 16.0	+ 56.8	113.8	52 51.3	+ 57.3	115.0	52 25.4	+ 57.7	116.2	51 58.4	+ 58.2	117.3	51 30.4	+ 58.5	118.4	51 01.3	+ 58.8	119.5	50 31.3	+ 59.1	120.6	**46**
47	54 35.9	+ 56.0	111.9	54 12.8	+ 56.7	113.2	53 48.6	+ 57.2	114.5	53 23.1	+ 57.7	115.7	52 56.6	+ 58.0	116.9	52 28.9	+ 58.4	118.1	52 00.1	+ 58.8	119.2	51 30.4	+ 59.0	120.3	**47**
48	55 31.9	+ 55.9	111.3	55 09.5	+ 56.5	112.6	54 45.8	+ 57.0	114.0	54 20.8	+ 57.5	115.2	53 54.6	+ 58.0	116.5	53 27.3	+ 58.4	117.7	52 58.9	+ 58.7	118.9	52 29.4	+ 59.0	120.0	**48**
49	56 27.8	+ 55.7	110.6	56 06.0	+ 56.3	112.0	55 42.8	+ 56.9	113.4	55 18.3	+ 57.4	114.7	54 52.6	+ 57.8	116.0	54 25.7	+ 58.2	117.3	53 57.6	+ 58.6	118.5	53 28.4	+ 58.9	119.7	**49**
50	57 23.5	+ 55.4	110.0	57 02.3	+ 56.1	111.4	56 39.7	+ 56.7	112.8	56 15.7	+ 57.3	114.2	55 50.4	+ 57.8	115.6	55 23.9	+ 58.2	116.9	54 56.2	+ 58.6	118.2	54 27.3	+ 58.9	119.4	**50**
51	58 18.9	+ 55.1	109.2	57 58.4	+ 55.8	110.8	57 36.4	+ 56.5	112.2	57 13.0	+ 57.1	113.7	56 48.2	+ 57.6	115.1	56 22.1	+ 58.1	116.4	55 54.8	+ 58.5	117.8	55 26.2	+ 58.9	119.1	**51**
52	59 14.0	+ 54.9	108.5	58 54.2	+ 55.7	110.1	58 32.9	+ 56.3	111.6	58 10.1	+ 56.9	113.1	57 45.8	+ 57.5	114.6	57 20.2	+ 58.0	116.0	56 53.3	+ 58.4	117.4	56 25.1	+ 58.8	118.7	**52**
53	60 08.9	+ 54.6	107.7	59 49.9	+ 55.4	109.3	59 29.2	+ 56.1	110.9	59 07.0	+ 56.8	112.5	58 43.3	+ 57.4	114.0	58 18.2	+ 57.9	115.5	57 51.7	+ 58.3	116.9	57 23.9	+ 58.7	118.3	**53**
54	61 03.5	+ 54.2	106.8	60 45.3	+ 55.0	108.5	60 25.3	+ 55.9	110.2	60 03.8	+ 56.6	111.9	59 40.7	+ 57.2	113.4	59 16.1	+ 57.7	115.0	58 50.0	+ 58.2	116.5	58 22.6	+ 58.6	118.0	**54**
55	61 57.7	+ 53.9	105.9	61 40.3	+ 54.8	107.7	61 21.2	+ 55.6	109.5	61 00.4	+ 56.3	111.2	60 37.9	+ 57.0	112.8	60 13.8	+ 57.6	114.5	59 48.2	+ 58.1	116.0	59 21.2	+ 58.5	117.5	**55**
56	62 51.6	+ 53.4	105.0	62 35.1	+ 54.5	106.9	62 16.8	+ 55.3	108.7	61 56.7	+ 56.1	110.5	61 34.9	+ 56.8	112.2	61 11.4	+ 57.5	113.9	60 46.3	+ 58.0	115.5	60 19.7	+ 58.5	117.1	**56**
57	63 45.0	+ 53.1	104.0	63 29.6	+ 54.0	105.9	63 12.1	+ 55.0	107.8	62 52.8	+ 55.9	109.7	62 31.7	+ 56.6	111.5	62 08.9	+ 57.2	113.3	61 44.3	+ 57.9	115.0	61 18.2	+ 58.4	116.6	**57**
58	64 38.1	+ 52.5	102.9	64 23.6	+ 53.6	104.9	64 07.1	+ 54.7	106.9	63 48.7	+ 55.6	108.9	63 28.3	+ 56.4	110.8	63 06.1	+ 57.1	112.6	62 42.2	+ 57.7	114.4	62 16.6	+ 58.2	116.2	**58**
59	65 30.6	+ 51.9	101.8	65 17.2	+ 53.2	103.9	65 01.8	+ 54.2	106.0	64 44.3	+ 55.2	108.0	64 24.7	+ 56.1	110.0	64 03.2	+ 56.9	111.9	63 39.9	+ 57.6	113.8	63 14.8	+ 58.2	115.6	**59**
60	66 22.5	+ 51.3	100.5	66 10.4	+ 52.6	102.8	65 56.0	+ 53.8	104.9	65 39.5	+ 54.9	107.1	65 20.8	+ 55.8	109.2	65 00.1	+ 56.7	111.2	64 37.5	+ 57.3	113.2	64 13.0	+ 57.9	115.1	**60**
61	67 13.8	+ 50.7	99.2	67 03.0	+ 52.1	101.5	66 49.8	+ 53.3	103.8	66 34.4	+ 54.4	106.1	66 16.6	+ 55.5	108.3	65 56.8	+ 56.3	110.4	65 34.8	+ 57.2	112.5	65 10.9	+ 57.9	114.5	**61**
62	68 04.5	+ 49.8	97.8	67 55.1	+ 51.3	100.2	67 43.1	+ 52.8	102.6	67 28.8	+ 54.0	105.0	67 12.1	+ 55.1	107.3	66 53.1	+ 56.1	109.5	66 32.0	+ 56.9	111.7	66 08.8	+ 57.6	113.8	**62**
63	68 54.3	+ 49.0	96.3	68 46.4	+ 50.6	98.8	68 35.9	+ 52.1	101.4	68 22.8	+ 53.5	103.8	68 07.2	+ 54.7	106.3	67 49.2	+ 55.8	108.6	67 28.9	+ 56.7	110.9	67 06.4	+ 57.5	113.1	**63**
64	69 43.3	+ 48.0	94.6	69 37.0	+ 49.8	97.3	69 28.0	+ 51.4	100.0	69 16.3	+ 52.8	102.6	69 01.9	+ 54.2	105.1	68 45.0	+ 55.3	107.6	68 25.6	+ 56.4	110.0	68 03.9	+ 57.2	112.4	**64**
65	70 31.3	+ 46.9	92.9	70 26.8	+ 48.8	95.7	70 19.4	+ 50.6	98.5	70 09.1	+ 52.2	101.2	69 56.1	+ 53.6	103.9	69 40.3	+ 55.0	106.5	69 22.0	+ 56.0	109.1	69 01.1	+ 57.0	111.6	**65**
66	71 18.2	+ 45.6	91.0	71 15.6	+ 47.8	93.9	71 10.0	+ 49.7	96.8	71 01.3	+ 51.5	99.7	70 49.7	+ 53.0	102.6	70 35.3	+ 54.4	105.3	70 18.0	+ 55.6	108.0	69 58.1	+ 56.7	110.7	**66**
67	72 03.8	+ 44.2	88.9	72 03.4	+ 46.4	92.0	71 59.7	+ 48.6	95.1	71 52.8	+ 50.5	98.1	71 42.7	+ 52.3	101.1	71 29.7	+ 53.8	104.1	71 13.6	+ 55.2	106.9	70 54.8	+ 56.4	109.7	**67**
68	72 48.0	+ 42.7	86.7	72 49.8	+ 45.1	89.9	72 48.3	+ 47.3	93.1	72 43.3	+ 49.5	96.3	72 35.0	+ 51.5	99.5	72 23.5	+ 53.2	102.6	72 08.8	+ 54.7	105.7	71 51.2	+ 55.9	108.6	**68**
69	73 30.7	*+ 40.7* •	84.2	73 34.9	+ 43.5	87.6	73 35.6	+ 46.0	91.0	73 32.8	+ 48.3	94.4	73 26.5	+ 50.4	97.8	73 16.7	+ 52.3	101.1	73 03.5	+ 54.0	104.3	72 47.1	+ 55.5	107.4	**69**
70	74 11.4	*+ 38.7* •	81.6	74 18.4	*+ 41.6* •	85.1	74 21.6	+ 44.4	88.7	74 21.1	+ 47.0	92.3	74 16.9	+ 49.3	95.8	74 09.0	+ 51.5	99.3	73 57.5	+ 53.3	102.7	73 42.6	+ 54.9	106.1	**70**
71	74 50.1	*+ 36.4* •	78.7	75 00.0	*+ 39.4* •	82.4	75 06.0	*+ 42.5* •	86.1	75 08.1	+ 45.3	89.9	75 06.2	+ 48.0	93.6	75 00.5	+ 50.3	97.4	74 50.8	+ 52.5	101.0	74 37.5	+ 54.3	104.6	**71**
72	75 26.5	*+ 33.7* •	75.6	75 39.4	*+ 37.1* •	79.4	75 48.5	*+ 40.3* •	83.3	75 53.4	*+ 43.4* •	87.3	75 54.2	+ 46.3	91.2	75 50.8	+ 49.0	95.2	75 43.3	+ 51.4	99.1	75 31.8	+ 53.5	103.0	**72**
73	76 00.2	*+ 30.7* •	72.3	76 16.5	*+ 34.3* •	76.2	76 28.8	*+ 37.8* •	80.2	76 36.8	*+ 41.3* •	84.4	76 40.5	*+ 44.5* •	88.6	76 39.8	+ 47.5	92.8	76 34.7	+ 50.2	97.0	76 25.3	+ 52.5	101.1	**73**
74	76 30.9	*+ 27.3* •	68.7	76 50.8	*+ 31.1* •	72.6	77 06.6	*+ 34.9* •	76.8	77 18.1	*+ 38.6* •	81.1	77 25.0	*+ 42.2* •	85.6	77 27.3	*+ 45.6* •	90.1	77 24.9	+ 48.7	94.5	77 17.8	+ 51.4	99.0	**74**
75	76 58.2	*+ 23.7* •	64.8	77 21.9	*+ 27.6* •	68.8	77 41.5	*+ 31.6* •	73.1	77 56.7	*+ 35.6* •	77.6	78 07.2	*+ 39.6* •	82.2	78 12.9	*+ 43.3* •	87.0	78 13.6	*+ 46.8* •	91.8	78 09.2	+ 50.0	96.5	**75**
76	77 21.9	*+ 19.6* •	60.6	77 49.5	*+ 23.6* •	64.7	78 13.1	*+ 27.8* •	69.0	78 32.3	*+ 32.1* •	73.6	78 46.8	*+ 36.4* •	78.5	78 56.2	*+ 40.7* •	83.5	79 00.4	*+ 44.6* •	88.6	78 59.2	*+ 48.2* •	93.7	**76**
77	77 41.5	*+ 15.2* •	56.3	78 13.1	*+ 19.2* •	60.2	78 40.9	*+ 23.5* •	64.6	79 04.4	*+ 28.1* •	69.3	79 23.2	*+ 32.7* •	74.3	79 36.9	*+ 37.3* •	79.5	79 45.0	*+ 41.7* •	85.0	79 47.4	*+ 45.9* •	90.5	**77**
78	77 56.7	*+ 10.5* •	51.7	78 32.3	*+ 14.5* •	55.5	79 04.4	*+ 18.8* •	59.8	79 32.5	*+ 23.4* •	64.5	79 55.9	*+ 28.3* •	69.6	80 14.2	*+ 33.3* •	75.0	80 26.7	*+ 38.4* •	80.8	80 33.3	*+ 43.1* •	86.7	**78**
79	78 07.2	*+ 5.7* •	46.9	78 46.8	*+ 9.4* •	50.6	79 23.2	*+ 13.7* •	54.7	79 55.9	*+ 18.3* •	59.3	80 24.2	*+ 23.3* •	64.4	80 47.5	*+ 28.6* •	70.0	81 05.1	*+ 34.1* •	76.0	81 16.4	*+ 39.5* •	82.3	**79**
80	78 12.9	*+ 0.7* •	42.1	78 56.2	*+ 4.2* •	45.5	79 36.9	*+ 8.1* •	49.4	80 14.2	*+ 12.5* •	53.8	80 47.5	*+ 17.6* •	58.8	81 16.1	*+ 23.1* •	64.3	81 39.2	*+ 28.9* •	70.5	81 55.9	*+ 35.0* •	77.2	**80**
81	78 13.6	*– 4.4* •	37.2	79 00.4	*– 1.2* •	40.3	79 45.0	*+ 2.4* •	43.8	80 26.7	*+ 6.6* •	48.0	81 05.1	*+ 11.3* •	52.7	81 39.2	*+ 16.7* •	58.1	82 08.1	*+ 22.8* •	64.3	82 30.9	*+ 29.4* •	71.1	**81**
82	78 09.2	*– 9.2* •	32.3	78 59.2	*– 6.6* •	35.0	79 47.4	*– 3.5* •	38.2	80 33.3	*+ 0.3* •	41.9	81 16.4	*+ 4.6* •	46.3	81 55.9	*+ 9.8* •	51.4	82 30.9	*+ 15.7* •	57.3	83 00.3	*+ 22.4* •	64.2	**82**
83	78 00.0	*– 14.0* •	27.5	78 52.6	*– 11.8* •	29.9	79 43.9	*– 9.1* •	32.6	80 33.6	*– 6.0* •	35.8	81 21.0	*– 2.2* •	39.7	82 05.7	*+ 2.3* •	44.3	82 46.6	*+ 7.8* •	49.8	83 22.7	*+ 14.3* •	56.4	**83**
84	77 46.0	*– 18.5* •	22.9	78 40.8	*– 16.6* •	24.8	79 34.8	*– 14.6* •	27.1	80 27.6	*– 12.1* •	29.8	81 18.8	*– 9.0* •	33.1	82 08.0	*– 5.3* •	37.0	82 54.4	*– 0.6* •	41.8	83 37.0	*+ 5.2* •	47.8	**84**
85	77 27.5	*– 22.6* •	18.4	78 24.2	*– 21.3* •	20.0	79 20.2	*– 19.7* •	21.8	80 15.5	*– 17.7* •	23.9	81 09.8	*– 15.4* •	26.6	82 02.7	*– 12.5* •	29.8	82 53.8	*– 8.9* •	33.7	83 42.2	*– 4.2* •	38.8	**85**
86	77 04.9	*– 26.4* •	14.2	78 02.9	*– 25.5* •	15.4	79 00.5	*– 24.3* •	16.8	79 57.8	*– 23.0* •	18.4	80 54.4	*– 21.4* •	20.4	81 50.2	*– 19.3* •	22.8	82 44.9	*– 16.7* •	25.8	83 38.0	*– 13.3* •	29.7	**86**
87	76 38.5	*– 29.9* •	10.3	77 37.4	*– 29.2* •	11.1	78 36.2	*– 28.5* •	12.0	79 34.8	*– 27.7* •	13.2	80 33.0	*– 26.6* •	14.5	81 30.9	*– 25.4* •	16.2	82 28.2	*– 23.7* •	18.3	83 24.7	*– 21.6* •	21.1	**87**
88	76 08.6	*– 32.9* •	6.6	77 08.2	*– 32.6* •	7.1	78 07.7	*– 32.2* •	7.7	79 07.1	*– 31.8* •	8.4	80 06.4	*– 31.2* •	9.2	81 05.5	*– 30.5* •	10.2	82 04.5	*– 29.8* •	11.5	83 03.1	*– 28.7* •	13.1	**88**
89	75 35.7	*– 35.7* •	3.2	76 35.6	*– 35.6* •	3.4	77 35.5	*– 35.5* •	3.7	78 35.3	*– 35.3* •	4.0	79 35.2	*– 35.2* •	4.4	80 35.0	*– 35.0* •	4.8	81 34.7	*– 34.7* •	5.4	82 34.4	*– 34.4* •	6.1	**89**
90	75 00.0	*– 38.1* •	0.0	76 00.0	*– 38.2* •	0.0	77 00.0	*– 38.3* •	0.0	78 00.0	*– 38.4* •	0.0	79 00.0	*– 38.5* •	0.0	80 00.0	*– 38.7* •	0.0	81 00.0	*– 38.9* •	0.0	82 00.0	*– 39.1* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 52°, 308°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	9 10.1	−58.7	127.0	8 33.9	−58.8	127.2	7 57.6	−59.0	127.3	7 21.3	−59.2	127.4	6 44.8	−59.3	127.5	6 08.2	−59.4	127.6	5 31.6	−59.5	127.7	4 54.9	−59.6	127.7	0
1	8 11.4	−58.7	127.2	7 35.1	−58.9	127.4	6 58.6	−59.0	127.5	6 22.1	−59.2	127.6	5 45.5	−59.3	127.6	5 08.8	−59.4	127.7	4 32.1	−59.6	127.8	3 55.3	−59.7	127.8	1
2	7 12.7	−58.7	127.5	6 36.2	−58.9	127.6	5 59.6	−59.1	127.6	5 22.9	−59.2	127.7	4 46.2	−59.4	127.8	4 09.4	−59.5	127.9	3 32.5	−59.5	127.9	2 55.6	−59.6	127.9	2
3	6 14.0	−58.7	127.7	5 37.3	−58.9	127.7	5 00.5	−59.0	127.8	4 23.7	−59.2	127.9	3 46.8	−59.3	127.9	3 09.9	−59.4	128.0	2 33.0	−59.6	128.0	1 56.0	−59.6	128.1	3
4	5 15.3	−58.8	127.9	4 38.4	−58.9	127.9	4 01.5	−59.1	128.0	3 24.5	−59.2	128.0	2 47.5	−59.3	128.1	2 10.5	−59.4	128.1	1 33.4	−59.5	128.2	0 56.4	−59.7	128.2	4
5	4 16.5	−58.7	128.1	3 39.5	−58.9	128.1	3 02.4	−59.0	128.2	2 25.3	−59.1	128.2	1 48.2	−59.3	128.2	1 11.1	−59.5	128.3	0 33.9	−59.5	128.3	0 03.3	+59.6	51.7	5
6	3 17.8	−58.7	128.3	2 40.6	−58.9	128.3	2 03.4	−59.1	128.4	1 26.2	−59.2	128.4	0 48.9	−59.3	128.4	0 11.6	−59.4	128.4	0 25.6	+59.6	51.6	1 02.9	+59.6	51.6	6
7	2 19.1	−58.8	128.5	1 41.7	−58.9	128.5	1 04.3	−59.0	128.5	0 27.0	−59.2	128.5	0 10.4	+59.3	51.5	0 47.8	+59.4	51.5	1 25.2	+59.5	51.5	2 02.5	+59.7	51.5	7
8	1 20.3	−58.7	128.7	0 42.8	−58.9	128.7	0 05.3	−59.1	128.7	0 32.2	+59.2	51.3	1 09.7	+59.4	51.3	1 47.2	+59.5	51.3	2 24.7	+59.6	51.4	3 02.2	+59.6	51.4	8
9	0 21.6	−58.8	128.9	0 16.1	+58.9	51.1	0 53.8	+59.0	51.1	1 31.4	+59.2	51.1	2 09.1	+59.3	51.2	2 46.7	+59.4	51.2	3 24.3	+59.5	51.2	4 01.8	+59.7	51.3	9
10	0 37.2	+58.7	50.9	1 15.0	+58.9	50.9	1 52.8	+59.1	50.9	2 30.6	+59.2	51.0	3 08.4	+59.3	51.0	3 46.1	+59.4	51.1	4 23.8	+59.5	51.1	5 01.5	+59.6	51.2	10
11	1 35.9	+58.7	50.7	2 13.9	+58.9	50.7	2 51.9	+59.0	50.8	3 29.8	+59.2	50.8	4 07.7	+59.3	50.9	4 45.5	+59.5	50.9	5 23.3	+59.6	51.0	6 01.1	+59.6	51.1	11
12	2 34.6	+58.8	50.5	3 12.8	+58.9	50.5	3 50.9	+59.0	50.6	4 29.0	+59.2	50.6	5 07.0	+59.3	50.7	5 45.0	+59.4	50.8	6 22.9	+59.5	50.9	7 00.7	+59.7	51.0	12
13	3 33.4	+58.7	50.3	4 11.7	+58.9	50.3	4 49.9	+59.1	50.4	5 28.2	+59.1	50.5	6 06.3	+59.3	50.6	6 44.4	+59.4	50.6	7 22.4	+59.6	50.7	8 00.4	+59.6	50.8	13
14	4 32.1	+58.7	50.1	5 10.6	+58.9	50.2	5 49.0	+59.0	50.2	6 27.3	+59.2	50.3	7 05.6	+59.3	50.4	7 43.8	+59.5	50.5	8 22.0	+59.5	50.6	9 00.0	+59.6	50.7	14
15	5 30.8	+58.7	49.9	6 09.5	+58.8	50.0	6 48.0	+59.1	50.0	7 26.5	+59.2	50.1	8 04.9	+59.3	50.2	8 43.3	+59.4	50.4	9 21.5	+59.5	50.5	9 59.6	+59.6	50.6	15
16	6 29.5	+58.8	49.7	7 08.3	+58.9	49.8	7 47.1	+59.0	49.9	8 25.7	+59.2	50.0	9 04.2	+59.3	50.1	9 42.7	+59.4	50.2	10 21.0	+59.5	50.4	10 59.2	+59.7	50.5	16
17	7 28.3	+58.7	49.5	8 07.2	+58.9	49.6	8 46.1	+59.0	49.7	9 24.9	+59.1	49.8	10 03.5	+59.3	49.9	10 42.1	+59.4	50.1	11 20.5	+59.6	50.2	11 58.9	+59.6	50.4	17
18	8 27.0	+58.7	49.3	9 06.1	+58.9	49.4	9 45.1	+59.0	49.5	10 24.0	+59.2	49.6	11 02.8	+59.3	49.8	11 41.5	+59.4	49.9	12 20.1	+59.5	50.1	12 58.5	+59.6	50.3	18
19	9 25.7	+58.7	49.0	10 05.0	+58.8	49.2	10 44.1	+59.0	49.3	11 23.2	+59.1	49.5	12 02.1	+59.3	49.6	12 40.9	+59.4	49.8	13 19.6	+59.5	50.0	13 58.1	+59.6	50.2	19
20	10 24.4	+58.7	48.8	11 03.8	+58.9	49.0	11 43.1	+59.0	49.1	12 22.3	+59.2	49.3	13 01.4	+59.3	49.5	13 40.3	+59.4	49.6	14 19.1	+59.5	49.8	14 57.7	+59.6	50.0	20
21	11 23.1	+58.7	48.6	12 02.7	+58.8	48.8	12 42.1	+59.0	48.9	13 21.5	+59.1	49.1	14 00.7	+59.2	49.3	14 39.7	+59.4	49.5	15 18.6	+59.5	49.7	15 57.3	+59.6	49.9	21
22	12 21.8	+58.6	48.4	13 01.5	+58.9	48.6	13 41.1	+59.0	48.8	14 20.6	+59.2	49.0	14 59.9	+59.3	49.1	15 39.1	+59.4	49.4	16 18.1	+59.5	49.6	16 56.9	+59.6	49.8	22
23	13 20.4	+58.7	48.2	14 00.4	+58.8	48.4	14 40.1	+59.0	48.6	15 19.8	+59.1	48.8	15 59.2	+59.3	49.0	16 38.5	+59.4	49.2	17 17.6	+59.5	49.4	17 56.5	+59.6	49.7	23
24	14 19.1	+58.6	48.0	14 59.2	+58.8	48.2	15 39.1	+59.0	48.4	16 18.9	+59.1	48.6	16 58.5	+59.2	48.8	17 37.9	+59.4	49.1	18 17.1	+59.5	49.3	18 56.1	+59.6	49.6	24
25	15 17.7	+58.7	47.8	15 58.0	+58.8	48.0	16 38.1	+58.9	48.2	17 18.0	+59.1	48.4	17 57.7	+59.3	48.7	18 37.3	+59.3	48.9	19 16.6	+59.5	49.2	19 55.7	+59.6	49.4	25
26	16 16.4	+58.6	47.5	16 56.8	+58.8	47.8	17 37.0	+59.0	48.0	18 17.1	+59.1	48.2	18 57.0	+59.2	48.5	19 36.6	+59.4	48.8	20 16.1	+59.5	49.0	20 55.3	+59.6	49.3	26
27	17 15.0	+58.6	47.3	17 55.6	+58.8	47.6	18 36.0	+58.9	47.8	19 16.2	+59.1	48.1	19 56.2	+59.2	48.3	20 36.0	+59.3	48.6	21 15.6	+59.4	48.9	21 54.9	+59.6	49.2	27
28	18 13.6	+58.6	47.1	18 54.4	+58.7	47.3	19 34.9	+58.9	47.6	20 15.3	+59.0	47.9	20 55.4	+59.2	48.1	21 35.3	+59.4	48.4	22 15.0	+59.5	48.7	22 54.5	+59.5	49.1	28
29	19 12.2	+58.6	46.9	19 53.1	+58.8	47.1	20 33.8	+59.0	47.4	21 14.3	+59.1	47.7	21 54.6	+59.2	48.0	22 34.7	+59.3	48.3	23 14.5	+59.4	48.6	23 54.0	+59.6	48.9	29
30	20 10.8	+58.5	46.6	20 51.9	+58.7	46.9	21 32.8	+58.8	47.2	22 13.4	+59.1	47.5	22 53.8	+59.2	47.8	23 34.0	+59.3	48.1	24 13.9	+59.5	48.5	24 53.6	+59.6	48.8	30
31	21 09.3	+58.6	46.4	21 50.6	+58.7	46.7	22 31.6	+58.9	47.0	23 12.5	+59.0	47.3	23 53.0	+59.2	47.6	24 33.3	+59.3	48.0	25 13.4	+59.4	48.3	25 53.2	+59.5	48.7	31
32	22 07.9	+58.5	46.2	22 49.3	+58.7	46.5	23 30.5	+58.9	46.8	24 11.5	+59.0	47.1	24 52.2	+59.2	47.4	25 32.6	+59.3	47.8	26 12.8	+59.4	48.1	26 52.7	+59.5	48.5	32
33	23 06.4	+58.5	45.9	23 48.0	+58.7	46.2	24 29.4	+58.8	46.6	25 10.5	+59.0	46.9	25 51.4	+59.1	47.3	26 31.9	+59.3	47.6	27 12.2	+59.5	48.0	27 52.2	+59.6	48.4	33
34	24 04.9	+58.5	45.7	24 46.7	+58.6	46.0	25 28.2	+58.8	46.4	26 09.5	+59.0	46.7	26 50.5	+59.1	47.1	27 31.2	+59.3	47.4	28 11.7	+59.4	47.8	28 51.8	+59.5	48.2	34
35	25 03.4	+58.4	45.4	25 45.3	+58.7	45.8	26 27.0	+58.8	46.1	27 08.5	+59.0	46.5	27 49.6	+59.2	46.9	28 30.5	+59.3	47.3	29 11.1	+59.4	47.7	29 51.3	+59.5	48.1	35
36	26 01.8	+58.4	45.2	26 44.0	+58.6	45.5	27 25.8	+58.8	45.9	28 07.5	+58.9	46.3	28 48.8	+59.1	46.7	29 29.8	+59.2	47.1	30 10.5	+59.3	47.5	30 50.8	+59.5	47.9	36
37	27 00.2	+58.4	44.9	27 42.6	+58.5	45.3	28 24.6	+58.8	45.7	29 06.4	+58.9	46.1	29 47.9	+59.0	46.5	30 29.0	+59.2	46.9	31 09.8	+59.4	47.3	31 50.3	+59.5	47.8	37
38	27 58.6	+58.4	44.7	28 41.1	+58.6	45.1	29 23.4	+58.7	45.5	30 05.3	+58.9	45.9	30 46.9	+59.1	46.3	31 28.2	+59.3	46.7	32 09.2	+59.4	47.2	32 49.8	+59.5	47.6	38
39	28 57.0	+58.3	44.4	29 39.7	+58.5	44.8	30 22.1	+58.7	45.2	31 04.2	+58.9	45.6	31 46.0	+59.1	46.1	32 27.5	+59.2	46.5	33 08.6	+59.3	47.0	33 49.3	+59.5	47.5	39
40	29 55.3	+58.3	44.1	30 38.2	+58.5	44.6	31 20.8	+58.7	45.0	32 03.1	+58.9	45.4	32 45.1	+59.0	45.9	33 26.7	+59.1	46.3	34 07.9	+59.3	46.8	34 48.8	+59.4	47.3	40
41	30 53.6	+58.3	43.9	31 36.7	+58.5	44.3	32 19.5	+58.7	44.7	33 02.0	+58.8	45.2	33 44.1	+59.0	45.7	34 25.8	+59.2	46.1	35 07.2	+59.3	46.6	35 48.2	+59.5	47.2	41
42	31 51.9	+58.2	43.6	32 35.2	+58.4	44.0	33 18.2	+58.6	44.5	34 00.8	+58.8	44.9	34 43.1	+59.0	45.4	35 25.0	+59.1	45.9	36 06.5	+59.3	46.5	36 47.7	+59.4	47.0	42
43	32 50.1	+58.2	43.3	33 33.6	+58.4	43.8	34 16.8	+58.6	44.2	34 59.6	+58.8	44.7	35 42.1	+58.9	45.2	36 24.1	+59.1	45.7	37 05.8	+59.3	46.3	37 47.1	+59.4	46.8	43
44	33 48.3	+58.1	43.0	34 32.0	+58.3	43.5	35 15.4	+58.5	44.0	35 58.4	+58.7	44.5	36 41.0	+58.9	45.0	37 23.2	+59.1	45.5	38 05.1	+59.2	46.1	38 46.5	+59.4	46.6	44
45	34 46.4	+58.1	42.7	35 30.3	+58.4	43.2	36 13.9	+58.5	43.7	36 57.1	+58.7	44.2	37 39.9	+58.9	44.7	38 22.3	+59.1	45.3	39 04.3	+59.3	45.9	39 45.9	+59.4	46.5	45
46	35 44.5	+58.1	42.4	36 28.7	+58.2	42.9	37 12.4	+58.5	43.4	37 55.8	+58.7	43.9	38 38.8	+58.9	44.5	39 21.4	+59.0	45.1	40 03.6	+59.2	45.7	40 45.3	+59.3	46.3	46
47	36 42.6	+58.0	42.1	37 26.9	+58.2	42.6	38 10.9	+58.4	43.1	38 54.5	+58.6	43.7	39 37.7	+58.8	44.2	40 20.4	+59.1	44.8	41 02.8	+59.1	45.4	41 44.6	+59.4	46.1	47
48	37 40.6	+57.9	41.8	38 25.1	+58.2	42.3	39 09.3	+58.4	42.8	39 53.1	+58.6	43.4	40 36.5	+58.8	44.0	41 19.5	+58.9	44.6	42 01.9	+59.2	45.2	42 44.0	+59.3	45.9	48
49	38 38.5	+57.9	41.4	39 23.3	+58.1	42.0	40 07.7	+58.4	42.5	40 51.7	+58.6	43.1	41 35.3	+58.8	43.7	42 18.4	+59.0	44.4	43 01.1	+59.1	45.0	43 43.3	+59.3	45.7	49
50	39 36.4	+57.8	41.1	40 21.4	+58.1	41.7	41 06.1	+58.3	42.2	41 50.3	+58.5	42.8	42 34.1	+58.7	43.5	43 17.4	+58.9	44.1	44 00.2	+59.1	44.8	44 42.6	+59.2	45.5	50
51	40 34.2	+57.8	40.8	41 19.5	+58.0	41.3	42 04.4	+58.2	41.9	42 48.8	+58.4	42.5	43 32.8	+58.6	43.2	44 16.3	+58.9	43.8	44 59.3	+59.1	44.5	45 41.8	+59.3	45.2	51
52	41 32.0	+57.7	40.4	42 17.5	+57.9	41.0	43 02.6	+58.2	41.6	43 47.2	+58.5	42.2	44 31.4	+58.7	42.9	45 15.2	+58.8	43.6	45 58.4	+59.0	44.3	46 41.1	+59.2	45.0	52
53	42 29.7	+57.6	40.0	43 15.4	+57.9	40.6	44 00.8	+58.1	41.3	44 45.7	+58.3	41.9	45 30.1	+58.5	42.6	46 14.0	+58.8	43.3	46 57.4	+59.0	44.0	47 40.3	+59.2	44.8	53
54	43 27.3	+57.6	39.6	44 13.3	+57.8	40.3	44 58.9	+58.0	40.9	45 44.0	+58.3	41.6	46 28.6	+58.6	42.3	47 12.8	+58.7	43.0	47 56.4	+59.0	43.7	48 39.5	+59.1	44.5	54
55	44 24.9	+57.4	39.3	45 11.1	+57.7	39.9	45 56.9	+58.0	40.5	46 42.3	+58.2	41.2	47 27.2	+58.4	41.9	48 11.5	+58.7	42.7	48 55.4	+58.9	43.5	49 38.6	+59.1	44.3	55
56	45 22.3	+57.4	38.8	46 08.8	+57.7	39.5	46 54.9	+57.9	40.2	47 40.5	+58.2	40.9	48 25.6	+58.5	41.6	49 10.2	+58.7	42.4	49 54.3	+58.9	43.2	50 37.7	+59.1	44.0	56
57	46 19.7	+57.3	38.4	47 06.5	+57.5	39.1	47 52.8	+57.8	39.8	48 38.7	+58.1	40.5	49 24.1	+58.3	41.3	50 08.9	+58.6	42.0	50 53.2	+58.8	42.9	51 36.8	+59.1	43.7	57
58	47 17.0	+57.1	38.0	48 04.0	+57.5	38.7	48 50.6	+57.8	39.4	49 36.8	+58.0	40.1	50 22.4	+58.3	40.9	51 07.5	+58.5	41.7	51 52.0	+58.7	42.6	52 35.9	+58.9	43.4	58
59	48 14.1	+57.1	37.5	49 01.5	+57.4	38.2	49 48.4	+57.6	39.0	50 34.8	+57.9	39.7	51 20.7	+58.2	40.5	52 06.0	+58.5	41.4	52 50.7	+58.7	42.2	53 34.8	+59.0	43.1	59
60	49 11.2	+56.9	37.1	49 58.9	+57.2	37.8	50 46.0	+57.6	38.5	51 32.7	+57.8	39.3	52 18.9	+58.1	40.1	53 04.5	+58.3	41.0	53 49.4	+58.7	41.9	54 33.8	+58.9	42.8	60
61	50 08.1	+56.9	36.6	50 56.1	+57.1	37.3	51 43.6	+57.4	38.1	52 30.5	+57.8	38.9	53 17.0	+58.0	39.7	54 02.8	+58.3	40.6	54 48.1	+58.6	41.5	55 32.7	+58.8	42.5	61
62	51 05.0	+56.6	36.1	51 53.2	+57.0	36.8	52 41.0	+57.3	37.6	53 28.3	+57.6	38.4	54 15.0	+57.9	39.3	55 01.1	+58.3	40.2	55 46.7	+58.5	41.1	56 31.5	+58.8	42.1	62
63	52 01.6	+56.6	35.6	52 50.2	+56.9	36.3	53 38.3	+57.2	37.1	54 25.9	+57.5	38.0	55 12.9	+57.9	38.8	55 59.4	+58.1	39.8	56 45.2	+58.4	40.7	57 30.3	+58.7	41.8	63
64	52 58.2	+56.3	35.0	53 47.1	+56.7	35.8	54 35.5	+57.1	36.6	55 23.4	+57.4	37.5	56 10.8	+57.7	38.4	56 57.5	+58.0	39.3	57 43.6	+58.3	40.3	58 29.0	+58.6	41.4	64
65	53 54.5	+56.2	34.4	54 43.8	+56.6	35.2	55 32.6	+56.9	36.1	56 20.8	+57.3	36.9	57 08.5	+57.6	37.9	57 55.5	+57.9	38.8	58 41.9	+58.3	39.9	59 27.6	+58.6	40.9	65
66	54 50.7	+56.1	33.8	55 40.4	+56.3	34.6	56 29.5	+56.7	35.5	57 18.1	+57.0	36.4	58 06.1	+57.4	37.3	58 53.4	+57.8	38.3	59 40.2	+58.1	39.4	60 26.2	+58.4	40.5	66
67	55 46.8	+55.8	33.2	56 36.7	+56.2	34.0	57 26.2	+56.6	34.9	58 15.1	+57.0	35.8	59 03.5	+57.3	36.8	59 51.2	+57.7	37.8	60 38.3	+58.0	38.9	61 24.6	+58.4	40.0	67
68	56 42.6	+55.6	32.5	57 32.9	+56.0	33.4	58 22.8	+56.3	34.3	59 12.1	+56.7	35.2	60 00.8	+57.1	36.2	60 48.9	+57.5	37.3	61 36.3	+57.9	38.4	62 23.0	+58.2	39.6	68
69	57 38.2	+55.3	31.8	58 28.9	+55.8	32.7	59 19.1	+56.2	33.6	60 08.8	+56.6	34.6	60 57.9	+57.0	35.6	61 46.4	+57.4	36.7	62 34.2	+57.7	37.8	63 21.2	+58.1	39.0	69
70	58 33.5	+55.1	31.1	59 24.7	+55.5	32.0	60 15.3	+55.9	32.9	61 05.4	+56.3	33.9	61 54.9	+56.7	34.9	62 43.8	+57.1	36.0	63 31.9	+57.6	37.2	64 19.3	+58.0	38.5	70
71	59 28.6	+54.8	30.3	60 20.2	+55.2	31.2	61 11.2	+55.7	32.2	62 01.7	+56.1	33.2	62 51.6	+56.6	34.2	63 40.9	+57.0	35.4	64 29.5	+57.4	36.6	65 17.3	+57.8	37.9	71
72	60 23.4	+54.5	29.5	61 15.4	+54.9	30.4	62 06.9	+55.3	31.4	62 57.8	+55.8	32.4	63 48.2	+56.3	33.5	64 37.9	+56.7	34.6	65 26.9	+57.2	35.9	66 15.1	+57.6	37.2	72
73	61 17.9	+54.1	28.7	62 10.3	+54.6	29.6	63 02.2	+55.1	30.5	63 53.6	+55.6	31.6	64 44.5	+56.0	32.7	65 34.6	+56.5	33.9	66 24.1	+57.0	35.1	67 12.7	+57.5	36.5	73
74	62 12.0	+53.8	27.8	63 04.9	+54.2	28.7	63 57.3	+54.7	29.6	64 49.2	+55.2	30.7	65 40.5	+55.7	31.8	66 31.1	+56.2	33.0	67 21.1	+56.7	34.3	68 10.2	+57.2	35.7	74
75	63 05.8	+53.3	26.8	63 59.1	+53.9	27.7	64 52.0	+54.3	28.7	65 44.4	+54.8	29.8	66 36.2	+55.3	30.9	67 27.3	+55.9	32.1	68 17.8	+56.4	33.5	69 07.4	+56.9	34.9	75
76	63 59.1	+52.9	25.8	64 53.0	+53.3	26.7	65 46.3	+53.9	27.7	66 39.2	+54.4	28.8	67 31.5	+55.0	29.9	68 23.2	+55.5	31.2	69 14.2	+56.1	32.5	70 04.3	+56.7	34.0	76
77	64 52.0	+52.4	24.7	65 46.3	+52.9	25.6	66 40.2	+53.4	26.6	67 33.6	+54.0	27.7	68 26.5	+54.5	28.8	69 18.7	+55.1	30.1	70 10.3	+55.7	31.5	71 01.0	+56.3	33.0	77
78	65 44.4	+51.8	23.5	66 39.2	+52.3	24.4	67 33.6	+52.9	25.4	68 27.6	+53.4	26.5	69 21.0	+54.0	27.7	70 13.8	+54.6	29.0	71 06.0	+55.2	30.4	71 57.3	+55.9	31.9	78
79	66 36.2	+51.1	22.2	67 31.5	+51.7	23.2	68 26.5	+52.2	24.2	69 21.0	+52.8	25.2	70 15.0	+53.4	26.4	71 08.4	+54.1	27.7	72 01.2	+54.7	29.2	72 53.2	+55.4	30.7	79
80	67 27.3	+50.5	20.9	68 23.2	+51.0	21.8	69 18.7	+51.6	22.8	70 13.8	+52.2	23.9	71 08.4	+52.8	25.0	72 02.5	+53.4	26.3	72 55.9	+54.2	27.8	73 48.6	+54.9	29.4	80
81	68 17.8	+49.6	19.5	69 14.2	+50.1	20.3	70 10.3	+50.7	21.3	71 06.0	+51.3	22.4	72 01.2	+52.0	23.5	72 55.9	+52.7	24.8	73 50.1	+53.4	26.3	74 43.5	+54.2	27.9	81
82	69 07.4	+48.7	17.9	70 04.3	+49.3	18.8	71 01.0	+49.8	19.7	71 57.3	+50.5	20.7	72 53.2	+51.1	21.9	73 48.6	+51.8	23.2	74 43.5	+52.6	24.6	75 37.7	+53.4	26.2	82
83	69 56.1	+47.7	16.3	70 53.6	+48.2	17.1	71 50.8	+48.8	18.0	72 47.8	+49.4	18.9	73 44.3	+50.1	20.1	74 40.4	+50.8	21.3	75 36.1	+51.6	22.7	76 31.1	+52.4	24.3	83
84	70 43.8	+46.6	14.5	71 41.8	+47.1	15.2	72 39.6	+47.6	16.0	73 37.2	+48.2	17.0	74 34.4	+48.8	18.0	75 31.2	+49.6	19.2	76 27.7	+50.3	20.6	77 23.5	+51.3	22.2	84
85	71 30.4	+45.3	12.5	72 28.9	+45.8	13.2	73 27.2	+46.3	14.0	74 25.4	+46.8	14.8	75 23.2	+47.5	15.8	76 20.8	+48.1	16.9	77 18.0	+48.9	18.2	78 14.8	+49.7	19.7	85
86	72 15.7	+43.8	10.4	73 14.7	+44.2	11.0	74 13.5	+44.7	11.7	75 12.2	+45.1	12.4	76 10.7	+45.7	13.3	77 08.9	+46.4	14.3	78 06.9	*+47.1*•	15.5	79 04.5	*+48.0*•	16.9	86
87	72 59.5	+42.1	8.1	73 58.9	+42.4	8.6	74 58.2	*+42.8*•	9.2	75 57.3	*+43.3*•	9.8	76 56.4	*+43.7*•	10.5	77 55.3	*+44.3*•	11.4	78 54.0	*+44.9*•	12.4	79 52.5	*+45.7*•	13.6	87
88	73 41.6	*+40.3*•	5.6	74 41.3	*+40.5*•	6.0	75 41.0	*+40.7*•	6.4	76 40.6	*+41.0*•	6.9	77 40.1	*+41.4*•	7.4	78 39.6	*+41.7*•	8.0	79 38.9	*+42.2*•	8.8	80 38.2	*+42.7*•	9.7	88
89	74 21.9	*+38.1*•	2.9	75 21.8	*+38.2*•	3.1	76 21.7	*+38.3*•	3.3	77 21.6	*+38.4*•	3.6	78 21.5	*+38.5*•	3.9	79 21.3	*+38.7*•	4.3	80 21.1	*+38.9*•	4.7	81 20.9	*+39.1*•	5.2	89
90	75 00.0	*+35.7*•	0.0	76 00.0	*+35.6*•	0.0	77 00.0	*+35.5*•	0.0	78 00.0	*+35.3*•	0.0	79 00.0	*+35.2*•	0.0	80 00.0	*+35.0*•	0.0	81 00.0	*+34.7*•	0.0	82 00.0	*+34.4*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 128°, 232°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 57.7	+58.6	126.1	8 22.3	+58.8	126.2	7 46.8	+59.0	126.3	7 11.3	+59.1	126.4	6 35.6	+59.3	126.5	5 59.9	+59.4	126.6	5 24.1	+59.6	126.7	4 48.3	+59.6	126.7	0
1	9 56.3	+58.7	125.8	9 21.1	+58.9	126.0	8 45.8	+59.0	126.1	8 10.4	+59.2	126.2	7 34.9	+59.3	126.3	6 59.3	+59.4	126.4	6 23.7	+59.5	126.5	5 47.9	+59.6	126.6	1
2	10 55.0	+58.6	125.6	10 20.0	+58.8	125.8	9 44.8	+59.0	125.9	9 09.6	+59.1	126.1	8 34.2	+59.3	126.2	7 58.7	+59.4	126.3	7 23.2	+59.5	126.4	6 47.5	+59.6	126.5	2
3	11 53.6	+58.7	125.4	11 18.8	+58.8	125.6	10 43.8	+59.0	125.7	10 08.7	+59.2	125.9	9 33.5	+59.3	126.0	8 58.1	+59.4	126.2	8 22.7	+59.5	126.3	7 47.1	+59.7	126.4	3
4	12 52.3	+58.6	125.2	12 17.6	+58.8	125.4	11 42.8	+59.0	125.5	11 07.9	+59.1	125.7	10 32.8	+59.2	125.9	9 57.5	+59.5	126.0	9 22.2	+59.5	126.2	8 46.8	+59.6	126.3	4
5	13 50.9	+58.6	125.0	13 16.4	+58.8	125.2	12 41.8	+59.0	125.4	12 07.0	+59.1	125.5	11 32.0	+59.3	125.7	10 57.0	+59.3	125.9	10 21.7	+59.5	126.0	9 46.4	+59.6	126.2	5
6	14 49.5	+58.6	124.8	14 15.2	+58.8	125.0	13 40.8	+58.9	125.2	13 06.1	+59.1	125.4	12 31.3	+59.3	125.5	11 56.3	+59.4	125.7	11 21.2	+59.5	125.9	10 46.0	+59.6	126.1	6
7	15 48.1	+58.6	124.5	15 14.0	+58.8	124.8	14 39.7	+59.0	125.0	14 05.2	+59.1	125.2	13 30.6	+59.2	125.4	12 55.7	+59.4	125.6	12 20.7	+59.6	125.8	11 45.6	+59.6	125.9	7
8	16 46.7	+58.6	124.3	16 12.8	+58.8	124.6	15 38.7	+58.9	124.8	15 04.3	+59.1	125.0	14 29.8	+59.3	125.2	13 55.1	+59.4	125.4	13 20.3	+59.5	125.6	12 45.2	+59.6	125.8	8
9	17 45.3	+58.6	124.1	17 11.6	+58.7	124.3	16 37.6	+58.9	124.6	16 03.4	+59.1	124.8	15 29.1	+59.2	125.1	14 54.5	+59.4	125.3	14 19.8	+59.5	125.5	13 44.8	+59.6	125.7	9
10	18 43.9	+58.5	123.9	18 10.3	+58.8	124.1	17 36.5	+59.0	124.4	17 02.5	+59.1	124.7	16 28.3	+59.2	124.9	15 53.9	+59.4	125.1	15 19.3	+59.4	125.4	14 44.4	+59.6	125.6	10
11	19 42.4	+58.5	123.6	19 09.1	+58.7	123.9	18 35.5	+58.9	124.2	18 01.6	+59.1	124.5	17 27.5	+59.3	124.7	16 53.3	+59.3	125.0	16 18.7	+59.5	125.2	15 44.0	+59.6	125.5	11
12	20 40.9	+58.5	123.4	20 07.8	+58.7	123.7	19 34.4	+58.9	124.0	19 00.7	+59.1	124.3	18 26.8	+59.2	124.6	17 52.6	+59.4	124.8	17 18.2	+59.5	125.1	16 43.6	+59.6	125.3	12
13	21 39.4	+58.5	123.1	21 06.5	+58.7	123.5	20 33.3	+58.8	123.8	19 59.8	+59.0	124.1	19 26.0	+59.2	124.4	18 52.0	+59.3	124.7	18 17.7	+59.5	125.0	17 43.2	+59.6	125.2	13
14	22 37.9	+58.5	122.9	22 05.2	+58.7	123.3	21 32.1	+58.9	123.6	20 58.8	+59.0	123.9	20 25.2	+59.2	124.2	19 51.3	+59.4	124.5	19 17.2	+59.5	124.8	18 42.8	+59.6	125.1	14
15	23 36.4	+58.4	122.7	23 03.9	+58.6	123.0	22 31.0	+58.8	123.4	21 57.8	+59.1	123.7	21 24.4	+59.2	124.0	20 50.7	+59.3	124.4	20 16.7	+59.4	124.7	19 42.4	+59.6	125.0	15
16	24 34.8	+58.5	122.4	24 02.5	+58.6	122.8	23 29.8	+58.9	123.2	22 56.9	+59.0	123.5	22 23.6	+59.1	123.9	21 50.0	+59.3	124.2	21 16.1	+59.5	124.5	20 42.0	+59.5	124.8	16
17	25 33.3	+58.3	122.2	25 01.1	+58.6	122.6	24 28.7	+58.8	122.9	23 55.9	+59.0	123.3	23 22.7	+59.2	123.7	22 49.3	+59.3	124.0	22 15.6	+59.4	124.4	21 41.5	+59.6	124.7	17
18	26 31.6	+58.4	121.9	25 59.7	+58.6	122.3	25 27.5	+58.8	122.7	24 54.9	+58.9	123.1	24 21.9	+59.2	123.5	23 48.6	+59.3	123.9	23 15.0	+59.5	124.2	22 41.1	+59.6	124.6	18
19	27 30.0	+58.3	121.6	26 58.3	+58.6	122.1	26 26.3	+58.7	122.5	25 53.8	+59.0	122.9	25 21.1	+59.1	123.3	24 47.9	+59.3	123.7	24 14.5	+59.4	124.1	23 40.7	+59.5	124.5	19
20	28 28.3	+58.3	121.4	27 56.9	+58.5	121.8	27 25.0	+58.8	122.3	26 52.8	+58.9	122.7	26 20.2	+59.1	123.1	25 47.2	+59.3	123.5	25 13.9	+59.4	123.9	24 40.2	+59.6	124.3	20
21	29 26.6	+58.3	121.1	28 55.4	+58.5	121.6	28 23.8	+58.7	122.1	27 51.7	+59.0	122.5	27 19.3	+59.1	122.9	26 46.5	+59.3	123.4	26 13.3	+59.4	123.8	25 39.8	+59.5	124.2	21
22	30 24.9	+58.2	120.8	29 53.9	+58.5	121.3	29 22.5	+58.7	121.8	28 50.7	+58.9	122.3	28 18.4	+59.1	122.7	27 45.8	+59.2	123.2	27 12.7	+59.4	123.6	26 39.3	+59.5	124.1	22
23	31 23.1	+58.2	120.6	30 52.4	+58.4	121.1	30 21.2	+58.7	121.6	29 49.6	+58.9	122.1	29 17.5	+59.1	122.5	28 45.0	+59.2	123.0	28 12.1	+59.4	123.5	27 38.8	+59.6	123.9	23
24	32 21.3	+58.2	120.3	31 50.8	+58.5	120.8	31 19.9	+58.6	121.3	30 48.4	+58.9	121.8	30 16.6	+59.0	122.3	29 44.2	+59.3	122.8	29 11.5	+59.4	123.3	28 38.4	+59.5	123.8	24
25	33 19.5	+58.1	120.0	32 49.3	+58.3	120.5	32 18.5	+58.6	121.1	31 47.3	+58.8	121.6	31 15.6	+59.0	122.1	30 43.5	+59.2	122.6	30 10.9	+59.3	123.1	29 37.9	+59.5	123.6	25
26	34 17.6	+58.1	119.7	33 47.6	+58.4	120.3	33 17.1	+58.6	120.8	32 46.1	+58.8	121.4	32 14.6	+59.1	121.9	31 42.7	+59.2	122.5	31 10.2	+59.4	123.0	30 37.4	+59.5	123.5	26
27	35 15.7	+58.0	119.4	34 46.0	+58.3	120.0	34 15.7	+58.6	120.6	33 44.9	+58.8	121.2	33 13.7	+58.9	121.7	32 41.9	+59.1	122.3	32 09.6	+59.3	122.8	31 36.9	+59.4	123.3	27
28	36 13.7	+58.0	119.1	35 44.3	+58.2	119.7	35 14.3	+58.5	120.3	34 43.7	+58.8	120.9	34 12.6	+59.0	121.5	33 41.0	+59.2	122.1	33 08.9	+59.4	122.6	32 36.3	+59.5	123.2	28
29	37 11.7	+57.9	118.7	36 42.5	+58.2	119.4	36 12.8	+58.5	120.0	35 42.5	+58.7	120.7	35 11.6	+58.9	121.3	34 40.2	+59.1	121.9	34 08.3	+59.3	122.4	33 35.8	+59.5	123.0	29
30	38 09.6	+57.8	118.4	37 40.7	+58.2	119.1	37 11.3	+58.4	119.8	36 41.2	+58.7	120.4	36 10.5	+58.9	121.0	35 39.3	+59.1	121.7	35 07.6	+59.2	122.3	34 35.3	+59.4	122.8	30
31	39 07.4	+57.8	118.1	38 38.9	+58.1	118.8	38 09.7	+58.4	119.5	37 39.9	+58.6	120.1	37 09.4	+58.9	120.8	36 38.4	+59.1	121.4	36 06.8	+59.3	122.1	35 34.7	+59.4	122.7	31
32	40 05.2	+57.8	117.7	39 37.0	+58.1	118.5	39 08.1	+58.3	119.2	38 38.5	+58.6	119.9	38 08.3	+58.9	120.6	37 37.5	+59.1	121.2	37 06.1	+59.3	121.9	36 34.1	+59.5	122.5	32
33	41 03.0	+57.6	117.4	40 35.1	+57.9	118.1	40 06.4	+58.3	118.9	39 37.1	+58.6	119.6	39 07.2	+58.8	120.3	38 36.6	+59.0	121.0	38 05.4	+59.2	121.7	37 33.6	+59.4	122.3	33
34	42 00.6	+57.6	117.0	41 33.0	+58.0	117.8	41 04.7	+58.3	118.6	40 35.7	+58.5	119.3	40 06.0	+58.8	120.1	39 35.6	+59.0	120.8	39 04.6	+59.2	121.5	38 33.0	+59.3	122.2	34
35	42 58.2	+57.6	116.6	42 31.0	+57.9	117.4	42 03.0	+58.2	118.2	41 34.2	+58.5	119.0	41 04.8	+58.7	119.8	40 34.6	+59.0	120.5	40 03.8	+59.2	121.3	39 32.3	+59.4	122.0	35
36	43 55.8	+57.4	116.2	43 28.9	+57.7	117.1	43 01.2	+58.1	117.9	42 32.7	+58.4	118.7	42 03.5	+58.7	119.5	41 33.6	+58.9	120.3	41 03.0	+59.1	121.0	40 31.7	+59.4	121.8	36
37	44 53.2	+57.3	115.8	44 26.6	+57.8	116.7	43 59.3	+58.1	117.6	43 31.1	+58.4	118.4	43 02.2	+58.7	119.2	42 32.5	+58.9	120.0	42 02.1	+59.2	120.8	41 31.1	+59.3	121.6	37
38	45 50.5	+57.3	115.4	45 24.4	+57.6	116.3	44 57.4	+58.0	117.2	44 29.5	+58.3	118.1	44 00.9	+58.6	118.9	43 31.4	+58.9	119.8	43 01.3	+59.1	120.6	42 30.4	+59.3	121.4	38
39	46 47.8	+57.1	115.0	46 22.0	+57.6	115.9	45 55.4	+57.9	116.8	45 27.8	+58.3	117.8	44 59.5	+58.5	118.6	44 30.3	+58.8	119.5	44 00.4	+59.0	120.4	43 29.7	+59.3	121.2	39
40	47 44.9	+57.1	114.5	47 19.6	+57.4	115.5	46 53.3	+57.8	116.5	46 26.1	+58.2	117.4	45 58.0	+58.6	118.3	45 29.1	+58.8	119.2	44 59.4	+59.1	120.1	44 29.0	+59.2	121.0	40
41	48 42.0	+56.9	114.0	48 17.0	+57.4	115.1	47 51.1	+57.8	116.1	47 24.3	+58.1	117.1	46 56.6	+58.4	118.0	46 27.9	+58.8	118.9	45 58.5	+59.0	119.9	45 28.2	+59.2	120.7	41
42	49 38.9	+56.8	113.6	49 14.4	+57.3	114.6	48 48.9	+57.7	115.7	48 22.4	+58.1	116.7	47 55.0	+58.4	117.7	47 26.7	+58.7	118.6	46 57.5	+59.0	119.6	46 27.4	+59.2	120.5	42
43	50 35.7	+56.7	113.1	50 11.7	+57.1	114.2	49 46.6	+57.6	115.2	49 20.5	+58.0	116.3	48 53.4	+58.3	117.3	48 25.4	+58.6	118.3	47 56.5	+58.9	119.3	47 26.6	+59.2	120.3	43
44	51 32.4	+56.5	112.5	51 08.8	+57.0	113.7	50 44.2	+57.4	114.8	50 18.5	+57.9	115.9	49 51.7	+58.3	117.0	49 24.0	+58.6	118.0	48 55.4	+58.9	119.0	48 25.8	+59.1	120.0	44
45	52 28.9	+56.3	112.0	52 05.8	+56.9	113.2	51 41.6	+57.4	114.4	51 16.4	+57.8	115.5	50 50.0	+58.2	116.6	50 22.6	+58.6	117.7	49 54.3	+58.8	118.7	49 24.9	+59.1	119.8	45
46	53 25.2	+56.2	111.4	53 02.7	+56.8	112.7	52 39.0	+57.3	113.9	52 14.2	+57.7	115.1	51 48.2	+58.1	116.2	51 21.2	+58.4	117.3	50 53.1	+58.8	118.4	50 24.0	+59.1	119.5	46
47	54 21.4	+56.0	110.8	53 59.5	+56.5	112.1	53 36.3	+57.1	113.4	53 11.9	+57.6	114.6	52 46.3	+58.0	115.8	52 19.6	+58.4	117.0	51 51.9	+58.7	118.1	51 23.1	+59.0	119.2	47
48	55 17.4	+55.8	110.2	54 56.0	+56.5	111.5	54 33.4	+56.9	112.9	54 09.5	+57.4	114.1	53 44.3	+58.0	115.4	53 18.0	+58.4	116.6	52 50.6	+58.7	117.8	52 22.1	+59.0	118.9	48
49	56 13.2	+55.6	109.5	55 52.5	+56.2	110.9	55 30.3	+56.9	112.3	55 06.9	+57.4	113.6	54 42.3	+57.8	114.9	54 16.4	+58.2	116.2	53 49.3	+58.6	117.4	53 21.1	+58.9	118.6	49
50	57 08.8	+55.4	108.9	56 48.7	+56.0	110.3	56 27.2	+56.6	111.7	56 04.3	+57.2	113.1	55 40.1	+57.7	114.5	55 14.6	+58.2	115.8	54 47.9	+58.5	117.1	54 20.0	+58.9	118.3	50
51	58 04.2	+55.1	108.1	57 44.7	+55.8	109.7	57 23.8	+56.5	111.1	57 01.5	+57.1	112.6	56 37.8	+57.6	114.0	56 12.8	+58.0	115.3	55 46.4	+58.5	116.7	55 18.9	+58.8	118.0	51
52	58 59.3	+54.8	107.4	58 40.5	+55.6	109.0	58 20.3	+56.3	110.5	57 58.6	+56.9	112.0	57 35.4	+57.4	113.5	57 10.8	+58.0	114.9	56 44.9	+58.4	116.3	56 17.7	+58.8	117.6	52
53	59 54.1	+54.5	106.6	59 36.1	+55.3	108.2	59 16.6	+56.0	109.8	58 55.5	+56.7	111.4	58 32.8	+57.3	112.9	58 08.8	+57.8	114.4	57 43.3	+58.3	115.8	57 16.5	+58.6	117.2	53
54	60 48.6	+54.2	105.7	60 31.4	+55.1	107.4	60 12.6	+55.8	109.1	59 52.2	+56.5	110.7	59 30.1	+57.2	112.3	59 06.6	+57.7	113.9	58 41.6	+58.2	115.4	58 15.1	+58.7	116.9	54
55	61 42.8	+53.8	104.8	61 26.5	+54.7	106.6	61 08.4	+55.6	108.4	60 48.7	+56.3	110.1	60 27.3	+57.0	111.7	60 04.3	+57.6	113.3	59 39.8	+58.0	114.9	59 13.8	+58.5	116.4	55
56	62 36.6	+53.3	103.9	62 21.2	+54.4	105.8	62 04.0	+55.3	107.6	61 45.0	+56.1	109.3	61 24.3	+56.7	111.1	61 01.9	+57.4	112.8	60 37.8	+58.0	114.4	60 12.3	+58.4	116.0	56
57	63 29.9	+53.0	102.9	63 15.6	+54.0	104.8	62 59.3	+54.9	106.7	62 41.1	+55.8	108.6	62 21.0	+56.6	110.4	61 59.3	+57.2	112.2	61 35.8	+57.8	113.9	61 10.7	+58.3	115.5	57
58	64 22.9	+52.4	101.8	64 09.6	+53.5	103.8	63 54.2	+54.6	105.8	63 36.9	+55.5	107.8	63 17.6	+56.3	109.7	62 56.5	+57.0	111.5	62 33.6	+57.7	113.3	62 09.0	+58.3	115.0	58
59	65 15.3	+51.9	100.7	65 03.1	+53.1	102.8	64 48.8	+54.2	104.9	64 32.4	+55.1	106.9	64 13.9	+56.1	108.9	63 53.5	+56.9	110.8	63 31.3	+57.5	112.7	63 07.3	+58.1	114.5	59
60	66 07.2	+51.3	99.5	65 56.2	+52.6	101.7	65 43.0	+53.7	103.8	65 27.5	+54.8	106.0	65 10.0	+55.7	108.1	64 50.4	+56.6	110.1	64 28.8	+57.3	112.0	64 05.4	+57.9	114.0	60
61	66 58.5	+50.6	98.2	66 48.8	+52.0	100.5	66 36.7	+53.3	102.7	66 22.3	+54.4	105.0	66 05.7	+55.5	107.2	65 47.0	+56.3	109.3	65 26.1	+57.1	111.4	65 03.3	+57.8	113.4	61
62	67 49.1	+49.8	96.8	67 40.8	+51.3	99.2	67 30.0	+52.6	101.6	67 16.7	+54.0	103.9	67 01.2	+55.0	106.2	66 43.3	+56.0	108.4	66 23.2	+56.9	110.6	66 01.1	+57.6	112.7	62
63	68 38.9	+48.9	95.2	68 32.1	+50.5	97.8	68 22.6	+52.1	100.3	68 10.7	+53.4	102.7	67 56.2	+54.6	105.2	67 39.3	+55.7	107.5	67 20.1	+56.7	109.8	66 58.7	+57.4	112.0	63
64	69 27.8	+48.0	93.6	69 22.6	+49.8	96.3	69 14.7	+51.3	98.9	69 04.1	+52.8	101.5	68 50.8	+54.2	104.0	68 35.0	+55.3	106.5	68 16.8	+56.3	108.9	67 56.1	+57.2	111.3	64
65	70 15.8	+46.9	91.9	70 12.4	+48.7	94.7	70 06.0	+50.6	97.4	69 56.9	+52.1	100.1	69 45.0	+53.5	102.8	69 30.3	+54.9	105.4	69 13.1	+56.0	108.0	68 53.3	+57.0	110.4	65
66	71 02.7	+45.6	90.0	71 01.1	+47.8	92.9	70 56.6	+49.6	95.8	70 49.0	+51.4	98.7	70 38.5	+53.0	101.5	70 25.2	+54.3	104.2	70 09.1	+55.5	106.9	69 50.3	+56.6	109.5	66
67	71 48.3	+44.3	88.0	71 48.9	+46.4	91.0	71 46.2	+48.6	94.0	71 40.4	+50.5	97.1	71 31.5	+52.2	100.0	71 19.5	+53.8	102.9	71 04.6	+55.2	105.8	70 46.9	+56.3	108.6	67
68	72 32.6	+42.6	85.8	72 35.3	+45.1	88.9	72 34.8	+47.3	92.1	72 30.9	+49.5	95.3	72 23.7	+51.4	98.4	72 13.3	+53.1	101.5	71 59.8	+54.6	104.5	71 43.2	+55.9	107.5	68
69	73 15.2	+40.9	83.4	73 20.4	+43.5	86.7	73 22.1	+46.0	90.0	73 20.4	+48.3	93.4	73 15.1	+50.4	96.7	73 06.4	+52.3	100.0	72 54.4	+54.0	103.2	72 39.1	+55.4	106.3	69
70	73 56.1	+38.8•	80.8	74 03.9	+41.7	84.2	74 08.1	+44.4	87.7	74 08.7	+46.9	91.3	74 05.5	+49.3	94.8	73 58.7	+51.4	98.2	73 48.4	+53.2	101.6	73 34.5	+54.9	105.0	70
71	74 34.9	+36.6•	78.0	74 45.6	+39.6•	81.5	74 52.5	+42.6•	85.2	74 55.6	+45.3	88.9	74 54.8	+47.9	92.6	74 50.1	+50.3	96.3	74 41.6	+52.4	99.9	74 29.4	+54.2	103.5	71
72	75 11.5	+33.9•	74.9	75 25.2	+37.2•	78.6	75 35.1	+40.4•	82.4	75 40.9	+43.5•	86.3	75 42.7	+46.4	90.3	75 40.4	+49.0	94.2	75 34.0	+51.4	98.0	75 23.6	+53.5	101.9	72
73	75 45.4	+31.0•	71.6	76 02.4	+34.5•	75.4	76 15.5	+38.0•	79.4	76 24.4	+41.3•	83.5	76 29.1	+44.5•	87.6	76 29.4	+47.5	91.8	76 25.4	+50.1	95.9	76 17.1	+52.5	100.0	73
74	76 16.4	+27.8•	68.1	76 36.9	+31.5•	72.0	76 53.5	+35.1•	76.1	77 05.7	+38.8•	80.3	77 13.6	+42.3•	84.7	77 16.9	+45.6•	89.1	77 15.5	+48.7	93.5	77 09.6	+51.3	97.9	74
75	76 44.2	+24.2•	64.3	77 08.4	+28.0•	68.2	77 28.6	+31.9•	72.4	77 44.5	+35.9•	76.8	77 55.9	+39.7•	81.4	78 02.5	+43.4•	86.0	78 04.2	+46.8•	90.8	78 00.9	+49.9	95.5	75
76	77 08.4	+20.2•	60.2	77 36.4	+24.1•	64.2	78 00.5	+28.2•	68.4	78 20.4	+32.4•	72.9	78 35.6	+36.6•	77.7	78 45.9	+40.7•	82.6	78 51.0	+44.6•	87.6	78 50.8	+48.2	92.7	76
77	77 28.6	+15.9•	55.9	78 00.5	+19.9•	59.8	78 28.7	+24.1•	64.1	78 52.8	+28.4•	68.7	79 12.2	+33.0•	73.6	79 26.6	+37.5•	78.7	79 35.6	+41.9•	84.1	79 39.0	+46.0•	89.5	77
78	77 44.5	+11.4•	51.5	78 20.4	+15.2•	55.2	78 52.8	+19.4•	59.4	79 21.2	+24.0•	64.0	79 45.2	+28.7•	69.0	80 04.1	+33.6•	74.3	80 17.5	+38.5•	79.9	80 25.0	+43.1•	85.8	78
79	77 55.9	+6.6•	46.8	78 35.6	+10.3•	50.4	79 12.2	+14.4•	54.4	79 45.2	+18.9•	58.9	80 13.9	+23.8•	63.9	80 37.7	+29.0•	69.4	80 56.0	+34.4•	75.2	81 08.1	+39.7•	81.5	79
80	78 02.5	+1.7•	42.0	78 45.9	+5.1•	45.4	79 26.6	+9.0•	49.2	80 04.1	+13.4•	53.5	80 37.7	+18.3•	58.4	81 06.7	+23.7•	63.8	81 30.4	+29.3•	69.9	81 47.8	+35.2•	76.4	80
81	78 04.2	−3.3•	37.2	78 51.0	−0.2•	40.2	79 35.6	+3.4•	43.8	80 17.5	+7.5•	47.8	80 56.0	+12.1•	52.4	81 30.4	+17.4•	57.8	81 59.7	+23.3•	63.8	82 23.0	+29.8•	70.5	81
82	78 00.9	−8.1•	32.4	78 50.8	−5.4•	35.1	79 39.0	−2.3•	38.2	80 25.0	+1.3•	41.9	81 08.1	+5.6•	46.2	81 47.8	+10.6•	51.2	82 23.0	+16.4•	57.0	82 52.8	+23.0•	63.7	82
83	77 52.8	−12.9•	27.6	78 45.4	−10.7•	29.9	79 36.7	−8.0•	32.7	80 26.3	−4.9•	35.9	81 13.7	−1.1•	39.7	81 58.4	+3.3•	44.2	82 39.4	+8.7•	49.6	83 15.8	+15.0•	56.1	83
84	77 39.9	−17.3•	23.0	78 34.7	−15.5•	24.9	79 28.7	−13.5•	27.2	80 21.4	−11.0•	29.9	81 12.6	−7.9•	33.1	82 01.7	−4.2•	37.0	82 48.1	+0.5•	41.8	83 30.8	+6.2•	47.6	84
85	77 22.6	−21.6•	18.6	78 19.2	−20.2•	20.1	79 15.2	−18.6•	21.9	80 10.4	−16.6•	24.1	81 04.7	−14.3•	26.7	81 57.5	−11.4•	29.8	82 48.6	−7.8•	33.8	83 37.0	−3.1•	38.8	85
86	77 01.0	−25.3•	14.4	77 59.0	−24.4•	15.5	78 56.6	−23.2•	16.9	79 53.8	−21.9•	18.5	80 50.4	−20.3•	20.5	81 46.1	−18.2•	22.9	82 40.8	−15.6•	25.9	83 33.9	−12.2•	29.8	86
87	76 35.7	−28.9•	10.4	77 34.6	−28.2•	11.2	78 33.4	−27.5•	12.2	79 31.9	−26.6•	13.3	80 30.1	−25.5•	14.7	81 27.9	−24.2•	16.4	82 25.2	−22.6•	18.5	83 21.7	−20.5•	21.2	87
88	76 06.8	−32.0•	6.7	77 06.4	−31.7•	7.2	78 05.9	−31.3•	7.8	79 05.3	−30.8•	8.5	80 04.6	−30.3•	9.3	81 03.7	−29.6•	10.3	82 02.6	−28.7•	11.6	83 01.2	−27.7•	13.3	88
89	75 34.8	−34.8•	3.2	76 34.7	−34.7•	3.4	77 34.6	−34.6•	3.7	78 34.5	−34.5•	4.0	79 34.3	−34.3•	4.4	80 34.1	−34.1•	4.9	81 33.9	−33.9•	5.5	82 33.5	−33.5•	6.2	89
90	75 00.0	−37.3•	0.0	76 00.0	−37.4•	0.0	77 00.0	−37.5•	0.0	78 00.0	−37.6•	0.0	79 00.0	−37.7•	0.0	80 00.0	−37.9•	0.0	81 00.0	−38.1•	0.0	82 00.0	−38.3•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 53°, 307°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 57.7	− 58.7	126.1	8 22.3	− 58.9	126.2	7 46.8	− 59.0	126.3	7 11.3	− 59.2	126.4	6 35.6	− 59.3	126.5	5 59.9	− 59.4	126.6	5 24.1	− 59.5	126.7	4 48.3	− 59.7	126.7	**0**
1	7 59.0	− 58.7	126.3	7 23.4	− 58.8	126.4	6 47.8	− 59.0	126.5	6 12.1	− 59.1	126.6	5 36.3	− 59.2	126.6	5 00.5	− 59.4	126.7	4 24.6	− 59.5	126.8	3 48.6	− 59.6	126.8	**1**
2	7 00.3	− 58.7	126.5	6 24.6	− 58.9	126.6	5 48.8	− 59.0	126.7	5 13.0	− 59.2	126.7	4 37.1	− 59.3	126.8	4 01.1	− 59.4	126.9	3 25.1	− 59.6	126.9	2 49.0	− 59.6	127.0	**2**
3	6 01.6	− 58.7	126.7	5 25.7	− 58.8	126.8	4 49.8	− 59.0	126.8	4 13.8	− 59.2	126.9	3 37.8	− 59.3	127.0	3 01.7	− 59.5	127.0	2 25.5	− 59.5	127.0	1 49.4	− 59.6	127.1	**3**
4	5 02.9	− 58.7	126.9	4 26.9	− 58.9	127.0	3 50.8	− 59.0	127.0	3 14.6	− 59.1	127.1	2 38.5	− 59.3	127.1	2 02.2	− 59.4	127.1	1 26.0	− 59.5	127.2	0 49.8	− 59.7	127.2	**4**
5	4 04.2	− 58.7	127.1	3 28.0	− 58.9	127.2	2 51.8	− 59.1	127.2	2 15.5	− 59.2	127.2	1 39.2	− 59.3	127.3	1 02.8	− 59.4	127.3	0 26.5	− 59.5	127.3	0 09.9	+ 59.6	52.7	**5**
6	3 05.5	− 58.7	127.3	2 29.1	− 58.8	127.3	1 52.7	− 59.0	127.4	1 16.3	− 59.2	127.4	0 39.9	− 59.3	127.4	0 03.4	− 59.4	127.4	0 33.0	+ 59.6	52.6	1 09.5	+ 59.6	52.6	**6**
7	2 06.8	− 58.7	127.5	1 30.3	− 58.9	127.5	0 53.7	− 59.0	127.6	0 17.1	− 59.1	127.6	0 19.4	+ 59.3	52.4	0 56.0	+ 59.4	52.4	1 32.6	+ 59.5	52.5	2 09.1	+ 59.6	52.5	**7**
8	1 08.1	− 58.7	127.7	0 31.4	− 58.9	127.7	0 05.3	+ 59.0	52.3	0 42.0	+ 59.2	52.3	1 18.7	+ 59.3	52.3	1 55.4	+ 59.5	52.3	2 32.1	+ 59.5	52.3	3 08.7	+ 59.7	52.4	**8**
9	0 09.4	− 58.7	127.9	0 27.5	+ 58.8	52.1	1 04.3	+ 59.1	52.1	1 41.2	+ 59.2	52.1	2 18.0	+ 59.3	52.1	2 54.9	+ 59.4	52.2	3 31.6	+ 59.6	52.2	4 08.4	+ 59.6	52.3	**9**
10	0 49.3	+ 58.7	51.9	1 26.3	+ 58.9	51.9	2 03.4	+ 59.0	51.9	2 40.4	+ 59.1	51.9	3 17.3	+ 59.3	52.0	3 54.3	+ 59.4	52.0	4 31.2	+ 59.5	52.1	5 08.0	+ 59.6	52.2	**10**
11	1 48.0	+ 58.7	51.7	2 25.2	+ 58.9	51.7	3 02.4	+ 59.0	51.7	3 39.5	+ 59.2	51.8	4 16.6	+ 59.3	51.8	4 53.7	+ 59.4	51.9	5 30.7	+ 59.5	52.0	6 07.6	+ 59.6	52.0	**11**
12	2 46.7	+ 58.7	51.5	3 24.1	+ 58.8	51.5	4 01.4	+ 59.0	51.5	4 38.7	+ 59.1	51.6	5 15.9	+ 59.3	51.7	5 53.1	+ 59.4	51.8	6 30.2	+ 59.5	51.8	7 07.2	+ 59.7	51.9	**12**
13	3 45.4	+ 58.7	51.2	4 22.9	+ 58.9	51.3	5 00.4	+ 59.0	51.4	5 37.8	+ 59.2	51.4	6 15.2	+ 59.3	51.5	6 52.5	+ 59.4	51.6	7 29.7	+ 59.6	51.7	8 06.9	+ 59.6	51.8	**13**
14	4 44.1	+ 58.7	51.0	5 21.8	+ 58.8	51.1	5 59.4	+ 59.0	51.2	6 37.0	+ 59.2	51.3	7 14.5	+ 59.3	51.4	7 51.9	+ 59.4	51.5	8 29.3	+ 59.5	51.6	9 06.5	+ 59.6	51.7	**14**
15	5 42.8	+ 58.7	50.8	6 20.6	+ 58.9	50.9	6 58.4	+ 59.0	51.0	7 36.2	+ 59.1	51.1	8 13.8	+ 59.3	51.2	8 51.3	+ 59.4	51.3	9 28.8	+ 59.5	51.5	10 06.1	+ 59.6	51.6	**15**
16	6 41.5	+ 58.7	50.6	7 19.5	+ 58.8	50.7	7 57.4	+ 59.1	50.8	8 35.3	+ 59.2	50.9	9 13.1	+ 59.3	51.1	9 50.7	+ 59.4	51.2	10 28.3	+ 59.5	51.3	11 05.7	+ 59.6	51.5	**16**
17	7 40.2	+ 58.6	50.4	8 18.3	+ 58.9	50.5	8 56.5	+ 58.9	50.6	9 34.5	+ 59.1	50.8	10 12.4	+ 59.2	50.9	10 50.1	+ 59.4	51.0	11 27.8	+ 59.5	51.2	12 05.3	+ 59.6	51.4	**17**
18	8 38.8	+ 58.7	50.2	9 17.2	+ 58.8	50.3	9 55.4	+ 59.0	50.5	10 33.6	+ 59.1	50.6	11 11.6	+ 59.3	50.7	11 49.5	+ 59.4	50.9	12 27.3	+ 59.5	51.1	13 04.9	+ 59.7	51.2	**18**
19	9 37.5	+ 58.7	50.0	10 16.0	+ 58.9	50.1	10 54.4	+ 59.0	50.3	11 32.7	+ 59.2	50.4	12 10.9	+ 59.3	50.6	12 48.9	+ 59.4	50.8	13 26.8	+ 59.5	50.9	14 04.6	+ 59.6	51.1	**19**
20	10 36.2	+ 58.6	49.8	11 14.9	+ 58.8	49.9	11 53.4	+ 59.0	50.1	12 31.9	+ 59.1	50.2	13 10.2	+ 59.2	50.4	13 48.3	+ 59.4	50.6	14 26.3	+ 59.5	50.8	15 04.2	+ 59.6	51.0	**20**
21	11 34.8	+ 58.7	49.6	12 13.7	+ 58.8	49.7	12 52.4	+ 59.0	49.9	13 31.0	+ 59.1	50.1	14 09.4	+ 59.3	50.3	14 47.7	+ 59.4	50.5	15 25.8	+ 59.5	50.7	16 03.8	+ 59.5	50.9	**21**
22	12 33.5	+ 58.6	49.3	13 12.5	+ 58.8	49.5	13 51.4	+ 58.9	49.7	14 30.1	+ 59.1	49.9	15 08.7	+ 59.2	50.1	15 47.1	+ 59.3	50.3	16 25.3	+ 59.5	50.5	17 03.3	+ 59.6	50.8	**22**
23	13 32.1	+ 58.6	49.1	14 11.3	+ 58.8	49.3	14 50.3	+ 59.0	49.5	15 29.2	+ 59.1	49.7	16 07.9	+ 59.2	49.9	16 46.4	+ 59.4	50.2	17 24.8	+ 59.5	50.4	18 02.9	+ 59.6	50.6	**23**
24	14 30.7	+ 58.6	48.9	15 10.1	+ 58.8	49.1	15 49.3	+ 58.9	49.3	16 28.3	+ 59.1	49.5	17 07.1	+ 59.3	49.8	17 45.8	+ 59.4	50.0	18 24.3	+ 59.4	50.3	19 02.5	+ 59.6	50.5	**24**
25	15 29.3	+ 58.6	48.7	16 08.9	+ 58.7	48.9	16 48.2	+ 58.9	49.1	17 27.4	+ 59.1	49.4	18 06.4	+ 59.2	49.6	18 45.2	+ 59.3	49.9	19 23.7	+ 59.5	50.1	20 02.1	+ 59.6	50.4	**25**
26	16 27.9	+ 58.6	48.5	17 07.6	+ 58.8	48.7	17 47.1	+ 59.0	48.9	18 26.5	+ 59.0	49.2	19 05.6	+ 59.2	49.4	19 44.5	+ 59.4	49.7	20 23.2	+ 59.5	50.0	21 01.7	+ 59.6	50.3	**26**
27	17 26.5	+ 58.6	48.2	18 06.4	+ 58.7	48.5	18 46.1	+ 58.9	48.7	19 25.5	+ 59.1	49.0	20 04.8	+ 59.2	49.3	20 43.9	+ 59.3	49.5	21 22.7	+ 59.4	49.8	22 01.3	+ 59.5	50.1	**27**
28	18 25.1	+ 58.5	48.0	19 05.1	+ 58.7	48.3	19 45.0	+ 58.9	48.5	20 24.6	+ 59.0	48.8	21 04.0	+ 59.2	49.1	21 43.2	+ 59.3	49.4	22 22.1	+ 59.5	49.7	23 00.8	+ 59.6	50.0	**28**
29	19 23.6	+ 58.6	47.8	20 03.8	+ 58.8	48.0	20 43.9	+ 58.8	48.3	21 23.6	+ 59.1	48.6	22 03.2	+ 59.2	48.9	22 42.5	+ 59.3	49.2	23 21.6	+ 59.4	49.5	24 00.4	+ 59.5	49.9	**29**
30	20 22.2	+ 58.5	47.5	21 02.6	+ 58.6	47.8	21 42.7	+ 58.9	48.1	22 22.7	+ 59.0	48.4	23 02.4	+ 59.1	48.7	23 41.8	+ 59.3	49.1	24 21.0	+ 59.4	49.4	24 59.9	+ 59.6	49.7	**30**
31	21 20.7	+ 58.5	47.3	22 01.2	+ 58.7	47.6	22 41.6	+ 58.8	47.9	23 21.7	+ 59.0	48.2	24 01.5	+ 59.2	48.5	24 41.1	+ 59.3	48.9	25 20.4	+ 59.5	49.2	25 59.5	+ 59.5	49.6	**31**
32	22 19.2	+ 58.4	47.1	22 59.9	+ 58.7	47.4	23 40.4	+ 58.9	47.7	24 20.7	+ 59.0	48.0	25 00.7	+ 59.1	48.4	25 40.4	+ 59.3	48.7	26 19.9	+ 59.4	49.1	26 59.0	+ 59.5	49.5	**32**
33	23 17.6	+ 58.5	46.8	23 58.6	+ 58.6	47.1	24 39.3	+ 58.8	47.5	25 19.7	+ 58.9	47.8	25 59.8	+ 59.2	48.2	26 39.7	+ 59.3	48.5	27 19.3	+ 59.4	48.9	27 58.5	+ 59.6	49.3	**33**
34	24 16.1	+ 58.4	46.6	24 57.2	+ 58.6	46.9	25 38.1	+ 58.7	47.3	26 18.6	+ 59.0	47.6	26 59.0	+ 59.1	48.0	27 39.0	+ 59.2	48.4	28 18.7	+ 59.4	48.8	28 58.1	+ 59.5	49.2	**34**
35	25 14.5	+ 58.4	46.3	25 55.8	+ 58.6	46.7	26 36.8	+ 58.8	47.0	27 17.6	+ 58.9	47.4	27 58.1	+ 59.1	47.8	28 38.2	+ 59.3	48.2	29 18.1	+ 59.3	48.6	29 57.6	+ 59.5	49.0	**35**
36	26 12.9	+ 58.4	46.1	26 54.4	+ 58.6	46.4	27 35.6	+ 58.8	46.8	28 16.5	+ 58.9	47.2	28 57.2	+ 59.0	47.6	29 37.5	+ 59.2	48.0	30 17.4	+ 59.4	48.4	30 57.1	+ 59.4	48.9	**36**
37	27 11.3	+ 58.3	45.8	27 53.0	+ 58.5	46.2	28 34.4	+ 58.7	46.6	29 15.4	+ 58.9	47.0	29 56.2	+ 59.1	47.4	30 36.7	+ 59.2	47.8	31 16.8	+ 59.3	48.3	31 56.5	+ 59.5	48.7	**37**
38	28 09.6	+ 58.3	45.5	28 51.5	+ 58.5	45.9	29 33.1	+ 58.7	46.3	30 14.3	+ 58.9	46.8	30 55.3	+ 59.0	47.2	31 35.9	+ 59.2	47.6	32 16.1	+ 59.4	48.1	32 56.0	+ 59.5	48.6	**38**
39	29 07.9	+ 58.3	45.3	29 50.0	+ 58.5	45.7	30 31.8	+ 58.6	46.1	31 13.2	+ 58.9	46.5	31 54.3	+ 59.0	47.0	32 35.1	+ 59.1	47.4	33 15.5	+ 59.3	47.9	33 55.5	+ 59.4	48.4	**39**
40	30 06.2	+ 58.3	45.0	30 48.5	+ 58.4	45.4	31 30.4	+ 58.7	45.9	32 12.1	+ 58.8	46.3	32 53.3	+ 59.0	46.8	33 34.2	+ 59.2	47.2	34 14.8	+ 59.3	47.7	34 54.9	+ 59.5	48.3	**40**
41	31 04.5	+ 58.2	44.7	31 46.9	+ 58.4	45.2	32 29.1	+ 58.6	45.6	33 10.9	+ 58.8	46.1	33 52.3	+ 59.0	46.5	34 33.4	+ 59.1	47.0	35 14.1	+ 59.3	47.6	35 54.4	+ 59.4	48.1	**41**
42	32 02.7	+ 58.1	44.4	32 45.3	+ 58.4	44.9	33 27.7	+ 58.6	45.4	34 09.7	+ 58.7	45.8	34 51.3	+ 58.9	46.3	35 32.5	+ 59.1	46.8	36 13.4	+ 59.2	47.4	36 53.8	+ 59.4	47.9	**42**
43	33 00.8	+ 58.2	44.2	33 43.7	+ 58.4	44.6	34 26.3	+ 58.5	45.1	35 08.4	+ 58.8	45.6	35 50.2	+ 59.0	46.1	36 31.6	+ 59.1	46.6	37 12.6	+ 59.3	47.2	37 53.2	+ 59.4	47.7	**43**
44	33 59.0	+ 58.0	43.9	34 42.1	+ 58.3	44.3	35 24.8	+ 58.5	44.8	36 07.2	+ 58.7	45.3	36 49.2	+ 58.8	45.9	37 30.7	+ 59.1	46.4	38 11.9	+ 59.2	47.0	38 52.6	+ 59.4	47.6	**44**
45	34 57.0	+ 58.1	43.5	35 40.4	+ 58.2	44.0	36 23.3	+ 58.5	44.5	37 05.9	+ 58.6	45.1	37 48.0	+ 58.9	45.6	38 29.8	+ 59.0	46.2	39 11.1	+ 59.2	46.8	39 52.0	+ 59.3	47.4	**45**
46	35 55.1	+ 58.0	43.2	36 38.6	+ 58.2	43.7	37 21.8	+ 58.4	44.3	38 04.5	+ 58.7	44.8	38 46.9	+ 58.8	45.4	39 28.8	+ 59.0	46.0	40 10.3	+ 59.2	46.6	40 51.3	+ 59.4	47.2	**46**
47	36 53.1	+ 57.9	42.9	37 36.8	+ 58.2	43.4	38 20.2	+ 58.4	44.0	39 03.2	+ 58.6	44.5	39 45.7	+ 58.8	45.1	40 27.8	+ 59.0	45.7	41 09.5	+ 59.2	46.3	41 50.7	+ 59.3	47.0	**47**
48	37 51.0	+ 57.9	42.6	38 35.0	+ 58.1	43.1	39 18.6	+ 58.3	43.7	40 01.8	+ 58.5	44.3	40 44.5	+ 58.8	44.9	41 26.8	+ 59.0	45.5	42 08.7	+ 59.1	46.1	42 50.0	+ 59.3	46.8	**48**
49	38 48.9	+ 57.8	42.3	39 33.1	+ 58.1	42.8	40 16.9	+ 58.3	43.4	41 00.3	+ 58.5	44.0	41 43.3	+ 58.7	44.6	42 25.8	+ 58.9	45.2	43 07.8	+ 59.1	45.9	43 49.3	+ 59.3	46.6	**49**
50	39 46.7	+ 57.8	41.9	40 31.2	+ 58.0	42.5	41 15.2	+ 58.2	43.1	41 58.8	+ 58.5	43.7	42 42.0	+ 58.7	44.3	43 24.7	+ 58.9	45.0	44 06.9	+ 59.1	45.6	44 48.6	+ 59.2	46.4	**50**
51	40 44.5	+ 57.7	41.6	41 29.2	+ 57.9	42.1	42 13.4	+ 58.2	42.7	42 57.3	+ 58.4	43.4	43 40.7	+ 58.6	44.0	44 23.6	+ 58.8	44.7	45 06.0	+ 59.0	45.4	45 47.8	+ 59.2	46.1	**51**
52	41 42.2	+ 57.6	41.2	42 27.1	+ 57.9	41.8	43 11.6	+ 58.1	42.4	43 55.7	+ 58.3	43.1	44 39.3	+ 58.6	43.7	45 22.4	+ 58.8	44.4	46 05.0	+ 59.0	45.1	46 47.0	+ 59.2	45.9	**52**
53	42 39.8	+ 57.5	40.8	43 25.0	+ 57.8	41.4	44 09.7	+ 58.1	42.1	44 54.0	+ 58.3	42.7	45 37.9	+ 58.5	43.4	46 21.2	+ 58.8	44.1	47 04.0	+ 59.0	44.9	47 46.2	+ 59.2	45.7	**53**
54	43 37.3	+ 57.5	40.4	44 22.8	+ 57.7	41.1	45 07.8	+ 58.0	41.7	45 52.3	+ 58.3	42.4	46 36.4	+ 58.5	43.1	47 20.0	+ 58.7	43.8	48 03.0	+ 58.9	44.6	48 45.4	+ 59.1	45.4	**54**
55	44 34.8	+ 57.3	40.0	45 20.5	+ 57.7	40.7	46 05.8	+ 57.9	41.3	46 50.6	+ 58.2	42.0	47 34.9	+ 58.4	42.8	48 18.7	+ 58.6	43.5	49 01.9	+ 58.9	44.3	49 44.5	+ 59.1	45.1	**55**
56	45 32.1	+ 57.3	39.6	46 18.2	+ 57.5	40.3	47 03.7	+ 57.8	41.0	47 48.8	+ 58.1	41.7	48 33.3	+ 58.4	42.4	49 17.3	+ 58.6	43.2	50 00.8	+ 58.8	44.0	50 43.6	+ 59.0	44.9	**56**
57	46 29.4	+ 57.2	39.2	47 15.7	+ 57.5	39.9	48 01.5	+ 57.8	40.6	48 46.9	+ 58.0	41.3	49 31.7	+ 58.3	42.1	50 15.9	+ 58.6	42.9	50 59.6	+ 58.8	43.7	51 42.6	+ 59.0	44.6	**57**
58	47 26.6	+ 57.1	38.7	48 13.2	+ 57.4	39.4	48 59.3	+ 57.6	40.2	49 44.9	+ 57.9	40.9	50 30.0	+ 58.2	41.7	51 14.5	+ 58.4	42.5	51 58.4	+ 58.7	43.4	52 41.6	+ 59.0	44.3	**58**
59	48 23.7	+ 56.9	38.3	49 10.6	+ 57.2	39.0	49 56.9	+ 57.6	39.7	50 42.8	+ 57.9	40.5	51 28.2	+ 58.1	41.3	52 12.9	+ 58.4	42.2	52 57.1	+ 58.7	43.1	53 40.6	+ 58.9	44.0	**59**
60	49 20.6	+ 56.9	37.8	50 07.8	+ 57.2	38.5	50 54.5	+ 57.5	39.3	51 40.7	+ 57.7	40.1	52 26.3	+ 58.1	40.9	53 11.3	+ 58.4	41.8	53 55.8	+ 58.6	42.7	54 39.5	+ 58.9	43.7	**60**
61	50 17.5	+ 56.7	37.3	51 05.0	+ 57.0	38.0	51 52.0	+ 57.3	38.8	52 38.4	+ 57.7	39.6	53 24.4	+ 57.9	40.5	54 09.7	+ 58.2	41.4	54 54.4	+ 58.5	42.3	55 38.4	+ 58.8	43.3	**61**
62	51 14.2	+ 56.6	36.8	52 02.0	+ 56.9	37.5	52 49.3	+ 57.2	38.3	53 36.1	+ 57.5	39.2	54 22.3	+ 57.9	40.1	55 07.9	+ 58.2	41.0	55 52.9	+ 58.4	41.9	56 37.2	+ 58.7	43.0	**62**
63	52 10.8	+ 56.4	36.2	52 58.9	+ 56.7	37.0	53 46.5	+ 57.1	37.8	54 33.6	+ 57.5	38.7	55 20.2	+ 57.7	39.6	56 06.1	+ 58.1	40.5	56 51.3	+ 58.4	41.5	57 35.9	+ 58.6	42.6	**63**
64	53 07.2	+ 56.2	35.7	53 55.6	+ 56.6	36.5	54 43.6	+ 57.0	37.3	55 31.1	+ 57.3	38.2	56 17.9	+ 57.7	39.1	57 04.2	+ 57.9	40.1	57 49.7	+ 58.3	41.1	58 34.5	+ 58.6	42.2	**64**
65	54 03.4	+ 56.1	35.1	54 52.2	+ 56.5	35.9	55 40.6	+ 56.8	36.8	56 28.4	+ 57.1	37.7	57 15.6	+ 57.5	38.6	58 02.1	+ 57.9	39.6	58 48.0	+ 58.2	40.7	59 33.1	+ 58.5	41.8	**65**
66	54 59.5	+ 55.8	34.5	55 48.7	+ 56.2	35.3	56 37.4	+ 56.6	36.2	57 25.5	+ 57.0	37.1	58 13.1	+ 57.3	38.1	59 00.0	+ 57.7	39.1	59 46.2	+ 58.0	40.2	60 31.6	+ 58.4	41.3	**66**
67	55 55.3	+ 55.7	33.8	56 44.9	+ 56.1	34.7	57 34.0	+ 56.4	35.6	58 22.5	+ 56.8	36.5	59 10.4	+ 57.2	37.5	59 57.7	+ 57.6	38.6	60 44.2	+ 58.0	39.7	61 30.0	+ 58.3	40.8	**67**
68	56 51.0	+ 55.4	33.2	57 41.0	+ 55.8	34.0	58 30.4	+ 56.3	34.9	59 19.3	+ 56.7	35.9	60 07.6	+ 57.1	36.9	60 55.3	+ 57.4	38.0	61 42.2	+ 57.8	39.1	62 28.3	+ 58.2	40.3	**68**
69	57 46.4	+ 55.2	32.5	58 36.8	+ 55.6	33.3	59 26.7	+ 56.0	34.3	60 16.0	+ 56.4	35.2	61 04.7	+ 56.8	36.3	61 52.7	+ 57.2	37.4	62 40.0	+ 57.6	38.6	63 26.5	+ 58.0	39.8	**69**
70	58 41.6	+ 54.9	31.7	59 32.4	+ 55.3	32.6	60 22.7	+ 55.8	33.5	61 12.4	+ 56.2	34.5	62 01.5	+ 56.6	35.6	62 49.9	+ 57.1	36.7	63 37.6	+ 57.5	37.9	64 24.5	+ 58.0	39.2	**70**
71	59 36.5	+ 54.6	30.9	60 27.7	+ 55.1	31.8	61 18.5	+ 55.5	32.8	62 08.6	+ 56.0	33.8	62 58.1	+ 56.5	34.9	63 47.0	+ 56.9	36.1	64 35.1	+ 57.3	37.3	65 22.5	+ 57.7	38.6	**71**
72	60 31.1	+ 54.3	30.1	61 22.8	+ 54.7	31.0	62 14.0	+ 55.2	32.0	63 04.6	+ 55.6	33.0	63 54.6	+ 56.1	34.1	64 43.9	+ 56.6	35.3	65 32.4	+ 57.1	36.6	66 20.2	+ 57.6	37.9	**72**
73	61 25.4	+ 53.9	29.2	62 17.5	+ 54.4	30.1	63 09.2	+ 54.8	31.1	64 00.2	+ 55.4	32.2	64 50.7	+ 55.9	33.3	65 40.5	+ 56.3	34.5	66 29.5	+ 56.9	35.8	67 17.8	+ 57.3	37.2	**73**
74	62 19.3	+ 53.6	28.3	63 11.9	+ 54.1	29.2	64 04.0	+ 54.6	30.2	64 55.6	+ 55.0	31.3	65 46.6	+ 55.5	32.4	66 36.8	+ 56.1	33.7	67 26.4	+ 56.6	35.0	68 15.1	+ 57.1	36.4	**74**
75	63 12.9	+ 53.1	27.3	64 06.0	+ 53.5	28.2	64 58.6	+ 54.1	29.3	65 50.6	+ 54.7	30.3	66 42.1	+ 55.2	31.5	67 32.9	+ 55.7	32.8	68 23.0	+ 56.3	34.1	69 12.2	+ 56.9	35.6	**75**
76	64 06.0	+ 52.6	26.3	64 59.5	+ 53.2	27.2	65 52.7	+ 53.6	28.2	66 45.3	+ 54.2	29.3	67 37.3	+ 54.8	30.5	68 28.6	+ 55.4	31.8	69 19.3	+ 55.9	33.2	70 09.1	+ 56.5	34.7	**76**
77	64 58.6	+ 52.0	25.1	65 52.7	+ 52.6	26.1	66 46.3	+ 53.2	27.1	67 39.5	+ 53.7	28.2	68 32.1	+ 54.3	29.4	69 24.0	+ 54.9	30.7	70 15.2	+ 55.5	32.1	71 05.6	+ 56.2	33.7	**77**
78	65 50.6	+ 51.5	23.9	66 45.3	+ 52.0	24.9	67 39.5	+ 52.6	25.9	68 33.2	+ 53.2	27.0	69 26.4	+ 53.7	28.2	70 18.9	+ 54.4	29.5	71 10.7	+ 55.1	31.0	72 01.8	+ 55.7	32.6	**78**
79	66 42.1	+ 50.8	22.7	67 37.3	+ 51.3	23.6	68 32.1	+ 51.9	24.6	69 26.4	+ 52.5	25.7	70 20.1	+ 53.2	26.9	71 13.3	+ 53.9	28.3	72 05.8	+ 54.6	29.7	72 57.5	+ 55.3	31.3	**79**
80	67 32.9	+ 50.1	21.3	68 28.6	+ 50.7	22.2	69 24.0	+ 51.2	23.2	70 18.9	+ 51.8	24.3	71 13.3	+ 52.5	25.5	72 07.2	+ 53.2	26.9	73 00.4	+ 53.9	28.3	73 52.8	+ 54.6	30.0	**80**
81	68 23.0	+ 49.2	19.8	69 19.3	+ 49.8	20.7	70 15.2	+ 50.4	21.7	71 10.7	+ 51.1	22.8	72 05.8	+ 51.7	24.0	73 00.4	+ 52.4	25.3	73 54.3	+ 53.1	26.8	74 47.4	+ 54.0	28.4	**81**
82	69 12.2	+ 48.3	18.2	70 09.1	+ 48.8	19.1	71 05.6	+ 49.4	20.1	72 01.8	+ 50.0	21.1	72 57.5	+ 50.8	22.3	73 52.8	+ 51.5	23.6	74 47.4	+ 52.3	25.1	75 41.4	+ 53.2	26.7	**82**
83	70 00.5	+ 47.3	16.5	70 57.9	+ 47.8	17.4	71 55.0	+ 48.4	18.3	72 51.8	+ 49.0	19.3	73 48.3	+ 49.7	20.4	74 44.3	+ 50.4	21.7	75 39.7	+ 51.3	23.1	76 34.6	+ 52.1	24.8	**83**
84	70 47.8	+ 46.0	14.7	71 45.7	+ 46.6	15.5	72 43.4	+ 47.1	16.3	73 40.8	+ 47.8	17.3	74 38.0	+ 48.4	18.4	75 34.7	+ 49.2	19.6	76 31.0	+ 50.0	21.0	77 26.7	+ 50.9	22.6	**84**
85	71 33.8	+ 44.7	12.7	72 32.3	+ 45.1	13.4	73 30.5	+ 45.7	14.2	74 28.6	+ 46.3	15.1	75 26.4	+ 46.9	16.1	76 23.9	+ 47.6	17.2	77 21.0	+ 48.4	18.5	78 17.6	+ 49.4	20.1	**85**
86	72 18.5	+ 43.2	10.6	73 17.4	+ 43.7	11.2	74 16.2	+ 44.1	11.9	75 14.9	+ 44.6	12.6	76 13.3	+ 45.2	13.5	77 11.5	+ 45.9	14.6	78 09.4	*+ 46.7* •	15.8	79 07.0	*+ 47.5* •	17.2	**86**
87	73 01.7	+ 41.5	8.2	74 01.1	*+ 41.8* •	8.7	75 00.3	*+ 42.2* •	9.3	75 59.5	*+ 42.6* •	9.9	76 58.5	*+ 43.1* •	10.7	77 57.4	*+ 43.7* •	11.6	78 56.1	*+ 44.3* •	12.6	79 54.5	*+ 45.1* •	13.8	**87**
88	73 43.2	*+ 39.5* •	5.7	74 42.9	*+ 39.7* •	6.1	75 42.5	*+ 40.0* •	6.5	76 42.1	*+ 40.3* •	7.0	77 41.6	*+ 40.7* •	7.5	78 41.1	*+ 41.0* •	8.2	79 40.4	*+ 41.5* •	8.9	80 39.6	*+ 42.1* •	9.9	**88**
89	74 22.7	*+ 37.3* •	3.0	75 22.6	*+ 37.4* •	3.2	76 22.5	*+ 37.5* •	3.4	77 22.4	*+ 37.6* •	3.7	78 22.3	*+ 37.7* •	4.0	79 22.1	*+ 37.9* •	4.3	80 21.9	*+ 38.1* •	4.8	81 21.7	*+ 38.3* •	5.3	**89**
90	75 00.0	*+ 34.8* •	0.0	76 00.0	*+ 34.7* •	0.0	77 00.0	*+ 34.6* •	0.0	78 00.0	*+ 34.5* •	0.0	79 00.0	*+ 34.3* •	0.0	80 00.0	*+ 34.1* •	0.0	81 00.0	*+ 33.9* •	0.0	82 00.0	*+ 33.5* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 127°, 233°

54°, 306° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec. °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	**Dec.** °
0	8 45.0	+58.7	125.1	8 10.5	+58.8	125.2	7 35.9	+59.0	125.3	7 01.2	+59.1	125.4	6 26.4	+59.2	125.5	5 51.5	+59.4	125.6	5 16.5	+59.6	125.7	4 41.5	+59.7	125.7	**0**
1	9 43.7	+58.6	124.8	9 09.3	+58.8	125.0	8 34.9	+58.9	125.1	8 00.3	+59.1	125.2	7 25.6	+59.3	125.3	6 50.9	+59.4	125.4	6 16.1	+59.5	125.5	5 41.2	+59.6	125.6	**1**
2	10 42.3	+58.6	124.6	10 08.1	+58.8	124.8	9 33.8	+59.0	124.9	8 59.4	+59.1	125.1	8 24.9	+59.3	125.2	7 50.3	+59.4	125.3	7 15.6	+59.5	125.4	6 40.8	+59.6	125.5	**2**
3	11 40.9	+58.6	124.4	11 06.9	+58.8	124.6	10 32.8	+59.0	124.7	9 58.5	+59.2	124.9	9 24.2	+59.2	125.0	8 49.7	+59.4	125.2	8 15.1	+59.5	125.3	7 40.4	+59.6	125.4	**3**
4	12 39.5	+58.6	124.2	12 05.7	+58.8	124.4	11 31.8	+58.9	124.5	10 57.7	+59.1	124.7	10 23.4	+59.3	124.9	9 49.1	+59.4	125.0	9 14.6	+59.5	125.1	8 40.0	+59.6	125.3	**4**
5	13 38.1	+58.6	124.0	13 04.5	+58.8	124.2	12 30.7	+59.0	124.4	11 56.8	+59.1	124.5	11 22.7	+59.2	124.7	10 48.5	+59.3	124.9	10 14.1	+59.5	125.0	9 39.6	+59.6	125.2	**5**
6	14 36.7	+58.6	123.7	14 03.3	+58.7	124.0	13 29.7	+58.9	124.2	12 55.9	+59.1	124.4	12 21.9	+59.3	124.5	11 47.8	+59.4	124.7	11 13.6	+59.5	124.9	10 39.2	+59.6	125.0	**6**
7	15 35.3	+58.5	123.5	15 02.0	+58.8	123.8	14 28.6	+58.9	124.0	13 55.0	+59.1	124.2	13 21.2	+59.2	124.4	12 47.2	+59.4	124.6	12 13.1	+59.5	124.8	11 38.8	+59.6	124.9	**7**
8	16 33.8	+58.6	123.3	16 00.8	+58.7	123.5	15 27.5	+58.9	123.8	14 54.1	+59.0	124.0	14 20.4	+59.2	124.2	13 46.6	+59.3	124.4	13 12.6	+59.5	124.6	12 38.4	+59.6	124.8	**8**
9	17 32.4	+58.5	123.1	16 59.5	+58.7	123.3	16 26.4	+58.9	123.6	15 53.1	+59.1	123.8	15 19.6	+59.3	124.1	14 45.9	+59.4	124.3	14 12.1	+59.5	124.5	13 38.0	+59.6	124.7	**9**
10	18 30.9	+58.5	122.8	17 58.2	+58.7	123.1	17 25.3	+58.9	123.4	16 52.2	+59.1	123.6	16 18.9	+59.2	123.9	15 45.3	+59.4	124.1	15 11.6	+59.4	124.4	14 37.6	+59.6	124.6	**10**
11	19 29.4	+58.5	122.6	18 56.9	+58.7	122.9	18 24.2	+58.9	123.2	17 51.3	+59.0	123.5	17 18.1	+59.2	123.7	16 44.7	+59.3	124.0	16 11.0	+59.5	124.2	15 37.2	+59.6	124.5	**11**
12	20 27.9	+58.5	122.4	19 55.6	+58.7	122.7	19 23.1	+58.9	123.0	18 50.3	+59.1	123.3	18 17.3	+59.2	123.5	17 44.0	+59.4	123.8	17 10.5	+59.5	124.1	16 36.8	+59.6	124.3	**12**
13	21 26.4	+58.4	122.1	20 54.3	+58.7	122.5	20 22.0	+58.8	122.8	19 49.4	+59.0	123.1	19 16.5	+59.2	123.4	18 43.4	+59.3	123.7	18 10.0	+59.4	123.9	17 36.4	+59.5	124.2	**13**
14	22 24.8	+58.4	121.9	21 53.0	+58.6	122.2	21 20.8	+58.9	122.6	20 48.4	+59.0	122.9	20 15.7	+59.1	123.2	19 42.7	+59.3	123.5	19 09.4	+59.5	123.8	18 35.9	+59.6	124.1	**14**
15	23 23.2	+58.5	121.6	22 51.6	+58.6	122.0	22 19.7	+58.8	122.4	21 47.4	+59.0	122.7	21 14.8	+59.2	123.0	20 42.0	+59.3	123.3	20 08.9	+59.4	123.7	19 35.5	+59.6	124.0	**15**
16	24 21.7	+58.3	121.4	23 50.2	+58.6	121.8	23 18.5	+58.8	122.1	22 46.4	+59.0	122.5	22 14.0	+59.2	122.8	21 41.3	+59.3	123.2	21 08.3	+59.5	123.5	20 35.1	+59.5	123.8	**16**
17	25 20.0	+58.4	121.1	24 48.8	+58.6	121.5	24 17.3	+58.8	121.9	23 45.4	+59.0	122.3	23 13.2	+59.1	122.7	22 40.6	+59.3	123.0	22 07.8	+59.4	123.4	21 34.6	+59.6	123.7	**17**
18	26 18.4	+58.3	120.9	25 47.4	+58.6	121.3	25 16.1	+58.7	121.7	24 44.4	+58.9	122.1	24 12.3	+59.1	122.5	23 39.9	+59.3	122.9	23 07.2	+59.4	123.2	22 34.2	+59.5	123.6	**18**
19	27 16.7	+58.3	120.6	26 46.0	+58.5	121.0	26 14.8	+58.8	121.5	25 43.3	+58.9	121.9	25 11.4	+59.1	122.3	24 39.2	+59.3	122.7	24 06.6	+59.5	123.1	23 33.7	+59.6	123.4	**19**
20	28 15.0	+58.3	120.3	27 44.5	+58.5	120.8	27 13.6	+58.7	121.2	26 42.2	+59.0	121.7	26 10.5	+59.1	122.1	25 38.5	+59.2	122.5	25 06.1	+59.4	122.9	24 33.3	+59.5	123.3	**20**
21	29 13.3	+58.2	120.1	28 43.0	+58.5	120.5	28 12.3	+58.7	121.0	27 41.2	+58.9	121.5	27 09.6	+59.1	121.9	26 37.7	+59.3	122.3	26 05.5	+59.4	122.8	25 32.8	+59.5	123.2	**21**
22	30 11.5	+58.2	119.8	29 41.5	+58.4	120.3	29 11.0	+58.6	120.8	28 40.1	+58.8	121.3	28 08.7	+59.1	121.7	27 37.0	+59.2	122.2	27 04.9	+59.3	122.6	26 32.3	+59.6	123.0	**22**
23	31 09.7	+58.2	119.5	30 39.9	+58.4	120.0	30 09.6	+58.7	120.5	29 38.9	+58.9	121.0	29 07.8	+59.0	121.5	28 36.2	+59.2	122.0	28 04.2	+59.4	122.4	27 31.9	+59.5	122.9	**23**
24	32 07.9	+58.1	119.2	31 38.3	+58.4	119.8	31 08.3	+58.6	120.3	30 37.8	+58.8	120.8	30 06.8	+59.1	121.3	29 35.4	+59.2	121.8	29 03.6	+59.4	122.3	28 31.4	+59.5	122.7	**24**
25	33 06.0	+58.0	118.9	32 36.7	+58.3	119.5	32 06.9	+58.6	120.0	31 36.6	+58.8	120.6	31 05.9	+59.0	121.1	30 34.6	+59.2	121.6	30 03.0	+59.3	122.1	29 30.9	+59.5	122.6	**25**
26	34 04.0	+58.1	118.6	33 35.0	+58.3	119.2	33 05.5	+58.5	119.8	32 35.4	+58.8	120.3	32 04.9	+59.0	120.9	31 33.8	+59.2	121.4	31 02.3	+59.4	121.9	30 30.4	+59.4	122.4	**26**
27	35 02.1	+58.0	118.3	34 33.3	+58.3	118.9	34 04.0	+58.6	119.5	33 34.2	+58.8	120.1	33 03.9	+58.9	120.7	32 33.0	+59.2	121.2	32 01.7	+59.3	121.8	31 29.8	+59.5	122.3	**27**
28	36 00.1	+57.9	118.0	35 31.6	+58.2	118.6	35 02.6	+58.4	119.3	34 33.0	+58.7	119.9	34 02.8	+59.0	120.4	33 32.2	+59.1	121.0	33 01.0	+59.3	121.6	32 29.3	+59.5	122.1	**28**
29	36 58.0	+57.9	117.7	36 29.8	+58.2	118.3	36 01.0	+58.5	119.0	35 31.7	+58.7	119.6	35 01.8	+58.9	120.2	34 31.3	+59.1	120.8	34 00.3	+59.3	121.4	33 28.8	+59.4	122.0	**29**
30	37 55.9	+57.8	117.3	37 28.0	+58.1	118.0	36 59.5	+58.4	118.7	36 30.4	+58.6	119.3	36 00.7	+58.9	120.0	35 30.4	+59.1	120.6	34 59.6	+59.2	121.2	34 28.2	+59.4	121.8	**30**
31	38 53.7	+57.7	117.0	38 26.1	+58.1	117.7	37 57.9	+58.3	118.4	37 29.0	+58.6	119.1	36 59.6	+58.8	119.7	36 29.5	+59.1	120.4	35 58.8	+59.3	121.0	35 27.6	+59.5	121.6	**31**
32	39 51.4	+57.7	116.7	39 24.2	+58.0	117.4	38 56.2	+58.3	118.1	38 27.6	+58.6	118.8	37 58.4	+58.8	119.5	37 28.6	+59.0	120.2	36 58.1	+59.2	120.8	36 27.1	+59.4	121.5	**32**
33	40 49.1	+57.6	116.3	40 22.2	+57.9	117.1	39 54.5	+58.3	117.8	39 26.2	+58.6	118.5	38 57.2	+58.8	119.3	38 27.6	+59.0	119.9	37 57.3	+59.2	120.6	37 26.5	+59.3	121.3	**33**
34	41 46.7	+57.6	115.9	41 20.1	+57.9	116.7	40 52.8	+58.2	117.5	40 24.8	+58.5	118.3	39 56.0	+58.8	119.0	39 26.6	+59.0	119.7	38 56.5	+59.2	120.4	38 25.8	+59.4	121.1	**34**
35	42 44.3	+57.5	115.5	42 18.0	+57.9	116.4	41 51.0	+58.2	117.2	41 23.3	+58.4	118.0	40 54.8	+58.7	118.7	40 25.6	+58.9	119.5	39 55.7	+59.2	120.2	39 25.2	+59.4	120.9	**35**
36	43 41.8	+57.3	115.1	43 15.9	+57.7	116.0	42 49.2	+58.1	116.8	42 21.7	+58.4	117.7	41 53.5	+58.7	118.5	41 24.5	+59.0	119.2	40 54.9	+59.1	120.0	40 24.6	+59.3	120.7	**36**
37	44 39.1	+57.3	114.7	44 13.6	+57.7	115.6	43 47.3	+58.0	116.5	43 20.1	+58.3	117.3	42 52.2	+58.6	118.2	42 23.5	+58.9	119.0	41 54.0	+59.1	119.8	41 23.9	+59.3	120.5	**37**
38	45 36.4	+57.2	114.3	45 11.3	+57.6	115.2	44 45.3	+58.0	116.1	44 18.4	+58.3	117.0	43 50.8	+58.6	117.9	43 22.4	+58.8	118.7	42 53.1	+59.1	119.5	42 23.2	+59.3	120.3	**38**
39	46 33.6	+57.1	113.9	46 08.9	+57.5	114.8	45 43.3	+57.8	115.8	45 16.7	+58.3	116.7	44 49.4	+58.5	117.6	44 21.2	+58.8	118.4	43 52.2	+59.1	119.3	43 22.5	+59.3	120.1	**39**
40	47 30.7	+57.0	113.4	47 06.4	+57.4	114.4	46 41.1	+57.9	115.4	46 15.0	+58.1	116.3	45 47.9	+58.5	117.3	45 20.0	+58.8	118.2	44 51.3	+59.0	119.0	44 21.8	+59.2	119.9	**40**
41	48 27.7	+56.9	113.0	48 03.8	+57.3	114.0	47 39.0	+57.7	115.0	47 13.1	+58.1	116.0	46 46.4	+58.4	116.9	46 18.8	+58.7	117.9	45 50.3	+59.0	118.8	45 21.0	+59.2	119.7	**41**
42	49 24.6	+56.7	112.5	49 01.1	+57.3	113.5	48 36.7	+57.6	114.6	48 11.2	+58.0	115.6	47 44.8	+58.4	116.6	47 17.5	+58.7	117.6	46 49.3	+58.9	118.5	46 20.2	+59.2	119.4	**42**
43	50 21.3	+56.7	112.0	49 58.4	+57.1	113.1	49 34.3	+57.6	114.2	49 09.2	+58.0	115.2	48 43.2	+58.3	116.3	48 16.2	+58.6	117.3	47 48.2	+58.9	118.2	47 19.4	+59.1	119.2	**43**
44	51 18.0	+56.4	111.4	50 55.5	+56.9	112.6	50 31.9	+57.4	113.7	50 07.2	+57.8	114.8	49 41.5	+58.2	115.9	49 14.8	+58.6	116.9	48 47.1	+58.9	118.0	48 18.5	+59.2	119.0	**44**
45	52 14.4	+56.3	110.9	51 52.4	+56.9	112.1	51 29.3	+57.3	113.3	51 05.0	+57.8	114.4	50 39.7	+58.2	115.5	50 13.4	+58.5	116.6	49 46.0	+58.8	117.7	49 17.7	+59.0	118.7	**45**
46	53 10.7	+56.1	110.3	52 49.3	+56.7	111.6	52 26.6	+57.2	112.8	52 02.8	+57.7	114.0	51 37.9	+58.1	115.1	51 11.9	+58.4	116.3	50 44.8	+58.8	117.4	50 16.7	+59.1	118.4	**46**
47	54 06.8	+56.0	109.7	53 46.0	+56.5	111.0	53 23.8	+57.1	112.3	53 00.5	+57.5	113.5	52 36.0	+57.9	114.7	52 10.3	+58.4	115.9	51 43.6	+58.7	117.0	51 15.8	+59.0	118.1	**47**
48	55 02.8	+55.7	109.1	54 42.5	+56.4	110.4	54 20.9	+56.9	111.8	53 58.0	+57.5	113.0	53 33.9	+57.9	114.3	53 08.7	+58.3	115.5	52 42.3	+58.6	116.7	52 14.8	+58.9	117.9	**48**
49	55 58.5	+55.6	108.5	55 38.9	+56.1	109.8	55 17.8	+56.8	111.2	54 55.5	+57.3	112.5	54 31.8	+57.8	113.8	54 07.0	+58.2	115.1	53 40.9	+58.6	116.3	53 13.7	+58.9	117.5	**49**
50	56 54.1	+55.3	107.8	56 35.0	+56.0	109.2	56 14.6	+56.6	110.6	55 52.8	+57.1	112.0	55 29.6	+57.7	113.4	55 05.2	+58.1	114.7	54 39.5	+58.5	116.0	54 12.6	+58.9	117.2	**50**
51	57 49.4	+55.0	107.1	57 31.0	+55.8	108.6	57 11.2	+56.4	110.0	56 49.9	+57.0	111.5	56 27.3	+57.5	112.9	56 03.3	+58.0	114.2	55 38.0	+58.4	115.6	55 11.5	+58.8	116.9	**51**
52	58 44.4	+54.7	106.3	58 26.8	+55.5	107.9	58 07.6	+56.2	109.4	57 46.9	+56.9	110.9	57 24.8	+57.4	112.4	57 01.3	+57.9	113.8	56 36.4	+58.4	115.2	56 10.3	+58.7	116.5	**52**
53	59 39.1	+54.5	105.5	59 22.3	+55.3	107.1	59 03.8	+56.0	108.7	58 43.8	+56.7	110.3	58 22.2	+57.3	111.8	57 59.2	+57.8	113.3	57 34.8	+58.3	114.7	57 09.0	+58.7	116.2	**53**
54	60 33.6	+54.1	104.7	60 17.6	+54.9	106.4	59 59.8	+55.8	108.0	59 40.5	+56.4	109.6	59 19.5	+57.1	111.2	58 57.0	+57.7	112.8	58 33.1	+58.1	114.3	58 07.7	+58.5	115.8	**54**
55	61 27.7	+53.7	103.8	61 12.5	+54.7	105.5	60 55.6	+55.5	107.3	60 36.9	+56.3	109.0	60 16.6	+56.9	110.6	59 54.7	+57.5	112.2	59 31.2	+58.1	113.8	59 06.2	+58.5	115.4	**55**
56	62 21.4	+53.4	102.8	62 07.2	+54.3	104.7	61 51.1	+55.2	106.5	61 33.2	+56.0	108.2	61 13.5	+56.8	110.0	60 52.2	+57.4	111.7	60 29.3	+57.9	113.3	60 04.7	+58.4	114.9	**56**
57	63 14.8	+52.9	101.8	63 01.5	+53.9	103.7	62 46.3	+54.9	105.6	62 29.2	+55.7	107.5	62 10.3	+56.5	109.3	61 49.6	+57.2	111.1	61 27.2	+57.8	112.8	61 03.1	+58.3	114.4	**57**
58	64 07.7	+52.3	100.7	63 55.4	+53.5	102.8	63 41.2	+54.5	104.7	63 24.9	+55.5	106.7	63 06.8	+56.3	108.6	62 46.8	+57.0	110.4	62 25.0	+57.6	112.2	62 01.4	+58.2	113.9	**58**
59	65 00.0	+51.9	99.6	64 48.9	+53.1	101.7	64 35.7	+54.1	103.8	64 20.4	+55.1	105.8	64 03.1	+56.0	107.8	63 43.8	+56.8	109.7	63 22.6	+57.5	111.6	62 59.6	+58.1	113.4	**59**
60	65 51.9	+51.2	98.4	65 42.0	+52.5	100.6	65 29.8	+53.7	102.8	65 15.5	+54.8	104.9	64 59.1	+55.7	106.9	64 40.6	+56.5	109.0	64 20.1	+57.3	110.9	63 57.7	+57.9	112.9	**60**
61	66 43.1	+50.5	97.1	66 34.5	+51.9	99.4	66 23.5	+53.2	101.7	66 10.3	+54.3	103.9	65 54.8	+55.3	106.1	65 37.1	+56.3	108.2	65 17.4	+57.0	110.2	64 55.6	+57.8	112.3	**61**
62	67 33.6	+49.8	95.7	67 26.4	+51.3	98.1	67 16.7	+52.6	100.5	67 04.6	+53.9	102.8	66 50.1	+55.0	105.1	66 33.4	+56.0	107.3	66 14.4	+56.9	109.5	65 53.4	+57.6	111.6	**62**
63	68 23.4	+48.9	94.2	68 17.7	+50.5	96.7	68 09.3	+52.0	99.2	67 58.5	+53.3	101.7	67 45.1	+54.6	104.1	67 29.4	+55.6	106.4	67 11.3	+56.5	108.7	66 51.0	+57.3	110.9	**63**
64	69 12.3	+48.0	92.6	69 08.2	+49.7	95.2	69 01.3	+51.3	97.8	68 51.8	+52.8	100.4	68 39.7	+54.1	102.9	68 25.0	+55.2	105.4	68 07.8	+56.3	107.8	67 48.3	+57.2	110.1	**64**
65	70 00.3	+46.8	90.9	69 57.9	+48.7	93.6	69 52.6	+50.5	96.4	69 44.6	+52.1	99.1	69 33.8	+53.5	101.7	69 20.2	+54.9	104.3	69 04.1	+55.9	106.9	68 45.5	+56.9	109.3	**65**
66	70 47.1	+45.7	89.0	70 46.6	+47.7	91.9	70 43.1	+49.6	94.8	70 36.7	+51.3	97.6	70 27.3	+52.9	100.4	70 15.1	+54.3	103.1	70 00.0	+55.6	105.8	69 42.4	+56.6	108.4	**66**
67	71 32.8	+44.3	87.0	71 34.3	+46.5	90.0	71 32.7	+48.6	93.0	71 28.0	+50.5	96.0	71 20.2	+52.2	99.0	71 09.4	+53.7	101.9	70 55.6	+55.1	104.7	70 39.0	+56.2	107.4	**67**
68	72 17.1	+42.7	84.9	72 20.8	+45.1	88.0	72 21.3	+47.3	91.1	72 18.5	+49.4	94.3	72 12.4	+51.3	97.4	72 03.1	+53.0	100.4	71 50.7	+54.5	103.4	71 35.2	+55.9	106.4	**68**
69	72 59.8	+41.0	82.5	73 05.9	+43.6	85.8	73 08.6	+46.0	89.1	73 07.9	+48.3	92.4	73 03.7	+50.4	95.6	72 56.1	+52.3	98.9	72 45.2	+53.9	102.1	72 31.1	+55.4	105.2	**69**
70	73 40.8	*+39.0* •	80.0	73 49.5	+41.8	83.3	73 54.6	+44.5	86.8	73 56.2	+46.9	90.3	73 54.1	+49.2	93.7	73 48.4	+51.3	97.2	73 39.1	+53.3	100.6	73 26.5	+54.8	103.9	**70**
71	74 19.8	*+36.7* •	77.2	74 31.3	*+39.7* •	80.7	74 39.1	*+42.6* •	84.3	74 43.1	+45.4	88.0	74 43.3	+48.0	91.6	74 39.7	+50.3	95.3	74 32.4	+52.3	98.9	74 21.3	+54.2	102.4	**71**
72	74 56.5	*+34.2* •	74.2	75 11.0	*+37.4* •	77.8	75 21.7	*+40.5* •	81.6	75 28.5	+43.5	85.4	75 31.3	+46.4	89.3	75 30.0	+49.0	93.1	75 24.7	+51.3	97.0	75 15.5	+53.3	100.8	**72**
73	75 30.7	*+31.4* •	71.0	75 48.4	*+34.8* •	74.7	76 02.2	*+38.2* •	78.6	76 12.0	*+41.5* •	82.6	76 17.7	*+44.5* •	86.7	76 19.0	+47.5	90.8	76 16.0	+50.2	94.9	76 08.8	+52.5	98.9	**73**
74	76 02.1	*+28.1* •	67.5	76 23.2	*+31.7* •	71.3	76 40.4	*+35.4* •	75.3	76 53.5	*+38.9* •	79.5	77 02.2	*+42.4* •	83.8	77 06.5	*+45.6* •	88.1	77 06.2	+48.6	92.5	77 01.3	+51.3	96.8	**74**
75	76 30.2	*+24.7* •	63.8	76 54.9	*+28.4* •	67.7	77 15.8	*+32.2* •	71.7	77 32.4	*+36.1* •	76.0	77 44.6	*+39.8* •	80.5	77 52.1	*+43.5* •	85.1	77 54.8	+46.8	89.8	77 52.6	+49.9	94.4	**75**
76	76 54.9	*+20.9* •	59.8	77 23.3	*+24.7* •	63.7	77 48.0	*+28.6* •	67.8	78 08.5	*+32.7* •	72.3	78 24.4	*+36.9* •	76.9	78 35.6	*+40.8* •	81.7	78 41.6	*+44.7* •	86.7	78 42.5	*+48.2* •	91.7	**76**
77	77 15.8	*+16.6* •	55.6	77 48.0	*+20.5* •	59.4	78 16.6	*+24.6* •	63.6	78 41.2	*+28.9* •	68.1	79 01.3	*+33.2* •	72.9	79 16.4	*+37.7* •	77.9	79 26.3	*+42.0* •	83.2	79 30.7	*+45.9* •	88.5	**77**
78	77 32.4	*+12.2* •	51.2	78 08.5	*+15.9* •	54.9	78 41.2	*+20.1* •	59.0	79 10.1	*+24.4* •	63.5	79 34.5	*+29.2* •	68.4	79 54.1	*+33.9* •	73.6	80 08.3	*+38.6* •	79.1	80 16.6	*+43.3* •	84.9	**78**
79	77 44.6	*+7.5* •	46.6	78 24.4	*+11.2* •	50.2	79 01.3	*+15.1* •	54.2	79 34.5	*+19.6* •	58.6	80 03.7	*+24.3* •	63.4	80 28.0	*+29.4* •	68.8	80 46.9	*+34.7* •	74.5	80 59.9	*+39.8* •	80.6	**79**
80	77 52.1	*+2.7* •	42.0	78 35.6	*+6.0* •	45.3	79 16.4	*+9.9* •	49.0	79 54.1	*+14.2* •	53.2	80 28.0	*+18.9* •	58.0	80 57.4	*+24.2* •	63.4	81 21.6	*+29.7* •	69.2	81 39.7	*+35.5* •	75.6	**80**
81	77 54.8	*−2.2* •	37.2	78 41.6	*+0.9* •	40.2	79 26.3	*+4.4* •	43.7	80 08.3	*+8.3* •	47.6	80 46.9	*+13.0* •	52.2	81 21.6	*+18.1* •	57.4	81 51.3	*+23.9* •	63.3	82 15.2	*+30.1* •	69.9	**81**
82	77 52.6	*−7.0* •	32.4	78 42.5	*−4.4* •	35.1	79 30.7	*−1.3* •	38.2	80 16.6	*+2.3* •	41.8	80 59.9	*+6.5* •	46.0	81 39.7	*+11.4* •	50.9	82 15.2	*+17.1* •	56.6	82 45.3	*+23.5* •	63.2	**82**
83	77 45.6	*−11.8* •	27.7	78 38.1	*−9.5* •	30.0	79 29.4	*−6.9* •	32.7	80 18.9	*−3.8* •	35.9	81 06.4	*−0.1* •	39.6	81 51.1	*+4.3* •	44.1	82 32.3	*+9.6* •	49.4	83 08.8	*+15.8* •	55.7	**83**
84	77 33.8	*−16.2* •	23.1	78 28.6	*−14.4* •	25.0	79 22.5	*−12.4* •	27.3	80 15.1	*−9.8* •	30.0	81 06.3	*−6.8* •	33.2	81 55.4	*−3.0* •	37.0	82 41.9	*+1.4* •	41.7	83 24.6	*+7.2* •	47.5	**84**
85	77 17.6	*−20.4* •	18.7	78 14.2	*−19.1* •	20.2	79 10.1	*−17.4* •	22.0	80 05.3	*−15.5* •	24.2	80 59.5	*−13.1* •	26.8	81 52.4	*−10.3* •	29.9	82 43.3	*−6.6* •	33.8	83 31.8	*−2.1* •	38.7	**85**
86	76 57.2	*−24.3* •	14.5	77 55.1	*−23.3* •	15.6	78 52.7	*−22.2* •	17.0	79 49.8	*−20.8* •	18.6	80 46.4	*−19.2* •	20.6	81 42.1	*−17.1* •	23.0	82 36.7	*−14.5* •	26.0	83 29.7	*−11.1* •	29.9	**86**
87	76 32.9	*−27.9* •	10.5	77 31.8	*−27.2* •	11.3	78 30.5	*−26.5* •	12.3	79 29.0	*−25.6* •	13.4	80 27.2	*−24.5* •	14.8	81 25.0	*−23.2* •	16.5	82 22.2	*−21.5* •	18.6	83 18.6	*−19.3* •	21.3	**87**
88	76 05.0	*−31.1* •	6.7	77 04.6	*−30.8* •	7.3	78 04.0	*−30.3* •	7.8	79 03.4	*−29.8* •	8.6	80 02.7	*−29.3* •	9.4	81 01.8	*−28.6* •	10.4	82 00.7	*−27.7* •	11.7	82 59.3	*−26.7* •	13.4	**88**
89	75 33.9	*−33.9* •	3.2	76 33.8	*−33.8* •	3.5	77 33.7	*−33.7* •	3.8	78 33.6	*−33.6* •	4.1	79 33.4	*−33.4* •	4.5	80 33.2	*−33.2* •	4.9	81 33.0	*−33.0* •	5.5	82 32.6	*−32.6* •	6.2	**89**
90	75 00.0	*−36.5* •	0.0	76 00.0	*−36.6* •	0.0	77 00.0	*−36.7* •	0.0	78 00.0	*−36.8* •	0.0	79 00.0	*−36.9* •	0.0	80 00.0	*−37.1* •	0.0	81 00.0	*−37.3* •	0.0	82 00.0	*−37.5* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 54°, 306°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 45.0	–58.6	125.1	8 10.5	–58.8	125.2	7 35.9	–59.0	125.3	7 01.2	–59.2	125.4	6 26.4	–59.3	125.5	5 51.5	–59.4	125.6	5 16.5	–59.5	125.7	4 41.5	–59.6	125.7	0
1	7 46.4	–58.7	125.3	7 11.7	–58.8	125.4	6 36.9	–59.0	125.5	6 02.0	–59.1	125.6	5 27.1	–59.3	125.7	4 52.1	–59.4	125.7	4 17.0	–59.5	125.8	3 41.9	–59.6	125.8	1
2	6 47.7	–58.6	125.5	6 12.9	–58.9	125.6	5 37.9	–59.0	125.7	5 02.9	–59.1	125.7	4 27.8	–59.3	125.8	3 52.7	–59.4	125.9	3 17.5	–59.5	125.9	2 42.3	–59.6	126.0	2
3	5 49.1	–58.7	125.7	5 14.0	–58.8	125.8	4 38.9	–59.0	125.8	4 03.8	–59.2	125.9	3 28.5	–59.2	126.0	2 53.3	–59.4	126.0	2 18.0	–59.5	126.0	1 42.7	–59.6	126.1	3
4	4 50.4	–58.6	125.9	4 15.2	–58.8	126.0	3 39.9	–59.0	126.0	3 04.6	–59.1	126.1	2 29.3	–59.3	126.1	1 53.9	–59.4	126.1	1 18.5	–59.5	126.2	0 43.1	–59.7	126.2	4
5	3 51.8	–58.7	126.1	3 16.4	–58.9	126.2	2 40.9	–59.0	126.2	2 05.5	–59.2	126.2	1 30.0	–59.3	126.3	0 54.5	–59.4	126.3	0 19.0	–59.6	126.3	0 16.6	+59.6	53.7	5
6	2 53.1	–58.7	126.3	2 17.5	–58.8	126.4	1 41.9	–59.0	126.4	1 06.3	–59.1	126.4	0 30.7	–59.3	126.4	0 04.9	+59.4	53.6	0 40.6	+59.5	53.6	1 16.2	+59.6	53.6	6
7	1 54.4	–58.6	126.5	1 18.7	–58.8	126.6	0 42.9	–59.0	126.6	0 07.2	–59.2	126.6	0 28.6	+59.3	53.4	1 04.3	+59.4	53.4	1 40.1	+59.5	53.4	2 15.8	+59.6	53.5	7
8	0 55.8	–58.7	126.8	0 19.9	–58.9	126.8	0 16.1	+59.0	53.2	0 52.0	+59.1	53.2	1 27.9	+59.2	53.3	2 03.7	+59.4	53.3	2 39.6	+59.5	53.3	3 15.4	+59.6	53.4	8
9	0 02.9	+58.7	53.0	0 39.0	+58.8	53.0	1 15.1	+58.9	53.1	1 51.1	+59.1	53.1	2 27.1	+59.3	53.1	3 03.1	+59.4	53.1	3 39.1	+59.5	53.2	4 15.0	+59.6	53.3	9
10	1 01.6	+58.7	52.8	1 37.8	+58.9	52.8	2 14.0	+59.0	52.9	2 50.2	+59.2	52.9	3 26.4	+59.3	53.0	4 02.5	+59.4	53.0	4 38.6	+59.5	53.1	5 14.6	+59.7	53.1	10
11	2 00.3	+58.6	52.6	2 36.7	+58.8	52.7	3 13.0	+59.0	52.7	3 49.4	+59.1	52.7	4 25.7	+59.3	52.8	5 01.9	+59.4	52.9	5 38.1	+59.5	52.9	6 14.3	+59.6	53.0	11
12	2 58.9	+58.7	52.4	3 35.5	+58.8	52.5	4 12.0	+59.0	52.5	4 48.5	+59.2	52.6	5 25.0	+59.2	52.6	6 01.3	+59.4	52.7	6 37.6	+59.6	52.8	7 13.9	+59.6	52.9	12
13	3 57.6	+58.6	52.2	4 34.3	+58.9	52.3	5 11.0	+59.0	52.3	5 47.7	+59.1	52.4	6 24.2	+59.3	52.5	7 00.7	+59.4	52.6	7 37.2	+59.5	52.7	8 13.5	+59.6	52.8	13
14	4 56.2	+58.7	52.0	5 33.2	+58.8	52.1	6 10.0	+59.0	52.1	6 46.8	+59.1	52.2	7 23.5	+59.3	52.3	8 00.1	+59.4	52.4	8 36.7	+59.5	52.6	9 13.1	+59.6	52.7	14
15	5 54.9	+58.7	51.8	6 32.0	+58.8	51.9	7 09.0	+59.0	52.0	7 45.9	+59.2	52.1	8 22.8	+59.2	52.2	8 59.5	+59.4	52.3	9 36.2	+59.5	52.4	10 12.7	+59.6	52.6	15
16	6 53.6	+58.6	51.6	7 30.8	+58.8	51.7	8 08.0	+59.0	51.8	8 45.1	+59.1	51.9	9 22.0	+59.3	52.0	9 58.9	+59.4	52.2	10 35.7	+59.5	52.3	11 12.3	+59.6	52.4	16
17	7 52.2	+58.6	51.4	8 29.6	+58.8	51.5	9 07.0	+58.9	51.6	9 44.2	+59.1	51.7	10 21.3	+59.3	51.9	10 58.3	+59.4	52.0	11 35.2	+59.5	52.2	12 11.9	+59.6	52.3	17
18	8 50.8	+58.7	51.1	9 28.4	+58.8	51.3	10 05.9	+59.0	51.4	10 43.3	+59.1	51.5	11 20.6	+59.2	51.7	11 57.7	+59.4	51.9	12 34.7	+59.5	52.0	13 11.5	+59.6	52.2	18
19	9 49.5	+58.6	50.9	10 27.2	+58.8	51.1	11 04.9	+58.9	51.2	11 42.4	+59.1	51.4	12 19.8	+59.2	51.5	12 57.1	+59.3	51.7	13 34.2	+59.4	51.9	14 11.1	+59.6	52.1	19
20	10 48.1	+58.6	50.7	11 26.0	+58.8	50.9	12 03.8	+59.0	51.0	12 41.5	+59.1	51.2	13 19.0	+59.3	51.4	13 56.4	+59.4	51.6	14 33.6	+59.5	51.8	15 10.7	+59.6	52.0	20
21	11 46.7	+58.6	50.5	12 24.8	+58.8	50.7	13 02.8	+58.9	50.8	13 40.6	+59.1	51.0	14 18.3	+59.2	51.2	14 55.8	+59.3	51.4	15 33.1	+59.5	51.6	16 10.3	+59.6	51.9	21
22	12 45.3	+58.6	50.3	13 23.6	+58.8	50.5	14 01.7	+59.0	50.6	14 39.7	+59.1	50.8	15 17.5	+59.2	51.0	15 55.1	+59.4	51.3	16 32.6	+59.5	51.5	17 09.9	+59.5	51.7	22
23	13 43.9	+58.6	50.1	14 22.4	+58.7	50.2	15 00.7	+58.9	50.4	15 38.8	+59.1	50.7	16 16.7	+59.2	50.9	16 54.5	+59.3	51.1	17 32.1	+59.4	51.4	18 09.4	+59.6	51.6	23
24	14 42.5	+58.6	49.8	15 21.1	+58.8	50.0	15 59.6	+58.9	50.2	16 37.9	+59.0	50.5	17 15.9	+59.3	50.7	17 53.8	+59.4	51.0	18 31.5	+59.5	51.2	19 09.0	+59.6	51.5	24
25	15 41.1	+58.5	49.6	16 19.9	+58.7	49.8	16 58.5	+58.9	50.1	17 36.9	+59.1	50.3	18 15.2	+59.2	50.5	18 53.2	+59.3	50.8	19 31.0	+59.5	51.1	20 08.6	+59.5	51.4	25
26	16 39.6	+58.6	49.4	17 18.6	+58.7	49.6	17 57.4	+58.9	49.9	18 36.0	+59.0	50.1	19 14.4	+59.1	50.4	19 52.5	+59.3	50.6	20 30.5	+59.4	50.9	21 08.1	+59.6	51.2	26
27	17 38.2	+58.5	49.1	18 17.3	+58.7	49.4	18 56.3	+58.8	49.6	19 35.0	+59.0	49.9	20 13.5	+59.2	50.2	20 51.8	+59.4	50.5	21 29.9	+59.4	50.8	22 07.7	+59.6	51.1	27
28	18 36.7	+58.5	48.9	19 16.0	+58.7	49.2	19 55.1	+58.9	49.4	20 34.0	+59.1	49.7	21 12.7	+59.2	50.0	21 51.2	+59.3	50.3	22 29.3	+59.5	50.6	23 07.3	+59.5	51.0	28
29	19 35.2	+58.5	48.7	20 14.7	+58.7	49.0	20 54.0	+58.8	49.2	21 33.1	+59.0	49.5	22 11.9	+59.1	49.8	22 50.5	+59.2	50.2	23 28.8	+59.4	50.5	24 06.8	+59.5	50.8	29
30	20 33.7	+58.5	48.4	21 13.4	+58.6	48.7	21 52.8	+58.9	49.0	22 32.1	+59.0	49.3	23 11.0	+59.2	49.7	23 49.7	+59.3	50.0	24 28.2	+59.4	50.3	25 06.3	+59.6	50.7	30
31	21 32.2	+58.4	48.2	22 12.0	+58.7	48.5	22 51.7	+58.8	48.8	23 31.1	+58.9	49.1	24 10.2	+59.1	49.5	24 49.0	+59.3	49.8	25 27.6	+59.4	50.2	26 05.9	+59.5	50.6	31
32	22 30.6	+58.4	48.0	23 10.7	+58.6	48.3	23 50.5	+58.8	48.6	24 30.0	+59.0	48.9	25 09.3	+59.1	49.3	25 48.3	+59.3	49.6	26 27.0	+59.4	50.0	27 05.4	+59.5	50.4	32
33	23 29.0	+58.4	47.7	24 09.3	+58.6	48.0	24 49.3	+58.7	48.4	25 29.0	+58.9	48.7	26 08.4	+59.1	49.1	26 47.6	+59.2	49.5	27 26.4	+59.4	49.9	28 04.9	+59.5	50.3	33
34	24 27.4	+58.4	47.5	25 07.9	+58.6	47.8	25 48.0	+58.8	48.2	26 27.9	+59.0	48.5	27 07.5	+59.1	48.9	27 46.8	+59.2	49.3	28 25.8	+59.3	49.7	29 04.4	+59.5	50.1	34
35	25 25.8	+58.4	47.2	26 06.5	+58.5	47.6	26 46.8	+58.7	47.9	27 26.9	+58.9	48.3	28 06.6	+59.1	48.7	28 46.0	+59.3	49.1	29 25.1	+59.4	49.5	30 03.9	+59.5	50.0	35
36	26 24.2	+58.3	46.9	27 05.0	+58.5	47.3	27 45.5	+58.7	47.7	28 25.8	+58.8	48.1	29 05.7	+59.0	48.5	29 45.3	+59.2	48.9	30 24.5	+59.3	49.4	31 03.4	+59.5	49.8	36
37	27 22.5	+58.3	46.7	28 03.5	+58.5	47.1	28 44.2	+58.7	47.5	29 24.6	+58.9	47.9	30 04.7	+59.0	48.3	30 44.5	+59.1	48.7	31 23.8	+59.4	49.2	32 02.9	+59.4	49.7	37
38	28 20.8	+58.3	46.4	29 02.0	+58.5	46.8	29 42.9	+58.7	47.2	30 23.5	+58.8	47.7	31 03.7	+59.0	48.1	31 43.6	+59.2	48.5	32 23.2	+59.3	49.0	33 02.3	+59.5	49.5	38
39	29 19.1	+58.2	46.1	30 00.5	+58.4	46.6	30 41.6	+58.6	47.0	31 22.3	+58.8	47.4	32 02.7	+59.0	47.9	32 42.8	+59.2	48.4	33 22.5	+59.3	48.8	34 01.8	+59.4	49.3	39
40	30 17.3	+58.2	45.9	30 58.9	+58.4	46.3	31 40.2	+58.6	46.7	32 21.1	+58.8	47.2	33 01.7	+59.0	47.7	33 42.0	+59.1	48.2	34 21.8	+59.3	48.7	35 01.2	+59.4	49.2	40
41	31 15.5	+58.1	45.6	31 57.3	+58.4	46.0	32 38.8	+58.6	46.5	33 19.9	+58.8	47.0	34 00.7	+58.9	47.4	34 41.1	+59.1	47.9	35 21.1	+59.2	48.5	36 00.6	+59.4	49.0	41
42	32 13.6	+58.1	45.3	32 55.7	+58.3	45.7	33 37.4	+58.5	46.2	34 18.7	+58.7	46.7	34 59.6	+58.9	47.2	35 40.2	+59.1	47.7	36 20.3	+59.3	48.3	37 00.0	+59.4	48.8	42
43	33 11.7	+58.1	45.0	33 54.0	+58.3	45.5	34 35.9	+58.5	46.0	35 17.4	+58.7	46.5	35 58.5	+58.9	47.0	36 39.3	+59.0	47.5	37 19.6	+59.2	48.1	37 59.4	+59.4	48.7	43
44	34 09.8	+58.0	44.7	34 52.3	+58.2	45.2	35 34.4	+58.4	45.7	36 16.1	+58.7	46.2	36 57.4	+58.9	46.7	37 38.3	+59.1	47.3	38 18.8	+59.2	47.9	38 58.8	+59.4	48.5	44
45	35 07.8	+58.0	44.4	35 50.5	+58.2	44.9	36 32.8	+58.5	45.4	37 14.8	+58.6	45.9	37 56.3	+58.8	46.5	38 37.4	+59.0	47.1	39 18.0	+59.2	47.7	39 58.2	+59.3	48.3	45
46	36 05.8	+57.9	44.1	36 48.7	+58.2	44.6	37 31.3	+58.3	45.1	38 13.4	+58.6	45.7	38 55.1	+58.8	46.2	39 36.4	+59.0	46.8	40 17.2	+59.1	47.5	40 57.5	+59.3	48.1	46
47	37 03.7	+57.9	43.7	37 46.9	+58.1	44.3	38 29.6	+58.4	44.8	39 12.0	+58.5	45.4	39 53.9	+58.8	46.0	40 35.4	+58.9	46.6	41 16.3	+59.2	47.2	41 56.8	+59.3	47.9	47
48	38 01.6	+57.8	43.4	38 45.0	+58.0	44.0	39 28.0	+58.3	44.5	40 10.5	+58.5	45.1	40 52.7	+58.7	45.7	41 34.3	+58.9	46.4	42 15.5	+59.1	47.0	42 56.1	+59.3	47.7	48
49	38 59.4	+57.8	43.1	39 43.0	+58.0	43.6	40 26.3	+58.2	44.2	41 09.0	+58.5	44.8	41 51.4	+58.6	45.4	42 33.2	+58.9	46.1	43 14.6	+59.0	46.8	43 55.4	+59.3	47.5	49
50	39 57.2	+57.6	42.7	40 41.0	+58.0	43.3	41 24.5	+58.2	43.9	42 07.5	+58.4	44.5	42 50.0	+58.7	45.2	43 32.1	+58.8	45.8	44 13.6	+59.1	46.5	44 54.7	+59.2	47.2	50
51	40 54.8	+57.7	42.4	41 39.0	+57.8	43.0	42 22.7	+58.1	43.6	43 05.9	+58.4	44.2	43 48.7	+58.6	44.9	44 30.9	+58.9	45.6	45 12.7	+59.0	46.3	45 53.9	+59.2	47.0	51
52	41 52.5	+57.5	42.0	42 36.8	+57.9	42.6	43 20.8	+58.1	43.2	44 04.3	+58.3	43.9	44 47.3	+58.5	44.6	45 29.8	+58.7	45.3	46 11.7	+59.0	46.0	46 53.1	+59.1	46.8	52
53	42 50.0	+57.5	41.6	43 34.7	+57.7	42.2	44 18.9	+57.9	42.9	45 02.6	+58.2	43.6	45 45.8	+58.5	44.3	46 28.5	+58.7	45.0	47 10.7	+58.9	45.7	47 52.2	+59.2	46.5	53
54	43 47.5	+57.3	41.2	44 32.4	+57.6	41.8	45 16.8	+58.0	42.5	46 00.8	+58.2	43.2	46 44.3	+58.4	43.9	47 27.2	+58.7	44.7	48 09.6	+58.9	45.5	48 51.4	+59.1	46.3	54
55	44 44.8	+57.3	40.8	45 30.0	+57.6	41.5	46 14.8	+57.8	42.1	46 59.0	+58.1	42.9	47 42.7	+58.4	43.6	48 25.9	+58.6	44.4	49 08.5	+58.8	45.2	49 50.5	+59.0	46.0	55
56	45 42.1	+57.2	40.4	46 27.6	+57.5	41.1	47 12.6	+57.8	41.8	47 57.1	+58.1	42.5	48 41.1	+58.3	43.3	49 24.5	+58.6	44.1	50 07.3	+58.8	44.9	50 49.5	+59.0	45.7	56
57	46 39.3	+57.1	39.9	47 25.1	+57.4	40.6	48 10.4	+57.7	41.4	48 55.2	+57.9	42.1	49 39.4	+58.2	42.9	50 23.1	+58.5	43.7	51 06.1	+58.8	44.6	51 48.5	+59.0	45.5	57
58	47 36.4	+57.0	39.5	48 22.5	+57.3	40.2	49 08.1	+57.5	40.9	49 53.1	+57.9	41.7	50 37.6	+58.2	42.5	51 21.6	+58.4	43.4	52 04.9	+58.6	44.2	52 47.5	+58.9	45.2	58
59	48 33.4	+56.8	39.0	49 19.8	+57.1	39.7	50 05.6	+57.5	40.5	50 51.0	+57.8	41.3	51 35.8	+58.1	42.1	52 20.0	+58.3	43.0	53 03.5	+58.7	43.9	53 46.4	+58.9	44.8	59
60	49 30.2	+56.8	38.5	50 16.9	+57.1	39.3	51 03.1	+57.4	40.1	51 48.8	+57.7	40.9	52 33.9	+57.9	41.7	53 18.3	+58.3	42.6	54 02.2	+58.5	43.5	54 45.3	+58.8	44.5	60
61	50 27.0	+56.6	38.0	51 14.0	+56.9	38.8	52 00.5	+57.3	39.6	52 46.5	+57.5	40.4	53 31.8	+57.9	41.3	54 16.6	+58.2	42.2	55 00.7	+58.5	43.2	55 44.1	+58.8	44.2	61
62	51 23.6	+56.4	37.5	52 10.9	+56.8	38.3	52 57.8	+57.1	39.1	53 44.0	+57.5	39.9	54 29.7	+57.8	40.8	55 14.8	+58.1	41.8	55 59.2	+58.4	42.8	56 42.9	+58.7	43.8	62
63	52 20.0	+56.3	36.9	53 07.7	+56.7	37.7	53 54.9	+57.0	38.6	54 41.5	+57.3	39.5	55 27.5	+57.7	40.4	56 12.9	+58.0	41.3	56 57.6	+58.3	42.3	57 41.6	+58.6	43.4	63
64	53 16.3	+56.1	36.4	54 04.4	+56.4	37.2	54 51.9	+56.8	38.0	55 38.8	+57.2	38.9	56 25.2	+57.6	39.9	57 10.9	+57.9	40.9	57 55.9	+58.3	41.9	58 40.2	+58.5	43.0	64
65	54 12.4	+55.9	35.8	55 00.8	+56.3	36.6	55 48.7	+56.7	37.5	56 36.0	+57.1	38.4	57 22.8	+57.4	39.4	58 08.8	+57.8	40.4	58 54.2	+58.1	41.5	59 38.7	+58.5	42.6	65
66	55 08.3	+55.8	35.1	55 57.1	+56.2	36.0	56 45.4	+56.5	36.9	57 33.1	+56.9	37.8	58 20.2	+57.2	38.8	59 06.6	+57.6	39.9	59 52.3	+58.0	41.0	60 37.2	+58.3	42.1	66
67	56 04.1	+55.5	34.5	56 53.3	+55.9	35.4	57 41.9	+56.3	36.3	58 30.0	+56.7	37.2	59 17.4	+57.2	38.2	60 04.2	+57.5	39.3	60 50.3	+57.8	40.4	61 35.5	+58.3	41.6	67
68	56 59.6	+55.2	33.8	57 49.2	+55.7	34.7	58 38.2	+56.1	35.6	59 26.7	+56.5	36.6	60 14.6	+56.9	37.6	61 01.7	+57.4	38.7	61 48.1	+57.8	39.9	62 33.8	+58.1	41.1	68
69	57 54.8	+55.0	33.1	58 44.9	+55.4	34.0	59 34.3	+55.9	34.9	60 23.2	+56.3	35.9	61 11.5	+56.7	37.0	61 59.1	+57.1	38.1	62 45.9	+57.6	39.3	63 31.9	+58.0	40.6	69
70	58 49.8	+54.8	32.3	59 40.3	+55.2	33.2	60 30.2	+55.6	34.2	61 19.5	+56.1	35.2	62 08.2	+56.5	36.3	62 56.2	+57.0	37.5	63 43.5	+57.4	38.7	64 29.9	+57.8	40.0	70
71	59 44.6	+54.4	31.5	60 35.5	+54.8	32.4	61 25.8	+55.4	33.4	62 15.6	+55.8	34.5	63 04.7	+56.3	35.6	63 53.2	+56.7	36.8	64 40.9	+57.2	38.0	65 27.7	+57.7	39.4	71
72	60 39.0	+54.1	30.7	61 30.3	+54.6	31.6	62 21.2	+55.0	32.6	63 11.4	+55.5	33.7	64 01.0	+56.0	34.8	64 49.9	+56.5	36.0	65 38.1	+57.0	37.3	66 25.4	+57.4	38.7	72
73	61 33.1	+53.7	29.8	62 24.9	+54.2	30.7	63 16.2	+54.7	31.7	64 06.9	+55.2	32.8	64 57.0	+55.8	34.0	65 46.4	+56.3	35.2	66 35.1	+56.7	36.5	67 22.8	+57.3	38.0	73
74	62 26.8	+53.2	28.8	63 19.1	+53.8	29.8	64 10.9	+54.3	30.8	65 02.1	+54.9	31.9	65 52.8	+55.3	33.1	66 42.7	+55.9	34.3	67 31.8	+56.5	35.7	68 20.1	+57.0	37.2	74
75	63 20.0	+52.9	27.8	64 12.9	+53.3	28.8	65 05.2	+53.9	29.8	65 57.0	+54.4	30.9	66 48.1	+55.0	32.1	67 38.6	+55.6	33.4	68 28.3	+56.1	34.8	69 17.1	+56.7	36.3	75
76	64 12.9	+52.3	26.7	65 06.2	+52.9	27.7	65 59.1	+53.4	28.7	66 51.4	+54.0	29.9	67 43.1	+54.6	31.1	68 34.2	+55.2	32.4	69 24.4	+55.8	33.8	70 13.8	+56.5	35.4	76
77	65 05.2	+51.8	25.6	65 59.1	+52.3	26.6	66 52.5	+52.9	27.6	67 45.4	+53.5	28.7	68 37.7	+54.1	30.0	69 29.4	+54.7	31.3	70 20.2	+55.4	32.7	71 10.3	+56.0	34.3	77
78	65 57.0	+51.1	24.4	66 51.4	+51.7	25.3	67 45.4	+52.3	26.4	68 38.9	+52.9	27.5	69 31.8	+53.6	28.7	70 24.1	+54.2	30.1	71 15.6	+54.9	31.6	72 06.3	+55.6	33.2	78
79	66 48.1	+50.5	23.1	67 43.1	+51.1	24.0	68 37.7	+51.7	25.1	69 31.8	+52.3	26.2	70 25.4	+52.9	27.4	71 18.3	+53.6	28.8	72 10.5	+54.3	30.3	73 01.9	+55.1	31.9	79
80	67 38.6	+49.7	21.7	68 34.2	+50.2	22.6	69 29.4	+50.8	23.6	70 24.1	+51.5	24.8	71 18.3	+52.2	26.0	72 11.9	+52.9	27.4	73 04.8	+53.7	28.9	73 57.0	+54.5	30.5	80
81	68 28.3	+48.8	20.2	69 24.4	+49.4	21.1	70 20.2	+50.1	22.1	71 15.6	+50.7	23.2	72 10.5	+51.4	24.4	73 04.8	+52.2	25.8	73 58.5	+53.0	27.3	74 51.5	+53.7	29.0	81
82	69 17.1	+47.9	18.6	70 13.8	+48.5	19.4	71 10.3	+49.0	20.4	72 06.3	+49.7	21.5	73 01.9	+50.4	22.7	73 57.0	+51.2	24.0	74 51.5	+52.0	25.5	75 45.2	+52.9	27.2	82
83	70 05.0	+46.7	16.8	71 02.3	+47.3	17.7	71 59.3	+47.9	18.6	72 56.0	+48.6	19.6	73 52.3	+49.3	20.8	74 48.2	+50.0	22.1	75 43.5	+50.9	23.6	76 38.1	+51.8	25.2	83
84	70 51.7	+45.6	14.9	71 49.6	+46.1	15.7	72 47.2	+46.7	16.6	73 44.6	+47.3	17.6	74 41.6	+48.0	18.7	75 38.2	+48.8	19.9	76 34.4	+49.6	21.4	77 29.9	+50.6	23.0	84
85	71 37.3	+44.1	12.9	72 35.7	+44.6	13.6	73 33.9	+45.1	14.4	74 31.9	+45.7	15.3	75 29.6	+46.4	16.3	76 27.0	+47.2	17.5	77 24.0	+48.0	18.9	78 20.5	+49.0	20.4	85
86	72 21.4	+42.6	10.7	73 20.3	+43.0	11.4	74 19.0	+43.5	12.1	75 17.6	+44.0	12.8	76 16.0	+44.6	13.8	77 14.2	*+45.3* •	14.8	78 12.0	*+46.1* •	16.0	79 09.5	*+47.0* •	17.5	86
87	73 04.0	+40.7	8.4	74 03.3	*+41.1* •	8.9	75 02.5	*+41.5* •	9.4	76 01.6	*+42.0* •	10.1	77 00.6	*+42.5* •	10.9	77 59.5	*+43.0* •	11.7	78 58.1	*+43.8* •	12.8	79 56.5	*+44.5* •	14.0	87
88	73 44.7	*+38.8* •	5.8	74 44.4	*+39.0* •	6.2	75 44.0	*+39.3* •	6.6	76 43.6	*+39.6* •	7.1	77 43.1	*+40.0* •	7.6	78 42.5	*+40.4* •	8.3	79 41.9	*+40.8* •	9.1	80 41.0	*+41.5* •	10.0	88
89	74 23.5	*+36.5* •	3.0	75 23.4	*+36.6* •	3.2	76 23.3	*+36.7* •	3.4	77 23.2	*+36.8* •	3.7	78 23.1	*+36.9* •	4.0	79 22.9	*+37.1* •	4.4	80 22.7	*+37.3* •	4.8	81 22.5	*+37.5* •	5.4	89
90	75 00.0	*+33.9* •	0.0	76 00.0	*+33.8* •	0.0	77 00.0	*+33.7* •	0.0	78 00.0	*+33.6* •	0.0	79 00.0	*+33.4* •	0.0	80 00.0	*+33.2* •	0.0	81 00.0	*+33.0* •	0.0	82 00.0	*+32.6* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 126°, 234°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 32.2	+58.6	124.1	7 58.6	+58.8	124.2	7 24.8	+59.0	124.3	6 50.9	+59.1	124.4	6 17.0	+59.2	124.5	5 43.0	+59.4	124.6	5 08.9	+59.5	124.7	4 34.7	+59.6	124.7	**0**
1	9 30.8	+58.6	123.9	8 57.4	+58.7	124.0	8 23.8	+58.9	124.1	7 50.0	+59.2	124.2	7 16.2	+59.3	124.3	6 42.4	+59.3	124.4	6 08.4	+59.5	124.5	5 34.3	+59.6	124.6	**1**
2	10 29.4	+58.6	123.6	9 56.1	+58.8	123.8	9 22.7	+58.9	123.9	8 49.2	+59.1	124.1	8 15.5	+59.2	124.2	7 41.7	+59.4	124.3	7 07.9	+59.5	124.4	6 33.9	+59.6	124.5	**2**
3	11 28.0	+58.6	123.4	10 54.9	+58.8	123.6	10 21.6	+58.9	123.7	9 48.3	+59.0	123.9	9 14.7	+59.3	124.0	8 41.1	+59.4	124.2	8 07.4	+59.5	124.3	7 33.5	+59.6	124.4	**3**
4	12 26.6	+58.6	123.2	11 53.7	+58.7	123.4	11 20.6	+58.9	123.5	10 47.3	+59.1	123.7	10 14.0	+59.2	123.9	9 40.5	+59.4	124.0	9 06.9	+59.5	124.1	8 33.1	+59.6	124.3	**4**
5	13 25.2	+58.5	123.0	12 52.4	+58.8	123.2	12 19.5	+58.9	123.4	11 46.4	+59.1	123.5	11 13.2	+59.2	123.7	10 39.9	+59.3	123.9	10 06.4	+59.4	124.0	9 32.7	+59.6	124.2	**5**
6	14 23.7	+58.5	122.7	13 51.2	+58.7	123.0	13 18.4	+58.9	123.2	12 45.5	+59.1	123.4	12 12.4	+59.3	123.5	11 39.2	+59.4	123.7	11 05.8	+59.5	123.9	10 32.3	+59.6	124.0	**6**
7	15 22.2	+58.6	122.5	14 49.9	+58.7	122.7	14 17.3	+58.9	123.0	13 44.6	+59.1	123.2	13 11.7	+59.2	123.4	12 38.6	+59.3	123.6	12 05.3	+59.5	123.7	11 31.9	+59.6	123.9	**7**
8	16 20.8	+58.5	122.3	15 48.6	+58.7	122.5	15 16.2	+58.9	122.8	14 43.7	+59.0	123.0	14 10.9	+59.2	123.2	13 37.9	+59.4	123.4	13 04.8	+59.5	123.6	12 31.5	+59.6	123.8	**8**
9	17 19.3	+58.5	122.1	16 47.3	+58.7	122.3	16 15.1	+58.9	122.6	15 42.7	+59.1	122.8	15 10.1	+59.2	123.0	14 37.3	+59.3	123.3	14 04.3	+59.5	123.5	13 31.1	+59.6	123.7	**9**
10	18 17.8	+58.4	121.8	17 46.0	+58.7	122.1	17 14.0	+58.9	122.4	16 41.8	+59.0	122.6	16 09.3	+59.2	122.9	15 36.6	+59.4	123.1	15 03.8	+59.4	123.3	14 30.7	+59.6	123.6	**10**
11	19 16.2	+58.5	121.6	18 44.7	+58.6	121.9	18 12.9	+58.8	122.2	17 40.8	+59.0	122.4	17 08.5	+59.2	122.7	16 36.0	+59.3	123.0	16 03.2	+59.5	123.2	15 30.3	+59.5	123.4	**11**
12	20 14.7	+58.4	121.3	19 43.3	+58.7	121.7	19 11.7	+58.9	122.0	18 39.8	+59.0	122.3	18 07.7	+59.2	122.5	17 35.3	+59.3	122.8	17 02.7	+59.4	123.1	16 29.8	+59.6	123.3	**12**
13	21 13.1	+58.5	121.1	20 42.0	+58.6	121.4	20 10.6	+58.8	121.8	19 38.8	+59.1	122.1	19 06.9	+59.1	122.4	18 34.6	+59.3	122.6	18 02.1	+59.5	122.9	17 29.4	+59.6	123.2	**13**
14	22 11.6	+58.4	120.9	21 40.6	+58.6	121.2	21 09.4	+58.8	121.5	20 37.9	+58.9	121.9	20 06.0	+59.2	122.2	19 33.9	+59.4	122.5	19 01.6	+59.4	122.8	18 29.0	+59.5	123.1	**14**
15	23 10.0	+58.3	120.6	22 39.2	+58.6	121.0	22 08.2	+58.8	121.3	21 36.8	+59.0	121.7	21 05.2	+59.1	122.0	20 33.3	+59.3	122.3	20 01.0	+59.5	122.6	19 28.5	+59.6	122.9	**15**
16	24 08.3	+58.4	120.4	23 37.8	+58.6	120.7	23 07.0	+58.8	121.1	22 35.8	+59.0	121.5	22 04.3	+59.2	121.8	21 32.6	+59.2	122.2	21 00.5	+59.4	122.5	20 28.1	+59.5	122.8	**16**
17	25 06.7	+58.3	120.1	24 36.4	+58.5	120.5	24 05.8	+58.7	120.9	23 34.8	+58.9	121.3	23 03.5	+59.1	121.6	22 31.8	+59.3	122.0	21 59.9	+59.4	122.3	21 27.6	+59.6	122.7	**17**
18	26 05.0	+58.3	119.8	25 34.9	+58.6	120.3	25 04.5	+58.8	120.7	24 33.7	+59.0	121.1	24 02.6	+59.1	121.5	23 31.1	+59.3	121.8	22 59.3	+59.4	122.2	22 27.2	+59.5	122.5	**18**
19	27 03.3	+58.2	119.6	26 33.5	+58.5	120.0	26 03.3	+58.7	120.4	25 32.7	+58.9	120.9	25 01.7	+59.1	121.3	24 30.4	+59.2	121.7	23 58.7	+59.4	122.0	23 26.7	+59.6	122.4	**19**
20	28 01.5	+58.3	119.3	27 32.0	+58.4	119.8	27 02.0	+58.7	120.2	26 31.6	+58.9	120.6	26 00.8	+59.1	121.1	25 29.6	+59.3	121.5	24 58.1	+59.4	121.9	24 26.3	+59.5	122.3	**20**
21	28 59.8	+58.2	119.0	28 30.4	+58.5	119.5	28 00.7	+58.6	120.0	27 30.5	+58.8	120.4	26 59.9	+59.0	120.9	26 28.9	+59.2	121.3	25 57.5	+59.4	121.7	25 25.8	+59.5	122.1	**21**
22	29 58.0	+58.1	118.8	29 28.9	+58.4	119.3	28 59.3	+58.7	119.7	28 29.3	+58.9	120.2	27 58.9	+59.1	120.7	27 28.1	+59.2	121.1	26 56.9	+59.4	121.6	26 25.3	+59.5	122.0	**22**
23	30 56.1	+58.1	118.5	30 27.3	+58.3	119.0	29 58.0	+58.6	119.5	29 28.2	+58.8	120.0	28 58.0	+59.0	120.5	28 27.3	+59.2	120.9	27 56.3	+59.3	121.4	27 24.8	+59.5	121.9	**23**
24	31 54.2	+58.1	118.2	31 25.6	+58.4	118.7	30 56.6	+58.6	119.2	30 27.0	+58.8	119.8	29 57.0	+59.0	120.3	29 26.5	+59.2	120.8	28 55.6	+59.4	121.2	28 24.3	+59.5	121.7	**24**
25	32 52.3	+58.0	117.9	32 24.0	+58.3	118.4	31 55.2	+58.5	119.0	31 25.8	+58.8	119.5	30 56.0	+59.0	120.1	30 25.7	+59.2	120.6	29 55.0	+59.3	121.1	29 23.8	+59.5	121.6	**25**
26	33 50.3	+58.0	117.6	33 22.3	+58.3	118.2	32 53.7	+58.5	118.7	32 24.6	+58.8	119.3	31 55.0	+59.0	119.8	31 24.9	+59.1	120.4	30 54.3	+59.3	120.9	30 23.3	+59.4	121.4	**26**
27	34 48.3	+58.0	117.3	34 20.6	+58.2	117.9	33 52.2	+58.5	118.5	33 23.4	+58.7	119.1	32 54.0	+58.9	119.6	32 24.0	+59.2	120.2	31 53.6	+59.3	120.7	31 22.7	+59.5	121.3	**27**
28	35 46.3	+57.9	116.9	35 18.8	+58.2	117.6	34 50.7	+58.5	118.2	34 22.1	+58.7	118.8	33 52.9	+58.9	119.4	33 23.2	+59.1	120.0	32 52.9	+59.3	120.5	32 22.2	+59.4	121.1	**28**
29	36 44.2	+57.8	116.6	36 17.0	+58.1	117.3	35 49.2	+58.4	117.9	35 20.8	+58.6	118.6	34 51.8	+58.9	119.2	34 22.3	+59.1	119.8	33 52.2	+59.3	120.4	33 21.6	+59.5	120.9	**29**
30	37 42.0	+57.8	116.3	37 15.1	+58.1	117.0	36 47.6	+58.3	117.6	36 19.4	+58.7	118.3	35 50.7	+58.9	118.9	35 21.4	+59.1	119.6	34 51.5	+59.3	120.2	34 21.1	+59.4	120.8	**30**
31	38 39.8	+57.7	115.9	38 13.2	+58.0	116.7	37 45.9	+58.4	117.4	37 18.1	+58.6	118.0	36 49.6	+58.8	118.7	36 20.5	+59.0	119.3	35 50.8	+59.2	120.0	35 20.5	+59.4	120.6	**31**
32	39 37.5	+57.6	115.6	39 11.2	+58.0	116.3	38 44.3	+58.2	117.1	38 16.7	+58.5	117.8	37 48.4	+58.8	118.4	37 19.5	+59.0	119.1	36 50.0	+59.2	119.8	36 19.9	+59.4	120.4	**32**
33	40 35.1	+57.6	115.2	40 09.2	+57.9	116.0	39 42.5	+58.3	116.7	39 15.2	+58.5	117.5	38 47.2	+58.8	118.2	38 18.5	+59.0	118.9	37 49.2	+59.2	119.6	37 19.3	+59.4	120.2	**33**
34	41 32.7	+57.5	114.9	41 07.1	+57.9	115.7	40 40.8	+58.2	116.4	40 13.7	+58.5	117.2	39 46.0	+58.7	117.9	39 17.5	+59.0	118.7	38 48.4	+59.2	119.4	38 18.7	+59.3	120.1	**34**
35	42 30.2	+57.4	114.5	42 05.0	+57.8	115.3	41 39.0	+58.1	116.1	41 12.2	+58.4	116.9	40 44.7	+58.7	117.7	40 16.5	+58.9	118.4	39 47.6	+59.1	119.2	39 18.0	+59.4	119.9	**35**
36	43 27.6	+57.4	114.1	43 02.8	+57.7	114.9	42 37.1	+58.0	115.8	42 10.6	+58.4	116.6	41 43.4	+58.6	117.4	41 15.4	+58.9	118.2	40 46.7	+59.1	118.9	40 17.4	+59.3	119.7	**36**
37	44 25.0	+57.2	113.7	44 00.5	+57.6	114.6	43 35.1	+58.0	115.4	43 09.0	+58.3	116.3	42 42.0	+58.6	117.1	42 14.3	+58.9	117.9	41 45.8	+59.1	118.7	41 16.7	+59.3	119.5	**37**
38	45 22.2	+57.2	113.2	44 58.1	+57.6	114.2	44 33.1	+57.9	115.1	44 07.3	+58.2	115.9	43 40.6	+58.6	116.8	43 13.2	+58.8	117.7	42 44.9	+59.1	118.5	42 16.0	+59.2	119.3	**38**
39	46 19.4	+57.0	112.8	45 55.7	+57.4	113.8	45 31.0	+57.9	114.7	45 05.5	+58.2	115.6	44 39.2	+58.5	116.5	44 12.0	+58.8	117.4	43 44.0	+59.0	118.2	43 15.2	+59.3	119.1	**39**
40	47 16.4	+57.0	112.4	46 53.1	+57.4	113.3	46 28.9	+57.8	114.3	46 03.7	+58.2	115.3	45 37.7	+58.4	116.2	45 10.8	+58.7	117.1	44 43.0	+59.0	118.0	44 14.5	+59.2	118.8	**40**
41	48 13.4	+56.8	111.9	47 50.5	+57.3	112.9	47 26.7	+57.7	113.9	47 01.9	+58.0	114.9	46 36.1	+58.4	115.9	46 09.5	+58.7	116.8	45 42.0	+59.0	117.7	45 13.7	+59.2	118.6	**41**
42	49 10.2	+56.7	111.4	48 47.8	+57.2	112.5	48 24.4	+57.5	113.5	47 59.9	+58.0	114.5	47 34.5	+58.4	115.5	47 08.2	+58.7	116.5	46 41.0	+58.9	117.5	46 12.9	+59.2	118.4	**42**
43	50 06.9	+56.5	110.9	49 45.0	+57.0	112.0	49 21.9	+57.5	113.1	48 57.9	+57.9	114.1	48 32.9	+58.2	115.2	48 06.9	+58.6	116.2	47 39.9	+58.9	117.2	47 12.1	+59.1	118.1	**43**
44	51 03.4	+56.5	110.4	50 42.0	+56.9	111.5	50 19.4	+57.4	112.6	49 55.8	+57.8	113.7	49 31.1	+58.2	114.8	49 05.5	+58.5	115.9	48 38.8	+58.8	116.9	48 11.2	+59.1	117.9	**44**
45	51 59.9	+56.2	109.8	51 38.9	+56.8	111.0	51 16.8	+57.3	112.2	50 53.6	+57.8	113.3	50 29.3	+58.2	114.4	50 04.0	+58.5	115.5	49 37.6	+58.8	116.6	49 10.3	+59.1	117.6	**45**
46	52 56.1	+56.1	109.2	52 35.7	+56.7	110.5	52 14.1	+57.2	111.7	51 51.4	+57.6	112.9	51 27.5	+58.0	114.0	51 02.5	+58.4	115.2	50 36.4	+58.8	116.3	50 09.4	+59.0	117.4	**46**
47	53 52.2	+55.9	108.7	53 32.4	+56.4	109.9	53 11.3	+57.0	111.2	52 49.0	+57.5	112.4	52 25.5	+58.0	113.6	52 00.9	+58.3	114.8	51 35.2	+58.7	116.0	51 08.4	+59.0	117.1	**47**
48	54 48.1	+55.7	108.0	54 28.8	+56.4	109.4	54 08.3	+56.9	110.7	53 46.5	+57.4	112.0	53 23.5	+57.8	113.2	52 59.2	+58.3	114.4	52 33.9	+58.6	115.6	52 07.4	+58.9	116.8	**48**
49	55 43.8	+55.4	107.4	55 25.2	+56.1	108.8	55 05.2	+56.7	110.1	54 43.9	+57.3	111.5	54 21.3	+57.8	112.8	53 57.5	+58.2	114.0	53 32.5	+58.5	115.3	53 06.3	+58.9	116.5	**49**
50	56 39.2	+55.3	106.7	56 21.3	+55.9	108.1	56 01.9	+56.6	109.5	55 41.2	+57.1	110.9	55 19.1	+57.6	112.3	54 55.7	+58.1	113.6	54 31.0	+58.5	114.9	54 05.2	+58.8	116.1	**50**
51	57 34.5	+54.9	106.0	57 17.2	+55.7	107.5	56 58.5	+56.3	108.9	56 38.3	+56.9	110.4	56 16.7	+57.5	111.8	55 53.8	+57.9	113.2	55 29.5	+58.4	114.5	55 04.0	+58.8	115.8	**51**
52	58 29.4	+54.7	105.2	58 12.9	+55.5	106.8	57 54.8	+56.2	108.3	57 35.2	+56.9	109.8	57 14.2	+57.4	111.3	56 51.7	+57.9	112.7	56 27.9	+58.3	114.1	56 02.8	+58.7	115.5	**52**
53	59 24.1	+54.4	104.4	59 08.4	+55.2	106.0	58 51.0	+56.0	107.6	58 32.1	+56.6	109.2	58 11.6	+57.2	110.7	57 49.6	+57.8	112.2	57 26.2	+58.3	113.7	57 01.5	+58.6	115.1	**53**
54	60 18.5	+54.1	103.6	60 03.6	+54.9	105.3	59 47.0	+55.7	106.9	59 28.7	+56.4	108.5	59 08.8	+57.1	110.1	58 47.4	+57.6	111.7	58 24.5	+58.1	113.2	58 00.1	+58.6	114.7	**54**
55	61 12.6	+53.7	102.7	60 58.5	+54.6	104.4	60 42.7	+55.4	106.2	60 25.1	+56.2	107.9	60 05.9	+56.8	109.5	59 45.0	+57.5	111.1	59 22.6	+58.0	112.7	58 58.7	+58.4	114.3	**55**
56	62 06.3	+53.2	101.7	61 53.1	+54.3	103.6	61 38.1	+55.2	105.4	61 21.3	+56.0	107.2	61 02.7	+56.7	108.9	60 42.5	+57.3	110.6	60 20.6	+57.9	112.2	59 57.1	+58.4	113.8	**56**
57	62 59.5	+52.9	100.7	62 47.4	+53.8	102.7	62 33.3	+54.8	104.5	62 17.3	+55.7	106.4	61 59.4	+56.5	108.2	61 39.8	+57.2	110.0	61 18.5	+57.7	111.7	60 55.5	+58.3	113.4	**57**
58	63 52.4	+52.3	99.7	63 41.2	+53.5	101.7	63 28.1	+54.5	103.6	63 13.0	+55.3	105.6	62 55.9	+56.2	107.5	62 37.0	+56.9	109.3	62 16.2	+57.6	111.1	61 53.8	+58.1	112.9	**58**
59	64 44.7	+51.8	98.6	64 34.7	+53.0	100.6	64 22.6	+54.0	102.7	64 08.3	+55.1	104.7	63 52.1	+56.0	106.7	63 33.9	+56.8	108.6	63 13.8	+57.5	110.5	62 51.9	+58.1	112.3	**59**
60	65 36.5	+51.2	97.4	65 27.7	+52.4	99.5	65 16.6	+53.7	101.7	65 03.4	+54.7	103.8	64 48.1	+55.6	105.8	64 30.7	+56.5	107.9	64 11.3	+57.2	109.8	63 50.0	+57.9	111.8	**60**
61	66 27.7	+50.5	96.1	66 20.1	+51.9	98.3	66 10.3	+53.1	100.6	65 58.1	+54.3	102.8	65 43.7	+55.3	105.0	65 27.2	+56.2	107.1	65 08.5	+57.1	109.1	64 47.9	+57.7	111.2	**61**
62	67 18.2	+49.7	94.7	67 12.0	+51.2	97.1	67 03.4	+52.6	99.4	66 52.4	+53.8	101.7	66 39.0	+55.0	104.0	66 23.4	+55.9	106.2	66 05.6	+56.8	108.4	65 45.6	+57.5	110.5	**62**
63	68 07.9	+48.9	93.2	68 03.2	+50.5	95.7	67 56.0	+52.0	98.2	67 46.2	+53.3	100.6	67 34.0	+54.5	103.0	67 19.3	+55.6	105.3	67 02.4	+56.5	107.6	66 43.1	+57.4	109.8	**63**
64	68 56.8	+47.9	91.6	68 53.7	+49.7	94.2	68 48.0	+51.2	96.8	68 39.5	+52.8	99.3	68 28.5	+54.0	101.8	68 14.9	+55.2	104.3	67 58.9	+56.2	106.7	67 40.5	+57.1	109.0	**64**
65	69 44.7	+46.9	89.9	69 43.4	+48.7	92.6	69 39.2	+50.5	95.3	69 32.3	+52.0	98.0	69 22.5	+53.5	100.6	69 10.1	+54.8	103.2	68 55.1	+55.9	105.8	68 37.6	+56.8	108.2	**65**
66	70 31.6	+45.7	88.1	70 32.1	+47.7	90.9	70 29.7	+49.6	93.7	70 24.3	+51.3	96.6	70 16.0	+52.9	99.3	70 04.9	+54.2	102.0	69 51.0	+55.5	104.7	69 34.4	+56.6	107.3	**66**
67	71 17.3	+44.3	86.1	71 19.8	+46.5	89.1	71 19.3	+48.5	92.0	71 15.6	+50.4	95.0	71 08.9	+52.1	97.9	70 59.1	+53.7	100.8	70 46.5	+55.0	103.6	70 31.0	+56.2	106.3	**67**
68	72 01.6	+42.8	84.0	72 06.3	+45.2	87.0	72 07.8	+47.4	90.1	72 06.0	+49.4	93.2	72 01.0	+51.3	96.3	71 52.8	+53.0	99.4	71 41.5	+54.5	102.3	71 27.2	+55.8	105.3	**68**
69	72 44.4	+41.1	81.7	72 51.5	+43.6	84.9	72 55.2	+46.0	88.1	72 55.4	+48.3	91.4	72 52.3	+50.4	94.6	72 45.8	+52.2	97.8	72 36.0	+53.9	101.0	72 23.0	+55.3	104.1	**69**
70	73 25.5	+39.1 •	79.1	73 35.1	+41.8	82.5	73 41.2	+44.5	85.9	73 43.7	+47.0	89.3	73 42.7	+49.2	92.7	73 38.0	+51.4	96.1	73 29.9	+53.2	99.5	73 18.3	+54.8	102.8	**70**
71	74 04.6	+37.0 •	76.4	74 16.9	+39.9 •	79.9	74 25.7	+42.7	83.4	74 30.7	+45.4	87.0	74 31.9	+47.9	90.6	74 29.4	+50.2	94.2	74 23.1	+52.3	97.8	74 13.1	+54.1	101.3	**71**
72	74 41.6	+34.4 •	73.5	74 56.8	+37.6 •	77.1	75 08.4	+40.6 •	80.7	75 16.1	+43.6	84.5	75 19.8	+46.4	88.3	75 19.6	+49.0	92.1	75 15.4	+51.3	95.9	75 07.2	+53.4	99.7	**72**
73	75 16.0	+31.7 •	70.3	75 34.4	+35.0 •	74.0	75 49.0	+38.3 •	77.8	75 59.7	+41.5 •	81.7	76 06.2	+44.6	85.7	76 08.6	+47.5	89.8	76 06.7	+50.1	93.8	76 00.6	+52.4	97.8	**73**
74	75 47.7	+28.6 •	66.9	76 09.4	+32.1 •	70.7	76 27.3	+35.7 •	74.6	76 41.2	+39.1 •	78.7	76 50.8	+42.5 •	82.9	76 56.1	+45.6	87.2	76 56.8	+48.6	91.5	76 53.0	+51.3	95.8	**74**
75	76 16.3	+25.2 •	63.3	76 41.5	+28.9 •	67.1	77 03.0	+32.5 •	71.1	77 20.3	+36.3 •	75.3	77 33.3	+40.0 •	79.7	77 41.7	+43.6 •	84.2	77 45.4	+46.9	88.8	77 44.3	+49.8	93.4	**75**
76	76 41.5	+21.5 •	59.4	77 10.4	+25.1 •	63.2	77 35.5	+29.0 •	67.3	77 56.6	+33.0 •	71.6	78 13.3	+37.0 •	76.1	78 25.3	+40.9 •	80.9	78 32.3	+44.7 •	85.7	78 34.1	+48.2	90.7	**76**
77	77 03.0	+17.3 •	55.3	77 35.5	+21.1 •	59.0	78 04.5	+25.1 •	63.1	78 29.6	+29.3 •	67.5	78 50.3	+33.6 •	72.2	79 06.2	+37.9 •	77.1	79 17.0	+42.1 •	82.3	79 22.3	+46.0 •	87.6	**77**
78	77 20.3	+13.0 •	51.0	77 56.6	+16.7 •	54.6	78 29.6	+20.7 •	58.6	78 58.9	+25.0 •	63.0	79 23.9	+29.5 •	67.8	79 44.1	+34.2 •	72.9	79 59.1	+38.8 •	78.3	80 08.3	+43.4 •	84.0	**78**
79	77 33.3	+8.4 •	46.5	78 13.3	+12.0 •	50.0	78 50.3	+15.9 •	53.9	79 23.9	+20.2 •	58.2	79 53.4	+24.9 •	62.9	80 18.3	+29.8 •	68.1	80 37.9	+34.9 •	73.8	80 51.7	+39.9 •	79.8	**79**
80	77 41.7	+3.7 •	41.9	78 25.3	+7.0 •	45.1	79 06.2	+10.8 •	48.8	79 44.1	+15.0 •	53.0	80 18.3	+19.6 •	57.6	80 48.1	+24.7 •	62.9	81 12.8	+30.1 •	68.6	81 31.6	+35.8 •	74.9	**80**
81	77 45.4	−1.1 •	37.2	78 32.3	+1.8 •	40.2	79 17.0	+5.3 •	43.6	79 59.1	+9.2 •	47.5	80 37.9	+13.8 •	51.9	81 12.8	+18.8 •	57.0	81 42.9	+24.5 •	62.8	82 07.4	+30.5 •	69.2	**81**
82	77 44.3	−6.0 •	32.5	78 34.1	−3.3 •	35.1	79 22.3	−0.2 •	38.2	80 08.3	+3.3 •	41.7	80 51.7	+7.4 •	45.9	81 31.6	+12.3 •	50.7	82 07.4	+17.8 •	56.3	82 37.9	+24.1 •	62.7	**82**
83	77 38.3	−10.6 •	27.8	78 30.8	−8.3 •	30.1	79 22.1	−5.8 •	32.8	80 11.6	−2.7 •	35.9	80 59.1	+0.9 •	39.6	81 43.9	+5.3 •	44.0	82 25.2	+10.4 •	49.2	83 02.0	+16.5 •	55.4	**83**
84	77 27.7	−15.1 •	23.2	78 22.5	−13.4 •	25.1	79 16.3	−11.2 •	27.4	80 08.9	−8.7 •	30.0	81 00.0	−5.6 •	33.2	81 49.2	−2.0 •	37.0	82 35.6	+2.5 •	41.6	83 18.5	+8.0 •	47.3	**84**
85	77 12.6	−19.3 •	18.8	78 09.1	−17.9 •	20.3	79 05.1	−16.4 •	22.1	80 00.2	−14.4 •	24.3	80 54.4	−12.1 •	26.9	81 47.2	−9.2 •	30.0	82 38.1	−5.5 •	33.8	83 26.5	−1.0 •	38.7	**85**
86	76 53.3	−23.3 •	14.6	77 51.2	−22.3 •	15.8	78 48.7	−21.1 •	17.1	79 45.8	−19.7 •	18.8	80 42.3	−18.0 •	20.7	81 38.0	−16.0 •	23.1	82 32.6	−13.4 •	26.1	83 25.5	−9.9 •	29.9	**86**
87	76 30.0	−26.8 •	10.6	77 28.9	−26.2 •	11.4	78 27.6	−25.4 •	12.4	79 26.1	−24.5 •	13.5	80 24.3	−23.5 •	14.9	81 22.0	−22.1 •	16.6	82 19.2	−20.4 •	18.7	83 15.6	−18.3 •	21.4	**87**
88	76 03.2	−30.1 •	6.8	77 02.7	−29.8 •	7.3	78 02.2	−29.4 •	7.9	79 01.6	−28.9 •	8.6	80 00.8	−28.3 •	9.5	80 59.9	−27.6 •	10.5	81 58.8	−26.7 •	11.8	82 57.3	−25.6 •	13.5	**88**
89	75 33.1	−33.1 •	3.3	76 32.9	−32.9 •	3.5	77 32.8	−32.8 •	3.8	78 32.7	−32.7 •	4.1	79 32.5	−32.5 •	4.5	80 32.3	−32.3 •	5.0	81 32.1	−32.1 •	5.6	82 31.7	−31.7 •	6.3	**89**
90	75 00.0	−35.7 •	0.0	76 00.0	−35.8 •	0.0	77 00.0	−35.9 •	0.0	78 00.0	−36.0 •	0.0	79 00.0	−36.1 •	0.0	80 00.0	−36.3 •	0.0	81 00.0	−36.5 •	0.0	82 00.0	−36.7 •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 55°, 305°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 32.2	–58.6	124.1	7 58.6	–58.8	124.2	7 24.8	–59.0	124.3	6 50.9	–59.1	124.4	6 17.0	–59.3	124.5	5 43.0	–59.4	124.6	5 08.9	–59.5	124.7	4 34.7	–59.6	124.7	**0**
1	7 33.6	–58.6	124.3	6 59.8	–58.8	124.4	6 25.8	–58.9	124.5	5 51.8	–59.1	124.6	5 17.7	–59.2	124.7	4 43.6	–59.4	124.7	4 09.4	–59.5	124.8	3 35.1	–59.6	124.9	**1**
2	6 35.0	–58.6	124.5	6 01.0	–58.8	124.6	5 26.9	–59.0	124.7	4 52.7	–59.1	124.8	4 18.5	–59.3	124.8	3 44.2	–59.4	124.9	3 09.9	–59.5	124.9	2 35.5	–59.6	125.0	**2**
3	5 36.4	–58.6	124.7	5 02.2	–58.8	124.8	4 27.9	–58.9	124.9	3 53.6	–59.1	124.9	3 19.2	–59.2	125.0	2 44.8	–59.4	125.0	2 10.4	–59.5	125.1	1 35.9	–59.6	125.1	**3**
4	4 37.8	–58.7	124.9	4 03.4	–58.8	125.0	3 29.0	–59.0	125.0	2 54.5	–59.1	125.1	2 20.0	–59.3	125.1	1 45.4	–59.4	125.2	1 10.9	–59.5	125.2	0 36.3	–59.6	125.2	**4**
5	3 39.1	–58.6	125.1	3 04.6	–58.8	125.2	2 30.0	–59.0	125.2	1 55.4	–59.2	125.3	1 20.7	–59.3	125.3	0 46.0	–59.4	125.3	0 11.4	–59.6	125.3	0 23.3	+59.6	54.7	**5**
6	2 40.5	–58.6	125.4	2 05.8	–58.8	125.4	1 31.0	–59.0	125.4	0 56.2	–59.1	125.4	0 21.4	–59.2	125.4	0 13.4	+59.3	54.6	0 48.2	+59.5	54.6	1 22.9	+59.6	54.6	**6**
7	1 41.9	–58.7	125.6	1 07.0	–58.8	125.6	0 32.0	–58.9	125.6	0 02.9	+59.1	54.4	0 37.8	+59.3	54.4	1 12.7	+59.4	54.4	1 47.7	+59.5	54.4	2 22.5	+59.6	54.5	**7**
8	0 43.2	–58.6	125.8	0 08.2	–58.9	125.8	0 26.9	+59.0	54.2	1 02.0	+59.1	54.2	1 37.1	+59.2	54.2	2 12.1	+59.4	54.3	2 47.2	+59.5	54.3	3 22.1	+59.7	54.3	**8**
9	0 15.4	+58.6	54.0	0 50.7	+58.8	54.0	1 25.9	+59.0	54.0	2 01.1	+59.2	54.1	2 36.3	+59.3	54.1	3 11.5	+59.4	54.1	3 46.7	+59.5	54.2	4 21.8	+59.6	54.2	**9**
10	1 14.0	+58.7	53.8	1 49.5	+58.8	53.8	2 24.9	+58.9	53.8	3 00.3	+59.1	53.9	3 35.6	+59.3	53.9	4 10.9	+59.4	54.0	4 46.2	+59.5	54.0	5 21.4	+59.6	54.1	**10**
11	2 12.7	+58.6	53.6	2 48.3	+58.8	53.6	3 23.8	+59.0	53.7	3 59.4	+59.1	53.7	4 34.9	+59.2	53.8	5 10.3	+59.4	53.8	5 45.7	+59.5	53.9	6 21.0	+59.6	54.0	**11**
12	3 11.3	+58.6	53.4	3 47.1	+58.8	53.4	4 22.8	+59.0	53.5	4 58.5	+59.1	53.5	5 34.1	+59.3	53.6	6 09.7	+59.4	53.7	6 45.2	+59.5	53.8	7 20.6	+59.6	53.9	**12**
13	4 09.9	+58.7	53.2	4 45.9	+58.8	53.2	5 21.8	+58.9	53.3	5 57.6	+59.1	53.4	6 33.4	+59.2	53.5	7 09.1	+59.3	53.6	7 44.7	+59.5	53.7	8 20.2	+59.6	53.8	**13**
14	5 08.6	+58.6	52.9	5 44.7	+58.8	53.0	6 20.7	+59.0	53.1	6 56.7	+59.1	53.2	7 32.6	+59.3	53.3	8 08.4	+59.4	53.4	8 44.2	+59.5	53.5	9 19.8	+59.6	53.7	**14**
15	6 07.2	+58.6	52.7	6 43.5	+58.8	52.8	7 19.7	+59.0	52.9	7 55.8	+59.1	53.0	8 31.9	+59.2	53.1	9 07.8	+59.4	53.3	9 43.7	+59.4	53.4	10 19.4	+59.6	53.5	**15**
16	7 05.8	+58.6	52.5	7 42.3	+58.8	52.6	8 18.7	+58.9	52.7	8 54.9	+59.1	52.8	9 31.1	+59.3	53.0	10 07.2	+59.4	53.1	10 43.1	+59.5	53.3	11 19.0	+59.6	53.4	**16**
17	8 04.4	+58.6	52.3	8 41.1	+58.7	52.4	9 17.6	+58.9	52.5	9 54.0	+59.1	52.7	10 30.4	+59.2	52.8	11 06.6	+59.3	53.0	11 42.6	+59.5	53.1	12 18.6	+59.5	53.3	**17**
18	9 03.0	+58.6	52.1	9 39.8	+58.8	52.2	10 16.5	+59.0	52.4	10 53.1	+59.1	52.5	11 29.6	+59.2	52.7	12 05.9	+59.4	52.8	12 42.1	+59.5	53.0	13 18.1	+59.6	53.2	**18**
19	10 01.6	+58.6	51.9	10 38.6	+58.8	52.0	11 15.5	+58.9	52.2	11 52.2	+59.1	52.3	12 28.8	+59.2	52.5	13 05.3	+59.3	52.7	13 41.6	+59.5	52.9	14 17.7	+59.6	53.1	**19**
20	11 00.2	+58.6	51.6	11 37.4	+58.7	51.8	12 14.4	+58.9	52.0	12 51.3	+59.1	52.1	13 28.0	+59.3	52.3	14 04.6	+59.4	52.5	14 41.1	+59.4	52.7	15 17.3	+59.6	52.9	**20**
21	11 58.8	+58.5	51.4	12 36.1	+58.8	51.6	13 13.3	+58.9	51.8	13 50.4	+59.0	52.0	14 27.3	+59.2	52.2	15 04.0	+59.3	52.4	15 40.5	+59.5	52.6	16 16.9	+59.6	52.8	**21**
22	12 57.3	+58.6	51.2	13 34.9	+58.7	51.4	14 12.2	+58.9	51.6	14 49.4	+59.1	51.8	15 26.5	+59.2	52.0	16 03.3	+59.4	52.2	16 40.0	+59.5	52.4	17 16.5	+59.5	52.7	**22**
23	13 55.9	+58.6	51.0	14 33.6	+58.7	51.2	15 11.1	+58.9	51.4	15 48.5	+59.0	51.6	16 25.7	+59.2	51.8	17 02.7	+59.3	52.1	17 39.5	+59.4	52.3	18 16.0	+59.6	52.6	**23**
24	14 54.5	+58.5	50.8	15 32.3	+58.7	51.0	16 10.0	+58.9	51.2	16 47.5	+59.1	51.4	17 24.9	+59.2	51.7	18 02.0	+59.3	51.9	18 38.9	+59.4	52.2	19 15.6	+59.6	52.4	**24**
25	15 53.0	+58.5	50.5	16 31.0	+58.7	50.7	17 08.9	+58.9	51.0	17 46.6	+59.0	51.2	18 24.1	+59.1	51.5	19 01.3	+59.3	51.7	19 38.3	+59.5	52.0	20 15.2	+59.5	52.3	**25**
26	16 51.5	+58.5	50.3	17 29.7	+58.7	50.5	18 07.8	+58.8	50.8	18 45.6	+59.0	51.0	19 23.2	+59.2	51.3	20 00.6	+59.3	51.6	20 37.8	+59.4	51.9	21 14.7	+59.5	52.2	**26**
27	17 50.0	+58.5	50.1	18 28.4	+58.7	50.3	19 06.6	+58.9	50.6	19 44.6	+59.0	50.8	20 22.4	+59.1	51.1	20 59.9	+59.3	51.4	21 37.2	+59.4	51.7	22 14.2	+59.6	52.0	**27**
28	18 48.5	+58.5	49.8	19 27.1	+58.6	50.1	20 05.5	+58.8	50.4	20 43.6	+59.0	50.7	21 21.5	+59.2	51.0	21 59.2	+59.3	51.3	22 36.6	+59.5	51.6	23 13.8	+59.5	51.9	**28**
29	19 47.0	+58.4	49.6	20 25.7	+58.7	49.9	21 04.3	+58.8	50.2	21 42.6	+59.0	50.5	22 20.7	+59.1	50.8	22 58.5	+59.3	51.1	23 36.1	+59.4	51.4	24 13.3	+59.5	51.8	**29**
30	20 45.4	+58.4	49.3	21 24.4	+58.6	49.6	22 03.1	+58.8	49.9	22 41.6	+59.0	50.3	23 19.8	+59.1	50.6	23 57.8	+59.2	50.9	24 35.5	+59.4	51.3	25 12.8	+59.6	51.6	**30**
31	21 43.8	+58.4	49.1	22 23.0	+58.6	49.4	23 01.9	+58.8	49.7	23 40.6	+58.9	50.1	24 18.9	+59.1	50.4	24 57.0	+59.3	50.8	25 34.9	+59.3	51.1	26 12.4	+59.5	51.5	**31**
32	22 42.2	+58.4	48.9	23 21.6	+58.6	49.2	24 00.7	+58.7	49.5	24 39.5	+58.9	49.9	25 18.0	+59.1	50.2	25 56.3	+59.2	50.6	26 34.2	+59.4	51.0	27 11.9	+59.5	51.4	**32**
33	23 40.6	+58.4	48.6	24 20.2	+58.5	48.9	24 59.4	+58.8	49.3	25 38.4	+58.9	49.6	26 17.1	+59.1	50.0	26 55.5	+59.3	50.4	27 33.6	+59.4	50.8	28 11.4	+59.5	51.2	**33**
34	24 39.0	+58.3	48.3	25 18.7	+58.5	48.7	25 58.2	+58.7	49.1	26 37.3	+58.9	49.4	27 16.2	+59.1	49.8	27 54.8	+59.2	50.2	28 33.0	+59.3	50.6	29 10.9	+59.4	51.1	**34**
35	25 37.3	+58.3	48.1	26 17.2	+58.5	48.5	26 56.9	+58.7	48.8	27 36.2	+58.9	49.2	28 15.3	+59.0	49.6	28 54.0	+59.2	50.0	29 32.3	+59.4	50.5	30 10.3	+59.5	50.9	**35**
36	26 35.6	+58.3	47.8	27 15.7	+58.5	48.2	27 55.6	+58.6	48.6	28 35.1	+58.9	49.0	29 14.3	+59.0	49.4	29 53.2	+59.1	49.8	30 31.7	+59.3	50.3	31 09.8	+59.5	50.8	**36**
37	27 33.9	+58.2	47.6	28 14.2	+58.5	48.0	28 54.2	+58.7	48.4	29 34.0	+58.8	48.8	30 13.3	+59.0	49.2	30 52.3	+59.2	49.7	31 31.0	+59.3	50.1	32 09.3	+59.4	50.6	**37**
38	28 32.1	+58.2	47.3	29 12.7	+58.4	47.7	29 52.9	+58.6	48.1	30 32.8	+58.8	48.5	31 12.3	+59.0	49.0	31 51.5	+59.1	49.5	32 30.3	+59.3	49.9	33 08.7	+59.5	50.4	**38**
39	29 30.3	+58.2	47.0	30 11.1	+58.4	47.4	30 51.5	+58.6	47.9	31 31.6	+58.8	48.3	32 11.3	+59.0	48.8	32 50.6	+59.2	49.3	33 29.6	+59.3	49.8	34 08.2	+59.4	50.3	**39**
40	30 28.5	+58.1	46.7	31 09.5	+58.3	47.2	31 50.1	+58.5	47.6	32 30.4	+58.7	48.1	33 10.3	+58.9	48.6	33 49.8	+59.1	49.1	34 28.9	+59.2	49.6	35 07.6	+59.4	50.1	**40**
41	31 26.6	+58.1	46.4	32 07.8	+58.3	46.9	32 48.6	+58.6	47.4	33 29.1	+58.7	47.8	34 09.2	+58.9	48.3	34 48.9	+59.1	48.9	35 28.1	+59.3	49.4	36 07.0	+59.4	49.9	**41**
42	32 24.7	+58.1	46.1	33 06.1	+58.3	46.6	33 47.2	+58.5	47.1	34 27.8	+58.7	47.6	35 08.1	+58.9	48.1	35 48.0	+59.0	48.6	36 27.4	+59.2	49.2	37 06.4	+59.4	49.8	**42**
43	33 22.8	+58.0	45.8	34 04.4	+58.3	46.3	34 45.7	+58.4	46.8	35 26.5	+58.7	47.3	36 07.0	+58.8	47.9	36 47.0	+59.0	48.4	37 26.6	+59.2	49.0	38 05.8	+59.3	49.6	**43**
44	34 20.8	+58.0	45.5	35 02.7	+58.1	46.0	35 44.1	+58.4	46.5	36 25.2	+58.6	47.1	37 05.8	+58.9	47.6	37 46.0	+59.1	48.2	38 25.8	+59.2	48.8	39 05.1	+59.4	49.4	**44**
45	35 18.8	+57.9	45.2	36 00.8	+58.2	45.7	36 42.5	+58.4	46.3	37 23.8	+58.6	46.8	38 04.7	+58.7	47.4	38 45.1	+58.9	48.0	39 25.0	+59.2	48.6	40 04.5	+59.3	49.2	**45**
46	36 16.7	+57.8	44.9	36 59.0	+58.1	45.4	37 40.9	+58.3	46.0	38 22.4	+58.5	46.5	39 03.4	+58.8	47.1	39 44.0	+59.0	47.7	40 24.2	+59.1	48.4	41 03.8	+59.3	49.0	**46**
47	37 14.5	+57.9	44.6	37 57.1	+58.0	45.1	38 39.2	+58.3	45.7	39 20.9	+58.5	46.3	40 02.2	+58.7	46.9	40 43.0	+58.9	47.5	41 23.3	+59.1	48.1	42 03.1	+59.3	48.8	**47**
48	38 12.4	+57.7	44.2	38 55.1	+58.0	44.8	39 37.5	+58.2	45.4	40 19.4	+58.5	46.0	41 00.9	+58.7	46.6	41 41.9	+58.9	47.2	42 22.4	+59.1	47.9	43 02.4	+59.2	48.6	**48**
49	39 10.1	+57.7	43.9	39 53.1	+58.0	44.5	40 35.7	+58.2	45.1	41 17.9	+58.4	45.7	41 59.6	+58.6	46.3	42 40.8	+58.8	47.0	43 21.5	+59.0	47.7	44 01.6	+59.2	48.4	**49**
50	40 07.8	+57.6	43.5	40 51.1	+57.8	44.1	41 33.9	+58.1	44.7	42 16.3	+58.4	45.4	42 58.2	+58.6	46.0	43 39.6	+58.8	46.7	44 20.5	+59.0	47.4	45 00.8	+59.2	48.1	**50**
51	41 05.4	+57.5	43.2	41 48.9	+57.8	43.8	42 32.0	+58.1	44.4	43 14.7	+58.3	45.0	43 56.8	+58.6	45.7	44 38.4	+58.8	46.4	45 19.5	+59.0	47.2	46 00.0	+59.2	47.9	**51**
52	42 02.9	+57.5	42.8	42 46.7	+57.8	43.4	43 30.1	+58.0	44.0	44 13.0	+58.2	44.7	44 55.4	+58.5	45.4	45 37.2	+58.7	46.1	46 18.5	+58.9	46.9	46 59.2	+59.1	47.7	**52**
53	43 00.4	+57.4	42.4	43 44.5	+57.6	43.0	44 28.1	+57.9	43.7	45 11.2	+58.2	44.4	45 53.9	+58.4	45.1	46 35.9	+58.7	45.8	47 17.4	+58.9	46.6	47 58.3	+59.2	47.4	**53**
54	43 57.8	+57.3	42.0	44 42.1	+57.6	42.6	45 26.0	+57.9	43.3	46 09.4	+58.2	44.0	46 52.3	+58.4	44.8	47 34.6	+58.6	45.5	48 16.3	+58.9	46.3	48 57.5	+59.0	47.2	**54**
55	44 55.1	+57.2	41.6	45 39.7	+57.5	42.2	46 23.9	+57.8	42.9	47 07.6	+58.0	43.7	47 50.7	+58.3	44.4	48 33.2	+58.6	45.2	49 15.2	+58.8	46.0	49 56.5	+59.1	46.9	**55**
56	45 52.3	+57.1	41.1	46 37.2	+57.4	41.8	47 21.7	+57.7	42.6	48 05.6	+58.0	43.3	48 49.0	+58.2	44.1	49 31.8	+58.5	44.9	50 14.0	+58.8	45.7	50 55.6	+58.9	46.6	**56**
57	46 49.4	+57.0	40.7	47 34.6	+57.3	41.4	48 19.4	+57.6	42.1	49 03.6	+57.9	42.9	49 47.2	+58.2	43.7	50 30.3	+58.5	44.5	51 12.8	+58.7	45.4	51 54.5	+59.0	46.3	**57**
58	47 46.4	+56.8	40.2	48 31.9	+57.2	41.0	49 17.0	+57.5	41.7	50 01.5	+57.8	42.5	50 45.4	+58.1	43.3	51 28.8	+58.3	44.2	52 11.5	+58.6	45.1	52 53.5	+58.9	46.0	**58**
59	48 43.2	+56.8	39.8	49 29.1	+57.1	40.5	50 14.5	+57.4	41.3	50 59.3	+57.7	42.1	51 43.5	+58.0	42.9	52 27.1	+58.3	43.8	53 10.1	+58.6	44.7	53 52.4	+58.8	45.7	**59**
60	49 40.0	+56.6	39.3	50 26.2	+57.0	40.0	51 11.9	+57.3	40.8	51 57.0	+57.6	41.6	52 41.5	+58.0	42.5	53 25.4	+58.3	43.4	54 08.7	+58.5	44.4	54 51.2	+58.8	45.4	**60**
61	50 36.6	+56.5	38.7	51 23.2	+56.8	39.5	52 09.2	+57.1	40.3	52 54.6	+57.5	41.2	53 39.5	+57.8	42.1	54 23.7	+58.1	43.0	55 07.2	+58.4	44.0	55 50.0	+58.7	45.0	**61**
62	51 33.1	+56.3	38.2	52 20.0	+56.7	39.0	53 06.3	+57.1	39.8	53 52.1	+57.4	40.7	54 37.3	+57.7	41.6	55 21.8	+58.0	42.6	56 05.6	+58.4	43.6	56 48.7	+58.7	44.6	**62**
63	52 29.4	+56.2	37.6	53 16.7	+56.5	38.5	54 03.4	+56.9	39.3	54 49.5	+57.2	40.2	55 35.0	+57.6	41.1	56 19.8	+58.0	42.1	57 04.0	+58.2	43.2	57 47.4	+58.5	44.2	**63**
64	53 25.6	+56.0	37.1	54 13.2	+56.4	37.9	55 00.3	+56.7	38.8	55 46.7	+57.2	39.7	56 32.6	+57.5	40.6	57 17.8	+57.8	41.7	58 02.2	+58.2	42.7	58 45.9	+58.5	43.8	**64**
65	54 21.6	+55.7	36.4	55 09.6	+56.1	37.3	55 57.0	+56.6	38.2	56 43.9	+56.9	39.1	57 30.1	+57.3	40.1	58 15.6	+57.7	41.2	59 00.4	+58.1	42.2	59 44.4	+58.4	43.4	**65**
66	55 17.3	+55.6	35.8	56 05.7	+56.0	36.7	56 53.6	+56.4	37.6	57 40.8	+56.8	38.5	58 27.4	+57.2	39.6	59 13.3	+57.6	40.6	59 58.5	+57.9	41.7	60 42.8	+58.3	42.9	**66**
67	56 12.9	+55.4	35.1	57 01.7	+55.8	36.0	57 50.0	+56.2	37.0	58 37.6	+56.6	37.9	59 24.6	+57.0	39.0	60 10.9	+57.4	40.1	60 56.4	+57.8	41.2	61 41.1	+58.2	42.4	**67**
68	57 08.3	+55.1	34.4	57 57.5	+55.5	35.3	58 46.2	+55.9	36.3	59 34.2	+56.4	37.3	60 21.6	+56.8	38.4	61 08.3	+57.2	39.5	61 54.2	+57.7	40.7	62 39.3	+58.1	41.9	**68**
69	58 03.4	+54.8	33.7	58 53.0	+55.3	34.6	59 42.1	+55.8	35.6	60 30.6	+56.2	36.6	61 18.4	+56.7	37.7	62 05.5	+57.1	38.8	62 51.9	+57.5	40.1	63 37.4	+57.9	41.4	**69**
70	58 58.2	+54.6	32.9	59 48.3	+55.0	33.9	60 37.9	+55.4	34.8	61 26.8	+55.9	35.9	62 15.1	+56.4	37.0	63 02.6	+56.9	38.2	63 49.4	+57.3	39.4	64 35.3	+57.7	40.8	**70**
71	59 52.8	+54.2	32.1	60 43.3	+54.7	33.0	61 33.3	+55.2	34.0	62 22.7	+55.7	35.1	63 11.5	+56.1	36.2	63 59.5	+56.6	37.5	64 46.7	+57.1	38.7	65 33.0	+57.6	40.1	**71**
72	60 47.0	+53.8	31.2	61 38.0	+54.4	32.2	62 28.5	+54.9	33.2	63 18.4	+55.4	34.3	64 07.6	+55.9	35.5	64 56.1	+56.4	36.7	65 43.8	+56.9	38.0	66 30.6	+57.4	39.4	**72**
73	61 40.8	+53.5	30.3	62 32.4	+54.0	31.3	63 23.4	+54.5	32.3	64 13.8	+55.0	33.4	65 03.5	+55.6	34.6	65 52.5	+56.1	35.9	66 40.7	+56.6	37.2	67 28.0	+57.2	38.7	**73**
74	62 34.3	+53.1	29.4	63 26.4	+53.5	30.3	64 17.9	+54.1	31.4	65 08.8	+54.6	32.5	65 59.1	+55.2	33.7	66 48.6	+55.8	35.0	67 37.3	+56.4	36.4	68 25.2	+56.9	37.9	**74**
75	63 27.4	+52.5	28.3	64 19.9	+53.1	29.3	65 12.0	+53.7	30.4	66 03.4	+54.3	31.5	66 54.3	+54.8	32.7	67 44.4	+55.4	34.0	68 33.7	+56.0	35.5	69 22.1	+56.6	37.0	**75**
76	64 19.9	+52.1	27.2	65 13.0	+52.7	28.2	66 05.7	+53.1	29.3	66 57.7	+53.8	30.4	67 49.1	+54.4	31.7	68 39.8	+55.0	33.0	69 29.7	+55.7	34.5	70 18.7	+56.3	36.0	**76**
77	65 12.0	+51.4	26.1	66 05.7	+52.0	27.0	66 58.8	+52.7	28.1	67 51.5	+53.2	29.3	68 43.5	+53.9	30.5	69 34.8	+54.6	31.9	70 25.4	+55.2	33.4	71 15.0	+55.9	35.0	**77**
78	66 03.4	+50.9	24.8	66 57.7	+51.4	25.8	67 51.5	+52.0	26.9	68 44.7	+52.7	28.0	69 37.4	+53.3	29.3	70 29.4	+54.0	30.7	71 20.6	+54.7	32.2	72 10.9	+55.4	33.8	**78**
79	66 54.3	+50.1	23.5	67 49.1	+50.7	24.5	68 43.5	+51.3	25.5	69 37.4	+52.0	26.7	70 30.7	+52.7	27.9	71 23.4	+53.3	29.3	72 15.3	+54.1	30.9	73 06.3	+55.0	32.5	**79**
80	67 44.4	+49.3	22.1	68 39.8	+49.9	23.0	69 34.8	+50.6	24.1	70 29.4	+51.2	25.2	71 23.4	+51.9	26.5	72 16.7	+52.7	27.9	73 09.4	+53.5	29.4	74 01.3	+54.2	31.1	**80**
81	68 33.7	+48.4	20.5	69 29.7	+49.0	21.5	70 25.4	+49.6	22.5	71 20.6	+50.3	23.6	72 15.3	+51.0	24.9	73 09.4	+51.9	26.2	74 02.9	+52.6	27.8	74 55.5	+53.6	29.5	**81**
82	69 22.1	+47.4	18.9	70 18.7	+48.0	19.8	71 15.0	+48.6	20.8	72 10.9	+49.3	21.9	73 06.3	+50.1	23.1	74 01.3	+50.8	24.5	74 55.5	+51.7	26.0	75 49.1	+52.6	27.7	**82**
83	70 09.5	+46.3	17.1	71 06.7	+46.9	18.0	72 03.6	+47.5	18.9	73 00.2	+48.2	20.0	73 56.4	+48.9	21.2	74 52.1	+49.7	22.5	75 47.2	+50.6	24.0	76 41.7	+51.5	25.7	**83**
84	70 55.8	+45.0	15.2	71 53.6	+45.5	16.0	72 51.1	+46.2	16.9	73 48.4	+46.8	17.9	74 45.3	+47.5	19.0	75 41.8	+48.3	20.3	76 37.8	+49.2	21.7	77 33.2	+50.2	23.4	**84**
85	71 40.8	+43.5	13.1	72 39.1	+44.1	13.9	73 37.3	+44.6	14.7	74 35.2	+45.2	15.6	75 32.8	+46.0	16.6	76 30.1	+46.8	17.8	77 27.0	+47.6	19.2	78 23.4	+48.6	20.8	**85**
86	72 24.3	+41.9	10.9	73 23.2	+42.3	11.5	74 21.9	+42.8	12.2	75 20.4	+43.4	13.0	76 18.8	*+44.0* •	14.0	77 16.9	*+44.7* •	15.0	78 14.6	*+45.6* •	16.3	79 12.0	*+46.5* •	17.8	**86**
87	73 06.2	+40.1	8.5	74 05.5	*+40.5* •	9.0	75 04.7	*+40.9* •	9.6	76 03.8	*+41.4* •	10.3	77 02.8	*+41.9* •	11.0	78 01.6	*+42.5* •	11.9	79 00.2	*+43.2* •	13.0	79 58.5	*+44.0* •	14.3	**87**
88	73 46.3	*+38.0* •	5.9	74 46.0	*+38.2* •	6.2	75 45.6	*+38.5* •	6.7	76 45.2	*+38.8* •	7.2	77 44.7	*+39.2* •	7.7	78 44.1	*+39.6* •	8.4	79 43.4	*+40.1* •	9.2	80 42.5	*+40.8* •	10.2	**88**
89	74 24.3	*+35.7* •	3.0	75 24.2	*+35.8* •	3.3	76 24.1	*+35.9* •	3.5	77 24.0	*+36.0* •	3.8	78 23.9	*+36.1* •	4.1	79 23.7	*+36.3* •	4.5	80 23.5	*+36.5* •	4.9	81 23.3	*+36.7* •	5.5	**89**
90	75 00.0	*+33.1* •	0.0	76 00.0	*+32.9* •	0.0	77 00.0	*+32.8* •	0.0	78 00.0	*+32.7* •	0.0	79 00.0	*+32.5* •	0.0	80 00.0	*+32.3* •	0.0	81 00.0	*+32.1* •	0.0	82 00.0	*+31.7* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 125°, 235°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 19.3	+58.6	123.1	7 46.5	+58.7	123.2	7 13.6	+58.9	123.3	6 40.6	+59.1	123.4	6 07.5	+59.2	123.5	5 34.3	+59.4	123.6	5 01.1	+59.5	123.7	4 27.8	+59.6	123.7	**0**
1	9 17.9	+58.5	122.9	8 45.2	+58.8	123.0	8 12.5	+58.9	123.1	7 39.7	+59.1	123.2	7 06.7	+59.3	123.3	6 33.7	+59.4	123.4	6 00.6	+59.5	123.5	5 27.4	+59.6	123.6	**1**
2	10 16.4	+58.6	122.6	9 44.0	+58.7	122.8	9 11.4	+59.0	122.9	8 38.8	+59.0	123.1	8 06.0	+59.2	123.2	7 33.1	+59.3	123.3	7 00.1	+59.5	123.4	6 27.0	+59.6	123.5	**2**
3	11 15.0	+58.5	122.4	10 42.7	+58.8	122.6	10 10.4	+58.9	122.7	9 37.8	+59.1	122.9	9 05.2	+59.2	123.0	8 32.4	+59.4	123.2	7 59.6	+59.5	123.3	7 26.6	+59.6	123.4	**3**
4	12 13.5	+58.5	122.2	11 41.5	+58.7	122.4	11 09.3	+58.9	122.5	10 36.9	+59.1	122.7	10 04.4	+59.2	122.9	9 31.8	+59.4	123.0	8 59.1	+59.4	123.1	8 26.2	+59.6	123.3	**4**
5	13 12.0	+58.6	122.0	12 40.2	+58.7	122.2	12 08.2	+58.9	122.4	11 36.0	+59.0	122.5	11 03.6	+59.2	122.7	10 31.2	+59.3	122.9	9 58.5	+59.5	123.0	9 25.8	+59.6	123.2	**5**
6	14 10.6	+58.5	121.7	13 38.9	+58.7	122.0	13 07.1	+58.8	122.2	12 35.0	+59.1	122.4	12 02.8	+59.3	122.5	11 30.5	+59.3	122.7	10 58.0	+59.5	122.9	10 25.4	+59.5	123.0	**6**
7	15 09.1	+58.5	121.5	14 37.6	+58.7	121.7	14 05.9	+58.9	122.0	13 34.1	+59.0	122.2	13 02.1	+59.2	122.4	12 29.8	+59.4	122.6	11 57.5	+59.4	122.7	11 24.9	+59.6	122.9	**7**
8	16 07.6	+58.4	121.3	15 36.3	+58.7	121.5	15 04.8	+58.9	121.8	14 33.1	+59.1	122.0	14 01.3	+59.2	122.2	13 29.2	+59.3	122.4	12 56.9	+59.5	122.6	12 24.5	+59.6	122.8	**8**
9	17 06.0	+58.5	121.1	16 35.0	+58.6	121.3	16 03.7	+58.8	121.6	15 32.2	+59.0	121.8	15 00.5	+59.1	122.0	14 28.5	+59.4	122.3	13 56.4	+59.5	122.5	13 24.1	+59.6	122.7	**9**
10	18 04.5	+58.4	120.8	17 33.6	+58.7	121.1	17 02.5	+58.9	121.4	16 31.2	+59.0	121.6	15 59.6	+59.2	121.9	15 27.9	+59.3	122.1	14 55.9	+59.4	122.3	14 23.7	+59.6	122.6	**10**
11	19 02.9	+58.5	120.6	18 32.3	+58.6	120.9	18 01.4	+58.8	121.2	17 30.2	+59.0	121.4	16 58.8	+59.2	121.7	16 27.2	+59.3	121.9	15 55.3	+59.5	122.2	15 23.3	+59.5	122.4	**11**
12	20 01.4	+58.4	120.3	19 30.9	+58.6	120.6	19 00.2	+58.8	120.9	18 29.2	+59.0	121.2	17 58.0	+59.1	121.5	17 26.5	+59.3	121.8	16 54.8	+59.4	122.1	16 22.8	+59.6	122.3	**12**
13	20 59.8	+58.4	120.1	20 29.5	+58.6	120.4	19 59.0	+58.8	120.7	19 28.2	+59.0	121.0	18 57.1	+59.2	121.3	18 25.8	+59.3	121.6	17 54.2	+59.5	121.9	17 22.4	+59.5	122.2	**13**
14	21 58.2	+58.3	119.8	21 28.1	+58.6	120.2	20 57.8	+58.8	120.5	20 27.2	+59.0	120.8	19 56.3	+59.1	121.2	19 25.1	+59.3	121.5	18 53.7	+59.4	121.8	18 21.9	+59.6	122.1	**14**
15	22 56.5	+58.4	119.6	22 26.7	+58.6	120.0	21 56.6	+58.8	120.3	21 26.2	+58.9	120.6	20 55.4	+59.2	121.0	20 24.4	+59.3	121.3	19 53.1	+59.4	121.6	19 21.5	+59.5	121.9	**15**
16	23 54.9	+58.3	119.3	23 25.3	+58.5	119.7	22 55.4	+58.7	120.1	22 25.1	+59.0	120.4	21 54.6	+59.1	120.8	21 23.7	+59.3	121.1	20 52.5	+59.4	121.5	20 21.0	+59.6	121.8	**16**
17	24 53.2	+58.2	119.1	24 23.8	+58.5	119.5	23 54.1	+58.7	119.9	23 24.1	+58.9	120.2	22 53.7	+59.1	120.6	22 23.0	+59.2	121.0	21 51.9	+59.4	121.3	21 20.6	+59.5	121.7	**17**
18	25 51.4	+58.3	118.8	25 22.3	+58.5	119.2	24 52.8	+58.8	119.6	24 23.0	+58.9	120.0	23 52.8	+59.1	120.4	23 22.2	+59.3	120.8	22 51.3	+59.4	121.2	22 20.1	+59.5	121.5	**18**
19	26 49.7	+58.2	118.5	26 20.8	+58.5	119.0	25 51.6	+58.6	119.4	25 21.9	+58.9	119.8	24 51.9	+59.0	120.2	24 21.5	+59.2	120.6	23 50.7	+59.4	121.0	23 19.6	+59.6	121.4	**19**
20	27 47.9	+58.2	118.3	27 19.3	+58.4	118.7	26 50.2	+58.7	119.2	26 20.8	+58.9	119.6	25 50.9	+59.1	120.0	25 20.7	+59.2	120.5	24 50.1	+59.4	120.9	24 19.2	+59.5	121.3	**20**
21	28 46.1	+58.2	118.0	28 17.7	+58.4	118.5	27 48.9	+58.6	118.9	27 19.7	+58.8	119.4	26 50.0	+59.0	119.8	26 19.9	+59.3	120.3	25 49.5	+59.4	120.7	25 18.7	+59.5	121.1	**21**
22	29 44.3	+58.1	117.7	29 16.1	+58.4	118.2	28 47.5	+58.7	118.7	28 18.5	+58.8	119.2	27 49.0	+59.1	119.6	27 19.2	+59.2	120.1	26 48.9	+59.3	120.5	26 18.2	+59.5	121.0	**22**
23	30 42.4	+58.1	117.4	30 14.5	+58.4	118.0	29 46.2	+58.5	118.5	29 17.3	+58.8	119.0	28 48.1	+59.0	119.4	28 18.4	+59.1	119.9	27 48.2	+59.4	120.4	27 17.7	+59.5	120.8	**23**
24	31 40.5	+58.0	117.1	31 12.9	+58.3	117.7	30 44.7	+58.6	118.2	30 16.1	+58.8	118.7	29 47.1	+59.0	119.2	29 17.5	+59.2	119.7	28 47.6	+59.3	120.2	28 17.2	+59.4	120.7	**24**
25	32 38.5	+58.0	116.8	32 11.2	+58.2	117.4	31 43.3	+58.5	118.0	31 14.9	+58.8	118.5	30 46.1	+58.9	119.0	30 16.7	+59.2	119.5	29 46.9	+59.3	120.0	29 16.6	+59.5	120.5	**25**
26	33 36.5	+58.0	116.5	33 09.4	+58.3	117.1	32 41.8	+58.5	117.7	32 13.7	+58.7	118.3	31 45.0	+59.0	118.8	31 15.9	+59.1	119.3	30 46.2	+59.3	119.9	30 16.1	+59.5	120.4	**26**
27	34 34.5	+57.9	116.2	34 07.7	+58.2	116.8	33 40.3	+58.5	117.4	33 12.4	+58.7	118.0	32 44.0	+58.9	118.6	32 15.0	+59.1	119.1	31 45.5	+59.3	119.7	31 15.6	+59.4	120.2	**27**
28	35 32.4	+57.8	115.9	35 05.9	+58.1	116.5	34 38.8	+58.4	117.2	34 11.1	+58.7	117.8	33 42.9	+58.9	118.4	33 14.1	+59.1	118.9	32 44.8	+59.3	119.5	32 15.0	+59.4	120.1	**28**
29	36 30.2	+57.8	115.6	36 04.0	+58.1	116.2	35 37.2	+58.4	116.9	35 09.8	+58.6	117.5	34 41.8	+58.8	118.1	34 13.2	+59.1	118.7	33 44.1	+59.2	119.3	33 14.4	+59.5	119.9	**29**
30	37 28.0	+57.7	115.2	37 02.1	+58.1	115.9	36 35.6	+58.3	116.6	36 08.4	+58.6	117.2	35 40.6	+58.9	117.9	35 12.3	+59.0	118.5	34 43.3	+59.3	119.1	34 13.9	+59.4	119.7	**30**
31	38 25.7	+57.7	114.9	38 00.2	+58.0	115.6	37 33.9	+58.3	116.3	37 07.0	+58.6	117.0	36 39.5	+58.8	117.6	36 11.3	+59.0	118.3	35 42.6	+59.2	118.9	35 13.3	+59.4	119.6	**31**
32	39 23.4	+57.6	114.5	38 58.2	+57.9	115.3	38 32.2	+58.2	116.0	38 05.6	+58.5	116.7	37 38.3	+58.7	117.4	37 10.3	+59.0	118.1	36 41.8	+59.2	118.7	36 12.7	+59.3	119.4	**32**
33	40 21.0	+57.6	114.2	39 56.1	+57.9	114.9	39 30.4	+58.2	115.7	39 04.1	+58.5	116.4	38 37.0	+58.8	117.1	38 09.3	+59.0	117.8	37 41.0	+59.2	118.5	37 12.0	+59.4	119.2	**33**
34	41 18.6	+57.4	113.8	40 54.0	+57.8	114.6	40 28.6	+58.2	115.4	40 02.6	+58.4	116.1	39 35.8	+58.7	116.9	39 08.3	+59.0	117.6	38 40.2	+59.1	118.3	38 11.4	+59.3	119.0	**34**
35	42 16.0	+57.4	113.4	41 51.8	+57.7	114.2	41 26.8	+58.1	115.0	41 01.0	+58.4	115.8	40 34.5	+58.7	116.6	40 07.3	+58.9	117.4	39 39.3	+59.2	118.1	39 10.7	+59.4	118.8	**35**
36	43 13.4	+57.3	113.0	42 49.5	+57.7	113.9	42 24.9	+58.0	114.7	41 59.4	+58.3	115.5	41 33.2	+58.6	116.3	41 06.2	+58.9	117.1	40 38.5	+59.1	117.9	40 10.1	+59.3	118.6	**36**
37	44 10.7	+57.2	112.6	43 47.2	+57.6	113.5	43 22.9	+57.9	114.4	42 57.7	+58.3	115.2	42 31.8	+58.6	116.0	42 05.1	+58.8	116.9	41 37.6	+59.0	117.7	41 09.4	+59.2	118.4	**37**
38	45 07.9	+57.1	112.2	44 44.8	+57.5	113.1	44 20.8	+57.9	114.0	43 56.0	+58.2	114.9	43 30.4	+58.5	115.7	43 03.9	+58.8	116.6	42 36.6	+59.1	117.4	42 08.6	+59.3	118.2	**38**
39	46 05.0	+57.0	111.7	45 42.3	+57.5	112.7	45 18.7	+57.8	113.6	44 54.2	+58.2	114.5	44 28.9	+58.5	115.4	44 02.7	+58.8	116.3	43 35.7	+59.0	117.2	43 07.9	+59.2	118.0	**39**
40	47 02.0	+56.9	111.3	46 39.8	+57.3	112.3	46 16.5	+57.8	113.2	45 52.4	+58.1	114.2	45 27.4	+58.4	115.1	45 01.5	+58.7	116.0	44 34.7	+59.0	116.9	44 07.1	+59.2	117.8	**40**
41	47 58.9	+56.8	110.8	47 37.1	+57.2	111.8	47 14.3	+57.6	112.8	46 50.5	+58.0	113.8	46 25.8	+58.4	114.8	46 00.2	+58.7	115.7	45 33.7	+58.9	116.7	45 06.3	+59.2	117.6	**41**
42	48 55.7	+56.6	110.3	48 34.3	+57.1	111.4	48 11.9	+57.6	112.4	47 48.5	+58.0	113.5	47 24.2	+58.3	114.5	46 58.9	+58.6	115.4	46 32.6	+58.9	116.4	46 05.5	+59.2	117.3	**42**
43	49 52.3	+56.5	109.8	49 31.4	+57.0	110.9	49 09.5	+57.4	112.0	48 46.5	+57.9	113.1	48 22.5	+58.2	114.1	47 57.5	+58.5	115.1	47 31.5	+58.9	116.1	47 04.7	+59.1	117.1	**43**
44	50 48.8	+56.4	109.3	50 28.4	+56.9	110.4	50 06.9	+57.4	111.6	49 44.4	+57.7	112.7	49 20.7	+58.2	113.7	48 56.0	+58.6	114.8	48 30.4	+58.8	115.8	48 03.8	+59.1	116.8	**44**
45	51 45.2	+56.2	108.7	51 25.3	+56.8	109.9	51 04.3	+57.2	111.1	50 42.1	+57.7	112.2	50 18.9	+58.1	113.4	49 54.6	+58.4	114.5	49 29.2	+58.8	115.5	49 02.9	+59.0	116.6	**45**
46	52 41.4	+56.0	108.2	52 22.1	+56.6	109.4	52 01.5	+57.1	110.6	51 39.8	+57.6	111.8	51 17.0	+58.0	113.0	50 53.0	+58.4	114.1	50 28.0	+58.7	115.2	50 01.9	+59.0	116.3	**46**
47	53 37.4	+55.9	107.6	53 18.7	+56.4	108.9	52 58.6	+57.0	110.1	52 37.4	+57.5	111.3	52 15.0	+57.9	112.6	51 51.4	+58.3	113.7	51 26.7	+58.6	114.9	51 00.9	+59.0	116.0	**47**
48	54 33.3	+55.6	107.0	54 15.1	+56.3	108.3	53 55.6	+56.9	109.6	53 34.9	+57.3	110.9	53 12.9	+57.8	112.1	52 49.7	+58.2	113.3	52 25.3	+58.6	114.5	51 59.9	+58.9	115.7	**48**
49	55 28.9	+55.4	106.3	55 11.4	+56.0	107.7	54 52.5	+56.6	109.0	54 32.2	+57.3	110.4	54 10.7	+57.7	111.7	53 47.9	+58.2	112.9	53 23.9	+58.6	114.2	52 58.8	+58.8	115.4	**49**
50	56 24.3	+55.2	105.6	56 07.4	+55.9	107.1	55 49.1	+56.6	108.5	55 29.5	+57.0	109.8	55 08.4	+57.6	111.2	54 46.1	+58.0	112.5	54 22.5	+58.4	113.8	53 57.6	+58.9	115.1	**50**
51	57 19.5	+54.9	104.9	57 03.3	+55.7	106.4	56 45.7	+56.3	107.9	56 26.5	+57.0	109.3	56 06.0	+57.5	110.7	55 44.1	+58.0	112.1	55 20.9	+58.4	113.4	54 56.5	+58.7	114.7	**51**
52	58 14.4	+54.7	104.1	57 59.0	+55.4	105.7	57 42.0	+56.1	107.2	57 23.5	+56.7	108.7	57 03.5	+57.3	110.2	56 42.1	+57.8	111.6	56 19.3	+58.3	113.0	55 55.2	+58.7	114.4	**52**
53	59 09.1	+54.3	103.3	58 54.4	+55.2	105.0	58 38.1	+55.9	106.5	58 20.2	+56.6	108.1	58 00.8	+57.2	109.6	57 39.9	+57.8	111.1	57 17.6	+58.2	112.6	56 53.9	+58.6	114.0	**53**
54	60 03.4	+54.0	102.5	59 49.6	+54.8	104.2	59 34.0	+55.7	105.8	59 16.8	+56.4	107.5	58 58.0	+57.0	109.1	58 37.7	+57.5	110.6	58 15.8	+58.1	112.1	57 52.5	+58.5	113.6	**54**
55	60 57.4	+53.6	101.6	60 44.4	+54.6	103.4	60 29.7	+55.4	105.1	60 13.2	+56.1	106.8	59 55.0	+56.9	108.4	59 35.2	+57.5	110.1	59 13.9	+58.0	111.6	58 51.0	+58.5	113.2	**55**
56	61 51.0	+53.3	100.7	61 39.0	+54.2	102.5	61 25.1	+55.1	104.3	61 09.3	+56.0	106.1	60 51.9	+56.6	107.8	60 32.7	+57.3	109.5	60 11.9	+57.8	111.1	59 49.5	+58.3	112.7	**56**
57	62 44.3	+52.7	99.7	62 33.2	+53.8	101.6	62 20.2	+54.7	103.5	62 05.3	+55.6	105.3	61 48.5	+56.4	107.1	61 30.0	+57.1	108.9	61 09.7	+57.8	110.6	60 47.8	+58.3	112.3	**57**
58	63 37.0	+52.3	98.6	63 27.0	+53.4	100.6	63 14.9	+54.5	102.6	63 00.9	+55.4	104.5	62 44.9	+56.2	106.4	62 27.1	+56.9	108.2	62 07.5	+57.5	110.0	61 46.1	+58.1	111.8	**58**
59	64 29.3	+51.8	97.5	64 20.4	+52.9	99.6	64 09.4	+54.0	101.6	63 56.3	+55.0	103.6	63 41.1	+55.9	105.6	63 24.0	+56.7	107.5	63 05.0	+57.4	109.4	62 44.2	+58.0	111.2	**59**
60	65 21.1	+51.1	96.3	65 13.3	+52.5	98.5	65 03.4	+53.6	100.6	64 51.3	+54.6	102.7	64 37.0	+55.6	104.8	64 20.7	+56.5	106.8	64 02.4	+57.2	108.7	63 42.2	+57.8	110.7	**60**
61	66 12.2	+50.5	95.0	66 05.8	+51.8	97.3	65 57.0	+53.1	99.5	65 45.9	+54.3	101.7	65 32.6	+55.3	103.9	65 17.2	+56.2	106.0	64 59.6	+57.0	108.0	64 40.0	+57.7	110.1	**61**
62	67 02.7	+49.7	93.7	66 57.6	+51.2	96.0	66 50.1	+52.5	98.4	66 40.2	+53.7	100.7	66 27.9	+54.9	102.9	66 13.4	+55.9	105.1	65 56.6	+56.8	107.3	65 37.7	+57.5	109.4	**62**
63	67 52.4	+48.9	92.2	67 48.8	+50.4	94.7	67 42.6	+51.9	97.1	67 33.9	+53.3	99.5	67 22.8	+54.5	101.9	67 09.3	+55.5	104.2	66 53.4	+56.5	106.5	66 35.2	+57.3	108.7	**63**
64	68 41.3	+47.9	90.7	68 39.2	+49.7	93.2	68 34.5	+51.3	95.8	68 27.2	+52.7	98.3	68 17.3	+54.0	100.8	68 04.8	+55.2	103.2	67 49.9	+56.2	105.6	67 32.5	+57.1	107.9	**64**
65	69 29.2	+46.9	89.0	69 28.9	+48.7	91.6	69 25.8	+50.4	94.3	69 19.9	+52.0	97.0	69 11.3	+53.4	99.6	69 00.0	+54.7	102.1	68 46.1	+55.8	104.7	68 29.6	+56.8	107.1	**65**
66	70 16.1	+45.7	87.2	70 17.6	+47.7	89.9	70 16.2	+49.6	92.7	70 11.9	+51.3	95.5	70 04.7	+52.8	98.3	69 54.7	+54.2	101.0	69 41.9	+55.4	103.6	69 26.4	+56.6	106.2	**66**
67	71 01.8	+44.4	85.2	71 05.3	+46.5	88.1	71 05.8	+48.5	91.0	71 03.2	+50.4	93.9	70 57.5	+52.1	96.8	70 48.9	+53.6	99.7	70 37.3	+55.0	102.5	70 23.0	+56.1	105.2	**67**
68	71 46.2	+42.9	83.1	71 51.8	+45.2	86.1	71 54.3	+47.4	89.2	71 53.6	+49.4	92.2	71 49.6	+51.3	95.3	71 42.5	+53.0	98.3	71 32.3	+54.5	101.3	71 19.1	+55.8	104.2	**68**
69	72 29.1	+41.2	80.8	72 37.0	+43.7	84.0	72 41.7	+46.0	87.2	72 43.0	+48.2	90.4	72 40.9	+50.3	93.6	72 35.5	+52.2	96.8	72 26.8	+53.8	99.9	72 14.9	+55.3	103.0	**69**
70	73 10.3	*+39.3*•	78.3	73 20.7	+42.0	81.6	73 27.7	+44.6	85.0	73 31.2	+47.0	88.3	73 31.2	+49.3	91.7	73 27.7	+51.3	95.1	73 20.6	+53.2	98.4	73 10.2	+54.7	101.7	**70**
71	73 49.6	*+37.1*•	75.7	74 02.7	*+40.0*•	79.1	74 12.3	+42.8	82.5	74 18.2	+45.5	86.1	74 20.5	+47.9	89.6	74 19.0	+50.2	93.2	74 13.8	+52.2	96.7	74 04.9	+54.1	100.2	**71**
72	74 26.7	*+34.7*•	72.8	74 42.7	*+37.8*•	76.3	74 55.1	*+40.8*•	79.9	75 03.7	+43.7	83.6	75 08.4	+46.4	87.4	75 09.2	+49.0	91.1	75 06.0	+51.3	94.9	74 59.0	+53.3	98.6	**72**
73	75 01.4	*+32.1*•	69.7	75 20.5	*+35.3*•	73.3	75 35.9	*+38.5*•	77.0	75 47.4	*+41.6*•	80.9	75 54.8	+44.7	84.8	75 58.2	+47.5	88.8	75 57.3	+50.1	92.8	75 52.3	+52.4	96.8	**73**
74	75 33.5	*+29.0*•	66.4	75 55.8	*+32.4*•	70.0	76 14.4	*+35.8*•	73.9	76 29.0	*+39.3*•	77.9	76 39.5	*+42.6*•	82.0	76 45.7	+45.7	86.2	76 47.4	+48.6	90.5	76 44.7	+51.2	94.7	**74**
75	76 02.5	*+25.7*•	62.8	76 28.2	*+29.2*•	66.5	76 50.2	*+32.9*•	70.4	77 08.3	*+36.5*•	74.6	77 22.1	*+40.1*•	78.9	77 31.4	*+43.6*•	83.3	77 36.0	+46.9	87.8	77 35.9	+49.9	92.4	**75**
76	76 28.2	*+22.0*•	59.0	76 57.4	*+25.7*•	62.7	77 23.1	*+29.4*•	66.7	77 44.8	*+33.3*•	70.9	78 02.2	*+37.3*•	75.4	78 15.0	*+41.1*•	80.0	78 22.9	*+44.8*•	84.8	78 25.8	+48.2	89.7	**76**
77	76 50.2	*+18.1*•	55.0	77 23.1	*+21.7*•	58.6	77 52.5	*+25.6*•	62.6	78 18.1	*+29.7*•	66.9	78 39.5	*+33.8*•	71.5	78 56.1	*+38.1*•	76.3	79 07.7	*+42.2*•	81.4	79 14.0	*+46.0*•	86.6	**77**
78	77 08.3	*+13.8*•	50.7	77 44.8	*+17.4*•	54.3	78 18.1	*+21.4*•	58.2	78 47.8	*+25.5*•	62.5	79 13.3	*+30.0*•	67.2	79 34.2	*+34.5*•	72.2	79 49.9	*+39.0*•	77.5	80 00.0	*+43.4*•	83.1	**78**
79	77 22.1	*+9.3*•	46.3	78 02.2	*+12.8*•	49.7	78 39.5	*+16.6*•	53.5	79 13.3	*+20.9*•	57.8	79 43.3	*+25.4*•	62.4	80 08.7	*+30.2*•	67.5	80 28.9	*+35.2*•	73.1	80 43.4	*+40.2*•	78.9	**79**
80	77 31.4	*+4.6*•	41.8	78 15.0	*+7.9*•	45.0	78 56.1	*+11.6*•	48.6	79 34.2	*+15.7*•	52.7	80 08.7	*+20.2*•	57.3	80 38.9	*+25.2*•	62.4	81 04.1	*+30.5*•	68.0	81 23.6	*+36.0*•	74.1	**80**
81	77 36.0	*–0.1*•	37.2	78 22.9	*+2.9*•	40.1	79 07.7	*+6.3*•	43.4	79 49.9	*+10.1*•	47.3	80 28.9	*+14.5*•	51.7	81 04.1	*+19.5*•	56.6	81 34.6	*+25.0*•	62.3	81 59.6	*+30.9*•	68.6	**81**
82	77 35.9	*–4.8*•	32.5	78 25.8	*–2.2*•	35.1	79 14.0	*+0.8*•	38.1	80 00.0	*+4.3*•	41.6	80 43.4	*+8.4*•	45.7	81 23.6	*+13.1*•	50.4	81 59.6	*+18.5*•	55.9	82 30.5	*+24.6*•	62.2	**82**
83	77 31.1	*–9.5*•	27.9	78 23.6	*–7.3*•	30.1	79 14.8	*–4.7*•	32.8	80 04.3	*–1.6*•	35.9	80 51.8	*+2.0*•	39.5	81 36.7	*+6.2*•	43.8	82 18.1	*+11.3*•	49.0	82 55.1	*+17.3*•	55.0	**83**
84	77 21.6	*–14.0*•	23.3	78 16.3	*–12.2*•	25.2	79 10.1	*–10.1*•	27.5	80 02.7	*–7.6*•	30.1	80 53.8	*–4.6*•	33.2	81 42.9	*–1.0*•	37.0	82 29.4	*+3.5*•	41.5	83 12.4	*+8.9*•	47.1	**84**
85	77 07.6	*–18.2*•	18.9	78 04.1	*–16.9*•	20.5	79 00.0	*–15.2*•	22.3	79 55.1	*–13.3*•	24.4	80 49.2	*–10.9*•	26.9	81 41.9	*–8.0*•	30.0	82 32.9	*–4.5*•	33.9	83 21.3	*+0.1*•	38.6	**85**
86	76 49.4	*–22.2*•	14.7	77 47.2	*–21.2*•	15.9	78 44.8	*–20.1*•	17.2	79 41.8	*–18.6*•	18.9	80 38.3	*–17.0*•	20.8	81 33.9	*–14.8*•	23.2	82 28.4	*–12.2*•	26.2	83 21.4	*–8.9*•	30.0	**86**
87	76 27.2	*–25.9*•	10.7	77 26.0	*–25.1*•	11.5	78 24.7	*–24.4*•	12.5	79 23.2	*–23.5*•	13.6	80 21.3	*–22.4*•	15.0	81 19.1	*–21.1*•	16.7	82 16.2	*–19.4*•	18.8	83 12.5	*–17.1*•	21.5	**87**
88	76 01.3	*–29.1*•	6.9	77 00.9	*–28.9*•	7.4	78 00.3	*–28.4*•	8.0	78 59.7	*–27.9*•	8.7	79 58.9	*–27.3*•	9.6	80 58.0	*–26.6*•	10.6	81 56.8	*–25.7*•	11.9	82 55.4	*–24.6*•	13.6	**88**
89	75 32.2	*–32.2*•	3.3	76 32.0	*–32.0*•	3.6	77 31.9	*–31.9*•	3.8	78 31.8	*–31.8*•	4.2	79 31.6	*–31.6*•	4.6	80 31.4	*–31.4*•	5.0	81 31.1	*–31.1*•	5.6	82 30.8	*–30.8*•	6.4	**89**
90	75 00.0	*–34.8*•	0.0	76 00.0	*–34.9*•	0.0	77 00.0	*–35.0*•	0.0	78 00.0	*–35.2*•	0.0	79 00.0	*–35.3*•	0.0	80 00.0	*–35.5*•	0.0	81 00.0	*–35.7*•	0.0	82 00.0	*–35.9*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 56°, 304°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 19.3	– 58.6	123.1	7 46.5	– 58.8	123.2	7 13.6	– 58.9	123.3	6 40.6	– 59.1	123.4	6 07.5	– 59.2	123.5	5 34.3	– 59.3	123.6	5 01.1	– 59.5	123.7	4 27.8	– 59.6	123.7	**0**
1	7 20.7	– 58.6	123.3	6 47.7	– 58.7	123.4	6 14.7	– 59.0	123.5	5 41.5	– 59.1	123.6	5 08.3	– 59.3	123.7	4 35.0	– 59.4	123.7	4 01.6	– 59.5	123.8	3 28.2	– 59.6	123.9	**1**
2	6 22.1	– 58.5	123.5	5 49.0	– 58.8	123.6	5 15.7	– 58.9	123.7	4 42.4	– 59.1	123.8	4 09.0	– 59.2	123.8	3 35.6	– 59.4	123.9	3 02.1	– 59.5	123.9	2 28.6	– 59.6	124.0	**2**
3	5 23.6	– 58.6	123.7	4 50.2	– 58.8	123.8	4 16.8	– 59.0	123.9	3 43.3	– 59.1	123.9	3 09.8	– 59.3	124.0	2 36.2	– 59.3	124.0	2 02.6	– 59.5	124.1	1 29.0	– 59.6	124.1	**3**
4	4 25.0	– 58.6	124.0	3 51.4	– 58.8	124.0	3 17.8	– 58.9	124.1	2 44.2	– 59.1	124.1	2 10.5	– 59.2	124.1	1 36.9	– 59.4	124.2	1 03.1	– 59.5	124.2	0 29.4	– 59.6	124.2	**4**
5	3 26.4	– 58.6	124.2	2 52.6	– 58.7	124.2	2 18.9	– 59.0	124.3	1 45.1	– 59.1	124.3	1 11.3	– 59.2	124.3	0 37.5	– 59.4	124.3	0 03.6	– 59.4	124.3	0 30.2	+ 59.6	55.7	**5**
6	2 27.8	– 58.6	124.4	1 53.9	– 58.8	124.4	1 19.9	– 58.9	124.4	0 46.0	– 59.1	124.5	0 12.1	– 59.3	124.5	0 21.9	+ 59.4	55.5	0 55.8	+ 59.5	55.5	1 29.8	+ 59.6	55.6	**6**
7	1 29.2	– 58.6	124.6	0 55.1	– 58.8	124.6	0 21.0	– 59.0	124.6	0 13.1	+ 59.1	55.4	0 47.2	+ 59.2	55.4	1 21.3	+ 59.3	55.4	1 55.3	+ 59.5	55.4	2 29.4	+ 59.6	55.5	**7**
8	0 30.6	– 58.6	124.8	0 03.7	+ 58.8	55.2	0 38.0	+ 58.9	55.2	1 12.2	+ 59.1	55.2	1 46.4	+ 59.3	55.2	2 20.6	+ 59.4	55.3	2 54.8	+ 59.5	55.3	3 29.0	+ 59.6	55.3	**8**
9	0 28.0	+ 58.6	55.0	1 02.5	+ 58.8	55.0	1 36.9	+ 58.9	55.0	2 11.3	+ 59.1	55.0	2 45.7	+ 59.2	55.1	3 20.0	+ 59.4	55.1	3 54.3	+ 59.5	55.2	4 28.6	+ 59.6	55.2	**9**
10	1 26.6	+ 58.6	54.8	2 01.3	+ 58.7	54.8	2 35.8	+ 59.0	54.8	3 10.4	+ 59.1	54.9	3 44.9	+ 59.3	54.9	4 19.4	+ 59.4	55.0	4 53.8	+ 59.5	55.0	5 28.2	+ 59.6	55.1	**10**
11	2 25.2	+ 58.6	54.5	3 00.0	+ 58.8	54.6	3 34.8	+ 58.9	54.6	4 09.5	+ 59.1	54.7	4 44.2	+ 59.2	54.7	5 18.8	+ 59.3	54.8	5 53.3	+ 59.5	54.9	6 27.8	+ 59.6	55.0	**11**
12	3 23.8	+ 58.6	54.3	3 58.8	+ 58.8	54.4	4 33.7	+ 59.0	54.4	5 08.6	+ 59.1	54.5	5 43.4	+ 59.2	54.6	6 18.1	+ 59.4	54.7	6 52.8	+ 59.5	54.8	7 27.4	+ 59.5	54.9	**12**
13	4 22.4	+ 58.6	54.1	4 57.6	+ 58.8	54.2	5 32.7	+ 58.9	54.3	6 07.7	+ 59.1	54.3	6 42.6	+ 59.3	54.4	7 17.5	+ 59.4	54.5	7 52.3	+ 59.5	54.6	8 26.9	+ 59.6	54.8	**13**
14	5 21.0	+ 58.6	53.9	5 56.4	+ 58.7	54.0	6 31.6	+ 58.9	54.1	7 06.8	+ 59.1	54.2	7 41.9	+ 59.2	54.3	8 16.9	+ 59.3	54.4	8 51.8	+ 59.4	54.5	9 26.5	+ 59.6	54.6	**14**
15	6 19.6	+ 58.6	53.7	6 55.1	+ 58.8	53.8	7 30.5	+ 59.0	53.9	8 05.9	+ 59.0	54.0	8 41.1	+ 59.2	54.1	9 16.2	+ 59.4	54.2	9 51.2	+ 59.5	54.4	10 26.1	+ 59.6	54.5	**15**
16	7 18.2	+ 58.6	53.5	7 53.9	+ 58.7	53.6	8 29.5	+ 58.9	53.7	9 04.9	+ 59.1	53.8	9 40.3	+ 59.2	53.9	10 15.6	+ 59.3	54.1	10 50.7	+ 59.5	54.2	11 25.7	+ 59.6	54.4	**16**
17	8 16.8	+ 58.5	53.2	8 52.6	+ 58.8	53.4	9 28.4	+ 58.9	53.5	10 04.0	+ 59.1	53.6	10 39.5	+ 59.3	53.8	11 14.9	+ 59.4	53.9	11 50.2	+ 59.5	54.1	12 25.3	+ 59.6	54.3	**17**
18	9 15.3	+ 58.6	53.0	9 51.4	+ 58.7	53.2	10 27.3	+ 58.9	53.3	11 03.1	+ 59.1	53.5	11 38.8	+ 59.2	53.6	12 14.3	+ 59.3	53.8	12 49.7	+ 59.4	54.0	13 24.9	+ 59.5	54.2	**18**
19	10 13.9	+ 58.6	52.8	10 50.1	+ 58.8	52.9	11 26.2	+ 58.9	53.1	12 02.2	+ 59.0	53.3	12 38.0	+ 59.2	53.4	13 13.6	+ 59.4	53.6	13 49.1	+ 59.5	53.8	14 24.4	+ 59.6	54.0	**19**
20	11 12.5	+ 58.5	52.6	11 48.9	+ 58.7	52.7	12 25.1	+ 58.9	52.9	13 01.2	+ 59.1	53.1	13 37.2	+ 59.2	53.3	14 13.0	+ 59.3	53.5	14 48.6	+ 59.4	53.7	15 24.0	+ 59.6	53.9	**20**
21	12 11.0	+ 58.5	52.4	12 47.6	+ 58.7	52.5	13 24.0	+ 58.9	52.7	14 00.3	+ 59.0	52.9	14 36.4	+ 59.2	53.1	15 12.3	+ 59.3	53.3	15 48.0	+ 59.5	53.5	16 23.6	+ 59.5	53.8	**21**
22	13 09.5	+ 58.5	52.1	13 46.3	+ 58.7	52.3	14 22.9	+ 58.9	52.5	14 59.3	+ 59.0	52.7	15 35.6	+ 59.1	52.9	16 11.6	+ 59.3	53.2	16 47.5	+ 59.4	53.4	17 23.1	+ 59.6	53.7	**22**
23	14 08.0	+ 58.6	51.9	14 45.0	+ 58.7	52.1	15 21.8	+ 58.8	52.3	15 58.3	+ 59.1	52.5	16 34.7	+ 59.2	52.8	17 10.9	+ 59.3	53.0	17 46.9	+ 59.5	53.3	18 22.7	+ 59.6	53.5	**23**
24	15 06.6	+ 58.4	51.7	15 43.7	+ 58.7	51.9	16 20.6	+ 58.9	52.1	16 57.4	+ 59.0	52.4	17 33.9	+ 59.2	52.6	18 10.2	+ 59.3	52.9	18 46.4	+ 59.4	53.1	19 22.3	+ 59.5	53.4	**24**
25	16 05.0	+ 58.5	51.4	16 42.4	+ 58.6	51.7	17 19.5	+ 58.8	51.9	17 56.4	+ 59.0	52.2	18 33.1	+ 59.1	52.4	19 09.5	+ 59.3	52.7	19 45.8	+ 59.4	53.0	20 21.8	+ 59.5	53.3	**25**
26	17 03.5	+ 58.5	51.2	17 41.0	+ 58.7	51.5	18 18.3	+ 58.8	51.7	18 55.4	+ 59.0	52.0	19 32.2	+ 59.2	52.2	20 08.8	+ 59.3	52.5	20 45.2	+ 59.4	52.8	21 21.3	+ 59.6	53.1	**26**
27	18 02.0	+ 58.4	51.0	18 39.7	+ 58.6	51.2	19 17.1	+ 58.8	51.5	19 54.4	+ 58.9	51.8	20 31.4	+ 59.1	52.1	21 08.1	+ 59.3	52.4	21 44.6	+ 59.4	52.7	22 20.9	+ 59.5	53.0	**27**
28	19 00.4	+ 58.5	50.7	19 38.3	+ 58.6	51.0	20 15.9	+ 58.8	51.3	20 53.3	+ 59.0	51.6	21 30.5	+ 59.1	51.9	22 07.4	+ 59.3	52.2	22 44.0	+ 59.4	52.5	23 20.4	+ 59.5	52.9	**28**
29	19 58.9	+ 58.4	50.5	20 36.9	+ 58.6	50.8	21 14.7	+ 58.8	51.1	21 52.3	+ 59.0	51.4	22 29.6	+ 59.1	51.7	23 06.7	+ 59.2	52.0	23 43.4	+ 59.4	52.4	24 19.9	+ 59.5	52.7	**29**
30	20 57.3	+ 58.3	50.2	21 35.5	+ 58.6	50.5	22 13.5	+ 58.8	50.9	22 51.3	+ 58.9	51.2	23 28.7	+ 59.1	51.5	24 05.9	+ 59.3	51.9	24 42.8	+ 59.4	52.2	25 19.4	+ 59.5	52.6	**30**
31	21 55.6	+ 58.4	50.0	22 34.1	+ 58.5	50.3	23 12.3	+ 58.7	50.6	23 50.2	+ 58.9	51.0	24 27.8	+ 59.1	51.3	25 05.2	+ 59.2	51.7	25 42.2	+ 59.4	52.1	26 18.9	+ 59.5	52.4	**31**
32	22 54.0	+ 58.3	49.7	23 32.6	+ 58.6	50.1	24 11.0	+ 58.7	50.4	24 49.1	+ 58.9	50.8	25 26.9	+ 59.1	51.1	26 04.4	+ 59.2	51.5	26 41.6	+ 59.3	51.9	27 18.4	+ 59.5	52.3	**32**
33	23 52.3	+ 58.4	49.5	24 31.2	+ 58.5	49.8	25 09.7	+ 58.7	50.2	25 48.0	+ 58.9	50.6	26 26.0	+ 59.0	50.9	27 03.6	+ 59.2	51.3	27 40.9	+ 59.4	51.7	28 17.9	+ 59.5	52.2	**33**
34	24 50.7	+ 58.2	49.2	25 29.7	+ 58.5	49.6	26 08.4	+ 58.7	50.0	26 46.9	+ 58.8	50.3	27 25.0	+ 59.0	50.7	28 02.8	+ 59.2	51.1	28 40.3	+ 59.3	51.6	29 17.4	+ 59.5	52.0	**34**
35	25 48.9	+ 58.3	49.0	26 28.2	+ 58.4	49.3	27 07.1	+ 58.7	49.7	27 45.7	+ 58.9	50.1	28 24.0	+ 59.1	50.5	29 02.0	+ 59.2	51.0	29 39.6	+ 59.3	51.4	30 16.9	+ 59.4	51.9	**35**
36	26 47.2	+ 58.2	48.7	27 26.6	+ 58.5	49.1	28 05.8	+ 58.6	49.5	28 44.6	+ 58.8	49.9	29 23.1	+ 58.9	50.3	30 01.2	+ 59.1	50.8	30 38.9	+ 59.4	51.2	31 16.3	+ 59.5	51.7	**36**
37	27 45.4	+ 58.2	48.4	28 25.1	+ 58.4	48.8	29 04.4	+ 58.6	49.2	29 43.4	+ 58.8	49.7	30 22.0	+ 59.0	50.1	31 00.3	+ 59.2	50.6	31 38.3	+ 59.2	51.0	32 15.8	+ 59.4	51.5	**37**
38	28 43.6	+ 58.2	48.2	29 23.5	+ 58.3	48.6	30 03.0	+ 58.6	49.0	30 42.2	+ 58.8	49.4	31 21.0	+ 59.0	49.9	31 59.5	+ 59.1	50.4	32 37.5	+ 59.3	50.9	33 15.2	+ 59.4	51.4	**38**
39	29 41.8	+ 58.1	47.9	30 21.8	+ 58.4	48.3	31 01.6	+ 58.5	48.8	31 41.0	+ 58.7	49.2	32 20.0	+ 58.9	49.7	32 58.6	+ 59.1	50.2	33 36.8	+ 59.3	50.7	34 14.6	+ 59.4	51.2	**39**
40	30 39.9	+ 58.1	47.6	31 20.2	+ 58.3	48.0	32 00.1	+ 58.5	48.5	32 39.7	+ 58.7	49.0	33 18.9	+ 58.9	49.5	33 57.7	+ 59.1	50.0	34 36.1	+ 59.2	50.5	35 14.0	+ 59.4	51.0	**40**
41	31 38.0	+ 58.0	47.3	32 18.5	+ 58.3	47.8	32 58.6	+ 58.5	48.2	33 38.4	+ 58.7	48.7	34 17.8	+ 58.9	49.2	34 56.8	+ 59.0	49.8	35 35.3	+ 59.2	50.3	36 13.4	+ 59.4	50.9	**41**
42	32 36.0	+ 58.0	47.0	33 16.8	+ 58.2	47.5	33 57.1	+ 58.5	48.0	34 37.1	+ 58.7	48.5	35 16.7	+ 58.8	49.0	35 55.8	+ 59.1	49.5	36 34.5	+ 59.2	50.1	37 12.8	+ 59.4	50.7	**42**
43	33 34.0	+ 58.0	46.7	34 15.0	+ 58.2	47.2	34 55.6	+ 58.4	47.7	35 35.8	+ 58.6	48.2	36 15.5	+ 58.8	48.8	36 54.9	+ 59.0	49.3	37 33.7	+ 59.2	49.9	38 12.2	+ 59.3	50.5	**43**
44	34 32.0	+ 57.9	46.4	35 13.2	+ 58.1	46.9	35 54.0	+ 58.3	47.4	36 34.4	+ 58.6	48.0	37 14.3	+ 58.8	48.5	37 53.9	+ 58.9	49.1	38 32.9	+ 59.2	49.7	39 11.5	+ 59.3	50.3	**44**
45	35 29.9	+ 57.8	46.1	36 11.3	+ 58.1	46.6	36 52.3	+ 58.4	47.1	37 33.0	+ 58.5	47.7	38 13.1	+ 58.8	48.3	38 52.8	+ 59.0	48.9	39 32.1	+ 59.1	49.5	40 10.8	+ 59.3	50.1	**45**
46	36 27.7	+ 57.8	45.7	37 09.4	+ 58.1	46.3	37 50.7	+ 58.3	46.8	38 31.5	+ 58.5	47.4	39 11.9	+ 58.7	48.0	39 51.8	+ 58.9	48.6	40 31.2	+ 59.1	49.3	41 10.1	+ 59.3	49.9	**46**
47	37 25.5	+ 57.8	45.4	38 07.5	+ 57.9	45.9	38 49.0	+ 58.2	46.5	39 30.0	+ 58.5	47.1	40 10.6	+ 58.7	47.7	40 50.7	+ 58.9	48.4	41 30.3	+ 59.1	49.0	42 09.4	+ 59.3	49.7	**47**
48	38 23.3	+ 57.6	45.1	39 05.4	+ 58.0	45.6	39 47.2	+ 58.2	46.2	40 28.5	+ 58.4	46.8	41 09.3	+ 58.6	47.5	41 49.6	+ 58.9	48.1	42 29.4	+ 59.1	48.8	43 08.7	+ 59.2	49.5	**48**
49	39 20.9	+ 57.6	44.7	40 03.4	+ 57.8	45.3	40 45.4	+ 58.1	45.9	41 26.9	+ 58.4	46.5	42 07.9	+ 58.6	47.2	42 48.5	+ 58.8	47.8	43 28.5	+ 59.0	48.5	44 07.9	+ 59.2	49.3	**49**
50	40 18.5	+ 57.6	44.3	41 01.2	+ 57.9	44.9	41 43.5	+ 58.1	45.6	42 25.3	+ 58.3	46.2	43 06.5	+ 58.6	46.9	43 47.3	+ 58.7	47.6	44 27.5	+ 59.0	48.3	45 07.1	+ 59.2	49.0	**50**
51	41 16.1	+ 57.5	44.0	41 59.1	+ 57.7	44.6	42 41.6	+ 58.0	45.2	43 23.6	+ 58.2	45.9	44 05.1	+ 58.5	46.6	44 46.0	+ 58.8	47.3	45 26.5	+ 58.9	48.0	46 06.3	+ 59.1	48.8	**51**
52	42 13.6	+ 57.3	43.6	42 56.8	+ 57.7	44.2	43 39.6	+ 57.9	44.9	44 21.8	+ 58.2	45.6	45 03.6	+ 58.4	46.3	45 44.8	+ 58.7	47.0	46 25.4	+ 58.9	47.8	47 05.4	+ 59.1	48.6	**52**
53	43 10.9	+ 57.3	43.2	43 54.5	+ 57.5	43.8	44 37.5	+ 57.9	44.5	45 20.0	+ 58.2	45.2	46 02.0	+ 58.4	45.9	46 43.5	+ 58.6	46.7	47 24.3	+ 58.9	47.5	48 04.5	+ 59.1	48.3	**53**
54	44 08.2	+ 57.2	42.8	44 52.0	+ 57.6	43.4	45 35.4	+ 57.8	44.1	46 18.2	+ 58.0	44.9	47 00.4	+ 58.4	45.6	47 42.1	+ 58.6	46.4	48 23.2	+ 58.8	47.2	49 03.6	+ 59.1	48.0	**54**
55	45 05.4	+ 57.2	42.3	45 49.6	+ 57.4	43.0	46 33.2	+ 57.7	43.7	47 16.2	+ 58.0	44.5	47 58.8	+ 58.2	45.3	48 40.7	+ 58.5	46.1	49 22.0	+ 58.8	46.9	50 02.7	+ 59.0	47.8	**55**
56	46 02.6	+ 57.0	41.9	46 47.0	+ 57.3	42.6	47 30.9	+ 57.6	43.3	48 14.2	+ 57.9	44.1	48 57.0	+ 58.2	44.9	49 39.2	+ 58.5	45.7	50 20.8	+ 58.7	46.6	51 01.7	+ 58.9	47.5	**56**
57	46 59.6	+ 56.9	41.5	47 44.3	+ 57.2	42.2	48 28.5	+ 57.5	42.9	49 12.1	+ 57.9	43.7	49 55.2	+ 58.1	44.5	50 37.7	+ 58.4	45.4	51 19.5	+ 58.7	46.3	52 00.6	+ 58.9	47.2	**57**
58	47 56.5	+ 56.7	41.0	48 41.5	+ 57.1	41.7	49 26.0	+ 57.4	42.5	50 10.0	+ 57.7	43.3	50 53.3	+ 58.1	44.1	51 36.1	+ 58.3	45.0	52 18.2	+ 58.6	45.9	52 59.5	+ 58.9	46.9	**58**
59	48 53.2	+ 56.7	40.5	49 38.6	+ 57.0	41.3	50 23.4	+ 57.4	42.0	51 07.7	+ 57.7	42.9	51 51.4	+ 57.9	43.7	52 34.4	+ 58.3	44.6	53 16.8	+ 58.5	45.6	53 58.4	+ 58.8	46.5	**59**
60	49 49.9	+ 56.5	40.0	50 35.6	+ 56.9	40.8	51 20.8	+ 57.2	41.6	52 05.4	+ 57.5	42.4	52 49.3	+ 57.9	43.3	53 32.7	+ 58.1	44.2	54 15.3	+ 58.5	45.2	54 57.2	+ 58.7	46.2	**60**
61	50 46.4	+ 56.4	39.5	51 32.5	+ 56.7	40.3	52 18.0	+ 57.0	41.1	53 02.9	+ 57.4	42.0	53 47.2	+ 57.8	42.9	54 30.8	+ 58.1	43.8	55 13.8	+ 58.4	44.8	55 55.9	+ 58.7	45.8	**61**
62	51 42.8	+ 56.2	38.9	52 29.2	+ 56.6	39.7	53 15.0	+ 57.0	40.6	54 00.3	+ 57.3	41.5	54 45.0	+ 57.6	42.4	55 28.9	+ 58.0	43.4	56 12.2	+ 58.3	44.4	56 54.6	+ 58.6	45.5	**62**
63	52 39.0	+ 56.0	38.3	53 25.8	+ 56.4	39.2	54 12.0	+ 56.8	40.0	54 57.6	+ 57.2	41.0	55 42.6	+ 57.5	41.9	56 26.9	+ 57.9	42.9	57 10.5	+ 58.2	44.0	57 53.2	+ 58.6	45.1	**63**
64	53 35.0	+ 55.9	37.7	54 22.2	+ 56.2	38.6	55 08.8	+ 56.6	39.5	55 54.8	+ 57.0	40.4	56 40.1	+ 57.4	41.4	57 24.8	+ 57.7	42.4	58 08.7	+ 58.1	43.5	58 51.8	+ 58.4	44.7	**64**
65	54 30.9	+ 55.6	37.1	55 18.4	+ 56.1	38.0	56 05.4	+ 56.5	38.9	56 51.8	+ 56.9	39.9	57 37.5	+ 57.3	40.9	58 22.5	+ 57.6	41.9	59 06.8	+ 58.0	43.0	59 50.2	+ 58.4	44.2	**65**
66	55 26.5	+ 55.4	36.5	56 14.5	+ 55.8	37.4	57 01.9	+ 56.2	38.3	57 48.7	+ 56.6	39.3	58 34.8	+ 57.0	40.3	59 20.1	+ 57.5	41.4	60 04.8	+ 57.8	42.5	60 48.6	+ 58.2	43.7	**66**
67	56 21.9	+ 55.2	35.8	57 10.3	+ 55.7	36.7	57 58.1	+ 56.1	37.6	58 45.3	+ 56.5	38.6	59 31.8	+ 57.0	39.7	60 17.6	+ 57.4	40.8	61 02.6	+ 57.8	42.0	61 46.8	+ 58.1	43.2	**67**
68	57 17.1	+ 55.0	35.1	58 06.0	+ 55.3	36.0	58 54.2	+ 55.8	37.0	59 41.8	+ 56.3	38.0	60 28.8	+ 56.7	39.1	61 15.0	+ 57.1	40.2	62 00.4	+ 57.6	41.4	62 44.9	+ 58.0	42.7	**68**
69	58 12.1	+ 54.6	34.3	59 01.3	+ 55.2	35.3	59 50.0	+ 55.6	36.2	60 38.1	+ 56.1	37.3	61 25.5	+ 56.5	38.4	62 12.1	+ 57.0	39.6	62 58.0	+ 57.4	40.8	63 42.9	+ 57.9	42.1	**69**
70	59 06.7	+ 54.4	33.5	59 56.5	+ 54.8	34.5	60 45.6	+ 55.3	35.5	61 34.2	+ 55.8	36.6	62 22.0	+ 56.3	37.7	63 09.1	+ 56.8	38.9	63 55.4	+ 57.2	40.2	64 40.8	+ 57.7	41.5	**70**
71	60 01.1	+ 54.0	32.7	60 51.3	+ 54.5	33.7	61 40.9	+ 55.1	34.7	62 30.0	+ 55.5	35.8	63 18.3	+ 56.0	36.9	64 05.9	+ 56.5	38.2	64 52.6	+ 57.0	39.5	65 38.5	+ 57.5	40.9	**71**
72	60 55.1	+ 53.6	31.8	61 45.8	+ 54.2	32.8	62 36.0	+ 54.6	33.8	63 25.5	+ 55.2	34.9	64 14.3	+ 55.7	36.1	65 02.4	+ 56.3	37.4	65 49.6	+ 56.8	38.7	66 36.0	+ 57.3	40.2	**72**
73	61 48.7	+ 53.3	30.9	62 40.0	+ 53.7	31.9	63 30.6	+ 54.4	32.9	64 20.7	+ 54.8	34.0	65 10.0	+ 55.5	35.3	65 58.7	+ 55.9	36.5	66 46.4	+ 56.6	37.9	67 33.3	+ 57.1	39.4	**73**
74	62 42.0	+ 52.8	29.9	63 33.7	+ 53.4	30.9	64 25.0	+ 53.9	31.9	65 15.5	+ 54.5	33.1	66 05.5	+ 55.0	34.3	66 54.6	+ 55.7	35.6	67 43.0	+ 56.2	37.1	68 30.4	+ 56.8	38.6	**74**
75	63 34.8	+ 52.3	28.8	64 27.1	+ 52.9	29.8	65 18.9	+ 53.4	30.9	66 10.0	+ 54.1	32.1	67 00.5	+ 54.7	33.3	67 50.3	+ 55.2	34.7	68 39.2	+ 55.9	36.1	69 27.2	+ 56.5	37.7	**75**
76	64 27.1	+ 51.8	27.7	65 20.0	+ 52.3	28.7	66 12.3	+ 52.9	29.8	67 04.1	+ 53.5	31.0	67 55.2	+ 54.2	32.2	68 45.5	+ 54.9	33.6	69 35.1	+ 55.5	35.1	70 23.7	+ 56.1	36.7	**76**
77	65 18.9	+ 51.1	26.5	66 12.3	+ 51.8	27.5	67 05.2	+ 52.4	28.6	67 57.6	+ 53.0	29.8	68 49.4	+ 53.6	31.1	69 40.4	+ 54.3	32.5	70 30.6	+ 55.0	34.0	71 19.8	+ 55.8	35.6	**77**
78	66 10.0	+ 50.5	25.3	67 04.1	+ 51.1	26.3	67 57.6	+ 51.8	27.3	68 50.6	+ 52.4	28.5	69 43.0	+ 53.1	29.8	70 34.7	+ 53.8	31.2	71 25.6	+ 54.5	32.8	72 15.6	+ 55.3	34.5	**78**
79	67 00.5	+ 49.8	23.9	67 55.2	+ 50.3	24.9	68 49.4	+ 51.0	26.0	69 43.0	+ 51.7	27.2	70 36.1	+ 52.4	28.4	71 28.5	+ 53.2	29.9	72 20.1	+ 54.0	31.4	73 10.9	+ 54.7	33.1	**79**
80	67 50.3	+ 48.9	22.4	68 45.5	+ 49.6	23.4	69 40.4	+ 50.2	24.5	70 34.7	+ 50.9	25.7	71 28.5	+ 51.6	26.9	72 21.7	+ 52.4	28.4	73 14.1	+ 53.2	29.9	74 05.6	+ 54.1	31.7	**80**
81	68 39.2	+ 48.0	20.9	69 35.1	+ 48.6	21.8	70 30.6	+ 49.2	22.9	71 25.6	+ 50.0	24.0	72 20.1	+ 50.8	25.3	73 14.1	+ 51.5	26.7	74 07.3	+ 52.4	28.3	74 59.7	+ 53.3	30.1	**81**
82	69 27.2	+ 46.9	19.2	70 23.7	+ 47.5	20.1	71 19.8	+ 48.2	21.1	72 15.6	+ 48.9	22.3	73 10.9	+ 49.7	23.5	74 05.6	+ 50.5	24.9	74 59.7	+ 51.4	26.5	75 53.0	+ 52.3	28.2	**82**
83	70 14.1	+ 45.8	17.4	71 11.2	+ 46.4	18.3	72 08.0	+ 47.1	19.2	73 04.5	+ 47.7	20.3	74 00.6	+ 48.5	21.5	74 56.1	+ 49.3	22.9	75 51.1	+ 50.2	24.4	76 45.3	+ 51.3	26.2	**83**
84	70 59.9	+ 44.4	15.4	71 57.6	+ 45.0	16.2	72 55.1	+ 45.6	17.2	73 52.2	+ 46.4	18.2	74 49.1	+ 47.0	19.3	75 45.4	+ 48.0	20.6	76 41.3	+ 48.9	22.1	77 36.6	+ 49.8	23.8	**84**
85	71 44.3	+ 43.0	13.3	72 42.6	+ 43.5	14.1	73 40.7	+ 44.1	14.9	74 38.6	+ 44.7	15.8	75 36.1	+ 45.4	16.9	76 33.4	+ 46.2	18.1	77 30.2	+ 47.1	19.5	78 26.4	+ 48.2	21.1	**85**
86	72 27.3	+ 41.2	11.1	73 26.1	+ 41.7	11.7	74 24.8	+ 42.2	12.4	75 23.3	*+ 42.8* •	13.3	76 21.5	*+ 43.5* •	14.2	77 19.6	*+ 44.2* •	15.3	78 17.3	*+ 45.0* •	16.6	79 14.6	*+ 46.0* •	18.0	**86**
87	73 08.5	+ 39.4	8.6	74 07.8	*+ 39.8* •	9.1	75 07.0	*+ 40.2* •	9.7	76 06.1	*+ 40.6* •	10.4	77 05.0	*+ 41.2* •	11.2	78 03.8	*+ 41.8* •	12.1	79 02.3	*+ 42.6* •	13.2	80 00.6	*+ 43.4* •	14.5	**87**
88	73 47.9	*+ 37.3* •	6.0	74 47.6	*+ 37.5* •	6.3	75 47.2	*+ 37.8* •	6.8	76 46.7	*+ 38.1* •	7.3	77 46.2	*+ 38.5* •	7.9	78 45.6	*+ 38.9* •	8.5	79 44.9	*+ 39.4* •	9.4	80 44.0	*+ 40.1* •	10.4	**88**
89	74 25.2	*+ 34.8* •	3.1	75 25.1	*+ 34.9* •	3.3	76 25.0	*+ 35.0* •	3.5	77 24.8	*+ 35.2* •	3.8	78 24.7	*+ 35.3* •	4.1	79 24.5	*+ 35.5* •	4.5	80 24.3	*+ 35.7* •	5.0	81 24.1	*+ 35.9* •	5.6	**89**
90	75 00.0	*+ 32.2* •	0.0	76 00.0	*+ 32.0* •	0.0	77 00.0	*+ 31.9* •	0.0	78 00.0	*+ 31.8* •	0.0	79 00.0	*+ 31.6* •	0.0	80 00.0	*+ 31.4* •	0.0	81 00.0	*+ 31.1* •	0.0	82 00.0	*+ 30.8* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 124°, 236°

57°, 303° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 06.2	+58.6	122.1	7 34.3	+58.7	122.2	7 02.2	+58.9	122.3	6 30.1	+59.1	122.4	5 57.9	+59.2	122.5	5 25.6	+59.4	122.6	4 53.3	+59.4	122.7	4 20.8	+59.6	122.7	**0**
1	9 04.8	+58.5	121.9	8 33.0	+58.7	122.0	8 01.1	+58.9	122.1	7 29.2	+59.0	122.2	6 57.1	+59.2	122.4	6 25.0	+59.3	122.5	5 52.7	+59.5	122.5	5 20.4	+59.6	122.6	**1**
2	10 03.3	+58.5	121.7	9 31.7	+58.7	121.8	9 00.0	+58.9	121.9	8 28.2	+59.1	122.1	7 56.3	+59.2	122.2	7 24.3	+59.4	122.3	6 52.2	+59.5	122.4	6 20.0	+59.6	122.5	**2**
3	11 01.8	+58.5	121.4	10 30.4	+58.7	121.6	9 58.9	+58.9	121.7	9 27.3	+59.1	121.9	8 55.5	+59.2	122.0	8 23.7	+59.3	122.2	7 51.7	+59.4	122.3	7 19.6	+59.6	122.4	**3**
4	12 00.3	+58.5	121.2	11 29.1	+58.7	121.4	10 57.8	+58.9	121.6	10 26.4	+59.0	121.7	9 54.7	+59.2	121.9	9 23.0	+59.4	122.0	8 51.1	+59.5	122.1	8 19.2	+59.5	122.3	**4**
5	12 58.8	+58.5	121.0	12 27.8	+58.7	121.2	11 56.7	+58.9	121.4	11 25.4	+59.0	121.5	10 53.9	+59.2	121.7	10 22.4	+59.3	121.9	9 50.6	+59.5	122.0	9 18.7	+59.6	122.2	**5**
6	13 57.3	+58.5	120.7	13 26.5	+58.7	121.0	12 55.6	+58.8	121.2	12 24.4	+59.1	121.3	11 53.1	+59.2	121.5	11 21.7	+59.3	121.7	10 50.1	+59.4	121.9	10 18.3	+59.6	122.0	**6**
7	14 55.8	+58.4	120.5	14 25.2	+58.7	120.7	13 54.4	+58.9	121.0	13 23.5	+59.0	121.2	12 52.3	+59.2	121.4	12 21.0	+59.3	121.6	11 49.5	+59.5	121.7	11 17.9	+59.6	121.9	**7**
8	15 54.2	+58.5	120.3	15 23.9	+58.6	120.5	14 53.3	+58.8	120.8	14 22.5	+59.0	121.0	13 51.5	+59.2	121.2	13 20.3	+59.4	121.4	12 49.0	+59.4	121.6	12 17.5	+59.5	121.8	**8**
9	16 52.7	+58.4	120.0	16 22.5	+58.6	120.3	15 52.1	+58.9	120.6	15 21.5	+59.0	120.8	14 50.7	+59.2	121.0	14 19.7	+59.3	121.2	13 48.4	+59.5	121.5	13 17.0	+59.6	121.7	**9**
10	17 51.1	+58.4	119.8	17 21.1	+58.7	120.1	16 51.0	+58.8	120.3	16 20.5	+59.0	120.6	15 49.9	+59.1	120.9	15 19.0	+59.3	121.1	14 47.9	+59.4	121.3	14 16.6	+59.6	121.5	**10**
11	18 49.5	+58.4	119.6	18 19.8	+58.6	119.9	17 49.8	+58.8	120.1	17 19.5	+59.0	120.4	16 49.0	+59.2	120.7	16 18.3	+59.3	120.9	15 47.3	+59.5	121.2	15 16.2	+59.5	121.4	**11**
12	19 47.9	+58.4	119.3	19 18.4	+58.6	119.6	18 48.6	+58.8	119.9	18 18.5	+59.0	120.2	17 48.2	+59.1	120.5	17 17.6	+59.3	120.8	16 46.8	+59.4	121.0	16 15.7	+59.6	121.3	**12**
13	20 46.3	+58.3	119.1	20 17.0	+58.5	119.4	19 47.4	+58.7	119.7	19 17.5	+58.9	120.0	18 47.3	+59.1	120.3	18 16.9	+59.3	120.6	17 46.2	+59.4	120.9	17 15.3	+59.5	121.2	**13**
14	21 44.6	+58.3	118.8	21 15.5	+58.6	119.2	20 46.1	+58.8	119.5	20 16.4	+59.0	119.8	19 46.4	+59.2	120.1	19 16.2	+59.3	120.5	18 45.6	+59.4	120.7	18 14.8	+59.6	121.0	**14**
15	22 42.9	+58.3	118.6	22 14.1	+58.5	118.9	21 44.9	+58.7	119.3	21 15.4	+58.9	119.6	20 45.6	+59.1	120.0	20 15.5	+59.2	120.3	19 45.0	+59.5	120.6	19 14.4	+59.5	120.9	**15**
16	23 41.2	+58.3	118.3	23 12.6	+58.5	118.7	22 43.6	+58.8	119.1	22 14.3	+58.9	119.4	21 44.7	+59.1	119.8	21 14.7	+59.3	120.1	20 44.5	+59.4	120.5	20 13.9	+59.5	120.8	**16**
17	24 39.5	+58.3	118.1	24 11.1	+58.5	118.5	23 42.4	+58.7	118.8	23 13.2	+58.9	119.2	22 43.8	+59.1	119.6	22 14.0	+59.2	120.0	21 43.9	+59.4	120.3	21 13.4	+59.6	120.6	**17**
18	25 37.8	+58.2	117.8	25 09.6	+58.5	118.2	24 41.1	+58.6	118.6	24 12.1	+58.9	119.0	23 42.9	+59.0	119.4	23 13.2	+59.3	119.8	22 43.3	+59.3	120.1	22 13.0	+59.5	120.5	**18**
19	26 36.0	+58.2	117.5	26 08.1	+58.4	118.0	25 39.7	+58.7	118.4	25 11.0	+58.9	118.8	24 41.9	+59.1	119.2	24 12.5	+59.2	119.6	23 42.6	+59.4	120.0	23 12.5	+59.5	120.4	**19**
20	27 34.2	+58.1	117.2	27 06.5	+58.4	117.7	26 38.4	+58.6	118.2	26 09.9	+58.8	118.6	25 41.0	+59.0	119.0	25 11.7	+59.2	119.4	24 42.0	+59.4	119.8	24 12.0	+59.5	120.2	**20**
21	28 32.3	+58.2	117.0	28 04.9	+58.4	117.4	27 37.0	+58.6	117.9	27 08.7	+58.9	118.4	26 40.0	+59.0	118.8	26 10.9	+59.2	119.3	25 41.4	+59.3	119.7	25 11.5	+59.5	120.1	**21**
22	29 30.5	+58.0	116.7	29 03.3	+58.3	117.2	28 35.6	+58.6	117.7	28 07.6	+58.8	118.1	27 39.0	+59.0	118.6	27 10.1	+59.2	119.1	26 40.7	+59.4	119.5	26 11.0	+59.5	119.9	**22**
23	30 28.5	+58.1	116.4	30 01.6	+58.3	116.9	29 34.2	+58.6	117.4	29 06.4	+58.7	117.9	28 38.0	+59.0	118.4	28 09.3	+59.1	118.9	27 40.1	+59.3	119.3	27 10.5	+59.4	119.8	**23**
24	31 26.6	+58.0	116.1	30 59.9	+58.3	116.6	30 32.8	+58.5	117.2	30 05.1	+58.8	117.7	29 37.0	+59.0	118.2	29 08.4	+59.2	118.7	28 39.4	+59.3	119.2	28 09.9	+59.5	119.6	**24**
25	32 24.6	+58.0	115.8	31 58.2	+58.3	116.4	31 31.3	+58.5	116.9	31 03.9	+58.7	117.5	30 36.0	+58.9	118.0	30 07.6	+59.1	118.5	29 38.7	+59.3	119.0	29 09.4	+59.5	119.5	**25**
26	33 22.6	+57.9	115.5	32 56.5	+58.2	116.1	32 29.8	+58.5	116.7	32 02.6	+58.7	117.2	31 34.9	+59.0	117.8	31 06.7	+59.1	118.3	30 38.0	+59.3	118.8	30 08.9	+59.4	119.3	**26**
27	34 20.5	+57.8	115.2	33 54.7	+58.1	115.8	33 28.3	+58.4	116.4	33 01.3	+58.7	117.0	32 33.9	+58.8	117.5	32 05.8	+59.1	118.1	31 37.3	+59.3	118.7	31 08.3	+59.4	119.2	**27**
28	35 18.3	+57.8	114.9	34 52.8	+58.1	115.5	34 26.7	+58.4	116.1	34 00.0	+58.6	116.7	33 32.7	+58.9	117.3	33 04.9	+59.1	117.9	32 36.6	+59.3	118.5	32 07.7	+59.5	119.0	**28**
29	36 16.1	+57.8	114.5	35 50.9	+58.1	115.2	35 25.1	+58.3	115.8	34 58.6	+58.7	116.5	34 31.6	+58.9	117.1	34 04.0	+59.1	117.7	33 35.9	+59.2	118.3	33 07.2	+59.4	118.9	**29**
30	37 13.9	+57.7	114.2	36 49.0	+58.0	114.9	36 23.4	+58.3	115.5	35 57.3	+58.5	116.2	35 30.5	+58.8	116.8	35 03.1	+59.0	117.5	34 35.1	+59.2	118.1	34 06.6	+59.4	118.7	**30**
31	38 11.6	+57.6	113.8	37 47.0	+58.0	114.6	37 21.7	+58.3	115.2	36 55.8	+58.6	115.9	36 29.3	+58.8	116.6	36 02.1	+59.0	117.3	35 34.3	+59.2	117.9	35 06.0	+59.3	118.5	**31**
32	39 09.2	+57.6	113.5	38 45.0	+57.9	114.2	38 20.0	+58.2	114.9	37 54.4	+58.5	115.7	37 28.1	+58.7	116.3	37 01.1	+59.0	117.0	36 33.5	+59.2	117.7	36 05.3	+59.4	118.3	**32**
33	40 06.8	+57.5	113.1	39 42.9	+57.8	113.9	39 18.2	+58.2	114.6	38 52.9	+58.4	115.4	38 26.8	+58.7	116.1	38 00.1	+58.9	116.8	37 32.7	+59.2	117.5	37 04.7	+59.4	118.2	**33**
34	41 04.3	+57.4	112.7	40 40.7	+57.8	113.5	40 16.4	+58.1	114.3	39 51.3	+58.4	115.1	39 25.5	+58.7	115.8	38 59.0	+59.0	116.6	38 31.9	+59.1	117.3	38 04.1	+59.3	118.0	**34**
35	42 01.7	+57.4	112.4	41 38.5	+57.7	113.2	41 14.5	+58.0	114.0	40 49.7	+58.4	114.8	40 24.2	+58.6	115.6	39 58.0	+58.9	116.3	39 31.0	+59.1	117.1	39 03.4	+59.3	117.8	**35**
36	42 59.1	+57.2	112.0	42 36.2	+57.7	112.8	42 12.5	+58.0	113.6	41 48.1	+58.3	114.5	41 22.8	+58.6	115.3	40 56.9	+58.8	116.1	40 30.1	+59.1	116.8	40 02.7	+59.3	117.6	**36**
37	43 56.3	+57.2	111.5	43 33.9	+57.5	112.4	43 10.5	+58.0	113.3	42 46.4	+58.3	114.2	42 21.4	+58.6	115.0	41 55.7	+58.8	115.8	41 29.2	+59.1	116.6	41 02.0	+59.2	117.4	**37**
38	44 53.5	+57.0	111.1	44 31.4	+57.5	112.0	44 08.5	+57.8	112.9	43 44.7	+58.1	113.8	43 20.0	+58.5	114.7	42 54.5	+58.8	115.5	42 28.3	+59.0	116.4	42 01.2	+59.3	117.2	**38**
39	45 50.5	+57.0	110.7	45 28.9	+57.4	111.6	45 06.3	+57.8	112.6	44 42.8	+58.2	113.5	44 18.5	+58.5	114.4	43 53.3	+58.8	115.3	43 27.3	+59.0	116.1	43 00.5	+59.2	117.0	**39**
40	46 47.5	+56.8	110.2	46 26.3	+57.3	111.2	46 04.1	+57.7	112.2	45 41.0	+58.0	113.1	45 17.0	+58.4	114.1	44 52.1	+58.7	115.0	44 26.3	+59.0	115.9	43 59.7	+59.2	116.7	**40**
41	47 44.3	+56.8	109.7	47 23.6	+57.2	110.8	47 01.8	+57.6	111.8	46 39.0	+58.0	112.8	46 15.4	+58.3	113.7	45 50.8	+58.6	114.7	45 25.3	+58.9	115.6	44 58.9	+59.2	116.5	**41**
42	48 41.1	+56.6	109.3	48 20.8	+57.0	110.3	47 59.4	+57.5	111.4	47 37.0	+58.0	112.4	47 13.7	+58.3	113.4	46 49.4	+58.6	114.4	46 24.2	+58.9	115.3	45 58.1	+59.1	116.3	**42**
43	49 37.7	+56.4	108.8	49 17.8	+57.0	109.9	48 56.9	+57.4	110.9	48 35.0	+57.8	112.0	48 12.0	+58.2	113.0	47 48.0	+58.5	114.1	47 23.1	+58.8	115.1	46 57.2	+59.1	116.0	**43**
44	50 34.1	+56.3	108.2	50 14.8	+56.8	109.4	49 54.3	+57.4	110.5	49 32.8	+57.7	111.6	49 10.2	+58.1	112.7	48 46.5	+58.5	113.7	48 21.9	+58.8	114.8	47 56.3	+59.1	115.8	**44**
45	51 30.4	+56.2	107.7	51 11.6	+56.7	108.9	50 51.7	+57.2	110.0	50 30.5	+57.7	111.2	50 08.3	+58.1	112.3	49 45.0	+58.5	113.4	49 20.7	+58.7	114.5	48 55.4	+59.0	115.5	**45**
46	52 26.6	+56.0	107.1	52 08.3	+56.6	108.3	51 48.9	+57.0	109.5	51 28.2	+57.5	110.7	51 06.4	+58.0	111.9	50 43.5	+58.3	113.0	50 19.4	+58.7	114.1	49 54.4	+59.0	115.2	**46**
47	53 22.6	+55.8	106.5	53 04.9	+56.4	107.8	52 45.9	+57.0	109.0	52 25.7	+57.5	110.3	52 04.4	+57.8	111.5	51 41.8	+58.3	112.7	51 18.1	+58.7	113.8	50 53.4	+58.9	114.9	**47**
48	54 18.4	+55.6	105.9	54 01.3	+56.2	107.2	53 42.9	+56.8	108.5	53 23.2	+57.3	109.8	53 02.2	+57.8	111.0	52 40.1	+58.2	112.3	52 16.8	+58.5	113.5	51 52.3	+58.9	114.6	**48**
49	55 14.0	+55.3	105.2	54 57.5	+56.0	106.6	54 39.7	+56.6	108.0	54 20.5	+57.2	109.3	54 00.0	+57.7	110.6	53 38.3	+58.1	111.9	53 15.3	+58.6	113.1	52 51.2	+58.8	114.3	**49**
50	56 09.3	+55.2	104.5	55 53.5	+55.9	106.0	55 36.3	+56.5	107.4	55 17.7	+57.0	108.8	54 57.7	+57.6	110.1	54 36.4	+58.0	111.4	54 13.9	+58.4	112.7	53 50.0	+58.8	114.0	**50**
51	57 04.5	+54.8	103.8	56 49.4	+55.6	105.3	56 32.8	+56.3	106.8	56 14.7	+56.9	108.2	55 55.3	+57.4	109.6	55 34.4	+58.0	111.0	55 12.3	+58.3	112.3	54 48.8	+58.8	113.7	**51**
52	57 59.3	+54.6	103.1	57 45.0	+55.3	104.6	57 29.1	+56.0	106.1	57 11.6	+56.7	107.6	56 52.7	+57.3	109.1	56 32.4	+57.8	110.5	56 10.6	+58.3	111.9	55 47.6	+58.6	113.3	**52**
53	58 53.9	+54.3	102.3	58 40.3	+55.1	103.9	58 25.1	+55.9	105.5	58 08.3	+56.6	107.0	57 50.0	+57.2	108.5	57 30.2	+57.7	110.0	57 08.9	+58.2	111.5	56 46.2	+58.6	112.9	**53**
54	59 48.2	+54.0	101.4	59 35.4	+54.9	103.1	59 21.0	+55.6	104.8	59 04.9	+56.3	106.4	58 47.2	+56.9	108.0	58 27.9	+57.5	109.5	58 07.1	+58.0	111.0	57 44.8	+58.5	112.5	**54**
55	60 42.2	+53.6	100.6	60 30.3	+54.5	102.3	60 16.6	+55.4	104.0	60 01.2	+56.1	105.7	59 44.1	+56.8	107.4	59 25.4	+57.4	109.0	59 05.1	+58.0	110.6	58 43.3	+58.4	112.1	**55**
56	61 35.8	+53.1	99.6	61 24.8	+54.1	101.4	61 12.0	+55.0	103.2	60 57.3	+55.9	105.0	60 40.9	+56.6	106.7	60 22.8	+57.3	108.4	60 03.1	+57.8	110.0	59 41.7	+58.4	111.7	**56**
57	62 28.9	+52.8	98.6	62 18.9	+53.8	100.5	62 07.0	+54.7	102.4	61 53.2	+55.6	104.2	61 37.5	+56.4	106.0	61 20.1	+57.1	107.8	61 00.9	+57.7	109.5	60 40.1	+58.2	111.2	**57**
58	63 21.7	+52.2	97.6	63 12.7	+53.4	99.6	63 01.7	+54.4	101.5	62 48.8	+55.3	103.4	62 33.9	+56.2	105.3	62 17.2	+56.9	107.1	61 58.6	+57.5	108.9	61 38.3	+58.1	110.7	**58**
59	64 13.9	+51.7	96.5	64 06.1	+52.9	98.5	63 56.1	+54.0	100.6	63 44.1	+55.0	102.6	63 30.1	+55.8	104.5	63 14.1	+56.6	106.4	62 56.1	+57.4	108.3	62 36.4	+57.9	110.1	**59**
60	65 05.6	+51.1	95.3	64 59.0	+52.3	97.4	64 50.1	+53.6	99.5	64 39.1	+54.6	101.6	64 25.9	+55.6	103.7	64 10.7	+56.4	105.7	63 53.5	+57.2	107.7	63 34.3	+57.9	109.6	**60**
61	65 56.7	+50.5	94.0	65 51.3	+51.8	96.3	65 43.7	+53.0	98.5	65 33.7	+54.2	100.6	65 21.5	+55.2	102.8	65 07.1	+56.2	104.9	64 50.7	+56.9	107.0	64 32.2	+57.6	109.0	**61**
62	66 47.2	+49.7	92.7	66 43.1	+51.2	95.0	66 36.7	+52.5	97.3	66 27.9	+53.7	99.6	66 16.7	+54.9	101.8	66 03.3	+55.8	104.0	65 47.6	+56.8	106.2	65 29.8	+57.5	108.3	**62**
63	67 36.9	+48.8	91.2	67 34.3	+50.4	93.7	67 29.2	+51.9	96.1	67 21.6	+53.2	98.5	67 11.6	+54.4	100.8	66 59.1	+55.5	103.1	66 44.4	+56.4	105.4	66 27.3	+57.3	107.6	**63**
64	68 25.7	+48.0	89.7	68 24.7	+49.7	92.2	68 21.1	+51.2	94.7	68 14.8	+52.7	97.2	68 06.0	+54.0	99.7	67 54.6	+55.2	102.1	67 40.8	+56.2	104.5	67 24.6	+57.0	106.8	**64**
65	69 13.7	+46.9	88.0	69 14.4	+48.7	90.7	69 12.3	+50.4	93.3	69 07.5	+52.0	95.9	69 00.0	+53.4	98.5	68 49.8	+54.6	101.1	68 37.0	+55.8	103.6	68 21.6	+56.8	106.0	**65**
66	70 00.6	+45.7	86.2	70 03.1	+47.7	89.0	70 02.7	+49.6	91.7	69 59.5	+51.2	94.5	69 53.4	+52.7	97.2	69 44.4	+54.2	99.9	69 32.8	+55.4	102.5	69 18.4	+56.5	105.1	**66**
67	70 46.3	+44.5	84.3	70 50.8	+46.6	87.2	70 52.3	+48.5	90.0	70 50.7	+50.4	92.9	70 46.1	+52.1	95.8	70 38.6	+53.6	98.6	70 28.2	+54.9	101.4	70 14.9	+56.1	104.2	**67**
68	71 30.8	+43.0	82.2	71 37.4	+45.2	85.2	71 40.8	+47.4	88.2	71 41.1	+49.4	91.2	71 38.2	+51.3	94.3	71 32.2	+52.9	97.2	71 23.1	+54.4	100.2	71 11.0	+55.7	103.1	**68**
69	72 13.8	+41.3	80.0	72 22.6	+43.8	83.1	72 28.2	+46.1	86.2	72 30.5	+48.3	89.4	72 29.5	+50.3	92.6	72 25.1	+52.2	95.7	72 17.5	+53.8	98.8	72 06.7	+55.3	101.9	**69**
70	72 55.1	+39.4	77.6	73 06.4	+42.0	80.8	73 14.3	+44.6	84.1	73 18.8	+47.0	87.4	73 19.8	+49.2	90.7	73 17.3	+51.3	94.0	73 11.3	+53.1	97.3	73 02.0	+54.7	100.6	**70**
71	73 34.5	+37.4 •	74.9	73 48.4	+40.2 •	78.3	73 58.9	+42.9	81.7	74 05.8	+45.5	85.2	74 09.0	+48.0	88.7	74 08.6	+50.2	92.2	74 04.4	+52.3	95.7	73 56.7	+54.0	99.2	**71**
72	74 11.9	+35.0 •	72.1	74 28.6	+38.0 •	75.6	74 41.8	+40.9 •	79.1	74 51.3	+43.8	82.7	74 57.0	+46.4	86.4	74 58.8	+49.0	90.1	74 56.7	+51.2	93.9	74 50.7	+53.3	97.5	**72**
73	74 46.9	+32.4 •	69.1	75 06.6	+35.5 •	72.6	75 22.7	+38.7 •	76.3	75 35.1	+41.7 •	80.0	75 43.4	+44.8	83.9	75 47.8	+47.5	87.8	75 47.9	+50.1	91.8	75 44.0	+52.4	95.7	**73**
74	75 19.3	+29.4 •	65.8	75 42.1	+32.8 •	69.4	76 01.4	+36.1 •	73.2	76 16.8	+39.5 •	77.1	76 28.2	+42.7 •	81.1	76 35.3	+45.8	85.3	76 38.0	+48.7	89.5	76 36.4	+51.2	93.7	**74**
75	75 48.7	+26.2 •	62.3	76 14.9	+29.7 •	65.9	76 37.5	+33.2 •	69.8	76 56.3	+36.7 •	73.8	77 10.9	+40.3 •	78.1	77 21.1	+43.7 •	82.4	77 26.7	+46.9	86.9	77 27.6	+49.8	91.4	**75**
76	76 14.9	+22.6 •	58.6	76 44.6	+26.1 •	62.2	77 10.7	+29.9 •	66.1	77 33.0	+33.7 •	70.2	77 51.2	+37.4 •	74.6	78 04.8	+41.2 •	79.2	78 13.6	+44.8 •	83.9	78 17.4	+48.2	88.7	**76**
77	76 37.5	+18.8 •	54.6	77 10.7	+22.3 •	58.2	77 40.6	+26.1 •	62.1	78 06.7	+30.1 •	66.3	78 28.6	+34.2 •	70.8	78 46.0	+38.3 •	75.6	78 58.4	+42.3 •	80.5	79 05.6	+46.1 •	85.7	**77**
78	76 56.3	+14.6 •	50.5	77 33.0	+18.2 •	54.0	78 06.7	+21.9 •	57.8	78 36.8	+26.0 •	62.0	79 02.8	+30.3 •	66.6	79 24.3	+34.8 •	71.5	79 40.7	+39.2 •	76.7	79 51.7	+43.6 •	82.2	**78**
79	77 10.9	+10.2 •	46.2	77 51.2	+13.6 •	49.5	78 28.6	+17.4 •	53.2	79 02.8	+21.5 •	57.4	79 33.1	+26.0 •	61.9	79 59.1	+30.6 •	66.9	80 19.9	+35.5 •	72.3	80 35.3	+40.3 •	78.1	**79**
80	77 21.1	+5.6 •	41.7	78 04.8	+8.8 •	44.8	78 46.0	+12.4 •	48.4	79 24.3	+16.4 •	52.4	79 59.1	+20.8 •	56.9	80 29.7	+25.7 •	61.9	80 55.4	+30.9 •	67.4	81 15.6	+36.2 •	73.4	**80**
81	77 26.7	+0.9 •	37.1	78 13.6	+3.8 •	40.0	78 58.4	+7.2 •	43.3	79 40.7	+11.0 •	47.1	80 19.9	+15.4 •	51.4	80 55.4	+20.2 •	56.3	81 26.3	+25.5 •	61.8	81 51.8	+31.3 •	68.0	**81**
82	77 27.6	–3.8 •	32.5	78 17.4	–1.1 •	35.1	79 05.6	+1.8 •	38.1	79 51.7	+5.3 •	41.5	80 35.3	+9.2 •	45.5	81 15.6	+13.9 •	50.2	81 51.8	+19.2 •	55.6	82 23.1	+25.2 •	61.7	**82**
83	77 23.8	–8.4 •	27.9	78 16.3	–6.2 •	30.2	79 07.4	–3.6 •	32.8	79 57.0	–0.6 •	35.9	80 44.5	+3.0 •	39.4	81 29.5	+7.1 •	43.7	82 11.0	+12.2 •	48.7	82 48.3	+18.0 •	54.7	**83**
84	77 15.4	–12.9 •	23.4	78 10.1	–11.1 •	25.3	79 03.8	–8.9 •	27.5	79 56.4	–6.5 •	30.1	80 47.5	–3.5 •	33.2	81 36.6	+0.1 •	36.9	82 23.2	+4.5 •	41.4	83 06.3	+9.8 •	46.9	**84**
85	77 02.5	–17.1 •	19.0	77 59.0	–15.7 •	20.6	78 54.9	–14.2 •	22.3	79 49.9	–12.1 •	24.5	80 44.0	–9.8 •	27.0	81 36.7	–6.9 •	30.1	82 27.7	–3.4 •	33.9	83 16.1	+1.1 •	38.6	**85**
86	76 45.4	–21.1 •	14.8	77 43.3	–20.2 •	16.0	78 40.7	–18.9 •	17.3	79 37.8	–17.6 •	19.0	80 34.2	–15.8 •	20.9	81 29.8	–13.8 •	23.3	82 24.3	–11.1 •	26.3	83 17.2	–7.7 •	30.0	**86**
87	76 24.3	–24.9 •	10.8	77 23.1	–24.1 •	11.6	78 21.8	–23.4 •	12.6	79 20.2	–22.4 •	13.7	80 18.4	–21.4 •	15.1	81 16.0	–19.9 •	16.8	82 13.2	–18.3 •	18.9	83 09.5	–16.1 •	21.6	**87**
88	75 59.4	–28.1 •	6.9	76 59.0	–27.9 •	7.5	77 58.4	–27.4 •	8.1	78 57.8	–26.9 •	8.8	79 57.0	–26.3 •	9.7	80 56.1	–25.6 •	10.7	81 54.9	–24.7 •	12.0	82 53.4	–23.5 •	13.7	**88**
89	75 31.3	–31.3 •	3.4	76 31.1	–31.1 •	3.6	77 31.0	–31.0 •	3.9	78 30.9	–30.9 •	4.2	79 30.7	–30.7 •	4.6	80 30.5	–30.5 •	5.1	81 30.2	–30.2 •	5.7	82 29.9	–29.9 •	6.4	**89**
90	75 00.0	–34.0 •	0.0	76 00.0	–34.1 •	0.0	77 00.0	–34.2 •	0.0	78 00.0	–34.3 •	0.0	79 00.0	–34.5 •	0.0	80 00.0	–34.7 •	0.0	81 00.0	–34.9 •	0.0	82 00.0	–35.1 •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 57°, 303°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	8 06.2	−58.5	122.1	7 34.3	−58.8	122.2	7 02.2	−58.9	122.3	6 30.1	−59.1	122.4	5 57.9	−59.2	122.5	5 25.6	−59.3	122.6	4 53.3	−59.5	122.7	4 20.8	−59.6	122.7	0
1	7 07.7	−58.6	122.3	6 35.5	−58.7	122.4	6 03.3	−58.9	122.5	5 31.0	−59.0	122.6	4 58.7	−59.2	122.7	4 26.3	−59.4	122.7	3 53.8	−59.5	122.8	3 21.2	−59.5	122.9	1
2	6 09.1	−58.5	122.5	5 36.8	−58.7	122.6	5 04.4	−58.9	122.7	4 32.0	−59.1	122.8	3 59.5	−59.3	122.8	3 26.9	−59.4	122.9	2 54.3	−59.5	122.9	2 21.7	−59.6	123.0	2
3	5 10.6	−58.6	122.8	4 38.1	−58.8	122.8	4 05.5	−58.9	122.9	3 32.9	−59.1	123.0	3 00.2	−59.2	123.0	2 27.5	−59.3	123.0	1 54.8	−59.5	123.1	1 22.1	−59.6	123.1	3
4	4 12.0	−58.6	123.0	3 39.3	−58.7	123.0	3 06.6	−58.9	123.1	2 33.8	−59.1	123.1	2 01.0	−59.2	123.2	1 28.2	−59.4	123.2	0 55.3	−59.4	123.2	0 22.5	−59.6	123.2	4
5	3 13.4	−58.5	123.2	2 40.6	−58.8	123.2	2 07.7	−59.0	123.3	1 34.7	−59.0	123.3	1 01.8	−59.2	123.3	0 28.8	−59.3	123.3	0 04.1	+59.5	56.7	0 37.1	+59.6	56.7	5
6	2 14.9	−58.6	123.4	1 41.8	−58.7	123.4	1 08.7	−58.9	123.5	0 35.7	−59.1	123.5	0 02.6	−59.3	123.5	0 30.5	+59.4	56.5	1 03.6	+59.5	56.5	1 36.7	+59.6	56.6	6
7	1 16.3	−58.6	123.6	0 43.1	−58.8	123.6	0 09.8	−58.9	123.7	0 23.4	+59.1	56.4	0 56.7	+59.2	56.4	1 29.9	+59.4	56.4	2 03.1	+59.5	56.4	2 36.3	+59.6	56.4	7
8	0 17.7	−58.5	123.8	0 15.7	+58.7	56.2	0 49.1	+58.9	56.2	1 22.5	+59.1	56.2	1 55.9	+59.2	56.2	2 29.3	+59.3	56.2	3 02.6	+59.5	56.3	3 35.9	+59.6	56.3	8
9	0 40.8	+58.6	55.9	1 14.4	+58.8	55.9	1 48.0	+58.9	56.0	2 21.6	+59.1	56.0	2 55.1	+59.2	56.0	3 28.6	+59.4	56.1	4 02.1	+59.4	56.1	4 35.5	+59.6	56.2	9
10	1 39.4	+58.6	55.7	2 13.2	+58.7	55.7	2 46.9	+59.0	55.8	3 20.7	+59.0	55.8	3 54.3	+59.3	55.9	4 28.0	+59.3	55.9	5 01.5	+59.5	56.0	5 35.1	+59.5	56.1	10
11	2 38.0	+58.5	55.5	3 11.9	+58.8	55.5	3 45.9	+58.9	55.6	4 19.7	+59.1	55.7	4 53.6	+59.2	55.7	5 27.3	+59.4	55.8	6 01.0	+59.5	55.9	6 34.6	+59.6	56.0	11
12	3 36.5	+58.6	55.3	4 10.7	+58.7	55.3	4 44.8	+58.9	55.4	5 18.8	+59.1	55.5	5 52.8	+59.2	55.6	6 26.7	+59.3	55.6	7 00.5	+59.5	55.7	7 34.2	+59.6	55.8	12
13	4 35.1	+58.6	55.1	5 09.4	+58.8	55.1	5 43.7	+58.9	55.2	6 17.9	+59.1	55.3	6 52.0	+59.2	55.4	7 26.0	+59.4	55.5	8 00.0	+59.4	55.6	8 33.8	+59.6	55.7	13
14	5 33.7	+58.5	54.8	6 08.2	+58.7	54.9	6 42.6	+58.9	55.0	7 17.0	+59.0	55.1	7 51.2	+59.2	55.2	8 25.4	+59.3	55.3	8 59.4	+59.5	55.5	9 33.4	+59.6	55.6	14
15	6 32.2	+58.6	54.6	7 06.9	+58.7	54.7	7 41.5	+58.9	54.8	8 16.0	+59.1	54.9	8 50.4	+59.2	55.1	9 24.7	+59.4	55.2	9 58.9	+59.5	55.3	10 33.0	+59.5	55.5	15
16	7 30.8	+58.5	54.4	8 05.6	+58.8	54.5	8 40.4	+58.9	54.6	9 15.1	+59.0	54.8	9 49.6	+59.2	54.9	10 24.1	+59.3	55.0	10 58.4	+59.4	55.2	11 32.5	+59.6	55.4	16
17	8 29.3	+58.5	54.2	9 04.4	+58.7	54.3	9 39.3	+58.9	54.4	10 14.1	+59.1	54.6	10 48.8	+59.2	54.7	11 23.4	+59.3	54.9	11 57.8	+59.5	55.1	12 32.1	+59.6	55.2	17
18	9 27.8	+58.6	54.0	10 03.1	+58.7	54.1	10 38.2	+58.9	54.2	11 13.2	+59.0	54.4	11 48.0	+59.2	54.6	12 22.7	+59.4	54.7	12 57.3	+59.4	54.9	13 31.7	+59.5	55.1	18
19	10 26.4	+58.5	53.7	11 01.8	+58.7	53.9	11 37.1	+58.8	54.1	12 12.2	+59.0	54.2	12 47.2	+59.2	54.4	13 22.1	+59.3	54.6	13 56.7	+59.5	54.8	14 31.2	+59.6	55.0	19
20	11 24.9	+58.5	53.5	12 00.5	+58.7	53.7	12 35.9	+58.9	53.9	13 11.2	+59.1	54.0	13 46.4	+59.2	54.2	14 21.4	+59.3	54.4	14 56.2	+59.4	54.7	15 30.8	+59.6	54.9	20
21	12 23.4	+58.5	53.3	12 59.2	+58.6	53.5	13 34.8	+58.9	53.7	14 10.3	+59.0	53.9	14 45.6	+59.1	54.1	15 20.7	+59.3	54.3	15 55.6	+59.5	54.5	16 30.4	+59.5	54.7	21
22	13 21.9	+58.4	53.1	13 57.8	+58.7	53.3	14 33.7	+58.8	53.5	15 09.3	+59.0	53.7	15 44.7	+59.2	53.9	16 20.0	+59.3	54.1	16 55.1	+59.4	54.4	17 29.9	+59.6	54.6	22
23	14 20.3	+58.5	52.8	14 56.5	+58.7	53.0	15 32.5	+58.8	53.3	16 08.3	+59.0	53.5	16 43.9	+59.2	53.7	17 19.3	+59.3	54.0	17 54.5	+59.4	54.2	18 29.5	+59.5	54.5	23
24	15 18.8	+58.5	52.6	15 55.2	+58.6	52.8	16 31.3	+58.9	53.1	17 07.3	+59.0	53.3	17 43.1	+59.1	53.5	18 18.6	+59.3	53.8	18 53.9	+59.4	54.1	19 29.0	+59.5	54.4	24
25	16 17.3	+58.4	52.4	16 53.8	+58.6	52.6	17 30.2	+58.8	52.8	18 06.3	+59.0	53.1	18 42.2	+59.1	53.4	19 17.9	+59.3	53.6	19 53.3	+59.4	53.9	20 28.5	+59.6	54.2	25
26	17 15.7	+58.4	52.1	17 52.4	+58.7	52.4	18 29.0	+58.8	52.6	19 05.3	+58.9	52.9	19 41.3	+59.2	53.2	20 17.2	+59.2	53.5	20 52.7	+59.4	53.8	21 28.1	+59.5	54.1	26
27	18 14.1	+58.4	51.9	18 51.1	+58.5	52.1	19 27.8	+58.7	52.4	20 04.2	+59.0	52.7	20 40.5	+59.1	53.0	21 16.4	+59.3	53.3	21 52.1	+59.4	53.6	22 27.6	+59.5	54.0	27
28	19 12.5	+58.4	51.6	19 49.6	+58.6	51.9	20 26.5	+58.8	52.2	21 03.2	+58.9	52.5	21 39.6	+59.1	52.8	22 15.7	+59.2	53.1	22 51.5	+59.4	53.5	23 27.1	+59.5	53.8	28
29	20 10.9	+58.4	51.4	20 48.2	+58.6	51.7	21 25.3	+58.7	52.0	22 02.1	+58.9	52.3	22 38.7	+59.0	52.6	23 14.9	+59.3	53.0	23 50.9	+59.4	53.3	24 26.6	+59.5	53.7	29
30	21 09.3	+58.3	51.2	21 46.8	+58.5	51.5	22 24.0	+58.8	51.8	23 01.0	+58.9	52.1	23 37.7	+59.1	52.4	24 14.2	+59.2	52.8	24 50.3	+59.4	53.2	25 26.1	+59.5	53.5	30
31	22 07.6	+58.3	50.9	22 45.3	+58.5	51.2	23 22.8	+58.7	51.6	23 59.9	+58.9	51.9	24 36.8	+59.1	52.3	25 13.4	+59.2	52.6	25 49.7	+59.3	53.0	26 25.6	+59.5	53.4	31
32	23 05.9	+58.3	50.6	23 43.8	+58.5	51.0	24 21.5	+58.7	51.3	24 58.8	+58.9	51.7	25 35.9	+59.0	52.1	26 12.6	+59.2	52.4	26 49.0	+59.4	52.8	27 25.1	+59.5	53.2	32
33	24 04.2	+58.3	50.4	24 42.3	+58.5	50.7	25 20.2	+58.6	51.1	25 57.7	+58.8	51.5	26 34.9	+59.0	51.9	27 11.8	+59.2	52.3	27 48.4	+59.3	52.7	28 24.6	+59.4	53.1	33
34	25 02.5	+58.2	50.1	25 40.8	+58.5	50.5	26 18.8	+58.7	50.9	26 56.5	+58.9	51.3	27 33.9	+59.0	51.7	28 11.0	+59.2	52.1	28 47.7	+59.3	52.5	29 24.0	+59.5	52.9	34
35	26 00.7	+58.2	49.9	26 39.3	+58.4	50.2	27 17.5	+58.6	50.6	27 55.4	+58.8	51.0	28 32.9	+59.0	51.5	29 10.2	+59.1	51.9	29 47.0	+59.3	52.3	30 23.5	+59.4	52.8	35
36	26 58.9	+58.2	49.6	27 37.7	+58.4	50.0	28 16.1	+58.6	50.4	28 54.2	+58.8	50.8	29 31.9	+59.0	51.2	30 09.3	+59.1	51.7	30 46.3	+59.3	52.2	31 22.9	+59.5	52.6	36
37	27 57.1	+58.2	49.3	28 36.1	+58.3	49.7	29 14.7	+58.6	50.1	29 53.0	+58.7	50.6	30 30.9	+58.9	51.0	31 08.4	+59.2	51.5	31 45.6	+59.3	52.0	32 22.4	+59.4	52.5	37
38	28 55.3	+58.1	49.0	29 34.4	+58.4	49.5	30 13.3	+58.5	49.9	30 51.7	+58.8	50.3	31 29.8	+59.0	50.8	32 07.6	+59.1	51.3	32 44.9	+59.2	51.8	33 21.8	+59.4	52.3	38
39	29 53.4	+58.0	48.7	30 32.8	+58.3	49.2	31 11.8	+58.5	49.6	31 50.5	+58.7	50.1	32 28.8	+58.9	50.6	33 06.7	+59.0	51.1	33 44.1	+59.3	51.6	34 21.2	+59.4	52.1	39
40	30 51.4	+58.1	48.5	31 31.1	+58.2	48.9	32 10.3	+58.5	49.4	32 49.2	+58.7	49.9	33 27.7	+58.8	50.4	34 05.7	+59.1	50.9	34 43.4	+59.2	51.4	35 20.6	+59.3	52.0	40
41	31 49.5	+58.0	48.2	32 29.3	+58.2	48.6	33 08.8	+58.4	49.1	33 47.9	+58.6	49.6	34 26.5	+58.9	50.1	35 04.8	+59.0	50.7	35 42.6	+59.2	51.2	36 19.9	+59.4	51.8	41
42	32 47.5	+57.9	47.9	33 27.5	+58.2	48.3	34 07.2	+58.4	48.8	34 46.5	+58.6	49.4	35 25.4	+58.8	49.9	36 03.8	+59.0	50.4	36 41.8	+59.2	51.0	37 19.3	+59.3	51.6	42
43	33 45.4	+57.9	47.5	34 25.7	+58.1	48.0	35 05.6	+58.4	48.6	35 45.1	+58.6	49.1	36 24.2	+58.8	49.6	37 02.8	+59.0	50.2	37 41.0	+59.1	50.8	38 18.6	+59.4	51.4	43
44	34 43.3	+57.8	47.2	35 23.8	+58.1	47.7	36 04.0	+58.3	48.3	36 43.7	+58.5	48.8	37 23.0	+58.7	49.4	38 01.8	+58.9	50.0	38 40.1	+59.2	50.6	39 18.0	+59.3	51.2	44
45	35 41.1	+57.8	46.9	36 21.9	+58.1	47.4	37 02.3	+58.3	48.0	37 42.2	+58.6	48.6	38 21.7	+58.8	49.1	39 00.7	+59.0	49.7	39 39.3	+59.1	50.4	40 17.3	+59.3	51.0	45
46	36 38.9	+57.8	46.6	37 20.0	+58.0	47.1	38 00.6	+58.2	47.7	38 40.8	+58.4	48.3	39 20.5	+58.6	48.9	39 59.7	+58.9	49.5	40 38.4	+59.1	50.2	41 16.6	+59.2	50.8	46
47	37 36.7	+57.6	46.2	38 18.0	+57.9	46.8	38 58.8	+58.2	47.4	39 39.2	+58.4	48.0	40 19.1	+58.7	48.6	40 58.6	+58.8	49.3	41 37.5	+59.0	49.9	42 15.8	+59.2	50.6	47
48	38 34.3	+57.6	45.9	39 15.9	+57.9	46.5	39 57.0	+58.1	47.1	40 37.6	+58.4	47.7	41 17.8	+58.6	48.3	41 57.4	+58.8	49.0	42 36.5	+59.0	49.7	43 15.0	+59.3	50.4	48
49	39 31.9	+57.6	45.5	40 13.8	+57.8	46.1	40 55.1	+58.1	46.7	41 36.0	+58.3	47.4	42 16.4	+58.5	48.0	42 56.2	+58.8	48.7	43 35.5	+59.0	49.4	44 14.3	+59.1	50.2	49
50	40 29.5	+57.4	45.1	41 11.6	+57.7	45.8	41 53.2	+58.0	46.4	42 34.3	+58.3	47.1	43 14.9	+58.5	47.7	43 55.0	+58.8	48.4	44 34.5	+59.0	49.2	45 13.4	+59.2	49.9	50
51	41 26.9	+57.4	44.8	42 09.3	+57.7	45.4	42 51.2	+58.0	46.1	43 32.6	+58.2	46.7	44 13.4	+58.5	47.4	44 53.8	+58.7	48.2	45 33.5	+58.9	48.9	46 12.6	+59.1	49.7	51
52	42 24.3	+57.3	44.4	43 07.0	+57.6	45.0	43 49.2	+57.8	45.7	44 30.8	+58.1	46.4	45 11.9	+58.4	47.1	45 52.5	+58.6	47.9	46 32.4	+58.9	48.6	47 11.7	+59.1	49.5	52
53	43 21.6	+57.3	44.0	44 04.6	+57.5	44.6	44 47.0	+57.8	45.3	45 28.9	+58.1	46.0	46 10.3	+58.4	46.8	46 51.1	+58.6	47.6	47 31.3	+58.8	48.4	48 10.8	+59.1	49.2	53
54	44 18.9	+57.1	43.5	45 02.1	+57.4	44.2	45 44.8	+57.8	44.9	46 27.0	+58.0	45.7	47 08.7	+58.2	46.5	47 49.7	+58.5	47.2	48 30.1	+58.8	48.1	49 09.9	+59.0	48.9	54
55	45 16.0	+57.0	43.1	45 59.5	+57.4	43.8	46 42.6	+57.6	44.6	47 25.0	+58.0	45.3	48 06.9	+58.3	46.1	48 48.2	+58.5	46.9	49 28.9	+58.7	47.8	50 08.9	+59.0	48.6	55
56	46 13.0	+56.9	42.7	46 56.9	+57.2	43.4	47 40.2	+57.6	44.1	48 23.0	+57.8	44.9	49 05.2	+58.1	45.7	49 46.7	+58.4	46.6	50 27.6	+58.7	47.4	51 07.9	+58.9	48.4	56
57	47 09.9	+56.8	42.2	47 54.1	+57.1	42.9	48 37.8	+57.4	43.7	49 20.8	+57.8	44.5	50 03.3	+58.1	45.4	50 45.1	+58.4	46.2	51 26.3	+58.6	47.1	52 06.8	+58.9	48.1	57
58	48 06.7	+56.7	41.7	48 51.2	+57.1	42.5	49 35.2	+57.4	43.3	50 18.6	+57.7	44.1	51 01.4	+58.0	45.0	51 43.5	+58.3	45.8	52 24.9	+58.6	46.8	53 05.7	+58.8	47.7	58
59	49 03.4	+56.5	41.2	49 48.3	+56.9	42.0	50 32.6	+57.2	42.8	51 16.3	+57.5	43.7	51 59.4	+57.8	44.5	52 41.8	+58.2	45.5	53 23.5	+58.5	46.4	54 04.5	+58.8	47.4	59
60	49 59.9	+56.5	40.7	50 45.2	+56.7	41.5	51 29.8	+57.1	42.3	52 13.8	+57.5	43.2	52 57.2	+57.8	44.1	53 40.0	+58.1	45.1	54 22.0	+58.4	46.0	55 03.3	+58.7	47.1	60
61	50 56.4	+56.2	40.2	51 41.9	+56.6	41.0	52 26.9	+57.0	41.8	53 11.3	+57.3	42.7	53 55.0	+57.7	43.7	54 38.1	+58.0	44.6	55 20.4	+58.4	45.6	56 02.0	+58.6	46.7	61
62	51 52.6	+56.1	39.6	52 38.5	+56.5	40.5	53 23.9	+56.8	41.3	54 08.6	+57.3	42.2	54 52.7	+57.6	43.2	55 36.1	+57.9	44.2	56 18.8	+58.2	45.2	57 00.6	+58.6	46.3	62
63	52 48.7	+55.9	39.0	53 35.0	+56.3	39.9	54 20.7	+56.7	40.8	55 05.9	+57.0	41.7	55 50.3	+57.4	42.7	56 34.0	+57.8	43.7	57 17.0	+58.2	44.8	57 59.2	+58.5	45.9	63
64	53 44.6	+55.7	38.4	54 31.3	+56.1	39.3	55 17.4	+56.6	40.2	56 02.9	+57.0	41.2	56 47.7	+57.4	42.2	57 31.8	+57.7	43.2	58 15.2	+58.0	44.3	58 57.7	+58.4	45.5	64
65	54 40.3	+55.5	37.8	55 27.4	+56.0	38.7	56 14.0	+56.3	39.6	56 59.9	+56.7	40.6	57 45.1	+57.1	41.6	58 29.5	+57.6	42.7	59 13.2	+58.0	43.8	59 56.1	+58.3	45.0	65
66	55 35.8	+55.3	37.1	56 23.4	+55.7	38.0	57 10.3	+56.2	39.0	57 56.6	+56.6	40.0	58 42.2	+57.0	41.0	59 27.1	+57.4	42.2	60 11.2	+57.8	43.3	60 54.4	+58.2	44.6	66
67	56 31.1	+55.0	36.4	57 19.1	+55.5	37.4	58 06.5	+55.9	38.3	58 53.2	+56.4	39.4	59 39.2	+56.8	40.4	60 24.5	+57.2	41.6	61 09.0	+57.6	42.8	61 52.6	+58.0	44.0	67
68	57 26.1	+54.8	35.7	58 14.6	+55.2	36.6	59 02.4	+55.7	37.6	59 49.6	+56.1	38.7	60 36.0	+56.7	39.8	61 21.7	+57.1	41.0	62 06.6	+57.5	42.2	62 50.6	+58.0	43.5	68
69	58 20.9	+54.5	34.9	59 09.8	+54.9	35.9	59 58.1	+55.4	36.9	60 45.7	+55.9	38.0	61 32.7	+56.4	39.1	62 18.8	+56.9	40.3	63 04.1	+57.4	41.6	63 48.6	+57.8	42.9	69
70	59 15.4	+54.1	34.1	60 04.7	+54.7	35.1	60 53.5	+55.2	36.1	61 41.6	+55.7	37.2	62 29.1	+56.1	38.4	63 15.7	+56.7	39.6	64 01.5	+57.1	40.9	64 46.4	+57.6	42.3	70
71	60 09.5	+53.8	33.3	60 59.4	+54.3	34.3	61 48.7	+54.8	35.3	62 37.3	+55.4	36.4	63 25.2	+55.9	37.6	64 12.4	+56.4	38.9	64 58.6	+57.0	40.2	65 44.0	+57.4	41.6	71
72	61 03.3	+53.5	32.4	61 53.7	+54.0	33.4	62 43.5	+54.5	34.4	63 32.7	+55.0	35.6	64 21.1	+55.6	36.8	65 08.8	+56.1	38.1	65 55.6	+56.6	39.4	66 41.4	+57.2	40.9	72
73	61 56.8	+53.0	31.4	62 47.7	+53.6	32.4	63 38.0	+54.1	33.5	64 27.7	+54.7	34.7	65 16.7	+55.3	35.9	66 04.9	+55.8	37.2	66 52.2	+56.5	38.6	67 38.6	+57.0	40.1	73
74	62 49.8	+52.5	30.4	63 41.3	+53.1	31.4	64 32.1	+53.7	32.5	65 22.4	+54.3	33.7	66 12.0	+54.9	34.9	67 00.7	+55.5	36.3	67 48.7	+56.1	37.7	68 35.6	+56.7	39.3	74
75	63 42.3	+52.1	29.3	64 34.4	+52.6	30.4	65 25.8	+53.3	31.5	66 16.7	+53.8	32.7	67 06.9	+54.4	33.9	67 56.2	+55.1	35.3	68 44.8	+55.7	36.8	69 32.3	+56.4	38.4	75
76	64 34.4	+51.4	28.2	65 27.0	+52.1	29.2	66 19.1	+52.7	30.3	67 10.5	+53.4	31.5	68 01.3	+54.0	32.8	68 51.3	+54.7	34.2	69 40.5	+55.3	35.7	70 28.7	+56.0	37.4	76
77	65 25.8	+50.9	27.0	66 19.1	+51.4	28.0	67 11.8	+52.1	29.1	68 03.9	+52.7	30.3	68 55.3	+53.5	31.6	69 46.0	+54.2	33.1	70 35.8	+54.9	34.6	71 24.7	+55.6	36.3	77
78	66 16.7	+50.2	25.7	67 10.5	+50.8	26.7	68 03.9	+51.4	27.8	68 56.6	+52.2	29.0	69 48.8	+52.8	30.4	70 40.2	+53.5	31.8	71 30.7	+54.4	33.4	72 20.3	+55.2	35.1	78
79	67 06.9	+49.3	24.3	68 01.3	+50.0	25.3	68 55.3	+50.7	26.4	69 48.8	+51.4	27.6	70 41.6	+52.1	28.9	71 33.7	+52.9	30.4	72 25.1	+53.7	32.0	73 15.5	+54.5	33.7	79
80	67 56.2	+48.6	22.8	68 51.3	+49.2	23.8	69 46.0	+49.8	24.9	70 40.2	+50.5	26.1	71 33.7	+51.4	27.4	72 26.6	+52.2	28.9	73 18.8	+53.0	30.5	74 10.0	+53.9	32.3	80
81	68 44.8	+47.5	21.2	69 40.5	+48.2	22.2	70 35.8	+48.9	23.3	71 30.7	+49.6	24.4	72 25.1	+50.4	25.7	73 18.8	+51.2	27.2	74 11.8	+52.1	28.8	75 03.9	+53.1	30.6	81
82	69 32.3	+46.5	19.5	70 28.7	+47.1	20.4	71 24.7	+47.8	21.5	72 20.3	+48.6	22.6	73 15.5	+49.3	23.9	74 10.0	+50.2	25.3	75 03.9	+51.1	26.9	75 57.0	+52.1	28.7	82
83	70 18.8	+45.2	17.7	71 15.8	+45.9	18.6	72 12.5	+46.6	19.5	73 08.9	+47.3	20.6	74 04.8	+48.1	21.9	75 00.2	+48.9	23.3	75 55.0	+49.9	24.8	76 49.1	+50.9	26.6	83
84	71 04.0	+43.9	15.7	72 01.7	+44.5	16.5	72 59.1	+45.1	17.4	73 56.2	+45.8	18.5	74 52.9	+46.6	19.6	75 49.1	+47.5	21.0	76 44.9	+48.4	22.5	77 40.0	+49.5	24.2	84
85	71 47.9	+42.4	13.5	72 46.2	+42.8	14.3	73 44.2	+43.5	15.1	74 42.0	+44.1	16.1	75 39.5	+44.9	17.2	76 36.6	+45.7	18.4	77 33.3	+46.7	19.8	78 29.5	+*47.7*•	21.5	85
86	72 30.3	+40.6	11.2	73 29.0	+41.1	11.9	74 27.7	+*41.6*•	12.6	75 26.1	+*42.3*•	13.5	76 24.4	+*42.9*•	14.4	77 22.3	+*43.7*•	15.5	78 20.0	+*44.5*•	16.8	79 17.2	+*45.5*•	18.3	86
87	73 10.9	+*38.6*•	8.7	74 10.1	+*39.1*•	9.3	75 09.3	+*39.5*•	9.9	76 08.4	+*39.9*•	10.6	77 07.3	+*40.5*•	11.4	78 06.0	+*41.2*•	12.3	79 04.5	+*41.9*•	13.4	80 02.7	+*42.8*•	14.7	87
88	73 49.5	+*36.5*•	6.0	74 49.2	+*36.7*•	6.4	75 48.8	+*37.0*•	6.9	76 48.3	+*37.4*•	7.4	77 47.8	+*37.7*•	8.0	78 47.2	+*38.1*•	8.7	79 46.4	+*38.7*•	9.5	80 45.5	+*39.4*•	10.5	88
89	74 26.0	+*34.0*•	3.1	75 25.9	+*34.1*•	3.3	76 25.8	+*34.2*•	3.6	77 25.7	+*34.3*•	3.9	78 25.5	+*34.5*•	4.2	79 25.3	+*34.7*•	4.6	80 25.1	+*34.9*•	5.0	81 24.9	+*35.1*•	5.6	89
90	75 00.0	+*31.3*•	0.0	76 00.0	+*31.1*•	0.0	77 00.0	+*31.0*•	0.0	78 00.0	+*30.9*•	0.0	79 00.0	+*30.7*•	0.0	80 00.0	+*30.5*•	0.0	81 00.0	+*30.2*•	0.0	82 00.0	+*29.9*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 123°, 237°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 53.0	+58.5	121.1	7 21.9	+58.7	121.2	6 50.8	+58.9	121.3	6 19.5	+59.1	121.4	5 48.2	+59.2	121.5	5 16.8	+59.3	121.6	4 45.3	+59.5	121.7	4 13.8	+59.5	121.7	0
1	8 51.5	+58.5	120.9	8 20.6	+58.7	121.0	7 49.7	+58.8	121.1	7 18.6	+59.0	121.3	6 47.4	+59.2	121.4	6 16.1	+59.4	121.5	5 44.8	+59.4	121.5	5 13.3	+59.6	121.6	1
2	9 50.0	+58.5	120.7	9 19.3	+58.7	120.8	8 48.5	+58.9	120.9	8 17.6	+59.1	121.1	7 46.6	+59.2	121.2	7 15.5	+59.3	121.3	6 44.2	+59.5	121.4	6 12.9	+59.6	121.5	2
3	10 48.5	+58.5	120.4	10 18.0	+58.7	120.6	9 47.4	+58.9	120.8	9 16.7	+59.0	120.9	8 45.8	+59.2	121.0	8 14.8	+59.3	121.2	7 43.7	+59.5	121.3	7 12.5	+59.6	121.4	3
4	11 47.0	+58.4	120.2	11 16.7	+58.7	120.4	10 46.3	+58.8	120.6	10 15.7	+59.0	120.7	9 45.0	+59.2	120.9	9 14.1	+59.4	121.0	8 43.2	+59.4	121.1	8 12.1	+59.5	121.3	4
5	12 45.4	+58.5	120.0	12 15.4	+58.6	120.2	11 45.1	+58.9	120.4	11 14.7	+59.0	120.5	10 44.2	+59.1	120.7	10 13.5	+59.3	120.9	9 42.6	+59.5	121.0	9 11.6	+59.6	121.2	5
6	13 43.9	+58.4	119.7	13 14.0	+58.7	120.0	12 44.0	+58.8	120.2	12 13.7	+59.0	120.3	11 43.3	+59.2	120.5	11 12.8	+59.3	120.7	10 42.1	+59.4	120.9	10 11.2	+59.6	121.0	6
7	14 42.3	+58.4	119.5	14 12.7	+58.6	119.7	13 42.8	+58.8	120.0	13 12.7	+59.0	120.2	12 42.5	+59.2	120.4	12 12.1	+59.3	120.6	11 41.5	+59.5	120.7	11 10.8	+59.5	120.9	7
8	15 40.7	+58.5	119.3	15 11.3	+58.6	119.5	14 41.6	+58.8	119.8	14 11.7	+59.0	120.0	13 41.7	+59.1	120.2	13 11.4	+59.3	120.4	12 41.0	+59.4	120.6	12 10.3	+59.6	120.8	8
9	16 39.2	+58.4	119.0	16 09.9	+58.6	119.3	15 40.4	+58.8	119.5	15 10.7	+59.0	119.8	14 40.8	+59.2	120.0	14 10.7	+59.3	120.2	13 40.4	+59.4	120.5	13 09.9	+59.6	120.7	9
10	17 37.6	+58.3	118.8	17 08.5	+58.6	119.1	16 39.2	+58.8	119.3	16 09.7	+59.0	119.6	15 40.0	+59.1	119.8	15 10.0	+59.3	120.1	14 39.8	+59.5	120.3	14 09.5	+59.5	120.5	10
11	18 35.9	+58.4	118.6	18 07.1	+58.6	118.8	17 38.0	+58.8	119.1	17 08.7	+59.0	119.4	16 39.1	+59.2	119.7	16 09.3	+59.3	119.9	15 39.3	+59.4	120.2	15 09.0	+59.5	120.4	11
12	19 34.3	+58.3	118.3	19 05.7	+58.6	118.6	18 36.8	+58.8	118.9	18 07.7	+58.9	119.2	17 38.3	+59.1	119.5	17 08.6	+59.3	119.8	16 38.7	+59.4	120.0	16 08.5	+59.6	120.3	12
13	20 32.6	+58.3	118.1	20 04.3	+58.5	118.4	19 35.6	+58.7	118.7	19 06.6	+59.0	119.0	18 37.4	+59.1	119.3	18 07.9	+59.2	119.6	17 38.1	+59.4	119.9	17 08.1	+59.5	120.2	13
14	21 30.9	+58.3	117.8	21 02.8	+58.5	118.2	20 34.3	+58.8	118.5	20 05.6	+58.9	118.8	19 36.5	+59.1	119.1	19 07.1	+59.3	119.4	18 37.5	+59.4	119.7	18 07.6	+59.6	120.0	14
15	22 29.2	+58.3	117.6	22 01.3	+58.5	117.9	21 33.1	+58.7	118.3	21 04.5	+58.9	118.6	20 35.6	+59.1	118.9	20 06.4	+59.3	119.3	19 36.9	+59.4	119.6	19 07.2	+59.5	119.9	15
16	23 27.5	+58.3	117.3	22 59.8	+58.5	117.7	22 31.8	+58.7	118.0	22 03.4	+58.9	118.4	21 34.7	+59.1	118.8	21 05.7	+59.2	119.1	20 36.3	+59.4	119.4	20 06.7	+59.5	119.8	16
17	24 25.8	+58.2	117.0	23 58.3	+58.5	117.4	23 30.5	+58.7	117.8	23 02.3	+58.9	118.2	22 33.8	+59.0	118.6	22 04.9	+59.2	118.9	21 35.7	+59.4	119.3	21 06.2	+59.5	119.6	17
18	25 24.0	+58.2	116.8	24 56.8	+58.4	117.2	24 29.2	+58.6	117.6	24 01.2	+58.8	118.0	23 32.8	+59.1	118.4	23 04.1	+59.3	118.8	22 35.1	+59.4	119.1	22 05.7	+59.5	119.5	18
19	26 22.2	+58.1	116.5	25 55.2	+58.4	116.9	25 27.8	+58.6	117.4	25 00.0	+58.9	117.8	24 31.9	+59.0	118.2	24 03.4	+59.2	118.6	23 34.5	+59.3	119.0	23 05.2	+59.5	119.3	19
20	27 20.3	+58.1	116.2	26 53.6	+58.4	116.7	26 26.4	+58.7	117.1	25 58.9	+58.8	117.6	25 30.9	+59.0	118.0	25 02.6	+59.2	118.4	24 33.8	+59.4	118.8	24 04.7	+59.5	119.2	20
21	28 18.4	+58.1	115.9	27 52.0	+58.3	116.4	27 25.1	+58.5	116.9	26 57.7	+58.8	117.3	26 29.9	+59.0	117.8	26 01.8	+59.1	118.2	25 33.2	+59.3	118.7	25 04.2	+59.5	119.1	21
22	29 16.5	+58.1	115.7	28 50.3	+58.3	116.2	28 23.6	+58.6	116.6	27 56.5	+58.8	117.1	27 28.9	+59.0	117.6	27 00.9	+59.2	118.0	26 32.5	+59.4	118.5	26 03.7	+59.5	118.9	22
23	30 14.6	+58.0	115.4	29 48.6	+58.3	115.9	29 22.2	+58.5	116.4	28 55.3	+58.7	116.9	28 27.9	+59.0	117.4	28 00.1	+59.2	117.9	27 31.9	+59.3	118.3	27 03.2	+59.5	118.8	23
24	31 12.6	+58.0	115.1	30 46.9	+58.3	115.6	30 20.7	+58.5	116.1	29 54.0	+58.8	116.7	29 26.9	+58.9	117.2	28 59.3	+59.1	117.7	28 31.2	+59.3	118.1	28 02.7	+59.4	118.6	24
25	32 10.6	+57.9	114.8	31 45.2	+58.2	115.3	31 19.2	+58.5	115.9	30 52.8	+58.7	116.4	30 25.8	+59.0	117.0	29 58.4	+59.1	117.5	29 30.5	+59.3	118.0	29 02.1	+59.5	118.5	25
26	33 08.5	+57.9	114.5	32 43.4	+58.1	115.0	32 17.7	+58.4	115.6	31 51.5	+58.7	116.2	31 24.8	+58.9	116.7	30 57.5	+59.1	117.3	30 29.8	+59.3	117.8	30 01.6	+59.4	118.3	26
27	34 06.4	+57.8	114.1	33 41.5	+58.2	114.7	33 16.1	+58.4	115.3	32 50.2	+58.6	115.9	32 23.7	+58.8	116.5	31 56.6	+59.1	117.1	31 29.1	+59.2	117.6	31 01.0	+59.4	118.2	27
28	35 04.2	+57.8	113.8	34 39.7	+58.0	114.4	34 14.5	+58.4	115.1	33 48.8	+58.6	115.7	33 22.5	+58.9	116.3	32 55.7	+59.1	116.9	32 28.3	+59.3	117.4	32 00.4	+59.4	118.0	28
29	36 02.0	+57.7	113.5	35 37.7	+58.1	114.1	35 12.9	+58.3	114.8	34 47.4	+58.6	115.4	34 21.4	+58.8	116.0	33 54.8	+59.0	116.7	33 27.6	+59.2	117.2	32 59.8	+59.4	117.8	29
30	36 59.7	+57.6	113.1	36 35.8	+58.0	113.8	36 11.2	+58.3	114.5	35 46.0	+58.6	115.2	35 20.2	+58.8	115.8	34 53.8	+59.0	116.4	34 26.8	+59.2	117.1	33 59.2	+59.4	117.7	30
31	37 57.3	+57.6	112.8	37 33.8	+57.9	113.5	37 09.5	+58.2	114.2	36 44.6	+58.5	114.9	36 19.0	+58.8	115.6	35 52.8	+59.0	116.2	35 26.0	+59.2	116.9	34 58.6	+59.4	117.5	31
32	38 54.9	+57.6	112.4	38 31.7	+57.9	113.2	38 07.7	+58.2	113.9	37 43.1	+58.4	114.6	37 17.8	+58.7	115.3	36 51.8	+58.9	116.0	36 25.2	+59.2	116.7	35 58.0	+59.3	117.3	32
33	39 52.5	+57.4	112.1	39 29.6	+57.8	112.8	39 05.9	+58.1	113.6	38 41.5	+58.5	114.3	38 16.5	+58.7	115.0	37 50.7	+59.0	115.8	37 24.4	+59.1	116.4	36 57.3	+59.3	117.1	33
34	40 49.9	+57.4	111.7	40 27.4	+57.7	112.5	40 04.0	+58.1	113.3	39 40.0	+58.4	114.0	39 15.2	+58.6	114.8	38 49.7	+58.9	115.5	38 23.5	+59.1	116.2	37 56.6	+59.4	116.9	34
35	41 47.3	+57.3	111.3	41 25.1	+57.7	112.1	41 02.1	+58.0	112.9	40 38.4	+58.3	113.7	40 13.8	+58.7	114.5	39 48.6	+58.9	115.3	39 22.6	+59.1	116.0	38 56.0	+59.3	116.7	35
36	42 44.6	+57.2	110.9	42 22.8	+57.6	111.8	42 00.1	+58.0	112.6	41 36.7	+58.3	113.4	41 12.5	+58.5	114.2	40 47.5	+58.8	115.0	40 21.7	+59.1	115.8	39 55.3	+59.2	116.5	36
37	43 41.8	+57.1	110.5	43 20.4	+57.5	111.4	42 58.1	+57.9	112.2	42 35.0	+58.2	113.1	42 11.0	+58.6	113.9	41 46.3	+58.8	114.8	41 20.8	+59.0	115.6	40 54.5	+59.3	116.3	37
38	44 38.9	+57.1	110.1	44 17.9	+57.4	111.0	43 56.0	+57.8	111.9	43 33.2	+58.2	112.8	43 09.6	+58.4	113.6	42 45.1	+58.8	114.5	42 19.8	+59.0	115.3	41 53.8	+59.2	116.1	38
39	45 36.0	+56.9	109.6	45 15.3	+57.4	110.6	44 53.8	+57.7	111.5	44 31.4	+58.1	112.4	44 08.0	+58.5	113.3	43 43.9	+58.7	114.2	43 18.8	+59.0	115.1	42 53.0	+59.2	115.9	39
40	46 32.9	+56.8	109.2	46 12.7	+57.2	110.2	45 51.5	+57.7	111.1	45 29.5	+58.0	112.1	45 06.5	+58.3	113.0	44 42.6	+58.6	113.9	44 17.8	+59.0	114.8	43 52.2	+59.2	115.7	40
41	47 29.7	+56.7	108.7	47 09.9	+57.2	109.7	46 49.2	+57.6	110.7	46 27.5	+58.0	111.7	46 04.8	+58.4	112.7	45 41.2	+58.7	113.6	45 16.8	+58.9	114.6	44 51.4	+59.1	115.5	41
42	48 26.4	+56.5	108.2	48 07.1	+57.0	109.3	47 46.8	+57.5	110.3	47 25.5	+57.9	111.3	47 03.2	+58.2	112.3	46 39.9	+58.6	113.3	46 15.7	+58.8	114.3	45 50.5	+59.2	115.2	42
43	49 22.9	+56.4	107.7	49 04.1	+57.0	108.8	48 44.3	+57.4	109.9	48 23.4	+57.8	110.9	48 01.4	+58.2	112.0	47 38.5	+58.5	113.0	47 14.5	+58.8	114.0	46 49.7	+59.0	115.0	43
44	50 19.3	+56.3	107.2	50 01.1	+56.8	108.3	49 41.7	+57.2	109.4	49 21.2	+57.7	110.5	48 59.6	+58.1	111.6	48 37.0	+58.4	112.7	48 13.3	+58.8	113.7	47 48.7	+59.1	114.7	44
45	51 15.6	+56.1	106.6	50 57.9	+56.6	107.8	50 38.9	+57.2	109.0	50 18.9	+57.6	110.1	49 57.7	+58.0	111.2	49 35.4	+58.4	112.3	49 12.1	+58.7	113.4	48 47.8	+59.0	114.5	45
46	52 11.7	+55.9	106.0	51 54.5	+56.5	107.3	51 36.1	+57.0	108.5	51 16.5	+57.5	109.7	50 55.7	+58.0	110.8	50 33.8	+58.4	112.0	50 10.8	+58.7	113.1	49 46.8	+59.0	114.2	46
47	53 07.6	+55.8	105.4	52 51.0	+56.4	106.7	52 33.1	+56.9	108.0	52 14.0	+57.4	109.2	51 53.7	+57.8	110.4	51 32.2	+58.2	111.6	51 09.5	+58.6	112.8	50 45.8	+58.9	113.9	47
48	54 03.4	+55.5	104.8	53 47.4	+56.1	106.1	53 30.0	+56.8	107.4	53 11.4	+57.3	108.7	52 51.5	+57.8	110.0	52 30.4	+58.2	111.2	52 08.1	+58.6	112.4	51 44.7	+58.9	113.6	48
49	54 58.9	+55.4	104.2	54 43.5	+56.0	105.5	54 26.8	+56.6	106.9	54 08.7	+57.1	108.2	53 49.3	+57.6	109.5	53 28.6	+58.1	110.8	53 06.7	+58.5	112.0	52 43.6	+58.8	113.3	49
50	55 54.3	+55.0	103.5	55 39.5	+55.8	104.9	55 23.4	+56.4	106.3	55 05.8	+57.0	107.7	54 46.9	+57.6	109.0	54 26.7	+58.0	110.4	54 05.2	+58.4	111.7	53 42.4	+58.8	112.9	50
51	56 49.3	+54.9	102.8	56 35.3	+55.6	104.3	56 19.8	+56.3	105.7	56 02.8	+56.9	107.1	55 44.5	+57.4	108.5	55 24.7	+57.9	109.9	55 03.6	+58.3	111.3	54 41.2	+58.7	112.6	51
52	57 44.2	+54.5	102.0	57 30.9	+55.3	103.6	57 16.1	+56.0	105.1	56 59.7	+56.7	106.6	56 41.9	+57.2	108.0	56 22.6	+57.8	109.5	56 01.9	+58.2	110.9	55 39.9	+58.6	112.2	52
53	58 38.7	+54.3	101.2	58 26.2	+55.1	102.8	58 12.1	+55.8	104.4	57 56.4	+56.5	106.0	57 39.1	+57.1	107.5	57 20.4	+57.6	109.0	57 00.1	+58.2	110.4	56 38.5	+58.6	111.9	53
54	59 33.0	+53.9	100.4	59 21.3	+54.8	102.1	59 07.9	+55.6	103.7	58 52.9	+56.3	105.3	58 36.2	+57.0	106.9	58 18.0	+57.5	108.4	57 58.3	+58.0	110.0	57 37.1	+58.4	111.5	54
55	60 26.9	+53.5	99.5	60 16.1	+54.4	101.2	60 03.5	+55.3	103.0	59 49.2	+56.0	104.6	59 33.2	+56.7	106.3	59 15.5	+57.4	107.9	58 56.3	+57.9	109.5	58 35.5	+58.4	111.0	55
56	61 20.4	+53.2	98.6	61 10.5	+54.1	100.4	60 58.8	+55.0	102.2	60 45.2	+55.9	103.9	60 29.9	+56.6	105.6	60 12.9	+57.2	107.3	59 54.2	+57.8	109.0	59 33.9	+58.3	110.6	56
57	62 13.6	+52.7	97.6	62 04.6	+53.8	99.5	61 53.8	+54.7	101.3	61 41.1	+55.5	103.2	61 26.5	+56.4	104.9	61 10.1	+57.1	106.7	60 52.0	+57.7	108.4	60 32.2	+58.2	110.1	57
58	63 06.3	+52.2	96.6	62 58.4	+53.3	98.5	62 48.5	+54.3	100.4	62 36.6	+55.3	102.3	62 22.9	+56.1	104.2	62 07.2	+56.8	106.0	61 49.7	+57.5	107.8	61 30.4	+58.1	109.6	58
59	63 58.5	+51.6	95.5	63 51.7	+52.9	97.5	63 42.8	+54.0	99.5	63 31.9	+54.9	101.5	63 19.0	+55.8	103.4	63 04.0	+56.7	105.4	62 47.2	+57.3	107.2	62 28.5	+57.9	109.1	59
60	64 50.1	+51.1	94.3	64 44.6	+52.3	96.4	64 36.8	+53.5	98.5	64 26.8	+54.6	100.6	64 14.8	+55.5	102.6	64 00.7	+56.3	104.6	63 44.5	+57.2	106.6	63 26.4	+57.8	108.5	60
61	65 41.2	+50.5	93.0	65 36.9	+51.8	95.2	65 30.3	+53.0	97.4	65 21.4	+54.2	99.6	65 10.3	+55.2	101.7	64 57.0	+56.2	103.8	64 41.7	+56.9	105.9	64 24.2	+57.7	107.9	61
62	66 31.7	+49.6	91.7	66 28.7	+51.1	94.0	66 23.3	+52.5	96.3	66 15.6	+53.7	98.5	66 05.5	+54.8	100.8	65 53.2	+55.8	103.0	65 38.6	+56.7	105.1	65 21.9	+57.4	107.2	62
63	67 21.3	+48.9	90.3	67 19.8	+50.4	92.7	67 15.8	+51.8	95.0	67 09.3	+53.2	97.4	67 00.3	+54.4	99.7	66 49.0	+55.4	102.1	66 35.3	+56.4	104.3	66 19.3	+57.3	106.5	63
64	68 10.2	+48.0	88.7	68 10.2	+49.7	91.2	68 07.6	+51.2	93.7	68 02.5	+52.6	96.2	67 54.7	+53.9	98.6	67 44.4	+55.1	101.1	67 31.7	+56.1	103.4	67 16.6	+57.0	105.8	64
65	68 58.2	+46.9	87.1	68 59.9	+48.7	89.7	68 58.8	+50.4	92.3	68 55.1	+51.9	94.9	68 48.6	+53.4	97.5	68 39.5	+54.7	100.0	68 27.8	+55.8	102.5	68 13.6	+56.7	104.9	65
66	69 45.1	+45.8	85.3	69 48.6	+47.7	88.0	69 49.2	+49.6	90.7	69 47.0	+51.2	93.5	69 42.0	+52.7	96.2	69 34.2	+54.1	98.8	69 23.6	+55.3	101.5	69 10.3	+56.5	104.0	66
67	70 30.9	+44.5	83.4	70 36.3	+46.6	86.2	70 38.8	+48.5	89.1	70 38.2	+50.4	91.9	70 34.7	+52.1	94.8	70 28.3	+53.6	97.6	70 18.9	+55.0	100.3	70 06.8	+56.0	103.1	67
68	71 15.4	+43.1	81.4	71 22.9	+45.3	84.3	71 27.3	+47.4	87.3	71 28.6	+49.4	90.3	71 26.8	+51.2	93.2	71 21.9	+52.9	96.2	71 13.9	+54.3	99.1	71 02.8	+55.7	102.0	68
69	71 58.5	+41.4	79.2	72 08.2	+43.9	82.2	72 14.7	+46.2	85.3	72 18.0	+48.3	88.4	72 18.0	+50.3	91.6	72 14.8	+52.1	94.7	72 08.2	+53.8	97.8	71 58.5	+55.3	100.8	69
70	72 39.9	+39.7	76.8	72 52.1	+42.2	79.9	73 00.9	+44.7	83.2	73 06.3	+47.0	86.4	73 08.3	+49.3	89.7	73 06.9	+51.2	93.0	73 02.0	+53.1	96.3	72 53.8	+54.6	99.5	70
71	73 19.6	*+37.5* •	74.2	73 34.3	*+40.3* •	77.5	73 45.6	+43.0	80.8	73 53.3	+45.6	84.2	73 57.6	+47.9	87.7	73 58.1	+50.3	91.2	73 55.1	+52.2	94.7	73 48.4	+54.0	98.1	71
72	73 57.1	*+35.3* •	71.4	74 14.6	*+38.2* •	74.8	74 28.6	*+41.0* •	78.3	74 38.9	+43.9	81.8	74 45.5	+46.6	85.5	74 48.4	+48.9	89.2	74 47.3	+51.3	92.8	74 42.4	+53.3	96.5	72
73	74 32.4	*+32.7* •	68.5	74 52.8	*+35.8* •	71.9	75 09.6	*+38.9* •	75.5	75 22.8	*+41.9* •	79.2	75 32.1	+44.8	83.0	75 37.3	+47.6	86.9	75 38.6	+50.0	90.8	75 35.7	+52.3	94.7	73
74	75 05.1	*+29.9* •	65.3	75 28.6	*+33.1* •	68.8	75 48.5	*+36.4* •	72.5	76 04.7	*+39.6* •	76.3	76 16.9	*+42.8* •	80.3	76 24.9	+45.8	84.4	76 28.6	+48.7	88.5	76 28.0	+51.2	92.7	74
75	75 35.0	*+26.7* •	61.8	76 01.7	*+30.0* •	65.4	76 24.9	*+33.5* •	69.1	76 44.3	*+37.0* •	73.1	76 59.7	*+40.4* •	77.2	77 10.7	*+43.8* •	81.5	77 17.3	+47.0	85.9	77 19.2	+49.9	90.4	75
76	76 01.7	*+23.2* •	58.2	76 31.7	*+26.7* •	61.7	76 58.4	*+30.3* •	65.5	77 21.3	*+34.0* •	69.6	77 40.1	*+37.7* •	73.9	77 54.5	*+41.4* •	78.4	78 04.3	*+44.9* •	83.0	78 09.1	+48.2	87.7	76
77	76 24.9	*+19.4* •	54.3	76 58.4	*+22.9* •	57.8	77 28.7	*+26.6* •	61.6	77 55.3	*+30.5* •	65.7	78 17.8	*+34.5* •	70.1	78 35.9	*+38.5* •	74.8	78 49.2	*+42.4* •	79.7	78 57.3	*+46.2* •	84.7	77
78	76 44.3	*+15.4* •	50.2	77 21.3	*+18.8* •	53.7	77 55.3	*+22.5* •	57.4	78 25.8	*+26.5* •	61.5	78 52.3	*+30.8* •	66.0	79 14.4	*+35.1* •	70.8	79 31.6	*+39.4* •	75.9	79 43.5	*+43.6* •	81.3	78
79	76 59.7	*+11.0* •	46.0	77 40.1	*+14.4* •	49.3	78 17.8	*+18.1* •	52.9	78 52.3	*+22.1* •	57.0	79 23.1	*+26.4* •	61.4	79 49.5	*+31.0* •	66.3	80 11.0	*+35.8* •	71.6	80 27.1	*+40.5* •	77.3	79
80	77 10.7	*+6.6* •	41.6	77 54.5	*+9.8* •	44.7	78 35.9	*+13.3* •	48.2	79 14.4	*+17.2* •	52.1	79 49.5	*+21.5* •	56.5	80 20.5	*+26.3* •	61.4	80 46.8	*+31.3* •	66.8	81 07.6	*+36.5* •	72.7	80
81	77 17.3	*+1.9* •	37.1	78 04.3	*+4.8* •	39.9	78 49.2	*+8.1* •	43.2	79 31.6	*+11.9* •	46.9	80 11.0	*+16.1* •	51.1	80 46.8	*+20.8* •	55.9	81 18.1	*+26.0* •	61.3	81 44.1	*+31.6* •	67.3	81
82	77 19.2	*−2.7* •	32.5	78 09.1	*−0.1* •	35.1	78 57.3	*+2.8* •	38.0	79 43.5	*+6.2* •	41.4	80 27.1	*+10.2* •	45.4	81 07.6	*+14.7* •	49.9	81 44.1	*+19.9* •	55.2	82 15.7	*+25.8* •	61.2	82
83	77 16.5	*−7.3* •	28.0	78 09.0	*−5.1* •	30.2	79 00.1	*−2.5* •	32.8	79 49.7	*+0.4* •	35.8	80 37.3	*+3.9* •	39.4	81 22.3	*+8.1* •	43.5	82 04.0	*+13.0* •	48.5	82 41.5	*+18.7* •	54.3	83
84	77 09.2	*−11.7* •	23.5	78 03.9	*−10.0* •	25.4	78 57.6	*−7.9* •	27.6	79 50.1	*−5.3* •	30.2	80 41.2	*−2.4* •	33.2	81 30.4	*+1.1* •	36.9	82 17.0	*+5.4* •	41.3	83 00.2	*+10.7* •	46.7	84
85	76 57.5	*−16.1* •	19.1	77 53.9	*−14.6* •	20.6	78 49.7	*−13.0* •	22.4	79 44.8	*−11.1* •	24.5	80 38.8	*−8.7* •	27.1	81 31.5	*−5.9* •	30.1	82 22.4	*−2.3* •	33.8	83 10.9	*+2.1* •	38.5	85
86	76 41.4	*−20.0* •	14.9	77 39.3	*−19.1* •	16.1	78 36.7	*−17.8* •	17.4	79 33.7	*−16.4* •	19.1	80 30.1	*−14.7* •	21.0	81 25.6	*−12.6* •	23.4	82 20.1	*−10.0* •	26.3	83 13.0	*−6.6* •	30.1	86
87	76 21.4	*−23.8* •	10.8	77 20.2	*−23.1* •	11.7	78 18.9	*−22.4* •	12.7	79 17.3	*−21.4* •	13.8	80 15.4	*−20.3* •	15.2	81 13.0	*−18.9* •	16.9	82 10.1	*−17.2* •	19.0	83 06.4	*−15.0* •	21.7	87
88	75 57.6	*−27.3* •	7.0	76 57.1	*−26.9* •	7.5	77 56.5	*−26.4* •	8.1	78 55.9	*−26.0* •	8.9	79 55.1	*−25.3* •	9.7	80 54.1	*−24.6* •	10.8	81 52.9	*−23.6* •	12.1	82 51.4	*−22.5* •	13.8	88
89	75 30.3	*−30.3* •	3.4	76 30.2	*−30.2* •	3.6	77 30.1	*−30.1* •	3.9	78 29.9	*−29.9* •	4.3	79 29.8	*−29.8* •	4.7	80 29.5	*−29.5* •	5.1	81 29.3	*−29.3* •	5.7	82 28.9	*−28.9* •	6.5	89
90	75 00.0	*−33.2* •	0.0	76 00.0	*−33.2* •	0.0	77 00.0	*−33.4* •	0.0	78 00.0	*−33.5* •	0.0	79 00.0	*−33.6* •	0.0	80 00.0	*−33.8* •	0.0	81 00.0	*−34.0* •	0.0	82 00.0	*−34.3* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 58°, 302°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 53.0	−58.5	121.1	7 21.9	−58.7	121.2	6 50.8	−58.9	121.3	6 19.5	−59.0	121.4	5 48.2	−59.2	121.5	5 16.8	−59.4	121.6	4 45.3	−59.5	121.7	4 13.8	−59.6	121.7	**0**
1	6 54.5	−58.5	121.3	6 23.2	−58.7	121.4	5 51.9	−58.9	121.5	5 20.5	−59.1	121.6	4 49.0	−59.2	121.7	4 17.4	−59.3	121.8	3 45.8	−59.4	121.8	3 14.2	−59.6	121.9	**1**
2	5 56.0	−58.6	121.6	5 24.5	−58.7	121.6	4 53.0	−58.9	121.7	4 21.4	−59.0	121.8	3 49.8	−59.2	121.9	3 18.1	−59.3	121.9	2 46.4	−59.5	121.9	2 14.6	−59.6	122.0	**2**
3	4 57.4	−58.5	121.8	4 25.8	−58.7	121.9	3 54.1	−58.9	121.9	3 22.4	−59.1	122.0	2 50.6	−59.2	122.0	2 18.8	−59.4	122.1	1 46.9	−59.5	122.1	1 15.0	−59.6	122.1	**3**
4	3 58.9	−58.5	122.0	3 27.1	−58.7	122.1	2 55.2	−58.9	122.1	2 23.3	−59.0	122.1	1 51.4	−59.2	122.2	1 19.4	−59.3	122.2	0 47.4	−59.4	122.2	0 15.4	−59.5	122.2	**4**
5	3 00.4	−58.6	122.2	2 28.4	−58.8	122.3	1 56.3	−58.9	122.3	1 24.3	−59.1	122.3	0 52.2	−59.2	122.3	0 20.1	−59.4	122.3	0 12.0	+59.5	57.7	0 44.1	+59.6	57.7	**5**
6	2 01.8	−58.5	122.4	1 29.6	−58.7	122.5	0 57.4	−58.9	122.5	0 25.2	−59.1	122.5	0 07.0	+59.3	57.5	0 39.3	+59.3	57.5	1 11.5	+59.5	57.5	1 43.7	+59.6	57.5	**6**
7	1 03.3	−58.5	122.7	0 30.9	−58.7	122.7	0 01.5	+58.9	57.3	0 33.9	+59.0	57.3	1 06.3	+59.2	57.3	1 38.6	+59.3	57.4	2 11.0	+59.4	57.4	2 43.3	+59.6	57.4	**7**
8	0 04.8	−58.6	122.9	0 27.8	+58.7	57.1	1 00.4	+58.9	57.1	1 32.9	+59.1	57.2	2 05.5	+59.2	57.2	2 38.0	+59.3	57.2	3 10.4	+59.5	57.3	3 42.9	+59.6	57.3	**8**
9	0 53.8	+58.5	56.9	1 26.5	+58.7	56.9	1 59.3	+58.9	56.9	2 32.0	+59.0	57.0	3 04.7	+59.2	57.0	3 37.3	+59.4	57.1	4 09.9	+59.5	57.1	4 42.5	+59.5	57.2	**9**
10	1 52.3	+58.5	56.7	2 25.2	+58.8	56.7	2 58.2	+58.9	56.8	3 31.0	+59.1	56.8	4 03.9	+59.2	56.9	4 36.7	+59.3	56.9	5 09.4	+59.4	57.0	5 42.0	+59.6	57.1	**10**
11	2 50.8	+58.6	56.5	3 24.0	+58.7	56.5	3 57.1	+58.8	56.6	4 30.1	+59.0	56.6	5 03.1	+59.2	56.7	5 36.0	+59.3	56.8	6 08.8	+59.5	56.9	6 41.6	+59.6	56.9	**11**
12	3 49.4	+58.5	56.2	4 22.7	+58.7	56.3	4 55.9	+58.9	56.4	5 29.1	+59.1	56.4	6 02.3	+59.2	56.5	6 35.3	+59.4	56.6	7 08.3	+59.5	56.7	7 41.2	+59.6	56.8	**12**
13	4 47.9	+58.5	56.0	5 21.4	+58.7	56.1	5 54.8	+58.9	56.2	6 28.2	+59.0	56.3	7 01.5	+59.2	56.4	7 34.7	+59.3	56.5	8 07.8	+59.4	56.6	8 40.8	+59.5	56.7	**13**
14	5 46.4	+58.5	55.8	6 20.1	+58.7	55.9	6 53.7	+58.9	56.0	7 27.2	+59.1	56.1	8 00.7	+59.2	56.2	8 34.0	+59.3	56.3	9 07.2	+59.5	56.4	9 40.3	+59.6	56.6	**14**
15	6 44.9	+58.6	55.6	7 18.8	+58.7	55.7	7 52.6	+58.9	55.8	8 26.3	+59.0	55.9	8 59.9	+59.2	56.0	9 33.3	+59.4	56.2	10 06.7	+59.4	56.3	10 39.9	+59.6	56.5	**15**
16	7 43.5	+58.5	55.4	8 17.5	+58.7	55.5	8 51.5	+58.8	55.6	9 25.3	+59.1	55.7	9 59.1	+59.1	55.9	10 32.7	+59.3	56.0	11 06.1	+59.5	56.2	11 39.5	+59.5	56.3	**16**
17	8 42.0	+58.5	55.1	9 16.2	+58.7	55.3	9 50.3	+58.9	55.4	10 24.4	+59.0	55.5	10 58.2	+59.2	55.7	11 32.0	+59.3	55.9	12 05.6	+59.4	56.0	12 39.0	+59.6	56.2	**17**
18	9 40.5	+58.4	54.9	10 14.9	+58.7	55.0	10 49.2	+58.9	55.2	11 23.4	+59.0	55.4	11 57.4	+59.2	55.5	12 31.3	+59.3	55.7	13 05.0	+59.5	55.9	13 38.6	+59.5	56.1	**18**
19	10 38.9	+58.5	54.7	11 13.6	+58.6	54.8	11 48.1	+58.8	55.0	12 22.4	+59.0	55.2	12 56.6	+59.1	55.4	13 30.6	+59.3	55.6	14 04.5	+59.4	55.8	14 38.1	+59.6	56.0	**19**
20	11 37.4	+58.5	54.4	12 12.2	+58.7	54.6	12 46.9	+58.8	54.8	13 21.4	+59.0	55.0	13 55.7	+59.2	55.2	14 29.9	+59.3	55.4	15 03.9	+59.4	55.6	15 37.7	+59.5	55.8	**20**
21	12 35.9	+58.5	54.2	13 10.9	+58.6	54.4	13 45.7	+58.9	54.6	14 20.4	+59.0	54.8	14 54.9	+59.2	55.0	15 29.2	+59.3	55.2	16 03.3	+59.4	55.5	16 37.2	+59.6	55.7	**21**
22	13 34.4	+58.4	54.0	14 09.5	+58.7	54.2	14 44.6	+58.8	54.4	15 19.4	+59.0	54.6	15 54.1	+59.1	54.8	16 28.5	+59.3	55.1	17 02.7	+59.5	55.3	17 36.8	+59.5	55.6	**22**
23	14 32.8	+58.4	53.8	15 08.2	+58.6	54.0	15 43.4	+58.8	54.2	16 18.4	+59.0	54.4	16 53.2	+59.1	54.7	17 27.8	+59.3	54.9	18 02.2	+59.4	55.2	18 36.3	+59.5	55.5	**23**
24	15 31.2	+58.4	53.5	16 06.8	+58.6	53.7	16 42.2	+58.8	54.0	17 17.4	+58.9	54.2	17 52.3	+59.1	54.5	18 27.1	+59.2	54.8	19 01.6	+59.4	55.0	19 35.8	+59.6	55.3	**24**
25	16 29.6	+58.4	53.3	17 05.4	+58.6	53.5	17 41.0	+58.8	53.8	18 16.3	+59.0	54.0	18 51.4	+59.2	54.3	19 26.3	+59.3	54.6	20 01.0	+59.4	54.9	20 35.4	+59.5	55.2	**25**
26	17 28.0	+58.4	53.0	18 04.0	+58.6	53.3	18 39.8	+58.7	53.6	19 15.3	+58.9	53.8	19 50.6	+59.1	54.1	20 25.6	+59.2	54.4	21 00.4	+59.3	54.7	21 34.9	+59.5	55.1	**26**
27	18 26.4	+58.4	52.8	19 02.6	+58.5	53.1	19 38.5	+58.8	53.4	20 14.2	+58.9	53.6	20 49.7	+59.0	53.9	21 24.8	+59.3	54.3	21 59.7	+59.4	54.6	22 34.4	+59.5	54.9	**27**
28	19 24.8	+58.3	52.6	20 01.1	+58.6	52.8	20 37.3	+58.7	53.1	21 13.1	+58.9	53.4	21 48.7	+59.1	53.8	22 24.1	+59.2	54.1	22 59.1	+59.4	54.4	23 33.9	+59.5	54.8	**28**
29	20 23.1	+58.3	52.3	20 59.7	+58.5	52.6	21 36.0	+58.7	52.9	22 12.0	+58.9	53.2	22 47.8	+59.1	53.6	23 23.3	+59.2	53.9	23 58.5	+59.4	54.3	24 33.4	+59.5	54.6	**29**
30	21 21.4	+58.3	52.1	21 58.2	+58.5	52.4	22 34.7	+58.7	52.7	23 10.9	+58.9	53.0	23 46.9	+59.0	53.4	24 22.5	+59.2	53.7	24 57.9	+59.3	54.1	25 32.9	+59.4	54.5	**30**
31	22 19.7	+58.3	51.8	22 56.7	+58.5	52.1	23 33.4	+58.7	52.5	24 09.8	+58.9	52.8	24 45.9	+59.1	53.2	25 21.7	+59.2	53.6	25 57.2	+59.3	53.9	26 32.3	+59.5	54.3	**31**
32	23 18.0	+58.3	51.5	23 55.2	+58.5	51.9	24 32.1	+58.6	52.2	25 08.7	+58.8	52.6	25 45.0	+59.0	53.0	26 20.9	+59.2	53.4	26 56.5	+59.4	53.8	27 31.8	+59.5	54.2	**32**
33	24 16.3	+58.2	51.3	24 53.7	+58.4	51.6	25 30.7	+58.7	52.0	26 07.5	+58.8	52.4	26 44.0	+59.0	52.8	27 20.1	+59.2	53.2	27 55.9	+59.3	53.6	28 31.3	+59.4	54.0	**33**
34	25 14.5	+58.2	51.0	25 52.1	+58.4	51.4	26 29.4	+58.6	51.8	27 06.3	+58.8	52.2	27 43.0	+59.0	52.6	28 19.3	+59.1	53.0	28 55.2	+59.3	53.4	29 30.7	+59.5	53.9	**34**
35	26 12.7	+58.1	50.7	26 50.5	+58.4	51.1	27 28.0	+58.6	51.5	28 05.1	+58.8	51.9	28 42.0	+58.9	52.4	29 18.4	+59.1	52.8	29 54.5	+59.3	53.3	30 30.2	+59.4	53.7	**35**
36	27 10.8	+58.2	50.5	27 48.9	+58.3	50.9	28 26.6	+58.5	51.3	29 03.9	+58.8	51.7	29 40.9	+59.0	52.2	30 17.5	+59.1	52.6	30 53.8	+59.2	53.1	31 29.6	+59.4	53.6	**36**
37	28 09.0	+58.1	50.2	28 47.2	+58.3	50.6	29 25.1	+58.6	51.0	30 02.7	+58.7	51.5	30 39.9	+58.9	51.9	31 16.6	+59.1	52.4	31 53.0	+59.3	52.9	32 29.0	+59.4	53.4	**37**
38	29 07.1	+58.0	49.9	29 45.5	+58.3	50.3	30 23.7	+58.5	50.8	31 01.4	+58.7	51.2	31 38.8	+58.9	51.7	32 15.7	+59.1	52.2	32 52.3	+59.2	52.7	33 28.4	+59.4	53.2	**38**
39	30 05.1	+58.0	49.6	30 43.8	+58.3	50.1	31 22.2	+58.4	50.5	32 00.1	+58.7	51.0	32 37.7	+58.8	51.5	33 14.8	+59.1	52.0	33 51.5	+59.3	52.5	34 27.8	+59.4	53.1	**39**
40	31 03.1	+58.0	49.3	31 42.1	+58.2	49.8	32 20.6	+58.5	50.3	32 58.8	+58.6	50.8	33 36.5	+58.9	51.3	34 13.9	+59.0	51.8	34 50.8	+59.2	52.3	35 27.2	+59.3	52.9	**40**
41	32 01.1	+57.9	49.0	32 40.3	+58.1	49.5	33 19.1	+58.3	50.0	33 57.4	+58.6	50.5	34 35.4	+58.8	51.0	35 12.9	+59.0	51.6	35 50.0	+59.1	52.1	36 26.5	+59.4	52.7	**41**
42	32 59.0	+57.9	48.7	33 38.4	+58.2	49.2	34 17.4	+58.4	49.7	34 56.0	+58.6	50.2	35 34.2	+58.8	50.8	36 11.9	+59.0	51.3	36 49.1	+59.2	51.9	37 25.9	+59.3	52.5	**42**
43	33 56.9	+57.9	48.4	34 36.6	+58.1	48.9	35 15.8	+58.3	49.4	35 54.6	+58.6	50.0	36 33.0	+58.7	50.5	37 10.9	+58.9	51.1	37 48.3	+59.1	51.7	38 25.2	+59.3	52.3	**43**
44	34 54.8	+57.8	48.1	35 34.7	+58.0	48.6	36 14.1	+58.3	49.1	36 53.2	+58.5	49.7	37 31.7	+58.8	50.3	38 09.8	+59.0	50.9	38 47.4	+59.1	51.5	39 24.5	+59.3	52.1	**44**
45	35 52.6	+57.7	47.7	36 32.7	+58.0	48.3	37 12.4	+58.2	48.8	37 51.7	+58.4	49.4	38 30.5	+58.6	50.0	39 08.8	+58.8	50.6	39 46.5	+59.1	51.3	40 23.8	+59.3	51.9	**45**
46	36 50.3	+57.6	47.4	37 30.7	+57.9	48.0	38 10.6	+58.2	48.5	38 50.1	+58.4	49.1	39 29.1	+58.7	49.8	40 07.6	+58.9	50.4	40 45.6	+59.1	51.1	41 23.1	+59.2	51.7	**46**
47	37 47.9	+57.7	47.1	38 28.6	+57.9	47.6	39 08.8	+58.1	48.2	39 48.5	+58.4	48.8	40 27.8	+58.6	49.5	41 06.5	+58.8	50.1	41 44.7	+59.0	50.8	42 22.3	+59.2	51.5	**47**
48	38 45.6	+57.5	46.7	39 26.5	+57.8	47.3	40 06.9	+58.1	47.9	40 46.9	+58.3	48.5	41 26.4	+58.6	49.2	42 05.3	+58.8	49.9	42 43.7	+59.0	50.6	43 21.5	+59.2	51.3	**48**
49	39 43.1	+57.5	46.3	40 24.3	+57.7	46.9	41 05.0	+58.0	47.6	41 45.2	+58.3	48.2	42 25.0	+58.5	48.9	43 04.1	+58.8	49.6	43 42.7	+59.0	50.3	44 20.7	+59.2	51.1	**49**
50	40 40.6	+57.4	46.0	41 22.0	+57.7	46.6	42 03.0	+58.0	47.2	42 43.5	+58.2	47.9	43 23.5	+58.4	48.6	44 02.9	+58.7	49.3	44 41.7	+58.9	50.1	45 19.9	+59.1	50.8	**50**
51	41 38.0	+57.3	45.6	42 19.7	+57.6	46.2	43 01.0	+57.9	46.9	43 41.7	+58.2	47.6	44 21.9	+58.5	48.3	45 01.6	+58.6	49.0	45 40.6	+58.9	49.8	46 19.0	+59.1	50.6	**51**
52	42 35.3	+57.2	45.2	43 17.3	+57.6	45.8	43 58.9	+57.8	46.5	44 39.9	+58.1	47.2	45 20.4	+58.3	48.0	46 00.2	+58.6	48.7	46 39.5	+58.8	49.5	47 18.1	+59.1	50.3	**52**
53	43 32.5	+57.1	44.8	44 14.9	+57.4	45.4	44 56.7	+57.7	46.1	45 38.0	+58.0	46.9	46 18.7	+58.3	47.6	46 58.8	+58.6	48.4	47 38.3	+58.8	49.2	48 17.2	+59.0	50.1	**53**
54	44 29.6	+57.1	44.3	45 12.3	+57.4	45.0	45 54.4	+57.7	45.8	46 36.0	+58.0	46.5	47 17.0	+58.2	47.3	47 57.4	+58.5	48.1	48 37.1	+58.8	48.9	49 16.2	+59.0	49.8	**54**
55	45 26.7	+56.9	43.9	46 09.7	+57.2	44.6	46 52.1	+57.6	45.4	47 34.0	+57.8	46.1	48 15.2	+58.2	46.9	48 55.9	+58.4	47.8	49 35.9	+58.7	48.6	50 15.2	+58.9	49.5	**55**
56	46 23.6	+56.8	43.4	47 06.9	+57.2	44.2	47 49.7	+57.4	44.9	48 31.8	+57.8	45.7	49 13.4	+58.1	46.6	49 54.3	+58.4	47.4	50 34.6	+58.6	48.3	51 14.1	+58.9	49.2	**56**
57	47 20.4	+56.7	43.0	48 04.1	+57.0	43.7	48 47.1	+57.4	44.5	49 29.6	+57.7	45.3	50 11.5	+58.0	46.2	50 52.7	+58.3	47.1	51 33.2	+58.6	48.0	52 13.0	+58.9	48.9	**57**
58	48 17.1	+56.6	42.5	49 01.1	+56.9	43.3	49 44.5	+57.3	44.1	50 27.3	+57.6	44.9	51 09.5	+57.9	45.8	51 51.0	+58.3	46.7	52 31.8	+58.6	47.6	53 11.9	+58.8	48.6	**58**
59	49 13.7	+56.5	42.0	49 58.0	+56.8	42.8	50 41.8	+57.2	43.6	51 24.9	+57.5	44.5	52 07.4	+57.9	45.4	52 49.3	+58.1	46.3	53 30.4	+58.4	47.3	54 10.7	+58.7	48.3	**59**
60	50 10.2	+56.2	41.5	50 54.8	+56.7	42.3	51 39.0	+57.0	43.1	52 22.4	+57.4	44.0	53 05.3	+57.7	44.9	53 47.4	+58.1	45.9	54 28.8	+58.4	46.9	55 09.4	+58.7	47.9	**60**
61	51 06.4	+56.2	40.9	51 51.5	+56.5	41.7	52 36.0	+56.9	42.6	53 19.8	+57.3	43.5	54 03.0	+57.6	44.5	54 45.5	+57.9	45.4	55 27.2	+58.3	46.5	56 08.1	+58.6	47.5	**61**
62	52 02.6	+55.9	40.3	52 48.0	+56.4	41.2	53 32.9	+56.7	42.1	54 17.1	+57.1	43.0	55 00.6	+57.5	44.0	55 43.4	+57.9	45.0	56 25.5	+58.2	46.0	57 06.7	+58.5	47.2	**62**
63	52 58.5	+55.8	39.7	53 44.4	+56.2	40.6	54 29.6	+56.6	41.5	55 14.2	+57.0	42.5	55 58.1	+57.4	43.5	56 41.3	+57.7	44.5	57 23.7	+58.1	45.6	58 05.2	+58.5	46.7	**63**
64	53 54.3	+55.6	39.1	54 40.6	+56.0	40.0	55 26.2	+56.4	40.9	56 11.2	+56.8	41.9	56 55.5	+57.2	42.9	57 39.0	+57.7	44.0	58 21.8	+58.0	45.1	59 03.7	+58.3	46.3	**64**
65	54 49.9	+55.4	38.5	55 36.6	+55.8	39.4	56 22.6	+56.3	40.3	57 08.0	+56.7	41.3	57 52.7	+57.1	42.4	58 36.7	+57.4	43.5	59 19.8	+57.8	44.6	60 02.0	+58.3	45.9	**65**
66	55 45.3	+55.1	37.8	56 32.4	+55.5	38.7	57 18.9	+56.0	39.7	58 04.7	+56.5	40.7	58 49.8	+56.9	41.8	59 34.1	+57.4	42.9	60 17.6	+57.8	44.1	61 00.3	+58.1	45.4	**66**
67	56 40.4	+54.9	37.1	57 27.9	+55.4	38.0	58 14.9	+55.8	39.0	59 01.2	+56.2	40.1	59 46.7	+56.7	41.2	60 31.5	+57.1	42.3	61 15.4	+57.6	43.6	61 58.4	+58.0	44.8	**67**
68	57 35.3	+54.6	36.3	58 23.3	+55.1	37.3	59 10.7	+55.6	38.3	59 57.4	+56.1	39.4	60 43.4	+56.5	40.5	61 28.6	+57.0	41.7	62 13.0	+57.4	43.0	62 56.4	+57.9	44.3	**68**
69	58 29.9	+54.2	35.6	59 18.4	+54.8	36.5	60 06.3	+55.2	37.6	60 53.5	+55.8	38.7	61 39.9	+56.3	39.8	62 25.6	+56.8	41.0	63 10.4	+57.3	42.3	63 54.3	+57.7	43.7	**69**
70	59 24.1	+54.0	34.7	60 13.2	+54.4	35.7	61 01.5	+55.0	36.8	61 49.3	+55.5	37.9	62 36.2	+56.1	39.1	63 22.4	+56.5	40.3	64 07.7	+57.0	41.7	64 52.0	+57.6	43.1	**70**
71	60 18.1	+53.6	33.9	61 07.6	+54.2	34.9	61 56.5	+54.7	35.9	62 44.8	+55.2	37.1	63 32.3	+55.7	38.3	64 18.9	+56.3	39.6	65 04.7	+56.9	40.9	65 49.6	+57.3	42.4	**71**
72	61 11.7	+53.2	32.9	62 01.8	+53.7	34.0	62 51.2	+54.3	35.1	63 40.0	+54.9	36.2	64 28.0	+55.5	37.4	65 15.2	+56.1	38.8	66 01.6	+56.5	40.2	66 46.9	+57.1	41.7	**72**
73	62 04.9	+52.8	32.0	62 55.5	+53.4	33.0	63 45.5	+54.0	34.1	64 34.9	+54.5	35.3	65 23.5	+55.1	36.5	66 11.3	+55.7	37.9	66 58.1	+56.3	39.3	67 44.0	+56.9	40.9	**73**
74	62 57.7	+52.3	30.9	63 48.9	+52.9	32.0	64 39.5	+53.4	33.1	65 29.4	+54.1	34.3	66 18.6	+54.7	35.6	67 07.0	+55.3	36.9	67 54.4	+56.0	38.4	68 40.9	+56.6	40.0	**74**
75	63 50.0	+51.8	29.8	64 41.8	+52.3	30.9	65 32.9	+53.0	32.0	66 23.5	+53.6	33.2	67 13.3	+54.3	34.5	68 02.3	+54.9	35.9	68 50.4	+55.6	37.4	69 37.5	+56.3	39.1	**75**
76	64 41.8	+51.1	28.7	65 34.1	+51.8	29.7	66 25.9	+52.5	30.9	67 17.1	+53.1	32.1	68 07.6	+53.8	33.4	68 57.2	+54.5	34.8	69 46.0	+55.2	36.4	70 33.8	+55.9	38.1	**76**
77	65 32.9	+50.6	27.4	66 25.9	+51.2	28.5	67 18.4	+51.8	29.6	68 10.2	+52.5	30.9	69 01.4	+53.2	32.2	69 51.7	+54.0	33.6	70 41.2	+54.7	35.2	71 29.7	+55.5	36.9	**77**
78	66 23.5	+49.8	26.1	67 17.1	+50.5	27.2	68 10.2	+51.2	28.3	69 02.7	+51.9	29.5	69 54.6	+52.6	30.9	70 45.7	+53.4	32.4	71 35.9	+54.2	34.0	72 25.2	+54.9	35.7	**78**
79	67 13.3	+49.0	24.7	68 07.6	+49.6	25.7	69 01.4	+50.3	26.9	69 54.6	+51.1	28.1	70 47.2	+51.9	29.5	71 39.1	+52.6	30.9	72 30.1	+53.5	32.6	73 20.1	+54.4	34.4	**79**
80	68 02.3	+48.1	23.2	68 57.2	+48.8	24.2	69 51.7	+49.5	25.3	70 45.7	+50.2	26.5	71 39.1	+51.0	27.9	72 31.7	+51.9	29.4	73 23.6	+52.7	31.0	74 14.5	+53.7	32.8	**80**
81	68 50.4	+47.1	21.6	69 46.0	+47.8	22.6	70 41.2	+48.5	23.6	71 35.9	+49.3	24.9	72 30.1	+50.0	26.2	73 23.6	+50.9	27.7	74 16.3	+51.9	29.3	75 08.2	+52.8	31.1	**81**
82	69 37.5	+46.0	19.8	70 33.8	+46.7	20.8	71 29.7	+47.4	21.8	72 25.2	+48.1	23.0	73 20.1	+49.0	24.3	74 14.5	+49.9	25.8	75 08.2	+50.8	27.4	76 01.0	+51.8	29.2	**82**
83	70 23.5	+44.8	17.9	71 20.5	+45.3	18.8	72 17.1	+46.0	19.9	73 13.3	+46.8	21.0	74 09.1	+47.6	22.2	75 04.4	+48.5	23.7	75 59.0	+49.5	25.3	76 52.8	+50.6	27.1	**83**
84	71 08.3	+43.3	15.9	72 05.8	+44.0	16.8	73 03.1	+44.6	17.7	74 00.1	+45.4	18.8	74 56.7	+46.2	20.0	75 52.9	+47.0	21.3	76 48.5	+48.0	22.9	77 43.4	+49.1	24.6	**84**
85	71 51.6	+41.7	13.7	72 49.8	+42.3	14.5	73 47.7	+43.0	15.4	74 45.5	+43.6	16.3	75 42.9	+44.3	17.4	76 39.9	*+45.3*•	18.7	77 36.5	*+46.2*•	20.1	78 32.5	*+47.3*•	21.8	**85**
86	72 33.3	+39.9	11.4	73 32.1	*+40.4*•	12.0	74 30.7	*+40.9*•	12.8	75 29.1	*+41.6*•	13.7	76 27.2	*+42.3*•	14.6	77 25.2	*+43.0*•	15.8	78 22.7	*+44.0*•	17.1	79 19.8	*+45.0*•	18.6	**86**
87	73 13.2	*+38.0*•	8.8	74 12.5	*+38.3*•	9.4	75 11.6	*+38.8*•	10.0	76 10.7	*+39.2*•	10.7	77 09.5	*+39.9*•	11.5	78 08.2	*+40.5*•	12.5	79 06.7	*+41.3*•	13.6	80 04.8	*+42.2*•	14.9	**87**
88	73 51.2	*+35.6*•	6.1	74 50.8	*+36.0*•	6.5	75 50.4	*+36.2*•	6.9	76 49.9	*+36.6*•	7.5	77 49.4	*+37.0*•	8.1	78 48.7	*+37.5*•	8.8	79 48.0	*+38.0*•	9.6	80 47.0	*+38.7*•	10.6	**88**
89	74 26.8	*+33.2*•	3.2	75 26.8	*+33.2*•	3.4	76 26.6	*+33.4*•	3.6	77 26.5	*+33.5*•	3.9	78 26.4	*+33.6*•	4.2	79 26.2	*+33.8*•	4.6	80 26.0	*+34.0*•	5.1	81 25.7	*+34.3*•	5.7	**89**
90	75 00.0	*+30.3*•	0.0	76 00.0	*+30.2*•	0.0	77 00.0	*+30.1*•	0.0	78 00.0	*+29.9*•	0.0	79 00.0	*+29.8*•	0.0	80 00.0	*+29.5*•	0.0	81 00.0	*+29.3*•	0.0	82 00.0	*+28.9*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 122°, 238°

59°, 301° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	7 39.6	+58.5	120.1	7 09.5	+58.6	120.2	6 39.2	+58.8	120.3	6 08.8	+59.1	120.4	5 38.4	+59.2	120.5	5 07.9	+59.3	120.6	4 37.3	+59.4	120.7	4 06.6	+59.6	120.8	0
1	8 38.1	+58.5	119.9	8 08.1	+58.7	120.0	7 38.0	+58.9	120.2	7 07.9	+59.0	120.3	6 37.6	+59.1	120.4	6 07.2	+59.3	120.5	5 36.7	+59.5	120.6	5 06.2	+59.6	120.6	1
2	9 36.6	+58.4	119.7	9 06.8	+58.7	119.8	8 36.9	+58.8	120.0	8 06.9	+59.0	120.1	7 36.7	+59.2	120.2	7 06.5	+59.3	120.3	6 36.2	+59.4	120.4	6 05.8	+59.5	120.5	2
3	10 35.0	+58.5	119.4	10 05.5	+58.6	119.6	9 35.7	+58.9	119.8	9 05.9	+59.0	119.9	8 35.9	+59.2	120.0	8 05.8	+59.4	120.2	7 35.6	+59.5	120.3	7 05.3	+59.6	120.4	3
4	11 33.5	+58.4	119.2	11 04.1	+58.6	119.4	10 34.6	+58.8	119.6	10 04.9	+59.0	119.7	9 35.1	+59.2	119.9	9 05.2	+59.3	120.0	8 35.1	+59.4	120.1	8 04.9	+59.6	120.3	4
5	12 31.9	+58.4	119.0	12 02.7	+58.7	119.2	11 33.4	+58.8	119.4	11 03.9	+59.0	119.5	10 34.3	+59.1	119.7	10 04.5	+59.3	119.9	9 34.5	+59.5	120.0	9 04.5	+59.5	120.1	5
6	13 30.3	+58.4	118.8	13 01.4	+58.6	119.0	12 32.2	+58.8	119.2	12 02.9	+59.0	119.3	11 33.4	+59.2	119.5	11 03.8	+59.3	119.7	10 34.0	+59.4	119.9	10 04.0	+59.6	120.0	6
7	14 28.7	+58.4	118.5	14 00.0	+58.6	118.7	13 31.0	+58.8	119.0	13 01.9	+59.0	119.2	12 32.6	+59.1	119.4	12 03.1	+59.3	119.5	11 33.4	+59.4	119.7	11 03.6	+59.5	119.9	7
8	15 27.1	+58.4	118.3	14 58.6	+58.6	118.5	14 29.8	+58.8	118.7	14 00.9	+59.0	119.0	13 31.7	+59.2	119.2	13 02.4	+59.3	119.4	12 32.8	+59.5	119.6	12 03.1	+59.6	119.8	8
9	16 25.5	+58.4	118.0	15 57.2	+58.6	118.3	15 28.6	+58.8	118.5	14 59.9	+58.9	118.8	14 30.9	+59.1	119.0	14 01.7	+59.3	119.2	13 32.3	+59.4	119.4	13 02.7	+59.5	119.7	9
10	17 23.9	+58.3	117.8	16 55.8	+58.5	118.1	16 27.4	+58.8	118.3	15 58.8	+59.0	118.6	15 30.0	+59.1	118.8	15 01.0	+59.2	119.1	14 31.7	+59.4	119.3	14 02.2	+59.6	119.5	10
11	18 22.2	+58.4	117.6	17 54.3	+58.6	117.8	17 26.2	+58.7	118.1	16 57.8	+58.9	118.4	16 29.1	+59.1	118.7	16 00.2	+59.3	118.9	15 31.1	+59.4	119.2	15 01.8	+59.5	119.4	11
12	19 20.6	+58.3	117.3	18 52.9	+58.5	117.6	18 24.9	+58.8	117.9	17 56.7	+59.0	118.2	17 28.2	+59.1	118.5	16 59.5	+59.3	118.8	16 30.5	+59.4	119.0	16 01.3	+59.5	119.3	12
13	20 18.9	+58.2	117.1	19 51.4	+58.5	117.4	19 23.7	+58.7	117.7	18 55.7	+58.9	118.0	18 27.3	+59.1	118.3	17 58.8	+59.2	118.6	17 29.9	+59.4	118.9	17 00.8	+59.6	119.1	13
14	21 17.1	+58.3	116.8	20 49.9	+58.5	117.1	20 22.4	+58.7	117.5	19 54.6	+58.9	117.8	19 26.4	+59.1	118.1	18 58.0	+59.3	118.4	18 29.3	+59.4	118.7	18 00.4	+59.5	119.0	14
15	22 15.4	+58.3	116.5	21 48.4	+58.5	116.9	21 21.1	+58.7	117.3	20 53.5	+58.9	117.6	20 25.5	+59.1	117.9	19 57.3	+59.2	118.3	19 28.7	+59.4	118.6	18 59.9	+59.5	118.9	15
16	23 13.7	+58.2	116.3	22 46.9	+58.5	116.7	22 19.8	+58.7	117.0	21 52.4	+58.8	117.4	21 24.6	+59.1	117.7	20 56.5	+59.2	118.1	20 28.1	+59.4	118.4	19 59.4	+59.5	118.7	16
17	24 11.9	+58.1	116.0	23 45.4	+58.4	116.4	23 18.5	+58.6	116.8	22 51.2	+58.9	117.2	22 23.7	+59.0	117.6	21 55.7	+59.3	117.9	21 27.5	+59.4	118.3	20 58.9	+59.5	118.6	17
18	25 10.0	+58.2	115.7	24 43.8	+58.4	116.2	24 17.1	+58.7	116.6	23 50.1	+58.8	117.0	23 22.7	+59.0	117.4	22 55.0	+59.2	117.7	22 26.9	+59.3	118.1	21 58.4	+59.5	118.5	18
19	26 08.2	+58.1	115.5	25 42.2	+58.4	115.9	25 15.8	+58.6	116.3	24 48.9	+58.9	116.8	24 21.7	+59.1	117.2	23 54.2	+59.2	117.6	23 26.2	+59.4	118.0	22 57.9	+59.5	118.3	19
20	27 06.3	+58.1	115.2	26 40.6	+58.3	115.7	26 14.4	+58.6	116.1	25 47.8	+58.8	116.5	25 20.8	+59.0	117.0	24 53.4	+59.1	117.4	24 25.6	+59.3	117.8	23 57.4	+59.5	118.2	20
21	28 04.4	+58.1	114.9	27 38.9	+58.3	115.4	27 13.0	+58.5	115.9	26 46.6	+58.8	116.3	26 19.8	+58.9	116.8	25 52.5	+59.2	117.2	25 24.9	+59.3	117.6	24 56.9	+59.5	118.0	21
22	29 02.5	+58.0	114.6	28 37.2	+58.3	115.1	28 11.5	+58.6	115.6	27 45.4	+58.7	116.1	27 18.7	+59.0	116.6	26 51.7	+59.2	117.0	26 24.2	+59.4	117.5	25 56.4	+59.4	117.9	22
23	30 00.5	+58.0	114.3	29 35.5	+58.3	114.9	29 10.1	+58.5	115.4	28 44.1	+58.7	115.9	28 17.7	+59.0	116.4	27 50.9	+59.1	116.8	27 23.6	+59.3	117.3	26 55.8	+59.5	117.7	23
24	30 58.5	+57.9	114.0	30 33.8	+58.2	114.6	30 08.6	+58.4	115.1	29 42.8	+58.8	115.6	29 16.7	+58.9	116.1	28 50.0	+59.1	116.6	28 22.9	+59.3	117.1	27 55.3	+59.4	117.6	24
25	31 56.4	+57.9	113.7	31 32.0	+58.2	114.3	31 07.0	+58.5	114.8	30 41.6	+58.6	115.4	30 15.6	+58.9	115.9	29 49.1	+59.1	116.4	29 22.2	+59.2	116.9	28 54.7	+59.5	117.4	25
26	32 54.3	+57.8	113.4	32 30.2	+58.1	114.0	32 05.5	+58.4	114.6	31 40.2	+58.7	115.1	31 14.5	+58.9	115.7	30 48.2	+59.1	116.2	30 21.4	+59.3	116.8	29 54.2	+59.4	117.3	26
27	33 52.1	+57.8	113.1	33 28.3	+58.1	113.7	33 03.9	+58.4	114.3	32 38.9	+58.6	114.9	32 13.4	+58.8	115.5	31 47.3	+59.1	116.0	31 20.7	+59.2	116.6	30 53.6	+59.4	117.1	27
28	34 49.9	+57.8	112.8	34 26.4	+58.0	113.4	34 02.3	+58.3	114.0	33 37.5	+58.6	114.6	33 12.2	+58.8	115.2	32 46.4	+59.0	115.8	32 19.9	+59.3	116.4	31 53.0	+59.4	117.0	28
29	35 47.7	+57.6	112.4	35 24.4	+58.0	113.1	35 00.6	+58.3	113.7	34 36.1	+58.6	114.4	34 11.0	+58.9	115.0	33 45.4	+59.0	115.6	33 19.2	+59.2	116.2	32 52.4	+59.4	116.8	29
30	36 45.3	+57.7	112.1	36 22.4	+58.0	112.8	35 58.9	+58.2	113.5	35 34.7	+58.5	114.1	35 09.9	+58.7	114.8	34 44.4	+59.0	115.4	34 18.4	+59.2	116.0	33 51.8	+59.4	116.6	30
31	37 43.0	+57.5	111.7	37 20.4	+57.9	112.5	36 57.1	+58.2	113.2	36 33.2	+58.5	113.8	36 08.6	+58.8	114.5	35 43.4	+59.0	115.2	35 17.6	+59.2	115.8	34 51.2	+59.3	116.4	31
32	38 40.5	+57.5	111.4	38 18.3	+57.8	112.1	37 55.3	+58.2	112.9	37 31.7	+58.4	113.6	37 07.4	+58.7	114.3	36 42.4	+58.9	114.9	36 16.8	+59.1	115.6	35 50.5	+59.3	116.3	32
33	39 38.0	+57.4	111.0	39 16.1	+57.8	111.8	38 53.5	+58.1	112.5	38 30.1	+58.4	113.3	38 06.1	+58.6	114.0	37 41.3	+58.9	114.7	37 15.9	+59.1	115.4	36 49.8	+59.4	116.1	33
34	40 35.4	+57.4	110.6	40 13.9	+57.7	111.4	39 51.6	+58.0	112.2	39 28.5	+58.4	113.0	39 04.7	+58.7	113.7	38 40.2	+58.9	114.5	38 15.0	+59.1	115.2	37 49.2	+59.3	115.9	34
35	41 32.8	+57.2	110.3	41 11.6	+57.7	111.1	40 49.6	+58.0	111.9	40 26.9	+58.3	112.7	40 03.4	+58.6	113.5	39 39.1	+58.9	114.2	39 14.1	+59.1	115.0	38 48.5	+59.3	115.7	35
36	42 30.0	+57.2	109.9	42 09.3	+57.5	110.7	41 47.6	+58.0	111.5	41 25.2	+58.2	112.4	41 02.0	+58.5	113.2	40 38.0	+58.8	114.0	40 13.2	+59.1	114.7	39 47.8	+59.2	115.5	36
37	43 27.2	+57.1	109.4	43 06.8	+57.5	110.3	42 45.6	+57.8	111.2	42 23.4	+58.2	112.0	42 00.5	+58.5	112.9	41 36.8	+58.8	113.7	41 12.3	+59.0	114.5	40 47.0	+59.3	115.3	37
38	44 24.3	+57.0	109.0	44 04.3	+57.4	109.9	43 43.4	+57.8	110.8	43 21.6	+58.2	111.7	42 59.0	+58.5	112.6	42 35.6	+58.7	113.4	42 11.3	+59.0	114.3	41 46.3	+59.2	115.1	38
39	45 21.3	+56.9	108.6	45 01.7	+57.3	109.5	44 41.2	+57.7	110.5	44 19.8	+58.1	111.4	43 57.5	+58.4	112.3	43 34.3	+58.7	113.2	43 10.3	+59.0	114.0	42 45.5	+59.2	114.9	39
40	46 18.2	+56.7	108.1	45 59.0	+57.2	109.1	45 38.9	+57.6	110.1	45 17.9	+58.0	111.0	44 55.9	+58.3	112.0	44 33.0	+58.7	112.9	44 09.3	+58.9	113.8	43 44.7	+59.1	114.6	40
41	47 14.9	+56.7	107.6	46 56.2	+57.2	108.7	46 36.5	+57.6	109.7	46 15.9	+57.9	110.7	45 54.2	+58.3	111.6	45 31.7	+58.6	112.6	45 08.2	+58.9	113.5	44 43.8	+59.2	114.4	41
42	48 11.6	+56.5	107.1	47 53.4	+57.0	108.2	47 34.1	+57.4	109.2	47 13.8	+57.9	110.3	46 52.5	+58.2	111.3	46 30.3	+58.5	112.3	46 07.1	+58.8	113.2	45 43.0	+59.1	114.2	42
43	49 08.1	+56.4	106.6	48 50.4	+56.8	107.7	48 31.5	+57.4	108.8	48 11.7	+57.7	109.9	47 50.7	+58.2	110.9	47 28.8	+58.5	111.9	47 05.9	+58.8	112.9	46 42.1	+59.0	113.9	43
44	50 04.5	+56.2	106.1	49 47.2	+56.8	107.2	49 28.9	+57.2	108.4	49 09.4	+57.7	109.5	48 48.9	+58.1	110.5	48 27.3	+58.5	111.6	48 04.7	+58.8	112.6	47 41.1	+59.1	113.7	44
45	51 00.7	+56.0	105.6	50 44.0	+56.6	106.7	50 26.1	+57.2	107.9	50 07.1	+57.6	109.0	49 47.0	+58.0	110.2	49 25.8	+58.3	111.3	49 03.5	+58.7	112.3	48 40.2	+59.0	113.4	45
46	51 56.7	+55.9	105.0	51 40.6	+56.5	106.2	51 23.3	+57.0	107.4	51 04.7	+57.5	108.6	50 45.0	+57.9	109.8	50 24.1	+58.3	110.9	50 02.2	+58.6	112.0	49 39.2	+58.9	113.1	46
47	52 52.6	+55.7	104.4	52 37.1	+56.3	105.7	52 20.3	+56.8	106.9	52 02.2	+57.4	108.1	51 42.9	+57.8	109.3	51 22.4	+58.3	110.5	51 00.8	+58.6	111.7	50 38.1	+58.9	112.8	47
48	53 48.3	+55.5	103.8	53 33.4	+56.1	105.1	53 17.1	+56.7	106.4	52 59.6	+57.2	107.7	52 40.7	+57.8	108.9	52 20.7	+58.1	110.1	51 59.4	+58.5	111.3	51 37.0	+58.9	112.5	48
49	54 43.8	+55.3	103.1	54 29.5	+56.0	104.5	54 13.8	+56.6	105.8	53 56.8	+57.1	107.2	53 38.5	+57.6	108.5	53 18.8	+58.1	109.7	52 57.9	+58.5	111.0	52 35.9	+58.8	112.2	49
50	55 39.1	+55.1	102.4	55 25.5	+55.7	103.9	55 10.4	+56.4	105.3	54 53.9	+57.0	106.6	54 36.1	+57.5	108.0	54 16.9	+58.0	109.3	53 56.4	+58.4	110.6	53 34.7	+58.7	111.9	50
51	56 34.2	+54.8	101.7	56 21.2	+55.5	103.2	56 06.8	+56.2	104.6	55 50.9	+56.8	106.1	55 33.6	+57.3	107.5	55 14.9	+57.8	108.9	54 54.8	+58.3	110.2	54 33.4	+58.7	111.5	51
52	57 29.0	+54.5	101.0	57 16.7	+55.3	102.5	57 03.0	+56.0	104.0	56 47.7	+56.7	105.5	56 30.9	+57.3	107.0	56 12.7	+57.8	108.4	55 53.1	+58.2	109.8	55 32.1	+58.6	111.2	52
53	58 23.5	+54.2	100.2	58 12.0	+55.1	101.8	57 59.0	+55.8	103.3	57 44.4	+56.4	104.9	57 28.2	+57.0	106.4	57 10.5	+57.6	107.9	56 51.3	+58.1	109.4	56 30.7	+58.6	110.8	53
54	59 17.7	+53.8	99.4	59 07.1	+54.7	101.0	58 54.8	+55.5	102.6	58 40.8	+56.3	104.2	58 25.2	+57.0	105.8	58 08.1	+57.5	107.4	57 49.4	+58.0	108.9	57 29.3	+58.4	110.4	54
55	60 11.5	+53.5	98.5	60 01.8	+54.4	100.2	59 50.3	+55.3	101.9	59 37.1	+56.0	103.6	59 22.2	+56.7	105.2	59 05.6	+57.4	106.8	58 47.4	+57.9	108.4	58 27.7	+58.4	110.0	55
56	61 05.0	+53.2	97.6	60 56.2	+54.1	99.3	60 45.6	+54.9	101.1	60 33.1	+55.8	102.9	60 18.9	+56.5	104.6	60 03.0	+57.1	106.2	59 45.3	+57.8	107.9	59 26.1	+58.3	109.5	56
57	61 58.2	+52.6	96.6	61 50.3	+53.7	98.4	61 40.5	+54.7	100.3	61 28.9	+55.5	102.1	61 15.4	+56.3	103.9	61 00.1	+57.0	105.6	60 43.1	+57.6	107.4	60 24.4	+58.1	109.0	57
58	62 50.8	+52.2	95.6	62 44.0	+53.3	97.5	62 35.2	+54.3	99.4	62 24.4	+55.3	101.3	62 11.7	+56.1	103.1	61 57.1	+56.9	105.0	61 40.7	+57.5	106.8	61 22.5	+58.1	108.5	58
59	63 43.0	+51.7	94.5	63 37.3	+52.8	96.5	63 29.5	+53.9	98.5	63 19.7	+54.9	100.4	63 07.8	+55.8	102.4	62 54.0	+56.6	104.3	62 38.2	+57.3	106.2	62 20.6	+57.9	108.0	59
60	64 34.7	+51.0	93.3	64 30.1	+52.3	95.4	64 23.4	+53.5	97.5	64 14.6	+54.5	99.5	64 03.6	+55.5	101.5	63 50.6	+56.3	103.5	63 35.5	+57.1	105.5	63 18.5	+57.8	107.4	60
61	65 25.7	+50.4	92.0	65 22.4	+51.8	94.2	65 16.9	+53.0	96.4	65 09.1	+54.1	98.5	64 59.1	+55.1	100.7	64 46.9	+56.1	102.7	64 32.6	+56.9	104.8	64 16.3	+57.6	106.8	61
62	66 16.1	+49.7	90.7	66 14.2	+51.1	93.0	66 09.9	+52.4	95.3	66 03.2	+53.7	97.5	65 54.2	+54.8	99.7	65 43.0	+55.8	101.9	65 29.5	+56.7	104.0	65 13.9	+57.4	106.2	62
63	67 05.8	+48.9	89.3	67 05.3	+50.4	91.7	67 02.3	+51.9	94.0	66 56.9	+53.1	96.4	66 49.0	+54.4	98.7	66 38.8	+55.4	101.0	66 26.2	+56.3	103.2	66 11.3	+57.2	105.4	63
64	67 54.7	+48.0	87.8	67 55.7	+49.6	90.2	67 54.2	+51.1	92.7	67 50.0	+52.6	95.2	67 43.4	+53.9	97.6	67 34.2	+55.0	100.0	67 22.5	+56.1	102.4	67 08.5	+57.0	104.7	64
65	68 42.7	+46.9	86.2	68 45.3	+48.8	88.7	68 45.3	+50.4	91.3	68 42.6	+52.0	93.9	68 37.3	+53.3	96.4	68 29.2	+54.6	98.9	68 18.6	+55.8	101.4	68 05.5	+56.7	103.9	65
66	69 29.6	+45.9	84.4	69 34.1	+47.7	87.1	69 35.7	+49.6	89.8	69 34.6	+51.2	92.5	69 30.6	+52.7	95.1	69 23.8	+54.1	97.8	69 14.4	+55.3	100.4	69 02.2	+56.4	103.0	66
67	70 15.5	+44.6	82.5	70 21.8	+46.7	85.3	70 25.3	+48.5	88.1	70 25.8	+50.3	90.9	70 23.3	+52.1	93.7	70 17.9	+53.6	96.5	70 09.7	+54.9	99.3	69 58.6	+56.1	102.0	67
68	71 00.1	+43.2	80.5	71 08.5	+45.3	83.4	71 13.8	+47.5	86.3	71 16.1	+49.5	89.3	71 15.4	+51.2	92.2	71 11.5	+52.9	95.2	71 04.6	+54.3	98.1	70 54.7	+55.6	100.9	68
69	71 43.3	+41.5	78.3	71 53.8	+44.0	81.3	72 01.3	+46.2	84.4	72 05.6	+48.3	87.5	72 06.6	+50.3	90.6	72 04.4	+52.1	93.7	71 58.9	+53.8	96.7	71 50.3	+55.2	99.8	69
70	72 24.8	+39.9	76.0	72 37.8	+42.3	79.1	72 47.5	+44.7	82.3	72 53.9	+47.0	85.5	72 56.9	+49.2	88.8	72 56.5	+51.2	92.0	72 52.7	+53.0	95.3	72 45.5	+54.6	98.5	70
71	73 04.7	*+37.8*•	73.5	73 20.1	+40.5	76.7	73 32.2	+43.2	80.0	73 40.9	+45.7	83.3	73 46.1	+48.0	86.8	73 47.7	+50.2	90.2	73 45.7	+52.2	93.6	73 40.1	+54.0	97.0	71
72	73 42.5	*+35.5*•	70.8	74 00.6	*+38.4*•	74.1	74 15.4	*+41.2*•	77.5	74 26.6	+43.9	81.0	74 34.1	+46.6	84.6	74 37.9	+49.0	88.2	74 37.9	+51.3	91.8	74 34.1	+53.3	95.4	72
73	74 18.0	*+33.1*•	67.8	74 39.0	*+36.1*•	71.2	74 56.6	*+39.1*•	74.7	75 10.5	*+42.1*•	78.4	75 20.7	+44.9	82.1	75 26.9	+47.6	85.9	75 29.2	+50.0	89.8	75 27.4	+52.3	93.7	73
74	74 51.1	*+30.2*•	64.7	75 15.1	*+33.4*•	68.1	75 35.7	*+36.6*•	71.7	75 52.6	*+39.8*•	75.5	76 05.6	*+42.9*•	79.4	76 14.5	+45.9	83.5	76 19.2	+48.7	87.5	76 19.7	+51.2	91.6	74
75	75 21.3	*+27.2*•	61.3	75 48.5	*+30.5*•	64.8	76 12.3	*+33.8*•	68.5	76 32.4	*+37.3*•	72.4	76 48.5	*+40.7*•	76.5	77 00.4	*+44.0*•	80.7	77 07.9	+47.1	85.0	77 10.9	+49.9	89.4	75
76	75 48.5	*+23.8*•	57.8	76 19.0	*+27.1*•	61.2	76 46.1	*+30.7*•	65.0	77 09.7	*+34.2*•	68.9	77 29.2	*+37.9*•	73.1	77 44.4	*+41.5*•	77.5	77 55.0	*+45.0*•	82.1	78 00.8	+48.2	86.8	76
77	76 12.3	*+20.1*•	54.0	76 46.1	*+23.6*•	57.4	77 16.8	*+27.1*•	61.1	77 43.9	*+30.9*•	65.2	78 07.1	*+34.8*•	69.5	78 25.9	*+38.7*•	74.1	78 40.0	*+42.5*•	78.9	78 49.0	*+46.2*•	83.8	77
78	76 32.4	*+16.1*•	50.0	77 09.7	*+19.5*•	53.3	77 43.9	*+23.2*•	57.0	78 14.8	*+27.1*•	61.0	78 41.9	*+31.1*•	65.4	79 04.6	*+35.4*•	70.1	79 22.5	*+39.6*•	75.2	79 35.2	*+43.8*•	80.4	78
79	76 48.5	*+11.9*•	45.8	77 29.2	*+15.2*•	49.0	78 07.1	*+18.8*•	52.6	78 41.9	*+22.7*•	56.6	79 13.0	*+27.0*•	61.0	79 40.0	*+31.4*•	65.7	80 02.1	*+36.0*•	70.9	80 19.0	*+40.6*•	76.5	79
80	77 00.4	*+7.5*•	41.5	77 44.4	*+10.6*•	44.5	78 25.9	*+14.1*•	47.9	79 04.6	*+17.9*•	51.8	79 40.0	*+22.1*•	56.1	80 11.4	*+26.7*•	60.9	80 38.1	*+31.7*•	66.2	80 59.6	*+36.8*•	72.0	80
81	77 07.9	*+3.0*•	37.0	77 55.0	*+5.8*•	39.8	78 40.0	*+9.0*•	43.0	79 22.5	*+12.7*•	46.7	80 02.1	*+16.9*•	50.8	80 38.1	*+21.5*•	55.5	81 09.8	*+26.6*•	60.8	81 36.4	*+32.0*•	66.7	81
82	77 10.9	*−1.7*•	32.5	78 00.8	*+0.9*•	35.1	78 49.0	*+3.8*•	38.0	79 35.2	*+7.2*•	41.3	80 19.0	*+11.0*•	45.2	80 59.6	*+15.5*•	49.6	81 36.4	*+20.6*•	54.8	82 08.4	*+26.3*•	60.7	82
83	77 09.2	*−6.2*•	28.0	78 01.7	*−4.1*•	30.2	78 52.8	*−1.5*•	32.8	79 42.4	*+1.5*•	35.8	80 30.0	*+4.9*•	39.3	81 15.1	*+9.0*•	43.4	81 57.0	*+13.8*•	48.2	82 34.7	*+19.4*•	54.0	83
84	77 03.0	*−10.6*•	23.6	77 57.6	*−8.8*•	25.4	78 51.3	*−6.7*•	27.6	79 43.9	*−4.3*•	30.2	80 34.9	*−1.3*•	33.2	81 24.1	*+2.2*•	36.8	82 10.8	*+6.4*•	41.2	82 54.1	*+11.6*•	46.5	84
85	76 52.4	*−15.0*•	19.2	77 48.8	*−13.6*•	20.7	78 44.6	*−11.9*•	22.5	79 39.6	*−10.0*•	24.6	80 33.6	*−7.6*•	27.1	81 26.3	*−4.8*•	30.1	82 17.2	*−1.3*•	33.8	83 05.7	*+3.1*•	38.4	85
86	76 37.4	*−19.0*•	15.0	77 35.2	*−17.9*•	16.2	78 32.7	*−16.8*•	17.5	79 29.6	*−15.3*•	19.1	80 26.0	*−13.7*•	21.1	81 21.5	*−11.5*•	23.4	82 15.9	*−8.8*•	26.4	83 08.8	*−5.5*•	30.1	86
87	76 18.4	*−22.7*•	10.9	77 17.3	*−22.1*•	11.8	78 15.9	*−21.3*•	12.7	79 14.3	*−20.4*•	13.9	80 12.3	*−19.2*•	15.3	81 10.0	*−17.8*•	17.0	82 07.1	*−16.1*•	19.1	83 03.3	*−13.9*•	21.8	87
88	75 55.7	*−26.3*•	7.1	76 55.2	*−25.9*•	7.6	77 54.6	*−25.4*•	8.2	78 53.9	*−24.9*•	8.9	79 53.1	*−24.3*•	9.8	80 52.2	*−23.6*•	10.9	81 51.0	*−22.7*•	12.2	82 49.4	*−21.4*•	13.9	88
89	75 29.4	*−29.4*•	3.4	76 29.3	*−29.3*•	3.7	77 29.2	*−29.2*•	4.0	78 29.0	*−29.0*•	4.3	79 28.8	*−28.8*•	4.7	80 28.6	*−28.6*•	5.2	81 28.3	*−28.3*•	5.8	82 28.0	*−28.0*•	6.6	89
90	75 00.0	*−32.3*•	0.0	76 00.0	*−32.4*•	0.0	77 00.0	*−32.5*•	0.0	78 00.0	*−32.6*•	0.0	79 00.0	*−32.8*•	0.0	80 00.0	*−33.0*•	0.0	81 00.0	*−33.2*•	0.0	82 00.0	*−33.5*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

59°, 301° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 59°, 301°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 39.6	–58.5	120.1	7 09.5	–58.7	120.2	6 39.2	–58.9	120.3	6 08.8	–59.0	120.4	5 38.4	–59.2	120.5	5 07.9	–59.4	120.6	4 37.3	–59.5	120.7	4 06.6	–59.5	120.8	**0**
1	6 41.1	–58.4	120.4	6 10.8	–58.7	120.5	5 40.3	–58.8	120.5	5 09.8	–59.0	120.6	4 39.2	–59.2	120.7	4 08.5	–59.3	120.8	3 37.8	–59.4	120.8	3 07.1	–59.6	120.9	**1**
2	5 42.7	–58.5	120.6	5 12.1	–58.7	120.7	4 41.5	–58.9	120.7	4 10.8	–59.1	120.8	3 40.0	–59.2	120.9	3 09.2	–59.3	120.9	2 38.4	–59.5	121.0	2 07.5	–59.6	121.0	**2**
3	4 44.2	–58.5	120.8	4 13.4	–58.7	120.9	3 42.6	–58.9	120.9	3 11.7	–59.0	121.0	2 40.8	–59.2	121.0	2 09.9	–59.3	121.1	1 38.9	–59.4	121.1	1 07.9	–59.6	121.1	**3**
4	3 45.7	–58.5	121.0	3 14.7	–58.7	121.1	2 43.7	–58.8	121.1	2 12.7	–59.0	121.2	1 41.6	–59.2	121.2	1 10.6	–59.4	121.2	0 39.5	–59.5	121.2	0 08.3	–59.5	121.2	**4**
5	2 47.2	–58.5	121.2	2 16.0	–58.7	121.3	1 44.9	–58.9	121.3	1 13.7	–59.1	121.3	0 42.4	–59.2	121.4	0 11.2	–59.3	121.4	0 20.0	+59.5	58.6	0 51.2	+59.6	58.6	**5**
6	1 48.7	–58.5	121.5	1 17.3	–58.7	121.5	0 46.0	–58.9	121.5	0 14.6	–59.0	121.5	0 16.8	+59.1	58.5	0 48.1	+59.3	58.5	1 19.5	+59.4	58.5	1 50.8	+59.6	58.5	**6**
7	0 50.2	–58.5	121.7	0 18.6	–58.7	121.7	0 12.9	+58.9	58.3	0 44.4	+59.1	58.3	1 15.9	+59.2	58.3	1 47.4	+59.4	58.3	2 18.9	+59.5	58.4	2 50.4	+59.5	58.4	**7**
8	0 08.3	+58.5	58.1	0 40.1	+58.7	58.1	1 11.8	+58.8	58.1	1 43.5	+59.0	58.1	2 15.1	+59.2	58.2	2 46.8	+59.3	58.2	3 18.4	+59.4	58.2	3 49.9	+59.6	58.3	**8**
9	1 06.8	+58.5	57.9	1 38.8	+58.6	57.9	2 10.6	+58.9	57.9	2 42.5	+59.0	57.9	3 14.3	+59.2	58.0	3 46.1	+59.3	58.0	4 17.8	+59.5	58.1	4 49.5	+59.6	58.2	**9**
10	2 05.3	+58.6	57.6	2 37.4	+58.7	57.7	3 09.5	+58.9	57.7	3 41.5	+59.1	57.8	4 13.5	+59.2	57.8	4 45.4	+59.4	57.9	5 17.3	+59.4	58.0	5 49.1	+59.5	58.1	**10**
11	3 03.9	+58.5	57.4	3 36.1	+58.7	57.5	4 08.4	+58.8	57.5	4 40.6	+59.0	57.6	5 12.7	+59.2	57.7	5 44.8	+59.3	57.7	6 16.7	+59.5	57.8	6 48.6	+59.6	57.9	**11**
12	4 02.4	+58.4	57.2	4 34.8	+58.7	57.3	5 07.2	+58.9	57.3	5 39.6	+59.0	57.4	6 11.9	+59.2	57.5	6 44.1	+59.3	57.6	7 16.2	+59.4	57.7	7 48.2	+59.6	57.8	**12**
13	5 00.8	+58.5	57.0	5 33.5	+58.7	57.0	6 06.1	+58.9	57.1	6 38.6	+59.1	57.2	7 11.1	+59.1	57.3	7 43.4	+59.3	57.4	8 15.6	+59.5	57.6	8 47.8	+59.5	57.7	**13**
14	5 59.3	+58.5	56.7	6 32.2	+58.7	56.8	7 05.0	+58.8	56.9	7 37.7	+59.0	57.0	8 10.2	+59.2	57.2	8 42.7	+59.3	57.3	9 15.1	+59.4	57.4	9 47.3	+59.6	57.6	**14**
15	6 57.8	+58.5	56.5	7 30.9	+58.6	56.6	8 03.8	+58.9	56.7	8 36.7	+59.0	56.9	9 09.4	+59.2	57.0	9 42.0	+59.3	57.1	10 14.5	+59.5	57.3	10 46.9	+59.5	57.4	**15**
16	7 56.3	+58.5	56.3	8 29.5	+58.7	56.4	9 02.7	+58.8	56.5	9 35.7	+59.0	56.7	10 08.6	+59.1	56.8	10 41.3	+59.3	57.0	11 14.0	+59.4	57.1	11 46.4	+59.6	57.3	**16**
17	8 54.8	+58.4	56.1	9 28.2	+58.7	56.2	10 01.5	+58.9	56.3	10 34.7	+59.0	56.5	11 07.7	+59.2	56.7	11 40.6	+59.3	56.8	12 13.4	+59.4	57.0	12 46.0	+59.5	57.2	**17**
18	9 53.2	+58.5	55.8	10 26.9	+58.6	56.0	11 00.4	+58.8	56.1	11 33.7	+59.0	56.3	12 06.9	+59.2	56.5	12 39.9	+59.3	56.7	13 12.8	+59.5	56.9	13 45.5	+59.6	57.1	**18**
19	10 51.7	+58.4	55.6	11 25.5	+58.6	55.8	11 59.2	+58.8	55.9	12 32.7	+59.0	56.1	13 06.1	+59.1	56.3	13 39.2	+59.3	56.5	14 12.3	+59.4	56.7	14 45.1	+59.5	56.9	**19**
20	11 50.1	+58.5	55.4	12 24.1	+58.7	55.6	12 58.0	+58.8	55.7	13 31.7	+59.0	55.9	14 05.2	+59.1	56.1	14 38.5	+59.3	56.4	15 11.7	+59.4	56.6	15 44.6	+59.6	56.8	**20**
21	12 48.6	+58.4	55.2	13 22.8	+58.6	55.3	13 56.8	+58.8	55.5	14 30.7	+58.9	55.8	15 04.3	+59.2	56.0	15 37.8	+59.3	56.2	16 11.1	+59.4	56.4	16 44.2	+59.5	56.7	**21**
22	13 47.0	+58.4	54.9	14 21.4	+58.6	55.1	14 55.6	+58.8	55.3	15 29.6	+59.0	55.6	16 03.5	+59.1	55.8	16 37.1	+59.3	56.0	17 10.5	+59.4	56.3	17 43.7	+59.5	56.6	**22**
23	14 45.4	+58.4	54.7	15 20.0	+58.6	54.9	15 54.4	+58.8	55.1	16 28.6	+58.9	55.4	17 02.6	+59.1	55.6	17 36.4	+59.2	55.9	18 09.9	+59.4	56.1	18 43.2	+59.5	56.4	**23**
24	15 43.8	+58.4	54.4	16 18.6	+58.6	54.7	16 53.2	+58.7	54.9	17 27.5	+59.0	55.2	18 01.7	+59.1	55.4	18 35.6	+59.3	55.7	19 09.3	+59.4	56.0	19 42.7	+59.5	56.3	**24**
25	16 42.2	+58.3	54.2	17 17.2	+58.5	54.4	17 51.9	+58.8	54.7	18 26.5	+58.9	55.0	19 00.8	+59.1	55.3	19 34.9	+59.2	55.5	20 08.7	+59.4	55.8	20 42.2	+59.6	56.1	**25**
26	17 40.5	+58.4	54.0	18 15.7	+58.6	54.2	18 50.7	+58.7	54.5	19 25.4	+58.9	54.8	19 59.9	+59.1	55.1	20 34.1	+59.2	55.4	21 08.1	+59.3	55.7	21 41.8	+59.5	56.0	**26**
27	18 38.9	+58.3	53.7	19 14.3	+58.5	54.0	19 49.4	+58.7	54.3	20 24.3	+58.9	54.6	20 59.0	+59.0	54.9	21 33.3	+59.3	55.2	22 07.4	+59.4	55.5	22 41.3	+59.4	55.9	**27**
28	19 37.2	+58.3	53.5	20 12.8	+58.5	53.8	20 48.1	+58.7	54.1	21 23.2	+58.9	54.4	21 58.0	+59.1	54.7	22 32.6	+59.2	55.0	23 06.8	+59.4	55.4	23 40.7	+59.5	55.7	**28**
29	20 35.5	+58.3	53.2	21 11.3	+58.5	53.5	21 46.8	+58.7	53.8	22 22.1	+58.9	54.2	22 57.1	+59.0	54.5	23 31.8	+59.2	54.9	24 06.2	+59.3	55.2	24 40.2	+59.5	55.6	**29**
30	21 33.8	+58.2	53.0	22 09.8	+58.4	53.3	22 45.5	+58.7	53.6	23 21.0	+58.8	54.0	23 56.1	+59.0	54.3	24 31.0	+59.2	54.7	25 05.5	+59.3	55.1	25 39.7	+59.5	55.4	**30**
31	22 32.0	+58.3	52.7	23 08.2	+58.5	53.0	23 44.2	+58.6	53.4	24 19.8	+58.8	53.7	24 55.1	+59.1	54.1	25 30.2	+59.1	54.5	26 04.8	+59.4	54.9	26 39.2	+59.4	55.3	**31**
32	23 30.3	+58.2	52.4	24 06.7	+58.4	52.8	24 42.8	+58.6	53.2	25 18.6	+58.9	53.5	25 54.2	+58.9	53.9	26 29.3	+59.2	54.3	27 04.2	+59.3	54.7	27 38.6	+59.5	55.1	**32**
33	24 28.5	+58.1	52.2	25 05.1	+58.4	52.5	25 41.4	+58.6	52.9	26 17.5	+58.8	53.3	26 53.1	+59.0	53.7	27 28.5	+59.1	54.1	28 03.5	+59.3	54.5	28 38.1	+59.4	55.0	**33**
34	25 26.6	+58.2	51.9	26 03.5	+58.4	52.3	26 40.0	+58.6	52.7	27 16.3	+58.7	53.1	27 52.1	+59.0	53.5	28 27.6	+59.2	53.9	29 02.8	+59.2	54.4	29 37.5	+59.4	54.8	**34**
35	26 24.8	+58.1	51.6	27 01.9	+58.3	52.0	27 38.6	+58.6	52.4	28 15.0	+58.8	52.9	28 51.1	+58.9	53.3	29 26.8	+59.1	53.7	30 02.0	+59.3	54.2	30 36.9	+59.5	54.7	**35**
36	27 22.9	+58.1	51.3	28 00.2	+58.3	51.8	28 37.2	+58.5	52.2	29 13.8	+58.7	52.6	29 50.0	+58.9	53.1	30 25.9	+59.1	53.5	31 01.3	+59.3	54.0	31 36.4	+59.4	54.5	**36**
37	28 21.0	+58.0	51.1	28 58.5	+58.3	51.5	29 35.7	+58.5	51.9	30 12.5	+58.7	52.4	30 48.9	+58.9	52.9	31 25.0	+59.0	53.3	32 00.6	+59.2	53.8	32 35.8	+59.4	54.3	**37**
38	29 19.0	+58.0	50.8	29 56.8	+58.2	51.2	30 34.2	+58.4	51.7	31 11.2	+58.7	52.1	31 47.8	+58.9	52.6	32 24.0	+59.1	53.1	32 59.8	+59.2	53.6	33 35.2	+59.3	54.2	**38**
39	30 17.0	+58.0	50.5	30 55.0	+58.2	50.9	31 32.6	+58.5	51.4	32 09.9	+58.6	51.9	32 46.7	+58.8	52.4	33 23.1	+59.0	52.9	33 59.0	+59.2	53.5	34 34.5	+59.4	54.0	**39**
40	31 15.0	+57.9	50.2	31 53.2	+58.2	50.7	32 31.1	+58.4	51.1	33 08.5	+58.6	51.6	33 45.5	+58.8	52.2	34 22.1	+59.0	52.7	34 58.2	+59.2	53.3	35 33.9	+59.3	53.8	**40**
41	32 12.9	+57.9	49.9	32 51.4	+58.1	50.4	33 29.5	+58.3	50.9	34 07.1	+58.6	51.4	34 44.3	+58.8	51.9	35 21.1	+59.0	52.5	35 57.4	+59.2	53.1	36 33.2	+59.4	53.6	**41**
42	33 10.8	+57.8	49.6	33 49.5	+58.1	50.1	34 27.8	+58.3	50.6	35 05.7	+58.5	51.1	35 43.1	+58.8	51.7	36 20.1	+58.9	52.3	36 56.6	+59.1	52.8	37 32.6	+59.3	53.5	**42**
43	34 08.6	+57.8	49.2	34 47.6	+58.0	49.8	35 26.1	+58.3	50.3	36 04.2	+58.5	50.9	36 41.9	+58.7	51.4	37 19.0	+59.0	52.0	37 55.7	+59.1	52.6	38 31.9	+59.2	53.3	**43**
44	35 06.4	+57.7	48.9	35 45.6	+58.0	49.5	36 24.4	+58.2	50.0	37 02.7	+58.5	50.6	37 40.6	+58.7	51.2	38 18.0	+58.9	51.8	38 54.8	+59.1	52.4	39 31.1	+59.3	53.1	**44**
45	36 04.1	+57.7	48.6	36 43.6	+57.9	49.1	37 22.6	+58.2	49.7	38 01.2	+58.4	50.3	38 39.3	+58.6	50.9	39 16.9	+58.8	51.5	39 53.9	+59.1	52.2	40 30.4	+59.3	52.9	**45**
46	37 01.8	+57.6	48.2	37 41.5	+57.9	48.8	38 20.8	+58.1	49.4	38 59.6	+58.4	50.0	39 37.9	+58.6	50.6	40 15.7	+58.9	51.3	40 53.0	+59.0	52.0	41 29.7	+59.2	52.7	**46**
47	37 59.4	+57.5	47.9	38 39.4	+57.8	48.5	39 18.9	+58.1	49.1	39 58.0	+58.3	49.7	40 36.5	+58.6	50.4	41 14.6	+58.7	51.0	41 52.0	+59.0	51.7	42 28.9	+59.2	52.4	**47**
48	38 56.9	+57.5	47.5	39 37.2	+57.8	48.1	40 17.0	+58.0	48.8	40 56.3	+58.3	49.4	41 35.1	+58.5	50.1	42 13.3	+58.8	50.8	42 51.0	+59.0	51.5	43 28.1	+59.2	52.2	**48**
49	39 54.4	+57.4	47.1	40 35.0	+57.7	47.8	41 15.0	+58.0	48.4	41 54.6	+58.2	49.1	42 33.6	+58.5	49.8	43 12.1	+58.7	50.5	43 50.0	+58.9	51.2	44 27.3	+59.1	52.0	**49**
50	40 51.8	+57.3	46.8	41 32.7	+57.6	47.4	42 13.0	+57.9	48.1	42 52.8	+58.2	48.8	43 32.1	+58.4	49.5	44 10.8	+58.7	50.2	44 48.9	+58.9	51.0	45 26.4	+59.1	51.7	**50**
51	41 49.1	+57.3	46.4	42 30.3	+57.5	47.0	43 10.9	+57.8	47.7	43 51.0	+58.1	48.4	44 30.5	+58.4	49.1	45 09.5	+58.6	49.9	45 47.8	+58.9	50.7	46 25.5	+59.1	51.5	**51**
52	42 46.4	+57.1	46.0	43 27.8	+57.5	46.6	44 08.7	+57.8	47.3	44 49.1	+58.1	48.1	45 28.9	+58.3	48.8	46 08.1	+58.6	49.6	46 46.7	+58.8	50.4	47 24.6	+59.0	51.2	**52**
53	43 43.5	+57.1	45.5	44 25.3	+57.3	46.2	45 06.5	+57.7	47.0	45 47.2	+57.9	47.7	46 27.2	+58.3	48.5	47 06.7	+58.5	49.3	47 45.5	+58.8	50.1	48 23.6	+59.0	51.0	**53**
54	44 40.6	+56.9	45.1	45 22.6	+57.3	45.8	46 04.2	+57.6	46.6	46 45.1	+57.9	47.3	47 25.5	+58.2	48.1	48 05.2	+58.5	49.0	48 44.3	+58.7	49.8	49 22.6	+59.0	50.7	**54**
55	45 37.5	+56.9	44.7	46 19.9	+57.2	45.4	47 01.8	+57.5	46.2	47 43.0	+57.8	47.0	48 23.7	+58.1	47.8	49 03.7	+58.4	48.6	49 43.0	+58.7	49.5	50 21.6	+58.9	50.4	**55**
56	46 34.4	+56.7	44.2	47 17.1	+57.1	45.0	47 59.3	+57.4	45.7	48 40.8	+57.8	46.5	49 21.8	+58.0	47.4	50 02.1	+58.3	48.3	50 41.7	+58.6	49.2	51 20.5	+58.9	50.1	**56**
57	47 31.1	+56.6	43.7	48 14.2	+56.9	44.5	48 56.7	+57.3	45.3	49 38.6	+57.6	46.1	50 19.8	+58.0	47.0	51 00.4	+58.3	47.9	51 40.3	+58.5	48.8	52 19.4	+58.8	49.8	**57**
58	48 27.7	+56.5	43.2	49 11.1	+56.9	44.0	49 54.0	+57.2	44.8	50 36.2	+57.5	45.7	51 17.8	+57.8	46.6	51 58.7	+58.1	47.5	52 38.8	+58.5	48.5	53 18.2	+58.8	49.5	**58**
59	49 24.2	+56.3	42.7	50 08.0	+56.7	43.5	50 51.2	+57.0	44.4	51 33.7	+57.5	45.2	52 15.6	+57.8	46.2	52 56.8	+58.1	47.1	53 37.3	+58.4	48.1	54 17.0	+58.7	49.1	**59**
60	50 20.5	+56.2	42.2	51 04.7	+56.5	43.0	51 48.2	+57.0	43.9	52 31.2	+57.3	44.8	53 13.4	+57.7	45.7	53 54.9	+58.0	46.7	54 35.7	+58.3	47.7	55 15.7	+58.6	48.8	**60**
61	51 16.7	+56.0	41.6	52 01.2	+56.5	42.5	52 45.2	+56.8	43.4	53 28.5	+57.2	44.3	54 11.1	+57.5	45.2	54 52.9	+57.9	46.3	55 34.0	+58.3	47.3	56 14.3	+58.6	48.4	**61**
62	52 12.7	+55.8	41.1	52 57.7	+56.2	41.9	53 42.0	+56.6	42.8	54 25.7	+57.0	43.8	55 08.6	+57.5	44.8	55 50.8	+57.8	45.8	56 32.3	+58.1	46.9	57 12.9	+58.5	48.0	**62**
63	53 08.5	+55.7	40.4	53 53.9	+56.1	41.3	54 38.6	+56.5	42.3	55 22.7	+56.9	43.2	56 06.1	+57.2	44.2	56 48.6	+57.7	45.3	57 30.4	+58.1	46.4	58 11.4	+58.4	47.6	**63**
64	54 04.2	+55.4	39.8	54 50.0	+55.8	40.7	55 35.1	+56.3	41.7	56 19.6	+56.7	42.7	57 03.3	+57.2	43.7	57 46.3	+57.6	44.8	58 28.5	+57.9	45.9	59 09.8	+58.3	47.1	**64**
65	54 59.6	+55.2	39.2	55 45.8	+55.7	40.1	56 31.4	+56.1	41.1	57 16.3	+56.6	42.1	58 00.5	+57.0	43.1	58 43.9	+57.4	44.3	59 26.4	+57.8	45.4	60 08.1	+58.2	46.7	**65**
66	55 54.8	+55.0	38.5	56 41.5	+55.5	39.4	57 27.5	+55.9	40.4	58 12.9	+56.3	41.4	58 57.5	+56.8	42.5	59 41.3	+57.2	43.7	60 24.2	+57.7	44.9	61 06.3	+58.0	46.2	**66**
67	56 49.8	+54.7	37.7	57 37.0	+55.2	38.7	58 23.4	+55.7	39.7	59 09.2	+56.2	40.8	59 54.3	+56.6	41.9	60 38.5	+57.1	43.1	61 21.9	+57.5	44.3	62 04.3	+58.0	45.7	**67**
68	57 44.5	+54.5	37.0	58 32.2	+54.9	38.0	59 19.1	+55.4	39.0	60 05.4	+55.9	40.1	60 50.9	+56.4	41.2	61 35.6	+56.9	42.5	62 19.4	+57.4	43.7	63 02.3	+57.8	45.1	**68**
69	58 39.0	+54.1	36.2	59 27.1	+54.6	37.2	60 14.5	+55.2	38.2	61 01.3	+55.7	39.3	61 47.3	+56.2	40.5	62 32.5	+56.7	41.8	63 16.8	+57.2	43.1	64 00.1	+57.7	44.5	**69**
70	59 33.1	+53.7	35.3	60 21.7	+54.3	36.4	61 09.7	+54.8	37.4	61 57.0	+55.4	38.6	62 43.5	+55.9	39.8	63 29.2	+56.4	41.1	64 14.0	+56.9	42.4	64 57.8	+57.4	43.8	**70**
71	60 26.8	+53.4	34.5	61 16.0	+54.0	35.5	62 04.5	+54.5	36.6	62 52.4	+55.0	37.7	63 39.4	+55.6	39.0	64 25.6	+56.2	40.3	65 10.9	+56.8	41.7	65 55.2	+57.3	43.2	**71**
72	61 20.2	+53.0	33.5	62 10.0	+53.5	34.6	62 59.0	+54.2	35.7	63 47.4	+54.7	36.9	64 35.0	+55.3	38.1	65 21.8	+55.9	39.5	66 07.7	+56.4	40.9	66 52.5	+57.1	42.4	**72**
73	62 13.2	+52.5	32.5	63 03.5	+53.1	33.6	63 53.2	+53.7	34.7	64 42.1	+54.4	35.9	65 30.3	+55.0	37.2	66 17.7	+55.6	38.6	67 04.1	+56.2	40.0	67 49.6	+56.7	41.6	**73**
74	63 05.7	+52.1	31.5	63 56.6	+52.7	32.5	64 46.9	+53.3	33.7	65 36.5	+53.9	34.9	66 25.3	+54.5	36.2	67 13.3	+55.2	37.6	68 00.3	+55.9	39.1	68 46.3	+56.5	40.7	**74**
75	63 57.8	+51.5	30.4	64 49.3	+52.1	31.4	65 40.2	+52.7	32.6	66 30.4	+53.4	33.8	67 19.8	+54.1	35.1	68 08.5	+54.7	36.6	68 56.2	+55.4	38.1	69 42.8	+56.2	39.8	**75**
76	64 49.3	+50.9	29.2	65 41.4	+51.5	30.2	66 32.9	+52.2	31.4	67 23.8	+52.9	32.7	68 13.9	+53.6	34.0	69 03.2	+54.3	35.5	69 51.6	+55.1	37.0	70 39.0	+55.8	38.7	**76**
77	65 40.2	+50.2	27.9	66 32.9	+50.9	29.0	67 25.1	+51.6	30.1	68 16.7	+52.2	31.4	69 07.5	+53.0	32.8	69 57.5	+53.8	34.2	70 46.7	+54.5	35.9	71 34.8	+55.3	37.6	**77**
78	66 30.4	+49.4	26.6	67 23.8	+50.1	27.6	68 16.7	+50.8	28.8	69 08.9	+51.6	30.0	70 00.5	+52.4	31.4	70 51.3	+53.1	32.9	71 41.2	+54.0	34.6	72 30.1	+54.8	36.3	**78**
79	67 19.8	+48.7	25.1	68 13.9	+49.3	26.2	69 07.5	+50.0	27.3	70 00.5	+50.8	28.6	70 52.9	+51.5	30.0	71 44.4	+52.5	31.5	72 35.2	+53.3	33.1	73 24.9	+54.2	35.0	**79**
80	68 08.5	+47.7	23.6	69 03.2	+48.4	24.6	69 57.5	+49.2	25.7	70 51.3	+49.9	27.0	71 44.4	+50.8	28.4	72 36.9	+51.6	29.9	73 28.5	+52.5	31.6	74 19.1	+53.4	33.4	**80**
81	68 56.2	+46.6	21.9	69 51.6	+47.4	22.9	70 46.7	+48.1	24.0	71 41.2	+48.9	25.3	72 35.2	+49.7	26.6	73 28.5	+50.6	28.1	74 21.0	+51.5	29.8	75 12.5	+52.6	31.7	**81**
82	69 42.8	+45.5	20.1	70 39.0	+46.2	21.1	71 34.8	+46.9	22.2	72 30.1	+47.7	23.4	73 24.9	+48.6	24.7	74 19.1	+49.5	26.2	75 12.5	+50.5	27.9	76 05.1	+51.6	29.7	**82**
83	70 28.3	+44.2	18.2	71 25.2	+44.9	19.1	72 21.7	+45.6	20.2	73 17.8	+46.4	21.3	74 13.5	+47.2	22.6	75 08.6	+48.1	24.0	76 03.0	+49.2	25.7	76 56.7	+50.2	27.5	**83**
84	71 12.5	+42.8	16.2	72 10.1	+43.3	17.0	73 07.3	+44.0	18.0	74 04.2	+44.8	19.1	75 00.7	+45.6	20.3	75 56.7	+46.6	21.7	76 52.2	+47.6	23.2	77 46.9	+48.8	25.0	**84**
85	71 55.3	+41.1	13.9	72 53.4	+41.7	14.7	73 51.3	+42.4	15.6	74 49.0	+43.0	16.6	75 46.3	*+43.9*•	17.7	76 43.3	*+44.7*•	19.0	77 39.8	*+45.7*•	20.5	78 35.7	*+46.8*•	22.2	**85**
86	72 36.4	+39.2	11.5	73 35.1	*+39.8*•	12.2	74 33.7	*+40.3*•	13.0	75 32.0	*+41.0*•	13.8	76 30.2	*+41.6*•	14.8	77 28.0	*+42.5*•	16.0	78 25.5	*+43.4*•	17.3	79 22.5	*+44.5*•	18.9	**86**
87	73 15.6	*+37.2*•	9.0	74 14.9	*+37.6*•	9.5	75 14.0	*+38.0*•	10.1	76 13.0	*+38.6*•	10.9	77 11.8	*+39.2*•	11.7	78 10.5	*+39.8*•	12.6	79 08.9	*+40.6*•	13.8	80 07.0	*+41.6*•	15.2	**87**
88	73 52.8	*+34.9*•	6.2	74 52.5	*+35.1*•	6.6	75 52.0	*+35.5*•	7.0	76 51.6	*+35.8*•	7.6	77 51.0	*+36.2*•	8.2	78 50.3	*+36.7*•	8.9	79 49.5	*+37.3*•	9.8	80 48.6	*+37.9*•	10.8	**88**
89	74 27.7	*+32.3*•	3.2	75 27.6	*+32.4*•	3.4	76 27.5	*+32.5*•	3.7	77 27.4	*+32.6*•	3.9	78 27.2	*+32.8*•	4.3	79 27.0	*+33.0*•	4.7	80 26.8	*+33.2*•	5.2	81 26.5	*+33.5*•	5.8	**89**
90	75 00.0	*+29.4*•	0.0	76 00.0	*+29.3*•	0.0	77 00.0	*+29.2*•	0.0	78 00.0	*+29.0*•	0.0	79 00.0	*+28.8*•	0.0	80 00.0	*+28.6*•	0.0	81 00.0	*+28.3*•	0.0	82 00.0	*+28.0*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 121°, 239°

60°, 300° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 26.1	+58.5	119.1	6 56.9	+58.6	119.3	6 27.5	+58.8	119.4	5 58.0	+59.0	119.5	5 28.5	+59.1	119.5	4 58.9	+59.3	119.6	4 29.2	+59.4	119.7	3 59.4	+59.6	119.8	**0**
1	8 24.6	+58.4	118.9	7 55.5	+58.6	119.0	7 26.3	+58.8	119.2	6 57.0	+59.0	119.3	6 27.6	+59.2	119.4	5 58.2	+59.3	119.5	5 28.6	+59.4	119.6	4 59.0	+59.5	119.6	**1**
2	9 23.0	+58.4	118.7	8 54.1	+58.7	118.8	8 25.1	+58.9	119.0	7 56.0	+59.0	119.1	7 26.8	+59.2	119.2	6 57.5	+59.3	119.3	6 28.0	+59.5	119.4	5 58.5	+59.6	119.5	**2**
3	10 21.4	+58.5	118.5	9 52.8	+58.6	118.6	9 24.0	+58.8	118.8	8 55.0	+59.0	118.9	8 26.0	+59.1	119.0	7 56.8	+59.3	119.2	7 27.5	+59.4	119.3	6 58.1	+59.5	119.4	**3**
4	11 19.9	+58.4	118.2	10 51.4	+58.6	118.4	10 22.8	+58.8	118.6	9 54.0	+59.0	118.7	9 25.1	+59.2	118.9	8 56.1	+59.3	119.0	8 26.9	+59.5	119.1	7 57.6	+59.6	119.3	**4**
5	12 18.3	+58.3	118.0	11 50.0	+58.6	118.2	11 21.6	+58.8	118.4	10 53.0	+59.0	118.5	10 24.3	+59.1	118.7	9 55.4	+59.3	118.9	9 26.4	+59.4	119.0	8 57.2	+59.5	119.1	**5**
6	13 16.6	+58.4	117.8	12 48.6	+58.6	118.0	12 20.4	+58.8	118.2	11 52.0	+59.0	118.3	11 23.4	+59.2	118.5	10 54.7	+59.3	118.7	10 25.8	+59.4	118.9	9 56.7	+59.6	119.0	**6**
7	14 15.0	+58.4	117.5	13 47.2	+58.6	117.7	13 19.2	+58.8	118.0	12 51.0	+58.9	118.2	12 22.6	+59.1	118.4	11 54.0	+59.3	118.5	11 25.2	+59.4	118.7	10 56.3	+59.5	118.9	**7**
8	15 13.4	+58.3	117.3	14 45.8	+58.6	117.5	14 18.0	+58.7	117.7	13 49.9	+59.0	118.0	13 21.7	+59.1	118.2	12 53.3	+59.2	118.4	12 24.6	+59.5	118.6	11 55.8	+59.6	118.8	**8**
9	16 11.7	+58.4	117.0	15 44.4	+58.5	117.3	15 16.7	+58.8	117.5	14 48.9	+58.9	117.8	14 20.8	+59.1	118.0	13 52.5	+59.3	118.2	13 24.1	+59.4	118.4	12 55.4	+59.5	118.6	**9**
10	17 10.1	+58.3	116.8	16 42.9	+58.5	117.1	16 15.5	+58.7	117.3	15 47.8	+59.0	117.6	15 19.9	+59.1	117.8	14 51.8	+59.3	118.1	14 23.5	+59.4	118.3	13 54.9	+59.6	118.5	**10**
11	18 08.4	+58.3	116.5	17 41.4	+58.6	116.8	17 14.2	+58.8	117.1	16 46.8	+58.9	117.4	16 19.0	+59.1	117.7	15 51.1	+59.2	117.9	15 22.9	+59.4	118.2	14 54.5	+59.5	118.4	**11**
12	19 06.7	+58.3	116.3	18 40.0	+58.5	116.6	18 13.0	+58.7	116.9	17 45.7	+58.9	117.2	17 18.1	+59.1	117.5	16 50.3	+59.3	117.7	16 22.3	+59.4	118.0	15 54.0	+59.5	118.3	**12**
13	20 05.0	+58.2	116.0	19 38.5	+58.5	116.4	19 11.7	+58.7	116.7	18 44.6	+58.9	117.0	18 17.2	+59.1	117.3	17 49.6	+59.2	117.6	17 21.7	+59.4	117.9	16 53.5	+59.5	118.1	**13**
14	21 03.2	+58.3	115.8	20 37.0	+58.4	116.1	20 10.4	+58.7	116.5	19 43.5	+58.9	116.8	19 16.3	+59.1	117.1	18 48.8	+59.3	117.4	18 21.1	+59.3	117.7	17 53.0	+59.5	118.0	**14**
15	22 01.5	+58.2	115.5	21 35.4	+58.5	115.9	21 09.1	+58.6	116.2	20 42.4	+58.8	116.6	20 15.4	+59.0	116.9	19 48.1	+59.2	117.2	19 20.4	+59.4	117.6	18 52.5	+59.5	117.9	**15**
16	22 59.7	+58.1	115.3	22 33.9	+58.4	115.6	22 07.7	+58.7	116.0	21 41.2	+58.9	116.4	21 14.4	+59.1	116.7	20 47.3	+59.2	117.1	20 19.8	+59.4	117.4	19 52.0	+59.6	117.7	**16**
17	23 57.8	+58.2	115.0	23 32.3	+58.4	115.4	23 06.4	+58.6	115.8	22 40.1	+58.8	116.2	22 13.5	+59.0	116.5	21 46.5	+59.2	116.9	21 19.2	+59.3	117.2	20 51.6	+59.4	117.6	**17**
18	24 56.0	+58.1	114.7	24 30.7	+58.4	115.1	24 05.0	+58.6	115.6	23 38.9	+58.9	116.0	23 12.5	+59.0	116.3	22 45.7	+59.2	116.7	22 18.5	+59.4	117.1	21 51.0	+59.5	117.5	**18**
19	25 54.1	+58.1	114.5	25 29.1	+58.3	114.9	25 03.6	+58.6	115.3	24 37.8	+58.8	115.7	24 11.5	+59.0	116.1	23 44.9	+59.2	116.5	23 17.9	+59.3	116.9	22 50.5	+59.5	117.3	**19**
20	26 52.2	+58.1	114.2	26 27.4	+58.3	114.6	26 02.2	+58.6	115.1	25 36.6	+58.7	115.5	25 10.5	+59.0	115.9	24 44.1	+59.1	116.4	24 17.2	+59.4	116.8	23 50.0	+59.5	117.2	**20**
21	27 50.3	+58.0	113.9	27 25.7	+58.3	114.4	27 00.8	+58.5	114.8	26 35.3	+58.8	115.3	26 09.5	+59.0	115.7	25 43.2	+59.2	116.2	25 16.6	+59.3	116.6	24 49.5	+59.5	117.0	**21**
22	28 48.3	+58.0	113.6	28 24.0	+58.3	114.1	27 59.3	+58.5	114.6	27 34.1	+58.7	115.1	27 08.5	+58.9	115.5	26 42.4	+59.1	116.0	26 15.9	+59.3	116.4	25 49.0	+59.4	116.9	**22**
23	29 46.3	+57.9	113.3	29 22.3	+58.2	113.8	28 57.8	+58.5	114.3	28 32.8	+58.8	114.8	28 07.4	+58.9	115.3	27 41.5	+59.1	115.8	27 15.2	+59.3	116.3	26 48.4	+59.5	116.7	**23**
24	30 44.2	+57.9	113.0	30 20.5	+58.2	113.5	29 56.3	+58.4	114.1	29 31.6	+58.6	114.6	29 06.3	+58.9	115.1	28 40.6	+59.1	115.6	28 14.5	+59.3	116.1	27 47.9	+59.4	116.6	**24**
25	31 42.1	+57.9	112.7	31 18.7	+58.1	113.3	30 54.7	+58.4	113.8	30 30.2	+58.7	114.4	30 05.2	+58.9	114.9	29 39.7	+59.1	115.4	29 13.8	+59.2	115.9	28 47.3	+59.4	116.4	**25**
26	32 40.0	+57.8	112.4	32 16.8	+58.2	113.0	31 53.1	+58.4	113.6	31 28.9	+58.6	114.1	31 04.1	+58.9	114.7	30 38.8	+59.1	115.2	30 13.0	+59.3	115.7	29 46.7	+59.4	116.3	**26**
27	33 37.8	+57.8	112.1	33 15.0	+58.0	112.7	32 51.5	+58.4	113.3	32 27.5	+58.6	113.9	32 03.0	+58.8	114.4	31 37.9	+59.0	115.0	31 12.3	+59.2	115.6	30 46.1	+59.4	116.1	**27**
28	34 35.6	+57.7	111.7	34 13.0	+58.0	112.4	33 49.9	+58.3	113.0	33 26.1	+58.6	113.6	33 01.8	+58.8	114.2	32 36.9	+59.1	114.8	32 11.5	+59.2	115.4	31 45.5	+59.4	115.9	**28**
29	35 33.3	+57.6	111.4	35 11.0	+58.0	112.1	34 48.2	+58.2	112.7	34 24.7	+58.5	113.3	34 00.6	+58.8	114.0	33 36.0	+59.0	114.6	33 10.7	+59.2	115.2	32 44.9	+59.4	115.8	**29**
30	36 30.9	+57.6	111.1	36 09.0	+57.9	111.7	35 46.4	+58.3	112.4	35 23.2	+58.5	113.1	34 59.4	+58.8	113.7	34 35.0	+58.9	114.4	34 09.9	+59.2	115.0	33 44.3	+59.3	115.6	**30**
31	37 28.5	+57.5	110.7	37 06.9	+57.9	111.4	36 44.7	+58.1	112.1	36 21.7	+58.5	112.8	35 58.2	+58.7	113.5	35 33.9	+59.0	114.1	35 09.1	+59.2	114.8	34 43.6	+59.4	115.4	**31**
32	38 26.0	+57.5	110.4	38 04.8	+57.8	111.1	37 42.8	+58.2	111.8	37 20.2	+58.4	112.5	36 56.9	+58.7	113.2	36 32.9	+58.9	113.9	36 08.3	+59.1	114.6	35 43.0	+59.3	115.2	**32**
33	39 23.5	+57.4	110.0	39 02.6	+57.7	110.7	38 41.0	+58.0	111.5	38 18.6	+58.4	112.2	37 55.6	+58.6	113.0	37 31.8	+58.9	113.7	37 07.4	+59.1	114.4	36 42.3	+59.3	115.0	**33**
34	40 20.9	+57.3	109.6	40 00.3	+57.7	110.4	39 39.0	+58.1	111.2	39 17.0	+58.3	111.9	38 54.2	+58.6	112.7	38 30.7	+58.9	113.4	38 06.5	+59.1	114.2	37 41.6	+59.3	114.9	**34**
35	41 18.2	+57.2	109.2	40 58.0	+57.6	110.0	40 37.1	+57.9	110.8	40 15.3	+58.3	111.6	39 52.8	+58.6	112.4	39 29.6	+58.8	113.2	39 05.6	+59.1	113.9	38 40.9	+59.3	114.7	**35**
36	42 15.4	+57.1	108.8	41 55.6	+57.6	109.7	41 35.0	+57.9	110.5	41 13.6	+58.2	111.3	40 51.4	+58.5	112.1	40 28.4	+58.8	112.9	40 04.7	+59.0	113.7	39 40.2	+59.2	114.5	**36**
37	43 12.5	+57.1	108.4	42 53.2	+57.4	109.3	42 32.9	+57.9	110.1	42 11.8	+58.2	111.0	41 49.9	+58.5	111.8	41 27.2	+58.8	112.7	41 03.7	+59.0	113.5	40 39.4	+59.3	114.3	**37**
38	44 09.6	+56.9	108.0	43 50.6	+57.4	108.9	43 30.8	+57.7	109.8	43 10.0	+58.1	110.7	42 48.4	+58.4	111.5	42 26.0	+58.7	112.4	42 02.7	+59.0	113.2	41 38.7	+59.2	114.0	**38**
39	45 06.5	+56.9	107.5	44 48.0	+57.3	108.5	44 28.5	+57.7	109.4	44 08.1	+58.1	110.3	43 46.8	+58.4	111.2	43 24.7	+58.7	112.1	43 01.7	+58.9	113.0	42 37.9	+59.1	113.8	**39**
40	46 03.4	+56.7	107.1	45 45.3	+57.1	108.0	45 26.2	+57.6	109.0	45 06.2	+58.0	110.0	44 45.2	+58.4	110.9	44 23.4	+58.6	111.8	44 00.6	+58.9	112.7	43 37.0	+59.2	113.6	**40**
41	47 00.1	+56.6	106.6	46 42.4	+57.1	107.6	46 23.8	+57.5	108.6	46 04.2	+57.9	109.6	45 43.6	+58.2	110.6	45 22.0	+58.6	111.5	44 59.5	+58.9	112.5	44 36.2	+59.1	113.4	**41**
42	47 56.7	+56.5	106.1	47 39.5	+57.0	107.2	47 21.3	+57.4	108.2	47 02.1	+57.8	109.2	46 41.8	+58.2	110.2	46 20.6	+58.5	111.2	45 58.4	+58.8	112.2	45 35.3	+59.1	113.1	**42**
43	48 53.2	+56.3	105.6	48 36.5	+56.8	106.7	48 18.7	+57.3	107.8	47 59.9	+57.7	108.8	47 40.0	+58.1	109.9	47 19.1	+58.5	110.9	46 57.2	+58.8	111.9	46 34.4	+59.0	112.9	**43**
44	49 49.5	+56.2	105.1	49 33.3	+56.8	106.2	49 16.0	+57.2	107.3	48 57.6	+57.7	108.4	48 38.1	+58.1	109.5	48 17.6	+58.4	110.6	47 56.0	+58.8	111.6	47 33.4	+59.1	112.6	**44**
45	50 45.7	+56.0	104.5	50 30.1	+56.5	105.7	50 13.2	+57.1	106.8	49 55.3	+57.5	108.0	49 36.2	+58.0	109.1	49 16.0	+58.4	110.2	48 54.8	+58.6	111.3	48 32.5	+58.9	112.3	**45**
46	51 41.7	+55.9	103.9	51 26.6	+56.5	105.2	51 10.3	+57.0	106.4	50 52.8	+57.5	107.5	50 34.2	+57.9	108.7	50 14.4	+58.3	109.8	49 53.4	+58.7	111.0	49 31.4	+59.0	112.1	**46**
47	52 37.6	+55.6	103.3	52 23.1	+56.2	104.6	52 07.3	+56.8	105.9	51 50.3	+57.3	107.1	51 32.1	+57.8	108.3	51 12.7	+58.2	109.5	50 52.1	+58.5	110.6	50 30.4	+58.9	111.8	**47**
48	53 33.2	+55.5	102.7	53 19.3	+56.1	104.0	53 04.1	+56.7	105.3	52 47.6	+57.2	106.6	52 29.9	+57.7	107.9	52 10.9	+58.1	109.1	51 50.6	+58.6	110.3	51 29.3	+58.8	111.5	**48**
49	54 28.7	+55.2	102.1	54 15.4	+56.0	103.4	54 00.8	+56.5	104.8	53 44.8	+57.1	106.1	53 27.6	+57.5	107.4	53 09.0	+58.0	108.7	52 49.2	+58.4	109.9	52 28.1	+58.8	111.1	**49**
50	55 23.9	+55.0	101.4	55 11.4	+55.7	102.8	54 57.3	+56.4	104.2	54 41.9	+57.0	105.6	54 25.1	+57.5	106.9	54 07.0	+58.0	108.2	53 47.6	+58.4	109.5	53 26.9	+58.7	110.8	**50**
51	56 18.9	+54.8	100.7	56 07.1	+55.5	102.1	55 53.7	+56.2	103.6	55 38.9	+56.8	105.0	55 22.6	+57.4	106.4	55 05.0	+57.8	107.8	54 46.0	+58.2	109.1	54 25.6	+58.7	110.5	**51**
52	57 13.7	+54.5	99.9	57 02.6	+55.2	101.5	56 49.9	+55.9	103.0	56 35.7	+56.6	104.4	56 20.0	+57.2	105.9	56 02.8	+57.7	107.3	55 44.2	+58.2	108.7	55 24.3	+58.6	110.1	**52**
53	58 08.2	+54.1	99.2	57 57.8	+55.0	100.7	57 45.8	+55.8	102.3	57 32.3	+56.4	103.8	57 17.2	+57.0	105.3	57 00.5	+57.6	106.8	56 42.4	+58.1	108.3	56 22.9	+58.5	109.7	**53**
54	59 02.3	+53.9	98.3	58 52.8	+54.7	100.0	58 41.6	+55.5	101.6	58 28.7	+56.2	103.2	58 14.2	+56.9	104.8	57 58.1	+57.5	106.3	57 40.5	+58.0	107.8	57 21.4	+58.4	109.3	**54**
55	59 56.2	+53.4	97.5	59 47.5	+54.4	99.2	59 37.1	+55.2	100.8	59 24.9	+56.0	102.5	59 11.1	+56.7	104.1	58 55.6	+57.3	105.8	58 38.5	+57.9	107.3	58 19.8	+58.4	108.9	**55**
56	60 49.6	+53.1	96.5	60 41.9	+54.0	98.3	60 32.3	+54.9	100.1	60 20.9	+55.8	101.8	60 07.8	+56.5	103.5	59 52.9	+57.2	105.2	59 36.4	+57.7	106.8	59 18.2	+58.3	108.4	**56**
57	61 42.7	+52.6	95.6	61 35.9	+53.7	97.4	61 27.2	+54.7	99.2	61 16.7	+55.5	101.0	61 04.3	+56.3	102.8	60 50.1	+57.0	104.6	60 34.1	+57.6	106.3	60 16.5	+58.1	108.0	**57**
58	62 35.3	+52.2	94.5	62 29.6	+53.3	96.5	62 21.9	+54.2	98.4	62 12.2	+55.2	100.2	62 00.6	+56.0	102.1	61 47.1	+56.7	103.9	61 31.7	+57.5	105.7	61 14.6	+58.0	107.5	**58**
59	63 27.5	+51.6	93.5	63 22.9	+52.8	95.4	63 16.1	+53.9	97.4	63 07.4	+54.8	99.4	62 56.6	+55.8	101.3	62 43.8	+56.6	103.2	62 29.2	+57.2	105.1	62 12.6	+57.9	106.9	**59**
60	64 19.1	+51.1	92.3	64 15.7	+52.3	94.4	64 10.0	+53.5	96.4	64 02.2	+54.5	98.5	63 52.4	+55.4	100.5	63 40.4	+56.3	102.5	63 26.4	+57.1	104.4	63 10.5	+57.8	106.4	**60**
61	65 10.2	+50.4	91.1	65 08.0	+51.7	93.2	65 03.5	+52.9	95.4	64 56.7	+54.1	97.5	64 47.8	+55.1	99.6	64 36.7	+56.1	101.7	64 23.5	+56.9	103.7	64 08.3	+57.5	105.7	**61**
62	66 00.6	+49.7	89.7	65 59.7	+51.1	92.0	65 56.4	+52.5	94.2	65 50.8	+53.7	96.5	65 42.9	+54.8	98.7	65 32.8	+55.7	100.8	65 20.4	+56.6	103.0	65 05.8	+57.4	105.1	**62**
63	66 50.3	+48.9	88.3	66 50.8	+50.4	90.7	66 48.9	+51.8	93.0	66 44.5	+53.1	95.3	66 37.7	+54.3	97.7	66 28.5	+55.4	99.9	66 17.0	+56.4	102.2	66 03.2	+57.2	104.4	**63**
64	67 39.2	+48.0	86.8	67 41.2	+49.6	89.3	67 40.7	+51.1	91.7	67 37.6	+52.6	94.1	67 32.0	+53.9	96.6	67 23.9	+55.0	98.9	67 13.4	+56.0	101.3	67 00.4	+57.0	103.6	**64**
65	68 27.2	+47.0	85.2	68 30.8	+48.8	87.8	68 31.8	+50.4	90.3	68 30.2	+51.9	92.9	68 25.9	+53.3	95.4	68 18.9	+54.6	97.9	68 09.4	+55.7	100.4	67 57.4	+56.6	102.8	**65**
66	69 14.2	+45.9	83.5	69 19.6	+47.8	86.2	69 22.2	+49.6	88.8	69 22.1	+51.2	91.5	69 19.2	+52.7	94.1	69 13.5	+54.1	96.7	69 05.1	+55.3	99.3	68 54.0	+56.4	101.9	**66**
67	70 00.1	+44.7	81.7	70 07.4	+46.7	84.4	70 11.8	+48.6	87.2	70 13.3	+50.4	90.0	70 11.9	+52.0	92.7	70 07.6	+53.5	95.5	70 00.4	+54.9	98.2	69 50.4	+56.1	100.9	**67**
68	70 44.8	+43.3	79.7	70 54.1	+45.4	82.5	71 00.4	+47.5	85.4	71 03.7	+49.4	88.3	71 03.9	+51.2	91.2	71 01.1	+52.9	94.1	70 55.3	+54.3	97.0	70 46.5	+55.6	99.9	**68**
69	71 28.1	+41.7	77.5	71 39.5	+44.0	80.5	71 47.9	+46.2	83.5	71 53.1	+48.3	86.5	71 55.1	+50.3	89.6	71 54.0	+52.1	92.6	71 49.6	+53.7	95.7	71 42.1	+55.1	98.7	**69**
70	72 09.8	+40.0	75.2	72 23.5	+42.5	78.3	72 34.1	+44.9	81.4	72 41.4	+47.2	84.6	72 45.4	+49.3	87.8	72 46.1	+51.2	91.0	72 43.3	+53.1	94.2	72 37.2	+54.6	97.4	**70**
71	72 49.8	*+38.0*•	72.8	73 06.0	+40.7	75.9	73 19.0	+43.2	79.1	73 28.6	+45.7	82.5	73 34.7	+48.0	85.8	73 37.3	+50.2	89.2	73 36.4	+52.2	92.6	73 31.8	+54.0	96.0	**71**
72	73 27.8	*+35.9*•	70.1	73 46.7	*+38.6*•	73.3	74 02.2	+41.4	76.7	74 14.3	+44.0	80.1	74 22.7	+46.7	83.6	74 27.5	+49.1	87.2	74 28.6	+51.2	90.8	74 25.8	+53.2	94.4	**72**
73	74 03.7	*+33.4*•	67.2	74 25.3	*+36.3*•	70.5	74 43.6	*+39.3*•	74.0	74 58.3	*+42.2*•	77.6	75 09.4	+45.0	81.2	75 16.6	+47.6	85.0	75 19.8	+50.1	88.8	75 19.0	+52.3	92.6	**73**
74	74 37.1	*+30.6*•	64.1	75 01.6	*+33.8*•	67.5	75 22.9	*+36.9*•	71.1	75 40.5	*+40.0*•	74.8	75 54.4	*+43.0*•	78.6	76 04.2	+46.0	82.6	76 09.9	+48.7	86.6	76 11.3	+51.2	90.6	**74**
75	75 07.7	*+27.7*•	60.9	75 35.4	*+30.9*•	64.3	75 59.8	*+34.1*•	67.9	76 20.5	*+37.5*•	71.7	76 37.4	*+40.8*•	75.7	76 50.2	*+44.0*•	79.8	76 58.6	+47.1	84.1	77 02.5	+49.9	88.4	**75**
76	75 35.4	*+24.4*•	57.3	76 06.3	*+27.6*•	60.7	76 33.9	*+31.1*•	64.4	76 58.0	*+34.7*•	68.3	77 18.2	*+38.2*•	72.4	77 34.2	*+41.7*•	76.7	77 45.7	*+45.1*•	81.2	77 52.4	+48.3	85.8	**76**
77	75 59.8	*+20.7*•	53.6	76 33.9	*+24.1*•	57.0	77 05.0	*+27.7*•	60.6	77 32.7	*+31.3*•	64.6	77 56.4	*+35.1*•	68.8	78 15.9	*+38.9*•	73.3	78 30.8	*+42.7*•	78.0	78 40.7	*+46.3*•	82.9	**77**
78	76 20.5	*+16.9*•	49.7	76 58.0	*+20.2*•	53.0	77 32.7	*+23.7*•	56.6	78 04.0	*+27.5*•	60.5	78 31.5	*+31.5*•	64.8	78 54.8	*+35.7*•	69.5	79 13.5	*+39.8*•	74.4	79 27.0	*+43.9*•	79.6	**78**
79	76 37.4	*+12.8*•	45.6	77 18.2	*+16.0*•	48.8	77 56.4	*+19.5*•	52.3	78 31.5	*+23.3*•	56.2	79 03.0	*+27.5*•	60.5	79 30.5	*+31.8*•	65.2	79 53.3	*+36.3*•	70.2	80 10.9	*+40.8*•	75.7	**79**
80	76 50.2	*+8.4*•	41.3	77 34.2	*+11.5*•	44.3	78 15.9	*+14.9*•	47.7	78 54.8	*+18.7*•	51.5	79 30.5	*+22.8*•	55.7	80 02.3	*+27.3*•	60.4	80 29.6	*+32.1*•	65.6	80 51.7	*+37.0*•	71.2	**80**
81	76 58.6	*+3.9*•	37.0	77 45.7	*+6.7*•	39.7	78 30.8	*+9.9*•	42.9	79 13.5	*+13.5*•	46.4	79 53.3	*+17.6*•	50.5	80 29.6	*+22.1*•	55.1	81 01.7	*+27.0*•	60.3	81 28.7	*+32.5*•	66.1	**81**
82	77 02.5	*–0.6*•	32.5	77 52.4	*+2.0*•	35.0	78 40.7	*+4.8*•	37.9	79 27.0	*+8.1*•	41.2	80 10.9	*+11.9*•	45.0	80 51.7	*+16.3*•	49.4	81 28.7	*+21.3*•	54.4	82 01.2	*+26.8*•	60.2	**82**
83	77 01.9	*–5.1*•	28.1	77 54.4	*–3.0*•	30.2	78 45.5	*–0.4*•	32.8	79 35.1	*+2.5*•	35.7	80 22.8	*+5.9*•	39.2	81 08.0	*+9.9*•	43.2	81 50.0	*+14.6*•	48.0	82 28.0	*+20.1*•	53.6	**83**
84	76 56.8	*–9.6*•	23.6	77 51.4	*–7.8*•	25.5	78 45.1	*–5.7*•	27.6	79 37.6	*–3.2*•	30.2	80 28.7	*–0.3*•	33.2	81 17.9	*+3.1*•	36.8	82 04.6	*+7.4*•	41.0	82 48.1	*+12.4*•	46.3	**84**
85	76 47.2	*–13.8*•	19.3	77 43.6	*–12.4*•	20.8	78 39.4	*–10.8*•	22.6	79 34.4	*–8.9*•	24.6	80 28.4	*–6.6*•	27.1	81 21.0	*–3.6*•	30.1	82 12.0	*–0.2*•	33.8	83 00.5	*+4.1*•	38.3	**85**
86	76 33.4	*–17.9*•	15.1	77 31.2	*–16.9*•	16.2	78 28.6	*–15.7*•	17.6	79 25.5	*–14.2*•	19.2	80 21.8	*–12.5*•	21.2	81 17.4	*–10.5*•	23.5	82 11.8	*–7.8*•	26.4	83 04.6	*–4.4*•	30.1	**86**
87	76 15.5	*–21.8*•	11.0	77 14.3	*–21.1*•	11.8	78 12.9	*–20.2*•	12.8	79 11.3	*–19.3*•	14.0	80 09.3	*–18.1*•	15.4	81 06.9	*–16.7*•	17.1	82 04.0	*–15.0*•	19.2	83 00.2	*–12.8*•	21.8	**87**
88	75 53.7	*–25.2*•	7.1	76 53.2	*–24.8*•	7.7	77 52.7	*–24.5*•	8.3	78 52.0	*–23.9*•	9.0	79 51.2	*–23.3*•	9.9	80 50.2	*–22.5*•	10.9	81 49.0	*–21.6*•	12.3	82 47.4	*–20.4*•	13.9	**88**
89	75 28.5	*–28.5*•	3.5	76 28.4	*–28.4*•	3.7	77 28.2	*–28.2*•	4.0	78 28.1	*–28.1*•	4.3	79 27.9	*–27.9*•	4.7	80 27.7	*–27.7*•	5.2	81 27.4	*–27.4*•	5.8	82 27.0	*–27.0*•	6.6	**89**
90	75 00.0	*–31.4*•	0.0	76 00.0	*–31.5*•	0.0	77 00.0	*–31.6*•	0.0	78 00.0	*–31.8*•	0.0	79 00.0	*–31.9*•	0.0	80 00.0	*–32.1*•	0.0	81 00.0	*–32.3*•	0.0	82 00.0	*–32.6*•	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

60°, 300° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 60°, 300°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 26.1	−58.4	119.1	6 56.9	−58.7	119.3	6 27.5	−58.9	119.4	5 58.0	−59.0	119.5	5 28.5	−59.2	119.5	4 58.9	−59.4	119.6	4 29.2	−59.5	119.7	3 59.4	−59.5	119.8	**0**
1	6 27.7	−58.5	119.4	5 58.2	−58.7	119.5	5 28.6	−58.8	119.6	4 59.0	−59.0	119.6	4 29.3	−59.2	119.7	3 59.5	−59.3	119.8	3 29.7	−59.4	119.8	2 59.9	−59.6	119.9	**1**
2	5 29.2	−58.4	119.6	4 59.5	−58.6	119.7	4 29.8	−58.8	119.8	4 00.0	−59.0	119.8	3 30.1	−59.1	119.9	3 00.2	−59.3	119.9	2 30.3	−59.5	120.0	2 00.3	−59.6	120.0	**2**
3	4 30.8	−58.5	119.8	4 00.9	−58.7	119.9	3 31.0	−58.9	119.9	3 01.0	−59.0	120.0	2 31.0	−59.2	120.0	2 00.9	−59.3	120.1	1 30.8	−59.4	120.1	1 00.7	−59.5	120.1	**3**
4	3 32.3	−58.5	120.1	3 02.2	−58.6	120.1	2 32.1	−58.8	120.1	2 02.0	−59.1	120.2	1 31.8	−59.2	120.2	1 01.6	−59.3	120.2	0 31.4	−59.5	120.2	0 01.2	−59.6	120.2	**4**
5	2 33.8	−58.4	120.3	2 03.6	−58.7	120.3	1 33.3	−58.9	120.3	1 02.9	−59.0	120.4	0 32.6	−59.2	120.4	0 02.3	−59.3	120.4	0 28.1	+59.4	59.6	0 58.4	+59.6	59.6	**5**
6	1 35.4	−58.5	120.5	1 04.9	−58.7	120.5	0 34.4	−58.8	120.5	0 03.9	−59.0	120.5	0 26.6	+59.1	59.5	0 57.0	+59.4	59.5	1 27.5	+59.5	59.5	1 58.0	+59.5	59.5	**6**
7	0 36.9	−58.5	120.7	0 06.2	−58.6	120.7	0 24.4	+58.9	59.3	0 55.1	+59.0	59.3	1 25.7	+59.2	59.3	1 56.4	+59.3	59.3	2 27.0	+59.4	59.4	2 57.5	+59.6	59.4	**7**
8	0 21.6	+58.5	59.0	0 52.4	+58.7	59.1	1 23.3	+58.8	59.1	1 54.1	+59.0	59.1	2 24.9	+59.2	59.1	2 55.7	+59.3	59.2	3 26.4	+59.4	59.2	3 57.1	+59.5	59.3	**8**
9	1 20.1	+58.4	58.8	1 51.1	+58.7	58.8	2 22.1	+58.9	58.9	2 53.1	+59.0	58.9	3 24.1	+59.2	59.0	3 55.0	+59.3	59.0	4 25.8	+59.5	59.1	4 56.6	+59.6	59.2	**9**
10	2 18.5	+58.5	58.6	2 49.8	+58.6	58.6	3 21.0	+58.8	58.7	3 52.1	+59.1	58.7	4 23.3	+59.1	58.8	4 54.3	+59.3	58.9	5 25.3	+59.4	58.9	5 56.2	+59.6	59.0	**10**
11	3 17.0	+58.5	58.4	3 48.4	+58.7	58.4	4 19.8	+58.9	58.5	4 51.2	+59.0	58.6	5 22.4	+59.2	58.6	5 53.6	+59.3	58.7	6 24.7	+59.5	58.8	6 55.8	+59.5	58.9	**11**
12	4 15.5	+58.4	58.2	4 47.1	+58.7	58.2	5 18.7	+58.8	58.3	5 50.2	+59.0	58.4	6 21.6	+59.2	58.5	6 52.9	+59.3	58.6	7 24.2	+59.4	58.7	7 55.3	+59.6	58.8	**12**
13	5 13.9	+58.5	57.9	5 45.8	+58.6	58.0	6 17.5	+58.8	58.1	6 49.2	+59.0	58.2	7 20.8	+59.1	58.3	7 52.2	+59.3	58.4	8 23.6	+59.4	58.5	8 54.9	+59.5	58.7	**13**
14	6 12.4	+58.4	57.7	6 44.4	+58.7	57.8	7 16.3	+58.9	57.9	7 48.2	+59.0	58.0	8 19.9	+59.2	58.1	8 51.5	+59.3	58.3	9 23.0	+59.5	58.4	9 54.4	+59.6	58.5	**14**
15	7 10.8	+58.5	57.5	7 43.1	+58.6	57.6	8 15.2	+58.8	57.7	8 47.2	+59.0	57.8	9 19.1	+59.1	58.0	9 50.8	+59.3	58.1	10 22.5	+59.4	58.3	10 54.0	+59.5	58.4	**15**
16	8 09.3	+58.4	57.2	8 41.7	+58.6	57.4	9 14.0	+58.8	57.5	9 46.2	+59.0	57.6	10 18.2	+59.2	57.8	10 50.1	+59.3	58.0	11 21.9	+59.4	58.1	11 53.5	+59.5	58.3	**16**
17	9 07.7	+58.5	57.0	9 40.3	+58.7	57.2	10 12.8	+58.8	57.3	10 45.2	+58.9	57.5	11 17.4	+59.1	57.6	11 49.4	+59.3	57.8	12 21.3	+59.4	58.0	12 53.0	+59.6	58.2	**17**
18	10 06.2	+58.4	56.8	10 39.0	+58.6	56.9	11 11.6	+58.8	57.1	11 44.1	+59.0	57.3	12 16.5	+59.1	57.4	12 48.7	+59.3	57.6	13 20.7	+59.4	57.8	13 52.6	+59.5	58.0	**18**
19	11 04.6	+58.4	56.6	11 37.6	+58.6	56.7	12 10.4	+58.8	56.9	12 43.1	+59.0	57.1	13 15.6	+59.2	57.3	13 48.0	+59.3	57.5	14 20.1	+59.5	57.7	14 52.1	+59.5	57.9	**19**
20	12 03.0	+58.4	56.3	12 36.2	+58.6	56.5	13 09.2	+58.8	56.7	13 42.1	+58.9	56.9	14 14.8	+59.1	57.1	14 47.3	+59.2	57.3	15 19.6	+59.4	57.5	15 51.6	+59.6	57.8	**20**
21	13 01.4	+58.4	56.1	13 34.8	+58.6	56.3	14 08.0	+58.8	56.5	14 41.0	+59.0	56.7	15 13.9	+59.1	56.9	15 46.5	+59.3	57.2	16 19.0	+59.4	57.4	16 51.2	+59.5	57.6	**21**
22	13 59.8	+58.3	55.8	14 33.4	+58.5	56.1	15 06.8	+58.7	56.3	15 40.0	+58.9	56.5	16 13.0	+59.1	56.7	16 45.8	+59.2	57.0	17 18.4	+59.3	57.2	17 50.7	+59.5	57.5	**22**
23	14 58.1	+58.4	55.6	15 31.9	+58.6	55.8	16 05.5	+58.8	56.1	16 38.9	+58.9	56.3	17 12.1	+59.1	56.6	17 45.0	+59.3	56.8	18 17.7	+59.4	57.1	18 50.2	+59.5	57.4	**23**
24	15 56.5	+58.3	55.4	16 30.5	+58.5	55.6	17 04.3	+58.7	55.9	17 37.8	+59.0	56.1	18 11.2	+59.1	56.4	18 44.3	+59.2	56.7	19 17.1	+59.4	56.9	19 49.7	+59.5	57.2	**24**
25	16 54.8	+58.4	55.1	17 29.0	+58.6	55.4	18 03.0	+58.7	55.6	18 36.8	+58.9	55.9	19 10.3	+59.0	56.2	19 43.5	+59.2	56.5	20 16.5	+59.4	56.8	20 49.2	+59.5	57.1	**25**
26	17 53.2	+58.3	54.9	18 27.6	+58.5	55.1	19 01.7	+58.7	55.4	19 35.7	+58.8	55.7	20 09.3	+59.1	56.0	20 42.7	+59.2	56.3	21 15.9	+59.3	56.6	21 48.7	+59.5	57.0	**26**
27	18 51.5	+58.2	54.6	19 26.1	+58.5	54.9	20 00.4	+58.7	55.2	20 34.5	+58.9	55.5	21 08.4	+59.0	55.8	21 41.9	+59.3	56.1	22 15.2	+59.4	56.5	22 48.2	+59.5	56.8	**27**
28	19 49.7	+58.3	54.4	20 24.6	+58.4	54.7	20 59.1	+58.7	55.0	21 33.4	+58.9	55.3	22 07.4	+59.1	55.6	22 41.2	+59.2	56.0	23 14.6	+59.3	56.3	23 47.7	+59.5	56.7	**28**
29	20 48.0	+58.2	54.1	21 23.0	+58.5	54.4	21 57.8	+58.6	54.8	22 32.3	+58.8	55.1	23 06.5	+59.0	55.4	23 40.3	+59.2	55.8	24 13.9	+59.3	56.2	24 47.2	+59.4	56.5	**29**
30	21 46.2	+58.2	53.9	22 21.5	+58.4	54.2	22 56.4	+58.7	54.5	23 31.1	+58.8	54.9	24 05.5	+59.0	55.2	24 39.5	+59.2	55.6	25 13.2	+59.4	56.0	25 46.6	+59.5	56.4	**30**
31	22 44.4	+58.2	53.6	23 19.9	+58.4	53.9	23 55.1	+58.6	54.3	24 29.9	+58.8	54.7	25 04.5	+59.0	55.0	25 38.7	+59.1	55.4	26 12.6	+59.3	55.8	26 46.1	+59.4	56.2	**31**
32	23 42.6	+58.2	53.3	24 18.3	+58.4	53.7	24 53.7	+58.6	54.1	25 28.7	+58.8	54.4	26 03.5	+58.9	54.8	26 37.8	+59.2	55.2	27 11.9	+59.3	55.7	27 45.5	+59.5	56.1	**32**
33	24 40.8	+58.1	53.1	25 16.7	+58.3	53.4	25 52.3	+58.5	53.8	26 27.5	+58.8	54.2	27 02.4	+59.0	54.6	27 37.0	+59.1	55.1	28 11.2	+59.2	55.5	28 45.0	+59.4	55.9	**33**
34	25 38.9	+58.1	52.8	26 15.0	+58.4	53.2	26 50.8	+58.6	53.6	27 26.3	+58.7	54.0	28 01.4	+58.9	54.4	28 36.1	+59.1	54.9	29 10.4	+59.3	55.3	29 44.4	+59.4	55.8	**34**
35	26 37.0	+58.1	52.5	27 13.4	+58.3	52.9	27 49.4	+58.5	53.3	28 25.0	+58.7	53.8	29 00.3	+58.9	54.2	29 35.2	+59.1	54.7	30 09.7	+59.3	55.1	30 43.8	+59.4	55.6	**35**
36	27 35.1	+58.0	52.2	28 11.7	+58.2	52.7	28 47.9	+58.5	53.1	29 23.7	+58.7	53.5	29 59.2	+58.9	54.0	30 34.3	+59.1	54.5	31 09.0	+59.2	55.0	31 43.2	+59.4	55.5	**36**
37	28 33.1	+58.0	51.9	29 09.9	+58.3	52.4	29 46.4	+58.4	52.8	30 22.4	+58.7	53.3	30 58.1	+58.9	53.8	31 33.4	+59.0	54.3	32 08.2	+59.2	54.8	32 42.6	+59.4	55.3	**37**
38	29 31.1	+58.0	51.6	30 08.2	+58.2	52.1	30 44.8	+58.5	52.6	31 21.1	+58.6	53.0	31 57.0	+58.8	53.5	32 32.4	+59.0	54.0	33 07.4	+59.2	54.6	33 42.0	+59.3	55.1	**38**
39	30 29.1	+57.9	51.4	31 06.4	+58.1	51.8	31 43.3	+58.3	52.3	32 19.7	+58.6	52.8	32 55.8	+58.8	53.3	33 31.4	+59.0	53.8	34 06.6	+59.2	54.4	34 41.3	+59.4	54.9	**39**
40	31 27.0	+57.9	51.0	32 04.5	+58.1	51.5	32 41.6	+58.4	52.0	33 18.3	+58.6	52.5	33 54.6	+58.8	53.1	34 30.4	+59.0	53.6	35 05.8	+59.2	54.2	35 40.7	+59.3	54.8	**40**
41	32 24.9	+57.8	50.7	33 02.6	+58.1	51.2	33 40.0	+58.3	51.7	34 16.9	+58.6	52.3	34 53.4	+58.8	52.8	35 29.4	+59.0	53.4	36 05.0	+59.1	54.0	36 40.0	+59.3	54.6	**41**
42	33 22.7	+57.8	50.4	34 00.7	+58.0	50.9	34 38.3	+58.3	51.5	35 15.5	+58.5	52.0	35 52.2	+58.7	52.6	36 28.4	+58.9	53.2	37 04.1	+59.1	53.8	37 39.3	+59.3	54.4	**42**
43	34 20.5	+57.7	50.1	34 58.7	+58.0	50.6	35 36.6	+58.2	51.2	36 14.0	+58.4	51.7	36 50.9	+58.7	52.3	37 27.3	+58.9	52.9	38 03.2	+59.1	53.5	38 38.6	+59.3	54.2	**43**
44	35 18.2	+57.6	49.8	35 56.7	+57.9	50.3	36 34.8	+58.2	50.9	37 12.4	+58.5	51.5	37 49.6	+58.6	52.1	38 26.2	+58.9	52.7	39 02.3	+59.1	53.3	39 37.9	+59.2	54.0	**44**
45	36 15.8	+57.6	49.4	36 54.6	+57.9	50.0	37 33.0	+58.1	50.6	38 10.9	+58.3	51.2	38 48.2	+58.6	51.8	39 25.1	+58.8	52.4	40 01.4	+59.0	53.1	40 37.1	+59.2	53.8	**45**
46	37 13.4	+57.6	49.1	37 52.5	+57.8	49.7	38 31.1	+58.1	50.3	39 09.2	+58.4	50.9	39 46.8	+58.6	51.5	40 23.9	+58.8	52.2	41 00.4	+59.0	52.9	41 36.3	+59.2	53.6	**46**
47	38 11.0	+57.5	48.7	38 50.3	+57.8	49.3	39 29.2	+58.0	49.9	40 07.6	+58.3	50.6	40 45.4	+58.5	51.2	41 22.7	+58.8	51.9	41 59.4	+59.0	52.6	42 35.5	+59.2	53.3	**47**
48	39 08.5	+57.4	48.3	39 48.1	+57.7	49.0	40 27.2	+58.0	49.6	41 05.9	+58.2	50.3	41 43.9	+58.5	50.9	42 21.5	+58.7	51.6	42 58.4	+58.9	52.4	43 34.7	+59.2	53.1	**48**
49	40 05.9	+57.3	48.0	40 45.8	+57.6	48.6	41 25.2	+57.9	49.3	42 04.1	+58.2	49.9	42 42.4	+58.5	50.6	43 20.2	+58.7	51.4	43 57.3	+59.0	52.1	44 33.9	+59.1	52.9	**49**
50	41 03.2	+57.2	47.6	41 43.4	+57.6	48.2	42 23.1	+57.9	48.9	43 02.3	+58.1	49.6	43 40.9	+58.4	50.3	44 18.9	+58.6	51.1	44 56.3	+58.8	51.8	45 33.0	+59.1	52.6	**50**
51	42 00.4	+57.2	47.2	42 41.0	+57.4	47.8	43 21.0	+57.7	48.5	44 00.4	+58.1	49.3	44 39.3	+58.3	50.0	45 17.5	+58.6	50.8	45 55.1	+58.9	51.6	46 32.1	+59.0	52.4	**51**
52	42 57.6	+57.1	46.8	43 38.4	+57.4	47.5	44 18.7	+57.7	48.2	44 58.5	+57.9	48.9	45 37.6	+58.3	49.7	46 16.1	+58.5	50.5	46 54.0	+58.7	51.3	47 31.1	+59.1	52.1	**52**
53	43 54.7	+56.9	46.3	44 35.8	+57.3	47.0	45 16.4	+57.6	47.8	45 56.4	+58.0	48.5	46 35.9	+58.2	49.3	47 14.6	+58.5	50.1	47 52.7	+58.8	51.0	48 30.2	+58.9	51.9	**53**
54	44 51.6	+56.9	45.9	45 33.1	+57.2	46.6	46 14.0	+57.6	47.4	46 54.4	+57.8	48.2	47 34.1	+58.1	49.0	48 13.1	+58.4	49.8	48 51.5	+58.7	50.7	49 29.1	+59.0	51.6	**54**
55	45 48.5	+56.8	45.4	46 30.3	+57.1	46.2	47 11.6	+57.4	47.0	47 52.2	+57.8	47.8	48 32.2	+58.1	48.6	49 11.5	+58.4	49.5	49 50.2	+58.6	50.4	50 28.1	+58.9	51.3	**55**
56	46 45.3	+56.6	45.0	47 27.4	+57.0	45.7	48 09.0	+57.3	46.5	48 50.0	+57.6	47.4	49 30.3	+58.0	48.2	50 09.9	+58.3	49.1	50 48.8	+58.6	50.0	51 27.0	+58.8	51.0	**56**
57	47 41.9	+56.5	44.5	48 24.4	+56.9	45.3	49 06.3	+57.3	46.1	49 47.6	+57.6	46.9	50 28.3	+57.8	47.8	51 08.2	+58.2	48.7	51 47.4	+58.5	49.7	52 25.8	+58.8	50.7	**57**
58	48 38.4	+56.4	44.0	49 21.3	+56.7	44.8	50 03.6	+57.1	45.6	50 45.2	+57.5	46.5	51 26.1	+57.9	47.4	52 06.4	+58.1	48.3	52 45.9	+58.4	49.3	53 24.6	+58.7	50.3	**58**
59	49 34.8	+56.2	43.5	50 18.0	+56.6	44.3	51 00.7	+57.0	45.1	51 42.7	+57.3	46.0	52 24.0	+57.7	47.0	53 04.5	+58.1	47.9	53 44.3	+58.4	48.9	54 23.3	+58.7	50.0	**59**
60	50 31.0	+56.1	42.9	51 14.6	+56.5	43.8	51 57.7	+56.8	44.6	52 40.0	+57.2	45.6	53 21.7	+57.6	46.5	54 02.6	+57.9	47.5	54 42.7	+58.3	48.6	55 22.0	+58.6	49.6	**60**
61	51 27.1	+55.9	42.4	52 11.1	+56.3	43.2	52 54.5	+56.7	44.1	53 37.2	+57.1	45.1	54 19.3	+57.4	46.0	55 00.5	+57.9	47.1	55 41.0	+58.2	48.1	56 20.6	+58.5	49.3	**61**
62	52 23.0	+55.7	41.8	53 07.4	+56.2	42.7	53 51.2	+56.6	43.6	54 34.3	+57.0	44.5	55 16.7	+57.4	45.5	55 58.4	+57.7	46.6	56 39.2	+58.1	47.7	57 19.1	+58.5	48.8	**62**
63	53 18.7	+55.5	41.2	54 03.6	+55.9	42.1	54 47.8	+56.4	43.0	55 31.3	+56.8	44.0	56 14.1	+57.2	45.0	56 56.1	+57.6	46.1	57 37.3	+58.0	47.2	58 17.6	+58.3	48.4	**63**
64	54 14.2	+55.3	40.5	54 59.5	+55.8	41.4	55 44.2	+56.2	42.4	56 28.1	+56.6	43.4	57 11.3	+57.1	44.5	57 53.7	+57.5	45.6	58 35.3	+57.8	46.8	59 15.9	+58.3	48.0	**64**
65	55 09.5	+55.1	39.8	55 55.3	+55.5	40.8	56 40.4	+56.0	41.8	57 24.7	+56.5	42.8	58 08.4	+56.9	43.9	58 51.2	+57.3	45.0	59 33.1	+57.8	46.2	60 14.2	+58.1	47.5	**65**
66	56 04.6	+54.8	39.1	56 50.8	+55.3	40.1	57 36.4	+55.7	41.1	58 21.2	+56.3	42.2	59 05.3	+56.7	43.3	59 48.5	+57.2	44.5	60 30.9	+57.6	45.7	61 12.3	+58.0	47.0	**66**
67	56 59.4	+54.5	38.4	57 46.1	+55.0	39.4	58 32.1	+55.6	40.4	59 17.5	+56.0	41.5	60 02.0	+56.5	42.6	60 45.7	+57.0	43.9	61 28.5	+57.5	45.1	62 10.3	+57.9	46.5	**67**
68	57 53.9	+54.3	37.6	58 41.1	+54.8	38.6	59 27.7	+55.3	39.7	60 13.5	+55.8	40.8	60 58.5	+56.3	42.0	61 42.7	+56.8	43.2	62 26.0	+57.2	44.5	63 08.2	+57.8	45.9	**68**
69	58 48.2	+53.9	36.8	59 35.9	+54.5	37.8	60 23.0	+55.0	38.9	61 09.3	+55.5	40.0	61 54.8	+56.1	41.2	62 39.5	+56.6	42.5	63 23.2	+57.1	43.9	64 06.0	+57.6	45.3	**69**
70	59 42.1	+53.6	36.0	60 30.4	+54.1	37.0	61 18.0	+54.6	38.1	62 04.8	+55.2	39.2	62 50.9	+55.8	40.5	63 36.1	+56.3	41.8	64 20.3	+56.9	43.2	65 03.6	+57.4	44.6	**70**
71	60 35.7	+53.2	35.0	61 24.5	+53.7	36.1	62 12.6	+54.4	37.2	63 00.0	+55.0	38.4	63 46.7	+55.5	39.7	64 32.4	+56.1	41.0	65 17.2	+56.7	42.4	66 01.0	+57.2	43.9	**71**
72	61 28.9	+52.7	34.1	62 18.2	+53.4	35.2	63 07.0	+53.9	36.3	63 55.0	+54.5	37.5	64 42.2	+55.1	38.8	65 28.5	+55.7	40.1	66 13.9	+56.3	41.6	66 58.2	+56.9	43.2	**72**
73	62 21.6	+52.3	33.1	63 11.6	+52.9	34.2	64 00.9	+53.5	35.3	64 49.5	+54.2	36.5	65 37.3	+54.8	37.8	66 24.2	+55.5	39.2	67 10.2	+56.1	40.7	67 55.1	+56.7	42.3	**73**
74	63 13.9	+51.8	32.0	64 04.5	+52.4	33.1	64 54.4	+53.1	34.3	65 43.7	+53.7	35.5	66 32.1	+54.4	36.8	67 19.7	+55.0	38.3	68 06.3	+55.7	39.8	68 51.8	+56.4	41.5	**74**
75	64 05.7	+51.2	30.9	64 56.9	+51.9	32.0	65 47.5	+52.5	33.1	66 37.4	+53.2	34.4	67 26.5	+53.9	35.8	68 14.7	+54.6	37.2	69 02.0	+55.3	38.8	69 48.2	+56.1	40.5	**75**
76	64 56.9	+50.6	29.7	65 48.8	+51.2	30.8	66 40.0	+51.9	31.9	67 30.6	+52.6	33.2	68 20.4	+53.4	34.6	69 09.3	+54.2	36.1	69 57.3	+54.9	37.7	70 44.3	+55.6	39.4	**76**
77	65 47.5	+49.9	28.4	66 40.0	+50.6	29.5	67 31.9	+51.3	30.6	68 23.2	+52.0	31.9	69 13.8	+52.7	33.3	70 03.5	+53.5	34.8	70 52.2	+54.4	36.5	71 39.9	+55.2	38.3	**77**
78	66 37.4	+49.1	27.0	67 30.6	+49.8	28.1	68 23.2	+50.6	29.3	69 15.2	+51.3	30.6	70 06.5	+52.1	32.0	70 57.0	+52.9	33.5	71 46.6	+53.7	35.2	72 35.1	+54.6	37.0	**78**
79	67 26.5	+48.2	25.5	68 20.4	+48.9	26.6	69 13.8	+49.7	27.8	70 06.5	+50.5	29.1	70 58.6	+51.3	30.5	71 49.9	+52.2	32.0	72 40.3	+53.1	33.7	73 29.7	+54.0	35.6	**79**
80	68 14.7	+47.3	23.9	69 09.3	+48.0	25.0	70 03.5	+48.7	26.2	70 57.0	+49.6	27.4	71 49.9	+50.4	28.8	72 42.1	+51.3	30.4	73 33.4	+52.3	32.1	74 23.7	+53.3	34.0	**80**
81	69 02.0	+46.2	22.2	69 57.3	+47.0	23.3	70 52.2	+47.7	24.4	71 46.6	+48.5	25.7	72 40.3	+49.4	27.1	73 33.4	+50.3	28.6	74 25.7	+51.3	30.3	75 17.0	+52.3	32.2	**81**
82	69 48.2	+45.0	20.4	70 44.3	+45.7	21.4	71 39.9	+46.5	22.5	72 35.1	+47.3	23.7	73 29.7	+48.2	25.1	74 23.7	+49.1	26.6	75 17.0	+50.1	28.3	76 09.3	+51.3	30.2	**82**
83	70 33.2	+43.7	18.5	71 30.0	+44.3	19.4	72 26.4	+45.1	20.5	73 22.4	+45.9	21.6	74 17.9	+46.8	23.0	75 12.8	+47.8	24.4	76 07.1	+48.8	26.1	77 00.6	+49.9	28.0	**83**
84	71 16.9	+42.2	16.4	72 14.3	+42.8	17.3	73 11.5	+43.5	18.2	74 08.3	+44.3	19.3	75 04.7	+45.1	20.6	76 00.6	+46.1	22.0	76 55.9	+47.2	23.6	77 50.5	+48.4	25.5	**84**
85	71 59.1	+40.4	14.1	72 57.1	+41.1	14.9	73 55.0	+41.7	15.8	74 52.6	+42.4	16.8	75 49.8	*+43.3*•	18.0	76 46.7	*+44.2*•	19.3	77 43.1	*+45.2*•	20.8	78 38.9	*+46.3*•	22.5	**85**
86	72 39.5	*+38.6*•	11.7	73 38.2	*+39.1*•	12.4	74 36.7	*+39.7*•	13.2	75 35.0	*+40.4*•	14.0	76 33.1	*+41.1*•	15.1	77 30.9	*+41.9*•	16.2	78 28.3	*+42.9*•	17.6	79 25.2	*+44.0*•	19.2	**86**
87	73 18.1	*+36.4*•	9.1	74 17.3	*+36.8*•	9.6	75 16.4	*+37.3*•	10.3	76 15.4	*+37.8*•	11.0	77 14.2	*+38.4*•	11.8	78 12.8	*+39.2*•	12.8	79 11.2	*+39.9*•	14.0	80 09.2	*+41.0*•	15.4	**87**
88	73 54.5	*+34.1*•	6.3	74 54.1	*+34.4*•	6.7	75 53.7	*+34.7*•	7.1	76 53.2	*+35.0*•	7.7	77 52.6	*+35.5*•	8.3	78 52.0	*+35.9*•	9.0	79 51.1	*+36.6*•	9.9	80 50.2	*+37.2*•	10.9	**88**
89	74 28.6	*+31.4*•	3.2	75 28.5	*+31.5*•	3.5	76 28.4	*+31.6*•	3.7	77 28.2	*+31.8*•	4.0	78 28.1	*+31.9*•	4.3	79 27.9	*+32.1*•	4.7	80 27.7	*+32.3*•	5.2	81 27.4	*+32.6*•	5.8	**89**
90	75 00.0	*+28.5*•	0.0	76 00.0	*+28.4*•	0.0	77 00.0	*+28.2*•	0.0	78 00.0	*+28.1*•	0.0	79 00.0	*+27.9*•	0.0	80 00.0	*+27.7*•	0.0	81 00.0	*+27.4*•	0.0	82 00.0	*+27.0*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 120°, 240°

61°, 299° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 12.5	+58.4	118.2	6 44.1	+58.6	118.3	6 15.7	+58.8	118.4	5 47.1	+59.0	118.5	5 18.5	+59.1	118.6	4 49.8	+59.3	118.6	4 21.0	+59.4	118.7	3 52.1	+59.6	118.8	0
1	8 10.9	+58.4	117.9	7 42.7	+58.7	118.1	7 14.5	+58.8	118.2	6 46.1	+59.0	118.3	6 17.6	+59.2	118.4	5 49.1	+59.2	118.5	5 20.4	+59.4	118.6	4 51.7	+59.5	118.6	1
2	9 09.3	+58.4	117.7	8 41.4	+58.6	117.8	8 13.3	+58.8	118.0	7 45.1	+59.0	118.1	7 16.8	+59.1	118.2	6 48.3	+59.3	118.3	6 19.8	+59.5	118.4	5 51.2	+59.6	118.5	2
3	10 07.7	+58.4	117.5	9 40.0	+58.6	117.6	9 12.1	+58.8	117.8	8 44.1	+58.9	117.9	8 15.9	+59.1	118.0	7 47.6	+59.3	118.2	7 19.3	+59.4	118.3	6 50.8	+59.5	118.4	3
4	11 06.1	+58.4	117.2	10 38.6	+58.6	117.4	10 10.9	+58.8	117.6	9 43.0	+59.0	117.7	9 15.0	+59.2	117.9	8 46.9	+59.3	118.0	8 18.7	+59.4	118.1	7 50.3	+59.6	118.3	4
5	12 04.5	+58.3	117.0	11 37.2	+58.5	117.2	11 09.7	+58.7	117.4	10 42.0	+59.0	117.5	10 14.2	+59.1	117.7	9 46.2	+59.3	117.9	9 18.1	+59.4	118.0	8 49.9	+59.5	118.1	5
6	13 02.8	+58.4	116.8	12 35.7	+58.6	117.0	12 08.4	+58.8	117.2	11 41.0	+58.9	117.3	11 13.3	+59.1	117.5	10 45.5	+59.3	117.7	10 17.5	+59.4	117.9	9 49.4	+59.6	118.0	6
7	14 01.2	+58.3	116.5	13 34.3	+58.6	116.7	13 07.2	+58.8	117.0	12 39.9	+59.0	117.2	12 12.4	+59.1	117.4	11 44.8	+59.2	117.5	11 16.9	+59.5	117.7	10 49.0	+59.5	117.9	7
8	14 59.5	+58.4	116.3	14 32.9	+58.5	116.5	14 06.0	+58.7	116.7	13 38.9	+58.9	117.0	13 11.5	+59.2	117.2	12 44.0	+59.3	117.4	12 16.4	+59.4	117.6	11 48.5	+59.5	117.8	8
9	15 57.9	+58.3	116.0	15 31.4	+58.5	116.3	15 04.7	+58.7	116.5	14 37.8	+58.9	116.8	14 10.7	+59.1	117.0	13 43.3	+59.3	117.2	13 15.8	+59.4	117.4	12 48.0	+59.5	117.6	9
10	16 56.2	+58.2	115.8	16 29.9	+58.5	116.1	16 03.4	+58.8	116.3	15 36.7	+58.9	116.6	15 09.8	+59.0	116.8	14 42.6	+59.2	117.1	14 15.2	+59.4	117.3	13 47.5	+59.6	117.5	10
11	17 54.4	+58.3	115.5	17 28.4	+58.5	115.8	17 02.2	+58.7	116.1	16 35.6	+58.9	116.4	16 08.8	+59.1	116.6	15 41.8	+59.3	116.9	15 14.6	+59.3	117.1	14 47.1	+59.5	117.4	11
12	18 52.7	+58.3	115.3	18 26.9	+58.5	115.6	18 00.9	+58.7	115.9	17 34.5	+58.9	116.2	17 07.9	+59.1	116.5	16 41.1	+59.2	116.7	16 13.9	+59.4	117.0	15 46.6	+59.5	117.3	12
13	19 51.0	+58.2	115.0	19 25.4	+58.5	115.4	18 59.6	+58.6	115.7	18 33.4	+58.9	116.0	18 07.0	+59.1	116.3	17 40.3	+59.2	116.6	17 13.3	+59.4	116.8	16 46.1	+59.5	117.1	13
14	20 49.2	+58.2	114.8	20 23.9	+58.4	115.1	19 58.2	+58.7	115.5	19 32.3	+58.9	115.8	19 06.1	+59.0	116.1	18 39.5	+59.2	116.4	18 12.7	+59.4	116.7	17 45.6	+59.5	117.0	14
15	21 47.4	+58.2	114.5	21 22.3	+58.4	114.9	20 56.9	+58.7	115.2	20 31.2	+58.8	115.6	20 05.1	+59.1	115.9	19 38.7	+59.3	116.2	19 12.1	+59.3	116.5	18 45.1	+59.5	116.9	15
16	22 45.6	+58.1	114.3	22 20.7	+58.4	114.6	21 55.6	+58.6	115.0	21 30.0	+58.9	115.4	21 04.2	+59.0	115.7	20 38.0	+59.2	116.1	20 11.4	+59.4	116.4	19 44.6	+59.5	116.7	16
17	23 43.7	+58.1	114.0	23 19.1	+58.4	114.4	22 54.2	+58.6	114.8	22 28.9	+58.8	115.2	22 03.2	+59.0	115.5	21 37.2	+59.1	115.9	21 10.8	+59.3	116.2	20 44.1	+59.5	116.6	17
18	24 41.8	+58.1	113.7	24 17.5	+58.4	114.1	23 52.8	+58.6	114.5	23 27.7	+58.8	114.9	23 02.2	+59.0	115.3	22 36.3	+59.2	115.7	22 10.1	+59.4	116.1	21 43.6	+59.5	116.4	18
19	25 39.9	+58.1	113.4	25 15.9	+58.3	113.9	24 51.4	+58.5	114.3	24 26.5	+58.8	114.7	24 01.2	+59.0	115.1	23 35.5	+59.2	115.5	23 09.5	+59.3	115.9	22 43.1	+59.5	116.3	19
20	26 38.0	+58.0	113.2	26 14.2	+58.3	113.6	25 49.9	+58.6	114.1	25 25.3	+58.7	114.5	25 00.2	+58.9	114.9	24 34.7	+59.1	115.3	24 08.8	+59.3	115.8	23 42.6	+59.4	116.2	20
21	27 36.0	+58.0	112.9	27 12.5	+58.2	113.3	26 48.5	+58.5	113.8	26 24.0	+58.8	114.3	25 59.1	+59.0	114.7	25 33.8	+59.2	115.2	25 08.1	+59.3	115.6	24 42.0	+59.5	116.0	21
22	28 34.0	+58.0	112.6	28 10.7	+58.3	113.1	27 47.0	+58.5	113.6	27 22.8	+58.7	114.0	26 58.1	+58.9	114.5	26 33.0	+59.1	115.0	26 07.4	+59.3	115.4	25 41.5	+59.4	115.9	22
23	29 32.0	+57.9	112.3	29 09.0	+58.2	112.8	28 45.5	+58.4	113.3	28 21.5	+58.7	113.8	27 57.0	+58.9	114.3	27 32.1	+59.1	114.8	27 06.7	+59.3	115.2	26 40.9	+59.5	115.7	23
24	30 29.9	+57.8	112.0	30 07.2	+58.1	112.5	29 43.9	+58.4	113.1	29 20.2	+58.6	113.6	28 55.9	+58.9	114.1	28 31.2	+59.1	114.6	28 06.0	+59.3	115.1	27 40.4	+59.4	115.6	24
25	31 27.7	+57.9	111.7	31 05.3	+58.1	112.2	30 42.3	+58.4	112.8	30 18.8	+58.7	113.3	29 54.8	+58.9	113.9	29 30.3	+59.1	114.4	29 05.3	+59.2	114.9	28 39.8	+59.4	115.4	25
26	32 25.6	+57.7	111.4	32 03.4	+58.1	111.9	31 40.7	+58.4	112.5	31 17.5	+58.6	113.1	30 53.7	+58.8	113.6	30 29.4	+59.0	114.2	30 04.5	+59.3	114.7	29 39.2	+59.4	115.2	26
27	33 23.3	+57.8	111.0	33 01.5	+58.0	111.6	32 39.1	+58.3	112.2	32 16.1	+58.6	112.8	31 52.5	+58.8	113.4	31 28.4	+59.0	114.0	31 03.8	+59.2	114.5	30 38.6	+59.4	115.1	27
28	34 21.1	+57.6	110.7	33 59.5	+58.0	111.3	33 37.4	+58.3	112.0	33 14.7	+58.5	112.6	32 51.3	+58.8	113.2	32 27.4	+59.0	113.8	32 03.0	+59.2	114.3	31 38.0	+59.4	114.9	28
29	35 18.7	+57.7	110.4	34 57.5	+58.0	111.0	34 35.7	+58.2	111.7	34 13.2	+58.5	112.3	33 50.1	+58.8	112.9	33 26.4	+59.0	113.5	33 02.2	+59.2	114.1	32 37.4	+59.3	114.7	29
30	36 16.4	+57.5	110.0	35 55.5	+57.9	110.7	35 33.9	+58.2	111.4	35 11.7	+58.5	112.0	34 48.9	+58.7	112.7	34 25.4	+59.0	113.3	34 01.4	+59.1	114.0	33 36.7	+59.4	114.6	30
31	37 13.9	+57.5	109.7	36 53.4	+57.8	110.4	36 32.1	+58.2	111.1	36 10.2	+58.4	111.8	35 47.6	+58.7	112.4	35 24.4	+58.9	113.1	35 00.5	+59.2	113.8	34 36.1	+59.3	114.4	31
32	38 11.4	+57.4	109.3	37 51.2	+57.8	110.1	37 30.3	+58.1	110.8	37 08.6	+58.4	111.5	36 46.3	+58.7	112.2	36 23.3	+58.9	112.9	35 59.7	+59.1	113.5	35 35.4	+59.3	114.2	32
33	39 08.8	+57.4	108.9	38 49.0	+57.7	109.7	38 28.4	+58.0	110.5	38 07.0	+58.4	111.2	37 45.0	+58.6	111.9	37 22.2	+58.9	112.6	36 58.8	+59.1	113.3	36 34.7	+59.3	114.0	33
34	40 06.2	+57.3	108.6	39 46.7	+57.6	109.4	39 26.4	+58.0	110.1	39 05.4	+58.3	110.9	38 43.6	+58.6	111.7	38 21.1	+58.9	112.4	37 57.9	+59.1	113.1	37 34.0	+59.3	113.8	34
35	41 03.5	+57.1	108.2	40 44.3	+57.6	109.0	40 24.4	+57.9	109.8	40 03.7	+58.3	110.6	39 42.2	+58.6	111.4	39 20.0	+58.8	112.1	38 57.0	+59.0	112.9	38 33.3	+59.3	113.6	35
36	42 00.6	+57.2	107.8	41 41.9	+57.5	108.6	41 22.3	+57.9	109.5	41 02.0	+58.2	110.3	40 40.8	+58.5	111.1	40 18.8	+58.8	111.9	39 56.0	+59.1	112.7	39 32.6	+59.2	113.4	36
37	42 57.8	+57.0	107.4	42 39.4	+57.4	108.2	42 20.2	+57.8	109.1	42 00.2	+58.1	110.0	41 39.3	+58.4	110.8	41 17.6	+58.7	111.6	40 55.1	+59.0	112.4	40 31.8	+59.2	113.2	37
38	43 54.8	+56.9	106.9	43 36.8	+57.4	107.8	43 18.0	+57.7	108.7	42 58.3	+58.1	109.6	42 37.7	+58.4	110.5	42 16.3	+58.7	111.3	41 54.1	+58.9	112.2	41 31.0	+59.2	113.0	38
39	44 51.7	+56.8	106.5	44 34.2	+57.2	107.4	44 15.7	+57.7	108.4	43 56.4	+58.0	109.3	43 36.1	+58.4	110.2	43 15.0	+58.7	111.1	42 53.0	+58.9	111.9	42 30.2	+59.2	112.8	39
40	45 48.5	+56.7	106.0	45 31.4	+57.2	107.0	45 13.4	+57.6	108.0	44 54.4	+58.0	108.9	44 34.5	+58.3	109.9	44 13.7	+58.6	110.8	43 51.9	+58.9	111.7	43 29.4	+59.1	112.6	40
41	46 45.2	+56.5	105.5	46 28.6	+57.0	106.6	46 11.0	+57.4	107.6	45 52.4	+57.8	108.5	45 32.8	+58.2	109.5	45 12.3	+58.5	110.5	44 50.8	+58.9	111.4	44 28.5	+59.1	112.3	41
42	47 41.7	+56.5	105.1	47 25.6	+56.9	106.1	47 08.4	+57.4	107.1	46 50.2	+57.8	108.2	46 31.0	+58.2	109.2	46 10.8	+58.6	110.2	45 49.7	+58.8	111.1	45 27.6	+59.1	112.1	42
43	48 38.2	+56.3	104.5	48 22.5	+56.9	105.6	48 05.8	+57.3	106.7	47 48.0	+57.8	107.8	47 29.2	+58.1	108.8	47 09.4	+58.4	109.8	46 48.5	+58.8	110.8	46 26.7	+59.0	111.8	43
44	49 34.5	+56.1	104.0	49 19.4	+56.6	105.1	49 03.1	+57.2	106.3	48 45.8	+57.6	107.4	48 27.3	+58.1	108.4	48 07.8	+58.4	109.5	47 47.3	+58.7	110.5	47 25.7	+59.0	111.6	44
45	50 30.6	+56.0	103.5	50 16.0	+56.6	104.6	50 00.3	+57.1	105.8	49 43.4	+57.5	106.9	49 25.4	+57.9	108.1	49 06.2	+58.3	109.2	48 46.0	+58.7	110.2	48 24.7	+59.0	111.3	45
46	51 26.6	+55.8	102.9	51 12.6	+56.4	104.1	50 57.4	+56.9	105.3	50 40.9	+57.4	106.5	50 23.3	+57.9	107.7	50 04.5	+58.3	108.8	49 44.7	+58.6	109.9	49 23.7	+58.9	111.0	46
47	52 22.4	+55.6	102.3	52 09.0	+56.2	103.6	51 54.3	+56.8	104.8	51 38.3	+57.3	106.0	51 21.2	+57.7	107.2	51 02.8	+58.2	108.4	50 43.3	+58.5	109.6	50 22.6	+58.9	110.7	47
48	53 18.0	+55.5	101.7	53 05.2	+56.1	103.0	52 51.1	+56.6	104.3	52 35.6	+57.2	105.5	52 18.9	+57.7	106.8	52 01.0	+58.1	108.0	51 41.8	+58.5	109.2	51 21.5	+58.8	110.4	48
49	54 13.5	+55.2	101.0	54 01.3	+55.9	102.4	53 47.7	+56.5	103.7	53 32.8	+57.1	105.0	53 16.6	+57.6	106.3	52 59.1	+58.0	107.6	52 40.3	+58.4	108.9	52 20.3	+58.8	110.1	49
50	55 08.7	+55.0	100.4	54 57.2	+55.6	101.8	54 44.2	+56.3	103.1	54 29.9	+56.9	104.5	54 14.2	+57.4	105.9	53 57.1	+57.9	107.2	53 38.7	+58.4	108.5	53 19.1	+58.7	109.8	50
51	56 03.7	+54.7	99.6	55 52.8	+55.5	101.1	55 40.5	+56.2	102.5	55 26.8	+56.7	104.0	55 11.6	+57.3	105.4	54 55.0	+57.8	106.7	54 37.1	+58.2	108.1	54 17.8	+58.6	109.4	51
52	56 58.4	+54.4	98.9	56 48.3	+55.2	100.4	56 36.7	+55.9	101.9	56 23.5	+56.6	103.4	56 08.9	+57.2	104.8	55 52.8	+57.7	106.3	55 35.3	+58.2	107.7	55 16.4	+58.6	109.0	52
53	57 52.8	+54.1	98.1	57 43.5	+55.0	99.7	57 32.6	+55.7	101.2	57 20.1	+56.4	102.8	57 06.1	+57.0	104.3	56 50.5	+57.6	105.8	56 33.5	+58.1	107.2	56 15.0	+58.5	108.7	53
54	58 46.9	+53.8	97.3	58 38.5	+54.6	98.9	58 28.3	+55.5	100.5	58 16.5	+56.2	102.1	58 03.1	+56.9	103.7	57 48.1	+57.4	105.2	57 31.6	+57.9	106.8	57 13.5	+58.4	108.3	54
55	59 40.7	+53.5	96.4	59 33.1	+54.4	98.1	59 23.8	+55.2	99.8	59 12.7	+56.0	101.5	59 00.0	+56.6	103.1	58 45.5	+57.3	104.7	58 29.5	+57.9	106.3	58 11.9	+58.4	107.8	55
56	60 34.2	+53.0	95.5	60 27.5	+54.0	97.3	60 19.0	+54.9	99.0	60 08.7	+55.7	100.7	59 56.6	+56.5	102.4	59 42.8	+57.2	104.1	59 27.4	+57.7	105.8	59 10.3	+58.2	107.4	56
57	61 27.2	+52.7	94.6	61 21.5	+53.7	96.4	61 13.9	+54.6	98.2	61 04.4	+55.5	100.0	60 53.1	+56.2	101.8	60 40.0	+56.9	103.5	60 25.1	+57.6	105.2	60 08.5	+58.1	106.9	57
58	62 19.9	+52.1	93.5	62 15.2	+53.2	95.4	62 08.5	+54.2	97.3	61 59.9	+55.1	99.2	61 49.3	+56.0	101.0	61 36.9	+56.8	102.9	61 22.7	+57.4	104.6	61 06.6	+58.0	106.4	58
59	63 12.0	+51.6	92.5	63 08.4	+52.8	94.4	63 02.7	+53.9	96.4	62 55.0	+54.9	98.3	62 45.3	+55.8	100.3	62 33.7	+56.5	102.2	62 20.1	+57.2	104.0	62 04.6	+57.9	105.9	59
60	64 03.6	+51.1	91.3	64 01.2	+52.3	93.4	63 56.6	+53.4	95.4	63 49.9	+54.5	97.4	63 41.1	+55.4	99.4	63 30.2	+56.3	101.4	63 17.3	+57.1	103.4	63 02.5	+57.7	105.3	60
61	64 54.7	+50.4	90.1	64 53.5	+51.7	92.2	64 50.0	+53.0	94.4	64 44.4	+54.0	96.5	64 36.5	+55.1	98.6	64 26.5	+56.0	100.6	64 14.4	+56.8	102.7	64 00.2	+57.6	104.7	61
62	65 45.1	+49.7	88.8	65 45.2	+51.1	91.0	65 43.0	+52.4	93.2	65 38.4	+53.6	95.4	65 31.6	+54.7	97.6	65 22.5	+55.7	99.8	65 11.2	+56.6	101.9	64 57.8	+57.3	104.0	62
63	66 34.8	+48.9	87.4	66 36.3	+50.4	89.7	66 35.4	+51.8	92.0	66 32.0	+53.2	94.3	66 26.3	+54.3	96.6	66 18.2	+55.4	98.9	66 07.8	+56.3	101.1	65 55.1	+57.2	103.3	63
64	67 23.7	+48.0	85.9	67 26.7	+49.6	88.3	67 27.2	+51.1	90.7	67 25.2	+52.5	93.1	67 20.6	+53.9	95.5	67 13.6	+55.0	97.9	67 04.1	+56.1	100.2	66 52.3	+56.9	102.6	64
65	68 11.7	+47.1	84.3	68 16.3	+48.8	86.8	68 18.3	+50.4	89.3	68 17.7	+51.9	91.9	68 14.5	+53.3	94.4	68 08.6	+54.5	96.8	68 00.2	+55.6	99.3	67 49.2	+56.7	101.7	65
66	68 58.8	+46.0	82.6	69 05.1	+47.9	85.2	69 08.7	+49.6	87.8	69 09.6	+51.2	90.5	69 07.8	+52.7	93.1	69 03.1	+54.1	95.7	68 55.8	+55.3	98.3	68 45.9	+56.3	100.8	66
67	69 44.8	+44.7	80.8	69 53.0	+46.7	83.5	69 58.3	+48.6	86.2	70 00.8	+50.4	89.0	70 00.5	+52.0	91.7	69 57.2	+53.5	94.5	69 51.1	+54.8	97.2	69 42.2	+56.0	99.9	67
68	70 29.5	+43.4	78.9	70 39.7	+45.5	81.7	70 46.9	+47.6	84.5	70 51.2	+49.4	87.4	70 52.5	+51.2	90.2	70 50.7	+52.8	93.1	70 45.9	+54.3	96.0	70 38.2	+55.6	98.8	68
69	71 12.9	+41.9	76.7	71 25.2	+44.2	79.6	71 34.5	+46.3	82.6	71 40.6	+48.4	85.6	71 43.7	+50.3	88.6	71 43.5	+52.2	91.6	71 40.2	+53.8	94.7	71 33.8	+55.1	97.7	69
70	71 54.8	+40.2	74.5	72 09.4	+42.5	77.5	72 20.8	+44.9	80.5	72 29.0	+47.2	83.7	72 34.0	+49.3	86.8	72 35.7	+51.2	90.0	72 34.0	+53.0	93.2	72 28.9	+54.6	96.4	70
71	72 35.0	*+38.3*•	72.0	72 51.9	+40.9	75.1	73 05.7	+43.4	78.3	73 16.2	+45.8	81.6	73 23.3	+48.1	84.9	73 26.9	+50.2	88.2	73 27.0	+52.2	91.6	73 23.5	+54.0	95.0	71
72	73 13.3	*+36.1*•	69.4	73 32.8	*+38.8*•	72.6	73 49.1	+41.5	75.9	74 02.0	+44.2	79.3	74 11.4	+46.7	82.7	74 17.1	+49.1	86.3	74 19.2	+51.2	89.8	74 17.5	+53.2	93.4	72
73	73 49.4	*+33.7*•	66.6	74 11.6	*+36.7*•	69.9	74 30.6	*+39.5*•	73.2	74 46.2	*+42.3*•	76.8	74 58.1	+45.1	80.4	75 06.2	+47.7	84.1	75 10.4	+50.1	87.9	75 10.7	+52.3	91.6	73
74	74 23.1	*+31.1*•	63.6	74 48.3	*+34.1*•	66.9	75 10.1	*+37.2*•	70.4	75 28.5	*+40.2*•	74.0	75 43.2	*+43.1*•	77.8	75 53.9	+46.0	81.7	76 00.5	+48.8	85.6	76 03.0	+51.2	89.7	74
75	74 54.2	*+28.2*•	60.4	75 22.4	*+31.3*•	63.7	75 47.3	*+34.5*•	67.2	76 08.7	*+37.8*•	71.0	76 26.3	*+41.0*•	74.9	76 39.9	*+44.2*•	79.0	76 49.3	+47.1	83.2	76 54.2	+49.9	87.4	75
76	75 22.4	*+24.9*•	56.9	75 53.7	*+28.1*•	60.2	76 21.8	*+31.5*•	63.8	76 46.5	*+34.9*•	67.6	77 07.3	*+38.5*•	71.7	77 24.1	*+41.8*•	75.9	77 36.4	*+45.2*•	80.4	77 44.1	+48.3	84.9	76
77	75 47.3	*+21.4*•	53.3	76 21.8	*+24.7*•	56.6	76 53.3	*+28.1*•	60.1	77 21.4	*+31.7*•	64.0	77 45.8	*+35.4*•	68.2	78 05.9	*+39.2*•	72.6	78 21.6	*+42.8*•	77.2	78 32.4	*+46.4*•	82.0	77
78	76 08.7	*+17.6*•	49.4	76 46.5	*+20.8*•	52.6	77 21.4	*+24.4*•	56.2	77 53.1	*+28.1*•	60.1	78 21.2	*+31.9*•	64.3	78 45.1	*+36.0*•	68.8	79 04.4	*+40.1*•	73.6	79 18.8	*+44.0*•	78.7	78
79	76 26.3	*+13.6*•	45.4	77 07.3	*+16.8*•	48.5	77 45.8	*+20.1*•	51.9	78 21.2	*+23.9*•	55.8	78 53.1	*+28.0*•	60.0	79 21.1	*+32.2*•	64.6	79 44.5	*+36.6*•	69.6	80 02.8	*+41.0*•	74.9	79
80	76 39.9	*+9.4*•	41.2	77 24.1	*+12.3*•	44.1	78 05.9	*+15.7*•	47.4	78 45.1	*+19.3*•	51.1	79 21.1	*+23.4*•	55.3	79 53.3	*+27.8*•	59.9	80 21.1	*+32.4*•	65.0	80 43.8	*+37.3*•	70.5	80
81	76 49.3	*+4.9*•	36.9	77 36.4	*+7.7*•	39.6	78 21.6	*+10.8*•	42.7	79 04.4	*+14.4*•	46.2	79 44.5	*+18.3*•	50.2	80 21.1	*+22.7*•	54.7	80 53.5	*+27.6*•	59.8	81 21.1	*+32.8*•	65.5	81
82	76 54.2	*+0.4*•	32.5	77 44.1	*+2.9*•	35.0	78 32.4	*+5.8*•	37.8	79 18.8	*+9.1*•	41.0	80 02.8	*+12.8*•	44.8	80 43.8	*+17.0*•	49.1	81 21.1	*+21.9*•	54.1	81 53.9	*+27.4*•	59.7	82
83	76 54.6	*−4.0*•	28.1	77 47.0	*−1.9*•	30.2	78 38.2	*+0.6*•	32.8	79 27.9	*+3.4*•	35.7	80 15.6	*+6.8*•	39.1	81 00.8	*+10.8*•	43.0	81 43.0	*+15.5*•	47.7	82 21.3	*+20.7*•	53.2	83
84	76 50.6	*−8.5*•	23.7	77 45.1	*−6.6*•	25.5	78 38.8	*−4.6*•	27.7	79 31.3	*−2.1*•	30.2	80 22.4	*+0.7*•	33.1	81 11.6	*+4.2*•	36.7	81 58.5	*+8.3*•	40.9	82 42.0	*+13.4*•	46.0	84
85	76 42.1	*−12.7*•	19.4	77 38.5	*−11.4*•	20.9	78 34.2	*−9.7*•	22.6	79 29.2	*−7.8*•	24.7	80 23.1	*−5.4*•	27.2	81 15.8	*−2.6*•	30.1	82 06.8	*+0.8*•	33.7	82 55.4	*+5.1*•	38.2	85
86	76 29.4	*−16.9*•	15.1	77 27.1	*−15.8*•	16.3	78 24.5	*−14.6*•	17.7	79 21.4	*−13.1*•	19.3	80 17.7	*−11.4*•	21.2	81 13.2	*−9.3*•	23.6	82 07.6	*−6.7*•	26.4	83 00.5	*−3.4*•	30.1	86
87	76 12.5	*−20.7*•	11.1	77 11.3	*−20.0*•	11.9	78 09.9	*−19.2*•	12.9	79 08.3	*−18.3*•	14.1	80 06.3	*−17.1*•	15.4	81 03.9	*−15.7*•	17.1	82 00.9	*−13.9*•	19.2	82 57.1	*−11.7*•	21.9	87
88	75 51.8	*−24.3*•	7.2	76 51.3	*−23.9*•	7.7	77 50.7	*−23.4*•	8.3	78 50.0	*−22.9*•	9.1	79 49.2	*−22.3*•	9.9	80 48.2	*−21.5*•	11.0	81 47.0	*−20.6*•	12.3	82 45.4	*−19.3*•	14.0	88
89	75 27.5	*−27.5*•	3.5	76 27.4	*−27.4*•	3.7	77 27.3	*−27.3*•	4.0	78 27.1	*−27.1*•	4.4	79 26.9	*−26.9*•	4.8	80 26.7	*−26.7*•	5.3	81 26.4	*−26.4*•	5.9	82 26.1	*−26.1*•	6.7	89
90	75 00.0	*−30.5*•	0.0	76 00.0	*−30.6*•	0.0	77 00.0	*−30.8*•	0.0	78 00.0	*−30.9*•	0.0	79 00.0	*−31.1*•	0.0	80 00.0	*−31.3*•	0.0	81 00.0	*−31.5*•	0.0	82 00.0	*−31.8*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 61°, 299°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 12.5	– 58.4	118.2	6 44.1	– 58.6	118.3	6 15.7	– 58.9	118.4	5 47.1	– 59.0	118.5	5 18.5	– 59.2	118.6	4 49.8	– 59.3	118.6	4 21.0	– 59.5	118.7	3 52.1	– 59.5	118.8	**0**
1	6 14.1	– 58.4	118.4	5 45.5	– 58.6	118.5	5 16.8	– 58.8	118.6	4 48.1	– 59.0	118.6	4 19.3	– 59.1	118.7	3 50.5	– 59.3	118.8	3 21.5	– 59.4	118.8	2 52.6	– 59.6	118.9	**1**
2	5 15.7	– 58.5	118.6	4 46.9	– 58.7	118.7	4 18.0	– 58.8	118.8	3 49.1	– 59.0	118.8	3 20.2	– 59.2	118.9	2 51.2	– 59.4	118.9	2 22.1	– 59.4	119.0	1 53.0	– 59.5	119.0	**2**
3	4 17.2	– 58.4	118.9	3 48.2	– 58.6	118.9	3 19.2	– 58.8	119.0	2 50.1	– 59.0	119.0	2 21.0	– 59.2	119.1	1 51.8	– 59.3	119.1	1 22.7	– 59.5	119.1	0 53.5	– 59.6	119.1	**3**
4	3 18.8	– 58.5	119.1	2 49.6	– 58.6	119.1	2 20.4	– 58.8	119.2	1 51.1	– 59.0	119.2	1 21.8	– 59.1	119.2	0 52.5	– 59.3	119.2	0 23.2	– 59.4	119.2	0 06.1	+ 59.5	60.7	**4**
5	2 20.3	– 58.4	119.3	1 51.0	– 58.7	119.3	1 21.6	– 58.9	119.4	0 52.1	– 59.0	119.4	0 22.7	– 59.2	119.4	0 06.8	+ 59.3	60.6	0 36.2	+ 59.4	60.6	1 05.6	+ 59.6	60.6	**5**
6	1 21.9	– 58.4	119.5	0 52.3	– 58.6	119.5	0 22.7	– 58.8	119.6	0 06.9	+ 59.0	60.4	0 36.5	+ 59.1	60.4	1 06.1	+ 59.3	60.5	1 35.6	+ 59.5	60.5	2 05.2	+ 59.5	60.5	**6**
7	0 23.5	– 58.5	119.8	0 06.3	+ 58.7	60.2	0 36.1	+ 58.8	60.2	1 05.9	+ 59.0	60.3	1 35.6	+ 59.2	60.3	2 05.4	+ 59.3	60.3	2 35.1	+ 59.4	60.3	3 04.7	+ 59.6	60.4	**7**
8	0 35.0	+ 58.4	60.0	1 05.0	+ 58.6	60.0	1 34.9	+ 58.9	60.0	2 04.9	+ 59.0	60.1	2 34.8	+ 59.1	60.1	3 04.7	+ 59.3	60.2	3 34.5	+ 59.4	60.2	4 04.3	+ 59.5	60.3	**8**
9	1 33.4	+ 58.5	59.8	2 03.6	+ 58.6	59.8	2 33.8	+ 58.8	59.9	3 03.9	+ 59.0	59.9	3 33.9	+ 59.2	59.9	4 04.0	+ 59.3	60.0	4 33.9	+ 59.5	60.1	5 03.8	+ 59.6	60.1	**9**
10	2 31.9	+ 58.4	59.6	3 02.2	+ 58.7	59.6	3 32.6	+ 58.8	59.7	4 02.9	+ 59.0	59.7	4 33.1	+ 59.1	59.8	5 03.3	+ 59.3	59.8	5 33.4	+ 59.4	59.9	6 03.4	+ 59.5	60.0	**10**
11	3 30.3	+ 58.4	59.3	4 00.9	+ 58.6	59.4	4 31.4	+ 58.8	59.5	5 01.9	+ 58.9	59.5	5 32.2	+ 59.2	59.6	6 02.6	+ 59.3	59.7	6 32.8	+ 59.4	59.8	7 02.9	+ 59.6	59.9	**11**
12	4 28.7	+ 58.5	59.1	4 59.5	+ 58.6	59.2	5 30.2	+ 58.8	59.3	6 00.8	+ 59.0	59.3	6 31.4	+ 59.1	59.4	7 01.9	+ 59.3	59.5	7 32.2	+ 59.5	59.7	8 02.5	+ 59.5	59.8	**12**
13	5 27.2	+ 58.4	58.9	5 58.1	+ 58.7	59.0	6 29.0	+ 58.8	59.1	6 59.8	+ 59.0	59.2	7 30.5	+ 59.2	59.3	8 01.2	+ 59.2	59.4	8 31.7	+ 59.4	59.5	9 02.0	+ 59.6	59.6	**13**
14	6 25.6	+ 58.4	58.7	6 56.8	+ 58.6	58.8	7 27.8	+ 58.8	58.9	7 58.8	+ 59.0	59.0	8 29.7	+ 59.1	59.1	9 00.4	+ 59.3	59.2	9 31.1	+ 59.4	59.4	10 01.6	+ 59.5	59.5	**14**
15	7 24.0	+ 58.4	58.4	7 55.4	+ 58.6	58.5	8 26.6	+ 58.8	58.7	8 57.8	+ 59.0	58.8	9 28.8	+ 59.2	58.9	9 59.7	+ 59.3	59.1	10 30.5	+ 59.4	59.2	11 01.1	+ 59.5	59.4	**15**
16	8 22.4	+ 58.4	58.2	8 54.0	+ 58.6	58.3	9 25.4	+ 58.8	58.5	9 56.8	+ 58.9	58.6	10 28.0	+ 59.1	58.8	10 59.0	+ 59.3	58.9	11 29.9	+ 59.4	59.1	12 00.6	+ 59.6	59.3	**16**
17	9 20.8	+ 58.4	58.0	9 52.6	+ 58.6	58.1	10 24.2	+ 58.8	58.3	10 55.7	+ 59.0	58.4	11 27.1	+ 59.1	58.6	11 58.3	+ 59.2	58.8	12 29.3	+ 59.4	58.9	13 00.2	+ 59.5	59.1	**17**
18	10 19.2	+ 58.4	57.7	10 51.2	+ 58.6	57.9	11 23.0	+ 58.8	58.0	11 54.7	+ 58.9	58.2	12 26.2	+ 59.1	58.4	12 57.5	+ 59.3	58.6	13 28.7	+ 59.4	58.8	13 59.7	+ 59.5	59.0	**18**
19	11 17.6	+ 58.4	57.5	11 49.8	+ 58.6	57.7	12 21.8	+ 58.8	57.8	12 53.6	+ 59.0	58.0	13 25.3	+ 59.1	58.2	13 56.8	+ 59.3	58.4	14 28.1	+ 59.4	58.7	14 59.2	+ 59.6	58.9	**19**
20	12 16.0	+ 58.3	57.3	12 48.4	+ 58.5	57.4	13 20.6	+ 58.7	57.6	13 52.6	+ 58.9	57.8	14 24.4	+ 59.1	58.1	14 56.1	+ 59.2	58.3	15 27.5	+ 59.4	58.5	15 58.8	+ 59.5	58.7	**20**
21	13 14.3	+ 58.4	57.0	13 46.9	+ 58.6	57.2	14 19.3	+ 58.8	57.4	14 51.5	+ 58.9	57.6	15 23.5	+ 59.1	57.9	15 55.3	+ 59.3	58.1	16 26.9	+ 59.4	58.4	16 58.3	+ 59.5	58.6	**21**
22	14 12.7	+ 58.3	56.8	14 45.5	+ 58.5	57.0	15 18.1	+ 58.7	57.2	15 50.4	+ 59.0	57.5	16 22.6	+ 59.1	57.7	16 54.6	+ 59.2	57.9	17 26.3	+ 59.4	58.2	17 57.8	+ 59.5	58.5	**22**
23	15 11.0	+ 58.3	56.5	15 44.0	+ 58.5	56.8	16 16.8	+ 58.7	57.0	16 49.4	+ 58.9	57.3	17 21.7	+ 59.1	57.5	17 53.8	+ 59.2	57.8	18 25.7	+ 59.3	58.1	18 57.3	+ 59.5	58.3	**23**
24	16 09.3	+ 58.3	56.3	16 42.5	+ 58.5	56.5	17 15.5	+ 58.7	56.8	17 48.3	+ 58.8	57.1	18 20.8	+ 59.0	57.3	18 53.0	+ 59.2	57.6	19 25.0	+ 59.4	57.9	19 56.8	+ 59.5	58.2	**24**
25	17 07.6	+ 58.3	56.0	17 41.0	+ 58.5	56.3	18 14.2	+ 58.7	56.6	18 47.1	+ 58.9	56.9	19 19.8	+ 59.1	57.1	19 52.2	+ 59.3	57.4	20 24.4	+ 59.3	57.8	20 56.3	+ 59.5	58.1	**25**
26	18 05.9	+ 58.3	55.8	18 39.5	+ 58.5	56.1	19 12.9	+ 58.7	56.4	19 46.0	+ 58.9	56.6	20 18.9	+ 59.0	57.0	20 51.5	+ 59.1	57.3	21 23.7	+ 59.4	57.6	21 55.8	+ 59.4	57.9	**26**
27	19 04.2	+ 58.2	55.5	19 38.0	+ 58.5	55.8	20 11.6	+ 58.6	56.1	20 44.9	+ 58.8	56.4	21 17.9	+ 59.0	56.8	21 50.6	+ 59.2	57.1	22 23.1	+ 59.3	57.4	22 55.2	+ 59.5	57.8	**27**
28	20 02.4	+ 58.3	55.3	20 36.5	+ 58.4	55.6	21 10.2	+ 58.7	55.9	21 43.7	+ 58.9	56.2	22 16.9	+ 59.0	56.6	22 49.8	+ 59.2	56.9	23 22.4	+ 59.4	57.3	23 54.7	+ 59.5	57.6	**28**
29	21 00.7	+ 58.1	55.0	21 34.9	+ 58.4	55.3	22 08.9	+ 58.6	55.7	22 42.6	+ 58.8	56.0	23 15.9	+ 59.0	56.4	23 49.0	+ 59.2	56.7	24 21.8	+ 59.3	57.1	24 54.2	+ 59.4	57.5	**29**
30	21 58.8	+ 58.2	54.8	22 33.3	+ 58.4	55.1	23 07.5	+ 58.6	55.4	23 41.4	+ 58.8	55.8	24 14.9	+ 59.0	56.2	24 48.2	+ 59.1	56.6	25 21.1	+ 59.3	56.9	25 53.6	+ 59.5	57.3	**30**
31	22 57.0	+ 58.2	54.5	23 31.7	+ 58.4	54.9	24 06.1	+ 58.6	55.2	24 40.2	+ 58.7	55.6	25 13.9	+ 59.0	56.0	25 47.3	+ 59.1	56.4	26 20.4	+ 59.3	56.8	26 53.1	+ 59.4	57.2	**31**
32	23 55.2	+ 58.1	54.2	24 30.1	+ 58.3	54.6	25 04.7	+ 58.5	55.0	25 38.9	+ 58.8	55.4	26 12.9	+ 58.9	55.8	26 46.4	+ 59.2	56.2	27 19.7	+ 59.2	56.6	27 52.5	+ 59.4	57.0	**32**
33	24 53.3	+ 58.1	54.0	25 28.4	+ 58.3	54.3	26 03.2	+ 58.6	54.7	26 37.7	+ 58.7	55.1	27 11.8	+ 58.9	55.6	27 45.6	+ 59.1	56.0	28 18.9	+ 59.3	56.4	28 51.9	+ 59.4	56.9	**33**
34	25 51.4	+ 58.0	53.7	26 26.7	+ 58.3	54.1	27 01.8	+ 58.5	54.5	27 36.4	+ 58.7	54.9	28 10.7	+ 58.9	55.3	28 44.7	+ 59.1	55.8	29 18.2	+ 59.3	56.3	29 51.3	+ 59.4	56.7	**34**
35	26 49.4	+ 58.0	53.4	27 25.0	+ 58.3	53.8	28 00.3	+ 58.4	54.2	28 35.1	+ 58.7	54.7	29 09.6	+ 58.9	55.1	29 43.8	+ 59.0	55.6	30 17.5	+ 59.2	56.1	30 50.7	+ 59.4	56.6	**35**
36	27 47.4	+ 58.0	53.1	28 23.3	+ 58.2	53.5	28 58.7	+ 58.5	54.0	29 33.8	+ 58.7	54.4	30 08.5	+ 58.9	54.9	30 42.8	+ 59.1	55.4	31 16.7	+ 59.2	55.9	31 50.1	+ 59.4	56.4	**36**
37	28 45.4	+ 58.0	52.8	29 21.5	+ 58.2	53.3	29 57.2	+ 58.4	53.7	30 32.5	+ 58.6	54.2	31 07.4	+ 58.8	54.7	31 41.9	+ 59.0	55.2	32 15.9	+ 59.2	55.7	32 49.5	+ 59.3	56.2	**37**
38	29 43.4	+ 57.9	52.5	30 19.7	+ 58.1	53.0	30 55.6	+ 58.4	53.5	31 31.1	+ 58.6	53.9	32 06.2	+ 58.8	54.5	32 40.9	+ 59.0	55.0	33 15.1	+ 59.2	55.5	33 48.8	+ 59.4	56.1	**38**
39	30 41.3	+ 57.8	52.2	31 17.8	+ 58.1	52.7	31 54.0	+ 58.3	53.2	32 29.7	+ 58.6	53.7	33 05.0	+ 58.8	54.2	33 39.9	+ 59.0	54.8	34 14.3	+ 59.1	55.3	34 48.2	+ 59.3	55.9	**39**
40	31 39.1	+ 57.9	51.9	32 15.9	+ 58.1	52.4	32 52.3	+ 58.4	52.9	33 28.3	+ 58.5	53.4	34 03.8	+ 58.8	54.0	34 38.9	+ 58.9	54.5	35 13.4	+ 59.2	55.1	35 47.5	+ 59.3	55.7	**40**
41	32 37.0	+ 57.7	51.6	33 14.0	+ 58.0	52.1	33 50.7	+ 58.2	52.6	34 26.8	+ 58.6	53.2	35 02.6	+ 58.7	53.7	35 37.8	+ 59.0	54.3	36 12.6	+ 59.1	54.9	36 46.8	+ 59.3	55.5	**41**
42	33 34.7	+ 57.7	51.3	34 12.0	+ 58.0	51.8	34 48.9	+ 58.3	52.3	35 25.4	+ 58.4	52.9	36 01.3	+ 58.7	53.5	36 36.8	+ 58.9	54.1	37 11.7	+ 59.1	54.7	37 46.1	+ 59.3	55.3	**42**
43	34 32.4	+ 57.7	50.9	35 10.0	+ 58.0	51.5	35 47.2	+ 58.1	52.0	36 23.8	+ 58.4	52.6	37 00.0	+ 58.7	53.2	37 35.7	+ 58.8	53.8	38 10.8	+ 59.1	54.5	38 45.4	+ 59.3	55.1	**43**
44	35 30.1	+ 57.6	50.6	36 08.0	+ 57.8	51.2	36 45.3	+ 58.2	51.7	37 22.2	+ 58.4	52.3	37 58.7	+ 58.6	53.0	38 34.5	+ 58.9	53.6	39 09.9	+ 59.0	54.2	39 44.7	+ 59.2	54.9	**44**
45	36 27.7	+ 57.5	50.3	37 05.8	+ 57.9	50.8	37 43.5	+ 58.1	51.4	38 20.6	+ 58.4	52.0	38 57.3	+ 58.6	52.7	39 33.4	+ 58.8	53.3	40 08.9	+ 59.0	54.0	40 43.9	+ 59.2	54.7	**45**
46	37 25.2	+ 57.5	49.9	38 03.7	+ 57.7	50.5	38 41.6	+ 58.0	51.1	39 19.0	+ 58.3	51.7	39 55.9	+ 58.5	52.4	40 32.2	+ 58.8	53.1	41 07.9	+ 59.0	53.8	41 43.1	+ 59.2	54.5	**46**
47	38 22.7	+ 57.4	49.5	39 01.4	+ 57.7	50.2	39 39.6	+ 58.0	50.8	40 17.3	+ 58.2	51.4	40 54.4	+ 58.5	52.1	41 31.0	+ 58.7	52.8	42 06.9	+ 59.0	53.5	42 42.3	+ 59.1	54.3	**47**
48	39 20.1	+ 57.4	49.2	39 59.1	+ 57.6	49.8	40 37.6	+ 57.9	50.5	41 15.5	+ 58.2	51.1	41 52.9	+ 58.4	51.8	42 29.7	+ 58.7	52.5	43 05.9	+ 58.9	53.3	43 41.4	+ 59.2	54.0	**48**
49	40 17.5	+ 57.2	48.8	40 56.7	+ 57.6	49.4	41 35.5	+ 57.9	50.1	42 13.7	+ 58.1	50.8	42 51.3	+ 58.4	51.5	43 28.4	+ 58.6	52.2	44 04.8	+ 58.9	53.0	44 40.6	+ 59.1	53.8	**49**
50	41 14.7	+ 57.2	48.4	41 54.3	+ 57.5	49.1	42 33.4	+ 57.7	49.7	43 11.8	+ 58.1	50.5	43 49.7	+ 58.4	51.2	44 27.0	+ 58.6	52.0	45 03.7	+ 58.8	52.7	45 39.7	+ 59.0	53.6	**50**
51	42 11.9	+ 57.1	48.0	42 51.8	+ 57.4	48.7	43 31.1	+ 57.8	49.4	44 09.9	+ 58.0	50.1	44 48.1	+ 58.3	50.9	45 25.6	+ 58.6	51.7	46 02.5	+ 58.8	52.5	46 38.7	+ 59.1	53.3	**51**
52	43 09.0	+ 57.0	47.6	43 49.2	+ 57.3	48.3	44 28.9	+ 57.6	49.0	45 07.9	+ 58.0	49.8	45 46.4	+ 58.2	50.5	46 24.2	+ 58.5	51.3	47 01.3	+ 58.8	52.2	47 37.8	+ 59.0	53.0	**52**
53	44 06.0	+ 56.9	47.1	44 46.5	+ 57.2	47.9	45 26.5	+ 57.5	48.6	46 05.9	+ 57.8	49.4	46 44.6	+ 58.2	50.2	47 22.7	+ 58.4	51.0	48 00.1	+ 58.7	51.9	48 36.8	+ 58.9	52.8	**53**
54	45 02.9	+ 56.7	46.7	45 43.7	+ 57.2	47.4	46 24.0	+ 57.5	48.2	47 03.7	+ 57.8	49.0	47 42.8	+ 58.0	49.8	48 21.1	+ 58.4	50.7	48 58.8	+ 58.6	51.6	49 35.7	+ 58.9	52.5	**54**
55	45 59.6	+ 56.7	46.2	46 40.9	+ 57.0	47.0	47 21.5	+ 57.4	47.8	48 01.5	+ 57.7	48.6	48 40.8	+ 58.1	49.4	49 19.5	+ 58.3	50.3	49 57.4	+ 58.6	51.2	50 34.6	+ 58.9	52.2	**55**
56	46 56.3	+ 56.6	45.8	47 37.9	+ 56.9	46.5	48 18.9	+ 57.2	47.3	48 59.2	+ 57.6	48.2	49 38.9	+ 57.9	49.1	50 17.8	+ 58.3	50.0	50 56.0	+ 58.6	50.9	51 33.5	+ 58.8	51.9	**56**
57	47 52.9	+ 56.4	45.3	48 34.8	+ 56.8	46.1	49 16.1	+ 57.2	46.9	49 56.8	+ 57.5	47.8	50 36.8	+ 57.8	48.7	51 16.1	+ 58.1	49.6	51 54.6	+ 58.5	50.5	52 32.3	+ 58.8	51.6	**57**
58	48 49.3	+ 56.2	44.7	49 31.6	+ 56.6	45.6	50 13.3	+ 57.0	46.4	50 54.3	+ 57.4	47.3	51 34.6	+ 57.8	48.2	52 14.2	+ 58.1	49.2	52 53.1	+ 58.4	50.2	53 31.1	+ 58.7	51.2	**58**
59	49 45.5	+ 56.2	44.2	50 28.2	+ 56.6	45.1	51 10.3	+ 56.9	45.9	51 51.7	+ 57.3	46.8	52 32.4	+ 57.6	47.8	53 12.3	+ 58.0	48.8	53 51.5	+ 58.3	49.8	54 29.8	+ 58.6	50.9	**59**
60	50 41.7	+ 55.9	43.7	51 24.8	+ 56.3	44.5	52 07.2	+ 56.8	45.4	52 49.0	+ 57.1	46.4	53 30.0	+ 57.6	47.3	54 10.3	+ 57.9	48.3	54 49.8	+ 58.2	49.4	55 28.4	+ 58.6	50.5	**60**
61	51 37.6	+ 55.8	43.1	52 21.1	+ 56.2	44.0	53 04.0	+ 56.6	44.9	53 46.1	+ 57.1	45.8	54 27.6	+ 57.4	46.8	55 08.2	+ 57.8	47.9	55 48.0	+ 58.2	49.0	56 27.0	+ 58.4	50.1	**61**
62	52 33.4	+ 55.6	42.5	53 17.3	+ 56.0	43.4	54 00.6	+ 56.4	44.3	54 43.2	+ 56.8	45.3	55 25.0	+ 57.2	46.3	56 06.0	+ 57.7	47.4	56 46.2	+ 58.0	48.5	57 25.4	+ 58.4	49.7	**62**
63	53 29.0	+ 55.4	41.9	54 13.3	+ 55.9	42.8	54 57.0	+ 56.3	43.7	55 40.0	+ 56.7	44.8	56 22.2	+ 57.2	45.8	57 03.7	+ 57.5	46.9	57 44.2	+ 58.0	48.1	58 23.8	+ 58.4	49.3	**63**
64	54 24.4	+ 55.1	41.2	55 09.2	+ 55.6	42.1	55 53.3	+ 56.1	43.1	56 36.7	+ 56.6	44.2	57 19.4	+ 57.0	45.2	58 01.2	+ 57.4	46.4	58 42.2	+ 57.8	47.6	59 22.2	+ 58.2	48.8	**64**
65	55 19.5	+ 54.9	40.5	56 04.8	+ 55.4	41.5	56 49.4	+ 55.9	42.5	57 33.3	+ 56.3	43.5	58 16.4	+ 56.8	44.7	58 58.6	+ 57.3	45.8	59 40.0	+ 57.7	47.0	60 20.4	+ 58.1	48.3	**65**
66	56 14.4	+ 54.7	39.8	57 00.2	+ 55.2	40.8	57 45.3	+ 55.6	41.8	58 29.6	+ 56.2	42.9	59 13.2	+ 56.6	44.0	59 55.9	+ 57.1	45.2	60 37.7	+ 57.5	46.5	61 18.5	+ 57.9	47.8	**66**
67	57 09.1	+ 54.4	39.1	57 55.4	+ 54.9	40.1	58 40.9	+ 55.5	41.1	59 25.8	+ 55.9	42.2	60 09.8	+ 56.4	43.4	60 53.0	+ 56.9	44.6	61 35.2	+ 57.4	45.9	62 16.4	+ 57.9	47.3	**67**
68	58 03.5	+ 54.1	38.3	58 50.3	+ 54.6	39.3	59 36.4	+ 55.1	40.4	60 21.7	+ 55.7	41.5	61 06.2	+ 56.2	42.7	61 49.9	+ 56.7	44.0	62 32.6	+ 57.2	45.3	63 14.3	+ 57.7	46.7	**68**
69	58 57.6	+ 53.7	37.4	59 44.9	+ 54.3	38.5	60 31.5	+ 54.8	39.6	61 17.4	+ 55.4	40.7	62 02.4	+ 56.0	42.0	62 46.6	+ 56.5	43.2	63 29.8	+ 57.0	44.6	64 12.0	+ 57.5	46.1	**69**
70	59 51.3	+ 53.4	36.6	60 39.2	+ 53.9	37.6	61 26.3	+ 54.6	38.7	62 12.8	+ 55.0	39.9	62 58.4	+ 55.6	41.2	63 43.1	+ 56.2	42.5	64 26.8	+ 56.8	43.9	65 09.5	+ 57.3	45.4	**70**
71	60 44.7	+ 52.9	35.6	61 33.1	+ 53.6	36.7	62 20.9	+ 54.1	37.8	63 07.8	+ 54.8	39.1	63 54.0	+ 55.4	40.3	64 39.3	+ 55.9	41.7	65 23.6	+ 56.5	43.1	66 06.8	+ 57.1	44.7	**71**
72	61 37.6	+ 52.6	34.7	62 26.7	+ 53.1	35.7	63 15.0	+ 53.8	36.9	64 02.6	+ 54.4	38.1	64 49.4	+ 55.0	39.4	65 35.2	+ 55.7	40.8	66 20.1	+ 56.3	42.3	67 03.9	+ 56.9	43.9	**72**
73	62 30.2	+ 52.0	33.6	63 19.8	+ 52.7	34.7	64 08.8	+ 53.3	35.9	64 57.0	+ 54.0	37.2	65 44.4	+ 54.6	38.5	66 30.9	+ 55.3	39.9	67 16.4	+ 55.9	41.4	68 00.8	+ 56.6	43.1	**73**
74	63 22.2	+ 51.5	32.5	64 12.5	+ 52.1	33.6	65 02.1	+ 52.8	34.8	65 51.0	+ 53.5	36.1	66 39.0	+ 54.2	37.5	67 26.2	+ 54.9	38.9	68 12.3	+ 55.6	40.5	68 57.4	+ 56.3	42.2	**74**
75	64 13.7	+ 50.9	31.4	65 04.6	+ 51.6	32.5	65 54.9	+ 52.3	33.7	66 44.5	+ 53.0	35.0	67 33.2	+ 53.7	36.4	68 21.1	+ 54.4	37.9	69 07.9	+ 55.2	39.5	69 53.7	+ 55.9	41.2	**75**
76	65 04.6	+ 50.3	30.1	65 56.2	+ 51.0	31.3	66 47.2	+ 51.7	32.5	67 37.5	+ 52.4	33.8	68 26.9	+ 53.2	35.2	69 15.5	+ 54.0	36.7	70 03.1	+ 54.7	38.3	70 49.6	+ 55.5	40.1	**76**
77	65 54.9	+ 49.6	28.8	66 47.2	+ 50.3	29.9	67 38.9	+ 51.0	31.2	68 29.9	+ 51.7	32.5	69 20.1	+ 52.5	33.9	70 09.5	+ 53.3	35.4	70 57.8	+ 54.2	37.1	71 45.1	+ 55.0	38.9	**77**
78	66 44.5	+ 48.7	27.4	67 37.5	+ 49.4	28.5	68 29.9	+ 50.2	29.7	69 21.6	+ 51.0	31.1	70 12.6	+ 51.9	32.5	71 02.8	+ 52.7	34.0	71 52.0	+ 53.6	35.8	72 40.1	+ 54.5	37.6	**78**
79	67 33.2	+ 47.9	25.9	68 26.9	+ 48.6	27.0	69 20.1	+ 49.4	28.2	70 12.6	+ 50.2	29.5	71 04.5	+ 51.0	31.0	71 55.5	+ 51.9	32.5	72 45.6	+ 52.8	34.3	73 34.6	+ 53.8	36.2	**79**
80	68 21.1	+ 46.8	24.3	69 15.5	+ 47.6	25.4	70 09.5	+ 48.3	26.6	71 02.8	+ 49.2	27.9	71 55.5	+ 50.1	29.3	72 47.4	+ 51.0	30.9	73 38.4	+ 52.0	32.6	74 28.4	+ 53.0	34.6	**80**
81	69 07.9	+ 45.8	22.6	70 03.1	+ 46.5	23.6	70 57.8	+ 47.3	24.8	71 52.0	+ 48.1	26.1	72 45.6	+ 49.0	27.5	73 38.4	+ 50.0	29.1	74 30.4	+ 51.0	30.8	75 21.4	+ 52.1	32.8	**81**
82	69 53.7	+ 44.5	20.7	70 49.6	+ 45.2	21.8	71 45.1	+ 46.0	22.9	72 40.1	+ 46.9	24.1	73 34.6	+ 47.8	25.5	74 28.4	+ 48.8	27.0	75 21.4	+ 49.9	28.8	76 13.5	+ 51.0	30.7	**82**
83	70 38.2	+ 43.1	18.8	71 34.8	+ 43.9	19.7	72 31.1	+ 44.6	20.8	73 27.0	+ 45.4	22.0	74 22.4	+ 46.3	23.3	75 17.2	+ 47.3	24.8	76 11.3	+ 48.4	26.5	77 04.5	+ 49.6	28.5	**83**
84	71 21.3	+ 41.6	16.6	72 18.7	+ 42.2	17.5	73 15.7	+ 43.0	18.5	74 12.4	+ 43.8	19.6	75 08.7	+ 44.7	20.9	76 04.5	+ 45.7	22.3	76 59.7	+ 46.7	24.0	77 54.1	+ 48.0	25.9	**84**
85	72 02.9	+ 39.8	14.3	73 00.9	+ 40.4	15.1	73 58.7	*+ 41.1* •	16.0	74 56.2	*+ 41.9* •	17.1	75 53.4	*+ 42.7* •	18.2	76 50.2	*+ 43.6* •	19.6	77 46.4	*+ 44.8* •	21.1	78 42.1	*+ 45.9* •	22.9	**85**
86	72 42.7	*+ 37.8* •	11.8	73 41.3	*+ 38.4* •	12.5	74 39.8	*+ 39.0* •	13.3	75 38.1	*+ 39.6* •	14.2	76 36.1	*+ 40.4* •	15.3	77 33.8	*+ 41.3* •	16.5	78 31.2	*+ 42.2* •	17.9	79 28.0	*+ 43.4* •	19.5	**86**
87	73 20.5	*+ 35.7* •	9.2	74 19.7	*+ 36.1* •	9.8	75 18.8	*+ 36.6* •	10.4	76 17.7	*+ 37.2* •	11.1	77 16.5	*+ 37.8* •	12.0	78 15.1	*+ 38.5* •	13.0	79 13.4	*+ 39.4* •	14.2	80 11.4	*+ 40.3* •	15.6	**87**
88	73 56.2	*+ 33.3* •	6.3	74 55.8	*+ 33.6* •	6.7	75 55.4	*+ 33.8* •	7.2	76 54.9	*+ 34.2* •	7.7	77 54.3	*+ 34.6* •	8.4	78 53.6	*+ 35.1* •	9.1	79 52.8	*+ 35.7* •	10.0	80 51.7	*+ 36.5* •	11.1	**88**
89	74 29.5	*+ 30.5* •	3.3	75 29.4	*+ 30.6* •	3.5	76 29.2	*+ 30.8* •	3.7	77 29.1	*+ 30.9* •	4.0	78 28.9	*+ 31.1* •	4.4	79 28.7	*+ 31.3* •	4.8	80 28.5	*+ 31.5* •	5.3	81 28.2	*+ 31.8* •	5.9	**89**
90	75 00.0	*+ 27.5* •	0.0	76 00.0	*+ 27.4* •	0.0	77 00.0	*+ 27.3* •	0.0	78 00.0	*+ 27.1* •	0.0	79 00.0	*+ 26.9* •	0.0	80 00.0	*+ 26.7* •	0.0	81 00.0	*+ 26.4* •	0.0	82 00.0	*+ 26.1* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 119°, 241°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 58.7	+58.4	117.2	6 31.3	+58.6	117.3	6 03.7	+58.8	117.4	5 36.1	+59.0	117.5	5 08.4	+59.1	117.6	4 40.6	+59.3	117.6	4 12.7	+59.4	117.7	3 44.8	+59.5	117.8	0
1	7 57.1	+58.4	117.0	7 29.9	+58.6	117.1	7 02.5	+58.8	117.2	6 35.1	+58.9	117.3	6 07.5	+59.1	117.4	5 39.9	+59.2	117.5	5 12.1	+59.4	117.6	4 44.3	+59.6	117.6	1
2	8 55.5	+58.4	116.7	8 28.5	+58.5	116.9	8 01.3	+58.8	117.0	7 34.0	+59.0	117.1	7 06.6	+59.2	117.2	6 39.1	+59.3	117.3	6 11.5	+59.5	117.4	5 43.9	+59.5	117.5	2
3	9 53.9	+58.3	116.5	9 27.0	+58.6	116.6	9 00.1	+58.8	116.8	8 33.0	+58.9	116.9	8 05.8	+59.1	117.0	7 38.4	+59.3	117.2	7 11.0	+59.4	117.3	6 43.4	+59.5	117.4	3
4	10 52.2	+58.4	116.2	10 25.6	+58.6	116.4	9 58.9	+58.7	116.6	9 31.9	+59.0	116.7	9 04.9	+59.1	116.9	8 37.7	+59.3	117.0	8 10.4	+59.4	117.1	7 42.9	+59.6	117.3	4
5	11 50.6	+58.3	116.0	11 24.2	+58.5	116.2	10 57.6	+58.8	116.4	10 30.9	+58.9	116.5	10 04.0	+59.1	116.7	9 37.0	+59.2	116.9	9 09.8	+59.4	117.0	8 42.5	+59.5	117.1	5
6	12 48.9	+58.3	115.8	12 22.7	+58.6	116.0	11 56.4	+58.7	116.2	11 29.8	+59.0	116.4	11 03.1	+59.1	116.5	10 36.2	+59.3	116.7	10 09.2	+59.4	116.9	9 42.0	+59.5	117.0	6
7	13 47.2	+58.3	115.5	13 21.3	+58.5	115.7	12 55.1	+58.8	116.0	12 28.8	+58.9	116.2	12 02.2	+59.1	116.4	11 35.5	+59.2	116.5	11 08.6	+59.4	116.7	10 41.5	+59.6	116.9	7
8	14 45.5	+58.3	115.3	14 19.8	+58.5	115.5	13 53.9	+58.7	115.7	13 27.7	+58.9	116.0	13 01.3	+59.1	116.2	12 34.7	+59.3	116.4	12 08.0	+59.4	116.6	11 41.1	+59.5	116.8	8
9	15 43.8	+58.3	115.0	15 18.3	+58.5	115.3	14 52.6	+58.7	115.5	14 26.6	+58.9	115.8	14 00.4	+59.1	116.0	13 34.0	+59.2	116.2	13 07.4	+59.4	116.4	12 40.6	+59.5	116.6	9
10	16 42.1	+58.3	114.8	16 16.8	+58.5	115.1	15 51.3	+58.7	115.3	15 25.5	+58.9	115.6	14 59.5	+59.1	115.8	14 33.2	+59.3	116.1	14 06.8	+59.4	116.3	13 40.1	+59.5	116.5	10
11	17 40.4	+58.2	114.5	17 15.3	+58.5	114.8	16 50.0	+58.7	115.1	16 24.4	+58.9	115.4	15 58.6	+59.0	115.6	15 32.5	+59.2	115.9	15 06.2	+59.3	116.1	14 39.6	+59.5	116.4	11
12	18 38.6	+58.2	114.3	18 13.8	+58.4	114.6	17 48.7	+58.7	114.9	17 23.3	+58.9	115.2	16 57.6	+59.1	115.5	16 31.7	+59.2	115.7	16 05.5	+59.4	116.0	15 39.1	+59.5	116.2	12
13	19 36.8	+58.2	114.0	19 12.2	+58.5	114.4	18 47.4	+58.6	114.7	18 22.2	+58.8	115.0	17 56.7	+59.0	115.3	17 30.9	+59.3	115.6	17 04.9	+59.4	115.8	16 38.6	+59.5	116.1	13
14	20 35.0	+58.2	113.8	20 10.7	+58.4	114.1	19 46.0	+58.6	114.4	19 21.0	+58.9	114.8	18 55.7	+59.1	115.1	18 30.2	+59.2	115.4	18 04.3	+59.3	115.7	17 38.1	+59.5	116.0	14
15	21 33.2	+58.2	113.5	21 09.1	+58.4	113.9	20 44.6	+58.7	114.2	20 19.9	+58.8	114.6	19 54.8	+59.0	114.9	19 29.4	+59.2	115.2	19 03.6	+59.4	115.5	18 37.6	+59.5	115.8	15
16	22 31.4	+58.1	113.2	22 07.5	+58.4	113.6	21 43.3	+58.6	114.0	21 18.7	+58.8	114.4	20 53.8	+59.0	114.7	20 28.6	+59.1	115.0	20 03.0	+59.3	115.4	19 37.1	+59.5	115.7	16
17	23 29.5	+58.1	113.0	23 05.9	+58.3	113.4	22 41.9	+58.6	113.8	22 17.5	+58.8	114.1	21 52.8	+59.0	114.5	21 27.7	+59.2	114.9	21 02.3	+59.4	115.2	20 36.6	+59.5	115.6	17
18	24 27.6	+58.0	112.7	24 04.2	+58.3	113.1	23 40.5	+58.5	113.5	23 16.3	+58.8	113.9	22 51.8	+59.0	114.3	22 26.9	+59.2	114.7	22 01.7	+59.3	115.1	21 36.1	+59.5	115.4	18
19	25 25.6	+58.1	112.4	25 02.5	+58.3	112.9	24 39.0	+58.6	113.3	24 15.1	+58.8	113.7	23 50.8	+58.9	114.1	23 26.1	+59.1	114.5	23 01.0	+59.3	114.9	22 35.6	+59.4	115.3	19
20	26 23.7	+58.0	112.1	26 00.8	+58.3	112.6	25 37.6	+58.5	113.0	25 13.9	+58.7	113.5	24 49.7	+59.0	113.9	24 25.2	+59.2	114.3	24 00.3	+59.3	114.7	23 35.0	+59.5	115.1	20
21	27 21.7	+57.9	111.9	26 59.1	+58.2	112.3	26 36.1	+58.5	112.8	26 12.6	+58.7	113.3	25 48.7	+58.9	113.7	25 24.4	+59.1	114.1	24 59.6	+59.3	114.6	24 34.5	+59.4	115.0	21
22	28 19.6	+57.9	111.6	27 57.3	+58.2	112.1	27 34.6	+58.4	112.5	27 11.3	+58.7	113.0	26 47.6	+58.9	113.5	26 23.5	+59.1	113.9	25 58.9	+59.3	114.4	25 33.9	+59.5	114.8	22
23	29 17.5	+57.9	111.3	28 55.5	+58.2	111.8	28 33.0	+58.4	112.3	28 10.0	+58.7	112.8	27 46.5	+58.9	113.3	27 22.6	+59.1	113.8	26 58.2	+59.3	114.2	26 33.4	+59.4	114.7	23
24	30 15.4	+57.9	111.0	29 53.7	+58.1	111.5	29 31.4	+58.4	112.0	29 08.7	+58.6	112.6	28 45.4	+58.9	113.1	28 21.7	+59.1	113.6	27 57.5	+59.2	114.1	27 32.8	+59.4	114.5	24
25	31 13.3	+57.8	110.7	30 51.8	+58.1	111.2	30 29.8	+58.4	111.8	30 07.3	+58.7	112.3	29 44.3	+58.8	112.8	29 20.8	+59.0	113.4	28 56.7	+59.3	113.9	28 32.2	+59.4	114.4	25
26	32 11.1	+57.7	110.3	31 49.9	+58.1	110.9	31 28.2	+58.3	111.5	31 06.0	+58.5	112.1	30 43.1	+58.9	112.6	30 19.8	+59.1	113.2	29 56.0	+59.2	113.7	29 31.6	+59.4	114.2	26
27	33 08.8	+57.7	110.0	32 48.0	+58.0	110.6	32 26.5	+58.3	111.2	32 04.5	+58.6	111.8	31 42.0	+58.8	112.4	31 18.9	+59.0	112.9	30 55.2	+59.2	113.5	30 31.0	+59.4	114.0	27
28	34 06.5	+57.6	109.7	33 46.0	+57.9	110.3	33 24.8	+58.3	110.9	33 03.1	+58.5	111.5	32 40.8	+58.7	112.1	32 17.9	+59.0	112.7	31 54.4	+59.2	113.3	31 30.4	+59.3	113.9	28
29	35 04.1	+57.6	109.3	34 43.9	+58.0	110.0	34 23.1	+58.2	110.6	34 01.6	+58.5	111.3	33 39.5	+58.8	111.9	33 16.9	+58.9	112.5	32 53.6	+59.2	113.1	32 29.7	+59.4	113.7	29
30	36 01.7	+57.6	109.0	35 41.9	+57.8	109.7	35 21.3	+58.2	110.4	35 00.1	+58.5	111.0	34 38.3	+58.7	111.7	34 15.8	+59.0	112.3	33 52.8	+59.1	112.9	33 29.1	+59.3	113.5	30
31	36 59.3	+57.4	108.6	36 39.7	+57.8	109.4	36 19.5	+58.1	110.1	35 58.6	+58.4	110.7	35 37.0	+58.7	111.4	35 14.8	+58.9	112.1	34 51.9	+59.1	112.7	34 28.4	+59.4	113.4	31
32	37 56.7	+57.4	108.3	37 37.5	+57.8	109.0	37 17.6	+58.1	109.7	36 57.0	+58.4	110.5	36 35.7	+58.6	111.2	36 13.7	+58.9	111.8	35 51.0	+59.2	112.5	35 27.8	+59.3	113.2	32
33	38 54.1	+57.3	107.9	38 35.3	+57.7	108.7	38 15.7	+58.0	109.4	37 55.4	+58.3	110.2	37 34.3	+58.6	110.9	37 12.6	+58.9	111.6	36 50.2	+59.0	112.3	36 27.1	+59.2	113.0	33
34	39 51.4	+57.3	107.5	39 33.0	+57.6	108.3	39 13.7	+58.0	109.1	38 53.7	+58.3	109.9	38 32.9	+58.6	110.6	38 11.5	+58.8	111.4	37 49.2	+59.1	112.1	37 26.3	+59.3	112.8	34
35	40 48.7	+57.1	107.1	40 30.6	+57.5	108.0	40 11.7	+57.9	108.8	39 52.0	+58.2	109.6	39 31.5	+58.5	110.3	39 10.3	+58.8	111.1	38 48.3	+59.0	111.9	38 25.6	+59.3	112.6	35
36	41 45.8	+57.1	106.7	41 28.1	+57.5	107.6	41 09.6	+57.8	108.4	40 50.2	+58.2	109.2	40 30.0	+58.5	110.0	40 09.1	+58.7	110.8	39 47.3	+59.1	111.6	39 24.9	+59.2	112.4	36
37	42 42.9	+57.0	106.3	42 25.6	+57.4	107.2	42 07.4	+57.8	108.1	41 48.4	+58.1	108.9	41 28.5	+58.5	109.8	41 07.8	+58.8	110.6	40 46.4	+58.9	111.4	40 24.1	+59.2	112.2	37
38	43 39.9	+56.8	105.9	43 23.0	+57.3	106.8	43 05.2	+57.7	107.7	42 46.5	+58.1	108.6	42 27.0	+58.4	109.4	42 06.6	+58.7	110.3	41 45.3	+59.0	111.1	41 23.3	+59.2	112.0	38
39	44 36.7	+56.8	105.4	44 20.3	+57.2	106.4	44 02.9	+57.6	107.3	43 44.6	+58.0	108.2	43 25.4	+58.3	109.1	43 05.3	+58.6	110.0	42 44.3	+58.9	110.9	42 22.5	+59.1	111.7	39
40	45 33.5	+56.7	105.0	45 17.5	+57.1	106.0	45 00.5	+57.6	106.9	44 42.6	+57.9	107.9	44 23.7	+58.3	108.8	44 03.9	+58.6	109.7	43 43.2	+58.9	110.6	43 21.6	+59.1	111.5	40
41	46 30.2	+56.5	104.5	46 14.6	+57.0	105.5	45 58.1	+57.4	106.5	45 40.5	+57.9	107.5	45 22.0	+58.2	108.5	45 02.5	+58.5	109.4	44 42.1	+58.8	110.4	44 20.7	+59.1	111.3	41
42	47 26.7	+56.4	104.0	47 11.6	+56.9	105.1	46 55.5	+57.4	106.1	46 38.4	+57.7	107.1	46 20.2	+58.1	108.1	46 01.0	+58.5	109.1	45 40.9	+58.8	110.1	45 19.8	+59.1	111.0	42
43	48 23.1	+56.3	103.5	48 08.5	+56.8	104.6	47 52.9	+57.2	105.7	47 36.1	+57.7	106.7	47 18.3	+58.1	107.8	46 59.5	+58.5	108.8	46 39.7	+58.7	109.8	46 18.9	+59.0	110.8	43
44	49 19.4	+56.1	103.0	49 05.3	+56.7	104.1	48 50.1	+57.2	105.2	48 33.8	+57.6	106.3	48 16.4	+58.0	107.4	47 58.0	+58.3	108.5	47 38.4	+58.7	109.5	47 17.9	+59.0	110.5	44
45	50 15.5	+55.9	102.4	50 02.0	+56.5	103.6	49 47.3	+57.0	104.8	49 31.4	+57.5	105.9	49 14.4	+58.0	107.0	48 56.3	+58.3	108.1	48 37.1	+58.7	109.2	48 16.9	+59.0	110.2	45
46	51 11.4	+55.8	101.9	50 58.5	+56.4	103.1	50 44.3	+56.9	104.3	50 28.9	+57.4	105.4	50 12.4	+57.8	106.6	49 54.6	+58.3	107.7	49 35.8	+58.6	108.9	49 15.9	+58.9	110.0	46
47	52 07.2	+55.6	101.3	51 54.9	+56.2	102.5	51 41.2	+56.8	103.8	51 26.3	+57.3	105.0	51 10.2	+57.7	106.2	50 52.9	+58.1	107.4	50 34.4	+58.5	108.5	50 14.8	+58.8	109.7	47
48	53 02.8	+55.4	100.6	52 51.1	+56.0	101.9	52 38.0	+56.6	103.2	52 23.6	+57.2	104.5	52 07.9	+57.7	105.7	51 51.0	+58.1	107.0	51 32.9	+58.5	108.2	51 13.6	+58.8	109.4	48
49	53 58.2	+55.2	100.0	53 47.1	+55.8	101.3	53 34.6	+56.5	102.7	53 20.8	+57.0	104.0	53 05.6	+57.5	105.3	52 49.1	+58.0	106.6	52 31.4	+58.4	107.8	52 12.4	+58.8	109.0	49
50	54 53.4	+54.9	99.3	54 42.9	+55.7	100.7	54 31.1	+56.2	102.1	54 17.8	+56.9	103.5	54 03.1	+57.4	104.8	53 47.1	+57.9	106.1	53 29.8	+58.3	107.4	53 11.2	+58.7	108.7	50
51	55 48.3	+54.7	98.6	55 38.6	+55.4	100.1	55 27.3	+56.2	101.5	55 14.7	+56.7	102.9	55 00.5	+57.3	104.3	54 45.0	+57.8	105.7	54 28.1	+58.2	107.0	54 09.9	+58.6	108.4	51
52	56 43.0	+54.4	97.9	56 34.0	+55.2	99.4	56 23.5	+55.9	100.9	56 11.4	+56.5	102.3	55 57.8	+57.2	103.8	55 42.8	+57.7	105.2	55 26.3	+58.2	106.6	55 08.5	+58.6	108.0	52
53	57 37.4	+54.1	97.1	57 29.2	+54.9	98.7	57 19.4	+55.6	100.2	57 07.9	+56.4	101.7	56 55.0	+57.0	103.2	56 40.5	+57.5	104.7	56 24.5	+58.0	106.2	56 07.1	+58.4	107.6	53
54	58 31.5	+53.8	96.3	58 24.1	+54.7	97.9	58 15.0	+55.5	99.5	58 04.3	+56.2	101.1	57 52.0	+56.8	102.7	57 38.0	+57.4	104.2	57 22.5	+58.0	105.7	57 05.5	+58.4	107.2	54
55	59 25.3	+53.4	95.4	59 18.8	+54.3	97.1	59 10.5	+55.1	98.8	59 00.5	+55.9	100.4	58 48.8	+56.6	102.0	58 35.4	+57.3	103.6	58 20.5	+57.8	105.2	58 03.9	+58.4	106.8	55
56	60 18.7	+53.1	94.5	60 13.1	+54.0	96.3	60 05.6	+54.9	98.0	59 56.4	+55.7	99.7	59 45.4	+56.5	101.4	59 32.7	+57.1	103.1	59 18.3	+57.7	104.7	59 02.3	+58.2	106.3	56
57	61 11.8	+52.6	93.6	61 07.1	+53.6	95.4	61 00.5	+54.6	97.2	60 52.1	+55.4	99.0	60 41.9	+56.2	100.7	60 29.8	+56.9	102.5	60 16.0	+57.6	104.2	60 00.5	+58.1	105.8	57
58	62 04.4	+52.1	92.5	62 00.7	+53.2	94.4	61 55.1	+54.2	96.3	61 47.5	+55.2	98.2	61 38.1	+56.0	100.0	61 26.7	+56.8	101.8	61 13.6	+57.4	103.6	60 58.6	+58.0	105.3	58
59	62 56.5	+51.6	91.5	62 53.9	+52.8	93.4	62 49.3	+53.8	95.4	62 42.7	+54.8	97.3	62 34.1	+55.7	99.2	62 23.5	+56.5	101.1	62 11.0	+57.2	103.0	61 56.6	+57.8	104.8	59
60	63 48.1	+51.0	90.3	63 46.7	+52.2	92.4	63 43.1	+53.4	94.4	63 37.5	+54.4	96.4	63 29.8	+55.4	98.4	63 20.0	+56.2	100.4	63 08.2	+57.0	102.3	62 54.4	+57.7	104.2	60
61	64 39.1	+50.4	89.1	64 38.9	+51.8	91.2	64 36.5	+53.0	93.3	64 31.9	+54.1	95.4	64 25.2	+55.0	97.5	64 16.2	+56.0	99.6	64 05.2	+56.8	101.6	63 52.1	+57.5	103.6	61
62	65 29.5	+49.8	87.8	65 30.7	+51.1	90.0	65 29.5	+52.4	92.2	65 26.0	+53.6	94.4	65 20.2	+54.7	96.6	65 12.2	+55.7	98.7	65 02.0	+56.6	100.9	64 49.6	+57.4	103.0	62
63	66 19.3	+48.9	86.5	66 21.8	+50.4	88.7	66 21.9	+51.8	91.0	66 19.6	+53.1	93.3	66 14.9	+54.3	95.6	66 07.9	+55.4	97.8	65 58.6	+56.3	100.1	65 47.0	+57.1	102.3	63
64	67 08.2	+48.1	85.0	67 12.2	+49.7	87.4	67 13.7	+51.1	89.8	67 12.7	+52.5	92.1	67 09.2	+53.8	94.5	67 03.3	+54.9	96.9	66 54.9	+56.0	99.2	66 44.1	+56.9	101.5	64
65	67 56.3	+47.1	83.4	68 01.9	+48.8	85.9	68 04.8	+50.5	88.4	68 05.2	+52.0	90.9	68 03.0	+53.3	93.3	67 58.2	+54.6	95.8	67 50.9	+55.6	98.3	67 41.0	+56.6	100.7	65
66	68 43.4	+46.1	81.8	68 50.7	+47.8	84.3	68 55.3	+49.6	86.9	68 57.2	+51.2	89.5	68 56.3	+52.7	92.1	68 52.8	+54.0	94.7	68 46.5	+55.3	97.3	68 37.6	+56.4	99.8	66
67	69 29.5	+44.8	80.0	69 38.5	+46.8	82.6	69 44.9	+48.6	85.3	69 48.4	+50.3	88.0	69 49.0	+52.0	90.7	69 46.8	+53.5	93.5	69 41.8	+54.8	96.2	69 34.0	+55.9	98.8	67
68	70 14.3	+43.5	78.0	70 25.3	+45.7	80.8	70 33.5	+47.6	83.6	70 38.7	+49.5	86.4	70 41.0	+51.2	89.3	70 40.3	+52.8	92.1	70 36.6	+54.3	95.0	70 29.9	+55.6	97.8	68
69	70 57.8	+42.1	76.0	71 11.0	+44.2	78.8	71 21.1	+46.4	81.7	71 28.2	+48.5	84.7	71 32.2	+50.4	87.7	71 33.1	+52.1	90.6	71 30.9	+53.7	93.6	71 25.5	+55.1	96.6	69
70	71 39.9	+40.3	73.7	71 55.2	+42.7	76.7	72 07.5	+45.0	79.7	72 16.7	+47.2	82.8	72 22.6	+49.3	85.9	72 25.2	+51.3	89.0	72 24.6	+53.0	92.2	72 20.6	+54.6	95.3	70
71	72 20.2	+38.5	71.3	72 37.9	+41.1	74.4	72 52.5	+43.5	77.5	73 03.9	+45.9	80.7	73 11.9	+48.1	84.0	73 16.5	+50.2	87.3	73 17.6	+52.2	90.6	73 15.2	+53.9	93.9	71
72	72 58.7	+36.5•	68.8	73 19.0	+39.0•	71.9	73 36.0	+41.7	75.1	73 49.8	+44.3	78.4	74 00.0	+46.8	81.9	74 06.7	+49.1	85.3	74 09.8	+51.2	88.8	74 09.1	+53.2	92.4	72
73	73 35.2	+34.0•	66.0	73 58.0	+36.9•	69.2	74 17.7	+39.8•	72.5	74 34.1	+42.4	76.0	74 46.8	+45.2	79.5	74 55.8	+47.8	83.2	75 01.0	+50.2	86.9	75 02.3	+52.3	90.6	73
74	74 09.2	+31.5•	63.0	74 34.9	+34.5•	66.3	74 57.5	+37.4•	69.7	75 16.5	+40.5•	73.2	75 32.0	+43.3•	77.0	75 43.6	+46.1	80.8	75 51.2	+48.8	84.7	75 54.6	+51.3	88.7	74
75	74 40.7	+28.7•	59.9	75 09.4	+31.7•	63.1	75 34.9	+34.8•	66.6	75 57.0	+38.0•	70.3	76 15.3	+41.2•	74.1	76 29.7	+44.3•	78.1	76 40.0	+47.2	82.3	76 45.9	+49.9	86.5	75
76	75 09.4	+25.5•	56.5	75 41.1	+28.6•	59.8	76 09.7	+31.9•	63.3	76 35.0	+35.2•	67.0	76 56.5	+38.6•	71.0	77 14.0	+42.0•	75.1	77 27.2	+45.3•	79.5	77 35.8	+48.4	84.0	76
77	75 34.9	+22.1•	52.9	76 09.7	+25.3•	56.1	76 41.6	+28.6•	59.7	77 10.2	+32.1•	63.4	77 35.1	+35.8•	67.5	77 56.0	+39.4•	71.8	78 12.5	+43.0•	76.4	78 24.2	+46.4•	81.1	77
78	75 57.0	+18.3•	49.1	76 35.0	+21.5•	52.3	77 10.2	+24.9•	55.8	77 42.3	+28.6•	59.6	78 10.9	+32.3•	63.7	78 35.4	+36.3•	68.1	78 55.5	+40.2•	72.9	79 10.6	+44.1•	77.9	78
79	76 15.3	+14.4•	45.2	76 56.5	+17.5•	48.2	77 35.1	+20.9•	51.6	78 10.9	+24.5•	55.3	78 43.2	+28.5•	59.5	79 11.7	+32.6•	64.0	79 35.7	+36.9•	68.9	79 54.7	+41.2•	74.1	79
80	76 29.7	+10.3•	41.0	77 14.0	+13.2•	43.9	77 56.0	+16.5•	47.2	78 35.4	+20.1•	50.8	79 11.7	+24.0•	54.9	79 44.3	+28.3•	59.4	80 12.6	+32.8•	64.4	80 35.9	+37.7•	69.8	80
81	76 40.0	+5.9•	36.8	77 27.2	+8.6•	39.5	78 12.5	+11.7•	42.5	78 55.5	+15.1•	46.0	79 35.7	+19.0•	49.9	80 12.6	+23.3•	54.3	80 45.4	+28.2•	59.3	81 13.6	+33.1•	64.9	81
82	76 45.9	+1.4•	32.5	77 35.8	+3.9•	34.9	78 24.2	+6.7•	37.7	79 16.0	+10.0•	40.9	79 54.7	+13.7•	44.6	80 35.9	+17.8•	48.8	81 13.6	+22.5•	53.7	81 46.7	+27.9•	59.2	82
83	76 47.3	−3.0•	28.1	77 39.7	−0.8•	30.2	78 30.9	+1.6•	32.7	79 20.6	+4.5•	35.6	80 08.4	+7.8•	38.9	80 53.7	+11.7•	42.8	81 36.1	+16.2•	47.5	82 14.6	+21.4•	52.9	83
84	76 44.3	−7.3•	23.7	77 38.9	−5.6•	25.6	78 32.5	−3.5•	27.7	79 25.1	−1.2•	30.2	80 16.2	+1.7•	33.1	81 05.4	+5.2•	36.6	81 52.3	+9.3•	40.8	82 36.0	+14.2•	45.8	84
85	76 37.0	−11.7•	19.4	77 33.3	−10.3•	20.9	78 29.0	−8.6•	22.7	79 23.9	−6.6•	24.7	80 17.9	−4.3•	27.2	81 10.6	−1.6•	30.1	82 01.6	+1.8•	33.7	82 50.2	+6.1•	38.1	85
86	76 25.3	−15.8•	15.2	77 23.0	−14.7•	16.4	78 20.4	−13.5•	17.7	79 17.3	−12.1•	19.4	80 13.6	−10.4•	21.3	81 09.0	−8.2•	23.6	82 03.4	−5.6•	26.5	82 56.3	−2.3•	30.1	86
87	76 09.5	−19.6•	11.1	77 08.3	−19.0•	12.0	78 06.9	−18.1•	13.0	79 05.2	−17.1•	14.1	80 03.2	−16.0•	15.5	81 00.8	−14.6•	17.2	81 57.8	−12.8•	19.3	82 54.0	−10.6•	22.0	87
88	75 49.9	−23.3•	7.2	76 49.3	−22.8•	7.8	77 48.8	−22.5•	8.4	78 48.1	−21.9•	9.1	79 47.2	−21.2•	10.0	80 46.2	−20.5•	11.1	81 45.0	−19.5•	12.4	82 43.4	−18.3•	14.1	88
89	75 26.6	−26.6•	3.5	76 26.5	−26.5•	3.8	77 26.3	−26.3•	4.1	78 26.2	−26.2•	4.4	79 26.0	−26.0•	4.8	80 25.7	−25.7•	5.3	81 25.5	−25.5•	5.9	82 25.1	−25.1•	6.7	89
90	75 00.0	−29.6•	0.0	76 00.0	−29.8•	0.0	77 00.0	−29.9•	0.0	78 00.0	−30.0•	0.0	79 00.0	−30.2•	0.0	80 00.0	−30.4•	0.0	81 00.0	−30.6•	0.0	82 00.0	−30.9•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 62°, 298°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 58.7	– 58.3	117.2	6 31.3	– 58.6	117.3	6 03.7	– 58.8	117.4	5 36.1	– 59.0	117.5	5 08.4	– 59.2	117.6	4 40.6	– 59.3	117.6	4 12.7	– 59.4	117.7	3 44.8	– 59.6	117.8	**0**
1	6 00.4	– 58.4	117.4	5 32.7	– 58.6	117.5	5 04.9	– 58.8	117.6	4 37.1	– 59.0	117.7	4 09.2	– 59.1	117.7	3 41.3	– 59.3	117.8	3 13.3	– 59.4	117.8	2 45.2	– 59.5	117.9	**1**
2	5 02.0	– 58.4	117.6	4 34.1	– 58.6	117.7	4 06.1	– 58.8	117.8	3 38.1	– 58.9	117.8	3 10.1	– 59.2	117.9	2 42.0	– 59.3	117.9	2 13.9	– 59.5	118.0	1 45.7	– 59.6	118.0	**2**
3	4 03.6	– 58.4	117.9	3 35.5	– 58.6	117.9	3 07.3	– 58.8	118.0	2 39.2	– 59.0	118.0	2 10.9	– 59.1	118.1	1 42.7	– 59.3	118.1	1 14.4	– 59.4	118.1	0 46.1	– 59.5	118.1	**3**
4	3 05.2	– 58.5	118.1	2 36.9	– 58.6	118.2	2 08.5	– 58.8	118.2	1 40.2	– 59.0	118.2	1 11.8	– 59.1	118.2	0 43.4	– 59.3	118.3	0 15.0	– 59.4	118.3	0 13.4	+ 59.5	61.7	**4**
5	2 06.7	– 58.4	118.3	1 38.3	– 58.7	118.4	1 09.7	– 58.8	118.4	0 41.2	– 59.0	118.4	0 12.7	– 59.2	118.4	0 15.9	+ 59.3	61.6	0 44.4	+ 59.4	61.6	1 12.9	+ 59.6	61.6	**5**
6	1 08.3	– 58.4	118.6	0 39.6	– 58.6	118.6	0 10.9	– 58.8	118.6	0 17.8	+ 59.0	61.4	0 46.5	+ 59.1	61.4	1 15.2	+ 59.3	61.4	1 43.8	+ 59.5	61.5	2 12.5	+ 59.5	61.5	**6**
7	0 09.9	– 58.4	118.8	0 19.0	+ 58.6	61.2	0 47.9	+ 58.8	61.2	1 16.8	+ 58.9	61.2	1 45.6	+ 59.2	61.3	2 14.5	+ 59.2	61.3	2 43.3	+ 59.4	61.3	3 12.0	+ 59.6	61.4	**7**
8	0 48.5	+ 58.4	61.0	1 17.6	+ 58.6	61.0	1 46.7	+ 58.8	61.0	2 15.7	+ 59.0	61.0	2 44.8	+ 59.1	61.1	3 13.7	+ 59.3	61.1	3 42.7	+ 59.4	61.2	4 11.6	+ 59.5	61.2	**8**
9	1 46.9	+ 58.4	60.8	2 16.2	+ 58.6	60.8	2 45.5	+ 58.8	60.8	3 14.7	+ 59.0	60.9	3 43.9	+ 59.1	60.9	4 13.0	+ 59.3	61.0	4 42.1	+ 59.4	61.0	5 11.1	+ 59.6	61.1	**9**
10	2 45.3	+ 58.4	60.5	3 14.8	+ 58.6	60.6	3 44.3	+ 58.8	60.6	4 13.7	+ 59.0	60.7	4 43.0	+ 59.2	60.7	5 12.3	+ 59.3	60.8	5 41.5	+ 59.5	60.9	6 10.7	+ 59.5	61.0	**10**
11	3 43.7	+ 58.4	60.3	4 13.4	+ 58.6	60.4	4 43.1	+ 58.8	60.4	5 12.7	+ 58.9	60.5	5 42.2	+ 59.1	60.6	6 11.6	+ 59.3	60.7	6 41.0	+ 59.4	60.8	7 10.2	+ 59.5	60.9	**11**
12	4 42.1	+ 58.4	60.1	5 12.0	+ 58.6	60.1	5 41.9	+ 58.8	60.2	6 11.6	+ 59.0	60.3	6 41.3	+ 59.1	60.4	7 10.9	+ 59.3	60.5	7 40.4	+ 59.4	60.6	8 09.7	+ 59.6	60.7	**12**
13	5 40.5	+ 58.4	59.8	6 10.6	+ 58.6	59.9	6 40.7	+ 58.7	60.0	7 10.6	+ 59.0	60.1	7 40.4	+ 59.2	60.2	8 10.2	+ 59.2	60.4	8 39.8	+ 59.4	60.5	9 09.3	+ 59.5	60.6	**13**
14	6 38.9	+ 58.4	59.6	7 09.2	+ 58.6	59.7	7 39.4	+ 58.8	59.8	8 09.6	+ 58.9	59.9	8 39.6	+ 59.1	60.1	9 09.4	+ 59.3	60.2	9 39.2	+ 59.4	60.3	10 08.8	+ 59.5	60.5	**14**
15	7 37.3	+ 58.4	59.4	8 07.8	+ 58.6	59.5	8 38.2	+ 58.8	59.6	9 08.5	+ 59.0	59.7	9 38.7	+ 59.1	59.9	10 08.7	+ 59.3	60.0	10 38.6	+ 59.4	60.2	11 08.3	+ 59.6	60.4	**15**
16	8 35.7	+ 58.4	59.1	9 06.4	+ 58.6	59.3	9 37.0	+ 58.8	59.4	10 07.5	+ 58.9	59.6	10 37.8	+ 59.1	59.7	11 08.0	+ 59.2	59.9	11 38.0	+ 59.4	60.1	12 07.9	+ 59.5	60.2	**16**
17	9 34.1	+ 58.3	58.9	10 05.0	+ 58.5	59.0	10 35.8	+ 58.7	59.2	11 06.4	+ 58.9	59.4	11 36.9	+ 59.1	59.5	12 07.2	+ 59.3	59.7	12 37.4	+ 59.4	59.9	13 07.4	+ 59.5	60.1	**17**
18	10 32.4	+ 58.4	58.7	11 03.5	+ 58.6	58.8	11 34.5	+ 58.8	59.0	12 05.3	+ 59.0	59.2	12 36.0	+ 59.1	59.4	13 06.5	+ 59.2	59.6	13 36.8	+ 59.4	59.8	14 06.9	+ 59.5	60.0	**18**
19	11 30.8	+ 58.3	58.4	12 02.1	+ 58.5	58.6	12 33.3	+ 58.7	58.8	13 04.3	+ 58.9	59.0	13 35.1	+ 59.1	59.2	14 05.7	+ 59.3	59.4	14 36.2	+ 59.4	59.6	15 06.4	+ 59.5	59.9	**19**
20	12 29.1	+ 58.3	58.2	13 00.6	+ 58.6	58.4	13 32.0	+ 58.7	58.6	14 03.2	+ 58.9	58.8	14 34.2	+ 59.1	59.0	15 05.0	+ 59.2	59.2	15 35.6	+ 59.3	59.5	16 05.9	+ 59.5	59.7	**20**
21	13 27.4	+ 58.3	57.9	13 59.2	+ 58.5	58.2	14 30.7	+ 58.8	58.4	15 02.1	+ 58.9	58.6	15 33.3	+ 59.0	58.8	16 04.2	+ 59.2	59.1	16 34.9	+ 59.4	59.3	17 05.4	+ 59.5	59.6	**21**
22	14 25.7	+ 58.3	57.7	14 57.7	+ 58.5	57.9	15 29.5	+ 58.7	58.2	16 01.0	+ 58.9	58.4	16 32.3	+ 59.1	58.6	17 03.4	+ 59.3	58.9	17 34.3	+ 59.4	59.2	18 04.9	+ 59.5	59.5	**22**
23	15 24.0	+ 58.3	57.5	15 56.2	+ 58.5	57.7	16 28.2	+ 58.7	57.9	16 59.9	+ 58.9	58.2	17 31.4	+ 59.1	58.5	18 02.7	+ 59.2	58.7	18 33.7	+ 59.3	59.0	19 04.4	+ 59.5	59.3	**23**
24	16 22.3	+ 58.3	57.2	16 54.7	+ 58.5	57.5	17 26.9	+ 58.6	57.7	17 58.8	+ 58.8	58.0	18 30.5	+ 59.0	58.3	19 01.9	+ 59.2	58.6	19 33.0	+ 59.4	58.9	20 03.9	+ 59.5	59.2	**24**
25	17 20.6	+ 58.2	57.0	17 53.2	+ 58.4	57.2	18 25.5	+ 58.7	57.5	18 57.6	+ 58.9	57.8	19 29.5	+ 59.0	58.1	20 01.1	+ 59.2	58.4	20 32.4	+ 59.3	58.7	21 03.4	+ 59.5	59.0	**25**
26	18 18.8	+ 58.3	56.7	18 51.6	+ 58.5	57.0	19 24.2	+ 58.6	57.3	19 56.5	+ 58.8	57.6	20 28.5	+ 59.0	57.9	21 00.3	+ 59.1	58.2	21 31.7	+ 59.3	58.6	22 02.9	+ 59.4	58.9	**26**
27	19 17.1	+ 58.2	56.5	19 50.1	+ 58.4	56.8	20 22.8	+ 58.7	57.1	20 55.3	+ 58.9	57.4	21 27.5	+ 59.0	57.7	21 59.4	+ 59.2	58.0	22 31.0	+ 59.4	58.4	23 02.3	+ 59.5	58.7	**27**
28	20 15.3	+ 58.1	56.2	20 48.5	+ 58.4	56.5	21 21.5	+ 58.6	56.8	21 54.2	+ 58.8	57.2	22 26.5	+ 59.0	57.5	22 58.6	+ 59.2	57.9	23 30.4	+ 59.3	58.2	24 01.8	+ 59.4	58.6	**28**
29	21 13.4	+ 58.2	55.9	21 46.9	+ 58.4	56.3	22 20.1	+ 58.6	56.6	22 53.0	+ 58.7	57.0	23 25.5	+ 59.0	57.3	23 57.8	+ 59.1	57.7	24 29.7	+ 59.3	58.1	25 01.2	+ 59.5	58.5	**29**
30	22 11.6	+ 58.1	55.7	22 45.3	+ 58.3	56.0	23 18.7	+ 58.5	56.4	23 51.7	+ 58.8	56.7	24 24.5	+ 59.0	57.1	24 56.9	+ 59.1	57.5	25 29.0	+ 59.3	57.9	26 00.7	+ 59.4	58.3	**30**
31	23 09.7	+ 58.1	55.4	23 43.6	+ 58.4	55.8	24 17.2	+ 58.6	56.1	24 50.5	+ 58.8	56.5	25 23.5	+ 58.9	56.9	25 56.0	+ 59.2	57.3	26 28.3	+ 59.2	57.7	27 00.1	+ 59.4	58.1	**31**
32	24 07.8	+ 58.1	55.1	24 42.0	+ 58.3	55.5	25 15.8	+ 58.5	55.9	25 49.3	+ 58.7	56.3	26 22.4	+ 58.9	56.7	26 55.2	+ 59.0	57.1	27 27.5	+ 59.3	57.5	27 59.5	+ 59.4	58.0	**32**
33	25 05.9	+ 58.1	54.9	25 40.3	+ 58.3	55.2	26 14.3	+ 58.5	55.6	26 48.0	+ 58.7	56.1	27 21.3	+ 58.9	56.5	27 54.2	+ 59.1	56.9	28 26.8	+ 59.2	57.4	28 58.9	+ 59.4	57.8	**33**
34	26 04.0	+ 58.0	54.6	26 38.6	+ 58.2	55.0	27 12.8	+ 58.5	55.4	27 46.7	+ 58.7	55.8	28 20.2	+ 58.9	56.3	28 53.3	+ 59.1	56.7	29 26.0	+ 59.3	57.2	29 58.3	+ 59.4	57.7	**34**
35	27 02.0	+ 57.9	54.3	27 36.8	+ 58.2	54.7	28 11.3	+ 58.4	55.1	28 45.4	+ 58.6	55.6	29 19.1	+ 58.8	56.0	29 52.4	+ 59.0	56.5	30 25.3	+ 59.2	57.0	30 57.7	+ 59.4	57.5	**35**
36	27 59.9	+ 58.0	54.0	28 35.0	+ 58.2	54.4	29 09.7	+ 58.4	54.9	29 44.0	+ 58.7	55.3	30 17.9	+ 58.9	55.8	30 51.4	+ 59.1	56.3	31 24.5	+ 59.2	56.8	31 57.1	+ 59.4	57.3	**36**
37	28 57.9	+ 57.9	53.7	29 33.2	+ 58.1	54.2	30 08.1	+ 58.4	54.6	30 42.7	+ 58.6	55.1	31 16.8	+ 58.8	55.6	31 50.5	+ 59.0	56.1	32 23.7	+ 59.2	56.6	32 56.5	+ 59.3	57.2	**37**
38	29 55.8	+ 57.8	53.4	30 31.3	+ 58.2	53.9	31 06.5	+ 58.4	54.4	31 41.3	+ 58.5	54.9	32 15.6	+ 58.8	55.4	32 49.5	+ 59.0	55.9	33 22.9	+ 59.1	56.4	33 55.8	+ 59.3	57.0	**38**
39	30 53.6	+ 57.8	53.1	31 29.5	+ 58.0	53.6	32 04.9	+ 58.3	54.1	32 39.8	+ 58.6	54.6	33 14.4	+ 58.7	55.1	33 48.5	+ 58.9	55.7	34 22.0	+ 59.2	56.2	34 55.1	+ 59.4	56.8	**39**
40	31 51.4	+ 57.8	52.8	32 27.5	+ 58.0	53.3	33 03.2	+ 58.2	53.8	33 38.4	+ 58.5	54.3	34 13.1	+ 58.8	54.9	34 47.4	+ 58.9	55.4	35 21.2	+ 59.1	56.0	35 54.5	+ 59.3	56.6	**40**
41	32 49.2	+ 57.7	52.5	33 25.5	+ 58.0	53.0	34 01.4	+ 58.3	53.5	34 36.9	+ 58.5	54.1	35 11.9	+ 58.7	54.6	35 46.3	+ 58.9	55.2	36 20.3	+ 59.1	55.8	36 53.8	+ 59.2	56.4	**41**
42	33 46.9	+ 57.7	52.1	34 23.5	+ 57.9	52.7	34 59.7	+ 58.2	53.2	35 35.4	+ 58.4	53.8	36 10.6	+ 58.6	54.4	36 45.2	+ 58.9	55.0	37 19.4	+ 59.1	55.6	37 53.0	+ 59.3	56.2	**42**
43	34 44.6	+ 57.6	51.8	35 21.4	+ 57.9	52.4	35 57.9	+ 58.1	52.9	36 33.8	+ 58.4	53.5	37 09.2	+ 58.6	54.1	37 44.1	+ 58.9	54.7	38 18.5	+ 59.0	55.4	38 52.3	+ 59.2	56.0	**43**
44	35 42.2	+ 57.5	51.5	36 19.3	+ 57.9	52.0	36 56.0	+ 58.1	52.6	37 32.2	+ 58.3	53.2	38 07.8	+ 58.6	53.8	38 43.0	+ 58.8	54.5	39 17.5	+ 59.1	55.2	39 51.5	+ 59.2	55.8	**44**
45	36 39.7	+ 57.5	51.1	37 17.2	+ 57.7	51.7	37 54.1	+ 58.0	52.3	38 30.5	+ 58.3	52.9	39 06.4	+ 58.6	53.6	39 41.8	+ 58.8	54.2	40 16.6	+ 59.0	54.9	40 50.7	+ 59.2	55.6	**45**
46	37 37.2	+ 57.4	50.7	38 14.9	+ 57.7	51.4	38 52.1	+ 58.0	52.0	39 28.8	+ 58.3	52.6	40 05.0	+ 58.5	53.3	40 40.6	+ 58.7	54.0	41 15.6	+ 58.9	54.7	41 49.9	+ 59.2	55.4	**46**
47	38 34.6	+ 57.4	50.4	39 12.6	+ 57.7	51.0	39 50.1	+ 58.0	51.6	40 27.1	+ 58.2	52.3	41 03.5	+ 58.4	53.0	41 39.3	+ 58.7	53.7	42 14.5	+ 58.9	54.4	42 49.1	+ 59.1	55.2	**47**
48	39 32.0	+ 57.2	50.0	40 10.3	+ 57.5	50.6	40 48.1	+ 57.8	51.3	41 25.3	+ 58.1	52.0	42 01.9	+ 58.5	52.7	42 38.0	+ 58.7	53.4	43 13.4	+ 58.9	54.2	43 48.2	+ 59.1	54.9	**48**
49	40 29.2	+ 57.2	49.6	41 07.8	+ 57.5	50.3	41 45.9	+ 57.8	51.0	42 23.4	+ 58.1	51.7	43 00.4	+ 58.3	52.4	43 36.7	+ 58.6	53.1	44 12.3	+ 58.9	53.9	44 47.3	+ 59.1	54.7	**49**
50	41 26.4	+ 57.1	49.2	42 05.3	+ 57.5	49.9	42 43.7	+ 57.7	50.6	43 21.5	+ 58.0	51.3	43 58.7	+ 58.3	52.1	44 35.3	+ 58.6	52.8	45 11.2	+ 58.8	53.6	45 46.4	+ 59.1	54.5	**50**
51	42 23.5	+ 57.0	48.8	43 02.8	+ 57.3	49.5	43 41.4	+ 57.7	50.2	44 19.5	+ 58.0	51.0	44 57.0	+ 58.3	51.7	45 33.9	+ 58.5	52.5	46 10.0	+ 58.8	53.4	46 45.5	+ 59.0	54.2	**51**
52	43 20.5	+ 56.9	48.4	44 00.1	+ 57.2	49.1	44 39.1	+ 57.6	49.8	45 17.5	+ 57.9	50.6	45 55.3	+ 58.1	51.4	46 32.4	+ 58.4	52.2	47 08.8	+ 58.7	53.1	47 44.5	+ 58.9	53.9	**52**
53	44 17.4	+ 56.8	47.9	44 57.3	+ 57.2	48.7	45 36.7	+ 57.5	49.4	46 15.4	+ 57.8	50.2	46 53.4	+ 58.2	51.0	47 30.8	+ 58.4	51.9	48 07.5	+ 58.7	52.8	48 43.4	+ 59.0	53.7	**53**
54	45 14.2	+ 56.7	47.5	45 54.5	+ 57.1	48.2	46 34.2	+ 57.4	49.0	47 13.2	+ 57.7	49.8	47 51.6	+ 58.0	50.7	48 29.2	+ 58.4	51.5	49 06.2	+ 58.6	52.4	49 42.4	+ 58.9	53.4	**54**
55	46 10.9	+ 56.6	47.0	46 51.6	+ 56.9	47.8	47 31.6	+ 57.3	48.6	48 10.9	+ 57.7	49.4	48 49.6	+ 58.0	50.3	49 27.6	+ 58.2	51.2	50 04.8	+ 58.6	52.1	50 41.3	+ 58.8	53.1	**55**
56	47 07.5	+ 56.5	46.5	47 48.5	+ 56.8	47.3	48 28.9	+ 57.1	48.1	49 08.6	+ 57.5	49.0	49 47.6	+ 57.8	49.9	50 25.8	+ 58.2	50.8	51 03.4	+ 58.5	51.8	51 40.1	+ 58.8	52.8	**56**
57	48 04.0	+ 56.3	46.0	48 45.3	+ 56.7	46.8	49 26.0	+ 57.1	47.7	50 06.1	+ 57.4	48.6	50 45.4	+ 57.8	49.5	51 24.0	+ 58.2	50.4	52 01.9	+ 58.4	51.4	52 38.9	+ 58.7	52.4	**57**
58	49 00.3	+ 56.1	45.5	49 42.0	+ 56.6	46.3	50 23.1	+ 57.0	47.2	51 03.5	+ 57.4	48.1	51 43.2	+ 57.7	49.0	52 22.2	+ 58.0	50.0	53 00.3	+ 58.4	51.0	53 37.6	+ 58.7	52.1	**58**
59	49 56.4	+ 56.1	45.0	50 38.6	+ 56.4	45.8	51 20.1	+ 56.8	46.7	52 00.9	+ 57.2	47.6	52 40.9	+ 57.6	48.6	53 20.2	+ 57.9	49.6	53 58.7	+ 58.2	50.6	54 36.3	+ 58.6	51.7	**59**
60	50 52.5	+ 55.8	44.4	51 35.0	+ 56.3	45.3	52 16.9	+ 56.7	46.2	52 58.1	+ 57.0	47.1	53 38.5	+ 57.5	48.1	54 18.1	+ 57.9	49.2	54 56.9	+ 58.2	50.2	55 34.9	+ 58.5	51.4	**60**
61	51 48.3	+ 55.7	43.8	52 31.3	+ 56.1	44.7	53 13.6	+ 56.5	45.6	53 55.1	+ 57.0	46.6	54 36.0	+ 57.3	47.6	55 16.0	+ 57.7	48.7	55 55.1	+ 58.1	49.8	56 33.4	+ 58.5	51.0	**61**
62	52 44.0	+ 55.4	43.2	53 27.4	+ 55.9	44.1	54 10.1	+ 56.3	45.1	54 52.1	+ 56.8	46.1	55 33.3	+ 57.2	47.1	56 13.7	+ 57.6	48.2	56 53.2	+ 58.0	49.4	57 31.9	+ 58.3	50.5	**62**
63	53 39.4	+ 55.3	42.6	54 23.3	+ 55.7	43.5	55 06.4	+ 56.2	44.5	55 48.9	+ 56.6	45.5	56 30.5	+ 57.1	46.6	57 11.3	+ 57.5	47.7	57 51.2	+ 57.9	48.9	58 30.2	+ 58.3	50.1	**63**
64	54 34.7	+ 55.0	41.9	55 19.0	+ 55.5	42.9	56 02.6	+ 56.0	43.9	56 45.5	+ 56.4	44.9	57 27.6	+ 56.9	46.0	58 08.8	+ 57.3	47.2	58 49.1	+ 57.8	48.4	59 28.5	+ 58.1	49.6	**64**
65	55 29.7	+ 54.8	41.2	56 14.5	+ 55.3	42.2	56 58.6	+ 55.8	43.2	57 41.9	+ 56.3	44.3	58 24.5	+ 56.7	45.4	59 06.1	+ 57.2	46.6	59 46.9	+ 57.6	47.9	60 26.6	+ 58.1	49.2	**65**
66	56 24.5	+ 54.5	40.5	57 09.8	+ 55.0	41.5	57 54.4	+ 55.5	42.5	58 38.2	+ 56.0	43.6	59 21.2	+ 56.5	44.8	60 03.3	+ 57.0	46.0	60 44.5	+ 57.5	47.3	61 24.7	+ 57.9	48.6	**66**
67	57 19.0	+ 54.2	39.7	58 04.8	+ 54.7	40.7	58 49.9	+ 55.3	41.8	59 34.2	+ 55.8	42.9	60 17.7	+ 56.3	44.1	61 00.3	+ 56.9	45.4	61 42.0	+ 57.3	46.7	62 22.6	+ 57.8	48.1	**67**
68	58 13.2	+ 53.9	38.9	58 59.5	+ 54.5	39.9	59 45.2	+ 55.0	41.0	60 30.0	+ 55.6	42.2	61 14.0	+ 56.1	43.4	61 57.2	+ 56.6	44.7	62 39.3	+ 57.1	46.1	63 20.4	+ 57.6	47.5	**68**
69	59 07.1	+ 53.5	38.1	59 54.0	+ 54.1	39.1	60 40.2	+ 54.6	40.2	61 25.6	+ 55.2	41.4	62 10.1	+ 55.8	42.7	62 53.8	+ 56.3	44.0	63 36.4	+ 57.0	45.4	64 18.0	+ 57.5	46.9	**69**
70	60 00.6	+ 53.2	37.2	60 48.1	+ 53.7	38.2	61 34.8	+ 54.4	39.4	62 20.8	+ 55.0	40.6	63 05.9	+ 55.6	41.9	63 50.1	+ 56.2	43.2	64 33.4	+ 56.7	44.7	65 15.5	+ 57.2	46.2	**70**
71	60 53.8	+ 52.7	36.2	61 41.8	+ 53.4	37.3	62 29.2	+ 54.0	38.5	63 15.8	+ 54.6	39.7	64 01.5	+ 55.2	41.0	64 46.3	+ 55.8	42.4	65 30.1	+ 56.4	43.9	66 12.7	+ 57.1	45.5	**71**
72	61 46.5	+ 52.3	35.2	62 35.2	+ 52.9	36.3	63 23.2	+ 53.5	37.5	64 10.4	+ 54.2	38.8	64 56.7	+ 54.9	40.1	65 42.1	+ 55.5	41.5	66 26.5	+ 56.1	43.1	67 09.8	+ 56.7	44.7	**72**
73	62 38.8	+ 51.8	34.2	63 28.1	+ 52.5	35.3	64 16.7	+ 53.2	36.5	65 04.6	+ 53.8	37.8	65 51.6	+ 54.4	39.1	66 37.6	+ 55.2	40.6	67 22.6	+ 55.9	42.2	68 06.5	+ 56.5	43.8	**73**
74	63 30.6	+ 51.3	33.1	64 20.6	+ 51.9	34.2	65 09.9	+ 52.6	35.4	65 58.4	+ 53.3	36.7	66 46.0	+ 54.0	38.1	67 32.8	+ 54.7	39.6	68 18.5	+ 55.4	41.2	69 03.0	+ 56.2	42.9	**74**
75	64 21.9	+ 50.6	31.9	65 12.5	+ 51.3	33.0	66 02.5	+ 52.0	34.2	66 51.7	+ 52.7	35.6	67 40.0	+ 53.6	37.0	68 27.5	+ 54.3	38.5	69 13.9	+ 55.1	40.1	69 59.2	+ 55.8	41.9	**75**
76	65 12.5	+ 50.0	30.6	66 03.8	+ 50.7	31.8	66 54.5	+ 51.4	33.0	67 44.4	+ 52.2	34.3	68 33.6	+ 52.9	35.8	69 21.8	+ 53.7	37.3	70 09.0	+ 54.5	39.0	70 55.0	+ 55.4	40.8	**76**
77	66 02.5	+ 49.2	29.3	66 54.5	+ 49.9	30.4	67 45.9	+ 50.7	31.7	68 36.6	+ 51.5	33.0	69 26.5	+ 52.3	34.4	70 15.5	+ 53.2	36.0	71 03.5	+ 54.0	37.7	71 50.4	+ 54.9	39.6	**77**
78	66 51.7	+ 48.3	27.8	67 44.4	+ 49.2	29.0	68 36.6	+ 49.9	30.2	69 28.1	+ 50.7	31.6	70 18.8	+ 51.6	33.0	71 08.7	+ 52.4	34.6	71 57.5	+ 53.4	36.4	72 45.3	+ 54.3	38.3	**78**
79	67 40.0	+ 47.5	26.3	68 33.6	+ 48.2	27.4	69 26.5	+ 49.0	28.7	70 18.8	+ 49.9	30.0	71 10.4	+ 50.7	31.5	72 01.1	+ 51.7	33.1	72 50.9	+ 52.6	34.8	73 39.6	+ 53.6	36.8	**79**
80	68 27.5	+ 46.4	24.7	69 21.8	+ 47.2	25.8	70 15.5	+ 48.0	27.0	71 08.7	+ 48.8	28.3	72 01.1	+ 49.8	29.8	72 52.8	+ 50.7	31.4	73 43.5	+ 51.8	33.2	74 33.2	+ 52.8	35.1	**80**
81	69 13.9	+ 45.3	22.9	70 09.0	+ 46.0	24.0	71 03.5	+ 46.9	25.2	71 57.5	+ 47.8	26.5	72 50.9	+ 48.7	27.9	73 43.5	+ 49.7	29.5	74 35.3	+ 50.7	31.3	75 26.0	+ 51.8	33.3	**81**
82	69 59.2	+ 44.0	21.0	70 55.0	+ 44.8	22.1	71 50.4	+ 45.6	23.2	72 45.3	+ 46.4	24.5	73 39.6	+ 47.4	25.9	74 33.2	+ 48.4	27.5	75 26.0	+ 49.5	29.2	76 17.8	+ 50.7	31.2	**82**
83	70 43.2	+ 42.6	19.0	71 39.8	+ 43.3	20.0	72 36.0	+ 44.0	21.1	73 31.7	+ 45.0	22.3	74 27.0	+ 45.8	23.7	75 21.6	+ 46.9	25.2	76 15.5	+ 48.0	26.9	77 08.5	+ 49.3	28.9	**83**
84	71 25.8	+ 40.9	16.8	72 23.1	+ 41.6	17.8	73 20.0	+ 42.5	18.8	74 16.7	+ 43.2	19.9	75 12.8	+ 44.2	21.2	76 08.5	+ 45.2	22.7	77 03.5	+ 46.3	24.3	77 57.8	+ 47.6	26.3	**84**
85	72 06.7	+ 39.2	14.5	73 04.7	+ 39.8	15.3	74 02.5	*+ 40.4* •	16.3	74 59.9	*+ 41.3* •	17.3	75 57.0	*+ 42.1* •	18.5	76 53.7	*+ 43.1* •	19.8	77 49.8	*+ 44.3* •	21.4	78 45.4	*+ 45.4* •	23.2	**85**
86	72 45.9	*+ 37.1* •	12.0	73 44.5	*+ 37.7* •	12.7	74 42.9	*+ 38.4* •	13.5	75 41.2	*+ 39.0* •	14.4	76 39.1	*+ 39.8* •	15.5	77 36.8	*+ 40.7* •	16.7	78 34.1	*+ 41.7* •	18.1	79 30.8	*+ 42.9* •	19.8	**86**
87	73 23.0	*+ 34.9* •	9.3	74 22.2	*+ 35.3* •	9.9	75 21.3	*+ 35.8* •	10.5	76 20.2	*+ 36.4* •	11.3	77 18.9	*+ 37.1* •	12.1	78 17.5	*+ 37.8* •	13.2	79 15.8	*+ 38.6* •	14.4	80 13.7	*+ 39.7* •	15.8	**87**
88	73 57.9	*+ 32.5* •	6.4	74 57.5	*+ 32.7* •	6.8	75 57.1	*+ 33.0* •	7.3	76 56.6	*+ 33.4* •	7.8	77 56.0	*+ 33.8* •	8.5	78 55.3	*+ 34.3* •	9.2	79 54.4	*+ 35.0* •	10.1	80 53.4	*+ 35.7* •	11.2	**88**
89	74 30.4	*+ 29.6* •	3.3	75 30.2	*+ 29.8* •	3.5	76 30.1	*+ 29.9* •	3.8	77 30.0	*+ 30.0* •	4.1	78 29.8	*+ 30.2* •	4.4	79 29.6	*+ 30.4* •	4.8	80 29.4	*+ 30.6* •	5.4	81 29.1	*+ 30.9* •	6.0	**89**
90	75 00.0	*+ 26.6* •	0.0	76 00.0	*+ 26.5* •	0.0	77 00.0	*+ 26.3* •	0.0	78 00.0	*+ 26.2* •	0.0	79 00.0	*+ 26.0* •	0.0	80 00.0	*+ 25.7* •	0.0	81 00.0	*+ 25.5* •	0.0	82 00.0	*+ 25.1* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 118°, 242°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 44.9	+58.3	116.2	6 18.3	+58.6	116.3	5 51.7	+58.8	116.4	5 25.0	+58.9	116.5	4 58.2	+59.1	116.6	4 31.3	+59.3	116.6	4 04.4	+59.4	116.7	3 37.4	+59.5	116.8	0
1	7 43.2	+58.4	116.0	7 16.9	+58.6	116.1	6 50.5	+58.7	116.2	6 23.9	+59.0	116.3	5 57.3	+59.1	116.4	5 30.6	+59.2	116.5	5 03.8	+59.4	116.6	4 36.9	+59.5	116.6	1
2	8 41.6	+58.3	115.7	8 15.5	+58.5	115.9	7 49.2	+58.8	116.0	7 22.9	+58.9	116.1	6 56.4	+59.1	116.2	6 29.8	+59.3	116.3	6 03.2	+59.4	116.4	5 36.4	+59.6	116.5	2
3	9 39.9	+58.4	115.5	9 14.0	+58.6	115.6	8 48.0	+58.7	115.8	8 21.8	+58.9	115.9	7 55.5	+59.1	116.1	7 29.1	+59.3	116.2	7 02.6	+59.4	116.3	6 36.0	+59.5	116.4	3
4	10 38.3	+58.3	115.3	10 12.6	+58.5	115.4	9 46.7	+58.8	115.6	9 20.7	+59.0	115.7	8 54.6	+59.1	115.9	8 28.4	+59.2	116.0	8 02.0	+59.4	116.1	7 35.5	+59.5	116.3	4
5	11 36.6	+58.3	115.0	11 11.1	+58.5	115.2	10 45.5	+58.7	115.4	10 19.7	+58.9	115.5	9 53.7	+59.1	115.7	9 27.6	+59.3	115.9	9 01.4	+59.4	116.0	8 35.0	+59.5	116.1	5
6	12 34.9	+58.3	114.8	12 09.6	+58.6	115.0	11 44.2	+58.7	115.2	11 18.6	+58.9	115.4	10 52.8	+59.1	115.5	10 26.9	+59.2	115.7	10 00.8	+59.4	115.9	9 34.5	+59.6	116.0	6
7	13 33.2	+58.3	114.5	13 08.2	+58.5	114.8	12 42.9	+58.7	115.0	12 17.5	+58.9	115.2	11 51.9	+59.1	115.4	11 26.1	+59.3	115.5	11 00.2	+59.4	115.7	10 34.1	+59.5	115.9	7
8	14 31.5	+58.2	114.3	14 06.7	+58.4	114.5	13 41.6	+58.7	114.7	13 16.4	+58.9	115.0	12 51.0	+59.1	115.2	12 25.4	+59.2	115.4	11 59.6	+59.4	115.6	11 33.6	+59.5	115.8	8
9	15 29.7	+58.3	114.0	15 05.1	+58.5	114.3	14 40.3	+58.7	114.5	14 15.3	+58.9	114.8	13 50.1	+59.0	115.0	13 24.6	+59.2	115.2	12 59.0	+59.3	115.4	12 33.1	+59.5	115.6	9
10	16 28.0	+58.2	113.8	16 03.6	+58.5	114.1	15 39.0	+58.7	114.3	15 14.2	+58.9	114.6	14 49.1	+59.1	114.8	14 23.8	+59.3	115.1	13 58.3	+59.4	115.3	13 32.6	+59.5	115.5	10
11	17 26.2	+58.2	113.5	17 02.1	+58.4	113.8	16 37.7	+58.7	114.1	16 13.1	+58.9	114.4	15 48.2	+59.1	114.6	15 23.1	+59.2	114.9	14 57.7	+59.4	115.1	14 32.1	+59.5	115.4	11
12	18 24.4	+58.2	113.3	18 00.5	+58.5	113.6	17 36.4	+58.6	113.9	17 12.0	+58.8	114.2	16 47.3	+59.0	114.4	16 22.3	+59.2	114.7	15 57.1	+59.3	115.0	15 31.6	+59.5	115.2	12
13	19 22.6	+58.2	113.0	18 59.0	+58.4	113.4	18 35.0	+58.7	113.7	18 10.8	+58.9	114.0	17 46.3	+59.0	114.3	17 21.5	+59.2	114.6	16 56.4	+59.4	114.8	16 31.1	+59.5	115.1	13
14	20 20.8	+58.1	112.8	19 57.4	+58.4	113.1	19 33.7	+58.6	113.4	19 09.7	+58.8	113.8	18 45.3	+59.0	114.1	18 20.7	+59.2	114.4	17 55.8	+59.3	114.7	17 30.6	+59.5	115.0	14
15	21 18.9	+58.1	112.5	20 55.8	+58.3	112.9	20 32.3	+58.6	113.2	20 08.5	+58.8	113.6	19 44.3	+59.1	113.9	19 19.9	+59.2	114.2	18 55.1	+59.4	114.5	18 30.1	+59.5	114.8	15
16	22 17.0	+58.1	112.2	21 54.1	+58.4	112.6	21 30.9	+58.6	113.0	21 07.3	+58.8	113.3	20 43.4	+58.9	113.7	20 19.1	+59.2	114.0	19 54.5	+59.3	114.4	19 29.6	+59.5	114.7	16
17	23 15.1	+58.1	112.0	22 52.5	+58.3	112.4	22 29.5	+58.5	112.7	22 06.1	+58.8	113.1	21 42.3	+59.0	113.5	21 18.3	+59.1	113.9	20 53.8	+59.3	114.2	20 29.1	+59.4	114.6	17
18	24 13.2	+58.0	111.7	23 50.8	+58.3	112.1	23 28.0	+58.6	112.5	23 04.9	+58.7	112.9	22 41.3	+59.0	113.3	22 17.4	+59.2	113.7	21 53.1	+59.4	114.0	21 28.5	+59.5	114.4	18
19	25 11.2	+58.0	111.4	24 49.1	+58.3	111.8	24 26.6	+58.5	112.3	24 03.6	+58.8	112.7	23 40.3	+58.9	113.1	23 16.6	+59.1	113.5	22 52.5	+59.3	113.9	22 28.0	+59.4	114.3	19
20	26 09.2	+58.0	111.1	25 47.4	+58.2	111.6	25 25.1	+58.5	112.0	25 02.4	+58.7	112.5	24 39.2	+59.0	112.9	24 15.7	+59.1	113.3	23 51.8	+59.3	113.7	23 27.4	+59.5	114.1	20
21	27 07.2	+57.9	110.8	26 45.6	+58.2	111.3	26 23.6	+58.4	111.8	26 01.1	+58.7	112.2	25 38.2	+58.9	112.7	25 14.8	+59.1	113.1	24 51.1	+59.2	113.6	24 26.9	+59.4	114.0	21
22	28 05.1	+57.9	110.5	27 43.8	+58.2	111.0	27 22.0	+58.5	111.5	26 59.8	+58.7	112.0	26 37.1	+58.9	112.5	26 13.9	+59.1	112.9	25 50.3	+59.3	113.4	25 26.3	+59.4	113.8	22
23	29 03.0	+57.9	110.2	28 42.0	+58.1	110.8	28 20.5	+58.4	111.3	27 58.5	+58.6	111.8	27 36.0	+58.9	112.3	27 13.0	+59.1	112.7	26 49.6	+59.3	113.2	26 25.7	+59.5	113.7	23
24	30 00.9	+57.8	109.9	29 40.1	+58.2	110.5	29 18.9	+58.4	111.0	28 57.1	+58.7	111.5	28 34.9	+58.8	112.0	28 12.1	+59.1	112.5	27 48.9	+59.2	113.0	27 25.2	+59.4	113.5	24
25	30 58.7	+57.8	109.6	30 38.3	+58.0	110.2	30 17.3	+58.3	110.7	29 55.8	+58.6	111.3	29 33.7	+58.8	111.8	29 11.2	+59.0	112.3	28 48.1	+59.2	112.8	28 24.6	+59.4	113.4	25
26	31 56.5	+57.7	109.3	31 36.3	+58.0	109.9	31 15.6	+58.3	110.5	30 54.4	+58.5	111.0	30 32.5	+58.8	111.6	30 10.2	+59.0	112.1	29 47.3	+59.2	112.7	29 24.0	+59.3	113.2	26
27	32 54.2	+57.6	109.0	32 34.3	+58.0	109.6	32 13.9	+58.3	110.2	31 52.9	+58.6	110.8	31 31.3	+58.8	111.4	31 09.2	+59.0	111.9	30 46.5	+59.2	112.5	30 23.3	+59.4	113.0	27
28	33 51.8	+57.6	108.7	33 32.3	+58.0	109.3	33 12.2	+58.2	109.9	32 51.5	+58.5	110.5	32 30.1	+58.8	111.1	32 08.2	+59.0	111.7	31 45.7	+59.2	112.3	31 22.7	+59.4	112.9	28
29	34 49.4	+57.6	108.3	34 30.3	+57.8	109.0	34 10.4	+58.2	109.6	33 50.0	+58.4	110.3	33 28.9	+58.7	110.9	33 07.2	+59.0	111.5	32 44.9	+59.2	112.1	32 22.1	+59.3	112.7	29
30	35 47.0	+57.5	108.0	35 28.1	+57.9	108.7	35 08.6	+58.2	109.3	34 48.4	+58.5	110.0	34 27.6	+58.7	110.6	34 06.2	+58.9	111.3	33 44.1	+59.1	111.9	33 21.4	+59.3	112.5	30
31	36 44.5	+57.4	107.6	36 26.0	+57.8	108.3	36 06.8	+58.1	109.0	35 46.9	+58.4	109.7	35 26.3	+58.7	110.4	35 05.1	+58.9	111.0	34 43.2	+59.1	111.7	34 20.7	+59.4	112.3	31
32	37 41.9	+57.4	107.3	37 23.8	+57.7	108.0	37 04.9	+58.0	108.7	36 45.3	+58.3	109.4	36 25.0	+58.6	110.1	36 04.0	+58.9	110.8	35 42.3	+59.1	111.5	35 20.1	+59.2	112.1	32
33	38 39.3	+57.3	106.9	38 21.5	+57.6	107.6	38 02.9	+58.0	108.4	37 43.6	+58.3	109.1	37 23.6	+58.6	109.9	37 02.9	+58.8	110.6	36 41.4	+59.1	111.3	36 19.3	+59.3	112.0	33
34	39 36.6	+57.2	106.5	39 19.1	+57.6	107.3	39 00.9	+58.0	108.1	38 41.9	+58.3	108.8	38 22.2	+58.5	109.6	38 01.7	+58.8	110.3	37 40.5	+59.1	111.0	37 18.6	+59.3	111.8	34
35	40 33.8	+57.1	106.1	40 16.7	+57.5	106.9	39 58.9	+57.8	107.7	39 40.2	+58.2	108.5	39 20.7	+58.6	109.3	39 00.5	+58.8	110.1	38 39.6	+59.0	110.8	38 17.9	+59.2	111.6	35
36	41 30.9	+57.0	105.7	41 14.2	+57.5	106.5	40 56.7	+57.9	107.4	40 38.4	+58.2	108.2	40 19.3	+58.4	109.0	39 59.3	+58.8	109.8	39 38.6	+59.0	110.6	39 17.1	+59.2	111.4	36
37	42 27.9	+57.0	105.3	42 11.7	+57.3	106.2	41 54.6	+57.7	107.0	41 36.6	+58.1	107.9	41 17.7	+58.4	108.7	40 58.1	+58.7	109.5	40 37.6	+59.0	110.4	40 16.3	+59.2	111.1	37
38	43 24.9	+56.8	104.9	43 09.0	+57.3	105.8	42 52.3	+57.7	106.7	42 34.7	+58.0	107.5	42 16.1	+58.4	108.4	41 56.8	+58.6	109.3	41 36.6	+58.9	110.1	41 15.5	+59.2	110.9	38
39	44 21.7	+56.8	104.4	44 06.3	+57.2	105.4	43 50.0	+57.6	106.3	43 32.7	+58.0	107.2	43 14.5	+58.3	108.1	42 55.4	+58.7	109.0	42 35.5	+58.9	109.9	42 14.7	+59.1	110.7	39
40	45 18.5	+56.6	104.0	45 03.5	+57.1	104.9	44 47.6	+57.5	105.9	44 30.7	+57.9	106.8	44 12.8	+58.3	107.8	43 54.1	+58.5	108.7	43 34.4	+58.8	109.6	43 13.8	+59.1	110.5	40
41	46 15.1	+56.5	103.5	46 00.6	+57.0	104.5	45 45.1	+57.4	105.5	45 28.6	+57.8	106.5	45 11.1	+58.2	107.4	44 52.6	+58.6	108.4	44 33.2	+58.9	109.3	44 12.9	+59.1	110.2	41
42	47 11.6	+56.4	103.0	46 57.6	+56.9	104.0	46 42.5	+57.3	105.1	46 26.4	+57.8	106.1	46 09.3	+58.1	107.1	45 51.2	+58.4	108.1	45 32.1	+58.7	109.0	45 12.0	+59.1	110.0	42
43	48 08.0	+56.2	102.5	47 54.5	+56.7	103.6	47 39.8	+57.3	104.6	47 24.2	+57.6	105.7	47 07.4	+58.1	106.7	46 49.6	+58.4	107.7	46 30.8	+58.8	108.8	46 11.1	+59.0	109.7	43
44	49 04.2	+56.1	102.0	48 51.2	+56.6	103.1	48 37.1	+57.1	104.2	48 21.8	+57.6	105.3	48 05.5	+58.0	106.3	47 48.0	+58.4	107.4	47 29.6	+58.7	108.5	47 10.1	+58.9	109.5	44
45	50 00.3	+55.9	101.4	49 47.8	+56.5	102.6	49 34.2	+57.0	103.7	49 19.4	+57.5	104.8	49 03.5	+57.9	106.0	48 46.4	+58.3	107.1	48 28.3	+58.6	108.1	48 09.0	+59.0	109.2	45
46	50 56.2	+55.8	100.8	50 44.3	+56.4	102.0	50 31.2	+56.9	103.2	50 16.9	+57.3	104.4	50 01.4	+57.8	105.6	49 44.7	+58.2	106.7	49 26.9	+58.6	107.8	49 08.0	+58.9	108.9	46
47	51 52.0	+55.5	100.2	51 40.7	+56.1	101.5	51 28.1	+56.7	102.7	51 14.2	+57.3	103.9	50 59.2	+57.7	105.1	50 42.9	+58.2	106.3	50 25.5	+58.5	107.5	50 06.9	+58.8	108.6	47
48	52 47.5	+55.4	99.6	52 36.8	+56.0	100.9	52 24.8	+56.6	102.2	52 11.5	+57.1	103.5	51 56.9	+57.6	104.7	51 41.1	+58.0	105.9	51 24.0	+58.4	107.1	51 05.7	+58.8	108.3	48
49	53 42.9	+55.1	99.0	53 32.8	+55.8	100.3	53 21.4	+56.4	101.6	53 08.6	+57.0	103.0	52 54.5	+57.5	104.2	52 39.1	+58.0	105.5	52 22.4	+58.4	106.8	52 04.5	+58.7	108.0	49
50	54 38.0	+54.9	98.3	54 28.6	+55.7	99.7	54 17.8	+56.3	101.1	54 05.6	+56.9	102.4	53 52.0	+57.4	103.8	53 37.1	+57.9	105.1	53 20.8	+58.3	106.4	53 03.2	+58.7	107.7	50
51	55 32.9	+54.7	97.6	55 24.3	+55.4	99.0	55 14.1	+56.1	100.5	55 02.5	+56.7	101.9	54 49.4	+57.3	103.3	54 35.0	+57.7	104.6	54 19.1	+58.2	106.0	54 01.9	+58.6	107.3	51
52	56 27.6	+54.4	96.9	56 19.7	+55.1	98.4	56 10.2	+55.8	99.8	55 59.2	+56.5	101.3	55 46.7	+57.1	102.7	55 32.7	+57.7	104.2	55 17.3	+58.2	105.6	55 00.5	+58.6	106.9	52
53	57 22.0	+54.1	96.1	57 14.8	+54.9	97.6	57 06.0	+55.7	99.2	56 55.7	+56.3	100.7	56 43.8	+57.0	102.2	56 30.4	+57.5	103.7	56 15.5	+58.0	105.1	55 59.1	+58.4	106.6	53
54	58 16.1	+53.7	95.3	58 09.7	+54.6	96.9	58 01.7	+55.4	98.5	57 52.0	+56.2	100.0	57 40.8	+56.8	101.6	57 27.9	+57.4	103.1	57 13.5	+57.9	104.7	56 57.5	+58.4	106.1	54
55	59 09.8	+53.4	94.4	59 04.3	+54.3	96.1	58 57.1	+55.2	97.7	58 48.2	+55.9	99.4	58 37.6	+56.6	101.0	58 25.3	+57.2	102.6	58 11.4	+57.8	104.2	57 55.9	+58.3	105.7	55
56	60 03.2	+53.0	93.5	59 58.6	+54.0	95.2	59 52.3	+54.8	97.0	59 44.1	+55.7	98.7	59 34.2	+56.4	100.4	59 22.5	+57.1	102.0	59 09.2	+57.7	103.7	58 54.2	+58.2	105.3	56
57	60 56.2	+52.6	92.6	60 52.6	+53.6	94.4	60 47.1	+54.6	96.1	60 39.8	+55.4	97.9	60 30.6	+56.2	99.7	60 19.6	+56.9	101.4	60 06.9	+57.5	103.1	59 52.4	+58.1	104.8	57
58	61 48.8	+52.2	91.6	61 46.2	+53.2	93.4	61 41.7	+54.2	95.3	61 35.2	+55.1	97.1	61 26.8	+55.9	98.9	61 16.5	+56.7	100.8	61 04.4	+57.4	102.5	60 50.5	+58.0	104.3	58
59	62 41.0	+51.6	90.5	62 39.4	+52.8	92.4	62 35.9	+53.8	94.4	62 30.3	+54.8	96.3	62 22.7	+55.7	98.2	62 13.2	+56.5	100.1	62 01.8	+57.2	101.9	61 48.5	+57.8	103.7	59
60	63 32.6	+51.0	89.4	63 32.2	+52.2	91.4	63 29.7	+53.4	93.4	63 25.1	+54.4	95.4	63 18.4	+55.4	97.4	63 09.7	+56.3	99.3	62 59.0	+57.0	101.3	62 46.3	+57.7	103.2	60
61	64 23.6	+50.4	88.2	64 24.4	+51.7	90.3	64 23.1	+52.9	92.3	64 19.5	+54.0	94.4	64 13.8	+55.1	96.5	64 06.0	+55.9	98.5	63 56.0	+56.8	100.6	63 44.0	+57.5	102.6	61
62	65 14.0	+49.8	86.9	65 16.1	+51.2	89.1	65 16.0	+52.4	91.2	65 13.5	+53.6	93.4	65 08.9	+54.6	95.6	65 01.9	+55.7	97.7	64 52.8	+56.5	99.8	64 41.5	+57.3	101.9	62
63	66 03.8	+48.9	85.5	66 07.3	+50.4	87.8	66 08.4	+51.8	90.1	66 07.1	+53.1	92.3	66 03.5	+54.3	94.6	65 57.6	+55.3	96.8	65 49.3	+56.3	99.0	65 38.8	+57.1	101.2	63
64	66 52.7	+48.2	84.1	66 57.7	+49.7	86.4	67 00.2	+51.2	88.8	67 00.2	+52.6	91.1	66 57.8	+53.8	93.5	66 52.9	+55.0	95.8	66 45.6	+56.0	98.2	66 35.9	+56.9	100.4	64
65	67 40.9	+47.1	82.5	67 47.4	+48.8	85.0	67 51.4	+50.4	87.4	67 52.8	+51.9	89.9	67 51.6	+53.3	92.3	67 47.9	+54.5	94.8	67 41.6	+55.6	97.2	67 32.8	+56.6	99.6	65
66	68 28.0	+46.2	80.9	68 36.2	+48.0	83.4	68 41.8	+49.6	86.0	68 44.7	+51.2	88.5	68 44.9	+52.7	91.1	68 42.4	+54.0	93.7	68 37.2	+55.3	96.2	68 29.4	+56.3	98.7	66
67	69 14.2	+44.9	79.1	69 24.2	+46.8	81.7	69 31.4	+48.7	84.4	69 35.9	+50.4	87.1	69 37.6	+52.0	89.8	69 36.4	+53.5	92.4	69 32.5	+54.7	95.1	69 25.7	+56.0	97.8	67
68	69 59.1	+43.7	77.2	70 11.0	+45.7	79.9	70 20.1	+47.7	82.7	70 26.3	+49.5	85.5	70 29.6	+51.2	88.3	70 29.9	+52.8	91.1	70 27.2	+54.3	93.9	70 21.7	+55.5	96.7	68
69	70 42.8	+42.2	75.2	70 56.7	+44.4	78.0	71 07.8	+46.4	80.8	71 15.8	+48.5	83.8	71 20.8	+50.4	86.7	71 22.7	+52.1	89.7	71 21.5	+53.7	92.6	71 17.2	+55.1	95.6	69
70	71 25.0	+40.6	73.0	71 41.1	+42.9	75.9	71 54.2	+45.2	78.8	72 04.3	+47.3	81.9	72 11.2	+49.3	85.0	72 14.8	+51.3	88.1	72 15.2	+53.0	91.2	72 12.3	+54.6	94.3	70
71	72 05.6	+38.7	70.6	72 24.0	+41.2	73.6	72 39.4	+43.6	76.7	72 51.6	+46.0	79.8	73 00.5	+48.2	83.1	73 06.1	+50.3	86.3	73 08.2	+52.2	89.6	73 06.9	+53.9	92.9	71
72	72 44.3	+36.7•	68.1	73 05.2	+39.3•	71.2	73 23.0	+41.9	74.3	73 37.6	+44.4	77.6	73 48.7	+46.9	81.0	73 56.4	+49.1	84.4	74 00.4	+51.3	87.9	74 00.8	+53.2	91.4	72
73	73 21.0	+34.4•	65.4	73 44.5	+37.2•	68.5	74 04.9	+39.9•	71.8	74 22.0	+42.6	75.2	74 35.6	+45.3	78.7	74 45.5	+47.8	82.3	74 51.7	+50.1	85.9	74 54.0	+52.3	89.6	73
74	73 55.4	+32.0•	62.5	74 21.7	+34.8•	65.7	74 44.8	+37.7•	69.0	75 04.6	+40.6•	72.5	75 20.9	+43.4	76.1	75 33.3	+46.2	79.9	75 41.8	+48.9	83.8	75 46.3	+51.2	87.7	74
75	74 27.4	+29.1•	59.4	74 56.5	+32.1•	62.6	75 22.5	+35.2•	66.0	75 45.2	+38.3•	69.6	76 04.3	+41.4•	73.4	76 19.5	+44.4•	77.3	76 30.7	+47.2	81.4	76 37.5	+50.0	85.5	75
76	74 56.5	+26.0•	56.1	75 28.6	+29.1•	59.3	75 57.7	+32.3•	62.7	76 23.5	+35.6•	66.4	76 45.7	+38.9•	70.3	77 03.9	+42.2•	74.4	77 17.9	+45.5•	78.6	77 27.5	+48.4	83.0	76
77	75 22.5	+22.7•	52.5	75 57.7	+25.8•	55.7	76 30.0	+29.1•	59.2	76 59.1	+32.5•	62.9	77 24.6	+36.0•	66.9	77 46.1	+39.7•	71.1	78 03.4	+43.1•	75.6	78 15.9	+46.6•	80.2	77
78	75 45.2	+19.1•	48.8	76 23.5	+22.2•	51.9	76 59.1	+25.5•	55.3	77 31.6	+29.0•	59.1	78 00.6	+32.8•	63.1	78 25.8	+36.5•	67.5	78 46.5	+40.5•	72.1	79 02.5	+44.2•	77.0	78
79	76 04.3	+15.2•	44.9	76 45.7	+18.2•	47.9	77 24.6	+21.5•	51.3	78 00.6	+25.2•	54.9	78 33.4	+28.9•	59.0	79 02.3	+33.0•	63.4	79 27.0	+37.1•	68.2	79 46.7	+41.4•	73.4	79
80	76 19.5	+11.2•	40.9	77 03.9	+14.0•	43.7	77 46.1	+17.3•	46.9	78 25.8	+20.7•	50.5	79 02.3	+24.7•	54.5	79 35.3	+28.8•	58.9	80 04.1	+33.3•	63.8	80 28.1	+37.9•	69.1	80
81	76 30.7	+6.8•	36.7	77 17.9	+9.6•	39.3	78 03.4	+12.5•	42.3	78 46.5	+16.0•	45.7	79 27.0	+19.7•	49.6	80 04.1	+24.0•	53.9	80 37.4	+28.6•	58.8	81 06.0	+33.6•	64.3	81
82	76 37.5	+2.5•	32.4	77 27.5	+4.9•	34.8	78 15.9	+7.7•	37.6	79 02.5	+10.8•	40.7	79 46.7	+14.5•	44.3	80 28.1	+18.6•	48.5	81 06.0	+23.2•	53.3	81 39.6	+28.3•	58.7	82
83	76 40.0	–1.9•	28.1	77 32.4	+0.2•	30.2	78 23.6	+2.7•	32.7	79 13.3	+5.5•	35.5	80 01.2	+8.7•	38.8	80 46.7	+12.5•	42.7	81 29.2	+17.0•	47.2	82 07.9	+22.2•	52.5	83
84	76 38.1	–6.3•	23.8	77 32.6	–4.5•	25.6	78 26.3	–2.5•	27.7	79 18.8	–0.1•	30.1	80 09.9	+2.8•	33.0	80 59.2	+6.2•	36.5	81 46.2	+10.1•	40.6	82 30.1	+14.9•	45.5	84
85	76 31.8	–10.6•	19.5	77 28.1	–9.2•	21.0	78 23.8	–7.5•	22.7	79 18.7	–5.6•	24.8	80 12.7	–3.3•	27.2	81 05.4	–0.6•	30.1	81 56.3	+2.9•	33.6	82 45.0	+7.1•	38.0	85
86	76 21.2	–14.7•	15.3	77 18.9	–13.6•	16.4	78 16.3	–12.5•	17.8	79 13.1	–10.9•	19.4	80 09.4	–9.2•	21.3	81 04.8	–7.1•	23.6	81 59.2	–4.5•	26.5	82 52.1	–1.3•	30.0	86
87	76 06.5	–18.6•	11.2	77 05.3	–17.9•	12.0	78 03.8	–17.0•	13.0	79 02.2	–16.1•	14.2	80 00.2	–15.0•	15.6	80 57.7	–13.5•	17.3	81 54.7	–11.8•	19.4	82 50.8	–9.5•	22.0	87
88	75 47.9	–22.3•	7.3	76 47.4	–21.9•	7.8	77 46.8	–21.4•	8.4	78 46.1	–20.9•	9.2	79 45.2	–20.2•	10.1	80 44.2	–19.4•	11.1	81 42.9	–18.4•	12.5	82 41.3	–17.2•	14.1	88
89	75 25.6	–25.6•	3.5	76 25.5	–25.5•	3.8	77 25.4	–25.4•	4.1	78 25.2	–25.2•	4.4	79 25.0	–25.0•	4.9	80 24.8	–24.8•	5.4	81 24.5	–24.5•	6.0	82 24.1	–24.1•	6.8	89
90	75 00.0	–28.7•	0.0	76 00.0	–28.9•	0.0	77 00.0	–29.0•	0.0	78 00.0	–29.1•	0.0	79 00.0	–29.3•	0.0	80 00.0	–29.5•	0.0	81 00.0	–29.7•	0.0	82 00.0	–30.0•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 63°, 297°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 44.9	−58.4	116.2	6 18.3	−58.5	116.3	5 51.7	−58.8	116.4	5 25.0	−59.0	116.5	4 58.2	−59.2	116.6	4 31.3	−59.3	116.6	4 04.4	−59.5	116.7	3 37.4	−59.6	116.8	0
1	5 46.5	−58.4	116.4	5 19.8	−58.6	116.5	4 52.9	−58.8	116.6	4 26.0	−58.9	116.7	3 59.0	−59.1	116.7	3 32.0	−59.3	116.8	3 04.9	−59.4	116.9	2 37.8	−59.5	116.9	1
2	4 48.1	−58.3	116.7	4 21.2	−58.6	116.7	3 54.1	−58.7	116.8	3 27.1	−59.0	116.9	2 59.9	−59.1	116.9	2 32.7	−59.2	117.0	2 05.5	−59.4	117.0	1 38.3	−59.6	117.0	2
3	3 49.8	−58.4	116.9	3 22.6	−58.6	117.0	2 55.4	−58.8	117.0	2 28.1	−59.0	117.0	2 00.8	−59.1	117.1	1 33.5	−59.3	117.1	1 06.1	−59.4	117.1	0 38.7	−59.5	117.1	3
4	2 51.4	−58.4	117.1	2 24.0	−58.6	117.2	1 56.6	−58.8	117.2	1 29.1	−58.9	117.2	1 01.7	−59.2	117.3	0 34.2	−59.3	117.3	0 06.7	−59.4	117.3	0 20.8	+59.5	62.7	4
5	1 53.0	−58.4	117.4	1 25.4	−58.6	117.4	0 57.8	−58.8	117.4	0 30.2	−59.0	117.4	0 02.5	−59.1	117.4	0 25.1	+59.3	62.6	0 52.7	+59.4	62.6	1 20.3	+59.6	62.6	5
6	0 54.6	−58.4	117.6	0 26.8	−58.6	117.6	0 01.0	+58.8	62.4	0 28.8	+58.9	62.4	0 56.6	+59.1	62.4	1 24.4	+59.2	62.4	1 52.1	+59.4	62.4	2 19.9	+59.5	62.5	6
7	0 03.8	+58.3	62.2	0 31.8	+58.5	62.2	0 59.8	+58.7	62.2	1 27.7	+59.0	62.2	1 55.7	+59.1	62.2	2 23.6	+59.3	62.3	2 51.5	+59.5	62.3	3 19.4	+59.5	62.4	7
8	1 02.1	+58.4	61.9	1 30.3	+58.6	62.0	1 58.5	+58.8	62.0	2 26.7	+59.0	62.0	2 54.8	+59.2	62.1	3 22.9	+59.3	62.1	3 51.0	+59.4	62.2	4 18.9	+59.6	62.2	8
9	2 00.5	+58.4	61.7	2 28.9	+58.6	61.7	2 57.3	+58.8	61.8	3 25.7	+58.9	61.8	3 54.0	+59.1	61.9	4 22.2	+59.3	62.0	4 50.4	+59.4	62.0	5 18.5	+59.5	62.1	9
10	2 58.9	+58.4	61.5	3 27.5	+58.6	61.5	3 56.1	+58.8	61.6	4 24.6	+59.0	61.7	4 53.1	+59.1	61.7	5 21.5	+59.2	61.8	5 49.8	+59.4	61.9	6 18.0	+59.5	62.0	10
11	3 57.3	+58.3	61.2	4 26.1	+58.6	61.3	4 54.9	+58.7	61.4	5 23.6	+58.9	61.5	5 52.2	+59.1	61.6	6 20.7	+59.3	61.6	6 49.2	+59.4	61.7	7 17.5	+59.6	61.9	11
12	4 55.6	+58.4	61.0	5 24.7	+58.6	61.1	5 53.6	+58.8	61.2	6 22.5	+59.0	61.3	6 51.3	+59.1	61.4	7 20.0	+59.3	61.5	7 48.6	+59.4	61.6	8 17.1	+59.5	61.7	12
13	5 54.0	+58.4	60.8	6 23.3	+58.5	60.9	6 52.4	+58.8	61.0	7 21.5	+58.9	61.1	7 50.4	+59.1	61.2	8 19.3	+59.3	61.3	8 48.0	+59.4	61.5	9 16.6	+59.5	61.6	13
14	6 52.4	+58.3	60.6	7 21.8	+58.6	60.7	7 51.2	+58.7	60.8	8 20.4	+58.9	60.9	8 49.5	+59.1	61.0	9 18.5	+59.3	61.2	9 47.4	+59.4	61.3	10 16.1	+59.5	61.5	14
15	7 50.7	+58.4	60.3	8 20.4	+58.5	60.4	8 49.9	+58.8	60.6	9 19.3	+59.0	60.7	9 48.6	+59.1	60.9	10 17.8	+59.2	61.0	10 46.8	+59.4	61.2	11 15.6	+59.5	61.3	15
16	8 49.1	+58.3	60.1	9 18.9	+58.6	60.2	9 48.7	+58.7	60.4	10 18.3	+58.9	60.5	10 47.7	+59.1	60.7	11 17.0	+59.3	60.9	11 46.2	+59.4	61.0	12 15.1	+59.6	61.2	16
17	9 47.4	+58.3	59.8	10 17.5	+58.5	60.0	10 47.4	+58.8	60.2	11 17.2	+58.9	60.3	11 46.8	+59.1	60.5	12 16.3	+59.2	60.7	12 45.6	+59.3	60.9	13 14.7	+59.5	61.1	17
18	10 45.7	+58.4	59.6	11 16.0	+58.6	59.8	11 46.2	+58.7	60.0	12 16.1	+58.9	60.1	12 45.9	+59.1	60.3	13 15.5	+59.2	60.5	13 44.9	+59.4	60.7	14 14.2	+59.5	61.0	18
19	11 44.1	+58.3	59.4	12 14.6	+58.5	59.5	12 44.9	+58.7	59.7	13 15.0	+58.9	59.9	13 45.0	+59.1	60.1	14 14.7	+59.3	60.4	14 44.3	+59.4	60.6	15 13.7	+59.5	60.8	19
20	12 42.4	+58.3	59.1	13 13.1	+58.5	59.3	13 43.6	+58.7	59.5	14 13.9	+58.9	59.7	14 44.1	+59.0	60.0	15 14.0	+59.2	60.2	15 43.7	+59.4	60.4	16 13.2	+59.5	60.7	20
21	13 40.7	+58.2	58.9	14 11.6	+58.5	59.1	14 42.3	+58.7	59.3	15 12.8	+58.9	59.5	15 43.1	+59.1	59.8	16 13.2	+59.2	60.0	16 43.1	+59.3	60.3	17 12.7	+59.5	60.6	21
22	14 38.9	+58.3	58.6	15 10.1	+58.4	58.9	15 41.0	+58.7	59.1	16 11.7	+58.9	59.3	16 42.2	+59.0	59.6	17 12.4	+59.2	59.9	17 42.4	+59.4	60.1	18 12.2	+59.4	60.4	22
23	15 37.2	+58.2	58.4	16 08.5	+58.5	58.6	16 39.7	+58.6	58.9	17 10.6	+58.8	59.1	17 41.2	+59.0	59.4	18 11.6	+59.2	59.7	18 41.8	+59.3	60.0	19 11.6	+59.5	60.3	23
24	16 35.4	+58.3	58.1	17 07.0	+58.5	58.4	17 38.3	+58.7	58.7	18 09.4	+58.9	58.9	18 40.2	+59.1	59.2	19 10.8	+59.2	59.5	19 41.1	+59.3	59.8	20 11.1	+59.5	60.1	24
25	17 33.7	+58.2	57.9	18 05.5	+58.4	58.2	18 37.0	+58.6	58.4	19 08.3	+58.8	58.7	19 39.3	+59.0	59.0	20 10.0	+59.2	59.3	20 40.4	+59.4	59.7	21 10.6	+59.5	60.0	25
26	18 31.9	+58.2	57.6	19 03.9	+58.4	57.9	19 35.6	+58.6	58.2	20 07.1	+58.8	58.5	20 38.3	+59.0	58.8	21 09.2	+59.1	59.2	21 39.8	+59.3	59.5	22 10.1	+59.4	59.9	26
27	19 30.1	+58.1	57.4	20 02.3	+58.4	57.7	20 34.2	+58.6	58.0	21 05.9	+58.8	58.3	21 37.3	+58.9	58.6	22 08.3	+59.2	59.0	22 39.1	+59.3	59.3	23 09.5	+59.5	59.7	27
28	20 28.2	+58.2	57.1	21 00.7	+58.3	57.4	21 32.8	+58.6	57.8	22 04.7	+58.8	58.1	22 36.2	+59.0	58.4	23 07.5	+59.1	58.8	23 38.4	+59.3	59.2	24 09.0	+59.4	59.6	28
29	21 26.4	+58.1	56.8	21 59.0	+58.4	57.2	22 31.4	+58.6	57.5	23 03.5	+58.7	57.9	23 35.2	+59.0	58.2	24 06.6	+59.1	58.6	24 37.7	+59.3	59.0	25 08.4	+59.4	59.4	29
30	22 24.5	+58.1	56.6	22 57.4	+58.3	56.9	23 30.0	+58.5	57.3	24 02.2	+58.8	57.7	24 34.2	+58.9	58.0	25 05.7	+59.2	58.4	25 37.0	+59.2	58.8	26 07.8	+59.4	59.3	30
31	23 22.6	+58.0	56.3	23 55.7	+58.3	56.7	24 28.5	+58.5	57.1	25 01.0	+58.7	57.4	25 33.1	+58.9	57.8	26 04.9	+59.0	58.2	26 36.2	+59.3	58.7	27 07.2	+59.5	59.1	31
32	24 20.6	+58.1	56.0	24 54.0	+58.3	56.4	25 27.0	+58.5	56.8	25 59.7	+58.7	57.2	26 32.0	+58.9	57.6	27 03.9	+59.1	58.1	27 35.5	+59.2	58.5	28 06.7	+59.4	58.9	32
33	25 18.7	+58.0	55.8	25 52.3	+58.2	56.1	26 25.5	+58.5	56.6	26 58.4	+58.7	57.0	27 30.9	+58.9	57.4	28 03.0	+59.1	57.9	28 34.7	+59.3	58.3	29 06.1	+59.3	58.8	33
34	26 16.7	+57.9	55.5	26 50.5	+58.2	55.9	27 24.0	+58.4	56.3	27 57.1	+58.6	56.7	28 29.8	+58.8	57.2	29 02.1	+59.0	57.7	29 34.0	+59.2	58.1	30 05.4	+59.4	58.6	34
35	27 14.6	+58.0	55.2	27 48.7	+58.2	55.6	28 22.4	+58.4	56.0	28 55.7	+58.7	56.5	29 28.6	+58.9	57.0	30 01.1	+59.1	57.5	30 33.2	+59.2	57.9	31 04.8	+59.4	58.5	35
36	28 12.6	+57.9	54.9	28 46.9	+58.1	55.3	29 20.8	+58.4	55.8	29 54.4	+58.6	56.3	30 27.5	+58.8	56.7	31 00.2	+59.0	57.2	31 32.4	+59.2	57.8	32 04.2	+59.3	58.3	36
37	29 10.5	+57.8	54.6	29 45.0	+58.1	55.0	30 19.2	+58.3	55.5	30 53.0	+58.5	56.0	31 26.3	+58.8	56.5	31 59.2	+58.9	57.0	32 31.6	+59.1	57.6	33 03.5	+59.4	58.1	37
38	30 08.3	+57.8	54.3	30 43.1	+58.1	54.8	31 17.5	+58.4	55.3	31 51.5	+58.6	55.8	32 25.1	+58.7	56.3	32 58.1	+59.0	56.8	33 30.7	+59.2	57.4	34 02.9	+59.3	57.9	38
39	31 06.1	+57.8	54.0	31 41.2	+58.0	54.5	32 15.9	+58.2	55.0	32 50.1	+58.5	55.5	33 23.8	+58.7	56.0	33 57.1	+58.9	56.6	34 29.9	+59.1	57.2	35 02.2	+59.3	57.7	39
40	32 03.9	+57.7	53.7	32 39.2	+58.0	54.2	33 14.1	+58.3	54.7	33 48.6	+58.4	55.2	34 22.5	+58.7	55.8	34 56.0	+58.9	56.4	35 29.0	+59.1	57.0	36 01.5	+59.3	57.6	40
41	33 01.6	+57.6	53.3	33 37.2	+57.9	53.9	34 12.4	+58.1	54.4	34 47.0	+58.5	55.0	35 21.2	+58.7	55.5	35 54.9	+58.9	56.1	36 28.1	+59.1	56.7	37 00.8	+59.2	57.4	41
42	33 59.2	+57.6	53.0	34 35.1	+57.9	53.5	35 10.5	+58.2	54.1	35 45.5	+58.4	54.7	36 19.9	+58.6	55.3	36 53.8	+58.9	55.9	37 27.2	+59.1	56.5	38 00.0	+59.3	57.2	42
43	34 56.8	+57.6	52.7	35 33.0	+57.8	53.2	36 08.7	+58.1	53.8	36 43.9	+58.3	54.4	37 18.5	+58.6	55.0	37 52.7	+58.8	55.6	38 26.3	+59.0	56.3	38 59.3	+59.2	57.0	43
44	35 54.4	+57.5	52.3	36 30.8	+57.8	52.9	37 06.8	+58.0	53.5	37 42.2	+58.3	54.1	38 17.1	+58.6	54.7	38 51.5	+58.8	55.4	39 25.3	+59.0	56.1	39 58.5	+59.2	56.8	44
45	36 51.9	+57.4	52.0	37 28.6	+57.7	52.6	38 04.8	+58.0	53.2	38 40.5	+58.3	53.8	39 15.7	+58.5	54.5	39 50.3	+58.7	55.1	40 24.3	+59.0	55.8	40 57.7	+59.1	56.5	45
46	37 49.3	+57.3	51.6	38 26.3	+57.7	52.2	39 02.8	+58.0	52.8	39 38.8	+58.2	53.5	40 14.2	+58.5	54.2	40 49.0	+58.7	54.9	41 23.3	+58.9	55.6	41 56.8	+59.2	56.3	46
47	38 46.6	+57.3	51.2	39 24.0	+57.6	51.8	40 00.8	+57.9	52.5	40 37.0	+58.2	53.2	41 12.7	+58.4	53.9	41 47.7	+58.7	54.6	42 22.2	+58.9	55.3	42 56.0	+59.1	56.1	47
48	39 43.9	+57.2	50.8	40 21.6	+57.5	51.5	40 58.7	+57.8	52.2	41 35.2	+58.1	52.9	42 11.1	+58.4	53.6	42 46.4	+58.7	54.3	43 21.1	+58.9	55.1	43 55.1	+59.1	55.9	48
49	40 41.1	+57.1	50.4	41 19.1	+57.4	51.1	41 56.5	+57.7	51.8	42 33.3	+58.0	52.5	43 09.5	+58.3	53.3	43 45.1	+58.5	54.0	44 20.0	+58.8	54.8	44 54.2	+59.1	55.6	49
50	41 38.2	+57.1	50.0	42 16.5	+57.4	50.7	42 54.2	+57.7	51.4	43 31.3	+58.0	52.2	44 07.8	+58.3	52.9	44 43.6	+58.6	53.7	45 18.8	+58.8	54.5	45 53.3	+59.0	55.4	50
51	42 35.3	+56.9	49.6	43 13.9	+57.2	50.3	43 51.9	+57.6	51.1	44 29.3	+57.9	51.8	45 06.1	+58.2	52.6	45 42.2	+58.5	53.4	46 17.6	+58.7	54.2	46 52.3	+59.0	55.1	51
52	43 32.2	+56.8	49.2	44 11.1	+57.2	49.9	44 49.5	+57.5	50.7	45 27.2	+57.8	51.4	46 04.3	+58.1	52.3	46 40.7	+58.4	53.1	47 16.3	+58.7	53.9	47 51.3	+58.9	54.8	52
53	44 29.0	+56.8	48.7	45 08.3	+57.1	49.5	45 47.0	+57.4	50.3	46 25.0	+57.8	51.1	47 02.4	+58.1	51.9	47 39.1	+58.3	52.8	48 15.0	+58.7	53.6	48 50.2	+58.9	54.6	53
54	45 25.8	+56.6	48.3	46 05.4	+57.0	49.0	46 44.4	+57.3	49.8	47 22.8	+57.6	50.7	48 00.5	+58.0	51.5	48 37.4	+58.3	52.4	49 13.7	+58.6	53.3	49 49.1	+58.9	54.3	54
55	46 22.4	+56.5	47.8	47 02.4	+56.8	48.6	47 41.7	+57.3	49.4	48 20.4	+57.6	50.3	48 58.5	+57.9	51.1	49 35.7	+58.3	52.0	50 12.3	+58.5	53.0	50 48.0	+58.8	54.0	55
56	47 18.9	+56.3	47.3	47 59.2	+56.8	48.1	48 39.0	+57.1	49.0	49 18.0	+57.5	49.8	49 56.4	+57.8	50.7	50 34.0	+58.1	51.7	51 10.8	+58.5	52.6	51 46.8	+58.7	53.6	56
57	48 15.2	+56.2	46.8	48 56.0	+56.6	47.6	49 36.1	+57.0	48.5	50 15.5	+57.4	49.4	50 54.2	+57.7	50.3	51 32.1	+58.1	51.3	52 09.3	+58.3	52.3	52 45.5	+58.7	53.3	57
58	49 11.4	+56.1	46.3	49 52.6	+56.5	47.1	50 33.1	+56.9	48.0	51 12.9	+57.2	48.9	51 51.9	+57.7	49.9	52 30.2	+58.0	50.9	53 07.6	+58.4	51.9	53 44.2	+58.7	53.0	58
59	50 07.5	+55.9	45.7	50 49.1	+56.3	46.6	51 30.0	+56.7	47.5	52 10.1	+57.2	48.4	52 49.6	+57.5	49.4	53 28.2	+57.9	50.4	54 06.0	+58.2	51.5	54 42.9	+58.5	52.6	59
60	51 03.4	+55.7	45.1	51 45.4	+56.1	46.0	52 26.7	+56.6	47.0	53 07.3	+57.0	47.9	53 47.1	+57.4	48.9	54 26.1	+57.8	50.0	55 04.2	+58.2	51.1	55 41.4	+58.5	52.2	60
61	51 59.1	+55.6	44.5	52 41.5	+56.0	45.5	53 23.3	+56.4	46.4	54 04.3	+56.8	47.4	54 44.5	+57.2	48.4	55 23.9	+57.6	49.5	56 02.4	+58.0	50.6	56 39.9	+58.4	51.8	61
62	52 54.7	+55.3	43.9	53 37.5	+55.8	44.9	54 19.7	+56.3	45.8	55 01.1	+56.7	46.9	55 41.7	+57.2	47.9	56 21.5	+57.6	49.0	57 00.4	+58.0	50.2	57 38.3	+58.4	51.4	62
63	53 50.0	+55.1	43.3	54 33.3	+55.6	44.2	55 16.0	+56.0	45.2	55 57.8	+56.6	46.3	56 38.9	+57.0	47.4	57 19.1	+57.4	48.5	57 58.4	+57.8	49.7	58 36.7	+58.2	51.0	63
64	54 45.1	+54.9	42.6	55 28.9	+55.4	43.6	56 12.0	+55.9	44.6	56 54.4	+56.3	45.7	57 35.9	+56.8	46.8	58 16.5	+57.3	48.0	58 56.2	+57.7	49.2	59 34.9	+58.1	50.5	64
65	55 40.0	+54.6	41.9	56 24.3	+55.1	42.9	57 07.9	+55.6	43.9	57 50.7	+56.1	45.0	58 32.7	+56.6	46.2	59 13.8	+57.1	47.4	59 53.9	+57.6	48.7	60 33.0	+58.0	50.0	65
66	56 34.6	+54.4	41.1	57 19.4	+54.9	42.2	58 03.5	+55.4	43.2	58 46.8	+56.0	44.4	59 29.3	+56.4	45.5	60 10.9	+56.9	46.8	60 51.5	+57.4	48.1	61 31.0	+57.9	49.5	66
67	57 29.0	+54.0	40.4	58 14.3	+54.6	41.4	58 58.9	+55.2	42.5	59 42.8	+55.7	43.7	60 25.7	+56.3	44.9	61 07.8	+56.7	46.1	61 48.9	+57.2	47.5	62 28.9	+57.7	48.9	67
68	58 23.0	+53.7	39.5	59 08.9	+54.3	40.6	59 54.1	+54.8	41.7	60 38.5	+55.4	42.9	61 22.0	+55.9	44.1	62 04.5	+56.6	45.5	62 46.1	+57.1	46.8	63 26.6	+57.6	48.3	68
69	59 16.7	+53.4	38.7	60 03.2	+53.9	39.8	60 48.9	+54.6	40.9	61 33.9	+55.1	42.1	62 17.9	+55.7	43.4	63 01.1	+56.2	44.7	63 43.2	+56.8	46.2	64 24.2	+57.3	47.7	69
70	60 10.1	+52.9	37.8	60 57.1	+53.6	38.9	61 43.5	+54.2	40.0	62 29.0	+54.8	41.3	63 13.6	+55.4	42.6	63 57.3	+56.0	44.0	64 40.0	+56.6	45.4	65 21.5	+57.2	47.0	70
71	61 03.0	+52.6	36.8	61 50.7	+53.2	37.9	62 37.7	+53.7	39.1	63 23.8	+54.4	40.4	64 09.0	+55.1	41.7	64 53.3	+55.8	43.1	65 36.6	+56.3	44.6	66 18.7	+57.0	46.2	71
72	61 55.6	+52.0	35.8	62 43.9	+52.7	36.9	63 31.4	+53.4	38.1	64 18.2	+54.1	39.4	65 04.1	+54.7	40.8	65 49.1	+55.3	42.2	66 32.9	+56.1	43.8	67 15.7	+56.7	45.4	72
73	62 47.6	+51.6	34.7	63 36.6	+52.2	35.9	64 24.8	+52.9	37.1	65 12.3	+53.6	38.4	65 58.8	+54.3	39.8	66 44.4	+55.1	41.3	67 29.0	+55.7	42.9	68 12.4	+56.4	44.6	73
74	63 39.2	+50.9	33.6	64 28.8	+51.7	34.8	65 17.7	+52.4	36.0	66 05.9	+53.1	37.3	66 53.1	+53.9	38.7	67 39.5	+54.5	40.2	68 24.7	+55.3	41.9	69 08.8	+56.0	43.6	74
75	64 30.1	+50.4	32.4	65 20.5	+51.0	33.6	66 10.1	+51.8	34.8	66 59.0	+52.5	36.1	67 47.0	+53.3	37.6	68 34.0	+54.1	39.1	69 20.0	+54.9	40.8	70 04.8	+55.7	42.6	75
76	65 20.5	+49.6	31.1	66 11.5	+50.4	32.3	67 01.9	+51.1	33.5	67 51.5	+52.0	34.9	68 40.3	+52.7	36.3	69 28.1	+53.6	37.9	70 14.9	+54.4	39.6	71 00.5	+55.3	41.5	76
77	66 10.1	+48.9	29.7	67 01.9	+49.6	30.9	67 53.0	+50.5	32.2	68 43.5	+51.2	33.5	69 33.0	+52.1	35.0	70 21.7	+52.9	36.6	71 09.3	+53.8	38.4	71 55.8	+54.7	40.3	77
78	66 59.0	+48.0	28.3	67 51.5	+48.8	29.4	68 43.5	+49.5	30.7	69 34.7	+50.4	32.1	70 25.1	+51.3	33.6	71 14.6	+52.3	35.2	72 03.1	+53.2	37.0	72 50.5	+54.1	38.9	78
79	67 47.0	+47.0	26.7	68 40.3	+47.8	27.9	69 33.0	+48.7	29.1	70 25.1	+49.5	30.5	71 16.4	+50.5	32.0	72 06.9	+51.4	33.6	72 56.3	+52.4	35.4	73 44.6	+53.4	37.4	79
80	68 34.0	+46.0	25.1	69 28.1	+46.8	26.2	70 21.7	+47.6	27.4	71 14.6	+48.5	28.8	72 06.9	+49.4	30.3	72 58.3	+50.4	31.9	73 48.7	+51.5	33.7	74 38.0	+52.6	35.7	80
81	69 20.0	+44.8	23.3	70 14.9	+45.6	24.4	71 09.3	+46.5	25.6	72 03.1	+47.4	26.9	72 56.3	+48.3	28.4	73 48.7	+49.3	30.0	74 40.2	+50.4	31.8	75 30.6	+51.6	33.9	81
82	70 04.8	+43.5	21.3	71 00.5	+44.3	22.4	71 55.8	+45.1	23.6	72 50.5	+46.0	24.9	73 44.6	+47.0	26.3	74 38.0	+48.1	27.9	75 30.6	+49.2	29.7	76 22.2	+50.4	31.8	82
83	70 48.3	+42.0	19.3	71 44.8	+42.7	20.3	72 40.9	+43.5	21.4	73 36.5	+44.4	22.6	74 31.6	+45.4	24.0	75 26.1	+46.4	25.6	76 19.8	+47.6	27.4	77 12.6	+48.9	29.4	83
84	71 30.3	+40.3	17.1	72 27.5	+41.1	18.0	73 24.4	+41.9	19.0	74 20.9	+42.7	20.2	75 17.0	+43.7	21.5	76 12.5	+44.7	23.0	77 07.4	+45.9	24.7	78 01.5	+47.2	26.7	84
85	72 10.6	+38.5	14.7	73 08.6	+39.1 •	15.5	74 06.3	+39.8 •	16.5	75 03.6	+40.7 •	17.5	76 00.7	+41.5 •	18.7	76 57.2	+42.6 •	20.1	77 53.3	+43.7 •	21.7	78 48.7	+45.0 •	23.6	85
86	72 49.1	+36.5 •	12.1	73 47.7	+37.0 •	12.9	74 46.1	+37.6 •	13.7	75 44.3	+38.3 •	14.6	76 42.2	+39.1 •	15.7	77 39.8	+40.1 •	16.9	78 37.0	+41.1 •	18.4	79 33.7	+42.3 •	20.1	86
87	73 25.6	+34.1 •	9.4	74 24.7	+34.6 •	10.0	75 23.7	+35.1 •	10.7	76 22.6	+35.7 •	11.4	77 21.3	+36.4 •	12.3	78 19.9	+37.0 •	13.3	79 18.1	+38.0 •	14.5	80 16.0	+39.0 •	16.0	87
88	73 59.7	+31.6 •	6.5	74 59.3	+31.8 •	6.9	75 58.8	+32.2 •	7.4	76 58.3	+32.6 •	7.9	77 57.7	+33.0 •	8.6	78 56.9	+33.6 •	9.3	79 56.1	+34.2 •	10.2	80 55.0	+35.0 •	11.4	88
89	74 31.3	+28.7 •	3.3	75 31.1	+28.9 •	3.6	76 31.0	+29.0 •	3.8	77 30.9	+29.1 •	4.1	78 30.7	+29.3 •	4.5	79 30.5	+29.5 •	4.9	80 30.3	+29.7 •	5.4	81 30.0	+30.0 •	6.0	89
90	75 00.0	+25.6 •	0.0	76 00.0	+25.5 •	0.0	77 00.0	+25.4 •	0.0	78 00.0	+25.2 •	0.0	79 00.0	+25.0 •	0.0	80 00.0	+24.8 •	0.0	81 00.0	+24.5 •	0.0	82 00.0	+24.1 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 117°, 243°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 30.9	+58.3	115.2	6 05.3	+58.5	115.3	5 39.6	+58.7	115.4	5 13.8	+58.9	115.5	4 47.9	+59.1	115.6	4 21.9	+59.3	115.7	3 55.9	+59.4	115.7	3 29.9	+59.5	115.8	**0**
1	7 29.2	+58.3	115.0	7 03.8	+58.5	115.1	6 38.3	+58.7	115.2	6 12.7	+58.9	115.3	5 47.0	+59.1	115.4	5 21.2	+59.3	115.5	4 55.3	+59.4	115.6	4 29.4	+59.5	115.7	**1**
2	8 27.5	+58.3	114.8	8 02.3	+58.6	114.9	7 37.0	+58.8	115.0	7 11.6	+58.9	115.1	6 46.1	+59.1	115.2	6 20.5	+59.2	115.3	5 54.7	+59.4	115.4	5 28.9	+59.5	115.5	**2**
3	9 25.8	+58.3	114.5	9 00.9	+58.5	114.7	8 35.8	+58.7	114.8	8 10.5	+59.0	114.9	7 45.2	+59.1	115.1	7 19.7	+59.3	115.2	6 54.1	+59.4	115.3	6 28.4	+59.6	115.4	**3**
4	10 24.1	+58.3	114.3	9 59.4	+58.5	114.4	9 34.5	+58.7	114.6	9 09.5	+58.9	114.7	8 44.3	+59.1	114.9	8 19.0	+59.2	115.0	7 53.5	+59.4	115.2	7 28.0	+59.5	115.3	**4**
5	11 22.4	+58.3	114.0	10 57.9	+58.5	114.2	10 33.2	+58.7	114.4	10 08.4	+58.9	114.6	9 43.4	+59.0	114.7	9 18.2	+59.3	114.9	8 52.9	+59.4	115.0	8 27.5	+59.5	115.1	**5**
6	12 20.7	+58.3	113.8	11 56.4	+58.5	114.0	11 31.9	+58.7	114.2	11 07.3	+58.9	114.4	10 42.4	+59.1	114.5	10 17.5	+59.2	114.7	9 52.3	+59.4	114.9	9 27.0	+59.5	115.0	**6**
7	13 19.0	+58.2	113.5	12 54.9	+58.5	113.8	12 30.6	+58.7	114.0	12 06.2	+58.9	114.2	11 41.5	+59.1	114.4	11 16.7	+59.2	114.5	10 51.7	+59.4	114.7	10 26.5	+59.5	114.9	**7**
8	14 17.2	+58.3	113.3	13 53.4	+58.5	113.5	13 29.3	+58.7	113.8	13 05.1	+58.8	114.0	12 40.6	+59.1	114.2	12 15.9	+59.3	114.4	11 51.1	+59.3	114.6	11 26.0	+59.5	114.8	**8**
9	15 15.5	+58.2	113.0	14 51.9	+58.4	113.3	14 28.0	+58.7	113.5	14 03.9	+58.9	113.8	13 39.7	+59.0	114.0	13 15.2	+59.2	114.2	12 50.4	+59.4	114.4	12 25.5	+59.5	114.6	**9**
10	16 13.7	+58.2	112.8	15 50.3	+58.5	113.1	15 26.7	+58.7	113.3	15 02.8	+58.9	113.6	14 38.7	+59.1	113.8	14 14.4	+59.2	114.0	13 49.8	+59.4	114.3	13 25.0	+59.5	114.5	**10**
11	17 11.9	+58.2	112.5	16 48.8	+58.4	112.8	16 25.4	+58.6	113.1	16 01.7	+58.8	113.4	15 37.8	+59.0	113.6	15 13.6	+59.2	113.9	14 49.2	+59.3	114.1	14 24.5	+59.5	114.4	**11**
12	18 10.1	+58.2	112.3	17 47.2	+58.4	112.6	17 24.0	+58.6	112.9	17 00.5	+58.9	113.2	16 36.8	+59.0	113.4	16 12.8	+59.2	113.7	15 48.5	+59.4	114.0	15 24.0	+59.5	114.2	**12**
13	19 08.3	+58.1	112.0	18 45.6	+58.4	112.3	18 22.6	+58.6	112.7	17 59.4	+58.8	113.0	17 35.8	+59.0	113.3	17 12.0	+59.2	113.5	16 47.9	+59.3	113.8	16 23.5	+59.5	114.1	**13**
14	20 06.4	+58.1	111.8	19 44.0	+58.3	112.1	19 21.2	+58.6	112.4	18 58.2	+58.8	112.8	18 34.8	+59.0	113.1	18 11.2	+59.2	113.4	17 47.2	+59.4	113.7	17 23.0	+59.5	114.0	**14**
15	21 04.5	+58.1	111.5	20 42.3	+58.4	111.9	20 19.8	+58.6	112.2	19 57.0	+58.8	112.5	19 33.8	+59.0	112.9	19 10.4	+59.1	113.2	18 46.6	+59.3	113.5	18 22.5	+59.5	113.8	**15**
16	22 02.6	+58.1	111.2	21 40.7	+58.3	111.6	21 18.4	+58.6	112.0	20 55.8	+58.8	112.3	20 32.8	+59.0	112.7	20 09.5	+59.2	113.0	19 45.9	+59.3	113.4	19 22.0	+59.4	113.7	**16**
17	23 00.7	+58.0	111.0	22 39.0	+58.3	111.4	22 17.0	+58.5	111.7	21 54.6	+58.7	112.1	21 31.8	+59.0	112.5	21 08.7	+59.1	112.8	20 45.2	+59.3	113.2	20 21.4	+59.5	113.5	**17**
18	23 58.7	+58.0	110.7	23 37.3	+58.3	111.1	23 15.5	+58.5	111.5	22 53.3	+58.8	111.9	22 30.8	+58.9	112.3	22 07.8	+59.2	112.7	21 44.5	+59.3	113.0	21 20.9	+59.4	113.4	**18**
19	24 56.7	+58.0	110.4	24 35.6	+58.2	110.8	24 14.0	+58.5	111.3	23 52.1	+58.7	111.7	23 29.7	+59.0	112.1	23 07.0	+59.1	112.5	22 43.8	+59.3	112.9	22 20.3	+59.5	113.3	**19**
20	25 54.7	+57.9	110.1	25 33.8	+58.2	110.6	25 12.5	+58.5	111.0	24 50.8	+58.7	111.4	24 28.7	+58.9	111.9	24 06.1	+59.1	112.3	23 43.1	+59.3	112.7	23 19.8	+59.4	113.1	**20**
21	26 52.6	+57.9	109.8	26 32.0	+58.2	110.3	26 11.0	+58.4	110.8	25 49.5	+58.7	111.2	25 27.6	+58.9	111.7	25 05.2	+59.1	112.1	24 42.4	+59.3	112.5	24 19.2	+59.4	113.0	**21**
22	27 50.5	+57.9	109.5	27 30.2	+58.2	110.0	27 09.4	+58.5	110.5	26 48.2	+58.6	111.0	26 26.5	+58.8	111.5	26 04.3	+59.1	111.9	25 41.7	+59.2	112.4	25 18.6	+59.5	112.8	**22**
23	28 48.4	+57.8	109.2	28 28.4	+58.1	109.7	28 07.9	+58.3	110.3	27 46.8	+58.7	110.8	27 25.3	+58.9	111.2	27 03.4	+59.0	111.7	26 40.9	+59.3	112.2	26 18.1	+59.4	112.6	**23**
24	29 46.2	+57.8	108.9	29 26.5	+58.1	109.5	29 06.2	+58.4	110.0	28 45.5	+58.6	110.5	28 24.2	+58.8	111.0	28 02.4	+59.1	111.5	27 40.2	+59.2	112.0	27 17.5	+59.4	112.5	**24**
25	30 44.0	+57.8	108.6	30 24.6	+58.0	109.2	30 04.6	+58.3	109.7	29 44.1	+58.6	110.3	29 23.0	+58.9	110.8	29 01.5	+59.0	111.3	28 39.4	+59.2	111.8	28 16.9	+59.4	112.3	**25**
26	31 41.8	+57.6	108.3	31 22.6	+58.0	108.9	31 02.9	+58.3	109.5	30 42.7	+58.5	110.0	30 21.9	+58.8	110.6	30 00.5	+59.0	111.1	29 38.6	+59.2	111.6	29 16.3	+59.3	112.2	**26**
27	32 39.4	+57.7	108.0	32 20.6	+58.0	108.6	32 01.2	+58.3	109.2	31 41.2	+58.5	109.8	31 20.7	+58.7	110.3	30 59.5	+59.0	110.9	30 37.8	+59.2	111.5	30 15.6	+59.4	112.0	**27**
28	33 37.1	+57.6	107.6	33 18.6	+57.9	108.3	32 59.5	+58.2	108.9	32 39.7	+58.5	109.5	32 19.4	+58.8	110.1	31 58.5	+59.0	110.7	31 37.0	+59.2	111.3	31 15.0	+59.3	111.8	**28**
29	34 34.7	+57.5	107.3	34 16.5	+57.9	108.0	33 57.7	+58.1	108.6	33 38.2	+58.5	109.2	33 18.2	+58.7	109.9	32 57.5	+58.9	110.5	32 36.2	+59.1	111.1	32 14.3	+59.4	111.7	**29**
30	35 32.2	+57.5	107.0	35 14.4	+57.8	107.6	34 55.8	+58.2	108.3	34 36.7	+58.4	109.0	34 16.9	+58.6	109.6	33 56.4	+58.9	110.2	33 35.3	+59.2	110.9	33 13.7	+59.3	111.5	**30**
31	36 29.7	+57.4	106.6	36 12.2	+57.7	107.3	35 54.0	+58.0	108.0	35 35.1	+58.4	108.7	35 15.5	+58.7	109.4	34 55.3	+58.9	110.0	34 34.5	+59.1	110.7	34 13.0	+59.3	111.3	**31**
32	37 27.1	+57.3	106.2	37 09.9	+57.7	107.0	36 52.0	+58.1	107.7	36 33.5	+58.3	108.4	36 14.2	+58.6	109.1	35 54.2	+58.9	109.8	35 33.6	+59.1	110.5	35 12.3	+59.3	111.1	**32**
33	38 24.4	+57.2	105.9	38 07.6	+57.6	106.6	37 50.1	+57.9	107.4	37 31.8	+58.3	108.1	37 12.8	+58.6	108.8	36 53.1	+58.8	109.5	36 32.7	+59.0	110.2	36 11.6	+59.2	110.9	**33**
34	39 21.6	+57.2	105.5	39 05.2	+57.6	106.3	38 48.0	+58.0	107.0	38 30.1	+58.2	107.8	38 11.4	+58.5	108.6	37 51.9	+58.8	109.3	37 31.7	+59.1	110.0	37 10.8	+59.3	110.7	**34**
35	40 18.8	+57.1	105.1	40 02.8	+57.5	105.9	39 46.0	+57.8	106.7	39 28.3	+58.2	107.5	39 09.9	+58.5	108.3	38 50.7	+58.8	109.0	38 30.8	+59.0	109.8	38 10.1	+59.2	110.5	**35**
36	41 15.9	+57.0	104.7	41 00.3	+57.4	105.5	40 43.8	+57.8	106.4	40 26.5	+58.1	107.2	40 08.4	+58.4	108.0	39 49.5	+58.7	108.8	39 29.8	+59.0	109.6	39 09.3	+59.2	110.3	**36**
37	42 12.9	+56.9	104.3	41 57.7	+57.3	105.1	41 41.6	+57.7	106.0	41 24.6	+58.1	106.8	41 06.8	+58.4	107.7	40 48.2	+58.7	108.5	40 28.8	+58.9	109.3	40 08.5	+59.2	110.1	**37**
38	43 09.8	+56.9	103.8	42 55.0	+57.3	104.7	42 39.3	+57.7	105.6	42 22.7	+58.0	106.5	42 05.2	+58.4	107.4	41 46.9	+58.6	108.2	41 27.7	+58.9	109.1	41 07.7	+59.1	109.9	**38**
39	44 06.7	+56.7	103.4	43 52.3	+57.2	104.3	43 37.0	+57.6	105.2	43 20.7	+58.0	106.2	43 03.6	+58.3	107.1	42 45.5	+58.7	107.9	42 26.6	+58.9	108.8	42 06.8	+59.2	109.7	**39**
40	45 03.4	+56.6	102.9	44 49.5	+57.0	103.9	44 34.6	+57.4	104.9	44 18.7	+57.9	105.8	44 01.9	+58.2	106.7	43 44.2	+58.5	107.7	43 25.5	+58.9	108.6	43 06.0	+59.1	109.4	**40**
41	46 00.0	+56.4	102.5	45 46.5	+57.0	103.5	45 32.0	+57.4	104.4	45 16.6	+57.8	105.4	45 00.1	+58.2	106.4	44 42.7	+58.5	107.3	44 24.4	+58.8	108.3	44 05.1	+59.0	109.2	**41**
42	46 56.4	+56.4	102.0	46 43.5	+56.8	103.0	46 29.4	+57.4	104.0	46 14.4	+57.7	105.0	45 58.3	+58.1	106.0	45 41.2	+58.5	107.0	45 23.2	+58.7	108.0	45 04.1	+59.1	109.0	**42**
43	47 52.8	+56.2	101.5	47 40.3	+56.7	102.5	47 26.8	+57.2	103.6	47 12.1	+57.7	104.6	46 56.4	+58.1	105.7	46 39.7	+58.4	106.7	46 21.9	+58.7	107.7	46 03.2	+59.0	108.7	**43**
44	48 49.0	+56.0	100.9	48 37.0	+56.6	102.0	48 24.0	+57.1	103.1	48 09.8	+57.5	104.2	47 54.5	+57.9	105.3	47 38.1	+58.3	106.4	47 20.6	+58.7	107.4	47 02.2	+58.9	108.4	**44**
45	49 45.0	+55.9	100.4	49 33.6	+56.5	101.5	49 21.1	+56.9	102.7	49 07.3	+57.5	103.8	48 52.4	+57.9	104.9	48 36.4	+58.3	106.0	48 19.3	+58.6	107.1	48 01.1	+59.0	108.2	**45**
46	50 40.9	+55.8	99.8	50 30.1	+56.3	101.0	50 18.0	+56.9	102.2	50 04.8	+57.3	103.4	49 50.3	+57.8	104.5	49 34.7	+58.2	105.7	49 17.9	+58.6	106.8	49 00.1	+58.8	107.9	**46**
47	51 36.7	+55.5	99.2	51 26.4	+56.2	100.5	51 14.9	+56.7	101.7	51 02.1	+57.2	102.9	50 48.1	+57.7	104.1	50 32.9	+58.1	105.3	50 16.5	+58.5	106.4	49 58.9	+58.9	107.6	**47**
48	52 32.2	+55.3	98.6	52 22.6	+55.9	99.9	52 11.6	+56.6	101.2	51 59.3	+57.1	102.4	51 45.8	+57.6	103.7	51 31.0	+58.0	104.9	51 15.0	+58.4	106.1	50 57.8	+58.7	107.3	**48**
49	53 27.5	+55.1	98.0	53 18.5	+55.8	99.3	53 08.2	+56.4	100.6	52 56.4	+57.0	101.9	52 43.4	+57.5	103.2	52 29.0	+58.0	104.5	52 13.4	+58.4	105.7	51 56.5	+58.8	107.0	**49**
50	54 22.6	+54.9	97.3	54 14.3	+55.6	98.7	54 04.6	+56.2	100.0	53 53.4	+56.8	101.4	53 40.9	+57.4	102.7	53 27.0	+57.9	104.0	53 11.8	+58.3	105.3	52 55.3	+58.6	106.6	**50**
51	55 17.5	+54.7	96.6	55 09.9	+55.4	98.0	55 00.8	+56.1	99.4	54 50.2	+56.7	100.8	54 38.3	+57.2	102.2	54 24.9	+57.7	103.6	54 10.1	+58.2	104.9	53 53.9	+58.6	106.3	**51**
52	56 12.2	+54.3	95.9	56 05.3	+55.1	97.3	55 56.9	+55.8	98.8	55 46.9	+56.5	100.3	55 35.5	+57.1	101.7	55 22.6	+57.6	103.1	55 08.3	+58.1	104.5	54 52.5	+58.6	105.9	**52**
53	57 06.5	+54.1	95.1	57 00.4	+54.9	96.6	56 52.7	+55.6	98.1	56 43.4	+56.3	99.7	56 32.6	+56.9	101.1	56 20.2	+57.5	102.6	56 06.4	+58.0	104.1	55 51.1	+58.4	105.5	**53**
54	58 00.6	+53.7	94.3	57 55.3	+54.6	95.9	57 48.3	+55.4	97.4	57 39.7	+56.2	99.0	57 29.5	+56.8	100.6	57 17.7	+57.4	102.1	57 04.4	+57.9	103.6	56 49.5	+58.4	105.1	**54**
55	58 54.3	+53.4	93.4	58 49.9	+54.3	95.1	58 43.7	+55.1	96.7	58 35.9	+55.8	98.3	58 26.3	+56.6	100.0	58 15.1	+57.2	101.6	58 02.3	+57.8	103.1	57 47.9	+58.3	104.7	**55**
56	59 47.7	+53.0	92.5	59 44.2	+53.9	94.2	59 38.8	+54.9	95.9	59 31.7	+55.7	97.6	59 22.9	+56.4	99.3	59 12.3	+57.1	101.0	59 00.1	+57.6	102.6	58 46.2	+58.1	104.2	**56**
57	60 40.7	+52.6	91.6	60 38.1	+53.6	93.4	60 33.7	+54.5	95.1	60 27.4	+55.4	96.9	60 19.3	+56.2	98.6	60 09.4	+56.9	100.4	59 57.7	+57.5	102.1	59 44.3	+58.1	103.7	**57**
58	61 33.3	+52.1	90.6	61 31.7	+53.2	92.4	61 28.2	+54.2	94.3	61 22.8	+55.1	96.1	61 15.5	+55.9	97.9	61 06.3	+56.7	99.7	60 55.2	+57.4	101.5	60 42.4	+57.9	103.2	**58**
59	62 25.4	+51.6	89.5	62 24.9	+52.8	91.4	62 22.4	+53.8	93.4	62 17.9	+54.8	95.3	62 11.4	+55.7	97.2	62 03.0	+56.4	99.0	61 52.6	+57.2	100.9	61 40.3	+57.8	102.7	**59**
60	63 17.0	+51.1	88.4	63 17.7	+52.2	90.4	63 16.2	+53.4	92.4	63 12.7	+54.4	94.4	63 07.1	+55.3	96.3	62 59.4	+56.2	98.3	62 49.8	+57.0	100.2	62 38.1	+57.7	102.1	**60**
61	64 08.1	+50.4	87.2	64 09.9	+51.7	89.3	64 09.6	+52.9	91.4	64 07.1	+54.0	93.4	64 02.4	+55.1	95.5	63 55.6	+56.0	97.5	63 46.8	+56.7	99.5	63 35.8	+57.5	101.5	**61**
62	64 58.5	+49.8	86.0	65 01.6	+51.2	88.1	65 02.5	+52.4	90.3	65 01.1	+53.6	92.4	64 57.5	+54.6	94.5	64 51.6	+55.6	96.7	64 43.5	+56.6	98.8	64 33.3	+57.3	100.9	**62**
63	65 48.3	+49.0	84.6	65 52.8	+50.4	86.9	65 54.9	+51.8	89.1	65 54.7	+53.1	91.3	65 52.1	+54.3	93.6	65 47.2	+55.3	95.8	65 40.1	+56.2	98.0	65 30.6	+57.1	100.2	**63**
64	66 37.3	+48.2	83.2	66 43.2	+49.7	85.5	66 46.7	+51.2	87.8	66 47.8	+52.5	90.2	66 46.4	+53.8	92.5	66 42.5	+55.0	94.8	66 36.3	+56.0	97.1	66 27.7	+56.8	99.4	**64**
65	67 25.5	+47.2	81.7	67 32.9	+48.9	84.1	67 37.9	+50.4	86.5	67 40.3	+51.9	88.9	67 40.2	+53.2	91.3	67 37.5	+54.5	93.8	67 32.3	+55.6	96.2	67 24.5	+56.6	98.6	**65**
66	68 12.7	+46.3	80.0	68 21.8	+48.0	82.5	68 28.3	+49.7	85.0	68 32.2	+51.2	87.6	68 33.4	+52.7	90.1	68 32.0	+54.0	92.7	68 27.9	+55.2	95.2	68 21.1	+56.3	97.7	**66**
67	68 59.0	+45.0	78.3	69 09.8	+47.0	80.9	69 18.0	+48.7	83.5	69 23.4	+50.5	86.1	69 26.1	+52.0	88.8	69 26.0	+53.5	91.4	69 23.1	+54.8	94.1	69 17.4	+56.0	96.7	**67**
68	69 44.0	+43.8	76.4	69 56.8	+45.8	79.1	70 06.7	+47.8	81.8	70 13.9	+49.5	84.5	70 18.1	+51.3	87.3	70 19.5	+52.8	90.1	70 17.9	+54.2	92.9	70 13.4	+55.5	95.7	**68**
69	70 27.8	+42.4	74.4	70 42.6	+44.5	77.2	70 54.5	+46.5	80.0	71 03.4	+48.6	82.8	71 09.4	+50.4	85.8	71 12.3	+52.1	88.7	71 12.1	+53.7	91.6	71 08.9	+55.1	94.6	**69**
70	71 10.2	+40.7	72.3	71 27.1	+43.0	75.1	71 41.0	+45.3	78.0	71 52.0	+47.3	81.0	71 59.8	+49.4	84.0	72 04.4	+51.3	87.1	72 05.8	+53.0	90.2	72 04.0	+54.5	93.3	**70**
71	71 50.9	+39.0	69.9	72 10.1	+41.4	72.9	72 26.3	+43.7	75.9	72 39.3	+46.1	79.0	72 49.2	+48.2	82.2	72 55.7	+50.3	85.4	72 58.8	+52.2	88.6	72 58.5	+53.9	91.9	**71**
72	72 29.9	*+37.0*•	67.5	72 51.5	+39.5	70.4	73 10.0	+42.1	73.6	73 25.4	+44.5	76.8	73 37.4	+47.0	80.1	73 46.0	+49.2	83.5	73 51.0	+51.3	86.9	73 52.4	+53.2	90.4	**72**
73	73 06.9	*+34.8*•	64.8	73 31.0	*+37.5*•	67.8	73 52.1	*+40.2*•	71.0	74 09.9	+42.9	74.4	74 24.4	+45.4	77.8	74 35.2	+47.9	81.4	74 42.3	+50.2	85.0	74 45.6	+52.3	88.7	**73**
74	73 41.7	*+32.3*•	61.9	74 08.5	*+35.1*•	65.0	74 32.3	*+37.9*•	68.3	74 52.8	*+40.8*•	71.8	75 09.8	+43.6	75.3	75 23.1	+46.3	79.1	75 32.5	+48.9	82.9	75 37.9	+51.3	86.7	**74**
75	74 14.0	*+29.6*•	58.9	74 43.6	*+32.5*•	62.0	75 10.2	*+35.5*•	65.4	75 33.6	*+38.5*•	68.9	75 53.4	*+41.5*•	72.6	76 09.4	+44.5	76.5	76 21.4	+47.4	80.5	76 29.2	+50.0	84.6	**75**
76	74 43.6	*+26.6*•	55.6	75 16.1	*+29.6*•	58.8	75 45.7	*+32.7*•	62.1	76 12.1	*+35.9*•	65.7	76 34.9	*+39.2*•	69.6	76 53.9	*+42.4*•	73.6	77 08.8	*+45.5*•	77.8	77 19.2	+48.5	82.1	**76**
77	75 10.2	*+23.4*•	52.2	75 45.7	*+26.4*•	55.3	76 18.4	*+29.6*•	58.7	76 48.0	*+32.9*•	62.3	77 14.1	*+36.4*•	66.2	77 36.3	*+39.9*•	70.4	77 54.3	*+43.3*•	74.8	78 07.7	*+46.7*•	79.4	**77**
78	75 33.6	*+19.8*•	48.5	76 12.1	*+22.8*•	51.6	76 48.0	*+26.1*•	54.9	77 20.9	*+29.6*•	58.6	77 50.5	*+33.1*•	62.5	78 16.2	*+36.8*•	66.8	78 37.6	*+40.7*•	71.4	78 54.4	*+44.3*•	76.2	**78**
79	75 53.4	*+16.0*•	44.7	76 34.9	*+19.0*•	47.7	77 14.1	*+22.2*•	50.9	77 50.5	*+25.7*•	54.5	78 23.6	*+29.4*•	58.5	78 53.0	*+33.4*•	62.8	79 18.3	*+37.4*•	67.5	79 38.7	*+41.6*•	72.6	**79**
80	76 09.4	*+12.0*•	40.7	76 53.9	*+14.9*•	43.5	77 36.3	*+18.0*•	46.6	78 16.2	*+21.4*•	50.1	78 53.0	*+25.3*•	54.0	79 26.4	*+29.3*•	58.4	79 55.7	*+33.7*•	63.2	80 20.3	*+38.2*•	68.4	**80**
81	76 21.4	*+7.8*•	36.6	77 08.8	*+10.4*•	39.2	77 54.3	*+13.4*•	42.1	78 37.6	*+16.8*•	45.5	79 18.3	*+20.4*•	49.3	79 55.7	*+24.6*•	53.5	80 29.4	*+29.1*•	58.3	80 58.5	*+34.0*•	63.7	**81**
82	76 29.2	*+3.5*•	32.4	77 19.2	*+5.9*•	34.7	78 07.7	*+8.6*•	37.4	78 54.4	*+11.7*•	40.5	79 38.7	*+15.3*•	44.1	80 20.3	*+19.3*•	48.2	80 58.5	*+23.8*•	52.9	81 32.5	*+28.8*•	58.3	**82**
83	76 32.7	*−0.9*•	28.1	77 25.1	*+1.3*•	30.2	78 16.3	*+3.7*•	32.6	79 06.1	*+6.4*•	35.4	79 54.0	*+9.7*•	38.7	80 39.6	*+13.4*•	42.5	81 22.3	*+17.8*•	46.9	82 01.3	*+22.8*•	52.1	**83**
84	76 31.8	*−5.2*•	23.8	77 26.4	*−3.5*•	25.6	78 20.0	*−1.4*•	27.7	79 12.5	*+1.0*•	30.1	80 03.7	*+3.8*•	33.0	80 53.0	*+7.1*•	36.4	81 40.1	*+11.1*•	40.4	82 24.1	*+15.8*•	45.3	**84**
85	76 26.6	*−9.5*•	19.5	77 22.9	*−8.1*•	21.0	78 18.6	*−6.5*•	22.7	79 13.5	*−4.5*•	24.8	80 07.5	*−2.3*•	27.2	81 00.1	*+0.6*•	30.1	81 51.2	*+3.8*•	33.6	82 39.9	*+8.0*•	37.8	**85**
86	76 17.1	*−13.6*•	15.3	77 14.8	*−12.6*•	16.5	78 12.1	*−11.3*•	17.9	79 09.0	*−9.9*•	19.5	80 05.2	*−8.1*•	21.4	81 00.7	*−6.1*•	23.7	81 55.0	*−3.4*•	26.5	82 47.9	*−0.2*•	30.0	**86**
87	76 03.5	*−17.6*•	11.3	77 02.2	*−16.8*•	12.1	78 00.8	*−16.0*•	13.1	78 59.1	*−15.0*•	14.3	79 57.1	*−13.9*•	15.6	80 54.6	*−12.4*•	17.3	81 51.6	*−10.7*•	19.4	82 47.7	*−8.4*•	22.0	**87**
88	75 45.9	*−21.2*•	7.3	76 45.4	*−20.8*•	7.9	77 44.8	*−20.4*•	8.5	78 44.1	*−19.9*•	9.2	79 43.2	*−19.2*•	10.1	80 42.2	*−18.4*•	11.2	81 40.9	*−17.4*•	12.5	82 39.3	*−16.2*•	14.2	**88**
89	75 24.7	*−24.7*•	3.6	76 24.6	*−24.6*•	3.8	77 24.4	*−24.4*•	4.1	78 24.2	*−24.2*•	4.5	79 24.0	*−24.0*•	4.9	80 23.8	*−23.8*•	5.4	81 23.5	*−23.5*•	6.0	82 23.1	*−23.1*•	6.8	**89**
90	75 00.0	*−27.8*•	0.0	76 00.0	*−27.9*•	0.0	77 00.0	*−28.1*•	0.0	78 00.0	*−28.2*•	0.0	79 00.0	*−28.4*•	0.0	80 00.0	*−28.6*•	0.0	81 00.0	*−28.8*•	0.0	82 00.0	*−29.1*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 64°, 296°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 30.9	–58.4	115.2	6 05.3	–58.6	115.3	5 39.6	–58.8	115.4	5 13.8	–59.0	115.5	4 47.9	–59.1	115.6	4 21.9	–59.2	115.7	3 55.9	–59.4	115.7	3 29.9	–59.6	115.8	0
1	5 32.5	–58.3	115.5	5 06.7	–58.5	115.5	4 40.8	–58.7	115.6	4 14.8	–58.9	115.7	3 48.8	–59.1	115.8	3 22.7	–59.3	115.8	2 56.5	–59.4	115.9	2 30.3	–59.5	115.9	1
2	4 34.2	–58.3	115.7	4 08.2	–58.6	115.8	3 42.1	–58.8	115.8	3 15.9	–59.0	115.9	2 49.7	–59.1	115.9	2 23.4	–59.2	116.0	1 57.1	–59.4	116.0	1 30.8	–59.5	116.0	2
3	3 35.9	–58.4	115.9	3 09.6	–58.6	116.0	2 43.3	–58.8	116.0	2 16.9	–58.9	116.1	1 50.6	–59.1	116.1	1 24.2	–59.3	116.1	0 57.7	–59.4	116.1	0 31.3	–59.5	116.2	3
4	2 37.5	–58.3	116.2	2 11.0	–58.5	116.2	1 44.5	–58.7	116.2	1 18.0	–58.9	116.3	0 51.5	–59.2	116.3	0 24.9	–59.3	116.3	0 01.7	+59.4	63.7	0 28.2	+59.6	63.7	4
5	1 39.2	–58.4	116.4	1 12.5	–58.6	116.4	0 45.8	–58.8	116.4	0 19.1	–59.0	116.4	0 07.7	+59.1	63.6	0 34.4	+59.2	63.6	1 01.1	+59.4	63.6	1 27.8	+59.5	63.6	5
6	0 40.8	–58.3	116.6	0 13.9	–58.6	116.6	0 13.0	+58.7	63.4	0 39.9	+58.9	63.4	1 06.8	+59.1	63.4	1 33.6	+59.3	63.4	2 00.5	+59.4	63.4	2 27.3	+59.5	63.5	6
7	0 17.5	+58.4	63.1	0 44.7	+58.5	63.1	1 11.7	+58.8	63.2	1 38.8	+59.0	63.2	2 05.9	+59.1	63.2	2 32.9	+59.3	63.2	2 59.9	+59.4	63.3	3 26.8	+59.6	63.3	7
8	1 15.9	+58.4	62.9	1 43.2	+58.6	62.9	2 10.5	+58.8	63.0	2 37.8	+58.9	63.0	3 05.0	+59.1	63.0	3 32.2	+59.2	63.1	3 59.3	+59.4	63.2	4 26.4	+59.5	63.2	8
9	2 14.3	+58.3	62.7	2 41.8	+58.5	62.7	3 09.3	+58.7	62.8	3 36.7	+58.9	62.8	4 04.1	+59.1	62.9	4 31.4	+59.3	62.9	4 58.7	+59.4	63.0	5 25.9	+59.5	63.1	9
10	3 12.6	+58.3	62.4	3 40.3	+58.6	62.5	4 08.0	+58.8	62.6	4 35.6	+59.0	62.6	5 03.2	+59.1	62.7	5 30.7	+59.2	62.8	5 58.1	+59.4	62.9	6 25.4	+59.5	63.0	10
11	4 10.9	+58.4	62.2	4 38.9	+58.5	62.3	5 06.8	+58.7	62.4	5 34.6	+58.9	62.4	6 02.3	+59.1	62.5	6 29.9	+59.3	62.6	6 57.5	+59.4	62.7	7 24.9	+59.5	62.8	11
12	5 09.3	+58.3	62.0	5 37.4	+58.6	62.1	6 05.5	+58.8	62.1	6 33.5	+58.9	62.2	7 01.4	+59.1	62.4	7 29.2	+59.2	62.5	7 56.9	+59.4	62.6	8 24.4	+59.6	62.7	12
13	6 07.6	+58.4	61.7	6 36.0	+58.5	61.8	7 04.3	+58.7	61.9	7 32.4	+59.0	62.1	8 00.5	+59.1	62.2	8 28.4	+59.3	62.3	8 56.3	+59.4	62.4	9 24.0	+59.5	62.6	13
14	7 06.0	+58.3	61.5	7 34.5	+58.6	61.6	8 03.0	+58.7	61.7	8 31.4	+58.9	61.9	8 59.6	+59.1	62.0	9 27.7	+59.2	62.1	9 55.7	+59.3	62.3	10 23.5	+59.5	62.5	14
15	8 04.3	+58.3	61.3	8 33.1	+58.5	61.4	9 01.7	+58.8	61.5	9 30.3	+58.9	61.7	9 58.7	+59.1	61.8	10 26.9	+59.3	62.0	10 55.0	+59.4	62.1	11 23.0	+59.5	62.3	15
16	9 02.6	+58.3	61.0	9 31.6	+58.5	61.2	10 00.5	+58.7	61.3	10 29.2	+58.9	61.5	10 57.8	+59.0	61.6	11 26.2	+59.2	61.8	11 54.4	+59.4	62.0	12 22.5	+59.5	62.2	16
17	10 00.9	+58.3	60.8	10 30.1	+58.5	60.9	10 59.2	+58.7	61.1	11 28.1	+58.9	61.3	11 56.8	+59.1	61.5	12 25.4	+59.2	61.7	12 53.8	+59.4	61.9	13 22.0	+59.5	62.1	17
18	10 59.2	+58.3	60.5	11 28.6	+58.5	60.7	11 57.9	+58.7	60.9	12 27.0	+58.9	61.1	12 55.9	+59.1	61.3	13 24.6	+59.2	61.5	13 53.2	+59.3	61.7	14 21.5	+59.5	61.9	18
19	11 57.5	+58.3	60.3	12 27.1	+58.5	60.5	12 56.6	+58.7	60.7	13 25.9	+58.8	60.9	13 55.0	+59.0	61.1	14 23.8	+59.3	61.3	14 52.5	+59.4	61.6	15 21.0	+59.5	61.8	19
20	12 55.8	+58.2	60.1	13 25.6	+58.5	60.3	13 55.3	+58.7	60.5	14 24.7	+58.9	60.7	14 54.0	+59.1	60.9	15 23.1	+59.2	61.2	15 51.9	+59.3	61.4	16 20.5	+59.5	61.7	20
21	13 54.0	+58.3	59.8	14 24.1	+58.5	60.0	14 54.0	+58.6	60.3	15 23.6	+58.9	60.5	15 53.1	+59.0	60.7	16 22.3	+59.2	61.0	16 51.2	+59.4	61.3	17 20.0	+59.5	61.5	21
22	14 52.3	+58.2	59.6	15 22.6	+58.4	59.8	15 52.6	+58.7	60.0	16 22.5	+58.8	60.3	16 52.1	+59.0	60.6	17 21.5	+59.1	60.8	17 50.6	+59.3	61.1	18 19.5	+59.4	61.4	22
23	15 50.5	+58.2	59.3	16 21.0	+58.4	59.6	16 51.3	+58.6	59.8	17 21.3	+58.8	60.1	17 51.1	+59.0	60.4	18 20.6	+59.2	60.6	18 49.9	+59.4	60.9	19 18.9	+59.5	61.2	23
24	16 48.7	+58.2	59.1	17 19.4	+58.4	59.3	17 49.9	+58.6	59.6	18 20.1	+58.9	59.9	18 50.1	+59.0	60.2	19 19.8	+59.2	60.5	19 49.3	+59.3	60.8	20 18.4	+59.5	61.1	24
25	17 46.9	+58.2	58.8	18 17.8	+58.4	59.1	18 48.5	+58.6	59.4	19 19.0	+58.8	59.7	19 49.1	+59.0	60.0	20 19.0	+59.2	60.3	20 48.6	+59.3	60.6	21 17.9	+59.4	61.0	25
26	18 45.1	+58.1	58.6	19 16.2	+58.4	58.8	19 47.1	+58.6	59.2	20 17.8	+58.8	59.5	20 48.1	+59.0	59.8	21 18.2	+59.1	60.1	21 47.9	+59.3	60.5	22 17.3	+59.5	60.8	26
27	19 43.2	+58.1	58.3	20 14.6	+58.4	58.6	20 45.7	+58.6	58.9	21 16.6	+58.7	59.2	21 47.1	+58.9	59.6	22 17.3	+59.1	59.9	22 47.2	+59.3	60.3	23 16.8	+59.4	60.7	27
28	20 41.3	+58.1	58.0	21 13.0	+58.3	58.4	21 44.3	+58.6	58.7	22 15.3	+58.8	59.0	22 46.0	+59.0	59.4	23 16.4	+59.2	59.8	23 46.5	+59.3	60.1	24 16.2	+59.4	60.5	28
29	21 39.4	+58.1	57.8	22 11.3	+58.3	58.1	22 42.9	+58.5	58.5	23 14.1	+58.7	58.8	23 45.0	+58.9	59.2	24 15.6	+59.1	59.6	24 45.8	+59.2	60.0	25 15.6	+59.4	60.4	29
30	22 37.5	+58.1	57.5	23 09.6	+58.3	57.8	23 41.4	+58.5	58.2	24 12.8	+58.7	58.6	24 43.9	+58.9	59.0	25 14.7	+59.1	59.4	25 45.0	+59.3	59.8	26 15.0	+59.4	60.2	30
31	23 35.6	+58.0	57.2	24 07.9	+58.3	57.6	24 39.9	+58.5	58.0	25 11.5	+58.7	58.4	25 42.8	+58.9	58.8	26 13.8	+59.0	59.2	26 44.3	+59.2	59.6	27 14.4	+59.4	60.1	31
32	24 33.6	+58.0	56.9	25 06.2	+58.2	57.3	25 38.4	+58.4	57.7	26 10.2	+58.7	58.1	26 41.7	+58.9	58.6	27 12.8	+59.1	59.0	27 43.5	+59.3	59.4	28 13.8	+59.4	59.9	32
33	25 31.6	+57.9	56.7	26 04.4	+58.2	57.1	26 36.8	+58.5	57.5	27 08.9	+58.7	57.9	27 40.6	+58.9	58.3	28 11.9	+59.0	58.8	28 42.8	+59.2	59.3	29 13.2	+59.4	59.7	33
34	26 29.5	+58.0	56.4	27 02.6	+58.2	56.8	27 35.3	+58.4	57.2	28 07.6	+58.6	57.7	28 39.5	+58.8	58.1	29 10.9	+59.1	58.6	29 42.0	+59.2	59.1	30 12.6	+59.4	59.6	34
35	27 27.5	+57.8	56.1	28 00.8	+58.1	56.5	28 33.7	+58.3	57.0	29 06.2	+58.6	57.4	29 38.3	+58.8	57.9	30 10.0	+59.0	58.4	30 41.2	+59.2	58.9	31 12.0	+59.3	59.4	35
36	28 25.3	+57.9	55.8	28 58.9	+58.1	56.2	29 32.0	+58.4	56.7	30 04.8	+58.6	57.2	30 37.1	+58.8	57.7	31 09.0	+58.9	58.2	31 40.4	+59.1	58.7	32 11.3	+59.3	59.2	36
37	29 23.2	+57.8	55.5	29 57.0	+58.1	55.9	30 30.4	+58.3	56.4	31 03.4	+58.5	56.9	31 35.9	+58.7	57.4	32 07.9	+59.0	58.0	32 39.5	+59.2	58.5	33 10.6	+59.4	59.1	37
38	30 21.0	+57.7	55.2	30 55.1	+58.0	55.6	31 28.7	+58.3	56.1	32 01.9	+58.5	56.7	32 34.6	+58.8	57.2	33 06.9	+58.9	57.7	33 38.7	+59.1	58.3	34 10.0	+59.3	58.9	38
39	31 18.7	+57.7	54.8	31 53.1	+58.0	55.3	32 27.0	+58.2	55.9	33 00.4	+58.5	56.4	33 33.4	+58.7	56.9	34 05.8	+59.0	57.5	34 37.8	+59.1	58.1	35 09.3	+59.3	58.7	39
40	32 16.4	+57.7	54.5	32 51.1	+57.9	55.0	33 25.2	+58.2	55.6	33 58.9	+58.4	56.1	34 32.1	+58.6	56.7	35 04.8	+58.8	57.3	35 36.9	+59.1	57.9	36 08.6	+59.2	58.5	40
41	33 14.1	+57.6	54.2	33 49.0	+57.9	54.7	34 23.4	+58.1	55.3	34 57.3	+58.4	55.9	35 30.7	+58.7	56.4	36 03.6	+58.9	57.0	36 36.0	+59.1	57.7	37 07.8	+59.3	58.3	41
42	34 11.7	+57.6	53.9	34 46.9	+57.8	54.4	35 21.5	+58.1	55.0	35 55.7	+58.4	55.6	36 29.4	+58.6	56.2	37 02.5	+58.8	56.8	37 35.1	+59.0	57.4	38 07.1	+59.2	58.1	42
43	35 09.3	+57.5	53.5	35 44.7	+57.8	54.1	36 19.6	+58.1	54.7	36 54.1	+58.3	55.3	37 28.0	+58.5	55.9	38 01.3	+58.8	56.6	38 34.1	+59.0	57.2	39 06.3	+59.2	57.9	43
44	36 06.8	+57.4	53.2	36 42.5	+57.7	53.8	37 17.7	+58.0	54.4	37 52.4	+58.3	55.0	38 26.5	+58.6	55.6	39 00.1	+58.8	56.3	39 33.1	+59.0	57.0	40 05.5	+59.2	57.7	44
45	37 04.2	+57.3	52.8	37 40.2	+57.7	53.4	38 15.7	+58.0	54.0	38 50.7	+58.2	54.7	39 25.1	+58.4	55.4	39 58.9	+58.7	56.0	40 32.1	+58.9	56.7	41 04.7	+59.1	57.5	45
46	38 01.5	+57.3	52.4	38 37.9	+57.6	53.1	39 13.7	+57.8	53.7	39 48.9	+58.2	54.4	40 23.5	+58.5	55.1	40 57.6	+58.7	55.8	41 31.0	+59.0	56.5	42 03.8	+59.2	57.2	46
47	38 58.8	+57.2	52.0	39 35.5	+57.5	52.7	40 11.5	+57.9	53.4	40 47.1	+58.1	54.1	41 22.0	+58.4	54.8	41 56.3	+58.6	55.5	42 30.0	+58.8	56.2	43 03.0	+59.1	57.0	47
48	39 56.0	+57.2	51.7	40 33.0	+57.4	52.3	41 09.4	+57.7	53.0	41 45.2	+58.0	53.7	42 20.4	+58.3	54.5	42 54.9	+58.6	55.2	43 28.8	+58.9	56.0	44 02.1	+59.0	56.8	48
49	40 53.2	+57.0	51.3	41 30.4	+57.4	51.9	42 07.1	+57.7	52.7	42 43.2	+58.0	53.4	43 18.7	+58.3	54.1	43 53.5	+58.6	54.9	44 27.7	+58.8	55.7	45 01.1	+59.1	56.5	49
50	41 50.2	+57.0	50.8	42 27.8	+57.3	51.5	43 04.8	+57.6	52.3	43 41.2	+58.0	53.0	44 17.0	+58.2	53.8	44 52.1	+58.5	54.6	45 26.5	+58.7	55.4	46 00.2	+59.0	56.3	50
51	42 47.2	+56.8	50.4	43 25.1	+57.2	51.1	44 02.4	+57.6	51.9	44 39.2	+57.8	52.7	45 15.2	+58.2	53.5	45 50.6	+58.4	54.3	46 25.2	+58.8	55.1	46 59.2	+58.9	56.0	51
52	43 44.0	+56.8	50.0	44 22.3	+57.1	50.7	45 00.0	+57.4	51.5	45 37.0	+57.8	52.3	46 13.4	+58.1	53.1	46 49.0	+58.4	54.0	47 24.0	+58.6	54.8	47 58.1	+59.0	55.7	52
53	44 40.8	+56.6	49.5	45 19.4	+57.0	50.3	45 57.4	+57.4	51.1	46 34.8	+57.7	51.9	47 11.5	+58.0	52.7	47 47.4	+58.3	53.6	48 22.6	+58.6	54.5	48 57.1	+58.8	55.5	53
54	45 37.4	+56.5	49.1	46 16.4	+56.9	49.8	46 54.8	+57.3	50.7	47 32.5	+57.6	51.5	48 09.5	+57.9	52.4	48 45.7	+58.3	53.3	49 21.2	+58.6	54.2	49 55.9	+58.9	55.2	54
55	46 33.9	+56.4	48.6	47 13.3	+56.8	49.4	47 52.1	+57.1	50.2	48 30.1	+57.5	51.1	49 07.4	+57.9	52.0	49 44.0	+58.2	52.9	50 19.8	+58.5	53.9	50 54.8	+58.7	54.8	55
56	47 30.3	+56.3	48.1	48 10.1	+56.7	48.9	48 49.2	+57.1	49.8	49 27.6	+57.4	50.6	50 05.3	+57.8	51.6	50 42.2	+58.1	52.5	51 18.3	+58.4	53.5	51 53.5	+58.8	54.5	56
57	48 26.6	+56.1	47.6	49 06.8	+56.5	48.4	49 46.3	+56.9	49.3	50 25.0	+57.3	50.2	51 03.1	+57.6	51.1	51 40.3	+58.0	52.1	52 16.7	+58.4	53.1	52 52.3	+58.6	54.2	57
58	49 22.7	+56.0	47.0	50 03.3	+56.4	47.9	50 43.2	+56.8	48.8	51 22.3	+57.2	49.7	52 00.7	+57.6	50.7	52 38.3	+58.0	51.7	53 15.1	+58.3	52.8	53 50.9	+58.6	53.8	58
59	50 18.7	+55.8	46.5	50 59.7	+56.2	47.3	51 40.0	+56.6	48.3	52 19.5	+57.1	49.2	52 58.3	+57.5	50.2	53 36.3	+57.8	51.3	54 13.4	+58.2	52.4	54 49.5	+58.6	53.5	59
60	51 14.5	+55.6	45.9	51 55.9	+56.1	46.8	52 36.6	+56.5	47.7	53 16.6	+56.9	48.7	53 55.8	+57.3	49.8	54 34.1	+57.7	50.8	55 11.6	+58.1	51.9	55 48.1	+58.4	53.1	60
61	52 10.1	+55.4	45.3	52 52.0	+55.8	46.2	53 33.1	+56.3	47.2	54 13.5	+56.8	48.2	54 53.1	+57.2	49.2	55 31.8	+57.6	50.3	56 09.7	+58.0	51.5	56 46.5	+58.4	52.7	61
62	53 05.5	+55.2	44.6	53 47.8	+55.7	45.6	54 29.4	+56.2	46.6	55 10.3	+56.6	47.6	55 50.3	+57.1	48.7	56 29.4	+57.5	49.8	57 07.7	+57.9	51.0	57 44.9	+58.3	52.3	62
63	54 00.7	+55.0	44.0	54 43.5	+55.5	45.0	55 25.6	+56.0	46.0	56 06.9	+56.4	47.0	56 47.4	+56.9	48.2	57 26.9	+57.4	49.3	58 05.6	+57.7	50.5	58 43.2	+58.2	51.8	63
64	54 55.7	+54.7	43.3	55 39.0	+55.2	44.3	56 21.6	+55.7	45.3	57 03.3	+56.3	46.4	57 44.3	+56.7	47.6	58 24.3	+57.2	48.8	59 03.3	+57.7	50.0	59 41.4	+58.0	51.3	64
65	55 50.4	+54.5	42.6	56 34.2	+55.0	43.6	57 17.3	+55.5	44.7	57 59.6	+56.0	45.8	58 41.0	+56.5	47.0	59 21.5	+57.0	48.2	60 01.0	+57.5	49.5	60 39.4	+58.0	50.8	65
66	56 44.9	+54.2	41.8	57 29.2	+54.8	42.9	58 12.8	+55.3	43.9	58 55.6	+55.8	45.1	59 37.5	+56.4	46.3	60 18.5	+56.9	47.6	60 58.5	+57.3	48.9	61 37.4	+57.8	50.3	66
67	57 39.1	+53.9	41.0	58 24.0	+54.4	42.1	59 08.1	+55.0	43.2	59 51.4	+55.6	44.4	60 33.9	+56.1	45.6	61 15.4	+56.6	46.9	61 55.8	+57.2	48.3	62 35.2	+57.7	49.7	67
68	58 33.0	+53.5	40.2	59 18.4	+54.1	41.3	60 03.1	+54.7	42.4	60 47.0	+55.3	43.6	61 30.0	+55.8	44.9	62 12.0	+56.4	46.2	62 53.0	+57.0	47.6	63 32.9	+57.5	49.1	68
69	59 26.5	+53.1	39.3	60 12.5	+53.8	40.4	60 57.8	+54.4	41.6	61 42.3	+55.0	42.8	62 25.8	+55.6	44.1	63 08.4	+56.2	45.5	63 50.0	+56.7	46.9	64 30.4	+57.3	48.4	69
70	60 19.6	+52.8	38.4	61 06.3	+53.4	39.5	61 52.2	+54.0	40.7	62 37.3	+54.6	41.9	63 21.4	+55.3	43.3	64 04.6	+55.9	44.7	64 46.7	+56.5	46.2	65 27.7	+57.1	47.7	70
71	61 12.4	+52.3	37.4	61 59.7	+53.0	38.5	62 46.2	+53.6	39.8	63 31.9	+54.3	41.0	64 16.7	+55.0	42.4	65 00.5	+55.6	43.8	65 43.2	+56.3	45.4	66 24.8	+56.9	47.0	71
72	62 04.7	+51.8	36.4	62 52.7	+52.4	37.5	63 39.8	+53.2	38.8	64 26.2	+53.9	40.1	65 11.7	+54.5	41.5	65 56.1	+55.3	42.9	66 39.5	+55.9	44.5	67 21.7	+56.6	46.2	72
73	62 56.5	+51.3	35.3	63 45.1	+52.0	36.5	64 33.0	+52.7	37.7	65 20.1	+53.4	39.0	66 06.2	+54.2	40.4	66 51.4	+54.8	42.0	67 35.4	+55.6	43.6	68 18.3	+56.3	45.3	73
74	63 47.8	+50.7	34.1	64 37.1	+51.4	35.3	65 25.7	+52.2	36.6	66 13.5	+52.9	37.9	67 00.4	+53.6	39.4	67 46.2	+54.5	40.9	68 31.0	+55.2	42.6	69 14.6	+55.9	44.3	74
75	64 38.5	+50.0	32.9	65 28.5	+50.8	34.1	66 17.9	+51.5	35.4	67 06.4	+52.3	36.7	67 54.0	+53.1	38.2	68 40.7	+53.9	39.8	69 26.2	+54.8	41.5	70 10.5	+55.6	43.3	75
76	65 28.5	+49.4	31.6	66 19.3	+50.1	32.8	67 09.4	+50.9	34.1	67 58.7	+51.7	35.4	68 47.1	+52.6	36.9	69 34.6	+53.4	38.5	70 21.0	+54.2	40.3	71 06.1	+55.1	42.2	76
77	66 17.9	+48.5	30.2	67 09.4	+49.3	31.4	68 00.3	+50.1	32.7	68 50.4	+50.9	34.1	69 39.7	+51.8	35.6	70 28.0	+52.7	37.2	71 15.2	+53.6	39.0	72 01.2	+54.6	40.9	77
78	67 06.4	+47.6	28.7	67 58.7	+48.4	29.9	68 50.4	+49.3	31.2	69 41.3	+50.2	32.6	70 31.5	+51.0	34.1	71 20.7	+52.0	35.7	72 08.8	+53.0	37.6	72 55.8	+53.9	39.5	78
79	67 54.0	+46.7	27.1	68 47.1	+47.5	28.3	69 39.7	+48.3	29.6	70 31.5	+49.2	31.0	71 22.5	+50.2	32.5	72 12.7	+51.1	34.1	73 01.8	+52.1	36.0	73 49.7	+53.2	38.0	79
80	68 40.7	+45.5	25.4	69 34.6	+46.4	26.6	70 28.0	+47.2	27.8	71 20.7	+48.1	29.2	72 12.7	+49.1	30.7	73 03.8	+50.1	32.4	73 53.9	+51.3	34.2	74 42.9	+52.4	36.3	80
81	69 26.2	+44.3	23.6	70 21.0	+45.1	24.7	71 15.2	+46.0	25.9	72 08.8	+47.0	27.3	73 01.8	+47.9	28.8	73 53.9	+49.0	30.5	74 45.2	+50.1	32.3	75 35.3	+51.3	34.4	81
82	70 10.5	+43.0	21.6	71 06.1	+43.7	22.7	72 01.2	+44.6	23.9	72 55.8	+45.5	25.2	73 49.7	+46.6	26.7	74 42.9	+47.7	28.3	75 35.3	+48.8	30.2	76 26.6	+50.1	32.3	82
83	70 53.5	+41.4	19.5	71 49.8	+42.2	20.6	72 45.8	+43.0	21.7	73 41.3	+44.0	23.0	74 36.3	+44.9	24.4	75 30.6	+46.0	26.0	76 24.1	+47.3	27.8	77 16.7	+48.6	29.8	83
84	71 34.9	+39.7	17.3	72 32.0	+40.5	18.2	73 28.8	+41.3	19.3	74 25.3	+42.1	20.5	75 21.2	+43.2 •	21.8	76 16.6	+44.3 •	23.3	77 11.4	+45.4 •	25.1	78 05.3	+46.7 •	27.1	84
85	72 14.6	+37.8 •	14.9	73 12.5	+38.5 •	15.7	74 10.1	+39.2 •	16.7	75 07.4	+40.1 •	17.8	76 04.4	+40.9 •	19.0	77 00.9	+42.0 •	20.4	77 56.8	+43.2 •	22.0	78 52.0	+44.5 •	23.9	85
86	72 52.4	+35.7 •	12.3	73 51.0	+36.2 •	13.0	74 49.3	+36.9 •	13.9	75 47.5	+37.6 •	14.8	76 45.3	+38.5 •	15.9	77 42.9	+39.4 •	17.1	78 40.0	+40.5 •	18.6	79 36.5	+41.8 •	20.3	86
87	73 28.1	+33.3 •	9.5	74 27.2	+33.8 •	10.1	75 26.2	+34.4 •	10.8	76 25.1	+34.9 •	11.6	77 23.8	+35.6 •	12.4	78 22.3	+36.3 •	13.5	79 20.5	+37.2 •	14.7	80 18.3	+38.4 •	16.2	87
88	74 01.4	+30.8 •	6.5	75 01.0	+31.1 •	7.0	76 00.6	+31.3 •	7.5	77 00.0	+31.8 •	8.0	77 59.4	+32.2 •	8.7	78 58.6	+32.8 •	9.4	79 57.7	+33.5 •	10.4	80 56.7	+34.2 •	11.5	88
89	74 32.2	+27.8 •	3.4	75 32.1	+27.9 •	3.6	76 31.9	+28.1 •	3.9	77 31.8	+28.2 •	4.2	78 31.6	+28.4 •	4.5	79 31.4	+28.6 •	4.9	80 31.2	+28.8 •	5.5	81 30.9	+29.1 •	6.1	89
90	75 00.0	+24.7 •	0.0	76 00.0	+24.6 •	0.0	77 00.0	+24.4 •	0.0	78 00.0	+24.2 •	0.0	79 00.0	+24.0 •	0.0	80 00.0	+23.8 •	0.0	81 00.0	+23.5 •	0.0	82 00.0	+23.1 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 116°, 244°

65°, 295° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 16.8	+58.3	114.2	5 52.1	+58.5	114.3	5 27.3	+58.7	114.4	5 02.5	+58.9	114.5	4 37.5	+59.1	114.6	4 12.5	+59.3	114.7	3 47.4	+59.4	114.7	3 22.3	+59.5	114.8	**0**
1	7 15.1	+58.3	114.0	6 50.6	+58.5	114.1	6 26.0	+58.8	114.2	6 01.4	+58.9	114.3	5 36.6	+59.1	114.4	5 11.8	+59.2	114.5	4 46.8	+59.4	114.6	4 21.8	+59.6	114.7	**1**
2	8 13.4	+58.3	113.8	7 49.1	+58.5	113.9	7 24.8	+58.7	114.0	7 00.3	+58.9	114.1	6 35.7	+59.1	114.2	6 11.0	+59.2	114.3	5 46.2	+59.4	114.4	5 21.4	+59.5	114.5	**2**
3	9 11.7	+58.2	113.5	8 47.6	+58.5	113.7	8 23.5	+58.7	113.8	7 59.2	+58.9	113.9	7 34.8	+59.1	114.1	7 10.2	+59.3	114.2	6 45.6	+59.4	114.3	6 20.9	+59.5	114.4	**3**
4	10 09.9	+58.3	113.3	9 46.1	+58.5	113.5	9 22.2	+58.7	113.6	8 58.1	+58.9	113.8	8 33.9	+59.0	113.9	8 09.5	+59.2	114.0	7 45.0	+59.4	114.2	7 20.4	+59.5	114.3	**4**
5	11 08.2	+58.3	113.0	10 44.6	+58.5	113.2	10 20.9	+58.7	113.4	9 57.0	+58.9	113.6	9 32.9	+59.1	113.7	9 08.7	+59.3	113.9	8 44.4	+59.4	114.0	8 19.9	+59.5	114.1	**5**
6	12 06.5	+58.2	112.8	11 43.1	+58.5	113.0	11 19.6	+58.7	113.2	10 55.9	+58.9	113.4	10 32.0	+59.1	113.5	10 08.0	+59.2	113.7	9 43.8	+59.3	113.9	9 19.4	+59.5	114.0	**6**
7	13 04.7	+58.2	112.6	12 41.6	+58.4	112.8	12 18.3	+58.6	113.0	11 54.8	+58.8	113.2	11 31.1	+59.0	113.4	11 07.2	+59.2	113.5	10 43.1	+59.4	113.7	10 18.9	+59.5	113.9	**7**
8	14 02.9	+58.2	112.3	13 40.0	+58.5	112.5	13 16.9	+58.7	112.8	12 53.6	+58.9	113.0	12 30.1	+59.1	113.2	12 06.4	+59.2	113.4	11 42.5	+59.4	113.6	11 18.4	+59.5	113.8	**8**
9	15 01.1	+58.2	112.1	14 38.5	+58.4	112.3	14 15.6	+58.7	112.5	13 52.5	+58.8	112.8	13 29.2	+59.0	113.0	13 05.6	+59.2	113.2	12 41.9	+59.3	113.4	12 17.9	+59.5	113.6	**9**
10	15 59.3	+58.2	111.8	15 36.9	+58.4	112.1	15 14.3	+58.6	112.3	14 51.3	+58.9	112.6	14 28.2	+59.0	112.8	14 04.8	+59.2	113.0	13 41.2	+59.4	113.3	13 17.4	+59.5	113.5	**10**
11	16 57.5	+58.2	111.5	16 35.3	+58.4	111.8	16 12.9	+58.6	112.1	15 50.2	+58.8	112.4	15 27.2	+59.0	112.6	15 04.0	+59.2	112.9	14 40.6	+59.3	113.1	14 16.9	+59.5	113.4	**11**
12	17 55.7	+58.1	111.3	17 33.7	+58.4	111.6	17 11.5	+58.6	111.9	16 49.0	+58.8	112.2	16 26.2	+59.1	112.4	16 03.2	+59.2	112.7	15 39.9	+59.4	113.0	15 16.4	+59.5	113.2	**12**
13	18 53.8	+58.1	111.0	18 32.1	+58.4	111.3	18 10.1	+58.6	111.7	17 47.8	+58.8	112.0	17 25.3	+59.0	112.3	17 02.4	+59.2	112.5	16 39.3	+59.3	112.8	16 15.9	+59.4	113.1	**13**
14	19 51.9	+58.1	110.8	19 30.5	+58.3	111.1	19 08.7	+58.6	111.4	18 46.6	+58.8	111.7	18 24.3	+59.0	112.1	18 01.6	+59.1	112.4	17 38.6	+59.3	112.7	17 15.3	+59.5	113.0	**14**
15	20 50.0	+58.1	110.5	20 28.8	+58.3	110.9	20 07.3	+58.6	111.2	19 45.4	+58.8	111.5	19 23.3	+58.9	111.9	19 00.7	+59.2	112.2	18 37.9	+59.4	112.5	18 14.8	+59.5	112.8	**15**
16	21 48.1	+58.0	110.2	21 27.1	+58.3	110.6	21 05.9	+58.5	111.0	20 44.2	+58.8	111.3	20 22.2	+59.0	111.7	19 59.9	+59.2	112.0	19 37.3	+59.3	112.3	19 14.3	+59.4	112.7	**16**
17	22 46.1	+58.0	110.0	22 25.4	+58.3	110.3	22 04.4	+58.5	110.7	21 43.0	+58.7	111.1	21 21.2	+58.9	111.5	20 59.1	+59.1	111.8	20 36.6	+59.3	112.2	20 13.7	+59.5	112.5	**17**
18	23 44.1	+58.0	109.7	23 23.7	+58.3	110.1	23 02.9	+58.5	110.5	22 41.7	+58.7	110.9	22 20.1	+59.0	111.3	21 58.2	+59.1	111.7	21 35.9	+59.3	112.0	21 13.2	+59.4	112.4	**18**
19	24 42.1	+58.0	109.4	24 22.0	+58.2	109.8	24 01.4	+58.5	110.2	23 40.4	+58.8	110.7	23 19.1	+58.9	111.1	22 57.3	+59.1	111.5	22 35.2	+59.2	111.9	22 12.6	+59.5	112.2	**19**
20	25 40.1	+57.9	109.1	25 20.2	+58.2	109.6	24 59.9	+58.4	110.0	24 39.2	+58.6	110.4	24 18.0	+58.9	110.9	23 56.4	+59.1	111.3	23 34.4	+59.3	111.7	23 12.1	+59.4	112.1	**20**
21	26 38.0	+57.9	108.8	26 18.4	+58.2	109.3	25 58.3	+58.5	109.8	25 37.8	+58.7	110.2	25 16.9	+58.9	110.7	24 55.5	+59.1	111.1	24 33.7	+59.3	111.5	24 11.5	+59.4	111.9	**21**
22	27 35.9	+57.8	108.5	27 16.6	+58.1	109.0	26 56.8	+58.4	109.5	26 36.5	+58.6	110.0	26 15.8	+58.8	110.4	25 54.6	+59.1	110.9	25 33.0	+59.2	111.3	25 10.9	+59.4	111.8	**22**
23	28 33.7	+57.8	108.2	28 14.7	+58.1	108.7	27 55.2	+58.3	109.2	27 35.1	+58.7	109.7	27 14.6	+58.9	110.2	26 53.7	+59.0	110.7	26 32.2	+59.3	111.2	26 10.3	+59.4	111.6	**23**
24	29 31.5	+57.8	107.9	29 12.8	+58.0	108.4	28 53.5	+58.4	109.0	28 33.8	+58.5	109.5	28 13.5	+58.8	110.0	27 52.7	+59.0	110.5	27 31.5	+59.2	111.0	27 09.7	+59.4	111.5	**24**
25	30 29.3	+57.7	107.6	30 10.8	+58.0	108.2	29 51.9	+58.3	108.7	29 32.3	+58.6	109.2	29 12.3	+58.8	109.8	28 51.7	+59.1	110.3	28 30.7	+59.2	110.8	28 09.1	+59.4	111.3	**25**
26	31 27.0	+57.6	107.3	31 08.8	+58.0	107.9	30 50.2	+58.2	108.4	30 30.9	+58.5	109.0	30 11.1	+58.8	109.5	29 50.8	+59.0	110.1	29 29.9	+59.2	110.6	29 08.5	+59.4	111.2	**26**
27	32 24.6	+57.6	107.0	32 06.8	+58.0	107.6	31 48.4	+58.3	108.2	31 29.4	+58.5	108.7	31 09.9	+58.7	109.3	30 49.8	+58.9	109.9	30 29.1	+59.2	110.4	30 07.9	+59.3	111.0	**27**
28	33 22.2	+57.6	106.6	33 04.8	+57.8	107.3	32 46.7	+58.1	107.9	32 27.9	+58.5	108.5	32 08.6	+58.8	109.1	31 48.7	+59.0	109.7	31 28.3	+59.1	110.2	31 07.2	+59.3	110.8	**28**
29	34 19.8	+57.5	106.3	34 02.6	+57.9	106.9	33 44.8	+58.2	107.6	33 26.4	+58.4	108.2	33 07.4	+58.6	108.8	32 47.7	+58.9	109.4	32 27.4	+59.1	110.0	32 06.5	+59.4	110.6	**29**
30	35 17.3	+57.4	105.9	35 00.5	+57.8	106.6	34 43.0	+58.1	107.3	34 24.8	+58.4	107.9	34 06.0	+58.7	108.6	33 46.6	+58.9	109.2	33 26.5	+59.2	109.8	33 05.9	+59.3	110.5	**30**
31	36 14.7	+57.4	105.6	35 58.3	+57.7	106.3	35 41.1	+58.0	107.0	35 23.2	+58.4	107.7	35 04.7	+58.6	108.3	34 45.5	+58.9	109.0	34 25.7	+59.1	109.6	34 05.2	+59.3	110.3	**31**
32	37 12.1	+57.3	105.2	36 56.0	+57.7	105.9	36 39.1	+58.1	106.7	36 21.6	+58.3	107.4	36 03.3	+58.6	108.1	35 44.4	+58.8	108.8	35 24.8	+59.0	109.4	35 04.5	+59.2	110.1	**32**
33	38 09.4	+57.2	104.8	37 53.7	+57.6	105.6	37 37.2	+57.9	106.3	37 19.9	+58.3	107.1	37 01.9	+58.6	107.8	36 43.2	+58.8	108.5	36 23.8	+59.1	109.2	36 03.7	+59.3	109.9	**33**
34	39 06.6	+57.2	104.5	38 51.3	+57.5	105.2	38 35.1	+57.9	106.0	38 18.2	+58.2	106.8	38 00.5	+58.5	107.5	37 42.0	+58.8	108.3	37 22.9	+59.0	109.0	37 03.0	+59.2	109.7	**34**
35	40 03.8	+57.1	104.1	39 48.8	+57.5	104.9	39 33.0	+57.8	105.7	39 16.4	+58.2	106.5	38 59.0	+58.5	107.2	38 40.8	+58.8	108.0	38 21.9	+59.0	108.8	38 02.2	+59.3	109.5	**35**
36	41 00.9	+56.9	103.7	40 46.3	+57.4	104.5	40 30.8	+57.8	105.3	40 14.6	+58.1	106.1	39 57.5	+58.4	107.0	39 39.6	+58.7	107.7	39 20.9	+59.0	108.5	39 01.5	+59.1	109.3	**36**
37	41 57.8	+56.9	103.2	41 43.7	+57.3	104.1	41 28.6	+57.7	105.0	41 12.7	+58.0	105.8	40 55.9	+58.4	106.7	40 38.3	+58.7	107.5	40 19.9	+58.9	108.3	40 00.6	+59.2	109.1	**37**
38	42 54.7	+56.8	102.8	42 41.0	+57.2	103.7	42 26.3	+57.6	104.6	42 10.7	+58.0	105.5	41 54.3	+58.3	106.3	41 37.0	+58.6	107.2	41 18.8	+58.9	108.0	40 59.8	+59.2	108.9	**38**
39	43 51.5	+56.7	102.4	43 38.2	+57.1	103.3	43 23.9	+57.6	104.2	43 08.7	+58.0	105.1	42 52.6	+58.3	106.0	42 35.6	+58.6	106.9	42 17.7	+58.9	107.8	41 59.0	+59.1	108.6	**39**
40	44 48.2	+56.6	101.9	44 35.3	+57.1	102.9	44 21.5	+57.4	103.8	44 06.7	+57.8	104.8	43 50.9	+58.2	105.7	43 34.2	+58.5	106.6	43 16.6	+58.8	107.5	42 58.1	+59.1	108.4	**40**
41	45 44.8	+56.4	101.4	45 32.4	+56.9	102.4	45 18.9	+57.4	103.4	45 04.5	+57.8	104.4	44 49.1	+58.2	105.4	44 32.7	+58.5	106.3	44 15.4	+58.8	107.3	43 57.2	+59.0	108.2	**41**
42	46 41.2	+56.3	100.9	46 29.3	+56.8	102.0	46 16.3	+57.3	103.0	46 02.3	+57.7	104.0	45 47.3	+58.1	105.0	45 31.2	+58.5	106.0	45 14.2	+58.8	107.0	44 56.2	+59.0	107.9	**42**
43	47 37.5	+56.2	100.4	47 26.1	+56.7	101.5	47 13.6	+57.2	102.6	47 00.0	+57.6	103.6	46 45.4	+58.0	104.7	46 29.7	+58.4	105.7	46 13.0	+58.7	106.7	45 55.2	+59.0	107.7	**43**
44	48 33.7	+56.0	99.9	48 22.8	+56.6	101.0	48 10.8	+57.1	102.1	47 57.6	+57.6	103.2	47 43.4	+57.9	104.3	47 28.1	+58.3	105.3	47 11.7	+58.6	106.4	46 54.2	+59.0	107.4	**44**
45	49 29.7	+55.9	99.4	49 19.4	+56.4	100.5	49 07.9	+56.9	101.6	48 55.2	+57.4	102.8	48 41.3	+57.9	103.9	48 26.4	+58.2	105.0	48 10.3	+58.6	106.1	47 53.2	+58.9	107.1	**45**
46	50 25.6	+55.7	98.8	50 15.8	+56.3	100.0	50 04.8	+56.8	101.2	49 52.6	+57.3	102.3	49 39.2	+57.8	103.5	49 24.6	+58.2	104.6	49 08.9	+58.6	105.7	48 52.1	+58.8	106.8	**46**
47	51 21.3	+55.5	98.2	51 12.1	+56.1	99.4	51 01.6	+56.7	100.7	50 49.9	+57.2	101.9	50 37.0	+57.6	103.1	50 22.8	+58.1	104.2	50 07.5	+58.4	105.4	49 50.9	+58.9	106.5	**47**
48	52 16.8	+55.3	97.6	52 08.2	+56.0	98.9	51 58.3	+56.6	100.1	51 47.1	+57.1	101.4	51 34.6	+57.6	102.6	51 20.9	+58.0	103.8	51 05.9	+58.5	105.0	50 49.8	+58.7	106.2	**48**
49	53 12.1	+55.1	97.0	53 04.2	+55.8	98.3	52 54.9	+56.4	99.6	52 44.2	+57.0	100.9	52 32.2	+57.5	102.2	52 18.9	+58.0	103.4	52 04.4	+58.3	104.7	51 48.5	+58.7	105.9	**49**
50	54 07.2	+54.9	96.3	54 00.0	+55.5	97.7	53 51.3	+56.2	99.0	53 41.2	+56.8	100.4	53 29.7	+57.3	101.7	53 16.9	+57.8	103.0	53 02.7	+58.3	104.3	52 47.2	+58.7	105.6	**50**
51	55 02.1	+54.6	95.6	54 55.5	+55.4	97.0	54 47.5	+56.0	98.4	54 38.0	+56.6	99.8	54 27.0	+57.3	101.2	54 14.7	+57.7	102.6	54 01.0	+58.2	103.9	53 45.9	+58.6	105.2	**51**
52	55 56.7	+54.4	94.9	55 50.9	+55.1	96.3	55 43.5	+55.8	97.8	55 34.6	+56.5	99.2	55 24.3	+57.0	100.7	55 12.4	+57.6	102.1	54 59.2	+58.1	103.5	54 44.5	+58.5	104.9	**52**
53	56 51.1	+54.0	94.1	56 46.0	+54.8	95.6	56 39.3	+55.6	97.1	56 31.1	+56.3	98.6	56 21.3	+57.0	100.1	56 10.0	+57.5	101.6	55 57.3	+57.9	103.0	55 43.0	+58.4	104.5	**53**
54	57 45.1	+53.7	93.3	57 40.8	+54.6	94.9	57 34.9	+55.4	96.4	57 27.4	+56.1	98.0	57 18.3	+56.7	99.5	57 07.5	+57.4	101.1	56 55.2	+57.9	102.6	56 41.4	+58.4	104.1	**54**
55	58 38.8	+53.4	92.4	58 35.4	+54.3	94.1	58 30.3	+55.1	95.7	58 23.5	+55.9	97.3	58 15.0	+56.6	98.9	58 04.9	+57.2	100.5	57 53.1	+57.8	102.1	57 39.8	+58.2	103.6	**55**
56	59 32.2	+53.0	91.5	59 29.7	+53.9	93.2	59 25.4	+54.8	94.9	59 19.4	+55.6	96.6	59 11.6	+56.4	98.3	59 02.1	+57.0	99.9	58 50.9	+57.6	101.6	58 38.0	+58.2	103.2	**56**
57	60 25.2	+52.6	90.6	60 23.6	+53.6	92.4	60 20.2	+54.5	94.1	60 15.0	+55.4	95.9	60 08.0	+56.1	97.6	59 59.1	+56.9	99.3	59 48.5	+57.5	101.0	59 36.2	+58.0	102.7	**57**
58	61 17.8	+52.1	89.6	61 17.2	+53.2	91.4	61 14.7	+54.2	93.3	61 10.4	+55.1	95.1	61 04.1	+55.9	96.9	60 56.0	+56.7	98.7	60 46.0	+57.4	100.4	60 34.2	+58.0	102.2	**58**
59	62 09.9	+51.6	88.6	62 10.4	+52.7	90.5	62 08.9	+53.8	92.4	62 05.5	+54.7	94.3	62 00.0	+55.7	96.1	61 52.7	+56.4	98.0	61 43.4	+57.1	99.8	61 32.2	+57.8	101.7	**59**
60	63 01.5	+51.1	87.5	63 03.1	+52.3	89.4	63 02.7	+53.4	91.4	63 00.2	+54.4	93.4	62 55.7	+55.3	95.3	62 49.1	+56.2	97.3	62 40.5	+57.0	99.2	62 30.0	+57.6	101.1	**60**
61	63 52.6	+50.5	86.3	63 55.4	+51.7	88.3	63 56.1	+52.9	90.4	63 54.6	+54.0	92.4	63 51.0	+55.0	94.5	63 45.3	+55.9	96.5	63 37.5	+56.7	98.5	63 27.6	+57.5	100.5	**61**
62	64 43.1	+49.7	85.0	64 47.1	+51.2	87.2	64 49.0	+52.4	89.3	64 48.6	+53.6	91.4	64 46.0	+54.7	93.5	64 41.2	+55.7	95.6	64 34.2	+56.5	97.7	64 25.1	+57.3	99.8	**62**
63	65 32.8	+49.1	83.7	65 38.3	+50.5	85.9	65 41.4	+51.8	88.1	65 42.2	+53.1	90.3	65 40.7	+54.2	92.6	65 36.9	+55.3	94.8	65 30.7	+56.3	96.9	65 22.4	+57.0	99.1	**63**
64	66 21.9	+48.2	82.3	66 28.8	+49.7	84.6	66 33.2	+51.2	86.9	66 35.3	+52.5	89.2	66 34.9	+53.8	91.5	66 32.2	+54.9	93.8	66 27.0	+55.9	96.1	66 19.4	+56.9	98.4	**64**
65	67 10.1	+47.4	80.8	67 18.5	+49.0	83.2	67 24.4	+50.5	85.5	67 27.8	+52.0	87.9	67 28.7	+53.3	90.4	67 27.1	+54.5	92.8	67 22.9	+55.6	95.2	67 16.3	+56.6	97.5	**65**
66	67 57.5	+46.3	79.2	68 07.5	+48.0	81.6	68 14.9	+49.7	84.1	68 19.8	+51.2	86.6	68 22.0	+52.7	89.1	68 21.6	+54.0	91.7	68 18.5	+55.2	94.2	68 12.9	+56.2	96.7	**66**
67	68 43.8	+45.2	77.5	68 55.5	+47.0	80.0	69 04.6	+48.8	82.6	69 11.0	+50.5	85.2	69 14.7	+52.0	87.8	69 15.6	+53.4	90.4	69 13.7	+54.8	93.1	69 09.1	+55.9	95.7	**67**
68	69 29.0	+43.9	75.6	69 42.5	+45.9	78.2	69 53.4	+47.8	80.9	70 01.5	+49.6	83.6	70 06.7	+51.3	86.4	70 09.0	+52.9	89.1	70 08.5	+54.3	91.9	70 05.0	+55.6	94.7	**68**
69	70 12.9	+42.5	73.6	70 28.4	+44.7	76.3	70 41.2	+46.6	79.1	70 51.1	+48.5	81.9	70 58.0	+50.4	84.8	71 01.9	+52.1	87.7	71 02.8	+53.6	90.6	71 00.6	+55.0	93.5	**69**
70	70 55.4	+41.0	71.5	71 13.1	+43.2	74.3	71 27.8	+45.4	77.2	71 39.6	+47.5	80.1	71 48.4	+49.4	83.1	71 54.0	+51.3	86.2	71 56.4	+53.0	89.2	71 55.6	+54.6	92.3	**70**
71	71 36.4	+39.2	69.2	71 56.3	+41.5	72.1	72 13.2	+43.9	75.1	72 27.1	+46.2	78.1	72 37.8	+48.4	81.3	72 45.3	+50.4	84.4	72 49.4	+52.3	87.7	72 50.2	+53.9	90.9	**71**
72	72 15.6	+37.3 •	66.8	72 37.8	+39.8	69.7	72 57.1	+42.3	72.8	73 13.3	+44.6	76.0	73 26.2	+47.0	79.2	73 35.7	+49.2	82.6	73 41.7	+51.3	86.0	73 44.1	+53.2	89.4	**72**
73	72 52.9	+35.1 •	64.2	73 17.6	+37.8 •	67.2	73 39.4	+40.3 •	70.3	73 57.9	+43.0	73.6	74 13.2	+45.5	77.0	74 24.9	+47.9	80.5	74 33.0	+50.2	84.1	74 37.3	+52.3	87.7	**73**
74	73 28.0	+32.8 •	61.4	73 55.4	+35.4 •	64.4	74 19.7	+38.3 •	67.6	74 40.9	+41.1 •	71.0	74 58.7	+43.8	74.5	75 12.8	+46.5	78.2	75 23.2	+49.0	82.0	75 29.6	+51.3	85.8	**74**
75	74 00.8	+30.0 •	58.4	74 30.8	+33.0 •	61.5	74 58.0	+35.8 •	64.7	75 22.0	+38.8 •	68.2	75 42.5	+41.7 •	71.8	75 59.3	+44.6	75.6	76 12.2	+47.4	79.6	76 20.9	+50.1	83.6	**75**
76	74 30.8	+27.2 •	55.2	75 03.8	+30.0 •	58.3	75 33.8	+33.1 •	61.6	76 00.8	+36.2 •	65.1	76 24.2	+39.4 •	68.9	76 43.9	+42.6 •	72.8	76 59.6	+45.6	77.0	77 11.0	+48.5	81.2	**76**
77	74 58.0	+24.0 •	51.8	75 33.8	+27.0 •	54.9	76 06.9	+30.1 •	58.2	76 37.0	+33.3 •	61.7	77 03.6	+36.7 •	65.6	77 26.5	+40.1 •	69.7	77 45.2	+43.5 •	74.0	77 59.5	+46.8 •	78.5	**77**
78	75 22.0	+20.5 •	48.2	76 00.8	+23.4 •	51.2	76 37.0	+26.6 •	54.5	77 10.3	+30.0 •	58.1	77 40.3	+33.6 •	62.0	78 06.6	+37.2 •	66.1	78 28.7	+40.9 •	70.6	78 46.3	+44.5 •	75.4	**78**
79	75 42.5	+16.8 •	44.5	76 24.2	+19.7 •	47.4	77 03.6	+22.9 •	50.6	77 40.3	+26.3 •	54.1	78 13.9	+29.9 •	58.0	78 43.8	+33.8 •	62.2	79 09.6	+37.8 •	66.9	79 30.8	+41.8 •	71.8	**79**
80	75 59.3	+12.9 •	40.5	76 43.9	+15.7 •	43.3	77 26.5	+18.7 •	46.4	78 06.6	+22.1 •	49.8	78 43.8	+25.8 •	53.6	79 17.6	+29.8 •	57.9	79 47.4	+34.0 •	62.6	80 12.6	+38.4 •	67.7	**80**
81	76 12.2	+8.7 •	36.5	76 59.6	+11.4 •	39.0	77 45.2	+14.3 •	41.9	78 28.7	+17.6 •	45.2	79 09.6	+21.2 •	48.9	79 47.4	+25.2 •	53.1	80 21.4	+29.6 •	57.8	80 51.0	+34.4 •	63.1	**81**
82	76 20.9	+4.5 •	32.3	77 11.0	+6.8 •	34.7	77 59.5	+9.6 •	37.3	78 46.3	+12.6 •	40.4	79 30.8	+16.1 •	43.9	80 12.6	+20.0 •	47.9	80 51.0	+24.5 •	52.5	81 25.4	+29.4 •	57.8	**82**
83	76 25.4	+0.2 •	28.1	77 17.8	+2.3 •	30.2	78 09.1	+4.6 •	32.5	78 58.9	+7.4 •	35.3	79 46.9	+10.6 •	38.5	80 32.6	+14.3 •	42.2	81 15.5	+18.5 •	46.6	81 54.8	+23.4 •	51.7	**83**
84	76 25.6	–4.2 •	23.8	77 20.1	–2.4 •	25.6	78 13.7	–0.3 •	27.7	79 06.3	+2.0 •	30.1	79 57.5	+4.7 •	32.9	80 46.9	+8.0 •	36.3	81 34.0	+12.0 •	40.2	82 18.2	+16.6 •	45.0	**84**
85	76 21.4	–8.4 •	19.6	77 17.7	–7.0 •	21.0	78 13.4	–5.4 •	22.8	79 08.3	–3.5 •	24.8	80 02.2	–1.1 •	27.2	80 54.9	+1.6 •	30.0	81 46.0	+4.8 •	33.5	82 34.8	+8.9 •	37.7	**85**
86	76 13.0	–12.6 •	15.4	77 10.7	–11.5 •	16.6	78 08.0	–10.3 •	17.9	79 04.8	–8.8 •	19.5	80 01.1	–7.1 •	21.4	80 56.5	–5.0 •	23.7	81 50.8	–2.4 •	26.5	82 43.7	+0.9 •	30.0	**86**
87	76 00.4	–16.5 •	11.3	76 59.2	–15.8 •	12.2	77 57.7	–14.9 •	13.1	78 56.0	–13.9 •	14.3	79 54.0	–12.8 •	15.7	80 51.5	–11.3 •	17.4	81 48.4	–9.5 •	19.4	82 44.6	–7.4 •	22.1	**87**
88	75 43.9	–20.2 •	7.4	76 43.4	–19.8 •	7.9	77 42.8	–19.4 •	8.5	78 42.1	–18.8 •	9.3	79 41.2	–18.1 •	10.2	80 40.2	–17.4 •	11.2	81 38.9	–16.4 •	12.6	82 37.2	–15.1 •	14.3	**88**
89	75 23.7	–23.7 •	3.6	76 23.6	–23.6 •	3.9	77 23.4	–23.4 •	4.2	78 23.3	–23.3 •	4.5	79 23.1	–23.1 •	4.9	80 22.8	–22.8 •	5.4	81 22.5	–22.5 •	6.1	82 22.1	–22.1 •	6.8	**89**
90	75 00.0	–26.9 •	0.0	76 00.0	–27.0 •	0.0	77 00.0	–27.2 •	0.0	78 00.0	–27.3 •	0.0	79 00.0	–27.5 •	0.0	80 00.0	–27.7 •	0.0	81 00.0	–27.9 •	0.0	82 00.0	–28.3 •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 65°, 295°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 16.8	–58.3	114.2	5 52.1	–58.5	114.3	5 27.3	–58.7	114.4	5 02.5	–59.0	114.5	4 37.5	–59.1	114.6	4 12.5	–59.2	114.7	3 47.4	–59.3	114.7	3 22.3	–59.5	114.8	0
1	5 18.5	–58.3	114.5	4 53.6	–58.6	114.6	4 28.6	–58.7	114.6	4 03.5	–58.9	114.7	3 38.4	–59.1	114.8	3 13.3	–59.3	114.8	2 48.1	–59.4	114.9	2 22.8	–59.5	114.9	1
2	4 20.2	–58.4	114.7	3 55.0	–58.5	114.8	3 29.9	–58.8	114.8	3 04.6	–58.9	114.9	2 39.3	–59.1	114.9	2 14.0	–59.2	115.0	1 48.7	–59.4	115.0	1 23.3	–59.5	115.0	2
3	3 21.8	–58.3	115.0	2 56.5	–58.5	115.0	2 31.1	–58.7	115.0	2 05.7	–58.9	115.1	1 40.2	–59.1	115.1	1 14.8	–59.3	115.1	0 49.3	–59.4	115.2	0 23.8	–59.6	115.2	3
4	2 23.5	–58.3	115.2	1 58.0	–58.6	115.2	1 32.4	–58.8	115.3	1 06.8	–59.0	115.3	0 41.1	–59.1	115.3	0 15.5	–59.2	115.3	0 10.1	+59.4	64.7	0 35.8	+59.5	64.7	4
5	1 25.2	–58.3	115.4	0 59.4	–58.5	115.4	0 33.6	–58.7	115.5	0 07.8	–58.9	115.5	0 18.0	+59.0	64.5	0 43.7	+59.3	64.5	1 09.5	+59.4	64.6	1 35.3	+59.5	64.6	5
6	0 26.9	–58.4	115.7	0 00.9	–58.6	115.7	0 25.1	+58.7	64.3	0 51.1	+58.9	64.3	1 17.0	+59.1	64.4	1 43.0	+59.2	64.4	2 08.9	+59.4	64.4	2 34.8	+59.5	64.5	6
7	0 31.5	+58.3	64.1	0 57.7	+58.5	64.1	1 23.8	+58.8	64.1	1 50.0	+58.9	64.2	2 16.1	+59.1	64.2	2 42.2	+59.3	64.2	3 08.3	+59.4	64.3	3 34.3	+59.5	64.3	7
8	1 29.8	+58.3	63.9	1 56.2	+58.5	63.9	2 22.6	+58.7	63.9	2 48.9	+59.0	64.0	3 15.2	+59.1	64.0	3 41.5	+59.2	64.1	4 07.7	+59.4	64.1	4 33.8	+59.6	64.2	8
9	2 28.1	+58.3	63.6	2 54.7	+58.6	63.7	3 21.3	+58.8	63.7	3 47.9	+58.9	63.8	4 14.3	+59.1	63.8	4 40.7	+59.3	63.9	5 07.1	+59.4	64.0	5 33.4	+59.5	64.1	9
10	3 26.4	+58.3	63.4	3 53.3	+58.5	63.5	4 20.1	+58.7	63.5	4 46.8	+58.9	63.6	5 13.4	+59.1	63.7	5 40.0	+59.2	63.8	6 06.5	+59.4	63.8	6 32.9	+59.5	63.9	10
11	4 24.7	+58.4	63.2	4 51.8	+58.5	63.2	5 18.8	+58.7	63.3	5 45.7	+58.9	63.4	6 12.5	+59.1	63.5	6 39.2	+59.3	63.6	7 05.9	+59.3	63.7	7 32.4	+59.5	63.8	11
12	5 23.1	+58.3	62.9	5 50.3	+58.5	63.0	6 17.5	+58.7	63.1	6 44.6	+58.9	63.2	7 11.6	+59.1	63.3	7 38.5	+59.2	63.4	8 05.2	+59.4	63.6	8 31.9	+59.5	63.7	12
13	6 21.4	+58.3	62.7	6 48.8	+58.6	62.8	7 16.2	+58.7	62.9	7 43.5	+58.9	63.0	8 10.7	+59.0	63.1	8 37.7	+59.2	63.3	9 04.6	+59.4	63.4	9 31.4	+59.5	63.6	13
14	7 19.7	+58.3	62.5	7 47.4	+58.5	62.6	8 14.9	+58.8	62.7	8 42.4	+58.9	62.8	9 09.7	+59.1	63.0	9 36.9	+59.3	63.1	10 04.0	+59.4	63.3	10 30.9	+59.5	63.4	14
15	8 18.0	+58.2	62.2	8 45.9	+58.5	62.3	9 13.7	+58.7	62.5	9 41.3	+58.9	62.6	10 08.8	+59.1	62.8	10 36.2	+59.2	63.0	11 03.4	+59.3	63.1	11 30.4	+59.5	63.3	15
16	9 16.2	+58.3	62.0	9 44.4	+58.5	62.1	10 12.4	+58.7	62.3	10 40.2	+58.9	62.4	11 07.9	+59.0	62.6	11 35.4	+59.2	62.8	12 02.7	+59.4	63.0	12 29.9	+59.5	63.2	16
17	10 14.5	+58.3	61.7	10 42.9	+58.4	61.9	11 11.1	+58.6	62.1	11 39.1	+58.9	62.2	12 06.9	+59.1	62.4	12 34.6	+59.2	62.6	13 02.1	+59.4	62.8	13 29.4	+59.5	63.0	17
18	11 12.8	+58.2	61.5	11 41.3	+58.5	61.7	12 09.7	+58.7	61.9	12 38.0	+58.8	62.0	13 06.0	+59.0	62.2	13 33.8	+59.2	62.5	14 01.5	+59.3	62.7	14 28.9	+59.5	62.9	18
19	12 11.0	+58.3	61.2	12 39.8	+58.5	61.4	13 08.4	+58.7	61.6	13 36.8	+58.9	61.8	14 05.0	+59.1	62.1	14 33.0	+59.2	62.3	15 00.8	+59.4	62.5	15 28.4	+59.5	62.8	19
20	13 09.3	+58.2	61.0	13 38.3	+58.4	61.2	14 07.1	+58.6	61.4	14 35.7	+58.8	61.6	15 04.1	+59.0	61.9	15 32.2	+59.2	62.1	16 00.2	+59.3	62.4	16 27.9	+59.4	62.6	20
21	14 07.5	+58.2	60.7	14 36.7	+58.5	61.0	15 05.7	+58.7	61.2	15 34.5	+58.9	61.4	16 03.1	+59.0	61.7	16 31.4	+59.2	62.0	16 59.5	+59.3	62.2	17 27.3	+59.5	62.5	21
22	15 05.7	+58.2	60.5	15 35.2	+58.4	60.7	16 04.4	+58.6	61.0	16 33.4	+58.8	61.2	17 02.1	+59.0	61.5	17 30.6	+59.2	61.8	17 58.8	+59.4	62.1	18 26.8	+59.5	62.4	22
23	16 03.9	+58.2	60.2	16 33.6	+58.4	60.5	17 03.0	+58.6	60.8	17 32.2	+58.8	61.0	18 01.1	+59.0	61.3	18 29.8	+59.1	61.6	18 58.2	+59.3	61.9	19 26.3	+59.4	62.2	23
24	17 02.1	+58.1	60.0	17 32.0	+58.4	60.3	18 01.6	+58.6	60.5	18 31.0	+58.8	60.8	19 00.1	+59.0	61.1	19 28.9	+59.2	61.4	19 57.5	+59.3	61.7	20 25.7	+59.5	62.1	24
25	18 00.2	+58.2	59.7	18 30.4	+58.3	60.0	19 00.2	+58.6	60.3	19 29.8	+58.8	60.6	19 59.1	+59.0	60.9	20 28.1	+59.1	61.3	20 56.8	+59.3	61.6	21 25.2	+59.4	61.9	25
26	18 58.4	+58.1	59.5	19 28.7	+58.4	59.8	19 58.8	+58.5	60.1	20 28.6	+58.7	60.4	20 58.1	+58.9	60.7	21 27.2	+59.2	61.1	21 56.1	+59.3	61.4	22 24.6	+59.5	61.8	26
27	19 56.5	+58.1	59.2	20 27.1	+58.3	59.5	20 57.3	+58.6	59.9	21 27.3	+58.8	60.2	21 57.0	+58.9	60.5	22 26.4	+59.1	60.9	22 55.4	+59.3	61.3	23 24.1	+59.4	61.6	27
28	20 54.6	+58.0	58.9	21 25.4	+58.3	59.3	21 55.9	+58.5	59.6	22 26.1	+58.7	60.0	22 55.9	+59.0	60.3	23 25.5	+59.1	60.7	23 54.7	+59.2	61.1	24 23.5	+59.4	61.5	28
29	21 52.6	+58.1	58.7	22 23.7	+58.3	59.0	22 54.4	+58.5	59.4	23 24.8	+58.7	59.7	23 54.9	+58.9	60.1	24 24.6	+59.1	60.5	24 53.9	+59.3	60.9	25 22.9	+59.4	61.3	29
30	22 50.7	+58.0	58.4	23 22.0	+58.2	58.8	23 52.9	+58.5	59.1	24 23.5	+58.7	59.5	24 53.8	+58.9	59.9	25 23.7	+59.0	60.3	25 53.2	+59.2	60.7	26 22.3	+59.4	61.2	30
31	23 48.7	+58.0	58.1	24 20.2	+58.2	58.5	24 51.4	+58.4	58.9	25 22.2	+58.7	59.3	25 52.7	+58.8	59.7	26 22.7	+59.1	60.1	26 52.4	+59.3	60.6	27 21.7	+59.4	61.0	31
32	24 46.7	+57.9	57.8	25 18.4	+58.2	58.2	25 49.8	+58.5	58.6	26 20.9	+58.6	59.1	26 51.5	+58.9	59.5	27 21.8	+59.0	59.9	27 51.7	+59.2	60.4	28 21.1	+59.4	60.9	32
33	25 44.6	+57.9	57.5	26 16.6	+58.2	58.0	26 48.3	+58.4	58.4	27 19.5	+58.7	58.8	27 50.4	+58.8	59.3	28 20.8	+59.1	59.7	28 50.9	+59.2	60.2	29 20.5	+59.3	60.7	33
34	26 42.5	+57.9	57.3	27 14.8	+58.1	57.7	27 46.7	+58.3	58.1	28 18.2	+58.6	58.6	28 49.2	+58.8	59.0	29 19.9	+59.0	59.5	29 50.1	+59.2	60.0	30 19.8	+59.4	60.5	34
35	27 40.4	+57.8	57.0	28 12.9	+58.1	57.4	28 45.0	+58.4	57.9	29 16.8	+58.5	58.3	29 48.0	+58.8	58.8	30 18.9	+59.0	59.3	30 49.3	+59.1	59.8	31 19.2	+59.3	60.3	35
36	28 38.2	+57.8	56.7	29 11.0	+58.1	57.1	29 43.4	+58.3	57.6	30 15.3	+58.6	58.1	30 46.8	+58.8	58.6	31 17.9	+58.9	59.1	31 48.4	+59.2	59.6	32 18.5	+59.3	60.2	36
37	29 36.0	+57.8	56.4	30 09.1	+58.0	56.8	30 41.7	+58.3	57.3	31 13.9	+58.5	57.8	31 45.6	+58.7	58.4	32 16.8	+59.0	58.9	32 47.6	+59.1	59.4	33 17.8	+59.3	60.0	37
38	30 33.8	+57.7	56.0	31 07.1	+58.0	56.5	31 40.0	+58.2	57.0	32 12.4	+58.4	57.6	32 44.3	+58.7	58.1	33 15.8	+58.9	58.7	33 46.7	+59.1	59.2	34 17.1	+59.3	59.8	38
39	31 31.5	+57.7	55.7	32 05.1	+57.9	56.2	32 38.2	+58.2	56.8	33 10.8	+58.5	57.3	33 43.0	+58.7	57.9	34 14.7	+58.9	58.4	34 45.8	+59.1	59.0	35 16.4	+59.3	59.6	39
40	32 29.2	+57.6	55.4	33 03.0	+57.9	55.9	33 36.4	+58.1	56.5	34 09.3	+58.4	57.0	34 41.7	+58.6	57.6	35 13.6	+58.8	58.2	35 44.9	+59.1	58.8	36 15.7	+59.3	59.4	40
41	33 26.8	+57.5	55.1	34 00.9	+57.8	55.6	34 34.5	+58.2	56.2	35 07.7	+58.4	56.8	35 40.3	+58.6	57.4	36 12.4	+58.9	58.0	36 44.0	+59.0	58.6	37 15.0	+59.2	59.2	41
42	34 24.3	+57.5	54.7	34 58.7	+57.8	55.3	35 32.7	+58.0	55.9	36 06.1	+58.3	56.5	36 38.9	+58.6	57.1	37 11.3	+58.8	57.7	37 43.0	+59.0	58.4	38 14.2	+59.2	59.0	42
43	35 21.8	+57.4	54.4	35 56.5	+57.7	55.0	36 30.7	+58.0	55.6	37 04.4	+58.3	56.2	37 37.5	+58.5	56.8	38 10.1	+58.7	57.5	38 42.0	+59.0	58.1	39 13.4	+59.2	58.8	43
44	36 19.2	+57.4	54.0	36 54.2	+57.7	54.6	37 28.7	+58.0	55.2	38 02.7	+58.2	55.9	38 36.0	+58.5	56.5	39 08.8	+58.8	57.2	39 41.0	+59.0	57.9	40 12.6	+59.2	58.6	44
45	37 16.6	+57.3	53.6	37 51.9	+57.6	54.3	38 26.7	+57.9	54.9	39 00.9	+58.2	55.6	39 34.5	+58.5	56.2	40 07.6	+58.7	56.9	40 40.0	+58.9	57.7	41 11.8	+59.1	58.4	45
46	38 13.9	+57.2	53.3	38 49.5	+57.6	53.9	39 24.6	+57.8	54.6	39 59.1	+58.1	55.3	40 33.0	+58.4	56.0	41 06.3	+58.6	56.7	41 38.9	+58.9	57.4	42 10.9	+59.1	58.2	46
47	39 11.1	+57.2	52.9	39 47.1	+57.4	53.5	40 22.4	+57.8	54.2	40 57.2	+58.1	54.9	41 31.4	+58.3	55.6	42 04.9	+58.6	56.4	42 37.8	+58.9	57.2	43 10.0	+59.1	57.9	47
48	40 08.3	+57.0	52.5	40 44.5	+57.4	53.2	41 20.2	+57.7	53.9	41 55.3	+58.0	54.6	42 29.7	+58.3	55.3	43 03.5	+58.6	56.1	43 36.7	+58.8	56.9	44 09.1	+59.0	57.7	48
49	41 05.3	+57.0	52.1	41 41.9	+57.3	52.8	42 17.9	+57.7	53.5	42 53.3	+57.9	54.2	43 28.0	+58.3	55.0	44 02.1	+58.5	55.8	44 35.5	+58.8	56.6	45 08.1	+59.0	57.4	49
50	42 02.3	+56.9	51.7	42 39.2	+57.3	52.4	43 15.6	+57.5	53.1	43 51.2	+57.9	53.9	44 26.3	+58.2	54.7	45 00.6	+58.5	55.5	45 34.3	+58.7	56.3	46 07.1	+59.0	57.2	50
51	42 59.2	+56.8	51.2	43 36.5	+57.1	52.0	44 13.1	+57.5	52.7	44 49.1	+57.8	53.5	45 24.5	+58.1	54.3	45 59.1	+58.4	55.2	46 33.0	+58.7	56.0	47 06.1	+59.0	56.9	51
52	43 56.0	+56.7	50.8	44 33.6	+57.0	51.5	45 10.6	+57.4	52.3	45 46.9	+57.8	53.1	46 22.6	+58.0	54.0	46 57.5	+58.4	54.8	47 31.7	+58.6	55.7	48 05.1	+58.9	56.6	52
53	44 52.7	+56.5	50.3	45 30.6	+57.0	51.1	46 08.0	+57.3	51.9	46 44.7	+57.6	52.7	47 20.6	+58.0	53.6	47 55.9	+58.2	54.5	48 30.3	+58.6	55.4	49 04.0	+58.8	56.4	53
54	45 49.2	+56.5	49.9	46 27.6	+56.8	50.7	47 05.3	+57.2	51.5	47 42.3	+57.6	52.3	48 18.6	+57.9	53.2	48 54.1	+58.3	54.1	49 28.9	+58.5	55.1	50 02.8	+58.8	56.1	54
55	46 45.7	+56.3	49.4	47 24.4	+56.7	50.2	48 02.5	+57.1	51.0	48 39.9	+57.4	51.9	49 16.5	+57.8	52.8	49 52.4	+58.1	53.8	50 27.4	+58.5	54.7	51 01.6	+58.8	55.7	55
56	47 42.0	+56.1	48.9	48 21.1	+56.6	49.7	48 59.6	+56.9	50.6	49 37.3	+57.4	51.5	50 14.3	+57.7	52.4	50 50.5	+58.1	53.4	51 25.9	+58.4	54.4	52 00.4	+58.7	55.4	56
57	48 38.1	+56.0	48.3	49 17.7	+56.4	49.2	49 56.5	+56.9	50.1	50 34.7	+57.2	51.0	51 12.0	+57.6	52.0	51 48.6	+58.0	53.0	52 24.3	+58.3	54.0	52 59.1	+58.6	55.1	57
58	49 34.1	+55.9	47.8	50 14.1	+56.3	48.7	50 53.4	+56.7	49.6	51 31.9	+57.1	50.5	52 09.6	+57.6	51.5	52 46.6	+57.8	52.6	53 22.6	+58.2	53.6	53 57.7	+58.6	54.7	58
59	50 30.0	+55.7	47.2	51 10.4	+56.1	48.1	51 50.1	+56.6	49.1	52 29.0	+57.0	50.0	53 07.2	+57.4	51.1	53 44.4	+57.8	52.1	54 20.8	+58.2	53.2	54 56.3	+58.5	54.3	59
60	51 25.7	+55.5	46.6	52 06.5	+56.0	47.5	52 46.7	+56.4	48.5	53 26.0	+56.9	49.5	54 04.6	+57.2	50.6	54 42.2	+57.7	51.7	55 19.0	+58.0	52.8	55 54.8	+58.4	54.0	60
61	52 21.2	+55.3	46.0	53 02.5	+55.8	47.0	53 43.1	+56.2	47.9	54 22.9	+56.7	49.0	55 01.8	+57.2	50.1	55 39.9	+57.6	51.2	56 17.0	+58.0	52.3	56 53.2	+58.3	53.5	61
62	53 16.5	+55.1	45.4	53 58.3	+55.5	46.3	54 39.3	+56.1	47.3	55 19.6	+56.5	48.4	55 59.0	+56.9	49.5	56 37.5	+57.4	50.7	57 15.0	+57.8	51.9	57 51.5	+58.3	53.1	62
63	54 11.6	+54.8	44.7	54 53.8	+55.4	45.7	55 35.4	+55.8	46.7	56 16.1	+56.3	47.8	56 55.9	+56.9	48.9	57 34.9	+57.3	50.1	58 12.8	+57.8	51.4	58 49.8	+58.1	52.7	63
64	55 06.4	+54.6	44.0	55 49.2	+55.1	45.0	56 31.2	+55.7	46.1	57 12.4	+56.2	47.2	57 52.8	+56.6	48.4	58 32.2	+57.1	49.6	59 10.6	+57.6	50.8	59 47.9	+58.0	52.2	64
65	56 01.0	+54.3	43.3	56 44.3	+54.9	44.3	57 26.9	+55.4	45.4	58 08.6	+55.9	46.5	58 49.4	+56.5	47.7	59 29.3	+56.9	49.0	60 08.2	+57.4	50.3	60 45.9	+57.9	51.7	65
66	56 55.3	+54.0	42.5	57 39.2	+54.6	43.5	58 22.3	+55.1	44.7	59 04.5	+55.7	45.8	59 45.9	+56.2	47.1	60 26.2	+56.8	48.3	61 05.6	+57.3	49.7	61 43.8	+57.8	51.1	66
67	57 49.3	+53.7	41.7	58 33.8	+54.3	42.8	59 17.4	+54.9	43.9	60 00.2	+55.5	45.1	60 42.1	+56.0	46.4	61 23.0	+56.6	47.7	62 02.9	+57.1	49.1	62 41.6	+57.6	50.5	67
68	58 43.0	+53.4	40.8	59 28.1	+53.9	41.9	60 12.3	+54.5	43.1	60 55.7	+55.1	44.3	61 38.1	+55.8	45.6	62 19.6	+56.3	47.0	63 00.0	+56.9	48.4	63 39.2	+57.5	49.9	68
69	59 36.4	+53.0	39.9	60 22.0	+53.6	41.1	61 06.8	+54.3	42.2	61 50.8	+54.9	43.5	62 33.9	+55.4	44.8	63 15.9	+56.1	46.2	63 56.9	+56.6	47.7	64 36.7	+57.2	49.2	69
70	60 29.4	+52.5	39.0	61 15.6	+53.2	40.1	62 01.1	+53.8	41.3	62 45.7	+54.5	42.6	63 29.3	+55.2	44.0	64 12.0	+55.8	45.4	64 53.5	+56.5	46.9	65 33.9	+57.0	48.5	70
71	61 21.9	+52.1	38.0	62 08.8	+52.8	39.2	62 54.9	+53.4	40.4	63 40.2	+54.1	41.7	64 24.5	+54.8	43.1	65 07.8	+55.5	44.6	65 50.0	+56.1	46.1	66 30.9	+56.8	47.8	71
72	62 14.0	+51.6	37.0	63 01.6	+52.2	38.1	63 48.3	+53.0	39.4	64 34.3	+53.7	40.7	65 19.3	+54.4	42.1	66 03.3	+55.1	43.6	66 46.1	+55.8	45.2	67 27.7	+56.5	46.9	72
73	63 05.6	+51.0	35.8	63 53.8	+51.8	37.0	64 41.3	+52.5	38.3	65 28.0	+53.2	39.7	66 13.7	+54.0	41.1	66 58.4	+54.7	42.6	67 41.9	+55.5	44.3	68 24.2	+56.2	46.0	73
74	63 56.6	+50.4	34.7	64 45.6	+51.1	35.9	65 33.8	+51.9	37.1	66 21.2	+52.7	38.5	67 07.7	+53.4	40.0	67 53.1	+54.3	41.6	68 37.4	+55.1	43.3	69 20.4	+55.9	45.1	74
75	64 47.0	+49.7	33.4	65 36.7	+50.5	34.6	66 25.7	+51.3	35.9	67 13.9	+52.1	37.3	68 01.1	+53.0	38.8	68 47.4	+53.7	40.4	69 32.5	+54.6	42.2	70 16.3	+55.4	44.0	75
76	65 36.7	+49.0	32.1	66 27.2	+49.8	33.3	67 17.0	+50.6	34.6	68 06.0	+51.4	36.0	68 54.1	+52.3	37.5	69 41.1	+53.2	39.2	70 27.1	+54.0	40.9	71 11.7	+55.0	42.9	76
77	66 25.7	+48.2	30.7	67 17.0	+49.0	31.9	68 07.6	+49.8	33.2	68 57.4	+50.7	34.6	69 46.4	+51.5	36.1	70 34.3	+52.5	37.8	71 21.1	+53.5	39.6	72 06.7	+54.4	41.6	77
78	67 13.9	+47.2	29.1	68 06.0	+48.1	30.3	68 57.4	+49.0	31.7	69 48.1	+49.8	33.1	70 37.9	+50.8	34.6	71 26.8	+51.8	36.3	72 14.6	+52.7	38.2	73 01.1	+53.8	40.2	78
79	68 01.1	+46.3	27.5	68 54.1	+47.0	28.7	69 46.4	+47.9	30.0	70 37.9	+48.9	31.4	71 28.7	+49.9	33.0	72 18.6	+50.8	34.7	73 07.3	+52.0	36.6	73 54.9	+53.0	38.6	79
80	68 47.4	+45.1	25.8	69 41.1	+46.0	27.0	70 34.3	+46.8	28.2	71 26.8	+47.8	29.6	72 18.6	+48.7	31.2	73 09.4	+49.9	32.9	73 59.3	+50.9	34.8	74 47.9	+52.1	36.9	80
81	69 32.5	+43.8	23.9	70 27.1	+44.6	25.1	71 21.1	+45.6	26.3	72 14.6	+46.5	27.7	73 07.3	+47.6	29.2	73 59.3	+48.6	30.9	74 50.2	+49.8	32.8	75 40.0	+51.1	34.9	81
82	70 16.3	+42.4	21.9	71 11.7	+43.3	23.0	72 06.7	+44.1	24.2	73 01.1	+45.1	25.6	73 54.9	+46.1	27.1	74 47.9	+47.3	28.8	75 40.0	+48.5	30.6	76 31.1	+49.8	32.8	82
83	70 58.7	+40.8	19.8	71 55.0	+41.6	20.8	72 50.8	+42.5	22.0	73 46.2	+43.5	23.3	74 41.0	+44.5	24.7	75 35.2	+45.6	26.3	76 28.5	+46.9	28.2	77 20.9	+48.2	30.3	83
84	71 39.5	+39.1	17.5	72 36.6	+39.8	18.5	73 33.3	+40.7	19.6	74 29.7	*+41.5*•	20.8	75 25.5	*+42.6*•	22.1	76 20.8	*+43.7*•	23.7	77 15.4	*+44.9*•	25.4	78 09.1	*+46.3*•	27.5	84
85	72 18.6	*+37.2*•	15.1	73 16.4	*+37.9*•	15.9	74 14.0	*+38.6*•	16.9	75 11.2	*+39.5*•	18.0	76 08.1	*+40.4*•	19.2	77 04.5	*+41.4*•	20.7	78 00.3	*+42.7*•	22.3	78 55.4	*+44.1*•	24.3	85
86	72 55.8	*+34.9*•	12.4	73 54.3	*+35.5*•	13.2	74 52.6	*+36.2*•	14.0	75 50.7	*+36.9*•	15.0	76 48.5	*+37.8*•	16.1	77 45.9	*+38.8*•	17.4	78 43.0	*+39.9*•	18.9	79 39.5	*+41.1*•	20.6	86
87	73 30.7	*+32.5*•	9.6	74 29.8	*+33.0*•	10.2	75 28.8	*+33.5*•	10.9	76 27.6	*+34.2*•	11.7	77 26.3	*+34.8*•	12.6	78 24.7	*+35.7*•	13.7	79 22.9	*+36.5*•	14.9	80 20.6	*+37.7*•	16.4	87
88	74 03.2	*+29.9*•	6.6	75 02.8	*+30.2*•	7.0	76 02.3	*+30.5*•	7.5	77 01.8	*+30.9*•	8.1	78 01.1	*+31.4*•	8.8	79 00.4	*+31.9*•	9.5	79 59.4	*+32.7*•	10.5	80 58.3	*+33.4*•	11.6	88
89	74 33.1	*+26.9*•	3.4	75 33.0	*+27.0*•	3.6	76 32.8	*+27.2*•	3.9	77 32.7	*+27.3*•	4.2	78 32.5	*+27.5*•	4.6	79 32.3	*+27.7*•	5.0	80 32.1	*+27.9*•	5.5	81 31.7	*+28.3*•	6.2	89
90	75 00.0	*+23.7*•	0.0	76 00.0	*+23.6*•	0.0	77 00.0	*+23.4*•	0.0	78 00.0	*+23.3*•	0.0	79 00.0	*+23.1*•	0.0	80 00.0	*+22.8*•	0.0	81 00.0	*+22.5*•	0.0	82 00.0	*+22.1*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 115°, 245°

66°, 294° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 02.6	+58.2	113.3	5 38.8	+58.5	113.4	5 15.0	+58.7	113.5	4 51.1	+58.9	113.5	4 27.1	+59.0	113.6	4 03.0	+59.2	113.7	3 38.9	+59.4	113.7	3 14.7	+59.5	113.8	0
1	7 00.8	+58.3	113.0	6 37.3	+58.5	113.1	6 13.7	+58.7	113.2	5 50.0	+58.9	113.3	5 26.1	+59.1	113.4	5 02.2	+59.3	113.5	4 38.3	+59.4	113.6	4 14.2	+59.5	113.7	1
2	7 59.1	+58.3	112.8	7 35.8	+58.5	112.9	7 12.4	+58.7	113.0	6 48.9	+58.8	113.1	6 25.2	+59.1	113.3	6 01.5	+59.2	113.4	5 37.6	+59.4	113.4	5 13.7	+59.5	113.5	2
3	8 57.4	+58.2	112.5	8 34.3	+58.5	112.7	8 11.1	+58.7	112.8	7 47.7	+58.9	113.0	7 24.3	+59.0	113.1	7 00.7	+59.2	113.2	6 37.0	+59.4	113.3	6 13.2	+59.5	113.4	3
4	9 55.6	+58.3	112.3	9 32.8	+58.4	112.5	9 09.8	+58.7	112.6	8 46.6	+58.9	112.8	8 23.3	+59.1	112.9	7 59.9	+59.3	113.0	7 36.4	+59.4	113.2	7 12.7	+59.5	113.3	4
5	10 53.9	+58.2	112.1	10 31.2	+58.5	112.2	10 08.5	+58.6	112.4	9 45.5	+58.9	112.6	9 22.4	+59.1	112.7	8 59.2	+59.2	112.9	8 35.8	+59.3	113.0	8 12.2	+59.5	113.1	5
6	11 52.1	+58.2	111.8	11 29.7	+58.5	112.0	11 07.1	+58.7	112.2	10 44.4	+58.8	112.4	10 21.5	+59.0	112.5	9 58.4	+59.2	112.7	9 35.1	+59.4	112.9	9 11.7	+59.5	113.0	6
7	12 50.3	+58.2	111.6	12 28.2	+58.4	111.8	12 05.8	+58.6	112.0	11 43.2	+58.9	112.2	11 20.5	+59.0	112.4	10 57.6	+59.2	112.5	10 34.5	+59.4	112.7	10 11.2	+59.5	112.9	7
8	13 48.5	+58.2	111.3	13 26.6	+58.4	111.5	13 04.4	+58.7	111.8	12 42.1	+58.8	112.0	12 19.5	+59.1	112.2	11 56.8	+59.2	112.4	11 33.9	+59.3	112.6	11 10.7	+59.5	112.8	8
9	14 46.7	+58.2	111.1	14 25.0	+58.4	111.3	14 03.1	+58.6	111.5	13 40.9	+58.9	111.8	13 18.6	+59.0	112.0	12 56.0	+59.2	112.2	12 33.2	+59.4	112.4	12 10.2	+59.5	112.6	9
10	15 44.9	+58.1	110.8	15 23.4	+58.4	111.1	15 01.7	+58.6	111.3	14 39.8	+58.8	111.6	14 17.6	+59.0	111.8	13 55.2	+59.2	112.0	13 32.6	+59.3	112.3	13 09.7	+59.5	112.5	10
11	16 43.0	+58.2	110.6	16 21.8	+58.4	110.8	16 00.3	+58.6	111.1	15 38.6	+58.8	111.4	15 16.6	+59.0	111.6	14 54.4	+59.2	111.9	14 31.9	+59.4	112.1	14 09.2	+59.5	112.4	11
12	17 41.2	+58.1	110.3	17 20.2	+58.4	110.6	16 58.9	+58.6	110.9	16 37.4	+58.8	111.2	16 15.6	+59.0	111.4	15 53.6	+59.1	111.7	15 31.3	+59.3	112.0	15 08.7	+59.5	112.2	12
13	18 39.3	+58.1	110.0	18 18.6	+58.3	110.3	17 57.5	+58.6	110.7	17 36.2	+58.8	111.0	17 14.6	+59.0	111.2	16 52.7	+59.2	111.5	16 30.6	+59.3	111.8	16 08.2	+59.4	112.1	13
14	19 37.4	+58.0	109.8	19 16.9	+58.3	110.1	18 56.1	+58.6	110.4	18 35.0	+58.8	110.7	18 13.6	+59.0	111.1	17 51.9	+59.2	111.4	17 29.9	+59.3	111.7	17 07.6	+59.5	111.9	14
15	20 35.4	+58.1	109.5	20 15.2	+58.3	109.9	19 54.7	+58.5	110.2	19 33.8	+58.8	110.5	19 12.6	+59.0	110.9	18 51.1	+59.1	111.2	18 29.2	+59.3	111.5	18 07.1	+59.4	111.8	15
16	21 33.5	+58.0	109.2	21 13.5	+58.3	109.6	20 53.2	+58.5	110.0	20 32.6	+58.7	110.3	20 11.6	+58.9	110.7	19 50.2	+59.1	111.0	19 28.5	+59.3	111.3	19 06.5	+59.5	111.7	16
17	22 31.5	+58.0	109.0	22 11.8	+58.2	109.3	21 51.7	+58.5	109.7	21 31.3	+58.7	110.1	21 10.5	+58.9	110.5	20 49.3	+59.2	110.8	20 27.8	+59.3	111.2	20 06.0	+59.4	111.5	17
18	23 29.5	+57.9	108.7	23 10.0	+58.3	109.1	22 50.2	+58.5	109.5	22 30.0	+58.7	109.9	22 09.4	+59.0	110.3	21 48.5	+59.1	110.6	21 27.1	+59.3	111.0	21 05.4	+59.5	111.4	18
19	24 27.4	+57.9	108.4	24 08.3	+58.2	108.8	23 48.7	+58.5	109.2	23 28.7	+58.7	109.7	23 08.4	+58.9	110.1	22 47.6	+59.1	110.5	22 26.4	+59.3	110.8	22 04.9	+59.4	111.2	19
20	25 25.3	+57.9	108.1	25 06.5	+58.1	108.6	24 47.2	+58.4	109.0	24 27.4	+58.7	109.4	24 07.3	+58.8	109.9	23 46.7	+59.1	110.3	23 25.7	+59.3	110.7	23 04.3	+59.4	111.1	20
21	26 23.2	+57.9	107.8	26 04.6	+58.2	108.3	25 45.6	+58.4	108.7	25 26.1	+58.6	109.2	25 06.1	+58.9	109.6	24 45.8	+59.0	110.1	24 25.0	+59.2	110.5	24 03.7	+59.4	110.9	21
22	27 21.1	+57.8	107.5	27 02.8	+58.1	108.0	26 44.0	+58.4	108.5	26 24.7	+58.7	109.0	26 05.0	+58.9	109.4	25 44.8	+59.1	109.9	25 24.2	+59.2	110.3	25 03.1	+59.4	110.8	22
23	28 18.9	+57.8	107.2	28 00.9	+58.1	107.7	27 42.4	+58.3	108.2	27 23.4	+58.6	108.7	27 03.9	+58.8	109.2	26 43.9	+59.0	109.7	26 23.4	+59.3	110.2	26 02.5	+59.4	110.6	23
24	29 16.7	+57.7	106.9	28 59.0	+58.0	107.4	28 40.7	+58.3	108.0	28 22.0	+58.5	108.5	28 02.7	+58.8	109.0	27 42.9	+59.0	109.5	27 22.7	+59.2	110.0	27 01.9	+59.4	110.5	24
25	30 14.4	+57.7	106.6	29 57.0	+58.0	107.1	29 39.0	+58.3	107.7	29 20.5	+58.6	108.2	29 01.5	+58.8	108.8	28 41.9	+59.0	109.3	28 21.9	+59.2	109.8	28 01.3	+59.4	110.3	25
26	31 12.1	+57.6	106.3	30 55.0	+57.9	106.8	30 37.3	+58.3	107.4	30 19.1	+58.5	108.0	30 00.3	+58.7	108.5	29 40.9	+59.0	109.1	29 21.1	+59.2	109.6	29 00.7	+59.3	110.1	26
27	32 09.7	+57.6	105.9	31 52.9	+58.0	106.5	31 35.6	+58.2	107.1	31 17.6	+58.5	107.7	30 59.0	+58.8	108.3	30 39.9	+59.0	108.9	30 20.3	+59.1	109.4	30 00.0	+59.4	110.0	27
28	33 07.3	+57.6	105.6	32 50.9	+57.8	106.2	32 33.8	+58.1	106.9	32 16.1	+58.4	107.5	31 57.8	+58.7	108.1	31 38.9	+58.9	108.6	31 19.4	+59.2	109.2	30 59.4	+59.3	109.8	28
29	34 04.9	+57.4	105.3	33 48.7	+57.8	105.9	33 31.9	+58.2	106.6	33 14.5	+58.4	107.2	32 56.5	+58.7	107.8	32 37.8	+58.9	108.4	32 18.6	+59.1	109.0	31 58.7	+59.3	109.6	29
30	35 02.3	+57.4	104.9	34 46.5	+57.8	105.6	34 30.1	+58.1	106.3	34 12.9	+58.4	106.9	33 55.2	+58.6	107.6	33 36.7	+58.9	108.2	33 17.7	+59.1	108.8	32 58.0	+59.3	109.4	30
31	35 59.7	+57.4	104.6	35 44.3	+57.7	105.3	35 28.2	+58.0	106.0	35 11.3	+58.4	106.6	34 53.8	+58.6	107.3	34 35.6	+58.9	108.0	34 16.8	+59.1	108.6	33 57.3	+59.3	109.3	31
32	36 57.1	+57.3	104.2	36 42.0	+57.6	104.9	36 26.2	+58.0	105.6	36 09.7	+58.2	106.3	35 52.4	+58.6	107.0	35 34.5	+58.8	107.7	35 15.9	+59.0	108.4	34 56.6	+59.3	109.1	32
33	37 54.4	+57.2	103.8	37 39.6	+57.6	104.6	37 24.2	+57.9	105.3	37 07.9	+58.3	106.1	36 51.0	+58.5	106.8	36 33.3	+58.8	107.5	36 14.9	+59.1	108.2	35 55.9	+59.2	108.9	33
34	38 51.6	+57.1	103.4	38 37.2	+57.5	104.2	38 22.1	+57.9	105.0	38 06.2	+58.2	105.7	37 49.5	+58.5	106.5	37 32.1	+58.8	107.2	37 14.0	+59.0	108.0	36 55.1	+59.2	108.7	34
35	39 48.7	+57.0	103.0	39 34.7	+57.5	103.9	39 20.0	+57.8	104.6	39 04.4	+58.1	105.4	38 48.0	+58.5	106.2	38 30.9	+58.7	107.0	38 13.0	+59.0	107.7	37 54.3	+59.2	108.5	35
36	40 45.7	+57.0	102.6	40 32.2	+57.4	103.5	40 17.8	+57.7	104.3	40 02.5	+58.1	105.1	39 46.5	+58.4	105.9	39 29.6	+58.7	106.7	39 12.0	+58.9	107.5	38 53.5	+59.2	108.3	36
37	41 42.7	+56.9	102.2	41 29.6	+57.2	103.1	41 15.5	+57.7	103.9	41 00.6	+58.1	104.8	40 44.9	+58.4	105.6	40 28.3	+58.7	106.4	40 10.9	+59.0	107.3	39 52.7	+59.2	108.1	37
38	42 39.6	+56.7	101.8	42 26.8	+57.2	102.7	42 13.2	+57.6	103.6	41 58.7	+58.0	104.5	41 43.3	+58.3	105.3	41 27.0	+58.6	106.2	41 09.9	+58.9	107.0	40 51.9	+59.1	107.8	38
39	43 36.3	+56.7	101.3	43 24.0	+57.2	102.3	43 10.8	+57.5	103.2	42 56.7	+57.9	104.1	42 41.6	+58.2	105.0	42 25.6	+58.6	105.9	42 08.8	+58.8	106.8	41 51.0	+59.1	107.6	39
40	44 33.0	+56.5	100.9	44 21.2	+57.0	101.8	44 08.3	+57.5	102.8	43 54.6	+57.8	103.7	43 39.8	+58.3	104.7	43 24.2	+58.5	105.6	43 07.6	+58.8	106.5	42 50.1	+59.1	107.4	40
41	45 29.5	+56.4	100.4	45 18.2	+56.9	101.4	45 05.8	+57.3	102.4	44 52.4	+57.8	103.4	44 38.1	+58.1	104.3	44 22.7	+58.5	105.3	44 06.4	+58.8	106.2	43 49.2	+59.0	107.1	41
42	46 25.9	+56.3	99.9	46 15.1	+56.8	101.0	46 03.1	+57.3	102.0	45 50.2	+57.7	103.0	45 36.2	+58.1	104.0	45 21.2	+58.4	105.0	45 05.2	+58.7	105.9	44 48.2	+59.1	106.9	42
43	47 22.2	+56.2	99.4	47 11.9	+56.6	100.5	47 00.4	+57.2	101.5	46 47.9	+57.6	102.6	46 34.3	+58.0	103.6	46 19.6	+58.4	104.6	46 03.9	+58.7	105.6	45 47.3	+58.9	106.6	43
44	48 18.4	+56.0	98.9	48 08.5	+56.6	100.0	47 57.6	+57.0	101.1	47 45.5	+57.5	102.2	47 32.3	+57.9	103.2	47 18.0	+58.3	104.3	47 02.6	+58.7	105.3	46 46.2	+59.0	106.4	44
45	49 14.4	+55.8	98.3	49 05.1	+56.4	99.5	48 54.6	+56.9	100.6	48 43.0	+57.4	101.7	48 30.2	+57.8	102.9	48 16.3	+58.2	103.9	48 01.3	+58.6	105.0	47 45.2	+58.9	106.1	45
46	50 10.2	+55.7	97.8	50 01.5	+56.3	99.0	49 51.5	+56.9	100.1	49 40.4	+57.3	101.3	49 28.0	+57.8	102.4	49 14.5	+58.2	103.6	48 59.9	+58.5	104.7	48 44.1	+58.8	105.8	46
47	51 05.9	+55.5	97.2	50 57.8	+56.1	98.4	50 48.4	+56.6	99.6	50 37.7	+57.2	100.8	50 25.8	+57.7	102.0	50 12.7	+58.1	103.2	49 58.4	+58.5	104.4	49 42.9	+58.8	105.5	47
48	52 01.4	+55.3	96.6	51 53.9	+55.9	97.9	51 45.0	+56.5	99.1	51 34.9	+57.0	100.4	51 23.5	+57.5	101.6	51 10.8	+58.0	102.8	50 56.9	+58.4	104.0	50 41.7	+58.8	105.2	48
49	52 56.7	+55.1	95.9	52 49.8	+55.7	97.3	52 41.5	+56.4	98.6	52 31.9	+57.0	99.9	52 21.0	+57.5	101.1	52 08.8	+57.9	102.4	51 55.3	+58.3	103.6	51 40.5	+58.7	104.9	49
50	53 51.8	+54.8	95.3	53 45.5	+55.6	96.6	53 37.9	+56.2	98.0	53 28.9	+56.8	99.3	53 18.5	+57.3	100.7	53 06.7	+57.8	102.0	52 53.6	+58.2	103.3	52 39.2	+58.6	104.5	50
51	54 46.6	+54.6	94.6	54 41.1	+55.3	96.0	54 34.1	+56.0	97.4	54 25.7	+56.6	98.8	54 15.8	+57.2	100.2	54 04.5	+57.7	101.5	53 51.8	+58.2	102.9	53 37.8	+58.6	104.2	51
52	55 41.2	+54.4	93.9	55 36.4	+55.1	95.3	55 30.1	+55.8	96.8	55 22.3	+56.5	98.2	55 13.0	+57.0	99.6	55 02.2	+57.6	101.0	54 50.0	+58.1	102.4	54 36.4	+58.5	103.8	52
53	56 35.6	+54.0	93.1	56 31.5	+54.9	94.6	56 25.9	+55.6	96.1	56 18.8	+56.2	97.6	56 10.0	+57.0	99.1	55 59.8	+57.5	100.5	55 48.1	+58.0	102.0	55 34.9	+58.4	103.4	53
54	57 29.6	+53.7	92.3	57 26.4	+54.5	93.9	57 21.5	+55.4	95.4	57 15.0	+56.1	97.0	57 07.0	+56.7	98.5	56 57.3	+57.3	100.0	56 46.1	+57.8	101.5	56 33.3	+58.3	103.0	54
55	58 23.3	+53.4	91.5	58 20.9	+54.3	93.1	58 16.9	+55.1	94.7	58 11.1	+55.9	96.3	58 03.7	+56.5	97.9	57 54.6	+57.2	99.5	57 43.9	+57.8	101.0	57 31.6	+58.3	102.6	55
56	59 16.7	+53.0	90.6	59 15.2	+53.9	92.3	59 12.0	+54.8	93.9	59 07.0	+55.6	95.6	59 00.2	+56.4	97.3	58 51.8	+57.0	98.9	58 41.7	+57.6	100.5	58 29.9	+58.1	102.1	56
57	60 09.7	+52.5	89.6	60 09.1	+53.6	91.4	60 06.8	+54.5	93.1	60 02.6	+55.3	94.9	59 56.6	+56.1	96.6	59 48.8	+56.9	98.3	59 39.3	+57.5	100.0	59 28.0	+58.1	101.7	57
58	61 02.2	+52.2	88.7	61 02.7	+53.2	90.5	61 01.3	+54.1	92.3	60 57.9	+55.1	94.1	60 52.7	+55.9	95.9	60 45.7	+56.6	97.6	60 36.8	+57.3	99.4	60 26.1	+57.9	101.1	58
59	61 54.4	+51.6	87.6	61 55.9	+52.7	89.5	61 55.4	+53.8	91.4	61 53.0	+54.8	93.2	61 48.6	+55.7	95.1	61 42.3	+56.4	97.0	61 34.1	+57.1	98.8	61 24.0	+57.8	100.6	59
60	62 46.0	+51.1	86.5	62 48.6	+52.3	88.5	62 49.2	+53.4	90.4	62 47.8	+54.3	92.4	62 44.3	+55.3	94.3	62 38.7	+56.2	96.2	62 31.2	+57.0	98.1	62 21.8	+57.6	100.0	60
61	63 37.1	+50.5	85.4	63 40.9	+51.7	87.4	63 42.6	+52.9	89.4	63 42.1	+54.1	91.4	63 39.6	+55.0	93.4	63 34.9	+56.0	95.5	63 28.2	+56.7	97.5	63 19.4	+57.4	99.4	61
62	64 27.6	+49.8	84.1	64 32.6	+51.2	86.2	64 35.5	+52.4	88.3	64 36.2	+53.5	90.4	64 34.6	+54.6	92.5	64 30.9	+55.6	94.6	64 24.9	+56.5	96.7	64 16.8	+57.3	98.8	62
63	65 17.4	+49.1	82.8	65 23.8	+50.5	85.0	65 27.9	+51.9	87.2	65 29.7	+53.1	89.4	65 29.2	+54.3	91.6	65 26.5	+55.3	93.7	65 21.4	+56.2	95.9	65 14.1	+57.1	98.1	63
64	66 06.5	+48.3	81.4	66 14.3	+49.8	83.7	66 19.8	+51.2	85.9	66 22.8	+52.6	88.2	66 23.5	+53.8	90.5	66 21.8	+54.9	92.8	66 17.6	+56.0	95.1	66 11.2	+56.8	97.3	64
65	66 54.8	+47.4	79.9	67 04.1	+49.0	82.3	67 11.0	+50.5	84.6	67 15.4	+51.9	87.0	67 17.3	+53.2	89.4	67 16.7	+54.5	91.8	67 13.6	+55.6	94.1	67 08.0	+56.6	96.5	65
66	67 42.2	+46.4	78.3	67 53.1	+48.1	80.8	68 01.5	+49.7	83.2	68 07.3	+51.3	85.7	68 10.5	+52.7	88.2	68 11.2	+54.0	90.7	68 09.2	+55.2	93.2	68 04.6	+56.2	95.6	66
67	68 28.6	+45.3	76.6	68 41.2	+47.1	79.1	68 51.2	+48.9	81.7	68 58.6	+50.5	84.3	69 03.2	+52.1	86.9	69 05.2	+53.4	89.5	69 04.4	+54.7	92.1	69 00.8	+55.9	94.7	67
68	69 13.9	+44.1	74.8	69 28.3	+46.0	77.4	69 40.1	+47.8	80.0	69 49.1	+49.6	82.7	69 55.3	+51.3	85.4	69 58.6	+52.9	88.2	69 59.1	+54.3	90.9	69 56.7	+55.5	93.7	68
69	69 58.0	+42.7	72.9	70 14.3	+44.8	75.5	70 27.9	+46.8	78.3	70 38.7	+48.7	81.1	70 46.6	+50.4	83.9	70 51.5	+52.1	86.8	70 53.4	+53.6	89.6	70 52.2	+55.1	92.5	69
70	70 40.7	+41.2	70.8	70 59.1	+43.4	73.5	71 14.7	+45.5	76.4	71 27.4	+47.5	79.3	71 37.0	+49.5	82.2	71 43.6	+51.3	85.2	71 47.0	+53.1	88.2	71 47.3	+54.5	91.3	70
71	71 21.9	+39.5	68.6	71 42.5	+41.8	71.4	72 00.2	+44.0	74.3	72 14.9	+46.3	77.3	72 26.5	+48.4	80.4	72 34.9	+50.4	83.5	72 40.1	+52.2	86.7	72 41.8	+53.9	89.9	71
72	72 01.4	*+37.6•*	66.2	72 24.3	+40.0	69.0	72 44.2	+42.5	72.0	73 01.2	+44.8	75.2	73 14.9	+47.1	78.4	73 25.3	+49.3	81.7	73 32.3	+51.3	85.0	73 35.7	+53.2	88.4	72
73	72 39.0	*+35.4•*	63.6	73 04.3	*+38.0•*	66.5	73 26.7	*+40.6•*	69.6	73 46.0	+43.2	72.8	74 02.0	+45.7	76.2	74 14.6	+48.1	79.6	74 23.6	+50.3	83.1	74 28.9	+52.4	86.7	73
74	73 14.4	*+33.2•*	60.8	73 42.3	*+35.8•*	63.8	74 07.3	*+38.5•*	67.0	74 29.2	*+41.2•*	70.3	74 47.7	+43.9	73.8	75 02.7	+46.5	77.4	75 13.9	+49.0	81.1	75 21.3	+51.3	84.8	74
75	73 47.6	*+30.5•*	57.9	74 18.1	*+33.3•*	60.9	74 45.8	*+36.2•*	64.1	75 10.4	*+39.1•*	67.5	75 31.6	*+42.0•*	71.1	75 49.2	+44.8	74.8	76 02.9	+47.6	78.7	76 12.6	+50.1	82.7	75
76	74 18.1	*+27.7•*	54.8	74 51.4	*+30.6•*	57.8	75 22.0	*+33.5•*	61.0	75 49.5	*+36.5•*	64.5	76 13.6	*+39.6•*	68.2	76 34.0	*+42.8•*	72.1	76 50.5	+45.7	76.1	77 02.7	+48.6	80.3	76
77	74 45.8	*+24.6•*	51.4	75 22.0	*+27.5•*	54.4	75 55.5	*+30.5•*	57.7	76 26.0	*+33.8•*	61.2	76 53.2	*+37.1•*	64.9	77 16.8	*+40.3•*	68.9	77 36.2	*+43.7•*	73.2	77 51.3	+46.9	77.6	77
78	75 10.4	*+21.2•*	47.9	75 49.5	*+24.1•*	50.9	76 26.0	*+27.2•*	54.1	76 59.8	*+30.5•*	57.6	77 30.3	*+33.9•*	61.4	77 57.1	*+37.5•*	65.5	78 19.9	*+41.1•*	69.9	78 38.2	*+44.7•*	74.6	78
79	75 31.6	*+17.6•*	44.2	76 13.6	*+20.4•*	47.1	76 53.2	*+23.6•*	50.2	77 30.3	*+26.8•*	53.7	78 04.2	*+30.4•*	57.5	78 34.6	*+34.2•*	61.7	79 01.0	*+38.1•*	66.2	79 22.9	*+42.0•*	71.1	79
80	75 49.2	*+13.7•*	40.4	76 34.0	*+16.5•*	43.1	77 16.8	*+19.4•*	46.1	77 57.1	*+22.8•*	49.5	78 34.6	*+26.4•*	53.2	79 08.8	*+30.3•*	57.4	79 39.1	*+34.4•*	62.0	80 04.9	*+38.7•*	67.1	80
81	76 02.9	*+9.7•*	36.4	76 50.5	*+12.2•*	38.9	77 36.2	*+15.1•*	41.7	78 19.9	*+18.3•*	45.0	79 01.0	*+21.9•*	48.6	79 39.1	*+25.8•*	52.7	80 13.5	*+30.1•*	57.3	80 43.6	*+34.7•*	62.5	81
82	76 12.6	*+5.5•*	32.2	77 02.7	*+7.8•*	34.6	77 51.3	*+10.5•*	37.2	78 38.2	*+13.5•*	40.2	79 22.9	*+16.9•*	43.6	80 04.9	*+20.7•*	47.6	80 43.6	*+25.1•*	52.1	81 18.3	*+29.9•*	57.3	82
83	76 18.1	*+1.2•*	28.0	77 10.5	*+3.3•*	30.1	78 01.8	*+5.7•*	32.5	78 51.7	*+8.3•*	35.2	79 39.8	*+11.4•*	38.3	80 25.6	*+15.1•*	42.0	81 08.7	*+19.3•*	46.3	81 48.2	*+24.1•*	51.3	83
84	76 19.3	*−3.1•*	23.8	77 13.8	*−1.3•*	25.6	78 07.5	*+0.6•*	27.6	79 00.0	*+3.0•*	30.0	79 51.2	*+5.8•*	32.8	80 40.7	*+9.0•*	36.1	81 28.0	*+12.8•*	40.1	82 12.3	*+17.4•*	44.8	84
85	76 16.2	*−7.3•*	19.6	77 12.5	*−6.0•*	21.1	78 08.1	*−4.3•*	22.8	79 03.0	*−2.3•*	24.8	79 57.0	*−0.1•*	27.1	80 49.7	*+2.6•*	30.0	81 40.8	*+5.9•*	33.4	82 29.7	*+9.9•*	37.6	85
86	76 08.9	*−11.5•*	15.4	77 06.5	*−10.4•*	16.6	78 03.8	*−9.1•*	17.9	79 00.7	*−7.8•*	19.5	79 56.9	*−6.0•*	21.4	80 52.3	*−3.9•*	23.7	81 46.7	*−1.4•*	26.5	82 39.6	*+1.8•*	29.9	86
87	75 57.4	*−15.5•*	11.4	76 56.1	*−14.7•*	12.2	77 54.7	*−13.9•*	13.2	78 52.9	*−12.9•*	14.4	79 50.9	*−11.7•*	15.7	80 48.4	*−10.3•*	17.4	81 45.3	*−8.5•*	19.5	82 41.4	*−6.2•*	22.1	87
88	75 41.9	*−19.2•*	7.4	76 41.4	*−18.8•*	8.0	77 40.8	*−18.3•*	8.6	78 40.0	*−17.7•*	9.3	79 39.2	*−17.1•*	10.2	80 38.1	*−16.3•*	11.3	81 36.8	*−15.3•*	12.6	82 35.2	*−14.1•*	14.3	88
89	75 22.7	*−22.7•*	3.6	76 22.6	*−22.6•*	3.9	77 22.5	*−22.5•*	4.2	78 22.3	*−22.3•*	4.5	79 22.1	*−22.1•*	5.0	80 21.8	*−21.8•*	5.5	81 21.5	*−21.5•*	6.1	82 21.1	*−21.1•*	6.9	89
90	75 00.0	*−26.0•*	0.0	76 00.0	*−26.1•*	0.0	77 00.0	*−26.2•*	0.0	78 00.0	*−26.4•*	0.0	79 00.0	*−26.6•*	0.0	80 00.0	*−26.8•*	0.0	81 00.0	*−27.0•*	0.0	82 00.0	*−27.4•*	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 66°, 294°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 02.6	–58.3	113.3	5 38.8	–58.5	113.4	5 15.0	–58.7	113.5	4 51.1	–58.9	113.5	4 27.1	–59.1	113.6	4 03.0	–59.2	113.7	3 38.9	–59.4	113.7	3 14.7	–59.5	113.8	**0**
1	5 04.3	–58.3	113.5	4 40.3	–58.5	113.6	4 16.3	–58.7	113.7	3 52.2	–58.9	113.7	3 28.0	–59.1	113.8	3 03.8	–59.3	113.8	2 39.5	–59.4	113.9	2 15.2	–59.5	113.9	**1**
2	4 06.0	–58.3	113.7	3 41.8	–58.5	113.8	3 17.6	–58.8	113.9	2 53.3	–58.9	113.9	2 28.9	–59.1	114.0	2 04.5	–59.2	114.0	1 40.1	–59.4	114.0	1 15.7	–59.5	114.0	**2**
3	3 07.7	–58.3	114.0	2 43.3	–58.5	114.0	2 18.8	–58.7	114.1	1 54.4	–59.0	114.1	1 29.8	–59.0	114.1	1 05.3	–59.2	114.2	0 40.7	–59.3	114.2	0 16.2	–59.5	114.2	**3**
4	2 09.4	–58.3	114.2	1 44.8	–58.5	114.3	1 20.1	–58.7	114.3	0 55.4	–58.9	114.3	0 30.8	–59.1	114.3	0 06.1	–59.3	114.3	0 18.6	+59.4	65.7	0 43.3	+59.6	65.7	**4**
5	1 11.1	–58.3	114.5	0 46.3	–58.6	114.5	0 21.4	–58.7	114.5	0 03.5	+58.9	65.5	0 28.3	+59.1	65.5	0 53.2	+59.2	65.5	1 18.0	+59.4	65.5	1 42.9	+59.5	65.6	**5**
6	0 12.8	–58.3	114.7	0 12.3	+58.5	65.3	0 37.3	+58.7	65.3	1 02.4	+58.9	65.3	1 27.4	+59.1	65.3	1 52.4	+59.3	65.4	2 17.4	+59.4	65.4	2 42.4	+59.5	65.4	**6**
7	0 45.5	+58.3	65.1	1 10.8	+58.5	65.1	1 36.0	+58.8	65.1	2 01.3	+58.9	65.1	2 26.5	+59.1	65.2	2 51.7	+59.2	65.2	3 16.8	+59.4	65.3	3 41.9	+59.5	65.3	**7**
8	1 43.8	+58.3	64.8	2 09.3	+58.5	64.9	2 34.8	+58.7	64.9	3 00.2	+58.9	64.9	3 25.6	+59.0	65.0	3 50.9	+59.2	65.1	4 16.2	+59.4	65.1	4 41.4	+59.5	65.2	**8**
9	2 42.1	+58.3	64.6	3 07.8	+58.5	64.6	3 33.5	+58.7	64.7	3 59.1	+58.9	64.8	4 24.6	+59.1	64.8	4 50.1	+59.3	64.9	5 15.6	+59.3	65.0	5 40.9	+59.5	65.1	**9**
10	3 40.4	+58.3	64.4	4 06.3	+58.5	64.4	4 32.2	+58.7	64.5	4 58.0	+58.9	64.6	5 23.7	+59.1	64.6	5 49.4	+59.2	64.7	6 14.9	+59.4	64.8	6 40.4	+59.5	64.9	**10**
11	4 38.7	+58.2	64.1	5 04.8	+58.5	64.2	5 30.9	+58.7	64.3	5 56.9	+58.9	64.4	6 22.8	+59.1	64.5	6 48.6	+59.2	64.6	7 14.3	+59.4	64.7	7 39.9	+59.5	64.8	**11**
12	5 36.9	+58.3	63.9	6 03.3	+58.5	64.0	6 29.6	+58.7	64.1	6 55.8	+58.9	64.2	7 21.9	+59.0	64.3	7 47.8	+59.3	64.4	8 13.7	+59.4	64.5	8 39.4	+59.5	64.7	**12**
13	6 35.2	+58.3	63.6	7 01.8	+58.5	63.8	7 28.3	+58.7	63.9	7 54.7	+58.9	64.0	8 20.9	+59.1	64.1	8 47.1	+59.2	64.2	9 13.1	+59.3	64.4	9 38.9	+59.5	64.5	**13**
14	7 33.5	+58.3	63.4	8 00.3	+58.5	63.5	8 27.0	+58.7	63.7	8 53.6	+58.8	63.8	9 20.0	+59.0	63.9	9 46.3	+59.2	64.1	10 12.4	+59.4	64.2	10 38.4	+59.5	64.4	**14**
15	8 31.8	+58.2	63.2	8 58.8	+58.5	63.3	9 25.7	+58.7	63.4	9 52.4	+58.9	63.6	10 19.0	+59.1	63.8	10 45.5	+59.2	63.9	11 11.8	+59.3	64.1	11 37.9	+59.5	64.3	**15**
16	9 30.0	+58.3	62.9	9 57.3	+58.4	63.1	10 24.4	+58.6	63.2	10 51.3	+58.9	63.4	11 18.1	+59.0	63.6	11 44.7	+59.2	63.8	12 11.1	+59.4	63.9	12 37.4	+59.5	64.1	**16**
17	10 28.3	+58.2	62.7	10 55.7	+58.5	62.8	11 23.0	+58.7	63.0	11 50.2	+58.8	63.2	12 17.1	+59.1	63.4	12 43.9	+59.2	63.6	13 10.5	+59.3	63.8	13 36.9	+59.5	64.0	**17**
18	11 26.5	+58.2	62.4	11 54.2	+58.4	62.6	12 21.7	+58.6	62.8	12 49.0	+58.9	63.0	13 16.2	+59.0	63.2	13 43.1	+59.2	63.4	14 09.8	+59.4	63.6	14 36.4	+59.4	63.9	**18**
19	12 24.7	+58.2	62.2	12 52.6	+58.5	62.4	13 20.3	+58.7	62.6	13 47.9	+58.8	62.8	14 15.2	+59.0	63.0	14 42.3	+59.2	63.3	15 09.2	+59.3	63.5	15 35.8	+59.5	63.7	**19**
20	13 22.9	+58.2	61.9	13 51.1	+58.4	62.1	14 19.0	+58.6	62.4	14 46.7	+58.8	62.6	15 14.2	+59.0	62.8	15 41.5	+59.2	63.1	16 08.5	+59.3	63.3	16 35.3	+59.5	63.6	**20**
21	14 21.1	+58.2	61.7	14 49.5	+58.4	61.9	15 17.6	+58.6	62.2	15 45.5	+58.8	62.4	16 13.2	+59.0	62.7	16 40.7	+59.1	62.9	17 07.8	+59.4	63.2	17 34.8	+59.4	63.5	**21**
22	15 19.3	+58.2	61.4	15 47.9	+58.4	61.7	16 16.2	+58.6	61.9	16 44.3	+58.8	62.2	17 12.2	+59.0	62.5	17 39.8	+59.2	62.7	18 07.2	+59.3	63.0	18 34.2	+59.5	63.3	**22**
23	16 17.5	+58.1	61.2	16 46.3	+58.3	61.4	17 14.8	+58.6	61.7	17 43.1	+58.8	62.0	18 11.2	+59.0	62.3	18 39.0	+59.1	62.6	19 06.5	+59.3	62.9	19 33.7	+59.4	63.2	**23**
24	17 15.6	+58.1	60.9	17 44.6	+58.4	61.2	18 13.4	+58.6	61.5	18 41.9	+58.8	61.8	19 10.2	+58.9	62.1	19 38.1	+59.2	62.4	20 05.8	+59.3	62.7	20 33.1	+59.5	63.0	**24**
25	18 13.7	+58.1	60.7	18 43.0	+58.3	60.9	19 12.0	+58.5	61.2	19 40.7	+58.8	61.6	20 09.1	+59.0	61.9	20 37.3	+59.1	62.2	21 05.1	+59.3	62.5	21 32.6	+59.4	62.9	**25**
26	19 11.8	+58.1	60.4	19 41.3	+58.3	60.7	20 10.5	+58.6	61.0	20 39.5	+58.7	61.3	21 08.1	+58.9	61.7	21 36.4	+59.1	62.0	22 04.4	+59.3	62.4	22 32.0	+59.4	62.7	**26**
27	20 09.9	+58.0	60.1	20 39.6	+58.3	60.4	21 09.1	+58.5	60.8	21 38.2	+58.7	61.1	22 07.0	+58.9	61.5	22 35.5	+59.1	61.8	23 03.7	+59.2	62.2	23 31.4	+59.5	62.6	**27**
28	21 07.9	+58.1	59.9	21 37.9	+58.3	60.2	22 07.6	+58.5	60.5	22 36.9	+58.7	60.9	23 05.9	+58.9	61.3	23 34.6	+59.1	61.7	24 02.9	+59.3	62.0	24 30.9	+59.4	62.4	**28**
29	22 06.0	+58.0	59.6	22 36.2	+58.2	59.9	23 06.1	+58.5	60.3	23 35.6	+58.7	60.7	24 04.8	+58.9	61.1	24 33.7	+59.1	61.5	25 02.2	+59.2	61.9	25 30.3	+59.4	62.3	**29**
30	23 04.0	+57.9	59.3	23 34.4	+58.3	59.7	24 04.6	+58.4	60.1	24 34.3	+58.7	60.5	25 03.7	+58.9	60.9	25 32.8	+59.0	61.3	26 01.4	+59.2	61.7	26 29.7	+59.4	62.1	**30**
31	24 01.9	+58.0	59.0	24 32.7	+58.1	59.4	25 03.0	+58.4	59.8	25 33.0	+58.6	60.2	26 02.6	+58.9	60.6	26 31.8	+59.1	61.1	27 00.6	+59.3	61.5	27 29.1	+59.3	62.0	**31**
32	24 59.9	+57.9	58.7	25 30.8	+58.2	59.1	26 01.4	+58.4	59.6	26 31.6	+58.7	60.0	27 01.5	+58.8	60.4	27 30.9	+59.0	60.9	27 59.9	+59.2	61.3	28 28.4	+59.4	61.8	**32**
33	25 57.8	+57.9	58.4	26 29.0	+58.1	58.9	26 59.8	+58.4	59.3	27 30.3	+58.6	59.7	28 00.3	+58.8	60.2	28 29.9	+59.0	60.7	28 59.1	+59.1	61.1	29 27.8	+59.3	61.6	**33**
34	26 55.7	+57.8	58.2	27 27.1	+58.1	58.6	27 58.2	+58.3	59.0	28 28.9	+58.5	59.5	28 59.1	+58.8	60.0	29 28.9	+59.0	60.5	29 58.2	+59.2	61.0	30 27.1	+59.4	61.5	**34**
35	27 53.5	+57.8	57.9	28 25.2	+58.1	58.3	28 56.5	+58.3	58.8	29 27.4	+58.6	59.3	29 57.9	+58.7	59.7	30 27.9	+58.9	60.2	30 57.4	+59.2	60.8	31 26.5	+59.3	61.3	**35**
36	28 51.3	+57.7	57.5	29 23.3	+58.0	58.0	29 54.8	+58.3	58.5	30 26.0	+58.5	59.0	30 56.6	+58.8	59.5	31 26.8	+59.0	60.0	31 56.6	+59.1	60.6	32 25.8	+59.3	61.1	**36**
37	29 49.0	+57.7	57.2	30 21.3	+58.0	57.7	30 53.1	+58.2	58.2	31 24.5	+58.5	58.7	31 55.4	+58.7	59.3	32 25.8	+58.9	59.8	32 55.7	+59.1	60.4	33 25.1	+59.3	60.9	**37**
38	30 46.7	+57.7	56.9	31 19.3	+57.9	57.4	31 51.3	+58.2	57.9	32 23.0	+58.4	58.5	32 54.1	+58.7	59.0	33 24.7	+58.9	59.6	33 54.8	+59.1	60.2	34 24.4	+59.3	60.8	**38**
39	31 44.4	+57.6	56.6	32 17.2	+57.9	57.1	32 49.5	+58.2	57.7	33 21.4	+58.4	58.2	33 52.8	+58.6	58.8	34 23.6	+58.9	59.4	34 53.9	+59.1	60.0	35 23.7	+59.2	60.6	**39**
40	32 42.0	+57.6	56.3	33 15.1	+57.8	56.8	33 47.7	+58.1	57.4	34 19.8	+58.4	57.9	34 51.4	+58.6	58.5	35 22.5	+58.8	59.1	35 53.0	+59.0	59.7	36 22.9	+59.3	60.4	**40**
41	33 39.6	+57.5	55.9	34 12.9	+57.8	56.5	34 45.8	+58.1	57.1	35 18.2	+58.3	57.7	35 50.0	+58.6	58.3	36 21.3	+58.8	58.9	36 52.0	+59.1	59.5	37 22.2	+59.2	60.2	**41**
42	34 37.1	+57.4	55.6	35 10.7	+57.8	56.2	35 43.9	+58.0	56.8	36 16.5	+58.3	57.4	36 48.6	+58.5	58.0	37 20.1	+58.8	58.6	37 51.1	+58.9	59.3	38 21.4	+59.2	60.0	**42**
43	35 34.5	+57.4	55.2	36 08.5	+57.6	55.8	36 41.9	+58.0	56.4	37 14.8	+58.2	57.1	37 47.1	+58.5	57.7	38 18.9	+58.7	58.4	38 50.0	+59.0	59.1	39 20.6	+59.2	59.8	**43**
44	36 31.9	+57.3	54.9	37 06.1	+57.7	55.5	37 39.9	+57.9	56.1	38 13.0	+58.2	56.8	38 45.6	+58.5	57.4	39 17.6	+58.7	58.1	39 49.0	+58.9	58.8	40 19.8	+59.1	59.5	**44**
45	37 29.2	+57.2	54.5	38 03.8	+57.5	55.1	38 37.8	+57.8	55.8	39 11.2	+58.2	56.5	39 44.1	+58.4	57.1	40 16.3	+58.7	57.8	40 47.9	+59.0	58.6	41 18.9	+59.1	59.3	**45**
46	38 26.4	+57.2	54.1	39 01.3	+57.5	54.8	39 35.6	+57.8	55.4	40 09.4	+58.1	56.1	40 42.5	+58.4	56.8	41 15.0	+58.6	57.6	41 46.9	+58.8	58.3	42 18.0	+59.1	59.1	**46**
47	39 23.6	+57.1	53.7	39 58.8	+57.4	54.4	40 33.4	+57.8	55.1	41 07.5	+58.0	55.8	41 40.9	+58.3	56.5	42 13.6	+58.6	57.3	42 45.7	+58.9	58.1	43 17.1	+59.1	58.9	**47**
48	40 20.7	+57.0	53.3	40 56.2	+57.4	54.0	41 31.2	+57.6	54.7	42 05.5	+58.0	55.5	42 39.2	+58.3	56.2	43 12.2	+58.6	57.0	43 44.6	+58.8	57.8	44 16.2	+59.0	58.6	**48**
49	41 17.7	+56.9	52.9	41 53.6	+57.2	53.6	42 28.8	+57.6	54.4	43 03.5	+57.9	55.1	43 37.5	+58.2	55.9	44 10.8	+58.5	56.7	44 43.4	+58.7	57.5	45 15.2	+59.0	58.4	**49**
50	42 14.6	+56.8	52.5	42 50.8	+57.2	53.2	43 26.4	+57.5	54.0	44 01.4	+57.8	54.8	44 35.7	+58.1	55.6	45 09.3	+58.4	56.4	45 42.1	+58.7	57.2	46 14.2	+59.0	58.1	**50**
51	43 11.4	+56.7	52.0	43 48.0	+57.0	52.8	44 23.9	+57.4	53.6	44 59.2	+57.8	54.4	45 33.8	+58.1	55.2	46 07.7	+58.4	56.1	46 40.8	+58.7	56.9	47 13.2	+58.9	57.8	**51**
52	44 08.1	+56.6	51.6	44 45.0	+57.0	52.4	45 21.3	+57.4	53.2	45 57.0	+57.6	54.0	46 31.9	+58.0	54.8	47 06.1	+58.3	55.7	47 39.5	+58.6	56.6	48 12.1	+58.9	57.5	**52**
53	45 04.7	+56.5	51.1	45 42.0	+56.9	51.9	46 18.7	+57.2	52.7	46 54.6	+57.6	53.6	47 29.9	+57.9	54.5	48 04.4	+58.2	55.4	48 38.1	+58.5	56.3	49 11.0	+58.8	57.3	**53**
54	46 01.2	+56.3	50.6	46 38.9	+56.7	51.5	47 15.9	+57.1	52.3	47 52.2	+57.5	53.2	48 27.8	+57.9	54.1	49 02.6	+58.2	55.0	49 36.6	+58.5	56.0	50 09.8	+58.8	57.0	**54**
55	46 57.5	+56.2	50.1	47 35.6	+56.6	51.0	48 13.0	+57.1	51.9	48 49.7	+57.4	52.7	49 25.7	+57.7	53.7	50 00.8	+58.1	54.6	50 35.1	+58.5	55.6	51 08.6	+58.7	56.6	**55**
56	47 53.7	+56.1	49.6	48 32.2	+56.5	50.5	49 10.1	+56.9	51.4	49 47.1	+57.3	52.3	50 23.4	+57.7	53.3	50 58.9	+58.0	54.2	51 33.6	+58.3	55.3	52 07.3	+58.7	56.3	**56**
57	48 49.8	+55.9	49.1	49 28.7	+56.4	50.0	50 07.0	+56.7	50.9	50 44.4	+57.2	51.8	51 21.1	+57.6	52.8	51 56.9	+58.0	53.8	52 31.9	+58.3	54.9	53 06.0	+58.6	56.0	**57**
58	49 45.7	+55.8	48.5	50 25.1	+56.2	49.4	51 03.7	+56.7	50.4	51 41.6	+57.0	51.4	52 18.7	+57.4	52.4	52 54.9	+57.8	53.4	53 30.2	+58.2	54.5	54 04.6	+58.5	55.6	**58**
59	50 41.5	+55.5	48.0	51 21.3	+56.0	48.9	52 00.4	+56.4	49.8	52 38.6	+57.0	50.8	53 16.1	+57.3	51.9	53 52.7	+57.7	53.0	54 28.4	+58.1	54.1	55 03.1	+58.5	55.2	**59**
60	51 37.0	+55.4	47.4	52 17.3	+55.9	48.3	52 56.8	+56.4	49.3	53 35.6	+56.7	50.3	54 13.4	+57.2	51.4	54 50.4	+57.7	52.5	55 26.5	+58.0	53.6	56 01.6	+58.4	54.8	**60**
61	52 32.4	+55.2	46.7	53 13.2	+55.6	47.7	53 53.2	+56.1	48.7	54 32.3	+56.6	49.8	55 10.6	+57.1	50.9	55 48.1	+57.5	52.0	56 24.5	+57.9	53.2	57 00.0	+58.3	54.4	**61**
62	53 27.6	+54.9	46.1	54 08.8	+55.5	47.1	54 49.3	+56.0	48.1	55 28.9	+56.5	49.2	56 07.7	+56.9	50.3	56 45.6	+57.3	51.5	57 22.4	+57.8	52.7	57 58.3	+58.2	54.0	**62**
63	54 22.5	+54.8	45.4	55 04.3	+55.2	46.4	55 45.3	+55.7	47.5	56 25.4	+56.2	48.6	57 04.6	+56.8	49.7	57 42.9	+57.2	50.9	58 20.2	+57.7	52.2	58 56.5	+58.1	53.5	**63**
64	55 17.3	+54.4	44.7	55 59.5	+55.0	45.7	56 41.0	+55.5	46.8	57 21.6	+56.1	47.9	58 01.4	+56.5	49.1	58 40.1	+57.1	50.4	59 17.9	+57.5	51.7	59 54.6	+57.9	53.0	**64**
65	56 11.7	+54.2	43.9	56 54.5	+54.8	45.0	57 36.5	+55.3	46.1	58 17.7	+55.8	47.3	58 57.9	+56.4	48.5	59 37.2	+56.9	49.8	60 15.4	+57.4	51.1	60 52.5	+57.9	52.5	**65**
66	57 05.9	+53.8	43.2	57 49.3	+54.4	44.2	58 31.8	+55.0	45.4	59 13.5	+55.6	46.6	59 54.3	+56.1	47.8	60 34.1	+56.7	49.1	61 12.8	+57.2	50.5	61 50.4	+57.7	51.9	**66**
67	57 59.7	+53.6	42.3	58 43.7	+54.1	43.4	59 26.8	+54.8	44.6	60 09.1	+55.3	45.8	60 50.4	+55.9	47.1	61 30.8	+56.4	48.5	62 10.0	+57.0	49.9	62 48.1	+57.5	51.3	**67**
68	58 53.3	+53.1	41.5	59 37.8	+53.8	42.6	60 21.6	+54.4	43.8	61 04.4	+55.1	45.0	61 46.3	+55.7	46.3	62 27.2	+56.3	47.7	63 07.0	+56.8	49.2	63 45.6	+57.4	50.7	**68**
69	59 46.4	+52.8	40.6	60 31.6	+53.4	41.7	61 16.0	+54.0	42.9	61 59.5	+54.7	44.2	62 42.0	+55.3	45.5	63 23.5	+56.0	47.0	64 03.8	+56.6	48.5	64 43.0	+57.2	50.0	**69**
70	60 39.2	+52.3	39.6	61 25.0	+53.0	40.8	62 10.0	+53.7	42.0	62 54.2	+54.3	43.3	63 37.3	+55.1	44.7	64 19.5	+55.6	46.1	65 00.4	+56.4	47.7	65 40.2	+57.0	49.3	**70**
71	61 31.5	+51.9	38.6	62 18.0	+52.6	39.8	63 03.7	+53.3	41.0	63 48.5	+54.0	42.4	64 32.4	+54.6	43.8	65 15.1	+55.4	45.3	65 56.8	+56.0	46.9	66 37.2	+56.7	48.5	**71**
72	62 23.4	+51.3	37.5	63 10.6	+52.0	38.7	63 57.0	+52.8	40.0	64 42.5	+53.5	41.4	65 27.0	+54.3	42.8	66 10.5	+55.0	44.3	66 52.8	+55.7	46.0	67 33.9	+56.4	47.7	**72**
73	63 14.7	+50.8	36.4	64 02.6	+51.5	37.6	64 49.8	+52.2	38.9	65 36.0	+53.0	40.3	66 21.3	+53.8	41.8	67 05.5	+54.6	43.3	67 48.5	+55.4	45.0	68 30.3	+56.1	46.8	**73**
74	64 05.5	+50.1	35.2	64 54.1	+50.9	36.4	65 42.0	+51.7	37.7	66 29.0	+52.5	39.1	67 15.1	+53.3	40.6	68 00.1	+54.1	42.2	68 43.9	+54.9	44.0	69 26.4	+55.7	45.8	**74**
75	64 55.6	+49.4	33.9	65 45.0	+50.3	35.1	66 33.7	+51.0	36.5	67 21.5	+51.9	37.9	68 08.4	+52.7	39.4	68 54.2	+53.6	41.1	69 38.8	+54.5	42.8	70 22.1	+55.3	44.7	**75**
76	65 45.0	+48.7	32.6	66 35.3	+49.4	33.8	67 24.7	+50.4	35.1	68 13.4	+51.2	36.6	69 01.1	+52.1	38.1	69 47.8	+52.9	39.8	70 33.3	+53.9	41.6	71 17.4	+54.9	43.6	**76**
77	66 33.7	+47.8	31.1	67 24.7	+48.7	32.3	68 15.1	+49.5	33.7	69 04.6	+50.4	35.1	69 53.2	+51.3	36.7	70 40.7	+52.3	38.4	71 27.2	+53.2	40.2	72 12.3	+54.2	42.3	**77**
78	67 21.5	+46.9	29.6	68 13.4	+47.7	30.8	69 04.6	+48.6	32.1	69 55.0	+49.5	33.6	70 44.5	+50.5	35.2	71 33.0	+51.5	36.9	72 20.4	+52.6	38.8	73 06.5	+53.6	40.8	**78**
79	68 08.4	+45.8	27.9	69 01.1	+46.7	29.1	69 53.2	+47.5	30.5	70 44.5	+48.5	31.9	71 35.0	+49.5	33.5	72 24.5	+50.6	35.2	73 13.0	+51.7	37.1	74 00.1	+52.9	39.2	**79**
80	68 54.2	+44.6	26.1	69 47.8	+45.5	27.3	70 40.7	+46.5	28.7	71 33.0	+47.4	30.1	72 24.5	+48.5	31.7	73 15.1	+49.6	33.4	74 04.7	+50.6	35.3	74 53.0	+51.9	37.5	**80**
81	69 38.8	+43.3	24.3	70 33.3	+44.1	25.4	71 27.2	+45.1	26.7	72 20.4	+46.1	28.1	73 13.0	+47.1	29.7	74 04.7	+48.3	31.4	74 55.3	+49.6	33.3	75 44.9	+50.8	35.5	**81**
82	70 22.1	+41.9	22.2	71 17.4	+42.8	23.4	72 12.3	+43.6	24.6	73 06.5	+44.7	25.9	74 00.1	+45.7	27.5	74 53.0	+46.8	29.2	75 44.9	+48.1	31.1	76 35.7	+49.4	33.3	**82**
83	71 04.0	+40.2	20.1	72 00.2	+41.0	21.1	72 55.9	+42.0	22.3	73 51.2	+42.9	23.6	74 45.8	+44.1	25.1	75 39.8	+45.2	26.7	76 33.0	+46.4	28.6	77 25.1	+47.9	30.7	**83**
84	71 44.2	+38.5	17.7	72 41.2	+39.3	18.7	73 37.9	*+40.1* •	19.8	74 34.1	*+41.0* •	21.0	75 29.9	*+42.0* •	22.4	76 25.0	*+43.2* •	24.0	77 19.4	*+44.5* •	25.8	78 13.0	*+45.9* •	27.9	**84**
85	72 22.7	*+36.4* •	15.2	73 20.5	*+37.1* •	16.1	74 18.0	*+37.9* •	17.1	75 15.1	*+38.8* •	18.2	76 11.9	*+39.8* •	19.5	77 08.2	*+40.9* •	21.0	78 03.9	*+42.1* •	22.6	78 58.9	*+43.5* •	24.6	**85**
86	72 59.1	*+34.2* •	12.6	73 57.6	*+34.8* •	13.3	74 55.9	*+35.5* •	14.2	75 53.9	*+36.3* •	15.2	76 51.7	*+37.1* •	16.3	77 49.1	*+38.1* •	17.6	78 46.0	*+39.3* •	19.1	79 42.4	*+40.6* •	20.9	**86**
87	73 33.3	*+31.7* •	9.7	74 32.4	*+32.2* •	10.3	75 31.4	*+32.7* •	11.0	76 30.2	*+33.3* •	11.8	77 28.8	*+34.1* •	12.7	78 27.2	*+34.9* •	13.8	79 25.3	*+35.9* •	15.1	80 23.0	*+37.0* •	16.6	**87**
88	74 05.0	*+29.0* •	6.7	75 04.6	*+29.3* •	7.1	76 04.1	*+29.7* •	7.6	77 03.5	*+30.1* •	8.2	78 02.9	*+30.5* •	8.9	79 02.1	*+31.1* •	9.6	80 01.2	*+31.8* •	10.6	81 00.0	*+32.6* •	11.8	**88**
89	74 34.0	*+26.0* •	3.4	75 33.9	*+26.1* •	3.7	76 33.8	*+26.2* •	3.9	77 33.6	*+26.4* •	4.2	78 33.4	*+26.6* •	4.6	79 33.2	*+26.8* •	5.0	80 33.0	*+27.0* •	5.6	81 32.6	*+27.4* •	6.2	**89**
90	75 00.0	*+22.7* •	0.0	76 00.0	*+22.6* •	0.0	77 00.0	*+22.5* •	0.0	78 00.0	*+22.3* •	0.0	79 00.0	*+22.1* •	0.0	80 00.0	*+21.8* •	0.0	81 00.0	*+21.5* •	0.0	82 00.0	*+21.1* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 114°, 246°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 48.3	+58.2	112.3	5 25.4	+58.5	112.4	5 02.6	+58.6	112.5	4 39.6	+58.9	112.5	4 16.5	+59.1	112.6	3 53.4	+59.3	112.7	3 30.3	+59.3	112.7	3 07.0	+59.5	112.8	**0**
1	6 46.5	+58.2	112.1	6 23.9	+58.5	112.2	6 01.2	+58.7	112.3	5 38.5	+58.8	112.4	5 15.6	+59.1	112.4	4 52.7	+59.2	112.5	4 29.6	+59.4	112.6	4 06.5	+59.5	112.7	**1**
2	7 44.7	+58.3	111.8	7 22.4	+58.5	111.9	6 59.9	+58.7	112.1	6 37.3	+58.9	112.2	6 14.7	+59.0	112.3	5 51.9	+59.2	112.4	5 29.0	+59.4	112.5	5 06.0	+59.5	112.5	**2**
3	8 43.0	+58.2	111.6	8 20.9	+58.4	111.7	7 58.6	+58.7	111.8	7 36.2	+58.9	112.0	7 13.7	+59.1	112.1	6 51.1	+59.2	112.2	6 28.4	+59.3	112.3	6 05.5	+59.5	112.4	**3**
4	9 41.2	+58.2	111.3	9 19.3	+58.5	111.5	8 57.3	+58.6	111.6	8 35.1	+58.8	111.8	8 12.8	+59.0	111.9	7 50.3	+59.2	112.0	7 27.7	+59.4	112.2	7 05.0	+59.5	112.3	**4**
5	10 39.4	+58.2	111.1	10 17.8	+58.4	111.2	9 55.9	+58.7	111.4	9 33.9	+58.9	111.6	9 11.8	+59.0	111.7	8 49.5	+59.2	111.9	8 27.1	+59.4	112.0	8 04.5	+59.5	112.2	**5**
6	11 37.6	+58.2	110.8	11 16.2	+58.4	111.0	10 54.6	+58.6	111.2	10 32.8	+58.8	111.4	10 10.8	+59.1	111.5	9 48.7	+59.2	111.7	9 26.5	+59.3	111.9	9 04.0	+59.5	112.0	**6**
7	12 35.8	+58.2	110.6	12 14.6	+58.4	110.8	11 53.2	+58.7	111.0	11 31.6	+58.9	111.2	11 09.9	+59.0	111.4	10 47.9	+59.2	111.5	10 25.8	+59.4	111.7	10 03.5	+59.5	111.9	**7**
8	13 34.0	+58.2	110.3	13 13.0	+58.4	110.6	12 51.9	+58.6	110.8	12 30.5	+58.8	111.0	12 08.9	+59.0	111.2	11 47.1	+59.2	111.4	11 25.2	+59.3	111.6	11 03.0	+59.5	111.8	**8**
9	14 32.2	+58.1	110.1	14 11.4	+58.4	110.3	13 50.5	+58.6	110.6	13 29.3	+58.8	110.8	13 07.9	+59.0	111.0	12 46.3	+59.2	111.2	12 24.5	+59.4	111.4	12 02.5	+59.5	111.6	**9**
10	15 30.3	+58.1	109.8	15 09.8	+58.4	110.1	14 49.1	+58.6	110.3	14 28.1	+58.9	110.6	14 06.9	+59.0	110.8	13 45.5	+59.2	111.0	13 23.9	+59.3	111.3	13 02.0	+59.5	111.5	**10**
11	16 28.4	+58.1	109.6	16 08.2	+58.4	109.8	15 47.7	+58.6	110.1	15 27.0	+58.8	110.4	15 05.9	+59.0	110.6	14 44.7	+59.2	110.9	14 23.2	+59.3	111.1	14 01.5	+59.4	111.4	**11**
12	17 26.5	+58.1	109.3	17 06.6	+58.3	109.6	16 46.3	+58.6	109.9	16 25.8	+58.7	110.2	16 04.9	+59.0	110.4	15 43.9	+59.1	110.7	15 22.5	+59.3	111.0	15 00.9	+59.5	111.2	**12**
13	18 24.6	+58.1	109.0	18 04.9	+58.3	109.4	17 44.9	+58.5	109.7	17 24.5	+58.8	110.0	17 03.9	+59.0	110.2	16 43.0	+59.2	110.5	16 21.8	+59.4	110.8	16 00.4	+59.5	111.1	**13**
14	19 22.7	+58.0	108.8	19 03.2	+58.3	109.1	18 43.4	+58.6	109.4	18 23.3	+58.8	109.7	18 02.9	+59.0	110.1	17 42.2	+59.1	110.4	17 21.2	+59.3	110.7	16 59.9	+59.4	110.9	**14**
15	20 20.7	+58.1	108.5	20 01.5	+58.3	108.9	19 42.0	+58.5	109.2	19 22.1	+58.7	109.5	19 01.9	+58.9	109.9	18 41.3	+59.2	110.2	18 20.5	+59.3	110.5	17 59.3	+59.5	110.8	**15**
16	21 18.8	+57.9	108.2	20 59.8	+58.3	108.6	20 40.5	+58.5	109.0	20 20.8	+58.7	109.3	20 00.8	+58.9	109.7	19 40.5	+59.1	110.0	19 19.8	+59.3	110.3	18 58.8	+59.4	110.7	**16**
17	22 16.7	+58.0	108.0	21 58.1	+58.2	108.3	21 39.0	+58.5	108.7	21 19.5	+58.8	109.1	20 59.7	+59.0	109.5	20 39.6	+59.1	109.8	20 19.1	+59.2	110.2	19 58.2	+59.4	110.5	**17**
18	23 14.7	+57.9	107.7	22 56.3	+58.2	108.1	22 37.5	+58.4	108.5	22 18.3	+58.7	108.9	21 58.7	+58.9	109.3	21 38.7	+59.1	109.6	21 18.3	+59.3	110.0	20 57.6	+59.5	110.4	**18**
19	24 12.6	+57.9	107.4	23 54.5	+58.2	107.8	23 35.9	+58.5	108.2	23 17.0	+58.6	108.6	22 57.6	+58.9	109.0	22 37.8	+59.1	109.4	22 17.6	+59.3	109.8	21 57.1	+59.4	110.2	**19**
20	25 10.5	+57.9	107.1	24 52.7	+58.1	107.5	24 34.4	+58.4	108.0	24 15.6	+58.7	108.4	23 56.5	+58.8	108.8	23 36.9	+59.0	109.3	23 16.9	+59.2	109.7	22 56.5	+59.4	110.1	**20**
21	26 08.4	+57.8	106.8	25 50.8	+58.1	107.3	25 32.8	+58.4	107.7	25 14.3	+58.6	108.2	24 55.3	+58.9	108.6	24 35.9	+59.1	109.1	24 16.1	+59.3	109.5	23 55.9	+59.4	109.9	**21**
22	27 06.2	+57.8	106.5	26 48.9	+58.1	107.0	26 31.2	+58.3	107.5	26 12.9	+58.6	107.9	25 54.2	+58.8	108.4	25 35.0	+59.0	108.9	25 15.4	+59.2	109.3	24 55.3	+59.4	109.8	**22**
23	28 04.0	+57.8	106.2	27 47.0	+58.1	106.7	27 29.5	+58.3	107.2	27 11.5	+58.6	107.7	26 53.0	+58.8	108.2	26 34.0	+59.1	108.7	26 14.6	+59.2	109.1	25 54.7	+59.4	109.6	**23**
24	29 01.8	+57.7	105.9	28 45.1	+58.0	106.4	28 27.8	+58.3	107.0	28 10.1	+58.6	107.5	27 51.8	+58.8	108.0	27 33.1	+59.0	108.5	27 13.8	+59.2	109.0	26 54.1	+59.4	109.4	**24**
25	29 59.5	+57.7	105.6	29 43.1	+58.0	106.1	29 26.1	+58.3	106.7	29 08.7	+58.5	107.2	28 50.6	+58.8	107.7	28 32.1	+59.0	108.3	28 13.0	+59.2	108.8	27 53.5	+59.3	109.3	**25**
26	30 57.2	+57.6	105.3	30 41.1	+57.9	105.8	30 24.4	+58.2	106.4	30 07.2	+58.5	107.0	29 49.4	+58.7	107.5	29 31.1	+58.9	108.1	29 12.2	+59.2	108.6	28 52.8	+59.4	109.1	**26**
27	31 54.8	+57.5	104.9	31 39.0	+57.9	105.5	31 22.6	+58.2	106.1	31 05.7	+58.4	106.7	30 48.1	+58.8	107.3	30 30.0	+59.0	107.8	30 11.4	+59.1	108.4	29 52.2	+59.3	108.9	**27**
28	32 52.3	+57.5	104.6	32 36.9	+57.8	105.2	32 20.8	+58.2	105.8	32 04.1	+58.5	106.4	31 46.9	+58.7	107.0	31 29.0	+58.9	107.6	31 10.5	+59.2	108.2	30 51.5	+59.3	108.8	**28**
29	33 49.8	+57.5	104.3	33 34.7	+57.8	104.9	33 19.0	+58.1	105.5	33 02.6	+58.4	106.2	32 45.6	+58.6	106.8	32 27.9	+58.9	107.4	32 09.7	+59.1	108.0	31 50.8	+59.3	108.6	**29**
30	34 47.3	+57.4	103.9	34 32.5	+57.8	104.6	34 17.1	+58.0	105.2	34 01.0	+58.3	105.9	33 44.2	+58.6	106.5	33 26.8	+58.9	107.2	33 08.8	+59.1	107.8	32 50.1	+59.3	108.4	**30**
31	35 44.7	+57.3	103.6	35 30.3	+57.6	104.2	35 15.1	+58.1	104.9	34 59.3	+58.4	105.6	34 42.8	+58.6	106.3	34 25.7	+58.8	106.9	34 07.9	+59.0	107.6	33 49.4	+59.3	108.2	**31**
32	36 42.0	+57.3	103.2	36 27.9	+57.7	103.9	36 13.2	+57.9	104.6	35 57.7	+58.2	105.3	35 41.4	+58.6	106.0	35 24.5	+58.9	106.7	35 06.9	+59.1	107.4	34 48.7	+59.2	108.0	**32**
33	37 39.3	+57.1	102.8	37 25.6	+57.5	103.6	37 11.1	+57.9	104.3	36 55.9	+58.3	105.0	36 40.0	+58.5	105.8	36 23.4	+58.7	106.5	36 06.0	+59.0	107.2	35 47.9	+59.3	107.9	**33**
34	38 36.4	+57.1	102.4	38 23.1	+57.5	103.2	38 09.0	+57.9	104.0	37 54.2	+58.1	104.7	37 38.5	+58.5	105.5	37 22.1	+58.8	106.2	37 05.0	+59.0	106.9	36 47.2	+59.2	107.7	**34**
35	39 33.5	+57.1	102.0	39 20.6	+57.4	102.8	39 06.9	+57.8	103.6	38 52.3	+58.2	104.4	38 37.0	+58.5	105.2	38 20.9	+58.7	106.0	38 04.0	+59.0	106.7	37 46.4	+59.2	107.5	**35**
36	40 30.6	+56.9	101.6	40 18.0	+57.4	102.5	40 04.7	+57.7	103.3	39 50.5	+58.1	104.1	39 35.5	+58.4	104.9	39 19.6	+58.7	105.7	39 03.0	+58.9	106.5	38 45.6	+59.2	107.2	**36**
37	41 27.5	+56.8	101.2	41 15.4	+57.3	102.1	41 02.4	+57.7	102.9	40 48.6	+58.0	103.8	40 33.9	+58.3	104.6	40 18.3	+58.7	105.4	40 01.9	+59.0	106.2	39 44.8	+59.1	107.0	**37**
38	42 24.3	+56.8	100.8	42 12.7	+57.1	101.7	42 00.1	+57.6	102.6	41 46.6	+57.9	103.4	41 32.2	+58.3	104.3	41 17.0	+58.6	105.1	41 00.9	+58.8	106.0	40 43.9	+59.1	106.8	**38**
39	43 21.1	+56.6	100.3	43 09.8	+57.1	101.3	42 57.7	+57.5	102.2	42 44.5	+57.9	103.1	42 30.5	+58.2	104.0	42 15.6	+58.5	104.9	41 59.7	+58.9	105.7	41 43.0	+59.1	106.6	**39**
40	44 17.7	+56.5	99.9	44 06.9	+57.0	100.8	43 55.2	+57.4	101.8	43 42.4	+57.9	102.7	43 28.7	+58.2	103.6	43 14.1	+58.5	104.6	42 58.6	+58.8	105.5	42 42.1	+59.1	106.4	**40**
41	45 14.2	+56.4	99.4	45 03.9	+56.9	100.4	44 52.6	+57.3	101.4	44 40.3	+57.7	102.3	44 26.9	+58.2	103.3	44 12.6	+58.5	104.3	43 57.4	+58.8	105.2	43 41.2	+59.0	106.1	**41**
42	46 10.6	+56.3	98.9	46 00.8	+56.8	99.9	45 49.9	+57.3	101.0	45 38.0	+57.7	102.0	45 25.1	+58.0	103.0	45 11.1	+58.4	103.9	44 56.2	+58.7	104.9	44 40.2	+59.0	105.9	**42**
43	47 06.9	+56.1	98.4	46 57.6	+56.6	99.5	46 47.2	+57.1	100.5	46 35.7	+57.6	101.6	46 23.1	+58.0	102.6	46 09.5	+58.4	103.6	45 54.9	+58.7	104.6	45 39.2	+59.0	105.6	**43**
44	48 03.0	+56.0	97.9	47 54.2	+56.6	99.0	47 44.3	+57.0	100.1	47 33.3	+57.4	101.1	47 21.1	+57.9	102.2	47 07.9	+58.3	103.3	46 53.6	+58.6	104.3	46 38.2	+58.9	105.3	**44**
45	48 59.0	+55.8	97.3	48 50.8	+56.3	98.5	48 41.3	+56.9	99.6	48 30.7	+57.4	100.7	48 19.0	+57.8	101.8	48 06.2	+58.2	102.9	47 52.2	+58.6	104.0	47 37.1	+58.9	105.1	**45**
46	49 54.8	+55.7	96.8	49 47.1	+56.3	98.0	49 38.2	+56.8	99.1	49 28.1	+57.3	100.3	49 16.8	+57.8	101.4	49 04.4	+58.1	102.6	48 50.8	+58.5	103.7	48 36.0	+58.9	104.8	**46**
47	50 50.5	+55.5	96.2	50 43.4	+56.1	97.4	50 35.0	+56.7	98.6	50 25.4	+57.2	99.8	50 14.6	+57.6	101.0	50 02.5	+58.1	102.2	49 49.3	+58.4	103.3	49 34.9	+58.7	104.5	**47**
48	51 46.0	+55.2	95.6	51 39.5	+55.9	96.8	51 31.7	+56.5	98.1	51 22.6	+57.0	99.3	51 12.2	+57.6	100.6	51 00.6	+58.0	101.8	50 47.7	+58.4	103.0	50 33.6	+58.8	104.2	**48**
49	52 41.2	+55.1	94.9	52 35.4	+55.7	96.3	52 28.2	+56.3	97.5	52 19.6	+56.9	98.8	52 09.8	+57.4	100.1	51 58.6	+57.9	101.4	51 46.1	+58.3	102.6	51 32.4	+58.7	103.8	**49**
50	53 36.3	+54.8	94.3	53 31.1	+55.5	95.6	53 24.5	+56.2	97.0	53 16.5	+56.8	98.3	53 07.2	+57.3	99.6	52 56.5	+57.8	100.9	52 44.4	+58.3	102.2	52 31.1	+58.6	103.5	**50**
51	54 31.1	+54.6	93.6	54 26.6	+55.4	95.0	54 20.7	+56.0	96.4	54 13.3	+56.6	97.8	54 04.5	+57.2	99.1	53 54.3	+57.7	100.5	53 42.7	+58.1	101.8	53 29.7	+58.6	103.2	**51**
52	55 25.7	+54.3	92.9	55 22.0	+55.0	94.3	55 16.7	+55.8	95.8	55 09.9	+56.5	97.2	55 01.7	+57.0	98.6	54 52.0	+57.6	100.0	54 40.8	+58.1	101.4	54 28.3	+58.4	102.8	**52**
53	56 20.0	+54.1	92.1	56 17.0	+54.9	93.6	56 12.5	+55.6	95.1	56 06.4	+56.2	96.6	55 58.7	+56.9	98.1	55 49.6	+57.4	99.5	55 38.9	+58.0	101.0	55 26.7	+58.5	102.4	**53**
54	57 14.1	+53.7	91.3	57 11.9	+54.5	92.9	57 08.1	+55.3	94.4	57 02.6	+56.1	96.0	56 55.6	+56.7	97.5	56 47.0	+57.3	99.0	56 36.9	+57.8	100.5	56 25.2	+58.3	102.0	**54**
55	58 07.8	+53.3	90.5	58 06.4	+54.3	92.1	58 03.4	+55.1	93.7	57 58.7	+55.8	95.3	57 52.3	+56.6	96.9	57 44.3	+57.2	98.5	57 34.7	+57.7	100.0	57 23.5	+58.2	101.6	**55**
56	59 01.1	+53.0	89.6	59 00.7	+53.9	91.3	58 58.5	+54.8	92.9	58 54.5	+55.6	94.6	58 48.9	+56.3	96.2	58 41.5	+57.0	97.9	58 32.4	+57.6	99.5	58 21.7	+58.1	101.1	**56**
57	59 54.1	+52.6	88.7	59 54.6	+53.6	90.4	59 53.3	+54.5	92.1	59 50.1	+55.4	93.9	59 45.2	+56.1	95.6	59 38.5	+56.8	97.3	59 30.0	+57.5	99.0	59 19.8	+58.1	100.6	**57**
58	60 46.7	+52.2	87.7	60 48.2	+53.2	89.5	60 47.8	+54.1	91.3	60 45.5	+55.0	93.1	60 41.3	+55.9	94.9	60 35.3	+56.7	96.6	60 27.5	+57.3	98.4	60 17.9	+57.9	100.1	**58**
59	61 38.9	+51.6	86.7	61 41.4	+52.7	88.5	61 41.9	+53.8	90.4	61 40.5	+54.8	92.3	61 37.2	+55.6	94.1	61 32.0	+56.4	95.9	61 24.8	+57.1	97.8	61 15.8	+57.7	99.6	**59**
60	62 30.5	+51.1	85.6	62 34.1	+52.3	87.5	62 35.7	+53.4	89.4	62 35.3	+54.4	91.4	62 32.8	+55.4	93.3	62 28.4	+56.2	95.2	62 21.9	+57.0	97.1	62 13.5	+57.6	99.0	**60**
61	63 21.6	+50.6	84.4	63 26.4	+51.8	86.4	63 29.1	+52.9	88.4	63 29.7	+54.0	90.4	63 28.2	+55.0	92.4	63 24.6	+55.9	94.4	63 18.9	+56.7	96.4	63 11.1	+57.5	98.4	**61**
62	64 12.2	+49.8	83.2	64 18.2	+51.2	85.3	64 22.0	+52.4	87.4	64 23.7	+53.5	89.5	64 23.2	+54.6	91.5	64 20.5	+55.6	93.6	64 15.6	+56.5	95.7	64 08.6	+57.2	97.7	**62**
63	65 02.0	+49.2	81.9	65 09.4	+50.5	84.1	65 14.4	+51.9	86.2	65 17.2	+53.1	88.4	65 17.8	+54.2	90.6	65 16.1	+55.2	92.7	65 12.1	+56.2	94.9	65 05.8	+57.1	97.0	**63**
64	65 51.2	+48.4	80.5	65 59.9	+49.8	82.8	66 06.3	+51.2	85.0	66 10.3	+52.6	87.3	66 12.0	+53.8	89.5	66 11.3	+54.9	91.8	66 08.3	+55.9	94.1	66 02.9	+56.8	96.3	**64**
65	66 39.6	+47.4	79.1	66 49.7	+49.1	81.4	66 57.5	+50.6	83.7	67 02.9	+52.0	86.0	67 05.8	+53.3	88.4	67 06.2	+54.5	90.8	67 04.2	+55.6	93.1	66 59.7	+56.5	95.5	**65**
66	67 27.0	+46.6	77.5	67 38.8	+48.2	79.9	67 48.1	+49.8	82.3	67 54.9	+51.3	84.7	67 59.1	+52.7	87.2	68 00.7	+54.0	89.7	67 59.8	+55.2	92.2	67 56.2	+56.3	94.6	**66**
67	68 13.6	+45.4	75.8	68 27.0	+47.2	78.3	68 37.9	+48.9	80.8	68 46.2	+50.5	83.3	68 51.8	+52.1	85.9	68 54.7	+53.5	88.5	68 55.0	+54.7	91.1	68 52.5	+55.9	93.7	**67**
68	68 59.0	+44.2	74.0	69 14.2	+46.1	76.6	69 26.8	+48.0	79.2	69 36.7	+49.7	81.8	69 43.9	+51.3	84.5	69 48.2	+52.9	87.2	69 49.7	+54.3	89.9	69 48.4	+55.5	92.6	**68**
69	69 43.2	+42.9	72.1	70 00.3	+44.9	74.7	70 14.8	+46.8	77.4	70 26.4	+48.7	80.2	70 35.2	+50.5	83.0	70 41.1	+52.1	85.8	70 44.0	+53.7	88.7	70 43.9	+55.0	91.5	**69**
70	70 26.1	+41.4	70.1	70 45.2	+43.5	72.8	71 01.6	+45.6	75.5	71 15.1	+47.7	78.4	71 25.7	+49.6	81.3	71 33.2	+51.4	84.3	71 37.7	+53.0	87.3	71 38.9	+54.6	90.3	**70**
71	71 07.5	+39.7	67.9	71 28.7	+42.0	70.6	71 47.2	+44.2	73.5	72 02.8	+46.4	76.5	72 15.3	+48.4	79.5	72 24.6	+50.4	82.6	72 30.7	+52.3	85.8	72 33.5	+53.9	88.9	**71**
72	71 47.2	+37.9	65.5	72 10.7	+40.3	68.3	72 31.4	+42.7	71.3	72 49.2	+44.9	74.4	73 03.7	+47.2	77.5	73 15.0	+49.4	80.8	73 23.0	+51.3	84.1	73 27.4	+53.2	87.4	**72**
73	72 25.1	*+35.8*•	63.0	72 51.0	*+38.3*•	65.9	73 14.1	+40.8	68.9	73 34.1	+43.3	72.1	73 50.9	+45.8	75.4	74 04.4	+48.1	78.7	74 14.3	+50.3	82.2	74 20.6	+52.4	85.8	**73**
74	73 00.9	*+33.6*•	60.3	73 29.3	*+36.2*•	63.2	73 54.9	*+38.8*•	66.3	74 17.4	*+41.5*•	69.6	74 36.7	+44.1	73.0	74 52.5	+46.7	76.5	75 04.6	+49.1	80.2	75 13.0	+51.3	83.9	**74**
75	73 34.5	*+31.0*•	57.4	74 05.5	*+33.7*•	60.4	74 33.7	*+36.5*•	63.5	74 58.9	*+39.3*•	66.8	75 20.8	*+42.2*•	70.4	75 39.2	+44.9	74.0	75 53.7	+47.7	77.9	76 04.3	+50.2	81.8	**75**
76	74 05.5	*+28.2*•	54.3	74 39.2	*+31.0*•	57.3	75 10.2	*+33.9*•	60.5	75 38.2	*+36.9*•	63.9	76 03.0	*+39.9*•	67.5	76 24.1	*+43.0*•	71.3	76 41.4	+45.9	75.3	76 54.5	+48.7	79.5	**76**
77	74 33.7	*+25.2*•	51.1	75 10.2	*+28.0*•	54.0	75 44.1	*+31.0*•	57.2	76 15.1	*+34.2*•	60.6	76 42.9	*+37.3*•	64.3	77 07.1	*+40.5*•	68.2	77 27.3	*+43.8*•	72.4	77 43.2	+47.0	76.8	**77**
78	74 58.9	*+21.9*•	47.6	75 38.2	*+24.8*•	50.5	76 15.1	*+27.8*•	53.6	76 49.3	*+30.9*•	57.1	77 20.2	*+34.4*•	60.8	77 47.6	*+37.9*•	64.9	78 11.1	*+41.3*•	69.2	78 30.2	*+44.8*•	73.8	**78**
79	75 20.8	*+18.4*•	44.0	76 03.0	*+21.1*•	46.8	76 42.9	*+24.2*•	49.8	77 20.2	*+27.4*•	53.2	77 54.6	*+30.9*•	57.0	78 25.5	*+34.5*•	61.1	78 52.4	*+38.4*•	65.5	79 15.0	*+42.2*•	70.3	**79**
80	75 39.2	*+14.5*•	40.2	76 24.1	*+17.3*•	42.8	77 07.1	*+20.2*•	45.8	77 47.6	*+23.5*•	49.1	78 25.5	*+26.9*•	52.8	79 00.0	*+30.8*•	56.9	79 30.8	*+34.8*•	61.4	79 57.2	*+39.0*•	66.4	**80**
81	75 53.7	*+10.6*•	36.2	76 41.4	*+13.1*•	38.7	77 27.3	*+15.9*•	41.5	78 11.1	*+19.1*•	44.7	78 52.4	*+22.6*•	48.3	79 30.8	*+26.4*•	52.3	80 05.6	*+30.6*•	56.8	80 36.2	*+35.1*•	61.9	**81**
82	76 04.3	*+6.5*•	32.2	76 54.5	*+8.8*•	34.4	77 43.2	*+11.4*•	37.0	78 30.2	*+14.3*•	40.0	79 15.0	*+17.7*•	43.4	79 57.2	*+21.5*•	47.3	80 36.2	*+25.7*•	51.7	81 11.3	*+30.4*•	56.8	**82**
83	76 10.8	*+2.2*•	28.0	77 03.3	*+4.2*•	30.0	77 54.6	*+6.6*•	32.4	78 44.5	*+9.3*•	35.1	79 32.7	*+12.3*•	38.2	80 18.7	*+15.9*•	41.8	81 01.9	*+20.0*•	46.0	81 41.7	*+24.8*•	51.0	**83**
84	76 13.0	*–2.0*•	23.8	77 07.5	*–0.3*•	25.6	78 01.2	*+1.7*•	27.6	78 53.8	*+4.0*•	30.0	79 45.0	*+6.8*•	32.7	80 34.6	*+9.9*•	36.0	81 21.9	*+13.7*•	39.9	82 06.5	*+18.1*•	44.5	**84**
85	76 11.0	*–6.3*•	19.6	77 07.2	*–4.8*•	21.1	78 02.9	*–3.2*•	22.8	78 57.8	*–1.3*•	24.8	79 51.8	*+0.9*•	27.1	80 44.5	*+3.6*•	29.9	81 35.6	*+6.9*•	33.3	82 24.6	*+10.8*•	37.4	**85**
86	76 04.7	*–10.4*•	15.5	77 02.4	*–9.4*•	16.6	77 59.7	*–8.1*•	18.0	78 56.5	*–6.7*•	19.6	79 52.7	*–4.9*•	21.4	80 48.1	*–2.8*•	23.7	81 42.5	*–0.3*•	26.4	82 35.4	*+2.9*•	29.9	**86**
87	75 54.3	*–14.4*•	11.4	76 53.0	*–13.6*•	12.3	77 51.6	*–12.8*•	13.2	78 49.8	*–11.8*•	14.4	79 47.8	*–10.7*•	15.8	80 45.3	*–9.2*•	17.4	81 42.2	*–7.4*•	19.5	82 38.3	*–5.2*•	22.1	**87**
88	75 39.9	*–18.2*•	7.5	76 39.4	*–17.8*•	8.0	77 38.8	*–17.3*•	8.6	78 38.0	*–16.7*•	9.4	79 37.1	*–16.0*•	10.3	80 36.1	*–15.3*•	11.3	81 34.8	*–14.3*•	12.7	82 33.1	*–13.0*•	14.3	**88**
89	75 21.7	*–21.7*•	3.6	76 21.6	*–21.6*•	3.9	77 21.5	*–21.5*•	4.2	78 21.3	*–21.3*•	4.6	79 21.1	*–21.1*•	5.0	80 20.8	*–20.8*•	5.5	81 20.5	*–20.5*•	6.1	82 20.1	*–20.1*•	6.9	**89**
90	75 00.0	*–25.1*•	0.0	76 00.0	*–25.2*•	0.0	77 00.0	*–25.3*•	0.0	78 00.0	*–25.5*•	0.0	79 00.0	*–25.6*•	0.0	80 00.0	*–25.9*•	0.0	81 00.0	*–26.1*•	0.0	82 00.0	*–26.4*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 67°, 293°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 48.3	– 58.3	112.3	5 25.4	– 58.4	112.4	5 02.6	– 58.7	112.5	4 39.6	– 58.9	112.5	4 16.5	– 59.0	112.6	3 53.4	– 59.2	112.7	3 30.3	– 59.4	112.7	3 07.0	– 59.5	112.8	**0**
1	4 50.0	– 58.3	112.5	4 27.0	– 58.5	112.6	4 03.9	– 58.7	112.7	3 40.7	– 58.9	112.7	3 17.5	– 59.1	112.8	2 54.2	– 59.2	112.8	2 30.9	– 59.4	112.9	2 07.5	– 59.5	112.9	**1**
2	3 51.7	– 58.2	112.8	3 28.5	– 58.5	112.8	3 05.2	– 58.7	112.9	2 41.8	– 58.9	112.9	2 18.4	– 59.1	113.0	1 55.0	– 59.3	113.0	1 31.5	– 59.4	113.0	1 08.0	– 59.5	113.1	**2**
3	2 53.5	– 58.3	113.0	2 30.0	– 58.5	113.1	2 06.5	– 58.7	113.1	1 42.9	– 58.9	113.1	1 19.3	– 59.0	113.1	0 55.7	– 59.2	113.2	0 32.1	– 59.3	113.2	0 08.5	– 59.5	113.2	**3**
4	1 55.2	– 58.3	113.3	1 31.5	– 58.5	113.3	1 07.8	– 58.7	113.3	0 44.0	– 58.9	113.3	0 20.3	– 59.1	113.3	0 03.5	+ 59.2	66.7	0 27.2	+ 59.4	66.7	0 51.0	+ 59.5	66.7	**4**
5	0 56.9	– 58.2	113.5	0 33.0	– 58.5	113.5	0 09.1	– 58.7	113.5	0 14.9	+ 58.9	66.5	0 38.8	+ 59.1	66.5	1 02.7	+ 59.2	66.5	1 26.6	+ 59.4	66.5	1 50.5	+ 59.5	66.6	**5**
6	0 01.3	+ 58.3	66.3	0 25.5	+ 58.5	66.3	0 49.6	+ 58.7	66.3	1 13.8	+ 58.8	66.3	1 37.9	+ 59.0	66.3	2 01.9	+ 59.3	66.4	2 26.0	+ 59.4	66.4	2 50.0	+ 59.5	66.4	**6**
7	0 59.6	+ 58.3	66.0	1 24.0	+ 58.5	66.1	1 48.3	+ 58.7	66.1	2 12.6	+ 58.9	66.1	2 36.9	+ 59.1	66.1	3 01.2	+ 59.2	66.2	3 25.4	+ 59.3	66.2	3 49.5	+ 59.5	66.3	**7**
8	1 57.9	+ 58.3	65.8	2 22.5	+ 58.5	65.8	2 47.0	+ 58.7	65.9	3 11.5	+ 58.9	65.9	3 36.0	+ 59.0	66.0	4 00.4	+ 59.2	66.0	4 24.7	+ 59.4	66.1	4 49.0	+ 59.5	66.2	**8**
9	2 56.2	+ 58.2	65.6	3 21.0	+ 58.5	65.6	3 45.7	+ 58.7	65.7	4 10.4	+ 58.9	65.7	4 35.0	+ 59.1	65.8	4 59.6	+ 59.2	65.9	5 24.1	+ 59.4	66.0	5 48.5	+ 59.5	66.0	**9**
10	3 54.4	+ 58.3	65.3	4 19.5	+ 58.4	65.4	4 44.4	+ 58.7	65.5	5 09.3	+ 58.9	65.5	5 34.1	+ 59.1	65.6	5 58.8	+ 59.3	65.7	6 23.5	+ 59.3	65.8	6 48.0	+ 59.5	65.9	**10**
11	4 52.7	+ 58.2	65.1	5 17.9	+ 58.5	65.2	5 43.1	+ 58.7	65.2	6 08.2	+ 58.9	65.3	6 33.2	+ 59.0	65.4	6 58.1	+ 59.2	65.5	7 22.8	+ 59.4	65.7	7 47.5	+ 59.5	65.8	**11**
12	5 50.9	+ 58.3	64.8	6 16.4	+ 58.5	64.9	6 41.8	+ 58.7	65.0	7 07.1	+ 58.8	65.1	7 32.2	+ 59.1	65.3	7 57.3	+ 59.2	65.4	8 22.2	+ 59.4	65.5	8 47.0	+ 59.5	65.7	**12**
13	6 49.2	+ 58.2	64.6	7 14.9	+ 58.4	64.7	7 40.5	+ 58.6	64.8	8 05.9	+ 58.9	65.0	8 31.3	+ 59.0	65.1	8 56.5	+ 59.2	65.2	9 21.6	+ 59.3	65.4	9 46.5	+ 59.5	65.5	**13**
14	7 47.4	+ 58.3	64.4	8 13.3	+ 58.5	64.5	8 39.1	+ 58.7	64.6	9 04.8	+ 58.9	64.8	9 30.3	+ 59.0	64.9	9 55.7	+ 59.2	65.1	10 20.9	+ 59.4	65.2	10 46.0	+ 59.5	65.4	**14**
15	8 45.7	+ 58.2	64.1	9 11.8	+ 58.5	64.3	9 37.8	+ 58.7	64.4	10 03.7	+ 58.8	64.6	10 29.3	+ 59.1	64.7	10 54.9	+ 59.2	64.9	11 20.3	+ 59.3	65.1	11 45.5	+ 59.4	65.3	**15**
16	9 43.9	+ 58.2	63.9	10 10.3	+ 58.4	64.0	10 36.5	+ 58.6	64.2	11 02.5	+ 58.8	64.4	11 28.4	+ 59.0	64.5	11 54.1	+ 59.2	64.7	12 19.6	+ 59.4	64.9	12 44.9	+ 59.5	65.1	**16**
17	10 42.1	+ 58.2	63.6	11 08.7	+ 58.4	63.8	11 35.1	+ 58.6	64.0	12 01.3	+ 58.9	64.2	12 27.4	+ 59.0	64.4	12 53.3	+ 59.2	64.6	13 19.0	+ 59.3	64.8	13 44.4	+ 59.5	65.0	**17**
18	11 40.3	+ 58.2	63.4	12 07.1	+ 58.4	63.6	12 33.7	+ 58.7	63.8	13 00.2	+ 58.8	64.0	13 26.4	+ 59.0	64.2	13 52.5	+ 59.1	64.4	14 18.3	+ 59.3	64.6	14 43.9	+ 59.5	64.9	**18**
19	12 38.5	+ 58.2	63.1	13 05.5	+ 58.4	63.3	13 32.4	+ 58.6	63.5	13 59.0	+ 58.8	63.8	14 25.4	+ 59.0	64.0	14 51.6	+ 59.2	64.2	15 17.6	+ 59.3	64.5	15 43.4	+ 59.4	64.7	**19**
20	13 36.7	+ 58.1	62.9	14 03.9	+ 58.4	63.1	14 31.0	+ 58.6	63.3	14 57.8	+ 58.8	63.6	15 24.4	+ 59.0	63.8	15 50.8	+ 59.2	64.0	16 16.9	+ 59.4	64.3	16 42.8	+ 59.5	64.6	**20**
21	14 34.8	+ 58.2	62.6	15 02.3	+ 58.4	62.9	15 29.6	+ 58.6	63.1	15 56.6	+ 58.8	63.3	16 23.4	+ 59.0	63.6	16 50.0	+ 59.1	63.9	17 16.3	+ 59.3	64.2	17 42.3	+ 59.4	64.4	**21**
22	15 33.0	+ 58.1	62.4	16 00.7	+ 58.4	62.6	16 28.2	+ 58.6	62.9	16 55.4	+ 58.8	63.1	17 22.4	+ 59.0	63.4	17 49.1	+ 59.2	63.7	18 15.6	+ 59.3	64.0	18 41.7	+ 59.5	64.3	**22**
23	16 31.1	+ 58.1	62.1	16 59.1	+ 58.3	62.4	17 26.8	+ 58.5	62.6	17 54.2	+ 58.8	62.9	18 21.4	+ 58.9	63.2	18 48.3	+ 59.1	63.5	19 14.9	+ 59.3	63.8	19 41.2	+ 59.4	64.1	**23**
24	17 29.2	+ 58.1	61.8	17 57.4	+ 58.3	62.1	18 25.3	+ 58.6	62.4	18 53.0	+ 58.7	62.7	19 20.3	+ 59.0	63.0	19 47.4	+ 59.1	63.3	20 14.2	+ 59.3	63.7	20 40.6	+ 59.5	64.0	**24**
25	18 27.3	+ 58.1	61.6	18 55.7	+ 58.3	61.9	19 23.9	+ 58.5	62.2	19 51.7	+ 58.8	62.5	20 19.3	+ 58.9	62.8	20 46.5	+ 59.1	63.2	21 13.5	+ 59.2	63.5	21 40.1	+ 59.4	63.9	**25**
26	19 25.4	+ 58.0	61.3	19 54.0	+ 58.3	61.6	20 22.4	+ 58.5	62.0	20 50.5	+ 58.7	62.3	21 18.2	+ 58.9	62.6	21 45.6	+ 59.1	63.0	22 12.7	+ 59.3	63.3	22 39.5	+ 59.4	63.7	**26**
27	20 23.4	+ 58.0	61.0	20 52.3	+ 58.3	61.4	21 20.9	+ 58.5	61.7	21 49.2	+ 58.7	62.1	22 17.1	+ 58.9	62.4	22 44.7	+ 59.1	62.8	23 12.0	+ 59.2	63.2	23 38.9	+ 59.4	63.6	**27**
28	21 21.4	+ 58.0	60.8	21 50.6	+ 58.2	61.1	22 19.4	+ 58.5	61.5	22 47.9	+ 58.7	61.8	23 16.0	+ 58.9	62.2	23 43.8	+ 59.1	62.6	24 11.2	+ 59.3	63.0	24 38.3	+ 59.4	63.4	**28**
29	22 19.4	+ 58.0	60.5	22 48.8	+ 58.2	60.9	23 17.9	+ 58.4	61.2	23 46.6	+ 58.6	61.6	24 14.9	+ 58.9	62.0	24 42.9	+ 59.0	62.4	25 10.5	+ 59.2	62.8	25 37.7	+ 59.4	63.2	**29**
30	23 17.4	+ 57.9	60.2	23 47.0	+ 58.2	60.6	24 16.3	+ 58.4	61.0	24 45.2	+ 58.7	61.4	25 13.8	+ 58.8	61.8	25 41.9	+ 59.1	62.2	26 09.7	+ 59.2	62.6	26 37.1	+ 59.4	63.1	**30**
31	24 15.3	+ 57.9	59.9	24 45.2	+ 58.2	60.3	25 14.7	+ 58.4	60.7	25 43.9	+ 58.6	61.1	26 12.6	+ 58.9	61.6	26 41.0	+ 59.0	62.0	27 08.9	+ 59.2	62.5	27 36.5	+ 59.3	62.9	**31**
32	25 13.2	+ 57.9	59.6	25 43.4	+ 58.1	60.1	26 13.1	+ 58.4	60.5	26 42.5	+ 58.6	60.9	27 11.5	+ 58.8	61.4	27 40.0	+ 59.0	61.8	28 08.1	+ 59.2	62.3	28 35.8	+ 59.4	62.8	**32**
33	26 11.1	+ 57.8	59.3	26 41.5	+ 58.1	59.8	27 11.5	+ 58.3	60.2	27 41.1	+ 58.6	60.7	28 10.3	+ 58.7	61.1	28 39.0	+ 59.0	61.6	29 07.3	+ 59.2	62.1	29 35.2	+ 59.3	62.6	**33**
34	27 08.9	+ 57.8	59.1	27 39.6	+ 58.0	59.5	28 09.8	+ 58.3	60.0	28 39.7	+ 58.5	60.4	29 09.0	+ 58.8	60.9	29 38.0	+ 59.0	61.4	30 06.5	+ 59.1	61.9	30 34.5	+ 59.3	62.4	**34**
35	28 06.7	+ 57.8	58.7	28 37.6	+ 58.0	59.2	29 08.1	+ 58.3	59.7	29 38.2	+ 58.5	60.2	30 07.8	+ 58.7	60.7	30 37.0	+ 58.9	61.2	31 05.6	+ 59.2	61.7	31 33.8	+ 59.3	62.2	**35**
36	29 04.5	+ 57.7	58.4	29 35.6	+ 58.0	58.9	30 06.4	+ 58.2	59.4	30 36.7	+ 58.5	59.9	31 06.5	+ 58.8	60.4	31 35.9	+ 58.9	61.0	32 04.8	+ 59.1	61.5	32 33.1	+ 59.3	62.1	**36**
37	30 02.2	+ 57.6	58.1	30 33.6	+ 58.0	58.6	31 04.6	+ 58.2	59.1	31 35.2	+ 58.4	59.7	32 05.3	+ 58.6	60.2	32 34.8	+ 58.9	60.7	33 03.9	+ 59.1	61.3	33 32.4	+ 59.3	61.9	**37**
38	30 59.8	+ 57.6	57.8	31 31.6	+ 57.9	58.3	32 02.8	+ 58.2	58.8	32 33.6	+ 58.5	59.4	33 03.9	+ 58.7	59.9	33 33.7	+ 58.9	60.5	34 03.0	+ 59.1	61.1	34 31.7	+ 59.3	61.7	**38**
39	31 57.4	+ 57.6	57.5	32 29.5	+ 57.8	58.0	33 01.0	+ 58.1	58.6	33 32.1	+ 58.3	59.1	34 02.6	+ 58.6	59.7	34 32.6	+ 58.9	60.3	35 02.1	+ 59.0	60.9	35 31.0	+ 59.2	61.5	**39**
40	32 55.0	+ 57.5	57.1	33 27.3	+ 57.8	57.7	33 59.1	+ 58.1	58.3	34 30.4	+ 58.4	58.8	35 01.2	+ 58.6	59.4	35 31.5	+ 58.8	60.0	36 01.1	+ 59.1	60.7	36 30.2	+ 59.2	61.3	**40**
41	33 52.5	+ 57.4	56.8	34 25.1	+ 57.7	57.4	34 57.2	+ 58.0	58.0	35 28.8	+ 58.3	58.6	35 59.8	+ 58.6	59.2	36 30.3	+ 58.8	59.8	37 00.2	+ 59.0	60.4	37 29.4	+ 59.2	61.1	**41**
42	34 49.9	+ 57.4	56.4	35 22.8	+ 57.7	57.0	35 55.2	+ 58.0	57.6	36 27.1	+ 58.2	58.3	36 58.4	+ 58.5	58.9	37 29.1	+ 58.7	59.5	37 59.2	+ 58.9	60.2	38 28.6	+ 59.2	60.9	**42**
43	35 47.3	+ 57.3	56.1	36 20.5	+ 57.7	56.7	36 53.2	+ 57.9	57.3	37 25.3	+ 58.2	58.0	37 56.9	+ 58.4	58.6	38 27.8	+ 58.7	59.3	38 58.1	+ 59.0	60.0	39 27.8	+ 59.2	60.7	**43**
44	36 44.6	+ 57.3	55.7	37 18.2	+ 57.5	56.3	37 51.1	+ 57.9	57.0	38 23.5	+ 58.2	57.7	38 55.3	+ 58.5	58.3	39 26.5	+ 58.7	59.0	39 57.1	+ 58.9	59.7	40 27.0	+ 59.1	60.5	**44**
45	37 41.9	+ 57.2	55.3	38 15.7	+ 57.5	56.0	38 49.0	+ 57.8	56.7	39 21.7	+ 58.1	57.3	39 53.8	+ 58.3	58.0	40 25.2	+ 58.6	58.8	40 56.0	+ 58.9	59.5	41 26.1	+ 59.1	60.3	**45**
46	38 39.1	+ 57.1	55.0	39 13.2	+ 57.5	55.6	39 46.8	+ 57.8	56.3	40 19.8	+ 58.0	57.0	40 52.1	+ 58.4	57.7	41 23.8	+ 58.7	58.5	41 54.9	+ 58.8	59.2	42 25.2	+ 59.1	60.0	**46**
47	39 36.2	+ 57.0	54.6	40 10.7	+ 57.3	55.3	40 44.6	+ 57.6	56.0	41 17.8	+ 58.0	56.7	41 50.5	+ 58.3	57.4	42 22.5	+ 58.5	58.2	42 53.7	+ 58.8	59.0	43 24.3	+ 59.0	59.8	**47**
48	40 33.2	+ 56.9	54.2	41 08.0	+ 57.3	54.9	41 42.2	+ 57.7	55.6	42 15.8	+ 58.0	56.3	42 48.8	+ 58.2	57.1	43 21.0	+ 58.5	57.9	43 52.5	+ 58.8	58.7	44 23.3	+ 59.0	59.5	**48**
49	41 30.1	+ 56.9	53.7	42 05.3	+ 57.2	54.5	42 39.9	+ 57.5	55.2	43 13.8	+ 57.8	56.0	43 47.0	+ 58.2	56.8	44 19.5	+ 58.5	57.6	44 51.3	+ 58.7	58.4	45 22.3	+ 59.0	59.3	**49**
50	42 27.0	+ 56.7	53.3	43 02.5	+ 57.1	54.1	43 37.4	+ 57.4	54.8	44 11.6	+ 57.8	55.6	44 45.2	+ 58.1	56.4	45 18.0	+ 58.4	57.3	45 50.0	+ 58.7	58.1	46 21.3	+ 59.0	59.0	**50**
51	43 23.7	+ 56.6	52.9	43 59.6	+ 57.0	53.6	44 34.8	+ 57.4	54.4	45 09.4	+ 57.7	55.2	45 43.3	+ 58.0	56.1	46 16.4	+ 58.3	56.9	46 48.7	+ 58.6	57.8	47 20.3	+ 58.9	58.7	**51**
52	44 20.3	+ 56.5	52.4	44 56.6	+ 56.9	53.2	45 32.2	+ 57.3	54.0	46 07.1	+ 57.6	54.8	46 41.3	+ 58.0	55.7	47 14.7	+ 58.3	56.6	47 47.3	+ 58.6	57.5	48 19.2	+ 58.8	58.5	**52**
53	45 16.8	+ 56.4	51.9	45 53.5	+ 56.8	52.7	46 29.5	+ 57.1	53.6	47 04.7	+ 57.6	54.4	47 39.3	+ 57.8	55.3	48 13.0	+ 58.2	56.2	48 45.9	+ 58.5	57.2	49 18.0	+ 58.8	58.2	**53**
54	46 13.2	+ 56.3	51.4	46 50.3	+ 56.7	52.3	47 26.6	+ 57.1	53.1	48 02.3	+ 57.4	54.0	48 37.1	+ 57.8	54.9	49 11.2	+ 58.2	55.9	49 44.4	+ 58.5	56.8	50 16.8	+ 58.8	57.9	**54**
55	47 09.5	+ 56.1	50.9	47 47.0	+ 56.5	51.8	48 23.7	+ 57.0	52.7	48 59.7	+ 57.4	53.6	49 34.9	+ 57.8	54.5	50 09.4	+ 58.0	55.5	50 42.9	+ 58.4	56.5	51 15.6	+ 58.7	57.5	**55**
56	48 05.6	+ 56.0	50.4	48 43.5	+ 56.4	51.3	49 20.7	+ 56.8	52.2	49 57.1	+ 57.2	53.1	50 32.7	+ 57.6	54.1	51 07.4	+ 58.0	55.1	51 41.3	+ 58.3	56.1	52 14.3	+ 58.6	57.2	**56**
57	49 01.6	+ 55.8	49.9	49 39.9	+ 56.3	50.8	50 17.5	+ 56.7	51.7	50 54.3	+ 57.1	52.7	51 30.3	+ 57.5	53.7	52 05.4	+ 57.9	54.7	52 39.6	+ 58.3	55.7	53 12.9	+ 58.6	56.8	**57**
58	49 57.4	+ 55.7	49.3	50 36.2	+ 56.1	50.2	51 14.2	+ 56.5	51.2	51 51.4	+ 57.0	52.2	52 27.8	+ 57.4	53.2	53 03.3	+ 57.8	54.2	53 37.9	+ 58.1	55.3	54 11.5	+ 58.5	56.5	**58**
59	50 53.1	+ 55.4	48.7	51 32.3	+ 55.9	49.7	52 10.7	+ 56.4	50.6	52 48.4	+ 56.8	51.7	53 25.2	+ 57.2	52.7	54 01.1	+ 57.7	53.8	54 36.0	+ 58.1	54.9	55 10.0	+ 58.4	56.1	**59**
60	51 48.5	+ 55.3	48.1	52 28.2	+ 55.8	49.1	53 07.1	+ 56.3	50.1	53 45.2	+ 56.7	51.1	54 22.4	+ 57.2	52.2	54 58.8	+ 57.5	53.3	55 34.1	+ 58.0	54.5	56 08.4	+ 58.4	55.7	**60**
61	52 43.8	+ 55.0	47.5	53 24.0	+ 55.5	48.5	54 03.4	+ 56.0	49.5	54 41.9	+ 56.5	50.6	55 19.6	+ 57.0	51.7	55 56.3	+ 57.5	52.8	56 32.1	+ 57.8	54.0	57 06.8	+ 58.2	55.3	**61**
62	53 38.8	+ 54.9	46.8	54 19.5	+ 55.4	47.8	54 59.4	+ 55.9	48.9	55 38.4	+ 56.4	50.0	56 16.6	+ 56.8	51.1	56 53.8	+ 57.3	52.3	57 29.9	+ 57.8	53.5	58 05.0	+ 58.2	54.8	**62**
63	54 33.7	+ 54.5	46.1	55 14.9	+ 55.1	47.1	55 55.3	+ 55.6	48.2	56 34.8	+ 56.2	49.4	57 13.4	+ 56.7	50.5	57 51.1	+ 57.1	51.8	58 27.7	+ 57.6	53.0	59 03.2	+ 58.1	54.4	**63**
64	55 28.2	+ 54.3	45.4	56 10.0	+ 54.8	46.4	56 50.9	+ 55.4	47.6	57 31.0	+ 55.9	48.7	58 10.1	+ 56.5	49.9	58 48.2	+ 57.0	51.2	59 25.3	+ 57.5	52.5	60 01.3	+ 57.9	53.9	**64**
65	56 22.5	+ 54.1	44.6	57 04.8	+ 54.6	45.7	57 46.3	+ 55.2	46.8	58 26.9	+ 55.7	48.0	59 06.6	+ 56.2	49.3	59 45.2	+ 56.8	50.6	60 22.8	+ 57.3	51.9	60 59.2	+ 57.8	53.3	**65**
66	57 16.6	+ 53.7	43.8	57 59.4	+ 54.3	44.9	58 41.5	+ 54.9	46.1	59 22.6	+ 55.5	47.3	60 02.8	+ 56.1	48.6	60 42.0	+ 56.6	49.9	61 20.1	+ 57.1	51.3	61 57.0	+ 57.6	52.8	**66**
67	58 10.3	+ 53.3	43.0	58 53.7	+ 54.0	44.1	59 36.4	+ 54.6	45.3	60 18.1	+ 55.2	46.5	60 58.9	+ 55.8	47.9	61 38.6	+ 56.4	49.2	62 17.2	+ 57.0	50.7	62 54.6	+ 57.5	52.2	**67**
68	59 03.6	+ 53.0	42.1	59 47.7	+ 53.6	43.3	60 31.0	+ 54.2	44.5	61 13.3	+ 54.9	45.7	61 54.7	+ 55.5	47.1	62 35.0	+ 56.1	48.5	63 14.2	+ 56.7	50.0	63 52.1	+ 57.4	51.5	**68**
69	59 56.6	+ 52.6	41.2	60 41.3	+ 53.3	42.4	61 25.2	+ 53.9	43.6	62 08.2	+ 54.6	44.9	62 50.2	+ 55.2	46.3	63 31.1	+ 55.9	47.7	64 10.9	+ 56.5	49.2	64 49.5	+ 57.1	50.8	**69**
70	60 49.2	+ 52.1	40.2	61 34.6	+ 52.8	41.4	62 19.1	+ 53.5	42.7	63 02.8	+ 54.2	44.0	63 45.4	+ 54.9	45.4	64 27.0	+ 55.6	46.9	65 07.4	+ 56.3	48.5	65 46.6	+ 56.8	50.1	**70**
71	61 41.3	+ 51.6	39.2	62 27.4	+ 52.3	40.4	63 12.6	+ 53.1	41.7	63 57.0	+ 53.8	43.0	64 40.3	+ 54.5	44.5	65 22.6	+ 55.2	46.0	66 03.7	+ 55.9	47.6	66 43.4	+ 56.7	49.3	**71**
72	62 32.9	+ 51.1	38.1	63 19.7	+ 51.8	39.3	64 05.7	+ 52.6	40.6	64 50.8	+ 53.3	42.0	65 34.8	+ 54.1	43.5	66 17.8	+ 54.9	45.0	66 59.6	+ 55.6	46.7	67 40.1	+ 56.3	48.5	**72**
73	63 24.0	+ 50.5	36.9	64 11.5	+ 51.3	38.2	64 58.3	+ 52.0	39.5	65 44.1	+ 52.8	40.9	66 28.9	+ 53.7	42.4	67 12.7	+ 54.4	44.0	67 55.2	+ 55.2	45.7	68 36.4	+ 56.0	47.5	**73**
74	64 14.5	+ 49.8	35.7	65 02.8	+ 50.6	37.0	65 50.3	+ 51.5	38.3	66 36.9	+ 52.3	39.7	67 22.6	+ 53.1	41.3	68 07.1	+ 54.0	42.9	68 50.4	+ 54.8	44.7	69 32.4	+ 55.6	46.5	**74**
75	65 04.3	+ 49.1	34.4	65 53.4	+ 50.0	35.7	66 41.8	+ 50.8	37.0	67 29.2	+ 51.7	38.5	68 15.7	+ 52.5	40.0	69 01.1	+ 53.4	41.7	69 45.2	+ 54.3	43.5	70 28.0	+ 55.2	45.4	**75**
76	65 53.4	+ 48.4	33.0	66 43.4	+ 49.2	34.3	67 32.6	+ 50.0	35.7	68 20.9	+ 50.9	37.1	69 08.2	+ 51.8	38.7	69 54.5	+ 52.7	40.4	70 39.5	+ 53.8	42.3	71 23.2	+ 54.7	44.2	**76**
77	66 41.8	+ 47.4	31.6	67 32.6	+ 48.3	32.8	68 22.6	+ 49.2	34.2	69 11.8	+ 50.1	35.7	70 00.0	+ 51.1	37.3	70 47.2	+ 52.1	39.0	71 33.3	+ 53.0	40.9	72 17.9	+ 54.1	42.9	**77**
78	67 29.2	+ 46.5	30.0	68 20.9	+ 47.3	31.2	69 11.8	+ 48.2	32.6	70 01.9	+ 49.2	34.1	70 51.1	+ 50.3	35.7	71 39.3	+ 51.3	37.5	72 26.3	+ 52.4	39.4	73 12.0	+ 53.5	41.5	**78**
79	68 15.7	+ 45.4	28.3	69 08.2	+ 46.3	29.5	70 00.0	+ 47.2	30.9	70 51.1	+ 48.2	32.4	71 41.4	+ 49.2	34.0	72 30.6	+ 50.3	35.8	73 18.7	+ 51.4	37.7	74 05.5	+ 52.6	39.8	**79**
80	69 01.1	+ 44.1	26.5	69 54.5	+ 45.0	27.7	70 47.2	+ 46.1	29.1	71 39.3	+ 47.0	30.5	72 30.6	+ 48.1	32.1	73 20.9	+ 49.2	33.9	74 10.1	+ 50.4	35.9	74 58.1	+ 51.6	38.0	**80**
81	69 45.2	+ 42.8	24.6	70 39.5	+ 43.7	25.8	71 33.3	+ 44.6	27.1	72 26.3	+ 45.7	28.5	73 18.7	+ 46.8	30.1	74 10.1	+ 48.0	31.9	75 00.5	+ 49.2	33.8	75 49.7	+ 50.6	36.0	**81**
82	70 28.0	+ 41.4	22.5	71 23.2	+ 42.2	23.7	72 17.9	+ 43.2	24.9	73 12.0	+ 44.2	26.3	74 05.5	+ 45.2	27.9	74 58.1	+ 46.4	29.6	75 49.7	+ 47.8	31.6	76 40.3	+ 49.1	33.8	**82**
83	71 09.4	+ 39.6	20.3	72 05.4	+ 40.5	21.4	73 01.1	+ 41.4	22.6	73 56.2	+ 42.4	23.9	74 50.7	+ 43.6	25.4	75 44.5	+ 44.8	27.1	76 37.5	+ 46.1	29.0	77 29.4	+ 47.5	31.2	**83**
84	71 49.0	+ 37.8	18.0	72 45.9	*+ 38.6* •	19.0	73 42.5	*+ 39.4* •	20.1	74 38.6	*+ 40.4* •	21.3	75 34.3	*+ 41.4* •	22.7	76 29.3	*+ 42.7* •	24.3	77 23.6	*+ 44.0* •	26.2	78 16.9	*+ 45.5* •	28.3	**84**
85	72 26.8	*+ 35.7* •	15.4	73 24.5	*+ 36.5* •	16.3	74 21.9	*+ 37.3* •	17.3	75 19.0	*+ 38.2* •	18.5	76 15.7	*+ 39.2* •	19.7	77 12.0	*+ 40.2* •	21.2	78 07.6	*+ 41.5* •	22.9	79 02.4	*+ 43.0* •	25.0	**85**
86	73 02.5	*+ 33.4* •	12.7	74 01.0	*+ 34.0* •	13.5	74 59.2	*+ 34.7* •	14.4	75 57.2	*+ 35.5* •	15.3	76 54.9	*+ 36.4* •	16.5	77 52.2	*+ 37.5* •	17.8	78 49.1	*+ 38.7* •	19.3	79 45.4	*+ 40.0* •	21.2	**86**
87	73 35.9	*+ 30.9* •	9.8	74 35.0	*+ 31.4* •	10.4	75 33.9	*+ 32.0* •	11.1	76 32.7	*+ 32.6* •	11.9	77 31.3	*+ 33.3* •	12.9	78 29.7	*+ 34.1* •	14.0	79 27.8	*+ 35.1* •	15.3	80 25.4	*+ 36.3* •	16.8	**87**
88	74 06.8	*+ 28.1* •	6.7	75 06.4	*+ 28.4* •	7.2	76 05.9	*+ 28.8* •	7.7	77 05.3	*+ 29.2* •	8.3	78 04.6	*+ 29.8* •	8.9	79 03.8	*+ 30.3* •	9.7	80 02.9	*+ 31.0* •	10.7	81 01.7	*+ 31.9* •	11.9	**88**
89	74 34.9	*+ 25.1* •	3.5	75 34.8	*+ 25.2* •	3.7	76 34.7	*+ 25.3* •	4.0	77 34.5	*+ 25.5* •	4.3	78 34.4	*+ 25.6* •	4.7	79 34.1	*+ 25.9* •	5.1	80 33.9	*+ 26.1* •	5.6	81 33.6	*+ 26.4* •	6.3	**89**
90	75 00.0	*+ 21.7* •	0.0	76 00.0	*+ 21.6* •	0.0	77 00.0	*+ 21.5* •	0.0	78 00.0	*+ 21.3* •	0.0	79 00.0	*+ 21.1* •	0.0	80 00.0	*+ 20.8* •	0.0	81 00.0	*+ 20.5* •	0.0	82 00.0	*+ 20.1* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 113°, 247°

68°, 292° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 33.8	+58.3	111.3	5 12.0	+58.4	111.4	4 50.0	+58.7	111.5	4 28.0	+58.9	111.6	4 05.9	+59.1	111.6	3 43.8	+59.2	111.7	3 21.6	+59.3	111.8	2 59.3	+59.5	111.8	0
1	6 32.1	+58.2	111.1	6 10.4	+58.5	111.2	5 48.7	+58.7	111.3	5 26.9	+58.8	111.4	5 05.0	+59.0	111.5	4 43.0	+59.2	111.5	4 20.9	+59.4	111.6	3 58.8	+59.5	111.7	1
2	7 30.3	+58.2	110.8	7 08.9	+58.4	111.0	6 47.4	+58.6	111.1	6 25.7	+58.9	111.2	6 04.0	+59.1	111.3	5 42.2	+59.2	111.4	5 20.3	+59.4	111.5	4 58.3	+59.5	111.5	2
3	8 28.5	+58.2	110.6	8 07.3	+58.5	110.7	7 46.0	+58.7	110.9	7 24.6	+58.9	111.0	7 03.1	+59.0	111.1	6 41.4	+59.2	111.2	6 19.7	+59.3	111.3	5 57.8	+59.5	111.4	3
4	9 26.7	+58.2	110.3	9 05.8	+58.4	110.5	8 44.7	+58.6	110.6	8 23.5	+58.8	110.8	8 02.1	+59.0	110.9	7 40.6	+59.2	111.0	7 19.0	+59.4	111.2	6 57.3	+59.5	111.3	4
5	10 24.9	+58.2	110.1	10 04.2	+58.4	110.3	9 43.3	+58.7	110.4	9 22.3	+58.8	110.6	9 01.1	+59.1	110.7	8 39.8	+59.2	110.9	8 18.4	+59.3	111.0	7 56.8	+59.5	111.2	5
6	11 23.1	+58.1	109.8	11 02.6	+58.4	110.0	10 42.0	+58.6	110.2	10 21.1	+58.9	110.4	10 00.2	+59.0	110.6	9 39.0	+59.2	110.7	9 17.7	+59.4	110.9	8 56.3	+59.4	111.0	6
7	12 21.2	+58.2	109.6	12 01.0	+58.4	109.8	11 40.6	+58.6	110.0	11 20.0	+58.8	110.2	10 59.2	+59.0	110.4	10 38.2	+59.2	110.5	10 17.1	+59.3	110.7	9 55.7	+59.5	110.9	7
8	13 19.4	+58.1	109.3	12 59.4	+58.4	109.6	12 39.2	+58.6	109.8	12 18.8	+58.8	110.0	11 58.2	+59.0	110.2	11 37.4	+59.2	110.4	11 16.4	+59.3	110.6	10 55.2	+59.5	110.8	8
9	14 17.5	+58.1	109.1	13 57.8	+58.4	109.3	13 37.8	+58.6	109.6	13 17.6	+58.8	109.8	12 57.2	+59.0	110.0	12 36.6	+59.2	110.2	12 15.7	+59.4	110.4	11 54.7	+59.5	110.6	9
10	15 15.6	+58.2	108.8	14 56.2	+58.3	109.1	14 36.4	+58.6	109.3	14 16.4	+58.8	109.6	13 56.2	+59.0	109.8	13 35.8	+59.1	110.0	13 15.1	+59.3	110.3	12 54.2	+59.5	110.5	10
11	16 13.8	+58.0	108.6	15 54.5	+58.3	108.8	15 35.0	+58.6	109.1	15 15.2	+58.8	109.4	14 55.2	+59.0	109.6	14 34.9	+59.2	109.9	14 14.4	+59.3	110.1	13 53.7	+59.4	110.4	11
12	17 11.8	+58.1	108.3	16 52.8	+58.4	108.6	16 33.6	+58.5	108.9	16 14.0	+58.8	109.2	15 54.2	+58.9	109.4	15 34.1	+59.1	109.7	15 13.7	+59.3	110.0	14 53.1	+59.5	110.2	12
13	18 09.9	+58.1	108.0	17 51.2	+58.3	108.4	17 32.1	+58.6	108.7	17 12.8	+58.7	109.0	16 53.1	+59.0	109.2	16 33.2	+59.2	109.5	16 13.0	+59.3	109.8	15 52.6	+59.4	110.1	13
14	19 08.0	+58.0	107.8	18 49.5	+58.2	108.1	18 30.7	+58.5	108.4	18 11.5	+58.8	108.7	17 52.1	+59.0	109.0	17 32.4	+59.1	109.4	17 12.3	+59.3	109.6	16 52.0	+59.5	109.9	14
15	20 06.0	+58.0	107.5	19 47.7	+58.3	107.9	19 29.2	+58.5	108.2	19 10.3	+58.7	108.5	18 51.1	+58.9	108.9	18 31.5	+59.1	109.2	18 11.6	+59.3	109.5	17 51.5	+59.4	109.8	15
16	21 04.0	+57.9	107.2	20 46.0	+58.2	107.6	20 27.7	+58.5	108.0	20 09.0	+58.7	108.3	19 50.0	+58.9	108.7	19 30.6	+59.1	109.0	19 10.9	+59.3	109.3	18 50.9	+59.5	109.6	16
17	22 01.9	+58.0	107.0	21 44.2	+58.3	107.3	21 26.2	+58.4	107.7	21 07.7	+58.7	108.1	20 48.9	+58.9	108.5	20 29.7	+59.1	108.8	20 10.2	+59.3	109.2	19 50.4	+59.4	109.5	17
18	22 59.9	+57.9	106.7	22 42.5	+58.1	107.1	22 24.6	+58.5	107.5	22 06.4	+58.7	107.9	21 47.8	+58.9	108.2	21 28.8	+59.1	108.6	21 09.5	+59.3	109.0	20 49.8	+59.4	109.4	18
19	23 57.8	+57.9	106.4	23 40.6	+58.2	106.8	23 23.1	+58.4	107.2	23 05.1	+58.7	107.6	22 46.7	+58.9	108.0	22 27.9	+59.1	108.4	22 08.8	+59.2	108.8	21 49.2	+59.4	109.2	19
20	24 55.7	+57.8	106.1	24 38.8	+58.1	106.5	24 21.5	+58.4	107.0	24 03.8	+58.6	107.4	23 45.6	+58.9	107.8	23 27.0	+59.1	108.2	23 08.0	+59.3	108.7	22 48.6	+59.4	109.1	20
21	25 53.5	+57.8	105.8	25 36.9	+58.1	106.3	25 19.9	+58.4	106.7	25 02.4	+58.6	107.2	24 44.5	+58.8	107.6	24 26.1	+59.0	108.1	24 07.3	+59.2	108.5	23 48.0	+59.4	108.9	21
22	26 51.3	+57.8	105.5	26 35.0	+58.1	106.0	26 18.3	+58.3	106.5	26 01.0	+58.6	106.9	25 43.3	+58.8	107.4	25 25.1	+59.0	107.9	25 06.5	+59.2	108.3	24 47.4	+59.4	108.7	22
23	27 49.1	+57.7	105.2	27 33.1	+58.0	105.7	27 16.6	+58.3	106.2	26 59.6	+58.6	106.7	26 42.1	+58.8	107.2	26 24.1	+59.1	107.7	26 05.7	+59.2	108.1	25 46.8	+59.4	108.6	23
24	28 46.8	+57.7	104.9	28 31.1	+58.0	105.4	28 14.9	+58.3	105.9	27 58.2	+58.5	106.5	27 40.9	+58.8	107.0	27 23.2	+59.0	107.5	27 04.9	+59.2	107.9	26 46.2	+59.3	108.4	24
25	29 44.5	+57.6	104.6	29 29.1	+58.0	105.1	29 13.2	+58.2	105.7	28 56.7	+58.5	106.2	28 39.7	+58.7	106.7	28 22.2	+58.9	107.3	28 04.1	+59.2	107.8	27 45.5	+59.4	108.3	25
26	30 42.1	+57.6	104.3	30 27.1	+57.9	104.8	30 11.4	+58.2	105.4	29 55.2	+58.5	106.0	29 38.4	+58.8	106.5	29 21.1	+59.0	107.0	29 03.3	+59.1	107.6	28 44.9	+59.3	108.1	26
27	31 39.7	+57.6	103.9	31 25.0	+57.8	104.5	31 09.6	+58.2	105.1	30 53.7	+58.4	105.7	30 37.2	+58.7	106.3	30 20.1	+58.9	106.8	30 02.4	+59.2	107.4	29 44.2	+59.4	107.9	27
28	32 37.3	+57.5	103.6	32 22.8	+57.9	104.2	32 07.8	+58.1	104.8	31 52.1	+58.5	105.4	31 35.9	+58.7	106.0	31 19.0	+58.9	106.6	31 01.6	+59.1	107.2	30 43.6	+59.3	107.8	28
29	33 34.8	+57.4	103.3	33 20.7	+57.7	103.9	33 05.9	+58.1	104.5	32 50.6	+58.3	105.2	32 34.6	+58.6	105.8	32 17.9	+58.9	106.4	32 00.7	+59.1	107.0	31 42.9	+59.3	107.6	29
30	34 32.2	+57.3	102.9	34 18.4	+57.8	103.6	34 04.0	+58.1	104.2	33 48.9	+58.4	104.9	33 33.2	+58.6	105.5	33 16.8	+58.9	106.2	32 59.8	+59.1	106.8	32 42.2	+59.3	107.4	30
31	35 29.5	+57.3	102.5	35 16.2	+57.6	103.2	35 02.1	+58.0	103.9	34 47.3	+58.3	104.6	34 31.8	+58.6	105.3	34 15.7	+58.8	105.9	33 58.9	+59.1	106.6	33 41.5	+59.2	107.2	31
32	36 26.8	+57.3	102.2	36 13.8	+57.6	102.9	36 00.1	+57.9	103.6	35 45.6	+58.3	104.3	35 30.4	+58.6	105.0	35 14.5	+58.8	105.7	34 58.0	+59.0	106.4	34 40.7	+59.3	107.0	32
33	37 24.1	+57.1	101.8	37 11.4	+57.6	102.5	36 58.0	+57.9	103.3	36 43.9	+58.2	104.0	36 29.0	+58.5	104.7	36 13.3	+58.8	105.4	35 57.0	+59.0	106.1	35 40.0	+59.2	106.8	33
34	38 21.2	+57.1	101.4	38 09.0	+57.4	102.2	37 55.9	+57.8	103.0	37 42.1	+58.1	103.7	37 27.5	+58.4	104.5	37 12.1	+58.8	105.2	36 56.0	+59.0	105.9	36 39.2	+59.2	106.6	34
35	39 18.3	+57.0	101.0	39 06.4	+57.4	101.8	38 53.7	+57.8	102.6	38 40.2	+58.2	103.4	38 25.9	+58.5	104.2	38 10.9	+58.7	104.9	37 55.0	+59.0	105.7	37 38.4	+59.2	106.4	35
36	40 15.3	+56.9	100.6	40 03.8	+57.4	101.4	39 51.5	+57.7	102.3	39 38.4	+58.0	103.1	39 24.4	+58.4	103.9	39 09.6	+58.6	104.7	38 54.0	+58.9	105.5	38 37.6	+59.2	106.2	36
37	41 12.2	+56.9	100.2	41 01.2	+57.2	101.1	40 49.2	+57.7	101.9	40 36.4	+58.0	102.7	40 22.8	+58.3	103.6	40 08.2	+58.7	104.4	39 52.9	+58.9	105.2	39 36.8	+59.1	106.0	37
38	42 09.1	+56.7	99.8	41 58.4	+57.2	100.7	41 46.9	+57.5	101.5	41 34.4	+58.0	102.4	41 21.1	+58.3	103.3	41 06.9	+58.6	104.1	40 51.8	+58.9	105.0	40 35.9	+59.1	105.8	38
39	43 05.8	+56.6	99.3	42 55.6	+57.0	100.2	42 44.4	+57.5	101.2	42 32.4	+57.8	102.1	42 19.4	+58.2	103.0	42 05.5	+58.5	103.8	41 50.7	+58.8	104.7	41 35.0	+59.1	105.6	39
40	44 02.4	+56.5	98.9	43 52.6	+57.0	99.8	43 41.9	+57.4	100.8	43 30.2	+57.8	101.7	43 17.6	+58.2	102.6	43 04.0	+58.5	103.5	42 49.5	+58.8	104.4	42 34.1	+59.1	105.3	40
41	44 58.9	+56.4	98.4	44 49.6	+56.9	99.4	44 39.3	+57.3	100.4	44 28.0	+57.8	101.3	44 15.8	+58.1	102.3	44 02.5	+58.5	103.2	43 48.3	+58.8	104.2	43 33.2	+59.0	105.1	41
42	45 55.3	+56.2	97.9	45 46.5	+56.7	98.9	45 36.6	+57.3	99.9	45 25.8	+57.6	100.9	45 13.9	+58.0	101.9	45 01.0	+58.4	102.9	44 47.1	+58.7	103.9	44 32.2	+59.0	104.8	42
43	46 51.5	+56.1	97.4	46 43.2	+56.7	98.5	46 33.9	+57.1	99.5	46 23.4	+57.6	100.5	46 11.9	+58.0	101.6	45 59.4	+58.3	102.6	45 45.8	+58.6	103.6	45 31.2	+58.9	104.6	43
44	47 47.6	+56.0	96.9	47 39.9	+56.5	98.0	47 31.0	+57.0	99.1	47 21.0	+57.5	100.1	47 09.9	+57.9	101.2	46 57.7	+58.3	102.2	46 44.4	+58.7	103.3	46 30.1	+58.9	104.3	44
45	48 43.6	+55.8	96.3	48 36.4	+56.4	97.5	48 28.0	+56.9	98.6	48 18.5	+57.3	99.7	48 07.8	+57.8	100.8	47 56.0	+58.2	101.9	47 43.1	+58.5	103.0	47 29.0	+58.9	104.0	45
46	49 39.4	+55.6	95.8	49 32.8	+56.2	96.9	49 24.9	+56.8	98.1	49 15.8	+57.3	99.3	49 05.6	+57.7	100.4	48 54.2	+58.1	101.5	48 41.6	+58.5	102.6	48 27.9	+58.9	103.7	46
47	50 35.0	+55.5	95.2	50 29.0	+56.0	96.4	50 21.7	+56.6	97.6	50 13.1	+57.2	98.8	50 03.3	+57.6	100.0	49 52.3	+58.1	101.1	49 40.1	+58.5	102.3	49 26.8	+58.7	103.4	47
48	51 30.5	+55.3	94.6	51 25.0	+55.9	95.8	51 18.3	+56.5	97.1	51 10.3	+57.0	98.3	51 00.9	+57.6	99.5	50 50.4	+58.0	100.8	50 38.6	+58.3	102.0	50 25.5	+58.8	103.1	48
49	52 25.8	+55.0	94.0	52 20.9	+55.8	95.2	52 14.8	+56.3	96.5	52 07.3	+56.9	97.8	51 58.5	+57.4	99.1	51 48.4	+57.8	100.3	51 36.9	+58.3	101.6	51 24.3	+58.6	102.8	49
50	53 20.8	+54.8	93.3	53 16.7	+55.5	94.6	53 11.1	+56.2	96.0	53 04.2	+56.7	97.3	52 55.9	+57.3	98.6	52 46.2	+57.8	99.9	52 35.2	+58.3	101.2	52 22.9	+58.7	102.5	50
51	54 15.6	+54.6	92.6	54 12.2	+55.3	94.0	54 07.3	+56.0	95.4	54 00.9	+56.6	96.7	53 53.2	+57.2	98.1	53 44.0	+57.7	99.5	53 33.5	+58.1	100.8	53 21.6	+58.5	102.1	51
52	55 10.2	+54.3	91.9	55 07.5	+55.1	93.3	55 03.3	+55.7	94.8	54 57.5	+56.5	96.2	54 50.4	+57.0	97.6	54 41.7	+57.6	99.0	54 31.6	+58.1	100.4	54 20.1	+58.5	101.7	52
53	56 04.5	+54.0	91.1	56 02.6	+54.8	92.6	55 59.0	+55.6	94.1	55 54.0	+56.2	95.6	55 47.4	+56.9	97.0	55 39.3	+57.4	98.5	55 29.7	+57.9	99.9	55 18.6	+58.4	101.4	53
54	56 58.5	+53.8	90.3	56 57.4	+54.5	91.9	56 54.6	+55.3	93.4	56 50.2	+56.1	94.9	56 44.3	+56.7	96.5	56 36.7	+57.3	98.0	56 27.6	+57.8	99.5	56 17.0	+58.3	101.0	54
55	57 52.3	+53.3	89.5	57 51.9	+54.3	91.1	57 49.9	+55.1	92.7	57 46.3	+55.8	94.3	57 41.0	+56.5	95.9	57 34.0	+57.2	97.4	57 25.4	+57.8	99.0	57 15.3	+58.2	100.5	55
56	58 45.6	+53.0	88.6	58 46.2	+53.9	90.3	58 45.0	+54.8	91.9	58 42.1	+55.6	93.6	58 37.5	+56.3	95.2	58 31.2	+57.0	96.9	58 23.2	+57.6	98.5	58 13.5	+58.1	100.1	56
57	59 38.6	+52.6	87.7	59 40.1	+53.6	89.4	59 39.8	+54.5	91.1	59 37.7	+55.3	92.9	59 33.8	+56.1	94.6	59 28.2	+56.8	96.2	59 20.8	+57.4	97.9	59 11.6	+58.0	99.6	57
58	60 31.2	+52.2	86.8	60 33.7	+53.2	88.5	60 34.3	+54.1	90.3	60 33.0	+55.1	92.1	60 29.9	+55.9	93.8	60 25.0	+56.6	95.6	60 18.2	+57.3	97.4	60 09.6	+57.9	99.1	58
59	61 23.4	+51.6	85.7	61 26.9	+52.7	87.6	61 28.4	+53.8	89.4	61 28.1	+54.7	91.3	61 25.8	+55.6	93.1	61 21.6	+56.4	94.9	61 15.5	+57.1	96.7	61 07.5	+57.8	98.5	59
60	62 15.0	+51.2	84.7	62 19.6	+52.3	86.6	62 22.2	+53.4	88.5	62 22.8	+54.4	90.4	62 21.4	+55.3	92.3	62 18.0	+56.2	94.2	62 12.6	+56.9	96.1	62 05.3	+57.6	98.0	60
61	63 06.2	+50.6	83.5	63 11.9	+51.8	85.5	63 15.6	+52.9	87.5	63 17.2	+54.0	89.5	63 16.7	+55.0	91.5	63 14.2	+55.9	93.4	63 09.5	+56.7	95.4	63 02.9	+57.4	97.4	61
62	63 56.8	+49.9	82.3	64 03.7	+51.2	84.4	64 08.5	+52.5	86.4	64 11.2	+53.6	88.5	64 11.7	+54.6	90.5	64 10.1	+55.6	92.6	64 06.2	+56.5	94.7	64 00.3	+57.2	96.7	62
63	64 46.7	+49.2	81.0	64 54.9	+50.6	83.2	65 01.0	+51.9	85.3	65 04.8	+53.1	87.4	65 06.3	+54.3	89.6	65 05.7	+55.2	91.7	65 02.7	+56.2	93.9	64 57.5	+57.1	96.0	63
64	65 35.9	+48.4	79.7	65 45.5	+49.9	81.9	65 52.9	+51.2	84.1	65 57.9	+52.6	86.3	66 00.6	+53.8	88.5	66 00.9	+54.9	90.8	65 58.9	+55.9	93.0	65 54.6	+56.8	95.3	64
65	66 24.3	+47.6	78.2	66 35.4	+49.1	80.5	66 44.1	+50.6	82.8	66 50.5	+52.0	85.1	66 54.4	+53.3	87.4	66 55.8	+54.5	89.8	66 54.8	+55.6	92.1	66 51.4	+56.5	94.5	65
66	67 11.9	+46.6	76.7	67 24.5	+48.3	79.0	67 34.7	+49.9	81.4	67 42.5	+51.3	83.8	67 47.7	+52.7	86.2	67 50.3	+54.0	88.7	67 50.4	+55.2	91.2	67 47.9	+56.2	93.6	66
67	67 58.5	+45.6	75.0	68 12.8	+47.3	77.4	68 24.6	+49.0	79.9	68 33.8	+50.6	82.4	68 40.4	+52.1	85.0	68 44.3	+53.5	87.5	68 45.6	+54.7	90.1	68 44.1	+55.9	92.7	67
68	68 44.1	+44.4	73.3	69 00.1	+46.2	75.8	69 13.6	+48.0	78.3	69 24.4	+49.7	80.9	69 32.5	+51.4	83.6	69 37.8	+52.9	86.2	69 40.3	+54.3	88.9	69 40.0	+55.5	91.6	68
69	69 28.5	+43.0	71.4	69 46.3	+45.1	73.9	70 01.6	+47.0	76.6	70 14.1	+48.8	79.3	70 23.9	+50.5	82.1	70 30.7	+52.2	84.9	70 34.6	+53.7	87.7	70 35.5	+55.1	90.5	69
70	70 11.5	+41.6	69.4	70 31.4	+43.7	72.0	70 48.6	+45.7	74.7	71 02.9	+47.8	77.5	71 14.4	+49.6	80.4	71 22.9	+51.4	83.3	71 28.3	+53.0	86.3	71 30.6	+54.5	89.3	70
71	70 53.1	+40.0	67.2	71 15.1	+42.2	69.9	71 34.3	+44.4	72.7	71 50.7	+46.5	75.6	72 04.0	+48.6	78.6	72 14.3	+50.5	81.7	72 21.3	+52.3	84.8	72 25.1	+54.0	87.9	71
72	71 33.1	+38.2	64.9	71 57.3	+40.5	67.7	72 18.7	+42.8	70.6	72 37.2	+45.1	73.6	72 52.6	+47.3	76.7	73 04.8	+49.4	79.9	73 13.6	+51.4	83.1	73 19.1	+53.2	86.5	72
73	72 11.3	*+36.2*•	62.4	72 37.8	*+38.6*•	65.2	73 01.5	+41.1	68.2	73 22.3	+43.5	71.3	73 39.9	+45.9	74.5	73 54.2	+48.2	77.9	74 05.0	+50.4	81.3	74 12.3	+52.4	84.8	73
74	72 47.5	*+33.9*•	59.7	73 16.4	*+36.5*•	62.6	73 42.6	*+39.1*•	65.7	74 05.8	+41.7	68.9	74 25.8	+44.3	72.2	74 42.4	+46.8	75.7	74 55.4	+49.2	79.3	75 04.7	+51.4	83.0	74
75	73 21.4	*+31.5*•	56.9	73 52.9	*+34.1*•	59.8	74 21.7	*+36.8*•	62.9	74 47.5	*+39.6*•	66.2	75 10.1	*+42.3*•	69.6	75 29.2	+45.1	73.2	75 44.6	+47.7	77.0	75 56.1	+50.2	80.9	75
76	73 52.9	*+28.8*•	53.9	74 27.0	*+31.5*•	56.8	74 58.5	*+34.3*•	59.9	75 27.1	*+37.2*•	63.2	75 52.4	*+40.2*•	66.8	76 14.3	*+43.1*•	70.5	76 32.3	+46.0	74.5	76 46.3	+48.8	78.6	76
77	74 21.7	*+25.8*•	50.7	74 58.5	*+28.6*•	53.6	75 32.8	*+31.5*•	56.7	76 04.3	*+34.5*•	60.1	76 32.6	*+37.7*•	63.7	76 57.4	*+40.8*•	67.5	77 18.3	*+44.0*•	71.6	77 35.1	+47.1	76.0	77
78	74 47.5	*+22.6*•	47.3	75 27.1	*+25.3*•	50.1	76 04.3	*+28.3*•	53.2	76 38.8	*+31.5*•	56.6	77 10.3	*+34.7*•	60.2	77 38.2	*+38.2*•	64.2	78 02.3	*+41.6*•	68.5	78 22.2	*+45.0*•	73.0	78
79	75 10.1	*+19.1*•	43.7	75 52.4	*+21.9*•	46.5	76 32.6	*+24.8*•	49.5	77 10.3	*+27.9*•	52.8	77 45.0	*+31.4*•	56.5	78 16.4	*+34.9*•	60.5	78 43.9	*+38.7*•	64.9	79 07.2	*+42.4*•	69.6	79
80	75 29.2	*+15.4*•	40.0	76 14.3	*+18.0*•	42.6	76 57.4	*+20.9*•	45.5	77 38.2	*+24.1*•	48.8	78 16.4	*+27.5*•	52.4	78 51.3	*+31.3*•	56.4	79 22.6	*+35.2*•	60.8	79 49.6	*+39.3*•	65.7	80
81	75 44.6	*+11.5*•	36.1	76 32.3	*+14.0*•	38.5	77 18.3	*+16.8*•	41.3	78 02.3	*+19.9*•	44.4	78 43.9	*+23.3*•	47.9	79 22.6	*+27.0*•	51.9	79 57.8	*+31.1*•	56.3	80 28.9	*+35.5*•	61.3	81
82	75 56.1	*+7.4*•	32.1	76 46.3	*+9.7*•	34.3	77 35.1	*+12.3*•	36.9	78 22.2	*+15.1*•	39.8	79 07.2	*+18.4*•	43.1	79 49.6	*+22.1*•	46.9	80 28.9	*+26.3*•	51.3	81 04.4	*+30.8*•	56.3	82
83	76 03.5	*+3.3*•	28.0	76 56.0	*+5.3*•	30.0	77 47.4	*+7.5*•	32.3	78 37.3	*+10.3*•	34.9	79 25.6	*+13.3*•	38.0	80 11.7	*+16.8*•	41.6	80 55.2	*+20.7*•	45.7	81 35.2	*+25.4*•	50.6	83
84	76 06.8	*–1.0*•	23.8	77 01.3	*+0.7*•	25.6	77 54.9	*+2.8*•	27.6	78 47.6	*+5.0*•	29.9	79 38.9	*+7.7*•	32.6	80 28.5	*+10.8*•	35.8	81 15.9	*+14.6*•	39.7	82 00.6	*+19.0*•	44.2	84
85	76 05.8	*–5.2*•	19.7	77 02.0	*–3.8*•	21.1	77 57.7	*–2.2*•	22.8	78 52.6	*–0.3*•	24.8	79 46.6	*+1.9*•	27.1	80 39.3	*+4.6*•	29.8	81 30.5	*+7.8*•	33.2	82 19.6	*+11.7*•	37.2	85
86	76 00.6	*–9.4*•	15.5	76 58.2	*–8.2*•	16.7	77 55.5	*–7.0*•	18.0	78 52.3	*–5.6*•	19.6	79 48.5	*–3.8*•	21.4	80 43.9	*–1.8*•	23.7	81 38.3	*+0.8*•	26.4	82 31.3	*+3.9*•	29.8	86
87	75 51.2	*–13.3*•	11.5	76 50.0	*–12.6*•	12.3	77 48.5	*–11.8*•	13.3	78 46.7	*–10.7*•	14.4	79 44.7	*–9.6*•	15.8	80 42.1	*–8.1*•	17.5	81 39.1	*–6.4*•	19.5	82 35.2	*–4.2*•	22.1	87
88	75 37.9	*–17.1*•	7.5	76 37.4	*–16.8*•	8.0	77 36.7	*–16.2*•	8.7	78 36.0	*–15.7*•	9.4	79 35.1	*–15.0*•	10.3	80 34.0	*–14.2*•	11.4	81 32.7	*–13.2*•	12.7	82 31.0	*–11.9*•	14.4	88
89	75 20.8	*–20.8*•	3.7	76 20.6	*–20.6*•	3.9	77 20.5	*–20.5*•	4.2	78 20.3	*–20.3*•	4.6	79 20.1	*–20.1*•	5.0	80 19.8	*–19.8*•	5.5	81 19.5	*–19.5*•	6.2	82 19.1	*–19.1*•	7.0	89
90	75 00.0	*–24.1*•	0.0	76 00.0	*–24.2*•	0.0	77 00.0	*–24.4*•	0.0	78 00.0	*–24.5*•	0.0	79 00.0	*–24.7*•	0.0	80 00.0	*–24.9*•	0.0	81 00.0	*–25.2*•	0.0	82 00.0	*–25.5*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 68°, 292°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 33.8	–58.2	111.3	5 12.0	–58.5	111.4	4 50.0	–58.6	111.5	4 28.0	–58.8	111.6	4 05.9	–59.0	111.6	3 43.8	–59.2	111.7	3 21.6	–59.4	111.8	2 59.3	–59.5	111.8	0
1	4 35.6	–58.2	111.6	4 13.5	–58.4	111.6	3 51.4	–58.7	111.7	3 29.2	–58.9	111.8	3 06.9	–59.1	111.8	2 44.6	–59.2	111.9	2 22.2	–59.4	111.9	1 59.8	–59.5	111.9	1
2	3 37.4	–58.3	111.8	3 15.1	–58.5	111.9	2 52.7	–58.7	111.9	2 30.3	–58.9	112.0	2 07.8	–59.0	112.0	1 45.4	–59.3	112.0	1 22.8	–59.3	112.0	1 00.3	–59.5	112.1	2
3	2 39.1	–58.2	112.0	2 16.6	–58.5	112.1	1 54.0	–58.7	112.1	1 31.4	–58.9	112.1	1 08.8	–59.1	112.2	0 46.1	–59.2	112.2	0 23.5	–59.4	112.2	0 00.8	–59.5	112.2	3
4	1 40.9	–58.3	112.3	1 18.1	–58.5	112.3	0 55.3	–58.6	112.3	0 32.5	–58.8	112.3	0 09.7	–59.0	112.3	0 13.1	+59.2	67.7	0 35.9	+59.4	67.7	0 58.7	+59.5	67.7	4
5	0 42.6	–58.2	112.5	0 19.6	–58.4	112.5	0 03.3	+58.7	67.5	0 26.3	+58.9	67.5	0 49.3	+59.1	67.5	1 12.3	+59.2	67.5	1 35.3	+59.3	67.5	1 58.2	+59.5	67.5	5
6	0 15.6	+58.3	67.2	0 38.8	+58.5	67.2	1 02.0	+58.7	67.3	1 25.2	+58.9	67.3	1 48.4	+59.0	67.3	2 11.5	+59.2	67.3	2 34.6	+59.4	67.4	2 57.7	+59.5	67.4	6
7	1 13.9	+58.2	67.0	1 37.3	+58.5	67.0	2 00.7	+58.7	67.0	2 24.1	+58.9	67.1	2 47.4	+59.1	67.1	3 10.7	+59.2	67.2	3 34.0	+59.3	67.2	3 57.2	+59.5	67.3	7
8	2 12.1	+58.3	66.8	2 35.8	+58.4	66.8	2 59.4	+58.7	66.8	3 23.0	+58.8	66.9	3 46.5	+59.0	66.9	4 09.9	+59.3	67.0	4 33.3	+59.4	67.1	4 56.7	+59.5	67.2	8
9	3 10.4	+58.2	66.5	3 34.2	+58.5	66.6	3 58.1	+58.6	66.6	4 21.8	+58.9	66.7	4 45.5	+59.1	66.8	5 09.2	+59.2	66.9	5 32.7	+59.4	66.9	5 56.2	+59.5	67.0	9
10	4 08.6	+58.2	66.3	4 32.7	+58.5	66.3	4 56.7	+58.7	66.4	5 20.7	+58.9	66.5	5 44.6	+59.0	66.6	6 08.4	+59.2	66.7	6 32.1	+59.3	66.8	6 55.7	+59.4	66.9	10
11	5 06.8	+58.3	66.0	5 31.2	+58.4	66.1	5 55.4	+58.7	66.2	6 19.6	+58.8	66.3	6 43.6	+59.1	66.4	7 07.6	+59.2	66.5	7 31.4	+59.4	66.6	7 55.1	+59.5	66.8	11
12	6 05.1	+58.2	65.8	6 29.6	+58.5	65.9	6 54.1	+58.6	66.0	7 18.4	+58.9	66.1	7 42.7	+59.0	66.2	8 06.8	+59.2	66.4	8 30.8	+59.3	66.5	8 54.6	+59.5	66.6	12
13	7 03.3	+58.2	65.5	7 28.1	+58.4	65.7	7 52.7	+58.7	65.8	8 17.3	+58.8	65.9	8 41.7	+59.0	66.1	9 06.0	+59.2	66.2	9 30.1	+59.4	66.3	9 54.1	+59.5	66.5	13
14	8 01.5	+58.2	65.3	8 26.5	+58.4	65.4	8 51.4	+58.6	65.6	9 16.1	+58.9	65.7	9 40.7	+59.0	65.9	10 05.2	+59.2	66.0	10 29.5	+59.3	66.2	10 53.6	+59.5	66.4	14
15	8 59.7	+58.2	65.1	9 24.9	+58.5	65.2	9 50.0	+58.7	65.4	10 15.0	+58.8	65.5	10 39.7	+59.1	65.7	11 04.4	+59.1	65.9	11 28.8	+59.3	66.0	11 53.1	+59.5	66.2	15
16	9 57.9	+58.2	64.8	10 23.4	+58.4	65.0	10 48.7	+58.6	65.1	11 13.8	+58.8	65.3	11 38.8	+59.0	65.5	12 03.5	+59.2	65.7	12 28.1	+59.4	65.9	12 52.6	+59.4	66.1	16
17	10 56.1	+58.2	64.6	11 21.8	+58.4	64.7	11 47.3	+58.6	64.9	12 12.6	+58.8	65.1	12 37.8	+59.0	65.3	13 02.7	+59.2	65.5	13 27.5	+59.3	65.7	13 52.0	+59.5	66.0	17
18	11 54.3	+58.1	64.3	12 20.2	+58.4	64.5	12 45.9	+58.6	64.7	13 11.4	+58.8	64.9	13 36.8	+59.0	65.1	14 01.9	+59.2	65.4	14 26.8	+59.3	65.6	14 51.5	+59.4	65.8	18
19	12 52.4	+58.2	64.1	13 18.6	+58.3	64.3	13 44.5	+58.6	64.5	14 10.2	+58.8	64.7	14 35.8	+58.9	64.9	15 01.1	+59.1	65.2	15 26.1	+59.3	65.4	15 50.9	+59.5	65.7	19
20	13 50.6	+58.1	63.8	14 16.9	+58.4	64.0	14 43.1	+58.6	64.3	15 09.0	+58.8	64.5	15 34.7	+59.0	64.8	16 00.2	+59.2	65.0	16 25.4	+59.3	65.3	16 50.4	+59.5	65.5	20
21	14 48.7	+58.1	63.6	15 15.3	+58.4	63.8	15 41.7	+58.6	64.0	16 07.8	+58.8	64.3	16 33.7	+59.0	64.6	16 59.4	+59.1	64.8	17 24.7	+59.3	65.1	17 49.9	+59.4	65.4	21
22	15 46.8	+58.1	63.3	16 13.7	+58.3	63.6	16 40.3	+58.5	63.8	17 06.6	+58.8	64.1	17 32.7	+58.9	64.4	17 58.5	+59.1	64.7	18 24.0	+59.3	65.0	18 49.3	+59.4	65.3	22
23	16 44.9	+58.1	63.0	17 12.0	+58.3	63.3	17 38.8	+58.5	63.6	18 05.4	+58.7	63.9	18 31.6	+59.0	64.2	18 57.6	+59.1	64.5	19 23.3	+59.3	64.8	19 48.7	+59.5	65.1	23
24	17 43.0	+58.0	62.8	18 10.3	+58.3	63.1	18 37.3	+58.6	63.4	19 04.1	+58.7	63.7	19 30.6	+58.9	64.0	19 56.7	+59.2	64.3	20 22.6	+59.3	64.6	20 48.2	+59.4	65.0	24
25	18 41.0	+58.1	62.5	19 08.6	+58.3	62.8	19 35.9	+58.5	63.1	20 02.8	+58.8	63.4	20 29.5	+58.9	63.8	20 55.9	+59.1	64.1	21 21.9	+59.2	64.5	21 47.6	+59.4	64.8	25
26	19 39.1	+58.0	62.2	20 06.9	+58.2	62.6	20 34.4	+58.4	62.9	21 01.6	+58.6	63.2	21 28.4	+58.9	63.6	21 55.0	+59.0	63.9	22 21.1	+59.3	64.3	22 47.0	+59.4	64.7	26
27	20 37.1	+58.0	62.0	21 05.1	+58.2	62.3	21 32.8	+58.5	62.6	22 00.2	+58.7	63.0	22 27.3	+58.9	63.4	22 54.0	+59.1	63.7	23 20.4	+59.2	64.1	23 46.4	+59.4	64.5	27
28	21 35.1	+57.9	61.7	22 03.3	+58.2	62.0	22 31.3	+58.4	62.4	22 58.9	+58.7	62.8	23 26.2	+58.9	63.2	23 53.1	+59.1	63.6	24 19.6	+59.3	64.0	24 45.8	+59.4	64.4	28
29	22 33.0	+57.9	61.4	23 01.5	+58.2	61.8	23 29.7	+58.5	62.2	23 57.6	+58.6	62.5	24 25.1	+58.8	62.9	24 52.2	+59.0	63.4	25 18.9	+59.2	63.8	25 45.2	+59.4	64.2	29
30	23 30.9	+57.9	61.1	23 59.7	+58.2	61.5	24 28.2	+58.4	61.9	24 56.2	+58.6	62.3	25 23.9	+58.8	62.7	25 51.2	+59.0	63.2	26 18.1	+59.2	63.6	26 44.6	+59.3	64.0	30
31	24 28.8	+57.9	60.8	24 57.9	+58.1	61.2	25 26.6	+58.3	61.7	25 54.8	+58.6	62.1	26 22.7	+58.8	62.5	26 50.2	+59.0	63.0	27 17.3	+59.2	63.4	27 43.9	+59.4	63.9	31
32	25 26.7	+57.8	60.5	25 56.0	+58.1	61.0	26 24.9	+58.4	61.4	26 53.4	+58.6	61.8	27 21.5	+58.8	62.3	27 49.2	+59.0	62.8	28 16.5	+59.2	63.2	28 43.3	+59.3	63.7	32
33	26 24.5	+57.8	60.3	26 54.1	+58.0	60.7	27 23.3	+58.3	61.1	27 52.0	+58.5	61.6	28 20.3	+58.8	62.1	28 48.2	+59.0	62.5	29 15.7	+59.1	63.0	29 42.6	+59.3	63.5	33
34	27 22.3	+57.7	59.9	27 52.1	+58.1	60.4	28 21.6	+58.2	60.9	28 50.5	+58.6	61.3	29 19.1	+58.7	61.8	29 47.2	+58.9	62.3	30 14.8	+59.1	62.8	30 41.9	+59.4	63.4	34
35	28 20.0	+57.7	59.6	28 50.2	+57.9	60.1	29 19.8	+58.3	60.6	29 49.1	+58.4	61.1	30 17.8	+58.8	61.6	30 46.1	+59.0	62.1	31 13.9	+59.2	62.7	31 41.3	+59.3	63.2	35
36	29 17.7	+57.7	59.3	29 48.1	+58.0	59.8	30 18.1	+58.2	60.3	30 47.5	+58.5	60.8	31 16.6	+58.6	61.4	31 45.1	+58.9	61.9	32 13.1	+59.1	62.5	32 40.6	+59.2	63.0	36
37	30 15.4	+57.6	59.0	30 46.1	+57.9	59.5	31 16.3	+58.1	60.0	31 46.0	+58.4	60.6	32 15.2	+58.7	61.1	32 44.0	+58.8	61.7	33 12.2	+59.1	62.2	33 39.8	+59.3	62.8	37
38	31 13.0	+57.6	58.7	31 44.0	+57.8	59.2	32 14.4	+58.2	59.7	32 44.4	+58.4	60.3	33 13.9	+58.6	60.9	33 42.8	+58.9	61.4	34 11.3	+59.0	62.0	34 39.1	+59.3	62.6	38
39	32 10.6	+57.5	58.4	32 41.8	+57.8	58.9	33 12.6	+58.1	59.5	33 42.8	+58.4	60.0	34 12.5	+58.6	60.6	34 41.7	+58.8	61.2	35 10.3	+59.0	61.8	35 38.4	+59.2	62.5	39
40	33 08.1	+57.5	58.0	33 39.6	+57.8	58.6	34 10.7	+58.0	59.2	34 41.2	+58.3	59.7	35 11.1	+58.6	60.3	35 40.5	+58.8	61.0	36 09.3	+59.1	61.6	36 37.6	+59.2	62.3	40
41	34 05.6	+57.3	57.7	34 37.4	+57.7	58.2	35 08.7	+58.0	58.8	35 39.5	+58.2	59.5	36 09.7	+58.5	60.1	36 39.3	+58.8	60.7	37 08.4	+58.9	61.4	37 36.8	+59.2	62.1	41
42	35 02.9	+57.4	57.3	35 35.1	+57.6	57.9	36 06.7	+57.9	58.5	36 37.7	+58.2	59.2	37 08.2	+58.5	59.8	37 38.1	+58.7	60.5	38 07.3	+59.0	61.1	38 36.0	+59.1	61.8	42
43	36 00.3	+57.2	57.0	36 32.7	+57.6	57.6	37 04.6	+57.9	58.2	37 35.9	+58.2	58.9	38 06.7	+58.4	59.5	38 36.8	+58.7	60.2	39 06.3	+58.9	60.9	39 35.1	+59.2	61.6	43
44	36 57.5	+57.2	56.6	37 30.3	+57.5	57.2	38 02.5	+57.8	57.9	38 34.1	+58.1	58.5	39 05.1	+58.4	59.2	39 35.5	+58.7	59.9	40 05.2	+58.9	60.7	40 34.3	+59.1	61.4	44
45	37 54.7	+57.2	56.2	38 27.8	+57.5	56.9	39 00.3	+57.8	57.5	39 32.2	+58.1	58.2	40 03.5	+58.4	58.9	40 34.2	+58.6	59.7	41 04.1	+58.9	60.4	41 33.4	+59.1	61.2	45
46	38 51.9	+57.0	55.8	39 25.3	+57.4	56.5	39 58.1	+57.7	57.2	40 30.3	+58.0	57.9	41 01.9	+58.3	58.6	41 32.8	+58.5	59.4	42 03.0	+58.8	60.2	42 32.5	+59.0	60.9	46
47	39 48.9	+56.9	55.4	40 22.7	+57.3	56.1	40 55.8	+57.6	56.8	41 28.3	+58.0	57.6	42 00.2	+58.2	58.3	42 31.3	+58.6	59.1	43 01.8	+58.8	59.9	43 31.5	+59.1	60.7	47
48	40 45.8	+56.9	55.0	41 20.0	+57.2	55.7	41 53.4	+57.6	56.5	42 26.3	+57.9	57.2	42 58.4	+58.2	58.0	43 29.9	+58.5	58.8	44 00.6	+58.7	59.6	44 30.6	+59.0	60.5	48
49	41 42.7	+56.8	54.6	42 17.2	+57.1	55.3	42 51.0	+57.5	56.1	43 24.2	+57.8	56.8	43 56.6	+58.1	57.7	44 28.4	+58.4	58.5	44 59.3	+58.7	59.3	45 29.6	+58.9	60.2	49
50	42 39.5	+56.6	54.1	43 14.3	+57.0	54.9	43 48.5	+57.4	55.7	44 22.0	+57.7	56.5	44 54.7	+58.1	57.3	45 26.8	+58.3	58.2	45 58.0	+58.7	59.0	46 28.5	+58.9	59.9	50
51	43 36.1	+56.6	53.7	44 11.3	+57.0	54.5	44 45.9	+57.3	55.3	45 19.7	+57.7	56.1	45 52.8	+58.0	56.9	46 25.1	+58.4	57.8	46 56.7	+58.6	58.7	47 27.4	+58.9	59.7	51
52	44 32.7	+56.4	53.2	45 08.3	+56.8	54.0	45 43.2	+57.2	54.8	46 17.4	+57.5	55.7	46 50.8	+57.9	56.6	47 23.5	+58.2	57.5	47 55.3	+58.6	58.4	48 26.3	+58.8	59.4	52
53	45 29.1	+56.3	52.7	46 05.1	+56.7	53.6	46 40.4	+57.1	54.4	47 14.9	+57.5	55.3	47 48.7	+57.9	56.2	48 21.7	+58.2	57.1	48 53.9	+58.4	58.1	49 25.1	+58.8	59.1	53
54	46 25.4	+56.2	52.2	47 01.8	+56.6	53.1	47 37.5	+57.0	54.0	48 12.4	+57.4	54.9	48 46.6	+57.7	55.8	49 19.9	+58.1	56.7	49 52.3	+58.5	57.7	50 23.9	+58.8	58.8	54
55	47 21.6	+56.1	51.7	47 58.4	+56.5	52.6	48 34.5	+56.9	53.5	49 09.8	+57.3	54.4	49 44.3	+57.7	55.4	50 18.0	+58.0	56.4	50 50.8	+58.3	57.4	51 22.7	+58.6	58.4	55
56	48 17.7	+55.8	51.2	48 54.9	+56.3	52.1	49 31.4	+56.7	53.0	50 07.1	+57.2	54.0	50 42.0	+57.5	54.9	51 16.0	+57.9	56.0	51 49.1	+58.3	57.0	52 21.3	+58.6	58.1	56
57	49 13.5	+55.8	50.6	49 51.2	+56.2	51.6	50 28.1	+56.7	52.5	51 04.3	+57.0	53.5	51 39.5	+57.5	54.5	52 13.9	+57.9	55.5	52 47.4	+58.2	56.6	53 19.9	+58.6	57.7	57
58	50 09.3	+55.5	50.1	50 47.4	+56.0	51.0	51 24.8	+56.4	52.0	52 01.3	+56.9	53.0	52 37.0	+57.3	54.0	53 11.8	+57.7	55.1	53 45.6	+58.2	56.2	54 18.5	+58.5	57.4	58
59	51 04.8	+55.4	49.5	51 43.4	+55.8	50.4	52 21.2	+56.3	51.4	52 58.2	+56.8	52.5	53 34.3	+57.2	53.5	54 09.5	+57.7	54.6	54 43.8	+58.0	55.8	55 17.0	+58.4	57.0	59
60	52 00.2	+55.1	48.9	52 39.2	+55.7	49.8	53 17.5	+56.2	50.9	53 55.0	+56.6	51.9	54 31.5	+57.1	53.0	55 07.2	+57.5	54.2	55 41.8	+57.9	55.3	56 15.4	+58.3	56.6	60
61	52 55.3	+54.9	48.2	53 34.9	+55.4	49.2	54 13.7	+55.9	50.3	54 51.6	+56.4	51.3	55 28.6	+56.9	52.5	56 04.7	+57.3	53.7	56 39.7	+57.8	54.9	57 13.7	+58.2	56.1	61
62	53 50.2	+54.7	47.5	54 30.3	+55.3	48.6	55 09.6	+55.8	49.6	55 48.0	+56.3	50.8	56 25.5	+56.8	51.9	57 02.0	+57.3	53.1	57 37.5	+57.7	54.4	58 11.9	+58.1	55.7	62
63	54 44.9	+54.5	46.8	55 25.6	+55.0	47.9	56 05.4	+55.5	49.0	56 44.3	+56.1	50.1	57 22.3	+56.6	51.3	57 59.3	+57.1	52.6	58 35.2	+57.6	53.9	59 10.0	+58.0	55.2	63
64	55 39.4	+54.1	46.1	56 20.6	+54.7	47.2	57 00.9	+55.3	48.3	57 40.4	+55.8	49.5	58 18.9	+56.4	50.7	58 56.4	+56.9	52.0	59 32.8	+57.4	53.3	60 08.0	+57.9	54.7	64
65	56 33.5	+53.9	45.3	57 15.3	+54.5	46.4	57 56.2	+55.1	47.6	58 36.2	+55.7	48.8	59 15.3	+56.2	50.0	59 53.3	+56.7	51.4	60 30.2	+57.2	52.7	61 05.9	+57.8	54.2	65
66	57 27.4	+53.5	44.5	58 09.8	+54.1	45.6	58 51.3	+54.7	46.8	59 31.9	+55.3	48.0	60 11.5	+55.9	49.3	60 50.0	+56.5	50.7	61 27.4	+57.1	52.1	62 03.7	+57.6	53.6	66
67	58 20.9	+53.2	43.7	59 03.9	+53.8	44.8	59 46.0	+54.5	46.0	60 27.2	+55.1	47.3	61 07.4	+55.7	48.6	61 46.5	+56.3	50.0	62 24.5	+56.9	51.5	63 01.3	+57.4	53.0	67
68	59 14.1	+52.8	42.8	59 57.7	+53.5	43.9	60 40.5	+54.1	45.2	61 22.3	+54.8	46.5	62 03.1	+55.4	47.8	62 42.8	+56.1	49.3	63 21.4	+56.7	50.8	63 58.7	+57.3	52.3	68
69	60 06.9	+52.3	41.8	60 51.2	+53.0	43.0	61 34.6	+53.7	44.3	62 17.1	+54.4	45.6	62 58.5	+55.1	47.0	63 38.9	+55.8	48.5	64 18.1	+56.4	50.0	64 56.0	+57.0	51.7	69
70	60 59.2	+51.9	40.8	61 44.2	+52.6	42.0	62 28.3	+53.4	43.3	63 11.5	+54.0	44.7	63 53.6	+54.8	46.1	64 34.7	+55.4	47.6	65 14.5	+56.1	49.2	65 53.0	+56.8	50.9	70
71	61 51.1	+51.4	39.8	62 36.8	+52.2	41.0	63 21.7	+52.8	42.3	64 05.5	+53.7	43.7	64 48.4	+54.4	45.2	65 30.1	+55.1	46.7	66 10.6	+55.9	48.4	66 49.8	+56.6	50.1	71
72	62 42.5	+50.9	38.7	63 29.0	+51.6	39.9	64 14.5	+52.4	41.2	64 59.2	+53.1	42.7	65 42.8	+53.9	44.2	66 25.2	+54.8	45.7	67 06.5	+55.5	47.4	67 46.4	+56.2	49.2	72
73	63 33.4	+50.2	37.5	64 20.6	+51.0	38.8	65 06.9	+51.8	40.1	65 52.3	+52.7	41.5	66 36.7	+53.5	43.1	67 20.0	+54.2	44.7	68 02.0	+55.1	46.4	68 42.6	+55.9	48.3	73
74	64 23.6	+49.6	36.3	65 11.6	+50.4	37.5	65 58.7	+51.3	38.9	66 45.0	+52.0	40.3	67 30.2	+52.9	41.9	68 14.2	+53.8	43.6	68 57.1	+54.6	45.4	69 38.5	+55.5	47.3	74
75	65 13.2	+48.8	34.9	66 02.0	+49.6	36.2	66 50.0	+50.5	37.6	67 37.0	+51.4	39.1	68 23.1	+52.3	40.7	69 08.0	+53.3	42.4	69 51.7	+54.2	44.2	70 34.0	+55.1	46.2	75
76	66 02.0	+48.0	33.5	66 51.6	+48.9	34.8	67 40.5	+49.7	36.2	68 28.4	+50.7	37.7	69 15.4	+51.6	39.3	70 01.3	+52.5	41.0	70 45.9	+53.5	42.9	71 29.1	+54.5	44.9	76
77	66 50.0	+47.0	32.0	67 40.5	+47.9	33.3	68 30.2	+48.9	34.7	69 19.1	+49.8	36.2	70 07.0	+50.9	37.8	70 53.8	+51.9	39.6	71 39.4	+52.9	41.5	72 23.6	+54.0	43.6	77
78	67 37.0	+46.1	30.4	68 28.4	+47.0	31.7	69 19.1	+47.9	33.1	70 08.9	+49.0	34.6	70 57.9	+49.9	36.2	71 45.7	+51.0	38.0	72 32.3	+52.2	40.0	73 17.6	+53.2	42.1	78
79	68 23.1	+44.9	28.7	69 15.4	+45.9	30.0	70 07.0	+46.8	31.3	70 57.9	+47.8	32.8	71 47.8	+48.9	34.5	72 36.7	+50.0	36.3	73 24.5	+51.2	38.3	74 10.8	+52.5	40.5	79
80	69 08.0	+43.7	26.9	70 01.3	+44.6	28.1	70 53.8	+45.6	29.5	71 45.7	+46.6	31.0	72 36.7	+47.8	32.6	73 26.7	+49.0	34.4	74 15.7	+50.1	36.4	75 03.3	+51.4	38.6	80
81	69 51.7	+42.3	24.9	70 45.9	+43.2	26.1	71 39.4	+44.2	27.4	72 32.3	+45.3	28.9	73 24.5	+46.3	30.5	74 15.7	+47.6	32.3	75 05.8	+48.9	34.3	75 54.7	+50.2	36.6	81
82	70 34.0	+40.8	22.8	71 29.1	+41.7	24.0	72 23.6	+42.7	25.3	73 17.6	+43.7	26.7	74 10.8	+44.9	28.3	75 03.3	+46.0	30.0	75 54.7	+47.4	32.0	76 44.9	+48.9	34.3	82
83	71 14.8	+39.0	20.6	72 10.8	+39.9	21.7	73 06.3	+40.8	22.9	74 01.3	+41.9	24.2	74 55.7	+43.0•	25.8	75 49.3	+44.3	27.5	76 42.1	+45.6	29.4	77 33.8	+47.1	31.6	83
84	71 53.8	+37.1	18.2	72 50.7	+37.9•	19.2	73 47.1	+38.9•	20.3	74 43.2	+39.8•	21.6	75 38.7	+40.9•	23.0	76 33.6	+42.2•	24.6	77 27.7	+43.5•	26.5	78 20.9	+45.0•	28.7	84
85	72 30.9	+35.1•	15.6	73 28.6	+35.8•	16.5	74 26.0	+36.6•	17.5	75 23.0	+37.5•	18.7	76 19.6	+38.6•	20.0	77 15.8	+39.6•	21.5	78 11.2	+41.1•	23.3	79 05.9	+42.6•	25.3	85
86	73 06.0	+32.6•	12.9	74 04.4	+33.3•	13.6	75 02.6	+34.0•	14.5	76 00.5	+34.8•	15.5	76 58.2	+35.7•	16.7	77 55.4	+36.8•	18.0	78 52.3	+37.9•	19.6	79 48.5	+39.4•	21.4	86
87	73 38.6	+30.1•	9.9	74 37.7	+30.5•	10.5	75 36.6	+31.1•	11.3	76 35.3	+31.8•	12.1	77 33.9	+32.5•	13.0	78 32.2	+33.4•	14.1	79 30.2	+34.4•	15.4	80 27.9	+35.6•	17.0	87
88	74 08.7	+27.2•	6.8	75 08.2	+27.6•	7.2	76 07.7	+27.9•	7.8	77 07.1	+28.4•	8.3	78 06.4	+28.9•	9.0	79 05.6	+29.5•	9.8	80 04.6	+30.2•	10.8	81 03.5	+31.0•	12.0	88
89	74 35.9	+24.1•	3.5	75 35.8	+24.2•	3.7	76 35.6	+24.4•	4.0	77 35.5	+24.5•	4.3	78 35.3	+24.7•	4.7	79 35.1	+24.9•	5.1	80 34.8	+25.2•	5.7	81 34.5	+25.5•	6.3	89
90	75 00.0	+20.8•	0.0	76 00.0	+20.6•	0.0	77 00.0	+20.5•	0.0	78 00.0	+20.3•	0.0	79 00.0	+20.1•	0.0	80 00.0	+19.8•	0.0	81 00.0	+19.5•	0.0	82 00.0	+19.1•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 112°, 248°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 19.3	+58.2	110.3	4 58.4	+58.5	110.4	4 37.4	+58.7	110.5	4 16.4	+58.8	110.6	3 55.3	+59.0	110.6	3 34.1	+59.2	110.7	3 12.8	+59.4	110.8	2 51.5	+59.5	110.8	0
1	6 17.5	+58.2	110.1	5 56.9	+58.4	110.2	5 36.1	+58.6	110.3	5 15.2	+58.9	110.4	4 54.3	+59.0	110.5	4 33.3	+59.2	110.5	4 12.2	+59.3	110.6	3 51.0	+59.5	110.7	1
2	7 15.7	+58.2	109.9	6 55.3	+58.4	110.0	6 34.7	+58.7	110.1	6 14.1	+58.8	110.2	5 53.3	+59.1	110.3	5 32.5	+59.2	110.4	5 11.5	+59.4	110.5	4 50.5	+59.5	110.6	2
3	8 13.9	+58.2	109.6	7 53.7	+58.4	109.7	7 33.4	+58.6	109.9	7 12.9	+58.9	110.0	6 52.4	+59.0	110.1	6 31.7	+59.2	110.2	6 10.9	+59.3	110.3	5 50.0	+59.5	110.4	3
4	9 12.1	+58.2	109.4	8 52.1	+58.4	109.5	8 32.0	+58.6	109.7	8 11.8	+58.8	109.8	7 51.4	+59.0	109.9	7 30.9	+59.2	110.1	7 10.2	+59.4	110.2	6 49.5	+59.5	110.3	4
5	10 10.3	+58.1	109.1	9 50.5	+58.4	109.3	9 30.6	+58.7	109.4	9 10.6	+58.8	109.6	8 50.4	+59.0	109.7	8 30.1	+59.1	109.9	8 09.6	+59.3	110.0	7 49.0	+59.4	110.2	5
6	11 08.4	+58.2	108.9	10 48.9	+58.4	109.0	10 29.3	+58.6	109.2	10 09.4	+58.8	109.4	9 49.4	+59.0	109.6	9 29.2	+59.2	109.7	9 08.9	+59.4	109.9	8 48.4	+59.5	110.0	6
7	12 06.6	+58.1	108.6	11 47.3	+58.4	108.8	11 27.9	+58.6	109.0	11 08.2	+58.8	109.2	10 48.4	+59.0	109.4	10 28.4	+59.2	109.6	10 08.3	+59.3	109.7	9 47.9	+59.5	109.9	7
8	13 04.7	+58.1	108.4	12 45.7	+58.3	108.6	12 26.5	+58.6	108.8	12 07.0	+58.8	109.0	11 47.4	+59.0	109.2	11 27.6	+59.2	109.4	11 07.6	+59.3	109.6	10 47.4	+59.5	109.8	8
9	14 02.8	+58.1	108.1	13 44.0	+58.4	108.3	13 25.1	+58.5	108.6	13 05.8	+58.8	108.8	12 46.4	+59.0	109.0	12 26.8	+59.1	109.2	12 06.9	+59.3	109.4	11 46.9	+59.4	109.6	9
10	15 00.9	+58.1	107.8	14 42.4	+58.3	108.1	14 23.6	+58.6	108.3	14 04.6	+58.8	108.6	13 45.4	+59.0	108.8	13 25.9	+59.2	109.0	13 06.2	+59.4	109.3	12 46.3	+59.5	109.5	10
11	15 59.0	+58.1	107.6	15 40.7	+58.3	107.9	15 22.2	+58.6	108.1	15 03.4	+58.8	108.4	14 44.4	+58.9	108.6	14 25.1	+59.1	108.9	14 05.6	+59.3	109.1	13 45.8	+59.5	109.3	11
12	16 57.1	+58.0	107.3	16 39.0	+58.3	107.6	16 20.8	+58.5	107.9	16 02.2	+58.7	108.2	15 43.3	+59.0	108.4	15 24.2	+59.2	108.7	15 04.9	+59.3	109.0	14 45.3	+59.4	109.2	12
13	17 55.1	+58.0	107.1	17 37.3	+58.3	107.4	17 19.3	+58.5	107.7	17 00.9	+58.8	108.0	16 42.3	+59.0	108.2	16 23.4	+59.1	108.5	16 04.2	+59.3	108.8	15 44.7	+59.5	109.1	13
14	18 53.1	+58.0	106.8	18 35.6	+58.3	107.1	18 17.8	+58.5	107.4	17 59.7	+58.7	107.7	17 41.3	+58.9	108.0	17 22.5	+59.1	108.3	17 03.5	+59.3	108.6	16 44.2	+59.4	108.9	14
15	19 51.1	+58.0	106.5	19 33.9	+58.2	106.9	19 16.3	+58.5	107.2	18 58.4	+58.7	107.5	18 40.2	+58.9	107.9	18 21.6	+59.1	108.2	18 02.8	+59.3	108.5	17 43.6	+59.4	108.8	15
16	20 49.1	+57.9	106.2	20 32.1	+58.2	106.6	20 14.8	+58.5	107.0	19 57.1	+58.7	107.3	19 39.1	+58.9	107.7	19 20.7	+59.2	108.0	19 02.1	+59.2	108.3	18 43.0	+59.5	108.6	16
17	21 47.0	+58.0	106.0	21 30.3	+58.2	106.3	21 13.3	+58.4	106.7	20 55.8	+58.7	107.1	20 38.0	+58.9	107.4	20 19.9	+59.0	107.8	20 01.3	+59.3	108.2	19 42.5	+59.4	108.5	17
18	22 45.0	+57.8	105.7	22 28.5	+58.2	106.1	22 11.7	+58.4	106.5	21 54.5	+58.7	106.9	21 36.9	+58.9	107.2	21 18.9	+59.1	107.6	21 00.6	+59.3	108.0	20 41.9	+59.4	108.4	18
19	23 42.8	+57.9	105.4	23 26.7	+58.1	105.8	23 10.1	+58.5	106.2	22 53.2	+58.6	106.6	22 35.8	+58.9	107.0	22 18.0	+59.1	107.4	21 59.9	+59.2	107.8	21 41.3	+59.4	108.2	19
20	24 40.7	+57.8	105.1	24 24.8	+58.2	105.5	24 08.6	+58.3	106.0	23 51.8	+58.6	106.4	23 34.7	+58.8	106.8	23 17.1	+59.0	107.2	22 59.1	+59.2	107.6	22 40.7	+59.4	108.0	20
21	25 38.5	+57.8	104.8	25 23.0	+58.0	105.3	25 06.9	+58.4	105.7	24 50.4	+58.6	106.2	24 33.5	+58.8	106.6	24 16.1	+59.1	107.0	23 58.3	+59.3	107.5	23 40.1	+59.4	107.9	21
22	26 36.3	+57.8	104.5	26 21.0	+58.1	105.0	26 05.3	+58.3	105.5	25 49.0	+58.6	105.9	25 32.3	+58.8	106.4	25 15.2	+59.0	106.9	24 57.6	+59.2	107.3	24 39.5	+59.4	107.7	22
23	27 34.1	+57.7	104.2	27 19.1	+58.0	104.7	27 03.6	+58.3	105.2	26 47.6	+58.6	105.7	26 31.1	+58.8	106.2	26 14.2	+59.0	106.7	25 56.8	+59.2	107.1	25 38.9	+59.3	107.6	23
24	28 31.8	+57.6	103.9	28 17.1	+58.0	104.4	28 01.9	+58.3	104.9	27 46.2	+58.5	105.4	27 29.9	+58.8	106.0	27 13.2	+59.0	106.4	26 56.0	+59.1	106.9	26 38.2	+59.4	107.4	24
25	29 29.4	+57.7	103.6	29 15.1	+57.9	104.1	29 00.2	+58.2	104.7	28 44.7	+58.5	105.2	28 28.7	+58.7	105.7	28 12.2	+58.9	106.2	27 55.1	+59.2	106.8	27 37.6	+59.3	107.3	25
26	30 27.1	+57.5	103.3	30 13.0	+57.9	103.8	29 58.4	+58.2	104.4	29 43.2	+58.5	104.9	29 27.4	+58.8	105.5	29 11.1	+59.0	106.0	28 54.3	+59.2	106.6	28 36.9	+59.4	107.1	26
27	31 24.6	+57.5	102.9	31 10.9	+57.8	103.5	30 56.6	+58.1	104.1	30 41.7	+58.4	104.7	30 26.2	+58.7	105.3	30 10.1	+58.9	105.8	29 53.5	+59.1	106.4	29 36.3	+59.3	106.9	27
28	32 22.1	+57.5	102.6	32 08.7	+57.8	103.2	31 54.7	+58.1	103.8	31 40.1	+58.4	104.4	31 24.9	+58.6	105.0	31 09.0	+58.9	105.6	30 52.6	+59.1	106.2	30 35.6	+59.3	106.7	28
29	33 19.6	+57.4	102.2	33 06.5	+57.8	102.9	32 52.8	+58.1	103.5	32 38.5	+58.4	104.1	32 23.5	+58.7	104.8	32 07.9	+58.9	105.4	31 51.7	+59.1	106.0	31 34.9	+59.3	106.6	29
30	34 17.0	+57.4	101.9	34 04.3	+57.7	102.6	33 50.9	+58.0	103.2	33 36.9	+58.3	103.9	33 22.2	+58.6	104.5	33 06.8	+58.9	105.1	32 50.8	+59.1	105.8	32 34.2	+59.3	106.4	30
31	35 14.4	+57.2	101.5	35 02.0	+57.6	102.2	34 48.9	+58.0	102.9	34 35.2	+58.3	103.6	34 20.8	+58.5	104.3	34 05.7	+58.8	104.9	33 49.9	+59.0	105.6	33 33.5	+59.2	106.2	31
32	36 11.6	+57.3	101.2	35 59.6	+57.6	101.9	35 46.9	+57.9	102.6	35 33.5	+58.2	103.3	35 19.3	+58.6	104.0	35 04.5	+58.8	104.7	34 48.9	+59.1	105.3	34 32.7	+59.3	106.0	32
33	37 08.9	+57.1	100.8	36 57.2	+57.6	101.5	36 44.8	+57.9	102.3	36 31.7	+58.2	103.0	36 17.9	+58.5	103.7	36 03.3	+58.7	104.4	35 48.0	+59.0	105.1	35 32.0	+59.2	105.8	33
34	38 06.0	+57.1	100.4	37 54.8	+57.4	101.2	37 42.7	+57.8	101.9	37 29.9	+58.2	102.7	37 16.4	+58.4	103.4	37 02.0	+58.8	104.2	36 47.0	+59.0	104.9	36 31.2	+59.2	105.6	34
35	39 03.1	+56.9	100.0	38 52.2	+57.4	100.8	38 40.5	+57.8	101.6	38 28.1	+58.1	102.4	38 14.8	+58.4	103.2	38 00.8	+58.7	103.9	37 46.0	+58.9	104.7	37 30.4	+59.2	105.4	35
36	40 00.0	+56.9	99.6	39 49.6	+57.3	100.4	39 38.3	+57.7	101.3	39 26.2	+58.0	102.1	39 13.2	+58.4	102.9	38 59.5	+58.6	103.7	38 44.9	+58.9	104.4	38 29.6	+59.1	105.2	36
37	40 56.9	+56.8	99.2	40 46.9	+57.2	100.0	40 36.0	+57.6	100.9	40 24.2	+58.0	101.7	40 11.6	+58.3	102.6	39 58.1	+58.7	103.4	39 43.8	+58.9	104.2	39 28.7	+59.1	105.0	37
38	41 53.7	+56.7	98.8	41 44.1	+57.2	99.6	41 33.6	+57.6	100.5	41 22.2	+57.9	101.4	41 09.9	+58.3	102.3	40 56.8	+58.5	103.1	40 42.7	+58.9	103.9	40 27.8	+59.2	104.8	38
39	42 50.4	+56.6	98.3	42 41.3	+57.0	99.2	42 31.2	+57.4	100.1	42 20.1	+57.9	101.0	42 08.2	+58.2	101.9	41 55.3	+58.6	102.8	41 41.6	+58.8	103.7	41 27.0	+59.0	104.5	39
40	43 47.0	+56.5	97.9	43 38.3	+57.0	98.8	43 28.6	+57.4	99.8	43 18.0	+57.8	100.7	43 06.4	+58.2	101.6	42 53.9	+58.5	102.5	42 40.4	+58.8	103.4	42 26.0	+59.1	104.3	40
41	44 43.5	+56.4	97.4	44 35.3	+56.8	98.4	44 26.0	+57.3	99.3	44 15.8	+57.7	100.3	44 04.6	+58.1	101.3	43 52.4	+58.4	102.2	43 39.2	+58.7	103.1	43 25.1	+59.0	104.1	41
42	45 39.9	+56.2	96.9	45 32.1	+56.8	97.9	45 23.3	+57.2	98.9	45 13.5	+57.6	99.9	45 02.7	+58.0	100.9	44 50.8	+58.4	101.9	44 37.9	+58.7	102.9	44 24.1	+59.0	103.8	42
43	46 36.1	+56.1	96.4	46 28.9	+56.6	97.5	46 20.5	+57.1	98.5	46 11.1	+57.6	99.5	46 00.7	+57.9	100.5	45 49.2	+58.3	101.6	45 36.6	+58.7	102.6	45 23.1	+58.9	103.6	43
44	47 32.2	+55.9	95.9	47 25.5	+56.5	97.0	47 17.6	+57.0	98.0	47 08.7	+57.4	99.1	46 58.6	+57.9	100.2	46 47.5	+58.3	101.2	46 35.3	+58.6	102.3	46 22.0	+58.9	103.3	44
45	48 28.1	+55.8	95.3	48 22.0	+56.3	96.5	48 14.6	+56.9	97.6	48 06.1	+57.4	98.7	47 56.5	+57.8	99.8	47 45.8	+58.2	100.9	47 33.9	+58.5	101.9	47 20.9	+58.9	103.0	45
46	49 23.9	+55.7	94.8	49 18.3	+56.2	95.9	49 11.5	+56.8	97.1	49 03.5	+57.3	98.2	48 54.3	+57.7	99.4	48 44.0	+58.1	100.5	48 32.4	+58.5	101.6	48 19.8	+58.8	102.7	46
47	50 19.6	+55.4	94.2	50 14.5	+56.1	95.4	50 08.3	+56.6	96.6	50 00.8	+57.1	97.8	49 52.0	+57.6	99.0	49 42.1	+58.0	100.1	49 30.9	+58.5	101.3	49 18.6	+58.8	102.4	47
48	51 15.0	+55.3	93.6	51 10.6	+55.9	94.8	51 04.9	+56.5	96.1	50 57.9	+57.0	97.3	50 49.6	+57.6	98.5	50 40.1	+58.0	99.7	50 29.4	+58.3	100.9	50 17.4	+58.7	102.1	48
49	52 10.3	+55.0	93.0	52 06.5	+55.7	94.3	52 01.4	+56.3	95.5	51 54.9	+56.9	96.8	51 47.2	+57.4	98.1	51 38.1	+57.9	99.3	51 27.7	+58.3	100.6	51 16.1	+58.7	101.8	49
50	53 05.3	+54.8	92.3	53 02.2	+55.5	93.6	52 57.7	+56.1	95.0	52 51.8	+56.7	96.3	52 44.6	+57.2	97.6	52 36.0	+57.7	98.9	52 26.0	+58.2	100.2	52 14.8	+58.6	101.4	50
51	54 00.1	+54.6	91.6	53 57.7	+55.3	93.0	53 53.8	+56.0	94.4	53 48.5	+56.6	95.7	53 41.8	+57.2	97.1	53 33.7	+57.7	98.4	53 24.2	+58.2	99.8	53 13.4	+58.5	101.1	51
52	54 54.7	+54.3	90.9	54 53.0	+55.0	92.3	54 49.8	+55.8	93.8	54 45.1	+56.4	95.2	54 39.0	+57.0	96.6	54 31.4	+57.6	98.0	54 22.4	+58.0	99.4	54 11.9	+58.5	100.7	52
53	55 49.0	+54.0	90.2	55 48.0	+54.9	91.6	55 45.6	+55.5	93.1	55 41.5	+56.3	94.6	55 36.0	+56.9	96.0	55 29.0	+57.4	97.5	55 20.4	+57.9	98.9	55 10.4	+58.4	100.3	53
54	56 43.0	+53.7	89.4	56 42.9	+54.5	90.9	56 41.1	+55.3	92.4	56 37.8	+56.0	93.9	56 32.9	+56.7	95.5	56 26.4	+57.3	97.0	56 18.3	+57.9	98.4	56 08.8	+58.3	99.9	54
55	57 36.7	+53.4	88.6	57 37.4	+54.3	90.1	57 36.4	+55.1	91.7	57 33.8	+55.8	93.3	57 29.6	+56.5	94.9	57 23.7	+57.1	96.4	57 16.2	+57.7	98.0	57 07.1	+58.2	99.5	55
56	58 30.1	+53.0	87.7	58 31.7	+53.9	89.3	58 31.5	+54.8	91.0	58 29.6	+55.6	92.6	58 26.1	+56.3	94.2	58 20.8	+57.0	95.8	58 13.9	+57.6	97.4	58 05.3	+58.1	99.0	56
57	59 23.1	+52.6	86.8	59 25.6	+53.6	88.5	59 26.3	+54.5	90.2	59 25.2	+55.4	91.9	59 22.4	+56.1	93.6	59 17.8	+56.8	95.2	59 11.5	+57.4	96.9	59 03.4	+58.0	98.6	57
58	60 15.7	+52.2	85.8	60 19.2	+53.2	87.6	60 20.8	+54.1	89.3	60 20.6	+55.0	91.1	60 18.5	+55.9	92.8	60 14.6	+56.6	94.6	60 08.9	+57.3	96.3	60 01.4	+57.8	98.1	58
59	61 07.9	+51.7	84.8	61 12.4	+52.7	86.6	61 14.9	+53.8	88.5	61 15.6	+54.7	90.3	61 14.4	+55.6	92.1	61 11.2	+56.4	93.9	61 06.2	+57.1	95.7	60 59.2	+57.8	97.5	59
60	61 59.6	+51.2	83.8	62 05.1	+52.4	85.6	62 08.7	+53.4	87.5	62 10.3	+54.4	89.4	62 10.0	+55.3	91.3	62 07.6	+56.2	93.2	62 03.3	+56.9	95.1	61 57.0	+57.6	97.0	60
61	62 50.8	+50.6	82.6	62 57.5	+51.8	84.6	63 02.1	+53.0	86.5	63 04.7	+54.0	88.5	63 05.3	+55.0	90.5	63 03.8	+55.8	92.4	63 00.2	+56.7	94.4	62 54.6	+57.4	96.3	61
62	63 41.4	+50.0	81.4	63 49.3	+51.2	83.4	63 55.1	+52.4	85.5	63 58.7	+53.6	87.5	64 00.3	+54.6	89.6	63 59.6	+55.6	91.6	63 56.9	+56.4	93.7	63 52.0	+57.2	95.7	62
63	64 31.4	+49.2	80.2	64 40.5	+50.7	82.2	64 47.5	+51.9	84.4	64 52.3	+53.1	86.5	64 54.9	+54.2	88.6	64 55.2	+55.3	90.7	64 53.3	+56.2	92.9	64 49.2	+57.0	95.0	63
64	65 20.6	+48.6	78.8	65 31.2	+49.9	81.0	65 39.4	+51.4	83.2	65 45.4	+52.7	85.4	65 49.1	+53.8	87.6	65 50.5	+54.9	89.8	65 49.5	+55.9	92.0	65 46.2	+56.8	94.3	64
65	66 09.2	+47.6	77.4	66 21.1	+49.2	79.6	66 30.8	+50.6	81.9	66 38.1	+52.0	84.2	66 42.9	+53.3	86.5	66 45.4	+54.5	88.8	66 45.4	+55.6	91.1	66 43.0	+56.6	93.5	65
66	66 56.8	+46.7	75.9	67 10.3	+48.4	78.2	67 21.4	+49.9	80.5	67 30.1	+51.3	82.9	67 36.2	+52.8	85.3	67 39.9	+54.0	87.7	67 41.0	+55.2	90.2	67 39.6	+56.2	92.6	66
67	67 43.5	+45.7	74.2	67 58.7	+47.4	76.6	68 11.3	+49.1	79.0	68 21.4	+50.7	81.5	68 29.0	+52.1	84.0	68 33.9	+53.5	86.6	68 36.2	+54.8	89.1	68 35.8	+55.9	91.7	67
68	68 29.2	+44.6	72.5	68 46.1	+46.3	74.9	69 00.4	+48.1	77.5	69 12.1	+49.8	80.0	69 21.1	+51.4	82.6	69 27.4	+52.9	85.3	69 31.0	+54.2	88.0	69 31.7	+55.5	90.6	68
69	69 13.8	+43.2	70.6	69 32.4	+45.2	73.2	69 48.5	+47.1	75.8	70 01.9	+48.9	78.4	70 12.5	+50.6	81.2	70 20.3	+52.2	83.9	70 25.2	+53.7	86.7	70 27.2	+55.0	89.5	69
70	69 57.0	+41.9	68.6	70 17.6	+43.9	71.2	70 35.6	+45.8	73.9	70 50.8	+47.8	76.7	71 03.1	+49.7	79.5	71 12.5	+51.5	82.4	71 18.9	+53.1	85.4	71 22.2	+54.6	88.3	70
71	70 38.9	+40.2	66.5	71 01.5	+42.4	69.2	71 21.4	+44.6	72.0	71 38.6	+46.6	74.8	71 52.8	+48.7	77.8	72 04.0	+50.5	80.8	72 12.0	+52.3	83.9	72 16.8	+53.9	87.0	71
72	71 19.1	+38.5	64.2	71 43.9	+40.7	67.0	72 06.0	+43.0	69.8	72 25.2	+45.3	72.8	72 41.5	+47.4	75.8	72 54.5	+49.5	79.0	73 04.3	+51.5	82.2	73 10.7	+53.3	85.5	72
73	71 57.6	+36.5•	61.8	72 24.6	+38.9	64.6	72 49.0	+41.3	67.5	73 10.5	+43.7	70.6	73 28.9	+46.0	73.7	73 44.0	+48.3	77.0	73 55.8	+50.4	80.4	74 04.0	+52.4	83.9	73
74	72 34.1	+34.3•	59.2	73 03.5	+36.9•	62.0	73 30.3	+39.4•	65.0	73 54.2	+41.9	68.1	74 14.9	+44.5	71.4	74 32.3	+46.9	74.9	74 46.2	+49.2	78.4	74 56.4	+51.4	82.0	74
75	73 08.4	+32.0•	56.4	73 40.4	+34.5•	59.3	74 09.7	+37.2•	62.3	74 36.1	+39.9•	65.5	74 59.4	+42.5•	68.9	75 19.2	+45.3	72.5	75 35.4	+47.9	76.2	75 47.8	+50.3	80.0	75
76	73 40.4	+29.3•	53.5	74 14.9	+32.0•	56.3	74 46.9	+34.7•	59.4	75 16.0	+37.5•	62.6	75 41.9	+40.5•	66.1	76 04.5	+43.3•	69.8	76 23.3	+46.2	73.7	76 38.1	+48.9	77.7	76
77	74 09.7	+26.4•	50.3	74 46.9	+29.1•	53.1	75 21.6	+31.9•	56.2	75 53.5	+34.9•	59.5	76 22.4	+38.0•	63.0	76 47.8	+41.1•	66.8	77 09.5	+44.1•	70.9	77 27.0	+47.2	75.1	77
78	74 36.1	+23.3•	47.0	75 16.0	+25.9•	49.7	75 53.5	+28.9•	52.8	76 28.4	+32.0•	56.1	77 00.4	+35.1•	59.7	77 28.9	+38.4•	63.6	77 53.6	+41.8•	67.7	78 14.2	+45.1•	72.2	78
79	74 59.4	+19.8•	43.5	75 41.9	+22.6•	46.1	76 22.4	+25.4•	49.1	77 00.4	+28.5•	52.4	77 35.5	+31.8•	56.0	78 07.3	+35.4•	59.9	78 35.4	+39.0•	64.2	78 59.3	+42.7•	68.9	79
80	75 19.2	+16.2•	39.8	76 04.5	+18.8•	42.3	76 47.8	+21.7•	45.2	77 28.9	+24.7•	48.4	78 07.3	+28.1•	52.0	78 42.7	+31.7•	55.9	79 14.4	+35.6•	60.3	79 42.0	+39.6•	65.0	80
81	75 35.4	+12.4•	35.9	76 23.3	+14.8•	38.4	77 09.5	+17.5•	41.1	77 53.6	+20.6•	44.1	78 35.4	+23.9•	47.6	79 14.4	+27.6•	51.5	79 50.0	+31.6•	55.8	80 21.6	+35.9•	60.7	81
82	75 47.8	+8.4•	32.0	76 38.1	+10.7•	34.2	77 27.0	+13.2•	36.7	78 14.2	+16.0•	39.6	78 59.3	+19.3•	42.9	79 42.0	+22.8•	46.6	80 21.6	+26.9•	50.9	80 57.5	+31.3•	55.8	82
83	75 56.2	+4.3•	27.9	76 48.8	+6.2•	29.9	77 40.2	+8.5•	32.2	78 30.2	+11.1•	34.8	79 18.6	+14.1•	37.8	80 04.8	+17.6•	41.3	80 48.5	+21.5•	45.4	81 28.8	+26.0•	50.2	83
84	76 00.5	0.0•	23.8	76 55.0	+1.8•	25.5	77 48.7	+3.7•	27.5	78 41.3	+6.1•	29.8	79 32.7	+8.7•	32.5	80 22.4	+11.7•	35.7	81 10.0	+15.4•	39.5	81 54.8	+19.7•	43.9	84
85	76 00.5	−4.1•	19.7	76 56.8	−2.7•	21.1	77 52.4	−1.1•	22.8	78 47.4	+0.7•	24.7	79 41.4	+2.9•	27.0	80 34.1	+5.7•	29.8	81 25.4	+8.7•	33.1	82 14.5	+12.6•	37.1	85
86	75 56.4	−8.2•	15.5	76 54.1	−7.2•	16.7	77 51.3	−5.9•	18.0	78 48.1	−4.5•	19.6	79 44.3	−2.8•	21.4	80 39.8	−0.8•	23.7	81 34.1	+1.8•	26.4	82 27.1	+4.9•	29.7	86
87	75 48.2	−12.3•	11.5	76 46.9	−11.6•	12.3	77 45.4	−10.7•	13.3	78 43.6	−9.7•	14.5	79 41.5	−8.5•	15.8	80 39.0	−7.0•	17.5	81 35.9	−5.3•	19.5	82 32.0	−3.0•	22.1	87
88	75 35.9	−16.1•	7.5	76 35.3	−15.7•	8.1	77 34.7	−15.2•	8.7	78 33.9	−14.6•	9.5	79 33.0	−13.9•	10.3	80 32.0	−13.2•	11.4	81 30.6	−12.1•	12.8	82 29.0	−10.9•	14.4	88
89	75 19.8	−19.8•	3.7	76 19.6	−19.6•	4.0	77 19.5	−19.5•	4.3	78 19.3	−19.3•	4.6	79 19.1	−19.1•	5.0	80 18.8	−18.8•	5.6	81 18.5	−18.5•	6.2	82 18.1	−18.1•	7.0	89
90	75 00.0	−23.2•	0.0	76 00.0	−23.3•	0.0	77 00.0	−23.4•	0.0	78 00.0	−23.6•	0.0	79 00.0	−23.8•	0.0	80 00.0	−24.0•	0.0	81 00.0	−24.3•	0.0	82 00.0	−24.6•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 69°, 291°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 19.3	–58.2	110.3	4 58.4	–58.4	110.4	4 37.4	–58.6	110.5	4 16.4	–58.9	110.6	3 55.3	–59.1	110.6	3 34.1	–59.2	110.7	3 12.8	–59.3	110.8	2 51.5	–59.5	110.8	0
1	4 21.1	–58.2	110.6	4 00.0	–58.5	110.7	3 38.8	–58.7	110.7	3 17.5	–58.8	110.8	2 56.2	–59.0	110.8	2 34.9	–59.2	110.9	2 13.5	–59.4	110.9	1 52.0	–59.5	110.9	1
2	3 22.9	–58.2	110.8	3 01.5	–58.4	110.9	2 40.1	–58.6	110.9	2 18.7	–58.9	111.0	1 57.2	–59.1	111.0	1 35.7	–59.2	111.0	1 14.1	–59.3	111.1	0 52.5	–59.4	111.1	2
3	2 24.7	–58.2	111.1	2 03.1	–58.5	111.1	1 41.5	–58.7	111.1	1 19.8	–58.8	111.2	0 58.1	–59.0	111.2	0 36.5	–59.3	111.2	0 14.8	–59.4	111.2	0 06.9	+59.5	68.8	3
4	1 26.5	–58.3	111.3	1 04.6	–58.4	111.3	0 42.8	–58.7	111.3	0 21.0	–58.9	111.4	0 00.9	+59.0	68.6	0 22.8	+59.2	68.6	0 44.6	+59.4	68.7	1 06.4	+59.5	68.7	4
5	0 28.2	–58.2	111.6	0 06.2	–58.5	111.6	0 15.9	+58.6	68.4	0 37.9	+58.9	68.4	0 59.9	+59.1	68.5	1 22.0	+59.2	68.5	1 44.0	+59.3	68.5	2 05.9	+59.5	68.5	5
6	0 30.0	+58.2	68.2	0 52.3	+58.4	68.2	1 14.5	+58.7	68.2	1 36.8	+58.8	68.3	1 59.0	+59.0	68.3	2 21.2	+59.2	68.3	2 43.3	+59.4	68.4	3 05.4	+59.5	68.4	6
7	1 28.2	+58.2	68.0	1 50.7	+58.5	68.0	2 13.2	+58.6	68.0	2 35.6	+58.9	68.1	2 58.0	+59.1	68.1	3 20.4	+59.2	68.2	3 42.7	+59.3	68.2	4 04.9	+59.5	68.3	7
8	2 26.4	+58.2	67.7	2 49.2	+58.4	67.8	3 11.8	+58.7	67.8	3 34.5	+58.8	67.9	3 57.1	+59.0	67.9	4 19.6	+59.2	68.0	4 42.0	+59.4	68.1	5 04.4	+59.5	68.1	8
9	3 24.6	+58.3	67.5	3 47.6	+58.4	67.5	4 10.5	+58.7	67.6	4 33.3	+58.9	67.7	4 56.1	+59.0	67.7	5 18.8	+59.2	67.8	5 41.4	+59.3	67.9	6 03.9	+59.5	68.0	9
10	4 22.9	+58.2	67.2	4 46.0	+58.5	67.3	5 09.2	+58.6	67.4	5 32.2	+58.8	67.5	5 55.1	+59.0	67.6	6 18.0	+59.2	67.7	6 40.7	+59.4	67.8	7 03.4	+59.4	67.9	10
11	5 21.1	+58.2	67.0	5 44.5	+58.4	67.1	6 07.8	+58.6	67.2	6 31.0	+58.9	67.3	6 54.1	+59.1	67.4	7 17.2	+59.2	67.5	7 40.1	+59.3	67.6	8 02.8	+59.5	67.8	11
12	6 19.3	+58.2	66.7	6 42.9	+58.4	66.9	7 06.4	+58.7	67.0	7 29.9	+58.8	67.1	7 53.2	+59.0	67.2	8 16.4	+59.1	67.3	8 39.4	+59.3	67.5	9 02.3	+59.5	67.6	12
13	7 17.5	+58.2	66.5	7 41.3	+58.5	66.6	8 05.1	+58.6	66.7	8 28.7	+58.8	66.9	8 52.2	+59.0	67.0	9 15.5	+59.2	67.2	9 38.7	+59.4	67.3	10 01.8	+59.5	67.5	13
14	8 15.7	+58.1	66.3	8 39.8	+58.4	66.4	9 03.7	+58.6	66.5	9 27.5	+58.9	66.7	9 51.2	+59.0	66.8	10 14.7	+59.2	67.0	10 38.1	+59.3	67.2	11 01.3	+59.4	67.3	14
15	9 13.8	+58.2	66.0	9 38.2	+58.4	66.2	10 02.3	+58.7	66.3	10 26.4	+58.8	66.5	10 50.2	+59.0	66.7	11 13.9	+59.2	66.8	11 37.4	+59.3	67.0	12 00.7	+59.5	67.2	15
16	10 12.0	+58.2	65.8	10 36.6	+58.3	65.9	11 01.0	+58.6	66.1	11 25.2	+58.8	66.3	11 49.2	+59.0	66.5	12 13.1	+59.1	66.7	12 36.7	+59.4	66.9	13 00.2	+59.5	67.1	16
17	11 10.2	+58.1	65.5	11 34.9	+58.4	65.7	11 59.6	+58.6	65.9	12 24.0	+58.8	66.1	12 48.2	+59.0	66.3	13 12.2	+59.2	66.5	13 36.1	+59.3	66.7	13 59.7	+59.4	66.9	17
18	12 08.3	+58.1	65.3	12 33.3	+58.4	65.5	12 58.2	+58.5	65.7	13 22.8	+58.8	65.9	13 47.2	+59.0	66.1	14 11.4	+59.2	66.3	14 35.4	+59.3	66.6	14 59.1	+59.5	66.8	18
19	13 06.4	+58.2	65.0	13 31.7	+58.3	65.2	13 56.7	+58.6	65.4	14 21.6	+58.7	65.7	14 46.2	+58.9	65.9	15 10.6	+59.1	66.2	15 34.7	+59.3	66.4	15 58.6	+59.4	66.7	19
20	14 04.6	+58.1	64.7	14 30.0	+58.4	65.0	14 55.3	+58.6	65.2	15 20.3	+58.8	65.5	15 45.1	+59.0	65.7	16 09.7	+59.1	66.0	16 34.0	+59.3	66.2	16 58.0	+59.5	66.5	20
21	15 02.7	+58.0	64.5	15 28.4	+58.3	64.7	15 53.9	+58.5	65.0	16 19.1	+58.8	65.3	16 44.1	+58.9	65.5	17 08.8	+59.2	65.8	17 33.3	+59.3	66.1	17 57.5	+59.4	66.4	21
22	16 00.7	+58.1	64.2	16 26.7	+58.3	64.5	16 52.4	+58.5	64.8	17 17.9	+58.7	65.0	17 43.0	+59.0	65.3	18 08.0	+59.1	65.6	18 32.6	+59.3	65.9	18 56.9	+59.4	66.2	22
23	16 58.8	+58.0	64.0	17 25.0	+58.3	64.2	17 50.9	+58.6	64.5	18 16.6	+58.7	64.8	18 42.0	+58.9	65.1	19 07.1	+59.1	65.4	19 31.9	+59.2	65.8	19 56.3	+59.5	66.1	23
24	17 56.8	+58.1	63.7	18 23.3	+58.3	64.0	18 49.5	+58.5	64.3	19 15.3	+58.7	64.6	19 40.9	+58.9	64.9	20 06.2	+59.1	65.3	20 31.1	+59.3	65.6	20 55.8	+59.4	65.9	24
25	18 54.9	+58.0	63.4	19 21.6	+58.2	63.7	19 48.0	+58.4	64.1	20 14.0	+58.7	64.4	20 39.8	+58.9	64.7	21 05.3	+59.0	65.1	21 30.4	+59.2	65.4	21 55.2	+59.4	65.8	25
26	19 52.9	+57.9	63.2	20 19.8	+58.2	63.5	20 46.4	+58.5	63.8	21 12.7	+58.7	64.2	21 38.7	+58.9	64.5	22 04.3	+59.1	64.9	22 29.6	+59.3	65.3	22 54.6	+59.4	65.6	26
27	20 50.8	+58.0	62.9	21 18.0	+58.2	63.2	21 44.9	+58.4	63.6	22 11.4	+58.7	63.9	22 37.6	+58.9	64.3	23 03.4	+59.1	64.7	23 28.9	+59.2	65.1	23 54.0	+59.4	65.5	27
28	21 48.8	+57.9	62.6	22 16.2	+58.2	63.0	22 43.3	+58.4	63.3	23 10.1	+58.6	63.7	23 36.5	+58.8	64.1	24 02.5	+59.0	64.5	24 28.1	+59.2	64.9	24 53.4	+59.3	65.3	28
29	22 46.7	+57.9	62.3	23 14.4	+58.1	62.7	23 41.7	+58.4	63.1	24 08.7	+58.6	63.5	24 35.3	+58.8	63.9	25 01.5	+59.0	64.3	25 27.3	+59.2	64.7	25 52.7	+59.4	65.2	29
30	23 44.6	+57.8	62.0	24 12.5	+58.2	62.4	24 40.1	+58.4	62.8	25 07.3	+58.6	63.2	25 34.1	+58.8	63.7	26 00.5	+59.0	64.1	26 26.5	+59.2	64.6	26 52.1	+59.4	65.0	30
31	24 42.4	+57.9	61.7	25 10.7	+58.0	62.2	25 38.5	+58.3	62.6	26 05.9	+58.6	63.0	26 32.9	+58.8	63.5	26 59.5	+59.0	63.9	27 25.7	+59.2	64.4	27 51.5	+59.3	64.8	31
32	25 40.3	+57.7	61.5	26 08.7	+58.1	61.9	26 36.8	+58.3	62.3	27 04.5	+58.5	62.8	27 31.7	+58.8	63.2	27 58.5	+59.0	63.7	28 24.9	+59.2	64.2	28 50.8	+59.3	64.7	32
33	26 38.0	+57.8	61.2	27 06.8	+58.0	61.6	27 35.1	+58.3	62.1	28 03.0	+58.5	62.5	28 30.5	+58.7	63.0	28 57.5	+59.0	63.5	29 24.1	+59.1	64.0	29 50.1	+59.3	64.5	33
34	27 35.8	+57.7	60.8	28 04.8	+58.0	61.3	28 33.4	+58.2	61.8	29 01.5	+58.5	62.3	29 29.2	+58.8	62.8	29 56.5	+58.9	63.3	30 23.2	+59.1	63.8	30 49.4	+59.3	64.3	34
35	28 33.5	+57.7	60.5	29 02.8	+57.9	61.0	29 31.6	+58.3	61.5	30 00.0	+58.5	62.0	30 28.0	+58.6	62.5	30 55.4	+58.9	63.1	31 22.3	+59.1	63.6	31 48.7	+59.3	64.1	35
36	29 31.2	+57.6	60.2	30 00.7	+57.9	60.7	30 29.9	+58.1	61.2	30 58.5	+58.4	61.8	31 26.6	+58.7	62.3	31 54.3	+58.9	62.8	32 21.4	+59.1	63.4	32 48.0	+59.3	64.0	36
37	30 28.8	+57.6	59.9	30 58.6	+57.9	60.4	31 28.0	+58.2	60.9	31 56.9	+58.4	61.5	32 25.3	+58.6	62.0	32 53.2	+58.8	62.6	33 20.5	+59.1	63.2	33 47.3	+59.3	63.8	37
38	31 26.4	+57.5	59.6	31 56.5	+57.8	60.1	32 26.2	+58.0	60.7	32 55.3	+58.4	61.2	33 23.9	+58.6	61.8	33 52.0	+58.9	62.4	34 19.6	+59.0	63.0	34 46.6	+59.2	63.6	38
39	32 23.9	+57.4	59.2	32 54.3	+57.8	59.8	33 24.2	+58.1	60.4	33 53.7	+58.3	60.9	34 22.5	+58.6	61.5	34 50.9	+58.8	62.1	35 18.6	+59.0	62.8	35 45.8	+59.2	63.4	39
40	33 21.3	+57.4	58.9	33 52.1	+57.7	59.5	34 22.3	+58.0	60.0	34 52.0	+58.3	60.6	35 21.1	+58.5	61.3	35 49.7	+58.7	61.9	36 17.6	+59.0	62.5	36 45.0	+59.2	63.2	40
41	34 18.7	+57.4	58.5	34 49.8	+57.6	59.1	35 20.3	+58.0	59.7	35 50.3	+58.2	60.4	36 19.6	+58.5	61.0	36 48.4	+58.8	61.6	37 16.6	+59.0	62.3	37 44.2	+59.2	63.0	41
42	35 16.1	+57.3	58.2	35 47.4	+57.6	58.8	36 18.3	+57.9	59.4	36 48.5	+58.2	60.1	37 18.1	+58.5	60.7	37 47.2	+58.7	61.4	38 15.6	+58.9	62.1	38 43.4	+59.1	62.8	42
43	36 13.4	+57.2	57.8	36 45.0	+57.6	58.4	37 16.2	+57.8	59.1	37 46.7	+58.1	59.8	38 16.6	+58.4	60.4	38 45.9	+58.7	61.1	39 14.5	+58.9	61.8	39 42.5	+59.1	62.6	43
44	37 10.6	+57.1	57.4	37 42.6	+57.4	58.1	38 14.0	+57.8	58.8	38 44.8	+58.1	59.4	39 15.0	+58.4	60.1	39 44.6	+58.6	60.9	40 13.4	+58.9	61.6	40 41.6	+59.1	62.3	44
45	38 07.7	+57.1	57.1	38 40.0	+57.4	57.7	39 11.8	+57.7	58.4	39 42.9	+58.0	59.1	40 13.4	+58.3	59.8	40 43.2	+58.6	60.6	41 12.3	+58.9	61.3	41 40.7	+59.1	62.1	45
46	39 04.8	+56.9	56.7	39 37.4	+57.4	57.3	40 09.5	+57.7	58.1	40 40.9	+58.0	58.8	41 11.7	+58.3	59.5	41 41.8	+58.5	60.3	42 11.2	+58.8	61.1	42 39.8	+59.1	61.9	46
47	40 01.7	+56.9	56.3	40 34.8	+57.2	57.0	41 07.2	+57.5	57.7	41 38.9	+57.9	58.4	42 10.0	+58.2	59.2	42 40.3	+58.5	60.0	43 10.0	+58.7	60.8	43 38.9	+59.0	61.6	47
48	40 58.6	+56.8	55.8	41 32.0	+57.2	56.6	42 04.7	+57.6	57.3	42 36.8	+57.9	58.1	43 08.2	+58.1	58.9	43 38.8	+58.5	59.7	44 08.7	+58.8	60.5	44 37.9	+58.9	61.4	48
49	41 55.4	+56.7	55.4	42 29.2	+57.0	56.2	43 02.3	+57.4	56.9	43 34.7	+57.7	57.7	44 06.3	+58.1	58.5	44 37.3	+58.4	59.4	45 07.5	+58.6	60.2	45 36.8	+59.0	61.1	49
50	42 52.1	+56.6	55.0	43 26.2	+57.0	55.7	43 59.7	+57.3	56.5	44 32.4	+57.7	57.3	45 04.4	+58.1	58.2	45 35.7	+58.3	59.0	46 06.1	+58.7	59.9	46 35.8	+58.9	60.8	50
51	43 48.7	+56.5	54.5	44 23.2	+56.9	55.3	44 57.0	+57.3	56.1	45 30.1	+57.6	57.0	46 02.5	+57.9	57.8	46 34.0	+58.3	58.7	47 04.8	+58.5	59.6	47 34.7	+58.8	60.6	51
52	44 45.2	+56.4	54.0	45 20.1	+56.8	54.8	45 54.3	+57.1	55.7	46 27.7	+57.5	56.6	47 00.4	+57.9	57.4	47 32.3	+58.2	58.4	48 03.3	+58.6	59.3	48 33.5	+58.8	60.3	52
53	45 41.6	+56.2	53.5	46 16.9	+56.6	54.4	46 51.4	+57.1	55.2	47 25.2	+57.5	56.1	47 58.3	+57.8	57.1	48 30.5	+58.1	58.0	49 01.9	+58.4	59.0	49 32.3	+58.8	60.0	53
54	46 37.8	+56.1	53.0	47 13.5	+56.5	53.9	47 48.5	+56.9	54.8	48 22.7	+57.3	55.7	48 56.1	+57.7	56.7	49 28.6	+58.1	57.6	50 00.3	+58.4	58.6	50 31.1	+58.7	59.7	54
55	47 33.9	+55.9	52.5	48 10.0	+56.4	53.4	48 45.4	+56.8	54.3	49 20.0	+57.2	55.3	49 53.8	+57.6	56.2	50 26.7	+58.0	57.2	50 58.7	+58.3	58.3	51 29.8	+58.7	59.3	55
56	48 29.8	+55.8	52.0	49 06.4	+56.3	52.9	49 42.2	+56.7	53.8	50 17.2	+57.1	54.8	50 51.4	+57.5	55.8	51 24.7	+57.9	56.8	51 57.0	+58.3	57.9	52 28.5	+58.5	59.0	56
57	49 25.6	+55.6	51.4	50 02.7	+56.0	52.4	50 38.9	+56.5	53.3	51 14.3	+57.0	54.3	51 48.9	+57.4	55.3	52 22.6	+57.8	56.4	52 55.3	+58.2	57.5	53 27.0	+58.6	58.6	57
58	50 21.2	+55.5	50.8	50 58.7	+56.0	51.8	51 35.4	+56.4	52.8	52 11.3	+56.9	53.8	52 46.3	+57.3	54.9	53 20.4	+57.7	56.0	53 53.5	+58.1	57.1	54 25.6	+58.4	58.3	58
59	51 16.7	+55.2	50.2	51 54.7	+55.7	51.2	52 31.8	+56.3	52.2	53 08.2	+56.7	53.3	53 43.6	+57.1	54.4	54 18.1	+57.5	55.5	54 51.6	+57.9	56.7	55 24.0	+58.4	57.9	59
60	52 11.9	+55.0	49.6	52 50.4	+55.6	50.6	53 28.1	+56.0	51.6	54 04.9	+56.5	52.7	54 40.7	+57.0	53.8	55 15.6	+57.5	55.0	55 49.5	+57.9	56.2	56 22.4	+58.3	57.4	60
61	53 06.9	+54.9	48.9	53 46.0	+55.3	50.0	54 24.1	+55.9	51.0	55 01.4	+56.4	52.1	55 37.7	+56.9	53.3	56 13.1	+57.3	54.5	56 47.4	+57.8	55.7	57 20.7	+58.1	57.0	61
62	54 01.8	+54.5	48.3	54 41.3	+55.1	49.3	55 20.0	+55.6	50.4	55 57.8	+56.1	51.5	56 34.6	+56.7	52.7	57 10.4	+57.2	54.0	57 45.2	+57.6	55.2	58 18.8	+58.1	56.6	62
63	54 56.3	+54.3	47.5	55 36.4	+54.9	48.6	56 15.6	+55.5	49.7	56 53.9	+56.0	50.9	57 31.3	+56.5	52.1	58 07.6	+57.0	53.4	58 42.8	+57.5	54.7	59 16.9	+58.0	56.1	63
64	55 50.6	+54.0	46.8	56 31.3	+54.6	47.9	57 11.1	+55.1	49.0	57 49.9	+55.8	50.2	58 27.8	+56.3	51.5	59 04.6	+56.9	52.8	59 40.3	+57.4	54.1	60 14.9	+57.8	55.6	64
65	56 44.6	+53.7	46.0	57 25.9	+54.3	47.1	58 06.2	+55.0	48.3	58 45.7	+55.5	49.5	59 24.1	+56.1	50.8	60 01.5	+56.6	52.2	60 37.7	+57.2	53.6	61 12.7	+57.7	55.0	65
66	57 38.3	+53.4	45.2	58 20.2	+54.0	46.3	59 01.2	+54.6	47.5	59 41.2	+55.2	48.8	60 20.2	+55.9	50.1	60 58.1	+56.5	51.5	61 34.9	+57.0	52.9	62 10.4	+57.6	54.4	66
67	58 31.7	+53.0	44.3	59 14.2	+53.7	45.5	59 55.8	+54.3	46.7	60 36.4	+55.0	48.0	61 16.1	+55.5	49.4	61 54.6	+56.2	50.8	62 31.9	+56.8	52.3	63 08.0	+57.4	53.8	67
68	59 24.7	+52.6	43.4	60 07.9	+53.2	44.6	60 50.1	+54.0	45.9	61 31.4	+54.6	47.2	62 11.6	+55.4	48.6	62 50.8	+55.9	50.0	63 28.7	+56.6	51.6	64 05.4	+57.2	53.2	68
69	60 17.3	+52.2	42.5	61 01.1	+52.9	43.7	61 44.1	+53.6	45.0	62 26.0	+54.3	46.3	63 07.0	+54.9	47.7	63 46.7	+55.7	49.2	64 25.3	+56.3	50.8	65 02.6	+56.9	52.5	69
70	61 09.5	+51.6	41.4	61 54.0	+52.4	42.7	62 37.7	+53.1	44.0	63 20.3	+53.9	45.4	64 01.9	+54.7	46.8	64 42.4	+55.4	48.4	65 21.6	+56.1	50.0	65 59.5	+56.8	51.7	70
71	62 01.1	+51.2	40.4	62 46.4	+51.9	41.6	63 30.8	+52.7	43.0	64 14.2	+53.5	44.4	64 56.6	+54.2	45.9	65 37.8	+54.9	47.4	66 17.7	+55.7	49.1	66 56.3	+56.4	50.9	71
72	62 52.3	+50.6	39.2	63 38.3	+51.4	40.5	64 23.5	+52.2	41.9	65 07.7	+53.0	43.3	65 50.8	+53.8	44.8	66 32.7	+54.6	46.5	67 13.4	+55.4	48.2	67 52.7	+56.2	50.0	72
73	63 42.9	+49.9	38.1	64 29.7	+50.8	39.3	65 15.7	+51.6	40.7	66 00.7	+52.4	42.2	66 44.6	+53.3	43.7	67 27.3	+54.2	45.4	68 08.8	+55.0	47.2	68 48.9	+55.8	49.1	73
74	64 32.8	+49.3	36.8	65 20.5	+50.1	38.1	66 07.3	+50.9	39.5	66 53.1	+51.8	41.0	67 37.9	+52.7	42.5	68 21.5	+53.6	44.2	69 03.8	+54.5	46.1	69 44.7	+55.4	48.0	74
75	65 22.1	+48.5	35.4	66 10.6	+49.4	36.7	66 58.2	+50.3	38.1	67 44.9	+51.2	39.7	68 30.6	+52.1	41.3	69 15.1	+53.0	43.0	69 58.3	+54.0	44.9	70 40.1	+54.9	46.9	75
76	66 10.6	+47.6	34.0	67 00.0	+48.5	35.3	67 48.5	+49.4	36.7	68 36.1	+50.4	38.2	69 22.7	+51.4	39.9	70 08.1	+52.4	41.7	70 52.3	+53.4	43.6	71 35.0	+54.4	45.6	76
77	66 58.2	+46.7	32.5	67 48.5	+47.6	33.8	68 37.9	+48.6	35.2	69 26.5	+49.6	36.7	70 14.1	+50.6	38.4	71 00.5	+51.7	40.2	71 45.7	+52.7	42.1	72 29.4	+53.8	44.3	77
78	67 44.9	+45.7	30.8	68 36.1	+46.6	32.1	69 26.5	+47.6	33.6	70 16.1	+48.6	35.1	71 04.7	+49.6	36.8	71 52.2	+50.7	38.6	72 38.4	+51.9	40.6	73 23.2	+53.1	42.8	78
79	68 30.6	+44.5	29.1	69 22.7	+45.4	30.4	70 14.1	+46.4	31.8	71 04.7	+47.5	33.3	71 54.3	+48.6	35.0	72 42.9	+49.8	36.8	73 30.3	+51.0	38.9	74 16.3	+52.2	41.1	79
80	69 15.1	+43.2	27.2	70 08.1	+44.2	28.5	71 00.5	+45.2	29.9	71 52.2	+46.2	31.4	72 42.9	+47.4	33.1	73 32.7	+48.6	34.9	74 21.3	+49.8	37.0	75 08.5	+51.2	39.2	80
81	69 58.3	+41.8	25.2	70 52.3	+42.7	26.5	71 45.7	+43.7	27.8	72 38.4	+44.8	29.3	73 30.3	+46.0	31.0	74 21.3	+47.2	32.8	75 11.1	+48.6	34.8	75 59.7	+50.0	37.1	81
82	70 40.1	+40.2	23.1	71 35.0	+41.1	24.3	72 29.4	+42.2	25.6	73 23.2	+43.2	27.0	74 16.3	+44.4	28.6	75 08.5	+45.7	30.4	75 59.7	+47.0	32.5	76 49.7	+48.5	34.8	82
83	71 20.3	+38.4	20.8	72 16.1	+39.4	21.9	73 11.6	*+40.3* •	23.2	74 06.4	*+41.4* •	24.5	75 00.7	*+42.5* •	26.1	75 54.2	*+43.8* •	27.8	76 46.7	+45.2	29.8	77 38.2	+46.7	32.1	83
84	71 58.7	*+36.4* •	18.4	72 55.5	*+37.3* •	19.4	73 51.9	*+38.2* •	20.6	74 47.8	*+39.2* •	21.8	75 43.2	*+40.4* •	23.3	76 38.0	*+41.6* •	25.0	77 31.9	*+43.1* •	26.9	78 24.9	*+44.6* •	29.1	84
85	72 35.1	*+34.3* •	15.8	73 32.8	*+35.0* •	16.7	74 30.1	*+35.9* •	17.7	75 27.0	*+36.9* •	18.9	76 23.6	*+37.9* •	20.2	77 19.6	*+39.1* •	21.8	78 15.0	*+40.4* •	23.5	79 09.5	*+42.0* •	25.6	85
86	73 09.4	*+31.9* •	13.0	74 07.8	*+32.5* •	13.8	75 06.0	*+33.2* •	14.7	76 03.9	*+34.1* •	15.7	77 01.5	*+35.0* •	16.9	77 58.7	*+36.1* •	18.2	78 55.4	*+37.4* •	19.8	79 51.5	*+38.8* •	21.7	86
87	73 41.3	*+29.2* •	10.0	74 40.3	*+29.8* •	10.7	75 39.2	*+30.3* •	11.4	76 38.0	*+30.9* •	12.2	77 36.5	*+31.7* •	13.2	78 34.8	*+32.6* •	14.3	79 32.8	*+33.6* •	15.6	80 30.3	*+34.9* •	17.2	87
88	74 10.5	*+26.3* •	6.9	75 10.1	*+26.6* •	7.3	76 09.5	*+27.1* •	7.8	77 08.9	*+27.5* •	8.4	78 08.2	*+28.0* •	9.1	79 07.4	*+28.6* •	9.9	80 06.4	*+29.3* •	10.9	81 05.2	*+30.2* •	12.1	88
89	74 36.8	*+23.2* •	3.5	75 36.7	*+23.3* •	3.8	76 36.6	*+23.4* •	4.0	77 36.4	*+23.6* •	4.4	78 36.2	*+23.8* •	4.7	79 36.0	*+24.0* •	5.2	80 35.7	*+24.3* •	5.7	81 35.4	*+24.6* •	6.4	89
90	75 00.0	*+19.8* •	0.0	76 00.0	*+19.6* •	0.0	77 00.0	*+19.5* •	0.0	78 00.0	*+19.3* •	0.0	79 00.0	*+19.1* •	0.0	80 00.0	*+18.8* •	0.0	81 00.0	*+18.5* •	0.0	82 00.0	*+18.1* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 111°, 249°

70°, 290° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 04.7	+58.2	109.4	4 44.8	+58.4	109.5	4 24.8	+58.6	109.5	4 04.7	+58.8	109.6	3 44.5	+59.0	109.7	3 24.3	+59.2	109.7	3 04.0	+59.4	109.8	2 43.7	+59.5	109.8	0
1	6 02.9	+58.2	109.1	5 43.2	+58.4	109.2	5 23.4	+58.6	109.3	5 03.5	+58.8	109.4	4 43.5	+59.1	109.5	4 23.5	+59.2	109.6	4 03.4	+59.3	109.6	3 43.2	+59.5	109.7	1
2	7 01.1	+58.1	108.9	6 41.6	+58.4	109.0	6 22.0	+58.6	109.1	6 02.3	+58.9	109.2	5 42.6	+59.0	109.3	5 22.7	+59.2	109.4	5 02.7	+59.4	109.5	4 42.7	+59.4	109.6	2
3	7 59.2	+58.2	108.6	7 40.0	+58.4	108.8	7 20.6	+58.7	108.9	7 01.2	+58.8	109.0	6 41.6	+59.0	109.1	6 21.9	+59.1	109.2	6 02.1	+59.3	109.3	5 42.1	+59.5	109.4	3
4	8 57.4	+58.1	108.4	8 38.4	+58.4	108.5	8 19.3	+58.6	108.7	8 00.0	+58.8	108.8	7 40.6	+59.0	108.9	7 21.0	+59.2	109.1	7 01.4	+59.3	109.2	6 41.6	+59.5	109.3	4
5	9 55.5	+58.2	108.1	9 36.8	+58.4	108.3	9 17.9	+58.6	108.5	8 58.8	+58.8	108.6	8 39.6	+59.0	108.8	8 20.2	+59.2	108.9	8 00.7	+59.4	109.0	7 41.1	+59.5	109.2	5
6	10 53.7	+58.1	107.9	10 35.2	+58.3	108.1	10 16.5	+58.6	108.2	9 57.6	+58.8	108.4	9 38.6	+59.0	108.6	9 19.4	+59.2	108.7	9 00.1	+59.3	108.9	8 40.6	+59.4	109.0	6
7	11 51.8	+58.1	107.6	11 33.5	+58.4	107.8	11 15.1	+58.6	108.0	10 56.4	+58.8	108.2	10 37.6	+59.0	108.4	10 18.6	+59.1	108.6	9 59.4	+59.3	108.7	9 40.0	+59.5	108.9	7
8	12 49.9	+58.1	107.4	12 31.9	+58.3	107.6	12 13.7	+58.5	107.8	11 55.2	+58.8	108.0	11 36.6	+59.0	108.2	11 17.7	+59.2	108.4	10 58.7	+59.3	108.6	10 39.5	+59.5	108.8	8
9	13 48.0	+58.1	107.1	13 30.2	+58.4	107.3	13 12.2	+58.6	107.6	12 54.0	+58.8	107.8	12 35.6	+58.9	108.0	12 16.9	+59.2	108.2	11 58.0	+59.4	108.4	11 39.0	+59.4	108.6	9
10	14 46.1	+58.0	106.9	14 28.6	+58.3	107.1	14 10.8	+58.5	107.4	13 52.8	+58.7	107.6	13 34.5	+59.0	107.8	13 16.1	+59.1	108.0	12 57.4	+59.3	108.3	12 38.4	+59.5	108.5	10
11	15 44.1	+58.1	106.6	15 26.9	+58.3	106.9	15 09.3	+58.6	107.1	14 51.5	+58.8	107.4	14 33.5	+59.0	107.6	14 15.2	+59.1	107.9	13 56.7	+59.3	108.1	13 37.9	+59.4	108.3	11
12	16 42.2	+58.0	106.3	16 25.2	+58.3	106.6	16 07.9	+58.5	106.9	15 50.3	+58.7	107.2	15 32.5	+58.9	107.4	15 14.3	+59.2	107.7	14 56.0	+59.3	108.0	14 37.3	+59.5	108.2	12
13	17 40.2	+58.0	106.1	17 23.5	+58.2	106.4	17 06.4	+58.5	106.7	16 49.0	+58.8	107.0	16 31.4	+58.9	107.2	16 13.5	+59.1	107.5	15 55.3	+59.3	107.8	15 36.8	+59.4	108.1	13
14	18 38.2	+58.0	105.8	18 21.7	+58.3	106.1	18 04.9	+58.5	106.4	17 47.8	+58.7	106.7	17 30.3	+59.0	107.0	17 12.6	+59.1	107.3	16 54.6	+59.2	107.6	16 36.2	+59.5	107.9	14
15	19 36.2	+57.9	105.5	19 20.0	+58.2	105.9	19 03.4	+58.5	106.2	18 46.5	+58.7	106.5	18 29.3	+58.9	106.9	18 11.7	+59.1	107.2	17 53.8	+59.3	107.5	17 35.7	+59.4	107.8	15
16	20 34.1	+58.0	105.2	20 18.2	+58.2	105.6	20 01.9	+58.4	106.0	19 45.2	+58.7	106.3	19 28.2	+58.9	106.6	19 10.8	+59.1	107.0	18 53.1	+59.3	107.3	18 35.1	+59.4	107.6	16
17	21 32.1	+57.9	105.0	21 16.4	+58.2	105.3	21 00.3	+58.4	105.7	20 43.9	+58.6	106.1	20 27.1	+58.9	106.4	20 09.9	+59.1	106.8	19 52.4	+59.2	107.1	19 34.5	+59.4	107.5	17
18	22 30.0	+57.8	104.7	22 14.6	+58.1	105.1	21 58.7	+58.5	105.5	21 42.5	+58.7	105.9	21 26.0	+58.8	106.2	21 09.0	+59.1	106.6	20 51.6	+59.3	107.0	20 33.9	+59.4	107.3	18
19	23 27.8	+57.9	104.4	23 12.7	+58.1	104.8	22 57.2	+58.3	105.2	22 41.2	+58.6	105.6	22 24.8	+58.9	106.0	22 08.1	+59.0	106.4	21 50.9	+59.2	106.8	21 33.3	+59.4	107.2	19
20	24 25.7	+57.8	104.1	24 10.8	+58.1	104.5	23 55.5	+58.4	105.0	23 39.8	+58.6	105.4	23 23.7	+58.8	105.8	23 07.1	+59.0	106.2	22 50.1	+59.3	106.6	22 32.7	+59.4	107.0	20
21	25 23.5	+57.7	103.8	25 08.9	+58.1	104.3	24 53.9	+58.3	104.7	24 38.4	+58.6	105.2	24 22.5	+58.8	105.6	24 06.1	+59.1	106.0	23 49.4	+59.2	106.5	23 32.1	+59.4	106.9	21
22	26 21.2	+57.8	103.5	26 07.0	+58.0	104.0	25 52.2	+58.3	104.5	25 37.0	+58.6	104.9	25 21.3	+58.8	105.4	25 05.2	+59.0	105.8	24 48.6	+59.2	106.3	24 31.5	+59.4	106.7	22
23	27 19.0	+57.7	103.2	27 05.0	+58.0	103.7	26 50.5	+58.3	104.2	26 35.6	+58.5	104.7	26 20.1	+58.8	105.2	26 04.2	+59.0	105.6	25 47.8	+59.2	106.1	25 30.9	+59.4	106.6	23
24	28 16.7	+57.6	102.9	28 03.0	+58.0	103.4	27 48.8	+58.3	103.9	27 34.1	+58.5	104.4	27 18.9	+58.8	104.9	27 03.2	+59.0	105.4	26 47.0	+59.1	105.9	26 30.3	+59.3	106.4	24
25	29 14.3	+57.6	102.6	29 01.0	+57.9	103.1	28 47.1	+58.2	103.7	28 32.6	+58.5	104.2	28 17.7	+58.7	104.7	28 02.2	+58.9	105.2	27 46.1	+59.2	105.7	27 29.6	+59.3	106.2	25
26	30 11.9	+57.6	102.3	29 58.9	+57.9	102.8	29 45.3	+58.2	103.4	29 31.1	+58.5	103.9	29 16.4	+58.7	104.5	29 01.1	+58.9	105.0	28 45.3	+59.1	105.6	28 28.9	+59.4	106.1	26
27	31 09.5	+57.5	101.9	30 56.8	+57.8	102.5	30 43.5	+58.1	103.1	30 29.6	+58.4	103.7	30 15.1	+58.7	104.2	30 00.0	+59.0	104.8	29 44.4	+59.2	105.4	29 28.3	+59.3	105.9	27
28	32 07.0	+57.4	101.6	31 54.6	+57.8	102.2	31 41.6	+58.1	102.8	31 28.0	+58.4	103.4	31 13.8	+58.6	104.0	30 59.0	+58.9	104.6	30 43.6	+59.1	105.2	30 27.6	+59.3	105.7	28
29	33 04.4	+57.4	101.2	32 52.4	+57.7	101.9	32 39.7	+58.0	102.5	32 26.4	+58.3	103.1	32 12.4	+58.6	103.8	31 57.9	+58.8	104.4	31 42.7	+59.1	105.0	31 26.9	+59.3	105.6	29
30	34 01.8	+57.3	100.9	33 50.1	+57.7	101.6	33 37.7	+58.1	102.2	33 24.7	+58.3	102.9	33 11.0	+58.6	103.5	32 56.7	+58.9	104.1	32 41.8	+59.0	104.8	32 26.2	+59.2	105.4	30
31	34 59.1	+57.3	100.5	34 47.8	+57.6	101.2	34 35.8	+57.9	101.9	34 23.0	+58.3	102.6	34 09.6	+58.6	103.2	33 55.6	+58.8	103.9	33 40.8	+59.1	104.5	33 25.4	+59.3	105.2	31
32	35 56.4	+57.2	100.2	35 45.4	+57.6	100.9	35 33.7	+57.9	101.6	35 21.3	+58.2	102.3	35 08.2	+58.5	103.0	34 54.4	+58.8	103.7	34 39.9	+59.0	104.3	34 24.7	+59.2	105.0	32
33	36 53.6	+57.1	99.8	36 43.0	+57.5	100.5	36 31.6	+57.9	101.3	36 19.5	+58.2	102.0	36 06.7	+58.5	102.7	35 53.2	+58.7	103.4	35 38.9	+59.0	104.1	35 23.9	+59.2	104.8	33
34	37 50.7	+57.0	99.4	37 40.5	+57.4	100.2	37 29.5	+57.8	100.9	37 17.7	+58.2	101.7	37 05.2	+58.4	102.4	36 51.9	+58.7	103.2	36 37.9	+59.0	103.9	36 23.1	+59.2	104.6	34
35	38 47.7	+57.0	99.0	38 37.9	+57.4	99.8	38 27.3	+57.7	100.6	38 15.9	+58.1	101.4	38 03.6	+58.4	102.1	37 50.6	+58.7	102.9	37 36.9	+58.9	103.7	37 22.3	+59.2	104.4	35
36	39 44.7	+56.9	98.6	39 35.3	+57.3	99.4	39 25.0	+57.7	100.2	39 14.0	+58.0	101.0	39 02.0	+58.4	101.8	38 49.3	+58.7	102.6	38 35.8	+58.9	103.4	38 21.5	+59.1	104.2	36
37	40 41.6	+56.8	98.2	40 32.6	+57.2	99.0	40 22.7	+57.6	99.9	40 12.0	+58.0	100.7	40 00.4	+58.3	101.5	39 48.0	+58.6	102.4	39 34.7	+58.9	103.2	39 20.6	+59.2	104.0	37
38	41 38.4	+56.6	97.8	41 29.8	+57.1	98.6	41 20.3	+57.6	99.5	41 10.0	+57.9	100.4	40 58.7	+58.3	101.2	40 46.6	+58.6	102.1	40 33.6	+58.8	102.9	40 19.8	+59.1	103.8	38
39	42 35.0	+56.6	97.3	42 26.9	+57.1	98.2	42 17.9	+57.4	99.1	42 07.9	+57.8	100.0	41 57.0	+58.2	100.9	41 45.2	+58.5	101.8	41 32.4	+58.9	102.7	41 18.9	+59.0	103.5	39
40	43 31.6	+56.5	96.9	43 24.0	+56.9	97.8	43 15.3	+57.4	98.7	43 05.7	+57.8	99.7	42 55.2	+58.1	100.6	42 43.7	+58.5	101.5	42 31.3	+58.7	102.4	42 17.9	+59.1	103.3	40
41	44 28.1	+56.3	96.4	44 20.9	+56.8	97.4	44 12.7	+57.3	98.3	44 03.5	+57.7	99.3	43 53.3	+58.1	100.2	43 42.2	+58.4	101.2	43 30.0	+58.8	102.1	43 17.0	+59.0	103.0	41
42	45 24.4	+56.3	95.9	45 17.7	+56.8	96.9	45 10.0	+57.2	97.9	45 01.2	+57.6	98.9	44 51.4	+58.0	99.9	44 40.6	+58.4	100.9	44 28.8	+58.7	101.8	44 16.0	+58.9	102.8	42
43	46 20.7	+56.0	95.4	46 14.5	+56.6	96.5	46 07.2	+57.1	97.5	45 58.8	+57.6	98.5	45 49.4	+58.0	99.5	45 39.0	+58.3	100.5	45 27.5	+58.6	101.5	45 14.9	+59.0	102.5	43
44	47 16.7	+56.0	94.9	47 11.1	+56.4	96.0	47 04.3	+56.9	97.0	46 56.4	+57.4	98.1	46 47.4	+57.8	99.2	46 37.3	+58.2	100.2	46 26.1	+58.6	101.2	46 13.9	+58.9	102.3	44
45	48 12.7	+55.8	94.4	48 07.5	+56.4	95.5	48 01.2	+56.9	96.6	47 53.8	+57.3	97.7	47 45.2	+57.8	98.8	47 35.5	+58.2	99.9	47 24.7	+58.5	100.9	47 12.8	+58.8	102.0	45
46	49 08.5	+55.6	93.8	49 03.9	+56.2	94.9	48 58.1	+56.7	96.1	48 51.1	+57.3	97.2	48 43.0	+57.7	98.4	48 33.7	+58.1	99.5	48 23.2	+58.5	100.6	48 11.6	+58.8	101.7	46
47	50 04.1	+55.4	93.2	50 00.1	+56.0	94.4	49 54.8	+56.7	95.6	49 48.4	+57.1	96.8	49 40.7	+57.6	97.9	49 31.8	+58.0	99.1	49 21.7	+58.4	100.3	49 10.4	+58.8	101.4	47
48	50 59.5	+55.2	92.6	50 56.1	+55.9	93.8	50 51.5	+56.4	95.1	50 45.5	+57.0	96.3	50 38.3	+57.5	97.5	50 29.8	+58.0	98.7	50 20.1	+58.4	99.9	50 09.2	+58.7	101.1	48
49	51 54.7	+55.1	92.0	51 52.0	+55.7	93.3	51 47.9	+56.3	94.5	51 42.5	+56.9	95.8	51 35.8	+57.4	97.1	51 27.8	+57.9	98.3	51 18.5	+58.3	99.5	51 07.9	+58.7	100.8	49
50	52 49.8	+54.8	91.3	52 47.7	+55.5	92.7	52 44.2	+56.2	94.0	52 39.4	+56.7	95.3	52 33.2	+57.3	96.6	52 25.7	+57.7	97.9	52 16.8	+58.2	99.2	52 06.6	+58.6	100.4	50
51	53 44.6	+54.6	90.7	53 43.2	+55.3	92.0	53 40.4	+55.9	93.4	53 36.1	+56.6	94.7	53 30.5	+57.1	96.1	53 23.4	+57.7	97.4	53 15.0	+58.1	98.7	53 05.2	+58.5	100.1	51
52	54 39.2	+54.3	89.9	54 38.5	+55.0	91.4	54 36.3	+55.8	92.8	54 32.7	+56.4	94.2	54 27.6	+57.0	95.6	54 21.1	+57.5	97.0	54 13.1	+58.0	98.3	54 03.7	+58.4	99.7	52
53	55 33.5	+54.0	89.2	55 33.5	+54.8	90.7	55 32.1	+55.5	92.1	55 29.1	+56.2	93.6	55 24.6	+56.9	95.0	55 18.6	+57.4	96.5	55 11.1	+57.9	97.9	55 02.1	+58.4	99.3	53
54	56 27.5	+53.7	88.4	56 28.3	+54.6	89.9	56 27.6	+55.3	91.4	56 25.3	+56.1	92.9	56 21.5	+56.6	94.4	56 16.0	+57.3	95.9	56 09.0	+57.9	97.4	56 00.5	+58.3	98.9	54
55	57 21.2	+53.4	87.6	57 22.9	+54.2	89.2	57 22.9	+55.1	90.7	57 21.4	+55.8	92.3	57 18.1	+56.6	93.8	57 13.3	+57.1	95.4	57 06.9	+57.7	96.9	56 58.8	+58.2	98.5	55
56	58 14.6	+53.0	86.8	58 17.1	+54.0	88.4	58 18.0	+54.8	90.0	58 17.2	+55.6	91.6	58 14.7	+56.3	93.2	58 10.4	+57.0	94.8	58 04.6	+57.5	96.4	57 57.0	+58.1	98.0	56
57	59 07.6	+52.6	85.9	59 11.1	+53.6	87.5	59 12.8	+54.5	89.2	59 12.8	+55.3	90.9	59 11.0	+56.1	92.6	59 07.4	+56.8	94.2	59 02.1	+57.4	95.9	58 55.1	+58.0	97.5	57
58	60 00.2	+52.2	84.9	60 04.7	+53.2	86.6	60 07.3	+54.1	88.4	60 08.1	+55.0	90.1	60 07.1	+55.8	91.9	60 04.2	+56.6	93.6	59 59.5	+57.3	95.3	59 53.1	+57.9	97.0	58
59	60 52.4	+51.8	83.9	60 57.9	+52.8	85.7	61 01.4	+53.9	87.5	61 03.1	+54.8	89.3	61 02.9	+55.6	91.1	61 00.8	+56.4	92.9	60 56.8	+57.1	94.7	60 51.0	+57.7	96.5	59
60	61 44.2	+51.2	82.8	61 50.7	+52.3	84.7	61 55.3	+53.4	86.6	61 57.9	+54.4	88.4	61 58.5	+55.3	90.3	61 57.2	+56.1	92.2	61 53.9	+56.9	94.1	61 48.7	+57.6	95.9	60
61	62 35.4	+50.6	81.7	62 43.0	+51.9	83.6	62 48.7	+52.9	85.6	62 52.3	+54.0	87.5	62 53.8	+55.0	89.5	62 53.3	+55.9	91.4	62 50.8	+56.7	93.4	62 46.3	+57.4	95.3	61
62	63 26.0	+50.1	80.6	63 34.9	+51.3	82.5	63 41.6	+52.5	84.5	63 46.3	+53.6	86.6	63 48.8	+54.7	88.6	63 49.2	+55.6	90.6	63 47.5	+56.5	92.7	63 43.7	+57.2	94.7	62
63	64 16.1	+49.3	79.3	64 26.2	+50.6	81.4	64 34.1	+52.0	83.4	64 39.9	+53.1	85.5	64 43.5	+54.2	87.6	64 44.8	+55.3	89.8	64 44.0	+56.2	91.9	64 40.9	+57.0	94.0	63
64	65 05.4	+48.6	78.0	65 16.8	+50.1	80.1	65 26.1	+51.3	82.2	65 33.0	+52.7	84.4	65 37.7	+53.8	86.6	65 40.1	+54.9	88.8	65 40.2	+55.9	91.0	65 37.9	+56.8	93.2	64
65	65 54.0	+47.8	76.6	66 06.9	+49.2	78.7	66 17.4	+50.7	81.0	66 25.7	+52.0	83.2	66 31.5	+53.3	85.5	66 35.0	+54.5	87.8	66 36.1	+55.5	90.1	66 34.7	+56.5	92.5	65
66	66 41.8	+46.8	75.0	66 56.1	+48.5	77.3	67 08.1	+50.0	79.6	67 17.7	+51.4	82.0	67 24.8	+52.8	84.4	67 29.5	+54.0	86.8	67 31.6	+55.2	89.2	67 31.2	+56.2	91.6	66
67	67 28.6	+45.9	73.4	67 44.6	+47.5	75.8	67 58.1	+49.1	78.2	68 09.1	+50.7	80.6	68 17.6	+52.2	83.1	68 23.5	+53.5	85.6	68 26.8	+54.8	88.1	68 27.4	+55.9	90.7	67
68	68 14.5	+44.7	71.7	68 32.1	+46.5	74.1	68 47.2	+48.2	76.6	68 59.8	+49.9	79.2	69 09.8	+51.4	81.7	69 17.0	+53.0	84.3	69 21.6	+54.3	87.0	69 23.3	+55.5	89.6	68
69	68 59.2	+43.4	69.9	69 18.6	+45.3	72.4	69 35.4	+47.2	74.9	69 49.7	+49.0	77.6	70 01.2	+50.7	80.3	70 10.0	+52.2	83.0	70 15.9	+53.7	85.8	70 18.8	+55.1	88.5	69
70	69 42.6	+42.0	67.9	70 03.9	+44.0	70.5	70 22.6	+46.0	73.1	70 38.7	+47.9	75.9	70 51.9	+49.7	78.7	71 02.2	+51.5	81.5	71 09.6	+53.1	84.4	71 13.9	+54.6	87.3	70
71	70 24.6	+40.5	65.9	70 47.9	+42.7	68.5	71 08.6	+44.7	71.2	71 26.6	+46.7	74.0	71 41.6	+48.8	76.9	71 53.7	+50.6	79.9	72 02.7	+52.3	82.9	72 08.5	+53.9	86.0	71
72	71 05.1	+38.8	63.6	71 30.6	+41.0	66.3	71 53.3	+43.3	69.1	72 13.3	+45.4	72.0	72 30.4	+47.5	75.0	72 44.3	+49.6	78.1	72 55.0	+51.5	81.3	73 02.4	+53.3	84.6	72
73	71 43.9	*+36.9*•	61.2	72 11.6	+39.2	63.9	72 36.6	+41.5	66.8	72 58.7	+43.9	69.8	73 17.9	+46.2	72.9	73 33.9	+48.4	76.2	73 46.5	+50.5	79.5	73 55.7	+52.4	82.9	73
74	72 20.8	*+34.7*•	58.7	72 50.8	*+37.1*•	61.4	73 18.1	*+39.7*•	64.3	73 42.6	+42.2	67.4	74 04.1	+44.6	70.7	74 22.3	+47.0	74.0	74 37.0	+49.4	77.5	74 48.1	+51.5	81.1	74
75	72 55.5	*+32.4*•	55.9	73 27.9	*+35.0*•	58.7	73 57.8	*+37.5*•	61.7	74 24.8	*+40.1*•	64.8	74 48.7	+42.8	68.2	75 09.3	+45.4	71.7	75 26.4	+47.9	75.3	75 39.6	+50.4	79.1	75
76	73 27.9	*+29.9*•	53.0	74 02.9	*+32.4*•	55.8	74 35.3	*+35.1*•	58.8	75 04.9	*+37.9*•	62.0	75 31.5	*+40.7*•	65.4	75 54.7	*+43.5*•	69.1	76 14.3	+46.3	72.9	76 30.0	+48.9	76.9	76
77	73 57.8	*+27.0*•	49.9	74 35.3	*+29.6*•	52.7	75 10.4	*+32.4*•	55.7	75 42.8	*+35.3*•	58.9	76 12.2	*+38.3*•	62.4	76 38.2	*+41.4*•	66.2	77 00.6	*+44.4*•	70.1	77 18.9	+47.4	74.3	77
78	74 24.8	*+23.9*•	46.6	75 04.9	*+26.6*•	49.4	75 42.8	*+29.4*•	52.3	76 18.1	*+32.4*•	55.6	76 50.5	*+35.5*•	59.1	77 19.6	*+38.7*•	62.9	77 45.0	*+42.0*•	67.0	78 06.3	*+45.3*•	71.4	78
79	74 48.7	*+20.6*•	43.2	75 31.5	*+23.2*•	45.8	76 12.2	*+26.0*•	48.8	76 50.5	*+29.1*•	52.0	77 26.0	*+32.3*•	55.5	77 58.3	*+35.8*•	59.4	78 27.0	*+39.3*•	63.6	78 51.6	*+42.8*•	68.1	79
80	75 09.3	*+17.1*•	39.6	75 54.7	*+19.6*•	42.1	76 38.2	*+22.4*•	44.9	77 19.6	*+25.4*•	48.1	77 58.3	*+28.7*•	51.5	78 34.1	*+32.2*•	55.4	79 06.3	*+36.0*•	59.7	79 34.4	*+39.9*•	64.4	80
81	75 26.4	*+13.2*•	35.8	76 14.3	*+15.7*•	38.2	77 00.6	*+18.3*•	40.8	77 45.0	*+21.3*•	43.9	78 27.0	*+24.6*•	47.2	79 06.3	*+28.1*•	51.1	79 42.3	*+32.0*•	55.3	80 14.3	*+36.3*•	60.1	81
82	75 39.6	*+9.4*•	31.9	76 30.0	*+11.5*•	34.1	77 18.9	*+14.1*•	36.6	78 06.3	*+16.8*•	39.4	78 51.6	*+20.0*•	42.6	79 34.4	*+23.6*•	46.3	80 14.3	*+27.5*•	50.5	80 50.6	*+31.8*•	55.3	82
83	75 49.0	*+5.2*•	27.9	76 41.5	*+7.3*•	29.8	77 33.0	*+9.5*•	32.1	78 23.1	*+12.0*•	34.7	79 11.6	*+14.9*•	37.6	79 58.0	*+18.3*•	41.1	80 41.8	*+22.2*•	45.1	81 22.4	*+26.6*•	49.8	83
84	75 54.2	*+1.1*•	23.8	76 48.8	*+2.8*•	25.5	77 42.5	*+4.7*•	27.5	78 35.1	*+7.0*•	29.8	79 26.5	*+9.7*•	32.4	80 16.3	*+12.7*•	35.5	81 04.0	*+16.3*•	39.2	81 49.0	*+20.5*•	43.6	84
85	75 55.3	*−3.1*•	19.7	76 51.6	*−1.7*•	21.1	77 47.2	*−0.1*•	22.8	78 42.1	*+1.8*•	24.7	79 36.2	*+3.9*•	27.0	80 29.0	*+6.6*•	29.7	81 20.3	*+9.7*•	32.9	82 09.5	*+13.5*•	36.9	85
86	75 52.2	*−7.1*•	15.6	76 49.9	*−6.1*•	16.7	77 47.1	*−4.8*•	18.0	78 43.9	*−3.4*•	19.6	79 40.1	*−1.7*•	21.4	80 35.6	*+0.3*•	23.6	81 30.0	*+2.8*•	26.3	82 23.0	*+5.9*•	29.6	86
87	75 45.1	*−11.3*•	11.5	76 43.8	*−10.5*•	12.4	77 42.3	*−9.7*•	13.4	78 40.5	*−8.6*•	14.5	79 38.4	*−7.4*•	15.9	80 35.9	*−6.0*•	17.5	81 32.8	*−4.2*•	19.5	82 28.9	*−2.0*•	22.1	87
88	75 33.8	*−15.0*•	7.6	76 33.3	*−14.7*•	8.1	77 32.6	*−14.1*•	8.7	78 31.9	*−13.6*•	9.5	79 31.0	*−12.9*•	10.4	80 29.9	*−12.1*•	11.5	81 28.6	*−11.1*•	12.8	82 26.9	*−9.8*•	14.4	88
89	75 18.8	*−18.8*•	3.7	76 18.6	*−18.6*•	4.0	77 18.5	*−18.5*•	4.3	78 18.3	*−18.3*•	4.6	79 18.1	*−18.1*•	5.1	80 17.8	*−17.8*•	5.6	81 17.5	*−17.5*•	6.2	82 17.1	*−17.1*•	7.0	89
90	75 00.0	*−22.2*•	0.0	76 00.0	*−22.3*•	0.0	77 00.0	*−22.5*•	0.0	78 00.0	*−22.6*•	0.0	79 00.0	*−22.8*•	0.0	80 00.0	*−23.1*•	0.0	81 00.0	*−23.3*•	0.0	82 00.0	*−23.7*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 04.7	−58.2	109.4	4 44.8	−58.4	109.5	4 24.8	−58.7	109.5	4 04.7	−58.9	109.6	3 44.5	−59.0	109.7	3 24.3	−59.2	109.7	3 04.0	−59.3	109.8	2 43.7	−59.5	109.8	0
1	4 06.5	−58.2	109.6	3 46.4	−58.5	109.7	3 26.1	−58.6	109.7	3 05.8	−58.8	109.8	2 45.5	−59.0	109.8	2 25.1	−59.2	109.9	2 04.7	−59.4	109.9	1 44.2	−59.5	110.0	1
2	3 08.3	−58.2	109.9	2 47.9	−58.4	109.9	2 27.5	−58.7	110.0	2 07.0	−58.9	110.0	1 46.5	−59.1	110.0	1 25.9	−59.2	110.0	1 05.3	−59.3	110.1	0 44.7	−59.5	110.1	2
3	2 10.1	−58.2	110.1	1 49.5	−58.4	110.1	1 28.8	−58.6	110.2	1 08.1	−58.8	110.2	0 47.4	−59.0	110.2	0 26.7	−59.2	110.2	0 06.0	−59.4	110.2	0 14.8	+59.4	69.8	3
4	1 11.9	−58.2	110.3	0 51.1	−58.5	110.4	0 30.2	−58.7	110.4	0 09.3	−58.8	110.4	0 11.6	+59.0	69.6	0 32.5	+59.2	69.6	0 53.4	+59.3	69.6	1 14.2	+59.5	69.7	4
5	0 13.7	−58.2	110.6	0 07.4	+58.4	69.4	0 28.5	+58.6	69.4	0 49.5	+58.9	69.4	1 10.6	+59.1	69.4	1 31.7	+59.2	69.5	1 52.7	+59.4	69.5	2 13.7	+59.5	69.5	5
6	0 44.5	+58.2	69.2	1 05.8	+58.4	69.2	1 27.1	+58.6	69.2	1 48.4	+58.8	69.2	2 09.7	+59.0	69.3	2 30.9	+59.2	69.3	2 52.1	+59.3	69.3	3 13.2	+59.5	69.4	6
7	1 42.7	+58.1	68.9	2 04.2	+58.4	69.0	2 25.7	+58.7	69.0	2 47.2	+58.9	69.0	3 08.7	+59.0	69.1	3 30.1	+59.2	69.1	3 51.4	+59.4	69.2	4 12.7	+59.5	69.3	7
8	2 40.8	+58.2	68.7	3 02.6	+58.5	68.7	3 24.4	+58.6	68.8	3 46.1	+58.8	68.8	4 07.7	+59.0	68.9	4 29.3	+59.2	69.0	4 50.8	+59.3	69.0	5 12.2	+59.4	69.1	8
9	3 39.0	+58.2	68.4	4 01.1	+58.4	68.5	4 23.0	+58.7	68.6	4 44.9	+58.8	68.6	5 06.7	+59.0	68.7	5 28.5	+59.1	68.8	5 50.1	+59.3	68.9	6 11.6	+59.5	69.0	9
10	4 37.2	+58.2	68.2	4 59.5	+58.4	68.3	5 21.7	+58.6	68.4	5 43.7	+58.9	68.4	6 05.7	+59.1	68.5	6 27.6	+59.2	68.6	6 49.4	+59.4	68.8	7 11.1	+59.5	68.9	10
11	5 35.4	+58.2	67.9	5 57.9	+58.4	68.0	6 20.3	+58.6	68.1	6 42.6	+58.8	68.2	7 04.8	+59.0	68.4	7 26.8	+59.2	68.5	7 48.8	+59.3	68.6	8 10.6	+59.5	68.7	11
12	6 33.6	+58.2	67.7	6 56.3	+58.4	67.8	7 18.9	+58.6	67.9	7 41.4	+58.8	68.0	8 03.8	+59.0	68.2	8 26.0	+59.2	68.3	8 48.1	+59.3	68.5	9 10.1	+59.4	68.6	12
13	7 31.8	+58.1	67.5	7 54.7	+58.4	67.6	8 17.5	+58.6	67.7	8 40.2	+58.8	67.8	9 02.8	+59.0	68.0	9 25.2	+59.2	68.1	9 47.4	+59.4	68.3	10 09.5	+59.5	68.5	13
14	8 29.9	+58.2	67.2	8 53.1	+58.4	67.3	9 16.1	+58.6	67.5	9 39.0	+58.8	67.6	10 01.8	+59.0	67.8	10 24.4	+59.1	68.0	10 46.8	+59.3	68.1	11 09.0	+59.5	68.3	14
15	9 28.1	+58.1	67.0	9 51.5	+58.4	67.1	10 14.7	+58.6	67.3	10 37.8	+58.8	67.4	11 00.8	+59.0	67.6	11 23.5	+59.2	67.8	11 46.1	+59.3	68.0	12 08.5	+59.4	68.2	15
16	10 26.2	+58.1	66.7	10 49.9	+58.3	66.9	11 13.3	+58.6	67.1	11 36.6	+58.8	67.2	11 59.8	+58.9	67.4	12 22.7	+59.1	67.6	12 45.4	+59.3	67.8	13 07.9	+59.5	68.1	16
17	11 24.3	+58.2	66.5	11 48.2	+58.4	66.6	12 11.9	+58.6	66.8	12 35.4	+58.8	67.0	12 58.7	+59.0	67.2	13 21.8	+59.2	67.5	13 44.7	+59.3	67.7	14 07.4	+59.4	67.9	17
18	12 22.5	+58.1	66.2	12 46.6	+58.3	66.4	13 10.5	+58.6	66.6	13 34.2	+58.8	66.8	13 57.7	+59.0	67.1	14 21.0	+59.1	67.3	14 44.0	+59.3	67.5	15 06.8	+59.5	67.8	18
19	13 20.6	+58.1	65.9	13 44.9	+58.3	66.2	14 09.1	+58.5	66.4	14 33.0	+58.7	66.6	14 56.7	+58.9	66.9	15 20.1	+59.1	67.1	15 43.3	+59.3	67.4	16 06.3	+59.4	67.6	19
20	14 18.7	+58.0	65.7	14 43.2	+58.4	65.9	15 07.6	+58.5	66.2	15 31.7	+58.8	66.4	15 55.6	+59.0	66.7	16 19.2	+59.2	66.9	16 42.6	+59.3	67.2	17 05.7	+59.5	67.5	20
21	15 16.7	+58.1	65.4	15 41.6	+58.3	65.7	16 06.1	+58.6	65.9	16 30.5	+58.7	66.2	16 54.6	+58.9	66.5	17 18.4	+59.1	66.8	17 41.9	+59.3	67.1	18 05.2	+59.4	67.4	21
22	16 14.8	+58.0	65.2	16 39.9	+58.2	65.4	17 04.7	+58.5	65.7	17 29.2	+58.7	66.0	17 53.5	+58.9	66.3	18 17.5	+59.1	66.6	18 41.2	+59.2	66.9	19 04.6	+59.4	67.2	22
23	17 12.8	+58.0	64.9	17 38.1	+58.3	65.2	18 03.2	+58.5	65.5	18 27.9	+58.7	65.8	18 52.4	+58.9	66.1	19 16.6	+59.1	66.4	19 40.4	+59.3	66.7	20 04.0	+59.4	67.1	23
24	18 10.8	+58.0	64.6	18 36.4	+58.2	64.9	19 01.7	+58.4	65.2	19 26.6	+58.7	65.6	19 51.3	+58.9	65.9	20 15.7	+59.1	66.2	20 39.7	+59.3	66.6	21 03.4	+59.4	66.9	24
25	19 08.8	+58.0	64.4	19 34.6	+58.2	64.7	20 00.1	+58.5	65.0	20 25.3	+58.7	65.3	20 50.2	+58.9	65.7	21 14.8	+59.0	66.0	21 39.0	+59.2	66.4	22 02.8	+59.4	66.8	25
26	20 06.8	+57.9	64.1	20 32.8	+58.2	64.4	20 58.6	+58.4	64.8	21 24.0	+58.7	65.1	21 49.1	+58.8	65.5	22 13.8	+59.1	65.8	22 38.2	+59.2	66.2	23 02.2	+59.4	66.6	26
27	21 04.7	+57.9	63.8	21 31.0	+58.2	64.2	21 57.0	+58.4	64.5	22 22.7	+58.6	64.9	22 47.9	+58.9	65.3	23 12.9	+59.0	65.6	23 37.4	+59.2	66.0	24 01.6	+59.4	66.4	27
28	22 02.6	+57.9	63.5	22 29.2	+58.1	63.9	22 55.4	+58.4	64.3	23 21.3	+58.6	64.7	23 46.8	+58.8	65.0	24 11.9	+59.0	65.5	24 36.6	+59.2	65.9	25 01.0	+59.3	66.3	28
29	23 00.5	+57.9	63.2	23 27.3	+58.2	63.6	23 53.8	+58.4	64.0	24 19.9	+58.6	64.4	24 45.6	+58.8	64.8	25 10.9	+59.0	65.3	25 35.8	+59.2	65.7	26 00.3	+59.4	66.1	29
30	23 58.4	+57.8	63.0	24 25.5	+58.0	63.4	24 52.2	+58.3	63.8	25 18.5	+58.6	64.2	25 44.4	+58.8	64.6	26 09.9	+59.0	65.1	26 35.0	+59.2	65.5	26 59.7	+59.3	66.0	30
31	24 56.2	+57.8	62.7	25 23.5	+58.1	63.1	25 50.5	+58.3	63.5	26 17.1	+58.5	63.9	26 43.2	+58.8	64.4	27 08.9	+59.0	64.9	27 34.2	+59.2	65.3	27 59.0	+59.4	65.8	31
32	25 54.0	+57.7	62.4	26 21.6	+58.0	62.8	26 48.8	+58.3	63.2	27 15.6	+58.5	63.7	27 42.0	+58.7	64.2	28 07.9	+59.0	64.6	28 33.4	+59.1	65.1	28 58.4	+59.3	65.6	32
33	26 51.7	+57.7	62.1	27 19.6	+58.0	62.5	27 47.1	+58.2	63.0	28 14.1	+58.5	63.4	28 40.7	+58.8	63.9	29 06.9	+58.9	64.4	29 32.5	+59.1	64.9	29 57.7	+59.3	65.5	33
34	27 49.4	+57.7	61.7	28 17.6	+57.9	62.2	28 45.3	+58.3	62.7	29 12.6	+58.5	63.2	29 39.5	+58.7	63.7	30 05.8	+58.9	64.2	30 31.6	+59.2	64.7	30 57.0	+59.3	65.3	34
35	28 47.1	+57.6	61.4	29 15.5	+58.0	61.9	29 43.6	+58.1	62.4	30 11.1	+58.4	62.9	30 38.2	+58.6	63.5	31 04.7	+58.9	64.0	31 30.8	+59.1	64.5	31 56.3	+59.3	65.1	35
36	29 44.7	+57.6	61.1	30 13.5	+57.8	61.6	30 41.7	+58.2	62.1	31 09.5	+58.4	62.7	31 36.8	+58.7	63.2	32 03.6	+58.9	63.8	32 29.9	+59.0	64.3	32 55.6	+59.2	64.9	36
37	30 42.3	+57.5	60.8	31 11.3	+57.8	61.3	31 39.9	+58.1	61.9	32 07.9	+58.4	62.4	32 35.5	+58.6	63.0	33 02.5	+58.8	63.5	33 28.9	+59.1	64.1	33 54.8	+59.3	64.7	37
38	31 39.8	+57.5	60.5	32 09.1	+57.8	61.0	32 38.0	+58.0	61.6	33 06.3	+58.3	62.1	33 34.1	+58.5	62.7	34 01.3	+58.8	63.3	34 28.0	+59.0	63.9	34 54.1	+59.2	64.5	38
39	32 37.3	+57.4	60.1	33 06.9	+57.7	60.7	33 36.0	+58.0	61.3	34 04.6	+58.3	61.8	34 32.6	+58.6	62.4	35 00.1	+58.8	63.1	35 27.0	+59.0	63.7	35 53.3	+59.2	64.3	39
40	33 34.7	+57.3	59.8	34 04.6	+57.7	60.4	34 34.0	+58.0	60.9	35 02.9	+58.2	61.6	35 31.2	+58.5	62.2	35 58.9	+58.7	62.8	36 26.0	+59.0	63.5	36 52.5	+59.2	64.1	40
41	34 32.0	+57.3	59.4	35 02.3	+57.6	60.0	35 32.0	+57.9	60.6	36 01.1	+58.2	61.3	36 29.7	+58.5	61.9	36 57.6	+58.8	62.6	37 25.0	+58.9	63.2	37 51.7	+59.1	63.9	41
42	35 29.3	+57.3	59.1	35 59.9	+57.6	59.7	36 29.9	+57.9	60.3	36 59.3	+58.2	61.0	37 28.2	+58.4	61.6	37 56.4	+58.7	62.3	38 23.9	+58.9	63.0	38 50.8	+59.2	63.7	42
43	36 26.6	+57.1	58.7	36 57.5	+57.5	59.3	37 27.8	+57.8	60.0	37 57.5	+58.1	60.6	38 26.6	+58.4	61.3	38 55.1	+58.6	62.0	39 22.8	+58.9	62.8	39 50.0	+59.1	63.5	43
44	37 23.7	+57.1	58.3	37 55.0	+57.4	59.0	38 25.6	+57.7	59.6	38 55.6	+58.1	60.3	39 25.0	+58.3	61.0	39 53.7	+58.6	61.8	40 21.7	+58.9	62.5	40 49.1	+59.1	63.3	44
45	38 20.8	+57.0	57.9	38 52.4	+57.3	58.6	39 23.3	+57.7	59.3	39 53.7	+57.9	60.0	40 23.3	+58.3	60.7	40 52.3	+58.6	61.5	41 20.6	+58.8	62.3	41 48.2	+59.0	63.0	45
46	39 17.8	+56.9	57.5	39 49.7	+57.3	58.2	40 21.0	+57.6	58.9	40 51.6	+58.0	59.7	41 21.6	+58.2	60.4	41 50.9	+58.5	61.2	42 19.4	+58.8	62.0	42 47.2	+59.0	62.8	46
47	40 14.7	+56.8	57.1	40 47.0	+57.2	57.8	41 18.6	+57.6	58.6	41 49.6	+57.8	59.3	42 19.8	+58.2	60.1	42 49.4	+58.5	60.9	43 18.2	+58.7	61.7	43 46.2	+59.0	62.6	47
48	41 11.5	+56.8	56.7	41 44.2	+57.1	57.4	42 16.2	+57.4	58.2	42 47.4	+57.8	59.0	43 18.0	+58.1	59.8	43 47.9	+58.4	60.6	44 16.9	+58.7	61.4	44 45.2	+59.0	62.3	48
49	42 08.3	+56.6	56.2	42 41.3	+57.0	57.0	43 13.6	+57.4	57.8	43 45.2	+57.8	58.6	44 16.1	+58.1	59.4	44 46.3	+58.3	60.3	45 15.6	+58.7	61.1	45 44.2	+58.9	62.0	49
50	43 04.9	+56.5	55.8	43 38.3	+56.9	56.6	44 11.0	+57.3	57.4	44 43.0	+57.6	58.2	45 14.2	+58.0	59.1	45 44.6	+58.4	59.9	46 14.3	+58.6	60.8	46 43.1	+58.9	61.8	50
51	44 01.4	+56.4	55.3	44 35.2	+56.8	56.1	45 08.3	+57.2	57.0	45 40.6	+57.6	57.8	46 12.2	+57.9	58.7	46 43.0	+58.2	59.6	47 12.9	+58.5	60.5	47 42.0	+58.8	61.5	51
52	44 57.8	+56.3	54.9	45 32.0	+56.7	55.7	46 05.5	+57.1	56.5	46 38.2	+57.5	57.4	47 10.1	+57.8	58.3	47 41.2	+58.2	59.2	48 11.4	+58.5	60.2	48 40.8	+58.8	61.2	52
53	45 54.1	+56.2	54.4	46 28.7	+56.6	55.2	47 02.6	+57.0	56.1	47 35.7	+57.3	57.0	48 07.9	+57.8	57.9	48 39.4	+58.1	58.9	49 09.9	+58.5	59.9	49 39.6	+58.7	60.9	53
54	46 50.3	+56.0	53.8	47 25.3	+56.4	54.7	47 59.6	+56.8	55.6	48 33.0	+57.3	56.6	49 05.7	+57.6	57.5	49 37.5	+58.0	58.5	50 08.4	+58.3	59.5	50 38.3	+58.7	60.6	54
55	47 46.3	+55.8	53.3	48 21.7	+56.3	54.2	48 56.4	+56.8	55.1	49 30.3	+57.2	56.1	50 03.3	+57.6	57.1	50 35.5	+57.9	58.1	51 06.7	+58.3	59.2	51 37.0	+58.6	60.2	55
56	48 42.1	+55.7	52.8	49 18.0	+56.2	53.7	49 53.2	+56.6	54.6	50 27.5	+57.0	55.6	51 00.9	+57.5	56.6	51 33.4	+57.9	57.7	52 05.0	+58.3	58.8	52 35.6	+58.6	59.9	56
57	49 37.8	+55.5	52.2	50 14.2	+56.0	53.1	50 49.8	+56.4	54.1	51 24.5	+56.9	55.1	51 58.4	+57.3	56.2	52 31.3	+57.7	57.3	53 03.3	+58.1	58.4	53 34.2	+58.5	59.5	57
58	50 33.3	+55.4	51.6	51 10.2	+55.8	52.6	51 46.2	+56.4	53.6	52 21.4	+56.8	54.6	52 55.7	+57.2	55.7	53 29.0	+57.7	56.8	54 01.4	+58.0	58.0	54 32.7	+58.4	59.1	58
59	51 28.7	+55.1	51.0	52 06.0	+55.7	52.0	52 42.6	+56.1	53.0	53 18.2	+56.6	54.1	53 52.9	+57.1	55.2	54 26.7	+57.5	56.3	54 59.4	+58.0	57.5	55 31.1	+58.3	58.7	59
60	52 23.8	+54.9	50.4	53 01.7	+55.4	51.4	53 38.7	+56.0	52.4	54 14.8	+56.5	53.5	54 50.0	+57.0	54.7	55 24.2	+57.4	55.8	55 57.4	+57.8	57.1	56 29.4	+58.3	58.3	60
61	53 18.7	+54.7	49.7	53 57.1	+55.3	50.7	54 34.7	+55.7	51.8	55 11.3	+56.3	52.9	55 47.0	+56.8	54.1	56 21.6	+57.3	55.3	56 55.2	+57.7	56.6	57 27.7	+58.1	57.9	61
62	54 13.4	+54.4	49.0	54 52.4	+55.0	50.1	55 30.4	+55.6	51.2	56 07.6	+56.1	52.3	56 43.8	+56.6	53.5	57 18.9	+57.1	54.8	57 52.9	+57.6	56.1	58 25.8	+58.1	57.4	62
63	55 07.8	+54.2	48.3	55 47.4	+54.7	49.4	56 26.0	+55.3	50.5	57 03.7	+55.9	51.7	57 40.4	+56.4	52.9	58 16.0	+57.0	54.2	58 50.5	+57.5	55.5	59 23.9	+57.9	56.9	63
64	56 02.0	+53.9	47.5	56 42.1	+54.5	48.6	57 21.3	+55.1	49.8	57 59.6	+55.6	51.0	58 36.8	+56.2	52.3	59 13.0	+56.7	53.6	59 48.0	+57.3	55.0	60 21.8	+57.8	56.4	64
65	56 55.9	+53.5	46.7	57 36.6	+54.2	47.8	58 16.4	+54.8	49.0	58 55.2	+55.4	50.3	59 33.0	+56.0	51.6	60 09.7	+56.6	53.0	60 45.3	+57.1	54.4	61 19.6	+57.7	55.9	65
66	57 49.4	+53.2	45.9	58 30.8	+53.8	47.0	59 11.2	+54.5	48.3	59 50.6	+55.2	49.5	60 29.0	+55.8	50.9	61 06.3	+56.4	52.3	61 42.4	+57.0	53.7	62 17.3	+57.5	55.3	66
67	58 42.6	+52.8	45.0	59 24.6	+53.5	46.2	60 05.7	+54.2	47.4	60 45.8	+54.8	48.7	61 24.8	+55.5	50.1	62 02.7	+56.1	51.6	62 39.4	+56.7	53.1	63 14.8	+57.3	54.7	67
68	59 35.4	+52.4	44.1	60 18.1	+53.1	45.3	60 59.9	+53.8	46.6	61 40.6	+54.5	47.9	62 20.3	+55.2	49.3	62 58.8	+55.9	50.8	63 36.1	+56.5	52.3	64 12.1	+57.1	54.0	68
69	60 27.8	+52.0	43.1	61 11.2	+52.7	44.3	61 53.7	+53.4	45.6	62 35.1	+54.2	47.0	63 15.5	+54.8	48.5	63 54.7	+55.5	50.0	64 32.6	+56.3	51.6	65 09.2	+56.9	53.3	69
70	61 19.8	+51.5	42.1	62 03.9	+52.2	43.3	62 47.1	+53.0	44.6	63 29.3	+53.7	46.1	64 10.3	+54.5	47.5	64 50.2	+55.3	49.1	65 28.9	+55.9	50.8	66 06.1	+56.7	52.5	70
71	62 11.3	+50.9	41.0	62 56.1	+51.7	42.3	63 40.1	+52.5	43.6	64 23.0	+53.3	45.0	65 04.8	+54.1	46.6	65 45.5	+54.8	48.2	66 24.8	+55.7	49.9	67 02.8	+56.4	51.7	71
72	63 02.2	+50.3	39.8	63 47.8	+51.2	41.1	64 32.6	+51.9	42.5	65 16.3	+52.8	44.0	65 58.9	+53.6	45.5	66 40.3	+54.5	47.2	67 20.5	+55.2	48.9	67 59.2	+56.0	50.8	72
73	63 52.5	+49.7	38.6	64 39.0	+50.5	39.9	65 24.5	+51.4	41.3	66 09.1	+52.2	42.8	66 52.5	+53.2	44.4	67 34.8	+54.0	46.1	68 15.7	+54.9	47.9	68 55.2	+55.7	49.8	73
74	64 42.2	+49.0	37.3	65 29.5	+49.8	38.6	66 15.9	+50.7	40.1	67 01.3	+51.6	41.6	67 45.7	+52.5	43.2	68 28.8	+53.4	44.9	69 10.6	+54.4	46.8	69 50.9	+55.3	48.8	74
75	65 31.2	+48.1	35.9	66 19.3	+49.1	37.3	67 06.6	+50.0	38.7	67 52.9	+51.0	40.2	68 38.2	+51.9	41.9	69 22.2	+52.9	43.7	70 05.0	+53.8	45.6	70 46.2	+54.8	47.6	75
76	66 19.3	+47.3	34.5	67 08.4	+48.2	35.8	67 56.6	+49.2	37.3	68 43.9	+50.1	38.8	69 30.1	+51.1	40.5	70 15.1	+52.2	42.3	70 58.8	+53.2	44.2	71 41.0	+54.3	46.3	76
77	67 06.6	+46.3	32.9	67 56.6	+47.3	34.3	68 45.8	+48.2	35.7	69 34.0	+49.3	37.3	70 21.2	+50.4	39.0	71 07.3	+51.4	40.8	71 52.0	+52.5	42.8	72 35.3	+53.6	44.9	77
78	67 52.9	+45.3	31.3	68 43.9	+46.2	32.6	69 34.0	+47.2	34.0	70 23.3	+48.3	35.6	71 11.6	+49.3	37.3	71 58.7	+50.5	39.2	72 44.5	+51.7	41.2	73 28.9	+52.9	43.4	78
79	68 38.2	+44.0	29.5	69 30.1	+45.0	30.8	70 21.2	+46.1	32.2	71 11.6	+47.1	33.8	72 00.9	+48.3	35.5	72 49.2	+49.5	37.4	73 36.2	+50.7	39.4	74 21.8	+52.0	41.7	79
80	69 22.2	+42.8	27.6	70 15.1	+43.7	28.9	71 07.3	+44.7	30.3	71 58.7	+45.8	31.8	72 49.2	+47.0	33.5	73 38.7	+48.2	35.4	74 26.9	+49.6	37.5	75 13.8	+51.0	39.8	80
81	70 05.0	+41.2	25.6	70 58.8	+42.2	26.8	71 52.0	+43.3	28.2	72 44.5	+44.4	29.7	73 36.2	+45.6	31.4	74 26.9	+46.9	33.3	75 16.5	+48.3	35.3	76 04.8	+49.7	37.7	81
82	70 46.2	+39.6	23.4	71 41.0	+40.6	24.6	72 35.3	+41.6	25.9	73 28.9	+42.8	27.4	74 21.8	+43.9	29.0	75 13.8	+45.3	30.9	76 04.8	+46.6	32.9	76 54.5	+48.1	35.3	82
83	71 25.8	+37.8	21.1	72 21.6	+38.7	22.2	73 16.9	+39.7•	23.5	74 11.7	+40.8•	24.9	75 05.7	+42.1•	26.4	75 59.1	+43.3•	28.2	76 51.4	+44.8•	30.2	77 42.6	+46.4	32.6	83
84	72 03.6	+35.8•	18.6	73 00.3	+36.7•	19.6	73 56.6	+37.6•	20.8	74 52.5	+38.6•	22.1	75 47.8	+39.8•	23.6	76 42.4	+41.1•	25.3	77 36.2	+42.5•	27.2	78 29.0	+44.2•	29.5	84
85	72 39.4	+33.5•	15.9	73 37.0	+34.3•	16.9	74 34.2	+35.2•	17.9	75 31.1	+36.2•	19.1	76 27.6	+37.2•	20.5	77 23.5	+38.5•	22.0	78 18.7	+39.9•	23.8	79 13.2	+41.4•	26.0	85
86	73 12.9	+31.1•	13.1	74 11.3	+31.7•	13.9	75 09.4	+32.5•	14.8	76 07.3	+33.3•	15.9	77 04.8	+34.3•	17.0	78 02.0	+35.4•	18.4	78 58.6	+36.7•	20.0	79 54.6	+38.2•	22.0	86
87	73 44.0	+28.4•	10.1	74 43.0	+28.9•	10.8	75 41.9	+29.5•	11.5	76 40.6	+30.2•	12.3	77 39.1	+31.0•	13.3	78 37.4	+31.8•	14.4	79 35.3	+32.9•	15.8	80 32.8	+34.2•	17.4	87
88	74 12.4	+25.4•	6.9	75 11.9	+25.8•	7.4	76 11.4	+26.1•	7.9	77 10.8	+26.6•	8.5	78 10.1	+27.1•	9.2	79 09.2	+27.7•	10.0	80 08.2	+28.5•	11.0	81 07.0	+29.3•	12.3	88
89	74 37.8	+22.2•	3.5	75 37.7	+22.3•	3.8	76 37.5	+22.5•	4.1	77 37.4	+22.6•	4.4	78 37.2	+22.8•	4.8	79 36.9	+23.1•	5.2	80 36.7	+23.3•	5.8	81 36.3	+23.7•	6.5	89
90	75 00.0	+18.8•	0.0	76 00.0	+18.6•	0.0	77 00.0	+18.5•	0.0	78 00.0	+18.3•	0.0	79 00.0	+18.1•	0.0	80 00.0	+17.8•	0.0	81 00.0	+17.5•	0.0	82 00.0	+17.1•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

71°, 289° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 50.0	+58.2	108.4	4 31.0	+58.4	108.5	4 12.0	+58.6	108.5	3 52.9	+58.8	108.6	3 33.7	+59.0	108.7	3 14.5	+59.1	108.7	2 55.2	+59.3	108.8	2 35.8	+59.5	108.8	**0**
1	5 48.2	+58.1	108.2	5 29.4	+58.4	108.2	5 10.6	+58.6	108.3	4 51.7	+58.8	108.4	4 32.7	+59.0	108.5	4 13.6	+59.2	108.6	3 54.5	+59.3	108.6	3 35.3	+59.5	108.7	**1**
2	6 46.3	+58.2	107.9	6 27.8	+58.4	108.0	6 09.2	+58.6	108.1	5 50.5	+58.8	108.2	5 31.7	+59.0	108.3	5 12.8	+59.2	108.4	4 53.8	+59.4	108.5	4 34.8	+59.4	108.6	**2**
3	7 44.5	+58.1	107.7	7 26.2	+58.4	107.8	7 07.8	+58.6	107.9	6 49.3	+58.8	108.0	6 30.7	+59.0	108.1	6 12.0	+59.2	108.2	5 53.2	+59.3	108.3	5 34.2	+59.5	108.4	**3**
4	8 42.6	+58.1	107.4	8 24.6	+58.4	107.5	8 06.4	+58.6	107.7	7 48.1	+58.8	107.8	7 29.7	+59.0	107.9	7 11.2	+59.1	108.1	6 52.5	+59.3	108.2	6 33.7	+59.5	108.3	**4**
5	9 40.7	+58.2	107.2	9 23.0	+58.3	107.3	9 05.0	+58.6	107.5	8 46.9	+58.8	107.6	8 28.7	+59.0	107.8	8 10.3	+59.2	107.9	7 51.8	+59.4	108.0	7 33.2	+59.5	108.2	**5**
6	10 38.9	+58.1	106.9	10 21.3	+58.4	107.1	10 03.6	+58.6	107.2	9 45.7	+58.8	107.4	9 27.7	+59.0	107.6	9 09.5	+59.2	107.7	8 51.2	+59.3	107.9	8 32.7	+59.4	108.0	**6**
7	11 37.0	+58.1	106.6	11 19.7	+58.3	106.8	11 02.2	+58.6	107.0	10 44.5	+58.8	107.2	10 26.7	+59.0	107.4	10 08.7	+59.1	107.6	9 50.5	+59.3	107.7	9 32.1	+59.5	107.9	**7**
8	12 35.1	+58.0	106.4	12 18.0	+58.3	106.6	12 00.8	+58.5	106.8	11 43.3	+58.8	107.0	11 25.7	+58.9	107.2	11 07.8	+59.2	107.4	10 49.8	+59.3	107.6	10 31.6	+59.4	107.8	**8**
9	13 33.1	+58.1	106.1	13 16.3	+58.4	106.4	12 59.3	+58.6	106.6	12 42.1	+58.8	106.8	12 24.6	+59.0	107.0	12 07.0	+59.1	107.2	11 49.1	+59.3	107.4	11 31.0	+59.5	107.6	**9**
10	14 31.2	+58.0	105.9	14 14.7	+58.3	106.1	13 57.9	+58.5	106.4	13 40.9	+58.7	106.6	13 23.6	+59.0	106.8	13 06.1	+59.2	107.1	12 48.4	+59.3	107.3	12 30.5	+59.4	107.5	**10**
11	15 29.2	+58.1	105.6	15 13.0	+58.2	105.9	14 56.4	+58.5	106.1	14 39.6	+58.8	106.4	14 22.6	+58.9	106.6	14 05.3	+59.1	106.9	13 47.7	+59.3	107.1	13 29.9	+59.5	107.3	**11**
12	16 27.3	+58.0	105.3	16 11.2	+58.3	105.6	15 54.9	+58.5	105.9	15 38.4	+58.7	106.2	15 21.5	+58.9	106.4	15 04.4	+59.1	106.7	14 47.0	+59.3	107.0	14 29.4	+59.4	107.2	**12**
13	17 25.3	+57.9	105.1	17 09.5	+58.2	105.4	16 53.4	+58.5	105.7	16 37.1	+58.7	106.0	16 20.4	+59.0	106.2	16 03.5	+59.1	106.5	15 46.3	+59.3	106.8	15 28.8	+59.5	107.1	**13**
14	18 23.2	+58.0	104.8	18 07.7	+58.3	105.1	17 51.9	+58.5	105.4	17 35.8	+58.7	105.7	17 19.4	+58.9	106.0	17 02.6	+59.1	106.3	16 45.6	+59.3	106.6	16 28.3	+59.4	106.9	**14**
15	19 21.2	+57.9	104.5	19 06.0	+58.2	104.9	18 50.4	+58.5	105.2	18 34.5	+58.7	105.5	18 18.3	+58.9	105.9	18 01.7	+59.1	106.2	17 44.9	+59.2	106.5	17 27.7	+59.4	106.8	**15**
16	20 19.1	+57.9	104.3	20 04.2	+58.2	104.6	19 48.9	+58.4	105.0	19 33.2	+58.7	105.3	19 17.2	+58.9	105.6	19 00.8	+59.1	106.0	18 44.1	+59.3	106.3	18 27.1	+59.4	106.6	**16**
17	21 17.0	+57.9	104.0	21 02.4	+58.1	104.4	20 47.3	+58.4	104.7	20 31.9	+58.6	105.1	20 16.1	+58.8	105.4	19 59.9	+59.1	105.8	19 43.4	+59.2	106.1	19 26.5	+59.4	106.5	**17**
18	22 14.9	+57.9	103.7	22 00.5	+58.1	104.1	21 45.7	+58.4	104.5	21 30.5	+58.7	104.9	21 14.9	+58.9	105.2	20 59.0	+59.0	105.6	20 42.6	+59.3	106.0	20 25.9	+59.4	106.3	**18**
19	23 12.8	+57.8	103.4	22 58.6	+58.2	103.8	22 44.1	+58.4	104.2	22 29.2	+58.6	104.6	22 13.8	+58.8	105.0	21 58.0	+59.1	105.4	21 41.9	+59.2	105.8	21 25.3	+59.4	106.2	**19**
20	24 10.6	+57.8	103.1	23 56.8	+58.0	103.5	23 42.5	+58.3	104.0	23 27.8	+58.6	104.4	23 12.6	+58.9	104.8	22 57.1	+59.0	105.2	22 41.1	+59.2	105.6	22 24.7	+59.4	106.0	**20**
21	25 08.4	+57.7	102.8	24 54.8	+58.1	103.3	24 40.8	+58.3	103.7	24 26.4	+58.5	104.2	24 11.5	+58.8	104.6	23 56.1	+59.0	105.0	23 40.3	+59.2	105.5	23 24.1	+59.4	105.9	**21**
22	26 06.1	+57.7	102.5	25 52.9	+58.0	103.0	25 39.1	+58.3	103.5	25 24.9	+58.6	103.9	25 10.3	+58.7	104.4	24 55.1	+59.0	104.8	24 39.5	+59.2	105.3	24 23.5	+59.4	105.7	**22**
23	27 03.8	+57.7	102.2	26 50.9	+58.0	102.7	26 37.4	+58.3	103.2	26 23.5	+58.5	103.7	26 09.0	+58.8	104.2	25 54.1	+59.0	104.6	25 38.7	+59.2	105.1	25 22.9	+59.3	105.6	**23**
24	28 01.5	+57.6	101.9	27 48.9	+57.9	102.4	27 35.7	+58.2	102.9	27 22.0	+58.5	103.4	27 07.8	+58.8	103.9	26 53.1	+59.0	104.4	26 37.9	+59.2	104.9	26 22.2	+59.4	105.4	**24**
25	28 59.1	+57.6	101.6	28 46.8	+57.9	102.1	28 33.9	+58.2	102.7	28 20.5	+58.5	103.2	28 06.6	+58.7	103.7	27 52.1	+58.9	104.2	27 37.1	+59.1	104.7	27 21.6	+59.3	105.2	**25**
26	29 56.7	+57.5	101.3	29 44.7	+57.9	101.8	29 32.1	+58.2	102.4	29 19.0	+58.4	102.9	29 05.3	+58.7	103.5	28 51.0	+58.9	104.0	28 36.2	+59.2	104.5	28 20.9	+59.3	105.1	**26**
27	30 54.2	+57.5	100.9	30 42.6	+57.8	101.5	30 30.3	+58.1	102.1	30 17.4	+58.4	102.7	30 04.0	+58.6	103.2	29 49.9	+59.0	103.8	29 35.4	+59.1	104.3	29 20.2	+59.3	104.9	**27**
28	31 51.7	+57.4	100.6	31 40.4	+57.7	101.2	31 28.4	+58.1	101.8	31 15.8	+58.4	102.4	31 02.6	+58.7	103.0	30 48.9	+58.8	103.6	30 34.5	+59.1	104.2	30 19.5	+59.3	104.7	**28**
29	32 49.1	+57.4	100.3	32 38.1	+57.8	100.9	32 26.5	+58.0	101.5	32 14.2	+58.3	102.1	32 01.3	+58.6	102.7	31 47.7	+58.9	103.3	31 33.6	+59.1	103.9	31 18.8	+59.3	104.5	**29**
30	33 46.5	+57.3	99.9	33 35.9	+57.6	100.6	33 24.5	+58.0	101.2	33 12.5	+58.3	101.9	32 59.9	+58.6	102.5	32 46.6	+58.8	103.1	32 32.7	+59.0	103.7	32 18.1	+59.2	104.4	**30**
31	34 43.8	+57.3	99.5	34 33.5	+57.6	100.2	34 22.5	+58.0	100.9	34 10.8	+58.3	101.6	33 58.5	+58.5	102.2	33 45.4	+58.8	102.9	33 31.7	+59.1	103.5	33 17.3	+59.3	104.2	**31**
32	35 41.1	+57.1	99.2	35 31.1	+57.6	99.9	35 20.5	+57.9	100.6	35 09.1	+58.2	101.3	34 57.0	+58.5	102.0	34 44.2	+58.8	102.6	34 30.8	+59.0	103.3	34 16.6	+59.2	104.0	**32**
33	36 38.2	+57.2	98.8	36 28.7	+57.5	99.5	36 18.4	+57.8	100.3	36 07.3	+58.2	101.0	35 55.5	+58.5	101.7	35 43.0	+58.7	102.4	35 29.8	+59.0	103.1	35 15.8	+59.2	103.8	**33**
34	37 35.4	+57.0	98.4	37 26.2	+57.4	99.2	37 16.2	+57.8	99.9	37 05.5	+58.1	100.7	36 54.0	+58.4	101.4	36 41.7	+58.8	102.1	36 28.8	+58.9	102.9	36 15.0	+59.2	103.6	**34**
35	38 32.4	+56.9	98.0	38 23.6	+57.4	98.8	38 14.0	+57.7	99.6	38 03.6	+58.1	100.4	37 52.4	+58.4	101.1	37 40.5	+58.6	101.9	37 27.7	+59.0	102.6	37 14.2	+59.2	103.4	**35**
36	39 29.3	+56.9	97.6	39 21.0	+57.2	98.4	39 11.7	+57.7	99.2	39 01.7	+58.0	100.0	38 50.8	+58.4	100.8	38 39.1	+58.7	101.6	38 26.7	+58.9	102.4	38 13.4	+59.1	103.2	**36**
37	40 26.2	+56.8	97.2	40 18.2	+57.2	98.0	40 09.4	+57.6	98.9	39 59.7	+58.0	99.7	39 49.2	+58.3	100.5	39 37.8	+58.6	101.3	39 25.6	+58.8	102.2	39 12.5	+59.1	103.0	**37**
38	41 23.0	+56.6	96.8	41 15.4	+57.1	97.6	41 07.0	+57.5	98.5	40 57.7	+57.9	99.4	40 47.5	+58.2	100.2	40 36.4	+58.5	101.1	40 24.4	+58.9	101.9	40 11.6	+59.1	102.7	**38**
39	42 19.6	+56.6	96.3	42 12.5	+57.1	97.2	42 04.5	+57.5	98.1	41 55.6	+57.8	99.0	41 45.7	+58.2	99.9	41 34.9	+58.6	100.8	41 23.3	+58.8	101.6	41 10.7	+59.1	102.5	**39**
40	43 16.2	+56.4	95.9	43 09.6	+56.9	96.8	43 02.0	+57.3	97.7	42 53.4	+57.8	98.7	42 43.9	+58.1	99.6	42 33.5	+58.4	100.5	42 22.1	+58.7	101.4	42 09.8	+59.0	102.3	**40**
41	44 12.6	+56.4	95.4	44 06.5	+56.8	96.4	43 59.3	+57.3	97.3	43 51.2	+57.7	98.3	43 42.0	+58.1	99.2	43 31.9	+58.4	100.2	43 20.8	+58.8	101.1	43 08.8	+59.0	102.0	**41**
42	45 09.0	+56.2	94.9	45 03.3	+56.7	95.9	44 56.6	+57.2	96.9	44 48.9	+57.6	97.9	44 40.1	+58.0	98.9	44 30.3	+58.4	99.9	44 19.6	+58.6	100.8	44 07.8	+59.0	101.8	**42**
43	46 05.2	+56.1	94.4	46 00.0	+56.6	95.5	45 53.8	+57.1	96.5	45 46.5	+57.5	97.5	45 38.1	+57.9	98.5	45 28.7	+58.3	99.5	45 18.2	+58.7	100.5	45 06.8	+58.9	101.5	**43**
44	47 01.3	+55.9	93.9	46 56.6	+56.5	95.0	46 50.9	+56.9	96.0	46 44.0	+57.4	97.1	46 36.0	+57.9	98.1	46 27.0	+58.2	99.2	46 16.9	+58.6	100.2	46 05.7	+58.9	101.2	**44**
45	47 57.2	+55.8	93.4	47 53.1	+56.3	94.5	47 47.8	+56.9	95.6	47 41.4	+57.4	96.7	47 33.9	+57.8	97.8	47 25.2	+58.2	98.8	47 15.5	+58.5	99.9	47 04.6	+58.8	101.0	**45**
46	48 53.0	+55.6	92.8	48 49.4	+56.2	94.0	48 44.7	+56.7	95.1	48 38.8	+57.2	96.2	48 31.7	+57.7	97.4	48 23.4	+58.1	98.5	48 14.0	+58.5	99.6	48 03.4	+58.8	100.7	**46**
47	49 48.6	+55.4	92.2	49 45.6	+56.0	93.4	49 41.4	+56.6	94.6	49 36.0	+57.1	95.8	49 29.4	+57.5	96.9	49 21.5	+58.0	98.1	49 12.5	+58.4	99.2	49 02.2	+58.8	100.4	**47**
48	50 44.0	+55.2	91.6	50 41.6	+55.9	92.9	50 38.0	+56.5	94.1	50 33.1	+57.0	95.3	50 26.9	+57.5	96.5	50 19.5	+58.0	97.7	50 10.9	+58.3	98.9	50 01.0	+58.7	100.1	**48**
49	51 39.2	+55.1	91.0	51 37.5	+55.7	92.3	51 34.5	+56.3	93.5	51 30.1	+56.9	94.8	51 24.4	+57.4	96.0	51 17.5	+57.8	97.3	51 09.2	+58.3	98.5	50 59.7	+58.6	99.7	**49**
50	52 34.3	+54.8	90.4	52 33.2	+55.5	91.7	52 30.8	+56.1	93.0	52 27.0	+56.7	94.3	52 21.8	+57.3	95.6	52 15.3	+57.8	96.9	52 07.5	+58.2	98.1	51 58.3	+58.6	99.4	**50**
51	53 29.1	+54.5	89.7	53 28.7	+55.3	91.0	53 26.9	+55.9	92.4	53 23.7	+56.5	93.7	53 19.1	+57.1	95.1	53 13.1	+57.6	96.4	53 05.7	+58.1	97.7	52 56.9	+58.5	99.0	**51**
52	54 23.6	+54.3	89.0	54 24.0	+55.0	90.4	54 22.8	+55.8	91.8	54 20.2	+56.4	93.2	54 16.2	+57.0	94.6	54 10.7	+57.5	95.9	54 03.8	+58.0	97.3	53 55.4	+58.5	98.7	**52**
53	55 17.9	+54.1	88.2	55 19.0	+54.8	89.7	55 18.6	+55.5	91.1	55 16.6	+56.3	92.6	55 13.2	+56.8	94.0	55 08.2	+57.5	95.4	55 01.8	+57.9	96.9	54 53.9	+58.4	98.3	**53**
54	56 12.0	+53.7	87.5	56 13.8	+54.6	89.0	56 14.1	+55.3	90.5	56 12.9	+56.0	92.0	56 10.0	+56.7	93.4	56 05.7	+57.2	94.9	55 59.7	+57.8	96.4	55 52.3	+58.2	97.9	**54**
55	57 05.7	+53.4	86.7	57 08.4	+54.2	88.2	57 09.4	+55.1	89.8	57 08.9	+55.8	91.3	57 06.7	+56.5	92.9	57 02.9	+57.2	94.4	56 57.5	+57.7	95.9	56 50.5	+58.2	97.4	**55**
56	57 59.1	+53.0	85.8	58 02.6	+54.0	87.4	58 04.5	+54.8	89.0	58 04.7	+55.6	90.6	58 03.2	+56.3	92.2	58 00.1	+56.9	93.8	57 55.2	+57.6	95.4	57 48.7	+58.1	97.0	**56**
57	58 52.1	+52.7	84.9	58 56.6	+53.6	86.6	58 59.3	+54.5	88.2	59 00.3	+55.3	89.9	58 59.5	+56.1	91.6	58 57.0	+56.8	93.2	58 52.8	+57.4	94.9	58 46.8	+58.0	96.5	**57**
58	59 44.8	+52.2	84.0	59 50.2	+53.2	85.7	59 53.8	+54.2	87.4	59 55.6	+55.1	89.1	59 55.6	+55.9	90.9	59 53.8	+56.6	92.6	59 50.2	+57.3	94.3	59 44.8	+57.9	96.0	**58**
59	60 37.0	+51.8	83.0	60 43.4	+52.8	84.8	60 48.0	+53.8	86.5	60 50.7	+54.7	88.3	60 51.5	+55.6	90.1	60 50.4	+56.4	91.9	60 47.5	+57.0	93.7	60 42.7	+57.7	95.5	**59**
60	61 28.8	+51.2	81.9	61 36.2	+52.4	83.8	61 41.8	+53.4	85.6	61 45.4	+54.4	87.5	61 47.1	+55.3	89.3	61 46.8	+56.1	91.2	61 44.5	+56.9	93.1	61 40.4	+57.5	94.9	**60**
61	62 20.0	+50.7	80.8	62 28.6	+51.9	82.7	62 35.2	+53.0	84.6	62 39.8	+54.0	86.6	62 42.4	+55.0	88.5	62 42.9	+55.9	90.4	62 41.4	+56.7	92.4	62 37.9	+57.4	94.3	**61**
62	63 10.7	+50.1	79.7	63 20.5	+51.3	81.6	63 28.2	+52.5	83.6	63 33.8	+53.7	85.6	63 37.4	+54.6	87.6	63 38.8	+55.6	89.6	63 38.1	+56.5	91.7	63 35.3	+57.3	93.7	**62**
63	64 00.8	+49.5	78.4	64 11.8	+50.8	80.5	64 20.7	+52.0	82.5	64 27.5	+53.1	84.6	64 32.0	+54.3	86.7	64 34.4	+55.3	88.8	64 34.6	+56.2	90.9	64 32.6	+57.0	93.0	**63**
64	64 50.3	+48.6	77.1	65 02.6	+50.0	79.2	65 12.7	+51.4	81.3	65 20.6	+52.7	83.5	65 26.3	+53.8	85.7	65 29.7	+54.9	87.9	65 30.8	+55.9	90.0	65 29.6	+56.8	92.2	**64**
65	65 38.9	+47.9	75.7	65 52.6	+49.4	77.9	66 04.1	+50.8	80.1	66 13.3	+52.1	82.3	66 20.1	+53.4	84.6	66 24.6	+54.5	86.9	66 26.7	+55.5	89.2	66 26.4	+56.5	91.5	**65**
66	66 26.8	+47.0	74.2	66 42.0	+48.5	76.5	66 54.9	+50.0	78.8	67 05.4	+51.4	81.1	67 13.5	+52.8	83.4	67 19.1	+54.1	85.8	67 22.2	+55.2	88.2	67 22.9	+56.2	90.6	**66**
67	67 13.8	+45.9	72.7	67 30.5	+47.6	75.0	67 44.9	+49.2	77.3	67 56.8	+50.8	79.7	68 06.3	+52.2	82.2	68 13.2	+53.5	84.7	68 17.4	+54.8	87.2	68 19.1	+55.9	89.7	**67**
68	67 59.7	+44.9	71.0	68 18.1	+46.7	73.3	68 34.1	+48.3	75.8	68 47.6	+49.9	78.3	68 58.5	+51.5	80.8	69 06.7	+52.9	83.4	69 12.2	+54.3	86.0	69 15.0	+55.5	88.7	**68**
69	68 44.6	+43.6	69.2	69 04.8	+45.4	71.6	69 22.4	+47.3	74.1	69 37.5	+49.1	76.7	69 50.0	+50.7	79.4	69 59.6	+52.3	82.1	70 06.5	+53.8	84.8	70 10.5	+55.1	87.6	**69**
70	69 28.2	+42.3	67.2	69 50.2	+44.3	69.8	70 09.7	+46.2	72.4	70 26.6	+48.0	75.0	70 40.7	+49.8	77.8	70 51.9	+51.6	80.6	71 00.3	+53.1	83.5	71 05.6	+54.5	86.4	**70**
71	70 10.5	+40.8	65.2	70 34.5	+42.8	67.8	70 55.9	+44.9	70.4	71 14.6	+46.9	73.2	71 30.5	+48.8	76.1	71 43.5	+50.6	79.0	71 53.4	+52.4	82.0	72 00.1	+54.0	85.1	**71**
72	70 51.3	+39.0	63.0	71 17.3	+41.3	65.6	71 40.8	+43.4	68.4	72 01.5	+45.6	71.2	72 19.3	+47.7	74.2	72 34.1	+49.7	77.3	72 45.8	+51.5	80.4	72 54.1	+53.3	83.6	**72**
73	71 30.3	+37.3	60.6	71 58.6	+39.4	63.3	72 24.2	+41.8	66.1	72 47.1	+44.0	69.1	73 07.0	+46.3	72.1	73 23.8	+48.5	75.3	73 37.3	+50.6	78.6	73 47.4	+52.5	82.0	**73**
74	72 07.6	+35.1 •	58.1	72 38.0	+37.6 •	60.8	73 06.0	+39.9	63.7	73 31.1	+42.4	66.7	73 53.3	+44.8	69.9	74 12.3	+47.1	73.2	74 27.9	+49.4	76.7	74 39.9	+51.5	80.2	**74**
75	72 42.7	+32.9 •	55.4	73 15.6	+35.3 •	58.2	73 45.9	+37.9 •	61.1	74 13.5	+40.4 •	64.2	74 38.1	+43.0	67.5	74 59.4	+45.6	70.9	75 17.3	+48.0	74.5	75 31.4	+50.5	78.2	**75**
76	73 15.6	+30.3 •	52.6	73 50.9	+32.9 •	55.3	74 23.8	+35.5 •	58.3	74 53.9	+38.3 •	61.4	75 21.1	+41.0 •	64.8	75 45.0	+43.7 •	68.3	76 05.3	+46.5	72.1	76 21.9	+49.0	76.0	**76**
77	73 45.9	+27.6 •	49.5	74 23.8	+30.1 •	52.3	74 59.3	+32.9 •	55.2	75 32.2	+35.7 •	58.4	76 02.1	+38.6 •	61.8	76 28.7	+41.6 •	65.5	76 51.8	+44.5 •	69.4	77 10.9	+47.5	73.5	**77**
78	74 13.5	+24.6 •	46.3	74 53.9	+27.2 •	49.0	75 32.2	+29.9 •	51.9	76 07.9	+32.8 •	55.1	76 40.7	+35.9 •	58.6	77 10.3	+39.1 •	62.3	77 36.3	+42.3 •	66.3	77 58.4	+45.4 •	70.6	**78**
79	74 38.1	+21.3 •	42.9	75 21.1	+23.9 •	45.5	76 02.1	+26.6 •	48.4	76 40.7	+29.6 •	51.5	77 16.6	+32.8 •	55.0	77 49.4	+36.1 •	58.8	78 18.6	+39.6 •	62.9	78 43.8	+43.1 •	67.4	**79**
80	74 59.4	+17.9 •	39.3	75 45.0	+20.3 •	41.8	76 28.7	+23.1 •	44.6	77 10.3	+26.0 •	47.7	77 49.4	+29.2 •	51.1	78 25.5	+32.7 •	54.9	78 58.2	+36.4 •	59.1	79 26.9	+40.2 •	63.7	**80**
81	75 17.3	+14.1 •	35.6	76 05.3	+16.6 •	38.0	76 51.8	+19.1 •	40.6	77 36.3	+22.1 •	43.6	78 18.6	+25.2 •	46.9	78 58.2	+28.7 •	50.6	79 34.6	+32.5 •	54.8	80 07.1	+36.6 •	59.5	**81**
82	75 31.4	+10.3 •	31.8	76 21.9	+12.4 •	33.9	77 10.9	+14.9 •	36.4	77 58.4	+17.6 •	39.2	78 43.8	+20.8 •	42.3	79 26.9	+24.2 •	45.9	80 07.1	+28.1 •	50.1	80 43.7	+32.4 •	54.8	**82**
83	75 41.7	+6.3 •	27.8	76 34.3	+8.2 •	29.7	77 25.8	+10.4 •	32.0	78 16.0	+13.0 •	34.5	79 04.6	+15.8 •	37.5	79 51.1	+19.2 •	40.8	80 35.2	+22.9 •	44.8	81 16.1	+27.2 •	49.4	**83**
84	75 48.0	+2.1 •	23.8	76 42.5	+3.8 •	25.5	77 36.2	+5.8 •	27.4	78 29.0	+7.9 •	29.7	79 20.4	+10.6 •	32.3	80 10.3	+13.5 •	35.4	80 58.1	+17.1 •	39.0	81 43.3	+21.2 •	43.3	**84**
85	75 50.1	−2.0 •	19.7	76 46.3	−0.6 •	21.1	77 42.0	+1.0 •	22.8	78 36.9	+2.9 •	24.7	79 31.0	+5.0 •	26.9	80 23.8	+7.6 •	29.6	81 15.2	+10.6 •	32.8	82 04.5	+14.4 •	36.7	**85**
86	75 48.1	−6.2 •	15.6	76 45.7	−5.1 •	16.7	77 43.0	−3.9 •	18.1	78 39.8	−2.4 •	19.6	79 36.0	−0.7 •	21.4	80 31.4	+1.3 •	23.6	81 25.8	+3.8 •	26.3	82 18.9	+6.8 •	29.5	**86**
87	75 41.9	−10.1 •	11.6	76 40.6	−9.4 •	12.4	77 39.1	−8.5 •	13.4	78 37.4	−7.6 •	14.5	79 35.3	−6.4 •	15.9	80 32.7	−4.9 •	17.5	81 29.6	−3.1 •	19.5	82 25.7	−0.9 •	22.1	**87**
88	75 31.8	−14.0 •	7.6	76 31.2	−13.6 •	8.1	77 30.6	−13.1 •	8.8	78 29.8	−12.5 •	9.5	79 28.9	−11.8 •	10.4	80 27.8	−11.0 •	11.5	81 26.5	−10.0 •	12.8	82 24.8	−8.7 •	14.5	**88**
89	75 17.8	−17.8 •	3.7	76 17.6	−17.6 •	4.0	77 17.5	−17.5 •	4.3	78 17.3	−17.3 •	4.7	79 17.1	−17.1 •	5.1	80 16.8	−16.8 •	5.6	81 16.5	−16.5 •	6.2	82 16.1	−16.1 •	7.0	**89**
90	75 00.0	−21.2 •	0.0	76 00.0	−21.4 •	0.0	77 00.0	−21.5 •	0.0	78 00.0	−21.7 •	0.0	79 00.0	−21.9 •	0.0	80 00.0	−22.1 •	0.0	81 00.0	−22.4 •	0.0	82 00.0	−22.7 •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 71°, 289°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 50.0	–58.1	108.4	4 31.0	–58.4	108.5	4 12.0	–58.6	108.5	3 52.9	–58.8	108.6	3 33.7	–59.0	108.7	3 14.5	–59.2	108.7	2 55.2	–59.4	108.8	2 35.8	–59.5	108.8	**0**
1	3 51.9	–58.2	108.6	3 32.6	–58.4	108.7	3 13.4	–58.6	108.8	2 54.1	–58.9	108.8	2 34.7	–59.0	108.9	2 15.3	–59.2	108.9	1 55.8	–59.3	108.9	1 36.3	–59.4	109.0	**1**
2	2 53.7	–58.2	108.9	2 34.2	–58.4	108.9	2 14.8	–58.7	109.0	1 55.2	–58.8	109.0	1 35.7	–59.0	109.0	1 16.1	–59.2	109.1	0 56.5	–59.4	109.1	0 36.9	–59.5	109.1	**2**
3	1 55.5	–58.2	109.1	1 35.8	–58.4	109.2	1 16.1	–58.6	109.2	0 56.4	–58.8	109.2	0 36.7	–59.1	109.2	0 16.9	–59.2	109.2	0 02.9	+59.3	70.8	0 22.6	+59.5	70.8	**3**
4	0 57.3	–58.1	109.4	0 37.4	–58.4	109.4	0 17.5	–58.6	109.4	0 02.4	+58.9	70.6	0 22.4	+59.0	70.6	0 42.3	+59.2	70.6	1 02.2	+59.3	70.6	1 22.1	+59.5	70.6	**4**
5	0 00.8	+58.2	70.4	0 21.0	+58.4	70.4	0 41.1	+58.7	70.4	1 01.3	+58.8	70.4	1 21.4	+59.0	70.4	1 41.5	+59.2	70.4	2 01.5	+59.4	70.5	2 21.6	+59.4	70.5	**5**
6	0 59.0	+58.2	70.1	1 19.4	+58.4	70.2	1 39.8	+58.6	70.2	2 00.1	+58.8	70.2	2 20.4	+59.0	70.2	2 40.7	+59.1	70.3	3 00.9	+59.3	70.3	3 21.0	+59.5	70.4	**6**
7	1 57.2	+58.2	69.9	2 17.8	+58.4	69.9	2 38.4	+58.6	70.0	2 58.9	+58.8	70.0	3 19.4	+59.0	70.1	3 39.8	+59.2	70.1	4 00.2	+59.3	70.2	4 20.5	+59.5	70.2	**7**
8	2 55.4	+58.1	69.6	3 16.2	+58.4	69.7	3 37.0	+58.6	69.7	3 57.7	+58.9	69.8	4 18.4	+59.0	69.9	4 39.0	+59.2	70.0	4 59.5	+59.4	70.0	5 20.0	+59.5	70.1	**8**
9	3 53.5	+58.2	69.4	4 14.6	+58.4	69.5	4 35.6	+58.6	69.5	4 56.6	+58.8	69.6	5 17.4	+59.0	69.7	5 38.2	+59.2	69.8	5 58.9	+59.3	69.9	6 19.5	+59.4	70.0	**9**
10	4 51.7	+58.2	69.2	5 13.0	+58.4	69.2	5 34.2	+58.7	69.3	5 55.4	+58.8	69.4	6 16.4	+59.0	69.5	6 37.4	+59.1	69.6	6 58.2	+59.3	69.7	7 18.9	+59.5	69.9	**10**
11	5 49.9	+58.1	68.9	6 11.4	+58.4	69.0	6 32.9	+58.6	69.1	6 54.2	+58.8	69.2	7 15.4	+59.0	69.3	7 36.5	+59.2	69.5	7 57.5	+59.4	69.6	8 18.4	+59.5	69.7	**11**
12	6 48.0	+58.2	68.7	7 09.8	+58.4	68.8	7 31.5	+58.6	68.9	7 53.0	+58.8	69.0	8 14.4	+59.0	69.1	8 35.7	+59.2	69.3	8 56.9	+59.3	69.4	9 17.9	+59.4	69.6	**12**
13	7 46.2	+58.1	68.4	8 08.2	+58.3	68.5	8 30.1	+58.5	68.7	8 51.8	+58.8	68.8	9 13.4	+59.0	69.0	9 34.9	+59.1	69.1	9 56.2	+59.3	69.3	10 17.3	+59.5	69.4	**13**
14	8 44.3	+58.1	68.2	9 06.5	+58.4	68.3	9 28.6	+58.6	68.5	9 50.6	+58.8	68.6	10 12.4	+59.0	68.8	10 34.0	+59.2	68.9	10 55.5	+59.3	69.1	11 16.8	+59.5	69.3	**14**
15	9 42.4	+58.1	67.9	10 04.9	+58.4	68.1	10 27.2	+58.6	68.2	10 49.4	+58.8	68.4	11 11.4	+59.0	68.6	11 33.2	+59.1	68.8	11 54.8	+59.3	69.0	12 16.3	+59.4	69.2	**15**
16	10 40.5	+58.1	67.7	11 03.3	+58.3	67.8	11 25.8	+58.6	68.0	11 48.2	+58.8	68.2	12 10.4	+58.9	68.4	12 32.3	+59.2	68.6	12 54.1	+59.3	68.8	13 15.7	+59.5	69.0	**16**
17	11 38.6	+58.1	67.4	12 01.6	+58.3	67.6	12 24.4	+58.5	67.8	12 47.0	+58.7	68.0	13 09.3	+59.0	68.2	13 31.5	+59.1	68.4	13 53.4	+59.3	68.7	14 15.2	+59.4	68.9	**17**
18	12 36.7	+58.1	67.1	12 59.9	+58.3	67.4	13 22.9	+58.6	67.6	13 45.7	+58.8	67.8	14 08.3	+58.9	68.0	14 30.6	+59.1	68.3	14 52.7	+59.3	68.5	15 14.6	+59.4	68.8	**18**
19	13 34.8	+58.1	66.9	13 58.2	+58.3	67.1	14 21.5	+58.5	67.3	14 44.5	+58.7	67.6	15 07.2	+59.0	67.8	15 29.7	+59.2	68.1	15 52.0	+59.3	68.3	16 14.0	+59.5	68.6	**19**
20	14 32.9	+58.0	66.6	14 56.5	+58.3	66.9	15 20.0	+58.5	67.1	15 43.2	+58.7	67.4	16 06.2	+58.9	67.6	16 28.9	+59.1	67.9	16 51.3	+59.3	68.2	17 13.5	+59.4	68.5	**20**
21	15 30.9	+58.0	66.4	15 54.8	+58.3	66.6	16 18.5	+58.5	66.9	16 41.9	+58.8	67.2	17 05.1	+58.9	67.4	17 28.0	+59.1	67.7	17 50.6	+59.2	68.0	18 12.9	+59.4	68.3	**21**
22	16 28.9	+58.0	66.1	16 53.1	+58.3	66.4	17 17.0	+58.5	66.7	17 40.7	+58.7	66.9	18 04.0	+58.9	67.2	18 27.1	+59.1	67.5	18 49.8	+59.3	67.9	19 12.3	+59.4	68.2	**22**
23	17 26.9	+58.0	65.8	17 51.4	+58.2	66.1	18 15.5	+58.5	66.4	18 39.4	+58.6	66.7	19 02.9	+58.9	67.0	19 26.2	+59.0	67.4	19 49.1	+59.2	67.7	20 11.7	+59.4	68.0	**23**
24	18 24.9	+58.0	65.6	18 49.6	+58.2	65.9	19 14.0	+58.4	66.2	19 38.0	+58.7	66.5	20 01.8	+58.9	66.8	20 25.2	+59.1	67.2	20 48.3	+59.3	67.5	21 11.1	+59.4	67.9	**24**
25	19 22.9	+57.9	65.3	19 47.8	+58.2	65.6	20 12.4	+58.4	65.9	20 36.7	+58.7	66.3	21 00.7	+58.8	66.6	21 24.3	+59.1	67.0	21 47.6	+59.2	67.4	22 10.5	+59.4	67.7	**25**
26	20 20.8	+57.9	65.0	20 46.0	+58.1	65.3	21 10.8	+58.5	65.7	21 35.4	+58.6	66.1	21 59.5	+58.9	66.4	22 23.4	+59.0	66.8	22 46.8	+59.2	67.2	23 09.9	+59.4	67.6	**26**
27	21 18.7	+57.9	64.7	21 44.1	+58.2	65.1	22 09.3	+58.3	65.5	22 34.0	+58.6	65.8	22 58.4	+58.8	66.2	23 22.4	+59.0	66.6	23 46.0	+59.2	67.0	24 09.3	+59.3	67.4	**27**
28	22 16.6	+57.8	64.4	22 42.3	+58.1	64.8	23 07.6	+58.4	65.2	23 32.6	+58.6	65.6	23 57.2	+58.8	66.0	24 21.4	+59.0	66.4	24 45.2	+59.2	66.8	25 08.6	+59.4	67.3	**28**
29	23 14.4	+57.8	64.2	23 40.4	+58.1	64.5	24 06.0	+58.3	64.9	24 31.2	+58.6	65.4	24 56.0	+58.8	65.8	25 20.4	+59.0	66.2	25 44.4	+59.2	66.6	26 08.0	+59.3	67.1	**29**
30	24 12.2	+57.8	63.9	24 38.5	+58.0	64.3	25 04.3	+58.3	64.7	25 29.8	+58.5	65.1	25 54.8	+58.8	65.6	26 19.4	+59.0	66.0	26 43.6	+59.2	66.5	27 07.3	+59.4	66.9	**30**
31	25 10.0	+57.8	63.6	25 36.5	+58.1	64.0	26 02.6	+58.3	64.4	26 28.3	+58.5	64.9	26 53.6	+58.7	65.3	27 18.4	+59.0	65.8	27 42.8	+59.1	66.3	28 06.7	+59.3	66.8	**31**
32	26 07.8	+57.7	63.3	26 34.6	+57.9	63.7	27 00.9	+58.3	64.2	27 26.8	+58.5	64.6	27 52.3	+58.8	65.1	28 17.4	+58.9	65.6	28 41.9	+59.2	66.1	29 06.0	+59.3	66.6	**32**
33	27 05.5	+57.7	63.0	27 32.5	+58.0	63.4	27 59.2	+58.2	63.9	28 25.3	+58.5	64.4	28 51.1	+58.7	64.9	29 16.3	+58.9	65.4	29 41.1	+59.1	65.9	30 05.3	+59.3	66.4	**33**
34	28 03.2	+57.6	62.7	28 30.5	+57.9	63.1	28 57.4	+58.2	63.6	29 23.8	+58.4	64.1	29 49.8	+58.6	64.6	30 15.2	+58.9	65.2	30 40.2	+59.1	65.7	31 04.6	+59.3	66.2	**34**
35	29 00.8	+57.6	62.3	29 28.4	+57.9	62.8	29 55.6	+58.1	63.3	30 22.2	+58.5	63.9	30 48.4	+58.7	64.4	31 14.1	+58.9	64.9	31 39.3	+59.0	65.5	32 03.9	+59.3	66.1	**35**
36	29 58.4	+57.5	62.0	30 26.3	+57.8	62.5	30 53.7	+58.1	63.1	31 20.7	+58.3	63.6	31 47.1	+58.6	64.1	32 13.0	+58.8	64.7	32 38.3	+59.1	65.3	33 03.2	+59.2	65.9	**36**
37	30 55.9	+57.5	61.7	31 24.1	+57.8	62.2	31 51.8	+58.1	62.8	32 19.0	+58.4	63.3	32 45.7	+58.6	63.9	33 11.8	+58.9	64.5	33 37.4	+59.0	65.1	34 02.4	+59.2	65.7	**37**
38	31 53.4	+57.4	61.3	32 21.9	+57.7	61.9	32 49.9	+58.0	62.5	33 17.4	+58.3	63.0	33 44.3	+58.5	63.6	34 10.7	+58.7	64.2	34 36.4	+59.0	64.9	35 01.6	+59.2	65.5	**38**
39	32 50.8	+57.4	61.0	33 19.6	+57.7	61.6	33 47.9	+58.0	62.2	34 15.7	+58.2	62.8	34 42.8	+58.6	63.4	35 09.4	+58.8	64.0	35 35.4	+59.0	64.6	36 00.8	+59.2	65.3	**39**
40	33 48.2	+57.3	60.7	34 17.3	+57.6	61.2	34 45.9	+57.9	61.8	35 13.9	+58.2	62.5	35 41.4	+58.4	63.1	36 08.2	+58.7	63.7	36 34.4	+59.0	64.4	37 00.0	+59.2	65.1	**40**
41	34 45.5	+57.2	60.3	35 14.9	+57.6	60.9	35 43.8	+57.9	61.5	36 12.1	+58.2	62.2	36 39.8	+58.5	62.8	37 06.9	+58.7	63.5	37 33.4	+58.9	64.2	37 59.2	+59.1	64.9	**41**
42	35 42.7	+57.2	59.9	36 12.5	+57.5	60.6	36 41.7	+57.8	61.2	37 10.3	+58.1	61.9	37 38.3	+58.4	62.5	38 05.6	+58.7	63.2	38 32.3	+58.9	63.9	38 58.3	+59.2	64.7	**42**
43	36 39.9	+57.1	59.6	37 10.0	+57.4	60.2	37 39.5	+57.8	60.9	38 08.4	+58.1	61.5	38 36.7	+58.3	62.2	39 04.3	+58.6	63.0	39 31.2	+58.9	63.7	39 57.5	+59.1	64.4	**43**
44	37 37.0	+57.0	59.2	38 07.4	+57.4	59.8	38 37.3	+57.7	60.5	39 06.5	+58.0	61.2	39 35.0	+58.4	61.9	40 02.9	+58.6	62.7	40 30.1	+58.8	63.4	40 56.6	+59.0	64.2	**44**
45	38 34.0	+57.0	58.8	39 04.8	+57.3	59.5	39 35.0	+57.6	60.2	40 04.5	+58.0	60.9	40 33.4	+58.2	61.6	41 01.5	+58.5	62.4	41 28.9	+58.8	63.2	41 55.6	+59.1	64.0	**45**
46	39 31.0	+56.8	58.4	40 02.1	+57.2	59.1	40 32.6	+57.6	59.8	41 02.5	+57.9	60.6	41 31.6	+58.2	61.3	42 00.0	+58.5	62.1	42 27.7	+58.8	62.9	42 54.7	+59.0	63.7	**46**
47	40 27.8	+56.8	57.9	40 59.3	+57.2	58.7	41 30.2	+57.5	59.4	42 00.4	+57.8	60.2	42 29.8	+58.2	61.0	42 58.5	+58.5	61.8	43 26.5	+58.7	62.6	43 53.7	+59.0	63.5	**47**
48	41 24.6	+56.7	57.5	41 56.5	+57.0	58.3	42 27.7	+57.4	59.0	42 58.2	+57.7	59.8	43 28.0	+58.0	60.7	43 57.0	+58.4	61.5	44 25.2	+58.7	62.4	44 52.7	+58.9	63.2	**48**
49	42 21.3	+56.5	57.1	42 53.5	+57.0	57.9	43 25.1	+57.3	58.7	43 55.9	+57.7	59.5	44 26.0	+58.1	60.3	44 55.4	+58.3	61.2	45 23.9	+58.6	62.1	45 51.6	+58.9	63.0	**49**
50	43 17.8	+56.5	56.6	43 50.5	+56.8	57.4	44 22.4	+57.3	58.2	44 53.6	+57.6	59.1	45 24.1	+57.9	60.0	45 53.7	+58.3	60.8	46 22.5	+58.6	61.8	46 50.5	+58.8	62.7	**50**
51	44 14.3	+56.3	56.2	44 47.3	+56.8	57.0	45 19.7	+57.1	57.8	45 51.2	+57.5	58.7	46 22.0	+57.9	59.6	46 52.0	+58.2	60.5	47 21.1	+58.5	61.4	47 49.3	+58.9	62.4	**51**
52	45 10.6	+56.2	55.7	45 44.1	+56.6	56.5	46 16.8	+57.0	57.4	46 48.7	+57.5	58.3	47 19.9	+57.8	59.2	47 50.2	+58.1	60.1	48 19.6	+58.5	61.1	48 48.2	+58.7	62.1	**52**
53	46 06.8	+56.1	55.2	46 40.7	+56.5	56.0	47 13.8	+57.0	56.9	47 46.2	+57.3	57.8	48 17.7	+57.7	58.8	48 48.3	+58.1	59.8	49 18.1	+58.4	60.8	49 46.9	+58.7	61.8	**53**
54	47 02.9	+55.9	54.6	47 37.2	+56.4	55.5	48 10.8	+56.8	56.5	48 43.5	+57.2	57.4	49 15.4	+57.6	58.4	49 46.4	+58.0	59.4	50 16.5	+58.3	60.4	50 45.6	+58.7	61.5	**54**
55	47 58.8	+55.8	54.1	48 33.6	+56.2	55.0	49 07.6	+56.6	56.0	49 40.7	+57.1	56.9	50 13.0	+57.5	57.9	50 44.4	+57.9	59.0	51 14.8	+58.3	60.0	51 44.3	+58.6	61.1	**55**
56	48 54.6	+55.6	53.6	49 29.8	+56.1	54.5	50 04.2	+56.6	55.5	50 37.8	+57.0	56.5	51 10.5	+57.4	57.5	51 42.3	+57.8	58.6	52 13.1	+58.2	59.7	52 42.9	+58.5	60.8	**56**
57	49 50.2	+55.4	53.0	50 25.9	+55.9	53.9	51 00.8	+56.4	54.9	51 34.8	+56.9	56.0	52 07.9	+57.3	57.0	52 40.1	+57.7	58.1	53 11.3	+58.1	59.3	53 41.4	+58.5	60.4	**57**
58	50 45.6	+55.2	52.4	51 21.8	+55.7	53.4	51 57.2	+56.2	54.4	52 31.7	+56.7	55.4	53 05.2	+57.2	56.5	53 37.8	+57.6	57.7	54 09.4	+58.0	58.8	54 39.9	+58.4	60.0	**58**
59	51 40.8	+55.0	51.8	52 17.5	+55.6	52.8	52 53.4	+56.1	53.8	53 28.4	+56.5	54.9	54 02.4	+57.0	56.0	54 35.4	+57.5	57.2	55 07.4	+57.9	58.4	55 38.3	+58.3	59.6	**59**
60	52 35.8	+54.8	51.1	53 13.1	+55.3	52.1	53 49.5	+55.8	53.2	54 24.9	+56.4	54.3	54 59.4	+56.9	55.5	55 32.9	+57.3	56.7	56 05.3	+57.8	57.9	56 36.6	+58.2	59.2	**60**
61	53 30.6	+54.6	50.4	54 08.4	+55.1	51.5	54 45.3	+55.7	52.6	55 21.3	+56.2	53.7	55 56.3	+56.7	54.9	56 30.2	+57.2	56.2	57 03.1	+57.7	57.4	57 34.8	+58.1	58.8	**61**
62	54 25.2	+54.3	49.7	55 03.5	+54.9	50.8	55 41.0	+55.5	51.9	56 17.5	+56.0	53.1	56 53.0	+56.6	54.3	57 27.4	+57.1	55.6	58 00.8	+57.5	56.9	58 32.9	+58.0	58.3	**62**
63	55 19.5	+54.0	49.0	55 58.4	+54.7	50.1	56 36.5	+55.2	51.3	57 13.5	+55.8	52.5	57 49.6	+56.3	53.7	58 24.5	+56.9	55.0	58 58.3	+57.4	56.4	59 30.9	+57.9	57.8	**63**
64	56 13.5	+53.7	48.2	56 53.1	+54.3	49.3	57 31.7	+54.9	50.5	58 09.3	+55.6	51.8	58 45.9	+56.1	53.1	59 21.4	+56.7	54.4	59 55.7	+57.3	55.8	60 28.8	+57.8	57.3	**64**
65	57 07.2	+53.4	47.4	57 47.4	+54.0	48.6	58 26.6	+54.7	49.8	59 04.9	+55.3	51.0	59 42.0	+56.0	52.4	60 18.1	+56.5	53.8	60 53.0	+57.0	55.2	61 26.6	+57.6	56.7	**65**
66	58 00.6	+53.1	46.5	58 41.4	+53.7	47.7	59 21.3	+54.4	49.0	60 00.2	+55.0	50.3	60 38.0	+55.6	51.6	61 14.6	+56.3	53.1	61 50.0	+56.9	54.6	62 24.2	+57.4	56.1	**66**
67	58 53.7	+52.6	45.7	59 35.1	+53.4	46.9	60 15.7	+54.0	48.1	60 55.2	+54.7	49.5	61 33.6	+55.4	50.9	62 10.9	+56.0	52.3	62 46.9	+56.7	53.9	63 21.6	+57.3	55.5	**67**
68	59 46.3	+52.2	44.7	60 28.5	+52.9	45.9	61 09.7	+53.7	47.3	61 49.9	+54.4	48.6	62 29.0	+55.1	50.1	63 06.9	+55.8	51.6	63 43.6	+56.4	53.1	64 18.9	+57.0	54.8	**68**
69	60 38.5	+51.8	43.7	61 21.4	+52.5	45.0	62 03.4	+53.2	46.3	62 44.3	+54.0	47.7	63 24.1	+54.7	49.2	64 02.7	+55.5	50.7	64 40.0	+56.2	52.4	65 15.9	+56.9	54.1	**69**
70	61 30.3	+51.2	42.7	62 13.9	+52.0	44.0	62 56.6	+52.8	45.3	63 38.3	+53.6	46.7	64 18.8	+54.4	48.3	64 58.2	+55.1	49.8	65 36.2	+55.8	51.5	66 12.8	+56.6	53.3	**70**
71	62 21.5	+50.7	41.6	63 05.9	+51.5	42.9	63 49.4	+52.3	44.3	64 31.9	+53.1	45.7	65 13.2	+53.9	47.3	65 53.3	+54.7	48.9	66 32.0	+55.6	50.6	67 09.4	+56.3	52.5	**71**
72	63 12.2	+50.1	40.4	63 57.4	+51.0	41.7	64 41.7	+51.8	43.1	65 25.0	+52.6	44.6	66 07.1	+53.5	46.2	66 48.0	+54.3	47.9	67 27.6	+55.1	49.7	68 05.7	+55.9	51.6	**72**
73	64 02.3	+49.4	39.2	64 48.4	+50.2	40.5	65 33.5	+51.1	41.9	66 17.6	+52.1	43.4	67 00.6	+52.9	45.1	67 42.3	+53.9	46.8	68 22.7	+54.8	48.6	69 01.6	+55.6	50.6	**73**
74	64 51.7	+48.6	37.8	65 38.6	+49.6	39.2	66 24.6	+50.5	40.6	67 09.7	+51.4	42.2	67 53.5	+52.4	43.8	68 36.2	+53.3	45.6	69 17.5	+54.2	47.5	69 57.2	+55.2	49.5	**74**
75	65 40.3	+47.9	36.4	66 28.2	+48.7	37.8	67 15.1	+49.7	39.3	68 01.1	+50.6	40.8	68 45.9	+51.7	42.5	69 29.5	+52.7	44.3	70 11.7	+53.7	46.2	70 52.4	+54.7	48.3	**75**
76	66 28.2	+46.9	35.0	67 16.9	+47.9	36.3	68 04.8	+48.9	37.8	68 51.7	+49.9	39.4	69 37.6	+50.9	41.1	70 22.2	+51.9	42.9	71 05.4	+53.1	44.9	71 47.1	+54.1	47.0	**76**
77	67 15.1	+46.0	33.4	68 04.8	+46.9	34.7	68 53.7	+47.9	36.2	69 41.6	+49.0	37.8	70 28.5	+50.0	39.5	71 14.1	+51.2	41.4	71 58.5	+52.3	43.4	72 41.2	+53.5	45.6	**77**
78	68 01.1	+44.8	31.7	68 51.7	+45.9	33.0	69 41.6	+46.9	34.5	70 30.6	+47.9	36.1	71 18.5	+49.1	37.8	72 05.3	+50.3	39.7	72 50.8	+51.4	41.8	73 34.7	+52.7	44.1	**78**
79	68 45.9	+43.6	29.9	69 37.6	+44.6	31.2	70 28.5	+45.6	32.7	71 18.5	+46.8	34.3	72 07.6	+48.0	36.0	72 55.6	+49.1	37.9	73 42.2	+50.5	40.0	74 27.4	+51.8	42.3	**79**
80	69 29.5	+42.2	27.9	70 22.2	+43.2	29.3	71 14.1	+44.4	30.7	72 05.3	+45.5	32.3	72 55.6	+46.6	34.0	73 44.7	+48.0	35.9	74 32.7	+49.3	38.0	75 19.2	+50.7	40.4	**80**
81	70 11.7	+40.7	25.9	71 05.4	+41.7	27.2	71 58.5	+42.7	28.6	72 50.8	+43.9	30.1	73 42.2	+45.2	31.8	74 32.7	+46.5	33.7	75 22.0	+47.9	35.8	76 09.9	+49.4	38.2	**81**
82	70 52.4	+39.0	23.7	71 47.1	+40.0	24.9	72 41.2	+41.1	26.2	73 34.7	+42.2	27.7	74 27.4	+43.5	29.4	75 19.2	+44.8	31.3	76 09.9	+46.3	33.4	76 59.3	+47.9	35.8	**82**
83	71 31.4	+37.2	21.3	72 27.1	*+38.1* •	22.5	73 22.3	*+39.1* •	23.7	74 16.9	*+40.3* •	25.2	75 10.9	*+41.5* •	26.8	76 04.0	*+42.9* •	28.6	76 56.2	*+44.3* •	30.6	77 47.2	*+46.0* •	33.0	**83**
84	72 08.6	*+35.1* •	18.8	73 05.2	*+36.0* •	19.9	74 01.4	*+37.0* •	21.0	74 57.2	*+38.0* •	22.4	75 52.4	*+39.2* •	23.9	76 46.9	*+40.5* •	25.6	77 40.5	*+42.1* •	27.6	78 33.2	*+43.7* •	29.9	**84**
85	72 43.7	*+32.8* •	16.1	73 41.2	*+33.6* •	17.1	74 38.4	*+34.5* •	18.1	75 35.2	*+35.5* •	19.3	76 31.6	*+36.6* •	20.7	77 27.4	*+37.9* •	22.3	78 22.6	*+39.2* •	24.1	79 16.9	*+40.9* •	26.3	**85**
86	73 16.5	*+30.2* •	13.2	74 14.8	*+30.9* •	14.1	75 12.9	*+31.7* •	15.0	76 10.7	*+32.6* •	16.0	77 08.2	*+33.6* •	17.2	78 05.3	*+34.7* •	18.6	79 01.8	*+36.1* •	20.3	79 57.8	*+37.5* •	22.2	**86**
87	73 46.7	*+27.6* •	10.2	74 45.7	*+28.1* •	10.9	75 44.6	*+28.6* •	11.6	76 43.3	*+29.3* •	12.4	77 41.8	*+30.1* •	13.4	78 40.0	*+31.0* •	14.6	79 37.9	*+32.1* •	16.0	80 35.3	*+33.5* •	17.6	**87**
88	74 14.3	*+24.5* •	7.0	75 13.8	*+24.8* •	7.4	76 13.2	*+25.3* •	8.0	77 12.6	*+25.7* •	8.6	78 11.9	*+26.2* •	9.3	79 11.0	*+26.9* •	10.1	80 10.0	*+27.6* •	11.1	81 08.8	*+28.5* •	12.4	**88**
89	74 38.8	*+21.2* •	3.6	75 38.6	*+21.4* •	3.8	76 38.5	*+21.5* •	4.1	77 38.3	*+21.7* •	4.4	78 38.1	*+21.9* •	4.8	79 37.9	*+22.1* •	5.3	80 37.6	*+22.4* •	5.8	81 37.3	*+22.7* •	6.5	**89**
90	75 00.0	*+17.8* •	0.0	76 00.0	*+17.6* •	0.0	77 00.0	*+17.5* •	0.0	78 00.0	*+17.3* •	0.0	79 00.0	*+17.1* •	0.0	80 00.0	*+16.8* •	0.0	81 00.0	*+16.5* •	0.0	82 00.0	*+16.1* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 109°, 251°

72°, 288° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 35.2	+58.2	107.4	4 17.2	+58.4	107.5	3 59.2	+58.6	107.6	3 41.0	+58.8	107.6	3 22.8	+59.0	107.7	3 04.6	+59.1	107.7	2 46.2	+59.4	107.8	2 27.9	+59.5	107.8	**0**
1	5 33.4	+58.1	107.2	5 15.6	+58.4	107.3	4 57.8	+58.6	107.4	4 39.8	+58.8	107.4	4 21.8	+59.0	107.5	4 03.7	+59.2	107.6	3 45.6	+59.3	107.6	3 27.4	+59.4	107.7	**1**
2	6 31.5	+58.1	106.9	6 14.0	+58.4	107.0	5 56.4	+58.6	107.1	5 38.6	+58.8	107.2	5 20.8	+59.0	107.3	5 02.9	+59.2	107.4	4 44.9	+59.3	107.5	4 26.8	+59.5	107.6	**2**
3	7 29.6	+58.2	106.7	7 12.4	+58.3	106.8	6 55.0	+58.5	106.9	6 37.4	+58.8	107.0	6 19.8	+59.0	107.1	6 02.1	+59.1	107.2	5 44.2	+59.4	107.3	5 26.3	+59.5	107.4	**3**
4	8 27.8	+58.1	106.4	8 10.7	+58.4	106.6	7 53.5	+58.6	106.7	7 36.2	+58.8	106.8	7 18.8	+59.0	107.0	7 01.2	+59.2	107.1	6 43.6	+59.3	107.2	6 25.8	+59.4	107.3	**4**
5	9 25.9	+58.1	106.2	9 09.1	+58.3	106.3	8 52.1	+58.6	106.5	8 35.0	+58.8	106.6	8 17.8	+59.0	106.8	8 00.4	+59.2	106.9	7 42.9	+59.3	107.0	7 25.2	+59.5	107.2	**5**
6	10 24.0	+58.0	105.9	10 07.4	+58.3	106.1	9 50.7	+58.6	106.3	9 33.8	+58.8	106.4	9 16.8	+58.9	106.6	8 59.6	+59.1	106.7	8 42.2	+59.3	106.9	8 24.7	+59.5	107.0	**6**
7	11 22.0	+58.1	105.7	11 05.7	+58.4	105.9	10 49.3	+58.5	106.0	10 32.6	+58.8	106.2	10 15.7	+59.0	106.4	9 58.7	+59.2	106.6	9 41.5	+59.3	106.7	9 24.2	+59.4	106.9	**7**
8	12 20.1	+58.1	105.4	12 04.1	+58.3	105.6	11 47.8	+58.6	105.8	11 31.4	+58.7	106.0	11 14.7	+59.0	106.2	10 57.9	+59.1	106.4	10 40.8	+59.3	106.6	10 23.6	+59.5	106.8	**8**
9	13 18.2	+58.0	105.1	13 02.4	+58.3	105.4	12 46.4	+58.5	105.6	12 30.1	+58.8	105.8	12 13.7	+58.9	106.0	11 57.0	+59.1	106.2	11 40.1	+59.3	106.4	11 23.1	+59.4	106.6	**9**
10	14 16.2	+58.0	104.9	14 00.7	+58.3	105.1	13 44.9	+58.5	105.4	13 28.9	+58.7	105.6	13 12.6	+59.0	105.8	12 56.1	+59.2	106.1	12 39.4	+59.3	106.3	12 22.5	+59.5	106.5	**10**
11	15 14.2	+58.0	104.6	14 59.0	+58.2	104.9	14 43.4	+58.5	105.1	14 27.6	+58.7	105.4	14 11.6	+58.9	105.6	13 55.3	+59.1	105.9	13 38.7	+59.3	106.1	13 22.0	+59.4	106.3	**11**
12	16 12.2	+58.0	104.4	15 57.2	+58.3	104.6	15 41.9	+58.5	104.9	15 26.3	+58.8	105.2	15 10.5	+58.9	105.4	14 54.4	+59.1	105.7	14 38.0	+59.3	106.0	14 21.4	+59.4	106.2	**12**
13	17 10.2	+58.0	104.1	16 55.5	+58.2	104.4	16 40.4	+58.5	104.7	16 25.1	+58.7	105.0	16 09.4	+58.9	105.2	15 53.5	+59.1	105.5	15 37.3	+59.3	105.8	15 20.8	+59.5	106.1	**13**
14	18 08.2	+57.9	103.8	17 53.7	+58.2	104.1	17 38.9	+58.4	104.4	17 23.8	+58.7	104.8	17 08.3	+58.9	105.1	16 52.6	+59.1	105.3	16 36.6	+59.2	105.6	16 20.3	+59.4	105.9	**14**
15	19 06.1	+57.9	103.5	18 51.9	+58.2	103.9	18 37.3	+58.5	104.2	18 22.5	+58.6	104.5	18 07.2	+58.9	104.9	17 51.7	+59.1	105.2	17 35.8	+59.3	105.5	17 19.7	+59.4	105.8	**15**
16	20 04.0	+57.9	103.3	19 50.1	+58.2	103.6	19 35.8	+58.4	104.0	19 21.1	+58.7	104.3	19 06.1	+58.9	104.7	18 50.8	+59.1	105.0	18 35.1	+59.3	105.3	18 19.1	+59.4	105.6	**16**
17	21 01.9	+57.9	103.0	20 48.3	+58.1	103.4	20 34.2	+58.4	103.7	20 19.8	+58.6	104.1	20 05.0	+58.9	104.4	19 49.9	+59.0	104.8	19 34.4	+59.2	105.1	19 18.5	+59.4	105.5	**17**
18	21 59.8	+57.8	102.7	21 46.4	+58.1	103.1	21 32.6	+58.4	103.5	21 18.4	+58.7	103.9	21 03.9	+58.8	104.2	20 48.9	+59.1	104.6	20 33.6	+59.2	105.0	20 17.9	+59.4	105.3	**18**
19	22 57.6	+57.8	102.4	22 44.5	+58.1	102.8	22 31.0	+58.4	103.2	22 17.1	+58.6	103.6	22 02.7	+58.8	104.0	21 48.0	+59.0	104.4	21 32.8	+59.3	104.8	21 17.3	+59.4	105.2	**19**
20	23 55.4	+57.8	102.1	23 42.6	+58.1	102.6	23 29.4	+58.3	103.0	23 15.7	+58.5	103.4	23 01.5	+58.9	103.8	22 47.0	+59.0	104.2	22 32.1	+59.2	104.6	22 16.7	+59.4	105.0	**20**
21	24 53.2	+57.7	101.8	24 40.7	+58.0	102.3	24 27.7	+58.3	102.7	24 14.2	+58.6	103.2	24 00.4	+58.7	103.6	23 46.0	+59.0	104.0	23 31.3	+59.2	104.5	23 16.1	+59.3	104.9	**21**
22	25 50.9	+57.7	101.5	25 38.7	+58.0	102.0	25 26.0	+58.3	102.5	25 12.8	+58.5	102.9	24 59.1	+58.8	103.4	24 45.0	+59.0	103.8	24 30.5	+59.1	104.3	24 15.4	+59.4	104.7	**22**
23	26 48.6	+57.7	101.2	26 36.7	+58.0	101.7	26 24.3	+58.2	102.2	26 11.3	+58.6	102.7	25 57.9	+58.8	103.2	25 44.0	+59.0	103.6	25 29.6	+59.2	104.1	25 14.8	+59.4	104.6	**23**
24	27 46.3	+57.6	100.9	27 34.7	+57.9	101.4	27 22.5	+58.2	101.9	27 09.9	+58.4	102.4	26 56.7	+58.7	102.9	26 43.0	+59.0	103.4	26 28.8	+59.2	103.9	26 14.2	+59.3	104.4	**24**
25	28 43.9	+57.5	100.6	28 32.6	+57.9	101.1	28 20.7	+58.2	101.7	28 08.3	+58.5	102.2	27 55.4	+58.7	102.7	27 42.0	+58.9	103.2	27 28.0	+59.1	103.7	27 13.5	+59.3	104.2	**25**
26	29 41.4	+57.6	100.3	29 30.5	+57.8	100.8	29 18.9	+58.2	101.4	29 06.8	+58.4	101.9	28 54.1	+58.7	102.5	28 40.9	+58.9	103.0	28 27.1	+59.1	103.5	28 12.8	+59.3	104.1	**26**
27	30 39.0	+57.4	99.9	30 28.3	+57.8	100.5	30 17.1	+58.1	101.1	30 05.2	+58.4	101.7	29 52.8	+58.7	102.2	29 39.8	+58.9	102.8	29 26.2	+59.2	103.3	29 12.1	+59.3	103.9	**27**
28	31 36.4	+57.4	99.6	31 26.1	+57.8	100.2	31 15.2	+58.0	100.8	31 03.6	+58.4	101.4	30 51.5	+58.6	102.0	30 38.7	+58.9	102.6	30 25.4	+59.0	103.1	30 11.4	+59.3	103.7	**28**
29	32 33.8	+57.4	99.3	32 23.9	+57.7	99.9	32 13.2	+58.1	100.5	32 02.0	+58.3	101.1	31 50.1	+58.6	101.7	31 37.6	+58.8	102.3	31 24.4	+59.1	102.9	31 10.7	+59.3	103.5	**29**
30	33 31.2	+57.3	98.9	33 21.6	+57.6	99.6	33 11.3	+58.0	100.2	33 00.3	+58.3	100.8	32 48.7	+58.6	101.5	32 36.4	+58.8	102.1	32 23.5	+59.1	102.7	32 10.0	+59.2	103.3	**30**
31	34 28.5	+57.2	98.5	34 19.2	+57.6	99.2	34 09.3	+57.9	99.9	33 58.6	+58.2	100.6	33 47.3	+58.5	101.2	33 35.2	+58.8	101.9	33 22.6	+59.0	102.5	33 09.2	+59.3	103.2	**31**
32	35 25.7	+57.2	98.2	35 16.8	+57.6	98.9	35 07.2	+57.9	99.6	34 56.8	+58.3	100.3	34 45.8	+58.5	101.0	34 34.0	+58.8	101.6	34 21.6	+59.0	102.3	34 08.5	+59.2	103.0	**32**
33	36 22.9	+57.1	97.8	36 14.4	+57.4	98.5	36 05.1	+57.8	99.3	35 55.1	+58.1	100.0	35 44.3	+58.5	100.7	35 32.8	+58.7	101.4	35 20.6	+59.0	102.1	35 07.7	+59.2	102.8	**33**
34	37 20.0	+57.0	97.4	37 11.8	+57.4	98.2	37 02.9	+57.8	98.9	36 53.2	+58.1	99.7	36 42.8	+58.4	100.4	36 31.5	+58.7	101.1	36 19.6	+58.9	101.9	36 06.9	+59.2	102.6	**34**
35	38 17.0	+56.9	97.0	38 09.2	+57.4	97.8	38 00.7	+57.7	98.6	37 51.3	+58.1	99.4	37 41.2	+58.4	100.1	37 30.2	+58.7	100.9	37 18.5	+59.0	101.6	37 06.1	+59.1	102.4	**35**
36	39 13.9	+56.9	96.6	39 06.6	+57.2	97.4	38 58.4	+57.6	98.2	38 49.4	+58.0	99.0	38 39.6	+58.3	99.8	38 28.9	+58.6	100.6	38 17.5	+58.9	101.4	38 05.2	+59.2	102.2	**36**
37	40 10.8	+56.7	96.2	40 03.8	+57.2	97.0	39 56.0	+57.6	97.9	39 47.4	+57.9	98.7	39 37.9	+58.3	99.5	39 27.5	+58.6	100.3	39 16.4	+58.8	101.1	39 04.4	+59.1	101.9	**37**
38	41 07.5	+56.7	95.8	41 01.0	+57.1	96.6	40 53.6	+57.5	97.5	40 45.3	+57.9	98.4	40 36.2	+58.2	99.2	40 26.1	+58.6	100.1	40 15.2	+58.9	100.9	40 03.5	+59.0	101.7	**38**
39	42 04.2	+56.5	95.3	41 58.1	+57.0	96.2	41 51.1	+57.5	97.1	41 43.2	+57.9	98.0	41 34.4	+58.2	98.9	41 24.7	+58.5	99.8	41 14.1	+58.8	100.6	41 02.5	+59.1	101.5	**39**
40	43 00.7	+56.5	94.9	42 55.1	+56.9	95.8	42 48.6	+57.3	96.7	42 41.1	+57.7	97.7	42 32.6	+58.1	98.6	42 23.2	+58.4	99.5	42 12.9	+58.7	100.4	42 01.6	+59.0	101.3	**40**
41	43 57.2	+56.3	94.4	43 52.0	+56.9	95.4	43 45.9	+57.3	96.3	43 38.8	+57.7	97.3	43 30.7	+58.1	98.2	43 21.6	+58.5	99.2	43 11.6	+58.7	100.1	43 00.6	+59.0	101.0	**41**
42	44 53.5	+56.2	93.9	44 48.9	+56.7	94.9	44 43.2	+57.2	95.9	44 36.5	+57.6	96.9	44 28.8	+58.0	97.9	44 20.1	+58.3	98.8	44 10.3	+58.7	99.8	43 59.6	+59.0	100.8	**42**
43	45 49.7	+56.1	93.4	45 45.6	+56.5	94.5	45 40.4	+57.0	95.5	45 34.1	+57.5	96.5	45 26.8	+57.9	97.5	45 18.4	+58.3	98.5	45 09.0	+58.6	99.5	44 58.6	+58.9	100.5	**43**
44	46 45.8	+55.9	92.9	46 42.1	+56.5	94.0	46 37.4	+57.0	95.0	46 31.6	+57.4	96.1	46 24.7	+57.8	97.1	46 16.7	+58.2	98.2	46 07.6	+58.6	99.2	45 57.5	+58.9	100.2	**44**
45	47 41.7	+55.7	92.4	47 38.6	+56.3	93.5	47 34.4	+56.8	94.6	47 29.0	+57.3	95.7	47 22.5	+57.8	96.7	47 14.9	+58.2	97.8	47 06.2	+58.5	98.9	46 56.4	+58.8	99.9	**45**
46	48 37.4	+55.6	91.8	48 34.9	+56.2	93.0	48 31.2	+56.7	94.1	48 26.3	+57.3	95.2	48 20.3	+57.7	96.3	48 13.1	+58.1	97.5	48 04.7	+58.5	98.6	47 55.2	+58.8	99.7	**46**
47	49 33.0	+55.5	91.3	49 31.1	+56.0	92.4	49 27.9	+56.6	93.6	49 23.6	+57.1	94.8	49 18.0	+57.6	95.9	49 11.2	+58.0	97.1	49 03.2	+58.4	98.2	48 54.0	+58.8	99.4	**47**
48	50 28.5	+55.2	90.7	50 27.1	+55.9	91.9	50 24.5	+56.5	93.1	50 20.7	+57.0	94.3	50 15.6	+57.4	95.5	50 09.2	+57.9	96.7	50 01.6	+58.3	97.9	49 52.8	+58.7	99.0	**48**
49	51 23.7	+55.0	90.0	51 23.0	+55.7	91.3	51 21.0	+56.3	92.5	51 17.7	+56.8	93.8	51 13.0	+57.4	95.0	51 07.1	+57.9	96.3	50 59.9	+58.3	97.5	50 51.5	+58.6	98.7	**49**
50	52 18.7	+54.8	89.4	52 18.7	+55.5	90.7	52 17.3	+56.1	92.0	52 14.5	+56.7	93.3	52 10.4	+57.3	94.6	52 05.0	+57.7	95.8	51 58.2	+58.2	97.1	51 50.1	+58.6	98.4	**50**
51	53 13.5	+54.6	88.7	53 14.2	+55.2	90.1	53 13.4	+55.9	91.4	53 11.2	+56.6	92.7	53 07.7	+57.1	94.1	53 02.7	+57.6	95.4	52 56.4	+58.1	96.7	52 48.7	+58.5	98.0	**51**
52	54 08.1	+54.3	88.0	54 09.4	+55.1	89.4	54 09.3	+55.8	90.8	54 07.8	+56.4	92.2	54 04.8	+57.0	93.6	54 00.3	+57.6	94.9	53 54.5	+58.0	96.3	53 47.2	+58.4	97.7	**52**
53	55 02.4	+54.1	87.3	55 04.5	+54.8	88.7	55 05.1	+55.5	90.2	55 04.2	+56.2	91.6	55 01.8	+56.8	93.0	54 57.9	+57.4	94.4	54 52.5	+57.9	95.9	54 45.6	+58.4	97.3	**53**
54	55 56.5	+53.7	86.5	55 59.3	+54.6	88.0	56 00.6	+55.4	89.5	56 00.4	+56.0	91.0	55 58.6	+56.7	92.5	55 55.3	+57.2	93.9	55 50.4	+57.8	95.4	55 44.0	+58.3	96.9	**54**
55	56 50.2	+53.4	85.7	56 53.9	+54.2	87.3	56 56.0	+55.0	88.8	56 56.4	+55.8	90.3	56 55.3	+56.5	91.9	56 52.5	+57.2	93.4	56 48.2	+57.7	94.9	56 42.3	+58.1	96.4	**55**
56	57 43.6	+53.1	84.9	57 48.1	+54.0	86.5	57 51.0	+54.8	88.0	57 52.2	+55.6	89.6	57 51.8	+56.3	91.2	57 49.7	+56.9	92.8	57 45.9	+57.5	94.4	57 40.4	+58.1	96.0	**56**
57	58 36.7	+52.7	84.0	58 42.1	+53.6	85.6	58 45.8	+54.5	87.3	58 47.8	+55.3	88.9	58 48.1	+56.1	90.6	58 46.6	+56.8	92.2	58 43.4	+57.4	93.9	58 38.5	+58.0	95.5	**57**
58	59 29.4	+52.2	83.1	59 35.7	+53.3	84.8	59 40.3	+54.2	86.5	59 43.1	+55.1	88.2	59 44.2	+55.8	89.9	59 43.4	+56.6	91.6	59 40.8	+57.3	93.3	59 36.5	+57.8	95.0	**58**
59	60 21.6	+51.8	82.1	60 29.0	+52.8	83.8	60 34.5	+53.8	85.6	60 38.2	+54.7	87.4	60 40.0	+55.6	89.1	60 40.0	+56.4	90.9	60 38.1	+57.1	92.7	60 34.3	+57.7	94.5	**59**
60	61 13.4	+51.3	81.0	61 21.8	+52.4	82.9	61 28.3	+53.5	84.7	61 32.9	+54.5	86.5	61 35.6	+55.3	88.4	61 36.4	+56.1	90.2	61 35.2	+56.9	92.1	61 32.0	+57.6	93.9	**60**
61	62 04.7	+50.8	80.0	62 14.2	+51.9	81.8	62 21.8	+53.0	83.7	62 27.4	+54.0	85.6	62 30.9	+55.0	87.5	62 32.5	+55.9	89.5	62 32.1	+56.6	91.4	62 29.6	+57.4	93.3	**61**
62	62 55.5	+50.1	78.8	63 06.1	+51.4	80.7	63 14.8	+52.5	82.7	63 21.4	+53.6	84.7	63 25.9	+54.7	86.7	63 28.4	+55.6	88.7	63 28.7	+56.5	90.7	63 27.0	+57.2	92.7	**62**
63	63 45.6	+49.5	77.6	63 57.5	+50.8	79.6	64 07.3	+52.1	81.6	64 15.0	+53.2	83.7	64 20.6	+54.3	85.7	64 24.0	+55.3	87.8	64 25.2	+56.2	89.9	64 24.2	+57.0	92.0	**63**
64	64 35.1	+48.8	76.3	64 48.3	+50.2	78.3	64 59.4	+51.4	80.4	65 08.2	+52.7	82.6	65 14.9	+53.8	84.7	65 19.3	+54.9	86.9	65 21.4	+55.9	89.1	65 21.2	+56.8	91.2	**64**
65	65 23.9	+48.0	74.9	65 38.5	+49.4	77.0	65 50.8	+50.8	79.2	66 00.9	+52.2	81.4	66 08.7	+53.4	83.6	66 14.2	+54.5	85.9	66 17.3	+55.6	88.2	66 18.0	+56.5	90.5	**65**
66	66 11.9	+47.1	73.4	66 27.9	+48.6	75.6	66 41.6	+50.1	77.9	66 53.1	+51.5	80.2	67 02.1	+52.8	82.5	67 08.7	+54.1	84.9	67 12.9	+55.2	87.2	67 14.5	+56.2	89.6	**66**
67	66 59.0	+46.1	71.9	67 16.5	+47.8	74.1	67 31.7	+49.4	76.5	67 44.6	+50.8	78.8	67 54.9	+52.3	81.3	68 02.8	+53.5	83.7	68 08.1	+54.8	86.2	68 10.7	+55.9	88.7	**67**
68	67 45.1	+45.0	70.2	68 04.3	+46.7	72.6	68 21.1	+48.4	75.0	68 35.4	+50.0	77.4	68 47.2	+51.5	79.9	68 56.3	+53.0	82.5	69 02.9	+54.3	85.1	69 06.6	+55.6	87.7	**68**
69	68 30.1	+43.9	68.4	68 51.0	+45.7	70.8	69 09.5	+47.4	73.3	69 25.4	+49.2	75.9	69 38.7	+50.8	78.5	69 49.3	+52.4	81.2	69 57.2	+53.7	83.9	70 02.2	+55.0	86.6	**69**
70	69 14.0	+42.5	66.5	69 36.7	+44.4	69.0	69 56.9	+46.3	71.6	70 14.6	+48.1	74.2	70 29.5	+49.9	76.9	70 41.7	+51.6	79.7	70 50.9	+53.2	82.5	70 57.2	+54.6	85.4	**70**
71	69 56.5	+41.0	64.5	70 21.1	+43.0	67.0	70 43.2	+45.0	69.7	71 02.7	+47.0	72.4	71 19.4	+48.9	75.2	71 33.3	+50.7	78.1	71 44.1	+52.4	81.1	71 51.8	+54.0	84.1	**71**
72	70 37.5	+39.4	62.4	71 04.1	+41.5	64.9	71 28.2	+43.7	67.6	71 49.7	+45.7	70.5	72 08.3	+47.8	73.4	72 24.0	+49.7	76.4	72 36.5	+51.6	79.5	72 45.8	+53.3	82.7	**72**
73	71 16.9	+37.5	60.0	71 45.6	+39.8	62.7	72 11.9	+42.0	65.4	72 35.4	+44.3	68.3	72 56.1	+46.5	71.4	73 13.7	+48.6	74.5	73 28.1	+50.7	77.8	73 39.1	+52.6	81.1	**73**
74	71 54.4	*+35.6* •	57.6	72 25.4	*+37.9* •	60.2	72 53.9	+40.2	63.1	73 19.7	+42.6	66.0	73 42.6	+45.0	69.2	74 02.3	+47.3	72.4	74 18.8	+49.5	75.8	74 31.7	+51.6	79.3	**74**
75	72 30.0	*+33.3* •	54.9	73 03.3	*+35.7* •	57.6	73 34.1	*+38.2* •	60.5	74 02.3	*+40.7* •	63.5	74 27.6	+43.2	66.7	74 49.6	+45.8	70.1	75 08.3	+48.1	73.7	75 23.3	+50.5	77.4	**75**
76	73 03.3	*+30.8* •	52.1	73 39.0	*+33.3* •	54.8	74 12.3	*+35.9* •	57.7	74 43.0	*+38.6* •	60.8	75 10.8	*+41.2* •	64.1	75 35.4	*+43.9* •	67.6	75 56.4	+46.6	71.3	76 13.8	+49.1	75.1	**76**
77	73 34.1	*+28.2* •	49.1	74 12.3	*+30.7* •	51.8	74 48.2	*+33.4* •	54.7	75 21.6	*+36.1* •	57.8	75 52.0	*+39.0* •	61.2	76 19.3	*+41.8* •	64.8	76 43.0	*+44.8* •	68.6	77 02.9	+47.6	72.7	**77**
78	74 02.3	*+25.3* •	46.0	74 43.0	*+27.8* •	48.6	75 21.6	*+30.4* •	51.5	75 57.7	*+33.3* •	54.6	76 31.0	*+36.3* •	58.0	77 01.1	*+39.4* •	61.7	77 27.8	*+42.5* •	65.6	77 50.5	*+45.7* •	69.9	**78**
79	74 27.6	*+22.0* •	42.6	75 10.8	*+24.6* •	45.2	75 52.0	*+27.3* •	48.0	76 31.0	*+30.1* •	51.1	77 07.3	*+33.2* •	54.5	77 40.5	*+36.5* •	58.2	78 10.3	*+39.9* •	62.3	78 36.2	*+43.3* •	66.7	**79**
80	74 49.6	*+18.7* •	39.1	75 35.4	*+21.0* •	41.6	76 19.3	*+23.7* •	44.3	77 01.1	*+26.7* •	47.3	77 40.5	*+29.8* •	50.7	78 17.0	*+33.2* •	54.4	78 50.2	*+36.7* •	58.5	79 19.5	*+40.4* •	63.1	**80**
81	75 08.3	*+15.0* •	35.5	75 56.4	*+17.4* •	37.8	76 43.0	*+19.9* •	40.4	77 27.8	*+22.7* •	43.3	78 10.3	*+25.9* •	46.5	78 50.2	*+29.3* •	50.2	79 26.9	*+33.0* •	54.3	79 59.9	*+37.0* •	58.9	**81**
82	75 23.3	*+11.2* •	31.6	76 13.8	*+13.3* •	33.8	77 02.9	*+15.8* •	36.2	77 50.5	*+18.5* •	38.9	78 36.2	*+21.4* •	42.1	79 19.5	*+24.8* •	45.6	79 59.9	*+28.7* •	49.7	80 36.9	*+32.8* •	54.3	**82**
83	75 34.5	*+7.2* •	27.7	76 27.1	*+9.2* •	29.7	77 18.7	*+11.3* •	31.8	78 09.0	*+13.8* •	34.4	78 57.6	*+16.7* •	37.3	79 44.3	*+20.0* •	40.6	80 28.6	*+23.6* •	44.5	81 09.7	*+27.9* •	49.0	**83**
84	75 41.7	*+3.2* •	23.7	76 36.3	*+4.8* •	25.4	77 30.0	*+6.8* •	27.3	78 22.8	*+8.9* •	29.6	79 14.3	*+11.5* •	32.2	80 04.3	*+14.4* •	35.2	80 52.2	*+17.9* •	38.8	81 37.6	*+21.9* •	43.0	**84**
85	75 44.9	*−1.0* •	19.7	76 41.1	*+0.4* •	21.1	77 36.8	*+2.0* •	22.7	78 31.7	*+3.9* •	24.6	79 25.8	*+6.0* •	26.9	80 18.7	*+8.5* •	29.5	81 10.1	*+11.6* •	32.7	81 59.5	*+15.2* •	36.5	**85**
86	75 43.9	*−5.1* •	15.6	76 41.5	*−4.0* •	16.8	77 38.8	*−2.8* •	18.1	78 35.6	*−1.4* •	19.6	79 31.8	*+0.3* •	21.4	80 27.2	*+2.4* •	23.6	81 21.7	*+4.8* •	26.2	82 14.7	*+7.9* •	29.5	**86**
87	75 38.8	*−9.1* •	11.6	76 37.5	*−8.3* •	12.4	77 36.0	*−7.5* •	13.4	78 34.2	*−6.5* •	14.5	79 32.1	*−5.3* •	15.9	80 29.6	*−3.9* •	17.5	81 26.5	*−2.1* •	19.5	82 22.6	*+0.1* •	22.0	**87**
88	75 29.7	*−13.0* •	7.6	76 29.2	*−12.6* •	8.2	77 28.5	*−12.1* •	8.8	78 27.7	*−11.4* •	9.6	79 26.8	*−10.8* •	10.4	80 25.7	*−9.9* •	11.5	81 24.4	*−8.9* •	12.8	82 22.7	*−7.7* •	14.5	**88**
89	75 16.7	*−16.7* •	3.7	76 16.6	*−16.6* •	4.0	77 16.4	*−16.4* •	4.3	78 16.3	*−16.3* •	4.7	79 16.0	*−16.0* •	5.1	80 15.8	*−15.8* •	5.6	81 15.5	*−15.5* •	6.3	82 15.0	*−15.0* •	7.1	**89**
90	75 00.0	*−20.3* •	0.0	76 00.0	*−20.4* •	0.0	77 00.0	*−20.5* •	0.0	78 00.0	*−20.7* •	0.0	79 00.0	*−20.9* •	0.0	80 00.0	*−21.1* •	0.0	81 00.0	*−21.4* •	0.0	82 00.0	*−21.8* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 72°, 288°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 35.2	–58.1	107.4	4 17.2	–58.3	107.5	3 59.2	–58.6	107.6	3 41.0	–58.8	107.6	3 22.8	–59.0	107.7	3 04.6	–59.2	107.7	2 46.2	–59.3	107.8	2 27.9	–59.5	107.8	**0**
1	3 37.1	–58.1	107.7	3 18.9	–58.4	107.7	3 00.6	–58.7	107.8	2 42.2	–58.8	107.8	2 23.8	–59.0	107.9	2 05.4	–59.2	107.9	1 46.9	–59.3	107.9	1 28.4	–59.5	108.0	**1**
2	2 39.0	–58.2	107.9	2 20.5	–58.4	108.0	2 01.9	–58.6	108.0	1 43.4	–58.8	108.0	1 24.8	–59.0	108.1	1 06.2	–59.2	108.1	0 47.6	–59.3	108.1	0 28.9	–59.4	108.1	**2**
3	1 40.8	–58.2	108.2	1 22.1	–58.4	108.2	1 03.3	–58.6	108.2	0 44.6	–58.8	108.2	0 25.8	–59.0	108.2	0 07.0	–59.1	108.2	0 11.7	+59.4	71.8	0 30.5	+59.5	71.8	**3**
4	0 42.6	–58.1	108.4	0 23.7	–58.4	108.4	0 04.7	–58.6	108.4	0 14.2	+58.8	71.6	0 33.2	+59.0	71.6	0 52.1	+59.2	71.6	1 11.1	+59.3	71.6	1 30.0	+59.5	71.6	**4**
5	0 15.5	+58.2	71.3	0 34.7	+58.4	71.3	0 53.9	+58.6	71.4	1 13.0	+58.9	71.4	1 32.2	+59.0	71.4	1 51.3	+59.2	71.4	2 10.4	+59.3	71.5	2 29.5	+59.4	71.5	**5**
6	1 13.7	+58.1	71.1	1 33.1	+58.4	71.1	1 52.5	+58.6	71.1	2 11.9	+58.8	71.2	2 31.2	+59.0	71.2	2 50.5	+59.2	71.3	3 09.7	+59.4	71.3	3 28.9	+59.5	71.4	**6**
7	2 11.8	+58.2	70.8	2 31.5	+58.4	70.9	2 51.1	+58.6	70.9	3 10.7	+58.8	71.0	3 30.2	+59.0	71.0	3 49.7	+59.1	71.1	4 09.1	+59.3	71.2	4 28.4	+59.5	71.2	**7**
8	3 10.0	+58.1	70.6	3 29.9	+58.3	70.7	3 49.7	+58.6	70.7	4 09.5	+58.8	70.8	4 29.2	+59.0	70.9	4 48.8	+59.2	70.9	5 08.4	+59.3	71.0	5 27.9	+59.4	71.1	**8**
9	4 08.1	+58.2	70.4	4 28.2	+58.4	70.4	4 48.3	+58.6	70.5	5 08.3	+58.8	70.6	5 28.2	+59.0	70.7	5 48.0	+59.2	70.8	6 07.7	+59.3	70.9	6 27.3	+59.5	71.0	**9**
10	5 06.3	+58.1	70.1	5 26.6	+58.4	70.2	5 46.9	+58.6	70.3	6 07.1	+58.8	70.4	6 27.2	+59.0	70.5	6 47.2	+59.1	70.6	7 07.0	+59.4	70.7	7 26.8	+59.5	70.8	**10**
11	6 04.4	+58.1	69.9	6 25.0	+58.4	70.0	6 45.5	+58.6	70.1	7 05.9	+58.8	70.2	7 26.2	+59.0	70.3	7 46.3	+59.2	70.4	8 06.4	+59.3	70.6	8 26.3	+59.4	70.7	**11**
12	7 02.5	+58.1	69.6	7 23.4	+58.3	69.7	7 44.1	+58.6	69.9	8 04.7	+58.8	70.0	8 25.2	+58.9	70.1	8 45.5	+59.1	70.3	9 05.7	+59.3	70.4	9 25.7	+59.5	70.6	**12**
13	8 00.6	+58.1	69.4	8 21.7	+58.4	69.5	8 42.7	+58.5	69.6	9 03.5	+58.8	69.8	9 24.1	+59.0	69.9	9 44.6	+59.2	70.1	10 05.0	+59.3	70.3	10 25.2	+59.4	70.4	**13**
14	8 58.7	+58.2	69.1	9 20.1	+58.3	69.3	9 41.2	+58.6	69.4	10 02.3	+58.7	69.6	10 23.1	+59.0	69.7	10 43.8	+59.1	69.9	11 04.3	+59.3	70.1	11 24.6	+59.5	70.3	**14**
15	9 56.9	+58.0	68.9	10 18.4	+58.3	69.0	10 39.8	+58.6	69.2	11 01.0	+58.8	69.4	11 22.1	+58.9	69.6	11 42.9	+59.2	69.8	12 03.6	+59.3	69.9	12 24.1	+59.4	70.2	**15**
16	10 54.9	+58.1	68.6	11 16.7	+58.4	68.8	11 38.4	+58.5	69.0	11 59.8	+58.8	69.2	12 21.0	+59.0	69.4	12 42.1	+59.1	69.6	13 02.9	+59.3	69.8	13 23.5	+59.5	70.0	**16**
17	11 53.0	+58.1	68.3	12 15.1	+58.3	68.5	12 36.9	+58.5	68.7	12 58.6	+58.7	69.0	13 20.0	+58.9	69.2	13 41.2	+59.1	69.4	14 02.2	+59.3	69.6	14 23.0	+59.4	69.9	**17**
18	12 51.1	+58.0	68.1	13 13.4	+58.3	68.3	13 35.4	+58.6	68.5	13 57.3	+58.7	68.8	14 18.9	+59.0	69.0	14 40.3	+59.1	69.2	15 01.5	+59.3	69.5	15 22.4	+59.4	69.7	**18**
19	13 49.1	+58.1	67.8	14 11.7	+58.2	68.1	14 34.0	+58.5	68.3	14 56.0	+58.8	68.5	15 17.9	+58.9	68.8	15 39.4	+59.2	69.1	16 00.8	+59.2	69.3	16 21.8	+59.5	69.6	**19**
20	14 47.2	+58.0	67.6	15 09.9	+58.3	67.8	15 32.5	+58.5	68.1	15 54.8	+58.7	68.3	16 16.8	+58.9	68.6	16 38.6	+59.1	68.9	17 00.0	+59.3	69.2	17 21.3	+59.4	69.4	**20**
21	15 45.2	+58.0	67.3	16 08.2	+58.2	67.6	16 31.0	+58.5	67.8	16 53.5	+58.7	68.1	17 15.7	+58.9	68.4	17 37.7	+59.0	68.7	17 59.3	+59.3	69.0	18 20.7	+59.4	69.3	**21**
22	16 43.2	+57.9	67.0	17 06.4	+58.3	67.3	17 29.5	+58.4	67.6	17 52.2	+58.7	67.9	18 14.6	+58.9	68.2	18 36.7	+59.1	68.5	18 58.6	+59.2	68.8	19 20.1	+59.4	69.1	**22**
23	17 41.1	+58.0	66.8	18 04.7	+58.2	67.1	18 27.9	+58.5	67.4	18 50.9	+58.6	67.7	19 13.5	+58.9	68.0	19 35.8	+59.1	68.3	19 57.8	+59.3	68.7	20 19.5	+59.4	69.0	**23**
24	18 39.1	+57.9	66.5	19 02.9	+58.2	66.8	19 26.4	+58.4	67.1	19 49.5	+58.7	67.5	20 12.4	+58.8	67.8	20 34.9	+59.0	68.1	20 57.1	+59.2	68.5	21 18.9	+59.4	68.8	**24**
25	19 37.0	+57.9	66.2	20 01.1	+58.1	66.5	20 24.8	+58.4	66.9	20 48.2	+58.6	67.2	21 11.2	+58.9	67.6	21 33.9	+59.1	67.9	21 56.3	+59.2	68.3	22 18.3	+59.3	68.7	**25**
26	20 34.9	+57.9	65.9	20 59.2	+58.2	66.3	21 23.2	+58.4	66.6	21 46.8	+58.6	67.0	22 10.1	+58.8	67.4	22 33.0	+59.0	67.8	22 55.5	+59.2	68.1	23 17.6	+59.4	68.5	**26**
27	21 32.8	+57.8	65.7	21 57.4	+58.1	66.0	22 21.6	+58.3	66.4	22 45.4	+58.6	66.8	23 08.9	+58.8	67.2	23 32.0	+59.0	67.6	23 54.7	+59.2	68.0	24 17.0	+59.4	68.4	**27**
28	22 30.6	+57.9	65.4	22 55.5	+58.1	65.7	23 19.9	+58.4	66.1	23 44.0	+58.6	66.5	24 07.7	+58.8	66.9	24 31.0	+59.0	67.4	24 53.9	+59.2	67.8	25 16.4	+59.3	68.2	**28**
29	23 28.5	+57.7	65.1	23 53.6	+58.0	65.5	24 18.3	+58.3	65.9	24 42.6	+58.5	66.3	25 06.5	+58.8	66.7	25 30.0	+59.0	67.2	25 53.1	+59.1	67.6	26 15.7	+59.4	68.1	**29**
30	24 26.2	+57.8	64.8	24 51.6	+58.0	65.2	25 16.6	+58.3	65.6	25 41.1	+58.6	66.1	26 05.3	+58.7	66.5	26 29.0	+58.9	67.0	26 52.2	+59.2	67.4	27 15.1	+59.3	67.9	**30**
31	25 24.0	+57.7	64.5	25 49.6	+58.0	64.9	26 14.9	+58.2	65.4	26 39.7	+58.5	65.8	27 04.0	+58.8	66.3	27 27.9	+59.0	66.7	27 51.4	+59.1	67.2	28 14.4	+59.3	67.7	**31**
32	26 21.7	+57.7	64.2	26 47.6	+58.0	64.6	27 13.1	+58.2	65.1	27 38.2	+58.4	65.6	28 02.8	+58.7	66.0	28 26.9	+58.9	66.5	28 50.5	+59.2	67.0	29 13.7	+59.3	67.5	**32**
33	27 19.4	+57.6	63.9	27 45.6	+57.9	64.3	28 11.3	+58.2	64.8	28 36.6	+58.5	65.3	29 01.5	+58.6	65.8	29 25.8	+58.9	66.3	29 49.7	+59.1	66.8	30 13.0	+59.3	67.4	**33**
34	28 17.0	+57.6	63.6	28 43.5	+57.9	64.0	29 09.5	+58.2	64.5	29 35.1	+58.4	65.0	30 00.1	+58.7	65.6	30 24.7	+58.9	66.1	30 48.8	+59.0	66.6	31 12.3	+59.2	67.2	**34**
35	29 14.6	+57.5	63.2	29 41.4	+57.8	63.7	30 07.7	+58.1	64.3	30 33.5	+58.4	64.8	30 58.8	+58.6	65.3	31 23.6	+58.8	65.9	31 47.8	+59.1	66.4	32 11.5	+59.3	67.0	**35**
36	30 12.1	+57.5	62.9	30 39.2	+57.8	63.4	31 05.8	+58.1	64.0	31 31.9	+58.3	64.5	31 57.4	+58.6	65.1	32 22.4	+58.9	65.6	32 46.9	+59.0	66.2	33 10.8	+59.2	66.8	**36**
37	31 09.6	+57.5	62.6	31 37.0	+57.7	63.1	32 03.9	+58.0	63.7	32 30.2	+58.3	64.2	32 56.0	+58.6	64.8	33 21.3	+58.8	65.4	33 45.9	+59.1	66.0	34 10.0	+59.3	66.6	**37**
38	32 07.1	+57.3	62.2	32 34.7	+57.7	62.8	33 01.9	+58.0	63.4	33 28.5	+58.3	64.0	33 54.6	+58.5	64.6	34 20.1	+58.7	65.2	34 45.0	+59.0	65.8	35 09.3	+59.2	66.4	**38**
39	33 04.4	+57.4	61.9	33 32.4	+57.7	62.5	33 59.9	+57.9	63.1	34 26.8	+58.2	63.7	34 53.1	+58.5	64.3	35 18.8	+58.8	64.9	35 44.0	+58.9	65.6	36 08.5	+59.1	66.2	**39**
40	34 01.8	+57.2	61.5	34 30.1	+57.6	62.1	34 57.8	+57.9	62.7	35 25.0	+58.2	63.4	35 51.6	+58.5	64.0	36 17.6	+58.7	64.7	36 42.9	+59.0	65.3	37 07.6	+59.2	66.0	**40**
41	34 59.0	+57.2	61.2	35 27.7	+57.5	61.8	35 55.7	+57.9	62.4	36 23.2	+58.1	63.1	36 50.1	+58.4	63.7	37 16.3	+58.7	64.4	37 41.9	+58.9	65.1	38 06.8	+59.1	65.8	**41**
42	35 56.2	+57.1	60.8	36 25.2	+57.5	61.4	36 53.6	+57.8	62.1	37 21.3	+58.1	62.8	37 48.5	+58.4	63.5	38 15.0	+58.6	64.2	38 40.8	+58.9	64.9	39 05.9	+59.1	65.6	**42**
43	36 53.3	+57.1	60.4	37 22.7	+57.4	61.1	37 51.4	+57.7	61.8	38 19.4	+58.1	62.4	38 46.9	+58.3	63.2	39 13.6	+58.6	63.9	39 39.7	+58.8	64.6	40 05.0	+59.1	65.4	**43**
44	37 50.4	+57.0	60.0	38 20.1	+57.3	60.7	38 49.1	+57.6	61.4	39 17.5	+58.0	62.1	39 45.2	+58.3	62.9	40 12.2	+58.6	63.6	40 38.5	+58.8	64.4	41 04.1	+59.1	65.2	**44**
45	38 47.4	+56.8	59.6	39 17.4	+57.2	60.3	39 46.7	+57.6	61.1	40 15.5	+57.9	61.8	40 43.5	+58.2	62.5	41 10.8	+58.5	63.3	41 37.3	+58.8	64.1	42 03.2	+59.0	64.9	**45**
46	39 44.2	+56.8	59.2	40 14.6	+57.2	59.9	40 44.3	+57.6	60.7	41 13.4	+57.8	61.4	41 41.7	+58.2	62.2	42 09.3	+58.5	63.0	42 36.1	+58.8	63.8	43 02.2	+59.0	64.7	**46**
47	40 41.0	+56.7	58.8	41 11.8	+57.1	59.5	41 41.9	+57.4	60.3	42 11.2	+57.8	61.1	42 39.9	+58.1	61.9	43 07.8	+58.4	62.7	43 34.9	+58.7	63.6	44 01.2	+58.9	64.4	**47**
48	41 37.7	+56.6	58.4	42 08.9	+57.0	59.1	42 39.3	+57.4	59.9	43 09.0	+57.7	60.7	43 38.0	+58.0	61.6	44 06.2	+58.3	62.4	44 33.6	+58.6	63.3	45 00.1	+59.0	64.2	**48**
49	42 34.3	+56.5	57.9	43 05.9	+56.9	58.7	43 36.7	+57.2	59.5	44 06.7	+57.7	60.3	44 36.0	+58.0	61.2	45 04.5	+58.3	62.1	45 32.2	+58.6	63.0	45 59.1	+58.8	63.9	**49**
50	43 30.8	+56.4	57.5	44 02.8	+56.8	58.3	44 33.9	+57.2	59.1	45 04.4	+57.5	60.0	45 34.0	+57.9	60.8	46 02.8	+58.3	61.7	46 30.8	+58.6	62.7	46 57.9	+58.9	63.6	**50**
51	44 27.2	+56.3	57.0	44 59.6	+56.6	57.8	45 31.1	+57.1	58.7	46 01.9	+57.5	59.6	46 31.9	+57.9	60.5	47 01.1	+58.2	61.4	47 29.4	+58.5	62.3	47 56.8	+58.8	63.3	**51**
52	45 23.5	+56.1	56.5	45 56.2	+56.6	57.3	46 28.2	+57.0	58.2	46 59.4	+57.4	59.1	47 29.8	+57.7	60.1	47 59.3	+58.1	61.0	48 27.9	+58.4	62.0	48 55.6	+58.7	63.0	**52**
53	46 19.6	+56.0	56.0	46 52.8	+56.4	56.9	47 25.2	+56.9	57.8	47 56.8	+57.3	58.7	48 27.5	+57.7	59.7	48 57.4	+58.0	60.7	49 26.3	+58.4	61.7	49 54.3	+58.7	62.7	**53**
54	47 15.6	+55.8	55.5	47 49.2	+56.3	56.4	48 22.1	+56.7	57.3	48 54.1	+57.1	58.3	49 25.2	+57.6	59.2	49 55.4	+58.0	60.3	50 24.7	+58.3	61.3	50 53.0	+58.6	62.4	**54**
55	48 11.4	+55.7	54.9	48 45.5	+56.2	55.8	49 18.8	+56.6	56.8	49 51.2	+57.1	57.8	50 22.8	+57.4	58.8	50 53.4	+57.8	59.9	51 23.0	+58.2	60.9	51 51.6	+58.6	62.0	**55**
56	49 07.1	+55.5	54.3	49 41.7	+56.0	55.3	50 15.4	+56.5	56.3	50 48.3	+56.9	57.3	51 20.2	+57.4	58.4	51 51.2	+57.8	59.4	52 21.2	+58.2	60.5	52 50.2	+58.5	61.7	**56**
57	50 02.6	+55.3	53.8	50 37.7	+55.8	54.7	51 11.9	+56.3	55.8	51 45.2	+56.8	56.8	52 17.6	+57.2	57.9	52 49.0	+57.7	59.0	53 19.4	+58.1	60.1	53 48.7	+58.5	61.3	**57**
58	50 57.9	+55.2	53.2	51 33.5	+55.6	54.2	52 08.2	+56.1	55.2	52 42.0	+56.6	56.3	53 14.8	+57.1	57.4	53 46.7	+57.5	58.5	54 17.5	+57.9	59.7	54 47.2	+58.3	60.9	**58**
59	51 53.1	+54.9	52.5	52 29.1	+55.5	53.5	53 04.3	+56.0	54.6	53 38.6	+56.5	55.7	54 11.9	+57.0	56.9	54 44.2	+57.4	58.0	55 15.4	+57.9	59.3	55 45.5	+58.3	60.5	**59**
60	52 48.0	+54.7	51.9	53 24.6	+55.2	52.9	54 00.3	+55.8	54.0	54 35.1	+56.3	55.1	55 08.9	+56.8	56.3	55 41.6	+57.3	57.5	56 13.3	+57.7	58.8	56 43.8	+58.2	60.1	**60**
61	53 42.7	+54.4	51.2	54 19.8	+55.1	52.3	54 56.1	+55.6	53.4	55 31.4	+56.1	54.5	56 05.7	+56.7	55.7	56 38.9	+57.2	57.0	57 11.0	+57.7	58.3	57 42.0	+58.1	59.6	**61**
62	54 37.1	+54.2	50.5	55 14.9	+54.7	51.6	55 51.7	+55.3	52.7	56 27.5	+56.0	53.9	57 02.4	+56.4	55.2	57 36.1	+57.0	56.4	58 08.7	+57.5	57.8	58 40.1	+57.9	59.2	**62**
63	55 31.3	+53.9	49.7	56 09.6	+54.5	50.8	56 47.0	+55.2	52.0	57 23.5	+55.7	53.2	57 58.8	+56.3	54.5	58 33.1	+56.8	55.8	59 06.2	+57.3	57.2	59 38.0	+57.9	58.7	**63**
64	56 25.2	+53.5	48.9	57 04.1	+54.2	50.1	57 42.2	+54.8	51.3	58 19.2	+55.4	52.5	58 55.1	+56.1	53.9	59 29.9	+56.7	55.2	60 03.5	+57.2	56.6	60 35.9	+57.7	58.1	**64**
65	57 18.7	+53.3	48.1	57 58.3	+53.9	49.3	58 37.0	+54.5	50.5	59 14.6	+55.2	51.8	59 51.2	+55.8	53.2	60 26.6	+56.4	54.6	61 00.7	+57.0	56.0	61 33.6	+57.5	57.6	**65**
66	58 12.0	+52.8	47.2	58 52.2	+53.6	48.4	59 31.5	+54.3	49.7	60 09.8	+54.9	51.0	60 47.0	+55.6	52.4	61 23.0	+56.2	53.9	61 57.7	+56.8	55.4	62 31.1	+57.4	57.0	**66**
67	59 04.8	+52.5	46.3	59 45.8	+53.2	47.6	60 25.8	+53.9	48.9	61 04.7	+54.6	50.2	61 42.6	+55.2	51.6	62 19.2	+55.9	53.1	62 54.5	+56.6	54.7	63 28.5	+57.2	56.3	**67**
68	59 57.3	+52.0	45.4	60 39.0	+52.7	46.6	61 19.7	+53.5	47.9	61 59.3	+54.3	49.3	62 37.8	+55.0	50.8	63 15.1	+55.7	52.3	63 51.1	+56.4	53.9	64 25.7	+57.0	55.6	**68**
69	60 49.3	+51.6	44.4	61 31.7	+52.4	45.6	62 13.2	+53.1	47.0	62 53.6	+53.8	48.4	63 32.8	+54.6	49.9	64 10.8	+55.4	51.5	64 47.5	+56.1	53.2	65 22.7	+56.8	54.9	**69**
70	61 40.9	+51.0	43.3	62 24.1	+51.8	44.6	63 06.3	+52.6	46.0	63 47.4	+53.4	47.4	64 27.4	+54.2	49.0	65 06.2	+55.0	50.6	65 43.6	+55.7	52.3	66 19.5	+56.5	54.1	**70**
71	62 31.9	+50.4	42.2	63 15.9	+51.3	43.5	63 58.9	+52.1	44.9	64 40.8	+53.0	46.4	65 21.6	+53.8	48.0	66 01.2	+54.6	49.6	66 39.3	+55.5	51.4	67 16.0	+56.2	53.2	**71**
72	63 22.3	+49.8	41.0	64 07.2	+50.6	42.3	64 51.0	+51.6	43.8	65 33.8	+52.4	45.3	66 15.4	+53.3	46.9	66 55.8	+54.2	48.6	67 34.8	+55.0	50.4	68 12.2	+55.9	52.3	**72**
73	64 12.1	+49.2	39.7	64 57.8	+50.0	41.1	65 42.6	+50.9	42.5	66 26.2	+51.9	44.1	67 08.7	+52.8	45.7	67 50.0	+53.7	47.5	68 29.8	+54.6	49.3	69 08.1	+55.5	51.3	**73**
74	65 01.3	+48.3	38.4	65 47.8	+49.3	39.8	66 33.5	+50.2	41.2	67 18.1	+51.2	42.8	68 01.5	+52.2	44.5	68 43.7	+53.1	46.3	69 24.4	+54.1	48.2	70 03.6	+55.1	50.2	**74**
75	65 49.6	+47.5	36.9	66 37.1	+48.5	38.3	67 23.7	+49.5	39.8	68 09.3	+50.4	41.4	68 53.7	+51.4	43.1	69 36.8	+52.5	45.0	70 18.5	+53.6	46.9	70 58.7	+54.6	49.0	**75**
76	66 37.1	+46.6	35.4	67 25.6	+47.6	36.8	68 13.2	+48.5	38.3	68 59.7	+49.6	39.9	69 45.1	+50.7	41.7	70 29.3	+51.8	43.5	71 12.1	+52.8	45.6	71 53.3	+53.9	47.7	**76**
77	67 23.7	+45.6	33.8	68 13.2	+46.5	35.2	69 01.7	+47.6	36.7	69 49.3	+48.7	38.3	70 35.8	+49.8	40.1	71 21.1	+50.9	42.0	72 04.9	+52.2	44.1	72 47.2	+53.3	46.3	**77**
78	68 09.3	+44.4	32.1	68 59.7	+45.4	33.5	69 49.3	+46.5	35.0	70 38.0	+47.6	36.6	71 25.6	+48.8	38.4	72 12.0	+50.0	40.3	72 57.1	+51.2	42.4	73 40.5	+52.6	44.7	**78**
79	68 53.7	+43.1	30.3	69 45.1	+44.2	31.6	70 35.8	+45.3	33.1	71 25.6	+46.4	34.7	72 14.4	+47.6	36.5	73 02.0	+48.9	38.5	73 48.3	+50.2	40.6	74 33.1	+51.5	42.9	**79**
80	69 36.8	+41.7	28.3	70 29.3	+42.8	29.6	71 21.1	+43.8	31.1	72 12.0	+45.1	32.7	73 02.0	+46.3	34.5	73 50.9	+47.6	36.4	74 38.5	+49.0	38.6	75 24.6	+50.5	41.0	**80**
81	70 18.5	+40.2	26.2	71 12.1	+41.2	27.5	72 04.9	+42.3	28.9	72 57.1	+43.4	30.5	73 48.3	+44.8	32.2	74 38.5	+46.1	34.2	75 27.5	+47.6	36.3	76 15.1	+49.1	38.8	**81**
82	70 58.7	+38.4	24.0	71 53.3	+39.4	25.2	72 47.2	+40.6	26.6	73 40.5	+41.8	28.1	74 33.1	+43.0	29.8	75 24.6	+44.4	31.7	76 15.1	+45.9	33.8	77 04.2	+47.5	36.3	**82**
83	71 37.1	*+36.5*•	21.6	72 32.7	*+37.5*•	22.7	73 27.8	*+38.5*•	24.0	74 22.3	*+39.7*•	25.5	75 16.1	*+40.9*•	27.1	76 09.0	*+42.4*•	29.0	77 01.0	*+43.9*•	31.1	77 51.7	*+45.6*•	33.5	**83**
84	72 13.6	*+34.4*•	19.0	73 10.2	*+35.3*•	20.1	74 06.3	*+36.3*•	21.3	75 02.0	*+37.4*•	22.6	75 57.0	*+38.7*•	24.2	76 51.4	*+40.0*•	25.9	77 44.9	*+41.5*•	27.9	78 37.3	*+43.3*•	30.3	**84**
85	72 48.0	*+32.1*•	16.3	73 45.5	*+32.8*•	17.2	74 42.6	*+33.8*•	18.3	75 39.4	*+34.7*•	19.5	76 35.7	*+35.9*•	20.9	77 31.4	*+37.2*•	22.6	78 26.4	*+38.7*•	24.4	79 20.6	*+40.4*•	26.6	**85**
86	73 20.1	*+29.4*•	13.4	74 18.3	*+30.2*•	14.2	75 16.4	*+30.9*•	15.1	76 14.1	*+31.9*•	16.2	77 11.6	*+32.8*•	17.4	78 08.6	*+34.0*•	18.8	79 05.1	*+35.4*•	20.5	80 01.0	*+36.9*•	22.5	**86**
87	73 49.5	*+26.7*•	10.3	74 48.5	*+27.2*•	10.9	75 47.3	*+27.8*•	11.7	76 46.0	*+28.5*•	12.6	77 44.4	*+29.4*•	13.6	78 42.6	*+30.3*•	14.7	79 40.5	*+31.3*•	16.1	80 37.9	*+32.7*•	17.8	**87**
88	74 16.2	*+23.5*•	7.0	75 15.7	*+23.9*•	7.5	76 15.1	*+24.4*•	8.0	77 14.5	*+24.8*•	8.6	78 13.8	*+25.3*•	9.4	79 12.9	*+26.0*•	10.2	80 11.8	*+26.8*•	11.2	81 10.6	*+27.6*•	12.5	**88**
89	74 39.7	*+20.3*•	3.6	75 39.6	*+20.4*•	3.8	76 39.5	*+20.5*•	4.1	77 39.3	*+20.7*•	4.5	78 39.1	*+20.9*•	4.8	79 38.9	*+21.1*•	5.3	80 38.6	*+21.4*•	5.9	81 38.2	*+21.8*•	6.6	**89**
90	75 00.0	*+16.7*•	0.0	76 00.0	*+16.6*•	0.0	77 00.0	*+16.4*•	0.0	78 00.0	*+16.3*•	0.0	79 00.0	*+16.0*•	0.0	80 00.0	*+15.8*•	0.0	81 00.0	*+15.5*•	0.0	82 00.0	*+15.0*•	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 108°, 252°

73°, 287° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	75°			76°			77°			78°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	4 20.4	+58.1	106.5	4 03.4	+58.3	106.5	3 46.3	+58.5	106.6	3 29.1	+58.8	106.6
1	5 18.5	+58.1	106.2	5 01.7	+58.4	106.3	4 44.8	+58.6	106.4	4 27.9	+58.8	106.4
2	6 16.6	+58.1	106.0	6 00.1	+58.3	106.1	5 43.4	+58.6	106.2	5 26.7	+58.8	106.2
3	7 14.7	+58.1	105.7	6 58.4	+58.4	105.8	6 42.0	+58.6	105.9	6 25.5	+58.8	106.0
4	8 12.8	+58.1	105.5	7 56.8	+58.3	105.6	7 40.6	+58.5	105.7	7 24.3	+58.7	105.8
5	9 10.9	+58.1	105.2	8 55.1	+58.3	105.4	8 39.1	+58.6	105.5	8 23.0	+58.8	105.6
6	10 09.0	+58.1	104.9	9 53.4	+58.4	105.1	9 37.7	+58.6	105.3	9 21.8	+58.8	105.4
7	11 07.1	+58.0	104.7	10 51.8	+58.3	104.9	10 36.3	+58.5	105.1	10 20.6	+58.7	105.2
8	12 05.1	+58.1	104.4	11 50.1	+58.3	104.6	11 34.8	+58.5	104.8	11 19.3	+58.8	105.0
9	13 03.2	+58.0	104.2	12 48.4	+58.2	104.4	12 33.3	+58.5	104.6	12 18.1	+58.7	104.8
10	14 01.2	+58.0	103.9	13 46.6	+58.3	104.1	13 31.8	+58.6	104.4	13 16.8	+58.8	104.6
11	14 59.2	+58.0	103.6	14 44.9	+58.2	103.9	14 30.4	+58.4	104.2	14 15.6	+58.7	104.4
12	15 57.2	+57.9	103.4	15 43.1	+58.3	103.7	15 28.8	+58.5	103.9	15 14.3	+58.7	104.2
13	16 55.1	+58.0	103.1	16 41.4	+58.2	103.4	16 27.3	+58.5	103.7	16 13.0	+58.7	104.0
14	17 53.1	+57.9	102.8	17 39.6	+58.2	103.1	17 25.8	+58.4	103.5	17 11.7	+58.7	103.8
15	18 51.0	+57.9	102.6	18 37.8	+58.2	102.9	18 24.2	+58.5	103.2	18 10.4	+58.6	103.5
16	19 48.9	+57.9	102.3	19 36.0	+58.1	102.6	19 22.7	+58.4	103.0	19 09.0	+58.7	103.3
17	20 46.8	+57.8	102.0	20 34.1	+58.1	102.4	20 21.1	+58.4	102.7	20 07.7	+58.6	103.1
18	21 44.6	+57.8	101.7	21 32.2	+58.1	102.1	21 19.5	+58.3	102.5	21 06.3	+58.6	102.9
19	22 42.4	+57.8	101.4	22 30.3	+58.1	101.8	22 17.8	+58.4	102.2	22 04.9	+58.6	102.6
20	23 40.2	+57.8	101.1	23 28.4	+58.1	101.6	23 16.2	+58.3	102.0	23 03.5	+58.6	102.4
21	24 38.0	+57.7	100.8	24 26.5	+58.0	101.3	24 14.5	+58.3	101.7	24 02.1	+58.5	102.2
22	25 35.7	+57.7	100.5	25 24.5	+58.0	101.0	25 12.8	+58.2	101.5	25 00.6	+58.5	101.9
23	26 33.4	+57.6	100.2	26 22.5	+57.9	100.7	26 11.0	+58.3	101.2	25 59.1	+58.5	101.7
24	27 31.0	+57.6	99.9	27 20.4	+57.9	100.4	27 09.3	+58.2	100.9	26 57.6	+58.5	101.4
25	28 28.6	+57.5	99.6	28 18.3	+57.9	100.1	28 07.5	+58.2	100.7	27 56.1	+58.5	101.2
26	29 26.1	+57.5	99.3	29 16.2	+57.8	99.8	29 05.7	+58.1	100.4	28 54.6	+58.4	100.9
27	30 23.6	+57.5	98.9	30 14.0	+57.8	99.5	30 03.8	+58.1	100.1	29 53.0	+58.4	100.7
28	31 21.1	+57.4	98.6	31 11.8	+57.7	99.2	31 01.9	+58.1	99.8	30 51.4	+58.3	100.4
29	32 18.5	+57.3	98.3	32 09.5	+57.7	98.9	32 00.0	+58.0	99.5	31 49.7	+58.3	100.1
30	33 15.8	+57.3	97.9	33 07.2	+57.7	98.6	32 58.0	+57.9	99.2	32 48.0	+58.3	99.8
31	34 13.1	+57.2	97.6	34 04.9	+57.6	98.2	33 55.9	+58.0	98.9	33 46.3	+58.3	99.6
32	35 10.3	+57.2	97.2	35 02.5	+57.5	97.9	34 53.9	+57.8	98.6	34 44.6	+58.1	99.3
33	36 07.5	+57.1	96.8	36 00.0	+57.4	97.5	35 51.7	+57.9	98.3	35 42.7	+58.2	99.0
34	37 04.6	+57.0	96.4	36 57.4	+57.4	97.2	36 49.6	+57.7	97.9	36 40.9	+58.1	98.7
35	38 01.6	+56.9	96.0	37 54.8	+57.4	96.8	37 47.3	+57.7	97.6	37 39.0	+58.1	98.4
36	38 58.5	+56.8	95.6	38 52.2	+57.2	96.4	38 45.0	+57.7	97.2	38 37.1	+57.9	98.0
37	39 55.3	+56.8	95.2	39 49.4	+57.2	96.1	39 42.7	+57.5	96.9	39 35.0	+58.0	97.7
38	40 52.1	+56.6	94.8	40 46.6	+57.1	95.7	40 40.2	+57.5	96.5	40 33.0	+57.9	97.4
39	41 48.7	+56.5	94.4	41 43.7	+57.0	95.2	41 37.7	+57.5	96.1	41 30.9	+57.8	97.0
40	42 45.2	+56.5	93.9	42 40.7	+56.9	94.8	42 35.2	+57.3	95.7	42 28.7	+57.7	96.7
41	43 41.7	+56.3	93.4	43 37.6	+56.8	94.4	43 32.5	+57.2	95.3	43 26.4	+57.7	96.3
42	44 38.0	+56.2	93.0	44 34.4	+56.7	93.9	44 29.7	+57.2	94.9	44 24.1	+57.6	95.9
43	45 34.2	+56.0	92.5	45 31.1	+56.6	93.5	45 26.9	+57.1	94.5	45 21.7	+57.5	95.5
44	46 30.2	+56.0	91.9	46 27.7	+56.4	93.0	46 24.0	+56.9	94.0	46 19.2	+57.4	95.1
45	47 26.2	+55.7	91.4	47 24.1	+56.3	92.5	47 20.9	+56.9	93.6	47 16.6	+57.3	94.7
46	48 21.9	+55.6	90.9	48 20.4	+56.2	92.0	48 17.8	+56.7	93.1	48 13.9	+57.2	94.2
47	49 17.5	+55.4	90.3	49 16.6	+56.0	91.5	49 14.5	+56.5	92.6	49 11.1	+57.1	93.8
48	50 12.9	+55.3	89.7	50 12.6	+55.9	90.9	50 11.0	+56.5	92.1	50 08.2	+57.0	93.3
49	51 08.2	+55.0	89.1	51 08.5	+55.7	90.3	51 07.5	+56.3	91.6	51 05.2	+56.9	92.8
50	52 03.2	+54.8	88.4	52 04.2	+55.4	89.7	52 03.8	+56.1	91.0	52 02.1	+56.7	92.3
51	52 58.0	+54.6	87.8	52 59.6	+55.3	89.1	52 59.9	+55.9	90.4	52 58.8	+56.5	91.8
52	53 52.6	+54.3	87.1	53 54.9	+55.1	88.4	53 55.8	+55.8	89.8	53 55.3	+56.4	91.2
53	54 46.9	+54.1	86.3	54 50.0	+54.8	87.8	54 51.6	+55.5	89.2	54 51.7	+56.2	90.6
54	55 41.0	+53.7	85.6	55 44.8	+54.6	87.0	55 47.1	+55.4	88.5	55 47.9	+56.0	90.0
55	56 34.7	+53.5	84.8	56 39.4	+54.3	86.3	56 42.5	+55.0	87.8	56 43.9	+55.9	89.3
56	57 28.2	+53.0	84.0	57 33.7	+53.9	85.5	57 37.5	+54.8	87.1	57 39.8	+55.5	88.7
57	58 21.2	+52.8	83.1	58 27.6	+53.7	84.7	58 32.3	+54.6	86.3	58 35.3	+55.4	88.0
58	59 14.0	+52.3	82.2	59 21.3	+53.3	83.8	59 26.9	+54.2	85.5	59 30.7	+55.0	87.2
59	60 06.3	+51.8	81.2	60 14.6	+52.8	82.9	60 21.1	+53.8	84.7	60 25.7	+54.8	86.4
60	60 58.1	+51.4	80.2	61 07.4	+52.5	81.9	61 14.9	+53.5	83.7	61 20.5	+54.4	85.6
61	61 49.5	+50.8	79.1	61 59.9	+51.9	80.9	62 08.4	+53.0	82.8	62 14.9	+54.1	84.7
62	62 40.3	+50.2	77.9	62 51.8	+51.5	79.8	63 01.4	+52.6	81.8	63 09.0	+53.7	83.7
63	63 30.5	+49.6	76.7	63 43.3	+50.8	78.7	63 54.0	+52.1	80.7	64 02.7	+53.2	82.7
64	64 20.1	+48.9	75.4	64 34.1	+50.3	77.5	64 46.1	+51.5	79.6	64 55.9	+52.7	81.7
65	65 09.0	+48.0	74.1	65 24.4	+49.5	76.2	65 37.6	+50.9	78.3	65 48.6	+52.2	80.5
66	65 57.0	+47.3	72.6	66 13.9	+48.7	74.8	66 28.5	+50.1	77.0	66 40.8	+51.6	79.3
67	66 44.3	+46.2	71.1	67 02.6	+47.8	73.3	67 18.6	+49.4	75.6	67 32.4	+50.8	78.0
68	67 30.5	+45.2	69.5	67 50.4	+46.9	71.8	68 08.0	+48.6	74.1	68 23.2	+50.1	76.6
69	68 15.7	+44.1	67.7	68 37.3	+45.8	70.1	68 56.6	+47.5	72.5	69 13.3	+49.3	75.0
70	68 59.8	+42.7	65.9	69 23.1	+44.6	68.3	69 44.1	+46.5	70.8	70 02.6	+48.2	73.4
71	69 42.5	+41.3	63.9	70 07.7	+43.3	66.3	70 30.6	+45.2	68.9	70 50.8	+47.2	71.6
72	70 23.8	+39.6	61.7	70 51.0	+41.8	64.3	71 15.8	+43.8	66.9	71 38.0	+45.9	69.7
73	71 03.4	+37.9	59.5	71 32.8	+40.0	62.0	71 59.6	+42.3	64.8	72 23.9	+44.4	67.6
74	71 41.3	+36.0 •	57.0	72 12.8	+38.2	59.6	72 41.9	+40.5	62.4	73 08.3	+42.9	65.3
75	72 17.3	+33.7 •	54.4	72 51.0	+36.2 •	57.1	73 22.4	+38.6 •	59.9	73 51.2	+41.0 •	62.9
76	72 51.0	+31.4 •	51.7	73 27.2	+33.8 •	54.3	74 01.0	+36.3 •	57.2	74 32.2	+38.8 •	60.2
77	73 22.4	+28.8 •	48.7	74 01.0	+31.2 •	51.4	74 37.3	+33.7 •	54.2	75 11.0	+36.5 •	57.3
78	73 51.2	+25.9 •	45.6	74 32.2	+28.3 •	48.2	75 11.0	+31.0 •	51.0	75 47.5	+33.8 •	54.1
79	74 17.1	+22.7 •	42.4	75 00.5	+25.2 •	44.9	75 42.0	+27.9 •	47.6	76 21.3	+30.7 •	50.7
80	74 39.8	+19.5 •	38.9	75 25.7	+21.9 •	41.3	76 09.9	+24.4 •	44.0	76 52.0	+27.2 •	47.0
81	74 59.3	+15.8 •	35.3	75 47.6	+18.1 •	37.6	76 34.3	+20.7 •	40.1	77 19.2	+23.5 •	43.0
82	75 15.1	+12.2 •	31.5	76 05.7	+14.2 •	33.6	76 55.0	+16.6 •	36.0	77 42.7	+19.2 •	38.7
83	75 27.3	+8.2 •	27.6	76 19.9	+10.2 •	29.6	77 11.6	+12.2 •	31.7	78 01.9	+14.8 •	34.2
84	75 35.5	+4.1 •	23.7	76 30.1	+5.8 •	25.4	77 23.8	+7.8 •	27.3	78 16.7	+9.8 •	29.5
85	75 39.6	+0.1 •	19.7	76 35.9	+1.4 •	21.1	77 31.6	+3.0 •	22.7	78 26.5	+4.9 •	24.6
86	75 39.7	–4.0 •	15.6	76 37.3	–2.9 •	16.8	77 34.6	–1.7 •	18.1	78 31.4	–0.3 •	19.6
87	75 35.7	–8.0 •	11.6	76 34.4	–7.3 •	12.4	77 32.9	–6.5 •	13.4	78 31.1	–5.4 •	14.6
88	75 27.7	–12.0 •	7.6	76 27.1	–11.5 •	8.2	77 26.4	–11.0 •	8.8	78 25.7	–10.5 •	9.6
89	75 15.7	–15.7 •	3.8	76 15.6	–15.6 •	4.0	77 15.4	–15.4 •	4.3	78 15.2	–15.2 •	4.7
90	75 00.0	–19.3 •	0.0	76 00.0	–19.4 •	0.0	77 00.0	–19.6 •	0.0	78 00.0	–19.7 •	0.0
	75°			76°			77°			78°		

Dec.	79°			80°			81°			82°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	3 11.9	+59.0	106.7	2 54.6	+59.2	106.8	2 37.3	+59.3	106.8	2 19.9	+59.5	106.8
1	4 10.9	+59.0	106.5	3 53.8	+59.1	106.6	3 36.6	+59.3	106.7	3 19.4	+59.5	106.7
2	5 09.9	+58.9	106.3	4 52.9	+59.2	106.4	4 35.9	+59.4	106.5	4 18.9	+59.4	106.6
3	6 08.8	+59.0	106.2	5 52.1	+59.2	106.3	5 35.3	+59.3	106.4	5 18.3	+59.5	106.4
4	7 07.8	+59.0	106.0	6 51.3	+59.1	106.1	6 34.6	+59.3	106.2	6 17.8	+59.4	106.3
5	8 06.8	+59.0	105.8	7 50.4	+59.2	105.9	7 33.9	+59.3	106.0	7 17.2	+59.5	106.2
6	9 05.8	+58.9	105.6	8 49.6	+59.1	105.7	8 33.2	+59.3	105.9	8 16.7	+59.4	106.0
7	10 04.7	+59.0	105.4	9 48.7	+59.1	105.6	9 32.5	+59.3	105.7	9 16.1	+59.5	105.9
8	11 03.7	+58.9	105.2	10 47.8	+59.2	105.4	10 31.8	+59.3	105.6	10 15.6	+59.4	105.8
9	12 02.6	+59.0	105.0	11 47.0	+59.1	105.2	11 31.1	+59.3	105.4	11 15.0	+59.5	105.6
10	13 01.6	+58.9	104.8	12 46.1	+59.1	105.1	12 30.4	+59.3	105.3	12 14.5	+59.4	105.5
11	14 00.5	+58.9	104.6	13 45.2	+59.1	104.9	13 29.7	+59.3	105.1	13 13.9	+59.5	105.3
12	14 59.4	+58.9	104.5	14 44.3	+59.1	104.7	14 29.0	+59.2	105.0	14 13.4	+59.4	105.2
13	15 58.3	+59.0	104.3	15 43.4	+59.1	104.5	15 28.2	+59.3	104.8	15 12.8	+59.4	105.1
14	16 57.3	+58.8	104.1	16 42.5	+59.1	104.3	16 27.5	+59.3	104.6	16 12.2	+59.4	104.9
15	17 56.1	+58.9	103.9	17 41.6	+59.1	104.2	17 26.8	+59.2	104.5	17 11.6	+59.4	104.8
16	18 55.0	+58.9	103.7	18 40.7	+59.1	104.0	18 26.0	+59.3	104.3	18 11.0	+59.4	104.6
17	19 53.9	+58.8	103.4	19 39.8	+59.0	103.8	19 25.3	+59.2	104.1	19 10.4	+59.4	104.5
18	20 52.7	+58.9	103.2	20 38.8	+59.1	103.6	20 24.5	+59.2	104.0	20 09.8	+59.4	104.3
19	21 51.6	+58.8	103.0	21 37.9	+59.0	103.4	21 23.7	+59.3	103.8	21 09.2	+59.4	104.2
20	22 50.4	+58.8	102.8	22 36.9	+59.0	103.2	22 23.0	+59.2	103.6	22 08.6	+59.4	104.0
21	23 49.2	+58.8	102.6	23 35.9	+59.0	103.0	23 22.2	+59.1	103.5	23 08.0	+59.3	103.9
22	24 48.0	+58.8	102.4	24 34.9	+59.0	102.8	24 21.3	+59.2	103.3	24 07.3	+59.4	103.7
23	25 46.8	+58.7	102.2	25 33.9	+58.9	102.6	25 20.5	+59.2	103.1	25 06.7	+59.3	103.5
24	26 45.5	+58.7	101.9	26 32.8	+59.0	102.4	26 19.7	+59.1	102.9	26 06.0	+59.4	103.4
25	27 44.2	+58.7	101.7	27 31.8	+58.9	102.2	27 18.8	+59.2	102.7	27 05.4	+59.3	103.2
26	28 42.9	+58.7	101.5	28 30.7	+58.9	102.0	28 18.0	+59.1	102.5	28 04.7	+59.3	103.0
27	29 41.6	+58.6	101.2	29 29.6	+58.9	101.8	29 17.1	+59.1	102.3	29 04.0	+59.3	102.9
28	30 40.2	+58.7	101.0	30 28.5	+58.9	101.6	30 16.2	+59.1	102.1	30 03.3	+59.3	102.7
29	31 38.9	+58.6	100.7	31 27.4	+58.8	101.3	31 15.3	+59.0	101.9	31 02.6	+59.2	102.5
30	32 37.5	+58.5	100.5	32 26.2	+58.8	101.1	32 14.3	+59.1	101.7	32 01.8	+59.3	102.3
31	33 36.0	+58.5	100.2	33 25.0	+58.8	100.9	33 13.4	+59.0	101.5	33 01.1	+59.2	102.2
32	34 34.5	+58.5	100.0	34 23.8	+58.8	100.6	34 12.4	+59.0	101.3	34 00.3	+59.2	102.0
33	35 33.0	+58.5	99.7	35 22.6	+58.7	100.4	35 11.4	+59.0	101.1	34 59.5	+59.2	101.8
34	36 31.5	+58.4	99.4	36 21.3	+58.7	100.1	36 10.4	+58.9	100.8	35 58.7	+59.2	101.6
35	37 29.9	+58.4	99.1	37 20.0	+58.7	99.9	37 09.3	+58.9	100.6	36 57.9	+59.1	101.4
36	38 28.3	+58.3	98.8	38 18.7	+58.6	99.6	38 08.2	+58.9	100.4	37 57.0	+59.2	101.1
37	39 26.6	+58.3	98.5	39 17.3	+58.6	99.3	39 07.1	+58.9	100.1	38 56.2	+59.1	100.9
38	40 24.9	+58.2	98.2	40 15.9	+58.5	99.0	40 06.0	+58.8	99.9	39 55.3	+59.1	100.7
39	41 23.1	+58.2	97.9	41 14.4	+58.5	98.8	41 04.8	+58.8	99.6	40 54.4	+59.0	100.5
40	42 21.3	+58.1	97.6	42 12.9	+58.4	98.5	42 03.6	+58.8	99.4	41 53.4	+59.0	100.2
41	43 19.4	+58.0	97.2	43 11.3	+58.4	98.2	43 02.4	+58.7	99.1	42 52.4	+59.0	100.0
42	44 17.4	+58.0	96.9	44 09.7	+58.4	97.8	44 01.1	+58.6	98.8	43 51.4	+59.0	99.7
43	45 15.4	+57.9	96.5	45 08.1	+58.3	97.5	44 59.7	+58.7	98.5	44 50.4	+58.9	99.5
44	46 13.3	+57.9	96.1	46 06.4	+58.2	97.2	45 58.4	+58.5	98.2	45 49.3	+58.8	99.2
45	47 11.2	+57.7	95.7	47 04.6	+58.1	96.8	46 56.9	+58.5	97.9	46 48.1	+58.9	98.9
46	48 08.9	+57.7	95.3	48 02.7	+58.1	96.5	47 55.4	+58.5	97.6	47 47.0	+58.8	98.6
47	49 06.6	+57.6	94.9	49 00.8	+58.0	96.1	48 53.9	+58.4	97.2	48 45.8	+58.7	98.3
48	50 04.2	+57.4	94.5	49 58.8	+58.0	95.7	49 52.3	+58.3	96.9	49 44.5	+58.7	98.0
49	51 01.6	+57.4	94.0	50 56.8	+57.8	95.3	50 50.6	+58.3	96.5	50 43.2	+58.6	97.7
50	51 59.0	+57.2	93.6	51 54.6	+57.7	94.8	51 48.9	+58.1	96.1	51 41.8	+58.6	97.4
51	52 56.2	+57.2	93.1	52 52.3	+57.7	94.4	52 47.0	+58.1	95.7	52 40.4	+58.5	97.0
52	53 53.4	+56.9	92.6	53 50.0	+57.5	93.9	53 45.1	+58.0	95.3	53 38.9	+58.4	96.6
53	54 50.3	+56.9	92.0	54 47.5	+57.4	93.4	54 43.1	+57.9	94.9	54 37.3	+58.4	96.3
54	55 47.2	+56.6	91.5	55 44.9	+57.2	92.9	55 41.0	+57.8	94.4	55 35.7	+58.2	95.8
55	56 43.8	+56.5	90.9	56 42.1	+57.1	92.4	56 38.8	+57.7	93.9	56 33.9	+58.2	95.4
56	57 40.3	+56.3	90.2	57 39.2	+57.0	91.8	57 36.5	+57.6	93.4	57 32.1	+58.1	95.0
57	58 36.6	+56.1	89.6	58 36.2	+56.8	91.2	58 34.1	+57.4	92.9	58 30.2	+58.0	94.5
58	59 32.7	+55.9	88.9	59 33.0	+56.6	90.6	59 31.5	+57.2	92.3	59 28.2	+57.8	94.0
59	60 28.6	+55.6	88.2	60 29.6	+56.3	89.9	60 28.7	+57.1	91.7	60 26.0	+57.7	93.5
60	61 24.2	+55.3	87.4	61 25.9	+56.2	89.2	61 25.8	+56.9	91.1	61 23.7	+57.6	92.9
61	62 19.5	+55.0	86.6	62 22.1	+55.9	88.5	62 22.7	+56.7	90.4	62 21.3	+57.4	92.3
62	63 14.5	+54.7	85.7	63 18.0	+55.6	87.7	63 19.4	+56.4	89.7	63 18.7	+57.2	91.7
63	64 09.2	+54.3	84.8	64 13.6	+55.3	86.8	64 15.8	+56.2	88.9	64 15.9	+57.0	91.0
64	65 03.5	+53.9	83.8	65 08.9	+54.9	85.9	65 12.0	+55.9	88.1	65 12.9	+56.8	90.3
65	65 57.4	+53.4	82.7	66 03.8	+54.5	85.0	66 07.9	+55.6	87.2	66 09.7	+56.5	89.5
66	66 50.8	+52.8	81.6	66 58.3	+54.1	83.9	67 03.5	+55.2	86.3	67 06.2	+56.2	88.6
67	67 43.6	+52.3	80.4	67 52.4	+53.6	82.8	67 58.7	+54.8	85.2	68 02.4	+55.9	87.7
68	68 35.9	+51.6	79.0	68 46.0	+53.1	81.6	68 53.5	+54.3	84.1	68 58.3	+55.5	86.7
69	69 27.5	+50.9	77.6	69 39.1	+52.3	80.2	69 47.8	+53.8	82.9	69 53.8	+55.1	85.6
70	70 18.4	+50.0	76.1	70 31.4	+51.7	78.8	70 41.6	+53.2	81.6	70 48.9	+54.6	84.5
71	71 08.4	+49.0	74.4	71 23.1	+50.8	77.3	71 34.8	+52.5	80.2	71 43.5	+54.0	83.2
72	71 57.4	+47.9	72.6	72 13.9	+49.8	75.5	72 27.3	+51.7	78.6	72 37.5	+53.4	81.7
73	72 45.3	+46.6	70.6	73 03.7	+48.7	73.7	73 19.0	+50.7	76.9	73 30.9	+52.6	80.2
74	73 31.9	+45.2	68.4	73 52.4	+47.4	71.6	74 09.7	+49.6	75.0	74 23.5	+51.6	78.4
75	74 17.1	+43.4	66.0	74 39.8	+45.9	69.4	74 59.3	+48.3	72.9	75 15.1	+50.6	76.5
76	75 00.5	+41.5 •	63.4	75 25.7	+44.2	66.9	75 47.6	+46.7	70.5	76 05.7	+49.3	74.3
77	75 42.0	+39.3 •	60.6	76 09.9	+42.1 •	64.1	76 34.3	+44.9	67.9	76 55.0	+47.7	71.9
78	76 21.3	+36.7 •	57.4	76 52.0	+39.7 •	61.0	77 19.2	+42.8 •	64.9	77 42.7	+45.8 •	69.1
79	76 58.0	+33.7 •	54.0	77 31.7	+36.9 •	57.7	78 02.0	+40.2 •	61.6	78 28.5	+43.5 •	66.0
80	77 31.7	+30.3 •	50.3	78 08.6	+33.6 •	53.9	78 42.2	+37.1 •	58.0	79 12.0	+40.8 •	62.4
81	78 02.0	+26.5 •	46.2	78 42.2	+29.8 •	49.8	79 19.3	+33.5 •	53.8	79 52.8	+37.4 •	58.4
82	78 28.5	+22.2 •	41.8	79 12.0	+25.6 •	45.3	79 52.8	+29.2 •	49.2	80 30.2	+33.3 •	53.8
83	78 50.7	+17.5 •	37.0	79 37.6	+20.7 •	40.3	80 22.0	+24.3 •	44.1	81 03.5	+28.4 •	48.6
84	79 08.2	+12.4 •	32.0	79 58.3	+15.3 •	35.0	80 46.3	+18.7 •	38.6	81 31.9	+22.6 •	42.7
85	79 20.6	+7.0 •	26.8	80 13.6	+9.5 •	29.4	81 05.0	+12.5 •	32.5	81 54.5	+16.1 •	36.3
86	79 27.6	+1.4 •	21.4	80 23.1	+3.4 •	23.5	81 17.5	+5.9 •	26.1	82 10.6	+8.9 •	29.3
87	79 29.0	–4.2 •	15.9	80 26.5	–2.8 •	17.5	81 23.4	–1.1 •	19.5	82 19.5	+1.1 •	22.0
88	79 24.8	–9.8 •	10.5	80 23.7	–8.9 •	11.5	81 22.3	–7.9 •	12.9	82 20.6	–6.6 •	14.5
89	79 15.0	–15.0 •	5.1	80 14.8	–14.8 •	5.7	81 14.4	–14.4 •	6.3	82 14.0	–14.0 •	7.1
90	79 00.0	–19.9 •	0.0	80 00.0	–20.2 •	0.0	81 00.0	–20.5 •	0.0	82 00.0	–20.8 •	0.0
	79°			80°			81°			82°		

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 73°, 287°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 20.4	–58.1	106.5	4 03.4	–58.4	106.5	3 46.3	–58.6	106.6	3 29.1	–58.8	106.6	3 11.9	–59.0	106.7	2 54.6	–59.2	106.8	2 37.3	–59.3	106.8	2 19.9	–59.4	106.8	0
1	3 22.3	–58.2	106.7	3 05.0	–58.4	106.8	2 47.7	–58.6	106.8	2 30.3	–58.8	106.8	2 12.9	–59.0	106.9	1 55.4	–59.1	106.9	1 38.0	–59.4	107.0	1 20.5	–59.5	107.0	1
2	2 24.1	–58.1	106.9	2 06.6	–58.3	107.0	1 49.1	–58.6	107.0	1 31.5	–58.8	107.0	1 13.9	–59.0	107.1	0 56.3	–59.2	107.1	0 38.6	–59.3	107.1	0 21.0	–59.5	107.1	2
3	1 26.0	–58.1	107.2	1 08.3	–58.4	107.2	0 50.5	–58.6	107.2	0 32.7	–58.8	107.2	0 14.9	–59.0	107.3	0 02.9	+59.2	72.7	0 20.7	+59.3	72.7	0 38.5	+59.4	72.8	3
4	0 27.9	–58.2	107.4	0 09.9	–58.4	107.4	0 08.1	+58.6	72.5	0 26.1	+58.8	72.6	0 44.1	+59.0	72.6	1 02.1	+59.1	72.6	1 20.0	+59.3	72.6	1 37.9	+59.5	72.6	4
5	0 30.3	+58.1	72.3	0 48.5	+58.4	72.3	1 06.7	+58.6	72.3	1 24.9	+58.8	72.4	1 43.1	+59.0	72.4	2 01.2	+59.2	72.4	2 19.3	+59.4	72.4	2 37.4	+59.5	72.5	5
6	1 28.4	+58.1	72.1	1 46.9	+58.3	72.1	2 05.3	+58.6	72.1	2 23.7	+58.8	72.2	2 42.1	+59.0	72.2	3 00.4	+59.2	72.2	3 18.7	+59.3	72.3	3 36.9	+59.4	72.4	6
7	2 26.5	+58.2	71.8	2 45.2	+58.4	71.9	3 03.9	+58.6	71.9	3 22.5	+58.8	72.0	3 41.1	+58.9	72.0	3 59.6	+59.1	72.1	4 18.0	+59.3	72.1	4 36.3	+59.5	72.2	7
8	3 24.7	+58.1	71.6	3 43.6	+58.4	71.6	4 02.5	+58.6	71.7	4 21.3	+58.8	71.8	4 40.0	+59.0	71.8	4 58.7	+59.2	71.9	5 17.3	+59.3	72.0	5 35.8	+59.5	72.1	8
9	4 22.8	+58.1	71.3	4 42.0	+58.3	71.4	5 01.1	+58.6	71.5	5 20.1	+58.8	71.6	5 39.0	+59.0	71.6	5 57.9	+59.1	71.7	6 16.6	+59.3	71.8	6 35.3	+59.4	72.0	9
10	5 20.9	+58.1	71.1	5 40.3	+58.4	71.2	5 59.7	+58.5	71.3	6 18.9	+58.8	71.4	6 38.0	+59.0	71.5	6 57.0	+59.2	71.6	7 15.9	+59.3	71.7	7 34.7	+59.5	71.8	10
11	6 19.0	+58.1	70.8	6 38.7	+58.3	70.9	6 58.2	+58.6	71.0	7 17.7	+58.7	71.2	7 37.0	+59.0	71.3	7 56.2	+59.1	71.4	8 15.2	+59.4	71.5	8 34.2	+59.4	71.7	11
12	7 17.1	+58.1	70.6	7 37.0	+58.4	70.7	7 56.8	+58.6	70.8	8 16.4	+58.8	71.0	8 36.0	+58.9	71.1	8 55.3	+59.2	71.2	9 14.6	+59.3	71.4	9 33.6	+59.5	71.5	12
13	8 15.2	+58.1	70.3	8 35.4	+58.3	70.5	8 55.4	+58.5	70.6	9 15.2	+58.8	70.7	9 34.9	+59.0	70.9	9 54.5	+59.1	71.1	10 13.9	+59.3	71.2	10 33.1	+59.4	71.4	13
14	9 13.3	+58.1	70.1	9 33.7	+58.3	70.2	9 53.9	+58.6	70.4	10 14.0	+58.7	70.5	10 33.9	+58.9	70.7	10 53.6	+59.1	70.9	11 13.2	+59.3	71.1	11 32.5	+59.5	71.3	14
15	10 11.4	+58.0	69.8	10 32.0	+58.3	70.0	10 52.5	+58.5	70.2	11 12.7	+58.8	70.3	11 32.8	+59.0	70.5	11 52.7	+59.2	70.7	12 12.5	+59.2	70.9	12 32.0	+59.4	71.1	15
16	11 09.4	+58.1	69.5	11 30.3	+58.3	69.7	11 51.0	+58.5	69.9	12 11.5	+58.7	70.1	12 31.8	+58.9	70.3	12 51.9	+59.1	70.5	13 11.7	+59.3	70.8	13 31.4	+59.4	71.0	16
17	12 07.5	+58.0	69.3	12 28.6	+58.3	69.5	12 49.5	+58.5	69.7	13 10.2	+58.8	69.9	13 30.7	+59.0	70.1	13 51.0	+59.1	70.4	14 11.0	+59.3	70.6	14 30.8	+59.5	70.9	17
18	13 05.5	+58.1	69.0	13 26.9	+58.3	69.3	13 48.0	+58.5	69.5	14 09.0	+58.7	69.7	14 29.7	+58.9	70.0	14 50.1	+59.1	70.2	15 10.3	+59.3	70.4	15 30.3	+59.4	70.7	18
19	14 03.6	+58.0	68.8	14 25.2	+58.2	69.0	14 46.5	+58.5	69.2	15 07.7	+58.7	69.5	15 28.6	+58.9	69.8	15 49.2	+59.1	70.0	16 09.6	+59.2	70.3	16 29.7	+59.4	70.6	19
20	15 01.6	+58.0	68.5	15 23.4	+58.3	68.8	15 45.0	+58.5	69.0	16 06.4	+58.7	69.3	16 27.5	+58.9	69.6	16 48.3	+59.1	69.8	17 08.8	+59.3	70.1	17 29.1	+59.4	70.4	20
21	15 59.6	+57.9	68.2	16 21.7	+58.2	68.5	16 43.5	+58.5	68.8	17 05.1	+58.7	69.1	17 26.4	+58.9	69.4	17 47.4	+59.1	69.7	18 08.1	+59.2	70.0	18 28.5	+59.4	70.3	21
22	16 57.5	+58.0	68.0	17 19.9	+58.2	68.3	17 42.0	+58.4	68.5	18 03.8	+58.6	68.8	18 25.3	+58.8	69.2	18 46.5	+59.0	69.5	19 07.3	+59.3	69.8	19 27.9	+59.4	70.1	22
23	17 55.5	+57.9	67.7	18 18.1	+58.2	68.0	18 40.4	+58.4	68.3	19 02.4	+58.7	68.6	19 24.1	+58.9	69.0	19 45.5	+59.1	69.3	20 06.6	+59.2	69.6	20 27.3	+59.4	70.0	23
24	18 53.4	+57.9	67.4	19 16.3	+58.1	67.7	19 38.8	+58.4	68.1	20 01.1	+58.6	68.4	20 23.0	+58.8	68.7	20 44.6	+59.0	69.1	21 05.8	+59.2	69.5	21 26.7	+59.4	69.8	24
25	19 51.3	+57.9	67.1	20 14.4	+58.2	67.5	20 37.2	+58.4	67.8	20 59.7	+58.6	68.2	21 21.8	+58.9	68.5	21 43.6	+59.0	68.9	22 05.0	+59.2	69.3	22 26.1	+59.3	69.7	25
26	20 49.2	+57.8	66.9	21 12.6	+58.1	67.2	21 35.6	+58.4	67.6	21 58.3	+58.6	67.9	22 20.7	+58.8	68.3	22 42.6	+59.1	68.7	23 04.2	+59.2	69.1	23 25.4	+59.4	69.5	26
27	21 47.0	+57.8	66.6	22 10.7	+58.1	66.9	22 34.0	+58.3	67.3	22 56.9	+58.6	67.7	23 19.5	+58.8	68.1	23 41.7	+59.0	68.5	24 03.4	+59.2	68.9	24 24.8	+59.4	69.3	27
28	22 44.8	+57.8	66.3	23 08.8	+58.0	66.7	23 32.3	+58.3	67.1	23 55.5	+58.6	67.5	24 18.3	+58.8	67.9	24 40.7	+58.9	68.3	25 02.6	+59.2	68.7	25 24.2	+59.3	69.2	28
29	23 42.6	+57.7	66.0	24 06.8	+58.0	66.4	24 30.6	+58.3	66.8	24 54.1	+58.5	67.2	25 17.1	+58.7	67.7	25 39.6	+59.0	68.1	26 01.8	+59.1	68.6	26 23.5	+59.3	69.0	29
30	24 40.3	+57.8	65.7	25 04.8	+58.0	66.1	25 28.9	+58.3	66.6	25 52.6	+58.5	67.0	26 15.8	+58.7	67.4	26 38.6	+58.9	67.9	27 00.9	+59.2	68.4	27 22.8	+59.3	68.9	30
31	25 38.1	+57.6	65.4	26 02.8	+58.0	65.8	26 27.2	+58.2	66.3	26 51.1	+58.5	66.7	27 14.5	+58.8	67.2	27 37.5	+59.0	67.7	28 00.1	+59.1	68.2	28 22.1	+59.3	68.7	31
32	26 35.7	+57.7	65.1	27 00.8	+57.9	65.5	27 25.4	+58.2	66.0	27 49.6	+58.4	66.5	28 13.3	+58.6	67.0	28 36.5	+58.9	67.5	28 59.2	+59.1	68.0	29 21.4	+59.3	68.5	32
33	27 33.4	+57.6	64.8	27 58.7	+57.9	65.3	28 23.6	+58.2	65.7	28 48.0	+58.4	66.2	29 11.9	+58.7	66.7	29 35.4	+58.9	67.3	29 58.3	+59.1	67.8	30 20.7	+59.3	68.3	33
34	28 31.0	+57.5	64.5	28 56.6	+57.8	65.0	29 21.8	+58.1	65.5	29 46.4	+58.4	66.0	30 10.6	+58.6	66.5	30 34.3	+58.8	67.0	30 57.4	+59.1	67.6	31 20.0	+59.3	68.2	34
35	29 28.5	+57.5	64.1	29 54.4	+57.8	64.6	30 19.9	+58.1	65.2	30 44.8	+58.4	65.7	31 09.2	+58.6	66.3	31 33.1	+58.9	66.8	31 56.5	+59.0	67.4	32 19.3	+59.2	68.0	35
36	30 26.0	+57.5	63.8	30 52.2	+57.8	64.3	31 18.0	+58.0	64.9	31 43.2	+58.3	65.4	32 07.8	+58.6	66.0	32 32.0	+58.8	66.6	32 55.5	+59.1	67.2	33 18.5	+59.2	67.8	36
37	31 23.5	+57.4	63.5	31 50.0	+57.7	64.0	32 16.0	+58.0	64.6	32 41.5	+58.3	65.2	33 06.4	+58.6	65.7	33 30.8	+58.8	66.4	33 54.6	+59.0	67.0	34 17.7	+59.2	67.6	37
38	32 20.9	+57.3	63.1	32 47.7	+57.7	63.7	33 14.0	+58.0	64.3	33 39.8	+58.2	64.9	34 05.0	+58.5	65.5	34 29.6	+58.7	66.1	34 53.6	+58.9	66.7	35 16.9	+59.2	67.4	38
39	33 18.2	+57.3	62.8	33 45.4	+57.6	63.4	34 12.0	+57.9	64.0	34 38.0	+58.2	64.6	35 03.5	+58.4	65.2	35 28.3	+58.7	65.9	35 52.5	+59.0	66.5	36 16.1	+59.2	67.2	39
40	34 15.5	+57.2	62.4	34 43.0	+57.5	63.0	35 09.9	+57.8	63.7	35 36.2	+58.2	64.3	36 01.9	+58.5	64.9	36 27.0	+58.7	65.6	36 51.5	+58.9	66.3	37 15.3	+59.1	67.0	40
41	35 12.7	+57.1	62.1	35 40.5	+57.5	62.7	36 07.7	+57.9	63.3	36 34.4	+58.1	64.0	37 00.4	+58.4	64.7	37 25.7	+58.7	65.3	37 50.4	+58.9	66.1	38 14.4	+59.2	66.8	41
42	36 09.8	+57.1	61.7	36 38.0	+57.4	62.3	37 05.6	+57.7	63.0	37 32.5	+58.0	63.7	37 58.8	+58.3	64.4	38 24.4	+58.6	65.1	38 49.3	+58.9	65.8	39 13.6	+59.1	66.5	42
43	37 06.9	+57.0	61.3	37 35.4	+57.4	62.0	38 03.3	+57.7	62.6	38 30.5	+58.0	63.4	38 57.1	+58.3	64.1	39 23.0	+58.6	64.8	39 48.2	+58.8	65.6	40 12.7	+59.0	66.3	43
44	38 03.9	+56.9	60.9	38 32.8	+57.2	61.6	39 01.0	+57.6	62.3	39 28.5	+58.0	63.0	39 55.4	+58.3	63.8	40 21.6	+58.5	64.5	40 47.0	+58.8	65.3	41 11.7	+59.1	66.1	44
45	39 00.8	+56.8	60.5	39 30.0	+57.2	61.2	39 58.6	+57.6	61.9	40 26.5	+57.9	62.7	40 53.7	+58.2	63.5	41 20.1	+58.5	64.2	41 45.8	+58.8	65.0	42 10.8	+59.0	65.9	45
46	39 57.6	+56.8	60.1	40 27.2	+57.2	60.8	40 56.2	+57.4	61.6	41 24.4	+57.8	62.3	41 51.9	+58.1	63.1	42 18.6	+58.5	63.9	42 44.6	+58.7	64.8	43 09.8	+58.9	65.6	46
47	40 54.4	+56.6	59.6	41 24.4	+57.0	60.4	41 53.6	+57.4	61.2	42 22.2	+57.7	62.0	42 50.0	+58.1	62.8	43 17.1	+58.3	63.6	43 43.3	+58.7	64.5	44 08.7	+59.0	65.4	47
48	41 51.0	+56.6	59.2	42 21.4	+56.9	60.0	42 51.0	+57.4	60.8	43 19.9	+57.7	61.6	43 48.1	+58.0	62.4	44 15.4	+58.4	63.3	44 42.0	+58.6	64.2	45 07.7	+58.9	65.1	48
49	42 47.6	+56.4	58.8	43 18.3	+56.9	59.6	43 48.4	+57.2	60.4	44 17.6	+57.6	61.2	44 46.1	+58.0	62.1	45 13.8	+58.3	63.0	45 40.6	+58.6	63.9	46 06.6	+58.9	64.8	49
50	43 44.0	+56.3	58.3	44 15.2	+56.7	59.1	44 45.6	+57.1	60.0	45 15.2	+57.5	60.8	45 44.1	+57.8	61.7	46 12.1	+58.2	62.6	46 39.2	+58.5	63.6	47 05.5	+58.8	64.5	50
51	44 40.3	+56.2	57.8	45 11.9	+56.6	58.7	45 42.7	+57.0	59.5	46 12.7	+57.5	60.4	46 41.9	+57.8	61.3	47 10.3	+58.1	62.3	47 37.7	+58.5	63.3	48 04.3	+58.7	64.2	51
52	45 36.5	+56.0	57.3	46 08.5	+56.5	58.2	46 39.7	+57.0	59.1	47 10.2	+57.3	60.0	47 39.7	+57.7	60.9	48 08.4	+58.1	61.9	48 36.2	+58.4	62.9	49 03.0	+58.8	63.9	52
53	46 32.5	+55.9	56.8	47 05.0	+56.4	57.7	47 36.7	+56.8	58.6	48 07.5	+57.2	59.6	48 37.4	+57.7	60.5	49 06.5	+58.0	61.5	49 34.6	+58.4	62.6	50 01.8	+58.6	63.6	53
54	47 28.4	+55.8	56.3	48 01.4	+56.2	57.2	48 33.5	+56.6	58.1	49 04.7	+57.1	59.1	49 35.1	+57.5	60.1	50 04.5	+57.9	61.1	50 33.0	+58.2	62.2	51 00.4	+58.7	63.3	54
55	48 24.2	+55.6	55.7	48 57.6	+56.1	56.7	49 30.1	+56.6	57.6	50 01.8	+57.0	58.6	50 32.6	+57.4	59.7	51 02.4	+57.8	60.7	51 31.2	+58.2	61.8	51 59.1	+58.5	63.0	55
56	49 19.8	+55.4	55.1	49 53.7	+55.9	56.1	50 26.7	+56.4	57.1	50 58.8	+56.9	58.1	51 30.0	+57.3	59.2	52 00.2	+57.8	60.3	52 29.4	+58.2	61.4	52 57.6	+58.5	62.6	56
57	50 15.2	+55.2	54.5	50 49.6	+55.7	55.5	51 23.1	+56.2	56.6	51 55.7	+56.7	57.6	52 27.3	+57.2	58.7	52 58.0	+57.6	59.9	53 27.6	+58.0	61.0	53 56.1	+58.4	62.2	57
58	51 10.4	+55.1	53.9	51 45.3	+55.6	55.0	52 19.3	+56.1	56.0	52 52.4	+56.6	57.1	53 24.5	+57.1	58.2	53 55.6	+57.5	59.4	54 25.6	+57.9	60.6	54 54.5	+58.3	61.8	58
59	52 05.5	+54.8	53.3	52 40.9	+55.3	54.3	53 15.4	+55.9	55.4	53 49.0	+56.4	56.5	54 21.6	+56.9	57.7	54 53.1	+57.4	58.9	55 23.5	+57.9	60.1	55 52.8	+58.3	61.4	59
60	53 00.3	+54.5	52.6	53 36.2	+55.2	53.7	54 11.3	+55.7	54.8	54 45.4	+56.2	56.0	55 18.5	+56.7	57.1	55 50.5	+57.2	58.4	56 21.4	+57.7	59.7	56 51.1	+58.1	61.0	60
61	53 54.8	+54.3	51.9	54 31.4	+54.9	53.0	55 07.0	+55.5	54.2	55 41.6	+56.1	55.3	56 15.2	+56.6	56.6	56 47.7	+57.1	57.8	57 19.1	+57.6	59.2	57 49.2	+58.1	60.5	61
62	54 49.1	+54.1	51.2	55 26.3	+54.6	52.3	56 02.5	+55.2	53.5	56 37.7	+55.8	54.7	57 11.8	+56.4	56.0	57 44.8	+57.0	57.3	58 16.7	+57.4	58.6	58 47.3	+57.9	60.0	62
63	55 43.2	+53.7	50.4	56 20.9	+54.4	51.6	56 57.7	+55.0	52.8	57 33.5	+55.6	54.0	58 08.2	+56.2	55.3	58 41.8	+56.7	56.7	59 14.1	+57.3	58.1	59 45.2	+57.8	59.5	63
64	56 36.9	+53.4	49.6	57 15.3	+54.1	50.8	57 52.7	+54.8	52.0	58 29.1	+55.4	53.3	59 04.4	+56.0	54.7	59 38.5	+56.6	56.0	60 11.4	+57.1	57.5	60 43.0	+57.7	59.0	64
65	57 30.3	+53.1	48.8	58 09.4	+53.8	50.0	58 47.5	+54.4	51.3	59 24.5	+55.1	52.6	60 00.4	+55.7	53.9	60 35.1	+56.3	55.4	61 08.5	+57.0	56.9	61 40.7	+57.5	58.4	65
66	58 23.4	+52.7	47.9	59 03.2	+53.4	49.1	59 41.9	+54.1	50.4	60 19.6	+54.8	51.8	60 56.1	+55.5	53.2	61 31.4	+56.2	54.7	62 05.5	+56.7	56.2	62 38.2	+57.3	57.8	66
67	59 16.1	+52.3	47.0	59 56.6	+53.0	48.2	60 36.0	+53.8	49.6	61 14.4	+54.4	50.9	61 51.6	+55.2	52.4	62 27.6	+55.8	53.9	63 02.2	+56.6	55.5	63 35.5	+57.2	57.2	67
68	60 08.4	+51.8	46.0	60 49.6	+52.6	47.3	61 29.8	+53.3	48.6	62 08.8	+54.1	50.1	62 46.8	+54.8	51.6	63 23.4	+55.6	53.1	63 58.8	+56.2	54.7	64 32.7	+56.9	56.5	68
69	61 00.2	+51.4	45.0	61 42.2	+52.1	46.3	62 23.1	+52.9	47.7	63 02.9	+53.8	49.1	63 41.6	+54.5	50.7	64 19.0	+55.3	52.3	64 55.0	+56.0	53.9	65 29.6	+56.7	55.7	69
70	61 51.6	+50.8	43.9	62 34.3	+51.6	45.2	63 16.0	+52.5	46.6	63 56.7	+53.2	48.1	64 36.1	+54.1	49.7	65 14.3	+54.9	51.3	65 51.0	+55.7	53.1	66 26.3	+56.4	54.9	70
71	62 42.4	+50.2	42.8	63 25.9	+51.1	44.1	64 08.5	+51.9	45.5	64 49.9	+52.8	47.1	65 30.2	+53.6	48.7	66 09.2	+54.4	50.4	66 46.7	+55.3	52.2	67 22.7	+56.2	54.0	71
72	63 32.6	+49.5	41.6	64 17.0	+50.4	42.9	65 00.4	+51.3	44.4	65 42.7	+52.3	45.9	66 23.8	+53.2	47.6	67 03.6	+54.1	49.3	67 42.0	+55.0	51.2	68 18.9	+55.8	53.1	72
73	64 22.1	+48.9	40.3	65 07.4	+49.8	41.7	65 51.7	+50.7	43.1	66 35.0	+51.6	44.7	67 17.0	+52.6	46.4	67 57.7	+53.5	48.2	68 37.0	+54.5	50.1	69 14.7	+55.4	52.1	73
74	65 11.0	+48.0	38.9	65 57.2	+49.0	40.3	66 42.4	+50.0	41.8	67 26.6	+51.0	43.4	68 09.6	+51.9	45.1	68 51.2	+53.0	46.9	69 31.5	+53.9	48.9	70 10.1	+54.9	51.0	74
75	65 59.0	+47.2	37.5	66 46.2	+48.1	38.9	67 32.4	+49.2	40.4	68 17.6	+50.2	42.0	69 01.5	+51.3	43.7	69 44.2	+52.3	45.6	70 25.4	+53.4	47.6	71 05.0	+54.5	49.8	75
76	66 46.2	+46.2	35.9	67 34.3	+47.3	37.3	68 21.6	+48.2	38.9	69 07.8	+49.3	40.5	69 52.8	+50.4	42.3	70 36.5	+51.6	44.2	71 18.8	+52.7	46.2	71 59.5	+53.8	48.4	76
77	67 32.4	+45.2	34.3	68 21.6	+46.2	35.7	69 09.8	+47.3	37.2	69 57.1	+48.4	38.9	70 43.2	+49.6	40.7	71 28.1	+50.7	42.6	72 11.5	+51.9	44.7	72 53.3	+53.2	47.0	77
78	68 17.6	+43.9	32.5	69 07.8	+45.0	33.9	69 57.1	+46.1	35.4	70 45.5	+47.3	37.1	71 32.8	+48.4	38.9	72 18.8	+49.7	40.9	73 03.4	+51.0	43.0	73 46.5	+52.3	45.4	78
79	69 01.5	+42.7	30.6	69 52.8	+43.7	32.0	70 43.2	+44.9	33.5	71 32.8	+46.0	35.2	72 21.2	+47.3	37.0	73 08.5	+48.6	39.0	73 54.4	+50.0	41.2	74 38.8	+51.3	43.6	79
80	69 44.2	+41.2	28.7	70 36.5	+42.3	30.0	71 28.1	+43.4	31.5	72 18.8	+44.6	33.1	73 08.5	+45.9	34.9	73 57.1	+47.3	36.9	74 44.4	+48.7	39.1	75 30.1	+50.3	41.6	80
81	70 25.4	+39.6	26.5	71 18.8	+40.7	27.8	72 11.5	+41.8	29.3	73 03.4	+43.1	30.9	73 54.4	+44.4	32.7	74 44.4	+45.7	34.6	75 33.1	+47.3	36.8	76 20.4	+48.8	39.3	81
82	71 05.0	+37.9	24.2	71 59.5	+38.8	25.5	72 53.3	+40.0	26.9	73 46.5	+41.2•	28.4	74 38.8	+42.5•	30.2	75 30.1	+44.0	32.1	76 20.4	+45.5	34.3	77 09.2	+47.2	36.8	82
83	71 42.9	+35.8•	21.8	72 38.3	+36.9•	23.0	73 33.3	+37.9•	24.3	74 27.7	+39.1•	25.8	75 21.3	+40.4•	27.4	76 14.1	+41.9•	29.3	77 05.9	+43.4•	31.5	77 56.4	+45.2•	33.9	83
84	72 18.7	+33.7•	19.2	73 15.2	+34.6•	20.3	74 11.2	+35.7•	21.5	75 06.8	+36.8•	22.9	76 01.7	+38.1•	24.5	76 56.0	+39.4•	26.2	77 49.3	+41.0•	28.3	78 41.6	+42.7•	30.7	84
85	72 52.4	+31.3•	16.4	73 49.8	+32.1•	17.4	74 46.9	+33.0•	18.5	75 43.6	+34.0•	19.8	76 39.8	+35.2•	21.2	77 35.4	+36.6•	22.8	78 30.3	+38.1•	24.7	79 24.3	+39.9•	27.0	85
86	73 23.7	+28.6•	13.5	74 21.9	+29.4•	14.3	75 19.9	+30.2•	15.3	76 17.6	+31.1•	16.4	77 15.0	+32.1•	17.6	78 12.0	+33.3•	19.0	79 08.4	+34.7•	20.7	80 04.2	+36.2•	22.8	86
87	73 52.3	+25.8•	10.4	74 51.3	+26.3•	11.0	75 50.1	+26.9•	11.8	76 48.7	+27.7•	12.7	77 47.1	+28.5•	13.7	78 45.3	+29.4•	14.9	79 43.1	+30.6•	16.3	80 40.4	+32.0•	18.0	87
88	74 18.1	+22.6•	7.1	75 17.6	+23.0•	7.6	76 17.0	+23.4•	8.1	77 16.4	+23.9•	8.7	78 15.6	+24.5•	9.4	79 14.7	+25.1•	10.3	80 13.7	+25.8•	11.3	81 12.4	+26.8•	12.6	88
89	74 40.7	+19.3•	3.6	75 40.6	+19.4•	3.9	76 40.4	+19.6•	4.2	77 40.3	+19.7•	4.5	78 40.1	+19.9•	4.9	79 39.8	+20.2•	5.3	80 39.5	+20.5•	5.9	81 39.2	+20.8•	6.6	89
90	75 00.0	+15.7•	0.0	76 00.0	+15.6•	0.0	77 00.0	+15.4•	0.0	78 00.0	+15.2•	0.0	79 00.0	+15.0•	0.0	80 00.0	+14.8•	0.0	81 00.0	+14.4•	0.0	82 00.0	+14.0•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 107°, 253°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 05.5	+58.1	105.5	3 49.4	+58.4	105.5	3 33.3	+58.6	105.6	3 17.1	+58.8	105.7	3 00.9	+59.0	105.7	2 44.6	+59.2	105.8	2 28.3	+59.3	105.8	2 11.9	+59.5	105.9	**0**
1	5 03.6	+58.1	105.2	4 47.8	+58.3	105.3	4 31.9	+58.5	105.4	4 15.9	+58.8	105.5	3 59.9	+58.9	105.5	3 43.8	+59.1	105.6	3 27.6	+59.3	105.7	3 11.4	+59.4	105.7	**1**
2	6 01.7	+58.0	105.0	5 46.1	+58.3	105.1	5 30.4	+58.6	105.2	5 14.7	+58.8	105.3	4 58.8	+59.0	105.4	4 42.9	+59.2	105.4	4 26.9	+59.3	105.5	4 10.8	+59.5	105.6	**2**
3	6 59.7	+58.1	104.7	6 44.4	+58.4	104.8	6 29.0	+58.6	105.0	6 13.5	+58.7	105.1	5 57.8	+59.0	105.2	5 42.1	+59.1	105.3	5 26.2	+59.3	105.4	5 10.3	+59.4	105.4	**3**
4	7 57.8	+58.1	104.5	7 42.8	+58.3	104.6	7 27.6	+58.5	104.7	7 12.2	+58.8	104.9	6 56.8	+58.9	105.0	6 41.2	+59.2	105.1	6 25.5	+59.3	105.2	6 09.7	+59.5	105.3	**4**
5	8 55.9	+58.1	104.2	8 41.1	+58.3	104.4	8 26.1	+58.6	104.5	8 11.0	+58.8	104.7	7 55.7	+59.0	104.8	7 40.4	+59.1	104.9	7 24.8	+59.3	105.1	7 09.2	+59.4	105.2	**5**
6	9 54.0	+58.0	104.0	9 39.4	+58.3	104.1	9 24.7	+58.5	104.3	9 09.8	+58.7	104.5	8 54.7	+59.0	104.6	8 39.5	+59.1	104.8	8 24.1	+59.3	104.9	8 08.6	+59.5	105.0	**6**
7	10 52.0	+58.0	103.7	10 37.7	+58.3	103.9	10 23.2	+58.5	104.1	10 08.5	+58.8	104.2	9 53.7	+58.9	104.4	9 38.6	+59.2	104.6	9 23.4	+59.3	104.7	9 08.1	+59.4	104.9	**7**
8	11 50.0	+58.1	103.4	11 36.0	+58.3	103.7	11 21.7	+58.5	103.8	11 07.3	+58.7	104.0	10 52.6	+59.0	104.2	10 37.8	+59.1	104.4	10 22.7	+59.3	104.6	10 07.5	+59.5	104.8	**8**
9	12 48.1	+58.0	103.2	12 34.3	+58.2	103.4	12 20.2	+58.5	103.6	12 06.0	+58.7	103.8	11 51.6	+58.9	104.0	11 36.9	+59.1	104.2	11 22.0	+59.3	104.4	11 07.0	+59.4	104.6	**9**
10	13 46.1	+58.0	102.9	13 32.5	+58.3	103.2	13 18.7	+58.5	103.4	13 04.7	+58.7	103.6	12 50.5	+58.9	103.8	12 36.0	+59.1	104.1	12 21.3	+59.3	104.3	12 06.4	+59.4	104.5	**10**
11	14 44.1	+57.9	102.7	14 30.8	+58.2	102.9	14 17.2	+58.5	103.2	14 03.4	+58.8	103.4	13 49.4	+58.9	103.7	13 35.1	+59.1	103.9	13 20.6	+59.3	104.1	13 05.8	+59.5	104.3	**11**
12	15 42.0	+58.0	102.4	15 29.0	+58.2	102.7	15 15.7	+58.5	102.9	15 02.2	+58.6	103.2	14 48.3	+58.9	103.5	14 34.2	+59.1	103.7	14 19.9	+59.2	104.0	14 05.3	+59.4	104.2	**12**
13	16 40.0	+57.9	102.1	16 27.2	+58.2	102.4	16 14.2	+58.4	102.7	16 00.8	+58.7	103.0	15 47.2	+58.9	103.3	15 33.3	+59.1	103.5	15 19.1	+59.3	103.8	15 04.7	+59.4	104.1	**13**
14	17 37.9	+57.9	101.9	17 25.4	+58.2	102.2	17 12.6	+58.5	102.5	16 59.5	+58.7	102.8	16 46.1	+58.9	103.1	16 32.4	+59.1	103.4	16 18.4	+59.3	103.6	16 04.1	+59.4	103.9	**14**
15	18 35.8	+57.9	101.6	18 23.6	+58.2	101.9	18 11.1	+58.4	102.2	17 58.2	+58.7	102.5	17 45.0	+58.9	102.9	17 31.5	+59.1	103.2	17 17.7	+59.2	103.5	17 03.5	+59.4	103.8	**15**
16	19 33.7	+57.9	101.3	19 21.8	+58.1	101.6	19 09.5	+58.4	102.0	18 56.9	+58.6	102.3	18 43.9	+58.8	102.7	18 30.6	+59.0	103.0	18 16.9	+59.3	103.3	18 02.9	+59.4	103.6	**16**
17	20 31.6	+57.8	101.0	20 19.9	+58.1	101.4	20 07.9	+58.4	101.7	19 55.5	+58.6	102.1	19 42.7	+58.9	102.5	19 29.6	+59.1	102.8	19 16.2	+59.2	103.1	19 02.3	+59.4	103.5	**17**
18	21 29.4	+57.8	100.7	21 18.0	+58.1	101.1	21 06.3	+58.3	101.5	20 54.1	+58.6	101.9	20 41.6	+58.8	102.2	20 28.7	+59.0	102.6	20 15.4	+59.2	103.0	20 01.7	+59.4	103.3	**18**
19	22 27.2	+57.8	100.4	22 16.1	+58.1	100.8	22 04.6	+58.3	101.2	21 52.7	+58.6	101.6	21 40.4	+58.8	102.0	21 27.7	+59.0	102.4	21 14.6	+59.2	102.8	21 01.1	+59.4	103.2	**19**
20	23 25.0	+57.7	100.1	23 14.2	+58.0	100.6	23 02.9	+58.4	101.0	22 51.3	+58.6	101.4	22 39.2	+58.8	101.8	22 26.7	+59.0	102.2	22 13.8	+59.2	102.6	22 00.5	+59.4	103.0	**20**
21	24 22.7	+57.7	99.8	24 12.2	+58.0	100.3	24 01.3	+58.2	100.7	23 49.9	+58.5	101.2	23 38.0	+58.8	101.6	23 25.7	+59.0	102.0	23 13.0	+59.2	102.4	22 59.9	+59.3	102.9	**21**
22	25 20.4	+57.7	99.5	25 10.2	+58.0	100.0	24 59.5	+58.3	100.5	24 48.4	+58.5	100.9	24 36.8	+58.7	101.4	24 24.7	+59.0	101.8	24 12.2	+59.2	102.3	23 59.2	+59.4	102.7	**22**
23	26 18.1	+57.6	99.2	26 08.2	+57.9	99.7	25 57.8	+58.2	100.2	25 46.9	+58.5	100.7	25 35.5	+58.8	101.2	25 23.7	+58.9	101.6	25 11.4	+59.1	102.1	24 58.6	+59.3	102.5	**23**
24	27 15.7	+57.6	98.9	27 06.1	+57.9	99.4	26 56.0	+58.2	99.9	26 45.4	+58.5	100.4	26 34.3	+58.7	100.9	26 22.6	+59.0	101.4	26 10.5	+59.2	101.9	25 57.9	+59.3	102.4	**24**
25	28 13.3	+57.5	98.6	28 04.0	+57.9	99.1	27 54.2	+58.2	99.7	27 43.9	+58.4	100.2	27 33.0	+58.7	100.7	27 21.6	+58.9	101.2	27 09.7	+59.1	101.7	26 57.2	+59.3	102.2	**25**
26	29 10.8	+57.5	98.3	29 01.9	+57.8	98.8	28 52.4	+58.1	99.4	28 42.3	+58.4	99.9	28 31.7	+58.6	100.5	28 20.5	+58.9	101.0	28 08.8	+59.1	101.5	27 56.5	+59.3	102.0	**26**
27	30 08.3	+57.4	98.0	29 59.7	+57.8	98.5	29 50.5	+58.1	99.1	29 40.7	+58.4	99.7	29 30.3	+58.7	100.2	29 19.4	+58.9	100.8	29 07.9	+59.1	101.3	28 55.8	+59.3	101.9	**27**
28	31 05.7	+57.4	97.6	30 57.5	+57.7	98.2	30 48.6	+58.0	98.8	30 39.1	+58.3	99.4	30 29.0	+58.6	100.0	30 18.3	+58.8	100.6	30 07.0	+59.1	101.1	29 55.1	+59.3	101.7	**28**
29	32 03.1	+57.3	97.3	31 55.2	+57.7	97.9	31 46.6	+58.0	98.5	31 37.4	+58.3	99.1	31 27.6	+58.6	99.7	31 17.1	+58.9	100.3	31 06.1	+59.0	100.9	30 54.4	+59.3	101.5	**29**
30	33 00.4	+57.3	96.9	32 52.9	+57.6	97.6	32 44.6	+58.0	98.2	32 35.7	+58.3	98.8	32 26.2	+58.5	99.5	32 16.0	+58.8	100.1	32 05.1	+59.1	100.7	31 53.7	+59.2	101.3	**30**
31	33 57.7	+57.2	96.6	33 50.5	+57.6	97.2	33 42.6	+57.9	97.9	33 34.0	+58.2	98.6	33 24.7	+58.5	99.2	33 14.8	+58.8	99.9	33 04.2	+59.0	100.5	32 52.9	+59.2	101.1	**31**
32	34 54.9	+57.1	96.2	34 48.1	+57.5	96.9	34 40.5	+57.9	97.6	34 32.2	+58.2	98.3	34 23.2	+58.5	98.9	34 13.6	+58.7	99.6	34 03.2	+59.0	100.3	33 52.1	+59.2	101.0	**32**
33	35 52.0	+57.1	95.8	35 45.6	+57.4	96.5	35 38.4	+57.8	97.3	35 30.4	+58.2	98.0	35 21.7	+58.5	98.7	35 12.3	+58.7	99.4	35 02.2	+58.9	100.1	34 51.3	+59.2	100.8	**33**
34	36 49.1	+57.0	95.4	36 43.0	+57.4	96.2	36 36.2	+57.7	96.9	36 28.6	+58.0	97.7	36 20.2	+58.4	98.4	36 11.0	+58.7	99.1	36 01.1	+59.0	99.8	35 50.5	+59.2	100.6	**34**
35	37 46.1	+56.9	95.1	37 40.4	+57.3	95.8	37 33.9	+57.7	96.6	37 26.6	+58.1	97.4	37 18.6	+58.3	98.1	37 09.7	+58.7	98.9	37 00.1	+58.9	99.6	36 49.7	+59.1	100.3	**35**
36	38 43.0	+56.8	94.7	38 37.7	+57.3	95.4	38 31.6	+57.6	96.2	38 24.7	+58.0	97.0	38 16.9	+58.3	97.8	38 08.4	+58.6	98.6	37 59.0	+58.9	99.4	37 48.8	+59.2	100.1	**36**
37	39 39.8	+56.8	94.2	39 35.0	+57.1	95.1	39 29.2	+57.6	95.9	39 22.7	+57.9	96.7	39 15.2	+58.3	97.5	39 07.0	+58.6	98.3	38 57.9	+58.8	99.1	38 48.0	+59.1	99.9	**37**
38	40 36.6	+56.6	93.8	40 32.1	+57.1	94.7	40 26.8	+57.5	95.5	40 20.6	+57.9	96.4	40 13.5	+58.2	97.2	40 05.6	+58.5	98.0	39 56.7	+58.9	98.9	39 47.1	+59.0	99.7	**38**
39	41 33.2	+56.5	93.4	41 29.2	+57.0	94.3	41 24.3	+57.4	95.1	41 18.5	+57.8	96.0	41 11.7	+58.2	96.9	41 04.1	+58.5	97.8	40 55.6	+58.7	98.6	40 46.1	+59.1	99.5	**39**
40	42 29.7	+56.5	92.9	42 26.2	+56.9	93.8	42 21.7	+57.3	94.7	42 16.3	+57.7	95.7	42 09.9	+58.1	96.6	42 02.6	+58.4	97.5	41 54.3	+58.8	98.3	41 45.2	+59.0	99.2	**40**
41	43 26.2	+56.3	92.5	43 23.1	+56.8	93.4	43 19.0	+57.3	94.3	43 14.0	+57.7	95.3	43 08.0	+58.0	96.2	43 01.0	+58.4	97.1	42 53.1	+58.7	98.1	42 44.2	+59.0	99.0	**41**
42	44 22.5	+56.2	92.0	44 19.9	+56.7	93.0	44 16.3	+57.1	93.9	44 11.7	+57.6	94.9	44 06.0	+58.0	95.9	43 59.4	+58.3	96.8	43 51.8	+58.6	97.8	43 43.2	+58.9	98.7	**42**
43	45 18.7	+56.0	91.5	45 16.6	+56.5	92.5	45 13.4	+57.1	93.5	45 09.3	+57.5	94.5	45 04.0	+57.9	95.5	44 57.7	+58.3	96.5	44 50.4	+58.6	97.5	44 42.1	+58.9	98.5	**43**
44	46 14.7	+55.9	91.0	46 13.1	+56.5	92.0	46 10.5	+56.9	93.1	46 06.8	+57.4	94.1	46 01.9	+57.9	95.1	45 56.0	+58.2	96.2	45 49.0	+58.6	97.2	45 41.0	+58.9	98.2	**44**
45	47 10.6	+55.8	90.4	47 09.6	+56.3	91.5	47 07.4	+56.9	92.6	47 04.2	+57.3	93.7	46 59.8	+57.7	94.7	46 54.2	+58.2	95.8	46 47.6	+58.5	96.9	46 39.9	+58.8	97.9	**45**
46	48 06.4	+55.6	89.9	48 05.9	+56.2	91.0	48 04.3	+56.7	92.1	48 01.5	+57.2	93.2	47 57.5	+57.7	94.3	47 52.4	+58.1	95.4	47 46.1	+58.5	96.5	47 38.7	+58.8	97.6	**46**
47	49 02.0	+55.4	89.3	49 02.1	+56.0	90.5	49 01.0	+56.6	91.6	48 58.7	+57.1	92.8	48 55.2	+57.5	93.9	48 50.5	+58.0	95.0	48 44.6	+58.4	96.2	48 37.5	+58.7	97.3	**47**
48	49 57.4	+55.2	88.7	49 58.1	+55.9	89.9	49 57.6	+56.4	91.1	49 55.8	+56.9	92.3	49 52.7	+57.5	93.5	49 48.5	+57.9	94.7	49 43.0	+58.3	95.9	49 36.2	+58.7	97.0	**48**
49	50 52.6	+55.1	88.1	50 54.0	+55.6	89.4	50 54.0	+56.3	90.6	50 52.7	+56.9	91.8	50 50.2	+57.4	93.0	50 46.4	+57.8	94.3	50 41.3	+58.2	95.5	50 34.9	+58.6	96.7	**49**
50	51 47.7	+54.8	87.5	51 49.6	+55.5	88.8	51 50.3	+56.1	90.0	51 49.6	+56.7	91.3	51 47.6	+57.2	92.6	51 44.2	+57.7	93.8	51 39.5	+58.2	95.1	51 33.5	+58.6	96.4	**50**
51	52 42.5	+54.6	86.8	52 45.1	+55.3	88.1	52 46.4	+55.9	89.5	52 46.3	+56.5	90.8	52 44.8	+57.1	92.1	52 41.9	+57.7	93.4	52 37.7	+58.1	94.7	52 32.1	+58.5	96.0	**51**
52	53 37.1	+54.3	86.1	53 40.4	+55.1	87.5	53 42.3	+55.8	88.8	53 42.8	+56.4	90.2	53 41.9	+57.0	91.6	53 39.6	+57.5	92.9	53 35.8	+58.0	94.3	53 30.6	+58.4	95.6	**52**
53	54 31.4	+54.1	85.4	54 35.5	+54.8	86.8	54 38.1	+55.6	88.2	54 39.2	+56.2	89.6	54 38.9	+56.8	91.0	54 37.1	+57.4	92.4	54 33.8	+57.9	93.8	54 29.0	+58.4	95.2	**53**
54	55 25.5	+53.8	84.7	55 30.3	+54.6	86.1	55 33.7	+55.3	87.6	55 35.4	+56.1	89.0	55 35.7	+56.7	90.5	55 34.5	+57.2	91.9	55 31.7	+57.8	93.4	55 27.4	+58.2	94.8	**54**
55	56 19.3	+53.4	83.9	56 24.9	+54.3	85.4	56 29.0	+55.1	86.9	56 31.5	+55.8	88.4	56 32.4	+56.5	89.9	56 31.7	+57.1	91.4	56 29.5	+57.6	92.9	56 25.6	+58.2	94.4	**55**
56	57 12.7	+53.1	83.0	57 19.2	+54.0	84.6	57 24.1	+54.8	86.1	57 27.3	+55.6	87.7	57 28.9	+56.3	89.3	57 28.8	+57.0	90.8	57 27.1	+57.6	92.4	57 23.8	+58.1	94.0	**56**
57	58 05.8	+52.8	82.2	58 13.2	+53.7	83.8	58 18.9	+54.5	85.4	58 22.9	+55.3	87.0	58 25.2	+56.1	88.6	58 25.8	+56.8	90.2	58 24.7	+57.4	91.9	58 21.9	+57.9	93.5	**57**
58	58 58.6	+52.3	81.3	59 06.9	+53.3	82.9	59 13.4	+54.2	84.6	59 18.2	+55.1	86.2	59 21.3	+55.8	87.9	59 22.6	+56.5	89.6	59 22.1	+57.2	91.3	59 19.8	+57.9	93.0	**58**
59	59 50.9	+51.9	80.3	60 00.2	+52.9	82.0	60 07.6	+53.9	83.7	60 13.3	+54.8	85.5	60 17.1	+55.6	87.2	60 19.1	+56.4	89.0	60 19.3	+57.1	90.7	60 17.7	+57.7	92.5	**59**
60	60 42.8	+51.4	79.3	60 53.1	+52.5	81.0	61 01.5	+53.5	82.8	61 08.1	+54.4	84.6	61 12.7	+55.4	86.4	61 15.5	+56.2	88.3	61 16.4	+56.9	90.1	61 15.4	+57.5	91.9	**60**
61	61 34.2	+50.9	78.2	61 45.6	+52.0	80.0	61 55.0	+53.1	81.9	62 02.5	+54.1	83.7	62 08.1	+55.0	85.6	62 11.7	+55.9	87.5	62 13.3	+56.7	89.4	62 12.9	+57.4	91.3	**61**
62	62 25.1	+50.3	77.1	62 37.6	+51.5	79.0	62 48.1	+52.6	80.9	62 56.6	+53.7	82.8	63 03.1	+54.7	84.8	63 07.6	+55.6	86.7	63 10.0	+56.4	88.7	63 10.3	+57.2	90.7	**62**
63	63 15.4	+49.7	75.9	63 29.1	+50.9	77.8	63 40.7	+52.1	79.8	63 50.3	+53.3	81.8	63 57.8	+54.3	83.8	64 03.2	+55.3	85.9	64 06.4	+56.2	87.9	64 07.5	+57.0	90.0	**63**
64	64 05.1	+49.0	74.6	64 20.0	+50.3	76.6	64 32.8	+51.6	78.7	64 43.6	+52.7	80.7	64 52.1	+53.9	82.8	64 58.5	+54.9	85.0	65 02.6	+55.9	87.1	65 04.5	+56.8	89.3	**64**
65	64 54.1	+48.2	73.3	65 10.3	+49.6	75.3	65 24.4	+50.9	77.5	65 36.3	+52.2	79.6	65 46.0	+53.5	81.8	65 53.4	+54.6	84.0	65 58.5	+55.6	86.2	66 01.3	+56.5	88.5	**65**
66	65 42.3	+47.3	71.9	65 59.9	+48.8	74.0	66 15.3	+50.3	76.2	66 28.5	+51.7	78.4	66 39.5	+52.9	80.7	66 48.0	+54.1	83.0	66 54.1	+55.3	85.3	66 57.8	+56.3	87.6	**66**
67	66 29.6	+46.4	70.3	66 48.7	+48.0	72.5	67 05.6	+49.5	74.8	67 20.2	+50.9	77.1	67 32.4	+52.3	79.5	67 42.1	+53.6	81.9	67 49.4	+54.8	84.3	67 54.1	+55.9	86.7	**67**
68	67 16.0	+45.4	68.7	67 36.7	+47.0	71.0	67 55.1	+48.6	73.3	68 11.1	+50.2	75.7	68 24.7	+51.7	78.1	68 35.7	+53.1	80.6	68 44.2	+54.3	83.2	68 50.0	+55.5	85.7	**68**
69	68 01.4	+44.2	67.0	68 23.7	+46.0	69.3	68 43.7	+47.7	71.7	69 01.3	+49.3	74.2	69 16.4	+50.9	76.7	69 28.8	+52.4	79.3	69 38.5	+53.9	82.0	69 45.5	+55.1	84.7	**69**
70	68 45.6	+43.0	65.2	69 09.7	+44.8	67.5	69 31.4	+46.6	70.0	69 50.6	+48.4	72.6	70 07.3	+50.1	75.2	70 21.2	+51.7	77.9	70 32.4	+53.2	80.7	70 40.6	+54.6	83.5	**70**
71	69 28.6	+41.5	63.2	69 54.5	+43.5	65.6	70 18.0	+45.4	68.2	70 39.0	+47.3	70.8	70 57.4	+49.1	73.6	71 12.9	+50.9	76.4	71 25.6	+52.5	79.3	71 35.2	+54.1	82.2	**71**
72	70 10.1	+40.0	61.1	70 38.0	+42.0	63.6	71 03.4	+44.1	66.2	71 26.3	+46.1	68.9	71 46.5	+48.0	71.8	72 03.8	+49.9	74.7	72 18.1	+51.7	77.7	72 29.3	+53.4	80.8	**72**
73	70 50.1	+38.3	58.9	71 20.0	+40.4	61.4	71 47.5	+42.5	64.1	72 12.4	+44.6	66.9	72 34.5	+46.8	69.8	72 53.7	+48.9	72.9	73 09.8	+50.8	76.0	73 22.7	+52.6	79.3	**73**
74	71 28.4	+36.3•	56.5	72 00.4	+38.5	59.1	72 30.0	+40.8	61.8	72 57.0	+43.1	64.6	73 21.3	+45.3	67.7	73 42.6	+47.5	70.8	74 00.6	+49.7	74.1	74 15.3	+51.7	77.5	**74**
75	72 04.7	+34.2•	53.9	72 38.9	+36.5•	56.5	73 10.8	+38.8•	59.3	73 40.1	+41.3	62.2	74 06.6	+43.7	65.3	74 30.1	+46.1	68.6	74 50.3	+48.4	72.0	75 07.0	+50.7	75.6	**75**
76	72 38.9	+31.9•	51.2	73 15.4	+34.2•	53.8	73 49.6	+36.7•	56.6	74 21.4	+39.2•	59.6	74 50.3	+41.8•	62.8	75 16.2	+44.3	66.1	75 38.7	+46.9	69.7	75 57.7	+49.4	73.5	**76**
77	73 10.8	+29.3•	48.4	73 49.6	+31.8•	50.9	74 26.3	+34.3•	53.7	75 00.6	+36.8•	56.7	75 32.1	+39.6•	60.0	76 00.5	+42.4•	63.4	76 25.6	+45.2	67.1	76 47.1	+47.8	71.1	**77**
78	73 40.1	+26.5•	45.3	74 21.4	+28.9•	47.8	75 00.6	+31.5•	50.6	75 37.4	+34.3•	53.6	76 11.7	+37.0•	56.9	76 42.9	+40.0•	60.4	77 10.8	+43.0•	64.2	77 34.9	+46.0•	68.3	**78**
79	74 06.6	+23.5•	42.1	74 50.3	+25.9•	44.5	75 32.1	+28.4•	47.2	76 11.7	+31.2•	50.2	76 48.7	+34.2•	53.5	77 22.9	+37.3•	57.1	77 53.8	+40.5•	61.0	78 20.9	+43.8•	65.3	**79**
80	74 30.1	+20.2•	38.7	75 16.2	+22.5•	41.0	76 00.5	+25.1•	43.7	76 42.9	+27.9•	46.6	77 22.9	+30.9•	49.8	78 00.2	+34.1•	53.4	78 34.3	+37.4•	57.4	79 04.7	+41.0•	61.8	**80**
81	74 50.3	+16.7•	35.1	75 38.7	+19.0•	37.3	76 25.6	+21.5•	39.8	77 10.8	+24.1•	42.7	77 53.8	+27.1•	45.8	78 34.3	+30.4•	49.4	79 11.7	+34.0•	53.3	79 45.7	+37.8•	57.8	**81**
82	75 07.0	+13.1•	31.4	75 57.7	+15.1•	33.5	76 47.1	+17.4•	35.8	77 34.9	+20.0•	38.5	78 20.9	+22.9•	41.5	79 04.7	+26.2•	44.9	79 45.7	+29.8•	48.8	80 23.5	+33.7•	53.3	**82**
83	75 20.1	+9.1•	27.6	76 12.8	+11.0•	29.4	77 04.5	+13.2•	31.6	77 54.9	+15.6•	34.0	78 43.8	+18.4•	36.8	79 30.9	+21.4•	40.1	80 15.5	+25.0•	43.8	80 57.2	+29.0•	48.2	**83**
84	75 29.2	+5.2•	23.6	76 23.8	+6.9•	25.3	77 17.7	+8.7•	27.2	78 10.5	+10.9•	29.4	79 02.2	+13.3•	31.9	79 52.3	+16.2•	34.8	80 40.5	+19.5•	38.3	81 26.2	+23.4•	42.4	**84**
85	75 34.4	+1.1•	19.7	76 30.7	+2.5•	21.0	77 26.4	+4.0•	22.7	78 21.4	+5.8•	24.5	79 15.5	+7.9•	26.7	80 08.5	+10.4•	29.3	81 00.0	+13.4•	32.4	81 49.6	+17.0•	36.1	**85**
86	75 35.5	−2.9•	15.6	76 33.2	−1.9•	16.8	77 30.4	−0.7•	18.1	78 27.2	+0.8•	19.6	79 23.4	+2.5•	21.4	80 18.9	+4.4•	23.5	81 13.4	+6.8•	26.1	82 06.6	+9.7•	29.2	**86**
87	75 32.6	−7.0•	11.6	76 31.3	−6.3•	12.5	77 29.7	−5.3•	13.4	78 28.0	−4.4•	14.6	79 25.9	−3.2•	15.9	80 23.3	−1.7•	17.5	81 20.2	0.0•	19.5	82 16.3	+2.2•	22.0	**87**
88	75 25.6	−10.9•	7.7	76 25.0	−10.4•	8.2	77 24.4	−10.0•	8.9	78 23.6	−9.4•	9.6	79 22.7	−8.7•	10.5	80 21.6	−7.9•	11.6	81 20.2	−6.8•	12.9	82 18.5	−5.5•	14.5	**88**
89	75 14.7	−14.7•	3.8	76 14.6	−14.6•	4.0	77 14.4	−14.4•	4.4	78 14.2	−14.2•	4.7	79 14.0	−14.0•	5.2	80 13.7	−13.7•	5.7	81 13.4	−13.4•	6.3	82 13.0	−13.0•	7.1	**89**
90	75 00.0	−18.3•	0.0	76 00.0	−18.4•	0.0	77 00.0	−18.6•	0.0	78 00.0	−18.8•	0.0	79 00.0	−19.0•	0.0	80 00.0	−19.2•	0.0	81 00.0	−19.5•	0.0	82 00.0	−19.9•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 74°, 286°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 05.5	–58.1	105.5	3 49.4	–58.3	105.5	3 33.3	–58.6	105.6	3 17.1	–58.8	105.7	3 00.9	–59.0	105.7	2 44.6	–59.1	105.8	2 28.3	–59.3	105.8	2 11.9	–59.5	105.9	**0**
1	3 07.4	–58.2	105.7	2 51.1	–58.4	105.8	2 34.7	–58.6	105.8	2 18.3	–58.8	105.9	2 01.9	–59.0	105.9	1 45.5	–59.2	105.9	1 29.0	–59.4	106.0	1 12.4	–59.4	106.0	**1**
2	2 09.2	–58.1	106.0	1 52.7	–58.3	106.0	1 36.1	–58.5	106.0	1 19.5	–58.7	106.1	1 02.9	–59.0	106.1	0 46.3	–59.2	106.1	0 29.6	–59.3	106.1	0 13.0	–59.5	106.1	**2**
3	1 11.1	–58.1	106.2	0 54.4	–58.4	106.2	0 37.6	–58.6	106.3	0 20.8	–58.8	106.3	0 03.9	–58.9	106.3	0 12.9	+59.1	73.7	0 29.7	+59.3	73.7	0 46.5	+59.4	73.7	**3**
4	0 13.0	–58.1	106.5	0 04.0	+58.4	73.5	0 21.0	+58.6	73.5	0 38.0	+58.8	73.5	0 55.0	+59.0	73.5	1 12.0	+59.2	73.6	1 29.0	+59.3	73.6	1 45.9	+59.5	73.6	**4**
5	0 45.1	+58.1	73.3	1 02.4	+58.3	73.3	1 19.6	+58.6	73.3	1 36.8	+58.8	73.3	1 54.0	+59.0	73.4	2 11.2	+59.1	73.4	2 28.3	+59.3	73.4	2 45.4	+59.5	73.5	**5**
6	1 43.2	+58.1	73.0	2 00.7	+58.4	73.1	2 18.2	+58.6	73.1	2 35.6	+58.8	73.1	2 53.0	+59.0	73.2	3 10.3	+59.2	73.2	3 27.6	+59.3	73.3	3 44.9	+59.4	73.3	**6**
7	2 41.3	+58.1	72.8	2 59.1	+58.3	72.8	3 16.8	+58.5	72.9	3 34.4	+58.8	72.9	3 52.0	+59.0	73.0	4 09.5	+59.1	73.1	4 26.9	+59.4	73.1	4 44.3	+59.5	73.2	**7**
8	3 39.4	+58.1	72.5	3 57.4	+58.4	72.6	4 15.3	+58.6	72.7	4 33.2	+58.8	72.7	4 51.0	+58.9	72.8	5 08.6	+59.2	72.9	5 26.3	+59.3	73.0	5 43.8	+59.4	73.1	**8**
9	4 37.5	+58.1	72.3	4 55.8	+58.3	72.4	5 13.9	+58.6	72.4	5 32.0	+58.7	72.5	5 49.9	+59.0	72.6	6 07.8	+59.1	72.7	6 25.6	+59.3	72.8	6 43.2	+59.5	72.9	**9**
10	5 35.6	+58.1	72.0	5 54.1	+58.3	72.1	6 12.5	+58.5	72.2	6 30.7	+58.8	72.3	6 48.9	+59.0	72.4	7 06.9	+59.2	72.6	7 24.9	+59.3	72.7	7 42.7	+59.4	72.8	**10**
11	6 33.7	+58.1	71.8	6 52.4	+58.4	71.9	7 11.0	+58.6	72.0	7 29.5	+58.8	72.1	7 47.9	+58.9	72.3	8 06.1	+59.1	72.4	8 24.2	+59.3	72.5	8 42.1	+59.5	72.7	**11**
12	7 31.8	+58.1	71.5	7 50.8	+58.3	71.6	8 09.6	+58.5	71.8	8 28.3	+58.7	71.9	8 46.8	+59.0	72.1	9 05.2	+59.2	72.2	9 23.5	+59.3	72.4	9 41.6	+59.4	72.5	**12**
13	8 29.9	+58.0	71.3	8 49.1	+58.3	71.4	9 08.1	+58.6	71.6	9 27.0	+58.8	71.7	9 45.8	+58.9	71.9	10 04.4	+59.1	72.0	10 22.8	+59.3	72.2	10 41.0	+59.4	72.4	**13**
14	9 27.9	+58.1	71.0	9 47.4	+58.3	71.2	10 06.7	+58.5	71.3	10 25.8	+58.7	71.5	10 44.7	+59.0	71.7	11 03.5	+59.1	71.9	11 22.1	+59.3	72.1	11 40.4	+59.5	72.3	**14**
15	10 26.0	+58.0	70.8	10 45.7	+58.3	70.9	11 05.2	+58.5	71.1	11 24.5	+58.8	71.3	11 43.7	+58.9	71.5	12 02.6	+59.1	71.7	12 21.4	+59.2	71.9	12 39.9	+59.4	72.1	**15**
16	11 24.0	+58.1	70.5	11 44.0	+58.3	70.7	12 03.7	+58.5	70.9	12 23.3	+58.7	71.1	12 42.6	+58.9	71.3	13 01.7	+59.1	71.5	13 20.6	+59.3	71.7	13 39.3	+59.4	72.0	**16**
17	12 22.1	+58.0	70.2	12 42.3	+58.2	70.4	13 02.2	+58.5	70.7	13 22.0	+58.7	70.9	13 41.5	+58.9	71.1	14 00.8	+59.1	71.3	14 19.9	+59.3	71.6	14 38.7	+59.5	71.8	**17**
18	13 20.1	+58.0	70.0	13 40.5	+58.3	70.2	14 00.7	+58.5	70.4	14 20.7	+58.7	70.7	14 40.4	+58.9	70.9	14 59.9	+59.1	71.2	15 19.2	+59.2	71.4	15 38.2	+59.4	71.7	**18**
19	14 18.1	+58.0	69.7	14 38.8	+58.2	70.0	14 59.2	+58.5	70.2	15 19.4	+58.7	70.5	15 39.3	+58.9	70.7	15 59.0	+59.1	71.0	16 18.4	+59.3	71.3	16 37.6	+59.4	71.5	**19**
20	15 16.1	+57.9	69.4	15 37.0	+58.2	69.7	15 57.7	+58.4	70.0	16 18.1	+58.7	70.2	16 38.2	+58.9	70.5	16 58.1	+59.1	70.8	17 17.7	+59.2	71.1	17 37.0	+59.4	71.4	**20**
21	16 14.0	+58.0	69.2	16 35.2	+58.2	69.5	16 56.1	+58.5	69.7	17 16.8	+58.6	70.0	17 37.1	+58.9	70.3	17 57.2	+59.1	70.6	18 16.9	+59.3	70.9	18 36.4	+59.4	71.2	**21**
22	17 12.0	+57.9	68.9	17 33.4	+58.2	69.2	17 54.6	+58.4	69.5	18 15.4	+58.7	69.8	18 36.0	+58.9	70.1	18 56.3	+59.0	70.4	19 16.2	+59.2	70.8	19 35.8	+59.4	71.1	**22**
23	18 09.9	+57.9	68.6	18 31.6	+58.1	68.9	18 53.0	+58.4	69.3	19 14.1	+58.6	69.6	19 34.9	+58.8	69.9	19 55.3	+59.0	70.2	20 15.4	+59.2	70.6	20 35.2	+59.4	70.9	**23**
24	19 07.8	+57.8	68.4	19 29.7	+58.2	68.7	19 51.4	+58.4	69.0	20 12.7	+58.6	69.4	20 33.7	+58.8	69.7	20 54.3	+59.1	70.1	21 14.6	+59.2	70.4	21 34.6	+59.3	70.8	**24**
25	20 05.6	+57.9	68.1	20 27.9	+58.1	68.4	20 49.8	+58.3	68.8	21 11.3	+58.6	69.1	21 32.5	+58.8	69.5	21 53.4	+59.0	69.9	22 13.8	+59.2	70.2	22 33.9	+59.4	70.6	**25**
26	21 03.5	+57.8	67.8	21 26.0	+58.1	68.2	21 48.1	+58.4	68.5	22 09.9	+58.6	68.9	22 31.3	+58.8	69.3	22 52.4	+59.0	69.7	23 13.0	+59.2	70.1	23 33.3	+59.3	70.5	**26**
27	22 01.3	+57.8	67.5	22 24.1	+58.0	67.9	22 46.5	+58.3	68.3	23 08.5	+58.6	68.7	23 30.1	+58.8	69.1	23 51.4	+59.0	69.5	24 12.2	+59.2	69.9	24 32.6	+59.4	70.3	**27**
28	22 59.1	+57.7	67.2	23 22.1	+58.1	67.6	23 44.8	+58.3	68.0	24 07.1	+58.5	68.4	24 28.9	+58.8	68.8	24 50.4	+58.9	69.3	25 11.4	+59.2	69.7	25 32.0	+59.3	70.2	**28**
29	23 56.8	+57.7	66.9	24 20.2	+58.0	67.3	24 43.1	+58.2	67.7	25 05.6	+58.5	68.2	25 27.7	+58.7	68.6	25 49.3	+59.0	69.1	26 10.6	+59.1	69.5	26 31.3	+59.3	70.0	**29**
30	24 54.5	+57.7	66.6	25 18.2	+57.9	67.0	25 41.3	+58.3	67.5	26 04.1	+58.5	67.9	26 26.4	+58.7	68.4	26 48.3	+58.9	68.9	27 09.7	+59.1	69.3	27 30.6	+59.3	69.8	**30**
31	25 52.2	+57.7	66.3	26 16.1	+58.0	66.8	26 39.6	+58.2	67.2	27 02.6	+58.4	67.7	27 25.1	+58.7	68.2	27 47.2	+58.9	68.6	28 08.8	+59.1	69.1	28 29.9	+59.3	69.6	**31**
32	26 49.9	+57.6	66.0	27 14.1	+57.8	66.5	27 37.8	+58.1	66.9	28 01.0	+58.5	67.4	28 23.8	+58.7	67.9	28 46.1	+58.9	68.4	29 07.9	+59.1	68.9	29 29.2	+59.3	69.5	**32**
33	27 47.5	+57.5	65.7	28 11.9	+57.9	66.2	28 35.9	+58.2	66.7	28 59.5	+58.4	67.2	29 22.5	+58.6	67.7	29 45.0	+58.9	68.2	30 07.0	+59.1	68.7	30 28.5	+59.3	69.3	**33**
34	28 45.0	+57.5	65.4	29 09.8	+57.8	65.9	29 34.1	+58.1	66.4	29 57.9	+58.3	66.9	30 21.1	+58.7	67.4	30 43.9	+58.8	68.0	31 06.1	+59.1	68.5	31 27.8	+59.2	69.1	**34**
35	29 42.5	+57.5	65.0	30 07.6	+57.8	65.6	30 32.2	+58.0	66.1	30 56.2	+58.4	66.6	31 19.8	+58.5	67.2	31 42.7	+58.9	67.8	32 05.2	+59.0	68.3	32 27.0	+59.3	68.9	**35**
36	30 40.0	+57.4	64.7	31 05.4	+57.7	65.2	31 30.2	+58.1	65.8	31 54.6	+58.3	66.4	32 18.3	+58.6	66.9	32 41.6	+58.8	67.5	33 04.2	+59.0	68.1	33 26.3	+59.2	68.7	**36**
37	31 37.4	+57.4	64.4	32 03.1	+57.7	64.9	32 28.3	+57.9	65.5	32 52.9	+58.2	66.1	33 16.9	+58.5	66.7	33 40.4	+58.7	67.3	34 03.2	+59.0	67.9	34 25.5	+59.2	68.5	**37**
38	32 34.8	+57.3	64.0	33 00.8	+57.6	64.6	33 26.2	+58.0	65.2	33 51.1	+58.2	65.8	34 15.4	+58.5	66.4	34 39.1	+58.8	67.0	35 02.2	+59.0	67.7	35 24.7	+59.1	68.3	**38**
39	33 32.1	+57.2	63.7	33 58.4	+57.6	64.3	34 24.2	+57.8	64.9	34 49.3	+58.2	65.5	35 13.9	+58.5	66.1	35 37.9	+58.7	66.8	36 01.2	+58.9	67.5	36 23.8	+59.2	68.1	**39**
40	34 29.3	+57.2	63.3	34 56.0	+57.5	63.9	35 22.0	+57.9	64.6	35 47.5	+58.1	65.2	36 12.4	+58.4	65.9	36 36.6	+58.6	66.5	37 00.1	+58.9	67.2	37 23.0	+59.1	67.9	**40**
41	35 26.5	+57.1	62.9	35 53.5	+57.4	63.6	36 19.9	+57.7	64.2	36 45.6	+58.1	64.9	37 10.8	+58.3	65.6	37 35.2	+58.7	66.3	37 59.0	+58.9	67.0	38 22.1	+59.1	67.7	**41**
42	36 23.6	+57.0	62.6	36 50.9	+57.4	63.2	37 17.6	+57.7	63.9	37 43.7	+58.0	64.6	38 09.1	+58.4	65.3	38 33.9	+58.6	66.0	38 57.9	+58.9	66.7	39 21.2	+59.1	67.5	**42**
43	37 20.6	+56.9	62.2	37 48.3	+57.3	62.8	38 15.3	+57.7	63.5	38 41.7	+58.0	64.3	39 07.5	+58.2	65.0	39 32.5	+58.5	65.7	39 56.8	+58.8	66.5	40 20.3	+59.1	67.3	**43**
44	38 17.5	+56.9	61.8	38 45.6	+57.2	62.5	39 13.0	+57.6	63.2	39 39.7	+57.9	63.9	40 05.7	+58.2	64.7	40 31.0	+58.5	65.4	40 55.6	+58.8	66.2	41 19.4	+59.0	67.0	**44**
45	39 14.4	+56.8	61.4	39 42.8	+57.2	62.1	40 10.6	+57.5	62.8	40 37.6	+57.9	63.6	41 03.9	+58.2	64.4	41 29.5	+58.5	65.2	41 54.4	+58.7	66.0	42 18.4	+59.0	66.8	**45**
46	40 11.2	+56.6	60.9	40 40.0	+57.0	61.7	41 08.1	+57.4	62.4	41 35.5	+57.8	63.2	42 02.1	+58.1	64.0	42 28.0	+58.4	64.9	42 53.1	+58.7	65.7	43 17.4	+59.0	66.5	**46**
47	41 07.8	+56.6	60.5	41 37.0	+57.0	61.3	42 05.5	+57.4	62.1	42 33.3	+57.7	62.9	43 00.2	+58.1	63.7	43 26.4	+58.4	64.5	43 51.8	+58.7	65.4	44 16.4	+58.9	66.3	**47**
48	42 04.4	+56.5	60.1	42 34.0	+56.9	60.8	43 02.9	+57.2	61.7	43 31.0	+57.6	62.5	43 58.3	+58.0	63.3	44 24.8	+58.3	64.2	44 50.5	+58.6	65.1	45 15.3	+58.9	66.0	**48**
49	43 00.9	+56.4	59.6	43 30.9	+56.8	60.4	44 00.1	+57.2	61.3	44 28.6	+57.6	62.1	44 56.3	+57.9	63.0	45 23.1	+58.3	63.9	45 49.1	+58.5	64.8	46 14.2	+58.8	65.7	**49**
50	43 57.3	+56.2	59.1	44 27.7	+56.6	60.0	44 57.3	+57.1	60.8	45 26.2	+57.4	61.7	45 54.2	+57.8	62.6	46 21.4	+58.1	63.5	46 47.6	+58.5	64.5	47 13.0	+58.8	65.5	**50**
51	44 53.5	+56.1	58.6	45 24.3	+56.6	59.5	45 54.4	+57.0	60.4	46 23.6	+57.4	61.3	46 52.0	+57.8	62.2	47 19.5	+58.2	63.2	47 46.1	+58.5	64.2	48 11.8	+58.8	65.2	**51**
52	45 49.6	+56.0	58.1	46 20.9	+56.4	59.0	46 51.4	+56.8	59.9	47 21.0	+57.3	60.9	47 49.8	+57.7	61.8	48 17.7	+58.0	62.8	48 44.6	+58.4	63.8	49 10.6	+58.7	64.9	**52**
53	46 45.6	+55.8	57.6	47 17.3	+56.3	58.5	47 48.2	+56.8	59.5	48 18.3	+57.2	60.4	48 47.5	+57.5	61.4	49 15.7	+58.0	62.4	49 43.0	+58.3	63.5	50 09.3	+58.6	64.5	**53**
54	47 41.4	+55.7	57.1	48 13.6	+56.2	58.0	48 45.0	+56.6	59.0	49 15.5	+57.0	60.0	49 45.0	+57.5	61.0	50 13.7	+57.8	62.0	50 41.3	+58.3	63.1	51 07.9	+58.6	64.2	**54**
55	48 37.1	+55.5	56.5	49 09.8	+56.0	57.5	49 41.6	+56.5	58.5	50 12.5	+57.0	59.5	50 42.5	+57.4	60.5	51 11.5	+57.8	61.6	51 39.6	+58.1	62.7	52 06.5	+58.5	63.9	**55**
56	49 32.6	+55.3	55.9	50 05.8	+55.8	56.9	50 38.1	+56.3	57.9	51 09.5	+56.8	59.0	51 39.9	+57.2	60.1	52 09.3	+57.7	61.2	52 37.7	+58.1	62.3	53 05.0	+58.5	63.5	**56**
57	50 27.9	+55.1	55.3	51 01.6	+55.7	56.3	51 34.4	+56.2	57.4	52 06.3	+56.6	58.5	52 37.1	+57.2	59.6	53 07.0	+57.6	60.7	53 35.8	+58.0	61.9	54 03.5	+58.4	63.1	**57**
58	51 23.0	+55.0	54.7	51 57.3	+55.4	55.7	52 30.6	+56.0	56.8	53 02.9	+56.5	57.9	53 34.3	+57.0	59.1	54 04.6	+57.4	60.3	54 33.8	+57.9	61.5	55 01.9	+58.3	62.7	**58**
59	52 18.0	+54.7	54.1	52 52.7	+55.3	55.1	53 26.6	+55.8	56.2	53 59.4	+56.4	57.4	54 31.3	+56.8	58.5	55 02.0	+57.4	59.8	55 31.7	+57.8	61.0	56 00.2	+58.2	62.3	**59**
60	53 12.7	+54.4	53.4	53 48.0	+55.0	54.5	54 22.4	+55.6	55.6	54 55.8	+56.1	56.8	55 28.1	+56.7	58.0	55 59.4	+57.2	59.2	56 29.5	+57.7	60.5	56 58.4	+58.1	61.9	**60**
61	54 07.1	+54.2	52.7	54 43.0	+54.8	53.8	55 18.0	+55.4	54.9	55 51.9	+56.0	56.2	56 24.8	+56.5	57.4	56 56.6	+57.0	58.7	57 27.2	+57.5	60.0	57 56.5	+58.0	61.4	**61**
62	55 01.3	+53.9	51.9	55 37.8	+54.6	53.1	56 13.4	+55.1	54.3	56 47.9	+55.8	55.5	57 21.3	+56.4	56.8	57 53.6	+56.9	58.1	58 24.7	+57.4	59.5	58 54.5	+57.9	60.9	**62**
63	55 55.2	+53.6	51.2	56 32.4	+54.2	52.3	57 08.5	+54.9	53.5	57 43.7	+55.5	54.8	58 17.7	+56.1	56.1	58 50.5	+56.7	57.5	59 22.1	+57.3	58.9	59 52.4	+57.8	60.4	**63**
64	56 48.8	+53.3	50.3	57 26.6	+54.0	51.5	58 03.4	+54.6	52.8	58 39.2	+55.2	54.1	59 13.8	+55.9	55.5	59 47.2	+56.5	56.9	60 19.4	+57.0	58.3	60 50.2	+57.6	59.9	**64**
65	57 42.1	+52.9	49.5	58 20.6	+53.6	50.7	58 58.0	+54.4	52.0	59 34.4	+55.0	53.3	60 09.7	+55.6	54.7	60 43.7	+56.3	56.2	61 16.4	+56.9	57.7	61 47.8	+57.5	59.3	**65**
66	58 35.0	+52.5	48.6	59 14.2	+53.3	49.9	59 52.4	+53.9	51.2	60 29.4	+54.7	52.5	61 05.3	+55.4	54.0	61 40.0	+56.0	55.5	62 13.3	+56.7	57.0	62 45.3	+57.3	58.7	**66**
67	59 27.5	+52.1	47.7	60 07.5	+52.8	48.9	60 46.3	+53.6	50.3	61 24.1	+54.4	51.7	62 00.7	+55.1	53.2	62 36.0	+55.8	54.7	63 10.0	+56.5	56.3	63 42.6	+57.0	58.0	**67**
68	60 19.6	+51.7	46.7	61 00.3	+52.4	48.0	61 39.9	+53.2	49.4	62 18.5	+53.9	50.8	62 55.8	+54.7	52.3	63 31.8	+55.5	53.9	64 06.5	+56.2	55.5	64 39.6	+56.9	57.3	**68**
69	61 11.3	+51.1	45.6	61 52.7	+52.0	47.0	62 33.1	+52.8	48.4	63 12.4	+53.6	49.8	63 50.5	+54.4	51.4	64 27.3	+55.1	53.0	65 02.7	+55.9	54.7	65 36.5	+56.7	56.5	**69**
70	62 02.4	+50.6	44.5	62 44.7	+51.4	45.9	63 25.9	+52.3	47.3	64 06.0	+53.1	48.8	64 44.9	+53.9	50.4	65 22.4	+54.8	52.1	65 58.6	+55.6	53.9	66 33.2	+56.3	55.7	**70**
71	62 53.0	+49.9	43.4	63 36.1	+50.8	44.7	64 18.2	+51.7	46.2	64 59.1	+52.6	47.7	65 38.8	+53.5	49.4	66 17.2	+54.4	51.1	66 54.2	+55.2	52.9	67 29.5	+56.1	54.8	**71**
72	63 42.9	+49.3	42.1	64 26.9	+50.2	43.5	65 09.9	+51.1	45.0	65 51.7	+52.1	46.6	66 32.3	+53.0	48.3	67 11.6	+53.9	50.0	67 49.4	+54.8	51.9	68 25.6	+55.7	53.9	**72**
73	64 32.2	+48.6	40.8	65 17.1	+49.5	42.2	66 01.0	+50.5	43.7	66 43.8	+51.4	45.3	67 25.3	+52.4	47.1	68 05.5	+53.4	48.9	68 44.2	+54.4	50.8	69 21.3	+55.3	52.9	**73**
74	65 20.8	+47.7	39.4	66 06.6	+48.7	40.9	66 51.5	+49.7	42.4	67 35.2	+50.8	44.0	68 17.7	+51.8	45.8	68 58.9	+52.8	47.6	69 38.6	+53.8	49.6	70 16.6	+54.8	51.7	**74**
75	66 08.5	+46.8	38.0	66 55.3	+47.9	39.4	67 41.2	+48.9	40.9	68 26.0	+49.9	42.6	69 09.5	+51.0	44.4	69 51.7	+52.1	46.3	70 32.4	+53.2	48.3	71 11.4	+54.4	50.5	**75**
76	66 55.3	+45.9	36.4	67 43.2	+46.9	37.8	68 30.1	+47.9	39.4	69 15.9	+49.1	41.1	70 00.5	+50.2	42.9	70 43.8	+51.4	44.8	71 25.6	+52.5	46.9	72 05.8	+53.7	49.2	**76**
77	67 41.2	+44.8	34.7	68 30.1	+45.8	36.2	69 18.0	+47.0	37.7	70 05.0	+48.0	39.4	70 50.7	+49.3	41.2	71 35.2	+50.5	43.2	72 18.1	+51.8	45.3	72 59.5	+52.9	47.7	**77**
78	68 26.0	+43.5	32.9	69 15.9	+44.6	34.4	70 05.0	+45.7	35.9	70 53.0	+47.0	37.6	71 40.0	+48.2	39.4	72 25.7	+49.4	41.5	73 09.9	+50.8	43.6	73 52.4	+52.2	46.0	**78**
79	69 09.5	+42.2	31.0	70 00.5	+43.3	32.4	70 50.7	+44.5	34.0	71 40.0	+45.7	35.7	72 28.2	+46.9	37.5	73 15.1	+48.3	39.5	74 00.7	+49.7	41.7	74 44.6	+51.1	44.2	**79**
80	69 51.7	+40.7	29.0	70 43.8	+41.8	30.4	71 35.2	+42.9	31.9	72 25.7	+44.2	33.6	73 15.1	+45.6	35.4	74 03.4	+47.0	37.4	74 50.4	+48.4	39.7	75 35.7	+50.0	42.1	**80**
81	70 32.4	+39.0	26.8	71 25.6	+40.2	28.2	72 18.1	+41.4	29.6	73 09.9	+42.5	31.3	74 00.7	+43.9	33.1	74 50.4	+45.3	35.1	75 38.8	+46.9	37.3	76 25.7	+48.5	39.9	**81**
82	71 11.4	+37.3	24.5	72 05.8	*+38.2*•	25.8	72 59.5	*+39.4*•	27.2	73 52.4	+40.7	28.8	74 44.6	*+42.0*•	30.6	75 35.7	+43.5	32.5	76 25.7	+45.1	34.8	77 14.2	+46.9	37.3	**82**
83	71 48.7	*+35.1*•	22.0	72 44.0	*+36.2*•	23.2	73 38.9	*+37.3*•	24.6	74 33.1	*+38.6*•	26.1	75 26.6	*+39.9*•	27.8	76 19.2	*+41.4*•	29.7	77 10.8	*+43.0*•	31.9	78 01.1	*+44.7*•	34.4	**83**
84	72 23.8	*+33.0*•	19.4	73 20.2	*+34.0*•	20.5	74 16.2	*+35.0*•	21.8	75 11.7	*+36.1*•	23.2	76 06.5	*+37.4*•	24.7	77 00.6	*+38.9*•	26.6	77 53.8	*+40.5*•	28.6	78 45.8	*+42.3*•	31.0	**84**
85	72 56.8	*+30.5*•	16.6	73 54.2	*+31.3*•	17.6	74 51.2	*+32.3*•	18.7	75 47.8	*+33.4*•	20.0	76 43.9	*+34.6*•	21.4	77 39.5	*+35.9*•	23.1	78 34.3	*+37.5*•	25.0	79 28.1	*+39.3*•	27.3	**85**
86	73 27.3	*+27.8*•	13.6	74 25.5	*+28.5*•	14.5	75 23.5	*+29.3*•	15.4	76 21.2	*+30.3*•	16.5	77 18.5	*+31.3*•	17.8	78 15.4	*+32.6*•	19.2	79 11.8	*+33.9*•	21.0	80 07.4	*+35.6*•	23.0	**86**
87	73 55.1	*+24.9*•	10.5	74 54.0	*+25.5*•	11.1	75 52.8	*+26.1*•	11.9	76 51.5	*+26.8*•	12.8	77 49.8	*+27.7*•	13.8	78 48.0	*+28.6*•	15.0	79 45.7	*+29.8*•	16.4	80 43.0	*+31.2*•	18.2	**87**
88	74 20.0	*+21.7*•	7.1	75 19.5	*+22.1*•	7.6	76 18.9	*+22.5*•	8.2	77 18.3	*+22.9*•	8.8	78 17.5	*+23.5*•	9.5	79 16.6	*+24.2*•	10.4	80 15.5	*+25.0*•	11.4	81 14.2	*+25.9*•	12.7	**88**
89	74 41.7	*+18.3*•	3.6	75 41.6	*+18.4*•	3.9	76 41.4	*+18.6*•	4.2	77 41.2	*+18.8*•	4.5	78 41.0	*+19.0*•	4.9	79 40.8	*+19.2*•	5.4	80 40.5	*+19.5*•	5.9	81 40.1	*+19.9*•	6.6	**89**
90	75 00.0	*+14.7*•	0.0	76 00.0	*+14.6*•	0.0	77 00.0	*+14.4*•	0.0	78 00.0	*+14.2*•	0.0	79 00.0	*+14.0*•	0.0	80 00.0	*+13.7*•	0.0	81 00.0	*+13.4*•	0.0	82 00.0	*+13.0*•	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 106°, 254°

75°, 285° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 50.5	+58.0	104.5	3 35.4	+58.3	104.6	3 20.3	+58.5	104.6	3 05.1	+58.8	104.7	2 49.8	+59.0	104.7	2 34.6	+59.1	104.8	2 19.2	+59.3	104.8	2 03.9	+59.4	104.9	**0**
1	4 48.5	+58.1	104.3	4 33.7	+58.3	104.3	4 18.8	+58.6	104.4	4 03.9	+58.7	104.5	3 48.8	+59.0	104.6	3 33.7	+59.1	104.6	3 18.5	+59.3	104.7	3 03.3	+59.5	104.7	**1**
2	5 46.6	+58.1	104.0	5 32.0	+58.4	104.1	5 17.4	+58.5	104.2	5 02.6	+58.8	104.3	4 47.8	+58.9	104.4	4 32.8	+59.2	104.4	4 17.8	+59.3	104.5	4 02.8	+59.4	104.6	**2**
3	6 44.7	+58.1	103.8	6 30.4	+58.3	103.9	6 15.9	+58.6	104.0	6 01.4	+58.7	104.1	5 46.7	+59.0	104.2	5 32.0	+59.1	104.3	5 17.1	+59.4	104.4	5 02.2	+59.5	104.5	**3**
4	7 42.8	+58.0	103.5	7 28.7	+58.3	103.6	7 14.5	+58.5	103.8	7 00.1	+58.8	103.9	6 45.7	+59.0	104.0	6 31.1	+59.2	104.1	6 16.5	+59.3	104.2	6 01.7	+59.4	104.3	**4**
5	8 40.8	+58.1	103.2	8 27.0	+58.3	103.4	8 13.0	+58.6	103.5	7 58.9	+58.8	103.7	7 44.7	+58.9	103.8	7 30.3	+59.1	103.9	7 15.8	+59.3	104.1	7 01.1	+59.5	104.2	**5**
6	9 38.9	+58.0	103.0	9 25.3	+58.3	103.2	9 11.6	+58.5	103.3	8 57.7	+58.7	103.5	8 43.6	+59.0	103.6	8 29.4	+59.1	103.8	8 15.1	+59.2	103.9	8 00.6	+59.4	104.0	**6**
7	10 36.9	+58.0	102.7	10 23.6	+58.2	102.9	10 10.1	+58.5	103.1	9 56.4	+58.7	103.3	9 42.6	+58.9	103.4	9 28.5	+59.2	103.6	9 14.3	+59.3	103.8	9 00.0	+59.4	103.9	**7**
8	11 34.9	+58.0	102.5	11 21.8	+58.3	102.7	11 08.6	+58.5	102.9	10 55.1	+58.8	103.1	10 41.5	+58.9	103.2	10 27.7	+59.1	103.4	10 13.6	+59.3	103.6	9 59.4	+59.5	103.8	**8**
9	12 32.9	+58.0	102.2	12 20.1	+58.3	102.4	12 07.1	+58.5	102.6	11 53.9	+58.7	102.8	11 40.4	+58.9	103.0	11 26.8	+59.1	103.2	11 12.9	+59.3	103.4	10 58.9	+59.4	103.6	**9**
10	13 30.9	+58.0	101.9	13 18.4	+58.2	102.2	13 05.6	+58.5	102.4	12 52.6	+58.7	102.6	12 39.3	+59.0	102.9	12 25.9	+59.1	103.1	12 12.2	+59.3	103.3	11 58.3	+59.4	103.5	**10**
11	14 28.9	+57.9	101.7	14 16.6	+58.2	101.9	14 04.1	+58.4	102.2	13 51.3	+58.7	102.4	13 38.3	+58.9	102.7	13 25.0	+59.1	102.9	13 11.5	+59.3	103.1	12 57.7	+59.5	103.4	**11**
12	15 26.8	+58.0	101.4	15 14.8	+58.2	101.7	15 02.5	+58.5	101.9	14 50.0	+58.7	102.2	14 37.2	+58.9	102.5	14 24.1	+59.1	102.7	14 10.8	+59.2	103.0	13 57.2	+59.4	103.2	**12**
13	16 24.8	+57.9	101.1	16 13.0	+58.2	101.4	16 01.0	+58.4	101.7	15 48.7	+58.6	102.0	15 36.1	+58.8	102.3	15 23.2	+59.1	102.5	15 10.0	+59.3	102.8	14 56.6	+59.4	103.1	**13**
14	17 22.7	+57.9	100.9	17 11.2	+58.2	101.2	16 59.4	+58.5	101.5	16 47.3	+58.7	101.8	16 34.9	+58.9	102.1	16 22.3	+59.0	102.4	16 09.3	+59.2	102.6	15 56.0	+59.4	102.9	**14**
15	18 20.6	+57.8	100.6	18 09.4	+58.1	100.9	17 57.9	+58.4	101.2	17 46.0	+58.6	101.6	17 33.8	+58.9	101.9	17 21.3	+59.1	102.2	17 08.5	+59.3	102.5	16 55.4	+59.4	102.8	**15**
16	19 18.4	+57.9	100.3	19 07.5	+58.2	100.7	18 56.3	+58.3	101.0	18 44.6	+58.7	101.3	18 32.7	+58.8	101.7	18 20.4	+59.0	102.0	18 07.8	+59.2	102.3	17 54.8	+59.4	102.6	**16**
17	20 16.3	+57.8	100.0	20 05.7	+58.1	100.4	19 54.6	+58.4	100.8	19 43.3	+58.6	101.1	19 31.5	+58.9	101.5	19 19.4	+59.1	101.8	19 07.0	+59.2	102.1	18 54.2	+59.4	102.5	**17**
18	21 14.1	+57.8	99.7	21 03.8	+58.0	100.1	20 53.0	+58.4	100.5	20 41.9	+58.6	100.9	20 30.4	+58.8	101.2	20 18.5	+59.0	101.6	20 06.2	+59.2	102.0	19 53.6	+59.4	102.3	**18**
19	22 11.9	+57.8	99.5	22 01.8	+58.1	99.9	21 51.4	+58.3	100.3	21 40.5	+58.5	100.6	21 29.2	+58.8	101.0	21 17.5	+59.0	101.4	21 05.4	+59.2	101.8	20 53.0	+59.3	102.2	**19**
20	23 09.7	+57.7	99.2	22 59.9	+58.0	99.6	22 49.7	+58.3	100.0	22 39.0	+58.6	100.4	22 28.0	+58.8	100.8	22 16.5	+59.0	101.2	22 04.6	+59.2	101.6	21 52.3	+59.4	102.0	**20**
21	24 07.4	+57.7	98.9	23 57.9	+58.0	99.3	23 48.0	+58.2	99.7	23 37.6	+58.5	100.2	23 26.8	+58.7	100.6	23 15.5	+59.0	101.0	23 03.8	+59.2	101.4	22 51.7	+59.4	101.9	**21**
22	25 05.1	+57.6	98.6	24 55.9	+57.9	99.0	24 46.2	+58.3	99.5	24 36.1	+58.5	99.9	24 25.5	+58.8	100.4	24 14.5	+59.0	100.8	24 03.0	+59.2	101.3	23 51.1	+59.3	101.7	**22**
23	26 02.7	+57.6	98.3	25 53.8	+58.0	98.7	25 44.5	+58.2	99.2	25 34.6	+58.5	99.7	25 24.3	+58.7	100.2	25 13.5	+58.9	100.6	25 02.2	+59.1	101.1	24 50.4	+59.3	101.5	**23**
24	27 00.3	+57.6	97.9	26 51.8	+57.9	98.4	26 42.7	+58.2	98.9	26 33.1	+58.5	99.4	26 23.0	+58.7	99.9	26 12.4	+59.0	100.4	26 01.3	+59.2	100.9	25 49.7	+59.4	101.4	**24**
25	27 57.9	+57.5	97.6	27 49.7	+57.8	98.1	27 40.9	+58.1	98.7	27 31.6	+58.4	99.2	27 21.7	+58.7	99.7	27 11.4	+58.9	100.2	27 00.5	+59.1	100.7	26 49.1	+59.3	101.2	**25**
26	28 55.4	+57.5	97.3	28 47.5	+57.8	97.8	28 39.0	+58.1	98.4	28 30.0	+58.4	98.9	28 20.4	+58.7	99.5	28 10.3	+58.9	100.0	27 59.6	+59.1	100.5	27 48.4	+59.3	101.0	**26**
27	29 52.9	+57.4	97.0	29 45.3	+57.8	97.5	29 37.1	+58.1	98.1	29 28.4	+58.4	98.7	29 19.1	+58.6	99.2	29 09.2	+58.8	99.8	28 58.7	+59.1	100.3	28 47.7	+59.2	100.9	**27**
28	30 50.3	+57.4	96.6	30 43.1	+57.7	97.2	30 35.2	+58.1	97.8	30 26.8	+58.3	98.4	30 17.7	+58.6	99.0	30 08.0	+58.9	99.6	29 57.8	+59.1	100.1	29 46.9	+59.3	100.7	**28**
29	31 47.7	+57.3	96.3	31 40.8	+57.7	96.9	31 33.3	+58.0	97.5	31 25.1	+58.3	98.1	31 16.3	+58.6	98.7	31 06.9	+58.8	99.3	30 56.9	+59.0	99.9	30 46.2	+59.3	100.5	**29**
30	32 45.0	+57.3	95.9	32 38.5	+57.6	96.6	32 31.3	+57.9	97.2	32 23.4	+58.2	97.8	32 14.9	+58.5	98.5	32 05.7	+58.8	99.1	31 55.9	+59.0	99.7	31 45.5	+59.2	100.3	**30**
31	33 42.3	+57.2	95.6	33 36.1	+57.5	96.2	33 29.2	+57.9	96.9	33 21.6	+58.3	97.6	33 13.4	+58.5	98.2	33 04.5	+58.8	98.9	32 54.9	+59.0	99.5	32 44.7	+59.2	100.1	**31**
32	34 39.5	+57.1	95.2	34 33.6	+57.5	95.9	34 27.1	+57.9	96.6	34 19.9	+58.1	97.3	34 11.9	+58.5	97.9	34 03.3	+58.7	98.6	33 53.9	+59.0	99.3	33 43.9	+59.2	99.9	**32**
33	35 36.6	+57.0	94.8	35 31.1	+57.5	95.6	35 25.0	+57.8	96.3	35 18.0	+58.2	97.0	35 10.4	+58.4	97.7	35 02.0	+58.7	98.4	34 52.9	+59.0	99.1	34 43.1	+59.2	99.7	**33**
34	36 33.6	+57.0	94.5	36 28.6	+57.4	95.2	36 22.8	+57.7	95.9	36 16.2	+58.1	96.7	36 08.8	+58.4	97.4	36 00.7	+58.7	98.1	35 51.9	+58.9	98.8	35 42.3	+59.2	99.5	**34**
35	37 30.6	+56.9	94.1	37 26.0	+57.3	94.8	37 20.5	+57.7	95.6	37 14.3	+58.0	96.4	37 07.2	+58.4	97.1	36 59.4	+58.7	97.9	36 50.8	+58.9	98.6	36 41.5	+59.1	99.3	**35**
36	38 27.5	+56.8	93.7	38 23.3	+57.2	94.5	38 18.2	+57.6	95.2	38 12.3	+58.0	96.0	38 05.6	+58.3	96.8	37 58.1	+58.6	97.6	37 49.7	+58.9	98.4	37 40.6	+59.1	99.1	**36**
37	39 24.3	+56.8	93.3	39 20.5	+57.2	94.1	39 15.8	+57.6	94.9	39 10.3	+57.9	95.7	39 03.9	+58.2	96.5	38 56.7	+58.5	97.3	38 48.6	+58.9	98.1	38 39.7	+59.1	98.9	**37**
38	40 21.1	+56.6	92.8	40 17.7	+57.0	93.7	40 13.4	+57.4	94.5	40 08.2	+57.9	95.4	40 02.1	+58.3	96.2	39 55.2	+58.6	97.0	39 47.5	+58.8	97.9	39 38.8	+59.1	98.7	**38**
39	41 17.7	+56.5	92.4	41 14.7	+57.0	93.3	41 10.8	+57.5	94.1	41 06.1	+57.8	95.0	41 00.4	+58.1	95.9	40 53.8	+58.4	96.7	40 46.3	+58.7	97.6	40 37.9	+59.0	98.5	**39**
40	42 14.2	+56.4	91.9	42 11.7	+56.9	92.9	42 08.3	+57.3	93.8	42 03.9	+57.7	94.7	41 58.5	+58.1	95.6	41 52.2	+58.5	96.4	41 45.0	+58.8	97.3	41 36.9	+59.0	98.2	**40**
41	43 10.6	+56.4	91.5	43 08.6	+56.8	92.4	43 05.6	+57.2	93.4	43 01.6	+57.6	94.3	42 56.6	+58.0	95.2	42 50.7	+58.4	96.1	42 43.8	+58.7	97.1	42 35.9	+59.0	98.0	**41**
42	44 07.0	+56.1	91.0	44 05.4	+56.7	92.0	44 02.8	+57.2	92.9	43 59.2	+57.6	93.9	43 54.6	+58.0	94.9	43 49.1	+58.3	95.8	43 42.5	+58.6	96.8	43 34.9	+58.9	97.7	**42**
43	45 03.1	+56.1	90.5	45 02.1	+56.5	91.5	45 00.0	+57.0	92.5	44 56.8	+57.5	93.5	44 52.6	+57.9	94.5	44 47.4	+58.3	95.5	44 41.1	+58.6	96.5	44 33.8	+58.9	97.5	**43**
44	45 59.2	+55.9	90.0	45 58.6	+56.5	91.0	45 57.0	+57.0	92.1	45 54.3	+57.4	93.1	45 50.5	+57.8	94.1	45 45.7	+58.2	95.2	45 39.7	+58.6	96.2	45 32.7	+58.9	97.2	**44**
45	46 55.1	+55.8	89.5	46 55.1	+56.3	90.5	46 54.0	+56.8	91.6	46 51.7	+57.3	92.7	46 48.3	+57.8	93.7	46 43.9	+58.1	94.8	46 38.3	+58.5	95.9	46 31.6	+58.8	96.9	**45**
46	47 50.9	+55.6	88.9	47 51.4	+56.2	90.0	47 50.8	+56.7	91.1	47 49.0	+57.2	92.2	47 46.1	+57.6	93.3	47 42.0	+58.1	94.4	47 36.8	+58.4	95.5	47 30.4	+58.8	96.6	**46**
47	48 46.5	+55.4	88.4	48 47.6	+56.0	89.5	48 47.5	+56.6	90.6	48 46.2	+57.1	91.8	48 43.7	+57.6	92.9	48 40.1	+58.0	94.1	48 35.2	+58.4	95.2	48 29.2	+58.7	96.3	**47**
48	49 41.9	+55.2	87.8	49 43.6	+55.8	89.0	49 44.1	+56.4	90.1	49 43.3	+57.0	91.3	49 41.3	+57.5	92.5	49 38.1	+57.9	93.7	49 33.6	+58.3	94.8	49 27.9	+58.7	96.0	**48**
49	50 37.1	+55.1	87.2	50 39.4	+55.7	88.4	50 40.5	+56.3	89.6	50 40.3	+56.8	90.8	50 38.8	+57.3	92.0	50 36.0	+57.8	93.3	50 31.9	+58.3	94.5	50 26.6	+58.6	95.7	**49**
50	51 32.2	+54.8	86.5	51 35.1	+55.5	87.8	51 36.8	+56.1	89.1	51 37.1	+56.7	90.3	51 36.1	+57.3	91.6	51 33.8	+57.7	92.8	51 30.2	+58.1	94.1	51 25.2	+58.6	95.3	**50**
51	52 27.0	+54.6	85.9	52 30.6	+55.3	87.2	52 32.9	+56.0	88.5	52 33.8	+56.6	89.8	52 33.4	+57.1	91.1	52 31.5	+57.6	92.4	52 28.3	+58.1	93.7	52 23.8	+58.5	95.0	**51**
52	53 21.6	+54.4	85.2	53 25.9	+55.1	86.5	53 28.9	+55.7	87.9	53 30.4	+56.4	89.2	53 30.5	+56.9	90.6	53 29.1	+57.6	91.9	53 26.4	+58.0	93.3	53 22.3	+58.4	94.6	**52**
53	54 16.0	+54.0	84.5	54 21.0	+54.9	85.9	54 24.6	+55.6	87.3	54 26.8	+56.2	88.7	54 27.4	+56.9	90.1	54 26.7	+57.3	91.4	54 24.4	+57.9	92.8	54 20.7	+58.3	94.2	**53**
54	55 10.0	+53.8	83.7	55 15.9	+54.6	85.2	55 20.2	+55.3	86.6	55 23.0	+56.0	88.0	55 24.3	+56.6	89.5	55 24.0	+57.3	90.9	55 22.3	+57.8	92.4	55 19.0	+58.3	93.8	**54**
55	56 03.8	+53.5	82.9	56 10.5	+54.3	84.4	56 15.5	+55.1	85.9	56 19.0	+55.8	87.4	56 20.9	+56.5	88.9	56 21.3	+57.1	90.4	56 20.1	+57.7	91.9	56 17.3	+58.2	93.4	**55**
56	56 57.3	+53.2	82.1	57 04.8	+54.0	83.6	57 10.6	+54.8	85.2	57 14.8	+55.6	86.7	57 17.4	+56.3	88.3	57 18.4	+57.0	89.8	57 17.8	+57.5	91.4	57 15.5	+58.0	93.0	**56**
57	57 50.5	+52.8	81.3	57 58.8	+53.7	82.8	58 05.4	+54.6	84.4	58 10.4	+55.4	86.0	58 13.7	+56.1	87.6	58 15.4	+56.7	89.3	58 15.3	+57.4	90.9	58 13.5	+58.0	92.5	**57**
58	58 43.3	+52.3	80.4	58 52.5	+53.3	82.0	59 00.0	+54.2	83.6	59 05.8	+55.1	85.3	59 09.8	+55.9	87.0	59 12.1	+56.6	88.6	59 12.7	+57.2	90.3	59 11.5	+57.8	92.0	**58**
59	59 35.6	+52.0	79.4	59 45.8	+53.0	81.1	59 54.2	+53.9	82.8	60 00.9	+54.8	84.5	60 05.7	+55.6	86.2	60 08.7	+56.4	88.0	60 09.9	+57.1	89.7	60 09.3	+57.7	91.5	**59**
60	60 27.6	+51.5	78.4	60 38.8	+52.5	80.1	60 48.1	+53.6	81.9	60 55.7	+54.4	83.7	61 01.3	+55.4	85.5	61 05.1	+56.2	87.3	61 07.0	+56.9	89.1	61 07.0	+57.6	90.9	**60**
61	61 19.1	+50.9	77.3	61 31.3	+52.0	79.1	61 41.7	+53.1	81.0	61 50.1	+54.1	82.8	61 56.7	+55.0	84.7	62 01.3	+55.9	86.5	62 03.9	+56.7	88.4	62 04.6	+57.4	90.3	**61**
62	62 10.0	+50.4	76.2	62 23.3	+51.6	78.1	62 34.8	+52.6	80.0	62 44.2	+53.8	81.9	62 51.7	+54.7	83.8	62 57.2	+55.6	85.8	63 00.6	+56.5	87.7	63 02.0	+57.2	89.7	**62**
63	63 00.4	+49.7	75.0	63 14.9	+51.0	77.0	63 27.4	+52.2	78.9	63 38.0	+53.3	80.9	63 46.4	+54.4	82.9	63 52.8	+55.3	84.9	63 57.1	+56.2	87.0	63 59.2	+57.0	89.0	**63**
64	63 50.1	+49.1	73.8	64 05.9	+50.4	75.8	64 19.6	+51.6	77.8	64 31.3	+52.8	79.8	64 40.8	+53.9	81.9	64 48.1	+55.0	84.0	64 53.3	+55.9	86.1	64 56.2	+56.8	88.3	**64**
65	64 39.2	+48.3	72.5	64 56.3	+49.7	74.5	65 11.2	+51.1	76.6	65 24.1	+52.2	78.7	65 34.7	+53.5	80.9	65 43.1	+54.6	83.1	65 49.2	+55.6	85.3	65 53.0	+56.5	87.5	**65**
66	65 27.5	+47.5	71.1	65 46.0	+48.9	73.2	66 02.3	+50.3	75.3	66 16.3	+51.7	77.5	66 28.2	+52.9	79.8	66 37.7	+54.1	82.0	66 44.8	+55.2	84.3	66 49.5	+56.2	86.7	**66**
67	66 15.0	+46.6	69.6	66 34.9	+48.1	71.7	66 52.6	+49.6	74.0	67 08.0	+51.1	76.2	67 21.1	+52.4	78.6	67 31.8	+53.7	80.9	67 40.0	+54.9	83.3	67 45.7	+55.9	85.8	**67**
68	67 01.6	+45.5	68.0	67 23.0	+47.2	70.2	67 42.2	+48.7	72.5	67 59.1	+50.2	74.9	68 13.5	+51.7	77.3	68 25.5	+53.1	79.7	68 34.9	+54.4	82.2	68 41.6	+55.6	84.8	**68**
69	67 47.1	+44.5	66.3	68 10.2	+46.1	68.6	68 30.9	+47.9	70.9	68 49.3	+49.5	73.4	69 05.2	+51.0	75.9	69 18.6	+52.5	78.4	69 29.3	+53.8	81.1	69 37.2	+55.1	83.7	**69**
70	68 31.6	+43.2	64.5	68 56.3	+45.0	66.8	69 18.8	+46.7	69.3	69 38.8	+48.5	71.8	69 56.2	+50.2	74.4	70 11.1	+51.7	77.0	70 23.1	+53.3	79.8	70 32.3	+54.7	82.6	**70**
71	69 14.8	+41.8	62.6	69 41.3	+43.7	64.9	70 05.5	+45.6	67.4	70 27.3	+47.4	70.0	70 46.4	+49.2	72.7	71 02.8	+51.0	75.5	71 16.4	+52.6	78.4	71 27.0	+54.1	81.3	**71**
72	69 56.6	+40.2	60.5	70 25.0	+42.3	62.9	70 51.1	+44.3	65.5	71 14.7	+46.2	68.2	71 35.6	+48.2	71.0	71 53.8	+50.0	73.9	72 09.0	+51.8	76.8	72 21.1	+53.4	79.9	**72**
73	70 36.8	+38.6	58.3	71 07.3	+40.6	60.8	71 35.4	+42.7	63.4	72 00.9	+44.9	66.2	72 23.8	+46.9	69.0	72 43.8	+48.9	72.0	73 00.8	+50.8	75.2	73 14.5	+52.7	78.4	**73**
74	71 15.4	*+36.8*•	56.0	71 47.9	+38.9	58.5	72 18.1	+41.1	61.1	72 45.8	+43.3	64.0	73 10.7	+45.6	66.9	73 32.7	+47.7	70.0	73 51.6	+49.8	73.3	74 07.2	+51.8	76.7	**74**
75	71 52.2	*+34.6*•	53.5	72 26.8	*+36.9*•	56.0	72 59.2	*+39.2*•	58.7	73 29.1	+41.5	61.6	73 56.3	+43.9	64.6	74 20.4	+46.3	67.9	74 41.4	+48.6	71.2	74 59.0	+50.7	74.8	**75**
76	72 26.8	*+32.4*•	50.8	73 03.7	*+34.7*•	53.3	73 38.4	*+37.1*•	56.1	74 10.6	*+39.6*•	59.0	74 40.2	*+42.0*•	62.1	75 06.7	+44.6	65.4	75 30.0	+47.0	68.9	75 49.7	+49.5	72.6	**76**
77	72 59.2	*+29.9*•	48.0	73 38.4	*+32.2*•	50.5	74 15.5	*+34.7*•	53.2	74 50.2	*+37.2*•	56.2	75 22.2	*+39.9*•	59.3	75 51.3	*+42.6*•	62.8	76 17.0	+45.3	66.4	76 39.2	+48.0	70.3	**77**
78	73 29.1	*+27.2*•	44.9	74 10.6	*+29.6*•	47.4	74 50.2	*+32.0*•	50.2	75 27.4	*+34.7*•	53.1	76 02.1	*+37.5*•	56.3	76 33.9	*+40.3*•	59.8	77 02.3	*+43.3*•	63.6	77 27.2	*+46.1*•	67.6	**78**
79	73 56.3	*+24.1*•	41.8	74 40.2	*+26.5*•	44.2	75 22.2	*+29.1*•	46.9	76 02.1	*+31.8*•	49.8	76 39.6	*+34.6*•	53.0	77 14.2	*+37.6*•	56.5	77 45.6	*+40.8*•	60.4	78 13.3	*+44.0*•	64.6	**79**
80	74 20.4	*+21.0*•	38.4	75 06.7	*+23.3*•	40.8	75 51.3	*+25.7*•	43.3	76 33.9	*+28.4*•	46.2	77 14.2	*+31.4*•	49.4	77 51.8	*+34.6*•	52.9	78 26.4	*+37.8*•	56.8	78 57.3	*+41.4*•	61.1	**80**
81	74 41.4	*+17.6*•	34.9	75 30.0	*+19.7*•	37.1	76 17.0	*+22.2*•	39.6	77 02.3	*+24.9*•	42.4	77 45.6	*+27.7*•	45.5	78 26.4	*+30.9*•	48.9	79 04.2	*+34.5*•	52.8	79 38.7	*+38.1*•	57.2	**81**
82	74 59.0	*+13.9*•	31.3	75 49.7	*+16.0*•	33.3	76 39.2	*+18.2*•	35.6	77 27.2	*+20.8*•	38.2	78 13.3	*+23.7*•	41.2	78 57.3	*+26.9*•	44.6	79 38.7	*+30.3*•	48.4	80 16.8	*+34.2*•	52.8	**82**
83	75 12.9	*+10.1*•	27.5	76 05.7	*+12.0*•	29.3	76 57.4	*+14.1*•	31.4	77 48.0	*+16.4*•	33.9	78 37.0	*+19.1*•	36.6	79 24.2	*+22.2*•	39.8	80 09.0	*+25.7*•	43.5	80 51.0	*+29.6*•	47.8	**83**
84	75 23.0	*+6.2*•	23.6	76 17.7	*+7.8*•	25.2	77 11.5	*+9.7*•	27.1	78 04.4	*+11.8*•	29.2	78 56.1	*+14.2*•	31.7	79 46.4	*+17.0*•	34.7	80 34.7	*+20.3*•	38.1	81 20.6	*+24.1*•	42.1	**84**
85	75 29.2	*+2.1*•	19.6	76 25.5	*+3.5*•	21.0	77 21.2	*+5.0*•	22.6	78 16.2	*+6.8*•	24.5	79 10.3	*+9.0*•	26.6	80 03.4	*+11.4*•	29.2	80 55.0	*+14.3*•	32.2	81 44.7	*+17.8*•	35.9	**85**
86	75 31.3	*−1.8*•	15.6	76 29.0	*−0.9*•	16.8	77 26.2	*+0.4*•	18.0	78 23.0	*+1.8*•	19.6	79 19.3	*+3.4*•	21.3	80 14.8	*+5.4*•	23.4	81 09.3	*+7.8*•	26.0	82 02.5	*+10.7*•	29.1	**86**
87	75 29.5	*−6.0*•	11.6	76 28.1	*−5.1*•	12.5	77 26.6	*−4.3*•	13.4	78 24.8	*−3.3*•	14.6	79 22.7	*−2.1*•	15.9	80 20.2	*−0.7*•	17.5	81 17.1	*+1.0*•	19.5	82 13.2	*+3.2*•	21.9	**87**
88	75 23.5	*−9.8*•	7.7	76 23.0	*−9.5*•	8.2	77 22.3	*−8.9*•	8.9	78 21.5	*−8.3*•	9.6	79 20.6	*−7.6*•	10.5	80 19.5	*−6.8*•	11.6	81 18.1	*−5.7*•	12.9	82 16.4	*−4.4*•	14.5	**88**
89	75 13.7	*−13.7*•	3.8	76 13.5	*−13.5*•	4.1	77 13.4	*−13.4*•	4.4	78 13.2	*−13.2*•	4.7	79 13.0	*−13.0*•	5.2	80 12.7	*−12.7*•	5.7	81 12.4	*−12.4*•	6.3	82 12.0	*−12.0*•	7.1	**89**
90	75 00.0	*−17.3*•	0.0	76 00.0	*−17.5*•	0.0	77 00.0	*−17.6*•	0.0	78 00.0	*−17.8*•	0.0	79 00.0	*−18.0*•	0.0	80 00.0	*−18.2*•	0.0	81 00.0	*−18.5*•	0.0	82 00.0	*−18.9*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 75°, 285°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 50.5	–58.1	104.5	3 35.4	–58.3	104.6	3 20.3	–58.6	104.6	3 05.1	–58.8	104.7	2 49.8	–58.9	104.7	2 34.6	–59.2	104.8	2 19.2	–59.3	104.8	2 03.9	–59.5	104.9	0
1	2 52.4	–58.1	104.8	2 37.1	–58.4	104.8	2 21.7	–58.6	104.9	2 06.3	–58.8	104.9	1 50.9	–59.0	104.9	1 35.4	–59.1	105.0	1 19.9	–59.3	105.0	1 04.4	–59.5	105.0	1
2	1 54.3	–58.1	105.0	1 38.7	–58.3	105.0	1 23.1	–58.5	105.1	1 07.5	–58.7	105.1	0 51.9	–59.0	105.1	0 36.3	–59.2	105.1	0 20.6	–59.3	105.1	0 04.9	–59.4	105.1	2
3	0 56.2	–58.1	105.3	0 40.4	–58.4	105.3	0 24.6	–58.6	105.3	0 08.8	–58.8	105.3	0 07.1	+58.9	74.7	0 22.9	+59.1	74.7	0 38.7	+59.3	74.7	0 54.5	+59.5	74.7	3
4	0 01.9	+58.1	74.5	0 18.0	+58.3	74.5	0 34.0	+58.6	74.5	0 50.0	+58.8	74.5	1 06.0	+59.0	74.5	1 22.0	+59.2	74.5	1 38.0	+59.3	74.6	1 54.0	+59.4	74.6	4
5	1 00.0	+58.1	74.2	1 16.3	+58.3	74.3	1 32.6	+58.5	74.3	1 48.8	+58.8	74.3	2 05.0	+59.0	74.3	2 21.2	+59.1	74.4	2 37.3	+59.3	74.4	2 53.4	+59.5	74.5	5
6	1 58.1	+58.1	74.0	2 14.6	+58.4	74.0	2 31.1	+58.6	74.1	2 47.6	+58.8	74.1	3 04.0	+59.0	74.2	3 20.3	+59.2	74.2	3 36.6	+59.3	74.3	3 52.9	+59.4	74.3	6
7	2 56.2	+58.1	73.7	3 13.0	+58.3	73.8	3 29.7	+58.5	73.8	3 46.4	+58.7	73.9	4 03.0	+58.9	74.0	4 19.5	+59.1	74.0	4 35.9	+59.3	74.1	4 52.3	+59.5	74.2	7
8	3 54.3	+58.1	73.5	4 11.3	+58.3	73.6	4 28.2	+58.6	73.6	4 45.1	+58.8	73.7	5 01.9	+59.0	73.8	5 18.6	+59.2	73.9	5 35.2	+59.4	74.0	5 51.8	+59.4	74.1	8
9	4 52.4	+58.0	73.2	5 09.6	+58.3	73.3	5 26.8	+58.6	73.4	5 43.9	+58.8	73.5	6 00.9	+58.9	73.6	6 17.8	+59.1	73.7	6 34.6	+59.3	73.8	6 51.2	+59.5	73.9	9
10	5 50.4	+58.1	73.0	6 07.9	+58.4	73.1	6 25.4	+58.5	73.2	6 42.7	+58.7	73.3	6 59.8	+59.0	73.4	7 16.9	+59.1	73.5	7 33.9	+59.2	73.7	7 50.7	+59.4	73.8	10
11	6 48.5	+58.1	72.7	7 06.3	+58.3	72.8	7 23.9	+58.5	73.0	7 41.4	+58.8	73.1	7 58.8	+58.9	73.2	8 16.0	+59.2	73.4	8 33.1	+59.3	73.5	8 50.1	+59.5	73.7	11
12	7 46.6	+58.0	72.5	8 04.6	+58.3	72.6	8 22.4	+58.6	72.7	8 40.2	+58.7	72.9	8 57.7	+59.0	73.0	9 15.2	+59.1	73.2	9 32.4	+59.3	73.3	9 49.6	+59.4	73.5	12
13	8 44.6	+58.1	72.2	9 02.9	+58.3	72.4	9 21.0	+58.5	72.5	9 38.9	+58.7	72.7	9 56.7	+58.9	72.8	10 14.3	+59.1	73.0	10 31.7	+59.3	73.2	10 49.0	+59.4	73.4	13
14	9 42.7	+58.0	72.0	10 01.2	+58.2	72.1	10 19.5	+58.5	72.3	10 37.6	+58.8	72.5	10 55.6	+59.0	72.7	11 13.4	+59.1	72.8	11 31.0	+59.3	73.0	11 48.4	+59.5	73.2	14
15	10 40.7	+58.0	71.7	10 59.4	+58.3	71.9	11 18.0	+58.5	72.1	11 36.4	+58.7	72.3	11 54.6	+58.9	72.5	12 12.5	+59.1	72.7	12 30.3	+59.3	72.9	12 47.9	+59.4	73.1	15
16	11 38.7	+58.0	71.4	11 57.7	+58.3	71.6	12 16.5	+58.5	71.8	12 35.1	+58.7	72.1	12 53.5	+58.9	72.3	13 11.6	+59.1	72.5	13 29.6	+59.2	72.7	13 47.3	+59.4	73.0	16
17	12 36.7	+58.0	71.2	12 56.0	+58.2	71.4	13 15.0	+58.5	71.6	13 33.8	+58.7	71.8	13 52.4	+58.9	72.1	14 10.7	+59.1	72.3	14 28.8	+59.3	72.6	14 46.7	+59.4	72.8	17
18	13 34.7	+58.0	70.9	13 54.2	+58.2	71.2	14 13.5	+58.4	71.4	14 32.5	+58.7	71.6	14 51.3	+58.9	71.9	15 09.8	+59.1	72.1	15 28.1	+59.3	72.4	15 46.1	+59.4	72.7	18
19	14 32.7	+57.9	70.7	14 52.4	+58.3	70.9	15 11.9	+58.5	71.2	15 31.2	+58.7	71.4	15 50.2	+58.9	71.7	16 08.9	+59.1	72.0	16 27.4	+59.2	72.2	16 45.5	+59.4	72.5	19
20	15 30.6	+58.0	70.4	15 50.7	+58.1	70.7	16 10.4	+58.4	70.9	16 29.9	+58.6	71.2	16 49.1	+58.8	71.5	17 08.0	+59.0	71.8	17 26.6	+59.2	72.1	17 44.9	+59.4	72.4	20
21	16 28.6	+57.9	70.1	16 48.8	+58.2	70.4	17 08.8	+58.5	70.7	17 28.5	+58.7	71.0	17 47.9	+58.9	71.3	18 07.0	+59.1	71.6	18 25.8	+59.3	71.9	18 44.3	+59.4	72.2	21
22	17 26.5	+57.9	69.8	17 47.0	+58.2	70.1	18 07.3	+58.4	70.4	18 27.2	+58.6	70.8	18 46.8	+58.8	71.1	19 06.1	+59.0	71.4	19 25.1	+59.2	71.7	19 43.7	+59.4	72.1	22
23	18 24.4	+57.9	69.6	18 45.2	+58.1	69.9	19 05.7	+58.3	70.2	19 25.8	+58.6	70.5	19 45.6	+58.9	70.9	20 05.1	+59.1	71.2	20 24.3	+59.2	71.6	20 43.1	+59.4	71.9	23
24	19 22.3	+57.8	69.3	19 43.3	+58.1	69.6	20 04.0	+58.4	70.0	20 24.4	+58.6	70.3	20 44.5	+58.8	70.7	21 04.2	+59.0	71.0	21 23.5	+59.2	71.4	21 42.5	+59.3	71.8	24
25	20 20.1	+57.8	69.0	20 41.4	+58.1	69.4	21 02.4	+58.3	69.7	21 23.0	+58.6	70.1	21 43.3	+58.8	70.4	22 03.2	+59.0	70.8	22 22.7	+59.2	71.2	22 41.8	+59.4	71.6	25
26	21 17.9	+57.8	68.7	21 39.5	+58.1	69.1	22 00.7	+58.4	69.5	22 21.6	+58.6	69.8	22 42.1	+58.8	70.2	23 02.2	+59.0	70.6	23 21.9	+59.2	71.0	23 41.2	+59.3	71.4	26
27	22 15.7	+57.7	68.4	22 37.6	+58.0	68.8	22 59.1	+58.3	69.2	23 20.2	+58.5	69.6	23 40.9	+58.7	70.0	24 01.2	+58.9	70.4	24 21.1	+59.1	70.9	24 40.5	+59.4	71.3	27
28	23 13.4	+57.8	68.1	23 35.6	+58.0	68.5	23 57.4	+58.2	68.9	24 18.7	+58.5	69.4	24 39.6	+58.8	69.8	25 00.1	+59.0	70.2	25 20.2	+59.2	70.7	25 39.9	+59.3	71.1	28
29	24 11.2	+57.7	67.8	24 33.6	+58.0	68.3	24 55.6	+58.3	68.7	25 17.2	+58.5	69.1	25 38.4	+58.7	69.6	25 59.1	+58.9	70.0	26 19.4	+59.1	70.5	26 39.2	+59.3	71.0	29
30	25 08.9	+57.6	67.5	25 31.6	+57.9	68.0	25 53.9	+58.2	68.4	26 15.7	+58.5	68.9	26 37.1	+58.7	69.3	26 58.0	+59.0	69.8	27 18.5	+59.1	70.3	27 38.5	+59.3	70.8	30
31	26 06.5	+57.6	67.2	26 29.5	+57.9	67.7	26 52.1	+58.1	68.1	27 14.2	+58.4	68.6	27 35.8	+58.7	69.1	27 57.0	+58.9	69.6	28 17.6	+59.1	70.1	28 37.8	+59.3	70.6	31
32	27 04.1	+57.6	66.9	27 27.4	+57.9	67.4	27 50.2	+58.2	67.9	28 12.6	+58.4	68.4	28 34.5	+58.6	68.9	28 55.9	+58.8	69.4	29 16.7	+59.1	69.9	29 37.1	+59.3	70.4	32
33	28 01.7	+57.5	66.6	28 25.3	+57.8	67.1	28 48.4	+58.1	67.6	29 11.0	+58.4	68.1	29 33.1	+58.6	68.6	29 54.7	+58.9	69.2	30 15.8	+59.1	69.7	30 36.4	+59.2	70.3	33
34	28 59.2	+57.5	66.3	29 23.1	+57.8	66.8	29 46.5	+58.1	67.3	30 09.4	+58.3	67.8	30 31.7	+58.6	68.4	30 53.6	+58.8	68.9	31 14.9	+59.0	69.5	31 35.6	+59.2	70.1	34
35	29 56.7	+57.4	65.9	30 20.9	+57.7	66.5	30 44.6	+58.0	67.0	31 07.7	+58.3	67.6	31 30.3	+58.6	68.1	31 52.4	+58.8	68.7	32 13.9	+59.0	69.3	32 34.8	+59.3	69.9	35
36	30 54.1	+57.4	65.6	31 18.6	+57.7	66.2	31 42.6	+58.0	66.7	32 06.0	+58.3	67.3	32 28.9	+58.5	67.9	32 51.2	+58.8	68.5	33 12.9	+59.0	69.1	33 34.1	+59.2	69.7	36
37	31 51.5	+57.3	65.3	32 16.3	+57.6	65.8	32 40.6	+57.9	66.4	33 04.3	+58.2	67.0	33 27.4	+58.5	67.6	33 50.0	+58.7	68.2	34 11.9	+59.0	68.9	34 33.3	+59.2	69.5	37
38	32 48.8	+57.2	64.9	33 13.9	+57.6	65.5	33 38.5	+57.9	66.1	34 02.5	+58.2	66.7	34 25.9	+58.5	67.3	34 48.7	+58.8	68.0	35 10.9	+59.0	68.6	35 32.5	+59.1	69.3	38
39	33 46.0	+57.2	64.6	34 11.5	+57.5	65.2	34 36.4	+57.9	65.8	35 00.7	+58.2	66.4	35 24.4	+58.4	67.1	35 47.5	+58.7	67.7	36 09.9	+58.9	68.4	36 31.6	+59.2	69.1	39
40	34 43.2	+57.1	64.2	35 09.0	+57.5	64.8	35 34.3	+57.8	65.5	35 58.9	+58.1	66.1	36 22.8	+58.4	66.8	36 46.2	+58.6	67.5	37 08.8	+58.9	68.2	37 30.8	+59.1	68.9	40
41	35 40.3	+57.1	63.8	36 06.5	+57.4	64.5	36 32.1	+57.7	65.1	36 57.0	+58.0	65.8	37 21.2	+58.4	66.5	37 44.8	+58.6	67.2	38 07.7	+58.9	67.9	38 29.9	+59.1	68.7	41
42	36 37.4	+57.0	63.4	37 03.9	+57.3	64.1	37 29.8	+57.7	64.8	37 55.0	+58.0	65.5	38 19.6	+58.3	66.2	38 43.4	+58.6	66.9	39 06.6	+58.8	67.7	39 29.0	+59.1	68.4	42
43	37 34.4	+56.9	63.0	38 01.2	+57.3	63.7	38 27.5	+57.6	64.4	38 53.0	+58.0	65.2	39 17.9	+58.2	65.9	39 42.0	+58.5	66.7	40 05.4	+58.8	67.4	40 28.1	+59.0	68.2	43
44	38 31.3	+56.8	62.6	38 58.5	+57.2	63.4	39 25.1	+57.5	64.1	39 51.0	+57.8	64.8	40 16.1	+58.2	65.6	40 40.5	+58.5	66.4	41 04.2	+58.8	67.2	41 27.1	+59.0	68.0	44
45	39 28.1	+56.7	62.2	39 55.7	+57.1	63.0	40 22.6	+57.5	63.7	40 48.8	+57.9	64.5	41 14.3	+58.2	65.3	41 39.0	+58.5	66.1	42 03.0	+58.7	66.9	42 26.1	+59.0	67.7	45
46	40 24.8	+56.6	61.8	40 52.8	+57.0	62.6	41 20.1	+57.4	63.3	41 46.7	+57.7	64.1	42 12.5	+58.0	64.9	42 37.5	+58.4	65.8	43 01.7	+58.7	66.6	43 25.1	+58.9	67.5	46
47	41 21.4	+56.5	61.4	41 49.8	+56.9	62.1	42 17.5	+57.3	62.9	42 44.4	+57.7	63.8	43 10.5	+58.1	64.6	43 35.9	+58.3	65.5	44 00.4	+58.6	66.3	44 24.0	+58.9	67.2	47
48	42 17.9	+56.5	60.9	42 46.7	+56.9	61.7	43 14.8	+57.2	62.5	43 42.1	+57.6	63.4	44 08.6	+57.9	64.2	44 34.2	+58.3	65.1	44 59.0	+58.6	66.0	45 22.9	+58.9	67.0	48
49	43 14.4	+56.2	60.4	43 43.6	+56.7	61.3	44 12.0	+57.2	62.1	44 39.7	+57.5	63.0	45 06.5	+57.9	63.9	45 32.5	+58.2	64.8	45 57.6	+58.5	65.7	46 21.8	+58.8	66.7	49
50	44 10.6	+56.2	60.0	44 40.3	+56.6	60.8	45 09.2	+57.0	61.7	45 37.2	+57.4	62.6	46 04.4	+57.8	63.5	46 30.7	+58.2	64.4	46 56.1	+58.5	65.4	47 20.6	+58.8	66.4	50
51	45 06.8	+56.1	59.5	45 36.9	+56.5	60.3	46 06.2	+56.9	61.2	46 34.6	+57.4	62.2	47 02.2	+57.7	63.1	47 28.9	+58.1	64.1	47 54.6	+58.5	65.1	48 19.4	+58.8	66.1	51
52	46 02.9	+55.9	59.0	46 33.4	+56.4	59.9	47 03.1	+56.8	60.8	47 32.0	+57.2	61.7	47 59.9	+57.6	62.7	48 27.0	+58.0	63.7	48 53.1	+58.3	64.7	49 18.2	+58.6	65.8	52
53	46 58.8	+55.7	58.4	47 29.8	+56.2	59.4	47 59.9	+56.7	60.3	48 29.2	+57.1	61.3	48 57.5	+57.6	62.3	49 25.0	+57.9	63.3	49 51.4	+58.3	64.4	50 16.8	+58.7	65.5	53
54	47 54.5	+55.6	57.9	48 26.0	+56.1	58.8	48 56.6	+56.6	59.8	49 26.3	+57.0	60.8	49 55.1	+57.4	61.9	50 22.9	+57.8	62.9	50 49.7	+58.2	64.0	51 15.5	+58.5	65.1	54
55	48 50.1	+55.4	57.3	49 22.1	+55.9	58.3	49 53.2	+56.4	59.3	50 23.3	+56.9	60.3	50 52.5	+57.4	61.4	51 20.7	+57.8	62.5	51 47.9	+58.2	63.6	52 14.0	+58.5	64.8	55
56	49 45.5	+55.2	56.7	50 18.0	+55.7	57.7	50 49.6	+56.2	58.8	51 20.2	+56.7	59.8	51 49.9	+57.2	60.9	52 18.5	+57.6	62.1	52 46.1	+58.0	63.2	53 12.5	+58.5	64.4	56
57	50 40.7	+55.1	56.1	51 13.7	+55.6	57.2	51 45.8	+56.1	58.2	52 16.9	+56.6	59.3	52 47.1	+57.0	60.4	53 16.1	+57.6	61.6	53 44.1	+58.0	62.8	54 11.0	+58.3	64.0	57
58	51 35.8	+54.8	55.5	52 09.3	+55.4	56.5	52 41.9	+55.9	57.6	53 13.5	+56.5	58.8	53 44.1	+57.0	59.9	54 13.7	+57.4	61.1	54 42.1	+57.8	62.4	55 09.3	+58.3	63.6	58
59	52 30.6	+54.6	54.8	53 04.7	+55.2	55.9	53 37.8	+55.8	57.0	54 10.0	+56.3	58.2	54 41.1	+56.8	59.4	55 11.1	+57.3	60.6	55 39.9	+57.8	61.9	56 07.6	+58.2	63.2	59
60	53 25.2	+54.3	54.1	53 59.9	+54.9	55.2	54 33.6	+55.5	56.4	55 06.3	+56.0	57.6	55 37.9	+56.6	58.8	56 08.4	+57.1	60.1	56 37.7	+57.6	61.4	57 05.8	+58.1	62.8	60
61	54 19.5	+54.1	53.4	54 54.8	+54.7	54.6	55 29.1	+55.3	55.7	56 02.3	+55.9	57.0	56 34.5	+56.5	58.2	57 05.5	+57.0	59.5	57 35.3	+57.5	60.9	58 03.9	+57.9	62.3	61
62	55 13.6	+53.8	52.7	55 49.5	+54.4	53.8	56 24.4	+55.0	55.0	56 58.2	+55.7	56.3	57 31.0	+56.2	57.6	58 02.5	+56.8	59.0	58 32.8	+57.4	60.3	59 01.8	+57.9	61.8	62
63	56 07.4	+53.4	51.9	56 43.9	+54.2	53.1	57 19.4	+54.8	54.3	57 53.9	+55.4	55.6	58 27.2	+56.1	56.9	58 59.3	+56.7	58.3	59 30.2	+57.2	59.8	59 59.7	+57.7	61.3	63
64	57 00.8	+53.2	51.1	57 38.1	+53.8	52.3	58 14.2	+54.5	53.6	58 49.3	+55.2	54.9	59 23.3	+55.8	56.3	59 56.0	+56.4	57.7	60 27.4	+57.0	59.2	60 57.4	+57.6	60.7	64
65	57 54.0	+52.7	50.2	58 31.9	+53.4	51.4	59 08.7	+54.2	52.7	59 44.5	+54.9	54.1	60 19.1	+55.5	55.5	60 52.4	+56.2	57.0	61 24.4	+56.8	58.5	61 55.0	+57.4	60.1	65
66	58 46.7	+52.4	49.3	59 25.3	+53.2	50.6	60 02.9	+53.9	51.9	60 39.4	+54.5	53.3	61 14.6	+55.3	54.8	61 48.6	+56.0	56.3	62 21.2	+56.7	57.9	62 52.4	+57.3	59.5	66
67	59 39.1	+51.9	48.3	60 18.5	+52.6	49.6	60 56.8	+53.4	51.0	61 33.9	+54.3	52.4	62 09.9	+55.0	53.9	62 44.6	+55.7	55.5	63 17.9	+56.3	57.1	63 49.7	+57.0	58.8	67
68	60 31.0	+51.4	47.3	61 11.1	+52.3	48.7	61 50.2	+53.1	50.1	62 28.2	+53.8	51.5	63 04.9	+54.6	53.1	63 40.3	+55.3	54.7	64 14.2	+56.2	56.4	64 46.7	+56.8	58.1	68
69	61 22.4	+50.9	46.3	62 03.4	+51.7	47.6	62 43.3	+52.6	49.0	63 22.0	+53.4	50.6	63 59.5	+54.2	52.1	64 35.6	+55.1	53.8	65 10.4	+55.8	55.5	65 43.5	+56.6	57.4	69
70	62 13.3	+50.4	45.1	62 55.1	+51.3	46.5	63 35.9	+52.1	48.0	64 15.4	+53.0	49.5	64 53.7	+53.9	51.1	65 30.7	+54.7	52.8	66 06.2	+55.5	54.6	66 40.1	+56.3	56.5	70
71	63 03.7	+49.7	44.0	63 46.4	+50.6	45.4	64 28.0	+51.5	46.8	65 08.4	+52.4	48.4	65 47.6	+53.3	50.1	66 25.4	+54.2	51.8	67 01.7	+55.1	53.7	67 36.4	+56.0	55.6	71
72	63 53.4	+49.0	42.7	64 37.0	+49.9	44.1	65 19.5	+50.9	45.6	66 00.8	+51.9	47.2	66 40.9	+52.8	48.9	67 19.6	+53.8	50.7	67 56.8	+54.7	52.7	68 32.4	+55.6	54.7	72
73	64 42.4	+48.3	41.4	65 26.9	+49.3	42.8	66 10.4	+50.2	44.4	66 52.7	+51.2	46.0	67 33.7	+52.3	47.7	68 13.4	+53.2	49.6	68 51.5	+54.3	51.5	69 28.0	+55.2	53.6	73
74	65 30.7	+47.4	40.0	66 16.2	+48.4	41.4	67 00.6	+49.5	43.0	67 43.9	+50.5	44.6	68 26.0	+51.5	46.4	69 06.6	+52.7	48.3	69 45.8	+53.6	50.3	70 23.2	+54.7	52.5	74
75	66 18.1	+46.5	38.5	67 04.6	+47.6	39.9	67 50.1	+48.6	41.5	68 34.4	+49.7	43.2	69 17.5	+50.9	45.0	69 59.3	+51.9	46.9	70 39.4	+53.1	49.0	71 17.9	+54.2	51.2	75
76	67 04.6	+45.5	36.9	67 52.2	+46.5	38.3	68 38.7	+47.7	39.9	69 24.1	+48.8	41.6	70 08.4	+49.9	43.5	70 51.2	+51.1	45.4	71 32.5	+52.4	47.6	72 12.1	+53.6	49.9	76
77	67 50.1	+44.3	35.2	68 38.7	+45.4	36.6	69 26.4	+46.5	38.2	70 12.9	+47.8	39.9	70 58.3	+49.0	41.8	71 42.3	+50.3	43.8	72 24.9	+51.5	46.0	73 05.7	+52.8	48.3	77
78	68 34.4	+43.1	33.4	69 24.1	+44.3	34.8	70 12.9	+45.4	36.4	71 00.7	+46.6	38.1	71 47.3	+47.9	40.0	72 32.6	+49.2	42.0	73 16.4	+50.5	44.2	73 58.5	+51.9	46.7	78
79	69 17.5	+41.8	31.4	70 08.4	+42.8	32.9	70 58.3	+44.0	34.4	71 47.3	+45.3	36.1	72 35.2	+46.6	38.0	73 21.8	+48.0	40.1	74 06.9	+49.5	42.3	74 50.4	+50.9	44.8	79
80	69 59.3	+40.1	29.3	70 51.2	+41.3	30.8	71 42.3	+42.6	32.3	72 32.6	+43.8	34.0	73 21.8	+45.1	35.9	74 09.8	+46.6	37.9	74 56.4	+48.1	40.2	75 41.3	+49.8	42.7	80
81	70 39.4	+38.5	27.1	71 32.5	+39.6	28.5	72 24.9	+40.8	30.0	73 16.4	+42.1	31.7	74 06.9	+43.5	33.5	74 56.4	+44.9	35.6	75 44.5	+46.6	37.8	76 31.1	+48.2	40.4	81
82	71 17.9	+36.6 •	24.8	72 12.1	+37.7 •	26.1	73 05.7	+38.8 •	27.5	73 58.5	+40.1 •	29.1	74 50.4	+41.6 •	30.9	75 41.3	+43.1 •	32.9	76 31.1	+44.7 •	35.2	77 19.3	+46.5	37.8	82
83	71 54.5	+34.5 •	22.3	72 49.8	+35.6 •	23.5	73 44.5	+36.7 •	24.9	74 38.6	+38.0 •	26.4	75 32.0	+39.3 •	28.1	76 24.4	+40.9 •	30.1	77 15.8	+42.5 •	32.3	78 05.8	+44.4 •	34.8	83
84	72 29.0	+32.3 •	19.6	73 25.4	+33.2 •	20.7	74 21.2	+34.3 •	22.0	75 16.6	+35.5 •	23.4	76 11.3	+36.8 •	25.0	77 05.3	+38.3 •	26.9	77 58.3	+40.0 •	29.0	78 50.2	+41.8 •	31.4	84
85	73 01.3	+29.7 •	16.8	73 58.6	+30.6 •	17.8	74 55.5	+31.6 •	18.9	75 52.1	+32.6 •	20.2	76 48.1	+33.9 •	21.6	77 43.6	+35.3 •	23.3	78 38.3	+36.8 •	25.3	79 32.0	+38.7 •	27.6	85
86	73 31.0	+26.9 •	13.7	74 29.2	+27.7 •	14.6	75 27.1	+28.5 •	15.6	76 24.7	+29.5 •	16.7	77 22.0	+30.6 •	17.9	78 18.9	+31.8 •	19.4	79 15.1	+33.3 •	21.2	80 10.7	+34.9 •	23.3	86
87	73 57.9	+24.0 •	10.5	74 56.9	+24.5 •	11.2	75 55.6	+25.2 •	12.0	76 54.2	+26.0 •	12.9	77 52.6	+26.8 •	13.9	78 50.7	+27.8 •	15.1	79 48.4	+29.0 •	16.6	80 45.6	+30.4 •	18.4	87
88	74 21.9	+20.8 •	7.2	75 21.4	+21.1 •	7.7	76 20.8	+21.6 •	8.2	77 20.2	+22.0 •	8.8	78 19.4	+22.6 •	9.6	79 18.5	+23.3 •	10.5	80 17.4	+24.1 •	11.5	81 16.0	+25.1 •	12.8	88
89	74 42.7	+17.3 •	3.7	75 42.5	+17.5 •	3.9	76 42.4	+17.6 •	4.2	77 42.2	+17.8 •	4.5	78 42.0	+18.0 •	4.9	79 41.8	+18.2 •	5.4	80 41.5	+18.5 •	6.0	81 41.1	+18.9 •	6.7	89
90	75 00.0	+13.7 •	0.0	76 00.0	+13.5 •	0.0	77 00.0	+13.4 •	0.0	78 00.0	+13.2 •	0.0	79 00.0	+13.0 •	0.0	80 00.0	+12.7 •	0.0	81 00.0	+12.4 •	0.0	82 00.0	+12.0 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 105°, 255°

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	3 35.4	+58.1	103.5	3 21.3	+58.3	103.6	3 07.2	+58.5	103.7	2 53.0	+58.7	103.7	2 38.7	+59.0	103.8	2 24.5	+59.1	103.8	2 10.1	+59.3	103.8	1 55.8	+59.4	103.9	0
1	4 33.5	+58.0	103.3	4 19.6	+58.3	103.4	4 05.7	+58.6	103.4	3 51.7	+58.8	103.5	3 37.7	+59.0	103.6	3 23.6	+59.1	103.6	3 09.4	+59.3	103.7	2 55.2	+59.5	103.7	1
2	5 31.5	+58.1	103.0	5 17.9	+58.3	103.1	5 04.3	+58.5	103.2	4 50.5	+58.8	103.3	4 36.7	+58.9	103.4	4 22.7	+59.2	103.5	4 08.7	+59.3	103.5	3 54.7	+59.4	103.6	2
3	6 29.6	+58.0	102.8	6 16.2	+58.3	102.9	6 02.8	+58.5	103.0	5 49.3	+58.7	103.1	5 35.6	+59.0	103.2	5 21.9	+59.1	103.3	5 08.0	+59.3	103.4	4 54.1	+59.5	103.5	3
4	7 27.6	+58.1	102.5	7 14.5	+58.3	102.7	7 01.3	+58.6	102.8	6 48.0	+58.8	102.9	6 34.6	+58.9	103.0	6 21.0	+59.1	103.1	6 07.3	+59.3	103.2	5 53.6	+59.4	103.3	4
5	8 25.7	+58.0	102.3	8 12.8	+58.3	102.4	7 59.9	+58.5	102.6	7 46.8	+58.7	102.7	7 33.5	+59.0	102.8	7 20.1	+59.2	102.9	7 06.6	+59.3	103.1	6 53.0	+59.4	103.2	5
6	9 23.7	+58.0	102.0	9 11.1	+58.3	102.2	8 58.4	+58.5	102.3	8 45.5	+58.7	102.5	8 32.5	+58.9	102.6	8 19.3	+59.1	102.8	8 05.9	+59.3	102.9	7 52.4	+59.5	103.1	6
7	10 21.7	+58.0	101.8	10 09.4	+58.3	101.9	9 56.9	+58.5	102.1	9 44.2	+58.8	102.3	9 31.4	+58.9	102.4	9 18.4	+59.1	102.6	9 05.2	+59.3	102.8	8 51.9	+59.4	102.9	7
8	11 19.7	+58.0	101.5	11 07.7	+58.2	101.7	10 55.4	+58.5	101.9	10 43.0	+58.7	102.1	10 30.3	+58.9	102.2	10 17.5	+59.1	102.4	10 04.5	+59.3	102.6	9 51.3	+59.4	102.8	8
9	12 17.7	+58.0	101.2	12 05.9	+58.3	101.4	11 53.9	+58.5	101.7	11 41.7	+58.7	101.9	11 29.2	+59.0	102.1	11 16.6	+59.1	102.3	11 03.8	+59.3	102.4	10 50.7	+59.5	102.6	9
10	13 15.7	+57.9	101.0	13 04.2	+58.2	101.2	12 52.4	+58.5	101.4	12 40.4	+58.7	101.6	12 28.2	+58.9	101.9	12 15.7	+59.1	102.1	12 03.1	+59.2	102.3	11 50.2	+59.4	102.5	10
11	14 13.6	+58.0	100.7	14 02.4	+58.2	100.9	13 50.9	+58.4	101.2	13 39.1	+58.7	101.4	13 27.1	+58.9	101.7	13 14.8	+59.1	101.9	13 02.3	+59.3	102.1	12 49.6	+59.4	102.4	11
12	15 11.6	+57.9	100.4	15 00.6	+58.2	100.7	14 49.3	+58.5	101.0	14 37.8	+58.6	101.2	14 26.0	+58.9	101.5	14 13.9	+59.1	101.7	14 01.6	+59.2	102.0	13 49.0	+59.4	102.2	12
13	16 09.5	+57.9	100.2	15 58.8	+58.2	100.4	15 47.8	+58.4	100.7	15 36.4	+58.7	101.0	15 24.9	+58.8	101.3	15 13.0	+59.1	101.5	15 00.8	+59.3	101.8	14 48.4	+59.4	102.1	13
14	17 07.4	+57.9	99.9	16 57.0	+58.1	100.2	16 46.2	+58.4	100.5	16 35.1	+58.7	100.8	16 23.7	+58.9	101.1	16 12.1	+59.0	101.4	16 00.1	+59.2	101.6	15 47.8	+59.4	101.9	14
15	18 05.3	+57.8	99.6	17 55.1	+58.1	99.9	17 44.6	+58.4	100.2	17 33.8	+58.6	100.6	17 22.6	+58.9	100.9	17 11.1	+59.1	101.2	16 59.3	+59.3	101.5	16 47.2	+59.4	101.8	15
16	19 03.1	+57.9	99.3	18 53.2	+58.2	99.7	18 43.0	+58.4	100.0	18 32.4	+58.6	100.3	18 21.5	+58.8	100.7	18 10.2	+59.0	101.0	17 58.6	+59.2	101.3	17 46.6	+59.4	101.6	16
17	20 01.0	+57.8	99.1	19 51.4	+58.0	99.4	19 41.4	+58.3	99.8	19 31.0	+58.6	100.1	19 20.3	+58.8	100.5	19 09.2	+59.1	100.8	18 57.8	+59.2	101.1	18 46.0	+59.4	101.5	17
18	20 58.8	+57.8	98.8	20 49.4	+58.1	99.1	20 39.7	+58.4	99.5	20 29.6	+58.6	99.9	20 19.1	+58.8	100.3	20 08.3	+59.0	100.6	19 57.0	+59.2	101.0	19 45.4	+59.4	101.3	18
19	21 56.6	+57.7	98.5	21 47.5	+58.0	98.9	21 38.1	+58.3	99.3	21 28.2	+58.6	99.7	21 17.9	+58.8	100.0	21 07.3	+59.0	100.4	20 56.2	+59.2	100.8	20 44.8	+59.4	101.2	19
20	22 54.3	+57.7	98.2	22 45.5	+58.1	98.6	22 36.4	+58.2	99.0	22 26.8	+58.5	99.4	22 16.7	+58.8	99.8	22 06.3	+59.0	100.2	21 55.4	+59.2	100.6	21 44.2	+59.3	101.0	20
21	23 52.0	+57.7	97.9	23 43.6	+57.9	98.3	23 34.6	+58.3	98.8	23 25.3	+58.5	99.2	23 15.5	+58.8	99.6	23 05.3	+59.0	100.0	22 54.6	+59.2	100.4	22 43.5	+59.4	100.9	21
22	24 49.7	+57.6	97.6	24 41.5	+58.0	98.0	24 32.9	+58.2	98.5	24 23.8	+58.5	98.9	24 14.3	+58.7	99.4	24 04.3	+58.9	99.8	23 53.8	+59.1	100.3	23 42.9	+59.3	100.7	22
23	25 47.3	+57.6	97.3	25 39.5	+57.9	97.7	25 31.1	+58.2	98.2	25 22.3	+58.5	98.7	25 13.0	+58.7	99.2	25 03.2	+59.0	99.6	24 52.9	+59.2	100.1	24 42.2	+59.3	100.5	23
24	26 44.9	+57.6	97.0	26 37.4	+57.9	97.5	26 29.3	+58.2	98.0	26 20.8	+58.4	98.4	26 11.7	+58.7	98.9	26 02.2	+58.9	99.4	25 52.1	+59.1	99.9	25 41.5	+59.3	100.4	24
25	27 42.5	+57.5	96.6	27 35.3	+57.8	97.2	27 27.5	+58.2	97.7	27 19.2	+58.5	98.2	27 10.4	+58.7	98.7	27 01.1	+58.9	99.2	26 51.2	+59.1	99.7	26 40.8	+59.4	100.2	25
26	28 40.0	+57.5	96.3	28 33.1	+57.8	96.9	28 25.7	+58.1	97.4	28 17.7	+58.3	97.9	28 09.1	+58.6	98.5	28 00.0	+58.9	99.0	27 50.3	+59.1	99.5	27 40.2	+59.2	100.0	26
27	29 37.5	+57.4	96.0	29 30.9	+57.8	96.6	29 23.8	+58.0	97.1	29 16.0	+58.4	97.7	29 07.7	+58.7	98.2	28 58.9	+58.8	98.8	28 49.4	+59.1	99.3	28 39.4	+59.3	99.9	27
28	30 34.9	+57.3	95.7	30 28.7	+57.7	96.2	30 21.8	+58.1	96.8	30 14.4	+58.3	97.4	30 06.4	+58.6	98.0	29 57.7	+58.9	98.6	29 48.5	+59.1	99.1	29 38.7	+59.3	99.7	28
29	31 32.2	+57.3	95.3	31 26.4	+57.6	95.9	31 19.9	+57.9	96.5	31 12.7	+58.3	97.1	31 05.0	+58.5	97.7	30 56.6	+58.8	98.3	30 47.6	+59.0	98.9	30 38.0	+59.2	99.5	29
30	32 29.5	+57.3	95.0	32 24.0	+57.6	95.6	32 17.8	+58.0	96.2	32 11.0	+58.3	96.9	32 03.5	+58.6	97.5	31 55.4	+58.8	98.1	31 46.6	+59.1	98.7	31 37.2	+59.3	99.3	30
31	33 26.8	+57.2	94.6	33 21.6	+57.6	95.3	33 15.8	+57.9	95.9	33 09.3	+58.2	96.6	33 02.1	+58.5	97.2	32 54.2	+58.8	97.9	32 45.7	+59.0	98.5	32 36.5	+59.2	99.1	31
32	34 24.0	+57.1	94.2	34 19.2	+57.5	94.9	34 13.7	+57.8	95.6	34 07.5	+58.1	96.3	34 00.6	+58.4	96.9	33 53.0	+58.7	97.6	33 44.7	+58.9	98.3	33 35.7	+59.2	98.9	32
33	35 21.1	+57.0	93.9	35 16.7	+57.4	94.6	35 11.5	+57.8	95.3	35 05.6	+58.2	96.0	34 59.0	+58.5	96.7	34 51.7	+58.7	97.4	34 43.6	+59.0	98.1	34 34.9	+59.2	98.7	33
34	36 18.1	+57.0	93.5	36 14.1	+57.4	94.2	36 09.3	+57.8	94.9	36 03.8	+58.0	95.7	35 57.5	+58.4	96.4	35 50.4	+58.7	97.1	35 42.6	+58.9	97.8	35 34.1	+59.1	98.5	34
35	37 15.1	+56.9	93.1	37 11.5	+57.3	93.9	37 07.1	+57.6	94.6	37 01.8	+58.1	95.4	36 55.9	+58.3	96.1	36 49.1	+58.6	96.9	36 41.5	+58.9	97.6	36 33.2	+59.2	98.3	35
36	38 12.0	+56.8	92.7	38 08.8	+57.2	93.5	38 04.7	+57.7	94.3	37 59.9	+57.9	95.0	37 54.2	+58.3	95.8	37 47.7	+58.6	96.6	37 40.4	+58.9	97.4	37 32.4	+59.1	98.1	36
37	39 08.8	+56.8	92.3	39 06.0	+57.2	93.1	39 02.4	+57.5	93.9	38 57.8	+58.0	94.7	38 52.5	+58.3	95.5	38 46.3	+58.6	96.3	38 39.3	+58.8	97.1	38 31.5	+59.0	97.9	37
38	40 05.6	+56.6	91.9	40 03.2	+57.0	92.7	39 59.9	+57.5	93.5	39 55.8	+57.8	94.4	39 50.8	+58.2	95.2	39 44.9	+58.5	96.0	39 38.1	+58.8	96.9	39 30.5	+59.1	97.7	38
39	41 02.2	+56.5	91.4	41 00.2	+57.0	92.3	40 57.4	+57.4	93.2	40 53.6	+57.8	94.0	40 49.0	+58.1	94.9	40 43.4	+58.5	95.7	40 36.9	+58.8	96.6	40 29.6	+59.0	97.4	39
40	41 58.7	+56.4	91.0	41 57.2	+56.9	91.9	41 54.8	+57.3	92.8	41 51.4	+57.7	93.7	41 47.1	+58.1	94.6	41 41.9	+58.4	95.4	41 35.7	+58.7	96.3	41 28.6	+59.0	97.2	40
41	42 55.1	+56.3	90.5	42 54.1	+56.8	91.4	42 52.1	+57.2	92.4	42 49.1	+57.7	93.3	42 45.2	+58.0	94.2	42 40.3	+58.4	95.1	42 34.4	+58.7	96.1	42 27.6	+59.0	97.0	41
42	43 51.4	+56.2	90.0	43 50.9	+56.7	91.0	43 49.3	+57.2	92.0	43 46.8	+57.6	92.9	43 43.2	+58.0	93.9	43 38.7	+58.3	94.8	43 33.1	+58.7	95.8	43 26.6	+58.9	96.7	42
43	44 47.6	+56.1	89.5	44 47.6	+56.5	90.5	44 46.5	+57.0	91.5	44 44.4	+57.4	92.5	44 41.2	+57.9	93.5	44 37.0	+58.3	94.5	44 31.8	+58.6	95.5	44 25.5	+58.9	96.5	43
44	45 43.7	+55.9	89.0	45 44.1	+56.5	90.1	45 43.5	+57.0	91.1	45 41.8	+57.4	92.1	45 39.1	+57.8	93.1	45 35.3	+58.2	94.2	45 30.4	+58.5	95.2	45 24.4	+58.9	96.2	44
45	46 39.6	+55.7	88.5	46 40.6	+56.3	89.6	46 40.5	+56.8	90.6	46 39.2	+57.3	91.7	46 36.9	+57.7	92.8	46 33.5	+58.1	93.8	46 28.9	+58.5	94.9	46 23.3	+58.8	95.9	45
46	47 35.3	+55.6	88.0	47 36.9	+56.2	89.1	47 37.3	+56.7	90.2	47 36.5	+57.2	91.3	47 34.6	+57.7	92.4	47 31.6	+58.1	93.4	47 27.4	+58.5	94.5	47 22.1	+58.8	95.6	46
47	48 30.9	+55.5	87.4	48 33.1	+56.0	88.5	48 34.0	+56.6	89.7	48 33.7	+57.1	90.8	48 32.3	+57.6	91.9	48 29.7	+58.0	93.1	48 25.9	+58.4	94.2	48 20.9	+58.7	95.3	47
48	49 26.4	+55.2	86.8	49 29.1	+55.8	88.0	49 30.6	+56.4	89.2	49 30.8	+57.0	90.3	49 29.9	+57.4	91.5	49 27.7	+57.9	92.7	49 24.3	+58.3	93.8	49 19.6	+58.7	95.0	48
49	50 21.6	+55.1	86.2	50 24.9	+55.7	87.4	50 27.0	+56.3	88.6	50 27.8	+56.8	89.9	50 27.3	+57.4	91.1	50 25.6	+57.8	92.3	50 22.6	+58.2	93.5	50 18.3	+58.6	94.7	49
50	51 16.7	+54.8	85.6	51 20.6	+55.5	86.8	51 23.3	+56.1	88.1	51 24.6	+56.7	89.3	51 24.7	+57.2	90.6	51 23.4	+57.7	91.8	51 20.8	+58.2	93.1	51 16.9	+58.6	94.3	50
51	52 11.5	+54.6	84.9	52 16.1	+55.4	86.2	52 19.4	+56.0	87.5	52 21.3	+56.6	88.8	52 21.9	+57.1	90.1	52 21.1	+57.6	91.4	52 19.0	+58.0	92.7	52 15.5	+58.4	94.0	51
52	53 06.1	+54.4	84.3	53 11.5	+55.0	85.6	53 15.4	+55.7	86.9	53 17.9	+56.4	88.3	53 19.0	+57.0	89.6	53 18.7	+57.5	90.9	53 17.0	+58.0	92.3	53 13.9	+58.5	93.6	52
53	54 00.5	+54.1	83.5	54 06.5	+54.9	84.9	54 11.1	+55.6	86.3	54 14.3	+56.2	87.7	54 16.0	+56.8	89.1	54 16.2	+57.4	90.5	54 15.0	+57.9	91.9	54 12.4	+58.3	93.2	53
54	54 54.6	+53.8	82.8	55 01.4	+54.6	84.2	55 06.7	+55.4	85.6	55 10.5	+56.1	87.1	55 12.8	+56.7	88.5	55 13.6	+57.3	90.0	55 12.9	+57.8	91.4	55 10.7	+58.3	92.8	54
55	55 48.4	+53.6	82.0	55 56.0	+54.4	83.5	56 02.1	+55.1	85.0	56 06.6	+55.8	86.4	56 09.5	+56.5	87.9	56 10.9	+57.1	89.4	56 10.7	+57.7	90.9	56 09.0	+58.1	92.4	55
56	56 42.0	+53.2	81.2	56 50.4	+54.0	82.7	56 57.2	+54.8	84.2	57 02.4	+55.6	85.8	57 06.0	+56.3	87.3	57 08.0	+56.9	88.9	57 08.4	+57.5	90.4	57 07.1	+58.1	92.0	56
57	57 35.2	+52.8	80.4	57 44.4	+53.7	81.9	57 52.0	+54.6	83.5	57 58.0	+55.4	85.1	58 02.3	+56.1	86.7	58 04.9	+56.8	88.3	58 05.9	+57.4	89.9	58 05.2	+57.9	91.5	57
58	58 28.0	+52.4	79.5	58 38.1	+53.4	81.1	58 46.6	+54.3	82.7	58 53.4	+55.1	84.3	58 58.4	+55.9	86.0	59 01.7	+56.6	87.7	59 03.3	+57.3	89.3	59 03.1	+57.9	91.0	58
59	59 20.4	+52.0	78.5	59 31.5	+53.0	80.2	59 40.9	+53.9	81.9	59 48.5	+54.8	83.6	59 54.3	+55.6	85.3	59 58.3	+56.4	87.0	60 00.6	+57.0	88.7	60 01.0	+57.7	90.5	59
60	60 12.4	+51.5	77.5	60 24.5	+52.6	79.2	60 34.8	+53.5	81.0	60 43.3	+54.5	82.7	60 49.9	+55.4	84.5	60 54.7	+56.2	86.3	60 57.6	+56.9	88.1	60 58.7	+57.5	89.9	60
61	61 03.9	+51.1	76.5	61 17.1	+52.1	78.3	61 28.3	+53.2	80.1	61 37.8	+54.1	81.9	61 45.3	+55.0	83.7	61 50.9	+55.9	85.6	61 54.5	+56.7	87.4	61 56.2	+57.4	89.3	61
62	61 55.0	+50.4	75.4	62 09.2	+51.6	77.2	62 21.5	+52.7	79.1	62 31.9	+53.8	81.0	62 40.3	+54.8	82.9	62 46.8	+55.6	84.8	62 51.2	+56.5	86.7	62 53.6	+57.2	88.7	62
63	62 45.4	+49.9	74.2	63 00.8	+51.0	76.1	63 14.2	+52.2	78.0	63 25.7	+53.3	80.0	63 35.1	+54.3	82.0	63 42.4	+55.4	84.0	63 47.7	+56.2	86.0	63 50.8	+57.0	88.0	63
64	63 35.3	+49.1	73.0	63 51.8	+50.5	74.9	64 06.4	+51.7	76.9	64 19.0	+52.9	78.9	64 29.4	+54.0	81.0	64 37.8	+55.0	83.1	64 43.9	+55.9	85.2	64 47.8	+56.8	87.3	64
65	64 24.4	+48.5	71.7	64 42.3	+49.8	73.7	64 58.1	+51.1	75.7	65 11.9	+52.3	77.8	65 23.4	+53.5	80.0	65 32.8	+54.6	82.1	65 39.8	+55.7	84.3	65 44.6	+56.6	86.5	65
66	65 12.9	+47.6	70.3	65 32.1	+49.0	72.4	65 49.2	+50.5	74.5	66 04.2	+51.7	76.6	66 16.9	+53.0	78.9	66 27.4	+54.1	81.1	66 35.5	+55.2	83.4	66 41.2	+56.2	85.7	66
67	66 00.5	+46.7	68.8	66 21.1	+48.3	70.9	66 39.7	+49.6	73.1	66 55.9	+51.1	75.4	67 09.9	+52.5	77.7	67 21.5	+53.7	80.0	67 30.7	+54.9	82.4	67 37.4	+55.9	84.8	67
68	66 47.2	+45.8	67.2	67 09.4	+47.3	69.4	67 29.3	+48.9	71.7	67 47.0	+50.4	74.0	68 02.4	+51.8	76.4	68 15.2	+53.2	78.8	68 25.6	+54.4	81.3	68 33.3	+55.6	83.8	68
69	67 33.0	+44.6	65.6	67 56.7	+46.3	67.8	68 18.2	+48.0	70.1	68 37.4	+49.6	72.6	68 54.2	+51.0	75.0	69 08.4	+52.5	77.6	69 20.0	+53.9	80.1	69 28.9	+55.2	82.8	69
70	68 17.6	+43.4	63.8	68 43.0	+45.2	66.1	69 06.2	+46.9	68.5	69 27.0	+48.6	71.0	69 45.2	+50.3	73.5	70 00.9	+51.9	76.2	70 13.9	+53.3	78.9	70 24.1	+54.6	81.6	70
71	69 01.0	+42.1	61.9	69 28.2	+43.9	64.3	69 53.1	+45.8	66.7	70 15.6	+47.6	69.3	70 35.5	+49.4	71.9	70 52.8	+51.0	74.7	71 07.2	+52.6	77.5	71 18.7	+54.2	80.4	71
72	69 43.1	+40.6	59.9	70 12.1	+42.5	62.3	70 38.9	+44.4	64.8	71 03.2	+46.4	67.4	71 24.9	+48.2	70.2	71 43.8	+50.1	73.0	71 59.8	+51.9	76.0	72 12.9	+53.4	79.0	72
73	70 23.7	+38.9	57.7	70 54.6	+41.0	60.2	71 23.3	+43.0	62.7	71 49.6	+45.0	65.4	72 13.1	+47.1	68.3	72 33.9	+49.1	71.2	72 51.7	+51.0	74.3	73 06.3	+52.8	77.5	73
74	71 02.6	+37.1	55.4	71 35.6	+39.2	57.9	72 06.3	+41.4	60.5	72 34.6	+43.6	63.3	73 00.2	+45.7	66.2	73 23.0	+47.8	69.3	73 42.7	+49.9	72.5	73 59.1	+51.8	75.8	74
75	71 39.7	+35.1 •	53.0	72 14.8	+37.3 •	55.4	72 47.7	+39.6 •	58.1	73 18.2	+41.8	60.9	73 45.9	+44.2	63.9	74 10.8	+46.4	67.1	74 32.6	+48.6	70.4	74 50.9	+50.9	73.9	75
76	72 14.8	+32.9 •	50.3	72 52.1	+35.2 •	52.8	73 27.3	+37.4 •	55.5	74 00.0	+39.9 •	58.4	74 30.1	+42.3 •	61.5	74 57.2	+44.8	64.7	75 21.2	+47.2	68.2	75 41.8	+49.5	71.8	76
77	72 47.7	+30.5 •	47.6	73 27.3	+32.7 •	50.0	74 04.7	+35.2 •	52.7	74 39.9	+37.6 •	55.6	75 12.4	+40.2 •	58.7	75 42.0	+42.9 •	62.1	76 08.4	+45.6	65.7	76 31.3	+48.2	69.5	77
78	73 18.2	+27.7 •	44.6	74 00.0	+30.1 •	47.0	74 39.9	+32.5 •	49.7	75 17.5	+35.1 •	52.6	75 52.6	+37.8 •	55.8	76 24.9	+40.6 •	59.2	76 54.0	+43.5 •	62.9	77 19.5	+46.3 •	66.8	78
79	73 45.9	+24.9 •	41.5	74 30.1	+27.1 •	43.9	75 12.4	+29.6 •	46.5	75 52.6	+32.3 •	49.4	76 30.4	+35.1 •	52.5	77 05.5	+38.0 •	56.0	77 37.5	+41.0 •	59.8	78 05.8	+44.2 •	63.8	79
80	74 10.8	+21.8 •	38.2	74 57.2	+24.0 •	40.5	75 42.0	+26.4 •	43.0	76 24.9	+29.1 •	45.8	77 05.5	+32.0 •	49.0	77 43.5	+35.0 •	52.4	78 18.5	+38.3 •	56.3	78 50.0	+41.7 •	60.5	80
81	74 32.6	+18.3 •	34.7	75 21.2	+20.6 •	36.9	76 08.4	+22.9 •	39.3	76 54.0	+25.5 •	42.0	77 37.5	+28.3 •	45.1	78 18.5	+31.5 •	48.5	78 56.8	+34.9 •	52.3	79 31.7	+38.5 •	56.6	81
82	74 50.9	+14.8 •	31.1	75 41.8	+16.8 •	33.1	76 31.3	+19.1 •	35.4	77 19.5	+21.5 •	38.0	78 05.8	+24.4 •	40.9	78 50.0	+27.5 •	44.2	79 31.7	+30.9 •	48.0	80 10.2	+34.7 •	52.3	82
83	75 05.7	+11.1 •	27.4	75 58.6	+12.9 •	29.2	76 50.4	+15.0 •	31.3	77 41.0	+17.3 •	33.7	78 30.2	+19.9 •	36.4	79 17.5	+22.9 •	39.5	80 02.6	+26.3 •	43.1	80 44.9	+30.1 •	47.3	83
84	75 16.8	+7.2 •	23.5	76 11.5	+8.8 •	25.1	77 05.4	+10.6 •	27.0	77 58.3	+12.7 •	29.1	78 50.1	+15.1 •	31.6	79 40.4	+17.9 •	34.5	80 28.9	+21.1 •	37.8	81 15.0	+24.8 •	41.8	84
85	75 24.0	+3.2 •	19.6	76 20.3	+4.5 •	21.0	77 16.0	+6.0 •	22.6	78 11.0	+7.9 •	24.4	79 05.2	+9.9 •	26.5	79 58.3	+12.3 •	29.1	80 50.0	+15.2 •	32.1	81 39.8	+18.6 •	35.7	85
86	75 27.2	−0.9 •	15.6	76 24.8	+0.2 •	16.7	77 22.0	+1.5 •	18.0	78 18.9	+2.8 •	19.5	79 15.1	+4.5 •	21.3	80 10.6	+6.4 •	23.4	81 05.2	+8.8 •	25.9	81 58.4	+11.7 •	29.0	86
87	75 26.3	−4.8 •	11.7	76 25.0	−4.1 •	12.5	77 23.5	−3.3 •	13.5	78 21.7	−2.3 •	14.6	79 19.6	−1.1 •	15.9	80 17.0	+0.4 •	17.5	81 14.0	+2.0 •	19.5	82 10.1	+4.2 •	21.9	87
88	75 21.5	−8.9 •	7.7	76 20.9	−8.4 •	8.2	77 20.2	−7.9 •	8.9	78 19.4	−7.2 •	9.6	79 18.5	−6.6 •	10.5	80 17.4	−5.7 •	11.6	81 16.0	−4.7 •	12.9	82 14.3	−3.4 •	14.5	88
89	75 12.6	−12.6 •	3.8	76 12.5	−12.5 •	4.1	77 12.3	−12.3 •	4.4	78 12.2	−12.2 •	4.8	79 11.9	−11.9 •	5.2	80 11.7	−11.7 •	5.7	81 11.3	−11.3 •	6.3	82 10.9	−10.9 •	7.2	89
90	75 00.0	−16.3 •	0.0	76 00.0	−16.5 •	0.0	77 00.0	−16.6 •	0.0	78 00.0	−16.8 •	0.0	79 00.0	−17.0 •	0.0	80 00.0	−17.2 •	0.0	81 00.0	−17.5 •	0.0	82 00.0	−17.9 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 76°, 284°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 35.4	–58.1	103.5	3 21.3	–58.3	103.6	3 07.2	–58.6	103.7	2 53.0	–58.8	103.7	2 38.7	–58.9	103.8	2 24.5	–59.2	103.8	2 10.1	–59.3	103.8	1 55.8	–59.5	103.9	0
1	2 37.3	–58.1	103.8	2 23.0	–58.3	103.8	2 08.6	–58.5	103.9	1 54.2	–58.7	103.9	1 39.8	–59.0	103.9	1 25.3	–59.1	104.0	1 10.8	–59.3	104.0	0 56.3	–59.4	104.0	1
2	1 39.2	–58.0	104.0	1 24.7	–58.4	104.1	1 10.1	–58.6	104.1	0 55.5	–58.8	104.1	0 40.8	–58.9	104.1	0 26.2	–59.2	104.1	0 11.5	–59.3	104.1	0 03.1	+59.5	75.9	2
3	0 41.2	–58.1	104.3	0 26.3	–58.3	104.3	0 11.5	–58.5	104.3	0 03.3	+58.8	75.7	0 18.1	+59.0	75.7	0 33.0	+59.1	75.7	0 47.8	+59.3	75.7	1 02.6	+59.4	75.7	3
4	0 16.9	+58.1	75.5	0 32.0	+58.3	75.5	0 47.0	+58.6	75.5	1 02.1	+58.7	75.5	1 17.1	+59.0	75.5	1 32.1	+59.1	75.5	1 47.1	+59.3	75.6	2 02.0	+59.5	75.6	4
5	1 15.0	+58.1	75.2	1 30.3	+58.3	75.2	1 45.6	+58.5	75.3	2 00.8	+58.8	75.3	2 16.1	+58.9	75.3	2 31.2	+59.2	75.4	2 46.4	+59.3	75.4	3 01.5	+59.4	75.5	5
6	2 13.1	+58.0	75.0	2 28.6	+58.3	75.0	2 44.1	+58.6	75.0	2 59.6	+58.8	75.1	3 15.0	+59.0	75.1	3 30.4	+59.1	75.2	3 45.7	+59.3	75.3	4 00.9	+59.5	75.3	6
7	3 11.1	+58.1	74.7	3 26.9	+58.4	74.8	3 42.7	+58.5	74.8	3 58.4	+58.7	74.9	4 14.0	+58.9	74.9	4 29.5	+59.2	75.0	4 45.0	+59.3	75.1	5 00.4	+59.4	75.2	7
8	4 09.2	+58.1	74.4	4 25.3	+58.3	74.5	4 41.2	+58.6	74.6	4 57.1	+58.8	74.7	5 12.9	+59.0	74.8	5 28.7	+59.1	74.9	5 44.3	+59.3	74.9	5 59.8	+59.5	75.0	8
9	5 07.3	+58.0	74.2	5 23.6	+58.3	74.3	5 39.8	+58.5	74.4	5 55.9	+58.7	74.5	6 11.9	+58.9	74.6	6 27.8	+59.1	74.7	6 43.6	+59.3	74.8	6 59.3	+59.4	74.9	9
10	6 05.3	+58.1	73.9	6 21.9	+58.3	74.0	6 38.3	+58.5	74.2	6 54.6	+58.8	74.3	7 10.8	+59.0	74.4	7 26.9	+59.1	74.5	7 42.9	+59.3	74.6	7 58.7	+59.4	74.8	10
11	7 03.4	+58.0	73.7	7 20.2	+58.3	73.8	7 36.8	+58.6	73.9	7 53.4	+58.7	74.1	8 09.8	+58.9	74.2	8 26.0	+59.2	74.3	8 42.2	+59.3	74.5	8 58.1	+59.5	74.6	11
12	8 01.4	+58.1	73.4	8 18.5	+58.2	73.6	8 35.4	+58.5	73.7	8 52.1	+58.7	73.9	9 08.7	+59.0	74.0	9 25.2	+59.1	74.2	9 41.5	+59.2	74.3	9 57.6	+59.4	74.5	12
13	8 59.5	+58.0	73.2	9 16.7	+58.3	73.3	9 33.9	+58.5	73.5	9 50.8	+58.8	73.7	10 07.7	+58.9	73.8	10 24.3	+59.1	74.0	10 40.7	+59.3	74.2	10 57.0	+59.4	74.4	13
14	9 57.5	+58.0	72.9	10 15.0	+58.3	73.1	10 32.4	+58.5	73.3	10 49.6	+58.7	73.4	11 06.6	+58.9	73.6	11 23.4	+59.1	73.8	11 40.0	+59.3	74.0	11 56.4	+59.5	74.2	14
15	10 55.5	+58.0	72.7	11 13.3	+58.2	72.8	11 30.9	+58.5	73.0	11 48.3	+58.7	73.2	12 05.5	+58.9	73.4	12 22.5	+59.1	73.6	12 39.3	+59.3	73.9	12 55.9	+59.4	74.1	15
16	11 53.5	+58.0	72.4	12 11.5	+58.3	72.6	12 29.4	+58.4	72.8	12 47.0	+58.7	73.0	13 04.4	+58.9	73.2	13 21.6	+59.1	73.5	13 38.6	+59.2	73.7	13 55.3	+59.4	73.9	16
17	12 51.5	+57.9	72.1	13 09.8	+58.2	72.4	13 27.8	+58.5	72.6	13 45.7	+58.7	72.8	14 03.3	+58.9	73.0	14 20.7	+59.1	73.3	14 37.8	+59.3	73.5	14 54.7	+59.4	73.8	17
18	13 49.4	+58.0	71.9	14 08.0	+58.2	72.1	14 26.3	+58.5	72.3	14 44.4	+58.7	72.6	15 02.2	+58.9	72.8	15 19.8	+59.0	73.1	15 37.1	+59.2	73.4	15 54.1	+59.4	73.6	18
19	14 47.4	+57.9	71.6	15 06.2	+58.2	71.9	15 24.8	+58.4	72.1	15 43.1	+58.6	72.4	16 01.1	+58.9	72.6	16 18.8	+59.1	72.9	16 36.3	+59.3	73.2	16 53.5	+59.4	73.5	19
20	15 45.3	+57.9	71.3	16 04.4	+58.2	71.6	16 23.2	+58.4	71.9	16 41.7	+58.7	72.2	17 00.0	+58.8	72.4	17 17.9	+59.1	72.7	17 35.6	+59.2	73.0	17 52.9	+59.4	73.3	20
21	16 43.2	+57.9	71.1	17 02.6	+58.1	71.3	17 21.6	+58.4	71.6	17 40.4	+58.6	71.9	17 58.8	+58.9	72.2	18 17.0	+59.0	72.6	18 34.8	+59.2	72.9	18 52.3	+59.4	73.2	21
22	17 41.1	+57.9	70.8	18 00.7	+58.1	71.1	18 20.0	+58.4	71.4	18 39.0	+58.6	71.7	18 57.7	+58.8	72.0	19 16.0	+59.0	72.4	19 34.0	+59.2	72.7	19 51.7	+59.3	73.0	22
23	18 39.0	+57.8	70.5	18 58.8	+58.2	70.8	19 18.4	+58.4	71.2	19 37.6	+58.6	71.5	19 56.5	+58.8	71.8	20 15.0	+59.0	72.2	20 33.2	+59.2	72.5	20 51.0	+59.4	72.9	23
24	19 36.8	+57.8	70.2	19 57.0	+58.0	70.6	20 16.8	+58.3	70.9	20 36.2	+58.6	71.3	20 55.3	+58.8	71.6	21 14.0	+59.1	72.0	21 32.4	+59.2	72.4	21 50.4	+59.4	72.7	24
25	20 34.6	+57.8	69.9	20 55.0	+58.1	70.3	21 15.1	+58.3	70.7	21 34.8	+58.6	71.0	21 54.1	+58.8	71.4	22 13.1	+58.9	71.8	22 31.6	+59.2	72.2	22 49.8	+59.3	72.6	25
26	21 32.4	+57.8	69.6	21 53.1	+58.0	70.0	22 13.4	+58.3	70.4	22 33.4	+58.5	70.8	22 52.9	+58.8	71.2	23 12.0	+59.0	71.6	23 30.8	+59.2	72.0	23 49.1	+59.4	72.4	26
27	22 30.2	+57.7	69.4	22 51.1	+58.0	69.7	23 11.7	+58.3	70.1	23 31.9	+58.5	70.6	23 51.7	+58.7	71.0	24 11.0	+59.0	71.4	24 30.0	+59.1	71.8	24 48.5	+59.3	72.3	27
28	23 27.9	+57.7	69.1	23 49.1	+58.0	69.5	24 10.0	+58.2	69.9	24 30.4	+58.5	70.3	24 50.4	+58.7	70.7	25 10.0	+58.9	71.2	25 29.1	+59.1	71.6	25 47.8	+59.3	72.1	28
29	24 25.6	+57.6	68.8	24 47.1	+58.0	69.2	25 08.2	+58.2	69.6	25 28.9	+58.5	70.1	25 49.1	+58.7	70.5	26 08.9	+58.9	71.0	26 28.2	+59.2	71.4	26 47.1	+59.3	71.9	29
30	25 23.2	+57.7	68.5	25 45.1	+57.9	68.9	26 06.4	+58.2	69.4	26 27.4	+58.4	69.8	26 47.8	+58.7	70.3	27 07.8	+59.0	70.8	27 27.4	+59.1	71.3	27 46.4	+59.3	71.8	30
31	26 20.9	+57.5	68.1	26 43.0	+57.8	68.6	27 04.6	+58.2	69.1	27 25.8	+58.4	69.6	27 46.5	+58.7	70.1	28 06.8	+58.8	70.6	28 26.5	+59.1	71.1	28 45.7	+59.3	71.6	31
32	27 18.4	+57.6	67.8	27 40.8	+57.9	68.3	28 02.8	+58.1	68.8	28 24.2	+58.4	69.3	28 45.2	+58.6	69.8	29 05.6	+58.9	70.3	29 25.6	+59.0	70.9	29 45.0	+59.2	71.4	32
33	28 16.0	+57.5	67.5	28 38.7	+57.8	68.0	29 00.9	+58.1	68.5	29 22.6	+58.4	69.0	29 43.8	+58.6	69.6	30 04.5	+58.8	70.1	30 24.6	+59.1	70.7	30 44.2	+59.3	71.2	33
34	29 13.5	+57.4	67.2	29 36.5	+57.7	67.7	29 59.0	+58.0	68.2	30 21.0	+58.3	68.8	30 42.4	+58.6	69.3	31 03.3	+58.9	69.9	31 23.7	+59.0	70.5	31 43.5	+59.2	71.0	34
35	30 10.9	+57.4	66.8	30 34.2	+57.7	67.4	30 57.0	+58.0	67.9	31 19.3	+58.3	68.5	31 41.0	+58.6	69.1	32 02.2	+58.7	69.7	32 22.7	+59.0	70.2	32 42.7	+59.2	70.8	35
36	31 08.3	+57.3	66.5	31 31.9	+57.7	67.1	31 55.0	+58.0	67.6	32 17.6	+58.2	68.2	32 39.6	+58.5	68.8	33 00.9	+58.8	69.4	33 21.7	+59.0	70.0	33 41.9	+59.2	70.7	36
37	32 05.6	+57.3	66.2	32 29.6	+57.6	66.7	32 53.0	+57.9	67.3	33 15.8	+58.2	67.9	33 38.1	+58.4	68.5	33 59.7	+58.7	69.2	34 20.7	+59.0	69.8	34 41.1	+59.2	70.5	37
38	33 02.9	+57.2	65.8	33 27.2	+57.5	66.4	33 50.9	+57.9	67.0	34 14.0	+58.2	67.6	34 36.5	+58.5	68.3	34 58.4	+58.7	68.9	35 19.7	+58.9	69.6	35 40.3	+59.1	70.3	38
39	34 00.1	+57.1	65.4	34 24.7	+57.5	66.1	34 48.8	+57.8	66.7	35 12.2	+58.1	67.3	35 35.0	+58.4	68.0	35 57.1	+58.7	68.7	36 18.6	+58.9	69.4	36 39.4	+59.2	70.0	39
40	34 57.2	+57.1	65.1	35 22.2	+57.5	65.7	35 46.6	+57.7	66.4	36 10.3	+58.1	67.0	36 33.4	+58.4	67.7	36 55.8	+58.6	68.4	37 17.5	+58.9	69.1	37 38.6	+59.1	69.8	40
41	35 54.3	+57.0	64.7	36 19.7	+57.3	65.4	36 44.3	+57.7	66.0	37 08.4	+58.0	66.7	37 31.8	+58.3	67.4	37 54.4	+58.6	68.1	38 16.4	+58.9	68.9	38 37.7	+59.1	69.6	41
42	36 51.3	+57.0	64.3	37 17.0	+57.3	65.0	37 42.0	+57.7	65.7	38 06.4	+58.0	66.4	38 30.1	+58.3	67.1	38 53.0	+58.6	67.9	39 15.3	+58.8	68.6	39 36.8	+59.0	69.4	42
43	37 48.3	+56.8	63.9	38 14.3	+57.2	64.6	38 39.7	+57.6	65.3	39 04.4	+57.9	66.1	39 28.4	+58.2	66.8	39 51.6	+58.5	67.6	40 14.1	+58.8	68.4	40 35.8	+59.1	69.2	43
44	38 45.1	+56.8	63.5	39 11.5	+57.2	64.2	39 37.3	+57.5	65.0	40 02.3	+57.8	65.7	40 26.6	+58.1	66.5	40 50.1	+58.5	67.3	41 12.9	+58.7	68.1	41 34.9	+59.0	68.9	44
45	39 41.9	+56.6	63.1	40 08.7	+57.0	63.8	40 34.8	+57.4	64.6	41 00.1	+57.8	65.4	41 24.7	+58.2	66.2	41 48.6	+58.4	67.0	42 11.6	+58.7	67.8	42 33.9	+58.9	68.7	45
46	40 38.5	+56.6	62.7	41 05.7	+57.0	63.4	41 32.2	+57.4	64.2	41 57.9	+57.7	65.0	42 22.9	+58.0	65.8	42 47.0	+58.4	66.7	43 10.3	+58.7	67.5	43 32.8	+59.0	68.4	46
47	41 35.1	+56.5	62.2	42 02.7	+56.9	63.0	42 29.6	+57.2	63.8	42 55.6	+57.7	64.7	43 20.9	+58.0	65.5	43 45.4	+58.3	66.4	44 09.0	+58.6	67.3	44 31.8	+58.9	68.2	47
48	42 31.6	+56.3	61.8	42 59.6	+56.8	62.6	43 26.8	+57.2	63.4	43 53.3	+57.5	64.3	44 18.9	+57.9	65.1	44 43.7	+58.3	66.0	45 07.6	+58.6	67.0	45 30.7	+58.8	67.9	48
49	43 27.9	+56.3	61.3	43 56.4	+56.6	62.1	44 24.0	+57.1	63.0	44 50.8	+57.5	63.9	45 16.8	+57.9	64.8	45 42.0	+58.1	65.7	46 06.2	+58.5	66.6	46 29.5	+58.8	67.6	49
50	44 24.2	+56.1	60.8	44 53.0	+56.6	61.7	45 21.1	+57.0	62.6	45 48.3	+57.4	63.5	46 14.7	+57.7	64.4	46 40.1	+58.2	65.4	47 04.7	+58.5	66.3	47 28.3	+58.8	67.3	50
51	45 20.3	+55.9	60.3	45 49.6	+56.4	61.2	46 18.1	+56.8	62.1	46 45.7	+57.3	63.0	47 12.4	+57.7	64.0	47 38.3	+58.0	65.0	48 03.2	+58.4	66.0	48 27.1	+58.7	67.0	51
52	46 16.2	+55.9	59.8	46 46.0	+56.3	60.7	47 14.9	+56.8	61.6	47 43.0	+57.2	62.6	48 10.1	+57.6	63.6	48 36.3	+58.0	64.6	49 01.6	+58.3	65.6	49 25.8	+58.7	66.7	52
53	47 12.1	+55.6	59.3	47 42.3	+56.2	60.2	48 11.7	+56.6	61.2	48 40.2	+57.0	62.2	49 07.7	+57.5	63.2	49 34.3	+57.9	64.2	49 59.9	+58.3	65.3	50 24.5	+58.6	66.4	53
54	48 07.7	+55.5	58.7	48 38.5	+56.0	59.7	49 08.3	+56.5	60.7	49 37.2	+57.0	61.7	50 05.2	+57.4	62.7	50 32.2	+57.8	63.8	50 58.2	+58.2	64.9	51 23.1	+58.5	66.0	54
55	49 03.2	+55.4	58.1	49 34.5	+55.8	59.1	50 04.8	+56.4	60.1	50 34.2	+56.8	61.2	51 02.6	+57.3	62.3	51 30.0	+57.7	63.4	51 56.4	+58.1	64.5	52 21.6	+58.5	65.7	55
56	49 58.6	+55.1	57.5	50 30.3	+55.7	58.6	51 01.2	+56.1	59.6	51 31.0	+56.7	60.7	51 59.9	+57.2	61.8	52 27.7	+57.6	62.9	52 54.5	+58.0	64.1	53 20.1	+58.4	65.3	56
57	50 53.7	+54.9	56.9	51 26.0	+55.5	58.0	51 57.3	+56.1	59.0	52 27.7	+56.6	60.2	52 57.1	+57.0	61.3	53 25.3	+57.5	62.5	53 52.5	+57.9	63.7	54 18.5	+58.3	64.9	57
58	51 48.6	+54.8	56.3	52 21.5	+55.3	57.3	52 53.4	+55.8	58.5	53 24.3	+56.3	59.6	53 54.1	+56.9	60.8	54 22.8	+57.4	62.0	54 50.4	+57.9	63.2	55 16.8	+58.3	64.5	58
59	52 43.4	+54.4	55.6	53 16.8	+55.0	56.7	53 49.2	+55.7	57.8	54 20.6	+56.2	59.0	54 51.0	+56.7	60.2	55 20.2	+57.2	61.5	55 48.3	+57.7	62.8	56 15.1	+58.1	64.1	59
60	53 37.8	+54.3	54.9	54 11.8	+54.9	56.0	54 44.9	+55.4	57.2	55 16.8	+56.1	58.4	55 47.7	+56.6	59.7	56 17.4	+57.1	60.9	56 46.0	+57.6	62.3	57 13.2	+58.1	63.6	60
61	54 32.1	+53.9	54.2	55 06.7	+54.6	55.3	55 40.3	+55.2	56.5	56 12.9	+55.8	57.8	56 44.3	+56.4	59.1	57 14.5	+57.0	60.4	57 43.6	+57.4	61.8	58 11.3	+57.9	63.2	61
62	55 26.0	+53.6	53.4	56 01.3	+54.3	54.6	56 35.5	+55.0	55.8	57 08.7	+55.5	57.1	57 40.7	+56.2	58.4	58 11.5	+56.7	59.8	58 41.0	+57.3	61.2	59 09.2	+57.9	62.7	62
63	56 19.6	+53.4	52.6	56 55.6	+54.0	53.8	57 30.5	+54.6	55.1	58 04.2	+55.4	56.4	58 36.9	+55.9	57.8	59 08.2	+56.6	59.2	59 38.3	+57.2	60.6	60 07.1	+57.6	62.1	63
64	57 13.0	+53.0	51.8	57 49.6	+53.7	53.0	58 25.1	+54.4	54.3	58 59.6	+55.0	55.7	59 32.8	+55.8	57.1	60 04.8	+56.4	58.5	60 35.5	+56.9	60.0	61 04.7	+57.6	61.6	64
65	58 06.0	+52.5	50.9	58 43.3	+53.3	52.2	59 19.5	+54.1	53.5	59 54.6	+54.8	54.9	60 28.6	+55.4	56.3	61 01.2	+56.1	57.8	61 32.4	+56.8	59.4	62 02.3	+57.4	61.0	65
66	58 58.5	+52.2	50.0	59 36.6	+53.0	51.3	60 13.6	+53.7	52.6	60 49.4	+54.5	54.1	61 24.0	+55.2	55.5	61 57.3	+55.9	57.1	62 29.2	+56.6	58.7	62 59.7	+57.1	60.4	66
67	59 50.7	+51.8	49.0	60 29.6	+52.5	50.3	61 07.3	+53.3	51.7	61 43.9	+54.1	53.2	62 19.2	+54.9	54.7	62 53.2	+55.6	56.3	63 25.8	+56.3	58.0	63 56.8	+57.0	59.7	67
68	60 42.5	+51.2	48.0	61 22.1	+52.1	49.3	62 00.6	+52.9	50.8	62 38.0	+53.7	52.3	63 14.1	+54.5	53.8	63 48.8	+55.3	55.5	64 22.1	+56.0	57.2	64 53.8	+56.8	59.0	68
69	61 33.7	+50.7	46.9	62 14.2	+51.5	48.3	62 53.5	+52.5	49.7	63 31.7	+53.3	51.3	64 08.6	+54.1	52.9	64 44.1	+54.9	54.6	65 18.1	+55.8	56.3	65 50.6	+56.5	58.2	69
70	62 24.4	+50.1	45.8	63 05.7	+51.0	47.2	63 46.0	+51.9	48.7	64 25.0	+52.8	50.2	65 02.7	+53.7	51.9	65 39.0	+54.6	53.6	66 13.9	+55.4	55.4	66 47.1	+56.2	57.3	70
71	63 14.5	+49.5	44.6	63 56.7	+50.4	46.0	64 37.9	+51.3	47.5	65 17.8	+52.2	49.1	65 56.4	+53.2	50.8	66 33.6	+54.1	52.6	67 09.3	+55.0	54.5	67 43.3	+55.9	56.4	71
72	64 04.0	+48.7	43.3	64 47.1	+49.8	44.7	65 29.2	+50.7	46.3	66 10.0	+51.7	47.9	66 49.6	+52.7	49.6	67 27.7	+53.7	51.5	68 04.3	+54.6	53.4	68 39.2	+55.5	55.5	72
73	64 52.7	+48.0	41.9	65 36.9	+48.9	43.4	66 19.9	+50.0	45.0	67 01.7	+51.0	46.6	67 42.3	+52.0	48.4	68 21.4	+53.1	50.3	68 58.9	+54.1	52.3	69 34.7	+55.1	54.4	73
74	65 40.7	+47.1	40.5	66 25.8	+48.2	42.0	67 09.9	+49.2	43.6	67 52.7	+50.3	45.3	68 34.3	+51.4	47.1	69 14.5	+52.4	49.0	69 53.0	+53.6	51.0	70 29.8	+54.7	53.2	74
75	66 27.8	+46.2	39.0	67 14.0	+47.2	40.5	67 59.1	+48.3	42.1	68 43.0	+49.5	43.8	69 25.7	+50.6	45.6	70 06.9	+51.8	47.6	70 46.6	+52.9	49.7	71 24.5	+54.0	52.0	75
76	67 14.0	+45.1	37.3	68 01.2	+46.2	38.8	68 47.4	+47.3	40.5	69 32.5	+48.5	42.2	70 16.3	+49.7	44.1	70 58.7	+50.9	46.1	71 39.5	+52.1	48.2	72 18.5	+53.4	50.6	76
77	67 59.1	+43.9	35.6	68 47.4	+45.1	37.1	69 34.7	+46.3	38.7	70 21.0	+47.4	40.5	71 06.0	+48.7	42.4	71 49.6	+50.0	44.4	72 31.6	+51.4	46.6	73 11.9	+52.7	49.0	77
78	68 43.0	+42.7	33.8	69 32.5	+43.8	35.3	70 21.0	+45.0	36.9	71 08.4	+46.3	38.6	71 54.7	+47.6	40.5	72 39.6	+48.9	42.6	73 23.0	+50.3	44.9	74 04.6	+51.7	47.3	78
79	69 25.7	+41.2	31.8	70 16.3	+42.4	33.3	71 06.0	+43.6	34.9	71 54.7	+44.9	36.6	72 42.3	+46.2	38.5	73 28.5	+47.7	40.6	74 13.3	+49.2	42.9	74 56.3	+50.7	45.4	79
80	70 06.9	+39.7	29.7	70 58.7	+40.8	31.1	71 49.6	+42.0	32.7	72 39.6	+43.4	34.4	73 28.5	+44.8	36.3	74 16.2	+46.3	38.4	75 02.5	+47.8	40.7	75 47.0	+49.5	43.3	80
81	70 46.6	+37.9	27.5	71 39.5	+39.0	28.8	72 31.6	+40.3	30.4	73 23.0	+41.6	32.1	74 13.3	+43.0	33.9	75 02.5	+44.5	36.0	75 50.3	+46.2	38.3	76 36.5	+47.9	40.9	81
82	71 24.5	*+35.9*•	25.1	72 18.5	*+37.1*•	26.4	73 11.9	*+38.3*•	27.9	74 04.6	*+39.6*•	29.5	74 56.3	*+41.1*•	31.3	75 47.0	*+42.7*•	33.4	76 36.5	*+44.3*•	35.7	77 24.4	+46.2	38.3	82
83	72 00.4	*+33.9*•	22.5	72 55.6	*+34.9*•	23.8	73 50.2	*+36.1*•	25.1	74 44.2	*+37.4*•	26.7	75 37.4	*+38.8*•	28.4	76 29.7	*+40.3*•	30.4	77 20.8	*+42.1*•	32.7	78 10.6	*+44.0*•	35.2	83
84	72 34.3	*+31.5*•	19.8	73 30.5	*+32.5*•	20.9	74 26.3	*+33.6*•	22.2	75 21.6	*+34.8*•	23.7	76 16.2	*+36.2*•	25.3	77 10.0	*+37.7*•	27.2	78 02.9	*+39.4*•	29.3	78 54.6	*+41.3*•	31.8	84
85	73 05.8	*+28.9*•	16.9	74 03.0	*+29.8*•	17.9	74 59.9	*+30.8*•	19.1	75 56.4	*+31.9*•	20.4	76 52.4	*+33.2*•	21.9	77 47.7	*+34.6*•	23.6	78 42.3	*+36.2*•	25.6	79 35.9	*+38.1*•	27.9	85
86	73 34.7	*+26.1*•	13.9	74 32.8	*+26.9*•	14.7	75 30.7	*+27.8*•	15.7	76 28.3	*+28.7*•	16.8	77 25.6	*+29.8*•	18.1	78 22.3	*+31.1*•	19.6	79 18.5	*+32.6*•	21.4	80 14.0	*+34.3*•	23.5	86
87	74 00.8	*+23.1*•	10.6	74 59.7	*+23.7*•	11.3	75 58.5	*+24.3*•	12.1	76 57.0	*+25.1*•	13.0	77 55.4	*+25.9*•	14.0	78 53.4	*+27.0*•	15.3	79 51.1	*+28.2*•	16.8	80 48.3	*+29.6*•	18.5	87
88	74 23.9	*+19.8*•	7.2	75 23.4	*+20.1*•	7.7	76 22.8	*+20.6*•	8.3	77 22.1	*+21.1*•	8.9	78 21.3	*+21.7*•	9.7	79 20.4	*+22.4*•	10.5	80 19.3	*+23.2*•	11.6	81 17.9	*+24.2*•	12.9	88
89	74 43.7	*+16.3*•	3.7	75 43.5	*+16.5*•	3.9	76 43.4	*+16.6*•	4.2	77 43.2	*+16.8*•	4.6	78 43.0	*+17.0*•	5.0	79 42.8	*+17.2*•	5.4	80 42.5	*+17.5*•	6.0	81 42.1	*+17.9*•	6.7	89
90	75 00.0	*+12.6*•	0.0	76 00.0	*+12.5*•	0.0	77 00.0	*+12.3*•	0.0	78 00.0	*+12.2*•	0.0	79 00.0	*+11.9*•	0.0	80 00.0	*+11.7*•	0.0	81 00.0	*+11.3*•	0.0	82 00.0	*+10.9*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 104°, 256°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 20.3	+58.0	102.6	3 07.2	+58.3	102.6	2 54.0	+58.6	102.7	2 40.8	+58.8	102.7	2 27.6	+59.0	102.8	2 14.3	+59.2	102.8	2 01.0	+59.3	102.8	1 47.6	+59.5	102.9	**0**
1	4 18.3	+58.1	102.3	4 05.5	+58.3	102.4	3 52.6	+58.5	102.5	3 39.6	+58.7	102.5	3 26.6	+58.9	102.6	3 13.5	+59.1	102.6	3 00.3	+59.3	102.7	2 47.1	+59.4	102.7	**1**
2	5 16.4	+58.0	102.1	5 03.8	+58.3	102.2	4 51.1	+58.5	102.2	4 38.3	+58.8	102.3	4 25.5	+58.9	102.4	4 12.6	+59.1	102.5	3 59.6	+59.3	102.5	3 46.5	+59.5	102.6	**2**
3	6 14.4	+58.0	101.8	6 02.1	+58.3	101.9	5 49.6	+58.6	102.0	5 37.1	+58.7	102.1	5 24.4	+59.0	102.2	5 11.7	+59.1	102.3	4 58.9	+59.3	102.4	4 46.0	+59.4	102.5	**3**
4	7 12.4	+58.1	101.6	7 00.4	+58.2	101.7	6 48.2	+58.5	101.8	6 35.8	+58.8	101.9	6 23.4	+58.9	102.0	6 10.8	+59.2	102.1	5 58.2	+59.3	102.2	5 45.4	+59.5	102.3	**4**
5	8 10.5	+58.0	101.3	7 58.6	+58.3	101.4	7 46.7	+58.5	101.6	7 34.6	+58.7	101.7	7 22.3	+59.0	101.8	7 10.0	+59.1	102.0	6 57.5	+59.3	102.1	6 44.9	+59.4	102.2	**5**
6	9 08.5	+58.0	101.0	8 56.9	+58.3	101.2	8 45.2	+58.5	101.3	8 33.3	+58.7	101.5	8 21.3	+58.9	101.6	8 09.1	+59.1	101.8	7 56.8	+59.2	101.9	7 44.3	+59.4	102.1	**6**
7	10 06.5	+58.0	100.8	9 55.2	+58.2	101.0	9 43.7	+58.5	101.1	9 32.0	+58.7	101.3	9 20.2	+58.9	101.5	9 08.2	+59.1	101.6	8 56.0	+59.3	101.8	8 43.7	+59.5	101.9	**7**
8	11 04.5	+58.0	100.5	10 53.4	+58.3	100.7	10 42.2	+58.5	100.9	10 30.7	+58.7	101.1	10 19.1	+58.9	101.3	10 07.3	+59.1	101.4	9 55.3	+59.3	101.6	9 43.2	+59.4	101.8	**8**
9	12 02.5	+57.9	100.3	11 51.7	+58.2	100.5	11 40.7	+58.4	100.7	11 29.4	+58.7	100.9	11 18.0	+58.9	101.1	11 06.4	+59.1	101.3	10 54.6	+59.3	101.5	10 42.6	+59.4	101.6	**9**
10	13 00.4	+58.0	100.0	12 49.9	+58.2	100.2	12 39.1	+58.5	100.4	12 28.1	+58.7	100.7	12 16.9	+58.9	100.9	12 05.5	+59.1	101.1	11 53.9	+59.2	101.3	11 42.0	+59.4	101.5	**10**
11	13 58.4	+57.9	99.7	13 48.1	+58.2	100.0	13 37.6	+58.4	100.2	13 26.8	+58.7	100.4	13 15.8	+58.9	100.7	13 04.6	+59.1	100.9	12 53.1	+59.3	101.1	12 41.4	+59.4	101.4	**11**
12	14 56.3	+57.9	99.5	14 46.3	+58.2	99.7	14 36.0	+58.5	100.0	14 25.5	+58.7	100.2	14 14.7	+58.9	100.5	14 03.7	+59.1	100.7	13 52.4	+59.2	101.0	13 40.8	+59.5	101.2	**12**
13	15 54.2	+57.9	99.2	15 44.5	+58.1	99.5	15 34.5	+58.4	99.7	15 24.2	+58.6	100.0	15 13.6	+58.9	100.3	15 02.8	+59.0	100.5	14 51.6	+59.3	100.8	14 40.3	+59.4	101.1	**13**
14	16 52.1	+57.9	98.9	16 42.6	+58.2	99.2	16 32.9	+58.4	99.5	16 22.8	+58.7	99.8	16 12.5	+58.8	100.1	16 01.8	+59.1	100.4	15 50.9	+59.2	100.6	15 39.7	+59.4	100.9	**14**
15	17 50.0	+57.8	98.6	17 40.8	+58.1	98.9	17 31.3	+58.4	99.3	17 21.5	+58.6	99.6	17 11.3	+58.9	99.9	17 00.9	+59.0	100.2	16 50.1	+59.3	100.5	16 39.1	+59.4	100.8	**15**
16	18 47.8	+57.8	98.4	18 38.9	+58.1	98.7	18 29.7	+58.3	99.0	18 20.1	+58.6	99.3	18 10.2	+58.8	99.7	17 59.9	+59.1	100.0	17 49.4	+59.2	100.3	17 38.5	+59.3	100.6	**16**
17	19 45.6	+57.8	98.1	19 37.0	+58.1	98.4	19 28.0	+58.4	98.8	19 18.7	+58.6	99.1	19 09.0	+58.8	99.5	18 59.0	+59.0	99.8	18 48.6	+59.2	100.1	18 37.8	+59.4	100.5	**17**
18	20 43.4	+57.8	97.8	20 35.1	+58.0	98.2	20 26.4	+58.3	98.5	20 17.3	+58.6	98.9	20 07.8	+58.8	99.3	19 58.0	+59.0	99.6	19 47.8	+59.2	100.0	19 37.2	+59.4	100.3	**18**
19	21 41.2	+57.7	97.5	21 33.1	+58.1	97.9	21 24.7	+58.3	98.3	21 15.9	+58.5	98.7	21 06.6	+58.8	99.0	20 57.0	+59.0	99.4	20 47.0	+59.2	99.8	20 36.6	+59.3	100.2	**19**
20	22 38.9	+57.7	97.2	22 31.2	+58.0	97.6	22 23.0	+58.3	98.0	22 14.4	+58.6	98.4	22 05.4	+58.8	98.8	21 56.0	+59.0	99.2	21 46.2	+59.2	99.6	21 35.9	+59.4	100.0	**20**
21	23 36.6	+57.7	96.9	23 29.2	+57.9	97.3	23 21.3	+58.2	97.8	23 13.0	+58.5	98.2	23 04.2	+58.8	98.6	22 55.0	+59.0	99.0	22 45.4	+59.1	99.4	22 35.3	+59.3	99.9	**21**
22	24 34.3	+57.6	96.6	24 27.1	+58.0	97.1	24 19.5	+58.3	97.5	24 11.5	+58.5	97.9	24 03.0	+58.7	98.4	23 54.0	+58.9	98.8	23 44.5	+59.2	99.3	23 34.6	+59.4	99.7	**22**
23	25 31.9	+57.6	96.3	25 25.1	+57.9	96.8	25 17.8	+58.2	97.2	25 10.0	+58.4	97.7	25 01.7	+58.7	98.2	24 52.9	+59.0	98.6	24 43.7	+59.1	99.1	24 34.0	+59.3	99.5	**23**
24	26 29.5	+57.5	96.0	26 23.0	+57.9	96.5	26 16.0	+58.1	97.0	26 08.4	+58.5	97.5	26 00.4	+58.7	97.9	25 51.9	+58.9	98.4	25 42.8	+59.2	98.9	25 33.3	+59.3	99.4	**24**
25	27 27.0	+57.5	95.7	27 20.9	+57.8	96.2	27 14.1	+58.2	96.7	27 06.9	+58.4	97.2	26 59.1	+58.7	97.7	26 50.8	+58.9	98.2	26 42.0	+59.1	98.7	26 32.6	+59.3	99.2	**25**
26	28 24.5	+57.5	95.3	28 18.7	+57.8	95.9	28 12.3	+58.1	96.4	28 05.3	+58.4	96.9	27 57.8	+58.6	97.5	27 49.7	+58.9	98.0	27 41.1	+59.1	98.5	27 31.9	+59.3	99.0	**26**
27	29 22.0	+57.4	95.0	29 16.5	+57.7	95.6	29 10.4	+58.0	96.1	29 03.7	+58.3	96.7	28 56.4	+58.6	97.2	28 48.6	+58.8	97.8	28 40.2	+59.0	98.3	28 31.2	+59.3	98.9	**27**
28	30 19.4	+57.4	94.7	30 14.2	+57.7	95.3	30 08.4	+58.0	95.8	30 02.0	+58.3	96.4	29 55.0	+58.6	97.0	29 47.4	+58.9	97.6	29 39.2	+59.1	98.1	29 30.5	+59.2	98.7	**28**
29	31 16.8	+57.3	94.3	31 11.9	+57.7	94.9	31 06.4	+58.0	95.5	31 00.3	+58.3	96.1	30 53.6	+58.6	96.7	30 46.3	+58.8	97.3	30 38.3	+59.0	97.9	30 29.7	+59.3	98.5	**29**
30	32 14.1	+57.2	94.0	32 09.6	+57.6	94.6	32 04.4	+58.0	95.2	31 58.6	+58.3	95.9	31 52.2	+58.5	96.5	31 45.1	+58.8	97.1	31 37.3	+59.1	97.7	31 29.0	+59.2	98.3	**30**
31	33 11.3	+57.2	93.6	33 07.2	+57.5	94.3	33 02.4	+57.8	94.9	32 56.9	+58.2	95.6	32 50.7	+58.5	96.2	32 43.9	+58.7	96.9	32 36.4	+59.0	97.5	32 28.2	+59.2	98.1	**31**
32	34 08.5	+57.1	93.3	34 04.7	+57.5	93.9	34 00.2	+57.9	94.6	33 55.1	+58.1	95.3	33 49.2	+58.5	96.0	33 42.6	+58.8	96.6	33 35.4	+58.9	97.3	33 27.4	+59.2	97.9	**32**
33	35 05.6	+57.0	92.9	35 02.2	+57.4	93.6	34 58.1	+57.8	94.3	34 53.2	+58.1	95.0	34 47.7	+58.4	95.7	34 41.4	+58.7	96.4	34 34.3	+59.0	97.1	34 26.6	+59.2	97.7	**33**
34	36 02.6	+57.0	92.5	35 59.6	+57.4	93.2	35 55.9	+57.7	94.0	35 51.3	+58.1	94.7	35 46.1	+58.4	95.4	35 40.1	+58.6	96.1	35 33.3	+58.9	96.8	35 25.8	+59.1	97.5	**34**
35	36 59.6	+56.9	92.1	36 57.0	+57.3	92.9	36 53.6	+57.7	93.6	36 49.4	+58.0	94.4	36 44.5	+58.3	95.1	36 38.7	+58.7	95.9	36 32.2	+58.9	96.6	36 24.9	+59.2	97.3	**35**
36	37 56.5	+56.8	91.7	37 54.3	+57.2	92.5	37 51.3	+57.6	93.3	37 47.4	+58.0	94.0	37 42.8	+58.3	94.8	37 37.4	+58.6	95.6	37 31.1	+58.9	96.4	37 24.1	+59.1	97.1	**36**
37	38 53.3	+56.7	91.3	38 51.5	+57.2	92.1	38 48.9	+57.5	92.9	38 45.4	+57.9	93.7	38 41.1	+58.2	94.5	38 36.0	+58.5	95.3	38 30.0	+58.8	96.1	38 23.2	+59.1	96.9	**37**
38	39 50.0	+56.7	90.9	39 48.7	+57.0	91.7	39 46.4	+57.5	92.6	39 43.3	+57.9	93.4	39 39.3	+58.2	94.2	39 34.5	+58.5	95.0	39 28.8	+58.8	95.9	39 22.3	+59.0	96.7	**38**
39	40 46.7	+56.5	90.5	40 45.7	+57.0	91.3	40 43.9	+57.4	92.2	40 41.2	+57.8	93.0	40 37.5	+58.2	93.9	40 33.0	+58.5	94.7	40 27.6	+58.8	95.6	40 21.3	+59.0	96.4	**39**
40	41 43.2	+56.4	90.0	41 42.7	+56.9	90.9	41 41.3	+57.3	91.8	41 39.0	+57.7	92.7	41 35.7	+58.1	93.6	41 31.5	+58.4	94.4	41 26.4	+58.7	95.3	41 20.3	+59.0	96.2	**40**
41	42 39.6	+56.3	89.5	42 39.6	+56.8	90.5	42 38.6	+57.2	91.4	42 36.7	+57.6	92.3	42 33.8	+58.0	93.2	42 29.9	+58.4	94.1	42 25.1	+58.7	95.1	42 19.3	+59.0	96.0	**41**
42	43 35.9	+56.2	89.1	43 36.4	+56.6	90.0	43 35.8	+57.2	91.0	43 34.3	+57.6	91.9	43 31.8	+58.0	92.9	43 28.3	+58.3	93.8	43 23.8	+58.6	94.8	43 18.3	+58.9	95.7	**42**
43	44 32.1	+56.0	88.6	44 33.0	+56.6	89.6	44 33.0	+57.0	90.6	44 31.9	+57.5	91.5	44 29.8	+57.9	92.5	44 26.6	+58.3	93.5	44 22.4	+58.6	94.5	44 17.2	+58.9	95.5	**43**
44	45 28.1	+55.9	88.1	45 29.6	+56.5	89.1	45 30.0	+57.0	90.1	45 29.4	+57.4	91.1	45 27.7	+57.8	92.1	45 24.9	+58.2	93.2	45 21.0	+58.6	94.2	45 16.1	+58.9	95.2	**44**
45	46 24.0	+55.8	87.6	46 26.1	+56.3	88.6	46 27.0	+56.8	89.7	46 26.8	+57.3	90.7	46 25.5	+57.7	91.8	46 23.1	+58.1	92.8	46 19.6	+58.5	93.9	46 15.0	+58.8	94.9	**45**
46	47 19.8	+55.6	87.0	47 22.4	+56.1	88.1	47 23.8	+56.7	89.2	47 24.1	+57.2	90.3	47 23.2	+57.7	91.4	47 21.2	+58.1	92.5	47 18.1	+58.4	93.5	47 13.8	+58.8	94.6	**46**
47	48 15.4	+55.5	86.5	48 18.5	+56.1	87.6	48 20.5	+56.6	88.7	48 21.3	+57.0	89.8	48 20.9	+57.5	91.0	48 19.3	+58.0	92.1	48 16.5	+58.4	93.2	48 12.6	+58.7	94.3	**47**
48	49 10.9	+55.2	85.9	49 14.6	+55.8	87.0	49 17.1	+56.4	88.2	49 18.3	+57.0	89.4	49 18.4	+57.5	90.5	49 17.3	+57.9	91.7	49 14.9	+58.3	92.8	49 11.3	+58.7	94.0	**48**
49	50 06.1	+55.1	85.3	50 10.4	+55.7	86.5	50 13.5	+56.3	87.7	50 15.3	+56.9	88.9	50 15.9	+57.3	90.1	50 15.2	+57.8	91.3	50 13.2	+58.2	92.5	50 10.0	+58.6	93.7	**49**
50	51 01.2	+54.9	84.7	51 06.1	+55.6	85.9	51 09.8	+56.1	87.1	51 12.2	+56.7	88.4	51 13.2	+57.3	89.6	51 13.0	+57.7	90.9	51 11.4	+58.2	92.1	51 08.6	+58.5	93.3	**50**
51	51 56.1	+54.6	84.0	52 01.7	+55.3	85.3	52 05.9	+56.0	86.6	52 08.9	+56.5	87.8	52 10.5	+57.1	89.1	52 10.7	+57.6	90.4	52 09.6	+58.1	91.7	52 07.1	+58.5	93.0	**51**
52	52 50.7	+54.4	83.3	52 57.0	+55.1	84.6	53 01.9	+55.8	86.0	53 05.4	+56.4	87.3	53 07.6	+56.9	88.6	53 08.3	+57.5	90.0	53 07.7	+57.9	91.3	53 05.6	+58.4	92.6	**52**
53	53 45.1	+54.1	82.6	53 52.1	+54.9	84.0	53 57.7	+55.6	85.3	54 01.8	+56.3	86.7	54 04.5	+56.9	88.1	54 05.8	+57.4	89.5	54 05.6	+57.9	90.9	54 04.0	+58.4	92.2	**53**
54	54 39.2	+53.9	81.9	54 47.0	+54.6	83.3	54 53.3	+55.3	84.7	54 58.1	+56.0	86.1	55 01.4	+56.7	87.5	55 03.2	+57.3	89.0	55 03.5	+57.8	90.4	55 02.4	+58.2	91.8	**54**
55	55 33.1	+53.5	81.1	55 41.6	+54.4	82.6	55 48.6	+55.1	84.0	55 54.1	+55.8	85.5	55 58.1	+56.5	87.0	56 00.5	+57.1	88.4	56 01.3	+57.7	89.9	56 00.6	+58.2	91.4	**55**
56	56 26.6	+53.3	80.3	56 36.0	+54.0	81.8	56 43.7	+54.9	83.3	56 49.9	+55.7	84.8	56 54.6	+56.3	86.4	56 57.6	+56.9	87.9	56 59.0	+57.5	89.4	56 58.8	+58.0	91.0	**56**
57	57 19.9	+52.8	79.5	57 30.0	+53.8	81.0	57 38.6	+54.6	82.6	57 45.6	+55.4	84.1	57 50.9	+56.1	85.7	57 54.5	+56.8	87.3	57 56.5	+57.4	88.9	57 56.8	+58.0	90.5	**57**
58	58 12.7	+52.5	78.6	58 23.8	+53.4	80.2	58 33.2	+54.3	81.8	58 41.0	+55.1	83.4	58 47.0	+55.9	85.0	58 51.3	+56.6	86.7	58 53.9	+57.3	88.3	58 54.8	+57.8	90.0	**58**
59	59 05.2	+52.1	77.6	59 17.2	+53.0	79.3	59 27.5	+54.0	81.0	59 36.1	+54.8	82.6	59 42.9	+55.6	84.3	59 47.9	+56.4	86.0	59 51.2	+57.1	87.8	59 52.6	+57.7	89.5	**59**
60	59 57.3	+51.6	76.7	60 10.2	+52.7	78.4	60 21.5	+53.6	80.1	60 30.9	+54.5	81.8	60 38.5	+55.4	83.6	60 44.3	+56.2	85.4	60 48.3	+56.9	87.1	60 50.3	+57.6	88.9	**60**
61	60 48.9	+51.1	75.6	61 02.9	+52.1	77.4	61 15.1	+53.2	79.2	61 25.4	+54.2	81.0	61 33.9	+55.1	82.8	61 40.5	+55.9	84.6	61 45.2	+56.7	86.5	61 47.9	+57.4	88.3	**61**
62	61 40.0	+50.5	74.5	61 55.0	+51.7	76.3	62 08.3	+52.7	78.2	62 19.6	+53.8	80.0	62 29.0	+54.8	81.9	62 36.4	+55.7	83.8	62 41.9	+56.4	85.8	62 45.3	+57.2	87.7	**62**
63	62 30.5	+49.9	73.4	62 46.7	+51.2	75.3	63 01.0	+52.3	77.1	63 13.4	+53.4	79.1	63 23.8	+54.4	81.0	63 32.1	+55.3	83.0	63 38.3	+56.3	85.0	63 42.5	+57.0	87.0	**63**
64	63 20.4	+49.3	72.2	63 37.9	+50.5	74.1	63 53.3	+51.8	76.1	64 06.8	+52.9	78.0	64 18.2	+54.0	80.1	64 27.4	+55.0	82.1	64 34.6	+55.9	84.2	64 39.5	+56.8	86.3	**64**
65	64 09.7	+48.6	70.9	64 28.4	+49.9	72.9	64 45.1	+51.1	74.9	64 59.7	+52.4	77.0	65 12.2	+53.5	79.1	65 22.4	+54.7	81.2	65 30.5	+55.6	83.4	65 36.3	+56.5	85.6	**65**
66	64 58.3	+47.8	69.5	65 18.3	+49.2	71.5	65 36.2	+50.6	73.6	65 52.1	+51.8	75.8	66 05.7	+53.1	78.0	66 17.1	+54.2	80.2	66 26.1	+55.3	82.4	66 32.8	+56.3	84.7	**66**
67	65 46.1	+46.8	68.1	66 07.5	+48.3	70.2	66 26.8	+49.8	72.3	66 43.9	+51.2	74.5	66 58.8	+52.5	76.8	67 11.3	+53.7	79.1	67 21.4	+54.9	81.5	67 29.1	+55.9	83.8	**67**
68	66 32.9	+46.0	66.5	66 55.8	+47.5	68.7	67 16.6	+48.9	70.9	67 35.1	+50.4	73.2	67 51.3	+51.8	75.5	68 05.0	+53.2	77.9	68 16.3	+54.5	80.4	68 25.0	+55.6	82.9	**68**
69	67 18.9	+44.8	64.9	67 43.3	+46.5	67.1	68 05.5	+48.1	69.4	68 25.5	+49.7	71.7	68 43.1	+51.2	74.2	68 58.2	+52.6	76.7	69 10.8	+53.9	79.2	69 20.6	+55.2	81.8	**69**
70	68 03.7	+43.7	63.1	68 29.8	+45.3	65.4	68 53.6	+47.1	67.7	69 15.2	+48.7	70.2	69 34.3	+50.4	72.7	69 50.8	+51.9	75.3	70 04.7	+53.4	78.0	70 15.8	+54.7	80.7	**70**
71	68 47.4	+42.3	61.3	69 15.1	+44.2	63.6	69 40.7	+46.0	66.0	70 03.9	+47.8	68.5	70 24.7	+49.4	71.1	70 42.7	+51.2	73.8	70 58.1	+52.7	76.6	71 10.5	+54.2	79.5	**71**
72	69 29.7	+40.9	59.3	69 59.3	+42.8	61.6	70 26.7	+44.7	64.1	70 51.7	+46.5	66.7	71 14.1	+48.4	69.4	71 33.9	+50.2	72.2	71 50.8	+51.9	75.1	72 04.7	+53.5	78.1	**72**
73	70 10.6	+39.3	57.1	70 42.1	+41.3	59.5	71 11.4	+43.2	62.1	71 38.2	+45.3	64.7	72 02.5	+47.3	67.5	72 24.1	+49.2	70.4	72 42.7	+51.0	73.5	72 58.2	+52.8	76.6	**73**
74	70 49.9	+37.5	54.9	71 23.4	+39.5	57.3	71 54.6	+41.7	59.9	72 23.5	+43.8	62.6	72 49.8	+45.9	65.5	73 13.3	+47.9	68.5	73 33.7	+50.0	71.6	73 51.0	+51.9	74.9	**74**
75	71 27.4	*+35.5* •	52.5	72 02.9	+37.7	54.9	72 36.3	+39.9	57.5	73 07.3	+42.1	60.3	73 35.7	+44.3	63.2	74 01.2	+46.6	66.4	74 23.7	+48.8	69.6	74 42.9	+50.9	73.1	**75**
76	72 02.9	*+33.4* •	49.9	72 40.6	*+35.6* •	52.3	73 16.2	*+37.8* •	55.0	73 49.4	*+40.2* •	57.8	74 20.0	+42.6	60.8	74 47.8	+45.0	64.0	75 12.5	+47.4	67.4	75 33.8	+49.7	71.0	**76**
77	72 36.3	*+31.0* •	47.2	73 16.2	*+33.2* •	49.6	73 54.0	*+35.6* •	52.2	74 29.6	*+38.0* •	55.1	75 02.6	*+40.6* •	58.1	75 32.8	*+43.2* •	61.4	75 59.9	+45.7	64.9	76 23.5	+48.3	68.7	**77**
78	73 07.3	*+28.4* •	44.2	73 49.4	*+30.6* •	46.6	74 29.6	*+33.0* •	49.3	75 07.6	*+35.6* •	52.1	75 43.2	*+38.2* •	55.2	76 16.0	*+40.9* •	58.6	76 45.6	*+43.8* •	62.2	77 11.8	+46.6	66.1	**78**
79	73 35.7	*+25.5* •	41.2	74 20.0	*+27.8* •	43.5	75 02.6	*+30.2* •	46.1	75 43.2	*+32.8* •	48.9	76 21.4	*+35.5* •	52.0	76 56.9	*+38.4* •	55.4	77 29.4	*+41.4* •	59.1	77 58.4	*+44.4* •	63.2	**79**
80	74 01.2	*+22.5* •	37.9	74 47.8	*+24.7* •	40.2	75 32.8	*+27.1* •	42.7	76 16.0	*+29.6* •	45.5	76 56.9	*+32.5* •	48.5	77 35.3	*+35.5* •	51.9	78 10.8	*+38.6* •	55.7	78 42.8	*+41.9* •	59.8	**80**
81	74 23.7	*+19.2* •	34.5	75 12.5	*+21.3* •	36.7	75 59.9	*+23.6* •	39.1	76 45.6	*+26.2* •	41.7	77 29.4	*+29.0* •	44.7	78 10.8	*+32.0* •	48.1	78 49.4	*+35.3* •	51.8	79 24.7	*+38.9* •	56.1	**81**
82	74 42.9	*+15.7* •	31.0	75 33.8	*+17.7* •	33.0	76 23.5	*+19.9* •	35.2	77 11.8	*+22.3* •	37.7	77 58.4	*+25.0* •	40.6	78 42.8	*+28.1* •	43.9	79 24.7	*+31.5* •	47.6	80 03.6	*+35.1* •	51.8	**82**
83	74 58.6	*+12.0* •	27.3	75 51.5	*+13.8* •	29.1	76 43.4	*+15.9* •	31.1	77 34.1	*+18.2* •	33.5	78 23.4	*+20.7* •	36.2	79 10.9	*+23.7* •	39.2	79 56.2	*+27.0* •	42.8	80 38.7	*+30.8* •	46.9	**83**
84	75 10.6	*+8.2* •	23.5	76 05.3	*+9.8* •	25.1	76 59.3	*+11.5* •	26.9	77 52.3	*+13.6* •	29.0	78 44.1	*+16.0* •	31.4	79 34.6	*+18.6* •	34.3	80 23.2	*+21.8* •	37.6	81 09.5	*+25.5* •	41.5	**84**
85	75 18.8	*+4.2* •	19.6	76 15.1	*+5.5* •	20.9	77 10.8	*+7.1* •	22.5	78 05.9	*+8.8* •	24.3	79 00.1	*+10.9* •	26.4	79 53.2	*+13.3* •	28.9	80 45.0	*+16.1* •	31.9	81 35.0	*+19.4* •	35.5	**85**
86	75 23.0	*+0.2* •	15.6	76 20.6	*+1.3* •	16.7	77 17.9	*+2.4* •	18.0	78 14.7	*+3.8* •	19.5	79 11.0	*+5.4* •	21.2	80 06.5	*+7.4* •	23.3	81 01.1	*+9.7* •	25.8	81 54.4	*+12.6* •	28.9	**86**
87	75 23.2	*−3.8* •	11.7	76 21.9	*−3.1* •	12.5	77 20.3	*−2.2* •	13.5	78 18.5	*−1.2* •	14.6	79 16.4	*0.0* •	15.9	80 13.9	*+1.4* •	17.5	81 10.8	*+3.1* •	19.4	82 07.0	*+5.2* •	21.8	**87**
88	75 19.4	*−7.8* •	7.7	76 18.8	*−7.3* •	8.3	77 18.1	*−6.8* •	8.9	78 17.3	*−6.2* •	9.6	79 16.4	*−5.5* •	10.5	80 15.3	*−4.7* •	11.6	81 13.9	*−3.6* •	12.9	82 12.2	*−2.3* •	14.5	**88**
89	75 11.6	*−11.6* •	3.8	76 11.5	*−11.5* •	4.1	77 11.3	*−11.3* •	4.4	78 11.1	*−11.1* •	4.8	79 10.9	*−10.9* •	5.2	80 10.6	*−10.6* •	5.7	81 10.3	*−10.3* •	6.4	82 09.9	*−9.9* •	7.2	**89**
90	75 00.0	*−15.3* •	0.0	76 00.0	*−15.5* •	0.0	77 00.0	*−15.6* •	0.0	78 00.0	*−15.8* •	0.0	79 00.0	*−16.0* •	0.0	80 00.0	*−16.2* •	0.0	81 00.0	*−16.6* •	0.0	82 00.0	*−16.9* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 77°, 283°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec. °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Dec. °
0	3 20.3	–58.1	102.6	3 07.2	–58.3	102.6	2 54.0	–58.5	102.7	2 40.8	–58.7	102.7	2 27.6	–58.9	102.8	2 14.3	–59.1	102.8	2 01.0	–59.3	102.8	1 47.6	–59.4	102.9	**0**
1	2 22.2	–58.0	102.8	2 08.9	–58.3	102.9	1 55.5	–58.5	102.9	1 42.1	–58.8	102.9	1 28.7	–59.0	103.0	1 15.2	–59.1	103.0	1 01.7	–59.3	103.0	0 48.2	–59.4	103.0	**1**
2	1 24.2	–58.1	103.1	1 10.6	–58.3	103.1	0 57.0	–58.6	103.1	0 43.3	–58.7	103.1	0 29.7	–59.0	103.1	0 16.1	–59.2	103.1	0 02.4	–59.3	103.2	0 11.2	+59.5	76.9	**2**
3	0 26.1	–58.1	103.3	0 12.3	–58.4	103.3	0 01.6	+58.5	76.7	0 15.4	+58.8	76.7	0 29.3	+58.9	76.7	0 43.1	+59.1	76.7	0 56.9	+59.3	76.7	1 10.7	+59.4	76.7	**3**
4	0 32.0	+58.0	76.4	0 46.1	+58.3	76.4	1 00.1	+58.6	76.4	1 14.2	+58.7	76.5	1 28.2	+59.0	76.5	1 42.2	+59.2	76.5	1 56.2	+59.3	76.5	2 10.1	+59.5	76.6	**4**
5	1 30.0	+58.1	76.2	1 44.4	+58.3	76.2	1 58.7	+58.5	76.2	2 12.9	+58.8	76.3	2 27.2	+58.9	76.3	2 41.4	+59.1	76.3	2 55.5	+59.3	76.4	3 09.6	+59.4	76.4	**5**
6	2 28.1	+58.0	75.9	2 42.7	+58.3	76.0	2 57.2	+58.5	76.0	3 11.7	+58.7	76.1	3 26.1	+59.0	76.1	3 40.5	+59.1	76.2	3 54.8	+59.3	76.2	4 09.0	+59.5	76.3	**6**
7	3 26.1	+58.1	75.7	3 41.0	+58.3	75.7	3 55.7	+58.6	75.8	4 10.4	+58.8	75.9	4 25.1	+58.9	75.9	4 39.6	+59.1	76.0	4 54.1	+59.3	76.1	5 08.5	+59.4	76.2	**7**
8	4 24.2	+58.0	75.4	4 39.3	+58.3	75.5	4 54.3	+58.5	75.6	5 09.2	+58.7	75.7	5 24.0	+59.0	75.7	5 38.7	+59.2	75.8	5 53.4	+59.3	75.9	6 07.9	+59.4	76.0	**8**
9	5 22.2	+58.1	75.2	5 37.6	+58.3	75.2	5 52.8	+58.5	75.3	6 07.9	+58.8	75.4	6 23.0	+58.9	75.6	6 37.9	+59.1	75.7	6 52.7	+59.3	75.8	7 07.3	+59.5	75.9	**9**
10	6 20.3	+58.0	74.9	6 35.9	+58.2	75.0	6 51.3	+58.5	75.1	7 06.7	+58.7	75.2	7 21.9	+58.9	75.4	7 37.0	+59.1	75.5	7 52.0	+59.2	75.6	8 06.8	+59.4	75.8	**10**
11	7 18.3	+58.0	74.6	7 34.1	+58.3	74.8	7 49.8	+58.5	74.9	8 05.4	+58.7	75.0	8 20.8	+59.0	75.2	8 36.1	+59.1	75.3	8 51.2	+59.3	75.5	9 06.2	+59.4	75.6	**11**
12	8 16.3	+58.1	74.4	8 32.4	+58.3	74.5	8 48.3	+58.5	74.7	9 04.1	+58.7	74.8	9 19.8	+58.9	75.0	9 35.2	+59.1	75.1	9 50.5	+59.3	75.3	10 05.6	+59.5	75.5	**12**
13	9 14.4	+58.0	74.1	9 30.7	+58.2	74.3	9 46.8	+58.5	74.5	10 02.8	+58.8	74.6	10 18.7	+58.9	74.8	10 34.3	+59.1	75.0	10 49.8	+59.3	75.2	11 05.1	+59.4	75.3	**13**
14	10 12.4	+57.9	73.9	10 28.9	+58.3	74.0	10 45.3	+58.5	74.2	11 01.6	+58.7	74.4	11 17.6	+58.9	74.6	11 33.4	+59.1	74.8	11 49.1	+59.2	75.0	12 04.5	+59.4	75.2	**14**
15	11 10.3	+58.0	73.6	11 27.2	+58.2	73.8	11 43.8	+58.5	74.0	12 00.3	+58.7	74.2	12 16.5	+58.9	74.4	12 32.5	+59.1	74.6	12 48.3	+59.3	74.8	13 03.9	+59.4	75.1	**15**
16	12 08.3	+58.0	73.3	12 25.4	+58.2	73.6	12 42.3	+58.5	73.8	12 59.0	+58.6	74.0	13 15.4	+58.9	74.2	13 31.6	+59.1	74.4	13 47.6	+59.2	74.7	14 03.3	+59.4	74.9	**16**
17	13 06.3	+57.9	73.1	13 23.6	+58.2	73.3	13 40.8	+58.4	73.5	13 57.6	+58.7	73.8	14 14.3	+58.9	74.0	14 30.7	+59.1	74.3	14 46.8	+59.3	74.5	15 02.7	+59.4	74.8	**17**
18	14 04.2	+58.0	72.8	14 21.8	+58.2	73.1	14 39.2	+58.4	73.3	14 56.3	+58.7	73.6	15 13.2	+58.8	73.8	15 29.8	+59.0	74.1	15 46.1	+59.2	74.3	16 02.1	+59.4	74.6	**18**
19	15 02.2	+57.9	72.5	15 20.0	+58.2	72.8	15 37.6	+58.5	73.1	15 55.0	+58.6	73.3	16 12.0	+58.9	73.6	16 28.8	+59.1	73.9	16 45.3	+59.3	74.2	17 01.5	+59.4	74.5	**19**
20	16 00.1	+57.9	72.3	16 18.2	+58.2	72.5	16 36.1	+58.4	72.8	16 53.6	+58.7	73.1	17 10.9	+58.8	73.4	17 27.9	+59.0	73.7	17 44.6	+59.2	74.0	18 00.9	+59.4	74.3	**20**
21	16 58.0	+57.8	72.0	17 16.4	+58.1	72.3	17 34.5	+58.3	72.6	17 52.3	+58.6	72.9	18 09.7	+58.9	73.2	18 26.9	+59.1	73.5	18 43.8	+59.2	73.8	19 00.3	+59.4	74.2	**21**
22	17 55.8	+57.9	71.7	18 14.5	+58.1	72.0	18 32.8	+58.4	72.3	18 50.9	+58.6	72.7	19 08.6	+58.8	73.0	19 26.0	+59.0	73.3	19 43.0	+59.2	73.7	19 59.7	+59.4	74.0	**22**
23	18 53.7	+57.8	71.4	19 12.6	+58.1	71.8	19 31.2	+58.3	72.1	19 49.5	+58.6	72.4	20 07.4	+58.8	72.8	20 25.0	+59.0	73.1	20 42.2	+59.2	73.5	20 59.1	+59.3	73.9	**23**
24	19 51.5	+57.8	71.2	20 10.7	+58.0	71.5	20 29.5	+58.4	71.9	20 48.1	+58.5	72.2	21 06.2	+58.8	72.6	21 24.0	+59.0	72.9	21 41.4	+59.2	73.3	21 58.4	+59.4	73.7	**24**
25	20 49.3	+57.7	70.9	21 08.7	+58.1	71.2	21 27.9	+58.3	71.6	21 46.6	+58.6	72.0	22 05.0	+58.8	72.4	22 23.0	+59.0	72.8	22 40.6	+59.1	73.1	22 57.8	+59.3	73.6	**25**
26	21 47.0	+57.8	70.6	22 06.8	+58.0	71.0	22 26.2	+58.2	71.3	22 45.2	+58.5	71.7	23 03.8	+58.7	72.1	23 22.0	+58.9	72.6	23 39.7	+59.2	73.0	23 57.1	+59.3	73.4	**26**
27	22 44.8	+57.7	70.3	23 04.8	+58.0	70.7	23 24.4	+58.3	71.1	23 43.7	+58.5	71.5	24 02.5	+58.7	71.9	24 20.9	+59.0	72.4	24 38.9	+59.1	72.8	24 56.4	+59.4	73.2	**27**
28	23 42.5	+57.6	70.0	24 02.8	+57.9	70.4	24 22.7	+58.2	70.8	24 42.2	+58.5	71.3	25 01.2	+58.8	71.7	25 19.9	+58.9	72.1	25 38.0	+59.2	72.6	25 55.8	+59.3	73.1	**28**
29	24 40.1	+57.6	69.7	25 00.7	+58.0	70.1	25 20.9	+58.2	70.6	25 40.7	+58.4	71.0	26 00.0	+58.7	71.5	26 18.8	+58.9	71.9	26 37.2	+59.1	72.4	26 55.1	+59.3	72.9	**29**
30	25 37.7	+57.6	69.4	25 58.7	+57.8	69.8	26 19.1	+58.2	70.3	26 39.1	+58.4	70.8	26 58.7	+58.6	71.2	27 17.7	+58.9	71.7	27 36.3	+59.1	72.2	27 54.4	+59.2	72.7	**30**
31	26 35.3	+57.6	69.1	26 56.5	+57.9	69.5	27 17.3	+58.1	70.0	27 37.5	+58.4	70.5	27 57.3	+58.7	71.0	28 16.6	+58.9	71.5	28 35.4	+59.1	72.0	28 53.6	+59.3	72.5	**31**
32	27 32.9	+57.5	68.7	27 54.4	+57.8	69.2	28 15.4	+58.1	69.7	28 35.9	+58.4	70.2	28 56.0	+58.6	70.8	29 15.5	+58.8	71.3	29 34.5	+59.0	71.8	29 52.9	+59.3	72.4	**32**
33	28 30.4	+57.4	68.4	28 52.2	+57.7	68.9	29 13.5	+58.1	69.5	29 34.3	+58.3	70.0	29 54.6	+58.6	70.5	30 14.3	+58.9	71.1	30 33.5	+59.1	71.6	30 52.2	+59.2	72.2	**33**
34	29 27.8	+57.4	68.1	29 49.9	+57.8	68.6	30 11.6	+58.0	69.2	30 32.6	+58.3	69.7	30 53.2	+58.5	70.3	31 13.2	+58.8	70.8	31 32.6	+59.0	71.4	31 51.4	+59.2	72.0	**34**
35	30 25.2	+57.4	67.8	30 47.7	+57.6	68.3	31 09.6	+58.0	68.9	31 30.9	+58.3	69.4	31 51.7	+58.6	70.0	32 12.0	+58.7	70.6	32 31.6	+59.0	71.2	32 50.6	+59.2	71.8	**35**
36	31 22.6	+57.3	67.4	31 45.3	+57.7	68.0	32 07.6	+57.9	68.6	32 29.2	+58.2	69.2	32 50.3	+58.5	69.8	33 10.7	+58.8	70.4	33 30.6	+59.0	71.0	33 49.8	+59.2	71.6	**36**
37	32 19.9	+57.2	67.1	32 43.0	+57.5	67.7	33 05.5	+57.9	68.3	33 27.4	+58.2	68.9	33 48.8	+58.4	69.5	34 09.5	+58.7	70.1	34 29.6	+58.9	70.8	34 49.0	+59.2	71.4	**37**
38	33 17.1	+57.2	66.7	33 40.5	+57.5	67.3	34 03.4	+57.8	67.9	34 25.6	+58.1	68.6	34 47.2	+58.4	69.2	35 08.2	+58.7	69.9	35 28.5	+58.9	70.5	35 48.2	+59.1	71.2	**38**
39	34 14.3	+57.1	66.3	34 38.0	+57.5	67.0	35 01.2	+57.8	67.6	35 23.7	+58.1	68.3	35 45.6	+58.4	68.9	36 06.9	+58.6	69.6	36 27.4	+58.9	70.3	36 47.3	+59.1	71.0	**39**
40	35 11.4	+57.0	66.0	35 35.5	+57.4	66.6	35 59.0	+57.7	67.3	36 21.8	+58.1	68.0	36 44.0	+58.4	68.6	37 05.5	+58.6	69.3	37 26.3	+58.9	70.1	37 46.4	+59.1	70.8	**40**
41	36 08.4	+57.0	65.6	36 32.9	+57.3	66.3	36 56.7	+57.7	66.9	37 19.9	+58.0	67.6	37 42.4	+58.3	68.4	38 04.1	+58.6	69.1	38 25.2	+58.8	69.8	38 45.5	+59.1	70.6	**41**
42	37 05.4	+56.9	65.2	37 30.2	+57.3	65.9	37 54.4	+57.6	66.6	38 17.9	+57.9	67.3	38 40.7	+58.2	68.1	39 02.7	+58.6	68.8	39 24.0	+58.9	69.6	39 44.6	+59.1	70.3	**42**
43	38 02.3	+56.8	64.8	38 27.5	+57.2	65.5	38 52.0	+57.5	66.2	39 15.8	+57.9	67.0	39 38.9	+58.2	67.7	40 01.3	+58.5	68.5	40 22.9	+58.7	69.3	40 43.7	+59.0	70.1	**43**
44	38 59.1	+56.7	64.4	39 24.7	+57.1	65.1	39 49.5	+57.5	65.9	40 13.7	+57.8	66.6	40 37.1	+58.2	67.4	40 59.8	+58.4	68.2	41 21.6	+58.8	69.0	41 42.7	+59.0	69.9	**44**
45	39 55.8	+56.6	64.0	40 21.8	+57.0	64.7	40 47.0	+57.4	65.5	41 11.5	+57.8	66.3	41 35.3	+58.0	67.1	41 58.2	+58.4	67.9	42 20.4	+58.6	68.8	42 41.7	+58.9	69.6	**45**
46	40 52.4	+56.5	63.5	41 18.8	+56.9	64.3	41 44.4	+57.3	65.1	42 09.3	+57.6	65.9	42 33.3	+58.1	66.8	42 56.6	+58.4	67.6	43 19.0	+58.7	68.5	43 40.6	+58.9	69.4	**46**
47	41 48.9	+56.4	63.1	42 15.7	+56.8	63.9	42 41.7	+57.2	64.7	43 06.9	+57.7	65.6	43 31.4	+57.9	66.4	43 55.0	+58.2	67.3	44 17.7	+58.6	68.2	44 39.5	+58.9	69.1	**47**
48	42 45.3	+56.3	62.6	43 12.5	+56.7	63.4	43 38.9	+57.2	64.3	44 04.6	+57.5	65.2	44 29.3	+57.9	66.1	44 53.2	+58.3	67.0	45 16.3	+58.5	67.9	45 38.4	+58.9	68.8	**48**
49	43 41.6	+56.2	62.1	44 09.2	+56.6	63.0	44 36.1	+57.0	63.9	45 02.1	+57.4	64.8	45 27.2	+57.8	65.7	45 51.5	+58.2	66.6	46 14.8	+58.5	67.6	46 37.3	+58.8	68.5	**49**
50	44 37.8	+56.0	61.7	45 05.8	+56.5	62.5	45 33.1	+56.9	63.4	45 59.5	+57.4	64.4	46 25.0	+57.8	65.3	46 49.7	+58.1	66.3	47 13.3	+58.5	67.2	47 36.1	+58.7	68.3	**50**
51	45 33.8	+55.9	61.1	46 02.3	+56.4	62.0	46 30.0	+56.9	63.0	46 56.9	+57.2	63.9	47 22.8	+57.6	64.9	47 47.8	+58.0	65.9	48 11.8	+58.4	66.9	48 34.8	+58.7	68.0	**51**
52	46 29.7	+55.8	60.6	46 58.7	+56.3	61.6	47 26.9	+56.7	62.5	47 54.1	+57.1	63.5	48 20.4	+57.6	64.5	48 45.8	+57.9	65.5	49 10.2	+58.3	66.6	49 33.5	+58.6	67.6	**52**
53	47 25.5	+55.6	60.1	47 55.0	+56.0	61.0	48 23.6	+56.5	62.0	48 51.2	+57.1	63.0	49 18.0	+57.4	64.1	49 43.7	+57.9	65.1	50 08.5	+58.2	66.2	50 32.1	+58.6	67.3	**53**
54	48 21.1	+55.4	59.5	48 51.0	+56.0	60.5	49 20.1	+56.5	61.5	49 48.3	+56.9	62.5	50 15.4	+57.4	63.6	50 41.6	+57.8	64.7	51 06.7	+58.2	65.8	51 30.7	+58.6	67.0	**54**
55	49 16.5	+55.2	58.9	49 47.0	+55.8	59.9	50 16.6	+56.2	61.0	50 45.2	+56.8	62.1	51 12.8	+57.2	63.1	51 39.4	+57.6	64.3	52 04.9	+58.1	65.4	52 29.3	+58.4	66.6	**55**
56	50 11.7	+55.1	58.3	50 42.8	+55.6	59.4	51 12.8	+56.2	60.4	51 42.0	+56.6	61.5	52 10.0	+57.1	62.7	52 37.0	+57.6	63.8	53 03.0	+57.9	65.0	53 27.7	+58.4	66.2	**56**
57	51 06.8	+54.8	57.7	51 38.4	+55.4	58.8	52 09.0	+55.9	59.9	52 38.6	+56.5	61.0	53 07.1	+57.0	62.2	53 34.6	+57.5	63.4	54 00.9	+57.9	64.6	54 26.1	+58.3	65.8	**57**
58	52 01.6	+54.6	57.1	52 33.8	+55.2	58.1	53 04.9	+55.8	59.3	53 35.1	+56.3	60.4	54 04.1	+56.9	61.6	54 32.1	+57.3	62.9	54 58.8	+57.8	64.1	55 24.4	+58.2	65.4	**58**
59	52 56.2	+54.4	56.4	53 29.0	+54.9	57.5	54 00.7	+55.6	58.7	54 31.4	+56.1	59.8	55 01.0	+56.6	61.1	55 29.4	+57.2	62.3	55 56.6	+57.7	63.7	56 22.6	+58.2	65.0	**59**
60	53 50.6	+54.1	55.7	54 23.9	+54.8	56.8	54 56.3	+55.3	58.0	55 27.5	+55.9	59.2	55 57.6	+56.5	60.5	56 26.6	+57.0	61.8	56 54.3	+57.6	63.2	57 20.8	+58.0	64.5	**60**
61	54 44.7	+53.8	54.9	55 18.7	+54.5	56.1	55 51.6	+55.1	57.3	56 23.4	+55.8	58.6	56 54.1	+56.4	59.9	57 23.6	+56.9	61.2	57 51.9	+57.4	62.6	58 18.8	+57.9	64.1	**61**
62	55 38.5	+53.5	54.1	56 13.2	+54.2	55.4	56 46.7	+54.9	56.6	57 19.2	+55.5	57.9	57 50.5	+56.1	59.3	58 20.5	+56.7	60.6	58 49.3	+57.2	62.1	59 16.7	+57.8	63.6	**62**
63	56 32.0	+53.2	53.3	57 07.4	+53.8	54.6	57 41.6	+54.6	55.9	58 14.7	+55.2	57.2	58 46.6	+55.9	58.6	59 17.2	+56.5	60.0	59 46.5	+57.1	61.5	60 14.5	+57.6	63.0	**63**
64	57 25.2	+52.9	52.5	58 01.2	+53.6	53.8	58 36.2	+54.2	55.1	59 09.9	+55.0	56.4	59 42.5	+55.6	57.9	60 13.7	+56.3	59.3	60 43.6	+57.0	60.9	61 12.1	+57.5	62.5	**64**
65	58 18.1	+52.4	51.6	58 54.8	+53.2	52.9	59 30.4	+54.0	54.2	60 04.9	+54.7	55.7	60 38.1	+55.4	57.1	61 10.0	+56.1	58.6	61 40.6	+56.7	60.2	62 09.6	+57.3	61.9	**65**
66	59 10.5	+52.0	50.7	59 48.0	+52.8	52.0	60 24.4	+53.6	53.4	60 59.6	+54.3	54.8	61 33.5	+55.1	56.3	62 06.1	+55.8	57.9	62 37.3	+56.5	59.5	63 06.9	+57.2	61.2	**66**
67	60 02.5	+51.6	49.7	60 40.8	+52.4	51.0	61 18.0	+53.1	52.4	61 53.9	+54.0	53.9	62 28.6	+54.8	55.5	63 01.9	+55.5	57.1	63 33.8	+56.2	58.8	64 04.1	+56.9	60.5	**67**
68	60 54.1	+51.0	48.6	61 33.2	+51.9	50.0	62 11.1	+52.8	51.5	62 47.9	+53.6	53.0	63 23.4	+54.4	54.6	63 57.4	+55.2	56.2	64 30.0	+56.0	58.0	65 01.0	+56.7	59.8	**68**
69	61 45.1	+50.5	47.5	62 25.1	+51.3	49.0	63 03.9	+52.2	50.4	63 41.5	+53.1	52.0	64 17.8	+54.0	53.6	64 52.6	+54.9	55.3	65 26.0	+55.6	57.1	65 57.7	+56.5	59.0	**69**
70	62 35.6	+49.9	46.4	63 16.4	+50.8	47.8	63 56.1	+51.8	49.3	64 34.6	+52.7	50.9	65 11.8	+53.5	52.6	65 47.5	+54.4	54.4	66 21.6	+55.4	56.2	66 54.2	+56.1	58.2	**70**
71	63 25.5	+49.2	45.2	64 07.2	+50.2	46.6	64 47.9	+51.1	48.2	65 27.3	+52.1	49.8	66 05.3	+53.1	51.5	66 41.9	+54.0	53.3	67 17.0	+54.9	55.2	67 50.3	+55.8	57.2	**71**
72	64 14.7	+48.5	43.9	64 57.4	+49.5	45.3	65 39.0	+50.5	46.9	66 19.4	+51.4	48.6	66 58.4	+52.5	50.3	67 35.9	+53.5	52.2	68 11.9	+54.5	54.2	68 46.1	+55.5	56.2	**72**
73	65 03.2	+47.6	42.5	65 46.9	+48.7	44.0	66 29.5	+49.7	45.6	67 10.8	+50.9	47.3	67 50.9	+51.8	49.1	68 29.4	+53.0	51.0	69 06.4	+53.9	53.0	69 41.6	+55.0	55.2	**73**
74	65 50.8	+46.8	41.0	66 35.6	+47.8	42.5	67 19.2	+49.0	44.2	68 01.7	+50.0	45.9	68 42.7	+51.2	47.7	69 22.4	+52.2	49.7	70 00.3	+53.5	51.8	70 36.6	+54.5	54.0	**74**
75	66 37.6	+45.8	39.5	67 23.4	+47.0	41.0	68 08.2	+48.0	42.6	68 51.7	+49.2	44.4	69 33.9	+50.4	46.2	70 14.6	+51.6	48.3	70 53.8	+52.7	50.4	71 31.1	+53.9	52.7	**75**
76	67 23.4	+44.8	37.8	68 10.4	+45.8	39.3	68 56.2	+47.0	41.0	69 40.9	+48.2	42.8	70 24.3	+49.4	44.7	71 06.2	+50.7	46.7	71 46.5	+52.0	48.9	72 25.0	+53.3	51.3	**76**
77	68 08.2	+43.5	36.1	68 56.2	+44.7	37.6	69 43.2	+45.9	39.2	70 29.1	+47.2	41.0	71 13.7	+48.5	42.9	71 56.9	+49.8	45.0	72 38.5	+51.1	47.3	73 18.3	+52.5	49.7	**77**
78	68 51.7	+42.2	34.2	69 40.9	+43.4	35.7	70 29.1	+44.6	37.3	71 16.3	+45.9	39.1	72 02.2	+47.2	41.1	72 46.7	+48.7	43.2	73 29.6	+50.1	45.5	74 10.8	+51.5	48.0	**78**
79	69 33.9	+40.7	32.2	70 24.3	+41.9	33.7	71 13.7	+43.2	35.3	72 02.2	+44.5	37.1	72 49.4	+46.0	39.0	73 35.4	+47.3	41.2	74 19.7	+48.9	43.5	75 02.3	+50.5	46.1	**79**
80	70 14.6	+39.2	30.0	71 06.2	+40.3	31.5	71 56.9	+41.6	33.1	72 46.7	+42.9	34.9	73 35.4	+44.3	36.8	74 22.7	+45.9	38.9	75 08.6	+47.5	41.3	75 52.8	+49.2	43.9	**80**
81	70 53.8	+37.3	27.8	71 46.5	+38.5	29.2	72 38.5	+39.8	30.7	73 29.6	+41.2	32.4	74 19.7	+42.6	34.4	75 08.6	+44.2	36.5	75 56.1	+45.9	38.8	76 42.0	+47.6	41.5	**81**
82	71 31.1	*+35.3*•	25.3	72 25.0	*+36.5*•	26.7	73 18.3	*+37.7*•	28.2	74 10.8	*+39.0*•	29.8	75 02.3	*+40.6*•	31.7	75 52.8	*+42.2*•	33.8	76 42.0	*+43.9*•	36.1	77 29.6	*+45.8*•	38.8	**82**
83	72 06.4	*+33.1*•	22.7	73 01.5	*+34.2*•	24.0	73 56.0	*+35.4*•	25.4	74 49.8	*+36.8*•	27.0	75 42.9	*+38.2*•	28.8	76 35.0	*+39.8*•	30.8	77 25.9	*+41.6*•	33.1	78 15.4	*+43.6*•	35.7	**83**
84	72 39.5	*+30.8*•	20.0	73 35.7	*+31.8*•	21.1	74 31.4	*+32.9*•	22.4	75 26.6	*+34.2*•	23.9	76 21.1	*+35.6*•	25.6	77 14.8	*+37.1*•	27.5	78 07.5	*+38.9*•	29.7	78 59.0	*+40.8*•	32.2	**84**
85	73 10.3	*+28.1*•	17.1	74 07.5	*+29.0*•	18.1	75 04.3	*+30.1*•	19.2	76 00.8	*+31.2*•	20.6	76 56.7	*+32.4*•	22.1	77 51.9	*+34.0*•	23.8	78 46.4	*+35.6*•	25.9	79 39.8	*+37.6*•	28.2	**85**
86	73 38.4	*+25.3*•	14.0	74 36.5	*+26.1*•	14.8	75 34.4	*+26.9*•	15.8	76 32.0	*+27.8*•	17.0	77 29.1	*+29.0*•	18.3	78 25.9	*+30.3*•	19.8	79 22.0	*+31.8*•	21.6	80 17.4	*+33.5*•	23.8	**86**
87	74 03.7	*+22.1*•	10.7	75 02.6	*+22.7*•	11.4	76 01.3	*+23.4*•	12.2	76 59.8	*+24.2*•	13.1	77 58.1	*+25.1*•	14.2	78 56.2	*+26.1*•	15.4	79 53.8	*+27.4*•	16.9	80 50.9	*+28.9*•	18.7	**87**
88	74 25.8	*+18.9*•	7.3	75 25.3	*+19.2*•	7.8	76 24.7	*+19.7*•	8.3	77 24.0	*+20.2*•	9.0	78 23.2	*+20.8*•	9.7	79 22.3	*+21.5*•	10.6	80 21.2	*+22.2*•	11.7	81 19.8	*+23.3*•	13.0	**88**
89	74 44.7	*+15.3*•	3.7	75 44.5	*+15.5*•	4.0	76 44.4	*+15.6*•	4.3	77 44.2	*+15.8*•	4.6	78 44.0	*+16.0*•	5.0	79 43.8	*+16.2*•	5.5	80 43.4	*+16.6*•	6.1	81 43.1	*+16.9*•	6.8	**89**
90	75 00.0	*+11.6*•	0.0	76 00.0	*+11.5*•	0.0	77 00.0	*+11.3*•	0.0	78 00.0	*+11.1*•	0.0	79 00.0	*+10.9*•	0.0	80 00.0	*+10.6*•	0.0	81 00.0	*+10.3*•	0.0	82 00.0	*+9.9*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 103°, 257°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 05.1	+58.0	101.6	2 53.0	+58.3	101.7	2 40.8	+58.6	101.7	2 28.7	+58.7	101.7	2 16.4	+59.0	101.8	2 04.1	+59.2	101.8	1 51.8	+59.3	101.9	1 39.5	+59.4	101.9	**0**
1	4 03.1	+58.1	101.3	3 51.3	+58.3	101.4	3 39.4	+58.5	101.5	3 27.4	+58.7	101.5	3 15.4	+58.9	101.6	3 03.3	+59.1	101.7	2 51.1	+59.3	101.7	2 38.9	+59.5	101.8	**1**
2	5 01.2	+58.0	101.1	4 49.6	+58.2	101.2	4 37.9	+58.5	101.3	4 26.1	+58.8	101.3	4 14.3	+58.9	101.4	4 02.4	+59.1	101.5	3 50.4	+59.3	101.5	3 38.4	+59.4	101.6	**2**
3	5 59.2	+58.0	100.8	5 47.8	+58.3	100.9	5 36.4	+58.5	101.0	5 24.9	+58.7	101.1	5 13.2	+59.0	101.2	5 01.5	+59.1	101.3	4 49.7	+59.3	101.4	4 37.8	+59.4	101.5	**3**
4	6 57.2	+58.0	100.6	6 46.1	+58.3	100.7	6 34.9	+58.5	100.8	6 23.6	+58.7	100.9	6 12.2	+58.9	101.0	6 00.6	+59.2	101.1	5 49.0	+59.3	101.2	5 37.2	+59.5	101.3	**4**
5	7 55.2	+58.0	100.3	7 44.4	+58.2	100.5	7 33.4	+58.5	100.6	7 22.3	+58.8	100.7	7 11.1	+58.9	100.8	6 59.8	+59.1	101.0	6 48.3	+59.3	101.1	6 36.7	+59.4	101.2	**5**
6	8 53.2	+58.0	100.1	8 42.6	+58.3	100.2	8 31.9	+58.5	100.4	8 21.1	+58.7	100.5	8 10.0	+59.0	100.7	7 58.9	+59.1	100.8	7 47.6	+59.2	100.9	7 36.1	+59.4	101.1	**6**
7	9 51.2	+58.0	99.8	9 40.9	+58.2	100.0	9 30.4	+58.5	100.1	9 19.8	+58.7	100.3	9 09.0	+58.9	100.5	8 58.0	+59.1	100.6	8 46.8	+59.3	100.8	8 35.5	+59.5	100.9	**7**
8	10 49.2	+57.9	99.5	10 39.1	+58.3	99.7	10 28.9	+58.5	99.9	10 18.5	+58.7	100.1	10 07.9	+58.9	100.3	9 57.1	+59.1	100.4	9 46.1	+59.3	100.6	9 35.0	+59.4	100.8	**8**
9	11 47.1	+58.0	99.3	11 37.4	+58.2	99.5	11 27.4	+58.4	99.7	11 17.2	+58.7	99.9	11 06.8	+58.9	100.1	10 56.2	+59.1	100.3	10 45.4	+59.2	100.5	10 34.4	+59.4	100.6	**9**
10	12 45.1	+57.9	99.0	12 35.6	+58.2	99.2	12 25.8	+58.5	99.5	12 15.9	+58.6	99.7	12 05.7	+58.9	99.9	11 55.3	+59.1	100.1	11 44.6	+59.3	100.3	11 33.8	+59.4	100.5	**10**
11	13 43.0	+58.0	98.7	13 33.8	+58.2	99.0	13 24.3	+58.4	99.2	13 14.5	+58.7	99.5	13 04.6	+58.9	99.7	12 54.4	+59.0	99.9	12 43.9	+59.3	100.1	12 33.2	+59.4	100.4	**11**
12	14 41.0	+57.9	98.5	14 32.0	+58.1	98.7	14 22.7	+58.5	99.0	14 13.2	+58.7	99.2	14 03.5	+58.8	99.5	13 53.4	+59.1	99.7	13 43.2	+59.2	100.0	13 32.6	+59.4	100.2	**12**
13	15 38.9	+57.8	98.2	15 30.1	+58.2	98.5	15 21.2	+58.4	98.8	15 11.9	+58.6	99.0	15 02.3	+58.9	99.3	14 52.5	+59.1	99.6	14 42.4	+59.2	99.8	14 32.0	+59.4	100.1	**13**
14	16 36.7	+57.9	97.9	16 28.3	+58.1	98.2	16 19.6	+58.4	98.5	16 10.5	+58.7	98.8	16 01.2	+58.8	99.1	15 51.6	+59.0	99.4	15 41.6	+59.3	99.7	15 31.4	+59.4	99.9	**14**
15	17 34.6	+57.8	97.7	17 26.4	+58.1	98.0	17 18.0	+58.3	98.3	17 09.2	+58.6	98.6	17 00.0	+58.9	98.9	16 50.6	+59.1	99.2	16 40.9	+59.2	99.5	16 30.8	+59.4	99.8	**15**
16	18 32.4	+57.8	97.4	18 24.5	+58.1	97.7	18 16.3	+58.4	98.0	18 07.8	+58.6	98.4	17 58.9	+58.8	98.7	17 49.7	+59.0	99.0	17 40.1	+59.2	99.3	17 30.2	+59.4	99.6	**16**
17	19 30.2	+57.8	97.1	19 22.6	+58.1	97.4	19 14.7	+58.3	97.8	19 06.4	+58.6	98.1	18 57.7	+58.8	98.5	18 48.7	+59.0	98.8	18 39.3	+59.2	99.1	18 29.6	+59.4	99.5	**17**
18	20 28.0	+57.8	96.8	20 20.7	+58.1	97.2	20 13.0	+58.3	97.5	20 05.0	+58.5	97.9	19 56.5	+58.8	98.3	19 47.7	+59.0	98.6	19 38.5	+59.2	99.0	19 29.0	+59.4	99.3	**18**
19	21 25.8	+57.7	96.5	21 18.8	+58.0	96.9	21 11.3	+58.3	97.3	21 03.5	+58.6	97.7	20 55.3	+58.8	98.1	20 46.7	+59.0	98.4	20 37.7	+59.2	98.8	20 28.4	+59.3	99.2	**19**
20	22 23.5	+57.7	96.2	22 16.8	+58.0	96.6	22 09.6	+58.3	97.0	22 02.1	+58.5	97.4	21 54.1	+58.8	97.8	21 45.7	+59.0	98.2	21 36.9	+59.2	98.6	21 27.7	+59.4	99.0	**20**
21	23 21.2	+57.6	95.9	23 14.8	+57.9	96.4	23 07.9	+58.2	96.8	23 00.6	+58.5	97.2	22 52.9	+58.7	97.6	22 44.7	+59.0	98.0	22 36.1	+59.2	98.4	22 27.1	+59.3	98.9	**21**
22	24 18.8	+57.7	95.6	24 12.7	+58.0	96.1	24 06.1	+58.3	96.5	23 59.1	+58.5	97.0	23 51.6	+58.7	97.4	23 43.7	+58.9	97.8	23 35.3	+59.1	98.3	23 26.4	+59.3	98.7	**22**
23	25 16.5	+57.5	95.3	25 10.7	+57.8	95.8	25 04.4	+58.2	96.2	24 57.6	+58.5	96.7	24 50.3	+58.7	97.2	24 42.6	+58.9	97.6	24 34.4	+59.1	98.1	24 25.7	+59.4	98.5	**23**
24	26 14.0	+57.6	95.0	26 08.5	+57.9	95.5	26 02.6	+58.1	96.0	25 56.1	+58.4	96.5	25 49.0	+58.7	96.9	25 41.5	+59.0	97.4	25 33.5	+59.2	97.9	25 25.1	+59.3	98.4	**24**
25	27 11.6	+57.5	94.7	27 06.4	+57.8	95.2	27 00.7	+58.1	95.7	26 54.5	+58.4	96.2	26 47.7	+58.7	96.7	26 40.5	+58.9	97.2	26 32.7	+59.1	97.7	26 24.4	+59.3	98.2	**25**
26	28 09.1	+57.4	94.4	28 04.2	+57.8	94.9	27 58.8	+58.1	95.4	27 52.9	+58.4	96.0	27 46.4	+58.6	96.5	27 39.4	+58.8	97.0	27 31.8	+59.1	97.5	27 23.7	+59.2	98.0	**26**
27	29 06.5	+57.4	94.0	29 02.0	+57.8	94.6	28 56.9	+58.1	95.1	28 51.3	+58.3	95.7	28 45.0	+58.6	96.2	28 38.2	+58.9	96.8	28 30.9	+59.0	97.3	28 22.9	+59.3	97.9	**27**
28	30 03.9	+57.4	93.7	29 59.8	+57.6	94.3	29 55.0	+58.0	94.8	29 49.6	+58.3	95.4	29 43.6	+58.6	96.0	29 37.1	+58.8	96.6	29 29.9	+59.1	97.1	29 22.2	+59.3	97.7	**28**
29	31 01.3	+57.3	93.4	30 57.4	+57.7	94.0	30 53.0	+58.0	94.6	30 47.9	+58.3	95.1	30 42.2	+58.6	95.7	30 35.9	+58.8	96.3	30 29.0	+59.0	96.9	30 21.5	+59.2	97.5	**29**
30	31 58.6	+57.2	93.0	31 55.1	+57.6	93.6	31 51.0	+57.9	94.3	31 46.2	+58.2	94.9	31 40.8	+58.5	95.5	31 34.7	+58.8	96.1	31 28.0	+59.1	96.7	31 20.7	+59.2	97.3	**30**
31	32 55.8	+57.2	92.7	32 52.7	+57.5	93.3	32 48.9	+57.9	93.9	32 44.4	+58.2	94.6	32 39.3	+58.5	95.2	32 33.5	+58.8	95.9	32 27.1	+58.9	96.5	32 19.9	+59.2	97.1	**31**
32	33 53.0	+57.1	92.3	33 50.2	+57.5	93.0	33 46.8	+57.8	93.6	33 42.6	+58.2	94.3	33 37.8	+58.5	95.0	33 32.3	+58.7	95.6	33 26.0	+59.0	96.3	33 19.1	+59.2	96.9	**32**
33	34 50.1	+57.0	91.9	34 47.7	+57.4	92.6	34 44.6	+57.8	93.3	34 40.8	+58.1	94.0	34 36.3	+58.4	94.7	34 31.0	+58.7	95.4	34 25.0	+59.0	96.1	34 18.3	+59.2	96.7	**33**
34	35 47.1	+57.0	91.5	35 45.1	+57.4	92.3	35 42.4	+57.7	93.0	35 38.9	+58.1	93.7	35 34.7	+58.3	94.4	35 29.7	+58.6	95.1	35 24.0	+58.9	95.8	35 17.5	+59.2	96.5	**34**
35	36 44.1	+56.9	91.1	36 42.5	+57.3	91.9	36 40.1	+57.7	92.6	36 37.0	+58.0	93.4	36 33.0	+58.4	94.1	36 28.3	+58.7	94.9	36 22.9	+58.9	95.6	36 16.7	+59.1	96.3	**35**
36	37 41.0	+56.8	90.7	37 39.8	+57.2	91.5	37 37.8	+57.6	92.3	37 35.0	+58.0	93.1	37 31.4	+58.3	93.8	37 27.0	+58.6	94.6	37 21.8	+58.8	95.4	37 15.8	+59.1	96.1	**36**
37	38 37.8	+56.7	90.3	38 37.0	+57.2	91.1	38 35.4	+57.5	91.9	38 33.0	+57.9	92.7	38 29.7	+58.2	93.5	38 25.6	+58.5	94.3	38 20.6	+58.9	95.1	38 14.9	+59.1	95.9	**37**
38	39 34.5	+56.6	89.9	39 34.2	+57.0	90.7	39 32.9	+57.5	91.6	39 30.9	+57.8	92.4	39 27.9	+58.2	93.2	39 24.1	+58.5	94.0	39 19.5	+58.8	94.9	39 14.0	+59.0	95.7	**38**
39	40 31.1	+56.5	89.5	40 31.2	+57.0	90.3	40 30.4	+57.4	91.2	40 28.7	+57.8	92.0	40 26.1	+58.2	92.9	40 22.6	+58.5	93.8	40 18.3	+58.7	94.6	40 13.0	+59.0	95.4	**39**
40	41 27.6	+56.5	89.0	41 28.2	+56.9	89.9	41 27.8	+57.3	90.8	41 26.5	+57.7	91.7	41 24.3	+58.0	92.6	41 21.1	+58.4	93.5	41 17.0	+58.8	94.3	41 12.0	+59.0	95.2	**40**
41	42 24.1	+56.3	88.6	42 25.1	+56.8	89.5	42 25.1	+57.2	90.4	42 24.2	+57.6	91.3	42 22.3	+58.1	92.2	42 19.5	+58.4	93.1	42 15.8	+58.6	94.1	42 11.0	+59.0	95.0	**41**
42	43 20.4	+56.2	88.1	43 21.9	+56.6	89.1	43 22.3	+57.2	90.0	43 21.8	+57.6	90.9	43 20.4	+57.9	91.9	43 17.9	+58.3	92.8	43 14.4	+58.7	93.8	43 10.0	+58.9	94.7	**42**
43	44 16.6	+56.0	87.6	44 18.5	+56.6	88.6	44 19.5	+57.0	89.6	44 19.4	+57.5	90.6	44 18.3	+57.9	91.5	44 16.2	+58.3	92.5	44 13.1	+58.6	93.5	44 08.9	+58.9	94.4	**43**
44	45 12.6	+55.9	87.1	45 15.1	+56.4	88.1	45 16.5	+57.0	89.1	45 16.9	+57.4	90.2	45 16.2	+57.8	91.2	45 14.5	+58.2	92.2	45 11.7	+58.5	93.2	45 07.8	+58.9	94.2	**44**
45	46 08.5	+55.8	86.6	46 11.5	+56.4	87.6	46 13.5	+56.8	88.7	46 14.3	+57.3	89.7	46 14.0	+57.8	90.8	46 12.7	+58.1	91.8	46 10.2	+58.5	92.9	46 06.7	+58.8	93.9	**45**
46	47 04.3	+55.6	86.1	47 07.9	+56.2	87.1	47 10.3	+56.7	88.2	47 11.6	+57.2	89.3	47 11.8	+57.6	90.4	47 10.8	+58.1	91.5	47 08.7	+58.4	92.5	47 05.5	+58.7	93.6	**46**
47	47 59.9	+55.5	85.5	48 04.1	+56.0	86.6	48 07.0	+56.6	87.7	48 08.8	+57.1	88.9	48 09.4	+57.6	90.0	48 08.9	+57.9	91.1	48 07.1	+58.4	92.2	48 04.2	+58.8	93.3	**47**
48	48 55.4	+55.3	84.9	49 00.1	+55.9	86.1	49 03.6	+56.4	87.2	49 05.9	+56.9	88.4	49 07.0	+57.4	89.5	49 06.8	+57.9	90.7	49 05.5	+58.3	91.9	49 03.0	+58.6	93.0	**48**
49	49 50.7	+55.1	84.3	49 56.0	+55.7	85.5	50 00.0	+56.3	86.7	50 02.8	+56.9	87.9	50 04.4	+57.4	89.1	50 04.7	+57.9	90.3	50 03.8	+58.2	91.5	50 01.6	+58.6	92.7	**49**
50	50 45.8	+54.8	83.7	50 51.7	+55.5	84.9	50 56.3	+56.2	86.2	50 59.7	+56.7	87.4	51 01.8	+57.2	88.6	51 02.6	+57.7	89.9	51 02.0	+58.2	91.1	51 00.2	+58.6	92.3	**50**
51	51 40.6	+54.7	83.1	51 47.2	+55.3	84.3	51 52.5	+55.9	85.6	51 56.4	+56.6	86.9	51 59.0	+57.1	88.2	52 00.3	+57.6	89.4	52 00.2	+58.1	90.7	51 58.8	+58.5	92.0	**51**
52	52 35.3	+54.4	82.4	52 42.5	+55.2	83.7	52 48.4	+55.8	85.0	52 53.0	+56.4	86.3	52 56.1	+57.0	87.7	52 57.9	+57.5	89.0	52 58.3	+58.0	90.3	52 57.3	+58.4	91.6	**52**
53	53 29.7	+54.2	81.7	53 37.7	+54.9	83.0	53 44.2	+55.6	84.4	53 49.4	+56.2	85.8	53 53.1	+56.8	87.1	53 55.4	+57.4	88.5	53 56.3	+57.8	89.9	53 55.7	+58.3	91.2	**53**
54	54 23.9	+53.9	81.0	54 32.6	+54.6	82.4	54 39.8	+55.4	83.8	54 45.6	+56.1	85.2	54 49.9	+56.7	86.6	54 52.8	+57.2	88.0	54 54.1	+57.8	89.4	54 54.0	+58.3	90.8	**54**
55	55 17.8	+53.6	80.2	55 27.2	+54.4	81.6	55 35.2	+55.2	83.1	55 41.7	+55.8	84.5	55 46.6	+56.5	86.0	55 50.0	+57.2	87.5	55 51.9	+57.7	88.9	55 52.3	+58.1	90.4	**55**
56	56 11.4	+53.2	79.4	56 21.6	+54.1	80.9	56 30.4	+54.9	82.4	56 37.5	+55.7	83.9	56 43.1	+56.4	85.4	56 47.2	+56.9	86.9	56 49.6	+57.5	88.4	56 50.4	+58.1	90.0	**56**
57	57 04.6	+52.9	78.6	57 15.7	+53.8	80.1	57 25.3	+54.6	81.6	57 33.2	+55.4	83.2	57 39.5	+56.1	84.8	57 44.1	+56.8	86.3	57 47.1	+57.4	87.9	57 48.5	+57.9	89.5	**57**
58	57 57.5	+52.6	77.7	58 09.5	+53.5	79.3	58 19.9	+54.3	80.9	58 28.6	+55.1	82.5	58 35.6	+55.9	84.1	58 40.9	+56.6	85.7	58 44.5	+57.3	87.4	58 46.4	+57.9	89.0	**58**
59	58 50.1	+52.1	76.8	59 03.0	+53.0	78.4	59 14.2	+54.0	80.0	59 23.7	+54.9	81.7	59 31.5	+55.7	83.4	59 37.5	+56.4	85.1	59 41.8	+57.1	86.8	59 44.3	+57.7	88.5	**59**
60	59 42.2	+51.6	75.8	59 56.0	+52.7	77.5	60 08.2	+53.6	79.2	60 18.6	+54.5	80.9	60 27.2	+55.4	82.6	60 33.9	+56.2	84.4	60 38.9	+56.9	86.2	60 42.0	+57.5	87.9	**60**
61	60 33.8	+51.2	74.8	60 48.7	+52.3	76.5	61 01.8	+53.3	78.3	61 13.1	+54.2	80.0	61 22.6	+55.1	81.8	61 30.1	+56.0	83.7	61 35.8	+56.7	85.5	61 39.5	+57.4	87.4	**61**
62	61 25.0	+50.7	73.7	61 41.0	+51.7	75.5	61 55.1	+52.8	77.3	62 07.3	+53.9	79.1	62 17.7	+54.8	81.0	62 26.1	+55.6	82.9	62 32.5	+56.5	84.8	62 36.9	+57.2	86.7	**62**
63	62 15.7	+50.0	72.6	62 32.7	+51.2	74.4	62 47.9	+52.3	76.3	63 01.2	+53.4	78.2	63 12.5	+54.4	80.1	63 21.7	+55.4	82.1	63 29.0	+56.2	84.1	63 34.1	+57.1	86.1	**63**
64	63 05.7	+49.4	71.4	63 23.9	+50.7	73.3	63 40.2	+51.9	75.2	63 54.6	+53.0	77.2	64 06.9	+54.0	79.2	64 17.1	+55.1	81.2	64 25.2	+56.0	83.3	64 31.2	+56.8	85.4	**64**
65	63 55.1	+48.7	70.1	64 14.6	+50.0	72.0	64 32.1	+51.2	74.0	64 47.6	+52.4	76.1	65 00.9	+53.6	78.2	65 12.2	+54.6	80.3	65 21.2	+55.6	82.4	65 28.0	+56.5	84.6	**65**
66	64 43.8	+47.9	68.7	65 04.6	+49.2	70.7	65 23.3	+50.6	72.8	65 40.0	+51.9	74.9	65 54.5	+53.1	77.1	66 06.8	+54.3	79.3	66 16.8	+55.4	81.5	66 24.5	+56.3	83.8	**66**
67	65 31.7	+47.0	67.3	65 53.8	+48.5	69.4	66 13.9	+49.9	71.5	66 31.9	+51.3	73.7	66 47.6	+52.6	75.9	67 01.1	+53.8	78.2	67 12.2	+54.9	80.5	67 20.8	+56.0	82.9	**67**
68	66 18.7	+46.1	65.8	66 42.3	+47.7	67.9	67 03.8	+49.1	70.1	67 23.2	+50.5	72.3	67 40.2	+51.9	74.7	67 54.9	+53.2	77.0	68 07.1	+54.5	79.5	68 16.8	+55.6	81.9	**68**
69	67 04.8	+45.1	64.2	67 30.0	+46.6	66.3	67 52.9	+48.3	68.6	68 13.7	+49.8	70.9	68 32.1	+51.3	73.3	68 48.1	+52.7	75.8	69 01.6	+53.9	78.3	69 12.4	+55.2	80.9	**69**
70	67 49.9	+43.9	62.5	68 16.6	+45.6	64.7	68 41.2	+47.2	67.0	69 03.5	+48.9	69.4	69 23.4	+50.4	71.9	69 40.8	+51.9	74.4	69 55.5	+53.4	77.1	70 07.6	+54.7	79.8	**70**
71	68 33.8	+42.6	60.6	69 02.2	+44.4	62.9	69 28.4	+46.2	65.3	69 52.4	+47.8	67.7	70 13.8	+49.6	70.3	70 32.7	+51.3	73.0	70 48.9	+52.8	75.7	71 02.3	+54.2	78.5	**71**
72	69 16.4	+41.2	58.7	69 46.6	+43.0	61.0	70 14.6	+44.9	63.4	70 40.2	+46.8	66.0	71 03.4	+48.6	68.6	71 24.0	+50.3	71.4	71 41.7	+52.0	74.2	71 56.5	+53.6	77.2	**72**
73	69 57.6	+39.6	56.6	70 29.6	+41.6	58.9	70 59.5	+43.5	61.4	71 27.0	+45.5	64.0	71 52.0	+47.4	66.8	72 14.3	+49.3	69.6	72 33.7	+51.1	72.6	72 50.1	+52.8	75.7	**73**
74	70 37.2	+37.9	54.3	71 11.2	+39.9	56.7	71 43.0	+41.9	59.3	72 12.5	+44.0	61.9	72 39.4	+46.1	64.7	73 03.6	+48.1	67.7	73 24.8	+50.2	70.8	73 42.9	+52.1	74.1	**74**
75	71 15.1	+36.0•	52.0	71 51.1	+38.0	54.4	72 24.9	+40.3	56.9	72 56.5	+42.4	59.7	73 25.5	+44.6	62.6	73 51.7	+46.8	65.6	74 15.0	+48.9	68.8	74 35.0	+51.0	72.2	**75**
76	71 51.1	+33.8•	49.4	72 29.1	+36.1•	51.8	73 05.2	+38.2•	54.4	73 38.9	+40.5•	57.2	74 10.1	+42.8	60.2	74 38.5	+45.2	63.3	75 03.9	+47.5	66.7	75 26.0	+49.8	70.2	**76**
77	72 24.9	+31.6•	46.7	73 05.2	+33.7•	49.1	73 43.4	+36.0•	51.7	74 19.4	+38.4•	54.5	74 52.9	+40.9•	57.5	75 23.7	+43.4	60.8	75 51.4	+46.0	64.2	76 15.8	+48.4	67.9	**77**
78	72 56.5	+29.0•	43.9	73 38.9	+31.2•	46.2	74 19.4	+33.5•	48.8	74 57.8	+36.0•	51.6	75 33.8	+38.6•	54.7	76 07.1	+41.3•	58.0	76 37.4	+43.9•	61.5	77 04.2	+46.7	65.3	**78**
79	73 25.5	+26.2•	40.9	74 10.1	+28.4•	43.2	74 52.9	+30.8•	45.7	75 33.8	+33.3•	48.5	76 12.4	+36.0•	51.5	76 48.4	+38.7•	54.9	77 21.3	+41.7•	58.5	77 50.9	+44.7•	62.5	**79**
80	73 51.7	+23.3•	37.7	74 38.5	+25.4•	39.9	75 23.7	+27.7•	42.3	76 07.1	+30.3•	45.1	76 48.4	+32.9•	48.1	77 27.1	+35.9•	51.4	78 03.0	+39.0•	55.1	78 35.6	+42.2•	59.2	**80**
81	74 15.0	+20.0•	34.3	75 03.9	+22.1•	36.4	75 51.4	+24.4•	38.8	76 37.4	+26.8•	41.4	77 21.3	+29.6•	44.3	78 03.0	+32.6•	47.6	78 42.0	+35.8•	51.3	79 17.8	+39.2•	55.5	**81**
82	74 35.0	+16.5•	30.8	75 26.0	+18.5•	32.8	76 15.8	+20.7•	35.0	77 04.2	+23.1•	37.5	77 50.9	+25.8•	40.3	78 35.6	+28.7•	43.5	79 17.8	+32.0•	47.1	79 57.0	+35.7•	51.3	**82**
83	74 51.5	+12.9•	27.2	75 44.5	+14.7•	28.9	76 36.5	+16.7•	31.0	77 27.3	+18.9•	33.3	78 16.7	+21.5•	35.9	79 04.3	+24.4•	39.0	79 49.8	+27.7•	42.5	80 32.7	+31.3•	46.5	**83**
84	75 04.4	+9.2•	23.4	75 59.2	+10.7•	25.0	76 53.2	+12.5•	26.8	77 46.2	+14.6•	28.9	78 38.2	+16.8•	31.3	79 28.7	+19.5•	34.1	80 17.5	+22.6•	37.3	81 04.0	+26.1•	41.2	**84**
85	75 13.6	+5.2•	19.5	76 09.9	+6.5•	20.9	77 05.7	+8.0•	22.4	78 00.8	+9.7•	24.2	78 55.0	+11.8•	26.3	79 48.2	+14.2•	28.8	80 40.1	+16.9•	31.7	81 30.1	+20.3•	35.2	**85**
86	75 18.8	+1.2•	15.6	76 16.4	+2.3•	16.7	77 13.7	+3.5•	18.0	78 10.5	+4.9•	19.4	79 06.8	+6.5•	21.2	80 02.4	+8.4•	23.2	80 57.0	+10.7•	25.7	81 50.4	+13.5•	28.7	**86**
87	75 20.0	−2.7•	11.7	76 18.7	−2.0•	12.5	77 17.2	−1.2•	13.5	78 15.4	−0.1•	14.6	79 13.3	+1.0•	15.9	80 10.8	+2.4•	17.5	81 07.7	+4.2•	19.4	82 03.9	+6.3•	21.8	**87**
88	75 17.3	−6.7•	7.7	76 16.7	−6.3•	8.3	77 16.0	−5.7•	8.9	78 15.3	−5.2•	9.7	79 14.3	−4.4•	10.5	80 13.2	−3.6•	11.6	81 11.9	−2.7•	12.9	82 10.2	−1.4•	14.5	**88**
89	75 10.6	−10.6•	3.8	76 10.4	−10.4•	4.1	77 10.3	−10.3•	4.4	78 10.1	−10.1•	4.8	79 09.9	−9.9•	5.2	80 09.6	−9.6•	5.7	81 09.2	−9.2•	6.4	82 08.8	−8.8•	7.2	**89**
90	75 00.0	−14.3•	0.0	76 00.0	−14.5•	0.0	77 00.0	−14.6•	0.0	78 00.0	−14.8•	0.0	79 00.0	−15.0•	0.0	80 00.0	−15.3•	0.0	81 00.0	−15.6•	0.0	82 00.0	−15.9•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 78°, 282°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 05.1	−58.1	101.6	2 53.0	−58.3	101.7	2 40.8	−58.5	101.7	2 28.7	−58.8	101.7	2 16.4	−58.9	101.8	2 04.1	−59.1	101.8	1 51.8	−59.3	101.9	1 39.5	−59.5	101.9	0
1	2 07.0	−58.0	101.9	1 54.7	−58.3	101.9	1 42.3	−58.5	101.9	1 29.9	−58.7	101.9	1 17.5	−59.0	102.0	1 05.0	−59.1	102.0	0 52.5	−59.3	102.0	0 40.0	−59.4	102.0	1
2	1 09.0	−58.1	102.1	0 56.4	−58.3	102.1	0 43.8	−58.5	102.1	0 31.2	−58.8	102.2	0 18.5	−58.9	102.2	0 05.9	−59.1	102.2	0 06.8	+59.2	77.8	0 19.4	+59.4	77.8	2
3	0 10.9	−58.0	102.4	0 01.9	+58.3	77.6	0 14.7	+58.6	77.6	0 27.6	+58.7	77.6	0 40.4	+59.0	77.7	0 53.2	+59.2	77.7	1 06.0	+59.3	77.7	1 18.8	+59.5	77.7	3
4	0 47.1	+58.0	77.4	1 00.2	+58.3	77.4	1 13.3	+58.5	77.4	1 26.3	+58.8	77.4	1 39.4	+58.9	77.5	1 52.4	+59.1	77.5	2 05.3	+59.3	77.5	2 18.3	+59.4	77.6	4
5	1 45.1	+58.1	77.1	1 58.5	+58.3	77.2	2 11.8	+58.5	77.2	2 25.1	+58.7	77.2	2 38.3	+59.0	77.3	2 51.5	+59.1	77.3	3 04.6	+59.3	77.4	3 17.7	+59.5	77.4	5
6	2 43.2	+58.0	76.9	2 56.8	+58.3	76.9	3 10.3	+58.6	77.0	3 23.8	+58.8	77.0	3 37.3	+58.9	77.1	3 50.6	+59.1	77.2	4 03.9	+59.3	77.2	4 17.2	+59.4	77.3	6
7	3 41.2	+58.1	76.6	3 55.1	+58.3	76.7	4 08.9	+58.5	76.8	4 22.6	+58.7	76.8	4 36.2	+58.9	76.9	4 49.7	+59.2	77.0	5 03.2	+59.3	77.1	5 16.6	+59.4	77.2	7
8	4 39.3	+58.0	76.4	4 53.4	+58.2	76.4	5 07.4	+58.5	76.5	5 21.3	+58.7	76.6	5 35.1	+59.0	76.7	5 48.9	+59.1	76.8	6 02.5	+59.3	76.9	6 16.0	+59.5	77.0	8
9	5 37.3	+58.0	76.1	5 51.6	+58.3	76.2	6 05.9	+58.5	76.3	6 20.0	+58.8	76.4	6 34.1	+58.9	76.5	6 48.0	+59.1	76.6	7 01.8	+59.3	76.8	7 15.5	+59.4	76.9	9
10	6 35.3	+58.0	75.9	6 49.9	+58.3	76.0	7 04.4	+58.5	76.1	7 18.8	+58.7	76.2	7 33.0	+58.9	76.3	7 47.1	+59.1	76.5	8 01.1	+59.2	76.6	8 14.9	+59.4	76.7	10
11	7 33.3	+58.0	75.6	7 48.2	+58.2	75.7	8 02.9	+58.5	75.9	8 17.5	+58.7	76.0	8 31.9	+58.9	76.1	8 46.2	+59.1	76.3	9 00.3	+59.3	76.4	9 14.3	+59.4	76.6	11
12	8 31.3	+58.0	75.3	8 46.4	+58.3	75.5	9 01.4	+58.5	75.6	9 16.2	+58.7	75.8	9 30.8	+58.9	76.0	9 45.3	+59.1	76.1	9 59.6	+59.3	76.3	10 13.7	+59.5	76.5	12
13	9 29.3	+58.0	75.1	9 44.7	+58.2	75.2	9 59.9	+58.5	75.4	10 14.9	+58.7	75.6	10 29.7	+59.0	75.8	10 44.4	+59.1	75.9	10 58.9	+59.2	76.1	11 13.2	+59.4	76.3	13
14	10 27.3	+58.0	74.8	10 42.9	+58.3	75.0	10 58.4	+58.4	75.2	11 13.6	+58.7	75.4	11 28.7	+58.9	75.6	11 43.5	+59.1	75.8	11 58.1	+59.3	76.0	12 12.6	+59.4	76.2	14
15	11 25.3	+57.9	74.6	11 41.2	+58.2	74.8	11 56.8	+58.5	75.0	12 12.3	+58.7	75.2	12 27.6	+58.8	75.4	12 42.6	+59.1	75.6	12 57.4	+59.3	75.8	13 12.0	+59.4	76.0	15
16	12 23.2	+58.0	74.3	12 39.4	+58.2	74.5	12 55.3	+58.4	74.7	13 11.0	+58.6	75.0	13 26.4	+58.9	75.2	13 41.7	+59.0	75.4	13 56.7	+59.2	75.7	14 11.4	+59.4	75.9	16
17	13 21.2	+57.9	74.0	13 37.6	+58.2	74.3	13 53.7	+58.5	74.5	14 09.6	+58.7	74.7	14 25.3	+58.9	75.0	14 40.7	+59.1	75.2	14 55.9	+59.2	75.5	15 10.8	+59.4	75.7	17
18	14 19.1	+57.9	73.8	14 35.8	+58.1	74.0	14 52.2	+58.4	74.3	15 08.3	+58.7	74.5	15 24.2	+58.9	74.8	15 39.8	+59.1	75.1	15 55.1	+59.3	75.3	16 10.2	+59.4	75.6	18
19	15 17.0	+57.9	73.5	15 33.9	+58.2	73.8	15 50.6	+58.4	74.0	16 07.0	+58.6	74.3	16 23.1	+58.8	74.6	16 38.9	+59.0	74.9	16 54.4	+59.2	75.2	17 09.6	+59.4	75.5	19
20	16 14.9	+57.9	73.2	16 32.1	+58.1	73.5	16 49.0	+58.4	73.8	17 05.6	+58.6	74.1	17 21.9	+58.8	74.4	17 37.9	+59.0	74.7	17 53.6	+59.2	75.0	18 09.0	+59.4	75.3	20
21	17 12.8	+57.8	72.9	17 30.2	+58.1	73.2	17 47.4	+58.3	73.5	18 04.2	+58.6	73.9	18 20.7	+58.9	74.2	18 36.9	+59.1	74.5	18 52.8	+59.2	74.8	19 08.4	+59.3	75.2	21
22	18 10.6	+57.8	72.7	18 28.3	+58.1	73.0	18 45.7	+58.4	73.3	19 02.8	+58.6	73.6	19 19.6	+58.8	74.0	19 36.0	+59.0	74.3	19 52.0	+59.2	74.6	20 07.7	+59.4	75.0	22
23	19 08.4	+57.8	72.4	19 26.4	+58.1	72.7	19 44.1	+58.3	73.1	20 01.4	+58.6	73.4	20 18.4	+58.8	73.8	20 35.0	+59.0	74.1	20 51.2	+59.2	74.5	21 07.1	+59.3	74.8	23
24	20 06.2	+57.8	72.1	20 24.5	+58.0	72.4	20 42.4	+58.3	72.8	21 00.0	+58.5	73.2	21 17.2	+58.7	73.5	21 34.0	+59.0	73.9	21 50.4	+59.2	74.3	22 06.4	+59.4	74.7	24
25	21 04.0	+57.7	71.8	21 22.5	+58.0	72.2	21 40.7	+58.3	72.5	21 58.5	+58.5	72.9	22 15.9	+58.8	73.3	22 33.0	+58.9	73.7	22 49.6	+59.1	74.1	23 05.8	+59.3	74.5	25
26	22 01.7	+57.7	71.5	22 20.5	+58.0	71.9	22 39.0	+58.3	72.3	22 57.0	+58.6	72.7	23 14.7	+58.7	73.1	23 31.9	+59.0	73.5	23 48.7	+59.2	73.9	24 05.1	+59.3	74.4	26
27	22 59.4	+57.7	71.2	23 18.5	+58.0	71.6	23 37.3	+58.2	72.0	23 55.6	+58.4	72.5	24 13.4	+58.7	72.9	24 30.9	+58.9	73.3	24 47.9	+59.1	73.8	25 04.4	+59.4	74.2	27
28	23 57.1	+57.6	70.9	24 16.5	+57.9	71.3	24 35.5	+58.2	71.8	24 54.0	+58.5	72.2	25 12.1	+58.7	72.7	25 29.8	+58.9	73.1	25 47.0	+59.1	73.6	26 03.8	+59.3	74.0	28
29	24 54.7	+57.6	70.6	25 14.4	+57.9	71.1	25 33.7	+58.2	71.5	25 52.5	+58.4	72.0	26 10.8	+58.7	72.4	26 28.7	+58.9	72.9	26 46.1	+59.1	73.4	27 03.1	+59.2	73.9	29
30	25 52.3	+57.6	70.3	26 12.3	+57.9	70.8	26 31.9	+58.1	71.2	26 50.9	+58.4	71.7	27 09.5	+58.7	72.2	27 27.6	+58.9	72.7	27 45.2	+59.1	73.2	28 02.3	+59.3	73.7	30
31	26 49.9	+57.5	70.0	27 10.2	+57.8	70.5	27 30.0	+58.1	71.0	27 49.3	+58.4	71.4	28 08.2	+58.6	72.0	28 26.5	+58.9	72.5	28 44.3	+59.1	73.0	29 01.6	+59.3	73.5	31
32	27 47.4	+57.5	69.7	28 08.0	+57.8	70.2	28 28.1	+58.1	70.7	28 47.7	+58.4	71.2	29 06.8	+58.6	71.7	29 25.4	+58.8	72.2	29 43.4	+59.1	72.8	30 00.9	+59.2	73.3	32
33	28 44.9	+57.4	69.3	29 05.8	+57.7	69.9	29 26.2	+58.0	70.4	29 46.1	+58.3	70.9	30 05.4	+58.6	71.5	30 24.2	+58.8	72.0	30 42.5	+59.0	72.6	31 00.1	+59.3	73.1	33
34	29 42.3	+57.3	69.0	30 03.5	+57.7	69.5	30 24.2	+58.0	70.1	30 44.4	+58.3	70.6	31 04.0	+58.5	71.2	31 23.0	+58.8	71.8	31 41.5	+59.0	72.4	31 59.4	+59.2	73.0	34
35	30 39.6	+57.4	68.7	31 01.2	+57.6	69.2	31 22.2	+58.0	69.8	31 42.7	+58.2	70.4	32 02.5	+58.5	71.0	32 21.8	+58.8	71.5	32 40.5	+59.0	72.2	32 58.6	+59.2	72.8	35
36	31 37.0	+57.2	68.3	31 58.8	+57.6	68.9	32 20.2	+57.9	69.5	32 40.9	+58.2	70.1	33 01.0	+58.5	70.7	33 20.6	+58.7	71.3	33 39.5	+59.0	71.9	33 57.8	+59.1	72.6	36
37	32 34.2	+57.2	68.0	32 56.4	+57.6	68.6	33 18.1	+57.8	69.2	33 39.1	+58.2	69.8	33 59.5	+58.5	70.4	34 19.3	+58.7	71.1	34 38.5	+58.9	71.7	34 56.9	+59.2	72.4	37
38	33 31.4	+57.1	67.6	33 54.0	+57.5	68.2	34 15.9	+57.8	68.9	34 37.3	+58.1	69.5	34 58.0	+58.4	70.1	35 18.0	+58.7	70.8	35 37.4	+58.9	71.5	35 56.1	+59.1	72.2	38
39	34 28.5	+57.1	67.2	34 51.5	+57.4	67.9	35 13.7	+57.8	68.5	35 35.4	+58.0	69.2	35 56.4	+58.3	69.9	36 16.7	+58.6	70.6	36 36.3	+58.9	71.3	36 55.2	+59.2	72.0	39
40	35 25.6	+57.0	66.9	35 48.9	+57.3	67.5	36 11.5	+57.7	68.2	36 33.4	+58.1	68.9	36 54.7	+58.3	69.6	37 15.3	+58.6	70.3	37 35.2	+58.8	71.0	37 54.4	+59.0	71.7	40
41	36 22.6	+56.9	66.5	36 46.2	+57.3	67.2	37 09.2	+57.6	67.9	37 31.5	+57.9	68.6	37 53.0	+58.3	69.3	38 13.9	+58.6	70.0	38 34.0	+58.9	70.8	38 53.4	+59.1	71.5	41
42	37 19.5	+56.9	66.1	37 43.5	+57.2	66.8	38 06.8	+57.6	67.5	38 29.4	+57.9	68.2	38 51.3	+58.2	69.0	39 12.5	+58.5	69.7	39 32.9	+58.8	70.5	39 52.5	+59.0	71.3	42
43	38 16.4	+56.7	65.7	38 40.7	+57.2	66.4	39 04.4	+57.5	67.1	39 27.3	+57.9	67.9	39 49.5	+58.2	68.7	40 11.0	+58.5	69.5	40 31.7	+58.7	70.2	40 51.5	+59.0	71.1	43
44	39 13.1	+56.7	65.3	39 37.9	+57.0	66.0	40 01.9	+57.4	66.8	40 25.2	+57.8	67.6	40 47.7	+58.1	68.3	41 09.5	+58.4	69.2	41 30.4	+58.7	70.0	41 50.5	+59.0	70.8	44
45	40 09.8	+56.5	64.8	40 34.9	+57.0	65.6	40 59.3	+57.4	66.4	41 23.0	+57.7	67.2	41 45.8	+58.1	68.0	42 07.9	+58.4	68.9	42 29.1	+58.7	69.7	42 49.5	+59.0	70.6	45
46	41 06.3	+56.5	64.4	41 31.9	+56.9	65.2	41 56.7	+57.3	66.0	42 20.7	+57.6	66.8	42 43.9	+58.0	67.7	43 06.3	+58.3	68.5	43 27.8	+58.6	69.4	43 48.5	+58.9	70.3	46
47	42 02.8	+56.3	63.9	42 28.8	+56.7	64.8	42 54.0	+57.1	65.6	43 18.3	+57.6	66.4	43 41.9	+57.9	67.3	44 04.6	+58.3	68.2	44 26.4	+58.6	69.1	44 47.4	+58.8	70.0	47
48	42 59.1	+56.3	63.5	43 25.5	+56.7	64.3	43 51.1	+57.1	65.2	44 15.9	+57.5	66.1	44 39.8	+57.9	67.0	45 02.9	+58.2	67.9	45 25.0	+58.5	68.8	45 46.2	+58.9	69.8	48
49	43 55.4	+56.1	63.0	44 22.2	+56.6	63.9	44 48.2	+57.0	64.7	45 13.4	+57.4	65.7	45 37.7	+57.8	66.6	46 01.1	+58.1	67.5	46 23.5	+58.5	68.5	46 45.1	+58.7	69.5	49
50	44 51.5	+56.0	62.5	45 18.8	+56.4	63.4	45 45.2	+56.9	64.3	46 10.8	+57.3	65.2	46 35.5	+57.7	66.2	46 59.2	+58.1	67.2	47 22.0	+58.4	68.2	47 43.8	+58.8	69.2	50
51	45 47.5	+55.8	62.0	46 15.2	+56.3	62.9	46 42.1	+56.8	63.8	47 08.1	+57.2	64.8	47 33.2	+57.6	65.8	47 57.3	+58.0	66.8	48 20.4	+58.4	67.8	48 42.6	+58.7	68.9	51
52	46 43.3	+55.7	61.5	47 11.5	+56.2	62.4	47 38.9	+56.6	63.4	48 05.3	+57.1	64.4	48 30.8	+57.5	65.4	48 55.3	+57.9	66.4	49 18.8	+58.3	67.5	49 41.3	+58.6	68.6	52
53	47 39.0	+55.5	60.9	48 07.7	+56.0	61.9	48 35.5	+56.5	62.9	49 02.4	+57.0	63.9	49 28.3	+57.4	64.9	49 53.2	+57.9	66.0	50 17.1	+58.2	67.1	50 39.9	+58.5	68.2	53
54	48 34.5	+55.3	60.3	49 03.7	+55.9	61.3	49 32.0	+56.4	62.4	49 59.4	+56.8	63.4	50 25.7	+57.3	64.5	50 51.1	+57.7	65.6	51 15.3	+58.1	66.7	51 38.4	+58.6	67.9	54
55	49 29.8	+55.2	59.7	49 59.6	+55.7	60.8	50 28.4	+56.2	61.8	50 56.2	+56.8	62.9	51 23.0	+57.2	64.0	51 48.8	+57.6	65.2	52 13.4	+58.1	66.3	52 37.0	+58.4	67.5	55
56	50 25.0	+55.0	59.1	50 55.3	+55.5	60.2	51 24.6	+56.1	61.3	51 53.0	+56.5	62.4	52 20.2	+57.1	63.5	52 46.4	+57.6	64.7	53 11.5	+58.0	65.9	53 35.4	+58.4	67.1	56
57	51 20.0	+54.7	58.5	51 50.8	+55.3	59.6	52 20.7	+55.9	60.7	52 49.5	+56.5	61.8	53 17.3	+56.9	63.0	53 44.0	+57.4	64.2	54 09.5	+57.8	65.5	54 33.8	+58.2	66.8	57
58	52 14.7	+54.5	57.8	52 46.1	+55.2	59.0	53 16.6	+55.7	60.1	53 46.0	+56.2	61.3	54 14.2	+56.8	62.5	54 41.4	+57.3	63.7	55 07.3	+57.8	65.0	55 32.0	+58.2	66.3	58
59	53 09.2	+54.3	57.2	53 41.3	+54.8	58.3	54 12.3	+55.5	59.5	54 42.2	+56.1	60.7	55 11.0	+56.6	61.9	55 38.7	+57.1	63.2	56 05.1	+57.6	64.5	56 30.2	+58.1	65.9	59
60	54 03.5	+54.0	56.4	54 36.1	+54.7	57.6	55 07.8	+55.2	58.8	55 38.3	+55.8	60.1	56 07.6	+56.5	61.3	56 35.8	+57.0	62.7	57 02.7	+57.5	64.0	57 28.3	+58.0	65.4	60
61	54 57.5	+53.7	55.7	55 30.8	+54.4	56.9	56 03.0	+55.0	58.1	56 34.1	+55.7	59.4	57 04.1	+56.2	60.7	57 32.8	+56.8	62.1	58 00.2	+57.4	63.5	58 26.3	+57.9	65.0	61
62	55 51.2	+53.4	54.9	56 25.2	+54.0	56.1	56 58.0	+54.8	57.4	57 29.8	+55.4	58.7	58 00.3	+56.1	60.1	58 29.6	+56.7	61.5	58 57.6	+57.2	62.9	59 24.2	+57.7	64.4	62
63	56 44.6	+53.0	54.1	57 19.2	+53.8	55.3	57 52.8	+54.5	56.6	58 25.2	+55.2	58.0	58 56.4	+55.8	59.4	59 26.3	+56.4	60.8	59 54.8	+57.1	62.4	60 21.9	+57.6	63.9	63
64	57 37.6	+52.7	53.2	58 13.0	+53.4	54.5	58 47.3	+54.1	55.8	59 20.4	+54.8	57.2	59 52.2	+55.6	58.7	60 22.7	+56.3	60.2	60 51.9	+56.8	61.7	61 19.5	+57.5	63.3	64
65	58 30.3	+52.3	52.3	59 06.4	+53.1	53.6	59 41.4	+53.9	55.0	60 15.2	+54.6	56.4	60 47.8	+55.3	57.9	61 19.0	+56.0	59.5	61 48.7	+56.7	61.1	62 17.0	+57.3	62.7	65
66	59 22.6	+51.8	51.4	59 59.5	+52.6	52.7	60 35.3	+53.4	54.1	61 09.8	+54.2	55.6	61 43.1	+55.0	57.1	62 15.0	+55.7	58.7	62 45.4	+56.4	60.4	63 14.3	+57.1	62.1	66
67	60 14.4	+51.4	50.4	60 52.1	+52.2	51.7	61 28.7	+53.0	53.2	62 04.0	+53.9	54.7	62 38.1	+54.6	56.2	63 10.7	+55.4	57.9	63 41.8	+56.2	59.6	64 11.4	+56.9	61.4	67
68	61 05.8	+50.8	49.3	61 44.3	+51.8	50.7	62 21.7	+52.6	52.2	62 57.9	+53.5	53.7	63 32.7	+54.3	55.3	64 06.1	+55.1	57.0	64 38.0	+55.9	58.8	65 08.3	+56.6	60.6	68
69	61 56.6	+50.3	48.2	62 36.1	+51.1	49.6	63 14.3	+52.1	51.1	63 51.4	+52.9	52.7	64 27.0	+53.9	54.4	65 01.2	+54.8	56.1	65 33.9	+55.6	57.9	66 04.9	+56.4	59.8	69
70	62 46.9	+49.6	47.0	63 27.2	+50.6	48.5	64 06.4	+51.6	50.0	64 44.3	+52.5	51.6	65 20.9	+53.4	53.3	65 56.0	+54.3	55.1	66 29.5	+55.2	57.0	67 01.3	+56.1	59.0	70
71	63 36.5	+49.0	45.8	64 17.8	+50.0	47.2	64 58.0	+50.9	48.8	65 36.8	+52.0	50.5	66 14.3	+52.9	52.2	66 50.3	+53.9	54.1	67 24.7	+54.8	56.0	67 57.4	+55.7	58.0	71
72	64 25.5	+48.2	44.4	65 07.8	+49.2	45.9	65 48.9	+50.3	47.5	66 28.8	+51.3	49.2	67 07.2	+52.4	51.0	67 44.2	+53.4	52.9	68 19.5	+54.4	54.9	68 53.1	+55.3	57.0	72
73	65 13.7	+47.4	43.0	65 57.0	+48.5	44.6	66 39.2	+49.5	46.2	67 20.1	+50.6	47.9	67 59.6	+51.7	49.7	68 37.6	+52.7	51.7	69 13.9	+53.9	53.8	69 48.4	+55.0	55.9	73
74	66 01.1	+46.5	41.6	66 45.5	+47.5	43.1	67 28.7	+48.7	44.7	68 10.7	+49.8	46.5	68 51.3	+50.9	48.4	69 30.3	+52.2	50.4	70 07.8	+53.2	52.5	70 43.4	+54.3	54.8	74
75	66 47.6	+45.4	40.0	67 33.0	+46.6	41.5	68 17.4	+47.7	43.2	69 00.5	+48.9	45.0	69 42.2	+50.2	46.9	70 22.5	+51.3	48.9	71 01.0	+52.6	51.1	71 37.7	+53.9	53.4	75
76	67 33.0	+44.4	38.3	68 19.6	+45.5	39.8	69 05.1	+46.7	41.5	69 49.4	+48.0	43.3	70 32.4	+49.2	45.3	71 13.8	+50.5	47.3	71 53.6	+51.8	49.6	72 31.6	+53.1	52.0	76
77	68 17.4	+43.1	36.5	69 05.1	+44.3	38.1	69 51.8	+45.6	39.7	70 37.4	+46.8	41.5	71 21.6	+48.1	43.5	72 04.3	+49.6	45.6	72 45.4	+51.0	47.9	73 24.7	+52.3	50.4	77
78	69 00.5	+41.7	34.6	69 49.4	+43.0	36.1	70 37.4	+44.2	37.8	71 24.2	+45.5	39.6	72 09.7	+47.0	41.6	72 53.9	+48.3	43.8	73 36.4	+49.8	46.1	74 17.0	+51.4	48.7	78
79	69 42.2	+40.3	32.6	70 32.4	+41.4	34.1	71 21.6	+42.7	35.7	72 09.7	+44.2	37.5	72 56.7	+45.5	39.5	73 42.2	+47.1	41.7	74 26.2	+48.7	44.1	75 08.4	+50.2	46.7	79
80	70 22.5	+38.5	30.4	71 13.8	+39.8	31.9	72 04.3	+41.1	33.5	72 53.9	+42.5	35.3	73 42.2	+44.0	37.3	74 29.3	+45.6	39.4	75 14.9	+47.2	41.8	75 58.6	+49.0	44.5	80
81	71 01.0	+36.7	28.1	71 53.6	*+38.0*•	29.5	72 45.4	*+39.3*•	31.1	73 36.4	*+40.6*•	32.8	74 26.2	*+42.2*•	34.8	75 14.9	+43.7	36.9	76 02.1	+45.5	39.3	76 47.6	+47.3	42.0	81
82	71 37.7	*+34.7*•	25.6	72 31.6	*+35.8*•	27.0	73 24.7	*+37.1*•	28.5	74 17.0	*+38.5*•	30.2	75 08.4	*+40.0*•	32.1	75 58.6	*+41.7*•	34.2	76 47.6	*+43.5*•	36.6	77 34.9	*+45.4*•	39.3	82
83	72 12.4	*+32.5*•	23.0	73 07.4	*+33.6*•	24.2	74 01.8	*+34.8*•	25.7	74 55.5	*+36.2*•	27.3	75 48.4	*+37.7*•	29.1	76 40.3	*+39.3*•	31.1	77 31.1	*+41.1*•	33.5	78 20.3	*+43.2*•	36.1	83
84	72 44.9	*+30.0*•	20.2	73 41.0	*+31.0*•	21.3	74 36.6	*+32.2*•	22.7	75 31.7	*+33.5*•	24.2	76 26.1	*+34.9*•	25.8	77 19.6	*+36.5*•	27.8	78 12.2	*+38.3*•	30.0	79 03.5	*+40.3*•	32.6	84
85	73 14.9	*+27.3*•	17.2	74 12.0	*+28.3*•	18.2	75 08.8	*+29.3*•	19.4	76 05.2	*+30.4*•	20.8	77 01.0	*+31.7*•	22.3	77 56.1	*+33.3*•	24.1	78 50.5	*+35.0*•	26.1	79 43.8	*+36.9*•	28.6	85
86	73 42.2	*+24.4*•	14.1	74 40.3	*+25.1*•	15.0	75 38.1	*+26.0*•	16.0	76 35.6	*+27.1*•	17.1	77 32.7	*+28.3*•	18.4	78 29.4	*+29.5*•	20.0	79 25.5	*+31.0*•	21.8	80 20.7	*+32.9*•	24.0	86
87	74 06.6	*+21.2*•	10.8	75 05.4	*+21.9*•	11.5	76 04.1	*+22.6*•	12.3	77 02.7	*+23.3*•	13.2	78 01.0	*+24.2*•	14.3	78 58.9	*+25.3*•	15.5	79 56.5	*+26.6*•	17.0	80 53.6	*+28.1*•	18.9	87
88	74 27.8	*+17.9*•	7.3	75 27.3	*+18.2*•	7.8	76 26.7	*+18.7*•	8.4	77 26.0	*+19.2*•	9.0	78 25.2	*+19.8*•	9.8	79 24.2	*+20.5*•	10.7	80 23.1	*+21.3*•	11.8	81 21.7	*+22.4*•	13.1	88
89	74 45.7	*+14.3*•	3.7	75 45.5	*+14.5*•	4.0	76 45.4	*+14.6*•	4.3	77 45.2	*+14.8*•	4.6	78 45.0	*+15.0*•	5.0	79 44.7	*+15.3*•	5.5	80 44.4	*+15.6*•	6.1	81 44.1	*+15.9*•	6.8	89
90	75 00.0	*+10.6*•	0.0	76 00.0	*+10.4*•	0.0	77 00.0	*+10.3*•	0.0	78 00.0	*+10.1*•	0.0	79 00.0	*+9.9*•	0.0	80 00.0	*+9.6*•	0.0	81 00.0	*+9.2*•	0.0	82 00.0	*+8.8*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 102°, 258°

79°, 281° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 49.8	+58.1	100.6	2 38.7	+58.3	100.7	2 27.6	+58.5	100.7	2 16.4	+58.8	100.8	2 05.2	+58.9	100.8	1 53.9	+59.1	100.8	1 42.6	+59.3	100.9	1 31.3	+59.4	100.9	**0**
1	3 47.9	+58.0	100.4	3 37.0	+58.3	100.4	3 26.1	+58.5	100.5	3 15.2	+58.7	100.6	3 04.1	+59.0	100.6	2 53.0	+59.2	100.7	2 41.9	+59.3	100.7	2 30.7	+59.5	100.8	**1**
2	4 45.9	+58.0	100.1	4 35.3	+58.3	100.2	4 24.6	+58.5	100.3	4 13.9	+58.7	100.4	4 03.1	+58.9	100.4	3 52.2	+59.1	100.5	3 41.2	+59.3	100.6	3 30.2	+59.4	100.6	**2**
3	5 43.9	+58.0	99.9	5 33.6	+58.2	100.0	5 23.1	+58.5	100.1	5 12.6	+58.7	100.2	5 02.0	+58.9	100.2	4 51.3	+59.1	100.3	4 40.5	+59.3	100.4	4 29.6	+59.4	100.5	**3**
4	6 41.9	+58.0	99.6	6 31.8	+58.3	99.7	6 21.6	+58.5	99.8	6 11.3	+58.8	99.9	6 00.9	+58.9	100.0	5 50.4	+59.1	100.2	5 39.8	+59.2	100.3	5 29.0	+59.5	100.3	**4**
5	7 39.9	+58.0	99.4	7 30.1	+58.2	99.5	7 20.1	+58.5	99.6	7 10.1	+58.7	99.7	6 59.8	+59.0	99.9	6 49.5	+59.1	100.0	6 39.0	+59.3	100.1	6 28.5	+59.4	100.2	**5**
6	8 37.9	+58.0	99.1	8 28.3	+58.3	99.2	8 18.6	+58.5	99.4	8 08.8	+58.7	99.5	7 58.8	+58.9	99.7	7 48.6	+59.1	99.8	7 38.3	+59.3	99.9	7 27.9	+59.4	100.1	**6**
7	9 35.9	+57.9	98.8	9 26.6	+58.2	99.0	9 17.1	+58.5	99.2	9 07.5	+58.7	99.3	8 57.7	+58.9	99.5	8 47.7	+59.1	99.6	8 37.6	+59.3	99.8	8 27.3	+59.5	99.9	**7**
8	10 33.8	+58.0	98.6	10 24.8	+58.2	98.8	10 15.6	+58.5	98.9	10 06.2	+58.7	99.1	9 56.6	+58.9	99.3	9 46.8	+59.1	99.5	9 36.9	+59.2	99.6	9 26.8	+59.4	99.8	**8**
9	11 31.8	+57.9	98.3	11 23.0	+58.2	98.5	11 14.1	+58.4	98.7	11 04.9	+58.7	98.9	10 55.5	+58.9	99.1	10 45.9	+59.1	99.3	10 36.1	+59.3	99.5	10 26.2	+59.4	99.6	**9**
10	12 29.7	+58.0	98.0	12 21.2	+58.2	98.3	12 12.5	+58.4	98.5	12 03.6	+58.6	98.7	11 54.4	+58.9	98.9	11 45.0	+59.1	99.1	11 35.4	+59.3	99.3	11 25.6	+59.4	99.5	**10**
11	13 27.7	+57.9	97.8	13 19.4	+58.2	98.0	13 10.9	+58.5	98.2	13 02.2	+58.7	98.5	12 53.3	+58.8	98.7	12 44.1	+59.0	98.9	12 34.7	+59.2	99.1	12 25.0	+59.4	99.4	**11**
12	14 25.6	+57.9	97.5	14 17.6	+58.2	97.8	14 09.4	+58.4	98.0	14 00.9	+58.6	98.3	13 52.1	+58.9	98.5	13 43.1	+59.1	98.7	13 33.9	+59.2	99.0	13 24.4	+59.4	99.2	**12**
13	15 23.5	+57.8	97.2	15 15.8	+58.1	97.5	15 07.8	+58.4	97.8	14 59.5	+58.7	98.0	14 51.0	+58.9	98.3	14 42.2	+59.1	98.6	14 33.1	+59.3	98.8	14 23.8	+59.4	99.1	**13**
14	16 21.3	+57.9	97.0	16 13.9	+58.1	97.2	16 06.2	+58.4	97.5	15 58.2	+58.6	97.8	15 49.9	+58.8	98.1	15 41.3	+59.0	98.4	15 32.4	+59.2	98.7	15 23.2	+59.4	98.9	**14**
15	17 19.2	+57.8	96.7	17 12.0	+58.1	97.0	17 04.6	+58.3	97.3	16 56.8	+58.6	97.6	16 48.7	+58.9	97.9	16 40.3	+59.1	98.2	16 31.6	+59.2	98.5	16 22.6	+59.4	98.8	**15**
16	18 17.0	+57.8	96.4	18 10.1	+58.1	96.7	18 02.9	+58.4	97.1	17 55.4	+58.6	97.4	17 47.6	+58.8	97.7	17 39.4	+59.0	98.0	17 30.8	+59.2	98.3	17 22.0	+59.4	98.6	**16**
17	19 14.8	+57.8	96.1	19 08.2	+58.1	96.5	19 01.3	+58.3	96.8	18 54.0	+58.6	97.1	18 46.4	+58.8	97.5	18 38.4	+59.0	97.8	18 30.0	+59.2	98.2	18 21.4	+59.3	98.5	**17**
18	20 12.6	+57.7	95.8	20 06.3	+58.0	96.2	19 59.6	+58.3	96.6	19 52.6	+58.6	96.9	19 45.2	+58.8	97.3	19 37.4	+59.0	97.6	19 29.2	+59.2	98.0	19 20.7	+59.4	98.3	**18**
19	21 10.3	+57.7	95.5	21 04.3	+58.0	95.9	20 57.9	+58.3	96.3	20 51.2	+58.5	96.7	20 44.0	+58.7	97.1	20 36.4	+59.0	97.4	20 28.4	+59.2	97.8	20 20.1	+59.4	98.2	**19**
20	22 08.0	+57.7	95.2	22 02.3	+58.0	95.6	21 56.2	+58.3	96.1	21 49.7	+58.5	96.4	21 42.7	+58.8	96.8	21 35.4	+59.0	97.2	21 27.6	+59.2	97.6	21 19.5	+59.3	98.0	**20**
21	23 05.7	+57.7	94.9	23 00.3	+58.0	95.4	22 54.5	+58.2	95.8	22 48.2	+58.5	96.2	22 41.5	+58.7	96.6	22 34.4	+58.9	97.0	22 26.8	+59.2	97.5	22 18.8	+59.3	97.9	**21**
22	24 03.4	+57.6	94.6	23 58.3	+57.9	95.1	23 52.7	+58.2	95.5	23 46.7	+58.5	96.0	23 40.2	+58.8	96.4	23 33.3	+59.0	96.8	23 26.0	+59.1	97.3	23 18.1	+59.4	97.7	**22**
23	25 01.0	+57.6	94.3	24 56.2	+57.9	94.8	24 50.9	+58.2	95.3	24 45.2	+58.4	95.7	24 39.0	+58.7	96.2	24 32.3	+58.9	96.6	24 25.1	+59.1	97.1	24 17.5	+59.3	97.5	**23**
24	25 58.6	+57.5	94.0	25 54.1	+57.8	94.5	25 49.1	+58.2	95.0	25 43.6	+58.5	95.5	25 37.7	+58.7	96.0	25 31.2	+58.9	96.4	25 24.2	+59.2	96.9	25 16.8	+59.3	97.4	**24**
25	26 56.1	+57.5	93.7	26 51.9	+57.9	94.2	26 47.3	+58.1	94.7	26 42.1	+58.4	95.2	26 36.4	+58.6	95.7	26 30.1	+58.9	96.2	26 23.4	+59.1	96.7	26 16.1	+59.3	97.2	**25**
26	27 53.6	+57.4	93.4	27 49.8	+57.7	93.9	27 45.4	+58.1	94.4	27 40.5	+58.3	95.0	27 35.0	+58.6	95.5	27 29.0	+58.9	96.0	27 22.5	+59.0	96.5	27 15.4	+59.3	97.0	**26**
27	28 51.0	+57.4	93.1	28 47.5	+57.8	93.6	28 43.5	+58.0	94.2	28 38.8	+58.4	94.7	28 33.6	+58.6	95.2	28 27.9	+58.8	95.8	28 21.5	+59.1	96.3	28 14.7	+59.2	96.9	**27**
28	29 48.4	+57.4	92.7	29 45.3	+57.7	93.3	29 41.5	+58.0	93.9	29 37.2	+58.3	94.4	29 32.2	+58.6	95.0	29 26.7	+58.9	95.6	29 20.6	+59.1	96.1	29 13.9	+59.3	96.7	**28**
29	30 45.8	+57.3	92.4	30 43.0	+57.6	93.0	30 39.5	+58.0	93.6	30 35.5	+58.3	94.2	30 30.8	+58.6	94.7	30 25.6	+58.8	95.3	30 19.7	+59.0	95.9	30 13.2	+59.2	96.5	**29**
30	31 43.1	+57.2	92.0	31 40.6	+57.6	92.7	31 37.5	+57.9	93.3	31 33.8	+58.2	93.9	31 29.4	+58.5	94.5	31 24.4	+58.7	95.1	31 18.7	+59.0	95.7	31 12.4	+59.2	96.3	**30**
31	32 40.3	+57.2	91.7	32 38.2	+57.5	92.3	32 35.4	+57.9	93.0	32 32.0	+58.2	93.6	32 27.9	+58.5	94.2	32 23.1	+58.8	94.9	32 17.7	+59.0	95.5	32 11.6	+59.2	96.1	**31**
32	33 37.5	+57.1	91.3	33 35.7	+57.5	92.0	33 33.3	+57.8	92.6	33 30.2	+58.1	93.3	33 26.4	+58.4	94.0	33 21.9	+58.7	94.6	33 16.7	+59.0	95.3	33 10.8	+59.2	95.9	**32**
33	34 34.6	+57.0	90.9	34 33.2	+57.4	91.6	34 31.1	+57.8	92.3	34 28.3	+58.2	93.0	34 24.8	+58.4	93.7	34 20.6	+58.7	94.4	34 15.7	+58.9	95.1	34 10.0	+59.2	95.7	**33**
34	35 31.6	+57.0	90.6	35 30.6	+57.4	91.3	35 28.9	+57.7	92.0	35 26.5	+58.0	92.7	35 23.2	+58.4	93.4	35 19.3	+58.7	94.1	35 14.6	+58.9	94.8	35 09.2	+59.1	95.5	**34**
35	36 28.6	+56.8	90.2	36 28.0	+57.3	90.9	36 26.6	+57.7	91.7	36 24.5	+58.0	92.4	36 21.6	+58.4	93.1	36 18.0	+58.6	93.9	36 13.5	+58.9	94.6	36 08.3	+59.2	95.3	**35**
36	37 25.4	+56.9	89.8	37 25.3	+57.2	90.5	37 24.3	+57.6	91.3	37 22.5	+58.0	92.1	37 20.0	+58.2	92.8	37 16.6	+58.6	93.6	37 12.4	+58.9	94.4	37 07.5	+59.1	95.1	**36**
37	38 22.3	+56.7	89.4	38 22.5	+57.1	90.2	38 21.9	+57.5	91.0	38 20.5	+57.9	91.7	38 18.2	+58.3	92.5	38 15.2	+58.5	93.3	38 11.3	+58.8	94.1	38 06.6	+59.0	94.9	**37**
38	39 19.0	+56.6	89.0	39 19.6	+57.1	89.8	39 19.4	+57.5	90.6	39 18.4	+57.8	91.4	39 16.5	+58.2	92.2	39 13.7	+58.5	93.0	39 10.1	+58.8	93.9	39 05.6	+59.1	94.7	**38**
39	40 15.6	+56.5	88.5	40 16.7	+57.0	89.4	40 16.9	+57.4	90.2	40 16.2	+57.8	91.1	40 14.7	+58.1	91.9	40 12.2	+58.5	92.8	40 08.9	+58.8	93.6	40 04.7	+59.0	94.4	**39**
40	41 12.1	+56.4	88.1	41 13.7	+56.9	89.0	41 14.3	+57.3	89.8	41 14.0	+57.7	90.7	41 12.8	+58.1	91.6	41 10.7	+58.4	92.5	41 07.7	+58.7	93.3	41 03.7	+59.0	94.2	**40**
41	42 08.5	+56.4	87.6	42 10.6	+56.7	88.5	42 11.6	+57.2	89.4	42 11.7	+57.7	90.3	42 10.9	+58.0	91.3	42 09.1	+58.4	92.2	42 06.4	+58.7	93.1	42 02.7	+59.0	94.0	**41**
42	43 04.9	+56.1	87.2	43 07.3	+56.7	88.1	43 08.8	+57.2	89.0	43 09.4	+57.5	90.0	43 08.9	+58.0	90.9	43 07.5	+58.3	91.8	43 05.1	+58.6	92.8	43 01.7	+58.9	93.7	**42**
43	44 01.0	+56.1	86.7	44 04.0	+56.6	87.6	44 06.0	+57.0	88.6	44 06.9	+57.5	89.6	44 06.9	+57.9	90.5	44 05.8	+58.2	91.5	44 03.7	+58.6	92.5	44 00.6	+58.9	93.4	**43**
44	44 57.1	+55.9	86.2	45 00.6	+56.4	87.2	45 03.0	+57.0	88.2	45 04.4	+57.4	89.2	45 04.8	+57.8	90.2	45 04.0	+58.2	91.2	45 02.3	+58.5	92.2	44 59.5	+58.8	93.2	**44**
45	45 53.0	+55.8	85.7	45 57.0	+56.4	86.7	46 00.0	+56.8	87.7	46 01.8	+57.3	88.8	46 02.6	+57.7	89.8	46 02.2	+58.2	90.8	46 00.8	+58.5	91.9	45 58.3	+58.8	92.9	**45**
46	46 48.8	+55.7	85.1	46 53.4	+56.2	86.2	46 56.8	+56.7	87.3	46 59.1	+57.2	88.3	47 00.3	+57.7	89.4	47 00.4	+58.0	90.5	46 59.3	+58.4	91.5	46 57.1	+58.8	92.6	**46**
47	47 44.5	+55.4	84.6	47 49.6	+56.0	85.7	47 53.5	+56.6	86.8	47 56.3	+57.1	87.9	47 58.0	+57.5	89.0	47 58.4	+58.0	90.1	47 57.7	+58.4	91.2	47 55.9	+58.7	92.3	**47**
48	48 39.9	+55.3	84.0	48 45.6	+55.9	85.1	48 50.1	+56.5	86.3	48 53.4	+57.0	87.4	48 55.5	+57.5	88.6	48 56.4	+57.9	89.7	48 56.1	+58.3	90.9	48 54.6	+58.7	92.0	**48**
49	49 35.2	+55.1	83.4	49 41.5	+55.7	84.6	49 46.6	+56.3	85.8	49 50.4	+56.8	86.9	49 53.0	+57.3	88.1	49 54.3	+57.8	89.3	49 54.4	+58.3	90.5	49 53.3	+58.6	91.7	**49**
50	50 30.3	+54.9	82.8	50 37.2	+55.6	84.0	50 42.9	+56.1	85.2	50 47.2	+56.8	86.4	50 50.3	+57.3	87.7	50 52.1	+57.8	88.9	50 52.7	+58.1	90.1	50 51.9	+58.5	91.3	**50**
51	51 25.2	+54.7	82.2	51 32.8	+55.3	83.4	51 39.0	+56.0	84.7	51 44.0	+56.5	85.9	51 47.6	+57.1	87.2	51 49.9	+57.6	88.5	51 50.8	+58.1	89.7	51 50.4	+58.5	91.0	**51**
52	52 19.9	+54.5	81.5	52 28.1	+55.2	82.8	52 35.0	+55.8	84.1	52 40.5	+56.5	85.4	52 44.7	+57.0	86.7	52 47.5	+57.5	88.0	52 48.9	+58.0	89.3	52 48.9	+58.4	90.6	**52**
53	53 14.4	+54.2	80.8	53 23.3	+54.9	82.1	53 30.8	+55.6	83.5	53 37.0	+56.2	84.8	53 41.7	+56.8	86.2	53 45.0	+57.4	87.5	53 46.9	+57.9	88.9	53 47.3	+58.4	90.2	**53**
54	54 08.6	+53.9	80.1	54 18.2	+54.7	81.4	54 26.4	+55.4	82.8	54 33.2	+56.1	84.2	54 38.5	+56.7	85.6	54 42.4	+57.2	87.0	54 44.8	+57.7	88.4	54 45.7	+58.2	89.8	**54**
55	55 02.5	+53.6	79.3	55 12.9	+54.4	80.7	55 21.8	+55.2	82.1	55 29.3	+55.8	83.6	55 35.2	+56.5	85.0	55 39.6	+57.2	86.5	55 42.5	+57.7	88.0	55 43.9	+58.2	89.4	**55**
56	55 56.1	+53.3	78.5	56 07.3	+54.1	80.0	56 17.0	+54.9	81.4	56 25.1	+55.7	82.9	56 31.7	+56.4	84.4	56 36.8	+56.9	85.9	56 40.2	+57.6	87.5	56 42.1	+58.0	89.0	**56**
57	56 49.4	+53.0	77.7	57 01.4	+53.9	79.2	57 11.9	+54.7	80.7	57 20.8	+55.4	82.3	57 28.1	+56.1	83.8	57 33.7	+56.8	85.4	57 37.8	+57.4	86.9	57 40.1	+58.0	88.5	**57**
58	57 42.4	+52.6	76.8	57 55.3	+53.5	78.4	58 06.6	+54.3	79.9	58 16.2	+55.2	81.5	58 24.2	+55.9	83.1	58 30.5	+56.7	84.8	58 35.2	+57.2	86.4	58 38.1	+57.8	88.0	**58**
59	58 35.0	+52.2	75.9	58 48.8	+53.1	77.5	59 00.9	+54.1	79.1	59 11.4	+54.9	80.8	59 20.1	+55.7	82.4	59 27.2	+56.4	84.1	59 32.4	+57.1	85.8	59 35.9	+57.7	87.5	**59**
60	59 27.2	+51.7	74.9	59 41.9	+52.7	76.6	59 55.0	+53.6	78.3	60 06.3	+54.6	80.0	60 15.8	+55.4	81.7	60 23.6	+56.2	83.4	60 29.5	+56.9	85.2	60 33.6	+57.6	87.0	**60**
61	60 18.9	+51.2	73.9	60 34.6	+52.3	75.6	60 48.6	+53.3	77.4	61 00.9	+54.2	79.1	61 11.2	+55.2	80.9	61 19.8	+55.9	82.7	61 26.4	+56.8	84.5	61 31.2	+57.4	86.4	**61**
62	61 10.1	+50.8	72.9	61 26.9	+51.9	74.6	61 41.9	+52.9	76.4	61 55.1	+54.0	78.2	62 06.4	+54.8	80.1	62 15.7	+55.7	82.0	62 23.2	+56.5	83.9	62 28.6	+57.2	85.8	**62**
63	62 00.9	+50.1	71.8	62 18.8	+51.3	73.6	62 34.8	+52.4	75.4	62 49.0	+53.4	77.3	63 01.2	+54.5	79.2	63 11.4	+55.4	81.1	63 19.7	+56.2	83.1	63 25.8	+57.1	85.1	**63**
64	62 51.0	+49.5	70.6	63 10.1	+50.7	72.4	63 27.2	+51.9	74.3	63 42.4	+53.1	76.3	63 55.7	+54.0	78.3	64 06.8	+55.1	80.3	64 15.9	+56.0	82.3	64 22.9	+56.8	84.4	**64**
65	63 40.5	+48.8	69.3	64 00.8	+50.1	71.2	64 19.1	+51.4	73.2	64 35.5	+52.5	75.2	64 49.7	+53.7	77.3	65 01.9	+54.7	79.4	65 11.9	+55.7	81.5	65 19.7	+56.5	83.6	**65**
66	64 29.3	+48.1	68.0	64 50.9	+49.4	70.0	65 10.5	+50.7	72.0	65 28.0	+52.0	74.1	65 43.4	+53.2	76.2	65 56.6	+54.3	78.4	66 07.6	+55.3	80.6	66 16.2	+56.3	82.8	**66**
67	65 17.4	+47.2	66.6	65 40.3	+48.6	68.6	66 01.2	+50.0	70.7	66 20.0	+51.3	72.8	66 36.6	+52.6	75.0	66 50.9	+53.8	77.3	67 02.9	+55.0	79.6	67 12.5	+56.0	81.9	**67**
68	66 04.6	+46.3	65.1	66 28.9	+47.8	67.2	66 51.2	+49.2	69.3	67 11.3	+50.7	71.5	67 29.2	+52.0	73.8	67 44.7	+53.3	76.2	67 57.9	+54.5	78.6	68 08.5	+55.6	81.0	**68**
69	66 50.9	+45.3	63.5	67 16.7	+46.8	65.6	67 40.4	+48.4	67.8	68 02.0	+49.8	70.1	68 21.2	+51.3	72.5	68 38.0	+52.8	74.9	68 52.4	+54.0	77.4	69 04.1	+55.3	80.0	**69**
70	67 36.2	+44.1	61.8	68 03.5	+45.8	64.0	68 28.8	+47.4	66.2	68 51.8	+49.0	68.6	69 12.5	+50.6	71.1	69 30.8	+52.0	73.6	69 46.4	+53.5	76.2	69 59.4	+54.7	78.9	**70**
71	68 20.3	+42.9	60.0	68 49.3	+44.6	62.2	69 16.2	+46.3	64.5	69 40.8	+48.1	67.0	70 03.1	+49.7	69.5	70 22.8	+51.3	72.1	70 39.9	+52.8	74.8	70 54.1	+54.3	77.6	**71**
72	69 03.2	+41.5	58.0	69 33.9	+43.3	60.3	70 02.5	+45.2	62.7	70 28.9	+46.9	65.2	70 52.8	+48.7	67.8	71 14.1	+50.4	70.6	71 32.7	+52.1	73.4	71 48.4	+53.6	76.3	**72**
73	69 44.7	+39.9	56.0	70 17.2	+41.9	58.3	70 47.7	+43.7	60.7	71 15.8	+45.7	63.3	71 41.5	+47.6	66.0	72 04.5	+49.5	68.8	72 24.8	+51.2	71.8	72 42.0	+52.9	74.8	**73**
74	70 24.6	+38.3	53.8	70 59.1	+40.2	56.1	71 31.4	+42.3	58.6	72 01.5	+44.3	61.3	72 29.1	+46.3	64.0	72 54.0	+48.3	67.0	73 16.0	+50.2	70.0	73 34.9	+52.1	73.2	**74**
75	71 02.9	+36.4	51.5	71 39.3	+38.5	53.8	72 13.7	+40.5	56.3	72 45.8	+42.6	59.0	73 15.4	+44.8	61.9	73 42.3	+46.9	64.9	74 06.2	+49.1	68.1	74 27.0	+51.1	71.4	**75**
76	71 39.3	*+34.4*•	49.0	72 17.8	*+36.4*•	51.3	72 54.2	*+38.6*•	53.9	73 28.4	+40.9	56.6	74 00.2	+43.1	59.5	74 29.2	+45.5	62.6	74 55.3	+47.7	65.9	75 18.1	+50.0	69.4	**76**
77	72 13.7	*+32.1*•	46.3	72 54.2	*+34.2*•	48.7	73 32.8	*+36.5*•	51.2	74 09.3	*+38.8*•	54.0	74 43.3	*+41.2*•	56.9	75 14.7	+43.6	60.1	75 43.0	+46.1	63.5	76 08.1	+48.5	67.1	**77**
78	72 45.8	*+29.6*•	43.5	73 28.4	*+31.8*•	45.8	74 09.3	*+34.0*•	48.4	74 48.1	*+36.4*•	51.1	75 24.5	*+39.0*•	54.1	75 58.3	*+41.6*•	57.3	76 29.1	*+44.3*•	60.8	76 56.6	+46.9	64.6	**78**
79	73 15.4	*+26.9*•	40.6	74 00.2	*+29.0*•	42.8	74 43.3	*+31.4*•	45.3	75 24.5	*+33.8*•	48.0	76 03.5	*+36.4*•	51.0	76 39.9	*+39.1*•	54.3	77 13.4	*+42.0*•	57.9	77 43.5	*+45.0*•	61.8	**79**
80	73 42.3	*+23.9*•	37.4	74 29.2	*+26.1*•	39.6	75 14.7	*+28.3*•	42.0	75 58.3	*+30.8*•	44.7	76 39.9	*+33.5*•	47.6	77 19.0	*+36.4*•	50.9	77 55.4	*+39.3*•	54.6	78 28.5	*+42.5*•	58.6	**80**
81	74 06.2	*+20.8*•	34.1	74 55.3	*+22.8*•	36.2	75 43.0	*+25.1*•	38.5	76 29.1	*+27.5*•	41.1	77 13.4	*+30.1*•	44.0	77 55.4	*+33.1*•	47.2	78 34.7	*+36.3*•	50.8	79 11.0	*+39.5*•	54.9	**81**
82	74 27.0	*+17.4*•	30.6	75 18.1	*+19.4*•	32.6	76 08.1	*+21.4*•	34.8	76 56.6	*+23.9*•	37.2	77 43.5	*+26.5*•	40.0	78 28.5	*+29.3*•	43.1	79 11.0	*+32.5*•	46.7	79 50.5	*+36.1*•	50.8	**82**
83	74 44.4	*+13.9*•	27.0	75 37.5	*+15.6*•	28.8	76 29.5	*+17.6*•	30.8	77 20.5	*+19.7*•	33.1	78 10.0	*+22.3*•	35.7	78 57.8	*+25.1*•	38.7	79 43.5	*+28.3*•	42.1	80 26.6	*+31.9*•	46.1	**83**
84	74 58.3	*+10.1*•	23.3	75 53.1	*+11.6*•	24.9	76 47.1	*+13.4*•	26.7	77 40.2	*+15.4*•	28.7	78 32.3	*+17.6*•	31.1	79 22.9	*+20.3*•	33.8	80 11.8	*+23.3*•	37.1	80 58.5	*+26.8*•	40.9	**84**
85	75 08.4	*+6.2*•	19.5	76 04.7	*+7.6*•	20.8	77 00.5	*+9.0*•	22.4	77 55.6	*+10.8*•	24.1	78 49.9	*+12.8*•	26.2	79 43.2	*+15.1*•	28.6	80 35.1	*+17.8*•	31.5	81 25.3	*+21.1*•	35.0	**85**
86	75 14.6	*+2.3*•	15.6	76 12.3	*+3.3*•	16.7	77 09.5	*+4.5*•	17.9	78 06.4	*+5.9*•	19.4	79 02.7	*+7.5*•	21.1	79 58.3	*+9.4*•	23.2	80 52.9	*+11.7*•	25.6	81 46.4	*+14.4*•	28.6	**86**
87	75 16.9	*–1.7*•	11.7	76 15.6	*–1.0*•	12.5	77 14.0	*–0.1*•	13.4	78 12.3	*+0.9*•	14.6	79 10.2	*+2.0*•	15.9	80 07.7	*+3.4*•	17.4	81 04.6	*+5.2*•	19.3	82 00.8	*+7.3*•	21.7	**87**
88	75 15.2	*–5.7*•	7.7	76 14.6	*–5.2*•	8.3	77 13.9	*–4.7*•	8.9	78 13.2	*–4.2*•	9.7	79 12.2	*–3.4*•	10.5	80 11.1	*–2.6*•	11.6	81 09.8	*–1.6*•	12.9	82 08.1	*–0.3*•	14.5	**88**
89	75 09.5	*–9.5*•	3.8	76 09.4	*–9.4*•	4.1	77 09.2	*–9.2*•	4.4	78 09.0	*–9.0*•	4.8	79 08.8	*–8.8*•	5.2	80 08.5	*–8.5*•	5.7	81 08.2	*–8.2*•	6.4	82 07.8	*–7.8*•	7.2	**89**
90	75 00.0	*–13.3*•	0.0	76 00.0	*–13.4*•	0.0	77 00.0	*–13.6*•	0.0	78 00.0	*–13.8*•	0.0	79 00.0	*–14.0*•	0.0	80 00.0	*–14.3*•	0.0	81 00.0	*–14.6*•	0.0	82 00.0	*–14.9*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 79°, 281°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 49.8	−58.0	100.6	2 38.7	−58.2	100.7	2 27.6	−58.5	100.7	2 16.4	−58.7	100.8	2 05.2	−58.9	100.8	1 53.9	−59.1	100.8	1 42.6	−59.3	100.9	1 31.3	−59.4	100.9	0
1	1 51.8	−58.0	100.9	1 40.5	−58.3	100.9	1 29.1	−58.5	100.9	1 17.7	−58.8	101.0	1 06.3	−59.0	101.0	0 54.8	−59.1	101.0	0 43.3	−59.2	101.0	0 31.9	−59.5	101.0	1
2	0 53.8	−58.0	101.1	0 42.2	−58.3	101.2	0 30.6	−58.6	101.2	0 18.9	−58.7	101.2	0 07.3	−58.9	101.2	0 04.3	+59.1	78.8	0 15.9	+59.3	78.8	0 27.6	+59.4	78.8	2
3	0 04.2	+58.1	78.6	0 16.1	+58.3	78.6	0 28.0	+58.5	78.6	0 39.8	+58.7	78.6	0 51.6	+59.0	78.6	1 03.4	+59.2	78.7	1 15.2	+59.3	78.7	1 27.0	+59.4	78.7	3
4	1 02.3	+58.0	78.3	1 14.4	+58.3	78.4	1 26.5	+58.5	78.4	1 38.5	+58.8	78.4	1 50.6	+58.9	78.4	2 02.6	+59.1	78.5	2 14.5	+59.3	78.5	2 26.4	+59.5	78.6	4
5	2 00.3	+58.0	78.1	2 12.7	+58.2	78.1	2 25.0	+58.5	78.2	2 37.3	+58.7	78.2	2 49.5	+58.9	78.3	3 01.7	+59.1	78.3	3 13.8	+59.3	78.4	3 25.9	+59.4	78.4	5
6	2 58.3	+58.1	77.8	3 10.9	+58.3	77.9	3 23.5	+58.5	77.9	3 36.0	+58.7	78.0	3 48.4	+59.0	78.1	4 00.8	+59.1	78.1	4 13.1	+59.3	78.2	4 25.3	+59.5	78.3	6
7	3 56.4	+58.0	77.6	4 09.2	+58.3	77.7	4 22.0	+58.5	77.7	4 34.7	+58.8	77.8	4 47.4	+58.9	77.9	4 59.9	+59.1	78.0	5 12.4	+59.3	78.1	5 24.8	+59.4	78.1	7
8	4 54.4	+58.0	77.3	5 07.5	+58.3	77.4	5 20.5	+58.5	77.5	5 33.5	+58.7	77.6	5 46.3	+58.9	77.7	5 59.0	+59.1	77.8	6 11.7	+59.2	77.9	6 24.2	+59.4	78.0	8
9	5 52.4	+58.0	77.1	6 05.8	+58.2	77.2	6 19.0	+58.5	77.3	6 32.2	+58.7	77.4	6 45.2	+58.9	77.5	6 58.1	+59.1	77.6	7 10.9	+59.3	77.7	7 23.6	+59.4	77.9	9
10	6 50.4	+58.0	76.8	7 04.0	+58.3	76.9	7 17.5	+58.5	77.1	7 30.9	+58.7	77.2	7 44.1	+59.0	77.3	7 57.2	+59.1	77.4	8 10.2	+59.3	77.6	8 23.0	+59.5	77.7	10
11	7 48.4	+58.0	76.6	8 02.3	+58.2	76.7	8 16.0	+58.5	76.8	8 29.6	+58.7	77.0	8 43.1	+58.9	77.1	8 56.3	+59.1	77.3	9 09.5	+59.3	77.4	9 22.5	+59.4	77.6	11
12	8 46.4	+58.0	76.3	9 00.5	+58.3	76.5	9 14.5	+58.5	76.6	9 28.3	+58.7	76.8	9 42.0	+58.9	76.9	9 55.4	+59.1	77.1	10 08.8	+59.2	77.3	10 21.9	+59.4	77.4	12
13	9 44.4	+57.9	76.0	9 58.8	+58.2	76.2	10 13.0	+58.4	76.4	10 27.0	+58.7	76.6	10 40.9	+58.9	76.7	10 54.5	+59.1	76.9	11 08.0	+59.3	77.1	11 21.3	+59.4	77.3	13
14	10 42.3	+58.0	75.8	10 57.0	+58.2	76.0	11 11.4	+58.5	76.2	11 25.7	+58.7	76.3	11 39.8	+58.9	76.5	11 53.6	+59.1	76.7	12 07.3	+59.2	77.0	12 20.7	+59.4	77.2	14
15	11 40.3	+57.9	75.5	11 55.2	+58.2	75.7	12 09.9	+58.4	75.9	12 24.4	+58.7	76.1	12 38.7	+58.8	76.3	12 52.7	+59.1	76.6	13 06.5	+59.3	76.8	13 20.1	+59.4	77.0	15
16	12 38.2	+57.9	75.2	12 53.4	+58.2	75.5	13 08.3	+58.5	75.7	13 23.1	+58.6	75.9	13 37.5	+58.9	76.2	13 51.8	+59.0	76.4	14 05.8	+59.2	76.6	14 19.5	+59.4	76.9	16
17	13 36.1	+57.9	75.0	13 51.6	+58.1	75.2	14 06.8	+58.4	75.5	14 21.7	+58.7	75.7	14 36.4	+58.9	76.0	14 50.8	+59.1	76.2	15 05.0	+59.2	76.5	15 18.9	+59.4	76.7	17
18	14 34.0	+57.9	74.7	14 49.7	+58.2	75.0	15 05.2	+58.4	75.2	15 20.4	+58.6	75.5	15 35.3	+58.8	75.8	15 49.9	+59.0	76.0	16 04.2	+59.3	76.3	16 18.3	+59.4	76.6	18
19	15 31.9	+57.9	74.4	15 47.9	+58.1	74.7	16 03.6	+58.4	75.0	16 19.0	+58.6	75.3	16 34.1	+58.8	75.5	16 48.9	+59.1	75.8	17 03.5	+59.2	76.1	17 17.7	+59.4	76.4	19
20	16 29.8	+57.8	74.2	16 46.0	+58.1	74.4	17 02.0	+58.3	74.7	17 17.6	+58.6	75.0	17 32.9	+58.9	75.3	17 48.0	+59.0	75.7	18 02.7	+59.2	76.0	18 17.1	+59.3	76.3	20
21	17 27.6	+57.9	73.9	17 44.1	+58.1	74.2	18 00.3	+58.4	74.5	18 16.2	+58.6	74.8	18 31.8	+58.8	75.1	18 47.0	+59.0	75.5	19 01.9	+59.2	75.8	19 16.4	+59.4	76.1	21
22	18 25.5	+57.8	73.6	18 42.2	+58.1	73.9	18 58.7	+58.3	74.3	19 14.8	+58.6	74.6	19 30.6	+58.8	74.9	19 46.0	+59.0	75.3	20 01.1	+59.2	75.6	20 15.8	+59.4	76.0	22
23	19 23.3	+57.7	73.3	19 40.3	+58.1	73.7	19 57.0	+58.3	74.0	20 13.4	+58.5	74.4	20 29.4	+58.8	74.7	20 45.0	+59.0	75.1	21 00.3	+59.2	75.4	21 15.2	+59.3	75.8	23
24	20 21.0	+57.8	73.0	20 38.4	+58.0	73.4	20 55.3	+58.3	73.8	21 11.9	+58.6	74.1	21 28.2	+58.7	74.5	21 44.0	+59.0	74.9	21 59.5	+59.1	75.3	22 14.5	+59.4	75.7	24
25	21 18.8	+57.7	72.7	21 36.4	+58.0	73.1	21 53.6	+58.3	73.5	22 10.5	+58.5	73.9	22 26.9	+58.8	74.3	22 43.0	+58.9	74.7	22 58.6	+59.2	75.1	23 13.9	+59.3	75.5	25
26	22 16.5	+57.7	72.4	22 34.4	+57.9	72.8	22 51.9	+58.2	73.2	23 09.0	+58.5	73.6	23 25.7	+58.7	74.1	23 41.9	+59.0	74.5	23 57.8	+59.1	74.9	24 13.2	+59.3	75.3	26
27	23 14.2	+57.6	72.1	23 32.3	+58.0	72.6	23 50.1	+58.2	73.0	24 07.5	+58.4	73.4	24 24.4	+58.7	73.8	24 40.9	+58.9	74.3	24 56.9	+59.1	74.7	25 12.5	+59.3	75.2	27
28	24 11.8	+57.6	71.8	24 30.3	+57.9	72.3	24 48.3	+58.2	72.7	25 05.9	+58.5	73.2	25 23.1	+58.7	73.6	25 39.8	+58.9	74.1	25 56.0	+59.2	74.5	26 11.8	+59.3	75.0	28
29	25 09.4	+57.6	71.5	25 28.2	+57.9	72.0	25 46.5	+58.2	72.4	26 04.4	+58.4	72.9	26 21.8	+58.7	73.4	26 38.7	+58.9	73.9	26 55.2	+59.1	74.3	27 11.1	+59.3	74.8	29
30	26 07.0	+57.5	71.2	26 26.1	+57.8	71.7	26 44.7	+58.1	72.2	27 02.8	+58.4	72.7	27 20.5	+58.6	73.1	27 37.6	+58.9	73.6	27 54.3	+59.0	74.1	28 10.4	+59.3	74.7	30
31	27 04.5	+57.5	70.9	27 23.9	+57.8	71.4	27 42.8	+58.1	71.9	28 01.2	+58.4	72.4	28 19.1	+58.6	72.9	28 36.5	+58.8	73.4	28 53.3	+59.1	73.9	29 09.7	+59.2	74.5	31
32	28 02.0	+57.4	70.6	28 21.7	+57.7	71.1	28 40.9	+58.0	71.6	28 59.6	+58.3	72.1	29 17.7	+58.6	72.7	29 35.3	+58.8	73.2	29 52.4	+59.0	73.7	30 08.9	+59.2	74.3	32
33	28 59.4	+57.4	70.3	29 19.4	+57.7	70.8	29 38.9	+58.0	71.3	29 57.9	+58.3	71.9	30 16.3	+58.5	72.4	30 34.1	+58.8	73.0	30 51.4	+59.1	73.5	31 08.1	+59.3	74.1	33
34	29 56.8	+57.3	69.9	30 17.1	+57.7	70.5	30 36.9	+58.0	71.0	30 56.2	+58.2	71.6	31 14.8	+58.6	72.2	31 32.9	+58.8	72.7	31 50.5	+59.0	73.3	32 07.4	+59.2	73.9	34
35	30 54.1	+57.3	69.6	31 14.8	+57.6	70.1	31 34.9	+57.9	70.7	31 54.4	+58.3	71.3	32 13.4	+58.5	71.9	32 31.7	+58.8	72.5	32 49.5	+58.9	73.1	33 06.6	+59.2	73.7	35
36	31 51.4	+57.3	69.2	32 12.4	+57.6	69.8	32 32.8	+57.9	70.4	32 52.7	+58.1	71.0	33 11.9	+58.4	71.6	33 30.5	+58.7	72.3	33 48.4	+59.0	72.9	34 05.8	+59.1	73.5	36
37	32 48.7	+57.1	68.9	33 10.0	+57.5	69.5	33 30.7	+57.9	70.1	33 50.8	+58.2	70.7	34 10.3	+58.5	71.4	34 29.2	+58.7	72.0	34 47.4	+58.9	72.7	35 04.9	+59.2	73.3	37
38	33 45.8	+57.1	68.5	34 07.5	+57.4	69.1	34 28.6	+57.7	69.8	34 49.0	+58.1	70.4	35 08.8	+58.3	71.1	35 27.9	+58.6	71.8	35 46.3	+58.9	72.4	36 04.1	+59.1	73.1	38
39	34 42.9	+57.0	68.1	35 04.9	+57.4	68.8	35 26.3	+57.8	69.4	35 47.1	+58.0	70.1	36 07.1	+58.4	70.8	36 26.5	+58.6	71.5	36 45.2	+58.9	72.2	37 03.2	+59.1	72.9	39
40	35 39.9	+57.0	67.8	36 02.3	+57.3	68.4	36 24.1	+57.6	69.1	36 45.1	+58.0	69.8	37 05.5	+58.3	70.5	37 25.1	+58.6	71.2	37 44.1	+58.8	72.0	38 02.3	+59.1	72.7	40
41	36 36.9	+56.9	67.4	36 59.6	+57.3	68.1	37 21.7	+57.6	68.8	37 43.1	+57.9	69.5	38 03.8	+58.2	70.2	38 23.7	+58.6	71.0	38 42.9	+58.8	71.7	39 01.4	+59.0	72.5	41
42	37 33.8	+56.8	67.0	37 56.9	+57.2	67.7	38 19.3	+57.6	68.4	38 41.0	+57.9	69.2	39 02.0	+58.2	69.9	39 22.3	+58.5	70.7	39 41.7	+58.8	71.5	40 00.4	+59.1	72.2	42
43	38 30.6	+56.7	66.6	38 54.1	+57.1	67.3	39 16.9	+57.4	68.0	39 38.9	+57.9	68.8	40 00.2	+58.2	69.6	40 20.8	+58.4	70.4	40 40.5	+58.8	71.2	40 59.5	+59.0	72.0	43
44	39 27.3	+56.6	66.1	39 51.2	+57.0	66.9	40 14.3	+57.4	67.7	40 36.8	+57.7	68.5	40 58.4	+58.1	69.3	41 19.2	+58.4	70.1	41 39.3	+58.7	70.9	41 58.5	+58.9	71.8	44
45	40 23.9	+56.5	65.7	40 48.2	+56.9	66.5	41 11.7	+57.4	67.3	41 34.5	+57.7	68.1	41 56.5	+58.0	68.9	42 17.6	+58.4	69.8	42 38.0	+58.6	70.6	42 57.4	+58.9	71.5	45
46	41 20.4	+56.4	65.3	41 45.1	+56.8	66.1	42 09.1	+57.2	66.9	42 32.2	+57.6	67.7	42 54.5	+58.0	68.6	43 16.0	+58.3	69.5	43 36.6	+58.6	70.4	43 56.3	+58.9	71.3	46
47	42 16.8	+56.3	64.8	42 41.9	+56.8	65.6	43 06.3	+57.1	66.5	43 29.8	+57.6	67.4	43 52.5	+57.9	68.2	44 14.3	+58.3	69.1	44 35.2	+58.6	70.1	44 55.2	+58.9	71.0	47
48	43 13.1	+56.2	64.3	43 38.7	+56.6	65.2	44 03.4	+57.1	66.1	44 27.4	+57.4	67.0	44 50.4	+57.8	67.9	45 12.6	+58.1	68.8	45 33.8	+58.5	69.7	45 54.1	+58.8	70.7	48
49	44 09.3	+56.0	63.8	44 35.3	+56.5	64.7	45 00.5	+56.9	65.6	45 24.8	+57.4	66.5	45 48.2	+57.8	67.5	46 10.7	+58.2	68.4	46 32.3	+58.5	69.4	46 52.9	+58.8	70.4	49
50	45 05.3	+55.9	63.3	45 31.8	+56.4	64.3	45 57.4	+56.9	65.2	46 22.2	+57.2	66.1	46 46.0	+57.7	67.1	47 08.9	+58.0	68.1	47 30.8	+58.4	69.1	47 51.7	+58.7	70.1	50
51	46 01.2	+55.8	62.8	46 28.2	+56.2	63.8	46 54.3	+56.7	64.7	47 19.4	+57.2	65.7	47 43.7	+57.5	66.7	48 06.9	+58.0	67.7	48 29.2	+58.3	68.8	48 50.4	+58.6	69.8	51
52	46 57.0	+55.6	62.3	47 24.4	+56.2	63.2	47 51.0	+56.6	64.2	48 16.6	+57.0	65.2	48 41.2	+57.5	66.3	49 04.9	+57.9	67.3	49 27.5	+58.3	68.4	49 49.0	+58.7	69.5	52
53	47 52.6	+55.4	61.7	48 20.6	+55.9	62.7	48 47.6	+56.4	63.7	49 13.6	+57.0	64.8	49 38.7	+57.4	65.8	50 02.8	+57.8	66.9	50 25.8	+58.2	68.0	50 47.7	+58.5	69.2	53
54	48 48.0	+55.3	61.2	49 16.5	+55.8	62.2	49 44.0	+56.4	63.2	50 10.6	+56.8	64.3	50 36.1	+57.3	65.4	51 00.6	+57.7	66.5	51 24.0	+58.1	67.6	51 46.2	+58.5	68.8	54
55	49 43.3	+55.1	60.6	50 12.3	+55.6	61.6	50 40.4	+56.1	62.7	51 07.4	+56.7	63.8	51 33.4	+57.1	64.9	51 58.3	+57.6	66.1	52 22.1	+58.0	67.2	52 44.7	+58.4	68.4	55
56	50 38.4	+54.9	59.9	51 07.9	+55.5	61.0	51 36.5	+56.0	62.1	52 04.1	+56.5	63.2	52 30.5	+57.0	64.4	52 55.9	+57.5	65.6	53 20.1	+57.9	66.8	53 43.1	+58.4	68.1	56
57	51 33.3	+54.6	59.3	52 03.4	+55.2	60.4	52 32.5	+55.8	61.5	53 00.6	+56.3	62.7	53 27.5	+56.9	63.9	53 53.4	+57.4	65.1	54 18.0	+57.9	66.4	54 41.5	+58.2	67.7	57
58	52 27.9	+54.4	58.6	52 58.6	+55.1	59.8	53 28.3	+55.6	60.9	53 56.9	+56.2	62.1	54 24.4	+56.8	63.3	54 50.8	+57.2	64.6	55 15.9	+57.7	65.9	55 39.7	+58.2	67.2	58
59	53 22.3	+54.2	57.9	53 53.7	+54.7	59.1	54 23.9	+55.5	60.3	54 53.1	+56.0	61.5	55 21.2	+56.5	62.8	55 48.0	+57.1	64.1	56 13.6	+57.6	65.4	56 37.9	+58.0	66.8	59
60	54 16.5	+53.9	57.2	54 48.4	+54.6	58.4	55 19.4	+55.1	59.6	55 49.1	+55.8	60.9	56 17.7	+56.4	62.2	56 45.1	+56.9	63.5	57 11.2	+57.5	64.9	57 35.9	+58.0	66.3	60
61	55 10.4	+53.5	56.4	55 43.0	+54.3	57.7	56 14.5	+55.0	58.9	56 44.9	+55.6	60.2	57 14.1	+56.2	61.6	57 42.0	+56.8	63.0	58 08.7	+57.3	64.4	58 33.9	+57.9	65.9	61
62	56 03.9	+53.3	55.6	56 37.3	+53.9	56.9	57 09.5	+54.6	58.2	57 40.5	+55.3	59.5	58 10.3	+56.0	60.9	58 38.8	+56.6	62.3	59 06.0	+57.2	63.8	59 31.8	+57.7	65.3	62
63	56 57.2	+52.9	54.8	57 31.2	+53.7	56.1	58 04.1	+54.4	57.4	58 35.8	+55.1	58.8	59 06.3	+55.7	60.2	59 35.4	+56.4	61.7	60 03.2	+57.0	63.2	60 29.5	+57.5	64.8	63
64	57 50.1	+52.5	53.9	58 24.9	+53.3	55.2	58 58.5	+54.0	56.6	59 30.9	+54.8	58.0	60 02.0	+55.5	59.5	60 31.8	+56.2	61.0	61 00.2	+56.8	62.6	61 27.0	+57.5	64.2	64
65	58 42.6	+52.2	53.0	59 18.2	+52.9	54.4	59 52.5	+53.7	55.8	60 25.7	+54.5	57.2	60 57.5	+55.2	58.7	61 28.0	+55.9	60.3	61 57.0	+56.6	61.9	62 24.5	+57.2	63.6	65
66	59 34.8	+51.6	52.0	60 11.1	+52.5	53.4	60 46.2	+53.4	54.9	61 20.2	+54.1	56.3	61 52.7	+54.9	57.9	62 23.9	+55.7	59.5	62 53.6	+56.4	61.2	63 21.7	+57.0	62.9	66
67	60 26.4	+51.2	51.0	61 03.6	+52.0	52.4	61 39.6	+52.9	53.9	62 14.3	+53.7	55.4	62 47.6	+54.6	57.0	63 19.6	+55.3	58.7	63 50.0	+56.1	60.4	64 18.7	+56.9	62.2	67
68	61 17.6	+50.6	50.0	61 55.6	+51.6	51.4	62 32.5	+52.4	52.9	63 08.0	+53.3	54.5	63 42.2	+54.2	56.1	64 14.9	+55.0	57.8	64 46.1	+55.8	59.6	65 15.6	+56.6	61.5	68
69	62 08.2	+50.1	48.8	62 47.2	+51.0	50.3	63 24.9	+51.9	51.8	64 01.3	+52.9	53.4	64 36.4	+53.7	55.1	65 09.9	+54.7	56.9	65 41.9	+55.5	58.7	66 12.2	+56.3	60.7	69
70	62 58.3	+49.4	47.6	63 38.2	+50.4	49.1	64 16.8	+51.4	50.7	64 54.2	+52.3	52.3	65 30.1	+53.3	54.1	66 04.6	+54.2	55.9	66 37.4	+55.1	57.8	67 08.5	+56.0	59.8	70
71	63 47.7	+48.7	46.4	64 28.6	+49.7	47.9	65 08.2	+50.7	49.5	65 46.5	+51.8	51.2	66 23.4	+52.8	52.9	66 58.8	+53.7	54.8	67 32.5	+54.7	56.8	68 04.5	+55.6	58.9	71
72	64 36.4	+48.0	45.0	65 18.3	+49.0	46.6	65 58.9	+50.1	48.2	66 38.3	+51.1	49.9	67 16.2	+52.1	51.7	67 52.5	+53.3	53.7	68 27.2	+54.3	55.7	69 00.1	+55.3	57.8	72
73	65 24.4	+47.1	43.6	66 07.3	+48.1	45.2	66 49.0	+49.2	46.8	67 29.4	+50.4	48.6	68 08.3	+51.6	50.4	68 45.8	+52.6	52.4	69 21.5	+53.7	54.5	69 55.4	+54.8	56.7	73
74	66 11.5	+46.1	42.1	66 55.4	+47.3	43.7	67 38.2	+48.5	45.3	68 19.8	+49.5	47.1	68 59.9	+50.7	49.0	69 38.4	+52.0	51.0	70 15.2	+53.2	53.2	70 50.2	+54.3	55.5	74
75	66 57.6	+45.1	40.5	67 42.7	+46.3	42.1	68 26.7	+47.4	43.7	69 09.3	+48.7	45.6	69 50.6	+49.9	47.5	70 30.4	+51.1	49.6	71 08.4	+52.4	51.8	71 44.5	+53.7	54.2	75
76	67 42.7	+44.0	38.8	68 29.0	+45.1	40.4	69 14.1	+46.4	42.1	69 58.0	+47.7	43.9	70 40.5	+49.0	45.9	71 21.5	+50.3	48.0	72 00.8	+51.6	50.3	72 38.2	+52.9	52.7	76
77	68 26.7	+42.6	36.9	69 14.1	+43.9	38.5	70 00.5	+45.2	40.2	70 45.7	+46.5	42.1	71 29.5	+47.9	44.1	72 11.8	+49.3	46.2	72 52.4	+50.7	48.6	73 31.1	+52.2	51.1	77
78	69 09.3	+41.3	35.0	69 58.0	+42.5	36.6	70 45.7	+43.8	38.3	71 32.2	+45.2	40.1	72 17.4	+46.6	42.1	73 01.1	+48.1	44.3	73 43.1	+49.7	46.7	74 23.3	+51.2	49.3	78
79	69 50.6	+39.8	32.9	70 40.5	+41.0	34.5	71 29.5	+42.3	36.2	72 17.4	+43.7	38.0	73 04.0	+45.2	40.0	73 49.2	+46.8	42.2	74 32.8	+48.4	44.7	75 14.5	+50.0	47.3	79
80	70 30.4	+38.0	30.7	71 21.5	+39.3	32.2	72 11.8	+40.6	33.9	73 01.1	+42.0	35.7	73 49.2	+43.6	37.7	74 36.0	+45.2	39.9	75 21.2	+46.8	42.4	76 04.5	+48.7	45.1	80
81	71 08.4	*+36.1* •	28.4	72 00.8	*+37.4* •	29.8	72 52.4	*+38.7* •	31.4	73 43.1	*+40.2* •	33.2	74 32.8	*+41.7* •	35.2	75 21.2	*+43.3* •	37.4	76 08.0	+45.2	39.8	76 53.2	+47.0	42.6	81
82	71 44.5	*+34.0* •	25.9	72 38.2	*+35.2* •	27.2	73 31.1	*+36.6* •	28.8	74 23.3	*+38.0* •	30.5	75 14.5	*+39.5* •	32.4	76 04.5	*+41.2* •	34.6	76 53.2	*+43.1* •	37.0	77 40.2	*+45.1* •	39.8	82
83	72 18.5	*+31.8* •	23.2	73 13.4	*+32.9* •	24.5	74 07.7	*+34.1* •	25.9	75 01.3	*+35.5* •	27.6	75 54.0	*+37.1* •	29.4	76 45.7	*+38.8* •	31.5	77 36.3	*+40.6* •	33.9	78 25.3	*+42.7* •	36.6	83
84	72 50.3	*+29.2* •	20.3	73 46.3	*+30.3* •	21.5	74 41.8	*+31.5* •	22.9	75 36.8	*+32.8* •	24.4	76 31.1	*+34.2* •	26.1	77 24.5	*+35.9* •	28.1	78 16.9	*+37.7* •	30.3	79 08.0	*+39.8* •	33.0	84
85	73 19.5	*+26.5* •	17.3	74 16.6	*+27.4* •	18.4	75 13.3	*+28.5* •	19.6	76 09.6	*+29.7* •	21.0	77 05.3	*+31.1* •	22.5	78 00.4	*+32.6* •	24.3	78 54.6	*+34.4* •	26.4	79 47.8	*+36.4* •	28.9	85
86	73 46.0	*+23.5* •	14.2	74 44.0	*+24.3* •	15.1	75 41.8	*+25.2* •	16.1	76 39.3	*+26.2* •	17.3	77 36.4	*+27.4* •	18.6	78 33.0	*+28.7* •	20.2	79 29.0	*+30.3* •	22.0	80 24.2	*+32.1* •	24.2	86
87	74 09.5	*+20.3* •	10.8	75 08.3	*+21.0* •	11.6	76 07.0	*+21.7* •	12.4	77 05.5	*+22.5* •	13.3	78 03.8	*+23.3* •	14.4	79 01.7	*+24.5* •	15.7	79 59.3	*+25.7* •	17.2	80 56.3	*+27.3* •	19.0	87
88	74 29.8	*+16.9* •	7.4	75 29.3	*+17.3* •	7.9	76 28.7	*+17.7* •	8.4	77 28.0	*+18.2* •	9.1	78 27.1	*+18.9* •	9.9	79 26.2	*+19.5* •	10.8	80 25.0	*+20.4* •	11.9	81 23.6	*+21.5* •	13.2	88
89	74 46.7	*+13.3* •	3.7	75 46.6	*+13.4* •	4.0	76 46.4	*+13.6* •	4.3	77 46.2	*+13.8* •	4.6	78 46.0	*+14.0* •	5.0	79 45.7	*+14.3* •	5.5	80 45.4	*+14.6* •	6.1	81 45.1	*+14.9* •	6.9	89
90	75 00.0	*+9.5* •	0.0	76 00.0	*+9.4* •	0.0	77 00.0	*+9.2* •	0.0	78 00.0	*+9.0* •	0.0	79 00.0	*+8.8* •	0.0	80 00.0	*+8.5* •	0.0	81 00.0	*+8.2* •	0.0	82 00.0	*+7.8* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 101°, 259°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 34.6	+ 58.0	99.7	2 24.5	+ 58.2	99.7	2 14.3	+ 58.5	99.7	2 04.1	+ 58.8	99.8	1 53.9	+ 59.0	99.8	1 43.7	+ 59.1	99.9	1 33.4	+ 59.3	99.9	1 23.1	+ 59.4	99.9	**0**
1	3 32.6	+ 58.0	99.4	3 22.7	+ 58.3	99.5	3 12.8	+ 58.5	99.5	3 02.9	+ 58.7	99.6	2 52.9	+ 58.9	99.6	2 42.8	+ 59.1	99.7	2 32.7	+ 59.3	99.7	2 22.5	+ 59.5	99.8	**1**
2	4 30.6	+ 58.0	99.2	4 21.0	+ 58.3	99.2	4 11.3	+ 58.5	99.3	4 01.6	+ 58.7	99.4	3 51.8	+ 58.9	99.4	3 41.9	+ 59.1	99.5	3 32.0	+ 59.2	99.6	3 22.0	+ 59.4	99.6	**2**
3	5 28.6	+ 58.0	98.9	5 19.3	+ 58.2	99.0	5 09.8	+ 58.5	99.1	5 00.3	+ 58.7	99.2	4 50.7	+ 58.9	99.3	4 41.0	+ 59.1	99.3	4 31.2	+ 59.3	99.4	4 21.4	+ 59.4	99.5	**3**
4	6 26.6	+ 58.0	98.6	6 17.5	+ 58.3	98.7	6 08.3	+ 58.5	98.9	5 59.0	+ 58.7	99.0	5 49.6	+ 58.9	99.1	5 40.1	+ 59.1	99.2	5 30.5	+ 59.3	99.3	5 20.8	+ 59.4	99.4	**4**
5	7 24.6	+ 57.9	98.4	7 15.8	+ 58.2	98.5	7 06.8	+ 58.5	98.6	6 57.7	+ 58.7	98.8	6 48.5	+ 59.0	98.9	6 39.2	+ 59.1	99.0	6 29.8	+ 59.3	99.1	6 20.2	+ 59.5	99.2	**5**
6	8 22.5	+ 58.0	98.1	8 14.0	+ 58.2	98.3	8 05.3	+ 58.5	98.4	7 56.4	+ 58.7	98.5	7 47.5	+ 58.9	98.7	7 38.3	+ 59.1	98.8	7 29.1	+ 59.2	98.9	7 19.7	+ 59.4	99.1	**6**
7	9 20.5	+ 58.0	97.9	9 12.2	+ 58.2	98.0	9 03.8	+ 58.4	98.2	8 55.1	+ 58.7	98.3	8 46.4	+ 58.9	98.5	8 37.4	+ 59.1	98.6	8 28.3	+ 59.3	98.8	8 19.1	+ 59.4	98.9	**7**
8	10 18.5	+ 57.9	97.6	10 10.4	+ 58.3	97.8	10 02.2	+ 58.5	98.0	9 53.8	+ 58.7	98.1	9 45.3	+ 58.9	98.3	9 36.5	+ 59.1	98.5	9 27.6	+ 59.3	98.6	9 18.5	+ 59.4	98.8	**8**
9	11 16.4	+ 57.9	97.3	11 08.7	+ 58.2	97.5	11 00.7	+ 58.4	97.7	10 52.5	+ 58.7	97.9	10 44.2	+ 58.9	98.1	10 35.6	+ 59.1	98.3	10 26.9	+ 59.2	98.5	10 17.9	+ 59.4	98.7	**9**
10	12 14.3	+ 58.0	97.1	12 06.9	+ 58.1	97.3	11 59.1	+ 58.5	97.5	11 51.2	+ 58.7	97.7	11 43.1	+ 58.8	97.9	11 34.7	+ 59.1	98.1	11 26.1	+ 59.3	98.3	11 17.3	+ 59.5	98.5	**10**
11	13 12.3	+ 57.9	96.8	13 05.0	+ 58.2	97.0	12 57.6	+ 58.4	97.3	12 49.9	+ 58.6	97.5	12 41.9	+ 58.9	97.7	12 33.8	+ 59.0	97.9	12 25.4	+ 59.2	98.2	12 16.8	+ 59.4	98.4	**11**
12	14 10.2	+ 57.8	96.5	14 03.2	+ 58.2	96.8	13 56.0	+ 58.4	97.0	13 48.5	+ 58.7	97.3	13 40.8	+ 58.9	97.5	13 32.8	+ 59.1	97.8	13 24.6	+ 59.3	98.0	13 16.2	+ 59.4	98.2	**12**
13	15 08.0	+ 57.9	96.3	15 01.4	+ 58.1	96.5	14 54.4	+ 58.4	96.8	14 47.2	+ 58.6	97.1	14 39.7	+ 58.8	97.3	14 31.9	+ 59.0	97.6	14 23.9	+ 59.2	97.8	14 15.6	+ 59.3	98.1	**13**
14	16 05.9	+ 57.8	96.0	15 59.5	+ 58.1	96.3	15 52.8	+ 58.4	96.6	15 45.8	+ 58.6	96.8	15 38.5	+ 58.9	97.1	15 30.9	+ 59.1	97.4	15 23.1	+ 59.2	97.7	15 14.9	+ 59.4	97.9	**14**
15	17 03.7	+ 57.9	95.7	16 57.6	+ 58.1	96.0	16 51.2	+ 58.3	96.3	16 44.4	+ 58.6	96.6	16 37.4	+ 58.8	96.9	16 30.0	+ 59.0	97.2	16 22.3	+ 59.2	97.5	16 14.3	+ 59.4	97.8	**15**
16	18 01.6	+ 57.7	95.4	17 55.7	+ 58.1	95.7	17 49.5	+ 58.4	96.1	17 43.0	+ 58.6	96.4	17 36.2	+ 58.8	96.7	17 29.0	+ 59.0	97.0	17 21.5	+ 59.2	97.3	17 13.7	+ 59.4	97.6	**16**
17	18 59.3	+ 57.8	95.1	18 53.8	+ 58.0	95.5	18 47.9	+ 58.3	95.8	18 41.6	+ 58.6	96.2	18 35.0	+ 58.8	96.5	18 28.0	+ 59.1	96.8	18 20.7	+ 59.2	97.2	18 13.1	+ 59.4	97.5	**17**
18	19 57.1	+ 57.8	94.9	19 51.8	+ 58.1	95.2	19 46.2	+ 58.3	95.6	19 40.2	+ 58.5	95.9	19 33.8	+ 58.8	96.3	19 27.1	+ 59.0	96.6	19 19.9	+ 59.2	97.0	19 12.5	+ 59.3	97.3	**18**
19	20 54.9	+ 57.7	94.6	20 49.9	+ 58.0	94.9	20 44.5	+ 58.3	95.3	20 38.7	+ 58.6	95.7	20 32.6	+ 58.8	96.1	20 26.1	+ 58.9	96.4	20 19.1	+ 59.2	96.8	20 11.8	+ 59.4	97.2	**19**
20	21 52.6	+ 57.6	94.3	21 47.9	+ 58.0	94.7	21 42.8	+ 58.2	95.1	21 37.3	+ 58.5	95.5	21 31.4	+ 58.7	95.9	21 25.0	+ 59.0	96.2	21 18.3	+ 59.2	96.6	21 11.2	+ 59.3	97.0	**20**
21	22 50.2	+ 57.7	94.0	22 45.9	+ 57.9	94.4	22 41.0	+ 58.3	94.8	22 35.8	+ 58.5	95.2	22 30.1	+ 58.8	95.6	22 24.0	+ 59.0	96.0	22 17.5	+ 59.1	96.5	22 10.5	+ 59.4	96.9	**21**
22	23 47.9	+ 57.6	93.7	23 43.8	+ 57.9	94.1	23 39.3	+ 58.2	94.5	23 34.3	+ 58.5	95.0	23 28.9	+ 58.7	95.4	23 23.0	+ 58.9	95.8	23 16.6	+ 59.2	96.3	23 09.9	+ 59.3	96.7	**22**
23	24 45.5	+ 57.6	93.4	24 41.7	+ 57.9	93.8	24 37.5	+ 58.2	94.3	24 32.8	+ 58.4	94.7	24 27.6	+ 58.7	95.2	24 21.9	+ 58.9	95.6	24 15.8	+ 59.1	96.1	24 09.2	+ 59.3	96.5	**23**
24	25 43.1	+ 57.5	93.1	25 39.6	+ 57.9	93.5	25 35.7	+ 58.1	94.0	25 31.2	+ 58.4	94.5	25 26.3	+ 58.7	95.0	25 20.8	+ 58.9	95.4	25 14.9	+ 59.1	95.9	25 08.5	+ 59.3	96.4	**24**
25	26 40.6	+ 57.5	92.7	26 37.5	+ 57.8	93.2	26 33.8	+ 58.1	93.7	26 29.6	+ 58.4	94.2	26 25.0	+ 58.6	94.7	26 19.7	+ 58.9	95.2	26 14.0	+ 59.1	95.7	26 07.8	+ 59.3	96.2	**25**
26	27 38.1	+ 57.4	92.4	27 35.3	+ 57.7	92.9	27 31.9	+ 58.1	93.5	27 28.0	+ 58.4	94.0	27 23.6	+ 58.6	94.5	27 18.6	+ 58.9	95.0	27 13.1	+ 59.1	95.5	27 07.1	+ 59.3	96.0	**26**
27	28 35.5	+ 57.4	92.1	28 33.0	+ 57.8	92.6	28 30.0	+ 58.0	93.2	28 26.4	+ 58.3	93.7	28 22.2	+ 58.6	94.3	28 17.5	+ 58.8	94.8	28 12.2	+ 59.1	95.3	28 06.4	+ 59.2	95.9	**27**
28	29 32.9	+ 57.3	91.8	29 30.8	+ 57.7	92.3	29 28.0	+ 58.1	92.9	29 24.7	+ 58.3	93.4	29 20.8	+ 58.6	94.0	29 16.3	+ 58.9	94.6	29 11.3	+ 59.0	95.1	29 05.6	+ 59.3	95.7	**28**
29	30 30.2	+ 57.3	91.4	30 28.5	+ 57.6	92.0	30 26.1	+ 57.9	92.6	30 23.0	+ 58.3	93.2	30 19.4	+ 58.6	93.8	30 15.2	+ 58.8	94.3	30 10.3	+ 59.1	94.9	30 04.9	+ 59.2	95.5	**29**
30	31 27.5	+ 57.3	91.1	31 26.1	+ 57.6	91.7	31 24.0	+ 57.9	92.3	31 21.3	+ 58.2	92.9	31 18.0	+ 58.5	93.5	31 14.0	+ 58.7	94.1	31 09.4	+ 59.0	94.7	31 04.1	+ 59.2	95.3	**30**
31	32 24.8	+ 57.1	90.7	32 23.7	+ 57.5	91.3	32 21.9	+ 57.9	92.0	32 19.5	+ 58.2	92.6	32 16.5	+ 58.5	93.2	32 12.7	+ 58.8	93.9	32 08.4	+ 59.0	94.5	32 03.3	+ 59.2	95.1	**31**
32	33 21.9	+ 57.1	90.3	33 21.2	+ 57.5	91.0	33 19.8	+ 57.8	91.7	33 17.7	+ 58.2	92.3	33 15.0	+ 58.4	93.0	33 11.5	+ 58.7	93.6	33 07.4	+ 58.9	94.3	33 02.5	+ 59.2	94.9	**32**
33	34 19.0	+ 57.1	90.0	34 18.7	+ 57.4	90.7	34 17.6	+ 57.8	91.3	34 15.9	+ 58.1	92.0	34 13.4	+ 58.4	92.7	34 10.2	+ 58.7	93.4	34 06.3	+ 59.0	94.1	34 01.7	+ 59.2	94.7	**33**
34	35 16.1	+ 56.9	89.6	35 16.1	+ 57.4	90.3	35 15.4	+ 57.7	91.0	35 14.0	+ 58.0	91.7	35 11.8	+ 58.4	92.4	35 08.9	+ 58.7	93.1	35 05.3	+ 58.9	93.8	35 00.9	+ 59.1	94.5	**34**
35	36 13.0	+ 56.9	89.2	36 13.5	+ 57.3	89.9	36 13.1	+ 57.7	90.7	36 12.0	+ 58.1	91.4	36 10.2	+ 58.3	92.1	36 07.6	+ 58.6	92.9	36 04.2	+ 58.9	93.6	36 00.0	+ 59.1	94.3	**35**
36	37 09.9	+ 56.8	88.8	37 10.8	+ 57.2	89.6	37 10.8	+ 57.6	90.3	37 10.1	+ 57.9	91.1	37 08.5	+ 58.3	91.9	37 06.2	+ 58.6	92.6	37 03.1	+ 58.8	93.4	36 59.1	+ 59.1	94.1	**36**
37	38 06.7	+ 56.7	88.4	38 08.0	+ 57.1	89.2	38 08.4	+ 57.5	90.0	38 08.0	+ 57.9	90.8	38 06.8	+ 58.2	91.6	38 04.8	+ 58.5	92.3	38 01.9	+ 58.8	93.1	37 58.2	+ 59.1	93.9	**37**
38	39 03.4	+ 56.7	88.0	39 05.1	+ 57.1	88.8	39 05.9	+ 57.5	89.6	39 05.9	+ 57.9	90.4	39 05.0	+ 58.2	91.2	39 03.3	+ 58.5	92.1	39 00.7	+ 58.8	92.9	38 57.3	+ 59.1	93.7	**38**
39	40 00.1	+ 56.5	87.6	40 02.2	+ 57.0	88.4	40 03.4	+ 57.4	89.2	40 03.8	+ 57.7	90.1	40 03.2	+ 58.2	90.9	40 01.8	+ 58.5	91.8	39 59.5	+ 58.8	92.6	39 56.4	+ 59.0	93.4	**39**
40	40 56.6	+ 56.4	87.1	40 59.2	+ 56.8	88.0	41 00.8	+ 57.3	88.9	41 01.5	+ 57.8	89.7	41 01.4	+ 58.0	90.6	41 00.3	+ 58.4	91.5	40 58.3	+ 58.7	92.3	40 55.4	+ 59.0	93.2	**40**
41	41 53.0	+ 56.4	86.7	41 56.0	+ 56.8	87.6	41 58.1	+ 57.3	88.5	41 59.3	+ 57.6	89.4	41 59.4	+ 58.1	90.3	41 58.7	+ 58.4	91.2	41 57.0	+ 58.7	92.1	41 54.4	+ 58.9	93.0	**41**
42	42 49.4	+ 56.2	86.2	42 52.8	+ 56.7	87.1	42 55.4	+ 57.1	88.1	42 56.9	+ 57.6	89.0	42 57.5	+ 57.9	89.9	42 57.1	+ 58.3	90.9	42 55.7	+ 58.6	91.8	42 53.3	+ 59.0	92.7	**42**
43	43 45.6	+ 56.0	85.7	43 49.5	+ 56.6	86.7	43 52.5	+ 57.0	87.6	43 54.5	+ 57.5	88.6	43 55.4	+ 57.9	89.6	43 55.4	+ 58.2	90.5	43 54.3	+ 58.6	91.5	43 52.3	+ 58.8	92.5	**43**
44	44 41.6	+ 56.0	85.2	44 46.1	+ 56.5	86.2	44 49.5	+ 57.0	87.2	44 52.0	+ 57.3	88.2	44 53.3	+ 57.8	89.2	44 53.6	+ 58.2	90.2	44 52.9	+ 58.5	91.2	44 51.1	+ 58.9	92.2	**44**
45	45 37.6	+ 55.8	84.7	45 42.6	+ 56.3	85.7	45 46.5	+ 56.8	86.8	45 49.3	+ 57.4	87.8	45 51.1	+ 57.8	88.8	45 51.8	+ 58.2	89.8	45 51.4	+ 58.5	90.9	45 50.0	+ 58.8	91.9	**45**
46	46 33.4	+ 55.6	84.2	46 38.9	+ 56.2	85.2	46 43.3	+ 56.8	86.3	46 46.7	+ 57.2	87.4	46 48.9	+ 57.6	88.4	46 50.0	+ 58.0	89.5	46 49.9	+ 58.5	90.6	46 48.8	+ 58.8	91.6	**46**
47	47 29.0	+ 55.5	83.6	47 35.1	+ 56.1	84.7	47 40.1	+ 56.5	85.8	47 43.9	+ 57.1	86.9	47 46.5	+ 57.6	88.0	47 48.0	+ 58.0	89.1	47 48.4	+ 58.3	90.2	47 47.6	+ 58.7	91.3	**47**
48	48 24.5	+ 55.3	83.1	48 31.2	+ 55.9	84.2	48 36.6	+ 56.5	85.3	48 41.0	+ 56.9	86.5	48 44.1	+ 57.4	87.6	48 46.0	+ 57.9	88.7	48 46.7	+ 58.3	89.9	48 46.3	+ 58.6	91.0	**48**
49	49 19.8	+ 55.1	82.5	49 27.1	+ 55.7	83.6	49 33.1	+ 56.3	84.8	49 37.9	+ 56.9	86.0	49 41.5	+ 57.4	87.1	49 43.9	+ 57.8	88.3	49 45.0	+ 58.3	89.5	49 44.9	+ 58.6	90.7	**49**
50	50 14.9	+ 55.0	81.9	50 22.8	+ 55.6	83.1	50 29.4	+ 56.2	84.3	50 34.8	+ 56.7	85.5	50 38.9	+ 57.2	86.7	50 41.7	+ 57.7	87.9	50 43.3	+ 58.1	89.1	50 43.5	+ 58.6	90.4	**50**
51	51 09.9	+ 54.7	81.2	51 18.4	+ 55.4	82.5	51 25.6	+ 56.0	83.7	51 31.5	+ 56.6	85.0	51 36.1	+ 57.2	86.2	51 39.4	+ 57.7	87.5	51 41.4	+ 58.1	88.7	51 42.1	+ 58.5	90.0	**51**
52	52 04.6	+ 54.5	80.6	52 13.8	+ 55.1	81.8	52 21.6	+ 55.8	83.1	52 28.1	+ 56.4	84.4	52 33.3	+ 57.0	85.7	52 37.1	+ 57.5	87.0	52 39.5	+ 58.0	88.3	52 40.6	+ 58.4	89.6	**52**
53	52 59.1	+ 54.2	79.9	53 08.9	+ 55.0	81.2	53 17.4	+ 55.6	82.5	53 24.5	+ 56.3	83.9	53 30.3	+ 56.8	85.2	53 34.6	+ 57.4	86.5	53 37.5	+ 57.9	87.9	53 39.0	+ 58.3	89.3	**53**
54	53 53.3	+ 53.9	79.2	54 03.9	+ 54.7	80.5	54 13.0	+ 55.5	81.9	54 20.8	+ 56.1	83.3	54 27.1	+ 56.7	84.7	54 32.0	+ 57.3	86.1	54 35.4	+ 57.8	87.5	54 37.3	+ 58.3	88.9	**54**
55	54 47.2	+ 53.7	78.4	54 58.6	+ 54.4	79.8	55 08.5	+ 55.2	81.2	55 16.9	+ 55.9	82.6	55 23.8	+ 56.6	84.1	55 29.3	+ 57.1	85.5	55 33.2	+ 57.6	87.0	55 35.6	+ 58.1	88.4	**55**
56	55 40.9	+ 53.4	77.6	55 53.0	+ 54.2	79.1	56 03.7	+ 54.9	80.5	56 12.8	+ 55.7	82.0	56 20.4	+ 56.3	83.5	56 26.4	+ 57.0	85.0	56 30.8	+ 57.6	86.5	56 33.7	+ 58.1	88.0	**56**
57	56 34.3	+ 53.0	76.8	56 47.2	+ 53.9	78.3	56 58.6	+ 54.7	79.8	57 08.5	+ 55.4	81.3	57 16.7	+ 56.2	82.9	57 23.4	+ 56.8	84.4	57 28.4	+ 57.4	86.0	57 31.8	+ 57.9	87.5	**57**
58	57 27.3	+ 52.6	75.9	57 41.1	+ 53.5	77.5	57 53.3	+ 54.4	79.0	58 03.9	+ 55.2	80.6	58 12.9	+ 55.9	82.2	58 20.2	+ 56.6	83.8	58 25.8	+ 57.3	85.4	58 29.7	+ 57.9	87.0	**58**
59	58 19.9	+ 52.3	75.0	58 34.6	+ 53.2	76.6	58 47.7	+ 54.1	78.2	58 59.1	+ 54.9	79.9	59 08.8	+ 55.7	81.5	59 16.8	+ 56.4	83.2	59 23.1	+ 57.1	84.8	59 27.6	+ 57.7	86.5	**59**
60	59 12.2	+ 51.8	74.1	59 27.8	+ 52.8	75.7	59 41.8	+ 53.7	77.4	59 54.0	+ 54.6	79.1	60 04.5	+ 55.5	80.8	60 13.2	+ 56.3	82.5	60 20.2	+ 56.9	84.2	60 25.3	+ 57.6	86.0	**60**
61	60 04.0	+ 51.3	73.1	60 20.6	+ 52.4	74.8	60 35.5	+ 53.3	76.5	60 48.6	+ 54.3	78.2	61 00.0	+ 55.1	80.0	61 09.5	+ 55.9	81.8	61 17.1	+ 56.7	83.6	61 22.9	+ 57.4	85.4	**61**
62	60 55.3	+ 50.9	72.0	61 13.0	+ 51.9	73.8	61 28.8	+ 53.0	75.5	61 42.9	+ 53.9	77.3	61 55.1	+ 54.9	79.2	62 05.4	+ 55.8	81.0	62 13.8	+ 56.5	82.9	62 20.3	+ 57.2	84.8	**62**
63	61 46.2	+ 50.2	70.9	62 04.9	+ 51.4	72.7	62 21.8	+ 52.5	74.5	62 36.8	+ 53.6	76.4	62 50.0	+ 54.5	78.3	63 01.2	+ 55.4	80.2	63 10.3	+ 56.3	82.2	63 17.5	+ 57.0	84.1	**63**
64	62 36.4	+ 49.6	69.8	62 56.3	+ 50.8	71.6	63 14.3	+ 51.9	73.5	63 30.4	+ 53.0	75.4	63 44.5	+ 54.1	77.4	63 56.6	+ 55.1	79.4	64 06.6	+ 56.0	81.4	64 14.5	+ 56.9	83.4	**64**
65	63 26.0	+ 49.0	68.5	63 47.1	+ 50.2	70.4	64 06.2	+ 51.5	72.4	64 23.4	+ 52.6	74.3	64 38.6	+ 53.7	76.4	64 51.7	+ 54.7	78.4	65 02.6	+ 55.7	80.5	65 11.4	+ 56.6	82.7	**65**
66	64 15.0	+ 48.2	67.2	64 37.3	+ 49.5	69.2	64 57.7	+ 50.8	71.2	65 16.0	+ 52.1	73.2	65 32.3	+ 53.2	75.3	65 46.4	+ 54.3	77.5	65 58.3	+ 55.4	79.7	66 08.0	+ 56.3	81.9	**66**
67	65 03.2	+ 47.4	65.8	65 26.8	+ 48.8	67.8	65 48.5	+ 50.1	69.9	66 08.1	+ 51.4	72.0	66 25.5	+ 52.7	74.2	66 40.7	+ 53.9	76.4	66 53.7	+ 55.0	78.7	67 04.3	+ 56.0	81.0	**67**
68	65 50.6	+ 46.4	64.4	66 15.6	+ 47.9	66.4	66 38.6	+ 49.4	68.5	66 59.5	+ 50.8	70.7	67 18.2	+ 52.1	73.0	67 34.6	+ 53.4	75.3	67 48.7	+ 54.5	77.6	68 00.3	+ 55.6	80.1	**68**
69	66 37.0	+ 45.5	62.8	67 03.5	+ 47.0	64.9	67 28.0	+ 48.5	67.1	67 50.3	+ 50.0	69.3	68 10.3	+ 51.4	71.7	68 28.0	+ 52.8	74.1	68 43.2	+ 54.1	76.5	68 55.9	+ 55.3	79.0	**69**
70	67 22.5	+ 44.4	61.1	67 50.5	+ 46.0	63.3	68 16.5	+ 47.6	65.5	68 40.3	+ 49.1	67.8	69 01.7	+ 50.7	70.2	69 20.8	+ 52.1	72.7	69 37.3	+ 53.5	75.3	69 51.2	+ 54.8	77.9	**70**
71	68 06.9	+ 43.1	59.3	68 36.5	+ 44.8	61.5	69 04.1	+ 46.5	63.8	69 29.4	+ 48.2	66.2	69 52.4	+ 49.8	68.7	70 12.9	+ 51.4	71.3	70 30.8	+ 52.9	74.0	70 46.0	+ 54.3	76.7	**71**
72	68 50.0	+ 41.8	57.4	69 21.3	+ 43.6	59.7	69 50.6	+ 45.3	62.0	70 17.6	+ 47.1	64.5	70 42.2	+ 48.9	67.1	71 04.3	+ 50.5	69.7	71 23.7	+ 52.2	72.5	71 40.3	+ 53.7	75.4	**72**
73	69 31.8	+ 40.4	55.4	70 04.9	+ 42.2	57.7	70 35.9	+ 44.0	60.1	71 04.7	+ 45.9	62.6	71 31.1	+ 47.7	65.3	71 54.8	+ 49.6	68.0	72 15.9	+ 51.3	70.9	72 34.0	+ 53.0	74.0	**73**
74	70 12.2	+ 38.6	53.3	70 47.1	+ 40.5	55.6	71 19.9	+ 42.6	58.0	71 50.6	+ 44.5	60.6	72 18.8	+ 46.5	63.3	72 44.4	+ 48.5	66.2	73 07.2	+ 50.3	69.2	73 27.0	+ 52.1	72.3	**74**
75	70 50.8	+ 36.8	51.0	71 27.6	+ 38.9	53.3	72 02.5	+ 40.8	55.8	72 35.1	+ 42.9	58.4	73 05.3	+ 45.1	61.2	73 32.9	+ 47.1	64.2	73 57.5	+ 49.3	67.3	74 19.1	+ 51.2	70.6	**75**
76	71 27.6	*+ 34.9* •	48.5	72 06.5	*+ 36.8* •	50.8	72 43.3	+ 39.0	53.3	73 18.0	+ 41.2	56.0	73 50.4	+ 43.4	58.9	74 20.0	+ 45.7	61.9	74 46.8	+ 47.8	65.2	75 10.3	+ 50.1	68.6	**76**
77	72 02.5	*+ 32.6* •	45.9	72 43.3	*+ 34.7* •	48.2	73 22.3	*+ 36.9* •	50.7	73 59.2	*+ 39.2* •	53.4	74 33.8	*+ 41.5* •	56.3	75 05.7	+ 43.9	59.5	75 34.6	+ 46.4	62.8	76 00.4	+ 48.7	66.4	**77**
78	72 35.1	*+ 30.2* •	43.2	73 18.0	*+ 32.4* •	45.4	73 59.2	*+ 34.6* •	47.9	74 38.4	*+ 36.9* •	50.6	75 15.3	*+ 39.3* •	53.6	75 49.6	*+ 41.8* •	56.7	76 21.0	*+ 44.4* •	60.2	76 49.1	+ 47.1	63.9	**78**
79	73 05.3	*+ 27.6* •	40.2	73 50.4	*+ 29.6* •	42.5	74 33.8	*+ 31.9* •	44.9	75 15.3	*+ 34.3* •	47.6	75 54.6	*+ 36.8* •	50.5	76 31.4	*+ 39.6* •	53.7	77 05.4	*+ 42.3* •	57.3	77 36.2	*+ 45.2* •	61.1	**79**
80	73 32.9	*+ 24.6* •	37.1	74 20.0	*+ 26.8* •	39.3	75 05.7	*+ 28.9* •	41.7	75 49.6	*+ 31.4* •	44.3	76 31.4	*+ 34.0* •	47.2	77 11.0	*+ 36.7* •	50.4	77 47.7	*+ 39.8* •	54.0	78 21.4	*+ 42.7* •	57.9	**80**
81	73 57.5	*+ 21.6* •	33.9	74 46.8	*+ 23.5* •	35.9	75 34.6	*+ 25.8* •	38.2	76 21.0	*+ 28.1* •	40.8	77 05.4	*+ 30.8* •	43.6	77 47.7	*+ 33.7* •	46.8	78 27.5	*+ 36.6* •	50.3	79 04.1	*+ 40.0* •	54.3	**81**
82	74 19.1	*+ 18.3* •	30.5	75 10.3	*+ 20.2* •	32.4	76 00.4	*+ 22.2* •	34.5	76 49.1	*+ 24.6* •	36.9	77 36.2	*+ 27.1* •	39.7	78 21.4	*+ 29.9* •	42.8	79 04.1	*+ 33.1* •	46.3	79 44.1	*+ 36.5* •	50.3	**82**
83	74 37.4	*+ 14.7* •	26.9	75 30.5	*+ 16.5* •	28.7	76 22.6	*+ 18.5* •	30.6	77 13.7	*+ 20.6* •	32.9	78 03.3	*+ 23.1* •	35.4	78 51.3	*+ 25.8* •	38.4	79 37.2	*+ 29.0* •	41.8	80 20.6	*+ 32.4* •	45.7	**83**
84	74 52.1	*+ 11.1* •	23.2	75 47.0	*+ 12.6* •	24.8	76 41.1	*+ 14.3* •	26.5	77 34.3	*+ 16.2* •	28.6	78 26.4	*+ 18.5* •	30.9	79 17.1	*+ 21.1* •	33.6	80 06.2	*+ 24.0* •	36.8	80 53.0	*+ 27.6* •	40.5	**84**
85	75 03.2	*+ 7.2* •	19.4	75 59.6	*+ 8.5* •	20.8	76 55.4	*+ 10.0* •	22.3	77 50.5	*+ 11.7* •	24.1	78 44.9	*+ 13.7* •	26.1	79 38.2	*+ 16.0* •	28.5	80 30.2	*+ 18.7* •	31.4	81 20.6	*+ 21.8* •	34.8	**85**
86	75 10.4	*+ 3.4* •	15.6	76 08.1	*+ 4.3* •	16.7	77 05.4	*+ 5.5* •	17.9	78 02.2	*+ 6.9* •	19.4	78 58.6	*+ 8.4* •	21.1	79 54.2	*+ 10.3* •	23.1	80 48.9	*+ 12.6* •	25.5	81 42.4	*+ 15.3* •	28.4	**86**
87	75 13.8	*– 0.7* •	11.7	76 12.4	*+ 0.1* •	12.5	77 10.9	*+ 1.0* •	13.4	78 09.1	*+ 2.0* •	14.5	79 07.0	*+ 3.1* •	15.8	80 04.5	*+ 4.5* •	17.4	81 01.5	*+ 6.2* •	19.3	81 57.7	*+ 8.3* •	21.6	**87**
88	75 13.1	*– 4.6* •	7.7	76 12.5	*– 4.1* •	8.3	77 11.9	*– 3.7* •	8.9	78 11.1	*– 3.1* •	9.7	79 10.1	*– 2.3* •	10.5	80 09.0	*– 1.5* •	11.6	81 07.7	*– 0.5* •	12.9	82 06.0	*+ 0.7* •	14.5	**88**
89	75 08.5	*– 8.5* •	3.8	76 08.4	*– 8.4* •	4.1	77 08.2	*– 8.2* •	4.4	78 08.0	*– 8.0* •	4.8	79 07.8	*– 7.8* •	5.2	80 07.5	*– 7.5* •	5.8	81 07.2	*– 7.2* •	6.4	82 06.7	*– 6.7* •	7.2	**89**
90	75 00.0	*– 12.3* •	0.0	76 00.0	*– 12.4* •	0.0	77 00.0	*– 12.6* •	0.0	78 00.0	*– 12.8* •	0.0	79 00.0	*– 13.0* •	0.0	80 00.0	*– 13.2* •	0.0	81 00.0	*– 13.6* •	0.0	82 00.0	*– 13.9* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 80°, 280°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 34.6	– 58.1	99.7	2 24.5	– 58.3	99.7	2 14.3	– 58.5	99.7	2 04.1	– 58.7	99.8	1 53.9	– 58.9	99.8	1 43.7	– 59.1	99.9	1 33.4	– 59.3	99.9	1 23.1	– 59.4	99.9	**0**
1	1 36.5	– 58.0	99.9	1 26.2	– 58.3	99.9	1 15.8	– 58.5	100.0	1 05.4	– 58.7	100.0	0 55.0	– 58.9	100.0	0 44.6	– 59.2	100.0	0 34.1	– 59.3	100.0	0 23.7	– 59.5	100.0	**1**
2	0 38.5	– 58.0	100.2	0 27.9	– 58.3	100.2	0 17.3	– 58.5	100.2	0 06.7	– 58.7	100.2	0 03.9	+ 59.0	79.8	0 14.6	+ 59.1	79.8	0 25.2	+ 59.3	79.8	0 35.8	+ 59.4	79.8	**2**
3	0 19.5	+ 58.0	79.6	0 30.4	+ 58.2	79.6	0 41.2	+ 58.5	79.6	0 52.0	+ 58.8	79.6	1 02.9	+ 58.9	79.6	1 13.7	+ 59.1	79.6	1 24.5	+ 59.2	79.7	1 35.2	+ 59.4	79.7	**3**
4	1 17.5	+ 58.0	79.3	1 28.6	+ 58.3	79.3	1 39.7	+ 58.5	79.4	1 50.8	+ 58.7	79.4	2 01.8	+ 58.9	79.4	2 12.8	+ 59.1	79.5	2 23.7	+ 59.3	79.5	2 34.6	+ 59.5	79.5	**4**
5	2 15.5	+ 58.0	79.1	2 26.9	+ 58.3	79.1	2 38.2	+ 58.5	79.1	2 49.5	+ 58.7	79.2	3 00.7	+ 59.0	79.2	3 11.9	+ 59.1	79.3	3 23.0	+ 59.3	79.3	3 34.1	+ 59.4	79.4	**5**
6	3 13.5	+ 58.1	78.8	3 25.2	+ 58.2	78.9	3 36.7	+ 58.5	78.9	3 48.2	+ 58.7	79.0	3 59.7	+ 58.9	79.1	4 11.0	+ 59.1	79.1	4 22.3	+ 59.3	79.2	4 33.5	+ 59.4	79.3	**6**
7	4 11.6	+ 58.0	78.5	4 23.4	+ 58.3	78.6	4 35.2	+ 58.5	78.7	4 46.9	+ 58.8	78.8	4 58.6	+ 58.9	78.9	5 10.1	+ 59.1	78.9	5 21.6	+ 59.3	79.0	5 32.9	+ 59.5	79.1	**7**
8	5 09.6	+ 58.0	78.3	5 21.7	+ 58.2	78.4	5 33.7	+ 58.5	78.5	5 45.7	+ 58.7	78.6	5 57.5	+ 58.9	78.7	6 09.2	+ 59.1	78.8	6 20.9	+ 59.2	78.9	6 32.4	+ 59.4	79.0	**8**
9	6 07.6	+ 57.9	78.0	6 19.9	+ 58.3	78.1	6 32.2	+ 58.5	78.3	6 44.4	+ 58.7	78.4	6 56.4	+ 58.9	78.5	7 08.3	+ 59.1	78.6	7 20.1	+ 59.3	78.7	7 31.8	+ 59.4	78.9	**9**
10	7 05.5	+ 58.0	77.8	7 18.2	+ 58.2	77.9	7 30.7	+ 58.5	78.0	7 43.1	+ 58.7	78.2	7 55.3	+ 58.9	78.3	8 07.4	+ 59.1	78.4	8 19.4	+ 59.3	78.6	8 31.2	+ 59.4	78.7	**10**
11	8 03.5	+ 58.0	77.5	8 16.4	+ 58.3	77.7	8 29.2	+ 58.5	77.8	8 41.8	+ 58.7	77.9	8 54.2	+ 58.9	78.1	9 06.5	+ 59.1	78.3	9 18.7	+ 59.2	78.4	9 30.6	+ 59.4	78.6	**11**
12	9 01.5	+ 58.0	77.3	9 14.7	+ 58.2	77.4	9 27.7	+ 58.4	77.6	9 40.5	+ 58.7	77.7	9 53.1	+ 58.9	77.9	10 05.6	+ 59.1	78.1	10 17.9	+ 59.3	78.3	10 30.0	+ 59.5	78.4	**12**
13	9 59.5	+ 57.9	77.0	10 12.9	+ 58.2	77.2	10 26.1	+ 58.5	77.3	10 39.2	+ 58.6	77.5	10 52.0	+ 58.9	77.7	11 04.7	+ 59.1	77.9	11 17.2	+ 59.2	78.1	11 29.5	+ 59.4	78.3	**13**
14	10 57.4	+ 57.9	76.7	11 11.1	+ 58.2	76.9	11 24.6	+ 58.4	77.1	11 37.8	+ 58.7	77.3	11 50.9	+ 58.9	77.5	12 03.8	+ 59.1	77.7	12 16.4	+ 59.3	77.9	12 28.9	+ 59.4	78.1	**14**
15	11 55.3	+ 58.0	76.5	12 09.3	+ 58.2	76.7	12 23.0	+ 58.4	76.9	12 36.5	+ 58.7	77.1	12 49.8	+ 58.9	77.3	13 02.9	+ 59.0	77.5	13 15.7	+ 59.2	77.8	13 28.3	+ 59.4	78.0	**15**
16	12 53.3	+ 57.9	76.2	13 07.5	+ 58.1	76.4	13 21.4	+ 58.5	76.7	13 35.2	+ 58.6	76.9	13 48.7	+ 58.8	77.1	14 01.9	+ 59.1	77.4	14 14.9	+ 59.3	77.6	14 27.7	+ 59.4	77.9	**16**
17	13 51.2	+ 57.9	75.9	14 05.6	+ 58.2	76.2	14 19.9	+ 58.4	76.4	14 33.8	+ 58.7	76.7	14 47.5	+ 58.9	76.9	15 01.0	+ 59.0	77.2	15 14.2	+ 59.2	77.4	15 27.1	+ 59.4	77.7	**17**
18	14 49.1	+ 57.8	75.7	15 03.8	+ 58.1	75.9	15 18.3	+ 58.3	76.2	15 32.5	+ 58.6	76.4	15 46.4	+ 58.8	76.7	16 00.0	+ 59.1	77.0	16 13.4	+ 59.2	77.3	16 26.5	+ 59.3	77.6	**18**
19	15 46.9	+ 57.9	75.4	16 01.9	+ 58.1	75.7	16 16.6	+ 58.4	75.9	16 31.1	+ 58.6	76.2	16 45.2	+ 58.8	76.5	16 59.1	+ 59.0	76.8	17 12.6	+ 59.2	77.1	17 25.8	+ 59.4	77.4	**19**
20	16 44.8	+ 57.8	75.1	17 00.0	+ 58.1	75.4	17 15.0	+ 58.4	75.7	17 29.7	+ 58.6	76.0	17 44.0	+ 58.9	76.3	17 58.1	+ 59.0	76.6	18 11.8	+ 59.2	76.9	18 25.2	+ 59.4	77.3	**20**
21	17 42.6	+ 57.8	74.8	17 58.1	+ 58.1	75.1	18 13.4	+ 58.3	75.5	18 28.3	+ 58.6	75.8	18 42.9	+ 58.8	76.1	18 57.1	+ 59.0	76.4	19 11.0	+ 59.2	76.8	19 24.6	+ 59.3	77.1	**21**
22	18 40.4	+ 57.8	74.5	18 56.2	+ 58.1	74.9	19 11.7	+ 58.3	75.2	19 26.9	+ 58.5	75.5	19 41.7	+ 58.7	75.9	19 56.1	+ 59.0	76.2	20 10.2	+ 59.2	76.6	20 23.9	+ 59.4	77.0	**22**
23	19 38.2	+ 57.7	74.3	19 54.3	+ 58.0	74.6	20 10.0	+ 58.3	75.0	20 25.4	+ 58.6	75.3	20 40.4	+ 58.8	75.7	20 55.1	+ 59.0	76.0	21 09.4	+ 59.2	76.4	21 23.3	+ 59.3	76.8	**23**
24	20 35.9	+ 57.7	74.0	20 52.3	+ 58.0	74.3	21 08.3	+ 58.3	74.7	21 24.0	+ 58.5	75.1	21 39.2	+ 58.8	75.5	21 54.1	+ 58.9	75.8	22 08.6	+ 59.1	76.2	22 22.6	+ 59.4	76.6	**24**
25	21 33.6	+ 57.7	73.7	21 50.3	+ 58.0	74.1	22 06.6	+ 58.2	74.4	22 22.5	+ 58.5	74.8	22 38.0	+ 58.7	75.2	22 53.0	+ 59.0	75.6	23 07.7	+ 59.2	76.1	23 22.0	+ 59.3	76.5	**25**
26	22 31.3	+ 57.7	73.4	22 48.3	+ 57.9	73.8	23 04.8	+ 58.3	74.2	23 21.0	+ 58.5	74.6	23 36.7	+ 58.7	75.0	23 52.0	+ 58.9	75.4	24 06.9	+ 59.1	75.9	24 21.3	+ 59.3	76.3	**26**
27	23 29.0	+ 57.6	73.1	23 46.2	+ 57.9	73.5	24 03.1	+ 58.2	73.9	24 19.5	+ 58.4	74.4	24 35.4	+ 58.7	74.8	24 50.9	+ 58.9	75.2	25 06.0	+ 59.1	75.7	25 20.6	+ 59.3	76.1	**27**
28	24 26.6	+ 57.6	72.8	24 44.1	+ 57.9	73.2	25 01.3	+ 58.1	73.7	25 17.9	+ 58.4	74.1	25 34.1	+ 58.7	74.6	25 49.8	+ 58.9	75.0	26 05.1	+ 59.1	75.5	26 19.9	+ 59.3	76.0	**28**
29	25 24.2	+ 57.5	72.5	25 42.0	+ 57.9	72.9	25 59.4	+ 58.2	73.4	26 16.3	+ 58.4	73.9	26 32.8	+ 58.6	74.3	26 48.7	+ 58.9	74.8	27 04.2	+ 59.1	75.3	27 19.2	+ 59.3	75.8	**29**
30	26 21.7	+ 57.5	72.1	26 39.9	+ 57.8	72.6	26 57.6	+ 58.1	73.1	27 14.7	+ 58.4	73.6	27 31.4	+ 58.7	74.1	27 47.6	+ 58.9	74.6	28 03.3	+ 59.1	75.1	28 18.5	+ 59.2	75.6	**30**
31	27 19.2	+ 57.5	71.8	27 37.7	+ 57.8	72.3	27 55.7	+ 58.0	72.8	28 13.1	+ 58.4	73.3	28 30.1	+ 58.6	73.9	28 46.5	+ 58.8	74.4	29 02.4	+ 59.0	74.9	29 17.7	+ 59.3	75.5	**31**
32	28 16.7	+ 57.4	71.5	28 35.5	+ 57.7	72.0	28 53.7	+ 58.0	72.5	29 11.5	+ 58.3	73.1	29 28.7	+ 58.5	73.6	29 45.3	+ 58.8	74.2	30 01.4	+ 59.1	74.7	30 17.0	+ 59.2	75.3	**32**
33	29 14.1	+ 57.3	71.2	29 33.2	+ 57.7	71.7	29 51.7	+ 58.0	72.2	30 09.8	+ 58.2	72.8	30 27.2	+ 58.6	73.4	30 44.1	+ 58.8	73.9	31 00.5	+ 59.0	74.5	31 16.2	+ 59.2	75.1	**33**
34	30 11.4	+ 57.3	70.8	30 30.9	+ 57.6	71.4	30 49.7	+ 58.0	72.0	31 08.0	+ 58.3	72.5	31 25.8	+ 58.5	73.1	31 42.9	+ 58.8	73.7	31 59.5	+ 59.0	74.3	32 15.4	+ 59.2	74.9	**34**
35	31 08.7	+ 57.3	70.5	31 28.5	+ 57.6	71.1	31 47.7	+ 57.9	71.6	32 06.3	+ 58.2	72.2	32 24.3	+ 58.5	72.8	32 41.7	+ 58.7	73.5	32 58.5	+ 58.9	74.1	33 14.6	+ 59.2	74.7	**35**
36	32 06.0	+ 57.2	70.1	32 26.1	+ 57.5	70.7	32 45.6	+ 57.8	71.3	33 04.5	+ 58.1	72.0	33 22.8	+ 58.4	72.6	33 40.4	+ 58.7	73.2	33 57.4	+ 59.0	73.9	34 13.8	+ 59.1	74.5	**36**
37	33 03.2	+ 57.1	69.8	33 23.6	+ 57.5	70.4	33 43.4	+ 57.9	71.0	34 02.6	+ 58.2	71.7	34 21.2	+ 58.4	72.3	34 39.1	+ 58.7	73.0	34 56.4	+ 58.9	73.6	35 12.9	+ 59.2	74.3	**37**
38	34 00.3	+ 57.1	69.4	34 21.1	+ 57.4	70.0	34 41.3	+ 57.7	70.7	35 00.8	+ 58.0	71.4	35 19.6	+ 58.4	72.0	35 37.8	+ 58.6	72.7	35 55.3	+ 58.9	73.4	36 12.1	+ 59.1	74.1	**38**
39	34 57.4	+ 57.0	69.0	35 18.5	+ 57.4	69.7	35 39.0	+ 57.7	70.4	35 58.8	+ 58.1	71.0	36 18.0	+ 58.3	71.7	36 36.4	+ 58.6	72.4	36 54.2	+ 58.8	73.2	37 11.2	+ 59.1	73.9	**39**
40	35 54.4	+ 56.9	68.7	36 15.9	+ 57.3	69.3	36 36.7	+ 57.6	70.0	36 56.9	+ 57.9	70.7	37 16.3	+ 58.3	71.4	37 35.0	+ 58.6	72.2	37 53.0	+ 58.9	72.9	38 10.3	+ 59.1	73.7	**40**
41	36 51.3	+ 56.8	68.3	37 13.2	+ 57.2	69.0	37 34.3	+ 57.6	69.7	37 54.8	+ 57.9	70.4	38 14.6	+ 58.2	71.1	38 33.6	+ 58.5	71.9	38 51.9	+ 58.8	72.7	39 09.4	+ 59.0	73.4	**41**
42	37 48.1	+ 56.8	67.9	38 10.4	+ 57.1	68.6	38 31.9	+ 57.5	69.3	38 52.7	+ 57.9	70.1	39 12.8	+ 58.2	70.8	39 32.1	+ 58.5	71.6	39 50.7	+ 58.7	72.4	40 08.4	+ 59.0	73.2	**42**
43	38 44.9	+ 56.6	67.4	39 07.5	+ 57.1	68.2	39 29.4	+ 57.5	69.0	39 50.6	+ 57.8	69.7	40 11.0	+ 58.1	70.5	40 30.6	+ 58.5	71.3	40 49.4	+ 58.8	72.1	41 07.4	+ 59.0	73.0	**43**
44	39 41.5	+ 56.6	67.0	40 04.6	+ 56.9	67.8	40 26.9	+ 57.3	68.6	40 48.4	+ 57.7	69.4	41 09.1	+ 58.1	70.2	41 29.1	+ 58.3	71.0	41 48.2	+ 58.6	71.9	42 06.4	+ 59.0	72.7	**44**
45	40 38.1	+ 56.4	66.6	41 01.5	+ 56.9	67.4	41 24.2	+ 57.3	68.2	41 46.1	+ 57.7	69.0	42 07.2	+ 58.0	69.9	42 27.4	+ 58.4	70.7	42 46.8	+ 58.7	71.6	43 05.4	+ 58.9	72.5	**45**
46	41 34.5	+ 56.4	66.1	41 58.4	+ 56.8	67.0	42 21.5	+ 57.2	67.8	42 43.8	+ 57.6	68.6	43 05.2	+ 58.0	69.5	43 25.8	+ 58.3	70.4	43 45.5	+ 58.6	71.3	44 04.3	+ 58.8	72.2	**46**
47	42 30.9	+ 56.2	65.7	42 55.2	+ 56.7	66.5	43 18.7	+ 57.1	67.4	43 41.4	+ 57.5	68.3	44 03.2	+ 57.8	69.2	44 24.1	+ 58.2	70.1	44 44.1	+ 58.5	71.0	45 03.1	+ 58.9	71.9	**47**
48	43 27.1	+ 56.2	65.2	43 51.9	+ 56.6	66.1	44 15.8	+ 57.0	67.0	44 38.9	+ 57.4	67.9	45 01.0	+ 57.8	68.8	45 22.3	+ 58.2	69.7	45 42.6	+ 58.5	70.7	46 02.0	+ 58.8	71.7	**48**
49	44 23.3	+ 55.9	64.7	44 48.5	+ 56.4	65.6	45 12.8	+ 56.9	66.5	45 36.3	+ 57.3	67.4	45 58.8	+ 57.8	68.4	46 20.5	+ 58.1	69.4	46 41.1	+ 58.5	70.4	47 00.8	+ 58.7	71.4	**49**
50	45 19.2	+ 55.9	64.2	45 44.9	+ 56.4	65.1	46 09.7	+ 56.8	66.1	46 33.6	+ 57.2	67.0	46 56.6	+ 57.6	68.0	47 18.6	+ 58.0	69.0	47 39.6	+ 58.3	70.0	47 59.5	+ 58.7	71.1	**50**
51	46 15.1	+ 55.7	63.7	46 41.3	+ 56.2	64.6	47 06.5	+ 56.7	65.6	47 30.8	+ 57.2	66.6	47 54.2	+ 57.6	67.6	48 16.6	+ 57.9	68.6	48 37.9	+ 58.3	69.7	48 58.2	+ 58.7	70.8	**51**
52	47 10.8	+ 55.5	63.1	47 37.5	+ 56.0	64.1	48 03.2	+ 56.5	65.1	48 28.0	+ 57.0	66.1	48 51.8	+ 57.4	67.2	49 14.5	+ 57.9	68.2	49 36.2	+ 58.3	69.3	49 56.9	+ 58.6	70.4	**52**
53	48 06.3	+ 55.4	62.6	48 33.5	+ 55.9	63.6	48 59.7	+ 56.4	64.6	49 25.0	+ 56.9	65.6	49 49.2	+ 57.3	66.7	50 12.4	+ 57.8	67.8	50 34.5	+ 58.2	68.9	50 55.5	+ 58.5	70.1	**53**
54	49 01.7	+ 55.2	62.0	49 29.4	+ 55.7	63.0	49 56.1	+ 56.3	64.1	50 21.9	+ 56.7	65.2	50 46.5	+ 57.3	66.3	51 10.2	+ 57.6	67.4	51 32.7	+ 58.0	68.6	51 54.0	+ 58.5	69.7	**54**
55	49 56.9	+ 55.0	61.4	50 25.1	+ 55.6	62.4	50 52.4	+ 56.1	63.5	51 18.6	+ 56.6	64.6	51 43.8	+ 57.1	65.8	52 07.8	+ 57.6	67.0	52 30.7	+ 58.0	68.1	52 52.5	+ 58.4	69.4	**55**
56	50 51.9	+ 54.8	60.8	51 20.7	+ 55.4	61.8	51 48.5	+ 55.9	63.0	52 15.2	+ 56.5	64.1	52 40.9	+ 57.0	65.3	53 05.4	+ 57.5	66.5	53 28.7	+ 58.0	67.7	53 50.9	+ 58.3	69.0	**56**
57	51 46.7	+ 54.5	60.1	52 16.1	+ 55.1	61.2	52 44.4	+ 55.8	62.4	53 11.7	+ 56.3	63.5	53 37.9	+ 56.8	64.8	54 02.9	+ 57.3	66.0	54 26.7	+ 57.8	67.3	54 49.2	+ 58.2	68.6	**57**
58	52 41.2	+ 54.3	59.4	53 11.2	+ 55.0	60.6	53 40.2	+ 55.5	61.7	54 08.0	+ 56.1	63.0	54 34.7	+ 56.7	64.2	55 00.2	+ 57.2	65.5	55 24.5	+ 57.7	66.8	55 47.4	+ 58.2	68.2	**58**
59	53 35.5	+ 54.1	58.7	54 06.2	+ 54.7	59.9	54 35.7	+ 55.3	61.1	55 04.1	+ 56.0	62.4	55 31.4	+ 56.5	63.6	55 57.4	+ 57.1	65.0	56 22.2	+ 57.5	66.3	56 45.6	+ 58.0	67.7	**59**
60	54 29.6	+ 53.7	58.0	55 00.9	+ 54.4	59.2	55 31.0	+ 55.1	60.4	56 00.1	+ 55.7	61.7	56 27.9	+ 56.3	63.0	56 54.5	+ 56.9	64.4	57 19.7	+ 57.5	65.8	57 43.6	+ 58.0	67.2	**60**
61	55 23.3	+ 53.5	57.2	55 55.3	+ 54.2	58.4	56 26.1	+ 54.9	59.7	56 55.8	+ 55.5	61.0	57 24.2	+ 56.1	62.4	57 51.4	+ 56.7	63.8	58 17.2	+ 57.2	65.3	58 41.6	+ 57.8	66.8	**61**
62	56 16.8	+ 53.1	56.4	56 49.5	+ 53.8	57.7	57 21.0	+ 54.5	59.0	57 51.3	+ 55.2	60.3	58 20.3	+ 56.0	61.7	58 48.1	+ 56.5	63.2	59 14.4	+ 57.2	64.7	59 39.4	+ 57.6	66.2	**62**
63	57 09.9	+ 52.8	55.5	57 43.3	+ 53.6	56.8	58 15.5	+ 54.3	58.2	58 46.5	+ 55.0	59.6	59 16.3	+ 55.6	61.0	59 44.6	+ 56.4	62.5	60 11.6	+ 56.9	64.1	60 37.0	+ 57.6	65.7	**63**
64	58 02.7	+ 52.4	54.7	58 36.9	+ 53.1	56.0	59 09.8	+ 54.0	57.4	59 41.5	+ 54.7	58.8	60 11.9	+ 55.4	60.3	60 41.0	+ 56.1	61.8	61 08.5	+ 56.8	63.4	61 34.6	+ 57.4	65.1	**64**
65	58 55.1	+ 52.0	53.7	59 30.0	+ 52.8	55.1	60 03.8	+ 53.5	56.5	60 36.2	+ 54.4	58.0	61 07.3	+ 55.2	59.5	61 37.1	+ 55.8	61.1	62 05.3	+ 56.5	62.8	62 32.0	+ 57.2	64.5	**65**
66	59 47.1	+ 51.5	52.7	60 22.8	+ 52.3	54.1	60 57.3	+ 53.2	55.6	61 30.6	+ 54.0	57.1	62 02.5	+ 54.8	58.7	62 32.9	+ 55.6	60.3	63 01.8	+ 56.3	62.0	63 29.2	+ 57.0	63.8	**66**
67	60 38.6	+ 51.0	51.7	61 15.1	+ 51.9	53.1	61 50.5	+ 52.8	54.6	62 24.6	+ 53.6	56.2	62 57.3	+ 54.4	57.8	63 28.5	+ 55.3	59.5	63 58.1	+ 56.1	61.3	64 26.2	+ 56.7	63.1	**67**
68	61 29.6	+ 50.4	50.6	62 07.0	+ 51.4	52.1	62 43.3	+ 52.3	53.6	63 18.2	+ 53.2	55.2	63 51.7	+ 54.1	56.9	64 23.8	+ 54.9	58.6	64 54.2	+ 55.7	60.4	65 22.9	+ 56.6	62.3	**68**
69	62 20.0	+ 49.8	49.5	62 58.4	+ 50.8	51.0	63 35.6	+ 51.7	52.5	64 11.4	+ 52.7	54.2	64 45.8	+ 53.6	55.9	65 18.7	+ 54.5	57.7	65 49.9	+ 55.5	59.5	66 19.5	+ 56.2	61.5	**69**
70	63 09.8	+ 49.2	48.3	63 49.2	+ 50.2	49.8	64 27.3	+ 51.2	51.4	65 04.1	+ 52.2	53.0	65 39.4	+ 53.2	54.8	66 13.2	+ 54.1	56.7	66 45.4	+ 55.0	58.6	67 15.7	+ 56.0	60.6	**70**
71	63 59.0	+ 48.5	47.0	64 39.4	+ 49.5	48.5	65 18.5	+ 50.5	50.1	65 56.3	+ 51.5	51.8	66 32.6	+ 52.6	53.7	67 07.3	+ 53.7	55.6	67 40.4	+ 54.6	57.6	68 11.7	+ 55.5	59.7	**71**
72	64 47.5	+ 47.6	45.6	65 28.9	+ 48.7	47.2	66 09.0	+ 49.8	48.8	66 47.8	+ 51.0	50.6	67 25.2	+ 52.0	52.4	68 01.0	+ 53.1	54.4	68 35.0	+ 54.2	56.5	69 07.2	+ 55.2	58.6	**72**
73	65 35.1	+ 46.8	44.2	66 17.6	+ 47.9	45.7	66 58.8	+ 49.1	47.4	67 38.8	+ 50.1	49.2	68 17.2	+ 51.3	51.1	68 54.1	+ 52.4	53.1	69 29.2	+ 53.6	55.3	70 02.4	+ 54.7	57.5	**73**
74	66 21.9	+ 45.8	42.6	67 05.5	+ 47.0	44.2	67 47.9	+ 48.1	45.9	68 28.9	+ 49.4	47.7	69 08.5	+ 50.6	49.7	69 46.5	+ 51.8	51.7	70 22.8	+ 53.0	53.9	70 57.1	+ 54.2	56.3	**74**
75	67 07.7	+ 44.8	41.0	67 52.5	+ 45.9	42.6	68 36.0	+ 47.2	44.3	69 18.3	+ 48.4	46.2	69 59.1	+ 49.7	48.1	70 38.3	+ 51.0	50.2	71 15.8	+ 52.3	52.5	71 51.3	+ 53.5	54.9	**75**
76	67 52.5	+ 43.5	39.2	68 38.4	+ 44.8	40.9	69 23.2	+ 46.1	42.6	70 06.7	+ 47.4	44.5	70 48.8	+ 48.7	46.5	71 29.3	+ 50.1	48.6	72 08.1	+ 51.4	50.9	72 44.8	+ 52.9	53.4	**76**
77	68 36.0	+ 42.3	37.4	69 23.2	+ 43.5	39.0	70 09.3	+ 44.8	40.7	70 54.1	+ 46.2	42.6	71 37.5	+ 47.6	44.6	72 19.4	+ 49.0	46.9	72 59.5	+ 50.5	49.2	73 37.7	+ 52.0	51.8	**77**
78	69 18.3	+ 40.8	35.4	70 06.7	+ 42.1	37.0	70 54.1	+ 43.4	38.7	71 40.3	+ 44.8	40.6	72 25.1	+ 46.3	42.7	73 08.4	+ 47.9	44.9	73 50.0	+ 49.4	47.3	74 29.7	+ 50.9	50.0	**78**
79	69 59.1	+ 39.2	33.3	70 48.8	+ 40.5	34.9	71 37.5	+ 41.9	36.6	72 25.1	+ 43.3	38.5	73 11.4	+ 44.9	40.5	73 56.3	+ 46.4	42.8	74 39.4	+ 48.1	45.2	75 20.6	+ 49.9	48.0	**79**
80	70 38.3	+ 37.5	31.1	71 29.3	+ 38.8	32.6	72 19.4	+ 40.1	34.3	73 08.4	+ 41.6	36.1	73 56.3	+ 43.1	38.2	74 42.7	+ 44.8	40.4	75 27.5	+ 46.6	42.9	76 10.5	+ 48.4	45.7	**80**
81	71 15.8	*+ 35.5* •	28.7	72 08.1	*+ 36.7* •	30.1	72 59.5	*+ 38.2* •	31.8	73 50.0	*+ 39.7* •	33.6	74 39.4	*+ 41.2* •	35.6	75 27.5	*+ 43.0* •	37.8	76 14.1	*+ 44.8* •	40.3	76 58.9	+ 46.7	43.1	**81**
82	71 51.3	*+ 33.4* •	26.1	72 44.8	*+ 34.7* •	27.5	73 37.7	*+ 35.9* •	29.1	74 29.7	*+ 37.4* •	30.8	75 20.6	*+ 39.1* •	32.8	76 10.5	*+ 40.7* •	35.0	76 58.9	*+ 42.6* •	37.5	77 45.6	*+ 44.7* •	40.3	**82**
83	72 24.7	*+ 31.0* •	23.4	73 19.5	*+ 32.1* •	24.7	74 13.6	*+ 33.5* •	26.2	75 07.1	*+ 34.9* •	27.9	75 59.7	*+ 36.5* •	29.7	76 51.2	*+ 38.2* •	31.8	77 41.5	*+ 40.2* •	34.3	78 30.3	*+ 42.2* •	37.0	**83**
84	72 55.7	*+ 28.4* •	20.5	73 51.6	*+ 29.6* •	21.7	74 47.1	*+ 30.8* •	23.1	75 42.0	*+ 32.1* •	24.6	76 36.2	*+ 33.5* •	26.4	77 29.4	*+ 35.3* •	28.4	78 21.7	*+ 37.1* •	30.7	79 12.5	*+ 39.4* •	33.4	**84**
85	73 24.1	*+ 25.7* •	17.5	74 21.2	*+ 26.6* •	18.6	75 17.9	*+ 27.7* •	19.8	76 14.1	*+ 28.9* •	21.1	77 09.7	*+ 30.4* •	22.7	78 04.7	*+ 31.9* •	24.6	78 58.8	*+ 33.7* •	26.7	79 51.9	*+ 35.7* •	29.2	**85**
86	73 49.8	*+ 22.6* •	14.3	74 47.8	*+ 23.4* •	15.2	75 45.6	*+ 24.3* •	16.2	76 43.0	*+ 25.4* •	17.4	77 40.1	*+ 26.5* •	18.8	78 36.6	*+ 28.0* •	20.4	79 32.5	*+ 29.6* •	22.2	80 27.6	*+ 31.5* •	24.5	**86**
87	74 12.4	*+ 19.4* •	10.9	75 11.2	*+ 20.0* •	11.6	76 09.9	*+ 20.7* •	12.4	77 08.4	*+ 21.5* •	13.4	78 06.6	*+ 22.5* •	14.5	79 04.6	*+ 23.5* •	15.8	80 02.1	*+ 24.8* •	17.3	80 59.1	*+ 26.4* •	19.2	**87**
88	74 31.8	*+ 15.9* •	7.4	75 31.2	*+ 16.4* •	7.9	76 30.6	*+ 16.8* •	8.5	77 29.9	*+ 17.3* •	9.1	78 29.1	*+ 17.9* •	9.9	79 28.1	*+ 18.7* •	10.8	80 26.9	*+ 19.5* •	12.0	81 25.5	*+ 20.6* •	13.3	**88**
89	74 47.7	*+ 12.3* •	3.8	75 47.6	*+ 12.4* •	4.0	76 47.4	*+ 12.6* •	4.3	77 47.2	*+ 12.8* •	4.7	78 47.0	*+ 13.0* •	5.1	79 46.8	*+ 13.2* •	5.6	80 46.4	*+ 13.6* •	6.2	81 46.1	*+ 13.9* •	6.9	**89**
90	75 00.0	*+ 8.5* •	0.0	76 00.0	*+ 8.4* •	0.0	77 00.0	*+ 8.2* •	0.0	78 00.0	*+ 8.0* •	0.0	79 00.0	*+ 7.8* •	0.0	80 00.0	*+ 7.5* •	0.0	81 00.0	*+ 7.2* •	0.0	82 00.0	*+ 6.7* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 100°, 260°

81°, 279° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 19.2	+58.0	98.7	2 10.1	+58.3	98.7	2 01.0	+58.5	98.8	1 51.8	+58.7	98.8	1 42.6	+59.0	98.8	1 33.4	+59.1	98.9	1 24.1	+59.3	98.9	1 14.9	+59.4	98.9	**0**
1	3 17.2	+58.0	98.4	3 08.4	+58.2	98.5	2 59.5	+58.5	98.6	2 50.5	+58.8	98.6	2 41.6	+58.9	98.6	2 32.5	+59.1	98.7	2 23.4	+59.3	98.7	2 14.3	+59.4	98.8	**1**
2	4 15.2	+58.0	98.2	4 06.6	+58.3	98.3	3 58.0	+58.5	98.3	3 49.3	+58.7	98.4	3 40.5	+58.9	98.5	3 31.6	+59.1	98.5	3 22.7	+59.3	98.6	3 13.7	+59.4	98.6	**2**
3	5 13.2	+58.0	97.9	5 04.9	+58.2	98.0	4 56.5	+58.5	98.1	4 48.0	+58.7	98.2	4 39.4	+58.9	98.3	4 30.7	+59.1	98.3	4 22.0	+59.2	98.4	4 13.1	+59.5	98.5	**3**
4	6 11.2	+58.0	97.7	6 03.1	+58.3	97.8	5 55.0	+58.5	97.9	5 46.7	+58.7	98.0	5 38.3	+58.9	98.1	5 29.8	+59.1	98.2	5 21.2	+59.3	98.3	5 12.6	+59.4	98.4	**4**
5	7 09.2	+58.0	97.4	7 01.4	+58.2	97.5	6 53.5	+58.4	97.7	6 45.4	+58.7	97.8	6 37.2	+58.9	97.9	6 28.9	+59.1	98.0	6 20.5	+59.3	98.1	6 12.0	+59.4	98.2	**5**
6	8 07.2	+57.9	97.2	7 59.6	+58.2	97.3	7 51.9	+58.5	97.4	7 44.1	+58.7	97.6	7 36.1	+58.9	97.7	7 28.0	+59.1	97.8	7 19.8	+59.2	98.0	7 11.4	+59.4	98.1	**6**
7	9 05.1	+58.0	96.9	8 57.8	+58.2	97.0	8 50.4	+58.5	97.2	8 42.8	+58.7	97.4	8 35.0	+58.9	97.5	8 27.1	+59.1	97.7	8 19.0	+59.3	97.8	8 10.8	+59.4	97.9	**7**
8	10 03.1	+57.9	96.6	9 56.0	+58.2	96.8	9 48.9	+58.4	97.0	9 41.5	+58.7	97.1	9 33.9	+58.9	97.3	9 26.2	+59.1	97.5	9 18.3	+59.3	97.6	9 10.2	+59.5	97.8	**8**
9	11 01.0	+57.9	96.4	10 54.2	+58.2	96.6	10 47.3	+58.4	96.7	10 40.2	+58.6	96.9	10 32.8	+58.9	97.1	10 25.3	+59.1	97.3	10 17.6	+59.2	97.5	10 09.7	+59.4	97.7	**9**
10	11 58.9	+57.9	96.1	11 52.4	+58.2	96.3	11 45.7	+58.5	96.5	11 38.8	+58.7	96.7	11 31.7	+58.9	96.9	11 24.4	+59.0	97.1	11 16.8	+59.3	97.3	11 09.1	+59.4	97.5	**10**
11	12 56.8	+57.9	95.8	12 50.6	+58.2	96.1	12 44.2	+58.4	96.3	12 37.5	+58.6	96.5	12 30.6	+58.8	96.7	12 23.4	+59.1	96.9	12 16.1	+59.2	97.2	12 08.5	+59.4	97.4	**11**
12	13 54.7	+57.9	95.6	13 48.8	+58.1	95.8	13 42.6	+58.4	96.0	13 36.1	+58.7	96.3	13 29.4	+58.9	96.5	13 22.5	+59.1	96.8	13 15.3	+59.2	97.0	13 07.9	+59.4	97.2	**12**
13	14 52.6	+57.8	95.3	14 46.9	+58.2	95.5	14 41.0	+58.4	95.8	14 34.8	+58.6	96.1	14 28.3	+58.9	96.3	14 21.6	+59.0	96.6	14 14.5	+59.3	96.8	14 07.3	+59.4	97.1	**13**
14	15 50.4	+57.9	95.0	15 45.1	+58.1	95.3	15 39.4	+58.4	95.6	15 33.4	+58.6	95.8	15 27.2	+58.8	96.1	15 20.6	+59.0	96.4	15 13.8	+59.2	96.7	15 06.7	+59.4	96.9	**14**
15	16 48.3	+57.8	94.7	16 43.2	+58.1	95.0	16 37.8	+58.3	95.3	16 32.0	+58.6	95.6	16 26.0	+58.8	95.9	16 19.6	+59.1	96.2	16 13.0	+59.2	96.5	16 06.1	+59.3	96.8	**15**
16	17 46.1	+57.8	94.5	17 41.3	+58.0	94.8	17 36.1	+58.3	95.1	17 30.6	+58.6	95.4	17 24.8	+58.8	95.7	17 18.7	+59.0	96.0	17 12.2	+59.2	96.3	17 05.4	+59.4	96.6	**16**
17	18 43.9	+57.7	94.2	18 39.3	+58.1	94.5	18 34.4	+58.4	94.8	18 29.2	+58.6	95.2	18 23.6	+58.8	95.5	18 17.7	+59.0	95.8	18 11.4	+59.2	96.2	18 04.8	+59.4	96.5	**17**
18	19 41.6	+57.8	93.9	19 37.4	+58.0	94.2	19 32.8	+58.3	94.6	19 27.8	+58.5	94.9	19 22.4	+58.8	95.3	19 16.7	+59.0	95.6	19 10.6	+59.2	96.0	19 04.2	+59.3	96.3	**18**
19	20 39.4	+57.7	93.6	20 35.4	+58.0	94.0	20 31.1	+58.2	94.3	20 26.3	+58.6	94.7	20 21.2	+58.8	95.1	20 15.7	+59.0	95.5	20 09.8	+59.2	95.8	20 03.5	+59.4	96.2	**19**
20	21 37.1	+57.6	93.3	21 33.4	+58.0	93.7	21 29.3	+58.3	94.1	21 24.9	+58.5	94.5	21 20.0	+58.7	94.9	21 14.7	+58.9	95.3	21 09.0	+59.1	95.6	21 02.9	+59.3	96.0	**20**
21	22 34.7	+57.7	93.0	22 31.4	+57.9	93.4	22 27.6	+58.2	93.8	22 23.4	+58.5	94.2	22 18.7	+58.8	94.6	22 13.6	+59.0	95.1	22 08.1	+59.2	95.5	22 02.2	+59.4	95.9	**21**
22	23 32.4	+57.6	92.7	23 29.3	+57.9	93.1	23 25.8	+58.2	93.6	23 21.9	+58.4	94.0	23 17.5	+58.7	94.4	23 12.6	+58.9	94.9	23 07.3	+59.1	95.3	23 01.6	+59.3	95.7	**22**
23	24 30.0	+57.5	92.4	24 27.2	+57.9	92.8	24 24.0	+58.2	93.3	24 20.3	+58.5	93.8	24 16.2	+58.7	94.2	24 11.5	+59.0	94.7	24 06.4	+59.2	95.1	24 00.9	+59.3	95.5	**23**
24	25 27.5	+57.6	92.1	25 25.1	+57.9	92.6	25 22.2	+58.1	93.0	25 18.8	+58.4	93.5	25 14.9	+58.6	94.0	25 10.5	+58.9	94.4	25 05.6	+59.1	94.9	25 00.2	+59.3	95.4	**24**
25	26 25.1	+57.4	91.8	26 23.0	+57.8	92.3	26 20.3	+58.1	92.8	26 17.2	+58.4	93.2	26 13.5	+58.7	93.7	26 09.4	+58.8	94.2	26 04.7	+59.1	94.7	25 59.5	+59.3	95.2	**25**
26	27 22.5	+57.5	91.4	27 20.8	+57.7	92.0	27 18.4	+58.1	92.5	27 15.6	+58.3	93.0	27 12.2	+58.6	93.5	27 08.2	+58.9	94.0	27 03.8	+59.1	94.5	26 58.8	+59.3	95.0	**26**
27	28 20.0	+57.4	91.1	28 18.5	+57.8	91.7	28 16.5	+58.1	92.2	28 13.9	+58.4	92.7	28 10.8	+58.6	93.3	28 07.1	+58.9	93.8	28 02.9	+59.0	94.3	27 58.1	+59.2	94.9	**27**
28	29 17.4	+57.3	90.8	29 16.3	+57.6	91.3	29 14.6	+58.0	91.9	29 12.3	+58.3	92.5	29 09.4	+58.6	93.0	29 06.0	+58.8	93.6	29 01.9	+59.1	94.1	28 57.3	+59.3	94.7	**28**
29	30 14.7	+57.3	90.4	30 13.9	+57.7	91.0	30 12.6	+57.9	91.6	30 10.6	+58.2	92.2	30 08.0	+58.5	92.8	30 04.8	+58.8	93.3	30 01.0	+59.0	93.9	29 56.6	+59.2	94.5	**29**
30	31 12.0	+57.2	90.1	31 11.6	+57.6	90.7	31 10.5	+57.9	91.3	31 08.8	+58.3	91.9	31 06.5	+58.5	92.5	31 03.6	+58.7	93.1	31 00.0	+59.0	93.7	30 55.8	+59.2	94.3	**30**
31	32 09.2	+57.2	89.7	32 09.2	+57.5	90.4	32 08.4	+57.9	91.0	32 07.1	+58.2	91.6	32 05.0	+58.5	92.3	32 02.3	+58.8	92.9	31 59.0	+59.0	93.5	31 55.0	+59.2	94.1	**31**
32	33 06.4	+57.1	89.4	33 06.7	+57.5	90.0	33 06.3	+57.8	90.7	33 05.3	+58.1	91.3	33 03.5	+58.5	92.0	33 01.1	+58.7	92.6	32 58.0	+59.0	93.3	32 54.2	+59.2	93.9	**32**
33	34 03.5	+57.0	89.0	34 04.2	+57.4	89.7	34 04.1	+57.8	90.4	34 03.4	+58.1	91.0	34 02.0	+58.4	91.7	33 59.8	+58.7	92.4	33 57.0	+58.9	93.1	33 53.4	+59.2	93.7	**33**
34	35 00.5	+57.0	88.6	35 01.6	+57.4	89.3	35 01.9	+57.7	90.0	35 01.5	+58.1	90.7	35 00.4	+58.3	91.4	34 58.5	+58.7	92.1	34 55.9	+58.9	92.8	34 52.6	+59.1	93.5	**34**
35	35 57.5	+56.9	88.3	35 59.0	+57.2	89.0	35 59.6	+57.7	89.7	35 59.6	+58.0	90.4	35 58.7	+58.4	91.2	35 57.2	+58.6	91.9	35 54.8	+58.9	92.6	35 51.7	+59.1	93.3	**35**
36	36 54.4	+56.8	87.9	36 56.2	+57.3	88.6	36 57.3	+57.6	89.4	36 57.6	+57.9	90.1	36 57.1	+58.3	90.9	36 55.8	+58.6	91.6	36 53.7	+58.8	92.4	36 50.8	+59.1	93.1	**36**
37	37 51.2	+56.7	87.5	37 53.5	+57.1	88.2	37 54.9	+57.6	89.0	37 55.5	+57.9	89.8	37 55.4	+58.2	90.6	37 54.4	+58.5	91.3	37 52.5	+58.9	92.1	37 49.9	+59.1	92.9	**37**
38	38 47.9	+56.7	87.0	38 50.6	+57.1	87.8	38 52.5	+57.4	88.6	38 53.4	+57.9	89.5	38 53.6	+58.2	90.3	38 52.9	+58.5	91.1	38 51.4	+58.8	91.9	38 49.0	+59.0	92.7	**38**
39	39 44.6	+56.5	86.6	39 47.7	+57.0	87.4	39 49.9	+57.4	88.3	39 51.3	+57.8	89.1	39 51.8	+58.1	89.9	39 51.4	+58.5	90.8	39 50.2	+58.7	91.6	39 48.0	+59.0	92.4	**39**
40	40 41.1	+56.4	86.2	40 44.7	+56.9	87.0	40 47.3	+57.3	87.9	40 49.1	+57.7	88.8	40 49.9	+58.1	89.6	40 49.9	+58.4	90.5	40 48.9	+58.7	91.3	40 47.0	+59.0	92.2	**40**
41	41 37.5	+56.4	85.7	41 41.6	+56.7	86.6	41 44.6	+57.3	87.5	41 46.8	+57.6	88.4	41 48.0	+58.0	89.3	41 48.3	+58.3	90.2	41 47.6	+58.7	91.1	41 46.0	+59.0	92.0	**41**
42	42 33.9	+56.2	85.3	42 38.3	+56.7	86.2	42 41.9	+57.1	87.1	42 44.4	+57.6	88.0	42 46.0	+58.0	88.9	42 46.6	+58.4	89.9	42 46.3	+58.6	90.8	42 45.0	+58.9	91.7	**42**
43	43 30.1	+56.1	84.8	43 35.0	+56.6	85.7	43 39.0	+57.1	86.7	43 42.0	+57.5	87.6	43 44.0	+57.9	88.6	43 45.0	+58.2	89.5	43 44.9	+58.6	90.5	43 43.9	+58.9	91.5	**43**
44	44 26.2	+55.9	84.3	44 31.6	+56.5	85.3	44 36.1	+56.9	86.2	44 39.5	+57.4	87.2	44 41.9	+57.8	88.2	44 43.2	+58.2	89.2	44 43.5	+58.6	90.2	44 42.8	+58.8	91.2	**44**
45	45 22.1	+55.8	83.8	45 28.1	+56.3	84.8	45 33.0	+56.9	85.8	45 36.9	+57.3	86.8	45 39.7	+57.7	87.8	45 41.4	+58.1	88.9	45 42.1	+58.4	89.9	45 41.6	+58.8	90.9	**45**
46	46 17.9	+55.7	83.2	46 24.4	+56.3	84.3	46 29.9	+56.7	85.3	46 34.2	+57.2	86.4	46 37.4	+57.7	87.4	46 39.5	+58.1	88.5	46 40.5	+58.5	89.6	46 40.4	+58.8	90.6	**46**
47	47 13.6	+55.5	82.7	47 20.7	+56.0	83.8	47 26.6	+56.6	84.9	47 31.4	+57.1	85.9	47 35.1	+57.5	87.0	47 37.6	+58.0	88.1	47 39.0	+58.3	89.2	47 39.2	+58.7	90.3	**47**
48	48 09.1	+55.3	82.1	48 16.7	+56.0	83.3	48 23.2	+56.5	84.4	48 28.5	+57.0	85.5	48 32.6	+57.5	86.6	48 35.6	+57.9	87.8	48 37.3	+58.4	88.9	48 37.9	+58.7	90.0	**48**
49	49 04.4	+55.2	81.6	49 12.7	+55.7	82.7	49 19.7	+56.3	83.9	49 25.5	+56.9	85.0	49 30.1	+57.4	86.2	49 33.5	+57.8	87.4	49 35.7	+58.2	88.5	49 36.6	+58.6	89.7	**49**
50	49 59.6	+54.9	80.9	50 08.4	+55.6	82.1	50 16.0	+56.2	83.3	50 22.4	+56.7	84.5	50 27.5	+57.2	85.7	50 31.3	+57.7	86.9	50 33.9	+58.1	88.1	50 35.2	+58.5	89.4	**50**
51	50 54.5	+54.8	80.3	51 04.0	+55.4	81.5	51 12.2	+56.0	82.8	51 19.1	+56.6	84.0	51 24.7	+57.2	85.3	51 29.0	+57.7	86.5	51 32.0	+58.1	87.8	51 33.7	+58.5	89.0	**51**
52	51 49.3	+54.5	79.7	51 59.4	+55.2	80.9	52 08.2	+55.9	82.2	52 15.7	+56.4	83.5	52 21.9	+57.0	84.8	52 26.7	+57.5	86.0	52 30.1	+58.0	87.3	52 32.2	+58.4	88.7	**52**
53	52 43.8	+54.3	79.0	52 54.6	+55.0	80.3	53 04.1	+55.6	81.6	53 12.1	+56.3	82.9	53 18.9	+56.8	84.2	53 24.2	+57.4	85.6	53 28.1	+57.9	86.9	53 30.6	+58.4	88.3	**53**
54	53 38.1	+54.0	78.3	53 49.6	+54.7	79.6	53 59.7	+55.4	81.0	54 08.4	+56.1	82.3	54 15.7	+56.7	83.7	54 21.6	+57.3	85.1	54 26.0	+57.8	86.5	54 29.0	+58.2	87.9	**54**
55	54 32.1	+53.7	77.5	54 44.3	+54.5	78.9	54 55.1	+55.3	80.3	55 04.5	+55.9	81.7	55 12.4	+56.6	83.1	55 18.9	+57.1	84.6	55 23.8	+57.7	86.0	55 27.2	+58.2	87.5	**55**
56	55 25.8	+53.4	76.7	55 38.8	+54.2	78.2	55 50.4	+54.9	79.6	56 00.4	+55.7	81.1	56 09.0	+56.4	82.5	56 16.0	+57.0	84.0	56 21.5	+57.5	85.5	56 25.4	+58.1	87.0	**56**
57	56 19.2	+53.1	75.9	56 33.0	+53.9	77.4	56 45.3	+54.8	78.9	56 56.1	+55.5	80.4	57 05.4	+56.1	81.9	57 13.0	+56.8	83.5	57 19.0	+57.5	85.0	57 23.5	+57.9	86.6	**57**
58	57 12.3	+52.7	75.1	57 26.9	+53.6	76.6	57 40.1	+54.4	78.1	57 51.6	+55.2	79.7	58 01.5	+56.0	81.3	58 09.8	+56.7	82.9	58 16.5	+57.2	84.5	58 21.4	+57.9	86.1	**58**
59	58 05.0	+52.3	74.2	58 20.5	+53.3	75.8	58 34.5	+54.1	77.3	58 46.8	+55.0	78.9	58 57.5	+55.7	80.6	59 06.5	+56.4	82.2	59 13.7	+57.1	83.9	59 19.3	+57.7	85.6	**59**
60	58 57.3	+51.9	73.3	59 13.8	+52.8	74.9	59 28.6	+53.8	76.5	59 41.8	+54.6	78.2	59 53.2	+55.5	79.8	60 02.9	+56.3	81.6	60 10.8	+57.0	83.3	60 17.0	+57.5	85.0	**60**
61	59 49.2	+51.4	72.3	60 06.6	+52.5	73.9	60 22.4	+53.4	75.6	60 36.4	+54.4	77.3	60 48.7	+55.2	79.1	60 59.2	+56.0	80.8	61 07.8	+56.7	82.6	61 14.5	+57.5	84.4	**61**
62	60 40.6	+50.9	71.2	60 59.1	+51.9	72.9	61 15.8	+53.0	74.7	61 30.8	+53.9	76.5	61 43.9	+54.9	78.3	61 55.2	+55.7	80.1	62 04.5	+56.6	81.9	62 12.0	+57.2	83.8	**62**
63	61 31.5	+50.4	70.1	61 51.0	+51.5	71.9	62 08.8	+52.5	73.7	62 24.7	+53.6	75.5	62 38.8	+54.5	77.4	62 50.9	+55.5	79.3	63 01.1	+56.3	81.2	63 09.2	+57.1	83.2	**63**
64	62 21.9	+49.7	69.0	62 42.5	+50.9	70.8	63 01.3	+52.1	72.6	63 18.3	+53.1	74.5	63 33.3	+54.2	76.5	63 46.4	+55.1	78.4	63 57.4	+56.0	80.4	64 06.3	+56.8	82.5	**64**
65	63 11.6	+49.1	67.8	63 33.4	+50.4	69.6	63 53.4	+51.5	71.5	64 11.4	+52.7	73.5	64 27.5	+53.7	75.5	64 41.5	+54.8	77.5	64 53.4	+55.7	79.6	65 03.1	+56.6	81.7	**65**
66	64 00.7	+48.4	66.5	64 23.8	+49.6	68.4	64 44.9	+50.9	70.3	65 04.1	+52.1	72.4	65 21.2	+53.3	74.4	65 36.3	+54.3	76.6	65 49.1	+55.4	78.7	65 59.7	+56.3	80.9	**66**
67	64 49.1	+47.5	65.1	65 13.4	+48.9	67.1	65 35.8	+50.3	69.1	65 56.2	+51.5	71.2	66 14.5	+52.8	73.3	66 30.6	+54.0	75.5	66 44.5	+55.0	77.8	66 56.0	+56.1	80.1	**67**
68	65 36.6	+46.7	63.6	66 02.3	+48.1	65.7	66 26.1	+49.5	67.7	66 47.7	+50.9	69.9	67 07.3	+52.2	72.1	67 24.6	+53.4	74.4	67 39.5	+54.6	76.7	67 52.1	+55.6	79.1	**68**
69	66 23.3	+45.7	62.1	66 50.4	+47.2	64.2	67 15.6	+48.6	66.3	67 38.6	+50.1	68.5	67 59.5	+51.5	70.8	68 18.0	+52.9	73.2	68 34.1	+54.1	75.6	68 47.7	+55.3	78.1	**69**
70	67 09.0	+44.6	60.4	67 37.6	+46.2	62.6	68 04.2	+47.8	64.8	68 28.7	+49.3	67.1	68 51.0	+50.8	69.4	69 10.9	+52.2	71.9	69 28.2	+53.6	74.4	69 43.0	+54.9	77.0	**70**
71	67 53.6	+43.4	58.7	68 23.8	+45.1	60.9	68 52.0	+46.7	63.1	69 18.0	+48.4	65.5	69 41.8	+49.9	67.9	70 03.1	+51.5	70.5	70 21.8	+53.0	73.1	70 37.9	+54.3	75.8	**71**
72	68 37.0	+42.1	56.8	69 08.9	+43.8	59.0	69 38.7	+45.6	61.3	70 06.4	+47.3	63.8	70 31.7	+49.0	66.3	70 54.6	+50.6	68.9	71 14.8	+52.2	71.7	71 32.2	+53.8	74.5	**72**
73	69 19.1	+40.6	54.8	69 52.7	+42.4	57.1	70 24.3	+44.2	59.4	70 53.7	+46.1	61.9	71 20.7	+47.9	64.5	71 45.2	+49.7	67.3	72 07.0	+51.4	70.1	72 26.0	+53.0	73.1	**73**
74	69 59.7	+39.1	52.7	70 35.1	+41.0	55.0	71 08.5	+42.9	57.4	71 39.8	+44.7	59.9	72 08.6	+46.7	62.6	72 34.9	+48.6	65.4	72 58.4	+50.5	68.4	73 19.0	+52.3	71.5	**74**
75	70 38.8	+37.3	50.5	71 16.1	+39.2	52.7	71 51.4	+41.2	55.2	72 24.5	+43.2	57.8	72 55.3	+45.3	60.5	73 23.5	+47.3	63.4	73 48.9	+49.4	66.5	74 11.3	+51.3	69.7	**75**
76	71 16.1	*+35.3* •	48.1	71 55.3	*+37.3* •	50.4	72 32.6	+39.3	52.8	73 07.7	+41.5	55.4	73 40.6	+43.7	58.2	74 10.8	+45.9	61.2	74 38.3	+48.0	64.4	75 02.6	+50.2	67.8	**76**
77	71 51.4	*+33.1* •	45.5	72 32.6	*+35.1* •	47.8	73 11.9	*+37.3* •	50.2	73 49.2	*+39.6* •	52.9	74 24.3	*+41.8* •	55.7	74 56.7	+44.2	58.8	75 26.3	+46.5	62.1	75 52.8	+48.8	65.6	**77**
78	72 24.5	*+30.8* •	42.8	73 07.7	*+32.9* •	45.0	73 49.2	*+35.1* •	47.5	74 28.8	*+37.3* •	50.1	75 06.1	*+39.7* •	53.0	75 40.9	*+42.2* •	56.1	76 12.8	+44.8	59.5	76 41.6	+47.3	63.2	**78**
79	72 55.3	*+28.2* •	39.9	73 40.6	*+30.2* •	42.1	74 24.3	*+32.4* •	44.5	75 06.1	*+34.8* •	47.1	75 45.8	*+37.3* •	50.0	76 23.1	*+39.9* •	53.2	76 57.6	*+42.6* •	56.6	77 28.9	*+45.4* •	60.4	**79**
80	73 23.5	*+25.4* •	36.9	74 10.8	*+27.5* •	39.0	74 56.7	*+29.6* •	41.3	75 40.9	*+31.9* •	43.9	76 23.1	*+34.5* •	46.8	77 03.0	*+37.2* •	49.9	77 40.2	*+40.1* •	53.4	78 14.3	*+43.1* •	57.3	**80**
81	73 48.9	*+22.4* •	33.7	74 38.3	*+24.3* •	35.7	75 26.3	*+26.5* •	37.9	76 12.8	*+28.8* •	40.4	76 57.6	*+31.3* •	43.2	77 40.2	*+34.1* •	46.3	78 20.3	*+37.1* •	49.9	78 57.4	*+40.3* •	53.8	**81**
82	74 11.3	*+19.1* •	30.3	75 02.6	*+20.9* •	32.2	75 52.8	*+23.0* •	34.3	76 41.6	*+25.3* •	36.7	77 28.9	*+27.8* •	39.4	78 14.3	*+30.6* •	42.4	78 57.4	*+33.6* •	45.9	79 37.7	*+37.0* •	49.8	**82**
83	74 30.4	*+15.6* •	26.8	75 23.5	*+17.4* •	28.5	76 15.8	*+19.2* •	30.5	77 06.9	*+21.4* •	32.7	77 56.7	*+23.8* •	35.2	78 44.9	*+26.5* •	38.1	79 31.0	*+29.6* •	41.4	80 14.7	*+32.9* •	45.3	**83**
84	74 46.0	*+12.1* •	23.1	75 40.9	*+13.5* •	24.7	76 35.0	*+15.3* •	26.4	77 28.3	*+17.2* •	28.4	78 20.5	*+19.4* •	30.7	79 11.4	*+21.9* •	33.4	80 00.6	*+24.8* •	36.5	80 47.6	*+28.2* •	40.2	**84**
85	74 58.1	*+8.2* •	19.4	75 54.4	*+9.5* •	20.7	76 50.3	*+10.9* •	22.2	77 45.5	*+12.6* •	24.0	78 39.9	*+14.6* •	26.0	79 33.3	*+16.8* •	28.3	80 25.4	*+19.5* •	31.2	81 15.8	*+22.6* •	34.5	**85**
86	75 06.3	*+4.3* •	15.5	76 03.9	*+5.4* •	16.6	77 01.2	*+6.6* •	17.9	77 58.1	*+7.9* •	19.3	78 54.5	*+9.4* •	21.0	79 50.1	*+11.3* •	23.0	80 44.9	*+13.5* •	25.4	81 38.4	*+16.3* •	28.3	**86**
87	75 10.6	*+0.4* •	11.7	76 09.3	*+1.1* •	12.5	77 07.8	*+2.0* •	13.4	78 06.0	*+3.0* •	14.5	79 03.9	*+4.1* •	15.8	80 01.4	*+5.5* •	17.4	80 58.4	*+7.2* •	19.2	81 54.7	*+9.2* •	21.6	**87**
88	75 11.0	*–3.5* •	7.7	76 10.4	*–3.1* •	8.3	77 09.8	*–2.6* •	8.9	78 09.0	*–2.0* •	9.7	79 08.0	*–1.3* •	10.5	80 06.9	*–0.4* •	11.6	81 05.6	*+0.5* •	12.9	82 03.9	*+1.8* •	14.5	**88**
89	75 07.5	*–7.5* •	3.9	76 07.3	*–7.3* •	4.1	77 07.2	*–7.2* •	4.4	78 07.0	*–7.0* •	4.8	79 06.7	*–6.7* •	5.2	80 06.5	*–6.5* •	5.8	81 06.1	*–6.1* •	6.4	82 05.7	*–5.7* •	7.2	**89**
90	75 00.0	*–11.3* •	0.0	76 00.0	*–11.4* •	0.0	77 00.0	*–11.6* •	0.0	78 00.0	*–11.8* •	0.0	79 00.0	*–12.0* •	0.0	80 00.0	*–12.2* •	0.0	81 00.0	*–12.5* •	0.0	82 00.0	*–12.9* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

81°, 279° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 81°, 279°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 19.2	–58.0	98.7	2 10.1	–58.2	98.7	2 01.0	–58.5	98.8	1 51.8	–58.7	98.8	1 42.6	–58.9	98.8	1 33.4	–59.1	98.9	1 24.1	–59.2	98.9	1 14.9	–59.5	98.9	0
1	1 21.2	–58.0	99.0	1 11.9	–58.3	99.0	1 02.5	–58.5	99.0	0 53.1	–58.7	99.0	0 43.7	–58.9	99.0	0 34.3	–59.1	99.0	0 24.9	–59.3	99.0	0 15.4	–59.4	99.1	1
2	0 23.2	–58.0	99.2	0 13.6	–58.3	99.2	0 04.0	–58.5	99.2	0 05.6	+58.7	80.8	0 15.2	+58.9	80.8	0 24.8	+59.1	80.8	0 34.4	+59.3	80.8	0 44.0	+59.4	80.8	2
3	0 34.8	+58.0	80.5	0 44.7	+58.2	80.5	0 54.5	+58.5	80.6	1 04.3	+58.8	80.6	1 14.1	+59.0	80.6	1 23.9	+59.1	80.6	1 33.7	+59.3	80.6	1 43.4	+59.5	80.7	3
4	1 32.8	+58.0	80.3	1 42.9	+58.3	80.3	1 53.0	+58.5	80.3	2 03.1	+58.7	80.4	2 13.1	+58.9	80.4	2 23.0	+59.2	80.4	2 33.0	+59.3	80.5	2 42.9	+59.4	80.5	4
5	2 30.8	+58.0	80.0	2 41.2	+58.2	80.1	2 51.5	+58.5	80.1	3 01.8	+58.7	80.2	3 12.0	+58.9	80.2	3 22.2	+59.1	80.3	3 32.3	+59.2	80.3	3 42.3	+59.4	80.4	5
6	3 28.8	+58.0	79.8	3 39.4	+58.3	79.8	3 50.0	+58.5	79.9	4 00.5	+58.7	80.0	4 10.9	+58.9	80.0	4 21.3	+59.1	80.1	4 31.5	+59.3	80.2	4 41.7	+59.5	80.3	6
7	4 26.8	+58.0	79.5	4 37.7	+58.2	79.6	4 48.5	+58.5	79.7	4 59.2	+58.7	79.8	5 09.8	+58.9	79.8	5 20.4	+59.1	79.9	5 30.8	+59.3	80.0	5 41.2	+59.4	80.1	7
8	5 24.8	+58.0	79.3	5 35.9	+58.3	79.3	5 47.0	+58.5	79.4	5 57.9	+58.7	79.5	6 08.7	+59.0	79.7	6 19.5	+59.1	79.8	6 30.1	+59.2	79.9	6 40.6	+59.4	80.0	8
9	6 22.8	+58.0	79.0	6 34.2	+58.2	79.1	6 45.5	+58.4	79.2	6 56.6	+58.7	79.3	7 07.7	+58.9	79.5	7 18.6	+59.1	79.6	7 29.3	+59.3	79.7	7 40.0	+59.4	79.8	9
10	7 20.8	+57.9	78.7	7 32.4	+58.2	78.9	7 43.9	+58.5	79.0	7 55.3	+58.7	79.1	8 06.6	+58.9	79.3	8 17.7	+59.0	79.4	8 28.6	+59.3	79.6	8 39.4	+59.4	79.7	10
11	8 18.7	+58.0	78.5	8 30.6	+58.3	78.6	8 42.4	+58.5	78.8	8 54.0	+58.7	78.9	9 05.5	+58.9	79.1	9 16.7	+59.1	79.2	9 27.9	+59.2	79.4	9 38.8	+59.4	79.6	11
12	9 16.7	+57.9	78.2	9 28.9	+58.2	78.4	9 40.9	+58.4	78.5	9 52.7	+58.7	78.7	10 04.4	+58.8	78.9	10 15.8	+59.1	79.1	10 27.1	+59.3	79.2	10 38.2	+59.5	79.4	12
13	10 14.6	+58.0	77.9	10 27.1	+58.2	78.1	10 39.3	+58.5	78.3	10 51.4	+58.6	78.5	11 03.2	+58.9	78.7	11 14.9	+59.1	78.9	11 26.4	+59.2	79.1	11 37.7	+59.4	79.3	13
14	11 12.6	+57.9	77.7	11 25.3	+58.1	77.9	11 37.8	+58.4	78.1	11 50.0	+58.7	78.3	12 02.1	+58.9	78.5	12 14.0	+59.0	78.7	12 25.6	+59.3	78.9	12 37.1	+59.4	79.1	14
15	12 10.5	+57.9	77.4	12 23.4	+58.2	77.6	12 36.2	+58.4	77.8	12 48.7	+58.6	78.1	13 01.0	+58.9	78.3	13 13.0	+59.1	78.5	13 24.9	+59.2	78.8	13 36.5	+59.3	79.0	15
16	13 08.4	+57.9	77.1	13 21.6	+58.2	77.4	13 34.6	+58.4	77.6	13 47.3	+58.7	77.9	13 59.9	+58.8	78.1	14 12.1	+59.1	78.3	14 24.1	+59.2	78.6	14 35.8	+59.4	78.8	16
17	14 06.3	+57.8	76.9	14 19.8	+58.1	77.1	14 33.0	+58.4	77.4	14 46.0	+58.6	77.6	14 58.7	+58.8	77.9	15 11.2	+59.0	78.2	15 23.3	+59.3	78.4	15 35.2	+59.4	78.7	17
18	15 04.1	+57.9	76.6	15 17.9	+58.1	76.9	15 31.4	+58.4	77.1	15 44.6	+58.6	77.4	15 57.5	+58.9	77.7	16 10.2	+59.0	78.0	16 22.6	+59.2	78.3	16 34.6	+59.4	78.5	18
19	16 02.0	+57.8	76.3	16 16.0	+58.1	76.6	16 29.8	+58.3	76.9	16 43.2	+58.6	77.2	16 56.4	+58.8	77.5	17 09.2	+59.0	77.8	17 21.8	+59.2	78.1	17 34.0	+59.4	78.4	19
20	16 59.8	+57.8	76.1	17 14.1	+58.1	76.4	17 28.1	+58.4	76.7	17 41.8	+58.6	77.0	17 55.2	+58.8	77.3	18 08.2	+59.1	77.6	18 21.0	+59.2	77.9	18 33.4	+59.3	78.2	20
21	17 57.6	+57.8	75.8	18 12.2	+58.1	76.1	18 26.5	+58.3	76.4	18 40.4	+58.6	76.7	18 54.0	+58.8	77.1	19 07.3	+59.0	77.4	19 20.2	+59.2	77.7	19 32.7	+59.4	78.1	21
22	18 55.4	+57.8	75.5	19 10.3	+58.0	75.8	19 24.8	+58.3	76.2	19 39.0	+58.5	76.5	19 52.8	+58.8	76.9	20 06.3	+58.9	77.2	20 19.4	+59.1	77.6	20 32.1	+59.3	77.9	22
23	19 53.2	+57.7	75.2	20 08.3	+58.0	75.6	20 23.1	+58.3	75.9	20 37.5	+58.5	76.3	20 51.6	+58.7	76.6	21 05.2	+59.0	77.0	21 18.5	+59.2	77.4	21 31.4	+59.4	77.8	23
24	20 50.9	+57.7	74.9	21 06.3	+58.0	75.3	21 21.4	+58.2	75.7	21 36.0	+58.5	76.0	21 50.3	+58.8	76.4	22 04.2	+59.0	76.8	22 17.7	+59.1	77.2	22 30.8	+59.3	77.6	24
25	21 48.6	+57.6	74.6	22 04.3	+58.0	75.0	22 19.6	+58.3	75.4	22 34.5	+58.5	75.8	22 49.1	+58.7	76.2	23 03.2	+58.9	76.6	23 16.8	+59.2	77.0	23 30.1	+59.3	77.5	25
26	22 46.2	+57.7	74.3	23 02.3	+57.9	74.7	23 17.9	+58.2	75.1	23 33.0	+58.5	75.6	23 47.8	+58.7	76.0	24 02.1	+58.9	76.4	24 16.0	+59.1	76.8	24 29.4	+59.3	77.3	26
27	23 43.9	+57.6	74.0	24 00.2	+57.9	74.4	24 16.1	+58.1	74.9	24 31.5	+58.4	75.3	24 46.5	+58.7	75.8	25 01.0	+58.9	76.2	25 15.1	+59.1	76.7	25 28.7	+59.3	77.1	27
28	24 41.5	+57.5	73.7	24 58.1	+57.8	74.1	25 14.2	+58.2	74.6	25 29.9	+58.5	75.1	25 45.2	+58.6	75.5	25 59.9	+58.9	76.0	26 14.2	+59.1	76.5	26 28.0	+59.3	77.0	28
29	25 39.0	+57.5	73.4	25 55.9	+57.9	73.9	26 12.4	+58.1	74.3	26 28.4	+58.3	74.8	26 43.8	+58.7	75.3	26 58.8	+58.9	75.8	27 13.3	+59.1	76.3	27 27.3	+59.3	76.8	29
30	26 36.5	+57.5	73.1	26 53.8	+57.7	73.6	27 10.5	+58.1	74.0	27 26.7	+58.4	74.5	27 42.5	+58.6	75.1	27 57.7	+58.8	75.6	28 12.4	+59.1	76.1	28 26.6	+59.2	76.6	30
31	27 34.0	+57.4	72.8	27 51.5	+57.8	73.3	28 08.6	+58.0	73.8	28 25.1	+58.3	74.3	28 41.1	+58.6	74.8	28 56.5	+58.9	75.3	29 11.5	+59.0	75.9	29 25.8	+59.3	76.4	31
32	28 31.4	+57.4	72.4	28 49.3	+57.7	72.9	29 06.6	+58.0	73.5	29 23.4	+58.3	74.0	29 39.7	+58.5	74.6	29 55.4	+58.8	75.1	30 10.5	+59.0	75.7	30 25.1	+59.2	76.2	32
33	29 28.8	+57.3	72.1	29 47.0	+57.7	72.6	30 04.6	+58.0	73.2	30 21.7	+58.3	73.7	30 38.2	+58.6	74.3	30 54.2	+58.7	74.9	31 09.5	+59.0	75.5	31 24.3	+59.2	76.1	33
34	30 26.1	+57.3	71.8	30 44.7	+57.6	72.3	31 02.6	+57.9	72.9	31 20.0	+58.2	73.5	31 36.8	+58.5	74.1	31 52.9	+58.8	74.6	32 08.5	+59.0	75.3	32 23.5	+59.2	75.9	34
35	31 23.4	+57.2	71.4	31 42.3	+57.5	72.0	32 00.5	+57.9	72.6	32 18.2	+58.2	73.2	32 35.3	+58.4	73.8	32 51.7	+58.7	74.4	33 07.5	+59.0	75.0	33 22.7	+59.2	75.7	35
36	32 20.6	+57.2	71.0	32 39.8	+57.5	71.7	32 58.4	+57.8	72.3	33 16.4	+58.1	72.9	33 33.7	+58.4	73.5	33 50.4	+58.7	74.2	34 06.5	+58.9	74.8	34 21.9	+59.1	75.5	36
37	33 17.8	+57.1	70.7	33 37.3	+57.5	71.3	33 56.2	+57.8	71.9	34 14.5	+58.1	72.6	34 32.1	+58.4	73.2	34 49.1	+58.7	73.9	35 05.4	+58.9	74.6	35 21.0	+59.1	75.3	37
38	34 14.9	+57.0	70.3	34 34.8	+57.4	71.0	34 54.0	+57.8	71.6	35 12.6	+58.1	72.3	35 30.5	+58.4	73.0	35 47.8	+58.6	73.7	36 04.3	+58.9	74.3	36 20.1	+59.1	75.1	38
39	35 11.9	+57.0	69.9	35 32.2	+57.3	70.6	35 51.8	+57.6	71.3	36 10.7	+58.0	72.0	36 28.9	+58.3	72.7	36 46.4	+58.6	73.4	37 03.2	+58.8	74.1	37 19.2	+59.1	74.8	39
40	36 08.9	+56.8	69.6	36 29.5	+57.2	70.2	36 49.4	+57.6	70.9	37 08.7	+57.9	71.7	37 27.2	+58.2	72.4	37 45.0	+58.5	73.1	38 02.0	+58.9	73.9	38 18.3	+59.1	74.6	40
41	37 05.7	+56.8	69.2	37 26.7	+57.2	69.9	37 47.0	+57.6	70.6	38 06.6	+57.9	71.3	38 25.4	+58.3	72.1	38 43.5	+58.5	72.8	39 00.9	+58.7	73.6	39 17.4	+59.0	74.4	41
42	38 02.5	+56.7	68.7	38 23.9	+57.1	69.5	38 44.6	+57.5	70.2	39 04.5	+57.8	71.0	39 23.7	+58.1	71.8	39 42.0	+58.5	72.6	39 59.6	+58.8	73.4	40 16.4	+59.0	74.2	42
43	38 59.2	+56.7	68.3	39 21.0	+57.0	69.1	39 42.1	+57.4	69.9	40 02.3	+57.8	70.6	40 21.8	+58.1	71.4	40 40.5	+58.4	72.3	40 58.4	+58.7	73.1	41 15.4	+59.0	73.9	43
44	39 55.9	+56.5	67.9	40 18.0	+57.0	68.7	40 39.5	+57.3	69.5	41 00.1	+57.7	70.3	41 19.9	+58.1	71.1	41 38.9	+58.4	72.0	41 57.1	+58.7	72.8	42 14.4	+58.9	73.7	44
45	40 52.4	+56.4	67.5	41 15.0	+56.8	68.3	41 36.8	+57.2	69.1	41 57.8	+57.6	69.9	42 18.0	+58.0	70.8	42 37.3	+58.3	71.6	42 55.8	+58.6	72.5	43 13.3	+58.9	73.4	45
46	41 48.8	+56.3	67.0	42 11.8	+56.8	67.8	42 34.0	+57.2	68.7	42 55.4	+57.6	69.5	43 16.0	+57.9	70.4	43 35.6	+58.3	71.3	43 54.4	+58.6	72.2	44 12.2	+58.9	73.2	46
47	42 45.1	+56.2	66.5	43 08.6	+56.6	67.4	43 31.2	+57.1	68.3	43 53.0	+57.5	69.2	44 13.9	+57.8	70.1	44 33.9	+58.2	71.0	44 53.0	+58.5	71.9	45 11.1	+58.8	72.9	47
48	43 41.3	+56.0	66.1	44 05.2	+56.5	66.9	44 28.3	+56.9	67.8	44 50.5	+57.3	68.8	45 11.7	+57.8	69.7	45 32.1	+58.1	70.6	45 51.5	+58.5	71.6	46 09.9	+58.8	72.6	48
49	44 37.3	+56.0	65.6	45 01.7	+56.4	66.5	45 25.2	+56.9	67.4	45 47.8	+57.3	68.3	46 09.5	+57.7	69.3	46 30.2	+58.1	70.3	46 50.0	+58.4	71.3	47 08.7	+58.8	72.3	49
50	45 33.3	+55.8	65.0	45 58.1	+56.3	66.0	46 22.1	+56.7	66.9	46 45.1	+57.2	67.9	47 07.2	+57.6	68.9	47 28.3	+58.0	69.9	47 48.4	+58.4	71.0	48 07.5	+58.6	72.0	50
51	46 29.1	+55.6	64.5	46 54.4	+56.2	65.5	47 18.8	+56.7	66.5	47 42.3	+57.1	67.5	48 04.8	+57.5	68.5	48 26.3	+57.9	69.5	48 46.8	+58.3	70.6	49 06.1	+58.7	71.7	51
52	47 24.7	+55.5	64.0	47 50.6	+55.9	65.0	48 15.5	+56.5	66.0	48 39.4	+57.0	67.0	49 02.3	+57.5	68.1	49 24.2	+57.9	69.1	49 45.1	+58.2	70.2	50 04.8	+58.6	71.4	52
53	48 20.2	+55.3	63.4	48 46.5	+55.9	64.4	49 12.0	+56.3	65.5	49 36.4	+56.8	66.5	49 59.8	+57.3	67.6	50 22.1	+57.7	68.7	50 43.3	+58.1	69.9	51 03.4	+58.5	71.0	53
54	49 15.5	+55.1	62.8	49 42.4	+55.7	63.9	50 08.3	+56.2	64.9	50 33.2	+56.7	66.0	50 57.1	+57.2	67.2	51 19.8	+57.7	68.3	51 41.4	+58.1	69.5	52 01.9	+58.4	70.7	54
55	50 10.6	+54.9	62.2	50 38.1	+55.4	63.3	51 04.5	+56.1	64.4	51 29.9	+56.6	65.5	51 54.3	+57.0	66.7	52 17.5	+57.5	67.9	52 39.5	+58.0	69.1	53 00.3	+58.4	70.3	55
56	51 05.5	+54.7	61.6	51 33.5	+55.3	62.7	52 00.6	+55.8	63.8	52 26.5	+56.4	65.0	52 51.3	+57.0	66.2	53 15.0	+57.4	67.4	53 37.5	+57.8	68.6	53 58.7	+58.3	69.9	56
57	52 00.2	+54.4	60.9	52 28.8	+55.1	62.0	52 56.4	+55.7	63.2	53 22.9	+56.3	64.4	53 48.3	+56.7	65.6	54 12.4	+57.3	66.9	54 35.3	+57.8	68.2	54 57.0	+58.2	69.5	57
58	52 54.6	+54.3	60.2	53 23.9	+54.9	61.4	53 52.1	+55.5	62.6	54 19.2	+56.0	63.8	54 45.0	+56.7	65.1	55 09.7	+57.2	66.4	55 33.1	+57.7	67.7	55 55.2	+58.1	69.1	58
59	53 48.9	+53.9	59.5	54 18.8	+54.6	60.7	54 47.6	+55.2	61.9	55 15.2	+55.9	63.2	55 41.7	+56.4	64.5	56 06.9	+57.0	65.8	56 30.8	+57.5	67.2	56 53.3	+58.0	68.6	59
60	54 42.8	+53.7	58.7	55 13.4	+54.3	60.0	55 42.8	+55.0	61.2	56 11.1	+55.7	62.5	56 38.1	+56.3	63.9	57 03.9	+56.8	65.3	57 28.3	+57.4	66.7	57 51.3	+58.0	68.2	60
61	55 36.5	+53.3	58.0	56 07.7	+54.1	59.2	56 37.8	+54.8	60.5	57 06.8	+55.4	61.9	57 34.4	+56.1	63.3	58 00.7	+56.7	64.7	58 25.7	+57.3	66.1	58 49.3	+57.7	67.7	61
62	56 29.8	+53.0	57.1	57 01.8	+53.7	58.4	57 32.6	+54.5	59.8	58 02.2	+55.2	61.2	58 30.5	+55.8	62.6	58 57.4	+56.5	64.1	59 23.0	+57.1	65.6	59 47.0	+57.7	67.1	62
63	57 22.8	+52.6	56.3	57 55.5	+53.4	57.6	58 27.1	+54.1	59.0	58 57.4	+54.8	60.4	59 26.3	+55.6	61.9	59 53.9	+56.3	63.4	60 20.1	+56.9	65.0	60 44.7	+57.5	66.6	63
64	58 15.4	+52.3	55.4	58 48.9	+53.1	56.7	59 21.2	+53.9	58.1	59 52.2	+54.6	59.6	60 21.9	+55.4	61.1	60 50.2	+56.0	62.7	61 17.0	+56.7	64.3	61 42.2	+57.3	66.0	64
65	59 07.7	+51.8	54.4	59 42.0	+52.6	55.8	60 15.1	+53.4	57.3	60 46.8	+54.3	58.8	61 17.3	+55.0	60.3	61 46.2	+55.8	61.9	62 13.7	+56.5	63.6	62 39.5	+57.2	65.3	65
66	59 59.5	+51.3	53.4	60 34.6	+52.2	54.9	61 08.5	+53.1	56.3	61 41.1	+53.9	57.9	62 12.3	+54.7	59.5	62 42.0	+55.5	61.2	63 10.2	+56.2	62.9	63 36.7	+56.9	64.7	66
67	60 50.8	+50.8	52.4	61 26.8	+51.7	53.8	62 01.6	+52.6	55.4	62 35.0	+53.5	56.9	63 07.0	+54.4	58.6	63 37.5	+55.2	60.3	64 06.4	+56.0	62.1	64 33.6	+56.8	64.0	67
68	61 41.6	+50.3	51.3	62 18.5	+51.2	52.8	62 54.2	+52.1	54.3	63 28.5	+53.0	55.9	64 01.4	+53.9	57.6	64 32.7	+54.8	59.4	65 02.4	+55.7	61.3	65 30.4	+56.4	63.2	68
69	62 31.9	+49.6	50.1	63 09.7	+50.6	51.6	63 46.3	+51.6	53.2	64 21.5	+52.6	54.9	64 55.3	+53.5	56.6	65 27.5	+54.5	58.5	65 58.1	+55.3	60.4	66 26.8	+56.2	62.3	69
70	63 21.5	+48.9	48.9	64 00.3	+50.0	50.4	64 37.9	+51.0	52.0	65 14.1	+52.0	53.7	65 48.8	+53.0	55.5	66 22.0	+54.0	57.4	66 53.4	+55.0	59.4	67 23.0	+55.9	61.5	70
71	64 10.4	+48.2	47.6	64 50.3	+49.3	49.1	65 28.9	+50.3	50.8	66 06.1	+51.4	52.5	66 41.8	+52.5	54.4	67 16.0	+53.5	56.3	67 48.4	+54.5	58.3	68 18.9	+55.5	60.5	71
72	64 58.6	+47.4	46.2	65 39.6	+48.4	47.8	66 19.2	+49.6	49.5	66 57.5	+50.7	51.2	67 34.3	+51.9	53.1	68 09.5	+52.9	55.1	68 42.9	+54.0	57.2	69 14.4	+55.1	59.4	72
73	65 46.0	+46.5	44.7	66 28.0	+47.7	46.3	67 08.8	+48.8	48.0	67 48.2	+50.0	49.9	68 26.2	+51.1	51.8	69 02.4	+52.4	53.8	69 36.9	+53.5	56.0	70 09.5	+54.6	58.3	73
74	66 32.5	+45.5	43.1	67 15.7	+46.6	44.8	67 57.6	+47.9	46.5	68 38.2	+49.1	48.4	69 17.3	+50.4	50.3	69 54.8	+51.6	52.4	70 30.4	+52.9	54.7	71 04.1	+54.1	57.0	74
75	67 18.0	+44.3	41.5	68 02.3	+45.6	43.1	68 45.5	+46.9	44.9	69 27.3	+48.2	46.8	70 07.7	+49.4	48.8	70 46.4	+50.8	50.9	71 23.3	+52.1	53.2	71 58.2	+53.4	55.7	75
76	68 02.3	+43.2	39.7	68 47.9	+44.5	41.4	69 32.4	+45.7	43.1	70 15.5	+47.1	45.0	70 57.1	+48.5	47.1	71 37.2	+49.8	49.3	72 15.4	+51.3	51.6	72 51.6	+52.7	54.2	76
77	68 45.5	+41.8	37.8	69 32.4	+43.1	39.5	70 18.1	+44.5	41.2	71 02.6	+45.8	43.2	71 45.6	+47.3	45.2	72 27.0	+48.8	47.5	73 06.7	+50.3	49.9	73 44.3	+51.8	52.5	77
78	69 27.3	+40.4	35.8	70 15.5	+41.6	37.4	71 02.6	+43.0	39.2	71 48.4	+44.5	41.1	72 32.9	+46.0	43.2	73 15.8	+47.6	45.5	73 57.0	+49.1	48.0	74 36.1	+50.8	50.7	78
79	70 07.7	+38.7	33.7	70 57.1	+40.1	35.3	71 45.6	+41.4	37.0	72 32.9	+42.9	38.9	73 18.9	+44.5	41.0	74 03.4	+46.1	43.3	74 46.1	+47.8	45.8	75 26.9	+49.6	48.6	79
80	70 46.4	+36.9	31.4	71 37.2	+38.2	33.0	72 27.0	+39.7	34.7	73 15.8	+41.2	36.6	74 03.4	+42.7	38.6	74 49.5	+44.4	40.9	75 33.9	+46.3	43.5	76 16.5	+48.1	46.3	80
81	71 23.3	+34.9 •	29.0	72 15.4	+36.2 •	30.5	73 06.7	+37.6 •	32.1	73 57.0	+39.1 •	34.0	74 46.1	+40.8 •	36.0	75 33.9	+42.6 •	38.3	76 20.2	+44.4 •	40.9	77 04.6	+46.4	43.7	81
82	71 58.2	+32.7 •	26.4	72 51.6	+33.9 •	27.8	73 44.3	+35.3 •	29.4	74 36.1	+36.8 •	31.2	75 26.9	+38.5 •	33.2	76 16.5	+40.2 •	35.4	77 04.6	+42.2 •	37.9	77 51.0	+44.3 •	40.8	82
83	72 30.9	+30.2 •	23.6	73 25.5	+31.5 •	25.0	74 19.6	+32.8 •	26.5	75 12.9	+34.3 •	28.1	76 05.4	+35.9 •	30.0	76 56.7	+37.7 •	32.2	77 46.8	+39.7 •	34.7	78 35.3	+41.9 •	37.5	83
84	73 01.1	+27.7 •	20.7	73 57.0	+28.8 •	21.9	74 52.4	+30.0 •	23.3	75 47.2	+31.4 •	24.9	76 41.3	+32.9 •	26.6	77 34.4	+34.7 •	28.7	78 26.5	+36.6 •	31.0	79 17.2	+38.7 •	33.7	84
85	73 28.8	+24.8 •	17.6	74 25.8	+25.8 •	18.7	75 22.4	+27.0 •	19.9	76 18.6	+28.2 •	21.3	77 14.2	+29.5 •	22.9	78 09.1	+31.1 •	24.8	79 03.1	+33.0 •	27.0	79 55.9	+35.2 •	29.5	85
86	73 53.6	+21.8 •	14.4	74 51.6	+22.6 •	15.3	75 49.4	+23.4 •	16.3	76 46.8	+24.5 •	17.5	77 43.7	+25.8 •	18.9	78 40.2	+27.2 •	20.5	79 36.1	+28.8 •	22.4	80 31.1	+30.7 •	24.7	86
87	74 15.4	+18.4 •	11.0	75 14.2	+19.0 •	11.7	76 12.8	+19.8 •	12.5	77 11.3	+20.6 •	13.5	78 09.5	+21.6 •	14.6	79 07.4	+22.7 •	15.9	80 04.9	+24.0 •	17.5	81 01.8	+25.6 •	19.4	87
88	74 33.8	+14.9 •	7.4	75 33.2	+15.4 •	7.9	76 32.6	+15.8 •	8.5	77 31.9	+16.3 •	9.2	78 31.1	+16.9 •	10.0	79 30.1	+17.7 •	10.9	80 28.9	+18.6 •	12.0	81 27.4	+19.7 •	13.4	88
89	74 48.7	+11.3 •	3.8	75 48.6	+11.4 •	4.0	76 48.4	+11.6 •	4.3	77 48.2	+11.8 •	4.7	78 48.0	+12.0 •	5.1	79 47.8	+12.2 •	5.6	80 47.5	+12.5 •	6.2	81 47.1	+12.9 •	6.9	89
90	75 00.0	+7.5 •	0.0	76 00.0	+7.3 •	0.0	77 00.0	+7.2 •	0.0	78 00.0	+7.0 •	0.0	79 00.0	+6.7 •	0.0	80 00.0	+6.5 •	0.0	81 00.0	+6.1 •	0.0	82 00.0	+5.7 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 99°, 261°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 03.9	+57.9	97.7	1 55.8	+58.2	97.8	1 47.6	+58.5	97.8	1 39.5	+58.7	97.8	1 31.3	+58.9	97.9	1 23.1	+59.1	97.9	1 14.9	+59.2	97.9	1 06.6	+59.4	97.9	**0**
1	3 01.8	+58.0	97.5	2 54.0	+58.3	97.5	2 46.1	+58.5	97.6	2 38.2	+58.7	97.6	2 30.2	+58.9	97.7	2 22.2	+59.1	97.7	2 14.1	+59.3	97.7	2 06.0	+59.4	97.8	**1**
2	3 59.8	+58.0	97.2	3 52.3	+58.2	97.3	3 44.6	+58.5	97.4	3 36.9	+58.7	97.4	3 29.1	+58.9	97.5	3 21.3	+59.1	97.5	3 13.4	+59.3	97.6	3 05.4	+59.5	97.6	**2**
3	4 57.8	+58.0	97.0	4 50.5	+58.2	97.0	4 43.1	+58.5	97.1	4 35.6	+58.7	97.2	4 28.0	+59.0	97.3	4 20.4	+59.1	97.4	4 12.7	+59.2	97.4	4 04.9	+59.4	97.5	**3**
4	5 55.8	+58.0	96.7	5 48.7	+58.3	96.8	5 41.6	+58.5	96.9	5 34.3	+58.7	97.0	5 27.0	+58.9	97.1	5 19.5	+59.1	97.2	5 11.9	+59.3	97.3	5 04.3	+59.4	97.4	**4**
5	6 53.8	+57.9	96.4	6 47.0	+58.2	96.6	6 40.1	+58.4	96.7	6 33.0	+58.7	96.8	6 25.9	+58.9	96.9	6 18.6	+59.1	97.0	6 11.2	+59.3	97.1	6 03.7	+59.4	97.2	**5**
6	7 51.7	+58.0	96.2	7 45.2	+58.2	96.3	7 38.5	+58.5	96.5	7 31.7	+58.7	96.6	7 24.8	+58.9	96.7	7 17.7	+59.1	96.8	7 10.5	+59.2	97.0	7 03.1	+59.5	97.1	**6**
7	8 49.7	+57.9	95.9	8 43.4	+58.2	96.1	8 37.0	+58.4	96.2	8 30.4	+58.7	96.4	8 23.7	+58.9	96.5	8 16.8	+59.1	96.7	8 09.7	+59.3	96.8	8 02.6	+59.4	97.0	**7**
8	9 47.6	+58.0	95.7	9 41.6	+58.2	95.8	9 35.4	+58.5	96.0	9 29.1	+58.7	96.2	9 22.6	+58.8	96.3	9 15.9	+59.0	96.5	9 09.0	+59.3	96.7	9 02.0	+59.4	96.8	**8**
9	10 45.6	+57.9	95.4	10 39.8	+58.2	95.6	10 33.9	+58.4	95.8	10 27.8	+58.6	95.9	10 21.4	+58.9	96.1	10 14.9	+59.1	96.3	10 08.3	+59.2	96.5	10 01.4	+59.4	96.7	**9**
10	11 43.5	+57.9	95.1	11 38.0	+58.2	95.3	11 32.3	+58.4	95.5	11 26.4	+58.7	95.7	11 20.3	+58.9	95.9	11 14.0	+59.1	96.1	11 07.5	+59.2	96.3	11 00.8	+59.4	96.5	**10**
11	12 41.4	+57.8	94.9	12 36.2	+58.1	95.1	12 30.7	+58.5	95.3	12 25.1	+58.6	95.5	12 19.2	+58.9	95.7	12 13.1	+59.0	96.0	12 06.7	+59.3	96.2	12 00.2	+59.4	96.4	**11**
12	13 39.2	+57.9	94.6	13 34.3	+58.2	94.8	13 29.2	+58.4	95.1	13 23.7	+58.7	95.3	13 18.1	+58.8	95.5	13 12.1	+59.1	95.8	13 06.0	+59.2	96.0	12 59.6	+59.4	96.2	**12**
13	14 37.1	+57.9	94.3	14 32.5	+58.1	94.6	14 27.6	+58.3	94.8	14 22.4	+58.6	95.1	14 16.9	+58.9	95.3	14 11.2	+59.0	95.6	14 05.2	+59.2	95.8	13 59.0	+59.4	96.1	**13**
14	15 35.0	+57.8	94.0	15 30.6	+58.1	94.3	15 25.9	+58.4	94.6	15 21.0	+58.6	94.9	15 15.8	+58.8	95.1	15 10.2	+59.1	95.4	15 04.4	+59.3	95.7	14 58.4	+59.4	95.9	**14**
15	16 32.8	+57.8	93.8	16 28.7	+58.1	94.1	16 24.3	+58.4	94.4	16 19.6	+58.6	94.6	16 14.6	+58.8	94.9	16 09.3	+59.0	95.2	16 03.7	+59.2	95.5	15 57.8	+59.3	95.8	**15**
16	17 30.6	+57.8	93.5	17 26.8	+58.1	93.8	17 22.7	+58.3	94.1	17 18.2	+58.6	94.4	17 13.4	+58.8	94.7	17 08.3	+59.0	95.0	17 02.9	+59.2	95.3	16 57.1	+59.4	95.6	**16**
17	18 28.4	+57.7	93.2	18 24.9	+58.0	93.5	18 21.0	+58.3	93.9	18 16.8	+58.5	94.2	18 12.2	+58.8	94.5	18 07.3	+59.0	94.8	18 02.1	+59.2	95.2	17 56.5	+59.4	95.5	**17**
18	19 26.1	+57.8	92.9	19 22.9	+58.0	93.3	19 19.3	+58.3	93.6	19 15.3	+58.6	94.0	19 11.0	+58.8	94.3	19 06.3	+59.0	94.7	19 01.3	+59.2	95.0	18 55.9	+59.3	95.3	**18**
19	20 23.9	+57.7	92.6	20 20.9	+58.0	93.0	20 17.6	+58.3	93.4	20 13.9	+58.5	93.7	20 09.8	+58.8	94.1	20 05.3	+59.0	94.5	20 00.5	+59.1	94.8	19 55.2	+59.4	95.2	**19**
20	21 21.6	+57.6	92.3	21 18.9	+58.0	92.7	21 15.9	+58.2	93.1	21 12.4	+58.5	93.5	21 08.6	+58.7	93.9	21 04.3	+59.0	94.3	20 59.6	+59.2	94.6	20 54.6	+59.3	95.0	**20**
21	22 19.2	+57.7	92.0	22 16.9	+57.9	92.4	22 14.1	+58.2	92.8	22 10.9	+58.5	93.3	22 07.3	+58.7	93.7	22 03.3	+58.9	94.1	21 58.8	+59.1	94.5	21 53.9	+59.3	94.9	**21**
22	23 16.9	+57.6	91.7	23 14.8	+57.9	92.2	23 12.3	+58.2	92.6	23 09.4	+58.5	93.0	23 06.0	+58.7	93.4	23 02.2	+58.9	93.9	22 57.9	+59.2	94.3	22 53.2	+59.4	94.7	**22**
23	24 14.5	+57.5	91.4	24 12.7	+57.9	91.9	24 10.5	+58.2	92.3	24 07.9	+58.4	92.8	24 04.7	+58.7	93.2	24 01.1	+59.0	93.7	23 57.1	+59.1	94.1	23 52.6	+59.3	94.5	**23**
24	25 12.0	+57.5	91.1	25 10.6	+57.9	91.6	25 08.7	+58.1	92.1	25 06.3	+58.4	92.5	25 03.4	+58.7	93.0	25 00.1	+58.9	93.5	24 56.2	+59.1	93.9	24 51.9	+59.3	94.4	**24**
25	26 09.5	+57.5	90.8	26 08.5	+57.8	91.3	26 06.8	+58.2	91.8	26 04.7	+58.4	92.3	26 02.1	+58.7	92.8	25 59.0	+58.8	93.2	25 55.3	+59.1	93.7	25 51.2	+59.3	94.2	**25**
26	27 07.0	+57.5	90.5	27 06.3	+57.7	91.0	27 05.0	+58.0	91.5	27 03.1	+58.4	92.0	27 00.8	+58.6	92.5	26 57.8	+58.9	93.0	26 54.4	+59.1	93.5	26 50.5	+59.2	94.0	**26**
27	28 04.5	+57.3	90.1	28 04.0	+57.7	90.7	28 03.0	+58.1	91.2	28 01.5	+58.3	91.7	27 59.4	+58.6	92.3	27 56.7	+58.9	92.8	27 53.5	+59.1	93.3	27 49.7	+59.3	93.9	**27**
28	29 01.8	+57.4	89.8	29 01.7	+57.7	90.4	29 01.1	+58.0	90.9	28 59.8	+58.3	91.5	28 58.0	+58.5	92.0	28 55.6	+58.8	92.6	28 52.6	+59.0	93.1	28 49.0	+59.2	93.7	**28**
29	29 59.2	+57.3	89.5	29 59.4	+57.7	90.1	29 59.1	+57.9	90.6	29 58.1	+58.3	91.2	29 56.5	+58.6	91.8	29 54.4	+58.8	92.4	29 51.6	+59.0	92.9	29 48.2	+59.3	93.5	**29**
30	30 56.5	+57.2	89.1	30 57.1	+57.6	89.7	30 57.0	+58.0	90.3	30 56.4	+58.2	90.9	30 55.1	+58.5	91.5	30 53.2	+58.7	92.1	30 50.6	+59.0	92.7	30 47.5	+59.2	93.3	**30**
31	31 53.7	+57.2	88.8	31 54.7	+57.5	89.4	31 55.0	+57.8	90.0	31 54.6	+58.2	90.6	31 53.6	+58.5	91.3	31 51.9	+58.8	91.9	31 49.6	+59.0	92.5	31 46.7	+59.2	93.1	**31**
32	32 50.9	+57.1	88.4	32 52.2	+57.5	89.1	32 52.8	+57.9	89.7	32 52.8	+58.1	90.4	32 52.1	+58.4	91.0	32 50.7	+58.7	91.7	32 48.6	+59.0	92.3	32 45.9	+59.2	92.9	**32**
33	33 48.0	+57.0	88.1	33 49.7	+57.4	88.7	33 50.7	+57.7	89.4	33 50.9	+58.1	90.1	33 50.5	+58.4	90.7	33 49.4	+58.7	91.4	33 47.6	+58.9	92.1	33 45.1	+59.1	92.7	**33**
34	34 45.0	+57.0	87.7	34 47.1	+57.3	88.4	34 48.4	+57.7	89.1	34 49.0	+58.1	89.8	34 48.9	+58.4	90.5	34 48.1	+58.6	91.2	34 46.5	+58.9	91.8	34 44.2	+59.2	92.5	**34**
35	35 42.0	+56.9	87.3	35 44.4	+57.3	88.0	35 46.1	+57.7	88.7	35 47.1	+58.0	89.5	35 47.3	+58.3	90.2	35 46.7	+58.7	90.9	35 45.4	+58.9	91.6	35 43.4	+59.1	92.3	**35**
36	36 38.9	+56.8	86.9	36 41.7	+57.3	87.6	36 43.8	+57.6	88.4	36 45.1	+58.0	89.1	36 45.6	+58.3	89.9	36 45.4	+58.5	90.6	36 44.3	+58.9	91.4	36 42.5	+59.1	92.1	**36**
37	37 35.7	+56.7	86.5	37 39.0	+57.1	87.3	37 41.4	+57.6	88.0	37 43.1	+57.9	88.8	37 43.9	+58.2	89.6	37 43.9	+58.6	90.4	37 43.2	+58.8	91.1	37 41.6	+59.0	91.9	**37**
38	38 32.4	+56.7	86.1	38 36.1	+57.1	86.9	38 39.0	+57.4	87.7	38 41.0	+57.8	88.5	38 42.1	+58.2	89.3	38 42.5	+58.5	90.1	38 42.0	+58.8	90.9	38 40.6	+59.1	91.7	**38**
39	39 29.1	+56.5	85.7	39 33.2	+57.0	86.5	39 36.4	+57.4	87.3	39 38.8	+57.8	88.1	39 40.3	+58.2	89.0	39 41.0	+58.4	89.8	39 40.8	+58.7	90.6	39 39.7	+59.0	91.5	**39**
40	40 25.6	+56.5	85.2	40 30.2	+56.9	86.1	40 33.8	+57.4	86.9	40 36.6	+57.7	87.8	40 38.5	+58.1	88.6	40 39.4	+58.5	89.5	40 39.5	+58.7	90.4	40 38.7	+59.0	91.2	**40**
41	41 22.1	+56.3	84.8	41 27.1	+56.8	85.7	41 31.2	+57.2	86.5	41 34.3	+57.7	87.4	41 36.6	+58.0	88.3	41 37.9	+58.3	89.2	41 38.2	+58.7	90.1	41 37.7	+58.9	91.0	**41**
42	42 18.4	+56.2	84.3	42 23.9	+56.7	85.2	42 28.4	+57.2	86.1	42 32.0	+57.5	87.0	42 34.6	+57.9	88.0	42 36.2	+58.3	88.9	42 36.9	+58.6	89.8	42 36.6	+59.0	90.7	**42**
43	43 14.6	+56.1	83.8	43 20.6	+56.6	84.8	43 25.6	+57.0	85.7	43 29.5	+57.5	86.7	43 32.5	+57.9	87.6	43 34.5	+58.3	88.6	43 35.5	+58.6	89.5	43 35.6	+58.8	90.5	**43**
44	44 10.7	+56.0	83.3	44 17.2	+56.5	84.3	44 22.6	+57.0	85.3	44 27.0	+57.4	86.3	44 30.4	+57.8	87.2	44 32.8	+58.2	88.2	44 34.1	+58.6	89.2	44 34.4	+58.9	90.2	**44**
45	45 06.7	+55.8	82.8	45 13.7	+56.3	83.8	45 19.6	+56.8	84.8	45 24.4	+57.4	85.9	45 28.2	+57.8	86.9	45 31.0	+58.1	87.9	45 32.7	+58.5	88.9	45 33.3	+58.8	89.9	**45**
46	46 02.5	+55.7	82.3	46 10.0	+56.2	83.3	46 16.4	+56.8	84.4	46 21.8	+57.2	85.4	46 26.0	+57.6	86.5	46 29.1	+58.1	87.5	46 31.2	+58.4	88.6	46 32.1	+58.8	89.6	**46**
47	46 58.2	+55.5	81.8	47 06.2	+56.1	82.8	47 13.2	+56.6	83.9	47 19.0	+57.1	85.0	47 23.6	+57.6	86.1	47 27.2	+58.0	87.2	47 29.6	+58.4	88.2	47 30.9	+58.7	89.3	**47**
48	47 53.7	+55.4	81.2	48 02.3	+56.0	82.3	48 09.8	+56.5	83.4	48 16.1	+57.0	84.5	48 21.2	+57.5	85.7	48 25.2	+57.9	86.8	48 28.0	+58.3	87.9	48 29.6	+58.6	89.0	**48**
49	48 49.1	+55.2	80.6	48 58.3	+55.8	81.8	49 06.3	+56.3	82.9	49 13.1	+56.9	84.1	49 18.7	+57.4	85.2	49 23.1	+57.8	86.4	49 26.3	+58.2	87.5	49 28.2	+58.6	88.7	**49**
50	49 44.3	+55.0	80.0	49 54.1	+55.6	81.2	50 02.6	+56.2	82.4	50 10.0	+56.7	83.6	50 16.1	+57.2	84.8	50 20.9	+57.7	86.0	50 24.5	+58.2	87.2	50 26.8	+58.6	88.4	**50**
51	50 39.3	+54.7	79.4	50 49.7	+55.4	80.6	50 58.8	+56.1	81.8	51 06.7	+56.6	83.1	51 13.3	+57.2	84.3	51 18.6	+57.7	85.5	51 22.7	+58.1	86.8	51 25.4	+58.5	88.0	**51**
52	51 34.0	+54.6	78.8	51 45.1	+55.2	80.0	51 54.9	+55.8	81.3	52 03.3	+56.5	82.5	52 10.5	+57.0	83.8	52 16.3	+57.5	85.1	52 20.8	+57.9	86.4	52 23.9	+58.4	87.7	**52**
53	52 28.6	+54.3	78.1	52 40.3	+55.0	79.4	52 50.7	+55.7	80.7	52 59.8	+56.3	82.0	53 07.5	+56.9	83.3	53 13.8	+57.4	84.6	53 18.7	+57.9	85.9	53 22.3	+58.3	87.3	**53**
54	53 22.9	+54.0	77.4	53 35.3	+54.8	78.7	53 46.4	+55.5	80.0	53 56.1	+56.1	81.4	54 04.4	+56.7	82.7	54 11.2	+57.3	84.1	54 16.6	+57.8	85.5	54 20.6	+58.3	86.9	**54**
55	54 16.9	+53.8	76.6	54 30.1	+54.5	78.0	54 41.9	+55.2	79.4	54 52.2	+55.9	80.8	55 01.1	+56.6	82.2	55 08.5	+57.2	83.6	55 14.4	+57.7	85.0	55 18.9	+58.1	86.5	**55**
56	55 10.7	+53.4	75.9	55 24.6	+54.3	77.3	55 37.1	+55.0	78.7	55 48.1	+55.8	80.1	55 57.7	+56.3	81.6	56 05.7	+57.0	83.1	56 12.1	+57.6	84.6	56 17.0	+58.1	86.0	**56**
57	56 04.1	+53.2	75.1	56 18.9	+53.9	76.5	56 32.1	+54.8	78.0	56 43.9	+55.5	79.5	56 54.0	+56.2	81.0	57 02.7	+56.8	82.5	57 09.7	+57.4	84.0	57 15.1	+58.0	85.6	**57**
58	56 57.3	+52.8	74.2	57 12.8	+53.7	75.7	57 26.9	+54.4	77.2	57 39.4	+55.2	78.8	57 50.2	+56.0	80.3	57 59.5	+56.7	81.9	58 07.1	+57.3	83.5	58 13.1	+57.8	85.1	**58**
59	57 50.1	+52.3	73.3	58 06.5	+53.3	74.9	58 21.3	+54.2	76.4	58 34.6	+55.0	78.0	58 46.2	+55.8	79.6	58 56.2	+56.4	81.3	59 04.4	+57.1	82.9	59 10.9	+57.8	84.6	**59**
60	58 42.4	+52.0	72.4	58 59.8	+52.9	74.0	59 15.5	+53.8	75.6	59 29.6	+54.7	77.3	59 42.0	+55.5	78.9	59 52.6	+56.3	80.6	60 01.5	+57.0	82.3	60 08.7	+57.5	84.0	**60**
61	59 34.4	+51.5	71.4	59 52.7	+52.5	73.1	60 09.3	+53.5	74.7	60 24.3	+54.4	76.4	60 37.5	+55.2	78.2	60 48.9	+56.0	79.9	60 58.5	+56.8	81.7	61 06.2	+57.5	83.5	**61**
62	60 25.9	+51.0	70.4	60 45.2	+52.1	72.1	61 02.8	+53.1	73.8	61 18.7	+54.0	75.6	61 32.7	+54.9	77.4	61 44.9	+55.8	79.2	61 55.3	+56.5	81.0	62 03.7	+57.2	82.9	**62**
63	61 16.9	+50.5	69.3	61 37.3	+51.5	71.1	61 55.9	+52.6	72.8	62 12.7	+53.6	74.6	62 27.6	+54.6	76.5	62 40.7	+55.5	78.4	62 51.8	+56.3	80.3	63 00.9	+57.1	82.2	**63**
64	62 07.4	+49.9	68.2	62 28.8	+51.1	70.0	62 48.5	+52.1	71.8	63 06.3	+53.2	73.7	63 22.2	+54.2	75.6	63 36.2	+55.1	77.5	63 48.1	+56.1	79.5	63 58.0	+56.8	81.5	**64**
65	62 57.3	+49.2	67.0	63 19.9	+50.4	68.8	63 40.6	+51.6	70.7	63 59.5	+52.7	72.6	64 16.4	+53.8	74.6	64 31.3	+54.9	76.6	64 44.2	+55.7	78.7	64 54.8	+56.7	80.8	**65**
66	63 46.5	+48.5	65.7	64 10.3	+49.8	67.6	64 32.2	+51.0	69.5	64 52.2	+52.2	71.5	65 10.2	+53.4	73.6	65 26.2	+54.4	75.7	65 39.9	+55.4	77.8	65 51.5	+56.3	80.0	**66**
67	64 35.0	+47.7	64.4	65 00.1	+49.0	66.3	65 23.2	+50.4	68.3	65 44.4	+51.7	70.3	66 03.6	+52.8	72.5	66 20.6	+54.0	74.6	66 35.3	+55.1	76.9	66 47.8	+56.1	79.1	**67**
68	65 22.7	+46.9	62.9	65 49.1	+48.3	64.9	66 13.6	+49.6	67.0	66 36.1	+50.9	69.1	66 56.4	+52.3	71.3	67 14.6	+53.4	73.5	67 30.4	+54.6	75.8	67 43.9	+55.7	78.2	**68**
69	66 09.6	+45.9	61.4	66 37.4	+47.4	63.4	67 03.2	+48.9	65.5	67 27.0	+50.3	67.7	67 48.7	+51.6	70.0	68 08.0	+53.0	72.3	68 25.0	+54.2	74.7	68 39.6	+55.3	77.2	**69**
70	66 55.5	+44.9	59.8	67 24.8	+46.4	61.9	67 52.1	+47.9	64.0	68 17.3	+49.4	66.3	68 40.3	+50.9	68.6	69 01.0	+52.3	71.0	69 19.2	+53.7	73.6	69 34.9	+54.9	76.1	**70**
71	67 40.4	+43.6	58.1	68 11.2	+45.3	60.2	68 40.0	+46.9	62.4	69 06.7	+48.5	64.7	69 31.2	+50.1	67.1	69 53.3	+51.6	69.7	70 12.9	+53.0	72.3	70 29.8	+54.4	74.9	**71**
72	68 24.0	+42.4	56.2	68 56.5	+44.0	58.4	69 26.9	+45.8	60.7	69 55.2	+47.5	63.0	70 21.3	+49.1	65.5	70 44.9	+50.7	68.1	71 05.9	+52.3	70.8	71 24.2	+53.8	73.7	**72**
73	69 06.4	+41.0	54.3	69 40.5	+42.8	56.5	70 12.7	+44.5	58.8	70 42.7	+46.3	61.2	71 10.4	+48.1	63.8	71 35.6	+49.9	66.5	71 58.2	+51.5	69.3	72 18.0	+53.1	72.2	**73**
74	69 47.4	+39.5	52.2	70 23.3	+41.2	54.4	70 57.2	+43.1	56.8	71 29.0	+45.0	59.3	71 58.5	+46.9	61.9	72 25.5	+48.7	64.7	72 49.7	+50.6	67.6	73 11.1	+52.4	70.7	**74**
75	70 26.9	+37.6	50.0	71 04.5	+39.6	52.2	71 40.3	+41.5	54.6	72 14.0	+43.5	57.1	72 45.4	+45.5	59.8	73 14.2	+47.5	62.7	73 40.3	+49.5	65.7	74 03.5	+51.4	68.9	**75**
76	71 04.5	+35.8	47.6	71 44.1	+37.7	49.9	72 21.8	+39.8	52.3	72 57.5	+41.8	54.8	73 30.9	+43.9	57.6	74 01.7	+46.1	60.5	74 29.8	+48.3	63.7	74 54.9	+50.3	67.0	**76**
77	71 40.3	*+33.7* •	45.1	72 21.8	*+35.7* •	47.3	73 01.6	*+37.7* •	49.7	73 39.3	*+39.9* •	52.3	74 14.8	+42.2	55.1	74 47.8	+44.5	58.2	75 18.1	+46.7	61.4	75 45.2	+49.0	64.8	**77**
78	72 14.0	*+31.4* •	42.4	72 57.5	*+33.4* •	44.6	73 39.3	*+35.5* •	47.0	74 19.2	*+37.8* •	49.6	74 57.0	*+40.0* •	52.5	75 32.3	*+42.5* •	55.5	76 04.8	+45.0	58.9	76 34.2	+47.5	62.4	**78**
79	72 45.4	*+28.8* •	39.6	73 30.9	*+30.8* •	41.7	74 14.8	*+33.0* •	44.1	74 57.0	*+35.3* •	46.7	75 37.0	*+37.8* •	49.5	76 14.8	*+40.2* •	52.6	76 49.8	*+42.9* •	56.0	77 21.7	*+45.6* •	59.7	**79**
80	73 14.2	*+26.1* •	36.6	74 01.7	*+28.1* •	38.7	74 47.8	*+30.3* •	41.0	75 32.3	*+32.5* •	43.5	76 14.8	*+35.0* •	46.3	76 55.0	*+37.7* •	49.4	77 32.7	*+40.4* •	52.9	78 07.3	*+43.4* •	56.7	**80**
81	73 40.3	*+23.2* •	33.4	74 29.8	*+25.1* •	35.4	75 18.1	*+27.1* •	37.6	76 04.8	*+29.4* •	40.1	76 49.8	*+31.9* •	42.8	77 32.7	*+34.6* •	45.9	78 13.1	*+37.6* •	49.4	78 50.7	*+40.7* •	53.2	**81**
82	74 03.5	*+19.9* •	30.1	74 54.9	*+21.7* •	32.0	75 45.2	*+23.8* •	34.1	76 34.2	*+26.0* •	36.4	77 21.7	*+28.4* •	39.0	78 07.3	*+31.2* •	42.0	78 50.7	*+34.1* •	45.4	79 31.4	*+37.4* •	49.3	**82**
83	74 23.4	*+16.5* •	26.6	75 16.6	*+18.2* •	28.4	76 09.0	*+20.0* •	30.3	77 00.2	*+22.2* •	32.5	77 50.1	*+24.6* •	34.9	78 38.5	*+27.1* •	37.8	79 24.8	*+30.2* •	41.1	80 08.8	*+33.5* •	44.8	**83**
84	74 39.9	*+13.0* •	23.0	75 34.8	*+14.5* •	24.6	76 29.0	*+16.2* •	26.3	77 22.4	*+18.0* •	28.3	78 14.7	*+20.2* •	30.5	79 05.6	*+22.7* •	33.2	79 55.0	*+25.5* •	36.2	80 42.3	*+28.8* •	39.9	**84**
85	74 52.9	*+9.2* •	19.3	75 49.3	*+10.5* •	20.6	76 45.2	*+11.9* •	22.1	77 40.4	*+13.6* •	23.8	78 34.9	*+15.5* •	25.8	79 28.3	*+17.7* •	28.2	80 20.5	*+20.3* •	31.0	81 11.1	*+23.4* •	34.3	**85**
86	75 02.1	*+5.4* •	15.5	75 59.8	*+6.4* •	16.6	76 57.1	*+7.5* •	17.8	77 54.0	*+8.9* •	19.2	78 50.4	*+10.4* •	20.9	79 46.0	*+12.3* •	22.9	80 40.8	*+14.5* •	25.3	81 34.5	*+17.1* •	28.1	**86**
87	75 07.5	*+1.4* •	11.6	76 06.2	*+2.1* •	12.5	77 04.6	*+3.1* •	13.4	78 02.9	*+4.0* •	14.5	79 00.8	*+5.2* •	15.8	79 58.3	*+6.5* •	17.3	80 55.3	*+8.2* •	19.2	81 51.6	*+10.2* •	21.5	**87**
88	75 08.9	*−2.5* •	7.7	76 08.3	*−2.0* •	8.3	77 07.7	*−1.6* •	8.9	78 06.9	*−1.0* •	9.7	79 06.0	*−0.3* •	10.5	80 04.8	*+0.6* •	11.6	81 03.5	*+1.6* •	12.8	82 01.8	*+2.8* •	14.4	**88**
89	75 06.4	*−6.4* •	3.9	76 06.3	*−6.3* •	4.1	77 06.1	*−6.1* •	4.4	78 05.9	*−5.9* •	4.8	79 05.7	*−5.7* •	5.2	80 05.4	*−5.4* •	5.8	81 05.1	*−5.1* •	6.4	82 04.6	*−4.6* •	7.2	**89**
90	75 00.0	*−10.2* •	0.0	76 00.0	*−10.4* •	0.0	77 00.0	*−10.5* •	0.0	78 00.0	*−10.7* •	0.0	79 00.0	*−11.0* •	0.0	80 00.0	*−11.2* •	0.0	81 00.0	*−11.5* •	0.0	82 00.0	*−11.9* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 82°, 278°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 03.9	–58.0	97.7	1 55.8	–58.3	97.8	1 47.6	–58.4	97.8	1 39.5	–58.7	97.8	1 31.3	–58.9	97.9	1 23.1	–59.1	97.9	1 14.9	–59.3	97.9	1 06.6	–59.4	97.9	0
1	1 05.9	–58.0	98.0	0 57.5	–58.2	98.0	0 49.2	–58.5	98.0	0 40.8	–58.7	98.0	0 32.4	–58.9	98.0	0 24.0	–59.1	98.1	0 15.6	–59.3	98.1	0 07.2	–59.5	98.1	1
2	0 07.9	–58.0	98.2	0 00.7	+58.3	81.8	0 09.3	+58.5	81.8	0 17.9	+58.8	81.8	0 26.5	+59.0	81.8	0 35.1	+59.1	81.8	0 43.7	+59.3	81.8	0 52.3	+59.4	81.8	2
3	0 50.1	+58.0	81.5	0 59.0	+58.2	81.5	1 07.8	+58.5	81.5	1 16.7	+58.7	81.6	1 25.5	+58.9	81.6	1 34.2	+59.1	81.6	1 43.0	+59.3	81.6	1 51.7	+59.4	81.7	3
4	1 48.1	+58.0	81.2	1 57.2	+58.3	81.3	2 06.3	+58.5	81.3	2 15.4	+58.7	81.3	2 24.4	+58.9	81.4	2 33.3	+59.1	81.4	2 42.3	+59.2	81.5	2 51.1	+59.4	81.5	4
5	2 46.1	+58.0	81.0	2 55.5	+58.2	81.0	3 04.8	+58.5	81.1	3 14.1	+58.7	81.1	3 23.3	+58.9	81.2	3 32.4	+59.1	81.3	3 41.5	+59.3	81.3	3 50.5	+59.5	81.4	5
6	3 44.1	+58.0	80.7	3 53.7	+58.3	80.8	4 03.3	+58.5	80.9	4 12.8	+58.7	80.9	4 22.2	+58.9	81.0	4 31.5	+59.1	81.1	4 40.8	+59.3	81.2	4 50.0	+59.4	81.2	6
7	4 42.1	+58.0	80.5	4 52.0	+58.2	80.6	5 01.8	+58.5	80.6	5 11.5	+58.7	80.7	5 21.1	+58.9	80.8	5 30.6	+59.1	80.9	5 40.1	+59.2	81.0	5 49.4	+59.4	81.1	7
8	5 40.1	+57.9	80.2	5 50.2	+58.2	80.3	6 00.3	+58.4	80.4	6 10.2	+58.7	80.5	6 20.0	+58.9	80.6	6 29.7	+59.1	80.7	6 39.3	+59.3	80.9	6 48.8	+59.4	81.0	8
9	6 38.0	+58.0	80.0	6 48.4	+58.3	80.1	6 58.7	+58.5	80.2	7 08.9	+58.7	80.3	7 18.9	+58.9	80.4	7 28.8	+59.1	80.6	7 38.6	+59.3	80.7	7 48.2	+59.4	80.8	9
10	7 36.0	+58.0	79.7	7 46.7	+58.2	79.8	7 57.2	+58.5	80.0	8 07.6	+58.7	80.1	8 17.8	+58.9	80.2	8 27.9	+59.1	80.4	8 37.9	+59.2	80.5	8 47.6	+59.5	80.7	10
11	8 34.0	+57.9	79.4	8 44.9	+58.2	79.6	8 55.7	+58.4	79.7	9 06.3	+58.6	79.9	9 16.7	+58.9	80.1	9 27.0	+59.1	80.2	9 37.1	+59.3	80.4	9 47.1	+59.4	80.5	11
12	9 31.9	+57.9	79.2	9 43.1	+58.2	79.3	9 54.1	+58.4	79.5	10 04.9	+58.7	79.7	10 15.6	+58.9	79.9	10 26.1	+59.1	80.0	10 36.4	+59.2	80.2	10 46.5	+59.4	80.4	12
13	10 29.8	+58.0	78.9	10 41.3	+58.2	79.1	10 52.5	+58.5	79.3	11 03.6	+58.7	79.5	11 14.5	+58.9	79.7	11 25.2	+59.0	79.9	11 35.6	+59.3	80.1	11 45.9	+59.4	80.3	13
14	11 27.8	+57.9	78.6	11 39.5	+58.1	78.8	11 51.0	+58.4	79.0	12 02.3	+58.6	79.3	12 13.4	+58.8	79.5	12 24.2	+59.1	79.7	12 34.9	+59.2	79.9	12 45.3	+59.4	80.1	14
15	12 25.7	+57.8	78.4	12 37.6	+58.2	78.6	12 49.4	+58.4	78.8	13 00.9	+58.7	79.0	13 12.2	+58.9	79.3	13 23.3	+59.0	79.5	13 34.1	+59.2	79.7	13 44.7	+59.4	80.0	15
16	13 23.5	+57.9	78.1	13 35.8	+58.1	78.3	13 47.8	+58.4	78.6	13 59.6	+58.6	78.8	14 11.1	+58.8	79.1	14 22.3	+59.1	79.3	14 33.3	+59.2	79.6	14 44.1	+59.3	79.8	16
17	14 21.4	+57.9	77.8	14 33.9	+58.2	78.1	14 46.2	+58.4	78.3	14 58.2	+58.6	78.6	15 09.9	+58.9	78.9	15 21.4	+59.0	79.1	15 32.5	+59.3	79.4	15 43.4	+59.4	79.7	17
18	15 19.3	+57.8	77.6	15 32.1	+58.1	77.8	15 44.6	+58.3	78.1	15 56.8	+58.6	78.4	16 08.8	+58.8	78.7	16 20.4	+59.0	78.9	16 31.8	+59.2	79.2	16 42.8	+59.4	79.5	18
19	16 17.1	+57.8	77.3	16 30.2	+58.1	77.6	16 42.9	+58.4	77.9	16 55.4	+58.6	78.2	17 07.6	+58.8	78.5	17 19.4	+59.0	78.8	17 31.0	+59.2	79.1	17 42.2	+59.4	79.4	19
20	17 14.9	+57.8	77.0	17 28.3	+58.0	77.3	17 41.3	+58.3	77.6	17 54.0	+58.6	77.9	18 06.4	+58.8	78.2	18 18.4	+59.0	78.6	18 30.2	+59.2	78.9	18 41.6	+59.3	79.2	20
21	18 12.7	+57.8	76.7	18 26.3	+58.1	77.0	18 39.6	+58.3	77.4	18 52.6	+58.5	77.7	19 05.2	+58.8	78.0	19 17.4	+59.0	78.4	19 29.4	+59.1	78.7	19 40.9	+59.4	79.1	21
22	19 10.5	+57.7	76.4	19 24.4	+58.0	76.8	19 37.9	+58.3	77.1	19 51.1	+58.6	77.5	20 04.0	+58.7	77.8	20 16.4	+59.0	78.2	20 28.5	+59.2	78.5	20 40.3	+59.3	78.9	22
23	20 08.2	+57.7	76.1	20 22.4	+58.0	76.5	20 36.2	+58.3	76.9	20 49.7	+58.5	77.2	21 02.7	+58.8	77.6	21 15.4	+59.0	78.0	21 27.7	+59.2	78.4	21 39.6	+59.3	78.8	23
24	21 05.9	+57.7	75.8	21 20.4	+57.9	76.2	21 34.5	+58.2	76.6	21 48.2	+58.5	77.0	22 01.5	+58.7	77.4	22 14.4	+58.9	77.8	22 26.9	+59.1	78.2	22 38.9	+59.4	78.6	24
25	22 03.6	+57.6	75.6	22 18.3	+58.0	75.9	22 32.7	+58.2	76.3	22 46.7	+58.4	76.8	23 00.2	+58.7	77.2	23 13.3	+59.0	77.6	23 26.0	+59.1	78.0	23 38.3	+59.3	78.4	25
26	23 01.2	+57.6	75.3	23 16.3	+57.9	75.7	23 30.9	+58.2	76.1	23 45.1	+58.5	76.5	23 58.9	+58.7	76.9	24 12.3	+58.9	77.4	24 25.1	+59.2	77.8	24 37.6	+59.3	78.3	26
27	23 58.8	+57.6	74.9	24 14.2	+57.9	75.4	24 29.1	+58.2	75.8	24 43.6	+58.4	76.3	24 57.6	+58.7	76.7	25 11.2	+58.9	77.2	25 24.3	+59.1	77.6	25 36.9	+59.3	78.1	27
28	24 56.4	+57.5	74.6	25 12.1	+57.8	75.1	25 27.3	+58.1	75.5	25 42.0	+58.4	76.0	25 56.3	+58.6	76.5	26 10.1	+58.8	77.0	26 23.4	+59.0	77.4	26 36.2	+59.2	77.9	28
29	25 53.9	+57.5	74.3	26 09.9	+57.8	74.8	26 25.4	+58.1	75.3	26 40.4	+58.4	75.8	26 54.9	+58.7	76.2	27 08.9	+58.9	76.7	27 22.4	+59.1	77.2	27 35.4	+59.3	77.8	29
30	26 51.4	+57.5	74.0	27 07.7	+57.8	74.5	27 23.5	+58.1	75.0	27 38.8	+58.3	75.5	27 53.6	+58.6	76.0	28 07.8	+58.8	76.5	28 21.5	+59.1	77.0	28 34.7	+59.2	77.6	30
31	27 48.9	+57.4	73.7	28 05.5	+57.7	74.2	28 21.6	+58.0	74.7	28 37.1	+58.3	75.2	28 52.2	+58.5	75.8	29 06.6	+58.9	76.3	29 20.6	+59.0	76.8	29 33.9	+59.3	77.4	31
32	28 46.3	+57.3	73.3	29 03.2	+57.7	73.9	29 19.6	+58.0	74.4	29 35.4	+58.3	75.0	29 50.7	+58.6	75.5	30 05.5	+58.7	76.1	30 19.6	+59.0	76.6	30 33.2	+59.2	77.2	32
33	29 43.6	+57.3	73.0	30 00.9	+57.6	73.6	30 17.6	+57.9	74.1	30 33.7	+58.3	74.7	30 49.3	+58.5	75.3	31 04.2	+58.8	75.8	31 18.6	+59.0	76.4	31 32.4	+59.2	77.0	33
34	30 40.9	+57.3	72.7	30 58.5	+57.6	73.2	31 15.5	+57.9	73.8	31 32.0	+58.2	74.4	31 47.8	+58.5	75.0	32 03.0	+58.8	75.6	32 17.6	+59.0	76.2	32 31.6	+59.2	76.8	34
35	31 38.2	+57.2	72.3	31 56.1	+57.5	72.9	32 13.4	+57.9	73.5	32 30.2	+58.1	74.1	32 46.3	+58.4	74.7	33 01.8	+58.7	75.4	33 16.6	+58.9	76.0	33 30.8	+59.2	76.6	35
36	32 35.4	+57.1	72.0	32 53.6	+57.5	72.6	33 11.3	+57.8	73.2	33 28.3	+58.1	73.8	33 44.7	+58.4	74.5	34 00.5	+58.6	75.1	34 15.5	+59.0	75.8	34 30.0	+59.1	76.4	36
37	33 32.5	+57.1	71.6	33 51.1	+57.4	72.2	34 09.1	+57.8	72.9	34 26.4	+58.1	73.5	34 43.1	+58.4	74.2	34 59.1	+58.7	74.9	35 14.5	+58.9	75.5	35 29.1	+59.1	76.2	37
38	34 29.6	+56.9	71.2	34 48.5	+57.4	71.9	35 06.9	+57.7	72.5	35 24.5	+58.1	73.2	35 41.5	+58.3	73.9	35 57.8	+58.6	74.6	36 13.4	+58.8	75.3	36 28.2	+59.1	76.0	38
39	35 26.5	+57.0	70.8	35 45.9	+57.3	71.5	36 04.6	+57.6	72.2	36 22.6	+57.9	72.9	36 39.8	+58.3	73.6	36 56.4	+58.6	74.3	37 12.2	+58.9	75.1	37 27.3	+59.1	75.8	39
40	36 23.5	+56.8	70.5	36 43.2	+57.2	71.2	37 02.2	+57.6	71.9	37 20.5	+58.0	72.6	37 38.1	+58.3	73.3	37 55.0	+58.5	74.1	38 11.1	+58.8	74.8	38 26.4	+59.0	75.6	40
41	37 20.3	+56.7	70.1	37 40.4	+57.2	70.8	37 59.8	+57.5	71.5	38 18.5	+57.8	72.3	38 36.4	+58.2	73.0	38 53.5	+58.5	73.8	39 09.9	+58.8	74.6	39 25.4	+59.1	75.4	41
42	38 17.0	+56.7	69.6	38 37.6	+57.0	70.4	38 57.3	+57.5	71.1	39 16.3	+57.8	71.9	39 34.6	+58.1	72.7	39 52.0	+58.5	73.5	40 08.7	+58.7	74.3	40 24.5	+59.0	75.1	42
43	39 13.7	+56.6	69.2	39 34.6	+57.0	70.0	39 54.8	+57.3	70.8	40 14.1	+57.8	71.6	40 32.7	+58.1	72.4	40 50.5	+58.4	73.2	41 07.4	+58.7	74.0	41 23.5	+58.9	74.9	43
44	40 10.3	+56.5	68.8	40 31.6	+56.9	69.6	40 52.1	+57.3	70.4	41 11.9	+57.7	71.2	41 30.8	+58.0	72.0	41 48.9	+58.3	72.9	42 06.1	+58.6	73.8	42 22.4	+59.0	74.6	44
45	41 06.8	+56.3	68.3	41 28.5	+56.8	69.2	41 49.4	+57.3	70.0	42 09.6	+57.6	70.8	42 28.8	+58.0	71.7	42 47.2	+58.3	72.6	43 04.7	+58.7	73.5	43 21.4	+58.9	74.4	45
46	42 03.1	+56.3	67.9	42 25.3	+56.7	68.7	42 46.7	+57.1	69.6	43 07.2	+57.5	70.5	43 26.8	+57.9	71.4	43 45.5	+58.3	72.3	44 03.4	+58.5	73.2	44 20.3	+58.8	74.1	46
47	42 59.4	+56.1	67.4	43 22.0	+56.6	68.3	43 43.8	+57.0	69.2	44 04.7	+57.4	70.1	44 24.7	+57.8	71.0	44 43.8	+58.2	71.9	45 01.9	+58.5	72.9	45 19.1	+58.8	73.8	47
48	43 55.5	+56.0	66.9	44 18.6	+56.5	67.8	44 40.8	+56.9	68.7	45 02.1	+57.4	69.7	45 22.5	+57.8	70.6	45 42.0	+58.1	71.6	46 00.4	+58.5	72.6	46 17.9	+58.8	73.6	48
49	44 51.5	+55.9	66.4	45 15.1	+56.3	67.3	45 37.7	+56.9	68.3	45 59.5	+57.2	69.2	46 20.3	+57.6	70.2	46 40.1	+58.0	71.2	46 58.9	+58.4	72.2	47 16.7	+58.7	73.3	49
50	45 47.4	+55.7	65.9	46 11.4	+56.3	66.9	46 34.6	+56.7	67.8	46 56.7	+57.2	68.8	47 17.9	+57.6	69.8	47 38.1	+58.0	70.8	47 57.3	+58.3	71.9	48 15.4	+58.7	73.0	50
51	46 43.1	+55.6	65.4	47 07.7	+56.1	66.3	47 31.3	+56.5	67.3	47 53.9	+57.0	68.4	48 15.5	+57.5	69.4	48 36.1	+57.9	70.5	48 55.6	+58.3	71.5	49 14.1	+58.6	72.6	51
52	47 38.7	+55.4	64.8	48 03.8	+55.9	65.8	48 27.8	+56.5	66.8	48 50.9	+57.0	67.9	49 13.0	+57.4	69.0	49 34.0	+57.8	70.1	49 53.9	+58.2	71.2	50 12.7	+58.6	72.3	52
53	48 34.1	+55.2	64.2	48 59.7	+55.8	65.3	49 24.3	+56.3	66.3	49 47.9	+56.8	67.4	50 10.4	+57.2	68.5	50 31.8	+57.7	69.6	50 52.1	+58.1	70.8	51 11.3	+58.5	72.0	53
54	49 29.3	+55.1	63.6	49 55.5	+55.6	64.7	50 20.6	+56.1	65.8	50 44.7	+56.6	66.9	51 07.6	+57.2	68.0	51 29.5	+57.6	69.2	51 50.2	+58.1	70.4	52 09.8	+58.4	71.6	54
55	50 24.4	+54.8	63.0	50 51.1	+55.4	64.1	51 16.7	+56.0	65.2	51 41.3	+56.5	66.4	52 04.8	+57.0	67.6	52 27.1	+57.5	68.8	52 48.3	+57.9	70.0	53 08.2	+58.4	71.2	55
56	51 19.2	+54.6	62.4	51 46.5	+55.2	63.5	52 12.7	+55.8	64.7	52 37.8	+56.4	65.8	53 01.8	+56.9	67.0	53 24.6	+57.4	68.3	53 46.2	+57.9	69.5	54 06.6	+58.2	70.8	56
57	52 13.8	+54.4	61.7	52 41.7	+55.0	62.9	53 08.5	+55.6	64.0	53 34.2	+56.2	65.3	53 58.7	+56.8	66.5	54 22.0	+57.3	67.8	54 44.1	+57.7	69.1	55 04.8	+58.2	70.4	57
58	53 08.2	+54.1	61.0	53 36.7	+54.8	62.2	54 04.1	+55.4	63.4	54 30.4	+56.0	64.7	54 55.5	+56.5	65.9	55 19.3	+57.1	67.3	55 41.8	+57.7	68.6	56 03.0	+58.1	70.0	58
59	54 02.3	+53.8	60.3	54 31.5	+54.5	61.5	54 59.5	+55.2	62.8	55 26.4	+55.8	64.0	55 52.0	+56.5	65.4	56 16.4	+57.0	66.7	56 39.5	+57.5	68.1	57 01.1	+58.0	69.5	59
60	54 56.1	+53.6	59.5	55 26.0	+54.2	60.8	55 54.7	+54.9	62.1	56 22.2	+55.6	63.4	56 48.5	+56.2	64.7	57 13.4	+56.8	66.1	57 37.0	+57.3	67.6	57 59.1	+57.9	69.1	60
61	55 49.7	+53.2	58.7	56 20.2	+54.0	60.0	56 49.6	+54.7	61.3	57 17.8	+55.3	62.7	57 44.7	+56.0	64.1	58 10.2	+56.6	65.5	58 34.3	+57.2	67.0	58 57.0	+57.8	68.6	61
62	56 42.9	+52.9	57.9	57 14.2	+53.6	59.2	57 44.3	+54.4	60.6	58 13.1	+55.1	62.0	58 40.7	+55.8	63.4	59 06.8	+56.5	64.9	59 31.5	+57.1	66.4	59 54.8	+57.6	68.0	62
63	57 35.8	+52.5	57.0	58 07.8	+53.3	58.4	58 38.7	+54.0	59.8	59 08.2	+54.8	61.2	59 36.5	+55.5	62.7	60 03.3	+56.2	64.2	60 28.6	+56.8	65.8	60 52.4	+57.4	67.5	63
64	58 28.3	+52.1	56.1	59 01.1	+52.9	57.5	59 32.7	+53.8	58.9	60 03.0	+54.6	60.4	60 32.0	+55.2	61.9	60 59.5	+56.0	63.5	61 25.4	+56.7	65.2	61 49.8	+57.3	66.9	64
65	59 20.4	+51.6	55.2	59 54.0	+52.5	56.6	60 26.5	+53.3	58.0	60 57.6	+54.1	59.6	61 27.2	+55.0	61.1	61 55.5	+55.7	62.8	62 22.1	+56.4	64.5	62 47.1	+57.2	66.2	65
66	60 12.0	+51.2	54.1	60 46.5	+52.1	55.6	61 19.8	+52.9	57.1	61 51.7	+53.8	58.7	62 22.2	+54.6	60.3	62 51.2	+55.4	62.0	63 18.5	+56.2	63.7	63 44.3	+56.9	65.5	66
67	61 03.2	+50.6	53.1	61 38.6	+51.5	54.6	62 12.7	+52.5	56.1	62 45.5	+53.4	57.7	63 16.8	+54.3	59.4	63 46.6	+55.1	61.1	64 14.7	+56.0	62.9	64 41.2	+56.6	64.8	67
68	61 53.8	+50.0	52.0	62 30.1	+51.1	53.5	63 05.2	+52.0	55.0	63 38.9	+52.9	56.7	64 11.1	+53.8	58.4	64 41.7	+54.7	60.2	65 10.7	+55.6	62.1	65 37.8	+56.5	64.0	68
69	62 43.8	+49.4	50.8	63 21.2	+50.4	52.3	63 57.2	+51.4	53.9	64 31.8	+52.4	55.6	65 04.9	+53.4	57.4	65 36.4	+54.4	59.2	66 06.3	+55.2	61.2	66 34.3	+56.1	63.2	69
70	63 33.2	+48.7	49.5	64 11.6	+49.7	51.1	64 48.6	+50.8	52.7	65 24.2	+51.9	54.5	65 58.3	+52.9	56.3	66 30.8	+53.9	58.2	67 01.5	+54.9	60.2	67 30.4	+55.8	62.3	70
71	64 21.9	+48.0	48.2	65 01.3	+49.1	49.8	65 39.4	+50.1	51.5	66 16.1	+51.2	53.2	66 51.2	+52.3	55.1	67 24.7	+53.4	57.1	67 56.4	+54.4	59.1	68 26.2	+55.4	61.3	71
72	65 09.9	+47.1	46.8	65 50.4	+48.2	48.4	66 29.5	+49.4	50.1	67 07.3	+50.5	51.9	67 43.5	+51.7	53.8	68 18.1	+52.8	55.9	68 50.8	+53.9	58.0	69 21.6	+55.0	60.2	72
73	65 57.0	+46.2	45.3	66 38.6	+47.3	46.9	67 18.9	+48.6	48.7	67 57.8	+49.8	50.5	68 35.2	+51.0	52.5	69 10.9	+52.2	54.6	69 44.7	+53.4	56.8	70 16.6	+54.5	59.1	73
74	66 43.2	+45.1	43.7	67 25.9	+46.4	45.3	68 07.5	+47.6	47.1	68 47.6	+48.9	49.0	69 26.2	+50.1	51.0	70 03.1	+51.4	53.1	70 38.1	+52.7	55.4	71 11.1	+54.0	57.8	74
75	67 28.3	+44.0	42.0	68 12.3	+45.3	43.7	68 55.1	+46.5	45.4	69 36.5	+47.9	47.4	70 16.3	+49.3	49.4	70 54.5	+50.6	51.6	71 30.8	+52.0	53.9	72 05.1	+53.3	56.4	75
76	68 12.3	+42.8	40.2	68 57.6	+44.0	41.9	69 41.6	+45.4	43.7	70 24.4	+46.7	45.6	71 05.6	+48.2	47.7	71 45.1	+49.6	49.9	72 22.8	+51.1	52.3	72 58.4	+52.5	54.9	76
77	68 55.1	+41.4	38.3	69 41.6	+42.8	39.9	70 27.0	+44.1	41.7	71 11.1	+45.6	43.7	71 53.8	+47.0	45.8	72 34.7	+48.6	48.1	73 13.9	+50.1	50.5	73 50.9	+51.7	53.2	77
78	69 36.5	+39.8	36.2	70 24.4	+41.2	37.9	71 11.1	+42.7	39.7	71 56.7	+44.1	41.6	72 40.8	+45.6	43.8	73 23.3	+47.2	46.1	74 04.0	+48.9	48.6	74 42.6	+50.6	51.3	78
79	70 16.3	+38.2	34.0	71 05.6	+39.5	35.7	71 53.8	+40.9	37.4	72 40.8	+42.5	39.4	73 26.4	+44.1	41.5	74 10.5	+45.8	43.9	74 52.9	+47.5	46.4	75 33.2	+49.3	49.2	79
80	70 54.5	+36.3	31.7	71 45.1	+37.7	33.3	72 34.7	+39.2	35.1	73 23.3	+40.7	37.0	74 10.5	+42.4	39.1	74 56.3	+44.1	41.4	75 40.4	+46.0	44.0	76 22.5	+47.9	46.9	80
81	71 30.8	*+34.3* •	29.2	72 22.8	*+35.6* •	30.8	73 13.9	*+37.0* •	32.5	74 04.0	*+38.6* •	34.4	74 52.9	*+40.3* •	36.4	75 40.4	*+42.1* •	38.8	76 26.4	*+44.0* •	41.4	77 10.4	+46.1	44.3	81
82	72 05.1	*+32.0* •	26.6	72 58.4	*+33.3* •	28.1	73 50.9	*+34.8* •	29.7	74 42.6	*+36.2* •	31.5	75 33.2	*+37.9* •	33.5	76 22.5	*+39.8* •	35.8	77 10.4	*+41.8* •	38.4	77 56.5	*+44.0* •	41.3	82
83	72 37.1	*+29.6* •	23.8	73 31.7	*+30.8* •	25.2	74 25.7	*+32.1* •	26.7	75 18.8	*+33.7* •	28.4	76 11.1	*+35.3* •	30.4	77 02.3	*+37.1* •	32.6	77 52.2	*+39.1* •	35.1	78 40.5	*+41.3* •	37.9	83
84	73 06.7	*+26.8* •	20.9	74 02.5	*+28.0* •	22.1	74 57.8	*+29.3* •	23.5	75 52.5	*+30.7* •	25.1	76 46.4	*+32.3* •	26.9	77 39.4	*+34.1* •	29.0	78 31.3	*+36.0* •	31.3	79 21.8	*+38.3* •	34.1	84
85	73 33.5	*+24.0* •	17.8	74 30.5	*+25.0* •	18.9	75 27.1	*+26.1* •	20.1	76 23.2	*+27.3* •	21.5	77 18.7	*+28.8* •	23.1	78 13.5	*+30.4* •	25.0	79 07.3	*+32.4* •	27.2	80 00.1	*+34.5* •	29.8	85
86	73 57.5	*+20.8* •	14.5	74 55.5	*+21.6* •	15.4	75 53.2	*+22.6* •	16.5	76 50.5	*+23.7* •	17.7	77 47.5	*+24.9* •	19.1	78 43.9	*+26.4* •	20.7	79 39.7	*+28.0* •	22.6	80 34.6	*+30.0* •	25.0	86
87	74 18.3	*+17.5* •	11.0	75 17.1	*+18.2* •	11.8	76 15.8	*+18.8* •	12.6	77 14.2	*+19.7* •	13.6	78 12.4	*+20.7* •	14.7	79 10.3	*+21.8* •	16.0	80 07.7	*+23.2* •	17.6	81 04.6	*+24.8* •	19.5	87
88	74 35.8	*+14.0* •	7.5	75 35.3	*+14.3* •	8.0	76 34.6	*+14.9* •	8.6	77 33.9	*+15.4* •	9.2	78 33.1	*+15.9* •	10.0	79 32.1	*+16.7* •	11.0	80 30.9	*+17.6* •	12.1	81 29.4	*+18.7* •	13.5	88
89	74 49.8	*+10.2* •	3.8	75 49.6	*+10.4* •	4.0	76 49.5	*+10.5* •	4.3	77 49.3	*+10.7* •	4.7	78 49.0	*+11.0* •	5.1	79 48.8	*+11.2* •	5.6	80 48.5	*+11.5* •	6.2	81 48.1	*+11.9* •	7.0	89
90	75 00.0	*+6.4* •	0.0	76 00.0	*+6.3* •	0.0	77 00.0	*+6.1* •	0.0	78 00.0	*+5.9* •	0.0	79 00.0	*+5.7* •	0.0	80 00.0	*+5.4* •	0.0	81 00.0	*+5.1* •	0.0	82 00.0	*+4.6* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 98°, 262°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 48.5	+57.9	96.8	1 41.4	+58.2	96.8	1 34.3	+58.4	96.8	1 27.1	+58.7	96.8	1 19.9	+59.0	96.9	1 12.8	+59.1	96.9	1 05.5	+59.3	96.9	0 58.3	+59.4	96.9	0
1	2 46.4	+58.0	96.5	2 39.6	+58.3	96.6	2 32.7	+58.5	96.6	2 25.8	+58.7	96.6	2 18.9	+58.9	96.7	2 11.9	+59.1	96.7	2 04.8	+59.3	96.8	1 57.7	+59.5	96.8	1
2	3 44.4	+58.0	96.2	3 37.9	+58.2	96.3	3 31.2	+58.5	96.4	3 24.5	+58.7	96.4	3 17.8	+58.9	96.5	3 11.0	+59.1	96.5	3 04.1	+59.3	96.6	2 57.2	+59.4	96.7	2
3	4 42.4	+58.0	96.0	4 36.1	+58.2	96.1	4 29.7	+58.5	96.2	4 23.2	+58.7	96.2	4 16.7	+58.9	96.3	4 10.1	+59.1	96.4	4 03.4	+59.2	96.4	3 56.6	+59.4	96.5	3
4	5 40.4	+57.9	95.7	5 34.3	+58.2	95.8	5 28.2	+58.4	95.9	5 21.9	+58.7	96.0	5 15.6	+58.9	96.1	5 09.2	+59.0	96.2	5 02.6	+59.3	96.3	4 56.0	+59.4	96.4	4
5	6 38.3	+58.0	95.5	6 32.5	+58.3	95.6	6 26.6	+58.5	95.7	6 20.6	+58.7	95.8	6 14.5	+58.9	95.9	6 08.2	+59.1	96.0	6 01.9	+59.3	96.1	5 55.4	+59.4	96.2	5
6	7 36.3	+57.9	95.2	7 30.8	+58.2	95.3	7 25.1	+58.5	95.5	7 19.3	+58.7	95.6	7 13.4	+58.9	95.7	7 07.3	+59.1	95.9	7 01.2	+59.2	96.0	6 54.8	+59.5	96.1	6
7	8 34.2	+58.0	94.9	8 29.0	+58.2	95.1	8 23.6	+58.4	95.2	8 18.0	+58.7	95.4	8 12.3	+58.9	95.5	8 06.4	+59.1	95.7	8 00.4	+59.3	95.8	7 54.3	+59.4	96.0	7
8	9 32.2	+57.9	94.7	9 27.2	+58.2	94.9	9 22.0	+58.4	95.0	9 16.7	+58.6	95.2	9 11.2	+58.9	95.3	9 05.5	+59.1	95.5	8 59.7	+59.2	95.7	8 53.7	+59.4	95.8	8
9	10 30.1	+57.9	94.4	10 25.4	+58.1	94.6	10 20.4	+58.5	94.8	10 15.3	+58.7	95.0	10 10.1	+58.8	95.1	10 04.6	+59.0	95.3	9 58.9	+59.3	95.5	9 53.1	+59.4	95.7	9
10	11 28.0	+57.9	94.2	11 23.5	+58.2	94.4	11 18.9	+58.4	94.6	11 14.0	+58.7	94.8	11 08.9	+58.9	95.0	11 03.6	+59.1	95.1	10 58.2	+59.2	95.3	10 52.5	+59.4	95.5	10
11	12 25.9	+57.9	93.9	12 21.7	+58.2	94.1	12 17.3	+58.4	94.3	12 12.7	+58.6	94.5	12 07.8	+58.9	94.8	12 02.7	+59.1	95.0	11 57.4	+59.2	95.2	11 51.9	+59.4	95.4	11
12	13 23.8	+57.8	93.6	13 19.9	+58.1	93.9	13 15.7	+58.4	94.1	13 11.3	+58.6	94.3	13 06.7	+58.8	94.6	13 01.8	+59.0	94.8	12 56.6	+59.3	95.0	12 51.3	+59.4	95.2	12
13	14 21.6	+57.9	93.3	14 18.0	+58.1	93.6	14 14.1	+58.4	93.9	14 09.9	+58.7	94.1	14 05.5	+58.8	94.4	14 00.8	+59.1	94.6	13 55.9	+59.2	94.9	13 50.7	+59.4	95.1	13
14	15 19.5	+57.8	93.1	15 16.1	+58.1	93.3	15 12.5	+58.3	93.6	15 08.6	+58.6	93.9	15 04.3	+58.9	94.2	14 59.9	+59.0	94.4	14 55.1	+59.2	94.7	14 50.1	+59.3	95.0	14
15	16 17.3	+57.8	92.8	16 14.2	+58.1	93.1	16 10.8	+58.4	93.4	16 07.2	+58.5	93.7	16 03.2	+58.8	93.9	15 58.9	+59.0	94.2	15 54.3	+59.2	94.5	15 49.4	+59.4	94.8	15
16	17 15.1	+57.8	92.5	17 12.3	+58.1	92.8	17 09.2	+58.3	93.1	17 05.7	+58.6	93.4	17 02.0	+58.8	93.7	16 57.9	+59.0	94.0	16 53.5	+59.2	94.4	16 48.8	+59.4	94.7	16
17	18 12.9	+57.7	92.2	18 10.4	+58.0	92.6	18 07.5	+58.3	92.9	18 04.3	+58.6	93.2	18 00.8	+58.8	93.5	17 56.9	+59.0	93.9	17 52.7	+59.2	94.2	17 48.2	+59.3	94.5	17
18	19 10.6	+57.7	91.9	19 08.4	+58.0	92.3	19 05.8	+58.3	92.6	19 02.9	+58.5	93.0	18 59.6	+58.8	93.3	18 55.9	+59.0	93.7	18 51.9	+59.2	94.0	18 47.5	+59.4	94.3	18
19	20 08.3	+57.7	91.7	20 06.4	+58.0	92.0	20 04.1	+58.3	92.4	20 01.4	+58.6	92.7	19 58.4	+58.7	93.1	19 54.9	+59.0	93.5	19 51.1	+59.2	93.8	19 46.9	+59.3	94.2	19
20	21 06.0	+57.7	91.4	21 04.4	+58.0	91.7	21 02.4	+58.2	92.1	21 00.0	+58.5	92.5	20 57.1	+58.8	92.9	20 53.9	+59.0	93.3	20 50.3	+59.1	93.7	20 46.2	+59.4	94.0	20
21	22 03.7	+57.6	91.1	22 02.4	+57.9	91.5	22 00.6	+58.3	91.9	21 58.5	+58.4	92.3	21 55.9	+58.7	92.7	21 52.9	+58.9	93.1	21 49.4	+59.2	93.5	21 45.6	+59.3	93.9	21
22	23 01.3	+57.6	90.8	23 00.3	+57.9	91.2	22 58.9	+58.1	91.6	22 56.9	+58.5	92.0	22 54.6	+58.7	92.5	22 51.8	+58.9	92.9	22 48.6	+59.1	93.3	22 44.9	+59.3	93.7	22
23	23 58.9	+57.6	90.5	23 58.2	+57.9	90.9	23 57.0	+58.2	91.3	23 55.4	+58.4	91.8	23 53.3	+58.7	92.2	23 50.7	+59.0	92.7	23 47.7	+59.1	93.1	23 44.2	+59.3	93.6	23
24	24 56.5	+57.5	90.1	24 56.1	+57.8	90.6	24 55.2	+58.2	91.1	24 53.8	+58.5	91.5	24 52.0	+58.7	92.0	24 49.7	+58.9	92.5	24 46.8	+59.1	92.9	24 43.5	+59.3	93.4	24
25	25 54.0	+57.5	89.8	25 53.9	+57.8	90.3	25 53.4	+58.1	90.8	25 52.3	+58.3	91.3	25 50.7	+58.6	91.8	25 48.6	+58.8	92.3	25 45.9	+59.1	92.7	25 42.8	+59.3	93.2	25
26	26 51.5	+57.4	89.5	26 51.7	+57.8	90.0	26 51.5	+58.0	90.5	26 50.6	+58.4	91.0	26 49.3	+58.6	91.5	26 47.4	+58.9	92.0	26 45.0	+59.1	92.5	26 42.1	+59.3	93.0	26
27	27 48.9	+57.4	89.2	27 49.5	+57.7	89.7	27 49.5	+58.1	90.2	27 49.0	+58.3	90.8	27 47.9	+58.6	91.3	27 46.3	+58.8	91.8	27 44.1	+59.1	92.3	27 41.4	+59.2	92.9	27
28	28 46.3	+57.4	88.9	28 47.2	+57.7	89.4	28 47.6	+58.0	90.0	28 47.3	+58.3	90.5	28 46.5	+58.6	91.0	28 45.1	+58.9	91.6	28 43.2	+59.0	92.1	28 40.6	+59.3	92.7	28
29	29 43.7	+57.2	88.5	29 44.9	+57.7	89.1	29 45.6	+57.9	89.7	29 45.6	+58.3	90.2	29 45.1	+58.5	90.8	29 44.0	+58.8	91.4	29 42.2	+59.0	91.9	29 39.9	+59.2	92.5	29
30	30 40.9	+57.3	88.2	30 42.6	+57.5	88.8	30 43.5	+58.0	89.4	30 43.9	+58.2	90.0	30 43.6	+58.5	90.5	30 42.8	+58.7	91.1	30 41.2	+59.1	91.7	30 39.1	+59.2	92.3	30
31	31 38.2	+57.2	87.8	31 40.1	+57.6	88.4	31 41.5	+57.8	89.1	31 42.1	+58.2	89.7	31 42.1	+58.5	90.3	31 41.5	+58.8	90.9	31 40.3	+58.9	91.5	31 38.3	+59.2	92.1	31
32	32 35.4	+57.1	87.5	32 37.7	+57.5	88.1	32 39.3	+57.9	88.7	32 40.3	+58.2	89.4	32 40.6	+58.5	90.0	32 40.3	+58.7	90.7	32 39.2	+59.0	91.3	32 37.5	+59.2	91.9	32
33	33 32.5	+57.0	87.1	33 35.2	+57.4	87.8	33 37.2	+57.7	88.4	33 38.5	+58.1	89.1	33 39.1	+58.4	89.8	33 39.0	+58.7	90.4	33 38.2	+58.9	91.1	33 36.7	+59.2	91.7	33
34	34 29.5	+57.0	86.7	34 32.6	+57.3	87.4	34 34.9	+57.8	88.1	34 36.6	+58.0	88.8	34 37.5	+58.3	89.5	34 37.7	+58.6	90.2	34 37.1	+58.9	90.9	34 35.9	+59.1	91.5	34
35	35 26.5	+56.9	86.3	35 29.9	+57.3	87.1	35 32.7	+57.6	87.8	35 34.6	+58.0	88.5	35 35.8	+58.4	89.2	35 36.3	+58.6	89.9	35 36.0	+58.9	90.6	35 35.0	+59.1	91.3	35
36	36 23.4	+56.8	85.9	36 27.2	+57.3	86.7	36 30.3	+57.6	87.4	36 32.6	+58.0	88.2	36 34.2	+58.3	88.9	36 34.9	+58.6	89.6	36 34.9	+58.9	90.4	36 34.1	+59.1	91.1	36
37	37 20.2	+56.7	85.5	37 24.5	+57.1	86.3	37 27.9	+57.6	87.1	37 30.6	+57.9	87.8	37 32.5	+58.2	88.6	37 33.5	+58.6	89.4	37 33.8	+58.8	90.1	37 33.2	+59.1	90.9	37
38	38 16.9	+56.7	85.1	38 21.6	+57.1	85.9	38 25.5	+57.5	86.7	38 28.5	+57.9	87.5	38 30.7	+58.2	88.3	38 32.1	+58.5	89.1	38 32.6	+58.8	89.9	38 32.3	+59.0	90.7	38
39	39 13.6	+56.6	84.7	39 18.7	+57.0	85.5	39 23.0	+57.4	86.3	39 26.4	+57.7	87.2	39 28.9	+58.1	88.0	39 30.6	+58.4	88.8	39 31.4	+58.7	89.6	39 31.3	+59.0	90.5	39
40	40 10.2	+56.4	84.3	40 15.7	+56.9	85.1	40 20.4	+57.3	86.0	40 24.1	+57.8	86.8	40 27.0	+58.1	87.7	40 29.0	+58.4	88.5	40 30.1	+58.8	89.4	40 30.3	+59.0	90.2	40
41	41 06.6	+56.4	83.8	41 12.6	+56.8	84.7	41 17.7	+57.2	85.6	41 21.9	+57.6	86.5	41 25.1	+58.0	87.3	41 27.4	+58.4	88.2	41 28.9	+58.6	89.1	41 29.3	+59.0	90.0	41
42	42 03.0	+56.2	83.4	42 09.4	+56.7	84.3	42 14.9	+57.2	85.2	42 19.5	+57.6	86.1	42 23.1	+58.0	87.0	42 25.8	+58.3	87.9	42 27.5	+58.7	88.8	42 28.3	+58.9	89.7	42
43	42 59.2	+56.1	82.9	43 06.1	+56.6	83.8	43 12.1	+57.1	84.8	43 17.1	+57.5	85.7	43 21.1	+57.9	86.6	43 24.1	+58.3	87.6	43 26.2	+58.6	88.5	43 27.2	+58.9	89.5	43
44	43 55.3	+56.0	82.4	44 02.7	+56.5	83.4	44 09.2	+56.9	84.3	44 14.6	+57.4	85.3	44 19.0	+57.8	86.3	44 22.4	+58.2	87.3	44 24.8	+58.5	88.2	44 26.1	+58.8	89.2	44
45	44 51.3	+55.9	81.9	44 59.2	+56.4	82.9	45 06.1	+56.9	83.9	45 12.0	+57.3	84.9	45 16.8	+57.8	85.9	45 20.6	+58.1	86.9	45 23.3	+58.5	87.9	45 24.9	+58.8	88.9	45
46	45 47.2	+55.7	81.4	45 55.6	+56.3	82.4	46 03.0	+56.8	83.4	46 09.3	+57.3	84.5	46 14.6	+57.6	85.5	46 18.7	+58.1	86.6	46 21.8	+58.4	87.6	46 23.7	+58.8	88.6	46
47	46 42.9	+55.5	80.9	46 51.9	+56.1	81.9	46 59.8	+56.6	83.0	47 06.6	+57.1	84.0	47 12.2	+57.6	85.1	47 16.8	+58.0	86.2	47 20.2	+58.4	87.3	47 22.5	+58.7	88.4	47
48	47 38.4	+55.4	80.3	47 48.0	+55.9	81.4	47 56.4	+56.5	82.5	48 03.7	+57.0	83.6	48 09.8	+57.5	84.7	48 14.8	+57.9	85.8	48 18.6	+58.3	86.9	48 21.2	+58.7	88.0	48
49	48 33.8	+55.2	79.7	48 43.9	+55.8	80.8	48 52.9	+56.4	82.0	49 00.7	+56.9	83.1	49 07.3	+57.4	84.3	49 12.7	+57.8	85.4	49 16.9	+58.2	86.6	49 19.9	+58.6	87.7	49
50	49 29.0	+55.0	79.1	49 39.7	+55.7	80.3	49 49.3	+56.2	81.4	49 57.6	+56.7	82.6	50 04.7	+57.2	83.8	50 10.5	+57.8	85.0	50 15.1	+58.2	86.2	50 18.5	+58.5	87.4	50
51	50 24.0	+54.8	78.5	50 35.4	+55.4	79.7	50 45.5	+56.0	80.9	50 54.3	+56.7	82.1	51 01.9	+57.2	83.3	51 08.3	+57.6	84.6	51 13.3	+58.1	85.8	51 17.0	+58.5	87.0	51
52	51 18.8	+54.6	77.9	51 30.8	+55.3	79.1	51 41.5	+55.9	80.3	51 51.0	+56.4	81.6	51 59.1	+57.0	82.8	52 05.9	+57.5	84.1	52 11.4	+58.0	85.4	52 15.5	+58.4	86.7	52
53	52 13.4	+54.4	77.2	52 26.1	+55.0	78.5	52 37.4	+55.7	79.7	52 47.4	+56.4	81.0	52 56.1	+56.9	82.3	53 03.4	+57.5	83.7	53 09.4	+57.9	85.0	53 13.9	+58.4	86.3	53
54	53 07.8	+54.0	76.5	53 21.1	+54.8	77.8	53 33.1	+55.5	79.1	53 43.8	+56.1	80.5	53 53.0	+56.8	81.8	54 00.9	+57.3	83.2	54 07.3	+57.8	84.5	54 12.3	+58.3	85.9	54
55	54 01.8	+53.9	75.8	54 15.9	+54.6	77.1	54 28.6	+55.3	78.5	54 39.9	+56.0	79.8	54 49.8	+56.5	81.2	54 58.2	+57.1	82.7	55 05.1	+57.7	84.1	55 10.6	+58.1	85.5	55
56	54 55.7	+53.5	75.0	55 10.5	+54.3	76.4	55 23.9	+55.0	77.8	55 35.9	+55.7	79.2	55 46.3	+56.4	80.7	55 55.3	+57.0	82.1	56 02.8	+57.6	83.6	56 08.7	+58.1	85.1	56
57	55 49.2	+53.2	74.2	56 04.8	+54.0	75.6	56 18.9	+54.8	77.1	56 31.6	+55.5	78.6	56 42.7	+56.3	80.0	56 52.3	+56.9	81.6	57 00.4	+57.4	83.1	57 06.8	+58.0	84.6	57
58	56 42.4	+52.8	73.4	56 58.8	+53.7	74.8	57 13.7	+54.6	76.3	57 27.1	+55.3	77.9	57 39.0	+56.0	79.4	57 49.2	+56.7	81.0	57 57.8	+57.3	82.5	58 04.8	+57.8	84.1	58
59	57 35.2	+52.5	72.5	57 52.5	+53.4	74.0	58 08.3	+54.2	75.6	58 22.4	+55.0	77.1	58 35.0	+55.8	78.7	58 45.9	+56.5	80.3	58 55.1	+57.1	82.0	59 02.6	+57.8	83.6	59
60	58 27.7	+52.0	71.6	58 45.9	+53.0	73.1	59 02.5	+53.9	74.7	59 17.4	+54.8	76.4	59 30.8	+55.5	78.0	59 42.4	+56.3	79.7	59 52.2	+57.0	81.4	60 00.4	+57.6	83.1	60
61	59 19.7	+51.6	70.6	59 38.9	+52.5	72.2	59 56.4	+53.5	73.9	60 12.2	+54.4	75.5	60 26.3	+55.3	77.2	60 38.7	+56.0	79.0	60 49.2	+56.8	80.7	60 58.0	+57.4	82.5	61
62	60 11.3	+51.2	69.6	60 31.4	+52.2	71.3	60 49.9	+53.1	73.0	61 06.6	+54.1	74.7	61 21.6	+54.9	76.4	61 34.7	+55.8	78.2	61 46.0	+56.6	80.1	61 55.4	+57.3	81.9	62
63	61 02.5	+50.5	68.5	61 23.6	+51.6	70.2	61 43.0	+52.7	72.0	62 00.7	+53.7	73.8	62 16.5	+54.7	75.6	62 30.5	+55.5	77.5	62 42.6	+56.3	79.3	62 52.7	+57.0	81.3	63
64	61 53.0	+50.0	67.4	62 15.2	+51.2	69.2	62 35.7	+52.2	71.0	62 54.4	+53.2	72.8	63 11.2	+54.2	74.7	63 26.0	+55.2	76.6	63 38.9	+56.1	78.6	63 49.7	+56.9	80.6	64
65	62 43.0	+49.4	66.2	63 06.4	+50.5	68.0	63 27.9	+51.7	69.9	63 47.6	+52.8	71.8	64 05.4	+53.9	73.7	64 21.2	+54.9	75.7	64 35.0	+55.8	77.8	64 46.6	+56.7	79.8	65
66	63 32.4	+48.7	65.0	63 56.9	+49.9	66.8	64 19.6	+51.1	68.7	64 40.4	+52.3	70.7	64 59.3	+53.4	72.7	65 16.1	+54.4	74.8	65 30.8	+55.4	76.9	65 43.3	+56.3	79.1	66
67	64 21.1	+47.9	63.6	64 46.8	+49.2	65.5	65 10.7	+50.5	67.5	65 32.7	+51.7	69.5	65 52.7	+52.9	71.6	66 10.5	+54.1	73.8	66 26.2	+55.1	76.0	66 39.6	+56.1	78.2	67
68	65 09.0	+47.0	62.2	65 36.0	+48.4	64.2	66 01.2	+49.8	66.2	66 24.4	+51.1	68.3	66 45.6	+52.3	70.4	67 04.6	+53.5	72.7	67 21.3	+54.7	75.0	67 35.7	+55.8	77.3	68
69	65 56.0	+46.1	60.7	66 24.4	+47.6	62.7	66 51.0	+49.0	64.8	67 15.5	+50.4	66.9	67 37.9	+51.8	69.2	67 58.1	+53.0	71.5	68 16.0	+54.2	73.9	68 31.5	+55.3	76.3	69
70	66 42.1	+45.1	59.1	67 12.0	+46.6	61.2	67 40.0	+48.1	63.3	68 05.9	+49.6	65.5	68 29.7	+51.0	67.8	68 51.1	+52.4	70.2	69 10.2	+53.7	72.7	69 26.8	+55.0	75.2	70
71	67 27.2	+44.0	57.4	67 58.6	+45.5	59.5	68 28.1	+47.1	61.7	68 55.5	+48.6	64.0	69 20.7	+50.2	66.4	69 43.5	+51.7	68.8	70 03.9	+53.1	71.4	70 21.8	+54.4	74.1	71
72	68 11.2	+42.7	55.6	68 44.1	+44.4	57.7	69 15.2	+46.0	60.0	69 44.1	+47.7	62.3	70 10.9	+49.3	64.8	70 35.2	+50.9	67.3	70 57.0	+52.5	70.0	71 16.2	+53.9	72.8	72
73	68 53.9	+41.3	53.7	69 28.5	+43.0	55.9	70 01.2	+44.8	58.1	70 31.8	+46.5	60.5	71 00.2	+48.2	63.1	71 26.1	+50.0	65.7	71 49.5	+51.6	68.5	72 10.1	+53.2	71.4	73
74	69 35.2	+39.8	51.7	70 11.5	+41.6	53.8	70 46.0	+43.4	56.1	71 18.3	+45.3	58.6	71 48.4	+47.1	61.2	72 16.1	+48.9	63.9	72 41.1	+50.7	66.8	73 03.3	+52.4	69.8	74
75	70 15.0	+38.1	49.5	70 53.1	+40.0	51.7	71 29.4	+41.8	54.0	72 03.6	+43.7	56.5	72 35.5	+45.8	59.2	73 05.0	+47.7	62.0	73 31.8	+49.6	65.0	73 55.7	+51.5	68.1	75
76	70 53.1	+36.3	47.2	71 33.1	+38.1	49.4	72 11.2	+40.1	51.7	72 47.3	+42.2	54.2	73 21.3	+44.2	57.0	73 52.7	+46.3	59.9	74 21.4	+48.4	62.9	74 47.2	+50.5	66.2	76
77	71 29.4	+34.2•	44.7	72 11.2	+36.1•	46.9	72 51.3	+38.2•	49.2	73 29.5	+40.3•	51.8	74 05.5	+42.4	54.5	74 39.0	+44.7	57.5	75 09.8	+47.0	60.7	75 37.7	+49.1	64.1	77
78	72 03.6	+31.9•	42.1	72 47.3	+34.0•	44.2	73 29.5	+36.0•	46.6	74 09.8	+38.1•	49.1	74 47.9	+40.5•	51.9	75 23.7	+42.8•	54.9	75 56.8	+45.2	58.2	76 26.8	+47.7	61.7	78
79	72 35.5	+29.5•	39.3	73 21.3	+31.4•	41.4	74 05.5	+33.5•	43.7	74 47.9	+35.8•	46.2	75 28.4	+38.1•	49.0	76 06.5	+40.6•	52.1	76 42.0	+43.2•	55.4	77 14.5	+45.9•	59.0	79
80	73 05.0	+26.8•	36.3	73 52.7	+28.7•	38.4	74 39.0	+30.8•	40.6	75 23.7	+33.1•	43.1	76 06.5	+35.5•	45.9	76 47.1	+38.1•	48.9	77 25.2	+40.8•	52.3	78 00.4	+43.6•	56.0	80
81	73 31.8	+23.9•	33.2	74 21.4	+25.8•	35.2	75 09.8	+27.9•	37.3	75 56.8	+30.0•	39.7	76 42.0	+32.5•	42.4	77 25.2	+35.2•	45.5	78 06.0	+38.0•	48.9	78 44.0	+41.0•	52.6	81
82	73 55.7	+20.8•	29.9	74 47.2	+22.6•	31.8	75 37.7	+24.5•	33.8	76 26.8	+26.7•	36.1	77 14.5	+29.1•	38.7	78 00.4	+31.7•	41.7	78 44.0	+34.7•	45.0	79 25.0	+37.9•	48.8	82
83	74 16.5	+17.4•	26.5	75 09.8	+19.0•	28.2	76 02.2	+20.9•	30.1	76 53.5	+23.0•	32.2	77 43.6	+25.3•	34.7	78 32.1	+27.9•	37.5	79 18.7	+30.8•	40.7	80 02.9	+34.0•	44.4	83
84	74 33.9	+13.9•	22.9	75 28.8	+15.4•	24.4	76 23.1	+17.0•	26.2	77 16.5	+18.9•	28.1	78 08.9	+21.0•	30.3	79 00.0	+23.4•	32.9	79 49.5	+26.2•	36.0	80 36.9	+29.5•	39.5	84
85	74 47.8	+10.2•	19.3	75 44.2	+11.4•	20.6	76 40.1	+12.9•	22.0	77 35.4	+14.5•	23.7	78 29.9	+16.4•	25.7	79 23.4	+18.6•	28.0	80 15.7	+21.1•	30.8	81 06.4	+24.1•	34.0	85
86	74 58.0	+6.4•	15.5	75 55.6	+7.4•	16.5	76 53.0	+8.5•	17.8	77 49.9	+9.9•	19.2	78 46.3	+11.4•	20.8	79 42.0	+13.2•	22.8	80 36.8	+15.4•	25.1	81 30.5	+18.0•	28.0	86
87	75 04.4	+2.4•	11.6	76 03.0	+3.2•	12.4	77 01.5	+4.1•	13.4	77 59.8	+5.0•	14.5	78 57.7	+6.2•	15.7	79 55.2	+7.6•	17.3	80 52.2	+9.2•	19.1	81 48.5	+11.2•	21.4	87
88	75 06.8	−1.4•	7.7	76 06.2	−1.0•	8.3	77 05.6	−0.5•	8.9	78 04.8	+0.1•	9.7	79 03.9	+0.7•	10.5	80 02.8	+1.6•	11.6	81 01.4	+2.6•	12.8	81 59.7	+3.9•	14.4	88
89	75 05.4	−5.4•	3.9	76 05.2	−5.2•	4.1	77 05.1	−5.1•	4.4	78 04.9	−4.9•	4.8	79 04.6	−4.6•	5.2	80 04.4	−4.4•	5.8	81 04.0	−4.0•	6.4	82 03.6	−3.6•	7.2	89
90	75 00.0	−9.2•	0.0	76 00.0	−9.4•	0.0	77 00.0	−9.5•	0.0	78 00.0	−9.7•	0.0	79 00.0	−9.9•	0.0	80 00.0	−10.2•	0.0	81 00.0	−10.5•	0.0	82 00.0	−10.9•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 83°, 277°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 48.5	−58.0	96.8	1 41.4	−58.3	96.8	1 34.3	−58.5	96.8	1 27.1	−58.7	96.8	1 19.9	−58.9	96.9	1 12.8	−59.1	96.9	1 05.5	−59.2	96.9	0 58.3	−59.4	96.9	0
1	0 50.5	−58.0	97.0	0 43.1	−58.2	97.0	0 35.8	−58.5	97.0	0 28.4	−58.7	97.1	0 21.0	−58.9	97.1	0 13.7	−59.1	97.1	0 06.3	−59.3	97.1	0 01.1	+59.4	82.9	1
2	0 07.5	+58.0	82.7	0 15.1	+58.3	82.7	0 22.7	+58.5	82.7	0 30.3	+58.7	82.7	0 37.9	+58.9	82.7	0 45.4	+59.1	82.8	0 53.0	+59.3	82.8	1 00.5	+59.5	82.8	2
3	1 05.5	+58.0	82.5	1 13.4	+58.2	82.5	1 21.2	+58.5	82.5	1 29.0	+58.7	82.5	1 36.8	+58.9	82.6	1 44.5	+59.1	82.6	1 52.3	+59.2	82.6	2 00.0	+59.4	82.7	3
4	2 03.5	+58.0	82.2	2 11.6	+58.2	82.2	2 19.7	+58.5	82.3	2 27.7	+58.7	82.3	2 35.7	+58.9	82.4	2 43.6	+59.1	82.4	2 51.5	+59.3	82.5	2 59.4	+59.4	82.5	4
5	3 01.5	+58.0	82.0	3 09.8	+58.3	82.0	3 18.2	+58.4	82.1	3 26.4	+58.7	82.1	3 34.6	+58.9	82.2	3 42.7	+59.1	82.2	3 50.8	+59.3	82.3	3 58.8	+59.4	82.4	5
6	3 59.5	+57.9	81.7	4 08.1	+58.2	81.8	4 16.6	+58.5	81.8	4 25.1	+58.7	81.9	4 33.5	+58.9	82.0	4 41.8	+59.1	82.1	4 50.1	+59.2	82.2	4 58.2	+59.5	82.2	6
7	4 57.4	+58.0	81.4	5 06.3	+58.2	81.5	5 15.1	+58.5	81.6	5 23.8	+58.7	81.7	5 32.4	+58.9	81.8	5 40.9	+59.1	81.9	5 49.3	+59.3	82.0	5 57.7	+59.4	82.1	7
8	5 55.4	+58.0	81.2	6 04.5	+58.3	81.3	6 13.6	+58.5	81.4	6 22.5	+58.7	81.5	6 31.3	+58.9	81.6	6 40.0	+59.1	81.7	6 48.6	+59.3	81.8	6 57.1	+59.4	82.0	8
9	6 53.4	+57.9	80.9	7 02.8	+58.2	81.0	7 12.1	+58.4	81.2	7 21.2	+58.7	81.3	7 30.2	+58.9	81.4	7 39.1	+59.1	81.5	7 47.9	+59.2	81.7	7 56.5	+59.4	81.8	9
10	7 51.3	+57.9	80.7	8 01.0	+58.2	80.8	8 10.5	+58.5	80.9	8 19.9	+58.7	81.1	8 29.1	+58.9	81.2	8 38.2	+59.1	81.4	8 47.1	+59.3	81.5	8 55.9	+59.4	81.7	10
11	8 49.2	+58.0	80.4	8 59.2	+58.2	80.5	9 09.0	+58.4	80.7	9 18.6	+58.6	80.9	9 28.0	+58.9	81.0	9 37.3	+59.1	81.2	9 46.4	+59.2	81.4	9 55.3	+59.4	81.5	11
12	9 47.2	+57.9	80.1	9 57.4	+58.2	80.3	10 07.4	+58.4	80.5	10 17.2	+58.7	80.7	10 26.9	+58.9	80.8	10 36.4	+59.0	81.0	10 45.6	+59.3	81.2	10 54.7	+59.4	81.4	12
13	10 45.1	+57.9	79.9	10 55.6	+58.1	80.1	11 05.8	+58.5	80.2	11 15.9	+58.7	80.4	11 25.8	+58.8	80.6	11 35.4	+59.1	80.8	11 44.9	+59.2	81.0	11 54.1	+59.4	81.2	13
14	11 43.0	+57.9	79.6	11 53.7	+58.2	79.8	12 04.3	+58.4	80.0	12 14.6	+58.6	80.2	12 24.6	+58.9	80.4	12 34.5	+59.0	80.7	12 44.1	+59.2	80.9	12 53.5	+59.4	81.1	14
15	12 40.9	+57.9	79.3	12 51.9	+58.1	79.5	13 02.7	+58.4	79.8	13 13.2	+58.6	80.0	13 23.5	+58.8	80.2	13 33.5	+59.1	80.5	13 43.3	+59.3	80.7	13 52.9	+59.4	81.0	15
16	13 38.8	+57.8	79.1	13 50.0	+58.2	79.3	14 01.1	+58.3	79.5	14 11.8	+58.6	79.8	14 22.3	+58.9	80.0	14 32.6	+59.0	80.3	14 42.6	+59.2	80.5	14 52.3	+59.4	80.8	16
17	14 36.6	+57.9	78.8	14 48.2	+58.1	79.0	14 59.4	+58.4	79.3	15 10.4	+58.6	79.6	15 21.2	+58.8	79.8	15 31.6	+59.0	80.1	15 41.8	+59.2	80.4	15 51.7	+59.3	80.7	17
18	15 34.5	+57.8	78.5	15 46.3	+58.1	78.8	15 57.8	+58.4	79.1	16 09.0	+58.6	79.3	16 20.0	+58.8	79.6	16 30.6	+59.1	79.9	16 41.0	+59.2	80.2	16 51.0	+59.4	80.5	18
19	16 32.3	+57.8	78.2	16 44.4	+58.0	78.5	16 56.2	+58.3	78.8	17 07.6	+58.6	79.1	17 18.8	+58.8	79.4	17 29.7	+59.0	79.7	17 40.2	+59.2	80.0	17 50.4	+59.4	80.4	19
20	17 30.1	+57.7	77.9	17 42.4	+58.1	78.3	17 54.5	+58.3	78.6	18 06.2	+58.6	78.9	18 17.6	+58.8	79.2	18 28.7	+59.0	79.5	18 39.4	+59.2	79.9	18 49.8	+59.3	80.2	20
21	18 27.8	+57.8	77.7	18 40.5	+58.0	78.0	18 52.8	+58.3	78.3	19 04.8	+58.5	78.7	19 16.4	+58.8	79.0	19 27.7	+58.9	79.3	19 38.6	+59.2	79.7	19 49.1	+59.4	80.1	21
22	19 25.6	+57.7	77.4	19 38.5	+58.0	77.7	19 51.1	+58.3	78.1	20 03.3	+58.5	78.4	20 15.2	+58.7	78.8	20 26.6	+59.0	79.2	20 37.8	+59.1	79.5	20 48.5	+59.3	79.9	22
23	20 23.3	+57.7	77.1	20 36.5	+58.0	77.5	20 49.4	+58.2	77.8	21 01.8	+58.6	78.2	21 13.9	+58.8	78.6	21 25.6	+59.0	79.0	21 36.9	+59.2	79.3	21 47.8	+59.3	79.7	23
24	21 21.0	+57.6	76.8	21 34.5	+58.0	77.2	21 47.6	+58.3	77.6	22 00.4	+58.4	78.0	22 12.7	+58.7	78.4	22 24.6	+58.9	78.8	22 36.1	+59.1	79.2	22 47.1	+59.4	79.6	24
25	22 18.6	+57.7	76.5	22 32.5	+57.9	76.9	22 45.9	+58.2	77.3	22 58.8	+58.5	77.7	23 11.4	+58.7	78.1	23 23.5	+58.9	78.6	23 35.2	+59.1	79.0	23 46.5	+59.3	79.4	25
26	23 16.3	+57.6	76.2	23 30.4	+57.9	76.6	23 44.1	+58.1	77.0	23 57.3	+58.4	77.5	24 10.1	+58.7	77.9	24 22.4	+58.9	78.3	24 34.3	+59.1	78.8	24 45.8	+59.3	79.2	26
27	24 13.9	+57.5	75.9	24 28.3	+57.8	76.3	24 42.2	+58.2	76.8	24 55.7	+58.4	77.2	25 08.8	+58.6	77.7	25 21.3	+58.9	78.1	25 33.4	+59.1	78.6	25 45.1	+59.2	79.1	27
28	25 11.4	+57.5	75.6	25 26.1	+57.9	76.0	25 40.4	+58.1	76.5	25 54.1	+58.4	77.0	26 07.4	+58.7	77.4	26 20.2	+58.9	77.9	26 32.5	+59.1	78.4	26 44.3	+59.3	78.9	28
29	26 08.9	+57.5	75.3	26 24.0	+57.7	75.7	26 38.5	+58.1	76.2	26 52.5	+58.4	76.7	27 06.1	+58.6	77.2	27 19.1	+58.9	77.7	27 31.6	+59.1	78.2	27 43.6	+59.3	78.7	29
30	27 06.4	+57.4	74.9	27 21.7	+57.8	75.4	27 36.6	+58.0	75.9	27 50.9	+58.3	76.4	28 04.7	+58.6	77.0	28 18.0	+58.8	77.5	28 30.7	+59.0	78.0	28 42.9	+59.2	78.5	30
31	28 03.8	+57.4	74.6	28 19.5	+57.7	75.1	28 34.6	+58.0	75.7	28 49.2	+58.3	76.2	29 03.3	+58.5	76.7	29 16.8	+58.8	77.3	29 29.7	+59.1	77.8	29 42.1	+59.2	78.4	31
32	29 01.2	+57.3	74.3	29 17.2	+57.6	74.8	29 32.6	+58.0	75.4	29 47.5	+58.3	75.9	30 01.8	+58.6	76.5	30 15.6	+58.8	77.0	30 28.8	+59.0	77.6	30 41.3	+59.3	78.2	32
33	29 58.5	+57.3	73.9	30 14.8	+57.7	74.5	30 30.6	+57.9	75.1	30 45.8	+58.2	75.6	31 00.4	+58.5	76.2	31 14.4	+58.7	76.8	31 27.8	+59.0	77.4	31 40.6	+59.2	78.0	33
34	30 55.8	+57.2	73.6	31 12.5	+57.5	74.2	31 28.5	+57.9	74.8	31 44.0	+58.2	75.4	31 58.9	+58.4	76.0	32 13.1	+58.8	76.6	32 26.8	+58.9	77.2	32 39.8	+59.1	77.8	34
35	31 53.0	+57.2	73.2	32 10.0	+57.5	73.8	32 26.4	+57.9	74.4	32 42.2	+58.1	75.1	32 57.3	+58.5	75.7	33 11.9	+58.7	76.3	33 25.7	+59.0	77.0	33 38.9	+59.2	77.6	35
36	32 50.2	+57.1	72.9	33 07.5	+57.5	73.5	33 24.3	+57.7	74.1	33 40.3	+58.1	74.8	33 55.8	+58.4	75.4	34 10.6	+58.6	76.1	34 24.7	+58.9	76.7	34 38.1	+59.1	77.4	36
37	33 47.3	+57.0	72.5	34 05.0	+57.4	73.2	34 22.0	+57.8	73.8	34 38.4	+58.1	74.5	34 54.2	+58.3	75.1	35 09.2	+58.7	75.8	35 23.6	+58.9	76.5	35 37.2	+59.1	77.2	37
38	34 44.3	+56.9	72.1	35 02.4	+57.3	72.8	35 19.8	+57.7	73.5	35 36.5	+58.0	74.2	35 52.5	+58.3	74.9	36 07.9	+58.6	75.6	36 22.5	+58.8	76.3	36 36.3	+59.1	77.0	38
39	35 41.2	+56.9	71.7	35 59.7	+57.3	72.4	36 17.5	+57.6	73.1	36 34.5	+58.0	73.8	36 50.8	+58.3	74.6	37 06.5	+58.5	75.3	37 21.3	+58.8	76.0	37 35.4	+59.1	76.8	39
40	36 38.1	+56.8	71.4	36 57.0	+57.2	72.1	37 15.1	+57.5	72.8	37 32.5	+57.9	73.5	37 49.1	+58.2	74.3	38 05.0	+58.5	75.0	38 20.1	+58.8	75.8	38 34.5	+59.0	76.5	40
41	37 34.9	+56.7	71.0	37 54.2	+57.1	71.7	38 12.6	+57.5	72.4	38 30.4	+57.8	73.2	38 47.3	+58.2	74.0	39 03.5	+58.5	74.7	39 18.9	+58.8	75.5	39 33.5	+59.1	76.3	41
42	38 31.6	+56.7	70.5	38 51.3	+57.0	71.3	39 10.1	+57.5	72.1	39 28.2	+57.8	72.8	39 45.5	+58.1	73.6	40 02.0	+58.5	74.4	40 17.7	+58.7	75.3	40 32.6	+58.9	76.1	42
43	39 28.3	+56.5	70.1	39 48.3	+57.0	70.9	40 07.6	+57.3	71.7	40 26.0	+57.7	72.5	40 43.6	+58.1	73.3	41 00.5	+58.4	74.1	41 16.4	+58.7	75.0	41 31.5	+59.0	75.8	43
44	40 24.8	+56.4	69.7	40 45.3	+56.8	70.5	41 04.9	+57.3	71.3	41 23.7	+57.7	72.1	41 41.7	+58.0	73.0	41 58.9	+58.3	73.8	42 15.1	+58.7	74.7	42 30.5	+58.9	75.6	44
45	41 21.2	+56.4	69.2	41 42.1	+56.8	70.1	42 02.2	+57.1	70.9	42 21.4	+57.5	71.8	42 39.7	+58.0	72.6	42 57.2	+58.3	73.5	43 13.8	+58.6	74.4	43 29.4	+58.9	75.3	45
46	42 17.6	+56.2	68.8	42 38.9	+56.6	69.6	42 59.3	+57.1	70.5	43 18.9	+57.5	71.4	43 37.7	+57.8	72.3	43 55.5	+58.2	73.2	44 12.4	+58.5	74.1	44 28.3	+58.8	75.1	46
47	43 13.8	+56.1	68.3	43 35.5	+56.6	69.2	43 56.4	+57.0	70.1	44 16.4	+57.5	71.0	44 35.5	+57.8	71.9	44 53.7	+58.2	72.9	45 10.9	+58.5	73.8	45 27.1	+58.9	74.8	47
48	44 09.9	+55.9	67.8	44 32.1	+56.4	68.7	44 53.4	+56.9	69.6	45 13.9	+57.3	70.6	45 33.3	+57.8	71.5	45 51.9	+58.1	72.5	46 09.4	+58.5	73.5	46 26.0	+58.7	74.5	48
49	45 05.8	+55.8	67.3	45 28.5	+56.3	68.2	45 50.3	+56.8	69.2	46 11.2	+57.2	70.1	46 31.1	+57.6	71.1	46 50.0	+58.0	72.1	47 07.9	+58.3	73.2	47 24.7	+58.7	74.2	49
50	46 01.6	+55.7	66.8	46 24.8	+56.2	67.7	46 47.1	+56.7	68.7	47 08.4	+57.1	69.7	47 28.7	+57.6	70.7	47 48.0	+57.9	71.8	48 06.2	+58.4	72.8	48 23.4	+58.7	73.9	50
51	46 57.3	+55.5	66.2	47 21.0	+56.0	67.2	47 43.8	+56.5	68.2	48 05.5	+57.0	69.3	48 26.3	+57.4	70.3	48 45.9	+57.9	71.4	49 04.6	+58.2	72.5	49 22.1	+58.6	73.6	51
52	47 52.8	+55.3	65.7	48 17.0	+55.9	66.7	48 40.3	+56.4	67.7	49 02.5	+56.9	68.8	49 23.7	+57.4	69.9	49 43.8	+57.8	71.0	50 02.8	+58.2	72.1	50 20.7	+58.5	73.2	52
53	48 48.1	+55.2	65.1	49 12.9	+55.7	66.1	49 36.7	+56.2	67.2	49 59.4	+56.8	68.3	50 21.1	+57.2	69.4	50 41.6	+57.7	70.6	51 01.0	+58.1	71.7	51 19.2	+58.5	72.9	53
54	49 43.3	+54.9	64.5	50 08.6	+55.6	65.6	50 32.9	+56.1	66.7	50 56.2	+56.6	67.8	51 18.3	+57.1	68.9	51 39.3	+57.6	70.1	51 59.1	+58.0	71.3	52 17.7	+58.4	72.5	54
55	50 38.2	+54.8	63.8	51 04.2	+55.3	65.0	51 29.0	+56.0	66.1	51 52.8	+56.5	67.3	52 15.4	+57.0	68.4	52 36.9	+57.4	69.7	52 57.1	+58.0	70.9	53 16.1	+58.4	72.2	55
56	51 33.0	+54.5	63.2	51 59.5	+55.2	64.3	52 25.0	+55.7	65.5	52 49.3	+56.3	66.7	53 12.4	+56.9	67.9	53 34.3	+57.4	69.2	53 55.1	+57.8	70.5	54 14.5	+58.2	71.8	56
57	52 27.5	+54.3	62.5	52 54.7	+54.9	63.7	53 20.7	+55.5	64.9	53 45.6	+56.1	66.1	54 09.3	+56.7	67.4	54 31.7	+57.2	68.7	54 52.9	+57.7	70.0	55 12.7	+58.2	71.4	57
58	53 21.8	+54.0	61.8	53 49.6	+54.7	63.0	54 16.2	+55.4	64.3	54 41.7	+56.0	65.5	55 06.0	+56.5	66.8	55 28.9	+57.1	68.2	55 50.6	+57.6	69.5	56 10.9	+58.1	70.9	58
59	54 15.8	+53.8	61.1	54 44.3	+54.4	62.3	55 11.6	+55.1	63.6	55 37.7	+55.7	64.9	56 02.5	+56.3	66.2	56 26.0	+56.9	67.6	56 48.2	+57.5	69.0	57 09.0	+57.9	70.5	59
60	55 09.6	+53.4	60.3	55 38.7	+54.2	61.6	56 06.7	+54.8	62.9	56 33.4	+55.5	64.2	56 58.8	+56.2	65.6	57 22.9	+56.8	67.0	57 45.7	+57.3	68.5	58 06.9	+57.9	70.0	60
61	56 03.0	+53.1	59.5	56 32.9	+53.8	60.8	57 01.5	+54.6	62.1	57 28.9	+55.3	63.5	57 55.0	+55.9	65.0	58 19.7	+56.6	66.4	58 43.0	+57.2	67.9	59 04.8	+57.7	69.5	61
62	56 56.1	+52.8	58.7	57 26.7	+53.6	60.0	57 56.1	+54.3	61.4	58 24.2	+55.0	62.8	58 50.9	+55.8	64.3	59 16.3	+56.4	65.8	59 40.2	+57.0	67.3	60 02.5	+57.6	68.9	62
63	57 48.9	+52.3	57.8	58 20.3	+53.1	59.1	58 50.4	+53.9	60.6	59 19.2	+54.7	62.0	59 46.7	+55.4	63.5	60 12.7	+56.1	65.1	60 37.2	+56.8	66.7	61 00.1	+57.4	68.4	63
64	58 41.2	+52.0	56.8	59 13.4	+52.8	58.2	59 44.3	+53.7	59.7	60 13.9	+54.4	61.2	60 42.1	+55.2	62.8	61 08.8	+55.9	64.4	61 34.0	+56.6	66.0	61 57.5	+57.3	67.8	64
65	59 33.2	+51.4	55.9	60 06.2	+52.4	57.3	60 38.0	+53.2	58.8	61 08.3	+54.1	60.3	61 37.3	+54.9	62.0	62 04.7	+55.7	63.6	62 30.6	+56.4	65.3	62 54.8	+57.1	67.1	65
66	60 24.6	+51.0	54.8	60 58.6	+51.9	56.3	61 31.2	+52.8	57.8	62 02.4	+53.7	59.4	62 32.2	+54.5	61.1	63 00.4	+55.4	62.8	63 27.0	+56.1	64.6	63 51.9	+56.8	66.4	66
67	61 15.6	+50.5	53.8	61 50.5	+51.4	55.3	62 24.0	+52.3	56.8	62 56.1	+53.2	58.5	63 26.7	+54.2	60.2	63 55.8	+55.0	61.9	64 23.1	+55.9	63.8	64 48.7	+56.7	65.7	67
68	62 06.1	+49.8	52.6	62 41.9	+50.8	54.2	63 16.3	+51.8	55.8	63 49.3	+52.8	57.4	64 20.9	+53.7	59.2	64 50.8	+54.6	61.0	65 19.0	+55.5	62.9	65 45.4	+56.3	64.9	68
69	62 55.9	+49.2	51.4	63 32.7	+50.2	53.0	64 08.1	+51.3	54.6	64 42.1	+52.3	56.3	65 14.6	+53.3	58.1	65 45.4	+54.3	60.0	66 14.5	+55.2	62.0	66 41.7	+56.1	64.0	69
70	63 45.1	+48.5	50.1	64 22.9	+49.6	51.7	64 59.4	+50.6	53.4	65 34.4	+51.7	55.2	66 07.9	+52.7	57.0	66 39.7	+53.8	59.0	67 09.7	+54.8	61.0	67 37.8	+55.7	63.1	70
71	64 33.6	+47.7	48.8	65 12.5	+48.8	50.4	65 50.0	+49.9	52.1	66 26.1	+51.1	53.9	67 00.6	+52.2	55.8	67 33.5	+53.2	57.8	68 04.5	+54.3	59.9	68 33.5	+55.4	62.1	71
72	65 21.3	+46.8	47.4	66 01.3	+47.9	49.0	66 39.9	+49.2	50.7	67 17.2	+50.3	52.6	67 52.8	+51.5	54.5	68 26.7	+52.7	56.6	68 58.8	+53.8	58.8	69 28.9	+54.9	61.1	72
73	66 08.1	+45.8	45.8	66 49.2	+47.1	47.5	67 29.1	+48.3	49.3	68 07.5	+49.5	51.2	68 44.3	+50.8	53.2	69 19.4	+52.0	55.3	69 52.6	+53.3	57.5	70 23.8	+54.4	59.9	73
74	66 53.9	+44.8	44.2	67 36.3	+46.1	45.9	68 17.4	+47.3	47.7	68 57.0	+48.7	49.6	69 35.1	+50.0	51.7	70 11.4	+51.3	53.8	70 45.9	+52.5	56.1	71 18.2	+53.9	58.6	74
75	67 38.7	+43.7	42.5	68 22.4	+44.9	44.2	69 04.7	+46.3	46.0	69 45.7	+47.6	48.0	70 25.1	+49.0	50.0	71 02.7	+50.4	52.3	71 38.4	+51.8	54.6	72 12.1	+53.1	57.2	75
76	68 22.4	+42.3	40.7	69 07.3	+43.7	42.4	69 51.0	+45.1	44.2	70 33.3	+46.5	46.2	71 14.1	+47.9	48.3	71 53.1	+49.4	50.6	72 30.2	+50.9	53.0	73 05.2	+52.4	55.6	76
77	69 04.7	+41.0	38.7	69 51.0	+42.3	40.4	70 36.1	+43.7	42.2	71 19.8	+45.2	44.2	72 02.0	+46.7	46.4	72 42.5	+48.3	48.7	73 21.1	+49.9	51.2	73 57.6	+51.5	53.9	77
78	69 45.7	+39.4	36.6	70 33.3	+40.8	38.3	71 19.8	+42.2	40.1	72 05.0	+43.7	42.1	72 48.7	+45.4	44.3	73 30.8	+47.0	46.6	74 11.0	+48.7	49.2	74 49.1	+50.4	52.0	78
79	70 25.1	+37.6	34.4	71 14.1	+39.0	36.1	72 02.0	+40.5	37.9	72 48.7	+42.1	39.9	73 34.1	+43.7	42.0	74 17.8	+45.5	44.4	74 59.7	+47.3	47.0	75 39.5	+49.2	49.9	79
80	71 02.7	+35.7	32.0	71 53.1	+37.1•	33.7	72 42.5	+38.6•	35.4	73 30.8	+40.2•	37.4	74 17.8	+41.9	39.6	75 03.3	+43.7	41.9	75 47.0	+45.6	44.6	76 28.7	+47.6	47.5	80
81	71 38.4	+33.7•	29.5	72 30.2	+35.0•	31.1	73 21.1	+36.5•	32.8	74 11.0	+38.1•	34.7	74 59.7	+39.8•	36.9	75 47.0	+41.7•	39.2	76 32.6	+43.7•	41.9	77 16.3	+45.7•	44.8	81
82	72 12.1	+31.3•	26.9	73 05.2	+32.7•	28.3	73 57.6	+34.1•	30.0	74 49.1	+35.7•	31.8	75 39.5	+37.4•	33.9	76 28.7	+39.3•	36.2	77 16.3	+41.3•	38.8	78 02.0	+43.6•	41.8	82
83	72 43.4	+28.8•	24.0	73 37.9	+30.1•	25.4	74 31.7	+31.5•	27.0	75 24.8	+33.0•	28.7	76 16.9	+34.7•	30.7	77 08.0	+36.5•	32.9	77 57.6	+38.6•	35.4	78 45.6	+40.9•	38.4	83
84	73 12.2	+26.1•	21.0	74 08.0	+27.2•	22.3	75 03.2	+28.5•	23.7	75 57.8	+30.0•	25.3	76 51.6	+31.6•	27.2	77 44.5	+33.4•	29.3	78 36.3	+35.5•	31.7	79 26.5	+37.7•	34.5	84
85	73 38.3	+23.1•	17.9	74 35.2	+24.1•	19.0	75 31.7	+25.3•	20.3	76 27.8	+26.5•	21.7	77 23.2	+28.0•	23.3	78 17.9	+29.7•	25.2	79 11.7	+31.6•	27.5	80 04.2	+33.9•	30.1	85
86	74 01.4	+19.9•	14.6	74 59.3	+20.8•	15.5	75 57.0	+21.7•	16.6	76 54.3	+22.9•	17.8	77 51.2	+24.1•	19.2	78 47.6	+25.6•	20.9	79 43.3	+27.3•	22.8	80 38.1	+29.3•	25.2	86
87	74 21.3	+16.5•	11.1	75 20.1	+17.2•	11.8	76 18.7	+18.0•	12.7	77 17.2	+18.7•	13.7	78 15.3	+19.8•	14.8	79 13.2	+20.9•	16.1	80 10.6	+22.2•	17.7	81 07.4	+23.9•	19.7	87
88	74 37.8	+13.0•	7.5	75 37.3	+13.3•	8.0	76 36.7	+13.8•	8.6	77 35.9	+14.4•	9.3	78 35.1	+15.0•	10.1	79 34.1	+15.7•	11.0	80 32.8	+16.7•	12.2	81 31.3	+17.8•	13.6	88
89	74 50.8	+9.2•	3.8	75 50.6	+9.4•	4.1	76 50.5	+9.5•	4.4	77 50.3	+9.7•	4.7	78 50.1	+9.9•	5.1	79 49.8	+10.2•	5.6	80 49.5	+10.5•	6.2	81 49.1	+10.9•	7.0	89
90	75 00.0	+5.4•	0.0	76 00.0	+5.2•	0.0	77 00.0	+5.1•	0.0	78 00.0	+4.9•	0.0	79 00.0	+4.6•	0.0	80 00.0	+4.4•	0.0	81 00.0	+4.0•	0.0	82 00.0	+3.6•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 97°, 263°

84°, 276° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 33.0	+58.0	95.8	1 26.9	+58.3	95.8	1 20.8	+58.5	95.8	1 14.7	+58.7	95.9	1 08.6	+58.9	95.9	1 02.4	+59.1	95.9	0 56.2	+59.3	95.9	0 50.0	+59.4	95.9	0
1	2 31.0	+58.0	95.5	2 25.2	+58.2	95.6	2 19.3	+58.5	95.6	2 13.4	+58.7	95.7	2 07.5	+58.9	95.7	2 01.5	+59.1	95.7	1 55.5	+59.3	95.8	1 49.4	+59.5	95.8	1
2	3 29.0	+57.9	95.3	3 23.4	+58.2	95.3	3 17.8	+58.5	95.4	3 12.1	+58.7	95.5	3 06.4	+58.9	95.5	3 00.6	+59.1	95.6	2 54.8	+59.2	95.6	2 48.9	+59.4	95.7	2
3	4 26.9	+58.0	95.0	4 21.6	+58.3	95.1	4 16.3	+58.4	95.2	4 10.8	+58.7	95.2	4 05.3	+58.9	95.3	3 59.7	+59.1	95.4	3 54.0	+59.3	95.5	3 48.3	+59.4	95.5	3
4	5 24.9	+58.0	94.8	5 19.9	+58.2	94.9	5 14.7	+58.5	94.9	5 09.5	+58.7	95.0	5 04.2	+58.9	95.1	4 58.8	+59.1	95.2	4 53.3	+59.2	95.3	4 47.7	+59.4	95.4	4
5	6 22.9	+57.9	94.5	6 18.1	+58.2	94.6	6 13.2	+58.5	94.7	6 08.2	+58.7	94.8	6 03.1	+58.9	94.9	5 57.9	+59.1	95.0	5 52.5	+59.3	95.1	5 47.1	+59.4	95.2	5
6	7 20.8	+57.9	94.2	7 16.3	+58.2	94.4	7 11.7	+58.4	94.5	7 06.9	+58.7	94.6	7 02.0	+58.9	94.7	6 57.0	+59.0	94.9	6 51.8	+59.3	95.0	6 46.5	+59.4	95.1	6
7	8 18.7	+58.0	94.0	8 14.5	+58.2	94.1	8 10.1	+58.5	94.3	8 05.6	+58.6	94.4	8 00.9	+58.9	94.6	7 56.0	+59.1	94.7	7 51.1	+59.2	94.8	7 45.9	+59.5	95.0	7
8	9 16.7	+57.9	93.7	9 12.7	+58.2	93.9	9 08.6	+58.4	94.0	9 04.2	+58.7	94.2	8 59.8	+58.8	94.4	8 55.1	+59.1	94.5	8 50.3	+59.3	94.7	8 45.4	+59.4	94.8	8
9	10 14.6	+57.9	93.5	10 10.9	+58.2	93.6	10 07.0	+58.4	93.8	10 02.9	+58.7	94.0	9 58.6	+58.9	94.2	9 54.2	+59.1	94.3	9 49.6	+59.2	94.5	9 44.8	+59.4	94.7	9
10	11 12.5	+57.9	93.2	11 09.1	+58.1	93.4	11 05.4	+58.4	93.6	11 01.6	+58.6	93.8	10 57.5	+58.9	94.0	10 53.3	+59.0	94.2	10 48.8	+59.3	94.4	10 44.2	+59.4	94.5	10
11	12 10.4	+57.9	92.9	12 07.2	+58.2	93.1	12 03.8	+58.4	93.3	12 00.2	+58.7	93.6	11 56.4	+58.8	93.8	11 52.3	+59.1	94.0	11 48.1	+59.2	94.2	11 43.6	+59.4	94.4	11
12	13 08.3	+57.8	92.6	13 05.4	+58.1	92.9	13 02.2	+58.4	93.1	12 58.9	+58.6	93.3	12 55.2	+58.9	93.6	12 51.4	+59.0	93.8	12 47.3	+59.2	94.0	12 43.0	+59.3	94.3	12
13	14 06.1	+57.9	92.4	14 03.5	+58.1	92.6	14 00.6	+58.4	92.9	13 57.5	+58.6	93.1	13 54.1	+58.8	93.4	13 50.4	+59.1	93.6	13 46.5	+59.2	93.9	13 42.3	+59.4	94.1	13
14	15 04.0	+57.8	92.1	15 01.6	+58.1	92.4	14 59.0	+58.4	92.6	14 56.1	+58.6	92.9	14 52.9	+58.8	93.2	14 49.5	+59.0	93.4	14 45.7	+59.3	93.7	14 41.7	+59.4	94.0	14
15	16 01.8	+57.8	91.8	15 59.7	+58.1	92.1	15 57.4	+58.3	92.4	15 54.7	+58.6	92.7	15 51.7	+58.9	93.0	15 48.5	+59.0	93.2	15 45.0	+59.2	93.5	15 41.1	+59.4	93.8	15
16	16 59.6	+57.7	91.5	16 57.8	+58.1	91.8	16 55.7	+58.3	92.2	16 53.3	+58.6	92.5	16 50.6	+58.8	92.8	16 47.5	+59.0	93.1	16 44.2	+59.2	93.4	16 40.5	+59.4	93.7	16
17	17 57.3	+57.8	91.3	17 55.9	+58.0	91.6	17 54.0	+58.3	91.9	17 51.9	+58.5	92.2	17 49.4	+58.8	92.5	17 46.5	+59.0	92.9	17 43.4	+59.1	93.2	17 39.9	+59.3	93.5	17
18	18 55.1	+57.7	91.0	18 53.9	+58.0	91.3	18 52.3	+58.3	91.7	18 50.4	+58.6	92.0	18 48.2	+58.7	92.3	18 45.5	+59.0	92.7	18 42.5	+59.2	93.0	18 39.2	+59.4	93.4	18
19	19 52.8	+57.7	90.7	19 51.9	+58.0	91.0	19 50.6	+58.3	91.4	19 49.0	+58.5	91.8	19 46.9	+58.8	92.1	19 44.5	+59.0	92.5	19 41.7	+59.2	92.8	19 38.6	+59.3	93.2	19
20	20 50.5	+57.7	90.4	20 49.9	+58.0	90.8	20 48.9	+58.2	91.2	20 47.5	+58.5	91.5	20 45.7	+58.7	91.9	20 43.5	+59.0	92.3	20 40.9	+59.2	92.7	20 37.9	+59.3	93.0	20
21	21 48.2	+57.6	90.1	21 47.9	+57.9	90.5	21 47.1	+58.3	90.9	21 46.0	+58.5	91.3	21 44.4	+58.8	91.7	21 42.5	+58.9	92.1	21 40.1	+59.1	92.5	21 37.2	+59.4	92.9	21
22	22 45.8	+57.6	89.8	22 45.8	+57.9	90.2	22 45.4	+58.2	90.6	22 44.5	+58.4	91.1	22 43.2	+58.7	91.5	22 41.4	+58.9	91.9	22 39.2	+59.1	92.3	22 36.6	+59.3	92.7	22
23	23 43.4	+57.6	89.5	23 43.7	+57.9	89.9	23 43.6	+58.1	90.4	23 42.9	+58.5	90.8	23 41.9	+58.7	91.2	23 40.3	+58.9	91.7	23 38.3	+59.2	92.1	23 35.9	+59.3	92.6	23
24	24 41.0	+57.5	89.2	24 41.6	+57.8	89.6	24 41.7	+58.2	90.1	24 41.4	+58.4	90.6	24 40.6	+58.6	91.0	24 39.2	+58.9	91.5	24 37.5	+59.1	91.9	24 35.2	+59.3	92.4	24
25	25 38.5	+57.5	88.9	25 39.4	+57.8	89.3	25 39.9	+58.1	89.8	25 39.8	+58.4	90.3	25 39.2	+58.7	90.8	25 38.1	+58.9	91.3	25 36.6	+59.1	91.7	25 34.5	+59.3	92.2	25
26	26 36.0	+57.4	88.5	26 37.2	+57.8	89.0	26 38.0	+58.0	89.5	26 38.2	+58.3	90.0	26 37.9	+58.6	90.5	26 37.0	+58.9	91.1	26 35.7	+59.0	91.6	26 33.8	+59.2	92.1	26
27	27 33.4	+57.4	88.2	27 35.0	+57.7	88.7	27 36.0	+58.1	89.3	27 36.5	+58.4	89.8	27 36.5	+58.6	90.3	27 35.9	+58.8	90.8	27 34.7	+59.1	91.4	27 33.0	+59.3	91.9	27
28	28 30.8	+57.3	87.9	28 32.7	+57.7	88.4	28 34.1	+58.0	89.0	28 34.9	+58.3	89.5	28 35.1	+58.5	90.1	28 34.7	+58.8	90.6	28 33.8	+59.0	91.2	28 32.3	+59.2	91.7	28
29	29 28.1	+57.3	87.6	29 30.4	+57.6	88.1	29 32.1	+57.9	88.7	29 33.2	+58.2	89.3	29 33.6	+58.6	89.8	29 33.5	+58.8	90.4	29 32.8	+59.1	91.0	29 31.5	+59.3	91.5	29
30	30 25.4	+57.3	87.2	30 28.0	+57.6	87.8	30 30.0	+58.0	88.4	30 31.4	+58.3	89.0	30 32.2	+58.5	89.6	30 32.3	+58.8	90.2	30 31.9	+59.0	90.7	30 30.8	+59.2	91.3	30
31	31 22.7	+57.1	86.9	31 25.6	+57.6	87.5	31 28.0	+57.8	88.1	31 29.7	+58.1	88.7	31 30.7	+58.5	89.3	31 31.1	+58.7	89.9	31 30.9	+58.9	90.5	31 30.0	+59.2	91.1	31
32	32 19.8	+57.2	86.5	32 23.2	+57.5	87.1	32 25.8	+57.9	87.8	32 27.8	+58.2	88.4	32 29.2	+58.4	89.0	32 29.8	+58.8	89.7	32 29.8	+59.0	90.3	32 29.2	+59.2	91.0	32
33	33 17.0	+57.0	86.1	33 20.7	+57.4	86.8	33 23.7	+57.7	87.5	33 26.0	+58.1	88.1	33 27.6	+58.4	88.8	33 28.6	+58.6	89.4	33 28.8	+58.9	90.1	33 28.4	+59.1	90.8	33
34	34 14.0	+57.0	85.8	34 18.1	+57.4	86.4	34 21.4	+57.8	87.1	34 24.1	+58.1	87.8	34 26.0	+58.4	88.5	34 27.2	+58.7	89.2	34 27.7	+59.0	89.9	34 27.5	+59.2	90.6	34
35	35 11.0	+56.9	85.4	35 15.5	+57.3	86.1	35 19.2	+57.6	86.8	35 22.2	+58.0	87.5	35 24.4	+58.3	88.2	35 25.9	+58.6	88.9	35 26.7	+58.8	89.6	35 26.7	+59.1	90.3	35
36	36 07.9	+56.8	85.0	36 12.8	+57.2	85.7	36 16.8	+57.7	86.5	36 20.2	+57.9	87.2	36 22.7	+58.3	87.9	36 24.5	+58.6	88.7	36 25.5	+58.9	89.4	36 25.8	+59.1	90.1	36
37	37 04.7	+56.8	84.6	37 10.0	+57.2	85.4	37 14.5	+57.5	86.1	37 18.1	+57.9	86.9	37 21.0	+58.3	87.6	37 23.1	+58.5	88.4	37 24.4	+58.8	89.2	37 24.9	+59.0	89.9	37
38	38 01.5	+56.6	84.2	38 07.2	+57.0	85.0	38 12.0	+57.5	85.8	38 16.0	+57.9	86.5	38 19.3	+58.2	87.3	38 21.6	+58.6	88.1	38 23.2	+58.8	88.9	38 23.9	+59.1	89.7	38
39	38 58.1	+56.6	83.8	39 04.2	+57.0	84.6	39 09.5	+57.4	85.4	39 13.9	+57.8	86.2	39 17.5	+58.1	87.0	39 20.2	+58.4	87.8	39 22.0	+58.8	88.7	39 23.0	+59.0	89.5	39
40	39 54.7	+56.5	83.3	40 01.2	+57.0	84.2	40 06.9	+57.3	85.0	40 11.7	+57.7	85.8	40 15.6	+58.1	86.7	40 18.6	+58.4	87.5	40 20.8	+58.7	88.4	40 22.0	+59.0	89.2	40
41	40 51.2	+56.4	82.9	40 58.2	+56.8	83.8	41 04.2	+57.3	84.6	41 09.4	+57.7	85.5	41 13.7	+58.0	86.4	41 17.0	+58.4	87.2	41 19.5	+58.6	88.1	41 21.0	+58.9	89.0	41
42	41 47.6	+56.2	82.4	41 55.0	+56.7	83.3	42 01.5	+57.2	84.2	42 07.1	+57.6	85.1	42 11.7	+58.0	86.0	42 15.4	+58.3	86.9	42 18.1	+58.7	87.8	42 19.9	+59.0	88.7	42
43	42 43.8	+56.1	82.0	42 51.7	+56.6	82.9	42 58.7	+57.1	83.8	43 04.7	+57.5	84.7	43 09.7	+57.9	85.7	43 13.7	+58.3	86.6	43 16.8	+58.6	87.5	43 18.9	+58.8	88.5	43
44	43 39.9	+56.1	81.5	43 48.3	+56.6	82.4	43 55.8	+56.9	83.4	44 02.2	+57.4	84.3	44 07.6	+57.8	85.3	44 12.0	+58.2	86.3	44 15.4	+58.5	87.2	44 17.7	+58.9	88.2	44
45	44 36.0	+55.8	81.0	44 44.9	+56.3	82.0	44 52.7	+56.9	82.9	44 59.6	+57.3	83.9	45 05.4	+57.8	84.9	45 10.2	+58.1	85.9	45 13.9	+58.5	86.9	45 16.6	+58.8	87.9	45
46	45 31.8	+55.8	80.5	45 41.2	+56.3	81.5	45 49.6	+56.8	82.5	45 56.9	+57.3	83.5	46 03.2	+57.6	84.5	46 08.3	+58.1	85.6	46 12.4	+58.4	86.6	46 15.4	+58.8	87.7	46
47	46 27.6	+55.5	79.9	46 37.5	+56.1	81.0	46 46.4	+56.6	82.0	46 54.2	+57.1	83.1	47 00.8	+57.6	84.1	47 06.4	+58.0	85.2	47 10.8	+58.4	86.3	47 14.2	+58.7	87.4	47
48	47 23.1	+55.4	79.4	47 33.6	+56.0	80.5	47 43.0	+56.5	81.5	47 51.3	+57.0	82.6	47 58.4	+57.5	83.7	48 04.4	+57.9	84.8	48 09.2	+58.3	85.9	48 12.9	+58.6	87.1	48
49	48 18.5	+55.3	78.8	48 29.6	+55.8	79.9	48 39.5	+56.4	81.0	48 48.3	+56.9	82.2	48 55.9	+57.4	83.3	49 02.3	+57.9	84.4	49 07.5	+58.3	85.6	49 11.5	+58.7	86.7	49
50	49 13.8	+55.0	78.2	49 25.4	+55.7	79.4	49 35.9	+56.3	80.5	49 45.2	+56.8	81.7	49 53.3	+57.3	82.8	50 00.2	+57.7	84.0	50 05.8	+58.2	85.2	50 10.2	+58.5	86.4	50
51	50 08.8	+54.9	77.6	50 21.1	+55.5	78.8	50 32.2	+56.0	80.0	50 42.0	+56.6	81.2	50 50.6	+57.2	82.4	50 57.9	+57.7	83.6	51 04.0	+58.0	84.8	51 08.7	+58.5	86.1	51
52	51 03.7	+54.6	77.0	51 16.6	+55.3	78.2	51 28.2	+56.0	79.4	51 38.6	+56.5	80.6	51 47.8	+57.0	81.9	51 55.6	+57.5	83.2	52 02.0	+58.0	84.4	52 07.2	+58.4	85.7	52
53	51 58.3	+54.4	76.3	52 11.9	+55.0	77.5	52 24.2	+55.7	78.8	52 35.1	+56.4	80.1	52 44.8	+56.9	81.4	52 53.1	+57.4	82.7	53 00.0	+58.0	84.0	53 05.6	+58.4	85.3	53
54	52 52.7	+54.1	75.6	53 06.9	+54.9	76.9	53 19.9	+55.5	78.2	53 31.5	+56.1	79.5	53 41.7	+56.8	80.9	53 50.5	+57.3	82.2	53 58.0	+57.8	83.6	54 04.0	+58.2	84.9	54
55	53 46.8	+53.9	74.9	54 01.8	+54.6	76.2	54 15.4	+55.3	77.6	54 27.6	+56.0	78.9	54 38.5	+56.6	80.3	54 47.8	+57.2	81.7	54 55.8	+57.7	83.1	55 02.2	+58.2	84.5	55
56	54 40.7	+53.6	74.1	54 56.4	+54.4	75.5	55 10.7	+55.1	76.9	55 23.6	+55.8	78.3	55 35.1	+56.4	79.7	55 45.0	+57.0	81.2	55 53.5	+57.6	82.6	56 00.4	+58.1	84.1	56
57	55 34.3	+53.2	73.3	55 50.8	+54.0	74.8	56 05.8	+54.8	76.2	56 19.4	+55.6	77.6	56 31.5	+56.2	79.1	56 42.0	+56.9	80.6	56 51.1	+57.4	82.1	56 58.5	+58.0	83.6	57
58	56 27.5	+52.9	72.5	56 44.8	+53.8	74.0	57 00.6	+54.6	75.4	57 15.0	+55.3	77.0	57 27.7	+56.1	78.5	57 38.9	+56.7	80.0	57 48.5	+57.3	81.6	57 56.5	+57.8	83.2	58
59	57 20.4	+52.6	71.7	57 38.6	+53.4	73.2	57 55.2	+54.3	74.7	58 10.3	+55.0	76.2	58 23.8	+55.8	77.8	58 35.6	+56.5	79.4	58 45.8	+57.2	81.0	58 54.3	+57.8	82.7	59
60	58 13.0	+52.1	70.7	58 32.0	+53.1	72.3	58 49.5	+53.9	73.9	59 05.3	+54.8	75.5	59 19.6	+55.5	77.1	59 32.1	+56.3	78.7	59 43.0	+57.0	80.4	59 52.1	+57.6	82.1	60
61	59 05.1	+51.7	69.8	59 25.1	+52.6	71.4	59 43.4	+53.6	73.0	60 00.1	+54.5	74.7	60 15.1	+55.3	76.3	60 28.4	+56.1	78.1	60 40.0	+56.8	79.8	60 49.7	+57.4	81.6	61
62	59 56.8	+51.2	68.8	60 17.7	+52.3	70.4	60 37.0	+53.2	72.1	60 54.6	+54.1	73.8	61 10.4	+55.1	75.6	61 24.5	+55.8	77.3	61 36.8	+56.5	79.1	61 47.1	+57.3	81.0	62
63	60 48.0	+50.7	67.7	61 10.0	+51.7	69.4	61 30.2	+52.8	71.1	61 48.7	+53.8	72.9	62 05.5	+54.6	74.7	62 20.3	+55.6	76.5	62 33.3	+56.4	78.4	62 44.4	+57.1	80.3	63
64	61 38.7	+50.2	66.6	62 01.7	+51.2	68.4	62 23.0	+52.3	70.1	62 42.5	+53.3	72.0	63 00.1	+54.4	73.8	63 15.9	+55.2	75.7	63 29.7	+56.1	77.7	63 41.5	+56.9	79.6	64
65	62 28.9	+49.5	65.5	62 52.9	+50.7	67.2	63 15.3	+51.8	69.1	63 35.8	+52.9	70.9	63 54.5	+53.9	72.9	64 11.1	+54.9	74.8	64 25.8	+55.8	76.9	64 38.4	+56.7	78.9	65
66	63 18.4	+48.8	64.2	63 43.6	+50.1	66.0	64 07.1	+51.2	67.9	64 28.7	+52.4	69.9	64 48.4	+53.5	71.9	65 06.0	+54.6	73.9	65 21.6	+55.5	76.0	65 35.1	+56.4	78.1	66
67	64 07.2	+48.1	62.9	64 33.7	+49.3	64.8	64 58.3	+50.6	66.7	65 21.1	+51.8	68.7	65 41.9	+52.9	70.8	66 00.6	+54.1	72.9	66 17.1	+55.2	75.1	66 31.5	+56.1	77.3	67
68	64 55.3	+47.2	61.5	65 23.0	+48.6	63.4	65 48.9	+49.9	65.4	66 12.9	+51.2	67.5	66 34.8	+52.5	69.6	66 54.7	+53.6	71.8	67 12.3	+54.7	74.1	67 27.6	+55.8	76.4	68
69	65 42.5	+46.3	60.0	66 11.6	+47.7	62.0	66 38.8	+49.1	64.0	67 04.1	+50.5	66.2	67 27.3	+51.8	68.4	67 48.3	+53.1	70.6	68 07.0	+54.3	73.0	68 23.4	+55.4	75.4	69
70	66 28.8	+45.4	58.5	66 59.3	+46.8	60.5	67 27.9	+48.3	62.6	67 54.6	+49.7	64.8	68 19.1	+51.1	67.0	68 41.4	+52.4	69.4	69 01.3	+53.8	71.8	69 18.8	+54.9	74.3	70
71	67 14.2	+44.2	56.8	67 46.1	+45.8	58.8	68 16.2	+47.3	61.0	68 44.3	+48.8	63.2	69 10.2	+50.3	65.6	69 33.8	+51.8	68.0	69 55.1	+53.2	70.6	70 13.7	+54.5	73.2	71
72	67 58.4	+43.0	55.0	68 31.9	+44.6	57.1	69 03.5	+46.3	59.3	69 33.1	+47.9	61.6	70 00.5	+49.5	64.0	70 25.6	+51.0	66.5	70 48.3	+52.5	69.2	71 08.2	+54.0	71.9	72
73	68 41.4	+41.7	53.1	69 16.5	+43.4	55.3	69 49.8	+45.0	57.5	70 21.0	+46.7	59.8	70 50.0	+48.4	62.3	71 16.6	+50.1	64.9	71 40.8	+51.7	67.7	72 02.2	+53.2	70.5	73
74	69 23.1	+40.1	51.1	69 59.9	+41.9	53.3	70 34.8	+43.7	55.5	71 07.7	+45.5	57.9	71 38.4	+47.3	60.5	72 06.7	+49.1	63.2	72 32.5	+50.8	66.0	72 55.4	+52.6	69.0	74
75	70 03.2	+38.6	49.0	70 41.8	+40.3	51.1	71 18.5	+42.2	53.4	71 53.2	+44.1	55.9	72 25.7	+46.0	58.5	72 55.8	+47.9	61.3	73 23.3	+49.8	64.2	73 48.0	+51.6	67.3	75
76	70 41.8	+36.7	46.7	71 22.1	+38.6	48.9	72 00.7	+40.4	51.2	72 37.3	+42.4	53.7	73 11.7	+44.5	56.3	73 43.7	+46.6	59.2	74 13.1	+48.6	62.2	74 39.6	+50.6	65.4	76
77	71 18.5	+34.7•	44.3	72 00.7	+36.6•	46.4	72 41.1	+38.6	48.7	73 19.7	+40.7	51.2	73 56.2	+42.8	54.0	74 30.3	+44.9	56.9	75 01.7	+47.1	60.0	75 30.2	+49.3	63.3	77
78	71 53.2	+32.5•	41.7	72 37.3	+34.4•	43.8	73 19.7	+36.5•	46.1	74 00.4	+38.6•	48.6	74 39.0	+40.8•	51.4	75 15.2	+43.1	54.3	75 48.8	+45.5	57.5	76 19.5	+47.9	61.0	78
79	72 25.7	+30.1•	38.9	73 11.7	+32.0•	41.0	73 56.2	+34.1•	43.3	74 39.0	+36.2•	45.8	75 19.8	+38.5•	48.5	75 58.3	+41.0•	51.5	76 34.3	+43.5•	54.8	77 07.4	+46.1•	58.4	79
80	72 55.8	+27.5•	36.0	73 43.7	+29.4•	38.1	74 30.3	+31.4•	40.3	75 15.2	+33.6•	42.7	75 58.3	+36.0•	45.4	76 39.3	+38.5•	48.4	77 17.8	+41.2•	51.8	77 53.5	+43.9•	55.4	80
81	73 23.3	+24.7•	33.0	74 13.1	+26.5•	34.9	75 01.7	+28.5•	37.0	75 48.8	+30.7•	39.4	76 34.3	+33.1•	42.1	77 17.8	+35.7•	45.0	77 59.0	+38.4•	48.4	78 37.4	+41.4•	52.1	81
82	73 48.0	+21.5•	29.7	74 39.6	+23.3•	31.5	75 30.2	+25.2•	33.6	76 19.5	+27.4•	35.8	77 07.4	+29.7•	38.4	77 53.5	+32.3•	41.3	78 37.4	+35.2•	44.6	79 18.8	+38.3•	48.3	82
83	74 09.5	+18.3•	26.4	75 02.9	+19.9•	28.0	75 55.4	+21.7•	29.9	76 46.9	+23.7•	32.0	77 37.1	+26.0•	34.4	78 25.8	+28.5•	37.2	79 12.6	+31.4•	40.3	79 57.1	+34.5•	44.0	83
84	74 27.8	+14.9•	22.8	75 22.8	+16.3•	24.3	76 17.1	+17.9•	26.0	77 10.6	+19.8•	27.9	78 03.1	+21.8•	30.1	78 54.3	+24.2•	32.7	79 44.0	+26.9•	35.7	80 31.6	+30.1•	39.2	84
85	74 42.7	+11.1•	19.2	75 39.1	+12.4•	20.5	76 35.0	+13.9•	21.9	77 30.4	+15.4•	23.6	78 24.9	+17.3•	25.6	79 18.5	+19.5•	27.9	80 10.9	+22.0•	30.6	81 01.7	+24.9•	33.8	85
86	74 53.8	+7.4•	15.4	75 51.5	+8.4•	16.5	76 48.9	+9.5•	17.7	77 45.8	+10.8•	19.1	78 42.2	+12.4•	20.7	79 38.0	+14.1•	22.7	80 32.9	+16.3•	25.0	81 26.6	+18.9•	27.8	86
87	75 01.2	+3.5•	11.6	75 59.9	+4.3•	12.4	76 58.4	+5.1•	13.4	77 56.6	+6.1•	14.4	78 54.6	+7.2•	15.7	79 52.1	+8.6•	17.2	80 49.2	+10.1•	19.0	81 45.5	+12.1•	21.3	87
88	75 04.7	−0.4•	7.7	76 04.2	0.0•	8.3	77 03.5	+0.5•	8.9	78 02.7	+1.1•	9.6	79 01.8	+1.8•	10.5	80 00.7	+2.6•	11.5	80 59.3	+3.7•	12.8	81 57.6	+5.0•	14.4	88
89	75 04.3	−4.3•	3.9	76 04.2	−4.2•	4.1	77 04.0	−4.0•	4.4	78 03.8	−3.8•	4.8	79 03.6	−3.6•	5.2	80 03.3	−3.3•	5.8	81 03.0	−3.0•	6.4	82 02.6	−2.6•	7.2	89
90	75 00.0	−8.2•	0.0	76 00.0	−8.3•	0.0	77 00.0	−8.5•	0.0	78 00.0	−8.7•	0.0	79 00.0	−8.9•	0.0	80 00.0	−9.2•	0.0	81 00.0	−9.5•	0.0	82 00.0	−9.9•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 84°, 276°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 33.0	–58.0	95.8	1 26.9	–58.2	95.8	1 20.8	–58.4	95.8	1 14.7	–58.7	95.9	1 08.6	–58.9	95.9	1 02.4	–59.1	95.9	0 56.2	–59.3	95.9	0 50.0	–59.4	95.9	0
1	0 35.0	–57.9	96.1	0 28.7	–58.2	96.1	0 22.4	–58.5	96.1	0 16.0	–58.7	96.1	0 09.7	–58.9	96.1	0 03.3	–59.1	96.1	0 03.1	+59.2	83.9	0 09.4	+59.4	83.9	1
2	0 22.9	+58.0	83.7	0 29.5	+58.3	83.7	0 36.1	+58.5	83.7	0 42.7	+58.7	83.7	0 49.2	+59.0	83.7	0 55.8	+59.1	83.7	1 02.3	+59.3	83.8	1 08.8	+59.5	83.8	2
3	1 20.9	+58.0	83.4	1 27.8	+58.2	83.5	1 34.6	+58.5	83.5	1 41.4	+58.7	83.5	1 48.2	+58.9	83.5	1 54.9	+59.1	83.6	2 01.6	+59.3	83.6	2 08.3	+59.4	83.6	3
4	2 18.9	+58.0	83.2	2 26.0	+58.2	83.2	2 33.1	+58.4	83.3	2 40.1	+58.7	83.3	2 47.1	+58.9	83.3	2 54.0	+59.1	83.4	3 00.9	+59.2	83.5	3 07.7	+59.4	83.5	4
5	3 16.9	+57.9	82.9	3 24.2	+58.3	83.0	3 31.5	+58.5	83.0	3 38.8	+58.7	83.1	3 46.0	+58.9	83.2	3 53.1	+59.1	83.2	4 00.1	+59.3	83.3	4 07.1	+59.4	83.4	5
6	4 14.8	+58.0	82.7	4 22.5	+58.2	82.7	4 30.0	+58.5	82.8	4 37.5	+58.7	82.9	4 44.9	+58.9	83.0	4 52.2	+59.1	83.1	4 59.4	+59.3	83.1	5 06.5	+59.4	83.2	6
7	5 12.8	+58.0	82.4	5 20.7	+58.2	82.5	5 28.5	+58.4	82.6	5 36.2	+58.7	82.7	5 43.8	+58.9	82.8	5 51.3	+59.1	82.9	5 58.7	+59.2	83.0	6 05.9	+59.4	83.1	7
8	6 10.8	+57.9	82.1	6 18.9	+58.2	82.2	6 26.9	+58.5	82.4	6 34.9	+58.7	82.5	6 42.7	+58.9	82.6	6 50.4	+59.0	82.7	6 57.9	+59.3	82.8	7 05.3	+59.5	82.9	8
9	7 08.7	+57.9	81.9	7 17.1	+58.2	82.0	7 25.4	+58.5	82.1	7 33.6	+58.6	82.3	7 41.6	+58.9	82.4	7 49.4	+59.1	82.5	7 57.2	+59.2	82.7	8 04.8	+59.4	82.8	9
10	8 06.6	+58.0	81.6	8 15.3	+58.2	81.8	8 23.9	+58.4	81.9	8 32.2	+58.7	82.0	8 40.5	+58.8	82.2	8 48.5	+59.1	82.4	8 56.4	+59.3	82.5	9 04.2	+59.4	82.7	10
11	9 04.6	+57.9	81.4	9 13.5	+58.2	81.5	9 22.3	+58.4	81.7	9 30.9	+58.7	81.8	9 39.3	+58.9	82.0	9 47.6	+59.1	82.2	9 55.7	+59.2	82.3	10 03.6	+59.4	82.5	11
12	10 02.5	+57.9	81.1	10 11.7	+58.2	81.3	10 20.7	+58.5	81.4	10 29.6	+58.6	81.6	10 38.2	+58.9	81.8	10 46.7	+59.0	82.0	10 54.9	+59.3	82.2	11 03.0	+59.4	82.4	12
13	11 00.4	+57.9	80.8	11 09.9	+58.1	81.0	11 19.2	+58.4	81.2	11 28.2	+58.7	81.4	11 37.1	+58.8	81.6	11 45.7	+59.1	81.8	11 54.2	+59.2	82.0	12 02.4	+59.4	82.2	13
14	11 58.3	+57.9	80.6	12 08.0	+58.2	80.8	12 17.6	+58.4	81.0	12 26.9	+58.6	81.2	12 35.9	+58.9	81.4	12 44.8	+59.0	81.6	12 53.4	+59.2	81.9	13 01.8	+59.4	82.1	14
15	12 56.2	+57.8	80.3	13 06.2	+58.1	80.5	13 16.0	+58.3	80.7	13 25.5	+58.6	81.0	13 34.8	+58.8	81.2	13 43.8	+59.1	81.5	13 52.6	+59.2	81.7	14 01.2	+59.3	81.9	15
16	13 54.0	+57.9	80.0	14 04.3	+58.1	80.3	14 14.3	+58.4	80.5	14 24.1	+58.6	80.8	14 33.6	+58.9	81.0	14 42.9	+59.0	81.3	14 51.8	+59.3	81.5	15 00.5	+59.4	81.8	16
17	14 51.9	+57.8	79.7	15 02.4	+58.1	80.0	15 12.7	+58.4	80.3	15 22.7	+58.6	80.5	15 32.5	+58.8	80.8	15 41.9	+59.0	81.1	15 51.1	+59.2	81.4	15 59.9	+59.4	81.6	17
18	15 49.7	+57.8	79.5	16 00.5	+58.1	79.7	16 11.1	+58.3	80.0	16 21.3	+58.6	80.3	16 31.3	+58.8	80.6	16 40.9	+59.0	80.9	16 50.3	+59.2	81.2	16 59.3	+59.4	81.5	18
19	16 47.5	+57.8	79.2	16 58.6	+58.1	79.5	17 09.4	+58.3	79.8	17 19.9	+58.6	80.1	17 30.1	+58.8	80.4	17 39.9	+59.0	80.7	17 49.5	+59.1	81.0	17 58.7	+59.3	81.3	19
20	17 45.3	+57.7	78.9	17 56.7	+58.0	79.2	18 07.7	+58.3	79.5	18 18.5	+58.5	79.9	18 28.9	+58.8	80.2	18 38.9	+59.0	80.5	18 48.6	+59.2	80.9	18 58.0	+59.4	81.2	20
21	18 43.0	+57.8	78.6	18 54.7	+58.0	78.9	19 06.0	+58.3	79.3	19 17.0	+58.6	79.6	19 27.7	+58.7	80.0	19 37.9	+59.0	80.3	19 47.8	+59.2	80.7	19 57.4	+59.3	81.0	21
22	19 40.8	+57.7	78.3	19 52.7	+58.0	78.7	20 04.3	+58.3	79.0	20 15.6	+58.5	79.4	20 26.4	+58.8	79.8	20 36.9	+59.0	80.1	20 47.0	+59.2	80.5	20 56.7	+59.3	80.9	22
23	20 38.5	+57.6	78.0	20 50.7	+58.0	78.4	21 02.6	+58.2	78.8	21 14.1	+58.5	79.2	21 25.2	+58.7	79.5	21 35.9	+58.9	79.9	21 46.2	+59.1	80.3	21 56.0	+59.4	80.7	23
24	21 36.1	+57.7	77.7	21 48.7	+57.9	78.1	22 00.8	+58.2	78.5	22 12.6	+58.4	78.9	22 23.9	+58.7	79.3	22 34.8	+58.9	79.7	22 45.3	+59.1	80.1	22 55.4	+59.3	80.6	24
25	22 33.8	+57.6	77.4	22 46.6	+57.9	77.8	22 59.0	+58.2	78.3	23 11.0	+58.5	78.7	23 22.6	+58.7	79.1	23 33.7	+59.0	79.5	23 44.4	+59.2	80.0	23 54.7	+59.3	80.4	25
26	23 31.4	+57.6	77.1	23 44.5	+57.9	77.6	23 57.2	+58.2	78.0	24 09.5	+58.4	78.4	24 21.3	+58.7	78.9	24 32.7	+58.9	79.3	24 43.6	+59.1	79.8	24 54.0	+59.3	80.2	26
27	24 29.0	+57.5	76.8	24 42.4	+57.8	77.3	24 55.4	+58.1	77.7	25 07.9	+58.4	78.2	25 20.0	+58.6	78.6	25 31.6	+58.8	79.1	25 42.7	+59.0	79.6	25 53.3	+59.2	80.1	27
28	25 26.5	+57.5	76.5	25 40.2	+57.8	77.0	25 53.5	+58.1	77.4	26 06.3	+58.4	77.9	26 18.6	+58.7	78.4	26 30.4	+58.9	78.9	26 41.7	+59.1	79.4	26 52.5	+59.3	79.9	28
29	26 24.0	+57.4	76.2	26 38.0	+57.8	76.7	26 51.6	+58.1	77.2	27 04.7	+58.3	77.7	27 17.3	+58.6	78.2	27 29.3	+58.8	78.7	27 40.8	+59.1	79.2	27 51.8	+59.3	79.7	29
30	27 21.4	+57.4	75.9	27 35.8	+57.7	76.4	27 49.7	+58.0	76.9	28 03.0	+58.4	77.4	28 15.9	+58.5	77.9	28 28.1	+58.9	78.5	28 39.9	+59.0	79.0	28 51.1	+59.2	79.5	30
31	28 18.8	+57.4	75.5	28 33.5	+57.7	76.1	28 47.7	+58.0	76.6	29 01.4	+58.2	77.1	29 14.4	+58.6	77.7	29 27.0	+58.8	78.2	29 38.9	+59.0	78.8	29 50.3	+59.2	79.3	31
32	29 16.2	+57.3	75.2	29 31.2	+57.7	75.7	29 45.7	+58.0	76.3	29 59.6	+58.3	76.9	30 13.0	+58.5	77.4	30 25.8	+58.7	78.0	30 37.9	+59.0	78.6	30 49.5	+59.2	79.2	32
33	30 13.5	+57.2	74.9	30 28.9	+57.6	75.4	30 43.7	+57.9	76.0	30 57.9	+58.2	76.6	31 11.5	+58.5	77.2	31 24.5	+58.8	77.8	31 36.9	+59.0	78.4	31 48.7	+59.2	79.0	33
34	31 10.7	+57.2	74.5	31 26.5	+57.5	75.1	31 41.6	+57.8	75.7	31 56.1	+58.2	76.3	32 10.0	+58.5	76.9	32 23.3	+58.7	77.5	32 35.9	+59.0	78.1	32 47.9	+59.2	78.8	34
35	32 07.9	+57.1	74.2	32 24.0	+57.5	74.8	32 39.4	+57.9	75.4	32 54.3	+58.1	76.0	33 08.5	+58.4	76.6	33 22.0	+58.7	77.3	33 34.9	+58.9	77.9	33 47.1	+59.2	78.6	35
36	33 05.0	+57.1	73.8	33 21.5	+57.4	74.4	33 37.3	+57.7	75.1	33 52.4	+58.1	75.7	34 06.9	+58.4	76.4	34 20.7	+58.6	77.0	34 33.8	+58.9	77.7	34 46.3	+59.1	78.4	36
37	34 02.1	+57.0	73.4	34 18.9	+57.4	74.1	34 35.0	+57.7	74.7	34 50.5	+58.0	75.4	35 05.3	+58.3	76.1	35 19.3	+58.7	76.8	35 32.7	+58.9	77.5	35 45.4	+59.1	78.2	37
38	34 59.1	+56.9	73.0	35 16.3	+57.3	73.7	35 32.7	+57.7	74.4	35 48.5	+58.0	75.1	36 03.6	+58.3	75.8	36 18.0	+58.6	76.5	36 31.6	+58.8	77.2	36 44.5	+59.1	78.0	38
39	35 56.0	+56.9	72.7	36 13.6	+57.2	73.4	36 30.4	+57.6	74.1	36 46.5	+58.0	74.8	37 01.9	+58.3	75.5	37 16.6	+58.5	76.2	37 30.4	+58.9	77.0	37 43.6	+59.0	77.7	39
40	36 52.9	+56.8	72.3	37 10.8	+57.2	73.0	37 28.0	+57.5	73.7	37 44.5	+57.8	74.5	38 00.2	+58.2	75.2	38 15.1	+58.5	76.0	38 29.3	+58.8	76.7	38 42.6	+59.1	77.5	40
41	37 49.7	+56.6	71.9	38 08.0	+57.1	72.6	38 25.5	+57.5	73.4	38 42.3	+57.9	74.1	38 58.4	+58.1	74.9	39 13.6	+58.5	75.7	39 28.1	+58.7	76.5	39 41.7	+59.0	77.3	41
42	38 46.3	+56.6	71.4	39 05.1	+57.0	72.2	39 23.0	+57.4	73.0	39 40.2	+57.7	73.8	39 56.5	+58.1	74.6	40 12.1	+58.4	75.4	40 26.8	+58.7	76.2	40 40.7	+59.0	77.0	42
43	39 42.9	+56.5	71.0	40 02.1	+56.9	71.8	40 20.4	+57.3	72.6	40 37.9	+57.7	73.4	40 54.6	+58.1	74.2	41 10.5	+58.4	75.1	41 25.5	+58.7	75.9	41 39.7	+58.9	76.8	43
44	40 39.4	+56.4	70.6	40 59.0	+56.8	71.4	41 17.7	+57.3	72.2	41 35.6	+57.7	73.1	41 52.7	+58.0	73.9	42 08.9	+58.3	74.8	42 24.2	+58.6	75.7	42 38.6	+58.9	76.5	44
45	41 35.8	+56.3	70.1	41 55.8	+56.7	71.0	42 15.0	+57.1	71.8	42 33.3	+57.5	72.7	42 50.7	+57.9	73.6	43 07.2	+58.3	74.5	43 22.8	+58.6	75.4	43 37.5	+58.9	76.3	45
46	42 32.1	+56.1	69.6	42 52.5	+56.6	70.5	43 12.1	+57.1	71.4	43 30.8	+57.5	72.3	43 48.6	+57.9	73.2	44 05.5	+58.2	74.1	44 21.4	+58.5	75.1	44 36.4	+58.8	76.0	46
47	43 28.2	+56.1	69.2	43 49.1	+56.6	70.1	44 09.2	+56.9	71.0	44 28.3	+57.4	71.9	44 46.5	+57.7	72.8	45 03.7	+58.1	73.8	45 19.9	+58.5	74.8	45 35.2	+58.8	75.7	47
48	44 24.3	+55.9	68.7	44 45.7	+56.3	69.6	45 06.1	+56.9	70.5	45 25.7	+57.2	71.5	45 44.2	+57.7	72.5	46 01.8	+58.1	73.4	46 18.4	+58.5	74.4	46 34.0	+58.8	75.5	48
49	45 20.2	+55.7	68.2	45 42.0	+56.3	69.1	46 03.0	+56.7	70.1	46 22.9	+57.2	71.1	46 41.9	+57.6	72.1	46 59.9	+58.0	73.1	47 16.9	+58.3	74.1	47 32.8	+58.7	75.2	49
50	46 15.9	+55.6	67.6	46 38.3	+56.1	68.6	46 59.7	+56.6	69.6	47 20.1	+57.1	70.6	47 39.5	+57.6	71.6	47 57.9	+57.9	72.7	48 15.2	+58.3	73.8	48 31.5	+58.6	74.8	50
51	47 11.5	+55.5	67.1	47 34.4	+56.0	68.1	47 56.3	+56.5	69.1	48 17.2	+57.0	70.2	48 37.1	+57.4	71.2	48 55.8	+57.9	72.3	49 13.5	+58.3	73.4	49 30.1	+58.6	74.5	51
52	48 07.0	+55.3	66.5	48 30.4	+55.8	67.5	48 52.8	+56.4	68.6	49 14.2	+56.8	69.7	49 34.5	+57.3	70.8	49 53.7	+57.8	71.9	50 11.8	+58.1	73.0	50 28.7	+58.5	74.2	52
53	49 02.3	+55.0	65.9	49 26.2	+55.7	67.0	49 49.2	+56.2	68.1	50 11.0	+56.8	69.2	50 31.8	+57.2	70.3	50 51.5	+57.6	71.5	51 09.9	+58.1	72.6	51 27.2	+58.5	73.8	53
54	49 57.3	+54.9	65.3	50 21.9	+55.5	66.4	50 45.4	+56.0	67.5	51 07.8	+56.5	68.7	51 29.0	+57.1	69.8	51 49.1	+57.6	71.0	52 08.0	+58.0	72.2	52 25.7	+58.4	73.5	54
55	50 52.2	+54.7	64.7	51 17.4	+55.3	65.8	51 41.4	+55.9	67.0	52 04.3	+56.5	68.1	52 26.1	+57.0	69.3	52 46.7	+57.4	70.6	53 06.0	+57.9	71.8	53 24.1	+58.3	73.1	55
56	51 46.9	+54.5	64.0	52 12.7	+55.0	65.2	52 37.3	+55.7	66.4	53 00.8	+56.2	67.6	53 23.1	+56.8	68.8	53 44.1	+57.3	70.1	54 03.9	+57.8	71.4	54 22.4	+58.3	72.7	56
57	52 41.4	+54.1	63.3	53 07.7	+54.9	64.5	53 33.0	+55.4	65.7	53 57.0	+56.1	67.0	54 19.9	+56.6	68.3	54 41.4	+57.2	69.6	55 01.7	+57.7	70.9	55 20.7	+58.1	72.3	57
58	53 35.5	+54.0	62.6	54 02.6	+54.6	63.8	54 28.4	+55.3	65.1	54 53.1	+55.9	66.4	55 16.5	+56.5	67.7	55 38.6	+57.1	69.0	55 59.4	+57.6	70.4	56 18.8	+58.1	71.8	58
59	54 29.5	+53.6	61.9	54 57.2	+54.3	63.1	55 23.7	+55.0	64.4	55 49.0	+55.7	65.7	56 13.0	+56.3	67.1	56 35.7	+56.9	68.5	56 57.0	+57.4	69.9	57 16.9	+57.9	71.4	59
60	55 23.1	+53.3	61.1	55 51.5	+54.1	62.4	56 18.7	+54.8	63.7	56 44.7	+55.4	65.1	57 09.3	+56.1	66.5	57 32.6	+56.7	67.9	57 54.4	+57.3	69.4	58 14.8	+57.8	70.9	60
61	56 16.4	+53.0	60.3	56 45.6	+53.7	61.6	57 13.5	+54.5	63.0	57 40.1	+55.2	64.4	58 05.4	+55.9	65.8	58 29.3	+56.5	67.3	58 51.7	+57.2	68.8	59 12.6	+57.7	70.4	61
62	57 09.4	+52.7	59.4	57 39.3	+53.5	60.8	58 08.0	+54.2	62.2	58 35.3	+55.0	63.6	59 01.3	+55.6	65.1	59 25.8	+56.4	66.6	59 48.9	+56.9	68.2	60 10.3	+57.6	69.8	62
63	58 02.1	+52.2	58.5	58 32.8	+53.0	59.9	59 02.2	+53.8	61.4	59 30.3	+54.6	62.8	59 56.9	+55.4	64.4	60 22.2	+56.1	66.0	60 45.8	+56.8	67.6	61 07.9	+57.4	69.3	63
64	58 54.3	+51.8	57.6	59 25.8	+52.7	59.0	59 56.0	+53.5	60.5	60 24.9	+54.3	62.0	60 52.3	+55.1	63.6	61 18.3	+55.8	65.2	61 42.6	+56.6	66.9	62 05.3	+57.2	68.6	64
65	59 46.1	+51.3	56.6	60 18.5	+52.2	58.1	60 49.5	+53.2	59.6	61 19.2	+54.0	61.1	61 47.4	+54.8	62.8	62 14.1	+55.6	64.5	62 39.2	+56.3	66.2	63 02.5	+57.1	68.0	65
66	60 37.4	+50.8	55.5	61 10.7	+51.7	57.0	61 42.7	+52.6	58.6	62 13.2	+53.6	60.2	62 42.2	+54.5	61.9	63 09.7	+55.3	63.6	63 35.5	+56.1	65.4	63 59.6	+56.8	67.3	66
67	61 28.2	+50.3	54.4	62 02.4	+51.3	56.0	62 35.3	+52.2	57.6	63 06.8	+53.1	59.2	63 36.7	+54.0	61.0	64 05.0	+54.9	62.8	64 31.6	+55.8	64.6	64 56.4	+56.6	66.6	67
68	62 18.5	+49.6	53.3	62 53.7	+50.6	54.9	63 27.5	+51.7	56.5	63 59.9	+52.7	58.2	64 30.7	+53.7	60.0	64 59.9	+54.6	61.8	65 27.4	+55.4	63.8	65 53.0	+56.3	65.8	68
69	63 08.1	+49.0	52.1	63 44.3	+50.1	53.7	64 19.2	+51.1	55.3	64 52.6	+52.1	57.1	65 24.4	+53.1	58.9	65 54.5	+54.1	60.8	66 22.8	+55.1	62.8	66 49.3	+56.0	64.9	69
70	63 57.1	+48.2	50.8	64 34.4	+49.3	52.4	65 10.3	+50.4	54.1	65 44.7	+51.5	55.9	66 17.5	+52.6	57.8	66 48.6	+53.7	59.7	67 17.9	+54.7	61.8	67 45.3	+55.7	64.0	70
71	64 45.3	+47.4	49.4	65 23.7	+48.6	51.0	66 00.7	+49.7	52.8	66 36.2	+50.9	54.6	67 10.1	+52.1	56.6	67 42.3	+53.2	58.6	68 12.6	+54.3	60.7	68 41.0	+55.2	63.0	71
72	65 32.7	+46.6	47.9	66 12.3	+47.7	49.6	66 50.4	+49.0	51.4	67 27.1	+50.2	53.3	68 02.2	+51.3	55.3	68 35.5	+52.5	57.3	69 06.9	+53.7	59.5	69 36.2	+54.9	61.9	72
73	66 19.3	+45.5	46.4	67 00.0	+46.8	48.1	67 39.4	+48.0	49.9	68 17.3	+49.3	51.8	68 53.5	+50.6	53.8	69 28.0	+51.9	56.0	70 00.6	+53.1	58.3	70 31.1	+54.3	60.7	73
74	67 04.8	+44.5	44.7	67 46.8	+45.7	46.5	68 27.4	+47.1	48.3	69 06.6	+48.4	50.2	69 44.1	+49.8	52.3	70 19.9	+51.1	54.5	70 53.7	+52.4	56.9	71 25.4	+53.7	59.4	74
75	67 49.3	+43.2	43.0	68 32.5	+44.6	44.7	69 14.5	+46.0	46.6	69 55.0	+47.4	48.6	70 33.9	+48.8	50.7	71 11.0	+50.2	52.9	71 46.1	+51.7	55.4	72 19.1	+53.1	57.9	75
76	68 32.5	+42.0	41.1	69 17.1	+43.4	42.9	70 00.5	+44.7	44.7	70 42.4	+46.1	46.7	71 22.7	+47.6	48.9	72 01.2	+49.2	51.2	72 37.8	+50.7	53.7	73 12.2	+52.2	56.4	76
77	69 14.5	+40.5	39.1	70 00.5	+41.9	40.9	70 45.2	+43.3	42.7	71 28.5	+44.9	44.8	72 10.3	+46.5	46.9	72 50.4	+48.0	49.3	73 28.5	+49.7	51.9	74 04.4	+51.3	54.6	77
78	69 55.0	+38.9	37.0	70 42.4	+40.3	38.7	71 28.5	+41.8	40.6	72 13.4	+43.4	42.6	72 56.8	+45.0	44.8	73 38.4	+46.7	47.2	74 18.2	+48.4	49.8	74 55.7	+50.2	52.7	78
79	70 33.9	+37.1	34.8	71 22.7	+38.5	36.5	72 10.3	+40.1	38.3	72 56.8	+41.6	40.3	73 41.8	+43.3	42.5	74 25.1	+45.2	44.9	75 06.6	+47.0	47.6	75 45.9	+48.9	50.5	79
80	71 11.0	*+35.1* •	32.4	72 01.2	*+36.6* •	34.0	72 50.4	*+38.1* •	35.8	73 38.4	*+39.8* •	37.8	74 25.1	*+41.5* •	40.0	75 10.3	*+43.3* •	42.4	75 53.6	+45.3	45.1	76 34.8	+47.4	48.1	80
81	71 46.1	*+33.0* •	29.8	72 37.8	*+34.4* •	31.4	73 28.5	*+35.9* •	33.2	74 18.2	*+37.5* •	35.1	75 06.6	*+39.3* •	37.3	75 53.6	*+41.2* •	39.7	76 38.9	*+43.3* •	42.4	77 22.2	*+45.4* •	45.4	81
82	72 19.1	*+30.7* •	27.1	73 12.2	*+32.0* •	28.6	74 04.4	*+33.5* •	30.3	74 55.7	*+35.1* •	32.2	75 45.9	*+36.9* •	34.3	76 34.8	*+38.8* •	36.6	77 22.2	*+40.9* •	39.3	78 07.6	*+43.2* •	42.3	82
83	72 49.8	*+28.0* •	24.2	73 44.2	*+29.3* •	25.6	74 37.9	*+30.8* •	27.2	75 30.8	*+32.4* •	29.0	76 22.8	*+34.1* •	31.0	77 13.6	*+36.0* •	33.2	78 03.1	*+38.1* •	35.8	78 50.8	*+40.5* •	38.8	83
84	73 17.8	*+25.3* •	21.2	74 13.5	*+26.4* •	22.5	75 08.7	*+27.7* •	23.9	76 03.2	*+29.2* •	25.5	76 56.9	*+30.8* •	27.4	77 49.6	*+32.7* •	29.5	78 41.2	*+34.8* •	32.0	79 31.3	*+37.2* •	34.9	84
85	73 43.1	*+22.2* •	18.0	74 39.9	*+23.3* •	19.1	75 36.4	*+24.5* •	20.4	76 32.4	*+25.8* •	21.9	77 27.7	*+27.3* •	23.5	78 22.3	*+29.0* •	25.5	79 16.0	*+31.0* •	27.7	80 08.5	*+33.2* •	30.4	85
86	74 05.3	*+19.0* •	14.7	75 03.2	*+19.9* •	15.6	76 00.9	*+20.8* •	16.7	76 58.2	*+21.9* •	17.9	77 55.0	*+23.3* •	19.4	78 51.3	*+24.8* •	21.0	79 47.0	*+26.4* •	23.0	80 41.7	*+28.5* •	25.4	86
87	74 24.3	*+15.6* •	11.2	75 23.1	*+16.2* •	11.9	76 21.7	*+17.0* •	12.8	77 20.1	*+17.8* •	13.7	78 18.3	*+18.8* •	14.9	79 16.1	*+20.0* •	16.2	80 13.4	*+21.4* •	17.9	81 10.2	*+23.1* •	19.8	87
88	74 39.9	*+11.9* •	7.5	75 39.3	*+12.4* •	8.1	76 38.7	*+12.8* •	8.6	77 37.9	*+13.4* •	9.3	78 37.1	*+14.0* •	10.1	79 36.1	*+14.7* •	11.1	80 34.8	*+15.7* •	12.2	81 33.3	*+16.8* •	13.7	88
89	74 51.8	*+8.2* •	3.8	75 51.7	*+8.3* •	4.1	76 51.5	*+8.5* •	4.4	77 51.3	*+8.7* •	4.7	78 51.1	*+8.9* •	5.2	79 50.8	*+9.2* •	5.7	80 50.5	*+9.5* •	6.3	81 50.1	*+9.9* •	7.0	89
90	75 00.0	*+4.3* •	0.0	76 00.0	*+4.2* •	0.0	77 00.0	*+4.0* •	0.0	78 00.0	*+3.8* •	0.0	79 00.0	*+3.6* •	0.0	80 00.0	*+3.3* •	0.0	81 00.0	*+3.0* •	0.0	82 00.0	*+2.6* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 96°, 264°

85°, 275° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 17.6	+57.9	94.8	1 12.5	+58.2	94.9	1 07.4	+58.5	94.9	1 02.3	+58.7	94.9	0 57.2	+58.9	94.9	0 52.0	+59.1	94.9	0 46.9	+59.2	94.9	0 41.7	+59.4	95.0	**0**
1	2 15.5	+58.0	94.6	2 10.7	+58.2	94.6	2 05.9	+58.4	94.6	2 01.0	+58.7	94.7	1 56.1	+58.9	94.7	1 51.1	+59.1	94.8	1 46.1	+59.3	94.8	1 41.1	+59.4	94.8	**1**
2	3 13.5	+58.0	94.3	3 08.9	+58.3	94.4	3 04.3	+58.5	94.4	2 59.7	+58.7	94.5	2 55.0	+58.9	94.5	2 50.2	+59.1	94.6	2 45.4	+59.3	94.6	2 40.5	+59.5	94.7	**2**
3	4 11.5	+57.9	94.1	4 07.2	+58.2	94.1	4 02.8	+58.5	94.2	3 58.4	+58.7	94.3	3 53.9	+58.9	94.3	3 49.3	+59.1	94.4	3 44.7	+59.2	94.5	3 40.0	+59.4	94.5	**3**
4	5 09.4	+58.0	93.8	5 05.4	+58.2	93.9	5 01.3	+58.4	94.0	4 57.1	+58.7	94.1	4 52.8	+58.9	94.1	4 48.4	+59.1	94.2	4 43.9	+59.3	94.3	4 39.4	+59.4	94.4	**4**
5	6 07.4	+57.9	93.5	6 03.6	+58.2	93.6	5 59.7	+58.5	93.7	5 55.8	+58.6	93.9	5 51.7	+58.9	94.0	5 47.5	+59.1	94.1	5 43.2	+59.3	94.2	5 38.8	+59.4	94.3	**5**
6	7 05.3	+57.9	93.3	7 01.8	+58.2	93.4	6 58.2	+58.4	93.5	6 54.4	+58.7	93.6	6 50.6	+58.9	93.8	6 46.6	+59.1	93.9	6 42.5	+59.2	94.0	6 38.2	+59.4	94.1	**6**
7	8 03.2	+58.0	93.0	8 00.0	+58.2	93.2	7 56.6	+58.5	93.3	7 53.1	+58.7	93.4	7 49.5	+58.8	93.6	7 45.7	+59.0	93.7	7 41.7	+59.3	93.8	7 37.6	+59.4	94.0	**7**
8	9 01.2	+57.9	92.7	8 58.2	+58.2	92.9	8 55.1	+58.4	93.1	8 51.8	+58.7	93.2	8 48.3	+58.9	93.4	8 44.7	+59.1	93.5	8 41.0	+59.2	93.7	8 37.0	+59.4	93.8	**8**
9	9 59.1	+57.9	92.5	9 56.4	+58.2	92.7	9 53.5	+58.4	92.8	9 50.5	+58.6	93.0	9 47.2	+58.9	93.2	9 43.8	+59.1	93.4	9 40.2	+59.2	93.5	9 36.4	+59.4	93.7	**9**
10	10 57.0	+57.9	92.2	10 54.6	+58.1	92.4	10 51.9	+58.4	92.6	10 49.1	+58.7	92.8	10 46.1	+58.9	93.0	10 42.9	+59.0	93.2	10 39.4	+59.3	93.4	10 35.8	+59.4	93.5	**10**
11	11 54.9	+57.8	91.9	11 52.7	+58.2	92.2	11 50.3	+58.4	92.4	11 47.8	+58.6	92.6	11 45.0	+58.8	92.8	11 41.9	+59.1	93.0	11 38.7	+59.2	93.2	11 35.2	+59.4	93.4	**11**
12	12 52.7	+57.9	91.7	12 50.9	+58.1	91.9	12 48.7	+58.4	92.1	12 46.4	+58.6	92.4	12 43.8	+58.9	92.6	12 41.0	+59.0	92.8	12 37.9	+59.2	93.0	12 34.6	+59.4	93.3	**12**
13	13 50.6	+57.8	91.4	13 49.0	+58.1	91.7	13 47.1	+58.4	91.9	13 45.0	+58.6	92.1	13 42.7	+58.8	92.4	13 40.0	+59.1	92.6	13 37.1	+59.3	92.9	13 34.0	+59.4	93.1	**13**
14	14 48.4	+57.8	91.1	14 47.1	+58.1	91.4	14 45.5	+58.4	91.7	14 43.6	+58.6	91.9	14 41.5	+58.8	92.2	14 39.1	+59.0	92.4	14 36.4	+59.2	92.7	14 33.4	+59.4	93.0	**14**
15	15 46.2	+57.8	90.9	15 45.2	+58.1	91.1	15 43.9	+58.3	91.4	15 42.2	+58.6	91.7	15 40.3	+58.8	92.0	15 38.1	+59.0	92.3	15 35.6	+59.2	92.5	15 32.8	+59.3	92.8	**15**
16	16 44.0	+57.8	90.6	16 43.3	+58.0	90.9	16 42.2	+58.3	91.2	16 40.8	+58.6	91.5	16 39.1	+58.8	91.8	16 37.1	+59.0	92.1	16 34.8	+59.2	92.4	16 32.1	+59.4	92.7	**16**
17	17 41.8	+57.8	90.3	17 41.3	+58.1	90.6	17 40.5	+58.3	90.9	17 39.4	+58.6	91.2	17 37.9	+58.8	91.6	17 36.1	+59.0	91.9	17 34.0	+59.2	92.2	17 31.5	+59.4	92.5	**17**
18	18 39.6	+57.7	90.0	18 39.4	+58.0	90.3	18 38.8	+58.3	90.7	18 38.0	+58.5	91.0	18 36.7	+58.8	91.4	18 35.1	+59.0	91.7	18 33.2	+59.2	92.0	18 30.9	+59.3	92.4	**18**
19	19 37.3	+57.7	89.7	19 37.4	+58.0	90.1	19 37.1	+58.3	90.4	19 36.5	+58.5	90.8	19 35.5	+58.7	91.1	19 34.1	+59.0	91.5	19 32.4	+59.1	91.9	19 30.2	+59.4	92.2	**19**
20	20 35.0	+57.6	89.4	20 35.4	+57.9	89.8	20 35.4	+58.2	90.2	20 35.0	+58.5	90.6	20 34.2	+58.8	90.9	20 33.1	+58.9	91.3	20 31.5	+59.2	91.7	20 29.6	+59.3	92.0	**20**
21	21 32.6	+57.7	89.1	21 33.3	+58.0	89.5	21 33.6	+58.3	89.9	21 33.5	+58.5	90.3	21 33.0	+58.7	90.7	21 32.0	+59.0	91.1	21 30.7	+59.1	91.5	21 28.9	+59.3	91.9	**21**
22	22 30.3	+57.6	88.8	22 31.3	+57.9	89.2	22 31.9	+58.2	89.7	22 32.0	+58.5	90.1	22 31.7	+58.7	90.5	22 31.0	+58.9	90.9	22 29.8	+59.2	91.3	22 28.2	+59.3	91.7	**22**
23	23 27.9	+57.5	88.5	23 29.2	+57.9	89.0	23 30.1	+58.1	89.4	23 30.5	+58.4	89.8	23 30.4	+58.7	90.3	23 29.9	+58.9	90.7	23 29.0	+59.1	91.1	23 27.5	+59.4	91.6	**23**
24	24 25.4	+57.6	88.2	24 27.1	+57.8	88.7	24 28.2	+58.2	89.1	24 28.9	+58.4	89.6	24 29.1	+58.7	90.0	24 28.8	+58.9	90.5	24 28.1	+59.1	90.9	24 26.9	+59.2	91.4	**24**
25	25 23.0	+57.4	87.9	25 24.9	+57.8	88.4	25 26.4	+58.1	88.9	25 27.3	+58.4	89.3	25 27.8	+58.6	89.8	25 27.7	+58.9	90.3	25 27.2	+59.1	90.8	25 26.1	+59.3	91.2	**25**
26	26 20.4	+57.5	87.6	26 22.7	+57.8	88.1	26 24.5	+58.0	88.6	26 25.7	+58.4	89.1	26 26.4	+58.6	89.6	26 26.6	+58.9	90.1	26 26.3	+59.1	90.6	26 25.4	+59.3	91.1	**26**
27	27 17.9	+57.4	87.3	27 20.5	+57.7	87.8	27 22.5	+58.1	88.3	27 24.1	+58.3	88.8	27 25.0	+58.6	89.3	27 25.5	+58.8	89.8	27 25.4	+59.0	90.4	27 24.7	+59.3	90.9	**27**
28	28 15.3	+57.3	86.9	28 18.2	+57.7	87.5	28 20.6	+58.0	88.0	28 22.4	+58.3	88.5	28 23.6	+58.6	89.1	28 24.3	+58.8	89.6	28 24.4	+59.1	90.2	28 24.0	+59.2	90.7	**28**
29	29 12.6	+57.3	86.6	29 15.9	+57.6	87.2	29 18.6	+58.0	87.7	29 20.7	+58.3	88.3	29 22.2	+58.5	88.8	29 23.1	+58.8	89.4	29 23.5	+59.0	90.0	29 23.2	+59.2	90.5	**29**
30	30 09.9	+57.3	86.3	30 13.5	+57.6	86.8	30 16.6	+57.9	87.4	30 19.0	+58.2	88.0	30 20.7	+58.6	88.6	30 21.9	+58.8	89.2	30 22.5	+59.0	89.8	30 22.4	+59.2	90.3	**30**
31	31 07.2	+57.2	85.9	31 11.1	+57.6	86.5	31 14.5	+57.9	87.1	31 17.2	+58.2	87.7	31 19.3	+58.4	88.3	31 20.7	+58.7	88.9	31 21.5	+59.0	89.5	31 21.6	+59.2	90.2	**31**
32	32 04.4	+57.1	85.5	32 08.7	+57.5	86.2	32 12.4	+57.8	86.8	32 15.4	+58.1	87.4	32 17.7	+58.5	88.1	32 19.4	+58.7	88.7	32 20.5	+58.9	89.3	32 20.8	+59.2	90.0	**32**
33	33 01.5	+57.0	85.2	33 06.2	+57.4	85.8	33 10.2	+57.8	86.5	33 13.5	+58.1	87.1	33 16.2	+58.4	87.8	33 18.1	+58.7	88.5	33 19.4	+59.0	89.1	33 20.0	+59.2	89.8	**33**
34	33 58.5	+57.0	84.8	34 03.6	+57.4	85.5	34 08.0	+57.7	86.2	34 11.6	+58.1	86.8	34 14.6	+58.4	87.5	34 16.8	+58.7	88.2	34 18.4	+58.9	88.9	34 19.2	+59.1	89.6	**34**
35	34 55.5	+56.9	84.4	35 01.0	+57.3	85.1	35 05.7	+57.7	85.8	35 09.7	+58.0	86.5	35 13.0	+58.3	87.2	35 15.5	+58.6	87.9	35 17.3	+58.8	88.7	35 18.3	+59.1	89.4	**35**
36	35 52.4	+56.9	84.0	35 58.3	+57.2	84.8	36 03.4	+57.6	85.5	36 07.7	+58.0	86.2	36 11.3	+58.3	87.0	36 14.1	+58.6	87.7	36 16.1	+58.9	88.4	36 17.4	+59.1	89.1	**36**
37	36 49.3	+56.8	83.7	36 55.5	+57.2	84.4	37 01.0	+57.6	85.1	37 05.7	+57.9	85.9	37 09.6	+58.2	86.7	37 12.7	+58.5	87.4	37 15.0	+58.8	88.2	37 16.5	+59.1	88.9	**37**
38	37 46.1	+56.6	83.2	37 52.7	+57.1	84.0	37 58.6	+57.5	84.8	38 03.6	+57.9	85.6	38 07.8	+58.2	86.4	38 11.2	+58.5	87.1	38 13.8	+58.8	87.9	38 15.6	+59.0	88.7	**38**
39	38 42.7	+56.6	82.8	38 49.8	+57.0	83.6	38 56.1	+57.4	84.4	39 01.5	+57.8	85.2	39 06.0	+58.2	86.0	39 09.7	+58.5	86.9	39 12.6	+58.8	87.7	39 14.6	+59.0	88.5	**39**
40	39 39.3	+56.5	82.4	39 46.8	+56.9	83.2	39 53.5	+57.3	84.0	39 59.3	+57.7	84.9	40 04.2	+58.1	85.7	40 08.2	+58.4	86.6	40 11.4	+58.7	87.4	40 13.6	+59.0	88.2	**40**
41	40 35.8	+56.4	82.0	40 43.7	+56.9	82.8	40 50.8	+57.3	83.7	40 57.0	+57.7	84.5	41 02.3	+58.0	85.4	41 06.6	+58.4	86.3	41 10.1	+58.7	87.1	41 12.6	+59.0	88.0	**41**
42	41 32.2	+56.2	81.5	41 40.6	+56.7	82.4	41 48.1	+57.2	83.3	41 54.7	+57.5	84.2	42 00.3	+58.0	85.1	42 05.0	+58.3	86.0	42 08.8	+58.6	86.9	42 11.6	+58.9	87.8	**42**
43	42 28.4	+56.2	81.0	42 37.3	+56.7	81.9	42 45.3	+57.1	82.9	42 52.2	+57.6	83.8	42 58.3	+57.9	84.7	43 03.3	+58.3	85.6	43 07.4	+58.6	86.6	43 10.5	+58.9	87.5	**43**
44	43 24.6	+56.0	80.6	43 34.0	+56.5	81.5	43 42.4	+57.0	82.4	43 49.8	+57.4	83.4	43 56.2	+57.8	84.3	44 01.6	+58.2	85.3	44 06.0	+58.5	86.3	44 09.4	+58.9	87.2	**44**
45	44 20.6	+55.9	80.1	44 30.5	+56.4	81.0	44 39.4	+56.8	82.0	44 47.2	+57.3	83.0	44 54.0	+57.8	84.0	44 59.8	+58.1	85.0	45 04.5	+58.5	86.0	45 08.3	+58.8	87.0	**45**
46	45 16.5	+55.8	79.5	45 26.9	+56.3	80.5	45 36.2	+56.8	81.5	45 44.5	+57.3	82.6	45 51.8	+57.7	83.6	45 57.9	+58.1	84.6	46 03.0	+58.5	85.6	46 07.1	+58.7	86.7	**46**
47	46 12.3	+55.6	79.0	46 23.2	+56.1	80.0	46 33.0	+56.7	81.1	46 41.8	+57.1	82.1	46 49.5	+57.5	83.2	46 56.0	+58.0	84.2	47 01.5	+58.4	85.3	47 05.8	+58.7	86.4	**47**
48	47 07.9	+55.4	78.5	47 19.3	+56.0	79.5	47 29.7	+56.5	80.6	47 38.9	+57.1	81.7	47 47.0	+57.6	82.8	47 54.0	+58.0	83.9	47 59.9	+58.3	85.0	48 04.5	+58.7	86.1	**48**
49	48 03.3	+55.3	77.9	48 15.3	+55.9	79.0	48 26.2	+56.4	80.1	48 36.0	+56.9	81.2	48 44.6	+57.4	82.3	48 52.0	+57.8	83.5	48 58.2	+58.2	84.6	49 03.2	+58.6	85.8	**49**
50	48 58.6	+55.1	77.3	49 11.2	+55.7	78.4	49 22.6	+56.3	79.6	49 32.9	+56.8	80.7	49 42.0	+57.2	81.9	49 49.8	+57.8	83.1	49 56.4	+58.2	84.2	50 01.8	+58.6	85.4	**50**
51	49 53.7	+54.9	76.7	50 06.9	+55.5	77.9	50 18.9	+56.1	79.0	50 29.7	+56.7	80.2	50 39.2	+57.2	81.4	50 47.6	+57.6	82.6	50 54.6	+58.1	83.9	51 00.4	+58.5	85.1	**51**
52	50 48.6	+54.6	76.1	51 02.4	+55.3	77.3	51 15.0	+55.9	78.5	51 26.4	+56.5	79.7	51 36.4	+57.1	81.0	51 45.2	+57.6	82.2	51 52.7	+58.0	83.5	51 58.9	+58.4	84.7	**52**
53	51 43.2	+54.5	75.4	51 57.7	+55.1	76.6	52 10.9	+55.8	77.9	52 22.9	+56.3	79.2	52 33.5	+56.9	80.4	52 42.8	+57.4	81.7	52 50.7	+57.9	83.0	52 57.3	+58.4	84.4	**53**
54	52 37.7	+54.2	74.7	52 52.8	+54.9	76.0	53 06.7	+55.6	77.3	53 19.2	+56.2	78.6	53 30.4	+56.8	79.9	53 40.2	+57.3	81.3	53 48.6	+57.9	82.6	53 55.7	+58.2	84.0	**54**
55	53 31.9	+53.9	74.0	53 47.7	+54.7	75.3	54 02.3	+55.3	76.7	54 15.4	+56.0	78.0	54 27.2	+56.6	79.4	54 37.5	+57.2	80.8	54 46.5	+57.7	82.2	54 53.9	+58.2	83.6	**55**
56	54 25.8	+53.6	73.3	54 42.4	+54.4	74.6	54 57.6	+55.1	76.0	55 11.4	+55.8	77.4	55 23.8	+56.5	78.8	55 34.7	+57.1	80.2	55 44.2	+57.6	81.7	55 52.1	+58.1	83.1	**56**
57	55 19.4	+53.3	72.5	55 36.8	+54.1	73.9	55 52.7	+54.9	75.3	56 07.2	+55.6	76.7	56 20.3	+56.2	78.2	56 31.8	+56.9	79.7	56 41.8	+57.4	81.2	56 50.2	+58.0	82.7	**57**
58	56 12.7	+53.0	71.7	56 30.9	+53.8	73.1	56 47.6	+54.6	74.6	57 02.8	+55.4	76.0	57 16.5	+56.1	77.6	57 28.7	+56.7	79.1	57 39.2	+57.4	80.6	57 48.2	+57.9	82.2	**58**
59	57 05.7	+52.7	70.8	57 24.7	+53.5	72.3	57 42.2	+54.3	73.8	57 58.2	+55.1	75.3	58 12.6	+55.8	76.9	58 25.4	+56.5	78.5	58 36.6	+57.1	80.1	58 46.1	+57.7	81.7	**59**
60	57 58.4	+52.2	69.9	58 18.2	+53.1	71.4	58 36.5	+54.0	73.0	58 53.3	+54.8	74.6	59 08.4	+55.6	76.2	59 21.9	+56.4	77.8	59 33.7	+57.0	79.5	59 43.8	+57.6	81.2	**60**
61	58 50.6	+51.8	69.0	59 11.3	+52.8	70.5	59 30.5	+53.7	72.1	59 48.1	+54.5	73.8	60 04.0	+55.4	75.4	60 18.3	+56.1	77.1	60 30.7	+56.9	78.9	60 41.4	+57.5	80.6	**61**
62	59 42.4	+51.3	68.0	60 04.1	+52.3	69.6	60 24.2	+53.3	71.3	60 42.6	+54.2	72.9	60 59.4	+55.0	74.7	61 14.4	+55.8	76.4	61 27.6	+56.6	78.2	61 38.9	+57.3	80.0	**62**
63	60 33.7	+50.8	67.0	60 56.4	+51.9	68.6	61 17.5	+52.8	70.3	61 36.8	+53.8	72.0	61 54.4	+54.8	73.8	62 10.2	+55.6	75.6	62 24.2	+56.4	77.5	62 36.2	+57.1	79.4	**63**
64	61 24.5	+50.3	65.9	61 48.3	+51.3	67.6	62 10.3	+52.4	69.3	62 30.6	+53.5	71.1	62 49.2	+54.3	72.9	63 05.8	+55.3	74.8	63 20.6	+56.1	76.7	63 33.3	+56.9	78.7	**64**
65	62 14.8	+49.6	64.7	62 39.6	+50.8	66.4	63 02.7	+51.9	68.2	63 24.1	+52.9	70.1	63 43.5	+54.0	72.0	64 01.1	+55.0	74.0	64 16.7	+55.8	75.9	64 30.2	+56.7	78.0	**65**
66	63 04.4	+49.0	63.5	63 30.4	+50.2	65.3	63 54.6	+51.3	67.1	64 17.0	+52.5	69.0	64 37.5	+53.6	71.0	64 56.1	+54.5	73.0	65 12.5	+55.6	75.1	65 26.9	+56.4	77.2	**66**
67	63 53.4	+48.3	62.2	64 20.6	+49.5	64.0	64 45.9	+50.8	65.9	65 09.5	+51.9	67.9	65 31.1	+53.0	69.9	65 50.6	+54.2	72.0	66 08.1	+55.2	74.2	66 23.3	+56.2	76.4	**67**
68	64 41.7	+47.4	60.8	65 10.1	+48.7	62.7	65 36.7	+50.0	64.7	66 01.4	+51.3	66.7	66 24.1	+52.6	68.8	66 44.8	+53.7	71.0	67 03.3	+54.8	73.2	67 19.5	+55.8	75.5	**68**
69	65 29.1	+46.6	59.4	65 58.8	+47.9	61.3	66 26.7	+49.3	63.3	66 52.7	+50.6	65.4	67 16.7	+51.9	67.6	67 38.5	+53.1	69.8	67 58.1	+54.3	72.1	68 15.3	+55.4	74.5	**69**
70	66 15.7	+45.5	57.8	66 46.7	+47.1	59.8	67 16.0	+48.5	61.8	67 43.3	+49.9	64.0	68 08.6	+51.2	66.2	68 31.6	+52.6	68.6	68 52.4	+53.8	71.0	69 10.7	+55.1	73.4	**70**
71	67 01.2	+44.5	56.2	67 33.8	+46.0	58.2	68 04.5	+47.5	60.3	68 33.2	+49.0	62.5	68 59.8	+50.5	64.8	69 24.2	+51.9	67.2	69 46.2	+53.3	69.7	70 05.8	+54.5	72.3	**71**
72	67 45.7	+43.3	54.4	68 19.8	+44.8	56.5	68 52.0	+46.4	58.6	69 22.2	+48.0	60.9	69 50.3	+49.6	63.3	70 16.1	+51.1	65.8	70 39.5	+52.6	68.4	71 00.3	+54.0	71.1	**72**
73	68 29.0	+42.0	52.6	69 04.6	+43.7	54.6	69 38.4	+45.3	56.8	70 10.2	+47.0	59.2	70 39.9	+48.6	61.6	71 07.2	+50.3	64.2	71 32.1	+51.8	66.9	71 54.3	+53.4	69.7	**73**
74	69 11.0	+40.6	50.6	69 48.3	+42.2	52.7	70 23.7	+44.0	54.9	70 57.2	+45.7	57.3	71 28.5	+47.5	59.8	71 57.5	+49.2	62.4	72 23.9	+51.0	65.2	72 47.7	+52.6	68.2	**74**
75	69 51.6	+38.9	48.5	70 30.5	+40.7	50.6	71 07.7	+42.5	52.9	71 42.9	+44.4	55.3	72 16.0	+46.2	57.8	72 46.7	+48.1	60.6	73 14.9	+49.9	63.5	73 40.3	+51.7	66.5	**75**
76	70 30.5	+37.2	46.2	71 11.2	+39.0	48.4	71 50.2	+40.8	50.6	72 27.3	+42.7	53.1	73 02.2	+44.8	55.7	73 34.8	+46.8	58.5	74 04.8	+48.8	61.5	74 32.0	+50.7	64.7	**76**
77	71 07.7	*+35.2* •	43.9	71 50.2	*+37.1* •	46.0	72 31.0	+39.0	48.2	73 10.0	+41.0	50.7	73 47.0	+43.0	53.4	74 21.6	+45.2	56.2	74 53.6	+47.3	59.3	75 22.7	+49.5	62.6	**77**
78	71 42.9	*+33.1* •	41.3	72 27.3	*+34.9* •	43.4	73 10.0	*+37.0* •	45.7	73 51.0	*+39.0* •	48.1	74 30.0	*+41.2* •	50.8	75 06.8	+43.4	53.7	75 40.9	+45.8	56.9	76 12.2	+48.1	60.3	**78**
79	72 16.0	*+30.7* •	38.6	73 02.2	*+32.6* •	40.7	73 47.0	*+34.6* •	42.9	74 30.0	*+36.8* •	45.3	75 11.2	*+39.0* •	48.0	75 50.2	*+41.3* •	51.0	76 26.7	*+43.8* •	54.2	77 00.3	+46.3	57.7	**79**
80	72 46.7	*+28.2* •	35.8	73 34.8	*+30.0* •	37.7	74 21.6	*+32.0* •	39.9	75 06.8	*+34.1* •	42.3	75 50.2	*+36.5* •	45.0	76 31.5	*+39.0* •	47.9	77 10.5	*+41.5* •	51.2	77 46.6	*+44.2* •	54.8	**80**
81	73 14.9	*+25.4* •	32.7	74 04.8	*+27.2* •	34.6	74 53.6	*+29.1* •	36.7	75 40.9	*+31.3* •	39.1	76 26.7	*+33.6* •	41.7	77 10.5	*+36.1* •	44.6	77 52.0	*+38.8* •	47.9	78 30.8	*+41.8* •	51.5	**81**
82	73 40.3	*+22.4* •	29.5	74 32.0	*+24.1* •	31.3	75 22.7	*+26.0* •	33.3	76 12.2	*+28.1* •	35.5	77 00.3	*+30.4* •	38.1	77 46.6	*+32.9* •	40.9	78 30.8	*+35.7* •	44.1	79 12.6	*+38.7* •	47.8	**82**
83	74 02.7	*+19.1* •	26.2	74 56.1	*+20.8* •	27.8	75 48.7	*+22.5* •	29.7	76 40.3	*+24.5* •	31.8	77 30.7	*+26.7* •	34.2	78 19.5	*+29.2* •	36.9	79 06.5	*+32.0* •	40.0	79 51.3	*+35.1* •	43.6	**83**
84	74 21.8	*+15.8* •	22.7	75 16.9	*+17.1* •	24.2	76 11.2	*+18.8* •	25.9	77 04.8	*+20.6* •	27.8	77 57.4	*+22.6* •	29.9	78 48.7	*+25.0* •	32.5	79 38.5	*+27.7* •	35.4	80 26.4	*+30.7* •	38.8	**84**
85	74 37.6	*+12.1* •	19.1	75 34.0	*+13.4* •	20.4	76 30.0	*+14.8* •	21.8	77 25.4	*+16.3* •	23.5	78 20.0	*+18.2* •	25.4	79 13.7	*+20.3* •	27.7	80 06.2	*+22.7* •	30.3	80 57.1	*+25.7* •	33.5	**85**
86	74 49.7	*+8.4* •	15.4	75 47.4	*+9.4* •	16.4	76 44.8	*+10.5* •	17.6	77 41.7	*+11.8* •	19.0	78 38.2	*+13.3* •	20.7	79 34.0	*+15.1* •	22.6	80 28.9	*+17.2* •	24.8	81 22.8	*+19.7* •	27.6	**86**
87	74 58.1	*+4.5* •	11.6	75 56.8	*+5.3* •	12.4	76 55.3	*+6.1* •	13.3	77 53.5	*+7.1* •	14.4	78 51.5	*+8.2* •	15.7	79 49.1	*+9.5* •	17.2	80 46.1	*+11.1* •	19.0	81 42.5	*+13.1* •	21.2	**87**
88	75 02.6	*+0.7* •	7.7	76 02.1	*+1.0* •	8.3	77 01.4	*+1.6* •	8.9	78 00.6	*+2.2* •	9.6	78 59.7	*+2.8* •	10.5	79 58.6	*+3.7* •	11.5	80 57.2	*+4.7* •	12.8	81 55.6	*+5.9* •	14.3	**88**
89	75 03.3	*–3.3* •	3.9	76 03.1	*–3.1* •	4.1	77 03.0	*–3.0* •	4.4	78 02.8	*–2.8* •	4.8	79 02.5	*–2.5* •	5.2	80 02.3	*–2.3* •	5.8	81 01.9	*–1.9* •	6.4	82 01.5	*–1.5* •	7.2	**89**
90	75 00.0	*–7.2* •	0.0	76 00.0	*–7.3* •	0.0	77 00.0	*–7.5* •	0.0	78 00.0	*–7.7* •	0.0	79 00.0	*–7.9* •	0.0	80 00.0	*–8.1* •	0.0	81 00.0	*–8.5* •	0.0	82 00.0	*–8.9* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 85°, 275°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 17.6	−58.0	94.8	1 12.5	−58.2	94.9	1 07.4	−58.5	94.9	1 02.3	−58.7	94.9	0 57.2	−58.9	94.9	0 52.0	−59.1	94.9	0 46.9	−59.3	94.9	0 41.7	−59.4	95.0	0
1	0 19.6	−58.0	95.1	0 14.3	−58.3	95.1	0 08.9	−58.4	95.1	0 03.6	−58.7	95.1	0 01.7	+58.9	84.9	0 07.1	+59.1	84.9	0 12.4	+59.3	84.9	0 17.7	+59.4	84.9	1
2	0 38.4	+58.0	84.7	0 44.0	+58.2	84.7	0 49.5	+58.5	84.7	0 55.1	+58.7	84.7	1 00.6	+58.9	84.7	1 06.2	+59.1	84.7	1 11.7	+59.2	84.7	1 17.1	+59.5	84.8	2
3	1 36.4	+57.9	84.4	1 42.2	+58.2	84.4	1 48.0	+58.5	84.5	1 53.8	+58.7	84.5	1 59.5	+58.9	84.5	2 05.3	+59.0	84.6	2 10.9	+59.3	84.6	2 16.6	+59.4	84.6	3
4	2 34.3	+58.0	84.1	2 40.4	+58.3	84.2	2 46.5	+58.5	84.2	2 52.5	+58.7	84.3	2 58.4	+59.0	84.3	3 04.3	+59.1	84.4	3 10.2	+59.3	84.4	3 16.0	+59.4	84.5	4
5	3 32.3	+58.0	83.9	3 38.7	+58.2	83.9	3 45.0	+58.4	84.0	3 51.2	+58.7	84.1	3 57.4	+58.8	84.1	4 03.4	+59.1	84.2	4 09.5	+59.2	84.3	4 15.4	+59.4	84.4	5
6	4 30.3	+57.9	83.6	4 36.9	+58.2	83.7	4 43.4	+58.5	83.8	4 49.9	+58.7	83.9	4 56.2	+58.9	83.9	5 02.5	+59.1	84.0	5 08.7	+59.3	84.1	5 14.8	+59.4	84.2	6
7	5 28.2	+58.0	83.4	5 35.1	+58.2	83.5	5 41.9	+58.4	83.6	5 48.6	+58.7	83.7	5 55.1	+58.9	83.8	6 01.6	+59.1	83.9	6 08.0	+59.2	84.0	6 14.2	+59.4	84.1	7
8	6 26.2	+57.9	83.1	6 33.3	+58.2	83.2	6 40.3	+58.5	83.3	6 47.3	+58.6	83.4	6 54.0	+58.9	83.6	7 00.7	+59.1	83.7	7 07.2	+59.3	83.8	7 13.6	+59.5	83.9	8
9	7 24.1	+57.9	82.8	7 31.5	+58.2	83.0	7 38.8	+58.4	83.1	7 45.9	+58.7	83.2	7 52.9	+58.9	83.4	7 59.8	+59.1	83.5	8 06.5	+59.2	83.7	8 13.1	+59.4	83.8	9
10	8 22.0	+58.0	82.6	8 29.7	+58.2	82.7	8 37.2	+58.5	82.9	8 44.6	+58.7	83.0	8 51.8	+58.9	83.2	8 58.9	+59.0	83.3	9 05.7	+59.3	83.5	9 12.5	+59.4	83.7	10
11	9 20.0	+57.9	82.3	9 27.9	+58.2	82.5	9 35.7	+58.4	82.6	9 43.3	+58.6	82.8	9 50.7	+58.9	83.0	9 57.9	+59.1	83.2	10 05.0	+59.2	83.3	10 11.9	+59.4	83.5	11
12	10 17.9	+57.9	82.0	10 26.1	+58.1	82.2	10 34.1	+58.4	82.4	10 41.9	+58.7	82.6	10 49.6	+58.8	82.8	10 57.0	+59.0	83.0	11 04.2	+59.3	83.2	11 11.3	+59.4	83.4	12
13	11 15.8	+57.8	81.8	11 24.2	+58.2	82.0	11 32.5	+58.4	82.2	11 40.6	+58.6	82.4	11 48.4	+58.9	82.6	11 56.0	+59.1	82.8	12 03.5	+59.2	83.0	12 10.7	+59.3	83.2	13
14	12 13.6	+57.9	81.5	12 22.4	+58.1	81.7	12 30.9	+58.4	81.9	12 39.2	+58.6	82.2	12 47.3	+58.8	82.4	12 55.1	+59.0	82.6	13 02.7	+59.2	82.8	13 10.0	+59.4	83.1	14
15	13 11.5	+57.9	81.2	13 20.5	+58.1	81.5	13 29.3	+58.4	81.7	13 37.8	+58.6	81.9	13 46.1	+58.8	82.2	13 54.1	+59.1	82.4	14 01.9	+59.2	82.7	14 09.4	+59.4	82.9	15
16	14 09.4	+57.8	81.0	14 18.6	+58.2	81.2	14 27.7	+58.3	81.5	14 36.4	+58.7	81.7	14 44.9	+58.9	82.0	14 53.2	+59.0	82.2	15 01.1	+59.2	82.5	15 08.8	+59.4	82.8	16
17	15 07.2	+57.8	80.7	15 16.8	+58.0	81.0	15 26.0	+58.4	81.2	15 35.1	+58.5	81.5	15 43.8	+58.8	81.8	15 52.2	+59.0	82.1	16 00.3	+59.2	82.3	16 08.2	+59.4	82.6	17
18	16 05.0	+57.8	80.4	16 14.8	+58.1	80.7	16 24.4	+58.3	81.0	16 33.6	+58.6	81.3	16 42.6	+58.8	81.6	16 51.2	+59.0	81.9	16 59.5	+59.2	82.2	17 07.6	+59.3	82.5	18
19	17 02.8	+57.7	80.1	17 12.9	+58.1	80.4	17 22.7	+58.3	80.7	17 32.2	+58.6	81.1	17 41.4	+58.8	81.4	17 50.2	+59.0	81.7	17 58.7	+59.2	82.0	18 06.9	+59.4	82.3	19
20	18 00.5	+57.8	79.8	18 11.0	+58.0	80.2	18 21.0	+58.3	80.5	18 30.8	+58.5	80.8	18 40.2	+58.7	81.2	18 49.2	+59.0	81.5	18 57.9	+59.2	81.8	19 06.3	+59.3	82.2	20
21	18 58.3	+57.7	79.6	19 09.0	+58.0	79.9	19 19.3	+58.3	80.2	19 29.3	+58.5	80.6	19 38.9	+58.8	80.9	19 48.2	+59.0	81.3	19 57.1	+59.2	81.7	20 05.6	+59.4	82.0	21
22	19 56.0	+57.7	79.3	20 07.0	+58.0	79.6	20 17.6	+58.3	80.0	20 27.8	+58.5	80.4	20 37.7	+58.7	80.7	20 47.2	+58.9	81.1	20 56.3	+59.1	81.5	21 05.0	+59.3	81.9	22
23	20 53.7	+57.6	79.0	21 05.0	+57.9	79.4	21 15.9	+58.2	79.7	21 26.3	+58.5	80.1	21 36.4	+58.8	80.5	21 46.1	+59.0	80.9	21 55.4	+59.2	81.3	22 04.3	+59.3	81.7	23
24	21 51.3	+57.7	78.7	22 02.9	+57.9	79.1	22 14.1	+58.2	79.5	22 24.8	+58.5	79.9	22 35.2	+58.7	80.3	22 45.1	+58.9	80.7	22 54.6	+59.1	81.1	23 03.6	+59.3	81.5	24
25	22 49.0	+57.6	78.4	23 00.8	+57.9	78.8	23 12.3	+58.2	79.2	23 23.3	+58.4	79.6	23 33.9	+58.7	80.1	23 44.0	+58.9	80.5	23 53.7	+59.1	80.9	24 02.9	+59.3	81.4	25
26	23 46.6	+57.5	78.1	23 58.7	+57.9	78.5	24 10.5	+58.1	78.9	24 21.7	+58.5	79.4	24 32.6	+58.6	79.8	24 42.9	+58.9	80.3	24 52.8	+59.1	80.7	25 02.2	+59.3	81.2	26
27	24 44.1	+57.5	77.8	24 56.6	+57.8	78.2	25 08.6	+58.1	78.7	25 20.2	+58.3	79.1	25 31.2	+58.7	79.6	25 41.8	+58.9	80.1	25 51.9	+59.1	80.6	26 01.5	+59.3	81.0	27
28	25 41.6	+57.5	77.4	25 54.4	+57.8	77.9	26 06.7	+58.1	78.4	26 18.5	+58.4	78.9	26 29.9	+58.6	79.4	26 40.7	+58.8	79.9	26 51.0	+59.1	80.4	27 00.8	+59.2	80.9	28
29	26 39.1	+57.4	77.1	26 52.2	+57.7	77.6	27 04.8	+58.1	78.1	27 16.9	+58.3	78.6	27 28.5	+58.6	79.1	27 39.5	+58.9	79.6	27 50.1	+59.0	80.2	28 00.0	+59.3	80.7	29
30	27 36.5	+57.4	76.8	27 49.9	+57.8	77.3	28 02.9	+58.0	77.8	28 15.2	+58.3	78.4	28 27.1	+58.5	78.9	28 38.4	+58.8	79.4	28 49.1	+59.0	80.0	28 59.3	+59.2	80.5	30
31	28 33.9	+57.3	76.5	28 47.7	+57.6	77.0	29 00.9	+58.0	77.5	29 13.5	+58.3	78.1	29 25.6	+58.6	78.6	29 37.2	+58.8	79.2	29 48.1	+59.1	79.8	29 58.5	+59.2	80.3	31
32	29 31.2	+57.3	76.1	29 45.3	+57.6	76.7	29 58.9	+57.9	77.2	30 11.8	+58.2	77.8	30 24.2	+58.5	78.4	30 36.0	+58.7	79.0	30 47.2	+59.0	79.5	30 57.7	+59.2	80.1	32
33	30 28.5	+57.2	75.8	30 42.9	+57.6	76.4	30 56.8	+57.9	76.9	31 10.0	+58.2	77.5	31 22.7	+58.5	78.1	31 34.7	+58.8	78.7	31 46.2	+58.9	79.3	31 56.9	+59.2	79.9	33
34	31 25.7	+57.2	75.4	31 40.5	+57.5	76.0	31 54.7	+57.8	76.6	32 08.2	+58.2	77.2	32 21.2	+58.4	77.9	32 33.5	+58.7	78.5	32 45.1	+59.0	79.1	32 56.1	+59.2	79.7	34
35	32 22.9	+57.1	75.1	32 38.0	+57.5	75.7	32 52.5	+57.8	76.3	33 06.4	+58.1	77.0	33 19.6	+58.4	77.6	33 32.2	+58.7	78.2	33 44.1	+58.9	78.9	33 55.3	+59.1	79.5	35
36	33 20.0	+57.0	74.7	33 35.5	+57.4	75.4	33 50.3	+57.8	76.0	34 04.5	+58.1	76.7	34 18.0	+58.4	77.3	34 30.9	+58.6	78.0	34 43.0	+58.9	78.7	34 54.4	+59.2	79.3	36
37	34 17.0	+57.0	74.3	34 32.9	+57.3	75.0	34 48.1	+57.7	75.7	35 02.6	+58.0	76.4	35 16.4	+58.3	77.0	35 29.5	+58.6	77.7	35 41.9	+58.9	78.4	35 53.6	+59.1	79.1	37
38	35 14.0	+56.9	74.0	35 30.2	+57.3	74.6	35 45.8	+57.6	75.3	36 00.6	+58.0	76.0	36 14.7	+58.3	76.7	36 28.1	+58.6	77.5	36 40.8	+58.8	78.2	36 52.7	+59.1	78.9	38
39	36 10.9	+56.8	73.6	36 27.5	+57.2	74.3	36 43.4	+57.6	75.0	36 58.6	+57.9	75.7	37 13.0	+58.3	76.5	37 26.7	+58.5	77.2	37 39.6	+58.8	77.9	37 51.8	+59.0	78.7	39
40	37 07.7	+56.7	73.2	37 24.7	+57.2	73.9	37 41.0	+57.5	74.6	37 56.5	+57.9	75.4	38 11.3	+58.2	76.1	38 25.2	+58.5	76.9	38 38.4	+58.8	77.7	38 50.8	+59.0	78.5	40
41	38 04.4	+56.7	72.8	38 21.9	+57.0	73.5	38 38.5	+57.4	74.3	38 54.4	+57.8	75.1	39 09.5	+58.1	75.8	39 23.7	+58.5	76.6	39 37.2	+58.7	77.4	39 49.8	+59.0	78.2	41
42	39 01.1	+56.5	72.3	39 18.9	+57.0	73.1	39 35.9	+57.4	73.9	39 52.2	+57.7	74.7	40 07.6	+58.1	75.5	40 22.2	+58.4	76.3	40 35.9	+58.7	77.2	40 48.8	+59.0	78.0	42
43	39 57.6	+56.5	71.9	40 15.9	+56.9	72.7	40 33.3	+57.3	73.5	40 49.9	+57.7	74.3	41 05.7	+58.0	75.2	41 20.6	+58.4	76.0	41 34.6	+58.7	76.9	41 47.8	+58.9	77.8	43
44	40 54.1	+56.3	71.5	41 12.8	+56.8	72.3	41 30.6	+57.2	73.1	41 47.6	+57.6	74.0	42 03.7	+58.0	74.8	42 19.0	+58.3	75.7	42 33.3	+58.6	76.6	42 46.7	+58.9	77.5	44
45	41 50.4	+56.3	71.0	42 09.6	+56.6	71.9	42 27.8	+57.1	72.7	42 45.2	+57.5	73.6	43 01.7	+57.9	74.5	43 17.3	+58.2	75.4	43 31.9	+58.6	76.3	43 45.6	+58.9	77.2	45
46	42 46.7	+56.1	70.5	43 06.2	+56.6	71.4	43 24.9	+57.1	72.3	43 42.7	+57.5	73.2	43 59.6	+57.8	74.1	44 15.5	+58.2	75.1	44 30.5	+58.5	76.0	44 44.5	+58.8	77.0	46
47	43 42.8	+56.0	70.0	44 02.8	+56.5	70.9	44 22.0	+56.9	71.9	44 40.2	+57.3	72.8	44 57.4	+57.8	73.8	45 13.7	+58.1	74.7	45 29.0	+58.5	75.7	45 43.3	+58.8	76.7	47
48	44 38.8	+55.8	69.5	44 59.3	+56.3	70.5	45 18.9	+56.8	71.4	45 37.5	+57.3	72.4	45 55.2	+57.6	73.4	46 11.8	+58.1	74.4	46 27.5	+58.4	75.4	46 42.1	+58.8	76.4	48
49	45 34.6	+55.7	69.0	45 55.6	+56.3	70.0	46 15.7	+56.7	71.0	46 34.8	+57.1	72.0	46 52.8	+57.6	73.0	47 09.9	+58.0	74.0	47 25.9	+58.4	75.0	47 40.9	+58.6	76.1	49
50	46 30.3	+55.6	68.5	46 51.9	+56.0	69.5	47 12.4	+56.6	70.5	47 31.9	+57.1	71.5	47 50.4	+57.5	72.6	48 07.9	+57.9	73.6	48 24.3	+58.3	74.7	48 39.5	+58.7	75.8	50
51	47 25.9	+55.4	67.9	47 47.9	+56.0	69.0	48 09.0	+56.4	70.0	48 29.0	+56.9	71.1	48 47.9	+57.4	72.1	49 05.8	+57.8	73.2	49 22.6	+58.2	74.3	49 38.2	+58.6	75.5	51
52	48 21.3	+55.2	67.4	48 43.9	+55.7	68.4	49 05.4	+56.3	69.5	49 25.9	+56.8	70.6	49 45.3	+57.3	71.7	50 03.6	+57.8	72.8	50 20.8	+58.1	74.0	50 36.8	+58.5	75.1	52
53	49 16.5	+55.0	66.8	49 39.6	+55.6	67.8	50 01.7	+56.2	68.9	50 22.7	+56.7	70.1	50 42.6	+57.2	71.2	51 01.4	+57.6	72.4	51 18.9	+58.1	73.6	51 35.3	+58.4	74.8	53
54	50 11.5	+54.8	66.1	50 35.2	+55.5	67.3	50 57.9	+56.0	68.4	51 19.4	+56.5	69.6	51 39.8	+57.0	70.7	51 59.0	+57.5	71.9	52 17.0	+58.0	73.2	52 33.7	+58.4	74.4	54
55	51 06.3	+54.6	65.5	51 30.7	+55.2	66.6	51 53.9	+55.8	67.8	52 15.9	+56.4	69.0	52 36.8	+57.0	70.2	52 56.5	+57.4	71.5	53 15.0	+57.8	72.7	53 32.1	+58.3	74.0	55
56	52 00.9	+54.4	64.8	52 25.9	+55.0	66.0	52 49.7	+55.6	67.2	53 12.3	+56.2	68.4	53 33.8	+56.7	69.7	53 53.9	+57.3	71.0	54 12.8	+57.8	72.3	54 30.4	+58.2	73.6	56
57	52 55.3	+54.1	64.1	53 20.9	+54.7	65.4	53 45.3	+55.4	66.6	54 08.5	+56.1	67.9	54 30.5	+56.6	69.2	54 51.2	+57.2	70.5	55 10.6	+57.7	71.8	55 28.6	+58.2	73.2	57
58	53 49.4	+53.8	63.4	54 15.6	+54.6	64.7	54 40.7	+55.2	65.9	55 04.6	+55.8	67.2	55 27.1	+56.5	68.6	55 48.4	+57.0	69.9	56 08.3	+57.5	71.3	56 26.8	+58.0	72.8	58
59	54 43.2	+53.6	62.7	55 10.2	+54.2	63.9	55 35.9	+55.0	65.2	56 00.4	+55.6	66.6	56 23.6	+56.2	68.0	56 45.4	+56.9	69.4	57 05.8	+57.4	70.8	57 24.8	+57.9	72.3	59
60	55 36.8	+53.2	61.9	56 04.4	+54.0	63.2	56 30.9	+54.7	64.5	56 56.0	+55.4	65.9	57 19.8	+56.1	67.3	57 42.3	+56.6	68.8	58 03.2	+57.3	70.3	58 22.7	+57.8	71.8	60
61	56 30.0	+52.8	61.0	56 58.4	+53.7	62.4	57 25.6	+54.4	63.8	57 51.4	+55.2	65.2	58 15.9	+55.8	66.7	58 38.9	+56.5	68.2	59 00.5	+57.1	69.7	59 20.5	+57.7	71.3	61
62	57 22.8	+52.5	60.2	57 52.1	+53.3	61.6	58 20.0	+54.1	63.0	58 46.6	+54.8	64.4	59 11.7	+55.6	66.0	59 35.4	+56.3	67.5	59 57.6	+56.9	69.1	60 18.2	+57.5	70.7	62
63	58 15.3	+52.1	59.3	58 45.4	+52.9	60.7	59 14.1	+53.7	62.1	59 41.4	+54.6	63.7	60 07.3	+55.3	65.2	60 31.7	+56.1	66.8	60 54.5	+56.8	68.5	61 15.7	+57.4	70.2	63
64	59 07.4	+51.7	58.3	59 38.3	+52.5	59.8	60 07.8	+53.4	61.3	60 36.0	+54.2	62.8	61 02.6	+55.1	64.4	61 27.8	+55.7	66.1	61 51.3	+56.5	67.8	62 13.1	+57.2	69.5	64
65	59 59.1	+51.2	57.3	60 30.8	+52.1	58.8	61 01.2	+53.0	60.3	61 30.2	+53.9	61.9	61 57.7	+54.7	63.6	62 23.5	+55.6	65.3	62 47.8	+56.3	67.1	63 10.3	+57.0	68.9	65
66	60 50.3	+50.6	56.3	61 22.9	+51.6	57.8	61 54.2	+52.6	59.4	62 24.1	+53.4	61.0	62 52.4	+54.3	62.7	63 19.1	+55.2	64.5	63 44.1	+56.0	66.3	64 07.3	+56.8	68.2	66
67	61 40.9	+50.1	55.1	62 14.5	+51.1	56.7	62 46.8	+52.0	58.3	63 17.5	+53.0	60.0	63 46.7	+54.0	61.8	64 14.3	+54.8	63.6	64 40.1	+55.7	65.5	65 04.1	+56.5	67.4	67
68	62 31.0	+49.4	54.0	63 05.6	+50.5	55.6	63 38.8	+51.5	57.2	64 10.5	+52.6	58.9	64 40.7	+53.5	60.8	65 09.1	+54.5	62.6	65 35.8	+55.4	64.6	66 00.6	+56.3	66.6	68
69	63 20.4	+48.8	52.7	63 56.1	+49.8	54.3	64 30.3	+50.9	56.0	65 03.1	+52.0	57.8	65 34.2	+53.0	59.7	66 03.6	+54.1	61.6	66 31.2	+55.0	63.6	66 56.9	+55.9	65.7	69
70	64 09.2	+47.9	51.4	64 45.9	+49.1	53.1	65 21.2	+50.3	54.8	65 55.1	+51.3	56.6	66 27.2	+52.5	58.5	66 57.7	+53.5	60.5	67 26.2	+54.7	62.6	67 52.8	+55.6	64.8	70
71	64 57.1	+47.2	50.0	65 35.0	+48.4	51.7	66 11.5	+49.5	53.5	66 46.4	+50.8	55.3	67 19.7	+51.9	57.3	67 51.2	+53.1	59.4	68 20.9	+54.1	61.5	68 48.4	+55.2	63.8	71
72	65 44.3	+46.3	48.5	66 23.4	+47.5	50.2	67 01.0	+48.7	52.0	67 37.2	+49.9	53.9	68 11.6	+51.2	56.0	68 44.3	+52.4	58.1	69 15.0	+53.6	60.3	69 43.6	+54.8	62.7	72
73	66 30.6	+45.2	46.9	67 10.9	+46.5	48.7	67 49.7	+47.9	50.5	68 27.1	+49.1	52.5	69 02.8	+50.4	54.5	69 36.7	+51.7	56.7	70 08.6	+53.0	59.0	70 38.4	+54.2	61.5	73
74	67 15.8	+44.1	45.3	67 57.4	+45.4	47.0	68 37.6	+46.7	48.9	69 16.2	+48.2	50.9	69 53.2	+49.6	53.0	70 28.4	+50.9	55.2	71 01.6	+52.3	57.6	71 32.6	+53.6	60.2	74
75	67 59.9	+42.9	43.5	68 42.8	+44.3	45.3	69 24.3	+45.7	47.1	70 04.4	+47.1	49.2	70 42.8	+48.5	51.3	71 19.3	+50.0	53.6	71 53.9	+51.5	56.1	72 26.2	+52.9	58.7	75
76	68 42.8	+41.5	41.6	69 27.1	+42.9	43.4	70 10.0	+44.4	45.3	70 51.5	+45.9	47.3	71 31.3	+47.4	49.5	72 09.3	+49.0	51.9	72 45.4	+50.5	54.4	73 19.1	+52.2	57.1	76
77	69 24.3	+40.1	39.6	70 10.0	+41.5	41.3	70 54.4	+43.0	43.2	71 37.4	+44.5	45.3	72 18.7	+46.2	47.5	72 58.3	+47.8	49.9	73 35.9	+49.5	52.5	74 11.3	+51.1	55.3	77
78	70 04.4	+38.4	37.4	70 51.5	+39.8	39.2	71 37.4	+41.3	41.1	72 21.9	+43.0	43.1	73 04.9	+44.6	45.4	73 46.1	+46.4	47.8	74 25.4	+48.2	50.5	75 02.4	+50.0	53.4	78
79	70 42.8	+36.5	35.1	71 31.3	+38.0	36.9	72 18.7	+39.6	38.7	73 04.9	+41.2	40.8	73 49.5	+43.0	43.0	74 32.5	+44.8	45.5	75 13.6	+46.7	48.2	75 52.4	+48.7	51.2	79
80	71 19.3	*+34.6*•	32.7	72 09.3	*+36.1*•	34.4	72 58.3	*+37.6*•	36.2	73 46.1	*+39.3*•	38.2	74 32.5	*+41.1*•	40.5	75 17.3	*+43.0*•	42.9	76 00.3	+44.9	45.7	76 41.1	+47.0	48.7	80
81	71 53.9	*+32.3*•	30.1	72 45.4	*+33.7*•	31.7	73 35.9	*+35.4*•	33.5	74 25.4	*+37.0*•	35.5	75 13.6	*+38.8*•	37.7	76 00.3	*+40.8*•	40.1	76 45.2	*+42.9*•	42.9	77 28.1	*+45.2*•	45.9	81
82	72 26.2	*+30.0*•	27.4	73 19.1	*+31.4*•	28.9	74 11.3	*+32.8*•	30.6	75 02.4	*+34.5*•	32.5	75 52.4	*+36.3*•	34.6	76 41.1	*+38.3*•	37.0	77 28.1	*+40.5*•	39.7	78 13.3	*+42.8*•	42.8	82
83	72 56.2	*+27.2*•	24.4	73 50.5	*+28.6*•	25.9	74 44.1	*+30.1*•	27.5	75 36.9	*+31.7*•	29.3	76 28.7	*+33.5*•	31.3	77 19.4	*+35.4*•	33.6	78 08.6	*+37.6*•	36.2	78 56.1	*+40.0*•	39.2	83
84	73 23.4	*+24.5*•	21.4	74 19.1	*+25.6*•	22.7	75 14.2	*+26.9*•	24.1	76 08.6	*+28.4*•	25.8	77 02.2	*+30.1*•	27.7	77 54.8	*+32.0*•	29.8	78 46.2	*+34.2*•	32.3	79 36.1	*+36.6*•	35.2	84
85	73 47.9	*+21.3*•	18.1	74 44.7	*+22.4*•	19.3	75 41.1	*+23.6*•	20.6	76 37.0	*+25.0*•	22.0	77 32.3	*+26.5*•	23.7	78 26.8	*+28.3*•	25.7	79 20.4	*+30.2*•	28.0	80 12.7	*+32.6*•	30.7	85
86	74 09.2	*+18.1*•	14.7	75 07.1	*+19.0*•	15.7	76 04.7	*+20.0*•	16.8	77 02.0	*+21.1*•	18.0	77 58.8	*+22.4*•	19.5	78 55.1	*+23.9*•	21.2	79 50.6	*+25.7*•	23.2	80 45.3	*+27.8*•	25.6	86
87	74 27.3	*+14.6*•	11.2	75 26.1	*+15.2*•	12.0	76 24.7	*+16.0*•	12.8	77 23.1	*+16.9*•	13.8	78 21.2	*+17.9*•	15.0	79 19.0	*+19.1*•	16.3	80 16.3	*+20.5*•	18.0	81 13.1	*+22.2*•	20.0	87
88	74 41.9	*+10.9*•	7.6	75 41.3	*+11.4*•	8.1	76 40.7	*+11.8*•	8.7	77 40.0	*+12.3*•	9.4	78 39.1	*+13.0*•	10.2	79 38.1	*+13.8*•	11.1	80 36.8	*+14.7*•	12.3	81 35.3	*+15.8*•	13.7	88
89	74 52.8	*+7.2*•	3.8	75 52.7	*+7.3*•	4.1	76 52.5	*+7.5*•	4.4	77 52.3	*+7.7*•	4.7	78 52.1	*+7.9*•	5.2	79 51.9	*+8.1*•	5.7	80 51.5	*+8.5*•	6.3	81 51.1	*+8.9*•	7.0	89
90	75 00.0	*+3.3*•	0.0	76 00.0	*+3.1*•	0.0	77 00.0	*+3.0*•	0.0	78 00.0	*+2.8*•	0.0	79 00.0	*+2.5*•	0.0	80 00.0	*+2.3*•	0.0	81 00.0	*+1.9*•	0.0	82 00.0	*+1.5*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 95°, 265°

86°, 274° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 02.1	+57.9	93.9	0 58.0	+58.2	93.9	0 53.9	+58.5	93.9	0 49.9	+58.7	93.9	0 45.8	+58.9	93.9	0 41.6	+59.1	93.9	0 37.5	+59.3	94.0	0 33.4	+59.4	94.0	**0**
1	2 00.0	+58.0	93.6	1 56.2	+58.3	93.6	1 52.4	+58.5	93.7	1 48.6	+58.6	93.7	1 44.7	+58.9	93.7	1 40.7	+59.1	93.8	1 36.8	+59.2	93.8	1 32.8	+59.4	93.8	**1**
2	2 58.0	+58.0	93.3	2 54.5	+58.2	93.4	2 50.9	+58.4	93.4	2 47.2	+58.7	93.5	2 43.6	+58.9	93.5	2 39.8	+59.1	93.6	2 36.0	+59.3	93.6	2 32.2	+59.4	93.7	**2**
3	3 56.0	+57.9	93.1	3 52.7	+58.2	93.2	3 49.3	+58.5	93.2	3 45.9	+58.7	93.3	3 42.5	+58.9	93.4	3 38.9	+59.1	93.4	3 35.3	+59.3	93.5	3 31.6	+59.4	93.5	**3**
4	4 53.9	+58.0	92.8	4 50.9	+58.2	92.9	4 47.8	+58.5	93.0	4 44.6	+58.7	93.1	4 41.4	+58.9	93.2	4 38.0	+59.1	93.2	4 34.6	+59.2	93.3	4 31.0	+59.5	93.4	**4**
5	5 51.9	+57.9	92.6	5 49.1	+58.2	92.7	5 46.3	+58.4	92.8	5 43.3	+58.7	92.9	5 40.3	+58.8	93.0	5 37.1	+59.1	93.1	5 33.8	+59.3	93.2	5 30.5	+59.4	93.3	**5**
6	6 49.8	+57.9	92.3	6 47.3	+58.2	92.4	6 44.7	+58.5	92.5	6 42.0	+58.7	92.7	6 39.1	+58.9	92.8	6 36.2	+59.1	92.9	6 33.1	+59.2	93.0	6 29.9	+59.4	93.1	**6**
7	7 47.7	+57.9	92.0	7 45.5	+58.2	92.2	7 43.2	+58.4	92.3	7 40.7	+58.6	92.5	7 38.0	+58.9	92.6	7 35.3	+59.0	92.7	7 32.3	+59.3	92.9	7 29.3	+59.4	93.0	**7**
8	8 45.6	+58.0	91.8	8 43.7	+58.2	91.9	8 41.6	+58.4	92.1	8 39.3	+58.7	92.2	8 36.9	+58.9	92.4	8 34.3	+59.1	92.5	8 31.6	+59.2	92.7	8 28.7	+59.4	92.8	**8**
9	9 43.6	+57.9	91.5	9 41.9	+58.2	91.7	9 40.0	+58.4	91.9	9 38.0	+58.6	92.0	9 35.8	+58.9	92.2	9 33.4	+59.1	92.4	9 30.8	+59.3	92.5	9 28.1	+59.4	92.7	**9**
10	10 41.5	+57.8	91.2	10 40.1	+58.1	91.4	10 38.4	+58.5	91.6	10 36.6	+58.7	91.8	10 34.7	+58.8	92.0	10 32.5	+59.0	92.2	10 30.1	+59.2	92.4	10 27.5	+59.4	92.6	**10**
11	11 39.3	+57.9	91.0	11 38.2	+58.2	91.2	11 36.9	+58.4	91.4	11 35.3	+58.6	91.6	11 33.5	+58.9	91.8	11 31.5	+59.1	92.0	11 29.3	+59.2	92.2	11 26.9	+59.4	92.4	**11**
12	12 37.2	+57.9	90.7	12 36.4	+58.1	90.9	12 35.3	+58.3	91.2	12 33.9	+58.7	91.4	12 32.4	+58.8	91.6	12 30.6	+59.0	91.8	12 28.5	+59.3	92.0	12 26.3	+59.4	92.3	**12**
13	13 35.1	+57.8	90.4	13 34.5	+58.1	90.7	13 33.6	+58.4	90.9	13 32.6	+58.6	91.2	13 31.2	+58.8	91.4	13 29.6	+59.1	91.6	13 27.8	+59.2	91.9	13 25.7	+59.4	92.1	**13**
14	14 32.9	+57.8	90.2	14 32.6	+58.1	90.4	14 32.0	+58.4	90.7	14 31.2	+58.6	90.9	14 30.0	+58.9	91.2	14 28.7	+59.0	91.5	14 27.0	+59.2	91.7	14 25.1	+59.3	92.0	**14**
15	15 30.7	+57.8	89.9	15 30.7	+58.1	90.2	15 30.4	+58.3	90.4	15 29.8	+58.6	90.7	15 28.9	+58.8	91.0	15 27.7	+59.0	91.3	15 26.2	+59.2	91.5	15 24.4	+59.4	91.8	**15**
16	16 28.5	+57.8	89.6	16 28.8	+58.0	89.9	16 28.7	+58.3	90.2	16 28.4	+58.5	90.5	16 27.7	+58.8	90.8	16 26.7	+59.0	91.1	16 25.4	+59.2	91.4	16 23.8	+59.4	91.7	**16**
17	17 26.3	+57.7	89.3	17 26.8	+58.1	89.6	17 27.0	+58.3	90.0	17 26.9	+58.6	90.3	17 26.5	+58.8	90.6	17 25.7	+59.0	90.9	17 24.6	+59.2	91.2	17 23.2	+59.3	91.5	**17**
18	18 24.0	+57.8	89.0	18 24.9	+58.0	89.4	18 25.3	+58.3	89.7	18 25.5	+58.5	90.0	18 25.3	+58.7	90.4	18 24.7	+59.0	90.7	18 23.8	+59.2	91.0	18 22.5	+59.4	91.4	**18**
19	19 21.8	+57.7	88.8	19 22.9	+58.0	89.1	19 23.6	+58.3	89.5	19 24.0	+58.5	89.8	19 24.0	+58.8	90.2	19 23.7	+59.0	90.5	19 23.0	+59.1	90.9	19 21.9	+59.3	91.2	**19**
20	20 19.5	+57.6	88.5	20 20.9	+57.9	88.8	20 21.9	+58.2	89.2	20 22.5	+58.5	89.6	20 22.8	+58.7	89.9	20 22.7	+58.9	90.3	20 22.1	+59.2	90.7	20 21.2	+59.4	91.1	**20**
21	21 17.1	+57.7	88.2	21 18.8	+58.0	88.6	21 20.1	+58.3	88.9	21 21.0	+58.5	89.3	21 21.5	+58.8	89.7	21 21.6	+59.0	90.1	21 21.3	+59.1	90.5	21 20.6	+59.3	90.9	**21**
22	22 14.8	+57.6	87.9	22 16.8	+57.9	88.3	22 18.4	+58.2	88.7	22 19.5	+58.5	89.1	22 20.3	+58.7	89.5	22 20.6	+58.9	89.9	22 20.4	+59.2	90.3	22 19.9	+59.3	90.7	**22**
23	23 12.4	+57.5	87.6	23 14.7	+57.9	88.0	23 16.6	+58.1	88.4	23 18.0	+58.4	88.9	23 19.0	+58.7	89.3	23 19.5	+58.9	89.7	23 19.6	+59.1	90.1	23 19.2	+59.3	90.6	**23**
24	24 09.9	+57.5	87.3	24 12.6	+57.8	87.7	24 14.7	+58.2	88.2	24 16.4	+58.4	88.6	24 17.7	+58.6	89.1	24 18.4	+58.9	89.5	24 18.7	+59.1	90.0	24 18.5	+59.3	90.4	**24**
25	25 07.4	+57.5	86.9	25 10.4	+57.8	87.4	25 12.9	+58.1	87.9	25 14.8	+58.4	88.4	25 16.3	+58.7	88.8	25 17.3	+58.9	89.3	25 17.8	+59.1	89.8	25 17.8	+59.3	90.2	**25**
26	26 04.9	+57.5	86.6	26 08.2	+57.8	87.1	26 11.0	+58.1	87.6	26 13.2	+58.4	88.1	26 15.0	+58.6	88.6	26 16.2	+58.8	89.1	26 16.9	+59.1	89.6	26 17.1	+59.2	90.1	**26**
27	27 02.4	+57.4	86.3	27 06.0	+57.7	86.8	27 09.1	+58.0	87.3	27 11.6	+58.3	87.8	27 13.6	+58.6	88.3	27 15.0	+58.9	88.9	27 16.0	+59.0	89.4	27 16.3	+59.3	89.9	**27**
28	27 59.8	+57.3	86.0	28 03.7	+57.7	86.5	28 07.1	+58.0	87.0	28 09.9	+58.3	87.6	28 12.2	+58.6	88.1	28 13.9	+58.8	88.6	28 15.0	+59.1	89.2	28 15.6	+59.2	89.7	**28**
29	28 57.1	+57.3	85.6	29 01.4	+57.7	86.2	29 05.1	+58.0	86.7	29 08.2	+58.3	87.3	29 10.8	+58.5	87.9	29 12.7	+58.8	88.4	29 14.1	+59.0	89.0	29 14.8	+59.3	89.5	**29**
30	29 54.4	+57.3	85.3	29 59.1	+57.6	85.9	30 03.1	+57.9	86.4	30 06.5	+58.2	87.0	30 09.3	+58.5	87.6	30 11.5	+58.8	88.2	30 13.1	+59.0	88.8	30 14.1	+59.2	89.4	**30**
31	30 51.7	+57.2	85.0	30 56.7	+57.5	85.5	31 01.0	+57.9	86.1	31 04.7	+58.2	86.7	31 07.8	+58.5	87.3	31 10.3	+58.7	88.0	31 12.1	+59.0	88.6	31 13.3	+59.2	89.2	**31**
32	31 48.9	+57.1	84.6	31 54.2	+57.5	85.2	31 58.9	+57.8	85.8	32 02.9	+58.2	86.5	32 06.3	+58.4	87.1	32 09.0	+58.7	87.7	32 11.1	+58.9	88.3	32 12.5	+59.2	89.0	**32**
33	32 46.0	+57.1	84.2	32 51.7	+57.4	84.9	32 56.7	+57.8	85.5	33 01.1	+58.1	86.2	33 04.7	+58.5	86.8	33 07.7	+58.7	87.5	33 10.0	+59.0	88.1	33 11.7	+59.1	88.8	**33**
34	33 43.1	+57.0	83.9	33 49.1	+57.4	84.5	33 54.5	+57.8	85.2	33 59.2	+58.1	85.9	34 03.2	+58.3	86.5	34 06.4	+58.7	87.2	34 09.0	+58.9	87.9	34 10.8	+59.2	88.6	**34**
35	34 40.1	+56.9	83.5	34 46.5	+57.4	84.2	34 52.3	+57.6	84.9	34 57.3	+58.0	85.6	35 01.5	+58.4	86.3	35 05.1	+58.6	87.0	35 07.9	+58.9	87.7	35 10.0	+59.1	88.4	**35**
36	35 37.0	+56.9	83.1	35 43.9	+57.2	83.8	35 49.9	+57.7	84.5	35 55.3	+58.0	85.3	35 59.9	+58.3	86.0	36 03.7	+58.6	86.7	36 06.8	+58.8	87.4	36 09.1	+59.1	88.2	**36**
37	36 33.9	+56.7	82.7	36 41.1	+57.2	83.4	36 47.6	+57.5	84.2	36 53.3	+57.9	84.9	36 58.2	+58.2	85.7	37 02.3	+58.5	86.4	37 05.6	+58.8	87.2	37 08.2	+59.0	87.9	**37**
38	37 30.6	+56.7	82.3	37 38.3	+57.1	83.1	37 45.1	+57.5	83.8	37 51.2	+57.8	84.6	37 56.4	+58.2	85.4	38 00.8	+58.5	86.2	38 04.4	+58.8	86.9	38 07.2	+59.1	87.7	**38**
39	38 27.3	+56.6	81.9	38 35.4	+57.0	82.7	38 42.6	+57.5	83.5	38 49.0	+57.8	84.3	38 54.6	+58.2	85.1	38 59.3	+58.5	85.9	39 03.2	+58.8	86.7	39 06.3	+59.0	87.5	**39**
40	39 23.9	+56.5	81.5	39 32.4	+57.0	82.3	39 40.1	+57.3	83.1	39 46.8	+57.8	83.9	39 52.8	+58.1	84.8	39 57.8	+58.4	85.6	40 02.0	+58.7	86.4	40 05.3	+59.0	87.3	**40**
41	40 20.4	+56.4	81.0	40 29.4	+56.8	81.9	40 37.4	+57.3	82.7	40 44.6	+57.7	83.6	40 50.9	+58.0	84.4	40 56.2	+58.4	85.3	41 00.7	+58.7	86.2	41 04.3	+59.0	87.0	**41**
42	41 16.8	+56.3	80.6	41 26.2	+56.8	81.4	41 34.7	+57.2	82.3	41 42.3	+57.6	83.2	41 48.9	+58.0	84.1	41 54.6	+58.3	85.0	41 59.4	+58.6	85.9	42 03.3	+58.9	86.8	**42**
43	42 13.1	+56.2	80.1	42 23.0	+56.6	81.0	42 31.9	+57.1	81.9	42 39.9	+57.5	82.8	42 46.9	+57.9	83.7	42 52.9	+58.3	84.7	42 58.0	+58.6	85.6	43 02.2	+58.9	86.5	**43**
44	43 09.3	+56.1	79.6	43 19.6	+56.6	80.6	43 29.0	+57.0	81.5	43 37.4	+57.4	82.4	43 44.8	+57.8	83.4	43 51.2	+58.2	84.3	43 56.6	+58.6	85.3	44 01.1	+58.8	86.3	**44**
45	44 05.4	+55.9	79.1	44 16.2	+56.4	80.1	44 26.0	+56.9	81.1	44 34.8	+57.4	82.0	44 42.6	+57.8	83.0	44 49.4	+58.2	84.0	44 55.2	+58.5	85.0	44 59.9	+58.8	86.0	**45**
46	45 01.3	+55.8	78.6	45 12.6	+56.3	79.6	45 22.9	+56.8	80.6	45 32.2	+57.2	81.6	45 40.4	+57.7	82.6	45 47.6	+58.1	83.6	45 53.7	+58.4	84.7	45 58.7	+58.8	85.7	**46**
47	45 57.1	+55.6	78.1	46 08.9	+56.2	79.1	46 19.7	+56.7	80.1	46 29.4	+57.2	81.2	46 38.1	+57.6	82.2	46 45.7	+58.0	83.3	46 52.1	+58.4	84.3	46 57.5	+58.7	85.4	**47**
48	46 52.7	+55.5	77.6	47 05.1	+56.0	78.6	47 16.4	+56.6	79.7	47 26.6	+57.1	80.7	47 35.7	+57.5	81.8	47 43.7	+57.9	82.9	47 50.5	+58.3	84.0	47 56.2	+58.7	85.1	**48**
49	47 48.2	+55.3	77.0	48 01.1	+55.9	78.1	48 13.0	+56.4	79.2	48 23.7	+56.9	80.3	48 33.2	+57.4	81.4	48 41.6	+57.9	82.5	48 48.8	+58.3	83.6	48 54.9	+58.6	84.8	**49**
50	48 43.5	+55.1	76.4	48 57.0	+55.7	77.5	49 09.4	+56.3	78.7	49 20.6	+56.8	79.8	49 30.6	+57.3	80.9	49 39.5	+57.7	82.1	49 47.1	+58.2	83.3	49 53.5	+58.6	84.5	**50**
51	49 38.6	+54.9	75.8	49 52.7	+55.6	77.0	50 05.7	+56.1	78.1	50 17.4	+56.7	79.3	50 27.9	+57.2	80.5	50 37.2	+57.7	81.7	50 45.3	+58.1	82.9	50 52.1	+58.5	84.1	**51**
52	50 33.5	+54.7	75.2	50 48.3	+55.3	76.4	51 01.8	+56.0	77.6	51 14.1	+56.5	78.8	51 25.1	+57.1	80.0	51 34.9	+57.6	81.2	51 43.4	+58.0	82.5	51 50.6	+58.4	83.8	**52**
53	51 28.2	+54.5	74.5	51 43.6	+55.2	75.7	51 57.8	+55.8	77.0	52 10.6	+56.4	78.2	52 22.2	+57.0	79.5	52 32.5	+57.4	80.8	52 41.4	+57.9	82.1	52 49.0	+58.4	83.4	**53**
54	52 22.7	+54.3	73.9	52 38.8	+54.9	75.1	52 53.6	+55.5	76.4	53 07.0	+56.2	77.7	53 19.2	+56.8	79.0	53 29.9	+57.4	80.3	53 39.3	+57.9	81.7	53 47.4	+58.2	83.0	**54**
55	53 17.0	+53.9	73.1	53 33.7	+54.7	74.4	53 49.1	+55.4	75.8	54 03.2	+56.1	77.1	54 16.0	+56.6	78.4	54 27.3	+57.2	79.8	54 37.2	+57.7	81.2	54 45.6	+58.2	82.6	**55**
56	54 10.9	+53.7	72.4	54 28.4	+54.5	73.7	54 44.5	+55.2	75.1	54 59.3	+55.8	76.5	55 12.6	+56.5	77.9	55 24.5	+57.0	79.3	55 34.9	+57.6	80.7	55 43.8	+58.1	82.2	**56**
57	55 04.6	+53.4	71.6	55 22.9	+54.1	73.0	55 39.7	+54.9	74.4	55 55.1	+55.6	75.8	56 09.1	+56.3	77.3	56 21.5	+57.0	78.7	56 32.5	+57.5	80.2	56 41.9	+58.0	81.7	**57**
58	55 58.0	+53.1	70.8	56 17.0	+53.9	72.2	56 34.6	+54.7	73.7	56 50.7	+55.4	75.2	57 05.4	+56.1	76.6	57 18.5	+56.7	78.2	57 30.0	+57.3	79.7	57 39.9	+57.9	81.2	**58**
59	56 51.1	+52.7	70.0	57 10.9	+53.6	71.4	57 29.3	+54.4	72.9	57 46.1	+55.2	74.4	58 01.5	+55.8	76.0	58 15.2	+56.6	77.5	58 27.3	+57.2	79.1	58 37.8	+57.8	80.7	**59**
60	57 43.8	+52.3	69.1	58 04.5	+53.2	70.6	58 23.7	+54.0	72.1	58 41.3	+54.9	73.7	58 57.3	+55.7	75.3	59 11.8	+56.3	76.9	59 24.5	+57.0	78.5	59 35.6	+57.6	80.2	**60**
61	58 36.1	+51.9	68.2	58 57.7	+52.8	69.7	59 17.7	+53.7	71.3	59 36.2	+54.5	72.9	59 53.0	+55.4	74.5	60 08.1	+56.2	76.2	60 21.5	+56.9	77.9	60 33.2	+57.5	79.7	**61**
62	59 28.0	+51.5	67.2	59 50.5	+52.4	68.8	60 11.4	+53.4	70.4	60 30.7	+54.3	72.1	60 48.4	+55.1	73.8	61 04.3	+55.9	75.5	61 18.4	+56.6	77.3	61 30.7	+57.3	79.1	**62**
63	60 19.5	+50.9	66.2	60 42.9	+52.0	67.8	61 04.8	+52.9	69.5	61 25.0	+53.9	71.2	61 43.5	+54.7	72.9	62 00.2	+55.6	74.7	62 15.0	+56.4	76.6	62 28.0	+57.1	78.4	**63**
64	61 10.4	+50.4	65.1	61 34.9	+51.4	66.8	61 57.7	+52.5	68.5	62 18.9	+53.5	70.3	62 38.2	+54.5	72.1	62 55.8	+55.3	73.9	63 11.4	+56.2	75.8	63 25.1	+57.0	77.8	**64**
65	62 00.8	+49.8	63.9	62 26.3	+50.9	65.7	62 50.2	+52.0	67.4	63 12.4	+53.0	69.3	63 32.7	+54.0	71.1	63 51.1	+55.0	73.1	64 07.6	+55.9	75.0	64 22.1	+56.7	77.1	**65**
66	62 50.6	+49.1	62.7	63 17.2	+50.4	64.5	63 42.2	+51.5	66.3	64 05.4	+52.6	68.2	64 26.7	+53.6	70.2	64 46.1	+54.6	72.1	65 03.5	+55.6	74.2	65 18.8	+56.4	76.3	**66**
67	63 39.7	+48.5	61.5	64 07.6	+49.6	63.3	64 33.7	+50.8	65.2	64 58.0	+52.0	67.1	65 20.3	+53.2	69.1	65 40.7	+54.3	71.2	65 59.1	+55.2	73.3	66 15.2	+56.2	75.5	**67**
68	64 28.2	+47.6	60.1	64 57.2	+48.9	62.0	65 24.5	+50.2	63.9	65 50.0	+51.4	65.9	66 13.5	+52.6	68.0	66 35.0	+53.7	70.1	66 54.3	+54.9	72.3	67 11.4	+55.9	74.6	**68**
69	65 15.8	+46.8	58.7	65 46.1	+48.1	60.6	66 14.7	+49.4	62.6	66 41.4	+50.7	64.6	67 06.1	+52.0	66.7	67 28.7	+53.3	69.0	67 49.2	+54.4	71.2	68 07.3	+55.5	73.6	**69**
70	66 02.6	+45.8	57.2	66 34.2	+47.3	59.1	67 04.1	+48.7	61.1	67 32.1	+50.1	63.2	67 58.1	+51.4	65.4	68 22.0	+52.6	67.7	68 43.6	+53.9	70.1	69 02.8	+55.0	72.6	**70**
71	66 48.4	+44.7	55.6	67 21.5	+46.2	57.5	67 52.8	+47.7	59.6	68 22.2	+49.1	61.8	68 49.5	+50.6	64.0	69 14.6	+52.0	66.4	69 37.5	+53.3	68.9	69 57.8	+54.6	71.4	**71**
72	67 33.1	+43.6	53.8	68 07.7	+45.1	55.8	68 40.5	+46.7	58.0	69 11.3	+48.2	60.2	69 40.1	+49.7	62.5	70 06.6	+51.3	65.0	70 30.8	+52.7	67.5	70 52.4	+54.1	70.2	**72**
73	68 16.7	+42.4	52.0	68 52.8	+44.0	54.0	69 27.2	+45.5	56.2	69 59.5	+47.2	58.5	70 29.8	+48.8	60.9	70 57.9	+50.4	63.4	71 23.5	+51.9	66.1	71 46.5	+53.4	68.8	**73**
74	68 59.1	+40.9	50.1	69 36.8	+42.5	52.1	70 12.7	+44.3	54.3	70 46.7	+46.0	56.6	71 18.6	+47.7	59.1	71 48.3	+49.4	61.7	72 15.4	+51.1	64.5	72 39.9	+52.7	67.3	**74**
75	69 40.0	+39.3	48.0	70 19.3	+41.1	50.1	70 57.0	+42.8	52.3	71 32.7	+44.6	54.6	72 06.3	+46.5	57.2	72 37.7	+48.3	59.9	73 06.5	+50.1	62.7	73 32.6	+51.9	65.7	**75**
76	70 19.3	+37.7	45.8	71 00.4	+39.4	47.9	71 39.8	+41.2	50.1	72 17.3	+43.1	52.5	72 52.8	+45.0	55.1	73 26.0	+46.9	57.8	73 56.6	+48.9	60.8	74 24.5	+50.8	63.9	**76**
77	70 57.0	*+35.7*•	43.4	71 39.8	+37.5	45.5	72 21.0	+39.4	47.7	73 00.4	+41.4	50.2	73 37.8	+43.4	52.8	74 12.9	+45.5	55.6	74 45.5	+47.6	58.6	75 15.3	+49.7	61.9	**77**
78	71 32.7	*+33.6*•	40.9	72 17.3	*+35.5*•	43.0	73 00.4	*+37.4*•	45.2	73 41.8	*+39.4*•	47.6	74 21.2	*+41.5*•	50.3	74 58.4	+43.7	53.1	75 33.1	+46.0	56.2	76 05.0	+48.2	59.6	**78**
79	72 06.3	*+31.4*•	38.3	72 52.8	*+33.2*•	40.3	73 37.8	*+35.1*•	42.5	74 21.2	*+37.2*•	44.9	75 02.7	*+39.4*•	47.5	75 42.1	*+41.7*•	50.4	76 19.1	*+44.1*•	53.6	76 53.2	+46.6	57.0	**79**
80	72 37.7	*+28.8*•	35.5	73 26.0	*+30.6*•	37.4	74 12.9	*+32.6*•	39.6	74 58.4	*+34.7*•	41.9	75 42.1	*+37.0*•	44.5	76 23.8	*+39.4*•	47.4	77 03.2	*+41.9*•	50.6	77 39.8	*+44.5*•	54.2	**80**
81	73 06.5	*+26.1*•	32.5	73 56.6	*+27.9*•	34.3	74 45.5	*+29.8*•	36.4	75 33.1	*+31.9*•	38.7	76 19.1	*+34.1*•	41.3	77 03.2	*+36.6*•	44.1	77 45.1	*+39.2*•	47.4	78 24.3	*+42.1*•	50.9	**81**
82	73 32.6	*+23.2*•	29.3	74 24.5	*+24.9*•	31.1	75 15.3	*+26.8*•	33.1	76 05.0	*+28.8*•	35.3	76 53.2	*+31.0*•	37.7	77 39.8	*+33.5*•	40.5	78 24.3	*+36.2*•	43.7	79 06.4	*+39.2*•	47.3	**82**
83	73 55.8	*+20.0*•	26.1	74 49.4	*+21.5*•	27.7	75 42.1	*+23.3*•	29.5	76 33.8	*+25.2*•	31.5	77 24.2	*+27.5*•	33.9	78 13.3	*+29.8*•	36.6	79 00.5	*+32.6*•	39.6	79 45.6	*+35.6*•	43.1	**83**
84	74 15.8	*+16.7*•	22.6	75 10.9	*+18.1*•	24.1	76 05.4	*+19.6*•	25.7	76 59.0	*+21.4*•	27.6	77 51.7	*+23.4*•	29.7	78 43.1	*+25.8*•	32.2	79 33.1	*+28.4*•	35.1	80 21.2	*+31.3*•	38.5	**84**
85	74 32.5	*+13.1*•	19.0	75 29.0	*+14.3*•	20.3	76 25.0	*+15.7*•	21.7	77 20.4	*+17.3*•	23.4	78 15.1	*+19.0*•	25.3	79 08.9	*+21.1*•	27.5	80 01.5	*+23.5*•	30.1	80 52.5	*+26.4*•	33.2	**85**
86	74 45.6	*+9.4*•	15.4	75 43.3	*+10.4*•	16.4	76 40.7	*+11.5*•	17.6	77 37.7	*+12.7*•	19.0	78 34.1	*+14.3*•	20.6	79 30.0	*+16.0*•	22.4	80 25.0	*+18.1*•	24.7	81 18.9	*+20.6*•	27.4	**86**
87	74 55.0	*+5.6*•	11.6	75 53.7	*+6.3*•	12.4	76 52.2	*+7.1*•	13.3	77 50.4	*+8.1*•	14.4	78 48.4	*+9.2*•	15.6	79 46.0	*+10.5*•	17.1	80 43.1	*+12.1*•	18.9	81 39.5	*+14.0*•	21.1	**87**
88	75 00.6	*+1.6*•	7.7	76 00.0	*+2.1*•	8.3	76 59.3	*+2.6*•	8.9	77 58.5	*+3.2*•	9.6	78 57.6	*+3.9*•	10.5	79 56.5	*+4.7*•	11.5	80 55.2	*+5.7*•	12.7	81 53.5	*+7.0*•	14.3	**88**
89	75 02.2	*–2.2*•	3.9	76 02.1	*–2.1*•	4.1	77 01.9	*–1.9*•	4.4	78 01.7	*–1.7*•	4.8	79 01.5	*–1.5*•	5.2	80 01.2	*–1.2*•	5.8	81 00.9	*–0.9*•	6.4	82 00.5	*–0.5*•	7.2	**89**
90	75 00.0	*–6.1*•	0.0	76 00.0	*–6.3*•	0.0	77 00.0	*–6.4*•	0.0	78 00.0	*–6.6*•	0.0	79 00.0	*–6.8*•	0.0	80 00.0	*–7.1*•	0.0	81 00.0	*–7.4*•	0.0	82 00.0	*–7.8*•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

86°, 274° L.H.A.   LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 86°, 274°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 02.1	– 58.0	93.9	0 58.0	– 58.2	93.9	0 53.9	– 58.4	93.9	0 49.9	– 58.7	93.9	0 45.8	– 58.9	93.9	0 41.6	– 59.1	93.9	0 37.5	– 59.3	94.0	0 33.4	– 59.4	94.0	**0**
1	0 04.1	– 58.0	94.1	0 00.2	+ 58.2	85.9	0 04.5	+ 58.5	85.9	0 08.8	+ 58.7	85.9	0 13.1	+ 58.9	85.9	0 17.5	+ 59.0	85.9	0 21.8	+ 59.2	85.9	0 26.0	+ 59.5	85.9	**1**
2	0 53.9	+ 57.9	85.6	0 58.4	+ 58.3	85.6	1 03.0	+ 58.5	85.7	1 07.5	+ 58.7	85.7	1 12.0	+ 58.9	85.7	1 16.5	+ 59.1	85.7	1 21.0	+ 59.3	85.7	1 25.5	+ 59.4	85.8	**2**
3	1 51.8	+ 58.0	85.4	1 56.7	+ 58.2	85.4	2 01.5	+ 58.4	85.4	2 06.2	+ 58.7	85.5	2 10.9	+ 59.0	85.5	2 15.6	+ 59.1	85.5	2 20.3	+ 59.2	85.6	2 24.9	+ 59.4	85.6	**3**
4	2 49.8	+ 57.9	85.1	2 54.9	+ 58.2	85.2	2 59.9	+ 58.5	85.2	3 04.9	+ 58.7	85.3	3 09.9	+ 58.8	85.3	3 14.7	+ 59.1	85.4	3 19.5	+ 59.3	85.4	3 24.3	+ 59.4	85.5	**4**
5	3 47.7	+ 58.0	84.8	3 53.1	+ 58.2	84.9	3 58.4	+ 58.5	85.0	4 03.6	+ 58.7	85.0	4 08.7	+ 58.9	85.1	4 13.8	+ 59.1	85.2	4 18.8	+ 59.3	85.3	4 23.7	+ 59.4	85.3	**5**
6	4 45.7	+ 57.9	84.6	4 51.3	+ 58.2	84.7	4 56.9	+ 58.4	84.8	5 02.3	+ 58.7	84.8	5 07.6	+ 58.9	84.9	5 12.9	+ 59.1	85.0	5 18.1	+ 59.2	85.1	5 23.1	+ 59.4	85.2	**6**
7	5 43.6	+ 58.0	84.3	5 49.5	+ 58.2	84.4	5 55.3	+ 58.5	84.5	6 01.0	+ 58.7	84.6	6 06.5	+ 58.9	84.7	6 12.0	+ 59.1	84.8	6 17.3	+ 59.3	85.0	6 22.5	+ 59.5	85.1	**7**
8	6 41.6	+ 57.9	84.1	6 47.7	+ 58.2	84.2	6 53.8	+ 58.4	84.3	6 59.7	+ 58.6	84.4	7 05.4	+ 58.9	84.5	7 11.1	+ 59.0	84.7	7 16.6	+ 59.2	84.8	7 22.0	+ 59.4	84.9	**8**
9	7 39.5	+ 57.9	83.8	7 45.9	+ 58.2	83.9	7 52.2	+ 58.4	84.1	7 58.3	+ 58.7	84.2	8 04.3	+ 58.9	84.3	8 10.1	+ 59.1	84.5	8 15.8	+ 59.3	84.6	8 21.4	+ 59.4	84.8	**9**
10	8 37.4	+ 58.0	83.5	8 44.1	+ 58.2	83.7	8 50.6	+ 58.5	83.8	8 57.0	+ 58.7	84.0	9 03.2	+ 58.9	84.2	9 09.2	+ 59.1	84.3	9 15.1	+ 59.2	84.5	9 20.8	+ 59.4	84.6	**10**
11	9 35.4	+ 57.9	83.3	9 42.3	+ 58.2	83.4	9 49.1	+ 58.4	83.6	9 55.7	+ 58.6	83.8	10 02.1	+ 58.8	84.0	10 08.3	+ 59.0	84.1	10 14.3	+ 59.3	84.3	10 20.2	+ 59.4	84.5	**11**
12	10 33.3	+ 57.8	83.0	10 40.5	+ 58.1	83.2	10 47.5	+ 58.4	83.4	10 54.3	+ 58.6	83.6	11 00.9	+ 58.9	83.8	11 07.3	+ 59.1	84.0	11 13.6	+ 59.2	84.2	11 19.6	+ 59.4	84.4	**12**
13	11 31.1	+ 57.9	82.7	11 38.6	+ 58.2	82.9	11 45.9	+ 58.4	83.1	11 52.9	+ 58.7	83.4	11 59.8	+ 58.8	83.6	12 06.4	+ 59.0	83.8	12 12.8	+ 59.2	84.0	12 19.0	+ 59.3	84.2	**13**
14	12 29.0	+ 57.9	82.5	12 36.8	+ 58.1	82.7	12 44.3	+ 58.4	82.9	12 51.6	+ 58.6	83.1	12 58.6	+ 58.9	83.4	13 05.4	+ 59.1	83.6	13 12.0	+ 59.2	83.8	13 18.3	+ 59.4	84.1	**14**
15	13 26.9	+ 57.8	82.2	13 34.9	+ 58.1	82.4	13 42.7	+ 58.3	82.7	13 50.2	+ 58.6	82.9	13 57.5	+ 58.8	83.2	14 04.5	+ 59.0	83.4	14 11.2	+ 59.3	83.7	14 17.7	+ 59.4	83.9	**15**
16	14 24.7	+ 57.8	81.9	14 33.0	+ 58.1	82.2	14 41.0	+ 58.4	82.4	14 48.8	+ 58.6	82.7	14 56.3	+ 58.8	83.0	15 03.5	+ 59.0	83.2	15 10.5	+ 59.2	83.5	15 17.1	+ 59.4	83.8	**16**
17	15 22.5	+ 57.8	81.6	15 31.1	+ 58.1	81.9	15 39.4	+ 58.3	82.2	15 47.4	+ 58.6	82.5	15 55.1	+ 58.8	82.8	16 02.5	+ 59.0	83.0	16 09.7	+ 59.2	83.3	16 16.5	+ 59.3	83.6	**17**
18	16 20.3	+ 57.8	81.4	16 29.2	+ 58.0	81.7	16 37.7	+ 58.4	82.0	16 46.0	+ 58.6	82.2	16 53.9	+ 58.8	82.5	17 01.5	+ 59.0	82.9	17 08.9	+ 59.1	83.2	17 15.8	+ 59.4	83.5	**18**
19	17 18.1	+ 57.8	81.1	17 27.2	+ 58.1	81.4	17 36.1	+ 58.3	81.7	17 44.6	+ 58.5	82.0	17 52.7	+ 58.8	82.3	18 00.5	+ 59.0	82.7	18 08.0	+ 59.2	83.0	18 15.2	+ 59.4	83.3	**19**
20	18 15.9	+ 57.7	80.8	18 25.3	+ 58.0	81.1	18 34.4	+ 58.3	81.5	18 43.1	+ 58.5	81.8	18 51.5	+ 58.8	82.1	18 59.5	+ 59.0	82.5	19 07.2	+ 59.2	82.8	19 14.6	+ 59.3	83.2	**20**
21	19 13.6	+ 57.7	80.5	19 23.3	+ 58.0	80.9	19 32.7	+ 58.2	81.2	19 41.6	+ 58.6	81.6	19 50.3	+ 58.7	81.9	19 58.5	+ 59.0	82.3	20 06.4	+ 59.2	82.6	20 13.9	+ 59.3	83.0	**21**
22	20 11.3	+ 57.7	80.2	20 21.3	+ 58.0	80.6	20 30.9	+ 58.3	81.0	20 40.2	+ 58.5	81.3	20 49.0	+ 58.7	81.7	20 57.5	+ 58.9	82.1	21 05.6	+ 59.1	82.5	21 13.2	+ 59.4	82.8	**22**
23	21 09.0	+ 57.6	79.9	21 19.3	+ 57.9	80.3	21 29.2	+ 58.2	80.7	21 38.7	+ 58.4	81.1	21 47.7	+ 58.8	81.5	21 56.4	+ 59.0	81.9	22 04.7	+ 59.1	82.3	22 12.6	+ 59.3	82.7	**23**
24	22 06.6	+ 57.6	79.6	22 17.2	+ 57.9	80.0	22 27.4	+ 58.2	80.4	22 37.1	+ 58.5	80.8	22 46.5	+ 58.7	81.3	22 55.4	+ 58.9	81.7	23 03.8	+ 59.2	82.1	23 11.9	+ 59.3	82.5	**24**
25	23 04.2	+ 57.6	79.3	23 15.1	+ 57.9	79.7	23 25.6	+ 58.1	80.2	23 35.6	+ 58.4	80.6	23 45.2	+ 58.6	81.0	23 54.3	+ 58.9	81.5	24 03.0	+ 59.1	81.9	24 11.2	+ 59.3	82.4	**25**
26	24 01.8	+ 57.5	79.0	24 13.0	+ 57.8	79.5	24 23.7	+ 58.2	79.9	24 34.0	+ 58.4	80.3	24 43.8	+ 58.7	80.8	24 53.2	+ 58.9	81.3	25 02.1	+ 59.1	81.7	25 10.5	+ 59.3	82.2	**26**
27	24 59.3	+ 57.5	78.7	25 10.8	+ 57.8	79.2	25 21.9	+ 58.1	79.6	25 32.4	+ 58.4	80.1	25 42.5	+ 58.6	80.6	25 52.1	+ 58.9	81.0	26 01.2	+ 59.1	81.5	26 09.8	+ 59.2	82.0	**27**
28	25 56.8	+ 57.4	78.4	26 08.6	+ 57.8	78.9	26 20.0	+ 58.0	79.4	26 30.8	+ 58.4	79.8	26 41.1	+ 58.6	80.3	26 51.0	+ 58.8	80.8	27 00.3	+ 59.0	81.3	27 09.0	+ 59.3	81.8	**28**
29	26 54.2	+ 57.5	78.1	27 06.4	+ 57.7	78.6	27 18.0	+ 58.1	79.1	27 29.2	+ 58.3	79.6	27 39.7	+ 58.6	80.1	27 49.8	+ 58.8	80.6	27 59.3	+ 59.1	81.1	28 08.3	+ 59.2	81.7	**29**
30	27 51.7	+ 57.3	77.7	28 04.1	+ 57.7	78.3	28 16.1	+ 58.0	78.8	28 27.5	+ 58.3	79.3	28 38.3	+ 58.6	79.8	28 48.6	+ 58.8	80.4	28 58.4	+ 59.0	80.9	29 07.5	+ 59.3	81.5	**30**
31	28 49.0	+ 57.3	77.4	29 01.8	+ 57.7	77.9	29 14.1	+ 57.9	78.5	29 25.8	+ 58.2	79.0	29 36.9	+ 58.5	79.6	29 47.4	+ 58.8	80.2	29 57.4	+ 59.0	80.7	30 06.8	+ 59.2	81.3	**31**
32	29 46.3	+ 57.3	77.1	29 59.5	+ 57.6	77.6	30 12.0	+ 58.0	78.2	30 24.0	+ 58.2	78.8	30 35.4	+ 58.5	79.3	30 46.2	+ 58.8	79.9	30 56.4	+ 59.0	80.5	31 06.0	+ 59.2	81.1	**32**
33	30 43.6	+ 57.2	76.7	30 57.1	+ 57.5	77.3	31 10.0	+ 57.8	77.9	31 22.2	+ 58.2	78.5	31 33.9	+ 58.5	79.1	31 45.0	+ 58.7	79.7	31 55.4	+ 59.0	80.3	32 05.2	+ 59.2	80.9	**33**
34	31 40.8	+ 57.1	76.4	31 54.6	+ 57.5	77.0	32 07.8	+ 57.9	77.6	32 20.4	+ 58.2	78.2	32 32.4	+ 58.4	78.8	32 43.7	+ 58.7	79.4	32 54.4	+ 58.9	80.1	33 04.4	+ 59.1	80.7	**34**
35	32 37.9	+ 57.1	76.0	32 52.1	+ 57.5	76.6	33 05.7	+ 57.8	77.3	33 18.6	+ 58.1	77.9	33 30.8	+ 58.4	78.5	33 42.4	+ 58.7	79.2	33 53.3	+ 58.9	79.9	34 03.5	+ 59.2	80.5	**35**
36	33 35.0	+ 57.0	75.6	33 49.6	+ 57.3	76.3	34 03.5	+ 57.7	76.9	34 16.7	+ 58.0	77.6	34 29.2	+ 58.4	78.3	34 41.1	+ 58.6	78.9	34 52.2	+ 58.9	79.6	35 02.7	+ 59.1	80.3	**36**
37	34 32.0	+ 57.0	75.3	34 46.9	+ 57.4	75.9	35 01.2	+ 57.7	76.6	35 14.7	+ 58.0	77.3	35 27.6	+ 58.3	78.0	35 39.7	+ 58.6	78.7	35 51.1	+ 58.9	79.4	36 01.8	+ 59.1	80.1	**37**
38	35 29.0	+ 56.8	74.9	35 44.3	+ 57.2	75.6	35 58.9	+ 57.6	76.3	36 12.7	+ 58.0	77.0	36 25.9	+ 58.3	77.7	36 38.3	+ 58.6	78.4	36 50.0	+ 58.8	79.2	37 00.9	+ 59.1	79.9	**38**
39	36 25.8	+ 56.8	74.5	36 41.5	+ 57.2	75.2	36 56.5	+ 57.5	75.9	37 10.7	+ 57.9	76.7	37 24.2	+ 58.2	77.4	37 36.9	+ 58.5	78.1	37 48.8	+ 58.8	78.9	38 00.0	+ 59.0	79.7	**39**
40	37 22.6	+ 56.7	74.1	37 38.7	+ 57.1	74.8	37 54.0	+ 57.5	75.6	38 08.6	+ 57.8	76.3	38 22.4	+ 58.2	77.1	38 35.4	+ 58.5	77.9	38 47.6	+ 58.8	78.7	38 59.0	+ 59.0	79.4	**40**
41	38 19.3	+ 56.6	73.7	38 35.8	+ 57.0	74.4	38 51.5	+ 57.4	75.2	39 06.4	+ 57.8	76.0	39 20.6	+ 58.1	76.8	39 33.9	+ 58.4	77.6	39 46.4	+ 58.7	78.4	39 58.0	+ 59.0	79.2	**41**
42	39 15.9	+ 56.5	73.2	39 32.8	+ 57.0	74.0	39 48.9	+ 57.4	74.8	40 04.2	+ 57.8	75.6	40 18.7	+ 58.1	76.5	40 32.3	+ 58.4	77.3	40 45.1	+ 58.7	78.1	40 57.0	+ 59.0	79.0	**42**
43	40 12.4	+ 56.5	72.8	40 29.8	+ 56.8	73.6	40 46.3	+ 57.2	74.4	41 02.0	+ 57.6	75.3	41 16.8	+ 58.0	76.1	41 30.7	+ 58.4	77.0	41 43.8	+ 58.7	77.8	41 56.0	+ 58.9	78.7	**43**
44	41 08.9	+ 56.3	72.4	41 26.6	+ 56.8	73.2	41 43.5	+ 57.2	74.0	41 59.6	+ 57.6	74.9	42 14.8	+ 57.9	75.8	42 29.1	+ 58.3	76.7	42 42.5	+ 58.6	77.6	42 54.9	+ 58.9	78.5	**44**
45	42 05.2	+ 56.2	71.9	42 23.4	+ 56.6	72.8	42 40.7	+ 57.1	73.6	42 57.2	+ 57.5	74.5	43 12.7	+ 57.9	75.4	43 27.4	+ 58.2	76.3	43 41.1	+ 58.5	77.3	43 53.8	+ 58.9	78.2	**45**
46	43 01.4	+ 56.0	71.4	43 20.0	+ 56.6	72.3	43 37.8	+ 57.0	73.2	43 54.7	+ 57.4	74.1	44 10.6	+ 57.8	75.1	44 25.6	+ 58.2	76.0	44 39.6	+ 58.5	77.0	44 52.7	+ 58.8	77.9	**46**
47	43 57.4	+ 56.0	70.9	44 16.6	+ 56.4	71.8	44 34.8	+ 56.9	72.8	44 52.1	+ 57.3	73.7	45 08.4	+ 57.8	74.7	45 23.8	+ 58.1	75.7	45 38.1	+ 58.5	76.7	45 51.5	+ 58.7	77.7	**47**
48	44 53.4	+ 55.8	70.4	45 13.0	+ 56.3	71.4	45 31.7	+ 56.8	72.3	45 49.4	+ 57.3	73.3	46 06.2	+ 57.6	74.3	46 21.9	+ 58.0	75.3	46 36.6	+ 58.4	76.3	46 50.2	+ 58.8	77.4	**48**
49	45 49.2	+ 55.6	69.9	46 09.3	+ 56.2	70.9	46 28.5	+ 56.7	71.9	46 46.7	+ 57.1	72.9	47 03.8	+ 57.6	73.9	47 19.9	+ 58.0	74.9	47 35.0	+ 58.3	76.0	47 49.0	+ 58.7	77.1	**49**
50	46 44.8	+ 55.5	69.4	47 05.5	+ 56.0	70.4	47 25.2	+ 56.5	71.4	47 43.8	+ 57.0	72.4	48 01.4	+ 57.5	73.5	48 17.9	+ 57.9	74.6	48 33.3	+ 58.3	75.6	48 47.7	+ 58.6	76.7	**50**
51	47 40.3	+ 55.4	68.8	48 01.5	+ 55.9	69.8	48 21.7	+ 56.4	70.9	48 40.8	+ 56.9	72.0	48 58.9	+ 57.3	73.0	49 15.8	+ 57.8	74.2	49 31.6	+ 58.2	75.3	49 46.3	+ 58.5	76.4	**51**
52	48 35.7	+ 55.1	68.2	48 57.4	+ 55.7	69.3	49 18.1	+ 56.3	70.4	49 37.7	+ 56.8	71.5	49 56.2	+ 57.3	72.6	50 13.6	+ 57.7	73.7	50 29.8	+ 58.1	74.9	50 44.8	+ 58.6	76.1	**52**
53	49 30.8	+ 55.0	67.6	49 53.1	+ 55.6	68.7	50 14.4	+ 56.1	69.8	50 34.5	+ 56.6	71.0	50 53.5	+ 57.1	72.1	51 11.3	+ 57.6	73.3	51 27.9	+ 58.1	74.5	51 43.4	+ 58.4	75.7	**53**
54	50 25.8	+ 54.7	67.0	50 48.7	+ 55.3	68.1	51 10.5	+ 55.9	69.3	51 31.1	+ 56.5	70.4	51 50.6	+ 57.0	71.6	52 08.9	+ 57.5	72.9	52 26.0	+ 57.9	74.1	52 41.8	+ 58.4	75.4	**54**
55	51 20.5	+ 54.5	66.3	51 44.0	+ 55.2	67.5	52 06.4	+ 55.8	68.7	52 27.6	+ 56.4	69.9	52 47.6	+ 56.9	71.1	53 06.4	+ 57.4	72.4	53 23.9	+ 57.9	73.7	53 40.2	+ 58.3	75.0	**55**
56	52 15.0	+ 54.3	65.7	52 39.2	+ 54.9	66.9	53 02.2	+ 55.5	68.1	53 24.0	+ 56.1	69.3	53 44.5	+ 56.8	70.6	54 03.8	+ 57.3	71.9	54 21.8	+ 57.8	73.2	54 38.5	+ 58.2	74.6	**56**
57	53 09.3	+ 54.0	65.0	53 34.1	+ 54.7	66.2	53 57.7	+ 55.4	67.4	54 20.1	+ 56.0	68.7	54 41.3	+ 56.5	70.0	55 01.1	+ 57.1	71.4	55 19.6	+ 57.6	72.7	55 36.7	+ 58.1	74.1	**57**
58	54 03.3	+ 53.8	64.2	54 28.8	+ 54.5	65.5	54 53.1	+ 55.1	66.8	55 16.1	+ 55.8	68.1	55 37.8	+ 56.4	69.5	55 58.2	+ 57.0	70.8	56 17.2	+ 57.5	72.3	56 34.8	+ 58.0	73.7	**58**
59	54 57.1	+ 53.4	63.5	55 23.3	+ 54.1	64.8	55 48.2	+ 54.9	66.1	56 11.9	+ 55.6	67.4	56 34.2	+ 56.2	68.8	56 55.2	+ 56.8	70.3	57 14.7	+ 57.4	71.7	57 32.8	+ 57.9	73.2	**59**
60	55 50.5	+ 53.1	62.7	56 17.4	+ 53.9	64.0	56 43.1	+ 54.6	65.4	57 07.5	+ 55.3	66.8	57 30.4	+ 56.0	68.2	57 52.0	+ 56.6	69.7	58 12.1	+ 57.2	71.2	58 30.7	+ 57.8	72.7	**60**
61	56 43.6	+ 52.8	61.8	57 11.3	+ 53.6	63.2	57 37.7	+ 54.3	64.6	58 02.8	+ 55.0	66.0	58 26.4	+ 55.8	67.5	58 48.6	+ 56.5	69.0	59 09.3	+ 57.1	70.6	59 28.5	+ 57.6	72.2	**61**
62	57 36.4	+ 52.3	60.9	58 04.9	+ 53.2	62.3	58 32.0	+ 54.1	63.8	58 57.8	+ 54.8	65.3	59 22.2	+ 55.5	66.8	59 45.1	+ 56.2	68.4	60 06.4	+ 56.9	70.0	60 26.1	+ 57.5	71.7	**62**
63	58 28.7	+ 52.0	60.0	58 58.1	+ 52.8	61.5	59 26.1	+ 53.6	62.9	59 52.6	+ 54.5	64.5	60 17.7	+ 55.3	66.1	60 41.3	+ 56.0	67.7	61 03.3	+ 56.7	69.4	61 23.6	+ 57.3	71.1	**63**
64	59 20.7	+ 51.5	59.1	59 50.9	+ 52.4	60.5	60 19.7	+ 53.3	62.1	60 47.1	+ 54.1	63.6	61 13.0	+ 55.0	65.3	61 37.3	+ 55.7	66.9	62 00.0	+ 56.5	68.7	62 20.9	+ 57.2	70.4	**64**
65	60 12.2	+ 51.0	58.0	60 43.3	+ 52.0	59.5	61 13.0	+ 52.9	61.1	61 41.2	+ 53.8	62.7	62 08.0	+ 54.6	64.4	62 33.0	+ 55.5	66.1	62 56.5	+ 56.2	67.9	63 18.1	+ 57.0	69.8	**65**
66	61 03.2	+ 50.5	57.0	61 35.3	+ 51.4	58.5	62 05.9	+ 52.4	60.1	62 35.0	+ 53.4	61.8	63 02.6	+ 54.2	63.5	63 28.5	+ 55.1	65.3	63 52.7	+ 56.0	67.2	64 15.1	+ 56.7	69.1	**66**
67	61 53.7	+ 49.9	55.8	62 26.7	+ 50.9	57.4	62 58.3	+ 51.9	59.1	63 28.4	+ 52.9	60.8	63 56.8	+ 53.9	62.6	64 23.6	+ 54.8	64.4	64 48.7	+ 55.6	66.3	65 11.8	+ 56.5	68.3	**67**
68	62 43.6	+ 49.2	54.6	63 17.6	+ 50.3	56.3	63 50.2	+ 51.4	57.9	64 21.3	+ 52.4	59.7	64 50.7	+ 53.4	61.5	65 18.4	+ 54.4	63.4	65 44.3	+ 55.4	65.4	66 08.3	+ 56.2	67.5	**68**
69	63 32.8	+ 48.5	53.4	64 07.9	+ 49.7	55.0	64 41.6	+ 50.7	56.8	65 13.7	+ 51.8	58.6	65 44.1	+ 52.9	60.4	66 12.8	+ 54.0	62.4	66 39.7	+ 54.9	64.5	67 04.5	+ 55.9	66.6	**69**
70	64 21.3	+ 47.8	52.0	64 57.6	+ 48.9	53.7	65 32.3	+ 50.1	55.5	66 05.5	+ 51.2	57.3	66 37.0	+ 52.4	59.3	67 06.8	+ 53.4	61.3	67 34.6	+ 54.5	63.4	68 00.4	+ 55.5	65.7	**70**
71	65 09.1	+ 46.9	50.6	65 46.5	+ 48.1	52.3	66 22.4	+ 49.3	54.1	66 56.7	+ 50.6	56.0	67 29.4	+ 51.7	58.0	68 00.2	+ 53.0	60.1	68 29.1	+ 54.1	62.3	68 55.9	+ 55.2	64.6	**71**
72	65 56.0	+ 46.0	49.1	66 34.6	+ 47.2	50.8	67 11.7	+ 48.5	52.7	67 47.3	+ 49.7	54.6	68 21.1	+ 51.1	56.7	68 53.2	+ 52.2	58.8	69 23.2	+ 53.5	61.1	69 51.1	+ 54.6	63.5	**72**
73	66 42.0	+ 44.9	47.5	67 21.8	+ 46.2	49.3	68 00.2	+ 47.6	51.1	68 37.0	+ 48.9	53.1	69 12.2	+ 50.2	55.2	69 45.4	+ 51.6	57.5	70 16.7	+ 52.8	59.8	70 45.7	+ 54.2	62.3	**73**
74	67 26.9	+ 43.8	45.8	68 08.0	+ 45.2	47.6	68 47.8	+ 46.5	49.5	69 25.9	+ 48.0	51.5	70 02.4	+ 49.3	53.7	70 37.0	+ 50.8	55.9	71 09.5	+ 52.2	58.4	71 39.9	+ 53.5	60.9	**74**
75	68 10.7	+ 42.5	44.0	68 53.2	+ 43.9	45.8	69 34.3	+ 45.3	47.7	70 13.9	+ 46.8	49.8	70 51.7	+ 48.4	52.0	71 27.8	+ 49.8	54.3	72 01.7	+ 51.3	56.8	72 33.4	+ 52.8	59.5	**75**
76	68 53.2	+ 41.1	42.1	69 37.1	+ 42.5	43.9	70 19.6	+ 44.1	45.8	71 00.7	+ 45.6	47.9	71 40.1	+ 47.1	50.1	72 17.6	+ 48.7	52.5	72 53.0	+ 50.4	55.1	73 26.2	+ 52.0	57.8	**76**
77	69 34.3	+ 39.6	40.0	70 19.6	+ 41.1	41.8	71 03.7	+ 42.6	43.7	71 46.3	+ 44.2	45.8	72 27.2	+ 45.9	48.1	73 06.3	+ 47.6	50.6	73 43.4	+ 49.3	53.2	74 18.2	+ 50.9	56.0	**77**
78	70 13.9	+ 37.8	37.8	71 00.7	+ 39.4	39.6	71 46.3	+ 40.9	41.5	72 30.5	+ 42.6	43.6	73 13.1	+ 44.3	45.9	73 53.9	+ 46.1	48.4	74 32.7	+ 47.9	51.1	75 09.1	+ 49.8	54.0	**78**
79	70 51.7	+ 36.1	35.5	71 40.1	*+ 37.5* •	37.2	72 27.2	+ 39.1	39.2	73 13.1	+ 40.8	41.2	73 57.4	+ 42.6	43.5	74 40.0	+ 44.5	46.0	75 20.6	+ 46.4	48.8	75 58.9	+ 48.5	51.8	**79**
80	71 27.8	*+ 33.9* •	33.0	72 17.6	*+ 35.4* •	34.7	73 06.3	*+ 37.1* •	36.6	73 53.9	*+ 38.8* •	38.7	74 40.0	*+ 40.6* •	40.9	75 24.5	*+ 42.5* •	43.4	76 07.0	+ 44.7	46.2	76 47.4	+ 46.8	49.3	**80**
81	72 01.7	*+ 31.7* •	30.4	72 53.0	*+ 33.2* •	32.0	73 43.4	*+ 34.8* •	33.8	74 32.7	*+ 36.4* •	35.8	75 20.6	*+ 38.3* •	38.1	76 07.0	*+ 40.4* •	40.6	76 51.7	*+ 42.5* •	43.4	77 34.2	*+ 44.8* •	46.5	**81**
82	72 33.4	*+ 29.2* •	27.6	73 26.2	*+ 30.6* •	29.1	74 18.2	*+ 32.1* •	30.9	75 09.1	*+ 33.9* •	32.8	75 58.9	*+ 35.8* •	35.0	76 47.4	*+ 37.8* •	37.4	77 34.2	*+ 40.0* •	40.2	78 19.0	*+ 42.4* •	43.3	**82**
83	73 02.6	*+ 26.5* •	24.6	73 56.8	*+ 27.9* •	26.1	74 50.3	*+ 29.4* •	27.7	75 43.0	*+ 31.0* •	29.5	76 34.7	*+ 32.8* •	31.6	77 25.2	*+ 34.8* •	33.9	78 14.2	*+ 37.0* •	36.6	79 01.4	*+ 39.5* •	39.7	**83**
84	73 29.1	*+ 23.6* •	21.5	74 24.7	*+ 24.8* •	22.8	75 19.7	*+ 26.2* •	24.3	76 14.0	*+ 27.7* •	26.0	77 07.5	*+ 29.5* •	27.9	78 00.0	*+ 31.4* •	30.1	78 51.2	*+ 33.6* •	32.6	79 40.9	*+ 36.1* •	35.6	**84**
85	73 52.7	*+ 20.5* •	18.2	74 49.5	*+ 21.6* •	19.4	75 45.9	*+ 22.8* •	20.7	76 41.7	*+ 24.2* •	22.2	77 37.0	*+ 25.6* •	23.9	78 31.4	*+ 27.5* •	25.9	79 24.8	*+ 29.6* •	28.2	80 17.0	*+ 31.9* •	31.0	**85**
86	74 13.2	*+ 17.1* •	14.8	75 11.1	*+ 18.0* •	15.8	76 08.7	*+ 19.0* •	16.9	77 05.9	*+ 20.2* •	18.2	78 02.6	*+ 21.6* •	19.6	78 58.9	*+ 23.0* •	21.4	79 54.4	*+ 24.8* •	23.4	80 48.9	*+ 27.0* •	25.8	**86**
87	74 30.3	*+ 13.7* •	11.3	75 29.1	*+ 14.3* •	12.0	76 27.7	*+ 15.0* •	12.9	77 26.1	*+ 15.9* •	13.9	78 24.2	*+ 16.9* •	15.1	79 21.9	*+ 18.2* •	16.4	80 19.2	*+ 19.6* •	18.1	81 15.9	*+ 21.4* •	20.1	**87**
88	74 44.0	*+ 9.9* •	7.6	75 43.4	*+ 10.3* •	8.1	76 42.7	*+ 10.9* •	8.7	77 42.0	*+ 11.4* •	9.4	78 41.1	*+ 12.1* •	10.2	79 40.1	*+ 12.8* •	11.2	80 38.8	*+ 13.8* •	12.4	81 37.3	*+ 14.9* •	13.8	**88**
89	74 53.9	*+ 6.1* •	3.8	75 53.7	*+ 6.3* •	4.1	76 53.6	*+ 6.4* •	4.4	77 53.4	*+ 6.6* •	4.8	78 53.2	*+ 6.8* •	5.2	79 52.9	*+ 7.1* •	5.7	80 52.6	*+ 7.4* •	6.3	81 52.2	*+ 7.8* •	7.1	**89**
90	75 00.0	*+ 2.2* •	0.0	76 00.0	*+ 2.1* •	0.0	77 00.0	*+ 1.9* •	0.0	78 00.0	*+ 1.7* •	0.0	79 00.0	*+ 1.5* •	0.0	80 00.0	*+ 1.2* •	0.0	81 00.0	*+ 0.9* •	0.0	82 00.0	*+ 0.5* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 94°, 266°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 46.6	+57.9	92.9	0 43.5	+58.2	92.9	0 40.5	+58.4	92.9	0 37.4	+58.7	92.9	0 34.3	+58.9	92.9	0 31.2	+59.1	93.0	0 28.1	+59.3	93.0	0 25.0	+59.5	93.0	**0**
1	1 44.5	+58.0	92.6	1 41.7	+58.3	92.7	1 38.9	+58.5	92.7	1 36.1	+58.7	92.7	1 33.2	+58.9	92.8	1 30.3	+59.1	92.8	1 27.4	+59.3	92.8	1 24.5	+59.4	92.8	**1**
2	2 42.5	+57.9	92.4	2 40.0	+58.2	92.4	2 37.4	+58.5	92.5	2 34.8	+58.7	92.5	2 32.1	+58.9	92.6	2 29.4	+59.1	92.6	2 26.7	+59.2	92.7	2 23.9	+59.4	92.7	**2**
3	3 40.4	+58.0	92.1	3 38.2	+58.2	92.2	3 35.9	+58.4	92.2	3 33.5	+58.7	92.3	3 31.0	+58.9	92.4	3 28.5	+59.1	92.4	3 25.9	+59.3	92.5	3 23.3	+59.4	92.6	**3**
4	4 38.4	+57.9	91.9	4 36.4	+58.2	91.9	4 34.3	+58.5	92.0	4 32.2	+58.6	92.1	4 29.9	+58.9	92.2	4 27.6	+59.1	92.3	4 25.2	+59.3	92.3	4 22.7	+59.4	92.4	**4**
5	5 36.3	+58.0	91.6	5 34.6	+58.2	91.7	5 32.8	+58.4	91.8	5 30.8	+58.7	91.9	5 28.8	+58.9	92.0	5 26.7	+59.1	92.1	5 24.5	+59.2	92.2	5 22.1	+59.4	92.3	**5**
6	6 34.3	+57.9	91.3	6 32.8	+58.2	91.5	6 31.2	+58.5	91.6	6 29.5	+58.7	91.7	6 27.7	+58.9	91.8	6 25.8	+59.0	91.9	6 23.7	+59.3	92.0	6 21.5	+59.4	92.1	**6**
7	7 32.2	+57.9	91.1	7 31.0	+58.2	91.2	7 29.7	+58.4	91.3	7 28.2	+58.7	91.5	7 26.6	+58.9	91.6	7 24.8	+59.1	91.7	7 23.0	+59.2	91.9	7 20.9	+59.4	92.0	**7**
8	8 30.1	+57.9	90.8	8 29.2	+58.2	91.0	8 28.1	+58.4	91.1	8 26.9	+58.6	91.3	8 25.5	+58.8	91.4	8 23.9	+59.1	91.6	8 22.2	+59.3	91.7	8 20.3	+59.4	91.9	**8**
9	9 28.0	+57.9	90.5	9 27.4	+58.1	90.7	9 26.5	+58.5	90.9	9 25.5	+58.7	91.0	9 24.3	+58.9	91.2	9 23.0	+59.0	91.4	9 21.5	+59.2	91.5	9 19.7	+59.5	91.7	**9**
10	10 25.9	+57.9	90.3	10 25.5	+58.2	90.5	10 25.0	+58.4	90.7	10 24.2	+58.6	90.8	10 23.2	+58.9	91.0	10 22.0	+59.1	91.2	10 20.7	+59.2	91.4	10 19.2	+59.3	91.6	**10**
11	11 23.8	+57.9	90.0	11 23.7	+58.1	90.2	11 23.4	+58.4	90.4	11 22.8	+58.7	90.6	11 22.1	+58.8	90.8	11 21.1	+59.1	91.0	11 19.9	+59.3	91.2	11 18.5	+59.4	91.4	**11**
12	12 21.7	+57.8	89.7	12 21.8	+58.2	90.0	12 21.8	+58.3	90.2	12 21.5	+58.6	90.4	12 20.9	+58.9	90.6	12 20.2	+59.0	90.8	12 19.2	+59.2	91.1	12 17.9	+59.4	91.3	**12**
13	13 19.5	+57.9	89.5	13 20.0	+58.1	89.7	13 20.1	+58.4	89.9	13 20.1	+58.6	90.2	13 19.8	+58.8	90.4	13 19.2	+59.0	90.7	13 18.4	+59.2	90.9	13 17.3	+59.4	91.1	**13**
14	14 17.4	+57.8	89.2	14 18.1	+58.1	89.5	14 18.5	+58.4	89.7	14 18.7	+58.6	90.0	14 18.6	+58.8	90.2	14 18.2	+59.1	90.5	14 17.6	+59.2	90.7	14 16.7	+59.4	91.0	**14**
15	15 15.2	+57.8	88.9	15 16.2	+58.1	89.2	15 16.9	+58.3	89.5	15 17.3	+58.6	89.7	15 17.4	+58.8	90.0	15 17.3	+59.0	90.3	15 16.8	+59.2	90.6	15 16.1	+59.4	90.8	**15**
16	16 13.0	+57.8	88.6	16 14.3	+58.0	88.9	16 15.2	+58.3	89.2	16 15.9	+58.5	89.5	16 16.2	+58.8	89.8	16 16.3	+59.0	90.1	16 16.0	+59.2	90.4	16 15.5	+59.3	90.7	**16**
17	17 10.8	+57.7	88.4	17 12.3	+58.1	88.7	17 13.5	+58.4	89.0	17 14.4	+58.6	89.3	17 15.0	+58.8	89.6	17 15.3	+59.0	89.9	17 15.2	+59.2	90.2	17 14.8	+59.4	90.5	**17**
18	18 08.5	+57.7	88.1	18 10.4	+58.0	88.4	18 11.9	+58.2	88.7	18 13.0	+58.5	89.1	18 13.8	+58.8	89.4	18 14.3	+59.0	89.7	18 14.4	+59.2	90.0	18 14.2	+59.3	90.4	**18**
19	19 06.2	+57.7	87.8	19 08.4	+58.0	88.1	19 10.1	+58.3	88.5	19 11.5	+58.6	88.8	19 12.6	+58.7	89.2	19 13.3	+58.9	89.5	19 13.6	+59.1	89.9	19 13.5	+59.4	90.2	**19**
20	20 03.9	+57.7	87.5	20 06.4	+57.9	87.9	20 08.4	+58.3	88.2	20 10.1	+58.5	88.6	20 11.3	+58.8	89.0	20 12.2	+59.0	89.3	20 12.7	+59.2	89.7	20 12.9	+59.3	90.1	**20**
21	21 01.6	+57.6	87.2	21 04.3	+58.0	87.6	21 06.7	+58.2	88.0	21 08.6	+58.5	88.4	21 10.1	+58.7	88.7	21 11.2	+58.9	89.1	21 11.9	+59.2	89.5	21 12.2	+59.3	89.9	**21**
22	21 59.2	+57.6	86.9	22 02.3	+57.9	87.3	22 04.9	+58.2	87.7	22 07.1	+58.4	88.1	22 08.8	+58.7	88.5	22 10.1	+59.0	88.9	22 11.1	+59.1	89.3	22 11.5	+59.3	89.7	**22**
23	22 56.8	+57.6	86.6	23 00.2	+57.9	87.0	23 03.1	+58.1	87.4	23 05.5	+58.5	87.9	23 07.5	+58.7	88.3	23 09.1	+58.9	88.7	23 10.2	+59.1	89.2	23 10.8	+59.4	89.6	**23**
24	23 54.4	+57.5	86.3	23 58.1	+57.8	86.7	24 01.2	+58.2	87.2	24 04.0	+58.4	87.6	24 06.2	+58.7	88.1	24 08.0	+58.9	88.5	24 09.3	+59.1	89.0	24 10.2	+59.2	89.4	**24**
25	24 51.9	+57.5	86.0	24 55.9	+57.8	86.4	24 59.4	+58.1	86.9	25 02.4	+58.4	87.4	25 04.9	+58.6	87.8	25 06.9	+58.9	88.3	25 08.4	+59.1	88.8	25 09.4	+59.3	89.3	**25**
26	25 49.4	+57.5	85.7	25 53.7	+57.8	86.1	25 57.5	+58.1	86.6	26 00.8	+58.3	87.1	26 03.5	+58.6	87.6	26 05.8	+58.8	88.1	26 07.5	+59.1	88.6	26 08.7	+59.3	89.1	**26**
27	26 46.9	+57.4	85.3	26 51.5	+57.7	85.8	26 55.6	+58.0	86.4	26 59.1	+58.4	86.9	27 02.1	+58.6	87.4	27 04.6	+58.9	87.9	27 06.6	+59.0	88.4	27 08.0	+59.3	88.9	**27**
28	27 44.3	+57.4	85.0	27 49.2	+57.7	85.5	27 53.6	+58.0	86.1	27 57.5	+58.3	86.6	28 00.7	+58.6	87.1	28 03.5	+58.8	87.7	28 05.6	+59.1	88.2	28 07.3	+59.2	88.7	**28**
29	28 41.7	+57.3	84.7	28 46.9	+57.7	85.2	28 51.6	+58.0	85.8	28 55.8	+58.2	86.3	28 59.3	+58.6	86.9	29 02.3	+58.8	87.4	29 04.7	+59.0	88.0	29 06.5	+59.2	88.5	**29**
30	29 39.0	+57.2	84.3	29 44.6	+57.6	84.9	29 49.6	+57.9	85.5	29 54.0	+58.3	86.1	29 57.9	+58.5	86.6	30 01.1	+58.8	87.2	30 03.7	+59.0	87.8	30 05.7	+59.2	88.4	**30**
31	30 36.2	+57.2	84.0	30 42.2	+57.6	84.6	30 47.5	+57.9	85.2	30 52.3	+58.2	85.8	30 56.4	+58.5	86.4	30 59.9	+58.7	87.0	31 02.7	+59.0	87.6	31 04.9	+59.2	88.2	**31**
32	31 33.4	+57.2	83.6	31 39.8	+57.5	84.3	31 45.4	+57.9	84.9	31 50.5	+58.1	85.5	31 54.9	+58.4	86.1	31 58.6	+58.7	86.7	32 01.7	+59.0	87.4	32 04.1	+59.2	88.0	**32**
33	32 30.6	+57.1	83.3	32 37.3	+57.4	83.9	32 43.3	+57.8	84.6	32 48.6	+58.2	85.2	32 53.3	+58.4	85.8	32 57.3	+58.7	86.5	33 00.7	+58.9	87.1	33 03.3	+59.2	87.8	**33**
34	33 27.7	+57.0	82.9	33 34.7	+57.4	83.6	33 41.1	+57.7	84.2	33 46.8	+58.0	84.9	33 51.7	+58.4	85.6	33 56.0	+58.7	86.2	33 59.6	+58.9	86.9	34 02.5	+59.1	87.6	**34**
35	34 24.7	+56.9	82.5	34 32.1	+57.3	83.2	34 38.8	+57.7	83.9	34 44.8	+58.1	84.6	34 50.1	+58.4	85.3	34 54.7	+58.6	86.0	34 58.5	+58.9	86.7	35 01.6	+59.1	87.4	**35**
36	35 21.6	+56.9	82.2	35 29.4	+57.3	82.9	35 36.5	+57.7	83.6	35 42.9	+57.9	84.3	35 48.5	+58.3	85.0	35 53.3	+58.6	85.7	35 57.4	+58.9	86.4	36 00.7	+59.1	87.2	**36**
37	36 18.5	+56.8	81.8	36 26.7	+57.2	82.5	36 34.2	+57.5	83.2	36 40.8	+58.0	84.0	36 46.8	+58.2	84.7	36 51.9	+58.5	85.5	36 56.3	+58.8	86.2	36 59.8	+59.1	87.0	**37**
38	37 15.3	+56.7	81.4	37 23.9	+57.1	82.1	37 31.7	+57.5	82.9	37 38.8	+57.8	83.6	37 45.0	+58.2	84.4	37 50.4	+58.6	85.2	37 55.1	+58.8	86.0	37 58.9	+59.0	86.7	**38**
39	38 12.0	+56.6	81.0	38 21.0	+57.1	81.7	38 29.2	+57.5	82.5	38 36.6	+57.9	83.3	38 43.2	+58.2	84.1	38 49.0	+58.4	84.9	38 53.9	+58.7	85.7	38 57.9	+59.1	86.5	**39**
40	39 08.6	+56.5	80.5	39 18.1	+56.9	81.3	39 26.7	+57.3	82.1	39 34.5	+57.7	83.0	39 41.4	+58.1	83.8	39 47.4	+58.5	84.6	39 52.6	+58.8	85.4	39 57.0	+59.0	86.3	**40**
41	40 05.1	+56.4	80.1	40 15.0	+56.9	80.9	40 24.0	+57.3	81.8	40 32.2	+57.7	82.6	40 39.5	+58.0	83.5	40 45.9	+58.3	84.3	40 51.4	+58.6	85.2	40 56.0	+58.9	86.0	**41**
42	41 01.5	+56.4	79.6	41 11.9	+56.8	80.5	41 21.3	+57.2	81.4	41 29.9	+57.6	82.2	41 37.5	+58.0	83.1	41 44.2	+58.4	84.0	41 50.0	+58.7	84.9	41 54.9	+58.9	85.8	**42**
43	41 57.9	+56.2	79.2	42 08.7	+56.6	80.1	42 18.5	+57.2	81.0	42 27.5	+57.5	81.9	42 35.5	+57.9	82.8	42 42.6	+58.3	83.7	42 48.7	+58.6	84.6	42 53.8	+58.9	85.5	**43**
44	42 54.1	+56.0	78.7	43 05.3	+56.6	79.6	43 15.7	+57.0	80.5	43 25.0	+57.5	81.5	43 33.4	+57.9	82.4	43 40.9	+58.2	83.4	43 47.3	+58.6	84.3	43 52.7	+58.9	85.3	**44**
45	43 50.1	+56.0	78.2	44 01.9	+56.5	79.2	44 12.7	+56.9	80.1	44 22.5	+57.4	81.1	44 31.3	+57.8	82.1	44 39.1	+58.1	83.0	44 45.9	+58.5	84.0	44 51.6	+58.8	85.0	**45**
46	44 46.1	+55.8	77.7	44 58.4	+56.3	78.7	45 09.6	+56.8	79.7	45 19.9	+57.2	80.7	45 29.1	+57.7	81.7	45 37.2	+58.1	82.7	45 44.4	+58.4	83.7	45 50.4	+58.8	84.7	**46**
47	45 41.9	+55.7	77.2	45 54.7	+56.2	78.2	46 06.4	+56.7	79.2	46 17.1	+57.2	80.2	46 26.8	+57.6	81.3	46 35.3	+58.1	82.3	46 42.8	+58.4	83.4	46 49.2	+58.7	84.4	**47**
48	46 37.6	+55.5	76.7	46 50.9	+56.0	77.7	47 03.1	+56.6	78.7	47 14.3	+57.1	79.8	47 24.4	+57.5	80.9	47 33.4	+57.9	81.9	47 41.2	+58.3	83.0	47 47.9	+58.7	84.1	**48**
49	47 33.1	+55.3	76.1	47 46.9	+56.0	77.2	47 59.7	+56.5	78.2	48 11.4	+56.9	79.3	48 21.9	+57.4	80.4	48 31.3	+57.9	81.6	48 39.5	+58.3	82.7	48 46.6	+58.6	83.8	**49**
50	48 28.4	+55.2	75.5	48 42.9	+55.7	76.6	48 56.2	+56.3	77.7	49 08.3	+56.9	78.9	49 19.3	+57.4	80.0	49 29.2	+57.7	81.2	49 37.8	+58.2	82.3	49 45.2	+58.6	83.5	**50**
51	49 23.6	+54.9	74.9	49 38.6	+55.6	76.1	49 52.5	+56.1	77.2	50 05.2	+56.7	78.4	50 16.7	+57.2	79.5	50 26.9	+57.7	80.7	50 36.0	+58.1	81.9	50 43.8	+58.5	83.1	**51**
52	50 18.5	+54.8	74.3	50 34.2	+55.4	75.5	50 48.6	+56.0	76.7	51 01.9	+56.5	77.9	51 13.9	+57.1	79.1	51 24.6	+57.6	80.3	51 34.1	+58.0	81.5	51 42.3	+58.4	82.8	**52**
53	51 13.3	+54.5	73.7	51 29.6	+55.2	74.9	51 44.6	+55.9	76.1	51 58.4	+56.5	77.3	52 11.0	+56.9	78.6	52 22.2	+57.5	79.8	52 32.1	+58.0	81.1	52 40.7	+58.4	82.4	**53**
54	52 07.8	+54.3	73.0	52 24.8	+55.0	74.2	52 40.5	+55.6	75.5	52 54.9	+56.2	76.8	53 07.9	+56.9	78.1	53 19.7	+57.3	79.4	53 30.1	+57.8	80.7	53 39.1	+58.3	82.0	**54**
55	53 02.1	+54.1	72.3	53 19.8	+54.7	73.6	53 36.1	+55.4	74.9	53 51.1	+56.1	76.2	54 04.8	+56.6	77.5	54 17.0	+57.3	78.9	54 27.9	+57.8	80.2	54 37.4	+58.2	81.6	**55**
56	53 56.2	+53.7	71.6	54 14.5	+54.5	72.9	54 31.5	+55.2	74.2	54 47.2	+55.8	75.6	55 01.4	+56.5	76.9	55 14.3	+57.0	78.3	55 25.7	+57.6	79.8	55 35.6	+58.1	81.2	**56**
57	54 49.9	+53.5	70.8	55 09.0	+54.3	72.1	55 26.7	+55.0	73.5	55 43.0	+55.7	74.9	55 57.9	+56.4	76.4	56 11.3	+57.0	77.8	56 23.3	+57.5	79.3	56 33.7	+58.0	80.8	**57**
58	55 43.4	+53.2	70.0	56 03.3	+53.9	71.4	56 21.7	+54.7	72.8	56 38.7	+55.5	74.3	56 54.3	+56.1	75.7	57 08.3	+56.8	77.2	57 20.8	+57.3	78.7	57 31.7	+57.9	80.3	**58**
59	56 36.6	+52.7	69.2	56 57.2	+53.6	70.6	57 16.4	+54.4	72.1	57 34.2	+55.1	73.6	57 50.4	+55.9	75.1	58 05.1	+56.5	76.6	58 18.1	+57.2	78.2	58 29.6	+57.8	79.8	**59**
60	57 29.3	+52.5	68.3	57 50.8	+53.3	69.8	58 10.8	+54.2	71.3	58 29.3	+55.0	72.8	58 46.3	+55.7	74.4	59 01.6	+56.4	76.0	59 15.3	+57.1	77.6	59 27.4	+57.6	79.3	**60**
61	58 21.8	+52.0	67.4	58 44.1	+52.9	68.9	59 05.0	+53.8	70.4	59 24.3	+54.6	72.0	59 42.0	+55.4	73.7	59 58.0	+56.2	75.3	60 12.4	+56.8	77.0	60 25.0	+57.5	78.7	**61**
62	59 13.8	+51.5	66.4	59 37.0	+52.5	68.0	59 58.8	+53.4	69.6	60 18.9	+54.3	71.2	60 37.4	+55.1	72.9	60 54.2	+55.9	74.6	61 09.2	+56.7	76.3	61 22.5	+57.3	78.1	**62**
63	60 05.3	+51.1	65.4	60 29.5	+52.1	67.0	60 52.2	+53.0	68.6	61 13.2	+54.0	70.3	61 32.5	+54.9	72.1	61 50.1	+55.7	73.8	62 05.9	+56.5	75.7	62 19.8	+57.2	77.5	**63**
64	60 56.4	+50.5	64.3	61 21.6	+51.6	66.0	61 45.2	+52.6	67.7	62 07.2	+53.5	69.4	62 27.4	+54.5	71.2	62 45.8	+55.4	73.0	63 02.4	+56.2	74.9	63 17.0	+57.0	76.8	**64**
65	61 46.9	+49.9	63.2	62 13.2	+51.0	64.9	62 37.8	+52.1	66.6	63 00.7	+53.1	68.4	63 21.9	+54.1	70.3	63 41.2	+55.0	72.2	63 58.6	+55.9	74.1	64 14.0	+56.7	76.1	**65**
66	62 36.8	+49.3	62.0	63 04.2	+50.4	63.7	63 29.9	+51.6	65.5	63 53.8	+52.7	67.4	64 16.0	+53.7	69.3	64 36.2	+54.7	71.3	64 54.5	+55.6	73.3	65 10.7	+56.5	75.4	**66**
67	63 26.1	+48.6	60.8	63 54.6	+49.8	62.5	64 21.5	+50.9	64.4	64 46.5	+52.1	66.3	65 09.7	+53.2	68.3	65 30.9	+54.3	70.3	65 50.1	+55.3	72.4	66 07.2	+56.2	74.5	**67**
68	64 14.7	+47.9	59.4	64 44.4	+49.1	61.2	65 12.4	+50.4	63.1	65 38.6	+51.6	65.1	66 02.9	+52.7	67.1	66 25.2	+53.8	69.3	66 45.4	+54.9	71.4	67 03.4	+55.9	73.7	**68**
69	65 02.6	+47.0	58.0	65 33.5	+48.3	59.9	66 02.8	+49.6	61.8	66 30.2	+50.8	63.8	66 55.6	+52.2	65.9	67 19.0	+53.4	68.1	67 40.3	+54.5	70.4	67 59.3	+55.5	72.7	**69**
70	65 49.6	+46.0	56.5	66 21.8	+47.5	58.4	66 52.4	+48.8	60.4	67 21.0	+50.2	62.5	67 47.8	+51.4	64.7	68 12.4	+52.7	66.9	68 34.8	+53.9	69.3	68 54.8	+55.1	71.7	**70**
71	66 35.6	+45.1	54.9	67 09.3	+46.4	56.9	67 41.2	+47.9	58.9	68 11.2	+49.3	61.0	68 39.2	+50.8	63.3	69 05.1	+52.1	65.6	69 28.7	+53.5	68.0	69 49.9	+54.7	70.6	**71**
72	67 20.7	+43.9	53.2	67 55.7	+45.4	55.2	68 29.1	+46.9	57.3	69 00.5	+48.5	59.5	69 30.0	+49.9	61.8	69 57.2	+51.4	64.2	70 22.2	+52.7	66.7	70 44.6	+54.1	69.3	**72**
73	68 04.6	+42.6	51.4	68 41.1	+44.3	53.4	69 16.0	+45.8	55.6	69 49.0	+47.3	57.8	70 19.9	+48.9	60.2	70 48.6	+50.5	62.7	71 14.9	+52.1	65.3	71 38.7	+53.6	68.0	**73**
74	68 47.2	+41.3	49.5	69 25.4	+42.8	51.6	70 01.8	+44.5	53.7	70 36.3	+46.3	56.0	71 08.8	+47.9	58.4	71 39.1	+49.6	61.0	72 07.0	+51.2	63.7	72 32.3	+52.8	66.5	**74**
75	69 28.5	+39.7	47.5	70 08.2	+41.5	49.5	70 46.3	+43.2	51.7	71 22.6	+44.9	54.0	71 56.7	+46.7	56.5	72 28.7	+48.5	59.1	72 58.2	+50.3	61.9	73 25.1	+51.9	64.9	**75**
76	70 08.2	+38.1	45.3	70 49.7	+39.8	47.4	71 29.5	+41.6	49.6	72 07.5	+43.4	51.9	72 43.4	+45.3	54.4	73 17.2	+47.2	57.1	73 48.5	+49.1	60.0	74 17.0	+51.0	63.1	**76**
77	70 46.3	+36.3•	43.0	71 29.5	+38.0	45.0	72 11.1	+39.8	47.2	72 50.9	+41.7	49.6	73 28.7	+43.7	52.2	74 04.4	+45.7	54.9	74 37.6	+47.7	57.9	75 08.0	+49.8	61.1	**77**
78	71 22.6	+34.1•	40.6	72 07.5	+35.9•	42.6	72 50.9	+37.8•	44.8	73 32.6	+39.8•	47.1	74 12.4	+41.9	49.7	74 50.1	+44.0	52.5	75 25.3	+46.3	55.6	75 57.8	+48.5	58.9	**78**
79	71 56.7	+32.0•	37.9	72 43.4	+33.8•	39.9	73 28.7	+35.7•	42.1	74 12.4	+37.7•	44.4	74 54.3	+39.8•	47.0	75 34.1	+42.1•	49.9	76 11.6	+44.4•	53.0	76 46.3	+46.8	56.4	**79**
80	72 28.7	+29.5•	35.2	73 17.2	+31.3•	37.1	74 04.4	+33.2•	39.2	74 50.1	+35.2•	41.5	75 34.1	+37.5•	44.1	76 16.2	+39.8•	46.9	76 56.0	+42.2•	50.1	77 33.1	+44.8•	53.6	**80**
81	72 58.2	+26.9•	32.2	73 48.5	+28.5•	34.1	74 37.6	+30.4•	36.1	75 25.3	+32.5•	38.4	76 11.6	+34.7•	40.9	76 56.0	+37.1•	43.7	77 38.2	+39.7•	46.9	78 17.9	+42.4•	50.4	**81**
82	73 25.1	+23.9•	29.1	74 17.0	+25.6•	30.9	75 08.0	+27.4•	32.8	75 57.8	+29.4•	35.0	76 46.3	+31.6•	37.4	77 33.1	+34.0•	40.1	78 17.9	+36.7•	43.3	79 00.3	+39.6•	46.8	**82**
83	73 49.0	+20.9•	25.9	74 42.6	+22.4•	27.5	75 35.4	+24.1•	29.3	76 27.2	+26.1•	31.3	77 17.9	+28.1•	33.6	78 07.1	+30.5•	36.2	78 54.6	+33.1•	39.2	79 39.9	+36.1•	42.7	**83**
84	74 09.9	+17.5•	22.5	75 05.0	+19.0•	23.9	75 59.5	+20.5•	25.5	76 53.3	+22.2•	27.4	77 46.0	+24.2•	29.5	78 37.6	+26.5•	32.0	79 27.7	+29.1•	34.8	80 16.0	+32.0•	38.1	**84**
85	74 27.4	+14.1•	19.0	75 24.0	+15.2•	20.2	76 20.0	+16.6•	21.6	77 15.5	+18.1•	23.2	78 10.2	+19.9•	25.1	79 04.1	+21.9•	27.3	79 56.8	+24.3•	29.9	80 48.0	+27.1•	33.0	**85**
86	74 41.5	+10.4•	15.3	75 39.2	+11.4•	16.3	76 36.6	+12.5•	17.5	77 33.6	+13.8•	18.9	78 30.1	+15.2•	20.5	79 26.0	+16.9•	22.3	80 21.1	+18.9•	24.6	81 15.1	+21.4•	27.3	**86**
87	74 51.9	+6.6•	11.5	75 50.6	+7.3•	12.3	76 49.1	+8.1•	13.2	77 47.4	+9.0•	14.3	78 45.3	+10.2•	15.5	79 42.9	+11.5•	17.0	80 40.0	+13.1•	18.8	81 36.5	+15.0•	21.0	**87**
88	74 58.5	+2.7•	7.7	75 57.9	+3.1•	8.3	76 57.2	+3.7•	8.9	77 56.4	+4.3•	9.6	78 55.5	+4.9•	10.5	79 54.4	+5.8•	11.5	80 53.1	+6.7•	12.7	81 51.5	+7.9•	14.2	**88**
89	75 01.2	−1.2•	3.9	76 01.0	−1.0•	4.1	77 00.9	−0.9•	4.4	78 00.7	−0.7•	4.8	79 00.4	−0.4•	5.2	80 00.2	−0.2•	5.8	80 59.8	+0.2•	6.4	81 59.4	+0.6•	7.2	**89**
90	75 00.0	−5.1•	0.0	76 00.0	−5.2•	0.0	77 00.0	−5.4•	0.0	78 00.0	−5.6•	0.0	79 00.0	−5.8•	0.0	80 00.0	−6.1•	0.0	81 00.0	−6.4•	0.0	82 00.0	−6.8•	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE **CONTRARY** NAME TO DECLINATION **L.H.A. 87°, 273°**

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	0 46.6	−58.0	92.9	0 43.5	−58.2	92.9	0 40.5	−58.5	92.9	0 37.4	−58.7	92.9	0 34.3	−58.9	92.9	0 31.2	−59.0	93.0	0 28.1	−59.2	93.0	0 25.0	−59.4	93.0	**0**
1	0 11.4	+58.0	86.8	0 14.7	+58.2	86.8	0 18.0	+58.5	86.9	0 21.3	+58.7	86.9	0 24.6	+58.9	86.9	0 27.8	+59.1	86.9	0 31.1	+59.3	86.9	0 34.4	+59.4	86.9	**1**
2	1 09.4	+57.9	86.6	1 12.9	+58.2	86.6	1 16.5	+58.4	86.6	1 20.0	+58.7	86.7	1 23.5	+58.9	86.7	1 26.9	+59.1	86.7	1 30.4	+59.2	86.7	1 33.8	+59.4	86.8	**2**
3	2 07.3	+58.0	86.3	2 11.1	+58.2	86.3	2 14.9	+58.5	86.4	2 18.7	+58.7	86.4	2 22.4	+58.9	86.5	2 26.0	+59.1	86.5	2 29.6	+59.3	86.6	2 33.2	+59.4	86.6	**3**
4	3 05.3	+57.9	86.1	3 09.4	+58.2	86.1	3 13.4	+58.4	86.2	3 17.4	+58.6	86.2	3 21.3	+58.9	86.3	3 25.1	+59.1	86.4	3 28.9	+59.3	86.4	3 32.6	+59.4	86.5	**4**
5	4 03.2	+58.0	85.8	4 07.6	+58.2	85.9	4 11.8	+58.5	86.0	4 16.0	+58.7	86.0	4 20.2	+58.9	86.1	4 24.2	+59.1	86.2	4 28.2	+59.2	86.3	4 32.0	+59.5	86.3	**5**
6	5 01.2	+57.9	85.5	5 05.8	+58.2	85.6	5 10.3	+58.5	85.7	5 14.7	+58.7	85.8	5 19.1	+58.8	85.9	5 23.3	+59.1	86.0	5 27.4	+59.3	86.1	5 31.5	+59.4	86.2	**6**
7	5 59.1	+57.9	85.3	6 04.0	+58.2	85.4	6 08.8	+58.4	85.5	6 13.4	+58.7	85.6	6 17.9	+58.9	85.7	6 22.4	+59.0	85.8	6 26.7	+59.2	85.9	6 30.9	+59.4	86.1	**7**
8	6 57.0	+58.0	85.0	7 02.2	+58.2	85.1	7 07.2	+58.4	85.3	7 12.1	+58.6	85.4	7 16.8	+58.9	85.5	7 21.4	+59.1	85.7	7 25.9	+59.3	85.8	7 30.3	+59.4	85.9	**8**
9	7 55.0	+57.9	84.8	8 00.4	+58.2	84.9	8 05.6	+58.5	85.0	8 10.7	+58.7	85.2	8 15.7	+58.9	85.3	8 20.5	+59.1	85.5	8 25.2	+59.2	85.6	8 29.7	+59.4	85.8	**9**
10	8 52.9	+57.9	84.5	8 58.6	+58.1	84.7	9 04.1	+58.4	84.8	9 09.4	+58.7	85.0	9 14.6	+58.9	85.1	9 19.6	+59.1	85.3	9 24.4	+59.3	85.5	9 29.1	+59.4	85.6	**10**
11	9 50.8	+57.9	84.2	9 56.7	+58.2	84.4	10 02.5	+58.4	84.6	10 08.1	+58.6	84.8	10 13.5	+58.8	84.9	10 18.7	+59.0	85.1	10 23.7	+59.2	85.3	10 28.5	+59.4	85.5	**11**
12	10 48.7	+57.9	84.0	10 54.9	+58.1	84.2	11 00.9	+58.4	84.3	11 06.7	+58.6	84.5	11 12.3	+58.9	84.7	11 17.7	+59.1	84.9	11 22.9	+59.2	85.1	11 27.9	+59.4	85.3	**12**
13	11 46.6	+57.8	83.7	11 53.0	+58.2	83.9	11 59.3	+58.4	84.1	12 05.3	+58.7	84.3	12 11.2	+58.8	84.5	12 16.8	+59.0	84.8	12 22.1	+59.3	85.0	12 27.3	+59.4	85.2	**13**
14	12 44.4	+57.9	83.4	12 51.2	+58.1	83.7	12 57.7	+58.4	83.9	13 04.0	+58.6	84.1	13 10.0	+58.8	84.3	13 15.8	+59.0	84.6	13 21.4	+59.2	84.8	13 26.7	+59.3	85.0	**14**
15	13 42.3	+57.8	83.2	13 49.3	+58.1	83.4	13 56.1	+58.3	83.6	14 02.6	+58.6	83.9	14 08.8	+58.9	84.1	14 14.8	+59.1	84.4	14 20.6	+59.2	84.6	14 26.0	+59.4	84.9	**15**
16	14 40.1	+57.8	82.9	14 47.4	+58.1	83.1	14 54.4	+58.4	83.4	15 01.2	+58.6	83.7	15 07.7	+58.8	83.9	15 13.9	+59.0	84.2	15 19.8	+59.2	84.5	15 25.4	+59.4	84.8	**16**
17	15 37.9	+57.8	82.6	15 45.5	+58.1	82.9	15 52.8	+58.3	83.2	15 59.8	+58.6	83.4	16 06.5	+58.8	83.7	16 12.9	+59.0	84.0	16 19.0	+59.2	84.3	16 24.8	+59.3	84.6	**17**
18	16 35.7	+57.8	82.3	16 43.6	+58.0	82.6	16 51.1	+58.3	82.9	16 58.4	+58.5	83.2	17 05.3	+58.8	83.5	17 11.9	+59.0	83.8	17 18.2	+59.2	84.1	17 24.1	+59.4	84.4	**18**
19	17 33.5	+57.7	82.0	17 41.6	+58.0	82.4	17 49.4	+58.3	82.7	17 56.9	+58.6	83.0	18 04.1	+58.8	83.3	18 10.9	+59.0	83.6	18 17.4	+59.1	84.0	18 23.5	+59.4	84.3	**19**
20	18 31.2	+57.7	81.8	18 39.6	+58.0	82.1	18 47.7	+58.3	82.4	18 55.5	+58.5	82.8	19 02.9	+58.7	83.1	19 09.9	+59.0	83.4	19 16.5	+59.2	83.8	19 22.9	+59.3	84.1	**20**
21	19 28.9	+57.7	81.5	19 37.6	+58.0	81.8	19 46.0	+58.3	82.2	19 54.0	+58.5	82.5	20 01.6	+58.8	82.9	20 08.9	+58.9	83.2	20 15.7	+59.2	83.6	20 22.2	+59.3	84.0	**21**
22	20 26.6	+57.7	81.2	20 35.6	+58.0	81.5	20 44.3	+58.2	81.9	20 52.5	+58.5	82.3	21 00.4	+58.7	82.7	21 07.8	+59.0	83.1	21 14.9	+59.1	83.4	21 21.5	+59.4	83.8	**22**
23	21 24.3	+57.6	80.9	21 33.6	+57.9	81.3	21 42.5	+58.2	81.7	21 51.0	+58.5	82.1	21 59.1	+58.7	82.4	22 06.8	+58.9	82.9	22 14.0	+59.2	83.3	22 20.9	+59.3	83.7	**23**
24	22 21.9	+57.6	80.6	22 31.5	+57.9	81.0	22 40.7	+58.2	81.4	22 49.5	+58.4	81.8	22 57.8	+58.7	82.2	23 05.7	+58.9	82.6	23 13.2	+59.1	83.1	23 20.2	+59.3	83.5	**24**
25	23 19.5	+57.5	80.3	23 29.4	+57.9	80.7	23 38.9	+58.1	81.1	23 47.9	+58.4	81.6	23 56.5	+58.7	82.0	24 04.6	+58.9	82.4	24 12.3	+59.1	82.9	24 19.5	+59.3	83.3	**25**
26	24 17.0	+57.6	80.0	24 27.3	+57.8	80.4	24 37.0	+58.2	80.9	24 46.3	+58.4	81.3	24 55.2	+58.6	81.8	25 03.5	+58.9	82.2	25 11.4	+59.1	82.7	25 18.8	+59.2	83.2	**26**
27	25 14.6	+57.4	79.6	25 25.1	+57.8	80.1	25 35.2	+58.1	80.6	25 44.7	+58.4	81.1	25 53.8	+58.6	81.5	26 02.4	+58.9	82.0	26 10.5	+59.0	82.5	26 18.0	+59.3	83.0	**27**
28	26 12.0	+57.5	79.3	26 22.9	+57.8	79.8	26 33.3	+58.0	80.3	26 43.1	+58.3	80.8	26 52.4	+58.6	81.3	27 01.3	+58.8	81.8	27 09.5	+59.1	82.3	27 17.3	+59.3	82.8	**28**
29	27 09.5	+57.4	79.0	27 20.7	+57.7	79.5	27 31.3	+58.0	80.0	27 41.4	+58.4	80.5	27 51.0	+58.6	81.1	28 00.1	+58.8	81.6	28 08.6	+59.0	82.1	28 16.6	+59.2	82.6	**29**
30	28 06.9	+57.3	78.7	28 18.4	+57.6	79.2	28 29.3	+58.0	79.7	28 39.8	+58.2	80.3	28 49.6	+58.6	80.8	28 58.9	+58.8	81.4	29 07.6	+59.1	81.9	29 15.8	+59.2	82.5	**30**
31	29 04.2	+57.3	78.3	29 16.0	+57.7	78.9	29 27.3	+58.0	79.4	29 38.0	+58.3	80.0	29 48.2	+58.5	80.6	29 57.7	+58.8	81.1	30 06.7	+59.0	81.7	30 15.0	+59.2	82.3	**31**
32	30 01.5	+57.2	78.0	30 13.7	+57.6	78.6	30 25.3	+57.9	79.1	30 36.3	+58.2	79.7	30 46.7	+58.5	80.3	30 56.5	+58.7	80.9	31 05.7	+59.0	81.5	31 14.2	+59.2	82.1	**32**
33	30 58.7	+57.2	77.7	31 11.3	+57.5	78.2	31 23.2	+57.8	78.8	31 34.5	+58.2	79.4	31 45.2	+58.4	80.0	31 55.2	+58.8	80.7	32 04.7	+58.9	81.3	32 13.4	+59.2	81.9	**33**
34	31 55.9	+57.1	77.3	32 08.8	+57.5	77.9	32 21.0	+57.9	78.5	32 32.7	+58.1	79.1	32 43.6	+58.5	79.8	32 54.0	+58.6	80.4	33 03.6	+59.0	81.1	33 12.6	+59.2	81.7	**34**
35	32 53.0	+57.1	76.9	33 06.3	+57.4	77.6	33 18.9	+57.7	78.2	33 30.8	+58.1	78.9	33 42.1	+58.3	79.5	33 52.6	+58.7	80.2	34 02.6	+58.9	80.8	34 11.8	+59.1	81.5	**35**
36	33 50.1	+57.0	76.6	34 03.7	+57.4	77.2	34 16.6	+57.7	77.9	34 28.9	+58.0	78.6	34 40.4	+58.4	79.2	34 51.3	+58.6	79.9	35 01.5	+58.8	80.6	35 10.9	+59.1	81.3	**36**
37	34 47.1	+56.9	76.2	35 01.1	+57.2	76.9	35 14.3	+57.7	77.5	35 26.9	+58.0	78.2	35 38.8	+58.3	78.9	35 49.9	+58.6	79.6	36 00.3	+58.9	80.4	36 10.0	+59.1	81.1	**37**
38	35 44.0	+56.8	75.8	35 58.3	+57.3	76.5	36 12.0	+57.6	77.2	36 24.9	+58.0	77.9	36 37.1	+58.3	78.7	36 48.5	+58.6	79.4	36 59.2	+58.8	80.1	37 09.1	+59.1	80.9	**38**
39	36 40.8	+56.8	75.4	36 55.6	+57.1	76.1	37 09.6	+57.5	76.9	37 22.9	+57.8	77.6	37 35.4	+58.2	78.4	37 47.1	+58.5	79.1	37 58.0	+58.8	79.9	38 08.2	+59.0	80.6	**39**
40	37 37.6	+56.6	75.0	37 52.7	+57.1	75.7	38 07.1	+57.5	76.5	38 20.7	+57.9	77.3	38 33.6	+58.1	78.0	38 45.6	+58.5	78.8	38 56.8	+58.8	79.6	39 07.2	+59.0	80.4	**40**
41	38 34.2	+56.6	74.6	38 49.8	+57.0	75.3	39 04.6	+57.4	76.1	39 18.6	+57.7	76.9	39 31.7	+58.2	77.7	39 44.1	+58.4	78.5	39 55.6	+58.7	79.4	40 06.2	+59.0	80.2	**41**
42	39 30.8	+56.5	74.1	39 46.8	+56.9	74.9	40 02.0	+57.3	75.8	40 16.3	+57.7	76.6	40 29.9	+58.0	77.4	40 42.5	+58.4	78.2	40 54.3	+58.7	79.1	41 05.2	+59.0	79.9	**42**
43	40 27.3	+56.4	73.7	40 43.7	+56.9	74.5	40 59.3	+57.3	75.4	41 14.0	+57.7	76.2	41 27.9	+58.0	77.1	41 40.9	+58.3	77.9	41 53.0	+58.6	78.8	42 04.2	+58.9	79.7	**43**
44	41 23.7	+56.3	73.3	41 40.6	+56.7	74.1	41 56.6	+57.1	75.0	42 11.7	+57.5	75.8	42 25.9	+57.9	76.7	42 39.2	+58.3	77.6	42 51.6	+58.6	78.5	43 03.1	+58.9	79.4	**44**
45	42 20.0	+56.1	72.8	42 37.3	+56.6	73.7	42 53.7	+57.1	74.6	43 09.2	+57.5	75.5	43 23.8	+57.9	76.4	43 37.5	+58.2	77.3	43 50.2	+58.6	78.2	44 02.0	+58.8	79.2	**45**
46	43 16.1	+56.0	72.3	43 33.9	+56.5	73.2	43 50.8	+56.9	74.1	44 06.7	+57.4	75.1	44 21.7	+57.8	76.0	44 35.7	+58.2	77.0	44 48.8	+58.5	77.9	45 00.8	+58.8	78.9	**46**
47	44 12.1	+55.9	71.8	44 30.4	+56.4	72.7	44 47.7	+56.9	73.7	45 04.1	+57.3	74.6	45 19.5	+57.7	75.6	45 33.9	+58.1	76.6	45 47.3	+58.4	77.6	45 59.6	+58.8	78.6	**47**
48	45 08.0	+55.8	71.3	45 26.8	+56.3	72.3	45 44.6	+56.7	73.2	46 01.4	+57.2	74.2	46 17.2	+57.6	75.2	46 32.0	+58.0	76.2	46 45.7	+58.4	77.3	46 58.4	+58.7	78.3	**48**
49	46 03.8	+55.6	70.8	46 23.1	+56.1	71.8	46 41.3	+56.7	72.8	46 58.6	+57.1	73.8	47 14.8	+57.6	74.8	47 30.0	+58.0	75.9	47 44.1	+58.4	76.9	47 57.1	+58.7	78.0	**49**
50	46 59.4	+55.4	70.2	47 19.2	+56.0	71.2	47 38.0	+56.5	72.3	47 55.7	+57.0	73.3	48 12.4	+57.4	74.4	48 28.0	+57.8	75.5	48 42.5	+58.2	76.6	48 55.8	+58.6	77.7	**50**
51	47 54.8	+55.3	69.7	48 15.2	+55.8	70.7	48 34.5	+56.3	71.8	48 52.7	+56.9	72.9	49 09.8	+57.4	74.0	49 25.8	+57.8	75.1	49 40.7	+58.2	76.2	49 54.4	+58.6	77.4	**51**
52	48 50.1	+55.1	69.1	49 11.0	+55.7	70.2	49 30.8	+56.3	71.3	49 49.6	+56.7	72.4	50 07.2	+57.2	73.5	50 23.6	+57.7	74.7	50 38.9	+58.1	75.8	50 53.0	+58.5	77.0	**52**
53	49 45.2	+54.9	68.5	50 06.7	+55.5	69.6	50 27.1	+56.0	70.7	50 46.3	+56.6	71.9	51 04.4	+57.1	73.0	51 21.3	+57.6	74.2	51 37.0	+58.0	75.4	51 51.5	+58.4	76.7	**53**
54	50 40.1	+54.7	67.8	51 02.2	+55.3	69.0	51 23.1	+55.9	70.1	51 42.9	+56.5	71.3	52 01.5	+57.0	72.5	52 18.9	+57.5	73.8	52 35.0	+58.0	75.0	52 49.9	+58.3	76.3	**54**
55	51 34.8	+54.4	67.2	51 57.5	+55.1	68.4	52 19.0	+55.7	69.6	52 39.4	+56.3	70.8	52 58.5	+56.9	72.0	53 16.4	+57.3	73.3	53 33.0	+57.8	74.6	53 48.2	+58.3	75.9	**55**
56	52 29.2	+54.2	66.5	52 52.6	+54.8	67.7	53 14.7	+55.5	68.9	53 35.7	+56.1	70.2	53 55.4	+56.6	71.5	54 13.7	+57.3	72.8	54 30.8	+57.7	74.1	54 46.5	+58.2	75.5	**56**
57	53 23.4	+54.0	65.8	53 47.4	+54.7	67.0	54 10.2	+55.3	68.3	54 31.8	+55.9	69.6	54 52.0	+56.6	70.9	55 11.0	+57.1	72.3	55 28.5	+57.7	73.7	55 44.7	+58.1	75.1	**57**
58	54 17.4	+53.6	65.0	54 42.1	+54.3	66.3	55 05.5	+55.1	67.6	55 27.7	+55.7	69.0	55 48.6	+56.3	70.3	56 08.1	+56.9	71.7	56 26.2	+57.4	73.2	56 42.8	+58.0	74.6	**58**
59	55 11.0	+53.3	64.3	55 36.4	+54.1	65.6	56 00.6	+54.8	66.9	56 23.4	+55.5	68.3	56 44.9	+56.2	69.7	57 05.0	+56.8	71.2	57 23.6	+57.4	72.6	57 40.8	+57.9	74.2	**59**
60	56 04.3	+53.1	63.5	56 30.5	+53.8	64.8	56 55.4	+54.6	66.2	57 18.9	+55.3	67.6	57 41.1	+55.9	69.1	58 01.8	+56.6	70.6	58 21.0	+57.2	72.1	58 38.7	+57.7	73.7	**60**
61	56 57.4	+52.6	62.6	57 24.3	+53.5	64.0	57 50.0	+54.2	65.4	58 14.2	+55.0	66.9	58 37.0	+55.8	68.4	58 58.4	+56.4	69.9	59 18.2	+57.0	71.5	59 36.4	+57.7	73.1	**61**
62	57 50.0	+52.3	61.7	58 17.8	+53.1	63.1	58 44.2	+53.9	64.6	59 09.2	+54.7	66.1	59 32.8	+55.4	67.7	59 54.8	+56.2	69.3	60 15.2	+56.9	70.9	60 34.1	+57.4	72.6	**62**
63	58 42.3	+51.8	60.8	59 10.9	+52.7	62.2	59 38.1	+53.6	63.7	60 03.9	+54.4	65.3	60 28.2	+55.2	66.9	60 51.0	+55.9	68.6	61 12.1	+56.6	70.2	61 31.5	+57.3	72.0	**63**
64	59 34.1	+51.3	59.8	60 03.6	+52.3	61.3	60 31.7	+53.2	62.8	60 58.3	+54.1	64.4	61 23.4	+54.9	66.1	61 46.9	+55.7	67.8	62 08.7	+56.5	69.5	62 28.8	+57.2	71.3	**64**
65	60 25.4	+50.9	58.8	60 55.9	+51.8	60.3	61 24.9	+52.7	61.9	61 52.4	+53.6	63.5	62 18.3	+54.6	65.2	62 42.6	+55.4	67.0	63 05.2	+56.2	68.8	63 26.0	+56.9	70.7	**65**
66	61 16.3	+50.3	57.7	61 47.7	+51.3	59.2	62 17.6	+52.3	60.9	62 46.0	+53.3	62.6	63 12.9	+54.1	64.3	63 38.0	+55.1	66.1	64 01.4	+55.9	68.0	64 22.9	+56.7	70.0	**66**
67	62 06.6	+49.7	56.5	62 39.0	+50.7	58.1	63 09.9	+51.8	59.8	63 39.3	+52.8	61.6	64 07.0	+53.8	63.4	64 33.1	+54.7	65.2	64 57.3	+55.6	67.2	65 19.6	+56.4	69.2	**67**
68	62 56.3	+49.0	55.3	63 29.7	+50.2	57.0	64 01.7	+51.2	58.7	64 32.1	+52.3	60.5	65 00.8	+53.3	62.3	65 27.8	+54.3	64.3	65 52.9	+55.2	66.3	66 16.0	+56.2	68.4	**68**
69	63 45.3	+48.3	54.0	64 19.9	+49.4	55.7	64 52.9	+50.6	57.5	65 24.4	+51.7	59.3	65 54.1	+52.8	61.2	66 22.1	+53.9	63.2	66 48.1	+54.9	65.3	67 12.2	+55.8	67.5	**69**
70	64 33.6	+47.6	52.7	65 09.3	+48.7	54.4	65 43.5	+49.9	56.2	66 16.1	+51.0	58.1	66 46.9	+52.3	60.0	67 16.0	+53.3	62.1	67 43.0	+54.5	64.3	68 08.0	+55.5	66.5	**70**
71	65 21.2	+46.6	51.2	65 58.0	+47.9	53.0	66 33.4	+49.1	54.8	67 07.1	+50.4	56.7	67 39.2	+51.5	58.8	68 09.3	+52.8	60.9	68 37.5	+53.9	63.1	69 03.5	+55.1	65.5	**71**
72	66 07.8	+45.7	49.7	66 45.9	+47.0	51.5	67 22.5	+48.3	53.3	67 57.5	+49.6	55.3	68 30.7	+50.9	57.4	69 02.1	+52.1	59.6	69 31.4	+53.4	61.9	69 58.6	+54.6	64.3	**72**
73	66 53.5	+44.6	48.1	67 32.9	+45.9	49.9	68 10.8	+47.3	51.8	68 47.1	+48.6	53.8	69 21.6	+50.1	55.9	69 54.2	+51.5	58.2	70 24.8	+52.8	60.6	70 53.2	+54.0	63.1	**73**
74	67 38.1	+43.4	46.3	68 18.8	+44.8	48.1	68 58.1	+46.2	50.1	69 35.7	+47.7	52.1	70 11.7	+49.1	54.3	70 45.7	+50.6	56.7	71 17.6	+52.0	59.1	71 47.2	+53.4	61.7	**74**
75	68 21.5	+42.1	44.5	69 03.6	+43.6	46.3	69 44.3	+45.1	48.3	70 23.4	+46.6	50.4	71 00.8	+48.1	52.6	71 36.3	+49.6	55.0	72 09.6	+51.2	57.5	72 40.6	+52.7	60.2	**75**
76	69 03.6	+40.7	42.5	69 47.2	+42.2	44.4	70 29.4	+43.7	46.3	71 10.0	+45.3	48.4	71 48.9	+46.9	50.7	72 25.9	+48.5	53.2	73 00.8	+50.1	55.8	73 33.3	+51.8	58.6	**76**
77	69 44.3	+39.1	40.4	70 29.4	+40.6	42.3	71 13.1	+42.2	44.2	71 55.3	+43.8	46.4	72 35.8	+45.5	48.7	73 14.4	+47.3	51.2	73 50.9	+49.1	53.9	74 25.1	+50.8	56.8	**77**
78	70 23.4	+37.4	38.2	71 10.0	+38.9	40.0	71 55.3	+40.5	42.0	72 39.1	+42.2	44.1	73 21.3	+44.0	46.5	74 01.7	+45.8	49.0	74 40.0	+47.7	51.7	75 15.9	+49.6	54.7	**78**
79	71 00.8	+35.5 •	35.9	71 48.9	+37.0 •	37.6	72 35.8	+38.6 •	39.6	73 21.3	+40.4	41.7	74 05.3	+42.2	44.0	74 47.5	+44.2	46.6	75 27.7	+46.1	49.4	76 05.5	+48.2	52.4	**79**
80	71 36.3	+33.3 •	33.3	72 25.9	+34.9 •	35.1	73 14.4	+36.5 •	37.0	74 01.7	+38.3 •	39.1	74 47.5	+40.2 •	41.4	75 31.7	+42.1 •	43.9	76 13.8	+44.3 •	46.8	76 53.7	+46.5	49.9	**80**
81	72 09.6	+31.0 •	30.7	73 00.8	+32.5 •	32.3	73 50.9	+34.2 •	34.2	74 40.0	+35.9 •	36.2	75 27.7	+37.8 •	38.5	76 13.8	+39.9 •	41.0	76 58.1	+42.1 •	43.9	77 40.2	+44.5 •	47.0	**81**
82	72 40.6	+28.5 •	27.8	73 33.3	+29.9 •	29.4	74 25.1	+31.5 •	31.2	75 15.9	+33.3 •	33.1	76 05.5	+35.2 •	35.3	76 53.7	+37.3 •	37.8	77 40.2	+39.6 •	40.6	78 24.7	+42.0 •	43.8	**82**
83	73 09.1	+25.7 •	24.8	74 03.2	+27.1 •	26.3	74 56.6	+28.7 •	27.9	75 49.2	+30.3 •	29.8	76 40.7	+32.2 •	31.9	77 31.0	+34.2 •	34.3	78 19.8	+36.5 •	37.0	79 06.7	+39.1 •	40.1	**83**
84	73 34.8	+22.8 •	21.7	74 30.3	+24.1 •	23.0	75 25.3	+25.4 •	24.5	76 19.5	+27.0 •	26.2	77 12.9	+28.7 •	28.1	78 05.2	+30.7 •	30.4	78 56.3	+33.0 •	33.0	79 45.8	+35.5 •	36.0	**84**
85	73 57.6	+19.6 •	18.4	74 54.4	+20.6 •	19.5	75 50.7	+21.9 •	20.8	76 46.5	+23.3 •	22.4	77 41.6	+24.9 •	24.1	78 35.9	+26.8 •	26.1	79 29.3	+28.8 •	28.5	80 21.3	+31.3 •	31.3	**85**
86	74 17.2	+16.2 •	14.9	75 15.0	+17.1 •	15.9	76 12.6	+18.1 •	17.0	77 09.8	+19.3 •	18.3	78 06.5	+20.7 •	19.8	79 02.7	+22.2 •	21.5	79 58.1	+24.1 •	23.6	80 52.6	+26.2 •	26.1	**86**
87	74 33.4	+12.6 •	11.3	75 32.1	+13.3 •	12.1	76 30.7	+14.1 •	12.9	77 29.1	+14.9 •	14.0	78 27.2	+16.0 •	15.1	79 24.9	+17.2 •	16.5	80 22.2	+18.6 •	18.2	81 18.8	+20.5 •	20.2	**87**
88	74 46.0	+8.9 •	7.6	75 45.4	+9.4 •	8.1	76 44.8	+9.8 •	8.7	77 44.0	+10.4 •	9.4	78 43.2	+11.0 •	10.3	79 42.1	+11.8 •	11.2	80 40.8	+12.8 •	12.4	81 39.3	+13.9 •	13.9	**88**
89	74 54.9	+5.1 •	3.8	75 54.8	+5.2 •	4.1	76 54.6	+5.4 •	4.4	77 54.4	+5.6 •	4.8	78 54.2	+5.8 •	5.2	79 53.9	+6.1 •	5.7	80 53.6	+6.4 •	6.3	81 53.2	+6.8 •	7.1	**89**
90	75 00.0	+1.2 •	0.0	76 00.0	+1.0 •	0.0	77 00.0	+0.9 •	0.0	78 00.0	+0.7 •	0.0	79 00.0	+0.4 •	0.0	80 00.0	+0.2 •	0.0	81 00.0	−0.2 •	0.0	82 00.0	−0.6 •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION **L.H.A. 93°, 267°**

88°, 272° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 31.1	+57.9	91.9	0 29.0	+58.2	91.9	0 27.0	+58.5	91.9	0 24.9	+58.7	92.0	0 22.9	+58.9	92.0	0 20.8	+59.1	92.0	0 18.8	+59.2	92.0	0 16.7	+59.4	92.0	**0**
1	1 29.0	+58.0	91.7	1 27.2	+58.3	91.7	1 25.5	+58.4	91.7	1 23.6	+58.7	91.7	1 21.8	+58.9	91.8	1 19.9	+59.1	91.8	1 18.0	+59.3	91.8	1 16.1	+59.4	91.8	**1**
2	2 27.0	+57.9	91.4	2 25.5	+58.2	91.5	2 23.9	+58.5	91.5	2 22.3	+58.7	91.5	2 20.7	+58.9	91.6	2 19.0	+59.1	91.6	2 17.3	+59.3	91.7	2 15.5	+59.4	91.7	**2**
3	3 24.9	+58.0	91.2	3 23.7	+58.2	91.2	3 22.4	+58.4	91.3	3 21.0	+58.7	91.3	3 19.6	+58.9	91.4	3 18.1	+59.1	91.4	3 16.6	+59.2	91.5	3 14.9	+59.5	91.6	**3**
4	4 22.9	+57.9	90.9	4 21.9	+58.2	91.0	4 20.8	+58.5	91.0	4 19.7	+58.7	91.1	4 18.5	+58.9	91.2	4 17.2	+59.1	91.3	4 15.8	+59.3	91.3	4 14.4	+59.4	91.4	**4**
5	5 20.8	+57.9	90.6	5 20.1	+58.2	90.7	5 19.3	+58.4	90.8	5 18.4	+58.7	90.9	5 17.4	+58.9	91.0	5 16.3	+59.0	91.1	5 15.1	+59.2	91.2	5 13.8	+59.4	91.3	**5**
6	6 18.7	+58.0	90.4	6 18.3	+58.2	90.5	6 17.7	+58.5	90.6	6 17.1	+58.6	90.7	6 16.3	+58.8	90.8	6 15.3	+59.1	90.9	6 14.3	+59.3	91.0	6 13.2	+59.4	91.1	**6**
7	7 16.7	+57.9	90.1	7 16.5	+58.2	90.2	7 16.2	+58.4	90.4	7 15.7	+58.7	90.5	7 15.1	+58.9	90.6	7 14.4	+59.1	90.7	7 13.6	+59.2	90.9	7 12.6	+59.4	91.0	**7**
8	8 14.6	+57.9	89.8	8 14.7	+58.2	90.0	8 14.6	+58.4	90.1	8 14.4	+58.6	90.3	8 14.0	+58.9	90.4	8 13.5	+59.1	90.6	8 12.8	+59.3	90.7	8 12.0	+59.4	90.9	**8**
9	9 12.5	+57.9	89.6	9 12.9	+58.1	89.7	9 13.0	+58.5	89.9	9 13.0	+58.7	90.1	9 12.9	+58.9	90.2	9 12.6	+59.0	90.4	9 12.1	+59.2	90.6	9 11.4	+59.4	90.7	**9**
10	10 10.4	+57.9	89.3	10 11.0	+58.2	89.5	10 11.5	+58.4	89.7	10 11.7	+58.6	89.9	10 11.8	+58.8	90.0	10 11.6	+59.1	90.2	10 11.3	+59.2	90.4	10 10.8	+59.4	90.6	**10**
11	11 08.3	+57.9	89.0	11 09.2	+58.1	89.2	11 09.9	+58.4	89.4	11 10.3	+58.7	89.6	11 10.6	+58.9	89.8	11 10.7	+59.0	90.0	11 10.5	+59.3	90.2	11 10.2	+59.4	90.4	**11**
12	12 06.2	+57.8	88.8	12 07.3	+58.2	89.0	12 08.3	+58.3	89.2	12 09.0	+58.6	89.4	12 09.5	+58.8	89.6	12 09.7	+59.1	89.9	12 09.8	+59.2	90.1	12 09.6	+59.4	90.3	**12**
13	13 04.0	+57.8	88.5	13 05.5	+58.1	88.7	13 06.6	+58.4	89.0	13 07.6	+58.6	89.2	13 08.3	+58.8	89.4	13 08.8	+59.0	89.7	13 09.0	+59.2	89.9	13 09.0	+59.4	90.1	**13**
14	14 01.8	+57.9	88.2	14 03.6	+58.1	88.5	14 05.0	+58.4	88.7	14 06.2	+58.6	89.0	14 07.1	+58.9	89.2	14 07.8	+59.0	89.5	14 08.2	+59.2	89.7	14 08.4	+59.3	90.0	**14**
15	14 59.7	+57.8	88.0	15 01.7	+58.0	88.2	15 03.4	+58.3	88.5	15 04.8	+58.6	88.8	15 06.0	+58.8	89.0	15 06.8	+59.1	89.3	15 07.4	+59.2	89.6	15 07.7	+59.4	89.8	**15**
16	15 57.5	+57.7	87.7	15 59.7	+58.1	88.0	16 01.7	+58.4	88.3	16 03.4	+58.6	88.5	16 04.8	+58.8	88.8	16 05.9	+59.0	89.1	16 06.6	+59.2	89.4	16 07.1	+59.4	89.7	**16**
17	16 55.2	+57.8	87.4	16 57.8	+58.0	87.7	17 00.1	+58.3	88.0	17 02.0	+58.5	88.3	17 03.6	+58.8	88.6	17 04.9	+59.0	88.9	17 05.8	+59.2	89.2	17 06.5	+59.3	89.5	**17**
18	17 53.0	+57.7	87.1	17 55.8	+58.1	87.4	17 58.4	+58.3	87.8	18 00.5	+58.6	88.1	18 02.4	+58.7	88.4	18 03.9	+59.0	88.7	18 05.0	+59.2	89.1	18 05.8	+59.4	89.4	**18**
19	18 50.7	+57.7	86.8	18 53.9	+58.0	87.2	18 56.7	+58.2	87.5	18 59.1	+58.5	87.9	19 01.1	+58.8	88.2	19 02.9	+58.9	88.5	19 04.2	+59.2	88.9	19 05.2	+59.3	89.2	**19**
20	19 48.4	+57.7	86.5	19 51.9	+57.9	86.9	19 54.9	+58.3	87.3	19 57.6	+58.5	87.6	19 59.9	+58.7	88.0	20 01.8	+59.0	88.3	20 03.4	+59.1	88.7	20 04.5	+59.4	89.1	**20**
21	20 46.1	+57.6	86.2	20 49.8	+58.0	86.6	20 53.2	+58.2	87.0	20 56.1	+58.5	87.4	20 58.6	+58.8	87.8	21 00.8	+58.9	88.1	21 02.5	+59.2	88.5	21 03.9	+59.3	88.9	**21**
22	21 43.7	+57.7	85.9	21 47.8	+57.9	86.3	21 51.4	+58.2	86.7	21 54.6	+58.5	87.1	21 57.4	+58.7	87.5	21 59.7	+59.0	87.9	22 01.7	+59.1	88.4	22 03.2	+59.3	88.8	**22**
23	22 41.4	+57.5	85.6	22 45.7	+57.9	86.1	22 49.6	+58.2	86.5	22 53.1	+58.4	86.9	22 56.1	+58.7	87.3	22 58.7	+58.9	87.7	23 00.8	+59.1	88.2	23 02.5	+59.3	88.6	**23**
24	23 38.9	+57.6	85.3	23 43.6	+57.8	85.8	23 47.8	+58.1	86.2	23 51.5	+58.4	86.7	23 54.8	+58.6	87.1	23 57.6	+58.9	87.5	23 59.9	+59.1	88.0	24 01.8	+59.3	88.4	**24**
25	24 36.5	+57.5	85.0	24 41.4	+57.9	85.5	24 45.9	+58.1	85.9	24 49.9	+58.4	86.4	24 53.4	+58.7	86.9	24 56.5	+58.9	87.3	24 59.0	+59.1	87.8	25 01.1	+59.3	88.3	**25**
26	25 34.0	+57.4	84.7	25 39.2	+57.8	85.2	25 44.0	+58.1	85.7	25 48.3	+58.4	86.1	25 52.1	+58.6	86.6	25 55.4	+58.8	87.1	25 58.1	+59.1	87.6	26 00.4	+59.3	88.1	**26**
27	26 31.4	+57.4	84.4	26 37.0	+57.8	84.9	26 42.1	+58.1	85.4	26 46.7	+58.3	85.9	26 50.7	+58.6	86.4	26 54.2	+58.9	86.9	26 57.2	+59.1	87.4	26 59.7	+59.2	87.9	**27**
28	27 28.8	+57.4	84.1	27 34.8	+57.7	84.6	27 40.2	+58.0	85.1	27 45.0	+58.3	85.6	27 49.3	+58.6	86.2	27 53.1	+58.8	86.7	27 56.3	+59.0	87.2	27 58.9	+59.3	87.7	**28**
29	28 26.2	+57.3	83.7	28 32.5	+57.6	84.3	28 38.2	+58.0	84.8	28 43.3	+58.3	85.4	28 47.9	+58.5	85.9	28 51.9	+58.8	86.5	28 55.3	+59.0	87.0	28 58.2	+59.2	87.6	**29**
30	29 23.5	+57.3	83.4	29 30.1	+57.7	84.0	29 36.2	+57.9	84.5	29 41.6	+58.2	85.1	29 46.4	+58.6	85.7	29 50.7	+58.8	86.2	29 54.3	+59.0	86.8	29 57.4	+59.2	87.4	**30**
31	30 20.8	+57.2	83.1	30 27.8	+57.5	83.6	30 34.1	+57.9	84.2	30 39.8	+58.2	84.8	30 45.0	+58.4	85.4	30 49.5	+58.7	86.0	30 53.3	+59.0	86.6	30 56.6	+59.2	87.2	**31**
32	31 18.0	+57.2	82.7	31 25.3	+57.5	83.3	31 32.0	+57.9	83.9	31 38.0	+58.2	84.5	31 43.4	+58.5	85.1	31 48.2	+58.7	85.8	31 52.3	+59.0	86.4	31 55.8	+59.2	87.0	**32**
33	32 15.2	+57.1	82.3	32 22.8	+57.5	83.0	32 29.9	+57.8	83.6	32 36.2	+58.1	84.2	32 41.9	+58.4	84.9	32 46.9	+58.7	85.5	32 51.3	+58.9	86.2	32 55.0	+59.1	86.8	**33**
34	33 12.3	+57.0	82.0	33 20.3	+57.4	82.6	33 27.7	+57.7	83.3	33 34.3	+58.1	83.9	33 40.3	+58.4	84.6	33 45.6	+58.7	85.3	33 50.2	+58.9	85.9	33 54.1	+59.2	86.6	**34**
35	34 09.3	+56.9	81.6	34 17.7	+57.3	82.3	34 25.4	+57.7	83.0	34 32.4	+58.1	83.6	34 38.7	+58.4	84.3	34 44.3	+58.6	85.0	34 49.1	+58.9	85.7	34 53.3	+59.1	86.4	**35**
36	35 06.2	+56.9	81.2	35 15.0	+57.3	81.9	35 23.1	+57.7	82.6	35 30.5	+57.9	83.3	35 37.1	+58.3	84.0	35 42.9	+58.6	84.8	35 48.0	+58.9	85.5	35 52.4	+59.1	86.2	**36**
37	36 03.1	+56.8	80.8	36 12.3	+57.2	81.6	36 20.8	+57.5	82.3	36 28.4	+58.0	83.0	36 35.4	+58.2	83.7	36 41.5	+58.6	84.5	36 46.9	+58.8	85.2	36 51.5	+59.1	86.0	**37**
38	36 59.9	+56.8	80.4	37 09.5	+57.2	81.2	37 18.3	+57.6	81.9	37 26.4	+57.9	82.7	37 33.6	+58.2	83.4	37 40.1	+58.5	84.2	37 45.7	+58.8	85.0	37 50.6	+59.0	85.8	**38**
39	37 56.7	+56.6	80.0	38 06.7	+57.0	80.8	38 15.9	+57.4	81.6	38 24.3	+57.8	82.4	38 31.8	+58.2	83.1	38 38.6	+58.5	83.9	38 44.5	+58.8	84.7	38 49.6	+59.0	85.5	**39**
40	38 53.3	+56.5	79.6	39 03.7	+57.0	80.4	39 13.3	+57.4	81.2	39 22.1	+57.7	82.0	39 30.0	+58.1	82.8	39 37.1	+58.4	83.6	39 43.3	+58.7	84.5	39 48.6	+59.0	85.3	**40**
41	39 49.8	+56.5	79.2	40 00.7	+56.9	80.0	40 10.7	+57.3	80.8	40 19.8	+57.7	81.7	40 28.1	+58.1	82.5	40 35.5	+58.4	83.3	40 42.0	+58.7	84.2	40 47.6	+59.0	85.1	**41**
42	40 46.3	+56.3	78.7	40 57.6	+56.8	79.6	41 08.0	+57.2	80.4	41 17.5	+57.7	81.3	41 26.2	+58.0	82.2	41 33.9	+58.3	83.0	41 40.7	+58.7	83.9	41 46.6	+58.9	84.8	**42**
43	41 42.6	+56.3	78.3	41 54.4	+56.7	79.1	42 05.2	+57.2	80.0	42 15.2	+57.5	80.9	42 24.2	+57.9	81.8	42 32.2	+58.3	82.7	42 39.4	+58.6	83.6	42 45.5	+58.9	84.6	**43**
44	42 38.9	+56.1	77.8	42 51.1	+56.6	78.7	43 02.4	+57.0	79.6	43 12.7	+57.5	80.5	43 22.1	+57.9	81.5	43 30.5	+58.2	82.4	43 38.0	+58.5	83.3	43 44.4	+58.9	84.3	**44**
45	43 35.0	+55.9	77.3	43 47.7	+56.4	78.2	43 59.4	+57.0	79.2	44 10.2	+57.4	80.1	44 20.0	+57.8	81.1	44 28.7	+58.2	82.1	44 36.5	+58.5	83.0	44 43.3	+58.8	84.0	**45**
46	44 30.9	+55.9	76.8	44 44.1	+56.4	77.8	44 56.4	+56.8	78.7	45 07.6	+57.3	79.7	45 17.8	+57.7	80.7	45 26.9	+58.1	81.7	45 35.0	+58.5	82.7	45 42.1	+58.8	83.7	**46**
47	45 26.8	+55.7	76.3	45 40.5	+56.2	77.3	45 53.2	+56.7	78.3	46 04.9	+57.2	79.3	46 15.5	+57.6	80.3	46 25.0	+58.0	81.4	46 33.5	+58.4	82.4	46 40.9	+58.7	83.5	**47**
48	46 22.5	+55.5	75.8	46 36.7	+56.1	76.8	46 49.9	+56.6	77.8	47 02.1	+57.0	78.9	47 13.1	+57.5	79.9	47 23.0	+58.0	81.0	47 31.9	+58.3	82.1	47 39.6	+58.7	83.2	**48**
49	47 18.0	+55.4	75.2	47 32.8	+56.0	76.3	47 46.5	+56.5	77.3	47 59.1	+57.0	78.4	48 10.6	+57.5	79.5	48 21.0	+57.9	80.6	48 30.2	+58.3	81.7	48 38.3	+58.6	82.8	**49**
50	48 13.4	+55.2	74.6	48 28.8	+55.7	75.7	48 43.0	+56.3	76.8	48 56.1	+56.9	77.9	49 08.1	+57.3	79.1	49 18.9	+57.8	80.2	49 28.5	+58.2	81.4	49 36.9	+58.6	82.5	**50**
51	49 08.6	+55.0	74.0	49 24.5	+55.7	75.2	49 39.3	+56.2	76.3	49 53.0	+56.7	77.4	50 05.4	+57.3	78.6	50 16.7	+57.7	79.8	50 26.7	+58.1	81.0	50 35.5	+58.5	82.2	**51**
52	50 03.6	+54.8	73.4	50 20.2	+55.4	74.6	50 35.5	+56.1	75.7	50 49.7	+56.6	76.9	51 02.7	+57.1	78.1	51 14.4	+57.6	79.4	51 24.8	+58.1	80.6	51 34.0	+58.4	81.8	**52**
53	50 58.4	+54.6	72.8	51 15.6	+55.2	74.0	51 31.6	+55.8	75.2	51 46.3	+56.4	76.4	51 59.8	+57.0	77.6	52 12.0	+57.5	78.9	52 22.9	+57.9	80.2	52 32.4	+58.4	81.5	**53**
54	51 53.0	+54.4	72.1	52 10.8	+55.1	73.3	52 27.4	+55.7	74.6	52 42.7	+56.3	75.8	52 56.8	+56.8	77.1	53 09.5	+57.3	78.4	53 20.8	+57.9	79.7	53 30.8	+58.3	81.1	**54**
55	52 47.4	+54.1	71.4	53 05.9	+54.8	72.7	53 23.1	+55.5	74.0	53 39.0	+56.1	75.3	53 53.6	+56.7	76.6	54 06.8	+57.3	77.9	54 18.7	+57.7	79.3	54 29.1	+58.2	80.7	**55**
56	53 41.5	+53.8	70.7	54 00.7	+54.5	72.0	54 18.6	+55.2	73.3	54 35.1	+55.9	74.7	54 50.3	+56.5	76.0	55 04.1	+57.1	77.4	55 16.4	+57.7	78.8	55 27.3	+58.1	80.2	**56**
57	54 35.3	+53.6	69.9	54 55.2	+54.3	71.3	55 13.8	+55.0	72.6	55 31.0	+55.7	74.0	55 46.8	+56.4	75.4	56 01.2	+56.9	76.9	56 14.1	+57.5	78.3	56 25.4	+58.1	79.8	**57**
58	55 28.9	+53.2	69.2	55 49.5	+54.0	70.5	56 08.8	+54.8	71.9	56 26.7	+55.5	73.4	56 43.2	+56.1	74.8	56 58.1	+56.8	76.3	57 11.6	+57.4	77.8	57 23.5	+57.9	79.3	**58**
59	56 22.1	+52.9	68.3	56 43.5	+53.7	69.7	57 03.6	+54.5	71.2	57 22.2	+55.3	72.7	57 39.3	+56.0	74.2	57 54.9	+56.6	75.7	58 09.0	+57.2	77.3	58 21.4	+57.8	78.8	**59**
60	57 15.0	+52.5	67.5	57 37.2	+53.4	68.9	57 58.1	+54.2	70.4	58 17.5	+54.9	71.9	58 35.3	+55.7	73.5	58 51.5	+56.5	75.1	59 06.2	+57.1	76.7	59 19.2	+57.6	78.3	**60**
61	58 07.5	+52.1	66.6	58 30.6	+53.0	68.1	58 52.3	+53.8	69.6	59 12.4	+54.7	71.2	59 31.0	+55.5	72.8	59 48.0	+56.2	74.4	60 03.3	+56.8	76.1	60 16.8	+57.5	77.8	**61**
62	58 59.6	+51.6	65.6	59 23.6	+52.6	67.2	59 46.1	+53.5	68.7	60 07.1	+54.4	70.3	60 26.5	+55.2	72.0	60 44.2	+55.9	73.7	61 00.1	+56.7	75.4	61 14.3	+57.4	77.2	**62**
63	59 51.2	+51.2	64.6	60 16.2	+52.2	66.2	60 39.6	+53.2	67.8	61 01.5	+54.0	69.5	61 21.7	+54.9	71.2	61 40.1	+55.8	73.0	61 56.8	+56.5	74.7	62 11.7	+57.2	76.6	**63**
64	60 42.4	+50.7	63.6	61 08.4	+51.7	65.2	61 32.8	+52.6	66.9	61 55.5	+53.7	68.6	62 16.6	+54.5	70.3	62 35.9	+55.4	72.2	62 53.3	+56.2	74.0	63 08.9	+57.0	75.9	**64**
65	61 33.1	+50.1	62.5	62 00.1	+51.1	64.1	62 25.4	+52.2	65.8	62 49.2	+53.2	67.6	63 11.1	+54.2	69.4	63 31.3	+55.1	71.3	63 49.5	+56.0	73.2	64 05.9	+56.7	75.2	**65**
66	62 23.2	+49.4	61.3	62 51.2	+50.6	63.0	63 17.6	+51.7	64.8	63 42.4	+52.7	66.6	64 05.3	+53.8	68.5	64 26.4	+54.7	70.4	64 45.5	+55.7	72.4	65 02.6	+56.5	74.5	**66**
67	63 12.6	+48.8	60.0	63 41.8	+50.0	61.8	64 09.3	+51.1	63.6	64 35.1	+52.2	65.5	64 59.1	+53.3	67.4	65 21.1	+54.4	69.4	65 41.2	+55.3	71.5	65 59.1	+56.3	73.6	**67**
68	64 01.4	+48.0	58.7	64 31.8	+49.2	60.5	65 00.4	+50.5	62.4	65 27.3	+51.7	64.3	65 52.4	+52.8	66.3	66 15.5	+53.9	68.4	66 36.5	+55.0	70.6	66 55.4	+55.9	72.8	**68**
69	64 49.4	+47.3	57.3	65 21.0	+48.5	59.2	65 50.9	+49.8	61.1	66 19.0	+51.0	63.1	66 45.2	+52.2	65.2	67 09.4	+53.4	67.3	67 31.5	+54.5	69.5	67 51.3	+55.6	71.8	**69**
70	65 36.7	+46.3	55.9	66 09.5	+47.7	57.7	66 40.7	+49.0	59.7	67 10.0	+50.3	61.7	67 37.4	+51.6	63.9	68 02.8	+52.9	66.1	68 26.0	+54.1	68.4	68 46.9	+55.2	70.8	**70**
71	66 23.0	+45.3	54.3	66 57.2	+46.7	56.2	67 29.7	+48.1	58.2	68 00.3	+49.5	60.3	68 29.0	+50.9	62.5	68 55.7	+52.2	64.8	69 20.1	+53.5	67.2	69 42.1	+54.7	69.7	**71**
72	67 08.3	+44.2	52.6	67 43.9	+45.6	54.6	68 17.8	+47.1	56.6	68 49.8	+48.6	58.8	69 19.9	+50.1	61.0	69 47.9	+51.5	63.4	70 13.6	+52.8	65.9	70 36.8	+54.2	68.5	**72**
73	67 52.5	+42.9	50.9	68 29.5	+44.5	52.8	69 04.9	+46.0	54.9	69 38.4	+47.6	57.1	70 10.0	+49.1	59.5	70 39.4	+50.7	61.9	71 06.4	+52.2	64.5	71 31.0	+53.6	67.2	**73**
74	68 35.4	+41.7	49.0	69 14.0	+43.3	51.0	69 50.9	+44.9	53.1	70 26.0	+46.5	55.3	70 59.1	+48.1	57.7	71 30.1	+49.7	60.2	71 58.6	+51.4	62.9	72 24.6	+52.9	65.7	**74**
75	69 17.1	+40.2	47.0	69 57.3	+41.7	49.0	70 35.8	+43.4	51.1	71 12.5	+45.2	53.4	71 47.2	+47.0	55.9	72 19.8	+48.7	58.4	72 50.0	+50.4	61.2	73 17.5	+52.1	64.1	**75**
76	69 57.3	+38.5	44.9	70 39.0	+40.2	46.9	71 19.2	+42.0	49.0	71 57.7	+43.7	51.3	72 34.2	+45.5	53.8	73 08.5	+47.4	56.5	73 40.4	+49.2	59.3	74 09.6	+51.1	62.3	**76**
77	70 35.8	+36.7	42.6	71 19.2	+38.5	44.6	72 01.2	+40.2	46.7	72 41.4	+42.1	49.1	73 19.7	+44.0	51.6	73 55.9	+46.0	54.3	74 29.6	+48.0	57.2	75 00.7	+50.0	60.4	**77**
78	71 12.5	*+34.7* •	40.2	71 57.7	*+36.5* •	42.1	72 41.4	*+38.3* •	44.3	73 23.5	+40.2	46.6	74 03.7	+42.3	49.2	74 41.9	+44.3	51.9	75 17.6	+46.5	54.9	75 50.7	+48.6	58.2	**78**
79	71 47.2	*+32.6* •	37.6	72 34.2	*+34.3* •	39.5	73 19.7	*+36.2* •	41.7	74 03.7	*+38.2* •	44.0	74 46.0	*+40.2* •	46.5	75 26.2	*+42.4* •	49.3	76 04.1	+44.7	52.4	76 39.3	+47.1	55.7	**79**
80	72 19.8	*+30.2* •	34.9	73 08.5	*+31.9* •	36.8	73 55.9	*+33.7* •	38.8	74 41.9	*+35.7* •	41.1	75 26.2	*+37.9* •	43.6	76 08.6	*+40.2* •	46.4	76 48.8	*+42.6* •	49.5	77 26.4	*+45.1* •	52.9	**80**
81	72 50.0	*+27.5* •	32.0	73 40.4	*+29.2* •	33.8	74 29.6	*+31.1* •	35.8	75 17.6	*+33.1* •	38.0	76 04.1	*+35.2* •	40.5	76 48.8	*+37.6* •	43.3	77 31.4	*+40.1* •	46.4	78 11.5	*+42.8* •	49.8	**81**
82	73 17.5	*+24.8* •	28.9	74 09.6	*+26.4* •	30.6	75 00.7	*+28.2* •	32.5	75 50.7	*+30.1* •	34.7	76 39.3	*+32.3* •	37.1	77 26.4	*+34.6* •	39.8	78 11.5	*+37.1* •	42.8	78 54.3	*+39.9* •	46.3	**82**
83	73 42.3	*+21.7* •	25.7	74 36.0	*+23.2* •	27.3	75 28.9	*+24.8* •	29.1	76 20.8	*+26.7* •	31.1	77 11.6	*+28.8* •	33.3	78 01.0	*+31.1* •	35.9	78 48.6	*+33.8* •	38.9	79 34.2	*+36.7* •	42.3	**83**
84	74 04.0	*+18.4* •	22.4	74 59.2	*+19.8* •	23.8	75 53.7	*+21.4* •	25.4	76 47.5	*+23.1* •	27.2	77 40.4	*+25.0* •	29.3	78 32.1	*+27.2* •	31.7	79 22.4	*+29.7* •	34.5	80 10.9	*+32.5* •	37.8	**84**
85	74 22.4	*+15.0* •	18.9	75 19.0	*+16.1* •	20.1	76 15.1	*+17.5* •	21.5	77 10.6	*+19.0* •	23.1	78 05.4	*+20.7* •	25.0	78 59.3	*+22.8* •	27.1	79 52.1	*+25.1* •	29.7	80 43.4	*+27.8* •	32.7	**85**
86	74 37.4	*+11.4* •	15.2	75 35.1	*+12.4* •	16.3	76 32.6	*+13.4* •	17.4	77 29.6	*+14.7* •	18.8	78 26.1	*+16.2* •	20.4	79 22.1	*+17.8* •	22.2	80 17.2	*+19.8* •	24.4	81 11.2	*+22.3* •	27.1	**86**
87	74 48.8	*+7.6* •	11.5	75 47.5	*+8.3* •	12.3	76 46.0	*+9.1* •	13.2	77 44.3	*+10.1* •	14.3	78 42.3	*+11.1* •	15.5	79 39.9	*+12.5* •	17.0	80 37.0	*+14.0* •	18.7	81 33.5	*+15.9* •	20.9	**87**
88	74 56.4	*+3.7* •	7.7	75 55.8	*+4.2* •	8.2	76 55.1	*+4.7* •	8.9	77 54.4	*+5.2* •	9.6	78 53.4	*+6.0* •	10.4	79 52.4	*+6.7* •	11.4	80 51.0	*+7.8* •	12.7	81 49.4	*+9.0* •	14.2	**88**
89	75 00.1	*–0.1* •	3.9	76 00.0	*0.0* •	4.1	76 59.8	*+0.2* •	4.4	77 59.6	*+0.4* •	4.8	78 59.4	*+0.6* •	5.2	79 59.1	*+0.9* •	5.8	80 58.8	*+1.2* •	6.4	81 58.4	*+1.6* •	7.2	**89**
90	75 00.0	*–4.0* •	0.0	76 00.0	*–4.2* •	0.0	77 00.0	*–4.3* •	0.0	78 00.0	*–4.5* •	0.0	79 00.0	*–4.8* •	0.0	80 00.0	*–5.0* •	0.0	81 00.0	*–5.4* •	0.0	82 00.0	*–5.8* •	0.0	**90**
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 88°, 272°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	0 31.1	−58.0	91.9	0 29.0	−58.2	91.9	0 27.0	−58.5	91.9	0 24.9	−58.6	92.0	0 22.9	−58.9	92.0	0 20.8	−59.1	92.0	0 18.8	−59.3	92.0	0 16.7	−59.4	92.0	0
1	0 26.9	+58.0	87.8	0 29.2	+58.2	87.8	0 31.5	+58.4	87.8	0 33.7	+58.7	87.8	0 36.0	+58.9	87.8	0 38.3	+59.0	87.9	0 40.5	+59.3	87.9	0 42.7	+59.4	87.9	1
2	1 24.9	+57.9	87.6	1 27.4	+58.2	87.6	1 29.9	+58.5	87.6	1 32.4	+58.7	87.6	1 34.9	+58.9	87.7	1 37.3	+59.1	87.7	1 39.8	+59.2	87.7	1 42.1	+59.5	87.7	2
3	2 22.8	+58.0	87.3	2 25.6	+58.2	87.3	2 28.4	+58.5	87.4	2 31.1	+58.7	87.4	2 33.8	+58.9	87.5	2 36.4	+59.1	87.5	2 39.0	+59.3	87.6	2 41.6	+59.4	87.6	3
4	3 20.8	+57.9	87.0	3 23.8	+58.3	87.1	3 26.9	+58.4	87.2	3 29.8	+58.7	87.2	3 32.7	+58.9	87.3	3 35.5	+59.1	87.3	3 38.3	+59.2	87.4	3 41.0	+59.4	87.5	4
5	4 18.7	+58.0	86.8	4 22.1	+58.2	86.8	4 25.3	+58.5	86.9	4 28.5	+58.7	87.0	4 31.6	+58.9	87.1	4 34.6	+59.1	87.2	4 37.5	+59.3	87.2	4 40.4	+59.4	87.3	5
6	5 16.7	+57.9	86.5	5 20.3	+58.2	86.6	5 23.8	+58.4	86.7	5 27.2	+58.7	86.8	5 30.5	+58.9	86.9	5 33.7	+59.1	87.0	5 36.8	+59.2	87.1	5 39.8	+59.4	87.2	6
7	6 14.6	+57.9	86.3	6 18.5	+58.2	86.4	6 22.2	+58.5	86.5	6 25.9	+58.6	86.6	6 29.4	+58.9	86.7	6 32.8	+59.0	86.8	6 36.0	+59.3	86.9	6 39.2	+59.4	87.0	7
8	7 12.5	+57.9	86.0	7 16.7	+58.1	86.1	7 20.7	+58.4	86.2	7 24.5	+58.7	86.4	7 28.3	+58.8	86.5	7 31.8	+59.1	86.6	7 35.3	+59.2	86.8	7 38.6	+59.4	86.9	8
9	8 10.4	+58.0	85.7	8 14.8	+58.2	85.9	8 19.1	+58.4	86.0	8 23.2	+58.6	86.2	8 27.1	+58.9	86.3	8 30.9	+59.1	86.5	8 34.5	+59.3	86.6	8 38.0	+59.4	86.8	9
10	9 08.4	+57.9	85.5	9 13.0	+58.2	85.6	9 17.5	+58.4	85.8	9 21.8	+58.7	85.9	9 26.0	+58.9	86.1	9 30.0	+59.0	86.3	9 33.8	+59.2	86.4	9 37.4	+59.4	86.6	10
11	10 06.3	+57.8	85.2	10 11.2	+58.1	85.4	10 15.9	+58.4	85.6	10 20.5	+58.6	85.7	10 24.9	+58.8	85.9	10 29.0	+59.1	86.1	10 33.0	+59.3	86.3	10 36.8	+59.4	86.5	11
12	11 04.1	+57.9	84.9	11 09.3	+58.2	85.1	11 14.3	+58.4	85.3	11 19.1	+58.7	85.5	11 23.7	+58.9	85.7	11 28.1	+59.0	85.9	11 32.3	+59.2	86.1	11 36.2	+59.4	86.3	12
13	12 02.0	+57.9	84.7	12 07.5	+58.1	84.9	12 12.7	+58.4	85.1	12 17.8	+58.6	85.3	12 22.6	+58.8	85.5	12 27.1	+59.1	85.7	12 31.5	+59.2	86.0	12 35.6	+59.4	86.2	13
14	12 59.9	+57.8	84.4	13 05.6	+58.1	84.6	13 11.1	+58.4	84.8	13 16.4	+58.6	85.1	13 21.4	+58.8	85.3	13 26.2	+59.0	85.6	13 30.7	+59.2	85.8	13 35.0	+59.4	86.0	14
15	13 57.7	+57.8	84.1	14 03.7	+58.1	84.4	14 09.5	+58.4	84.6	14 15.0	+58.6	84.9	14 20.2	+58.9	85.1	14 25.2	+59.0	85.4	14 29.9	+59.2	85.6	14 34.4	+59.3	85.9	15
16	14 55.5	+57.8	83.8	15 01.8	+58.1	84.1	15 07.9	+58.3	84.4	15 13.6	+58.6	84.6	15 19.1	+58.8	84.9	15 24.2	+59.1	85.2	15 29.1	+59.2	85.5	15 33.7	+59.4	85.7	16
17	15 53.3	+57.8	83.6	15 59.9	+58.1	83.8	16 06.2	+58.3	84.1	16 12.2	+58.6	84.4	16 17.9	+58.8	84.7	16 23.3	+59.0	85.0	16 28.3	+59.2	85.3	16 33.1	+59.4	85.6	17
18	16 51.1	+57.8	83.3	16 58.0	+58.0	83.6	17 04.5	+58.3	83.9	17 10.8	+58.5	84.2	17 16.7	+58.8	84.5	17 22.3	+59.0	84.8	17 27.5	+59.2	85.1	17 32.5	+59.3	85.4	18
19	17 48.9	+57.7	83.0	17 56.0	+58.0	83.3	18 02.8	+58.3	83.6	18 09.3	+58.6	84.0	18 15.5	+58.7	84.3	18 21.3	+58.9	84.6	18 26.7	+59.2	84.9	18 31.8	+59.4	85.3	19
20	18 46.6	+57.7	82.7	18 54.0	+58.0	83.0	19 01.1	+58.3	83.4	19 07.9	+58.5	83.7	19 14.2	+58.8	84.1	19 20.2	+59.0	84.4	19 25.9	+59.2	84.8	19 31.2	+59.3	85.1	20
21	19 44.3	+57.7	82.4	19 52.0	+58.0	82.8	19 59.4	+58.2	83.1	20 06.4	+58.5	83.5	20 13.0	+58.7	83.9	20 19.2	+59.0	84.2	20 25.1	+59.1	84.6	20 30.5	+59.3	85.0	21
22	20 42.0	+57.6	82.1	20 50.0	+57.9	82.5	20 57.6	+58.3	82.9	21 04.9	+58.5	83.3	21 11.7	+58.7	83.6	21 18.2	+58.9	84.0	21 24.2	+59.1	84.4	21 29.8	+59.4	84.8	22
23	21 39.6	+57.6	81.8	21 47.9	+58.0	82.2	21 55.9	+58.2	82.6	22 03.4	+58.4	83.0	22 10.4	+58.8	83.4	22 17.1	+58.9	83.8	22 23.3	+59.2	84.2	22 29.2	+59.3	84.6	23
24	22 37.2	+57.6	81.5	22 45.9	+57.8	81.9	22 54.1	+58.1	82.4	23 01.8	+58.5	82.8	23 09.2	+58.6	83.2	23 16.0	+58.9	83.6	23 22.5	+59.1	84.1	23 28.5	+59.3	84.5	24
25	23 34.8	+57.6	81.2	23 43.7	+57.9	81.7	23 52.2	+58.2	82.1	24 00.3	+58.4	82.5	24 07.8	+58.7	83.0	24 14.9	+58.9	83.4	24 21.6	+59.1	83.9	24 27.8	+59.3	84.3	25
26	24 32.4	+57.5	80.9	24 41.6	+57.8	81.4	24 50.4	+58.1	81.8	24 58.7	+58.4	82.3	25 06.5	+58.6	82.7	25 13.8	+58.9	83.2	25 20.7	+59.1	83.7	25 27.1	+59.2	84.1	26
27	25 29.9	+57.4	80.6	25 39.4	+57.8	81.1	25 48.5	+58.1	81.5	25 57.1	+58.3	82.0	26 05.1	+58.7	82.5	26 12.7	+58.9	83.0	26 19.8	+59.1	83.5	26 26.3	+59.3	84.0	27
28	26 27.3	+57.4	80.3	26 37.2	+57.7	80.8	26 46.6	+58.0	81.3	26 55.4	+58.4	81.8	27 03.8	+58.6	82.3	27 11.6	+58.8	82.8	27 18.9	+59.0	83.3	27 25.6	+59.3	83.8	28
29	27 24.7	+57.4	79.9	27 34.9	+57.7	80.5	27 44.6	+58.0	81.0	27 53.8	+58.3	81.5	28 02.4	+58.5	82.0	28 10.4	+58.8	82.6	28 17.9	+59.1	83.1	28 24.9	+59.2	83.6	29
30	28 22.1	+57.3	79.6	28 32.6	+57.7	80.1	28 42.6	+58.0	80.7	28 52.1	+58.2	81.2	29 00.9	+58.6	81.8	29 09.2	+58.8	82.3	29 17.0	+59.0	82.9	29 24.1	+59.2	83.4	30
31	29 19.4	+57.3	79.3	29 30.3	+57.6	79.8	29 40.6	+57.9	80.4	29 50.3	+58.3	81.0	29 59.5	+58.5	81.5	30 08.0	+58.8	82.1	30 16.0	+59.0	82.7	30 23.3	+59.2	83.3	31
32	30 16.7	+57.2	78.9	30 27.9	+57.6	79.5	30 38.5	+57.9	80.1	30 48.6	+58.2	80.7	30 58.0	+58.5	81.3	31 06.8	+58.7	81.9	31 15.0	+58.9	82.5	31 22.5	+59.2	83.1	32
33	31 13.9	+57.2	78.6	31 25.5	+57.5	79.2	31 36.4	+57.9	79.8	31 46.8	+58.1	80.4	31 56.5	+58.4	81.0	32 05.5	+58.7	81.6	32 13.9	+59.0	82.2	32 21.7	+59.2	82.9	33
34	32 11.1	+57.1	78.2	32 23.0	+57.5	78.8	32 34.3	+57.8	79.5	32 44.9	+58.2	80.1	32 54.9	+58.4	80.7	33 04.2	+58.7	81.4	33 12.9	+58.9	82.0	33 20.9	+59.1	82.7	34
35	33 08.2	+57.0	77.9	33 20.5	+57.4	78.5	33 32.1	+57.7	79.2	33 43.1	+58.0	79.8	33 53.3	+58.4	80.5	34 02.9	+58.7	81.1	34 11.8	+58.9	81.8	34 20.0	+59.2	82.5	35
36	34 05.2	+57.0	77.5	34 17.9	+57.3	78.2	34 29.8	+57.7	78.8	34 41.1	+58.1	79.5	34 51.7	+58.3	80.2	35 01.6	+58.6	80.9	35 10.7	+58.9	81.6	35 19.2	+59.1	82.3	36
37	35 02.2	+56.9	77.1	35 15.2	+57.3	77.8	35 27.5	+57.7	78.5	35 39.2	+57.9	79.2	35 50.0	+58.3	79.9	36 00.2	+58.6	80.6	36 09.6	+58.9	81.3	36 18.3	+59.1	82.1	37
38	35 59.1	+56.8	76.7	36 12.5	+57.2	77.4	36 25.2	+57.6	78.1	36 37.1	+58.0	78.9	36 48.3	+58.3	79.6	36 58.8	+58.5	80.3	37 08.5	+58.8	81.1	37 17.4	+59.0	81.8	38
39	36 55.9	+56.7	76.3	37 09.7	+57.1	77.1	37 22.8	+57.5	77.8	37 35.1	+57.8	78.5	37 46.6	+58.2	79.3	37 57.3	+58.5	80.1	38 07.3	+58.8	80.8	38 16.4	+59.1	81.6	39
40	37 52.6	+56.7	75.9	38 06.8	+57.1	76.7	38 20.3	+57.4	77.4	38 32.9	+57.8	78.2	38 44.8	+58.1	79.0	38 55.8	+58.5	79.8	39 06.1	+58.7	80.6	39 15.5	+59.0	81.4	40
41	38 49.3	+56.5	75.5	39 03.9	+57.0	76.3	39 17.7	+57.4	77.1	39 30.7	+57.8	77.9	39 42.9	+58.1	78.7	39 54.3	+58.4	79.5	40 04.8	+58.7	80.3	40 14.5	+59.0	81.2	41
42	39 45.8	+56.5	75.1	40 00.9	+56.9	75.9	40 15.1	+57.3	76.7	40 28.5	+57.7	77.5	40 41.0	+58.1	78.3	40 52.7	+58.4	79.2	41 03.5	+58.7	80.0	41 13.5	+58.9	80.9	42
43	40 42.3	+56.3	74.6	40 57.8	+56.7	75.4	41 12.4	+57.2	76.3	41 26.2	+57.6	77.1	41 39.1	+58.0	78.0	41 51.1	+58.3	78.9	42 02.2	+58.6	79.8	42 12.4	+58.9	80.7	43
44	41 38.6	+56.2	74.2	41 54.5	+56.7	75.0	42 09.6	+57.1	75.9	42 23.8	+57.5	76.8	42 37.1	+57.9	77.7	42 49.4	+58.3	78.6	43 00.8	+58.6	79.5	43 11.3	+58.9	80.4	44
45	42 34.8	+56.1	73.7	42 51.2	+56.6	74.6	43 06.7	+57.1	75.5	43 21.3	+57.5	76.4	43 35.0	+57.8	77.3	43 47.7	+58.2	78.2	43 59.4	+58.6	79.2	44 10.2	+58.8	80.1	45
46	43 30.9	+56.0	73.2	43 47.8	+56.5	74.1	44 03.8	+56.9	75.0	44 18.8	+57.4	76.0	44 32.8	+57.8	76.9	44 45.9	+58.2	77.9	44 58.0	+58.5	78.9	45 09.0	+58.8	79.9	46
47	44 26.9	+55.9	72.7	44 44.3	+56.4	73.6	45 00.7	+56.9	74.6	45 16.2	+57.2	75.6	45 30.6	+57.7	76.6	45 44.1	+58.0	77.6	45 56.5	+58.4	78.6	46 07.8	+58.8	79.6	47
48	45 22.8	+55.7	72.2	45 40.7	+56.2	73.2	45 57.6	+56.7	74.1	46 13.4	+57.2	75.1	46 28.3	+57.6	76.2	46 42.1	+58.0	77.2	46 54.9	+58.4	78.2	47 06.6	+58.7	79.3	48
49	46 18.5	+55.6	71.7	46 36.9	+56.1	72.7	46 54.3	+56.6	73.7	47 10.6	+57.1	74.7	47 25.9	+57.5	75.8	47 40.1	+58.0	76.8	47 53.3	+58.3	77.9	48 05.3	+58.7	79.0	49
50	47 14.1	+55.3	71.1	47 33.0	+55.9	72.1	47 50.9	+56.4	73.2	48 07.7	+57.0	74.2	48 23.4	+57.5	75.3	48 38.1	+57.8	76.4	48 51.6	+58.2	77.5	49 04.0	+58.6	78.7	50
51	48 09.4	+55.3	70.5	48 28.9	+55.8	71.6	48 47.3	+56.4	72.7	49 04.7	+56.8	73.8	49 20.9	+57.3	74.9	49 35.9	+57.8	76.0	49 49.8	+58.2	77.2	50 02.6	+58.5	78.3	51
52	49 04.7	+55.0	69.9	49 24.7	+55.6	71.0	49 43.7	+56.1	72.1	50 01.5	+56.7	73.3	50 18.2	+57.2	74.4	50 33.7	+57.7	75.6	50 48.0	+58.1	76.8	51 01.1	+58.5	78.0	52
53	49 59.7	+54.8	69.3	50 20.3	+55.5	70.4	50 39.8	+56.1	71.6	50 58.2	+56.6	72.8	51 15.4	+57.1	74.0	51 31.4	+57.5	75.2	51 46.1	+58.0	76.4	51 59.6	+58.4	77.6	53
54	50 54.5	+54.6	68.7	51 15.8	+55.2	69.8	51 35.9	+55.8	71.0	51 54.8	+56.4	72.2	52 12.5	+56.9	73.5	52 28.9	+57.5	74.7	52 44.1	+57.9	76.0	52 58.0	+58.4	77.3	54
55	51 49.1	+54.4	68.0	52 11.0	+55.0	69.2	52 31.7	+55.7	70.4	52 51.2	+56.2	71.7	53 09.4	+56.8	72.9	53 26.4	+57.3	74.2	53 42.0	+57.9	75.5	53 56.4	+58.2	76.9	55
56	52 43.5	+54.1	67.3	53 06.0	+54.8	68.6	53 27.4	+55.4	69.8	53 47.4	+56.1	71.1	54 06.2	+56.7	72.4	54 23.7	+57.2	73.7	54 39.9	+57.7	75.1	54 54.6	+58.2	76.4	56
57	53 37.6	+53.9	66.6	54 00.8	+54.6	67.9	54 22.8	+55.3	69.2	54 43.5	+55.9	70.5	55 02.9	+56.5	71.8	55 20.9	+57.1	73.2	55 37.6	+57.6	74.6	55 52.8	+58.1	76.0	57
58	54 31.5	+53.5	65.9	54 55.4	+54.3	67.2	55 18.1	+55.0	68.5	55 39.4	+55.7	69.8	55 59.4	+56.3	71.2	56 18.0	+56.9	72.6	56 35.2	+57.4	74.1	56 50.9	+57.9	75.6	58
59	55 25.0	+53.3	65.1	55 49.7	+54.0	66.4	56 13.1	+54.7	67.8	56 35.1	+55.4	69.2	56 55.7	+56.1	70.6	57 14.9	+56.7	72.1	57 32.6	+57.4	73.6	57 48.8	+57.9	75.1	59
60	56 18.3	+52.9	64.3	56 43.7	+53.7	65.6	57 07.8	+54.5	67.0	57 30.5	+55.2	68.5	57 51.8	+55.9	69.9	58 11.6	+56.6	71.5	58 30.0	+57.1	73.0	58 46.7	+57.7	74.6	60
61	57 11.2	+52.5	63.4	57 37.4	+53.4	64.8	58 02.3	+54.1	66.2	58 25.7	+55.0	67.7	58 47.7	+55.7	69.3	59 08.2	+56.4	70.8	59 27.1	+57.0	72.4	59 44.4	+57.6	74.0	61
62	58 03.7	+52.2	62.5	58 30.8	+53.0	63.9	58 56.4	+53.9	65.4	59 20.7	+54.6	67.0	59 43.4	+55.4	68.5	60 04.6	+56.1	70.1	60 24.1	+56.9	71.8	60 42.0	+57.5	73.5	62
63	58 55.9	+51.6	61.5	59 23.8	+52.6	63.0	59 50.3	+53.4	64.6	60 15.3	+54.3	66.1	60 38.8	+55.1	67.8	61 00.7	+55.9	69.4	61 21.0	+56.6	71.1	61 39.5	+57.3	72.9	63
64	59 47.5	+51.3	60.5	60 16.4	+52.1	62.1	60 43.7	+53.1	63.6	61 09.6	+54.0	65.3	61 33.9	+54.8	66.9	61 56.6	+55.6	68.7	62 17.6	+56.4	70.4	62 36.8	+57.1	72.3	64
65	60 38.8	+50.7	59.5	61 08.5	+51.7	61.1	61 36.8	+52.7	62.7	62 03.6	+53.6	64.3	62 28.7	+54.5	66.1	62 52.2	+55.4	67.9	63 14.0	+56.1	69.7	63 33.9	+56.9	71.6	65
66	61 29.5	+50.1	58.4	62 00.2	+51.2	60.0	62 29.5	+52.1	61.6	62 57.2	+53.1	63.4	63 23.2	+54.1	65.2	63 47.6	+55.0	67.0	64 10.1	+55.9	68.9	64 30.8	+56.6	70.8	66
67	62 19.6	+49.5	57.2	62 51.4	+50.5	58.9	63 21.6	+51.7	60.6	63 50.3	+52.7	62.3	64 17.3	+53.7	64.2	64 42.6	+54.6	66.1	65 06.0	+55.5	68.0	65 27.4	+56.4	70.1	67
68	63 09.1	+48.8	56.0	63 41.9	+50.0	57.7	64 13.3	+51.0	59.4	64 43.0	+52.1	61.2	65 11.0	+53.2	63.1	65 37.2	+54.2	65.1	66 01.5	+55.2	67.1	66 23.8	+56.1	69.2	68
69	63 57.9	+48.1	54.7	64 31.9	+49.3	56.4	65 04.3	+50.5	58.2	65 35.1	+51.6	60.1	66 04.2	+52.7	62.0	66 31.4	+53.8	64.0	66 56.7	+54.8	66.1	67 19.9	+55.8	68.3	69
70	64 46.0	+47.3	53.3	65 21.2	+48.5	55.0	65 54.8	+49.7	56.9	66 26.7	+50.9	58.8	66 56.9	+52.1	60.8	67 25.2	+53.3	62.9	67 51.5	+54.4	65.1	68 15.7	+55.4	67.4	70
71	65 33.3	+46.4	51.8	66 09.7	+47.6	53.6	66 44.5	+48.9	55.5	67 17.6	+50.2	57.4	67 49.0	+51.4	59.5	68 18.5	+52.6	61.7	68 45.9	+53.8	63.9	69 11.1	+55.0	66.3	71
72	66 19.7	+45.4	50.3	66 57.3	+46.7	52.1	67 33.4	+48.0	54.0	68 07.8	+49.4	56.0	68 40.4	+50.7	58.1	69 11.1	+52.0	60.4	69 39.7	+53.3	62.7	70 06.1	+54.5	65.1	72
73	67 05.1	+44.2	48.6	67 44.0	+45.7	50.5	68 21.4	+47.1	52.4	68 57.2	+48.4	54.4	69 31.1	+49.9	56.6	70 03.1	+51.3	58.9	70 33.0	+52.7	61.3	71 00.6	+54.0	63.9	73
74	67 49.3	+43.1	46.9	68 29.7	+44.5	48.7	69 08.5	+45.9	50.7	69 45.6	+47.5	52.8	70 21.0	+48.9	55.0	70 54.4	+50.4	57.4	71 25.7	+51.8	59.9	71 54.6	+53.3	62.5	74
75	68 32.4	+41.8	45.0	69 14.2	+43.2	46.9	69 54.4	+44.8	48.8	70 33.1	+46.3	51.0	71 09.9	+47.9	53.2	71 44.8	+49.5	55.7	72 17.5	+51.1	58.3	72 47.9	+52.5	61.0	75
76	69 14.2	+40.2	43.0	69 57.4	+41.8	44.9	70 39.2	+43.3	46.9	71 19.4	+44.9	49.0	71 57.8	+46.6	51.3	72 34.3	+48.3	53.8	73 08.6	+50.0	56.5	73 40.4	+51.7	59.3	76
77	69 54.4	+38.7	40.9	70 39.2	+40.2	42.7	71 22.5	+41.8	44.7	72 04.3	+43.5	46.9	72 44.4	+45.3	49.3	73 22.6	+47.0	51.8	73 58.6	+48.8	54.5	74 32.1	+50.7	57.5	77
78	70 33.1	+36.8	38.6	71 19.4	+38.4	40.5	72 04.3	+40.1	42.5	72 47.8	+41.9	44.6	73 29.7	+43.6	47.0	74 09.6	+45.5	49.6	74 47.4	+47.5	52.4	75 22.8	+49.4	55.4	78
79	71 09.9	*+34.9*•	36.2	71 57.8	*+36.5*•	38.0	72 44.4	*+38.2*•	40.0	73 29.7	*+39.9*•	42.2	74 13.3	+41.8	44.5	74 55.1	+43.8	47.1	75 34.9	+45.8	50.0	76 12.2	+48.0	53.1	79
80	71 44.8	*+32.7*•	33.6	72 34.3	*+34.3*•	35.4	73 22.6	*+36.0*•	37.3	74 09.6	*+37.8*•	39.5	74 55.1	*+39.8*•	41.8	75 38.9	*+41.8*•	44.4	76 20.7	*+44.0*•	47.3	77 00.2	+46.2	50.5	80
81	72 17.5	*+30.4*•	30.9	73 08.6	*+31.8*•	32.6	73 58.6	*+33.5*•	34.5	74 47.4	*+35.4*•	36.6	75 34.9	*+37.3*•	38.9	76 20.7	*+39.5*•	41.5	77 04.7	*+41.7*•	44.4	77 46.4	*+44.1*•	47.6	81
82	72 47.9	*+27.7*•	28.1	73 40.4	*+29.3*•	29.7	74 32.1	*+30.9*•	31.4	75 22.8	*+32.6*•	33.4	76 12.2	*+34.6*•	35.7	77 00.2	*+36.7*•	38.2	77 46.4	*+39.1*•	41.1	78 30.5	*+41.6*•	44.3	82
83	73 15.6	*+25.0*•	25.0	74 09.7	*+26.3*•	26.5	75 03.0	*+27.9*•	28.2	75 55.4	*+29.6*•	30.1	76 46.8	*+31.5*•	32.2	77 36.9	*+33.6*•	34.6	78 25.5	*+35.9*•	37.4	79 12.1	*+38.6*•	40.6	83
84	73 40.6	*+21.9*•	21.8	74 36.0	*+23.2*•	23.2	75 30.9	*+24.6*•	24.7	76 25.0	*+26.2*•	26.4	77 18.3	*+28.0*•	28.4	78 10.5	*+30.1*•	30.6	79 01.4	*+32.4*•	33.3	79 50.7	*+35.0*•	36.3	84
85	74 02.5	*+18.7*•	18.5	74 59.2	*+19.8*•	19.6	75 55.5	*+21.0*•	21.0	76 51.2	*+22.5*•	22.5	77 46.3	*+24.1*•	24.3	78 40.6	*+25.9*•	26.3	79 33.8	*+28.1*•	28.7	80 25.7	*+30.5*•	31.6	85
86	74 21.2	*+15.2*•	15.0	75 19.0	*+16.2*•	16.0	76 16.5	*+17.2*•	17.1	77 13.7	*+18.4*•	18.4	78 10.4	*+19.7*•	19.9	79 06.5	*+21.4*•	21.7	80 01.9	*+23.2*•	23.7	80 56.2	*+25.5*•	26.3	86
87	74 36.4	*+11.7*•	11.4	75 35.2	*+12.3*•	12.1	76 33.7	*+13.2*•	13.0	77 32.1	*+14.0*•	14.0	78 30.1	*+15.1*•	15.2	79 27.9	*+16.2*•	16.6	80 25.1	*+17.8*•	18.3	81 21.7	*+19.6*•	20.4	87
88	74 48.1	*+7.9*•	7.6	75 47.5	*+8.3*•	8.2	76 46.9	*+8.8*•	8.8	77 46.1	*+9.4*•	9.5	78 45.2	*+10.0*•	10.3	79 44.1	*+10.9*•	11.3	80 42.9	*+11.7*•	12.5	81 41.3	*+12.9*•	14.0	88
89	74 56.0	*+4.0*•	3.8	75 55.8	*+4.2*•	4.1	76 55.7	*+4.3*•	4.4	77 55.5	*+4.5*•	4.8	78 55.2	*+4.8*•	5.2	79 55.0	*+5.0*•	5.7	80 54.6	*+5.4*•	6.3	81 54.2	*+5.8*•	7.1	89
90	75 00.0	*+0.1*•	0.0	76 00.0	*0.0*•	0.0	77 00.0	*−0.2*•	0.0	78 00.0	*−0.4*•	0.0	79 00.0	*−0.6*•	0.0	80 00.0	*−0.9*•	0.0	81 00.0	*−1.2*•	0.0	82 00.0	*−1.6*•	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 92°, 268°

89°, 271° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 15.5	+58.0	91.0	0 14.5	+58.2	91.0	0 13.5	+58.5	91.0	0 12.5	+58.7	91.0	0 11.4	+58.9	91.0	0 10.4	+59.1	91.0	0 09.4	+59.2	91.0	0 08.3	+59.5	91.0	0
1	1 13.5	+57.9	90.7	1 12.7	+58.2	90.7	1 12.0	+58.4	90.7	1 11.2	+58.7	90.8	1 10.3	+58.9	90.8	1 09.5	+59.1	90.8	1 08.6	+59.3	90.8	1 07.8	+59.4	90.9	1
2	2 11.4	+58.0	90.4	2 10.9	+58.3	90.5	2 10.4	+58.5	90.5	2 09.9	+58.6	90.6	2 09.2	+58.9	90.6	2 08.6	+59.1	90.6	2 07.9	+59.3	90.7	2 07.2	+59.4	90.7	2
3	3 09.4	+57.9	90.2	3 09.2	+58.2	90.2	3 08.9	+58.4	90.3	3 08.5	+58.7	90.4	3 08.1	+58.9	90.4	3 07.7	+59.1	90.5	3 07.2	+59.2	90.5	3 06.6	+59.4	90.6	3
4	4 07.3	+58.0	89.9	4 07.4	+58.2	90.0	4 07.3	+58.5	90.1	4 07.2	+58.7	90.1	4 07.0	+58.9	90.2	4 06.8	+59.0	90.3	4 06.4	+59.3	90.4	4 06.0	+59.4	90.4	4
5	5 05.3	+57.9	89.7	5 05.6	+58.2	89.8	5 05.8	+58.4	89.8	5 05.9	+58.7	89.9	5 05.9	+58.9	90.0	5 05.8	+59.1	90.1	5 05.7	+59.2	90.2	5 05.4	+59.4	90.3	5
6	6 03.2	+57.9	89.4	6 03.8	+58.2	89.5	6 04.2	+58.5	89.6	6 04.6	+58.7	89.7	6 04.8	+58.9	89.8	6 04.9	+59.1	89.9	6 04.9	+59.3	90.0	6 04.8	+59.4	90.2	6
7	7 01.1	+58.0	89.1	7 02.0	+58.2	89.3	7 02.7	+58.4	89.4	7 03.3	+58.6	89.5	7 03.7	+58.9	89.6	7 04.0	+59.1	89.8	7 04.2	+59.2	89.9	7 04.2	+59.4	90.0	7
8	7 59.1	+57.9	88.9	8 00.2	+58.1	89.0	8 01.1	+58.4	89.2	8 01.9	+58.7	89.3	8 02.6	+58.8	89.4	8 03.1	+59.0	89.6	8 03.4	+59.3	89.7	8 03.6	+59.5	89.9	8
9	8 57.0	+57.9	88.6	8 58.3	+58.2	88.8	8 59.5	+58.5	88.9	9 00.6	+58.6	89.1	9 01.4	+58.9	89.2	9 02.1	+59.1	89.4	9 02.7	+59.2	89.6	9 03.1	+59.4	89.7	9
10	9 54.9	+57.9	88.4	9 56.5	+58.2	88.5	9 58.0	+58.4	88.7	9 59.2	+58.7	88.9	10 00.3	+58.9	89.1	10 01.2	+59.1	89.2	10 01.9	+59.3	89.4	10 02.5	+59.3	89.6	10
11	10 52.8	+57.8	88.1	10 54.7	+58.1	88.3	10 56.4	+58.4	88.5	10 57.9	+58.6	88.7	10 59.2	+58.8	88.9	11 00.3	+59.0	89.1	11 01.2	+59.2	89.2	11 01.8	+59.4	89.4	11
12	11 50.6	+57.9	87.8	11 52.8	+58.1	88.0	11 54.8	+58.4	88.2	11 56.5	+58.6	88.4	11 58.0	+58.9	88.7	11 59.3	+59.1	88.9	12 00.4	+59.2	89.1	12 01.2	+59.4	89.3	12
13	12 48.5	+57.8	87.5	12 50.9	+58.2	87.8	12 53.2	+58.3	88.0	12 55.1	+58.6	88.2	12 56.9	+58.8	88.5	12 58.4	+59.0	88.7	12 59.6	+59.2	88.9	13 00.6	+59.4	89.1	13
14	13 46.3	+57.9	87.3	13 49.1	+58.1	87.5	13 51.5	+58.4	87.8	13 53.7	+58.6	88.0	13 55.7	+58.8	88.3	13 57.4	+59.0	88.5	13 58.8	+59.2	88.8	14 00.0	+59.4	89.0	14
15	14 44.2	+57.8	87.0	14 47.2	+58.0	87.3	14 49.9	+58.3	87.5	14 52.3	+58.6	87.8	14 54.5	+58.8	88.1	14 56.4	+59.0	88.3	14 58.0	+59.2	88.6	14 59.4	+59.4	88.9	15
16	15 42.0	+57.7	86.7	15 45.2	+58.1	87.0	15 48.2	+58.4	87.3	15 50.9	+58.6	87.6	15 53.3	+58.8	87.8	15 55.4	+59.1	88.1	15 57.2	+59.2	88.4	15 58.8	+59.3	88.7	16
17	16 39.7	+57.8	86.4	16 43.3	+58.1	86.7	16 46.6	+58.3	87.0	16 49.5	+58.6	87.3	16 52.1	+58.8	87.6	16 54.5	+59.0	87.9	16 56.4	+59.2	88.2	16 58.1	+59.4	88.6	17
18	17 37.5	+57.7	86.2	17 41.4	+58.0	86.5	17 44.9	+58.3	86.8	17 48.1	+58.5	87.1	17 50.9	+58.8	87.4	17 53.5	+58.9	87.8	17 55.6	+59.2	88.1	17 57.5	+59.3	88.4	18
19	18 35.2	+57.7	85.9	18 39.4	+58.0	86.2	18 43.2	+58.2	86.5	18 46.6	+58.5	86.9	18 49.7	+58.8	87.2	18 52.4	+59.0	87.6	18 54.8	+59.2	87.9	18 56.8	+59.4	88.2	19
20	19 32.9	+57.7	85.6	19 37.4	+57.9	85.9	19 41.4	+58.3	86.3	19 45.1	+58.6	86.6	19 48.5	+58.7	87.0	19 51.4	+59.0	87.4	19 54.0	+59.1	87.7	19 56.2	+59.3	88.1	20
21	20 30.6	+57.7	85.3	20 35.3	+58.0	85.7	20 39.7	+58.2	86.0	20 43.7	+58.4	86.4	20 47.2	+58.7	86.8	20 50.4	+58.9	87.2	20 53.1	+59.2	87.5	20 55.5	+59.3	87.9	21
22	21 28.3	+57.6	85.0	21 33.3	+57.9	85.4	21 37.9	+58.2	85.8	21 42.1	+58.5	86.2	21 45.9	+58.8	86.6	21 49.3	+59.0	87.0	21 52.3	+59.1	87.4	21 54.8	+59.4	87.8	22
23	22 25.9	+57.6	84.7	22 31.2	+57.9	85.1	22 36.1	+58.2	85.5	22 40.6	+58.5	85.9	22 44.7	+58.6	86.3	22 48.3	+58.9	86.8	22 51.4	+59.1	87.2	22 54.2	+59.3	87.6	23
24	23 23.5	+57.5	84.4	23 29.1	+57.9	84.8	23 34.3	+58.2	85.2	23 39.1	+58.4	85.7	23 43.3	+58.7	86.1	23 47.2	+58.9	86.6	23 50.5	+59.2	87.0	23 53.5	+59.3	87.4	24
25	24 21.0	+57.5	84.1	24 27.0	+57.8	84.5	24 32.5	+58.1	85.0	24 37.5	+58.4	85.4	24 42.0	+58.7	85.9	24 46.1	+58.9	86.3	24 49.7	+59.1	86.8	24 52.8	+59.2	87.3	25
26	25 18.5	+57.5	83.8	25 24.8	+57.8	84.2	25 30.6	+58.1	84.7	25 35.9	+58.3	85.2	25 40.7	+58.6	85.7	25 45.0	+58.8	86.1	25 48.8	+59.0	86.6	25 52.0	+59.3	87.1	26
27	26 16.0	+57.4	83.4	26 22.6	+57.7	83.9	26 28.7	+58.0	84.4	26 34.2	+58.4	84.9	26 39.3	+58.6	85.4	26 43.8	+58.9	85.9	26 47.8	+59.1	86.4	26 51.3	+59.3	86.9	27
28	27 13.4	+57.4	83.1	27 20.3	+57.8	83.6	27 26.7	+58.1	84.1	27 32.6	+58.3	84.7	27 37.9	+58.6	85.2	27 42.7	+58.8	85.7	27 46.9	+59.0	86.2	27 50.6	+59.2	86.8	28
29	28 10.8	+57.3	82.8	28 18.1	+57.6	83.3	28 24.8	+57.9	83.9	28 30.9	+58.3	84.4	28 36.5	+58.5	84.9	28 41.5	+58.8	85.5	28 45.9	+59.1	86.0	28 49.8	+59.2	86.6	29
30	29 08.1	+57.3	82.4	29 15.7	+57.6	83.0	29 22.7	+58.0	83.6	29 29.2	+58.2	84.1	29 35.0	+58.6	84.7	29 40.3	+58.8	85.3	29 45.0	+59.0	85.8	29 49.0	+59.3	86.4	30
31	30 05.4	+57.2	82.1	30 13.3	+57.6	82.7	30 20.7	+57.9	83.3	30 27.4	+58.2	83.8	30 33.6	+58.5	84.4	30 39.1	+58.7	85.0	30 44.0	+59.0	85.6	30 48.3	+59.2	86.2	31
32	31 02.6	+57.2	81.8	31 10.9	+57.5	82.4	31 18.6	+57.9	83.0	31 25.6	+58.2	83.6	31 32.1	+58.4	84.2	31 37.8	+58.8	84.8	31 43.0	+58.9	85.4	31 47.5	+59.1	86.0	32
33	31 59.8	+57.1	81.4	32 08.4	+57.5	82.0	32 16.5	+57.8	82.6	32 23.8	+58.1	83.3	32 30.5	+58.4	83.9	32 36.6	+58.7	84.5	32 41.9	+59.0	85.2	32 46.6	+59.2	85.8	33
34	32 56.9	+57.0	81.0	33 05.9	+57.4	81.7	33 14.3	+57.7	82.3	33 21.9	+58.1	83.0	33 28.9	+58.4	83.6	33 35.3	+58.6	84.3	33 40.9	+58.9	85.0	33 45.8	+59.1	85.6	34
35	33 53.9	+57.0	80.7	34 03.3	+57.4	81.3	34 12.0	+57.7	82.0	34 20.0	+58.1	82.7	34 27.3	+58.4	83.4	34 33.9	+58.7	84.0	34 39.8	+58.9	84.7	34 44.9	+59.2	85.4	35
36	34 50.9	+56.9	80.3	35 00.7	+57.3	81.0	35 09.7	+57.7	81.7	35 18.1	+58.0	82.4	35 25.7	+58.3	83.1	35 32.6	+58.6	83.8	35 38.7	+58.8	84.5	35 44.1	+59.1	85.2	36
37	35 47.8	+56.8	79.9	35 58.0	+57.2	80.6	36 07.4	+57.6	81.3	36 16.1	+57.9	82.1	36 24.0	+58.3	82.8	36 31.2	+58.5	83.5	36 37.5	+58.9	84.3	36 43.2	+59.0	85.0	37
38	36 44.6	+56.8	79.5	36 55.2	+57.2	80.2	37 05.0	+57.5	81.0	37 14.0	+57.9	81.7	37 22.3	+58.2	82.5	37 29.7	+58.5	83.2	37 36.4	+58.8	84.0	37 42.2	+59.1	84.8	38
39	37 41.4	+56.6	79.1	37 52.4	+57.0	79.9	38 02.5	+57.5	80.6	38 11.9	+57.8	81.4	38 20.5	+58.2	82.2	38 28.2	+58.5	83.0	38 35.2	+58.8	83.8	38 41.3	+59.0	84.5	39
40	38 38.0	+56.6	78.7	38 49.4	+57.0	79.5	39 00.0	+57.4	80.3	39 09.7	+57.8	81.1	39 18.7	+58.1	81.9	39 26.7	+58.5	82.7	39 34.0	+58.7	83.5	39 40.3	+59.0	84.3	40
41	39 34.6	+56.5	78.2	39 46.4	+56.9	79.1	39 57.4	+57.3	79.9	40 07.5	+57.7	80.7	40 16.8	+58.0	81.5	40 25.2	+58.4	82.4	40 32.7	+58.7	83.2	40 39.3	+59.0	84.1	41
42	40 31.1	+56.3	77.8	40 43.3	+56.8	78.6	40 54.7	+57.3	79.5	41 05.2	+57.7	80.3	41 14.8	+58.0	81.2	41 23.6	+58.3	82.1	41 31.4	+58.6	83.0	41 38.3	+58.9	83.8	42
43	41 27.4	+56.3	77.3	41 40.1	+56.8	78.2	41 52.0	+57.1	79.1	42 02.9	+57.5	80.0	42 12.8	+58.0	80.9	42 21.9	+58.3	81.8	42 30.0	+58.7	82.7	42 37.2	+58.9	83.6	43
44	42 23.7	+56.1	76.9	42 36.9	+56.6	77.8	42 49.1	+57.1	78.7	43 00.4	+57.5	79.6	43 10.8	+57.9	80.5	43 20.2	+58.2	81.4	43 28.7	+58.5	82.4	43 36.1	+58.9	83.3	44
45	43 19.8	+56.0	76.4	43 33.5	+56.5	77.3	43 46.2	+56.9	78.3	43 57.9	+57.4	79.2	44 08.7	+57.8	80.1	44 18.4	+58.2	81.1	44 27.2	+58.5	82.1	44 35.0	+58.8	83.0	45
46	44 15.8	+55.9	75.9	44 30.0	+56.4	76.9	44 43.1	+56.9	77.8	44 55.3	+57.3	78.8	45 06.5	+57.7	79.8	45 16.6	+58.1	80.8	45 25.7	+58.5	81.8	45 33.8	+58.8	82.8	46
47	45 11.7	+55.8	75.4	45 26.4	+56.2	76.4	45 40.0	+56.8	77.4	45 52.6	+57.2	78.4	46 04.2	+57.6	79.4	46 14.7	+58.1	80.4	46 24.2	+58.4	81.4	46 32.6	+58.7	82.5	47
48	46 07.5	+55.5	74.9	46 22.6	+56.1	75.9	46 36.8	+56.6	76.9	46 49.8	+57.1	77.9	47 01.8	+57.6	79.0	47 12.8	+57.9	80.0	47 22.6	+58.4	81.1	47 31.3	+58.7	82.2	48
49	47 03.0	+55.5	74.3	47 18.7	+56.0	75.4	47 33.4	+56.5	76.4	47 46.9	+57.0	77.5	47 59.4	+57.5	78.6	48 10.7	+57.9	79.7	48 21.0	+58.2	80.8	48 30.0	+58.6	81.9	49
50	47 58.5	+55.2	73.7	48 14.7	+55.8	74.8	48 29.9	+56.4	75.9	48 43.9	+56.9	77.0	48 56.9	+57.3	78.1	49 08.6	+57.8	79.3	49 19.2	+58.2	80.4	49 28.6	+58.6	81.5	50
51	48 53.7	+55.1	73.2	49 10.5	+55.7	74.3	49 26.3	+56.2	75.4	49 40.8	+56.8	76.5	49 54.2	+57.3	77.7	50 06.4	+57.7	78.8	50 17.4	+58.2	80.0	50 27.2	+58.5	81.2	51
52	49 48.8	+54.8	72.5	50 06.2	+55.5	73.7	50 22.5	+56.0	74.8	50 37.6	+56.6	76.0	50 51.5	+57.1	77.2	51 04.1	+57.7	78.4	51 15.6	+58.0	79.6	51 25.7	+58.5	80.9	52
53	50 43.6	+54.7	71.9	51 01.7	+55.3	73.1	51 18.5	+55.9	74.3	51 34.2	+56.5	75.5	51 48.6	+57.0	76.7	52 01.8	+57.5	78.0	52 13.6	+58.0	79.2	52 24.2	+58.4	80.5	53
54	51 38.3	+54.4	71.3	51 57.0	+55.0	72.5	52 14.4	+55.8	73.7	52 30.7	+56.3	74.9	52 45.6	+56.9	76.2	52 59.3	+57.4	77.5	53 11.6	+57.9	78.8	53 22.6	+58.3	80.1	54
55	52 32.7	+54.2	70.6	52 52.0	+54.9	71.8	53 10.2	+55.5	73.1	53 27.0	+56.1	74.4	53 42.5	+56.7	75.7	53 56.7	+57.2	77.0	54 09.5	+57.7	78.3	54 20.9	+58.2	79.7	55
56	53 26.9	+53.9	69.9	53 46.9	+54.6	71.1	54 05.7	+55.3	72.4	54 23.1	+56.0	73.8	54 39.2	+56.6	75.1	54 53.9	+57.2	76.5	55 07.2	+57.7	77.9	55 19.1	+58.1	79.3	56
57	54 20.8	+53.6	69.1	54 41.5	+54.4	70.4	55 01.0	+55.0	71.8	55 19.1	+55.7	73.1	55 35.8	+56.4	74.5	55 51.1	+56.9	76.0	56 04.9	+57.5	77.4	56 17.2	+58.1	78.9	57
58	55 14.4	+53.3	68.3	55 35.9	+54.1	69.7	55 56.0	+54.9	71.1	56 14.8	+55.5	72.5	56 32.2	+56.2	73.9	56 48.0	+56.9	75.4	57 02.4	+57.4	76.9	57 15.3	+57.9	78.4	58
59	56 07.7	+53.0	67.5	56 30.0	+53.7	68.9	56 50.9	+54.5	70.3	57 10.3	+55.3	71.8	57 28.4	+55.9	73.3	57 44.9	+56.6	74.8	57 59.8	+57.3	76.3	58 13.2	+57.8	77.9	59
60	57 00.7	+52.6	66.7	57 23.7	+53.5	68.1	57 45.4	+54.3	69.6	58 05.6	+55.1	71.1	58 24.3	+55.8	72.6	58 41.5	+56.5	74.2	58 57.1	+57.1	75.8	59 11.0	+57.7	77.4	60
61	57 53.3	+52.2	65.8	58 17.2	+53.1	67.2	58 39.7	+53.9	68.8	59 00.7	+54.7	70.3	59 20.1	+55.5	71.9	59 38.0	+56.2	73.5	59 54.2	+56.9	75.2	60 08.7	+57.5	76.8	61
62	58 45.5	+51.7	64.8	59 10.3	+52.7	66.3	59 33.6	+53.6	67.9	59 55.4	+54.4	69.5	60 15.6	+55.3	71.1	60 34.2	+56.0	72.8	60 51.1	+56.7	74.5	61 06.2	+57.4	76.3	62
63	59 37.2	+51.4	63.8	60 03.0	+52.2	65.4	60 27.2	+53.2	67.0	60 49.8	+54.1	68.6	61 10.9	+54.9	70.3	61 30.2	+55.8	72.1	61 47.8	+56.5	73.8	62 03.6	+57.2	75.6	63
64	60 28.6	+50.8	62.8	60 55.2	+51.8	64.4	61 20.4	+52.8	66.0	61 43.9	+53.8	67.7	62 05.8	+54.6	69.5	62 26.0	+55.4	71.3	62 44.3	+56.3	73.1	63 00.8	+57.0	75.0	64
65	61 19.4	+50.2	61.7	61 47.0	+51.3	63.3	62 13.2	+52.3	65.0	62 37.7	+53.3	66.8	63 00.4	+54.3	68.6	63 21.4	+55.2	70.4	63 40.6	+56.0	72.3	63 57.8	+56.8	74.3	65
66	62 09.6	+49.6	60.6	62 38.3	+50.8	62.2	63 05.5	+51.8	64.0	63 31.0	+52.8	65.8	63 54.7	+53.8	67.6	64 16.6	+54.8	69.6	64 36.6	+55.7	71.5	64 54.6	+56.6	73.5	66
67	62 59.2	+49.0	59.3	63 29.1	+50.1	61.1	63 57.3	+51.2	62.8	64 23.8	+52.3	64.7	64 48.5	+53.4	66.6	65 11.4	+54.4	68.6	65 32.3	+55.4	70.6	65 51.2	+56.2	72.7	67
68	63 48.2	+48.2	58.0	64 19.2	+49.4	59.8	64 48.5	+50.6	61.6	65 16.1	+51.8	63.5	65 41.9	+52.9	65.5	66 05.8	+54.0	67.6	66 27.7	+55.0	69.7	66 47.4	+56.0	71.9	68
69	64 36.4	+47.5	56.7	65 08.6	+48.7	58.5	65 39.1	+50.0	60.4	66 07.9	+51.2	62.3	66 34.8	+52.4	64.4	66 59.8	+53.5	66.5	67 22.7	+54.6	68.7	67 43.4	+55.6	70.9	69
70	65 23.9	+46.5	55.2	65 57.3	+47.8	57.1	66 29.1	+49.1	59.0	66 59.1	+50.4	61.0	67 27.2	+51.7	63.1	67 53.3	+53.0	65.3	68 17.3	+54.1	67.6	68 39.0	+55.3	69.9	70
71	66 10.4	+45.6	53.7	66 45.1	+47.0	55.6	67 18.2	+48.3	57.5	67 49.5	+49.7	59.6	68 18.9	+51.0	61.8	68 46.3	+52.3	64.0	69 11.4	+53.6	66.4	69 34.3	+54.8	68.8	71
72	66 56.0	+44.5	52.1	67 32.1	+45.9	54.0	68 06.5	+47.4	56.0	68 39.2	+48.8	58.1	69 09.9	+50.3	60.3	69 38.6	+51.6	62.6	70 05.0	+53.0	65.1	70 29.1	+54.3	67.7	72
73	67 40.5	+43.3	50.3	68 18.0	+44.8	52.2	68 53.9	+46.3	54.3	69 28.0	+47.8	56.5	70 00.2	+49.3	58.7	70 30.2	+50.8	61.2	70 58.0	+52.3	63.7	71 23.4	+53.6	66.3	73
74	68 23.8	+42.0	48.5	69 02.8	+43.5	50.4	69 40.2	+45.1	52.5	70 15.8	+46.7	54.7	70 49.5	+48.3	57.0	71 21.0	+49.9	59.5	71 50.3	+51.5	62.1	72 17.0	+53.0	64.9	74
75	69 05.8	+40.5	46.5	69 46.3	+42.2	48.5	70 25.3	+43.8	50.6	71 02.5	+45.5	52.8	71 37.8	+47.2	55.2	72 10.9	+48.9	57.7	72 41.8	+50.5	60.5	73 10.0	+52.2	63.3	75
76	69 46.3	+39.0	44.4	70 28.5	+40.6	46.4	71 09.1	+42.3	48.5	71 48.0	+44.0	50.8	72 25.0	+45.8	53.2	72 59.8	+47.6	55.8	73 32.3	+49.5	58.6	74 02.2	+51.3	61.6	76
77	70 25.3	+37.2	42.2	71 09.1	+38.9	44.1	71 51.4	+40.6	46.2	72 32.0	+42.5	48.5	73 10.8	+44.3	51.0	73 47.4	+46.3	53.7	74 21.8	+48.2	56.6	74 53.5	+50.1	59.6	77
78	71 02.5	*+35.3* •	39.8	71 48.0	*+37.0* •	41.7	72 32.0	*+38.8* •	43.8	73 14.5	+40.6	46.1	73 55.1	+42.6	48.6	74 33.7	+44.6	51.3	75 10.0	+46.7	54.3	75 43.6	+48.9	57.5	78
79	71 37.8	*+33.1* •	37.3	72 25.0	*+34.8* •	39.2	73 10.8	*+36.6* •	41.2	73 55.1	*+38.6* •	43.5	74 37.7	*+40.6* •	46.0	75 18.3	*+42.8* •	48.8	75 56.7	+45.0	51.8	76 32.5	+47.2	55.1	79
80	72 10.9	*+30.9* •	34.6	72 59.8	*+32.5* •	36.4	73 47.4	*+34.4* •	38.5	74 33.7	*+36.3* •	40.7	75 18.3	*+38.4* •	43.2	76 01.1	*+40.6* •	45.9	76 41.7	*+42.9* •	49.0	77 19.7	*+45.4* •	52.3	80
81	72 41.8	*+28.2* •	31.7	73 32.3	*+29.9* •	33.5	74 21.8	*+31.7* •	35.5	75 10.0	*+33.6* •	37.7	75 56.7	*+35.8* •	40.1	76 41.7	*+38.0* •	42.8	77 24.6	*+40.5* •	45.9	78 05.1	*+43.1* •	49.3	81
82	73 10.0	*+25.5* •	28.7	74 02.2	*+27.1* •	30.4	74 53.5	*+28.8* •	32.3	75 43.6	*+30.8* •	34.4	76 32.5	*+32.8* •	36.7	77 19.7	*+35.2* •	39.4	78 05.1	*+37.7* •	42.4	78 48.2	*+40.4* •	45.8	82
83	73 35.5	*+22.6* •	25.6	74 29.3	*+24.0* •	27.1	75 22.3	*+25.7* •	28.8	76 14.4	*+27.4* •	30.8	77 05.3	*+29.5* •	33.0	77 54.9	*+31.7* •	35.6	78 42.8	*+34.3* •	38.5	79 28.6	*+37.2* •	41.9	83
84	73 58.1	*+19.3* •	22.2	74 53.3	*+20.7* •	23.6	75 48.0	*+22.1* •	25.2	76 41.8	*+23.9* •	27.0	77 34.8	*+25.8* •	29.1	78 26.6	*+28.0* •	31.4	79 17.1	*+30.4* •	34.2	80 05.8	*+33.1* •	37.4	84
85	74 17.4	*+15.9* •	18.8	75 14.0	*+17.1* •	20.0	76 10.1	*+18.4* •	21.4	77 05.7	*+19.9* •	23.0	78 00.6	*+21.6* •	24.8	78 54.6	*+23.5* •	26.9	79 47.5	*+25.8* •	29.5	80 38.9	*+28.6* •	32.4	85
86	74 33.3	*+12.4* •	15.2	75 31.1	*+13.3* •	16.2	76 28.5	*+14.4* •	17.4	77 25.6	*+15.6* •	18.7	78 22.2	*+17.0* •	20.2	79 18.1	*+18.8* •	22.1	80 13.3	*+20.7* •	24.2	81 07.5	*+23.0* •	26.9	86
87	74 45.7	*+8.6* •	11.5	75 44.4	*+9.3* •	12.3	76 42.9	*+10.2* •	13.2	77 41.2	*+11.1* •	14.2	78 39.2	*+12.2* •	15.4	79 36.9	*+13.4* •	16.9	80 34.0	*+15.0* •	18.6	81 30.5	*+16.9* •	20.8	87
88	74 54.3	*+4.8* •	7.7	75 53.7	*+5.2* •	8.2	76 53.1	*+5.7* •	8.8	77 52.3	*+6.3* •	9.6	78 51.4	*+7.0* •	10.4	79 50.3	*+7.8* •	11.4	80 49.0	*+8.7* •	12.6	81 47.4	*+9.9* •	14.1	88
89	74 59.1	*+0.9* •	3.9	75 58.9	*+1.1* •	4.1	76 58.8	*+1.2* •	4.4	77 58.6	*+1.4* •	4.8	78 58.4	*+1.6* •	5.2	79 58.1	*+1.9* •	5.7	80 57.7	*+2.3* •	6.4	81 57.3	*+2.7* •	7.2	89
90	75 00.0	*–3.0* •	0.0	76 00.0	*–3.1* •	0.0	77 00.0	*–3.3* •	0.0	78 00.0	*–3.5* •	0.0	79 00.0	*–3.7* •	0.0	80 00.0	*–4.0* •	0.0	81 00.0	*–4.3* •	0.0	82 00.0	*–4.7* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 89°, 271°

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 15.5	– 57.9	91.0	0 14.5	– 58.2	91.0	0 13.5	– 58.5	91.0	0 12.5	– 58.7	91.0	0 11.4	– 58.8	91.0	0 10.4	– 59.1	91.0	0 09.4	– 59.3	91.0	0 08.3	– 59.4	91.0	**0**
1	0 42.4	+ 58.0	88.8	0 43.7	+ 58.2	88.8	0 45.0	+ 58.4	88.8	0 46.2	+ 58.7	88.8	0 47.4	+ 58.9	88.8	0 48.7	+ 59.1	88.8	0 49.9	+ 59.2	88.9	0 51.1	+ 59.4	88.9	**1**
2	1 40.4	+ 57.9	88.5	1 41.9	+ 58.2	88.5	1 43.4	+ 58.5	88.6	1 44.9	+ 58.7	88.6	1 46.3	+ 58.9	88.6	1 47.8	+ 59.0	88.7	1 49.1	+ 59.3	88.7	1 50.5	+ 59.4	88.7	**2**
3	2 38.3	+ 58.0	88.3	2 40.1	+ 58.2	88.3	2 41.9	+ 58.4	88.4	2 43.6	+ 58.7	88.4	2 45.2	+ 58.9	88.4	2 46.8	+ 59.1	88.5	2 48.4	+ 59.3	88.5	2 49.9	+ 59.4	88.6	**3**
4	3 36.3	+ 57.9	88.0	3 38.3	+ 58.3	88.1	3 40.3	+ 58.5	88.1	3 42.3	+ 58.7	88.2	3 44.1	+ 58.9	88.3	3 45.9	+ 59.1	88.3	3 47.7	+ 59.2	88.4	3 49.3	+ 59.4	88.5	**4**
5	4 34.2	+ 58.0	87.7	4 36.6	+ 58.2	87.8	4 38.8	+ 58.5	87.9	4 41.0	+ 58.6	88.0	4 43.0	+ 58.9	88.1	4 45.0	+ 59.1	88.1	4 46.9	+ 59.3	88.2	4 48.7	+ 59.4	88.3	**5**
6	5 32.2	+ 57.9	87.5	5 34.8	+ 58.2	87.6	5 37.3	+ 58.4	87.7	5 39.6	+ 58.7	87.8	5 41.9	+ 58.9	87.9	5 44.1	+ 59.1	88.0	5 46.2	+ 59.2	88.1	5 48.1	+ 59.4	88.2	**6**
7	6 30.1	+ 57.9	87.2	6 33.0	+ 58.2	87.3	6 35.7	+ 58.4	87.4	6 38.3	+ 58.7	87.6	6 40.8	+ 58.9	87.7	6 43.2	+ 59.0	87.8	6 45.4	+ 59.3	87.9	6 47.5	+ 59.5	88.0	**7**
8	7 28.0	+ 57.9	87.0	7 31.2	+ 58.1	87.1	7 34.1	+ 58.5	87.2	7 37.0	+ 58.6	87.3	7 39.7	+ 58.9	87.5	7 42.2	+ 59.1	87.6	7 44.7	+ 59.2	87.8	7 47.0	+ 59.4	87.9	**8**
9	8 25.9	+ 57.9	86.7	8 29.3	+ 58.2	86.8	8 32.6	+ 58.4	87.0	8 35.6	+ 58.7	87.1	8 38.6	+ 58.8	87.3	8 41.3	+ 59.1	87.4	8 43.9	+ 59.3	87.6	8 46.4	+ 59.4	87.7	**9**
10	9 23.8	+ 57.9	86.4	9 27.5	+ 58.2	86.6	9 31.0	+ 58.4	86.8	9 34.3	+ 58.6	86.9	9 37.4	+ 58.9	87.1	9 40.4	+ 59.0	87.3	9 43.2	+ 59.2	87.4	9 45.8	+ 59.4	87.6	**10**
11	10 21.7	+ 57.9	86.2	10 25.7	+ 58.1	86.3	10 29.4	+ 58.4	86.5	10 32.9	+ 58.7	86.7	10 36.3	+ 58.8	86.9	10 39.4	+ 59.1	87.1	10 42.4	+ 59.2	87.3	10 45.2	+ 59.3	87.5	**11**
12	11 19.6	+ 57.9	85.9	11 23.8	+ 58.2	86.1	11 27.8	+ 58.4	86.3	11 31.6	+ 58.6	86.5	11 35.1	+ 58.9	86.7	11 38.5	+ 59.0	86.9	11 41.6	+ 59.3	87.1	11 44.5	+ 59.4	87.3	**12**
13	12 17.5	+ 57.8	85.6	12 22.0	+ 58.1	85.8	12 26.2	+ 58.4	86.1	12 30.2	+ 58.6	86.3	12 34.0	+ 58.8	86.5	12 37.5	+ 59.1	86.7	12 40.9	+ 59.2	86.9	12 43.9	+ 59.4	87.2	**13**
14	13 15.3	+ 57.9	85.3	13 20.1	+ 58.1	85.6	13 24.6	+ 58.3	85.8	13 28.8	+ 58.6	86.1	13 32.8	+ 58.9	86.3	13 36.6	+ 59.0	86.5	13 40.1	+ 59.2	86.8	13 43.3	+ 59.4	87.0	**14**
15	14 13.2	+ 57.8	85.1	14 18.2	+ 58.1	85.3	14 22.9	+ 58.4	85.6	14 27.4	+ 58.6	85.8	14 31.7	+ 58.8	86.1	14 35.6	+ 59.0	86.4	14 39.3	+ 59.2	86.6	14 42.7	+ 59.4	86.9	**15**
16	15 11.0	+ 57.8	84.8	15 16.3	+ 58.1	85.1	15 21.3	+ 58.3	85.3	15 26.0	+ 58.6	85.6	15 30.5	+ 58.8	85.9	15 34.6	+ 59.0	86.2	15 38.5	+ 59.2	86.4	15 42.1	+ 59.3	86.7	**16**
17	16 08.8	+ 57.7	84.5	16 14.4	+ 58.0	84.8	16 19.6	+ 58.4	85.1	16 24.6	+ 58.6	85.4	16 29.3	+ 58.8	85.7	16 33.6	+ 59.0	86.0	16 37.7	+ 59.2	86.3	16 41.4	+ 59.4	86.6	**17**
18	17 06.5	+ 57.8	84.2	17 12.4	+ 58.0	84.5	17 18.0	+ 58.3	84.9	17 23.2	+ 58.5	85.2	17 28.1	+ 58.8	85.5	17 32.6	+ 59.0	85.8	17 36.9	+ 59.2	86.1	17 40.8	+ 59.3	86.4	**18**
19	18 04.3	+ 57.7	83.9	18 10.4	+ 58.1	84.3	18 16.3	+ 58.2	84.6	18 21.7	+ 58.6	84.9	18 26.9	+ 58.7	85.3	18 31.6	+ 59.0	85.6	18 36.1	+ 59.1	85.9	18 40.1	+ 59.4	86.3	**19**
20	19 02.0	+ 57.7	83.7	19 08.5	+ 57.9	84.0	19 14.5	+ 58.3	84.4	19 20.3	+ 58.5	84.7	19 25.6	+ 58.8	85.1	19 30.6	+ 59.0	85.4	19 35.2	+ 59.2	85.8	19 39.5	+ 59.3	86.1	**20**
21	19 59.7	+ 57.7	83.4	20 06.4	+ 58.0	83.7	20 12.8	+ 58.2	84.1	20 18.8	+ 58.5	84.5	20 24.4	+ 58.7	84.8	20 29.6	+ 58.9	85.2	20 34.4	+ 59.2	85.6	20 38.8	+ 59.4	86.0	**21**
22	20 57.4	+ 57.6	83.1	21 04.4	+ 57.9	83.5	21 11.0	+ 58.3	83.8	21 17.3	+ 58.5	84.2	21 23.1	+ 58.7	84.6	21 28.5	+ 59.0	85.0	21 33.6	+ 59.1	85.4	21 38.2	+ 59.3	85.8	**22**
23	21 55.0	+ 57.6	82.8	22 02.3	+ 57.9	83.2	22 09.3	+ 58.2	83.6	22 15.8	+ 58.4	84.0	22 21.8	+ 58.7	84.4	22 27.5	+ 58.9	84.8	22 32.7	+ 59.1	85.2	22 37.5	+ 59.3	85.6	**23**
24	22 52.6	+ 57.6	82.5	23 00.2	+ 57.9	82.9	23 07.5	+ 58.1	83.3	23 14.2	+ 58.4	83.7	23 20.5	+ 58.7	84.2	23 26.4	+ 58.9	84.6	23 31.8	+ 59.1	85.0	23 36.8	+ 59.3	85.5	**24**
25	23 50.2	+ 57.5	82.2	23 58.1	+ 57.9	82.6	24 05.6	+ 58.2	83.0	24 12.6	+ 58.5	83.5	24 19.2	+ 58.7	83.9	24 25.3	+ 58.9	84.4	24 30.9	+ 59.1	84.8	24 36.1	+ 59.3	85.3	**25**
26	24 47.7	+ 57.5	81.9	24 56.0	+ 57.8	82.3	25 03.8	+ 58.1	82.8	25 11.1	+ 58.3	83.2	25 17.9	+ 58.6	83.7	25 24.2	+ 58.9	84.2	25 30.0	+ 59.1	84.7	25 35.4	+ 59.3	85.1	**26**
27	25 45.2	+ 57.4	81.5	25 53.8	+ 57.7	82.0	26 01.9	+ 58.0	82.5	26 09.4	+ 58.4	83.0	26 16.5	+ 58.6	83.5	26 23.1	+ 58.8	84.0	26 29.1	+ 59.1	84.5	26 34.7	+ 59.2	85.0	**27**
28	26 42.6	+ 57.4	81.2	26 51.5	+ 57.8	81.7	26 59.9	+ 58.1	82.2	27 07.8	+ 58.3	82.7	27 15.1	+ 58.6	83.2	27 21.9	+ 58.9	83.7	27 28.2	+ 59.0	84.3	27 33.9	+ 59.3	84.8	**28**
29	27 40.0	+ 57.4	80.9	27 49.3	+ 57.7	81.4	27 58.0	+ 58.0	81.9	28 06.1	+ 58.3	82.5	28 13.7	+ 58.6	83.0	28 20.8	+ 58.8	83.5	28 27.2	+ 59.1	84.1	28 33.2	+ 59.2	84.6	**29**
30	28 37.4	+ 57.3	80.6	28 47.0	+ 57.6	81.1	28 56.0	+ 57.9	81.6	29 04.4	+ 58.3	82.2	29 12.3	+ 58.5	82.7	29 19.6	+ 58.8	83.3	29 26.3	+ 59.0	83.9	29 32.4	+ 59.2	84.4	**30**
31	29 34.7	+ 57.3	80.2	29 44.6	+ 57.6	80.8	29 53.9	+ 58.0	81.3	30 02.7	+ 58.2	81.9	30 10.8	+ 58.5	82.5	30 18.4	+ 58.7	83.1	30 25.3	+ 59.0	83.7	30 31.6	+ 59.2	84.2	**31**
32	30 32.0	+ 57.2	79.9	30 42.2	+ 57.6	80.5	30 51.9	+ 57.8	81.0	31 00.9	+ 58.2	81.6	31 09.3	+ 58.5	82.2	31 17.1	+ 58.7	82.8	31 24.3	+ 59.0	83.4	31 30.8	+ 59.2	84.0	**32**
33	31 29.2	+ 57.1	79.5	31 39.8	+ 57.5	80.1	31 49.7	+ 57.9	80.7	31 59.1	+ 58.1	81.4	32 07.8	+ 58.4	82.0	32 15.8	+ 58.8	82.6	32 23.3	+ 58.9	83.2	32 30.0	+ 59.2	83.9	**33**
34	32 26.3	+ 57.1	79.2	32 37.3	+ 57.4	79.8	32 47.6	+ 57.8	80.4	32 57.2	+ 58.1	81.1	33 06.2	+ 58.4	81.7	33 14.6	+ 58.6	82.3	33 22.2	+ 58.9	83.0	33 29.2	+ 59.1	83.7	**34**
35	33 23.4	+ 57.0	78.8	33 34.7	+ 57.4	79.4	33 45.4	+ 57.7	80.1	33 55.3	+ 58.1	80.8	34 04.6	+ 58.4	81.4	34 13.2	+ 58.7	82.1	34 21.1	+ 58.9	82.8	34 28.3	+ 59.2	83.5	**35**
36	34 20.4	+ 56.9	78.4	34 32.1	+ 57.3	79.1	34 43.1	+ 57.7	79.8	34 53.4	+ 58.0	80.5	35 03.0	+ 58.3	81.1	35 11.9	+ 58.6	81.8	35 20.0	+ 58.9	82.5	35 27.5	+ 59.1	83.2	**36**
37	35 17.3	+ 56.9	78.0	35 29.4	+ 57.3	78.7	35 40.8	+ 57.6	79.4	35 51.4	+ 58.0	80.1	36 01.3	+ 58.3	80.9	36 10.5	+ 58.6	81.6	36 18.9	+ 58.8	82.3	36 26.6	+ 59.0	83.0	**37**
38	36 14.2	+ 56.8	77.6	36 26.7	+ 57.2	78.4	36 38.4	+ 57.6	79.1	36 49.4	+ 57.9	79.8	36 59.6	+ 58.3	80.6	37 09.1	+ 58.5	81.3	37 17.7	+ 58.9	82.1	37 25.6	+ 59.1	82.8	**38**
39	37 11.0	+ 56.7	77.2	37 23.9	+ 57.1	78.0	37 36.0	+ 57.5	78.7	37 47.3	+ 57.9	79.5	37 57.9	+ 58.1	80.3	38 07.6	+ 58.5	81.0	38 16.6	+ 58.7	81.8	38 24.7	+ 59.0	82.6	**39**
40	38 07.7	+ 56.6	76.8	38 21.0	+ 57.0	77.6	38 33.5	+ 57.4	78.4	38 45.2	+ 57.8	79.2	38 56.0	+ 58.2	79.9	39 06.1	+ 58.5	80.7	39 15.3	+ 58.8	81.6	39 23.7	+ 59.0	82.4	**40**
41	39 04.3	+ 56.5	76.4	39 18.0	+ 57.0	77.2	39 30.9	+ 57.4	78.0	39 43.0	+ 57.7	78.8	39 54.2	+ 58.1	79.6	40 04.6	+ 58.4	80.5	40 14.1	+ 58.7	81.3	40 22.7	+ 59.0	82.1	**41**
42	40 00.8	+ 56.5	76.0	40 15.0	+ 56.8	76.8	40 28.3	+ 57.2	77.6	40 40.7	+ 57.7	78.5	40 52.3	+ 58.0	79.3	41 03.0	+ 58.3	80.2	41 12.8	+ 58.7	81.0	41 21.7	+ 59.0	81.9	**42**
43	40 57.3	+ 56.3	75.5	41 11.8	+ 56.8	76.4	41 25.5	+ 57.2	77.2	41 38.4	+ 57.6	78.1	41 50.3	+ 58.0	79.0	42 01.3	+ 58.4	79.8	42 11.5	+ 58.6	80.7	42 20.7	+ 58.9	81.6	**43**
44	41 53.6	+ 56.2	75.1	42 08.6	+ 56.7	75.9	42 22.7	+ 57.1	76.8	42 36.0	+ 57.5	77.7	42 48.3	+ 57.9	78.6	42 59.7	+ 58.2	79.5	43 10.1	+ 58.6	80.4	43 19.6	+ 58.8	81.4	**44**
45	42 49.8	+ 56.0	74.6	43 05.3	+ 56.5	75.5	43 19.8	+ 57.1	76.4	43 33.5	+ 57.4	77.3	43 46.2	+ 57.8	78.3	43 57.9	+ 58.2	79.2	44 08.7	+ 58.5	80.1	44 18.4	+ 58.9	81.1	**45**
46	43 45.8	+ 56.0	74.1	44 01.8	+ 56.5	75.0	44 16.9	+ 56.9	76.0	44 30.9	+ 57.4	76.9	44 44.0	+ 57.8	77.9	44 56.1	+ 58.1	78.9	45 07.2	+ 58.5	79.8	45 17.3	+ 58.8	80.8	**46**
47	44 41.8	+ 55.8	73.6	44 58.3	+ 56.3	74.5	45 13.8	+ 56.8	75.5	45 28.3	+ 57.2	76.5	45 41.8	+ 57.6	77.5	45 54.2	+ 58.1	78.5	46 05.7	+ 58.4	79.5	46 16.1	+ 58.7	80.5	**47**
48	45 37.6	+ 55.7	73.1	45 54.6	+ 56.2	74.1	46 10.6	+ 56.7	75.1	46 25.5	+ 57.2	76.1	46 39.4	+ 57.6	77.1	46 52.3	+ 58.0	78.1	47 04.1	+ 58.4	79.2	47 14.8	+ 58.7	80.2	**48**
49	46 33.3	+ 55.5	72.5	46 50.8	+ 56.0	73.5	47 07.3	+ 56.5	74.6	47 22.7	+ 57.0	75.6	47 37.0	+ 57.5	76.7	47 50.3	+ 57.9	77.8	48 02.5	+ 58.3	78.8	48 13.5	+ 58.7	79.9	**49**
50	47 28.8	+ 55.3	72.0	47 46.8	+ 55.9	73.0	48 03.8	+ 56.4	74.1	48 19.7	+ 57.0	75.2	48 34.5	+ 57.4	76.3	48 48.2	+ 57.9	77.4	49 00.8	+ 58.2	78.5	49 12.2	+ 58.6	79.6	**50**
51	48 24.1	+ 55.2	71.4	48 42.7	+ 55.8	72.5	49 00.2	+ 56.3	73.6	49 16.7	+ 56.8	74.7	49 31.9	+ 57.3	75.8	49 46.1	+ 57.7	77.0	49 59.0	+ 58.2	78.1	50 10.8	+ 58.5	79.3	**51**
52	49 19.3	+ 55.0	70.8	49 38.5	+ 55.5	71.9	49 56.5	+ 56.2	73.0	50 13.5	+ 56.6	74.2	50 29.2	+ 57.2	75.4	50 43.8	+ 57.7	76.5	50 57.2	+ 58.1	77.7	51 09.3	+ 58.5	78.9	**52**
53	50 14.3	+ 54.7	70.2	50 34.0	+ 55.4	71.3	50 52.7	+ 56.0	72.5	51 10.1	+ 56.6	73.7	51 26.4	+ 57.1	74.9	51 41.5	+ 57.5	76.1	51 55.3	+ 57.9	77.3	52 07.8	+ 58.4	78.6	**53**
54	51 09.0	+ 54.6	69.5	51 29.4	+ 55.2	70.7	51 48.7	+ 55.8	71.9	52 06.7	+ 56.4	73.1	52 23.5	+ 56.9	74.4	52 39.0	+ 57.4	75.6	52 53.2	+ 57.9	76.9	53 06.2	+ 58.3	78.2	**54**
55	52 03.6	+ 54.3	68.9	52 24.6	+ 55.0	70.1	52 44.5	+ 55.6	71.3	53 03.1	+ 56.2	72.6	53 20.4	+ 56.8	73.8	53 36.4	+ 57.3	75.1	53 51.1	+ 57.8	76.5	54 04.5	+ 58.3	77.8	**55**
56	52 57.9	+ 54.0	68.2	53 19.6	+ 54.7	69.4	53 40.1	+ 55.4	70.7	53 59.3	+ 56.0	72.0	54 17.2	+ 56.6	73.3	54 33.7	+ 57.2	74.6	54 48.9	+ 57.7	76.0	55 02.8	+ 58.1	77.4	**56**
57	53 51.9	+ 53.8	67.4	54 14.3	+ 54.5	68.7	54 35.5	+ 55.1	70.0	54 55.3	+ 55.8	71.4	55 13.8	+ 56.5	72.7	55 30.9	+ 57.1	74.1	55 46.6	+ 57.6	75.5	56 00.9	+ 58.1	77.0	**57**
58	54 45.7	+ 53.5	66.7	55 08.8	+ 54.2	68.0	55 30.6	+ 55.0	69.3	55 51.1	+ 55.7	70.7	56 10.3	+ 56.2	72.1	56 28.0	+ 56.8	73.6	56 44.2	+ 57.5	75.0	56 59.0	+ 57.9	76.5	**58**
59	55 39.2	+ 53.1	65.9	56 03.0	+ 54.0	67.2	56 25.6	+ 54.7	68.6	56 46.8	+ 55.4	70.0	57 06.5	+ 56.1	71.5	57 24.8	+ 56.7	73.0	57 41.7	+ 57.3	74.5	57 56.9	+ 57.9	76.0	**59**
60	56 32.3	+ 52.8	65.1	56 57.0	+ 53.6	66.4	57 20.3	+ 54.4	67.9	57 42.2	+ 55.1	69.3	58 02.6	+ 55.9	70.8	58 21.5	+ 56.6	72.4	58 39.0	+ 57.1	73.9	58 54.8	+ 57.7	75.5	**60**
61	57 25.1	+ 52.4	64.2	57 50.6	+ 53.2	65.6	58 14.7	+ 54.0	67.1	58 37.3	+ 54.9	68.6	58 58.5	+ 55.6	70.1	59 18.1	+ 56.3	71.7	59 36.1	+ 57.0	73.3	59 52.5	+ 57.6	75.0	**61**
62	58 17.5	+ 52.1	63.3	58 43.8	+ 52.9	64.7	59 08.7	+ 53.8	66.2	59 32.2	+ 54.5	67.8	59 54.1	+ 55.3	69.4	60 14.4	+ 56.1	71.0	60 33.1	+ 56.8	72.7	60 50.1	+ 57.4	74.4	**62**
63	59 09.6	+ 51.5	62.3	59 36.7	+ 52.5	63.8	60 02.5	+ 53.4	65.4	60 26.7	+ 54.3	67.0	60 49.4	+ 55.1	68.6	61 10.5	+ 55.8	70.3	61 29.9	+ 56.5	72.0	61 47.5	+ 57.2	73.8	**63**
64	60 01.1	+ 51.1	61.3	60 29.2	+ 52.1	62.8	60 55.9	+ 52.9	64.4	61 21.0	+ 53.9	66.1	61 44.5	+ 54.7	67.8	62 06.3	+ 55.6	69.5	62 26.4	+ 56.4	71.3	62 44.7	+ 57.1	73.2	**64**
65	60 52.2	+ 50.5	60.2	61 21.3	+ 51.5	61.8	61 48.8	+ 52.6	63.5	62 14.9	+ 53.4	65.2	62 39.2	+ 54.4	66.9	63 01.9	+ 55.3	68.7	63 22.8	+ 56.1	70.6	63 41.8	+ 56.9	72.5	**65**
66	61 42.7	+ 50.0	59.1	62 12.8	+ 51.0	60.7	62 41.4	+ 52.0	62.4	63 08.3	+ 53.1	64.2	63 33.6	+ 54.1	66.0	63 57.2	+ 54.9	67.8	64 18.9	+ 55.8	69.8	64 38.7	+ 56.6	71.7	**66**
67	62 32.7	+ 49.3	57.9	63 03.8	+ 50.5	59.6	63 33.4	+ 51.5	61.3	64 01.4	+ 52.6	63.1	64 27.7	+ 53.5	65.0	64 52.1	+ 54.6	66.9	65 14.7	+ 55.5	68.9	65 35.3	+ 56.3	71.0	**67**
68	63 22.0	+ 48.7	56.7	63 54.3	+ 49.7	58.4	64 24.9	+ 50.9	60.1	64 54.0	+ 52.0	62.0	65 21.2	+ 53.1	63.9	65 46.7	+ 54.1	65.9	66 10.2	+ 55.1	68.0	66 31.6	+ 56.1	70.1	**68**
69	64 10.7	+ 47.8	55.3	64 44.0	+ 49.1	57.1	65 15.8	+ 50.3	58.9	65 46.0	+ 51.4	60.8	66 14.3	+ 52.6	62.8	66 40.8	+ 53.7	64.8	67 05.3	+ 54.8	67.0	67 27.7	+ 55.7	69.2	**69**
70	64 58.5	+ 47.1	53.9	65 33.1	+ 48.3	55.7	66 06.1	+ 49.5	57.6	66 37.4	+ 50.8	59.5	67 06.9	+ 52.0	61.6	67 34.5	+ 53.2	63.7	68 00.1	+ 54.2	65.9	68 23.4	+ 55.4	68.2	**70**
71	65 45.6	+ 46.1	52.5	66 21.4	+ 47.4	54.3	66 55.6	+ 48.7	56.2	67 28.2	+ 50.0	58.2	67 58.9	+ 51.3	60.3	68 27.7	+ 52.5	62.5	68 54.3	+ 53.8	64.8	69 18.8	+ 54.9	67.1	**71**
72	66 31.7	+ 45.1	50.9	67 08.8	+ 46.4	52.7	67 44.3	+ 47.9	54.6	68 18.2	+ 49.2	56.7	68 50.2	+ 50.5	58.8	69 20.2	+ 51.9	61.1	69 48.1	+ 53.2	63.5	70 13.7	+ 54.5	66.0	**72**
73	67 16.8	+ 43.9	49.2	67 55.2	+ 45.4	51.0	68 32.2	+ 46.8	53.0	69 07.4	+ 48.2	55.1	69 40.7	+ 49.7	57.3	70 12.1	+ 51.1	59.7	70 41.3	+ 52.5	62.1	71 08.2	+ 53.8	64.7	**73**
74	68 00.7	+ 42.7	47.4	68 40.6	+ 44.2	49.3	69 19.0	+ 45.6	51.3	69 55.6	+ 47.2	53.4	70 30.4	+ 48.7	55.7	71 03.2	+ 50.3	58.1	71 33.8	+ 51.8	60.6	72 02.0	+ 53.2	63.3	**74**
75	68 43.4	+ 41.4	45.5	69 24.8	+ 42.9	47.4	70 04.6	+ 44.5	49.4	70 42.8	+ 46.0	51.6	71 19.1	+ 47.7	53.9	71 53.5	+ 49.2	56.4	72 25.6	+ 50.8	59.0	72 55.2	+ 52.4	61.8	**75**
76	69 24.8	+ 39.8	43.5	70 07.7	+ 41.4	45.4	70 49.1	+ 43.0	47.4	71 28.8	+ 44.7	49.6	72 06.8	+ 46.3	52.0	72 42.7	+ 48.1	54.5	73 16.4	+ 49.8	57.2	73 47.6	+ 51.6	60.1	**76**
77	70 04.6	+ 38.2	41.3	70 49.1	+ 39.7	43.2	71 32.1	+ 41.4	45.2	72 13.5	+ 43.1	47.5	72 53.1	+ 45.0	49.8	73 30.8	+ 46.8	52.4	74 06.2	+ 48.7	55.2	74 39.2	+ 50.5	58.2	**77**
78	70 42.8	+ 36.3	39.0	71 28.8	+ 38.0	40.9	72 13.5	+ 39.6	42.9	72 56.6	+ 41.5	45.1	73 38.1	+ 43.3	47.5	74 17.6	+ 45.2	50.2	74 54.9	+ 47.2	53.0	75 29.7	+ 49.2	56.1	**78**
79	71 19.1	*+ 34.4* •	36.6	72 06.8	*+ 35.9* •	38.4	72 53.1	*+ 37.7* •	40.4	73 38.1	*+ 39.5* •	42.6	74 21.4	*+ 41.4* •	45.0	75 02.8	+ 43.4	47.7	75 42.1	+ 45.5	50.6	76 18.9	+ 47.7	53.7	**79**
80	71 53.5	*+ 32.1* •	34.0	72 42.7	*+ 33.7* •	35.7	73 30.8	*+ 35.4* •	37.7	74 17.6	*+ 37.3* •	39.9	75 02.8	*+ 39.3* •	42.3	75 46.2	*+ 41.4* •	44.9	76 27.6	*+ 43.7* •	47.9	77 06.6	+ 46.0	51.1	**80**
81	72 25.6	*+ 29.6* •	31.2	73 16.4	*+ 31.2* •	32.9	74 06.2	*+ 33.0* •	34.8	74 54.9	*+ 34.8* •	36.9	75 42.1	*+ 36.8* •	39.3	76 27.6	*+ 39.0* •	41.9	77 11.3	*+ 41.3* •	44.9	77 52.6	*+ 43.8* •	48.1	**81**
82	72 55.2	*+ 27.0* •	28.3	73 47.6	*+ 28.6* •	29.9	74 39.2	*+ 30.2* •	31.7	75 29.7	*+ 32.0* •	33.7	76 18.9	*+ 34.0* •	36.0	77 06.6	*+ 36.2* •	38.6	77 52.6	*+ 38.6* •	41.5	78 36.4	*+ 41.2* •	44.8	**82**
83	73 22.2	*+ 24.2* •	25.2	74 16.2	*+ 25.6* •	26.7	75 09.4	*+ 27.1* •	28.4	76 01.7	*+ 28.9* •	30.3	76 52.9	*+ 30.9* •	32.5	77 42.8	*+ 33.1* •	34.9	78 31.2	*+ 35.4* •	37.8	79 17.6	*+ 38.1* •	41.0	**83**
84	73 46.4	*+ 21.0* •	22.0	74 41.8	*+ 22.3* •	23.3	75 36.5	*+ 23.8* •	24.9	76 30.6	*+ 25.4* •	26.6	77 23.8	*+ 27.2* •	28.6	78 15.9	*+ 29.3* •	30.9	79 06.6	*+ 31.7* •	33.6	79 55.7	*+ 34.4* •	36.7	**84**
85	74 07.4	*+ 17.8* •	18.6	75 04.1	*+ 18.9* •	19.8	76 00.3	*+ 20.2* •	21.1	76 56.0	*+ 21.6* •	22.7	77 51.0	*+ 23.3* •	24.5	78 45.2	*+ 25.2* •	26.5	79 38.3	*+ 27.4* •	29.0	80 30.1	*+ 29.9* •	31.9	**85**
86	74 25.2	*+ 14.3* •	15.1	75 23.0	*+ 15.2* •	16.0	76 20.5	*+ 16.3* •	17.2	77 17.6	*+ 17.5* •	18.5	78 14.3	*+ 18.9* •	20.0	79 10.4	*+ 20.4* •	21.8	80 05.7	*+ 22.4* •	23.9	81 00.0	*+ 24.6* •	26.5	**86**
87	74 39.5	*+ 10.6* •	11.4	75 38.2	*+ 11.4* •	12.2	76 36.8	*+ 12.1* •	13.1	77 35.1	*+ 13.1* •	14.1	78 33.2	*+ 14.1* •	15.3	79 30.8	*+ 15.4* •	16.7	80 28.1	*+ 16.8* •	18.4	81 24.6	*+ 18.7* •	20.5	**87**
88	74 50.1	*+ 6.9* •	7.7	75 49.6	*+ 7.3* •	8.2	76 48.9	*+ 7.8* •	8.8	77 48.2	*+ 8.3* •	9.5	78 47.3	*+ 9.0* •	10.3	79 46.2	*+ 9.8* •	11.3	80 44.9	*+ 10.8* •	12.5	81 43.3	*+ 12.0* •	14.0	**88**
89	74 57.0	*+ 3.0* •	3.9	75 56.9	*+ 3.1* •	4.1	76 56.7	*+ 3.3* •	4.4	77 56.5	*+ 3.5* •	4.8	78 56.3	*+ 3.7* •	5.2	79 56.0	*+ 4.0* •	5.7	80 55.7	*+ 4.3* •	6.4	81 55.3	*+ 4.7* •	7.1	**89**
90	75 00.0	*– 0.9* •	0.0	76 00.0	*– 1.1* •	0.0	77 00.0	*– 1.2* •	0.0	78 00.0	*– 1.4* •	0.0	79 00.0	*– 1.6* •	0.0	80 00.0	*– 1.9* •	0.0	81 00.0	*– 2.3* •	0.0	82 00.0	*– 2.7* •	0.0	**90**
	75°			**76°**			**77°**			**78°**			**79°**			**80°**			**81°**			**82°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 91°, 269°

90°, 270° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	75°			76°			77°			78°			79°			80°			81°			82°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 00.0	+ 58.0	90.0	0 00.0	+ 58.2	90.0	0 00.0	+ 58.5	90.0	0 00.0	+ 58.7	90.0	0 00.0	+ 58.9	90.0	0 00.0	+ 59.1	90.0	0 00.0	+ 59.3	90.0	0 00.0	+ 59.4	90.0	0
1	0 58.0	+ 57.9	89.7	0 58.2	+ 58.2	89.8	0 58.5	+ 58.4	89.8	0 58.7	+ 58.7	89.8	0 58.9	+ 58.9	89.8	0 59.1	+ 59.1	89.8	0 59.3	+ 59.2	89.8	0 59.4	+ 59.4	89.9	1
2	1 55.9	+ 58.0	89.5	1 56.4	+ 58.2	89.5	1 56.9	+ 58.5	89.5	1 57.4	+ 58.7	89.6	1 57.8	+ 58.9	89.6	1 58.2	+ 59.1	89.7	1 58.5	+ 59.3	89.7	1 58.8	+ 59.4	89.7	2
3	2 53.9	+ 57.9	89.2	2 54.6	+ 58.3	89.3	2 55.4	+ 58.4	89.3	2 56.1	+ 58.6	89.4	2 56.7	+ 58.9	89.4	2 57.3	+ 59.0	89.5	2 57.8	+ 59.2	89.5	2 58.2	+ 59.5	89.6	3
4	3 51.8	+ 58.0	89.0	3 52.9	+ 58.2	89.0	3 53.8	+ 58.5	89.1	3 54.7	+ 58.7	89.2	3 55.6	+ 58.9	89.2	3 56.3	+ 59.1	89.3	3 57.0	+ 59.3	89.4	3 57.7	+ 59.4	89.4	4
5	4 49.8	+ 57.9	88.7	4 51.1	+ 58.2	88.8	4 52.3	+ 58.4	88.9	4 53.4	+ 58.7	89.0	4 54.5	+ 58.9	89.0	4 55.4	+ 59.1	89.1	4 56.3	+ 59.3	89.2	4 57.1	+ 59.4	89.3	5
6	5 47.7	+ 57.9	88.4	5 49.3	+ 58.2	88.5	5 50.7	+ 58.5	88.6	5 52.1	+ 58.7	88.7	5 53.4	+ 58.8	88.9	5 54.5	+ 59.1	89.0	5 55.6	+ 59.2	89.1	5 56.5	+ 59.4	89.2	6
7	6 45.6	+ 57.9	88.2	6 47.5	+ 58.2	88.3	6 49.2	+ 58.4	88.4	6 50.8	+ 58.6	88.5	6 52.2	+ 58.9	88.7	6 53.6	+ 59.1	88.8	6 54.8	+ 59.3	88.9	6 55.9	+ 59.4	89.0	7
8	7 43.5	+ 58.0	87.9	7 45.7	+ 58.1	88.1	7 47.6	+ 58.4	88.2	7 49.4	+ 58.7	88.3	7 51.1	+ 58.9	88.5	7 52.7	+ 59.0	88.6	7 54.1	+ 59.2	88.7	7 55.3	+ 59.4	88.9	8
9	8 41.5	+ 57.9	87.7	8 43.8	+ 58.2	87.8	8 46.0	+ 58.5	88.0	8 48.1	+ 58.7	88.1	8 50.0	+ 58.9	88.3	8 51.7	+ 59.1	88.4	8 53.3	+ 59.2	88.6	8 54.7	+ 59.4	88.7	9
10	9 39.4	+ 57.8	87.4	9 42.0	+ 58.2	87.6	9 44.5	+ 58.4	87.7	9 46.8	+ 58.6	87.9	9 48.9	+ 58.8	88.1	9 50.8	+ 59.1	88.2	9 52.5	+ 59.3	88.4	9 54.1	+ 59.4	88.6	10
11	10 37.2	+ 57.9	87.1	10 40.2	+ 58.1	87.3	10 42.9	+ 58.4	87.5	10 45.4	+ 58.6	87.7	10 47.7	+ 58.9	87.9	10 49.9	+ 59.0	88.1	10 51.8	+ 59.2	88.3	10 53.5	+ 59.4	88.5	11
12	11 35.1	+ 57.9	86.9	11 38.3	+ 58.1	87.1	11 41.3	+ 58.4	87.3	11 44.0	+ 58.7	87.5	11 46.6	+ 58.8	87.7	11 48.9	+ 59.0	87.9	11 51.0	+ 59.2	88.1	11 52.9	+ 59.4	88.3	12
13	12 33.0	+ 57.8	86.6	12 36.4	+ 58.2	86.8	12 39.7	+ 58.3	87.0	12 42.7	+ 58.6	87.3	12 45.4	+ 58.9	87.5	12 47.9	+ 59.1	87.7	12 50.2	+ 59.3	87.9	12 52.3	+ 59.4	88.2	13
14	13 30.8	+ 57.9	86.3	13 34.6	+ 58.1	86.5	13 38.0	+ 58.4	86.8	13 41.3	+ 58.6	87.0	13 44.3	+ 58.8	87.3	13 47.0	+ 59.0	87.5	13 49.5	+ 59.2	87.8	13 51.7	+ 59.3	88.0	14
15	14 28.7	+ 57.8	86.0	14 32.7	+ 58.1	86.3	14 36.4	+ 58.4	86.6	14 39.9	+ 58.6	86.8	14 43.1	+ 58.8	87.1	14 46.0	+ 59.0	87.3	14 48.7	+ 59.2	87.6	14 51.0	+ 59.4	87.9	15
16	15 26.5	+ 57.7	85.8	15 30.8	+ 58.0	86.0	15 34.8	+ 58.3	86.3	15 38.5	+ 58.6	86.6	15 41.9	+ 58.8	86.9	15 45.0	+ 59.0	87.1	15 47.9	+ 59.2	87.4	15 50.4	+ 59.4	87.7	16
17	16 24.2	+ 57.8	85.5	16 28.8	+ 58.1	85.8	16 33.1	+ 58.3	86.1	16 37.1	+ 58.5	86.4	16 40.7	+ 58.8	86.7	16 44.0	+ 59.0	87.0	16 47.1	+ 59.2	87.3	16 49.8	+ 59.3	87.6	17
18	17 22.0	+ 57.7	85.2	17 26.9	+ 58.0	85.5	17 31.4	+ 58.3	85.8	17 35.6	+ 58.6	86.1	17 39.5	+ 58.8	86.5	17 43.0	+ 59.0	86.8	17 46.3	+ 59.1	87.1	17 49.1	+ 59.4	87.4	18
19	18 19.7	+ 57.8	84.9	18 24.9	+ 58.0	85.2	18 29.7	+ 58.3	85.6	18 34.2	+ 58.5	85.9	18 38.3	+ 58.7	86.2	18 42.0	+ 59.0	86.6	18 45.4	+ 59.2	86.9	18 48.5	+ 59.3	87.3	19
20	19 17.5	+ 57.6	84.6	19 22.9	+ 58.0	85.0	19 28.0	+ 58.2	85.3	19 32.7	+ 58.5	85.7	19 37.0	+ 58.8	86.0	19 41.0	+ 59.0	86.4	19 44.6	+ 59.2	86.7	19 47.8	+ 59.4	87.1	20
21	20 15.1	+ 57.7	84.3	20 20.9	+ 57.9	84.7	20 26.2	+ 58.3	85.1	20 31.2	+ 58.5	85.4	20 35.8	+ 58.7	85.8	20 40.0	+ 58.9	86.2	20 43.8	+ 59.1	86.6	20 47.2	+ 59.3	86.9	21
22	21 12.8	+ 57.6	84.0	21 18.8	+ 58.0	84.4	21 24.5	+ 58.2	84.8	21 29.7	+ 58.5	85.2	21 34.5	+ 58.7	85.6	21 38.9	+ 59.0	86.0	21 42.9	+ 59.2	86.4	21 46.5	+ 59.3	86.8	22
23	22 10.4	+ 57.6	83.7	22 16.8	+ 57.9	84.1	22 22.7	+ 58.2	84.5	22 28.2	+ 58.4	85.0	22 33.2	+ 58.7	85.4	22 37.9	+ 58.9	85.8	22 42.1	+ 59.1	86.2	22 45.8	+ 59.3	86.6	23
24	23 08.0	+ 57.6	83.4	23 14.7	+ 57.8	83.9	23 20.9	+ 58.1	84.3	23 26.6	+ 58.5	84.7	23 31.9	+ 58.7	85.1	23 36.8	+ 58.9	85.6	23 41.2	+ 59.1	86.0	23 45.1	+ 59.3	86.5	24
25	24 05.6	+ 57.5	83.1	24 12.5	+ 57.9	83.6	24 19.0	+ 58.2	84.0	24 25.1	+ 58.4	84.5	24 30.6	+ 58.7	84.9	24 35.7	+ 58.9	85.4	24 40.3	+ 59.1	85.8	24 44.4	+ 59.3	86.3	25
26	25 03.1	+ 57.5	82.8	25 10.4	+ 57.8	83.3	25 17.2	+ 58.1	83.7	25 23.5	+ 58.3	84.2	25 29.3	+ 58.6	84.7	25 34.6	+ 58.8	85.2	25 39.4	+ 59.1	85.6	25 43.7	+ 59.3	86.1	26
27	26 00.6	+ 57.4	82.5	26 08.2	+ 57.7	83.0	26 15.3	+ 58.0	83.5	26 21.8	+ 58.4	84.0	26 27.9	+ 58.6	84.4	26 33.4	+ 58.9	84.9	26 38.5	+ 59.0	85.4	26 43.0	+ 59.2	85.9	27
28	26 58.0	+ 57.4	82.2	27 05.9	+ 57.7	82.7	27 13.3	+ 58.0	83.2	27 20.2	+ 58.3	83.7	27 26.5	+ 58.6	84.2	27 32.3	+ 58.8	84.7	27 37.5	+ 59.1	85.2	27 42.2	+ 59.3	85.8	28
29	27 55.4	+ 57.3	81.8	28 03.6	+ 57.7	82.4	28 11.3	+ 58.0	82.9	28 18.5	+ 58.3	83.4	28 25.1	+ 58.5	84.0	28 31.1	+ 58.8	84.5	28 36.6	+ 59.0	85.0	28 41.5	+ 59.2	85.6	29
30	28 52.7	+ 57.3	81.5	29 01.3	+ 57.7	82.0	29 09.3	+ 58.0	82.6	29 16.8	+ 58.2	83.2	29 23.6	+ 58.6	83.7	29 29.9	+ 58.8	84.3	29 35.6	+ 59.0	84.8	29 40.7	+ 59.2	85.4	30
31	29 50.0	+ 57.3	81.2	29 59.0	+ 57.6	81.7	30 07.3	+ 57.9	82.3	30 15.0	+ 58.3	82.9	30 22.2	+ 58.5	83.5	30 28.7	+ 58.8	84.0	30 34.6	+ 59.0	84.6	30 39.9	+ 59.2	85.2	31
32	30 47.3	+ 57.2	80.8	30 56.6	+ 57.5	81.4	31 05.2	+ 57.9	82.0	31 13.3	+ 58.1	82.6	31 20.7	+ 58.4	83.2	31 27.5	+ 58.7	83.8	31 33.6	+ 59.0	84.4	31 39.1	+ 59.2	85.0	32
33	31 44.5	+ 57.1	80.5	31 54.1	+ 57.5	81.1	32 03.1	+ 57.8	81.7	32 11.4	+ 58.2	82.3	32 19.1	+ 58.5	82.9	32 26.2	+ 58.7	83.6	32 32.6	+ 58.9	84.2	32 38.3	+ 59.2	84.8	33
34	32 41.6	+ 57.0	80.1	32 51.6	+ 57.4	80.7	33 00.9	+ 57.8	81.4	33 09.6	+ 58.1	82.0	33 17.6	+ 58.4	82.7	33 24.9	+ 58.7	83.3	33 31.5	+ 59.0	84.0	33 37.5	+ 59.1	84.6	34
35	33 38.6	+ 57.0	79.7	33 49.0	+ 57.4	80.4	33 58.7	+ 57.7	81.0	34 07.7	+ 58.0	81.7	34 16.0	+ 58.3	82.4	34 23.6	+ 58.6	83.1	34 30.5	+ 58.8	83.7	34 36.6	+ 59.2	84.4	35
36	34 35.6	+ 57.0	79.4	34 46.4	+ 57.3	80.0	34 56.4	+ 57.7	80.7	35 05.7	+ 58.0	81.4	35 14.3	+ 58.3	82.1	35 22.2	+ 58.6	82.8	35 29.3	+ 58.9	83.5	35 35.8	+ 59.1	84.2	36
37	35 32.6	+ 56.8	79.0	35 43.7	+ 57.2	79.7	35 54.1	+ 57.6	80.4	36 03.7	+ 58.0	81.1	36 12.6	+ 58.3	81.8	36 20.8	+ 58.6	82.5	36 28.2	+ 58.9	83.3	36 34.9	+ 59.0	84.0	37
38	36 29.4	+ 56.8	78.6	36 40.9	+ 57.2	79.3	36 51.7	+ 57.5	80.0	37 01.7	+ 57.9	80.8	37 10.9	+ 58.3	81.5	37 19.4	+ 58.5	82.3	37 27.1	+ 58.8	83.0	37 33.9	+ 59.1	83.8	38
39	37 26.2	+ 56.6	78.2	37 38.1	+ 57.1	78.9	37 49.2	+ 57.5	79.7	37 59.6	+ 57.8	80.4	38 09.2	+ 58.1	81.2	38 17.9	+ 58.5	82.0	38 25.9	+ 58.7	82.8	38 33.0	+ 59.0	83.6	39
40	38 22.8	+ 56.6	77.7	38 35.2	+ 57.0	78.5	38 46.7	+ 57.4	79.3	38 57.4	+ 57.8	80.1	39 07.3	+ 58.2	80.9	39 16.4	+ 58.5	81.7	39 24.6	+ 58.8	82.5	39 32.0	+ 59.0	83.3	40
41	39 19.4	+ 56.5	77.3	39 32.2	+ 56.9	78.1	39 44.1	+ 57.4	78.9	39 55.2	+ 57.7	79.8	40 05.5	+ 58.0	80.6	40 14.9	+ 58.4	81.4	40 23.4	+ 58.7	82.3	40 31.0	+ 59.0	83.1	41
42	40 15.9	+ 56.4	76.9	40 29.1	+ 56.9	77.7	40 41.5	+ 57.2	78.5	40 52.9	+ 57.7	79.4	41 03.5	+ 58.1	80.3	41 13.3	+ 58.3	81.1	41 22.1	+ 58.6	82.0	41 30.0	+ 58.9	82.9	42
43	41 12.3	+ 56.3	76.4	41 26.0	+ 56.7	77.3	41 38.7	+ 57.2	78.2	41 50.6	+ 57.6	79.0	42 01.6	+ 57.9	79.9	42 11.6	+ 58.3	80.8	42 20.7	+ 58.7	81.7	42 28.9	+ 58.9	82.6	43
44	42 08.6	+ 56.2	76.0	42 22.7	+ 56.6	76.9	42 35.9	+ 57.1	77.7	42 48.2	+ 57.5	78.6	42 59.5	+ 57.9	79.6	43 09.9	+ 58.3	80.5	43 19.4	+ 58.5	81.4	43 27.8	+ 58.9	82.3	44
45	43 04.8	+ 56.0	75.5	43 19.3	+ 56.6	76.4	43 33.0	+ 57.0	77.3	43 45.7	+ 57.4	78.3	43 57.4	+ 57.8	79.2	44 08.2	+ 58.1	80.1	44 17.9	+ 58.6	81.1	44 26.7	+ 58.8	82.1	45
46	44 00.8	+ 55.9	75.0	44 15.9	+ 56.4	75.9	44 30.0	+ 56.9	76.9	44 43.1	+ 57.3	77.8	44 55.2	+ 57.8	78.8	45 06.3	+ 58.2	79.8	45 16.5	+ 58.4	80.8	45 25.5	+ 58.8	81.8	46
47	44 56.7	+ 55.8	74.5	45 12.3	+ 56.3	75.5	45 26.9	+ 56.7	76.4	45 40.4	+ 57.3	77.4	45 53.0	+ 57.6	78.4	46 04.5	+ 58.0	79.5	46 14.9	+ 58.4	80.5	46 24.3	+ 58.8	81.5	47
48	45 52.5	+ 55.6	74.0	46 08.6	+ 56.1	75.0	46 23.6	+ 56.7	76.0	46 37.7	+ 57.1	77.0	46 50.6	+ 57.6	78.0	47 02.5	+ 58.0	79.1	47 13.3	+ 58.4	80.1	47 23.1	+ 58.7	81.2	48
49	46 48.1	+ 55.5	73.4	47 04.7	+ 56.0	74.4	47 20.3	+ 56.5	75.5	47 34.8	+ 57.0	76.5	47 48.2	+ 57.5	77.6	48 00.5	+ 57.9	78.7	48 11.7	+ 58.3	79.8	48 21.8	+ 58.6	80.9	49
50	47 43.6	+ 55.3	72.9	48 00.7	+ 55.9	73.9	48 16.8	+ 56.4	75.0	48 31.8	+ 56.9	76.1	48 45.7	+ 57.4	77.2	48 58.4	+ 57.8	78.3	49 10.0	+ 58.2	79.4	49 20.4	+ 58.6	80.6	50
51	48 38.9	+ 55.1	72.3	48 56.6	+ 55.7	73.4	49 13.2	+ 56.3	74.5	49 28.7	+ 56.8	75.6	49 43.1	+ 57.2	76.7	49 56.2	+ 57.8	77.9	50 08.2	+ 58.2	79.1	50 19.0	+ 58.5	80.2	51
52	49 34.0	+ 54.9	71.7	49 52.3	+ 55.5	72.8	50 09.5	+ 56.1	73.9	50 25.5	+ 56.6	75.1	50 40.3	+ 57.2	76.3	50 54.0	+ 57.6	77.5	51 06.4	+ 58.0	78.7	51 17.5	+ 58.5	79.9	52
53	50 28.9	+ 54.7	71.0	50 47.8	+ 55.4	72.2	51 05.6	+ 55.9	73.4	51 22.1	+ 56.5	74.6	51 37.5	+ 57.0	75.8	51 51.6	+ 57.5	77.0	52 04.4	+ 58.0	78.3	52 16.0	+ 58.4	79.5	53
54	51 23.6	+ 54.5	70.4	51 43.2	+ 55.1	71.6	52 01.5	+ 55.8	72.8	52 18.6	+ 56.4	74.0	52 34.5	+ 56.9	75.3	52 49.1	+ 57.4	76.6	53 02.4	+ 57.9	77.8	53 14.4	+ 58.3	79.2	54
55	52 18.1	+ 54.2	69.7	52 38.3	+ 54.9	70.9	52 57.3	+ 55.5	72.2	53 15.0	+ 56.2	73.5	53 31.4	+ 56.8	74.8	53 46.5	+ 57.3	76.1	54 00.3	+ 57.8	77.4	54 12.7	+ 58.2	78.8	55
56	53 12.3	+ 54.0	69.0	53 33.2	+ 54.7	70.3	53 52.8	+ 55.4	71.6	54 11.2	+ 56.0	72.9	54 28.2	+ 56.6	74.2	54 43.8	+ 57.2	75.6	54 58.1	+ 57.6	76.9	55 10.9	+ 58.2	78.3	56
57	54 06.3	+ 53.7	68.3	54 27.9	+ 54.4	69.6	54 48.2	+ 55.1	70.9	55 07.2	+ 55.7	72.2	55 24.8	+ 56.4	73.6	55 41.0	+ 57.0	75.0	55 55.7	+ 57.6	76.5	56 09.1	+ 58.0	77.9	57
58	55 00.0	+ 53.4	67.5	55 22.3	+ 54.2	68.8	55 43.3	+ 54.9	70.2	56 02.9	+ 55.6	71.6	56 21.2	+ 56.2	73.0	56 38.0	+ 56.8	74.5	56 53.3	+ 57.4	75.9	57 07.1	+ 57.9	77.4	58
59	55 53.4	+ 53.0	66.7	56 16.5	+ 53.8	68.1	56 38.2	+ 54.6	69.5	56 58.5	+ 55.4	70.9	57 17.4	+ 56.0	72.4	57 34.8	+ 56.7	73.9	57 50.7	+ 57.3	75.4	58 05.0	+ 57.9	77.0	59
60	56 46.4	+ 52.7	65.9	57 10.3	+ 53.5	67.3	57 32.8	+ 54.3	68.7	57 53.9	+ 55.0	70.2	58 13.4	+ 55.9	71.7	58 31.5	+ 56.5	73.3	58 48.0	+ 57.1	74.8	59 02.9	+ 57.7	76.4	60
61	57 39.1	+ 52.4	65.0	58 03.8	+ 53.2	66.4	58 27.1	+ 54.0	67.9	58 48.9	+ 54.9	69.4	59 09.3	+ 55.5	71.0	59 28.0	+ 56.3	72.6	59 45.1	+ 57.0	74.2	60 00.6	+ 57.5	75.9	61
62	58 31.5	+ 51.9	64.0	58 57.0	+ 52.8	65.5	59 21.1	+ 53.7	67.1	59 43.8	+ 54.5	68.6	60 04.8	+ 55.3	70.3	60 24.3	+ 56.0	71.9	60 42.1	+ 56.7	73.6	60 58.1	+ 57.4	75.3	62
63	59 23.4	+ 51.4	63.1	59 49.8	+ 52.4	64.6	60 14.8	+ 53.3	66.2	60 38.3	+ 54.1	67.8	61 00.1	+ 55.0	69.5	61 20.3	+ 55.8	71.2	61 38.8	+ 56.6	72.9	61 55.5	+ 57.2	74.7	63
64	60 14.8	+ 50.9	62.0	60 42.2	+ 51.9	63.6	61 08.1	+ 52.9	65.2	61 32.4	+ 53.8	66.9	61 55.1	+ 54.7	68.6	62 16.1	+ 55.5	70.4	62 35.4	+ 56.3	72.2	62 52.7	+ 57.1	74.1	64
65	61 05.7	+ 50.4	61.0	61 34.1	+ 51.4	62.6	62 01.0	+ 52.4	64.2	62 26.2	+ 53.4	66.0	62 49.8	+ 54.3	67.7	63 11.6	+ 55.3	69.6	63 31.7	+ 56.0	71.5	63 49.8	+ 56.8	73.4	65
66	61 56.1	+ 49.8	59.8	62 25.5	+ 50.9	61.5	62 53.4	+ 51.9	63.2	63 19.6	+ 53.0	65.0	63 44.1	+ 54.0	66.8	64 06.9	+ 54.8	68.7	64 27.7	+ 55.8	70.6	64 46.6	+ 56.6	72.6	66
67	62 45.9	+ 49.2	58.6	63 16.4	+ 50.3	60.3	63 45.3	+ 51.4	62.1	64 12.6	+ 52.4	63.9	64 38.1	+ 53.5	65.8	65 01.7	+ 54.5	67.8	65 23.5	+ 55.4	69.8	65 43.2	+ 56.3	71.8	67
68	63 35.1	+ 48.4	57.4	64 06.7	+ 49.6	59.1	64 36.7	+ 50.7	60.9	65 05.0	+ 51.9	62.8	65 31.6	+ 53.0	64.7	65 56.2	+ 54.1	66.7	66 18.9	+ 55.1	68.8	66 39.5	+ 56.0	71.0	68
69	64 23.5	+ 47.6	56.0	64 56.3	+ 48.8	57.8	65 27.4	+ 50.1	59.6	65 56.9	+ 51.3	61.6	66 24.6	+ 52.4	63.6	66 50.3	+ 53.6	65.7	67 14.0	+ 54.6	67.8	67 35.5	+ 55.7	70.1	69
70	65 11.1	+ 46.8	54.6	65 45.1	+ 48.1	56.4	66 17.5	+ 49.4	58.3	66 48.2	+ 50.6	60.3	67 17.0	+ 51.9	62.3	67 43.9	+ 53.0	64.5	68 08.6	+ 54.3	66.7	68 31.2	+ 55.3	69.1	70
71	65 57.9	+ 45.9	53.1	66 33.2	+ 47.2	54.9	67 06.9	+ 48.5	56.8	67 38.8	+ 49.9	58.9	68 08.9	+ 51.1	61.0	68 36.9	+ 52.5	63.2	69 02.9	+ 53.6	65.6	69 26.5	+ 54.9	68.0	71
72	66 43.8	+ 44.8	51.5	67 20.4	+ 46.2	53.3	67 55.4	+ 47.6	55.3	68 28.7	+ 48.9	57.4	69 00.0	+ 50.4	59.6	69 29.4	+ 51.7	61.9	69 56.5	+ 53.1	64.3	70 21.4	+ 54.3	66.8	72
73	67 28.6	+ 43.6	49.8	68 06.6	+ 45.1	51.6	68 43.0	+ 46.5	53.7	69 17.6	+ 48.1	55.8	69 50.4	+ 49.5	58.0	70 21.1	+ 51.0	60.4	70 49.6	+ 52.4	62.9	71 15.7	+ 53.8	65.5	73
74	68 12.2	+ 42.4	47.9	68 51.7	+ 43.8	49.8	69 29.5	+ 45.4	51.9	70 05.7	+ 46.9	54.1	70 39.9	+ 48.5	56.4	71 12.1	+ 50.1	58.8	71 42.0	+ 51.6	61.4	72 09.5	+ 53.1	64.1	74
75	68 54.6	+ 40.9	46.0	69 35.5	+ 42.5	47.9	70 14.9	+ 44.1	50.0	70 52.6	+ 45.8	52.2	71 28.4	+ 47.4	54.5	72 02.2	+ 49.0	57.1	72 33.6	+ 50.7	59.7	73 02.6	+ 52.3	62.6	75
76	69 35.5	+ 39.4	43.9	70 18.0	+ 41.0	45.9	70 59.0	+ 42.7	47.9	71 38.4	+ 44.3	50.2	72 15.8	+ 46.1	52.6	72 51.2	+ 47.9	55.1	73 24.3	+ 49.7	57.9	73 54.9	+ 51.4	60.8	76
77	70 14.9	+ 37.7	41.7	70 59.0	+ 39.4	43.7	71 41.7	+ 41.0	45.7	72 22.7	+ 42.8	48.0	73 01.9	+ 44.7	50.4	73 39.1	+ 46.5	53.1	74 14.0	+ 48.4	55.9	74 46.3	+ 50.3	58.9	77
78	70 52.6	+ 35.8	39.4	71 38.4	*+ 37.4* •	41.3	72 22.7	+ 39.2	43.4	73 05.5	+ 41.1	45.6	73 46.6	+ 42.9	48.1	74 25.6	+ 44.9	50.8	75 02.4	+ 47.0	53.6	75 36.6	+ 49.1	56.8	78
79	71 28.4	*+ 33.8* •	36.9	72 15.8	*+ 35.4* •	38.8	73 01.9	*+ 37.2* •	40.8	73 46.6	*+ 39.0* •	43.1	74 29.5	*+ 41.0* •	45.5	75 10.5	+ 43.1	48.2	75 49.4	+ 45.2	51.2	76 25.7	+ 47.5	54.4	79
80	72 02.2	*+ 31.4* •	34.3	72 51.2	*+ 33.1* •	36.1	73 39.1	*+ 34.9* •	38.1	74 25.6	*+ 36.8* •	40.3	75 10.5	*+ 38.9* •	42.7	75 53.6	*+ 41.0* •	45.4	76 34.6	*+ 43.3* •	48.4	77 13.2	*+ 45.6* •	51.7	80
81	72 33.6	*+ 29.0* •	31.5	73 24.3	*+ 30.6* •	33.2	74 14.0	*+ 32.3* •	35.1	75 02.4	*+ 34.2* •	37.3	75 49.4	*+ 36.3* •	39.7	76 34.6	*+ 38.6* •	42.4	77 17.9	*+ 40.9* •	45.4	77 58.8	*+ 43.5* •	48.7	81
82	73 02.6	*+ 26.3* •	28.5	73 54.9	*+ 27.8* •	30.2	74 46.3	*+ 29.5* •	32.0	75 36.6	*+ 31.4* •	34.1	76 25.7	*+ 33.4* •	36.4	77 13.2	*+ 35.6* •	39.0	77 58.8	*+ 38.2* •	41.9	78 42.3	*+ 40.8* •	45.3	82
83	73 28.9	*+ 23.3* •	25.4	74 22.7	*+ 24.8* •	26.9	75 15.8	*+ 26.4* •	28.6	76 08.0	*+ 28.2* •	30.6	76 59.1	*+ 30.2* •	32.8	77 48.8	*+ 32.4* •	35.3	78 37.0	*+ 34.8* •	38.1	79 23.1	*+ 37.6* •	41.4	83
84	73 52.2	*+ 20.2* •	22.1	74 47.5	*+ 21.5* •	23.5	75 42.2	*+ 23.0* •	25.0	76 36.2	*+ 24.6* •	26.8	77 29.3	*+ 26.5* •	28.8	78 21.2	*+ 28.7* •	31.2	79 11.8	*+ 31.1* •	33.9	80 00.7	*+ 33.8* •	37.1	84
85	74 12.4	*+ 16.9* •	18.7	75 09.0	*+ 18.0* •	19.9	76 05.2	*+ 19.3* •	21.3	77 00.8	*+ 20.8* •	22.8	77 55.8	*+ 22.4* •	24.6	78 49.9	*+ 24.3* •	26.7	79 42.9	*+ 26.6* •	29.2	80 34.5	*+ 29.2* •	32.2	85
86	74 29.3	*+ 13.3* •	15.1	75 27.0	*+ 14.3* •	16.1	76 24.5	*+ 15.3* •	17.3	77 21.6	*+ 16.6* •	18.6	78 18.2	*+ 18.0* •	20.1	79 14.2	*+ 19.6* •	21.9	80 09.5	*+ 21.5* •	24.1	81 03.7	*+ 23.9* •	26.7	86
87	74 42.6	*+ 9.6* •	11.4	75 41.3	*+ 10.3* •	12.2	76 39.8	*+ 11.2* •	13.1	77 38.2	*+ 12.0* •	14.1	78 36.2	*+ 13.1* •	15.4	79 33.8	*+ 14.4* •	16.8	80 31.0	*+ 15.9* •	18.5	81 27.6	*+ 17.7* •	20.6	87
88	74 52.2	*+ 5.8* •	7.7	75 51.6	*+ 6.3* •	8.2	76 51.0	*+ 6.7* •	8.8	77 50.2	*+ 7.3* •	9.5	78 49.3	*+ 8.0* •	10.4	79 48.2	*+ 8.8* •	11.4	80 46.9	*+ 9.8* •	12.6	81 45.3	*+ 11.0* •	14.1	88
89	74 58.0	*+ 2.0* •	3.9	75 57.9	*+ 2.1* •	4.1	76 57.7	*+ 2.3* •	4.4	77 57.5	*+ 2.5* •	4.8	78 57.3	*+ 2.7* •	5.2	79 57.0	*+ 3.0* •	5.7	80 56.7	*+ 3.3* •	6.4	81 56.3	*+ 3.7* •	7.1	89
90	75 00.0	*– 2.0* •	0.0	76 00.0	*– 2.1* •	0.0	77 00.0	*– 2.3* •	0.0	78 00.0	*– 2.5* •	0.0	79 00.0	*– 2.7* •	0.0	80 00.0	*– 3.0* •	0.0	81 00.0	*– 3.3* •	0.0	82 00.0	*– 3.7* •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

LATITUDE *CONTRARY NAME TO DECLINATION L.H.A. 90°, 270°

	75°			76°			77°			78°			79°			80°			81°			82°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 00.0	−58.0	90.0	0 00.0	−58.2	90.0	0 00.0	−58.5	90.0	0 00.0	−58.7	90.0	0 00.0	−58.9	90.0	0 00.0	−59.1	90.0	0 00.0	−59.3	90.0	0 00.0	−59.4	90.0	0
1	0 58.0	+57.9	89.7	0 58.2	+58.2	89.8	0 58.5	+58.4	89.8	0 58.7	+58.7	89.8	0 58.9	+58.9	89.8	0 59.1	+59.1	89.8	0 59.3	+59.2	89.8	0 59.4	+59.4	89.9	1
2	1 55.9	+58.0	89.5	1 56.4	+58.2	89.5	1 56.9	+58.5	89.5	1 57.4	+58.7	89.6	1 57.8	+58.9	89.6	1 58.2	+59.1	89.7	1 58.5	+59.3	89.7	1 58.8	+59.4	89.7	2
3	2 53.9	+57.9	89.2	2 54.6	+58.3	89.3	2 55.4	+58.4	89.3	2 56.1	+58.6	89.4	2 56.7	+58.9	89.4	2 57.3	+59.0	89.5	2 57.8	+59.2	89.5	2 58.2	+59.5	89.6	3
4	3 51.8	+58.0	89.0	3 52.9	+58.2	89.0	3 53.8	+58.5	89.1	3 54.7	+58.7	89.2	3 55.6	+58.9	89.2	3 56.3	+59.1	89.3	3 57.0	+59.3	89.4	3 57.7	+59.4	89.4	4
5	4 49.8	+57.9	88.7	4 51.1	+58.2	88.8	4 52.3	+58.4	88.9	4 53.4	+58.7	89.0	4 54.5	+58.9	89.0	4 55.4	+59.1	89.1	4 56.3	+59.3	89.2	4 57.1	+59.4	89.3	5
6	5 47.7	+57.9	88.4	5 49.3	+58.2	88.5	5 50.7	+58.5	88.6	5 52.1	+58.7	88.7	5 53.4	+58.8	88.9	5 54.5	+59.1	89.0	5 55.6	+59.2	89.1	5 56.5	+59.4	89.2	6
7	6 45.6	+57.9	88.2	6 47.5	+58.2	88.3	6 49.2	+58.4	88.4	6 50.8	+58.6	88.5	6 52.2	+58.9	88.7	6 53.6	+59.1	88.8	6 54.8	+59.3	88.9	6 55.9	+59.4	89.0	7
8	7 43.5	+58.0	87.9	7 45.7	+58.1	88.1	7 47.6	+58.4	88.2	7 49.4	+58.7	88.3	7 51.1	+58.9	88.5	7 52.7	+59.0	88.6	7 54.1	+59.2	88.7	7 55.3	+59.4	88.9	8
9	8 41.5	+57.9	87.7	8 43.8	+58.2	87.8	8 46.0	+58.5	88.0	8 48.1	+58.7	88.1	8 50.0	+58.9	88.3	8 51.7	+59.1	88.4	8 53.3	+59.2	88.6	8 54.7	+59.4	88.7	9
10	9 39.4	+57.8	87.4	9 42.0	+58.2	87.6	9 44.5	+58.4	87.7	9 46.8	+58.6	87.9	9 48.9	+58.8	88.1	9 50.8	+59.1	88.2	9 52.5	+59.3	88.4	9 54.1	+59.4	88.6	10
11	10 37.2	+57.9	87.1	10 40.2	+58.1	87.3	10 42.9	+58.4	87.5	10 45.4	+58.6	87.7	10 47.7	+58.9	87.9	10 49.9	+59.0	88.1	10 51.8	+59.2	88.3	10 53.5	+59.4	88.5	11
12	11 35.1	+57.9	86.9	11 38.3	+58.1	87.1	11 41.3	+58.4	87.3	11 44.0	+58.7	87.5	11 46.6	+58.8	87.7	11 48.9	+59.0	87.9	11 51.0	+59.2	88.1	11 52.9	+59.4	88.3	12
13	12 33.0	+57.8	86.6	12 36.4	+58.2	86.8	12 39.7	+58.3	87.0	12 42.7	+58.6	87.3	12 45.4	+58.9	87.5	12 47.9	+59.1	87.7	12 50.2	+59.3	87.9	12 52.3	+59.4	88.2	13
14	13 30.8	+57.9	86.3	13 34.6	+58.1	86.5	13 38.0	+58.4	86.8	13 41.3	+58.6	87.0	13 44.3	+58.8	87.3	13 47.0	+59.0	87.5	13 49.5	+59.2	87.8	13 51.7	+59.3	88.0	14
15	14 28.7	+57.8	86.0	14 32.7	+58.1	86.3	14 36.4	+58.4	86.6	14 39.9	+58.6	86.8	14 43.1	+58.8	87.1	14 46.0	+59.0	87.3	14 48.7	+59.2	87.6	14 51.0	+59.4	87.9	15
16	15 26.5	+57.7	85.8	15 30.8	+58.0	86.0	15 34.8	+58.3	86.3	15 38.5	+58.6	86.6	15 41.9	+58.8	86.9	15 45.0	+59.0	87.1	15 47.9	+59.2	87.4	15 50.4	+59.4	87.7	16
17	16 24.2	+57.8	85.5	16 28.8	+58.1	85.8	16 33.1	+58.3	86.1	16 37.1	+58.5	86.4	16 40.7	+58.8	86.7	16 44.0	+59.0	87.0	16 47.1	+59.2	87.3	16 49.8	+59.3	87.6	17
18	17 22.0	+57.7	85.2	17 26.9	+58.0	85.5	17 31.4	+58.3	85.8	17 35.6	+58.6	86.1	17 39.5	+58.8	86.5	17 43.0	+59.0	86.8	17 46.3	+59.1	87.1	17 49.1	+59.4	87.4	18
19	18 19.7	+57.8	84.9	18 24.9	+58.0	85.2	18 29.7	+58.3	85.6	18 34.2	+58.5	85.9	18 38.3	+58.7	86.2	18 42.0	+59.0	86.6	18 45.4	+59.2	86.9	18 48.5	+59.3	87.3	19
20	19 17.5	+57.6	84.6	19 22.9	+58.0	85.0	19 28.0	+58.2	85.3	19 32.7	+58.5	85.7	19 37.0	+58.8	86.0	19 41.0	+59.0	86.4	19 44.6	+59.2	86.7	19 47.8	+59.4	87.1	20
21	20 15.1	+57.7	84.3	20 20.9	+57.9	84.7	20 26.2	+58.3	85.1	20 31.2	+58.5	85.4	20 35.8	+58.7	85.8	20 40.0	+58.9	86.2	20 43.8	+59.1	86.6	20 47.2	+59.3	86.9	21
22	21 12.8	+57.6	84.0	21 18.8	+58.0	84.4	21 24.5	+58.2	84.8	21 29.7	+58.5	85.2	21 34.5	+58.7	85.6	21 38.9	+59.0	86.0	21 42.9	+59.2	86.4	21 46.5	+59.3	86.8	22
23	22 10.4	+57.6	83.7	22 16.8	+57.9	84.1	22 22.7	+58.2	84.5	22 28.2	+58.4	85.0	22 33.2	+58.7	85.4	22 37.9	+58.9	85.8	22 42.1	+59.1	86.2	22 45.8	+59.3	86.6	23
24	23 08.0	+57.6	83.4	23 14.7	+57.8	83.9	23 20.9	+58.1	84.3	23 26.6	+58.5	84.7	23 31.9	+58.7	85.1	23 36.8	+58.9	85.6	23 41.2	+59.1	86.0	23 45.1	+59.3	86.5	24
25	24 05.6	+57.5	83.1	24 12.5	+57.9	83.6	24 19.0	+58.2	84.0	24 25.1	+58.4	84.5	24 30.6	+58.7	84.9	24 35.7	+58.9	85.4	24 40.3	+59.1	85.8	24 44.4	+59.3	86.3	25
26	25 03.1	+57.5	82.8	25 10.4	+57.8	83.3	25 17.2	+58.1	83.7	25 23.5	+58.3	84.2	25 29.3	+58.6	84.7	25 34.6	+58.8	85.2	25 39.4	+59.1	85.6	25 43.7	+59.3	86.1	26
27	26 00.6	+57.4	82.5	26 08.2	+57.7	83.0	26 15.3	+58.0	83.5	26 21.8	+58.4	84.0	26 27.9	+58.6	84.4	26 33.4	+58.9	84.9	26 38.5	+59.0	85.4	26 43.0	+59.2	85.9	27
28	26 58.0	+57.4	82.2	27 05.9	+57.7	82.7	27 13.3	+58.0	83.2	27 20.2	+58.3	83.7	27 26.5	+58.6	84.2	27 32.3	+58.8	84.7	27 37.5	+59.1	85.2	27 42.2	+59.3	85.8	28
29	27 55.4	+57.3	81.8	28 03.6	+57.7	82.4	28 11.3	+58.0	82.9	28 18.5	+58.3	83.4	28 25.1	+58.5	84.0	28 31.1	+58.8	84.5	28 36.6	+59.0	85.0	28 41.5	+59.2	85.6	29
30	28 52.7	+57.3	81.5	29 01.3	+57.7	82.0	29 09.3	+58.0	82.6	29 16.8	+58.2	83.2	29 23.6	+58.6	83.7	29 29.9	+58.8	84.3	29 35.6	+59.0	84.8	29 40.7	+59.2	85.4	30
31	29 50.0	+57.3	81.2	29 59.0	+57.6	81.7	30 07.3	+57.9	82.3	30 15.0	+58.3	82.9	30 22.2	+58.5	83.5	30 28.7	+58.8	84.0	30 34.6	+59.0	84.6	30 39.9	+59.2	85.2	31
32	30 47.3	+57.2	80.8	30 56.6	+57.5	81.4	31 05.2	+57.9	82.0	31 13.3	+58.1	82.6	31 20.7	+58.4	83.2	31 27.5	+58.7	83.8	31 33.6	+59.0	84.4	31 39.1	+59.2	85.0	32
33	31 44.5	+57.1	80.5	31 54.1	+57.5	81.1	32 03.1	+57.8	81.7	32 11.4	+58.2	82.3	32 19.1	+58.5	82.9	32 26.2	+58.7	83.6	32 32.6	+58.9	84.2	32 38.3	+59.2	84.8	33
34	32 41.6	+57.0	80.1	32 51.6	+57.4	80.7	33 00.9	+57.8	81.4	33 09.6	+58.1	82.0	33 17.6	+58.4	82.7	33 24.9	+58.7	83.3	33 31.5	+59.0	84.0	33 37.5	+59.1	84.6	34
35	33 38.6	+57.0	79.7	33 49.0	+57.4	80.4	33 58.7	+57.7	81.0	34 07.7	+58.0	81.7	34 16.0	+58.3	82.4	34 23.6	+58.6	83.1	34 30.5	+58.8	83.7	34 36.6	+59.2	84.4	35
36	34 35.6	+57.0	79.4	34 46.4	+57.3	80.0	34 56.4	+57.7	80.7	35 05.7	+58.0	81.4	35 14.3	+58.3	82.1	35 22.2	+58.6	82.8	35 29.3	+58.9	83.5	35 35.8	+59.1	84.2	36
37	35 32.6	+56.8	79.0	35 43.7	+57.2	79.7	35 54.1	+57.6	80.4	36 03.7	+58.0	81.1	36 12.6	+58.3	81.8	36 20.8	+58.6	82.5	36 28.2	+58.9	83.3	36 34.9	+59.0	84.0	37
38	36 29.4	+56.8	78.6	36 40.9	+57.2	79.3	36 51.7	+57.5	80.0	37 01.7	+57.9	80.8	37 10.9	+58.3	81.5	37 19.4	+58.5	82.3	37 27.1	+58.8	83.0	37 33.9	+59.1	83.8	38
39	37 26.2	+56.6	78.2	37 38.1	+57.1	78.9	37 49.2	+57.5	79.7	37 59.6	+57.8	80.4	38 09.2	+58.1	81.2	38 17.9	+58.5	82.0	38 25.9	+58.7	82.8	38 33.0	+59.0	83.6	39
40	38 22.8	+56.6	77.7	38 35.2	+57.0	78.5	38 46.7	+57.4	79.3	38 57.4	+57.8	80.1	39 07.3	+58.2	80.9	39 16.4	+58.5	81.7	39 24.6	+58.8	82.5	39 32.0	+59.0	83.3	40
41	39 19.4	+56.5	77.3	39 32.2	+56.9	78.1	39 44.1	+57.4	78.9	39 55.2	+57.7	79.8	40 05.5	+58.0	80.6	40 14.9	+58.4	81.4	40 23.4	+58.7	82.3	40 31.0	+59.0	83.1	41
42	40 15.9	+56.4	76.9	40 29.1	+56.9	77.7	40 41.5	+57.2	78.5	40 52.9	+57.7	79.4	41 03.5	+58.1	80.3	41 13.3	+58.3	81.1	41 22.1	+58.6	82.0	41 30.0	+58.9	82.9	42
43	41 12.3	+56.3	76.4	41 26.0	+56.7	77.3	41 38.7	+57.2	78.2	41 50.6	+57.6	79.0	42 01.6	+57.9	79.9	42 11.6	+58.3	80.8	42 20.7	+58.7	81.7	42 28.9	+58.9	82.6	43
44	42 08.6	+56.2	76.0	42 22.7	+56.6	76.9	42 35.9	+57.1	77.7	42 48.2	+57.5	78.6	42 59.5	+57.9	79.6	43 09.9	+58.3	80.5	43 19.4	+58.5	81.4	43 27.8	+58.9	82.3	44
45	43 04.8	+56.0	75.5	43 19.3	+56.6	76.4	43 33.0	+57.0	77.3	43 45.7	+57.4	78.3	43 57.4	+57.8	79.2	44 08.2	+58.1	80.1	44 17.9	+58.6	81.1	44 26.7	+58.8	82.1	45
46	44 00.8	+55.9	75.0	44 15.9	+56.4	75.9	44 30.0	+56.9	76.9	44 43.1	+57.3	77.8	44 55.2	+57.8	78.8	45 06.3	+58.2	79.8	45 16.5	+58.4	80.8	45 25.5	+58.8	81.8	46
47	44 56.7	+55.8	74.5	45 12.3	+56.3	75.5	45 26.9	+56.7	76.4	45 40.4	+57.3	77.4	45 53.0	+57.6	78.4	46 04.5	+58.0	79.5	46 14.9	+58.4	80.5	46 24.3	+58.8	81.5	47
48	45 52.5	+55.6	74.0	46 08.6	+56.1	75.0	46 23.6	+56.7	76.0	46 37.7	+57.1	77.0	46 50.6	+57.6	78.0	47 02.5	+58.0	79.1	47 13.3	+58.4	80.1	47 23.1	+58.7	81.2	48
49	46 48.1	+55.5	73.4	47 04.7	+56.0	74.4	47 20.3	+56.5	75.5	47 34.8	+57.0	76.5	47 48.2	+57.5	77.6	48 00.5	+57.9	78.7	48 11.7	+58.3	79.8	48 21.8	+58.6	80.9	49
50	47 43.6	+55.3	72.9	48 00.7	+55.9	73.9	48 16.8	+56.4	75.0	48 31.8	+56.9	76.1	48 45.7	+57.4	77.2	48 58.4	+57.8	78.3	49 10.0	+58.2	79.4	49 20.4	+58.6	80.6	50
51	48 38.9	+55.1	72.3	48 56.6	+55.7	73.4	49 13.2	+56.3	74.5	49 28.7	+56.8	75.6	49 43.1	+57.2	76.7	49 56.2	+57.8	77.9	50 08.2	+58.2	79.1	50 19.0	+58.5	80.2	51
52	49 34.0	+54.9	71.7	49 52.3	+55.5	72.8	50 09.5	+56.1	73.9	50 25.5	+56.6	75.1	50 40.3	+57.2	76.3	50 54.0	+57.6	77.5	51 06.4	+58.0	78.7	51 17.5	+58.5	79.9	52
53	50 28.9	+54.7	71.0	50 47.8	+55.4	72.2	51 05.6	+55.9	73.4	51 22.1	+56.5	74.6	51 37.5	+57.0	75.8	51 51.6	+57.5	77.0	52 04.4	+58.0	78.3	52 16.0	+58.4	79.5	53
54	51 23.6	+54.5	70.4	51 43.2	+55.1	71.6	52 01.5	+55.8	72.8	52 18.6	+56.4	74.0	52 34.5	+56.9	75.3	52 49.1	+57.4	76.6	53 02.4	+57.9	77.8	53 14.4	+58.3	79.2	54
55	52 18.1	+54.2	69.7	52 38.3	+54.9	70.9	52 57.3	+55.5	72.2	53 15.0	+56.2	73.5	53 31.4	+56.8	74.8	53 46.5	+57.3	76.1	54 00.3	+57.8	77.4	54 12.7	+58.2	78.8	55
56	53 12.3	+54.0	69.0	53 33.2	+54.7	70.3	53 52.8	+55.4	71.6	54 11.2	+56.0	72.9	54 28.2	+56.6	74.2	54 43.8	+57.2	75.6	54 58.1	+57.6	76.9	55 10.9	+58.2	78.3	56
57	54 06.3	+53.7	68.3	54 27.9	+54.4	69.6	54 48.2	+55.1	70.9	55 07.2	+55.7	72.2	55 24.8	+56.4	73.6	55 41.0	+57.0	75.0	55 55.7	+57.6	76.5	56 09.1	+58.0	77.9	57
58	55 00.0	+53.4	67.5	55 22.3	+54.2	68.8	55 43.3	+54.9	70.2	56 02.9	+55.6	71.6	56 21.2	+56.2	73.0	56 38.0	+56.8	74.5	56 53.3	+57.4	75.9	57 07.1	+57.9	77.4	58
59	55 53.4	+53.0	66.7	56 16.5	+53.8	68.1	56 38.2	+54.6	69.5	56 58.5	+55.4	70.9	57 17.4	+56.0	72.4	57 34.8	+56.7	73.9	57 50.7	+57.3	75.4	58 05.0	+57.9	77.0	59
60	56 46.4	+52.7	65.9	57 10.3	+53.5	67.3	57 32.8	+54.3	68.7	57 53.9	+55.0	70.2	58 13.4	+55.9	71.7	58 31.5	+56.5	73.3	58 48.0	+57.1	74.8	59 02.9	+57.7	76.4	60
61	57 39.1	+52.4	65.0	58 03.8	+53.2	66.4	58 27.1	+54.0	67.9	58 48.9	+54.9	69.4	59 09.3	+55.5	71.0	59 28.0	+56.3	72.6	59 45.1	+57.0	74.2	60 00.6	+57.5	75.9	61
62	58 31.5	+51.9	64.0	58 57.0	+52.8	65.5	59 21.1	+53.7	67.1	59 43.8	+54.5	68.6	60 04.8	+55.3	70.3	60 24.3	+56.0	71.9	60 42.1	+56.7	73.6	60 58.1	+57.4	75.3	62
63	59 23.4	+51.4	63.1	59 49.8	+52.4	64.6	60 14.8	+53.3	66.2	60 38.3	+54.1	67.8	61 00.1	+55.0	69.5	61 20.3	+55.8	71.2	61 38.8	+56.6	72.9	61 55.5	+57.2	74.7	63
64	60 14.8	+50.9	62.0	60 42.2	+51.9	63.6	61 08.1	+52.9	65.2	61 32.4	+53.8	66.9	61 55.1	+54.7	68.6	62 16.1	+55.5	70.4	62 35.4	+56.3	72.2	62 52.7	+57.1	74.1	64
65	61 05.7	+50.4	61.0	61 34.1	+51.4	62.6	62 01.0	+52.4	64.2	62 26.2	+53.4	66.0	62 49.8	+54.3	67.7	63 11.6	+55.3	69.6	63 31.7	+56.0	71.5	63 49.8	+56.8	73.4	65
66	61 56.1	+49.8	59.8	62 25.5	+50.9	61.5	62 53.4	+51.9	63.2	63 19.6	+53.0	65.0	63 44.1	+54.0	66.8	64 06.9	+54.8	68.7	64 27.7	+55.8	70.6	64 46.6	+56.6	72.6	66
67	62 45.9	+49.2	58.6	63 16.4	+50.3	60.3	63 45.3	+51.4	62.1	64 12.6	+52.4	63.9	64 38.1	+53.5	65.8	65 01.7	+54.5	67.8	65 23.5	+55.4	69.8	65 43.2	+56.3	71.8	67
68	63 35.1	+48.4	57.4	64 06.7	+49.6	59.1	64 36.7	+50.7	60.9	65 05.0	+51.9	62.8	65 31.6	+53.0	64.7	65 56.2	+54.1	66.7	66 18.9	+55.1	68.8	66 39.5	+56.0	71.0	68
69	64 23.5	+47.6	56.0	64 56.3	+48.8	57.8	65 27.4	+50.1	59.6	65 56.9	+51.3	61.6	66 24.6	+52.4	63.6	66 50.3	+53.6	65.7	67 14.0	+54.6	67.8	67 35.5	+55.7	70.1	69
70	65 11.1	+46.8	54.6	65 45.1	+48.1	56.4	66 17.5	+49.4	58.3	66 48.2	+50.6	60.3	67 17.0	+51.9	62.3	67 43.9	+53.0	64.5	68 08.6	+54.3	66.7	68 31.2	+55.3	69.1	70
71	65 57.9	+45.9	53.1	66 33.2	+47.2	54.9	67 06.9	+48.5	56.8	67 38.8	+49.9	58.9	68 08.9	+51.1	61.0	68 36.9	+52.5	63.2	69 02.9	+53.6	65.6	69 26.5	+54.9	68.0	71
72	66 43.8	+44.8	51.5	67 20.4	+46.2	53.3	67 55.4	+47.6	55.3	68 28.7	+48.9	57.4	69 00.0	+50.4	59.6	69 29.4	+51.7	61.9	69 56.5	+53.1	64.3	70 21.4	+54.3	66.8	72
73	67 28.6	+43.6	49.8	68 06.6	+45.1	51.6	68 43.0	+46.5	53.7	69 17.6	+48.1	55.8	69 50.4	+49.5	58.0	70 21.1	+51.0	60.4	70 49.6	+52.4	62.9	71 15.7	+53.8	65.5	73
74	68 12.2	+42.4	47.9	68 51.7	+43.8	49.8	69 29.5	+45.4	51.9	70 05.7	+46.9	54.1	70 39.9	+48.5	56.4	71 12.1	+50.1	58.8	71 42.0	+51.6	61.4	72 09.5	+53.1	64.1	74
75	68 54.6	+40.9	46.0	69 35.5	+42.5	47.9	70 14.9	+44.1	50.0	70 52.6	+45.8	52.2	71 28.4	+47.4	54.5	72 02.2	+49.0	57.1	72 33.6	+50.7	59.7	73 02.6	+52.3	62.6	75
76	69 35.5	+39.4	43.9	70 18.0	+41.0	45.9	70 59.0	+42.7	47.9	71 38.4	+44.3	50.2	72 15.8	+46.1	52.6	72 51.2	+47.9	55.1	73 24.3	+49.7	57.9	73 54.9	+51.4	60.8	76
77	70 14.9	+37.7	41.7	70 59.0	+39.4	43.7	71 41.7	+41.0	45.7	72 22.7	+42.8	48.0	73 01.9	+44.7	50.4	73 39.1	+46.5	53.1	74 14.0	+48.4	55.9	74 46.3	+50.3	58.9	77
78	70 52.6	+35.8	39.4	71 38.4	+37.4 •	41.3	72 22.7	+39.2	43.4	73 05.5	+41.1	45.6	73 46.6	+42.9	48.1	74 25.6	+44.9	50.8	75 02.4	+47.0	53.6	75 36.6	+49.1	56.8	78
79	71 28.4	+33.8 •	36.9	72 15.8	+35.4 •	38.8	73 01.9	+37.2 •	40.8	73 46.6	+39.0 •	43.1	74 29.5	+41.0 •	45.5	75 10.5	+43.1	48.2	75 49.4	+45.2	51.2	76 25.7	+47.5	54.4	79
80	72 02.2	+31.4 •	34.3	72 51.2	+33.1 •	36.1	73 39.1	+34.9 •	38.1	74 25.6	+36.8 •	40.3	75 10.5	+38.9 •	42.7	75 53.6	+41.0 •	45.4	76 34.6	+43.3 •	48.4	77 13.2	+45.6 •	51.7	80
81	72 33.6	+29.0 •	31.5	73 24.3	+30.6 •	33.2	74 14.0	+32.3 •	35.1	75 02.4	+34.2 •	37.3	75 49.4	+36.3 •	39.7	76 34.6	+38.6 •	42.4	77 17.9	+40.9 •	45.4	77 58.8	+43.5 •	48.7	81
82	73 02.6	+26.3 •	28.5	73 54.9	+27.8 •	30.2	74 46.3	+29.5 •	32.0	75 36.6	+31.4 •	34.1	76 25.7	+33.4 •	36.4	77 13.2	+35.6 •	39.0	77 58.8	+38.2 •	41.9	78 42.3	+40.8 •	45.3	82
83	73 28.9	+23.3 •	25.4	74 22.7	+24.8 •	26.9	75 15.8	+26.4 •	28.6	76 08.0	+28.2 •	30.6	76 59.1	+30.2 •	32.8	77 48.8	+32.4 •	35.3	78 37.0	+34.8 •	38.1	79 23.1	+37.6 •	41.4	83
84	73 52.2	+20.2 •	22.1	74 47.5	+21.5 •	23.5	75 42.2	+23.0 •	25.0	76 36.2	+24.6 •	26.8	77 29.3	+26.5 •	28.8	78 21.2	+28.7 •	31.2	79 11.8	+31.1 •	33.9	80 00.7	+33.8 •	37.1	84
85	74 12.4	+16.9 •	18.7	75 09.0	+18.0 •	19.9	76 05.2	+19.3 •	21.3	77 00.8	+20.8 •	22.8	77 55.8	+22.4 •	24.6	78 49.9	+24.3 •	26.7	79 42.9	+26.6 •	29.2	80 34.5	+29.2 •	32.2	85
86	74 29.3	+13.3 •	15.1	75 27.0	+14.3 •	16.1	76 24.5	+15.3 •	17.3	77 21.6	+16.6 •	18.6	78 18.2	+18.0 •	20.1	79 14.2	+19.6 •	21.9	80 09.5	+21.5 •	24.1	81 03.7	+23.9 •	26.7	86
87	74 42.6	+9.6 •	11.4	75 41.3	+10.3 •	12.2	76 39.8	+11.2 •	13.1	77 38.2	+12.0 •	14.1	78 36.2	+13.1 •	15.4	79 33.8	+14.4 •	16.8	80 31.0	+15.9 •	18.5	81 27.6	+17.7 •	20.6	87
88	74 52.2	+5.8 •	7.7	75 51.6	+6.3 •	8.2	76 51.0	+6.7 •	8.8	77 50.2	+7.3 •	9.5	78 49.3	+8.0 •	10.4	79 48.2	+8.8 •	11.4	80 46.9	+9.8 •	12.6	81 45.3	+11.0 •	14.1	88
89	74 58.0	+2.0 •	3.9	75 57.9	+2.1 •	4.1	76 57.7	+2.3 •	4.4	77 57.5	+2.5 •	4.8	78 57.3	+2.7 •	5.2	79 57.0	+3.0 •	5.7	80 56.7	+3.3 •	6.4	81 56.3	+3.7 •	7.1	89
90	75 00.0	−2.0 •	0.0	76 00.0	−2.1 •	0.0	77 00.0	−2.3 •	0.0	78 00.0	−2.5 •	0.0	79 00.0	−2.7 •	0.0	80 00.0	−3.0 •	0.0	81 00.0	−3.3 •	0.0	82 00.0	−3.7 •	0.0	90
	75°			76°			77°			78°			79°			80°			81°			82°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 90°, 270°

*No entries for contrary name appear on this page.

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	4 00.0	+60.0	180.0	3 00.0	+60.0	180.0	2 00.0	+60.0	180.0	1 00.0	+60.0	180.0	0 00.0	−60.0	0.0	0
1	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	4 00.0	+60.0	180.0	3 00.0	+60.0	180.0	2 00.0	+60.0	180.0	1 00.0	+60.0	180.0	1
2	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	4 00.0	+60.0	180.0	3 00.0	+60.0	180.0	2 00.0	+60.0	180.0	2
3	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	4 00.0	+60.0	180.0	3 00.0	+60.0	180.0	3
4	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	4 00.0	+60.0	180.0	4
5	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	5 00.0	+60.0	180.0	5
6	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	6 00.0	+60.0	180.0	6
7	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	7 00.0	+60.0	180.0	7
8	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	8 00.0	+60.0	180.0	8
9	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	9 00.0	+60.0	180.0	9
10	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	10 00.0	+60.0	180.0	10
11	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	11 00.0	+60.0	180.0	11
12	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	12 00.0	+60.0	180.0	12
13	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	13 00.0	+60.0	180.0	13
14	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	14 00.0	+60.0	180.0	14
15	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	15 00.0	+60.0	180.0	15
16	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	16 00.0	+60.0	180.0	16
17	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	17 00.0	+60.0	180.0	17
18	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	18 00.0	+60.0	180.0	18
19	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	19 00.0	+60.0	180.0	19
20	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	20 00.0	+60.0	180.0	20
21	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	21 00.0	+60.0	180.0	21
22	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	22 00.0	+60.0	180.0	22
23	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	23 00.0	+60.0	180.0	23
24	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	24 00.0	+60.0	180.0	24
25	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	25 00.0	+60.0	180.0	25
26	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	26 00.0	+60.0	180.0	26
27	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	27 00.0	+60.0	180.0	27
28	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	28 00.0	+60.0	180.0	28
29	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	29 00.0	+60.0	180.0	29
30	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	30
31	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	31
32	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	32
33	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	33
34	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	34
35	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	35
36	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	36
37	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	37
38	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	38
39	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	39
40	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	40
41	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	41
42	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	42
43	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	43
44	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	44
45	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	45
46	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	46
47	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	47
48	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	48
49	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	49
50	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	50
51	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	51
52	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	52
53	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	53
54	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	54
55	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	55
56	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	56
57	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	57
58	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	58
59	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	59
60	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	60
61	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	61
62	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	62
63	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	63
64	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	64
65	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	65
66	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	66
67	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	67
68	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	68
69	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	69
70	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	70
71	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	71
72	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	72
73	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	73
74	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	74
75	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	75
76	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	76
77	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	77
78	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	78
79	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	79
80	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	80
81	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	81
82	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	82
83	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	83
84	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	84
85	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	85
86	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	86
87	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	87
88	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	88
89	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	89
90	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 0°, 360°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	0
1	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	1
2	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	2
3	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	3
4	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	4
5	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	5
6	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	6
7	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	7
8	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	8
9	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	9
10	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	10
11	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	11
12	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	12
13	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	13
14	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	14
15	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	15
16	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	16
17	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	17
18	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	18
19	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	19
20	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	20
21	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	21
22	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	22
23	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	23
24	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	24
25	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	25
26	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	26
27	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	27
28	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	28
29	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	29
30	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	30
31	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	31
32	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	32
33	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	33
34	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	34
35	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	35
36	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	36
37	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	37
38	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	38
39	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	39
40	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	40
41	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	41
42	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	42
43	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	43
44	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	44
45	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	45
46	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	46
47	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	47
48	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	48
49	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	49
50	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	50
51	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	51
52	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	52
53	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	53
54	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	54
55	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	55
56	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	56
57	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	57
58	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	58
59	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	59
60	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	60
61	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	61
62	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	62
63	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	63
64	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	64
65	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	65
66	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	66
67	60 00.0	+60.0	0.0	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	67
68	61 00.0	+60.0	0.0	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	68
69	62 00.0	+60.0	0.0	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	69
70	63 00.0	+60.0	0.0	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	70
71	64 00.0	+60.0	0.0	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	71
72	65 00.0	+60.0	0.0	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	72
73	66 00.0	+60.0	0.0	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	73
74	67 00.0	+60.0	0.0	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	74
75	68 00.0	+60.0	0.0	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	75
76	69 00.0	+60.0	0.0	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	76
77	70 00.0	+60.0	0.0	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	77
78	71 00.0	+60.0	0.0	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	78
79	72 00.0	+60.0	0.0	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	79
80	73 00.0	+60.0	0.0	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	80
81	74 00.0	+60.0	0.0	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	81
82	75 00.0	+60.0	0.0	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	82
83	76 00.0	+60.0	0.0	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	83
84	77 00.0	+60.0	0.0	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	84
85	78 00.0	+60.0	0.0	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	85
86	79 00.0	+60.0	0.0	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	86
87	80 00.0	+60.0	0.0	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	87 00.0	+60.0	0.0	87
88	81 00.0	+60.0	0.0	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	87 00.0	+60.0	0.0	88 00.0	+60.0	0.0	88
89	82 00.0	+60.0	0.0	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	87 00.0	+60.0	0.0	88 00.0	+60.0	0.0	89 00.0	+60.0	0.0	89
90	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	87 00.0	+60.0	0.0	88 00.0	+60.0	0.0	89 00.0	+60.0	0.0	90 00.0	−60.0	0.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 180°, 180°

1°, 359° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.9	+60.0	179.0	5 59.9	+60.0	179.0	5 00.0	+60.0	179.0	4 00.0	+60.0	179.0	3 00.0	+60.0	179.0	2 00.0	+60.0	179.0	1 00.0	+60.0	179.0	0 00.0	+60.0	179.0	**0**
1	7 59.9	+60.0	179.0	6 59.9	+60.0	179.0	6 00.0	+60.0	179.0	5 00.0	+60.0	179.0	4 00.0	+60.0	179.0	3 00.0	+60.0	179.0	2 00.0	+60.0	179.0	1 00.0	+60.0	179.0	**1**
2	8 59.9	+60.0	179.0	7 59.9	+60.0	179.0	7 00.0	+60.0	179.0	6 00.0	+60.0	179.0	5 00.0	+60.0	179.0	4 00.0	+60.0	179.0	3 00.0	+60.0	179.0	2 00.0	+60.0	179.0	**2**
3	9 59.9	+60.0	179.0	8 59.9	+60.0	179.0	8 00.0	+60.0	179.0	7 00.0	+60.0	179.0	6 00.0	+60.0	179.0	5 00.0	+60.0	179.0	4 00.0	+60.0	179.0	3 00.0	+60.0	179.0	**3**
4	10 59.9	+60.0	179.0	9 59.9	+60.0	179.0	9 00.0	+60.0	179.0	8 00.0	+60.0	179.0	7 00.0	+60.0	179.0	6 00.0	+60.0	179.0	5 00.0	+60.0	179.0	4 00.0	+60.0	179.0	**4**
5	11 59.9	+60.0	179.0	10 59.9	+60.0	179.0	10 00.0	+60.0	179.0	9 00.0	+60.0	179.0	8 00.0	+60.0	179.0	7 00.0	+60.0	179.0	6 00.0	+60.0	179.0	5 00.0	+60.0	179.0	**5**
6	12 59.9	+60.0	179.0	11 59.9	+60.0	179.0	11 00.0	+60.0	179.0	10 00.0	+60.0	179.0	9 00.0	+60.0	179.0	8 00.0	+60.0	179.0	7 00.0	+60.0	179.0	6 00.0	+60.0	179.0	**6**
7	13 59.9	+60.0	179.0	12 59.9	+60.0	179.0	12 00.0	+60.0	179.0	11 00.0	+60.0	179.0	10 00.0	+60.0	179.0	9 00.0	+60.0	179.0	8 00.0	+60.0	179.0	7 00.0	+60.0	179.0	**7**
8	14 59.9	+60.0	179.0	13 59.9	+60.0	179.0	13 00.0	+60.0	179.0	12 00.0	+60.0	179.0	11 00.0	+60.0	179.0	10 00.0	+60.0	179.0	9 00.0	+60.0	179.0	8 00.0	+60.0	179.0	**8**
9	15 59.9	+60.0	179.0	14 59.9	+60.0	179.0	14 00.0	+60.0	179.0	13 00.0	+60.0	179.0	12 00.0	+60.0	179.0	11 00.0	+60.0	179.0	10 00.0	+60.0	179.0	9 00.0	+60.0	179.0	**9**
10	16 59.9	+60.0	179.0	15 59.9	+60.0	179.0	15 00.0	+60.0	179.0	14 00.0	+60.0	179.0	13 00.0	+60.0	179.0	12 00.0	+60.0	179.0	11 00.0	+60.0	179.0	10 00.0	+60.0	179.0	**10**
11	17 59.9	+60.0	179.0	16 59.9	+60.0	179.0	16 00.0	+60.0	179.0	15 00.0	+60.0	179.0	14 00.0	+60.0	179.0	13 00.0	+60.0	179.0	12 00.0	+60.0	179.0	11 00.0	+60.0	179.0	**11**
12	18 59.9	+60.0	179.0	17 59.9	+60.0	179.0	17 00.0	+60.0	179.0	16 00.0	+60.0	179.0	15 00.0	+60.0	179.0	14 00.0	+60.0	179.0	13 00.0	+60.0	179.0	12 00.0	+60.0	179.0	**12**
13	19 59.9	+60.0	179.0	18 59.9	+60.0	179.0	18 00.0	+60.0	179.0	17 00.0	+60.0	179.0	16 00.0	+60.0	179.0	15 00.0	+60.0	179.0	14 00.0	+60.0	179.0	13 00.0	+60.0	179.0	**13**
14	20 59.9	+60.0	179.0	19 59.9	+60.0	179.0	19 00.0	+60.0	179.0	18 00.0	+60.0	179.0	17 00.0	+60.0	179.0	16 00.0	+60.0	179.0	15 00.0	+60.0	179.0	14 00.0	+60.0	179.0	**14**
15	21 59.9	+60.0	179.0	20 59.9	+60.0	179.0	20 00.0	+60.0	179.0	19 00.0	+60.0	179.0	18 00.0	+60.0	179.0	17 00.0	+60.0	179.0	16 00.0	+60.0	179.0	15 00.0	+60.0	179.0	**15**
16	22 59.9	+60.0	179.0	21 59.9	+60.0	179.0	21 00.0	+60.0	179.0	20 00.0	+60.0	179.0	19 00.0	+60.0	179.0	18 00.0	+60.0	179.0	17 00.0	+60.0	179.0	16 00.0	+60.0	179.0	**16**
17	23 59.9	+60.0	179.0	22 59.9	+60.0	179.0	22 00.0	+60.0	179.0	21 00.0	+60.0	179.0	20 00.0	+60.0	179.0	19 00.0	+60.0	179.0	18 00.0	+60.0	179.0	17 00.0	+60.0	179.0	**17**
18	24 59.9	+60.0	179.0	23 59.9	+60.0	179.0	23 00.0	+60.0	179.0	22 00.0	+60.0	179.0	21 00.0	+60.0	179.0	20 00.0	+60.0	179.0	19 00.0	+60.0	179.0	18 00.0	+60.0	179.0	**18**
19	25 59.9	+60.0	178.9	24 59.9	+60.0	179.0	24 00.0	+60.0	179.0	23 00.0	+60.0	179.0	22 00.0	+60.0	179.0	21 00.0	+60.0	179.0	20 00.0	+60.0	179.0	19 00.0	+60.0	179.0	**19**
20	26 59.9	+60.0	178.9	25 59.9	+60.0	179.0	25 00.0	+60.0	179.0	24 00.0	+60.0	179.0	23 00.0	+60.0	179.0	22 00.0	+60.0	179.0	21 00.0	+60.0	179.0	20 00.0	+60.0	179.0	**20**
21	27 59.9	+60.0	178.9	26 59.9	+60.0	179.0	26 00.0	+60.0	179.0	25 00.0	+60.0	179.0	24 00.0	+60.0	179.0	23 00.0	+60.0	179.0	22 00.0	+60.0	179.0	21 00.0	+60.0	179.0	**21**
22	28 59.9	+60.0	178.9	27 59.9	+60.0	178.9	27 00.0	+60.0	179.0	26 00.0	+60.0	179.0	25 00.0	+60.0	179.0	24 00.0	+60.0	179.0	23 00.0	+60.0	179.0	22 00.0	+60.0	179.0	**22**
23	29 59.9	+60.0	178.9	28 59.9	+60.0	178.9	28 00.0	+60.0	179.0	27 00.0	+60.0	179.0	26 00.0	+60.0	179.0	25 00.0	+60.0	179.0	24 00.0	+60.0	179.0	23 00.0	+60.0	179.0	**23**
24	30 59.9	+60.0	178.9	29 59.9	+60.0	178.9	29 00.0	+60.0	179.0	28 00.0	+60.0	179.0	27 00.0	+60.0	179.0	26 00.0	+60.0	179.0	25 00.0	+60.0	179.0	24 00.0	+60.0	179.0	**24**
25	31 59.9	+60.0	178.9	30 59.9	+60.0	178.9	30 00.0	+60.0	179.0	29 00.0	+60.0	179.0	28 00.0	+60.0	179.0	27 00.0	+60.0	179.0	26 00.0	+60.0	179.0	25 00.0	+60.0	179.0	**25**
26	32 59.9	+60.0	178.9	31 59.9	+60.0	178.9	31 00.0	+60.0	179.0	30 00.0	+60.0	179.0	29 00.0	+60.0	179.0	28 00.0	+60.0	179.0	27 00.0	+60.0	179.0	26 00.0	+60.0	179.0	**26**
27	33 59.9	+60.0	178.9	32 59.9	+60.0	178.9	32 00.0	+60.0	178.9	31 00.0	+60.0	179.0	30 00.0	+60.0	179.0	29 00.0	+60.0	179.0	28 00.0	+60.0	179.0	27 00.0	+60.0	179.0	**27**
28	34 59.9	+60.0	178.9	33 59.9	+60.0	178.9	33 00.0	+60.0	178.9	32 00.0	+60.0	179.0	31 00.0	+60.0	179.0	30 00.0	+60.0	179.0	29 00.0	+60.0	179.0	28 00.0	+60.0	179.0	**28**
29	35 59.9	+60.0	178.9	34 59.9	+60.0	178.9	34 00.0	+60.0	178.9	33 00.0	+60.0	179.0	32 00.0	+60.0	179.0	31 00.0	+60.0	179.0	30 00.0	+60.0	179.0	29 00.0	+60.0	179.0	**29**
30	36 59.9	+60.0	178.9	35 59.9	+60.0	178.9	35 00.0	+60.0	178.9	34 00.0	+60.0	179.0	33 00.0	+60.0	179.0	32 00.0	+60.0	179.0	31 00.0	+60.0	179.0	30 00.0	+60.0	179.0	**30**
31	37 59.9	+60.0	178.9	36 59.9	+60.0	178.9	36 00.0	+60.0	178.9	35 00.0	+60.0	179.0	34 00.0	+60.0	179.0	33 00.0	+60.0	179.0	32 00.0	+60.0	179.0	31 00.0	+60.0	179.0	**31**
32	38 59.9	+60.0	178.9	37 59.9	+60.0	178.9	37 00.0	+60.0	178.9	36 00.0	+60.0	179.0	35 00.0	+60.0	179.0	34 00.0	+60.0	179.0	33 00.0	+60.0	179.0	32 00.0	+60.0	179.0	**32**
33	39 59.9	+60.0	178.9	38 59.9	+60.0	178.9	38 00.0	+60.0	178.9	37 00.0	+60.0	178.9	36 00.0	+60.0	179.0	35 00.0	+60.0	179.0	34 00.0	+60.0	179.0	33 00.0	+60.0	179.0	**33**
34	40 59.9	+60.0	178.9	39 59.9	+60.0	178.9	39 00.0	+60.0	178.9	38 00.0	+60.0	178.9	37 00.0	+60.0	179.0	36 00.0	+60.0	179.0	35 00.0	+60.0	179.0	34 00.0	+60.0	179.0	**34**
35	41 59.9	+60.0	178.9	40 59.9	+60.0	178.9	40 00.0	+60.0	178.9	39 00.0	+60.0	178.9	38 00.0	+60.0	179.0	37 00.0	+60.0	179.0	36 00.0	+60.0	179.0	35 00.0	+60.0	179.0	**35**
36	42 59.9	+60.0	178.9	41 59.9	+60.0	178.9	41 00.0	+60.0	178.9	40 00.0	+60.0	178.9	39 00.0	+60.0	179.0	38 00.0	+60.0	179.0	37 00.0	+60.0	179.0	36 00.0	+60.0	179.0	**36**
37	43 59.9	+60.0	178.9	42 59.9	+60.0	178.9	42 00.0	+60.0	178.9	41 00.0	+60.0	178.9	40 00.0	+60.0	179.0	39 00.0	+60.0	179.0	38 00.0	+60.0	179.0	37 00.0	+60.0	179.0	**37**
38	44 59.9	+60.0	178.9	43 59.9	+60.0	178.9	43 00.0	+60.0	178.9	42 00.0	+60.0	178.9	41 00.0	+60.0	179.0	40 00.0	+60.0	179.0	39 00.0	+60.0	179.0	38 00.0	+60.0	179.0	**38**
39	45 59.9	+60.0	178.9	44 59.9	+60.0	178.9	44 00.0	+60.0	178.9	43 00.0	+60.0	178.9	42 00.0	+60.0	179.0	41 00.0	+60.0	179.0	40 00.0	+60.0	179.0	39 00.0	+60.0	179.0	**39**
40	46 59.9	+60.0	178.9	45 59.9	+60.0	178.9	45 00.0	+60.0	178.9	44 00.0	+60.0	178.9	43 00.0	+60.0	179.0	42 00.0	+60.0	179.0	41 00.0	+60.0	179.0	40 00.0	+60.0	179.0	**40**
41	47 59.9	+60.0	178.9	46 59.9	+60.0	178.9	46 00.0	+60.0	178.9	45 00.0	+60.0	178.9	44 00.0	+60.0	179.0	43 00.0	+60.0	179.0	42 00.0	+60.0	179.0	41 00.0	+60.0	179.0	**41**
42	48 59.9	+60.0	178.9	47 59.9	+60.0	178.9	47 00.0	+60.0	178.9	46 00.0	+60.0	178.9	45 00.0	+60.0	178.9	44 00.0	+60.0	179.0	43 00.0	+60.0	179.0	42 00.0	+60.0	179.0	**42**
43	49 59.9	+60.0	178.9	48 59.9	+60.0	178.9	48 00.0	+59.9	178.9	47 00.0	+60.0	178.9	46 00.0	+60.0	178.9	45 00.0	+60.0	179.0	44 00.0	+60.0	179.0	43 00.0	+60.0	179.0	**43**
44	50 59.9	+60.0	178.9	49 59.9	+60.0	178.9	48 59.9	+60.0	178.9	48 00.0	+60.0	178.9	47 00.0	+60.0	178.9	46 00.0	+60.0	179.0	45 00.0	+60.0	179.0	44 00.0	+60.0	179.0	**44**
45	51 59.9	+60.0	178.9	50 59.9	+60.0	178.9	49 59.9	+60.0	178.9	49 00.0	+60.0	178.9	48 00.0	+60.0	178.9	47 00.0	+60.0	179.0	46 00.0	+60.0	179.0	45 00.0	+60.0	179.0	**45**
46	52 59.9	+60.0	178.8	51 59.9	+60.0	178.9	50 59.9	+60.0	178.9	50 00.0	+60.0	178.9	49 00.0	+60.0	178.9	48 00.0	+60.0	179.0	47 00.0	+60.0	179.0	46 00.0	+60.0	179.0	**46**
47	53 59.9	+60.0	178.8	52 59.9	+60.0	178.9	51 59.9	+60.0	178.9	51 00.0	+60.0	178.9	50 00.0	+60.0	178.9	49 00.0	+60.0	179.0	48 00.0	+60.0	179.0	47 00.0	+60.0	179.0	**47**
48	54 59.9	+60.0	178.8	53 59.9	+60.0	178.9	52 59.9	+60.0	178.9	52 00.0	+60.0	178.9	51 00.0	+60.0	178.9	50 00.0	+60.0	179.0	49 00.0	+60.0	179.0	48 00.0	+60.0	179.0	**48**
49	55 59.9	+60.0	178.8	54 59.9	+60.0	178.9	53 59.9	+60.0	178.9	53 00.0	+60.0	178.9	52 00.0	+60.0	178.9	51 00.0	+60.0	179.0	50 00.0	+60.0	179.0	49 00.0	+60.0	179.0	**49**
50	56 59.9	+60.0	178.8	55 59.9	+60.0	178.9	54 59.9	+60.0	178.9	54 00.0	+60.0	178.9	53 00.0	+60.0	178.9	52 00.0	+60.0	179.0	51 00.0	+60.0	179.0	50 00.0	+60.0	179.0	**50**
51	57 59.9	+60.0	178.8	56 59.9	+60.0	178.8	55 59.9	+60.0	178.9	55 00.0	+60.0	178.9	54 00.0	+60.0	178.9	53 00.0	+60.0	179.0	52 00.0	+60.0	179.0	51 00.0	+60.0	179.0	**51**
52	58 59.9	+60.0	178.8	57 59.9	+60.0	178.8	56 59.9	+60.0	178.9	56 00.0	+60.0	178.9	55 00.0	+60.0	178.9	54 00.0	+60.0	179.0	53 00.0	+60.0	179.0	52 00.0	+60.0	179.0	**52**
53	59 59.9	+60.0	178.8	58 59.9	+60.0	178.8	57 59.9	+60.0	178.9	57 00.0	+60.0	178.9	56 00.0	+60.0	178.9	55 00.0	+60.0	179.0	54 00.0	+60.0	179.0	53 00.0	+60.0	179.0	**53**
54	60 59.9	+60.0	178.8	59 59.9	+60.0	178.8	58 59.9	+60.0	178.9	58 00.0	+60.0	178.9	57 00.0	+60.0	178.9	56 00.0	+60.0	178.9	55 00.0	+60.0	179.0	54 00.0	+60.0	179.0	**54**
55	61 59.9	+60.0	178.8	60 59.9	+60.0	178.8	59 59.9	+60.0	178.9	59 00.0	+60.0	178.9	58 00.0	+60.0	178.9	57 00.0	+60.0	178.9	56 00.0	+60.0	179.0	55 00.0	+60.0	179.0	**55**
56	62 59.9	+60.0	178.8	61 59.9	+60.0	178.8	60 59.9	+60.0	178.8	60 00.0	+60.0	178.9	59 00.0	+60.0	178.9	58 00.0	+60.0	178.9	57 00.0	+60.0	179.0	56 00.0	+60.0	179.0	**56**
57	63 59.9	+60.0	178.8	62 59.9	+60.0	178.8	61 59.9	+60.0	178.8	61 00.0	+60.0	178.9	60 00.0	+60.0	178.9	59 00.0	+60.0	178.9	58 00.0	+60.0	179.0	57 00.0	+60.0	179.0	**57**
58	64 59.9	+60.0	178.7	63 59.9	+60.0	178.8	62 59.9	+60.0	178.8	62 00.0	+60.0	178.9	61 00.0	+60.0	178.9	60 00.0	+60.0	178.9	59 00.0	+60.0	179.0	58 00.0	+60.0	179.0	**58**
59	65 59.9	+60.0	178.7	64 59.9	+60.0	178.8	63 59.9	+60.0	178.8	63 00.0	+60.0	178.9	62 00.0	+60.0	178.9	61 00.0	+60.0	178.9	60 00.0	+60.0	179.0	59 00.0	+60.0	179.0	**59**
60	66 59.9	+60.0	178.7	65 59.9	+60.0	178.8	64 59.9	+60.0	178.8	64 00.0	+60.0	178.9	63 00.0	+60.0	178.9	62 00.0	+60.0	178.9	61 00.0	+60.0	179.0	60 00.0	+60.0	179.0	**60**
61	67 59.9	+60.0	178.7	66 59.9	+60.0	178.8	65 59.9	+60.0	178.8	65 00.0	+60.0	178.9	64 00.0	+60.0	178.9	63 00.0	+60.0	178.9	62 00.0	+60.0	179.0	61 00.0	+60.0	179.0	**61**
62	68 59.9	+60.0	178.7	67 59.9	+60.0	178.7	66 59.9	+60.0	178.8	66 00.0	+60.0	178.8	65 00.0	+60.0	178.9	64 00.0	+60.0	178.9	63 00.0	+60.0	179.0	62 00.0	+60.0	179.0	**62**
63	69 59.9	+60.0	178.7	68 59.9	+60.0	178.7	67 59.9	+60.0	178.8	67 00.0	+60.0	178.8	66 00.0	+60.0	178.9	65 00.0	+60.0	178.9	64 00.0	+60.0	179.0	63 00.0	+60.0	179.0	**63**
64	70 59.9	+60.0	178.7	69 59.9	+60.0	178.7	68 59.9	+60.0	178.8	68 00.0	+60.0	178.8	67 00.0	+60.0	178.9	66 00.0	+60.0	178.9	65 00.0	+60.0	179.0	64 00.0	+60.0	179.0	**64**
65	71 59.9	+60.0	178.6	70 59.9	+60.0	178.7	69 59.9	+60.0	178.8	69 00.0	+60.0	178.8	68 00.0	+60.0	178.9	67 00.0	+60.0	178.9	66 00.0	+60.0	179.0	65 00.0	+60.0	179.0	**65**
66	72 59.9	+60.0	178.6	71 59.9	+60.0	178.7	70 59.9	+60.0	178.8	70 00.0	+60.0	178.8	69 00.0	+60.0	178.9	68 00.0	+60.0	178.9	67 00.0	+60.0	179.0	66 00.0	+60.0	179.0	**66**
67	73 59.9	+60.0	178.6	72 59.9	+60.0	178.7	71 59.9	+60.0	178.7	71 00.0	+60.0	178.8	70 00.0	+60.0	178.9	69 00.0	+60.0	178.9	68 00.0	+60.0	179.0	67 00.0	+60.0	179.0	**67**
68	74 59.9	+60.0	178.6	73 59.9	+60.0	178.6	72 59.9	+60.0	178.7	72 00.0	+60.0	178.8	71 00.0	+60.0	178.8	70 00.0	+60.0	178.9	69 00.0	+60.0	179.0	68 00.0	+60.0	179.0	**68**
69	75 59.9	+60.0	178.5	74 59.9	+60.0	178.6	73 59.9	+60.0	178.7	73 00.0	+60.0	178.8	72 00.0	+60.0	178.8	71 00.0	+60.0	178.9	70 00.0	+60.0	179.0	69 00.0	+60.0	179.0	**69**
70	76 59.9	+60.0	178.5	75 59.9	+60.0	178.6	74 59.9	+60.0	178.7	74 00.0	+60.0	178.8	73 00.0	+60.0	178.8	72 00.0	+60.0	178.9	71 00.0	+60.0	178.9	70 00.0	+60.0	179.0	**70**
71	77 59.9	+60.0	178.4	76 59.9	+60.0	178.6	75 59.9	+60.0	178.7	75 00.0	+60.0	178.7	74 00.0	+60.0	178.8	73 00.0	+60.0	178.9	72 00.0	+60.0	178.9	71 00.0	+60.0	179.0	**71**
72	78 59.9	+60.0	178.4	77 59.9	+60.0	178.5	76 59.9	+60.0	178.6	76 00.0	+60.0	178.7	75 00.0	+60.0	178.8	74 00.0	+60.0	178.9	73 00.0	+60.0	178.9	72 00.0	+60.0	179.0	**72**
73	79 59.9	+60.0	178.3	78 59.9	+60.0	178.5	77 59.9	+60.0	178.6	77 00.0	+60.0	178.7	76 00.0	+60.0	178.8	75 00.0	+60.0	178.9	74 00.0	+60.0	178.9	73 00.0	+60.0	179.0	**73**
74	80 59.9	+60.0	178.2	79 59.9	+60.0	178.4	78 59.9	+60.0	178.6	78 00.0	+60.0	178.7	77 00.0	+60.0	178.8	76 00.0	+60.0	178.9	75 00.0	+60.0	178.9	74 00.0	+60.0	179.0	**74**
75	81 59.9	+60.0	178.1	80 59.9	+60.0	178.3	79 59.9	+60.0	178.5	79 00.0	+59.9	178.6	78 00.0	+60.0	178.8	77 00.0	+60.0	178.8	76 00.0	+60.0	178.9	75 00.0	+60.0	179.0	**75**
76	82 59.9	+60.0	178.0	81 59.9	+60.0	178.3	80 59.9	+60.0	178.5	79 59.9	+60.0	178.6	79 00.0	+60.0	178.7	78 00.0	+60.0	178.8	77 00.0	+60.0	178.9	76 00.0	+60.0	179.0	**76**
77	83 59.9	+59.9	177.8	82 59.9	+60.0	178.2	81 59.9	+60.0	178.4	80 59.9	+60.0	178.6	80 00.0	+60.0	178.7	79 00.0	+60.0	178.8	78 00.0	+60.0	178.9	77 00.0	+60.0	179.0	**77**
78	84 59.8	+60.0	177.6	83 59.9	+60.0	178.0	82 59.9	+60.0	178.3	81 59.9	+60.0	178.5	81 00.0	+60.0	178.7	80 00.0	+60.0	178.8	79 00.0	+60.0	178.9	78 00.0	+60.0	179.0	**78**
79	85 59.8	+60.0	177.3	84 59.9	+60.0	177.8	83 59.9	+60.0	178.2	82 59.9	+60.0	178.4	82 00.0	+60.0	178.6	81 00.0	+60.0	178.8	80 00.0	+60.0	178.9	79 00.0	+60.0	179.0	**79**
80	86 59.8	+59.9	176.7	85 59.9	+59.9	177.5	84 59.9	+60.0	178.0	83 59.9	+60.0	178.3	83 00.0	+60.0	178.6	82 00.0	+60.0	178.8	81 00.0	+60.0	178.9	80 00.0	+60.0	179.0	**80**
81	87 59.7	*+59.8*	•175.5	86 59.8	+60.0	177.0	85 59.9	+60.0	177.8	84 59.9	+60.0	178.2	84 00.0	+60.0	178.5	83 00.0	+60.0	178.7	82 00.0	+60.0	178.9	81 00.0	+60.0	179.0	**81**
82	88 59.5	*+53.2*	•172.1	87 59.8	*+59.8*	•176.0	86 59.9	+59.9	177.3	85 59.9	+60.0	178.0	85 00.0	+60.0	178.4	84 00.0	+60.0	178.7	83 00.0	+60.0	178.9	82 00.0	+60.0	179.0	**82**
83	89 52.7	*−53.1*	• 89.5	88 59.6	*+54.1*	•173.0	87 59.8	*+59.9*	•176.5	86 59.9	+60.0	177.7	86 00.0	+59.9	178.3	85 00.0	+60.0	178.6	84 00.0	+60.0	178.8	83 00.0	+60.0	179.0	**83**
84	88 59.6	*−59.8*	• 6.0	89 53.7	*−54.0*	• 89.5	88 59.7	*+55.1*	•174.0	87 59.9	*+59.9*	•177.0	86 59.9	+60.0	178.0	86 00.0	+60.0	178.5	85 00.0	+60.0	178.8	84 00.0	+60.0	179.0	**84**
85	87 59.8	−59.9	2.5	88 59.7	*−59.8*	• 5.0	89 54.8	*−55.0*	• 89.5	88 59.8	*+56.0*	•175.0	87 59.9	+60.0	177.5	87 00.0	+60.0	178.3	86 00.0	+60.0	178.8	85 00.0	+60.0	179.0	**85**
86	86 59.9	−59.9	1.3	87 59.9	−60.0	2.0	88 59.8	*−59.9*	• 4.0	89 55.8	*−55.9*	• 89.5	88 59.9	*+57.0*	•176.0	88 00.0	+59.9	178.0	87 00.0	+60.0	178.7	86 00.0	+60.0	179.0	**86**
87	86 00.0	−60.0	0.8	86 59.9	−59.9	1.0	87 59.9	−59.9	1.5	88 59.9	*−59.9*	• 3.0	89 56.9	*−57.0*	• 89.5	88 59.9	*+58.0*	•177.0	88 00.0	+60.0	178.5	87 00.0	+60.0	179.0	**87**
88	85 00.0	−60.0	0.4	86 00.0	−60.0	0.5	87 00.0	−60.0	0.7	88 00.0	−60.0	1.0	88 59.9	−59.9	2.0	89 57.9	*−57.9*	• 89.5	89 00.0	*+59.0*	•178.0	88 00.0	+60.0	179.0	**88**
89	84 00.0	−60.0	0.2	85 00.0	−60.0	0.2	86 00.0	−60.0	0.3	87 00.0	−60.0	0.3	88 00.0	−60.0	0.5	89 00.0	−60.0	1.0	89 59.0	*−59.0*	• 89.5	89 00.0	+60.0	179.0	**89**
90	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	89.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 59.9	− 60.0	179.0	5 59.9	− 60.0	179.0	5 00.0	− 60.0	179.0	4 00.0	− 60.0	179.0	3 00.0	− 60.0	179.0	2 00.0	− 60.0	179.0	1 00.0	− 60.0	179.0	0 00.0	+ 60.0	1.0	**0**
1	5 59.9	− 60.0	179.0	4 59.9	− 60.0	179.0	4 00.0	− 60.0	179.0	3 00.0	− 60.0	179.0	2 00.0	− 60.0	179.0	1 00.0	− 60.0	179.0	0 00.0	− 60.0	179.0	1 00.0	+ 60.0	1.0	**1**
2	4 59.9	− 60.0	179.0	3 59.9	− 60.0	179.0	3 00.0	− 60.0	179.0	2 00.0	− 60.0	179.0	1 00.0	− 60.0	179.0	0 00.0	− 60.0	179.0	1 00.0	+ 60.0	1.0	2 00.0	+ 60.0	1.0	**2**
3	3 59.9	− 60.0	179.0	2 59.9	− 60.0	179.0	2 00.0	− 60.0	179.0	1 00.0	− 60.0	179.0	0 00.0	− 60.0	179.0	1 00.0	+ 60.0	1.0	2 00.0	+ 60.0	1.0	3 00.0	+ 60.0	1.0	**3**
4	2 59.9	− 60.0	179.0	1 59.9	− 60.0	179.0	1 00.0	− 60.0	179.0	0 00.0	− 60.0	179.0	1 00.0	+ 60.0	1.0	2 00.0	+ 60.0	1.0	3 00.0	+ 60.0	1.0	4 00.0	+ 60.0	1.0	**4**
5	1 59.9	− 60.0	179.0	0 59.9	− 60.0	179.0	0 00.0	− 60.0	179.0	1 00.0	+ 60.0	1.0	2 00.0	+ 60.0	1.0	3 00.0	+ 60.0	1.0	4 00.0	+ 60.0	1.0	5 00.0	+ 60.0	1.0	**5**
6	0 59.9	− 60.0	179.0	0 00.1	+ 60.0	1.0	1 00.0	+ 60.0	1.0	2 00.0	+ 60.0	1.0	3 00.0	+ 60.0	1.0	4 00.0	+ 60.0	1.0	5 00.0	+ 60.0	1.0	6 00.0	+ 60.0	1.0	**6**
7	0 00.1	+ 60.0	1.0	1 00.1	+ 60.0	1.0	2 00.0	+ 60.0	1.0	3 00.0	+ 60.0	1.0	4 00.0	+ 60.0	1.0	5 00.0	+ 60.0	1.0	6 00.0	+ 60.0	1.0	7 00.0	+ 60.0	1.0	**7**
8	1 00.1	+ 60.0	1.0	2 00.1	+ 60.0	1.0	3 00.0	+ 60.0	1.0	4 00.0	+ 60.0	1.0	5 00.0	+ 60.0	1.0	6 00.0	+ 60.0	1.0	7 00.0	+ 60.0	1.0	8 00.0	+ 60.0	1.0	**8**
9	2 00.1	+ 60.0	1.0	3 00.1	+ 60.0	1.0	4 00.0	+ 60.0	1.0	5 00.0	+ 60.0	1.0	6 00.0	+ 60.0	1.0	7 00.0	+ 60.0	1.0	8 00.0	+ 60.0	1.0	9 00.0	+ 60.0	1.0	**9**
10	3 00.1	+ 60.0	1.0	4 00.1	+ 60.0	1.0	5 00.0	+ 60.0	1.0	6 00.0	+ 60.0	1.0	7 00.0	+ 60.0	1.0	8 00.0	+ 60.0	1.0	9 00.0	+ 60.0	1.0	10 00.0	+ 60.0	1.0	**10**
11	4 00.1	+ 60.0	1.0	5 00.1	+ 60.0	1.0	6 00.0	+ 60.0	1.0	7 00.0	+ 60.0	1.0	8 00.0	+ 60.0	1.0	9 00.0	+ 60.0	1.0	10 00.0	+ 60.0	1.0	11 00.0	+ 60.0	1.0	**11**
12	5 00.1	+ 60.0	1.0	6 00.1	+ 60.0	1.0	7 00.0	+ 60.0	1.0	8 00.0	+ 60.0	1.0	9 00.0	+ 60.0	1.0	10 00.0	+ 60.0	1.0	11 00.0	+ 60.0	1.0	12 00.0	+ 60.0	1.0	**12**
13	6 00.1	+ 60.0	1.0	7 00.1	+ 60.0	1.0	8 00.0	+ 60.0	1.0	9 00.0	+ 60.0	1.0	10 00.0	+ 60.0	1.0	11 00.0	+ 60.0	1.0	12 00.0	+ 60.0	1.0	13 00.0	+ 60.0	1.0	**13**
14	7 00.1	+ 60.0	1.0	8 00.1	+ 60.0	1.0	9 00.0	+ 60.0	1.0	10 00.0	+ 60.0	1.0	11 00.0	+ 60.0	1.0	12 00.0	+ 60.0	1.0	13 00.0	+ 60.0	1.0	14 00.0	+ 60.0	1.0	**14**
15	8 00.1	+ 60.0	1.0	9 00.1	+ 60.0	1.0	10 00.0	+ 60.0	1.0	11 00.0	+ 60.0	1.0	12 00.0	+ 60.0	1.0	13 00.0	+ 60.0	1.0	14 00.0	+ 60.0	1.0	15 00.0	+ 60.0	1.0	**15**
16	9 00.1	+ 60.0	1.0	10 00.1	+ 60.0	1.0	11 00.0	+ 60.0	1.0	12 00.0	+ 60.0	1.0	13 00.0	+ 60.0	1.0	14 00.0	+ 60.0	1.0	15 00.0	+ 60.0	1.0	16 00.0	+ 60.0	1.0	**16**
17	10 00.1	+ 60.0	1.0	11 00.1	+ 60.0	1.0	12 00.0	+ 60.0	1.0	13 00.0	+ 60.0	1.0	14 00.0	+ 60.0	1.0	15 00.0	+ 60.0	1.0	16 00.0	+ 60.0	1.0	17 00.0	+ 60.0	1.0	**17**
18	11 00.1	+ 60.0	1.0	12 00.1	+ 60.0	1.0	13 00.0	+ 60.0	1.0	14 00.0	+ 60.0	1.0	15 00.0	+ 60.0	1.0	16 00.0	+ 60.0	1.0	17 00.0	+ 60.0	1.0	18 00.0	+ 60.0	1.0	**18**
19	12 00.1	+ 60.0	1.0	13 00.1	+ 60.0	1.0	14 00.0	+ 60.0	1.0	15 00.0	+ 60.0	1.0	16 00.0	+ 60.0	1.0	17 00.0	+ 60.0	1.0	18 00.0	+ 60.0	1.0	19 00.0	+ 60.0	1.0	**19**
20	13 00.1	+ 60.0	1.0	14 00.1	+ 60.0	1.0	15 00.0	+ 60.0	1.0	16 00.0	+ 60.0	1.0	17 00.0	+ 60.0	1.0	18 00.0	+ 60.0	1.0	19 00.0	+ 60.0	1.0	20 00.0	+ 60.0	1.0	**20**
21	14 00.1	+ 60.0	1.0	15 00.1	+ 60.0	1.0	16 00.0	+ 60.0	1.0	17 00.0	+ 60.0	1.0	18 00.0	+ 60.0	1.0	19 00.0	+ 60.0	1.0	20 00.0	+ 60.0	1.0	21 00.0	+ 60.0	1.0	**21**
22	15 00.1	+ 60.0	1.0	16 00.1	+ 60.0	1.0	17 00.0	+ 60.0	1.0	18 00.0	+ 60.0	1.0	19 00.0	+ 60.0	1.0	20 00.0	+ 60.0	1.0	21 00.0	+ 60.0	1.0	22 00.0	+ 60.0	1.0	**22**
23	16 00.1	+ 60.0	1.0	17 00.1	+ 60.0	1.0	18 00.0	+ 60.0	1.0	19 00.0	+ 60.0	1.0	20 00.0	+ 60.0	1.0	21 00.0	+ 60.0	1.0	22 00.0	+ 60.0	1.0	23 00.0	+ 60.0	1.0	**23**
24	17 00.1	+ 60.0	1.0	18 00.1	+ 60.0	1.0	19 00.0	+ 60.0	1.0	20 00.0	+ 60.0	1.0	21 00.0	+ 60.0	1.0	22 00.0	+ 60.0	1.0	23 00.0	+ 60.0	1.0	24 00.0	+ 60.0	1.0	**24**
25	18 00.1	+ 60.0	1.0	19 00.1	+ 60.0	1.0	20 00.0	+ 60.0	1.0	21 00.0	+ 60.0	1.0	22 00.0	+ 60.0	1.0	23 00.0	+ 60.0	1.0	24 00.0	+ 60.0	1.0	25 00.0	+ 60.0	1.0	**25**
26	19 00.1	+ 60.0	1.0	20 00.1	+ 60.0	1.0	21 00.0	+ 60.0	1.0	22 00.0	+ 60.0	1.0	23 00.0	+ 60.0	1.0	24 00.0	+ 60.0	1.0	25 00.0	+ 60.0	1.0	26 00.0	+ 60.0	1.0	**26**
27	20 00.1	+ 60.0	0.9	21 00.1	+ 60.0	1.0	22 00.0	+ 60.0	1.0	23 00.0	+ 60.0	1.0	24 00.0	+ 60.0	1.0	25 00.0	+ 60.0	1.0	26 00.0	+ 60.0	1.0	27 00.0	+ 60.0	1.0	**27**
28	21 00.1	+ 60.0	0.9	22 00.1	+ 60.0	1.0	23 00.0	+ 60.0	1.0	24 00.0	+ 60.0	1.0	25 00.0	+ 60.0	1.0	26 00.0	+ 60.0	1.0	27 00.0	+ 60.0	1.0	28 00.0	+ 60.0	1.0	**28**
29	22 00.1	+ 60.0	0.9	23 00.1	+ 60.0	1.0	24 00.0	+ 60.0	1.0	25 00.0	+ 60.0	1.0	26 00.0	+ 60.0	1.0	27 00.0	+ 60.0	1.0	28 00.0	+ 60.0	1.0	29 00.0	+ 60.0	1.0	**29**
30	23 00.1	+ 60.0	0.9	24 00.1	+ 60.0	0.9	25 00.0	+ 60.0	1.0	26 00.0	+ 60.0	1.0	27 00.0	+ 60.0	1.0	28 00.0	+ 60.0	1.0	29 00.0	+ 60.0	1.0	30 00.0	+ 60.0	1.0	**30**
31	24 00.1	+ 60.0	0.9	25 00.1	+ 60.0	0.9	26 00.0	+ 60.0	1.0	27 00.0	+ 60.0	1.0	28 00.0	+ 60.0	1.0	29 00.0	+ 60.0	1.0	30 00.0	+ 60.0	1.0	31 00.0	+ 60.0	1.0	**31**
32	25 00.1	+ 60.0	0.9	26 00.1	+ 60.0	0.9	27 00.0	+ 60.0	1.0	28 00.0	+ 60.0	1.0	29 00.0	+ 60.0	1.0	30 00.0	+ 60.0	1.0	31 00.0	+ 60.0	1.0	32 00.0	+ 60.0	1.0	**32**
33	26 00.1	+ 60.0	0.9	27 00.1	+ 60.0	0.9	28 00.0	+ 60.0	0.9	29 00.0	+ 60.0	1.0	30 00.0	+ 60.0	1.0	31 00.0	+ 60.0	1.0	32 00.0	+ 60.0	1.0	33 00.0	+ 60.0	1.0	**33**
34	27 00.1	+ 60.0	0.9	28 00.1	+ 60.0	0.9	29 00.0	+ 60.0	0.9	30 00.0	+ 60.0	1.0	31 00.0	+ 60.0	1.0	32 00.0	+ 60.0	1.0	33 00.0	+ 60.0	1.0	34 00.0	+ 60.0	1.0	**34**
35	28 00.1	+ 60.0	0.9	29 00.1	+ 60.0	0.9	30 00.0	+ 60.0	0.9	31 00.0	+ 60.0	1.0	32 00.0	+ 60.0	1.0	33 00.0	+ 60.0	1.0	34 00.0	+ 60.0	1.0	35 00.0	+ 60.0	1.0	**35**
36	29 00.1	+ 60.0	0.9	30 00.1	+ 60.0	0.9	31 00.0	+ 60.0	0.9	32 00.0	+ 60.0	1.0	33 00.0	+ 60.0	1.0	34 00.0	+ 60.0	1.0	35 00.0	+ 60.0	1.0	36 00.0	+ 60.0	1.0	**36**
37	30 00.1	+ 60.0	0.9	31 00.1	+ 60.0	0.9	32 00.0	+ 60.0	0.9	33 00.0	+ 60.0	1.0	34 00.0	+ 60.0	1.0	35 00.0	+ 60.0	1.0	36 00.0	+ 60.0	1.0	37 00.0	+ 60.0	1.0	**37**
38	31 00.1	+ 60.0	0.9	32 00.1	+ 60.0	0.9	33 00.0	+ 60.0	0.9	34 00.0	+ 60.0	1.0	35 00.0	+ 60.0	1.0	36 00.0	+ 60.0	1.0	37 00.0	+ 60.0	1.0	38 00.0	+ 60.0	1.0	**38**
39	32 00.1	+ 60.0	0.9	33 00.1	+ 60.0	0.9	34 00.0	+ 60.0	0.9	35 00.0	+ 60.0	0.9	36 00.0	+ 60.0	1.0	37 00.0	+ 60.0	1.0	38 00.0	+ 60.0	1.0	39 00.0	+ 60.0	1.0	**39**
40	33 00.1	+ 60.0	0.9	34 00.1	+ 60.0	0.9	35 00.0	+ 60.0	0.9	36 00.0	+ 60.0	0.9	37 00.0	+ 60.0	1.0	38 00.0	+ 60.0	1.0	39 00.0	+ 60.0	1.0	40 00.0	+ 60.0	1.0	**40**
41	34 00.1	+ 60.0	0.9	35 00.1	+ 60.0	0.9	36 00.0	+ 60.0	0.9	37 00.0	+ 60.0	0.9	38 00.0	+ 60.0	1.0	39 00.0	+ 60.0	1.0	40 00.0	+ 60.0	1.0	41 00.0	+ 60.0	1.0	**41**
42	35 00.1	+ 60.0	0.9	36 00.1	+ 60.0	0.9	37 00.0	+ 60.0	0.9	38 00.0	+ 60.0	0.9	39 00.0	+ 60.0	1.0	40 00.0	+ 60.0	1.0	41 00.0	+ 60.0	1.0	42 00.0	+ 60.0	1.0	**42**
43	36 00.1	+ 60.0	0.9	37 00.1	+ 59.9	0.9	38 00.0	+ 60.0	0.9	39 00.0	+ 60.0	0.9	40 00.0	+ 60.0	1.0	41 00.0	+ 60.0	1.0	42 00.0	+ 60.0	1.0	43 00.0	+ 60.0	1.0	**43**
44	37 00.1	+ 60.0	0.9	38 00.0	+ 60.0	0.9	39 00.0	+ 60.0	0.9	40 00.0	+ 60.0	0.9	41 00.0	+ 60.0	1.0	42 00.0	+ 60.0	1.0	43 00.0	+ 60.0	1.0	44 00.0	+ 60.0	1.0	**44**
45	38 00.1	+ 60.0	0.9	39 00.0	+ 60.0	0.9	40 00.0	+ 60.0	0.9	41 00.0	+ 60.0	0.9	42 00.0	+ 60.0	1.0	43 00.0	+ 60.0	1.0	44 00.0	+ 60.0	1.0	45 00.0	+ 60.0	1.0	**45**
46	39 00.1	+ 60.0	0.9	40 00.0	+ 60.0	0.9	41 00.0	+ 60.0	0.9	42 00.0	+ 60.0	0.9	43 00.0	+ 60.0	0.9	44 00.0	+ 60.0	1.0	45 00.0	+ 60.0	1.0	46 00.0	+ 60.0	1.0	**46**
47	40 00.1	+ 60.0	0.9	41 00.0	+ 60.0	0.9	42 00.0	+ 60.0	0.9	43 00.0	+ 60.0	0.9	44 00.0	+ 60.0	0.9	45 00.0	+ 60.0	1.0	46 00.0	+ 60.0	1.0	47 00.0	+ 60.0	1.0	**47**
48	41 00.1	+ 60.0	0.9	42 00.0	+ 60.0	0.9	43 00.0	+ 60.0	0.9	44 00.0	+ 60.0	0.9	45 00.0	+ 60.0	0.9	46 00.0	+ 60.0	1.0	47 00.0	+ 60.0	1.0	48 00.0	+ 60.0	1.0	**48**
49	42 00.1	+ 60.0	0.9	43 00.0	+ 60.0	0.9	44 00.0	+ 60.0	0.9	45 00.0	+ 60.0	0.9	46 00.0	+ 60.0	0.9	47 00.0	+ 60.0	1.0	48 00.0	+ 60.0	1.0	49 00.0	+ 60.0	1.0	**49**
50	43 00.1	+ 60.0	0.9	44 00.0	+ 60.0	0.9	45 00.0	+ 60.0	0.9	46 00.0	+ 60.0	0.9	47 00.0	+ 60.0	0.9	48 00.0	+ 60.0	1.0	49 00.0	+ 60.0	1.0	50 00.0	+ 60.0	1.0	**50**
51	44 00.1	+ 60.0	0.9	45 00.0	+ 60.0	0.9	46 00.0	+ 60.0	0.9	47 00.0	+ 60.0	0.9	48 00.0	+ 60.0	0.9	49 00.0	+ 60.0	1.0	50 00.0	+ 60.0	1.0	51 00.0	+ 60.0	1.0	**51**
52	45 00.1	+ 60.0	0.9	46 00.0	+ 60.0	0.9	47 00.0	+ 60.0	0.9	48 00.0	+ 60.0	0.9	49 00.0	+ 60.0	0.9	50 00.0	+ 60.0	1.0	51 00.0	+ 60.0	1.0	52 00.0	+ 60.0	1.0	**52**
53	46 00.1	+ 60.0	0.9	47 00.0	+ 60.0	0.9	48 00.0	+ 60.0	0.9	49 00.0	+ 60.0	0.9	50 00.0	+ 60.0	0.9	51 00.0	+ 60.0	1.0	52 00.0	+ 60.0	1.0	53 00.0	+ 60.0	1.0	**53**
54	47 00.1	+ 60.0	0.9	48 00.0	+ 60.0	0.9	49 00.0	+ 60.0	0.9	50 00.0	+ 60.0	0.9	51 00.0	+ 60.0	0.9	52 00.0	+ 60.0	1.0	53 00.0	+ 60.0	1.0	54 00.0	+ 60.0	1.0	**54**
55	48 00.1	+ 60.0	0.9	49 00.0	+ 60.0	0.9	50 00.0	+ 60.0	0.9	51 00.0	+ 60.0	0.9	52 00.0	+ 60.0	0.9	53 00.0	+ 60.0	1.0	54 00.0	+ 60.0	1.0	55 00.0	+ 60.0	1.0	**55**
56	49 00.1	+ 60.0	0.9	50 00.0	+ 60.0	0.9	51 00.0	+ 60.0	0.9	52 00.0	+ 60.0	0.9	53 00.0	+ 60.0	0.9	54 00.0	+ 60.0	1.0	55 00.0	+ 60.0	1.0	56 00.0	+ 60.0	1.0	**56**
57	50 00.1	+ 60.0	0.8	51 00.0	+ 60.0	0.9	52 00.0	+ 60.0	0.9	53 00.0	+ 60.0	0.9	54 00.0	+ 60.0	0.9	55 00.0	+ 60.0	0.9	56 00.0	+ 60.0	1.0	57 00.0	+ 60.0	1.0	**57**
58	51 00.1	+ 60.0	0.8	52 00.0	+ 60.0	0.9	53 00.0	+ 60.0	0.9	54 00.0	+ 60.0	0.9	55 00.0	+ 60.0	0.9	56 00.0	+ 60.0	0.9	57 00.0	+ 60.0	1.0	58 00.0	+ 60.0	1.0	**58**
59	52 00.1	+ 60.0	0.8	53 00.0	+ 60.0	0.9	54 00.0	+ 60.0	0.9	55 00.0	+ 60.0	0.9	56 00.0	+ 60.0	0.9	57 00.0	+ 60.0	0.9	58 00.0	+ 60.0	1.0	59 00.0	+ 60.0	1.0	**59**
60	53 00.1	+ 60.0	0.8	54 00.0	+ 60.0	0.9	55 00.0	+ 60.0	0.9	56 00.0	+ 60.0	0.9	57 00.0	+ 60.0	0.9	58 00.0	+ 60.0	0.9	59 00.0	+ 60.0	1.0	60 00.0	+ 60.0	1.0	**60**
61	54 00.1	+ 60.0	0.8	55 00.0	+ 60.0	0.8	56 00.0	+ 60.0	0.9	57 00.0	+ 60.0	0.9	58 00.0	+ 60.0	0.9	59 00.0	+ 60.0	0.9	60 00.0	+ 60.0	1.0	61 00.0	+ 60.0	1.0	**61**
62	55 00.1	+ 60.0	0.8	56 00.0	+ 60.0	0.8	57 00.0	+ 60.0	0.9	58 00.0	+ 60.0	0.9	59 00.0	+ 60.0	0.9	60 00.0	+ 60.0	0.9	61 00.0	+ 60.0	1.0	62 00.0	+ 60.0	1.0	**62**
63	56 00.1	+ 60.0	0.8	57 00.0	+ 60.0	0.8	58 00.0	+ 60.0	0.9	59 00.0	+ 60.0	0.9	60 00.0	+ 60.0	0.9	61 00.0	+ 60.0	0.9	62 00.0	+ 60.0	1.0	63 00.0	+ 60.0	1.0	**63**
64	57 00.1	+ 60.0	0.8	58 00.0	+ 60.0	0.8	59 00.0	+ 60.0	0.9	60 00.0	+ 60.0	0.9	61 00.0	+ 60.0	0.9	62 00.0	+ 60.0	0.9	63 00.0	+ 60.0	1.0	64 00.0	+ 60.0	1.0	**64**
65	58 00.1	+ 60.0	0.8	59 00.0	+ 60.0	0.8	60 00.0	+ 60.0	0.8	61 00.0	+ 60.0	0.9	62 00.0	+ 60.0	0.9	63 00.0	+ 60.0	0.9	64 00.0	+ 60.0	1.0	65 00.0	+ 60.0	1.0	**65**
66	59 00.1	+ 59.9	0.8	60 00.0	+ 60.0	0.8	61 00.0	+ 60.0	0.8	62 00.0	+ 60.0	0.9	63 00.0	+ 60.0	0.9	64 00.0	+ 60.0	0.9	65 00.0	+ 60.0	1.0	66 00.0	+ 60.0	1.0	**66**
67	60 00.0	+ 60.0	0.8	61 00.0	+ 60.0	0.8	62 00.0	+ 60.0	0.8	63 00.0	+ 60.0	0.9	64 00.0	+ 60.0	0.9	65 00.0	+ 60.0	0.9	66 00.0	+ 60.0	1.0	67 00.0	+ 60.0	1.0	**67**
68	61 00.0	+ 60.0	0.8	62 00.0	+ 60.0	0.8	63 00.0	+ 60.0	0.8	64 00.0	+ 60.0	0.9	65 00.0	+ 60.0	0.9	66 00.0	+ 60.0	0.9	67 00.0	+ 60.0	1.0	68 00.0	+ 60.0	1.0	**68**
69	62 00.0	+ 60.0	0.8	63 00.0	+ 60.0	0.8	64 00.0	+ 60.0	0.8	65 00.0	+ 60.0	0.8	66 00.0	+ 60.0	0.9	67 00.0	+ 60.0	0.9	68 00.0	+ 60.0	1.0	69 00.0	+ 60.0	1.0	**69**
70	63 00.0	+ 60.0	0.8	64 00.0	+ 60.0	0.8	65 00.0	+ 60.0	0.8	66 00.0	+ 60.0	0.8	67 00.0	+ 60.0	0.9	68 00.0	+ 60.0	0.9	69 00.0	+ 60.0	1.0	70 00.0	+ 60.0	1.0	**70**
71	64 00.0	+ 60.0	0.7	65 00.0	+ 60.0	0.8	66 00.0	+ 60.0	0.8	67 00.0	+ 60.0	0.8	68 00.0	+ 60.0	0.9	69 00.0	+ 60.0	0.9	70 00.0	+ 60.0	1.0	71 00.0	+ 60.0	1.0	**71**
72	65 00.0	+ 60.0	0.7	66 00.0	+ 60.0	0.8	67 00.0	+ 60.0	0.8	68 00.0	+ 60.0	0.8	69 00.0	+ 60.0	0.9	70 00.0	+ 60.0	0.9	71 00.0	+ 60.0	0.9	72 00.0	+ 60.0	1.0	**72**
73	66 00.0	+ 60.0	0.7	67 00.0	+ 60.0	0.7	68 00.0	+ 60.0	0.8	69 00.0	+ 60.0	0.8	70 00.0	+ 60.0	0.9	71 00.0	+ 60.0	0.9	72 00.0	+ 60.0	0.9	73 00.0	+ 60.0	1.0	**73**
74	67 00.0	+ 60.0	0.7	68 00.0	+ 60.0	0.7	69 00.0	+ 60.0	0.8	70 00.0	+ 60.0	0.8	71 00.0	+ 60.0	0.8	72 00.0	+ 60.0	0.9	73 00.0	+ 60.0	0.9	74 00.0	+ 60.0	1.0	**74**
75	68 00.0	+ 60.0	0.7	69 00.0	+ 60.0	0.7	70 00.0	+ 60.0	0.8	71 00.0	+ 60.0	0.8	72 00.0	+ 60.0	0.8	73 00.0	+ 60.0	0.9	74 00.0	+ 60.0	0.9	75 00.0	+ 60.0	1.0	**75**
76	69 00.0	+ 60.0	0.7	70 00.0	+ 60.0	0.7	71 00.0	+ 60.0	0.7	72 00.0	+ 60.0	0.8	73 00.0	+ 60.0	0.8	74 00.0	+ 60.0	0.9	75 00.0	+ 60.0	0.9	76 00.0	+ 60.0	1.0	**76**
77	70 00.0	+ 60.0	0.7	71 00.0	+ 60.0	0.7	72 00.0	+ 60.0	0.7	73 00.0	+ 60.0	0.8	74 00.0	+ 60.0	0.8	75 00.0	+ 60.0	0.9	76 00.0	+ 60.0	0.9	77 00.0	+ 60.0	1.0	**77**
78	71 00.0	+ 60.0	0.6	72 00.0	+ 60.0	0.7	73 00.0	+ 60.0	0.7	74 00.0	+ 60.0	0.8	75 00.0	+ 60.0	0.8	76 00.0	+ 60.0	0.9	77 00.0	+ 60.0	0.9	78 00.0	+ 60.0	1.0	**78**
79	72 00.0	+ 60.0	0.6	73 00.0	+ 60.0	0.7	74 00.0	+ 60.0	0.7	75 00.0	+ 60.0	0.7	76 00.0	+ 60.0	0.8	77 00.0	+ 60.0	0.8	78 00.0	+ 60.0	0.9	79 00.0	+ 60.0	1.0	**79**
80	73 00.0	+ 60.0	0.6	74 00.0	+ 60.0	0.6	75 00.0	+ 60.0	0.7	76 00.0	+ 60.0	0.7	77 00.0	+ 60.0	0.8	78 00.0	+ 60.0	0.8	79 00.0	+ 60.0	0.9	80 00.0	+ 60.0	1.0	**80**
81	74 00.0	+ 60.0	0.6	75 00.0	+ 60.0	0.6	76 00.0	+ 60.0	0.6	77 00.0	+ 60.0	0.7	78 00.0	+ 60.0	0.8	79 00.0	+ 60.0	0.8	80 00.0	+ 60.0	0.9	81 00.0	+ 60.0	1.0	**81**
82	75 00.0	+ 60.0	0.5	76 00.0	+ 60.0	0.6	77 00.0	+ 60.0	0.6	78 00.0	+ 60.0	0.7	79 00.0	+ 60.0	0.7	80 00.0	+ 60.0	0.8	81 00.0	+ 60.0	0.9	82 00.0	+ 60.0	1.0	**82**
83	76 00.0	+ 60.0	0.5	77 00.0	+ 60.0	0.5	78 00.0	+ 60.0	0.6	79 00.0	+ 60.0	0.6	80 00.0	+ 60.0	0.7	81 00.0	+ 60.0	0.8	82 00.0	+ 60.0	0.9	83 00.0	+ 60.0	1.0	**83**
84	77 00.0	+ 60.0	0.5	78 00.0	+ 60.0	0.5	79 00.0	+ 60.0	0.5	80 00.0	+ 60.0	0.6	81 00.0	+ 60.0	0.7	82 00.0	+ 60.0	0.8	83 00.0	+ 60.0	0.9	84 00.0	+ 60.0	1.0	**84**
85	78 00.0	+ 60.0	0.4	79 00.0	+ 60.0	0.5	80 00.0	+ 60.0	0.5	81 00.0	+ 60.0	0.6	82 00.0	+ 60.0	0.6	83 00.0	+ 60.0	0.7	84 00.0	+ 60.0	0.8	85 00.0	+ 60.0	1.0	**85**
86	79 00.0	+ 60.0	0.4	80 00.0	+ 60.0	0.4	81 00.0	+ 60.0	0.4	82 00.0	+ 60.0	0.5	83 00.0	+ 60.0	0.6	84 00.0	+ 60.0	0.7	85 00.0	+ 60.0	0.8	86 00.0	+ 60.0	1.0	**86**
87	80 00.0	+ 60.0	0.3	81 00.0	+ 60.0	0.3	82 00.0	+ 60.0	0.4	83 00.0	+ 60.0	0.4	84 00.0	+ 60.0	0.5	85 00.0	+ 60.0	0.6	86 00.0	+ 60.0	0.8	87 00.0	+ 60.0	1.0	**87**
88	81 00.0	+ 60.0	0.2	82 00.0	+ 60.0	0.3	83 00.0	+ 60.0	0.3	84 00.0	+ 60.0	0.3	85 00.0	+ 60.0	0.4	86 00.0	+ 60.0	0.5	87 00.0	+ 60.0	0.7	88 00.0	+ 60.0	1.0	**88**
89	82 00.0	+ 60.0	0.1	83 00.0	+ 60.0	0.1	84 00.0	+ 60.0	0.2	85 00.0	+ 60.0	0.2	86 00.0	+ 60.0	0.3	87 00.0	+ 60.0	0.3	88 00.0	+ 60.0	0.5	89 00.0	+ 60.0	1.0	**89**
90	83 00.0	+ 60.0	0.0	84 00.0	+ 60.0	0.0	85 00.0	+ 60.0	0.0	86 00.0	+ 60.0	0.0	87 00.0	+ 60.0	0.0	88 00.0	+ 60.0	0.0	89 00.0	*+ 59.0*•	0.0	90 00.0	− 60.0	0.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

2°, 358° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.7	+60.0	178.0	5 59.8	+60.0	178.0	4 59.8	+60.0	178.0	3 59.9	+60.0	178.0	2 59.9	+60.0	178.0	1 59.9	+60.0	178.0	1 00.0	+60.0	178.0	0 00.0	+60.0	178.0	**0**
1	7 59.7	+60.0	178.0	6 59.8	+60.0	178.0	5 59.8	+60.0	178.0	4 59.9	+60.0	178.0	3 59.9	+60.0	178.0	2 59.9	+60.0	178.0	2 00.0	+60.0	178.0	1 00.0	+60.0	178.0	**1**
2	8 59.7	+60.0	178.0	7 59.8	+60.0	178.0	6 59.8	+60.0	178.0	5 59.9	+60.0	178.0	4 59.9	+60.0	178.0	3 59.9	+60.0	178.0	3 00.0	+60.0	178.0	2 00.0	+60.0	178.0	**2**
3	9 59.7	+60.0	178.0	8 59.8	+60.0	178.0	7 59.8	+60.0	178.0	6 59.9	+60.0	178.0	5 59.9	+60.0	178.0	4 59.9	+60.0	178.0	4 00.0	+60.0	178.0	3 00.0	+60.0	178.0	**3**
4	10 59.7	+60.0	178.0	9 59.8	+60.0	178.0	8 59.8	+60.0	178.0	7 59.9	+60.0	178.0	6 59.9	+60.0	178.0	5 59.9	+60.0	178.0	5 00.0	+60.0	178.0	4 00.0	+60.0	178.0	**4**
5	11 59.7	+60.0	178.0	10 59.8	+60.0	178.0	9 59.8	+60.0	178.0	8 59.9	+60.0	178.0	7 59.9	+60.0	178.0	6 59.9	+60.0	178.0	6 00.0	+60.0	178.0	5 00.0	+60.0	178.0	**5**
6	12 59.7	+60.0	178.0	11 59.8	+60.0	178.0	10 59.8	+60.0	178.0	9 59.9	+60.0	178.0	8 59.9	+60.0	178.0	7 59.9	+60.0	178.0	7 00.0	+60.0	178.0	6 00.0	+60.0	178.0	**6**
7	13 59.7	+60.0	178.0	12 59.8	+60.0	178.0	11 59.8	+60.0	178.0	10 59.9	+60.0	178.0	9 59.9	+60.0	178.0	8 59.9	+60.0	178.0	8 00.0	+60.0	178.0	7 00.0	+60.0	178.0	**7**
8	14 59.7	+60.0	177.9	13 59.8	+60.0	178.0	12 59.8	+60.0	178.0	11 59.9	+60.0	178.0	10 59.9	+60.0	178.0	9 59.9	+60.0	178.0	9 00.0	+60.0	178.0	8 00.0	+60.0	178.0	**8**
9	15 59.7	+60.0	177.9	14 59.8	+60.0	178.0	13 59.8	+60.0	178.0	12 59.9	+60.0	178.0	11 59.9	+60.0	178.0	10 59.9	+60.0	178.0	10 00.0	+60.0	178.0	9 00.0	+60.0	178.0	**9**
10	16 59.7	+60.0	177.9	15 59.8	+60.0	178.0	14 59.8	+60.0	178.0	13 59.9	+60.0	178.0	12 59.9	+60.0	178.0	11 59.9	+60.0	178.0	11 00.0	+60.0	178.0	10 00.0	+60.0	178.0	**10**
11	17 59.7	+60.0	177.9	16 59.8	+60.0	177.9	15 59.8	+60.0	178.0	14 59.9	+60.0	178.0	13 59.9	+60.0	178.0	12 59.9	+60.0	178.0	12 00.0	+60.0	178.0	11 00.0	+60.0	178.0	**11**
12	18 59.7	+60.0	177.9	17 59.8	+60.0	177.9	16 59.8	+60.0	178.0	15 59.9	+60.0	178.0	14 59.9	+60.0	178.0	13 59.9	+60.0	178.0	13 00.0	+60.0	178.0	12 00.0	+60.0	178.0	**12**
13	19 59.7	+60.0	177.9	18 59.8	+60.0	177.9	17 59.8	+60.0	178.0	16 59.9	+60.0	178.0	15 59.9	+60.0	178.0	14 59.9	+60.0	178.0	14 00.0	+60.0	178.0	13 00.0	+60.0	178.0	**13**
14	20 59.7	+60.0	177.9	19 59.8	+60.0	177.9	18 59.8	+60.0	177.9	17 59.9	+60.0	178.0	16 59.9	+60.0	178.0	15 59.9	+60.0	178.0	15 00.0	+60.0	178.0	14 00.0	+60.0	178.0	**14**
15	21 59.7	+60.0	177.9	20 59.8	+60.0	177.9	19 59.8	+60.0	177.9	18 59.9	+60.0	178.0	17 59.9	+60.0	178.0	16 59.9	+60.0	178.0	16 00.0	+60.0	178.0	15 00.0	+60.0	178.0	**15**
16	22 59.7	+60.0	177.9	21 59.8	+60.0	177.9	20 59.8	+60.0	177.9	19 59.9	+60.0	178.0	18 59.9	+60.0	178.0	17 59.9	+60.0	178.0	17 00.0	+60.0	178.0	16 00.0	+60.0	178.0	**16**
17	23 59.7	+60.0	177.9	22 59.8	+60.0	177.9	21 59.8	+60.0	177.9	20 59.9	+60.0	178.0	19 59.9	+60.0	178.0	18 59.9	+60.0	178.0	18 00.0	+60.0	178.0	17 00.0	+60.0	178.0	**17**
18	24 59.7	+60.0	177.9	23 59.8	+60.0	177.9	22 59.8	+60.0	177.9	21 59.9	+59.9	177.9	20 59.9	+60.0	178.0	19 59.9	+60.0	178.0	19 00.0	+60.0	178.0	18 00.0	+60.0	178.0	**18**
19	25 59.7	+60.0	177.9	24 59.8	+60.0	177.9	23 59.8	+60.0	177.9	22 59.8	+60.0	177.9	21 59.9	+60.0	178.0	20 59.9	+60.0	178.0	20 00.0	+60.0	178.0	19 00.0	+60.0	178.0	**19**
20	26 59.7	+60.0	177.9	25 59.8	+60.0	177.9	24 59.8	+60.0	177.9	23 59.8	+60.0	177.9	22 59.9	+60.0	178.0	21 59.9	+60.0	178.0	21 00.0	+60.0	178.0	20 00.0	+60.0	178.0	**20**
21	27 59.7	+60.0	177.9	26 59.8	+60.0	177.9	25 59.8	+60.0	177.9	24 59.8	+60.0	177.9	23 59.9	+60.0	178.0	22 59.9	+60.0	178.0	22 00.0	+60.0	178.0	21 00.0	+60.0	178.0	**21**
22	28 59.7	+60.0	177.9	27 59.8	+60.0	177.9	26 59.8	+60.0	177.9	25 59.8	+60.0	177.9	24 59.9	+60.0	178.0	23 59.9	+60.0	178.0	23 00.0	+60.0	178.0	22 00.0	+60.0	178.0	**22**
23	29 59.7	+60.0	177.9	28 59.8	+60.0	177.9	27 59.8	+60.0	177.9	26 59.8	+60.0	177.9	25 59.9	+60.0	178.0	24 59.9	+60.0	178.0	24 00.0	+60.0	178.0	23 00.0	+60.0	178.0	**23**
24	30 59.7	+60.0	177.9	29 59.8	+60.0	177.9	28 59.8	+60.0	177.9	27 59.8	+60.0	177.9	26 59.9	+60.0	177.9	25 59.9	+60.0	178.0	25 00.0	+60.0	178.0	24 00.0	+60.0	178.0	**24**
25	31 59.7	+60.0	177.9	30 59.8	+60.0	177.9	29 59.8	+60.0	177.9	28 59.8	+60.0	177.9	27 59.9	+60.0	177.9	26 59.9	+60.0	178.0	26 00.0	+60.0	178.0	25 00.0	+60.0	178.0	**25**
26	32 59.7	+60.0	177.9	31 59.8	+60.0	177.9	30 59.8	+60.0	177.9	29 59.8	+60.0	177.9	28 59.9	+60.0	177.9	27 59.9	+60.0	178.0	27 00.0	+60.0	178.0	26 00.0	+60.0	178.0	**26**
27	33 59.7	+60.0	177.9	32 59.8	+60.0	177.9	31 59.8	+60.0	177.9	30 59.8	+60.0	177.9	29 59.9	+60.0	177.9	28 59.9	+60.0	178.0	28 00.0	+60.0	178.0	27 00.0	+60.0	178.0	**27**
28	34 59.7	+60.0	177.8	33 59.8	+60.0	177.9	32 59.8	+60.0	177.9	31 59.8	+60.0	177.9	30 59.9	+60.0	177.9	29 59.9	+60.0	178.0	29 00.0	+60.0	178.0	28 00.0	+60.0	178.0	**28**
29	35 59.7	+60.0	177.8	34 59.8	+60.0	177.9	33 59.8	+60.0	177.9	32 59.8	+60.0	177.9	31 59.9	+60.0	177.9	30 59.9	+60.0	178.0	30 00.0	+60.0	178.0	29 00.0	+60.0	178.0	**29**
30	36 59.7	+60.0	177.8	35 59.8	+60.0	177.9	34 59.8	+60.0	177.9	33 59.8	+60.0	177.9	32 59.9	+60.0	177.9	31 59.9	+60.0	178.0	31 00.0	+60.0	178.0	30 00.0	+60.0	178.0	**30**
31	37 59.7	+60.0	177.8	36 59.8	+60.0	177.9	35 59.8	+60.0	177.9	34 59.8	+60.0	177.9	33 59.9	+60.0	177.9	32 59.9	+60.0	178.0	32 00.0	+60.0	178.0	31 00.0	+60.0	178.0	**31**
32	38 59.7	+60.0	177.8	37 59.8	+60.0	177.8	36 59.8	+60.0	177.9	35 59.8	+60.0	177.9	34 59.9	+60.0	177.9	33 59.9	+60.0	178.0	33 00.0	+60.0	178.0	32 00.0	+60.0	178.0	**32**
33	39 59.7	+60.0	177.8	38 59.8	+60.0	177.8	37 59.8	+60.0	177.9	36 59.8	+60.0	177.9	35 59.9	+60.0	177.9	34 59.9	+60.0	178.0	34 00.0	+60.0	178.0	33 00.0	+60.0	178.0	**33**
34	40 59.7	+60.0	177.8	39 59.8	+60.0	177.8	38 59.8	+60.0	177.9	37 59.8	+60.0	177.9	36 59.9	+60.0	177.9	35 59.9	+60.0	178.0	35 00.0	+60.0	178.0	34 00.0	+60.0	178.0	**34**
35	41 59.7	+60.0	177.8	40 59.8	+60.0	177.8	39 59.8	+60.0	177.9	38 59.8	+60.0	177.9	37 59.9	+60.0	177.9	36 59.9	+60.0	177.9	36 00.0	+60.0	178.0	35 00.0	+60.0	178.0	**35**
36	42 59.7	+60.0	177.8	41 59.8	+60.0	177.8	40 59.8	+60.0	177.9	39 59.8	+60.0	177.9	38 59.9	+60.0	177.9	37 59.9	+60.0	177.9	37 00.0	+60.0	178.0	36 00.0	+60.0	178.0	**36**
37	43 59.7	+60.0	177.8	42 59.8	+60.0	177.8	41 59.8	+60.0	177.9	40 59.8	+60.0	177.9	39 59.9	+60.0	177.9	38 59.9	+60.0	177.9	38 00.0	+60.0	178.0	37 00.0	+60.0	178.0	**37**
38	44 59.7	+60.0	177.8	43 59.8	+60.0	177.8	42 59.8	+60.0	177.8	41 59.8	+60.0	177.9	40 59.9	+60.0	177.9	39 59.9	+60.0	177.9	39 00.0	+60.0	178.0	38 00.0	+60.0	178.0	**38**
39	45 59.7	+60.0	177.8	44 59.8	+60.0	177.8	43 59.8	+60.0	177.8	42 59.8	+60.0	177.9	41 59.9	+60.0	177.9	40 59.9	+60.0	177.9	40 00.0	+60.0	178.0	39 00.0	+60.0	178.0	**39**
40	46 59.7	+60.0	177.8	45 59.8	+60.0	177.8	44 59.8	+60.0	177.8	43 59.8	+60.0	177.9	42 59.9	+60.0	177.9	41 59.9	+60.0	177.9	41 00.0	+60.0	178.0	40 00.0	+60.0	178.0	**40**
41	47 59.7	+60.0	177.7	46 59.8	+60.0	177.8	45 59.8	+60.0	177.8	44 59.8	+60.0	177.9	43 59.9	+60.0	177.9	42 59.9	+60.0	177.9	42 00.0	+60.0	178.0	41 00.0	+60.0	178.0	**41**
42	48 59.7	+60.0	177.7	47 59.8	+60.0	177.8	46 59.8	+60.0	177.8	45 59.8	+60.0	177.9	44 59.9	+60.0	177.9	43 59.9	+60.0	177.9	43 00.0	+60.0	178.0	42 00.0	+60.0	178.0	**42**
43	49 59.7	+60.0	177.7	48 59.8	+60.0	177.8	47 59.8	+60.0	177.8	46 59.8	+60.0	177.9	45 59.9	+60.0	177.9	44 59.9	+60.0	177.9	44 00.0	+60.0	178.0	43 00.0	+60.0	178.0	**43**
44	50 59.7	+60.0	177.7	49 59.8	+60.0	177.8	48 59.8	+60.0	177.8	47 59.8	+60.0	177.8	46 59.9	+60.0	177.9	45 59.9	+60.0	177.9	45 00.0	+60.0	178.0	44 00.0	+60.0	178.0	**44**
45	51 59.7	+60.0	177.7	50 59.8	+60.0	177.8	49 59.8	+60.0	177.8	48 59.8	+60.0	177.8	47 59.9	+60.0	177.9	46 59.9	+60.0	177.9	46 00.0	+60.0	178.0	45 00.0	+60.0	178.0	**45**
46	52 59.7	+60.0	177.7	51 59.8	+60.0	177.7	50 59.8	+60.0	177.8	49 59.8	+60.0	177.8	48 59.9	+60.0	177.9	47 59.9	+60.0	177.9	47 00.0	+60.0	178.0	46 00.0	+60.0	178.0	**46**
47	53 59.7	+60.0	177.7	52 59.8	+60.0	177.7	51 59.8	+60.0	177.8	50 59.8	+60.0	177.8	49 59.9	+60.0	177.9	48 59.9	+60.0	177.9	48 00.0	+60.0	178.0	47 00.0	+60.0	178.0	**47**
48	54 59.7	+60.0	177.7	53 59.8	+59.9	177.7	52 59.8	+60.0	177.8	51 59.8	+60.0	177.8	50 59.9	+60.0	177.9	49 59.9	+60.0	177.9	49 00.0	+60.0	178.0	48 00.0	+60.0	178.0	**48**
49	55 59.7	+60.0	177.7	54 59.7	+60.0	177.7	53 59.8	+60.0	177.8	52 59.8	+60.0	177.8	51 59.9	+60.0	177.9	50 59.9	+60.0	177.9	50 00.0	+60.0	178.0	49 00.0	+60.0	178.0	**49**
50	56 59.7	+60.0	177.6	55 59.7	+60.0	177.7	54 59.8	+60.0	177.8	53 59.8	+60.0	177.8	52 59.9	+60.0	177.9	51 59.9	+60.0	177.9	51 00.0	+60.0	178.0	50 00.0	+60.0	178.0	**50**
51	57 59.7	+60.0	177.6	56 59.7	+60.0	177.7	55 59.8	+60.0	177.7	54 59.8	+60.0	177.8	53 59.9	+60.0	177.9	52 59.9	+60.0	177.9	52 00.0	+60.0	178.0	51 00.0	+60.0	178.0	**51**
52	58 59.7	+60.0	177.6	57 59.7	+60.0	177.7	56 59.8	+60.0	177.7	55 59.8	+60.0	177.8	54 59.9	+60.0	177.9	53 59.9	+60.0	177.9	53 00.0	+60.0	178.0	52 00.0	+60.0	178.0	**52**
53	59 59.7	+60.0	177.6	58 59.7	+60.0	177.7	57 59.8	+60.0	177.7	56 59.8	+60.0	177.8	55 59.9	+60.0	177.8	54 59.9	+60.0	177.9	54 00.0	+60.0	178.0	53 00.0	+60.0	178.0	**53**
54	60 59.7	+60.0	177.6	59 59.7	+60.0	177.6	58 59.8	+60.0	177.7	57 59.8	+60.0	177.8	56 59.9	+60.0	177.8	55 59.9	+60.0	177.9	55 00.0	+60.0	178.0	54 00.0	+60.0	178.0	**54**
55	61 59.7	+60.0	177.6	60 59.7	+60.0	177.6	59 59.8	+60.0	177.7	58 59.8	+60.0	177.8	57 59.9	+60.0	177.8	56 59.9	+60.0	177.9	56 00.0	+60.0	177.9	55 00.0	+60.0	178.0	**55**
56	62 59.7	+60.0	177.5	61 59.7	+60.0	177.6	60 59.8	+60.0	177.7	59 59.8	+60.0	177.8	58 59.9	+60.0	177.8	57 59.9	+60.0	177.9	57 00.0	+60.0	177.9	56 00.0	+60.0	178.0	**56**
57	63 59.7	+60.0	177.5	62 59.7	+60.0	177.6	61 59.8	+60.0	177.7	60 59.8	+60.0	177.8	59 59.9	+60.0	177.8	58 59.9	+60.0	177.9	58 00.0	+60.0	177.9	57 00.0	+60.0	178.0	**57**
58	64 59.7	+60.0	177.5	63 59.7	+60.0	177.6	62 59.8	+60.0	177.7	61 59.8	+60.0	177.7	60 59.9	+60.0	177.8	59 59.9	+60.0	177.9	59 00.0	+60.0	177.9	58 00.0	+60.0	178.0	**58**
59	65 59.7	+60.0	177.5	64 59.7	+60.0	177.6	63 59.8	+60.0	177.7	62 59.8	+60.0	177.7	61 59.9	+60.0	177.8	60 59.9	+60.0	177.9	60 00.0	+60.0	177.9	59 00.0	+60.0	178.0	**59**
60	66 59.7	+60.0	177.4	65 59.7	+60.0	177.5	64 59.8	+60.0	177.6	63 59.8	+60.0	177.7	62 59.9	+60.0	177.8	61 59.9	+60.0	177.9	61 00.0	+60.0	177.9	60 00.0	+60.0	178.0	**60**
61	67 59.7	+60.0	177.4	66 59.7	+60.0	177.5	65 59.8	+60.0	177.6	64 59.8	+60.0	177.7	63 59.9	+60.0	177.8	62 59.9	+60.0	177.9	62 00.0	+60.0	177.9	61 00.0	+60.0	178.0	**61**
62	68 59.7	+60.0	177.4	67 59.7	+60.0	177.5	66 59.8	+60.0	177.6	65 59.8	+60.0	177.7	64 59.9	+60.0	177.8	63 59.9	+60.0	177.9	63 00.0	+60.0	177.9	62 00.0	+60.0	178.0	**62**
63	69 59.7	+60.0	177.3	68 59.7	+60.0	177.5	67 59.8	+60.0	177.6	66 59.8	+60.0	177.7	65 59.9	+60.0	177.8	64 59.9	+60.0	177.9	64 00.0	+60.0	177.9	63 00.0	+60.0	178.0	**63**
64	70 59.7	+60.0	177.3	69 59.7	+60.0	177.4	68 59.8	+60.0	177.6	67 59.8	+60.0	177.7	66 59.9	+60.0	177.8	65 59.9	+60.0	177.8	65 00.0	+60.0	177.9	64 00.0	+60.0	178.0	**64**
65	71 59.7	+59.9	177.3	70 59.7	+60.0	177.4	69 59.8	+60.0	177.5	68 59.8	+60.0	177.6	67 59.9	+60.0	177.7	66 59.9	+60.0	177.8	66 00.0	+60.0	177.9	65 00.0	+60.0	178.0	**65**
66	72 59.6	+60.0	177.2	71 59.7	+60.0	177.4	70 59.8	+60.0	177.5	69 59.8	+60.0	177.6	68 59.9	+60.0	177.7	67 59.9	+60.0	177.8	67 00.0	+60.0	177.9	66 00.0	+60.0	178.0	**66**
67	73 59.6	+60.0	177.2	72 59.7	+60.0	177.3	71 59.8	+60.0	177.5	70 59.8	+60.0	177.6	69 59.9	+60.0	177.7	68 59.9	+60.0	177.8	68 00.0	+60.0	177.9	67 00.0	+60.0	178.0	**67**
68	74 59.6	+60.0	177.1	73 59.7	+60.0	177.3	72 59.8	+60.0	177.4	71 59.8	+60.0	177.6	70 59.9	+60.0	177.7	69 59.9	+60.0	177.8	69 00.0	+60.0	177.9	68 00.0	+60.0	178.0	**68**
69	75 59.6	+60.0	177.0	74 59.7	+60.0	177.2	73 59.8	+60.0	177.4	72 59.8	+60.0	177.5	71 59.9	+60.0	177.7	70 59.9	+60.0	177.8	70 00.0	+60.0	177.9	69 00.0	+60.0	178.0	**69**
70	76 59.6	+60.0	177.0	75 59.7	+60.0	177.2	74 59.8	+60.0	177.4	73 59.8	+60.0	177.5	72 59.9	+60.0	177.7	71 59.9	+60.0	177.8	71 00.0	+60.0	177.9	70 00.0	+60.0	178.0	**70**
71	77 59.6	+60.0	176.9	76 59.7	+60.0	177.1	75 59.8	+59.9	177.3	74 59.8	+60.0	177.5	73 59.9	+60.0	177.6	72 59.9	+60.0	177.8	72 00.0	+60.0	177.9	71 00.0	+60.0	178.0	**71**
72	78 59.6	+60.0	176.8	77 59.7	+60.0	177.0	76 59.7	+60.0	177.3	75 59.8	+60.0	177.4	74 59.9	+60.0	177.6	73 59.9	+60.0	177.8	73 00.0	+60.0	177.9	72 00.0	+60.0	178.0	**72**
73	79 59.6	+60.0	176.6	78 59.7	+60.0	176.9	77 59.7	+60.0	177.2	76 59.8	+60.0	177.4	75 59.9	+60.0	177.6	74 59.9	+60.0	177.7	74 00.0	+60.0	177.9	73 00.0	+60.0	178.0	**73**
74	80 59.6	+59.9	176.5	79 59.7	+59.9	176.8	78 59.7	+60.0	177.1	77 59.8	+60.0	177.3	76 59.9	+60.0	177.5	75 59.9	+60.0	177.7	75 00.0	+60.0	177.9	74 00.0	+60.0	178.0	**74**
75	81 59.5	+60.0	176.3	80 59.6	+60.0	176.7	79 59.7	+60.0	177.0	78 59.8	+60.0	177.3	77 59.9	+60.0	177.5	76 59.9	+60.0	177.7	76 00.0	+60.0	177.9	75 00.0	+60.0	178.0	**75**
76	82 59.5	+60.0	176.0	81 59.6	+60.0	176.5	80 59.7	+60.0	176.9	79 59.8	+60.0	177.2	78 59.9	+60.0	177.5	77 59.9	+60.0	177.7	77 00.0	+60.0	177.8	76 00.0	+60.0	178.0	**76**
77	83 59.5	+59.9	175.7	82 59.6	+60.0	176.3	81 59.7	+60.0	176.8	80 59.8	+60.0	177.1	79 59.9	+60.0	177.4	78 59.9	+60.0	177.6	78 00.0	+60.0	177.8	77 00.0	+60.0	178.0	**77**
78	84 59.4	+59.9	175.2	83 59.6	+59.9	176.0	82 59.7	+60.0	176.6	81 59.8	+60.0	177.0	80 59.9	+59.9	177.3	79 59.9	+60.0	177.6	79 00.0	+60.0	177.8	78 00.0	+60.0	178.0	**78**
79	85 59.3	+59.9	174.5	84 59.5	+60.0	175.6	83 59.7	+59.9	176.4	82 59.8	+60.0	176.9	81 59.8	+60.0	177.3	80 59.9	+60.0	177.6	80 00.0	+60.0	177.8	79 00.0	+60.0	178.0	**79**
80	86 59.2	+59.7	173.4	85 59.5	+59.8	175.0	84 59.6	+60.0	176.0	83 59.8	+59.9	176.7	82 59.8	+60.0	177.2	81 59.9	+60.0	177.5	81 00.0	+60.0	177.8	80 00.0	+60.0	178.0	**80**
81	87 58.9	*+59.1*	•171.1	86 59.3	+59.8	174.0	85 59.6	+59.9	175.5	84 59.7	+60.0	176.4	83 59.8	+60.0	177.0	82 59.9	+60.0	177.4	82 00.0	+60.0	177.8	81 00.0	+60.0	178.0	**81**
82	88 58.0	*+47.4*	•164.4	87 59.1	*+59.4*	•172.1	86 59.5	+59.9	174.7	85 59.7	+60.0	176.0	84 59.8	+60.0	176.8	83 59.9	+60.0	177.3	83 00.0	+60.0	177.7	82 00.0	+60.0	178.0	**82**
83	89 45.4	*−46.9*•	89.0	88 58.5	*+49.0*	•166.2	87 59.4	*+59.5*	•173.0	86 59.7	+59.9	175.3	85 59.8	+60.0	176.5	84 59.9	+60.0	177.2	84 00.0	+60.0	177.7	83 00.0	+60.0	178.0	**83**
84	88 58.5	*−59.1*•	11.8	89 47.5	*−48.6*•	89.0	88 58.9	*+50.6*	•168.2	87 59.6	*+59.7*	•174.0	86 59.8	+59.9	176.0	85 59.9	+60.0	177.0	85 00.0	+60.0	177.6	84 00.0	+60.0	178.0	**84**
85	87 59.4	−59.7	5.0	88 58.9	*−59.3*•	9.9	89 49.5	*−50.2*•	89.0	88 59.3	*+52.3*	•170.1	87 59.7	*+59.9*	•175.0	86 59.9	+60.0	176.7	86 00.0	+60.0	177.5	85 00.0	+60.0	178.0	**85**
86	86 59.7	−59.9	2.7	87 59.6	−59.8	4.0	88 59.3	*−59.6*•	7.9	89 51.6	*−52.0*•	89.0	88 59.6	*+54.1*	•172.0	87 59.9	*+59.9*	•176.0	87 00.0	+59.9	177.3	86 00.0	+60.0	178.0	**86**
87	85 59.8	−59.9	1.5	86 59.8	−59.9	2.0	87 59.7	−59.8	3.0	88 59.6	*−59.7*•	6.0	89 53.7	*−53.9*•	89.0	88 59.8	*+56.0*	•174.0	87 59.9	+60.0	177.0	87 00.0	+60.0	178.0	**87**
88	84 59.9	−59.9	0.8	85 59.9	−59.9	1.0	86 59.9	−59.9	1.3	87 59.9	−59.9	2.0	88 59.8	*−59.9*•	4.0	89 55.8	*−55.9*•	89.0	88 59.9	*+58.0*	•176.0	88 00.0	+60.0	178.0	**88**
89	84 00.0	−60.0	0.3	85 00.0	−60.0	0.4	86 00.0	−60.0	0.5	87 00.0	−60.0	0.7	87 59.9	−59.9	1.0	88 59.9	*−59.9*•	2.0	89 57.9	*−57.9*•	89.0	89 00.0	+60.0	178.0	**89**
90	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	89.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

2°, 358° L.H.A.

LATITUDE SAME NAME AS DECLINATION

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 59.7	−60.0	178.0	5 59.8	−60.0	178.0	4 59.8	−60.0	178.0	3 59.9	−60.0	178.0	2 59.9	−60.0	178.0	1 59.9	−60.0	178.0	1 00.0	−60.0	178.0	0 00.0	+60.0	2.0	**0**
1	5 59.7	−60.0	178.0	4 59.8	−60.0	178.0	3 59.8	−60.0	178.0	2 59.9	−60.0	178.0	1 59.9	−60.0	178.0	0 59.9	−60.0	178.0	0 00.0	+60.0	2.0	1 00.0	+60.0	2.0	**1**
2	4 59.7	−60.0	178.0	3 59.8	−60.0	178.0	2 59.8	−60.0	178.0	1 59.9	−60.0	178.0	0 59.9	−60.0	178.0	0 00.1	+60.0	2.0	1 00.0	+60.0	2.0	2 00.0	+60.0	2.0	**2**
3	3 59.7	−60.0	178.0	2 59.8	−60.0	178.0	1 59.8	−60.0	178.0	0 59.9	−60.0	178.0	0 00.1	+60.0	2.0	1 00.1	+60.0	2.0	2 00.0	+60.0	2.0	3 00.0	+60.0	2.0	**3**
4	2 59.7	−60.0	178.0	1 59.8	−60.0	178.0	0 59.8	−60.0	178.0	0 00.1	+60.0	2.0	1 00.1	+60.0	2.0	2 00.1	+60.0	2.0	3 00.0	+60.0	2.0	4 00.0	+60.0	2.0	**4**
5	1 59.7	−60.0	178.0	0 59.8	−60.0	178.0	0 00.2	+60.0	2.0	1 00.1	+60.0	2.0	2 00.1	+60.0	2.0	3 00.1	+60.0	2.0	4 00.0	+60.0	2.0	5 00.0	+60.0	2.0	**5**
6	0 59.7	−60.0	178.0	0 00.2	+60.0	2.0	1 00.2	+60.0	2.0	2 00.1	+60.0	2.0	3 00.1	+60.0	2.0	4 00.1	+60.0	2.0	5 00.0	+60.0	2.0	6 00.0	+60.0	2.0	**6**
7	0 00.3	+60.0	2.0	1 00.2	+60.0	2.0	2 00.2	+60.0	2.0	3 00.1	+60.0	2.0	4 00.1	+60.0	2.0	5 00.1	+60.0	2.0	6 00.0	+60.0	2.0	7 00.0	+60.0	2.0	**7**
8	1 00.3	+60.0	2.0	2 00.2	+60.0	2.0	3 00.2	+60.0	2.0	4 00.1	+60.0	2.0	5 00.1	+60.0	2.0	6 00.1	+60.0	2.0	7 00.0	+60.0	2.0	8 00.0	+60.0	2.0	**8**
9	2 00.3	+60.0	2.0	3 00.2	+60.0	2.0	4 00.2	+60.0	2.0	5 00.1	+60.0	2.0	6 00.1	+60.0	2.0	7 00.1	+60.0	2.0	8 00.0	+60.0	2.0	9 00.0	+60.0	2.0	**9**
10	3 00.3	+60.0	2.0	4 00.2	+60.0	2.0	5 00.2	+60.0	2.0	6 00.1	+60.0	2.0	7 00.1	+60.0	2.0	8 00.1	+60.0	2.0	9 00.0	+60.0	2.0	10 00.0	+60.0	2.0	**10**
11	4 00.3	+60.0	2.0	5 00.2	+60.0	2.0	6 00.2	+60.0	2.0	7 00.1	+60.0	2.0	8 00.1	+60.0	2.0	9 00.1	+60.0	2.0	10 00.0	+60.0	2.0	11 00.0	+60.0	2.0	**11**
12	5 00.3	+60.0	2.0	6 00.2	+60.0	2.0	7 00.2	+60.0	2.0	8 00.1	+60.0	2.0	9 00.1	+60.0	2.0	10 00.1	+60.0	2.0	11 00.0	+60.0	2.0	12 00.0	+60.0	2.0	**12**
13	6 00.3	+59.9	2.0	7 00.2	+60.0	2.0	8 00.2	+60.0	2.0	9 00.1	+60.0	2.0	10 00.1	+60.0	2.0	11 00.1	+60.0	2.0	12 00.0	+60.0	2.0	13 00.0	+60.0	2.0	**13**
14	7 00.2	+60.0	2.0	8 00.2	+60.0	2.0	9 00.2	+60.0	2.0	10 00.1	+60.0	2.0	11 00.1	+60.0	2.0	12 00.1	+60.0	2.0	13 00.0	+60.0	2.0	14 00.0	+60.0	2.0	**14**
15	8 00.2	+60.0	2.0	9 00.2	+60.0	2.0	10 00.2	+60.0	2.0	11 00.1	+60.0	2.0	12 00.1	+60.0	2.0	13 00.1	+60.0	2.0	14 00.0	+60.0	2.0	15 00.0	+60.0	2.0	**15**
16	9 00.2	+60.0	1.9	10 00.2	+60.0	2.0	11 00.2	+60.0	2.0	12 00.1	+60.0	2.0	13 00.1	+60.0	2.0	14 00.1	+60.0	2.0	15 00.0	+60.0	2.0	16 00.0	+60.0	2.0	**16**
17	10 00.2	+60.0	1.9	11 00.2	+60.0	1.9	12 00.2	+60.0	2.0	13 00.1	+60.0	2.0	14 00.1	+60.0	2.0	15 00.1	+60.0	2.0	16 00.0	+60.0	2.0	17 00.0	+60.0	2.0	**17**
18	11 00.2	+60.0	1.9	12 00.2	+60.0	1.9	13 00.2	+60.0	2.0	14 00.1	+60.0	2.0	15 00.1	+60.0	2.0	16 00.1	+60.0	2.0	17 00.0	+60.0	2.0	18 00.0	+60.0	2.0	**18**
19	12 00.2	+60.0	1.9	13 00.2	+60.0	1.9	14 00.2	+60.0	1.9	15 00.1	+60.0	2.0	16 00.1	+60.0	2.0	17 00.1	+60.0	2.0	18 00.0	+60.0	2.0	19 00.0	+60.0	2.0	**19**
20	13 00.2	+60.0	1.9	14 00.2	+60.0	1.9	15 00.2	+60.0	1.9	16 00.1	+60.0	2.0	17 00.1	+60.0	2.0	18 00.1	+60.0	2.0	19 00.0	+60.0	2.0	20 00.0	+60.0	2.0	**20**
21	14 00.2	+60.0	1.9	15 00.2	+60.0	1.9	16 00.2	+60.0	1.9	17 00.1	+60.0	2.0	18 00.1	+60.0	2.0	19 00.1	+60.0	2.0	20 00.0	+60.0	2.0	21 00.0	+60.0	2.0	**21**
22	15 00.2	+60.0	1.9	16 00.2	+60.0	1.9	17 00.2	+60.0	1.9	18 00.1	+60.0	1.9	19 00.1	+60.0	2.0	20 00.1	+60.0	2.0	21 00.0	+60.0	2.0	22 00.0	+60.0	2.0	**22**
23	16 00.2	+60.0	1.9	17 00.2	+60.0	1.9	18 00.2	+60.0	1.9	19 00.1	+60.0	1.9	20 00.1	+60.0	2.0	21 00.1	+60.0	2.0	22 00.0	+60.0	2.0	23 00.0	+60.0	2.0	**23**
24	17 00.2	+60.0	1.9	18 00.2	+60.0	1.9	19 00.2	+60.0	1.9	20 00.1	+60.0	1.9	21 00.1	+60.0	2.0	22 00.1	+60.0	2.0	23 00.0	+60.0	2.0	24 00.0	+60.0	2.0	**24**
25	18 00.2	+60.0	1.9	19 00.2	+60.0	1.9	20 00.2	+60.0	1.9	21 00.1	+60.0	1.9	22 00.1	+60.0	2.0	23 00.1	+60.0	2.0	24 00.0	+60.0	2.0	25 00.0	+60.0	2.0	**25**
26	19 00.2	+60.0	1.9	20 00.2	+60.0	1.9	21 00.2	+60.0	1.9	22 00.1	+60.0	1.9	23 00.1	+60.0	2.0	24 00.1	+60.0	2.0	25 00.0	+60.0	2.0	26 00.0	+60.0	2.0	**26**
27	20 00.2	+60.0	1.9	21 00.2	+60.0	1.9	22 00.2	+60.0	1.9	23 00.1	+60.0	1.9	24 00.1	+60.0	2.0	25 00.1	+60.0	2.0	26 00.0	+60.0	2.0	27 00.0	+60.0	2.0	**27**
28	21 00.2	+60.0	1.9	22 00.2	+60.0	1.9	23 00.2	+60.0	1.9	24 00.1	+60.0	1.9	25 00.1	+60.0	1.9	26 00.1	+60.0	2.0	27 00.0	+60.0	2.0	28 00.0	+60.0	2.0	**28**
29	22 00.2	+60.0	1.9	23 00.2	+60.0	1.9	24 00.2	+60.0	1.9	25 00.1	+60.0	1.9	26 00.1	+60.0	1.9	27 00.1	+60.0	2.0	28 00.0	+60.0	2.0	29 00.0	+60.0	2.0	**29**
30	23 00.2	+60.0	1.9	24 00.2	+60.0	1.9	25 00.2	+60.0	1.9	26 00.1	+60.0	1.9	27 00.1	+60.0	1.9	28 00.1	+60.0	2.0	29 00.0	+60.0	2.0	30 00.0	+60.0	2.0	**30**
31	24 00.2	+60.0	1.9	25 00.2	+60.0	1.9	26 00.2	+60.0	1.9	27 00.1	+60.0	1.9	28 00.1	+60.0	1.9	29 00.1	+60.0	2.0	30 00.0	+60.0	2.0	31 00.0	+60.0	2.0	**31**
32	25 00.2	+60.0	1.9	26 00.2	+60.0	1.9	27 00.2	+60.0	1.9	28 00.1	+60.0	1.9	29 00.1	+60.0	1.9	30 00.1	+60.0	2.0	31 00.0	+60.0	2.0	32 00.0	+60.0	2.0	**32**
33	26 00.2	+60.0	1.9	27 00.2	+60.0	1.9	28 00.2	+60.0	1.9	29 00.1	+60.0	1.9	30 00.1	+60.0	1.9	31 00.1	+60.0	2.0	32 00.0	+60.0	2.0	33 00.0	+60.0	2.0	**33**
34	27 00.2	+60.0	1.9	28 00.2	+60.0	1.9	29 00.2	+60.0	1.9	30 00.1	+60.0	1.9	31 00.1	+60.0	1.9	32 00.1	+60.0	2.0	33 00.0	+60.0	2.0	34 00.0	+60.0	2.0	**34**
35	28 00.2	+60.0	1.9	29 00.2	+60.0	1.9	30 00.2	+60.0	1.9	31 00.1	+60.0	1.9	32 00.1	+60.0	1.9	33 00.1	+60.0	2.0	34 00.0	+60.0	2.0	35 00.0	+60.0	2.0	**35**
36	29 00.2	+60.0	1.9	30 00.2	+60.0	1.9	31 00.2	+60.0	1.9	32 00.1	+60.0	1.9	33 00.1	+60.0	1.9	34 00.1	+60.0	2.0	35 00.0	+60.0	2.0	36 00.0	+60.0	2.0	**36**
37	30 00.2	+60.0	1.8	31 00.2	+60.0	1.9	32 00.2	+60.0	1.9	33 00.1	+60.0	1.9	34 00.1	+60.0	1.9	35 00.1	+60.0	1.9	36 00.0	+60.0	2.0	37 00.0	+60.0	2.0	**37**
38	31 00.2	+60.0	1.8	32 00.2	+60.0	1.9	33 00.2	+60.0	1.9	34 00.1	+60.0	1.9	35 00.1	+60.0	1.9	36 00.1	+60.0	1.9	37 00.0	+60.0	2.0	38 00.0	+60.0	2.0	**38**
39	32 00.2	+60.0	1.8	33 00.2	+60.0	1.9	34 00.2	+60.0	1.9	35 00.1	+60.0	1.9	36 00.1	+60.0	1.9	37 00.1	+60.0	1.9	38 00.0	+60.0	2.0	39 00.0	+60.0	2.0	**39**
40	33 00.2	+60.0	1.8	34 00.2	+60.0	1.8	35 00.2	+60.0	1.9	36 00.1	+60.0	1.9	37 00.1	+60.0	1.9	38 00.1	+60.0	1.9	39 00.0	+60.0	2.0	40 00.0	+60.0	2.0	**40**
41	34 00.2	+60.0	1.8	35 00.2	+60.0	1.8	36 00.2	+60.0	1.9	37 00.1	+60.0	1.9	38 00.1	+60.0	1.9	39 00.1	+60.0	1.9	40 00.0	+60.0	2.0	41 00.0	+60.0	2.0	**41**
42	35 00.2	+60.0	1.8	36 00.2	+60.0	1.8	37 00.2	+60.0	1.9	38 00.1	+60.0	1.9	39 00.1	+60.0	1.9	40 00.1	+60.0	1.9	41 00.0	+60.0	2.0	42 00.0	+60.0	2.0	**42**
43	36 00.2	+60.0	1.8	37 00.2	+60.0	1.8	38 00.2	+60.0	1.9	39 00.1	+60.0	1.9	40 00.1	+60.0	1.9	41 00.1	+60.0	1.9	42 00.0	+60.0	2.0	43 00.0	+60.0	2.0	**43**
44	37 00.2	+60.0	1.8	38 00.2	+60.0	1.8	39 00.2	+60.0	1.9	40 00.1	+60.0	1.9	41 00.1	+60.0	1.9	42 00.1	+60.0	1.9	43 00.0	+60.0	2.0	44 00.0	+60.0	2.0	**44**
45	38 00.2	+60.0	1.8	39 00.2	+60.0	1.8	40 00.2	+60.0	1.8	41 00.1	+60.0	1.9	42 00.1	+60.0	1.9	43 00.1	+60.0	1.9	44 00.0	+60.0	2.0	45 00.0	+60.0	2.0	**45**
46	39 00.2	+60.0	1.8	40 00.2	+60.0	1.8	41 00.2	+60.0	1.8	42 00.1	+60.0	1.9	43 00.1	+60.0	1.9	44 00.1	+60.0	1.9	45 00.0	+60.0	2.0	46 00.0	+60.0	2.0	**46**
47	40 00.2	+60.0	1.8	41 00.2	+60.0	1.8	42 00.2	+60.0	1.8	43 00.1	+60.0	1.9	44 00.1	+60.0	1.9	45 00.1	+60.0	1.9	46 00.0	+60.0	2.0	47 00.0	+60.0	2.0	**47**
48	41 00.2	+60.0	1.8	42 00.2	+60.0	1.8	43 00.2	+60.0	1.8	44 00.1	+60.0	1.9	45 00.1	+60.0	1.9	46 00.1	+60.0	1.9	47 00.0	+60.0	2.0	48 00.0	+60.0	2.0	**48**
49	42 00.2	+60.0	1.8	43 00.2	+60.0	1.8	44 00.2	+60.0	1.8	45 00.1	+60.0	1.9	46 00.1	+60.0	1.9	47 00.1	+60.0	1.9	48 00.0	+60.0	2.0	49 00.0	+60.0	2.0	**49**
50	43 00.2	+60.0	1.8	44 00.2	+60.0	1.8	45 00.2	+60.0	1.8	46 00.1	+60.0	1.9	47 00.1	+60.0	1.9	48 00.1	+60.0	1.9	49 00.0	+60.0	2.0	50 00.0	+60.0	2.0	**50**
51	44 00.2	+60.0	1.7	45 00.2	+60.0	1.8	46 00.2	+60.0	1.8	47 00.1	+60.0	1.8	48 00.1	+60.0	1.9	49 00.1	+60.0	1.9	50 00.0	+60.0	2.0	51 00.0	+60.0	2.0	**51**
52	45 00.2	+60.0	1.7	46 00.2	+60.0	1.8	47 00.2	+60.0	1.8	48 00.1	+60.0	1.8	49 00.1	+60.0	1.9	50 00.1	+60.0	1.9	51 00.0	+60.0	2.0	52 00.0	+60.0	2.0	**52**
53	46 00.2	+60.0	1.7	47 00.2	+60.0	1.8	48 00.2	+60.0	1.8	49 00.1	+60.0	1.8	50 00.1	+60.0	1.9	51 00.1	+60.0	1.9	52 00.0	+60.0	2.0	53 00.0	+60.0	2.0	**53**
54	47 00.2	+60.0	1.7	48 00.2	+60.0	1.8	49 00.2	+60.0	1.8	50 00.1	+60.0	1.8	51 00.1	+60.0	1.9	52 00.1	+60.0	1.9	53 00.0	+60.0	2.0	54 00.0	+60.0	2.0	**54**
55	48 00.2	+60.0	1.7	49 00.2	+60.0	1.7	50 00.2	+60.0	1.8	51 00.1	+60.0	1.8	52 00.1	+60.0	1.9	53 00.1	+60.0	1.9	54 00.0	+60.0	2.0	55 00.0	+60.0	2.0	**55**
56	49 00.2	+60.0	1.7	50 00.2	+60.0	1.7	51 00.2	+60.0	1.8	52 00.1	+60.0	1.8	53 00.1	+60.0	1.9	54 00.1	+60.0	1.9	55 00.0	+60.0	1.9	56 00.0	+60.0	2.0	**56**
57	50 00.2	+60.0	1.7	51 00.2	+60.0	1.7	52 00.2	+60.0	1.8	53 00.1	+60.0	1.8	54 00.1	+60.0	1.9	55 00.1	+60.0	1.9	56 00.0	+60.0	1.9	57 00.0	+60.0	2.0	**57**
58	51 00.2	+60.0	1.7	52 00.2	+60.0	1.7	53 00.2	+60.0	1.8	54 00.1	+60.0	1.8	55 00.1	+60.0	1.8	56 00.1	+60.0	1.9	57 00.0	+60.0	1.9	58 00.0	+60.0	2.0	**58**
59	52 00.2	+60.0	1.7	53 00.2	+60.0	1.7	54 00.2	+60.0	1.8	55 00.1	+60.0	1.8	56 00.1	+60.0	1.8	57 00.1	+60.0	1.9	58 00.0	+60.0	1.9	59 00.0	+60.0	2.0	**59**
60	53 00.2	+60.0	1.7	54 00.2	+60.0	1.7	55 00.2	+60.0	1.7	56 00.1	+60.0	1.8	57 00.1	+60.0	1.8	58 00.1	+60.0	1.9	59 00.0	+60.0	1.9	60 00.0	+60.0	2.0	**60**
61	54 00.2	+60.0	1.6	55 00.2	+60.0	1.7	56 00.2	+60.0	1.7	57 00.1	+60.0	1.8	58 00.1	+60.0	1.8	59 00.1	+60.0	1.9	60 00.0	+60.0	1.9	61 00.0	+60.0	2.0	**61**
62	55 00.2	+60.0	1.6	56 00.2	+60.0	1.7	57 00.2	+60.0	1.7	58 00.1	+60.0	1.8	59 00.1	+60.0	1.8	60 00.1	+60.0	1.9	61 00.0	+60.0	1.9	62 00.0	+60.0	2.0	**62**
63	56 00.2	+60.0	1.6	57 00.2	+60.0	1.7	58 00.2	+60.0	1.7	59 00.1	+60.0	1.8	60 00.1	+60.0	1.8	61 00.1	+60.0	1.9	62 00.0	+60.0	1.9	63 00.0	+60.0	2.0	**63**
64	57 00.2	+60.0	1.6	58 00.2	+60.0	1.7	59 00.2	+60.0	1.7	60 00.1	+60.0	1.8	61 00.1	+60.0	1.8	62 00.1	+60.0	1.9	63 00.0	+60.0	1.9	64 00.0	+60.0	2.0	**64**
65	58 00.2	+60.0	1.6	59 00.2	+60.0	1.6	60 00.2	+60.0	1.7	61 00.1	+60.0	1.7	62 00.1	+60.0	1.8	63 00.1	+60.0	1.9	64 00.0	+60.0	1.9	65 00.0	+60.0	2.0	**65**
66	59 00.2	+60.0	1.6	60 00.2	+60.0	1.6	61 00.2	+60.0	1.7	62 00.1	+60.0	1.7	63 00.1	+60.0	1.8	64 00.1	+60.0	1.9	65 00.0	+60.0	1.9	66 00.0	+60.0	2.0	**66**
67	60 00.2	+60.0	1.6	61 00.2	+60.0	1.6	62 00.2	+60.0	1.7	63 00.1	+60.0	1.7	64 00.1	+60.0	1.8	65 00.1	+60.0	1.8	66 00.0	+60.0	1.9	67 00.0	+60.0	2.0	**67**
68	61 00.2	+60.0	1.5	62 00.2	+60.0	1.6	63 00.2	+59.9	1.7	64 00.1	+60.0	1.7	65 00.1	+60.0	1.8	66 00.1	+60.0	1.8	67 00.0	+60.0	1.9	68 00.0	+60.0	2.0	**68**
69	62 00.2	+60.0	1.5	63 00.2	+60.0	1.6	64 00.1	+60.0	1.6	65 00.1	+60.0	1.7	66 00.1	+60.0	1.8	67 00.1	+60.0	1.8	68 00.0	+60.0	1.9	69 00.0	+60.0	2.0	**69**
70	63 00.2	+60.0	1.5	64 00.2	+60.0	1.6	65 00.1	+60.0	1.6	66 00.1	+60.0	1.7	67 00.1	+60.0	1.8	68 00.1	+60.0	1.8	69 00.0	+60.0	1.9	70 00.0	+60.0	2.0	**70**
71	64 00.2	+60.0	1.5	65 00.2	+60.0	1.5	66 00.1	+60.0	1.6	67 00.1	+60.0	1.7	68 00.1	+60.0	1.7	69 00.1	+60.0	1.8	70 00.0	+60.0	1.9	71 00.0	+60.0	2.0	**71**
72	65 00.2	+60.0	1.5	66 00.2	+60.0	1.5	67 00.1	+60.0	1.6	68 00.1	+60.0	1.6	69 00.1	+60.0	1.7	70 00.1	+60.0	1.8	71 00.0	+60.0	1.9	72 00.0	+60.0	2.0	**72**
73	66 00.2	+60.0	1.4	67 00.2	+60.0	1.5	68 00.1	+60.0	1.6	69 00.1	+60.0	1.6	70 00.1	+60.0	1.7	71 00.1	+60.0	1.8	72 00.0	+60.0	1.9	73 00.0	+60.0	2.0	**73**
74	67 00.2	+60.0	1.4	68 00.2	+60.0	1.5	69 00.1	+60.0	1.5	70 00.1	+60.0	1.6	71 00.1	+60.0	1.7	72 00.1	+60.0	1.8	73 00.0	+60.0	1.9	74 00.0	+60.0	2.0	**74**
75	68 00.2	+60.0	1.4	69 00.2	+60.0	1.4	70 00.1	+60.0	1.5	71 00.1	+60.0	1.6	72 00.1	+60.0	1.7	73 00.1	+60.0	1.8	74 00.0	+60.0	1.9	75 00.0	+60.0	2.0	**75**
76	69 00.2	+60.0	1.4	70 00.2	+60.0	1.4	71 00.1	+60.0	1.5	72 00.1	+60.0	1.6	73 00.1	+60.0	1.7	74 00.1	+60.0	1.8	75 00.0	+60.0	1.9	76 00.0	+60.0	2.0	**76**
77	70 00.2	+60.0	1.3	71 00.2	+59.9	1.4	72 00.1	+60.0	1.5	73 00.1	+60.0	1.5	74 00.1	+60.0	1.6	75 00.1	+60.0	1.7	76 00.0	+60.0	1.9	77 00.0	+60.0	2.0	**77**
78	71 00.2	+60.0	1.3	72 00.1	+60.0	1.3	73 00.1	+60.0	1.4	74 00.1	+60.0	1.5	75 00.1	+60.0	1.6	76 00.1	+60.0	1.7	77 00.0	+60.0	1.8	78 00.0	+60.0	2.0	**78**
79	72 00.2	+60.0	1.2	73 00.1	+60.0	1.3	74 00.1	+60.0	1.4	75 00.1	+60.0	1.5	76 00.1	+60.0	1.6	77 00.1	+60.0	1.7	78 00.0	+60.0	1.8	79 00.0	+60.0	2.0	**79**
80	73 00.2	+59.9	1.2	74 00.1	+60.0	1.3	75 00.1	+60.0	1.3	76 00.1	+60.0	1.4	77 00.1	+60.0	1.5	78 00.1	+60.0	1.7	79 00.0	+60.0	1.8	80 00.0	+60.0	2.0	**80**
81	74 00.1	+60.0	1.1	75 00.1	+60.0	1.2	76 00.1	+60.0	1.3	77 00.1	+60.0	1.4	78 00.1	+60.0	1.5	79 00.1	+60.0	1.6	80 00.0	+60.0	1.8	81 00.0	+60.0	2.0	**81**
82	75 00.1	+60.0	1.1	76 00.1	+60.0	1.2	77 00.1	+60.0	1.2	78 00.1	+60.0	1.3	79 00.1	+60.0	1.5	80 00.1	+60.0	1.6	81 00.0	+60.0	1.8	82 00.0	+60.0	2.0	**82**
83	76 00.1	+60.0	1.0	77 00.1	+60.0	1.1	78 00.1	+60.0	1.2	79 00.1	+60.0	1.3	80 00.1	+60.0	1.4	81 00.1	+60.0	1.6	82 00.0	+60.0	1.8	83 00.0	+60.0	2.0	**83**
84	77 00.1	+60.0	0.9	78 00.1	+60.0	1.0	79 00.1	+60.0	1.1	80 00.1	+60.0	1.2	81 00.1	+60.0	1.3	82 00.1	+60.0	1.5	83 00.0	+60.0	1.7	84 00.0	+60.0	2.0	**84**
85	78 00.1	+60.0	0.8	79 00.1	+60.0	0.9	80 00.1	+60.0	1.0	81 00.1	+60.0	1.1	82 00.1	+60.0	1.3	83 00.1	+59.9	1.4	84 00.0	+60.0	1.7	85 00.0	+60.0	2.0	**85**
86	79 00.1	+60.0	0.7	80 00.1	+60.0	0.8	81 00.1	+60.0	0.9	82 00.1	+60.0	1.0	83 00.1	+60.0	1.1	84 00.0	+60.0	1.3	85 00.0	+60.0	1.6	86 00.0	+60.0	2.0	**86**
87	80 00.1	+60.0	0.6	81 00.1	+60.0	0.7	82 00.1	+60.0	0.8	83 00.1	+59.9	0.9	84 00.1	+59.9	1.0	85 00.0	+60.0	1.2	86 00.0	+60.0	1.5	87 00.0	+60.0	2.0	**87**
88	81 00.1	+59.9	0.4	82 00.1	+59.9	0.5	83 00.1	+59.9	0.6	84 00.0	+60.0	0.7	85 00.0	+60.0	0.8	86 00.0	+60.0	1.0	87 00.0	+60.0	1.3	88 00.0	+60.0	2.0	**88**
89	82 00.0	+60.0	0.3	83 00.0	+60.0	0.3	84 00.0	+60.0	0.3	85 00.0	+60.0	0.4	86 00.0	+60.0	0.5	87 00.0	+60.0	0.7	88 00.0	+60.0	1.0	89 00.0	+60.0	2.0	**89**
90	83 00.0	+60.0	0.0	84 00.0	+60.0	0.0	85 00.0	+60.0	0.0	86 00.0	+60.0	0.0	87 00.0	+59.9	0.0	88 00.0	*+59.9*•	0.0	89 00.0	*+57.9*•	0.0	90 00.0	−60.0	1.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.4	+60.0	177.0	5 59.5	+60.0	177.0	4 59.6	+60.0	177.0	3 59.7	+60.0	177.0	2 59.8	+60.0	177.0	1 59.8	+60.0	177.0	0 59.9	+60.0	177.0	0 00.0	+60.0	177.0	0
1	7 59.4	+60.0	177.0	6 59.5	+60.0	177.0	5 59.6	+60.0	177.0	4 59.7	+60.0	177.0	3 59.8	+60.0	177.0	2 59.8	+60.0	177.0	1 59.9	+60.0	177.0	1 00.0	+60.0	177.0	1
2	8 59.4	+60.0	177.0	7 59.5	+60.0	177.0	6 59.6	+60.0	177.0	5 59.7	+60.0	177.0	4 59.8	+60.0	177.0	3 59.8	+60.0	177.0	2 59.9	+60.0	177.0	2 00.0	+60.0	177.0	2
3	9 59.4	+60.0	177.0	8 59.5	+60.0	177.0	7 59.6	+60.0	177.0	6 59.7	+60.0	177.0	5 59.8	+60.0	177.0	4 59.8	+60.0	177.0	3 59.9	+60.0	177.0	3 00.0	+60.0	177.0	3
4	10 59.4	+60.0	177.0	9 59.5	+60.0	177.0	8 59.6	+60.0	177.0	7 59.7	+60.0	177.0	6 59.8	+60.0	177.0	5 59.8	+60.0	177.0	4 59.9	+60.0	177.0	4 00.0	+60.0	177.0	4
5	11 59.4	+60.0	176.9	10 59.5	+60.0	177.0	9 59.6	+60.0	177.0	8 59.7	+60.0	177.0	7 59.8	+60.0	177.0	6 59.8	+60.0	177.0	5 59.9	+60.0	177.0	5 00.0	+60.0	177.0	5
6	12 59.4	+60.0	176.9	11 59.5	+60.0	176.9	10 59.6	+60.0	177.0	9 59.7	+60.0	177.0	8 59.8	+60.0	177.0	7 59.8	+60.0	177.0	6 59.9	+60.0	177.0	6 00.0	+60.0	177.0	6
7	13 59.4	+60.0	176.9	12 59.5	+60.0	176.9	11 59.6	+60.0	177.0	10 59.7	+60.0	177.0	9 59.8	+60.0	177.0	8 59.8	+60.0	177.0	7 59.9	+60.0	177.0	7 00.0	+60.0	177.0	7
8	14 59.4	+60.0	176.9	13 59.5	+60.0	176.9	12 59.6	+60.0	177.0	11 59.7	+60.0	177.0	10 59.8	+60.0	177.0	9 59.8	+60.0	177.0	8 59.9	+60.0	177.0	8 00.0	+60.0	177.0	8
9	15 59.4	+60.0	176.9	14 59.5	+60.0	176.9	13 59.6	+60.0	176.9	12 59.7	+60.0	177.0	11 59.8	+60.0	177.0	10 59.8	+60.0	177.0	9 59.9	+60.0	177.0	9 00.0	+60.0	177.0	9
10	16 59.4	+60.0	176.9	15 59.5	+60.0	176.9	14 59.6	+60.0	176.9	13 59.7	+60.0	177.0	12 59.8	+60.0	177.0	11 59.8	+60.0	177.0	10 59.9	+60.0	177.0	10 00.0	+60.0	177.0	10
11	17 59.4	+60.0	176.9	16 59.5	+60.0	176.9	15 59.6	+60.0	176.9	14 59.7	+60.0	177.0	13 59.8	+60.0	177.0	12 59.8	+60.0	177.0	11 59.9	+60.0	177.0	11 00.0	+60.0	177.0	11
12	18 59.4	+60.0	176.9	17 59.5	+60.0	176.9	16 59.6	+60.0	176.9	15 59.7	+60.0	176.9	14 59.8	+60.0	177.0	13 59.8	+60.0	177.0	12 59.9	+60.0	177.0	12 00.0	+60.0	177.0	12
13	19 59.4	+60.0	176.9	18 59.5	+60.0	176.9	17 59.6	+60.0	176.9	16 59.7	+60.0	176.9	15 59.8	+59.9	177.0	14 59.8	+60.0	177.0	13 59.9	+60.0	177.0	13 00.0	+60.0	177.0	13
14	20 59.4	+60.0	176.9	19 59.5	+60.0	176.9	18 59.6	+60.0	176.9	17 59.7	+60.0	176.9	16 59.7	+60.0	177.0	15 59.8	+60.0	177.0	14 59.9	+60.0	177.0	14 00.0	+60.0	177.0	14
15	21 59.4	+60.0	176.9	20 59.5	+60.0	176.9	19 59.6	+60.0	176.9	18 59.7	+60.0	176.9	17 59.7	+60.0	177.0	16 59.8	+60.0	177.0	15 59.9	+60.0	177.0	15 00.0	+60.0	177.0	15
16	22 59.4	+60.0	176.9	21 59.5	+60.0	176.9	20 59.6	+60.0	176.9	19 59.7	+60.0	176.9	18 59.7	+60.0	177.0	17 59.8	+60.0	177.0	16 59.9	+60.0	177.0	16 00.0	+60.0	177.0	16
17	23 59.4	+60.0	176.9	22 59.5	+60.0	176.9	21 59.6	+60.0	176.9	20 59.7	+60.0	176.9	19 59.7	+60.0	176.9	18 59.8	+60.0	177.0	17 59.9	+60.0	177.0	17 00.0	+60.0	177.0	17
18	24 59.4	+60.0	176.9	23 59.5	+60.0	176.9	22 59.6	+60.0	176.9	21 59.7	+60.0	176.9	20 59.7	+60.0	176.9	19 59.8	+60.0	177.0	18 59.9	+60.0	177.0	18 00.0	+60.0	177.0	18
19	25 59.4	+60.0	176.8	24 59.5	+60.0	176.9	23 59.6	+60.0	176.9	22 59.7	+60.0	176.9	21 59.7	+60.0	176.9	20 59.8	+60.0	177.0	19 59.9	+60.0	177.0	19 00.0	+60.0	177.0	19
20	26 59.4	+60.0	176.8	25 59.5	+60.0	176.9	24 59.6	+60.0	176.9	23 59.7	+60.0	176.9	22 59.7	+60.0	176.9	21 59.8	+60.0	177.0	20 59.9	+60.0	177.0	20 00.0	+60.0	177.0	20
21	27 59.4	+60.0	176.8	26 59.5	+60.0	176.9	25 59.6	+60.0	176.9	24 59.7	+60.0	176.9	23 59.7	+60.0	176.9	22 59.8	+60.0	177.0	21 59.9	+60.0	177.0	21 00.0	+60.0	177.0	21
22	28 59.4	+60.0	176.8	27 59.5	+60.0	176.8	26 59.6	+60.0	176.9	25 59.7	+60.0	176.9	24 59.7	+60.0	176.9	23 59.8	+60.0	177.0	22 59.9	+60.0	177.0	22 00.0	+60.0	177.0	22
23	29 59.4	+60.0	176.8	28 59.5	+60.0	176.8	27 59.6	+60.0	176.9	26 59.7	+60.0	176.9	25 59.7	+60.0	176.9	24 59.8	+60.0	177.0	23 59.9	+60.0	177.0	23 00.0	+60.0	177.0	23
24	30 59.4	+60.0	176.8	29 59.5	+60.0	176.8	28 59.6	+60.0	176.9	27 59.7	+60.0	176.9	26 59.7	+60.0	176.9	25 59.8	+60.0	177.0	24 59.9	+60.0	177.0	24 00.0	+60.0	177.0	24
25	31 59.4	+60.0	176.8	30 59.5	+60.0	176.8	29 59.6	+60.0	176.9	28 59.7	+60.0	176.9	27 59.7	+60.0	176.9	26 59.8	+60.0	176.9	25 59.9	+60.0	177.0	25 00.0	+60.0	177.0	25
26	32 59.4	+60.0	176.8	31 59.5	+60.0	176.8	30 59.6	+60.0	176.9	29 59.7	+60.0	176.9	28 59.7	+60.0	176.9	27 59.8	+60.0	176.9	26 59.9	+60.0	177.0	26 00.0	+60.0	177.0	26
27	33 59.4	+60.0	176.8	32 59.5	+60.0	176.8	31 59.6	+60.0	176.8	30 59.7	+60.0	176.9	29 59.7	+60.0	176.9	28 59.8	+60.0	176.9	27 59.9	+60.0	177.0	27 00.0	+60.0	177.0	27
28	34 59.4	+60.0	176.8	33 59.5	+60.0	176.8	32 59.6	+60.0	176.8	31 59.7	+60.0	176.9	30 59.7	+60.0	176.9	29 59.8	+60.0	176.9	28 59.9	+60.0	177.0	28 00.0	+60.0	177.0	28
29	35 59.4	+60.0	176.8	34 59.5	+60.0	176.8	33 59.6	+60.0	176.8	32 59.7	+60.0	176.9	31 59.7	+60.0	176.9	30 59.8	+60.0	176.9	29 59.9	+60.0	177.0	29 00.0	+60.0	177.0	29
30	36 59.4	+60.0	176.7	35 59.5	+60.0	176.8	34 59.6	+60.0	176.8	33 59.7	+60.0	176.9	32 59.7	+60.0	176.9	31 59.8	+60.0	176.9	30 59.9	+60.0	177.0	30 00.0	+60.0	177.0	30
31	37 59.4	+60.0	176.7	36 59.5	+60.0	176.8	35 59.6	+60.0	176.8	34 59.7	+60.0	176.9	33 59.7	+60.0	176.9	32 59.8	+60.0	176.9	31 59.9	+60.0	177.0	31 00.0	+60.0	177.0	31
32	38 59.4	+60.0	176.7	37 59.5	+60.0	176.8	36 59.6	+60.0	176.8	35 59.7	+60.0	176.9	34 59.7	+60.0	176.9	33 59.8	+60.0	176.9	32 59.9	+60.0	177.0	32 00.0	+60.0	177.0	32
33	39 59.4	+60.0	176.7	38 59.5	+60.0	176.8	37 59.6	+60.0	176.8	36 59.7	+60.0	176.8	35 59.7	+60.0	176.9	34 59.8	+60.0	176.9	33 59.9	+60.0	177.0	33 00.0	+60.0	177.0	33
34	40 59.4	+60.0	176.7	39 59.5	+60.0	176.8	38 59.6	+60.0	176.8	37 59.7	+60.0	176.8	36 59.7	+60.0	176.9	35 59.8	+60.0	176.9	34 59.9	+60.0	177.0	34 00.0	+60.0	177.0	34
35	41 59.4	+60.0	176.7	40 59.5	+60.0	176.7	39 59.6	+60.0	176.8	38 59.7	+60.0	176.8	37 59.7	+60.0	176.9	36 59.8	+60.0	176.9	35 59.9	+60.0	177.0	35 00.0	+60.0	177.0	35
36	42 59.4	+60.0	176.7	41 59.5	+60.0	176.7	40 59.6	+60.0	176.8	39 59.7	+60.0	176.8	38 59.7	+60.0	176.9	37 59.8	+60.0	176.9	36 59.9	+60.0	177.0	36 00.0	+60.0	177.0	36
37	43 59.4	+60.0	176.7	42 59.5	+60.0	176.7	41 59.6	+60.0	176.8	40 59.7	+60.0	176.8	39 59.7	+60.0	176.9	38 59.8	+60.0	176.9	37 59.9	+60.0	177.0	37 00.0	+60.0	177.0	37
38	44 59.4	+60.0	176.7	43 59.5	+60.0	176.7	42 59.6	+60.0	176.8	41 59.7	+60.0	176.8	40 59.7	+60.0	176.9	39 59.8	+60.0	176.9	38 59.9	+60.0	177.0	38 00.0	+60.0	177.0	38
39	45 59.4	+60.0	176.6	44 59.5	+60.0	176.7	43 59.6	+60.0	176.8	42 59.7	+60.0	176.8	41 59.7	+60.0	176.9	40 59.8	+60.0	176.9	39 59.9	+60.0	177.0	39 00.0	+60.0	177.0	39
40	46 59.4	+60.0	176.6	45 59.5	+60.0	176.7	44 59.6	+60.0	176.8	43 59.7	+59.9	176.8	42 59.7	+60.0	176.9	41 59.8	+60.0	176.9	40 59.9	+60.0	177.0	40 00.0	+60.0	177.0	40
41	47 59.4	+59.9	176.6	46 59.5	+60.0	176.7	45 59.6	+60.0	176.7	44 59.6	+60.0	176.8	43 59.7	+60.0	176.9	42 59.8	+60.0	176.9	41 59.9	+60.0	177.0	41 00.0	+60.0	177.0	41
42	48 59.3	+60.0	176.6	47 59.5	+60.0	176.7	46 59.6	+60.0	176.7	45 59.6	+60.0	176.8	44 59.7	+60.0	176.8	43 59.8	+60.0	176.9	42 59.9	+60.0	177.0	42 00.0	+60.0	177.0	42
43	49 59.3	+60.0	176.6	48 59.5	+59.9	176.7	47 59.6	+59.9	176.7	46 59.6	+60.0	176.8	45 59.7	+60.0	176.8	44 59.8	+60.0	176.9	43 59.9	+60.0	176.9	43 00.0	+60.0	177.0	43
44	50 59.3	+60.0	176.6	49 59.4	+60.0	176.6	48 59.5	+60.0	176.7	47 59.6	+60.0	176.8	46 59.7	+60.0	176.8	45 59.8	+60.0	176.9	44 59.9	+60.0	176.9	44 00.0	+60.0	177.0	44
45	51 59.3	+60.0	176.6	50 59.4	+60.0	176.6	49 59.5	+60.0	176.7	48 59.6	+60.0	176.8	47 59.7	+60.0	176.8	46 59.8	+60.0	176.9	45 59.9	+60.0	176.9	45 00.0	+60.0	177.0	45
46	52 59.3	+60.0	176.5	51 59.4	+60.0	176.6	50 59.5	+60.0	176.7	49 59.6	+60.0	176.8	48 59.7	+60.0	176.8	47 59.8	+60.0	176.9	46 59.9	+60.0	176.9	46 00.0	+60.0	177.0	46
47	53 59.3	+60.0	176.5	52 59.4	+60.0	176.6	51 59.5	+60.0	176.7	50 59.6	+60.0	176.7	49 59.7	+60.0	176.8	48 59.8	+60.0	176.9	47 59.9	+60.0	176.9	47 00.0	+60.0	177.0	47
48	54 59.3	+60.0	176.5	53 59.4	+60.0	176.6	52 59.5	+60.0	176.7	51 59.6	+60.0	176.7	50 59.7	+60.0	176.8	49 59.8	+60.0	176.9	48 59.9	+60.0	176.9	48 00.0	+60.0	177.0	48
49	55 59.3	+60.0	176.5	54 59.4	+60.0	176.6	53 59.5	+60.0	176.7	52 59.6	+60.0	176.7	51 59.7	+60.0	176.8	50 59.8	+60.0	176.9	49 59.9	+60.0	176.9	49 00.0	+60.0	177.0	49
50	56 59.3	+60.0	176.5	55 59.4	+60.0	176.6	54 59.5	+60.0	176.6	53 59.6	+60.0	176.7	52 59.7	+60.0	176.8	51 59.8	+60.0	176.9	50 59.9	+60.0	176.9	50 00.0	+60.0	177.0	50
51	57 59.3	+60.0	176.4	56 59.4	+60.0	176.5	55 59.5	+60.0	176.6	54 59.6	+60.0	176.7	53 59.7	+60.0	176.8	52 59.8	+60.0	176.9	51 59.9	+60.0	176.9	51 00.0	+60.0	177.0	51
52	58 59.3	+60.0	176.4	57 59.4	+60.0	176.5	56 59.5	+60.0	176.6	55 59.6	+60.0	176.7	54 59.7	+60.0	176.8	53 59.8	+60.0	176.9	52 59.9	+60.0	176.9	52 00.0	+60.0	177.0	52
53	59 59.3	+60.0	176.4	58 59.4	+60.0	176.5	57 59.5	+60.0	176.6	56 59.6	+60.0	176.7	55 59.7	+60.0	176.8	54 59.8	+60.0	176.9	53 59.9	+60.0	176.9	53 00.0	+60.0	177.0	53
54	60 59.3	+60.0	176.4	59 59.4	+60.0	176.5	58 59.5	+60.0	176.6	57 59.6	+60.0	176.7	56 59.7	+60.0	176.8	55 59.8	+60.0	176.8	54 59.9	+60.0	176.9	54 00.0	+60.0	177.0	54
55	61 59.3	+60.0	176.3	60 59.4	+60.0	176.5	59 59.5	+60.0	176.6	58 59.6	+60.0	176.7	57 59.7	+60.0	176.8	56 59.8	+60.0	176.8	55 59.9	+60.0	176.9	55 00.0	+60.0	177.0	55
56	62 59.3	+60.0	176.3	61 59.4	+60.0	176.4	60 59.5	+60.0	176.5	59 59.6	+60.0	176.6	58 59.7	+60.0	176.7	57 59.8	+60.0	176.8	56 59.9	+60.0	176.9	56 00.0	+60.0	177.0	56
57	63 59.3	+60.0	176.3	62 59.4	+60.0	176.4	61 59.5	+60.0	176.5	60 59.6	+60.0	176.6	59 59.7	+60.0	176.7	58 59.8	+60.0	176.8	57 59.9	+60.0	176.9	57 00.0	+60.0	177.0	57
58	64 59.3	+60.0	176.2	63 59.4	+60.0	176.4	62 59.5	+60.0	176.5	61 59.6	+60.0	176.6	60 59.7	+60.0	176.7	59 59.8	+60.0	176.8	58 59.9	+60.0	176.9	58 00.0	+60.0	177.0	58
59	65 59.3	+60.0	176.2	64 59.4	+60.0	176.3	63 59.5	+60.0	176.5	62 59.6	+60.0	176.6	61 59.7	+60.0	176.7	60 59.8	+60.0	176.8	59 59.9	+60.0	176.9	59 00.0	+60.0	177.0	59
60	66 59.3	+60.0	176.2	65 59.4	+60.0	176.3	64 59.5	+60.0	176.5	63 59.6	+60.0	176.6	62 59.7	+60.0	176.7	61 59.8	+60.0	176.8	60 59.9	+60.0	176.9	60 00.0	+60.0	177.0	60
61	67 59.3	+59.9	176.1	66 59.4	+60.0	176.3	65 59.5	+60.0	176.4	64 59.6	+60.0	176.6	63 59.7	+60.0	176.7	62 59.8	+60.0	176.8	61 59.9	+60.0	176.9	61 00.0	+60.0	177.0	61
62	68 59.2	+60.0	176.1	67 59.4	+60.0	176.2	66 59.5	+60.0	176.4	65 59.6	+60.0	176.5	64 59.7	+60.0	176.7	63 59.8	+60.0	176.8	62 59.9	+60.0	176.9	62 00.0	+60.0	177.0	62
63	69 59.2	+60.0	176.0	68 59.4	+60.0	176.2	67 59.5	+60.0	176.4	66 59.6	+60.0	176.5	65 59.7	+60.0	176.7	64 59.8	+60.0	176.8	63 59.9	+60.0	176.9	63 00.0	+60.0	177.0	63
64	70 59.2	+60.0	176.0	69 59.4	+60.0	176.2	68 59.5	+60.0	176.3	67 59.6	+60.0	176.5	66 59.7	+60.0	176.6	65 59.8	+60.0	176.8	64 59.9	+60.0	176.9	64 00.0	+60.0	177.0	64
65	71 59.2	+60.0	175.9	70 59.4	+60.0	176.1	69 59.5	+60.0	176.3	68 59.6	+60.0	176.5	67 59.7	+60.0	176.6	66 59.8	+60.0	176.8	65 59.9	+60.0	176.9	65 00.0	+60.0	177.0	65
66	72 59.2	+60.0	175.8	71 59.4	+59.9	176.1	70 59.5	+60.0	176.3	69 59.6	+60.0	176.4	68 59.7	+60.0	176.6	67 59.8	+60.0	176.7	66 59.9	+60.0	176.9	66 00.0	+60.0	177.0	66
67	73 59.2	+60.0	175.7	72 59.3	+60.0	176.0	71 59.5	+60.0	176.2	70 59.6	+60.0	176.4	69 59.7	+60.0	176.6	68 59.8	+60.0	176.7	67 59.9	+60.0	176.9	67 00.0	+60.0	177.0	67
68	74 59.2	+60.0	175.7	73 59.3	+60.0	175.9	72 59.5	+60.0	176.2	71 59.6	+60.0	176.4	70 59.7	+60.0	176.5	69 59.8	+60.0	176.7	68 59.9	+60.0	176.9	68 00.0	+60.0	177.0	68
69	75 59.2	+59.9	175.6	74 59.3	+60.0	175.8	73 59.5	+60.0	176.1	72 59.6	+60.0	176.3	71 59.7	+60.0	176.5	70 59.8	+60.0	176.7	69 59.9	+60.0	176.9	69 00.0	+60.0	177.0	69
70	76 59.1	+60.0	175.4	75 59.3	+60.0	175.8	74 59.5	+59.9	176.0	73 59.6	+60.0	176.3	72 59.7	+60.0	176.5	71 59.8	+60.0	176.7	70 59.9	+60.0	176.8	70 00.0	+60.0	177.0	70
71	77 59.1	+60.0	175.3	76 59.3	+60.0	175.7	75 59.4	+60.0	176.0	74 59.6	+60.0	176.2	73 59.7	+60.0	176.5	72 59.8	+60.0	176.7	71 59.9	+60.0	176.8	71 00.0	+60.0	177.0	71
72	78 59.1	+59.9	175.1	77 59.3	+59.9	175.5	76 59.4	+60.0	175.9	75 59.6	+60.0	176.2	74 59.7	+60.0	176.4	73 59.8	+60.0	176.6	72 59.9	+60.0	176.8	72 00.0	+60.0	177.0	72
73	79 59.0	+60.0	175.0	78 59.2	+60.0	175.4	77 59.4	+60.0	175.8	76 59.6	+60.0	176.1	75 59.7	+60.0	176.4	74 59.8	+60.0	176.6	73 59.9	+60.0	176.8	73 00.0	+60.0	177.0	73
74	80 59.0	+59.9	174.7	79 59.2	+60.0	175.2	78 59.4	+60.0	175.7	77 59.6	+60.0	176.0	76 59.7	+60.0	176.3	75 59.8	+60.0	176.6	74 59.9	+60.0	176.8	74 00.0	+60.0	177.0	74
75	81 58.9	+60.0	174.4	80 59.2	+59.9	175.0	79 59.4	+60.0	175.5	78 59.6	+59.9	175.9	77 59.7	+60.0	176.3	76 59.8	+60.0	176.5	75 59.9	+60.0	176.8	75 00.0	+60.0	177.0	75
76	82 58.9	+59.9	174.1	81 59.1	+60.0	174.8	80 59.4	+59.9	175.4	79 59.5	+60.0	175.8	78 59.7	+60.0	176.2	77 59.8	+60.0	176.5	76 59.9	+60.0	176.8	76 00.0	+60.0	177.0	76
77	83 58.8	+59.8	173.6	82 59.1	+59.9	174.5	81 59.3	+60.0	175.2	80 59.5	+60.0	175.7	79 59.7	+60.0	176.1	78 59.8	+60.0	176.5	77 59.9	+60.0	176.8	77 00.0	+60.0	177.0	77
78	84 58.6	+59.8	172.9	83 59.0	+59.9	174.0	82 59.3	+60.0	174.9	81 59.5	+60.0	175.5	80 59.7	+60.0	176.0	79 59.8	+60.0	176.4	78 59.9	+60.0	176.7	78 00.0	+60.0	177.0	78
79	85 58.4	+59.7	171.8	84 58.9	+59.9	173.4	83 59.3	+59.9	174.5	82 59.5	+60.0	175.3	81 59.7	+59.9	175.9	80 59.8	+60.0	176.3	79 59.9	+60.0	176.7	79 00.0	+60.0	177.0	79
80	86 58.1	+59.4	170.1	85 58.8	+59.7	172.6	84 59.2	+59.9	174.0	83 59.5	+59.9	175.0	82 59.6	+60.0	175.7	81 59.8	+60.0	176.3	80 59.9	+60.0	176.7	80 00.0	+60.0	177.0	80
81	87 57.5	*+58.1*	•166.7	86 58.5	+59.6	171.1	85 59.1	+59.8	173.3	84 59.4	+59.9	174.6	83 59.6	+60.0	175.5	82 59.8	+60.0	176.1	81 59.9	+60.0	176.6	81 00.0	+60.0	177.0	81
82	88 55.6	*+42.5*	•157.1	87 58.1	*+58.6*	•168.1	86 58.9	+59.7	172.0	85 59.3	+59.9	174.0	84 59.6	+60.0	175.2	83 59.8	+60.0	176.0	82 59.9	+60.0	176.6	82 00.0	+60.0	177.0	82
83	89 38.1	*−41.4*	• 88.5	88 56.7	*+44.5*	•159.7	87 58.6	*+59.0*	•169.6	86 59.2	+59.8	173.0	85 59.6	+59.9	174.8	84 59.8	+60.0	175.8	83 59.9	+60.0	176.5	83 00.0	+60.0	177.0	83
84	88 56.7	*−58.1*	• 17.3	89 41.2	*−43.6*	• 88.5	88 57.6	*+46.7*	•162.5	87 59.0	*+59.4*	•171.1	86 59.5	+59.9	174.0	85 59.8	+59.9	175.5	84 59.9	+60.0	176.4	84 00.0	+60.0	177.0	84
85	87 58.6	−59.4	7.4	88 57.6	*−58.6*	• 14.6	89 44.3	*−45.9*	• 88.5	88 58.4	*+49.0*	•165.3	87 59.4	*+59.6*	•172.5	86 59.7	+60.0	175.0	85 59.9	+60.0	176.3	85 00.0	+60.0	177.0	85
86	86 59.2	−59.6	4.0	87 59.0	−59.5	6.0	88 58.4	*−59.0*	• 11.8	89 47.4	*−48.4*	• 88.5	88 59.0	*+51.6*	•168.1	87 59.7	*+59.8*	•174.0	86 59.9	+60.0	176.0	86 00.0	+60.0	177.0	86
87	85 59.6	−59.8	2.2	86 59.5	−59.7	3.0	87 59.4	−59.7	4.5	88 59.0	*−59.3*	• 8.9	89 50.6	*−51.1*	• 88.5	88 59.5	*+54.2*	•171.0	87 59.9	+59.9	175.5	87 00.0	+60.0	177.0	87
88	84 59.8	−59.9	1.2	85 59.8	−59.9	1.5	86 59.7	−59.8	2.0	87 59.7	−59.8	3.0	88 59.5	*−59.6*	• 6.0	89 53.7	*−53.9*	• 88.5	88 59.8	*+57.1*	•174.0	88 00.0	+60.0	177.0	88
89	83 59.9	−59.9	0.5	84 59.9	−59.9	0.6	85 59.9	−59.9	0.7	86 59.9	−59.9	1.0	87 59.9	−59.9	1.5	88 59.8	*−59.8*	• 3.0	89 56.9	*−56.9*	• 88.5	89 00.0	+60.0	177.0	89
90	83 00.0	−59.9	0.0	84 00.0	−59.9	0.0	85 00.0	−59.9	0.0	86 00.0	−59.9	0.0	87 00.0	−59.9	0.0	88 00.0	−59.9	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	88.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 3°, 357°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.4	–60.0	177.0	5 59.5	–60.0	177.0	4 59.6	–60.0	177.0	3 59.7	–60.0	177.0	2 59.8	–60.0	177.0	1 59.8	–60.0	177.0	0 59.9	–60.0	177.0	0 00.0	+60.0	3.0	0
1	5 59.4	–60.0	177.0	4 59.5	–60.0	177.0	3 59.6	–60.0	177.0	2 59.7	–60.0	177.0	1 59.8	–60.0	177.0	0 59.8	–60.0	177.0	0 00.1	+60.0	3.0	1 00.0	+60.0	3.0	1
2	4 59.4	–60.0	177.0	3 59.5	–60.0	177.0	2 59.6	–60.0	177.0	1 59.7	–60.0	177.0	0 59.8	–60.0	177.0	0 00.2	+60.0	3.0	1 00.1	+60.0	3.0	2 00.0	+60.0	3.0	2
3	3 59.4	–60.0	177.0	2 59.5	–60.0	177.0	1 59.6	–60.0	177.0	0 59.7	–60.0	177.0	0 00.2	+60.0	3.0	1 00.2	+60.0	3.0	2 00.1	+60.0	3.0	3 00.0	+60.0	3.0	3
4	2 59.4	–60.0	177.0	1 59.5	–60.0	177.0	0 59.6	–60.0	177.0	0 00.3	+60.0	3.0	1 00.2	+60.0	3.0	2 00.2	+60.0	3.0	3 00.1	+60.0	3.0	4 00.0	+60.0	3.0	4
5	1 59.4	–60.0	177.0	0 59.5	–60.0	177.0	0 00.4	+60.0	3.0	1 00.3	+60.0	3.0	2 00.2	+60.0	3.0	3 00.2	+60.0	3.0	4 00.1	+60.0	3.0	5 00.0	+60.0	3.0	5
6	0 59.4	–60.0	177.0	0 00.5	+60.0	3.0	1 00.4	+60.0	3.0	2 00.3	+60.0	3.0	3 00.2	+60.0	3.0	4 00.2	+60.0	3.0	5 00.1	+60.0	3.0	6 00.0	+60.0	3.0	6
7	0 00.6	+60.0	3.0	1 00.5	+60.0	3.0	2 00.4	+60.0	3.0	3 00.3	+60.0	3.0	4 00.2	+60.0	3.0	5 00.2	+60.0	3.0	6 00.1	+60.0	3.0	7 00.0	+60.0	3.0	7
8	1 00.6	+60.0	3.0	2 00.5	+60.0	3.0	3 00.4	+60.0	3.0	4 00.3	+60.0	3.0	5 00.2	+60.0	3.0	6 00.2	+60.0	3.0	7 00.1	+60.0	3.0	8 00.0	+60.0	3.0	8
9	2 00.6	+60.0	3.0	3 00.5	+60.0	3.0	4 00.4	+60.0	3.0	5 00.3	+60.0	3.0	6 00.2	+60.0	3.0	7 00.2	+60.0	3.0	8 00.1	+60.0	3.0	9 00.0	+60.0	3.0	9
10	3 00.6	+60.0	3.0	4 00.5	+60.0	3.0	5 00.4	+60.0	3.0	6 00.3	+60.0	3.0	7 00.2	+60.0	3.0	8 00.2	+60.0	3.0	9 00.1	+60.0	3.0	10 00.0	+60.0	3.0	10
11	4 00.6	+60.0	3.0	5 00.5	+60.0	3.0	6 00.4	+60.0	3.0	7 00.3	+60.0	3.0	8 00.2	+60.0	3.0	9 00.2	+60.0	3.0	10 00.1	+60.0	3.0	11 00.0	+60.0	3.0	11
12	5 00.6	+60.0	2.9	6 00.5	+60.0	3.0	7 00.4	+60.0	3.0	8 00.3	+60.0	3.0	9 00.2	+60.0	3.0	10 00.2	+60.0	3.0	11 00.1	+60.0	3.0	12 00.0	+60.0	3.0	12
13	6 00.6	+60.0	2.9	7 00.5	+60.0	2.9	8 00.4	+60.0	3.0	9 00.3	+60.0	3.0	10 00.2	+60.0	3.0	11 00.2	+60.0	3.0	12 00.1	+60.0	3.0	13 00.0	+60.0	3.0	13
14	7 00.6	+60.0	2.9	8 00.5	+60.0	2.9	9 00.4	+60.0	2.9	10 00.3	+60.0	3.0	11 00.2	+60.0	3.0	12 00.2	+60.0	3.0	13 00.1	+60.0	3.0	14 00.0	+60.0	3.0	14
15	8 00.6	+60.0	2.9	9 00.5	+60.0	2.9	10 00.4	+60.0	2.9	11 00.3	+60.0	3.0	12 00.2	+60.0	3.0	13 00.2	+60.0	3.0	14 00.1	+60.0	3.0	15 00.0	+60.0	3.0	15
16	9 00.6	+60.0	2.9	10 00.5	+60.0	2.9	11 00.4	+60.0	2.9	12 00.3	+60.0	2.9	13 00.2	+60.0	3.0	14 00.2	+60.0	3.0	15 00.1	+60.0	3.0	16 00.0	+60.0	3.0	16
17	10 00.6	+60.0	2.9	11 00.5	+60.0	2.9	12 00.4	+60.0	2.9	13 00.3	+60.0	2.9	14 00.2	+60.0	3.0	15 00.2	+60.0	3.0	16 00.1	+60.0	3.0	17 00.0	+60.0	3.0	17
18	11 00.6	+60.0	2.9	12 00.5	+60.0	2.9	13 00.4	+60.0	2.9	14 00.3	+60.0	2.9	15 00.2	+60.0	3.0	16 00.2	+60.0	3.0	17 00.1	+60.0	3.0	18 00.0	+60.0	3.0	18
19	12 00.6	+60.0	2.9	13 00.5	+60.0	2.9	14 00.4	+60.0	2.9	15 00.3	+60.0	2.9	16 00.2	+60.0	3.0	17 00.2	+60.0	3.0	18 00.1	+60.0	3.0	19 00.0	+60.0	3.0	19
20	13 00.6	+60.0	2.9	14 00.5	+60.0	2.9	15 00.4	+60.0	2.9	16 00.3	+60.0	2.9	17 00.2	+60.0	2.9	18 00.2	+60.0	3.0	19 00.1	+60.0	3.0	20 00.0	+60.0	3.0	20
21	14 00.6	+60.0	2.9	15 00.5	+60.0	2.9	16 00.4	+60.0	2.9	17 00.3	+60.0	2.9	18 00.2	+60.0	2.9	19 00.2	+60.0	3.0	20 00.1	+60.0	3.0	21 00.0	+60.0	3.0	21
22	15 00.6	+59.9	2.9	16 00.5	+60.0	2.9	17 00.4	+60.0	2.9	18 00.3	+60.0	2.9	19 00.2	+60.0	2.9	20 00.2	+60.0	3.0	21 00.1	+60.0	3.0	22 00.0	+60.0	3.0	22
23	16 00.5	+60.0	2.9	17 00.5	+60.0	2.9	18 00.4	+60.0	2.9	19 00.3	+60.0	2.9	20 00.2	+60.0	2.9	21 00.2	+60.0	3.0	22 00.1	+60.0	3.0	23 00.0	+60.0	3.0	23
24	17 00.5	+60.0	2.9	18 00.5	+60.0	2.9	19 00.4	+60.0	2.9	20 00.3	+60.0	2.9	21 00.2	+60.0	2.9	22 00.2	+60.0	3.0	23 00.1	+60.0	3.0	24 00.0	+60.0	3.0	24
25	18 00.5	+60.0	2.9	19 00.5	+60.0	2.9	20 00.4	+60.0	2.9	21 00.3	+60.0	2.9	22 00.2	+60.0	2.9	23 00.2	+60.0	3.0	24 00.1	+60.0	3.0	25 00.0	+60.0	3.0	25
26	19 00.5	+60.0	2.9	20 00.5	+60.0	2.9	21 00.4	+60.0	2.9	22 00.3	+60.0	2.9	23 00.2	+60.0	2.9	24 00.2	+60.0	3.0	25 00.1	+60.0	3.0	26 00.0	+60.0	3.0	26
27	20 00.5	+60.0	2.8	21 00.5	+60.0	2.9	22 00.4	+60.0	2.9	23 00.3	+60.0	2.9	24 00.2	+60.0	2.9	25 00.2	+60.0	2.9	26 00.1	+60.0	3.0	27 00.0	+60.0	3.0	27
28	21 00.5	+60.0	2.8	22 00.5	+60.0	2.9	23 00.4	+60.0	2.9	24 00.3	+60.0	2.9	25 00.2	+60.0	2.9	26 00.2	+60.0	2.9	27 00.1	+60.0	3.0	28 00.0	+60.0	3.0	28
29	22 00.5	+60.0	2.8	23 00.5	+60.0	2.9	24 00.4	+60.0	2.9	25 00.3	+60.0	2.9	26 00.2	+60.0	2.9	27 00.2	+60.0	2.9	28 00.1	+60.0	3.0	29 00.0	+60.0	3.0	29
30	23 00.5	+60.0	2.8	24 00.5	+60.0	2.8	25 00.4	+60.0	2.9	26 00.3	+60.0	2.9	27 00.2	+60.0	2.9	28 00.2	+60.0	2.9	29 00.1	+60.0	3.0	30 00.0	+60.0	3.0	30
31	24 00.5	+60.0	2.8	25 00.5	+60.0	2.8	26 00.4	+60.0	2.9	27 00.3	+60.0	2.9	28 00.2	+60.0	2.9	29 00.2	+60.0	2.9	30 00.1	+60.0	3.0	31 00.0	+60.0	3.0	31
32	25 00.5	+60.0	2.8	26 00.5	+60.0	2.8	27 00.4	+60.0	2.9	28 00.3	+60.0	2.9	29 00.2	+60.0	2.9	30 00.2	+60.0	2.9	31 00.1	+60.0	3.0	32 00.0	+60.0	3.0	32
33	26 00.5	+60.0	2.8	27 00.5	+60.0	2.8	28 00.4	+60.0	2.8	29 00.3	+60.0	2.9	30 00.2	+60.0	2.9	31 00.2	+60.0	2.9	32 00.1	+60.0	3.0	33 00.0	+60.0	3.0	33
34	27 00.5	+60.0	2.8	28 00.5	+60.0	2.8	29 00.4	+60.0	2.8	30 00.3	+60.0	2.9	31 00.2	+60.0	2.9	32 00.2	+60.0	2.9	33 00.1	+60.0	3.0	34 00.0	+60.0	3.0	34
35	28 00.5	+60.0	2.8	29 00.5	+60.0	2.8	30 00.4	+60.0	2.8	31 00.3	+60.0	2.9	32 00.2	+60.0	2.9	33 00.2	+60.0	2.9	34 00.1	+60.0	3.0	35 00.0	+60.0	3.0	35
36	29 00.5	+60.0	2.8	30 00.5	+60.0	2.8	31 00.4	+60.0	2.8	32 00.3	+60.0	2.9	33 00.2	+60.0	2.9	34 00.2	+60.0	2.9	35 00.1	+60.0	3.0	36 00.0	+60.0	3.0	36
37	30 00.5	+60.0	2.8	31 00.5	+60.0	2.8	32 00.4	+60.0	2.8	33 00.3	+60.0	2.9	34 00.2	+60.0	2.9	35 00.2	+60.0	2.9	36 00.1	+60.0	3.0	37 00.0	+60.0	3.0	37
38	31 00.5	+60.0	2.8	32 00.5	+60.0	2.8	33 00.4	+60.0	2.8	34 00.3	+60.0	2.9	35 00.2	+60.0	2.9	36 00.2	+60.0	2.9	37 00.1	+60.0	3.0	38 00.0	+60.0	3.0	38
39	32 00.5	+60.0	2.7	33 00.5	+60.0	2.8	34 00.4	+60.0	2.8	35 00.3	+60.0	2.8	36 00.2	+60.0	2.9	37 00.2	+60.0	2.9	38 00.1	+60.0	3.0	39 00.0	+60.0	3.0	39
40	33 00.5	+60.0	2.7	34 00.5	+60.0	2.8	35 00.4	+60.0	2.8	36 00.3	+60.0	2.8	37 00.2	+60.0	2.9	38 00.2	+60.0	2.9	39 00.1	+60.0	3.0	40 00.0	+60.0	3.0	40
41	34 00.5	+60.0	2.7	35 00.5	+60.0	2.8	36 00.4	+60.0	2.8	37 00.3	+60.0	2.8	38 00.2	+60.0	2.9	39 00.2	+60.0	2.9	40 00.1	+60.0	3.0	41 00.0	+60.0	3.0	41
42	35 00.5	+60.0	2.7	36 00.5	+60.0	2.8	37 00.4	+60.0	2.8	38 00.3	+60.0	2.8	39 00.2	+60.0	2.9	40 00.2	+60.0	2.9	41 00.1	+60.0	3.0	42 00.0	+60.0	3.0	42
43	36 00.5	+60.0	2.7	37 00.5	+59.9	2.7	38 00.4	+60.0	2.8	39 00.3	+60.0	2.8	40 00.2	+60.0	2.9	41 00.2	+60.0	2.9	42 00.1	+60.0	3.0	43 00.0	+60.0	3.0	43
44	37 00.5	+60.0	2.7	38 00.4	+60.0	2.7	39 00.4	+60.0	2.8	40 00.3	+60.0	2.8	41 00.2	+60.0	2.9	42 00.2	+60.0	2.9	43 00.1	+60.0	3.0	44 00.0	+60.0	3.0	44
45	38 00.5	+60.0	2.7	39 00.4	+60.0	2.7	40 00.4	+60.0	2.8	41 00.3	+60.0	2.8	42 00.2	+60.0	2.9	43 00.2	+60.0	2.9	44 00.1	+60.0	2.9	45 00.0	+60.0	3.0	45
46	39 00.5	+60.0	2.7	40 00.4	+60.0	2.7	41 00.4	+60.0	2.8	42 00.3	+60.0	2.8	43 00.2	+60.0	2.8	44 00.2	+60.0	2.9	45 00.1	+60.0	2.9	46 00.0	+60.0	3.0	46
47	40 00.5	+60.0	2.7	41 00.4	+60.0	2.7	42 00.4	+60.0	2.8	43 00.3	+60.0	2.8	44 00.2	+60.0	2.8	45 00.2	+60.0	2.9	46 00.1	+60.0	2.9	47 00.0	+60.0	3.0	47
48	41 00.5	+60.0	2.7	42 00.4	+60.0	2.7	43 00.4	+60.0	2.7	44 00.3	+60.0	2.8	45 00.2	+60.0	2.8	46 00.2	+60.0	2.9	47 00.1	+60.0	2.9	48 00.0	+60.0	3.0	48
49	42 00.5	+60.0	2.6	43 00.4	+60.0	2.7	44 00.4	+60.0	2.7	45 00.3	+60.0	2.8	46 00.2	+60.0	2.8	47 00.2	+60.0	2.9	48 00.1	+60.0	2.9	49 00.0	+60.0	3.0	49
50	43 00.5	+60.0	2.6	44 00.4	+60.0	2.7	45 00.4	+60.0	2.7	46 00.3	+60.0	2.8	47 00.2	+60.0	2.8	48 00.2	+60.0	2.9	49 00.1	+60.0	2.9	50 00.0	+60.0	3.0	50
51	44 00.5	+60.0	2.6	45 00.4	+60.0	2.7	46 00.4	+60.0	2.7	47 00.3	+60.0	2.8	48 00.2	+60.0	2.8	49 00.2	+60.0	2.9	50 00.1	+60.0	2.9	51 00.0	+60.0	3.0	51
52	45 00.5	+60.0	2.6	46 00.4	+60.0	2.7	47 00.4	+60.0	2.7	48 00.3	+60.0	2.8	49 00.2	+60.0	2.8	50 00.2	+60.0	2.9	51 00.1	+60.0	2.9	52 00.0	+60.0	3.0	52
53	46 00.5	+60.0	2.6	47 00.4	+60.0	2.6	48 00.4	+60.0	2.7	49 00.3	+60.0	2.8	50 00.2	+60.0	2.8	51 00.2	+60.0	2.9	52 00.1	+60.0	2.9	53 00.0	+60.0	3.0	53
54	47 00.5	+60.0	2.6	48 00.4	+60.0	2.6	49 00.4	+60.0	2.7	50 00.3	+60.0	2.7	51 00.2	+60.0	2.8	52 00.2	+60.0	2.9	53 00.1	+60.0	2.9	54 00.0	+60.0	3.0	54
55	48 00.5	+60.0	2.6	49 00.4	+60.0	2.6	50 00.4	+60.0	2.7	51 00.3	+60.0	2.7	52 00.2	+60.0	2.8	53 00.2	+60.0	2.9	54 00.1	+60.0	2.9	55 00.0	+60.0	3.0	55
56	49 00.5	+60.0	2.6	50 00.4	+60.0	2.6	51 00.4	+60.0	2.7	52 00.3	+60.0	2.7	53 00.2	+60.0	2.8	54 00.2	+60.0	2.9	55 00.1	+60.0	2.9	56 00.0	+60.0	3.0	56
57	50 00.5	+60.0	2.5	51 00.4	+60.0	2.6	52 00.4	+60.0	2.7	53 00.3	+60.0	2.7	54 00.2	+60.0	2.8	55 00.2	+60.0	2.8	56 00.1	+60.0	2.9	57 00.0	+60.0	3.0	57
58	51 00.5	+60.0	2.5	52 00.4	+60.0	2.6	53 00.4	+60.0	2.6	54 00.3	+60.0	2.7	55 00.2	+60.0	2.8	56 00.2	+60.0	2.8	57 00.1	+60.0	2.9	58 00.0	+60.0	3.0	58
59	52 00.5	+60.0	2.5	53 00.4	+60.0	2.6	54 00.4	+60.0	2.6	55 00.3	+60.0	2.7	56 00.2	+60.0	2.8	57 00.2	+60.0	2.8	58 00.1	+60.0	2.9	59 00.0	+60.0	3.0	59
60	53 00.5	+60.0	2.5	54 00.4	+60.0	2.6	55 00.4	+60.0	2.6	56 00.3	+60.0	2.7	57 00.2	+60.0	2.8	58 00.2	+60.0	2.8	59 00.1	+60.0	2.9	60 00.0	+60.0	3.0	60
61	54 00.5	+60.0	2.5	55 00.4	+60.0	2.5	56 00.4	+60.0	2.6	57 00.3	+60.0	2.7	58 00.2	+60.0	2.7	59 00.2	+60.0	2.8	60 00.1	+60.0	2.9	61 00.0	+60.0	3.0	61
62	55 00.5	+60.0	2.5	56 00.4	+60.0	2.5	57 00.4	+60.0	2.6	58 00.3	+60.0	2.7	59 00.2	+60.0	2.7	60 00.2	+60.0	2.8	61 00.1	+60.0	2.9	62 00.0	+60.0	3.0	62
63	56 00.5	+60.0	2.4	57 00.4	+60.0	2.5	58 00.4	+59.9	2.6	59 00.3	+60.0	2.6	60 00.2	+60.0	2.7	61 00.2	+60.0	2.8	62 00.1	+60.0	2.9	63 00.0	+60.0	3.0	63
64	57 00.5	+60.0	2.4	58 00.4	+60.0	2.5	59 00.3	+60.0	2.6	60 00.3	+60.0	2.6	61 00.2	+60.0	2.7	62 00.2	+60.0	2.8	63 00.1	+60.0	2.9	64 00.0	+60.0	3.0	64
65	58 00.5	+60.0	2.4	59 00.4	+60.0	2.5	60 00.3	+60.0	2.5	61 00.3	+60.0	2.6	62 00.2	+60.0	2.7	63 00.2	+60.0	2.8	64 00.1	+60.0	2.9	65 00.0	+60.0	3.0	65
66	59 00.5	+59.9	2.4	60 00.4	+60.0	2.4	61 00.3	+60.0	2.5	62 00.3	+60.0	2.6	63 00.2	+60.0	2.7	64 00.2	+60.0	2.8	65 00.1	+60.0	2.9	66 00.0	+60.0	3.0	66
67	60 00.4	+60.0	2.3	61 00.4	+60.0	2.4	62 00.3	+60.0	2.5	63 00.3	+60.0	2.6	64 00.2	+60.0	2.7	65 00.2	+60.0	2.8	66 00.1	+60.0	2.9	67 00.0	+60.0	3.0	67
68	61 00.4	+60.0	2.3	62 00.4	+60.0	2.4	63 00.3	+60.0	2.5	64 00.3	+60.0	2.6	65 00.2	+60.0	2.7	66 00.2	+60.0	2.8	67 00.1	+60.0	2.9	68 00.0	+60.0	3.0	68
69	62 00.4	+60.0	2.3	63 00.4	+60.0	2.4	64 00.3	+60.0	2.5	65 00.3	+60.0	2.5	66 00.2	+60.0	2.6	67 00.2	+60.0	2.8	68 00.1	+60.0	2.9	69 00.0	+60.0	3.0	69
70	63 00.4	+60.0	2.3	64 00.4	+60.0	2.3	65 00.3	+60.0	2.4	66 00.3	+60.0	2.5	67 00.2	+60.0	2.6	68 00.2	+59.9	2.7	69 00.1	+60.0	2.9	70 00.0	+60.0	3.0	70
71	64 00.4	+60.0	2.2	65 00.4	+60.0	2.3	66 00.3	+60.0	2.4	67 00.3	+60.0	2.5	68 00.2	+60.0	2.6	69 00.1	+60.0	2.7	70 00.1	+60.0	2.9	71 00.0	+60.0	3.0	71
72	65 00.4	+60.0	2.2	66 00.4	+60.0	2.3	67 00.3	+60.0	2.4	68 00.3	+60.0	2.5	69 00.2	+60.0	2.6	70 00.1	+60.0	2.7	71 00.1	+60.0	2.8	72 00.0	+60.0	3.0	72
73	66 00.4	+60.0	2.2	67 00.4	+60.0	2.2	68 00.3	+60.0	2.3	69 00.3	+60.0	2.4	70 00.2	+60.0	2.6	71 00.1	+60.0	2.7	72 00.1	+60.0	2.8	73 00.0	+60.0	3.0	73
74	67 00.4	+60.0	2.1	68 00.4	+60.0	2.2	69 00.3	+60.0	2.3	70 00.3	+60.0	2.4	71 00.2	+60.0	2.5	72 00.1	+60.0	2.7	73 00.1	+60.0	2.8	74 00.0	+60.0	3.0	74
75	68 00.4	+60.0	2.1	69 00.4	+59.9	2.2	70 00.3	+60.0	2.3	71 00.3	+60.0	2.4	72 00.2	+60.0	2.5	73 00.1	+60.0	2.7	74 00.1	+60.0	2.8	75 00.0	+60.0	3.0	75
76	69 00.4	+60.0	2.0	70 00.3	+60.0	2.1	71 00.3	+60.0	2.2	72 00.3	+60.0	2.3	73 00.2	+60.0	2.5	74 00.1	+60.0	2.6	75 00.1	+60.0	2.8	76 00.0	+60.0	3.0	76
77	70 00.4	+60.0	2.0	71 00.3	+60.0	2.1	72 00.3	+60.0	2.2	73 00.3	+59.9	2.3	74 00.2	+60.0	2.4	75 00.1	+60.0	2.6	76 00.1	+60.0	2.8	77 00.0	+60.0	3.0	77
78	71 00.4	+60.0	1.9	72 00.3	+60.0	2.0	73 00.3	+60.0	2.1	74 00.2	+60.0	2.3	75 00.2	+60.0	2.4	76 00.1	+60.0	2.6	77 00.1	+60.0	2.8	78 00.0	+60.0	3.0	78
79	72 00.4	+59.9	1.9	73 00.3	+60.0	2.0	74 00.3	+60.0	2.1	75 00.2	+60.0	2.2	76 00.2	+60.0	2.4	77 00.1	+60.0	2.5	78 00.1	+60.0	2.8	79 00.0	+60.0	3.0	79
80	73 00.3	+60.0	1.8	74 00.3	+60.0	1.9	75 00.3	+60.0	2.0	76 00.2	+60.0	2.2	77 00.2	+60.0	2.3	78 00.1	+60.0	2.5	79 00.1	+60.0	2.7	80 00.0	+60.0	3.0	80
81	74 00.3	+60.0	1.7	75 00.3	+60.0	1.8	76 00.3	+60.0	1.9	77 00.2	+60.0	2.1	78 00.2	+60.0	2.3	79 00.1	+60.0	2.5	80 00.1	+60.0	2.7	81 00.0	+60.0	3.0	81
82	75 00.3	+60.0	1.6	76 00.3	+60.0	1.7	77 00.3	+59.9	1.9	78 00.2	+60.0	2.0	79 00.2	+60.0	2.2	80 00.1	+60.0	2.4	81 00.1	+60.0	2.7	82 00.0	+60.0	3.0	82
83	76 00.3	+60.0	1.5	77 00.3	+59.9	1.6	78 00.2	+60.0	1.8	79 00.2	+60.0	1.9	80 00.2	+60.0	2.1	81 00.1	+60.0	2.3	82 00.1	+60.0	2.6	83 00.0	+60.0	3.0	83
84	77 00.3	+59.9	1.4	78 00.2	+60.0	1.5	79 00.2	+60.0	1.6	80 00.2	+60.0	1.8	81 00.2	+60.0	2.0	82 00.1	+60.0	2.3	83 00.1	+60.0	2.6	84 00.0	+60.0	3.0	84
85	78 00.2	+60.0	1.3	79 00.2	+60.0	1.4	80 00.2	+60.0	1.5	81 00.2	+60.0	1.7	82 00.2	+59.9	1.9	83 00.1	+60.0	2.1	84 00.1	+60.0	2.5	85 00.0	+60.0	3.0	85
86	79 00.2	+60.0	1.1	80 00.2	+60.0	1.2	81 00.2	+60.0	1.3	82 00.2	+59.9	1.5	83 00.1	+60.0	1.7	84 00.1	+60.0	2.0	85 00.1	+60.0	2.4	86 00.0	+60.0	3.0	86
87	80 00.2	+59.9	0.9	81 00.2	+59.9	1.0	82 00.2	+59.9	1.1	83 00.1	+60.0	1.3	84 00.1	+60.0	1.5	85 00.1	+60.0	1.8	86 00.1	+60.0	2.3	87 00.0	+60.0	3.0	87
88	81 00.1	+60.0	0.7	82 00.1	+60.0	0.8	83 00.1	+60.0	0.9	84 00.1	+60.0	1.0	85 00.1	+60.0	1.2	86 00.1	+60.0	1.5	87 00.1	+59.9	2.0	88 00.0	+60.0	3.0	88
89	82 00.1	+59.9	0.4	83 00.1	+59.9	0.4	84 00.1	+59.9	0.5	85 00.1	+59.9	0.6	86 00.1	+59.9	0.8	87 00.1	+59.9	1.0	88 00.0	+60.0	1.5	89 00.0	+60.0	3.0	89
90	83 00.0	+59.9	0.0	84 00.0	+59.9	0.0	85 00.0	+59.9	0.0	86 00.0	+59.9	0.0	87 00.0	+59.9	0.0	88 00.0	*+59.8*•	0.0	89 00.0	*+56.9*•	0.0	90 00.0	–60.0	1.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 177°, 183°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.0	+ 60.0	176.0	5 59.1	+ 60.0	176.0	4 59.3	+ 60.0	176.0	3 59.4	+ 60.0	176.0	2 59.6	+ 60.0	176.0	1 59.7	+ 60.0	176.0	0 59.9	+ 60.0	176.0	0 00.0	+ 60.0	176.0	**0**
1	7 59.0	+ 60.0	176.0	6 59.1	+ 60.0	176.0	5 59.3	+ 60.0	176.0	4 59.4	+ 60.0	176.0	3 59.6	+ 60.0	176.0	2 59.7	+ 60.0	176.0	1 59.9	+ 60.0	176.0	1 00.0	+ 60.0	176.0	**1**
2	8 59.0	+ 60.0	176.0	7 59.1	+ 60.0	176.0	6 59.3	+ 60.0	176.0	5 59.4	+ 60.0	176.0	4 59.6	+ 60.0	176.0	3 59.7	+ 60.0	176.0	2 59.9	+ 60.0	176.0	2 00.0	+ 60.0	176.0	**2**
3	9 59.0	+ 60.0	175.9	8 59.1	+ 60.0	176.0	7 59.3	+ 60.0	176.0	6 59.4	+ 60.0	176.0	5 59.6	+ 60.0	176.0	4 59.7	+ 60.0	176.0	3 59.9	+ 60.0	176.0	3 00.0	+ 60.0	176.0	**3**
4	10 59.0	+ 60.0	175.9	9 59.1	+ 60.0	175.9	8 59.3	+ 60.0	176.0	7 59.4	+ 60.0	176.0	6 59.6	+ 60.0	176.0	5 59.7	+ 60.0	176.0	4 59.9	+ 60.0	176.0	4 00.0	+ 60.0	176.0	**4**
5	11 59.0	+ 60.0	175.9	10 59.1	+ 60.0	175.9	9 59.3	+ 60.0	176.0	8 59.4	+ 60.0	176.0	7 59.6	+ 60.0	176.0	6 59.7	+ 60.0	176.0	5 59.9	+ 60.0	176.0	5 00.0	+ 60.0	176.0	**5**
6	12 59.0	+ 60.0	175.9	11 59.1	+ 60.0	175.9	10 59.3	+ 60.0	175.9	9 59.4	+ 60.0	176.0	8 59.6	+ 60.0	176.0	7 59.7	+ 60.0	176.0	6 59.9	+ 60.0	176.0	6 00.0	+ 60.0	176.0	**6**
7	13 59.0	+ 60.0	175.9	12 59.1	+ 60.0	175.9	11 59.3	+ 60.0	175.9	10 59.4	+ 60.0	176.0	9 59.6	+ 60.0	176.0	8 59.7	+ 60.0	176.0	7 59.9	+ 60.0	176.0	7 00.0	+ 60.0	176.0	**7**
8	14 59.0	+ 60.0	175.9	13 59.1	+ 60.0	175.9	12 59.3	+ 60.0	175.9	11 59.4	+ 60.0	176.0	10 59.6	+ 60.0	176.0	9 59.7	+ 60.0	176.0	8 59.9	+ 60.0	176.0	8 00.0	+ 60.0	176.0	**8**
9	15 59.0	+ 59.9	175.9	14 59.1	+ 60.0	175.9	13 59.3	+ 60.0	175.9	12 59.4	+ 60.0	175.9	11 59.6	+ 60.0	176.0	10 59.7	+ 60.0	176.0	9 59.9	+ 60.0	176.0	9 00.0	+ 60.0	176.0	**9**
10	16 58.9	+ 60.0	175.9	15 59.1	+ 60.0	175.9	14 59.3	+ 60.0	175.9	13 59.4	+ 60.0	175.9	12 59.6	+ 60.0	176.0	11 59.7	+ 60.0	176.0	10 59.9	+ 60.0	176.0	10 00.0	+ 60.0	176.0	**10**
11	17 58.9	+ 60.0	175.9	16 59.1	+ 60.0	175.9	15 59.3	+ 60.0	175.9	14 59.4	+ 60.0	175.9	13 59.6	+ 60.0	176.0	12 59.7	+ 60.0	176.0	11 59.9	+ 60.0	176.0	11 00.0	+ 60.0	176.0	**11**
12	18 58.9	+ 60.0	175.9	17 59.1	+ 60.0	175.9	16 59.3	+ 60.0	175.9	15 59.4	+ 60.0	175.9	14 59.6	+ 60.0	175.9	13 59.7	+ 60.0	176.0	12 59.9	+ 60.0	176.0	12 00.0	+ 60.0	176.0	**12**
13	19 58.9	+ 60.0	175.9	18 59.1	+ 60.0	175.9	17 59.3	+ 60.0	175.9	16 59.4	+ 60.0	175.9	15 59.6	+ 60.0	175.9	14 59.7	+ 60.0	176.0	13 59.9	+ 60.0	176.0	13 00.0	+ 60.0	176.0	**13**
14	20 58.9	+ 60.0	175.8	19 59.1	+ 60.0	175.9	18 59.3	+ 59.9	175.9	17 59.4	+ 60.0	175.9	16 59.6	+ 60.0	175.9	15 59.7	+ 60.0	176.0	14 59.9	+ 60.0	176.0	14 00.0	+ 60.0	176.0	**14**
15	21 58.9	+ 60.0	175.8	20 59.1	+ 60.0	175.9	19 59.2	+ 60.0	175.9	18 59.4	+ 60.0	175.9	17 59.6	+ 60.0	175.9	16 59.7	+ 60.0	176.0	15 59.9	+ 60.0	176.0	15 00.0	+ 60.0	176.0	**15**
16	22 58.9	+ 60.0	175.8	21 59.1	+ 60.0	175.9	20 59.2	+ 60.0	175.9	19 59.4	+ 60.0	175.9	18 59.6	+ 60.0	175.9	17 59.7	+ 60.0	176.0	16 59.9	+ 60.0	176.0	16 00.0	+ 60.0	176.0	**16**
17	23 58.9	+ 60.0	175.8	22 59.1	+ 60.0	175.8	21 59.2	+ 60.0	175.9	20 59.4	+ 60.0	175.9	19 59.6	+ 60.0	175.9	18 59.7	+ 60.0	176.0	17 59.9	+ 60.0	176.0	17 00.0	+ 60.0	176.0	**17**
18	24 58.9	+ 60.0	175.8	23 59.1	+ 60.0	175.8	22 59.2	+ 60.0	175.9	21 59.4	+ 60.0	175.9	20 59.6	+ 60.0	175.9	19 59.7	+ 60.0	176.0	18 59.9	+ 60.0	176.0	18 00.0	+ 60.0	176.0	**18**
19	25 58.9	+ 60.0	175.8	24 59.1	+ 60.0	175.8	23 59.2	+ 60.0	175.9	22 59.4	+ 60.0	175.9	21 59.6	+ 60.0	175.9	20 59.7	+ 60.0	175.9	19 59.9	+ 60.0	176.0	19 00.0	+ 60.0	176.0	**19**
20	26 58.9	+ 60.0	175.8	25 59.1	+ 60.0	175.8	24 59.2	+ 60.0	175.9	23 59.4	+ 60.0	175.9	22 59.6	+ 60.0	175.9	21 59.7	+ 60.0	175.9	20 59.9	+ 60.0	176.0	20 00.0	+ 60.0	176.0	**20**
21	27 58.9	+ 60.0	175.8	26 59.1	+ 60.0	175.8	25 59.2	+ 60.0	175.8	24 59.4	+ 60.0	175.9	23 59.6	+ 60.0	175.9	22 59.7	+ 60.0	175.9	21 59.9	+ 60.0	176.0	21 00.0	+ 60.0	176.0	**21**
22	28 58.9	+ 60.0	175.8	27 59.1	+ 60.0	175.8	26 59.2	+ 60.0	175.8	25 59.4	+ 60.0	175.9	24 59.6	+ 60.0	175.9	23 59.7	+ 60.0	175.9	22 59.9	+ 60.0	176.0	22 00.0	+ 60.0	176.0	**22**
23	29 58.9	+ 60.0	175.7	28 59.1	+ 60.0	175.8	27 59.2	+ 60.0	175.8	26 59.4	+ 60.0	175.9	25 59.6	+ 60.0	175.9	24 59.7	+ 60.0	175.9	23 59.9	+ 60.0	176.0	23 00.0	+ 60.0	176.0	**23**
24	30 58.9	+ 60.0	175.7	29 59.1	+ 60.0	175.8	28 59.2	+ 60.0	175.8	27 59.4	+ 60.0	175.9	26 59.6	+ 60.0	175.9	25 59.7	+ 60.0	175.9	24 59.9	+ 60.0	176.0	24 00.0	+ 60.0	176.0	**24**
25	31 58.9	+ 60.0	175.7	30 59.1	+ 60.0	175.8	29 59.2	+ 60.0	175.8	28 59.4	+ 60.0	175.9	27 59.6	+ 59.9	175.9	26 59.7	+ 60.0	175.9	25 59.9	+ 60.0	176.0	25 00.0	+ 60.0	176.0	**25**
26	32 58.9	+ 60.0	175.7	31 59.1	+ 60.0	175.8	30 59.2	+ 60.0	175.8	29 59.4	+ 60.0	175.8	28 59.5	+ 60.0	175.9	27 59.7	+ 60.0	175.9	26 59.9	+ 60.0	176.0	26 00.0	+ 60.0	176.0	**26**
27	33 58.9	+ 60.0	175.7	32 59.1	+ 60.0	175.8	31 59.2	+ 60.0	175.8	30 59.4	+ 60.0	175.8	29 59.5	+ 60.0	175.9	28 59.7	+ 60.0	175.9	27 59.9	+ 60.0	176.0	27 00.0	+ 60.0	176.0	**27**
28	34 58.9	+ 60.0	175.7	33 59.1	+ 60.0	175.7	32 59.2	+ 60.0	175.8	31 59.4	+ 60.0	175.8	30 59.5	+ 60.0	175.9	29 59.7	+ 60.0	175.9	28 59.9	+ 60.0	176.0	28 00.0	+ 60.0	176.0	**28**
29	35 58.9	+ 60.0	175.7	34 59.1	+ 60.0	175.7	33 59.2	+ 60.0	175.8	32 59.4	+ 60.0	175.8	31 59.5	+ 60.0	175.9	30 59.7	+ 60.0	175.9	29 59.9	+ 60.0	176.0	29 00.0	+ 60.0	176.0	**29**
30	36 58.9	+ 60.0	175.7	35 59.1	+ 60.0	175.7	34 59.2	+ 60.0	175.8	33 59.4	+ 60.0	175.8	32 59.5	+ 60.0	175.9	31 59.7	+ 60.0	175.9	30 59.9	+ 60.0	176.0	30 00.0	+ 60.0	176.0	**30**
31	37 58.9	+ 60.0	175.6	36 59.1	+ 60.0	175.7	35 59.2	+ 60.0	175.8	34 59.4	+ 60.0	175.8	33 59.5	+ 60.0	175.9	32 59.7	+ 60.0	175.9	31 59.9	+ 60.0	176.0	31 00.0	+ 60.0	176.0	**31**
32	38 58.9	+ 60.0	175.6	37 59.1	+ 60.0	175.7	36 59.2	+ 60.0	175.8	35 59.4	+ 60.0	175.8	34 59.5	+ 60.0	175.9	33 59.7	+ 60.0	175.9	32 59.9	+ 60.0	176.0	32 00.0	+ 60.0	176.0	**32**
33	39 58.9	+ 60.0	175.6	38 59.1	+ 60.0	175.7	37 59.2	+ 60.0	175.7	36 59.4	+ 60.0	175.8	35 59.5	+ 60.0	175.9	34 59.7	+ 60.0	175.9	33 59.9	+ 60.0	176.0	33 00.0	+ 60.0	176.0	**33**
34	40 58.9	+ 60.0	175.6	39 59.1	+ 60.0	175.7	38 59.2	+ 60.0	175.7	37 59.4	+ 60.0	175.8	36 59.5	+ 60.0	175.8	35 59.7	+ 60.0	175.9	34 59.9	+ 60.0	176.0	34 00.0	+ 60.0	176.0	**34**
35	41 58.9	+ 60.0	175.6	40 59.1	+ 59.9	175.7	39 59.2	+ 60.0	175.7	38 59.4	+ 60.0	175.8	37 59.5	+ 60.0	175.8	36 59.7	+ 60.0	175.9	35 59.9	+ 60.0	175.9	35 00.0	+ 60.0	176.0	**35**
36	42 58.9	+ 60.0	175.6	41 59.0	+ 60.0	175.6	40 59.2	+ 60.0	175.7	39 59.4	+ 60.0	175.8	38 59.5	+ 60.0	175.8	37 59.7	+ 60.0	175.9	36 59.9	+ 60.0	175.9	36 00.0	+ 60.0	176.0	**36**
37	43 58.9	+ 60.0	175.6	42 59.0	+ 60.0	175.6	41 59.2	+ 60.0	175.7	40 59.4	+ 60.0	175.8	39 59.5	+ 60.0	175.8	38 59.7	+ 60.0	175.9	37 59.9	+ 60.0	175.9	37 00.0	+ 60.0	176.0	**37**
38	44 58.9	+ 60.0	175.5	43 59.0	+ 60.0	175.6	42 59.2	+ 60.0	175.7	41 59.4	+ 60.0	175.8	40 59.5	+ 60.0	175.8	39 59.7	+ 60.0	175.9	38 59.9	+ 60.0	175.9	38 00.0	+ 60.0	176.0	**38**
39	45 58.9	+ 60.0	175.5	44 59.0	+ 60.0	175.6	43 59.2	+ 60.0	175.7	42 59.4	+ 60.0	175.7	41 59.5	+ 60.0	175.8	40 59.7	+ 60.0	175.9	39 59.9	+ 60.0	175.9	39 00.0	+ 60.0	176.0	**39**
40	46 58.9	+ 59.9	175.5	45 59.0	+ 60.0	175.6	44 59.2	+ 60.0	175.7	43 59.4	+ 60.0	175.7	42 59.5	+ 60.0	175.8	41 59.7	+ 60.0	175.9	40 59.9	+ 60.0	175.9	40 00.0	+ 60.0	176.0	**40**
41	47 58.8	+ 60.0	175.5	46 59.0	+ 60.0	175.6	45 59.2	+ 60.0	175.7	44 59.4	+ 60.0	175.7	43 59.5	+ 60.0	175.8	42 59.7	+ 60.0	175.9	41 59.9	+ 60.0	175.9	41 00.0	+ 60.0	176.0	**41**
42	48 58.8	+ 60.0	175.5	47 59.0	+ 60.0	175.6	46 59.2	+ 60.0	175.6	45 59.4	+ 60.0	175.7	44 59.5	+ 60.0	175.8	43 59.7	+ 60.0	175.9	42 59.9	+ 60.0	175.9	42 00.0	+ 60.0	176.0	**42**
43	49 58.8	+ 60.0	175.4	48 59.0	+ 60.0	175.5	47 59.2	+ 60.0	175.6	46 59.4	+ 60.0	175.7	45 59.5	+ 60.0	175.8	44 59.7	+ 60.0	175.9	43 59.9	+ 60.0	175.9	43 00.0	+ 60.0	176.0	**43**
44	50 58.8	+ 60.0	175.4	49 59.0	+ 60.0	175.5	48 59.2	+ 60.0	175.6	47 59.4	+ 60.0	175.7	46 59.5	+ 60.0	175.8	45 59.7	+ 60.0	175.9	44 59.9	+ 60.0	175.9	44 00.0	+ 60.0	176.0	**44**
45	51 58.8	+ 60.0	175.4	50 59.0	+ 60.0	175.5	49 59.2	+ 60.0	175.6	48 59.4	+ 60.0	175.7	47 59.5	+ 60.0	175.8	46 59.7	+ 60.0	175.9	45 59.9	+ 60.0	175.9	45 00.0	+ 60.0	176.0	**45**
46	52 58.8	+ 60.0	175.4	51 59.0	+ 60.0	175.5	50 59.2	+ 60.0	175.6	49 59.4	+ 60.0	175.7	48 59.5	+ 60.0	175.8	47 59.7	+ 60.0	175.8	46 59.9	+ 60.0	175.9	46 00.0	+ 60.0	176.0	**46**
47	53 58.8	+ 60.0	175.4	52 59.0	+ 60.0	175.5	51 59.2	+ 60.0	175.6	50 59.4	+ 60.0	175.7	49 59.5	+ 60.0	175.8	48 59.7	+ 60.0	175.8	47 59.9	+ 60.0	175.9	47 00.0	+ 60.0	176.0	**47**
48	54 58.8	+ 60.0	175.3	53 59.0	+ 60.0	175.4	52 59.2	+ 60.0	175.6	51 59.4	+ 60.0	175.7	50 59.5	+ 60.0	175.7	49 59.7	+ 60.0	175.8	48 59.9	+ 60.0	175.9	48 00.0	+ 60.0	176.0	**48**
49	55 58.8	+ 60.0	175.3	54 59.0	+ 60.0	175.4	53 59.2	+ 60.0	175.5	52 59.4	+ 60.0	175.6	51 59.5	+ 60.0	175.7	50 59.7	+ 60.0	175.8	49 59.9	+ 60.0	175.9	49 00.0	+ 60.0	176.0	**49**
50	56 58.8	+ 60.0	175.3	55 59.0	+ 60.0	175.4	54 59.2	+ 60.0	175.5	53 59.4	+ 60.0	175.6	52 59.5	+ 60.0	175.7	51 59.7	+ 60.0	175.8	50 59.9	+ 60.0	175.9	50 00.0	+ 60.0	176.0	**50**
51	57 58.8	+ 60.0	175.3	56 59.0	+ 60.0	175.4	55 59.2	+ 60.0	175.5	54 59.4	+ 60.0	175.6	53 59.5	+ 60.0	175.7	52 59.7	+ 60.0	175.8	51 59.9	+ 60.0	175.9	51 00.0	+ 60.0	176.0	**51**
52	58 58.8	+ 60.0	175.2	57 59.0	+ 60.0	175.4	56 59.2	+ 60.0	175.5	55 59.4	+ 60.0	175.6	54 59.5	+ 60.0	175.7	53 59.7	+ 60.0	175.8	52 59.9	+ 60.0	175.9	52 00.0	+ 60.0	176.0	**52**
53	59 58.8	+ 60.0	175.2	58 59.0	+ 60.0	175.3	57 59.2	+ 60.0	175.5	56 59.4	+ 60.0	175.6	55 59.5	+ 60.0	175.7	54 59.7	+ 60.0	175.8	53 59.9	+ 60.0	175.9	53 00.0	+ 60.0	176.0	**53**
54	60 58.8	+ 60.0	175.2	59 59.0	+ 60.0	175.3	58 59.2	+ 60.0	175.4	57 59.4	+ 59.9	175.6	56 59.5	+ 60.0	175.7	55 59.7	+ 60.0	175.8	54 59.9	+ 60.0	175.9	54 00.0	+ 60.0	176.0	**54**
55	61 58.8	+ 59.9	175.1	60 59.0	+ 60.0	175.3	59 59.2	+ 60.0	175.4	58 59.3	+ 60.0	175.5	57 59.5	+ 60.0	175.7	56 59.7	+ 60.0	175.8	55 59.9	+ 59.9	175.9	55 00.0	+ 60.0	176.0	**55**
56	62 58.7	+ 60.0	175.1	61 59.0	+ 60.0	175.2	60 59.2	+ 60.0	175.4	59 59.3	+ 60.0	175.5	58 59.5	+ 60.0	175.7	57 59.7	+ 60.0	175.8	56 59.8	+ 60.0	175.9	56 00.0	+ 60.0	176.0	**56**
57	63 58.7	+ 60.0	175.0	62 59.0	+ 59.9	175.2	61 59.2	+ 59.9	175.4	60 59.3	+ 60.0	175.5	59 59.5	+ 60.0	175.6	58 59.7	+ 60.0	175.8	57 59.8	+ 60.0	175.9	57 00.0	+ 60.0	176.0	**57**
58	64 58.7	+ 60.0	175.0	63 58.9	+ 60.0	175.2	62 59.1	+ 60.0	175.3	61 59.3	+ 60.0	175.5	60 59.5	+ 60.0	175.6	59 59.7	+ 60.0	175.8	58 59.8	+ 60.0	175.9	58 00.0	+ 60.0	176.0	**58**
59	65 58.7	+ 60.0	174.9	64 58.9	+ 60.0	175.1	63 59.1	+ 60.0	175.3	62 59.3	+ 60.0	175.5	61 59.5	+ 60.0	175.6	60 59.7	+ 60.0	175.8	59 59.8	+ 60.0	175.9	59 00.0	+ 60.0	176.0	**59**
60	66 58.7	+ 60.0	174.9	65 58.9	+ 60.0	175.1	64 59.1	+ 60.0	175.3	63 59.3	+ 60.0	175.4	62 59.5	+ 60.0	175.6	61 59.7	+ 60.0	175.7	60 59.8	+ 60.0	175.9	60 00.0	+ 60.0	176.0	**60**
61	67 58.7	+ 60.0	174.8	66 58.9	+ 60.0	175.0	65 59.1	+ 60.0	175.2	64 59.3	+ 60.0	175.4	63 59.5	+ 60.0	175.6	62 59.7	+ 60.0	175.7	61 59.8	+ 60.0	175.9	61 00.0	+ 60.0	176.0	**61**
62	68 58.7	+ 59.9	174.8	67 58.9	+ 60.0	175.0	66 59.1	+ 60.0	175.2	65 59.3	+ 60.0	175.4	64 59.5	+ 60.0	175.6	63 59.7	+ 60.0	175.7	62 59.8	+ 60.0	175.9	62 00.0	+ 60.0	176.0	**62**
63	69 58.6	+ 60.0	174.7	68 58.9	+ 60.0	174.9	67 59.1	+ 60.0	175.2	66 59.3	+ 60.0	175.4	65 59.5	+ 60.0	175.5	64 59.7	+ 60.0	175.7	63 59.8	+ 60.0	175.9	63 00.0	+ 60.0	176.0	**63**
64	70 58.6	+ 60.0	174.6	69 58.9	+ 60.0	174.9	68 59.1	+ 60.0	175.1	67 59.3	+ 60.0	175.3	66 59.5	+ 60.0	175.5	65 59.7	+ 60.0	175.7	64 59.8	+ 60.0	175.9	64 00.0	+ 60.0	176.0	**64**
65	71 58.6	+ 60.0	174.5	70 58.9	+ 59.9	174.8	69 59.1	+ 60.0	175.1	68 59.3	+ 60.0	175.3	67 59.5	+ 60.0	175.5	66 59.7	+ 60.0	175.7	65 59.8	+ 60.0	175.8	65 00.0	+ 60.0	176.0	**65**
66	72 58.6	+ 60.0	174.4	71 58.8	+ 60.0	174.7	70 59.1	+ 60.0	175.0	69 59.3	+ 60.0	175.2	68 59.5	+ 60.0	175.5	67 59.7	+ 60.0	175.7	66 59.8	+ 60.0	175.8	66 00.0	+ 60.0	176.0	**66**
67	73 58.6	+ 59.9	174.3	72 58.8	+ 60.0	174.7	71 59.1	+ 60.0	174.9	70 59.3	+ 60.0	175.2	69 59.5	+ 60.0	175.4	68 59.7	+ 60.0	175.6	67 59.8	+ 60.0	175.8	67 00.0	+ 60.0	176.0	**67**
68	74 58.5	+ 60.0	174.2	73 58.8	+ 60.0	174.6	72 59.1	+ 60.0	174.9	71 59.3	+ 60.0	175.2	70 59.5	+ 60.0	175.4	69 59.7	+ 60.0	175.6	68 59.8	+ 60.0	175.8	68 00.0	+ 60.0	176.0	**68**
69	75 58.5	+ 59.9	174.1	74 58.8	+ 60.0	174.5	73 59.1	+ 59.9	174.8	72 59.3	+ 60.0	175.1	71 59.5	+ 60.0	175.4	70 59.7	+ 60.0	175.6	69 59.8	+ 60.0	175.8	69 00.0	+ 60.0	176.0	**69**
70	76 58.4	+ 60.0	173.9	75 58.8	+ 59.9	174.3	74 59.0	+ 60.0	174.7	73 59.3	+ 60.0	175.0	72 59.5	+ 60.0	175.3	71 59.7	+ 60.0	175.6	70 59.8	+ 60.0	175.8	70 00.0	+ 60.0	176.0	**70**
71	77 58.4	+ 59.9	173.7	76 58.7	+ 60.0	174.2	75 59.0	+ 60.0	174.6	74 59.3	+ 60.0	175.0	73 59.5	+ 60.0	175.3	72 59.7	+ 60.0	175.5	71 59.8	+ 60.0	175.8	71 00.0	+ 60.0	176.0	**71**
72	78 58.3	+ 60.0	173.5	77 58.7	+ 60.0	174.1	76 59.0	+ 60.0	174.5	75 59.3	+ 59.9	174.9	74 59.5	+ 60.0	175.2	73 59.7	+ 60.0	175.5	72 59.8	+ 60.0	175.8	72 00.0	+ 60.0	176.0	**72**
73	79 58.3	+ 59.9	173.3	78 58.7	+ 59.9	173.9	77 59.0	+ 59.9	174.4	76 59.2	+ 60.0	174.8	75 59.5	+ 60.0	175.2	74 59.7	+ 60.0	175.5	73 59.8	+ 60.0	175.8	73 00.0	+ 60.0	176.0	**73**
74	80 58.2	+ 59.9	173.0	79 58.6	+ 60.0	173.7	78 58.9	+ 60.0	174.2	77 59.2	+ 60.0	174.7	76 59.5	+ 60.0	175.1	75 59.7	+ 60.0	175.4	74 59.8	+ 60.0	175.7	74 00.0	+ 60.0	176.0	**74**
75	81 58.1	+ 59.9	172.6	80 58.6	+ 59.9	173.4	79 58.9	+ 60.0	174.0	78 59.2	+ 60.0	174.6	77 59.5	+ 59.9	175.0	76 59.7	+ 60.0	175.4	75 59.8	+ 60.0	175.7	75 00.0	+ 60.0	176.0	**75**
76	82 58.0	+ 59.8	172.1	81 58.5	+ 59.9	173.1	80 58.9	+ 59.9	173.8	79 59.2	+ 60.0	174.4	78 59.4	+ 60.0	174.9	77 59.7	+ 60.0	175.3	76 59.8	+ 60.0	175.7	76 00.0	+ 60.0	176.0	**76**
77	83 57.8	+ 59.8	171.4	82 58.4	+ 59.9	172.6	81 58.8	+ 60.0	173.5	80 59.2	+ 59.9	174.3	79 59.4	+ 60.0	174.8	78 59.7	+ 60.0	175.3	77 59.8	+ 60.0	175.7	77 00.0	+ 60.0	176.0	**77**
78	84 57.6	+ 59.6	170.5	83 58.3	+ 59.8	172.1	82 58.8	+ 59.9	173.2	81 59.1	+ 60.0	174.0	80 59.4	+ 60.0	174.7	79 59.7	+ 59.9	175.2	78 59.8	+ 60.0	175.6	78 00.0	+ 60.0	176.0	**78**
79	85 57.2	+ 59.4	169.1	84 58.1	+ 59.7	171.3	83 58.7	+ 59.8	172.7	82 59.1	+ 59.9	173.7	81 59.4	+ 60.0	174.5	80 59.6	+ 60.0	175.1	79 59.8	+ 60.0	175.6	79 00.0	+ 60.0	176.0	**79**
80	86 56.6	+ 58.9	166.9	85 57.8	+ 59.6	170.1	84 58.5	+ 59.9	172.0	83 59.0	+ 60.0	173.4	82 59.4	+ 59.9	174.3	81 59.6	+ 60.0	175.0	80 59.8	+ 60.0	175.6	80 00.0	+ 60.0	176.0	**80**
81	87 55.5	*+ 56.8*	•162.5	86 57.4	+ 59.2	168.1	85 58.4	+ 59.7	171.1	84 59.0	+ 59.8	172.8	83 59.3	+ 60.0	174.0	82 59.6	+ 60.0	174.9	81 59.8	+ 60.0	175.5	81 00.0	+ 60.0	176.0	**81**
82	88 52.3	*+ 38.5*	•150.4	87 56.6	*+ 57.6*	•164.3	86 58.1	+ 59.4	169.4	85 58.8	+ 59.8	172.0	84 59.3	+ 59.9	173.6	83 59.6	+ 60.0	174.7	82 59.8	+ 60.0	175.4	82 00.0	+ 60.0	176.0	**82**
83	89 30.8	*– 36.6*	• 88.0	88 54.2	*+ 40.7*	•153.6	87 57.5	*+ 58.3*	•166.2	86 58.6	+ 59.7	170.7	85 59.2	+ 59.9	173.0	84 59.6	+ 60.0	174.4	83 59.8	+ 60.0	175.3	83 00.0	+ 60.0	176.0	**83**
84	88 54.2	*– 56.7*	• 22.4	89 34.9	*– 39.1*	• 88.0	88 55.8	*+ 43.3*	•157.0	87 58.3	*+ 58.9*	•168.1	86 59.1	+ 59.8	172.0	85 59.6	+ 59.9	174.0	84 59.8	+ 60.0	175.2	84 00.0	+ 60.0	176.0	**84**
85	87 57.5	– 58.9	9.8	88 55.8	*– 57.5*	• 19.0	89 39.1	*– 41.9*	• 88.0	88 57.2	*+ 46.1*	•160.6	87 58.9	*+ 59.4*	•170.1	86 59.5	+ 59.9	173.3	85 59.8	+ 60.0	175.0	85 00.0	+ 60.0	176.0	**85**
86	86 58.6	– 59.4	5.3	87 58.3	– 59.2	7.9	88 57.2	*– 58.3*	• 15.4	89 43.3	*– 45.0*	• 88.0	88 58.3	*+ 49.1*	•164.3	87 59.4	*+ 59.7*	•172.0	86 59.8	+ 60.0	174.7	86 00.0	+ 60.0	176.0	**86**
87	85 59.2	– 59.6	3.0	86 59.1	– 59.5	4.0	87 58.9	– 59.4	6.0	88 58.3	*– 58.9*	• 11.7	89 47.4	*– 48.3*	• 88.0	88 59.1	*+ 52.5*	•168.1	87 59.8	+ 59.9	174.0	87 00.0	+ 60.0	176.0	**87**
88	84 59.6	– 59.8	1.6	85 59.6	– 59.8	2.0	86 59.5	– 59.7	2.7	87 59.4	– 59.6	4.0	88 59.1	*– 59.3*	• 7.9	89 51.6	*– 51.9*	• 88.0	88 59.7	*+ 56.1*	•172.0	88 00.0	+ 60.0	176.0	**88**
89	83 59.8	– 59.8	0.7	84 59.8	– 59.8	0.8	85 59.8	– 59.8	1.0	86 59.8	– 59.8	1.3	87 59.8	– 59.8	2.0	88 59.7	*– 59.7*	• 4.0	89 55.8	*– 55.8*	• 88.0	89 00.0	+ 60.0	176.0	**89**
90	83 00.0	– 59.9	0.0	84 00.0	– 59.9	0.0	85 00.0	– 59.9	0.0	86 00.0	– 59.9	0.0	87 00.0	– 59.9	0.0	88 00.0	– 59.9	0.0	89 00.0	*– 59.9*	• 0.0	90 00.0	– 60.0	88.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 4°, 356°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 59.0	–60.0	176.0	5 59.1	–60.0	176.0	4 59.3	–60.0	176.0	3 59.4	–60.0	176.0	2 59.6	–60.0	176.0	1 59.7	–60.0	176.0	0 59.9	–60.0	176.0	0 00.0	+60.0	4.0	**0**
1	5 59.0	–60.0	176.0	4 59.1	–60.0	176.0	3 59.3	–60.0	176.0	2 59.4	–60.0	176.0	1 59.6	–60.0	176.0	0 59.7	–60.0	176.0	0 00.1	+60.0	4.0	1 00.0	+60.0	4.0	**1**
2	4 59.0	–60.0	176.0	3 59.1	–60.0	176.0	2 59.3	–60.0	176.0	1 59.4	–60.0	176.0	0 59.6	–60.0	176.0	0 00.3	+60.0	4.0	1 00.1	+60.0	4.0	2 00.0	+60.0	4.0	**2**
3	3 59.0	–60.0	176.0	2 59.1	–60.0	176.0	1 59.3	–60.0	176.0	0 59.4	–60.0	176.0	0 00.4	+60.0	4.0	1 00.3	+60.0	4.0	2 00.1	+60.0	4.0	3 00.0	+60.0	4.0	**3**
4	2 59.0	–60.0	176.0	1 59.1	–60.0	176.0	0 59.3	–60.0	176.0	0 00.6	+60.0	4.0	1 00.4	+60.0	4.0	2 00.3	+60.0	4.0	3 00.1	+60.0	4.0	4 00.0	+60.0	4.0	**4**
5	1 59.0	–60.0	176.0	0 59.1	–60.0	176.0	0 00.7	+60.0	4.0	1 00.6	+60.0	4.0	2 00.4	+60.0	4.0	3 00.3	+60.0	4.0	4 00.1	+60.0	4.0	5 00.0	+60.0	4.0	**5**
6	0 59.0	–60.0	176.0	0 00.9	+60.0	4.0	1 00.7	+60.0	4.0	2 00.6	+60.0	4.0	3 00.4	+60.0	4.0	4 00.3	+60.0	4.0	5 00.1	+60.0	4.0	6 00.0	+60.0	4.0	**6**
7	0 01.0	+60.0	4.0	1 00.9	+60.0	4.0	2 00.7	+60.0	4.0	3 00.6	+60.0	4.0	4 00.4	+60.0	4.0	5 00.3	+60.0	4.0	6 00.1	+60.0	4.0	7 00.0	+60.0	4.0	**7**
8	1 01.0	+60.0	4.0	2 00.9	+60.0	4.0	3 00.7	+60.0	4.0	4 00.6	+60.0	4.0	5 00.4	+60.0	4.0	6 00.3	+60.0	4.0	7 00.1	+60.0	4.0	8 00.0	+60.0	4.0	**8**
9	2 01.0	+60.0	4.0	3 00.9	+60.0	4.0	4 00.7	+60.0	4.0	5 00.6	+60.0	4.0	6 00.4	+60.0	4.0	7 00.3	+60.0	4.0	8 00.1	+60.0	4.0	9 00.0	+60.0	4.0	**9**
10	3 01.0	+60.0	3.9	4 00.9	+60.0	3.9	5 00.7	+60.0	4.0	6 00.6	+60.0	4.0	7 00.4	+60.0	4.0	8 00.3	+60.0	4.0	9 00.1	+60.0	4.0	10 00.0	+60.0	4.0	**10**
11	4 01.0	+60.0	3.9	5 00.9	+60.0	3.9	6 00.7	+60.0	3.9	7 00.6	+60.0	4.0	8 00.4	+60.0	4.0	9 00.3	+60.0	4.0	10 00.1	+60.0	4.0	11 00.0	+60.0	4.0	**11**
12	5 01.0	+60.0	3.9	6 00.9	+60.0	3.9	7 00.7	+60.0	3.9	8 00.6	+60.0	4.0	9 00.4	+60.0	4.0	10 00.3	+60.0	4.0	11 00.1	+60.0	4.0	12 00.0	+60.0	4.0	**12**
13	6 01.0	+60.0	3.9	7 00.9	+60.0	3.9	8 00.7	+60.0	3.9	9 00.6	+60.0	3.9	10 00.4	+60.0	4.0	11 00.3	+60.0	4.0	12 00.1	+60.0	4.0	13 00.0	+60.0	4.0	**13**
14	7 01.0	+60.0	3.9	8 00.9	+60.0	3.9	9 00.7	+60.0	3.9	10 00.6	+60.0	3.9	11 00.4	+60.0	4.0	12 00.3	+60.0	4.0	13 00.1	+60.0	4.0	14 00.0	+60.0	4.0	**14**
15	8 01.0	+60.0	3.9	9 00.9	+60.0	3.9	10 00.7	+60.0	3.9	11 00.6	+60.0	3.9	12 00.4	+60.0	4.0	13 00.3	+60.0	4.0	14 00.1	+60.0	4.0	15 00.0	+60.0	4.0	**15**
16	9 01.0	+60.0	3.9	10 00.9	+60.0	3.9	11 00.7	+60.0	3.9	12 00.6	+60.0	3.9	13 00.4	+60.0	3.9	14 00.3	+60.0	4.0	15 00.1	+60.0	4.0	16 00.0	+60.0	4.0	**16**
17	10 01.0	+60.0	3.9	11 00.9	+60.0	3.9	12 00.7	+60.0	3.9	13 00.6	+60.0	3.9	14 00.4	+60.0	3.9	15 00.3	+60.0	4.0	16 00.1	+60.0	4.0	17 00.0	+60.0	4.0	**17**
18	11 01.0	+60.0	3.9	12 00.9	+59.9	3.9	13 00.7	+60.0	3.9	14 00.6	+60.0	3.9	15 00.4	+60.0	3.9	16 00.3	+60.0	4.0	17 00.1	+60.0	4.0	18 00.0	+60.0	4.0	**18**
19	12 01.0	+60.0	3.9	13 00.8	+60.0	3.9	14 00.7	+60.0	3.9	15 00.6	+60.0	3.9	16 00.4	+60.0	3.9	17 00.3	+60.0	4.0	18 00.1	+60.0	4.0	19 00.0	+60.0	4.0	**19**
20	13 01.0	+60.0	3.9	14 00.8	+60.0	3.9	15 00.7	+60.0	3.9	16 00.6	+60.0	3.9	17 00.4	+60.0	3.9	18 00.3	+60.0	4.0	19 00.1	+60.0	4.0	20 00.0	+60.0	4.0	**20**
21	14 01.0	+60.0	3.8	15 00.8	+60.0	3.9	16 00.7	+60.0	3.9	17 00.6	+60.0	3.9	18 00.4	+60.0	3.9	19 00.3	+60.0	3.9	20 00.1	+60.0	4.0	21 00.0	+60.0	4.0	**21**
22	15 01.0	+60.0	3.8	16 00.8	+60.0	3.9	17 00.7	+60.0	3.9	18 00.6	+60.0	3.9	19 00.4	+60.0	3.9	20 00.3	+60.0	3.9	21 00.1	+60.0	4.0	22 00.0	+60.0	4.0	**22**
23	16 01.0	+60.0	3.8	17 00.8	+60.0	3.9	18 00.7	+60.0	3.9	19 00.6	+60.0	3.9	20 00.4	+60.0	3.9	21 00.3	+60.0	3.9	22 00.1	+60.0	4.0	23 00.0	+60.0	4.0	**23**
24	17 01.0	+60.0	3.8	18 00.8	+60.0	3.8	19 00.7	+60.0	3.9	20 00.6	+60.0	3.9	21 00.4	+60.0	3.9	22 00.3	+60.0	3.9	23 00.1	+60.0	4.0	24 00.0	+60.0	4.0	**24**
25	18 01.0	+60.0	3.8	19 00.8	+60.0	3.8	20 00.7	+60.0	3.9	21 00.6	+60.0	3.9	22 00.4	+60.0	3.9	23 00.3	+60.0	3.9	24 00.1	+60.0	4.0	25 00.0	+60.0	4.0	**25**
26	19 01.0	+60.0	3.8	20 00.8	+60.0	3.8	21 00.7	+60.0	3.9	22 00.6	+60.0	3.9	23 00.4	+60.0	3.9	24 00.3	+60.0	3.9	25 00.1	+60.0	4.0	26 00.0	+60.0	4.0	**26**
27	20 01.0	+60.0	3.8	21 00.8	+60.0	3.8	22 00.7	+60.0	3.8	23 00.6	+60.0	3.9	24 00.4	+60.0	3.9	25 00.3	+60.0	3.9	26 00.1	+60.0	4.0	27 00.0	+60.0	4.0	**27**
28	21 01.0	+60.0	3.8	22 00.8	+60.0	3.8	23 00.7	+60.0	3.8	24 00.6	+60.0	3.9	25 00.4	+60.0	3.9	26 00.3	+60.0	3.9	27 00.1	+60.0	4.0	28 00.0	+60.0	4.0	**28**
29	22 01.0	+60.0	3.8	23 00.8	+60.0	3.8	24 00.7	+60.0	3.8	25 00.6	+60.0	3.9	26 00.4	+60.0	3.9	27 00.3	+60.0	3.9	28 00.1	+60.0	4.0	29 00.0	+60.0	4.0	**29**
30	23 01.0	+60.0	3.8	24 00.8	+60.0	3.8	25 00.7	+60.0	3.8	26 00.6	+60.0	3.9	27 00.4	+60.0	3.9	28 00.3	+60.0	3.9	29 00.1	+60.0	4.0	30 00.0	+60.0	4.0	**30**
31	24 01.0	+60.0	3.8	25 00.8	+60.0	3.8	26 00.7	+60.0	3.8	27 00.6	+60.0	3.8	28 00.4	+60.0	3.9	29 00.3	+60.0	3.9	30 00.1	+60.0	4.0	31 00.0	+60.0	4.0	**31**
32	25 01.0	+60.0	3.7	26 00.8	+60.0	3.8	27 00.7	+60.0	3.8	28 00.6	+60.0	3.8	29 00.4	+60.0	3.9	30 00.3	+60.0	3.9	31 00.1	+60.0	4.0	32 00.0	+60.0	4.0	**32**
33	26 01.0	+59.9	3.7	27 00.8	+60.0	3.8	28 00.7	+60.0	3.8	29 00.6	+60.0	3.8	30 00.4	+60.0	3.9	31 00.3	+60.0	3.9	32 00.1	+60.0	4.0	33 00.0	+60.0	4.0	**33**
34	27 00.9	+60.0	3.7	28 00.8	+60.0	3.8	29 00.7	+60.0	3.8	30 00.6	+60.0	3.8	31 00.4	+60.0	3.9	32 00.3	+60.0	3.9	33 00.1	+60.0	4.0	34 00.0	+60.0	4.0	**34**
35	28 00.9	+60.0	3.7	29 00.8	+60.0	3.7	30 00.7	+60.0	3.8	31 00.6	+60.0	3.8	32 00.4	+60.0	3.9	33 00.3	+60.0	3.9	34 00.1	+60.0	4.0	35 00.0	+60.0	4.0	**35**
36	29 00.9	+60.0	3.7	30 00.8	+60.0	3.7	31 00.7	+60.0	3.8	32 00.6	+60.0	3.8	33 00.4	+60.0	3.9	34 00.3	+60.0	3.9	35 00.1	+60.0	4.0	36 00.0	+60.0	4.0	**36**
37	30 00.9	+60.0	3.7	31 00.8	+60.0	3.7	32 00.7	+60.0	3.8	33 00.6	+60.0	3.8	34 00.4	+60.0	3.9	35 00.3	+60.0	3.9	36 00.1	+60.0	3.9	37 00.0	+60.0	4.0	**37**
38	31 00.9	+60.0	3.7	32 00.8	+60.0	3.7	33 00.7	+60.0	3.8	34 00.6	+60.0	3.8	35 00.4	+60.0	3.8	36 00.3	+60.0	3.9	37 00.1	+60.0	3.9	38 00.0	+60.0	4.0	**38**
39	32 00.9	+60.0	3.7	33 00.8	+60.0	3.7	34 00.7	+60.0	3.7	35 00.6	+60.0	3.8	36 00.4	+60.0	3.8	37 00.3	+60.0	3.9	38 00.1	+60.0	3.9	39 00.0	+60.0	4.0	**39**
40	33 00.9	+60.0	3.7	34 00.8	+60.0	3.7	35 00.7	+60.0	3.7	36 00.6	+60.0	3.8	37 00.4	+60.0	3.8	38 00.3	+60.0	3.9	39 00.1	+60.0	3.9	40 00.0	+60.0	4.0	**40**
41	34 00.9	+60.0	3.6	35 00.8	+60.0	3.7	36 00.7	+60.0	3.7	37 00.6	+60.0	3.8	38 00.4	+60.0	3.8	39 00.3	+60.0	3.9	40 00.1	+60.0	3.9	41 00.0	+60.0	4.0	**41**
42	35 00.9	+60.0	3.6	36 00.8	+60.0	3.7	37 00.7	+60.0	3.7	38 00.6	+59.9	3.8	39 00.4	+60.0	3.8	40 00.3	+60.0	3.9	41 00.1	+60.0	3.9	42 00.0	+60.0	4.0	**42**
43	36 00.9	+60.0	3.6	37 00.8	+60.0	3.7	38 00.7	+60.0	3.7	39 00.5	+60.0	3.8	40 00.4	+60.0	3.8	41 00.3	+60.0	3.9	42 00.1	+60.0	3.9	43 00.0	+60.0	4.0	**43**
44	37 00.9	+60.0	3.6	38 00.8	+60.0	3.7	39 00.7	+60.0	3.7	40 00.5	+60.0	3.8	41 00.4	+60.0	3.8	42 00.3	+60.0	3.9	43 00.1	+60.0	3.9	44 00.0	+60.0	4.0	**44**
45	38 00.9	+60.0	3.6	39 00.8	+60.0	3.6	40 00.7	+60.0	3.7	41 00.5	+60.0	3.7	42 00.4	+60.0	3.8	43 00.3	+60.0	3.9	44 00.1	+60.0	3.9	45 00.0	+60.0	4.0	**45**
46	39 00.9	+60.0	3.6	40 00.8	+60.0	3.6	41 00.7	+60.0	3.7	42 00.5	+60.0	3.7	43 00.4	+60.0	3.8	44 00.3	+60.0	3.9	45 00.1	+60.0	3.9	46 00.0	+60.0	4.0	**46**
47	40 00.9	+60.0	3.6	41 00.8	+60.0	3.6	42 00.7	+60.0	3.7	43 00.5	+60.0	3.7	44 00.4	+60.0	3.8	45 00.3	+60.0	3.9	46 00.1	+60.0	3.9	47 00.0	+60.0	4.0	**47**
48	41 00.9	+60.0	3.5	42 00.8	+60.0	3.6	43 00.7	+60.0	3.7	44 00.5	+60.0	3.7	45 00.4	+60.0	3.8	46 00.3	+60.0	3.9	47 00.1	+60.0	3.9	48 00.0	+60.0	4.0	**48**
49	42 00.9	+60.0	3.5	43 00.8	+60.0	3.6	44 00.7	+60.0	3.6	45 00.5	+60.0	3.7	46 00.4	+60.0	3.8	47 00.3	+60.0	3.8	48 00.1	+60.0	3.9	49 00.0	+60.0	4.0	**49**
50	43 00.9	+60.0	3.5	44 00.8	+60.0	3.6	45 00.7	+60.0	3.6	46 00.5	+60.0	3.7	47 00.4	+60.0	3.8	48 00.3	+60.0	3.8	49 00.1	+60.0	3.9	50 00.0	+60.0	4.0	**50**
51	44 00.9	+60.0	3.5	45 00.8	+60.0	3.6	46 00.7	+60.0	3.6	47 00.5	+60.0	3.7	48 00.4	+60.0	3.8	49 00.3	+60.0	3.8	50 00.1	+60.0	3.9	51 00.0	+60.0	4.0	**51**
52	45 00.9	+60.0	3.5	46 00.8	+60.0	3.5	47 00.7	+60.0	3.6	48 00.5	+60.0	3.7	49 00.4	+60.0	3.8	50 00.3	+60.0	3.8	51 00.1	+60.0	3.9	52 00.0	+60.0	4.0	**52**
53	46 00.9	+60.0	3.5	47 00.8	+60.0	3.5	48 00.7	+60.0	3.6	49 00.5	+60.0	3.7	50 00.4	+60.0	3.7	51 00.3	+60.0	3.8	52 00.1	+60.0	3.9	53 00.0	+60.0	4.0	**53**
54	47 00.9	+60.0	3.4	48 00.8	+60.0	3.5	49 00.7	+60.0	3.6	50 00.5	+60.0	3.7	51 00.4	+60.0	3.7	52 00.3	+60.0	3.8	53 00.1	+60.0	3.9	54 00.0	+60.0	4.0	**54**
55	48 00.9	+60.0	3.4	49 00.8	+60.0	3.5	50 00.7	+59.9	3.6	51 00.5	+60.0	3.6	52 00.4	+60.0	3.7	53 00.3	+60.0	3.8	54 00.1	+60.0	3.9	55 00.0	+60.0	4.0	**55**
56	49 00.9	+60.0	3.4	50 00.8	+60.0	3.5	51 00.6	+60.0	3.6	52 00.5	+60.0	3.6	53 00.4	+60.0	3.7	54 00.3	+60.0	3.8	55 00.1	+60.0	3.9	56 00.0	+60.0	4.0	**56**
57	50 00.9	+60.0	3.4	51 00.8	+60.0	3.5	52 00.6	+60.0	3.5	53 00.5	+60.0	3.6	54 00.4	+60.0	3.7	55 00.3	+60.0	3.8	56 00.1	+60.0	3.9	57 00.0	+60.0	4.0	**57**
58	51 00.9	+60.0	3.4	52 00.8	+59.9	3.4	53 00.6	+60.0	3.5	54 00.5	+60.0	3.6	55 00.4	+60.0	3.7	56 00.3	+60.0	3.8	57 00.1	+60.0	3.9	58 00.0	+60.0	4.0	**58**
59	52 00.9	+59.9	3.3	53 00.7	+60.0	3.4	54 00.6	+60.0	3.5	55 00.5	+60.0	3.6	56 00.4	+60.0	3.7	57 00.3	+60.0	3.8	58 00.1	+60.0	3.9	59 00.0	+60.0	4.0	**59**
60	53 00.8	+60.0	3.3	54 00.7	+60.0	3.4	55 00.6	+60.0	3.5	56 00.5	+60.0	3.6	57 00.4	+60.0	3.7	58 00.3	+60.0	3.8	59 00.1	+60.0	3.9	60 00.0	+60.0	4.0	**60**
61	54 00.8	+60.0	3.3	55 00.7	+60.0	3.4	56 00.6	+60.0	3.5	57 00.5	+60.0	3.6	58 00.4	+60.0	3.7	59 00.3	+60.0	3.8	60 00.1	+60.0	3.9	61 00.0	+60.0	4.0	**61**
62	55 00.8	+60.0	3.3	56 00.7	+60.0	3.4	57 00.6	+60.0	3.4	58 00.5	+60.0	3.5	59 00.4	+60.0	3.6	60 00.3	+60.0	3.8	61 00.1	+60.0	3.9	62 00.0	+60.0	4.0	**62**
63	56 00.8	+60.0	3.2	57 00.7	+60.0	3.3	58 00.6	+60.0	3.4	59 00.5	+60.0	3.5	60 00.4	+60.0	3.6	61 00.3	+60.0	3.7	62 00.1	+60.0	3.9	63 00.0	+60.0	4.0	**63**
64	57 00.8	+60.0	3.2	58 00.7	+60.0	3.3	59 00.6	+60.0	3.4	60 00.5	+60.0	3.5	61 00.4	+60.0	3.6	62 00.3	+60.0	3.7	63 00.1	+60.0	3.9	64 00.0	+60.0	4.0	**64**
65	58 00.8	+60.0	3.2	59 00.7	+60.0	3.3	60 00.6	+60.0	3.4	61 00.5	+60.0	3.5	62 00.4	+60.0	3.6	63 00.3	+60.0	3.7	64 00.1	+60.0	3.9	65 00.0	+60.0	4.0	**65**
66	59 00.8	+60.0	3.2	60 00.7	+60.0	3.3	61 00.6	+60.0	3.4	62 00.5	+60.0	3.5	63 00.4	+60.0	3.6	64 00.3	+60.0	3.7	65 00.1	+60.0	3.8	66 00.0	+60.0	4.0	**66**
67	60 00.8	+60.0	3.1	61 00.7	+60.0	3.2	62 00.6	+60.0	3.3	63 00.5	+60.0	3.4	64 00.4	+60.0	3.6	65 00.3	+60.0	3.7	66 00.1	+60.0	3.8	67 00.0	+60.0	4.0	**67**
68	61 00.8	+60.0	3.1	62 00.7	+60.0	3.2	63 00.6	+60.0	3.3	64 00.5	+60.0	3.4	65 00.4	+60.0	3.5	66 00.3	+60.0	3.7	67 00.1	+60.0	3.8	68 00.0	+60.0	4.0	**68**
69	62 00.8	+60.0	3.1	63 00.7	+60.0	3.2	64 00.6	+60.0	3.3	65 00.5	+60.0	3.4	66 00.4	+60.0	3.5	67 00.3	+60.0	3.7	68 00.1	+60.0	3.8	69 00.0	+60.0	4.0	**69**
70	63 00.8	+60.0	3.0	64 00.7	+60.0	3.1	65 00.6	+60.0	3.2	66 00.5	+60.0	3.4	67 00.4	+60.0	3.5	68 00.3	+60.0	3.7	69 00.1	+60.0	3.8	70 00.0	+60.0	4.0	**70**
71	64 00.8	+59.9	3.0	65 00.7	+60.0	3.1	66 00.6	+60.0	3.2	67 00.5	+60.0	3.3	68 00.4	+60.0	3.5	69 00.3	+60.0	3.6	70 00.1	+60.0	3.8	71 00.0	+60.0	4.0	**71**
72	65 00.7	+60.0	2.9	66 00.7	+60.0	3.0	67 00.6	+60.0	3.2	68 00.5	+60.0	3.3	69 00.4	+60.0	3.4	70 00.3	+60.0	3.6	71 00.1	+60.0	3.8	72 00.0	+60.0	4.0	**72**
73	66 00.7	+60.0	2.9	67 00.7	+59.9	3.0	68 00.6	+60.0	3.1	69 00.5	+60.0	3.3	70 00.4	+60.0	3.4	71 00.3	+60.0	3.6	72 00.1	+60.0	3.8	73 00.0	+60.0	4.0	**73**
74	67 00.7	+60.0	2.8	68 00.6	+60.0	2.9	69 00.6	+60.0	3.1	70 00.5	+60.0	3.2	71 00.4	+60.0	3.4	72 00.3	+60.0	3.6	73 00.1	+60.0	3.8	74 00.0	+60.0	4.0	**74**
75	68 00.7	+60.0	2.8	69 00.6	+60.0	2.9	70 00.6	+59.9	3.0	71 00.5	+60.0	3.2	72 00.4	+60.0	3.4	73 00.3	+60.0	3.5	74 00.1	+60.0	3.8	75 00.0	+60.0	4.0	**75**
76	69 00.7	+60.0	2.7	70 00.6	+60.0	2.8	71 00.5	+60.0	3.0	72 00.5	+59.9	3.1	73 00.4	+60.0	3.3	74 00.3	+60.0	3.5	75 00.1	+60.0	3.7	76 00.0	+60.0	4.0	**76**
77	70 00.7	+60.0	2.6	71 00.6	+60.0	2.8	72 00.5	+60.0	2.9	73 00.4	+60.0	3.1	74 00.4	+60.0	3.3	75 00.3	+60.0	3.5	76 00.1	+60.0	3.7	77 00.0	+60.0	4.0	**77**
78	71 00.7	+59.9	2.6	72 00.6	+60.0	2.7	73 00.5	+60.0	2.8	74 00.4	+60.0	3.0	75 00.4	+59.9	3.2	76 00.3	+59.9	3.4	77 00.1	+60.0	3.7	78 00.0	+60.0	4.0	**78**
79	72 00.6	+60.0	2.5	73 00.6	+60.0	2.6	74 00.5	+60.0	2.8	75 00.4	+60.0	2.9	76 00.3	+60.0	3.2	77 00.2	+60.0	3.4	78 00.1	+60.0	3.7	79 00.0	+60.0	4.0	**79**
80	73 00.6	+60.0	2.4	74 00.6	+59.9	2.5	75 00.5	+60.0	2.7	76 00.4	+60.0	2.9	77 00.3	+60.0	3.1	78 00.2	+60.0	3.3	79 00.1	+60.0	3.6	80 00.0	+60.0	4.0	**80**
81	74 00.6	+59.9	2.3	75 00.5	+60.0	2.4	76 00.5	+60.0	2.6	77 00.4	+60.0	2.8	78 00.3	+60.0	3.0	79 00.2	+60.0	3.3	80 00.1	+60.0	3.6	81 00.0	+60.0	4.0	**81**
82	75 00.5	+60.0	2.2	76 00.5	+60.0	2.3	77 00.5	+59.9	2.5	78 00.4	+60.0	2.7	79 00.3	+60.0	2.9	80 00.2	+60.0	3.2	81 00.1	+60.0	3.6	82 00.0	+60.0	4.0	**82**
83	76 00.5	+60.0	2.0	77 00.5	+59.9	2.2	78 00.4	+60.0	2.3	79 00.4	+60.0	2.6	80 00.3	+60.0	2.8	81 00.2	+60.0	3.1	82 00.1	+60.0	3.5	83 00.0	+60.0	4.0	**83**
84	77 00.5	+59.9	1.9	78 00.4	+60.0	2.0	79 00.4	+60.0	2.2	80 00.4	+59.9	2.4	81 00.3	+60.0	2.7	82 00.2	+60.0	3.0	83 00.1	+60.0	3.4	84 00.0	+60.0	4.0	**84**
85	78 00.4	+60.0	1.7	79 00.4	+60.0	1.8	80 00.4	+59.9	2.0	81 00.3	+60.0	2.2	82 00.3	+60.0	2.5	83 00.2	+60.0	2.9	84 00.1	+60.0	3.3	85 00.0	+60.0	4.0	**85**
86	79 00.4	+59.9	1.5	80 00.4	+59.9	1.6	81 00.3	+60.0	1.8	82 00.3	+60.0	2.0	83 00.3	+59.9	2.3	84 00.2	+60.0	2.7	85 00.1	+60.0	3.2	86 00.0	+60.0	4.0	**86**
87	80 00.3	+59.9	1.2	81 00.3	+59.9	1.3	82 00.3	+59.9	1.5	83 00.3	+59.9	1.7	84 00.2	+60.0	2.0	85 00.2	+59.9	2.4	86 00.1	+60.0	3.0	87 00.0	+60.0	4.0	**87**
88	81 00.2	+59.9	0.9	82 00.2	+59.9	1.0	83 00.2	+59.9	1.1	84 00.2	+59.9	1.3	85 00.2	+59.9	1.6	86 00.1	+60.0	2.0	87 00.1	+60.0	2.7	88 00.0	+60.0	4.0	**88**
89	82 00.1	+59.9	0.5	83 00.1	+59.9	0.6	84 00.1	+59.9	0.7	85 00.1	+59.9	0.8	86 00.1	+59.9	1.0	87 00.1	+59.9	1.3	88 00.1	*+59.9* •	2.0	89 00.0	+60.0	4.0	**89**
90	83 00.0	+59.8	0.0	84 00.0	+59.8	0.0	85 00.0	+59.8	0.0	86 00.0	+59.8	0.0	87 00.0	+59.8	0.0	88 00.0	*+59.7* •	0.0	89 00.0	*+55.8* •	0.0	90 00.0	–60.0	2.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 176°, 184°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 58.4	+ 60.0	175.0	5 58.6	+ 60.0	175.0	4 58.9	+ 60.0	175.0	3 59.1	+ 60.0	175.0	2 59.3	+ 60.0	175.0	1 59.5	+ 60.0	175.0	0 59.8	+ 60.0	175.0	0 00.0	+ 60.0	175.0	**0**
1	7 58.4	+ 60.0	175.0	6 58.6	+ 60.0	175.0	5 58.9	+ 60.0	175.0	4 59.1	+ 60.0	175.0	3 59.3	+ 60.0	175.0	2 59.5	+ 60.0	175.0	1 59.8	+ 60.0	175.0	1 00.0	+ 60.0	175.0	**1**
2	8 58.4	+ 60.0	174.9	7 58.6	+ 60.0	175.0	6 58.9	+ 60.0	175.0	5 59.1	+ 60.0	175.0	4 59.3	+ 60.0	175.0	3 59.5	+ 60.0	175.0	2 59.8	+ 60.0	175.0	2 00.0	+ 60.0	175.0	**2**
3	9 58.4	+ 60.0	174.9	8 58.6	+ 60.0	174.9	7 58.9	+ 59.9	175.0	6 59.1	+ 60.0	175.0	5 59.3	+ 60.0	175.0	4 59.5	+ 60.0	175.0	3 59.8	+ 60.0	175.0	3 00.0	+ 60.0	175.0	**3**
4	10 58.4	+ 60.0	174.9	9 58.6	+ 60.0	174.9	8 58.8	+ 60.0	175.0	7 59.1	+ 60.0	175.0	6 59.3	+ 60.0	175.0	5 59.5	+ 60.0	175.0	4 59.8	+ 60.0	175.0	4 00.0	+ 60.0	175.0	**4**
5	11 58.4	+ 60.0	174.9	10 58.6	+ 60.0	174.9	9 58.8	+ 60.0	174.9	8 59.1	+ 60.0	175.0	7 59.3	+ 60.0	175.0	6 59.5	+ 60.0	175.0	5 59.8	+ 60.0	175.0	5 00.0	+ 60.0	175.0	**5**
6	12 58.4	+ 60.0	174.9	11 58.6	+ 60.0	174.9	10 58.8	+ 60.0	174.9	9 59.1	+ 60.0	175.0	8 59.3	+ 60.0	175.0	7 59.5	+ 60.0	175.0	6 59.8	+ 60.0	175.0	6 00.0	+ 60.0	175.0	**6**
7	13 58.4	+ 60.0	174.9	12 58.6	+ 60.0	174.9	11 58.8	+ 60.0	174.9	10 59.1	+ 60.0	174.9	9 59.3	+ 60.0	175.0	8 59.5	+ 60.0	175.0	7 59.8	+ 60.0	175.0	7 00.0	+ 60.0	175.0	**7**
8	14 58.4	+ 60.0	174.9	13 58.6	+ 60.0	174.9	12 58.8	+ 60.0	174.9	11 59.1	+ 60.0	174.9	10 59.3	+ 60.0	175.0	9 59.5	+ 60.0	175.0	8 59.8	+ 60.0	175.0	8 00.0	+ 60.0	175.0	**8**
9	15 58.4	+ 60.0	174.9	14 58.6	+ 60.0	174.9	13 58.8	+ 60.0	174.9	12 59.1	+ 60.0	174.9	11 59.3	+ 60.0	175.0	10 59.5	+ 60.0	175.0	9 59.8	+ 60.0	175.0	9 00.0	+ 60.0	175.0	**9**
10	16 58.4	+ 60.0	174.9	15 58.6	+ 60.0	174.9	14 58.8	+ 60.0	174.9	13 59.1	+ 60.0	174.9	12 59.3	+ 60.0	174.9	11 59.5	+ 60.0	175.0	10 59.8	+ 60.0	175.0	10 00.0	+ 60.0	175.0	**10**
11	17 58.4	+ 60.0	174.8	16 58.6	+ 60.0	174.9	15 58.8	+ 60.0	174.9	14 59.1	+ 60.0	174.9	13 59.3	+ 60.0	174.9	12 59.5	+ 60.0	175.0	11 59.8	+ 60.0	175.0	11 00.0	+ 60.0	175.0	**11**
12	18 58.4	+ 59.9	174.8	17 58.6	+ 60.0	174.9	16 58.8	+ 60.0	174.9	15 59.1	+ 60.0	174.9	14 59.3	+ 60.0	174.9	13 59.5	+ 60.0	175.0	12 59.8	+ 60.0	175.0	12 00.0	+ 60.0	175.0	**12**
13	19 58.3	+ 60.0	174.8	18 58.6	+ 60.0	174.8	17 58.8	+ 60.0	174.9	16 59.1	+ 60.0	174.9	15 59.3	+ 60.0	174.9	14 59.5	+ 60.0	175.0	13 59.8	+ 60.0	175.0	13 00.0	+ 60.0	175.0	**13**
14	20 58.3	+ 60.0	174.8	19 58.6	+ 60.0	174.8	18 58.8	+ 60.0	174.9	17 59.1	+ 60.0	174.9	16 59.3	+ 60.0	174.9	15 59.5	+ 60.0	175.0	14 59.8	+ 60.0	175.0	14 00.0	+ 60.0	175.0	**14**
15	21 58.3	+ 60.0	174.8	20 58.6	+ 60.0	174.8	19 58.8	+ 60.0	174.9	18 59.1	+ 60.0	174.9	17 59.3	+ 60.0	174.9	16 59.5	+ 60.0	174.9	15 59.8	+ 60.0	175.0	15 00.0	+ 60.0	175.0	**15**
16	22 58.3	+ 60.0	174.8	21 58.6	+ 60.0	174.8	20 58.8	+ 60.0	174.9	19 59.1	+ 60.0	174.9	18 59.3	+ 60.0	174.9	17 59.5	+ 60.0	174.9	16 59.8	+ 60.0	175.0	16 00.0	+ 60.0	175.0	**16**
17	23 58.3	+ 60.0	174.8	22 58.6	+ 60.0	174.8	21 58.8	+ 60.0	174.8	20 59.1	+ 60.0	174.9	19 59.3	+ 60.0	174.9	18 59.5	+ 60.0	174.9	17 59.8	+ 60.0	175.0	17 00.0	+ 60.0	175.0	**17**
18	24 58.3	+ 60.0	174.8	23 58.6	+ 60.0	174.8	22 58.8	+ 60.0	174.8	21 59.1	+ 60.0	174.9	20 59.3	+ 60.0	174.9	19 59.5	+ 60.0	174.9	18 59.8	+ 60.0	175.0	18 00.0	+ 60.0	175.0	**18**
19	25 58.3	+ 60.0	174.7	24 58.6	+ 60.0	174.8	23 58.8	+ 60.0	174.8	22 59.1	+ 60.0	174.9	21 59.3	+ 60.0	174.9	20 59.5	+ 60.0	174.9	19 59.8	+ 60.0	175.0	19 00.0	+ 60.0	175.0	**19**
20	26 58.3	+ 60.0	174.7	25 58.6	+ 60.0	174.8	24 58.8	+ 60.0	174.8	23 59.1	+ 60.0	174.9	22 59.3	+ 60.0	174.9	21 59.5	+ 60.0	174.9	20 59.8	+ 60.0	175.0	20 00.0	+ 60.0	175.0	**20**
21	27 58.3	+ 60.0	174.7	26 58.6	+ 60.0	174.8	25 58.8	+ 60.0	174.8	24 59.1	+ 60.0	174.8	23 59.3	+ 60.0	174.9	22 59.5	+ 60.0	174.9	21 59.8	+ 60.0	175.0	21 00.0	+ 60.0	175.0	**21**
22	28 58.3	+ 60.0	174.7	27 58.6	+ 60.0	174.7	26 58.8	+ 60.0	174.8	25 59.1	+ 60.0	174.8	24 59.3	+ 60.0	174.9	23 59.5	+ 60.0	174.9	22 59.8	+ 60.0	175.0	22 00.0	+ 60.0	175.0	**22**
23	29 58.3	+ 60.0	174.7	28 58.6	+ 60.0	174.7	27 58.8	+ 60.0	174.8	26 59.1	+ 60.0	174.8	25 59.3	+ 60.0	174.9	24 59.5	+ 60.0	174.9	23 59.8	+ 60.0	175.0	23 00.0	+ 60.0	175.0	**23**
24	30 58.3	+ 60.0	174.7	29 58.6	+ 60.0	174.7	28 58.8	+ 60.0	174.8	27 59.1	+ 60.0	174.8	26 59.3	+ 60.0	174.9	25 59.5	+ 60.0	174.9	24 59.8	+ 60.0	175.0	24 00.0	+ 60.0	175.0	**24**
25	31 58.3	+ 60.0	174.7	30 58.6	+ 60.0	174.7	29 58.8	+ 60.0	174.8	28 59.1	+ 60.0	174.8	27 59.3	+ 60.0	174.9	26 59.5	+ 60.0	174.9	25 59.8	+ 60.0	175.0	25 00.0	+ 60.0	175.0	**25**
26	32 58.3	+ 60.0	174.6	31 58.6	+ 59.9	174.7	30 58.8	+ 60.0	174.8	29 59.1	+ 60.0	174.8	28 59.3	+ 60.0	174.9	27 59.5	+ 60.0	174.9	26 59.8	+ 60.0	175.0	26 00.0	+ 60.0	175.0	**26**
27	33 58.3	+ 60.0	174.6	32 58.5	+ 60.0	174.7	31 58.8	+ 60.0	174.7	30 59.1	+ 60.0	174.8	29 59.3	+ 60.0	174.9	28 59.5	+ 60.0	174.9	27 59.8	+ 60.0	175.0	27 00.0	+ 60.0	175.0	**27**
28	34 58.3	+ 60.0	174.6	33 58.5	+ 60.0	174.7	32 58.8	+ 60.0	174.7	31 59.1	+ 59.9	174.8	30 59.3	+ 60.0	174.8	29 59.5	+ 60.0	174.9	28 59.8	+ 60.0	175.0	28 00.0	+ 60.0	175.0	**28**
29	35 58.3	+ 60.0	174.6	34 58.5	+ 60.0	174.7	33 58.8	+ 60.0	174.7	32 59.0	+ 60.0	174.8	31 59.3	+ 60.0	174.8	30 59.5	+ 60.0	174.9	29 59.8	+ 60.0	175.0	29 00.0	+ 60.0	175.0	**29**
30	36 58.3	+ 60.0	174.6	35 58.5	+ 60.0	174.6	34 58.8	+ 60.0	174.7	33 59.0	+ 60.0	174.8	32 59.3	+ 60.0	174.8	31 59.5	+ 60.0	174.9	30 59.8	+ 60.0	174.9	30 00.0	+ 60.0	175.0	**30**
31	37 58.3	+ 60.0	174.6	36 58.5	+ 60.0	174.6	35 58.8	+ 60.0	174.7	34 59.0	+ 60.0	174.8	33 59.3	+ 60.0	174.8	32 59.5	+ 60.0	174.9	31 59.8	+ 60.0	174.9	31 00.0	+ 60.0	175.0	**31**
32	38 58.3	+ 60.0	174.5	37 58.5	+ 60.0	174.6	36 58.8	+ 60.0	174.7	35 59.0	+ 60.0	174.8	34 59.3	+ 60.0	174.8	33 59.5	+ 60.0	174.9	32 59.8	+ 60.0	174.9	32 00.0	+ 60.0	175.0	**32**
33	39 58.3	+ 59.9	174.5	38 58.5	+ 60.0	174.6	37 58.8	+ 60.0	174.7	36 59.0	+ 60.0	174.7	35 59.3	+ 60.0	174.8	34 59.5	+ 60.0	174.9	33 59.8	+ 60.0	174.9	33 00.0	+ 60.0	175.0	**33**
34	40 58.2	+ 60.0	174.5	39 58.5	+ 60.0	174.6	38 58.8	+ 60.0	174.7	37 59.0	+ 60.0	174.7	36 59.3	+ 60.0	174.8	35 59.5	+ 60.0	174.9	34 59.8	+ 60.0	174.9	34 00.0	+ 60.0	175.0	**34**
35	41 58.2	+ 60.0	174.5	40 58.5	+ 60.0	174.6	39 58.8	+ 60.0	174.7	38 59.0	+ 60.0	174.7	37 59.3	+ 60.0	174.8	36 59.5	+ 60.0	174.9	35 59.8	+ 60.0	174.9	35 00.0	+ 60.0	175.0	**35**
36	42 58.2	+ 60.0	174.5	41 58.5	+ 60.0	174.6	40 58.8	+ 60.0	174.6	39 59.0	+ 60.0	174.7	38 59.3	+ 60.0	174.8	37 59.5	+ 60.0	174.9	36 59.8	+ 60.0	174.9	36 00.0	+ 60.0	175.0	**36**
37	43 58.2	+ 60.0	174.4	42 58.5	+ 60.0	174.5	41 58.8	+ 60.0	174.6	40 59.0	+ 60.0	174.7	39 59.3	+ 60.0	174.8	38 59.5	+ 60.0	174.9	37 59.8	+ 60.0	174.9	37 00.0	+ 60.0	175.0	**37**
38	44 58.2	+ 60.0	174.4	43 58.5	+ 60.0	174.5	42 58.8	+ 60.0	174.6	41 59.0	+ 60.0	174.7	40 59.3	+ 60.0	174.8	39 59.5	+ 60.0	174.9	38 59.8	+ 60.0	174.9	38 00.0	+ 60.0	175.0	**38**
39	45 58.2	+ 60.0	174.4	44 58.5	+ 60.0	174.5	43 58.8	+ 60.0	174.6	42 59.0	+ 60.0	174.7	41 59.3	+ 60.0	174.8	40 59.5	+ 60.0	174.9	39 59.8	+ 60.0	174.9	39 00.0	+ 60.0	175.0	**39**
40	46 58.2	+ 60.0	174.4	45 58.5	+ 60.0	174.5	44 58.8	+ 60.0	174.6	43 59.0	+ 60.0	174.7	42 59.3	+ 60.0	174.8	41 59.5	+ 60.0	174.8	40 59.8	+ 60.0	174.9	40 00.0	+ 60.0	175.0	**40**
41	47 58.2	+ 60.0	174.4	46 58.5	+ 60.0	174.5	45 58.8	+ 60.0	174.6	44 59.0	+ 60.0	174.7	43 59.3	+ 60.0	174.8	42 59.5	+ 60.0	174.8	41 59.8	+ 60.0	174.9	41 00.0	+ 60.0	175.0	**41**
42	48 58.2	+ 60.0	174.3	47 58.5	+ 60.0	174.4	46 58.8	+ 60.0	174.6	45 59.0	+ 60.0	174.7	44 59.3	+ 60.0	174.7	43 59.5	+ 60.0	174.8	42 59.8	+ 60.0	174.9	42 00.0	+ 60.0	175.0	**42**
43	49 58.2	+ 60.0	174.3	48 58.5	+ 60.0	174.4	47 58.8	+ 60.0	174.5	46 59.0	+ 60.0	174.6	45 59.3	+ 60.0	174.7	44 59.5	+ 60.0	174.8	43 59.8	+ 60.0	174.9	43 00.0	+ 60.0	175.0	**43**
44	50 58.2	+ 60.0	174.3	49 58.5	+ 60.0	174.4	48 58.8	+ 59.9	174.5	47 59.0	+ 60.0	174.6	46 59.3	+ 60.0	174.7	45 59.5	+ 60.0	174.8	44 59.8	+ 60.0	174.9	44 00.0	+ 60.0	175.0	**44**
45	51 58.2	+ 60.0	174.3	50 58.5	+ 60.0	174.4	49 58.7	+ 60.0	174.5	48 59.0	+ 60.0	174.6	47 59.3	+ 60.0	174.7	46 59.5	+ 60.0	174.8	45 59.8	+ 60.0	174.9	45 00.0	+ 60.0	175.0	**45**
46	52 58.2	+ 60.0	174.2	51 58.5	+ 60.0	174.4	50 58.7	+ 60.0	174.5	49 59.0	+ 60.0	174.6	48 59.3	+ 60.0	174.7	47 59.5	+ 60.0	174.8	46 59.8	+ 60.0	174.9	46 00.0	+ 60.0	175.0	**46**
47	53 58.2	+ 59.9	174.2	52 58.5	+ 59.9	174.3	51 58.7	+ 60.0	174.5	50 59.0	+ 60.0	174.6	49 59.3	+ 60.0	174.7	48 59.5	+ 60.0	174.8	47 59.8	+ 60.0	174.9	47 00.0	+ 60.0	175.0	**47**
48	54 58.1	+ 60.0	174.2	53 58.4	+ 60.0	174.3	52 58.7	+ 60.0	174.4	51 59.0	+ 60.0	174.6	50 59.3	+ 60.0	174.7	49 59.5	+ 60.0	174.8	48 59.8	+ 60.0	174.9	48 00.0	+ 60.0	175.0	**48**
49	55 58.1	+ 60.0	174.1	54 58.4	+ 60.0	174.3	53 58.7	+ 60.0	174.4	52 59.0	+ 60.0	174.6	51 59.3	+ 60.0	174.7	50 59.5	+ 60.0	174.8	49 59.8	+ 60.0	174.9	49 00.0	+ 60.0	175.0	**49**
50	56 58.1	+ 60.0	174.1	55 58.4	+ 60.0	174.3	54 58.7	+ 60.0	174.4	53 59.0	+ 60.0	174.5	52 59.3	+ 60.0	174.7	51 59.5	+ 60.0	174.8	50 59.8	+ 60.0	174.9	50 00.0	+ 60.0	175.0	**50**
51	57 58.1	+ 60.0	174.1	56 58.4	+ 60.0	174.2	55 58.7	+ 60.0	174.4	54 59.0	+ 60.0	174.5	53 59.3	+ 60.0	174.6	52 59.5	+ 60.0	174.8	51 59.8	+ 60.0	174.9	51 00.0	+ 60.0	175.0	**51**
52	58 58.1	+ 60.0	174.0	57 58.4	+ 60.0	174.2	56 58.7	+ 60.0	174.3	55 59.0	+ 60.0	174.5	54 59.3	+ 60.0	174.6	53 59.5	+ 60.0	174.8	52 59.8	+ 60.0	174.9	52 00.0	+ 60.0	175.0	**52**
53	59 58.1	+ 60.0	174.0	58 58.4	+ 60.0	174.2	57 58.7	+ 60.0	174.3	56 59.0	+ 60.0	174.5	55 59.3	+ 60.0	174.6	54 59.5	+ 60.0	174.8	53 59.8	+ 60.0	174.9	53 00.0	+ 60.0	175.0	**53**
54	60 58.1	+ 60.0	173.9	59 58.4	+ 60.0	174.1	58 58.7	+ 60.0	174.3	57 59.0	+ 60.0	174.5	56 59.3	+ 60.0	174.6	55 59.5	+ 60.0	174.7	54 59.8	+ 60.0	174.9	54 00.0	+ 60.0	175.0	**54**
55	61 58.1	+ 59.9	173.9	60 58.4	+ 60.0	174.1	59 58.7	+ 60.0	174.3	58 59.0	+ 60.0	174.4	57 59.3	+ 60.0	174.6	56 59.5	+ 60.0	174.7	55 59.8	+ 60.0	174.9	55 00.0	+ 60.0	175.0	**55**
56	62 58.0	+ 60.0	173.8	61 58.4	+ 60.0	174.0	60 58.7	+ 60.0	174.2	59 59.0	+ 60.0	174.4	58 59.3	+ 60.0	174.6	57 59.5	+ 60.0	174.7	56 59.8	+ 60.0	174.9	56 00.0	+ 60.0	175.0	**56**
57	63 58.0	+ 60.0	173.8	62 58.4	+ 59.9	174.0	61 58.7	+ 60.0	174.2	60 59.0	+ 60.0	174.4	59 59.3	+ 60.0	174.6	58 59.5	+ 60.0	174.7	57 59.8	+ 60.0	174.9	57 00.0	+ 60.0	175.0	**57**
58	64 58.0	+ 60.0	173.7	63 58.3	+ 60.0	174.0	62 58.7	+ 60.0	174.2	61 59.0	+ 60.0	174.4	60 59.3	+ 59.9	174.5	59 59.5	+ 60.0	174.7	58 59.8	+ 60.0	174.9	58 00.0	+ 60.0	175.0	**58**
59	65 58.0	+ 60.0	173.7	64 58.3	+ 60.0	173.9	63 58.7	+ 60.0	174.1	62 59.0	+ 60.0	174.3	61 59.2	+ 60.0	174.5	60 59.5	+ 60.0	174.7	59 59.8	+ 60.0	174.8	59 00.0	+ 60.0	175.0	**59**
60	66 58.0	+ 59.9	173.6	65 58.3	+ 60.0	173.9	64 58.7	+ 59.9	174.1	63 59.0	+ 60.0	174.3	62 59.2	+ 60.0	174.5	61 59.5	+ 60.0	174.7	60 59.8	+ 60.0	174.8	60 00.0	+ 60.0	175.0	**60**
61	67 57.9	+ 60.0	173.5	66 58.3	+ 60.0	173.8	65 58.6	+ 60.0	174.0	64 59.0	+ 59.9	174.3	63 59.2	+ 60.0	174.5	62 59.5	+ 60.0	174.7	61 59.8	+ 60.0	174.8	61 00.0	+ 60.0	175.0	**61**
62	68 57.9	+ 60.0	173.5	67 58.3	+ 60.0	173.7	66 58.6	+ 60.0	174.0	65 58.9	+ 60.0	174.2	64 59.2	+ 60.0	174.4	63 59.5	+ 60.0	174.6	62 59.8	+ 60.0	174.8	62 00.0	+ 60.0	175.0	**62**
63	69 57.9	+ 60.0	173.4	68 58.3	+ 59.9	173.7	67 58.6	+ 60.0	173.9	66 58.9	+ 60.0	174.2	65 59.2	+ 60.0	174.4	64 59.5	+ 60.0	174.6	63 59.8	+ 60.0	174.8	63 00.0	+ 60.0	175.0	**63**
64	70 57.9	+ 59.9	173.3	69 58.2	+ 60.0	173.6	68 58.6	+ 60.0	173.9	67 58.9	+ 60.0	174.2	66 59.2	+ 60.0	174.4	65 59.5	+ 60.0	174.6	64 59.8	+ 60.0	174.8	64 00.0	+ 60.0	175.0	**64**
65	71 57.8	+ 60.0	173.2	70 58.2	+ 60.0	173.5	69 58.6	+ 60.0	173.8	68 58.9	+ 60.0	174.1	67 59.2	+ 60.0	174.4	66 59.5	+ 60.0	174.6	65 59.8	+ 60.0	174.8	65 00.0	+ 60.0	175.0	**65**
66	72 57.8	+ 59.9	173.1	71 58.2	+ 60.0	173.4	70 58.6	+ 60.0	173.8	69 58.9	+ 60.0	174.1	68 59.2	+ 60.0	174.3	67 59.5	+ 60.0	174.6	66 59.8	+ 60.0	174.8	66 00.0	+ 60.0	175.0	**66**
67	73 57.7	+ 60.0	172.9	72 58.2	+ 59.9	173.3	71 58.6	+ 59.9	173.7	70 58.9	+ 60.0	174.0	69 59.2	+ 60.0	174.3	68 59.5	+ 60.0	174.5	67 59.8	+ 60.0	174.8	67 00.0	+ 60.0	175.0	**67**
68	74 57.7	+ 59.9	172.8	73 58.1	+ 60.0	173.2	72 58.5	+ 60.0	173.6	71 58.9	+ 60.0	173.9	70 59.2	+ 60.0	174.2	69 59.5	+ 60.0	174.5	68 59.8	+ 60.0	174.8	68 00.0	+ 60.0	175.0	**68**
69	75 57.6	+ 60.0	172.6	74 58.1	+ 60.0	173.1	73 58.5	+ 60.0	173.5	72 58.9	+ 60.0	173.9	71 59.2	+ 60.0	174.2	70 59.5	+ 60.0	174.5	69 59.8	+ 60.0	174.8	69 00.0	+ 60.0	175.0	**69**
70	76 57.6	+ 59.9	172.4	75 58.1	+ 59.9	172.9	74 58.5	+ 60.0	173.4	73 58.9	+ 60.0	173.8	72 59.2	+ 60.0	174.2	71 59.5	+ 60.0	174.5	70 59.8	+ 60.0	174.7	70 00.0	+ 60.0	175.0	**70**
71	77 57.5	+ 59.9	172.2	76 58.0	+ 60.0	172.8	75 58.5	+ 59.9	173.3	74 58.9	+ 59.9	173.7	73 59.2	+ 60.0	174.1	72 59.5	+ 60.0	174.4	71 59.8	+ 60.0	174.7	71 00.0	+ 60.0	175.0	**71**
72	78 57.4	+ 59.9	171.9	77 58.0	+ 59.9	172.6	76 58.4	+ 60.0	173.1	75 58.8	+ 60.0	173.6	74 59.2	+ 60.0	174.0	73 59.5	+ 60.0	174.4	72 59.8	+ 60.0	174.7	72 00.0	+ 60.0	175.0	**72**
73	79 57.3	+ 59.9	171.6	78 57.9	+ 59.9	172.3	77 58.4	+ 60.0	173.0	76 58.8	+ 60.0	173.5	75 59.2	+ 60.0	174.0	74 59.5	+ 60.0	174.4	73 59.8	+ 60.0	174.7	73 00.0	+ 60.0	175.0	**73**
74	80 57.2	+ 59.8	171.2	79 57.8	+ 59.9	172.1	78 58.4	+ 59.9	172.8	77 58.8	+ 60.0	173.4	76 59.2	+ 59.9	173.9	75 59.5	+ 60.0	174.3	74 59.8	+ 60.0	174.7	74 00.0	+ 60.0	175.0	**74**
75	81 57.0	+ 59.8	170.7	80 57.7	+ 59.9	171.7	79 58.3	+ 59.9	172.6	78 58.8	+ 59.9	173.2	77 59.1	+ 60.0	173.8	76 59.5	+ 60.0	174.2	75 59.8	+ 60.0	174.7	75 00.0	+ 60.0	175.0	**75**
76	82 56.8	+ 59.8	170.1	81 57.6	+ 59.9	171.3	80 58.2	+ 60.0	172.3	79 58.7	+ 60.0	173.0	78 59.1	+ 60.0	173.7	77 59.5	+ 60.0	174.2	76 59.8	+ 60.0	174.6	76 00.0	+ 60.0	175.0	**76**
77	83 56.6	+ 59.6	169.3	82 57.5	+ 59.8	170.8	81 58.2	+ 59.9	171.9	80 58.7	+ 59.9	172.8	79 59.1	+ 60.0	173.5	78 59.5	+ 60.0	174.1	77 59.8	+ 60.0	174.6	77 00.0	+ 60.0	175.0	**77**
78	84 56.2	+ 59.5	168.2	83 57.3	+ 59.7	170.1	82 58.1	+ 59.8	171.5	81 58.6	+ 60.0	172.5	80 59.1	+ 60.0	173.4	79 59.5	+ 59.9	174.0	78 59.8	+ 59.9	174.6	78 00.0	+ 60.0	175.0	**78**
79	85 55.7	+ 59.1	166.5	84 57.0	+ 59.6	169.1	83 57.9	+ 59.8	170.9	82 58.6	+ 59.9	172.2	81 59.1	+ 59.9	173.2	80 59.4	+ 60.0	173.9	79 59.7	+ 60.0	174.5	79 00.0	+ 60.0	175.0	**79**
80	86 54.8	+ 58.3	163.7	85 56.6	+ 59.4	167.6	84 57.7	+ 59.8	170.1	83 58.5	+ 59.9	171.7	82 59.0	+ 60.0	172.9	81 59.4	+ 60.0	173.8	80 59.7	+ 60.0	174.5	80 00.0	+ 60.0	175.0	**80**
81	87 53.1	*+ 55.3*	•158.3	86 56.0	+ 58.7	165.2	85 57.5	+ 59.5	168.8	84 58.4	+ 59.8	171.0	83 59.0	+ 59.9	172.5	82 59.4	+ 60.0	173.6	81 59.7	+ 60.0	174.4	81 00.0	+ 60.0	175.0	**81**
82	88 48.4	*+ 35.1*	•144.4	87 54.7	*+ 56.4*	•160.6	86 57.0	+ 59.1	166.8	85 58.2	+ 59.7	170.1	84 58.9	+ 59.9	172.0	83 59.4	+ 60.0	173.3	82 59.7	+ 60.0	174.3	82 00.0	+ 60.0	175.0	**82**
83	89 23.5	*– 32.4*	• 87.5	88 51.1	*+ 37.6*	•148.0	87 56.1	*+ 57.4*	•162.9	86 57.9	+ 59.4	168.4	85 58.8	+ 59.8	171.3	84 59.4	+ 59.9	173.0	83 59.7	+ 60.0	174.2	83 00.0	+ 60.0	175.0	**83**
84	88 51.1	*– 55.0*	• 27.0	89 28.7	*– 35.2*	• 87.5	88 53.5	*+ 40.4*	•151.9	87 57.3	*+ 58.3*	•165.2	86 58.6	+ 59.7	170.1	85 59.3	+ 59.9	172.5	84 59.7	+ 60.0	174.0	84 00.0	+ 60.0	175.0	**84**
85	87 56.1	*– 58.2*	• 12.2	88 53.5	*– 56.2*	• 23.1	89 33.9	*– 38.3*	• 87.5	88 55.6	*+ 43.5*	•156.1	87 58.3	*+ 59.0*	•167.6	86 59.2	+ 59.9	171.7	85 59.7	+ 60.0	173.8	85 00.0	+ 60.0	175.0	**85**
86	86 57.9	– 59.1	6.6	87 57.3	– 58.7	9.8	88 55.6	*– 57.3*	• 18.9	89 39.1	*– 41.8*	• 87.5	88 57.3	*+ 47.0*	•160.5	87 59.1	*+ 59.5*	•170.0	86 59.7	+ 60.0	173.3	86 00.0	+ 60.0	175.0	**86**
87	85 58.8	– 59.4	3.7	86 58.6	– 59.3	5.0	87 58.3	– 59.1	7.4	88 57.3	*– 58.2*	• 14.5	89 44.3	*– 45.7*	• 87.5	88 58.6	*+ 50.9*	•165.2	87 59.7	*+ 59.8*	•172.5	87 00.0	+ 60.0	175.0	**87**
88	84 59.4	– 59.7	2.0	85 59.3	– 59.6	2.5	86 59.2	– 59.5	3.3	87 59.1	– 59.4	5.0	88 58.6	*– 58.9*	• 9.8	89 49.5	*– 50.0*	• 87.5	88 59.5	*+ 55.3*	•170.0	88 00.0	+ 60.0	175.0	**88**
89	83 59.7	– 59.7	0.8	84 59.7	– 59.7	1.0	85 59.7	– 59.7	1.2	86 59.7	– 59.7	1.7	87 59.7	– 59.7	2.5	88 59.5	*– 59.5*	• 5.0	89 54.8	*– 54.8*	• 87.5	89 00.0	+ 60.0	175.0	**89**
90	83 00.0	– 59.8	0.0	84 00.0	– 59.8	0.0	85 00.0	– 59.8	0.0	86 00.0	– 59.8	0.0	87 00.0	– 59.8	0.0	88 00.0	– 59.8	0.0	89 00.0	*– 59.9*	• 0.0	90 00.0	– 60.0	87.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 58.4	–60.0	175.0	5 58.6	–60.0	175.0	4 58.9	–60.0	175.0	3 59.1	–60.0	175.0	2 59.3	–60.0	175.0	1 59.5	–60.0	175.0	0 59.8	–60.0	175.0	0 00.0	+60.0	5.0	**0**
1	5 58.4	–60.0	175.0	4 58.6	–60.0	175.0	3 58.9	–60.0	175.0	2 59.1	–60.0	175.0	1 59.3	–60.0	175.0	0 59.5	–60.0	175.0	0 00.2	+60.0	5.0	1 00.0	+60.0	5.0	**1**
2	4 58.4	–60.0	175.0	3 58.6	–60.0	175.0	2 58.9	–60.0	175.0	1 59.1	–60.0	175.0	0 59.3	–60.0	175.0	0 00.5	+60.0	5.0	1 00.2	+60.0	5.0	2 00.0	+60.0	5.0	**2**
3	3 58.4	–60.0	175.0	2 58.6	–60.0	175.0	1 58.9	–60.0	175.0	0 59.1	–60.0	175.0	0 00.7	+60.0	5.0	1 00.5	+60.0	5.0	2 00.2	+60.0	5.0	3 00.0	+60.0	5.0	**3**
4	2 58.4	–60.0	175.0	1 58.6	–60.0	175.0	0 58.9	–60.0	175.0	0 00.9	+60.0	5.0	1 00.7	+60.0	5.0	2 00.5	+60.0	5.0	3 00.2	+60.0	5.0	4 00.0	+60.0	5.0	**4**
5	1 58.4	–60.0	175.0	0 58.6	–60.0	175.0	0 01.1	+60.0	5.0	1 00.9	+60.0	5.0	2 00.7	+60.0	5.0	3 00.5	+60.0	5.0	4 00.2	+60.0	5.0	5 00.0	+60.0	5.0	**5**
6	0 58.4	–60.0	175.0	0 01.4	+60.0	5.0	1 01.1	+60.0	5.0	2 00.9	+60.0	5.0	3 00.7	+60.0	5.0	4 00.5	+60.0	5.0	5 00.2	+60.0	5.0	6 00.0	+60.0	5.0	**6**
7	0 01.6	+60.0	5.0	1 01.4	+60.0	5.0	2 01.1	+60.0	5.0	3 00.9	+60.0	5.0	4 00.7	+60.0	5.0	5 00.5	+60.0	5.0	6 00.2	+60.0	5.0	7 00.0	+60.0	5.0	**7**
8	1 01.6	+60.0	5.0	2 01.4	+60.0	5.0	3 01.1	+60.0	5.0	4 00.9	+60.0	5.0	5 00.7	+60.0	5.0	6 00.5	+60.0	5.0	7 00.2	+60.0	5.0	8 00.0	+60.0	5.0	**8**
9	2 01.6	+60.0	4.9	3 01.4	+59.9	4.9	4 01.1	+60.0	5.0	5 00.9	+60.0	5.0	6 00.7	+60.0	5.0	7 00.5	+60.0	5.0	8 00.2	+60.0	5.0	9 00.0	+60.0	5.0	**9**
10	3 01.6	+60.0	4.9	4 01.3	+60.0	4.9	5 01.1	+60.0	4.9	6 00.9	+60.0	5.0	7 00.7	+60.0	5.0	8 00.5	+60.0	5.0	9 00.2	+60.0	5.0	10 00.0	+60.0	5.0	**10**
11	4 01.6	+60.0	4.9	5 01.3	+60.0	4.9	6 01.1	+60.0	4.9	7 00.9	+60.0	4.9	8 00.7	+60.0	5.0	9 00.5	+60.0	5.0	10 00.2	+60.0	5.0	11 00.0	+60.0	5.0	**11**
12	5 01.6	+60.0	4.9	6 01.3	+60.0	4.9	7 01.1	+60.0	4.9	8 00.9	+60.0	4.9	9 00.7	+60.0	5.0	10 00.5	+60.0	5.0	11 00.2	+60.0	5.0	12 00.0	+60.0	5.0	**12**
13	6 01.6	+60.0	4.9	7 01.3	+60.0	4.9	8 01.1	+60.0	4.9	9 00.9	+60.0	4.9	10 00.7	+60.0	4.9	11 00.5	+60.0	5.0	12 00.2	+60.0	5.0	13 00.0	+60.0	5.0	**13**
14	7 01.6	+60.0	4.9	8 01.3	+60.0	4.9	9 01.1	+60.0	4.9	10 00.9	+60.0	4.9	11 00.7	+60.0	4.9	12 00.5	+60.0	5.0	13 00.2	+60.0	5.0	14 00.0	+60.0	5.0	**14**
15	8 01.6	+60.0	4.9	9 01.3	+60.0	4.9	10 01.1	+60.0	4.9	11 00.9	+60.0	4.9	12 00.7	+60.0	4.9	13 00.5	+60.0	5.0	14 00.2	+60.0	5.0	15 00.0	+60.0	5.0	**15**
16	9 01.6	+59.9	4.9	10 01.3	+60.0	4.9	11 01.1	+60.0	4.9	12 00.9	+60.0	4.9	13 00.7	+60.0	4.9	14 00.5	+60.0	5.0	15 00.2	+60.0	5.0	16 00.0	+60.0	5.0	**16**
17	10 01.5	+60.0	4.9	11 01.3	+60.0	4.9	12 01.1	+60.0	4.9	13 00.9	+60.0	4.9	14 00.7	+60.0	4.9	15 00.5	+60.0	5.0	16 00.2	+60.0	5.0	17 00.0	+60.0	5.0	**17**
18	11 01.5	+60.0	4.8	12 01.3	+60.0	4.9	13 01.1	+60.0	4.9	14 00.9	+60.0	4.9	15 00.7	+60.0	4.9	16 00.5	+60.0	4.9	17 00.2	+60.0	5.0	18 00.0	+60.0	5.0	**18**
19	12 01.5	+60.0	4.8	13 01.3	+60.0	4.9	14 01.1	+60.0	4.9	15 00.9	+60.0	4.9	16 00.7	+60.0	4.9	17 00.5	+60.0	4.9	18 00.2	+60.0	5.0	19 00.0	+60.0	5.0	**19**
20	13 01.5	+60.0	4.8	14 01.3	+60.0	4.8	15 01.1	+60.0	4.9	16 00.9	+60.0	4.9	17 00.7	+60.0	4.9	18 00.5	+60.0	4.9	19 00.2	+60.0	5.0	20 00.0	+60.0	5.0	**20**
21	14 01.5	+60.0	4.8	15 01.3	+60.0	4.8	16 01.1	+60.0	4.9	17 00.9	+60.0	4.9	18 00.7	+60.0	4.9	19 00.5	+60.0	4.9	20 00.2	+60.0	5.0	21 00.0	+60.0	5.0	**21**
22	15 01.5	+60.0	4.8	16 01.3	+60.0	4.8	17 01.1	+60.0	4.8	18 00.9	+60.0	4.9	19 00.7	+60.0	4.9	20 00.5	+60.0	4.9	21 00.2	+60.0	5.0	22 00.0	+60.0	5.0	**22**
23	16 01.5	+60.0	4.8	17 01.3	+60.0	4.8	18 01.1	+60.0	4.8	19 00.9	+60.0	4.9	20 00.7	+60.0	4.9	21 00.5	+59.9	4.9	22 00.2	+60.0	5.0	23 00.0	+60.0	5.0	**23**
24	17 01.5	+60.0	4.8	18 01.3	+60.0	4.8	19 01.1	+60.0	4.8	20 00.9	+60.0	4.9	21 00.7	+60.0	4.9	22 00.4	+60.0	4.9	23 00.2	+60.0	5.0	24 00.0	+60.0	5.0	**24**
25	18 01.5	+60.0	4.8	19 01.3	+60.0	4.8	20 01.1	+60.0	4.8	21 00.9	+60.0	4.9	22 00.7	+60.0	4.9	23 00.4	+60.0	4.9	24 00.2	+60.0	5.0	25 00.0	+60.0	5.0	**25**
26	19 01.5	+60.0	4.8	20 01.3	+60.0	4.8	21 01.1	+60.0	4.8	22 00.9	+60.0	4.8	23 00.7	+60.0	4.9	24 00.4	+60.0	4.9	25 00.2	+60.0	5.0	26 00.0	+60.0	5.0	**26**
27	20 01.5	+60.0	4.7	21 01.3	+60.0	4.8	22 01.1	+60.0	4.8	23 00.9	+60.0	4.8	24 00.7	+60.0	4.9	25 00.4	+60.0	4.9	26 00.2	+60.0	5.0	27 00.0	+60.0	5.0	**27**
28	21 01.5	+60.0	4.7	22 01.3	+60.0	4.8	23 01.1	+60.0	4.8	24 00.9	+60.0	4.8	25 00.7	+60.0	4.9	26 00.4	+60.0	4.9	27 00.2	+60.0	5.0	28 00.0	+60.0	5.0	**28**
29	22 01.5	+60.0	4.7	23 01.3	+60.0	4.8	24 01.1	+60.0	4.8	25 00.9	+60.0	4.8	26 00.7	+60.0	4.9	27 00.4	+60.0	4.9	28 00.2	+60.0	5.0	29 00.0	+60.0	5.0	**29**
30	23 01.5	+60.0	4.7	24 01.3	+60.0	4.7	25 01.1	+60.0	4.8	26 00.9	+60.0	4.8	27 00.7	+60.0	4.9	28 00.4	+60.0	4.9	29 00.2	+60.0	5.0	30 00.0	+60.0	5.0	**30**
31	24 01.5	+60.0	4.7	25 01.3	+60.0	4.7	26 01.1	+60.0	4.8	27 00.9	+60.0	4.8	28 00.7	+60.0	4.9	29 00.4	+60.0	4.9	30 00.2	+60.0	4.9	31 00.0	+60.0	5.0	**31**
32	25 01.5	+60.0	4.7	26 01.3	+60.0	4.7	27 01.1	+60.0	4.8	28 00.9	+60.0	4.8	29 00.7	+60.0	4.8	30 00.4	+60.0	4.9	31 00.2	+60.0	4.9	32 00.0	+60.0	5.0	**32**
33	26 01.5	+60.0	4.7	27 01.3	+60.0	4.7	28 01.1	+60.0	4.7	29 00.9	+60.0	4.8	30 00.7	+60.0	4.8	31 00.4	+60.0	4.9	32 00.2	+60.0	4.9	33 00.0	+60.0	5.0	**33**
34	27 01.5	+60.0	4.7	28 01.3	+60.0	4.7	29 01.1	+60.0	4.7	30 00.9	+60.0	4.8	31 00.7	+60.0	4.8	32 00.4	+60.0	4.9	33 00.2	+60.0	4.9	34 00.0	+60.0	5.0	**34**
35	28 01.5	+60.0	4.6	29 01.3	+60.0	4.7	30 01.1	+60.0	4.7	31 00.9	+60.0	4.8	32 00.7	+60.0	4.8	33 00.4	+60.0	4.9	34 00.2	+60.0	4.9	35 00.0	+60.0	5.0	**35**
36	29 01.5	+60.0	4.6	30 01.3	+60.0	4.7	31 01.1	+60.0	4.7	32 00.9	+60.0	4.8	33 00.7	+60.0	4.8	34 00.4	+60.0	4.9	35 00.2	+60.0	4.9	36 00.0	+60.0	5.0	**36**
37	30 01.5	+60.0	4.6	31 01.3	+60.0	4.7	32 01.1	+60.0	4.7	33 00.9	+60.0	4.8	34 00.7	+60.0	4.8	35 00.4	+60.0	4.9	36 00.2	+60.0	4.9	37 00.0	+60.0	5.0	**37**
38	31 01.5	+60.0	4.6	32 01.3	+60.0	4.6	33 01.1	+60.0	4.7	34 00.9	+60.0	4.8	35 00.7	+60.0	4.8	36 00.4	+60.0	4.9	37 00.2	+60.0	4.9	38 00.0	+60.0	5.0	**38**
39	32 01.5	+60.0	4.6	33 01.3	+60.0	4.6	34 01.1	+60.0	4.7	35 00.9	+60.0	4.7	36 00.7	+60.0	4.8	37 00.4	+60.0	4.9	38 00.2	+60.0	4.9	39 00.0	+60.0	5.0	**39**
40	33 01.5	+60.0	4.6	34 01.3	+60.0	4.6	35 01.1	+60.0	4.7	36 00.9	+60.0	4.7	37 00.7	+60.0	4.8	38 00.4	+60.0	4.9	39 00.2	+60.0	4.9	40 00.0	+60.0	5.0	**40**
41	34 01.5	+59.9	4.6	35 01.3	+60.0	4.6	36 01.1	+60.0	4.7	37 00.9	+60.0	4.7	38 00.7	+60.0	4.8	39 00.4	+60.0	4.9	40 00.2	+60.0	4.9	41 00.0	+60.0	5.0	**41**
42	35 01.4	+60.0	4.5	36 01.3	+60.0	4.6	37 01.1	+60.0	4.7	38 00.9	+60.0	4.7	39 00.7	+60.0	4.8	40 00.4	+60.0	4.9	41 00.2	+60.0	4.9	42 00.0	+60.0	5.0	**42**
43	36 01.4	+60.0	4.5	37 01.3	+59.9	4.6	38 01.1	+60.0	4.6	39 00.9	+60.0	4.7	40 00.7	+60.0	4.8	41 00.4	+60.0	4.8	42 00.2	+60.0	4.9	43 00.0	+60.0	5.0	**43**
44	37 01.4	+60.0	4.5	38 01.2	+60.0	4.6	39 01.1	+60.0	4.6	40 00.9	+60.0	4.7	41 00.7	+60.0	4.8	42 00.4	+60.0	4.8	43 00.2	+60.0	4.9	44 00.0	+60.0	5.0	**44**
45	38 01.4	+60.0	4.5	39 01.2	+60.0	4.5	40 01.1	+59.9	4.6	41 00.9	+60.0	4.7	42 00.7	+60.0	4.8	43 00.4	+60.0	4.8	44 00.2	+60.0	4.9	45 00.0	+60.0	5.0	**45**
46	39 01.4	+60.0	4.5	40 01.2	+60.0	4.5	41 01.0	+60.0	4.6	42 00.9	+60.0	4.7	43 00.7	+59.9	4.7	44 00.4	+60.0	4.8	45 00.2	+60.0	4.9	46 00.0	+60.0	5.0	**46**
47	40 01.4	+60.0	4.5	41 01.2	+60.0	4.5	42 01.0	+60.0	4.6	43 00.9	+59.9	4.7	44 00.6	+60.0	4.7	45 00.4	+60.0	4.8	46 00.2	+60.0	4.9	47 00.0	+60.0	5.0	**47**
48	41 01.4	+60.0	4.4	42 01.2	+60.0	4.5	43 01.0	+60.0	4.6	44 00.8	+60.0	4.7	45 00.6	+60.0	4.7	46 00.4	+60.0	4.8	47 00.2	+60.0	4.9	48 00.0	+60.0	5.0	**48**
49	42 01.4	+60.0	4.4	43 01.2	+60.0	4.5	44 01.0	+60.0	4.6	45 00.8	+60.0	4.6	46 00.6	+60.0	4.7	47 00.4	+60.0	4.8	48 00.2	+60.0	4.9	49 00.0	+60.0	5.0	**49**
50	43 01.4	+60.0	4.4	44 01.2	+60.0	4.5	45 01.0	+60.0	4.5	46 00.8	+60.0	4.6	47 00.6	+60.0	4.7	48 00.4	+60.0	4.8	49 00.2	+60.0	4.9	50 00.0	+60.0	5.0	**50**
51	44 01.4	+60.0	4.4	45 01.2	+60.0	4.5	46 01.0	+60.0	4.5	47 00.8	+60.0	4.6	48 00.6	+60.0	4.7	49 00.4	+60.0	4.8	50 00.2	+60.0	4.9	51 00.0	+60.0	5.0	**51**
52	45 01.4	+60.0	4.4	46 01.2	+60.0	4.4	47 01.0	+60.0	4.5	48 00.8	+60.0	4.6	49 00.6	+60.0	4.7	50 00.4	+60.0	4.8	51 00.2	+60.0	4.9	52 00.0	+60.0	5.0	**52**
53	46 01.4	+60.0	4.3	47 01.2	+60.0	4.4	48 01.0	+60.0	4.5	49 00.8	+60.0	4.6	50 00.6	+60.0	4.7	51 00.4	+60.0	4.8	52 00.2	+60.0	4.9	53 00.0	+60.0	5.0	**53**
54	47 01.4	+60.0	4.3	48 01.2	+60.0	4.4	49 01.0	+60.0	4.5	50 00.8	+60.0	4.6	51 00.6	+60.0	4.7	52 00.4	+60.0	4.8	53 00.2	+60.0	4.9	54 00.0	+60.0	5.0	**54**
55	48 01.4	+60.0	4.3	49 01.2	+60.0	4.4	50 01.0	+60.0	4.5	51 00.8	+60.0	4.6	52 00.6	+60.0	4.7	53 00.4	+60.0	4.8	54 00.2	+60.0	4.9	55 00.0	+60.0	5.0	**55**
56	49 01.4	+60.0	4.3	50 01.2	+60.0	4.4	51 01.0	+60.0	4.4	52 00.8	+60.0	4.5	53 00.6	+60.0	4.6	54 00.4	+60.0	4.8	55 00.2	+60.0	4.9	56 00.0	+60.0	5.0	**56**
57	50 01.4	+59.9	4.2	51 01.2	+60.0	4.3	52 01.0	+60.0	4.4	53 00.8	+60.0	4.5	54 00.6	+60.0	4.6	55 00.4	+60.0	4.7	56 00.2	+60.0	4.9	57 00.0	+60.0	5.0	**57**
58	51 01.3	+60.0	4.2	52 01.2	+60.0	4.3	53 01.0	+60.0	4.4	54 00.8	+60.0	4.5	55 00.6	+60.0	4.6	56 00.4	+60.0	4.7	57 00.2	+60.0	4.9	58 00.0	+60.0	5.0	**58**
59	52 01.3	+60.0	4.2	53 01.2	+60.0	4.3	54 01.0	+60.0	4.4	55 00.8	+60.0	4.5	56 00.6	+60.0	4.6	57 00.4	+60.0	4.7	58 00.2	+60.0	4.9	59 00.0	+60.0	5.0	**59**
60	53 01.3	+60.0	4.2	54 01.2	+60.0	4.3	55 01.0	+60.0	4.4	56 00.8	+60.0	4.5	57 00.6	+60.0	4.6	58 00.4	+60.0	4.7	59 00.2	+60.0	4.9	60 00.0	+60.0	5.0	**60**
61	54 01.3	+60.0	4.1	55 01.2	+59.9	4.2	56 01.0	+60.0	4.3	57 00.8	+60.0	4.5	58 00.6	+60.0	4.6	59 00.4	+60.0	4.7	60 00.2	+60.0	4.8	61 00.0	+60.0	5.0	**61**
62	55 01.3	+60.0	4.1	56 01.1	+60.0	4.2	57 01.0	+60.0	4.3	58 00.8	+60.0	4.4	59 00.6	+60.0	4.6	60 00.4	+60.0	4.7	61 00.2	+60.0	4.8	62 00.0	+60.0	5.0	**62**
63	56 01.3	+60.0	4.1	57 01.1	+60.0	4.2	58 01.0	+60.0	4.3	59 00.8	+60.0	4.4	60 00.6	+60.0	4.5	61 00.4	+60.0	4.7	62 00.2	+60.0	4.8	63 00.0	+60.0	5.0	**63**
64	57 01.3	+60.0	4.0	58 01.1	+60.0	4.1	59 01.0	+60.0	4.3	60 00.8	+60.0	4.4	61 00.6	+60.0	4.5	62 00.4	+60.0	4.7	63 00.2	+60.0	4.8	64 00.0	+60.0	5.0	**64**
65	58 01.3	+60.0	4.0	59 01.1	+60.0	4.1	60 01.0	+60.0	4.2	61 00.8	+60.0	4.4	62 00.6	+60.0	4.5	63 00.4	+60.0	4.7	64 00.2	+60.0	4.8	65 00.0	+60.0	5.0	**65**
66	59 01.3	+59.9	3.9	60 01.1	+60.0	4.1	61 01.0	+59.9	4.2	62 00.8	+60.0	4.3	63 00.6	+60.0	4.5	64 00.4	+60.0	4.6	65 00.2	+60.0	4.8	66 00.0	+60.0	5.0	**66**
67	60 01.2	+60.0	3.9	61 01.1	+60.0	4.0	62 00.9	+60.0	4.2	63 00.8	+60.0	4.3	64 00.6	+60.0	4.5	65 00.4	+60.0	4.6	66 00.2	+60.0	4.8	67 00.0	+60.0	5.0	**67**
68	61 01.2	+60.0	3.9	62 01.1	+60.0	4.0	63 00.9	+60.0	4.1	64 00.8	+60.0	4.3	65 00.6	+60.0	4.4	66 00.4	+60.0	4.6	67 00.2	+60.0	4.8	68 00.0	+60.0	5.0	**68**
69	62 01.2	+60.0	3.8	63 01.1	+60.0	3.9	64 00.9	+60.0	4.1	65 00.8	+60.0	4.2	66 00.6	+60.0	4.4	67 00.4	+60.0	4.6	68 00.2	+60.0	4.8	69 00.0	+60.0	5.0	**69**
70	63 01.2	+60.0	3.8	64 01.1	+60.0	3.9	65 00.9	+60.0	4.0	66 00.8	+60.0	4.2	67 00.6	+60.0	4.4	68 00.4	+60.0	4.6	69 00.2	+60.0	4.8	70 00.0	+60.0	5.0	**70**
71	64 01.2	+60.0	3.7	65 01.1	+59.9	3.9	66 00.9	+60.0	4.0	67 00.8	+60.0	4.2	68 00.6	+60.0	4.3	69 00.4	+60.0	4.5	70 00.2	+60.0	4.8	71 00.0	+60.0	5.0	**71**
72	65 01.2	+59.9	3.7	66 01.0	+60.0	3.8	67 00.9	+60.0	4.0	68 00.8	+59.9	4.1	69 00.6	+60.0	4.3	70 00.4	+60.0	4.5	71 00.2	+60.0	4.7	72 00.0	+60.0	5.0	**72**
73	66 01.1	+60.0	3.6	67 01.0	+60.0	3.7	68 00.9	+60.0	3.9	69 00.7	+60.0	4.1	70 00.6	+60.0	4.3	71 00.4	+60.0	4.5	72 00.2	+60.0	4.7	73 00.0	+60.0	5.0	**73**
74	67 01.1	+60.0	3.5	68 01.0	+60.0	3.7	69 00.9	+60.0	3.8	70 00.7	+60.0	4.0	71 00.6	+60.0	4.2	72 00.4	+60.0	4.5	73 00.2	+60.0	4.7	74 00.0	+60.0	5.0	**74**
75	68 01.1	+60.0	3.5	69 01.0	+60.0	3.6	70 00.9	+59.9	3.8	71 00.7	+60.0	4.0	72 00.6	+60.0	4.2	73 00.4	+60.0	4.4	74 00.2	+60.0	4.7	75 00.0	+60.0	5.0	**75**
76	69 01.1	+59.9	3.4	70 01.0	+59.9	3.5	71 00.8	+60.0	3.7	72 00.7	+60.0	3.9	73 00.6	+60.0	4.1	74 00.4	+60.0	4.4	75 00.2	+60.0	4.7	76 00.0	+60.0	5.0	**76**
77	70 01.0	+60.0	3.3	71 00.9	+60.0	3.5	72 00.8	+60.0	3.6	73 00.7	+60.0	3.8	74 00.6	+60.0	4.1	75 00.4	+60.0	4.3	76 00.2	+60.0	4.6	77 00.0	+60.0	5.0	**77**
78	71 01.0	+60.0	3.2	72 00.9	+60.0	3.4	73 00.8	+60.0	3.6	74 00.7	+60.0	3.8	75 00.6	+59.9	4.0	76 00.4	+60.0	4.3	77 00.2	+60.0	4.6	78 00.0	+60.0	5.0	**78**
79	72 01.0	+59.9	3.1	73 00.9	+60.0	3.3	74 00.8	+60.0	3.5	75 00.7	+60.0	3.7	76 00.5	+60.0	3.9	77 00.4	+60.0	4.2	78 00.2	+60.0	4.6	79 00.0	+60.0	5.0	**79**
80	73 00.9	+60.0	3.0	74 00.9	+59.9	3.2	75 00.8	+59.9	3.4	76 00.7	+59.9	3.6	77 00.5	+60.0	3.9	78 00.4	+60.0	4.2	79 00.2	+60.0	4.6	80 00.0	+60.0	5.0	**80**
81	74 00.9	+60.0	2.8	75 00.8	+60.0	3.0	76 00.7	+60.0	3.2	77 00.6	+60.0	3.5	78 00.5	+60.0	3.8	79 00.4	+60.0	4.1	80 00.2	+60.0	4.5	81 00.0	+60.0	5.0	**81**
82	75 00.9	+59.9	2.7	76 00.8	+59.9	2.9	77 00.7	+60.0	3.1	78 00.6	+60.0	3.3	79 00.5	+60.0	3.6	80 00.4	+60.0	4.0	81 00.2	+60.0	4.4	82 00.0	+60.0	5.0	**82**
83	76 00.8	+59.9	2.5	77 00.7	+60.0	2.7	78 00.7	+59.9	2.9	79 00.6	+59.9	3.2	80 00.5	+60.0	3.5	81 00.4	+59.9	3.9	82 00.2	+60.0	4.4	83 00.0	+60.0	5.0	**83**
84	77 00.7	+60.0	2.3	78 00.7	+59.9	2.5	79 00.6	+60.0	2.7	80 00.5	+60.0	3.0	81 00.5	+59.9	3.3	82 00.3	+60.0	3.8	83 00.2	+60.0	4.3	84 00.0	+60.0	5.0	**84**
85	78 00.7	+59.9	2.1	79 00.6	+59.9	2.3	80 00.6	+59.9	2.5	81 00.5	+60.0	2.8	82 00.4	+60.0	3.1	83 00.3	+60.0	3.6	84 00.2	+60.0	4.2	85 00.0	+60.0	5.0	**85**
86	79 00.6	+59.9	1.8	80 00.5	+60.0	2.0	81 00.5	+59.9	2.2	82 00.5	+59.9	2.5	83 00.4	+59.9	2.9	84 00.3	+60.0	3.3	85 00.2	+60.0	4.0	86 00.0	+60.0	5.0	**86**
87	80 00.5	+59.9	1.5	81 00.5	+59.8	1.7	82 00.4	+59.9	1.9	83 00.4	+59.9	2.1	84 00.3	+60.0	2.5	85 00.3	+59.9	3.0	86 00.2	+60.0	3.8	87 00.0	+60.0	5.0	**87**
88	81 00.4	+59.8	1.1	82 00.3	+59.9	1.3	83 00.3	+59.9	1.4	84 00.3	+59.9	1.7	85 00.3	+59.9	2.0	86 00.2	+60.0	2.5	87 00.2	+59.9	3.3	88 00.0	+60.0	5.0	**88**
89	82 00.2	+59.8	0.6	83 00.2	+59.8	0.7	84 00.2	+59.8	0.8	85 00.2	+59.8	1.0	86 00.2	+59.8	1.3	87 00.2	+59.8	1.7	88 00.1	*+59.9*•	2.5	89 00.0	+60.0	5.0	**89**
90	83 00.0	+59.7	0.0	84 00.0	+59.7	0.0	85 00.0	+59.7	0.0	86 00.0	+59.7	0.0	87 00.0	+59.7	0.0	88 00.0	*+59.5*•	0.0	89 00.0	*+54.8*•	0.0	90 00.0	–60.0	2.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

6°, 354° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 57.7	+60.0	174.0	5 58.0	+60.0	174.0	4 58.4	+59.9	174.0	3 58.7	+60.0	174.0	2 59.0	+60.0	174.0	1 59.3	+60.0	174.0	0 59.7	+60.0	174.0	0 00.0	+60.0	174.0	**0**
1	7 57.7	+60.0	173.9	6 58.0	+60.0	174.0	5 58.3	+60.0	174.0	4 58.7	+60.0	174.0	3 59.0	+60.0	174.0	2 59.3	+60.0	174.0	1 59.7	+60.0	174.0	1 00.0	+60.0	174.0	**1**
2	8 57.7	+60.0	173.9	7 58.0	+60.0	173.9	6 58.3	+60.0	174.0	5 58.7	+60.0	174.0	4 59.0	+60.0	174.0	3 59.3	+60.0	174.0	2 59.7	+60.0	174.0	2 00.0	+60.0	174.0	**2**
3	9 57.7	+60.0	173.9	8 58.0	+60.0	173.9	7 58.3	+60.0	173.9	6 58.7	+60.0	174.0	5 59.0	+60.0	174.0	4 59.3	+60.0	174.0	3 59.7	+60.0	174.0	3 00.0	+60.0	174.0	**3**
4	10 57.7	+60.0	173.9	9 58.0	+60.0	173.9	8 58.3	+60.0	173.9	7 58.7	+60.0	174.0	6 59.0	+60.0	174.0	5 59.3	+60.0	174.0	4 59.7	+60.0	174.0	4 00.0	+60.0	174.0	**4**
5	11 57.7	+60.0	173.9	10 58.0	+60.0	173.9	9 58.3	+60.0	173.9	8 58.7	+60.0	173.9	7 59.0	+60.0	174.0	6 59.3	+60.0	174.0	5 59.7	+60.0	174.0	5 00.0	+60.0	174.0	**5**
6	12 57.7	+60.0	173.9	11 58.0	+60.0	173.9	10 58.3	+60.0	173.9	9 58.7	+60.0	173.9	8 59.0	+60.0	174.0	7 59.3	+60.0	174.0	6 59.7	+60.0	174.0	6 00.0	+60.0	174.0	**6**
7	13 57.7	+59.9	173.9	12 58.0	+60.0	173.9	11 58.3	+60.0	173.9	10 58.7	+60.0	173.9	9 59.0	+60.0	174.0	8 59.3	+60.0	174.0	7 59.7	+60.0	174.0	7 00.0	+60.0	174.0	**7**
8	14 57.6	+60.0	173.8	13 58.0	+60.0	173.9	12 58.3	+60.0	173.9	11 58.7	+60.0	173.9	10 59.0	+60.0	173.9	9 59.3	+60.0	174.0	8 59.7	+60.0	174.0	8 00.0	+60.0	174.0	**8**
9	15 57.6	+60.0	173.8	14 58.0	+60.0	173.9	13 58.3	+60.0	173.9	12 58.7	+60.0	173.9	11 59.0	+60.0	173.9	10 59.3	+60.0	174.0	9 59.7	+60.0	174.0	9 00.0	+60.0	174.0	**9**
10	16 57.6	+60.0	173.8	15 58.0	+60.0	173.9	14 58.3	+60.0	173.9	13 58.7	+60.0	173.9	12 59.0	+60.0	173.9	11 59.3	+60.0	174.0	10 59.7	+60.0	174.0	10 00.0	+60.0	174.0	**10**
11	17 57.6	+60.0	173.8	16 58.0	+60.0	173.8	15 58.3	+60.0	173.9	14 58.7	+60.0	173.9	13 59.0	+60.0	173.9	12 59.3	+60.0	174.0	11 59.7	+60.0	174.0	11 00.0	+60.0	174.0	**11**
12	18 57.6	+60.0	173.8	17 58.0	+60.0	173.8	16 58.3	+60.0	173.9	15 58.7	+60.0	173.9	14 59.0	+60.0	173.9	13 59.3	+60.0	174.0	12 59.7	+60.0	174.0	12 00.0	+60.0	174.0	**12**
13	19 57.6	+60.0	173.8	18 58.0	+60.0	173.8	17 58.3	+60.0	173.9	16 58.7	+60.0	173.9	15 59.0	+60.0	173.9	14 59.3	+60.0	173.9	13 59.7	+60.0	174.0	13 00.0	+60.0	174.0	**13**
14	20 57.6	+60.0	173.8	19 58.0	+60.0	173.8	18 58.3	+60.0	173.8	17 58.7	+60.0	173.9	16 59.0	+60.0	173.9	15 59.3	+60.0	173.9	14 59.7	+60.0	174.0	14 00.0	+60.0	174.0	**14**
15	21 57.6	+60.0	173.8	20 58.0	+60.0	173.8	19 58.3	+60.0	173.8	18 58.7	+60.0	173.9	17 59.0	+60.0	173.9	16 59.3	+60.0	173.9	15 59.7	+60.0	174.0	15 00.0	+60.0	174.0	**15**
16	22 57.6	+60.0	173.7	21 58.0	+60.0	173.8	20 58.3	+60.0	173.8	19 58.7	+60.0	173.9	18 59.0	+60.0	173.9	17 59.3	+60.0	173.9	16 59.7	+60.0	174.0	16 00.0	+60.0	174.0	**16**
17	23 57.6	+60.0	173.7	22 58.0	+60.0	173.8	21 58.3	+60.0	173.8	20 58.7	+60.0	173.9	19 59.0	+60.0	173.9	18 59.3	+60.0	173.9	17 59.7	+60.0	174.0	17 00.0	+60.0	174.0	**17**
18	24 57.6	+60.0	173.7	23 58.0	+59.9	173.8	22 58.3	+60.0	173.8	21 58.7	+60.0	173.8	20 59.0	+60.0	173.9	19 59.3	+60.0	173.9	18 59.7	+60.0	174.0	18 00.0	+60.0	174.0	**18**
19	25 57.6	+60.0	173.7	24 57.9	+60.0	173.7	23 58.3	+60.0	173.8	22 58.7	+59.9	173.8	21 59.0	+60.0	173.9	20 59.3	+60.0	173.9	19 59.7	+60.0	174.0	19 00.0	+60.0	174.0	**19**
20	26 57.6	+60.0	173.7	25 57.9	+60.0	173.7	24 58.3	+60.0	173.8	23 58.6	+60.0	173.8	22 59.0	+60.0	173.9	21 59.3	+60.0	173.9	20 59.7	+60.0	174.0	20 00.0	+60.0	174.0	**20**
21	27 57.6	+60.0	173.7	26 57.9	+60.0	173.7	25 58.3	+60.0	173.8	24 58.6	+60.0	173.8	23 59.0	+60.0	173.9	22 59.3	+60.0	173.9	21 59.7	+60.0	174.0	21 00.0	+60.0	174.0	**21**
22	28 57.6	+60.0	173.6	27 57.9	+60.0	173.7	26 58.3	+60.0	173.8	25 58.6	+60.0	173.8	24 59.0	+60.0	173.9	23 59.3	+60.0	173.9	22 59.7	+60.0	174.0	22 00.0	+60.0	174.0	**22**
23	29 57.6	+60.0	173.6	28 57.9	+60.0	173.7	27 58.3	+60.0	173.7	26 58.6	+60.0	173.8	25 59.0	+60.0	173.9	24 59.3	+60.0	173.9	23 59.7	+60.0	174.0	23 00.0	+60.0	174.0	**23**
24	30 57.6	+59.9	173.6	29 57.9	+60.0	173.7	28 58.3	+60.0	173.7	27 58.6	+60.0	173.8	26 59.0	+60.0	173.8	25 59.3	+60.0	173.9	24 59.7	+60.0	174.0	24 00.0	+60.0	174.0	**24**
25	31 57.5	+60.0	173.6	30 57.9	+60.0	173.7	29 58.3	+60.0	173.7	28 58.6	+60.0	173.8	27 59.0	+60.0	173.8	26 59.3	+60.0	173.9	25 59.7	+60.0	173.9	25 00.0	+60.0	174.0	**25**
26	32 57.5	+60.0	173.6	31 57.9	+60.0	173.6	30 58.3	+60.0	173.7	29 58.6	+60.0	173.8	28 59.0	+60.0	173.8	27 59.3	+60.0	173.9	26 59.7	+60.0	173.9	26 00.0	+60.0	174.0	**26**
27	33 57.5	+60.0	173.6	32 57.9	+60.0	173.6	31 58.3	+60.0	173.7	30 58.6	+60.0	173.8	29 59.0	+60.0	173.8	28 59.3	+60.0	173.9	27 59.7	+60.0	173.9	27 00.0	+60.0	174.0	**27**
28	34 57.5	+60.0	173.5	33 57.9	+60.0	173.6	32 58.3	+60.0	173.7	31 58.6	+60.0	173.8	30 59.0	+60.0	173.8	29 59.3	+60.0	173.9	28 59.7	+60.0	173.9	28 00.0	+60.0	174.0	**28**
29	35 57.5	+60.0	173.5	34 57.9	+60.0	173.6	33 58.3	+60.0	173.7	32 58.6	+60.0	173.7	31 59.0	+60.0	173.8	30 59.3	+60.0	173.9	29 59.7	+60.0	173.9	29 00.0	+60.0	174.0	**29**
30	36 57.5	+60.0	173.5	35 57.9	+60.0	173.6	34 58.3	+60.0	173.7	33 58.6	+60.0	173.7	32 59.0	+60.0	173.8	31 59.3	+60.0	173.9	30 59.7	+60.0	173.9	30 00.0	+60.0	174.0	**30**
31	37 57.5	+60.0	173.5	36 57.9	+60.0	173.6	35 58.3	+60.0	173.6	34 58.6	+60.0	173.7	33 59.0	+60.0	173.8	32 59.3	+60.0	173.9	31 59.7	+60.0	173.9	31 00.0	+60.0	174.0	**31**
32	38 57.5	+60.0	173.5	37 57.9	+60.0	173.5	36 58.3	+60.0	173.6	35 58.6	+60.0	173.7	34 59.0	+60.0	173.8	33 59.3	+60.0	173.9	32 59.7	+60.0	173.9	32 00.0	+60.0	174.0	**32**
33	39 57.5	+60.0	173.4	38 57.9	+60.0	173.5	37 58.3	+59.9	173.6	36 58.6	+60.0	173.7	35 59.0	+60.0	173.8	34 59.3	+60.0	173.9	33 59.7	+60.0	173.9	33 00.0	+60.0	174.0	**33**
34	40 57.5	+60.0	173.4	39 57.9	+60.0	173.5	38 58.2	+60.0	173.6	37 58.6	+60.0	173.7	36 59.0	+60.0	173.8	35 59.3	+60.0	173.9	34 59.7	+60.0	173.9	34 00.0	+60.0	174.0	**34**
35	41 57.5	+60.0	173.4	40 57.9	+60.0	173.5	39 58.2	+60.0	173.6	38 58.6	+60.0	173.7	37 59.0	+60.0	173.8	36 59.3	+60.0	173.8	35 59.7	+60.0	173.9	35 00.0	+60.0	174.0	**35**
36	42 57.5	+60.0	173.4	41 57.9	+60.0	173.5	40 58.2	+60.0	173.6	39 58.6	+60.0	173.7	38 59.0	+60.0	173.8	37 59.3	+60.0	173.8	36 59.7	+60.0	173.9	36 00.0	+60.0	174.0	**36**
37	43 57.5	+59.9	173.3	42 57.9	+59.9	173.4	41 58.2	+60.0	173.6	40 58.6	+60.0	173.7	39 59.0	+60.0	173.7	38 59.3	+60.0	173.8	37 59.7	+60.0	173.9	37 00.0	+60.0	174.0	**37**
38	44 57.4	+60.0	173.3	43 57.8	+60.0	173.4	42 58.2	+60.0	173.5	41 58.6	+60.0	173.6	40 59.0	+60.0	173.7	39 59.3	+60.0	173.8	38 59.7	+60.0	173.9	38 00.0	+60.0	174.0	**38**
39	45 57.4	+60.0	173.3	44 57.8	+60.0	173.4	43 58.2	+60.0	173.5	42 58.6	+60.0	173.6	41 59.0	+60.0	173.7	40 59.3	+60.0	173.8	39 59.7	+60.0	173.9	39 00.0	+60.0	174.0	**39**
40	46 57.4	+60.0	173.3	45 57.8	+60.0	173.4	44 58.2	+60.0	173.5	43 58.6	+60.0	173.6	42 59.0	+60.0	173.7	41 59.3	+60.0	173.8	40 59.7	+60.0	173.9	40 00.0	+60.0	174.0	**40**
41	47 57.4	+60.0	173.2	46 57.8	+60.0	173.4	45 58.2	+60.0	173.5	44 58.6	+60.0	173.6	43 59.0	+60.0	173.7	42 59.3	+60.0	173.8	41 59.7	+60.0	173.9	41 00.0	+60.0	174.0	**41**
42	48 57.4	+60.0	173.2	47 57.8	+60.0	173.3	46 58.2	+60.0	173.5	45 58.6	+60.0	173.6	44 59.0	+60.0	173.7	43 59.3	+60.0	173.8	42 59.7	+60.0	173.9	42 00.0	+60.0	174.0	**42**
43	49 57.4	+60.0	173.2	48 57.8	+60.0	173.3	47 58.2	+60.0	173.4	46 58.6	+60.0	173.6	45 59.0	+60.0	173.7	44 59.3	+60.0	173.8	43 59.7	+60.0	173.9	43 00.0	+60.0	174.0	**43**
44	50 57.4	+60.0	173.1	49 57.8	+60.0	173.3	48 58.2	+60.0	173.4	47 58.6	+60.0	173.6	46 59.0	+60.0	173.7	45 59.3	+60.0	173.8	44 59.7	+60.0	173.9	44 00.0	+60.0	174.0	**44**
45	51 57.4	+60.0	173.1	50 57.8	+60.0	173.3	49 58.2	+60.0	173.4	48 58.6	+60.0	173.5	47 59.0	+60.0	173.7	46 59.3	+60.0	173.8	45 59.7	+60.0	173.9	45 00.0	+60.0	174.0	**45**
46	52 57.4	+59.9	173.1	51 57.8	+60.0	173.2	50 58.2	+60.0	173.4	49 58.6	+60.0	173.5	48 59.0	+60.0	173.6	47 59.3	+60.0	173.8	46 59.7	+60.0	173.9	46 00.0	+60.0	174.0	**46**
47	53 57.3	+60.0	173.0	52 57.8	+60.0	173.2	51 58.2	+60.0	173.4	50 58.6	+60.0	173.5	49 59.0	+60.0	173.6	48 59.3	+60.0	173.8	47 59.7	+60.0	173.9	47 00.0	+60.0	174.0	**47**
48	54 57.3	+60.0	173.0	53 57.8	+59.9	173.2	52 58.2	+60.0	173.3	51 58.6	+60.0	173.5	50 59.0	+60.0	173.6	49 59.3	+60.0	173.8	48 59.7	+60.0	173.9	48 00.0	+60.0	174.0	**48**
49	55 57.3	+60.0	173.0	54 57.7	+60.0	173.1	53 58.2	+60.0	173.3	52 58.6	+60.0	173.5	51 59.0	+59.9	173.6	50 59.3	+60.0	173.7	49 59.7	+60.0	173.9	49 00.0	+60.0	174.0	**49**
50	56 57.3	+60.0	172.9	55 57.7	+60.0	173.1	54 58.2	+60.0	173.3	53 58.6	+60.0	173.4	52 58.9	+60.0	173.6	51 59.3	+60.0	173.7	50 59.7	+60.0	173.9	50 00.0	+60.0	174.0	**50**
51	57 57.3	+60.0	172.9	56 57.7	+60.0	173.1	55 58.2	+59.9	173.2	54 58.6	+60.0	173.4	53 58.9	+60.0	173.6	52 59.3	+60.0	173.7	51 59.7	+60.0	173.9	51 00.0	+60.0	174.0	**51**
52	58 57.3	+59.9	172.8	57 57.7	+60.0	173.0	56 58.1	+60.0	173.2	55 58.6	+59.9	173.4	54 58.9	+60.0	173.6	53 59.3	+60.0	173.7	52 59.7	+60.0	173.9	52 00.0	+60.0	174.0	**52**
53	59 57.2	+60.0	172.8	58 57.7	+60.0	173.0	57 58.1	+60.0	173.2	56 58.5	+60.0	173.4	55 58.9	+60.0	173.5	54 59.3	+60.0	173.7	53 59.7	+60.0	173.9	53 00.0	+60.0	174.0	**53**
54	60 57.2	+60.0	172.7	59 57.7	+60.0	172.9	58 58.1	+60.0	173.2	57 58.5	+60.0	173.3	56 58.9	+60.0	173.5	55 59.3	+60.0	173.7	54 59.7	+60.0	173.9	54 00.0	+60.0	174.0	**54**
55	61 57.2	+60.0	172.7	60 57.7	+60.0	172.9	59 58.1	+60.0	173.1	58 58.5	+60.0	173.3	57 58.9	+60.0	173.5	56 59.3	+60.0	173.7	55 59.7	+60.0	173.8	55 00.0	+60.0	174.0	**55**
56	62 57.2	+60.0	172.6	61 57.7	+59.9	172.9	60 58.1	+60.0	173.1	59 58.5	+60.0	173.3	58 58.9	+60.0	173.5	57 59.3	+60.0	173.7	56 59.7	+60.0	173.8	56 00.0	+60.0	174.0	**56**
57	63 57.2	+59.9	172.6	62 57.6	+60.0	172.8	61 58.1	+60.0	173.0	60 58.5	+60.0	173.3	59 58.9	+60.0	173.5	58 59.3	+60.0	173.7	57 59.7	+60.0	173.8	57 00.0	+60.0	174.0	**57**
58	64 57.1	+60.0	172.5	63 57.6	+60.0	172.8	62 58.1	+60.0	173.0	61 58.5	+60.0	173.2	60 58.9	+60.0	173.4	59 59.3	+60.0	173.6	58 59.7	+60.0	173.8	58 00.0	+60.0	174.0	**58**
59	65 57.1	+60.0	172.4	64 57.6	+60.0	172.7	63 58.1	+60.0	173.0	62 58.5	+60.0	173.2	61 58.9	+60.0	173.4	60 59.3	+60.0	173.6	59 59.7	+60.0	173.8	59 00.0	+60.0	174.0	**59**
60	66 57.1	+59.9	172.3	65 57.6	+60.0	172.6	64 58.1	+59.9	172.9	63 58.5	+60.0	173.2	62 58.9	+60.0	173.4	61 59.3	+60.0	173.6	60 59.7	+60.0	173.8	60 00.0	+60.0	174.0	**60**
61	67 57.0	+60.0	172.2	66 57.6	+59.9	172.6	65 58.0	+60.0	172.9	64 58.5	+60.0	173.1	63 58.9	+60.0	173.4	62 59.3	+60.0	173.6	61 59.7	+60.0	173.8	61 00.0	+60.0	174.0	**61**
62	68 57.0	+60.0	172.1	67 57.5	+60.0	172.5	66 58.0	+60.0	172.8	65 58.5	+60.0	173.1	64 58.9	+60.0	173.3	63 59.3	+60.0	173.6	62 59.7	+60.0	173.8	62 00.0	+60.0	174.0	**62**
63	69 57.0	+59.9	172.0	68 57.5	+60.0	172.4	67 58.0	+60.0	172.7	66 58.5	+60.0	173.0	65 58.9	+60.0	173.3	64 59.3	+60.0	173.6	63 59.7	+60.0	173.8	63 00.0	+60.0	174.0	**63**
64	70 56.9	+60.0	171.9	69 57.5	+59.9	172.3	68 58.0	+60.0	172.7	67 58.5	+60.0	173.0	66 58.9	+60.0	173.3	65 59.3	+60.0	173.5	64 59.7	+60.0	173.8	64 00.0	+60.0	174.0	**64**
65	71 56.9	+59.9	171.8	70 57.4	+60.0	172.2	69 58.0	+60.0	172.6	68 58.5	+59.9	172.9	67 58.9	+60.0	173.2	66 59.3	+60.0	173.5	65 59.7	+60.0	173.8	65 00.0	+60.0	174.0	**65**
66	72 56.8	+60.0	171.7	71 57.4	+60.0	172.1	70 58.0	+59.9	172.5	69 58.4	+60.0	172.9	68 58.9	+60.0	173.2	67 59.3	+60.0	173.5	66 59.7	+60.0	173.8	66 00.0	+60.0	174.0	**66**
67	73 56.8	+59.9	171.5	72 57.4	+59.9	172.0	71 57.9	+60.0	172.4	70 58.4	+60.0	172.8	69 58.9	+60.0	173.1	68 59.3	+60.0	173.5	67 59.7	+60.0	173.7	67 00.0	+60.0	174.0	**67**
68	74 56.7	+59.9	171.3	73 57.3	+60.0	171.9	72 57.9	+60.0	172.3	71 58.4	+60.0	172.7	70 58.9	+60.0	173.1	69 59.3	+60.0	173.4	68 59.7	+60.0	173.7	68 00.0	+60.0	174.0	**68**
69	75 56.6	+59.9	171.1	74 57.3	+59.9	171.7	73 57.9	+59.9	172.2	72 58.4	+60.0	172.7	71 58.9	+59.9	173.0	70 59.3	+60.0	173.4	69 59.7	+60.0	173.7	69 00.0	+60.0	174.0	**69**
70	76 56.5	+59.9	170.9	75 57.2	+60.0	171.5	74 57.8	+60.0	172.1	73 58.4	+59.9	172.6	72 58.8	+60.0	173.0	71 59.3	+60.0	173.4	70 59.7	+60.0	173.7	70 00.0	+60.0	174.0	**70**
71	77 56.4	+59.9	170.6	76 57.2	+59.9	171.3	75 57.8	+59.9	171.9	74 58.3	+60.0	172.5	73 58.8	+60.0	172.9	72 59.3	+60.0	173.3	71 59.7	+60.0	173.7	71 00.0	+60.0	174.0	**71**
72	78 56.3	+59.8	170.3	77 57.1	+59.9	171.1	76 57.7	+60.0	171.8	75 58.3	+60.0	172.3	74 58.8	+60.0	172.8	73 59.3	+60.0	173.3	72 59.7	+60.0	173.7	72 00.0	+60.0	174.0	**72**
73	79 56.1	+59.9	169.9	78 57.0	+59.9	170.8	77 57.7	+59.9	171.6	76 58.3	+60.0	172.2	75 58.8	+60.0	172.8	74 59.3	+60.0	173.2	73 59.7	+59.9	173.6	73 00.0	+60.0	174.0	**73**
74	80 56.0	+59.8	169.5	79 56.9	+59.9	170.5	78 57.6	+60.0	171.3	77 58.3	+59.9	172.1	76 58.8	+60.0	172.7	75 59.3	+59.9	173.2	74 59.6	+60.0	173.6	74 00.0	+60.0	174.0	**74**
75	81 55.8	+59.7	168.9	80 56.8	+59.8	170.1	79 57.6	+59.9	171.1	78 58.2	+60.0	171.9	77 58.8	+60.0	172.5	76 59.2	+60.0	173.1	75 59.6	+60.0	173.6	75 00.0	+60.0	174.0	**75**
76	82 55.5	+59.6	168.2	81 56.6	+59.8	169.6	80 57.5	+59.9	170.7	79 58.2	+59.9	171.7	78 58.8	+59.9	172.4	77 59.2	+60.0	173.0	76 59.6	+60.0	173.5	76 00.0	+60.0	174.0	**76**
77	83 55.1	+59.5	167.2	82 56.4	+59.7	169.0	81 57.4	+59.8	170.3	80 58.1	+59.9	171.4	79 58.7	+60.0	172.2	78 59.2	+60.0	172.9	77 59.6	+60.0	173.5	77 00.0	+60.0	174.0	**77**
78	84 54.6	+59.2	165.8	83 56.1	+59.6	168.1	82 57.2	+59.8	169.8	81 58.0	+59.9	171.1	80 58.7	+60.0	172.0	79 59.2	+60.0	172.8	78 59.6	+60.0	173.5	78 00.0	+60.0	174.0	**78**
79	85 53.8	+58.7	163.8	84 55.7	+59.4	167.0	83 57.0	+59.7	169.1	82 57.9	+59.9	170.6	81 58.7	+59.9	171.8	80 59.2	+60.0	172.7	79 59.6	+60.0	173.4	79 00.0	+60.0	174.0	**79**
80	86 52.5	*+57.6*	•160.5	85 55.1	+59.1	165.2	84 56.7	+59.6	168.1	83 57.8	+59.9	170.1	82 58.6	+59.9	171.5	81 59.2	+60.0	172.5	80 59.6	+60.0	173.3	80 00.0	+60.0	174.0	**80**
81	87 50.1	*+53.8*	•154.3	86 54.2	*+58.2*	•162.4	85 56.3	+59.4	166.6	84 57.7	+59.7	169.3	83 58.5	+59.9	171.0	82 59.2	+59.9	172.3	81 59.6	+60.0	173.3	81 00.0	+60.0	174.0	**81**
82	88 43.9	*+32.2*	•138.9	87 52.4	*+55.1*	•156.9	86 55.7	+58.7	164.2	85 57.4	+59.6	168.1	84 58.4	+59.9	170.4	83 59.1	+60.0	172.0	82 59.6	+60.0	173.2	82 00.0	+60.0	174.0	**82**
83	89 16.1	*−28.6*	• 87.0	88 47.5	*+34.9*	•142.8	87 54.4	*+56.5*	•159.6	86 57.0	+59.1	166.2	85 58.3	+59.7	169.6	84 59.1	+59.9	171.6	83 59.6	+60.0	173.0	83 00.0	+60.0	174.0	**83**
84	88 47.5	*−53.1*	• 31.2	89 22.4	*−31.5*	• 87.0	88 50.9	*+37.7*	•147.1	87 56.1	*+57.7*	•162.3	86 58.0	+59.6	168.1	85 59.0	+59.9	171.0	84 59.6	+60.0	172.8	84 00.0	+60.0	174.0	**84**
85	87 54.4	*−57.4*	• 14.4	88 50.9	*−54.8*	• 26.9	89 28.6	*−34.8*	• 87.0	88 53.8	*+41.1*	•151.8	87 57.6	*+58.6*	•165.2	86 58.9	+59.8	170.0	85 59.6	+60.0	172.5	85 00.0	+60.0	174.0	**85**
86	86 57.0	−58.7	7.9	87 56.1	*−58.1*	• 11.7	88 53.8	*−56.2*	• 22.2	89 34.9	*−38.7*	• 87.0	88 56.2	*+45.0*	•156.9	87 58.7	*+59.4*	•168.1	86 59.6	+59.9	172.0	86 00.0	+60.0	174.0	**86**
87	85 58.3	−59.2	4.5	86 58.0	−59.0	5.9	87 57.6	−58.7	8.8	88 56.2	*−57.5*	• 17.1	89 41.2	*−43.1*	• 87.0	88 58.1	*+49.3*	•162.3	87 59.5	*+59.8*	•171.0	87 00.0	+60.0	174.0	**87**
88	84 59.1	−59.5	2.4	85 59.0	−59.4	3.0	86 58.9	−59.3	4.0	87 58.7	−59.1	5.9	88 58.1	*−58.6*	• 11.7	89 47.4	*−48.1*	• 87.0	88 59.3	*+54.4*	•168.1	88 00.0	+60.0	174.0	**88**
89	83 59.6	−59.6	1.0	84 59.6	−59.6	1.2	85 59.6	−59.6	1.5	86 59.6	−59.6	2.0	87 59.5	−59.5	3.0	88 59.3	*−59.3*	• 5.9	89 53.7	*−53.7*	• 87.0	89 00.0	+60.0	174.0	**89**
90	83 00.0	−59.7	0.0	84 00.0	−59.7	0.0	85 00.0	−59.7	0.0	86 00.0	−59.7	0.0	87 00.0	−59.8	0.0	88 00.0	−59.8	0.0	89 00.0	*−59.8*	• 0.0	90 00.0	−60.0	87.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 6°, 354°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 57.7	–60.0	174.0	5 58.0	–60.0	174.0	4 58.4	–60.0	174.0	3 58.7	–60.0	174.0	2 59.0	–60.0	174.0	1 59.3	–60.0	174.0	0 59.7	–60.0	174.0	0 00.0	+60.0	6.0	0
1	5 57.7	–60.0	174.0	4 58.0	–60.0	174.0	3 58.4	–60.0	174.0	2 58.7	–60.0	174.0	1 59.0	–60.0	174.0	0 59.3	–60.0	174.0	0 00.3	+60.0	6.0	1 00.0	+60.0	6.0	1
2	4 57.7	–60.0	174.0	3 58.0	–60.0	174.0	2 58.4	–60.0	174.0	1 58.7	–60.0	174.0	0 59.0	–60.0	174.0	0 00.7	+60.0	6.0	1 00.3	+60.0	6.0	2 00.0	+60.0	6.0	2
3	3 57.7	–60.0	174.0	2 58.0	–60.0	174.0	1 58.4	–60.0	174.0	0 58.7	–60.0	174.0	0 01.0	+60.0	6.0	1 00.7	+60.0	6.0	2 00.3	+60.0	6.0	3 00.0	+60.0	6.0	3
4	2 57.7	–60.0	174.0	1 58.0	–60.0	174.0	0 58.4	–60.0	174.0	0 01.3	+60.0	6.0	1 01.0	+60.0	6.0	2 00.7	+60.0	6.0	3 00.3	+60.0	6.0	4 00.0	+60.0	6.0	4
5	1 57.7	–60.0	174.0	0 58.0	–60.0	174.0	0 01.6	+60.0	6.0	1 01.3	+60.0	6.0	2 01.0	+60.0	6.0	3 00.7	+60.0	6.0	4 00.3	+60.0	6.0	5 00.0	+60.0	6.0	5
6	0 57.7	–60.0	174.0	0 02.0	+60.0	6.0	1 01.6	+60.0	6.0	2 01.3	+60.0	6.0	3 01.0	+60.0	6.0	4 00.7	+60.0	6.0	5 00.3	+60.0	6.0	6 00.0	+60.0	6.0	6
7	0 02.3	+60.0	6.0	1 02.0	+60.0	6.0	2 01.6	+60.0	6.0	3 01.3	+60.0	6.0	4 01.0	+60.0	6.0	5 00.7	+60.0	6.0	6 00.3	+60.0	6.0	7 00.0	+60.0	6.0	7
8	1 02.3	+60.0	5.9	2 02.0	+59.9	5.9	3 01.6	+60.0	5.9	4 01.3	+60.0	6.0	5 01.0	+60.0	6.0	6 00.7	+60.0	6.0	7 00.3	+60.0	6.0	8 00.0	+60.0	6.0	8
9	2 02.3	+60.0	5.9	3 01.9	+60.0	5.9	4 01.6	+60.0	5.9	5 01.3	+60.0	5.9	6 01.0	+60.0	6.0	7 00.7	+60.0	6.0	8 00.3	+60.0	6.0	9 00.0	+60.0	6.0	9
10	3 02.3	+60.0	5.9	4 01.9	+60.0	5.9	5 01.6	+60.0	5.9	6 01.3	+60.0	5.9	7 01.0	+60.0	6.0	8 00.7	+60.0	6.0	9 00.3	+60.0	6.0	10 00.0	+60.0	6.0	10
11	4 02.3	+60.0	5.9	5 01.9	+60.0	5.9	6 01.6	+60.0	5.9	7 01.3	+60.0	5.9	8 01.0	+60.0	5.9	9 00.7	+60.0	6.0	10 00.3	+60.0	6.0	11 00.0	+60.0	6.0	11
12	5 02.3	+59.9	5.9	6 01.9	+60.0	5.9	7 01.6	+60.0	5.9	8 01.3	+60.0	5.9	9 01.0	+60.0	5.9	10 00.7	+60.0	6.0	11 00.3	+60.0	6.0	12 00.0	+60.0	6.0	12
13	6 02.2	+60.0	5.9	7 01.9	+60.0	5.9	8 01.6	+60.0	5.9	9 01.3	+60.0	5.9	10 01.0	+60.0	5.9	11 00.7	+60.0	6.0	12 00.3	+60.0	6.0	13 00.0	+60.0	6.0	13
14	7 02.2	+60.0	5.9	8 01.9	+60.0	5.9	9 01.6	+60.0	5.9	10 01.3	+60.0	5.9	11 01.0	+60.0	5.9	12 00.7	+60.0	6.0	13 00.3	+60.0	6.0	14 00.0	+60.0	6.0	14
15	8 02.2	+60.0	5.9	9 01.9	+60.0	5.9	10 01.6	+60.0	5.9	11 01.3	+60.0	5.9	12 01.0	+60.0	5.9	13 00.7	+60.0	5.9	14 00.3	+60.0	6.0	15 00.0	+60.0	6.0	15
16	9 02.2	+60.0	5.8	10 01.9	+60.0	5.9	11 01.6	+60.0	5.9	12 01.3	+60.0	5.9	13 01.0	+60.0	5.9	14 00.7	+60.0	5.9	15 00.3	+60.0	6.0	16 00.0	+60.0	6.0	16
17	10 02.2	+60.0	5.8	11 01.9	+60.0	5.8	12 01.6	+60.0	5.9	13 01.3	+60.0	5.9	14 01.0	+60.0	5.9	15 00.7	+60.0	5.9	16 00.3	+60.0	6.0	17 00.0	+60.0	6.0	17
18	11 02.2	+60.0	5.8	12 01.9	+60.0	5.8	13 01.6	+60.0	5.9	14 01.3	+60.0	5.9	15 01.0	+60.0	5.9	16 00.7	+59.9	5.9	17 00.3	+60.0	6.0	18 00.0	+60.0	6.0	18
19	12 02.2	+60.0	5.8	13 01.9	+60.0	5.8	14 01.6	+60.0	5.8	15 01.3	+60.0	5.9	16 01.0	+60.0	5.9	17 00.6	+60.0	5.9	18 00.3	+60.0	6.0	19 00.0	+60.0	6.0	19
20	13 02.2	+60.0	5.8	14 01.9	+60.0	5.8	15 01.6	+60.0	5.8	16 01.3	+60.0	5.9	17 01.0	+60.0	5.9	18 00.6	+60.0	5.9	19 00.3	+60.0	6.0	20 00.0	+60.0	6.0	20
21	14 02.2	+60.0	5.8	15 01.9	+60.0	5.8	16 01.6	+60.0	5.8	17 01.3	+60.0	5.9	18 01.0	+60.0	5.9	19 00.6	+60.0	5.9	20 00.3	+60.0	6.0	21 00.0	+60.0	6.0	21
22	15 02.2	+60.0	5.8	16 01.9	+60.0	5.8	17 01.6	+60.0	5.8	18 01.3	+60.0	5.8	19 01.0	+60.0	5.9	20 00.6	+60.0	5.9	21 00.3	+60.0	6.0	22 00.0	+60.0	6.0	22
23	16 02.2	+60.0	5.7	17 01.9	+60.0	5.8	18 01.6	+60.0	5.8	19 01.3	+60.0	5.8	20 01.0	+60.0	5.9	21 00.6	+60.0	5.9	22 00.3	+60.0	6.0	23 00.0	+60.0	6.0	23
24	17 02.2	+60.0	5.7	18 01.9	+60.0	5.8	19 01.6	+60.0	5.8	20 01.3	+60.0	5.8	21 01.0	+60.0	5.9	22 00.6	+60.0	5.9	23 00.3	+60.0	6.0	24 00.0	+60.0	6.0	24
25	18 02.2	+60.0	5.7	19 01.9	+60.0	5.8	20 01.6	+60.0	5.8	21 01.3	+60.0	5.8	22 01.0	+60.0	5.9	23 00.6	+60.0	5.9	24 00.3	+60.0	6.0	25 00.0	+60.0	6.0	25
26	19 02.2	+60.0	5.7	20 01.9	+60.0	5.7	21 01.6	+60.0	5.8	22 01.3	+60.0	5.8	23 01.0	+60.0	5.9	24 00.6	+60.0	5.9	25 00.3	+60.0	6.0	26 00.0	+60.0	6.0	26
27	20 02.2	+60.0	5.7	21 01.9	+60.0	5.7	22 01.6	+60.0	5.8	23 01.3	+60.0	5.8	24 01.0	+60.0	5.9	25 00.6	+60.0	5.9	26 00.3	+60.0	5.9	27 00.0	+60.0	6.0	27
28	21 02.2	+60.0	5.7	22 01.9	+60.0	5.7	23 01.6	+60.0	5.8	24 01.3	+60.0	5.8	25 01.0	+60.0	5.8	26 00.6	+60.0	5.9	27 00.3	+60.0	5.9	28 00.0	+60.0	6.0	28
29	22 02.2	+60.0	5.7	23 01.9	+60.0	5.7	24 01.6	+60.0	5.7	25 01.3	+60.0	5.8	26 01.0	+60.0	5.8	27 00.6	+60.0	5.9	28 00.3	+60.0	5.9	29 00.0	+60.0	6.0	29
30	23 02.2	+60.0	5.6	24 01.9	+60.0	5.7	25 01.6	+60.0	5.7	26 01.3	+60.0	5.8	27 01.0	+60.0	5.8	28 00.6	+60.0	5.9	29 00.3	+60.0	5.9	30 00.0	+60.0	6.0	30
31	24 02.2	+59.9	5.6	25 01.9	+60.0	5.7	26 01.6	+60.0	5.7	27 01.3	+60.0	5.8	28 01.0	+60.0	5.8	29 00.6	+60.0	5.9	30 00.3	+60.0	5.9	31 00.0	+60.0	6.0	31
32	25 02.1	+60.0	5.6	26 01.9	+60.0	5.7	27 01.6	+60.0	5.7	28 01.3	+60.0	5.8	29 01.0	+60.0	5.8	30 00.6	+60.0	5.9	31 00.3	+60.0	5.9	32 00.0	+60.0	6.0	32
33	26 02.1	+60.0	5.6	27 01.9	+59.9	5.6	28 01.6	+60.0	5.7	29 01.3	+60.0	5.8	30 01.0	+60.0	5.8	31 00.6	+60.0	5.9	32 00.3	+60.0	5.9	33 00.0	+60.0	6.0	33
34	27 02.1	+60.0	5.6	28 01.8	+60.0	5.6	29 01.6	+60.0	5.7	30 01.3	+60.0	5.7	31 01.0	+60.0	5.8	32 00.6	+60.0	5.9	33 00.3	+60.0	5.9	34 00.0	+60.0	6.0	34
35	28 02.1	+60.0	5.6	29 01.8	+60.0	5.6	30 01.6	+59.9	5.7	31 01.3	+60.0	5.7	32 01.0	+60.0	5.8	33 00.6	+60.0	5.9	34 00.3	+60.0	5.9	35 00.0	+60.0	6.0	35
36	29 02.1	+60.0	5.6	30 01.8	+60.0	5.6	31 01.5	+60.0	5.7	32 01.3	+60.0	5.7	33 01.0	+59.9	5.8	34 00.6	+60.0	5.9	35 00.3	+60.0	5.9	36 00.0	+60.0	6.0	36
37	30 02.1	+60.0	5.5	31 01.8	+60.0	5.6	32 01.5	+60.0	5.7	33 01.3	+59.9	5.7	34 00.9	+60.0	5.8	35 00.6	+60.0	5.8	36 00.3	+60.0	5.9	37 00.0	+60.0	6.0	37
38	31 02.1	+60.0	5.5	32 01.8	+60.0	5.6	33 01.5	+60.0	5.6	34 01.2	+60.0	5.7	35 00.9	+60.0	5.8	36 00.6	+60.0	5.8	37 00.3	+60.0	5.9	38 00.0	+60.0	6.0	38
39	32 02.1	+60.0	5.5	33 01.8	+60.0	5.6	34 01.5	+60.0	5.6	35 01.2	+60.0	5.7	36 00.9	+60.0	5.8	37 00.6	+60.0	5.8	38 00.3	+60.0	5.9	39 00.0	+60.0	6.0	39
40	33 02.1	+60.0	5.5	34 01.8	+60.0	5.5	35 01.5	+60.0	5.6	36 01.2	+60.0	5.7	37 00.9	+60.0	5.8	38 00.6	+60.0	5.8	39 00.3	+60.0	5.9	40 00.0	+60.0	6.0	40
41	34 02.1	+60.0	5.5	35 01.8	+60.0	5.5	36 01.5	+60.0	5.6	37 01.2	+60.0	5.7	38 00.9	+60.0	5.7	39 00.6	+60.0	5.8	40 00.3	+60.0	5.9	41 00.0	+60.0	6.0	41
42	35 02.1	+60.0	5.4	36 01.8	+60.0	5.5	37 01.5	+60.0	5.6	38 01.2	+60.0	5.7	39 00.9	+60.0	5.7	40 00.6	+60.0	5.8	41 00.3	+60.0	5.9	42 00.0	+60.0	6.0	42
43	36 02.1	+60.0	5.4	37 01.8	+60.0	5.5	38 01.5	+60.0	5.6	39 01.2	+60.0	5.6	40 00.9	+60.0	5.7	41 00.6	+60.0	5.8	42 00.3	+60.0	5.9	43 00.0	+60.0	6.0	43
44	37 02.1	+60.0	5.4	38 01.8	+60.0	5.5	39 01.5	+60.0	5.6	40 01.2	+60.0	5.6	41 00.9	+60.0	5.7	42 00.6	+60.0	5.8	43 00.3	+60.0	5.9	44 00.0	+60.0	6.0	44
45	38 02.1	+60.0	5.4	39 01.8	+60.0	5.5	40 01.5	+60.0	5.5	41 01.2	+60.0	5.6	42 00.9	+60.0	5.7	43 00.6	+60.0	5.8	44 00.3	+60.0	5.9	45 00.0	+60.0	6.0	45
46	39 02.1	+59.9	5.4	40 01.8	+60.0	5.4	41 01.5	+60.0	5.5	42 01.2	+60.0	5.6	43 00.9	+60.0	5.7	44 00.6	+60.0	5.8	45 00.3	+60.0	5.9	46 00.0	+60.0	6.0	46
47	40 02.0	+60.0	5.3	41 01.8	+60.0	5.4	42 01.5	+60.0	5.5	43 01.2	+60.0	5.6	44 00.9	+60.0	5.7	45 00.6	+60.0	5.8	46 00.3	+60.0	5.9	47 00.0	+60.0	6.0	47
48	41 02.0	+60.0	5.3	42 01.8	+60.0	5.4	43 01.5	+60.0	5.5	44 01.2	+60.0	5.6	45 00.9	+60.0	5.7	46 00.6	+60.0	5.8	47 00.3	+60.0	5.9	48 00.0	+60.0	6.0	48
49	42 02.0	+60.0	5.3	43 01.8	+60.0	5.4	44 01.5	+60.0	5.5	45 01.2	+60.0	5.6	46 00.9	+60.0	5.7	47 00.6	+60.0	5.8	48 00.3	+60.0	5.9	49 00.0	+60.0	6.0	49
50	43 02.0	+60.0	5.3	44 01.8	+60.0	5.4	45 01.5	+60.0	5.5	46 01.2	+60.0	5.6	47 00.9	+60.0	5.7	48 00.6	+60.0	5.8	49 00.3	+60.0	5.9	50 00.0	+60.0	6.0	50
51	44 02.0	+60.0	5.2	45 01.8	+59.9	5.3	46 01.5	+60.0	5.4	47 01.2	+60.0	5.5	48 00.9	+60.0	5.6	49 00.6	+60.0	5.8	50 00.3	+60.0	5.9	51 00.0	+60.0	6.0	51
52	45 02.0	+60.0	5.2	46 01.7	+60.0	5.3	47 01.5	+60.0	5.4	48 01.2	+60.0	5.5	49 00.9	+60.0	5.6	50 00.6	+60.0	5.7	51 00.3	+60.0	5.9	52 00.0	+60.0	6.0	52
53	46 02.0	+60.0	5.2	47 01.7	+60.0	5.3	48 01.5	+60.0	5.4	49 01.2	+60.0	5.5	50 00.9	+60.0	5.6	51 00.6	+60.0	5.7	52 00.3	+60.0	5.9	53 00.0	+60.0	6.0	53
54	47 02.0	+60.0	5.2	48 01.7	+60.0	5.3	49 01.5	+60.0	5.4	50 01.2	+60.0	5.5	51 00.9	+60.0	5.6	52 00.6	+60.0	5.7	53 00.3	+60.0	5.9	54 00.0	+60.0	6.0	54
55	48 02.0	+60.0	5.1	49 01.7	+60.0	5.2	50 01.5	+60.0	5.4	51 01.2	+60.0	5.5	52 00.9	+60.0	5.6	53 00.6	+60.0	5.7	54 00.3	+60.0	5.9	55 00.0	+60.0	6.0	55
56	49 02.0	+59.9	5.1	50 01.7	+60.0	5.2	51 01.5	+60.0	5.3	52 01.2	+60.0	5.5	53 00.9	+60.0	5.6	54 00.6	+60.0	5.7	55 00.3	+60.0	5.8	56 00.0	+60.0	6.0	56
57	50 01.9	+60.0	5.1	51 01.7	+60.0	5.2	52 01.5	+59.9	5.3	53 01.2	+60.0	5.4	54 00.9	+60.0	5.6	55 00.6	+60.0	5.7	56 00.3	+60.0	5.8	57 00.0	+60.0	6.0	57
58	51 01.9	+60.0	5.1	52 01.7	+60.0	5.2	53 01.4	+60.0	5.3	54 01.2	+60.0	5.4	55 00.9	+60.0	5.5	56 00.6	+60.0	5.7	57 00.3	+60.0	5.8	58 00.0	+60.0	6.0	58
59	52 01.9	+60.0	5.0	53 01.7	+60.0	5.1	54 01.4	+60.0	5.3	55 01.2	+60.0	5.4	56 00.9	+60.0	5.5	57 00.6	+60.0	5.7	58 00.3	+60.0	5.8	59 00.0	+60.0	6.0	59
60	53 01.9	+60.0	5.0	54 01.7	+60.0	5.1	55 01.4	+60.0	5.2	56 01.2	+60.0	5.4	57 00.9	+60.0	5.5	58 00.6	+60.0	5.7	59 00.3	+60.0	5.8	60 00.0	+60.0	6.0	60
61	54 01.9	+60.0	4.9	55 01.7	+60.0	5.1	56 01.4	+60.0	5.2	57 01.2	+60.0	5.3	58 00.9	+60.0	5.5	59 00.6	+60.0	5.6	60 00.3	+60.0	5.8	61 00.0	+60.0	6.0	61
62	55 01.9	+60.0	4.9	56 01.7	+59.9	5.0	57 01.4	+60.0	5.2	58 01.2	+60.0	5.3	59 00.9	+60.0	5.5	60 00.6	+60.0	5.6	61 00.3	+60.0	5.8	62 00.0	+60.0	6.0	62
63	56 01.9	+59.9	4.9	57 01.6	+60.0	5.0	58 01.4	+60.0	5.1	59 01.2	+60.0	5.3	60 00.9	+60.0	5.4	61 00.6	+60.0	5.6	62 00.3	+60.0	5.8	63 00.0	+60.0	6.0	63
64	57 01.8	+60.0	4.8	58 01.6	+60.0	5.0	59 01.4	+60.0	5.1	60 01.2	+59.9	5.3	61 00.9	+60.0	5.4	62 00.6	+60.0	5.6	63 00.3	+60.0	5.8	64 00.0	+60.0	6.0	64
65	58 01.8	+60.0	4.8	59 01.6	+60.0	4.9	60 01.4	+60.0	5.1	61 01.1	+60.0	5.2	62 00.9	+60.0	5.4	63 00.6	+60.0	5.6	64 00.3	+60.0	5.8	65 00.0	+60.0	6.0	65
66	59 01.8	+60.0	4.7	60 01.6	+60.0	4.9	61 01.4	+60.0	5.0	62 01.1	+60.0	5.2	63 00.9	+60.0	5.4	64 00.6	+60.0	5.6	65 00.3	+60.0	5.8	66 00.0	+60.0	6.0	66
67	60 01.8	+60.0	4.7	61 01.6	+60.0	4.8	62 01.4	+60.0	5.0	63 01.1	+60.0	5.2	64 00.9	+60.0	5.3	65 00.6	+60.0	5.5	66 00.3	+60.0	5.8	67 00.0	+60.0	6.0	67
68	61 01.8	+60.0	4.6	62 01.6	+60.0	4.8	63 01.4	+59.9	5.0	64 01.1	+60.0	5.1	65 00.9	+60.0	5.3	66 00.6	+60.0	5.5	67 00.3	+60.0	5.8	68 00.0	+60.0	6.0	68
69	62 01.8	+59.9	4.6	63 01.6	+59.9	4.7	64 01.3	+60.0	4.9	65 01.1	+60.0	5.1	66 00.9	+60.0	5.3	67 00.6	+60.0	5.5	68 00.3	+60.0	5.7	69 00.0	+60.0	6.0	69
70	63 01.7	+60.0	4.5	64 01.5	+60.0	4.7	65 01.3	+60.0	4.9	66 01.1	+60.0	5.0	67 00.9	+60.0	5.3	68 00.6	+60.0	5.5	69 00.3	+60.0	5.7	70 00.0	+60.0	6.0	70
71	64 01.7	+60.0	4.5	65 01.5	+60.0	4.6	66 01.3	+60.0	4.8	67 01.1	+60.0	5.0	68 00.9	+60.0	5.2	69 00.6	+60.0	5.5	70 00.3	+60.0	5.7	71 00.0	+60.0	6.0	71
72	65 01.7	+60.0	4.4	66 01.5	+60.0	4.6	67 01.3	+60.0	4.7	68 01.1	+60.0	5.0	69 00.9	+59.9	5.2	70 00.6	+60.0	5.4	71 00.3	+60.0	5.7	72 00.0	+60.0	6.0	72
73	66 01.7	+59.9	4.3	67 01.5	+59.9	4.5	68 01.3	+60.0	4.7	69 01.1	+60.0	4.9	70 00.8	+60.0	5.1	71 00.6	+60.0	5.4	72 00.3	+60.0	5.7	73 00.0	+60.0	6.0	73
74	67 01.6	+60.0	4.2	68 01.4	+60.0	4.4	69 01.3	+59.9	4.6	70 01.1	+59.9	4.8	71 00.8	+60.0	5.1	72 00.6	+60.0	5.4	73 00.3	+60.0	5.7	74 00.0	+60.0	6.0	74
75	68 01.6	+60.0	4.1	69 01.4	+60.0	4.3	70 01.2	+60.0	4.5	71 01.0	+60.0	4.8	72 00.8	+60.0	5.0	73 00.6	+60.0	5.3	74 00.3	+60.0	5.6	75 00.0	+60.0	6.0	75
76	69 01.6	+59.9	4.1	70 01.4	+60.0	4.2	71 01.2	+60.0	4.5	72 01.0	+60.0	4.7	73 00.8	+60.0	5.0	74 00.6	+60.0	5.3	75 00.3	+60.0	5.6	76 00.0	+60.0	6.0	76
77	70 01.5	+60.0	3.9	71 01.4	+59.9	4.1	72 01.2	+60.0	4.4	73 01.0	+60.0	4.6	74 00.8	+60.0	4.9	75 00.6	+60.0	5.2	76 00.3	+60.0	5.6	77 00.0	+60.0	6.0	77
78	71 01.5	+59.9	3.8	72 01.3	+60.0	4.0	73 01.2	+59.9	4.3	74 01.0	+60.0	4.5	75 00.8	+60.0	4.8	76 00.6	+60.0	5.2	77 00.3	+60.0	5.5	78 00.0	+60.0	6.0	78
79	72 01.4	+60.0	3.7	73 01.3	+59.9	3.9	74 01.1	+60.0	4.2	75 01.0	+59.9	4.4	76 00.8	+60.0	4.7	77 00.6	+59.9	5.1	78 00.3	+60.0	5.5	79 00.0	+60.0	6.0	79
80	73 01.4	+59.9	3.6	74 01.2	+60.0	3.8	75 01.1	+60.0	4.0	76 00.9	+60.0	4.3	77 00.8	+59.9	4.6	78 00.5	+60.0	5.0	79 00.3	+60.0	5.5	80 00.0	+60.0	6.0	80
81	74 01.3	+59.9	3.4	75 01.2	+59.9	3.6	76 01.1	+59.9	3.9	77 00.9	+60.0	4.2	78 00.7	+60.0	4.5	79 00.5	+60.0	4.9	80 00.3	+60.0	5.4	81 00.0	+60.0	6.0	81
82	75 01.2	+60.0	3.2	76 01.1	+60.0	3.5	77 01.0	+60.0	3.7	78 00.9	+59.9	4.0	79 00.7	+60.0	4.4	80 00.5	+60.0	4.8	81 00.3	+60.0	5.3	82 00.0	+60.0	6.0	82
83	76 01.2	+59.9	3.0	77 01.1	+59.9	3.3	78 01.0	+59.9	3.5	79 00.8	+60.0	3.8	80 00.7	+60.0	4.2	81 00.5	+60.0	4.7	82 00.3	+60.0	5.3	83 00.0	+60.0	6.0	83
84	77 01.1	+59.9	2.8	78 01.0	+59.9	3.0	79 00.9	+59.9	3.3	80 00.8	+59.9	3.6	81 00.7	+59.9	4.0	82 00.5	+60.0	4.5	83 00.3	+60.0	5.1	84 00.0	+60.0	6.0	84
85	78 01.0	+59.8	2.5	79 00.9	+59.9	2.7	80 00.8	+59.9	3.0	81 00.7	+60.0	3.3	82 00.6	+60.0	3.8	83 00.5	+59.9	4.3	84 00.3	+60.0	5.0	85 00.0	+60.0	6.0	85
86	79 00.8	+59.9	2.2	80 00.8	+59.9	2.4	81 00.7	+59.9	2.7	82 00.7	+59.9	3.0	83 00.6	+59.9	3.4	84 00.4	+60.0	4.0	85 00.3	+59.9	4.8	86 00.0	+60.0	6.0	86
87	80 00.7	+59.8	1.8	81 00.7	+59.8	2.0	82 00.6	+59.9	2.3	83 00.6	+59.8	2.6	84 00.5	+59.9	3.0	85 00.4	+59.9	3.6	86 00.2	+60.0	4.5	87 00.0	+60.0	6.0	87
88	81 00.5	+59.8	1.3	82 00.5	+59.8	1.5	83 00.5	+59.8	1.7	84 00.4	+59.9	2.0	85 00.4	+59.8	2.4	86 00.3	+59.9	3.0	87 00.2	+60.0	4.0	88 00.0	+60.0	6.0	88
89	82 00.3	+59.7	0.8	83 00.3	+59.7	0.9	84 00.3	+59.7	1.0	85 00.3	+59.7	1.2	86 00.2	+59.8	1.5	87 00.2	+59.8	2.0	88 00.2	*+59.8* •	3.0	89 00.0	+60.0	6.0	89
90	83 00.0	+59.6	0.0	84 00.0	+59.6	0.0	85 00.0	+59.6	0.0	86 00.0	+59.6	0.0	87 00.0	+59.5	0.0	88 00.0	*+59.3* •	0.0	89 00.0	*+53.7* •	0.0	90 00.0	–60.0	3.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 174°, 186°

7°, 353° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 56.9	+59.9	172.9	5 57.3	+60.0	173.0	4 57.8	+60.0	173.0	3 58.2	+60.0	173.0	2 58.7	+60.0	173.0	1 59.1	+60.0	173.0	0 59.6	+60.0	173.0	0 00.0	+60.0	173.0	0
1	7 56.8	+60.0	172.9	6 57.3	+60.0	172.9	5 57.8	+60.0	173.0	4 58.2	+60.0	173.0	3 58.7	+60.0	173.0	2 59.1	+60.0	173.0	1 59.6	+60.0	173.0	1 00.0	+60.0	173.0	1
2	8 56.8	+60.0	172.9	7 57.3	+60.0	172.9	6 57.8	+59.9	173.0	5 58.2	+60.0	173.0	4 58.7	+60.0	173.0	3 59.1	+60.0	173.0	2 59.6	+60.0	173.0	2 00.0	+60.0	173.0	2
3	9 56.8	+60.0	172.9	8 57.3	+60.0	172.9	7 57.7	+60.0	172.9	6 58.2	+60.0	173.0	5 58.7	+60.0	173.0	4 59.1	+60.0	173.0	3 59.6	+60.0	173.0	3 00.0	+60.0	173.0	3
4	10 56.8	+60.0	172.9	9 57.3	+60.0	172.9	8 57.7	+60.0	172.9	7 58.2	+60.0	172.9	6 58.7	+60.0	173.0	5 59.1	+60.0	173.0	4 59.6	+60.0	173.0	4 00.0	+60.0	173.0	4
5	11 56.8	+60.0	172.9	10 57.3	+60.0	172.9	9 57.7	+60.0	172.9	8 58.2	+60.0	172.9	7 58.7	+59.9	173.0	6 59.1	+60.0	173.0	5 59.6	+60.0	173.0	5 00.0	+60.0	173.0	5
6	12 56.8	+60.0	172.9	11 57.3	+60.0	172.9	10 57.7	+60.0	172.9	9 58.2	+60.0	172.9	8 58.6	+60.0	173.0	7 59.1	+60.0	173.0	6 59.6	+60.0	173.0	6 00.0	+60.0	173.0	6
7	13 56.8	+60.0	172.8	12 57.3	+60.0	172.9	11 57.7	+60.0	172.9	10 58.2	+60.0	172.9	9 58.6	+60.0	172.9	8 59.1	+60.0	173.0	7 59.6	+60.0	173.0	7 00.0	+60.0	173.0	7
8	14 56.8	+60.0	172.8	13 57.3	+60.0	172.9	12 57.7	+60.0	172.9	11 58.2	+60.0	172.9	10 58.6	+60.0	172.9	9 59.1	+60.0	173.0	8 59.6	+60.0	173.0	8 00.0	+60.0	173.0	8
9	15 56.8	+60.0	172.8	14 57.3	+60.0	172.8	13 57.7	+60.0	172.9	12 58.2	+60.0	172.9	11 58.6	+60.0	172.9	10 59.1	+60.0	173.0	9 59.6	+60.0	173.0	9 00.0	+60.0	173.0	9
10	16 56.8	+60.0	172.8	15 57.3	+60.0	172.8	14 57.7	+60.0	172.9	13 58.2	+60.0	172.9	12 58.6	+60.0	172.9	11 59.1	+60.0	173.0	10 59.6	+60.0	173.0	10 00.0	+60.0	173.0	10
11	17 56.8	+60.0	172.8	16 57.3	+59.9	172.8	15 57.7	+60.0	172.9	14 58.2	+60.0	172.9	13 58.6	+60.0	172.9	12 59.1	+60.0	172.9	11 59.6	+60.0	173.0	11 00.0	+60.0	173.0	11
12	18 56.8	+60.0	172.8	17 57.2	+60.0	172.8	16 57.7	+60.0	172.8	15 58.2	+60.0	172.9	14 58.6	+60.0	172.9	13 59.1	+60.0	172.9	12 59.6	+60.0	173.0	12 00.0	+60.0	173.0	12
13	19 56.8	+60.0	172.7	18 57.2	+60.0	172.8	17 57.7	+60.0	172.8	16 58.2	+60.0	172.9	15 58.6	+60.0	172.9	14 59.1	+60.0	172.9	13 59.6	+60.0	173.0	13 00.0	+60.0	173.0	13
14	20 56.8	+59.9	172.7	19 57.2	+60.0	172.8	18 57.7	+60.0	172.8	17 58.2	+60.0	172.9	16 58.6	+60.0	172.9	15 59.1	+60.0	172.9	14 59.6	+60.0	173.0	14 00.0	+60.0	173.0	14
15	21 56.7	+60.0	172.7	20 57.2	+60.0	172.8	19 57.7	+60.0	172.8	18 58.2	+60.0	172.8	17 58.6	+60.0	172.9	16 59.1	+60.0	172.9	15 59.6	+60.0	173.0	15 00.0	+60.0	173.0	15
16	22 56.7	+60.0	172.7	21 57.2	+60.0	172.7	20 57.7	+60.0	172.8	19 58.2	+60.0	172.8	18 58.6	+60.0	172.9	17 59.1	+60.0	172.9	16 59.6	+60.0	173.0	16 00.0	+60.0	173.0	16
17	23 56.7	+60.0	172.7	22 57.2	+60.0	172.7	21 57.7	+60.0	172.8	20 58.2	+60.0	172.8	19 58.6	+60.0	172.9	18 59.1	+60.0	172.9	17 59.6	+60.0	173.0	17 00.0	+60.0	173.0	17
18	24 56.7	+60.0	172.7	23 57.2	+60.0	172.7	22 57.7	+60.0	172.8	21 58.2	+60.0	172.8	20 58.6	+60.0	172.9	19 59.1	+60.0	172.9	18 59.6	+60.0	173.0	18 00.0	+60.0	173.0	18
19	25 56.7	+60.0	172.6	24 57.2	+60.0	172.7	23 57.7	+60.0	172.8	22 58.2	+60.0	172.8	21 58.6	+60.0	172.9	20 59.1	+60.0	172.9	19 59.5	+60.0	173.0	19 00.0	+60.0	173.0	19
20	26 56.7	+60.0	172.6	25 57.2	+60.0	172.7	24 57.7	+60.0	172.7	23 58.2	+60.0	172.8	22 58.6	+60.0	172.9	21 59.1	+60.0	172.9	20 59.5	+60.0	173.0	20 00.0	+60.0	173.0	20
21	27 56.7	+60.0	172.6	26 57.2	+60.0	172.7	25 57.7	+60.0	172.7	24 58.2	+60.0	172.8	23 58.6	+60.0	172.8	22 59.1	+60.0	172.9	21 59.5	+60.0	173.0	21 00.0	+60.0	173.0	21
22	28 56.7	+60.0	172.6	27 57.2	+60.0	172.7	26 57.7	+60.0	172.7	25 58.2	+60.0	172.8	24 58.6	+60.0	172.8	23 59.1	+60.0	172.9	22 59.5	+60.0	172.9	22 00.0	+60.0	173.0	22
23	29 56.7	+60.0	172.6	28 57.2	+60.0	172.6	27 57.7	+60.0	172.7	26 58.2	+60.0	172.8	25 58.6	+60.0	172.8	24 59.1	+60.0	172.9	23 59.5	+60.0	172.9	23 00.0	+60.0	173.0	23
24	30 56.7	+60.0	172.5	29 57.2	+60.0	172.6	28 57.7	+60.0	172.7	27 58.2	+59.9	172.8	26 58.6	+60.0	172.8	25 59.1	+60.0	172.9	24 59.5	+60.0	172.9	24 00.0	+60.0	173.0	24
25	31 56.7	+60.0	172.5	30 57.2	+60.0	172.6	29 57.7	+60.0	172.7	28 58.1	+60.0	172.7	27 58.6	+60.0	172.8	26 59.1	+60.0	172.9	25 59.5	+60.0	172.9	25 00.0	+60.0	173.0	25
26	32 56.7	+59.9	172.5	31 57.2	+60.0	172.6	30 57.7	+60.0	172.7	29 58.1	+60.0	172.7	28 58.6	+60.0	172.8	27 59.1	+60.0	172.9	26 59.5	+60.0	172.9	26 00.0	+60.0	173.0	26
27	33 56.6	+60.0	172.5	32 57.2	+59.9	172.6	31 57.7	+59.9	172.6	30 58.1	+60.0	172.7	29 58.6	+60.0	172.8	28 59.1	+60.0	172.9	27 59.5	+60.0	172.9	27 00.0	+60.0	173.0	27
28	34 56.6	+60.0	172.5	33 57.1	+60.0	172.5	32 57.6	+60.0	172.6	31 58.1	+60.0	172.7	30 58.6	+60.0	172.8	29 59.1	+60.0	172.9	28 59.5	+60.0	172.9	28 00.0	+60.0	173.0	28
29	35 56.6	+60.0	172.4	34 57.1	+60.0	172.5	33 57.6	+60.0	172.6	32 58.1	+60.0	172.7	31 58.6	+60.0	172.8	30 59.1	+60.0	172.9	29 59.5	+60.0	172.9	29 00.0	+60.0	173.0	29
30	36 56.6	+60.0	172.4	35 57.1	+60.0	172.5	34 57.6	+60.0	172.6	33 58.1	+60.0	172.7	32 58.6	+60.0	172.8	31 59.1	+60.0	172.9	30 59.5	+60.0	172.9	30 00.0	+60.0	173.0	30
31	37 56.6	+60.0	172.4	36 57.1	+60.0	172.5	35 57.6	+60.0	172.6	34 58.1	+60.0	172.7	33 58.6	+60.0	172.8	32 59.1	+60.0	172.8	31 59.5	+60.0	172.9	31 00.0	+60.0	173.0	31
32	38 56.6	+60.0	172.4	37 57.1	+60.0	172.5	36 57.6	+60.0	172.6	35 58.1	+60.0	172.7	34 58.6	+60.0	172.8	33 59.1	+60.0	172.8	32 59.5	+60.0	172.9	32 00.0	+60.0	173.0	32
33	39 56.6	+60.0	172.3	38 57.1	+60.0	172.4	37 57.6	+60.0	172.6	36 58.1	+60.0	172.7	35 58.6	+60.0	172.7	34 59.1	+60.0	172.8	33 59.5	+60.0	172.9	33 00.0	+60.0	173.0	33
34	40 56.6	+60.0	172.3	39 57.1	+60.0	172.4	38 57.6	+60.0	172.5	37 58.1	+60.0	172.6	36 58.6	+60.0	172.7	35 59.1	+60.0	172.8	34 59.5	+60.0	172.9	34 00.0	+60.0	173.0	34
35	41 56.6	+59.9	172.3	40 57.1	+60.0	172.4	39 57.6	+60.0	172.5	38 58.1	+60.0	172.6	37 58.6	+60.0	172.7	36 59.1	+60.0	172.8	35 59.5	+60.0	172.9	35 00.0	+60.0	173.0	35
36	42 56.5	+60.0	172.3	41 57.1	+60.0	172.4	40 57.6	+60.0	172.5	39 58.1	+60.0	172.6	38 58.6	+60.0	172.7	37 59.1	+60.0	172.8	36 59.5	+60.0	172.9	36 00.0	+60.0	173.0	36
37	43 56.5	+60.0	172.2	42 57.1	+60.0	172.4	41 57.6	+60.0	172.5	40 58.1	+60.0	172.6	39 58.6	+60.0	172.7	38 59.1	+60.0	172.8	37 59.5	+60.0	172.9	37 00.0	+60.0	173.0	37
38	44 56.5	+60.0	172.2	43 57.1	+60.0	172.3	42 57.6	+60.0	172.5	41 58.1	+60.0	172.6	40 58.6	+60.0	172.7	39 59.1	+60.0	172.8	38 59.5	+60.0	172.9	38 00.0	+60.0	173.0	38
39	45 56.5	+60.0	172.2	44 57.1	+59.9	172.3	43 57.6	+60.0	172.4	42 58.1	+60.0	172.6	41 58.6	+60.0	172.7	40 59.1	+60.0	172.8	39 59.5	+60.0	172.9	39 00.0	+60.0	173.0	39
40	46 56.5	+60.0	172.1	45 57.0	+60.0	172.3	44 57.6	+60.0	172.4	43 58.1	+60.0	172.5	42 58.6	+60.0	172.7	41 59.1	+60.0	172.8	40 59.5	+60.0	172.9	40 00.0	+60.0	173.0	40
41	47 56.5	+60.0	172.1	46 57.0	+60.0	172.3	45 57.6	+60.0	172.4	44 58.1	+60.0	172.5	43 58.6	+60.0	172.7	42 59.1	+60.0	172.8	41 59.5	+60.0	172.9	41 00.0	+60.0	173.0	41
42	48 56.5	+59.9	172.1	47 57.0	+60.0	172.2	46 57.6	+60.0	172.4	45 58.1	+60.0	172.5	44 58.6	+60.0	172.6	43 59.1	+60.0	172.8	42 59.5	+60.0	172.9	42 00.0	+60.0	173.0	42
43	49 56.4	+60.0	172.0	48 57.0	+60.0	172.2	47 57.6	+60.0	172.4	46 58.1	+60.0	172.5	45 58.6	+60.0	172.6	44 59.1	+60.0	172.8	43 59.5	+60.0	172.9	43 00.0	+60.0	173.0	43
44	50 56.4	+60.0	172.0	49 57.0	+60.0	172.2	48 57.6	+59.9	172.3	47 58.1	+60.0	172.5	46 58.6	+60.0	172.6	45 59.1	+60.0	172.8	44 59.5	+60.0	172.9	44 00.0	+60.0	173.0	44
45	51 56.4	+60.0	172.0	50 57.0	+60.0	172.1	49 57.5	+60.0	172.3	48 58.1	+60.0	172.5	47 58.6	+60.0	172.6	46 59.1	+60.0	172.7	45 59.5	+60.0	172.9	45 00.0	+60.0	173.0	45
46	52 56.4	+60.0	171.9	51 57.0	+60.0	172.1	50 57.5	+60.0	172.3	49 58.1	+60.0	172.4	48 58.6	+60.0	172.6	47 59.1	+60.0	172.7	46 59.5	+60.0	172.9	46 00.0	+60.0	173.0	46
47	53 56.4	+60.0	171.9	52 57.0	+60.0	172.1	51 57.5	+60.0	172.2	50 58.1	+60.0	172.4	49 58.6	+60.0	172.6	48 59.1	+60.0	172.7	47 59.5	+60.0	172.9	47 00.0	+60.0	173.0	47
48	54 56.4	+59.9	171.8	53 57.0	+59.9	172.0	52 57.5	+60.0	172.2	51 58.1	+60.0	172.4	50 58.6	+60.0	172.6	49 59.1	+60.0	172.7	48 59.5	+60.0	172.9	48 00.0	+60.0	173.0	48
49	55 56.3	+60.0	171.8	54 56.9	+60.0	172.0	53 57.5	+60.0	172.2	52 58.1	+59.9	172.4	51 58.6	+60.0	172.5	50 59.1	+60.0	172.7	49 59.5	+60.0	172.9	49 00.0	+60.0	173.0	49
50	56 56.3	+60.0	171.7	55 56.9	+60.0	172.0	54 57.5	+60.0	172.2	53 58.0	+60.0	172.3	52 58.6	+60.0	172.5	51 59.1	+60.0	172.7	50 59.5	+60.0	172.9	50 00.0	+60.0	173.0	50
51	57 56.3	+60.0	171.7	56 56.9	+60.0	171.9	55 57.5	+60.0	172.1	54 58.0	+60.0	172.3	53 58.6	+60.0	172.5	52 59.1	+60.0	172.7	51 59.5	+60.0	172.8	51 00.0	+60.0	173.0	51
52	58 56.3	+59.9	171.6	57 56.9	+60.0	171.9	56 57.5	+60.0	172.1	55 58.0	+60.0	172.3	54 58.6	+60.0	172.5	53 59.1	+60.0	172.7	52 59.5	+60.0	172.8	52 00.0	+60.0	173.0	52
53	59 56.2	+60.0	171.6	58 56.9	+60.0	171.8	57 57.5	+60.0	172.1	56 58.0	+60.0	172.3	55 58.6	+60.0	172.5	54 59.1	+60.0	172.7	53 59.5	+60.0	172.8	53 00.0	+60.0	173.0	53
54	60 56.2	+60.0	171.5	59 56.9	+59.9	171.8	58 57.5	+59.9	172.0	57 58.0	+60.0	172.2	56 58.6	+59.9	172.4	55 59.1	+60.0	172.6	54 59.5	+60.0	172.8	54 00.0	+60.0	173.0	54
55	61 56.2	+60.0	171.5	60 56.8	+60.0	171.7	59 57.4	+60.0	172.0	58 58.0	+60.0	172.2	57 58.5	+60.0	172.4	56 59.1	+60.0	172.6	55 59.5	+60.0	172.8	55 00.0	+60.0	173.0	55
56	62 56.2	+59.9	171.4	61 56.8	+60.0	171.7	60 57.4	+60.0	171.9	59 58.0	+60.0	172.2	58 58.5	+60.0	172.4	57 59.1	+60.0	172.6	56 59.5	+60.0	172.8	56 00.0	+60.0	173.0	56
57	63 56.1	+60.0	171.3	62 56.8	+60.0	171.6	61 57.4	+60.0	171.9	60 58.0	+60.0	172.1	59 58.5	+60.0	172.4	58 59.1	+60.0	172.6	57 59.5	+60.0	172.8	57 00.0	+60.0	173.0	57
58	64 56.1	+60.0	171.2	63 56.8	+59.9	171.5	62 57.4	+60.0	171.8	61 58.0	+60.0	172.1	60 58.5	+60.0	172.4	59 59.1	+60.0	172.6	58 59.5	+60.0	172.8	58 00.0	+60.0	173.0	58
59	65 56.1	+59.9	171.1	64 56.7	+60.0	171.5	63 57.4	+60.0	171.8	62 58.0	+60.0	172.1	61 58.5	+60.0	172.3	60 59.1	+59.9	172.6	59 59.5	+60.0	172.8	59 00.0	+60.0	173.0	59
60	66 56.0	+60.0	171.1	65 56.7	+60.0	171.4	64 57.4	+59.9	171.7	63 58.0	+60.0	172.0	62 58.5	+60.0	172.3	61 59.0	+60.0	172.5	60 59.5	+60.0	172.8	60 00.0	+60.0	173.0	60
61	67 56.0	+59.9	171.0	66 56.7	+59.9	171.3	65 57.3	+60.0	171.7	64 58.0	+59.9	172.0	63 58.5	+60.0	172.3	62 59.0	+60.0	172.5	61 59.5	+60.0	172.8	61 00.0	+60.0	173.0	61
62	68 55.9	+60.0	170.8	67 56.6	+60.0	171.2	66 57.3	+60.0	171.6	65 57.9	+60.0	171.9	64 58.5	+60.0	172.2	63 59.0	+60.0	172.5	62 59.5	+60.0	172.8	62 00.0	+60.0	173.0	62
63	69 55.9	+59.9	170.7	68 56.6	+60.0	171.1	67 57.3	+60.0	171.5	66 57.9	+60.0	171.9	65 58.5	+60.0	172.2	64 59.0	+60.0	172.5	63 59.5	+60.0	172.8	63 00.0	+60.0	173.0	63
64	70 55.8	+59.9	170.6	69 56.6	+59.9	171.0	68 57.3	+59.9	171.4	67 57.9	+60.0	171.8	66 58.5	+60.0	172.1	65 59.0	+60.0	172.5	64 59.5	+60.0	172.7	64 00.0	+60.0	173.0	64
65	71 55.7	+60.0	170.4	70 56.5	+60.0	170.9	69 57.2	+60.0	171.4	68 57.9	+60.0	171.8	67 58.5	+60.0	172.1	66 59.0	+60.0	172.4	65 59.5	+60.0	172.7	65 00.0	+60.0	173.0	65
66	72 55.7	+59.9	170.3	71 56.5	+59.9	170.8	70 57.2	+60.0	171.3	69 57.9	+60.0	171.7	68 58.5	+60.0	172.1	67 59.0	+60.0	172.4	66 59.5	+60.0	172.7	66 00.0	+60.0	173.0	66
67	73 55.6	+59.9	170.1	72 56.4	+60.0	170.7	71 57.2	+59.9	171.2	70 57.9	+59.9	171.6	69 58.5	+60.0	172.0	68 59.0	+60.0	172.4	67 59.5	+60.0	172.7	67 00.0	+60.0	173.0	67
68	74 55.5	+59.9	169.9	73 56.4	+59.9	170.5	72 57.1	+60.0	171.0	71 57.8	+60.0	171.5	70 58.5	+59.9	171.9	69 59.0	+60.0	172.3	68 59.5	+60.0	172.7	68 00.0	+60.0	173.0	68
69	75 55.4	+59.9	169.7	74 56.3	+59.9	170.3	73 57.1	+60.0	170.9	72 57.8	+60.0	171.4	71 58.4	+60.0	171.9	70 59.0	+60.0	172.3	69 59.5	+60.0	172.7	69 00.0	+60.0	173.0	69
70	76 55.3	+59.8	169.4	75 56.2	+59.9	170.1	74 57.1	+59.9	170.8	73 57.8	+60.0	171.3	72 58.4	+60.0	171.8	71 59.0	+60.0	172.3	70 59.5	+60.0	172.6	70 00.0	+60.0	173.0	70
71	77 55.1	+59.9	169.1	76 56.1	+59.9	169.9	75 57.0	+59.9	170.6	74 57.8	+59.9	171.2	73 58.4	+60.0	171.7	72 59.0	+60.0	172.2	71 59.5	+60.0	172.6	71 00.0	+60.0	173.0	71
72	78 55.0	+59.8	168.7	77 56.0	+59.9	169.6	76 56.9	+60.0	170.4	75 57.7	+60.0	171.1	74 58.4	+60.0	171.6	73 59.0	+60.0	172.2	72 59.5	+60.0	172.6	72 00.0	+60.0	173.0	72
73	79 54.8	+59.7	168.3	78 55.9	+59.9	169.3	77 56.9	+59.9	170.2	76 57.7	+59.9	170.9	75 58.4	+60.0	171.5	74 59.0	+60.0	172.1	73 59.5	+60.0	172.6	73 00.0	+60.0	173.0	73
74	80 54.5	+59.7	167.7	79 55.8	+59.8	168.9	78 56.8	+59.9	169.9	77 57.6	+60.0	170.7	76 58.4	+59.9	171.4	75 59.0	+60.0	172.0	74 59.5	+60.0	172.5	74 00.0	+60.0	173.0	74
75	81 54.2	+59.6	167.1	80 55.6	+59.8	168.5	79 56.7	+59.9	169.6	78 57.6	+59.9	170.5	77 58.3	+60.0	171.3	76 59.0	+60.0	172.0	75 59.5	+60.0	172.5	75 00.0	+60.0	173.0	75
76	82 53.8	+59.5	166.2	81 55.4	+59.7	167.9	80 56.6	+59.8	169.2	79 57.5	+59.9	170.3	78 58.3	+60.0	171.1	77 59.0	+59.9	171.9	76 59.5	+60.0	172.5	76 00.0	+60.0	173.0	76
77	83 53.3	+59.3	165.1	82 55.1	+59.6	167.2	81 56.4	+59.8	168.7	80 57.4	+59.9	170.0	79 58.3	+59.9	170.9	78 58.9	+60.0	171.8	77 59.5	+60.0	172.4	77 00.0	+60.0	173.0	77
78	84 52.6	+59.0	163.5	83 54.7	+59.5	166.2	82 56.2	+59.7	168.1	81 57.3	+59.9	169.6	80 58.2	+60.0	170.7	79 58.9	+60.0	171.6	78 59.5	+60.0	172.4	78 00.0	+60.0	173.0	78
79	85 51.6	+58.3	161.2	84 54.2	+59.2	164.8	83 55.9	+59.7	167.3	82 57.2	+59.8	169.1	81 58.2	+59.9	170.4	80 58.9	+60.0	171.5	79 59.5	+60.0	172.3	79 00.0	+60.0	173.0	79
80	86 49.9	*+56.8*	•157.5	85 53.4	+58.8	162.8	84 55.6	+59.4	166.2	83 57.0	+59.8	168.4	82 58.1	+59.9	170.0	81 58.9	+60.0	171.3	80 59.5	+60.0	172.2	80 00.0	+60.0	173.0	80
81	87 46.7	*+52.1*	•150.5	86 52.2	*+57.6*	•159.6	85 55.0	+59.2	164.5	84 56.8	+59.7	167.5	83 58.0	+59.9	169.5	82 58.9	+59.9	171.0	81 59.5	+60.0	172.1	81 00.0	+60.0	173.0	81
82	88 38.8	*+30.0*	•134.1	87 49.8	*+53.8*	•153.4	86 54.2	+58.2	161.7	85 56.5	+59.4	166.1	84 57.9	+59.8	168.9	83 58.8	+60.0	170.7	82 59.5	+60.0	172.0	82 00.0	+60.0	173.0	82
83	89 08.8	*−25.2*	•86.5	88 43.6	*+32.5*	•138.1	87 52.4	*+55.5*	•156.4	86 55.9	+58.9	163.9	85 57.7	+59.6	167.8	84 58.8	+59.9	170.2	83 59.5	+60.0	171.8	83 00.0	+60.0	173.0	83
84	88 43.6	*−51.2*	•35.0	89 16.1	*−28.2*	•86.5	88 47.9	*+35.5*	•142.6	87 54.8	*+56.9*	•159.5	86 57.3	+59.4	166.1	85 58.7	+59.8	169.5	84 59.5	+59.9	171.6	84 00.0	+60.0	173.0	84
85	87 52.4	*−56.5*	•16.6	88 47.9	*−53.1*	•30.4	89 23.4	*−31.7*	•86.5	88 51.7	*+39.0*	•147.7	87 56.7	*+58.2*	•162.8	86 58.5	+59.7	168.4	85 59.4	+60.0	171.3	85 00.0	+60.0	173.0	85
86	86 55.9	−58.2	9.1	87 54.8	*−57.5*	•13.5	88 51.7	*−55.0*	•25.3	89 30.7	*−35.8*	•86.5	88 54.9	*+43.1*	•153.3	87 58.2	*+59.2*	•166.1	86 59.4	+59.9	170.7	86 00.0	+60.0	173.0	86
87	85 57.7	−58.9	5.2	86 57.3	−58.6	6.9	87 56.7	*−58.2*	•10.2	88 54.9	*−56.7*	•19.7	89 38.0	*−40.6*	•86.5	88 57.4	*+48.0*	•159.5	87 59.3	*+59.8*	•169.5	87 00.0	+60.0	173.0	87
88	84 58.8	−59.3	2.8	85 58.7	−59.2	3.5	86 58.5	−59.1	4.6	87 58.2	−58.8	6.9	88 57.4	*−58.1*	•13.5	89 45.4	*−46.3*	•86.5	88 59.1	*+53.6*	•166.1	88 00.0	+60.0	173.0	88
89	83 59.5	−59.5	1.2	84 59.5	−59.5	1.4	85 59.4	−59.4	1.7	86 59.4	−59.4	2.3	87 59.3	−59.3	3.5	88 59.1	*−59.1*	•6.9	89 52.7	*−52.7*	•86.5	89 00.0	+60.0	173.0	89
90	83 00.0	−59.6	0.0	84 00.0	−59.6	0.0	85 00.0	−59.6	0.0	86 00.0	−59.6	0.0	87 00.0	−59.7	0.0	88 00.0	−59.7	0.0	89 00.0	*−59.8*	•0.0	90 00.0	−60.0	86.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°		
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °
0	6 56.9	−60.0	172.9	5 57.3	−60.0	173.0	4 57.8	−60.0	173.0	3 58.2	−60.0	173.0
1	5 56.9	−60.0	173.0	4 57.3	−60.0	173.0	3 57.8	−60.0	173.0	2 58.2	−60.0	173.0
2	4 56.9	−60.0	173.0	3 57.3	−60.0	173.0	2 57.8	−60.0	173.0	1 58.2	−60.0	173.0
3	3 56.9	−60.0	173.0	2 57.3	−60.0	173.0	1 57.8	−60.0	173.0	0 58.2	−60.0	173.0
4	2 56.9	−60.0	173.0	1 57.3	−60.0	173.0	0 57.8	−60.0	173.0	0 01.8	+60.0	7.0
5	1 56.9	−60.0	173.0	0 57.3	−60.0	173.0	0 02.2	+60.0	7.0	1 01.8	+60.0	7.0
6	0 56.9	−60.0	173.0	0 02.7	+60.0	7.0	1 02.2	+60.0	7.0	2 01.8	+60.0	7.0
7	0 03.1	+60.0	6.9	1 02.7	+60.0	6.9	2 02.2	+60.0	7.0	3 01.8	+60.0	7.0
8	1 03.1	+60.0	6.9	2 02.7	+59.9	6.9	3 02.2	+60.0	6.9	4 01.8	+60.0	6.9
9	2 03.1	+60.0	6.9	3 02.6	+60.0	6.9	4 02.2	+60.0	6.9	5 01.8	+60.0	6.9
10	3 03.1	+60.0	6.9	4 02.6	+60.0	6.9	5 02.2	+60.0	6.9	6 01.8	+60.0	6.9
11	4 03.1	+60.0	6.9	5 02.6	+60.0	6.9	6 02.2	+60.0	6.9	7 01.8	+60.0	6.9
12	5 03.1	+60.0	6.9	6 02.6	+60.0	6.9	7 02.2	+60.0	6.9	8 01.8	+60.0	6.9
13	6 03.1	+60.0	6.9	7 02.6	+60.0	6.9	8 02.2	+60.0	6.9	9 01.8	+60.0	6.9
14	7 03.1	+59.9	6.8	8 02.6	+60.0	6.9	9 02.2	+60.0	6.9	10 01.8	+60.0	6.9
15	8 03.0	+60.0	6.8	9 02.6	+60.0	6.8	10 02.2	+60.0	6.9	11 01.8	+60.0	6.9
16	9 03.0	+60.0	6.8	10 02.6	+60.0	6.8	11 02.2	+60.0	6.9	12 01.8	+60.0	6.9
17	10 03.0	+60.0	6.8	11 02.6	+60.0	6.8	12 02.2	+60.0	6.8	13 01.8	+60.0	6.9
18	11 03.0	+60.0	6.8	12 02.6	+60.0	6.8	13 02.2	+60.0	6.8	14 01.8	+59.9	6.9
19	12 03.0	+60.0	6.8	13 02.6	+60.0	6.8	14 02.2	+60.0	6.8	15 01.7	+60.0	6.9
20	13 03.0	+60.0	6.8	14 02.6	+60.0	6.8	15 02.2	+60.0	6.8	16 01.7	+60.0	6.8
21	14 03.0	+60.0	6.7	15 02.6	+60.0	6.8	16 02.2	+60.0	6.8	17 01.7	+60.0	6.8
22	15 03.0	+60.0	6.7	16 02.6	+60.0	6.8	17 02.2	+60.0	6.8	18 01.7	+60.0	6.8
23	16 03.0	+60.0	6.7	17 02.6	+60.0	6.7	18 02.2	+60.0	6.8	19 01.7	+60.0	6.8
24	17 03.0	+60.0	6.7	18 02.6	+60.0	6.7	19 02.2	+60.0	6.8	20 01.7	+60.0	6.8
25	18 03.0	+60.0	6.7	19 02.6	+60.0	6.7	20 02.2	+60.0	6.8	21 01.7	+60.0	6.8
26	19 03.0	+60.0	6.7	20 02.6	+60.0	6.7	21 02.2	+59.9	6.7	22 01.7	+60.0	6.8
27	20 03.0	+60.0	6.6	21 02.6	+60.0	6.7	22 02.1	+60.0	6.7	23 01.7	+60.0	6.8
28	21 03.0	+59.9	6.6	22 02.6	+59.9	6.7	23 02.1	+60.0	6.7	24 01.7	+60.0	6.8
29	22 02.9	+60.0	6.6	23 02.5	+60.0	6.7	24 02.1	+60.0	6.7	25 01.7	+60.0	6.8
30	23 02.9	+60.0	6.6	24 02.5	+60.0	6.6	25 02.1	+60.0	6.7	26 01.7	+60.0	6.7
31	24 02.9	+60.0	6.6	25 02.5	+60.0	6.6	26 02.1	+60.0	6.7	27 01.7	+60.0	6.7
32	25 02.9	+60.0	6.6	26 02.5	+60.0	6.6	27 02.1	+60.0	6.7	28 01.7	+60.0	6.7
33	26 02.9	+60.0	6.5	27 02.5	+60.0	6.6	28 02.1	+60.0	6.6	29 01.7	+60.0	6.7
34	27 02.9	+60.0	6.5	28 02.5	+60.0	6.6	29 02.1	+60.0	6.6	30 01.7	+60.0	6.7
35	28 02.9	+60.0	6.5	29 02.5	+60.0	6.6	30 02.1	+60.0	6.6	31 01.7	+60.0	6.7
36	29 02.9	+60.0	6.5	30 02.5	+60.0	6.5	31 02.1	+60.0	6.6	32 01.7	+60.0	6.7
37	30 02.9	+60.0	6.5	31 02.5	+60.0	6.5	32 02.1	+60.0	6.6	33 01.7	+60.0	6.7
38	31 02.9	+60.0	6.4	32 02.5	+60.0	6.5	33 02.1	+60.0	6.6	34 01.7	+60.0	6.7
39	32 02.9	+60.0	6.4	33 02.5	+60.0	6.5	34 02.1	+60.0	6.6	35 01.7	+60.0	6.6
40	33 02.9	+59.9	6.4	34 02.5	+60.0	6.5	35 02.1	+60.0	6.5	36 01.7	+60.0	6.6
41	34 02.8	+60.0	6.4	35 02.5	+60.0	6.5	36 02.1	+60.0	6.5	37 01.7	+60.0	6.6
42	35 02.8	+60.0	6.4	36 02.5	+60.0	6.4	37 02.1	+60.0	6.5	38 01.7	+60.0	6.6
43	36 02.8	+60.0	6.3	37 02.5	+59.9	6.4	38 02.1	+60.0	6.5	39 01.7	+60.0	6.6
44	37 02.8	+60.0	6.3	38 02.4	+60.0	6.4	39 02.1	+60.0	6.5	40 01.7	+60.0	6.6
45	38 02.8	+60.0	6.3	39 02.4	+60.0	6.4	40 02.1	+60.0	6.5	41 01.7	+60.0	6.6
46	39 02.8	+60.0	6.3	40 02.4	+60.0	6.3	41 02.1	+60.0	6.4	42 01.7	+60.0	6.5
47	40 02.8	+60.0	6.2	41 02.4	+60.0	6.3	42 02.1	+59.9	6.4	43 01.7	+60.0	6.5
48	41 02.8	+60.0	6.2	42 02.4	+60.0	6.3	43 02.0	+60.0	6.4	44 01.7	+60.0	6.5
49	42 02.8	+59.9	6.2	43 02.4	+60.0	6.3	44 02.0	+60.0	6.4	45 01.7	+60.0	6.5
50	43 02.7	+60.0	6.2	44 02.4	+60.0	6.3	45 02.0	+60.0	6.4	46 01.7	+59.9	6.5
51	44 02.7	+60.0	6.1	45 02.4	+60.0	6.2	46 02.0	+60.0	6.3	47 01.6	+60.0	6.5
52	45 02.7	+60.0	6.1	46 02.4	+60.0	6.2	47 02.0	+60.0	6.3	48 01.6	+60.0	6.4
53	46 02.7	+60.0	6.1	47 02.4	+60.0	6.2	48 02.0	+60.0	6.3	49 01.6	+60.0	6.4
54	47 02.7	+60.0	6.0	48 02.4	+59.9	6.2	49 02.0	+60.0	6.3	50 01.6	+60.0	6.4
55	48 02.7	+60.0	6.0	49 02.3	+60.0	6.1	50 02.0	+60.0	6.2	51 01.6	+60.0	6.4
56	49 02.7	+59.9	6.0	50 02.3	+60.0	6.1	51 02.0	+60.0	6.2	52 01.6	+60.0	6.4
57	50 02.6	+60.0	5.9	51 02.3	+60.0	6.1	52 02.0	+60.0	6.2	53 01.6	+60.0	6.3
58	51 02.6	+60.0	5.9	52 02.3	+60.0	6.0	53 02.0	+60.0	6.2	54 01.6	+60.0	6.3
59	52 02.6	+60.0	5.9	53 02.3	+60.0	6.0	54 02.0	+59.9	6.1	55 01.6	+60.0	6.3
60	53 02.6	+60.0	5.8	54 02.3	+60.0	6.0	55 01.9	+60.0	6.1	56 01.6	+60.0	6.3
61	54 02.6	+60.0	5.8	55 02.3	+59.9	5.9	56 01.9	+60.0	6.1	57 01.6	+60.0	6.2
62	55 02.6	+59.9	5.7	56 02.2	+60.0	5.9	57 01.9	+60.0	6.0	58 01.6	+60.0	6.2
63	56 02.5	+60.0	5.7	57 02.2	+60.0	5.8	58 01.9	+60.0	6.0	59 01.6	+60.0	6.2
64	57 02.5	+60.0	5.6	58 02.2	+60.0	5.8	59 01.9	+60.0	6.0	60 01.6	+60.0	6.1
65	58 02.5	+60.0	5.6	59 02.2	+60.0	5.7	60 01.9	+60.0	5.9	61 01.6	+59.9	6.1
66	59 02.5	+59.9	5.5	60 02.2	+60.0	5.7	61 01.9	+60.0	5.9	62 01.5	+60.0	6.1
67	60 02.4	+60.0	5.5	61 02.2	+59.9	5.6	62 01.9	+59.9	5.8	63 01.5	+60.0	6.0
68	61 02.4	+60.0	5.4	62 02.1	+60.0	5.6	63 01.8	+60.0	5.8	64 01.5	+60.0	6.0
69	62 02.4	+60.0	5.3	63 02.1	+60.0	5.5	64 01.8	+60.0	5.7	65 01.5	+60.0	5.9
70	63 02.4	+59.9	5.3	64 02.1	+60.0	5.5	65 01.8	+60.0	5.7	66 01.5	+60.0	5.9
71	64 02.3	+60.0	5.2	65 02.1	+59.9	5.4	66 01.8	+60.0	5.6	67 01.5	+60.0	5.8
72	65 02.3	+59.9	5.1	66 02.0	+60.0	5.3	67 01.8	+59.9	5.5	68 01.5	+60.0	5.8
73	66 02.2	+60.0	5.0	67 02.0	+60.0	5.2	68 01.7	+60.0	5.5	69 01.5	+59.9	5.7
74	67 02.2	+60.0	4.9	68 02.0	+59.9	5.2	69 01.7	+60.0	5.4	70 01.4	+60.0	5.6
75	68 02.2	+59.9	4.8	69 01.9	+60.0	5.1	70 01.7	+60.0	5.3	71 01.4	+60.0	5.6
76	69 02.1	+60.0	4.7	70 01.9	+60.0	5.0	71 01.7	+59.9	5.2	72 01.4	+60.0	5.5
77	70 02.1	+59.9	4.6	71 01.9	+59.9	4.8	72 01.6	+60.0	5.1	73 01.4	+59.9	5.4
78	71 02.0	+59.9	4.5	72 01.8	+59.9	4.7	73 01.6	+59.9	5.0	74 01.3	+60.0	5.3
79	72 01.9	+60.0	4.3	73 01.7	+60.0	4.6	74 01.5	+60.0	4.8	75 01.3	+60.0	5.2
80	73 01.9	+59.9	4.2	74 01.7	+59.9	4.4	75 01.5	+59.9	4.7	76 01.3	+59.9	5.0
81	74 01.8	+59.9	4.0	75 01.6	+59.9	4.2	76 01.4	+60.0	4.5	77 01.2	+60.0	4.9
82	75 01.7	+59.9	3.8	76 01.5	+60.0	4.0	77 01.4	+59.9	4.3	78 01.2	+59.9	4.7
83	76 01.6	+59.9	3.5	77 01.5	+59.8	3.8	78 01.3	+59.9	4.1	79 01.1	+60.0	4.5
84	77 01.5	+59.8	3.3	78 01.3	+59.9	3.5	79 01.2	+59.9	3.8	80 01.1	+59.9	4.2
85	78 01.3	+59.8	2.9	79 01.2	+59.9	3.2	80 01.1	+59.9	3.5	81 01.0	+59.9	3.9
86	79 01.1	+59.8	2.6	80 01.1	+59.8	2.8	81 01.0	+59.8	3.1	82 00.9	+59.9	3.5
87	80 00.9	+59.8	2.1	81 00.9	+59.8	2.3	82 00.8	+59.8	2.6	83 00.8	+59.8	3.0
88	81 00.7	+59.7	1.6	82 00.7	+59.7	1.8	83 00.6	+59.8	2.0	84 00.6	+59.8	2.3
89	82 00.4	+59.6	0.9	83 00.4	+59.6	1.0	84 00.4	+59.6	1.2	85 00.4	+59.6	1.4
90	83 00.0	+59.5	0.0	84 00.0	+59.5	0.0	85 00.0	+59.4	0.0	86 00.0	+59.4	0.0
	83°			84°			85°			86°		

87°			88°			89°			90°			Dec.
Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
2 58.7	−60.0	173.0	1 59.1	−60.0	173.0	0 59.6	−60.0	173.0	0 00.0	+60.0	7.0	0
1 58.7	−60.0	173.0	0 59.1	−60.0	173.0	0 00.4	+60.0	7.0	1 00.0	+60.0	7.0	1
0 58.7	−60.0	173.0	0 00.9	+60.0	7.0	1 00.4	+60.0	7.0	2 00.0	+60.0	7.0	2
0 01.3	+60.0	7.0	1 00.9	+60.0	7.0	2 00.4	+60.0	7.0	3 00.0	+60.0	7.0	3
1 01.3	+60.0	7.0	2 00.9	+60.0	7.0	3 00.4	+60.0	7.0	4 00.0	+60.0	7.0	4
2 01.3	+60.0	7.0	3 00.9	+60.0	7.0	4 00.4	+60.0	7.0	5 00.0	+60.0	7.0	5
3 01.3	+60.0	7.0	4 00.9	+60.0	7.0	5 00.4	+60.0	7.0	6 00.0	+60.0	7.0	6
4 01.3	+60.0	7.0	5 00.9	+60.0	7.0	6 00.4	+60.0	7.0	7 00.0	+60.0	7.0	7
5 01.3	+60.0	7.0	6 00.9	+60.0	7.0	7 00.4	+60.0	7.0	8 00.0	+60.0	7.0	8
6 01.3	+60.0	7.0	7 00.9	+60.0	7.0	8 00.4	+60.0	7.0	9 00.0	+60.0	7.0	9
7 01.3	+60.0	6.9	8 00.9	+60.0	7.0	9 00.4	+60.0	7.0	10 00.0	+60.0	7.0	10
8 01.3	+60.0	6.9	9 00.9	+60.0	7.0	10 00.4	+60.0	7.0	11 00.0	+60.0	7.0	11
9 01.3	+60.0	6.9	10 00.9	+60.0	7.0	11 00.4	+60.0	7.0	12 00.0	+60.0	7.0	12
10 01.3	+60.0	6.9	11 00.9	+60.0	6.9	12 00.4	+60.0	7.0	13 00.0	+60.0	7.0	13
11 01.3	+60.0	6.9	12 00.9	+60.0	6.9	13 00.4	+60.0	7.0	14 00.0	+60.0	7.0	14
12 01.3	+60.0	6.9	13 00.9	+60.0	6.9	14 00.4	+60.0	7.0	15 00.0	+60.0	7.0	15
13 01.3	+60.0	6.9	14 00.9	+60.0	6.9	15 00.4	+60.0	7.0	16 00.0	+60.0	7.0	16
14 01.3	+60.0	6.9	15 00.9	+60.0	6.9	16 00.4	+60.0	7.0	17 00.0	+60.0	7.0	17
15 01.3	+60.0	6.9	16 00.9	+60.0	6.9	17 00.4	+60.0	7.0	18 00.0	+60.0	7.0	18
16 01.3	+60.0	6.9	17 00.9	+60.0	6.9	18 00.4	+60.0	7.0	19 00.0	+60.0	7.0	19
17 01.3	+60.0	6.9	18 00.9	+60.0	6.9	19 00.4	+60.0	7.0	20 00.0	+60.0	7.0	20
18 01.3	+60.0	6.9	19 00.9	+60.0	6.9	20 00.4	+60.0	7.0	21 00.0	+60.0	7.0	21
19 01.3	+60.0	6.9	20 00.9	+60.0	6.9	21 00.4	+60.0	7.0	22 00.0	+60.0	7.0	22
20 01.3	+60.0	6.9	21 00.9	+60.0	6.9	22 00.4	+60.0	6.9	23 00.0	+60.0	7.0	23
21 01.3	+60.0	6.9	22 00.9	+60.0	6.9	23 00.4	+60.0	6.9	24 00.0	+60.0	7.0	24
22 01.3	+60.0	6.8	23 00.9	+60.0	6.9	24 00.4	+60.0	6.9	25 00.0	+60.0	7.0	25
23 01.3	+60.0	6.8	24 00.9	+60.0	6.9	25 00.4	+60.0	6.9	26 00.0	+60.0	7.0	26
24 01.3	+60.0	6.8	25 00.9	+60.0	6.9	26 00.4	+60.0	6.9	27 00.0	+60.0	7.0	27
25 01.3	+60.0	6.8	26 00.9	+60.0	6.9	27 00.4	+60.0	6.9	28 00.0	+60.0	7.0	28
26 01.3	+60.0	6.8	27 00.9	+60.0	6.9	28 00.4	+60.0	6.9	29 00.0	+60.0	7.0	29
27 01.3	+60.0	6.8	28 00.9	+60.0	6.9	29 00.4	+60.0	6.9	30 00.0	+60.0	7.0	30
28 01.3	+60.0	6.8	29 00.9	+60.0	6.9	30 00.4	+60.0	6.9	31 00.0	+60.0	7.0	31
29 01.3	+60.0	6.8	30 00.9	+60.0	6.9	31 00.4	+60.0	6.9	32 00.0	+60.0	7.0	32
30 01.3	+60.0	6.8	31 00.9	+60.0	6.8	32 00.4	+60.0	6.9	33 00.0	+60.0	7.0	33
31 01.3	+60.0	6.8	32 00.9	+60.0	6.8	33 00.4	+60.0	6.9	34 00.0	+60.0	7.0	34
32 01.3	+60.0	6.8	33 00.9	+60.0	6.8	34 00.4	+60.0	6.9	35 00.0	+60.0	7.0	35
33 01.3	+60.0	6.8	34 00.9	+60.0	6.8	35 00.4	+60.0	6.9	36 00.0	+60.0	7.0	36
34 01.3	+60.0	6.7	35 00.9	+60.0	6.8	36 00.4	+60.0	6.9	37 00.0	+60.0	7.0	37
35 01.3	+60.0	6.7	36 00.9	+60.0	6.8	37 00.4	+60.0	6.9	38 00.0	+60.0	7.0	38
36 01.3	+60.0	6.7	37 00.9	+60.0	6.8	38 00.4	+60.0	6.9	39 00.0	+60.0	7.0	39
37 01.3	+60.0	6.7	38 00.9	+60.0	6.8	39 00.4	+60.0	6.9	40 00.0	+60.0	7.0	40
38 01.3	+60.0	6.7	39 00.9	+60.0	6.8	40 00.4	+60.0	6.9	41 00.0	+60.0	7.0	41
39 01.3	+60.0	6.7	40 00.9	+60.0	6.8	41 00.4	+60.0	6.9	42 00.0	+60.0	7.0	42
40 01.3	+60.0	6.7	41 00.9	+60.0	6.8	42 00.4	+60.0	6.9	43 00.0	+60.0	7.0	43
41 01.3	+60.0	6.7	42 00.9	+60.0	6.8	43 00.4	+60.0	6.9	44 00.0	+60.0	7.0	44
42 01.3	+60.0	6.7	43 00.9	+60.0	6.8	44 00.4	+60.0	6.9	45 00.0	+60.0	7.0	45
43 01.3	+60.0	6.6	44 00.9	+60.0	6.8	45 00.4	+60.0	6.9	46 00.0	+60.0	7.0	46
44 01.3	+60.0	6.6	45 00.9	+60.0	6.8	46 00.4	+60.0	6.9	47 00.0	+60.0	7.0	47
45 01.3	+60.0	6.6	46 00.9	+60.0	6.7	47 00.4	+60.0	6.9	48 00.0	+60.0	7.0	48
46 01.3	+60.0	6.6	47 00.9	+60.0	6.7	48 00.4	+60.0	6.9	49 00.0	+60.0	7.0	49
47 01.3	+60.0	6.6	48 00.9	+60.0	6.7	49 00.4	+60.0	6.9	50 00.0	+60.0	7.0	50
48 01.3	+60.0	6.6	49 00.9	+60.0	6.7	50 00.4	+60.0	6.9	51 00.0	+60.0	7.0	51
49 01.3	+60.0	6.6	50 00.9	+60.0	6.7	51 00.4	+60.0	6.8	52 00.0	+60.0	7.0	52
50 01.3	+60.0	6.6	51 00.9	+60.0	6.7	52 00.4	+60.0	6.8	53 00.0	+60.0	7.0	53
51 01.3	+59.9	6.5	52 00.9	+60.0	6.7	53 00.4	+60.0	6.8	54 00.0	+60.0	7.0	54
52 01.2	+60.0	6.5	53 00.9	+60.0	6.7	54 00.4	+60.0	6.8	55 00.0	+60.0	7.0	55
53 01.2	+60.0	6.5	54 00.9	+59.9	6.7	55 00.4	+60.0	6.8	56 00.0	+60.0	7.0	56
54 01.2	+60.0	6.5	55 00.8	+60.0	6.6	56 00.4	+60.0	6.8	57 00.0	+60.0	7.0	57
55 01.2	+60.0	6.5	56 00.8	+60.0	6.6	57 00.4	+60.0	6.8	58 00.0	+60.0	7.0	58
56 01.2	+60.0	6.4	57 00.8	+60.0	6.6	58 00.4	+60.0	6.8	59 00.0	+60.0	7.0	59
57 01.2	+60.0	6.4	58 00.8	+60.0	6.6	59 00.4	+60.0	6.8	60 00.0	+60.0	7.0	60
58 01.2	+60.0	6.4	59 00.8	+60.0	6.6	60 00.4	+60.0	6.8	61 00.0	+60.0	7.0	61
59 01.2	+60.0	6.4	60 00.8	+60.0	6.6	61 00.4	+60.0	6.8	62 00.0	+60.0	7.0	62
60 01.2	+60.0	6.4	61 00.8	+60.0	6.6	62 00.4	+60.0	6.8	63 00.0	+60.0	7.0	63
61 01.2	+60.0	6.3	62 00.8	+60.0	6.5	63 00.4	+60.0	6.8	64 00.0	+60.0	7.0	64
62 01.2	+60.0	6.3	63 00.8	+60.0	6.5	64 00.4	+60.0	6.7	65 00.0	+60.0	7.0	65
63 01.2	+60.0	6.3	64 00.8	+60.0	6.5	65 00.4	+60.0	6.7	66 00.0	+60.0	7.0	66
64 01.2	+60.0	6.2	65 00.8	+60.0	6.5	66 00.4	+60.0	6.7	67 00.0	+60.0	7.0	67
65 01.2	+60.0	6.2	66 00.8	+60.0	6.4	67 00.4	+60.0	6.7	68 00.0	+60.0	7.0	68
66 01.2	+60.0	6.2	67 00.8	+60.0	6.4	68 00.4	+60.0	6.7	69 00.0	+60.0	7.0	69
67 01.2	+60.0	6.1	68 00.8	+60.0	6.4	69 00.4	+60.0	6.7	70 00.0	+60.0	7.0	70
68 01.2	+60.0	6.1	69 00.8	+60.0	6.4	70 00.4	+60.0	6.7	71 00.0	+60.0	7.0	71
69 01.2	+59.9	6.0	70 00.8	+60.0	6.3	71 00.4	+60.0	6.6	72 00.0	+60.0	7.0	72
70 01.1	+60.0	6.0	71 00.8	+60.0	6.3	72 00.4	+60.0	6.6	73 00.0	+60.0	7.0	73
71 01.1	+60.0	5.9	72 00.8	+60.0	6.2	73 00.4	+60.0	6.6	74 00.0	+60.0	7.0	74
72 01.1	+60.0	5.9	73 00.8	+60.0	6.2	74 00.4	+60.0	6.6	75 00.0	+60.0	7.0	75
73 01.1	+60.0	5.8	74 00.8	+60.0	6.1	75 00.4	+60.0	6.5	76 00.0	+60.0	7.0	76
74 01.1	+60.0	5.7	75 00.8	+60.0	6.1	76 00.4	+60.0	6.5	77 00.0	+60.0	7.0	77
75 01.1	+60.0	5.6	76 00.8	+60.0	6.0	77 00.4	+60.0	6.5	78 00.0	+60.0	7.0	78
76 01.1	+59.9	5.5	77 00.8	+59.9	5.9	78 00.4	+60.0	6.4	79 00.0	+60.0	7.0	79
77 01.0	+60.0	5.4	78 00.7	+60.0	5.8	79 00.4	+60.0	6.4	80 00.0	+60.0	7.0	80
78 01.0	+60.0	5.3	79 00.7	+60.0	5.7	80 00.4	+60.0	6.3	81 00.0	+60.0	7.0	81
79 01.0	+59.9	5.1	80 00.7	+60.0	5.6	81 00.4	+60.0	6.2	82 00.0	+60.0	7.0	82
80 00.9	+60.0	4.9	81 00.7	+60.0	5.5	82 00.4	+60.0	6.1	83 00.0	+60.0	7.0	83
81 00.9	+59.9	4.7	82 00.7	+59.9	5.3	83 00.4	+60.0	6.0	84 00.0	+60.0	7.0	84
82 00.8	+60.0	4.4	83 00.6	+60.0	5.0	84 00.4	+60.0	5.8	85 00.0	+60.0	7.0	85
83 00.8	+59.9	4.0	84 00.6	+59.9	4.7	85 00.4	+59.9	5.6	86 00.0	+60.0	7.0	86
84 00.7	+59.8	3.5	85 00.5	+59.9	4.2	86 00.3	+60.0	5.3	87 00.0	+60.0	7.0	87
85 00.5	+59.8	2.8	86 00.4	+59.9	3.5	87 00.3	+59.9	4.7	88 00.0	+60.0	7.0	88
86 00.3	+59.7	1.7	87 00.3	+59.7	2.3	88 00.2	*+59.8* •	3.5	89 00.0	+60.0	7.0	89
87 00.0	+59.3	0.0	88 00.0	*+59.1* •	0.0	89 00.0	*+52.7* •	0.0	90 00.0	−60.0	3.5	90
87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 55.9	+60.0	171.9	5 56.5	+60.0	172.0	4 57.1	+60.0	172.0	3 57.7	+60.0	172.0	2 58.2	+60.0	172.0	1 58.8	+60.0	172.0	0 59.4	+60.0	172.0	0 00.0	+60.0	172.0	0
1	7 55.9	+60.0	171.9	6 56.5	+60.0	171.9	5 57.1	+60.0	172.0	4 57.7	+60.0	172.0	3 58.2	+60.0	172.0	2 58.8	+60.0	172.0	1 59.4	+60.0	172.0	1 00.0	+60.0	172.0	1
2	8 55.9	+60.0	171.9	7 56.5	+60.0	171.9	6 57.1	+60.0	171.9	5 57.7	+60.0	172.0	4 58.2	+60.0	172.0	3 58.8	+60.0	172.0	2 59.4	+60.0	172.0	2 00.0	+60.0	172.0	2
3	9 55.9	+60.0	171.9	8 56.5	+60.0	171.9	7 57.1	+60.0	171.9	6 57.7	+59.9	172.0	5 58.2	+60.0	172.0	4 58.8	+60.0	172.0	3 59.4	+60.0	172.0	3 00.0	+60.0	172.0	3
4	10 55.9	+59.9	171.9	9 56.5	+60.0	171.9	8 57.1	+60.0	171.9	7 57.6	+60.0	171.9	6 58.2	+60.0	172.0	5 58.8	+60.0	172.0	4 59.4	+60.0	172.0	4 00.0	+60.0	172.0	4
5	11 55.8	+60.0	171.9	10 56.5	+59.9	171.9	9 57.1	+59.9	171.9	8 57.6	+60.0	171.9	7 58.2	+60.0	172.0	6 58.8	+60.0	172.0	5 59.4	+60.0	172.0	5 00.0	+60.0	172.0	5
6	12 55.8	+60.0	171.8	11 56.4	+60.0	171.9	10 57.0	+60.0	171.9	9 57.6	+60.0	171.9	8 58.2	+60.0	171.9	7 58.8	+60.0	172.0	6 59.4	+60.0	172.0	6 00.0	+60.0	172.0	6
7	13 55.8	+60.0	171.8	12 56.4	+60.0	171.9	11 57.0	+60.0	171.9	10 57.6	+60.0	171.9	9 58.2	+60.0	171.9	8 58.8	+60.0	172.0	7 59.4	+60.0	172.0	7 00.0	+60.0	172.0	7
8	14 55.8	+60.0	171.8	13 56.4	+60.0	171.8	12 57.0	+60.0	171.9	11 57.6	+60.0	171.9	10 58.2	+60.0	171.9	9 58.8	+60.0	172.0	8 59.4	+60.0	172.0	8 00.0	+60.0	172.0	8
9	15 55.8	+60.0	171.8	14 56.4	+60.0	171.8	13 57.0	+60.0	171.9	12 57.6	+60.0	171.9	11 58.2	+60.0	171.9	10 58.8	+60.0	172.0	9 59.4	+60.0	172.0	9 00.0	+60.0	172.0	9
10	16 55.8	+60.0	171.8	15 56.4	+60.0	171.8	14 57.0	+60.0	171.8	13 57.6	+60.0	171.9	12 58.2	+60.0	171.9	11 58.8	+60.0	171.9	10 59.4	+60.0	172.0	10 00.0	+60.0	172.0	10
11	17 55.8	+60.0	171.7	16 56.4	+60.0	171.8	15 57.0	+60.0	171.8	14 57.6	+60.0	171.9	13 58.2	+60.0	171.9	12 58.8	+60.0	171.9	11 59.4	+60.0	172.0	11 00.0	+60.0	172.0	11
12	18 55.8	+60.0	171.7	17 56.4	+60.0	171.8	16 57.0	+60.0	171.8	15 57.6	+60.0	171.9	14 58.2	+60.0	171.9	13 58.8	+60.0	171.9	12 59.4	+60.0	172.0	12 00.0	+60.0	172.0	12
13	19 55.8	+60.0	171.7	18 56.4	+60.0	171.8	17 57.0	+60.0	171.8	16 57.6	+60.0	171.8	15 58.2	+60.0	171.9	14 58.8	+60.0	171.9	13 59.4	+60.0	172.0	13 00.0	+60.0	172.0	13
14	20 55.8	+60.0	171.7	19 56.4	+60.0	171.7	18 57.0	+60.0	171.8	17 57.6	+60.0	171.8	16 58.2	+60.0	171.9	15 58.8	+60.0	171.9	14 59.4	+60.0	172.0	14 00.0	+60.0	172.0	14
15	21 55.8	+59.9	171.7	20 56.4	+60.0	171.7	19 57.0	+60.0	171.8	18 57.6	+60.0	171.8	17 58.2	+60.0	171.9	16 58.8	+60.0	171.9	15 59.4	+60.0	172.0	15 00.0	+60.0	172.0	15
16	22 55.7	+60.0	171.6	21 56.4	+60.0	171.7	20 57.0	+60.0	171.8	19 57.6	+60.0	171.8	18 58.2	+60.0	171.9	17 58.8	+60.0	171.9	16 59.4	+60.0	172.0	16 00.0	+60.0	172.0	16
17	23 55.7	+60.0	171.6	22 56.4	+60.0	171.7	21 57.0	+60.0	171.7	20 57.6	+60.0	171.8	19 58.2	+60.0	171.9	18 58.8	+60.0	171.9	17 59.4	+60.0	172.0	17 00.0	+60.0	172.0	17
18	24 55.7	+60.0	171.6	23 56.4	+60.0	171.7	22 57.0	+60.0	171.7	21 57.6	+60.0	171.8	20 58.2	+60.0	171.9	19 58.8	+60.0	171.9	18 59.4	+60.0	172.0	18 00.0	+60.0	172.0	18
19	25 55.7	+60.0	171.6	24 56.4	+59.9	171.7	23 57.0	+60.0	171.7	22 57.6	+60.0	171.8	21 58.2	+60.0	171.8	20 58.8	+60.0	171.9	19 59.4	+60.0	172.0	19 00.0	+60.0	172.0	19
20	26 55.7	+60.0	171.6	25 56.3	+60.0	171.6	24 57.0	+60.0	171.7	23 57.6	+60.0	171.8	22 58.2	+60.0	171.8	21 58.8	+60.0	171.9	20 59.4	+60.0	171.9	20 00.0	+60.0	172.0	20
21	27 55.7	+60.0	171.5	26 56.3	+60.0	171.6	25 57.0	+60.0	171.7	24 57.6	+60.0	171.8	23 58.2	+60.0	171.8	22 58.8	+60.0	171.9	21 59.4	+60.0	171.9	21 00.0	+60.0	172.0	21
22	28 55.7	+60.0	171.5	27 56.3	+60.0	171.6	26 57.0	+60.0	171.7	25 57.6	+60.0	171.7	24 58.2	+60.0	171.8	23 58.8	+60.0	171.9	22 59.4	+60.0	171.9	22 00.0	+60.0	172.0	22
23	29 55.7	+60.0	171.5	28 56.3	+60.0	171.6	27 57.0	+60.0	171.7	26 57.6	+60.0	171.7	25 58.2	+60.0	171.8	24 58.8	+60.0	171.9	23 59.4	+60.0	171.9	23 00.0	+60.0	172.0	23
24	30 55.7	+59.9	171.5	29 56.3	+60.0	171.6	28 57.0	+59.9	171.6	27 57.6	+60.0	171.7	26 58.2	+60.0	171.8	25 58.8	+60.0	171.9	24 59.4	+60.0	171.9	24 00.0	+60.0	172.0	24
25	31 55.6	+60.0	171.5	30 56.3	+60.0	171.5	29 56.9	+60.0	171.6	28 57.6	+60.0	171.7	27 58.2	+60.0	171.8	26 58.8	+60.0	171.9	25 59.4	+60.0	171.9	25 00.0	+60.0	172.0	25
26	32 55.6	+60.0	171.4	31 56.3	+60.0	171.5	30 56.9	+60.0	171.6	29 57.6	+60.0	171.7	28 58.2	+60.0	171.8	27 58.8	+60.0	171.9	26 59.4	+60.0	171.9	26 00.0	+60.0	172.0	26
27	33 55.6	+60.0	171.4	32 56.3	+60.0	171.5	31 56.9	+60.0	171.6	30 57.6	+60.0	171.7	29 58.2	+60.0	171.8	28 58.8	+60.0	171.9	27 59.4	+60.0	171.9	27 00.0	+60.0	172.0	27
28	34 55.6	+60.0	171.4	33 56.3	+60.0	171.5	32 56.9	+60.0	171.6	31 57.6	+60.0	171.7	30 58.2	+60.0	171.8	29 58.8	+60.0	171.8	28 59.4	+60.0	171.9	28 00.0	+60.0	172.0	28
29	35 55.6	+60.0	171.4	34 56.3	+60.0	171.5	33 56.9	+60.0	171.6	32 57.6	+60.0	171.7	31 58.2	+60.0	171.8	30 58.8	+60.0	171.8	29 59.4	+60.0	171.9	29 00.0	+60.0	172.0	29
30	36 55.6	+60.0	171.3	35 56.3	+59.9	171.4	34 56.9	+60.0	171.5	33 57.6	+60.0	171.6	32 58.2	+60.0	171.7	31 58.8	+60.0	171.8	30 59.4	+60.0	171.9	30 00.0	+60.0	172.0	30
31	37 55.6	+60.0	171.3	36 56.2	+60.0	171.4	35 56.9	+60.0	171.5	34 57.6	+60.0	171.6	33 58.2	+60.0	171.7	32 58.8	+60.0	171.8	31 59.4	+60.0	171.9	31 00.0	+60.0	172.0	31
32	38 55.6	+59.9	171.3	37 56.2	+60.0	171.4	36 56.9	+60.0	171.5	35 57.6	+59.9	171.6	34 58.2	+60.0	171.7	33 58.8	+60.0	171.8	32 59.4	+60.0	171.9	32 00.0	+60.0	172.0	32
33	39 55.5	+60.0	171.2	38 56.2	+60.0	171.4	37 56.9	+60.0	171.5	36 57.5	+60.0	171.6	35 58.2	+60.0	171.7	34 58.8	+60.0	171.8	33 59.4	+60.0	171.9	33 00.0	+60.0	172.0	33
34	40 55.5	+60.0	171.2	39 56.2	+60.0	171.3	38 56.9	+60.0	171.5	37 57.5	+60.0	171.6	36 58.2	+60.0	171.7	35 58.8	+60.0	171.8	34 59.4	+60.0	171.9	34 00.0	+60.0	172.0	34
35	41 55.5	+60.0	171.2	40 56.2	+60.0	171.3	39 56.9	+60.0	171.4	38 57.5	+60.0	171.6	37 58.2	+60.0	171.7	36 58.8	+60.0	171.8	35 59.4	+60.0	171.9	35 00.0	+60.0	172.0	35
36	42 55.5	+60.0	171.2	41 56.2	+60.0	171.3	40 56.9	+60.0	171.4	39 57.5	+60.0	171.6	38 58.2	+60.0	171.7	37 58.8	+60.0	171.8	36 59.4	+60.0	171.9	36 00.0	+60.0	172.0	36
37	43 55.5	+60.0	171.1	42 56.2	+60.0	171.3	41 56.9	+60.0	171.4	40 57.5	+60.0	171.5	39 58.2	+60.0	171.7	38 58.8	+60.0	171.8	37 59.4	+60.0	171.9	37 00.0	+60.0	172.0	37
38	44 55.5	+59.9	171.1	43 56.2	+60.0	171.2	42 56.9	+60.0	171.4	41 57.5	+60.0	171.5	40 58.2	+60.0	171.6	39 58.8	+60.0	171.8	38 59.4	+60.0	171.9	38 00.0	+60.0	172.0	38
39	45 55.4	+60.0	171.1	44 56.2	+59.9	171.2	43 56.9	+59.9	171.4	42 57.5	+60.0	171.5	41 58.2	+60.0	171.6	40 58.8	+60.0	171.8	39 59.4	+60.0	171.9	39 00.0	+60.0	172.0	39
40	46 55.4	+60.0	171.0	45 56.1	+60.0	171.2	44 56.8	+60.0	171.3	43 57.5	+60.0	171.5	42 58.2	+60.0	171.6	41 58.8	+60.0	171.8	40 59.4	+60.0	171.9	40 00.0	+60.0	172.0	40
41	47 55.4	+60.0	171.0	46 56.1	+60.0	171.2	45 56.8	+60.0	171.3	44 57.5	+60.0	171.5	43 58.2	+60.0	171.6	42 58.8	+60.0	171.7	41 59.4	+60.0	171.9	41 00.0	+60.0	172.0	41
42	48 55.4	+60.0	170.9	47 56.1	+60.0	171.1	46 56.8	+60.0	171.3	45 57.5	+60.0	171.4	44 58.2	+60.0	171.6	43 58.8	+60.0	171.7	42 59.4	+60.0	171.9	42 00.0	+60.0	172.0	42
43	49 55.4	+59.9	170.9	48 56.1	+60.0	171.1	47 56.8	+60.0	171.3	46 57.5	+60.0	171.4	45 58.2	+60.0	171.6	44 58.8	+60.0	171.7	43 59.4	+60.0	171.9	43 00.0	+60.0	172.0	43
44	50 55.3	+60.0	170.9	49 56.1	+60.0	171.1	48 56.8	+60.0	171.2	47 57.5	+60.0	171.4	46 58.2	+60.0	171.6	45 58.8	+60.0	171.7	44 59.4	+60.0	171.9	44 00.0	+60.0	172.0	44
45	51 55.3	+60.0	170.8	50 56.1	+60.0	171.0	49 56.8	+60.0	171.2	48 57.5	+60.0	171.4	47 58.2	+59.9	171.5	46 58.8	+60.0	171.7	45 59.4	+60.0	171.9	45 00.0	+60.0	172.0	45
46	52 55.3	+60.0	170.8	51 56.1	+59.9	171.0	50 56.8	+60.0	171.2	49 57.5	+60.0	171.4	48 58.1	+60.0	171.5	47 58.8	+60.0	171.7	46 59.4	+60.0	171.9	46 00.0	+60.0	172.0	46
47	53 55.3	+59.9	170.7	52 56.0	+60.0	170.9	51 56.8	+60.0	171.1	50 57.5	+60.0	171.3	49 58.1	+60.0	171.5	48 58.8	+60.0	171.7	47 59.4	+60.0	171.8	47 00.0	+60.0	172.0	47
48	54 55.2	+60.0	170.7	53 56.0	+60.0	170.9	52 56.8	+59.9	171.1	51 57.5	+60.0	171.3	50 58.1	+60.0	171.5	49 58.8	+60.0	171.7	48 59.4	+60.0	171.8	48 00.0	+60.0	172.0	48
49	55 55.2	+60.0	170.6	54 56.0	+60.0	170.9	53 56.7	+60.0	171.1	52 57.5	+59.9	171.3	51 58.1	+60.0	171.5	50 58.8	+60.0	171.7	49 59.4	+60.0	171.8	49 00.0	+60.0	172.0	49
50	56 55.2	+60.0	170.6	55 56.0	+60.0	170.8	54 56.7	+60.0	171.0	53 57.4	+60.0	171.3	52 58.1	+60.0	171.5	51 58.8	+60.0	171.6	50 59.4	+60.0	171.8	50 00.0	+60.0	172.0	50
51	57 55.2	+59.9	170.5	56 56.0	+59.9	170.8	55 56.7	+60.0	171.0	54 57.4	+60.0	171.2	53 58.1	+60.0	171.4	52 58.8	+60.0	171.6	51 59.4	+60.0	171.8	51 00.0	+60.0	172.0	51
52	58 55.1	+60.0	170.4	57 55.9	+60.0	170.7	56 56.7	+60.0	171.0	55 57.4	+60.0	171.2	54 58.1	+60.0	171.4	53 58.8	+60.0	171.6	52 59.4	+60.0	171.8	52 00.0	+60.0	172.0	52
53	59 55.1	+60.0	170.4	58 55.9	+60.0	170.7	57 56.7	+60.0	170.9	56 57.4	+60.0	171.2	55 58.1	+60.0	171.4	54 58.8	+60.0	171.6	53 59.4	+60.0	171.8	53 00.0	+60.0	172.0	53
54	60 55.1	+59.9	170.3	59 55.9	+60.0	170.6	58 56.7	+60.0	170.9	57 57.4	+60.0	171.1	56 58.1	+60.0	171.4	55 58.8	+60.0	171.6	54 59.4	+60.0	171.8	54 00.0	+60.0	172.0	54
55	61 55.0	+60.0	170.2	60 55.9	+59.9	170.5	59 56.7	+59.9	170.8	58 57.4	+60.0	171.1	57 58.1	+60.0	171.3	56 58.8	+60.0	171.6	55 59.4	+60.0	171.8	55 00.0	+60.0	172.0	55
56	62 55.0	+59.9	170.2	61 55.8	+60.0	170.5	60 56.6	+60.0	170.8	59 57.4	+60.0	171.1	58 58.1	+60.0	171.3	57 58.8	+60.0	171.6	56 59.4	+60.0	171.8	56 00.0	+60.0	172.0	56
57	63 54.9	+60.0	170.1	62 55.8	+60.0	170.4	61 56.6	+60.0	170.7	60 57.4	+60.0	171.0	59 58.1	+60.0	171.3	58 58.8	+60.0	171.5	57 59.4	+60.0	171.8	57 00.0	+60.0	172.0	57
58	64 54.9	+59.9	170.0	63 55.8	+59.9	170.3	62 56.6	+60.0	170.7	61 57.4	+60.0	171.0	60 58.1	+60.0	171.3	59 58.8	+60.0	171.5	58 59.4	+60.0	171.8	58 00.0	+60.0	172.0	58
59	65 54.8	+60.0	169.9	64 55.7	+60.0	170.3	63 56.6	+60.0	170.6	62 57.4	+59.9	170.9	61 58.1	+60.0	171.2	60 58.8	+60.0	171.5	59 59.4	+60.0	171.8	59 00.0	+60.0	172.0	59
60	66 54.8	+59.9	169.8	65 55.7	+60.0	170.2	64 56.6	+59.9	170.5	63 57.3	+60.0	170.9	62 58.1	+60.0	171.2	61 58.8	+60.0	171.5	60 59.4	+60.0	171.8	60 00.0	+60.0	172.0	60
61	67 54.7	+60.0	169.7	66 55.7	+59.9	170.1	65 56.5	+60.0	170.5	64 57.3	+60.0	170.8	63 58.1	+60.0	171.2	62 58.8	+60.0	171.5	61 59.4	+60.0	171.7	61 00.0	+60.0	172.0	61
62	68 54.7	+59.9	169.5	67 55.6	+60.0	170.0	66 56.5	+60.0	170.4	65 57.3	+60.0	170.8	64 58.1	+59.9	171.1	63 58.8	+59.9	171.4	62 59.4	+60.0	171.7	62 00.0	+60.0	172.0	62
63	69 54.6	+59.9	169.4	68 55.6	+59.9	169.9	67 56.5	+59.9	170.3	66 57.3	+60.0	170.7	65 58.0	+60.0	171.1	64 58.7	+60.0	171.4	63 59.4	+60.0	171.7	63 00.0	+60.0	172.0	63
64	70 54.5	+59.9	169.2	69 55.5	+60.0	169.8	68 56.4	+60.0	170.2	67 57.3	+60.0	170.6	66 58.0	+60.0	171.0	65 58.7	+60.0	171.4	64 59.4	+60.0	171.7	64 00.0	+60.0	172.0	64
65	71 54.4	+59.9	169.1	70 55.5	+59.9	169.6	69 56.4	+60.0	170.1	68 57.3	+59.9	170.6	67 58.0	+60.0	171.0	66 58.7	+60.0	171.3	65 59.4	+60.0	171.7	65 00.0	+60.0	172.0	65
66	72 54.3	+59.9	168.9	71 55.4	+59.9	169.5	70 56.4	+59.9	170.0	69 57.2	+60.0	170.5	68 58.0	+60.0	170.9	67 58.7	+60.0	171.3	66 59.4	+60.0	171.7	66 00.0	+60.0	172.0	66
67	73 54.2	+59.9	168.7	72 55.3	+60.0	169.3	71 56.3	+60.0	169.9	70 57.2	+60.0	170.4	69 58.0	+60.0	170.9	68 58.7	+60.0	171.3	67 59.4	+60.0	171.7	67 00.0	+60.0	172.0	67
68	74 54.1	+59.9	168.5	73 55.3	+59.9	169.1	72 56.3	+59.9	169.8	71 57.2	+59.9	170.3	70 58.0	+60.0	170.8	69 58.7	+60.0	171.2	68 59.4	+60.0	171.6	68 00.0	+60.0	172.0	68
69	75 54.0	+59.8	168.2	74 55.2	+59.9	168.9	73 56.2	+60.0	169.6	72 57.1	+60.0	170.2	71 58.0	+60.0	170.7	70 58.7	+60.0	171.2	69 59.4	+60.0	171.6	69 00.0	+60.0	172.0	69
70	76 53.8	+59.8	167.9	75 55.1	+59.9	168.7	74 56.2	+59.9	169.4	73 57.1	+60.0	170.1	72 58.0	+59.9	170.6	71 58.7	+60.0	171.1	70 59.4	+60.0	171.6	70 00.0	+60.0	172.0	70
71	77 53.6	+59.8	167.5	76 55.0	+59.8	168.5	75 56.1	+59.9	169.3	74 57.1	+59.9	169.9	73 57.9	+60.0	170.6	72 58.7	+60.0	171.1	71 59.4	+60.0	171.6	71 00.0	+60.0	172.0	71
72	78 53.4	+59.8	167.1	77 54.8	+59.9	168.1	76 56.0	+59.9	169.0	75 57.0	+60.0	169.8	74 57.9	+60.0	170.5	73 58.7	+60.0	171.0	72 59.4	+60.0	171.5	72 00.0	+60.0	172.0	72
73	79 53.2	+59.7	166.6	78 54.7	+59.8	167.8	77 55.9	+59.9	168.8	76 57.0	+59.9	169.6	75 57.9	+60.0	170.3	74 58.7	+60.0	171.0	73 59.4	+60.0	171.5	73 00.0	+60.0	172.0	73
74	80 52.9	+59.6	166.0	79 54.5	+59.7	167.4	78 55.8	+59.9	168.5	77 56.9	+59.9	169.4	76 57.9	+59.9	170.2	75 58.7	+60.0	170.9	74 59.4	+60.0	171.5	74 00.0	+60.0	172.0	74
75	81 52.5	+59.5	165.2	80 54.2	+59.8	166.8	79 55.7	+59.8	168.1	78 56.8	+60.0	169.2	77 57.8	+60.0	170.1	76 58.7	+59.9	170.8	75 59.4	+60.0	171.4	75 00.0	+60.0	172.0	75
76	82 52.0	+59.3	164.3	81 54.0	+59.6	166.2	80 55.5	+59.8	167.7	79 56.8	+59.9	168.9	78 57.8	+59.9	169.9	77 58.6	+60.0	170.7	76 59.4	+60.0	171.4	76 00.0	+60.0	172.0	76
77	83 51.3	+59.1	163.0	82 53.6	+59.5	165.3	81 55.3	+59.8	167.1	80 56.7	+59.8	168.5	79 57.7	+60.0	169.7	78 58.6	+60.0	170.6	77 59.4	+60.0	171.3	77 00.0	+60.0	172.0	77
78	84 50.4	+58.7	161.2	83 53.1	+59.3	164.2	82 55.1	+59.6	166.4	81 56.5	+59.9	168.1	80 57.7	+59.9	169.4	79 58.6	+60.0	170.4	78 59.4	+60.0	171.3	78 00.0	+60.0	172.0	78
79	85 49.1	+57.8	158.6	84 52.4	+59.0	162.7	83 54.7	+59.5	165.5	82 56.4	+59.7	167.5	81 57.6	+59.9	169.1	80 58.6	+59.9	170.3	79 59.4	+60.0	171.2	79 00.0	+60.0	172.0	79
80	86 46.9	*+56.0*	•154.5	85 51.4	+58.4	160.5	84 54.2	+59.3	164.2	83 56.1	+59.7	166.8	82 57.5	+59.9	168.6	81 58.5	+60.0	170.0	80 59.4	+59.9	171.1	80 00.0	+60.0	172.0	80
81	87 42.9	*+50.5*	•146.9	86 49.8	*+57.0*	•156.8	85 53.5	+58.9	162.3	84 55.8	+59.6	165.7	83 57.4	+59.8	168.1	82 58.5	+59.9	169.7	81 59.3	+60.0	171.0	81 00.0	+60.0	172.0	81
82	88 33.4	*+28.1*	•129.7	87 46.8	*+52.4*	•150.0	86 52.4	*+57.8*	•159.2	85 55.4	+59.2	164.2	84 57.2	+59.8	167.3	83 58.4	+60.0	169.4	82 59.3	+60.0	170.9	82 00.0	+60.0	172.0	82
83	89 01.5	*–22.3*	•86.0	88 39.2	*+30.7*	•133.8	87 50.2	*+54.3*	•153.3	86 54.6	+58.6	161.7	85 57.0	+59.5	166.1	84 58.4	+59.9	168.8	83 59.3	+60.0	170.7	83 00.0	+60.0	172.0	83
84	88 39.2	*–49.0*	•38.2	89 09.9	*–25.4*	•86.0	88 44.5	*+33.7*	•138.5	87 53.2	*+56.1*	•156.8	86 56.5	+59.2	164.2	85 58.3	+59.8	168.1	84 59.3	+60.0	170.4	84 00.0	+60.0	172.0	84
85	87 50.2	*–55.6*	•18.7	88 44.5	*–51.3*	•33.5	89 18.2	*–28.9*	•86.0	88 49.3	*+37.2*	•143.9	87 55.7	*+57.7*	•160.4	86 58.1	+59.6	166.7	85 59.3	+59.9	170.0	85 00.0	+60.0	172.0	85
86	86 54.6	–57.6	10.4	87 53.2	*–56.7*	•15.3	88 49.3	*–53.6*	•28.2	89 26.5	*–33.1*	•86.0	88 53.4	*+41.5*	•149.9	87 57.7	*+58.9*	•164.2	86 59.2	+59.9	169.4	86 00.0	+60.0	172.0	86
87	85 57.0	–58.6	5.9	86 56.5	–58.2	7.8	87 55.7	*–57.6*	•11.6	88 53.4	*–55.7*	•22.1	89 34.9	*–38.3*	•86.0	88 56.6	*+46.7*	•156.7	87 59.1	*+59.7*	•168.0	87 00.0	+60.0	172.0	87
88	84 58.4	–59.1	3.2	85 58.3	–59.0	4.0	86 58.1	–58.8	5.3	87 57.7	–58.5	7.8	88 56.6	*–57.5*	•15.3	89 43.3	*–44.5*	•86.0	88 58.8	*+52.8*	•164.2	88 00.0	+60.0	172.0	88
89	83 59.3	–59.3	1.3	84 59.3	–59.3	1.6	85 59.3	–59.3	2.0	86 59.2	–59.2	2.6	87 59.1	–59.1	4.0	88 58.8	*–58.8*	•7.8	89 51.6	*–51.6*	•86.0	89 00.0	+60.0	172.0	89
90	83 00.0	–59.5	0.0	84 00.0	–59.5	0.0	85 00.0	–59.5	0.0	86 00.0	–59.5	0.0	87 00.0	–59.6	0.0	88 00.0	–59.6	0.0	89 00.0	*–59.7*	•0.0	90 00.0	–60.0	86.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 8°, 352°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 55.9	–60.0	171.9	5 56.5	–60.0	172.0	4 57.1	–60.0	172.0	3 57.7	–60.0	172.0	2 58.2	–60.0	172.0	1 58.8	–60.0	172.0	0 59.4	–60.0	172.0	0 00.0	+60.0	8.0	0
1	5 55.9	–60.0	172.0	4 56.5	–60.0	172.0	3 57.1	–60.0	172.0	2 57.7	–60.0	172.0	1 58.2	–60.0	172.0	0 58.8	–60.0	172.0	0 00.6	+60.0	8.0	1 00.0	+60.0	8.0	1
2	4 55.9	–60.0	172.0	3 56.5	–60.0	172.0	2 57.1	–60.0	172.0	1 57.7	–60.0	172.0	0 58.2	–59.9	172.0	0 01.2	+60.0	8.0	1 00.6	+60.0	8.0	2 00.0	+60.0	8.0	2
3	3 55.9	–60.0	172.0	2 56.5	–60.0	172.0	1 57.1	–60.0	172.0	0 57.7	–60.0	172.0	0 01.7	+60.0	8.0	1 01.2	+60.0	8.0	2 00.6	+60.0	8.0	3 00.0	+60.0	8.0	3
4	2 55.9	–60.0	172.0	1 56.5	–60.0	172.0	0 57.1	–60.0	172.0	0 02.3	+60.0	8.0	1 01.7	+60.0	8.0	2 01.2	+60.0	8.0	3 00.6	+60.0	8.0	4 00.0	+60.0	8.0	4
5	1 55.9	–60.0	172.0	0 56.5	–60.0	172.0	0 02.9	+60.0	8.0	1 02.3	+60.0	8.0	2 01.7	+60.0	8.0	3 01.2	+60.0	8.0	4 00.6	+60.0	8.0	5 00.0	+60.0	8.0	5
6	0 55.9	–59.9	172.0	0 03.5	+60.0	8.0	1 02.9	+60.0	8.0	2 02.3	+60.0	8.0	3 01.7	+60.0	8.0	4 01.2	+60.0	8.0	5 00.6	+60.0	8.0	6 00.0	+60.0	8.0	6
7	0 04.0	+60.0	7.9	1 03.5	+60.0	7.9	2 02.9	+60.0	7.9	3 02.3	+60.0	8.0	4 01.7	+60.0	8.0	5 01.2	+60.0	8.0	6 00.6	+60.0	8.0	7 00.0	+60.0	8.0	7
8	1 04.0	+60.0	7.9	2 03.5	+60.0	7.9	3 02.9	+60.0	7.9	4 02.3	+60.0	7.9	5 01.7	+60.0	8.0	6 01.2	+60.0	8.0	7 00.6	+60.0	8.0	8 00.0	+60.0	8.0	8
9	2 04.0	+60.0	7.9	3 03.5	+60.0	7.9	4 02.9	+60.0	7.9	5 02.3	+60.0	7.9	6 01.7	+60.0	7.9	7 01.2	+60.0	8.0	8 00.6	+60.0	8.0	9 00.0	+60.0	8.0	9
10	3 04.0	+60.0	7.9	4 03.5	+59.9	7.9	5 02.9	+60.0	7.9	6 02.3	+60.0	7.9	7 01.7	+60.0	7.9	8 01.2	+60.0	8.0	9 00.6	+60.0	8.0	10 00.0	+60.0	8.0	10
11	4 04.0	+60.0	7.9	5 03.4	+60.0	7.9	6 02.9	+60.0	7.9	7 02.3	+60.0	7.9	8 01.7	+60.0	7.9	9 01.2	+60.0	8.0	10 00.6	+60.0	8.0	11 00.0	+60.0	8.0	11
12	5 04.0	+60.0	7.9	6 03.4	+60.0	7.9	7 02.9	+60.0	7.9	8 02.3	+60.0	7.9	9 01.7	+60.0	7.9	10 01.2	+60.0	7.9	11 00.6	+60.0	8.0	12 00.0	+60.0	8.0	12
13	6 04.0	+60.0	7.8	7 03.4	+60.0	7.9	8 02.9	+60.0	7.9	9 02.3	+60.0	7.9	10 01.7	+60.0	7.9	11 01.2	+60.0	7.9	12 00.6	+60.0	8.0	13 00.0	+60.0	8.0	13
14	7 04.0	+60.0	7.8	8 03.4	+60.0	7.8	9 02.9	+60.0	7.9	10 02.3	+60.0	7.9	11 01.7	+60.0	7.9	12 01.2	+60.0	7.9	13 00.6	+60.0	8.0	14 00.0	+60.0	8.0	14
15	8 04.0	+60.0	7.8	9 03.4	+60.0	7.8	10 02.9	+60.0	7.8	11 02.3	+60.0	7.9	12 01.7	+60.0	7.9	13 01.2	+60.0	7.9	14 00.6	+60.0	8.0	15 00.0	+60.0	8.0	15
16	9 04.0	+60.0	7.8	10 03.4	+60.0	7.8	11 02.9	+60.0	7.8	12 02.3	+60.0	7.9	13 01.7	+60.0	7.9	14 01.2	+60.0	7.9	15 00.6	+60.0	8.0	16 00.0	+60.0	8.0	16
17	10 04.0	+60.0	7.8	11 03.4	+60.0	7.8	12 02.9	+59.9	7.8	13 02.3	+60.0	7.9	14 01.7	+60.0	7.9	15 01.2	+60.0	7.9	16 00.6	+60.0	8.0	17 00.0	+60.0	8.0	17
18	11 04.0	+59.9	7.8	12 03.4	+60.0	7.8	13 02.8	+60.0	7.8	14 02.3	+60.0	7.8	15 01.7	+60.0	7.9	16 01.2	+60.0	7.9	17 00.6	+60.0	8.0	18 00.0	+60.0	8.0	18
19	12 03.9	+60.0	7.7	13 03.4	+60.0	7.8	14 02.8	+60.0	7.8	15 02.3	+60.0	7.8	16 01.7	+60.0	7.9	17 01.2	+60.0	7.9	18 00.6	+60.0	8.0	19 00.0	+60.0	8.0	19
20	13 03.9	+60.0	7.7	14 03.4	+60.0	7.7	15 02.8	+60.0	7.8	16 02.3	+60.0	7.8	17 01.7	+60.0	7.9	18 01.2	+60.0	7.9	19 00.6	+60.0	8.0	20 00.0	+60.0	8.0	20
21	14 03.9	+60.0	7.7	15 03.4	+60.0	7.7	16 02.8	+60.0	7.8	17 02.3	+60.0	7.8	18 01.7	+60.0	7.9	19 01.2	+60.0	7.9	20 00.6	+60.0	7.9	21 00.0	+60.0	8.0	21
22	15 03.9	+60.0	7.7	16 03.4	+60.0	7.7	17 02.8	+60.0	7.8	18 02.3	+60.0	7.8	19 01.7	+60.0	7.8	20 01.2	+60.0	7.9	21 00.6	+60.0	7.9	22 00.0	+60.0	8.0	22
23	16 03.9	+60.0	7.7	17 03.4	+60.0	7.7	18 02.8	+60.0	7.7	19 02.3	+60.0	7.8	20 01.7	+60.0	7.8	21 01.2	+60.0	7.9	22 00.6	+60.0	7.9	23 00.0	+60.0	8.0	23
24	17 03.9	+60.0	7.6	18 03.4	+60.0	7.7	19 02.8	+60.0	7.7	20 02.3	+60.0	7.8	21 01.7	+60.0	7.8	22 01.2	+59.9	7.9	23 00.6	+60.0	7.9	24 00.0	+60.0	8.0	24
25	18 03.9	+60.0	7.6	19 03.4	+59.9	7.7	20 02.8	+60.0	7.7	21 02.3	+60.0	7.8	22 01.7	+60.0	7.8	23 01.1	+60.0	7.9	24 00.6	+60.0	7.9	25 00.0	+60.0	8.0	25
26	19 03.9	+60.0	7.6	20 03.3	+60.0	7.7	21 02.8	+60.0	7.7	22 02.3	+60.0	7.8	23 01.7	+60.0	7.8	24 01.1	+60.0	7.9	25 00.6	+60.0	7.9	26 00.0	+60.0	8.0	26
27	20 03.9	+60.0	7.6	21 03.3	+60.0	7.6	22 02.8	+60.0	7.7	23 02.3	+60.0	7.7	24 01.7	+60.0	7.8	25 01.1	+60.0	7.9	26 00.6	+60.0	7.9	27 00.0	+60.0	8.0	27
28	21 03.9	+59.9	7.6	22 03.3	+60.0	7.6	23 02.8	+60.0	7.7	24 02.3	+60.0	7.7	25 01.7	+60.0	7.8	26 01.1	+60.0	7.9	27 00.6	+60.0	7.9	28 00.0	+60.0	8.0	28
29	22 03.8	+60.0	7.5	23 03.3	+60.0	7.6	24 02.8	+60.0	7.7	25 02.3	+59.9	7.7	26 01.7	+60.0	7.8	27 01.1	+60.0	7.9	28 00.6	+60.0	7.9	29 00.0	+60.0	8.0	29
30	23 03.8	+60.0	7.5	24 03.3	+60.0	7.6	25 02.8	+60.0	7.6	26 02.2	+60.0	7.7	27 01.7	+60.0	7.8	28 01.1	+60.0	7.8	29 00.6	+60.0	7.9	30 00.0	+60.0	8.0	30
31	24 03.8	+60.0	7.5	25 03.3	+60.0	7.6	26 02.8	+60.0	7.6	27 02.2	+60.0	7.7	28 01.7	+60.0	7.8	29 01.1	+60.0	7.8	30 00.6	+60.0	7.9	31 00.0	+60.0	8.0	31
32	25 03.8	+60.0	7.5	26 03.3	+60.0	7.5	27 02.8	+60.0	7.6	28 02.2	+60.0	7.7	29 01.7	+60.0	7.8	30 01.1	+60.0	7.8	31 00.6	+60.0	7.9	32 00.0	+60.0	8.0	32
33	26 03.8	+60.0	7.5	27 03.3	+60.0	7.5	28 02.8	+60.0	7.6	29 02.2	+60.0	7.7	30 01.7	+60.0	7.7	31 01.1	+60.0	7.8	32 00.6	+60.0	7.9	33 00.0	+60.0	8.0	33
34	27 03.8	+60.0	7.4	28 03.3	+60.0	7.5	29 02.8	+60.0	7.6	30 02.2	+60.0	7.7	31 01.7	+60.0	7.7	32 01.1	+60.0	7.8	33 00.6	+60.0	7.9	34 00.0	+60.0	8.0	34
35	28 03.8	+60.0	7.4	29 03.3	+60.0	7.5	30 02.8	+60.0	7.6	31 02.2	+60.0	7.6	32 01.7	+60.0	7.7	33 01.1	+60.0	7.8	34 00.6	+60.0	7.9	35 00.0	+60.0	8.0	35
36	29 03.8	+60.0	7.4	30 03.3	+60.0	7.5	31 02.8	+59.9	7.6	32 02.2	+60.0	7.6	33 01.7	+60.0	7.7	34 01.1	+60.0	7.8	35 00.6	+60.0	7.9	36 00.0	+60.0	8.0	36
37	30 03.8	+59.9	7.4	31 03.3	+60.0	7.5	32 02.7	+60.0	7.5	33 02.2	+60.0	7.6	34 01.7	+60.0	7.7	35 01.1	+60.0	7.8	36 00.6	+60.0	7.9	37 00.0	+60.0	8.0	37
38	31 03.7	+60.0	7.4	32 03.3	+59.9	7.4	33 02.7	+60.0	7.5	34 02.2	+60.0	7.6	35 01.7	+60.0	7.7	36 01.1	+60.0	7.8	37 00.6	+60.0	7.9	38 00.0	+60.0	8.0	38
39	32 03.7	+60.0	7.3	33 03.2	+60.0	7.4	34 02.7	+60.0	7.5	35 02.2	+60.0	7.6	36 01.7	+60.0	7.7	37 01.1	+60.0	7.8	38 00.6	+60.0	7.9	39 00.0	+60.0	8.0	39
40	33 03.7	+60.0	7.3	34 03.2	+60.0	7.4	35 02.7	+60.0	7.5	36 02.2	+60.0	7.6	37 01.7	+60.0	7.7	38 01.1	+60.0	7.8	39 00.6	+60.0	7.9	40 00.0	+60.0	8.0	40
41	34 03.7	+60.0	7.3	35 03.2	+60.0	7.4	36 02.7	+60.0	7.5	37 02.2	+60.0	7.6	38 01.7	+60.0	7.7	39 01.1	+60.0	7.8	40 00.6	+60.0	7.9	41 00.0	+60.0	8.0	41
42	35 03.7	+60.0	7.3	36 03.2	+60.0	7.3	37 02.7	+60.0	7.4	38 02.2	+60.0	7.5	39 01.7	+60.0	7.7	40 01.1	+60.0	7.8	41 00.6	+60.0	7.9	42 00.0	+60.0	8.0	42
43	36 03.7	+60.0	7.2	37 03.2	+60.0	7.3	38 02.7	+60.0	7.4	39 02.2	+60.0	7.5	40 01.7	+60.0	7.6	41 01.1	+60.0	7.8	42 00.6	+60.0	7.9	43 00.0	+60.0	8.0	43
44	37 03.7	+60.0	7.2	38 03.2	+60.0	7.3	39 02.7	+60.0	7.4	40 02.2	+60.0	7.5	41 01.7	+60.0	7.6	42 01.1	+60.0	7.7	43 00.6	+60.0	7.9	44 00.0	+60.0	8.0	44
45	38 03.7	+59.9	7.2	39 03.2	+60.0	7.3	40 02.7	+60.0	7.4	41 02.2	+60.0	7.5	42 01.7	+60.0	7.6	43 01.1	+60.0	7.7	44 00.6	+60.0	7.9	45 00.0	+60.0	8.0	45
46	39 03.6	+60.0	7.2	40 03.2	+60.0	7.3	41 02.7	+60.0	7.4	42 02.2	+60.0	7.5	43 01.7	+60.0	7.6	44 01.1	+60.0	7.7	45 00.6	+60.0	7.9	46 00.0	+60.0	8.0	46
47	40 03.6	+60.0	7.1	41 03.2	+60.0	7.2	42 02.7	+60.0	7.3	43 02.2	+60.0	7.5	44 01.7	+60.0	7.6	45 01.1	+60.0	7.7	46 00.6	+60.0	7.9	47 00.0	+60.0	8.0	47
48	41 03.6	+60.0	7.1	42 03.2	+59.9	7.2	43 02.7	+60.0	7.3	44 02.2	+60.0	7.4	45 01.7	+60.0	7.6	46 01.1	+60.0	7.7	47 00.6	+60.0	7.8	48 00.0	+60.0	8.0	48
49	42 03.6	+60.0	7.1	43 03.1	+60.0	7.2	44 02.7	+60.0	7.3	45 02.2	+60.0	7.4	46 01.7	+60.0	7.6	47 01.1	+60.0	7.7	48 00.6	+60.0	7.8	49 00.0	+60.0	8.0	49
50	43 03.6	+60.0	7.0	44 03.1	+60.0	7.2	45 02.7	+59.9	7.3	46 02.2	+60.0	7.4	47 01.7	+59.9	7.5	48 01.1	+60.0	7.7	49 00.6	+60.0	7.8	50 00.0	+60.0	8.0	50
51	44 03.6	+60.0	7.0	45 03.1	+60.0	7.1	46 02.6	+60.0	7.2	47 02.2	+59.9	7.4	48 01.6	+60.0	7.5	49 01.1	+60.0	7.7	50 00.6	+60.0	7.8	51 00.0	+60.0	8.0	51
52	45 03.6	+59.9	7.0	46 03.1	+60.0	7.1	47 02.6	+60.0	7.2	48 02.1	+60.0	7.4	49 01.6	+60.0	7.5	50 01.1	+60.0	7.7	51 00.6	+60.0	7.8	52 00.0	+60.0	8.0	52
53	46 03.5	+60.0	6.9	47 03.1	+60.0	7.1	48 02.6	+60.0	7.2	49 02.1	+60.0	7.3	50 01.6	+60.0	7.5	51 01.1	+60.0	7.7	52 00.6	+60.0	7.8	53 00.0	+60.0	8.0	53
54	47 03.5	+60.0	6.9	48 03.1	+60.0	7.0	49 02.6	+60.0	7.2	50 02.1	+60.0	7.3	51 01.6	+60.0	7.5	52 01.1	+60.0	7.6	53 00.6	+60.0	7.8	54 00.0	+60.0	8.0	54
55	48 03.5	+60.0	6.9	49 03.1	+59.9	7.0	50 02.6	+60.0	7.1	51 02.1	+60.0	7.3	52 01.6	+60.0	7.5	53 01.1	+60.0	7.6	54 00.6	+60.0	7.8	55 00.0	+60.0	8.0	55
56	49 03.5	+60.0	6.8	50 03.0	+60.0	7.0	51 02.6	+60.0	7.1	52 02.1	+60.0	7.3	53 01.6	+60.0	7.4	54 01.1	+60.0	7.6	55 00.6	+60.0	7.8	56 00.0	+60.0	8.0	56
57	50 03.5	+59.9	6.8	51 03.0	+60.0	6.9	52 02.6	+60.0	7.1	53 02.1	+60.0	7.2	54 01.6	+60.0	7.4	55 01.1	+60.0	7.6	56 00.6	+60.0	7.8	57 00.0	+60.0	8.0	57
58	51 03.4	+60.0	6.7	52 03.0	+60.0	6.9	53 02.6	+60.0	7.0	54 02.1	+60.0	7.2	55 01.6	+60.0	7.4	56 01.1	+60.0	7.6	57 00.6	+60.0	7.8	58 00.0	+60.0	8.0	58
59	52 03.4	+60.0	6.7	53 03.0	+60.0	6.8	54 02.6	+59.9	7.0	55 02.1	+60.0	7.2	56 01.6	+60.0	7.4	57 01.1	+60.0	7.6	58 00.6	+60.0	7.8	59 00.0	+60.0	8.0	59
60	53 03.4	+60.0	6.6	54 03.0	+60.0	6.8	55 02.5	+60.0	7.0	56 02.1	+60.0	7.2	57 01.6	+60.0	7.3	58 01.1	+60.0	7.5	59 00.6	+60.0	7.8	60 00.0	+60.0	8.0	60
61	54 03.4	+59.9	6.6	55 03.0	+59.9	6.8	56 02.5	+60.0	6.9	57 02.1	+60.0	7.1	58 01.6	+60.0	7.3	59 01.1	+60.0	7.5	60 00.6	+60.0	7.8	61 00.0	+60.0	8.0	61
62	55 03.3	+60.0	6.6	56 02.9	+60.0	6.7	57 02.5	+60.0	6.9	58 02.1	+60.0	7.1	59 01.6	+60.0	7.3	60 01.1	+60.0	7.5	61 00.6	+60.0	7.7	62 00.0	+60.0	8.0	62
63	56 03.3	+60.0	6.5	57 02.9	+60.0	6.7	58 02.5	+60.0	6.9	59 02.1	+59.9	7.1	60 01.6	+60.0	7.3	61 01.1	+60.0	7.5	62 00.6	+60.0	7.7	63 00.0	+60.0	8.0	63
64	57 03.3	+60.0	6.4	58 02.9	+60.0	6.6	59 02.5	+60.0	6.8	60 02.0	+60.0	7.0	61 01.6	+60.0	7.2	62 01.1	+60.0	7.5	63 00.6	+60.0	7.7	64 00.0	+60.0	8.0	64
65	58 03.3	+59.9	6.4	59 02.9	+59.9	6.6	60 02.5	+59.9	6.8	61 02.0	+60.0	7.0	62 01.6	+60.0	7.2	63 01.1	+60.0	7.4	64 00.6	+60.0	7.7	65 00.0	+60.0	8.0	65
66	59 03.2	+60.0	6.3	60 02.8	+60.0	6.5	61 02.4	+60.0	6.7	62 02.0	+60.0	6.9	63 01.6	+60.0	7.2	64 01.1	+60.0	7.4	65 00.6	+60.0	7.7	66 00.0	+60.0	8.0	66
67	60 03.2	+60.0	6.3	61 02.8	+60.0	6.4	62 02.4	+60.0	6.7	63 02.0	+60.0	6.9	64 01.6	+60.0	7.1	65 01.1	+60.0	7.4	66 00.6	+60.0	7.7	67 00.0	+60.0	8.0	67
68	61 03.2	+59.9	6.2	62 02.8	+60.0	6.4	63 02.4	+60.0	6.6	64 02.0	+60.0	6.8	65 01.6	+59.9	7.1	66 01.1	+60.0	7.4	67 00.6	+60.0	7.7	68 00.0	+60.0	8.0	68
69	62 03.1	+60.0	6.1	63 02.8	+59.9	6.3	64 02.4	+60.0	6.5	65 02.0	+60.0	6.8	66 01.5	+60.0	7.1	67 01.1	+60.0	7.3	68 00.6	+60.0	7.7	69 00.0	+60.0	8.0	69
70	63 03.1	+59.9	6.0	64 02.7	+60.0	6.2	65 02.4	+59.9	6.5	66 02.0	+59.9	6.7	67 01.5	+60.0	7.0	68 01.1	+60.0	7.3	69 00.6	+60.0	7.6	70 00.0	+60.0	8.0	70
71	64 03.0	+60.0	5.9	65 02.7	+60.0	6.2	66 02.3	+60.0	6.4	67 01.9	+60.0	6.7	68 01.5	+60.0	7.0	69 01.1	+60.0	7.3	70 00.6	+60.0	7.6	71 00.0	+60.0	8.0	71
72	65 03.0	+59.9	5.9	66 02.7	+59.9	6.1	67 02.3	+60.0	6.3	68 01.9	+60.0	6.6	69 01.5	+60.0	6.9	70 01.1	+59.9	7.2	71 00.6	+60.0	7.6	72 00.0	+60.0	8.0	72
73	66 02.9	+60.0	5.8	67 02.6	+60.0	6.0	68 02.3	+59.9	6.2	69 01.9	+60.0	6.5	70 01.5	+60.0	6.8	71 01.0	+60.0	7.2	72 00.6	+60.0	7.6	73 00.0	+60.0	8.0	73
74	67 02.9	+59.9	5.6	68 02.6	+59.9	5.9	69 02.2	+60.0	6.2	70 01.9	+60.0	6.4	71 01.5	+60.0	6.8	72 01.0	+60.0	7.1	73 00.6	+59.9	7.5	74 00.0	+60.0	8.0	74
75	68 02.8	+60.0	5.5	69 02.5	+60.0	5.8	70 02.2	+60.0	6.1	71 01.9	+59.9	6.4	72 01.5	+59.9	6.7	73 01.0	+60.0	7.1	74 00.5	+60.0	7.5	75 00.0	+60.0	8.0	75
76	69 02.8	+59.9	5.4	70 02.5	+59.9	5.7	71 02.2	+59.9	5.9	72 01.8	+60.0	6.3	73 01.4	+60.0	6.6	74 01.0	+60.0	7.0	75 00.5	+60.0	7.5	76 00.0	+60.0	8.0	76
77	70 02.7	+59.9	5.3	71 02.4	+60.0	5.5	72 02.1	+60.0	5.8	73 01.8	+60.0	6.2	74 01.4	+60.0	6.5	75 01.0	+60.0	7.0	76 00.5	+60.0	7.4	77 00.0	+60.0	8.0	77
78	71 02.6	+59.9	5.1	72 02.4	+59.9	5.4	73 02.1	+59.9	5.7	74 01.8	+59.9	6.0	75 01.4	+60.0	6.4	76 01.0	+60.0	6.9	77 00.5	+60.0	7.4	78 00.0	+60.0	8.0	78
79	72 02.5	+59.9	4.9	73 02.3	+59.9	5.2	74 02.0	+60.0	5.5	75 01.7	+60.0	5.9	76 01.4	+60.0	6.3	77 01.0	+60.0	6.8	78 00.5	+60.0	7.3	79 00.0	+60.0	8.0	79
80	73 02.4	+59.9	4.8	74 02.2	+59.9	5.0	75 02.0	+59.9	5.4	76 01.7	+59.9	5.7	77 01.4	+59.9	6.2	78 01.0	+60.0	6.7	79 00.5	+60.0	7.3	80 00.0	+60.0	8.0	80
81	74 02.3	+59.9	4.5	75 02.1	+59.9	4.8	76 01.9	+59.9	5.2	77 01.6	+60.0	5.6	78 01.3	+60.0	6.0	79 01.0	+59.9	6.6	80 00.5	+60.0	7.2	81 00.0	+60.0	8.0	81
82	75 02.2	+59.9	4.3	76 02.0	+59.9	4.6	77 01.8	+59.9	5.0	78 01.6	+59.9	5.4	79 01.3	+59.9	5.8	80 00.9	+60.0	6.4	81 00.5	+60.0	7.1	82 00.0	+60.0	8.0	82
83	76 02.1	+59.8	4.0	77 01.9	+59.9	4.3	78 01.7	+59.9	4.7	79 01.5	+59.9	5.1	80 01.2	+60.0	5.6	81 00.9	+60.0	6.2	82 00.5	+60.0	7.0	83 00.0	+60.0	8.0	83
84	77 01.9	+59.8	3.7	78 01.8	+59.8	4.0	79 01.6	+59.9	4.4	80 01.4	+59.9	4.8	81 01.2	+59.9	5.3	82 00.9	+59.9	6.0	83 00.5	+60.0	6.9	84 00.0	+60.0	8.0	84
85	78 01.7	+59.8	3.4	79 01.6	+59.8	3.7	80 01.5	+59.8	4.0	81 01.3	+59.9	4.5	82 01.1	+59.9	5.0	83 00.8	+60.0	5.7	84 00.5	+60.0	6.7	85 00.0	+60.0	8.0	85
86	79 01.5	+59.7	2.9	80 01.4	+59.8	3.2	81 01.3	+59.8	3.6	82 01.2	+59.8	4.0	83 01.0	+59.9	4.6	84 00.8	+59.9	5.3	85 00.5	+59.9	6.4	86 00.0	+60.0	8.0	86
87	80 01.2	+59.7	2.4	81 01.2	+59.7	2.7	82 01.1	+59.7	3.0	83 01.0	+59.8	3.4	84 00.9	+59.8	4.0	85 00.7	+59.9	4.8	86 00.4	+60.0	6.0	87 00.0	+60.0	8.0	87
88	81 00.9	+59.6	1.8	82 00.9	+59.6	2.0	83 00.8	+59.7	2.3	84 00.8	+59.7	2.7	85 00.7	+59.7	3.2	86 00.6	+59.8	4.0	87 00.4	+59.9	5.3	88 00.0	+60.0	8.0	88
89	82 00.5	+59.5	1.0	83 00.5	+59.5	1.1	84 00.5	+59.5	1.3	85 00.5	+59.5	1.6	86 00.4	+59.6	2.0	87 00.4	+59.6	2.7	88 00.3	*+59.7* •	4.0	89 00.0	+60.0	8.0	89
90	83 00.0	+59.3	0.0	84 00.0	+59.3	0.0	85 00.0	+59.3	0.0	86 00.0	+59.2	0.0	87 00.0	+59.1	0.0	88 00.0	*+58.8* •	0.0	89 00.0	*+51.6* •	0.0	90 00.0	–60.0	4.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 172°, 188°

Dec.	83°			84°			85°			86°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	6 54.8	+60.0	170.9	5 55.6	+59.9	171.0	4 56.3	+60.0	171.0	3 57.0	+60.0	171.0
1	7 54.8	+60.0	170.9	6 55.5	+60.0	170.9	5 56.3	+60.0	171.0	4 57.0	+60.0	171.0
2	8 54.8	+60.0	170.9	7 55.5	+60.0	170.9	6 56.3	+60.0	170.9	5 57.0	+60.0	171.0
3	9 54.8	+60.0	170.9	8 55.5	+60.0	170.9	7 56.3	+60.0	170.9	6 57.0	+60.0	170.9
4	10 54.8	+59.9	170.9	9 55.5	+60.0	170.9	8 56.3	+60.0	170.9	7 57.0	+60.0	170.9
5	11 54.7	+60.0	170.8	10 55.5	+60.0	170.9	9 56.3	+60.0	170.9	8 57.0	+60.0	170.9
6	12 54.7	+60.0	170.8	11 55.5	+60.0	170.9	10 56.3	+60.0	170.9	9 57.0	+60.0	170.9
7	13 54.7	+60.0	170.8	12 55.5	+60.0	170.8	11 56.3	+60.0	170.9	10 57.0	+60.0	170.9
8	14 54.7	+60.0	170.8	13 55.5	+60.0	170.8	12 56.3	+59.9	170.9	11 57.0	+60.0	170.9
9	15 54.7	+60.0	170.8	14 55.5	+60.0	170.8	13 56.2	+60.0	170.8	12 57.0	+60.0	170.9
10	16 54.7	+60.0	170.7	15 55.5	+60.0	170.8	14 56.2	+60.0	170.8	13 57.0	+60.0	170.9
11	17 54.7	+60.0	170.7	16 55.5	+60.0	170.8	15 56.2	+60.0	170.8	14 57.0	+60.0	170.9
12	18 54.7	+60.0	170.7	17 55.5	+59.9	170.7	16 56.2	+60.0	170.8	15 57.0	+60.0	170.8
13	19 54.7	+59.9	170.7	18 55.4	+60.0	170.7	17 56.2	+60.0	170.8	16 57.0	+60.0	170.8
14	20 54.6	+60.0	170.6	19 55.4	+60.0	170.7	18 56.2	+60.0	170.8	17 57.0	+60.0	170.8
15	21 54.6	+60.0	170.6	20 55.4	+60.0	170.7	19 56.2	+60.0	170.8	18 57.0	+60.0	170.8
16	22 54.6	+60.0	170.6	21 55.4	+60.0	170.7	20 56.2	+60.0	170.7	19 57.0	+60.0	170.8
17	23 54.6	+60.0	170.6	22 55.4	+60.0	170.7	21 56.2	+60.0	170.7	20 57.0	+60.0	170.8
18	24 54.6	+60.0	170.6	23 55.4	+60.0	170.6	22 56.2	+60.0	170.7	21 57.0	+60.0	170.8
19	25 54.6	+60.0	170.5	24 55.4	+60.0	170.6	23 56.2	+60.0	170.7	22 57.0	+60.0	170.8
20	26 54.6	+59.9	170.5	25 55.4	+60.0	170.6	24 56.2	+60.0	170.7	23 57.0	+60.0	170.7
21	27 54.5	+60.0	170.5	26 55.4	+60.0	170.6	25 56.2	+60.0	170.7	24 57.0	+60.0	170.7
22	28 54.5	+60.0	170.5	27 55.4	+59.9	170.6	26 56.2	+60.0	170.6	25 57.0	+60.0	170.7
23	29 54.5	+60.0	170.4	28 55.3	+60.0	170.5	27 56.2	+59.9	170.6	26 57.0	+59.9	170.7
24	30 54.5	+60.0	170.4	29 55.3	+60.0	170.5	28 56.1	+60.0	170.6	27 56.9	+60.0	170.7
25	31 54.5	+60.0	170.4	30 55.3	+60.0	170.5	29 56.1	+60.0	170.6	28 56.9	+60.0	170.7
26	32 54.5	+60.0	170.4	31 55.3	+60.0	170.5	30 56.1	+60.0	170.6	29 56.9	+60.0	170.7
27	33 54.5	+59.9	170.3	32 55.3	+60.0	170.4	31 56.1	+60.0	170.5	30 56.9	+60.0	170.6
28	34 54.4	+60.0	170.3	33 55.3	+60.0	170.4	32 56.1	+60.0	170.5	31 56.9	+60.0	170.6
29	35 54.4	+60.0	170.3	34 55.3	+60.0	170.4	33 56.1	+60.0	170.5	32 56.9	+60.0	170.6
30	36 54.4	+60.0	170.2	35 55.3	+60.0	170.4	34 56.1	+60.0	170.5	33 56.9	+60.0	170.6
31	37 54.4	+60.0	170.2	36 55.3	+59.9	170.3	35 56.1	+60.0	170.5	34 56.9	+60.0	170.6
32	38 54.4	+60.0	170.2	37 55.2	+60.0	170.3	36 56.1	+60.0	170.4	35 56.9	+60.0	170.6
33	39 54.4	+59.9	170.2	38 55.2	+60.0	170.3	37 56.1	+60.0	170.4	36 56.9	+60.0	170.6
34	40 54.3	+60.0	170.1	39 55.2	+60.0	170.3	38 56.1	+60.0	170.4	37 56.9	+60.0	170.5
35	41 54.3	+60.0	170.1	40 55.2	+60.0	170.2	39 56.1	+59.9	170.4	38 56.9	+60.0	170.5
36	42 54.3	+60.0	170.1	41 55.2	+60.0	170.2	40 56.0	+60.0	170.4	39 56.9	+60.0	170.5
37	43 54.3	+60.0	170.0	42 55.2	+60.0	170.2	41 56.0	+60.0	170.3	40 56.9	+60.0	170.5
38	44 54.3	+59.9	170.0	43 55.2	+59.9	170.1	42 56.0	+60.0	170.3	41 56.9	+60.0	170.5
39	45 54.2	+60.0	169.9	44 55.1	+60.0	170.1	43 56.0	+60.0	170.3	42 56.9	+60.0	170.4
40	46 54.2	+60.0	169.9	45 55.1	+60.0	170.1	44 56.0	+60.0	170.3	43 56.9	+60.0	170.4
41	47 54.2	+60.0	169.9	46 55.1	+60.0	170.0	45 56.0	+60.0	170.2	44 56.9	+59.9	170.4
42	48 54.2	+59.9	169.8	47 55.1	+60.0	170.0	46 56.0	+60.0	170.2	45 56.8	+60.0	170.4
43	49 54.1	+60.0	169.8	48 55.1	+60.0	170.0	47 56.0	+60.0	170.2	46 56.8	+60.0	170.4
44	50 54.1	+60.0	169.7	49 55.1	+59.9	169.9	48 56.0	+59.9	170.1	47 56.8	+60.0	170.3
45	51 54.1	+60.0	169.7	50 55.0	+60.0	169.9	49 55.9	+60.0	170.1	48 56.8	+60.0	170.3
46	52 54.1	+59.9	169.6	51 55.0	+60.0	169.9	50 55.9	+60.0	170.1	49 56.8	+60.0	170.3
47	53 54.0	+60.0	169.6	52 55.0	+60.0	169.8	51 55.9	+60.0	170.0	50 56.8	+60.0	170.3
48	54 54.0	+60.0	169.5	53 55.0	+59.9	169.8	52 55.9	+60.0	170.0	51 56.8	+60.0	170.2
49	55 54.0	+59.9	169.5	54 54.9	+60.0	169.7	53 55.9	+60.0	170.0	52 56.8	+60.0	170.2
50	56 53.9	+60.0	169.4	55 54.9	+60.0	169.7	54 55.9	+60.0	169.9	53 56.8	+60.0	170.2
51	57 53.9	+59.9	169.3	56 54.9	+60.0	169.6	55 55.9	+59.9	169.9	54 56.8	+60.0	170.1
52	58 53.8	+60.0	169.3	57 54.9	+59.9	169.6	56 55.8	+60.0	169.8	55 56.8	+59.9	170.1
53	59 53.8	+60.0	169.2	58 54.8	+60.0	169.5	57 55.8	+60.0	169.8	56 56.7	+60.0	170.1
54	60 53.8	+59.9	169.1	59 54.8	+60.0	169.4	58 55.8	+60.0	169.7	57 56.7	+60.0	170.0
55	61 53.7	+60.0	169.0	60 54.8	+59.9	169.4	59 55.8	+60.0	169.7	58 56.7	+60.0	170.0
56	62 53.7	+59.9	168.9	61 54.7	+60.0	169.3	60 55.8	+59.9	169.6	59 56.7	+60.0	169.9
57	63 53.6	+59.9	168.8	62 54.7	+60.0	169.2	61 55.7	+60.0	169.6	60 56.7	+60.0	169.9
58	64 53.5	+60.0	168.7	63 54.7	+59.9	169.1	62 55.7	+60.0	169.5	61 56.7	+60.0	169.8
59	65 53.5	+59.9	168.6	64 54.6	+60.0	169.0	63 55.7	+59.9	169.4	62 56.7	+59.9	169.8
60	66 53.4	+59.9	168.5	65 54.6	+59.9	169.0	64 55.6	+60.0	169.4	63 56.6	+60.0	169.7
61	67 53.3	+60.0	168.4	66 54.5	+60.0	168.9	65 55.6	+60.0	169.3	64 56.6	+60.0	169.7
62	68 53.3	+59.9	168.2	67 54.5	+59.9	168.7	66 55.6	+59.9	169.2	65 56.6	+60.0	169.6
63	69 53.2	+59.9	168.1	68 54.4	+59.9	168.6	67 55.5	+60.0	169.1	66 56.6	+59.9	169.6
64	70 53.1	+59.9	167.9	69 54.3	+60.0	168.5	68 55.5	+60.0	169.0	67 56.5	+60.0	169.5
65	71 53.0	+59.8	167.7	70 54.3	+59.9	168.3	69 55.5	+59.9	168.9	68 56.5	+60.0	169.4
66	72 52.8	+59.9	167.5	71 54.2	+59.9	168.2	70 55.4	+59.9	168.8	69 56.5	+60.0	169.3
67	73 52.7	+59.9	167.3	72 54.1	+59.9	168.0	71 55.3	+60.0	168.6	70 56.5	+59.9	169.2
68	74 52.6	+59.8	167.0	73 54.0	+59.9	167.8	72 55.3	+59.9	168.5	71 56.4	+60.0	169.1
69	75 52.4	+59.8	166.7	74 53.9	+59.9	167.6	73 55.2	+59.9	168.3	72 56.4	+59.9	169.0
70	76 52.2	+59.8	166.4	75 53.8	+59.8	167.3	74 55.1	+59.9	168.1	73 56.3	+60.0	168.8
71	77 52.0	+59.7	166.0	76 53.6	+59.9	167.0	75 55.0	+59.9	167.9	74 56.3	+59.9	168.7
72	78 51.7	+59.7	165.5	77 53.5	+59.8	166.7	76 54.9	+59.9	167.7	75 56.2	+60.0	168.5
73	79 51.4	+59.6	164.9	78 53.3	+59.7	166.3	77 54.8	+59.9	167.4	76 56.2	+59.9	168.3
74	80 51.0	+59.5	164.3	79 53.0	+59.7	165.8	78 54.7	+59.8	167.0	77 56.1	+59.9	168.1
75	81 50.5	+59.4	163.4	80 52.7	+59.7	165.2	79 54.5	+59.8	166.6	78 56.0	+59.9	167.8
76	82 49.9	+59.2	162.3	81 52.4	+59.5	164.5	80 54.3	+59.8	166.1	79 55.9	+59.9	167.5
77	83 49.1	+58.8	160.9	82 51.9	+59.4	163.5	81 54.1	+59.7	165.5	80 55.8	+59.8	167.1
78	84 47.9	+58.4	159.0	83 51.3	+59.2	162.3	82 53.8	+59.5	164.8	81 55.6	+59.8	166.6
79	85 46.3	+57.3	156.1	84 50.5	+58.7	160.6	83 53.3	+59.4	163.7	82 55.4	+59.7	166.0
80	86 43.6	*+55.2*	•151.6	85 49.2	+58.0	158.1	84 52.7	+59.2	162.3	83 55.1	+59.6	165.1
81	87 38.8	*+48.8*	•143.4	86 47.2	*+56.3*	•154.1	85 51.9	+58.5	160.2	84 54.7	+59.5	164.0
82	88 27.6	*+26.7*	•125.9	87 43.5	*+51.0*	•146.7	86 50.4	*+57.3*	•156.7	85 54.2	+59.1	162.3
83	88 54.3	*−19.8*	•85.5	88 34.5	*+29.1*	•129.9	87 47.7	*+53.2*	•150.3	86 53.3	+58.2	159.4
84	88 34.5	*−46.8*	•41.1	89 03.6	*−22.7*	•85.5	88 40.9	*+32.1*	•134.7	87 51.5	*+55.2*	•154.1
85	87 47.7	*−54.4*	•20.8	88 40.9	*−49.4*	•36.4	89 13.0	*−26.3*	•85.5	88 46.7	*+35.7*	•140.2
86	86 53.3	−57.1	11.6	87 51.5	*−55.9*	•17.0	88 46.7	*−52.1*	•30.8	89 22.4	*−30.7*	•85.5
87	85 56.2	−58.3	6.6	86 55.6	−57.8	8.8	87 54.6	*−57.0*	•13.0	88 51.7	*−54.6*	•24.3
88	84 57.9	−58.8	3.6	85 57.8	−58.7	4.4	86 57.6	−58.5	5.9	87 57.1	*−58.1*	•8.8
89	83 59.1	−59.1	1.5	84 59.1	−59.1	1.8	85 59.1	−59.1	2.2	86 59.0	−59.0	3.0
90	83 00.0	−59.4	0.0	84 00.0	−59.4	0.0	85 00.0	−59.4	0.0	86 00.0	−59.4	0.0
	83°			84°			85°			86°		

87°			88°			89°			90°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
2 57.8	+60.0	171.0	1 58.5	+60.0	171.0	0 59.3	+60.0	171.0	0 00.0	+60.0	171.0	**0**
3 57.8	+60.0	171.0	2 58.5	+60.0	171.0	1 59.3	+60.0	171.0	1 00.0	+60.0	171.0	**1**
4 57.8	+60.0	171.0	3 58.5	+60.0	171.0	2 59.3	+60.0	171.0	2 00.0	+60.0	171.0	**2**
5 57.8	+60.0	171.0	4 58.5	+60.0	171.0	3 59.3	+60.0	171.0	3 00.0	+60.0	171.0	**3**
6 57.8	+60.0	171.0	5 58.5	+60.0	171.0	4 59.3	+60.0	171.0	4 00.0	+60.0	171.0	**4**
7 57.8	+60.0	170.9	6 58.5	+60.0	171.0	5 59.3	+60.0	171.0	5 00.0	+60.0	171.0	**5**
8 57.8	+60.0	170.9	7 58.5	+60.0	171.0	6 59.3	+60.0	171.0	6 00.0	+60.0	171.0	**6**
9 57.8	+60.0	170.9	8 58.5	+60.0	171.0	7 59.3	+60.0	171.0	7 00.0	+60.0	171.0	**7**
10 57.8	+60.0	170.9	9 58.5	+60.0	171.0	8 59.3	+60.0	171.0	8 00.0	+60.0	171.0	**8**
11 57.8	+60.0	170.9	10 58.5	+60.0	170.9	9 59.3	+60.0	171.0	9 00.0	+60.0	171.0	**9**
12 57.8	+60.0	170.9	11 58.5	+60.0	170.9	10 59.3	+60.0	171.0	10 00.0	+60.0	171.0	**10**
13 57.8	+60.0	170.9	12 58.5	+60.0	170.9	11 59.3	+60.0	171.0	11 00.0	+60.0	171.0	**11**
14 57.8	+60.0	170.9	13 58.5	+60.0	170.9	12 59.3	+60.0	171.0	12 00.0	+60.0	171.0	**12**
15 57.8	+60.0	170.9	14 58.5	+60.0	170.9	13 59.3	+60.0	171.0	13 00.0	+60.0	171.0	**13**
16 57.8	+60.0	170.9	15 58.5	+60.0	170.9	14 59.3	+60.0	171.0	14 00.0	+60.0	171.0	**14**
17 57.8	+59.9	170.9	16 58.5	+60.0	170.9	15 59.3	+60.0	171.0	15 00.0	+60.0	171.0	**15**
18 57.7	+60.0	170.9	17 58.5	+60.0	170.9	16 59.3	+60.0	171.0	16 00.0	+60.0	171.0	**16**
19 57.7	+60.0	170.8	18 58.5	+60.0	170.9	17 59.3	+60.0	171.0	17 00.0	+60.0	171.0	**17**
20 57.7	+60.0	170.8	19 58.5	+60.0	170.9	18 59.3	+60.0	170.9	18 00.0	+60.0	171.0	**18**
21 57.7	+60.0	170.8	20 58.5	+60.0	170.9	19 59.3	+60.0	170.9	19 00.0	+60.0	171.0	**19**
22 57.7	+60.0	170.8	21 58.5	+60.0	170.9	20 59.3	+60.0	170.9	20 00.0	+60.0	171.0	**20**
23 57.7	+60.0	170.8	22 58.5	+60.0	170.9	21 59.3	+60.0	170.9	21 00.0	+60.0	171.0	**21**
24 57.7	+60.0	170.8	23 58.5	+60.0	170.9	22 59.3	+60.0	170.9	22 00.0	+60.0	171.0	**22**
25 57.7	+60.0	170.8	24 58.5	+60.0	170.9	23 59.3	+60.0	170.9	23 00.0	+60.0	171.0	**23**
26 57.7	+60.0	170.8	25 58.5	+60.0	170.9	24 59.3	+60.0	170.9	24 00.0	+60.0	171.0	**24**
27 57.7	+60.0	170.8	26 58.5	+60.0	170.8	25 59.3	+60.0	170.9	25 00.0	+60.0	171.0	**25**
28 57.7	+60.0	170.8	27 58.5	+60.0	170.8	26 59.3	+60.0	170.9	26 00.0	+60.0	171.0	**26**
29 57.7	+60.0	170.7	28 58.5	+60.0	170.8	27 59.3	+60.0	170.9	27 00.0	+60.0	171.0	**27**
30 57.7	+60.0	170.7	29 58.5	+60.0	170.8	28 59.3	+60.0	170.9	28 00.0	+60.0	171.0	**28**
31 57.7	+60.0	170.7	30 58.5	+60.0	170.8	29 59.3	+60.0	170.9	29 00.0	+60.0	171.0	**29**
32 57.7	+60.0	170.7	31 58.5	+60.0	170.8	30 59.3	+60.0	170.9	30 00.0	+60.0	171.0	**30**
33 57.7	+60.0	170.7	32 58.5	+60.0	170.8	31 59.3	+60.0	170.9	31 00.0	+60.0	171.0	**31**
34 57.7	+60.0	170.7	33 58.5	+60.0	170.8	32 59.3	+60.0	170.9	32 00.0	+60.0	171.0	**32**
35 57.7	+60.0	170.7	34 58.5	+60.0	170.8	33 59.3	+60.0	170.9	33 00.0	+60.0	171.0	**33**
36 57.7	+60.0	170.7	35 58.5	+60.0	170.8	34 59.3	+60.0	170.9	34 00.0	+60.0	171.0	**34**
37 57.7	+60.0	170.6	36 58.5	+60.0	170.8	35 59.3	+60.0	170.9	35 00.0	+60.0	171.0	**35**
38 57.7	+60.0	170.6	37 58.5	+60.0	170.8	36 59.3	+60.0	170.9	36 00.0	+60.0	171.0	**36**
39 57.7	+60.0	170.6	38 58.5	+60.0	170.8	37 59.3	+60.0	170.9	37 00.0	+60.0	171.0	**37**
40 57.7	+60.0	170.6	39 58.5	+60.0	170.7	38 59.3	+60.0	170.9	38 00.0	+60.0	171.0	**38**
41 57.7	+60.0	170.6	40 58.5	+60.0	170.7	39 59.3	+60.0	170.9	39 00.0	+60.0	171.0	**39**
42 57.7	+60.0	170.6	41 58.5	+60.0	170.7	40 59.3	+59.9	170.9	40 00.0	+60.0	171.0	**40**
43 57.7	+60.0	170.6	42 58.5	+60.0	170.7	41 59.2	+60.0	170.9	41 00.0	+60.0	171.0	**41**
44 57.7	+60.0	170.5	43 58.5	+60.0	170.7	42 59.2	+60.0	170.9	42 00.0	+60.0	171.0	**42**
45 57.7	+60.0	170.5	44 58.5	+60.0	170.7	43 59.2	+60.0	170.9	43 00.0	+60.0	171.0	**43**
46 57.7	+60.0	170.5	45 58.5	+60.0	170.7	44 59.2	+60.0	170.8	44 00.0	+60.0	171.0	**44**
47 57.7	+60.0	170.5	46 58.5	+60.0	170.7	45 59.2	+60.0	170.8	45 00.0	+60.0	171.0	**45**
48 57.7	+60.0	170.5	47 58.5	+60.0	170.7	46 59.2	+60.0	170.8	46 00.0	+60.0	171.0	**46**
49 57.7	+59.9	170.5	48 58.5	+60.0	170.6	47 59.2	+60.0	170.8	47 00.0	+60.0	171.0	**47**
50 57.6	+60.0	170.4	49 58.5	+60.0	170.6	48 59.2	+60.0	170.8	48 00.0	+60.0	171.0	**48**
51 57.6	+60.0	170.4	50 58.5	+60.0	170.6	49 59.2	+60.0	170.8	49 00.0	+60.0	171.0	**49**
52 57.6	+60.0	170.4	51 58.5	+60.0	170.6	50 59.2	+60.0	170.8	50 00.0	+60.0	171.0	**50**
53 57.6	+60.0	170.4	52 58.5	+60.0	170.6	51 59.2	+60.0	170.8	51 00.0	+60.0	171.0	**51**
54 57.6	+60.0	170.3	53 58.5	+60.0	170.6	52 59.2	+60.0	170.8	52 00.0	+60.0	171.0	**52**
55 57.6	+60.0	170.3	54 58.5	+59.9	170.6	53 59.2	+60.0	170.8	53 00.0	+60.0	171.0	**53**
56 57.6	+60.0	170.3	55 58.4	+60.0	170.5	54 59.2	+60.0	170.8	54 00.0	+60.0	171.0	**54**
57 57.6	+60.0	170.3	56 58.4	+60.0	170.5	55 59.2	+60.0	170.8	55 00.0	+60.0	171.0	**55**
58 57.6	+60.0	170.2	57 58.4	+60.0	170.5	56 59.2	+60.0	170.8	56 00.0	+60.0	171.0	**56**
59 57.6	+60.0	170.2	58 58.4	+60.0	170.5	57 59.2	+60.0	170.8	57 00.0	+60.0	171.0	**57**
60 57.6	+60.0	170.2	59 58.4	+60.0	170.5	58 59.2	+60.0	170.7	58 00.0	+60.0	171.0	**58**
61 57.6	+60.0	170.1	60 58.4	+60.0	170.4	59 59.2	+60.0	170.7	59 00.0	+60.0	171.0	**59**
62 57.6	+60.0	170.1	61 58.4	+60.0	170.4	60 59.2	+60.0	170.7	60 00.0	+60.0	171.0	**60**
63 57.6	+59.9	170.1	62 58.4	+60.0	170.4	61 59.2	+60.0	170.7	61 00.0	+60.0	171.0	**61**
64 57.5	+60.0	170.0	63 58.4	+60.0	170.4	62 59.2	+60.0	170.7	62 00.0	+60.0	171.0	**62**
65 57.5	+60.0	170.0	64 58.4	+60.0	170.3	63 59.2	+60.0	170.7	63 00.0	+60.0	171.0	**63**
66 57.5	+60.0	169.9	65 58.4	+60.0	170.3	64 59.2	+60.0	170.7	64 00.0	+60.0	171.0	**64**
67 57.5	+60.0	169.9	66 58.4	+60.0	170.3	65 59.2	+60.0	170.7	65 00.0	+60.0	171.0	**65**
68 57.5	+60.0	169.8	67 58.4	+60.0	170.2	66 59.2	+60.0	170.6	66 00.0	+60.0	171.0	**66**
69 57.5	+60.0	169.7	68 58.4	+60.0	170.2	67 59.2	+60.0	170.6	67 00.0	+60.0	171.0	**67**
70 57.5	+59.9	169.7	69 58.4	+60.0	170.1	68 59.2	+60.0	170.6	68 00.0	+60.0	171.0	**68**
71 57.4	+60.0	169.6	70 58.4	+60.0	170.1	69 59.2	+60.0	170.6	69 00.0	+60.0	171.0	**69**
72 57.4	+60.0	169.5	71 58.4	+60.0	170.0	70 59.2	+60.0	170.5	70 00.0	+60.0	171.0	**70**
73 57.4	+60.0	169.4	72 58.4	+59.9	170.0	71 59.2	+60.0	170.5	71 00.0	+60.0	171.0	**71**
74 57.4	+59.9	169.3	73 58.3	+60.0	169.9	72 59.2	+60.0	170.5	72 00.0	+60.0	171.0	**72**
75 57.3	+60.0	169.1	74 58.3	+60.0	169.8	73 59.2	+60.0	170.5	73 00.0	+60.0	171.0	**73**
76 57.3	+59.9	169.0	75 58.3	+60.0	169.8	74 59.2	+60.0	170.4	74 00.0	+60.0	171.0	**74**
77 57.2	+60.0	168.8	76 58.3	+60.0	169.7	75 59.2	+60.0	170.4	75 00.0	+60.0	171.0	**75**
78 57.2	+59.9	168.6	77 58.3	+60.0	169.5	76 59.2	+60.0	170.3	76 00.0	+60.0	171.0	**76**
79 57.1	+60.0	168.4	78 58.3	+59.9	169.4	77 59.2	+60.0	170.3	77 00.0	+60.0	171.0	**77**
80 57.1	+59.9	168.1	79 58.2	+60.0	169.2	78 59.2	+60.0	170.2	78 00.0	+60.0	171.0	**78**
81 57.0	+59.9	167.7	80 58.2	+60.0	169.0	79 59.2	+60.0	170.1	79 00.0	+60.0	171.0	**79**
82 56.9	+59.8	167.2	81 58.2	+59.9	168.8	80 59.2	+60.0	170.0	80 00.0	+60.0	171.0	**80**
83 56.7	+59.8	166.6	82 58.1	+59.9	168.5	81 59.2	+60.0	169.9	81 00.0	+60.0	171.0	**81**
84 56.5	+59.7	165.7	83 58.0	+59.9	168.0	82 59.2	+59.9	169.7	82 00.0	+60.0	171.0	**82**
85 56.2	+59.4	164.4	84 57.9	+59.9	167.5	83 59.1	+60.0	169.5	83 00.0	+60.0	171.0	**83**
86 55.6	+59.0	162.2	85 57.8	+59.8	166.6	84 59.1	+60.0	169.2	84 00.0	+60.0	171.0	**84**
87 54.6	*+57.1*	•158.0	86 57.6	+59.5	165.1	85 59.1	+59.9	168.8	85 00.0	+60.0	171.0	**85**
88 51.7	*+40.1*	•146.7	87 57.1	*+58.6*	•162.2	86 59.0	+59.9	168.0	86 00.0	+60.0	171.0	**86**
89 31.8	*−36.1*	•85.5	88 55.7	*+45.5*	•154.0	87 58.9	*+59.6*	•166.6	87 00.0	+60.0	171.0	**87**
88 55.7	*−56.8*	•17.0	89 41.2	*−42.7*	•85.5	88 58.5	*+52.1*	•162.2	88 00.0	+60.0	171.0	**88**
87 58.9	−58.9	4.4	88 58.5	*−58.5*	•8.8	89 50.6	*−50.6*	•85.5	89 00.0	+60.0	171.0	**89**
87 00.0	−59.4	0.0	88 00.0	−59.5	0.0	89 00.0	*−59.6*	•0.0	90 00.0	−60.0	85.5	**90**
87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 9°, 351°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 54.8	–60.0	170.9	5 55.6	–60.0	171.0	4 56.3	–60.0	171.0	3 57.0	–60.0	171.0	2 57.8	–60.0	171.0	1 58.5	–60.0	171.0	0 59.3	–60.0	171.0	0 00.0	+60.0	9.0	**0**
1	5 54.8	–60.0	171.0	4 55.6	–60.0	171.0	3 56.3	–60.0	171.0	2 57.0	–60.0	171.0	1 57.8	–60.0	171.0	0 58.5	–60.0	171.0	0 00.7	+60.0	9.0	1 00.0	+60.0	9.0	**1**
2	4 54.8	–60.0	171.0	3 55.6	–60.0	171.0	2 56.3	–60.0	171.0	1 57.0	–59.9	171.0	0 57.8	–60.0	171.0	0 01.5	+60.0	9.0	1 00.7	+60.0	9.0	2 00.0	+60.0	9.0	**2**
3	3 54.8	–60.0	171.0	2 55.6	–60.0	171.0	1 56.3	–60.0	171.0	0 57.1	–60.0	171.0	0 02.2	+60.0	9.0	1 01.5	+60.0	9.0	2 00.7	+60.0	9.0	3 00.0	+60.0	9.0	**3**
4	2 54.8	–59.9	171.0	1 55.6	–60.0	171.0	0 56.3	–60.0	171.0	0 02.9	+60.0	9.0	1 02.2	+60.0	9.0	2 01.5	+60.0	9.0	3 00.7	+60.0	9.0	4 00.0	+60.0	9.0	**4**
5	1 54.9	–60.0	171.0	0 55.6	–60.0	171.0	0 03.7	+60.0	9.0	1 02.9	+60.0	9.0	2 02.2	+60.0	9.0	3 01.5	+60.0	9.0	4 00.7	+60.0	9.0	5 00.0	+60.0	9.0	**5**
6	0 54.9	–60.0	171.0	0 04.4	+60.0	9.0	1 03.7	+60.0	9.0	2 02.9	+60.0	9.0	3 02.2	+60.0	9.0	4 01.5	+60.0	9.0	5 00.7	+60.0	9.0	6 00.0	+60.0	9.0	**6**
7	0 05.1	+60.0	8.9	1 04.4	+60.0	8.9	2 03.7	+60.0	8.9	3 02.9	+60.0	8.9	4 02.2	+60.0	9.0	5 01.5	+60.0	9.0	6 00.7	+60.0	9.0	7 00.0	+60.0	9.0	**7**
8	1 05.1	+60.0	8.9	2 04.4	+60.0	8.9	3 03.7	+60.0	8.9	4 02.9	+60.0	8.9	5 02.2	+60.0	8.9	6 01.5	+60.0	9.0	7 00.7	+60.0	9.0	8 00.0	+60.0	9.0	**8**
9	2 05.1	+60.0	8.9	3 04.4	+60.0	8.9	4 03.7	+59.9	8.9	5 02.9	+60.0	8.9	6 02.2	+60.0	8.9	7 01.5	+60.0	9.0	8 00.7	+60.0	9.0	9 00.0	+60.0	9.0	**9**
10	3 05.1	+60.0	8.9	4 04.4	+60.0	8.9	5 03.6	+60.0	8.9	6 02.9	+60.0	8.9	7 02.2	+60.0	8.9	8 01.5	+60.0	9.0	9 00.7	+60.0	9.0	10 00.0	+60.0	9.0	**10**
11	4 05.1	+60.0	8.9	5 04.4	+60.0	8.9	6 03.6	+60.0	8.9	7 02.9	+60.0	8.9	8 02.2	+60.0	8.9	9 01.5	+60.0	8.9	10 00.7	+60.0	9.0	11 00.0	+60.0	9.0	**11**
12	5 05.1	+60.0	8.8	6 04.4	+59.9	8.9	7 03.6	+60.0	8.9	8 02.9	+60.0	8.9	9 02.2	+60.0	8.9	10 01.5	+60.0	8.9	11 00.7	+60.0	9.0	12 00.0	+60.0	9.0	**12**
13	6 05.1	+59.9	8.8	7 04.3	+60.0	8.8	8 03.6	+60.0	8.9	9 02.9	+60.0	8.9	10 02.2	+60.0	8.9	11 01.5	+60.0	8.9	12 00.7	+60.0	9.0	13 00.0	+60.0	9.0	**13**
14	7 05.0	+60.0	8.8	8 04.3	+60.0	8.8	9 03.6	+60.0	8.8	10 02.9	+60.0	8.9	11 02.2	+60.0	8.9	12 01.5	+60.0	8.9	13 00.7	+60.0	9.0	14 00.0	+60.0	9.0	**14**
15	8 05.0	+60.0	8.8	9 04.3	+60.0	8.8	10 03.6	+60.0	8.8	11 02.9	+60.0	8.9	12 02.2	+60.0	8.9	13 01.5	+60.0	8.9	14 00.7	+60.0	9.0	15 00.0	+60.0	9.0	**15**
16	9 05.0	+60.0	8.8	10 04.3	+60.0	8.8	11 03.6	+60.0	8.8	12 02.9	+60.0	8.8	13 02.2	+60.0	8.9	14 01.5	+60.0	8.9	15 00.7	+60.0	9.0	16 00.0	+60.0	9.0	**16**
17	10 05.0	+60.0	8.7	11 04.3	+60.0	8.8	12 03.6	+60.0	8.8	13 02.9	+60.0	8.8	14 02.2	+60.0	8.9	15 01.5	+60.0	8.9	16 00.7	+60.0	9.0	17 00.0	+60.0	9.0	**17**
18	11 05.0	+60.0	8.7	12 04.3	+60.0	8.8	13 03.6	+60.0	8.8	14 02.9	+60.0	8.8	15 02.2	+60.0	8.9	16 01.5	+60.0	8.9	17 00.7	+60.0	9.0	18 00.0	+60.0	9.0	**18**
19	12 05.0	+60.0	8.7	13 04.3	+60.0	8.7	14 03.6	+60.0	8.8	15 02.9	+60.0	8.8	16 02.2	+60.0	8.9	17 01.5	+60.0	8.9	18 00.7	+60.0	8.9	19 00.0	+60.0	9.0	**19**
20	13 05.0	+60.0	8.7	14 04.3	+60.0	8.7	15 03.6	+60.0	8.8	16 02.9	+60.0	8.8	17 02.2	+60.0	8.8	18 01.5	+60.0	8.9	19 00.7	+60.0	8.9	20 00.0	+60.0	9.0	**20**
21	14 05.0	+60.0	8.7	15 04.3	+60.0	8.7	16 03.6	+60.0	8.7	17 02.9	+60.0	8.8	18 02.2	+60.0	8.8	19 01.5	+60.0	8.9	20 00.7	+60.0	8.9	21 00.0	+60.0	9.0	**21**
22	15 05.0	+59.9	8.6	16 04.3	+60.0	8.7	17 03.6	+60.0	8.7	18 02.9	+60.0	8.8	19 02.2	+60.0	8.8	20 01.5	+60.0	8.9	21 00.7	+60.0	8.9	22 00.0	+60.0	9.0	**22**
23	16 04.9	+60.0	8.6	17 04.3	+60.0	8.7	18 03.6	+60.0	8.7	19 02.9	+60.0	8.8	20 02.2	+60.0	8.8	21 01.5	+60.0	8.9	22 00.7	+60.0	8.9	23 00.0	+60.0	9.0	**23**
24	17 04.9	+60.0	8.6	18 04.3	+59.9	8.6	19 03.6	+60.0	8.7	20 02.9	+60.0	8.8	21 02.2	+60.0	8.8	22 01.5	+60.0	8.9	23 00.7	+60.0	8.9	24 00.0	+60.0	9.0	**24**
25	18 04.9	+60.0	8.6	19 04.2	+60.0	8.6	20 03.6	+60.0	8.7	21 02.9	+60.0	8.7	22 02.2	+60.0	8.8	23 01.5	+60.0	8.9	24 00.7	+60.0	8.9	25 00.0	+60.0	9.0	**25**
26	19 04.9	+60.0	8.6	20 04.2	+60.0	8.6	21 03.6	+59.9	8.7	22 02.9	+60.0	8.7	23 02.2	+60.0	8.8	24 01.5	+60.0	8.9	25 00.7	+60.0	8.9	26 00.0	+60.0	9.0	**26**
27	20 04.9	+60.0	8.5	21 04.2	+60.0	8.6	22 03.5	+60.0	8.6	23 02.9	+60.0	8.7	24 02.2	+60.0	8.8	25 01.5	+60.0	8.8	26 00.7	+60.0	8.9	27 00.0	+60.0	9.0	**27**
28	21 04.9	+60.0	8.5	22 04.2	+60.0	8.6	23 03.5	+60.0	8.6	24 02.9	+59.9	8.7	25 02.2	+60.0	8.8	26 01.5	+60.0	8.8	27 00.7	+60.0	8.9	28 00.0	+60.0	9.0	**28**
29	22 04.9	+60.0	8.5	23 04.2	+60.0	8.6	24 03.5	+60.0	8.6	25 02.8	+60.0	8.7	26 02.2	+60.0	8.8	27 01.5	+59.9	8.8	28 00.7	+60.0	8.9	29 00.0	+60.0	9.0	**29**
30	23 04.9	+59.9	8.5	24 04.2	+60.0	8.5	25 03.5	+60.0	8.6	26 02.8	+60.0	8.7	27 02.2	+60.0	8.7	28 01.4	+60.0	8.8	29 00.7	+60.0	8.9	30 00.0	+60.0	9.0	**30**
31	24 04.8	+60.0	8.4	25 04.2	+60.0	8.5	26 03.5	+60.0	8.6	27 02.8	+60.0	8.7	28 02.2	+59.9	8.7	29 01.4	+60.0	8.8	30 00.7	+60.0	8.9	31 00.0	+60.0	9.0	**31**
32	25 04.8	+60.0	8.4	26 04.2	+60.0	8.5	27 03.5	+60.0	8.6	28 02.8	+60.0	8.6	29 02.1	+60.0	8.7	30 01.4	+60.0	8.8	31 00.7	+60.0	8.9	32 00.0	+60.0	9.0	**32**
33	26 04.8	+60.0	8.4	27 04.2	+60.0	8.5	28 03.5	+60.0	8.5	29 02.8	+60.0	8.6	30 02.1	+60.0	8.7	31 01.4	+60.0	8.8	32 00.7	+60.0	8.9	33 00.0	+60.0	9.0	**33**
34	27 04.8	+60.0	8.4	28 04.2	+59.9	8.5	29 03.5	+60.0	8.5	30 02.8	+60.0	8.6	31 02.1	+60.0	8.7	32 01.4	+60.0	8.8	33 00.7	+60.0	8.9	34 00.0	+60.0	9.0	**34**
35	28 04.8	+60.0	8.4	29 04.1	+60.0	8.4	30 03.5	+60.0	8.5	31 02.8	+60.0	8.6	32 02.1	+60.0	8.7	33 01.4	+60.0	8.8	34 00.7	+60.0	8.9	35 00.0	+60.0	9.0	**35**
36	29 04.8	+60.0	8.3	30 04.1	+60.0	8.4	31 03.5	+60.0	8.5	32 02.8	+60.0	8.6	33 02.1	+60.0	8.7	34 01.4	+60.0	8.8	35 00.7	+60.0	8.9	36 00.0	+60.0	9.0	**36**
37	30 04.8	+59.9	8.3	31 04.1	+60.0	8.4	32 03.5	+60.0	8.5	33 02.8	+60.0	8.6	34 02.1	+60.0	8.7	35 01.4	+60.0	8.8	36 00.7	+60.0	8.9	37 00.0	+60.0	9.0	**37**
38	31 04.7	+60.0	8.3	32 04.1	+60.0	8.4	33 03.5	+60.0	8.5	34 02.8	+60.0	8.6	35 02.1	+60.0	8.7	36 01.4	+60.0	8.8	37 00.7	+60.0	8.9	38 00.0	+60.0	9.0	**38**
39	32 04.7	+60.0	8.2	33 04.1	+60.0	8.3	34 03.5	+60.0	8.4	35 02.8	+60.0	8.5	36 02.1	+60.0	8.6	37 01.4	+60.0	8.8	38 00.7	+60.0	8.9	39 00.0	+60.0	9.0	**39**
40	33 04.7	+60.0	8.2	34 04.1	+60.0	8.3	35 03.5	+59.9	8.4	36 02.8	+60.0	8.5	37 02.1	+60.0	8.6	38 01.4	+60.0	8.8	39 00.7	+60.0	8.9	40 00.0	+60.0	9.0	**40**
41	34 04.7	+60.0	8.2	35 04.1	+60.0	8.3	36 03.4	+60.0	8.4	37 02.8	+60.0	8.5	38 02.1	+60.0	8.6	39 01.4	+60.0	8.7	40 00.7	+60.0	8.9	41 00.0	+60.0	9.0	**41**
42	35 04.7	+60.0	8.2	36 04.1	+60.0	8.3	37 03.4	+60.0	8.4	38 02.8	+60.0	8.5	39 02.1	+60.0	8.6	40 01.4	+60.0	8.7	41 00.7	+60.0	8.9	42 00.0	+60.0	9.0	**42**
43	36 04.7	+59.9	8.1	37 04.1	+59.9	8.2	38 03.4	+60.0	8.4	39 02.8	+60.0	8.5	40 02.1	+60.0	8.6	41 01.4	+60.0	8.7	42 00.7	+60.0	8.9	43 00.0	+60.0	9.0	**43**
44	37 04.6	+60.0	8.1	38 04.0	+60.0	8.2	39 03.4	+60.0	8.3	40 02.8	+60.0	8.5	41 02.1	+60.0	8.6	42 01.4	+60.0	8.7	43 00.7	+60.0	8.9	44 00.0	+60.0	9.0	**44**
45	38 04.6	+60.0	8.1	39 04.0	+60.0	8.2	40 03.4	+60.0	8.3	41 02.8	+60.0	8.4	42 02.1	+60.0	8.6	43 01.4	+60.0	8.7	44 00.7	+60.0	8.8	45 00.0	+60.0	9.0	**45**
46	39 04.6	+60.0	8.0	40 04.0	+60.0	8.2	41 03.4	+60.0	8.3	42 02.8	+60.0	8.4	43 02.1	+60.0	8.5	44 01.4	+60.0	8.7	45 00.7	+60.0	8.8	46 00.0	+60.0	9.0	**46**
47	40 04.6	+60.0	8.0	41 04.0	+60.0	8.1	42 03.4	+60.0	8.3	43 02.8	+59.9	8.4	44 02.1	+60.0	8.5	45 01.4	+60.0	8.7	46 00.7	+60.0	8.8	47 00.0	+60.0	9.0	**47**
48	41 04.6	+60.0	8.0	42 04.0	+60.0	8.1	43 03.4	+60.0	8.2	44 02.7	+60.0	8.4	45 02.1	+60.0	8.5	46 01.4	+60.0	8.7	47 00.7	+60.0	8.8	48 00.0	+60.0	9.0	**48**
49	42 04.6	+59.9	7.9	43 04.0	+60.0	8.1	44 03.4	+60.0	8.2	45 02.7	+60.0	8.4	46 02.1	+60.0	8.5	47 01.4	+60.0	8.7	48 00.7	+60.0	8.8	49 00.0	+60.0	9.0	**49**
50	43 04.5	+60.0	7.9	44 04.0	+59.9	8.0	45 03.4	+59.9	8.2	46 02.7	+60.0	8.3	47 02.1	+60.0	8.5	48 01.4	+60.0	8.6	49 00.7	+60.0	8.8	50 00.0	+60.0	9.0	**50**
51	44 04.5	+60.0	7.9	45 03.9	+60.0	8.0	46 03.3	+60.0	8.2	47 02.7	+60.0	8.3	48 02.1	+60.0	8.5	49 01.4	+60.0	8.6	50 00.7	+60.0	8.8	51 00.0	+60.0	9.0	**51**
52	45 04.5	+60.0	7.8	46 03.9	+60.0	8.0	47 03.3	+60.0	8.1	48 02.7	+60.0	8.3	49 02.1	+60.0	8.4	50 01.4	+60.0	8.6	51 00.7	+60.0	8.8	52 00.0	+60.0	9.0	**52**
53	46 04.5	+59.9	7.8	47 03.9	+60.0	7.9	48 03.3	+60.0	8.1	49 02.7	+60.0	8.3	50 02.1	+60.0	8.4	51 01.4	+60.0	8.6	52 00.7	+60.0	8.8	53 00.0	+60.0	9.0	**53**
54	47 04.4	+60.0	7.8	48 03.9	+60.0	7.9	49 03.3	+60.0	8.1	50 02.7	+60.0	8.2	51 02.1	+60.0	8.4	52 01.4	+60.0	8.6	53 00.7	+60.0	8.8	54 00.0	+60.0	9.0	**54**
55	48 04.4	+60.0	7.7	49 03.9	+60.0	7.9	50 03.3	+60.0	8.0	51 02.7	+60.0	8.2	52 02.1	+60.0	8.4	53 01.4	+60.0	8.6	54 00.7	+60.0	8.8	55 00.0	+60.0	9.0	**55**
56	49 04.4	+60.0	7.7	50 03.9	+59.9	7.8	51 03.3	+60.0	8.0	52 02.7	+60.0	8.2	53 02.1	+60.0	8.4	54 01.4	+60.0	8.6	55 00.7	+60.0	8.8	56 00.0	+60.0	9.0	**56**
57	50 04.4	+59.9	7.6	51 03.8	+60.0	7.8	52 03.3	+60.0	8.0	53 02.7	+60.0	8.1	54 02.1	+59.9	8.3	55 01.4	+60.0	8.5	56 00.7	+60.0	8.8	57 00.0	+60.0	9.0	**57**
58	51 04.3	+60.0	7.6	52 03.8	+60.0	7.7	53 03.3	+59.9	7.9	54 02.7	+60.0	8.1	55 02.0	+60.0	8.3	56 01.4	+60.0	8.5	57 00.7	+60.0	8.8	58 00.0	+60.0	9.0	**58**
59	52 04.3	+60.0	7.5	53 03.8	+60.0	7.7	54 03.2	+60.0	7.9	55 02.7	+59.9	8.1	56 02.0	+60.0	8.3	57 01.4	+60.0	8.5	58 00.7	+60.0	8.7	59 00.0	+60.0	9.0	**59**
60	53 04.3	+60.0	7.5	54 03.8	+59.9	7.7	55 03.2	+60.0	7.8	56 02.6	+60.0	8.0	57 02.0	+60.0	8.3	58 01.4	+60.0	8.5	59 00.7	+60.0	8.7	60 00.0	+60.0	9.0	**60**
61	54 04.3	+59.9	7.4	55 03.7	+60.0	7.6	56 03.2	+60.0	7.8	57 02.6	+60.0	8.0	58 02.0	+60.0	8.2	59 01.4	+60.0	8.5	60 00.7	+60.0	8.7	61 00.0	+60.0	9.0	**61**
62	55 04.2	+60.0	7.4	56 03.7	+60.0	7.6	57 03.2	+60.0	7.8	58 02.6	+60.0	8.0	59 02.0	+60.0	8.2	60 01.4	+60.0	8.5	61 00.7	+60.0	8.7	62 00.0	+60.0	9.0	**62**
63	56 04.2	+60.0	7.3	57 03.7	+60.0	7.5	58 03.2	+59.9	7.7	59 02.6	+60.0	7.9	60 02.0	+60.0	8.2	61 01.4	+60.0	8.4	62 00.7	+60.0	8.7	63 00.0	+60.0	9.0	**63**
64	57 04.2	+59.9	7.2	58 03.7	+59.9	7.4	59 03.1	+60.0	7.7	60 02.6	+60.0	7.9	61 02.0	+60.0	8.1	62 01.4	+60.0	8.4	63 00.7	+60.0	8.7	64 00.0	+60.0	9.0	**64**
65	58 04.1	+60.0	7.2	59 03.6	+60.0	7.4	60 03.1	+60.0	7.6	61 02.6	+60.0	7.8	62 02.0	+60.0	8.1	63 01.4	+60.0	8.4	64 00.7	+60.0	8.7	65 00.0	+60.0	9.0	**65**
66	59 04.1	+59.9	7.1	60 03.6	+60.0	7.3	61 03.1	+60.0	7.6	62 02.6	+59.9	7.8	63 02.0	+60.0	8.1	64 01.4	+60.0	8.4	65 00.7	+60.0	8.7	66 00.0	+60.0	9.0	**66**
67	60 04.0	+60.0	7.0	61 03.6	+59.9	7.3	62 03.1	+59.9	7.5	63 02.5	+60.0	7.7	64 02.0	+60.0	8.0	65 01.4	+60.0	8.3	66 00.7	+60.0	8.6	67 00.0	+60.0	9.0	**67**
68	61 04.0	+59.9	7.0	62 03.5	+60.0	7.2	63 03.0	+60.0	7.4	64 02.5	+60.0	7.7	65 02.0	+60.0	8.0	66 01.4	+60.0	8.3	67 00.7	+60.0	8.6	68 00.0	+60.0	9.0	**68**
69	62 03.9	+60.0	6.9	63 03.5	+60.0	7.1	64 03.0	+60.0	7.4	65 02.5	+60.0	7.6	66 02.0	+59.9	7.9	67 01.4	+59.9	8.3	68 00.7	+60.0	8.6	69 00.0	+60.0	9.0	**69**
70	63 03.9	+59.9	6.8	64 03.5	+59.9	7.0	65 03.0	+60.0	7.3	66 02.5	+60.0	7.6	67 01.9	+60.0	7.9	68 01.3	+60.0	8.2	69 00.7	+60.0	8.6	70 00.0	+60.0	9.0	**70**
71	64 03.8	+60.0	6.7	65 03.4	+60.0	6.9	66 03.0	+59.9	7.2	67 02.5	+59.9	7.5	68 01.9	+60.0	7.8	69 01.3	+60.0	8.2	70 00.7	+60.0	8.6	71 00.0	+60.0	9.0	**71**
72	65 03.8	+59.9	6.6	66 03.4	+59.9	6.8	67 02.9	+60.0	7.1	68 02.4	+60.0	7.4	69 01.9	+60.0	7.8	70 01.3	+60.0	8.1	71 00.7	+60.0	8.5	72 00.0	+60.0	9.0	**72**
73	66 03.7	+59.9	6.5	67 03.3	+60.0	6.7	68 02.9	+59.9	7.0	69 02.4	+60.0	7.3	70 01.9	+60.0	7.7	71 01.3	+60.0	8.1	72 00.7	+60.0	8.5	73 00.0	+60.0	9.0	**73**
74	67 03.6	+60.0	6.4	68 03.3	+59.9	6.6	69 02.8	+60.0	6.9	70 02.4	+59.9	7.3	71 01.9	+60.0	7.6	72 01.3	+60.0	8.0	73 00.7	+60.0	8.5	74 00.0	+60.0	9.0	**74**
75	68 03.6	+59.9	6.2	69 03.2	+59.9	6.5	70 02.8	+59.9	6.8	71 02.3	+60.0	7.2	72 01.9	+59.9	7.5	73 01.3	+60.0	8.0	74 00.7	+60.0	8.5	75 00.0	+60.0	9.0	**75**
76	69 03.5	+59.9	6.1	70 03.1	+60.0	6.4	71 02.7	+60.0	6.7	72 02.3	+60.0	7.0	73 01.8	+60.0	7.5	74 01.3	+60.0	7.9	75 00.7	+60.0	8.4	76 00.0	+60.0	9.0	**76**
77	70 03.4	+59.9	5.9	71 03.1	+59.9	6.2	72 02.7	+59.9	6.6	73 02.3	+59.9	6.9	74 01.8	+60.0	7.3	75 01.3	+60.0	7.8	76 00.7	+60.0	8.4	77 00.0	+60.0	9.0	**77**
78	71 03.3	+59.9	5.7	72 03.0	+59.9	6.1	73 02.6	+60.0	6.4	74 02.2	+60.0	6.8	75 01.8	+59.9	7.2	76 01.3	+60.0	7.7	77 00.7	+60.0	8.3	78 00.0	+60.0	9.0	**78**
79	72 03.2	+59.9	5.6	73 02.9	+59.9	5.9	74 02.6	+59.9	6.2	75 02.2	+59.9	6.6	76 01.7	+60.0	7.1	77 01.3	+59.9	7.6	78 00.7	+60.0	8.3	79 00.0	+60.0	9.0	**79**
80	73 03.1	+59.8	5.3	74 02.8	+59.9	5.7	75 02.5	+59.9	6.0	76 02.1	+60.0	6.5	77 01.7	+60.0	7.0	78 01.2	+60.0	7.5	79 00.7	+60.0	8.2	80 00.0	+60.0	9.0	**80**
81	74 02.9	+59.9	5.1	75 02.7	+59.8	5.4	76 02.4	+59.9	5.8	77 02.1	+59.9	6.3	78 01.7	+59.9	6.8	79 01.2	+60.0	7.4	80 00.7	+60.0	8.1	81 00.0	+60.0	9.0	**81**
82	75 02.8	+59.8	4.8	76 02.5	+59.9	5.2	77 02.3	+59.9	5.6	78 02.0	+59.9	6.0	79 01.6	+60.0	6.6	80 01.2	+60.0	7.2	81 00.7	+59.9	8.0	82 00.0	+60.0	9.0	**82**
83	76 02.6	+59.8	4.5	77 02.4	+59.8	4.9	78 02.2	+59.8	5.3	79 01.9	+59.9	5.8	80 01.6	+59.9	6.3	81 01.2	+59.9	7.0	82 00.6	+60.0	7.9	83 00.0	+60.0	9.0	**83**
84	77 02.4	+59.8	4.2	78 02.2	+59.8	4.5	79 02.0	+59.9	4.9	80 01.8	+59.8	5.4	81 01.5	+59.9	6.0	82 01.1	+60.0	6.8	83 00.6	+60.0	7.7	84 00.0	+60.0	9.0	**84**
85	78 02.2	+59.7	3.8	79 02.0	+59.8	4.1	80 01.9	+59.7	4.5	81 01.6	+59.9	5.0	82 01.4	+59.9	5.6	83 01.1	+59.9	6.4	84 00.6	+60.0	7.5	85 00.0	+60.0	9.0	**85**
86	79 01.9	+59.7	3.3	80 01.8	+59.7	3.6	81 01.6	+59.8	4.0	82 01.5	+59.8	4.5	83 01.3	+59.8	5.2	84 01.0	+59.9	6.0	85 00.6	+60.0	7.2	86 00.0	+60.0	9.0	**86**
87	80 01.6	+59.6	2.7	81 01.5	+59.6	3.0	82 01.4	+59.7	3.4	83 01.3	+59.7	3.9	84 01.1	+59.8	4.5	85 00.9	+59.8	5.4	86 00.6	+59.9	6.8	87 00.0	+60.0	9.0	**87**
88	81 01.2	+59.4	2.0	82 01.1	+59.5	2.3	83 01.1	+59.5	2.6	84 01.0	+59.6	3.0	85 00.9	+59.7	3.6	86 00.7	+59.8	4.5	87 00.5	+59.9	6.0	88 00.0	+60.0	9.0	**88**
89	82 00.6	+59.4	1.1	83 00.6	+59.4	1.3	84 00.6	+59.4	1.5	85 00.6	+59.4	1.8	86 00.6	+59.4	2.2	87 00.5	+59.5	3.0	88 00.4	*+59.6* •	4.5	89 00.0	+60.0	9.0	**89**
90	83 00.0	+59.1	0.0	84 00.0	+59.1	0.0	85 00.0	+59.1	0.0	86 00.0	+59.0	0.0	87 00.0	+58.9	0.0	88 00.0	*+58.5* •	0.0	89 00.0	*+50.6* •	0.0	90 00.0	–60.0	4.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 171°, 189°

10°, 350° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 53.6	+60.0	169.9	5 54.5	+60.0	169.9	4 55.4	+60.0	170.0	3 56.3	+60.0	170.0	2 57.3	+60.0	170.0	1 58.2	+60.0	170.0	0 59.1	+60.0	170.0	0 00.0	+60.0	170.0	0
1	7 53.6	+60.0	169.9	6 54.5	+60.0	169.9	5 55.4	+60.0	169.9	4 56.3	+60.0	170.0	3 57.3	+60.0	170.0	2 58.2	+60.0	170.0	1 59.1	+60.0	170.0	1 00.0	+60.0	170.0	1
2	8 53.6	+59.9	169.9	7 54.5	+60.0	169.9	6 55.4	+60.0	169.9	5 56.3	+60.0	170.0	4 57.3	+60.0	170.0	3 58.2	+60.0	170.0	2 59.1	+60.0	170.0	2 00.0	+60.0	170.0	2
3	9 53.5	+60.0	169.9	8 54.5	+60.0	169.9	7 55.4	+60.0	169.9	6 56.3	+60.0	169.9	5 57.3	+60.0	170.0	4 58.2	+60.0	170.0	3 59.1	+60.0	170.0	3 00.0	+60.0	170.0	3
4	10 53.5	+60.0	169.8	9 54.5	+60.0	169.9	8 55.4	+60.0	169.9	7 56.3	+60.0	169.9	6 57.3	+60.0	169.9	5 58.2	+60.0	170.0	4 59.1	+60.0	170.0	4 00.0	+60.0	170.0	4
5	11 53.5	+60.0	169.8	10 54.5	+60.0	169.9	9 55.4	+60.0	169.9	8 56.3	+60.0	169.9	7 57.3	+59.9	169.9	6 58.2	+60.0	170.0	5 59.1	+60.0	170.0	5 00.0	+60.0	170.0	5
6	12 53.5	+60.0	169.8	11 54.5	+59.9	169.8	10 55.4	+60.0	169.9	9 56.3	+60.0	169.9	8 57.2	+60.0	169.9	7 58.2	+60.0	170.0	6 59.1	+60.0	170.0	6 00.0	+60.0	170.0	6
7	13 53.5	+60.0	169.8	12 54.4	+60.0	169.8	11 55.4	+60.0	169.9	10 56.3	+60.0	169.9	9 57.2	+60.0	169.9	8 58.2	+60.0	170.0	7 59.1	+60.0	170.0	7 00.0	+60.0	170.0	7
8	14 53.5	+60.0	169.8	13 54.4	+60.0	169.8	12 55.4	+60.0	169.8	11 56.3	+60.0	169.9	10 57.2	+60.0	169.9	9 58.2	+60.0	169.9	8 59.1	+60.0	170.0	8 00.0	+60.0	170.0	8
9	15 53.5	+59.9	169.7	14 54.4	+60.0	169.8	13 55.4	+60.0	169.8	12 56.3	+60.0	169.9	11 57.2	+60.0	169.9	10 58.2	+60.0	169.9	9 59.1	+60.0	170.0	9 00.0	+60.0	170.0	9
10	16 53.4	+60.0	169.7	15 54.4	+60.0	169.8	14 55.4	+60.0	169.8	13 56.3	+60.0	169.9	12 57.2	+60.0	169.9	11 58.2	+60.0	169.9	10 59.1	+60.0	170.0	10 00.0	+60.0	170.0	10
11	17 53.4	+60.0	169.7	16 54.4	+60.0	169.7	15 55.4	+59.9	169.8	14 56.3	+60.0	169.8	13 57.2	+60.0	169.9	12 58.2	+60.0	169.9	11 59.1	+60.0	170.0	11 00.0	+60.0	170.0	11
12	18 53.4	+60.0	169.7	17 54.4	+60.0	169.7	16 55.3	+60.0	169.8	15 56.3	+60.0	169.8	14 57.2	+60.0	169.9	13 58.2	+60.0	169.9	12 59.1	+60.0	170.0	12 00.0	+60.0	170.0	12
13	19 53.4	+60.0	169.6	18 54.4	+60.0	169.7	17 55.3	+60.0	169.8	16 56.3	+60.0	169.8	15 57.2	+60.0	169.9	14 58.2	+60.0	169.9	13 59.1	+60.0	170.0	13 00.0	+60.0	170.0	13
14	20 53.4	+60.0	169.6	19 54.4	+60.0	169.7	18 55.3	+60.0	169.7	17 56.3	+60.0	169.8	16 57.2	+60.0	169.9	15 58.2	+60.0	169.9	14 59.1	+60.0	170.0	14 00.0	+60.0	170.0	14
15	21 53.4	+60.0	169.6	20 54.4	+59.9	169.7	19 55.3	+60.0	169.7	18 56.3	+60.0	169.8	17 57.2	+60.0	169.8	16 58.2	+60.0	169.9	15 59.1	+60.0	170.0	15 00.0	+60.0	170.0	15
16	22 53.4	+59.9	169.6	21 54.3	+60.0	169.6	20 55.3	+60.0	169.7	19 56.3	+60.0	169.8	18 57.2	+60.0	169.8	17 58.2	+60.0	169.9	16 59.1	+60.0	169.9	16 00.0	+60.0	170.0	16
17	23 53.3	+60.0	169.5	22 54.3	+60.0	169.6	21 55.3	+60.0	169.7	20 56.3	+60.0	169.8	19 57.2	+60.0	169.8	18 58.2	+60.0	169.9	17 59.1	+60.0	169.9	17 00.0	+60.0	170.0	17
18	24 53.3	+60.0	169.5	23 54.3	+60.0	169.6	22 55.3	+60.0	169.7	21 56.3	+60.0	169.7	20 57.2	+60.0	169.8	19 58.2	+60.0	169.9	18 59.1	+60.0	169.9	18 00.0	+60.0	170.0	18
19	25 53.3	+60.0	169.5	24 54.3	+60.0	169.6	23 55.3	+60.0	169.7	22 56.3	+60.0	169.7	21 57.2	+60.0	169.8	20 58.2	+60.0	169.9	19 59.1	+60.0	169.9	19 00.0	+60.0	170.0	19
20	26 53.3	+60.0	169.5	25 54.3	+60.0	169.5	24 55.3	+60.0	169.6	23 56.3	+59.9	169.7	22 57.2	+60.0	169.8	21 58.2	+60.0	169.9	20 59.1	+60.0	169.9	20 00.0	+60.0	170.0	20
21	27 53.3	+60.0	169.4	26 54.3	+60.0	169.5	25 55.3	+60.0	169.6	24 56.2	+60.0	169.7	23 57.2	+60.0	169.8	22 58.2	+60.0	169.9	21 59.1	+60.0	169.9	21 00.0	+60.0	170.0	21
22	28 53.3	+59.9	169.4	27 54.3	+60.0	169.5	26 55.3	+60.0	169.6	25 56.2	+60.0	169.7	24 57.2	+60.0	169.8	23 58.2	+59.9	169.9	22 59.1	+60.0	169.9	22 00.0	+60.0	170.0	22
23	29 53.2	+60.0	169.4	28 54.3	+59.9	169.5	27 55.3	+59.9	169.6	26 56.2	+60.0	169.7	25 57.2	+60.0	169.8	24 58.1	+60.0	169.8	23 59.1	+60.0	169.9	23 00.0	+60.0	170.0	23
24	30 53.2	+60.0	169.3	29 54.2	+60.0	169.5	28 55.2	+60.0	169.6	27 56.2	+60.0	169.7	26 57.2	+60.0	169.7	25 58.1	+60.0	169.8	24 59.1	+60.0	169.9	24 00.0	+60.0	170.0	24
25	31 53.2	+60.0	169.3	30 54.2	+60.0	169.4	29 55.2	+60.0	169.5	28 56.2	+60.0	169.6	27 57.2	+60.0	169.7	26 58.1	+60.0	169.8	25 59.1	+60.0	169.9	25 00.0	+60.0	170.0	25
26	32 53.2	+60.0	169.3	31 54.2	+60.0	169.4	30 55.2	+60.0	169.5	29 56.2	+60.0	169.6	28 57.2	+60.0	169.7	27 58.1	+60.0	169.8	26 59.1	+60.0	169.9	26 00.0	+60.0	170.0	26
27	33 53.2	+59.9	169.3	32 54.2	+60.0	169.4	31 55.2	+60.0	169.5	30 56.2	+60.0	169.6	29 57.2	+60.0	169.7	28 58.1	+60.0	169.8	27 59.1	+60.0	169.9	27 00.0	+60.0	170.0	27
28	34 53.1	+60.0	169.2	33 54.2	+60.0	169.4	32 55.2	+60.0	169.5	31 56.2	+60.0	169.6	30 57.2	+60.0	169.7	29 58.1	+60.0	169.8	28 59.1	+60.0	169.9	28 00.0	+60.0	170.0	28
29	35 53.1	+60.0	169.2	34 54.2	+60.0	169.3	33 55.2	+60.0	169.5	32 56.2	+60.0	169.6	31 57.2	+60.0	169.7	30 58.1	+60.0	169.8	29 59.1	+60.0	169.9	29 00.0	+60.0	170.0	29
30	36 53.1	+60.0	169.2	35 54.2	+59.9	169.3	34 55.2	+60.0	169.4	33 56.2	+60.0	169.6	32 57.2	+60.0	169.7	31 58.1	+60.0	169.8	30 59.1	+60.0	169.9	30 00.0	+60.0	170.0	30
31	37 53.1	+60.0	169.1	36 54.1	+60.0	169.3	35 55.2	+60.0	169.4	34 56.2	+60.0	169.5	33 57.2	+60.0	169.7	32 58.1	+60.0	169.8	31 59.1	+60.0	169.9	31 00.0	+60.0	170.0	31
32	38 53.1	+59.9	169.1	37 54.1	+60.0	169.2	36 55.2	+60.0	169.4	35 56.2	+60.0	169.5	34 57.2	+60.0	169.6	33 58.1	+60.0	169.8	32 59.1	+60.0	169.9	32 00.0	+60.0	170.0	32
33	39 53.0	+60.0	169.1	38 54.1	+60.0	169.2	37 55.2	+59.9	169.4	36 56.2	+60.0	169.5	35 57.2	+60.0	169.6	34 58.1	+60.0	169.8	33 59.1	+60.0	169.9	33 00.0	+60.0	170.0	33
34	40 53.0	+60.0	169.0	39 54.1	+60.0	169.2	38 55.1	+60.0	169.3	37 56.2	+60.0	169.5	36 57.2	+60.0	169.6	35 58.1	+60.0	169.8	34 59.1	+60.0	169.9	34 00.0	+60.0	170.0	34
35	41 53.0	+60.0	169.0	40 54.1	+60.0	169.2	39 55.1	+60.0	169.3	38 56.2	+60.0	169.5	37 57.2	+60.0	169.6	36 58.1	+60.0	169.7	35 59.1	+60.0	169.9	35 00.0	+60.0	170.0	35
36	42 53.0	+59.9	168.9	41 54.1	+59.9	169.1	40 55.1	+60.0	169.3	39 56.2	+59.9	169.4	38 57.2	+60.0	169.6	37 58.1	+60.0	169.7	36 59.1	+60.0	169.9	36 00.0	+60.0	170.0	36
37	43 52.9	+60.0	168.9	42 54.0	+60.0	169.1	41 55.1	+60.0	169.3	40 56.1	+60.0	169.4	39 57.2	+59.9	169.6	38 58.1	+60.0	169.7	37 59.1	+60.0	169.9	37 00.0	+60.0	170.0	37
38	44 52.9	+60.0	168.9	43 54.0	+60.0	169.1	42 55.1	+60.0	169.2	41 56.1	+60.0	169.4	40 57.1	+60.0	169.6	39 58.1	+60.0	169.7	38 59.1	+60.0	169.9	38 00.0	+60.0	170.0	38
39	45 52.9	+60.0	168.8	44 54.0	+60.0	169.0	43 55.1	+60.0	169.2	42 56.1	+60.0	169.4	41 57.1	+60.0	169.5	40 58.1	+60.0	169.7	39 59.1	+60.0	169.9	39 00.0	+60.0	170.0	39
40	46 52.9	+59.9	168.8	45 54.0	+60.0	169.0	44 55.1	+60.0	169.2	43 56.1	+60.0	169.4	42 57.1	+60.0	169.5	41 58.1	+60.0	169.7	40 59.1	+60.0	169.9	40 00.0	+60.0	170.0	40
41	47 52.8	+60.0	168.7	46 54.0	+59.9	168.9	45 55.1	+59.9	169.1	44 56.1	+60.0	169.3	43 57.1	+60.0	169.5	42 58.1	+60.0	169.7	41 59.1	+60.0	169.8	41 00.0	+60.0	170.0	41
42	48 52.8	+60.0	168.7	47 53.9	+60.0	168.9	46 55.0	+60.0	169.1	45 56.1	+60.0	169.3	44 57.1	+60.0	169.5	43 58.1	+60.0	169.7	42 59.1	+60.0	169.8	42 00.0	+60.0	170.0	42
43	49 52.8	+59.9	168.6	48 53.9	+60.0	168.9	47 55.0	+60.0	169.1	46 56.1	+60.0	169.3	45 57.1	+60.0	169.5	44 58.1	+60.0	169.7	43 59.1	+60.0	169.8	43 00.0	+60.0	170.0	43
44	50 52.7	+60.0	168.6	49 53.9	+60.0	168.8	48 55.0	+60.0	169.0	47 56.1	+60.0	169.3	46 57.1	+60.0	169.5	45 58.1	+60.0	169.6	44 59.1	+60.0	169.8	44 00.0	+60.0	170.0	44
45	51 52.7	+60.0	168.5	50 53.9	+59.9	168.8	49 55.0	+60.0	169.0	48 56.1	+60.0	169.2	47 57.1	+60.0	169.4	46 58.1	+60.0	169.6	45 59.1	+60.0	169.8	45 00.0	+60.0	170.0	45
46	52 52.7	+59.9	168.5	51 53.8	+60.0	168.7	50 55.0	+60.0	169.0	49 56.1	+60.0	169.2	48 57.1	+60.0	169.4	47 58.1	+60.0	169.6	46 59.1	+60.0	169.8	46 00.0	+60.0	170.0	46
47	53 52.6	+60.0	168.4	52 53.8	+60.0	168.7	51 55.0	+59.9	168.9	50 56.1	+59.9	169.2	49 57.1	+60.0	169.4	48 58.1	+60.0	169.6	47 59.1	+60.0	169.8	47 00.0	+60.0	170.0	47
48	54 52.6	+59.9	168.3	53 53.8	+60.0	168.6	52 54.9	+60.0	168.9	51 56.0	+60.0	169.1	50 57.1	+60.0	169.4	49 58.1	+60.0	169.6	48 59.1	+60.0	169.8	48 00.0	+60.0	170.0	48
49	55 52.5	+60.0	168.3	54 53.8	+59.9	168.6	53 54.9	+60.0	168.8	52 56.0	+60.0	169.1	51 57.1	+60.0	169.3	50 58.1	+60.0	169.6	49 59.1	+60.0	169.8	49 00.0	+60.0	170.0	49
50	56 52.5	+60.0	168.2	55 53.7	+60.0	168.5	54 54.9	+60.0	168.8	53 56.0	+60.0	169.1	52 57.1	+60.0	169.3	51 58.1	+60.0	169.6	50 59.1	+60.0	169.8	50 00.0	+60.0	170.0	50
51	57 52.5	+59.9	168.1	56 53.7	+60.0	168.5	55 54.9	+60.0	168.8	54 56.0	+60.0	169.0	53 57.1	+60.0	169.3	52 58.1	+60.0	169.5	51 59.1	+60.0	169.8	51 00.0	+60.0	170.0	51
52	58 52.4	+60.0	168.1	57 53.7	+59.9	168.4	56 54.9	+59.9	168.7	55 56.0	+60.0	169.0	54 57.1	+60.0	169.3	53 58.1	+60.0	169.5	52 59.1	+60.0	169.8	52 00.0	+60.0	170.0	52
53	59 52.4	+59.9	168.0	58 53.6	+60.0	168.3	57 54.8	+60.0	168.7	56 56.0	+60.0	169.0	55 57.1	+60.0	169.2	54 58.1	+60.0	169.5	53 59.1	+60.0	169.8	53 00.0	+60.0	170.0	53
54	60 52.3	+59.9	167.9	59 53.6	+60.0	168.3	58 54.8	+60.0	168.6	57 56.0	+59.9	168.9	56 57.1	+59.9	169.2	55 58.1	+60.0	169.5	54 59.1	+60.0	169.8	54 00.0	+60.0	170.0	54
55	61 52.2	+60.0	167.8	60 53.6	+59.9	168.2	59 54.8	+60.0	168.5	58 55.9	+60.0	168.9	57 57.0	+60.0	169.2	56 58.1	+60.0	169.5	55 59.1	+60.0	169.7	55 00.0	+60.0	170.0	55
56	62 52.2	+59.9	167.7	61 53.5	+60.0	168.1	60 54.8	+59.9	168.5	59 55.9	+60.0	168.8	58 57.0	+60.0	169.1	57 58.1	+60.0	169.5	56 59.1	+60.0	169.7	56 00.0	+60.0	170.0	56
57	63 52.1	+59.9	167.6	62 53.5	+59.9	168.0	61 54.7	+60.0	168.4	60 55.9	+60.0	168.8	59 57.0	+60.0	169.1	58 58.1	+60.0	169.4	57 59.1	+60.0	169.7	57 00.0	+60.0	170.0	57
58	64 52.0	+60.0	167.5	63 53.4	+60.0	167.9	62 54.7	+60.0	168.3	61 55.9	+60.0	168.7	60 57.0	+60.0	169.1	59 58.1	+60.0	169.4	58 59.1	+60.0	169.7	58 00.0	+60.0	170.0	58
59	65 52.0	+59.9	167.4	64 53.4	+59.9	167.8	63 54.7	+59.9	168.3	62 55.9	+59.9	168.7	61 57.0	+60.0	169.0	60 58.1	+60.0	169.4	59 59.1	+60.0	169.7	59 00.0	+60.0	170.0	59
60	66 51.9	+59.9	167.2	65 53.3	+59.9	167.7	64 54.6	+60.0	168.2	63 55.8	+60.0	168.6	62 57.0	+60.0	169.0	61 58.1	+60.0	169.4	60 59.1	+60.0	169.7	60 00.0	+60.0	170.0	60
61	67 51.8	+59.9	167.1	66 53.2	+60.0	167.6	65 54.6	+59.9	168.1	64 55.8	+60.0	168.5	63 57.0	+60.0	168.9	62 58.1	+59.9	169.3	61 59.1	+60.0	169.7	61 00.0	+60.0	170.0	61
62	68 51.7	+59.9	166.9	67 53.2	+59.9	167.5	66 54.5	+60.0	168.0	65 55.8	+60.0	168.5	64 57.0	+60.0	168.9	63 58.0	+60.0	169.3	62 59.1	+60.0	169.7	62 00.0	+60.0	170.0	62
63	69 51.6	+59.9	166.8	68 53.1	+59.9	167.4	67 54.5	+59.9	167.9	66 55.8	+59.9	168.4	65 57.0	+59.9	168.8	64 58.0	+60.0	169.3	63 59.1	+60.0	169.6	63 00.0	+60.0	170.0	63
64	70 51.5	+59.8	166.6	69 53.0	+59.9	167.2	68 54.4	+60.0	167.8	67 55.7	+60.0	168.3	66 56.9	+60.0	168.8	65 58.0	+60.0	169.2	64 59.1	+60.0	169.6	64 00.0	+60.0	170.0	64
65	71 51.3	+59.9	166.4	70 52.9	+59.9	167.1	69 54.4	+59.9	167.7	68 55.7	+60.0	168.2	67 56.9	+60.0	168.7	66 58.0	+60.0	169.2	65 59.1	+60.0	169.6	65 00.0	+60.0	170.0	65
66	72 51.2	+59.8	166.1	71 52.8	+59.9	166.9	70 54.3	+60.0	167.5	69 55.7	+59.9	168.1	68 56.9	+60.0	168.7	67 58.0	+60.0	169.1	66 59.1	+59.9	169.6	66 00.0	+60.0	170.0	66
67	73 51.0	+59.8	165.9	72 52.7	+59.9	166.7	71 54.3	+59.9	167.4	70 55.6	+60.0	168.0	69 56.9	+60.0	168.6	68 58.0	+60.0	169.1	67 59.0	+60.0	169.6	67 00.0	+60.0	170.0	67
68	74 50.8	+59.8	165.6	73 52.6	+59.9	166.5	72 54.2	+59.9	167.2	71 55.6	+59.9	167.9	70 56.9	+59.9	168.5	69 58.0	+60.0	169.1	68 59.0	+60.0	169.5	68 00.0	+60.0	170.0	68
69	75 50.6	+59.8	165.3	74 52.5	+59.8	166.2	73 54.1	+59.9	167.0	72 55.5	+60.0	167.8	71 56.8	+60.0	168.4	70 58.0	+60.0	169.0	69 59.0	+60.0	169.5	69 00.0	+60.0	170.0	69
70	76 50.4	+59.7	164.9	75 52.3	+59.8	165.9	74 54.0	+59.9	166.8	73 55.5	+59.9	167.6	72 56.8	+60.0	168.3	71 58.0	+60.0	168.9	70 59.0	+60.0	169.5	70 00.0	+60.0	170.0	70
71	77 50.1	+59.7	164.4	76 52.1	+59.8	165.6	75 53.9	+59.9	166.6	74 55.4	+60.0	167.4	73 56.8	+59.9	168.2	72 58.0	+60.0	168.9	71 59.0	+60.0	169.5	71 00.0	+60.0	170.0	71
72	78 49.8	+59.6	163.9	77 51.9	+59.8	165.2	76 53.8	+59.8	166.3	75 55.4	+59.9	167.3	74 56.7	+60.0	168.1	73 58.0	+59.9	168.8	72 59.0	+60.0	169.4	72 00.0	+60.0	170.0	72
73	79 49.4	+59.5	163.3	78 51.7	+59.7	164.8	77 53.6	+59.9	166.0	76 55.3	+59.9	167.0	75 56.7	+60.0	167.9	74 57.9	+60.0	168.7	73 59.0	+60.0	169.4	73 00.0	+60.0	170.0	73
74	80 48.9	+59.4	162.6	79 51.4	+59.6	164.2	78 53.5	+59.8	165.6	77 55.2	+59.9	166.8	76 56.7	+59.9	167.8	75 57.9	+60.0	168.6	74 59.0	+60.0	169.4	74 00.0	+60.0	170.0	74
75	81 48.3	+59.2	161.6	80 51.0	+59.6	163.6	79 53.3	+59.7	165.2	78 55.1	+59.8	166.5	77 56.6	+59.9	167.6	76 57.9	+60.0	168.5	75 59.0	+60.0	169.3	75 00.0	+60.0	170.0	75
76	82 47.5	+59.1	160.4	81 50.6	+59.4	162.8	80 53.0	+59.7	164.6	79 54.9	+59.9	166.1	78 56.5	+60.0	167.3	77 57.9	+60.0	168.4	76 59.0	+60.0	169.3	76 00.0	+60.0	170.0	76
77	83 46.6	+58.6	158.9	82 50.0	+59.3	161.8	81 52.7	+59.6	163.9	80 54.8	+59.8	165.7	79 56.5	+59.9	167.1	78 57.9	+59.9	168.2	77 59.0	+60.0	169.2	77 00.0	+60.0	170.0	77
78	84 45.2	+58.0	156.7	83 49.3	+59.0	160.4	82 52.3	+59.5	163.1	81 54.6	+59.7	165.1	80 56.4	+59.9	166.7	79 57.8	+60.0	168.0	78 59.0	+60.0	169.1	78 00.0	+60.0	170.0	78
79	85 43.2	+56.8	153.6	84 48.3	+58.5	158.5	83 51.8	+59.3	161.9	82 54.3	+59.7	164.4	81 56.3	+59.8	166.3	80 57.8	+59.9	167.8	79 59.0	+60.0	169.0	79 00.0	+60.0	170.0	79
80	86 40.0	*+54.2*	•148.8	85 46.8	+57.6	155.8	84 51.1	+58.9	160.4	83 54.0	+59.5	163.5	82 56.1	+59.8	165.8	81 57.7	+60.0	167.5	80 59.0	+60.0	168.9	80 00.0	+60.0	170.0	80
81	87 34.2	*+47.4*	•140.1	86 44.4	*+55.5*	•151.5	85 50.0	+58.3	158.0	84 53.5	+59.3	162.2	83 55.9	+59.8	165.1	82 57.7	+59.9	167.2	81 59.0	+60.0	168.8	81 00.0	+60.0	170.0	81
82	88 21.6	*+25.4*	•122.4	87 39.9	*+49.7*	•143.6	86 48.3	*+56.7*	•154.3	85 52.8	+58.9	160.3	84 55.7	+59.6	164.1	83 57.6	+59.9	166.7	82 59.0	+59.9	168.6	82 00.0	+60.0	170.0	82
83	88 47.0	*−17.4*	• 85.0	88 29.6	*+27.8*	•126.4	87 45.0	*+52.1*	•147.4	86 51.7	*+57.8*	•157.3	85 55.3	+59.3	162.7	84 57.5	+59.8	166.1	83 58.9	+60.0	168.4	83 00.0	+60.0	170.0	83
84	88 29.6	*−44.6*	• 43.6	88 57.4	*−20.3*	• 85.0	88 37.1	*+30.7*	•131.2	87 49.5	*+54.5*	•151.4	86 54.6	+58.8	160.3	85 57.3	+59.7	165.1	84 58.9	+60.0	168.0	84 00.0	+60.0	170.0	84
85	87 45.0	*−53.3*	• 22.7	88 37.1	*−47.6*	• 38.9	89 07.8	*−23.8*	• 85.0	88 44.0	*+34.2*	•136.8	87 53.4	*+56.5*	•155.7	86 57.0	+59.4	163.5	85 58.9	+59.9	167.5	85 00.0	+60.0	170.0	85
86	86 51.7	*−56.4*	• 12.8	87 49.5	*−54.9*	• 18.6	88 44.0	*−50.6*	• 33.2	89 18.2	*−28.3*	• 85.0	88 49.9	*+38.7*	•143.5	87 56.4	*+58.4*	•160.3	86 58.8	+59.8	166.7	86 00.0	+60.0	170.0	86
87	85 55.3	−57.8	7.3	86 54.6	−57.3	9.7	87 53.4	*−56.4*	• 14.3	88 49.9	*−53.5*	• 26.5	89 28.6	*−33.8*	• 85.0	88 54.8	*+44.3*	•151.4	87 58.6	*+59.6*	•165.1	87 00.0	+60.0	170.0	87
88	84 57.5	−58.6	4.0	85 57.3	−58.4	4.9	86 57.0	−58.1	6.5	87 56.4	*−57.6*	• 9.7	88 54.8	*−56.2*	• 18.6	89 39.1	*−40.9*	• 85.0	88 58.2	*+51.3*	•160.3	88 00.0	+60.0	170.0	88
89	83 58.9	−58.9	1.7	84 58.9	−58.9	2.0	85 58.9	−58.9	2.5	86 58.8	−58.8	3.3	87 58.6	−58.6	4.9	88 58.2	*−58.2*	• 9.7	89 49.5	*−49.5*	• 85.0	89 00.0	+60.0	170.0	89
90	83 00.0	−59.2	0.0	84 00.0	−59.2	0.0	85 00.0	−59.2	0.0	86 00.0	−59.3	0.0	87 00.0	−59.3	0.0	88 00.0	−59.4	0.0	89 00.0	*−59.5*	• 0.0	90 00.0	−60.0	85.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 10°, 350°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 53.6	–60.0	169.9	5 54.5	–60.0	169.9	4 55.4	–60.0	170.0	3 56.3	–59.9	170.0	2 57.3	–60.0	170.0	1 58.2	–60.0	170.0	0 59.1	–60.0	170.0	0 00.0	+60.0	10.0	0
1	5 53.6	–60.0	169.9	4 54.5	–60.0	170.0	3 55.4	–60.0	170.0	2 56.4	–60.0	170.0	1 57.3	–60.0	170.0	0 58.2	–60.0	170.0	0 00.9	+60.0	10.0	1 00.0	+60.0	10.0	1
2	4 53.6	–60.0	170.0	3 54.5	–60.0	170.0	2 55.4	–59.9	170.0	1 56.4	–60.0	170.0	0 57.3	–60.0	170.0	0 01.8	+60.0	10.0	1 00.9	+60.0	10.0	2 00.0	+60.0	10.0	2
3	3 53.6	–60.0	170.0	2 54.5	–59.9	170.0	1 55.5	–60.0	170.0	0 56.4	–60.0	170.0	0 02.7	+60.0	10.0	1 01.8	+60.0	10.0	2 00.9	+60.0	10.0	3 00.0	+60.0	10.0	3
4	2 53.6	–59.9	170.0	1 54.6	–60.0	170.0	0 55.5	–60.0	170.0	0 03.6	+60.0	10.0	1 02.7	+60.0	10.0	2 01.8	+60.0	10.0	3 00.9	+60.0	10.0	4 00.0	+60.0	10.0	4
5	1 53.7	–60.0	170.0	0 54.6	–60.0	170.0	0 04.5	+60.0	10.0	1 03.6	+60.0	10.0	2 02.7	+60.0	10.0	3 01.8	+60.0	10.0	4 00.9	+60.0	10.0	5 00.0	+60.0	10.0	5
6	0 53.7	–60.0	170.1	0 05.4	+60.0	9.9	1 04.5	+60.0	9.9	2 03.6	+60.0	10.0	3 02.7	+60.0	10.0	4 01.8	+60.0	10.0	5 00.9	+60.0	10.0	6 00.0	+60.0	10.0	6
7	0 06.3	+60.0	9.9	1 05.4	+60.0	9.9	2 04.5	+60.0	9.9	3 03.6	+60.0	9.9	4 02.7	+60.0	9.9	5 01.8	+60.0	10.0	6 00.9	+60.0	10.0	7 00.0	+60.0	10.0	7
8	1 06.3	+60.0	9.9	2 05.4	+60.0	9.9	3 04.5	+60.0	9.9	4 03.6	+60.0	9.9	5 02.7	+60.0	9.9	6 01.8	+60.0	10.0	7 00.9	+60.0	10.0	8 00.0	+60.0	10.0	8
9	2 06.3	+60.0	9.9	3 05.4	+60.0	9.9	4 04.5	+60.0	9.9	5 03.6	+60.0	9.9	6 02.7	+60.0	9.9	7 01.8	+60.0	10.0	8 00.9	+60.0	10.0	9 00.0	+60.0	10.0	9
10	3 06.3	+60.0	9.9	4 05.4	+60.0	9.9	5 04.5	+60.0	9.9	6 03.6	+60.0	9.9	7 02.7	+60.0	9.9	8 01.8	+60.0	9.9	9 00.9	+60.0	10.0	10 00.0	+60.0	10.0	10
11	4 06.3	+60.0	9.8	5 05.4	+60.0	9.9	6 04.5	+60.0	9.9	7 03.6	+60.0	9.9	8 02.7	+60.0	9.9	9 01.8	+60.0	9.9	10 00.9	+60.0	10.0	11 00.0	+60.0	10.0	11
12	5 06.3	+59.9	9.8	6 05.4	+60.0	9.8	7 04.5	+60.0	9.9	8 03.6	+60.0	9.9	9 02.7	+60.0	9.9	10 01.8	+60.0	9.9	11 00.9	+60.0	10.0	12 00.0	+60.0	10.0	12
13	6 06.2	+60.0	9.8	7 05.4	+59.9	9.8	8 04.5	+60.0	9.8	9 03.6	+60.0	9.9	10 02.7	+60.0	9.9	11 01.8	+60.0	9.9	12 00.9	+60.0	10.0	13 00.0	+60.0	10.0	13
14	7 06.2	+60.0	9.8	8 05.3	+60.0	9.8	9 04.5	+60.0	9.8	10 03.6	+60.0	9.9	11 02.7	+60.0	9.9	12 01.8	+60.0	9.9	13 00.9	+60.0	10.0	14 00.0	+60.0	10.0	14
15	8 06.2	+60.0	9.8	9 05.3	+60.0	9.8	10 04.5	+60.0	9.8	11 03.6	+60.0	9.8	12 02.7	+60.0	9.9	13 01.8	+60.0	9.9	14 00.9	+60.0	10.0	15 00.0	+60.0	10.0	15
16	9 06.2	+60.0	9.7	10 05.3	+60.0	9.8	11 04.5	+60.0	9.8	12 03.6	+60.0	9.8	13 02.7	+60.0	9.9	14 01.8	+60.0	9.9	15 00.9	+60.0	10.0	16 00.0	+60.0	10.0	16
17	10 06.2	+60.0	9.7	11 05.3	+60.0	9.7	12 04.5	+59.9	9.8	13 03.6	+60.0	9.8	14 02.7	+60.0	9.9	15 01.8	+60.0	9.9	16 00.9	+60.0	9.9	17 00.0	+60.0	10.0	17
18	11 06.2	+60.0	9.7	12 05.3	+60.0	9.7	13 04.4	+60.0	9.8	14 03.6	+60.0	9.8	15 02.7	+60.0	9.8	16 01.8	+60.0	9.9	17 00.9	+60.0	9.9	18 00.0	+60.0	10.0	18
19	12 06.2	+59.9	9.7	13 05.3	+60.0	9.7	14 04.4	+60.0	9.7	15 03.6	+60.0	9.8	16 02.7	+60.0	9.8	17 01.8	+60.0	9.9	18 00.9	+60.0	9.9	19 00.0	+60.0	10.0	19
20	13 06.1	+60.0	9.6	14 05.3	+60.0	9.7	15 04.4	+60.0	9.7	16 03.6	+60.0	9.8	17 02.7	+60.0	9.8	18 01.8	+60.0	9.9	19 00.9	+60.0	9.9	20 00.0	+60.0	10.0	20
21	14 06.1	+60.0	9.6	15 05.3	+60.0	9.7	16 04.4	+60.0	9.7	17 03.6	+60.0	9.8	18 02.7	+60.0	9.8	19 01.8	+60.0	9.9	20 00.9	+60.0	9.9	21 00.0	+60.0	10.0	21
22	15 06.1	+60.0	9.6	16 05.3	+60.0	9.6	17 04.4	+60.0	9.7	18 03.6	+59.9	9.7	19 02.7	+60.0	9.8	20 01.8	+60.0	9.9	21 00.9	+60.0	9.9	22 00.0	+60.0	10.0	22
23	16 06.1	+60.0	9.6	17 05.3	+59.9	9.6	18 04.4	+60.0	9.7	19 03.5	+60.0	9.7	20 02.7	+60.0	9.8	21 01.8	+60.0	9.9	22 00.9	+60.0	9.9	23 00.0	+60.0	10.0	23
24	17 06.1	+60.0	9.6	18 05.2	+60.0	9.6	19 04.4	+60.0	9.7	20 03.5	+60.0	9.7	21 02.7	+60.0	9.8	22 01.8	+60.0	9.9	23 00.9	+60.0	9.9	24 00.0	+60.0	10.0	24
25	18 06.1	+60.0	9.5	19 05.2	+60.0	9.6	20 04.4	+60.0	9.6	21 03.5	+60.0	9.7	22 02.7	+60.0	9.8	23 01.8	+60.0	9.8	24 00.9	+60.0	9.9	25 00.0	+60.0	10.0	25
26	19 06.1	+59.9	9.5	20 05.2	+60.0	9.6	21 04.4	+60.0	9.6	22 03.5	+60.0	9.7	23 02.7	+60.0	9.8	24 01.8	+60.0	9.8	25 00.9	+60.0	9.9	26 00.0	+60.0	10.0	26
27	20 06.0	+60.0	9.5	21 05.2	+60.0	9.5	22 04.4	+60.0	9.6	23 03.5	+60.0	9.7	24 02.7	+60.0	9.8	25 01.8	+60.0	9.8	26 00.9	+60.0	9.9	27 00.0	+60.0	10.0	27
28	21 06.0	+60.0	9.5	22 05.2	+60.0	9.5	23 04.4	+60.0	9.6	24 03.5	+60.0	9.7	25 02.7	+60.0	9.7	26 01.8	+60.0	9.8	27 00.9	+60.0	9.9	28 00.0	+60.0	10.0	28
29	22 06.0	+60.0	9.4	23 05.2	+60.0	9.5	24 04.4	+60.0	9.6	25 03.5	+60.0	9.7	26 02.7	+60.0	9.7	27 01.8	+60.0	9.8	28 00.9	+60.0	9.9	29 00.0	+60.0	10.0	29
30	23 06.0	+60.0	9.4	24 05.2	+60.0	9.5	25 04.4	+59.9	9.6	26 03.5	+60.0	9.6	27 02.7	+60.0	9.7	28 01.8	+60.0	9.8	29 00.9	+60.0	9.9	30 00.0	+60.0	10.0	30
31	24 06.0	+60.0	9.4	25 05.2	+60.0	9.5	26 04.3	+60.0	9.5	27 03.5	+60.0	9.6	28 02.7	+60.0	9.7	29 01.8	+60.0	9.8	30 00.9	+60.0	9.9	31 00.0	+60.0	10.0	31
32	25 06.0	+59.9	9.4	26 05.2	+59.9	9.4	27 04.3	+60.0	9.5	28 03.5	+60.0	9.6	29 02.7	+59.9	9.7	30 01.8	+60.0	9.8	31 00.9	+60.0	9.9	32 00.0	+60.0	10.0	32
33	26 05.9	+60.0	9.3	27 05.1	+60.0	9.4	28 04.3	+60.0	9.5	29 03.5	+60.0	9.6	30 02.6	+60.0	9.7	31 01.8	+60.0	9.8	32 00.9	+60.0	9.9	33 00.0	+60.0	10.0	33
34	27 05.9	+60.0	9.3	28 05.1	+60.0	9.4	29 04.3	+60.0	9.5	30 03.5	+60.0	9.6	31 02.6	+60.0	9.7	32 01.8	+60.0	9.8	33 00.9	+60.0	9.9	34 00.0	+60.0	10.0	34
35	28 05.9	+60.0	9.3	29 05.1	+60.0	9.4	30 04.3	+60.0	9.5	31 03.5	+60.0	9.6	32 02.6	+60.0	9.7	33 01.8	+60.0	9.8	34 00.9	+60.0	9.9	35 00.0	+60.0	10.0	35
36	29 05.9	+60.0	9.3	30 05.1	+60.0	9.3	31 04.3	+60.0	9.4	32 03.5	+60.0	9.5	33 02.6	+60.0	9.6	34 01.8	+60.0	9.8	35 00.9	+60.0	9.9	36 00.0	+60.0	10.0	36
37	30 05.9	+60.0	9.2	31 05.1	+60.0	9.3	32 04.3	+60.0	9.4	33 03.5	+60.0	9.5	34 02.6	+60.0	9.6	35 01.8	+60.0	9.8	36 00.9	+60.0	9.9	37 00.0	+60.0	10.0	37
38	31 05.9	+59.9	9.2	32 05.1	+60.0	9.3	33 04.3	+60.0	9.4	34 03.5	+60.0	9.5	35 02.6	+60.0	9.6	36 01.8	+60.0	9.7	37 00.9	+60.0	9.9	38 00.0	+60.0	10.0	38
39	32 05.8	+60.0	9.2	33 05.1	+59.9	9.3	34 04.3	+60.0	9.4	35 03.5	+60.0	9.5	36 02.6	+60.0	9.6	37 01.8	+60.0	9.7	38 00.9	+60.0	9.9	39 00.0	+60.0	10.0	39
40	33 05.8	+60.0	9.1	34 05.0	+60.0	9.2	35 04.3	+59.9	9.4	36 03.5	+59.9	9.5	37 02.6	+60.0	9.6	38 01.8	+60.0	9.7	39 00.9	+60.0	9.9	40 00.0	+60.0	10.0	40
41	34 05.8	+60.0	9.1	35 05.0	+60.0	9.2	36 04.2	+60.0	9.3	37 03.4	+60.0	9.5	38 02.6	+60.0	9.6	39 01.8	+60.0	9.7	40 00.9	+60.0	9.9	41 00.0	+60.0	10.0	41
42	35 05.8	+60.0	9.1	36 05.0	+60.0	9.2	37 04.2	+60.0	9.3	38 03.4	+60.0	9.4	39 02.6	+60.0	9.6	40 01.8	+60.0	9.7	41 00.9	+60.0	9.8	42 00.0	+60.0	10.0	42
43	36 05.8	+59.9	9.0	37 05.0	+60.0	9.2	38 04.2	+60.0	9.3	39 03.4	+60.0	9.4	40 02.6	+60.0	9.5	41 01.8	+60.0	9.7	42 00.9	+60.0	9.8	43 00.0	+60.0	10.0	43
44	37 05.7	+60.0	9.0	38 05.0	+60.0	9.1	39 04.2	+60.0	9.3	40 03.4	+60.0	9.4	41 02.6	+60.0	9.5	42 01.8	+60.0	9.7	43 00.9	+60.0	9.8	44 00.0	+60.0	10.0	44
45	38 05.7	+60.0	9.0	39 05.0	+60.0	9.1	40 04.2	+60.0	9.2	41 03.4	+60.0	9.4	42 02.6	+60.0	9.5	43 01.8	+60.0	9.7	44 00.9	+60.0	9.8	45 00.0	+60.0	10.0	45
46	39 05.7	+60.0	8.9	40 05.0	+59.9	9.1	41 04.2	+60.0	9.2	42 03.4	+60.0	9.3	43 02.6	+60.0	9.5	44 01.8	+60.0	9.7	45 00.9	+60.0	9.8	46 00.0	+60.0	10.0	46
47	40 05.7	+59.9	8.9	41 04.9	+60.0	9.0	42 04.2	+60.0	9.2	43 03.4	+60.0	9.3	44 02.6	+60.0	9.5	45 01.8	+60.0	9.6	46 00.9	+60.0	9.8	47 00.0	+60.0	10.0	47
48	41 05.6	+60.0	8.9	42 04.9	+60.0	9.0	43 04.2	+60.0	9.2	44 03.4	+60.0	9.3	45 02.6	+60.0	9.5	46 01.8	+60.0	9.6	47 00.9	+60.0	9.8	48 00.0	+60.0	10.0	48
49	42 05.6	+60.0	8.8	43 04.9	+60.0	9.0	44 04.2	+59.9	9.1	45 03.4	+60.0	9.3	46 02.6	+60.0	9.4	47 01.8	+60.0	9.6	48 00.9	+60.0	9.8	49 00.0	+60.0	10.0	49
50	43 05.6	+60.0	8.8	44 04.9	+60.0	8.9	45 04.1	+60.0	9.1	46 03.4	+60.0	9.3	47 02.6	+60.0	9.4	48 01.8	+59.9	9.6	49 00.9	+60.0	9.8	50 00.0	+60.0	10.0	50
51	44 05.6	+59.9	8.8	45 04.9	+59.9	8.9	46 04.1	+60.0	9.1	47 03.4	+60.0	9.2	48 02.6	+60.0	9.4	49 01.7	+60.0	9.6	50 00.9	+60.0	9.8	51 00.0	+60.0	10.0	51
52	45 05.5	+60.0	8.7	46 04.8	+60.0	8.9	47 04.1	+60.0	9.0	48 03.4	+59.9	9.2	49 02.6	+60.0	9.4	50 01.7	+60.0	9.6	51 00.9	+60.0	9.8	52 00.0	+60.0	10.0	52
53	46 05.5	+60.0	8.7	47 04.8	+60.0	8.8	48 04.1	+60.0	9.0	49 03.3	+60.0	9.2	50 02.6	+60.0	9.4	51 01.7	+60.0	9.6	52 00.9	+60.0	9.8	53 00.0	+60.0	10.0	53
54	47 05.5	+60.0	8.6	48 04.8	+60.0	8.8	49 04.1	+60.0	9.0	50 03.3	+60.0	9.1	51 02.6	+59.9	9.3	52 01.7	+60.0	9.5	53 00.9	+60.0	9.8	54 00.0	+60.0	10.0	54
55	48 05.5	+59.9	8.6	49 04.8	+60.0	8.7	50 04.1	+59.9	8.9	51 03.3	+60.0	9.1	52 02.5	+60.0	9.3	53 01.7	+60.0	9.5	54 00.9	+60.0	9.8	55 00.0	+60.0	10.0	55
56	49 05.4	+60.0	8.5	50 04.8	+59.9	8.7	51 04.0	+60.0	8.9	52 03.3	+60.0	9.1	53 02.5	+60.0	9.3	54 01.7	+60.0	9.5	55 00.9	+60.0	9.8	56 00.0	+60.0	10.0	56
57	50 05.4	+60.0	8.5	51 04.7	+60.0	8.7	52 04.0	+60.0	8.8	53 03.3	+60.0	9.1	54 02.5	+60.0	9.3	55 01.7	+60.0	9.5	56 00.9	+60.0	9.7	57 00.0	+60.0	10.0	57
58	51 05.4	+59.9	8.4	52 04.7	+60.0	8.6	53 04.0	+60.0	8.8	54 03.3	+60.0	9.0	55 02.5	+60.0	9.2	56 01.7	+60.0	9.5	57 00.9	+60.0	9.7	58 00.0	+60.0	10.0	58
59	52 05.3	+60.0	8.4	53 04.7	+59.9	8.6	54 04.0	+60.0	8.8	55 03.3	+60.0	9.0	56 02.5	+60.0	9.2	57 01.7	+60.0	9.5	58 00.9	+60.0	9.7	59 00.0	+60.0	10.0	59
60	53 05.3	+60.0	8.3	54 04.6	+60.0	8.5	55 04.0	+59.9	8.7	56 03.3	+59.9	8.9	57 02.5	+60.0	9.2	58 01.7	+60.0	9.4	59 00.9	+60.0	9.7	60 00.0	+60.0	10.0	60
61	54 05.3	+59.9	8.3	55 04.6	+60.0	8.5	56 03.9	+60.0	8.7	57 03.2	+60.0	8.9	58 02.5	+60.0	9.2	59 01.7	+60.0	9.4	60 00.9	+60.0	9.7	61 00.0	+60.0	10.0	61
62	55 05.2	+60.0	8.2	56 04.6	+60.0	8.4	57 03.9	+60.0	8.6	58 03.2	+60.0	8.9	59 02.5	+60.0	9.1	60 01.7	+60.0	9.4	61 00.9	+60.0	9.7	62 00.0	+60.0	10.0	62
63	56 05.2	+59.9	8.1	57 04.6	+59.9	8.3	58 03.9	+60.0	8.6	59 03.2	+60.0	8.8	60 02.5	+60.0	9.1	61 01.7	+60.0	9.4	62 00.9	+60.0	9.7	63 00.0	+60.0	10.0	63
64	57 05.1	+60.0	8.1	58 04.5	+60.0	8.3	59 03.9	+60.0	8.5	60 03.2	+60.0	8.8	61 02.5	+60.0	9.0	62 01.7	+60.0	9.3	63 00.9	+60.0	9.7	64 00.0	+60.0	10.0	64
65	58 05.1	+59.9	8.0	59 04.5	+59.9	8.2	60 03.9	+59.9	8.5	61 03.2	+60.0	8.7	62 02.5	+60.0	9.0	63 01.7	+60.0	9.3	64 00.9	+60.0	9.6	65 00.0	+60.0	10.0	65
66	59 05.0	+60.0	7.9	60 04.4	+60.0	8.1	61 03.8	+60.0	8.4	62 03.2	+59.9	8.7	63 02.5	+59.9	9.0	64 01.7	+60.0	9.3	65 00.9	+60.0	9.6	66 00.0	+60.0	10.0	66
67	60 05.0	+59.9	7.8	61 04.4	+60.0	8.1	62 03.8	+60.0	8.3	63 03.1	+60.0	8.6	64 02.4	+60.0	8.9	65 01.7	+60.0	9.2	66 00.9	+60.0	9.6	67 00.0	+60.0	10.0	67
68	61 04.9	+60.0	7.7	62 04.4	+59.9	8.0	63 03.8	+59.9	8.3	64 03.1	+60.0	8.5	65 02.4	+60.0	8.9	66 01.7	+60.0	9.2	67 00.9	+60.0	9.6	68 00.0	+60.0	10.0	68
69	62 04.9	+59.9	7.6	63 04.3	+60.0	7.9	64 03.7	+60.0	8.2	65 03.1	+60.0	8.5	66 02.4	+60.0	8.8	67 01.7	+60.0	9.2	68 00.9	+60.0	9.6	69 00.0	+60.0	10.0	69
70	63 04.8	+59.9	7.5	64 04.3	+59.9	7.8	65 03.7	+59.9	8.1	66 03.1	+59.9	8.4	67 02.4	+60.0	8.8	68 01.7	+60.0	9.1	69 00.9	+60.0	9.5	70 00.0	+60.0	10.0	70
71	64 04.7	+60.0	7.4	65 04.2	+60.0	7.7	66 03.6	+60.0	8.0	67 03.0	+60.0	8.3	68 02.4	+60.0	8.7	69 01.7	+59.9	9.1	70 00.9	+60.0	9.5	71 00.0	+60.0	10.0	71
72	65 04.7	+59.9	7.3	66 04.2	+59.9	7.6	67 03.6	+60.0	7.9	68 03.0	+60.0	8.3	69 02.4	+59.9	8.6	70 01.6	+60.0	9.0	71 00.9	+60.0	9.5	72 00.0	+60.0	10.0	72
73	66 04.6	+59.9	7.2	67 04.1	+59.9	7.5	68 03.6	+59.9	7.8	69 03.0	+59.9	8.2	70 02.3	+60.0	8.6	71 01.6	+60.0	9.0	72 00.9	+60.0	9.5	73 00.0	+60.0	10.0	73
74	67 04.5	+59.9	7.1	68 04.0	+59.9	7.4	69 03.5	+59.9	7.7	70 02.9	+60.0	8.1	71 02.3	+60.0	8.5	72 01.6	+60.0	8.9	73 00.9	+60.0	9.4	74 00.0	+60.0	10.0	74
75	68 04.4	+59.9	6.9	69 03.9	+60.0	7.2	70 03.4	+60.0	7.6	71 02.9	+60.0	8.0	72 02.3	+60.0	8.4	73 01.6	+60.0	8.9	74 00.9	+60.0	9.4	75 00.0	+60.0	10.0	75
76	69 04.3	+59.9	6.8	70 03.9	+59.9	7.1	71 03.4	+59.9	7.4	72 02.9	+59.9	7.8	73 02.3	+59.9	8.3	74 01.6	+60.0	8.8	75 00.9	+59.9	9.3	76 00.0	+60.0	10.0	76
77	70 04.2	+59.9	6.6	71 03.8	+59.9	6.9	72 03.3	+59.9	7.3	73 02.8	+60.0	7.7	74 02.2	+60.0	8.2	75 01.6	+60.0	8.7	76 00.8	+60.0	9.3	77 00.0	+60.0	10.0	77
78	71 04.1	+59.8	6.4	72 03.7	+59.9	6.7	73 03.2	+60.0	7.1	74 02.8	+59.9	7.5	75 02.2	+60.0	8.0	76 01.6	+59.9	8.6	77 00.8	+60.0	9.2	78 00.0	+60.0	10.0	78
79	72 03.9	+59.9	6.2	73 03.6	+59.8	6.5	74 03.2	+59.9	6.9	75 02.7	+59.9	7.4	76 02.2	+59.9	7.9	77 01.5	+60.0	8.5	78 00.8	+60.0	9.2	79 00.0	+60.0	10.0	79
80	73 03.8	+59.8	5.9	74 03.4	+59.9	6.3	75 03.1	+59.8	6.7	76 02.6	+59.9	7.2	77 02.1	+60.0	7.7	78 01.5	+60.0	8.4	79 00.8	+60.0	9.1	80 00.0	+60.0	10.0	80
81	74 03.6	+59.8	5.7	75 03.3	+59.8	6.0	76 02.9	+59.9	6.5	77 02.5	+59.9	7.0	78 02.1	+59.9	7.5	79 01.5	+60.0	8.2	80 00.8	+60.0	9.0	81 00.0	+60.0	10.0	81
82	75 03.4	+59.8	5.4	76 03.1	+59.9	5.8	77 02.8	+59.9	6.2	78 02.4	+59.9	6.7	79 02.0	+59.9	7.3	80 01.5	+59.9	8.0	81 00.8	+60.0	8.9	82 00.0	+60.0	10.0	82
83	76 03.2	+59.8	5.0	77 03.0	+59.7	5.4	78 02.7	+59.8	5.9	79 02.3	+59.9	6.4	80 01.9	+59.9	7.0	81 01.4	+60.0	7.8	82 00.8	+60.0	8.8	83 00.0	+60.0	10.0	83
84	77 03.0	+59.7	4.6	78 02.7	+59.8	5.0	79 02.5	+59.8	5.5	80 02.2	+59.8	6.0	81 01.8	+59.9	6.7	82 01.4	+59.9	7.5	83 00.8	+60.0	8.6	84 00.0	+60.0	10.0	84
85	78 02.7	+59.6	4.2	79 02.5	+59.7	4.6	80 02.3	+59.7	5.0	81 02.0	+59.8	5.6	82 01.7	+59.9	6.3	83 01.3	+59.9	7.2	84 00.8	+59.9	8.3	85 00.0	+60.0	10.0	85
86	79 02.3	+59.6	3.7	80 02.2	+59.6	4.0	81 02.0	+59.7	4.5	82 01.8	+59.8	5.0	83 01.6	+59.8	5.7	84 01.2	+59.9	6.7	85 00.7	+60.0	8.0	86 00.0	+60.0	10.0	86
87	80 01.9	+59.5	3.0	81 01.8	+59.6	3.3	82 01.7	+59.6	3.8	83 01.6	+59.6	4.3	84 01.4	+59.7	5.0	85 01.1	+59.8	6.0	86 00.7	+59.9	7.5	87 00.0	+60.0	10.0	87
88	81 01.4	+59.4	2.2	82 01.4	+59.4	2.5	83 01.3	+59.5	2.9	84 01.2	+59.5	3.3	85 01.1	+59.6	4.0	86 00.9	+59.7	5.0	87 00.6	+59.9	6.7	88 00.0	+60.0	10.0	88
89	82 00.8	+59.2	1.2	83 00.8	+59.2	1.4	84 00.8	+59.2	1.7	85 00.7	+59.3	2.0	86 00.7	+59.3	2.5	87 00.6	+59.4	3.3	88 00.5	*+59.5* •	5.0	89 00.0	+60.0	10.0	89
90	83 00.0	+58.9	0.0	84 00.0	+58.9	0.0	85 00.0	+58.9	0.0	86 00.0	+58.8	0.0	87 00.0	+58.6	0.0	88 00.0	*+58.2* •	0.0	89 00.0	*+49.5* •	0.0	90 00.0	–60.0	5.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 170°, 190°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 52.2	+60.0	168.9	5 53.4	+60.0	168.9	4 54.5	+60.0	169.0	3 55.6	+60.0	169.0	2 56.7	+60.0	169.0	1 57.8	+60.0	169.0	0 58.9	+60.0	169.0	0 00.0	+60.0	169.0	0
1	7 52.2	+60.0	168.9	6 53.4	+59.9	168.9	5 54.5	+60.0	168.9	4 55.6	+60.0	169.0	3 56.7	+60.0	169.0	2 57.8	+60.0	169.0	1 58.9	+60.0	169.0	1 00.0	+60.0	169.0	1
2	8 52.2	+60.0	168.9	7 53.3	+60.0	168.9	6 54.5	+59.9	168.9	5 55.6	+60.0	168.9	4 56.7	+60.0	169.0	3 57.8	+60.0	169.0	2 58.9	+60.0	169.0	2 00.0	+60.0	169.0	2
3	9 52.2	+60.0	168.8	8 53.3	+60.0	168.9	7 54.4	+60.0	168.9	6 55.6	+60.0	168.9	5 56.7	+60.0	169.0	4 57.8	+60.0	169.0	3 58.9	+60.0	169.0	3 00.0	+60.0	169.0	3
4	10 52.2	+60.0	168.8	9 53.3	+60.0	168.9	8 54.4	+60.0	168.9	7 55.6	+60.0	168.9	6 56.7	+60.0	168.9	5 57.8	+60.0	169.0	4 58.9	+60.0	169.0	4 00.0	+60.0	169.0	4
5	11 52.2	+59.9	168.8	10 53.3	+60.0	168.8	9 54.4	+60.0	168.9	8 55.6	+60.0	168.9	7 56.7	+60.0	168.9	6 57.8	+60.0	169.0	5 58.9	+60.0	169.0	5 00.0	+60.0	169.0	5
6	12 52.1	+60.0	168.8	11 53.3	+60.0	168.8	10 54.4	+60.0	168.9	9 55.6	+59.9	168.9	8 56.7	+60.0	168.9	7 57.8	+60.0	169.0	6 58.9	+60.0	169.0	6 00.0	+60.0	169.0	6
7	13 52.1	+60.0	168.8	12 53.3	+60.0	168.8	11 54.4	+60.0	168.8	10 55.5	+60.0	168.9	9 56.7	+60.0	168.9	8 57.8	+60.0	168.9	7 58.9	+60.0	169.0	7 00.0	+60.0	169.0	7
8	14 52.1	+60.0	168.7	13 53.3	+60.0	168.8	12 54.4	+60.0	168.8	11 55.5	+60.0	168.9	10 56.7	+60.0	168.9	9 57.8	+60.0	168.9	8 58.9	+60.0	169.0	8 00.0	+60.0	169.0	8
9	15 52.1	+60.0	168.7	14 53.3	+59.9	168.8	13 54.4	+60.0	168.8	12 55.5	+60.0	168.9	11 56.7	+60.0	168.9	10 57.8	+60.0	168.9	9 58.9	+60.0	169.0	9 00.0	+60.0	169.0	9
10	16 52.1	+60.0	168.7	15 53.2	+60.0	168.7	14 54.4	+60.0	168.8	13 55.5	+60.0	168.8	12 56.7	+60.0	168.9	11 57.8	+60.0	168.9	10 58.9	+60.0	169.0	10 00.0	+60.0	169.0	10
11	17 52.1	+59.9	168.7	16 53.2	+60.0	168.7	15 54.4	+60.0	168.8	14 55.5	+60.0	168.8	13 56.7	+60.0	168.9	12 57.8	+60.0	168.9	11 58.9	+60.0	169.0	11 00.0	+60.0	169.0	11
12	18 52.0	+60.0	168.6	17 53.2	+60.0	168.7	16 54.4	+60.0	168.8	15 55.5	+60.0	168.8	14 56.7	+59.9	168.9	13 57.8	+60.0	168.9	12 58.9	+60.0	169.0	12 00.0	+60.0	169.0	12
13	19 52.0	+60.0	168.6	18 53.2	+60.0	168.7	17 54.4	+60.0	168.7	16 55.5	+60.0	168.8	15 56.6	+60.0	168.9	14 57.8	+60.0	168.9	13 58.9	+60.0	169.0	13 00.0	+60.0	169.0	13
14	20 52.0	+60.0	168.6	19 53.2	+60.0	168.6	18 54.4	+59.9	168.7	17 55.5	+60.0	168.8	16 56.6	+60.0	168.8	15 57.8	+60.0	168.9	14 58.9	+60.0	169.0	14 00.0	+60.0	169.0	14
15	21 52.0	+60.0	168.5	20 53.2	+60.0	168.6	19 54.3	+60.0	168.7	18 55.5	+60.0	168.8	17 56.6	+60.0	168.8	16 57.8	+60.0	168.9	15 58.9	+60.0	168.9	15 00.0	+60.0	169.0	15
16	22 52.0	+59.9	168.5	21 53.2	+59.9	168.6	20 54.3	+60.0	168.7	19 55.5	+60.0	168.7	18 56.6	+60.0	168.8	17 57.8	+60.0	168.9	16 58.9	+60.0	168.9	16 00.0	+60.0	169.0	16
17	23 51.9	+60.0	168.5	22 53.1	+60.0	168.6	21 54.3	+60.0	168.7	20 55.5	+60.0	168.7	19 56.6	+60.0	168.8	18 57.8	+60.0	168.9	17 58.9	+60.0	168.9	17 00.0	+60.0	169.0	17
18	24 51.9	+60.0	168.5	23 53.1	+60.0	168.6	22 54.3	+60.0	168.6	21 55.5	+60.0	168.7	20 56.6	+60.0	168.8	19 57.8	+60.0	168.9	18 58.9	+60.0	168.9	18 00.0	+60.0	169.0	18
19	25 51.9	+60.0	168.4	24 53.1	+60.0	168.5	23 54.3	+60.0	168.6	22 55.5	+60.0	168.7	21 56.6	+60.0	168.8	20 57.8	+60.0	168.9	19 58.9	+60.0	168.9	19 00.0	+60.0	169.0	19
20	26 51.9	+60.0	168.4	25 53.1	+60.0	168.5	24 54.3	+60.0	168.6	23 55.5	+60.0	168.7	22 56.6	+60.0	168.8	21 57.8	+60.0	168.9	20 58.9	+60.0	168.9	20 00.0	+60.0	169.0	20
21	27 51.9	+59.9	168.4	26 53.1	+60.0	168.5	25 54.3	+60.0	168.6	24 55.5	+60.0	168.7	23 56.6	+60.0	168.8	22 57.8	+60.0	168.8	21 58.9	+60.0	168.9	21 00.0	+60.0	169.0	21
22	28 51.8	+60.0	168.3	27 53.1	+60.0	168.5	26 54.3	+60.0	168.6	25 55.5	+59.9	168.7	24 56.6	+60.0	168.7	23 57.8	+60.0	168.8	22 58.9	+60.0	168.9	22 00.0	+60.0	169.0	22
23	29 51.8	+60.0	168.3	28 53.1	+59.9	168.4	27 54.3	+60.0	168.5	26 55.4	+60.0	168.6	25 56.6	+60.0	168.7	24 57.8	+60.0	168.8	23 58.9	+60.0	168.9	23 00.0	+60.0	169.0	23
24	30 51.8	+60.0	168.3	29 53.0	+60.0	168.4	28 54.3	+59.9	168.5	27 55.4	+60.0	168.6	26 56.6	+60.0	168.7	25 57.8	+60.0	168.8	24 58.9	+60.0	168.9	24 00.0	+60.0	169.0	24
25	31 51.8	+60.0	168.3	30 53.0	+60.0	168.4	29 54.2	+60.0	168.5	28 55.4	+60.0	168.6	27 56.6	+60.0	168.7	26 57.8	+60.0	168.8	25 58.9	+60.0	168.9	25 00.0	+60.0	169.0	25
26	32 51.8	+59.9	168.2	31 53.0	+60.0	168.3	30 54.2	+60.0	168.5	29 55.4	+60.0	168.6	28 56.6	+60.0	168.7	27 57.8	+60.0	168.8	26 58.9	+60.0	168.9	26 00.0	+60.0	169.0	26
27	33 51.7	+60.0	168.2	32 53.0	+60.0	168.3	31 54.2	+60.0	168.4	30 55.4	+60.0	168.6	29 56.6	+60.0	168.7	28 57.8	+60.0	168.8	27 58.9	+60.0	168.9	27 00.0	+60.0	169.0	27
28	34 51.7	+60.0	168.2	33 53.0	+60.0	168.3	32 54.2	+60.0	168.4	31 55.4	+60.0	168.6	30 56.6	+60.0	168.7	29 57.8	+60.0	168.8	28 58.9	+60.0	168.9	28 00.0	+60.0	169.0	28
29	35 51.7	+60.0	168.1	34 53.0	+59.9	168.3	33 54.2	+60.0	168.4	32 55.4	+60.0	168.5	31 56.6	+60.0	168.7	30 57.8	+59.9	168.8	29 58.9	+60.0	168.9	29 00.0	+60.0	169.0	29
30	36 51.7	+59.9	168.1	35 52.9	+60.0	168.2	34 54.2	+60.0	168.4	33 55.4	+60.0	168.5	32 56.6	+60.0	168.6	31 57.7	+60.0	168.8	30 58.9	+60.0	168.9	30 00.0	+60.0	169.0	30
31	37 51.6	+60.0	168.0	36 52.9	+60.0	168.2	35 54.2	+60.0	168.4	34 55.4	+60.0	168.5	33 56.6	+60.0	168.6	32 57.7	+60.0	168.8	31 58.9	+60.0	168.9	31 00.0	+60.0	169.0	31
32	38 51.6	+60.0	168.0	37 52.9	+60.0	168.2	36 54.2	+59.9	168.3	35 55.4	+60.0	168.5	34 56.6	+60.0	168.6	33 57.7	+60.0	168.7	32 58.9	+60.0	168.9	32 00.0	+60.0	169.0	32
33	39 51.6	+60.0	168.0	38 52.9	+60.0	168.1	37 54.1	+60.0	168.3	36 55.4	+60.0	168.5	35 56.6	+60.0	168.6	34 57.7	+60.0	168.7	33 58.9	+60.0	168.9	33 00.0	+60.0	169.0	33
34	40 51.6	+59.9	167.9	39 52.9	+59.9	168.1	38 54.1	+60.0	168.3	37 55.4	+60.0	168.4	36 56.6	+60.0	168.6	35 57.7	+60.0	168.7	34 58.9	+60.0	168.9	34 00.0	+60.0	169.0	34
35	41 51.5	+60.0	167.9	40 52.8	+60.0	168.1	39 54.1	+60.0	168.2	38 55.4	+59.9	168.4	37 56.6	+60.0	168.6	36 57.7	+60.0	168.7	35 58.9	+60.0	168.9	35 00.0	+60.0	169.0	35
36	42 51.5	+60.0	167.8	41 52.8	+60.0	168.0	40 54.1	+60.0	168.2	39 55.3	+60.0	168.4	38 56.6	+60.0	168.6	37 57.7	+60.0	168.7	36 58.9	+60.0	168.9	36 00.0	+60.0	169.0	36
37	43 51.5	+59.9	167.8	42 52.8	+60.0	168.0	41 54.1	+60.0	168.2	40 55.3	+60.0	168.4	39 56.6	+60.0	168.5	38 57.7	+60.0	168.7	37 58.9	+60.0	168.9	37 00.0	+60.0	169.0	37
38	44 51.4	+60.0	167.8	43 52.8	+60.0	168.0	42 54.1	+60.0	168.2	41 55.3	+60.0	168.3	40 56.6	+59.9	168.5	39 57.7	+60.0	168.7	38 58.9	+60.0	168.8	38 00.0	+60.0	169.0	38
39	45 51.4	+60.0	167.7	44 52.8	+59.9	167.9	43 54.1	+59.9	168.1	42 55.3	+60.0	168.3	41 56.5	+60.0	168.5	40 57.7	+60.0	168.7	39 58.9	+60.0	168.8	39 00.0	+60.0	169.0	39
40	46 51.4	+59.9	167.7	45 52.7	+60.0	167.9	44 54.0	+60.0	168.1	43 55.3	+60.0	168.3	42 56.5	+60.0	168.5	41 57.7	+60.0	168.7	40 58.9	+60.0	168.8	40 00.0	+60.0	169.0	40
41	47 51.3	+60.0	167.6	46 52.7	+60.0	167.8	45 54.0	+60.0	168.1	44 55.3	+60.0	168.3	43 56.5	+60.0	168.5	42 57.7	+60.0	168.7	41 58.9	+60.0	168.8	41 00.0	+60.0	169.0	41
42	48 51.3	+60.0	167.6	47 52.7	+59.9	167.8	46 54.0	+60.0	168.0	45 55.3	+60.0	168.2	44 56.5	+60.0	168.4	43 57.7	+60.0	168.6	42 58.9	+60.0	168.8	42 00.0	+60.0	169.0	42
43	49 51.3	+59.9	167.5	48 52.6	+60.0	167.7	47 54.0	+60.0	168.0	46 55.3	+60.0	168.2	45 56.5	+60.0	168.4	44 57.7	+60.0	168.6	43 58.9	+60.0	168.8	43 00.0	+60.0	169.0	43
44	50 51.2	+60.0	167.4	49 52.6	+60.0	167.7	48 54.0	+60.0	167.9	47 55.3	+60.0	168.2	46 56.5	+60.0	168.4	45 57.7	+60.0	168.6	44 58.9	+60.0	168.8	44 00.0	+60.0	169.0	44
45	51 51.2	+59.9	167.4	50 52.6	+60.0	167.7	49 54.0	+59.9	167.9	48 55.3	+59.9	168.2	47 56.5	+60.0	168.4	46 57.7	+60.0	168.6	45 58.9	+60.0	168.8	45 00.0	+60.0	169.0	45
46	52 51.1	+60.0	167.3	51 52.6	+59.9	167.6	50 53.9	+60.0	167.9	49 55.2	+60.0	168.1	48 56.5	+60.0	168.4	47 57.7	+60.0	168.6	46 58.9	+60.0	168.8	46 00.0	+60.0	169.0	46
47	53 51.1	+59.9	167.3	52 52.5	+60.0	167.5	51 53.9	+60.0	167.8	50 55.2	+60.0	168.1	49 56.5	+60.0	168.3	48 57.7	+60.0	168.6	47 58.9	+60.0	168.8	47 00.0	+60.0	169.0	47
48	54 51.0	+60.0	167.2	53 52.5	+60.0	167.5	52 53.9	+60.0	167.8	51 55.2	+60.0	168.1	50 56.5	+60.0	168.3	49 57.7	+60.0	168.6	48 58.9	+60.0	168.8	48 00.0	+60.0	169.0	48
49	55 51.0	+59.9	167.1	54 52.5	+59.9	167.4	53 53.9	+59.9	167.7	52 55.2	+60.0	168.0	51 56.5	+60.0	168.3	50 57.7	+60.0	168.5	49 58.9	+60.0	168.8	49 00.0	+60.0	169.0	49
50	56 50.9	+60.0	167.0	55 52.4	+60.0	167.4	54 53.8	+60.0	167.7	53 55.2	+60.0	168.0	52 56.5	+60.0	168.3	51 57.7	+60.0	168.5	50 58.9	+60.0	168.8	50 00.0	+60.0	169.0	50
51	57 50.9	+59.9	167.0	56 52.4	+59.9	167.3	55 53.8	+60.0	167.6	54 55.2	+60.0	167.9	53 56.5	+60.0	168.2	52 57.7	+60.0	168.5	51 58.9	+60.0	168.8	51 00.0	+60.0	169.0	51
52	58 50.8	+60.0	166.9	57 52.3	+60.0	167.2	56 53.8	+60.0	167.6	55 55.2	+59.9	167.9	54 56.5	+59.9	168.2	53 57.7	+60.0	168.5	52 58.9	+60.0	168.7	52 00.0	+60.0	169.0	52
53	59 50.8	+59.9	166.8	58 52.3	+60.0	167.2	57 53.8	+59.9	167.5	56 55.1	+60.0	167.9	55 56.4	+60.0	168.2	54 57.7	+60.0	168.5	53 58.9	+60.0	168.7	53 00.0	+60.0	169.0	53
54	60 50.7	+59.9	166.7	59 52.3	+59.9	167.1	58 53.7	+60.0	167.5	57 55.1	+60.0	167.8	56 56.4	+60.0	168.1	55 57.7	+60.0	168.4	54 58.9	+60.0	168.7	54 00.0	+60.0	169.0	54
55	61 50.6	+59.9	166.6	60 52.2	+60.0	167.0	59 53.7	+60.0	167.4	58 55.1	+60.0	167.8	57 56.4	+60.0	168.1	56 57.7	+60.0	168.4	55 58.9	+60.0	168.7	55 00.0	+60.0	169.0	55
56	62 50.5	+60.0	166.5	61 52.2	+59.9	166.9	60 53.7	+59.9	167.3	59 55.1	+60.0	167.7	58 56.4	+60.0	168.1	57 57.7	+60.0	168.4	56 58.9	+60.0	168.7	56 00.0	+60.0	169.0	56
57	63 50.5	+59.9	166.4	62 52.1	+59.9	166.8	61 53.6	+60.0	167.3	60 55.1	+59.9	167.7	59 56.4	+60.0	168.0	58 57.7	+60.0	168.4	57 58.9	+60.0	168.7	57 00.0	+60.0	169.0	57
58	64 50.4	+59.9	166.2	63 52.0	+60.0	166.7	62 53.6	+59.9	167.2	61 55.0	+60.0	167.6	60 56.4	+60.0	168.0	59 57.7	+60.0	168.3	58 58.9	+60.0	168.7	58 00.0	+60.0	169.0	58
59	65 50.3	+59.9	166.1	64 52.0	+59.9	166.6	63 53.5	+60.0	167.1	62 55.0	+60.0	167.5	61 56.4	+60.0	167.9	60 57.7	+60.0	168.3	59 58.9	+60.0	168.7	59 00.0	+60.0	169.0	59
60	66 50.2	+59.9	166.0	65 51.9	+59.9	166.5	64 53.5	+60.0	167.0	63 55.0	+60.0	167.5	62 56.4	+59.9	167.9	61 57.7	+59.9	168.3	60 58.9	+60.0	168.7	60 00.0	+60.0	169.0	60
61	67 50.1	+59.9	165.8	66 51.8	+60.0	166.4	65 53.5	+59.9	166.9	64 55.0	+59.9	167.4	63 56.3	+60.0	167.8	62 57.6	+60.0	168.3	61 58.9	+60.0	168.6	61 00.0	+60.0	169.0	61
62	68 50.0	+59.8	165.6	67 51.8	+59.9	166.2	66 53.4	+59.9	166.8	65 54.9	+60.0	167.3	64 56.3	+60.0	167.8	63 57.6	+60.0	168.2	62 58.9	+60.0	168.6	62 00.0	+60.0	169.0	62
63	69 49.8	+59.9	165.4	68 51.7	+59.9	166.1	67 53.3	+60.0	166.7	66 54.9	+60.0	167.2	65 56.3	+60.0	167.7	64 57.6	+60.0	168.2	63 58.9	+60.0	168.6	63 00.0	+60.0	169.0	63
64	70 49.7	+59.8	165.2	69 51.6	+59.9	165.9	68 53.3	+59.9	166.6	67 54.9	+59.9	167.1	66 56.3	+60.0	167.7	65 57.6	+60.0	168.2	64 58.9	+60.0	168.6	64 00.0	+60.0	169.0	64
65	71 49.5	+59.8	165.0	70 51.5	+59.8	165.8	69 53.2	+59.9	166.4	68 54.8	+60.0	167.0	67 56.3	+60.0	167.6	66 57.6	+60.0	168.1	65 58.9	+60.0	168.6	65 00.0	+60.0	169.0	65
66	72 49.3	+59.8	164.8	71 51.3	+59.9	165.6	70 53.1	+60.0	166.3	69 54.8	+59.9	166.9	68 56.3	+59.9	167.5	67 57.6	+60.0	168.1	66 58.9	+60.0	168.6	66 00.0	+60.0	169.0	66
67	73 49.1	+59.8	164.5	72 51.2	+59.9	165.4	71 53.1	+59.9	166.1	70 54.7	+60.0	166.8	69 56.2	+60.0	167.4	68 57.6	+60.0	168.0	67 58.9	+59.9	168.5	67 00.0	+60.0	169.0	67
68	74 48.9	+59.8	164.2	73 51.1	+59.8	165.1	72 53.0	+59.9	165.9	71 54.7	+59.9	166.7	70 56.2	+60.0	167.4	69 57.6	+60.0	168.0	68 58.8	+60.0	168.5	68 00.0	+60.0	169.0	68
69	75 48.7	+59.7	163.8	74 50.9	+59.8	164.8	73 52.9	+59.9	165.7	72 54.6	+59.9	166.5	71 56.2	+59.9	167.3	70 57.6	+60.0	167.9	69 58.8	+60.0	168.5	69 00.0	+60.0	169.0	69
70	76 48.4	+59.6	163.4	75 50.7	+59.8	164.5	74 52.8	+59.8	165.5	73 54.5	+60.0	166.4	72 56.1	+60.0	167.2	71 57.6	+59.9	167.8	70 58.8	+60.0	168.4	70 00.0	+60.0	169.0	70
71	77 48.0	+59.6	162.9	76 50.5	+59.8	164.2	75 52.6	+59.9	165.3	74 54.5	+59.9	166.2	73 56.1	+60.0	167.0	72 57.5	+60.0	167.8	71 58.8	+60.0	168.4	71 00.0	+60.0	169.0	71
72	78 47.6	+59.6	162.3	77 50.3	+59.7	163.7	76 52.5	+59.8	165.0	75 54.4	+59.9	166.0	74 56.1	+59.9	166.9	73 57.5	+60.0	167.7	72 58.8	+60.0	168.4	72 00.0	+60.0	169.0	72
73	79 47.2	+59.4	161.7	78 50.0	+59.6	163.3	77 52.3	+59.8	164.6	76 54.3	+59.9	165.7	75 56.0	+60.0	166.7	74 57.5	+60.0	167.6	73 58.8	+60.0	168.3	73 00.0	+60.0	169.0	73
74	80 46.6	+59.3	160.8	79 49.6	+59.6	162.7	78 52.1	+59.7	164.2	77 54.2	+59.9	165.5	76 56.0	+59.9	166.5	75 57.5	+60.0	167.5	74 58.8	+60.0	168.3	74 00.0	+60.0	169.0	74
75	81 45.9	+59.1	159.8	80 49.2	+59.5	162.0	79 51.8	+59.8	163.7	78 54.1	+59.8	165.1	77 55.9	+59.9	166.3	76 57.5	+59.9	167.4	75 58.8	+60.0	168.2	75 00.0	+60.0	169.0	75
76	82 45.0	+58.8	158.5	81 48.7	+59.3	161.1	80 51.6	+59.6	163.1	79 53.9	+59.8	164.7	78 55.8	+59.9	166.1	77 57.4	+60.0	167.2	76 58.8	+60.0	168.2	76 00.0	+60.0	169.0	76
77	83 43.8	+58.4	156.9	82 48.0	+59.1	160.0	81 51.2	+59.5	162.4	80 53.7	+59.8	164.3	79 55.7	+59.9	165.8	78 57.4	+60.0	167.1	77 58.8	+60.0	168.1	77 00.0	+60.0	169.0	77
78	84 42.2	+57.6	154.6	83 47.1	+58.8	158.5	82 50.7	+59.4	161.4	81 53.5	+59.7	163.7	80 55.6	+59.9	165.4	79 57.4	+59.9	166.9	78 58.8	+60.0	168.0	78 00.0	+60.0	169.0	78
79	85 39.8	*+56.3*	•151.2	84 45.9	+58.2	156.5	83 50.1	+59.1	160.2	82 53.2	+59.6	162.9	81 55.5	+59.8	165.0	80 57.3	+60.0	166.6	79 58.8	+60.0	167.9	79 00.0	+60.0	169.0	79
80	86 36.1	*+53.3*	•146.0	85 44.1	+57.1	153.5	84 49.2	+58.8	158.5	83 52.8	+59.4	161.9	82 55.3	+59.8	164.4	81 57.3	+59.9	166.3	80 58.8	+60.0	167.8	80 00.0	+60.0	169.0	80
81	87 29.4	*+45.9*	•137.0	86 41.2	*+54.9*	•148.9	85 48.0	+57.9	156.0	84 52.2	+59.2	160.5	83 55.1	+59.7	163.6	82 57.2	+59.9	165.9	81 58.8	+59.9	167.6	81 00.0	+60.0	169.0	81
82	88 15.3	*+24.4*	•119.3	87 36.1	*+48.3*	•140.6	86 45.9	*+56.2*	•151.9	85 51.4	+58.6	158.4	84 54.8	+59.5	162.6	83 57.1	+59.8	165.4	82 58.7	+60.0	167.5	82 00.0	+60.0	169.0	82
83	88 39.7	*−15.3*	•84.5	88 24.4	*+26.7*	•123.2	87 42.1	*+51.0*	•144.6	86 50.0	*+57.5*	•155.1	85 54.3	+59.2	161.0	84 56.9	+59.8	164.7	83 58.7	+60.0	167.2	83 00.0	+60.0	169.0	83
84	88 24.4	*−42.3*	•45.9	88 51.1	*−18.0*	•84.5	88 33.1	*+29.5*	•127.9	87 47.5	*+53.5*	•148.8	86 53.5	+58.5	158.4	85 56.7	+59.7	163.6	84 58.7	+59.9	166.8	84 00.0	+60.0	169.0	84
85	87 42.1	*−52.1*	•24.5	88 33.1	*−45.6*	•41.1	89 02.6	*−21.6*	•84.5	88 41.0	*+33.0*	•133.6	87 52.0	*+56.0*	•153.5	86 56.4	+59.3	161.9	85 58.6	+59.9	166.3	85 00.0	+60.0	169.0	85
86	86 50.0	*−55.7*	•13.9	87 47.5	*−54.0*	•20.2	88 41.0	*−49.0*	•35.4	89 14.0	*−26.0*	•84.5	88 48.0	*+37.5*	•140.5	87 55.7	*+58.0*	•158.4	86 58.5	+59.9	165.4	86 00.0	+60.0	169.0	86
87	85 54.3	−57.4	8.0	86 53.5	*−56.8*	•10.6	87 52.0	*−55.6*	•15.6	88 48.0	*−52.3*	•28.5	89 25.5	*−31.8*	•84.5	88 53.7	*+43.3*	•148.8	87 58.4	*+59.4*	•163.6	87 00.0	+60.0	169.0	87
88	84 56.9	−58.2	4.3	85 56.7	−58.0	5.4	86 56.4	−57.8	7.2	87 55.7	*−57.2*	•10.6	88 53.7	*−55.3*	•20.2	89 37.0	*−39.2*	•84.5	88 57.8	*+50.7*	•158.4	88 00.0	+60.0	169.0	88
89	83 58.7	−58.7	1.8	84 58.7	−58.7	2.2	85 58.6	−58.6	2.7	86 58.5	−58.5	3.6	87 58.4	−58.4	5.4	88 57.8	*−57.8*	•10.6	89 48.5	*−48.5*	•84.5	89 00.0	+60.0	169.0	89
90	83 00.0	−59.0	0.0	84 00.0	−59.1	0.0	85 00.0	−59.1	0.0	86 00.0	−59.1	0.0	87 00.0	−59.2	0.0	88 00.0	−59.3	0.0	89 00.0	*−59.4*	•0.0	90 00.0	−60.0	84.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 11°, 349°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 52.2	–59.9	168.9	5 53.4	–60.0	168.9	4 54.5	–60.0	169.0	3 55.6	–60.0	169.0	2 56.7	–60.0	169.0	1 57.8	–60.0	169.0	0 58.9	–60.0	169.0	0 00.0	+60.0	11.0	**0**
1	5 52.3	–60.0	168.9	4 53.4	–60.0	169.0	3 54.5	–60.0	169.0	2 55.6	–60.0	169.0	1 56.7	–60.0	169.0	0 57.8	–60.0	169.0	0 01.1	+60.0	11.0	1 00.0	+60.0	11.0	**1**
2	4 52.3	–60.0	169.0	3 53.4	–60.0	169.0	2 54.5	–60.0	169.0	1 55.6	–60.0	169.0	0 56.7	–60.0	169.0	0 02.2	+60.0	11.0	1 01.1	+60.0	11.0	2 00.0	+60.0	11.0	**2**
3	3 52.3	–60.0	169.0	2 53.4	–60.0	169.0	1 54.5	–60.0	169.0	0 55.6	–60.0	169.0	0 03.3	+60.0	11.0	1 02.2	+60.0	11.0	2 01.1	+60.0	11.0	3 00.0	+60.0	11.0	**3**
4	2 52.3	–60.0	169.0	1 53.4	–60.0	169.0	0 54.5	–60.0	169.0	0 04.4	+60.0	11.0	1 03.3	+60.0	11.0	2 02.2	+60.0	11.0	3 01.1	+60.0	11.0	4 00.0	+60.0	11.0	**4**
5	1 52.3	–60.0	169.0	0 53.4	–60.0	169.0	0 05.5	+60.0	11.0	1 04.4	+60.0	11.0	2 03.3	+60.0	11.0	3 02.2	+60.0	11.0	4 01.1	+60.0	11.0	5 00.0	+60.0	11.0	**5**
6	0 52.3	–59.9	169.1	0 06.6	+60.0	10.9	1 05.5	+60.0	10.9	2 04.4	+60.0	10.9	3 03.3	+60.0	11.0	4 02.2	+60.0	11.0	5 01.1	+60.0	11.0	6 00.0	+60.0	11.0	**6**
7	0 07.6	+60.0	10.9	1 06.6	+59.9	10.9	2 05.5	+60.0	10.9	3 04.4	+60.0	10.9	4 03.3	+60.0	10.9	5 02.2	+60.0	11.0	6 01.1	+60.0	11.0	7 00.0	+60.0	11.0	**7**
8	1 07.6	+60.0	10.9	2 06.5	+60.0	10.9	3 05.5	+60.0	10.9	4 04.4	+60.0	10.9	5 03.3	+60.0	10.9	6 02.2	+60.0	11.0	7 01.1	+60.0	11.0	8 00.0	+60.0	11.0	**8**
9	2 07.6	+60.0	10.9	3 06.5	+60.0	10.9	4 05.5	+59.9	10.9	5 04.4	+60.0	10.9	6 03.3	+60.0	10.9	7 02.2	+60.0	10.9	8 01.1	+60.0	11.0	9 00.0	+60.0	11.0	**9**
10	3 07.6	+60.0	10.8	4 06.5	+60.0	10.9	5 05.4	+60.0	10.9	6 04.4	+60.0	10.9	7 03.3	+60.0	10.9	8 02.2	+60.0	10.9	9 01.1	+60.0	11.0	10 00.0	+60.0	11.0	**10**
11	4 07.6	+60.0	10.8	5 06.5	+60.0	10.8	6 05.4	+60.0	10.9	7 04.4	+60.0	10.9	8 03.3	+60.0	10.9	9 02.2	+60.0	10.9	10 01.1	+60.0	11.0	11 00.0	+60.0	11.0	**11**
12	5 07.6	+59.9	10.8	6 06.5	+60.0	10.8	7 05.4	+60.0	10.8	8 04.4	+59.9	10.9	9 03.3	+60.0	10.9	10 02.2	+60.0	10.9	11 01.1	+60.0	11.0	12 00.0	+60.0	11.0	**12**
13	6 07.5	+60.0	10.8	7 06.5	+60.0	10.8	8 05.4	+60.0	10.8	9 04.3	+60.0	10.9	10 03.3	+60.0	10.9	11 02.2	+60.0	10.9	12 01.1	+60.0	11.0	13 00.0	+60.0	11.0	**13**
14	7 07.5	+60.0	10.8	8 06.5	+60.0	10.8	9 05.4	+60.0	10.8	10 04.3	+60.0	10.8	11 03.3	+60.0	10.9	12 02.2	+60.0	10.9	13 01.1	+60.0	11.0	14 00.0	+60.0	11.0	**14**
15	8 07.5	+60.0	10.7	9 06.5	+59.9	10.8	10 05.4	+60.0	10.8	11 04.3	+60.0	10.8	12 03.3	+60.0	10.9	13 02.2	+60.0	10.9	14 01.1	+60.0	11.0	15 00.0	+60.0	11.0	**15**
16	9 07.5	+60.0	10.7	10 06.4	+60.0	10.7	11 05.4	+60.0	10.8	12 04.3	+60.0	10.8	13 03.3	+60.0	10.9	14 02.2	+60.0	10.9	15 01.1	+60.0	10.9	16 00.0	+60.0	11.0	**16**
17	10 07.5	+60.0	10.7	11 06.4	+60.0	10.7	12 05.4	+60.0	10.8	13 04.3	+60.0	10.8	14 03.3	+60.0	10.8	15 02.2	+60.0	10.9	16 01.1	+60.0	10.9	17 00.0	+60.0	11.0	**17**
18	11 07.5	+59.9	10.7	12 06.4	+60.0	10.7	13 05.4	+60.0	10.7	14 04.3	+60.0	10.8	15 03.3	+60.0	10.8	16 02.2	+60.0	10.9	17 01.1	+60.0	10.9	18 00.0	+60.0	11.0	**18**
19	12 07.4	+60.0	10.6	13 06.4	+60.0	10.7	14 05.4	+60.0	10.7	15 04.3	+60.0	10.8	16 03.3	+59.9	10.8	17 02.2	+60.0	10.9	18 01.1	+60.0	10.9	19 00.0	+60.0	11.0	**19**
20	13 07.4	+60.0	10.6	14 06.4	+60.0	10.7	15 05.4	+59.9	10.7	16 04.3	+60.0	10.8	17 03.2	+60.0	10.8	18 02.2	+60.0	10.9	19 01.1	+60.0	10.9	20 00.0	+60.0	11.0	**20**
21	14 07.4	+60.0	10.6	15 06.4	+60.0	10.6	16 05.3	+60.0	10.7	17 04.3	+60.0	10.7	18 03.2	+60.0	10.8	19 02.2	+60.0	10.9	20 01.1	+60.0	10.9	21 00.0	+60.0	11.0	**21**
22	15 07.4	+60.0	10.6	16 06.4	+60.0	10.6	17 05.3	+60.0	10.7	18 04.3	+60.0	10.7	19 03.2	+60.0	10.8	20 02.2	+60.0	10.9	21 01.1	+60.0	10.9	22 00.0	+60.0	11.0	**22**
23	16 07.4	+60.0	10.5	17 06.4	+59.9	10.6	18 05.3	+60.0	10.6	19 04.3	+60.0	10.7	20 03.2	+60.0	10.8	21 02.2	+60.0	10.8	22 01.1	+60.0	10.9	23 00.0	+60.0	11.0	**23**
24	17 07.4	+59.9	10.5	18 06.3	+60.0	10.6	19 05.3	+60.0	10.6	20 04.3	+60.0	10.7	21 03.2	+60.0	10.8	22 02.2	+60.0	10.8	23 01.1	+60.0	10.9	24 00.0	+60.0	11.0	**24**
25	18 07.3	+60.0	10.5	19 06.3	+60.0	10.5	20 05.3	+60.0	10.6	21 04.3	+60.0	10.7	22 03.2	+60.0	10.8	23 02.2	+60.0	10.8	24 01.1	+60.0	10.9	25 00.0	+60.0	11.0	**25**
26	19 07.3	+60.0	10.5	20 06.3	+60.0	10.5	21 05.3	+60.0	10.6	22 04.3	+60.0	10.7	23 03.2	+60.0	10.7	24 02.2	+60.0	10.8	25 01.1	+60.0	10.9	26 00.0	+60.0	11.0	**26**
27	20 07.3	+60.0	10.4	21 06.3	+60.0	10.5	22 05.3	+60.0	10.6	23 04.3	+60.0	10.6	24 03.2	+60.0	10.7	25 02.2	+60.0	10.8	26 01.1	+60.0	10.9	27 00.0	+60.0	11.0	**27**
28	21 07.3	+60.0	10.4	22 06.3	+60.0	10.5	23 05.3	+60.0	10.6	24 04.3	+60.0	10.6	25 03.2	+60.0	10.7	26 02.2	+60.0	10.8	27 01.1	+60.0	10.9	28 00.0	+60.0	11.0	**28**
29	22 07.3	+59.9	10.4	23 06.3	+60.0	10.5	24 05.3	+60.0	10.5	25 04.3	+59.9	10.6	26 03.2	+60.0	10.7	27 02.2	+60.0	10.8	28 01.1	+60.0	10.9	29 00.0	+60.0	11.0	**29**
30	23 07.2	+60.0	10.4	24 06.3	+59.9	10.4	25 05.3	+60.0	10.5	26 04.2	+60.0	10.6	27 03.2	+60.0	10.7	28 02.2	+60.0	10.8	29 01.1	+60.0	10.9	30 00.0	+60.0	11.0	**30**
31	24 07.2	+60.0	10.3	25 06.2	+60.0	10.4	26 05.3	+59.9	10.5	27 04.2	+60.0	10.6	28 03.2	+60.0	10.7	29 02.2	+60.0	10.8	30 01.1	+60.0	10.9	31 00.0	+60.0	11.0	**31**
32	25 07.2	+60.0	10.3	26 06.2	+60.0	10.4	27 05.2	+60.0	10.5	28 04.2	+60.0	10.6	29 03.2	+60.0	10.7	30 02.2	+60.0	10.8	31 01.1	+60.0	10.9	32 00.0	+60.0	11.0	**32**
33	26 07.2	+60.0	10.3	27 06.2	+60.0	10.4	28 05.2	+60.0	10.5	29 04.2	+60.0	10.5	30 03.2	+60.0	10.7	31 02.2	+60.0	10.8	32 01.1	+60.0	10.9	33 00.0	+60.0	11.0	**33**
34	27 07.2	+59.9	10.2	28 06.2	+60.0	10.3	29 05.2	+60.0	10.4	30 04.2	+60.0	10.5	31 03.2	+60.0	10.6	32 02.2	+60.0	10.8	33 01.1	+60.0	10.9	34 00.0	+60.0	11.0	**34**
35	28 07.1	+60.0	10.2	29 06.2	+60.0	10.3	30 05.2	+60.0	10.4	31 04.2	+60.0	10.5	32 03.2	+60.0	10.6	33 02.2	+60.0	10.7	34 01.1	+60.0	10.9	35 00.0	+60.0	11.0	**35**
36	29 07.1	+60.0	10.2	30 06.2	+60.0	10.3	31 05.2	+60.0	10.4	32 04.2	+60.0	10.5	33 03.2	+60.0	10.6	34 02.2	+59.9	10.7	35 01.1	+60.0	10.9	36 00.0	+60.0	11.0	**36**
37	30 07.1	+60.0	10.1	31 06.2	+59.9	10.3	32 05.2	+60.0	10.4	33 04.2	+60.0	10.5	34 03.2	+60.0	10.6	35 02.1	+60.0	10.7	36 01.1	+60.0	10.9	37 00.0	+60.0	11.0	**37**
38	31 07.1	+60.0	10.1	32 06.1	+60.0	10.2	33 05.2	+60.0	10.3	34 04.2	+60.0	10.5	35 03.2	+60.0	10.6	36 02.1	+60.0	10.7	37 01.1	+60.0	10.9	38 00.0	+60.0	11.0	**38**
39	32 07.1	+59.9	10.1	33 06.1	+60.0	10.2	34 05.2	+60.0	10.3	35 04.2	+60.0	10.4	36 03.2	+60.0	10.6	37 02.1	+60.0	10.7	38 01.1	+60.0	10.8	39 00.0	+60.0	11.0	**39**
40	33 07.0	+60.0	10.1	34 06.1	+60.0	10.2	35 05.2	+59.9	10.3	36 04.2	+60.0	10.4	37 03.2	+60.0	10.6	38 02.1	+60.0	10.7	39 01.1	+60.0	10.8	40 00.0	+60.0	11.0	**40**
41	34 07.0	+60.0	10.0	35 06.1	+60.0	10.1	36 05.1	+60.0	10.3	37 04.2	+60.0	10.4	38 03.2	+60.0	10.5	39 02.1	+60.0	10.7	40 01.1	+60.0	10.8	41 00.0	+60.0	11.0	**41**
42	35 07.0	+60.0	10.0	36 06.1	+59.9	10.1	37 05.1	+60.0	10.2	38 04.2	+59.9	10.4	39 03.2	+60.0	10.5	40 02.1	+60.0	10.7	41 01.1	+60.0	10.8	42 00.0	+60.0	11.0	**42**
43	36 07.0	+59.9	9.9	37 06.0	+60.0	10.1	38 05.1	+60.0	10.2	39 04.1	+60.0	10.4	40 03.2	+60.0	10.5	41 02.1	+60.0	10.7	42 01.1	+60.0	10.8	43 00.0	+60.0	11.0	**43**
44	37 06.9	+60.0	9.9	38 06.0	+60.0	10.0	39 05.1	+60.0	10.2	40 04.1	+60.0	10.3	41 03.2	+59.9	10.5	42 02.1	+60.0	10.6	43 01.1	+60.0	10.8	44 00.0	+60.0	11.0	**44**
45	38 06.9	+60.0	9.9	39 06.0	+60.0	10.0	40 05.1	+60.0	10.2	41 04.1	+60.0	10.3	42 03.1	+60.0	10.5	43 02.1	+60.0	10.6	44 01.1	+60.0	10.8	45 00.0	+60.0	11.0	**45**
46	39 06.9	+60.0	9.8	40 06.0	+60.0	10.0	41 05.1	+60.0	10.1	42 04.1	+60.0	10.3	43 03.1	+60.0	10.5	44 02.1	+60.0	10.6	45 01.1	+60.0	10.8	46 00.0	+60.0	11.0	**46**
47	40 06.9	+59.9	9.8	41 06.0	+59.9	9.9	42 05.1	+59.9	10.1	43 04.1	+60.0	10.3	44 03.1	+60.0	10.4	45 02.1	+60.0	10.6	46 01.1	+60.0	10.8	47 00.0	+60.0	11.0	**47**
48	41 06.8	+60.0	9.8	42 05.9	+60.0	9.9	43 05.0	+60.0	10.1	44 04.1	+60.0	10.2	45 03.1	+60.0	10.4	46 02.1	+60.0	10.6	47 01.1	+60.0	10.8	48 00.0	+60.0	11.0	**48**
49	42 06.8	+60.0	9.7	43 05.9	+60.0	9.9	44 05.0	+60.0	10.0	45 04.1	+60.0	10.2	46 03.1	+60.0	10.4	47 02.1	+60.0	10.6	48 01.1	+60.0	10.8	49 00.0	+60.0	11.0	**49**
50	43 06.8	+59.9	9.7	44 05.9	+60.0	9.8	45 05.0	+60.0	10.0	46 04.1	+60.0	10.2	47 03.1	+60.0	10.4	48 02.1	+60.0	10.6	49 01.1	+60.0	10.8	50 00.0	+60.0	11.0	**50**
51	44 06.7	+60.0	9.6	45 05.9	+60.0	9.8	46 05.0	+60.0	10.0	47 04.1	+60.0	10.2	48 03.1	+60.0	10.3	49 02.1	+60.0	10.6	50 01.1	+60.0	10.8	51 00.0	+60.0	11.0	**51**
52	45 06.7	+60.0	9.6	46 05.9	+59.9	9.8	47 05.0	+60.0	9.9	48 04.1	+59.9	10.1	49 03.1	+60.0	10.3	50 02.1	+60.0	10.5	51 01.1	+60.0	10.8	52 00.0	+60.0	11.0	**52**
53	46 06.7	+59.9	9.5	47 05.8	+60.0	9.7	48 05.0	+59.9	9.9	49 04.0	+60.0	10.1	50 03.1	+60.0	10.3	51 02.1	+60.0	10.5	52 01.1	+60.0	10.8	53 00.0	+60.0	11.0	**53**
54	47 06.6	+60.0	9.5	48 05.8	+60.0	9.7	49 04.9	+60.0	9.9	50 04.0	+60.0	10.1	51 03.1	+60.0	10.3	52 02.1	+60.0	10.5	53 01.1	+60.0	10.7	54 00.0	+60.0	11.0	**54**
55	48 06.6	+60.0	9.4	49 05.8	+59.9	9.6	50 04.9	+60.0	9.8	51 04.0	+60.0	10.0	52 03.1	+60.0	10.3	53 02.1	+60.0	10.5	54 01.1	+60.0	10.7	55 00.0	+60.0	11.0	**55**
56	49 06.6	+59.9	9.4	50 05.7	+60.0	9.6	51 04.9	+60.0	9.8	52 04.0	+60.0	10.0	53 03.1	+60.0	10.2	54 02.1	+60.0	10.5	55 01.1	+60.0	10.7	56 00.0	+60.0	11.0	**56**
57	50 06.5	+60.0	9.3	51 05.7	+60.0	9.5	52 04.9	+60.0	9.7	53 04.0	+60.0	10.0	54 03.1	+60.0	10.2	55 02.1	+60.0	10.4	56 01.1	+60.0	10.7	57 00.0	+60.0	11.0	**57**
58	51 06.5	+59.9	9.3	52 05.7	+60.0	9.5	53 04.9	+59.9	9.7	54 04.0	+60.0	9.9	55 03.1	+59.9	10.2	56 02.1	+60.0	10.4	57 01.1	+60.0	10.7	58 00.0	+60.0	11.0	**58**
59	52 06.4	+60.0	9.2	53 05.7	+59.9	9.4	54 04.8	+60.0	9.6	55 04.0	+59.9	9.9	56 03.0	+60.0	10.1	57 02.1	+60.0	10.4	58 01.1	+60.0	10.7	59 00.0	+60.0	11.0	**59**
60	53 06.4	+60.0	9.1	54 05.6	+60.0	9.4	55 04.8	+60.0	9.6	56 03.9	+60.0	9.8	57 03.0	+60.0	10.1	58 02.1	+60.0	10.4	59 01.1	+60.0	10.7	60 00.0	+60.0	11.0	**60**
61	54 06.4	+59.9	9.1	55 05.6	+59.9	9.3	56 04.8	+60.0	9.5	57 03.9	+60.0	9.8	58 03.0	+60.0	10.1	59 02.1	+60.0	10.4	60 01.1	+60.0	10.7	61 00.0	+60.0	11.0	**61**
62	55 06.3	+60.0	9.0	56 05.5	+60.0	9.2	57 04.8	+59.9	9.5	58 03.9	+60.0	9.8	59 03.0	+60.0	10.0	60 02.1	+60.0	10.3	61 01.1	+60.0	10.7	62 00.0	+60.0	11.0	**62**
63	56 06.3	+59.9	8.9	57 05.5	+60.0	9.2	58 04.7	+60.0	9.4	59 03.9	+60.0	9.7	60 03.0	+60.0	10.0	61 02.1	+60.0	10.3	62 01.1	+60.0	10.6	63 00.0	+60.0	11.0	**63**
64	57 06.2	+59.9	8.9	58 05.5	+59.9	9.1	59 04.7	+60.0	9.4	60 03.9	+59.9	9.6	61 03.0	+60.0	10.0	62 02.1	+60.0	10.3	63 01.1	+60.0	10.6	64 00.0	+60.0	11.0	**64**
65	58 06.1	+60.0	8.8	59 05.4	+60.0	9.0	60 04.7	+59.9	9.3	61 03.8	+60.0	9.6	62 03.0	+60.0	9.9	63 02.1	+59.9	10.2	64 01.1	+60.0	10.6	65 00.0	+60.0	11.0	**65**
66	59 06.1	+59.9	8.7	60 05.4	+59.9	9.0	61 04.6	+60.0	9.2	62 03.8	+60.0	9.5	63 03.0	+59.9	9.9	64 02.0	+60.0	10.2	65 01.1	+60.0	10.6	66 00.0	+60.0	11.0	**66**
67	60 06.0	+60.0	8.6	61 05.3	+60.0	8.9	62 04.6	+59.9	9.2	63 03.8	+60.0	9.5	64 02.9	+60.0	9.8	65 02.0	+60.0	10.2	66 01.1	+60.0	10.6	67 00.0	+60.0	11.0	**67**
68	61 06.0	+59.9	8.5	62 05.3	+59.9	8.8	63 04.5	+60.0	9.1	64 03.8	+59.9	9.4	65 02.9	+60.0	9.8	66 02.0	+60.0	10.1	67 01.1	+60.0	10.5	68 00.0	+60.0	11.0	**68**
69	62 05.9	+59.9	8.4	63 05.2	+60.0	8.7	64 04.5	+60.0	9.0	65 03.7	+60.0	9.3	66 02.9	+60.0	9.7	67 02.0	+60.0	10.1	68 01.1	+60.0	10.5	69 00.0	+60.0	11.0	**69**
70	63 05.8	+59.9	8.3	64 05.2	+59.9	8.6	65 04.5	+59.9	8.9	66 03.7	+60.0	9.3	67 02.9	+60.0	9.6	68 02.0	+60.0	10.0	69 01.1	+59.9	10.5	70 00.0	+60.0	11.0	**70**
71	64 05.7	+59.9	8.2	65 05.1	+59.9	8.5	66 04.4	+60.0	8.8	67 03.7	+59.9	9.2	68 02.9	+60.0	9.6	69 02.0	+60.0	10.0	70 01.0	+60.0	10.5	71 00.0	+60.0	11.0	**71**
72	65 05.6	+59.9	8.0	66 05.0	+59.9	8.4	67 04.4	+59.9	8.7	68 03.6	+60.0	9.1	69 02.9	+59.9	9.5	70 02.0	+60.0	9.9	71 01.0	+60.0	10.4	72 00.0	+60.0	11.0	**72**
73	66 05.5	+59.9	7.9	67 04.9	+60.0	8.2	68 04.3	+59.9	8.6	69 03.6	+60.0	9.0	70 02.8	+60.0	9.4	71 02.0	+60.0	9.9	72 01.0	+60.0	10.4	73 00.0	+60.0	11.0	**73**
74	67 05.4	+59.9	7.8	68 04.9	+59.9	8.1	69 04.2	+60.0	8.5	70 03.6	+59.9	8.9	71 02.8	+60.0	9.3	72 02.0	+60.0	9.8	73 01.0	+60.0	10.4	74 00.0	+60.0	11.0	**74**
75	68 05.3	+59.9	7.6	69 04.8	+59.9	7.9	70 04.2	+59.9	8.3	71 03.5	+60.0	8.8	72 02.8	+59.9	9.2	73 02.0	+59.9	9.7	74 01.0	+60.0	10.3	75 00.0	+60.0	11.0	**75**
76	69 05.2	+59.9	7.4	70 04.7	+59.9	7.8	71 04.1	+59.9	8.2	72 03.5	+59.9	8.6	73 02.7	+60.0	9.1	74 01.9	+60.0	9.7	75 01.0	+60.0	10.3	76 00.0	+60.0	11.0	**76**
77	70 05.1	+59.8	7.2	71 04.6	+59.9	7.6	72 04.0	+59.9	8.0	73 03.4	+59.9	8.5	74 02.7	+60.0	9.0	75 01.9	+60.0	9.6	76 01.0	+60.0	10.2	77 00.0	+60.0	11.0	**77**
78	71 04.9	+59.9	7.0	72 04.5	+59.8	7.4	73 03.9	+59.9	7.8	74 03.3	+60.0	8.3	75 02.7	+59.9	8.8	76 01.9	+60.0	9.5	77 01.0	+60.0	10.2	78 00.0	+60.0	11.0	**78**
79	72 04.8	+59.8	6.8	73 04.3	+59.9	7.2	74 03.8	+59.9	7.6	75 03.3	+59.9	8.1	76 02.6	+60.0	8.7	77 01.9	+59.9	9.3	78 01.0	+60.0	10.1	79 00.0	+60.0	11.0	**79**
80	73 04.6	+59.8	6.5	74 04.2	+59.8	6.9	75 03.7	+59.9	7.4	76 03.2	+59.9	7.9	77 02.6	+59.9	8.5	78 01.8	+60.0	9.2	79 01.0	+60.0	10.0	80 00.0	+60.0	11.0	**80**
81	74 04.4	+59.7	6.2	75 04.0	+59.8	6.7	76 03.6	+59.8	7.1	77 03.1	+59.9	7.7	78 02.5	+59.9	8.3	79 01.8	+60.0	9.0	80 01.0	+60.0	9.9	81 00.0	+60.0	11.0	**81**
82	75 04.1	+59.8	5.9	76 03.8	+59.8	6.3	77 03.4	+59.8	6.8	78 03.0	+59.8	7.4	79 02.4	+59.9	8.0	80 01.8	+59.9	8.8	81 01.0	+60.0	9.8	82 00.0	+60.0	11.0	**82**
83	76 03.9	+59.7	5.5	77 03.6	+59.7	6.0	78 03.2	+59.8	6.5	79 02.8	+59.9	7.0	80 02.3	+59.9	7.7	81 01.7	+60.0	8.6	82 01.0	+59.9	9.6	83 00.0	+60.0	11.0	**83**
84	77 03.6	+59.6	5.1	78 03.3	+59.7	5.5	79 03.0	+59.8	6.0	80 02.7	+59.8	6.6	81 02.2	+59.9	7.4	82 01.7	+59.9	8.3	83 00.9	+60.0	9.4	84 00.0	+60.0	11.0	**84**
85	78 03.2	+59.6	4.6	79 03.0	+59.7	5.0	80 02.8	+59.7	5.5	81 02.5	+59.7	6.1	82 02.1	+59.8	6.9	83 01.6	+59.9	7.9	84 00.9	+60.0	9.2	85 00.0	+60.0	11.0	**85**
86	79 02.8	+59.5	4.0	80 02.7	+59.5	4.4	81 02.5	+59.6	4.9	82 02.2	+59.7	5.5	83 01.9	+59.8	6.3	84 01.5	+59.8	7.3	85 00.9	+59.9	8.8	86 00.0	+60.0	11.0	**86**
87	80 02.3	+59.4	3.3	81 02.2	+59.5	3.7	82 02.1	+59.5	4.1	83 01.9	+59.6	4.7	84 01.7	+59.6	5.5	85 01.3	+59.8	6.6	86 00.8	+59.9	8.3	87 00.0	+60.0	11.0	**87**
88	81 01.7	+59.3	2.4	82 01.7	+59.2	2.8	83 01.6	+59.3	3.1	84 01.5	+59.4	3.7	85 01.3	+59.5	4.4	86 01.1	+59.6	5.5	87 00.7	+59.9	7.3	88 00.0	+60.0	11.0	**88**
89	82 01.0	+59.0	1.4	83 00.9	+59.1	1.6	84 00.9	+59.1	1.8	85 00.9	+59.1	2.2	86 00.8	+59.2	2.7	87 00.7	+59.3	3.7	88 00.6	*+59.4* •	5.5	89 00.0	+60.0	11.0	**89**
90	83 00.0	+58.7	0.0	84 00.0	+58.7	0.0	85 00.0	+58.6	0.0	86 00.0	+58.5	0.0	87 00.0	+58.4	0.0	88 00.0	*+57.8* •	0.0	89 00.0	*+48.5* •	0.0	90 00.0	–60.0	5.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 169°, 191°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 50.8	+60.0	167.9	5 52.1	+60.0	167.9	4 53.4	+60.0	168.0	3 54.7	+60.0	168.0	2 56.1	+60.0	168.0	1 57.4	+60.0	168.0	0 58.7	+60.0	168.0	0 00.0	+60.0	168.0	**0**
1	7 50.8	+59.9	167.9	6 52.1	+60.0	167.9	5 53.4	+60.0	167.9	4 54.7	+60.0	168.0	3 56.1	+60.0	168.0	2 57.4	+60.0	168.0	1 58.7	+60.0	168.0	1 00.0	+60.0	168.0	**1**
2	8 50.7	+60.0	167.9	7 52.1	+60.0	167.9	6 53.4	+60.0	167.9	5 54.7	+60.0	167.9	4 56.1	+60.0	168.0	3 57.4	+60.0	168.0	2 58.7	+60.0	168.0	2 00.0	+60.0	168.0	**2**
3	9 50.7	+60.0	167.8	8 52.1	+59.9	167.9	7 53.4	+60.0	167.9	6 54.7	+60.0	167.9	5 56.1	+59.9	168.0	4 57.4	+60.0	168.0	3 58.7	+60.0	168.0	3 00.0	+60.0	168.0	**3**
4	10 50.7	+60.0	167.8	9 52.0	+60.0	167.8	8 53.4	+60.0	167.9	7 54.7	+60.0	167.9	6 56.0	+60.0	167.9	5 57.4	+60.0	168.0	4 58.7	+60.0	168.0	4 00.0	+60.0	168.0	**4**
5	11 50.7	+60.0	167.8	10 52.0	+60.0	167.8	9 53.4	+60.0	167.9	8 54.7	+60.0	167.9	7 56.0	+60.0	167.9	6 57.4	+60.0	168.0	5 58.7	+60.0	168.0	5 00.0	+60.0	168.0	**5**
6	12 50.7	+59.9	167.8	11 52.0	+60.0	167.8	10 53.4	+60.0	167.8	9 54.7	+60.0	167.9	8 56.0	+60.0	167.9	7 57.4	+60.0	167.9	6 58.7	+60.0	168.0	6 00.0	+60.0	168.0	**6**
7	13 50.6	+60.0	167.7	12 52.0	+60.0	167.8	11 53.4	+59.9	167.8	10 54.7	+60.0	167.9	9 56.0	+60.0	167.9	8 57.4	+60.0	167.9	7 58.7	+60.0	168.0	7 00.0	+60.0	168.0	**7**
8	14 50.6	+60.0	167.7	13 52.0	+60.0	167.8	12 53.3	+60.0	167.8	11 54.7	+60.0	167.9	10 56.0	+60.0	167.9	9 57.4	+60.0	167.9	8 58.7	+60.0	168.0	8 00.0	+60.0	168.0	**8**
9	15 50.6	+60.0	167.7	14 52.0	+60.0	167.7	13 53.3	+60.0	167.8	12 54.7	+60.0	167.8	11 56.0	+60.0	167.9	10 57.4	+60.0	167.9	9 58.7	+60.0	168.0	9 00.0	+60.0	168.0	**9**
10	16 50.6	+60.0	167.6	15 52.0	+59.9	167.7	14 53.3	+60.0	167.8	13 54.7	+60.0	167.8	12 56.0	+60.0	167.9	11 57.4	+60.0	167.9	10 58.7	+60.0	168.0	10 00.0	+60.0	168.0	**10**
11	17 50.6	+59.9	167.6	16 51.9	+60.0	167.7	15 53.3	+60.0	167.7	14 54.7	+60.0	167.8	13 56.0	+60.0	167.9	12 57.4	+60.0	167.9	11 58.7	+60.0	168.0	11 00.0	+60.0	168.0	**11**
12	18 50.5	+60.0	167.6	17 51.9	+60.0	167.7	16 53.3	+60.0	167.7	15 54.7	+60.0	167.8	14 56.0	+60.0	167.8	13 57.4	+60.0	167.9	12 58.7	+60.0	168.0	12 00.0	+60.0	168.0	**12**
13	19 50.5	+60.0	167.6	18 51.9	+60.0	167.6	17 53.3	+60.0	167.7	16 54.7	+60.0	167.8	15 56.0	+60.0	167.8	14 57.4	+60.0	167.9	13 58.7	+60.0	168.0	13 00.0	+60.0	168.0	**13**
14	20 50.5	+60.0	167.5	19 51.9	+60.0	167.6	18 53.3	+60.0	167.7	17 54.7	+59.9	167.8	16 56.0	+60.0	167.8	15 57.4	+60.0	167.9	14 58.7	+60.0	167.9	14 00.0	+60.0	168.0	**14**
15	21 50.5	+59.9	167.5	20 51.9	+60.0	167.6	19 53.3	+60.0	167.7	18 54.6	+60.0	167.7	17 56.0	+60.0	167.8	16 57.4	+60.0	167.9	15 58.7	+60.0	167.9	15 00.0	+60.0	168.0	**15**
16	22 50.4	+60.0	167.5	21 51.9	+59.9	167.6	20 53.3	+59.9	167.6	19 54.6	+60.0	167.7	18 56.0	+60.0	167.8	17 57.4	+59.9	167.9	16 58.7	+60.0	167.9	16 00.0	+60.0	168.0	**16**
17	23 50.4	+60.0	167.4	22 51.8	+60.0	167.5	21 53.2	+60.0	167.6	20 54.6	+60.0	167.7	19 56.0	+60.0	167.8	18 57.3	+60.0	167.9	17 58.7	+60.0	167.9	17 00.0	+60.0	168.0	**17**
18	24 50.4	+60.0	167.4	23 51.8	+60.0	167.5	22 53.2	+60.0	167.6	21 54.6	+60.0	167.7	20 56.0	+60.0	167.8	19 57.3	+60.0	167.9	18 58.7	+60.0	167.9	18 00.0	+60.0	168.0	**18**
19	25 50.4	+60.0	167.4	24 51.8	+60.0	167.5	23 53.2	+60.0	167.6	22 54.6	+60.0	167.7	21 56.0	+60.0	167.8	20 57.3	+60.0	167.8	19 58.7	+60.0	167.9	19 00.0	+60.0	168.0	**19**
20	26 50.4	+59.9	167.4	25 51.8	+60.0	167.5	24 53.2	+60.0	167.6	23 54.6	+60.0	167.7	22 56.0	+60.0	167.8	21 57.3	+60.0	167.8	20 58.7	+60.0	167.9	20 00.0	+60.0	168.0	**20**
21	27 50.3	+60.0	167.3	26 51.8	+60.0	167.4	25 53.2	+60.0	167.5	24 54.6	+60.0	167.6	23 56.0	+60.0	167.7	22 57.3	+60.0	167.8	21 58.7	+60.0	167.9	21 00.0	+60.0	168.0	**21**
22	28 50.3	+60.0	167.3	27 51.8	+59.9	167.4	26 53.2	+60.0	167.5	25 54.6	+60.0	167.6	24 56.0	+60.0	167.7	23 57.3	+60.0	167.8	22 58.7	+60.0	167.9	22 00.0	+60.0	168.0	**22**
23	29 50.3	+60.0	167.3	28 51.7	+60.0	167.4	27 53.2	+60.0	167.5	26 54.6	+60.0	167.6	25 56.0	+60.0	167.7	24 57.3	+60.0	167.8	23 58.7	+60.0	167.9	23 00.0	+60.0	168.0	**23**
24	30 50.3	+59.9	167.2	29 51.7	+60.0	167.3	28 53.2	+60.0	167.5	27 54.6	+60.0	167.6	26 56.0	+60.0	167.7	25 57.3	+60.0	167.8	24 58.7	+60.0	167.9	24 00.0	+60.0	168.0	**24**
25	31 50.2	+60.0	167.2	30 51.7	+60.0	167.3	29 53.2	+59.9	167.4	28 54.6	+60.0	167.6	27 56.0	+60.0	167.7	26 57.3	+60.0	167.8	25 58.7	+60.0	167.9	25 00.0	+60.0	168.0	**25**
26	32 50.2	+60.0	167.1	31 51.7	+60.0	167.3	30 53.1	+60.0	167.4	29 54.6	+60.0	167.6	28 56.0	+60.0	167.7	27 57.3	+60.0	167.8	26 58.7	+60.0	167.9	26 00.0	+60.0	168.0	**26**
27	33 50.2	+59.9	167.1	32 51.7	+59.9	167.3	31 53.1	+60.0	167.4	30 54.6	+59.9	167.5	29 56.0	+60.0	167.7	28 57.3	+60.0	167.8	27 58.7	+60.0	167.9	27 00.0	+60.0	168.0	**27**
28	34 50.1	+60.0	167.1	33 51.6	+60.0	167.2	32 53.1	+60.0	167.4	31 54.5	+60.0	167.5	30 56.0	+59.9	167.6	29 57.3	+60.0	167.8	28 58.7	+60.0	167.9	28 00.0	+60.0	168.0	**28**
29	35 50.1	+60.0	167.0	34 51.6	+60.0	167.2	33 53.1	+60.0	167.3	32 54.5	+60.0	167.5	31 55.9	+60.0	167.6	30 57.3	+60.0	167.8	29 58.7	+60.0	167.9	29 00.0	+60.0	168.0	**29**
30	36 50.1	+60.0	167.0	35 51.6	+60.0	167.2	34 53.1	+60.0	167.3	33 54.5	+60.0	167.5	32 55.9	+60.0	167.6	31 57.3	+60.0	167.7	30 58.7	+60.0	167.9	30 00.0	+60.0	168.0	**30**
31	37 50.1	+59.9	167.0	36 51.6	+60.0	167.1	35 53.1	+60.0	167.3	34 54.5	+60.0	167.4	33 55.9	+60.0	167.6	32 57.3	+60.0	167.7	31 58.7	+60.0	167.9	31 00.0	+60.0	168.0	**31**
32	38 50.0	+60.0	166.9	37 51.6	+59.9	167.1	36 53.1	+59.9	167.3	35 54.5	+60.0	167.4	34 55.9	+60.0	167.6	33 57.3	+60.0	167.7	32 58.7	+60.0	167.9	32 00.0	+60.0	168.0	**32**
33	39 50.0	+60.0	166.9	38 51.5	+60.0	167.1	37 53.0	+60.0	167.2	36 54.5	+60.0	167.4	35 55.9	+60.0	167.6	34 57.3	+60.0	167.7	33 58.7	+60.0	167.9	33 00.0	+60.0	168.0	**33**
34	40 50.0	+59.9	166.8	39 51.5	+60.0	167.0	38 53.0	+60.0	167.2	37 54.5	+60.0	167.4	36 55.9	+60.0	167.5	35 57.3	+60.0	167.7	34 58.7	+60.0	167.9	34 00.0	+60.0	168.0	**34**
35	41 49.9	+60.0	166.8	40 51.5	+60.0	167.0	39 53.0	+60.0	167.2	38 54.5	+60.0	167.4	37 55.9	+60.0	167.5	36 57.3	+60.0	167.7	35 58.7	+60.0	167.9	35 00.0	+60.0	168.0	**35**
36	42 49.9	+60.0	166.7	41 51.5	+59.9	166.9	40 53.0	+60.0	167.1	39 54.5	+60.0	167.3	38 55.9	+60.0	167.5	37 57.3	+60.0	167.7	36 58.7	+60.0	167.8	36 00.0	+60.0	168.0	**36**
37	43 49.9	+59.9	166.7	42 51.4	+60.0	166.9	41 53.0	+60.0	167.1	40 54.5	+59.9	167.3	39 55.9	+60.0	167.5	38 57.3	+60.0	167.7	37 58.7	+60.0	167.8	37 00.0	+60.0	168.0	**37**
38	44 49.8	+60.0	166.6	43 51.4	+60.0	166.9	42 53.0	+59.9	167.1	41 54.4	+60.0	167.3	40 55.9	+60.0	167.5	39 57.3	+60.0	167.7	38 58.7	+60.0	167.8	38 00.0	+60.0	168.0	**38**
39	45 49.8	+59.9	166.6	44 51.4	+60.0	166.8	43 52.9	+60.0	167.0	42 54.4	+60.0	167.3	41 55.9	+60.0	167.5	40 57.3	+60.0	167.6	39 58.7	+60.0	167.8	39 00.0	+60.0	168.0	**39**
40	46 49.7	+60.0	166.5	45 51.4	+59.9	166.8	44 52.9	+60.0	167.0	43 54.4	+60.0	167.2	42 55.9	+60.0	167.4	41 57.3	+60.0	167.6	40 58.7	+60.0	167.8	40 00.0	+60.0	168.0	**40**
41	47 49.7	+59.9	166.5	46 51.3	+60.0	166.7	45 52.9	+60.0	167.0	44 54.4	+60.0	167.2	43 55.9	+60.0	167.4	42 57.3	+60.0	167.6	41 58.7	+60.0	167.8	41 00.0	+60.0	168.0	**41**
42	48 49.6	+60.0	166.4	47 51.3	+60.0	166.7	46 52.9	+60.0	166.9	45 54.4	+60.0	167.2	44 55.9	+60.0	167.4	43 57.3	+60.0	167.6	42 58.7	+60.0	167.8	42 00.0	+60.0	168.0	**42**
43	49 49.6	+60.0	166.4	48 51.3	+59.9	166.6	47 52.9	+59.9	166.9	46 54.4	+60.0	167.1	45 55.9	+60.0	167.4	44 57.3	+60.0	167.6	43 58.7	+60.0	167.8	43 00.0	+60.0	168.0	**43**
44	50 49.6	+59.9	166.3	49 51.2	+60.0	166.6	48 52.8	+60.0	166.9	47 54.4	+60.0	167.1	46 55.9	+59.9	167.3	45 57.3	+60.0	167.6	44 58.7	+60.0	167.8	44 00.0	+60.0	168.0	**44**
45	51 49.5	+60.0	166.2	50 51.2	+60.0	166.5	49 52.8	+60.0	166.8	48 54.4	+59.9	167.1	47 55.8	+60.0	167.3	46 57.3	+60.0	167.6	45 58.7	+60.0	167.8	45 00.0	+60.0	168.0	**45**
46	52 49.5	+59.9	166.2	51 51.2	+59.9	166.5	50 52.8	+60.0	166.8	49 54.3	+60.0	167.0	48 55.8	+60.0	167.3	47 57.3	+60.0	167.5	46 58.7	+60.0	167.8	46 00.0	+60.0	168.0	**46**
47	53 49.4	+59.9	166.1	52 51.1	+60.0	166.4	51 52.8	+59.9	166.7	50 54.3	+60.0	167.0	49 55.8	+60.0	167.3	48 57.3	+60.0	167.5	47 58.7	+60.0	167.8	47 00.0	+60.0	168.0	**47**
48	54 49.3	+60.0	166.0	53 51.1	+59.9	166.4	52 52.7	+60.0	166.7	51 54.3	+60.0	167.0	50 55.8	+60.0	167.2	49 57.3	+60.0	167.5	48 58.7	+60.0	167.8	48 00.0	+60.0	168.0	**48**
49	55 49.3	+59.9	165.9	54 51.0	+60.0	166.3	53 52.7	+60.0	166.6	52 54.3	+60.0	166.9	51 55.8	+60.0	167.2	50 57.3	+60.0	167.5	49 58.7	+60.0	167.8	49 00.0	+60.0	168.0	**49**
50	56 49.2	+60.0	165.9	55 51.0	+59.9	166.2	54 52.7	+59.9	166.6	53 54.3	+60.0	166.9	52 55.8	+60.0	167.2	51 57.3	+60.0	167.5	50 58.7	+60.0	167.7	50 00.0	+60.0	168.0	**50**
51	57 49.2	+59.9	165.8	56 50.9	+60.0	166.2	55 52.6	+60.0	166.5	54 54.3	+59.9	166.8	53 55.8	+60.0	167.2	52 57.3	+60.0	167.5	51 58.7	+60.0	167.7	51 00.0	+60.0	168.0	**51**
52	58 49.1	+59.9	165.7	57 50.9	+59.9	166.1	56 52.6	+60.0	166.5	55 54.2	+60.0	166.8	54 55.8	+60.0	167.1	53 57.3	+60.0	167.4	52 58.7	+60.0	167.7	52 00.0	+60.0	168.0	**52**
53	59 49.0	+59.9	165.6	58 50.8	+60.0	166.0	57 52.6	+59.9	166.4	56 54.2	+60.0	166.8	55 55.8	+60.0	167.1	54 57.3	+59.9	167.4	53 58.7	+60.0	167.7	53 00.0	+60.0	168.0	**53**
54	60 48.9	+59.9	165.5	59 50.8	+59.9	165.9	58 52.5	+60.0	166.3	57 54.2	+60.0	166.7	56 55.8	+59.9	167.1	55 57.2	+60.0	167.4	54 58.7	+60.0	167.7	54 00.0	+60.0	168.0	**54**
55	61 48.8	+60.0	165.4	60 50.7	+60.0	165.8	59 52.5	+60.0	166.3	58 54.2	+59.9	166.7	57 55.7	+60.0	167.0	56 57.2	+60.0	167.4	55 58.7	+60.0	167.7	55 00.0	+60.0	168.0	**55**
56	62 48.8	+59.9	165.3	61 50.7	+59.9	165.7	60 52.5	+59.9	166.2	59 54.1	+60.0	166.6	58 55.7	+60.0	167.0	57 57.2	+60.0	167.3	56 58.7	+60.0	167.7	56 00.0	+60.0	168.0	**56**
57	63 48.7	+59.9	165.1	62 50.6	+59.9	165.6	61 52.4	+60.0	166.1	60 54.1	+60.0	166.5	59 55.7	+60.0	166.9	58 57.2	+60.0	167.3	57 58.7	+60.0	167.7	57 00.0	+60.0	168.0	**57**
58	64 48.6	+59.9	165.0	63 50.5	+60.0	165.5	62 52.4	+59.9	166.0	61 54.1	+60.0	166.5	60 55.7	+60.0	166.9	59 57.2	+60.0	167.3	58 58.7	+59.9	167.7	58 00.0	+60.0	168.0	**58**
59	65 48.5	+59.8	164.9	64 50.5	+59.9	165.4	63 52.3	+60.0	165.9	62 54.1	+59.9	166.4	61 55.7	+60.0	166.8	60 57.2	+60.0	167.3	59 58.6	+60.0	167.6	59 00.0	+60.0	168.0	**59**
60	66 48.3	+59.9	164.7	65 50.4	+59.9	165.3	64 52.3	+59.9	165.8	63 54.0	+60.0	166.3	62 55.7	+60.0	166.8	61 57.2	+60.0	167.2	60 58.6	+60.0	167.6	60 00.0	+60.0	168.0	**60**
61	67 48.2	+59.9	164.5	66 50.3	+59.9	165.2	65 52.2	+60.0	165.7	64 54.0	+60.0	166.3	63 55.7	+59.9	166.7	62 57.2	+60.0	167.2	61 58.6	+60.0	167.6	61 00.0	+60.0	168.0	**61**
62	68 48.1	+59.8	164.3	67 50.2	+59.9	165.0	66 52.2	+59.9	165.6	65 54.0	+59.9	166.2	64 55.6	+60.0	166.7	63 57.2	+60.0	167.2	62 58.6	+60.0	167.6	62 00.0	+60.0	168.0	**62**
63	69 47.9	+59.8	164.1	68 50.1	+59.9	164.8	67 52.1	+59.9	165.5	66 53.9	+60.0	166.1	65 55.6	+60.0	166.6	64 57.2	+60.0	167.1	63 58.6	+60.0	167.6	63 00.0	+60.0	168.0	**63**
64	70 47.7	+59.8	163.9	69 50.0	+59.9	164.7	68 52.0	+59.9	165.4	67 53.9	+59.9	166.0	66 55.6	+60.0	166.6	65 57.2	+60.0	167.1	64 58.6	+60.0	167.6	64 00.0	+60.0	168.0	**64**
65	71 47.5	+59.8	163.7	70 49.9	+59.8	164.5	69 51.9	+59.9	165.2	68 53.8	+60.0	165.9	67 55.6	+59.9	166.5	66 57.2	+60.0	167.0	65 58.6	+60.0	167.5	65 00.0	+60.0	168.0	**65**
66	72 47.3	+59.8	163.4	71 49.7	+59.9	164.3	70 51.8	+60.0	165.1	69 53.8	+59.9	165.8	68 55.5	+60.0	166.4	67 57.2	+59.9	167.0	66 58.6	+60.0	167.5	66 00.0	+60.0	168.0	**66**
67	73 47.1	+59.7	163.1	72 49.6	+59.8	164.0	71 51.8	+59.8	164.9	70 53.7	+60.0	165.6	69 55.5	+60.0	166.3	68 57.1	+60.0	166.9	67 58.6	+60.0	167.5	67 00.0	+60.0	168.0	**67**
68	74 46.8	+59.7	162.7	73 49.4	+59.8	163.8	72 51.6	+59.9	164.7	71 53.7	+59.9	165.5	70 55.5	+59.9	166.2	69 57.1	+60.0	166.9	68 58.6	+60.0	167.5	68 00.0	+60.0	168.0	**68**
69	75 46.5	+59.7	162.3	74 49.2	+59.8	163.5	73 51.5	+59.9	164.5	72 53.6	+59.9	165.3	71 55.4	+60.0	166.1	70 57.1	+60.0	166.8	69 58.6	+60.0	167.4	69 00.0	+60.0	168.0	**69**
70	76 46.2	+59.6	161.9	75 49.0	+59.7	163.1	74 51.4	+59.8	164.2	73 53.5	+59.9	165.1	72 55.4	+60.0	166.0	71 57.1	+60.0	166.7	70 58.6	+60.0	167.4	70 00.0	+60.0	168.0	**70**
71	77 45.8	+59.5	161.4	76 48.7	+59.7	162.7	75 51.2	+59.9	163.9	74 53.4	+59.9	164.9	73 55.4	+59.9	165.9	72 57.1	+60.0	166.7	71 58.6	+60.0	167.4	71 00.0	+60.0	168.0	**71**
72	78 45.3	+59.5	160.8	77 48.4	+59.7	162.3	76 51.1	+59.8	163.6	75 53.3	+59.9	164.7	74 55.3	+60.0	165.7	73 57.1	+59.9	166.6	72 58.6	+60.0	167.3	72 00.0	+60.0	168.0	**72**
73	79 44.8	+59.3	160.0	78 48.1	+59.6	161.8	77 50.9	+59.7	163.2	76 53.2	+59.9	164.5	75 55.3	+59.9	165.5	74 57.0	+60.0	166.5	73 58.6	+60.0	167.3	73 00.0	+60.0	168.0	**73**
74	80 44.1	+59.2	159.1	79 47.7	+59.5	161.1	78 50.6	+59.7	162.8	77 53.1	+59.8	164.2	76 55.2	+59.9	165.3	75 57.0	+60.0	166.3	74 58.6	+60.0	167.2	74 00.0	+60.0	168.0	**74**
75	81 43.3	+58.9	158.1	80 47.2	+59.3	160.4	79 50.3	+59.7	162.2	78 52.9	+59.8	163.8	77 55.1	+59.9	165.1	76 57.0	+60.0	166.2	75 58.6	+60.0	167.2	75 00.0	+60.0	168.0	**75**
76	82 42.2	+58.6	156.7	81 46.5	+59.2	159.4	80 50.0	+59.5	161.6	79 52.7	+59.8	163.4	78 55.0	+59.9	164.8	77 57.0	+59.9	166.1	76 58.6	+60.0	167.1	76 00.0	+60.0	168.0	**76**
77	83 40.8	+58.1	154.9	82 45.7	+59.0	158.2	81 49.5	+59.5	160.8	80 52.5	+59.7	162.8	79 54.9	+59.9	164.5	78 56.9	+60.0	165.9	77 58.6	+60.0	167.0	77 00.0	+60.0	168.0	**77**
78	84 38.9	+57.2	152.4	83 44.7	+58.6	156.6	82 49.0	+59.2	159.8	81 52.2	+59.7	162.2	80 54.8	+59.8	164.1	79 56.9	+59.9	165.7	78 58.6	+60.0	166.9	78 00.0	+60.0	168.0	**78**
79	85 36.1	*+55.7*	•148.8	84 43.3	+57.9	154.5	83 48.2	+59.0	158.4	82 51.9	+59.5	161.4	81 54.6	+59.8	163.6	80 56.8	+59.9	165.4	79 58.6	+59.9	166.8	79 00.0	+60.0	168.0	**79**
80	86 31.8	*+52.5*	•143.4	85 41.2	+56.7	151.3	84 47.2	+58.5	156.6	83 51.4	+59.3	160.3	82 54.4	+59.8	163.0	81 56.7	+59.9	165.1	80 58.5	+60.0	166.7	80 00.0	+60.0	168.0	**80**
81	87 24.3	*+44.5*	•134.1	86 37.9	*+54.1*	•146.4	85 45.7	+57.7	153.9	84 50.7	+59.1	158.8	83 54.2	+59.6	162.2	82 56.6	+59.9	164.6	81 58.5	+60.0	166.5	81 00.0	+60.0	168.0	**81**
82	88 08.8	*+23.6*	•116.5	87 32.0	*+47.1*	•137.8	86 43.4	*+55.6*	•149.6	85 49.8	+58.4	156.6	84 53.8	+59.4	161.0	83 56.5	+59.9	164.1	82 58.5	+60.0	166.3	82 00.0	+60.0	168.0	**82**
83	88 32.4	*–13.3*	•84.0	88 19.1	*+25.8*	•120.3	87 39.0	*+49.9*	•141.8	86 48.2	*+57.0*	•153.0	85 53.2	+59.1	159.3	84 56.4	+59.7	163.3	83 58.5	+59.9	166.0	83 00.0	+60.0	168.0	**83**
84	88 19.1	*–40.1*	•47.8	88 44.9	*–16.0*	•84.0	88 28.9	*+28.5*	•124.9	87 45.2	*+52.7*	•146.3	86 52.3	+58.3	156.5	85 56.1	+59.6	162.1	84 58.4	+60.0	165.6	84 00.0	+60.0	168.0	**84**
85	87 39.0	*–50.8*	•26.2	88 28.9	*–43.7*	•43.1	88 57.4	*–19.5*	•84.0	88 37.9	*+32.0*	•130.6	87 50.6	*+55.3*	•151.2	86 55.7	+59.2	160.2	85 58.4	+59.9	165.0	85 00.0	+60.0	168.0	**85**
86	86 48.2	*–55.0*	•15.1	87 45.2	*–52.9*	•21.7	88 37.9	*–47.3*	•37.4	89 09.9	*–24.0*	•84.0	88 45.9	*+36.5*	•137.7	87 54.9	*+57.7*	•156.5	86 58.3	+59.7	164.1	86 00.0	+60.0	168.0	**86**
87	85 53.2	–56.8	8.7	86 52.3	*–56.2*	•11.5	87 50.6	*–54.9*	•16.8	88 45.9	*–51.0*	•30.3	89 22.4	*–29.8*	•84.0	88 52.6	*+42.3*	•146.3	87 58.0	*+59.4*	•162.1	87 00.0	+60.0	168.0	**87**
88	84 56.4	–57.9	4.7	85 56.1	–57.7	5.9	86 55.7	–57.3	7.8	87 54.9	*–56.6*	•11.5	88 52.6	*–54.6*	•21.7	89 34.9	*–37.5*	•84.0	88 57.4	*+50.1*	•156.5	88 00.0	+60.0	168.0	**88**
89	83 58.5	–58.5	2.0	84 58.4	–58.4	2.4	85 58.4	–58.4	3.0	86 58.3	–58.3	3.9	87 58.0	*–58.0*	•5.9	88 57.4	*–57.4*	•11.5	89 47.5	*–47.5*	•84.0	89 00.0	+60.0	168.0	**89**
90	83 00.0	–58.9	0.0	84 00.0	–58.9	0.0	85 00.0	–58.9	0.0	86 00.0	–58.9	0.0	87 00.0	–59.0	0.0	88 00.0	–59.1	0.0	89 00.0	*–59.3*	•0.0	90 00.0	–60.0	84.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 12°, 348°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 50.8	–60.0	167.9	5 52.1	–60.0	167.9	4 53.4	–60.0	168.0	3 54.7	–59.9	168.0	2 56.1	–60.0	168.0	1 57.4	–60.0	168.0	0 58.7	–60.0	168.0	0 00.0	+60.0	12.0	**0**
1	5 50.8	–60.0	167.9	4 52.1	–60.0	168.0	3 53.4	–60.0	168.0	2 54.8	–60.0	168.0	1 56.1	–60.0	168.0	0 57.4	–60.0	168.0	0 01.3	+60.0	12.0	1 00.0	+60.0	12.0	**1**
2	4 50.8	–60.0	168.0	3 52.1	–60.0	168.0	2 53.4	–59.9	168.0	1 54.8	–60.0	168.0	0 56.1	–60.0	168.0	0 02.6	+60.0	12.0	1 01.3	+60.0	12.0	2 00.0	+60.0	12.0	**2**
3	3 50.8	–59.9	168.0	2 52.1	–59.9	168.0	1 53.5	–60.0	168.0	0 54.8	–60.0	168.0	0 03.9	+60.0	12.0	1 02.6	+60.0	12.0	2 01.3	+60.0	12.0	3 00.0	+60.0	12.0	**3**
4	2 50.9	–60.0	168.0	1 52.2	–60.0	168.0	0 53.5	–60.0	168.0	0 05.2	+60.0	12.0	1 03.9	+60.0	12.0	2 02.6	+60.0	12.0	3 01.3	+60.0	12.0	4 00.0	+60.0	12.0	**4**
5	1 50.9	–60.0	168.0	0 52.2	–60.0	168.0	0 06.5	+60.0	12.0	1 05.2	+60.0	12.0	2 03.9	+60.0	12.0	3 02.6	+60.0	12.0	4 01.3	+60.0	12.0	5 00.0	+60.0	12.0	**5**
6	0 50.9	–60.0	168.1	0 07.8	+60.0	11.9	1 06.5	+60.0	11.9	2 05.2	+60.0	11.9	3 03.9	+60.0	12.0	4 02.6	+60.0	12.0	5 01.3	+60.0	12.0	6 00.0	+60.0	12.0	**6**
7	0 09.1	+60.0	11.9	1 07.8	+60.0	11.9	2 06.5	+60.0	11.9	3 05.2	+60.0	11.9	4 03.9	+60.0	11.9	5 02.6	+60.0	12.0	6 01.3	+60.0	12.0	7 00.0	+60.0	12.0	**7**
8	1 09.1	+59.9	11.9	2 07.8	+60.0	11.9	3 06.5	+60.0	11.9	4 05.2	+60.0	11.9	5 03.9	+60.0	11.9	6 02.6	+60.0	11.9	7 01.3	+60.0	12.0	8 00.0	+60.0	12.0	**8**
9	2 09.0	+60.0	11.9	3 07.8	+60.0	11.9	4 06.5	+60.0	11.9	5 05.2	+60.0	11.9	6 03.9	+60.0	11.9	7 02.6	+60.0	11.9	8 01.3	+60.0	12.0	9 00.0	+60.0	12.0	**9**
10	3 09.0	+60.0	11.8	4 07.8	+59.9	11.8	5 06.5	+60.0	11.9	6 05.2	+60.0	11.9	7 03.9	+60.0	11.9	8 02.6	+60.0	11.9	9 01.3	+60.0	12.0	10 00.0	+60.0	12.0	**10**
11	4 09.0	+60.0	11.8	5 07.7	+60.0	11.8	6 06.5	+60.0	11.8	7 05.2	+60.0	11.9	8 03.9	+60.0	11.9	9 02.6	+60.0	11.9	10 01.3	+60.0	12.0	11 00.0	+60.0	12.0	**11**
12	5 09.0	+60.0	11.8	6 07.7	+60.0	11.8	7 06.5	+59.9	11.8	8 05.2	+60.0	11.9	9 03.9	+60.0	11.9	10 02.6	+60.0	11.9	11 01.3	+60.0	12.0	12 00.0	+60.0	12.0	**12**
13	6 09.0	+60.0	11.8	7 07.7	+60.0	11.8	8 06.4	+60.0	11.8	9 05.2	+60.0	11.8	10 03.9	+60.0	11.9	11 02.6	+60.0	11.9	12 01.3	+60.0	12.0	13 00.0	+60.0	12.0	**13**
14	7 09.0	+59.9	11.7	8 07.7	+60.0	11.8	9 06.4	+60.0	11.8	10 05.2	+60.0	11.8	11 03.9	+60.0	11.9	12 02.6	+60.0	11.9	13 01.3	+60.0	12.0	14 00.0	+60.0	12.0	**14**
15	8 08.9	+60.0	11.7	9 07.7	+60.0	11.7	10 06.4	+60.0	11.8	11 05.2	+60.0	11.8	12 03.9	+60.0	11.9	13 02.6	+60.0	11.9	14 01.3	+60.0	11.9	15 00.0	+60.0	12.0	**15**
16	9 08.9	+60.0	11.7	10 07.7	+60.0	11.7	11 06.4	+60.0	11.8	12 05.2	+59.9	11.8	13 03.9	+60.0	11.8	14 02.6	+60.0	11.9	15 01.3	+60.0	11.9	16 00.0	+60.0	12.0	**16**
17	10 08.9	+60.0	11.7	11 07.7	+59.9	11.7	12 06.4	+60.0	11.7	13 05.1	+60.0	11.8	14 03.9	+60.0	11.8	15 02.6	+60.0	11.9	16 01.3	+60.0	11.9	17 00.0	+60.0	12.0	**17**
18	11 08.9	+60.0	11.6	12 07.6	+60.0	11.7	13 06.4	+60.0	11.7	14 05.1	+60.0	11.8	15 03.9	+60.0	11.8	16 02.6	+60.0	11.9	17 01.3	+60.0	11.9	18 00.0	+60.0	12.0	**18**
19	12 08.9	+59.9	11.6	13 07.6	+60.0	11.6	14 06.4	+60.0	11.7	15 05.1	+60.0	11.7	16 03.9	+60.0	11.8	17 02.6	+60.0	11.9	18 01.3	+60.0	11.9	19 00.0	+60.0	12.0	**19**
20	13 08.8	+60.0	11.6	14 07.6	+60.0	11.6	15 06.4	+60.0	11.7	16 05.1	+60.0	11.7	17 03.9	+60.0	11.8	18 02.6	+60.0	11.9	19 01.3	+60.0	11.9	20 00.0	+60.0	12.0	**20**
21	14 08.8	+60.0	11.5	15 07.6	+60.0	11.6	16 06.4	+59.9	11.7	17 05.1	+60.0	11.7	18 03.9	+60.0	11.8	19 02.6	+60.0	11.8	20 01.3	+60.0	11.9	21 00.0	+60.0	12.0	**21**
22	15 08.8	+60.0	11.5	16 07.6	+60.0	11.6	17 06.3	+60.0	11.6	18 05.1	+60.0	11.7	19 03.9	+60.0	11.8	20 02.6	+60.0	11.8	21 01.3	+60.0	11.9	22 00.0	+60.0	12.0	**22**
23	16 08.8	+59.9	11.5	17 07.6	+59.9	11.6	18 06.3	+60.0	11.6	19 05.1	+60.0	11.7	20 03.9	+59.9	11.8	21 02.6	+60.0	11.8	22 01.3	+60.0	11.9	23 00.0	+60.0	12.0	**23**
24	17 08.7	+60.0	11.5	18 07.5	+60.0	11.5	19 06.3	+60.0	11.6	20 05.1	+60.0	11.7	21 03.8	+60.0	11.7	22 02.6	+60.0	11.8	23 01.3	+60.0	11.9	24 00.0	+60.0	12.0	**24**
25	18 08.7	+60.0	11.4	19 07.5	+60.0	11.5	20 06.3	+60.0	11.6	21 05.1	+60.0	11.7	22 03.8	+60.0	11.7	23 02.6	+60.0	11.8	24 01.3	+60.0	11.9	25 00.0	+60.0	12.0	**25**
26	19 08.7	+60.0	11.4	20 07.5	+60.0	11.5	21 06.3	+60.0	11.6	22 05.1	+60.0	11.6	23 03.8	+60.0	11.7	24 02.6	+60.0	11.8	25 01.3	+60.0	11.9	26 00.0	+60.0	12.0	**26**
27	20 08.7	+60.0	11.4	21 07.5	+60.0	11.5	22 06.3	+60.0	11.5	23 05.1	+60.0	11.6	24 03.8	+60.0	11.7	25 02.6	+60.0	11.8	26 01.3	+60.0	11.9	27 00.0	+60.0	12.0	**27**
28	21 08.7	+59.9	11.4	22 07.5	+60.0	11.4	23 06.3	+60.0	11.5	24 05.1	+60.0	11.6	25 03.8	+60.0	11.7	26 02.6	+60.0	11.8	27 01.3	+60.0	11.9	28 00.0	+60.0	12.0	**28**
29	22 08.6	+60.0	11.3	23 07.5	+59.9	11.4	24 06.3	+60.0	11.5	25 05.1	+60.0	11.6	26 03.8	+60.0	11.7	27 02.6	+60.0	11.8	28 01.3	+60.0	11.9	29 00.0	+60.0	12.0	**29**
30	23 08.6	+60.0	11.3	24 07.4	+60.0	11.4	25 06.3	+59.9	11.5	26 05.1	+59.9	11.6	27 03.8	+60.0	11.7	28 02.6	+60.0	11.8	29 01.3	+60.0	11.9	30 00.0	+60.0	12.0	**30**
31	24 08.6	+60.0	11.3	25 07.4	+60.0	11.4	26 06.2	+60.0	11.4	27 05.0	+60.0	11.5	28 03.8	+60.0	11.7	29 02.6	+60.0	11.8	30 01.3	+60.0	11.9	31 00.0	+60.0	12.0	**31**
32	25 08.6	+59.9	11.2	26 07.4	+60.0	11.3	27 06.2	+60.0	11.4	28 05.0	+60.0	11.5	29 03.8	+60.0	11.6	30 02.6	+60.0	11.8	31 01.3	+60.0	11.9	32 00.0	+60.0	12.0	**32**
33	26 08.5	+60.0	11.2	27 07.4	+60.0	11.3	28 06.2	+60.0	11.4	29 05.0	+60.0	11.5	30 03.8	+60.0	11.6	31 02.6	+60.0	11.7	32 01.3	+60.0	11.9	33 00.0	+60.0	12.0	**33**
34	27 08.5	+60.0	11.2	28 07.4	+60.0	11.3	29 06.2	+60.0	11.4	30 05.0	+60.0	11.5	31 03.8	+60.0	11.6	32 02.6	+60.0	11.7	33 01.3	+60.0	11.9	34 00.0	+60.0	12.0	**34**
35	28 08.5	+60.0	11.1	29 07.4	+59.9	11.2	30 06.2	+60.0	11.4	31 05.0	+60.0	11.5	32 03.8	+60.0	11.6	33 02.6	+60.0	11.7	34 01.3	+60.0	11.9	35 00.0	+60.0	12.0	**35**
36	29 08.5	+59.9	11.1	30 07.3	+60.0	11.2	31 06.2	+60.0	11.3	32 05.0	+60.0	11.5	33 03.8	+60.0	11.6	34 02.6	+60.0	11.7	35 01.3	+60.0	11.9	36 00.0	+60.0	12.0	**36**
37	30 08.4	+60.0	11.1	31 07.3	+60.0	11.2	32 06.2	+60.0	11.3	33 05.0	+60.0	11.4	34 03.8	+60.0	11.6	35 02.6	+60.0	11.7	36 01.3	+60.0	11.8	37 00.0	+60.0	12.0	**37**
38	31 08.4	+60.0	11.0	32 07.3	+60.0	11.2	33 06.2	+59.9	11.3	34 05.0	+60.0	11.4	35 03.8	+60.0	11.5	36 02.6	+60.0	11.7	37 01.3	+60.0	11.8	38 00.0	+60.0	12.0	**38**
39	32 08.4	+60.0	11.0	33 07.3	+60.0	11.1	34 06.1	+60.0	11.3	35 05.0	+60.0	11.4	36 03.8	+60.0	11.5	37 02.6	+59.9	11.7	38 01.3	+60.0	11.8	39 00.0	+60.0	12.0	**39**
40	33 08.4	+59.9	11.0	34 07.3	+59.9	11.1	35 06.1	+60.0	11.2	36 05.0	+60.0	11.4	37 03.8	+60.0	11.5	38 02.5	+60.0	11.7	39 01.3	+60.0	11.8	40 00.0	+60.0	12.0	**40**
41	34 08.3	+60.0	10.9	35 07.2	+60.0	11.1	36 06.1	+60.0	11.2	37 05.0	+59.9	11.3	38 03.8	+60.0	11.5	39 02.5	+60.0	11.7	40 01.3	+60.0	11.8	41 00.0	+60.0	12.0	**41**
42	35 08.3	+60.0	10.9	36 07.2	+60.0	11.0	37 06.1	+60.0	11.2	38 04.9	+60.0	11.3	39 03.8	+60.0	11.5	40 02.5	+60.0	11.6	41 01.3	+60.0	11.8	42 00.0	+60.0	12.0	**42**
43	36 08.3	+60.0	10.9	37 07.2	+60.0	11.0	38 06.1	+60.0	11.1	39 04.9	+60.0	11.3	40 03.8	+59.9	11.5	41 02.5	+60.0	11.6	42 01.3	+60.0	11.8	43 00.0	+60.0	12.0	**43**
44	37 08.3	+59.9	10.8	38 07.2	+60.0	11.0	39 06.1	+59.9	11.1	40 04.9	+60.0	11.3	41 03.7	+60.0	11.4	42 02.5	+60.0	11.6	43 01.3	+60.0	11.8	44 00.0	+60.0	12.0	**44**
45	38 08.2	+60.0	10.8	39 07.2	+59.9	10.9	40 06.0	+60.0	11.1	41 04.9	+60.0	11.2	42 03.7	+60.0	11.4	43 02.5	+60.0	11.6	44 01.3	+60.0	11.8	45 00.0	+60.0	12.0	**45**
46	39 08.2	+60.0	10.7	40 07.1	+60.0	10.9	41 06.0	+60.0	11.0	42 04.9	+60.0	11.2	43 03.7	+60.0	11.4	44 02.5	+60.0	11.6	45 01.3	+60.0	11.8	46 00.0	+60.0	12.0	**46**
47	40 08.2	+59.9	10.7	41 07.1	+60.0	10.8	42 06.0	+60.0	11.0	43 04.9	+60.0	11.2	44 03.7	+60.0	11.4	45 02.5	+60.0	11.6	46 01.3	+60.0	11.8	47 00.0	+60.0	12.0	**47**
48	41 08.1	+60.0	10.6	42 07.1	+60.0	10.8	43 06.0	+60.0	11.0	44 04.9	+60.0	11.2	45 03.7	+60.0	11.4	46 02.5	+60.0	11.6	47 01.3	+60.0	11.8	48 00.0	+60.0	12.0	**48**
49	42 08.1	+60.0	10.6	43 07.1	+59.9	10.8	44 06.0	+60.0	10.9	45 04.9	+60.0	11.1	46 03.7	+60.0	11.3	47 02.5	+60.0	11.5	48 01.3	+60.0	11.8	49 00.0	+60.0	12.0	**49**
50	43 08.1	+59.9	10.6	44 07.0	+60.0	10.7	45 06.0	+59.9	10.9	46 04.9	+59.9	11.1	47 03.7	+60.0	11.3	48 02.5	+60.0	11.5	49 01.3	+60.0	11.8	50 00.0	+60.0	12.0	**50**
51	44 08.0	+60.0	10.5	45 07.0	+60.0	10.7	46 05.9	+60.0	10.9	47 04.8	+60.0	11.1	48 03.7	+60.0	11.3	49 02.5	+60.0	11.5	50 01.3	+60.0	11.8	51 00.0	+60.0	12.0	**51**
52	45 08.0	+59.9	10.5	46 07.0	+59.9	10.6	47 05.9	+60.0	10.8	48 04.8	+60.0	11.0	49 03.7	+60.0	11.3	50 02.5	+60.0	11.5	51 01.3	+60.0	11.7	52 00.0	+60.0	12.0	**52**
53	46 07.9	+60.0	10.4	47 06.9	+60.0	10.6	48 05.9	+60.0	10.8	49 04.8	+60.0	11.0	50 03.7	+60.0	11.2	51 02.5	+60.0	11.5	52 01.3	+60.0	11.7	53 00.0	+60.0	12.0	**53**
54	47 07.9	+60.0	10.3	48 06.9	+60.0	10.5	49 05.9	+59.9	10.8	50 04.8	+60.0	11.0	51 03.7	+60.0	11.2	52 02.5	+60.0	11.5	53 01.3	+60.0	11.7	54 00.0	+60.0	12.0	**54**
55	48 07.9	+59.9	10.3	49 06.9	+59.9	10.5	50 05.8	+60.0	10.7	51 04.8	+60.0	10.9	52 03.7	+60.0	11.2	53 02.5	+60.0	11.4	54 01.3	+60.0	11.7	55 00.0	+60.0	12.0	**55**
56	49 07.8	+60.0	10.2	50 06.8	+60.0	10.4	51 05.8	+60.0	10.7	52 04.8	+59.9	10.9	53 03.7	+59.9	11.2	54 02.5	+60.0	11.4	55 01.3	+60.0	11.7	56 00.0	+60.0	12.0	**56**
57	50 07.8	+59.9	10.2	51 06.8	+60.0	10.4	52 05.8	+60.0	10.6	53 04.7	+60.0	10.9	54 03.6	+60.0	11.1	55 02.5	+60.0	11.4	56 01.3	+60.0	11.7	57 00.0	+60.0	12.0	**57**
58	51 07.7	+60.0	10.1	52 06.8	+59.9	10.3	53 05.8	+59.9	10.6	54 04.7	+60.0	10.8	55 03.6	+60.0	11.1	56 02.5	+60.0	11.4	57 01.3	+60.0	11.7	58 00.0	+60.0	12.0	**58**
59	52 07.7	+59.9	10.0	53 06.7	+60.0	10.3	54 05.7	+60.0	10.5	55 04.7	+60.0	10.8	56 03.6	+60.0	11.1	57 02.5	+60.0	11.4	58 01.3	+60.0	11.7	59 00.0	+60.0	12.0	**59**
60	53 07.6	+60.0	10.0	54 06.7	+59.9	10.2	55 05.7	+60.0	10.5	56 04.7	+60.0	10.7	57 03.6	+60.0	11.0	58 02.5	+60.0	11.3	59 01.3	+60.0	11.7	60 00.0	+60.0	12.0	**60**
61	54 07.6	+59.9	9.9	55 06.6	+60.0	10.1	56 05.7	+60.0	10.4	57 04.7	+59.9	10.7	58 03.6	+60.0	11.0	59 02.5	+60.0	11.3	60 01.3	+60.0	11.6	61 00.0	+60.0	12.0	**61**
62	55 07.5	+59.9	9.8	56 06.6	+60.0	10.1	57 05.7	+59.9	10.4	58 04.6	+60.0	10.6	59 03.6	+60.0	10.9	60 02.5	+60.0	11.3	61 01.3	+60.0	11.6	62 00.0	+60.0	12.0	**62**
63	56 07.4	+60.0	9.7	57 06.6	+59.9	10.0	58 05.6	+60.0	10.3	59 04.6	+60.0	10.6	60 03.6	+60.0	10.9	61 02.5	+59.9	11.2	62 01.3	+60.0	11.6	63 00.0	+60.0	12.0	**63**
64	57 07.4	+59.9	9.7	58 06.5	+60.0	9.9	59 05.6	+59.9	10.2	60 04.6	+60.0	10.5	61 03.6	+59.9	10.9	62 02.4	+60.0	11.2	63 01.3	+60.0	11.6	64 00.0	+60.0	12.0	**64**
65	58 07.3	+59.9	9.6	59 06.5	+59.9	9.9	60 05.5	+60.0	10.2	61 04.6	+59.9	10.5	62 03.5	+60.0	10.8	63 02.4	+60.0	11.2	64 01.3	+60.0	11.6	65 00.0	+60.0	12.0	**65**
66	59 07.2	+60.0	9.5	60 06.4	+59.9	9.8	61 05.5	+60.0	10.1	62 04.5	+60.0	10.4	63 03.5	+60.0	10.8	64 02.4	+60.0	11.1	65 01.3	+60.0	11.6	66 00.0	+60.0	12.0	**66**
67	60 07.2	+59.9	9.4	61 06.3	+60.0	9.7	62 05.5	+59.9	10.0	63 04.5	+60.0	10.3	64 03.5	+60.0	10.7	65 02.4	+60.0	11.1	66 01.3	+60.0	11.5	67 00.0	+60.0	12.0	**67**
68	61 07.1	+59.9	9.3	62 06.3	+59.9	9.6	63 05.4	+60.0	9.9	64 04.5	+59.9	10.3	65 03.5	+60.0	10.6	66 02.4	+60.0	11.1	67 01.3	+60.0	11.5	68 00.0	+60.0	12.0	**68**
69	62 07.0	+59.9	9.2	63 06.2	+59.9	9.5	64 05.4	+59.9	9.8	65 04.4	+60.0	10.2	66 03.5	+59.9	10.6	67 02.4	+60.0	11.0	68 01.3	+60.0	11.5	69 00.0	+60.0	12.0	**69**
70	63 06.9	+59.9	9.0	64 06.1	+60.0	9.4	65 05.3	+59.9	9.7	66 04.4	+60.0	10.1	67 03.4	+60.0	10.5	68 02.4	+60.0	11.0	69 01.3	+59.9	11.5	70 00.0	+60.0	12.0	**70**
71	64 06.8	+59.9	8.9	65 06.1	+59.9	9.3	66 05.2	+60.0	9.6	67 04.4	+59.9	10.0	68 03.4	+60.0	10.4	69 02.4	+60.0	10.9	70 01.2	+60.0	11.4	71 00.0	+60.0	12.0	**71**
72	65 06.7	+59.9	8.8	66 06.0	+59.9	9.1	67 05.2	+59.9	9.5	68 04.3	+60.0	9.9	69 03.4	+60.0	10.4	70 02.4	+60.0	10.8	71 01.2	+60.0	11.4	72 00.0	+60.0	12.0	**72**
73	66 06.6	+59.9	8.6	67 05.9	+59.9	9.0	68 05.1	+59.9	9.4	69 04.3	+59.9	9.8	70 03.4	+59.9	10.3	71 02.4	+59.9	10.8	72 01.2	+60.0	11.4	73 00.0	+60.0	12.0	**73**
74	67 06.5	+59.8	8.5	68 05.8	+59.9	8.8	69 05.0	+60.0	9.2	70 04.2	+60.0	9.7	71 03.3	+60.0	10.2	72 02.3	+60.0	10.7	73 01.2	+60.0	11.3	74 00.0	+60.0	12.0	**74**
75	68 06.3	+59.9	8.3	69 05.7	+59.9	8.7	70 05.0	+59.9	9.1	71 04.2	+59.9	9.5	72 03.3	+60.0	10.1	73 02.3	+60.0	10.6	74 01.2	+60.0	11.3	75 00.0	+60.0	12.0	**75**
76	69 06.2	+59.8	8.1	70 05.6	+59.8	8.5	71 04.9	+59.9	8.9	72 04.1	+59.9	9.4	73 03.3	+59.9	9.9	74 02.3	+60.0	10.5	75 01.2	+60.0	11.2	76 00.0	+60.0	12.0	**76**
77	70 06.0	+59.9	7.9	71 05.4	+59.9	8.3	72 04.8	+59.9	8.7	73 04.0	+60.0	9.2	74 03.2	+60.0	9.8	75 02.3	+60.0	10.4	76 01.2	+60.0	11.2	77 00.0	+60.0	12.0	**77**
78	71 05.9	+59.8	7.7	72 05.3	+59.8	8.1	73 04.7	+59.8	8.5	74 04.0	+59.9	9.1	75 03.2	+59.9	9.6	76 02.3	+59.9	10.3	77 01.2	+60.0	11.1	78 00.0	+60.0	12.0	**78**
79	72 05.7	+59.8	7.4	73 05.1	+59.9	7.8	74 04.5	+59.9	8.3	75 03.9	+59.9	8.9	76 03.1	+59.9	9.5	77 02.2	+60.0	10.2	78 01.2	+60.0	11.0	79 00.0	+60.0	12.0	**79**
80	73 05.5	+59.7	7.1	74 05.0	+59.8	7.6	75 04.4	+59.8	8.1	76 03.8	+59.9	8.6	77 03.0	+60.0	9.3	78 02.2	+60.0	10.0	79 01.2	+60.0	10.9	80 00.0	+60.0	12.0	**80**
81	74 05.2	+59.7	6.8	75 04.8	+59.7	7.3	76 04.2	+59.9	7.8	77 03.7	+59.8	8.4	78 03.0	+59.9	9.0	79 02.2	+59.9	9.8	80 01.2	+60.0	10.8	81 00.0	+60.0	12.0	**81**
82	75 04.9	+59.7	6.5	76 04.5	+59.8	6.9	77 04.1	+59.7	7.4	78 03.5	+59.9	8.0	79 02.9	+59.9	8.8	80 02.1	+59.9	9.6	81 01.2	+59.9	10.7	82 00.0	+60.0	12.0	**82**
83	76 04.6	+59.7	6.0	77 04.3	+59.7	6.5	78 03.8	+59.8	7.0	79 03.4	+59.8	7.7	80 02.8	+59.8	8.4	81 02.0	+60.0	9.4	82 01.1	+60.0	10.5	83 00.0	+60.0	12.0	**83**
84	77 04.3	+59.5	5.6	78 04.0	+59.6	6.0	79 03.6	+59.7	6.6	80 03.2	+59.7	7.2	81 02.6	+59.9	8.0	82 02.0	+59.9	9.0	83 01.1	+60.0	10.3	84 00.0	+60.0	12.0	**84**
85	78 03.8	+59.6	5.0	79 03.6	+59.6	5.5	80 03.3	+59.6	6.0	81 02.9	+59.7	6.7	82 02.5	+59.8	7.5	83 01.9	+59.9	8.6	84 01.1	+60.0	10.0	85 00.0	+60.0	12.0	**85**
86	79 03.4	+59.4	4.4	80 03.2	+59.4	4.8	81 02.9	+59.6	5.3	82 02.6	+59.7	6.0	83 02.3	+59.7	6.9	84 01.8	+59.8	8.0	85 01.1	+59.9	9.6	86 00.0	+60.0	12.0	**86**
87	80 02.8	+59.2	3.6	81 02.6	+59.4	4.0	82 02.5	+59.4	4.5	83 02.3	+59.5	5.2	84 02.0	+59.6	6.0	85 01.6	+59.7	7.2	86 01.0	+59.9	9.0	87 00.0	+60.0	12.0	**87**
88	81 02.0	+59.1	2.7	82 02.0	+59.1	3.0	83 01.9	+59.2	3.4	84 01.8	+59.3	4.0	85 01.6	+59.4	4.8	86 01.3	+59.6	6.0	87 00.9	+59.8	8.0	88 00.0	+60.0	12.0	**88**
89	82 01.1	+58.9	1.5	83 01.1	+58.9	1.7	84 01.1	+58.9	2.0	85 01.1	+58.9	2.4	86 01.0	+59.0	3.0	87 00.9	+59.1	4.0	88 00.7	*+59.3* •	6.0	89 00.0	+60.0	12.0	**89**
90	83 00.0	+58.5	0.0	84 00.0	+58.4	0.0	85 00.0	+58.4	0.0	86 00.0	+58.3	0.0	87 00.0	*+58.0* •	0.0	88 00.0	*+57.4* •	0.0	89 00.0	*+47.5* •	0.0	90 00.0	–60.0	6.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 168°, 192°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 49.2	+60.0	166.9	5 50.7	+60.0	166.9	4 52.3	+60.0	167.0	3 53.8	+60.0	167.0	2 55.4	+60.0	167.0	1 56.9	+60.0	167.0	0 58.5	+60.0	167.0	0 00.0	+60.0	167.0	**0**
1	7 49.2	+59.9	166.9	6 50.7	+60.0	166.9	5 52.3	+60.0	166.9	4 53.8	+60.0	167.0	3 55.4	+60.0	167.0	2 56.9	+60.0	167.0	1 58.5	+60.0	167.0	1 00.0	+60.0	167.0	**1**
2	8 49.1	+60.0	166.8	7 50.7	+60.0	166.9	6 52.3	+60.0	166.9	5 53.8	+60.0	166.9	4 55.4	+60.0	167.0	3 56.9	+60.0	167.0	2 58.5	+60.0	167.0	2 00.0	+60.0	167.0	**2**
3	9 49.1	+60.0	166.8	8 50.7	+60.0	166.9	7 52.3	+59.9	166.9	6 53.8	+60.0	166.9	5 55.4	+60.0	166.9	4 56.9	+60.0	167.0	3 58.5	+60.0	167.0	3 00.0	+60.0	167.0	**3**
4	10 49.1	+60.0	166.8	9 50.7	+60.0	166.8	8 52.2	+60.0	166.9	7 53.8	+60.0	166.9	6 55.4	+60.0	166.9	5 56.9	+60.0	167.0	4 58.5	+60.0	167.0	4 00.0	+60.0	167.0	**4**
5	11 49.1	+59.9	166.8	10 50.7	+59.9	166.8	9 52.2	+60.0	166.9	8 53.8	+60.0	166.9	7 55.4	+60.0	166.9	6 56.9	+60.0	167.0	5 58.5	+60.0	167.0	5 00.0	+60.0	167.0	**5**
6	12 49.0	+60.0	166.7	11 50.6	+60.0	166.8	10 52.2	+60.0	166.8	9 53.8	+60.0	166.9	8 55.4	+60.0	166.9	7 56.9	+60.0	166.9	6 58.5	+60.0	167.0	6 00.0	+60.0	167.0	**6**
7	13 49.0	+60.0	166.7	12 50.6	+60.0	166.8	11 52.2	+60.0	166.8	10 53.8	+60.0	166.9	9 55.4	+59.9	166.9	8 56.9	+60.0	166.9	7 58.5	+60.0	167.0	7 00.0	+60.0	167.0	**7**
8	14 49.0	+60.0	166.7	13 50.6	+60.0	166.7	12 52.2	+60.0	166.8	11 53.8	+60.0	166.8	10 55.3	+60.0	166.9	9 56.9	+60.0	166.9	8 58.5	+60.0	167.0	8 00.0	+60.0	167.0	**8**
9	15 49.0	+59.9	166.6	14 50.6	+60.0	166.7	13 52.2	+60.0	166.8	12 53.8	+60.0	166.8	11 55.3	+60.0	166.9	10 56.9	+60.0	166.9	9 58.5	+60.0	167.0	9 00.0	+60.0	167.0	**9**
10	16 48.9	+60.0	166.6	15 50.6	+60.0	166.7	14 52.2	+60.0	166.7	13 53.8	+60.0	166.8	12 55.3	+60.0	166.9	11 56.9	+60.0	166.9	10 58.5	+60.0	167.0	10 00.0	+60.0	167.0	**10**
11	17 48.9	+60.0	166.6	16 50.6	+59.9	166.7	15 52.2	+59.9	166.7	14 53.8	+59.9	166.8	13 55.3	+60.0	166.8	12 56.9	+60.0	166.9	11 58.5	+60.0	167.0	11 00.0	+60.0	167.0	**11**
12	18 48.9	+60.0	166.6	17 50.5	+60.0	166.6	16 52.1	+60.0	166.7	15 53.7	+60.0	166.8	14 55.3	+60.0	166.8	13 56.9	+60.0	166.9	12 58.5	+60.0	167.0	12 00.0	+60.0	167.0	**12**
13	19 48.9	+59.9	166.5	18 50.5	+60.0	166.6	17 52.1	+60.0	166.7	16 53.7	+60.0	166.8	15 55.3	+60.0	166.8	14 56.9	+60.0	166.9	13 58.5	+60.0	166.9	13 00.0	+60.0	167.0	**13**
14	20 48.8	+60.0	166.5	19 50.5	+60.0	166.6	18 52.1	+60.0	166.7	17 53.7	+60.0	166.7	16 55.3	+60.0	166.8	15 56.9	+60.0	166.9	14 58.5	+60.0	166.9	14 00.0	+60.0	167.0	**14**
15	21 48.8	+60.0	166.5	20 50.5	+60.0	166.6	19 52.1	+60.0	166.6	18 53.7	+60.0	166.7	17 55.3	+60.0	166.8	16 56.9	+60.0	166.9	15 58.5	+60.0	166.9	15 00.0	+60.0	167.0	**15**
16	22 48.8	+60.0	166.4	21 50.5	+59.9	166.5	20 52.1	+60.0	166.6	19 53.7	+60.0	166.7	18 55.3	+60.0	166.8	17 56.9	+60.0	166.9	16 58.5	+60.0	166.9	16 00.0	+60.0	167.0	**16**
17	23 48.8	+59.9	166.4	22 50.4	+60.0	166.5	21 52.1	+60.0	166.6	20 53.7	+60.0	166.7	19 55.3	+60.0	166.8	18 56.9	+60.0	166.9	17 58.5	+60.0	166.9	17 00.0	+60.0	167.0	**17**
18	24 48.7	+60.0	166.4	23 50.4	+60.0	166.5	22 52.1	+60.0	166.6	21 53.7	+60.0	166.7	20 55.3	+60.0	166.8	19 56.9	+60.0	166.8	18 58.5	+60.0	166.9	18 00.0	+60.0	167.0	**18**
19	25 48.7	+60.0	166.3	24 50.4	+60.0	166.4	23 52.1	+59.9	166.6	22 53.7	+60.0	166.7	21 55.3	+60.0	166.7	20 56.9	+60.0	166.8	19 58.5	+60.0	166.9	19 00.0	+60.0	167.0	**19**
20	26 48.7	+60.0	166.3	25 50.4	+60.0	166.4	24 52.0	+60.0	166.5	23 53.7	+60.0	166.6	22 55.3	+60.0	166.7	21 56.9	+60.0	166.8	20 58.5	+60.0	166.9	20 00.0	+60.0	167.0	**20**
21	27 48.7	+59.9	166.3	26 50.4	+59.9	166.4	25 52.0	+60.0	166.5	24 53.7	+60.0	166.6	23 55.3	+60.0	166.7	22 56.9	+60.0	166.8	21 58.5	+60.0	166.9	21 00.0	+60.0	167.0	**21**
22	28 48.6	+60.0	166.2	27 50.3	+60.0	166.4	26 52.0	+60.0	166.5	25 53.7	+60.0	166.6	24 55.3	+60.0	166.7	23 56.9	+60.0	166.8	22 58.5	+60.0	166.9	22 00.0	+60.0	167.0	**22**
23	29 48.6	+60.0	166.2	28 50.3	+60.0	166.3	27 52.0	+60.0	166.5	26 53.7	+59.9	166.6	25 55.3	+60.0	166.7	24 56.9	+60.0	166.8	23 58.5	+60.0	166.9	23 00.0	+60.0	167.0	**23**
24	30 48.6	+59.9	166.2	29 50.3	+60.0	166.3	28 52.0	+60.0	166.4	27 53.6	+60.0	166.6	26 55.3	+60.0	166.7	25 56.9	+60.0	166.8	24 58.5	+59.9	166.9	24 00.0	+60.0	167.0	**24**
25	31 48.5	+60.0	166.1	30 50.3	+59.9	166.3	29 52.0	+60.0	166.4	28 53.6	+60.0	166.5	27 55.3	+60.0	166.7	26 56.9	+60.0	166.8	25 58.4	+60.0	166.9	25 00.0	+60.0	167.0	**25**
26	32 48.5	+60.0	166.1	31 50.2	+60.0	166.2	30 52.0	+59.9	166.4	29 53.6	+60.0	166.5	28 55.3	+60.0	166.6	27 56.9	+60.0	166.8	26 58.4	+60.0	166.9	26 00.0	+60.0	167.0	**26**
27	33 48.5	+59.9	166.0	32 50.2	+60.0	166.2	31 51.9	+60.0	166.3	30 53.6	+60.0	166.5	29 55.3	+60.0	166.6	28 56.9	+60.0	166.8	27 58.4	+60.0	166.9	27 00.0	+60.0	167.0	**27**
28	34 48.4	+60.0	166.0	33 50.2	+60.0	166.2	32 51.9	+60.0	166.3	31 53.6	+60.0	166.5	30 55.3	+59.9	166.6	29 56.9	+60.0	166.7	28 58.4	+60.0	166.9	28 00.0	+60.0	167.0	**28**
29	35 48.4	+60.0	166.0	34 50.2	+60.0	166.1	33 51.9	+60.0	166.3	32 53.6	+60.0	166.4	31 55.2	+60.0	166.6	30 56.9	+60.0	166.7	29 58.4	+60.0	166.9	29 00.0	+60.0	167.0	**29**
30	36 48.4	+59.9	165.9	35 50.2	+59.9	166.1	34 51.9	+60.0	166.3	33 53.6	+60.0	166.4	32 55.2	+60.0	166.6	31 56.9	+60.0	166.7	30 58.4	+60.0	166.9	30 00.0	+60.0	167.0	**30**
31	37 48.3	+60.0	165.9	36 50.1	+60.0	166.1	35 51.9	+60.0	166.2	34 53.6	+60.0	166.4	33 55.2	+60.0	166.6	32 56.9	+60.0	166.7	31 58.4	+60.0	166.9	31 00.0	+60.0	167.0	**31**
32	38 48.3	+60.0	165.8	37 50.1	+60.0	166.0	36 51.9	+59.9	166.2	35 53.6	+60.0	166.4	34 55.2	+60.0	166.5	33 56.9	+60.0	166.7	32 58.4	+60.0	166.9	32 00.0	+60.0	167.0	**32**
33	39 48.3	+59.9	165.8	38 50.1	+59.9	166.0	37 51.8	+60.0	166.2	36 53.6	+59.9	166.4	35 55.2	+60.0	166.5	34 56.9	+60.0	166.7	33 58.4	+60.0	166.9	33 00.0	+60.0	167.0	**33**
34	40 48.2	+60.0	165.7	39 50.0	+60.0	165.9	38 51.8	+60.0	166.1	37 53.5	+60.0	166.3	36 55.2	+60.0	166.5	35 56.9	+59.9	166.7	34 58.4	+60.0	166.8	34 00.0	+60.0	167.0	**34**
35	41 48.2	+59.9	165.7	40 50.0	+60.0	165.9	39 51.8	+60.0	166.1	38 53.5	+60.0	166.3	37 55.2	+60.0	166.5	36 56.8	+60.0	166.7	35 58.4	+60.0	166.8	35 00.0	+60.0	167.0	**35**
36	42 48.1	+60.0	165.6	41 50.0	+60.0	165.9	40 51.8	+60.0	166.1	39 53.5	+60.0	166.3	38 55.2	+60.0	166.5	37 56.8	+60.0	166.7	36 58.4	+60.0	166.8	36 00.0	+60.0	167.0	**36**
37	43 48.1	+60.0	165.6	42 50.0	+59.9	165.8	41 51.8	+59.9	166.0	40 53.5	+60.0	166.3	39 55.2	+60.0	166.5	38 56.8	+60.0	166.6	37 58.4	+60.0	166.8	37 00.0	+60.0	167.0	**37**
38	44 48.1	+59.9	165.5	43 49.9	+60.0	165.8	42 51.7	+60.0	166.0	41 53.5	+60.0	166.2	40 55.2	+60.0	166.4	39 56.8	+60.0	166.6	38 58.4	+60.0	166.8	38 00.0	+60.0	167.0	**38**
39	45 48.0	+60.0	165.5	44 49.9	+60.0	165.7	43 51.7	+60.0	166.0	42 53.5	+60.0	166.2	41 55.2	+60.0	166.4	40 56.8	+60.0	166.6	39 58.4	+60.0	166.8	39 00.0	+60.0	167.0	**39**
40	46 48.0	+59.9	165.4	45 49.9	+59.9	165.7	44 51.7	+60.0	165.9	43 53.5	+59.9	166.2	42 55.2	+60.0	166.4	41 56.8	+60.0	166.6	40 58.4	+60.0	166.8	40 00.0	+60.0	167.0	**40**
41	47 47.9	+60.0	165.4	46 49.8	+60.0	165.6	45 51.7	+59.9	165.9	44 53.4	+60.0	166.1	43 55.2	+60.0	166.4	42 56.8	+60.0	166.6	41 58.4	+60.0	166.8	41 00.0	+60.0	167.0	**41**
42	48 47.9	+59.9	165.3	47 49.8	+60.0	165.6	46 51.6	+60.0	165.8	45 53.4	+60.0	166.1	44 55.2	+59.9	166.3	43 56.8	+60.0	166.6	42 58.4	+60.0	166.8	42 00.0	+60.0	167.0	**42**
43	49 47.8	+60.0	165.2	48 49.8	+59.9	165.5	47 51.6	+60.0	165.8	46 53.4	+60.0	166.1	45 55.1	+60.0	166.3	44 56.8	+60.0	166.6	43 58.4	+60.0	166.8	43 00.0	+60.0	167.0	**43**
44	50 47.8	+59.9	165.2	49 49.7	+60.0	165.5	48 51.6	+60.0	165.8	47 53.4	+60.0	166.0	46 55.1	+60.0	166.3	45 56.8	+60.0	166.5	44 58.4	+60.0	166.8	44 00.0	+60.0	167.0	**44**
45	51 47.7	+59.9	165.1	50 49.7	+59.9	165.4	49 51.6	+59.9	165.7	48 53.4	+60.0	166.0	47 55.1	+60.0	166.3	46 56.8	+60.0	166.5	45 58.4	+60.0	166.8	45 00.0	+60.0	167.0	**45**
46	52 47.6	+60.0	165.0	51 49.6	+60.0	165.4	50 51.5	+60.0	165.7	49 53.4	+59.9	166.0	48 55.1	+60.0	166.2	47 56.8	+60.0	166.5	46 58.4	+60.0	166.8	46 00.0	+60.0	167.0	**46**
47	53 47.6	+59.9	164.9	52 49.6	+59.9	165.3	51 51.5	+60.0	165.6	50 53.3	+60.0	165.9	49 55.1	+60.0	166.2	48 56.8	+60.0	166.5	47 58.4	+60.0	166.8	47 00.0	+60.0	167.0	**47**
48	54 47.5	+59.9	164.9	53 49.5	+60.0	165.2	52 51.5	+59.9	165.6	51 53.3	+60.0	165.9	50 55.1	+60.0	166.2	49 56.8	+60.0	166.5	48 58.4	+60.0	166.7	48 00.0	+60.0	167.0	**48**
49	55 47.4	+60.0	164.8	54 49.5	+59.9	165.2	53 51.4	+60.0	165.5	52 53.3	+60.0	165.8	51 55.1	+60.0	166.2	50 56.8	+60.0	166.5	49 58.4	+60.0	166.7	49 00.0	+60.0	167.0	**49**
50	56 47.4	+59.9	164.7	55 49.4	+60.0	165.1	54 51.4	+60.0	165.5	53 53.3	+60.0	165.8	52 55.1	+60.0	166.1	51 56.8	+60.0	166.4	50 58.4	+60.0	166.7	50 00.0	+60.0	167.0	**50**
51	57 47.3	+59.9	164.6	56 49.4	+59.9	165.0	55 51.4	+59.9	165.4	54 53.3	+59.9	165.8	53 55.1	+60.0	166.1	52 56.8	+60.0	166.4	51 58.4	+60.0	166.7	51 00.0	+60.0	167.0	**51**
52	58 47.2	+59.9	164.5	57 49.3	+60.0	164.9	56 51.3	+60.0	165.3	55 53.2	+60.0	165.7	54 55.1	+59.9	166.1	53 56.8	+60.0	166.4	52 58.4	+60.0	166.7	52 00.0	+60.0	167.0	**52**
53	59 47.1	+59.9	164.4	58 49.3	+59.9	164.8	57 51.3	+60.0	165.3	56 53.2	+60.0	165.7	55 55.0	+60.0	166.0	54 56.8	+60.0	166.4	53 58.4	+60.0	166.7	53 00.0	+60.0	167.0	**53**
54	60 47.0	+59.9	164.3	59 49.2	+59.9	164.8	58 51.3	+59.9	165.2	57 53.2	+60.0	165.6	56 55.0	+60.0	166.0	55 56.8	+60.0	166.3	54 58.4	+60.0	166.7	54 00.0	+60.0	167.0	**54**
55	61 46.9	+59.9	164.2	60 49.1	+60.0	164.7	59 51.2	+60.0	165.1	58 53.2	+59.9	165.5	57 55.0	+60.0	165.9	56 56.8	+60.0	166.3	55 58.4	+60.0	166.7	55 00.0	+60.0	167.0	**55**
56	62 46.8	+59.9	164.0	61 49.1	+59.9	164.6	60 51.2	+59.9	165.0	59 53.1	+60.0	165.5	58 55.0	+60.0	165.9	57 56.8	+60.0	166.3	56 58.4	+60.0	166.7	56 00.0	+60.0	167.0	**56**
57	63 46.7	+59.9	163.9	62 49.0	+59.9	164.4	61 51.1	+60.0	164.9	60 53.1	+60.0	165.4	59 55.0	+60.0	165.9	58 56.8	+59.9	166.3	57 58.4	+60.0	166.6	57 00.0	+60.0	167.0	**57**
58	64 46.6	+59.9	163.8	63 48.9	+59.9	164.3	62 51.1	+59.9	164.9	61 53.1	+59.9	165.3	60 55.0	+59.9	165.8	59 56.7	+60.0	166.2	58 58.4	+60.0	166.6	58 00.0	+60.0	167.0	**58**
59	65 46.5	+59.8	163.6	64 48.8	+59.9	164.2	63 51.0	+59.9	164.8	62 53.0	+60.0	165.3	61 54.9	+60.0	165.8	60 56.7	+60.0	166.2	59 58.4	+60.0	166.6	59 00.0	+60.0	167.0	**59**
60	66 46.3	+59.9	163.4	65 48.7	+59.9	164.1	64 50.9	+60.0	164.7	63 53.0	+60.0	165.2	62 54.9	+60.0	165.7	61 56.7	+60.0	166.2	60 58.4	+60.0	166.6	60 00.0	+60.0	167.0	**60**
61	67 46.2	+59.8	163.2	66 48.6	+59.9	163.9	65 50.9	+59.9	164.5	64 53.0	+59.9	165.1	63 54.9	+60.0	165.6	62 56.7	+60.0	166.1	61 58.4	+60.0	166.6	61 00.0	+60.0	167.0	**61**
62	68 46.0	+59.8	163.0	67 48.5	+59.9	163.8	66 50.8	+59.9	164.4	65 52.9	+60.0	165.0	64 54.9	+60.0	165.6	63 56.7	+60.0	166.1	62 58.4	+60.0	166.6	62 00.0	+60.0	167.0	**62**
63	69 45.8	+59.8	162.8	68 48.4	+59.9	163.6	67 50.7	+59.9	164.3	66 52.9	+59.9	164.9	65 54.9	+59.9	165.5	64 56.7	+60.0	166.0	63 58.4	+60.0	166.5	63 00.0	+60.0	167.0	**63**
64	70 45.6	+59.8	162.6	69 48.3	+59.8	163.4	68 50.6	+59.9	164.1	67 52.8	+60.0	164.8	66 54.8	+60.0	165.4	65 56.7	+60.0	166.0	64 58.4	+60.0	166.5	64 00.0	+60.0	167.0	**64**
65	71 45.4	+59.8	162.3	70 48.1	+59.8	163.2	69 50.5	+59.9	164.0	68 52.8	+59.9	164.7	67 54.8	+60.0	165.4	66 56.7	+60.0	166.0	65 58.4	+60.0	166.5	65 00.0	+60.0	167.0	**65**
66	72 45.2	+59.7	162.0	71 47.9	+59.9	163.0	70 50.4	+59.9	163.8	69 52.7	+59.9	164.6	68 54.8	+59.9	165.3	67 56.7	+60.0	165.9	66 58.4	+60.0	166.5	66 00.0	+60.0	167.0	**66**
67	73 44.9	+59.7	161.7	72 47.8	+59.8	162.7	71 50.3	+59.9	163.6	70 52.6	+60.0	164.4	69 54.7	+60.0	165.2	68 56.7	+59.9	165.8	67 58.4	+60.0	166.4	67 00.0	+60.0	167.0	**67**
68	74 44.6	+59.6	161.3	73 47.6	+59.7	162.4	72 50.2	+59.9	163.4	71 52.6	+59.9	164.3	70 54.7	+60.0	165.1	69 56.6	+60.0	165.8	68 58.4	+60.0	166.4	68 00.0	+60.0	167.0	**68**
69	75 44.2	+59.6	160.9	74 47.3	+59.8	162.1	73 50.1	+59.8	163.2	72 52.5	+59.9	164.1	71 54.7	+59.9	165.0	70 56.6	+60.0	165.7	69 58.4	+60.0	166.4	69 00.0	+60.0	167.0	**69**
70	76 43.8	+59.6	160.4	75 47.1	+59.7	161.7	74 49.9	+59.8	162.9	73 52.4	+59.9	163.9	72 54.6	+60.0	164.8	71 56.6	+60.0	165.6	70 58.4	+60.0	166.3	70 00.0	+60.0	167.0	**70**
71	77 43.4	+59.4	159.9	76 46.8	+59.6	161.3	75 49.7	+59.8	162.6	74 52.3	+59.9	163.7	73 54.6	+59.9	164.7	72 56.6	+60.0	165.5	71 58.4	+60.0	166.3	71 00.0	+60.0	167.0	**71**
72	78 42.8	+59.4	159.2	77 46.4	+59.6	160.8	76 49.5	+59.8	162.2	75 52.2	+59.9	163.5	74 54.5	+59.9	164.5	73 56.6	+59.9	165.4	72 58.4	+60.0	166.3	72 00.0	+60.0	167.0	**72**
73	79 42.2	+59.2	158.4	78 46.0	+59.6	160.3	77 49.3	+59.7	161.8	76 52.1	+59.8	163.2	75 54.4	+60.0	164.3	74 56.5	+60.0	165.3	73 58.4	+60.0	166.2	73 00.0	+60.0	167.0	**73**
74	80 41.4	+59.0	157.5	79 45.6	+59.4	159.6	78 49.0	+59.7	161.4	77 51.9	+59.8	162.8	76 54.4	+59.9	164.1	75 56.5	+60.0	165.2	74 58.4	+60.0	166.2	74 00.0	+60.0	167.0	**74**
75	81 40.4	+58.8	156.3	80 45.0	+59.2	158.8	79 48.7	+59.6	160.8	78 51.7	+59.8	162.5	77 54.3	+59.9	163.9	76 56.5	+59.9	165.1	75 58.4	+59.9	166.1	75 00.0	+60.0	167.0	**75**
76	82 39.2	+58.4	154.8	81 44.2	+59.1	157.7	80 48.3	+59.4	160.1	79 51.5	+59.7	162.0	78 54.2	+59.9	163.6	77 56.4	+60.0	164.9	76 58.3	+60.0	166.0	76 00.0	+60.0	167.0	**76**
77	83 37.6	+57.8	152.9	82 43.3	+58.8	156.5	81 47.7	+59.4	159.2	80 51.2	+59.7	161.4	79 54.1	+59.8	163.2	78 56.4	+59.9	164.7	77 58.3	+60.0	165.9	77 00.0	+60.0	167.0	**77**
78	84 35.4	+56.8	150.3	83 42.1	+58.4	154.8	82 47.1	+59.1	158.1	81 50.9	+59.6	160.7	80 53.9	+59.8	162.8	79 56.3	+60.0	164.5	78 58.3	+60.0	165.8	78 00.0	+60.0	167.0	**78**
79	85 32.2	+55.1•	146.5	84 40.5	+57.6	152.5	83 46.2	+58.9	156.7	82 50.5	+59.4	159.9	81 53.7	+59.8	162.3	80 56.3	+59.9	164.2	79 58.3	+60.0	165.7	79 00.0	+60.0	167.0	**79**
80	86 27.3	+51.6•	140.8	85 38.1	+56.2•	149.1	84 45.1	+58.3	154.7	83 49.9	+59.3	158.7	82 53.5	+59.7	161.6	81 56.2	+59.9	163.8	80 58.3	+60.0	165.6	80 00.0	+60.0	167.0	**80**
81	87 18.9	+43.3•	131.3	86 34.3	+53.3•	144.0	85 43.4	+57.2	151.8	84 49.2	+58.8	157.1	83 53.2	+59.5	160.7	82 56.1	+59.8	163.4	81 58.3	+59.9	165.4	81 00.0	+60.0	167.0	**81**
82	88 02.2	+22.9•	114.0	87 27.6	+46.0•	135.0	86 40.6	+55.1•	147.3	85 48.0	+58.2	154.7	84 52.7	+59.4	159.5	83 55.9	+59.8	162.8	82 58.2	+60.0	165.2	82 00.0	+60.0	167.0	**82**
83	88 25.1	–11.5•	83.5	88 13.6	+25.0•	117.6	87 35.7	+48.8•	139.2	86 46.2	+56.6•	150.9	85 52.1	+58.9	157.6	84 55.7	+59.7	161.9	83 58.2	+60.0	164.9	83 00.0	+60.0	167.0	**83**
84	88 13.6	–37.9•	49.5	88 38.6	–14.1•	83.5	88 24.5	+27.7•	122.2	87 42.8	+51.9•	143.9	86 51.0	+58.0•	154.7	85 55.4	+59.5	160.7	84 58.2	+59.9	164.4	84 00.0	+60.0	167.0	**84**
85	87 35.7	–49.5•	27.8	88 24.5	–41.7•	44.9	88 52.2	–17.5•	83.5	88 34.7	+31.0•	127.8	87 49.0	+54.8•	149.0	86 54.9	+59.1	158.6	85 58.1	+59.9	163.8	85 00.0	+60.0	167.0	**85**
86	86 46.2	–54.1•	16.2	87 42.8	–51.8•	23.2	88 34.7	–45.7•	39.2	89 05.7	–21.9•	83.5	88 43.8	+35.5•	135.0	87 54.0	+57.4•	154.6	86 58.0	+59.7	162.8	86 00.0	+60.0	167.0	**86**
87	85 52.1	–56.4	9.4	86 51.0	–55.6•	12.4	87 49.0	–54.1•	18.0	88 43.8	–49.8•	32.1	89 19.3	–27.9•	83.5	88 51.4	+41.4•	143.8	87 57.7	+59.3•	160.7	87 00.0	+60.0	167.0	**87**
88	84 55.7	–57.5	5.1	85 55.4	–57.2	6.3	86 54.9	–56.8•	8.4	87 54.0	–56.0•	12.4	88 51.4	–53.7•	23.2	89 32.8	–35.8•	83.5	88 57.0	+49.4•	154.6	88 00.0	+60.0	167.0	**88**
89	83 58.2	–58.2	2.1	84 58.2	–58.2	2.6	85 58.1	–58.1	3.2	86 58.0	–58.0	4.3	87 57.7	–57.7•	6.3	88 57.0	–57.0•	12.4	89 46.4	–46.4•	83.5	89 00.0	+60.0	167.0	**89**
90	83 00.0	–58.7	0.0	84 00.0	–58.7	0.0	85 00.0	–58.7	0.0	86 00.0	–58.8	0.0	87 00.0	–58.8	0.0	88 00.0	–59.0	0.0	89 00.0	–59.2•	0.0	90 00.0	–60.0	83.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 13°, 347°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 49.2	−60.0	166.9	5 50.7	−59.9	166.9	4 52.3	−60.0	167.0	3 53.8	−60.0	167.0	2 55.4	−60.0	167.0	1 56.9	−60.0	167.0	0 58.5	−60.0	167.0	0 00.0	+60.0	13.0	0
1	5 49.2	−60.0	166.9	4 50.8	−60.0	167.0	3 52.3	−60.0	167.0	2 53.8	−59.9	167.0	1 55.4	−60.0	167.0	0 56.9	−60.0	167.0	0 01.5	+60.0	13.0	1 00.0	+60.0	13.0	1
2	4 49.2	−59.9	167.0	3 50.8	−60.0	167.0	2 52.3	−60.0	167.0	1 53.9	−60.0	167.0	0 55.4	−60.0	167.0	0 03.1	+60.0	13.0	1 01.5	+60.0	13.0	2 00.0	+60.0	13.0	2
3	3 49.3	−60.0	167.0	2 50.8	−60.0	167.0	1 52.3	−60.0	167.0	0 53.9	−60.0	167.0	0 04.6	+60.0	13.0	1 03.1	+60.0	13.0	2 01.5	+60.0	13.0	3 00.0	+60.0	13.0	3
4	2 49.3	−60.0	167.0	1 50.8	−60.0	167.0	0 52.3	−60.0	167.0	0 06.1	+60.0	13.0	1 04.6	+60.0	13.0	2 03.1	+60.0	13.0	3 01.5	+60.0	13.0	4 00.0	+60.0	13.0	4
5	1 49.3	−60.0	167.0	0 50.8	−60.0	167.0	0 07.7	+59.9	12.9	1 06.1	+60.0	13.0	2 04.6	+60.0	13.0	3 03.1	+60.0	13.0	4 01.5	+60.0	13.0	5 00.0	+60.0	13.0	5
6	0 49.3	−60.0	167.1	0 09.2	+59.9	12.9	1 07.6	+60.0	12.9	2 06.1	+60.0	12.9	3 04.6	+60.0	12.9	4 03.1	+60.0	13.0	5 01.5	+60.0	13.0	6 00.0	+60.0	13.0	6
7	0 10.7	+59.9	12.9	1 09.1	+60.0	12.9	2 07.6	+60.0	12.9	3 06.1	+60.0	12.9	4 04.6	+60.0	12.9	5 03.1	+60.0	13.0	6 01.5	+60.0	13.0	7 00.0	+60.0	13.0	7
8	1 10.6	+60.0	12.9	2 09.1	+60.0	12.9	3 07.6	+60.0	12.9	4 06.1	+60.0	12.9	5 04.6	+60.0	12.9	6 03.1	+60.0	12.9	7 01.5	+60.0	13.0	8 00.0	+60.0	13.0	8
9	2 10.6	+60.0	12.8	3 09.1	+60.0	12.9	4 07.6	+60.0	12.9	5 06.1	+60.0	12.9	6 04.6	+60.0	12.9	7 03.1	+60.0	12.9	8 01.5	+60.0	13.0	9 00.0	+60.0	13.0	9
10	3 10.6	+60.0	12.8	4 09.1	+60.0	12.8	5 07.6	+60.0	12.9	6 06.1	+60.0	12.9	7 04.6	+60.0	12.9	8 03.1	+60.0	12.9	9 01.5	+60.0	13.0	10 00.0	+60.0	13.0	10
11	4 10.6	+59.9	12.8	5 09.1	+60.0	12.8	6 07.6	+60.0	12.8	7 06.1	+60.0	12.9	8 04.6	+60.0	12.9	9 03.1	+60.0	12.9	10 01.5	+60.0	13.0	11 00.0	+60.0	13.0	11
12	5 10.5	+60.0	12.8	6 09.1	+59.9	12.8	7 07.6	+60.0	12.8	8 06.1	+60.0	12.8	9 04.6	+60.0	12.9	10 03.1	+60.0	12.9	11 01.5	+60.0	13.0	12 00.0	+60.0	13.0	12
13	6 10.5	+60.0	12.7	7 09.0	+60.0	12.8	8 07.6	+59.9	12.8	9 06.1	+60.0	12.8	10 04.6	+60.0	12.9	11 03.1	+60.0	12.9	12 01.5	+60.0	13.0	13 00.0	+60.0	13.0	13
14	7 10.5	+60.0	12.7	8 09.0	+60.0	12.7	9 07.5	+60.0	12.8	10 06.1	+59.9	12.8	11 04.6	+60.0	12.9	12 03.1	+59.9	12.9	13 01.5	+60.0	12.9	14 00.0	+60.0	13.0	14
15	8 10.5	+60.0	12.7	9 09.0	+60.0	12.7	10 07.5	+60.0	12.8	11 06.0	+60.0	12.8	12 04.6	+59.9	12.8	13 03.0	+60.0	12.9	14 01.5	+60.0	12.9	15 00.0	+60.0	13.0	15
16	9 10.5	+59.9	12.7	10 09.0	+60.0	12.7	11 07.5	+60.0	12.7	12 06.0	+60.0	12.8	13 04.5	+60.0	12.8	14 03.0	+60.0	12.9	15 01.5	+60.0	12.9	16 00.0	+60.0	13.0	16
17	10 10.4	+60.0	12.6	11 09.0	+60.0	12.7	12 07.5	+60.0	12.7	13 06.0	+60.0	12.8	14 04.5	+60.0	12.8	15 03.0	+60.0	12.9	16 01.5	+60.0	12.9	17 00.0	+60.0	13.0	17
18	11 10.4	+60.0	12.6	12 09.0	+59.9	12.6	13 07.5	+60.0	12.7	14 06.0	+60.0	12.7	15 04.5	+60.0	12.8	16 03.0	+60.0	12.9	17 01.5	+60.0	12.9	18 00.0	+60.0	13.0	18
19	12 10.4	+60.0	12.6	13 08.9	+60.0	12.6	14 07.5	+60.0	12.7	15 06.0	+60.0	12.7	16 04.5	+60.0	12.8	17 03.0	+60.0	12.9	18 01.5	+60.0	12.9	19 00.0	+60.0	13.0	19
20	13 10.4	+59.9	12.5	14 08.9	+60.0	12.6	15 07.5	+60.0	12.6	16 06.0	+60.0	12.7	17 04.5	+60.0	12.8	18 03.0	+60.0	12.8	19 01.5	+60.0	12.9	20 00.0	+60.0	13.0	20
21	14 10.3	+60.0	12.5	15 08.9	+60.0	12.6	16 07.5	+59.9	12.6	17 06.0	+60.0	12.7	18 04.5	+60.0	12.8	19 03.0	+60.0	12.8	20 01.5	+60.0	12.9	21 00.0	+60.0	13.0	21
22	15 10.3	+60.0	12.5	16 08.9	+60.0	12.5	17 07.4	+60.0	12.6	18 06.0	+60.0	12.7	19 04.5	+60.0	12.7	20 03.0	+60.0	12.8	21 01.5	+60.0	12.9	22 00.0	+60.0	13.0	22
23	16 10.3	+60.0	12.5	17 08.9	+60.0	12.5	18 07.4	+60.0	12.6	19 06.0	+60.0	12.7	20 04.5	+60.0	12.7	21 03.0	+60.0	12.8	22 01.5	+60.0	12.9	23 00.0	+60.0	13.0	23
24	17 10.3	+59.9	12.4	18 08.9	+59.9	12.5	19 07.4	+60.0	12.6	20 06.0	+60.0	12.6	21 04.5	+60.0	12.7	22 03.0	+60.0	12.8	23 01.5	+60.0	12.9	24 00.0	+60.0	13.0	24
25	18 10.2	+60.0	12.4	19 08.8	+60.0	12.5	20 07.4	+60.0	12.5	21 06.0	+60.0	12.6	22 04.5	+60.0	12.7	23 03.0	+60.0	12.8	24 01.5	+60.0	12.9	25 00.0	+60.0	13.0	25
26	19 10.2	+60.0	12.4	20 08.8	+60.0	12.4	21 07.4	+60.0	12.5	22 06.0	+60.0	12.6	23 04.5	+60.0	12.7	24 03.0	+60.0	12.8	25 01.5	+60.0	12.9	26 00.0	+60.0	13.0	26
27	20 10.2	+60.0	12.3	21 08.8	+60.0	12.4	22 07.4	+60.0	12.5	23 06.0	+59.9	12.6	24 04.5	+60.0	12.7	25 03.0	+60.0	12.8	26 01.5	+60.0	12.9	27 00.0	+60.0	13.0	27
28	21 10.2	+59.9	12.3	22 08.8	+60.0	12.4	23 07.4	+60.0	12.5	24 05.9	+60.0	12.6	25 04.5	+60.0	12.7	26 03.0	+60.0	12.8	27 01.5	+60.0	12.9	28 00.0	+60.0	13.0	28
29	22 10.1	+60.0	12.3	23 08.8	+59.9	12.4	24 07.4	+59.9	12.4	25 05.9	+60.0	12.5	26 04.5	+60.0	12.7	27 03.0	+60.0	12.8	28 01.5	+60.0	12.9	29 00.0	+60.0	13.0	29
30	23 10.1	+60.0	12.2	24 08.7	+60.0	12.3	25 07.3	+60.0	12.4	26 05.9	+60.0	12.5	27 04.5	+60.0	12.6	28 03.0	+60.0	12.8	29 01.5	+60.0	12.9	30 00.0	+60.0	13.0	30
31	24 10.1	+60.0	12.2	25 08.7	+60.0	12.3	26 07.3	+60.0	12.4	27 05.9	+60.0	12.5	28 04.5	+60.0	12.6	29 03.0	+60.0	12.7	30 01.5	+60.0	12.9	31 00.0	+60.0	13.0	31
32	25 10.1	+59.9	12.2	26 08.7	+60.0	12.3	27 07.3	+60.0	12.4	28 05.9	+60.0	12.5	29 04.5	+60.0	12.6	30 03.0	+60.0	12.7	31 01.5	+60.0	12.9	32 00.0	+60.0	13.0	32
33	26 10.0	+60.0	12.1	27 08.7	+60.0	12.2	28 07.3	+60.0	12.4	29 05.9	+60.0	12.5	30 04.5	+60.0	12.6	31 03.0	+60.0	12.7	32 01.5	+60.0	12.9	33 00.0	+60.0	13.0	33
34	27 10.0	+60.0	12.1	28 08.7	+59.9	12.2	29 07.3	+60.0	12.3	30 05.9	+60.0	12.4	31 04.5	+60.0	12.6	32 03.0	+60.0	12.7	33 01.5	+60.0	12.9	34 00.0	+60.0	13.0	34
35	28 10.0	+59.9	12.1	29 08.6	+60.0	12.2	30 07.3	+60.0	12.3	31 05.9	+60.0	12.4	32 04.5	+60.0	12.6	33 03.0	+60.0	12.7	34 01.5	+60.0	12.8	35 00.0	+60.0	13.0	35
36	29 09.9	+60.0	12.0	30 08.6	+60.0	12.1	31 07.3	+59.9	12.3	32 05.9	+60.0	12.4	33 04.5	+59.9	12.5	34 03.0	+60.0	12.7	35 01.5	+60.0	12.8	36 00.0	+60.0	13.0	36
37	30 09.9	+60.0	12.0	31 08.6	+60.0	12.1	32 07.2	+60.0	12.2	33 05.9	+59.9	12.4	34 04.4	+60.0	12.5	35 03.0	+60.0	12.7	36 01.5	+60.0	12.8	37 00.0	+60.0	13.0	37
38	31 09.9	+59.9	12.0	32 08.6	+59.9	12.1	33 07.2	+60.0	12.2	34 05.8	+60.0	12.4	35 04.4	+60.0	12.5	36 03.0	+60.0	12.7	37 01.5	+60.0	12.8	38 00.0	+60.0	13.0	38
39	32 09.8	+60.0	11.9	33 08.5	+60.0	12.1	34 07.2	+60.0	12.2	35 05.8	+60.0	12.3	36 04.4	+60.0	12.5	37 03.0	+60.0	12.7	38 01.5	+60.0	12.8	39 00.0	+60.0	13.0	39
40	33 09.8	+60.0	11.9	34 08.5	+60.0	12.0	35 07.2	+60.0	12.2	36 05.8	+60.0	12.3	37 04.4	+60.0	12.5	38 03.0	+60.0	12.6	39 01.5	+60.0	12.8	40 00.0	+60.0	13.0	40
41	34 09.8	+60.0	11.8	35 08.5	+60.0	12.0	36 07.2	+60.0	12.1	37 05.8	+60.0	12.3	38 04.4	+60.0	12.5	39 03.0	+60.0	12.6	40 01.5	+60.0	12.8	41 00.0	+60.0	13.0	41
42	35 09.8	+59.9	11.8	36 08.5	+59.9	11.9	37 07.2	+59.9	12.1	38 05.8	+60.0	12.3	39 04.4	+60.0	12.4	40 03.0	+60.0	12.6	41 01.5	+60.0	12.8	42 00.0	+60.0	13.0	42
43	36 09.7	+60.0	11.8	37 08.4	+60.0	11.9	38 07.1	+60.0	12.1	39 05.8	+60.0	12.2	40 04.4	+60.0	12.4	41 03.0	+60.0	12.6	42 01.5	+60.0	12.8	43 00.0	+60.0	13.0	43
44	37 09.7	+59.9	11.7	38 08.4	+60.0	11.9	39 07.1	+60.0	12.0	40 05.8	+60.0	12.2	41 04.4	+60.0	12.4	42 03.0	+60.0	12.6	43 01.5	+60.0	12.8	44 00.0	+60.0	13.0	44
45	38 09.6	+60.0	11.7	39 08.4	+60.0	11.8	40 07.1	+60.0	12.0	41 05.8	+59.9	12.2	42 04.4	+60.0	12.4	43 03.0	+60.0	12.6	44 01.5	+60.0	12.8	45 00.0	+60.0	13.0	45
46	39 09.6	+60.0	11.6	40 08.4	+59.9	11.8	41 07.1	+60.0	12.0	42 05.7	+60.0	12.2	43 04.4	+60.0	12.4	44 03.0	+60.0	12.6	45 01.5	+60.0	12.8	46 00.0	+60.0	13.0	46
47	40 09.6	+59.9	11.6	41 08.3	+60.0	11.8	42 07.1	+59.9	11.9	43 05.7	+60.0	12.1	44 04.4	+60.0	12.3	45 03.0	+60.0	12.5	46 01.5	+60.0	12.8	47 00.0	+60.0	13.0	47
48	41 09.5	+60.0	11.5	42 08.3	+60.0	11.7	43 07.0	+60.0	11.9	44 05.7	+60.0	12.1	45 04.4	+60.0	12.3	46 03.0	+60.0	12.5	47 01.5	+60.0	12.8	48 00.0	+60.0	13.0	48
49	42 09.5	+59.9	11.5	43 08.3	+59.9	11.7	44 07.0	+60.0	11.9	45 05.7	+60.0	12.1	46 04.4	+59.9	12.3	47 03.0	+60.0	12.5	48 01.5	+60.0	12.7	49 00.0	+60.0	13.0	49
50	43 09.4	+60.0	11.4	44 08.2	+60.0	11.6	45 07.0	+60.0	11.8	46 05.7	+60.0	12.0	47 04.3	+60.0	12.3	48 03.0	+60.0	12.5	49 01.5	+60.0	12.7	50 00.0	+60.0	13.0	50
51	44 09.4	+60.0	11.4	45 08.2	+60.0	11.6	46 07.0	+59.9	11.8	47 05.7	+60.0	12.0	48 04.3	+60.0	12.2	49 03.0	+59.9	12.5	50 01.5	+60.0	12.7	51 00.0	+60.0	13.0	51
52	45 09.4	+59.9	11.3	46 08.2	+59.9	11.5	47 06.9	+60.0	11.7	48 05.7	+59.9	12.0	49 04.3	+60.0	12.2	50 02.9	+60.0	12.5	51 01.5	+60.0	12.7	52 00.0	+60.0	13.0	52
53	46 09.3	+60.0	11.3	47 08.1	+60.0	11.5	48 06.9	+60.0	11.7	49 05.6	+60.0	11.9	50 04.3	+60.0	12.2	51 02.9	+60.0	12.4	52 01.5	+60.0	12.7	53 00.0	+60.0	13.0	53
54	47 09.3	+59.9	11.2	48 08.1	+60.0	11.4	49 06.9	+60.0	11.7	50 05.6	+60.0	11.9	51 04.3	+60.0	12.1	52 02.9	+60.0	12.4	53 01.5	+60.0	12.7	54 00.0	+60.0	13.0	54
55	48 09.2	+60.0	11.2	49 08.1	+59.9	11.4	50 06.9	+59.9	11.6	51 05.6	+60.0	11.9	52 04.3	+60.0	12.1	53 02.9	+60.0	12.4	54 01.5	+60.0	12.7	55 00.0	+60.0	13.0	55
56	49 09.2	+59.9	11.1	50 08.0	+60.0	11.3	51 06.8	+60.0	11.6	52 05.6	+60.0	11.8	53 04.3	+60.0	12.1	54 02.9	+60.0	12.4	55 01.5	+60.0	12.7	56 00.0	+60.0	13.0	56
57	50 09.1	+60.0	11.0	51 08.0	+59.9	11.3	52 06.8	+60.0	11.5	53 05.6	+59.9	11.8	54 04.3	+60.0	12.1	55 02.9	+60.0	12.3	56 01.5	+60.0	12.7	57 00.0	+60.0	13.0	57
58	51 09.1	+59.9	11.0	52 07.9	+60.0	11.2	53 06.8	+59.9	11.5	54 05.5	+60.0	11.7	55 04.3	+60.0	12.0	56 02.9	+60.0	12.3	57 01.5	+60.0	12.7	58 00.0	+60.0	13.0	58
59	52 09.0	+59.9	10.9	53 07.9	+59.9	11.1	54 06.7	+60.0	11.4	55 05.5	+60.0	11.7	56 04.3	+59.9	12.0	57 02.9	+60.0	12.3	58 01.5	+60.0	12.6	59 00.0	+60.0	13.0	59
60	53 08.9	+60.0	10.8	54 07.8	+60.0	11.1	55 06.7	+60.0	11.3	56 05.5	+60.0	11.6	57 04.2	+60.0	11.9	58 02.9	+60.0	12.3	59 01.5	+60.0	12.6	60 00.0	+60.0	13.0	60
61	54 08.9	+59.9	10.7	55 07.8	+59.9	11.0	56 06.7	+59.9	11.3	57 05.5	+60.0	11.6	58 04.2	+60.0	11.9	59 02.9	+60.0	12.2	60 01.5	+60.0	12.6	61 00.0	+60.0	13.0	61
62	55 08.8	+59.9	10.6	56 07.7	+60.0	10.9	57 06.6	+60.0	11.2	58 05.5	+59.9	11.5	59 04.2	+60.0	11.9	60 02.9	+60.0	12.2	61 01.5	+60.0	12.6	62 00.0	+60.0	13.0	62
63	56 08.7	+60.0	10.6	57 07.7	+59.9	10.8	58 06.6	+59.9	11.1	59 05.4	+60.0	11.5	60 04.2	+60.0	11.8	61 02.9	+60.0	12.2	62 01.5	+60.0	12.6	63 00.0	+60.0	13.0	63
64	57 08.7	+59.9	10.5	58 07.6	+60.0	10.8	59 06.5	+60.0	11.1	60 05.4	+60.0	11.4	61 04.2	+60.0	11.8	62 02.9	+60.0	12.1	63 01.5	+60.0	12.6	64 00.0	+60.0	13.0	64
65	58 08.6	+59.9	10.4	59 07.6	+59.9	10.7	60 06.5	+60.0	11.0	61 05.4	+59.9	11.3	62 04.2	+59.9	11.7	63 02.9	+60.0	12.1	64 01.5	+60.0	12.5	65 00.0	+60.0	13.0	65
66	59 08.5	+59.9	10.3	60 07.5	+59.9	10.6	61 06.5	+59.9	10.9	62 05.3	+60.0	11.3	63 04.1	+60.0	11.7	64 02.9	+59.9	12.1	65 01.5	+60.0	12.5	66 00.0	+60.0	13.0	66
67	60 08.4	+59.9	10.2	61 07.4	+60.0	10.5	62 06.4	+59.9	10.8	63 05.3	+60.0	11.2	64 04.1	+60.0	11.6	65 02.8	+60.0	12.0	66 01.5	+60.0	12.5	67 00.0	+60.0	13.0	67
68	61 08.3	+59.9	10.1	62 07.4	+59.9	10.4	63 06.3	+60.0	10.7	64 05.3	+59.9	11.1	65 04.1	+60.0	11.5	66 02.8	+60.0	12.0	67 01.5	+60.0	12.5	68 00.0	+60.0	13.0	68
69	62 08.2	+59.9	9.9	63 07.3	+59.9	10.3	64 06.3	+59.9	10.6	65 05.2	+60.0	11.0	66 04.1	+59.9	11.5	67 02.8	+60.0	11.9	68 01.5	+60.0	12.4	69 00.0	+60.0	13.0	69
70	63 08.1	+59.9	9.8	64 07.2	+59.9	10.2	65 06.2	+60.0	10.5	66 05.2	+59.9	10.9	67 04.0	+60.0	11.4	68 02.8	+60.0	11.9	69 01.5	+60.0	12.4	70 00.0	+60.0	13.0	70
71	64 08.0	+59.9	9.7	65 07.1	+59.9	10.0	66 06.2	+59.9	10.4	67 05.1	+60.0	10.8	68 04.0	+60.0	11.3	69 02.8	+60.0	11.8	70 01.5	+60.0	12.4	71 00.0	+60.0	13.0	71
72	65 07.9	+59.8	9.5	66 07.0	+59.9	9.9	67 06.1	+59.9	10.3	68 05.1	+59.9	10.7	69 04.0	+59.9	11.2	70 02.8	+60.0	11.8	71 01.5	+60.0	12.3	72 00.0	+60.0	13.0	72
73	66 07.7	+59.9	9.4	67 06.9	+59.9	9.7	68 06.0	+59.9	10.2	69 05.0	+60.0	10.6	70 03.9	+60.0	11.1	71 02.8	+59.9	11.7	72 01.5	+60.0	12.3	73 00.0	+60.0	13.0	73
74	67 07.6	+59.8	9.2	68 06.8	+59.9	9.6	69 05.9	+59.9	10.0	70 05.0	+59.9	10.5	71 03.9	+60.0	11.0	72 02.7	+60.0	11.6	73 01.5	+59.9	12.3	74 00.0	+60.0	13.0	74
75	68 07.4	+59.9	9.0	69 06.7	+59.8	9.4	70 05.8	+59.9	9.8	71 04.9	+59.9	10.3	72 03.9	+59.9	10.9	73 02.7	+60.0	11.5	74 01.4	+60.0	12.2	75 00.0	+60.0	13.0	75
76	69 07.3	+59.8	8.8	70 06.5	+59.9	9.2	71 05.7	+59.9	9.7	72 04.8	+59.9	10.2	73 03.8	+60.0	10.8	74 02.7	+60.0	11.4	75 01.4	+60.0	12.2	76 00.0	+60.0	13.0	76
77	70 07.1	+59.8	8.6	71 06.4	+59.8	9.0	72 05.6	+59.9	9.5	73 04.7	+59.9	10.0	74 03.8	+59.9	10.6	75 02.7	+59.9	11.3	76 01.4	+60.0	12.1	77 00.0	+60.0	13.0	77
78	71 06.9	+59.8	8.3	72 06.2	+59.8	8.8	73 05.5	+59.8	9.3	74 04.6	+59.9	9.8	75 03.7	+59.9	10.5	76 02.6	+60.0	11.2	77 01.4	+60.0	12.0	78 00.0	+60.0	13.0	78
79	72 06.7	+59.7	8.0	73 06.0	+59.8	8.5	74 05.3	+59.9	9.0	75 04.5	+59.9	9.6	76 03.6	+60.0	10.3	77 02.6	+60.0	11.0	78 01.4	+60.0	11.9	79 00.0	+60.0	13.0	79
80	73 06.4	+59.7	7.7	74 05.8	+59.8	8.2	75 05.2	+59.8	8.7	76 04.4	+59.9	9.3	77 03.6	+59.9	10.0	78 02.6	+59.9	10.9	79 01.4	+60.0	11.8	80 00.0	+60.0	13.0	80
81	74 06.1	+59.7	7.4	75 05.6	+59.7	7.9	76 05.0	+59.8	8.4	77 04.3	+59.8	9.0	78 03.5	+59.9	9.8	79 02.5	+60.0	10.7	80 01.4	+60.0	11.7	81 00.0	+60.0	13.0	81
82	75 05.8	+59.6	7.0	76 05.3	+59.7	7.5	77 04.8	+59.7	8.0	78 04.1	+59.8	8.7	79 03.4	+59.8	9.5	80 02.5	+59.9	10.4	81 01.4	+59.9	11.6	82 00.0	+60.0	13.0	82
83	76 05.4	+59.6	6.5	77 05.0	+59.6	7.0	78 04.5	+59.7	7.6	79 03.9	+59.8	8.3	80 03.2	+59.9	9.1	81 02.4	+59.9	10.1	82 01.3	+60.0	11.4	83 00.0	+60.0	13.0	83
84	77 05.0	+59.5	6.0	78 04.6	+59.6	6.5	79 04.2	+59.7	7.1	80 03.7	+59.7	7.8	81 03.1	+59.8	8.7	82 02.3	+59.9	9.8	83 01.3	+60.0	11.2	84 00.0	+60.0	13.0	84
85	78 04.5	+59.4	5.4	79 04.2	+59.5	5.9	80 03.9	+59.5	6.5	81 03.4	+59.7	7.2	82 02.9	+59.7	8.1	83 02.2	+59.9	9.3	84 01.3	+59.9	10.8	85 00.0	+60.0	13.0	85
86	79 03.9	+59.3	4.7	80 03.7	+59.4	5.2	81 03.4	+59.5	5.8	82 03.1	+59.5	6.5	83 02.6	+59.7	7.4	84 02.1	+59.8	8.7	85 01.2	+60.0	10.4	86 00.0	+60.0	13.0	86
87	80 03.2	+59.2	3.9	81 03.1	+59.2	4.3	82 02.9	+59.3	4.9	83 02.6	+59.5	5.6	84 02.3	+59.6	6.5	85 01.9	+59.6	7.8	86 01.2	+59.8	9.8	87 00.0	+60.0	13.0	87
88	81 02.4	+58.9	2.9	82 02.3	+59.0	3.2	83 02.2	+59.1	3.7	84 02.1	+59.1	4.3	85 01.9	+59.3	5.2	86 01.5	+59.5	6.5	87 01.0	+59.8	8.7	88 00.0	+60.0	13.0	88
89	82 01.3	+58.7	1.6	83 01.3	+58.7	1.9	84 01.3	+58.7	2.2	85 01.2	+58.8	2.6	86 01.2	+58.8	3.2	87 01.0	+59.0	4.3	88 00.8	*+59.2* •	6.5	89 00.0	+60.0	13.0	89
90	83 00.0	+58.2	0.0	84 00.0	+58.2	0.0	85 00.0	+58.1	0.0	86 00.0	+58.0	0.0	87 00.0	*+57.7* •	0.0	88 00.0	*+57.0* •	0.0	89 00.0	*+46.4* •	0.0	90 00.0	−60.0	6.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 167°, 193°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 47.5	+59.9	165.9	5 49.3	+59.9	165.9	4 51.1	+60.0	165.9	3 52.9	+60.0	166.0	2 54.6	+60.0	166.0	1 56.4	+60.0	166.0	0 58.2	+60.0	166.0	0 00.0	+60.0	166.0	0
1	7 47.4	+60.0	165.9	6 49.2	+60.0	165.9	5 51.1	+59.9	165.9	4 52.9	+59.9	166.0	3 54.6	+60.0	166.0	2 56.4	+60.0	166.0	1 58.2	+60.0	166.0	1 00.0	+60.0	166.0	1
2	8 47.4	+60.0	165.8	7 49.2	+60.0	165.9	6 51.0	+60.0	165.9	5 52.8	+60.0	165.9	4 54.6	+60.0	166.0	3 56.4	+60.0	166.0	2 58.2	+60.0	166.0	2 00.0	+60.0	166.0	2
3	9 47.4	+60.0	165.8	8 49.2	+60.0	165.8	7 51.0	+60.0	165.9	6 52.8	+60.0	165.9	5 54.6	+60.0	165.9	4 56.4	+60.0	166.0	3 58.2	+60.0	166.0	3 00.0	+60.0	166.0	3
4	10 47.4	+59.9	165.8	9 49.2	+60.0	165.8	8 51.0	+60.0	165.9	7 52.8	+60.0	165.9	6 54.6	+60.0	165.9	5 56.4	+60.0	166.0	4 58.2	+60.0	166.0	4 00.0	+60.0	166.0	4
5	11 47.3	+60.0	165.7	10 49.2	+60.0	165.8	9 51.0	+60.0	165.8	8 52.8	+60.0	165.9	7 54.6	+60.0	165.9	6 56.4	+60.0	165.9	5 58.2	+60.0	166.0	5 00.0	+60.0	166.0	5
6	12 47.3	+60.0	165.7	11 49.2	+59.9	165.8	10 51.0	+60.0	165.8	9 52.8	+60.0	165.9	8 54.6	+60.0	165.9	7 56.4	+60.0	165.9	6 58.2	+60.0	166.0	6 00.0	+60.0	166.0	6
7	13 47.3	+59.9	165.7	12 49.1	+60.0	165.7	11 51.0	+60.0	165.8	10 52.8	+60.0	165.8	9 54.6	+60.0	165.9	8 56.4	+60.0	165.9	7 58.2	+60.0	166.0	7 00.0	+60.0	166.0	7
8	14 47.2	+60.0	165.7	13 49.1	+60.0	165.7	12 51.0	+59.9	165.8	11 52.8	+60.0	165.8	10 54.6	+60.0	165.9	9 56.4	+60.0	165.9	8 58.2	+60.0	166.0	8 00.0	+60.0	166.0	8
9	15 47.2	+60.0	165.6	14 49.1	+60.0	165.7	13 50.9	+60.0	165.8	12 52.8	+60.0	165.8	11 54.6	+60.0	165.9	10 56.4	+60.0	165.9	9 58.2	+60.0	166.0	9 00.0	+60.0	166.0	9
10	16 47.2	+60.0	165.6	15 49.1	+59.9	165.7	14 50.9	+60.0	165.7	13 52.8	+60.0	165.8	12 54.6	+60.0	165.9	11 56.4	+60.0	165.9	10 58.2	+60.0	166.0	10 00.0	+60.0	166.0	10
11	17 47.2	+59.9	165.6	16 49.0	+60.0	165.6	15 50.9	+60.0	165.7	14 52.8	+60.0	165.8	13 54.6	+60.0	165.8	12 56.4	+60.0	165.9	11 58.2	+60.0	166.0	11 00.0	+60.0	166.0	11
12	18 47.1	+60.0	165.5	17 49.0	+60.0	165.6	16 50.9	+60.0	165.7	15 52.8	+59.9	165.8	14 54.6	+60.0	165.8	13 56.4	+60.0	165.9	12 58.2	+60.0	165.9	12 00.0	+60.0	166.0	12
13	19 47.1	+60.0	165.5	18 49.0	+60.0	165.6	17 50.9	+60.0	165.7	16 52.7	+60.0	165.7	15 54.6	+60.0	165.8	14 56.4	+60.0	165.9	13 58.2	+60.0	165.9	13 00.0	+60.0	166.0	13
14	20 47.1	+59.9	165.5	19 49.0	+60.0	165.6	18 50.9	+60.0	165.6	17 52.7	+60.0	165.7	16 54.6	+60.0	165.8	15 56.4	+60.0	165.9	14 58.2	+60.0	165.9	14 00.0	+60.0	166.0	14
15	21 47.0	+60.0	165.4	20 49.0	+59.9	165.5	19 50.9	+59.9	165.6	18 52.7	+60.0	165.7	17 54.6	+60.0	165.8	16 56.4	+60.0	165.9	15 58.2	+60.0	165.9	15 00.0	+60.0	166.0	15
16	22 47.0	+60.0	165.4	21 48.9	+60.0	165.5	20 50.8	+60.0	165.6	19 52.7	+60.0	165.7	18 54.6	+60.0	165.8	17 56.4	+60.0	165.9	16 58.2	+60.0	165.9	16 00.0	+60.0	166.0	16
17	23 47.0	+60.0	165.4	22 48.9	+60.0	165.5	21 50.8	+60.0	165.6	20 52.7	+60.0	165.7	19 54.6	+60.0	165.8	18 56.4	+60.0	165.8	17 58.2	+60.0	165.9	17 00.0	+60.0	166.0	17
18	24 47.0	+59.9	165.3	23 48.9	+60.0	165.4	22 50.8	+60.0	165.5	21 52.7	+60.0	165.6	20 54.6	+60.0	165.7	19 56.4	+60.0	165.8	18 58.2	+60.0	165.9	18 00.0	+60.0	166.0	18
19	25 46.9	+60.0	165.3	24 48.9	+59.9	165.4	23 50.8	+60.0	165.5	22 52.7	+60.0	165.6	21 54.6	+59.9	165.7	20 56.4	+60.0	165.8	19 58.2	+60.0	165.9	19 00.0	+60.0	166.0	19
20	26 46.9	+60.0	165.2	25 48.8	+60.0	165.4	24 50.8	+60.0	165.5	23 52.7	+60.0	165.6	22 54.5	+60.0	165.7	21 56.4	+60.0	165.8	20 58.2	+60.0	165.9	20 00.0	+60.0	166.0	20
21	27 46.9	+59.9	165.2	26 48.8	+60.0	165.3	25 50.8	+59.9	165.5	24 52.7	+60.0	165.6	23 54.5	+60.0	165.7	22 56.4	+60.0	165.8	21 58.2	+60.0	165.9	21 00.0	+60.0	166.0	21
22	28 46.8	+60.0	165.2	27 48.8	+60.0	165.3	26 50.7	+60.0	165.4	25 52.7	+59.9	165.6	24 54.5	+60.0	165.7	23 56.4	+60.0	165.8	22 58.2	+60.0	165.9	22 00.0	+60.0	166.0	22
23	29 46.8	+60.0	165.1	28 48.8	+60.0	165.3	27 50.7	+60.0	165.4	26 52.6	+60.0	165.5	25 54.5	+60.0	165.7	24 56.4	+60.0	165.8	23 58.2	+60.0	165.9	23 00.0	+60.0	166.0	23
24	30 46.8	+59.9	165.1	29 48.8	+59.9	165.2	28 50.7	+60.0	165.4	27 52.6	+60.0	165.5	26 54.5	+60.0	165.7	25 56.4	+60.0	165.8	24 58.2	+60.0	165.9	24 00.0	+60.0	166.0	24
25	31 46.7	+60.0	165.1	30 48.7	+60.0	165.2	29 50.7	+60.0	165.4	28 52.6	+60.0	165.5	27 54.5	+60.0	165.6	26 56.4	+60.0	165.8	25 58.2	+60.0	165.9	25 00.0	+60.0	166.0	25
26	32 46.7	+59.9	165.0	31 48.7	+60.0	165.2	30 50.7	+60.0	165.3	29 52.6	+60.0	165.5	28 54.5	+60.0	165.6	27 56.4	+60.0	165.8	26 58.2	+60.0	165.9	26 00.0	+60.0	166.0	26
27	33 46.6	+60.0	165.0	32 48.7	+59.9	165.1	31 50.7	+59.9	165.3	30 52.6	+60.0	165.5	29 54.5	+60.0	165.6	28 56.4	+60.0	165.7	27 58.2	+60.0	165.9	27 00.0	+60.0	166.0	27
28	34 46.6	+60.0	164.9	33 48.6	+60.0	165.1	32 50.6	+60.0	165.3	31 52.6	+60.0	165.4	30 54.5	+60.0	165.6	29 56.4	+60.0	165.7	28 58.2	+60.0	165.9	28 00.0	+60.0	166.0	28
29	35 46.6	+59.9	164.9	34 48.6	+60.0	165.1	33 50.6	+60.0	165.2	32 52.6	+60.0	165.4	31 54.5	+60.0	165.6	30 56.4	+60.0	165.7	29 58.2	+60.0	165.9	29 00.0	+60.0	166.0	29
30	36 46.5	+60.0	164.8	35 48.6	+60.0	165.0	34 50.6	+60.0	165.2	33 52.6	+60.0	165.4	32 54.5	+60.0	165.5	31 56.4	+60.0	165.7	30 58.2	+60.0	165.9	30 00.0	+60.0	166.0	30
31	37 46.5	+59.9	164.8	36 48.6	+59.9	165.0	35 50.6	+60.0	165.2	34 52.6	+59.9	165.4	33 54.5	+60.0	165.5	32 56.4	+60.0	165.7	31 58.2	+60.0	165.9	31 00.0	+60.0	166.0	31
32	38 46.4	+60.0	164.7	37 48.5	+60.0	164.9	36 50.6	+59.9	165.1	35 52.5	+60.0	165.3	34 54.5	+60.0	165.5	33 56.4	+60.0	165.7	32 58.2	+60.0	165.8	32 00.0	+60.0	166.0	32
33	39 46.4	+60.0	164.7	38 48.5	+60.0	164.9	37 50.5	+60.0	165.1	36 52.5	+60.0	165.3	35 54.5	+60.0	165.5	34 56.4	+59.9	165.7	33 58.2	+60.0	165.8	33 00.0	+60.0	166.0	33
34	40 46.4	+59.9	164.6	39 48.5	+59.9	164.9	38 50.5	+60.0	165.1	37 52.5	+60.0	165.3	36 54.5	+59.9	165.5	35 56.3	+60.0	165.7	34 58.2	+60.0	165.8	34 00.0	+60.0	166.0	34
35	41 46.3	+60.0	164.6	40 48.4	+60.0	164.8	39 50.5	+60.0	165.0	38 52.5	+60.0	165.3	37 54.4	+60.0	165.5	36 56.3	+60.0	165.6	35 58.2	+60.0	165.8	35 00.0	+60.0	166.0	35
36	42 46.3	+59.9	164.5	41 48.4	+60.0	164.8	40 50.5	+59.9	165.0	39 52.5	+60.0	165.2	38 54.4	+60.0	165.4	37 56.3	+60.0	165.6	36 58.2	+60.0	165.8	36 00.0	+60.0	166.0	36
37	43 46.2	+60.0	164.5	42 48.4	+59.9	164.7	41 50.4	+60.0	165.0	40 52.5	+60.0	165.2	39 54.4	+60.0	165.4	38 56.3	+60.0	165.6	37 58.2	+60.0	165.8	37 00.0	+60.0	166.0	37
38	44 46.2	+59.9	164.4	43 48.3	+60.0	164.7	42 50.4	+60.0	164.9	41 52.5	+59.9	165.2	40 54.4	+60.0	165.4	39 56.3	+60.0	165.6	38 58.2	+60.0	165.8	38 00.0	+60.0	166.0	38
39	45 46.1	+60.0	164.4	44 48.3	+59.9	164.6	43 50.4	+60.0	164.9	42 52.4	+60.0	165.1	41 54.4	+60.0	165.4	40 56.3	+60.0	165.6	39 58.2	+60.0	165.8	39 00.0	+60.0	166.0	39
40	46 46.1	+59.9	164.3	45 48.2	+60.0	164.6	44 50.4	+59.9	164.8	43 52.4	+60.0	165.1	42 54.4	+60.0	165.3	41 56.3	+60.0	165.6	40 58.2	+60.0	165.8	40 00.0	+60.0	166.0	40
41	47 46.0	+59.9	164.2	46 48.2	+60.0	164.5	45 50.3	+60.0	164.8	44 52.4	+60.0	165.1	43 54.4	+60.0	165.3	42 56.3	+60.0	165.6	41 58.2	+60.0	165.8	41 00.0	+60.0	166.0	41
42	48 45.9	+60.0	164.2	47 48.2	+59.9	164.5	46 50.3	+60.0	164.8	45 52.4	+60.0	165.0	44 54.4	+60.0	165.3	43 56.3	+60.0	165.5	42 58.2	+60.0	165.8	42 00.0	+60.0	166.0	42
43	49 45.9	+59.9	164.1	48 48.1	+60.0	164.4	47 50.3	+60.0	164.7	46 52.4	+60.0	165.0	45 54.4	+60.0	165.3	44 56.3	+60.0	165.5	43 58.2	+60.0	165.8	43 00.0	+60.0	166.0	43
44	50 45.8	+59.9	164.0	49 48.1	+59.9	164.4	48 50.3	+59.9	164.7	47 52.4	+59.9	165.0	46 54.4	+60.0	165.2	45 56.3	+60.0	165.5	44 58.2	+60.0	165.8	44 00.0	+60.0	166.0	44
45	51 45.7	+60.0	164.0	50 48.0	+60.0	164.3	49 50.2	+60.0	164.6	48 52.3	+60.0	164.9	47 54.4	+59.9	165.2	46 56.3	+60.0	165.5	45 58.2	+60.0	165.8	45 00.0	+60.0	166.0	45
46	52 45.7	+59.9	163.9	51 48.0	+59.9	164.2	50 50.2	+60.0	164.6	49 52.3	+60.0	164.9	48 54.3	+60.0	165.2	47 56.3	+60.0	165.5	46 58.2	+60.0	165.7	46 00.0	+60.0	166.0	46
47	53 45.6	+59.9	163.8	52 47.9	+60.0	164.2	51 50.2	+59.9	164.5	50 52.3	+60.0	164.8	49 54.3	+60.0	165.2	48 56.3	+60.0	165.5	47 58.2	+60.0	165.7	47 00.0	+60.0	166.0	47
48	54 45.5	+59.9	163.7	53 47.9	+59.9	164.1	52 50.1	+60.0	164.5	51 52.3	+59.9	164.8	50 54.3	+60.0	165.1	49 56.3	+60.0	165.4	48 58.2	+60.0	165.7	48 00.0	+60.0	166.0	48
49	55 45.4	+60.0	163.6	54 47.8	+60.0	164.0	53 50.1	+59.9	164.4	52 52.2	+60.0	164.8	51 54.3	+60.0	165.1	50 56.3	+60.0	165.4	49 58.2	+60.0	165.7	49 00.0	+60.0	166.0	49
50	56 45.4	+59.9	163.5	55 47.8	+59.9	163.9	54 50.0	+60.0	164.3	53 52.2	+60.0	164.7	52 54.3	+60.0	165.1	51 56.3	+60.0	165.4	50 58.2	+60.0	165.7	50 00.0	+60.0	166.0	50
51	57 45.3	+59.9	163.4	56 47.7	+59.9	163.9	55 50.0	+60.0	164.3	54 52.2	+60.0	164.7	53 54.3	+60.0	165.0	52 56.3	+60.0	165.4	51 58.2	+60.0	165.7	51 00.0	+60.0	166.0	51
52	58 45.2	+59.9	163.3	57 47.6	+60.0	163.8	56 50.0	+59.9	164.2	55 52.2	+59.9	164.6	54 54.3	+60.0	165.0	53 56.3	+60.0	165.3	52 58.2	+60.0	165.7	52 00.0	+60.0	166.0	52
53	59 45.1	+59.9	163.2	58 47.6	+59.9	163.7	57 49.9	+60.0	164.1	56 52.1	+60.0	164.6	55 54.3	+59.9	164.9	54 56.3	+60.0	165.3	53 58.2	+60.0	165.7	53 00.0	+60.0	166.0	53
54	60 45.0	+59.9	163.1	59 47.5	+59.9	163.6	58 49.9	+59.9	164.1	57 52.1	+60.0	164.5	56 54.2	+60.0	164.9	55 56.3	+59.9	165.3	54 58.2	+60.0	165.7	54 00.0	+60.0	166.0	54
55	61 44.9	+59.8	163.0	60 47.4	+59.9	163.5	59 49.8	+60.0	164.0	58 52.1	+59.9	164.4	57 54.2	+60.0	164.9	56 56.2	+60.0	165.3	55 58.2	+60.0	165.6	55 00.0	+60.0	166.0	55
56	62 44.7	+59.9	162.8	61 47.3	+59.9	163.4	60 49.8	+59.9	163.9	59 52.0	+60.0	164.4	58 54.2	+60.0	164.8	57 56.2	+60.0	165.2	56 58.2	+60.0	165.6	56 00.0	+60.0	166.0	56
57	63 44.6	+59.9	162.7	62 47.2	+59.9	163.3	61 49.7	+59.9	163.8	60 52.0	+60.0	164.3	59 54.2	+60.0	164.8	58 56.2	+60.0	165.2	57 58.2	+60.0	165.6	57 00.0	+60.0	166.0	57
58	64 44.5	+59.8	162.5	63 47.1	+59.9	163.1	62 49.6	+60.0	163.7	61 52.0	+59.9	164.2	60 54.2	+59.9	164.7	59 56.2	+60.0	165.2	58 58.2	+60.0	165.6	58 00.0	+60.0	166.0	58
59	65 44.3	+59.9	162.3	64 47.0	+59.9	163.0	63 49.6	+59.9	163.6	62 51.9	+60.0	164.1	61 54.1	+60.0	164.7	60 56.2	+60.0	165.1	59 58.2	+60.0	165.6	59 00.0	+60.0	166.0	59
60	66 44.2	+59.8	162.2	65 46.9	+59.9	162.8	64 49.5	+59.9	163.5	63 51.9	+59.9	164.1	62 54.1	+60.0	164.6	61 56.2	+60.0	165.1	60 58.2	+60.0	165.6	60 00.0	+60.0	166.0	60
61	67 44.0	+59.8	162.0	66 46.8	+59.9	162.7	65 49.4	+59.9	163.4	64 51.8	+60.0	164.0	63 54.1	+60.0	164.5	62 56.2	+60.0	165.1	61 58.2	+60.0	165.5	61 00.0	+60.0	166.0	61
62	68 43.8	+59.8	161.8	67 46.7	+59.8	162.5	66 49.3	+60.0	163.2	65 51.8	+59.9	163.9	64 54.1	+59.9	164.5	63 56.2	+60.0	165.0	62 58.2	+60.0	165.5	62 00.0	+60.0	166.0	62
63	69 43.6	+59.8	161.5	68 46.5	+59.9	162.3	67 49.3	+59.9	163.1	66 51.7	+60.0	163.8	65 54.0	+60.0	164.4	64 56.2	+60.0	165.0	63 58.2	+60.0	165.5	63 00.0	+60.0	166.0	63
64	70 43.4	+59.7	161.3	69 46.4	+59.8	162.1	68 49.2	+59.9	162.9	67 51.7	+59.9	163.7	66 54.0	+60.0	164.3	65 56.2	+60.0	164.9	64 58.2	+59.9	165.5	64 00.0	+60.0	166.0	64
65	71 43.1	+59.7	161.0	70 46.2	+59.8	161.9	69 49.1	+59.8	162.8	68 51.6	+60.0	163.5	67 54.0	+59.9	164.2	66 56.2	+59.9	164.9	65 58.1	+60.0	165.5	65 00.0	+60.0	166.0	65
66	72 42.8	+59.7	160.7	71 46.0	+59.8	161.7	70 48.9	+59.9	162.6	69 51.6	+59.9	163.4	68 53.9	+60.0	164.1	67 56.1	+60.0	164.8	66 58.1	+60.0	165.4	66 00.0	+60.0	166.0	66
67	73 42.5	+59.7	160.3	72 45.8	+59.8	161.4	71 48.8	+59.9	162.4	70 51.5	+59.9	163.2	69 53.9	+60.0	164.0	68 56.1	+60.0	164.8	67 58.1	+60.0	165.4	67 00.0	+60.0	166.0	67
68	74 42.2	+59.6	159.9	73 45.6	+59.7	161.1	72 48.7	+59.8	162.1	71 51.4	+59.9	163.1	70 53.9	+59.9	163.9	69 56.1	+60.0	164.7	68 58.1	+60.0	165.4	68 00.0	+60.0	166.0	68
69	75 41.8	+59.5	159.5	74 45.3	+59.7	160.7	73 48.5	+59.8	161.9	72 51.3	+59.9	162.9	71 53.8	+60.0	163.8	70 56.1	+60.0	164.6	69 58.1	+60.0	165.3	69 00.0	+60.0	166.0	69
70	76 41.3	+59.5	158.9	75 45.0	+59.7	160.4	74 48.3	+59.8	161.6	73 51.2	+59.9	162.7	72 53.8	+59.9	163.7	71 56.1	+59.9	164.5	70 58.1	+60.0	165.3	70 00.0	+60.0	166.0	70
71	77 40.8	+59.3	158.3	76 44.7	+59.6	159.9	75 48.1	+59.8	161.3	74 51.1	+59.8	162.5	73 53.7	+59.9	163.5	72 56.0	+60.0	164.4	71 58.1	+60.0	165.3	71 00.0	+60.0	166.0	71
72	78 40.1	+59.3	157.6	77 44.3	+59.5	159.4	76 47.9	+59.7	160.9	75 50.9	+59.9	162.2	74 53.6	+60.0	163.3	73 56.0	+60.0	164.3	72 58.1	+60.0	165.2	72 00.0	+60.0	166.0	72
73	79 39.4	+59.1	156.8	78 43.8	+59.5	158.8	77 47.6	+59.7	160.5	76 50.8	+59.8	161.9	75 53.6	+59.9	163.1	74 56.0	+59.9	164.2	73 58.1	+60.0	165.2	73 00.0	+60.0	166.0	73
74	80 38.5	+58.9	155.8	79 43.3	+59.3	158.1	78 47.3	+59.6	159.9	77 50.6	+59.8	161.5	76 53.5	+59.9	162.9	75 55.9	+60.0	164.1	74 58.1	+60.0	165.1	74 00.0	+60.0	166.0	74
75	81 37.4	+58.6	154.5	80 42.6	+59.2	157.2	79 46.9	+59.5	159.3	78 50.4	+59.8	161.1	77 53.4	+59.9	162.6	76 55.9	+60.0	163.9	75 58.1	+60.0	165.0	75 00.0	+60.0	166.0	75
76	82 36.0	+58.1	153.0	81 41.8	+58.9	156.1	80 46.4	+59.4	158.6	79 50.2	+59.7	160.6	78 53.3	+59.8	162.3	77 55.9	+59.9	163.7	76 58.1	+60.0	165.0	76 00.0	+60.0	166.0	76
77	83 34.1	+57.5	150.9	82 40.7	+58.7	154.7	81 45.8	+59.3	157.7	80 49.9	+59.6	160.0	79 53.1	+59.8	161.9	78 55.8	+59.9	163.5	77 58.1	+60.0	164.9	77 00.0	+60.0	166.0	77
78	84 31.6	+56.5	148.2	83 39.4	+58.1	152.9	82 45.1	+59.0	156.5	81 49.5	+59.5	159.3	80 52.9	+59.8	161.5	79 55.7	+60.0	163.3	78 58.1	+59.9	164.8	78 00.0	+60.0	166.0	78
79	85 28.1	+54.5	•144.3	84 37.5	+57.3	150.5	83 44.1	+58.7	155.0	82 49.0	+59.4	158.3	81 52.7	+59.8	160.9	80 55.7	+59.9	163.0	79 58.0	+60.0	164.6	79 00.0	+60.0	166.0	79
80	86 22.6	+50.7	•138.3	85 34.8	+55.7	•147.0	84 42.8	+58.0	152.9	83 48.4	+59.1	157.1	82 52.5	+59.6	160.2	81 55.6	+59.8	162.6	80 58.0	+60.0	164.5	80 00.0	+60.0	166.0	80
81	87 13.3	+42.2	•128.7	86 30.5	+52.6	•141.6	85 40.8	+56.9	149.8	84 47.5	+58.7	155.4	83 52.1	+59.5	159.2	82 55.4	+59.9	162.1	81 58.0	+60.0	164.3	81 00.0	+60.0	166.0	81
82	87 55.5	+22.4	•111.6	87 23.1	+44.9	•132.4	86 37.7	+54.5	•145.1	85 46.2	+57.9	152.8	84 51.6	+59.2	157.9	83 55.3	+59.8	161.5	82 58.0	+59.9	164.0	82 00.0	+60.0	166.0	82
83	88 17.9	−9.9	• 83.1	88 08.0	+24.4	•115.2	87 32.2	+47.8	•136.7	86 44.1	+56.2	•148.8	85 50.8	+58.8	156.0	84 55.1	+59.6	160.6	83 57.9	+60.0	163.7	83 00.0	+60.0	166.0	83
84	88 08.0	−35.8	• 50.9	88 32.4	−12.4	• 83.0	88 20.0	+27.0	•119.6	87 40.3	+51.0	•141.5	86 49.6	+57.7	•152.8	85 54.7	+59.5	159.2	84 57.9	+59.9	163.3	84 00.0	+60.0	166.0	84
85	87 32.2	−48.1	• 29.4	88 20.0	−39.7	• 46.5	88 47.0	−15.7	• 83.0	88 31.3	+30.2	•125.2	87 47.3	+54.2	•146.9	86 54.2	+58.9	157.0	85 57.8	+59.8	162.6	85 00.0	+60.0	166.0	85
86	86 44.1	−53.3	• 17.2	87 40.3	−50.7	• 24.5	88 31.3	−44.0	• 40.8	89 01.5	−20.0	• 83.0	88 41.5	+34.6	•132.4	87 53.1	+57.0	•152.8	86 57.6	+59.8	161.4	86 00.0	+60.0	166.0	86
87	85 50.8	−55.7	10.1	86 49.6	−54.9	• 13.2	87 47.3	−53.1	• 19.2	88 41.5	−48.4	• 33.7	89 16.1	−26.0	• 83.0	88 50.1	+40.7	•141.5	87 57.4	+59.1	•159.2	87 00.0	+60.0	166.0	87
88	84 55.1	−57.2	5.5	85 54.7	−56.8	6.8	86 54.2	−56.4	• 9.0	87 53.1	−55.5	• 13.2	88 50.1	−52.7	• 24.5	89 30.8	−34.3	• 83.0	88 56.5	+48.9	•152.8	88 00.0	+60.0	166.0	88
89	83 57.9	−57.9	2.3	84 57.9	−57.9	2.8	85 57.8	−57.8	3.4	86 57.6	−57.6	4.6	87 57.4	−57.4	• 6.8	88 56.5	−56.5	• 13.2	89 45.4	−45.4	• 83.0	89 00.0	+60.0	166.0	89
90	83 00.0	−58.4	0.0	84 00.0	−58.5	0.0	85 00.0	−58.5	0.0	86 00.0	−58.6	0.0	87 00.0	−58.7	0.0	88 00.0	−58.8	0.0	89 00.0	−59.1	• 0.0	90 00.0	−60.0	83.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 14°, 346°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 47.5	–60.0	165.9	5 49.3	–60.0	165.9	4 51.1	–60.0	165.9	3 52.9	–60.0	166.0	2 54.6	–59.9	166.0	1 56.4	–60.0	166.0	0 58.2	–60.0	166.0	0 00.0	+60.0	14.0	**0**
1	5 47.5	–60.0	165.9	4 49.3	–60.0	166.0	3 51.1	–60.0	166.0	2 52.9	–60.0	166.0	1 54.7	–60.0	166.0	0 56.4	–60.0	166.0	0 01.8	+60.0	14.0	1 00.0	+60.0	14.0	**1**
2	4 47.5	–60.0	166.0	3 49.3	–60.0	166.0	2 51.1	–60.0	166.0	1 52.9	–60.0	166.0	0 54.7	–60.0	166.0	0 03.6	+60.0	14.0	1 01.8	+60.0	14.0	2 00.0	+60.0	14.0	**2**
3	3 47.5	–59.9	166.0	2 49.3	–60.0	166.0	1 51.1	–60.0	166.0	0 52.9	–60.0	166.0	0 05.3	+60.0	14.0	1 03.6	+60.0	14.0	2 01.8	+60.0	14.0	3 00.0	+60.0	14.0	**3**
4	2 47.6	–60.0	166.0	1 49.3	–59.9	166.0	0 51.1	–60.0	166.0	0 07.1	+60.0	14.0	1 05.3	+60.0	14.0	2 03.6	+60.0	14.0	3 01.8	+60.0	14.0	4 00.0	+60.0	14.0	**4**
5	1 47.6	–60.0	166.0	0 49.4	–60.0	166.1	0 08.9	+60.0	13.9	1 07.1	+60.0	13.9	2 05.3	+60.0	14.0	3 03.6	+60.0	14.0	4 01.8	+60.0	14.0	5 00.0	+60.0	14.0	**5**
6	0 47.6	–60.0	166.1	0 10.6	+60.0	13.9	1 08.9	+59.9	13.9	2 07.1	+60.0	13.9	3 05.3	+60.0	13.9	4 03.6	+60.0	14.0	5 01.8	+60.0	14.0	6 00.0	+60.0	14.0	**6**
7	0 12.4	+59.9	13.9	1 10.6	+60.0	13.9	2 08.8	+60.0	13.9	3 07.1	+60.0	13.9	4 05.3	+60.0	13.9	5 03.6	+59.9	13.9	6 01.8	+60.0	14.0	7 00.0	+60.0	14.0	**7**
8	1 12.3	+60.0	13.9	2 10.6	+60.0	13.9	3 08.8	+60.0	13.9	4 07.1	+60.0	13.9	5 05.3	+60.0	13.9	6 03.5	+60.0	13.9	7 01.8	+60.0	14.0	8 00.0	+60.0	14.0	**8**
9	2 12.3	+60.0	13.8	3 10.6	+59.9	13.8	4 08.8	+60.0	13.9	5 07.1	+60.0	13.9	6 05.3	+60.0	13.9	7 03.5	+60.0	13.9	8 01.8	+60.0	14.0	9 00.0	+60.0	14.0	**9**
10	3 12.3	+59.9	13.8	4 10.5	+60.0	13.8	5 08.8	+60.0	13.8	6 07.1	+59.9	13.9	7 05.3	+60.0	13.9	8 03.5	+60.0	13.9	9 01.8	+60.0	14.0	10 00.0	+60.0	14.0	**10**
11	4 12.2	+60.0	13.8	5 10.5	+60.0	13.8	6 08.8	+60.0	13.8	7 07.0	+60.0	13.8	8 05.3	+60.0	13.9	9 03.5	+60.0	13.9	10 01.8	+60.0	14.0	11 00.0	+60.0	14.0	**11**
12	5 12.2	+60.0	13.7	6 10.5	+60.0	13.8	7 08.8	+60.0	13.8	8 07.0	+60.0	13.8	9 05.3	+60.0	13.9	10 03.5	+60.0	13.9	11 01.8	+60.0	14.0	12 00.0	+60.0	14.0	**12**
13	6 12.2	+60.0	13.7	7 10.5	+60.0	13.7	8 08.8	+59.9	13.8	9 07.0	+60.0	13.8	10 05.3	+60.0	13.9	11 03.5	+60.0	13.9	12 01.8	+60.0	13.9	13 00.0	+60.0	14.0	**13**
14	7 12.2	+59.9	13.7	8 10.5	+59.9	13.7	9 08.7	+60.0	13.8	10 07.0	+60.0	13.8	11 05.3	+60.0	13.8	12 03.5	+60.0	13.9	13 01.8	+60.0	13.9	14 00.0	+60.0	14.0	**14**
15	8 12.1	+60.0	13.7	9 10.4	+60.0	13.7	10 08.7	+60.0	13.7	11 07.0	+60.0	13.8	12 05.3	+60.0	13.8	13 03.5	+60.0	13.9	14 01.8	+60.0	13.9	15 00.0	+60.0	14.0	**15**
16	9 12.1	+60.0	13.6	10 10.4	+60.0	13.7	11 08.7	+60.0	13.7	12 07.0	+60.0	13.8	13 05.3	+60.0	13.8	14 03.5	+60.0	13.9	15 01.8	+60.0	13.9	16 00.0	+60.0	14.0	**16**
17	10 12.1	+60.0	13.6	11 10.4	+60.0	13.6	12 08.7	+60.0	13.7	13 07.0	+60.0	13.7	14 05.3	+60.0	13.8	15 03.5	+60.0	13.9	16 01.8	+60.0	13.9	17 00.0	+60.0	14.0	**17**
18	11 12.1	+59.9	13.6	12 10.4	+60.0	13.6	13 08.7	+60.0	13.7	14 07.0	+60.0	13.7	15 05.3	+60.0	13.8	16 03.5	+60.0	13.9	17 01.8	+60.0	13.9	18 00.0	+60.0	14.0	**18**
19	12 12.0	+60.0	13.5	13 10.4	+59.9	13.6	14 08.7	+60.0	13.6	15 07.0	+60.0	13.7	16 05.3	+60.0	13.8	17 03.5	+60.0	13.8	18 01.8	+60.0	13.9	19 00.0	+60.0	14.0	**19**
20	13 12.0	+60.0	13.5	14 10.3	+60.0	13.6	15 08.7	+59.9	13.6	16 07.0	+60.0	13.7	17 05.3	+59.9	13.8	18 03.5	+60.0	13.8	19 01.8	+60.0	13.9	20 00.0	+60.0	14.0	**20**
21	14 12.0	+60.0	13.5	15 10.3	+60.0	13.5	16 08.6	+60.0	13.6	17 07.0	+59.9	13.7	18 05.2	+60.0	13.7	19 03.5	+60.0	13.8	20 01.8	+60.0	13.9	21 00.0	+60.0	14.0	**21**
22	15 12.0	+59.9	13.4	16 10.3	+60.0	13.5	17 08.6	+60.0	13.6	18 06.9	+60.0	13.7	19 05.2	+60.0	13.7	20 03.5	+60.0	13.8	21 01.8	+60.0	13.9	22 00.0	+60.0	14.0	**22**
23	16 11.9	+60.0	13.4	17 10.3	+60.0	13.5	18 08.6	+60.0	13.6	19 06.9	+60.0	13.6	20 05.2	+60.0	13.7	21 03.5	+60.0	13.8	22 01.8	+60.0	13.9	23 00.0	+60.0	14.0	**23**
24	17 11.9	+60.0	13.4	18 10.3	+59.9	13.5	19 08.6	+60.0	13.5	20 06.9	+60.0	13.6	21 05.2	+60.0	13.7	22 03.5	+60.0	13.8	23 01.8	+60.0	13.9	24 00.0	+60.0	14.0	**24**
25	18 11.9	+59.9	13.3	19 10.2	+60.0	13.4	20 08.6	+60.0	13.5	21 06.9	+60.0	13.6	22 05.2	+60.0	13.7	23 03.5	+60.0	13.8	24 01.8	+60.0	13.9	25 00.0	+60.0	14.0	**25**
26	19 11.8	+60.0	13.3	20 10.2	+60.0	13.4	21 08.6	+60.0	13.5	22 06.9	+60.0	13.6	23 05.2	+60.0	13.7	24 03.5	+60.0	13.8	25 01.8	+60.0	13.9	26 00.0	+60.0	14.0	**26**
27	20 11.8	+60.0	13.3	21 10.2	+60.0	13.4	22 08.6	+59.9	13.5	23 06.9	+60.0	13.6	24 05.2	+60.0	13.7	25 03.5	+60.0	13.8	26 01.8	+60.0	13.9	27 00.0	+60.0	14.0	**27**
28	21 11.8	+59.9	13.2	22 10.2	+59.9	13.3	23 08.5	+60.0	13.4	24 06.9	+60.0	13.5	25 05.2	+60.0	13.6	26 03.5	+60.0	13.8	27 01.8	+60.0	13.9	28 00.0	+60.0	14.0	**28**
29	22 11.7	+60.0	13.2	23 10.1	+60.0	13.3	24 08.5	+60.0	13.4	25 06.9	+60.0	13.5	26 05.2	+60.0	13.6	27 03.5	+60.0	13.7	28 01.8	+60.0	13.9	29 00.0	+60.0	14.0	**29**
30	23 11.7	+60.0	13.2	24 10.1	+60.0	13.3	25 08.5	+60.0	13.4	26 06.9	+60.0	13.5	27 05.2	+60.0	13.6	28 03.5	+60.0	13.7	29 01.8	+60.0	13.9	30 00.0	+60.0	14.0	**30**
31	24 11.7	+60.0	13.1	25 10.1	+60.0	13.2	26 08.5	+60.0	13.4	27 06.9	+59.9	13.5	28 05.2	+60.0	13.6	29 03.5	+60.0	13.7	30 01.8	+60.0	13.9	31 00.0	+60.0	14.0	**31**
32	25 11.7	+59.9	13.1	26 10.1	+60.0	13.2	27 08.5	+60.0	13.3	28 06.8	+60.0	13.5	29 05.2	+60.0	13.6	30 03.5	+60.0	13.7	31 01.8	+60.0	13.9	32 00.0	+60.0	14.0	**32**
33	26 11.6	+60.0	13.1	27 10.1	+59.9	13.2	28 08.5	+59.9	13.3	29 06.8	+60.0	13.4	30 05.2	+60.0	13.6	31 03.5	+60.0	13.7	32 01.8	+60.0	13.8	33 00.0	+60.0	14.0	**33**
34	27 11.6	+60.0	13.0	28 10.0	+60.0	13.2	29 08.4	+60.0	13.3	30 06.8	+60.0	13.4	31 05.2	+60.0	13.5	32 03.5	+60.0	13.7	33 01.8	+60.0	13.8	34 00.0	+60.0	14.0	**34**
35	28 11.6	+59.9	13.0	29 10.0	+60.0	13.1	30 08.4	+60.0	13.2	31 06.8	+60.0	13.4	32 05.2	+60.0	13.5	33 03.5	+60.0	13.7	34 01.8	+60.0	13.8	35 00.0	+60.0	14.0	**35**
36	29 11.5	+60.0	13.0	30 10.0	+60.0	13.1	31 08.4	+60.0	13.2	32 06.8	+60.0	13.4	33 05.2	+60.0	13.5	34 03.5	+60.0	13.7	35 01.8	+60.0	13.8	36 00.0	+60.0	14.0	**36**
37	30 11.5	+60.0	12.9	31 10.0	+59.9	13.0	32 08.4	+60.0	13.2	33 06.8	+60.0	13.3	34 05.2	+59.9	13.5	35 03.5	+60.0	13.7	36 01.8	+60.0	13.8	37 00.0	+60.0	14.0	**37**
38	31 11.5	+59.9	12.9	32 09.9	+60.0	13.0	33 08.4	+59.9	13.2	34 06.8	+60.0	13.3	35 05.1	+60.0	13.5	36 03.5	+60.0	13.6	37 01.8	+60.0	13.8	38 00.0	+60.0	14.0	**38**
39	32 11.4	+60.0	12.8	33 09.9	+60.0	13.0	34 08.3	+60.0	13.1	35 06.8	+59.9	13.3	36 05.1	+60.0	13.5	37 03.5	+60.0	13.6	38 01.8	+60.0	13.8	39 00.0	+60.0	14.0	**39**
40	33 11.4	+59.9	12.8	34 09.9	+59.9	12.9	35 08.3	+60.0	13.1	36 06.7	+60.0	13.3	37 05.1	+60.0	13.4	38 03.5	+60.0	13.6	39 01.8	+60.0	13.8	40 00.0	+60.0	14.0	**40**
41	34 11.3	+60.0	12.8	35 09.8	+60.0	12.9	36 08.3	+60.0	13.1	37 06.7	+60.0	13.2	38 05.1	+60.0	13.4	39 03.5	+60.0	13.6	40 01.8	+60.0	13.8	41 00.0	+60.0	14.0	**41**
42	35 11.3	+60.0	12.7	36 09.8	+60.0	12.9	37 08.3	+60.0	13.0	38 06.7	+60.0	13.2	39 05.1	+60.0	13.4	40 03.5	+60.0	13.6	41 01.8	+60.0	13.8	42 00.0	+60.0	14.0	**42**
43	36 11.3	+59.9	12.7	37 09.8	+60.0	12.8	38 08.3	+59.9	13.0	39 06.7	+60.0	13.2	40 05.1	+60.0	13.4	41 03.5	+60.0	13.6	42 01.8	+60.0	13.8	43 00.0	+60.0	14.0	**43**
44	37 11.2	+60.0	12.6	38 09.8	+59.9	12.8	39 08.2	+60.0	13.0	40 06.7	+60.0	13.2	41 05.1	+60.0	13.3	42 03.5	+59.9	13.6	43 01.8	+60.0	13.8	44 00.0	+60.0	14.0	**44**
45	38 11.2	+59.9	12.6	39 09.7	+60.0	12.7	40 08.2	+60.0	12.9	41 06.7	+60.0	13.1	42 05.1	+60.0	13.3	43 03.4	+60.0	13.5	44 01.8	+60.0	13.8	45 00.0	+60.0	14.0	**45**
46	39 11.1	+60.0	12.5	40 09.7	+60.0	12.7	41 08.2	+60.0	12.9	42 06.7	+59.9	13.1	43 05.1	+60.0	13.3	44 03.4	+60.0	13.5	45 01.8	+60.0	13.8	46 00.0	+60.0	14.0	**46**
47	40 11.1	+59.9	12.5	41 09.7	+59.9	12.7	42 08.2	+60.0	12.9	43 06.6	+60.0	13.1	44 05.1	+60.0	13.3	45 03.4	+60.0	13.5	46 01.8	+59.9	13.7	47 00.0	+60.0	14.0	**47**
48	41 11.0	+60.0	12.4	42 09.6	+60.0	12.6	43 08.2	+59.9	12.8	44 06.6	+60.0	13.0	45 05.1	+60.0	13.3	46 03.4	+60.0	13.5	47 01.7	+60.0	13.7	48 00.0	+60.0	14.0	**48**
49	42 11.0	+60.0	12.4	43 09.6	+60.0	12.6	44 08.1	+60.0	12.8	45 06.6	+60.0	13.0	46 05.1	+59.9	13.2	47 03.4	+60.0	13.5	48 01.7	+60.0	13.7	49 00.0	+60.0	14.0	**49**
50	43 11.0	+59.9	12.3	44 09.6	+59.9	12.5	45 08.1	+60.0	12.7	46 06.6	+60.0	13.0	47 05.0	+60.0	13.2	48 03.4	+60.0	13.5	49 01.7	+60.0	13.7	50 00.0	+60.0	14.0	**50**
51	44 10.9	+60.0	12.3	45 09.5	+60.0	12.5	46 08.1	+59.9	12.7	47 06.6	+60.0	12.9	48 05.0	+60.0	13.2	49 03.4	+60.0	13.4	50 01.7	+60.0	13.7	51 00.0	+60.0	14.0	**51**
52	45 10.9	+59.9	12.2	46 09.5	+59.9	12.4	47 08.0	+60.0	12.6	48 06.6	+59.9	12.9	49 05.0	+60.0	13.1	50 03.4	+60.0	13.4	51 01.7	+60.0	13.7	52 00.0	+60.0	14.0	**52**
53	46 10.8	+59.9	12.1	47 09.4	+60.0	12.4	48 08.0	+60.0	12.6	49 06.5	+60.0	12.9	50 05.0	+60.0	13.1	51 03.4	+60.0	13.4	52 01.7	+60.0	13.7	53 00.0	+60.0	14.0	**53**
54	47 10.7	+60.0	12.1	48 09.4	+59.9	12.3	49 08.0	+60.0	12.6	50 06.5	+60.0	12.8	51 05.0	+60.0	13.1	52 03.4	+60.0	13.4	53 01.7	+60.0	13.7	54 00.0	+60.0	14.0	**54**
55	48 10.7	+59.9	12.0	49 09.3	+60.0	12.2	50 08.0	+59.9	12.5	51 06.5	+60.0	12.8	52 05.0	+60.0	13.1	53 03.4	+60.0	13.3	54 01.7	+60.0	13.7	55 00.0	+60.0	14.0	**55**
56	49 10.6	+60.0	11.9	50 09.3	+60.0	12.2	51 07.9	+60.0	12.4	52 06.5	+60.0	12.7	53 05.0	+60.0	13.0	54 03.4	+60.0	13.3	55 01.7	+60.0	13.7	56 00.0	+60.0	14.0	**56**
57	50 10.6	+59.9	11.9	51 09.3	+59.9	12.1	52 07.9	+59.9	12.4	53 06.5	+59.9	12.7	54 05.0	+59.9	13.0	55 03.4	+60.0	13.3	56 01.7	+60.0	13.6	57 00.0	+60.0	14.0	**57**
58	51 10.5	+59.9	11.8	52 09.2	+60.0	12.1	53 07.8	+60.0	12.3	54 06.4	+60.0	12.6	55 04.9	+60.0	12.9	56 03.4	+60.0	13.3	57 01.7	+60.0	13.6	58 00.0	+60.0	14.0	**58**
59	52 10.4	+60.0	11.7	53 09.2	+59.9	12.0	54 07.8	+60.0	12.3	55 06.4	+60.0	12.6	56 04.9	+60.0	12.9	57 03.4	+60.0	13.2	58 01.7	+60.0	13.6	59 00.0	+60.0	14.0	**59**
60	53 10.4	+59.9	11.6	54 09.1	+59.9	11.9	55 07.8	+59.9	12.2	56 06.4	+59.9	12.5	57 04.9	+60.0	12.9	58 03.4	+60.0	13.2	59 01.7	+60.0	13.6	60 00.0	+60.0	14.0	**60**
61	54 10.3	+59.9	11.6	55 09.0	+60.0	11.8	56 07.7	+60.0	12.1	57 06.3	+60.0	12.5	58 04.9	+60.0	12.8	59 03.4	+59.9	13.2	60 01.7	+60.0	13.6	61 00.0	+60.0	14.0	**61**
62	55 10.2	+59.9	11.5	56 09.0	+59.9	11.8	57 07.7	+59.9	12.1	58 06.3	+60.0	12.4	59 04.9	+60.0	12.8	60 03.3	+60.0	13.2	61 01.7	+60.0	13.6	62 00.0	+60.0	14.0	**62**
63	56 10.1	+59.9	11.4	57 08.9	+59.9	11.7	58 07.6	+60.0	12.0	59 06.3	+60.0	12.4	60 04.9	+59.9	12.7	61 03.3	+60.0	13.1	62 01.7	+60.0	13.5	63 00.0	+60.0	14.0	**63**
64	57 10.0	+59.9	11.3	58 08.8	+60.0	11.6	59 07.6	+59.9	11.9	60 06.3	+59.9	12.3	61 04.8	+60.0	12.7	62 03.3	+60.0	13.1	63 01.7	+60.0	13.5	64 00.0	+60.0	14.0	**64**
65	58 09.9	+60.0	11.2	59 08.8	+59.9	11.5	60 07.5	+60.0	11.8	61 06.2	+60.0	12.2	62 04.8	+60.0	12.6	63 03.3	+60.0	13.0	64 01.7	+60.0	13.5	65 00.0	+60.0	14.0	**65**
66	59 09.9	+59.8	11.1	60 08.7	+59.9	11.4	61 07.5	+59.9	11.8	62 06.2	+59.9	12.1	63 04.8	+60.0	12.6	64 03.3	+60.0	13.0	65 01.7	+60.0	13.5	66 00.0	+60.0	14.0	**66**
67	60 09.7	+59.9	11.0	61 08.6	+59.9	11.3	62 07.4	+60.0	11.7	63 06.1	+60.0	12.1	64 04.8	+59.9	12.5	65 03.3	+60.0	13.0	66 01.7	+60.0	13.5	67 00.0	+60.0	14.0	**67**
68	61 09.6	+59.9	10.8	62 08.5	+59.9	11.2	63 07.4	+59.9	11.6	64 06.1	+60.0	12.0	65 04.7	+60.0	12.4	66 03.3	+60.0	12.9	67 01.7	+60.0	13.4	68 00.0	+60.0	14.0	**68**
69	62 09.5	+59.9	10.7	63 08.4	+59.9	11.1	64 07.3	+59.9	11.5	65 06.1	+59.9	11.9	66 04.7	+60.0	12.3	67 03.3	+60.0	12.8	68 01.7	+60.0	13.4	69 00.0	+60.0	14.0	**69**
70	63 09.4	+59.9	10.6	64 08.3	+59.9	10.9	65 07.2	+59.9	11.3	66 06.0	+59.9	11.8	67 04.7	+60.0	12.3	68 03.3	+59.9	12.8	69 01.7	+60.0	13.4	70 00.0	+60.0	14.0	**70**
71	64 09.3	+59.8	10.4	65 08.2	+59.9	10.8	66 07.1	+60.0	11.2	67 05.9	+60.0	11.7	68 04.7	+59.9	12.2	69 03.2	+60.0	12.7	70 01.7	+60.0	13.3	71 00.0	+60.0	14.0	**71**
72	65 09.1	+59.9	10.2	66 08.1	+59.9	10.6	67 07.1	+59.9	11.1	68 05.9	+59.9	11.6	69 04.6	+60.0	12.1	70 03.2	+60.0	12.7	71 01.7	+60.0	13.3	72 00.0	+60.0	14.0	**72**
73	66 09.0	+59.8	10.1	67 08.0	+59.9	10.5	68 07.0	+59.9	10.9	69 05.8	+60.0	11.4	70 04.6	+59.9	12.0	71 03.2	+60.0	12.6	72 01.7	+60.0	13.3	73 00.0	+60.0	14.0	**73**
74	67 08.8	+59.8	9.9	68 07.9	+59.8	10.3	69 06.9	+59.9	10.8	70 05.8	+59.9	11.3	71 04.5	+60.0	11.9	72 03.2	+60.0	12.5	73 01.7	+60.0	13.2	74 00.0	+60.0	14.0	**74**
75	68 08.6	+59.8	9.7	69 07.7	+59.9	10.1	70 06.8	+59.8	10.6	71 05.7	+59.9	11.1	72 04.5	+59.9	11.7	73 03.2	+59.9	12.4	74 01.7	+60.0	13.2	75 00.0	+60.0	14.0	**75**
76	69 08.4	+59.8	9.5	70 07.6	+59.8	9.9	71 06.6	+59.9	10.4	72 05.6	+59.9	11.0	73 04.4	+60.0	11.6	74 03.1	+60.0	12.3	75 01.7	+60.0	13.1	76 00.0	+60.0	14.0	**76**
77	70 08.2	+59.8	9.2	71 07.4	+59.8	9.7	72 06.5	+59.8	10.2	73 05.5	+59.9	10.8	74 04.4	+59.9	11.4	75 03.1	+60.0	12.2	76 01.7	+59.9	13.0	77 00.0	+60.0	14.0	**77**
78	71 08.0	+59.7	8.9	72 07.2	+59.8	9.4	73 06.3	+59.9	10.0	74 05.4	+59.9	10.6	75 04.3	+59.9	11.3	76 03.1	+59.9	12.0	77 01.6	+60.0	12.9	78 00.0	+60.0	14.0	**78**
79	72 07.7	+59.7	8.7	73 07.0	+59.7	9.1	74 06.2	+59.8	9.7	75 05.3	+59.8	10.3	76 04.2	+59.9	11.1	77 03.0	+60.0	11.9	78 01.6	+60.0	12.9	79 00.0	+60.0	14.0	**79**
80	73 07.4	+59.7	8.3	74 06.7	+59.8	8.8	75 06.0	+59.8	9.4	76 05.1	+59.9	10.1	77 04.1	+59.9	10.8	78 03.0	+59.9	11.7	79 01.6	+60.0	12.8	80 00.0	+60.0	14.0	**80**
81	74 07.1	+59.6	7.9	75 06.5	+59.7	8.5	76 05.8	+59.7	9.1	77 05.0	+59.8	9.7	78 04.0	+59.9	10.5	79 02.9	+60.0	11.5	80 01.6	+60.0	12.6	81 00.0	+60.0	14.0	**81**
82	75 06.7	+59.6	7.5	76 06.2	+59.6	8.1	77 05.5	+59.7	8.7	78 04.8	+59.8	9.4	79 03.9	+59.9	10.2	80 02.9	+59.9	11.2	81 01.6	+60.0	12.5	82 00.0	+60.0	14.0	**82**
83	76 06.3	+59.5	7.1	77 05.8	+59.6	7.6	78 05.2	+59.7	8.2	79 04.6	+59.7	9.0	80 03.8	+59.8	9.8	81 02.8	+59.9	10.9	82 01.6	+59.9	12.3	83 00.0	+60.0	14.0	**83**
84	77 05.8	+59.4	6.5	78 05.4	+59.5	7.0	79 04.9	+59.6	7.7	80 04.3	+59.7	8.4	81 03.6	+59.8	9.4	82 02.7	+59.9	10.5	83 01.5	+60.0	12.0	84 00.0	+60.0	14.0	**84**
85	78 05.2	+59.4	5.9	79 04.9	+59.4	6.4	80 04.5	+59.5	7.0	81 04.0	+59.6	7.8	82 03.4	+59.7	8.8	83 02.6	+59.8	10.0	84 01.5	+59.9	11.7	85 00.0	+60.0	14.0	**85**
86	79 04.6	+59.2	5.1	80 04.3	+59.3	5.6	81 04.0	+59.4	6.2	82 03.6	+59.5	7.0	83 03.1	+59.6	8.0	84 02.4	+59.7	9.4	85 01.4	+59.9	11.2	86 00.0	+60.0	14.0	**86**
87	80 03.8	+59.0	4.2	81 03.6	+59.1	4.7	82 03.4	+59.2	5.3	83 03.1	+59.3	6.0	84 02.7	+59.4	7.0	85 02.1	+59.7	8.4	86 01.3	+59.9	10.5	87 00.0	+60.0	14.0	**87**
88	81 02.8	+58.8	3.1	82 02.7	+58.8	3.5	83 02.6	+58.9	4.0	84 02.4	+59.0	4.7	85 02.1	+59.2	5.6	86 01.8	+59.4	7.0	87 01.2	+59.7	9.3	88 00.0	+60.0	14.0	**88**
89	82 01.6	+58.4	1.7	83 01.5	+58.5	2.0	84 01.5	+58.5	2.3	85 01.4	+58.6	2.8	86 01.3	+58.7	3.5	87 01.2	+58.8	4.7	88 00.9	*+59.1* •	7.0	89 00.0	+60.0	14.0	**89**
90	83 00.0	+57.9	0.0	84 00.0	+57.9	0.0	85 00.0	+57.8	0.0	86 00.0	+57.6	0.0	87 00.0	*+57.4* •	0.0	88 00.0	*+56.5* •	0.0	89 00.0	*+45.4* •	0.0	90 00.0	–60.0	7.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 166°, 194°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 45.6	+60.0	164.9	5 47.7	+60.0	164.9	4 49.8	+59.9	164.9	3 51.8	+60.0	165.0	2 53.9	+60.0	165.0	1 55.9	+60.0	165.0	0 58.0	+60.0	165.0	0 00.0	+60.0	165.0	0
1	7 45.6	+60.0	164.9	6 47.7	+59.9	164.9	5 49.7	+60.0	164.9	4 51.8	+60.0	164.9	3 53.9	+60.0	165.0	2 55.9	+60.0	165.0	1 58.0	+60.0	165.0	1 00.0	+60.0	165.0	1
2	8 45.6	+59.9	164.8	7 47.6	+60.0	164.9	6 49.7	+60.0	164.9	5 51.8	+60.0	164.9	4 53.9	+59.9	165.0	3 55.9	+60.0	165.0	2 58.0	+60.0	165.0	2 00.0	+60.0	165.0	2
3	9 45.5	+60.0	164.8	8 47.6	+60.0	164.8	7 49.7	+60.0	164.9	6 51.8	+60.0	164.9	5 53.8	+60.0	164.9	4 55.9	+60.0	165.0	3 58.0	+60.0	165.0	3 00.0	+60.0	165.0	3
4	10 45.5	+60.0	164.8	9 47.6	+60.0	164.8	8 49.7	+60.0	164.9	7 51.8	+60.0	164.9	6 53.8	+60.0	164.9	5 55.9	+60.0	165.0	4 58.0	+60.0	165.0	4 00.0	+60.0	165.0	4
5	11 45.5	+59.9	164.7	10 47.6	+60.0	164.8	9 49.7	+60.0	164.8	8 51.8	+59.9	164.9	7 53.8	+60.0	164.9	6 55.9	+60.0	164.9	5 58.0	+60.0	165.0	5 00.0	+60.0	165.0	5
6	12 45.4	+60.0	164.7	11 47.6	+59.9	164.8	10 49.7	+59.9	164.8	9 51.7	+60.0	164.9	8 53.8	+60.0	164.9	7 55.9	+60.0	164.9	6 58.0	+60.0	165.0	6 00.0	+60.0	165.0	6
7	13 45.4	+60.0	164.7	12 47.5	+60.0	164.7	11 49.6	+60.0	164.8	10 51.7	+60.0	164.8	9 53.8	+60.0	164.9	8 55.9	+60.0	164.9	7 58.0	+60.0	165.0	7 00.0	+60.0	165.0	7
8	14 45.4	+59.9	164.6	13 47.5	+60.0	164.7	12 49.6	+60.0	164.8	11 51.7	+60.0	164.8	10 53.8	+60.0	164.9	9 55.9	+60.0	164.9	8 58.0	+59.9	165.0	8 00.0	+60.0	165.0	8
9	15 45.3	+60.0	164.6	14 47.5	+60.0	164.7	13 49.6	+60.0	164.7	12 51.7	+60.0	164.8	11 53.8	+60.0	164.9	10 55.9	+60.0	164.9	9 57.9	+60.0	165.0	9 00.0	+60.0	165.0	9
10	16 45.3	+60.0	164.6	15 47.5	+59.9	164.6	14 49.6	+60.0	164.7	13 51.7	+60.0	164.8	12 53.8	+60.0	164.8	11 55.9	+60.0	164.9	10 57.9	+60.0	165.0	10 00.0	+60.0	165.0	10
11	17 45.3	+59.9	164.5	16 47.4	+60.0	164.6	15 49.6	+60.0	164.7	14 51.7	+60.0	164.8	13 53.8	+60.0	164.8	12 55.9	+60.0	164.9	11 57.9	+60.0	164.9	11 00.0	+60.0	165.0	11
12	18 45.2	+60.0	164.5	17 47.4	+60.0	164.6	16 49.6	+59.9	164.7	15 51.7	+60.0	164.7	14 53.8	+60.0	164.8	13 55.9	+60.0	164.9	12 57.9	+60.0	164.9	12 00.0	+60.0	165.0	12
13	19 45.2	+60.0	164.5	18 47.4	+60.0	164.6	17 49.5	+60.0	164.6	16 51.7	+60.0	164.7	15 53.8	+60.0	164.8	14 55.9	+60.0	164.9	13 57.9	+60.0	164.9	13 00.0	+60.0	165.0	13
14	20 45.2	+59.9	164.4	19 47.4	+59.9	164.5	18 49.5	+60.0	164.6	17 51.7	+60.0	164.7	16 53.8	+60.0	164.8	15 55.9	+60.0	164.9	14 57.9	+60.0	164.9	14 00.0	+60.0	165.0	14
15	21 45.1	+60.0	164.4	20 47.3	+60.0	164.5	19 49.5	+60.0	164.6	18 51.7	+59.9	164.7	17 53.8	+60.0	164.8	16 55.9	+60.0	164.9	15 57.9	+60.0	164.9	15 00.0	+60.0	165.0	15
16	22 45.1	+60.0	164.3	21 47.3	+60.0	164.5	20 49.5	+60.0	164.6	19 51.6	+60.0	164.7	18 53.8	+60.0	164.8	17 55.9	+60.0	164.8	16 57.9	+60.0	164.9	16 00.0	+60.0	165.0	16
17	23 45.1	+59.9	164.3	22 47.3	+60.0	164.4	21 49.5	+60.0	164.5	20 51.6	+60.0	164.6	19 53.8	+60.0	164.7	18 55.9	+60.0	164.8	17 57.9	+60.0	164.9	17 00.0	+60.0	165.0	17
18	24 45.0	+60.0	164.3	23 47.3	+59.9	164.4	22 49.5	+59.9	164.5	21 51.6	+60.0	164.6	20 53.8	+60.0	164.7	19 55.9	+60.0	164.8	18 57.9	+60.0	164.9	18 00.0	+60.0	165.0	18
19	25 45.0	+60.0	164.2	24 47.2	+60.0	164.4	23 49.4	+60.0	164.5	22 51.6	+60.0	164.6	21 53.8	+59.9	164.7	20 55.9	+60.0	164.8	19 57.9	+60.0	164.9	19 00.0	+60.0	165.0	19
20	26 45.0	+59.9	164.2	25 47.2	+60.0	164.3	24 49.4	+60.0	164.5	23 51.6	+60.0	164.6	22 53.7	+60.0	164.7	21 55.9	+60.0	164.8	20 57.9	+60.0	164.9	20 00.0	+60.0	165.0	20
21	27 44.9	+60.0	164.2	26 47.2	+60.0	164.3	25 49.4	+60.0	164.4	24 51.6	+60.0	164.6	23 53.7	+60.0	164.7	22 55.9	+60.0	164.8	21 57.9	+60.0	164.9	21 00.0	+60.0	165.0	21
22	28 44.9	+59.9	164.1	27 47.2	+59.9	164.3	26 49.4	+60.0	164.4	25 51.6	+60.0	164.5	24 53.7	+60.0	164.7	23 55.9	+59.9	164.8	22 57.9	+60.0	164.9	22 00.0	+60.0	165.0	22
23	29 44.8	+60.0	164.1	28 47.1	+60.0	164.2	27 49.4	+59.9	164.4	26 51.6	+60.0	164.5	25 53.7	+60.0	164.6	24 55.8	+60.0	164.8	23 57.9	+60.0	164.9	23 00.0	+60.0	165.0	23
24	30 44.8	+60.0	164.0	29 47.1	+60.0	164.2	28 49.3	+60.0	164.3	27 51.6	+59.9	164.5	26 53.7	+60.0	164.6	25 55.8	+60.0	164.8	24 57.9	+60.0	164.9	24 00.0	+60.0	165.0	24
25	31 44.8	+59.9	164.0	30 47.1	+59.9	164.2	29 49.3	+60.0	164.3	28 51.5	+60.0	164.5	27 53.7	+60.0	164.6	26 55.8	+60.0	164.7	25 57.9	+60.0	164.9	25 00.0	+60.0	165.0	25
26	32 44.7	+60.0	163.9	31 47.0	+60.0	164.1	30 49.3	+60.0	164.3	29 51.5	+60.0	164.4	28 53.7	+60.0	164.6	27 55.8	+60.0	164.7	26 57.9	+60.0	164.9	26 00.0	+60.0	165.0	26
27	33 44.7	+59.9	163.9	32 47.0	+60.0	164.1	31 49.3	+60.0	164.3	30 51.5	+60.0	164.4	29 53.7	+60.0	164.6	28 55.8	+60.0	164.7	27 57.9	+60.0	164.9	27 00.0	+60.0	165.0	27
28	34 44.6	+60.0	163.9	33 47.0	+59.9	164.0	32 49.3	+59.9	164.2	31 51.5	+60.0	164.4	30 53.7	+60.0	164.6	29 55.8	+60.0	164.7	28 57.9	+60.0	164.9	28 00.0	+60.0	165.0	28
29	35 44.6	+59.9	163.8	34 46.9	+60.0	164.0	33 49.2	+60.0	164.2	32 51.5	+60.0	164.4	31 53.7	+60.0	164.5	30 55.8	+60.0	164.7	29 57.9	+60.0	164.9	29 00.0	+60.0	165.0	29
30	36 44.5	+60.0	163.8	35 46.9	+60.0	164.0	34 49.2	+60.0	164.2	33 51.5	+60.0	164.3	32 53.7	+60.0	164.5	31 55.8	+60.0	164.7	30 57.9	+60.0	164.8	30 00.0	+60.0	165.0	30
31	37 44.5	+60.0	163.7	36 46.9	+59.9	163.9	35 49.2	+60.0	164.1	34 51.5	+59.9	164.3	33 53.7	+60.0	164.5	32 55.8	+60.0	164.7	31 57.9	+60.0	164.8	31 00.0	+60.0	165.0	31
32	38 44.5	+59.9	163.7	37 46.8	+60.0	163.9	36 49.2	+59.9	164.1	35 51.4	+60.0	164.3	34 53.7	+59.9	164.5	33 55.8	+60.0	164.7	32 57.9	+60.0	164.8	32 00.0	+60.0	165.0	32
33	39 44.4	+59.9	163.6	38 46.8	+60.0	163.8	37 49.1	+60.0	164.1	36 51.4	+60.0	164.3	35 53.6	+60.0	164.5	34 55.8	+60.0	164.6	33 57.9	+60.0	164.8	33 00.0	+60.0	165.0	33
34	40 44.3	+60.0	163.5	39 46.8	+59.9	163.8	38 49.1	+60.0	164.0	37 51.4	+60.0	164.2	36 53.6	+60.0	164.4	35 55.8	+60.0	164.6	34 57.9	+60.0	164.8	34 00.0	+60.0	165.0	34
35	41 44.3	+59.9	163.5	40 46.7	+60.0	163.7	39 49.1	+60.0	164.0	38 51.4	+60.0	164.2	37 53.6	+60.0	164.4	36 55.8	+60.0	164.6	35 57.9	+60.0	164.8	35 00.0	+60.0	165.0	35
36	42 44.2	+60.0	163.4	41 46.7	+60.0	163.7	40 49.1	+59.9	163.9	39 51.4	+60.0	164.2	38 53.6	+60.0	164.4	37 55.8	+60.0	164.6	36 57.9	+60.0	164.8	36 00.0	+60.0	165.0	36
37	43 44.2	+59.9	163.4	42 46.7	+59.9	163.6	41 49.0	+60.0	163.9	40 51.4	+59.9	164.1	39 53.6	+60.0	164.4	38 55.8	+60.0	164.6	37 57.9	+60.0	164.8	37 00.0	+60.0	165.0	37
38	44 44.1	+60.0	163.3	43 46.6	+60.0	163.6	42 49.0	+60.0	163.9	41 51.3	+60.0	164.1	40 53.6	+60.0	164.3	39 55.8	+60.0	164.6	38 57.9	+60.0	164.8	38 00.0	+60.0	165.0	38
39	45 44.1	+59.9	163.3	44 46.6	+59.9	163.5	43 49.0	+60.0	163.8	42 51.3	+60.0	164.1	41 53.6	+60.0	164.3	40 55.8	+60.0	164.6	39 57.9	+60.0	164.8	39 00.0	+60.0	165.0	39
40	46 44.0	+59.9	163.2	45 46.5	+60.0	163.5	44 49.0	+59.9	163.8	43 51.3	+60.0	164.0	42 53.6	+60.0	164.3	41 55.8	+60.0	164.5	40 57.9	+60.0	164.8	40 00.0	+60.0	165.0	40
41	47 43.9	+60.0	163.1	46 46.5	+59.9	163.4	45 48.9	+60.0	163.7	44 51.3	+60.0	164.0	43 53.6	+60.0	164.3	42 55.8	+60.0	164.5	41 57.9	+60.0	164.8	41 00.0	+60.0	165.0	41
42	48 43.9	+59.9	163.0	47 46.4	+60.0	163.4	46 48.9	+60.0	163.7	45 51.3	+59.9	164.0	44 53.6	+60.0	164.2	43 55.8	+60.0	164.5	42 57.9	+60.0	164.8	42 00.0	+60.0	165.0	42
43	49 43.8	+59.9	163.0	48 46.4	+59.9	163.3	47 48.9	+59.9	163.6	46 51.2	+60.0	163.9	45 53.6	+59.9	164.2	44 55.8	+60.0	164.5	43 57.9	+60.0	164.8	43 00.0	+60.0	165.0	43
44	50 43.7	+60.0	162.9	49 46.3	+60.0	163.2	48 48.8	+60.0	163.6	47 51.2	+60.0	163.9	46 53.5	+60.0	164.2	45 55.8	+60.0	164.5	44 57.9	+60.0	164.7	44 00.0	+60.0	165.0	44
45	51 43.7	+59.9	162.8	50 46.3	+59.9	163.2	49 48.8	+60.0	163.5	48 51.2	+60.0	163.9	47 53.5	+60.0	164.2	46 55.8	+60.0	164.5	45 57.9	+60.0	164.7	45 00.0	+60.0	165.0	45
46	52 43.6	+59.9	162.7	51 46.2	+60.0	163.1	50 48.8	+59.9	163.5	49 51.2	+60.0	163.8	48 53.5	+60.0	164.1	47 55.8	+60.0	164.4	46 57.9	+60.0	164.7	46 00.0	+60.0	165.0	46
47	53 43.5	+59.9	162.6	52 46.2	+59.9	163.0	51 48.7	+60.0	163.4	50 51.2	+59.9	163.8	49 53.5	+60.0	164.1	48 55.8	+59.9	164.4	47 57.9	+60.0	164.7	47 00.0	+60.0	165.0	47
48	54 43.4	+59.9	162.6	53 46.1	+59.9	163.0	52 48.7	+59.9	163.4	51 51.1	+60.0	163.7	50 53.5	+60.0	164.1	49 55.7	+60.0	164.4	48 57.9	+60.0	164.7	48 00.0	+60.0	165.0	48
49	55 43.3	+59.9	162.5	54 46.0	+60.0	162.9	53 48.6	+60.0	163.3	52 51.1	+60.0	163.7	51 53.5	+60.0	164.0	50 55.7	+60.0	164.4	49 57.9	+60.0	164.7	49 00.0	+60.0	165.0	49
50	56 43.2	+59.9	162.4	55 46.0	+59.9	162.8	54 48.6	+59.9	163.2	53 51.1	+60.0	163.6	52 53.5	+59.9	164.0	51 55.7	+60.0	164.3	50 57.9	+60.0	164.7	50 00.0	+60.0	165.0	50
51	57 43.1	+59.9	162.2	56 45.9	+59.9	162.7	55 48.5	+60.0	163.2	54 51.1	+59.9	163.6	53 53.4	+60.0	164.0	52 55.7	+60.0	164.3	51 57.9	+60.0	164.7	51 00.0	+60.0	165.0	51
52	58 43.0	+59.9	162.1	57 45.8	+59.9	162.6	56 48.5	+59.9	163.1	55 51.0	+60.0	163.5	54 53.4	+60.0	163.9	53 55.7	+60.0	164.3	52 57.9	+60.0	164.7	52 00.0	+60.0	165.0	52
53	59 42.9	+59.9	162.0	58 45.7	+60.0	162.5	57 48.4	+60.0	163.0	56 51.0	+60.0	163.5	55 53.4	+60.0	163.9	54 55.7	+60.0	164.3	53 57.9	+60.0	164.6	53 00.0	+60.0	165.0	53
54	60 42.8	+59.8	161.9	59 45.7	+59.9	162.4	58 48.4	+59.9	162.9	57 51.0	+59.9	163.4	56 53.4	+60.0	163.8	55 55.7	+60.0	164.2	54 57.9	+60.0	164.6	54 00.0	+60.0	165.0	54
55	61 42.6	+59.9	161.7	60 45.6	+59.9	162.3	59 48.3	+60.0	162.8	58 50.9	+60.0	163.3	57 53.4	+60.0	163.8	56 55.7	+60.0	164.2	55 57.9	+60.0	164.6	55 00.0	+60.0	165.0	55
56	62 42.5	+59.9	161.6	61 45.5	+59.9	162.2	60 48.3	+59.9	162.7	59 50.9	+59.9	163.3	58 53.4	+59.9	163.7	57 55.7	+60.0	164.2	56 57.9	+60.0	164.6	56 00.0	+60.0	165.0	56
57	63 42.4	+59.8	161.4	62 45.4	+59.9	162.1	61 48.2	+59.9	162.6	60 50.8	+60.0	163.2	59 53.3	+60.0	163.7	58 55.7	+60.0	164.1	57 57.9	+60.0	164.6	57 00.0	+60.0	165.0	57
58	64 42.2	+59.8	161.3	63 45.3	+59.8	161.9	62 48.1	+59.9	162.5	61 50.8	+60.0	163.1	60 53.3	+60.0	163.6	59 55.7	+60.0	164.1	58 57.9	+60.0	164.6	58 00.0	+60.0	165.0	58
59	65 42.0	+59.8	161.1	64 45.1	+59.9	161.8	63 48.0	+60.0	162.4	62 50.8	+59.9	163.0	61 53.3	+60.0	163.6	60 55.7	+60.0	164.1	59 57.9	+60.0	164.6	59 00.0	+60.0	165.0	59
60	66 41.8	+59.8	160.9	65 45.0	+59.9	161.6	64 48.0	+59.9	162.3	63 50.7	+60.0	162.9	62 53.3	+59.9	163.5	61 55.7	+59.9	164.0	60 57.9	+60.0	164.5	60 00.0	+60.0	165.0	60
61	67 41.6	+59.8	160.7	66 44.9	+59.8	161.5	65 47.9	+59.9	162.2	64 50.7	+59.9	162.8	63 53.2	+60.0	163.4	62 55.6	+60.0	164.0	61 57.9	+60.0	164.5	61 00.0	+60.0	165.0	61
62	68 41.4	+59.8	160.5	67 44.7	+59.9	161.3	66 47.8	+59.9	162.0	65 50.6	+59.9	162.7	64 53.2	+60.0	163.4	63 55.6	+60.0	164.0	62 57.9	+60.0	164.5	62 00.0	+60.0	165.0	62
63	69 41.2	+59.7	160.2	68 44.6	+59.8	161.1	67 47.7	+59.9	161.9	66 50.5	+60.0	162.6	65 53.2	+59.9	163.3	64 55.6	+60.0	163.9	63 57.9	+60.0	164.5	63 00.0	+60.0	165.0	63
64	70 40.9	+59.7	159.9	69 44.4	+59.8	160.9	68 47.6	+59.8	161.7	67 50.5	+59.9	162.5	66 53.1	+60.0	163.2	65 55.6	+60.0	163.9	64 57.9	+60.0	164.4	64 00.0	+60.0	165.0	64
65	71 40.6	+59.7	159.6	70 44.2	+59.8	160.6	69 47.4	+59.9	161.5	68 50.4	+59.9	162.4	67 53.1	+60.0	163.1	66 55.6	+60.0	163.8	65 57.9	+60.0	164.4	65 00.0	+60.0	165.0	65
66	72 40.3	+59.7	159.3	71 44.0	+59.8	160.4	70 47.3	+59.9	161.3	69 50.3	+59.9	162.2	68 53.1	+59.9	163.0	67 55.6	+60.0	163.7	66 57.9	+60.0	164.4	66 00.0	+60.0	165.0	66
67	73 40.0	+59.6	158.9	72 43.8	+59.7	160.1	71 47.2	+59.8	161.1	70 50.2	+59.9	162.1	69 53.0	+60.0	162.9	68 55.6	+59.9	163.7	67 57.9	+60.0	164.4	67 00.0	+60.0	165.0	67
68	74 39.6	+59.5	158.5	73 43.5	+59.7	159.8	72 47.0	+59.8	160.9	71 50.1	+59.9	161.9	70 53.0	+59.9	162.8	69 55.5	+60.0	163.6	68 57.9	+60.0	164.3	68 00.0	+60.0	165.0	68
69	75 39.1	+59.5	158.0	74 43.2	+59.7	159.4	73 46.8	+59.8	160.6	72 50.0	+59.9	161.7	71 52.9	+60.0	162.6	70 55.5	+60.0	163.5	69 57.9	+60.0	164.3	69 00.0	+60.0	165.0	69
70	76 38.6	+59.4	157.5	75 42.9	+59.6	159.0	74 46.6	+59.8	160.3	73 49.9	+59.9	161.5	72 52.9	+59.9	162.5	71 55.5	+60.0	163.4	70 57.9	+59.9	164.3	70 00.0	+60.0	165.0	70
71	77 38.0	+59.3	156.8	76 42.5	+59.5	158.5	75 46.4	+59.7	159.9	74 49.8	+59.8	161.2	73 52.8	+59.9	162.3	72 55.5	+59.9	163.3	71 57.8	+60.0	164.2	71 00.0	+60.0	165.0	71
72	78 37.3	+59.1	156.1	77 42.0	+59.5	157.9	76 46.1	+59.7	159.5	75 49.6	+59.8	160.9	74 52.7	+59.9	162.1	73 55.4	+60.0	163.2	72 57.8	+60.0	164.2	72 00.0	+60.0	165.0	72
73	79 36.4	+59.0	155.2	78 41.5	+59.4	157.3	77 45.8	+59.6	159.1	76 49.4	+59.8	160.6	75 52.6	+59.9	161.9	74 55.4	+60.0	163.1	73 57.8	+60.0	164.1	73 00.0	+60.0	165.0	73
74	80 35.4	+58.7	154.1	79 40.9	+59.2	156.5	78 45.4	+59.6	158.5	77 49.2	+59.8	160.2	76 52.5	+59.9	161.7	75 55.4	+59.9	162.9	74 57.8	+60.0	164.0	74 00.0	+60.0	165.0	74
75	81 34.1	+58.5	152.8	80 40.1	+59.1	155.6	79 45.0	+59.4	157.9	78 49.0	+59.7	159.8	77 52.4	+59.9	161.4	76 55.3	+60.0	162.8	75 57.8	+60.0	164.0	75 00.0	+60.0	165.0	75
76	82 32.6	+57.9	151.2	81 39.2	+58.8	154.4	80 44.4	+59.4	157.1	79 48.7	+59.7	159.3	78 52.3	+59.8	161.1	77 55.3	+59.9	162.6	76 57.8	+60.0	163.9	76 00.0	+60.0	165.0	76
77	83 30.5	+57.2	149.0	82 38.0	+58.4	153.0	81 43.8	+59.1	156.1	80 48.4	+59.5	158.6	79 52.1	+59.8	160.7	78 55.2	+59.9	162.4	77 57.8	+60.0	163.8	77 00.0	+60.0	165.0	77
78	84 27.7	+56.0	146.1	83 36.4	+57.9	151.1	82 42.9	+58.9	154.9	81 47.9	+59.5	157.8	80 51.9	+59.8	160.2	79 55.1	+59.9	162.1	78 57.8	+60.0	163.7	78 00.0	+60.0	165.0	78
79	85 23.7	*+53.9*	•142.0	84 34.3	+56.9	148.5	83 41.8	+58.5	153.3	82 47.4	+59.3	156.8	81 51.7	+59.7	159.6	80 55.0	+59.9	161.8	79 57.8	+59.9	163.5	79 00.0	+60.0	165.0	79
80	86 17.6	*+49.9*	•136.0	85 31.2	*+55.3*	•144.9	84 40.3	+57.8	151.1	83 46.7	+59.0	155.5	82 51.4	+59.5	158.8	81 54.9	+59.9	161.4	80 57.7	+60.0	163.4	80 00.0	+60.0	165.0	80
81	87 07.5	*+41.1*	•126.2	86 26.5	*+51.9*	•139.3	85 38.1	+56.5	147.9	84 45.7	+58.5	153.7	83 50.9	+59.5	157.8	82 54.8	+59.8	160.8	81 57.7	+60.0	163.2	81 00.0	+60.0	165.0	81
82	87 48.6	*+22.0*	•109.5	87 18.4	*+43.9*	•130.0	86 34.6	*+53.9*	•142.9	85 44.2	+57.7	151.0	84 50.4	+59.1	156.4	83 54.6	+59.7	160.2	82 57.7	+59.9	162.9	82 00.0	+60.0	165.0	82
83	88 10.6	*–8.3*	•82.6	88 02.3	*+23.9*	•112.9	87 28.5	*+46.9*	•134.3	86 41.9	*+55.7*	•146.8	85 49.5	+58.6	154.3	84 54.3	+59.7	159.2	83 57.6	+60.0	162.6	83 00.0	+60.0	165.0	83
84	88 02.3	*–33.8*	•52.2	88 26.2	*–10.8*	•82.5	88 15.4	*+26.4*	•117.2	87 37.6	*+50.2*	•139.2	86 48.1	*+57.5*	•151.0	85 54.0	+59.3	157.8	84 57.6	+59.9	162.1	84 00.0	+60.0	165.0	84
85	87 28.5	*–46.6*	•30.8	88 15.4	*–37.8*	•47.9	88 41.8	*–14.0*	•82.5	88 27.8	*+29.6*	•122.7	87 45.6	*+53.5*	•144.8	86 53.3	+58.8	155.4	85 57.5	+59.8	161.3	85 00.0	+60.0	165.0	85
86	86 41.9	*–52.4*	•18.3	87 37.6	*–49.5*	•25.9	88 27.8	*–42.2*	•42.3	88 57.4	*–18.3*	•82.5	88 39.1	*+33.9*	•129.9	87 52.1	*+56.7*	•151.0	86 57.3	+59.7	160.1	86 00.0	+60.0	165.0	86
87	85 49.5	*–55.2*	•10.7	86 48.1	*–54.1*	•14.1	87 45.6	*–52.3*	•20.3	88 39.1	*–47.0*	•35.2	89 13.0	*–24.2*	•82.5	88 48.8	*+39.9*	•139.2	87 57.0	*+59.0*	•157.8	87 00.0	+60.0	165.0	87
88	84 54.3	–56.7	5.8	85 54.0	–56.4	7.3	86 53.3	*–55.8*	•9.6	87 52.1	*–54.8*	•14.1	88 48.8	*–51.8*	•25.9	89 28.7	*–32.7*	•82.5	88 56.0	*+48.3*	•151.0	88 00.0	+60.0	165.0	88
89	83 57.6	–57.6	2.5	84 57.6	–57.6	2.9	85 57.5	–57.5	3.7	86 57.3	–57.3	4.9	87 57.0	*–57.0*	•7.3	88 56.0	*–56.0*	•14.1	89 44.3	*–44.3*	•82.5	89 00.0	+60.0	165.0	89
90	83 00.0	–58.2	0.0	84 00.0	–58.2	0.0	85 00.0	–58.3	0.0	86 00.0	–58.4	0.0	87 00.0	–58.5	0.0	88 00.0	–58.6	0.0	89 00.0	*–59.0*	•0.0	90 00.0	–60.0	82.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 15°, 345°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 45.6	– 59.9	164.9	5 47.7	– 60.0	164.9	4 49.8	– 60.0	164.9	3 51.8	– 60.0	165.0	2 53.9	– 60.0	165.0	1 55.9	– 60.0	165.0	0 58.0	– 60.0	165.0	0 00.0	+ 60.0	15.0	0
1	5 45.7	– 60.0	164.9	4 47.7	– 60.0	164.9	3 49.8	– 60.0	165.0	2 51.8	– 60.0	165.0	1 53.9	– 60.0	165.0	0 55.9	– 60.0	165.0	0 02.0	+ 60.0	15.0	1 00.0	+ 60.0	15.0	1
2	4 45.7	– 60.0	165.0	3 47.7	– 59.9	165.0	2 49.8	– 60.0	165.0	1 51.8	– 60.0	165.0	0 53.9	– 60.0	165.0	0 04.1	+ 60.0	15.0	1 02.0	+ 60.0	15.0	2 00.0	+ 60.0	15.0	2
3	3 45.7	– 60.0	165.0	2 47.8	– 60.0	165.0	1 49.8	– 60.0	165.0	0 51.8	– 60.0	165.0	0 06.1	+ 60.0	15.0	1 04.1	+ 60.0	15.0	2 02.0	+ 60.0	15.0	3 00.0	+ 60.0	15.0	3
4	2 45.7	– 59.9	165.0	1 47.8	– 60.0	165.0	0 49.8	– 60.0	165.0	0 08.2	+ 59.9	15.0	1 06.1	+ 60.0	15.0	2 04.1	+ 60.0	15.0	3 02.0	+ 60.0	15.0	4 00.0	+ 60.0	15.0	4
5	1 45.8	– 60.0	165.1	0 47.8	– 60.0	165.1	0 10.2	+ 60.0	14.9	1 08.1	+ 60.0	14.9	2 06.1	+ 60.0	15.0	3 04.1	+ 60.0	15.0	4 02.0	+ 60.0	15.0	5 00.0	+ 60.0	15.0	5
6	0 45.8	– 60.0	165.1	0 12.2	+ 60.0	14.9	1 10.2	+ 59.9	14.9	2 08.1	+ 60.0	14.9	3 06.1	+ 60.0	14.9	4 04.1	+ 60.0	15.0	5 02.0	+ 60.0	15.0	6 00.0	+ 60.0	15.0	6
7	0 14.2	+ 59.9	14.9	1 12.2	+ 59.9	14.9	2 10.1	+ 60.0	14.9	3 08.1	+ 60.0	14.9	4 06.1	+ 60.0	14.9	5 04.1	+ 60.0	14.9	6 02.0	+ 60.0	15.0	7 00.0	+ 60.0	15.0	7
8	1 14.1	+ 60.0	14.9	2 12.1	+ 60.0	14.9	3 10.1	+ 60.0	14.9	4 08.1	+ 60.0	14.9	5 06.1	+ 60.0	14.9	6 04.1	+ 60.0	14.9	7 02.0	+ 60.0	15.0	8 00.0	+ 60.0	15.0	8
9	2 14.1	+ 60.0	14.8	3 12.1	+ 60.0	14.8	4 10.1	+ 60.0	14.9	5 08.1	+ 60.0	14.9	6 06.1	+ 60.0	14.9	7 04.1	+ 60.0	14.9	8 02.0	+ 60.0	15.0	9 00.0	+ 60.0	15.0	9
10	3 14.1	+ 59.9	14.8	4 12.1	+ 60.0	14.8	5 10.1	+ 60.0	14.8	6 08.1	+ 60.0	14.9	7 06.1	+ 60.0	14.9	8 04.1	+ 60.0	14.9	9 02.0	+ 60.0	15.0	10 00.0	+ 60.0	15.0	10
11	4 14.0	+ 60.0	14.8	5 12.1	+ 59.9	14.8	6 10.1	+ 60.0	14.8	7 08.1	+ 60.0	14.8	8 06.1	+ 60.0	14.9	9 04.1	+ 60.0	14.9	10 02.0	+ 60.0	15.0	11 00.0	+ 60.0	15.0	11
12	5 14.0	+ 60.0	14.7	6 12.0	+ 60.0	14.8	7 10.1	+ 59.9	14.8	8 08.1	+ 60.0	14.8	9 06.1	+ 60.0	14.9	10 04.1	+ 60.0	14.9	11 02.0	+ 60.0	14.9	12 00.0	+ 60.0	15.0	12
13	6 14.0	+ 60.0	14.7	7 12.0	+ 60.0	14.7	8 10.0	+ 60.0	14.8	9 08.1	+ 60.0	14.8	10 06.1	+ 60.0	14.8	11 04.1	+ 60.0	14.9	12 02.0	+ 60.0	14.9	13 00.0	+ 60.0	15.0	13
14	7 14.0	+ 59.9	14.7	8 12.0	+ 60.0	14.7	9 10.0	+ 60.0	14.7	10 08.1	+ 59.9	14.8	11 06.1	+ 60.0	14.8	12 04.1	+ 60.0	14.9	13 02.0	+ 60.0	14.9	14 00.0	+ 60.0	15.0	14
15	8 13.9	+ 60.0	14.6	9 12.0	+ 60.0	14.7	10 10.0	+ 60.0	14.7	11 08.0	+ 60.0	14.8	12 06.1	+ 59.9	14.8	13 04.1	+ 60.0	14.9	14 02.0	+ 60.0	14.9	15 00.0	+ 60.0	15.0	15
16	9 13.9	+ 60.0	14.6	10 12.0	+ 59.9	14.6	11 10.0	+ 60.0	14.7	12 08.0	+ 60.0	14.7	13 06.0	+ 60.0	14.8	14 04.1	+ 59.9	14.9	15 02.0	+ 60.0	14.9	16 00.0	+ 60.0	15.0	16
17	10 13.9	+ 59.9	14.6	11 11.9	+ 60.0	14.6	12 10.0	+ 60.0	14.7	13 08.0	+ 60.0	14.7	14 06.0	+ 60.0	14.8	15 04.0	+ 60.0	14.9	16 02.0	+ 60.0	14.9	17 00.0	+ 60.0	15.0	17
18	11 13.8	+ 60.0	14.5	12 11.9	+ 60.0	14.6	13 10.0	+ 60.0	14.6	14 08.0	+ 60.0	14.7	15 06.0	+ 60.0	14.8	16 04.0	+ 60.0	14.8	17 02.0	+ 60.0	14.9	18 00.0	+ 60.0	15.0	18
19	12 13.8	+ 60.0	14.5	13 11.9	+ 60.0	14.6	14 10.0	+ 59.9	14.6	15 08.0	+ 60.0	14.7	16 06.0	+ 60.0	14.8	17 04.0	+ 60.0	14.8	18 02.0	+ 60.0	14.9	19 00.0	+ 60.0	15.0	19
20	13 13.8	+ 59.9	14.5	14 11.9	+ 59.9	14.5	15 09.9	+ 60.0	14.6	16 08.0	+ 60.0	14.7	17 06.0	+ 60.0	14.7	18 04.0	+ 60.0	14.8	19 02.0	+ 60.0	14.9	20 00.0	+ 60.0	15.0	20
21	14 13.7	+ 60.0	14.4	15 11.8	+ 60.0	14.5	16 09.9	+ 60.0	14.6	17 08.0	+ 60.0	14.6	18 06.0	+ 60.0	14.7	19 04.0	+ 60.0	14.8	20 02.0	+ 60.0	14.9	21 00.0	+ 60.0	15.0	21
22	15 13.7	+ 60.0	14.4	16 11.8	+ 60.0	14.5	17 09.9	+ 60.0	14.5	18 08.0	+ 60.0	14.6	19 06.0	+ 60.0	14.7	20 04.0	+ 60.0	14.8	21 02.0	+ 60.0	14.9	22 00.0	+ 60.0	15.0	22
23	16 13.7	+ 59.9	14.4	17 11.8	+ 60.0	14.4	18 09.9	+ 60.0	14.5	19 08.0	+ 59.9	14.6	20 06.0	+ 60.0	14.7	21 04.0	+ 60.0	14.8	22 02.0	+ 60.0	14.9	23 00.0	+ 60.0	15.0	23
24	17 13.6	+ 60.0	14.3	18 11.8	+ 59.9	14.4	19 09.9	+ 60.0	14.5	20 07.9	+ 60.0	14.6	21 06.0	+ 60.0	14.7	22 04.0	+ 60.0	14.8	23 02.0	+ 60.0	14.9	24 00.0	+ 60.0	15.0	24
25	18 13.6	+ 60.0	14.3	19 11.7	+ 60.0	14.4	20 09.9	+ 59.9	14.5	21 07.9	+ 60.0	14.6	22 06.0	+ 60.0	14.7	23 04.0	+ 60.0	14.8	24 02.0	+ 60.0	14.9	25 00.0	+ 60.0	15.0	25
26	19 13.6	+ 59.9	14.3	20 11.7	+ 60.0	14.4	21 09.8	+ 60.0	14.4	22 07.9	+ 60.0	14.5	23 06.0	+ 60.0	14.6	24 04.0	+ 60.0	14.8	25 02.0	+ 60.0	14.9	26 00.0	+ 60.0	15.0	26
27	20 13.5	+ 60.0	14.2	21 11.7	+ 60.0	14.3	22 09.8	+ 60.0	14.4	23 07.9	+ 60.0	14.5	24 06.0	+ 60.0	14.6	25 04.0	+ 60.0	14.7	26 02.0	+ 60.0	14.9	27 00.0	+ 60.0	15.0	27
28	21 13.5	+ 60.0	14.2	22 11.7	+ 59.9	14.3	23 09.8	+ 60.0	14.4	24 07.9	+ 60.0	14.5	25 06.0	+ 60.0	14.6	26 04.0	+ 60.0	14.7	27 02.0	+ 60.0	14.9	28 00.0	+ 60.0	15.0	28
29	22 13.5	+ 59.9	14.2	23 11.6	+ 60.0	14.3	24 09.8	+ 60.0	14.4	25 07.9	+ 60.0	14.5	26 06.0	+ 60.0	14.6	27 04.0	+ 60.0	14.7	28 02.0	+ 60.0	14.9	29 00.0	+ 60.0	15.0	29
30	23 13.4	+ 60.0	14.1	24 11.6	+ 60.0	14.2	25 09.8	+ 59.9	14.3	26 07.9	+ 60.0	14.5	27 06.0	+ 60.0	14.6	28 04.0	+ 60.0	14.7	29 02.0	+ 60.0	14.9	30 00.0	+ 60.0	15.0	30
31	24 13.4	+ 60.0	14.1	25 11.6	+ 60.0	14.2	26 09.7	+ 60.0	14.3	27 07.9	+ 60.0	14.4	28 06.0	+ 59.9	14.6	29 04.0	+ 60.0	14.7	30 02.0	+ 60.0	14.8	31 00.0	+ 60.0	15.0	31
32	25 13.4	+ 59.9	14.0	26 11.6	+ 59.9	14.2	27 09.7	+ 60.0	14.3	28 07.9	+ 59.9	14.4	29 05.9	+ 60.0	14.5	30 04.0	+ 60.0	14.7	31 02.0	+ 60.0	14.8	32 00.0	+ 60.0	15.0	32
33	26 13.3	+ 60.0	14.0	27 11.5	+ 60.0	14.1	28 09.7	+ 60.0	14.3	29 07.8	+ 60.0	14.4	30 05.9	+ 60.0	14.5	31 04.0	+ 60.0	14.7	32 02.0	+ 60.0	14.8	33 00.0	+ 60.0	15.0	33
34	27 13.3	+ 60.0	14.0	28 11.5	+ 60.0	14.1	29 09.7	+ 60.0	14.2	30 07.8	+ 60.0	14.4	31 05.9	+ 60.0	14.5	32 04.0	+ 60.0	14.7	33 02.0	+ 60.0	14.8	34 00.0	+ 60.0	15.0	34
35	28 13.3	+ 59.9	13.9	29 11.5	+ 59.9	14.1	30 09.7	+ 59.9	14.2	31 07.8	+ 60.0	14.3	32 05.9	+ 60.0	14.5	33 04.0	+ 60.0	14.7	34 02.0	+ 60.0	14.8	35 00.0	+ 60.0	15.0	35
36	29 13.2	+ 60.0	13.9	30 11.4	+ 60.0	14.0	31 09.6	+ 60.0	14.2	32 07.8	+ 60.0	14.3	33 05.9	+ 60.0	14.5	34 04.0	+ 60.0	14.6	35 02.0	+ 60.0	14.8	36 00.0	+ 60.0	15.0	36
37	30 13.2	+ 59.9	13.8	31 11.4	+ 60.0	14.0	32 09.6	+ 60.0	14.1	33 07.8	+ 60.0	14.3	34 05.9	+ 60.0	14.5	35 04.0	+ 60.0	14.6	36 02.0	+ 60.0	14.8	37 00.0	+ 60.0	15.0	37
38	31 13.1	+ 60.0	13.8	32 11.4	+ 60.0	13.9	33 09.6	+ 60.0	14.1	34 07.8	+ 60.0	14.3	35 05.9	+ 60.0	14.4	36 04.0	+ 60.0	14.6	37 02.0	+ 60.0	14.8	38 00.0	+ 60.0	15.0	38
39	32 13.1	+ 60.0	13.8	33 11.4	+ 59.9	13.9	34 09.6	+ 60.0	14.1	35 07.8	+ 59.9	14.2	36 05.9	+ 60.0	14.4	37 04.0	+ 60.0	14.6	38 02.0	+ 60.0	14.8	39 00.0	+ 60.0	15.0	39
40	33 13.1	+ 59.9	13.7	34 11.3	+ 60.0	13.9	35 09.6	+ 59.9	14.0	36 07.7	+ 60.0	14.2	37 05.9	+ 60.0	14.4	38 04.0	+ 60.0	14.6	39 02.0	+ 60.0	14.8	40 00.0	+ 60.0	15.0	40
41	34 13.0	+ 60.0	13.7	35 11.3	+ 60.0	13.8	36 09.5	+ 60.0	14.0	37 07.7	+ 60.0	14.2	38 05.9	+ 60.0	14.4	39 04.0	+ 60.0	14.6	40 02.0	+ 60.0	14.8	41 00.0	+ 60.0	15.0	41
42	35 13.0	+ 59.9	13.6	36 11.3	+ 59.9	13.8	37 09.5	+ 60.0	14.0	38 07.7	+ 60.0	14.2	39 05.9	+ 60.0	14.3	40 04.0	+ 60.0	14.6	41 02.0	+ 60.0	14.8	42 00.0	+ 60.0	15.0	42
43	36 12.9	+ 60.0	13.6	37 11.2	+ 60.0	13.7	38 09.5	+ 60.0	13.9	39 07.7	+ 60.0	14.1	40 05.9	+ 59.9	14.3	41 04.0	+ 60.0	14.5	42 02.0	+ 60.0	14.8	43 00.0	+ 60.0	15.0	43
44	37 12.9	+ 59.9	13.5	38 11.2	+ 60.0	13.7	39 09.5	+ 59.9	13.9	40 07.7	+ 60.0	14.1	41 05.8	+ 60.0	14.3	42 04.0	+ 60.0	14.5	43 02.0	+ 60.0	14.8	44 00.0	+ 60.0	15.0	44
45	38 12.8	+ 60.0	13.5	39 11.2	+ 59.9	13.7	40 09.4	+ 60.0	13.9	41 07.7	+ 59.9	14.1	42 05.8	+ 60.0	14.3	43 04.0	+ 59.9	14.5	44 02.0	+ 60.0	14.7	45 00.0	+ 60.0	15.0	45
46	39 12.8	+ 59.9	13.4	40 11.1	+ 60.0	13.6	41 09.4	+ 60.0	13.8	42 07.6	+ 60.0	14.0	43 05.8	+ 60.0	14.3	44 03.9	+ 60.0	14.5	45 02.0	+ 60.0	14.7	46 00.0	+ 60.0	15.0	46
47	40 12.7	+ 60.0	13.4	41 11.1	+ 59.9	13.6	42 09.4	+ 60.0	13.8	43 07.6	+ 60.0	14.0	44 05.8	+ 60.0	14.2	45 03.9	+ 60.0	14.5	46 02.0	+ 60.0	14.7	47 00.0	+ 60.0	15.0	47
48	41 12.7	+ 59.9	13.3	42 11.0	+ 60.0	13.5	43 09.4	+ 59.9	13.7	44 07.6	+ 60.0	14.0	45 05.8	+ 60.0	14.2	46 03.9	+ 60.0	14.5	47 02.0	+ 60.0	14.7	48 00.0	+ 60.0	15.0	48
49	42 12.6	+ 60.0	13.3	43 11.0	+ 60.0	13.5	44 09.3	+ 60.0	13.7	45 07.6	+ 60.0	13.9	46 05.8	+ 60.0	14.2	47 03.9	+ 60.0	14.4	48 02.0	+ 60.0	14.7	49 00.0	+ 60.0	15.0	49
50	43 12.6	+ 59.9	13.2	44 11.0	+ 59.9	13.4	45 09.3	+ 60.0	13.6	46 07.6	+ 59.9	13.9	47 05.8	+ 60.0	14.1	48 03.9	+ 60.0	14.4	49 02.0	+ 60.0	14.7	50 00.0	+ 60.0	15.0	50
51	44 12.5	+ 60.0	13.1	45 10.9	+ 60.0	13.4	46 09.3	+ 59.9	13.6	47 07.5	+ 60.0	13.9	48 05.8	+ 60.0	14.1	49 03.9	+ 60.0	14.4	50 02.0	+ 60.0	14.7	51 00.0	+ 60.0	15.0	51
52	45 12.5	+ 59.9	13.1	46 10.9	+ 59.9	13.3	47 09.2	+ 60.0	13.6	48 07.5	+ 60.0	13.8	49 05.8	+ 59.9	14.1	50 03.9	+ 60.0	14.4	51 02.0	+ 60.0	14.7	52 00.0	+ 60.0	15.0	52
53	46 12.4	+ 59.9	13.0	47 10.8	+ 60.0	13.2	48 09.2	+ 60.0	13.5	49 07.5	+ 60.0	13.8	50 05.7	+ 60.0	14.1	51 03.9	+ 60.0	14.4	52 02.0	+ 60.0	14.7	53 00.0	+ 60.0	15.0	53
54	47 12.3	+ 60.0	12.9	48 10.8	+ 59.9	13.2	49 09.2	+ 59.9	13.5	50 07.5	+ 60.0	13.7	51 05.7	+ 60.0	14.0	52 03.9	+ 60.0	14.3	53 02.0	+ 60.0	14.7	54 00.0	+ 60.0	15.0	54
55	48 12.3	+ 59.9	12.9	49 10.7	+ 60.0	13.1	50 09.1	+ 60.0	13.4	51 07.5	+ 59.9	13.7	52 05.7	+ 60.0	14.0	53 03.9	+ 60.0	14.3	54 02.0	+ 60.0	14.6	55 00.0	+ 60.0	15.0	55
56	49 12.2	+ 59.9	12.8	50 10.7	+ 59.9	13.1	51 09.1	+ 59.9	13.3	52 07.4	+ 60.0	13.6	53 05.7	+ 60.0	13.9	54 03.9	+ 60.0	14.3	55 02.0	+ 60.0	14.6	56 00.0	+ 60.0	15.0	56
57	50 12.1	+ 59.9	12.7	51 10.6	+ 60.0	13.0	52 09.0	+ 60.0	13.3	53 07.4	+ 60.0	13.6	54 05.7	+ 60.0	13.9	55 03.9	+ 60.0	14.3	56 02.0	+ 60.0	14.6	57 00.0	+ 60.0	15.0	57
58	51 12.0	+ 60.0	12.6	52 10.6	+ 59.9	12.9	53 09.0	+ 60.0	13.2	54 07.4	+ 59.9	13.5	55 05.7	+ 60.0	13.9	56 03.9	+ 60.0	14.2	57 02.0	+ 60.0	14.6	58 00.0	+ 60.0	15.0	58
59	52 12.0	+ 59.9	12.6	53 10.5	+ 59.9	12.9	54 09.0	+ 59.9	13.2	55 07.3	+ 60.0	13.5	56 05.7	+ 59.9	13.8	57 03.9	+ 60.0	14.2	58 02.0	+ 60.0	14.6	59 00.0	+ 60.0	15.0	59
60	53 11.9	+ 59.9	12.5	54 10.4	+ 60.0	12.8	55 08.9	+ 60.0	13.1	56 07.3	+ 60.0	13.4	57 05.6	+ 60.0	13.8	58 03.9	+ 60.0	14.2	59 02.0	+ 60.0	14.6	60 00.0	+ 60.0	15.0	60
61	54 11.8	+ 59.9	12.4	55 10.4	+ 59.9	12.7	56 08.9	+ 59.9	13.0	57 07.3	+ 60.0	13.4	58 05.6	+ 60.0	13.7	59 03.9	+ 59.9	14.1	60 02.0	+ 60.0	14.5	61 00.0	+ 60.0	15.0	61
62	55 11.7	+ 59.9	12.3	56 10.3	+ 59.9	12.6	57 08.8	+ 60.0	12.9	58 07.3	+ 59.9	13.3	59 05.6	+ 60.0	13.7	60 03.8	+ 60.0	14.1	61 02.0	+ 60.0	14.5	62 00.0	+ 60.0	15.0	62
63	56 11.6	+ 59.9	12.2	57 10.2	+ 60.0	12.5	58 08.8	+ 59.9	12.9	59 07.2	+ 60.0	13.2	60 05.6	+ 60.0	13.6	61 03.8	+ 60.0	14.1	62 02.0	+ 60.0	14.5	63 00.0	+ 60.0	15.0	63
64	57 11.5	+ 59.9	12.1	58 10.2	+ 59.9	12.4	59 08.7	+ 59.9	12.8	60 07.2	+ 59.9	13.2	61 05.6	+ 59.9	13.6	62 03.8	+ 60.0	14.0	63 02.0	+ 60.0	14.5	64 00.0	+ 60.0	15.0	64
65	58 11.4	+ 59.9	12.0	59 10.1	+ 59.9	12.3	60 08.6	+ 60.0	12.7	61 07.1	+ 60.0	13.1	62 05.5	+ 60.0	13.5	63 03.8	+ 60.0	14.0	64 02.0	+ 60.0	14.5	65 00.0	+ 60.0	15.0	65
66	59 11.3	+ 59.9	11.9	60 10.0	+ 59.9	12.2	61 08.6	+ 59.9	12.6	62 07.1	+ 59.9	13.0	63 05.5	+ 60.0	13.5	64 03.8	+ 60.0	13.9	65 02.0	+ 60.0	14.4	66 00.0	+ 60.0	15.0	66
67	60 11.2	+ 59.9	11.7	61 09.9	+ 59.9	12.1	62 08.5	+ 59.9	12.5	63 07.0	+ 60.0	12.9	64 05.5	+ 59.9	13.4	65 03.8	+ 60.0	13.9	66 02.0	+ 60.0	14.4	67 00.0	+ 60.0	15.0	67
68	61 11.1	+ 59.8	11.6	62 09.8	+ 59.9	12.0	63 08.4	+ 60.0	12.4	64 07.0	+ 59.9	12.8	65 05.4	+ 60.0	13.3	66 03.8	+ 60.0	13.8	67 02.0	+ 60.0	14.4	68 00.0	+ 60.0	15.0	68
69	62 10.9	+ 59.9	11.5	63 09.7	+ 59.9	11.9	64 08.4	+ 59.9	12.3	65 06.9	+ 60.0	12.7	66 05.4	+ 60.0	13.2	67 03.8	+ 59.9	13.8	68 02.0	+ 60.0	14.4	69 00.0	+ 60.0	15.0	69
70	63 10.8	+ 59.8	11.3	64 09.6	+ 59.9	11.7	65 08.3	+ 59.9	12.2	66 06.9	+ 59.9	12.6	67 05.4	+ 59.9	13.1	68 03.7	+ 60.0	13.7	69 02.0	+ 59.9	14.3	70 00.0	+ 60.0	15.0	70
71	64 10.6	+ 59.9	11.2	65 09.5	+ 59.8	11.6	66 08.2	+ 59.9	12.0	67 06.8	+ 60.0	12.5	68 05.3	+ 60.0	13.1	69 03.7	+ 60.0	13.6	70 01.9	+ 60.0	14.3	71 00.0	+ 60.0	15.0	71
72	65 10.5	+ 59.8	11.0	66 09.3	+ 59.9	11.4	67 08.1	+ 59.9	11.9	68 06.8	+ 59.9	12.4	69 05.3	+ 60.0	12.9	70 03.7	+ 60.0	13.6	71 01.9	+ 60.0	14.2	72 00.0	+ 60.0	15.0	72
73	66 10.3	+ 59.8	10.8	67 09.2	+ 59.8	11.2	68 08.0	+ 59.9	11.7	69 06.7	+ 59.9	12.3	70 05.3	+ 59.9	12.8	71 03.7	+ 60.0	13.5	72 01.9	+ 60.0	14.2	73 00.0	+ 60.0	15.0	73
74	67 10.1	+ 59.8	10.6	68 09.0	+ 59.9	11.1	69 07.9	+ 59.8	11.6	70 06.6	+ 59.9	12.1	71 05.2	+ 59.9	12.7	72 03.7	+ 59.9	13.4	73 01.9	+ 60.0	14.1	74 00.0	+ 60.0	15.0	74
75	68 09.9	+ 59.8	10.4	69 08.9	+ 59.8	10.8	70 07.7	+ 59.9	11.4	71 06.5	+ 59.9	11.9	72 05.1	+ 60.0	12.6	73 03.6	+ 60.0	13.3	74 01.9	+ 60.0	14.1	75 00.0	+ 60.0	15.0	75
76	69 09.7	+ 59.7	10.1	70 08.7	+ 59.8	10.6	71 07.6	+ 59.9	11.2	72 06.4	+ 59.9	11.8	73 05.1	+ 59.9	12.4	74 03.6	+ 60.0	13.2	75 01.9	+ 60.0	14.0	76 00.0	+ 60.0	15.0	76
77	70 09.4	+ 59.8	9.9	71 08.5	+ 59.8	10.4	72 07.5	+ 59.8	10.9	73 06.3	+ 59.9	11.6	74 05.0	+ 59.9	12.3	75 03.6	+ 59.9	13.1	76 01.9	+ 60.0	14.0	77 00.0	+ 60.0	15.0	77
78	71 09.2	+ 59.6	9.6	72 08.3	+ 59.7	10.1	73 07.3	+ 59.8	10.7	74 06.2	+ 59.8	11.3	75 04.9	+ 59.9	12.1	76 03.5	+ 60.0	12.9	77 01.9	+ 60.0	13.9	78 00.0	+ 60.0	15.0	78
79	72 08.8	+ 59.7	9.3	73 08.0	+ 59.7	9.8	74 07.1	+ 59.8	10.4	75 06.0	+ 59.9	11.1	76 04.8	+ 59.9	11.8	77 03.5	+ 59.9	12.7	78 01.9	+ 60.0	13.8	79 00.0	+ 60.0	15.0	79
80	73 08.5	+ 59.6	8.9	74 07.7	+ 59.7	9.5	75 06.9	+ 59.7	10.1	76 05.9	+ 59.8	10.8	77 04.7	+ 59.9	11.6	78 03.4	+ 60.0	12.5	79 01.9	+ 59.9	13.7	80 00.0	+ 60.0	15.0	80
81	74 08.1	+ 59.6	8.5	75 07.4	+ 59.7	9.1	76 06.6	+ 59.7	9.7	77 05.7	+ 59.8	10.4	78 04.6	+ 59.9	11.3	79 03.4	+ 59.9	12.3	80 01.8	+ 60.0	13.5	81 00.0	+ 60.0	15.0	81
82	75 07.7	+ 59.5	8.1	76 07.1	+ 59.6	8.6	77 06.3	+ 59.7	9.3	78 05.5	+ 59.7	10.1	79 04.5	+ 59.8	11.0	80 03.3	+ 59.9	12.0	81 01.8	+ 60.0	13.4	82 00.0	+ 60.0	15.0	82
83	76 07.2	+ 59.5	7.6	77 06.7	+ 59.5	8.1	78 06.0	+ 59.6	8.8	79 05.2	+ 59.7	9.6	80 04.3	+ 59.8	10.5	81 03.2	+ 59.9	11.7	82 01.8	+ 60.0	13.1	83 00.0	+ 60.0	15.0	83
84	77 06.7	+ 59.3	7.0	78 06.2	+ 59.4	7.5	79 05.6	+ 59.5	8.2	80 04.9	+ 59.7	9.0	81 04.1	+ 59.8	10.0	82 03.1	+ 59.8	11.3	83 01.8	+ 59.9	12.9	84 00.0	+ 60.0	15.0	84
85	78 06.0	+ 59.2	6.3	79 05.6	+ 59.3	6.8	80 05.1	+ 59.5	7.5	81 04.6	+ 59.5	8.4	82 03.9	+ 59.6	9.4	83 02.9	+ 59.8	10.7	84 01.7	+ 59.9	12.5	85 00.0	+ 60.0	15.0	85
86	79 05.2	+ 59.1	5.5	80 04.9	+ 59.2	6.0	81 04.6	+ 59.3	6.7	82 04.1	+ 59.4	7.5	83 03.5	+ 59.6	8.6	84 02.7	+ 59.8	10.0	85 01.6	+ 59.9	12.0	86 00.0	+ 60.0	15.0	86
87	80 04.3	+ 58.9	4.5	81 04.1	+ 59.0	5.0	82 03.9	+ 59.0	5.6	83 03.5	+ 59.2	6.4	84 03.1	+ 59.4	7.5	85 02.5	+ 59.6	9.0	86 01.5	+ 59.9	11.3	87 00.0	+ 60.0	15.0	87
88	81 03.2	+ 58.6	3.3	82 03.1	+ 58.7	3.7	83 02.9	+ 58.8	4.3	84 02.7	+ 58.9	5.0	85 02.5	+ 59.0	6.0	86 02.1	+ 59.3	7.5	87 01.4	+ 59.6	10.0	88 00.0	+ 60.0	15.0	88
89	82 01.8	+ 58.2	1.9	83 01.8	+ 58.2	2.1	84 01.7	+ 58.3	2.5	85 01.6	+ 58.4	3.0	86 01.5	+ 58.5	3.7	87 01.4	+ 58.6	5.0	88 01.0	*+ 59.0* •	7.5	89 00.0	+ 60.0	15.0	89
90	83 00.0	+ 57.6	0.0	84 00.0	+ 57.6	0.0	85 00.0	+ 57.5	0.0	86 00.0	+ 57.3	0.0	87 00.0	*+ 57.0* •	0.0	88 00.0	*+ 56.0* •	0.0	89 00.0	*+ 44.3* •	0.0	90 00.0	– 60.0	7.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 165°, 195°

Dec.	**83°**			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			**Dec.**
	Hc	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 43.7	+59.9	163.9	5 46.0	+60.0	163.9	4 48.4	+59.9	163.9	3 50.7	+60.0	164.0	2 53.0	+60.0	164.0	1 55.3	+60.0	164.0	0 57.7	+60.0	164.0	0 00.0	+60.0	164.0	**0**
1	7 43.6	+60.0	163.9	6 46.0	+60.0	163.9	5 48.3	+60.0	163.9	4 50.7	+60.0	163.9	3 53.0	+60.0	164.0	2 55.3	+60.0	164.0	1 57.7	+60.0	164.0	1 00.0	+60.0	164.0	**1**
2	8 43.6	+59.9	163.8	7 46.0	+59.9	163.9	6 48.3	+60.0	163.9	5 50.7	+60.0	163.9	4 53.0	+60.0	164.0	3 55.3	+60.0	164.0	2 57.7	+60.0	164.0	2 00.0	+60.0	164.0	**2**
3	9 43.5	+60.0	163.8	8 45.9	+60.0	163.8	7 48.3	+60.0	163.9	6 50.7	+59.9	163.9	5 53.0	+60.0	163.9	4 55.3	+60.0	164.0	3 57.7	+60.0	164.0	3 00.0	+60.0	164.0	**3**
4	10 43.5	+60.0	163.7	9 45.9	+60.0	163.8	8 48.3	+60.0	163.8	7 50.6	+60.0	163.9	6 53.0	+60.0	163.9	5 55.3	+60.0	164.0	4 57.7	+60.0	164.0	4 00.0	+60.0	164.0	**4**
5	11 43.5	+59.9	163.7	10 45.9	+60.0	163.8	9 48.3	+59.9	163.8	8 50.6	+60.0	163.9	7 53.0	+60.0	163.9	6 55.3	+60.0	163.9	5 57.7	+60.0	164.0	5 00.0	+60.0	164.0	**5**
6	12 43.4	+60.0	163.7	11 45.9	+59.9	163.7	10 48.2	+60.0	163.8	9 50.6	+60.0	163.8	8 53.0	+60.0	163.9	7 55.3	+60.0	163.9	6 57.7	+60.0	164.0	6 00.0	+60.0	164.0	**6**
7	13 43.4	+60.0	163.6	12 45.8	+60.0	163.7	11 48.2	+60.0	163.8	10 50.6	+60.0	163.8	9 53.0	+60.0	163.9	8 55.3	+60.0	163.9	7 57.7	+60.0	164.0	7 00.0	+60.0	164.0	**7**
8	14 43.4	+59.9	163.6	13 45.8	+60.0	163.7	12 48.2	+60.0	163.7	11 50.6	+60.0	163.8	10 53.0	+60.0	163.9	9 55.3	+60.0	163.9	8 57.7	+60.0	164.0	8 00.0	+60.0	164.0	**8**
9	15 43.3	+60.0	163.6	14 45.8	+59.9	163.6	13 48.2	+60.0	163.7	12 50.6	+60.0	163.8	11 53.0	+60.0	163.8	10 55.3	+60.0	163.9	9 57.7	+60.0	164.0	9 00.0	+60.0	164.0	**9**
10	16 43.3	+60.0	163.5	15 45.7	+60.0	163.6	14 48.2	+60.0	163.7	13 50.6	+60.0	163.8	12 53.0	+60.0	163.8	11 55.3	+60.0	163.9	10 57.7	+60.0	163.9	10 00.0	+60.0	164.0	**10**
11	17 43.3	+59.9	163.5	16 45.7	+60.0	163.6	15 48.2	+59.9	163.7	14 50.6	+60.0	163.7	13 53.0	+59.9	163.8	12 55.3	+60.0	163.9	11 57.7	+60.0	163.9	11 00.0	+60.0	164.0	**11**
12	18 43.2	+60.0	163.5	17 45.7	+60.0	163.6	16 48.1	+60.0	163.6	15 50.6	+59.9	163.7	14 52.9	+60.0	163.8	13 55.3	+60.0	163.9	12 57.7	+60.0	163.9	12 00.0	+60.0	164.0	**12**
13	19 43.2	+59.9	163.4	18 45.7	+59.9	163.5	17 48.1	+60.0	163.6	16 50.5	+60.0	163.7	15 52.9	+60.0	163.8	14 55.3	+60.0	163.9	13 57.7	+60.0	163.9	13 00.0	+60.0	164.0	**13**
14	20 43.1	+60.0	163.4	19 45.6	+60.0	163.5	18 48.1	+60.0	163.6	17 50.5	+60.0	163.7	16 52.9	+60.0	163.8	15 55.3	+60.0	163.9	14 57.7	+60.0	163.9	14 00.0	+60.0	164.0	**14**
15	21 43.1	+60.0	163.3	20 45.6	+60.0	163.5	19 48.1	+60.0	163.6	18 50.5	+60.0	163.7	17 52.9	+60.0	163.8	16 55.3	+60.0	163.8	15 57.7	+60.0	163.9	15 00.0	+60.0	164.0	**15**
16	22 43.1	+59.9	163.3	21 45.6	+60.0	163.4	20 48.1	+59.9	163.5	19 50.5	+60.0	163.6	18 52.9	+60.0	163.7	17 55.3	+60.0	163.8	16 57.7	+60.0	163.9	16 00.0	+60.0	164.0	**16**
17	23 43.0	+60.0	163.3	22 45.6	+59.9	163.4	21 48.0	+60.0	163.5	20 50.5	+60.0	163.6	19 52.9	+60.0	163.7	18 55.3	+60.0	163.8	17 57.7	+60.0	163.9	17 00.0	+60.0	164.0	**17**
18	24 43.0	+59.9	163.2	23 45.5	+60.0	163.4	22 48.0	+60.0	163.5	21 50.5	+60.0	163.6	20 52.9	+60.0	163.7	19 55.3	+60.0	163.8	18 57.7	+60.0	163.9	18 00.0	+60.0	164.0	**18**
19	25 42.9	+60.0	163.2	24 45.5	+60.0	163.3	23 48.0	+60.0	163.5	22 50.5	+60.0	163.6	21 52.9	+60.0	163.7	20 55.3	+60.0	163.8	19 57.7	+60.0	163.9	19 00.0	+60.0	164.0	**19**
20	26 42.9	+60.0	163.1	25 45.5	+59.9	163.3	24 48.0	+60.0	163.4	23 50.5	+59.9	163.6	22 52.9	+60.0	163.7	21 55.3	+60.0	163.8	20 57.7	+60.0	163.9	20 00.0	+60.0	164.0	**20**
21	27 42.9	+59.9	163.1	26 45.4	+60.0	163.3	25 48.0	+59.9	163.4	24 50.4	+60.0	163.5	23 52.9	+60.0	163.7	22 55.3	+60.0	163.8	21 57.7	+60.0	163.9	21 00.0	+60.0	164.0	**21**
22	28 42.8	+60.0	163.1	27 45.4	+60.0	163.2	26 47.9	+60.0	163.4	25 50.4	+60.0	163.5	24 52.9	+60.0	163.6	23 55.3	+60.0	163.8	22 57.7	+60.0	163.9	22 00.0	+60.0	164.0	**22**
23	29 42.8	+59.9	163.0	28 45.4	+59.9	163.2	27 47.9	+60.0	163.3	26 50.4	+60.0	163.5	25 52.9	+60.0	163.6	24 55.3	+60.0	163.8	23 57.7	+60.0	163.9	23 00.0	+60.0	164.0	**23**
24	30 42.7	+60.0	163.0	29 45.3	+60.0	163.1	28 47.9	+60.0	163.3	27 50.4	+60.0	163.5	26 52.9	+59.9	163.6	25 55.3	+60.0	163.7	24 57.7	+60.0	163.9	24 00.0	+60.0	164.0	**24**
25	31 42.7	+59.9	162.9	30 45.3	+60.0	163.1	29 47.9	+59.9	163.3	28 50.4	+60.0	163.4	27 52.8	+60.0	163.6	26 55.3	+60.0	163.7	25 57.7	+60.0	163.9	25 00.0	+60.0	164.0	**25**
26	32 42.6	+60.0	162.9	31 45.3	+59.9	163.1	30 47.8	+60.0	163.2	29 50.4	+60.0	163.4	28 52.8	+60.0	163.6	27 55.3	+60.0	163.7	26 57.7	+60.0	163.9	26 00.0	+60.0	164.0	**26**
27	33 42.6	+59.9	162.8	32 45.2	+60.0	163.0	31 47.8	+60.0	163.2	30 50.4	+59.9	163.4	29 52.8	+60.0	163.5	28 55.3	+60.0	163.7	27 57.7	+60.0	163.9	27 00.0	+60.0	164.0	**27**
28	34 42.5	+60.0	162.8	33 45.2	+60.0	163.0	32 47.8	+60.0	163.2	31 50.3	+60.0	163.4	30 52.8	+60.0	163.5	29 55.3	+60.0	163.7	28 57.7	+60.0	163.8	28 00.0	+60.0	164.0	**28**
29	35 42.5	+59.9	162.7	34 45.2	+59.9	162.9	33 47.8	+59.9	163.1	32 50.3	+60.0	163.3	31 52.8	+60.0	163.5	30 55.3	+60.0	163.7	29 57.7	+60.0	163.8	29 00.0	+60.0	164.0	**29**
30	36 42.4	+60.0	162.7	35 45.1	+60.0	162.9	34 47.7	+60.0	163.1	33 50.3	+60.0	163.3	32 52.8	+60.0	163.5	31 55.3	+60.0	163.7	30 57.7	+60.0	163.8	30 00.0	+60.0	164.0	**30**
31	37 42.4	+59.9	162.6	36 45.1	+59.9	162.8	35 47.7	+60.0	163.1	34 50.3	+60.0	163.3	33 52.8	+60.0	163.5	32 55.3	+59.9	163.7	31 57.7	+60.0	163.8	31 00.0	+60.0	164.0	**31**
32	38 42.3	+60.0	162.6	37 45.0	+60.0	162.8	36 47.7	+60.0	163.0	35 50.3	+60.0	163.2	34 52.8	+60.0	163.4	33 55.2	+60.0	163.6	32 57.7	+59.9	163.8	32 00.0	+60.0	164.0	**32**
33	39 42.3	+59.9	162.5	38 45.0	+60.0	162.8	37 47.7	+59.9	163.0	36 50.3	+59.9	163.2	35 52.8	+60.0	163.4	34 55.2	+60.0	163.6	33 57.6	+60.0	163.8	33 00.0	+60.0	164.0	**33**
34	40 42.2	+60.0	162.5	39 45.0	+59.9	162.7	38 47.6	+60.0	163.0	37 50.2	+60.0	163.2	36 52.8	+60.0	163.4	35 55.2	+60.0	163.6	34 57.6	+60.0	163.8	34 00.0	+60.0	164.0	**34**
35	41 42.2	+59.9	162.4	40 44.9	+60.0	162.7	39 47.6	+60.0	162.9	38 50.2	+60.0	163.1	37 52.8	+60.0	163.4	36 55.2	+60.0	163.6	35 57.6	+60.0	163.8	35 00.0	+60.0	164.0	**35**
36	42 42.1	+59.9	162.3	41 44.9	+59.9	162.6	40 47.6	+59.9	162.9	39 50.2	+60.0	163.1	38 52.8	+59.9	163.4	37 55.2	+60.0	163.6	36 57.6	+60.0	163.8	36 00.0	+60.0	164.0	**36**
37	43 42.0	+60.0	162.3	42 44.8	+60.0	162.6	41 47.5	+60.0	162.8	40 50.2	+60.0	163.1	39 52.7	+60.0	163.3	38 55.2	+60.0	163.6	37 57.6	+60.0	163.8	37 00.0	+60.0	164.0	**37**
38	44 42.0	+59.9	162.2	43 44.8	+59.9	162.5	42 47.5	+60.0	162.8	41 50.2	+59.9	163.1	40 52.7	+60.0	163.3	39 55.2	+60.0	163.5	38 57.6	+60.0	163.8	38 00.0	+60.0	164.0	**38**
39	45 41.9	+59.9	162.1	44 44.7	+60.0	162.4	43 47.5	+59.9	162.7	42 50.1	+60.0	163.0	41 52.7	+60.0	163.3	40 55.2	+60.0	163.5	39 57.6	+60.0	163.8	39 00.0	+60.0	164.0	**39**
40	46 41.8	+59.9	162.1	45 44.7	+59.9	162.4	44 47.4	+60.0	162.7	43 50.1	+60.0	163.0	42 52.7	+60.0	163.3	41 55.2	+60.0	163.5	40 57.6	+60.0	163.8	40 00.0	+60.0	164.0	**40**
41	47 41.7	+60.0	162.0	46 44.6	+60.0	162.3	45 47.4	+60.0	162.6	44 50.1	+60.0	162.9	43 52.7	+60.0	163.2	42 55.2	+60.0	163.5	41 57.6	+60.0	163.8	41 00.0	+60.0	164.0	**41**
42	48 41.7	+59.9	161.9	47 44.6	+59.9	162.3	46 47.4	+59.9	162.6	45 50.1	+60.0	162.9	44 52.7	+60.0	163.2	43 55.2	+60.0	163.5	42 57.6	+60.0	163.7	42 00.0	+60.0	164.0	**42**
43	49 41.6	+59.9	161.8	48 44.5	+60.0	162.2	47 47.3	+60.0	162.5	46 50.1	+59.9	162.9	45 52.7	+60.0	163.2	44 55.2	+60.0	163.5	43 57.6	+60.0	163.7	43 00.0	+60.0	164.0	**43**
44	50 41.5	+59.9	161.8	49 44.5	+59.9	162.1	48 47.3	+60.0	162.5	47 50.0	+60.0	162.8	46 52.7	+59.9	163.1	45 55.2	+60.0	163.4	44 57.6	+60.0	163.7	44 00.0	+60.0	164.0	**44**
45	51 41.4	+59.9	161.7	50 44.4	+59.9	162.1	49 47.3	+59.9	162.4	48 50.0	+60.0	162.8	47 52.6	+60.0	163.1	46 55.2	+60.0	163.4	45 57.6	+60.0	163.7	45 00.0	+60.0	164.0	**45**
46	52 41.3	+59.9	161.6	51 44.3	+60.0	162.0	50 47.2	+60.0	162.4	49 50.0	+60.0	162.7	48 52.6	+60.0	163.1	47 55.2	+60.0	163.4	46 57.6	+60.0	163.7	46 00.0	+60.0	164.0	**46**
47	53 41.2	+59.9	161.5	52 44.3	+59.9	161.9	51 47.2	+59.9	162.3	50 50.0	+59.9	162.7	49 52.6	+60.0	163.0	48 55.2	+60.0	163.4	47 57.6	+60.0	163.7	47 00.0	+60.0	164.0	**47**
48	54 41.1	+59.9	161.4	53 44.2	+59.9	161.8	52 47.1	+60.0	162.2	51 49.9	+60.0	162.6	50 52.6	+60.0	163.0	49 55.2	+60.0	163.4	48 57.6	+60.0	163.7	48 00.0	+60.0	164.0	**48**
49	55 41.0	+59.9	161.3	54 44.1	+60.0	161.7	53 47.1	+59.9	162.2	52 49.9	+60.0	162.6	51 52.6	+60.0	163.0	50 55.2	+60.0	163.3	49 57.6	+60.0	163.7	49 00.0	+60.0	164.0	**49**
50	56 40.9	+59.9	161.2	55 44.1	+59.9	161.7	54 47.0	+60.0	162.1	53 49.9	+59.9	162.5	52 52.6	+59.9	162.9	51 55.2	+59.9	163.3	50 57.6	+60.0	163.7	50 00.0	+60.0	164.0	**50**
51	57 40.8	+59.9	161.1	56 44.0	+59.9	161.6	55 47.0	+59.9	162.0	54 49.8	+60.0	162.5	53 52.5	+60.0	162.9	52 55.1	+60.0	163.3	51 57.6	+60.0	163.7	51 00.0	+60.0	164.0	**51**
52	58 40.7	+59.9	160.9	57 43.9	+59.9	161.5	56 46.9	+60.0	162.0	55 49.8	+60.0	162.4	54 52.5	+60.0	162.8	53 55.1	+60.0	163.3	52 57.6	+60.0	163.6	52 00.0	+60.0	164.0	**52**
53	59 40.6	+59.8	160.8	58 43.8	+59.9	161.4	57 46.9	+59.9	161.9	56 49.8	+59.9	162.4	55 52.5	+60.0	162.8	54 55.1	+60.0	163.2	53 57.6	+60.0	163.6	53 00.0	+60.0	164.0	**53**
54	60 40.4	+59.9	160.7	59 43.7	+59.9	161.3	58 46.8	+59.9	161.8	57 49.7	+60.0	162.3	56 52.5	+60.0	162.8	55 55.1	+60.0	163.2	54 57.6	+60.0	163.6	54 00.0	+60.0	164.0	**54**
55	61 40.3	+59.8	160.5	60 43.6	+59.9	161.1	59 46.7	+60.0	161.7	58 49.7	+59.9	162.2	57 52.5	+59.9	162.7	56 55.1	+60.0	163.2	55 57.6	+60.0	163.6	55 00.0	+60.0	164.0	**55**
56	62 40.1	+59.9	160.4	61 43.5	+59.9	161.0	60 46.7	+59.9	161.6	59 49.6	+60.0	162.1	58 52.4	+60.0	162.7	57 55.1	+60.0	163.1	56 57.6	+60.0	163.6	56 00.0	+60.0	164.0	**56**
57	63 40.0	+59.8	160.2	62 43.4	+59.9	160.9	61 46.6	+59.9	161.5	60 49.6	+59.9	162.1	59 52.4	+60.0	162.6	58 55.1	+60.0	163.1	57 57.6	+60.0	163.6	57 00.0	+60.0	164.0	**57**
58	64 39.8	+59.8	160.0	63 43.3	+59.8	160.7	62 46.5	+59.9	161.4	61 49.5	+60.0	162.0	60 52.4	+60.0	162.5	59 55.1	+60.0	163.1	58 57.6	+60.0	163.5	58 00.0	+60.0	164.0	**58**
59	65 39.6	+59.8	159.9	64 43.1	+59.9	160.6	63 46.4	+59.9	161.3	62 49.5	+59.9	161.9	61 52.4	+59.9	162.5	60 55.1	+60.0	163.0	59 57.6	+60.0	163.5	59 00.0	+60.0	164.0	**59**
60	66 39.4	+59.8	159.6	65 43.0	+59.8	160.4	64 46.3	+59.9	161.1	63 49.4	+60.0	161.8	62 52.3	+60.0	162.4	61 55.1	+59.9	163.0	60 57.6	+60.0	163.5	60 00.0	+60.0	164.0	**60**
61	67 39.2	+59.7	159.4	66 42.8	+59.9	160.2	65 46.2	+59.9	161.0	64 49.4	+59.9	161.7	63 52.3	+60.0	162.3	62 55.0	+60.0	162.9	61 57.6	+60.0	163.5	61 00.0	+60.0	164.0	**61**
62	68 38.9	+59.7	159.2	67 42.7	+59.8	160.1	66 46.1	+59.9	160.8	65 49.3	+59.9	161.6	64 52.3	+59.9	162.3	63 55.0	+60.0	162.9	62 57.6	+60.0	163.5	62 00.0	+60.0	164.0	**62**
63	69 38.6	+59.7	158.9	68 42.5	+59.8	159.8	67 46.0	+59.9	160.7	66 49.2	+60.0	161.5	65 52.2	+60.0	162.2	64 55.0	+60.0	162.8	63 57.6	+60.0	163.4	63 00.0	+60.0	164.0	**63**
64	70 38.3	+59.7	158.6	69 42.3	+59.8	159.6	68 45.9	+59.8	160.5	67 49.2	+59.9	161.3	66 52.2	+60.0	162.1	65 55.0	+60.0	162.8	64 57.6	+60.0	163.4	64 00.0	+60.0	164.0	**64**
65	71 38.0	+59.7	158.3	70 42.1	+59.7	159.4	69 45.7	+59.9	160.3	68 49.1	+59.9	161.2	67 52.2	+59.9	162.0	66 55.0	+60.0	162.7	65 57.6	+60.0	163.4	65 00.0	+60.0	164.0	**65**
66	72 37.7	+59.6	157.9	71 41.8	+59.8	159.1	70 45.6	+59.8	160.1	69 49.0	+59.9	161.0	68 52.1	+60.0	161.9	67 55.0	+59.9	162.7	66 57.6	+60.0	163.4	66 00.0	+60.0	164.0	**66**
67	73 37.3	+59.5	157.5	72 41.6	+59.7	158.8	71 45.4	+59.8	159.9	70 48.9	+59.9	160.9	69 52.1	+59.9	161.8	68 54.9	+60.0	162.6	67 57.6	+60.0	163.3	67 00.0	+60.0	164.0	**67**
68	74 36.8	+59.5	157.1	73 41.3	+59.6	158.4	72 45.2	+59.8	159.6	71 48.8	+59.9	160.7	70 52.0	+59.9	161.6	69 54.9	+60.0	162.5	68 57.6	+60.0	163.3	68 00.0	+60.0	164.0	**68**
69	75 36.3	+59.4	156.6	74 40.9	+59.6	158.0	73 45.0	+59.8	159.3	72 48.7	+59.8	160.5	71 51.9	+60.0	161.5	70 54.9	+60.0	162.4	69 57.6	+60.0	163.2	69 00.0	+60.0	164.0	**69**
70	76 35.7	+59.3	156.0	75 40.5	+59.6	157.6	74 44.8	+59.7	159.0	73 48.5	+59.9	160.2	72 51.9	+59.9	161.3	71 54.9	+59.9	162.3	70 57.6	+60.0	163.2	70 00.0	+60.0	164.0	**70**
71	77 35.0	+59.2	155.3	76 40.1	+59.5	157.1	75 44.5	+59.7	158.6	74 48.4	+59.8	160.0	73 51.8	+59.9	161.2	72 54.8	+60.0	162.2	71 57.6	+59.9	163.2	71 00.0	+60.0	164.0	**71**
72	78 34.2	+59.1	154.5	77 39.6	+59.4	156.5	76 44.2	+59.7	158.2	75 48.2	+59.8	159.7	74 51.7	+59.9	161.0	73 54.8	+60.0	162.1	72 57.5	+60.0	163.1	72 00.0	+60.0	164.0	**72**
73	79 33.3	+58.8	153.6	78 39.0	+59.3	155.8	77 43.9	+59.5	157.7	76 48.0	+59.8	159.3	75 51.6	+59.9	160.7	74 54.8	+59.9	162.0	73 57.5	+60.0	163.0	73 00.0	+60.0	164.0	**73**
74	80 32.1	+58.6	152.5	79 38.3	+59.1	155.0	78 43.4	+59.5	157.1	77 47.8	+59.7	158.9	76 51.5	+59.9	160.5	75 54.7	+60.0	161.8	74 57.5	+60.0	163.0	74 00.0	+60.0	164.0	**74**
75	81 30.7	+58.2	151.1	80 37.4	+59.0	154.0	79 42.9	+59.4	156.4	78 47.5	+59.7	158.5	77 51.4	+59.8	160.2	76 54.7	+59.9	161.6	75 57.5	+60.0	162.9	75 00.0	+60.0	164.0	**75**
76	82 28.9	+57.7	149.4	81 36.4	+58.6	152.8	80 42.3	+59.3	155.6	79 47.2	+59.6	157.9	78 51.2	+59.8	159.8	77 54.6	+59.9	161.4	76 57.5	+60.0	162.8	76 00.0	+60.0	164.0	**76**
77	83 26.6	+56.9	147.1	82 35.0	+58.3	151.3	81 41.6	+59.0	154.6	80 46.8	+59.5	157.2	79 51.0	+59.8	159.4	78 54.5	+60.0	161.2	77 57.5	+60.0	162.7	77 00.0	+60.0	164.0	**77**
78	84 23.5	+55.6	144.1	83 33.3	+57.6	149.3	82 40.6	+58.8	153.3	81 46.3	+59.4	156.4	80 50.8	+59.7	158.9	79 54.5	+59.9	160.9	78 57.5	+60.0	162.6	78 00.0	+60.0	164.0	**78**
79	85 19.1	*+53.3*	•139.9	84 30.9	+56.6	146.6	83 39.4	+58.3	151.6	82 45.7	+59.2	155.3	81 50.5	+59.7	158.2	80 54.4	+59.8	160.6	79 57.5	+59.9	162.4	79 00.0	+60.0	164.0	**79**
80	86 12.4	*+49.1*	•133.6	85 27.5	*+54.8*	•142.8	84 37.7	+57.5	149.3	83 44.9	+58.9	153.9	82 50.2	+59.5	157.4	81 54.2	+59.9	160.1	80 57.4	+60.0	162.3	80 00.0	+60.0	164.0	**80**
81	87 01.5	*+40.2*	•123.8	86 22.3	*+51.2*	•137.0	85 35.2	*+56.2*	•145.9	84 43.8	+58.3	152.0	83 49.7	+59.4	156.4	82 54.1	+59.8	159.6	81 57.4	+60.0	162.1	81 00.0	+60.0	164.0	**81**
82	87 41.7	*+21.7*	•107.5	87 13.5	*+42.9*	•127.6	86 31.4	*+53.3*	•140.8	85 42.1	+57.4	149.2	84 49.1	+59.0	154.9	83 53.9	+59.7	158.8	82 57.4	+59.9	161.8	82 00.0	+60.0	164.0	**82**
83	88 03.4	*–7.0*	•82.1	87 56.4	*+23.6*	•110.8	87 24.7	*+46.0*	•132.0	86 39.5	*+55.3*	•144.8	85 48.1	+58.5	152.7	84 53.6	+59.5	157.8	83 57.3	+59.9	161.4	83 00.0	+60.0	164.0	**83**
84	87 56.4	*–31.7*	•53.3	88 20.0	*–9.3*	•82.0	88 10.7	*+25.9*	•115.0	87 34.8	*+49.5*	•137.0	86 46.6	*+57.1*	•149.2	85 53.1	+59.3	156.3	84 57.2	+59.9	160.9	84 00.0	+60.0	164.0	**84**
85	87 24.7	*–45.2*	•32.1	88 10.7	*–35.9*	•49.1	88 36.6	*–12.3*	•82.0	88 24.3	*+29.0*	•120.4	87 43.7	*+53.0*	•142.7	86 52.4	+58.6	153.9	85 57.1	+59.8	160.1	85 00.0	+60.0	164.0	**85**
86	86 39.5	*–51.4*	•19.3	87 34.8	*–48.2*	•27.1	88 24.3	*–40.6*	•43.7	88 53.3	*–16.6*	•82.0	88 36.7	*+33.2*	•127.5	87 51.0	*+56.4*	•149.2	86 56.9	+59.7	158.8	86 00.0	+60.0	164.0	**86**
87	85 48.1	*–54.5*	•11.4	86 46.6	*–53.5*	•14.9	87 43.7	*–51.3*	•21.3	88 36.7	*–45.7*	•36.5	89 09.9	*–22.5*	•82.0	88 47.4	*+39.2*	•136.9	87 56.6	*+58.9*	•156.3	87 00.0	+60.0	164.0	**87**
88	84 53.6	–56.3	6.2	85 53.1	–55.9	7.7	86 52.4	*–55.3*	•10.2	87 51.0	*–54.1*	•14.9	88 47.4	*–50.8*	•27.1	89 26.6	*–31.1*	•82.0	88 55.5	*+47.8*	•149.1	88 00.0	+60.0	164.0	**88**
89	83 57.3	–57.3	2.6	84 57.2	–57.2	3.1	85 57.1	–57.1	3.9	86 56.9	*–56.9*	•5.2	87 56.6	*–56.6*	•7.7	88 55.5	*–55.5*	•14.9	89 43.3	*–43.3*	•82.0	89 00.0	+60.0	164.0	**89**
90	83 00.0	–58.0	0.0	84 00.0	–58.0	0.0	85 00.0	–58.1	0.0	86 00.0	–58.1	0.0	87 00.0	–58.2	0.0	88 00.0	–58.4	0.0	89 00.0	*–58.8*	•0.0	90 00.0	–60.0	82.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 16°, 344°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 43.7	–60.0	163.9	5 46.0	–60.0	163.9	4 48.4	–60.0	163.9	3 50.7	–60.0	164.0	2 53.0	–60.0	164.0	1 55.3	–59.9	164.0	0 57.7	–60.0	164.0	0 00.0	+60.0	16.0	0
1	5 43.7	–60.0	163.9	4 46.0	–59.9	163.9	3 48.4	–60.0	164.0	2 50.7	–60.0	164.0	1 53.0	–60.0	164.0	0 55.4	–60.0	164.0	0 02.3	+60.0	16.0	1 00.0	+60.0	16.0	1
2	4 43.7	–59.9	164.0	3 46.1	–60.0	164.0	2 48.4	–60.0	164.0	1 50.7	–60.0	164.0	0 53.0	–60.0	164.0	0 04.6	+60.0	16.0	1 02.3	+60.0	16.0	2 00.0	+60.0	16.0	2
3	3 43.8	–60.0	164.0	2 46.1	–60.0	164.0	1 48.4	–60.0	164.0	0 50.7	–60.0	164.0	0 07.0	+60.0	16.0	1 04.6	+60.0	16.0	2 02.3	+60.0	16.0	3 00.0	+60.0	16.0	3
4	2 43.8	–60.0	164.0	1 46.1	–60.0	164.0	0 48.4	–60.0	164.0	0 09.3	+60.0	16.0	1 07.0	+59.9	16.0	2 04.6	+60.0	16.0	3 02.3	+60.0	16.0	4 00.0	+60.0	16.0	4
5	1 43.8	–59.9	164.1	0 46.1	–59.9	164.1	0 11.6	+59.9	15.9	1 09.3	+59.9	15.9	2 06.9	+60.0	15.9	3 04.6	+60.0	16.0	4 02.3	+60.0	16.0	5 00.0	+60.0	16.0	5
6	0 43.9	–60.0	164.1	0 13.8	+60.0	15.9	1 11.5	+60.0	15.9	2 09.2	+60.0	15.9	3 06.9	+60.0	15.9	4 04.6	+60.0	16.0	5 02.3	+60.0	16.0	6 00.0	+60.0	16.0	6
7	0 16.1	+60.0	15.9	1 13.8	+60.0	15.9	2 11.5	+60.0	15.9	3 09.2	+60.0	15.9	4 06.9	+60.0	15.9	5 04.6	+60.0	15.9	6 02.3	+60.0	16.0	7 00.0	+60.0	16.0	7
8	1 16.1	+59.9	15.8	2 13.8	+60.0	15.9	3 11.5	+60.0	15.9	4 09.2	+60.0	15.9	5 06.9	+60.0	15.9	6 04.6	+60.0	15.9	7 02.3	+60.0	16.0	8 00.0	+60.0	16.0	8
9	2 16.0	+60.0	15.8	3 13.8	+59.9	15.8	4 11.5	+60.0	15.8	5 09.2	+60.0	15.9	6 06.9	+60.0	15.9	7 04.6	+60.0	15.9	8 02.3	+60.0	16.0	9 00.0	+60.0	16.0	9
10	3 16.0	+60.0	15.8	4 13.7	+60.0	15.8	5 11.5	+60.0	15.8	6 09.2	+60.0	15.8	7 06.9	+60.0	15.9	8 04.6	+60.0	15.9	9 02.3	+60.0	16.0	10 00.0	+60.0	16.0	10
11	4 16.0	+59.9	15.7	5 13.7	+60.0	15.8	6 11.5	+59.9	15.8	7 09.2	+60.0	15.8	8 06.9	+60.0	15.9	9 04.6	+60.0	15.9	10 02.3	+60.0	15.9	11 00.0	+60.0	16.0	11
12	5 15.9	+60.0	15.7	6 13.7	+60.0	15.7	7 11.4	+60.0	15.8	8 09.2	+60.0	15.8	9 06.9	+60.0	15.8	10 04.6	+60.0	15.9	11 02.3	+60.0	15.9	12 00.0	+60.0	16.0	12
13	6 15.9	+60.0	15.7	7 13.7	+59.9	15.7	8 11.4	+60.0	15.7	9 09.2	+60.0	15.8	10 06.9	+60.0	15.8	11 04.6	+60.0	15.9	12 02.3	+60.0	15.9	13 00.0	+60.0	16.0	13
14	7 15.9	+59.9	15.6	8 13.6	+60.0	15.7	9 11.4	+60.0	15.7	10 09.2	+59.9	15.8	11 06.9	+60.0	15.8	12 04.6	+60.0	15.9	13 02.3	+60.0	15.9	14 00.0	+60.0	16.0	14
15	8 15.8	+60.0	15.6	9 13.6	+60.0	15.6	10 11.4	+60.0	15.7	11 09.1	+60.0	15.7	12 06.9	+60.0	15.8	13 04.6	+60.0	15.9	14 02.3	+60.0	15.9	15 00.0	+60.0	16.0	15
16	9 15.8	+60.0	15.6	10 13.6	+60.0	15.6	11 11.4	+60.0	15.7	12 09.1	+60.0	15.7	13 06.9	+60.0	15.8	14 04.6	+60.0	15.9	15 02.3	+60.0	15.9	16 00.0	+60.0	16.0	16
17	10 15.8	+59.9	15.5	11 13.6	+59.9	15.6	12 11.4	+59.9	15.6	13 09.1	+60.0	15.7	14 06.9	+60.0	15.8	15 04.6	+60.0	15.8	16 02.3	+60.0	15.9	17 00.0	+60.0	16.0	17
18	11 15.7	+60.0	15.5	12 13.5	+60.0	15.6	13 11.3	+60.0	15.6	14 09.1	+60.0	15.7	15 06.9	+60.0	15.8	16 04.6	+60.0	15.8	17 02.3	+60.0	15.9	18 00.0	+60.0	16.0	18
19	12 15.7	+60.0	15.5	13 13.5	+60.0	15.5	14 11.3	+60.0	15.6	15 09.1	+60.0	15.7	16 06.9	+60.0	15.7	17 04.6	+60.0	15.8	18 02.3	+60.0	15.9	19 00.0	+60.0	16.0	19
20	13 15.7	+59.9	15.4	14 13.5	+60.0	15.5	15 11.3	+60.0	15.6	16 09.1	+60.0	15.6	17 06.9	+59.9	15.7	18 04.6	+60.0	15.8	19 02.3	+60.0	15.9	20 00.0	+60.0	16.0	20
21	14 15.6	+60.0	15.4	15 13.5	+59.9	15.5	16 11.3	+60.0	15.5	17 09.1	+60.0	15.6	18 06.8	+60.0	15.7	19 04.6	+60.0	15.8	20 02.3	+60.0	15.9	21 00.0	+60.0	16.0	21
22	15 15.6	+60.0	15.4	16 13.4	+60.0	15.4	17 11.3	+59.9	15.5	18 09.1	+59.9	15.6	19 06.8	+60.0	15.7	20 04.6	+60.0	15.8	21 02.3	+60.0	15.9	22 00.0	+60.0	16.0	22
23	16 15.6	+59.9	15.3	17 13.4	+60.0	15.4	18 11.2	+60.0	15.5	19 09.0	+60.0	15.6	20 06.8	+60.0	15.7	21 04.6	+60.0	15.8	22 02.3	+60.0	15.9	23 00.0	+60.0	16.0	23
24	17 15.5	+60.0	15.3	18 13.4	+60.0	15.4	19 11.2	+60.0	15.5	20 09.0	+60.0	15.6	21 06.8	+60.0	15.7	22 04.6	+60.0	15.8	23 02.3	+60.0	15.9	24 00.0	+60.0	16.0	24
25	18 15.5	+59.9	15.3	19 13.4	+59.9	15.3	20 11.2	+60.0	15.4	21 09.0	+60.0	15.5	22 06.8	+60.0	15.6	23 04.6	+60.0	15.8	24 02.3	+60.0	15.9	25 00.0	+60.0	16.0	25
26	19 15.4	+60.0	15.2	20 13.3	+60.0	15.3	21 11.2	+60.0	15.4	22 09.0	+60.0	15.5	23 06.8	+60.0	15.6	24 04.6	+60.0	15.7	25 02.3	+60.0	15.9	26 00.0	+60.0	16.0	26
27	20 15.4	+60.0	15.2	21 13.3	+60.0	15.3	22 11.2	+59.9	15.4	23 09.0	+60.0	15.5	24 06.8	+60.0	15.6	25 04.6	+60.0	15.7	26 02.3	+60.0	15.9	27 00.0	+60.0	16.0	27
28	21 15.4	+59.9	15.1	22 13.3	+59.9	15.2	23 11.1	+60.0	15.4	24 09.0	+60.0	15.5	25 06.8	+60.0	15.6	26 04.6	+60.0	15.7	27 02.3	+60.0	15.9	28 00.0	+60.0	16.0	28
29	22 15.3	+60.0	15.1	23 13.2	+60.0	15.2	24 11.1	+60.0	15.3	25 09.0	+60.0	15.4	26 06.8	+60.0	15.6	27 04.6	+60.0	15.7	28 02.3	+60.0	15.9	29 00.0	+60.0	16.0	29
30	23 15.3	+59.9	15.1	24 13.2	+60.0	15.2	25 11.1	+60.0	15.3	26 09.0	+59.9	15.4	27 06.8	+60.0	15.6	28 04.6	+60.0	15.7	29 02.3	+60.0	15.8	30 00.0	+60.0	16.0	30
31	24 15.2	+60.0	15.0	25 13.2	+59.9	15.1	26 11.1	+60.0	15.3	27 08.9	+60.0	15.4	28 06.8	+60.0	15.5	29 04.6	+60.0	15.7	30 02.3	+60.0	15.8	31 00.0	+60.0	16.0	31
32	25 15.2	+60.0	15.0	26 13.1	+60.0	15.1	27 11.1	+59.9	15.2	28 08.9	+60.0	15.4	29 06.8	+60.0	15.5	30 04.6	+59.9	15.7	31 02.3	+60.0	15.8	32 00.0	+60.0	16.0	32
33	26 15.2	+59.9	14.9	27 13.1	+60.0	15.1	28 11.0	+60.0	15.2	29 08.9	+60.0	15.3	30 06.8	+59.9	15.5	31 04.5	+60.0	15.7	32 02.3	+60.0	15.8	33 00.0	+60.0	16.0	33
34	27 15.1	+60.0	14.9	28 13.1	+60.0	15.0	29 11.0	+60.0	15.2	30 08.9	+60.0	15.3	31 06.7	+60.0	15.5	32 04.5	+60.0	15.6	33 02.3	+60.0	15.8	34 00.0	+60.0	16.0	34
35	28 15.1	+59.9	14.9	29 13.1	+59.9	15.0	30 11.0	+60.0	15.1	31 08.9	+60.0	15.3	32 06.7	+60.0	15.5	33 04.5	+60.0	15.6	34 02.3	+60.0	15.8	35 00.0	+60.0	16.0	35
36	29 15.0	+60.0	14.8	30 13.0	+60.0	15.0	31 11.0	+59.9	15.1	32 08.9	+60.0	15.3	33 06.7	+60.0	15.4	34 04.5	+60.0	15.6	35 02.3	+60.0	15.8	36 00.0	+60.0	16.0	36
37	30 15.0	+59.9	14.8	31 13.0	+60.0	14.9	32 10.9	+60.0	15.1	33 08.9	+59.9	15.2	34 06.7	+60.0	15.4	35 04.5	+60.0	15.6	36 02.3	+60.0	15.8	37 00.0	+60.0	16.0	37
38	31 14.9	+60.0	14.7	32 13.0	+59.9	14.9	33 10.9	+60.0	15.0	34 08.8	+60.0	15.2	35 06.7	+60.0	15.4	36 04.5	+60.0	15.6	37 02.3	+60.0	15.8	38 00.0	+60.0	16.0	38
39	32 14.9	+59.9	14.7	33 12.9	+60.0	14.8	34 10.9	+60.0	15.0	35 08.8	+60.0	15.2	36 06.7	+60.0	15.4	37 04.5	+60.0	15.6	38 02.3	+60.0	15.8	39 00.0	+60.0	16.0	39
40	33 14.8	+60.0	14.6	34 12.9	+59.9	14.8	35 10.9	+59.9	15.0	36 08.8	+60.0	15.2	37 06.7	+60.0	15.4	38 04.5	+60.0	15.6	39 02.3	+60.0	15.8	40 00.0	+60.0	16.0	40
41	34 14.8	+59.9	14.6	35 12.8	+60.0	14.8	36 10.8	+60.0	14.9	37 08.8	+60.0	15.1	38 06.7	+60.0	15.3	39 04.5	+60.0	15.5	40 02.3	+60.0	15.8	41 00.0	+60.0	16.0	41
42	35 14.7	+60.0	14.5	36 12.8	+60.0	14.7	37 10.8	+60.0	14.9	38 08.8	+60.0	15.1	39 06.7	+60.0	15.3	40 04.5	+60.0	15.5	41 02.3	+60.0	15.8	42 00.0	+60.0	16.0	42
43	36 14.7	+59.9	14.5	37 12.8	+59.9	14.7	38 10.8	+60.0	14.9	39 08.8	+59.9	15.1	40 06.7	+59.9	15.3	41 04.5	+60.0	15.5	42 02.3	+60.0	15.7	43 00.0	+60.0	16.0	43
44	37 14.6	+60.0	14.4	38 12.7	+60.0	14.6	39 10.8	+59.9	14.8	40 08.7	+60.0	15.0	41 06.6	+60.0	15.3	42 04.5	+60.0	15.5	43 02.3	+60.0	15.7	44 00.0	+60.0	16.0	44
45	38 14.6	+59.9	14.4	39 12.7	+59.9	14.6	40 10.7	+60.0	14.8	41 08.7	+60.0	15.0	42 06.6	+60.0	15.2	43 04.5	+60.0	15.5	44 02.3	+60.0	15.7	45 00.0	+60.0	16.0	45
46	39 14.5	+60.0	14.3	40 12.6	+60.0	14.5	41 10.7	+60.0	14.7	42 08.7	+60.0	15.0	43 06.6	+60.0	15.2	44 04.5	+60.0	15.5	45 02.3	+60.0	15.7	46 00.0	+60.0	16.0	46
47	40 14.5	+59.9	14.3	41 12.6	+60.0	14.5	42 10.7	+59.9	14.7	43 08.7	+60.0	14.9	44 06.6	+60.0	15.2	45 04.5	+60.0	15.4	46 02.3	+60.0	15.7	47 00.0	+60.0	16.0	47
48	41 14.4	+60.0	14.2	42 12.6	+59.9	14.4	43 10.6	+60.0	14.7	44 08.7	+59.9	14.9	45 06.6	+60.0	15.1	46 04.5	+60.0	15.4	47 02.3	+60.0	15.7	48 00.0	+60.0	16.0	48
49	42 14.4	+59.9	14.1	43 12.5	+60.0	14.4	44 10.6	+60.0	14.6	45 08.6	+60.0	14.9	46 06.6	+60.0	15.1	47 04.5	+60.0	15.4	48 02.3	+60.0	15.7	49 00.0	+60.0	16.0	49
50	43 14.3	+59.9	14.1	44 12.5	+59.9	14.3	45 10.6	+59.9	14.6	46 08.6	+60.0	14.8	47 06.6	+60.0	15.1	48 04.5	+60.0	15.4	49 02.3	+60.0	15.7	50 00.0	+60.0	16.0	50
51	44 14.2	+60.0	14.0	45 12.4	+60.0	14.3	46 10.5	+60.0	14.5	47 08.6	+60.0	14.8	48 06.6	+59.9	15.1	49 04.5	+60.0	15.4	50 02.3	+60.0	15.7	51 00.0	+60.0	16.0	51
52	45 14.2	+59.9	13.9	46 12.4	+59.9	14.2	47 10.5	+60.0	14.5	48 08.6	+59.9	14.7	49 06.5	+60.0	15.0	50 04.5	+59.9	15.3	51 02.3	+60.0	15.7	52 00.0	+60.0	16.0	52
53	46 14.1	+59.9	13.9	47 12.3	+60.0	14.1	48 10.5	+59.9	14.4	49 08.5	+60.0	14.7	50 06.5	+60.0	15.0	51 04.4	+60.0	15.3	52 02.3	+60.0	15.6	53 00.0	+60.0	16.0	53
54	47 14.0	+59.9	13.8	48 12.3	+59.9	14.1	49 10.4	+60.0	14.3	50 08.5	+60.0	14.6	51 06.5	+60.0	15.0	52 04.4	+60.0	15.3	53 02.3	+60.0	15.6	54 00.0	+60.0	16.0	54
55	48 13.9	+60.0	13.7	49 12.2	+59.9	14.0	50 10.4	+59.9	14.3	51 08.5	+60.0	14.6	52 06.5	+60.0	14.9	53 04.4	+60.0	15.3	54 02.3	+60.0	15.6	55 00.0	+60.0	16.0	55
56	49 13.9	+59.9	13.7	50 12.1	+60.0	13.9	51 10.3	+60.0	14.2	52 08.5	+59.9	14.5	53 06.5	+60.0	14.9	54 04.4	+60.0	15.2	55 02.3	+60.0	15.6	56 00.0	+60.0	16.0	56
57	50 13.8	+59.9	13.6	51 12.1	+59.9	13.9	52 10.3	+59.9	14.2	53 08.4	+60.0	14.5	54 06.5	+59.9	14.8	55 04.4	+60.0	15.2	56 02.3	+60.0	15.6	57 00.0	+60.0	16.0	57
58	51 13.7	+59.9	13.5	52 12.0	+59.9	13.8	53 10.2	+60.0	14.1	54 08.4	+60.0	14.4	55 06.4	+60.0	14.8	56 04.4	+60.0	15.2	57 02.3	+60.0	15.6	58 00.0	+60.0	16.0	58
59	52 13.6	+59.9	13.4	53 11.9	+60.0	13.7	54 10.2	+59.9	14.0	55 08.4	+59.9	14.4	56 06.4	+60.0	14.7	57 04.4	+60.0	15.1	58 02.3	+60.0	15.6	59 00.0	+60.0	16.0	59
60	53 13.5	+59.9	13.3	54 11.9	+59.9	13.6	55 10.1	+60.0	14.0	56 08.3	+60.0	14.3	57 06.4	+60.0	14.7	58 04.4	+60.0	15.1	59 02.3	+60.0	15.5	60 00.0	+60.0	16.0	60
61	54 13.4	+59.9	13.2	55 11.8	+59.9	13.5	56 10.1	+59.9	13.9	57 08.3	+59.9	14.3	58 06.4	+60.0	14.7	59 04.4	+60.0	15.1	60 02.3	+60.0	15.5	61 00.0	+60.0	16.0	61
62	55 13.3	+59.9	13.1	56 11.7	+59.9	13.4	57 10.0	+60.0	13.8	58 08.2	+60.0	14.2	59 06.4	+59.9	14.6	60 04.4	+60.0	15.0	61 02.3	+59.9	15.5	62 00.0	+60.0	16.0	62
63	56 13.2	+59.9	13.0	57 11.6	+59.9	13.4	58 10.0	+59.9	13.7	59 08.2	+60.0	14.1	60 06.3	+60.0	14.5	61 04.4	+59.9	15.0	62 02.2	+60.0	15.5	63 00.0	+60.0	16.0	63
64	57 13.1	+59.9	12.9	58 11.5	+60.0	13.3	59 09.9	+59.9	13.6	60 08.2	+59.9	14.0	61 06.3	+60.0	14.5	62 04.3	+60.0	15.0	63 02.2	+60.0	15.5	64 00.0	+60.0	16.0	64
65	58 13.0	+59.9	12.8	59 11.5	+59.9	13.1	60 09.8	+60.0	13.5	61 08.1	+60.0	14.0	62 06.3	+60.0	14.4	63 04.3	+60.0	14.9	64 02.2	+60.0	15.4	65 00.0	+60.0	16.0	65
66	59 12.9	+59.8	12.7	60 11.4	+59.9	13.0	61 09.8	+59.9	13.4	62 08.1	+59.9	13.9	63 06.3	+59.9	14.3	64 04.3	+60.0	14.9	65 02.2	+60.0	15.4	66 00.0	+60.0	16.0	66
67	60 12.7	+59.9	12.5	61 11.3	+59.8	12.9	62 09.7	+59.9	13.3	63 08.0	+60.0	13.8	64 06.2	+60.0	14.3	65 04.3	+60.0	14.8	66 02.2	+60.0	15.4	67 00.0	+60.0	16.0	67
68	61 12.6	+59.8	12.4	62 11.1	+59.9	12.8	63 09.6	+59.9	13.2	64 08.0	+59.9	13.7	65 06.2	+60.0	14.2	66 04.3	+60.0	14.7	67 02.2	+60.0	15.3	68 00.0	+60.0	16.0	68
69	62 12.4	+59.9	12.2	63 11.0	+59.9	12.6	64 09.5	+59.9	13.1	65 07.9	+59.9	13.6	66 06.2	+59.9	14.1	67 04.3	+59.9	14.7	68 02.2	+60.0	15.3	69 00.0	+60.0	16.0	69
70	63 12.3	+59.8	12.1	64 10.9	+59.9	12.5	65 09.4	+59.9	13.0	66 07.8	+60.0	13.5	67 06.1	+60.0	14.0	68 04.2	+60.0	14.6	69 02.2	+60.0	15.3	70 00.0	+60.0	16.0	70
71	64 12.1	+59.8	11.9	65 10.8	+59.8	12.3	66 09.3	+59.9	12.8	67 07.8	+59.9	13.3	68 06.1	+59.9	13.9	69 04.2	+60.0	14.5	70 02.2	+60.0	15.2	71 00.0	+60.0	16.0	71
72	65 11.9	+59.8	11.7	66 10.6	+59.9	12.2	67 09.2	+59.9	12.7	68 07.7	+59.9	13.2	69 06.0	+60.0	13.8	70 04.2	+60.0	14.5	71 02.2	+60.0	15.2	72 00.0	+60.0	16.0	72
73	66 11.7	+59.8	11.5	67 10.5	+59.8	12.0	68 09.1	+59.9	12.5	69 07.6	+59.9	13.1	70 06.0	+59.9	13.7	71 04.2	+60.0	14.4	72 02.2	+60.0	15.1	73 00.0	+60.0	16.0	73
74	67 11.5	+59.8	11.3	68 10.3	+59.8	11.8	69 09.0	+59.8	12.3	70 07.5	+59.9	12.9	71 05.9	+60.0	13.6	72 04.2	+59.9	14.3	73 02.2	+60.0	15.1	74 00.0	+60.0	16.0	74
75	68 11.3	+59.7	11.1	69 10.1	+59.8	11.6	70 08.8	+59.9	12.1	71 07.4	+59.9	12.7	72 05.9	+59.9	13.4	73 04.1	+60.0	14.2	74 02.2	+60.0	15.0	75 00.0	+60.0	16.0	75
76	69 11.0	+59.7	10.8	70 09.9	+59.8	11.3	71 08.7	+59.8	11.9	72 07.3	+59.9	12.5	73 05.8	+59.9	13.3	74 04.1	+59.9	14.1	75 02.2	+60.0	15.0	76 00.0	+60.0	16.0	76
77	70 10.7	+59.7	10.5	71 09.7	+59.7	11.1	72 08.5	+59.8	11.7	73 07.2	+59.8	12.3	74 05.7	+59.9	13.1	75 04.0	+60.0	13.9	76 02.2	+60.0	14.9	77 00.0	+60.0	16.0	77
78	71 10.4	+59.7	10.2	72 09.4	+59.7	10.8	73 08.3	+59.8	11.4	74 07.0	+59.9	12.1	75 05.6	+59.9	12.9	76 04.0	+60.0	13.8	77 02.2	+59.9	14.8	78 00.0	+60.0	16.0	78
79	72 10.1	+59.6	9.9	73 09.1	+59.7	10.5	74 08.1	+59.7	11.1	75 06.9	+59.8	11.8	76 05.5	+59.9	12.6	77 04.0	+59.9	13.6	78 02.1	+60.0	14.7	79 00.0	+60.0	16.0	79
80	73 09.7	+59.6	9.5	74 08.8	+59.7	10.1	75 07.8	+59.7	10.7	76 06.7	+59.8	11.5	77 05.4	+59.9	12.4	78 03.9	+59.9	13.4	79 02.1	+60.0	14.6	80 00.0	+60.0	16.0	80
81	74 09.3	+59.5	9.1	75 08.5	+59.5	9.7	76 07.5	+59.7	10.4	77 06.5	+59.7	11.1	78 05.3	+59.8	12.1	79 03.8	+59.9	13.1	80 02.1	+60.0	14.4	81 00.0	+60.0	16.0	81
82	75 08.8	+59.4	8.6	76 08.0	+59.6	9.2	77 07.2	+59.6	9.9	78 06.2	+59.8	10.7	79 05.1	+59.8	11.7	80 03.7	+59.9	12.8	81 02.1	+59.9	14.3	82 00.0	+60.0	16.0	82
83	76 08.2	+59.4	8.1	77 07.6	+59.4	8.7	78 06.8	+59.6	9.4	79 06.0	+59.6	10.2	80 04.9	+59.8	11.2	81 03.6	+59.9	12.5	82 02.0	+60.0	14.0	83 00.0	+60.0	16.0	83
84	77 07.6	+59.2	7.4	78 07.0	+59.4	8.0	79 06.4	+59.5	8.8	80 05.6	+59.6	9.6	81 04.7	+59.7	10.7	82 03.5	+59.8	12.0	83 02.0	+59.9	13.7	84 00.0	+60.0	16.0	84
85	78 06.8	+59.2	6.7	79 06.4	+59.2	7.3	80 05.9	+59.3	8.0	81 05.2	+59.5	8.9	82 04.4	+59.6	10.0	83 03.3	+59.8	11.5	84 01.9	+60.0	13.4	85 00.0	+60.0	16.0	85
86	79 06.0	+58.9	5.8	80 05.6	+59.1	6.4	81 05.2	+59.2	7.1	82 04.7	+59.3	8.0	83 04.0	+59.5	9.2	84 03.1	+59.7	10.7	85 01.9	+59.9	12.8	86 00.0	+60.0	16.0	86
87	80 04.9	+58.7	4.8	81 04.7	+58.8	5.3	82 04.4	+58.9	6.0	83 04.0	+59.1	6.9	84 03.5	+59.3	8.0	85 02.8	+59.5	9.6	86 01.8	+59.8	12.0	87 00.0	+60.0	16.0	87
88	81 03.6	+58.4	3.5	82 03.5	+58.5	4.0	83 03.3	+58.6	4.6	84 03.1	+58.8	5.3	85 02.8	+59.0	6.4	86 02.3	+59.3	8.0	87 01.6	+59.6	10.7	88 00.0	+60.0	16.0	88
89	82 02.0	+58.0	2.0	83 02.0	+58.0	2.3	84 01.9	+58.1	2.7	85 01.9	+58.1	3.2	86 01.8	+58.2	4.0	87 01.6	+58.4	5.3	88 01.2	*+58.8* •	8.0	89 00.0	+60.0	16.0	89
90	83 00.0	+57.3	0.0	84 00.0	+57.2	0.0	85 00.0	+57.1	0.0	86 00.0	*+56.9* •	0.0	87 00.0	*+56.6* •	0.0	88 00.0	*+55.5* •	0.0	89 00.0	*+43.3* •	0.0	90 00.0	–60.0	8.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 164°, 196°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 41.6	+59.9	162.9	5 44.2	+60.0	162.9	4 46.9	+59.9	162.9	3 49.5	+60.0	163.0	2 52.1	+60.0	163.0	1 54.8	+60.0	163.0	0 57.4	+60.0	163.0	0 00.0	+60.0	163.0	0
1	7 41.5	+60.0	162.8	6 44.2	+60.0	162.9	5 46.8	+60.0	162.9	4 49.5	+60.0	162.9	3 52.1	+60.0	163.0	2 54.8	+59.9	163.0	1 57.4	+60.0	163.0	1 00.0	+60.0	163.0	1
2	8 41.5	+59.9	162.8	7 44.2	+59.9	162.8	6 46.8	+60.0	162.9	5 49.5	+60.0	162.9	4 52.1	+60.0	162.9	3 54.7	+60.0	163.0	2 57.4	+60.0	163.0	2 00.0	+60.0	163.0	2
3	9 41.4	+60.0	162.8	8 44.1	+60.0	162.8	7 46.8	+60.0	162.9	6 49.5	+59.9	162.9	5 52.1	+60.0	162.9	4 54.7	+60.0	163.0	3 57.4	+60.0	163.0	3 00.0	+60.0	163.0	3
4	10 41.4	+60.0	162.7	9 44.1	+60.0	162.8	8 46.8	+60.0	162.8	7 49.4	+60.0	162.9	6 52.1	+60.0	162.9	5 54.7	+60.0	162.9	4 57.4	+60.0	163.0	4 00.0	+60.0	163.0	4
5	11 41.4	+59.9	162.7	10 44.1	+59.9	162.8	9 46.8	+59.9	162.8	8 49.4	+60.0	162.9	7 52.1	+60.0	162.9	6 54.7	+60.0	162.9	5 57.4	+60.0	163.0	5 00.0	+60.0	163.0	5
6	12 41.3	+60.0	162.7	11 44.0	+60.0	162.7	10 46.7	+60.0	162.8	9 49.4	+60.0	162.8	8 52.1	+60.0	162.9	7 54.7	+60.0	162.9	6 57.4	+60.0	163.0	6 00.0	+60.0	163.0	6
7	13 41.3	+59.9	162.6	12 44.0	+60.0	162.7	11 46.7	+60.0	162.8	10 49.4	+60.0	162.8	9 52.1	+60.0	162.9	8 54.7	+60.0	162.9	7 57.4	+60.0	163.0	7 00.0	+60.0	163.0	7
8	14 41.2	+60.0	162.6	13 44.0	+60.0	162.7	12 46.7	+60.0	162.7	11 49.4	+60.0	162.8	10 52.1	+60.0	162.9	9 54.7	+60.0	162.9	8 57.4	+60.0	163.0	8 00.0	+60.0	163.0	8
9	15 41.2	+60.0	162.5	14 44.0	+59.9	162.6	13 46.7	+60.0	162.7	12 49.4	+60.0	162.8	11 52.1	+60.0	162.8	10 54.7	+60.0	162.9	9 57.4	+60.0	163.0	9 00.0	+60.0	163.0	9
10	16 41.2	+59.9	162.5	15 43.9	+60.0	162.6	14 46.7	+59.9	162.7	13 49.4	+60.0	162.8	12 52.1	+59.9	162.8	11 54.7	+60.0	162.9	10 57.4	+60.0	162.9	10 00.0	+60.0	163.0	10
11	17 41.1	+60.0	162.5	16 43.9	+60.0	162.6	15 46.6	+60.0	162.6	14 49.4	+59.9	162.7	13 52.0	+60.0	162.8	12 54.7	+60.0	162.9	11 57.4	+60.0	162.9	11 00.0	+60.0	163.0	11
12	18 41.1	+59.9	162.4	17 43.9	+59.9	162.5	16 46.6	+60.0	162.6	15 49.3	+60.0	162.7	14 52.0	+60.0	162.8	13 54.7	+60.0	162.9	12 57.4	+60.0	162.9	12 00.0	+60.0	163.0	12
13	19 41.0	+60.0	162.4	18 43.8	+60.0	162.5	17 46.6	+60.0	162.6	16 49.3	+60.0	162.7	15 52.0	+60.0	162.8	14 54.7	+60.0	162.9	13 57.4	+60.0	162.9	13 00.0	+60.0	163.0	13
14	20 41.0	+59.9	162.3	19 43.8	+60.0	162.5	18 46.6	+60.0	162.6	17 49.3	+60.0	162.7	16 52.0	+60.0	162.8	15 54.7	+60.0	162.8	14 57.4	+60.0	162.9	14 00.0	+60.0	163.0	14
15	21 40.9	+60.0	162.3	20 43.8	+59.9	162.4	19 46.6	+59.9	162.5	18 49.3	+60.0	162.6	17 52.0	+60.0	162.7	16 54.7	+60.0	162.8	15 57.4	+60.0	162.9	15 00.0	+60.0	163.0	15
16	22 40.9	+60.0	162.3	21 43.7	+60.0	162.4	20 46.5	+60.0	162.5	19 49.3	+60.0	162.6	18 52.0	+60.0	162.7	17 54.7	+60.0	162.8	16 57.4	+60.0	162.9	16 00.0	+60.0	163.0	16
17	23 40.9	+59.9	162.2	22 43.7	+60.0	162.4	21 46.5	+60.0	162.5	20 49.3	+60.0	162.6	19 52.0	+60.0	162.7	18 54.7	+60.0	162.8	17 57.4	+60.0	162.9	17 00.0	+60.0	163.0	17
18	24 40.8	+60.0	162.2	23 43.7	+59.9	162.3	22 46.5	+60.0	162.4	21 49.3	+59.9	162.6	20 52.0	+60.0	162.7	19 54.7	+60.0	162.8	18 57.4	+60.0	162.9	18 00.0	+60.0	163.0	18
19	25 40.8	+59.9	162.1	24 43.6	+60.0	162.3	23 46.5	+59.9	162.4	22 49.2	+60.0	162.5	21 52.0	+60.0	162.7	20 54.7	+60.0	162.8	19 57.4	+60.0	162.9	19 00.0	+60.0	163.0	19
20	26 40.7	+60.0	162.1	25 43.6	+60.0	162.2	24 46.4	+60.0	162.4	23 49.2	+60.0	162.5	22 52.0	+60.0	162.7	21 54.7	+60.0	162.8	20 57.4	+60.0	162.9	20 00.0	+60.0	163.0	20
21	27 40.7	+59.9	162.0	26 43.6	+59.9	162.2	25 46.4	+60.0	162.4	24 49.2	+60.0	162.5	23 52.0	+60.0	162.6	22 54.7	+60.0	162.8	21 57.4	+60.0	162.9	21 00.0	+60.0	163.0	21
22	28 40.6	+60.0	162.0	27 43.5	+60.0	162.2	26 46.4	+60.0	162.3	25 49.2	+60.0	162.5	24 52.0	+60.0	162.6	23 54.7	+60.0	162.8	22 57.4	+60.0	162.9	22 00.0	+60.0	163.0	22
23	29 40.6	+59.9	162.0	28 43.5	+60.0	162.1	27 46.4	+59.9	162.3	26 49.2	+60.0	162.4	25 52.0	+59.9	162.6	24 54.7	+60.0	162.7	23 57.4	+60.0	162.9	23 00.0	+60.0	163.0	23
24	30 40.5	+60.0	161.9	29 43.5	+59.9	162.1	28 46.3	+60.0	162.3	27 49.2	+60.0	162.4	26 51.9	+60.0	162.6	25 54.7	+60.0	162.7	24 57.4	+60.0	162.9	24 00.0	+60.0	163.0	24
25	31 40.5	+59.9	161.9	30 43.4	+60.0	162.0	29 46.3	+60.0	162.2	28 49.2	+59.9	162.4	27 51.9	+60.0	162.6	26 54.7	+60.0	162.7	25 57.4	+60.0	162.9	25 00.0	+60.0	163.0	25
26	32 40.4	+60.0	161.8	31 43.4	+59.9	162.0	30 46.3	+60.0	162.2	29 49.1	+60.0	162.4	28 51.9	+60.0	162.5	27 54.7	+60.0	162.7	26 57.4	+60.0	162.9	26 00.0	+60.0	163.0	26
27	33 40.4	+59.9	161.8	32 43.3	+60.0	162.0	31 46.3	+59.9	162.2	30 49.1	+60.0	162.3	29 51.9	+60.0	162.5	28 54.7	+60.0	162.7	27 57.4	+60.0	162.8	27 00.0	+60.0	163.0	27
28	34 40.3	+60.0	161.7	33 43.3	+60.0	161.9	32 46.2	+60.0	162.1	31 49.1	+60.0	162.3	30 51.9	+60.0	162.5	29 54.7	+60.0	162.7	28 57.4	+60.0	162.8	28 00.0	+60.0	163.0	28
29	35 40.3	+59.9	161.7	34 43.3	+59.9	161.9	33 46.2	+60.0	162.1	32 49.1	+60.0	162.3	31 51.9	+60.0	162.5	30 54.7	+59.9	162.7	29 57.4	+60.0	162.8	29 00.0	+60.0	163.0	29
30	36 40.2	+59.9	161.6	35 43.2	+60.0	161.8	34 46.2	+59.9	162.0	33 49.1	+59.9	162.3	32 51.9	+60.0	162.5	31 54.6	+60.0	162.6	30 57.4	+60.0	162.8	30 00.0	+60.0	163.0	30
31	37 40.1	+60.0	161.5	36 43.2	+59.9	161.8	35 46.1	+60.0	162.0	34 49.0	+60.0	162.2	33 51.9	+60.0	162.4	32 54.6	+60.0	162.6	31 57.4	+59.9	162.8	31 00.0	+60.0	163.0	31
32	38 40.1	+59.9	161.5	37 43.1	+60.0	161.7	36 46.1	+60.0	162.0	35 49.0	+60.0	162.2	34 51.9	+60.0	162.4	33 54.6	+60.0	162.6	32 57.3	+60.0	162.8	32 00.0	+60.0	163.0	32
33	39 40.0	+59.9	161.4	38 43.1	+59.9	161.7	37 46.1	+60.0	161.9	36 49.0	+60.0	162.2	35 51.9	+59.9	162.4	34 54.6	+60.0	162.6	33 57.3	+60.0	162.8	33 00.0	+60.0	163.0	33
34	40 39.9	+60.0	161.4	39 43.0	+60.0	161.6	38 46.1	+59.9	161.9	37 49.0	+60.0	162.1	36 51.8	+60.0	162.4	35 54.6	+60.0	162.6	34 57.3	+60.0	162.8	34 00.0	+60.0	163.0	34
35	41 39.9	+59.9	161.3	40 43.0	+59.9	161.6	39 46.0	+60.0	161.8	38 49.0	+59.9	162.1	37 51.8	+60.0	162.3	36 54.6	+60.0	162.6	35 57.3	+60.0	162.8	35 00.0	+60.0	163.0	35
36	42 39.8	+59.9	161.2	41 42.9	+60.0	161.5	40 46.0	+60.0	161.8	39 48.9	+60.0	162.1	38 51.8	+60.0	162.3	37 54.6	+60.0	162.6	36 57.3	+60.0	162.8	36 00.0	+60.0	163.0	36
37	43 39.7	+60.0	161.2	42 42.9	+59.9	161.5	41 46.0	+59.9	161.8	40 48.9	+60.0	162.0	39 51.8	+60.0	162.3	38 54.6	+60.0	162.5	37 57.3	+60.0	162.8	37 00.0	+60.0	163.0	37
38	44 39.7	+59.9	161.1	43 42.8	+60.0	161.4	42 45.9	+60.0	161.7	41 48.9	+60.0	162.0	40 51.8	+60.0	162.3	39 54.6	+60.0	162.5	38 57.3	+60.0	162.8	38 00.0	+60.0	163.0	38
39	45 39.6	+59.9	161.0	44 42.8	+59.9	161.4	43 45.9	+59.9	161.7	42 48.9	+60.0	162.0	41 51.8	+60.0	162.2	40 54.6	+60.0	162.5	39 57.3	+60.0	162.8	39 00.0	+60.0	163.0	39
40	46 39.5	+59.9	161.0	45 42.7	+60.0	161.3	44 45.8	+60.0	161.6	43 48.9	+59.9	161.9	42 51.8	+60.0	162.2	41 54.6	+60.0	162.5	40 57.3	+60.0	162.7	40 00.0	+60.0	163.0	40
41	47 39.4	+59.9	160.9	46 42.7	+59.9	161.2	45 45.8	+60.0	161.6	44 48.8	+60.0	161.9	43 51.8	+59.9	162.2	42 54.6	+60.0	162.5	41 57.3	+60.0	162.7	41 00.0	+60.0	163.0	41
42	48 39.3	+59.9	160.8	47 42.6	+59.9	161.2	46 45.8	+59.9	161.5	45 48.8	+60.0	161.8	44 51.7	+60.0	162.1	43 54.6	+60.0	162.4	42 57.3	+60.0	162.7	42 00.0	+60.0	163.0	42
43	49 39.2	+60.0	160.7	48 42.5	+60.0	161.1	47 45.7	+60.0	161.5	46 48.8	+60.0	161.8	45 51.7	+60.0	162.1	44 54.6	+60.0	162.4	43 57.3	+60.0	162.7	43 00.0	+60.0	163.0	43
44	50 39.2	+59.9	160.6	49 42.5	+59.9	161.0	48 45.7	+59.9	161.4	47 48.8	+59.9	161.7	46 51.7	+60.0	162.1	45 54.6	+60.0	162.4	44 57.3	+60.0	162.7	44 00.0	+60.0	163.0	44
45	51 39.1	+59.9	160.5	50 42.4	+59.9	160.9	49 45.6	+60.0	161.3	48 48.7	+60.0	161.7	47 51.7	+60.0	162.1	46 54.6	+60.0	162.4	45 57.3	+60.0	162.7	45 00.0	+60.0	163.0	45
46	52 39.0	+59.8	160.4	51 42.3	+60.0	160.9	50 45.6	+59.9	161.3	49 48.7	+60.0	161.7	48 51.7	+60.0	162.0	47 54.6	+60.0	162.4	46 57.3	+60.0	162.7	46 00.0	+60.0	163.0	46
47	53 38.8	+59.9	160.3	52 42.3	+59.9	160.8	51 45.5	+60.0	161.2	50 48.7	+59.9	161.6	49 51.7	+60.0	162.0	48 54.6	+59.9	162.3	47 57.3	+60.0	162.7	47 00.0	+60.0	163.0	47
48	54 38.7	+59.9	160.2	53 42.2	+59.9	160.7	52 45.5	+59.9	161.1	51 48.6	+60.0	161.6	50 51.7	+59.9	161.9	49 54.5	+60.0	162.3	48 57.3	+60.0	162.7	48 00.0	+60.0	163.0	48
49	55 38.6	+59.9	160.1	54 42.1	+59.9	160.6	53 45.4	+60.0	161.1	52 48.6	+60.0	161.5	51 51.6	+60.0	161.9	50 54.5	+60.0	162.3	49 57.3	+60.0	162.7	49 00.0	+60.0	163.0	49
50	56 38.5	+59.9	160.0	55 42.0	+59.9	160.5	54 45.4	+59.9	161.0	53 48.6	+59.9	161.4	52 51.6	+60.0	161.9	51 54.5	+60.0	162.3	50 57.3	+60.0	162.6	50 00.0	+60.0	163.0	50
51	57 38.4	+59.8	159.9	56 41.9	+59.9	160.4	55 45.3	+59.9	160.9	54 48.5	+60.0	161.4	53 51.6	+60.0	161.8	52 54.5	+60.0	162.2	51 57.3	+60.0	162.6	51 00.0	+60.0	163.0	51
52	58 38.2	+59.9	159.8	57 41.8	+59.9	160.3	56 45.2	+60.0	160.8	55 48.5	+60.0	161.3	54 51.6	+60.0	161.8	53 54.5	+60.0	162.2	52 57.3	+60.0	162.6	52 00.0	+60.0	163.0	52
53	59 38.1	+59.8	159.6	58 41.7	+59.9	160.2	57 45.2	+59.9	160.7	56 48.5	+59.9	161.3	55 51.6	+59.9	161.7	54 54.5	+60.0	162.2	53 57.3	+60.0	162.6	53 00.0	+60.0	163.0	53
54	60 37.9	+59.9	159.5	59 41.6	+59.9	160.1	58 45.1	+59.9	160.7	57 48.4	+60.0	161.2	56 51.5	+60.0	161.7	55 54.5	+60.0	162.1	54 57.3	+60.0	162.6	54 00.0	+60.0	163.0	54
55	61 37.8	+59.8	159.3	60 41.5	+59.9	160.0	59 45.0	+60.0	160.6	58 48.4	+59.9	161.1	57 51.5	+60.0	161.6	56 54.5	+60.0	162.1	55 57.3	+60.0	162.6	55 00.0	+60.0	163.0	55
56	62 37.6	+59.8	159.2	61 41.4	+59.9	159.8	60 45.0	+59.9	160.5	59 48.3	+60.0	161.0	58 51.5	+60.0	161.6	57 54.5	+60.0	162.1	56 57.3	+60.0	162.6	56 00.0	+60.0	163.0	56
57	63 37.4	+59.8	159.0	62 41.3	+59.8	159.7	61 44.9	+59.9	160.3	60 48.3	+59.9	160.9	59 51.5	+59.9	161.5	58 54.5	+60.0	162.0	57 57.3	+60.0	162.5	57 00.0	+60.0	163.0	57
58	64 37.2	+59.8	158.8	63 41.1	+59.9	159.5	62 44.8	+59.9	160.2	61 48.2	+60.0	160.9	60 51.4	+60.0	161.4	59 54.5	+59.9	162.0	58 57.3	+60.0	162.5	58 00.0	+60.0	163.0	58
59	65 37.0	+59.8	158.6	64 41.0	+59.8	159.4	63 44.7	+59.9	160.1	62 48.2	+59.9	160.8	61 51.4	+60.0	161.4	60 54.4	+60.0	162.0	59 57.3	+60.0	162.5	59 00.0	+60.0	163.0	59
60	66 36.8	+59.7	158.4	65 40.8	+59.8	159.2	64 44.6	+59.9	160.0	63 48.1	+59.9	160.7	62 51.4	+59.9	161.3	61 54.4	+60.0	161.9	60 57.3	+60.0	162.5	60 00.0	+60.0	163.0	60
61	67 36.5	+59.7	158.2	66 40.6	+59.9	159.0	65 44.5	+59.9	159.8	64 48.0	+60.0	160.6	63 51.3	+60.0	161.2	62 54.4	+60.0	161.9	61 57.3	+60.0	162.5	61 00.0	+60.0	163.0	61
62	68 36.2	+59.7	157.9	67 40.5	+59.8	158.8	66 44.4	+59.8	159.7	65 48.0	+59.9	160.4	64 51.3	+60.0	161.2	63 54.4	+60.0	161.8	62 57.3	+60.0	162.4	62 00.0	+60.0	163.0	62
63	69 35.9	+59.7	157.6	68 40.3	+59.7	158.6	67 44.2	+59.9	159.5	66 47.9	+59.9	160.3	65 51.3	+59.9	161.1	64 54.4	+60.0	161.8	63 57.3	+60.0	162.4	63 00.0	+60.0	163.0	63
64	70 35.6	+59.6	157.3	69 40.0	+59.8	158.4	68 44.1	+59.8	159.3	67 47.8	+59.9	160.2	66 51.2	+60.0	161.0	65 54.4	+59.9	161.7	64 57.3	+60.0	162.4	64 00.0	+60.0	163.0	64
65	71 35.2	+59.6	157.0	70 39.8	+59.7	158.1	69 43.9	+59.9	159.1	68 47.7	+59.9	160.0	67 51.2	+59.9	160.9	66 54.3	+60.0	161.6	65 57.3	+60.0	162.3	65 00.0	+60.0	163.0	65
66	72 34.8	+59.6	156.6	71 39.5	+59.7	157.8	70 43.8	+59.8	158.9	69 47.6	+59.9	159.9	68 51.1	+60.0	160.8	67 54.3	+60.0	161.6	66 57.3	+60.0	162.3	66 00.0	+60.0	163.0	66
67	73 34.4	+59.5	156.2	72 39.2	+59.7	157.5	71 43.6	+59.8	158.6	70 47.5	+59.9	159.7	69 51.1	+59.9	160.6	68 54.3	+60.0	161.5	67 57.3	+60.0	162.3	67 00.0	+60.0	163.0	67
68	74 33.9	+59.4	155.7	73 38.9	+59.6	157.1	72 43.4	+59.7	158.4	71 47.4	+59.8	159.5	70 51.0	+59.9	160.5	69 54.3	+59.9	161.4	68 57.3	+60.0	162.2	68 00.0	+60.0	163.0	68
69	75 33.3	+59.3	155.2	74 38.5	+59.6	156.7	73 43.1	+59.8	158.1	72 47.2	+59.9	159.3	71 50.9	+59.9	160.3	70 54.2	+60.0	161.3	69 57.3	+59.9	162.2	69 00.0	+60.0	163.0	69
70	76 32.6	+59.3	154.5	75 38.1	+59.5	156.2	74 42.9	+59.7	157.7	73 47.1	+59.8	159.0	72 50.8	+60.0	160.2	71 54.2	+60.0	161.2	70 57.2	+60.0	162.2	70 00.0	+60.0	163.0	70
71	77 31.9	+59.1	153.8	76 37.6	+59.4	155.7	75 42.6	+59.6	157.3	74 46.9	+59.8	158.7	73 50.8	+59.9	160.0	72 54.2	+59.9	161.1	71 57.2	+60.0	162.1	71 00.0	+60.0	163.0	71
72	78 31.0	+58.9	153.0	77 37.0	+59.4	155.1	76 42.2	+59.6	156.9	75 46.7	+59.8	158.4	74 50.7	+59.9	159.8	73 54.1	+60.0	161.0	72 57.2	+60.0	162.0	72 00.0	+60.0	163.0	72
73	79 29.9	+58.7	152.0	78 36.4	+59.2	154.4	77 41.8	+59.5	156.3	76 46.5	+59.7	158.1	75 50.6	+59.8	159.5	74 54.1	+59.9	160.8	73 57.2	+60.0	162.0	73 00.0	+60.0	163.0	73
74	80 28.6	+58.5	150.8	79 35.6	+59.0	153.5	78 41.3	+59.5	155.7	77 46.2	+59.7	157.6	76 50.4	+59.9	159.3	75 54.0	+60.0	160.7	74 57.2	+60.0	161.9	74 00.0	+60.0	163.0	74
75	81 27.1	+58.0	149.4	80 34.6	+58.8	152.5	79 40.8	+59.3	155.0	78 45.9	+59.7	157.1	77 50.3	+59.8	159.0	76 54.0	+59.9	160.5	75 57.2	+60.0	161.8	75 00.0	+60.0	163.0	75
76	82 25.1	+57.4	147.6	81 33.4	+58.5	151.2	80 40.1	+59.2	154.1	79 45.6	+59.5	156.6	78 50.1	+59.8	158.6	77 53.9	+59.9	160.3	76 57.2	+60.0	161.7	76 00.0	+60.0	163.0	76
77	83 22.5	+56.6	145.2	82 31.9	+58.1	149.6	81 39.3	+58.9	153.1	80 45.1	+59.5	155.8	79 49.9	+59.7	158.1	78 53.8	+60.0	160.0	77 57.2	+59.9	161.6	77 00.0	+60.0	163.0	77
78	84 19.1	+55.2	142.1	83 30.0	+57.4	147.5	82 38.2	+58.6	151.7	81 44.6	+59.3	155.0	80 49.6	+59.7	157.6	79 53.8	+59.8	159.7	78 57.1	+60.0	161.5	78 00.0	+60.0	163.0	78
79	85 14.3	+52.7	•137.8	84 27.4	+56.3	144.7	83 36.8	+58.2	149.9	82 43.9	+59.1	153.8	81 49.3	+59.6	156.9	80 53.6	+59.9	159.4	79 57.1	+60.0	161.4	79 00.0	+60.0	163.0	79
80	86 07.0	+48.3	•131.4	85 23.7	+54.3	•140.8	84 35.0	+57.2	147.5	83 43.0	+58.7	152.4	82 48.9	+59.5	156.0	81 53.5	+59.8	158.9	80 57.1	+60.0	161.2	80 00.0	+60.0	163.0	80
81	86 55.3	+39.4	•121.6	86 18.0	+50.5	•134.9	85 32.2	+55.8	•144.0	84 41.7	+58.2	150.3	83 48.4	+59.3	154.9	82 53.3	+59.8	158.3	81 57.1	+59.9	160.9	81 00.0	+60.0	163.0	81
82	87 34.7	+21.4	•105.7	87 08.5	+42.0	•125.3	86 28.0	+52.7	•138.7	85 39.9	+57.2	147.4	84 47.7	+58.9	153.4	83 53.1	+59.7	157.5	82 57.0	+60.0	160.6	82 00.0	+60.0	163.0	82
83	87 56.1	–5.6	• 81.6	87 50.5	+23.3	•108.8	87 20.7	+45.2	•129.7	86 37.1	+54.8	•142.8	85 46.6	+58.3	151.1	84 52.8	+59.5	156.5	83 57.0	+59.9	160.2	83 00.0	+60.0	163.0	83
84	87 50.5	–29.8	• 54.3	88 13.8	–7.9	• 81.5	88 05.9	+25.5	•112.9	87 31.9	+48.7	•134.8	86 44.9	+56.9	•147.4	85 52.3	+59.2	154.9	84 56.9	+59.8	159.7	84 00.0	+60.0	163.0	84
85	87 20.7	–43.6	• 33.4	88 05.9	–34.0	• 50.2	88 31.4	–10.8	• 81.5	88 20.6	+28.5	•118.2	87 41.8	+52.3	•140.7	86 51.5	+58.4	152.3	85 56.7	+59.8	158.9	85 00.0	+60.0	163.0	85
86	86 37.1	–50.5	• 20.2	87 31.9	–47.0	• 28.3	88 20.6	–38.8	• 44.9	88 49.1	–15.0	• 81.5	88 34.1	+32.7	•125.2	87 49.9	+56.0	•147.4	86 56.5	+59.6	157.5	86 00.0	+60.0	163.0	86
87	85 46.6	–53.8	• 12.0	86 44.9	–52.6	• 15.7	87 41.8	–50.3	• 22.4	88 34.1	–44.2	• 37.8	89 06.8	–20.9	• 81.5	88 45.9	+38.6	•134.7	87 56.1	+58.9	•154.9	87 00.0	+60.0	163.0	87
88	84 52.8	–55.8	6.6	85 52.3	–55.4	• 8.1	86 51.5	–54.8	• 10.7	87 49.9	–53.4	• 15.7	88 45.9	–49.8	• 28.3	89 24.5	–29.5	• 81.5	88 55.0	+47.3	•147.4	88 00.0	+60.0	163.0	88
89	83 57.0	–57.0	2.8	84 56.9	–56.9	3.3	85 56.7	–56.7	4.1	86 56.5	–56.5	• 5.5	87 56.1	–56.1	• 8.1	88 55.0	–55.0	• 15.6	89 42.3	–42.3	• 81.5	89 00.0	+60.0	163.0	89
90	83 00.0	–57.7	0.0	84 00.0	–57.7	0.0	85 00.0	–57.8	0.0	86 00.0	–57.9	0.0	87 00.0	–58.0	0.0	88 00.0	–58.2	• 0.0	89 00.0	–58.7	• 0.0	90 00.0	–60.0	81.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 17°, 343°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 41.6	−60.0	162.9	5 44.2	−60.0	162.9	4 46.9	−60.0	162.9	3 49.5	−60.0	163.0	2 52.1	−60.0	163.0	1 54.8	−60.0	163.0	0 57.4	−60.0	163.0	0 00.0	+60.0	17.0	0
1	5 41.6	−60.0	162.9	4 44.2	−59.9	162.9	3 46.9	−60.0	163.0	2 49.5	−60.0	163.0	1 52.1	−60.0	163.0	0 54.8	−60.0	163.0	0 02.6	+60.0	17.0	1 00.0	+60.0	17.0	1
2	4 41.6	−59.9	163.0	3 44.3	−60.0	163.0	2 46.9	−60.0	163.0	1 49.5	−60.0	163.0	0 52.1	−60.0	163.0	0 05.2	+60.0	17.0	1 02.6	+60.0	17.0	2 00.0	+60.0	17.0	2
3	3 41.7	−60.0	163.0	2 44.3	−60.0	163.0	1 46.9	−60.0	163.0	0 49.5	−60.0	163.0	0 07.9	+59.9	17.0	1 05.2	+60.0	17.0	2 02.6	+60.0	17.0	3 00.0	+60.0	17.0	3
4	2 41.7	−59.9	163.0	1 44.3	−59.9	163.0	0 46.9	−59.9	163.0	0 10.5	+59.9	17.0	1 07.8	+60.0	17.0	2 05.2	+60.0	17.0	3 02.6	+60.0	17.0	4 00.0	+60.0	17.0	4
5	1 41.8	−60.0	163.1	0 44.4	−60.0	163.1	0 13.0	+60.0	16.9	1 10.4	+60.0	16.9	2 07.8	+60.0	16.9	3 05.2	+60.0	17.0	4 02.6	+60.0	17.0	5 00.0	+60.0	17.0	5
6	0 41.8	−60.0	163.1	0 15.6	+60.0	16.9	1 13.0	+60.0	16.9	2 10.4	+60.0	16.9	3 07.8	+60.0	16.9	4 05.2	+60.0	16.9	5 02.6	+60.0	17.0	6 00.0	+60.0	17.0	6
7	0 18.2	+59.9	16.9	1 15.6	+60.0	16.9	2 13.0	+60.0	16.9	3 10.4	+60.0	16.9	4 07.8	+60.0	16.9	5 05.2	+60.0	16.9	6 02.6	+60.0	17.0	7 00.0	+60.0	17.0	7
8	1 18.1	+60.0	16.8	2 15.6	+59.9	16.8	3 13.0	+60.0	16.9	4 10.4	+60.0	16.9	5 07.8	+60.0	16.9	6 05.2	+60.0	16.9	7 02.6	+60.0	17.0	8 00.0	+60.0	17.0	8
9	2 18.1	+60.0	16.8	3 15.5	+60.0	16.8	4 13.0	+59.9	16.8	5 10.4	+60.0	16.9	6 07.8	+60.0	16.9	7 05.2	+60.0	16.9	8 02.6	+60.0	17.0	9 00.0	+60.0	17.0	9
10	3 18.1	+59.9	16.8	4 15.5	+60.0	16.8	5 12.9	+60.0	16.8	6 10.4	+60.0	16.8	7 07.8	+60.0	16.9	8 05.2	+60.0	16.9	9 02.6	+60.0	17.0	10 00.0	+60.0	17.0	10
11	4 18.0	+60.0	16.7	5 15.5	+59.9	16.8	6 12.9	+60.0	16.8	7 10.4	+60.0	16.8	8 07.8	+60.0	16.9	9 05.2	+60.0	16.9	10 02.6	+60.0	16.9	11 00.0	+60.0	17.0	11
12	5 18.0	+59.9	16.7	6 15.4	+60.0	16.7	7 12.9	+60.0	16.8	8 10.4	+59.9	16.8	9 07.8	+60.0	16.8	10 05.2	+60.0	16.9	11 02.6	+60.0	16.9	12 00.0	+60.0	17.0	12
13	6 17.9	+60.0	16.7	7 15.4	+60.0	16.7	8 12.9	+60.0	16.7	9 10.3	+60.0	16.8	10 07.8	+60.0	16.8	11 05.2	+60.0	16.9	12 02.6	+60.0	16.9	13 00.0	+60.0	17.0	13
14	7 17.9	+60.0	16.6	8 15.4	+60.0	16.7	9 12.9	+59.9	16.7	10 10.3	+60.0	16.8	11 07.8	+60.0	16.8	12 05.2	+60.0	16.9	13 02.6	+60.0	16.9	14 00.0	+60.0	17.0	14
15	8 17.9	+59.9	16.6	9 15.4	+59.9	16.6	10 12.8	+60.0	16.7	11 10.3	+60.0	16.7	12 07.8	+60.0	16.8	13 05.2	+60.0	16.9	14 02.6	+60.0	16.9	15 00.0	+60.0	17.0	15
16	9 17.8	+60.0	16.5	10 15.3	+60.0	16.6	11 12.8	+60.0	16.6	12 10.3	+60.0	16.7	13 07.8	+60.0	16.8	14 05.2	+60.0	16.8	15 02.6	+60.0	16.9	16 00.0	+60.0	17.0	16
17	10 17.8	+59.9	16.5	11 15.3	+60.0	16.6	12 12.8	+60.0	16.6	13 10.3	+60.0	16.7	14 07.8	+59.9	16.8	15 05.2	+60.0	16.8	16 02.6	+60.0	16.9	17 00.0	+60.0	17.0	17
18	11 17.7	+60.0	16.5	12 15.3	+59.9	16.5	13 12.8	+60.0	16.6	14 10.3	+60.0	16.7	15 07.7	+60.0	16.7	16 05.2	+60.0	16.8	17 02.6	+60.0	16.9	18 00.0	+60.0	17.0	18
19	12 17.7	+60.0	16.4	13 15.2	+60.0	16.5	14 12.8	+59.9	16.6	15 10.3	+59.9	16.6	16 07.7	+60.0	16.7	17 05.2	+60.0	16.8	18 02.6	+60.0	16.9	19 00.0	+60.0	17.0	19
20	13 17.7	+59.9	16.4	14 15.2	+60.0	16.5	15 12.7	+60.0	16.5	16 10.2	+60.0	16.6	17 07.7	+60.0	16.7	18 05.2	+60.0	16.8	19 02.6	+60.0	16.9	20 00.0	+60.0	17.0	20
21	14 17.6	+60.0	16.4	15 15.2	+60.0	16.4	16 12.7	+60.0	16.5	17 10.2	+60.0	16.6	18 07.7	+60.0	16.7	19 05.2	+60.0	16.8	20 02.6	+60.0	16.9	21 00.0	+60.0	17.0	21
22	15 17.6	+59.9	16.3	16 15.2	+59.9	16.4	17 12.7	+60.0	16.5	18 10.2	+60.0	16.6	19 07.7	+60.0	16.7	20 05.2	+60.0	16.8	21 02.6	+60.0	16.9	22 00.0	+60.0	17.0	22
23	16 17.5	+60.0	16.3	17 15.1	+60.0	16.4	18 12.7	+60.0	16.5	19 10.2	+60.0	16.6	20 07.7	+60.0	16.7	21 05.2	+60.0	16.8	22 02.6	+60.0	16.9	23 00.0	+60.0	17.0	23
24	17 17.5	+60.0	16.2	18 15.1	+60.0	16.3	19 12.7	+59.9	16.4	20 10.2	+60.0	16.5	21 07.7	+60.0	16.6	22 05.2	+60.0	16.8	23 02.6	+60.0	16.9	24 00.0	+60.0	17.0	24
25	18 17.5	+59.9	16.2	19 15.1	+59.9	16.3	20 12.6	+60.0	16.4	21 10.2	+60.0	16.5	22 07.7	+60.0	16.6	23 05.2	+60.0	16.7	24 02.6	+60.0	16.9	25 00.0	+60.0	17.0	25
26	19 17.4	+60.0	16.2	20 15.0	+60.0	16.3	21 12.6	+60.0	16.4	22 10.2	+59.9	16.5	23 07.7	+60.0	16.6	24 05.2	+60.0	16.7	25 02.6	+60.0	16.9	26 00.0	+60.0	17.0	26
27	20 17.4	+59.9	16.1	21 15.0	+60.0	16.2	22 12.6	+60.0	16.3	23 10.1	+60.0	16.5	24 07.7	+60.0	16.6	25 05.2	+60.0	16.7	26 02.6	+60.0	16.9	27 00.0	+60.0	17.0	27
28	21 17.3	+60.0	16.1	22 15.0	+59.9	16.2	23 12.6	+59.9	16.3	24 10.1	+60.0	16.4	25 07.7	+60.0	16.6	26 05.2	+59.9	16.7	27 02.6	+60.0	16.8	28 00.0	+60.0	17.0	28
29	22 17.3	+59.9	16.0	23 14.9	+60.0	16.2	24 12.5	+60.0	16.3	25 10.1	+60.0	16.4	26 07.7	+59.9	16.5	27 05.1	+60.0	16.7	28 02.6	+60.0	16.8	29 00.0	+60.0	17.0	29
30	23 17.2	+60.0	16.0	24 14.9	+60.0	16.1	25 12.5	+60.0	16.3	26 10.1	+60.0	16.4	27 07.6	+60.0	16.5	28 05.1	+60.0	16.7	29 02.6	+60.0	16.8	30 00.0	+60.0	17.0	30
31	24 17.2	+59.9	16.0	25 14.9	+59.9	16.1	26 12.5	+60.0	16.2	27 10.1	+60.0	16.4	28 07.6	+60.0	16.5	29 05.1	+60.0	16.7	30 02.6	+60.0	16.8	31 00.0	+60.0	17.0	31
32	25 17.1	+60.0	15.9	26 14.8	+60.0	16.0	27 12.5	+59.9	16.2	28 10.1	+60.0	16.3	29 07.6	+60.0	16.5	30 05.1	+60.0	16.7	31 02.6	+60.0	16.8	32 00.0	+60.0	17.0	32
33	26 17.1	+60.0	15.9	27 14.8	+60.0	16.0	28 12.4	+60.0	16.2	29 10.1	+59.9	16.3	30 07.6	+60.0	16.5	31 05.1	+60.0	16.6	32 02.6	+60.0	16.8	33 00.0	+60.0	17.0	33
34	27 17.1	+59.9	15.8	28 14.8	+59.9	16.0	29 12.4	+60.0	16.1	30 10.0	+60.0	16.3	31 07.6	+60.0	16.4	32 05.1	+60.0	16.6	33 02.6	+60.0	16.8	34 00.0	+60.0	17.0	34
35	28 17.0	+60.0	15.8	29 14.7	+60.0	15.9	30 12.4	+60.0	16.1	31 10.0	+60.0	16.3	32 07.6	+60.0	16.4	33 05.1	+60.0	16.6	34 02.6	+60.0	16.8	35 00.0	+60.0	17.0	35
36	29 17.0	+59.9	15.7	30 14.7	+59.9	15.9	31 12.4	+59.9	16.1	32 10.0	+60.0	16.2	33 07.6	+60.0	16.4	34 05.1	+60.0	16.6	35 02.6	+60.0	16.8	36 00.0	+60.0	17.0	36
37	30 16.9	+60.0	15.7	31 14.6	+60.0	15.8	32 12.3	+60.0	16.0	33 10.0	+60.0	16.2	34 07.6	+60.0	16.4	35 05.1	+60.0	16.6	36 02.6	+60.0	16.8	37 00.0	+60.0	17.0	37
38	31 16.9	+59.9	15.6	32 14.6	+60.0	15.8	33 12.3	+60.0	16.0	34 10.0	+60.0	16.2	35 07.6	+60.0	16.4	36 05.1	+60.0	16.6	37 02.6	+60.0	16.8	38 00.0	+60.0	17.0	38
39	32 16.8	+59.9	15.6	33 14.6	+59.9	15.8	34 12.3	+60.0	15.9	35 10.0	+59.9	16.1	36 07.6	+59.9	16.3	37 05.1	+60.0	16.5	38 02.6	+60.0	16.8	39 00.0	+60.0	17.0	39
40	33 16.7	+60.0	15.5	34 14.5	+60.0	15.7	35 12.3	+59.9	15.9	36 09.9	+60.0	16.1	37 07.5	+60.0	16.3	38 05.1	+60.0	16.5	39 02.6	+60.0	16.8	40 00.0	+60.0	17.0	40
41	34 16.7	+59.9	15.5	35 14.5	+59.9	15.7	36 12.2	+60.0	15.9	37 09.9	+60.0	16.1	38 07.5	+60.0	16.3	39 05.1	+60.0	16.5	40 02.6	+60.0	16.8	41 00.0	+60.0	17.0	41
42	35 16.6	+60.0	15.4	36 14.4	+60.0	15.6	37 12.2	+60.0	15.8	38 09.9	+60.0	16.0	39 07.5	+60.0	16.3	40 05.1	+60.0	16.5	41 02.6	+60.0	16.7	42 00.0	+60.0	17.0	42
43	36 16.6	+59.9	15.4	37 14.4	+60.0	15.6	38 12.2	+59.9	15.8	39 09.9	+60.0	16.0	40 07.5	+60.0	16.2	41 05.1	+60.0	16.5	42 02.6	+60.0	16.7	43 00.0	+60.0	17.0	43
44	37 16.5	+60.0	15.3	38 14.4	+59.9	15.5	39 12.1	+60.0	15.7	40 09.9	+59.9	16.0	41 07.5	+60.0	16.2	42 05.1	+60.0	16.5	43 02.6	+60.0	16.7	44 00.0	+60.0	17.0	44
45	38 16.5	+59.9	15.3	39 14.3	+60.0	15.5	40 12.1	+60.0	15.7	41 09.8	+60.0	15.9	42 07.5	+60.0	16.2	43 05.1	+60.0	16.4	44 02.6	+60.0	16.7	45 00.0	+60.0	17.0	45
46	39 16.4	+59.9	15.2	40 14.3	+59.9	15.4	41 12.1	+59.9	15.7	42 09.8	+60.0	15.9	43 07.5	+60.0	16.2	44 05.1	+60.0	16.4	45 02.6	+60.0	16.7	46 00.0	+60.0	17.0	46
47	40 16.3	+60.0	15.1	41 14.2	+60.0	15.4	42 12.0	+60.0	15.6	43 09.8	+60.0	15.9	44 07.5	+59.9	16.1	45 05.1	+60.0	16.4	46 02.6	+60.0	16.7	47 00.0	+60.0	17.0	47
48	41 16.3	+59.9	15.1	42 14.2	+59.9	15.3	43 12.0	+60.0	15.6	44 09.8	+59.9	15.8	45 07.4	+60.0	16.1	46 05.1	+59.9	16.4	47 02.6	+60.0	16.7	48 00.0	+60.0	17.0	48
49	42 16.2	+59.9	15.0	43 14.1	+60.0	15.3	44 12.0	+59.9	15.5	45 09.7	+60.0	15.8	46 07.4	+60.0	16.1	47 05.0	+60.0	16.4	48 02.6	+60.0	16.7	49 00.0	+60.0	17.0	49
50	43 16.1	+60.0	15.0	44 14.1	+59.9	15.2	45 11.9	+60.0	15.5	46 09.7	+60.0	15.7	47 07.4	+60.0	16.0	48 05.0	+60.0	16.3	49 02.6	+60.0	16.7	50 00.0	+60.0	17.0	50
51	44 16.1	+59.9	14.9	45 14.0	+59.9	15.1	46 11.9	+59.9	15.4	47 09.7	+60.0	15.7	48 07.4	+60.0	16.0	49 05.0	+60.0	16.3	50 02.6	+60.0	16.6	51 00.0	+60.0	17.0	51
52	45 16.0	+59.9	14.8	46 13.9	+60.0	15.1	47 11.8	+60.0	15.4	48 09.7	+59.9	15.7	49 07.4	+60.0	16.0	50 05.0	+60.0	16.3	51 02.6	+60.0	16.6	52 00.0	+60.0	17.0	52
53	46 15.9	+59.9	14.7	47 13.9	+59.9	15.0	48 11.8	+60.0	15.3	49 09.6	+60.0	15.6	50 07.4	+60.0	15.9	51 05.0	+60.0	16.3	52 02.6	+60.0	16.6	53 00.0	+60.0	17.0	53
54	47 15.8	+59.9	14.7	48 13.8	+60.0	15.0	49 11.8	+59.9	15.2	50 09.6	+60.0	15.6	51 07.4	+59.9	15.9	52 05.0	+60.0	16.2	53 02.6	+60.0	16.6	54 00.0	+60.0	17.0	54
55	48 15.7	+59.9	14.6	49 13.8	+59.9	14.9	50 11.7	+60.0	15.2	51 09.6	+59.9	15.5	52 07.3	+60.0	15.9	53 05.0	+60.0	16.2	54 02.6	+60.0	16.6	55 00.0	+60.0	17.0	55
56	49 15.6	+60.0	14.5	50 13.7	+59.9	14.8	51 11.7	+59.9	15.1	52 09.5	+60.0	15.5	53 07.3	+60.0	15.8	54 05.0	+60.0	16.2	55 02.6	+60.0	16.6	56 00.0	+60.0	17.0	56
57	50 15.6	+59.9	14.4	51 13.6	+59.9	14.7	52 11.6	+60.0	15.1	53 09.5	+60.0	15.4	54 07.3	+60.0	15.8	55 05.0	+60.0	16.2	56 02.6	+60.0	16.6	57 00.0	+60.0	17.0	57
58	51 15.5	+59.9	14.3	52 13.5	+60.0	14.7	53 11.6	+59.9	15.0	54 09.5	+59.9	15.3	55 07.3	+60.0	15.7	56 05.0	+60.0	16.1	57 02.6	+59.9	16.5	58 00.0	+60.0	17.0	58
59	52 15.4	+59.9	14.2	53 13.5	+59.9	14.6	54 11.5	+59.9	14.9	55 09.4	+60.0	15.3	56 07.3	+59.9	15.7	57 05.0	+60.0	16.1	58 02.5	+60.0	16.5	59 00.0	+60.0	17.0	59
60	53 15.3	+59.8	14.1	54 13.4	+59.9	14.5	55 11.4	+60.0	14.8	56 09.4	+59.9	15.2	57 07.2	+60.0	15.6	58 05.0	+59.9	16.1	59 02.5	+60.0	16.5	60 00.0	+60.0	17.0	60
61	54 15.1	+59.9	14.0	55 13.3	+59.9	14.4	56 11.4	+59.9	14.8	57 09.3	+60.0	15.2	58 07.2	+60.0	15.6	59 04.9	+60.0	16.0	60 02.5	+60.0	16.5	61 00.0	+60.0	17.0	61
62	55 15.0	+59.9	13.9	56 13.2	+59.9	14.3	57 11.3	+59.9	14.7	58 09.3	+60.0	15.1	59 07.2	+60.0	15.5	60 04.9	+60.0	16.0	61 02.5	+60.0	16.5	62 00.0	+60.0	17.0	62
63	56 14.9	+59.9	13.8	57 13.1	+59.9	14.2	58 11.2	+60.0	14.6	59 09.3	+59.9	15.0	60 07.2	+59.9	15.5	61 04.9	+60.0	15.9	62 02.5	+60.0	16.4	63 00.0	+60.0	17.0	63
64	57 14.8	+59.8	13.7	58 13.0	+59.9	14.1	59 11.2	+59.9	14.5	60 09.2	+60.0	14.9	61 07.1	+60.0	15.4	62 04.9	+60.0	15.9	63 02.5	+60.0	16.4	64 00.0	+60.0	17.0	64
65	58 14.6	+59.9	13.6	59 12.9	+59.9	14.0	60 11.1	+59.9	14.4	61 09.2	+59.9	14.8	62 07.1	+60.0	15.3	63 04.9	+60.0	15.8	64 02.5	+60.0	16.4	65 00.0	+60.0	17.0	65
66	59 14.5	+59.9	13.4	60 12.8	+59.9	13.9	61 11.0	+59.9	14.3	62 09.1	+59.9	14.7	63 07.1	+59.9	15.2	64 04.9	+60.0	15.8	65 02.5	+60.0	16.4	66 00.0	+60.0	17.0	66
67	60 14.4	+59.8	13.3	61 12.7	+59.9	13.7	62 10.9	+59.9	14.2	63 09.0	+60.0	14.7	64 07.0	+60.0	15.2	65 04.9	+59.9	15.7	66 02.5	+60.0	16.3	67 00.0	+60.0	17.0	67
68	61 14.2	+59.8	13.2	62 12.6	+59.8	13.6	63 10.8	+59.9	14.0	64 09.0	+59.9	14.5	65 07.0	+59.9	15.1	66 04.8	+60.0	15.7	67 02.5	+60.0	16.3	68 00.0	+60.0	17.0	68
69	62 14.0	+59.8	13.0	63 12.4	+59.9	13.4	64 10.7	+59.9	13.9	65 08.9	+59.9	14.4	66 06.9	+60.0	15.0	67 04.8	+60.0	15.6	68 02.5	+60.0	16.3	69 00.0	+60.0	17.0	69
70	63 13.8	+59.9	12.8	64 12.3	+59.8	13.3	65 10.6	+59.9	13.8	66 08.8	+60.0	14.3	67 06.9	+59.9	14.9	68 04.8	+60.0	15.5	69 02.5	+60.0	16.2	70 00.0	+60.0	17.0	70
71	64 13.7	+59.7	12.6	65 12.1	+59.9	13.1	66 10.5	+59.9	13.6	67 08.8	+59.9	14.2	68 06.8	+60.0	14.8	69 04.8	+59.9	15.5	70 02.5	+60.0	16.2	71 00.0	+60.0	17.0	71
72	65 13.4	+59.8	12.5	66 12.0	+59.8	12.9	67 10.4	+59.9	13.5	68 08.7	+59.9	14.0	69 06.8	+59.9	14.7	70 04.7	+60.0	15.4	71 02.5	+60.0	16.1	72 00.0	+60.0	17.0	72
73	66 13.2	+59.8	12.2	67 11.8	+59.8	12.7	68 10.3	+59.8	13.3	69 08.6	+59.9	13.9	70 06.7	+60.0	14.6	71 04.7	+60.0	15.3	72 02.5	+60.0	16.1	73 00.0	+60.0	17.0	73
74	67 13.0	+59.7	12.0	68 11.6	+59.8	12.5	69 10.1	+59.8	13.1	70 08.5	+59.9	13.7	71 06.7	+59.9	14.4	72 04.7	+60.0	15.2	73 02.5	+60.0	16.0	74 00.0	+60.0	17.0	74
75	68 12.7	+59.7	11.8	69 11.4	+59.8	12.3	70 09.9	+59.9	12.9	71 08.4	+59.8	13.5	72 06.6	+59.9	14.3	73 04.7	+59.9	15.1	74 02.5	+60.0	16.0	75 00.0	+60.0	17.0	75
76	69 12.4	+59.7	11.5	70 11.2	+59.7	12.0	71 09.8	+59.8	12.7	72 08.2	+59.9	13.3	73 06.5	+59.9	14.1	74 04.6	+60.0	14.9	75 02.5	+59.9	15.9	76 00.0	+60.0	17.0	76
77	70 12.1	+59.6	11.2	71 10.9	+59.7	11.8	72 09.6	+59.8	12.4	73 08.1	+59.8	13.1	74 06.4	+59.9	13.9	75 04.6	+59.9	14.8	76 02.4	+60.0	15.8	77 00.0	+60.0	17.0	77
78	71 11.7	+59.7	10.9	72 10.6	+59.7	11.5	73 09.4	+59.7	12.1	74 07.9	+59.9	12.8	75 06.3	+59.9	13.7	76 04.5	+60.0	14.6	77 02.4	+60.0	15.7	78 00.0	+60.0	17.0	78
79	72 11.4	+59.5	10.5	73 10.3	+59.6	11.1	74 09.1	+59.7	11.8	75 07.8	+59.8	12.6	76 06.2	+59.9	13.4	77 04.5	+59.9	14.4	78 02.4	+60.0	15.6	79 00.0	+60.0	17.0	79
80	73 10.9	+59.5	10.1	74 09.9	+59.6	10.7	75 08.8	+59.7	11.4	76 07.6	+59.7	12.2	77 06.1	+59.8	13.1	78 04.4	+59.9	14.2	79 02.4	+60.0	15.5	80 00.0	+60.0	17.0	80
81	74 10.4	+59.5	9.7	75 09.5	+59.6	10.3	76 08.5	+59.6	11.0	77 07.3	+59.7	11.8	78 05.9	+59.9	12.8	79 04.3	+59.9	14.0	80 02.4	+59.9	15.3	81 00.0	+60.0	17.0	81
82	75 09.9	+59.4	9.1	76 09.1	+59.5	9.8	77 08.1	+59.6	10.5	78 07.0	+59.7	11.4	79 05.8	+59.7	12.4	80 04.2	+59.9	13.6	81 02.3	+60.0	15.1	82 00.0	+60.0	17.0	82
83	76 09.3	+59.3	8.6	77 08.6	+59.3	9.2	78 07.7	+59.5	10.0	79 06.7	+59.6	10.9	80 05.5	+59.8	12.0	81 04.1	+59.9	13.3	82 02.3	+60.0	14.9	83 00.0	+60.0	17.0	83
84	77 08.6	+59.1	7.9	78 07.9	+59.3	8.5	79 07.2	+59.4	9.3	80 06.3	+59.6	10.2	81 05.3	+59.6	11.4	82 04.0	+59.8	12.8	83 02.3	+59.9	14.6	84 00.0	+60.0	17.0	84
85	78 07.7	+59.0	7.1	79 07.2	+59.1	7.8	80 06.6	+59.3	8.5	81 05.9	+59.4	9.5	82 04.9	+59.6	10.7	83 03.8	+59.7	12.2	84 02.2	+59.9	14.2	85 00.0	+60.0	17.0	85
86	79 06.7	+58.8	6.2	80 06.3	+59.0	6.8	81 05.9	+59.0	7.6	82 05.3	+59.2	8.5	83 04.5	+59.5	9.7	84 03.5	+59.7	11.4	85 02.1	+59.9	13.6	86 00.0	+60.0	17.0	86
87	80 05.5	+58.6	5.1	81 05.3	+58.7	5.7	82 04.9	+58.9	6.4	83 04.5	+59.0	7.3	84 04.0	+59.2	8.5	85 03.2	+59.4	10.2	86 02.0	+59.8	12.8	87 00.0	+60.0	17.0	87
88	81 04.1	+58.2	3.8	82 04.0	+58.3	4.2	83 03.8	+58.4	4.8	84 03.5	+58.6	5.7	85 03.2	+58.8	6.8	86 02.6	+59.2	8.5	87 01.8	+59.5	11.4	88 00.0	+60.0	17.0	88
89	82 02.3	+57.7	2.1	83 02.3	+57.7	2.4	84 02.2	+57.8	2.8	85 02.1	+57.9	3.4	86 02.0	+58.0	4.2	87 01.8	*+58.2* •	5.7	88 01.3	*+58.7* •	8.5	89 00.0	+60.0	17.0	89
90	83 00.0	+57.0	0.0	84 00.0	+56.9	0.0	85 00.0	+56.7	0.0	86 00.0	*+56.5* •	0.0	87 00.0	*+56.1* •	0.0	88 00.0	*+55.0* •	0.0	89 00.0	*+42.3* •	0.0	90 00.0	−60.0	8.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 163°, 197°

18°, 342° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 39.3	+60.0	161.9	5 42.3	+60.0	161.9	4 45.3	+60.0	161.9	3 48.2	+60.0	162.0	2 51.2	+60.0	162.0	1 54.1	+60.0	162.0	0 57.1	+60.0	162.0	0 00.0	+60.0	162.0	**0**
1	7 39.3	+60.0	161.8	6 42.3	+60.0	161.9	5 45.3	+59.9	161.9	4 48.2	+60.0	161.9	3 51.2	+60.0	162.0	2 54.1	+60.0	162.0	1 57.1	+60.0	162.0	1 00.0	+60.0	162.0	**1**
2	8 39.3	+59.9	161.8	7 42.3	+59.9	161.8	6 45.2	+60.0	161.9	5 48.2	+60.0	161.9	4 51.2	+60.0	161.9	3 54.1	+60.0	162.0	2 57.1	+60.0	162.0	2 00.0	+60.0	162.0	**2**
3	9 39.2	+60.0	161.8	8 42.2	+60.0	161.8	7 45.2	+60.0	161.9	6 48.2	+60.0	161.9	5 51.2	+60.0	161.9	4 54.1	+60.0	162.0	3 57.1	+60.0	162.0	3 00.0	+60.0	162.0	**3**
4	10 39.2	+59.9	161.7	9 42.2	+60.0	161.8	8 45.2	+60.0	161.8	7 48.2	+60.0	161.9	6 51.2	+59.9	161.9	5 54.1	+60.0	161.9	4 57.1	+60.0	162.0	4 00.0	+60.0	162.0	**4**
5	11 39.1	+60.0	161.7	10 42.2	+59.9	161.7	9 45.2	+59.9	161.8	8 48.2	+60.0	161.8	7 51.1	+60.0	161.9	6 54.1	+60.0	161.9	5 57.1	+60.0	162.0	5 00.0	+60.0	162.0	**5**
6	12 39.1	+59.9	161.6	11 42.1	+60.0	161.7	10 45.1	+60.0	161.8	9 48.2	+59.9	161.8	8 51.1	+60.0	161.9	7 54.1	+60.0	161.9	6 57.1	+60.0	162.0	6 00.0	+60.0	162.0	**6**
7	13 39.0	+60.0	161.6	12 42.1	+60.0	161.7	11 45.1	+60.0	161.7	10 48.1	+60.0	161.8	9 51.1	+60.0	161.9	8 54.1	+60.0	161.9	7 57.1	+60.0	162.0	7 00.0	+60.0	162.0	**7**
8	14 39.0	+59.9	161.6	13 42.1	+59.9	161.6	12 45.1	+60.0	161.7	11 48.1	+60.0	161.8	10 51.1	+60.0	161.8	9 54.1	+60.0	161.9	8 57.1	+60.0	162.0	8 00.0	+60.0	162.0	**8**
9	15 38.9	+60.0	161.5	14 42.0	+60.0	161.6	13 45.1	+60.0	161.7	12 48.1	+60.0	161.8	11 51.1	+60.0	161.8	10 54.1	+60.0	161.9	9 57.1	+60.0	161.9	9 00.0	+60.0	162.0	**9**
10	16 38.9	+60.0	161.5	15 42.0	+60.0	161.6	14 45.1	+59.9	161.7	13 48.1	+60.0	161.7	12 51.1	+60.0	161.8	11 54.1	+60.0	161.9	10 57.1	+60.0	161.9	10 00.0	+60.0	162.0	**10**
11	17 38.9	+59.9	161.4	16 42.0	+59.9	161.5	15 45.0	+60.0	161.6	14 48.1	+60.0	161.7	13 51.1	+60.0	161.8	12 54.1	+60.0	161.9	11 57.1	+60.0	161.9	11 00.0	+60.0	162.0	**11**
12	18 38.8	+60.0	161.4	17 41.9	+60.0	161.5	16 45.0	+60.0	161.6	15 48.1	+59.9	161.7	14 51.1	+60.0	161.8	13 54.1	+60.0	161.9	12 57.1	+60.0	161.9	12 00.0	+60.0	162.0	**12**
13	19 38.8	+59.9	161.4	18 41.9	+60.0	161.5	17 45.0	+60.0	161.6	16 48.0	+60.0	161.7	15 51.1	+60.0	161.8	14 54.1	+60.0	161.8	13 57.1	+60.0	161.9	13 00.0	+60.0	162.0	**13**
14	20 38.7	+60.0	161.3	19 41.9	+59.9	161.4	18 45.0	+59.9	161.5	17 48.0	+60.0	161.6	16 51.1	+60.0	161.7	15 54.1	+60.0	161.8	14 57.1	+59.9	161.9	14 00.0	+60.0	162.0	**14**
15	21 38.7	+59.9	161.3	20 41.8	+60.0	161.4	19 44.9	+60.0	161.5	18 48.0	+60.0	161.6	17 51.1	+60.0	161.7	16 54.1	+60.0	161.8	15 57.0	+60.0	161.9	15 00.0	+60.0	162.0	**15**
16	22 38.6	+60.0	161.2	21 41.8	+59.9	161.4	20 44.9	+60.0	161.5	19 48.0	+60.0	161.6	18 51.1	+59.9	161.7	17 54.1	+60.0	161.8	16 57.0	+60.0	161.9	16 00.0	+60.0	162.0	**16**
17	23 38.6	+59.9	161.2	22 41.7	+60.0	161.3	21 44.9	+60.0	161.4	20 48.0	+60.0	161.6	19 51.0	+60.0	161.7	18 54.1	+60.0	161.8	17 57.0	+60.0	161.9	17 00.0	+60.0	162.0	**17**
18	24 38.5	+60.0	161.1	23 41.7	+60.0	161.3	22 44.9	+59.9	161.4	21 48.0	+60.0	161.5	20 51.0	+60.0	161.7	19 54.1	+60.0	161.8	18 57.0	+60.0	161.9	18 00.0	+60.0	162.0	**18**
19	25 38.5	+59.9	161.1	24 41.7	+59.9	161.2	23 44.8	+60.0	161.4	22 48.0	+59.9	161.5	21 51.0	+60.0	161.7	20 54.1	+60.0	161.8	19 57.0	+60.0	161.9	19 00.0	+60.0	162.0	**19**
20	26 38.4	+60.0	161.0	25 41.6	+60.0	161.2	24 44.8	+60.0	161.4	23 47.9	+60.0	161.5	22 51.0	+60.0	161.6	21 54.1	+59.9	161.8	20 57.0	+60.0	161.9	20 00.0	+60.0	162.0	**20**
21	27 38.4	+59.9	161.0	26 41.6	+60.0	161.2	25 44.8	+60.0	161.3	24 47.9	+60.0	161.5	23 51.0	+60.0	161.6	22 54.0	+60.0	161.7	21 57.0	+60.0	161.9	21 00.0	+60.0	162.0	**21**
22	28 38.3	+59.9	160.9	27 41.6	+59.9	161.1	26 44.8	+59.9	161.3	25 47.9	+60.0	161.4	24 51.0	+60.0	161.6	23 54.0	+60.0	161.7	22 57.0	+60.0	161.9	22 00.0	+60.0	162.0	**22**
23	29 38.2	+60.0	160.9	28 41.5	+60.0	161.1	27 44.7	+60.0	161.3	26 47.9	+60.0	161.4	25 51.0	+60.0	161.6	24 54.0	+60.0	161.7	23 57.0	+60.0	161.9	23 00.0	+60.0	162.0	**23**
24	30 38.2	+59.9	160.8	29 41.5	+59.9	161.0	28 44.7	+60.0	161.2	27 47.9	+59.9	161.4	26 51.0	+60.0	161.6	25 54.0	+60.0	161.7	24 57.0	+60.0	161.9	24 00.0	+60.0	162.0	**24**
25	31 38.1	+60.0	160.8	30 41.4	+60.0	161.0	29 44.7	+59.9	161.2	28 47.8	+60.0	161.4	27 51.0	+60.0	161.5	26 54.0	+60.0	161.7	25 57.0	+60.0	161.9	25 00.0	+60.0	162.0	**25**
26	32 38.1	+59.9	160.7	31 41.4	+59.9	160.9	30 44.6	+60.0	161.1	29 47.8	+60.0	161.3	28 51.0	+59.9	161.5	27 54.0	+60.0	161.7	26 57.0	+60.0	161.8	26 00.0	+60.0	162.0	**26**
27	33 38.0	+59.9	160.7	32 41.3	+60.0	160.9	31 44.6	+60.0	161.1	30 47.8	+60.0	161.3	29 50.9	+60.0	161.5	28 54.0	+60.0	161.7	27 57.0	+60.0	161.8	27 00.0	+60.0	162.0	**27**
28	34 37.9	+60.0	160.6	33 41.3	+60.0	160.9	32 44.6	+60.0	161.1	31 47.8	+60.0	161.3	30 50.9	+60.0	161.5	29 54.0	+60.0	161.7	28 57.0	+60.0	161.8	28 00.0	+60.0	162.0	**28**
29	35 37.9	+59.9	160.6	34 41.3	+59.9	160.8	33 44.6	+59.9	161.0	32 47.8	+60.0	161.2	31 50.9	+60.0	161.4	30 54.0	+60.0	161.6	29 57.0	+60.0	161.8	29 00.0	+60.0	162.0	**29**
30	36 37.8	+60.0	160.5	35 41.2	+60.0	160.8	34 44.5	+60.0	161.0	33 47.8	+59.9	161.2	32 50.9	+60.0	161.4	31 54.0	+60.0	161.6	30 57.0	+60.0	161.8	30 00.0	+60.0	162.0	**30**
31	37 37.8	+59.9	160.5	36 41.2	+59.9	160.7	35 44.5	+60.0	161.0	34 47.7	+60.0	161.2	33 50.9	+60.0	161.4	32 54.0	+60.0	161.6	31 57.0	+60.0	161.8	31 00.0	+60.0	162.0	**31**
32	38 37.7	+59.9	160.4	37 41.1	+60.0	160.7	36 44.5	+59.9	160.9	35 47.7	+60.0	161.2	34 50.9	+60.0	161.4	33 54.0	+60.0	161.6	32 57.0	+60.0	161.8	32 00.0	+60.0	162.0	**32**
33	39 37.6	+59.9	160.3	38 41.1	+59.9	160.6	37 44.4	+60.0	160.9	36 47.7	+60.0	161.1	35 50.9	+60.0	161.4	34 54.0	+60.0	161.6	33 57.0	+60.0	161.8	33 00.0	+60.0	162.0	**33**
34	40 37.5	+60.0	160.3	39 41.0	+60.0	160.6	38 44.4	+59.9	160.8	37 47.7	+59.9	161.1	36 50.9	+60.0	161.3	35 54.0	+60.0	161.6	34 57.0	+60.0	161.8	34 00.0	+60.0	162.0	**34**
35	41 37.5	+59.9	160.2	40 41.0	+59.9	160.5	39 44.3	+60.0	160.8	38 47.6	+60.0	161.0	37 50.9	+59.9	161.3	36 54.0	+60.0	161.5	35 57.0	+60.0	161.8	35 00.0	+60.0	162.0	**35**
36	42 37.4	+59.9	160.1	41 40.9	+59.9	160.4	40 44.3	+60.0	160.7	39 47.6	+60.0	161.0	38 50.8	+60.0	161.3	37 54.0	+60.0	161.5	36 57.0	+60.0	161.8	36 00.0	+60.0	162.0	**36**
37	43 37.3	+59.9	160.1	42 40.8	+60.0	160.4	41 44.3	+59.9	160.7	40 47.6	+60.0	161.0	39 50.8	+60.0	161.2	38 54.0	+60.0	161.5	37 57.0	+60.0	161.8	37 00.0	+60.0	162.0	**37**
38	44 37.2	+59.9	160.0	43 40.8	+59.9	160.3	42 44.2	+60.0	160.6	41 47.6	+59.9	160.9	40 50.8	+60.0	161.2	39 54.0	+60.0	161.5	38 57.0	+60.0	161.8	38 00.0	+60.0	162.0	**38**
39	45 37.1	+59.9	159.9	44 40.7	+60.0	160.3	43 44.2	+59.9	160.6	42 47.5	+60.0	160.9	41 50.8	+60.0	161.2	40 54.0	+60.0	161.5	39 57.0	+60.0	161.7	39 00.0	+60.0	162.0	**39**
40	46 37.0	+60.0	159.8	45 40.7	+59.9	160.2	44 44.1	+60.0	160.5	43 47.5	+60.0	160.9	42 50.8	+60.0	161.2	41 54.0	+59.9	161.5	40 57.0	+60.0	161.7	40 00.0	+60.0	162.0	**40**
41	47 37.0	+59.9	159.8	46 40.6	+59.9	160.1	45 44.1	+60.0	160.5	44 47.5	+60.0	160.8	43 50.8	+60.0	161.1	42 53.9	+60.0	161.4	41 57.0	+60.0	161.7	41 00.0	+60.0	162.0	**41**
42	48 36.9	+59.9	159.7	47 40.5	+60.0	160.1	46 44.1	+59.9	160.4	45 47.5	+59.9	160.8	44 50.8	+59.9	161.1	43 53.9	+60.0	161.4	42 57.0	+60.0	161.7	42 00.0	+60.0	162.0	**42**
43	49 36.8	+59.9	159.6	48 40.5	+59.9	160.0	47 44.0	+60.0	160.4	46 47.4	+60.0	160.7	45 50.7	+60.0	161.1	44 53.9	+60.0	161.4	43 57.0	+60.0	161.7	43 00.0	+60.0	162.0	**43**
44	50 36.7	+59.9	159.5	49 40.4	+59.9	159.9	48 44.0	+59.9	160.3	47 47.4	+60.0	160.7	46 50.7	+60.0	161.0	45 53.9	+60.0	161.4	44 57.0	+60.0	161.7	44 00.0	+60.0	162.0	**44**
45	51 36.6	+59.8	159.4	50 40.3	+59.9	159.8	49 43.9	+60.0	160.2	48 47.4	+59.9	160.6	47 50.7	+60.0	161.0	46 53.9	+60.0	161.3	45 57.0	+60.0	161.7	45 00.0	+60.0	162.0	**45**
46	52 36.4	+59.9	159.3	51 40.2	+59.9	159.7	50 43.9	+59.9	160.2	49 47.3	+60.0	160.6	48 50.7	+60.0	161.0	47 53.9	+60.0	161.3	46 57.0	+60.0	161.7	46 00.0	+60.0	162.0	**46**
47	53 36.3	+59.9	159.2	52 40.1	+60.0	159.7	51 43.8	+59.9	160.1	50 47.3	+60.0	160.5	49 50.7	+60.0	160.9	48 53.9	+60.0	161.3	47 57.0	+60.0	161.7	47 00.0	+60.0	162.0	**47**
48	54 36.2	+59.9	159.1	53 40.1	+59.9	159.6	52 43.7	+60.0	160.0	51 47.3	+59.9	160.5	50 50.7	+59.9	160.9	49 53.9	+60.0	161.3	48 57.0	+60.0	161.6	48 00.0	+60.0	162.0	**48**
49	55 36.1	+59.8	159.0	54 40.0	+59.9	159.5	53 43.7	+59.9	160.0	52 47.2	+60.0	160.4	51 50.6	+60.0	160.8	50 53.9	+60.0	161.2	49 57.0	+60.0	161.6	49 00.0	+60.0	162.0	**49**
50	56 35.9	+59.9	158.8	55 39.9	+59.9	159.4	54 43.6	+60.0	159.9	53 47.2	+60.0	160.4	52 50.6	+60.0	160.8	51 53.9	+60.0	161.2	50 57.0	+60.0	161.6	50 00.0	+60.0	162.0	**50**
51	57 35.8	+59.8	158.7	56 39.8	+59.9	159.3	55 43.6	+59.9	159.8	54 47.2	+59.9	160.3	53 50.6	+60.0	160.8	52 53.9	+60.0	161.2	51 57.0	+60.0	161.6	51 00.0	+60.0	162.0	**51**
52	58 35.6	+59.9	158.6	57 39.7	+59.9	159.2	56 43.5	+59.9	159.7	55 47.1	+60.0	160.2	54 50.6	+59.9	160.7	53 53.9	+59.9	161.2	52 57.0	+60.0	161.6	52 00.0	+60.0	162.0	**52**
53	59 35.5	+59.8	158.4	58 39.6	+59.8	159.1	57 43.4	+59.9	159.6	56 47.1	+59.9	160.2	55 50.5	+60.0	160.7	54 53.8	+60.0	161.1	53 57.0	+60.0	161.6	53 00.0	+60.0	162.0	**53**
54	60 35.3	+59.8	158.3	59 39.4	+59.9	158.9	58 43.3	+59.9	159.5	57 47.0	+60.0	160.1	56 50.5	+60.0	160.6	55 53.8	+60.0	161.1	54 57.0	+60.0	161.6	54 00.0	+60.0	162.0	**54**
55	61 35.1	+59.8	158.1	60 39.3	+59.9	158.8	59 43.2	+60.0	159.4	58 47.0	+59.9	160.0	57 50.5	+60.0	160.5	56 53.8	+60.0	161.1	55 57.0	+60.0	161.5	55 00.0	+60.0	162.0	**55**
56	62 34.9	+59.8	158.0	61 39.2	+59.8	158.7	60 43.2	+59.9	159.3	59 46.9	+60.0	159.9	58 50.5	+59.9	160.5	57 53.8	+60.0	161.0	56 57.0	+60.0	161.5	56 00.0	+60.0	162.0	**56**
57	63 34.7	+59.8	157.8	62 39.0	+59.9	158.5	61 43.1	+59.9	159.2	60 46.9	+59.9	159.8	59 50.4	+60.0	160.4	58 53.8	+60.0	161.0	57 57.0	+60.0	161.5	57 00.0	+60.0	162.0	**57**
58	64 34.5	+59.8	157.6	63 38.9	+59.8	158.4	62 43.0	+59.9	159.1	61 46.8	+59.9	159.7	60 50.4	+60.0	160.4	59 53.8	+60.0	160.9	58 57.0	+60.0	161.5	58 00.0	+60.0	162.0	**58**
59	65 34.3	+59.7	157.4	64 38.7	+59.8	158.2	63 42.9	+59.8	158.9	62 46.7	+60.0	159.6	61 50.4	+59.9	160.3	60 53.8	+60.0	160.9	59 57.0	+60.0	161.5	59 00.0	+60.0	162.0	**59**
60	66 34.0	+59.7	157.1	65 38.5	+59.8	158.0	64 42.7	+59.9	158.8	63 46.7	+59.9	159.5	62 50.3	+60.0	160.2	61 53.8	+59.9	160.9	60 57.0	+60.0	161.4	60 00.0	+60.0	162.0	**60**
61	67 33.7	+59.7	156.9	66 38.3	+59.8	157.8	65 42.6	+59.9	158.6	64 46.6	+59.9	159.4	63 50.3	+59.9	160.1	62 53.7	+60.0	160.8	61 57.0	+60.0	161.4	61 00.0	+60.0	162.0	**61**
62	68 33.4	+59.7	156.6	67 38.1	+59.8	157.6	66 42.5	+59.8	158.5	65 46.5	+59.9	159.3	64 50.2	+60.0	160.0	63 53.7	+60.0	160.7	62 57.0	+60.0	161.4	62 00.0	+60.0	162.0	**62**
63	69 33.1	+59.6	156.3	68 37.9	+59.8	157.4	67 42.3	+59.9	158.3	66 46.4	+59.9	159.2	65 50.2	+60.0	160.0	64 53.7	+60.0	160.7	63 57.0	+60.0	161.4	63 00.0	+60.0	162.0	**63**
64	70 32.7	+59.6	156.0	69 37.7	+59.7	157.1	68 42.2	+59.8	158.1	67 46.3	+59.9	159.0	66 50.2	+59.9	159.9	65 53.7	+60.0	160.6	64 57.0	+60.0	161.3	64 00.0	+60.0	162.0	**64**
65	71 32.3	+59.6	155.6	70 37.4	+59.7	156.8	69 42.0	+59.8	157.9	68 46.2	+59.9	158.9	67 50.1	+59.9	159.7	66 53.7	+59.9	160.6	65 57.0	+59.9	161.3	65 00.0	+60.0	162.0	**65**
66	72 31.9	+59.4	155.2	71 37.1	+59.7	156.5	70 41.8	+59.8	157.7	69 46.1	+59.9	158.7	68 50.0	+60.0	159.6	67 53.6	+60.0	160.5	66 56.9	+60.0	161.3	66 00.0	+60.0	162.0	**66**
67	73 31.3	+59.5	154.8	72 36.8	+59.6	156.2	71 41.6	+59.8	157.4	70 46.0	+59.9	158.5	69 50.0	+59.9	159.5	68 53.6	+60.0	160.4	67 56.9	+60.0	161.2	67 00.0	+60.0	162.0	**67**
68	74 30.8	+59.3	154.3	73 36.4	+59.6	155.8	72 41.4	+59.7	157.1	71 45.9	+59.8	158.3	70 49.9	+59.9	159.4	69 53.6	+60.0	160.3	68 56.9	+60.0	161.2	68 00.0	+60.0	162.0	**68**
69	75 30.1	+59.3	153.7	74 36.0	+59.5	155.4	73 41.1	+59.7	156.8	72 45.7	+59.8	158.1	71 49.8	+59.9	159.2	70 53.6	+59.9	160.2	69 56.9	+60.0	161.2	69 00.0	+60.0	162.0	**69**
70	76 29.4	+59.2	153.1	75 35.5	+59.4	154.9	74 40.8	+59.7	156.4	73 45.5	+59.9	157.8	72 49.7	+60.0	159.0	71 53.5	+60.0	160.1	70 56.9	+60.0	161.1	70 00.0	+60.0	162.0	**70**
71	77 28.6	+59.0	152.4	76 34.9	+59.4	154.3	75 40.5	+59.6	156.0	74 45.4	+59.7	157.5	73 49.7	+59.8	158.8	72 53.5	+59.9	160.0	71 56.9	+60.0	161.1	71 00.0	+60.0	162.0	**71**
72	78 27.6	+58.8	151.5	77 34.3	+59.3	153.7	76 40.1	+59.6	155.5	75 45.1	+59.8	157.2	74 49.5	+59.9	158.6	73 53.4	+60.0	159.9	72 56.9	+60.0	161.0	72 00.0	+60.0	162.0	**72**
73	79 26.4	+58.6	150.5	78 33.6	+59.1	152.9	77 39.7	+59.4	155.0	76 44.9	+59.7	156.8	75 49.4	+59.9	158.4	74 53.4	+59.9	159.7	73 56.9	+60.0	160.9	73 00.0	+60.0	162.0	**73**
74	80 25.0	+58.3	149.2	79 32.7	+58.9	152.0	78 39.1	+59.4	154.3	77 44.6	+59.7	156.3	76 49.3	+59.8	158.1	75 53.3	+60.0	159.6	74 56.9	+60.0	160.9	74 00.0	+60.0	162.0	**74**
75	81 23.3	+57.8	147.7	80 31.6	+58.7	150.9	79 38.5	+59.3	153.6	78 44.3	+59.6	155.8	77 49.1	+59.8	157.7	76 53.3	+59.9	159.4	75 56.9	+59.9	160.8	75 00.0	+60.0	162.0	**75**
76	82 21.1	+57.2	145.8	81 30.3	+58.4	149.6	80 37.8	+59.1	152.7	79 43.9	+59.5	155.2	78 48.9	+59.8	157.3	77 53.2	+59.9	159.1	76 56.8	+60.0	160.7	76 00.0	+60.0	162.0	**76**
77	83 18.3	+56.2	143.4	82 28.7	+57.9	147.9	81 36.9	+58.8	151.5	80 43.4	+59.4	154.5	79 48.7	+59.7	156.9	78 53.1	+59.9	158.9	77 56.8	+60.0	160.6	77 00.0	+60.0	162.0	**77**
78	84 14.5	*+54.8*	•140.2	83 26.6	+57.1	145.8	82 35.7	+58.5	150.1	81 42.8	+59.2	153.5	80 48.4	+59.7	156.3	79 53.0	+59.9	158.5	78 56.8	+60.0	160.4	78 00.0	+60.0	162.0	**78**
79	85 09.3	*+52.2*	•135.7	84 23.7	+55.9	142.9	83 34.2	+57.9	148.2	82 42.0	+59.0	152.4	81 48.1	+59.5	155.6	80 52.9	+59.8	158.2	79 56.8	+60.0	160.3	79 00.0	+60.0	162.0	**79**
80	86 01.5	*+47.5*	•129.3	85 19.6	*+53.8*	•138.8	84 32.1	+57.0	145.7	83 41.0	+58.6	150.8	82 47.6	+59.5	154.7	81 52.7	+59.8	157.7	80 56.8	+59.9	160.1	80 00.0	+60.0	162.0	**80**
81	86 49.0	*+38.6*	•119.5	86 13.4	*+49.9*	•132.8	85 29.1	*+55.4*	•142.1	84 39.6	+58.0	148.7	83 47.1	+59.2	153.5	82 52.5	+59.8	157.1	81 56.7	+60.0	159.8	81 00.0	+60.0	162.0	**81**
82	87 27.6	*+21.3*	•104.0	87 03.3	*+41.3*	•123.2	86 24.5	*+52.1*	•136.6	85 37.6	+56.9	145.7	84 46.3	+58.8	151.8	83 52.3	+59.6	156.2	82 56.7	+59.9	159.5	82 00.0	+60.0	162.0	**82**
83	87 48.9	*–4.3*	•81.1	87 44.6	*+23.0*	•107.0	87 16.6	*+44.5*	•127.6	86 34.5	*+54.4*	•140.9	85 45.1	+58.1	149.4	84 51.9	+59.5	155.1	83 56.6	+59.9	159.1	83 00.0	+60.0	162.0	**83**
84	87 44.6	*–28.0*	•55.1	88 07.6	*–6.5*	•81.0	88 01.1	*+25.2*	•110.9	87 28.9	*+48.0*	•132.7	86 43.2	*+56.5*	•145.6	85 51.4	+59.1	153.4	84 56.5	+59.9	158.5	84 00.0	+60.0	162.0	**84**
85	87 16.6	*–42.1*	•34.5	88 01.1	*–32.2*	•51.1	88 26.3	*–9.4*	•81.0	88 16.9	*+28.1*	•116.1	87 39.7	*+51.8*	•138.7	86 50.5	+58.3	150.7	85 56.4	+59.7	157.6	85 00.0	+60.0	162.0	**85**
86	86 34.5	*–49.4*	•21.1	87 28.9	*–45.7*	•29.4	88 16.9	*–37.2*	•45.9	88 45.0	*–13.5*	•81.0	88 31.5	*+32.2*	•123.1	87 48.8	*+55.6*	•145.6	86 56.1	+59.6	156.2	86 00.0	+60.0	162.0	**86**
87	85 45.1	*–53.2*	•12.6	86 43.2	*–51.8*	•16.4	87 39.7	*–49.2*	•23.4	88 31.5	*–42.7*	•38.9	89 03.7	*–19.3*	•81.0	88 44.4	*+38.1*	•132.6	87 55.7	*+58.7*	•153.4	87 00.0	+60.0	162.0	**87**
88	84 51.9	–55.3	6.9	85 51.4	*–54.9*	•8.6	86 50.5	*–54.1*	•11.3	87 48.8	*–52.7*	•16.4	88 44.4	*–48.7*	•29.4	89 22.5	*–28.1*	•81.0	88 54.4	*+46.8*	•145.6	88 00.0	+60.0	162.0	**88**
89	83 56.6	–56.6	2.9	84 56.5	–56.5	3.5	85 56.4	–56.4	4.4	86 56.1	*–56.1*	•5.8	87 55.7	*–55.7*	•8.6	88 54.4	*–54.4*	•16.4	89 41.2	*–41.2*	•81.0	89 00.0	+60.0	162.0	**89**
90	83 00.0	–57.4	0.0	84 00.0	–57.5	0.0	85 00.0	–57.5	0.0	86 00.0	–57.6	0.0	87 00.0	–57.8	0.0	88 00.0	*–58.0*	•0.0	89 00.0	*–58.5*	•0.0	90 00.0	–60.0	81.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 18°, 342°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 39.3	–59.9	161.9	5 42.3	–59.9	161.9	4 45.3	–60.0	161.9	3 48.2	–60.0	162.0	2 51.2	–60.0	162.0	1 54.1	–60.0	162.0	0 57.1	–60.0	162.0	0 00.0	+60.0	18.0	**0**
1	5 39.4	–60.0	161.9	4 42.4	–60.0	161.9	3 45.3	–60.0	162.0	2 48.2	–59.9	162.0	1 51.2	–60.0	162.0	0 54.1	–60.0	162.0	0 02.9	+60.0	18.0	1 00.0	+60.0	18.0	**1**
2	4 39.4	–59.9	161.9	3 42.4	–60.0	162.0	2 45.3	–60.0	162.0	1 48.3	–60.0	162.0	0 51.2	–60.0	162.0	0 05.9	+60.0	18.0	1 02.9	+60.0	18.0	2 00.0	+60.0	18.0	**2**
3	3 39.5	–60.0	162.0	2 42.4	–60.0	162.0	1 45.3	–59.9	162.0	0 48.3	–60.0	162.0	0 08.8	+60.0	18.0	1 05.9	+60.0	18.0	2 02.9	+60.0	18.0	3 00.0	+60.0	18.0	**3**
4	2 39.5	–59.9	162.0	1 42.4	–59.9	162.0	0 45.4	–60.0	162.0	0 11.7	+60.0	18.0	1 08.8	+60.0	18.0	2 05.9	+60.0	18.0	3 02.9	+60.0	18.0	4 00.0	+60.0	18.0	**4**
5	1 39.6	–60.0	162.1	0 42.5	–60.0	162.1	0 14.6	+60.0	17.9	1 11.7	+60.0	17.9	2 08.8	+60.0	17.9	3 05.9	+60.0	18.0	4 02.9	+60.0	18.0	5 00.0	+60.0	18.0	**5**
6	0 39.6	–60.0	162.1	0 17.5	+60.0	17.9	1 14.6	+60.0	17.9	2 11.7	+60.0	17.9	3 08.8	+60.0	17.9	4 05.9	+60.0	17.9	5 02.9	+60.0	18.0	6 00.0	+60.0	18.0	**6**
7	0 20.4	+59.9	17.9	1 17.5	+59.9	17.9	2 14.6	+59.9	17.9	3 11.7	+60.0	17.9	4 08.8	+60.0	17.9	5 05.9	+59.9	17.9	6 02.9	+60.0	18.0	7 00.0	+60.0	18.0	**7**
8	1 20.3	+60.0	17.8	2 17.4	+60.0	17.8	3 14.5	+60.0	17.8	4 11.7	+59.9	17.9	5 08.8	+59.9	17.9	6 05.8	+60.0	17.9	7 02.9	+60.0	18.0	8 00.0	+60.0	18.0	**8**
9	2 20.3	+59.9	17.8	3 17.4	+60.0	17.8	4 14.5	+60.0	17.8	5 11.6	+60.0	17.8	6 08.7	+60.0	17.9	7 05.8	+60.0	17.9	8 02.9	+60.0	18.0	9 00.0	+60.0	18.0	**9**
10	3 20.2	+60.0	17.7	4 17.4	+59.9	17.8	5 14.5	+60.0	17.8	6 11.6	+60.0	17.8	7 08.7	+60.0	17.9	8 05.8	+60.0	17.9	9 02.9	+60.0	17.9	10 00.0	+60.0	18.0	**10**
11	4 20.2	+59.9	17.7	5 17.3	+60.0	17.7	6 14.5	+60.0	17.8	7 11.6	+60.0	17.8	8 08.7	+60.0	17.8	9 05.8	+60.0	17.9	10 02.9	+60.0	17.9	11 00.0	+60.0	18.0	**11**
12	5 20.1	+60.0	17.7	6 17.3	+60.0	17.7	7 14.5	+59.9	17.7	8 11.6	+60.0	17.8	9 08.7	+60.0	17.8	10 05.8	+60.0	17.9	11 02.9	+60.0	17.9	12 00.0	+60.0	18.0	**12**
13	6 20.1	+60.0	17.6	7 17.3	+59.9	17.7	8 14.4	+60.0	17.7	9 11.6	+60.0	17.8	10 08.7	+60.0	17.8	11 05.8	+60.0	17.9	12 02.9	+60.0	17.9	13 00.0	+60.0	18.0	**13**
14	7 20.1	+59.9	17.6	8 17.2	+60.0	17.6	9 14.4	+60.0	17.7	10 11.6	+60.0	17.7	11 08.7	+60.0	17.8	12 05.8	+60.0	17.9	13 02.9	+60.0	17.9	14 00.0	+60.0	18.0	**14**
15	8 20.0	+60.0	17.6	9 17.2	+60.0	17.6	10 14.4	+60.0	17.7	11 11.6	+59.9	17.7	12 08.7	+60.0	17.8	13 05.8	+60.0	17.8	14 02.9	+60.0	17.9	15 00.0	+60.0	18.0	**15**
16	9 20.0	+59.9	17.5	10 17.2	+59.9	17.6	11 14.4	+59.9	17.6	12 11.5	+60.0	17.7	13 08.7	+60.0	17.8	14 05.8	+60.0	17.8	15 02.9	+60.0	17.9	16 00.0	+60.0	18.0	**16**
17	10 19.9	+60.0	17.5	11 17.1	+60.0	17.5	12 14.3	+60.0	17.6	13 11.5	+60.0	17.7	14 08.7	+60.0	17.7	15 05.8	+60.0	17.8	16 02.9	+60.0	17.9	17 00.0	+60.0	18.0	**17**
18	11 19.9	+59.9	17.4	12 17.1	+60.0	17.5	13 14.3	+60.0	17.6	14 11.5	+60.0	17.6	15 08.7	+60.0	17.7	16 05.8	+60.0	17.8	17 02.9	+60.0	17.9	18 00.0	+60.0	18.0	**18**
19	12 19.8	+60.0	17.4	13 17.1	+59.9	17.5	14 14.3	+60.0	17.5	15 11.5	+60.0	17.6	16 08.7	+60.0	17.7	17 05.8	+60.0	17.8	18 02.9	+60.0	17.9	19 00.0	+60.0	18.0	**19**
20	13 19.8	+59.9	17.4	14 17.0	+60.0	17.4	15 14.3	+60.0	17.5	16 11.5	+60.0	17.6	17 08.7	+59.9	17.7	18 05.8	+60.0	17.8	19 02.9	+60.0	17.9	20 00.0	+60.0	18.0	**20**
21	14 19.7	+60.0	17.3	15 17.0	+60.0	17.4	16 14.3	+59.9	17.5	17 11.5	+59.9	17.6	18 08.6	+60.0	17.7	19 05.8	+60.0	17.8	20 02.9	+60.0	17.9	21 00.0	+60.0	18.0	**21**
22	15 19.7	+60.0	17.3	16 17.0	+59.9	17.4	17 14.2	+60.0	17.5	18 11.4	+60.0	17.6	19 08.6	+60.0	17.7	20 05.8	+60.0	17.8	21 02.9	+60.0	17.9	22 00.0	+60.0	18.0	**22**
23	16 19.7	+59.9	17.2	17 16.9	+60.0	17.3	18 14.2	+60.0	17.4	19 11.4	+60.0	17.5	20 08.6	+60.0	17.6	21 05.8	+60.0	17.8	22 02.9	+60.0	17.9	23 00.0	+60.0	18.0	**23**
24	17 19.6	+60.0	17.2	18 16.9	+60.0	17.3	19 14.2	+60.0	17.4	20 11.4	+60.0	17.5	21 08.6	+60.0	17.6	22 05.8	+60.0	17.7	23 02.9	+60.0	17.9	24 00.0	+60.0	18.0	**24**
25	18 19.6	+59.9	17.2	19 16.9	+59.9	17.3	20 14.2	+59.9	17.4	21 11.4	+60.0	17.5	22 08.6	+60.0	17.6	23 05.8	+60.0	17.7	24 02.9	+60.0	17.9	25 00.0	+60.0	18.0	**25**
26	19 19.5	+60.0	17.1	20 16.8	+60.0	17.2	21 14.1	+60.0	17.3	22 11.4	+60.0	17.5	23 08.6	+60.0	17.6	24 05.8	+60.0	17.7	25 02.9	+60.0	17.9	26 00.0	+60.0	18.0	**26**
27	20 19.5	+59.9	17.1	21 16.8	+60.0	17.2	22 14.1	+60.0	17.3	23 11.4	+60.0	17.4	24 08.6	+60.0	17.6	25 05.8	+60.0	17.7	26 02.9	+60.0	17.8	27 00.0	+60.0	18.0	**27**
28	21 19.4	+60.0	17.0	22 16.8	+59.9	17.1	23 14.1	+60.0	17.3	24 11.4	+59.9	17.4	25 08.6	+60.0	17.5	26 05.8	+60.0	17.7	27 02.9	+60.0	17.8	28 00.0	+60.0	18.0	**28**
29	22 19.4	+59.9	17.0	23 16.7	+60.0	17.1	24 14.1	+59.9	17.2	25 11.3	+60.0	17.4	26 08.6	+60.0	17.5	27 05.8	+60.0	17.7	28 02.9	+60.0	17.8	29 00.0	+60.0	18.0	**29**
30	23 19.3	+60.0	16.9	24 16.7	+60.0	17.1	25 14.0	+60.0	17.2	26 11.3	+60.0	17.4	27 08.6	+60.0	17.5	28 05.8	+60.0	17.7	29 02.9	+60.0	17.8	30 00.0	+60.0	18.0	**30**
31	24 19.3	+59.9	16.9	25 16.7	+59.9	17.0	26 14.0	+60.0	17.2	27 11.3	+60.0	17.3	28 08.6	+59.9	17.5	29 05.8	+60.0	17.6	30 02.9	+60.0	17.8	31 00.0	+60.0	18.0	**31**
32	25 19.2	+60.0	16.9	26 16.6	+60.0	17.0	27 14.0	+59.9	17.1	28 11.3	+60.0	17.3	29 08.5	+60.0	17.5	30 05.8	+59.9	17.6	31 02.9	+60.0	17.8	32 00.0	+60.0	18.0	**32**
33	26 19.2	+59.9	16.8	27 16.6	+59.9	17.0	28 13.9	+60.0	17.1	29 11.3	+59.9	17.3	30 08.5	+60.0	17.4	31 05.7	+60.0	17.6	32 02.9	+60.0	17.8	33 00.0	+60.0	18.0	**33**
34	27 19.1	+60.0	16.8	28 16.5	+60.0	16.9	29 13.9	+60.0	17.1	30 11.2	+60.0	17.2	31 08.5	+60.0	17.4	32 05.7	+60.0	17.6	33 02.9	+60.0	17.8	34 00.0	+60.0	18.0	**34**
35	28 19.1	+59.9	16.7	29 16.5	+60.0	16.9	30 13.9	+60.0	17.0	31 11.2	+60.0	17.2	32 08.5	+60.0	17.4	33 05.7	+60.0	17.6	34 02.9	+60.0	17.8	35 00.0	+60.0	18.0	**35**
36	29 19.0	+59.9	16.7	30 16.5	+59.9	16.8	31 13.9	+59.9	17.0	32 11.2	+60.0	17.2	33 08.5	+60.0	17.4	34 05.7	+60.0	17.6	35 02.9	+60.0	17.8	36 00.0	+60.0	18.0	**36**
37	30 18.9	+60.0	16.6	31 16.4	+60.0	16.8	32 13.8	+60.0	17.0	33 11.2	+60.0	17.2	34 08.5	+60.0	17.3	35 05.7	+60.0	17.6	36 02.9	+60.0	17.8	37 00.0	+60.0	18.0	**37**
38	31 18.9	+59.9	16.6	32 16.4	+59.9	16.7	33 13.8	+60.0	16.9	34 11.2	+59.9	17.1	35 08.5	+60.0	17.3	36 05.7	+60.0	17.5	37 02.9	+60.0	17.8	38 00.0	+60.0	18.0	**38**
39	32 18.8	+60.0	16.5	33 16.3	+60.0	16.7	34 13.8	+59.9	16.9	35 11.1	+60.0	17.1	36 08.5	+60.0	17.3	37 05.7	+60.0	17.5	38 02.9	+60.0	17.8	39 00.0	+60.0	18.0	**39**
40	33 18.8	+59.9	16.5	34 16.3	+59.9	16.6	35 13.7	+60.0	16.8	36 11.1	+60.0	17.1	37 08.5	+59.9	17.3	38 05.7	+60.0	17.5	39 02.9	+60.0	17.7	40 00.0	+60.0	18.0	**40**
41	34 18.7	+59.9	16.4	35 16.2	+60.0	16.6	36 13.7	+60.0	16.8	37 11.1	+60.0	17.0	38 08.4	+60.0	17.2	39 05.7	+60.0	17.5	40 02.9	+60.0	17.7	41 00.0	+60.0	18.0	**41**
42	35 18.6	+60.0	16.3	36 16.2	+59.9	16.5	37 13.7	+59.9	16.8	38 11.1	+60.0	17.0	39 08.4	+60.0	17.2	40 05.7	+60.0	17.5	41 02.9	+60.0	17.7	42 00.0	+60.0	18.0	**42**
43	36 18.6	+59.9	16.3	37 16.1	+60.0	16.5	38 13.6	+60.0	16.7	39 11.1	+59.9	17.0	40 08.4	+60.0	17.2	41 05.7	+60.0	17.5	42 02.9	+60.0	17.7	43 00.0	+60.0	18.0	**43**
44	37 18.5	+59.9	16.2	38 16.1	+59.9	16.4	39 13.6	+60.0	16.7	40 11.0	+60.0	16.9	41 08.4	+60.0	17.2	42 05.7	+60.0	17.4	43 02.9	+60.0	17.7	44 00.0	+60.0	18.0	**44**
45	38 18.4	+60.0	16.2	39 16.0	+60.0	16.4	40 13.6	+59.9	16.6	41 11.0	+60.0	16.9	42 08.4	+60.0	17.1	43 05.7	+60.0	17.4	44 02.9	+60.0	17.7	45 00.0	+60.0	18.0	**45**
46	39 18.4	+59.9	16.1	40 16.0	+59.9	16.3	41 13.5	+60.0	16.6	42 11.0	+60.0	16.8	43 08.4	+60.0	17.1	44 05.7	+60.0	17.4	45 02.9	+60.0	17.7	46 00.0	+60.0	18.0	**46**
47	40 18.3	+59.9	16.0	41 15.9	+60.0	16.3	42 13.5	+59.9	16.5	43 11.0	+59.9	16.8	44 08.4	+59.9	17.1	45 05.7	+60.0	17.4	46 02.9	+60.0	17.7	47 00.0	+60.0	18.0	**47**
48	41 18.2	+59.9	16.0	42 15.9	+59.9	16.2	43 13.4	+60.0	16.5	44 10.9	+60.0	16.8	45 08.3	+60.0	17.0	46 05.7	+60.0	17.3	47 02.9	+60.0	17.7	48 00.0	+60.0	18.0	**48**
49	42 18.1	+60.0	15.9	43 15.8	+60.0	16.2	44 13.4	+60.0	16.4	45 10.9	+60.0	16.7	46 08.3	+60.0	17.0	47 05.7	+59.9	17.3	48 02.9	+60.0	17.7	49 00.0	+60.0	18.0	**49**
50	43 18.1	+59.9	15.8	44 15.8	+59.9	16.1	45 13.4	+59.9	16.4	46 10.9	+59.9	16.7	47 08.3	+60.0	17.0	48 05.6	+60.0	17.3	49 02.9	+60.0	17.6	50 00.0	+60.0	18.0	**50**
51	44 18.0	+59.9	15.8	45 15.7	+59.9	16.0	46 13.3	+60.0	16.3	47 10.8	+60.0	16.6	48 08.3	+60.0	16.9	49 05.6	+60.0	17.3	50 02.9	+60.0	17.6	51 00.0	+60.0	18.0	**51**
52	45 17.9	+59.9	15.7	46 15.6	+60.0	16.0	47 13.3	+59.9	16.3	48 10.8	+60.0	16.6	49 08.3	+60.0	16.9	50 05.6	+60.0	17.3	51 02.9	+60.0	17.6	52 00.0	+60.0	18.0	**52**
53	46 17.8	+59.9	15.6	47 15.6	+59.9	15.9	48 13.2	+60.0	16.2	49 10.8	+60.0	16.5	50 08.3	+59.9	16.9	51 05.6	+60.0	17.2	52 02.9	+60.0	17.6	53 00.0	+60.0	18.0	**53**
54	47 17.7	+59.9	15.5	48 15.5	+59.9	15.8	49 13.2	+59.9	16.1	50 10.8	+59.9	16.5	51 08.2	+60.0	16.8	52 05.6	+60.0	17.2	53 02.9	+60.0	17.6	54 00.0	+60.0	18.0	**54**
55	48 17.6	+59.9	15.5	49 15.4	+59.9	15.8	50 13.1	+60.0	16.1	51 10.7	+60.0	16.4	52 08.2	+60.0	16.8	53 05.6	+60.0	17.2	54 02.9	+60.0	17.6	55 00.0	+60.0	18.0	**55**
56	49 17.5	+59.9	15.4	50 15.3	+60.0	15.7	51 13.1	+59.9	16.0	52 10.7	+59.9	16.4	53 08.2	+60.0	16.7	54 05.6	+60.0	17.1	55 02.9	+60.0	17.6	56 00.0	+60.0	18.0	**56**
57	50 17.4	+59.9	15.3	51 15.3	+59.9	15.6	52 13.0	+59.9	15.9	53 10.6	+60.0	16.3	54 08.2	+59.9	16.7	55 05.6	+60.0	17.1	56 02.9	+60.0	17.5	57 00.0	+60.0	18.0	**57**
58	51 17.3	+59.9	15.2	52 15.2	+59.9	15.5	53 12.9	+60.0	15.9	54 10.6	+60.0	16.2	55 08.1	+60.0	16.6	56 05.6	+60.0	17.1	57 02.9	+60.0	17.5	58 00.0	+60.0	18.0	**58**
59	52 17.2	+59.9	15.1	53 15.1	+59.9	15.4	54 12.9	+59.9	15.8	55 10.6	+59.9	16.2	56 08.1	+60.0	16.6	57 05.6	+59.9	17.0	58 02.9	+60.0	17.5	59 00.0	+60.0	18.0	**59**
60	53 17.1	+59.9	15.0	54 15.0	+59.9	15.3	55 12.8	+59.9	15.7	56 10.5	+60.0	16.1	57 08.1	+60.0	16.5	58 05.5	+60.0	17.0	59 02.9	+59.9	17.5	60 00.0	+60.0	18.0	**60**
61	54 17.0	+59.8	14.9	55 14.9	+59.9	15.2	56 12.7	+60.0	15.6	57 10.5	+59.9	16.0	58 08.1	+59.9	16.5	59 05.5	+60.0	17.0	60 02.8	+60.0	17.5	61 00.0	+60.0	18.0	**61**
62	55 16.8	+59.9	14.8	56 14.8	+59.9	15.1	57 12.7	+59.9	15.5	58 10.4	+60.0	16.0	59 08.0	+60.0	16.4	60 05.5	+60.0	16.9	61 02.8	+60.0	17.4	62 00.0	+60.0	18.0	**62**
63	56 16.7	+59.9	14.6	57 14.7	+59.9	15.0	58 12.6	+59.9	15.4	59 10.4	+59.9	15.9	60 08.0	+60.0	16.4	61 05.5	+60.0	16.9	62 02.8	+60.0	17.4	63 00.0	+60.0	18.0	**63**
64	57 16.6	+59.8	14.5	58 14.6	+59.9	14.9	59 12.5	+59.9	15.3	60 10.3	+60.0	15.8	61 08.0	+59.9	16.3	62 05.5	+60.0	16.8	63 02.8	+60.0	17.4	64 00.0	+60.0	18.0	**64**
65	58 16.4	+59.9	14.4	59 14.5	+59.9	14.8	60 12.4	+59.9	15.2	61 10.3	+59.9	15.7	62 07.9	+60.0	16.2	63 05.5	+60.0	16.8	64 02.8	+60.0	17.4	65 00.0	+60.0	18.0	**65**
66	59 16.3	+59.8	14.2	60 14.4	+59.8	14.7	61 12.3	+59.9	15.1	62 10.2	+59.9	15.6	63 07.9	+60.0	16.1	64 05.5	+59.9	16.7	65 02.8	+60.0	17.3	66 00.0	+60.0	18.0	**66**
67	60 16.1	+59.8	14.1	61 14.2	+59.9	14.5	62 12.2	+59.9	15.0	63 10.1	+60.0	15.5	64 07.9	+59.9	16.1	65 05.4	+60.0	16.7	66 02.8	+60.0	17.3	67 00.0	+60.0	18.0	**67**
68	61 15.9	+59.8	13.9	62 14.1	+59.8	14.4	63 12.1	+59.9	14.9	64 10.1	+59.9	15.4	65 07.8	+60.0	16.0	66 05.4	+60.0	16.6	67 02.8	+60.0	17.3	68 00.0	+60.0	18.0	**68**
69	62 15.7	+59.8	13.8	63 13.9	+59.9	14.2	64 12.0	+59.9	14.7	65 10.0	+59.9	15.3	66 07.8	+59.9	15.9	67 05.4	+60.0	16.5	68 02.8	+60.0	17.2	69 00.0	+60.0	18.0	**69**
70	63 15.5	+59.8	13.6	64 13.8	+59.8	14.1	65 11.9	+59.9	14.6	66 09.9	+59.9	15.2	67 07.7	+60.0	15.8	68 05.4	+59.9	16.5	69 02.8	+60.0	17.2	70 00.0	+60.0	18.0	**70**
71	64 15.3	+59.8	13.4	65 13.6	+59.8	13.9	66 11.8	+59.8	14.4	67 09.8	+59.9	15.0	68 07.7	+59.9	15.7	69 05.3	+60.0	16.4	70 02.8	+60.0	17.1	71 00.0	+60.0	18.0	**71**
72	65 15.1	+59.7	13.2	66 13.4	+59.8	13.7	67 11.6	+59.9	14.3	68 09.7	+59.9	14.9	69 07.6	+60.0	15.5	70 05.3	+60.0	16.3	71 02.8	+60.0	17.1	72 00.0	+60.0	18.0	**72**
73	66 14.8	+59.7	13.0	67 13.2	+59.8	13.5	68 11.5	+59.8	14.1	69 09.6	+59.9	14.7	70 07.6	+59.9	15.4	71 05.3	+60.0	16.2	72 02.8	+60.0	17.0	73 00.0	+60.0	18.0	**73**
74	67 14.5	+59.7	12.7	68 13.0	+59.8	13.3	69 11.3	+59.8	13.9	70 09.5	+59.9	14.5	71 07.5	+59.9	15.3	72 05.3	+59.9	16.1	73 02.8	+60.0	17.0	74 00.0	+60.0	18.0	**74**
75	68 14.2	+59.7	12.5	69 12.8	+59.7	13.0	70 11.1	+59.8	13.6	71 09.4	+59.8	14.3	72 07.4	+59.9	15.1	73 05.2	+60.0	16.0	74 02.8	+59.9	16.9	75 00.0	+60.0	18.0	**75**
76	69 13.9	+59.7	12.2	70 12.5	+59.7	12.8	71 10.9	+59.8	13.4	72 09.2	+59.9	14.1	73 07.3	+59.9	14.9	74 05.2	+59.9	15.8	75 02.7	+60.0	16.8	76 00.0	+60.0	18.0	**76**
77	70 13.6	+59.6	11.9	71 12.2	+59.7	12.5	72 10.7	+59.8	13.1	73 09.1	+59.8	13.9	74 07.2	+59.9	14.7	75 05.1	+60.0	15.7	76 02.7	+60.0	16.8	77 00.0	+60.0	18.0	**77**
78	71 13.2	+59.5	11.5	72 11.9	+59.6	12.1	73 10.5	+59.7	12.8	74 08.9	+59.8	13.6	75 07.1	+59.9	14.5	76 05.1	+59.9	15.5	77 02.7	+60.0	16.7	78 00.0	+60.0	18.0	**78**
79	72 12.7	+59.5	11.1	73 11.5	+59.6	11.8	74 10.2	+59.7	12.5	75 08.7	+59.8	13.3	76 07.0	+59.8	14.2	77 05.0	+59.9	15.3	78 02.7	+60.0	16.5	79 00.0	+60.0	18.0	**79**
80	73 12.2	+59.5	10.7	74 11.1	+59.6	11.4	75 09.9	+59.6	12.1	76 08.5	+59.7	12.9	77 06.8	+59.9	13.9	78 04.9	+59.9	15.1	79 02.7	+60.0	16.4	80 00.0	+60.0	18.0	**80**
81	74 11.7	+59.4	10.2	75 10.7	+59.5	10.9	76 09.5	+59.6	11.7	77 08.2	+59.7	12.5	78 06.7	+59.8	13.6	79 04.8	+59.9	14.8	80 02.7	+59.9	16.2	81 00.0	+60.0	18.0	**81**
82	75 11.1	+59.3	9.7	76 10.2	+59.4	10.4	77 09.1	+59.5	11.2	78 07.9	+59.6	12.1	79 06.5	+59.7	13.2	80 04.7	+59.9	14.5	81 02.6	+60.0	16.0	82 00.0	+60.0	18.0	**82**
83	76 10.4	+59.2	9.1	77 09.6	+59.3	9.8	78 08.6	+59.5	10.6	79 07.5	+59.6	11.5	80 06.2	+59.7	12.7	81 04.6	+59.8	14.1	82 02.6	+59.9	15.8	83 00.0	+60.0	18.0	**83**
84	77 09.6	+59.0	8.4	78 08.9	+59.2	9.0	79 08.1	+59.3	9.9	80 07.1	+59.5	10.8	81 05.9	+59.6	12.0	82 04.4	+59.8	13.5	83 02.5	+60.0	15.5	84 00.0	+60.0	18.0	**84**
85	78 08.6	+58.9	7.5	79 08.1	+59.0	8.2	80 07.4	+59.2	9.0	81 06.6	+59.3	10.0	82 05.5	+59.6	11.3	83 04.2	+59.7	12.9	84 02.5	+59.9	15.0	85 00.0	+60.0	18.0	**85**
86	79 07.5	+58.7	6.6	80 07.1	+58.8	7.2	81 06.6	+58.9	8.0	82 05.9	+59.2	9.0	83 05.1	+59.3	10.3	84 03.9	+59.6	12.0	85 02.4	+59.8	14.4	86 00.0	+60.0	18.0	**86**
87	80 06.2	+58.4	5.4	81 05.9	+58.5	6.0	82 05.5	+58.7	6.8	83 05.1	+58.8	7.7	84 04.4	+59.1	9.0	85 03.5	+59.5	10.8	86 02.2	+59.8	13.5	87 00.0	+60.0	18.0	**87**
88	81 04.6	+58.0	4.0	82 04.4	+58.1	4.5	83 04.2	+58.3	5.1	84 03.9	+58.5	6.0	85 03.5	+58.7	7.2	86 03.0	+59.0	9.0	87 02.0	+59.5	12.0	88 00.0	+60.0	18.0	**88**
89	82 02.6	+57.4	2.2	83 02.5	+57.5	2.6	84 02.5	+57.5	3.0	85 02.4	+57.6	3.6	86 02.2	+57.8	4.5	87 02.0	*+58.0* •	6.0	88 01.5	*+58.5* •	9.0	89 00.0	+60.0	18.0	**89**
90	83 00.0	+56.6	0.0	84 00.0	+56.5	0.0	85 00.0	+56.4	0.0	86 00.0	*+56.1* •	0.0	87 00.0	*+55.7* •	0.0	88 00.0	*+54.4* •	0.0	89 00.0	*+41.2* •	0.0	90 00.0	–60.0	9.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 162°, 198°

19°, 341° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 37.0	+60.0	160.9	5 40.3	+60.0	160.9	4 43.6	+60.0	160.9	3 46.9	+60.0	161.0	2 50.2	+60.0	161.0	1 53.5	+60.0	161.0	0 56.7	+60.0	161.0	0 00.0	+60.0	161.0	**0**
1	7 37.0	+59.9	160.8	6 40.3	+60.0	160.9	5 43.6	+60.0	160.9	4 46.9	+60.0	160.9	3 50.2	+60.0	161.0	2 53.5	+60.0	161.0	1 56.7	+60.0	161.0	1 00.0	+60.0	161.0	**1**
2	8 36.9	+60.0	160.8	7 40.3	+59.9	160.8	6 43.6	+59.9	160.9	5 46.9	+60.0	160.9	4 50.2	+60.0	160.9	3 53.5	+59.9	161.0	2 56.7	+60.0	161.0	2 00.0	+60.0	161.0	**2**
3	9 36.9	+59.9	160.7	8 40.2	+60.0	160.8	7 43.5	+60.0	160.8	6 46.9	+59.9	160.9	5 50.2	+59.9	160.9	4 53.4	+60.0	161.0	3 56.7	+60.0	161.0	3 00.0	+60.0	161.0	**3**
4	10 36.8	+60.0	160.7	9 40.2	+59.9	160.8	8 43.5	+60.0	160.8	7 46.8	+60.0	160.9	6 50.1	+60.0	160.9	5 53.4	+60.0	160.9	4 56.7	+60.0	161.0	4 00.0	+60.0	161.0	**4**
5	11 36.8	+59.9	160.7	10 40.1	+60.0	160.7	9 43.5	+60.0	160.8	8 46.8	+60.0	160.8	7 50.1	+60.0	160.9	6 53.4	+60.0	160.9	5 56.7	+60.0	161.0	5 00.0	+60.0	161.0	**5**
6	12 36.7	+60.0	160.6	11 40.1	+60.0	160.7	10 43.5	+59.9	160.8	9 46.8	+60.0	160.8	8 50.1	+60.0	160.9	7 53.4	+60.0	160.9	6 56.7	+60.0	161.0	6 00.0	+60.0	161.0	**6**
7	13 36.7	+59.9	160.6	12 40.1	+59.9	160.7	11 43.4	+60.0	160.7	10 46.8	+60.0	160.8	9 50.1	+60.0	160.9	8 53.4	+60.0	160.9	7 56.7	+60.0	161.0	7 00.0	+60.0	161.0	**7**
8	14 36.6	+60.0	160.5	13 40.0	+60.0	160.6	12 43.4	+60.0	160.7	11 46.8	+60.0	160.8	10 50.1	+60.0	160.8	9 53.4	+60.0	160.9	8 56.7	+60.0	161.0	8 00.0	+60.0	161.0	**8**
9	15 36.6	+59.9	160.5	14 40.0	+60.0	160.6	13 43.4	+60.0	160.7	12 46.8	+59.9	160.7	11 50.1	+60.0	160.8	10 53.4	+60.0	160.9	9 56.7	+60.0	160.9	9 00.0	+60.0	161.0	**9**
10	16 36.5	+60.0	160.5	15 40.0	+59.9	160.5	14 43.4	+59.9	160.6	13 46.7	+60.0	160.7	12 50.1	+60.0	160.8	11 53.4	+60.0	160.9	10 56.7	+60.0	160.9	10 00.0	+60.0	161.0	**10**
11	17 36.5	+59.9	160.4	16 39.9	+60.0	160.5	15 43.3	+60.0	160.6	14 46.7	+60.0	160.7	13 50.1	+60.0	160.8	12 53.4	+60.0	160.9	11 56.7	+60.0	160.9	11 00.0	+60.0	161.0	**11**
12	18 36.4	+60.0	160.4	17 39.9	+59.9	160.5	16 43.3	+60.0	160.6	15 46.7	+60.0	160.7	14 50.1	+60.0	160.8	13 53.4	+60.0	160.8	12 56.7	+60.0	160.9	12 00.0	+60.0	161.0	**12**
13	19 36.4	+59.9	160.3	18 39.8	+60.0	160.4	17 43.3	+60.0	160.5	16 46.7	+60.0	160.7	15 50.1	+60.0	160.7	14 53.4	+60.0	160.8	13 56.7	+60.0	160.9	13 00.0	+60.0	161.0	**13**
14	20 36.3	+60.0	160.3	19 39.8	+60.0	160.4	18 43.3	+59.9	160.5	17 46.7	+60.0	160.6	16 50.1	+59.9	160.7	15 53.4	+60.0	160.8	14 56.7	+60.0	160.9	14 00.0	+60.0	161.0	**14**
15	21 36.3	+59.9	160.2	20 39.8	+59.9	160.4	19 43.2	+60.0	160.5	18 46.7	+59.9	160.6	17 50.0	+60.0	160.7	16 53.4	+60.0	160.8	15 56.7	+60.0	160.9	15 00.0	+60.0	161.0	**15**
16	22 36.2	+59.9	160.2	21 39.7	+60.0	160.3	20 43.2	+60.0	160.5	19 46.6	+60.0	160.6	18 50.0	+60.0	160.7	17 53.4	+60.0	160.8	16 56.7	+60.0	160.9	16 00.0	+60.0	161.0	**16**
17	23 36.1	+60.0	160.1	22 39.7	+59.9	160.3	21 43.2	+60.0	160.4	20 46.6	+60.0	160.5	19 50.0	+60.0	160.7	18 53.4	+60.0	160.8	17 56.7	+60.0	160.9	17 00.0	+60.0	161.0	**17**
18	24 36.1	+59.9	160.1	23 39.6	+60.0	160.2	22 43.2	+59.9	160.4	21 46.6	+60.0	160.5	20 50.0	+60.0	160.7	19 53.4	+60.0	160.8	18 56.7	+60.0	160.9	18 00.0	+60.0	161.0	**18**
19	25 36.0	+60.0	160.0	24 39.6	+60.0	160.2	23 43.1	+60.0	160.4	22 46.6	+60.0	160.5	21 50.0	+60.0	160.6	20 53.4	+60.0	160.8	19 56.7	+60.0	160.9	19 00.0	+60.0	161.0	**19**
20	26 36.0	+59.9	160.0	25 39.6	+59.9	160.2	24 43.1	+60.0	160.3	23 46.6	+60.0	160.5	22 50.0	+60.0	160.6	21 53.4	+60.0	160.7	20 56.7	+60.0	160.9	20 00.0	+60.0	161.0	**20**
21	27 35.9	+59.9	159.9	26 39.5	+60.0	160.1	25 43.1	+59.9	160.3	24 46.6	+59.9	160.4	23 50.0	+60.0	160.6	22 53.4	+60.0	160.7	21 56.7	+60.0	160.9	21 00.0	+60.0	161.0	**21**
22	28 35.8	+60.0	159.9	27 39.5	+59.9	160.1	26 43.0	+60.0	160.2	25 46.5	+60.0	160.4	24 50.0	+60.0	160.6	23 53.4	+60.0	160.7	22 56.7	+60.0	160.9	22 00.0	+60.0	161.0	**22**
23	29 35.8	+59.9	159.8	28 39.4	+60.0	160.0	27 43.0	+60.0	160.2	26 46.5	+60.0	160.4	25 50.0	+60.0	160.6	24 53.4	+60.0	160.7	23 56.7	+60.0	160.9	23 00.0	+60.0	161.0	**23**
24	30 35.7	+60.0	159.8	29 39.4	+59.9	160.0	28 43.0	+59.9	160.2	27 46.5	+60.0	160.4	26 50.0	+59.9	160.5	25 53.4	+60.0	160.7	24 56.7	+60.0	160.9	24 00.0	+60.0	161.0	**24**
25	31 35.7	+59.9	159.7	30 39.3	+60.0	159.9	29 42.9	+60.0	160.1	28 46.5	+60.0	160.3	27 49.9	+60.0	160.5	26 53.4	+59.9	160.7	25 56.7	+60.0	160.8	25 00.0	+60.0	161.0	**25**
26	32 35.6	+59.9	159.7	31 39.3	+59.9	159.9	30 42.9	+60.0	160.1	29 46.5	+59.9	160.3	28 49.9	+60.0	160.5	27 53.3	+60.0	160.7	26 56.7	+60.0	160.8	26 00.0	+60.0	161.0	**26**
27	33 35.5	+60.0	159.6	32 39.2	+60.0	159.8	31 42.9	+59.9	160.1	30 46.4	+60.0	160.3	29 49.9	+60.0	160.5	28 53.3	+60.0	160.7	27 56.7	+60.0	160.8	27 00.0	+60.0	161.0	**27**
28	34 35.5	+59.9	159.6	33 39.2	+59.9	159.8	32 42.8	+60.0	160.0	31 46.4	+60.0	160.2	30 49.9	+60.0	160.4	29 53.3	+60.0	160.6	28 56.7	+60.0	160.8	28 00.0	+60.0	161.0	**28**
29	35 35.4	+59.9	159.5	34 39.1	+60.0	159.7	33 42.8	+60.0	160.0	32 46.4	+60.0	160.2	31 49.9	+60.0	160.4	30 53.3	+60.0	160.6	29 56.7	+60.0	160.8	29 00.0	+60.0	161.0	**29**
30	36 35.3	+59.9	159.4	35 39.1	+59.9	159.7	34 42.8	+59.9	159.9	33 46.4	+59.9	160.2	32 49.9	+60.0	160.4	31 53.3	+60.0	160.6	30 56.7	+60.0	160.8	30 00.0	+60.0	161.0	**30**
31	37 35.2	+60.0	159.4	36 39.0	+60.0	159.6	35 42.7	+60.0	159.9	34 46.3	+60.0	160.1	33 49.9	+60.0	160.4	32 53.3	+60.0	160.6	31 56.7	+60.0	160.8	31 00.0	+60.0	161.0	**31**
32	38 35.2	+59.9	159.3	37 39.0	+59.9	159.6	36 42.7	+60.0	159.9	35 46.3	+60.0	160.1	34 49.9	+59.9	160.3	33 53.3	+60.0	160.6	32 56.7	+60.0	160.8	32 00.0	+60.0	161.0	**32**
33	39 35.1	+59.9	159.3	38 38.9	+60.0	159.5	37 42.7	+59.9	159.8	36 46.3	+60.0	160.1	35 49.8	+60.0	160.3	34 53.3	+60.0	160.6	33 56.7	+60.0	160.8	33 00.0	+60.0	161.0	**33**
34	40 35.0	+59.9	159.2	39 38.9	+59.9	159.5	38 42.6	+60.0	159.8	37 46.3	+60.0	160.0	36 49.8	+60.0	160.3	35 53.3	+60.0	160.5	34 56.7	+60.0	160.8	34 00.0	+60.0	161.0	**34**
35	41 34.9	+59.9	159.1	40 38.8	+59.9	159.4	39 42.6	+59.9	159.7	38 46.3	+59.9	160.0	37 49.8	+60.0	160.3	36 53.3	+60.0	160.5	35 56.7	+60.0	160.8	35 00.0	+60.0	161.0	**35**
36	42 34.8	+59.9	159.0	41 38.7	+60.0	159.4	40 42.5	+60.0	159.7	39 46.2	+60.0	160.0	38 49.8	+60.0	160.2	37 53.3	+60.0	160.5	36 56.7	+60.0	160.8	36 00.0	+60.0	161.0	**36**
37	43 34.7	+60.0	159.0	42 38.7	+59.9	159.3	41 42.5	+60.0	159.6	40 46.2	+60.0	159.9	39 49.8	+60.0	160.2	38 53.3	+60.0	160.5	37 56.7	+60.0	160.7	37 00.0	+60.0	161.0	**37**
38	44 34.7	+59.9	158.9	43 38.6	+60.0	159.2	42 42.5	+59.9	159.6	41 46.2	+59.9	159.9	40 49.8	+60.0	160.2	39 53.3	+60.0	160.5	38 56.7	+60.0	160.7	38 00.0	+60.0	161.0	**38**
39	45 34.6	+59.9	158.8	44 38.6	+59.9	159.2	43 42.4	+60.0	159.5	42 46.1	+60.0	159.8	41 49.8	+59.9	160.2	40 53.3	+60.0	160.4	39 56.7	+60.0	160.7	39 00.0	+60.0	161.0	**39**
40	46 34.5	+59.9	158.7	45 38.5	+59.9	159.1	44 42.4	+59.9	159.5	43 46.1	+60.0	159.8	42 49.7	+60.0	160.1	41 53.3	+60.0	160.4	40 56.7	+60.0	160.7	40 00.0	+60.0	161.0	**40**
41	47 34.4	+59.9	158.6	46 38.4	+59.9	159.0	45 42.3	+60.0	159.4	44 46.1	+60.0	159.8	43 49.7	+60.0	160.1	42 53.3	+60.0	160.4	41 56.7	+60.0	160.7	41 00.0	+60.0	161.0	**41**
42	48 34.3	+59.8	158.6	47 38.3	+60.0	159.0	46 42.3	+59.9	159.3	45 46.1	+59.9	159.7	44 49.7	+60.0	160.1	43 53.3	+59.9	160.4	42 56.7	+60.0	160.7	42 00.0	+60.0	161.0	**42**
43	49 34.1	+59.9	158.5	48 38.3	+59.9	158.9	47 42.2	+60.0	159.3	46 46.0	+60.0	159.7	45 49.7	+60.0	160.0	44 53.2	+60.0	160.4	43 56.7	+60.0	160.7	43 00.0	+60.0	161.0	**43**
44	50 34.0	+59.9	158.4	49 38.2	+59.9	158.8	48 42.2	+59.9	159.2	47 46.0	+60.0	159.6	46 49.7	+60.0	160.0	45 53.2	+60.0	160.3	44 56.7	+60.0	160.7	44 00.0	+60.0	161.0	**44**
45	51 33.9	+59.9	158.3	50 38.1	+59.9	158.7	49 42.1	+59.9	159.1	48 46.0	+59.9	159.6	47 49.7	+59.9	159.9	46 53.2	+60.0	160.3	45 56.7	+60.0	160.7	45 00.0	+60.0	161.0	**45**
46	52 33.8	+59.9	158.2	51 38.0	+59.9	158.6	50 42.0	+60.0	159.1	49 45.9	+60.0	159.5	48 49.6	+60.0	159.9	47 53.2	+60.0	160.3	46 56.7	+60.0	160.7	46 00.0	+60.0	161.0	**46**
47	53 33.7	+59.8	158.0	52 37.9	+59.9	158.5	51 42.0	+59.9	159.0	50 45.9	+59.9	159.4	49 49.6	+60.0	159.9	48 53.2	+60.0	160.3	47 56.7	+60.0	160.6	47 00.0	+60.0	161.0	**47**
48	54 33.5	+59.9	157.9	53 37.8	+59.9	158.4	52 41.9	+59.9	158.9	51 45.8	+60.0	159.4	50 49.6	+60.0	159.8	49 53.2	+60.0	160.2	48 56.7	+60.0	160.6	48 00.0	+60.0	161.0	**48**
49	55 33.4	+59.8	157.8	54 37.7	+59.9	158.3	53 41.8	+60.0	158.9	52 45.8	+60.0	159.3	51 49.6	+60.0	159.8	50 53.2	+60.0	160.2	49 56.7	+60.0	160.6	49 00.0	+60.0	161.0	**49**
50	56 33.2	+59.9	157.7	55 37.6	+59.9	158.2	54 41.8	+59.9	158.8	53 45.8	+59.9	159.3	52 49.6	+59.9	159.7	51 53.2	+60.0	160.2	50 56.7	+60.0	160.6	50 00.0	+60.0	161.0	**50**
51	57 33.1	+59.8	157.6	56 37.5	+59.9	158.1	55 41.7	+59.9	158.7	54 45.7	+60.0	159.2	53 49.5	+60.0	159.7	52 53.2	+60.0	160.2	51 56.7	+60.0	160.6	51 00.0	+60.0	161.0	**51**
52	58 32.9	+59.8	157.4	57 37.4	+59.8	158.0	56 41.6	+59.9	158.6	55 45.7	+59.9	159.1	54 49.5	+60.0	159.6	53 53.2	+60.0	160.1	52 56.7	+60.0	160.6	52 00.0	+60.0	161.0	**52**
53	59 32.7	+59.8	157.3	58 37.2	+59.9	157.9	57 41.5	+60.0	158.5	56 45.6	+60.0	159.1	55 49.5	+59.9	159.6	54 53.2	+59.9	160.1	53 56.7	+60.0	160.6	53 00.0	+60.0	161.0	**53**
54	60 32.5	+59.8	157.1	59 37.1	+59.9	157.8	58 41.5	+59.9	158.4	57 45.6	+59.9	159.0	56 49.4	+60.0	159.5	55 53.1	+60.0	160.0	54 56.7	+59.9	160.5	54 00.0	+60.0	161.0	**54**
55	61 32.3	+59.8	156.9	60 37.0	+59.8	157.6	59 41.4	+59.9	158.3	58 45.5	+59.9	158.9	57 49.4	+60.0	159.5	56 53.1	+60.0	160.0	55 56.6	+60.0	160.5	55 00.0	+60.0	161.0	**55**
56	62 32.1	+59.8	156.8	61 36.8	+59.9	157.5	60 41.3	+59.9	158.2	59 45.4	+60.0	158.8	58 49.4	+60.0	159.4	57 53.1	+60.0	160.0	56 56.6	+60.0	160.5	56 00.0	+60.0	161.0	**56**
57	63 31.9	+59.7	156.6	62 36.7	+59.8	157.3	61 41.2	+59.8	158.0	60 45.4	+59.9	158.7	59 49.4	+59.9	159.3	58 53.1	+60.0	159.9	57 56.6	+60.0	160.5	57 00.0	+60.0	161.0	**57**
58	64 31.6	+59.8	156.4	63 36.5	+59.8	157.2	62 41.0	+59.9	157.9	61 45.3	+59.9	158.6	60 49.3	+60.0	159.3	59 53.1	+60.0	159.9	58 56.6	+60.0	160.5	58 00.0	+60.0	161.0	**58**
59	65 31.4	+59.7	156.1	64 36.3	+59.8	157.0	63 40.9	+59.9	157.8	62 45.2	+60.0	158.5	61 49.3	+59.9	159.2	60 53.1	+60.0	159.8	59 56.6	+60.0	160.4	59 00.0	+60.0	161.0	**59**
60	66 31.1	+59.7	155.9	65 36.1	+59.8	156.8	64 40.8	+59.9	157.6	63 45.2	+59.9	158.4	62 49.2	+60.0	159.1	61 53.1	+59.9	159.8	60 56.6	+60.0	160.4	60 00.0	+60.0	161.0	**60**
61	67 30.8	+59.6	155.6	66 35.9	+59.8	156.6	65 40.7	+59.8	157.5	64 45.1	+59.9	158.3	63 49.2	+59.9	159.0	62 53.0	+60.0	159.7	61 56.6	+60.0	160.4	61 00.0	+60.0	161.0	**61**
62	68 30.4	+59.7	155.3	67 35.7	+59.7	156.4	66 40.5	+59.9	157.3	65 45.0	+59.9	158.2	64 49.1	+60.0	158.9	63 53.0	+60.0	159.7	62 56.6	+60.0	160.4	62 00.0	+60.0	161.0	**62**
63	69 30.1	+59.6	155.0	68 35.4	+59.8	156.1	67 40.4	+59.8	157.1	66 44.9	+59.9	158.0	65 49.1	+59.9	158.8	64 53.0	+60.0	159.6	63 56.6	+60.0	160.3	63 00.0	+60.0	161.0	**63**
64	70 29.7	+59.5	154.7	69 35.2	+59.7	155.8	68 40.2	+59.8	156.9	67 44.8	+59.9	157.9	66 49.0	+60.0	158.7	65 53.0	+59.9	159.6	64 56.6	+60.0	160.3	64 00.0	+60.0	161.0	**64**
65	71 29.2	+59.5	154.3	70 34.9	+59.6	155.6	69 40.0	+59.8	156.7	68 44.7	+59.9	157.7	67 49.0	+59.9	158.6	66 52.9	+60.0	159.5	65 56.6	+60.0	160.3	65 00.0	+60.0	161.0	**65**
66	72 28.7	+59.5	153.9	71 34.5	+59.7	155.2	70 39.8	+59.7	156.4	69 44.6	+59.8	157.5	68 48.9	+60.0	158.5	67 52.9	+60.0	159.4	66 56.6	+60.0	160.2	66 00.0	+60.0	161.0	**66**
67	73 28.2	+59.3	153.4	72 34.2	+59.5	154.9	71 39.5	+59.8	156.2	70 44.4	+59.9	157.3	69 48.9	+59.9	158.4	68 52.9	+60.0	159.3	67 56.6	+60.0	160.2	67 00.0	+60.0	161.0	**67**
68	74 27.5	+59.3	152.9	73 33.7	+59.6	154.5	72 39.3	+59.7	155.9	71 44.3	+59.8	157.1	70 48.8	+59.9	158.2	69 52.9	+59.9	159.2	68 56.6	+60.0	160.2	68 00.0	+60.0	161.0	**68**
69	75 26.8	+59.2	152.3	74 33.3	+59.5	154.0	73 39.0	+59.7	155.5	72 44.1	+59.8	156.9	71 48.7	+59.9	158.1	70 52.8	+60.0	159.1	69 56.6	+60.0	160.1	69 00.0	+60.0	161.0	**69**
70	76 26.0	+59.1	151.7	75 32.8	+59.4	153.5	74 38.7	+59.6	155.1	73 43.9	+59.8	156.6	72 48.6	+59.9	157.9	71 52.8	+59.9	159.0	70 56.6	+60.0	160.1	70 00.0	+60.0	161.0	**70**
71	77 25.1	+58.9	150.9	76 32.2	+59.3	152.9	75 38.3	+59.6	154.7	74 43.7	+59.8	156.3	73 48.5	+59.9	157.7	72 52.7	+60.0	158.9	71 56.6	+60.0	160.0	71 00.0	+60.0	161.0	**71**
72	78 24.0	+58.7	150.0	77 31.5	+59.1	152.2	76 37.9	+59.5	154.2	75 43.5	+59.7	155.9	74 48.4	+59.8	157.4	73 52.7	+59.9	158.8	72 56.6	+59.9	159.9	72 00.0	+60.0	161.0	**72**
73	79 22.7	+58.5	148.9	78 30.6	+59.1	151.5	77 37.4	+59.4	153.6	76 43.2	+59.7	155.5	75 48.2	+59.9	157.2	74 52.6	+60.0	158.6	73 56.5	+60.0	159.9	73 00.0	+60.0	161.0	**73**
74	80 21.2	+58.1	147.6	79 29.7	+58.8	150.5	78 36.8	+59.3	153.0	77 42.9	+59.6	155.1	76 48.1	+59.8	156.9	75 52.6	+59.9	158.4	74 56.5	+60.0	159.8	74 00.0	+60.0	161.0	**74**
75	81 19.3	+57.6	146.1	80 28.5	+58.6	149.4	79 36.1	+59.2	152.2	78 42.5	+59.6	154.5	77 47.9	+59.8	156.5	76 52.5	+59.9	158.2	75 56.5	+60.0	159.7	75 00.0	+60.0	161.0	**75**
76	82 16.9	+56.9	144.1	81 27.1	+58.2	148.0	80 35.3	+59.0	151.2	79 42.1	+59.4	153.9	78 47.7	+59.7	156.1	77 52.4	+59.9	158.0	76 56.5	+60.0	159.6	76 00.0	+60.0	161.0	**76**
77	83 13.8	+55.9	141.6	82 25.3	+57.7	146.3	81 34.3	+58.7	150.0	80 41.5	+59.4	153.1	79 47.4	+59.7	155.6	78 52.3	+59.9	157.7	77 56.5	+59.9	159.5	77 00.0	+60.0	161.0	**77**
78	84 09.7	*+54.4*	•138.3	83 23.0	+56.8	144.0	82 33.0	+58.3	148.5	81 40.9	+59.1	152.1	80 47.1	+59.6	155.0	79 52.2	+59.9	157.4	78 56.4	+60.0	159.3	78 00.0	+60.0	161.0	**78**
79	85 04.1	*+51.6*	•133.7	84 19.8	+55.6	141.0	83 31.3	+57.8	146.6	82 40.0	+58.9	150.9	81 46.7	+59.6	154.3	80 52.1	+59.8	157.0	79 56.4	+60.0	159.2	79 00.0	+60.0	161.0	**79**
80	85 55.7	*+46.9*	•127.2	85 15.4	*+53.4*	•136.9	84 29.1	+56.7	144.0	83 38.9	+58.5	149.3	82 46.3	+59.3	153.3	81 51.9	+59.8	156.5	80 56.4	+59.9	159.0	80 00.0	+60.0	161.0	**80**
81	86 42.6	*+37.9*	•117.4	86 08.8	*+49.2*	•130.7	85 25.8	*+55.0*	•140.3	84 37.4	+57.8	147.1	83 45.6	+59.1	152.1	82 51.7	+59.7	155.8	81 56.3	+60.0	158.7	81 00.0	+60.0	161.0	**81**
82	87 20.5	*+21.2*	•102.4	86 58.0	*+40.6*	•121.1	86 20.8	*+51.6*	•134.7	85 35.2	+56.6	143.9	84 44.7	+58.7	150.3	83 51.4	+59.6	155.0	82 56.3	+59.9	158.4	82 00.0	+60.0	161.0	**82**
83	87 41.7	*−3.1*	•80.6	87 38.6	*+22.8*	•105.3	87 12.4	*+43.8*	•125.5	86 31.8	*+54.0*	•139.0	85 43.4	+58.0	147.8	84 51.0	+59.4	153.8	83 56.2	+59.9	157.9	83 00.0	+60.0	161.0	**83**
84	87 38.6	*−26.2*	•55.8	88 01.4	*−5.2*	•80.6	87 56.2	*+24.9*	•109.1	87 25.8	*+47.3*	•130.6	86 41.4	*+56.2*	•143.9	85 50.4	+59.0	152.0	84 56.1	+59.9	157.3	84 00.0	+60.0	161.0	**84**
85	87 12.4	*−40.6*	•35.6	87 56.2	*−30.4*	•52.0	88 21.1	*−8.0*	•80.5	88 13.1	*+27.7*	•114.1	87 37.6	*+51.3*	•136.7	86 49.4	+58.2	149.2	85 56.0	+59.7	156.4	85 00.0	+60.0	161.0	**85**
86	86 31.8	*−48.4*	•22.0	87 25.8	*−44.4*	•30.4	88 13.1	*−35.5*	•46.9	88 40.8	*−11.9*	•80.5	88 28.9	*+31.7*	•121.0	87 47.6	*+55.2*	•143.9	86 55.7	+59.5	154.9	86 00.0	+60.0	161.0	**86**
87	85 43.4	*−52.4*	•13.2	86 41.4	*−51.0*	•17.2	87 37.6	*−48.2*	•24.3	88 28.9	*−41.3*	•40.0	89 00.6	*−17.8*	•80.5	88 42.8	*+37.6*	•130.6	87 55.2	*+58.6*	•152.0	87 00.0	+60.0	161.0	**87**
88	84 51.0	−54.8	7.3	85 50.4	*−54.3*	•9.0	86 49.4	*−53.4*	•11.8	87 47.6	*−51.9*	•17.2	88 42.8	*−47.6*	•30.4	89 20.4	*−26.6*	•80.5	88 53.8	*+46.4*	•143.8	88 00.0	+60.0	161.0	**88**
89	83 56.2	−56.2	3.1	84 56.1	−56.1	3.7	85 56.0	−56.0	4.6	86 55.7	*−55.7*	•6.1	87 55.2	*−55.2*	•9.0	88 53.8	*−53.8*	•17.2	89 40.2	*−40.2*	•80.5	89 00.0	+60.0	161.0	**89**
90	83 00.0	−57.1	0.0	84 00.0	−57.2	0.0	85 00.0	−57.3	0.0	86 00.0	−57.4	0.0	87 00.0	−57.5	0.0	88 00.0	*−57.8*	•0.0	89 00.0	*−58.4*	•0.0	90 00.0	−60.0	80.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 19°, 341°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec. °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Dec. °
0	6 37.0	–59.9	160.9	5 40.3	–59.9	160.9	4 43.6	–60.0	160.9	3 46.9	–60.0	161.0	2 50.2	–60.0	161.0	1 53.5	–60.0	161.0	0 56.7	–60.0	161.0	0 00.0	+60.0	19.0	0
1	5 37.1	–60.0	160.9	4 40.4	–60.0	160.9	3 43.6	–59.9	161.0	2 46.9	–60.0	161.0	1 50.2	–60.0	161.0	0 53.5	–60.0	161.0	0 03.3	+60.0	19.0	1 00.0	+60.0	19.0	1
2	4 37.1	–59.9	160.9	3 40.4	–60.0	161.0	2 43.7	–60.0	161.0	1 46.9	–59.9	161.0	0 50.2	–60.0	161.0	0 06.5	+60.0	19.0	1 03.3	+60.0	19.0	2 00.0	+60.0	19.0	2
3	3 37.2	–60.0	161.0	2 40.4	–59.9	161.0	1 43.7	–60.0	161.0	0 47.0	–60.0	161.0	0 09.8	+60.0	19.0	1 06.5	+60.0	19.0	2 03.3	+60.0	19.0	3 00.0	+60.0	19.0	3
4	2 37.2	–59.9	161.0	1 40.5	–60.0	161.0	0 43.7	–60.0	161.0	0 13.0	+60.0	19.0	1 09.8	+60.0	19.0	2 06.5	+60.0	19.0	3 03.3	+60.0	19.0	4 00.0	+60.0	19.0	4
5	1 37.3	–60.0	161.1	0 40.5	–60.0	161.1	0 16.3	+59.9	18.9	1 13.0	+60.0	18.9	2 09.8	+60.0	18.9	3 06.5	+60.0	19.0	4 03.3	+60.0	19.0	5 00.0	+60.0	19.0	5
6	0 37.3	–60.0	161.1	0 19.5	+59.9	18.9	1 16.2	+60.0	18.9	2 13.0	+60.0	18.9	3 09.8	+60.0	18.9	4 06.5	+60.0	18.9	5 03.3	+60.0	19.0	6 00.0	+60.0	19.0	6
7	0 22.7	+59.9	18.9	1 19.4	+60.0	18.9	2 16.2	+60.0	18.9	3 13.0	+60.0	18.9	4 09.8	+59.9	18.9	5 06.5	+60.0	18.9	6 03.3	+60.0	19.0	7 00.0	+60.0	19.0	7
8	1 22.6	+60.0	18.8	2 19.4	+60.0	18.8	3 16.2	+60.0	18.8	4 13.0	+60.0	18.9	5 09.7	+60.0	18.9	6 06.5	+60.0	18.9	7 03.3	+60.0	19.0	8 00.0	+60.0	19.0	8
9	2 22.6	+59.9	18.8	3 19.4	+59.9	18.8	4 16.2	+59.9	18.8	5 13.0	+59.9	18.8	6 09.7	+60.0	18.9	7 06.5	+60.0	18.9	8 03.3	+60.0	19.0	9 00.0	+60.0	19.0	9
10	3 22.5	+60.0	18.7	4 19.3	+60.0	18.8	5 16.1	+60.0	18.8	6 12.9	+60.0	18.8	7 09.7	+60.0	18.9	8 06.5	+60.0	18.9	9 03.3	+60.0	18.9	10 00.0	+60.0	19.0	10
11	4 22.5	+59.9	18.7	5 19.3	+60.0	18.7	6 16.1	+60.0	18.8	7 12.9	+60.0	18.8	8 09.7	+60.0	18.8	9 06.5	+60.0	18.9	10 03.3	+60.0	18.9	11 00.0	+60.0	19.0	11
12	5 22.4	+60.0	18.7	6 19.3	+59.9	18.7	7 16.1	+60.0	18.7	8 12.9	+60.0	18.8	9 09.7	+60.0	18.8	10 06.5	+60.0	18.9	11 03.3	+60.0	18.9	12 00.0	+60.0	19.0	12
13	6 22.4	+59.9	18.6	7 19.2	+60.0	18.7	8 16.1	+59.9	18.7	9 12.9	+60.0	18.7	10 09.7	+60.0	18.8	11 06.5	+60.0	18.9	12 03.3	+60.0	18.9	13 00.0	+60.0	19.0	13
14	7 22.3	+60.0	18.6	8 19.2	+60.0	18.6	9 16.0	+60.0	18.7	10 12.9	+60.0	18.7	11 09.7	+60.0	18.8	12 06.5	+60.0	18.8	13 03.3	+60.0	18.9	14 00.0	+60.0	19.0	14
15	8 22.3	+59.9	18.5	9 19.2	+59.9	18.6	10 16.0	+60.0	18.6	11 12.9	+59.9	18.7	12 09.7	+60.0	18.8	13 06.5	+60.0	18.8	14 03.3	+60.0	18.9	15 00.0	+60.0	19.0	15
16	9 22.2	+60.0	18.5	10 19.1	+60.0	18.5	11 16.0	+60.0	18.6	12 12.8	+60.0	18.7	13 09.7	+60.0	18.7	14 06.5	+60.0	18.8	15 03.3	+60.0	18.9	16 00.0	+60.0	19.0	16
17	10 22.2	+59.9	18.5	11 19.1	+59.9	18.5	12 16.0	+59.9	18.6	13 12.8	+60.0	18.7	14 09.7	+60.0	18.7	15 06.5	+60.0	18.8	16 03.3	+60.0	18.9	17 00.0	+60.0	19.0	17
18	11 22.1	+60.0	18.4	12 19.0	+60.0	18.5	13 15.9	+60.0	18.5	14 12.8	+60.0	18.6	15 09.7	+59.9	18.7	16 06.5	+60.0	18.8	17 03.3	+60.0	18.9	18 00.0	+60.0	19.0	18
19	12 22.1	+59.9	18.4	13 19.0	+60.0	18.4	14 15.9	+60.0	18.5	15 12.8	+60.0	18.6	16 09.6	+60.0	18.7	17 06.5	+60.0	18.8	18 03.3	+59.9	18.9	19 00.0	+60.0	19.0	19
20	13 22.0	+60.0	18.3	14 19.0	+59.9	18.4	15 15.9	+60.0	18.5	16 12.8	+60.0	18.6	17 09.6	+60.0	18.7	18 06.5	+60.0	18.8	19 03.2	+60.0	18.9	20 00.0	+60.0	19.0	20
21	14 22.0	+59.9	18.3	15 18.9	+60.0	18.4	16 15.9	+59.9	18.5	17 12.8	+59.9	18.6	18 09.6	+60.0	18.7	19 06.5	+60.0	18.8	20 03.2	+60.0	18.9	21 00.0	+60.0	19.0	21
22	15 21.9	+60.0	18.2	16 18.9	+60.0	18.3	17 15.8	+60.0	18.4	18 12.7	+60.0	18.5	19 09.6	+60.0	18.6	20 06.5	+59.9	18.8	21 03.2	+60.0	18.9	22 00.0	+60.0	19.0	22
23	16 21.9	+59.9	18.2	17 18.9	+59.9	18.3	18 15.8	+60.0	18.4	19 12.7	+60.0	18.5	20 09.6	+60.0	18.6	21 06.4	+60.0	18.7	22 03.2	+60.0	18.9	23 00.0	+60.0	19.0	23
24	17 21.8	+60.0	18.2	18 18.8	+60.0	18.3	19 15.8	+60.0	18.4	20 12.7	+60.0	18.5	21 09.6	+60.0	18.6	22 06.4	+60.0	18.7	23 03.2	+60.0	18.9	24 00.0	+60.0	19.0	24
25	18 21.8	+59.9	18.1	19 18.8	+59.9	18.2	20 15.8	+59.9	18.3	21 12.7	+60.0	18.5	22 09.6	+60.0	18.6	23 06.4	+60.0	18.7	24 03.2	+60.0	18.9	25 00.0	+60.0	19.0	25
26	19 21.7	+60.0	18.1	20 18.7	+60.0	18.2	21 15.7	+60.0	18.3	22 12.7	+60.0	18.4	23 09.6	+60.0	18.6	24 06.4	+60.0	18.7	25 03.2	+60.0	18.8	26 00.0	+60.0	19.0	26
27	20 21.7	+59.9	18.0	21 18.7	+60.0	18.1	22 15.7	+60.0	18.3	23 12.7	+59.9	18.4	24 09.6	+60.0	18.5	25 06.4	+60.0	18.7	26 03.2	+60.0	18.8	27 00.0	+60.0	19.0	27
28	21 21.6	+60.0	18.0	22 18.7	+59.9	18.1	23 15.7	+59.9	18.2	24 12.6	+60.0	18.4	25 09.6	+59.9	18.5	26 06.4	+60.0	18.7	27 03.2	+60.0	18.8	28 00.0	+60.0	19.0	28
29	22 21.6	+59.9	17.9	23 18.6	+60.0	18.1	24 15.6	+60.0	18.2	25 12.6	+60.0	18.3	26 09.5	+60.0	18.5	27 06.4	+60.0	18.7	28 03.2	+60.0	18.8	29 00.0	+60.0	19.0	29
30	23 21.5	+59.9	17.9	24 18.6	+59.9	18.0	25 15.6	+60.0	18.2	26 12.6	+60.0	18.3	27 09.5	+60.0	18.5	28 06.4	+60.0	18.6	29 03.2	+60.0	18.8	30 00.0	+60.0	19.0	30
31	24 21.4	+60.0	17.8	25 18.5	+60.0	18.0	26 15.6	+60.0	18.1	27 12.6	+60.0	18.3	28 09.5	+60.0	18.5	29 06.4	+60.0	18.6	30 03.2	+60.0	18.8	31 00.0	+60.0	19.0	31
32	25 21.4	+59.9	17.8	26 18.5	+60.0	17.9	27 15.6	+59.9	18.1	28 12.6	+59.9	18.3	29 09.5	+60.0	18.4	30 06.4	+60.0	18.6	31 03.2	+60.0	18.8	32 00.0	+60.0	19.0	32
33	26 21.3	+60.0	17.7	27 18.5	+59.9	17.9	28 15.5	+60.0	18.1	29 12.5	+60.0	18.2	30 09.5	+60.0	18.4	31 06.4	+60.0	18.6	32 03.2	+60.0	18.8	33 00.0	+60.0	19.0	33
34	27 21.3	+59.9	17.7	28 18.4	+60.0	17.9	29 15.5	+60.0	18.0	30 12.5	+60.0	18.2	31 09.5	+60.0	18.4	32 06.4	+60.0	18.6	33 03.2	+60.0	18.8	34 00.0	+60.0	19.0	34
35	28 21.2	+59.9	17.6	29 18.4	+59.9	17.8	30 15.5	+59.9	18.0	31 12.5	+60.0	18.2	32 09.5	+60.0	18.4	33 06.4	+60.0	18.6	34 03.2	+60.0	18.8	35 00.0	+60.0	19.0	35
36	29 21.1	+60.0	17.6	30 18.3	+60.0	17.8	31 15.4	+60.0	17.9	32 12.5	+60.0	18.1	33 09.5	+60.0	18.3	34 06.4	+60.0	18.5	35 03.2	+60.0	18.8	36 00.0	+60.0	19.0	36
37	30 21.1	+59.9	17.5	31 18.3	+59.9	17.7	32 15.4	+60.0	17.9	33 12.5	+59.9	18.1	34 09.5	+59.9	18.3	35 06.4	+60.0	18.5	36 03.2	+60.0	18.8	37 00.0	+60.0	19.0	37
38	31 21.0	+60.0	17.5	32 18.2	+60.0	17.7	33 15.4	+59.9	17.9	34 12.4	+60.0	18.1	35 09.4	+60.0	18.3	36 06.4	+60.0	18.5	37 03.2	+60.0	18.8	38 00.0	+60.0	19.0	38
39	32 21.0	+59.9	17.4	33 18.2	+59.9	17.6	34 15.3	+60.0	17.8	35 12.4	+60.0	18.0	36 09.4	+60.0	18.3	37 06.4	+60.0	18.5	38 03.2	+60.0	18.7	39 00.0	+60.0	19.0	39
40	33 20.9	+59.9	17.4	34 18.1	+60.0	17.6	35 15.3	+60.0	17.8	36 12.4	+60.0	18.0	37 09.4	+60.0	18.2	38 06.4	+60.0	18.5	39 03.2	+60.0	18.7	40 00.0	+60.0	19.0	40
41	34 20.8	+60.0	17.3	35 18.1	+59.9	17.5	36 15.3	+59.9	17.7	37 12.4	+59.9	18.0	38 09.4	+60.0	18.2	39 06.4	+59.9	18.5	40 03.2	+60.0	18.7	41 00.0	+60.0	19.0	41
42	35 20.8	+59.9	17.3	36 18.0	+60.0	17.5	37 15.2	+60.0	17.7	38 12.3	+60.0	17.9	39 09.4	+60.0	18.2	40 06.3	+60.0	18.4	41 03.2	+60.0	18.7	42 00.0	+60.0	19.0	42
43	36 20.7	+59.9	17.2	37 18.0	+59.9	17.4	38 15.2	+59.9	17.7	39 12.3	+60.0	17.9	40 09.4	+60.0	18.2	41 06.3	+60.0	18.4	42 03.2	+60.0	18.7	43 00.0	+60.0	19.0	43
44	37 20.6	+59.9	17.1	38 17.9	+60.0	17.4	39 15.1	+60.0	17.6	40 12.3	+60.0	17.9	41 09.4	+59.9	18.1	42 06.3	+60.0	18.4	43 03.2	+60.0	18.7	44 00.0	+60.0	19.0	44
45	38 20.5	+60.0	17.1	39 17.9	+59.9	17.3	40 15.1	+60.0	17.6	41 12.3	+59.9	17.8	42 09.3	+60.0	18.1	43 06.3	+60.0	18.4	44 03.2	+60.0	18.7	45 00.0	+60.0	19.0	45
46	39 20.5	+59.9	17.0	40 17.8	+59.9	17.2	41 15.1	+59.9	17.5	42 12.2	+60.0	17.8	43 09.3	+60.0	18.1	44 06.3	+60.0	18.4	45 03.2	+60.0	18.7	46 00.0	+60.0	19.0	46
47	40 20.4	+59.9	16.9	41 17.7	+60.0	17.2	42 15.0	+60.0	17.5	43 12.2	+60.0	17.7	44 09.3	+60.0	18.0	45 06.3	+60.0	18.3	46 03.2	+60.0	18.7	47 00.0	+60.0	19.0	47
48	41 20.3	+59.9	16.9	42 17.7	+59.9	17.1	43 15.0	+59.9	17.4	44 12.2	+59.9	17.7	45 09.3	+60.0	18.0	46 06.3	+60.0	18.3	47 03.2	+60.0	18.6	48 00.0	+60.0	19.0	48
49	42 20.2	+59.9	16.8	43 17.6	+59.9	17.1	44 14.9	+60.0	17.3	45 12.1	+60.0	17.6	46 09.3	+60.0	18.0	47 06.3	+60.0	18.3	48 03.2	+60.0	18.6	49 00.0	+60.0	19.0	49
50	43 20.1	+59.9	16.7	44 17.5	+60.0	17.0	45 14.9	+59.9	17.3	46 12.1	+60.0	17.6	47 09.3	+59.9	17.9	48 06.3	+60.0	18.3	49 03.2	+60.0	18.6	50 00.0	+60.0	19.0	50
51	44 20.0	+59.9	16.6	45 17.5	+59.9	16.9	46 14.8	+60.0	17.2	47 12.1	+59.9	17.6	48 09.2	+60.0	17.9	49 06.3	+60.0	18.2	50 03.2	+60.0	18.6	51 00.0	+60.0	19.0	51
52	45 19.9	+59.9	16.6	46 17.4	+59.9	16.9	47 14.8	+59.9	17.2	48 12.0	+60.0	17.5	49 09.2	+60.0	17.8	50 06.3	+60.0	18.2	51 03.2	+60.0	18.6	52 00.0	+60.0	19.0	52
53	46 19.8	+59.9	16.5	47 17.3	+59.9	16.8	48 14.7	+60.0	17.1	49 12.0	+60.0	17.4	50 09.2	+60.0	17.8	51 06.3	+59.9	18.2	52 03.2	+60.0	18.6	53 00.0	+60.0	19.0	53
54	47 19.7	+59.9	16.4	48 17.2	+60.0	16.7	49 14.7	+59.9	17.0	50 12.0	+59.9	17.4	51 09.2	+59.9	17.8	52 06.2	+60.0	18.2	53 03.2	+60.0	18.6	54 00.0	+60.0	19.0	54
55	48 19.6	+59.9	16.3	49 17.2	+59.9	16.6	50 14.6	+59.9	17.0	51 11.9	+60.0	17.3	52 09.1	+60.0	17.7	53 06.2	+60.0	18.1	54 03.2	+60.0	18.5	55 00.0	+60.0	19.0	55
56	49 19.5	+59.9	16.2	50 17.1	+59.9	16.6	51 14.5	+60.0	16.9	52 11.9	+60.0	17.3	53 09.1	+60.0	17.7	54 06.2	+60.0	18.1	55 03.2	+60.0	18.5	56 00.0	+60.0	19.0	56
57	50 19.4	+59.9	16.1	51 17.0	+59.9	16.5	52 14.5	+59.9	16.8	53 11.9	+59.9	17.2	54 09.1	+60.0	17.6	55 06.2	+60.0	18.1	56 03.2	+60.0	18.5	57 00.0	+60.0	19.0	57
58	51 19.3	+59.9	16.0	52 16.9	+59.9	16.4	53 14.4	+59.9	16.8	54 11.8	+60.0	17.2	55 09.1	+59.9	17.6	56 06.2	+60.0	18.0	57 03.2	+60.0	18.5	58 00.0	+60.0	19.0	58
59	52 19.2	+59.8	15.9	53 16.8	+59.9	16.3	54 14.3	+60.0	16.7	55 11.8	+59.9	17.1	56 09.0	+60.0	17.5	57 06.2	+60.0	18.0	58 03.2	+60.0	18.5	59 00.0	+60.0	19.0	59
60	53 19.0	+59.9	15.8	54 16.7	+59.9	16.2	55 14.3	+59.9	16.6	56 11.7	+60.0	17.0	57 09.0	+60.0	17.5	58 06.2	+60.0	17.9	59 03.2	+60.0	18.5	60 00.0	+60.0	19.0	60
61	54 18.9	+59.9	15.7	55 16.6	+59.9	16.1	56 14.2	+59.9	16.5	57 11.7	+59.9	16.9	58 09.0	+60.0	17.4	59 06.2	+59.9	17.9	60 03.2	+60.0	18.4	61 00.0	+60.0	19.0	61
62	55 18.8	+59.8	15.6	56 16.5	+59.9	16.0	57 14.1	+59.9	16.4	58 11.6	+59.9	16.9	59 09.0	+59.9	17.3	60 06.1	+60.0	17.9	61 03.2	+60.0	18.4	62 00.0	+60.0	19.0	62
63	56 18.6	+59.8	15.5	57 16.4	+59.9	15.9	58 14.0	+59.9	16.3	59 11.5	+60.0	16.8	60 08.9	+60.0	17.3	61 06.1	+60.0	17.8	62 03.2	+60.0	18.4	63 00.0	+60.0	19.0	63
64	57 18.4	+59.9	15.3	58 16.3	+59.8	15.7	59 13.9	+59.9	16.2	60 11.5	+59.9	16.7	61 08.9	+59.9	17.2	62 06.1	+60.0	17.8	63 03.2	+60.0	18.4	64 00.0	+60.0	19.0	64
65	58 18.3	+59.8	15.2	59 16.1	+59.9	15.6	60 13.8	+59.9	16.1	61 11.4	+60.0	16.6	62 08.8	+60.0	17.1	63 06.1	+60.0	17.7	64 03.2	+59.9	18.3	65 00.0	+60.0	19.0	65
66	59 18.1	+59.8	15.0	60 16.0	+59.8	15.5	61 13.7	+59.9	16.0	62 11.4	+59.9	16.5	63 08.8	+60.0	17.0	64 06.1	+60.0	17.6	65 03.1	+60.0	18.3	66 00.0	+60.0	19.0	66
67	60 17.9	+59.8	14.9	61 15.8	+59.9	15.3	62 13.6	+59.9	15.8	63 11.3	+59.9	16.4	64 08.8	+59.9	17.0	65 06.1	+59.9	17.6	66 03.1	+60.0	18.3	67 00.0	+60.0	19.0	67
68	61 17.7	+59.8	14.7	62 15.7	+59.8	15.2	63 13.5	+59.9	15.7	64 11.2	+59.9	16.3	65 08.7	+60.0	16.9	66 06.0	+60.0	17.5	67 03.1	+60.0	18.2	68 00.0	+60.0	19.0	68
69	62 17.5	+59.8	14.5	63 15.5	+59.8	15.0	64 13.4	+59.9	15.6	65 11.1	+59.9	16.1	66 08.7	+59.9	16.8	67 06.0	+60.0	17.4	68 03.1	+60.0	18.2	69 00.0	+60.0	19.0	69
70	63 17.3	+59.7	14.3	64 15.3	+59.9	14.9	65 13.3	+59.8	15.4	66 11.0	+59.9	16.0	67 08.6	+59.9	16.7	68 06.0	+60.0	17.4	69 03.1	+60.0	18.1	70 00.0	+60.0	19.0	70
71	64 17.0	+59.8	14.1	65 15.2	+59.7	14.7	66 13.1	+59.9	15.2	67 10.9	+59.9	15.9	68 08.5	+60.0	16.5	69 06.0	+59.9	17.3	70 03.1	+60.0	18.1	71 00.0	+60.0	19.0	71
72	65 16.8	+59.7	13.9	66 14.9	+59.8	14.5	67 13.0	+59.8	15.1	68 10.8	+59.9	15.7	69 08.5	+59.9	16.4	70 05.9	+60.0	17.2	71 03.1	+60.0	18.0	72 00.0	+60.0	19.0	72
73	66 16.5	+59.7	13.7	67 14.7	+59.8	14.2	68 12.8	+59.8	14.9	69 10.7	+59.9	15.5	70 08.4	+59.9	16.3	71 05.9	+59.9	17.1	72 03.1	+60.0	18.0	73 00.0	+60.0	19.0	73
74	67 16.2	+59.7	13.4	68 14.5	+59.7	14.0	69 12.6	+59.8	14.6	70 10.6	+59.8	15.3	71 08.3	+59.9	16.1	72 05.8	+60.0	17.0	73 03.1	+60.0	17.9	74 00.0	+60.0	19.0	74
75	68 15.9	+59.6	13.2	69 14.2	+59.7	13.8	70 12.4	+59.8	14.4	71 10.4	+59.9	15.1	72 08.2	+59.9	15.9	73 05.8	+60.0	16.8	74 03.1	+60.0	17.9	75 00.0	+60.0	19.0	75
76	69 15.5	+59.6	12.8	70 13.9	+59.7	13.5	71 12.2	+59.7	14.1	72 10.3	+59.8	14.9	73 08.1	+59.9	15.8	74 05.8	+59.9	16.7	75 03.1	+59.9	17.8	76 00.0	+60.0	19.0	76
77	70 15.1	+59.6	12.5	71 13.6	+59.7	13.2	72 11.9	+59.8	13.9	73 10.1	+59.8	14.7	74 08.0	+59.9	15.5	75 05.7	+59.9	16.5	76 03.0	+60.0	17.7	77 00.0	+60.0	19.0	77
78	71 14.7	+59.5	12.2	72 13.3	+59.6	12.8	73 11.7	+59.7	13.5	74 09.9	+59.8	14.4	75 07.9	+59.9	15.3	76 05.6	+60.0	16.4	77 03.0	+60.0	17.6	78 00.0	+60.0	19.0	78
79	72 14.2	+59.4	11.7	73 12.9	+59.5	12.4	74 11.4	+59.6	13.2	75 09.7	+59.7	14.0	76 07.8	+59.8	15.0	77 05.6	+59.9	16.1	78 03.0	+60.0	17.5	79 00.0	+60.0	19.0	79
80	73 13.6	+59.4	11.3	74 12.4	+59.5	12.0	75 11.0	+59.6	12.8	76 09.4	+59.7	13.7	77 07.6	+59.8	14.7	78 05.5	+59.9	15.9	79 03.0	+60.0	17.3	80 00.0	+60.0	19.0	80
81	74 13.0	+59.4	10.8	75 11.9	+59.4	11.5	76 10.6	+59.6	12.3	77 09.1	+59.7	13.2	78 07.4	+59.8	14.3	79 05.4	+59.9	15.6	80 03.0	+59.9	17.1	81 00.0	+60.0	19.0	81
82	75 12.4	+59.2	10.2	76 11.3	+59.4	10.9	77 10.2	+59.4	11.8	78 08.8	+59.6	12.7	79 07.2	+59.7	13.9	80 05.3	+59.8	15.3	81 02.9	+60.0	16.9	82 00.0	+60.0	19.0	82
83	76 11.6	+59.1	9.6	77 10.7	+59.2	10.3	78 09.6	+59.4	11.2	79 08.4	+59.5	12.2	80 06.9	+59.7	13.4	81 05.1	+59.8	14.8	82 02.9	+59.9	16.7	83 00.0	+60.0	19.0	83
84	77 10.7	+58.9	8.8	78 09.9	+59.1	9.6	79 09.0	+59.2	10.4	80 07.9	+59.4	11.5	81 06.6	+59.6	12.7	82 04.9	+59.8	14.3	83 02.8	+59.9	16.3	84 00.0	+60.0	19.0	84
85	78 09.6	+58.8	7.9	79 09.0	+58.9	8.7	80 08.2	+59.1	9.5	81 07.3	+59.3	10.6	82 06.2	+59.4	11.9	83 04.7	+59.7	13.6	84 02.7	+59.9	15.9	85 00.0	+60.0	19.0	85
86	79 08.4	+58.5	6.9	80 07.9	+58.7	7.6	81 07.3	+58.9	8.5	82 06.6	+59.0	9.5	83 05.6	+59.3	10.9	84 04.4	+59.6	12.7	85 02.6	+59.9	15.2	86 00.0	+60.0	19.0	86
87	80 06.9	+58.2	5.7	81 06.6	+58.3	6.3	82 06.2	+58.5	7.1	83 05.6	+58.8	8.1	84 04.9	+59.1	9.5	85 04.0	+59.3	11.4	86 02.5	+59.7	14.3	87 00.0	+60.0	19.0	87
88	81 05.1	+57.8	4.2	82 04.9	+57.9	4.7	83 04.7	+58.0	5.4	84 04.4	+58.2	6.3	85 04.0	+58.5	7.6	86 03.3	+58.9	9.5	87 02.2	+59.4	12.7	88 00.0	+60.0	19.0	88
89	82 02.9	+57.1	2.4	83 02.8	+57.2	2.7	84 02.7	+57.3	3.1	85 02.6	+57.4	3.8	86 02.5	+57.5	4.7	87 02.2	*+57.8* •	6.3	88 01.6	*+58.4* •	9.5	89 00.0	+60.0	19.0	89
90	83 00.0	+56.2	0.0	84 00.0	+56.1	0.0	85 00.0	+56.0	0.0	86 00.0	*+55.7* •	0.0	87 00.0	*+55.2* •	0.0	88 00.0	*+53.8* •	0.0	89 00.0	*+40.2* •	0.0	90 00.0	–60.0	9.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 161°, 199°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 34.6	+59.9	159.9	5 38.2	+60.0	159.9	4 41.9	+59.9	159.9	3 45.5	+60.0	160.0	2 49.1	+60.0	160.0	1 52.8	+60.0	160.0	0 56.4	+60.0	160.0	0 00.0	+60.0	160.0	**0**
1	7 34.5	+59.9	159.8	6 38.2	+59.9	159.9	5 41.8	+60.0	159.9	4 45.5	+60.0	159.9	3 49.1	+60.0	160.0	2 52.8	+60.0	160.0	1 56.4	+60.0	160.0	1 00.0	+60.0	160.0	**1**
2	8 34.4	+60.0	159.8	7 38.1	+60.0	159.8	6 41.8	+60.0	159.9	5 45.5	+60.0	159.9	4 49.1	+60.0	159.9	3 52.8	+59.9	160.0	2 56.4	+60.0	160.0	2 00.0	+60.0	160.0	**2**
3	9 34.4	+59.9	159.7	8 38.1	+60.0	159.8	7 41.8	+60.0	159.8	6 45.5	+59.9	159.9	5 49.1	+60.0	159.9	4 52.7	+60.0	160.0	3 56.4	+60.0	160.0	3 00.0	+60.0	160.0	**3**
4	10 34.3	+60.0	159.7	9 38.1	+59.9	159.8	8 41.8	+59.9	159.8	7 45.4	+60.0	159.9	6 49.1	+60.0	159.9	5 52.7	+60.0	159.9	4 56.4	+60.0	160.0	4 00.0	+60.0	160.0	**4**
5	11 34.3	+59.9	159.6	10 38.0	+60.0	159.7	9 41.7	+60.0	159.8	8 45.4	+60.0	159.8	7 49.1	+60.0	159.9	6 52.7	+60.0	159.9	5 56.4	+60.0	160.0	5 00.0	+60.0	160.0	**5**
6	12 34.2	+60.0	159.6	11 38.0	+59.9	159.7	10 41.7	+60.0	159.7	9 45.4	+60.0	159.8	8 49.1	+60.0	159.9	7 52.7	+60.0	159.9	6 56.4	+60.0	160.0	6 00.0	+60.0	160.0	**6**
7	13 34.2	+59.9	159.6	12 37.9	+60.0	159.6	11 41.7	+59.9	159.7	10 45.4	+60.0	159.8	9 49.1	+60.0	159.8	8 52.7	+60.0	159.9	7 56.4	+60.0	160.0	7 00.0	+60.0	160.0	**7**
8	14 34.1	+60.0	159.5	13 37.9	+60.0	159.6	12 41.6	+60.0	159.7	11 45.4	+59.9	159.8	10 49.1	+59.9	159.8	9 52.7	+60.0	159.9	8 56.4	+60.0	159.9	8 00.0	+60.0	160.0	**8**
9	15 34.1	+59.9	159.5	14 37.9	+59.9	159.6	13 41.6	+60.0	159.7	12 45.3	+60.0	159.7	11 49.0	+60.0	159.8	10 52.7	+60.0	159.9	9 56.4	+60.0	159.9	9 00.0	+60.0	160.0	**9**
10	16 34.0	+60.0	159.4	15 37.8	+60.0	159.5	14 41.6	+60.0	159.6	13 45.3	+60.0	159.7	12 49.0	+60.0	159.8	11 52.7	+60.0	159.9	10 56.4	+60.0	159.9	10 00.0	+60.0	160.0	**10**
11	17 34.0	+59.9	159.4	16 37.8	+59.9	159.5	15 41.6	+59.9	159.6	14 45.3	+60.0	159.7	13 49.0	+60.0	159.8	12 52.7	+60.0	159.9	11 56.4	+60.0	159.9	11 00.0	+60.0	160.0	**11**
12	18 33.9	+59.9	159.3	17 37.7	+60.0	159.4	16 41.5	+60.0	159.6	15 45.3	+60.0	159.7	14 49.0	+60.0	159.8	13 52.7	+60.0	159.8	12 56.4	+60.0	159.9	12 00.0	+60.0	160.0	**12**
13	19 33.8	+60.0	159.3	18 37.7	+59.9	159.4	17 41.5	+60.0	159.5	16 45.3	+60.0	159.6	15 49.0	+60.0	159.7	14 52.7	+60.0	159.8	13 56.4	+60.0	159.9	13 00.0	+60.0	160.0	**13**
14	20 33.8	+59.9	159.2	19 37.6	+60.0	159.4	18 41.5	+59.9	159.5	17 45.3	+59.9	159.6	16 49.0	+60.0	159.7	15 52.7	+60.0	159.8	14 56.4	+60.0	159.9	14 00.0	+60.0	160.0	**14**
15	21 33.7	+60.0	159.2	20 37.6	+60.0	159.3	19 41.4	+60.0	159.5	18 45.2	+60.0	159.6	17 49.0	+60.0	159.7	16 52.7	+60.0	159.8	15 56.4	+60.0	159.9	15 00.0	+60.0	160.0	**15**
16	22 33.7	+59.9	159.1	21 37.6	+59.9	159.3	20 41.4	+60.0	159.4	19 45.2	+60.0	159.6	18 49.0	+60.0	159.7	17 52.7	+60.0	159.8	16 56.4	+60.0	159.9	16 00.0	+60.0	160.0	**16**
17	23 33.6	+59.9	159.1	22 37.5	+60.0	159.2	21 41.4	+60.0	159.4	20 45.2	+60.0	159.5	19 49.0	+60.0	159.7	18 52.7	+60.0	159.8	17 56.4	+60.0	159.9	17 00.0	+60.0	160.0	**17**
18	24 33.5	+60.0	159.0	23 37.5	+59.9	159.2	22 41.4	+59.9	159.4	21 45.2	+60.0	159.5	20 49.0	+59.9	159.6	19 52.7	+60.0	159.8	18 56.4	+60.0	159.9	18 00.0	+60.0	160.0	**18**
19	25 33.5	+59.9	159.0	24 37.4	+60.0	159.2	23 41.3	+60.0	159.3	22 45.2	+59.9	159.5	21 48.9	+60.0	159.6	20 52.7	+60.0	159.8	19 56.4	+60.0	159.9	19 00.0	+60.0	160.0	**19**
20	26 33.4	+59.9	158.9	25 37.4	+59.9	159.1	24 41.3	+60.0	159.3	23 45.1	+60.0	159.4	22 48.9	+60.0	159.6	21 52.7	+60.0	159.7	20 56.4	+60.0	159.9	20 00.0	+60.0	160.0	**20**
21	27 33.3	+60.0	158.9	26 37.3	+60.0	159.1	25 41.3	+59.9	159.2	24 45.1	+60.0	159.4	23 48.9	+60.0	159.6	22 52.7	+60.0	159.7	21 56.4	+60.0	159.9	21 00.0	+60.0	160.0	**21**
22	28 33.3	+59.9	158.8	27 37.3	+59.9	159.0	26 41.2	+60.0	159.2	25 45.1	+60.0	159.4	24 48.9	+60.0	159.6	23 52.7	+60.0	159.7	22 56.4	+60.0	159.9	22 00.0	+60.0	160.0	**22**
23	29 33.2	+59.9	158.8	28 37.2	+60.0	159.0	27 41.2	+60.0	159.2	26 45.1	+60.0	159.4	25 48.9	+60.0	159.5	24 52.7	+59.9	159.7	23 56.4	+60.0	159.9	23 00.0	+60.0	160.0	**23**
24	30 33.1	+60.0	158.7	29 37.2	+59.9	158.9	28 41.2	+59.9	159.1	27 45.1	+59.9	159.3	26 48.9	+60.0	159.5	25 52.6	+60.0	159.7	24 56.4	+60.0	159.8	24 00.0	+60.0	160.0	**24**
25	31 33.1	+59.9	158.7	30 37.1	+60.0	158.9	29 41.1	+60.0	159.1	28 45.0	+60.0	159.3	27 48.9	+60.0	159.5	26 52.6	+60.0	159.7	25 56.4	+60.0	159.8	25 00.0	+60.0	160.0	**25**
26	32 33.0	+59.9	158.6	31 37.1	+59.9	158.8	30 41.1	+59.9	159.1	29 45.0	+60.0	159.3	28 48.9	+59.9	159.5	27 52.6	+60.0	159.6	26 56.4	+59.9	159.8	26 00.0	+60.0	160.0	**26**
27	33 32.9	+59.9	158.6	32 37.0	+60.0	158.8	31 41.0	+60.0	159.0	30 45.0	+60.0	159.2	29 48.8	+60.0	159.4	28 52.6	+60.0	159.6	27 56.3	+60.0	159.8	27 00.0	+60.0	160.0	**27**
28	34 32.8	+60.0	158.5	33 37.0	+59.9	158.7	32 41.0	+60.0	159.0	31 45.0	+59.9	159.2	30 48.8	+60.0	159.4	29 52.6	+60.0	159.6	28 56.3	+60.0	159.8	28 00.0	+60.0	160.0	**28**
29	35 32.8	+59.9	158.4	34 36.9	+60.0	158.7	33 41.0	+59.9	158.9	32 44.9	+60.0	159.2	31 48.8	+60.0	159.4	30 52.6	+60.0	159.6	29 56.3	+60.0	159.8	29 00.0	+60.0	160.0	**29**
30	36 32.7	+59.9	158.4	35 36.9	+59.9	158.6	34 40.9	+60.0	158.9	33 44.9	+60.0	159.1	32 48.8	+60.0	159.4	31 52.6	+60.0	159.6	30 56.3	+60.0	159.8	30 00.0	+60.0	160.0	**30**
31	37 32.6	+59.9	158.3	36 36.8	+59.9	158.6	35 40.9	+60.0	158.8	34 44.9	+60.0	159.1	33 48.8	+60.0	159.3	32 52.6	+60.0	159.6	31 56.3	+60.0	159.8	31 00.0	+60.0	160.0	**31**
32	38 32.5	+59.9	158.2	37 36.7	+60.0	158.5	36 40.9	+59.9	158.8	35 44.9	+59.9	159.1	34 48.8	+60.0	159.3	33 52.6	+60.0	159.6	32 56.3	+60.0	159.8	32 00.0	+60.0	160.0	**32**
33	39 32.4	+59.9	158.2	38 36.7	+59.9	158.5	37 40.8	+60.0	158.8	36 44.8	+60.0	159.0	35 48.8	+60.0	159.3	34 52.6	+60.0	159.5	33 56.3	+60.0	159.8	33 00.0	+60.0	160.0	**33**
34	40 32.3	+60.0	158.1	39 36.6	+59.9	158.4	38 40.8	+59.9	158.7	37 44.8	+60.0	159.0	36 48.8	+59.9	159.3	35 52.6	+60.0	159.5	34 56.3	+60.0	159.8	34 00.0	+60.0	160.0	**34**
35	41 32.3	+59.9	158.0	40 36.5	+60.0	158.3	39 40.7	+60.0	158.7	38 44.8	+60.0	158.9	37 48.7	+60.0	159.2	36 52.6	+60.0	159.5	35 56.3	+60.0	159.8	35 00.0	+60.0	160.0	**35**
36	42 32.2	+59.9	157.9	41 36.5	+59.9	158.3	40 40.7	+59.9	158.6	39 44.8	+59.9	158.9	38 48.7	+60.0	159.2	37 52.6	+60.0	159.5	36 56.3	+60.0	159.7	36 00.0	+60.0	160.0	**36**
37	43 32.1	+59.9	157.9	42 36.4	+59.9	158.2	41 40.6	+60.0	158.5	40 44.7	+60.0	158.9	39 48.7	+60.0	159.2	38 52.6	+60.0	159.5	37 56.3	+60.0	159.7	37 00.0	+60.0	160.0	**37**
38	44 32.0	+59.9	157.8	43 36.3	+60.0	158.1	42 40.6	+59.9	158.5	41 44.7	+60.0	158.8	40 48.7	+60.0	159.1	39 52.6	+60.0	159.4	38 56.3	+60.0	159.7	38 00.0	+60.0	160.0	**38**
39	45 31.9	+59.8	157.7	44 36.3	+59.9	158.1	43 40.5	+60.0	158.4	42 44.7	+59.9	158.8	41 48.7	+60.0	159.1	40 52.6	+59.9	159.4	39 56.3	+60.0	159.7	39 00.0	+60.0	160.0	**39**
40	46 31.7	+59.9	157.6	45 36.2	+59.9	158.0	44 40.5	+59.9	158.4	43 44.6	+60.0	158.7	42 48.7	+59.9	159.1	41 52.5	+60.0	159.4	40 56.3	+60.0	159.7	40 00.0	+60.0	160.0	**40**
41	47 31.6	+59.9	157.5	46 36.1	+59.9	157.9	45 40.4	+60.0	158.3	44 44.6	+60.0	158.7	43 48.6	+60.0	159.0	42 52.5	+60.0	159.4	41 56.3	+60.0	159.7	41 00.0	+60.0	160.0	**41**
42	48 31.5	+59.9	157.4	47 36.0	+59.9	157.9	46 40.4	+59.9	158.3	45 44.6	+59.9	158.6	44 48.6	+60.0	159.0	43 52.5	+60.0	159.4	42 56.3	+60.0	159.7	42 00.0	+60.0	160.0	**42**
43	49 31.4	+59.9	157.3	48 35.9	+59.9	157.8	47 40.3	+60.0	158.2	46 44.5	+60.0	158.6	45 48.6	+60.0	159.0	44 52.5	+60.0	159.3	43 56.3	+60.0	159.7	43 00.0	+60.0	160.0	**43**
44	50 31.3	+59.8	157.2	49 35.8	+60.0	157.7	48 40.3	+59.9	158.1	47 44.5	+60.0	158.5	46 48.6	+60.0	158.9	45 52.5	+60.0	159.3	44 56.3	+60.0	159.7	44 00.0	+60.0	160.0	**44**
45	51 31.1	+59.9	157.1	50 35.8	+59.9	157.6	49 40.2	+59.9	158.1	48 44.5	+59.9	158.5	47 48.6	+59.9	158.9	46 52.5	+60.0	159.3	45 56.3	+60.0	159.6	45 00.0	+60.0	160.0	**45**
46	52 31.0	+59.9	157.0	51 35.7	+59.9	157.5	50 40.1	+60.0	158.0	49 44.4	+60.0	158.4	48 48.5	+60.0	158.9	47 52.5	+60.0	159.3	46 56.3	+60.0	159.6	46 00.0	+60.0	160.0	**46**
47	53 30.9	+59.8	156.9	52 35.6	+59.9	157.4	51 40.1	+59.9	157.9	50 44.4	+59.9	158.4	49 48.5	+60.0	158.8	48 52.5	+60.0	159.2	47 56.3	+60.0	159.6	47 00.0	+60.0	160.0	**47**
48	54 30.7	+59.8	156.8	53 35.5	+59.8	157.3	52 40.0	+59.9	157.8	51 44.3	+60.0	158.3	50 48.5	+60.0	158.8	49 52.5	+60.0	159.2	48 56.3	+60.0	159.6	48 00.0	+60.0	160.0	**48**
49	55 30.5	+59.9	156.7	54 35.3	+59.9	157.2	53 39.9	+59.9	157.7	52 44.3	+59.9	158.2	51 48.5	+59.9	158.7	50 52.5	+60.0	159.2	49 56.3	+60.0	159.6	49 00.0	+60.0	160.0	**49**
50	56 30.4	+59.8	156.5	55 35.2	+59.9	157.1	54 39.8	+60.0	157.7	53 44.2	+60.0	158.2	52 48.4	+60.0	158.7	51 52.5	+59.9	159.1	50 56.3	+60.0	159.6	50 00.0	+60.0	160.0	**50**
51	57 30.2	+59.8	156.4	56 35.1	+59.9	157.0	55 39.8	+59.9	157.6	54 44.2	+59.9	158.1	53 48.4	+60.0	158.6	52 52.4	+60.0	159.1	51 56.3	+60.0	159.6	51 00.0	+60.0	160.0	**51**
52	58 30.0	+59.8	156.2	57 35.0	+59.8	156.9	56 39.7	+59.9	157.5	55 44.1	+60.0	158.0	54 48.4	+60.0	158.6	53 52.4	+60.0	159.1	52 56.3	+60.0	159.5	52 00.0	+60.0	160.0	**52**
53	59 29.8	+59.8	156.1	58 34.8	+59.9	156.7	57 39.6	+59.9	157.4	56 44.1	+59.9	158.0	55 48.4	+59.9	158.5	54 52.4	+60.0	159.0	53 56.3	+60.0	159.5	53 00.0	+60.0	160.0	**53**
54	60 29.6	+59.8	155.9	59 34.7	+59.8	156.6	58 39.5	+59.9	157.3	57 44.0	+60.0	157.9	56 48.3	+60.0	158.5	55 52.4	+60.0	159.0	54 56.3	+60.0	159.5	54 00.0	+60.0	160.0	**54**
55	61 29.4	+59.8	155.7	60 34.5	+59.9	156.5	59 39.4	+59.9	157.1	58 44.0	+59.9	157.8	57 48.3	+60.0	158.4	56 52.4	+60.0	159.0	55 56.3	+60.0	159.5	55 00.0	+60.0	160.0	**55**
56	62 29.2	+59.7	155.5	61 34.4	+59.8	156.3	60 39.3	+59.9	157.0	59 43.9	+59.9	157.7	58 48.3	+59.9	158.3	57 52.4	+60.0	158.9	56 56.3	+60.0	159.5	56 00.0	+60.0	160.0	**56**
57	63 28.9	+59.7	155.3	62 34.2	+59.8	156.1	61 39.2	+59.8	156.9	60 43.8	+59.9	157.6	59 48.2	+60.0	158.3	58 52.4	+59.9	158.9	57 56.3	+60.0	159.5	57 00.0	+60.0	160.0	**57**
58	64 28.6	+59.7	155.1	63 34.0	+59.8	156.0	62 39.0	+59.9	156.8	61 43.7	+60.0	157.5	60 48.2	+59.9	158.2	59 52.3	+60.0	158.8	58 56.3	+60.0	159.4	58 00.0	+60.0	160.0	**58**
59	65 28.3	+59.7	154.9	64 33.8	+59.8	155.8	63 38.9	+59.9	156.6	62 43.7	+59.9	157.4	61 48.1	+60.0	158.1	60 52.3	+60.0	158.8	59 56.3	+60.0	159.4	59 00.0	+60.0	160.0	**59**
60	66 28.0	+59.7	154.6	65 33.6	+59.8	155.6	64 38.8	+59.8	156.5	63 43.6	+59.9	157.3	62 48.1	+59.9	158.0	61 52.3	+60.0	158.7	60 56.3	+60.0	159.4	60 00.0	+60.0	160.0	**60**
61	67 27.7	+59.6	154.4	66 33.4	+59.7	155.4	65 38.6	+59.8	156.3	64 43.5	+59.9	157.1	63 48.0	+60.0	157.9	62 52.3	+60.0	158.7	61 56.3	+60.0	159.4	61 00.0	+60.0	160.0	**61**
62	68 27.3	+59.6	154.1	67 33.1	+59.7	155.1	66 38.4	+59.9	156.1	65 43.4	+59.9	157.0	64 48.0	+59.9	157.8	63 52.3	+59.9	158.6	62 56.3	+60.0	159.3	62 00.0	+60.0	160.0	**62**
63	69 26.9	+59.6	153.7	68 32.8	+59.7	154.9	67 38.3	+59.8	155.9	66 43.3	+59.9	156.9	65 47.9	+60.0	157.7	64 52.2	+60.0	158.6	63 56.3	+60.0	159.3	63 00.0	+60.0	160.0	**63**
64	70 26.5	+59.5	153.4	69 32.5	+59.7	154.6	68 38.1	+59.8	155.7	67 43.2	+59.9	156.7	66 47.9	+59.9	157.6	65 52.2	+60.0	158.5	64 56.3	+59.9	159.3	64 00.0	+60.0	160.0	**64**
65	71 26.0	+59.4	153.0	70 32.2	+59.6	154.3	69 37.9	+59.7	155.5	68 43.1	+59.8	156.5	67 47.8	+59.9	157.5	66 52.2	+60.0	158.4	65 56.2	+60.0	159.2	65 00.0	+60.0	160.0	**65**
66	72 25.4	+59.4	152.6	71 31.8	+59.6	154.0	70 37.6	+59.8	155.2	69 42.9	+59.9	156.3	68 47.7	+60.0	157.4	67 52.2	+59.9	158.3	66 56.2	+60.0	159.2	66 00.0	+60.0	160.0	**66**
67	73 24.8	+59.3	152.1	72 31.4	+59.6	153.6	71 37.4	+59.7	154.9	70 42.8	+59.8	156.1	69 47.7	+59.9	157.2	68 52.1	+60.0	158.2	67 56.2	+60.0	159.2	67 00.0	+60.0	160.0	**67**
68	74 24.1	+59.3	151.5	73 31.0	+59.5	153.2	72 37.1	+59.7	154.6	71 42.6	+59.8	155.9	70 47.6	+59.9	157.1	69 52.1	+60.0	158.1	68 56.2	+60.0	159.1	68 00.0	+60.0	160.0	**68**
69	75 23.4	+59.1	150.9	74 30.5	+59.4	152.7	73 36.8	+59.6	154.2	72 42.4	+59.8	155.6	71 47.5	+59.9	156.9	70 52.1	+59.9	158.0	69 56.2	+60.0	159.1	69 00.0	+60.0	160.0	**69**
70	76 22.5	+59.0	150.2	75 29.9	+59.3	152.2	74 36.4	+59.6	153.9	73 42.2	+59.8	155.4	72 47.4	+59.9	156.7	71 52.0	+60.0	157.9	70 56.2	+60.0	159.0	70 00.0	+60.0	160.0	**70**
71	77 21.5	+58.8	149.4	76 29.2	+59.3	151.5	75 36.0	+59.6	153.4	74 42.0	+59.7	155.0	73 47.3	+59.8	156.5	72 52.0	+59.9	157.8	71 56.2	+60.0	159.0	71 00.0	+60.0	160.0	**71**
72	78 20.3	+58.6	148.5	77 28.5	+59.1	150.8	76 35.6	+59.4	152.9	75 41.7	+59.7	154.7	74 47.1	+59.9	156.3	73 51.9	+60.0	157.6	72 56.2	+60.0	158.9	72 00.0	+60.0	160.0	**72**
73	79 18.9	+58.3	147.4	78 27.6	+58.9	150.0	77 35.0	+59.4	152.3	76 41.4	+59.7	154.3	75 47.0	+59.8	156.0	74 51.9	+59.9	157.5	73 56.2	+60.0	158.8	73 00.0	+60.0	160.0	**73**
74	80 17.2	+57.9	146.0	79 26.5	+58.8	149.0	78 34.4	+59.2	151.6	77 41.1	+59.6	153.8	76 46.8	+59.8	155.7	75 51.8	+59.9	157.3	74 56.2	+59.9	158.7	74 00.0	+60.0	160.0	**74**
75	81 15.1	+57.4	144.4	80 25.3	+58.4	147.9	79 33.6	+59.1	150.8	78 40.7	+59.5	153.2	77 46.6	+59.8	155.3	76 51.7	+59.9	157.1	75 56.1	+60.0	158.6	75 00.0	+60.0	160.0	**75**
76	82 12.5	+56.7	142.4	81 23.7	+58.0	146.4	80 32.7	+58.9	149.8	79 40.2	+59.4	152.5	78 46.4	+59.7	154.9	77 51.6	+59.9	156.8	76 56.1	+60.0	158.5	76 00.0	+60.0	160.0	**76**
77	83 09.2	+55.6	139.8	82 21.7	+57.5	144.6	81 31.6	+58.6	148.5	80 39.6	+59.3	151.7	79 46.1	+59.7	154.3	78 51.5	+59.9	156.5	77 56.1	+60.0	158.4	77 00.0	+60.0	160.0	**77**
78	84 04.8	*+53.9*	•136.4	83 19.2	+56.6	142.3	82 30.2	+58.2	147.0	81 38.9	+59.0	150.7	80 45.8	+59.5	153.7	79 51.4	+59.8	156.2	78 56.1	+59.9	158.3	78 00.0	+60.0	160.0	**78**
79	84 58.7	*+51.1*	•131.8	84 15.8	+55.2	139.2	83 28.4	+57.5	145.0	82 37.9	+58.8	149.4	81 45.3	+59.5	152.9	80 51.2	+59.9	155.8	79 56.0	+60.0	158.1	79 00.0	+60.0	160.0	**79**
80	85 49.8	*+46.3*	•125.2	85 11.0	*+52.9*	•135.0	84 25.9	+56.5	142.3	83 36.7	+58.4	147.7	82 44.8	+59.3	151.9	81 51.1	+59.7	155.2	80 56.0	+59.9	157.9	80 00.0	+60.0	160.0	**80**
81	86 36.1	*+37.2*	•115.5	86 03.9	*+48.6*	•128.8	85 22.4	*+54.7*	•138.4	84 35.1	+57.6	145.5	83 44.1	+59.0	150.6	82 50.8	+59.7	154.6	81 55.9	+60.0	157.6	81 00.0	+60.0	160.0	**81**
82	87 13.3	*+21.2*	•100.8	86 52.5	*+40.0*	•119.2	86 17.1	*+51.0*	•132.7	85 32.7	*+56.3*	•142.2	84 43.1	+58.6	148.9	83 50.5	+59.5	153.7	82 55.9	+59.9	157.2	82 00.0	+60.0	160.0	**82**
83	87 34.5	*–2.0*	•80.1	87 32.5	*+22.7*	•103.7	87 08.1	*+43.1*	•123.5	86 29.0	*+53.5*	•137.2	85 41.7	+57.8	146.3	84 50.0	+59.4	152.4	83 55.8	+59.9	156.8	83 00.0	+60.0	160.0	**83**
84	87 32.5	*–24.4*	•56.4	87 55.2	*–4.0*	•80.1	87 51.2	*+24.7*	•107.4	87 22.5	*+46.7*	•128.7	86 39.5	*+55.9*	•142.2	85 49.4	+58.9	150.6	84 55.7	+59.8	156.1	84 00.0	+60.0	160.0	**84**
85	87 08.1	*–39.1*	•36.6	87 51.2	*–28.7*	•52.7	88 15.9	*–6.7*	•80.0	88 09.2	*+27.5*	•112.3	87 35.4	*+50.8*	•134.8	86 48.3	*+58.0*	•147.7	85 55.5	+59.7	155.2	85 00.0	+60.0	160.0	**85**
86	86 29.0	*–47.3*	•22.9	87 22.5	*–43.0*	•31.4	88 09.2	*–33.8*	•47.8	88 36.7	*–10.5*	•80.0	88 26.2	*+31.3*	•119.0	87 46.3	*+54.9*	•142.1	86 55.2	+59.5	153.6	86 00.0	+60.0	160.0	**86**
87	85 41.7	*–51.7*	•13.8	86 39.5	*–50.1*	•17.9	87 35.4	*–47.1*	•25.2	88 26.2	*–39.9*	•41.0	88 57.5	*–16.3*	•80.0	88 41.2	*+37.1*	•128.6	87 54.7	*+58.5*	•150.6	87 00.0	+60.0	160.0	**87**
88	84 50.0	*–54.2*	•7.6	85 49.4	*–53.7*	•9.4	86 48.3	*–52.8*	•12.4	87 46.3	*–51.1*	•17.9	88 41.2	*–46.5*	•31.4	89 18.3	*–25.1*	•80.0	88 53.2	*+46.0*	•142.1	88 00.0	+60.0	160.0	**88**
89	83 55.8	–55.8	3.2	84 55.7	–55.7	3.9	85 55.5	*–55.5*	•4.8	86 55.2	*–55.2*	•6.4	87 54.7	*–54.7*	•9.4	88 53.2	*–53.2*	•17.9	89 39.2	*–39.2*	•80.0	89 00.0	+60.0	160.0	**89**
90	83 00.0	–56.8	0.0	84 00.0	–56.9	0.0	85 00.0	–57.0	0.0	86 00.0	–57.1	0.0	87 00.0	–57.3	0.0	88 00.0	*–57.6*	•0.0	89 00.0	*–58.2*	•0.0	90 00.0	–60.0	80.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 34.6	–60.0	159.9	5 38.2	–59.9	159.9	4 41.9	–60.0	159.9	3 45.5	–60.0	160.0	2 49.1	–60.0	160.0	1 52.8	–60.0	160.0	0 56.4	–60.0	160.0	0 00.0	+60.0	20.0	**0**
1	5 34.6	–59.9	159.9	4 38.3	–60.0	159.9	3 41.9	–60.0	160.0	2 45.5	–60.0	160.0	1 49.1	–59.9	160.0	0 52.8	–60.0	160.0	0 03.6	+60.0	20.0	1 00.0	+60.0	20.0	**1**
2	4 34.7	–60.0	159.9	3 38.3	–60.0	160.0	2 41.9	–60.0	160.0	1 45.5	–59.9	160.0	0 49.2	–60.0	160.0	0 07.2	+60.0	20.0	1 03.6	+60.0	20.0	2 00.0	+60.0	20.0	**2**
3	3 34.7	–59.9	160.0	2 38.3	–59.9	160.0	1 41.9	–59.9	160.0	0 45.6	–60.0	160.0	0 10.8	+60.0	20.0	1 07.2	+60.0	20.0	2 03.6	+60.0	20.0	3 00.0	+60.0	20.0	**3**
4	2 34.8	–60.0	160.0	1 38.4	–60.0	160.0	0 42.0	–60.0	160.0	0 14.4	+60.0	19.9	1 10.8	+60.0	20.0	2 07.2	+60.0	20.0	3 03.6	+60.0	20.0	4 00.0	+60.0	20.0	**4**
5	1 34.8	–59.9	160.1	0 38.4	–60.0	160.1	0 18.0	+60.0	19.9	1 14.4	+60.0	19.9	2 10.8	+60.0	19.9	3 07.2	+60.0	20.0	4 03.6	+60.0	20.0	5 00.0	+60.0	20.0	**5**
6	0 34.9	–60.0	160.1	0 21.6	+59.9	19.9	1 18.0	+59.9	19.9	2 14.4	+60.0	19.9	3 10.8	+60.0	19.9	4 07.2	+60.0	19.9	5 03.6	+60.0	20.0	6 00.0	+60.0	20.0	**6**
7	0 25.1	+59.9	19.8	1 21.5	+60.0	19.9	2 17.9	+60.0	19.9	3 14.4	+60.0	19.9	4 10.8	+60.0	19.9	5 07.2	+60.0	19.9	6 03.6	+60.0	20.0	7 00.0	+60.0	20.0	**7**
8	1 25.0	+60.0	19.8	2 21.5	+59.9	19.8	3 17.9	+60.0	19.8	4 14.4	+59.9	19.9	5 10.8	+60.0	19.9	6 07.2	+60.0	19.9	7 03.6	+60.0	20.0	8 00.0	+60.0	20.0	**8**
9	2 25.0	+59.9	19.8	3 21.4	+60.0	19.8	4 17.9	+60.0	19.8	5 14.3	+60.0	19.8	6 10.8	+60.0	19.9	7 07.2	+60.0	19.9	8 03.6	+60.0	19.9	9 00.0	+60.0	20.0	**9**
10	3 24.9	+60.0	19.7	4 21.4	+60.0	19.7	5 17.9	+59.9	19.8	6 14.3	+60.0	19.8	7 10.8	+60.0	19.8	8 07.2	+60.0	19.9	9 03.6	+60.0	19.9	10 00.0	+60.0	20.0	**10**
11	4 24.9	+59.9	19.7	5 21.4	+59.9	19.7	6 17.8	+60.0	19.7	7 14.3	+60.0	19.8	8 10.8	+59.9	19.8	9 07.2	+60.0	19.9	10 03.6	+60.0	19.9	11 00.0	+60.0	20.0	**11**
12	5 24.8	+60.0	19.6	6 21.3	+60.0	19.7	7 17.8	+60.0	19.7	8 14.3	+60.0	19.8	9 10.7	+60.0	19.8	10 07.2	+60.0	19.9	11 03.6	+60.0	19.9	12 00.0	+60.0	20.0	**12**
13	6 24.8	+59.9	19.6	7 21.3	+59.9	19.6	8 17.8	+60.0	19.7	9 14.3	+60.0	19.7	10 10.7	+60.0	19.8	11 07.2	+60.0	19.9	12 03.6	+60.0	19.9	13 00.0	+60.0	20.0	**13**
14	7 24.7	+60.0	19.6	8 21.2	+60.0	19.6	9 17.8	+59.9	19.7	10 14.3	+59.9	19.7	11 10.7	+60.0	19.8	12 07.2	+60.0	19.8	13 03.6	+60.0	19.9	14 00.0	+60.0	20.0	**14**
15	8 24.7	+59.9	19.5	9 21.2	+60.0	19.6	10 17.7	+60.0	19.6	11 14.2	+60.0	19.7	12 10.7	+60.0	19.8	13 07.2	+60.0	19.8	14 03.6	+60.0	19.9	15 00.0	+60.0	20.0	**15**
16	9 24.6	+60.0	19.5	10 21.2	+59.9	19.5	11 17.7	+60.0	19.6	12 14.2	+60.0	19.7	13 10.7	+60.0	19.7	14 07.2	+60.0	19.8	15 03.6	+60.0	19.9	16 00.0	+60.0	20.0	**16**
17	10 24.6	+59.9	19.4	11 21.1	+60.0	19.5	12 17.7	+59.9	19.6	13 14.2	+60.0	19.6	14 10.7	+60.0	19.7	15 07.2	+60.0	19.8	16 03.6	+60.0	19.9	17 00.0	+60.0	20.0	**17**
18	11 24.5	+59.9	19.4	12 21.1	+59.9	19.5	13 17.6	+60.0	19.5	14 14.2	+60.0	19.6	15 10.7	+60.0	19.7	16 07.2	+60.0	19.8	17 03.6	+60.0	19.9	18 00.0	+60.0	20.0	**18**
19	12 24.4	+60.0	19.3	13 21.0	+60.0	19.4	14 17.6	+60.0	19.5	15 14.2	+59.9	19.6	16 10.7	+60.0	19.7	17 07.2	+60.0	19.8	18 03.6	+60.0	19.9	19 00.0	+60.0	20.0	**19**
20	13 24.4	+59.9	19.3	14 21.0	+60.0	19.4	15 17.6	+60.0	19.5	16 14.1	+60.0	19.6	17 10.7	+60.0	19.7	18 07.2	+59.9	19.8	19 03.6	+60.0	19.9	20 00.0	+60.0	20.0	**20**
21	14 24.3	+60.0	19.2	15 21.0	+59.9	19.3	16 17.6	+59.9	19.4	17 14.1	+60.0	19.5	18 10.7	+59.9	19.6	19 07.1	+60.0	19.8	20 03.6	+60.0	19.9	21 00.0	+60.0	20.0	**21**
22	15 24.3	+59.9	19.2	16 20.9	+60.0	19.3	17 17.5	+60.0	19.4	18 14.1	+60.0	19.5	19 10.6	+60.0	19.6	20 07.1	+60.0	19.7	21 03.6	+60.0	19.9	22 00.0	+60.0	20.0	**22**
23	16 24.2	+60.0	19.2	17 20.9	+59.9	19.3	18 17.5	+60.0	19.4	19 14.1	+60.0	19.5	20 10.6	+60.0	19.6	21 07.1	+60.0	19.7	22 03.6	+60.0	19.9	23 00.0	+60.0	20.0	**23**
24	17 24.2	+59.9	19.1	18 20.8	+60.0	19.2	19 17.5	+59.9	19.3	20 14.1	+60.0	19.5	21 10.6	+60.0	19.6	22 07.1	+60.0	19.7	23 03.6	+60.0	19.9	24 00.0	+60.0	20.0	**24**
25	18 24.1	+59.9	19.1	19 20.8	+60.0	19.2	20 17.4	+60.0	19.3	21 14.1	+59.9	19.4	22 10.6	+60.0	19.6	23 07.1	+60.0	19.7	24 03.6	+60.0	19.8	25 00.0	+60.0	20.0	**25**
26	19 24.0	+60.0	19.0	20 20.8	+59.9	19.1	21 17.4	+60.0	19.3	22 14.0	+60.0	19.4	23 10.6	+60.0	19.5	24 07.1	+60.0	19.7	25 03.6	+60.0	19.8	26 00.0	+60.0	20.0	**26**
27	20 24.0	+59.9	19.0	21 20.7	+60.0	19.1	22 17.4	+60.0	19.2	23 14.0	+60.0	19.4	24 10.6	+60.0	19.5	25 07.1	+60.0	19.7	26 03.6	+60.0	19.8	27 00.0	+60.0	20.0	**27**
28	21 23.9	+60.0	18.9	22 20.7	+59.9	19.1	23 17.4	+59.9	19.2	24 14.0	+60.0	19.3	25 10.6	+60.0	19.5	26 07.1	+60.0	19.7	27 03.6	+60.0	19.8	28 00.0	+60.0	20.0	**28**
29	22 23.9	+59.9	18.9	23 20.6	+60.0	19.0	24 17.3	+60.0	19.2	25 14.0	+59.9	19.3	26 10.6	+60.0	19.5	27 07.1	+60.0	19.6	28 03.6	+60.0	19.8	29 00.0	+60.0	20.0	**29**
30	23 23.8	+59.9	18.8	24 20.6	+59.9	19.0	25 17.3	+60.0	19.1	26 13.9	+60.0	19.3	27 10.6	+59.9	19.4	28 07.1	+60.0	19.6	29 03.6	+60.0	19.8	30 00.0	+60.0	20.0	**30**
31	24 23.7	+60.0	18.8	25 20.5	+60.0	18.9	26 17.3	+59.9	19.1	27 13.9	+60.0	19.3	28 10.5	+60.0	19.4	29 07.1	+60.0	19.6	30 03.6	+60.0	19.8	31 00.0	+60.0	20.0	**31**
32	25 23.7	+59.9	18.7	26 20.5	+59.9	18.9	27 17.2	+60.0	19.0	28 13.9	+60.0	19.2	29 10.5	+60.0	19.4	30 07.1	+60.0	19.6	31 03.6	+60.0	19.8	32 00.0	+60.0	20.0	**32**
33	26 23.6	+60.0	18.7	27 20.4	+60.0	18.8	28 17.2	+60.0	19.0	29 13.9	+60.0	19.2	30 10.5	+60.0	19.4	31 07.1	+60.0	19.6	32 03.6	+60.0	19.8	33 00.0	+60.0	20.0	**33**
34	27 23.6	+59.9	18.6	28 20.4	+59.9	18.8	29 17.2	+59.9	19.0	30 13.9	+59.9	19.2	31 10.5	+60.0	19.4	32 07.1	+60.0	19.6	33 03.6	+60.0	19.8	34 00.0	+60.0	20.0	**34**
35	28 23.5	+59.9	18.6	29 20.3	+60.0	18.7	30 17.1	+60.0	18.9	31 13.8	+60.0	19.1	32 10.5	+60.0	19.3	33 07.1	+60.0	19.5	34 03.6	+60.0	19.8	35 00.0	+60.0	20.0	**35**
36	29 23.4	+59.9	18.5	30 20.3	+59.9	18.7	31 17.1	+59.9	18.9	32 13.8	+60.0	19.1	33 10.5	+60.0	19.3	34 07.1	+60.0	19.5	35 03.6	+60.0	19.8	36 00.0	+60.0	20.0	**36**
37	30 23.3	+60.0	18.5	31 20.2	+60.0	18.7	32 17.0	+60.0	18.9	33 13.8	+60.0	19.1	34 10.5	+59.9	19.3	35 07.1	+60.0	19.5	36 03.6	+60.0	19.7	37 00.0	+60.0	20.0	**37**
38	31 23.3	+59.9	18.4	32 20.2	+59.9	18.6	33 17.0	+60.0	18.8	34 13.8	+59.9	19.0	35 10.4	+60.0	19.3	36 07.1	+59.9	19.5	37 03.6	+60.0	19.7	38 00.0	+60.0	20.0	**38**
39	32 23.2	+59.9	18.3	33 20.1	+60.0	18.6	34 17.0	+59.9	18.8	35 13.7	+60.0	19.0	36 10.4	+60.0	19.2	37 07.0	+60.0	19.5	38 03.6	+60.0	19.7	39 00.0	+60.0	20.0	**39**
40	33 23.1	+60.0	18.3	34 20.1	+59.9	18.5	35 16.9	+60.0	18.7	36 13.7	+60.0	19.0	37 10.4	+60.0	19.2	38 07.0	+60.0	19.5	39 03.6	+60.0	19.7	40 00.0	+60.0	20.0	**40**
41	34 23.1	+59.9	18.2	35 20.0	+59.9	18.4	36 16.9	+59.9	18.7	37 13.7	+60.0	18.9	38 10.4	+60.0	19.2	39 07.0	+60.0	19.4	40 03.6	+60.0	19.7	41 00.0	+60.0	20.0	**41**
42	35 23.0	+59.9	18.2	36 19.9	+60.0	18.4	37 16.8	+60.0	18.6	38 13.7	+59.9	18.9	39 10.4	+60.0	19.1	40 07.0	+60.0	19.4	41 03.6	+60.0	19.7	42 00.0	+60.0	20.0	**42**
43	36 22.9	+59.9	18.1	37 19.9	+59.9	18.3	38 16.8	+60.0	18.6	39 13.6	+60.0	18.8	40 10.4	+60.0	19.1	41 07.0	+60.0	19.4	42 03.6	+60.0	19.7	43 00.0	+60.0	20.0	**43**
44	37 22.8	+59.9	18.0	38 19.8	+60.0	18.3	39 16.8	+59.9	18.5	40 13.6	+60.0	18.8	41 10.4	+59.9	19.1	42 07.0	+60.0	19.4	43 03.6	+60.0	19.7	44 00.0	+60.0	20.0	**44**
45	38 22.7	+59.9	18.0	39 19.8	+59.9	18.2	40 16.7	+60.0	18.5	41 13.6	+59.9	18.8	42 10.3	+60.0	19.0	43 07.0	+60.0	19.3	44 03.6	+60.0	19.7	45 00.0	+60.0	20.0	**45**
46	39 22.6	+60.0	17.9	40 19.7	+59.9	18.2	41 16.7	+59.9	18.4	42 13.5	+60.0	18.7	43 10.3	+60.0	19.0	44 07.0	+60.0	19.3	45 03.6	+60.0	19.7	46 00.0	+60.0	20.0	**46**
47	40 22.6	+59.9	17.8	41 19.6	+60.0	18.1	42 16.6	+60.0	18.4	43 13.5	+60.0	18.7	44 10.3	+60.0	19.0	45 07.0	+60.0	19.3	46 03.6	+60.0	19.6	47 00.0	+60.0	20.0	**47**
48	41 22.5	+59.9	17.8	42 19.6	+59.9	18.0	43 16.6	+59.9	18.3	44 13.5	+59.9	18.6	45 10.3	+60.0	18.9	46 07.0	+60.0	19.3	47 03.6	+59.9	19.6	48 00.0	+60.0	20.0	**48**
49	42 22.4	+59.9	17.7	43 19.5	+59.9	18.0	44 16.5	+60.0	18.3	45 13.4	+60.0	18.6	46 10.3	+59.9	18.9	47 07.0	+60.0	19.3	48 03.5	+60.0	19.6	49 00.0	+60.0	20.0	**49**
50	43 22.3	+59.9	17.6	44 19.4	+59.9	17.9	45 16.5	+59.9	18.2	46 13.4	+60.0	18.5	47 10.2	+60.0	18.9	48 07.0	+59.9	19.2	49 03.5	+60.0	19.6	50 00.0	+60.0	20.0	**50**
51	44 22.2	+59.9	17.5	45 19.3	+60.0	17.8	46 16.4	+60.0	18.1	47 13.4	+59.9	18.5	48 10.2	+60.0	18.8	49 06.9	+60.0	19.2	50 03.5	+60.0	19.6	51 00.0	+60.0	20.0	**51**
52	45 22.1	+59.9	17.4	46 19.3	+59.9	17.8	47 16.4	+59.9	18.1	48 13.3	+60.0	18.4	49 10.2	+60.0	18.8	50 06.9	+60.0	19.2	51 03.5	+60.0	19.6	52 00.0	+60.0	20.0	**52**
53	46 22.0	+59.9	17.4	47 19.2	+59.9	17.7	48 16.3	+59.9	18.0	49 13.3	+60.0	18.4	50 10.2	+60.0	18.7	51 06.9	+60.0	19.1	52 03.5	+60.0	19.6	53 00.0	+60.0	20.0	**53**
54	47 21.9	+59.8	17.3	48 19.1	+59.9	17.6	49 16.2	+60.0	17.9	50 13.3	+59.9	18.3	51 10.2	+59.9	18.7	52 06.9	+60.0	19.1	53 03.5	+60.0	19.5	54 00.0	+60.0	20.0	**54**
55	48 21.7	+59.9	17.2	49 19.0	+59.9	17.5	50 16.2	+59.9	17.9	51 13.2	+60.0	18.3	52 10.1	+60.0	18.7	53 06.9	+60.0	19.1	54 03.5	+60.0	19.5	55 00.0	+60.0	20.0	**55**
56	49 21.6	+59.9	17.1	50 18.9	+59.9	17.4	51 16.1	+59.9	17.8	52 13.2	+59.9	18.2	53 10.1	+60.0	18.6	54 06.9	+60.0	19.0	55 03.5	+60.0	19.5	56 00.0	+60.0	20.0	**56**
57	50 21.5	+59.9	17.0	51 18.8	+59.9	17.3	52 16.0	+60.0	17.7	53 13.1	+60.0	18.1	54 10.1	+59.9	18.6	55 06.9	+60.0	19.0	56 03.5	+60.0	19.5	57 00.0	+60.0	20.0	**57**
58	51 21.4	+59.8	16.9	52 18.7	+59.9	17.2	53 16.0	+59.9	17.6	54 13.1	+59.9	18.1	55 10.0	+60.0	18.5	56 06.9	+60.0	19.0	57 03.5	+60.0	19.5	58 00.0	+60.0	20.0	**58**
59	52 21.2	+59.9	16.8	53 18.6	+59.9	17.1	54 15.9	+59.9	17.6	55 13.0	+60.0	18.0	56 10.0	+60.0	18.4	57 06.9	+59.9	18.9	58 03.5	+60.0	19.4	59 00.0	+60.0	20.0	**59**
60	53 21.1	+59.8	16.6	54 18.5	+59.9	17.0	55 15.8	+59.9	17.5	56 13.0	+59.9	17.9	57 10.0	+59.9	18.4	58 06.8	+60.0	18.9	59 03.5	+60.0	19.4	60 00.0	+60.0	20.0	**60**
61	54 20.9	+59.9	16.5	55 18.4	+59.9	16.9	56 15.7	+59.9	17.4	57 12.9	+60.0	17.8	58 09.9	+60.0	18.3	59 06.8	+60.0	18.8	60 03.5	+60.0	19.4	61 00.0	+60.0	20.0	**61**
62	55 20.8	+59.8	16.4	56 18.3	+59.8	16.8	57 15.6	+59.9	17.3	58 12.9	+59.9	17.7	59 09.9	+60.0	18.3	60 06.8	+60.0	18.8	61 03.5	+60.0	19.4	62 00.0	+60.0	20.0	**62**
63	56 20.6	+59.8	16.3	57 18.1	+59.9	16.7	58 15.5	+59.9	17.2	59 12.8	+59.9	17.7	60 09.9	+59.9	18.2	61 06.8	+60.0	18.7	62 03.5	+60.0	19.4	63 00.0	+60.0	20.0	**63**
64	57 20.4	+59.8	16.1	58 18.0	+59.9	16.6	59 15.4	+59.9	17.1	60 12.7	+59.9	17.6	61 09.8	+60.0	18.1	62 06.8	+59.9	18.7	63 03.5	+60.0	19.3	64 00.0	+60.0	20.0	**64**
65	58 20.2	+59.9	16.0	59 17.9	+59.8	16.4	60 15.3	+59.9	16.9	61 12.6	+60.0	17.5	62 09.8	+59.9	18.0	63 06.7	+60.0	18.6	64 03.5	+60.0	19.3	65 00.0	+60.0	20.0	**65**
66	59 20.1	+59.7	15.8	60 17.7	+59.8	16.3	61 15.2	+59.9	16.8	62 12.6	+59.9	17.4	63 09.7	+60.0	17.9	64 06.7	+60.0	18.6	65 03.5	+60.0	19.3	66 00.0	+60.0	20.0	**66**
67	60 19.8	+59.8	15.7	61 17.5	+59.9	16.2	62 15.1	+59.9	16.7	63 12.5	+59.9	17.2	64 09.7	+59.9	17.9	65 06.7	+60.0	18.5	66 03.5	+60.0	19.2	67 00.0	+60.0	20.0	**67**
68	61 19.6	+59.8	15.5	62 17.4	+59.8	16.0	63 15.0	+59.8	16.5	64 12.4	+59.9	17.1	65 09.6	+60.0	17.8	66 06.7	+60.0	18.4	67 03.5	+60.0	19.2	68 00.0	+60.0	20.0	**68**
69	62 19.4	+59.7	15.3	63 17.2	+59.8	15.8	64 14.8	+59.9	16.4	65 12.3	+59.9	17.0	66 09.6	+59.9	17.7	67 06.7	+59.9	18.4	68 03.5	+60.0	19.1	69 00.0	+60.0	20.0	**69**
70	63 19.1	+59.8	15.1	64 17.0	+59.8	15.6	65 14.7	+59.8	16.2	66 12.2	+59.9	16.9	67 09.5	+60.0	17.5	68 06.6	+60.0	18.3	69 03.5	+59.9	19.1	70 00.0	+60.0	20.0	**70**
71	64 18.9	+59.7	14.9	65 16.8	+59.8	15.4	66 14.5	+59.9	16.0	67 12.1	+59.9	16.7	68 09.5	+59.9	17.4	69 06.6	+60.0	18.2	70 03.4	+60.0	19.1	71 00.0	+60.0	20.0	**71**
72	65 18.6	+59.7	14.7	66 16.6	+59.7	15.2	67 14.4	+59.8	15.9	68 12.0	+59.9	16.5	69 09.4	+59.9	17.3	70 06.6	+59.9	18.1	71 03.4	+60.0	19.0	72 00.0	+60.0	20.0	**72**
73	66 18.3	+59.6	14.4	67 16.3	+59.7	15.0	68 14.2	+59.8	15.6	69 11.9	+59.8	16.4	70 09.3	+59.9	17.1	71 06.5	+60.0	18.0	72 03.4	+60.0	18.9	73 00.0	+60.0	20.0	**73**
74	67 17.9	+59.7	14.1	68 16.0	+59.7	14.8	69 14.0	+59.7	15.4	70 11.7	+59.9	16.2	71 09.2	+59.9	17.0	72 06.5	+59.9	17.9	73 03.4	+60.0	18.9	74 00.0	+60.0	20.0	**74**
75	68 17.6	+59.6	13.8	69 15.7	+59.7	14.5	70 13.7	+59.8	15.2	71 11.6	+59.8	15.9	72 09.1	+59.9	16.8	73 06.4	+60.0	17.7	74 03.4	+60.0	18.8	75 00.0	+60.0	20.0	**75**
76	69 17.2	+59.5	13.5	70 15.4	+59.7	14.2	71 13.5	+59.7	14.9	72 11.4	+59.8	15.7	73 09.0	+59.9	16.6	74 06.4	+59.9	17.6	75 03.4	+60.0	18.7	76 00.0	+60.0	20.0	**76**
77	70 16.7	+59.5	13.2	71 15.1	+59.6	13.8	72 13.2	+59.7	14.6	73 11.2	+59.8	15.4	74 08.9	+59.9	16.4	75 06.3	+59.9	17.4	76 03.4	+60.0	18.6	77 00.0	+60.0	20.0	**77**
78	71 16.2	+59.5	12.8	72 14.7	+59.5	13.5	73 12.9	+59.7	14.3	74 11.0	+59.7	15.1	75 08.8	+59.8	16.1	76 06.2	+60.0	17.2	77 03.4	+59.9	18.5	78 00.0	+60.0	20.0	**78**
79	72 15.7	+59.4	12.4	73 14.2	+59.5	13.1	74 12.6	+59.6	13.9	75 10.7	+59.7	14.8	76 08.6	+59.8	15.8	77 06.2	+59.9	17.0	78 03.3	+60.0	18.4	79 00.0	+60.0	20.0	**79**
80	73 15.1	+59.3	11.9	74 13.7	+59.5	12.6	75 12.2	+59.6	13.4	76 10.4	+59.7	14.4	77 08.4	+59.8	15.5	78 06.1	+59.9	16.7	79 03.3	+60.0	18.2	80 00.0	+60.0	20.0	**80**
81	74 14.4	+59.3	11.4	75 13.2	+59.4	12.1	76 11.8	+59.5	13.0	77 10.1	+59.6	13.9	78 08.2	+59.8	15.1	79 06.0	+59.8	16.4	80 03.3	+59.9	18.0	81 00.0	+60.0	20.0	**81**
82	75 13.7	+59.1	10.8	76 12.6	+59.2	11.5	77 11.3	+59.4	12.4	78 09.7	+59.6	13.4	79 08.0	+59.7	14.6	80 05.8	+59.9	16.1	81 03.2	+60.0	17.8	82 00.0	+60.0	20.0	**82**
83	76 12.8	+59.0	10.1	77 11.8	+59.2	10.8	78 10.7	+59.3	11.7	79 09.3	+59.5	12.8	80 07.7	+59.6	14.1	81 05.7	+59.8	15.6	82 03.2	+59.9	17.5	83 00.0	+60.0	20.0	**83**
84	77 11.8	+58.9	9.3	78 11.0	+59.0	10.1	79 10.0	+59.1	11.0	80 08.8	+59.3	12.1	81 07.3	+59.5	13.4	82 05.5	+59.7	15.1	83 03.1	+59.9	17.2	84 00.0	+60.0	20.0	**84**
85	78 10.7	+58.6	8.4	79 10.0	+58.8	9.1	80 09.1	+59.0	10.0	81 08.1	+59.2	11.2	82 06.8	+59.5	12.5	83 05.2	+59.7	14.3	84 03.0	+59.9	16.7	85 00.0	+60.0	20.0	**85**
86	79 09.3	+58.4	7.3	80 08.8	+58.5	8.0	81 08.1	+58.7	8.9	82 07.3	+59.0	10.0	83 06.3	+59.2	11.5	84 04.9	+59.5	13.4	85 02.9	+59.8	16.0	86 00.0	+60.0	20.0	**86**
87	80 07.7	+58.0	6.0	81 07.3	+58.2	6.7	82 06.8	+58.4	7.5	83 06.3	+58.6	8.6	84 05.5	+58.9	10.0	85 04.4	+59.2	12.0	86 02.7	+59.7	15.0	87 00.0	+60.0	20.0	**87**
88	81 05.7	+57.5	4.4	82 05.5	+57.6	5.0	83 05.2	+57.8	5.7	84 04.9	+58.0	6.6	85 04.4	+58.3	8.0	86 03.6	+58.8	10.0	87 02.4	+59.4	13.4	88 00.0	+60.0	20.0	**88**
89	82 03.2	+56.8	2.5	83 03.1	+56.9	2.8	84 03.0	+57.0	3.3	85 02.9	+57.1	4.0	86 02.7	+57.3	5.0	87 02.4	*+57.6* •	6.6	88 01.8	*+58.2* •	10.0	89 00.0	+60.0	20.0	**89**
90	83 00.0	+55.8	0.0	84 00.0	+55.7	0.0	85 00.0	*+55.5* •	0.0	86 00.0	*+55.2* •	0.0	87 00.0	*+54.7* •	0.0	88 00.0	*+53.2* •	0.0	89 00.0	*+39.2* •	0.0	90 00.0	–60.0	10.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

21°, 339° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 32.0	+59.9	158.9	5 36.0	+60.0	158.9	4 40.0	+60.0	158.9	3 44.0	+60.0	159.0	2 48.0	+60.0	159.0	1 52.0	+60.0	159.0	0 56.0	+60.0	159.0	0 00.0	+60.0	159.0	**0**
1	7 31.9	+60.0	158.8	6 36.0	+59.9	158.9	5 40.0	+60.0	158.9	4 44.0	+60.0	158.9	3 48.0	+60.0	159.0	2 52.0	+60.0	159.0	1 56.0	+60.0	159.0	1 00.0	+60.0	159.0	**1**
2	8 31.9	+59.9	158.8	7 35.9	+60.0	158.8	6 40.0	+59.9	158.9	5 44.0	+60.0	158.9	4 48.0	+60.0	158.9	3 52.0	+60.0	159.0	2 56.0	+60.0	159.0	2 00.0	+60.0	159.0	**2**
3	9 31.8	+59.9	158.7	8 35.9	+59.9	158.8	7 39.9	+60.0	158.8	6 44.0	+60.0	158.9	5 48.0	+60.0	158.9	4 52.0	+60.0	159.0	3 56.0	+60.0	159.0	3 00.0	+60.0	159.0	**3**
4	10 31.7	+60.0	158.7	9 35.8	+60.0	158.7	8 39.9	+60.0	158.8	7 44.0	+59.9	158.9	6 48.0	+60.0	158.9	5 52.0	+60.0	158.9	4 56.0	+60.0	159.0	4 00.0	+60.0	159.0	**4**
5	11 31.7	+59.9	158.6	10 35.8	+60.0	158.7	9 39.9	+59.9	158.8	8 43.9	+60.0	158.8	7 48.0	+60.0	158.9	6 52.0	+60.0	158.9	5 56.0	+60.0	159.0	5 00.0	+60.0	159.0	**5**
6	12 31.6	+60.0	158.6	11 35.8	+59.9	158.7	10 39.8	+60.0	158.7	9 43.9	+60.0	158.8	8 48.0	+60.0	158.9	7 52.0	+60.0	158.9	6 56.0	+60.0	159.0	6 00.0	+60.0	159.0	**6**
7	13 31.6	+59.9	158.5	12 35.7	+60.0	158.6	11 39.8	+60.0	158.7	10 43.9	+60.0	158.8	9 48.0	+59.9	158.8	8 52.0	+60.0	158.9	7 56.0	+60.0	159.0	7 00.0	+60.0	159.0	**7**
8	14 31.5	+59.9	158.5	13 35.7	+59.9	158.6	12 39.8	+60.0	158.7	11 43.9	+60.0	158.7	10 47.9	+60.0	158.8	9 52.0	+60.0	158.9	8 56.0	+60.0	158.9	8 00.0	+60.0	159.0	**8**
9	15 31.4	+60.0	158.4	14 35.6	+60.0	158.5	13 39.8	+59.9	158.6	12 43.9	+59.9	158.7	11 47.9	+60.0	158.8	10 52.0	+60.0	158.9	9 56.0	+60.0	158.9	9 00.0	+60.0	159.0	**9**
10	16 31.4	+59.9	158.4	15 35.6	+59.9	158.5	14 39.7	+60.0	158.6	13 43.8	+60.0	158.7	12 47.9	+60.0	158.8	11 52.0	+60.0	158.9	10 56.0	+60.0	158.9	10 00.0	+60.0	159.0	**10**
11	17 31.3	+60.0	158.4	16 35.5	+60.0	158.5	15 39.7	+60.0	158.6	14 43.8	+60.0	158.7	13 47.9	+60.0	158.8	12 52.0	+60.0	158.8	11 56.0	+60.0	158.9	11 00.0	+60.0	159.0	**11**
12	18 31.3	+59.9	158.3	17 35.5	+59.9	158.4	16 39.7	+59.9	158.5	15 43.8	+60.0	158.6	14 47.9	+60.0	158.7	13 52.0	+60.0	158.8	12 56.0	+60.0	158.9	12 00.0	+60.0	159.0	**12**
13	19 31.2	+59.9	158.3	18 35.4	+60.0	158.4	17 39.6	+60.0	158.5	16 43.8	+60.0	158.6	15 47.9	+60.0	158.7	14 52.0	+60.0	158.8	13 56.0	+60.0	158.9	13 00.0	+60.0	159.0	**13**
14	20 31.1	+60.0	158.2	19 35.4	+59.9	158.3	18 39.6	+60.0	158.5	17 43.8	+59.9	158.6	16 47.9	+60.0	158.7	15 52.0	+60.0	158.8	14 56.0	+60.0	158.9	14 00.0	+60.0	159.0	**14**
15	21 31.1	+59.9	158.2	20 35.3	+60.0	158.3	19 39.6	+59.9	158.4	18 43.7	+60.0	158.6	17 47.9	+60.0	158.7	16 52.0	+59.9	158.8	15 56.0	+60.0	158.9	15 00.0	+60.0	159.0	**15**
16	22 31.0	+59.9	158.1	21 35.3	+59.9	158.3	20 39.5	+60.0	158.4	19 43.7	+60.0	158.5	18 47.9	+59.9	158.7	17 51.9	+60.0	158.8	16 56.0	+60.0	158.9	16 00.0	+60.0	159.0	**16**
17	23 30.9	+60.0	158.1	22 35.2	+60.0	158.2	21 39.5	+60.0	158.4	20 43.7	+60.0	158.5	19 47.8	+60.0	158.6	18 51.9	+60.0	158.8	17 56.0	+60.0	158.9	17 00.0	+60.0	159.0	**17**
18	24 30.9	+59.9	158.0	23 35.2	+59.9	158.2	22 39.5	+59.9	158.3	21 43.7	+60.0	158.5	20 47.8	+60.0	158.6	19 51.9	+60.0	158.8	18 56.0	+60.0	158.9	18 00.0	+60.0	159.0	**18**
19	25 30.8	+59.9	157.9	24 35.1	+60.0	158.1	23 39.4	+60.0	158.3	22 43.7	+59.9	158.4	21 47.8	+60.0	158.6	20 51.9	+60.0	158.7	19 56.0	+60.0	158.9	19 00.0	+60.0	159.0	**19**
20	26 30.7	+59.9	157.9	25 35.1	+59.9	158.1	24 39.4	+60.0	158.3	23 43.6	+60.0	158.4	22 47.8	+60.0	158.6	21 51.9	+60.0	158.7	20 56.0	+60.0	158.9	20 00.0	+60.0	159.0	**20**
21	27 30.6	+60.0	157.8	26 35.0	+60.0	158.0	25 39.4	+59.9	158.2	24 43.6	+60.0	158.4	23 47.8	+60.0	158.6	22 51.9	+60.0	158.7	21 56.0	+60.0	158.9	21 00.0	+60.0	159.0	**21**
22	28 30.6	+59.9	157.8	27 35.0	+59.9	158.0	26 39.3	+60.0	158.2	25 43.6	+60.0	158.4	24 47.8	+60.0	158.5	23 51.9	+60.0	158.7	22 56.0	+60.0	158.9	22 00.0	+60.0	159.0	**22**
23	29 30.5	+59.9	157.7	28 34.9	+60.0	157.9	27 39.3	+59.9	158.1	26 43.6	+59.9	158.3	25 47.8	+60.0	158.5	24 51.9	+60.0	158.7	23 56.0	+60.0	158.8	23 00.0	+60.0	159.0	**23**
24	30 30.4	+59.9	157.7	29 34.9	+59.9	157.9	28 39.2	+60.0	158.1	27 43.5	+60.0	158.3	26 47.8	+59.9	158.5	25 51.9	+60.0	158.7	24 56.0	+60.0	158.8	24 00.0	+60.0	159.0	**24**
25	31 30.3	+60.0	157.6	30 34.8	+60.0	157.8	29 39.2	+60.0	158.1	28 43.5	+60.0	158.3	27 47.7	+60.0	158.5	26 51.9	+60.0	158.6	25 56.0	+60.0	158.8	25 00.0	+60.0	159.0	**25**
26	32 30.3	+59.9	157.5	31 34.8	+59.9	157.8	30 39.2	+59.9	158.0	29 43.5	+60.0	158.2	28 47.7	+60.0	158.4	27 51.9	+60.0	158.6	26 56.0	+60.0	158.8	26 00.0	+60.0	159.0	**26**
27	33 30.2	+59.9	157.5	32 34.7	+59.9	157.7	31 39.1	+60.0	158.0	30 43.5	+59.9	158.2	29 47.7	+60.0	158.4	28 51.9	+60.0	158.6	27 56.0	+60.0	158.8	27 00.0	+60.0	159.0	**27**
28	34 30.1	+59.9	157.4	33 34.6	+60.0	157.7	32 39.1	+59.9	157.9	31 43.4	+60.0	158.2	30 47.7	+60.0	158.4	29 51.9	+60.0	158.6	28 56.0	+60.0	158.8	28 00.0	+60.0	159.0	**28**
29	35 30.0	+59.9	157.4	34 34.6	+59.9	157.6	33 39.0	+60.0	157.9	32 43.4	+60.0	158.1	31 47.7	+60.0	158.4	30 51.9	+60.0	158.6	29 56.0	+60.0	158.8	29 00.0	+60.0	159.0	**29**
30	36 29.9	+59.9	157.3	35 34.5	+60.0	157.6	34 39.0	+60.0	157.8	33 43.4	+60.0	158.1	32 47.7	+60.0	158.3	31 51.9	+60.0	158.6	30 56.0	+60.0	158.8	30 00.0	+60.0	159.0	**30**
31	37 29.8	+59.9	157.2	36 34.5	+59.9	157.5	35 39.0	+59.9	157.8	34 43.4	+59.9	158.1	33 47.7	+59.9	158.3	32 51.9	+60.0	158.5	31 56.0	+60.0	158.8	31 00.0	+60.0	159.0	**31**
32	38 29.7	+59.9	157.2	37 34.4	+59.9	157.5	36 38.9	+60.0	157.7	35 43.3	+60.0	158.0	34 47.6	+60.0	158.3	33 51.9	+59.9	158.5	32 56.0	+60.0	158.8	32 00.0	+60.0	159.0	**32**
33	39 29.6	+59.9	157.1	38 34.3	+60.0	157.4	37 38.9	+59.9	157.7	36 43.3	+60.0	158.0	35 47.6	+60.0	158.3	34 51.8	+60.0	158.5	33 56.0	+60.0	158.8	33 00.0	+60.0	159.0	**33**
34	40 29.5	+59.9	157.0	39 34.3	+59.9	157.3	38 38.8	+60.0	157.6	37 43.3	+59.9	157.9	36 47.6	+60.0	158.2	35 51.8	+60.0	158.5	34 56.0	+60.0	158.8	34 00.0	+60.0	159.0	**34**
35	41 29.4	+59.9	156.9	40 34.2	+59.9	157.3	39 38.8	+59.9	157.6	38 43.2	+60.0	157.9	37 47.6	+60.0	158.2	36 51.8	+60.0	158.5	35 56.0	+60.0	158.7	35 00.0	+60.0	159.0	**35**
36	42 29.3	+59.9	156.8	41 34.1	+59.9	157.2	40 38.7	+60.0	157.5	39 43.2	+60.0	157.9	38 47.6	+60.0	158.2	37 51.8	+60.0	158.5	36 56.0	+60.0	158.7	36 00.0	+60.0	159.0	**36**
37	43 29.2	+59.9	156.8	42 34.0	+59.9	157.1	41 38.7	+59.9	157.5	40 43.2	+59.9	157.8	39 47.6	+59.9	158.1	38 51.8	+60.0	158.4	37 56.0	+60.0	158.7	37 00.0	+60.0	159.0	**37**
38	44 29.1	+59.9	156.7	43 33.9	+60.0	157.1	42 38.6	+60.0	157.4	41 43.1	+60.0	157.8	40 47.5	+60.0	158.1	39 51.8	+60.0	158.4	38 56.0	+60.0	158.7	38 00.0	+60.0	159.0	**38**
39	45 29.0	+59.9	156.6	44 33.9	+59.9	157.0	43 38.6	+59.9	157.4	42 43.1	+60.0	157.7	41 47.5	+60.0	158.1	40 51.8	+60.0	158.4	39 56.0	+60.0	158.7	39 00.0	+60.0	159.0	**39**
40	46 28.9	+59.9	156.5	45 33.8	+59.9	156.9	44 38.5	+59.9	157.3	43 43.1	+59.9	157.7	42 47.5	+60.0	158.0	41 51.8	+60.0	158.4	40 56.0	+60.0	158.7	40 00.0	+60.0	159.0	**40**
41	47 28.8	+59.8	156.4	46 33.7	+59.9	156.8	45 38.4	+60.0	157.2	44 43.0	+60.0	157.6	43 47.5	+60.0	158.0	42 51.8	+60.0	158.3	41 56.0	+60.0	158.7	41 00.0	+60.0	159.0	**41**
42	48 28.6	+59.9	156.3	47 33.6	+59.9	156.8	46 38.4	+59.9	157.2	45 43.0	+60.0	157.6	44 47.5	+59.9	158.0	43 51.8	+60.0	158.3	42 56.0	+60.0	158.7	42 00.0	+60.0	159.0	**42**
43	49 28.5	+59.9	156.2	48 33.5	+59.9	156.7	47 38.3	+60.0	157.1	46 43.0	+59.9	157.5	45 47.4	+60.0	157.9	44 51.8	+60.0	158.3	43 56.0	+59.9	158.7	43 00.0	+60.0	159.0	**43**
44	50 28.4	+59.8	156.1	49 33.4	+59.9	156.6	48 38.3	+59.9	157.0	47 42.9	+60.0	157.5	46 47.4	+60.0	157.9	45 51.8	+59.9	158.3	44 55.9	+60.0	158.6	44 00.0	+60.0	159.0	**44**
45	51 28.2	+59.9	156.0	50 33.3	+59.9	156.5	49 38.2	+59.9	157.0	48 42.9	+59.9	157.4	47 47.4	+60.0	157.8	46 51.7	+60.0	158.2	45 55.9	+60.0	158.6	45 00.0	+60.0	159.0	**45**
46	52 28.1	+59.8	155.9	51 33.2	+59.9	156.4	50 38.1	+59.9	156.9	49 42.8	+60.0	157.4	48 47.4	+59.9	157.8	47 51.7	+60.0	158.2	46 55.9	+60.0	158.6	46 00.0	+60.0	159.0	**46**
47	53 27.9	+59.9	155.8	52 33.1	+59.9	156.3	51 38.0	+60.0	156.8	50 42.8	+59.9	157.3	49 47.3	+60.0	157.8	48 51.7	+60.0	158.2	47 55.9	+60.0	158.6	47 00.0	+60.0	159.0	**47**
48	54 27.8	+59.8	155.6	53 33.0	+59.9	156.2	52 38.0	+59.9	156.7	51 42.7	+60.0	157.2	50 47.3	+60.0	157.7	49 51.7	+60.0	158.2	48 55.9	+60.0	158.6	48 00.0	+60.0	159.0	**48**
49	55 27.6	+59.8	155.5	54 32.9	+59.8	156.1	53 37.9	+59.9	156.6	52 42.7	+59.9	157.2	51 47.3	+60.0	157.7	50 51.7	+60.0	158.1	49 55.9	+60.0	158.6	49 00.0	+60.0	159.0	**49**
50	56 27.4	+59.8	155.4	55 32.7	+59.9	156.0	54 37.8	+59.9	156.5	53 42.6	+60.0	157.1	52 47.3	+59.9	157.6	51 51.7	+60.0	158.1	50 55.9	+60.0	158.6	50 00.0	+60.0	159.0	**50**
51	57 27.2	+59.8	155.2	56 32.6	+59.8	155.9	55 37.7	+59.9	156.5	54 42.6	+59.9	157.0	53 47.2	+60.0	157.6	52 51.7	+60.0	158.1	51 55.9	+60.0	158.5	51 00.0	+60.0	159.0	**51**
52	58 27.0	+59.8	155.1	57 32.4	+59.9	155.7	56 37.6	+59.9	156.4	55 42.5	+60.0	156.9	54 47.2	+60.0	157.5	53 51.7	+60.0	158.0	52 55.9	+60.0	158.5	52 00.0	+60.0	159.0	**52**
53	59 26.8	+59.8	154.9	58 32.3	+59.8	155.6	57 37.5	+59.9	156.2	56 42.5	+59.9	156.9	55 47.2	+59.9	157.4	54 51.7	+59.9	158.0	53 55.9	+60.0	158.5	53 00.0	+60.0	159.0	**53**
54	60 26.6	+59.7	154.7	59 32.1	+59.9	155.5	58 37.4	+59.9	156.1	57 42.4	+59.9	156.8	56 47.1	+60.0	157.4	55 51.6	+60.0	158.0	54 55.9	+60.0	158.5	54 00.0	+60.0	159.0	**54**
55	61 26.3	+59.8	154.5	60 32.0	+59.8	155.3	59 37.3	+59.9	156.0	58 42.3	+60.0	156.7	57 47.1	+60.0	157.3	56 51.6	+60.0	157.9	55 55.9	+60.0	158.5	55 00.0	+60.0	159.0	**55**
56	62 26.1	+59.7	154.3	61 31.8	+59.8	155.1	60 37.2	+59.9	155.9	59 42.3	+59.9	156.6	58 47.1	+59.9	157.3	57 51.6	+60.0	157.9	56 55.9	+60.0	158.5	56 00.0	+60.0	159.0	**56**
57	63 25.8	+59.7	154.1	62 31.6	+59.8	155.0	61 37.1	+59.8	155.8	60 42.2	+59.9	156.5	59 47.0	+60.0	157.2	58 51.6	+60.0	157.8	57 55.9	+60.0	158.4	57 00.0	+60.0	159.0	**57**
58	64 25.5	+59.7	153.9	63 31.4	+59.8	154.8	62 36.9	+59.9	155.6	61 42.1	+59.9	156.4	60 47.0	+59.9	157.1	59 51.6	+60.0	157.8	58 55.9	+60.0	158.4	58 00.0	+60.0	159.0	**58**
59	65 25.2	+59.6	153.7	64 31.2	+59.7	154.6	63 36.8	+59.8	155.5	62 42.0	+59.9	156.3	61 46.9	+60.0	157.0	60 51.6	+59.9	157.7	59 55.9	+60.0	158.4	59 00.0	+60.0	159.0	**59**
60	66 24.8	+59.6	153.4	65 30.9	+59.8	154.4	64 36.6	+59.9	155.3	63 41.9	+59.9	156.1	62 46.9	+59.9	156.9	61 51.5	+60.0	157.7	60 55.9	+60.0	158.4	60 00.0	+60.0	159.0	**60**
61	67 24.4	+59.6	153.1	66 30.7	+59.7	154.2	65 36.5	+59.8	155.1	64 41.8	+59.9	156.0	63 46.8	+60.0	156.8	62 51.5	+60.0	157.6	61 55.9	+60.0	158.3	61 00.0	+60.0	159.0	**61**
62	68 24.0	+59.6	152.8	67 30.4	+59.7	153.9	66 36.3	+59.8	154.9	65 41.7	+59.9	155.9	64 46.8	+59.9	156.7	63 51.5	+60.0	157.6	62 55.9	+60.0	158.3	62 00.0	+60.0	159.0	**62**
63	69 23.6	+59.5	152.5	68 30.1	+59.7	153.6	67 36.1	+59.8	154.7	66 41.6	+59.9	155.7	65 46.7	+60.0	156.6	64 51.5	+59.9	157.5	63 55.9	+60.0	158.3	63 00.0	+60.0	159.0	**63**
64	70 23.1	+59.5	152.1	69 29.8	+59.6	153.4	68 35.9	+59.7	154.5	67 41.5	+59.8	155.6	66 46.7	+59.9	156.5	65 51.4	+60.0	157.4	64 55.9	+60.0	158.2	64 00.0	+60.0	159.0	**64**
65	71 22.6	+59.4	151.7	70 29.4	+59.6	153.0	69 35.6	+59.8	154.3	68 41.3	+59.9	155.4	67 46.6	+59.9	156.4	66 51.4	+60.0	157.3	65 55.9	+60.0	158.2	65 00.0	+60.0	159.0	**65**
66	72 22.0	+59.3	151.2	71 29.0	+59.6	152.7	70 35.4	+59.7	154.0	69 41.2	+59.8	155.2	68 46.5	+59.9	156.3	67 51.4	+59.9	157.3	66 55.9	+59.9	158.2	66 00.0	+60.0	159.0	**66**
67	73 21.3	+59.3	150.7	72 28.6	+59.5	152.3	71 35.1	+59.7	153.7	70 41.0	+59.9	155.0	69 46.4	+59.9	156.1	68 51.3	+60.0	157.2	67 55.8	+60.0	158.1	67 00.0	+60.0	159.0	**67**
68	74 20.6	+59.1	150.2	73 28.1	+59.4	151.8	72 34.8	+59.7	153.4	71 40.9	+59.8	154.7	70 46.3	+59.9	155.9	69 51.3	+60.0	157.1	68 55.8	+60.0	158.1	68 00.0	+60.0	159.0	**68**
69	75 19.7	+59.1	149.5	74 27.5	+59.4	151.4	73 34.5	+59.6	153.0	72 40.7	+59.7	154.4	71 46.2	+59.9	155.8	70 51.3	+59.9	156.9	69 55.8	+60.0	158.0	69 00.0	+60.0	159.0	**69**
70	76 18.8	+58.9	148.8	75 26.9	+59.3	150.8	74 34.1	+59.5	152.6	73 40.4	+59.8	154.1	72 46.1	+59.9	155.6	71 51.2	+60.0	156.8	70 55.8	+60.0	158.0	70 00.0	+60.0	159.0	**70**
71	77 17.7	+58.7	148.0	76 26.2	+59.1	150.2	75 33.6	+59.5	152.1	74 40.2	+59.7	153.8	73 46.0	+59.8	155.3	72 51.2	+59.9	156.7	71 55.8	+60.0	157.9	71 00.0	+60.0	159.0	**71**
72	78 16.4	+58.4	147.0	77 25.3	+59.1	149.4	76 33.1	+59.4	151.6	75 39.9	+59.7	153.4	74 45.8	+59.9	155.1	73 51.1	+59.9	156.5	72 55.8	+60.0	157.8	72 00.0	+60.0	159.0	**72**
73	79 14.8	+58.2	145.8	78 24.4	+58.8	148.6	77 32.5	+59.3	150.9	76 39.6	+59.6	153.0	75 45.7	+59.8	154.8	74 51.0	+60.0	156.4	73 55.8	+60.0	157.8	73 00.0	+60.0	159.0	**73**
74	80 13.0	+57.8	144.5	79 23.2	+58.6	147.6	78 31.8	+59.2	150.2	77 39.2	+59.5	152.5	76 45.5	+59.8	154.5	75 51.0	+59.9	156.2	74 55.8	+59.9	157.7	74 00.0	+60.0	159.0	**74**
75	81 10.8	+57.2	142.8	80 21.8	+58.4	146.3	79 31.0	+59.0	149.3	78 38.7	+59.5	151.9	77 45.3	+59.7	154.1	76 50.9	+59.9	155.9	75 55.7	+60.0	157.6	75 00.0	+60.0	159.0	**75**
76	82 08.0	+56.4	140.7	81 20.2	+57.8	144.9	80 30.0	+58.8	148.3	79 38.2	+59.4	151.2	78 45.0	+59.7	153.6	77 50.8	+59.9	155.7	76 55.7	+60.0	157.5	76 00.0	+60.0	159.0	**76**
77	83 04.4	+55.3	138.1	82 18.0	+57.3	143.0	81 28.8	+58.5	147.0	80 37.6	+59.2	150.3	79 44.7	+59.6	153.1	78 50.7	+59.8	155.4	77 55.7	+60.0	157.3	77 00.0	+60.0	159.0	**77**
78	83 59.7	*+53.5*	•134.6	83 15.3	+56.3	140.6	82 27.3	+58.0	145.4	81 36.8	+59.0	149.3	80 44.3	+59.6	152.4	79 50.5	+59.9	155.0	78 55.7	+59.9	157.2	78 00.0	+60.0	159.0	**78**
79	84 53.2	*+50.6*	•129.9	84 11.6	+54.9	137.5	83 25.3	+57.4	143.3	82 35.8	+58.6	148.0	81 43.9	+59.4	151.6	80 50.4	+59.8	154.6	79 55.6	+60.0	157.0	79 00.0	+60.0	159.0	**79**
80	85 43.8	*+45.6*	•123.3	85 06.5	*+52.5*	•133.1	84 22.7	+56.2	140.6	83 34.4	+58.3	146.2	82 43.3	+59.2	150.6	81 50.2	+59.7	154.0	80 55.6	+59.9	156.8	80 00.0	+60.0	159.0	**80**
81	86 29.4	*+36.7*	•113.7	85 59.0	*+48.0*	•126.8	85 18.9	*+54.3*	•136.7	84 32.7	+57.4	143.9	83 42.5	+59.0	149.2	82 49.9	+59.6	153.3	81 55.5	+60.0	156.5	81 00.0	+60.0	159.0	**81**
82	87 06.1	*+21.2*	• 99.4	86 47.0	*+39.4*	•117.3	86 13.2	*+50.5*	•130.9	85 30.1	*+56.0*	•140.5	84 41.5	+58.5	147.4	83 49.5	+59.6	152.4	82 55.5	+59.9	156.1	82 00.0	+60.0	159.0	**82**
83	87 27.3	*−0.9*	• 79.6	87 26.4	*+22.6*	•102.1	87 03.7	*+42.5*	•121.6	86 26.1	*+53.1*	•135.4	85 40.0	+57.5	144.7	84 49.1	+59.2	151.1	83 55.4	+59.9	155.6	83 00.0	+60.0	159.0	**83**
84	87 26.4	*−22.7*	• 57.0	87 49.0	*−2.8*	• 79.6	87 46.2	*+24.6*	•105.7	87 19.2	*+46.1*	•126.8	86 37.5	*+55.7*	•140.5	85 48.3	+58.9	149.2	84 55.3	+59.8	155.0	84 00.0	+60.0	159.0	**84**
85	87 03.7	*−37.6*	• 37.5	87 46.2	*−27.0*	• 53.4	88 10.8	*−5.5*	• 79.5	88 05.3	*+27.3*	•110.5	87 33.2	*+50.2*	•133.0	86 47.2	*+57.8*	•146.1	85 55.1	+59.7	154.0	85 00.0	+60.0	159.0	**85**
86	86 26.1	*−46.1*	• 23.7	87 19.2	*−41.7*	• 32.3	88 05.3	*−32.1*	• 48.6	88 32.6	*−9.2*	• 79.5	88 23.4	*+31.0*	•117.2	87 45.0	*+54.6*	•140.4	86 54.8	+59.4	152.3	86 00.0	+60.0	159.0	**86**
87	85 40.0	*−50.9*	• 14.4	86 37.5	*−49.2*	• 18.6	87 33.2	*−46.0*	• 26.1	88 23.4	*−38.4*	• 41.9	88 54.4	*−14.8*	• 79.5	88 39.6	*+36.7*	•126.7	87 54.2	*+58.3*	•149.2	87 00.0	+60.0	159.0	**87**
88	84 49.1	*−53.7*	• 8.0	85 48.3	*−53.0*	• 9.8	86 47.2	*−52.1*	• 12.9	87 45.0	*−50.2*	• 18.6	88 39.6	*−45.4*	• 32.3	89 16.3	*−23.8*	• 79.5	88 52.5	*+45.6*	•140.4	88 00.0	+60.0	159.0	**88**
89	83 55.4	−55.4	3.4	84 55.3	−55.3	4.1	85 55.1	*−55.1*	• 5.0	86 54.8	*−54.8*	• 6.7	87 54.2	*−54.2*	• 9.8	88 52.5	*−52.5*	• 18.6	89 38.1	*−38.1*	• 79.5	89 00.0	+60.0	159.0	**89**
90	83 00.0	−56.5	0.0	84 00.0	−56.6	0.0	85 00.0	−56.7	0.0	86 00.0	−56.8	0.0	87 00.0	*−57.0*	• 0.0	88 00.0	*−57.3*	• 0.0	89 00.0	*−58.0*	• 0.0	90 00.0	−60.0	79.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 21°, 339°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 32.0	–60.0	158.9	5 36.0	–59.9	158.9	4 40.0	–59.9	158.9	3 44.0	–59.9	159.0	2 48.0	–60.0	159.0	1 52.0	–60.0	159.0	0 56.0	–60.0	159.0	0 00.0	+60.0	21.0	**0**
1	5 32.0	–59.9	158.9	4 36.1	–60.0	158.9	3 40.1	–60.0	159.0	2 44.1	–60.0	159.0	1 48.0	–59.9	159.0	0 52.0	–60.0	159.0	0 04.0	+60.0	21.0	1 00.0	+60.0	21.0	**1**
2	4 32.1	–59.9	158.9	3 36.1	–60.0	159.0	2 40.1	–60.0	159.0	1 44.1	–60.0	159.0	0 48.1	–60.0	159.0	0 08.0	+60.0	21.0	1 04.0	+60.0	21.0	2 00.0	+60.0	21.0	**2**
3	3 32.2	–60.0	159.0	2 36.1	–59.9	159.0	1 40.1	–60.0	159.0	0 44.1	–60.0	159.0	0 11.9	+60.0	21.0	1 08.0	+60.0	21.0	2 04.0	+60.0	21.0	3 00.0	+60.0	21.0	**3**
4	2 32.2	–59.9	159.0	1 36.2	–60.0	159.0	0 40.1	–59.9	159.1	0 15.9	+60.0	20.9	1 11.9	+60.0	21.0	2 08.0	+59.9	21.0	3 04.0	+60.0	21.0	4 00.0	+60.0	21.0	**4**
5	1 32.3	–60.0	159.1	0 36.2	–59.9	159.1	0 19.8	+60.0	20.9	1 15.9	+60.0	20.9	2 11.9	+60.0	20.9	3 07.9	+60.0	20.9	4 04.0	+60.0	21.0	5 00.0	+60.0	21.0	**5**
6	0 32.3	–59.9	159.1	0 23.7	+60.0	20.9	1 19.8	+60.0	20.9	2 15.9	+59.9	20.9	3 11.9	+60.0	20.9	4 07.9	+60.0	20.9	5 04.0	+60.0	21.0	6 00.0	+60.0	21.0	**6**
7	0 27.6	+60.0	20.8	1 23.7	+60.0	20.8	2 19.8	+59.9	20.9	3 15.8	+60.0	20.9	4 11.9	+60.0	20.9	5 07.9	+60.0	20.9	6 04.0	+60.0	21.0	7 00.0	+60.0	21.0	**7**
8	1 27.6	+59.9	20.8	2 23.7	+59.9	20.8	3 19.7	+60.0	20.8	4 15.8	+60.0	20.8	5 11.9	+60.0	20.9	6 07.9	+60.0	20.9	7 04.0	+60.0	21.0	8 00.0	+60.0	21.0	**8**
9	2 27.5	+59.9	20.7	3 23.6	+60.0	20.8	4 19.7	+60.0	20.8	5 15.8	+60.0	20.8	6 11.9	+60.0	20.9	7 07.9	+60.0	20.9	8 04.0	+60.0	20.9	9 00.0	+60.0	21.0	**9**
10	3 27.4	+60.0	20.7	4 23.6	+59.9	20.7	5 19.7	+59.9	20.8	6 15.8	+60.0	20.8	7 11.9	+59.9	20.8	8 07.9	+60.0	20.9	9 04.0	+60.0	20.9	10 00.0	+60.0	21.0	**10**
11	4 27.4	+59.9	20.7	5 23.5	+60.0	20.7	6 19.6	+60.0	20.7	7 15.8	+59.9	20.8	8 11.8	+60.0	20.8	9 07.9	+60.0	20.9	10 04.0	+60.0	20.9	11 00.0	+60.0	21.0	**11**
12	5 27.3	+60.0	20.6	6 23.5	+59.9	20.7	7 19.6	+60.0	20.7	8 15.7	+60.0	20.7	9 11.8	+60.0	20.8	10 07.9	+60.0	20.9	11 04.0	+60.0	20.9	12 00.0	+60.0	21.0	**12**
13	6 27.3	+59.9	20.6	7 23.4	+60.0	20.6	8 19.6	+60.0	20.7	9 15.7	+60.0	20.7	10 11.8	+60.0	20.8	11 07.9	+60.0	20.8	12 04.0	+60.0	20.9	13 00.0	+60.0	21.0	**13**
14	7 27.2	+60.0	20.5	8 23.4	+60.0	20.6	9 19.6	+59.9	20.6	10 15.7	+60.0	20.7	11 11.8	+60.0	20.8	12 07.9	+60.0	20.8	13 04.0	+60.0	20.9	14 00.0	+60.0	21.0	**14**
15	8 27.2	+59.9	20.5	9 23.4	+59.9	20.5	10 19.5	+60.0	20.6	11 15.7	+60.0	20.7	12 11.8	+60.0	20.7	13 07.9	+60.0	20.8	14 04.0	+60.0	20.9	15 00.0	+60.0	21.0	**15**
16	9 27.1	+59.9	20.4	10 23.3	+60.0	20.5	11 19.5	+60.0	20.6	12 15.7	+59.9	20.6	13 11.8	+60.0	20.7	14 07.9	+60.0	20.8	15 04.0	+60.0	20.9	16 00.0	+60.0	21.0	**16**
17	10 27.0	+60.0	20.4	11 23.3	+59.9	20.5	12 19.5	+59.9	20.5	13 15.6	+60.0	20.6	14 11.8	+60.0	20.7	15 07.9	+60.0	20.8	16 04.0	+60.0	20.9	17 00.0	+60.0	21.0	**17**
18	11 27.0	+59.9	20.3	12 23.2	+60.0	20.4	13 19.4	+60.0	20.5	14 15.6	+60.0	20.6	15 11.8	+60.0	20.7	16 07.9	+60.0	20.8	17 04.0	+60.0	20.9	18 00.0	+60.0	21.0	**18**
19	12 26.9	+60.0	20.3	13 23.2	+59.9	20.4	14 19.4	+60.0	20.5	15 15.6	+60.0	20.6	16 11.8	+59.9	20.7	17 07.9	+60.0	20.8	18 04.0	+60.0	20.9	19 00.0	+60.0	21.0	**19**
20	13 26.9	+59.9	20.3	14 23.1	+60.0	20.3	15 19.4	+59.9	20.4	16 15.6	+60.0	20.5	17 11.7	+60.0	20.6	18 07.9	+60.0	20.8	19 04.0	+60.0	20.9	20 00.0	+60.0	21.0	**20**
21	14 26.8	+59.9	20.2	15 23.1	+59.9	20.3	16 19.3	+60.0	20.4	17 15.6	+59.9	20.5	18 11.7	+60.0	20.6	19 07.9	+60.0	20.7	20 04.0	+60.0	20.9	21 00.0	+60.0	21.0	**21**
22	15 26.7	+60.0	20.2	16 23.0	+60.0	20.3	17 19.3	+60.0	20.4	18 15.5	+60.0	20.5	19 11.7	+60.0	20.6	20 07.9	+60.0	20.7	21 04.0	+60.0	20.9	22 00.0	+60.0	21.0	**22**
23	16 26.7	+59.9	20.1	17 23.0	+60.0	20.2	18 19.3	+59.9	20.3	19 15.5	+60.0	20.5	20 11.7	+60.0	20.6	21 07.9	+60.0	20.7	22 04.0	+60.0	20.9	23 00.0	+60.0	21.0	**23**
24	17 26.6	+60.0	20.1	18 23.0	+59.9	20.2	19 19.2	+60.0	20.3	20 15.5	+60.0	20.4	21 11.7	+60.0	20.6	22 07.9	+59.9	20.7	23 04.0	+60.0	20.8	24 00.0	+60.0	21.0	**24**
25	18 26.6	+59.9	20.0	19 22.9	+60.0	20.1	20 19.2	+60.0	20.3	21 15.5	+60.0	20.4	22 11.7	+60.0	20.5	23 07.8	+60.0	20.7	24 04.0	+60.0	20.8	25 00.0	+60.0	21.0	**25**
26	19 26.5	+59.9	20.0	20 22.9	+59.9	20.1	21 19.2	+59.9	20.2	22 15.5	+59.9	20.4	23 11.7	+60.0	20.5	24 07.8	+60.0	20.7	25 04.0	+60.0	20.8	26 00.0	+60.0	21.0	**26**
27	20 26.4	+60.0	19.9	21 22.8	+60.0	20.1	22 19.1	+60.0	20.2	23 15.4	+60.0	20.3	24 11.7	+60.0	20.5	25 07.8	+60.0	20.7	26 04.0	+60.0	20.8	27 00.0	+60.0	21.0	**27**
28	21 26.4	+59.9	19.9	22 22.8	+59.9	20.0	23 19.1	+60.0	20.2	24 15.4	+60.0	20.3	25 11.7	+59.9	20.5	26 07.8	+60.0	20.6	27 04.0	+59.9	20.8	28 00.0	+60.0	21.0	**28**
29	22 26.3	+59.9	19.8	23 22.7	+60.0	20.0	24 19.1	+59.9	20.1	25 15.4	+60.0	20.3	26 11.6	+60.0	20.4	27 07.8	+60.0	20.6	28 03.9	+60.0	20.8	29 00.0	+60.0	21.0	**29**
30	23 26.2	+60.0	19.8	24 22.7	+59.9	19.9	25 19.0	+60.0	20.1	26 15.4	+59.9	20.2	27 11.6	+60.0	20.4	28 07.8	+60.0	20.6	29 03.9	+60.0	20.8	30 00.0	+60.0	21.0	**30**
31	24 26.2	+59.9	19.7	25 22.6	+60.0	19.9	26 19.0	+60.0	20.0	27 15.3	+60.0	20.2	28 11.6	+60.0	20.4	29 07.8	+60.0	20.6	30 03.9	+60.0	20.8	31 00.0	+60.0	21.0	**31**
32	25 26.1	+59.9	19.7	26 22.6	+59.9	19.8	27 19.0	+59.9	20.0	28 15.3	+60.0	20.2	29 11.6	+60.0	20.4	30 07.8	+60.0	20.6	31 03.9	+60.0	20.8	32 00.0	+60.0	21.0	**32**
33	26 26.0	+59.9	19.6	27 22.5	+59.9	19.8	28 18.9	+60.0	20.0	29 15.3	+60.0	20.2	30 11.6	+60.0	20.3	31 07.8	+60.0	20.6	32 03.9	+60.0	20.8	33 00.0	+60.0	21.0	**33**
34	27 25.9	+60.0	19.6	28 22.4	+60.0	19.7	29 18.9	+60.0	19.9	30 15.3	+59.9	20.1	31 11.6	+60.0	20.3	32 07.8	+60.0	20.5	33 03.9	+60.0	20.8	34 00.0	+60.0	21.0	**34**
35	28 25.9	+59.9	19.5	29 22.4	+59.9	19.7	30 18.9	+59.9	19.9	31 15.2	+60.0	20.1	32 11.6	+59.9	20.3	33 07.8	+60.0	20.5	34 03.9	+60.0	20.8	35 00.0	+60.0	21.0	**35**
36	29 25.8	+59.9	19.4	30 22.3	+60.0	19.6	31 18.8	+60.0	19.8	32 15.2	+60.0	20.0	33 11.5	+60.0	20.3	34 07.8	+60.0	20.5	35 03.9	+60.0	20.7	36 00.0	+60.0	21.0	**36**
37	30 25.7	+59.9	19.4	31 22.3	+59.9	19.6	32 18.8	+59.9	19.8	33 15.2	+60.0	20.0	34 11.5	+60.0	20.2	35 07.8	+60.0	20.5	36 03.9	+60.0	20.7	37 00.0	+60.0	21.0	**37**
38	31 25.6	+60.0	19.3	32 22.2	+60.0	19.5	33 18.7	+60.0	19.8	34 15.2	+59.9	20.0	35 11.5	+60.0	20.2	36 07.8	+60.0	20.5	37 03.9	+60.0	20.7	38 00.0	+60.0	21.0	**38**
39	32 25.6	+59.9	19.3	33 22.2	+59.9	19.5	34 18.7	+59.9	19.7	35 15.1	+60.0	19.9	36 11.5	+60.0	20.2	37 07.8	+60.0	20.4	38 03.9	+60.0	20.7	39 00.0	+60.0	21.0	**39**
40	33 25.5	+59.9	19.2	34 22.1	+59.9	19.4	35 18.6	+60.0	19.7	36 15.1	+60.0	19.9	37 11.5	+60.0	20.2	38 07.8	+59.9	20.4	39 03.9	+60.0	20.7	40 00.0	+60.0	21.0	**40**
41	34 25.4	+59.9	19.1	35 22.0	+60.0	19.4	36 18.6	+60.0	19.6	37 15.1	+59.9	19.9	38 11.5	+59.9	20.1	39 07.7	+60.0	20.4	40 03.9	+60.0	20.7	41 00.0	+60.0	21.0	**41**
42	35 25.3	+59.9	19.1	36 22.0	+59.9	19.3	37 18.6	+59.9	19.6	38 15.0	+60.0	19.8	39 11.4	+60.0	20.1	40 07.7	+60.0	20.4	41 03.9	+60.0	20.7	42 00.0	+60.0	21.0	**42**
43	36 25.2	+59.9	19.0	37 21.9	+59.9	19.3	38 18.5	+60.0	19.5	39 15.0	+60.0	19.8	40 11.4	+60.0	20.1	41 07.7	+60.0	20.4	42 03.9	+60.0	20.7	43 00.0	+60.0	21.0	**43**
44	37 25.1	+59.9	18.9	38 21.8	+60.0	19.2	39 18.5	+59.9	19.5	40 15.0	+60.0	19.7	41 11.4	+60.0	20.0	42 07.7	+60.0	20.3	43 03.9	+60.0	20.7	44 00.0	+60.0	21.0	**44**
45	38 25.0	+59.9	18.9	39 21.8	+59.9	19.1	40 18.4	+60.0	19.4	41 15.0	+59.9	19.7	42 11.4	+60.0	20.0	43 07.7	+60.0	20.3	44 03.9	+60.0	20.7	45 00.0	+60.0	21.0	**45**
46	39 24.9	+59.9	18.8	40 21.7	+59.9	19.1	41 18.4	+59.9	19.4	42 14.9	+60.0	19.7	43 11.4	+59.9	20.0	44 07.7	+60.0	20.3	45 03.9	+60.0	20.6	46 00.0	+60.0	21.0	**46**
47	40 24.8	+59.9	18.7	41 21.6	+60.0	19.0	42 18.3	+60.0	19.3	43 14.9	+59.9	19.6	44 11.3	+60.0	19.9	45 07.7	+60.0	20.3	46 03.9	+60.0	20.6	47 00.0	+60.0	21.0	**47**
48	41 24.7	+59.9	18.6	42 21.6	+59.9	18.9	43 18.3	+59.9	19.2	44 14.8	+60.0	19.6	45 11.3	+60.0	19.9	46 07.7	+60.0	20.2	47 03.9	+60.0	20.6	48 00.0	+60.0	21.0	**48**
49	42 24.6	+59.9	18.6	43 21.5	+59.9	18.9	44 18.2	+59.9	19.2	45 14.8	+60.0	19.5	46 11.3	+60.0	19.9	47 07.7	+60.0	20.2	48 03.9	+60.0	20.6	49 00.0	+60.0	21.0	**49**
50	43 24.5	+59.9	18.5	44 21.4	+59.9	18.8	45 18.1	+60.0	19.1	46 14.8	+59.9	19.5	47 11.3	+60.0	19.8	48 07.7	+60.0	20.2	49 03.9	+60.0	20.6	50 00.0	+60.0	21.0	**50**
51	44 24.4	+59.9	18.4	45 21.3	+59.9	18.7	46 18.1	+59.9	19.1	47 14.7	+60.0	19.4	48 11.3	+59.9	19.8	49 07.7	+59.9	20.2	50 03.9	+60.0	20.6	51 00.0	+60.0	21.0	**51**
52	45 24.3	+59.9	18.3	46 21.2	+59.9	18.6	47 18.0	+60.0	19.0	48 14.7	+59.9	19.3	49 11.2	+60.0	19.7	50 07.6	+60.0	20.1	51 03.9	+60.0	20.6	52 00.0	+60.0	21.0	**52**
53	46 24.2	+59.9	18.2	47 21.1	+59.9	18.6	48 18.0	+59.9	18.9	49 14.6	+60.0	19.3	50 11.2	+60.0	19.7	51 07.6	+60.0	20.1	52 03.9	+60.0	20.5	53 00.0	+60.0	21.0	**53**
54	47 24.1	+59.8	18.1	48 21.0	+59.9	18.5	49 17.9	+59.9	18.8	50 14.6	+60.0	19.2	51 11.2	+60.0	19.6	52 07.6	+60.0	20.1	53 03.9	+60.0	20.5	54 00.0	+60.0	21.0	**54**
55	48 23.9	+59.9	18.0	49 20.9	+59.9	18.4	50 17.8	+59.9	18.8	51 14.6	+59.9	19.2	52 11.2	+59.9	19.6	53 07.6	+60.0	20.0	54 03.9	+60.0	20.5	55 00.0	+60.0	21.0	**55**
56	49 23.8	+59.9	17.9	50 20.8	+59.9	18.3	51 17.7	+60.0	18.7	52 14.5	+60.0	19.1	53 11.1	+60.0	19.5	54 07.6	+60.0	20.0	55 03.9	+60.0	20.5	56 00.0	+60.0	21.0	**56**
57	50 23.7	+59.8	17.8	51 20.7	+59.9	18.2	52 17.7	+59.9	18.6	53 14.5	+59.9	19.0	54 11.1	+60.0	19.5	55 07.6	+60.0	20.0	56 03.9	+60.0	20.5	57 00.0	+60.0	21.0	**57**
58	51 23.5	+59.9	17.7	52 20.6	+59.9	18.1	53 17.6	+59.9	18.5	54 14.4	+59.9	19.0	55 11.1	+59.9	19.4	56 07.6	+59.9	19.9	57 03.9	+60.0	20.4	58 00.0	+60.0	21.0	**58**
59	52 23.4	+59.8	17.6	53 20.5	+59.9	18.0	54 17.5	+59.9	18.4	55 14.3	+60.0	18.9	56 11.0	+60.0	19.4	57 07.5	+60.0	19.9	58 03.9	+60.0	20.4	59 00.0	+60.0	21.0	**59**
60	53 23.2	+59.9	17.5	54 20.4	+59.9	17.9	55 17.4	+59.9	18.3	56 14.3	+59.9	18.8	57 11.0	+60.0	19.3	58 07.5	+60.0	19.8	59 03.9	+60.0	20.4	60 00.0	+60.0	21.0	**60**
61	54 23.1	+59.8	17.4	55 20.3	+59.8	17.8	56 17.3	+59.9	18.2	57 14.2	+60.0	18.7	58 11.0	+59.9	19.2	59 07.5	+60.0	19.8	60 03.9	+60.0	20.4	61 00.0	+60.0	21.0	**61**
62	55 22.9	+59.8	17.2	56 20.1	+59.9	17.7	57 17.2	+59.9	18.1	58 14.2	+59.9	18.6	59 10.9	+60.0	19.2	60 07.5	+60.0	19.7	61 03.9	+60.0	20.3	62 00.0	+60.0	21.0	**62**
63	56 22.7	+59.8	17.1	57 20.0	+59.8	17.5	58 17.1	+59.9	18.0	59 14.1	+59.9	18.5	60 10.9	+59.9	19.1	61 07.5	+60.0	19.7	62 03.9	+60.0	20.3	63 00.0	+60.0	21.0	**63**
64	57 22.5	+59.8	16.9	58 19.8	+59.9	17.4	59 17.0	+59.9	17.9	60 14.0	+59.9	18.4	61 10.8	+60.0	19.0	62 07.5	+59.9	19.6	63 03.9	+59.9	20.3	64 00.0	+60.0	21.0	**64**
65	58 22.3	+59.8	16.8	59 19.7	+59.8	17.3	60 16.9	+59.9	17.8	61 13.9	+60.0	18.3	62 10.8	+59.9	18.9	63 07.4	+60.0	19.6	64 03.8	+60.0	20.3	65 00.0	+60.0	21.0	**65**
66	59 22.1	+59.8	16.6	60 19.5	+59.8	17.1	61 16.8	+59.8	17.7	62 13.9	+59.9	18.2	63 10.7	+60.0	18.8	64 07.4	+60.0	19.5	65 03.8	+60.0	20.2	66 00.0	+60.0	21.0	**66**
67	60 21.9	+59.7	16.4	61 19.3	+59.8	17.0	62 16.6	+59.9	17.5	63 13.8	+59.9	18.1	64 10.7	+59.9	18.8	65 07.4	+60.0	19.4	66 03.8	+60.0	20.2	67 00.0	+60.0	21.0	**67**
68	61 21.6	+59.8	16.3	62 19.1	+59.8	16.8	63 16.5	+59.8	17.4	64 13.7	+59.9	18.0	65 10.6	+60.0	18.6	66 07.4	+59.9	19.4	67 03.8	+60.0	20.2	68 00.0	+60.0	21.0	**68**
69	62 21.4	+59.7	16.1	63 18.9	+59.8	16.6	64 16.3	+59.9	17.2	65 13.6	+59.9	17.8	66 10.6	+59.9	18.5	67 07.3	+60.0	19.3	68 03.8	+60.0	20.1	69 00.0	+60.0	21.0	**69**
70	63 21.1	+59.7	15.9	64 18.7	+59.8	16.4	65 16.2	+59.8	17.0	66 13.5	+59.8	17.7	67 10.5	+59.9	18.4	68 07.3	+60.0	19.2	69 03.8	+60.0	20.1	70 00.0	+60.0	21.0	**70**
71	64 20.8	+59.7	15.6	65 18.5	+59.7	16.2	66 16.0	+59.8	16.9	67 13.3	+59.9	17.5	68 10.4	+59.9	18.3	69 07.3	+59.9	19.1	70 03.8	+60.0	20.0	71 00.0	+60.0	21.0	**71**
72	65 20.5	+59.6	15.4	66 18.2	+59.8	16.0	67 15.8	+59.8	16.7	68 13.2	+59.9	17.4	69 10.3	+60.0	18.1	70 07.2	+60.0	19.0	71 03.8	+60.0	20.0	72 00.0	+60.0	21.0	**72**
73	66 20.1	+59.7	15.1	67 18.0	+59.7	15.8	68 15.6	+59.8	16.4	69 13.1	+59.8	17.2	70 10.3	+59.9	18.0	71 07.2	+59.9	18.9	72 03.8	+60.0	19.9	73 00.0	+60.0	21.0	**73**
74	67 19.8	+59.6	14.8	68 17.7	+59.7	15.5	69 15.4	+59.8	16.2	70 12.9	+59.8	17.0	71 10.2	+59.9	17.8	72 07.1	+60.0	18.8	73 03.8	+59.9	19.8	74 00.0	+60.0	21.0	**74**
75	68 19.4	+59.5	14.5	69 17.4	+59.6	15.2	70 15.2	+59.7	15.9	71 12.7	+59.8	16.7	72 10.1	+59.8	17.6	73 07.1	+59.9	18.6	74 03.7	+60.0	19.7	75 00.0	+60.0	21.0	**75**
76	69 18.9	+59.5	14.2	70 17.0	+59.6	14.9	71 14.9	+59.7	15.6	72 12.5	+59.8	16.5	73 09.9	+59.9	17.4	74 07.0	+60.0	18.5	75 03.7	+60.0	19.7	76 00.0	+60.0	21.0	**76**
77	70 18.4	+59.5	13.8	71 16.6	+59.6	14.5	72 14.6	+59.6	15.3	73 12.3	+59.8	16.2	74 09.8	+59.9	17.2	75 07.0	+59.9	18.3	76 03.7	+60.0	19.6	77 00.0	+60.0	21.0	**77**
78	71 17.9	+59.4	13.4	72 16.2	+59.5	14.2	73 14.2	+59.7	15.0	74 12.1	+59.7	15.9	75 09.7	+59.8	16.9	76 06.9	+59.9	18.1	77 03.7	+60.0	19.4	78 00.0	+60.0	21.0	**78**
79	72 17.3	+59.4	13.0	73 15.7	+59.5	13.7	74 13.9	+59.5	14.6	75 11.8	+59.7	15.5	76 09.5	+59.8	16.6	77 06.8	+59.9	17.9	78 03.7	+59.9	19.3	79 00.0	+60.0	21.0	**79**
80	73 16.7	+59.2	12.5	74 15.2	+59.3	13.3	75 13.4	+59.6	14.1	76 11.5	+59.7	15.1	77 09.3	+59.7	16.3	78 06.7	+59.9	17.6	79 03.6	+60.0	19.1	80 00.0	+60.0	21.0	**80**
81	74 15.9	+59.2	11.9	75 14.5	+59.3	12.7	76 13.0	+59.4	13.6	77 11.2	+59.5	14.6	78 09.0	+59.8	15.8	79 06.6	+59.8	17.3	80 03.6	+60.0	19.0	81 00.0	+60.0	21.0	**81**
82	75 15.1	+59.0	11.3	76 13.8	+59.2	12.1	77 12.4	+59.4	13.0	78 10.7	+59.6	14.1	79 08.8	+59.6	15.4	80 06.4	+59.8	16.9	81 03.6	+59.9	18.7	82 00.0	+60.0	21.0	**82**
83	76 14.1	+58.9	10.6	77 13.0	+59.1	11.4	78 11.8	+59.2	12.3	79 10.3	+59.4	13.4	80 08.4	+59.6	14.8	81 06.2	+59.8	16.4	82 03.5	+59.9	18.4	83 00.0	+60.0	21.0	**83**
84	77 13.0	+58.8	9.7	78 12.1	+58.9	10.6	79 11.0	+59.1	11.5	80 09.7	+59.2	12.7	81 08.0	+59.5	14.1	82 06.0	+59.7	15.8	83 03.4	+59.9	18.1	84 00.0	+60.0	21.0	**84**
85	78 11.8	+58.5	8.8	79 11.0	+58.7	9.6	80 10.1	+58.8	10.5	81 08.9	+59.2	11.7	82 07.5	+59.4	13.2	83 05.7	+59.7	15.1	84 03.3	+59.9	17.6	85 00.0	+60.0	21.0	**85**
86	79 10.3	+58.1	7.6	80 09.7	+58.3	8.4	81 08.9	+58.6	9.4	82 08.1	+58.8	10.5	83 06.9	+59.1	12.0	84 05.4	+59.4	14.0	85 03.2	+59.8	16.9	86 00.0	+60.0	21.0	**86**
87	80 08.4	+57.8	6.3	81 08.0	+58.0	7.0	82 07.5	+58.2	7.9	83 06.9	+58.5	9.0	84 06.0	+58.8	10.5	85 04.8	+59.2	12.6	86 03.0	+59.7	15.8	87 00.0	+60.0	21.0	**87**
88	81 06.2	+57.3	4.6	82 06.0	+57.4	5.2	83 05.7	+57.6	6.0	84 05.4	+57.8	7.0	85 04.8	+58.2	8.4	86 04.0	+58.7	10.5	87 02.7	+59.3	14.0	88 00.0	+60.0	21.0	**88**
89	82 03.5	+56.5	2.6	83 03.4	+56.6	3.0	84 03.3	+56.7	3.5	85 03.2	+56.8	4.2	86 03.0	*+57.0*•	5.2	87 02.7	*+57.3*•	7.0	88 02.0	*+58.0*•	10.5	89 00.0	+60.0	21.0	**89**
90	83 00.0	+55.4	0.0	84 00.0	+55.3	0.0	85 00.0	*+55.1*•	0.0	86 00.0	*+54.8*•	0.0	87 00.0	*+54.2*•	0.0	88 00.0	*+52.5*•	0.0	89 00.0	*+38.1*•	0.0	90 00.0	–60.0	10.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 159°, 201°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 29.3	+59.9	157.9	5 33.7	+60.0	157.9	4 38.1	+60.0	157.9	3 42.5	+60.0	158.0	2 46.9	+60.0	158.0	1 51.3	+60.0	158.0	0 55.6	+60.0	158.0	0 00.0	+60.0	158.0	**0**
1	7 29.2	+60.0	157.8	6 33.7	+59.9	157.9	5 38.1	+59.9	157.9	4 42.5	+60.0	157.9	3 46.9	+60.0	158.0	2 51.3	+59.9	158.0	1 55.6	+60.0	158.0	1 00.0	+60.0	158.0	**1**
2	8 29.2	+59.9	157.8	7 33.6	+60.0	157.8	6 38.0	+60.0	157.9	5 42.5	+59.9	157.9	4 46.9	+59.9	157.9	3 51.2	+60.0	158.0	2 55.6	+60.0	158.0	2 00.0	+60.0	158.0	**2**
3	9 29.1	+59.9	157.7	8 33.6	+59.9	157.8	7 38.0	+60.0	157.8	6 42.4	+60.0	157.9	5 46.8	+60.0	157.9	4 51.2	+60.0	157.9	3 55.6	+60.0	158.0	3 00.0	+60.0	158.0	**3**
4	10 29.0	+60.0	157.7	9 33.5	+60.0	157.7	8 38.0	+59.9	157.8	7 42.4	+60.0	157.8	6 46.8	+60.0	157.9	5 51.2	+60.0	157.9	4 55.6	+60.0	158.0	4 00.0	+60.0	158.0	**4**
5	11 29.0	+59.9	157.6	10 33.5	+59.9	157.7	9 37.9	+60.0	157.8	8 42.4	+60.0	157.8	7 46.8	+60.0	157.9	6 51.2	+60.0	157.9	5 55.6	+60.0	158.0	5 00.0	+60.0	158.0	**5**
6	12 28.9	+59.9	157.6	11 33.4	+60.0	157.6	10 37.9	+60.0	157.7	9 42.4	+60.0	157.8	8 46.8	+60.0	157.9	7 51.2	+60.0	157.9	6 55.6	+60.0	158.0	6 00.0	+60.0	158.0	**6**
7	13 28.8	+60.0	157.5	12 33.4	+59.9	157.6	11 37.9	+59.9	157.7	10 42.4	+59.9	157.8	9 46.8	+60.0	157.8	8 51.2	+60.0	157.9	7 55.6	+60.0	158.0	7 00.0	+60.0	158.0	**7**
8	14 28.8	+59.9	157.5	13 33.3	+60.0	157.6	12 37.8	+60.0	157.7	11 42.3	+60.0	157.7	10 46.8	+60.0	157.8	9 51.2	+60.0	157.9	8 55.6	+60.0	157.9	8 00.0	+60.0	158.0	**8**
9	15 28.7	+59.9	157.4	14 33.3	+59.9	157.5	13 37.8	+60.0	157.6	12 42.3	+60.0	157.7	11 46.8	+60.0	157.8	10 51.2	+60.0	157.9	9 55.6	+60.0	157.9	9 00.0	+60.0	158.0	**9**
10	16 28.6	+60.0	157.4	15 33.2	+60.0	157.5	14 37.8	+59.9	157.6	13 42.3	+60.0	157.7	12 46.8	+60.0	157.8	11 51.2	+60.0	157.9	10 55.6	+60.0	157.9	10 00.0	+60.0	158.0	**10**
11	17 28.6	+59.9	157.3	16 33.2	+59.9	157.4	15 37.7	+60.0	157.6	14 42.3	+59.9	157.7	13 46.8	+59.9	157.8	12 51.2	+60.0	157.8	11 55.6	+60.0	157.9	11 00.0	+60.0	158.0	**11**
12	18 28.5	+59.9	157.3	17 33.1	+60.0	157.4	16 37.7	+60.0	157.5	15 42.2	+60.0	157.6	14 46.7	+60.0	157.7	13 51.2	+60.0	157.8	12 55.6	+60.0	157.9	12 00.0	+60.0	158.0	**12**
13	19 28.4	+59.9	157.2	18 33.1	+59.9	157.4	17 37.7	+59.9	157.5	16 42.2	+60.0	157.6	15 46.7	+60.0	157.7	14 51.2	+60.0	157.8	13 55.6	+60.0	157.9	13 00.0	+60.0	158.0	**13**
14	20 28.3	+60.0	157.2	19 33.0	+60.0	157.3	18 37.6	+60.0	157.4	17 42.2	+60.0	157.6	16 46.7	+60.0	157.7	15 51.2	+60.0	157.8	14 55.6	+60.0	157.9	14 00.0	+60.0	158.0	**14**
15	21 28.3	+59.9	157.1	20 33.0	+59.9	157.3	19 37.6	+60.0	157.4	18 42.2	+60.0	157.5	17 46.7	+60.0	157.7	16 51.2	+60.0	157.8	15 55.6	+60.0	157.9	15 00.0	+60.0	158.0	**15**
16	22 28.2	+59.9	157.1	21 32.9	+60.0	157.2	20 37.6	+59.9	157.4	19 42.2	+59.9	157.5	18 46.7	+60.0	157.6	17 51.2	+60.0	157.8	16 55.6	+60.0	157.9	16 00.0	+60.0	158.0	**16**
17	23 28.1	+60.0	157.0	22 32.9	+59.9	157.2	21 37.5	+60.0	157.3	20 42.1	+60.0	157.5	19 46.7	+60.0	157.6	18 51.2	+60.0	157.8	17 55.6	+60.0	157.9	17 00.0	+60.0	158.0	**17**
18	24 28.1	+59.9	157.0	23 32.8	+60.0	157.1	22 37.5	+60.0	157.3	21 42.1	+60.0	157.5	20 46.7	+60.0	157.6	19 51.2	+60.0	157.7	18 55.6	+60.0	157.9	18 00.0	+60.0	158.0	**18**
19	25 28.0	+59.9	156.9	24 32.8	+59.9	157.1	23 37.5	+59.9	157.3	22 42.1	+60.0	157.4	21 46.7	+59.9	157.6	20 51.2	+60.0	157.7	19 55.6	+60.0	157.9	19 00.0	+60.0	158.0	**19**
20	26 27.9	+59.9	156.8	25 32.7	+59.9	157.0	24 37.4	+60.0	157.2	23 42.1	+59.9	157.4	22 46.6	+60.0	157.6	21 51.2	+59.9	157.7	20 55.6	+60.0	157.9	20 00.0	+60.0	158.0	**20**
21	27 27.8	+59.9	156.8	26 32.6	+60.0	157.0	25 37.4	+59.9	157.2	24 42.0	+60.0	157.4	23 46.6	+60.0	157.5	22 51.1	+60.0	157.7	21 55.6	+60.0	157.9	21 00.0	+60.0	158.0	**21**
22	28 27.7	+60.0	156.7	27 32.6	+59.9	156.9	26 37.3	+60.0	157.1	25 42.0	+60.0	157.3	24 46.6	+60.0	157.5	23 51.1	+60.0	157.7	22 55.6	+60.0	157.8	22 00.0	+60.0	158.0	**22**
23	29 27.7	+59.9	156.7	28 32.5	+60.0	156.9	27 37.3	+60.0	157.1	26 42.0	+60.0	157.3	25 46.6	+60.0	157.5	24 51.1	+60.0	157.7	23 55.6	+60.0	157.8	23 00.0	+60.0	158.0	**23**
24	30 27.6	+59.9	156.6	29 32.5	+59.9	156.8	28 37.3	+59.9	157.1	27 42.0	+59.9	157.3	26 46.6	+60.0	157.5	25 51.1	+60.0	157.6	24 55.6	+60.0	157.8	24 00.0	+60.0	158.0	**24**
25	31 27.5	+59.9	156.5	30 32.4	+59.9	156.8	29 37.2	+60.0	157.0	28 41.9	+60.0	157.2	27 46.6	+60.0	157.4	26 51.1	+60.0	157.6	25 55.6	+60.0	157.8	25 00.0	+60.0	158.0	**25**
26	32 27.4	+59.9	156.5	31 32.3	+60.0	156.7	30 37.2	+59.9	157.0	29 41.9	+60.0	157.2	28 46.6	+59.9	157.4	27 51.1	+60.0	157.6	26 55.6	+60.0	157.8	26 00.0	+60.0	158.0	**26**
27	33 27.3	+59.9	156.4	32 32.3	+59.9	156.7	31 37.1	+60.0	156.9	30 41.9	+59.9	157.2	29 46.5	+60.0	157.4	28 51.1	+60.0	157.6	27 55.6	+60.0	157.8	27 00.0	+60.0	158.0	**27**
28	34 27.2	+59.9	156.4	33 32.2	+59.9	156.6	32 37.1	+59.9	156.9	31 41.8	+60.0	157.1	30 46.5	+60.0	157.4	29 51.1	+60.0	157.6	28 55.6	+60.0	157.8	28 00.0	+60.0	158.0	**28**
29	35 27.1	+59.9	156.3	34 32.1	+60.0	156.6	33 37.0	+60.0	156.8	32 41.8	+60.0	157.1	31 46.5	+60.0	157.3	30 51.1	+60.0	157.6	29 55.6	+60.0	157.8	29 00.0	+60.0	158.0	**29**
30	36 27.0	+59.9	156.2	35 32.1	+59.9	156.5	34 37.0	+59.9	156.8	33 41.8	+60.0	157.0	32 46.5	+60.0	157.3	31 51.1	+60.0	157.5	30 55.6	+60.0	157.8	30 00.0	+60.0	158.0	**30**
31	37 26.9	+59.9	156.1	36 32.0	+59.9	156.4	35 36.9	+60.0	156.7	34 41.8	+59.9	157.0	33 46.5	+60.0	157.3	32 51.1	+60.0	157.5	31 55.6	+60.0	157.8	31 00.0	+60.0	158.0	**31**
32	38 26.8	+59.9	156.1	37 31.9	+60.0	156.4	36 36.9	+59.9	156.7	35 41.7	+60.0	157.0	34 46.5	+59.9	157.2	33 51.1	+60.0	157.5	32 55.6	+60.0	157.8	32 00.0	+60.0	158.0	**32**
33	39 26.7	+59.9	156.0	38 31.9	+59.9	156.3	37 36.8	+60.0	156.6	36 41.7	+60.0	156.9	35 46.4	+60.0	157.2	34 51.1	+60.0	157.5	33 55.6	+60.0	157.8	33 00.0	+60.0	158.0	**33**
34	40 26.6	+59.9	155.9	39 31.8	+59.9	156.3	38 36.8	+59.9	156.6	37 41.7	+59.9	156.9	36 46.4	+60.0	157.2	35 51.1	+59.9	157.5	34 55.6	+60.0	157.7	34 00.0	+60.0	158.0	**34**
35	41 26.5	+59.9	155.8	40 31.7	+59.9	156.2	39 36.7	+60.0	156.5	38 41.6	+60.0	156.8	37 46.4	+60.0	157.2	36 51.0	+60.0	157.5	35 55.6	+60.0	157.7	35 00.0	+60.0	158.0	**35**
36	42 26.4	+59.9	155.8	41 31.6	+59.9	156.1	40 36.7	+59.9	156.5	39 41.6	+60.0	156.8	38 46.4	+60.0	157.1	37 51.0	+60.0	157.4	36 55.6	+60.0	157.7	36 00.0	+60.0	158.0	**36**
37	43 26.3	+59.9	155.7	42 31.5	+60.0	156.0	41 36.6	+60.0	156.4	40 41.6	+59.9	156.8	39 46.4	+59.9	157.1	38 51.0	+60.0	157.4	37 55.6	+60.0	157.7	37 00.0	+60.0	158.0	**37**
38	44 26.2	+59.8	155.6	43 31.5	+59.9	156.0	42 36.6	+59.9	156.4	41 41.5	+60.0	156.7	40 46.3	+60.0	157.1	39 51.0	+60.0	157.4	38 55.6	+60.0	157.7	38 00.0	+60.0	158.0	**38**
39	45 26.0	+59.9	155.5	44 31.4	+59.9	155.9	43 36.5	+59.9	156.3	42 41.5	+60.0	156.7	41 46.3	+60.0	157.0	40 51.0	+60.0	157.4	39 55.6	+60.0	157.7	39 00.0	+60.0	158.0	**39**
40	46 25.9	+59.9	155.4	45 31.3	+59.9	155.8	44 36.4	+60.0	156.2	43 41.5	+59.9	156.6	42 46.3	+60.0	157.0	41 51.0	+60.0	157.3	40 55.6	+60.0	157.7	40 00.0	+60.0	158.0	**40**
41	47 25.8	+59.8	155.3	46 31.2	+59.9	155.7	45 36.4	+59.9	156.2	44 41.4	+60.0	156.6	43 46.3	+60.0	157.0	42 51.0	+60.0	157.3	41 55.6	+60.0	157.7	41 00.0	+60.0	158.0	**41**
42	48 25.6	+59.9	155.2	47 31.1	+59.9	155.7	46 36.3	+59.9	156.1	45 41.4	+59.9	156.5	44 46.3	+59.9	156.9	43 51.0	+60.0	157.3	42 55.6	+60.0	157.7	42 00.0	+60.0	158.0	**42**
43	49 25.5	+59.8	155.1	48 31.0	+59.9	155.6	47 36.2	+60.0	156.0	46 41.3	+60.0	156.5	45 46.2	+60.0	156.9	44 51.0	+60.0	157.3	43 55.6	+60.0	157.6	43 00.0	+60.0	158.0	**43**
44	50 25.3	+59.9	155.0	49 30.9	+59.9	155.5	48 36.2	+59.9	156.0	47 41.3	+59.9	156.4	46 46.2	+60.0	156.8	45 51.0	+60.0	157.2	44 55.6	+60.0	157.6	44 00.0	+60.0	158.0	**44**
45	51 25.2	+59.8	154.9	50 30.8	+59.8	155.4	49 36.1	+59.9	155.9	48 41.2	+60.0	156.3	47 46.2	+60.0	156.8	46 51.0	+59.9	157.2	45 55.6	+60.0	157.6	45 00.0	+60.0	158.0	**45**
46	52 25.0	+59.9	154.7	51 30.6	+59.9	155.3	50 36.0	+59.9	155.8	49 41.2	+59.9	156.3	48 46.2	+59.9	156.7	47 50.9	+60.0	157.2	46 55.6	+60.0	157.6	46 00.0	+60.0	158.0	**46**
47	53 24.9	+59.8	154.6	52 30.5	+59.9	155.2	51 35.9	+60.0	155.7	50 41.1	+60.0	156.2	49 46.1	+60.0	156.7	48 50.9	+60.0	157.2	47 55.6	+59.9	157.6	47 00.0	+60.0	158.0	**47**
48	54 24.7	+59.8	154.5	53 30.4	+59.9	155.1	52 35.9	+59.9	155.6	51 41.1	+59.9	156.2	50 46.1	+60.0	156.7	49 50.9	+60.0	157.1	48 55.5	+60.0	157.6	48 00.0	+60.0	158.0	**48**
49	55 24.5	+59.8	154.3	54 30.3	+59.8	155.0	53 35.8	+59.9	155.5	52 41.0	+60.0	156.1	51 46.1	+59.9	156.6	50 50.9	+60.0	157.1	49 55.5	+60.0	157.6	49 00.0	+60.0	158.0	**49**
50	56 24.3	+59.8	154.2	55 30.1	+59.9	154.8	54 35.7	+59.9	155.4	53 41.0	+59.9	156.0	52 46.0	+60.0	156.5	51 50.9	+60.0	157.1	50 55.5	+60.0	157.5	50 00.0	+60.0	158.0	**50**
51	57 24.1	+59.7	154.1	56 30.0	+59.8	154.7	55 35.6	+59.9	155.3	54 40.9	+60.0	155.9	53 46.0	+60.0	156.5	52 50.9	+60.0	157.0	51 55.5	+60.0	157.5	51 00.0	+60.0	158.0	**51**
52	58 23.8	+59.8	153.9	57 29.8	+59.8	154.6	56 35.5	+59.9	155.2	55 40.9	+59.9	155.9	54 46.0	+59.9	156.4	53 50.9	+60.0	157.0	52 55.5	+60.0	157.5	52 00.0	+60.0	158.0	**52**
53	59 23.6	+59.8	153.7	58 29.6	+59.9	154.4	57 35.4	+59.8	155.1	56 40.8	+59.9	155.8	55 45.9	+60.0	156.4	54 50.9	+59.9	156.9	53 55.5	+60.0	157.5	53 00.0	+60.0	158.0	**53**
54	60 23.4	+59.7	153.5	59 29.5	+59.8	154.3	58 35.2	+59.9	155.0	57 40.7	+59.9	155.7	56 45.9	+60.0	156.3	55 50.8	+60.0	156.9	54 55.5	+60.0	157.5	54 00.0	+60.0	158.0	**54**
55	61 23.1	+59.7	153.3	60 29.3	+59.8	154.1	59 35.1	+59.9	154.9	58 40.6	+60.0	155.6	57 45.9	+59.9	156.2	56 50.8	+60.0	156.9	55 55.5	+60.0	157.4	55 00.0	+60.0	158.0	**55**
56	62 22.8	+59.7	153.1	61 29.1	+59.8	154.0	60 35.0	+59.9	154.8	59 40.6	+59.9	155.5	58 45.8	+60.0	156.2	57 50.8	+60.0	156.8	56 55.5	+60.0	157.4	56 00.0	+60.0	158.0	**56**
57	63 22.5	+59.7	152.9	62 28.9	+59.8	153.8	61 34.9	+59.8	154.6	60 40.5	+59.9	155.4	59 45.8	+59.9	156.1	58 50.8	+60.0	156.8	57 55.5	+60.0	157.4	57 00.0	+60.0	158.0	**57**
58	64 22.2	+59.6	152.7	63 28.7	+59.7	153.6	62 34.7	+59.9	154.5	61 40.4	+59.9	155.3	60 45.7	+60.0	156.0	59 50.8	+59.9	156.7	58 55.5	+60.0	157.4	58 00.0	+60.0	158.0	**58**
59	65 21.8	+59.7	152.4	64 28.4	+59.8	153.4	63 34.6	+59.8	154.3	62 40.3	+59.9	155.1	61 45.7	+59.9	155.9	60 50.7	+60.0	156.7	59 55.5	+60.0	157.4	59 00.0	+60.0	158.0	**59**
60	66 21.5	+59.6	152.2	65 28.2	+59.7	153.2	64 34.4	+59.8	154.1	63 40.2	+59.9	155.0	62 45.6	+60.0	155.8	61 50.7	+60.0	156.6	60 55.5	+60.0	157.3	60 00.0	+60.0	158.0	**60**
61	67 21.1	+59.5	151.9	66 27.9	+59.7	152.9	65 34.2	+59.8	154.0	64 40.1	+59.9	154.9	63 45.6	+59.9	155.7	62 50.7	+60.0	156.6	61 55.5	+60.0	157.3	61 00.0	+60.0	158.0	**61**
62	68 20.6	+59.5	151.5	67 27.6	+59.7	152.7	66 34.0	+59.8	153.8	65 40.0	+59.9	154.7	64 45.5	+59.9	155.6	63 50.7	+59.9	156.5	62 55.5	+60.0	157.3	62 00.0	+60.0	158.0	**62**
63	69 20.1	+59.5	151.2	68 27.3	+59.6	152.4	67 33.8	+59.8	153.5	66 39.9	+59.8	154.6	65 45.4	+60.0	155.5	64 50.6	+60.0	156.4	63 55.5	+60.0	157.2	63 00.0	+60.0	158.0	**63**
64	70 19.6	+59.4	150.8	69 26.9	+59.6	152.1	68 33.6	+59.7	153.3	67 39.7	+59.9	154.4	66 45.4	+59.9	155.4	65 50.6	+60.0	156.3	64 55.5	+60.0	157.2	64 00.0	+60.0	158.0	**64**
65	71 19.0	+59.4	150.4	70 26.5	+59.6	151.8	69 33.3	+59.8	153.0	68 39.6	+59.8	154.2	67 45.3	+59.9	155.3	66 50.6	+59.9	156.3	65 55.5	+60.0	157.2	65 00.0	+60.0	158.0	**65**
66	72 18.4	+59.3	149.9	71 26.1	+59.5	151.4	70 33.1	+59.6	152.8	69 39.4	+59.8	154.0	68 45.2	+59.9	155.1	67 50.5	+60.0	156.2	66 55.5	+60.0	157.1	66 00.0	+60.0	158.0	**66**
67	73 17.7	+59.2	149.4	72 25.6	+59.5	151.0	71 32.7	+59.7	152.5	70 39.2	+59.8	153.8	69 45.1	+59.9	155.0	68 50.5	+60.0	156.1	67 55.5	+59.9	157.1	67 00.0	+60.0	158.0	**67**
68	74 16.9	+59.0	148.8	73 25.1	+59.4	150.5	72 32.4	+59.6	152.1	71 39.0	+59.8	153.5	70 45.0	+59.9	154.8	69 50.5	+59.9	156.0	68 55.4	+60.0	157.0	68 00.0	+60.0	158.0	**68**
69	75 15.9	+59.0	148.1	74 24.5	+59.3	150.0	73 32.0	+59.6	151.7	72 38.8	+59.8	153.2	71 44.9	+59.9	154.6	70 50.4	+60.0	155.9	69 55.4	+60.0	157.0	69 00.0	+60.0	158.0	**69**
70	76 14.9	+58.8	147.4	75 23.8	+59.2	149.5	74 31.6	+59.5	151.3	73 38.6	+59.7	152.9	72 44.8	+59.8	154.4	71 50.4	+59.9	155.7	70 55.4	+60.0	156.9	70 00.0	+60.0	158.0	**70**
71	77 13.7	+58.6	146.5	76 23.0	+59.1	148.8	75 31.1	+59.5	150.8	74 38.3	+59.7	152.6	73 44.6	+59.9	154.2	72 50.3	+60.0	155.6	71 55.4	+60.0	156.9	71 00.0	+60.0	158.0	**71**
72	78 12.3	+58.3	145.5	77 22.1	+58.9	148.0	76 30.6	+59.3	150.2	75 38.0	+59.6	152.2	74 44.5	+59.8	153.9	73 50.3	+59.9	155.4	72 55.4	+60.0	156.8	72 00.0	+60.0	158.0	**72**
73	79 10.6	+58.1	144.3	78 21.0	+58.8	147.2	77 29.9	+59.3	149.6	76 37.6	+59.6	151.7	75 44.3	+59.8	153.6	74 50.2	+59.9	155.2	73 55.4	+60.0	156.7	73 00.0	+60.0	158.0	**73**
74	80 08.7	+57.6	142.9	79 19.8	+58.5	146.1	78 29.2	+59.1	148.8	77 37.2	+59.5	151.2	76 44.1	+59.8	153.3	75 50.1	+59.9	155.0	74 55.4	+59.9	156.6	74 00.0	+60.0	158.0	**74**
75	81 06.3	+57.0	141.2	80 18.3	+58.2	144.8	79 28.3	+58.9	148.0	78 36.7	+59.4	150.6	77 43.9	+59.7	152.9	76 50.0	+59.9	154.8	75 55.3	+60.0	156.5	75 00.0	+60.0	158.0	**75**
76	82 03.3	+56.1	139.0	81 16.5	+57.7	143.3	80 27.2	+58.7	146.9	79 36.1	+59.3	149.9	78 43.6	+59.7	152.4	77 49.9	+59.9	154.5	76 55.3	+60.0	156.4	76 00.0	+60.0	158.0	**76**
77	82 59.4	+55.0	136.3	82 14.2	+57.0	141.4	81 25.9	+58.4	145.6	80 35.4	+59.2	149.0	79 43.3	+59.6	151.8	78 49.8	+59.8	154.2	77 55.3	+60.0	156.3	77 00.0	+60.0	158.0	**77**
78	83 54.4	*+53.1*	•132.8	83 11.2	+56.1	139.0	82 24.3	+57.9	143.9	81 34.6	+58.9	147.9	80 42.9	+59.5	151.1	79 49.6	+59.8	153.8	78 55.3	+59.9	156.1	78 00.0	+60.0	158.0	**78**
79	84 47.5	*+50.1*	•128.1	84 07.3	*+54.6*	•135.7	83 22.2	+57.1	141.8	82 33.5	+58.6	146.5	81 42.4	+59.3	150.3	80 49.4	+59.8	153.4	79 55.2	+60.0	155.9	79 00.0	+60.0	158.0	**79**
80	85 37.6	*+45.1*	•121.5	85 01.9	*+52.0*	•131.3	84 19.3	+55.9	138.9	83 32.1	+58.0	144.7	82 41.7	+59.2	149.2	81 49.2	+59.7	152.8	80 55.2	+59.9	155.7	80 00.0	+60.0	158.0	**80**
81	86 22.7	*+36.2*	•111.9	85 53.9	*+47.5*	•125.0	85 15.2	*+54.0*	•134.9	84 30.1	+57.3	142.3	83 40.9	+58.9	147.8	82 48.9	+59.6	152.1	81 55.1	+59.9	155.4	81 00.0	+60.0	158.0	**81**
82	86 58.9	*+21.2*	•98.1	86 41.4	*+38.8*	•115.5	86 09.2	*+50.0*	•129.0	85 27.4	*+55.7*	•138.8	84 39.8	+58.3	145.9	83 48.5	+59.5	151.1	82 55.0	+59.9	155.0	82 00.0	+60.0	158.0	**82**
83	87 20.1	*+0.1*	•79.1	87 20.2	*+22.7*	•100.7	86 59.2	*+41.9*	•119.7	86 23.1	*+52.7*	•133.6	85 38.1	+57.4	143.1	84 48.0	+59.2	149.8	83 54.9	+59.9	154.5	83 00.0	+60.0	158.0	**83**
84	87 20.2	*–21.0*	•57.4	87 42.9	*–1.8*	•79.1	87 41.1	*+24.6*	•104.1	87 15.8	*+45.6*	•124.9	86 35.5	*+55.3*	•138.8	85 47.2	+58.8	147.8	84 54.8	+59.8	153.8	84 00.0	+60.0	158.0	**84**
85	86 59.2	*–36.1*	•38.4	87 41.1	*–25.3*	•54.0	88 05.7	*–4.3*	•79.0	88 01.4	*+27.1*	•108.8	87 30.8	*+49.8*	•131.2	86 46.0	*+57.7*	•144.6	85 54.6	+59.7	152.8	85 00.0	+60.0	158.0	**85**
86	86 23.1	*–45.0*	•24.5	87 15.8	*–40.3*	•33.2	88 01.4	*–30.6*	•49.3	88 28.5	*–7.9*	•79.0	88 20.6	*+30.7*	•115.3	87 43.7	*+54.2*	•138.8	86 54.3	+59.3	151.1	86 00.0	+60.0	158.0	**86**
87	85 38.1	*–50.1*	•14.9	86 35.5	*–48.3*	•19.3	87 30.8	*–44.8*	•26.9	88 20.6	*–36.9*	•42.7	88 51.3	*–13.4*	•79.0	88 37.9	*+36.3*	•124.8	87 53.6	*+58.2*	•147.8	87 00.0	+60.0	158.0	**87**
88	84 48.0	*–53.1*	•8.3	85 47.2	*–52.4*	•10.3	86 46.0	*–51.4*	•13.4	87 43.7	*–49.4*	•19.3	88 37.9	*–44.3*	•33.2	89 14.2	*–22.4*	•79.0	88 51.8	*+45.3*	•138.8	88 00.0	+60.0	158.0	**88**
89	83 54.9	–54.9	3.5	84 54.8	–54.8	4.2	85 54.6	*–54.6*	•5.3	86 54.3	*–54.3*	•7.0	87 53.6	*–53.6*	•10.2	88 51.8	*–51.8*	•19.2	89 37.1	*–37.1*	•79.0	89 00.0	+60.0	158.0	**89**
90	83 00.0	–56.2	0.0	84 00.0	–56.2	0.0	85 00.0	–56.3	0.0	86 00.0	–56.5	0.0	87 00.0	*–56.7*	•0.0	88 00.0	*–57.1*	•0.0	89 00.0	*–57.8*	•0.0	90 00.0	–60.0	79.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 22°, 338°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 29.3	−60.0	157.9	5 33.7	−60.0	157.9	4 38.1	−60.0	157.9	3 42.5	−60.0	158.0	2 46.9	−60.0	158.0	1 51.3	−60.0	158.0	0 55.6	−60.0	158.0	0 00.0	+60.0	22.0	0
1	5 29.3	−59.9	157.9	4 33.7	−59.9	157.9	3 38.1	−59.9	158.0	2 42.5	−60.0	158.0	1 46.9	−60.0	158.0	0 51.3	−60.0	158.0	0 04.4	+60.0	22.0	1 00.0	+60.0	22.0	1
2	4 29.4	−59.9	157.9	3 33.8	−60.0	158.0	2 38.2	−60.0	158.0	1 42.5	−59.9	158.0	0 46.9	−60.0	158.0	0 08.7	+60.0	22.0	1 04.4	+60.0	22.0	2 00.0	+60.0	22.0	2
3	3 29.5	−60.0	158.0	2 33.8	−59.9	158.0	1 38.2	−60.0	158.0	0 42.6	−60.0	158.0	0 13.1	+60.0	22.0	1 08.7	+60.0	22.0	2 04.4	+60.0	22.0	3 00.0	+60.0	22.0	3
4	2 29.5	−59.9	158.0	1 33.9	−60.0	158.0	0 38.2	−59.9	158.1	0 17.4	+60.0	21.9	1 13.1	+60.0	21.9	2 08.7	+60.0	22.0	3 04.4	+60.0	22.0	4 00.0	+60.0	22.0	4
5	1 29.6	−59.9	158.1	0 33.9	−59.9	158.1	0 21.7	+60.0	21.9	1 17.4	+60.0	21.9	2 13.1	+59.9	21.9	3 08.7	+60.0	21.9	4 04.4	+60.0	22.0	5 00.0	+60.0	22.0	5
6	0 29.7	−60.0	158.1	0 26.0	+60.0	21.9	1 21.7	+60.0	21.9	2 17.4	+60.0	21.9	3 13.0	+60.0	21.9	4 08.7	+60.0	21.9	5 04.4	+60.0	22.0	6 00.0	+60.0	22.0	6
7	0 30.3	+59.9	21.8	1 26.0	+59.9	21.8	2 21.7	+59.9	21.8	3 17.4	+59.9	21.9	4 13.0	+60.0	21.9	5 08.7	+60.0	21.9	6 04.4	+60.0	22.0	7 00.0	+60.0	22.0	7
8	1 30.2	+60.0	21.8	2 25.9	+60.0	21.8	3 21.6	+60.0	21.8	4 17.3	+60.0	21.8	5 13.0	+60.0	21.9	6 08.7	+60.0	21.9	7 04.4	+60.0	22.0	8 00.0	+60.0	22.0	8
9	2 30.2	+59.9	21.7	3 25.9	+59.9	21.8	4 21.6	+60.0	21.8	5 17.3	+60.0	21.8	6 13.0	+60.0	21.9	7 08.7	+60.0	21.9	8 04.4	+60.0	21.9	9 00.0	+60.0	22.0	9
10	3 30.1	+59.9	21.7	4 25.8	+60.0	21.7	5 21.6	+59.9	21.7	6 17.3	+60.0	21.8	7 13.0	+60.0	21.8	8 08.7	+60.0	21.9	9 04.4	+60.0	21.9	10 00.0	+60.0	22.0	10
11	4 30.0	+60.0	21.6	5 25.8	+59.9	21.7	6 21.5	+60.0	21.7	7 17.3	+60.0	21.8	8 13.0	+60.0	21.8	9 08.7	+60.0	21.9	10 04.4	+60.0	21.9	11 00.0	+60.0	22.0	11
12	5 30.0	+59.9	21.6	6 25.7	+60.0	21.6	7 21.5	+60.0	21.7	8 17.3	+59.9	21.7	9 13.0	+60.0	21.8	10 08.7	+60.0	21.9	11 04.4	+60.0	21.9	12 00.0	+60.0	22.0	12
13	6 29.9	+59.9	21.6	7 25.7	+60.0	21.6	8 21.5	+59.9	21.6	9 17.2	+60.0	21.7	10 13.0	+60.0	21.8	11 08.7	+60.0	21.8	12 04.4	+60.0	21.9	13 00.0	+60.0	22.0	13
14	7 29.8	+60.0	21.5	8 25.7	+59.9	21.6	9 21.4	+60.0	21.6	10 17.2	+60.0	21.7	11 13.0	+59.9	21.7	12 08.7	+60.0	21.8	13 04.4	+59.9	21.9	14 00.0	+60.0	22.0	14
15	8 29.8	+59.9	21.5	9 25.6	+60.0	21.5	10 21.4	+60.0	21.6	11 17.2	+60.0	21.7	12 12.9	+60.0	21.7	13 08.7	+60.0	21.8	14 04.3	+60.0	21.9	15 00.0	+60.0	22.0	15
16	9 29.7	+59.9	21.4	10 25.6	+59.9	21.5	11 21.4	+59.9	21.5	12 17.2	+59.9	21.6	13 12.9	+60.0	21.7	14 08.7	+60.0	21.8	15 04.3	+60.0	21.9	16 00.0	+60.0	22.0	16
17	10 29.6	+60.0	21.4	11 25.5	+60.0	21.4	12 21.3	+60.0	21.5	13 17.1	+60.0	21.6	14 12.9	+60.0	21.7	15 08.7	+59.9	21.8	16 04.3	+60.0	21.9	17 00.0	+60.0	22.0	17
18	11 29.6	+59.9	21.3	12 25.5	+59.9	21.4	13 21.3	+60.0	21.5	14 17.1	+60.0	21.6	15 12.9	+60.0	21.7	16 08.6	+60.0	21.8	17 04.3	+60.0	21.9	18 00.0	+60.0	22.0	18
19	12 29.5	+60.0	21.3	13 25.4	+60.0	21.4	14 21.3	+59.9	21.4	15 17.1	+60.0	21.5	16 12.9	+60.0	21.6	17 08.6	+60.0	21.8	18 04.3	+60.0	21.9	19 00.0	+60.0	22.0	19
20	13 29.5	+59.9	21.2	14 25.4	+59.9	21.3	15 21.2	+60.0	21.4	16 17.1	+60.0	21.5	17 12.9	+60.0	21.6	18 08.6	+60.0	21.7	19 04.3	+60.0	21.9	20 00.0	+60.0	22.0	20
21	14 29.4	+59.9	21.2	15 25.3	+60.0	21.3	16 21.2	+60.0	21.4	17 17.1	+59.9	21.5	18 12.9	+60.0	21.6	19 08.6	+60.0	21.7	20 04.3	+60.0	21.9	21 00.0	+60.0	22.0	21
22	15 29.3	+59.9	21.1	16 25.3	+59.9	21.2	17 21.2	+59.9	21.3	18 17.0	+60.0	21.5	19 12.9	+59.9	21.6	20 08.6	+60.0	21.7	21 04.3	+60.0	21.9	22 00.0	+60.0	22.0	22
23	16 29.2	+60.0	21.1	17 25.2	+60.0	21.2	18 21.1	+60.0	21.3	19 17.0	+60.0	21.4	20 12.8	+60.0	21.6	21 08.6	+60.0	21.7	22 04.3	+60.0	21.8	23 00.0	+60.0	22.0	23
24	17 29.2	+59.9	21.0	18 25.2	+59.9	21.1	19 21.1	+60.0	21.3	20 17.0	+60.0	21.4	21 12.8	+60.0	21.5	22 08.6	+60.0	21.7	23 04.3	+60.0	21.8	24 00.0	+60.0	22.0	24
25	18 29.1	+59.9	21.0	19 25.1	+60.0	21.1	20 21.1	+59.9	21.2	21 17.0	+59.9	21.4	22 12.8	+60.0	21.5	23 08.6	+60.0	21.7	24 04.3	+60.0	21.8	25 00.0	+60.0	22.0	25
26	19 29.0	+60.0	20.9	20 25.1	+59.9	21.1	21 21.0	+60.0	21.2	22 16.9	+60.0	21.3	23 12.8	+60.0	21.5	24 08.6	+60.0	21.7	25 04.3	+60.0	21.8	26 00.0	+60.0	22.0	26
27	20 29.0	+59.9	20.9	21 25.0	+60.0	21.0	22 21.0	+60.0	21.2	23 16.9	+60.0	21.3	24 12.8	+60.0	21.5	25 08.6	+60.0	21.6	26 04.3	+60.0	21.8	27 00.0	+60.0	22.0	27
28	21 28.9	+59.9	20.8	22 25.0	+59.9	21.0	23 21.0	+59.9	21.1	24 16.9	+60.0	21.3	25 12.8	+60.0	21.4	26 08.6	+60.0	21.6	27 04.3	+60.0	21.8	28 00.0	+60.0	22.0	28
29	22 28.8	+60.0	20.8	23 24.9	+59.9	20.9	24 20.9	+60.0	21.1	25 16.9	+59.9	21.2	26 12.8	+59.9	21.4	27 08.6	+60.0	21.6	28 04.3	+60.0	21.8	29 00.0	+60.0	22.0	29
30	23 28.8	+59.9	20.7	24 24.8	+60.0	20.9	25 20.9	+59.9	21.0	26 16.8	+60.0	21.2	27 12.7	+60.0	21.4	28 08.6	+60.0	21.6	29 04.3	+60.0	21.8	30 00.0	+60.0	22.0	30
31	24 28.7	+59.9	20.7	25 24.8	+59.9	20.8	26 20.8	+60.0	21.0	27 16.8	+60.0	21.2	28 12.7	+60.0	21.4	29 08.6	+60.0	21.6	30 04.3	+60.0	21.8	31 00.0	+60.0	22.0	31
32	25 28.6	+59.9	20.6	26 24.7	+60.0	20.8	27 20.8	+60.0	21.0	28 16.8	+60.0	21.1	29 12.7	+60.0	21.3	30 08.6	+60.0	21.6	31 04.3	+60.0	21.8	32 00.0	+60.0	22.0	32
33	26 28.5	+59.9	20.5	27 24.7	+59.9	20.7	28 20.8	+59.9	20.9	29 16.8	+59.9	21.1	30 12.7	+60.0	21.3	31 08.6	+59.9	21.5	32 04.3	+60.0	21.8	33 00.0	+60.0	22.0	33
34	27 28.4	+60.0	20.5	28 24.6	+60.0	20.7	29 20.7	+60.0	20.9	30 16.7	+60.0	21.1	31 12.7	+60.0	21.3	32 08.5	+60.0	21.5	33 04.3	+60.0	21.8	34 00.0	+60.0	22.0	34
35	28 28.4	+59.9	20.4	29 24.6	+59.9	20.6	30 20.7	+59.9	20.8	31 16.7	+60.0	21.0	32 12.7	+60.0	21.3	33 08.5	+60.0	21.5	34 04.3	+60.0	21.7	35 00.0	+60.0	22.0	35
36	29 28.3	+59.9	20.4	30 24.5	+59.9	20.6	31 20.6	+60.0	20.8	32 16.7	+60.0	21.0	33 12.7	+59.9	21.2	34 08.5	+60.0	21.5	35 04.3	+60.0	21.7	36 00.0	+60.0	22.0	36
37	30 28.2	+59.9	20.3	31 24.4	+60.0	20.5	32 20.6	+59.9	20.7	33 16.7	+59.9	21.0	34 12.6	+60.0	21.2	35 08.5	+60.0	21.5	36 04.3	+60.0	21.7	37 00.0	+60.0	22.0	37
38	31 28.1	+59.9	20.2	32 24.4	+59.9	20.5	33 20.5	+60.0	20.7	34 16.6	+60.0	20.9	35 12.6	+60.0	21.2	36 08.5	+60.0	21.4	37 04.3	+60.0	21.7	38 00.0	+60.0	22.0	38
39	32 28.0	+59.9	20.2	33 24.3	+59.9	20.4	34 20.5	+59.9	20.6	35 16.6	+60.0	20.9	36 12.6	+60.0	21.2	37 08.5	+60.0	21.4	38 04.3	+60.0	21.7	39 00.0	+60.0	22.0	39
40	33 27.9	+59.9	20.1	34 24.2	+60.0	20.4	35 20.4	+60.0	20.6	36 16.6	+59.9	20.9	37 12.6	+60.0	21.1	38 08.5	+60.0	21.4	39 04.3	+60.0	21.7	40 00.0	+60.0	22.0	40
41	34 27.8	+60.0	20.1	35 24.2	+59.9	20.3	36 20.4	+59.9	20.5	37 16.5	+60.0	20.8	38 12.6	+59.9	21.1	39 08.5	+60.0	21.4	40 04.3	+60.0	21.7	41 00.0	+60.0	22.0	41
42	35 27.8	+59.9	20.0	36 24.1	+59.9	20.2	37 20.3	+60.0	20.5	38 16.5	+60.0	20.8	39 12.5	+60.0	21.1	40 08.5	+60.0	21.4	41 04.3	+60.0	21.7	42 00.0	+60.0	22.0	42
43	36 27.7	+59.9	19.9	37 24.0	+60.0	20.2	38 20.3	+59.9	20.4	39 16.5	+59.9	20.7	40 12.5	+60.0	21.0	41 08.5	+60.0	21.3	42 04.3	+60.0	21.7	43 00.0	+60.0	22.0	43
44	37 27.6	+59.9	19.8	38 24.0	+59.9	20.1	39 20.2	+60.0	20.4	40 16.4	+60.0	20.7	41 12.5	+60.0	21.0	42 08.5	+60.0	21.3	43 04.3	+60.0	21.6	44 00.0	+60.0	22.0	44
45	38 27.5	+59.9	19.8	39 23.9	+59.9	20.0	40 20.2	+59.9	20.3	41 16.4	+60.0	20.6	42 12.5	+60.0	21.0	43 08.5	+59.9	21.3	44 04.3	+60.0	21.6	45 00.0	+60.0	22.0	45
46	39 27.4	+59.9	19.7	40 23.8	+59.9	20.0	41 20.1	+60.0	20.3	42 16.4	+59.9	20.6	43 12.5	+59.9	20.9	44 08.4	+60.0	21.3	45 04.3	+60.0	21.6	46 00.0	+60.0	22.0	46
47	40 27.3	+59.8	19.6	41 23.7	+59.9	19.9	42 20.1	+59.9	20.2	43 16.3	+60.0	20.5	44 12.4	+60.0	20.9	45 08.4	+60.0	21.2	46 04.3	+60.0	21.6	47 00.0	+60.0	22.0	47
48	41 27.1	+59.9	19.5	42 23.6	+59.9	19.8	43 20.0	+60.0	20.2	44 16.3	+59.9	20.5	45 12.4	+60.0	20.8	46 08.4	+60.0	21.2	47 04.3	+60.0	21.6	48 00.0	+60.0	22.0	48
49	42 27.0	+59.9	19.5	43 23.5	+60.0	19.8	44 20.0	+59.9	20.1	45 16.2	+60.0	20.4	46 12.4	+60.0	20.8	47 08.4	+60.0	21.2	48 04.3	+60.0	21.6	49 00.0	+60.0	22.0	49
50	43 26.9	+59.9	19.4	44 23.5	+59.9	19.7	45 19.9	+59.9	20.0	46 16.2	+60.0	20.4	47 12.4	+59.9	20.8	48 08.4	+60.0	21.2	49 04.3	+60.0	21.6	50 00.0	+60.0	22.0	50
51	44 26.8	+59.9	19.3	45 23.4	+59.9	19.6	46 19.8	+60.0	20.0	47 16.2	+59.9	20.3	48 12.3	+60.0	20.7	49 08.4	+60.0	21.1	50 04.3	+60.0	21.5	51 00.0	+60.0	22.0	51
52	45 26.7	+59.8	19.2	46 23.3	+59.9	19.5	47 19.8	+59.9	19.9	48 16.1	+60.0	20.3	49 12.3	+60.0	20.7	50 08.4	+60.0	21.1	51 04.3	+60.0	21.5	52 00.0	+60.0	22.0	52
53	46 26.5	+59.9	19.1	47 23.2	+59.9	19.4	48 19.7	+59.9	19.8	49 16.1	+59.9	20.2	50 12.3	+60.0	20.6	51 08.4	+60.0	21.1	52 04.3	+60.0	21.5	53 00.0	+60.0	22.0	53
54	47 26.4	+59.9	19.0	48 23.1	+59.9	19.4	49 19.6	+59.9	19.7	50 16.0	+60.0	20.1	51 12.3	+59.9	20.6	52 08.4	+59.9	21.0	53 04.3	+60.0	21.5	54 00.0	+60.0	22.0	54
55	48 26.3	+59.8	18.9	49 23.0	+59.9	19.3	50 19.5	+60.0	19.7	51 16.0	+59.9	20.1	52 12.2	+60.0	20.5	53 08.3	+60.0	21.0	54 04.3	+60.0	21.5	55 00.0	+60.0	22.0	55
56	49 26.1	+59.9	18.8	50 22.9	+59.8	19.2	51 19.5	+59.9	19.6	52 15.9	+60.0	20.0	53 12.2	+60.0	20.5	54 08.3	+60.0	21.0	55 04.3	+60.0	21.5	56 00.0	+60.0	22.0	56
57	50 26.0	+59.8	18.7	51 22.7	+59.9	19.1	52 19.4	+59.9	19.5	53 15.9	+59.9	19.9	54 12.2	+59.9	20.4	55 08.3	+60.0	20.9	56 04.3	+60.0	21.4	57 00.0	+60.0	22.0	57
58	51 25.8	+59.8	18.6	52 22.6	+59.9	19.0	53 19.3	+59.9	19.4	54 15.8	+59.9	19.9	55 12.1	+60.0	20.4	56 08.3	+60.0	20.9	57 04.3	+60.0	21.4	58 00.0	+60.0	22.0	58
59	52 25.6	+59.9	18.4	53 22.5	+59.9	18.9	54 19.2	+59.9	19.3	55 15.7	+60.0	19.8	56 12.1	+60.0	20.3	57 08.3	+60.0	20.8	58 04.3	+59.9	21.4	59 00.0	+60.0	22.0	59
60	53 25.5	+59.8	18.3	54 22.4	+59.8	18.8	55 19.1	+59.9	19.2	56 15.7	+59.9	19.7	57 12.1	+59.9	20.2	58 08.3	+59.9	20.8	59 04.2	+60.0	21.4	60 00.0	+60.0	22.0	60
61	54 25.3	+59.8	18.2	55 22.2	+59.9	18.6	56 19.0	+59.9	19.1	57 15.6	+59.9	19.6	58 12.0	+60.0	20.2	59 08.2	+60.0	20.7	60 04.2	+60.0	21.3	61 00.0	+60.0	22.0	61
62	55 25.1	+59.8	18.1	56 22.1	+59.8	18.5	57 18.9	+59.9	19.0	58 15.5	+59.9	19.5	59 12.0	+59.9	20.1	60 08.2	+60.0	20.7	61 04.2	+60.0	21.3	62 00.0	+60.0	22.0	62
63	56 24.9	+59.8	17.9	57 21.9	+59.9	18.4	58 18.8	+59.9	18.9	59 15.4	+60.0	19.4	60 11.9	+60.0	20.0	61 08.2	+60.0	20.6	62 04.2	+60.0	21.3	63 00.0	+60.0	22.0	63
64	57 24.7	+59.8	17.8	58 21.8	+59.8	18.2	59 18.7	+59.8	18.8	60 15.4	+59.9	19.3	61 11.9	+59.9	19.9	62 08.2	+60.0	20.6	63 04.2	+60.0	21.3	64 00.0	+60.0	22.0	64
65	58 24.5	+59.7	17.6	59 21.6	+59.8	18.1	60 18.5	+59.9	18.6	61 15.3	+59.9	19.2	62 11.8	+60.0	19.8	63 08.2	+59.9	20.5	64 04.2	+60.0	21.2	65 00.0	+60.0	22.0	65
66	59 24.2	+59.8	17.4	60 21.4	+59.8	17.9	61 18.4	+59.8	18.5	62 15.2	+59.9	19.1	63 11.8	+59.9	19.7	64 08.1	+60.0	20.4	65 04.2	+60.0	21.2	66 00.0	+60.0	22.0	66
67	60 24.0	+59.7	17.2	61 21.2	+59.8	17.8	62 18.2	+59.9	18.4	63 15.1	+59.9	19.0	64 11.7	+60.0	19.6	65 08.1	+60.0	20.4	66 04.2	+60.0	21.2	67 00.0	+60.0	22.0	67
68	61 23.7	+59.7	17.0	62 21.0	+59.8	17.6	63 18.1	+59.8	18.2	64 15.0	+59.9	18.8	65 11.7	+59.9	19.5	66 08.1	+59.9	20.3	67 04.2	+60.0	21.1	68 00.0	+60.0	22.0	68
69	62 23.4	+59.7	16.8	63 20.8	+59.7	17.4	64 17.9	+59.9	18.0	65 14.9	+59.9	18.7	66 11.6	+59.9	19.4	67 08.0	+60.0	20.2	68 04.2	+60.0	21.1	69 00.0	+60.0	22.0	69
70	63 23.1	+59.7	16.6	64 20.5	+59.8	17.2	65 17.8	+59.8	17.9	66 14.8	+59.8	18.5	67 11.5	+59.9	19.3	68 08.0	+60.0	20.1	69 04.2	+60.0	21.0	70 00.0	+60.0	22.0	70
71	64 22.8	+59.7	16.4	65 20.3	+59.7	17.0	66 17.6	+59.8	17.7	67 14.6	+59.9	18.4	68 11.4	+59.9	19.2	69 08.0	+59.9	20.0	70 04.2	+60.0	21.0	71 00.0	+60.0	22.0	71
72	65 22.5	+59.6	16.1	66 20.0	+59.7	16.8	67 17.4	+59.7	17.4	68 14.5	+59.8	18.2	69 11.3	+59.9	19.0	70 07.9	+60.0	19.9	71 04.2	+59.9	20.9	72 00.0	+60.0	22.0	72
73	66 22.1	+59.6	15.9	67 19.7	+59.7	16.5	68 17.1	+59.8	17.2	69 14.3	+59.9	18.0	70 11.2	+59.9	18.9	71 07.9	+59.9	19.8	72 04.1	+60.0	20.8	73 00.0	+60.0	22.0	73
74	67 21.7	+59.5	15.6	68 19.4	+59.6	16.2	69 16.9	+59.7	17.0	70 14.2	+59.8	17.8	71 11.1	+59.9	18.7	72 07.8	+60.0	19.7	73 04.1	+60.0	20.8	74 00.0	+60.0	22.0	74
75	68 21.2	+59.6	15.2	69 19.0	+59.6	15.9	70 16.6	+59.7	16.7	71 14.0	+59.8	17.5	72 11.0	+59.9	18.5	73 07.8	+59.9	19.5	74 04.1	+60.0	20.7	75 00.0	+60.0	22.0	75
76	69 20.8	+59.4	14.9	70 18.6	+59.6	15.6	71 16.3	+59.7	16.4	72 13.8	+59.7	17.3	73 10.9	+59.9	18.3	74 07.7	+59.9	19.4	75 04.1	+60.0	20.6	76 00.0	+60.0	22.0	76
77	70 20.2	+59.4	14.5	71 18.2	+59.5	15.2	72 16.0	+59.6	16.1	73 13.5	+59.8	17.0	74 10.8	+59.8	18.0	75 07.6	+59.9	19.2	76 04.1	+59.9	20.5	77 00.0	+60.0	22.0	77
78	71 19.6	+59.4	14.1	72 17.7	+59.5	14.8	73 15.6	+59.6	15.7	74 13.3	+59.7	16.6	75 10.6	+59.8	17.7	76 07.5	+59.9	19.0	77 04.0	+60.0	20.4	78 00.0	+60.0	22.0	78
79	72 19.0	+59.3	13.6	73 17.2	+59.4	14.4	74 15.2	+59.6	15.3	75 13.0	+59.6	16.3	76 10.4	+59.8	17.4	77 07.4	+59.9	18.7	78 04.0	+60.0	20.2	79 00.0	+60.0	22.0	79
80	73 18.3	+59.2	13.1	74 16.6	+59.4	13.9	75 14.8	+59.4	14.8	76 12.6	+59.6	15.8	77 10.2	+59.7	17.0	78 07.3	+59.9	18.4	79 04.0	+59.9	20.1	80 00.0	+60.0	22.0	80
81	74 17.5	+59.1	12.5	75 16.0	+59.2	13.3	76 14.2	+59.4	14.3	77 12.2	+59.6	15.3	78 09.9	+59.7	16.6	79 07.2	+59.8	18.1	80 03.9	+60.0	19.9	81 00.0	+60.0	22.0	81
82	75 16.6	+58.9	11.8	76 15.2	+59.1	12.7	77 13.6	+59.3	13.6	78 11.8	+59.4	14.8	79 09.6	+59.7	16.1	80 07.0	+59.8	17.7	81 03.9	+59.9	19.6	82 00.0	+60.0	22.0	82
83	76 15.5	+58.8	11.1	77 14.3	+59.0	11.9	78 12.9	+59.2	12.9	79 11.2	+59.4	14.1	80 09.3	+59.5	15.5	81 06.8	+59.8	17.2	82 03.8	+60.0	19.3	83 00.0	+60.0	22.0	83
84	77 14.3	+58.6	10.2	78 13.3	+58.8	11.1	79 12.1	+59.0	12.1	80 10.6	+59.2	13.3	81 08.8	+59.5	14.7	82 06.6	+59.7	16.6	83 03.8	+59.9	18.9	84 00.0	+60.0	22.0	84
85	78 12.9	+58.3	9.2	79 12.1	+58.5	10.0	80 11.1	+58.7	11.0	81 09.8	+59.0	12.3	82 08.3	+59.3	13.8	83 06.3	+59.6	15.8	84 03.7	+59.8	18.4	85 00.0	+60.0	22.0	85
86	79 11.2	+58.1	8.0	80 10.6	+58.2	8.8	81 09.8	+58.5	9.8	82 08.8	+58.8	11.0	83 07.6	+59.0	12.6	84 05.9	+59.4	14.7	85 03.5	+59.8	17.7	86 00.0	+60.0	22.0	86
87	80 09.3	+57.5	6.6	81 08.8	+57.8	7.3	82 08.3	+58.0	8.2	83 07.6	+58.3	9.4	84 06.6	+58.7	11.0	85 05.3	+59.1	13.2	86 03.3	+59.6	16.6	87 00.0	+60.0	22.0	87
88	81 06.8	+57.0	4.9	82 06.6	+57.2	5.5	83 06.3	+57.4	6.3	84 05.9	+57.6	7.3	85 05.3	+58.0	8.8	86 04.4	+58.5	11.0	87 02.9	+59.3	14.7	88 00.0	+60.0	22.0	88
89	82 03.8	+56.2	2.7	83 03.8	+56.2	3.1	84 03.7	+56.3	3.6	85 03.5	+56.5	4.4	86 03.3	*+56.7*•	5.5	87 02.9	*+57.1*•	7.3	88 02.2	*+57.8*•	11.0	89 00.0	+60.0	22.0	89
90	83 00.0	+54.9	0.0	84 00.0	+54.8	0.0	85 00.0	*+54.6*•	0.0	86 00.0	*+54.3*•	0.0	87 00.0	*+53.6*•	0.0	88 00.0	*+51.8*•	0.0	89 00.0	*+37.1*•	0.0	90 00.0	−60.0	11.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 158°, 202°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 26.5	+59.9	156.8	5 31.3	+59.9	156.9	4 36.1	+60.0	156.9	3 40.9	+60.0	156.9	2 45.7	+60.0	157.0	1 50.5	+60.0	157.0	0 55.2	+60.0	157.0	0 00.0	+60.0	157.0	**0**
1	7 26.4	+59.9	156.8	6 31.2	+60.0	156.8	5 36.1	+59.9	156.9	4 40.9	+59.9	156.9	3 45.7	+60.0	157.0	2 50.5	+59.9	157.0	1 55.2	+60.0	157.0	1 00.0	+60.0	157.0	**1**
2	8 26.3	+60.0	156.7	7 31.2	+59.9	156.8	6 36.0	+60.0	156.9	5 40.8	+60.0	156.9	4 45.7	+59.9	156.9	3 50.4	+60.0	157.0	2 55.2	+60.0	157.0	2 00.0	+60.0	157.0	**2**
3	9 26.3	+59.9	156.7	8 31.1	+60.0	156.8	7 36.0	+60.0	156.8	6 40.8	+60.0	156.9	5 45.6	+60.0	156.9	4 50.4	+60.0	156.9	3 55.2	+60.0	157.0	3 00.0	+60.0	157.0	**3**
4	10 26.2	+59.9	156.7	9 31.1	+59.9	156.7	8 36.0	+59.9	156.8	7 40.8	+60.0	156.8	6 45.6	+60.0	156.9	5 50.4	+60.0	156.9	4 55.2	+60.0	157.0	4 00.0	+60.0	157.0	**4**
5	11 26.1	+59.9	156.6	10 31.0	+60.0	156.7	9 35.9	+60.0	156.7	8 40.8	+60.0	156.8	7 45.6	+60.0	156.9	6 50.4	+60.0	156.9	5 55.2	+60.0	157.0	5 00.0	+60.0	157.0	**5**
6	12 26.0	+60.0	156.6	11 31.0	+59.9	156.6	10 35.9	+59.9	156.7	9 40.8	+59.9	156.8	8 45.6	+60.0	156.8	7 50.4	+60.0	156.9	6 55.2	+60.0	157.0	6 00.0	+60.0	157.0	**6**
7	13 26.0	+59.9	156.5	12 30.9	+60.0	156.6	11 35.8	+60.0	156.7	10 40.7	+60.0	156.8	9 45.6	+60.0	156.8	8 50.4	+60.0	156.9	7 55.2	+60.0	156.9	7 00.0	+60.0	157.0	**7**
8	14 25.9	+59.9	156.5	13 30.9	+59.9	156.6	12 35.8	+60.0	156.6	11 40.7	+60.0	156.7	10 45.6	+60.0	156.8	9 50.4	+60.0	156.9	8 55.2	+60.0	156.9	8 00.0	+60.0	157.0	**8**
9	15 25.8	+60.0	156.4	14 30.8	+60.0	156.5	13 35.8	+59.9	156.6	12 40.7	+60.0	156.7	11 45.6	+60.0	156.8	10 50.4	+60.0	156.9	9 55.2	+60.0	156.9	9 00.0	+60.0	157.0	**9**
10	16 25.8	+59.9	156.3	15 30.8	+59.9	156.5	14 35.7	+60.0	156.6	13 40.7	+59.9	156.7	12 45.6	+59.9	156.8	11 50.4	+60.0	156.8	10 55.2	+60.0	156.9	10 00.0	+60.0	157.0	**10**
11	17 25.7	+59.9	156.3	16 30.7	+60.0	156.4	15 35.7	+60.0	156.5	14 40.6	+60.0	156.6	13 45.5	+60.0	156.7	12 50.4	+60.0	156.8	11 55.2	+60.0	156.9	11 00.0	+60.0	157.0	**11**
12	18 25.6	+59.9	156.2	17 30.7	+59.9	156.4	16 35.7	+59.9	156.5	15 40.6	+60.0	156.6	14 45.5	+60.0	156.7	13 50.4	+60.0	156.8	12 55.2	+60.0	156.9	12 00.0	+60.0	157.0	**12**
13	19 25.5	+60.0	156.2	18 30.6	+59.9	156.3	17 35.6	+60.0	156.5	16 40.6	+60.0	156.6	15 45.5	+60.0	156.7	14 50.4	+60.0	156.8	13 55.2	+60.0	156.9	13 00.0	+60.0	157.0	**13**
14	20 25.5	+59.9	156.1	19 30.5	+60.0	156.3	18 35.6	+59.9	156.4	17 40.6	+59.9	156.6	16 45.5	+60.0	156.7	15 50.4	+60.0	156.8	14 55.2	+60.0	156.9	14 00.0	+60.0	157.0	**14**
15	21 25.4	+59.9	156.1	20 30.5	+59.9	156.2	19 35.5	+60.0	156.4	18 40.5	+60.0	156.5	17 45.5	+60.0	156.7	16 50.4	+60.0	156.8	15 55.2	+60.0	156.9	15 00.0	+60.0	157.0	**15**
16	22 25.3	+59.9	156.0	21 30.4	+60.0	156.2	20 35.5	+60.0	156.3	19 40.5	+60.0	156.5	18 45.5	+60.0	156.6	17 50.4	+60.0	156.8	16 55.2	+60.0	156.9	16 00.0	+60.0	157.0	**16**
17	23 25.2	+59.9	156.0	22 30.4	+59.9	156.1	21 35.5	+59.9	156.3	20 40.5	+60.0	156.5	19 45.5	+59.9	156.6	18 50.4	+60.0	156.7	17 55.2	+60.0	156.9	17 00.0	+60.0	157.0	**17**
18	24 25.1	+59.9	155.9	23 30.3	+60.0	156.1	22 35.4	+60.0	156.3	21 40.5	+59.9	156.4	20 45.4	+60.0	156.6	19 50.4	+59.9	156.7	18 55.2	+60.0	156.9	18 00.0	+60.0	157.0	**18**
19	25 25.0	+60.0	155.9	24 30.3	+59.9	156.0	23 35.4	+59.9	156.2	22 40.4	+60.0	156.4	21 45.4	+60.0	156.6	20 50.3	+60.0	156.7	19 55.2	+60.0	156.9	19 00.0	+60.0	157.0	**19**
20	26 25.0	+59.9	155.8	25 30.2	+59.9	156.0	24 35.3	+60.0	156.2	23 40.4	+60.0	156.4	22 45.4	+60.0	156.5	21 50.3	+60.0	156.7	20 55.2	+60.0	156.9	20 00.0	+60.0	157.0	**20**
21	27 24.9	+59.9	155.7	26 30.1	+60.0	155.9	25 35.3	+60.0	156.1	24 40.4	+60.0	156.3	23 45.4	+60.0	156.5	22 50.3	+60.0	156.7	21 55.2	+60.0	156.8	21 00.0	+60.0	157.0	**21**
22	28 24.8	+59.9	155.7	27 30.1	+59.9	155.9	26 35.3	+59.9	156.1	25 40.4	+59.9	156.3	24 45.4	+60.0	156.5	23 50.3	+60.0	156.7	22 55.2	+60.0	156.8	22 00.0	+60.0	157.0	**22**
23	29 24.7	+59.9	155.6	28 30.0	+59.9	155.8	27 35.2	+60.0	156.1	26 40.3	+60.0	156.3	25 45.4	+60.0	156.5	24 50.3	+60.0	156.7	23 55.2	+60.0	156.8	23 00.0	+60.0	157.0	**23**
24	30 24.6	+59.9	155.6	29 29.9	+60.0	155.8	28 35.2	+59.9	156.0	27 40.3	+60.0	156.2	26 45.4	+59.9	156.4	25 50.3	+60.0	156.6	24 55.2	+60.0	156.8	24 00.0	+60.0	157.0	**24**
25	31 24.5	+59.9	155.5	30 29.9	+59.9	155.7	29 35.1	+60.0	156.0	28 40.3	+59.9	156.2	27 45.3	+60.0	156.4	26 50.3	+60.0	156.6	25 55.2	+60.0	156.8	25 00.0	+60.0	157.0	**25**
26	32 24.4	+59.9	155.4	31 29.8	+59.9	155.7	30 35.1	+59.9	155.9	29 40.2	+60.0	156.2	28 45.3	+60.0	156.4	27 50.3	+60.0	156.6	26 55.2	+60.0	156.8	26 00.0	+60.0	157.0	**26**
27	33 24.3	+59.9	155.4	32 29.7	+60.0	155.6	31 35.0	+60.0	155.9	30 40.2	+60.0	156.1	29 45.3	+60.0	156.4	28 50.3	+60.0	156.6	27 55.2	+60.0	156.8	27 00.0	+60.0	157.0	**27**
28	34 24.2	+59.9	155.3	33 29.7	+59.9	155.6	32 35.0	+59.9	155.8	31 40.2	+60.0	156.1	30 45.3	+60.0	156.3	29 50.3	+60.0	156.6	28 55.2	+60.0	156.8	28 00.0	+60.0	157.0	**28**
29	35 24.1	+59.9	155.2	34 29.6	+59.9	155.5	33 34.9	+60.0	155.8	32 40.2	+59.9	156.0	31 45.3	+60.0	156.3	30 50.3	+60.0	156.5	29 55.2	+60.0	156.8	29 00.0	+60.0	157.0	**29**
30	36 24.0	+59.9	155.1	35 29.5	+59.9	155.4	34 34.9	+59.9	155.7	33 40.1	+60.0	156.0	32 45.3	+59.9	156.3	31 50.3	+60.0	156.5	30 55.2	+60.0	156.8	30 00.0	+60.0	157.0	**30**
31	37 23.9	+59.9	155.1	36 29.4	+60.0	155.4	35 34.8	+60.0	155.7	34 40.1	+60.0	156.0	33 45.2	+60.0	156.2	32 50.3	+60.0	156.5	31 55.2	+60.0	156.8	31 00.0	+60.0	157.0	**31**
32	38 23.8	+59.9	155.0	37 29.4	+59.9	155.3	36 34.8	+59.9	155.6	35 40.1	+59.9	155.9	34 45.2	+60.0	156.2	33 50.3	+59.9	156.5	32 55.2	+60.0	156.8	32 00.0	+60.0	157.0	**32**
33	39 23.7	+59.9	154.9	38 29.3	+59.9	155.3	37 34.7	+60.0	155.6	36 40.0	+60.0	155.9	35 45.2	+60.0	156.2	34 50.2	+60.0	156.5	33 55.2	+60.0	156.7	33 00.0	+60.0	157.0	**33**
34	40 23.6	+59.9	154.8	39 29.2	+59.9	155.2	38 34.7	+59.9	155.5	37 40.0	+60.0	155.8	36 45.2	+60.0	156.2	35 50.2	+60.0	156.4	34 55.2	+60.0	156.7	34 00.0	+60.0	157.0	**34**
35	41 23.5	+59.8	154.7	40 29.1	+59.9	155.1	39 34.6	+59.9	155.5	38 40.0	+59.9	155.8	37 45.2	+59.9	156.1	36 50.2	+60.0	156.4	35 55.2	+60.0	156.7	35 00.0	+60.0	157.0	**35**
36	42 23.3	+59.9	154.7	41 29.0	+59.9	155.0	40 34.5	+60.0	155.4	39 39.9	+60.0	155.8	38 45.1	+60.0	156.1	37 50.2	+60.0	156.4	36 55.2	+60.0	156.7	36 00.0	+60.0	157.0	**36**
37	43 23.2	+59.9	154.6	42 28.9	+59.9	155.0	41 34.5	+59.9	155.3	40 39.9	+59.9	155.7	39 45.1	+60.0	156.1	38 50.2	+60.0	156.4	37 55.2	+60.0	156.7	37 00.0	+60.0	157.0	**37**
38	44 23.1	+59.8	154.5	43 28.8	+59.9	154.9	42 34.4	+60.0	155.3	41 39.8	+60.0	155.7	40 45.1	+60.0	156.0	39 50.2	+60.0	156.4	38 55.2	+60.0	156.7	38 00.0	+60.0	157.0	**38**
39	45 22.9	+59.9	154.4	44 28.7	+59.9	154.8	43 34.4	+59.9	155.2	42 39.8	+60.0	155.6	41 45.1	+59.9	156.0	40 50.2	+60.0	156.3	39 55.2	+60.0	156.7	39 00.0	+60.0	157.0	**39**
40	46 22.8	+59.9	154.3	45 28.6	+59.9	154.7	44 34.3	+59.9	155.2	43 39.8	+59.9	155.6	42 45.0	+60.0	155.9	41 50.2	+60.0	156.3	40 55.2	+60.0	156.7	40 00.0	+60.0	157.0	**40**
41	47 22.7	+59.8	154.2	46 28.5	+59.9	154.6	45 34.2	+60.0	155.1	44 39.7	+60.0	155.5	43 45.0	+60.0	155.9	42 50.2	+60.0	156.3	41 55.2	+60.0	156.7	41 00.0	+60.0	157.0	**41**
42	48 22.5	+59.9	154.1	47 28.4	+59.9	154.6	46 34.2	+59.9	155.0	45 39.7	+59.9	155.5	44 45.0	+60.0	155.9	43 50.2	+59.9	156.3	42 55.2	+60.0	156.6	42 00.0	+60.0	157.0	**42**
43	49 22.4	+59.8	154.0	48 28.3	+59.9	154.5	47 34.1	+59.9	154.9	46 39.6	+60.0	155.4	45 45.0	+59.9	155.8	44 50.1	+60.0	156.2	43 55.2	+60.0	156.6	43 00.0	+60.0	157.0	**43**
44	50 22.2	+59.8	153.9	49 28.2	+59.9	154.4	48 34.0	+59.9	154.9	47 39.6	+59.9	155.3	46 44.9	+60.0	155.8	45 50.1	+60.0	156.2	44 55.2	+59.9	156.6	44 00.0	+60.0	157.0	**44**
45	51 22.0	+59.8	153.7	50 28.1	+59.9	154.3	49 33.9	+59.9	154.8	48 39.5	+60.0	155.3	47 44.9	+60.0	155.7	46 50.1	+60.0	156.2	45 55.1	+60.0	156.6	45 00.0	+60.0	157.0	**45**
46	52 21.8	+59.9	153.6	51 28.0	+59.8	154.2	50 33.8	+59.9	154.7	49 39.5	+59.9	155.2	48 44.9	+60.0	155.7	47 50.1	+60.0	156.1	46 55.1	+60.0	156.6	46 00.0	+60.0	157.0	**46**
47	53 21.7	+59.8	153.5	52 27.8	+59.9	154.1	51 33.7	+60.0	154.6	50 39.4	+60.0	155.1	49 44.9	+59.9	155.6	48 50.1	+60.0	156.1	47 55.1	+60.0	156.6	47 00.0	+60.0	157.0	**47**
48	54 21.5	+59.7	153.3	53 27.7	+59.8	154.0	52 33.7	+59.9	154.5	51 39.4	+59.9	155.1	50 44.8	+60.0	155.6	49 50.1	+60.0	156.1	48 55.1	+60.0	156.6	48 00.0	+60.0	157.0	**48**
49	55 21.2	+59.8	153.2	54 27.5	+59.9	153.8	53 33.6	+59.9	154.4	52 39.3	+59.9	155.0	51 44.8	+60.0	155.5	50 50.1	+60.0	156.1	49 55.1	+60.0	156.5	49 00.0	+60.0	157.0	**49**
50	56 21.0	+59.8	153.0	55 27.4	+59.8	153.7	54 33.5	+59.8	154.3	53 39.2	+60.0	154.9	52 44.8	+59.9	155.5	51 50.1	+59.9	156.0	50 55.1	+60.0	156.5	50 00.0	+60.0	157.0	**50**
51	57 20.8	+59.8	152.9	56 27.2	+59.9	153.6	55 33.3	+59.9	154.2	54 39.2	+59.9	154.8	53 44.7	+60.0	155.4	52 50.0	+60.0	156.0	51 55.1	+60.0	156.5	51 00.0	+60.0	157.0	**51**
52	58 20.6	+59.7	152.7	57 27.1	+59.8	153.4	56 33.2	+59.9	154.1	55 39.1	+59.9	154.8	54 44.7	+60.0	155.4	53 50.0	+60.0	155.9	52 55.1	+60.0	156.5	52 00.0	+60.0	157.0	**52**
53	59 20.3	+59.7	152.5	58 26.9	+59.8	153.3	57 33.1	+59.9	154.0	56 39.0	+60.0	154.7	55 44.7	+59.9	155.3	54 50.0	+60.0	155.9	53 55.1	+60.0	156.5	53 00.0	+60.0	157.0	**53**
54	60 20.0	+59.8	152.4	59 26.7	+59.8	153.1	58 33.0	+59.9	153.9	57 39.0	+59.9	154.6	56 44.6	+60.0	155.2	55 50.0	+60.0	155.9	54 55.1	+60.0	156.4	54 00.0	+60.0	157.0	**54**
55	61 19.8	+59.6	152.2	60 26.5	+59.8	153.0	59 32.9	+59.8	153.8	58 38.9	+59.9	154.5	57 44.6	+59.9	155.2	56 50.0	+60.0	155.8	55 55.1	+60.0	156.4	55 00.0	+60.0	157.0	**55**
56	62 19.4	+59.7	151.9	61 26.3	+59.8	152.8	60 32.7	+59.9	153.6	59 38.8	+59.9	154.4	58 44.5	+60.0	155.1	57 50.0	+59.9	155.8	56 55.1	+60.0	156.4	56 00.0	+60.0	157.0	**56**
57	63 19.1	+59.7	151.7	62 26.1	+59.7	152.6	61 32.6	+59.8	153.5	60 38.7	+59.9	154.3	59 44.5	+59.9	155.0	58 49.9	+60.0	155.7	57 55.1	+60.0	156.4	57 00.0	+60.0	157.0	**57**
58	64 18.8	+59.6	151.5	63 25.8	+59.8	152.4	62 32.4	+59.8	153.3	61 38.6	+59.9	154.2	60 44.4	+60.0	154.9	59 49.9	+60.0	155.7	58 55.1	+60.0	156.4	58 00.0	+60.0	157.0	**58**
59	65 18.4	+59.6	151.2	64 25.6	+59.7	152.2	63 32.2	+59.9	153.2	62 38.5	+59.9	154.0	61 44.4	+59.9	154.8	60 49.9	+60.0	155.6	59 55.1	+60.0	156.3	59 00.0	+60.0	157.0	**59**
60	66 18.0	+59.5	150.9	65 25.3	+59.7	152.0	64 32.1	+59.8	153.0	63 38.4	+59.9	153.9	62 44.3	+60.0	154.8	61 49.9	+59.9	155.6	60 55.1	+60.0	156.3	60 00.0	+60.0	157.0	**60**
61	67 17.5	+59.6	150.6	66 25.0	+59.6	151.7	65 31.9	+59.8	152.8	64 38.3	+59.9	153.8	63 44.3	+59.9	154.7	62 49.8	+60.0	155.5	61 55.1	+60.0	156.3	61 00.0	+60.0	157.0	**61**
62	68 17.1	+59.4	150.3	67 24.6	+59.7	151.5	66 31.7	+59.7	152.6	65 38.2	+59.8	153.6	64 44.2	+59.9	154.5	63 49.8	+60.0	155.4	62 55.1	+60.0	156.2	62 00.0	+60.0	157.0	**62**
63	69 16.5	+59.5	149.9	68 24.3	+59.6	151.2	67 31.4	+59.8	152.4	66 38.0	+59.9	153.4	65 44.1	+59.9	154.4	64 49.8	+60.0	155.3	63 55.1	+60.0	156.2	63 00.0	+60.0	157.0	**63**
64	70 16.0	+59.3	149.5	69 23.9	+59.6	150.9	68 31.2	+59.7	152.1	67 37.9	+59.8	153.3	66 44.0	+60.0	154.3	65 49.8	+59.9	155.3	64 55.1	+60.0	156.2	64 00.0	+60.0	157.0	**64**
65	71 15.3	+59.3	149.1	70 23.5	+59.5	150.5	69 30.9	+59.7	151.8	68 37.7	+59.8	153.1	67 44.0	+59.9	154.2	66 49.7	+60.0	155.2	65 55.1	+59.9	156.1	65 00.0	+60.0	157.0	**65**
66	72 14.6	+59.3	148.6	71 23.0	+59.5	150.1	70 30.6	+59.7	151.6	69 37.5	+59.8	152.8	68 43.9	+59.9	154.0	67 49.7	+59.9	155.1	66 55.0	+60.0	156.1	66 00.0	+60.0	157.0	**66**
67	73 13.9	+59.1	148.1	72 22.5	+59.4	149.7	71 30.3	+59.6	151.2	70 37.3	+59.8	152.6	69 43.8	+59.9	153.9	68 49.6	+60.0	155.0	67 55.0	+60.0	156.0	67 00.0	+60.0	157.0	**67**
68	74 13.0	+59.0	147.4	73 21.9	+59.4	149.2	72 29.9	+59.6	150.9	71 37.1	+59.8	152.3	70 43.7	+59.8	153.7	69 49.6	+59.9	154.9	68 55.0	+60.0	156.0	68 00.0	+60.0	157.0	**68**
69	75 12.0	+58.9	146.8	74 21.3	+59.2	148.7	73 29.5	+59.5	150.5	72 36.9	+59.7	152.1	71 43.5	+59.9	153.5	70 49.5	+60.0	154.8	69 55.0	+60.0	155.9	69 00.0	+60.0	157.0	**69**
70	76 10.9	+58.7	146.0	75 20.5	+59.2	148.1	74 29.0	+59.5	150.0	73 36.6	+59.7	151.7	72 43.4	+59.8	153.3	71 49.5	+59.9	154.6	70 55.0	+60.0	155.9	70 00.0	+60.0	157.0	**70**
71	77 09.6	+58.5	145.1	76 19.7	+59.0	147.4	75 28.5	+59.4	149.5	74 36.3	+59.7	151.4	73 43.2	+59.9	153.0	72 49.4	+60.0	154.5	71 55.0	+60.0	155.8	71 00.0	+60.0	157.0	**71**
72	78 08.1	+58.2	144.0	77 18.7	+58.9	146.7	76 27.9	+59.3	148.9	75 36.0	+59.6	151.0	74 43.1	+59.8	152.7	73 49.4	+59.9	154.3	72 55.0	+60.0	155.7	72 00.0	+60.0	157.0	**72**
73	79 06.3	+57.9	142.8	78 17.6	+58.6	145.7	77 27.2	+59.2	148.3	76 35.6	+59.5	150.5	75 42.9	+59.8	152.4	74 49.3	+59.9	154.1	73 55.0	+59.9	155.6	73 00.0	+60.0	157.0	**73**
74	80 04.2	+57.4	141.4	79 16.2	+58.4	144.7	78 26.4	+59.1	147.5	77 35.1	+59.5	149.9	76 42.7	+59.7	152.1	75 49.2	+59.9	153.9	74 54.9	+60.0	155.6	74 00.0	+60.0	157.0	**74**
75	81 01.6	+56.8	139.6	80 14.6	+58.1	143.4	79 25.5	+58.8	146.6	78 34.6	+59.4	149.3	77 42.4	+59.7	151.6	76 49.1	+59.9	153.7	75 54.9	+60.0	155.4	75 00.0	+60.0	157.0	**75**
76	81 58.4	+55.9	137.4	81 12.7	+57.5	141.8	80 24.3	+58.6	145.4	79 34.0	+59.2	148.5	78 42.1	+59.6	151.2	77 49.0	+59.8	153.4	76 54.9	+60.0	155.3	76 00.0	+60.0	157.0	**76**
77	82 54.3	+54.6	134.6	82 10.2	+56.9	139.8	81 22.9	+58.3	144.1	80 33.2	+59.1	147.6	79 41.7	+59.6	150.6	78 48.8	+59.9	153.1	77 54.9	+59.9	155.2	77 00.0	+60.0	157.0	**77**
78	83 48.9	*+52.8*	•131.1	83 07.1	+55.8	137.3	82 21.2	+57.7	142.4	81 32.3	+58.8	146.5	80 41.3	+59.5	149.9	79 48.7	+59.8	152.7	78 54.8	+60.0	155.0	78 00.0	+60.0	157.0	**78**
79	84 41.7	*+49.6*	•126.3	84 02.9	*+54.2*	•134.0	83 18.9	+56.9	140.2	82 31.1	+58.5	145.1	81 40.8	+59.3	149.0	80 48.5	+59.7	152.2	79 54.8	+59.9	154.8	79 00.0	+60.0	157.0	**79**
80	85 31.3	*+44.6*	•119.7	84 57.1	*+51.6*	•129.5	84 15.8	+55.7	137.3	83 29.6	+57.9	143.2	82 40.1	+59.1	147.9	81 48.2	+59.7	151.6	80 54.7	+60.0	154.6	80 00.0	+60.0	157.0	**80**
81	86 15.9	*+35.7*	•110.3	85 48.7	*+47.0*	•123.2	85 11.5	*+53.5*	•133.2	84 27.5	+57.1	140.7	83 39.2	+58.8	146.4	82 47.9	+59.6	150.8	81 54.7	+59.9	154.3	81 00.0	+60.0	157.0	**81**
82	86 51.6	*+21.3*	• 96.8	86 35.7	*+38.3*	•113.7	86 05.0	*+49.6*	•127.2	85 24.6	*+55.4*	•137.2	84 38.0	+58.2	144.5	83 47.5	+59.4	149.8	82 54.6	+59.9	153.9	82 00.0	+60.0	157.0	**82**
83	87 12.9	*+1.1*	• 78.6	87 14.0	*+22.7*	• 99.3	86 54.6	*+41.5*	•117.9	86 20.0	*+52.4*	•131.9	85 36.2	+57.2	141.6	84 46.9	+59.2	148.4	83 54.5	+59.8	153.3	83 00.0	+60.0	157.0	**83**
84	87 14.0	*−19.4*	• 57.8	87 36.7	*−0.6*	• 78.6	87 36.1	*+24.4*	•102.7	87 12.4	*+45.0*	•123.1	86 33.4	*+55.0*	•137.2	85 46.1	+58.7	146.4	84 54.3	+59.8	152.6	84 00.0	+60.0	157.0	**84**
85	86 54.6	*−34.6*	• 39.2	87 36.1	*−23.7*	• 54.4	88 00.5	*−3.1*	• 78.5	87 57.4	*+27.0*	•107.2	87 28.4	*+49.3*	•129.4	86 44.8	*+57.4*	•143.1	85 54.1	+59.7	151.5	85 00.0	+60.0	157.0	**85**
86	86 20.0	*−43.8*	• 25.2	87 12.4	*−39.0*	• 34.0	87 57.4	*−29.0*	• 49.9	88 24.4	*−6.7*	• 78.5	88 17.7	*+30.6*	•113.6	87 42.2	*+53.9*	•137.1	86 53.8	+59.2	149.8	86 00.0	+60.0	157.0	**86**
87	85 36.2	*−49.3*	• 15.5	86 33.4	*−47.3*	• 19.9	87 28.4	*−43.6*	• 27.6	88 17.7	*−35.5*	• 43.4	88 48.3	*−12.2*	• 78.5	88 36.1	*+36.1*	•123.0	87 53.0	*+58.1*	•146.4	87 00.0	+60.0	157.0	**87**
88	84 46.9	*−52.4*	• 8.6	85 46.1	*−51.8*	• 10.6	86 44.8	*−50.7*	• 13.9	87 42.2	*−48.4*	• 19.9	88 36.1	*−43.1*	• 34.0	89 12.2	*−21.1*	• 78.5	88 51.1	*+45.0*	•137.1	88 00.0	+60.0	157.0	**88**
89	83 54.5	−54.5	3.7	84 54.3	*−54.3*	• 4.4	85 54.1	*−54.1*	• 5.5	86 53.8	*−53.8*	• 7.2	87 53.0	*−53.0*	• 10.6	88 51.1	*−51.1*	• 19.9	89 36.1	*−36.1*	• 78.5	89 00.0	+60.0	157.0	**89**
90	83 00.0	−55.8	0.0	84 00.0	−55.9	0.0	85 00.0	−56.0	0.0	86 00.0	−56.2	0.0	87 00.0	*−56.4*	• 0.0	88 00.0	*−56.8*	• 0.0	89 00.0	*−57.6*	• 0.0	90 00.0	−60.0	78.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 23°, 337°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 26.5	–60.0	156.8	5 31.3	–60.0	156.9	4 36.1	–60.0	156.9	3 40.9	–60.0	156.9	2 45.7	–60.0	157.0	1 50.5	–60.0	157.0	0 55.2	–60.0	157.0	0 00.0	+60.0	23.0	0
1	5 26.5	–59.9	156.9	4 31.3	–59.9	156.9	3 36.1	–59.9	157.0	2 40.9	–60.0	157.0	1 45.7	–60.0	157.0	0 50.5	–60.0	157.0	0 04.8	+60.0	23.0	1 00.0	+60.0	23.0	1
2	4 26.6	–59.9	156.9	3 31.4	–60.0	157.0	2 36.2	–60.0	157.0	1 40.9	–59.9	157.0	0 45.7	–60.0	157.0	0 09.5	+60.0	23.0	1 04.8	+60.0	23.0	2 00.0	+60.0	23.0	2
3	3 26.7	–60.0	157.0	2 31.4	–59.9	157.0	1 36.2	–60.0	157.0	0 41.0	–60.0	157.0	0 14.3	+60.0	23.0	1 09.5	+60.0	23.0	2 04.8	+60.0	23.0	3 00.0	+60.0	23.0	3
4	2 26.7	–59.9	157.0	1 31.5	–60.0	157.1	0 36.2	–59.9	157.1	0 19.0	+60.0	22.9	1 14.3	+60.0	22.9	2 09.5	+60.0	23.0	3 04.8	+60.0	23.0	4 00.0	+60.0	23.0	4
5	1 26.8	–59.9	157.1	0 31.5	–59.9	157.1	0 23.7	+60.0	22.9	1 19.0	+60.0	22.9	2 14.3	+59.9	22.9	3 09.5	+60.0	22.9	4 04.8	+60.0	23.0	5 00.0	+60.0	23.0	5
6	0 26.9	–60.0	157.1	0 28.4	+60.0	22.9	1 23.7	+60.0	22.9	2 19.0	+60.0	22.9	3 14.2	+60.0	22.9	4 09.5	+60.0	22.9	5 04.8	+60.0	23.0	6 00.0	+60.0	23.0	6
7	0 33.1	+59.9	22.8	1 28.4	+59.9	22.8	2 23.7	+59.9	22.8	3 19.0	+59.9	22.9	4 14.2	+60.0	22.9	5 09.5	+60.0	22.9	6 04.8	+60.0	23.0	7 00.0	+60.0	23.0	7
8	1 33.0	+59.9	22.8	2 28.3	+60.0	22.8	3 23.6	+60.0	22.8	4 18.9	+60.0	22.8	5 14.2	+60.0	22.9	6 09.5	+60.0	22.9	7 04.8	+60.0	22.9	8 00.0	+60.0	23.0	8
9	2 32.9	+60.0	22.7	3 28.3	+59.9	22.7	4 23.6	+60.0	22.8	5 18.9	+60.0	22.8	6 14.2	+60.0	22.8	7 09.5	+60.0	22.9	8 04.8	+60.0	22.9	9 00.0	+60.0	23.0	9
10	3 32.9	+59.9	22.7	4 28.2	+60.0	22.7	5 23.6	+59.9	22.7	6 18.9	+60.0	22.8	7 14.2	+60.0	22.8	8 09.5	+60.0	22.9	9 04.8	+60.0	22.9	10 00.0	+60.0	23.0	10
11	4 32.8	+59.9	22.6	5 28.2	+59.9	22.7	6 23.5	+60.0	22.7	7 18.9	+59.9	22.7	8 14.2	+60.0	22.8	9 09.5	+60.0	22.9	10 04.8	+60.0	22.9	11 00.0	+60.0	23.0	11
12	5 32.7	+59.9	22.6	6 28.1	+60.0	22.6	7 23.5	+59.9	22.7	8 18.8	+60.0	22.7	9 14.2	+60.0	22.8	10 09.5	+60.0	22.8	11 04.8	+60.0	22.9	12 00.0	+60.0	23.0	12
13	6 32.6	+60.0	22.5	7 28.1	+59.9	22.6	8 23.4	+60.0	22.6	9 18.8	+60.0	22.7	10 14.2	+59.9	22.8	11 09.5	+60.0	22.8	12 04.8	+60.0	22.9	13 00.0	+60.0	23.0	13
14	7 32.6	+59.9	22.5	8 28.0	+60.0	22.5	9 23.4	+60.0	22.6	10 18.8	+60.0	22.7	11 14.1	+60.0	22.7	12 09.5	+60.0	22.8	13 04.8	+59.9	22.9	14 00.0	+60.0	23.0	14
15	8 32.5	+59.9	22.4	9 28.0	+59.9	22.5	10 23.4	+59.9	22.6	11 18.8	+59.9	22.6	12 14.1	+60.0	22.7	13 09.5	+60.0	22.8	14 04.7	+60.0	22.9	15 00.0	+60.0	23.0	15
16	9 32.4	+60.0	22.4	10 27.9	+60.0	22.5	11 23.3	+60.0	22.5	12 18.7	+60.0	22.6	13 14.1	+60.0	22.7	14 09.5	+59.9	22.8	15 04.7	+60.0	22.9	16 00.0	+60.0	23.0	16
17	10 32.4	+59.9	22.3	11 27.9	+59.9	22.4	12 23.3	+60.0	22.5	13 18.7	+60.0	22.6	14 14.1	+60.0	22.7	15 09.4	+60.0	22.8	16 04.7	+60.0	22.9	17 00.0	+60.0	23.0	17
18	11 32.3	+59.9	22.3	12 27.8	+59.9	22.4	13 23.3	+59.9	22.5	14 18.7	+60.0	22.6	15 14.1	+60.0	22.7	16 09.4	+60.0	22.8	17 04.7	+60.0	22.9	18 00.0	+60.0	23.0	18
19	12 32.2	+60.0	22.2	13 27.7	+60.0	22.3	14 23.2	+60.0	22.4	15 18.7	+60.0	22.5	16 14.1	+60.0	22.6	17 09.4	+60.0	22.7	18 04.7	+60.0	22.9	19 00.0	+60.0	23.0	19
20	13 32.2	+59.9	22.2	14 27.7	+59.9	22.3	15 23.2	+60.0	22.4	16 18.7	+59.9	22.5	17 14.1	+59.9	22.6	18 09.4	+60.0	22.7	19 04.7	+60.0	22.9	20 00.0	+60.0	23.0	20
21	14 32.1	+59.9	22.1	15 27.6	+60.0	22.2	16 23.2	+59.9	22.3	17 18.6	+60.0	22.5	18 14.0	+60.0	22.6	19 09.4	+60.0	22.7	20 04.7	+60.0	22.9	21 00.0	+60.0	23.0	21
22	15 32.0	+59.9	22.1	16 27.6	+59.9	22.2	17 23.1	+60.0	22.3	18 18.6	+60.0	22.4	19 14.0	+60.0	22.6	20 09.4	+60.0	22.7	21 04.7	+60.0	22.8	22 00.0	+60.0	23.0	22
23	16 31.9	+60.0	22.0	17 27.5	+60.0	22.2	18 23.1	+59.9	22.3	19 18.6	+60.0	22.4	20 14.0	+60.0	22.5	21 09.4	+60.0	22.7	22 04.7	+60.0	22.8	23 00.0	+60.0	23.0	23
24	17 31.9	+59.9	22.0	18 27.5	+59.9	22.1	19 23.0	+60.0	22.2	20 18.6	+59.9	22.4	21 14.0	+60.0	22.5	22 09.4	+60.0	22.7	23 04.7	+60.0	22.8	24 00.0	+60.0	23.0	24
25	18 31.8	+59.9	21.9	19 27.4	+60.0	22.1	20 23.0	+60.0	22.2	21 18.5	+60.0	22.3	22 14.0	+60.0	22.5	23 09.4	+60.0	22.7	24 04.7	+60.0	22.8	25 00.0	+60.0	23.0	25
26	19 31.7	+59.9	21.9	20 27.4	+59.9	22.0	21 23.0	+59.9	22.2	22 18.5	+60.0	22.3	23 14.0	+60.0	22.5	24 09.4	+60.0	22.6	25 04.7	+60.0	22.8	26 00.0	+60.0	23.0	26
27	20 31.6	+60.0	21.8	21 27.3	+59.9	22.0	22 22.9	+60.0	22.1	23 18.5	+59.9	22.3	24 14.0	+59.9	22.4	25 09.4	+60.0	22.6	26 04.7	+60.0	22.8	27 00.0	+60.0	23.0	27
28	21 31.6	+59.9	21.8	22 27.2	+60.0	21.9	23 22.9	+59.9	22.1	24 18.4	+60.0	22.2	25 13.9	+60.0	22.4	26 09.4	+60.0	22.6	27 04.7	+60.0	22.8	28 00.0	+60.0	23.0	28
29	22 31.5	+59.9	21.7	23 27.2	+59.9	21.9	24 22.8	+60.0	22.0	25 18.4	+60.0	22.2	26 13.9	+60.0	22.4	27 09.4	+60.0	22.6	28 04.7	+60.0	22.8	29 00.0	+60.0	23.0	29
30	23 31.4	+59.9	21.7	24 27.1	+60.0	21.8	25 22.8	+60.0	22.0	26 18.4	+60.0	22.2	27 13.9	+60.0	22.4	28 09.4	+60.0	22.6	29 04.7	+60.0	22.8	30 00.0	+60.0	23.0	30
31	24 31.3	+59.9	21.6	25 27.1	+59.9	21.8	26 22.8	+59.9	22.0	27 18.4	+59.9	22.1	28 13.9	+60.0	22.3	29 09.4	+59.9	22.6	30 04.7	+60.0	22.8	31 00.0	+60.0	23.0	31
32	25 31.2	+59.9	21.5	26 27.0	+59.9	21.7	27 22.7	+60.0	21.9	28 18.3	+60.0	22.1	29 13.9	+60.0	22.3	30 09.3	+60.0	22.5	31 04.7	+60.0	22.8	32 00.0	+60.0	23.0	32
33	26 31.1	+60.0	21.5	27 26.9	+60.0	21.7	28 22.7	+59.9	21.9	29 18.3	+60.0	22.1	30 13.9	+60.0	22.3	31 09.3	+60.0	22.5	32 04.7	+60.0	22.8	33 00.0	+60.0	23.0	33
34	27 31.1	+59.9	21.4	28 26.9	+59.9	21.6	29 22.6	+60.0	21.8	30 18.3	+59.9	22.0	31 13.9	+59.9	22.3	32 09.3	+60.0	22.5	33 04.7	+60.0	22.7	34 00.0	+60.0	23.0	34
35	28 31.0	+59.9	21.4	29 26.8	+59.9	21.6	30 22.6	+59.9	21.8	31 18.2	+60.0	22.0	32 13.8	+60.0	22.2	33 09.3	+60.0	22.5	34 04.7	+60.0	22.7	35 00.0	+60.0	23.0	35
36	29 30.9	+59.9	21.3	30 26.7	+60.0	21.5	31 22.5	+60.0	21.7	32 18.2	+60.0	22.0	33 13.8	+60.0	22.2	34 09.3	+60.0	22.5	35 04.7	+60.0	22.7	36 00.0	+60.0	23.0	36
37	30 30.8	+59.9	21.2	31 26.7	+59.9	21.5	32 22.5	+59.9	21.7	33 18.2	+60.0	21.9	34 13.8	+60.0	22.2	35 09.3	+60.0	22.4	36 04.7	+60.0	22.7	37 00.0	+60.0	23.0	37
38	31 30.7	+59.9	21.2	32 26.6	+59.9	21.4	33 22.4	+60.0	21.6	34 18.2	+59.9	21.9	35 13.8	+60.0	22.1	36 09.3	+60.0	22.4	37 04.7	+60.0	22.7	38 00.0	+60.0	23.0	38
39	32 30.6	+59.9	21.1	33 26.5	+60.0	21.3	34 22.4	+59.9	21.6	35 18.1	+60.0	21.8	36 13.8	+59.9	22.1	37 09.3	+60.0	22.4	38 04.7	+60.0	22.7	39 00.0	+60.0	23.0	39
40	33 30.5	+59.9	21.0	34 26.5	+59.9	21.3	35 22.3	+60.0	21.5	36 18.1	+60.0	21.8	37 13.7	+60.0	22.1	38 09.3	+60.0	22.4	39 04.7	+60.0	22.7	40 00.0	+60.0	23.0	40
41	34 30.4	+59.9	21.0	35 26.4	+59.9	21.2	36 22.3	+59.9	21.5	37 18.1	+59.9	21.8	38 13.7	+60.0	22.0	39 09.3	+60.0	22.4	40 04.7	+60.0	22.7	41 00.0	+60.0	23.0	41
42	35 30.3	+59.9	20.9	36 26.3	+59.9	21.2	37 22.2	+60.0	21.4	38 18.0	+60.0	21.7	39 13.7	+60.0	22.0	40 09.3	+60.0	22.3	41 04.7	+60.0	22.7	42 00.0	+60.0	23.0	42
43	36 30.2	+59.9	20.8	37 26.2	+60.0	21.1	38 22.2	+59.9	21.4	39 18.0	+59.9	21.7	40 13.7	+60.0	22.0	41 09.3	+59.9	22.3	42 04.7	+60.0	22.6	43 00.0	+60.0	23.0	43
44	37 30.1	+59.9	20.7	38 26.2	+59.9	21.0	39 22.1	+59.9	21.3	40 17.9	+60.0	21.6	41 13.7	+59.9	21.9	42 09.2	+60.0	22.3	43 04.7	+60.0	22.6	44 00.0	+60.0	23.0	44
45	38 30.0	+59.9	20.7	39 26.1	+59.9	21.0	40 22.0	+60.0	21.3	41 17.9	+60.0	21.6	42 13.6	+60.0	21.9	43 09.2	+60.0	22.3	44 04.7	+60.0	22.6	45 00.0	+60.0	23.0	45
46	39 29.9	+59.9	20.6	40 26.0	+59.9	20.9	41 22.0	+59.9	21.2	42 17.9	+59.9	21.5	43 13.6	+60.0	21.9	44 09.2	+60.0	22.2	45 04.7	+60.0	22.6	46 00.0	+60.0	23.0	46
47	40 29.8	+59.8	20.5	41 25.9	+59.9	20.8	42 21.9	+60.0	21.1	43 17.8	+60.0	21.5	44 13.6	+60.0	21.8	45 09.2	+60.0	22.2	46 04.7	+60.0	22.6	47 00.0	+60.0	23.0	47
48	41 29.6	+59.9	20.4	42 25.8	+59.9	20.7	43 21.9	+59.9	21.1	44 17.8	+59.9	21.4	45 13.6	+59.9	21.8	46 09.2	+60.0	22.2	47 04.7	+60.0	22.6	48 00.0	+60.0	23.0	48
49	42 29.5	+59.9	20.3	43 25.7	+59.9	20.7	44 21.8	+59.9	21.0	45 17.7	+60.0	21.4	46 13.5	+60.0	21.7	47 09.2	+60.0	22.1	48 04.7	+60.0	22.6	49 00.0	+60.0	23.0	49
50	43 29.4	+59.9	20.3	44 25.6	+59.9	20.6	45 21.7	+59.9	20.9	46 17.7	+59.9	21.3	47 13.5	+60.0	21.7	48 09.2	+60.0	22.1	49 04.7	+60.0	22.5	50 00.0	+60.0	23.0	50
51	44 29.3	+59.8	20.2	45 25.5	+59.9	20.5	46 21.6	+60.0	20.9	47 17.6	+60.0	21.3	48 13.5	+60.0	21.7	49 09.2	+59.9	22.1	50 04.7	+60.0	22.5	51 00.0	+60.0	23.0	51
52	45 29.1	+59.9	20.1	46 25.4	+59.9	20.4	47 21.6	+59.9	20.8	48 17.6	+59.9	21.2	49 13.5	+59.9	21.6	50 09.1	+60.0	22.1	51 04.7	+60.0	22.5	52 00.0	+60.0	23.0	52
53	46 29.0	+59.8	20.0	47 25.3	+59.9	20.3	48 21.5	+59.9	20.7	49 17.5	+60.0	21.1	50 13.4	+60.0	21.6	51 09.1	+60.0	22.0	52 04.7	+60.0	22.5	53 00.0	+60.0	23.0	53
54	47 28.8	+59.9	19.9	48 25.2	+59.9	20.2	49 21.4	+59.9	20.6	50 17.5	+59.9	21.1	51 13.4	+60.0	21.5	52 09.1	+60.0	22.0	53 04.7	+60.0	22.5	54 00.0	+60.0	23.0	54
55	48 28.7	+59.8	19.8	49 25.1	+59.9	20.2	50 21.3	+59.9	20.6	51 17.4	+60.0	21.0	52 13.4	+59.9	21.5	53 09.1	+60.0	21.9	54 04.7	+60.0	22.5	55 00.0	+60.0	23.0	55
56	49 28.5	+59.9	19.6	50 25.0	+59.8	20.1	51 21.2	+60.0	20.5	52 17.4	+59.9	20.9	53 13.3	+60.0	21.4	54 09.1	+60.0	21.9	55 04.7	+59.9	22.4	56 00.0	+60.0	23.0	56
57	50 28.4	+59.8	19.5	51 24.8	+59.9	20.0	52 21.2	+59.9	20.4	53 17.3	+59.9	20.9	54 13.3	+60.0	21.3	55 09.1	+60.0	21.9	56 04.6	+60.0	22.4	57 00.0	+60.0	23.0	57
58	51 28.2	+59.8	19.4	52 24.7	+59.9	19.8	53 21.1	+59.9	20.3	54 17.2	+60.0	20.8	55 13.3	+59.9	21.3	56 09.1	+59.9	21.8	57 04.6	+60.0	22.4	58 00.0	+60.0	23.0	58
59	52 28.0	+59.8	19.3	53 24.6	+59.8	19.7	54 21.0	+59.9	20.2	55 17.2	+59.9	20.7	56 13.2	+60.0	21.2	57 09.0	+60.0	21.8	58 04.6	+60.0	22.4	59 00.0	+60.0	23.0	59
60	53 27.8	+59.8	19.2	54 24.4	+59.9	19.6	55 20.9	+59.8	20.1	56 17.1	+59.9	20.6	57 13.2	+59.9	21.2	58 09.0	+60.0	21.7	59 04.6	+60.0	22.3	60 00.0	+60.0	23.0	60
61	54 27.6	+59.8	19.0	55 24.3	+59.8	19.5	56 20.7	+59.9	20.0	57 17.0	+60.0	20.5	58 13.1	+60.0	21.1	59 09.0	+60.0	21.7	60 04.6	+60.0	22.3	61 00.0	+60.0	23.0	61
62	55 27.4	+59.8	18.9	56 24.1	+59.8	19.4	57 20.6	+59.9	19.9	58 17.0	+59.9	20.4	59 13.1	+59.9	21.0	60 09.0	+60.0	21.6	61 04.6	+60.0	22.3	62 00.0	+60.0	23.0	62
63	56 27.2	+59.8	18.7	57 23.9	+59.9	19.2	58 20.5	+59.9	19.8	59 16.9	+59.9	20.3	60 13.0	+60.0	20.9	61 09.0	+59.9	21.6	62 04.6	+60.0	22.3	63 00.0	+60.0	23.0	63
64	57 27.0	+59.7	18.6	58 23.8	+59.8	19.1	59 20.4	+59.8	19.6	60 16.8	+59.9	20.2	61 13.0	+59.9	20.8	62 08.9	+60.0	21.5	63 04.6	+60.0	22.2	64 00.0	+60.0	23.0	64
65	58 26.7	+59.8	18.4	59 23.6	+59.8	18.9	60 20.2	+59.9	19.5	61 16.7	+59.9	20.1	62 12.9	+60.0	20.7	63 08.9	+60.0	21.4	64 04.6	+60.0	22.2	65 00.0	+60.0	23.0	65
66	59 26.5	+59.7	18.2	60 23.4	+59.8	18.8	61 20.1	+59.8	19.3	62 16.6	+59.9	20.0	63 12.9	+59.9	20.6	64 08.9	+59.9	21.4	65 04.6	+60.0	22.2	66 00.0	+60.0	23.0	66
67	60 26.2	+59.7	18.0	61 23.2	+59.7	18.6	62 19.9	+59.9	19.2	63 16.5	+59.9	19.8	64 12.8	+59.9	20.5	65 08.8	+60.0	21.3	66 04.6	+60.0	22.1	67 00.0	+60.0	23.0	67
68	61 25.9	+59.7	17.8	62 22.9	+59.8	18.4	63 19.8	+59.8	19.0	64 16.4	+59.8	19.7	65 12.7	+60.0	20.4	66 08.8	+60.0	21.2	67 04.6	+60.0	22.1	68 00.0	+60.0	23.0	68
69	62 25.6	+59.7	17.6	63 22.7	+59.7	18.2	64 19.6	+59.8	18.9	65 16.2	+59.9	19.6	66 12.7	+59.9	20.3	67 08.8	+59.9	21.1	68 04.6	+60.0	22.0	69 00.0	+60.0	23.0	69
70	63 25.3	+59.6	17.4	64 22.4	+59.8	18.0	65 19.4	+59.8	18.7	66 16.1	+59.9	19.4	67 12.6	+59.9	20.2	68 08.7	+60.0	21.0	69 04.6	+59.9	22.0	70 00.0	+60.0	23.0	70
71	64 24.9	+59.6	17.1	65 22.2	+59.7	17.8	66 19.2	+59.8	18.5	67 16.0	+59.8	19.2	68 12.5	+59.9	20.0	69 08.7	+59.9	20.9	70 04.5	+60.0	21.9	71 00.0	+60.0	23.0	71
72	65 24.5	+59.6	16.9	66 21.9	+59.6	17.5	67 19.0	+59.7	18.2	68 15.8	+59.8	19.0	69 12.4	+59.9	19.9	70 08.6	+60.0	20.8	71 04.5	+60.0	21.9	72 00.0	+60.0	23.0	72
73	66 24.1	+59.6	16.6	67 21.5	+59.7	17.3	68 18.7	+59.7	18.0	69 15.6	+59.9	18.8	70 12.3	+59.9	19.7	71 08.6	+59.9	20.7	72 04.5	+60.0	21.8	73 00.0	+60.0	23.0	73
74	67 23.7	+59.5	16.3	68 21.2	+59.6	17.0	69 18.4	+59.8	17.7	70 15.5	+59.8	18.6	71 12.2	+59.8	19.5	72 08.5	+60.0	20.6	73 04.5	+60.0	21.7	74 00.0	+60.0	23.0	74
75	68 23.2	+59.5	15.9	69 20.8	+59.6	16.7	70 18.2	+59.6	17.5	71 15.3	+59.7	18.3	72 12.0	+59.9	19.3	73 08.5	+59.9	20.4	74 04.5	+60.0	21.6	75 00.0	+60.0	23.0	75
76	69 22.7	+59.4	15.6	70 20.4	+59.5	16.3	71 17.8	+59.7	17.1	72 15.0	+59.8	18.1	73 11.9	+59.8	19.1	74 08.4	+59.9	20.2	75 04.5	+59.9	21.5	76 00.0	+60.0	23.0	76
77	70 22.1	+59.4	15.2	71 19.9	+59.5	15.9	72 17.5	+59.6	16.8	73 14.8	+59.7	17.8	74 11.7	+59.9	18.8	75 08.3	+59.9	20.0	76 04.4	+60.0	21.4	77 00.0	+60.0	23.0	77
78	71 21.5	+59.3	14.7	72 19.4	+59.4	15.5	73 17.1	+59.5	16.4	74 14.5	+59.7	17.4	75 11.6	+59.8	18.5	76 08.2	+59.9	19.8	77 04.4	+60.0	21.3	78 00.0	+60.0	23.0	78
79	72 20.8	+59.2	14.2	73 18.8	+59.4	15.0	74 16.6	+59.5	16.0	75 14.2	+59.6	17.0	76 11.4	+59.7	18.2	77 08.1	+59.9	19.6	78 04.4	+60.0	21.1	79 00.0	+60.0	23.0	79
80	73 20.0	+59.1	13.7	74 18.2	+59.2	14.5	75 16.1	+59.4	15.5	76 13.8	+59.6	16.6	77 11.1	+59.7	17.8	78 08.0	+59.9	19.3	79 04.4	+59.9	21.0	80 00.0	+60.0	23.0	80
81	74 19.1	+59.0	13.1	75 17.4	+59.2	13.9	76 15.5	+59.4	14.9	77 13.4	+59.5	16.0	78 10.8	+59.7	17.4	79 07.9	+59.8	18.9	80 04.3	+60.0	20.8	81 00.0	+60.0	23.0	81
82	75 18.1	+58.8	12.4	76 16.6	+59.0	13.3	77 14.9	+59.2	14.3	78 12.9	+59.4	15.4	79 10.5	+59.6	16.8	80 07.7	+59.8	18.5	81 04.3	+59.9	20.5	82 00.0	+60.0	23.0	82
83	76 16.9	+58.7	11.6	77 15.6	+58.9	12.5	78 14.1	+59.1	13.5	79 12.3	+59.3	14.7	80 10.1	+59.5	16.2	81 07.5	+59.7	18.0	82 04.2	+59.9	20.2	83 00.0	+60.0	23.0	83
84	77 15.6	+58.5	10.7	78 14.5	+58.7	11.6	79 13.2	+58.9	12.6	80 11.6	+59.1	13.9	81 09.6	+59.4	15.4	82 07.2	+59.7	17.3	83 04.1	+59.9	19.8	84 00.0	+60.0	23.0	84
85	78 14.1	+58.2	9.6	79 13.2	+58.4	10.5	80 12.1	+58.6	11.5	81 10.7	+59.0	12.8	82 09.0	+59.3	14.4	83 06.9	+59.5	16.5	84 04.0	+59.8	19.2	85 00.0	+60.0	23.0	85
86	79 12.3	+57.8	8.4	80 11.6	+58.0	9.2	81 10.7	+58.3	10.2	82 09.7	+58.6	11.5	83 08.3	+58.9	13.2	84 06.4	+59.4	15.4	85 03.8	+59.8	18.5	86 00.0	+60.0	23.0	86
87	80 10.1	+57.4	6.9	81 09.6	+57.6	7.6	82 09.0	+57.9	8.6	83 08.3	+58.1	9.9	84 07.2	+58.6	11.5	85 05.8	+59.0	13.8	86 03.6	+59.6	17.3	87 00.0	+60.0	23.0	87
88	81 07.5	+56.7	5.1	82 07.2	+56.9	5.7	83 06.9	+57.1	6.5	84 06.4	+57.4	7.6	85 05.8	+57.8	9.2	86 04.8	+58.4	11.5	87 03.2	+59.2	15.4	88 00.0	+60.0	23.0	88
89	82 04.2	+55.8	2.8	83 04.1	+55.9	3.2	84 04.0	+56.0	3.8	85 03.8	+56.2	4.5	86 03.6	*+56.4* •	5.7	87 03.2	*+56.8* •	7.6	88 02.4	*+57.6* •	11.5	89 00.0	+60.0	23.0	89
90	83 00.0	+54.5	0.0	84 00.0	*+54.3* •	0.0	85 00.0	*+54.1* •	0.0	86 00.0	*+53.8* •	0.0	87 00.0	*+53.0* •	0.0	88 00.0	*+51.1* •	0.0	89 00.0	*+36.1* •	0.0	90 00.0	–60.0	11.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 157°, 203°

24°, 336° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 23.5	+60.0	155.8	5 28.8	+59.9	155.9	4 34.0	+60.0	155.9	3 39.2	+60.0	155.9	2 44.4	+60.0	156.0	1 49.6	+60.0	156.0	0 54.8	+60.0	156.0	0 00.0	+60.0	156.0	**0**
1	7 23.5	+59.9	155.8	6 28.7	+60.0	155.8	5 34.0	+59.9	155.9	4 39.2	+60.0	155.9	3 44.4	+60.0	155.9	2 49.6	+60.0	156.0	1 54.8	+60.0	156.0	1 00.0	+60.0	156.0	**1**
2	8 23.4	+59.9	155.7	7 28.7	+59.9	155.8	6 33.9	+60.0	155.8	5 39.2	+59.9	155.9	4 44.4	+60.0	155.9	3 49.6	+60.0	156.0	2 54.8	+60.0	156.0	2 00.0	+60.0	156.0	**2**
3	9 23.3	+59.9	155.7	8 28.6	+60.0	155.8	7 33.9	+60.0	155.8	6 39.1	+60.0	155.9	5 44.4	+60.0	155.9	4 49.6	+60.0	155.9	3 54.8	+60.0	156.0	3 00.0	+60.0	156.0	**3**
4	10 23.2	+60.0	155.6	9 28.6	+59.9	155.7	8 33.9	+59.9	155.8	7 39.1	+60.0	155.8	6 44.4	+60.0	155.9	5 49.6	+60.0	155.9	4 54.8	+60.0	156.0	4 00.0	+60.0	156.0	**4**
5	11 23.2	+59.9	155.6	10 28.5	+59.9	155.7	9 33.8	+60.0	155.7	8 39.1	+60.0	155.8	7 44.4	+59.9	155.9	6 49.6	+60.0	155.9	5 54.8	+60.0	156.0	5 00.0	+60.0	156.0	**5**
6	12 23.1	+59.9	155.5	11 28.4	+60.0	155.6	10 33.8	+59.9	155.7	9 39.1	+59.9	155.8	8 44.3	+60.0	155.8	7 49.6	+60.0	155.9	6 54.8	+60.0	156.0	6 00.0	+60.0	156.0	**6**
7	13 23.0	+59.9	155.5	12 28.4	+59.9	155.6	11 33.7	+60.0	155.7	10 39.0	+60.0	155.7	9 44.3	+60.0	155.8	8 49.6	+60.0	155.9	7 54.8	+60.0	155.9	7 00.0	+60.0	156.0	**7**
8	14 22.9	+59.9	155.4	13 28.3	+60.0	155.5	12 33.7	+60.0	155.6	11 39.0	+60.0	155.7	10 44.3	+60.0	155.8	9 49.6	+60.0	155.9	8 54.8	+60.0	155.9	8 00.0	+60.0	156.0	**8**
9	15 22.8	+60.0	155.4	14 28.3	+59.9	155.5	13 33.7	+59.9	155.6	12 39.0	+60.0	155.7	11 44.3	+60.0	155.8	10 49.6	+60.0	155.9	9 54.8	+60.0	155.9	9 00.0	+60.0	156.0	**9**
10	16 22.8	+59.9	155.3	15 28.2	+60.0	155.4	14 33.6	+60.0	155.6	13 39.0	+59.9	155.7	12 44.3	+60.0	155.8	11 49.6	+60.0	155.8	10 54.8	+60.0	155.9	10 00.0	+60.0	156.0	**10**
11	17 22.7	+59.9	155.3	16 28.2	+59.9	155.4	15 33.6	+59.9	155.5	14 38.9	+60.0	155.6	13 44.3	+60.0	155.7	12 49.6	+59.9	155.8	11 54.8	+60.0	155.9	11 00.0	+60.0	156.0	**11**
12	18 22.6	+59.9	155.2	17 28.1	+59.9	155.3	16 33.5	+60.0	155.5	15 38.9	+60.0	155.6	14 44.3	+59.9	155.7	13 49.5	+60.0	155.8	12 54.8	+60.0	155.9	12 00.0	+60.0	156.0	**12**
13	19 22.5	+59.9	155.2	18 28.0	+60.0	155.3	17 33.5	+60.0	155.4	16 38.9	+60.0	155.6	15 44.2	+60.0	155.7	14 49.5	+60.0	155.8	13 54.8	+60.0	155.9	13 00.0	+60.0	156.0	**13**
14	20 22.4	+59.9	155.1	19 28.0	+59.9	155.3	18 33.5	+59.9	155.4	17 38.9	+59.9	155.5	16 44.2	+60.0	155.7	15 49.5	+60.0	155.8	14 54.8	+60.0	155.9	14 00.0	+60.0	156.0	**14**
15	21 22.3	+60.0	155.0	20 27.9	+60.0	155.2	19 33.4	+60.0	155.4	18 38.8	+60.0	155.5	17 44.2	+60.0	155.6	16 49.5	+60.0	155.8	15 54.8	+60.0	155.9	15 00.0	+60.0	156.0	**15**
16	22 22.3	+59.9	155.0	21 27.9	+59.9	155.2	20 33.4	+59.9	155.3	19 38.8	+60.0	155.5	18 44.2	+60.0	155.6	17 49.5	+60.0	155.8	16 54.8	+60.0	155.9	16 00.0	+60.0	156.0	**16**
17	23 22.2	+59.9	154.9	22 27.8	+59.9	155.1	21 33.3	+60.0	155.3	20 38.8	+60.0	155.4	19 44.2	+60.0	155.6	18 49.5	+60.0	155.7	17 54.8	+60.0	155.9	17 00.0	+60.0	156.0	**17**
18	24 22.1	+59.9	154.9	23 27.7	+60.0	155.1	22 33.3	+59.9	155.2	21 38.8	+59.9	155.4	20 44.2	+60.0	155.6	19 49.5	+60.0	155.7	18 54.8	+60.0	155.9	18 00.0	+60.0	156.0	**18**
19	25 22.0	+59.9	154.8	24 27.7	+59.9	155.0	23 33.2	+60.0	155.2	22 38.7	+60.0	155.4	21 44.2	+59.9	155.5	20 49.5	+60.0	155.7	19 54.8	+60.0	155.9	19 00.0	+60.0	156.0	**19**
20	26 21.9	+59.9	154.7	25 27.6	+59.9	155.0	24 33.2	+59.9	155.2	23 38.7	+60.0	155.3	22 44.1	+60.0	155.5	21 49.5	+60.0	155.7	20 54.8	+60.0	155.8	20 00.0	+60.0	156.0	**20**
21	27 21.8	+59.9	154.7	26 27.5	+60.0	154.9	25 33.1	+60.0	155.1	24 38.7	+59.9	155.3	23 44.1	+60.0	155.5	22 49.5	+60.0	155.7	21 54.8	+60.0	155.8	21 00.0	+60.0	156.0	**21**
22	28 21.7	+59.9	154.6	27 27.5	+59.9	154.8	26 33.1	+60.0	155.1	25 38.6	+60.0	155.3	24 44.1	+60.0	155.5	23 49.5	+60.0	155.7	22 54.8	+60.0	155.8	22 00.0	+60.0	156.0	**22**
23	29 21.6	+59.9	154.6	28 27.4	+59.9	154.8	27 33.1	+59.9	155.0	26 38.6	+60.0	155.2	25 44.1	+60.0	155.4	24 49.5	+60.0	155.6	23 54.8	+60.0	155.8	23 00.0	+60.0	156.0	**23**
24	30 21.5	+59.9	154.5	29 27.3	+59.9	154.7	28 33.0	+60.0	155.0	27 38.6	+60.0	155.2	26 44.1	+60.0	155.4	25 49.5	+60.0	155.6	24 54.8	+60.0	155.8	24 00.0	+60.0	156.0	**24**
25	31 21.4	+59.9	154.4	30 27.2	+60.0	154.7	29 33.0	+59.9	154.9	28 38.6	+59.9	155.2	27 44.1	+59.9	155.4	26 49.5	+60.0	155.6	25 54.8	+60.0	155.8	25 00.0	+60.0	156.0	**25**
26	32 21.3	+59.9	154.4	31 27.2	+59.9	154.6	30 32.9	+60.0	154.9	29 38.5	+60.0	155.1	28 44.0	+60.0	155.4	27 49.5	+59.9	155.6	26 54.8	+60.0	155.8	26 00.0	+60.0	156.0	**26**
27	33 21.2	+59.9	154.3	32 27.1	+59.9	154.6	31 32.9	+59.9	154.8	30 38.5	+60.0	155.1	29 44.0	+60.0	155.3	28 49.4	+60.0	155.6	27 54.8	+60.0	155.8	27 00.0	+60.0	156.0	**27**
28	34 21.1	+59.9	154.2	33 27.0	+59.9	154.5	32 32.8	+59.9	154.8	31 38.5	+59.9	155.0	30 44.0	+60.0	155.3	29 49.4	+60.0	155.5	28 54.8	+60.0	155.8	28 00.0	+60.0	156.0	**28**
29	35 21.0	+59.9	154.1	34 26.9	+60.0	154.4	33 32.7	+60.0	154.7	32 38.4	+60.0	155.0	31 44.0	+60.0	155.3	30 49.4	+60.0	155.5	29 54.8	+60.0	155.8	29 00.0	+60.0	156.0	**29**
30	36 20.9	+59.9	154.1	35 26.9	+59.9	154.4	34 32.7	+59.9	154.7	33 38.4	+60.0	155.0	32 44.0	+59.9	155.2	31 49.4	+60.0	155.5	30 54.8	+60.0	155.8	30 00.0	+60.0	156.0	**30**
31	37 20.8	+59.9	154.0	36 26.8	+59.9	154.3	35 32.6	+60.0	154.6	34 38.4	+59.9	154.9	33 43.9	+60.0	155.2	32 49.4	+60.0	155.5	31 54.8	+60.0	155.7	31 00.0	+60.0	156.0	**31**
32	38 20.7	+59.8	153.9	37 26.7	+59.9	154.2	36 32.6	+59.9	154.6	35 38.3	+60.0	154.9	34 43.9	+60.0	155.2	33 49.4	+60.0	155.5	32 54.8	+60.0	155.7	32 00.0	+60.0	156.0	**32**
33	39 20.5	+59.9	153.8	38 26.6	+59.9	154.2	37 32.5	+60.0	154.5	36 38.3	+59.9	154.8	35 43.9	+60.0	155.2	34 49.4	+60.0	155.4	33 54.8	+60.0	155.7	33 00.0	+60.0	156.0	**33**
34	40 20.4	+59.9	153.7	39 26.5	+59.9	154.1	38 32.5	+59.9	154.5	37 38.2	+60.0	154.8	36 43.9	+60.0	155.1	35 49.4	+60.0	155.4	34 54.8	+60.0	155.7	34 00.0	+60.0	156.0	**34**
35	41 20.3	+59.8	153.7	40 26.4	+59.9	154.0	39 32.4	+59.9	154.4	38 38.2	+60.0	154.8	37 43.9	+59.9	155.1	36 49.4	+60.0	155.4	35 54.8	+59.9	155.7	35 00.0	+60.0	156.0	**35**
36	42 20.1	+59.9	153.6	41 26.3	+59.9	154.0	40 32.3	+60.0	154.3	39 38.2	+59.9	154.7	38 43.8	+60.0	155.1	37 49.4	+60.0	155.4	36 54.7	+60.0	155.7	36 00.0	+60.0	156.0	**36**
37	43 20.0	+59.9	153.5	42 26.2	+59.9	153.9	41 32.3	+59.9	154.3	40 38.1	+60.0	154.7	39 43.8	+60.0	155.0	38 49.4	+59.9	155.4	37 54.7	+60.0	155.7	37 00.0	+60.0	156.0	**37**
38	44 19.9	+59.8	153.4	43 26.1	+59.9	153.8	42 32.2	+59.9	154.2	41 38.1	+59.9	154.6	40 43.8	+60.0	155.0	39 49.3	+60.0	155.3	38 54.7	+60.0	155.7	38 00.0	+60.0	156.0	**38**
39	45 19.7	+59.9	153.3	44 26.0	+59.9	153.7	43 32.1	+60.0	154.1	42 38.0	+60.0	154.6	41 43.8	+59.9	154.9	40 49.3	+60.0	155.3	39 54.7	+60.0	155.7	39 00.0	+60.0	156.0	**39**
40	46 19.6	+59.8	153.2	45 25.9	+59.9	153.6	44 32.1	+59.9	154.1	43 38.0	+59.9	154.5	42 43.7	+60.0	154.9	41 49.3	+60.0	155.3	40 54.7	+60.0	155.7	40 00.0	+60.0	156.0	**40**
41	47 19.4	+59.8	153.1	46 25.8	+59.9	153.6	45 32.0	+59.9	154.0	44 37.9	+60.0	154.4	43 43.7	+60.0	154.9	42 49.3	+60.0	155.3	41 54.7	+60.0	155.6	41 00.0	+60.0	156.0	**41**
42	48 19.2	+59.9	153.0	47 25.7	+59.9	153.5	46 31.9	+59.9	153.9	45 37.9	+59.9	154.4	44 43.7	+60.0	154.8	43 49.3	+60.0	155.2	42 54.7	+60.0	155.6	42 00.0	+60.0	156.0	**42**
43	49 19.1	+59.8	152.8	48 25.6	+59.8	153.4	47 31.8	+59.9	153.9	46 37.8	+60.0	154.3	45 43.7	+59.9	154.8	44 49.3	+60.0	155.2	43 54.7	+60.0	155.6	43 00.0	+60.0	156.0	**43**
44	50 18.9	+59.8	152.7	49 25.4	+59.9	153.3	48 31.7	+59.9	153.8	47 37.8	+59.9	154.3	46 43.6	+60.0	154.7	45 49.3	+60.0	155.2	44 54.7	+60.0	155.6	44 00.0	+60.0	156.0	**44**
45	51 18.7	+59.8	152.6	50 25.3	+59.9	153.2	49 31.6	+60.0	153.7	48 37.7	+60.0	154.2	47 43.6	+60.0	154.7	46 49.3	+60.0	155.1	45 54.7	+60.0	155.6	45 00.0	+60.0	156.0	**45**
46	52 18.5	+59.8	152.5	51 25.2	+59.8	153.1	50 31.6	+59.9	153.6	49 37.7	+59.9	154.1	48 43.6	+59.9	154.6	47 49.3	+59.9	155.1	46 54.7	+60.0	155.6	46 00.0	+60.0	156.0	**46**
47	53 18.3	+59.8	152.3	52 25.0	+59.9	152.9	51 31.5	+59.9	153.5	50 37.6	+60.0	154.1	49 43.5	+60.0	154.6	48 49.2	+60.0	155.1	47 54.7	+60.0	155.6	47 00.0	+60.0	156.0	**47**
48	54 18.1	+59.8	152.2	53 24.9	+59.8	152.8	52 31.4	+59.9	153.4	51 37.6	+59.9	154.0	50 43.5	+60.0	154.5	49 49.2	+60.0	155.0	48 54.7	+60.0	155.5	48 00.0	+60.0	156.0	**48**
49	55 17.9	+59.8	152.0	54 24.7	+59.9	152.7	53 31.3	+59.8	153.3	52 37.5	+59.9	153.9	51 43.5	+59.9	154.5	50 49.2	+60.0	155.0	49 54.7	+60.0	155.5	49 00.0	+60.0	156.0	**49**
50	56 17.7	+59.7	151.9	55 24.6	+59.8	152.6	54 31.1	+59.9	153.2	53 37.4	+60.0	153.8	52 43.4	+60.0	154.4	51 49.2	+60.0	155.0	50 54.7	+60.0	155.5	50 00.0	+60.0	156.0	**50**
51	57 17.4	+59.7	151.7	56 24.4	+59.8	152.4	55 31.0	+59.9	153.1	54 37.4	+59.9	153.8	53 43.4	+60.0	154.4	52 49.2	+60.0	154.9	51 54.7	+60.0	155.5	51 00.0	+60.0	156.0	**51**
52	58 17.1	+59.8	151.6	57 24.2	+59.8	152.3	56 30.9	+59.9	153.0	55 37.3	+59.9	153.7	54 43.4	+59.9	154.3	53 49.2	+59.9	154.9	52 54.7	+60.0	155.5	52 00.0	+60.0	156.0	**52**
53	59 16.9	+59.7	151.4	58 24.0	+59.8	152.2	57 30.8	+59.8	152.9	56 37.2	+59.9	153.6	55 43.3	+60.0	154.2	54 49.1	+60.0	154.9	53 54.7	+60.0	155.4	53 00.0	+60.0	156.0	**53**
54	60 16.6	+59.7	151.2	59 23.8	+59.8	152.0	58 30.6	+59.9	152.8	57 37.1	+59.9	153.5	56 43.3	+59.9	154.2	55 49.1	+60.0	154.8	54 54.7	+60.0	155.4	54 00.0	+60.0	156.0	**54**
55	61 16.3	+59.6	151.0	60 23.6	+59.8	151.8	59 30.5	+59.9	152.6	58 37.0	+59.9	153.4	57 43.2	+60.0	154.1	56 49.1	+60.0	154.8	55 54.7	+60.0	155.4	55 00.0	+60.0	156.0	**55**
56	62 15.9	+59.7	150.7	61 23.4	+59.7	151.6	60 30.4	+59.8	152.5	59 36.9	+59.9	153.3	58 43.2	+59.9	154.0	57 49.1	+60.0	154.7	56 54.7	+60.0	155.4	56 00.0	+60.0	156.0	**56**
57	63 15.6	+59.6	150.5	62 23.1	+59.8	151.5	61 30.2	+59.8	152.3	60 36.8	+59.9	153.2	59 43.1	+60.0	153.9	58 49.1	+59.9	154.7	57 54.7	+60.0	155.4	57 00.0	+60.0	156.0	**57**
58	64 15.2	+59.6	150.3	63 22.9	+59.7	151.2	62 30.0	+59.8	152.2	61 36.7	+59.9	153.0	60 43.1	+59.9	153.9	59 49.0	+60.0	154.6	58 54.7	+60.0	155.3	58 00.0	+60.0	156.0	**58**
59	65 14.8	+59.6	150.0	64 22.6	+59.7	151.0	63 29.8	+59.8	152.0	62 36.6	+59.9	152.9	61 43.0	+60.0	153.8	60 49.0	+60.0	154.6	59 54.7	+60.0	155.3	59 00.0	+60.0	156.0	**59**
60	66 14.4	+59.5	149.7	65 22.3	+59.6	150.8	64 29.6	+59.8	151.8	63 36.5	+59.9	152.8	62 43.0	+59.9	153.7	61 49.0	+60.0	154.5	60 54.7	+60.0	155.3	60 00.0	+60.0	156.0	**60**
61	67 13.9	+59.5	149.4	66 21.9	+59.7	150.5	65 29.4	+59.8	151.6	64 36.4	+59.9	152.6	63 42.9	+59.9	153.6	62 49.0	+59.9	154.4	61 54.7	+59.9	155.2	61 00.0	+60.0	156.0	**61**
62	68 13.4	+59.4	149.0	67 21.6	+59.6	150.3	66 29.2	+59.8	151.4	65 36.3	+59.8	152.5	64 42.8	+59.9	153.4	63 48.9	+60.0	154.4	62 54.6	+60.0	155.2	62 00.0	+60.0	156.0	**62**
63	69 12.8	+59.4	148.6	68 21.2	+59.6	150.0	67 29.0	+59.7	151.2	66 36.1	+59.8	152.3	65 42.7	+60.0	153.3	64 48.9	+60.0	154.3	63 54.6	+60.0	155.2	63 00.0	+60.0	156.0	**63**
64	70 12.2	+59.3	148.2	69 20.8	+59.5	149.6	68 28.7	+59.7	150.9	67 35.9	+59.9	152.1	66 42.7	+59.9	153.2	65 48.9	+59.9	154.2	64 54.6	+60.0	155.1	64 00.0	+60.0	156.0	**64**
65	71 11.5	+59.3	147.8	70 20.3	+59.5	149.3	69 28.4	+59.7	150.6	68 35.8	+59.8	151.9	67 42.6	+59.9	153.1	66 48.8	+60.0	154.1	65 54.6	+60.0	155.1	65 00.0	+60.0	156.0	**65**
66	72 10.8	+59.1	147.3	71 19.8	+59.5	148.9	70 28.1	+59.6	150.3	69 35.6	+59.8	151.7	68 42.5	+59.9	152.9	67 48.8	+59.9	154.0	66 54.6	+60.0	155.0	66 00.0	+60.0	156.0	**66**
67	73 09.9	+59.1	146.7	72 19.3	+59.3	148.4	71 27.7	+59.6	150.0	70 35.4	+59.7	151.4	69 42.4	+59.8	152.7	68 48.7	+60.0	153.9	67 54.6	+60.0	155.0	67 00.0	+60.0	156.0	**67**
68	74 09.0	+58.9	146.1	73 18.6	+59.3	148.0	72 27.3	+59.6	149.6	71 35.1	+59.8	151.2	70 42.2	+59.9	152.5	69 48.7	+59.9	153.8	68 54.6	+60.0	154.9	68 00.0	+60.0	156.0	**68**
69	75 07.9	+58.8	145.4	74 17.9	+59.2	147.4	73 26.9	+59.5	149.2	72 34.9	+59.7	150.9	71 42.1	+59.9	152.3	70 48.6	+60.0	153.7	69 54.6	+60.0	154.9	69 00.0	+60.0	156.0	**69**
70	76 06.7	+58.6	144.6	75 17.1	+59.1	146.8	74 26.4	+59.4	148.8	73 34.6	+59.7	150.5	72 42.0	+59.8	152.1	71 48.6	+59.9	153.5	70 54.6	+59.9	154.8	70 00.0	+60.0	156.0	**70**
71	77 05.3	+58.4	143.7	76 16.2	+59.0	146.1	75 25.8	+59.4	148.2	74 34.3	+59.6	150.1	73 41.8	+59.8	151.9	72 48.5	+59.9	153.4	71 54.5	+60.0	154.8	71 00.0	+60.0	156.0	**71**
72	78 03.7	+58.1	142.6	77 15.2	+58.8	145.3	76 25.2	+59.2	147.6	75 33.9	+59.6	149.7	74 41.6	+59.8	151.6	73 48.4	+60.0	153.2	72 54.5	+60.0	154.7	72 00.0	+60.0	156.0	**72**
73	79 01.8	+57.7	141.3	78 14.0	+58.5	144.3	77 24.4	+59.2	146.9	76 33.5	+59.5	149.2	75 41.4	+59.8	151.2	74 48.4	+59.9	153.0	73 54.5	+60.0	154.6	73 00.0	+60.0	156.0	**73**
74	79 59.5	+57.3	139.8	79 12.5	+58.3	143.2	78 23.6	+58.9	146.1	77 33.0	+59.4	148.7	76 41.2	+59.7	150.9	75 48.3	+59.9	152.8	74 54.5	+60.0	154.5	74 00.0	+60.0	156.0	**74**
75	80 56.8	+56.6	138.0	80 10.8	+57.9	141.9	79 22.5	+58.8	145.2	78 32.4	+59.4	148.0	77 40.9	+59.7	150.4	76 48.2	+59.8	152.5	75 54.5	+59.9	154.4	75 00.0	+60.0	156.0	**75**
76	81 53.4	+55.6	135.8	81 08.7	+57.4	140.3	80 21.3	+58.5	144.0	79 31.8	+59.2	147.2	78 40.6	+59.6	149.9	77 48.0	+59.9	152.2	76 54.4	+60.0	154.3	76 00.0	+60.0	156.0	**76**
77	82 49.0	+54.4	133.0	82 06.1	+56.6	138.3	81 19.8	+58.1	142.6	80 31.0	+59.0	146.3	79 40.2	+59.5	149.3	78 47.9	+59.8	151.9	77 54.4	+60.0	154.1	77 00.0	+60.0	156.0	**77**
78	83 43.4	*+52.3*	•129.3	83 02.7	+55.6	135.7	82 17.9	+57.6	140.9	81 30.0	+58.7	145.1	80 39.7	+59.4	148.6	79 47.7	+59.8	151.5	78 54.4	+59.9	153.9	78 00.0	+60.0	156.0	**78**
79	84 35.7	*+49.2*	•124.5	83 58.3	*+53.9*	•132.4	83 15.5	+56.7	138.6	82 28.7	+58.4	143.6	81 39.1	+59.3	147.7	80 47.5	+59.7	151.0	79 54.3	+60.0	153.7	79 00.0	+60.0	156.0	**79**
80	85 24.9	*+44.1*	•117.9	84 52.2	*+51.2*	•127.8	84 12.2	+55.4	135.6	83 27.1	+57.7	141.7	82 38.4	+59.0	146.5	81 47.2	+59.7	150.4	80 54.3	+59.9	153.5	80 00.0	+60.0	156.0	**80**
81	86 09.0	*+35.4*	•108.7	85 43.4	*+46.5*	•121.4	85 07.6	*+53.2*	•131.5	84 24.8	+56.9	139.2	83 37.4	+58.7	145.0	82 46.9	+59.5	149.6	81 54.2	+59.9	153.1	81 00.0	+60.0	156.0	**81**
82	86 44.4	*+21.4*	•95.6	86 29.9	*+37.9*	•112.1	86 00.8	*+49.2*	•125.5	85 21.7	*+55.2*	•135.6	84 36.1	+58.1	143.0	83 46.4	+59.4	148.5	82 54.1	+59.9	152.7	82 00.0	+60.0	156.0	**82**
83	87 05.8	*+2.0*	•78.1	87 07.8	*+22.8*	•98.0	86 50.0	*+40.9*	•116.2	86 16.9	*+51.9*	•130.2	85 34.2	+57.0	140.1	84 45.8	+59.1	147.1	83 54.0	+59.8	152.2	83 00.0	+60.0	156.0	**83**
84	87 07.8	*–17.8*	•58.1	87 30.6	*+0.3*	•78.1	87 30.9	*+24.5*	•101.2	87 08.8	*+44.6*	•121.3	86 31.2	*+54.8*	•135.5	85 44.9	+58.6	145.0	84 53.8	+59.8	151.4	84 00.0	+60.0	156.0	**84**
85	86 50.0	*–33.1*	•39.9	87 30.9	*–22.1*	•54.9	87 55.4	*–2.0*	•78.0	87 53.4	*+26.9*	•105.7	87 26.0	*+48.8*	•127.7	86 43.5	*+57.3*	•141.6	85 53.6	+59.6	150.3	85 00.0	+60.0	156.0	**85**
86	86 16.9	*–42.7*	•25.9	87 08.8	*–37.6*	•34.8	87 53.4	*–27.4*	•50.4	88 20.3	*–5.5*	•78.0	88 14.8	*+30.4*	•111.9	87 40.8	*+53.6*	•135.5	86 53.2	+59.3	148.5	86 00.0	+60.0	156.0	**86**
87	85 34.2	*–48.4*	•16.0	86 31.2	*–46.3*	•20.5	87 26.0	*–42.5*	•28.4	88 14.8	*–34.0*	•44.1	88 45.2	*–10.8*	•78.0	88 34.4	*+35.7*	•121.3	87 52.5	*+57.9*	•145.0	87 00.0	+60.0	156.0	**87**
88	84 45.8	*–51.8*	•8.9	85 44.9	*–51.1*	•11.0	86 43.5	*–49.9*	•14.4	87 40.8	*–47.6*	•20.5	88 34.4	*–41.9*	•34.7	89 10.1	*–19.7*	•78.0	88 50.4	*+44.7*	•135.5	88 00.0	+60.0	156.0	**88**
89	83 54.0	–54.0	3.8	84 53.8	*–53.8*	•4.6	85 53.6	*–53.6*	•5.7	86 53.2	*–53.2*	•7.5	87 52.5	*–52.5*	•11.0	88 50.4	*–50.4*	•20.5	89 35.1	*–35.1*	•78.0	89 00.0	+60.0	156.0	**89**
90	83 00.0	–55.4	0.0	84 00.0	–55.5	0.0	85 00.0	–55.6	0.0	86 00.0	*–55.8*	•0.0	87 00.0	*–56.1*	•0.0	88 00.0	*–56.5*	•0.0	89 00.0	*–57.4*	•0.0	90 00.0	–60.0	78.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 24°, 336°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 23.5	−59.9	155.8	5 28.8	−60.0	155.9	4 34.0	−60.0	155.9	3 39.2	−60.0	155.9	2 44.4	−60.0	156.0	1 49.6	−60.0	156.0	0 54.8	−60.0	156.0	0 00.0	+60.0	24.0	0
1	5 23.6	−59.9	155.9	4 28.8	−59.9	155.9	3 34.0	−59.9	156.0	2 39.2	−59.9	156.0	1 44.4	−59.9	156.0	0 49.6	−60.0	156.0	0 05.2	+60.0	24.0	1 00.0	+60.0	24.0	1
2	4 23.7	−59.9	155.9	3 28.9	−60.0	156.0	2 34.1	−60.0	156.0	1 39.3	−60.0	156.0	0 44.5	−60.0	156.0	0 10.4	+60.0	24.0	1 05.2	+60.0	24.0	2 00.0	+60.0	24.0	2
3	3 23.8	−60.0	156.0	2 28.9	−59.9	156.0	1 34.1	−59.9	156.0	0 39.3	−60.0	156.0	0 15.5	+60.0	24.0	1 10.4	+60.0	24.0	2 05.2	+60.0	24.0	3 00.0	+60.0	24.0	3
4	2 23.8	−59.9	156.0	1 29.0	−60.0	156.1	0 34.2	−60.0	156.1	0 20.7	+60.0	23.9	1 15.5	+60.0	23.9	2 10.4	+59.9	24.0	3 05.2	+60.0	24.0	4 00.0	+60.0	24.0	4
5	1 23.9	−59.9	156.1	0 29.0	−59.9	156.1	0 25.8	+60.0	23.9	1 20.7	+59.9	23.9	2 15.5	+60.0	23.9	3 10.3	+60.0	23.9	4 05.2	+60.0	24.0	5 00.0	+60.0	24.0	5
6	0 24.0	−60.0	156.1	0 30.9	+59.9	23.9	1 25.8	+59.9	23.9	2 20.6	+60.0	23.9	3 15.5	+60.0	23.9	4 10.3	+60.0	23.9	5 05.2	+60.0	24.0	6 00.0	+60.0	24.0	6
7	0 36.0	+59.9	23.8	1 30.8	+60.0	23.8	2 25.7	+60.0	23.8	3 20.6	+60.0	23.9	4 15.5	+60.0	23.9	5 10.3	+60.0	23.9	6 05.2	+60.0	24.0	7 00.0	+60.0	24.0	7
8	1 35.9	+59.9	23.8	2 30.8	+59.9	23.8	3 25.7	+60.0	23.8	4 20.6	+60.0	23.8	5 15.5	+60.0	23.9	6 10.3	+60.0	23.9	7 05.2	+60.0	23.9	8 00.0	+60.0	24.0	8
9	2 35.8	+59.9	23.7	3 30.7	+60.0	23.7	4 25.7	+59.9	23.8	5 20.6	+59.9	23.8	6 15.5	+59.9	23.8	7 10.3	+60.0	23.9	8 05.2	+60.0	23.9	9 00.0	+60.0	24.0	9
10	3 35.7	+60.0	23.7	4 30.7	+59.9	23.7	5 25.6	+60.0	23.7	6 20.5	+60.0	23.8	7 15.4	+60.0	23.8	8 10.3	+60.0	23.9	9 05.2	+60.0	23.9	10 00.0	+60.0	24.0	10
11	4 35.7	+59.9	23.6	5 30.6	+60.0	23.6	6 25.6	+59.9	23.7	7 20.5	+60.0	23.7	8 15.4	+60.0	23.8	9 10.3	+60.0	23.9	10 05.2	+60.0	23.9	11 00.0	+60.0	24.0	11
12	5 35.6	+59.9	23.6	6 30.6	+59.9	23.6	7 25.5	+60.0	23.7	8 20.5	+60.0	23.7	9 15.4	+60.0	23.8	10 10.3	+60.0	23.8	11 05.2	+60.0	23.9	12 00.0	+60.0	24.0	12
13	6 35.5	+59.9	23.5	7 30.5	+60.0	23.6	8 25.5	+60.0	23.6	9 20.5	+59.9	23.7	10 15.4	+60.0	23.8	11 10.3	+60.0	23.8	12 05.2	+60.0	23.9	13 00.0	+60.0	24.0	13
14	7 35.4	+60.0	23.5	8 30.5	+59.9	23.5	9 25.5	+59.9	23.6	10 20.4	+60.0	23.7	11 15.4	+60.0	23.7	12 10.3	+60.0	23.8	13 05.2	+60.0	23.9	14 00.0	+60.0	24.0	14
15	8 35.4	+59.9	23.4	9 30.4	+59.9	23.5	10 25.4	+60.0	23.5	11 20.4	+60.0	23.6	12 15.4	+60.0	23.7	13 10.3	+60.0	23.8	14 05.2	+60.0	23.9	15 00.0	+60.0	24.0	15
16	9 35.3	+59.9	23.4	10 30.3	+60.0	23.4	11 25.4	+59.9	23.5	12 20.4	+60.0	23.6	13 15.4	+59.9	23.7	14 10.3	+60.0	23.8	15 05.2	+60.0	23.9	16 00.0	+60.0	24.0	16
17	10 35.2	+59.9	23.3	11 30.3	+59.9	23.4	12 25.3	+60.0	23.5	13 20.4	+59.9	23.6	14 15.3	+60.0	23.7	15 10.3	+60.0	23.8	16 05.2	+60.0	23.9	17 00.0	+60.0	24.0	17
18	11 35.1	+60.0	23.3	12 30.2	+60.0	23.3	13 25.3	+60.0	23.4	14 20.3	+60.0	23.5	15 15.3	+60.0	23.6	16 10.3	+60.0	23.8	17 05.2	+60.0	23.9	18 00.0	+60.0	24.0	18
19	12 35.1	+59.9	23.2	13 30.2	+59.9	23.3	14 25.3	+59.9	23.4	15 20.3	+60.0	23.5	16 15.3	+60.0	23.6	17 10.3	+60.0	23.7	18 05.2	+60.0	23.9	19 00.0	+60.0	24.0	19
20	13 35.0	+59.9	23.2	14 30.1	+60.0	23.3	15 25.2	+60.0	23.4	16 20.3	+60.0	23.5	17 15.3	+60.0	23.6	18 10.3	+59.9	23.7	19 05.2	+60.0	23.9	20 00.0	+60.0	24.0	20
21	14 34.9	+59.9	23.1	15 30.1	+59.9	23.2	16 25.2	+59.9	23.3	17 20.3	+59.9	23.4	18 15.3	+60.0	23.6	19 10.2	+60.0	23.7	20 05.2	+60.0	23.8	21 00.0	+60.0	24.0	21
22	15 34.8	+59.9	23.0	16 30.0	+59.9	23.2	17 25.1	+60.0	23.3	18 20.2	+60.0	23.4	19 15.3	+59.9	23.5	20 10.2	+60.0	23.7	21 05.2	+60.0	23.8	22 00.0	+60.0	24.0	22
23	16 34.7	+60.0	23.0	17 29.9	+60.0	23.1	18 25.1	+60.0	23.2	19 20.2	+60.0	23.4	20 15.2	+60.0	23.5	21 10.2	+60.0	23.7	22 05.2	+59.9	23.8	23 00.0	+60.0	24.0	23
24	17 34.7	+59.9	22.9	18 29.9	+59.9	23.1	19 25.1	+59.9	23.2	20 20.2	+59.9	23.3	21 15.2	+60.0	23.5	22 10.2	+60.0	23.7	23 05.1	+60.0	23.8	24 00.0	+60.0	24.0	24
25	18 34.6	+59.9	22.9	19 29.8	+60.0	23.0	20 25.0	+60.0	23.2	21 20.1	+60.0	23.3	22 15.2	+60.0	23.5	23 10.2	+60.0	23.6	24 05.1	+60.0	23.8	25 00.0	+60.0	24.0	25
26	19 34.5	+59.9	22.8	20 29.8	+59.9	23.0	21 25.0	+59.9	23.1	22 20.1	+60.0	23.3	23 15.2	+60.0	23.4	24 10.2	+60.0	23.6	25 05.1	+60.0	23.8	26 00.0	+60.0	24.0	26
27	20 34.4	+59.9	22.8	21 29.7	+59.9	22.9	22 24.9	+60.0	23.1	23 20.1	+60.0	23.2	24 15.2	+60.0	23.4	25 10.2	+60.0	23.6	26 05.1	+60.0	23.8	27 00.0	+60.0	24.0	27
28	21 34.3	+59.9	22.7	22 29.6	+60.0	22.9	23 24.9	+59.9	23.0	24 20.1	+59.9	23.2	25 15.2	+60.0	23.4	26 10.2	+60.0	23.6	27 05.1	+60.0	23.8	28 00.0	+60.0	24.0	28
29	22 34.2	+59.9	22.7	23 29.6	+59.9	22.8	24 24.8	+60.0	23.0	25 20.0	+60.0	23.2	26 15.2	+59.9	23.4	27 10.2	+60.0	23.6	28 05.1	+60.0	23.8	29 00.0	+60.0	24.0	29
30	23 34.1	+60.0	22.6	24 29.5	+59.9	22.8	25 24.8	+59.9	23.0	26 20.0	+60.0	23.1	27 15.1	+60.0	23.3	28 10.2	+60.0	23.6	29 05.1	+60.0	23.8	30 00.0	+60.0	24.0	30
31	24 34.1	+59.9	22.5	25 29.4	+60.0	22.7	26 24.7	+60.0	22.9	27 20.0	+59.9	23.1	28 15.1	+60.0	23.3	29 10.2	+60.0	23.5	30 05.1	+60.0	23.8	31 00.0	+60.0	24.0	31
32	25 34.0	+59.9	22.5	26 29.4	+59.9	22.7	27 24.7	+60.0	22.9	28 19.9	+60.0	23.1	29 15.1	+60.0	23.3	30 10.2	+60.0	23.5	31 05.1	+60.0	23.8	32 00.0	+60.0	24.0	32
33	26 33.9	+59.9	22.4	27 29.3	+59.9	22.6	28 24.7	+59.9	22.8	29 19.9	+60.0	23.0	30 15.1	+60.0	23.3	31 10.2	+59.9	23.5	32 05.1	+60.0	23.7	33 00.0	+60.0	24.0	33
34	27 33.8	+59.9	22.4	28 29.2	+60.0	22.6	29 24.6	+60.0	22.8	30 19.9	+59.9	23.0	31 15.1	+59.9	23.2	32 10.1	+60.0	23.5	33 05.1	+60.0	23.7	34 00.0	+60.0	24.0	34
35	28 33.7	+59.9	22.3	29 29.2	+59.9	22.5	30 24.6	+59.9	22.7	31 19.8	+60.0	23.0	32 15.0	+60.0	23.2	33 10.1	+60.0	23.5	34 05.1	+60.0	23.7	35 00.0	+60.0	24.0	35
36	29 33.6	+59.9	22.2	30 29.1	+59.9	22.4	31 24.5	+59.9	22.7	32 19.8	+60.0	22.9	33 15.0	+60.0	23.2	34 10.1	+60.0	23.4	35 05.1	+60.0	23.7	36 00.0	+60.0	24.0	36
37	30 33.5	+59.9	22.2	31 29.0	+59.9	22.4	32 24.4	+60.0	22.6	33 19.8	+59.9	22.9	34 15.0	+60.0	23.1	35 10.1	+60.0	23.4	36 05.1	+60.0	23.7	37 00.0	+60.0	24.0	37
38	31 33.4	+59.9	22.1	32 28.9	+60.0	22.3	33 24.4	+59.9	22.6	34 19.7	+60.0	22.8	35 15.0	+60.0	23.1	36 10.1	+60.0	23.4	37 05.1	+60.0	23.7	38 00.0	+60.0	24.0	38
39	32 33.3	+59.9	22.0	33 28.9	+59.9	22.3	34 24.3	+60.0	22.5	35 19.7	+60.0	22.8	36 15.0	+59.9	23.1	37 10.1	+60.0	23.4	38 05.1	+60.0	23.7	39 00.0	+60.0	24.0	39
40	33 33.2	+59.9	22.0	34 28.8	+59.9	22.2	35 24.3	+59.9	22.5	36 19.7	+59.9	22.8	37 14.9	+60.0	23.0	38 10.1	+60.0	23.3	39 05.1	+60.0	23.7	40 00.0	+60.0	24.0	40
41	34 33.1	+59.9	21.9	35 28.7	+59.9	22.1	36 24.2	+60.0	22.4	37 19.6	+60.0	22.7	38 14.9	+60.0	23.0	39 10.1	+60.0	23.3	40 05.1	+60.0	23.7	41 00.0	+60.0	24.0	41
42	35 33.0	+59.9	21.8	36 28.6	+59.9	22.1	37 24.2	+59.9	22.4	38 19.6	+60.0	22.7	39 14.9	+60.0	23.0	40 10.1	+60.0	23.3	41 05.1	+60.0	23.6	42 00.0	+60.0	24.0	42
43	36 32.9	+59.8	21.7	37 28.5	+60.0	22.0	38 24.1	+59.9	22.3	39 19.6	+59.9	22.6	40 14.9	+60.0	22.9	41 10.1	+60.0	23.3	42 05.1	+60.0	23.6	43 00.0	+60.0	24.0	43
44	37 32.7	+59.9	21.7	38 28.5	+59.9	21.9	39 24.0	+60.0	22.2	40 19.5	+60.0	22.6	41 14.9	+59.9	22.9	42 10.1	+59.9	23.3	43 05.1	+60.0	23.6	44 00.0	+60.0	24.0	44
45	38 32.6	+59.9	21.6	39 28.4	+59.9	21.9	40 24.0	+59.9	22.2	41 19.5	+59.9	22.5	42 14.8	+60.0	22.9	43 10.0	+60.0	23.2	44 05.1	+60.0	23.6	45 00.0	+60.0	24.0	45
46	39 32.5	+59.9	21.5	40 28.3	+59.9	21.8	41 23.9	+59.9	22.1	42 19.4	+60.0	22.5	43 14.8	+60.0	22.8	44 10.0	+60.0	23.2	45 05.1	+60.0	23.6	46 00.0	+60.0	24.0	46
47	40 32.4	+59.8	21.4	41 28.2	+59.9	21.7	42 23.8	+60.0	22.1	43 19.4	+59.9	22.4	44 14.8	+60.0	22.8	45 10.0	+60.0	23.2	46 05.1	+60.0	23.6	47 00.0	+60.0	24.0	47
48	41 32.2	+59.9	21.3	42 28.1	+59.9	21.7	43 23.8	+59.9	22.0	44 19.3	+60.0	22.4	45 14.8	+59.9	22.7	46 10.0	+60.0	23.1	47 05.1	+60.0	23.6	48 00.0	+60.0	24.0	48
49	42 32.1	+59.9	21.2	43 28.0	+59.9	21.6	44 23.7	+59.9	21.9	45 19.3	+59.9	22.3	46 14.7	+60.0	22.7	47 10.0	+60.0	23.1	48 05.1	+60.0	23.5	49 00.0	+60.0	24.0	49
50	43 32.0	+59.8	21.1	44 27.9	+59.9	21.5	45 23.6	+60.0	21.9	46 19.2	+60.0	22.2	47 14.7	+60.0	22.7	48 10.0	+60.0	23.1	49 05.1	+60.0	23.5	50 00.0	+60.0	24.0	50
51	44 31.8	+59.9	21.0	45 27.8	+59.8	21.4	46 23.6	+59.9	21.8	47 19.2	+59.9	22.2	48 14.7	+59.9	22.6	49 10.0	+60.0	23.0	50 05.1	+60.0	23.5	51 00.0	+60.0	24.0	51
52	45 31.7	+59.8	20.9	46 27.6	+59.9	21.3	47 23.5	+59.9	21.7	48 19.1	+60.0	22.1	49 14.6	+60.0	22.6	50 10.0	+59.9	23.0	51 05.1	+60.0	23.5	52 00.0	+60.0	24.0	52
53	46 31.5	+59.9	20.8	47 27.5	+59.9	21.2	48 23.4	+59.9	21.6	49 19.1	+59.9	22.1	50 14.6	+60.0	22.5	51 09.9	+60.0	23.0	52 05.1	+60.0	23.5	53 00.0	+60.0	24.0	53
54	47 31.4	+59.8	20.7	48 27.4	+59.9	21.1	49 23.3	+59.9	21.5	50 19.0	+60.0	22.0	51 14.6	+59.9	22.5	52 09.9	+60.0	22.9	53 05.1	+60.0	23.5	54 00.0	+60.0	24.0	54
55	48 31.2	+59.8	20.6	49 27.3	+59.9	21.0	50 23.2	+59.9	21.5	51 19.0	+59.9	21.9	52 14.5	+60.0	22.4	53 09.9	+60.0	22.9	54 05.1	+60.0	23.4	55 00.0	+60.0	24.0	55
56	49 31.0	+59.9	20.5	50 27.2	+59.8	20.9	51 23.1	+59.9	21.4	52 18.9	+59.9	21.8	53 14.5	+60.0	22.3	54 09.9	+60.0	22.9	55 05.1	+60.0	23.4	56 00.0	+60.0	24.0	56
57	50 30.9	+59.8	20.4	51 27.0	+59.9	20.8	52 23.0	+59.9	21.3	53 18.8	+60.0	21.8	54 14.5	+59.9	22.3	55 09.9	+60.0	22.8	56 05.1	+60.0	23.4	57 00.0	+60.0	24.0	57
58	51 30.7	+59.8	20.3	52 26.9	+59.8	20.7	53 22.9	+59.9	21.2	54 18.8	+59.9	21.7	55 14.4	+60.0	22.2	56 09.9	+59.9	22.8	57 05.1	+59.9	23.4	58 00.0	+60.0	24.0	58
59	52 30.5	+59.8	20.1	53 26.7	+59.9	20.6	54 22.8	+59.9	21.1	55 18.7	+59.9	21.6	56 14.4	+59.9	22.1	57 09.8	+60.0	22.7	58 05.0	+60.0	23.3	59 00.0	+60.0	24.0	59
60	53 30.3	+59.8	20.0	54 26.6	+59.8	20.5	55 22.7	+59.9	21.0	56 18.6	+59.9	21.5	57 14.3	+60.0	22.1	58 09.8	+60.0	22.7	59 05.0	+60.0	23.3	60 00.0	+60.0	24.0	60
61	54 30.1	+59.7	19.9	55 26.4	+59.8	20.3	56 22.6	+59.8	20.9	57 18.5	+59.9	21.4	58 14.3	+59.9	22.0	59 09.8	+60.0	22.6	60 05.0	+60.0	23.3	61 00.0	+60.0	24.0	61
62	55 29.8	+59.8	19.7	56 26.2	+59.8	20.2	57 22.4	+59.9	20.7	58 18.4	+60.0	21.3	59 14.2	+60.0	21.9	60 09.8	+59.9	22.6	61 05.0	+60.0	23.3	62 00.0	+60.0	24.0	62
63	56 29.6	+59.7	19.5	57 26.0	+59.9	20.1	58 22.3	+59.9	20.6	59 18.4	+59.9	21.2	60 14.2	+59.9	21.8	61 09.7	+60.0	22.5	62 05.0	+60.0	23.2	63 00.0	+60.0	24.0	63
64	57 29.3	+59.8	19.4	58 25.9	+59.8	19.9	59 22.2	+59.8	20.5	60 18.3	+59.9	21.1	61 14.1	+60.0	21.7	62 09.7	+60.0	22.4	63 05.0	+60.0	23.2	64 00.0	+60.0	24.0	64
65	58 29.1	+59.7	19.2	59 25.7	+59.7	19.8	60 22.0	+59.9	20.3	61 18.2	+59.9	21.0	62 14.1	+59.9	21.7	63 09.7	+60.0	22.4	64 05.0	+60.0	23.2	65 00.0	+60.0	24.0	65
66	59 28.8	+59.7	19.0	60 25.4	+59.8	19.6	61 21.9	+59.8	20.2	62 18.1	+59.8	20.8	63 14.0	+59.9	21.6	64 09.7	+59.9	22.3	65 05.0	+60.0	23.1	66 00.0	+60.0	24.0	66
67	60 28.5	+59.7	18.8	61 25.2	+59.8	19.4	62 21.7	+59.8	20.0	63 17.9	+59.9	20.7	64 13.9	+59.9	21.4	65 09.6	+60.0	22.2	66 05.0	+60.0	23.1	67 00.0	+60.0	24.0	67
68	61 28.2	+59.7	18.6	62 25.0	+59.7	19.2	63 21.5	+59.8	19.9	64 17.8	+59.9	20.6	65 13.8	+60.0	21.3	66 09.6	+59.9	22.1	67 05.0	+60.0	23.0	68 00.0	+60.0	24.0	68
69	62 27.9	+59.6	18.4	63 24.7	+59.7	19.0	64 21.3	+59.8	19.7	65 17.7	+59.8	20.4	66 13.8	+59.9	21.2	67 09.5	+60.0	22.1	68 05.0	+60.0	23.0	69 00.0	+60.0	24.0	69
70	63 27.5	+59.6	18.1	64 24.4	+59.7	18.8	65 21.1	+59.8	19.5	66 17.5	+59.9	20.2	67 13.7	+59.9	21.1	68 09.5	+60.0	22.0	69 05.0	+59.9	22.9	70 00.0	+60.0	24.0	70
71	64 27.1	+59.6	17.9	65 24.1	+59.7	18.5	66 20.9	+59.7	19.3	67 17.4	+59.8	20.1	68 13.6	+59.9	20.9	69 09.5	+59.9	21.9	70 04.9	+60.0	22.9	71 00.0	+60.0	24.0	71
72	65 26.7	+59.6	17.6	66 23.8	+59.6	18.3	67 20.6	+59.8	19.0	68 17.2	+59.8	19.9	69 13.5	+59.9	20.8	70 09.4	+60.0	21.7	71 04.9	+60.0	22.8	72 00.0	+60.0	24.0	72
73	66 26.3	+59.5	17.3	67 23.4	+59.7	18.0	68 20.4	+59.7	18.8	69 17.0	+59.8	19.6	70 13.4	+59.8	20.6	71 09.4	+59.9	21.6	72 04.9	+60.0	22.7	73 00.0	+60.0	24.0	73
74	67 25.8	+59.5	17.0	68 23.1	+59.5	17.7	69 20.1	+59.7	18.5	70 16.8	+59.8	19.4	71 13.2	+59.9	20.4	72 09.3	+59.9	21.5	73 04.9	+60.0	22.7	74 00.0	+60.0	24.0	74
75	68 25.3	+59.4	16.6	69 22.6	+59.6	17.4	70 19.8	+59.6	18.2	71 16.6	+59.8	19.1	72 13.1	+59.9	20.2	73 09.2	+59.9	21.3	74 04.9	+60.0	22.6	75 00.0	+60.0	24.0	75
76	69 24.7	+59.4	16.2	70 22.2	+59.5	17.0	71 19.4	+59.6	17.9	72 16.4	+59.7	18.9	73 13.0	+59.8	19.9	74 09.1	+60.0	21.1	75 04.9	+59.9	22.5	76 00.0	+60.0	24.0	76
77	70 24.1	+59.3	15.8	71 21.7	+59.4	16.6	72 19.0	+59.6	17.5	73 16.1	+59.7	18.5	74 12.8	+59.8	19.7	75 09.1	+59.9	20.9	76 04.8	+60.0	22.4	77 00.0	+60.0	24.0	77
78	71 23.4	+59.2	15.4	72 21.1	+59.4	16.2	73 18.6	+59.5	17.1	74 15.8	+59.6	18.2	75 12.6	+59.8	19.3	76 09.0	+59.8	20.7	77 04.8	+60.0	22.2	78 00.0	+60.0	24.0	78
79	72 22.6	+59.1	14.9	73 20.5	+59.3	15.7	74 18.1	+59.4	16.7	75 15.4	+59.6	17.8	76 12.4	+59.7	19.0	77 08.8	+59.9	20.4	78 04.8	+59.9	22.1	79 00.0	+60.0	24.0	79
80	73 21.7	+59.1	14.3	74 19.8	+59.2	15.2	75 17.5	+59.4	16.2	76 15.0	+59.6	17.3	77 12.1	+59.7	18.6	78 08.7	+59.9	20.1	79 04.7	+60.0	21.9	80 00.0	+60.0	24.0	80
81	74 20.8	+58.9	13.6	75 19.0	+59.1	14.5	76 16.9	+59.3	15.6	77 14.6	+59.4	16.7	78 11.8	+59.6	18.1	79 08.6	+59.8	19.7	80 04.7	+59.9	21.7	81 00.0	+60.0	24.0	81
82	75 19.7	+58.7	12.9	76 18.1	+58.9	13.8	77 16.2	+59.1	14.9	78 14.0	+59.4	16.1	79 11.4	+59.6	17.6	80 08.4	+59.7	19.3	81 04.6	+60.0	21.4	82 00.0	+60.0	24.0	82
83	76 18.4	+58.6	12.1	77 17.0	+58.8	13.0	78 15.3	+59.0	14.1	79 13.4	+59.2	15.4	80 11.0	+59.5	16.9	81 08.1	+59.8	18.8	82 04.6	+59.9	21.1	83 00.0	+60.0	24.0	83
84	77 17.0	+58.3	11.1	78 15.8	+58.5	12.1	79 14.3	+58.8	13.2	80 12.6	+59.1	14.5	81 10.5	+59.3	16.1	82 07.9	+59.6	18.1	83 04.5	+59.9	20.6	84 00.0	+60.0	24.0	84
85	78 15.3	+58.1	10.0	79 14.3	+58.3	10.9	80 13.1	+58.6	12.0	81 11.7	+58.8	13.4	82 09.8	+59.2	15.1	83 07.5	+59.5	17.2	84 04.4	+59.8	20.1	85 00.0	+60.0	24.0	85
86	79 13.4	+57.6	8.7	80 12.6	+57.9	9.6	81 11.7	+58.1	10.7	82 10.5	+58.5	12.0	83 09.0	+58.9	13.8	84 07.0	+59.3	16.1	85 04.2	+59.7	19.3	86 00.0	+60.0	24.0	86
87	80 11.0	+57.1	7.2	81 10.5	+57.4	8.0	82 09.8	+57.7	9.0	83 09.0	+58.0	10.3	84 07.9	+58.4	12.0	85 06.3	+58.9	14.4	86 03.9	+59.6	18.1	87 00.0	+60.0	24.0	87
88	81 08.1	+56.5	5.3	82 07.9	+56.6	6.0	83 07.5	+56.9	6.8	84 07.0	+57.2	8.0	85 06.3	+57.6	9.6	86 05.2	+58.3	12.0	87 03.5	+59.1	16.1	88 00.0	+60.0	24.0	88
89	82 04.6	+55.4	3.0	83 04.5	+55.5	3.4	84 04.4	+55.6	3.9	85 04.2	*+55.8* •	4.7	86 03.9	*+56.1* •	5.9	87 03.5	*+56.5* •	8.0	88 02.6	*+57.4* •	12.0	89 00.0	+60.0	24.0	89
90	83 00.0	+54.0	0.0	84 00.0	*+53.8* •	0.0	85 00.0	*+53.6* •	0.0	86 00.0	*+53.2* •	0.0	87 00.0	*+52.5* •	0.0	88 00.0	*+50.4* •	0.0	89 00.0	*+35.1* •	0.0	90 00.0	−60.0	12.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 156°, 204°

25°, 335° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 20.5	+59.9	154.8	5 26.2	+59.9	154.9	4 31.8	+60.0	154.9	3 37.5	+60.0	154.9	2 43.1	+60.0	155.0	1 48.8	+59.9	155.0	0 54.4	+60.0	155.0	0 00.0	+60.0	155.0	**0**
1	7 20.4	+59.9	154.8	6 26.1	+59.9	154.8	5 31.8	+59.9	154.9	4 37.5	+59.9	154.9	3 43.1	+60.0	154.9	2 48.7	+60.0	155.0	1 54.4	+60.0	155.0	1 00.0	+60.0	155.0	**1**
2	8 20.3	+59.9	154.7	7 26.0	+60.0	154.8	6 31.7	+60.0	154.8	5 37.4	+60.0	154.9	4 43.1	+60.0	154.9	3 48.7	+60.0	155.0	2 54.4	+60.0	155.0	2 00.0	+60.0	155.0	**2**
3	9 20.2	+60.0	154.7	8 26.0	+59.9	154.7	7 31.7	+60.0	154.8	6 37.4	+60.0	154.9	5 43.1	+60.0	154.9	4 48.7	+60.0	154.9	3 54.4	+60.0	155.0	3 00.0	+60.0	155.0	**3**
4	10 20.2	+59.9	154.6	9 25.9	+60.0	154.7	8 31.7	+59.9	154.8	7 37.4	+60.0	154.8	6 43.1	+59.9	154.9	5 48.7	+60.0	154.9	4 54.4	+60.0	155.0	4 00.0	+60.0	155.0	**4**
5	11 20.1	+59.9	154.6	10 25.9	+59.9	154.7	9 31.6	+60.0	154.7	8 37.4	+59.9	154.8	7 43.0	+60.0	154.9	6 48.7	+60.0	154.9	5 54.4	+60.0	155.0	5 00.0	+60.0	155.0	**5**
6	12 20.0	+59.9	154.5	11 25.8	+59.9	154.6	10 31.6	+59.9	154.7	9 37.3	+60.0	154.8	8 43.0	+60.0	154.8	7 48.7	+60.0	154.9	6 54.4	+60.0	155.0	6 00.0	+60.0	155.0	**6**
7	13 19.9	+59.9	154.5	12 25.7	+60.0	154.6	11 31.5	+60.0	154.7	10 37.3	+60.0	154.7	9 43.0	+60.0	154.8	8 48.7	+60.0	154.9	7 54.4	+60.0	154.9	7 00.0	+60.0	155.0	**7**
8	14 19.8	+59.9	154.4	13 25.7	+59.9	154.5	12 31.5	+60.0	154.6	11 37.3	+59.9	154.7	10 43.0	+60.0	154.8	9 48.7	+60.0	154.9	8 54.4	+60.0	154.9	8 00.0	+60.0	155.0	**8**
9	15 19.7	+59.9	154.4	14 25.6	+60.0	154.5	13 31.5	+59.9	154.6	12 37.2	+60.0	154.7	11 43.0	+60.0	154.8	10 48.7	+60.0	154.9	9 54.4	+60.0	154.9	9 00.0	+60.0	155.0	**9**
10	16 19.6	+60.0	154.3	15 25.6	+59.9	154.4	14 31.4	+60.0	154.5	13 37.2	+60.0	154.6	12 43.0	+60.0	154.7	11 48.7	+60.0	154.8	10 54.4	+60.0	154.9	10 00.0	+60.0	155.0	**10**
11	17 19.6	+59.9	154.2	16 25.5	+59.9	154.4	15 31.4	+59.9	154.5	14 37.2	+60.0	154.6	13 43.0	+59.9	154.7	12 48.7	+60.0	154.8	11 54.4	+60.0	154.9	11 00.0	+60.0	155.0	**11**
12	18 19.5	+59.9	154.2	17 25.4	+60.0	154.3	16 31.3	+60.0	154.5	15 37.2	+59.9	154.6	14 42.9	+60.0	154.7	13 48.7	+60.0	154.8	12 54.4	+60.0	154.9	12 00.0	+60.0	155.0	**12**
13	19 19.4	+59.9	154.1	18 25.4	+59.9	154.3	17 31.3	+59.9	154.4	16 37.1	+60.0	154.5	15 42.9	+60.0	154.7	14 48.7	+60.0	154.8	13 54.4	+60.0	154.9	13 00.0	+60.0	155.0	**13**
14	20 19.3	+59.9	154.1	19 25.3	+59.9	154.2	18 31.2	+60.0	154.4	17 37.1	+60.0	154.5	16 42.9	+60.0	154.6	15 48.7	+60.0	154.8	14 54.4	+60.0	154.9	14 00.0	+60.0	155.0	**14**
15	21 19.2	+59.9	154.0	20 25.2	+60.0	154.2	19 31.2	+59.9	154.3	18 37.1	+59.9	154.5	17 42.9	+60.0	154.6	16 48.7	+59.9	154.8	15 54.4	+60.0	154.9	15 00.0	+60.0	155.0	**15**
16	22 19.1	+59.9	154.0	21 25.2	+59.9	154.1	20 31.1	+60.0	154.3	19 37.0	+60.0	154.5	18 42.9	+60.0	154.6	17 48.6	+60.0	154.7	16 54.4	+59.9	154.9	16 00.0	+60.0	155.0	**16**
17	23 19.0	+59.9	153.9	22 25.1	+59.9	154.1	21 31.1	+59.9	154.3	20 37.0	+60.0	154.4	19 42.9	+59.9	154.6	18 48.6	+60.0	154.7	17 54.3	+60.0	154.9	17 00.0	+60.0	155.0	**17**
18	24 18.9	+59.9	153.8	23 25.0	+60.0	154.0	22 31.0	+60.0	154.2	21 37.0	+60.0	154.4	20 42.8	+60.0	154.6	19 48.6	+60.0	154.7	18 54.3	+60.0	154.9	18 00.0	+60.0	155.0	**18**
19	25 18.8	+59.9	153.8	24 25.0	+59.9	154.0	23 31.0	+60.0	154.2	22 37.0	+59.9	154.3	21 42.8	+60.0	154.5	20 48.6	+60.0	154.7	19 54.3	+60.0	154.9	19 00.0	+60.0	155.0	**19**
20	26 18.7	+59.9	153.7	25 24.9	+59.9	153.9	24 31.0	+59.9	154.1	23 36.9	+60.0	154.3	22 42.8	+60.0	154.5	21 48.6	+60.0	154.7	20 54.3	+60.0	154.8	20 00.0	+60.0	155.0	**20**
21	27 18.6	+59.9	153.6	26 24.8	+59.9	153.9	25 30.9	+60.0	154.1	24 36.9	+60.0	154.3	23 42.8	+60.0	154.5	22 48.6	+60.0	154.7	21 54.3	+60.0	154.8	21 00.0	+60.0	155.0	**21**
22	28 18.5	+59.9	153.6	27 24.7	+60.0	153.8	26 30.9	+59.9	154.0	25 36.9	+59.9	154.2	24 42.8	+60.0	154.4	23 48.6	+60.0	154.6	22 54.3	+60.0	154.8	22 00.0	+60.0	155.0	**22**
23	29 18.4	+59.9	153.5	28 24.7	+59.9	153.7	27 30.8	+59.9	154.0	26 36.8	+60.0	154.2	25 42.8	+59.9	154.4	24 48.6	+60.0	154.6	23 54.3	+60.0	154.8	23 00.0	+60.0	155.0	**23**
24	30 18.3	+59.9	153.4	29 24.6	+59.9	153.7	28 30.7	+60.0	153.9	27 36.8	+60.0	154.2	26 42.7	+60.0	154.4	25 48.6	+60.0	154.6	24 54.3	+60.0	154.8	24 00.0	+60.0	155.0	**24**
25	31 18.2	+59.9	153.4	30 24.5	+59.9	153.6	29 30.7	+59.9	153.9	28 36.8	+59.9	154.1	27 42.7	+60.0	154.4	26 48.6	+60.0	154.6	25 54.3	+60.0	154.8	25 00.0	+60.0	155.0	**25**
26	32 18.1	+59.9	153.3	31 24.4	+60.0	153.6	30 30.6	+60.0	153.8	29 36.7	+60.0	154.1	28 42.7	+60.0	154.3	27 48.6	+60.0	154.6	26 54.3	+60.0	154.8	26 00.0	+60.0	155.0	**26**
27	33 18.0	+59.9	153.2	32 24.4	+59.9	153.5	31 30.6	+59.9	153.8	30 36.7	+60.0	154.1	29 42.7	+60.0	154.3	28 48.6	+60.0	154.5	27 54.3	+60.0	154.8	27 00.0	+60.0	155.0	**27**
28	34 17.9	+59.9	153.1	33 24.3	+59.9	153.4	32 30.5	+60.0	153.7	31 36.7	+59.9	154.0	30 42.7	+59.9	154.3	29 48.6	+59.9	154.5	28 54.3	+60.0	154.8	28 00.0	+60.0	155.0	**28**
29	35 17.8	+59.8	153.1	34 24.2	+59.9	153.4	33 30.5	+59.9	153.7	32 36.6	+60.0	154.0	31 42.6	+60.0	154.2	30 48.5	+60.0	154.5	29 54.3	+60.0	154.8	29 00.0	+60.0	155.0	**29**
30	36 17.6	+59.9	153.0	35 24.1	+59.9	153.3	34 30.4	+59.9	153.6	33 36.6	+59.9	153.9	32 42.6	+60.0	154.2	31 48.5	+60.0	154.5	30 54.3	+60.0	154.8	30 00.0	+60.0	155.0	**30**
31	37 17.5	+59.9	152.9	36 24.0	+59.9	153.3	35 30.3	+60.0	153.6	34 36.5	+60.0	153.9	33 42.6	+60.0	154.2	32 48.5	+60.0	154.5	31 54.3	+60.0	154.7	31 00.0	+60.0	155.0	**31**
32	38 17.4	+59.8	152.8	37 23.9	+59.9	153.2	36 30.3	+59.9	153.5	35 36.5	+60.0	153.8	34 42.6	+60.0	154.2	33 48.5	+60.0	154.4	32 54.3	+60.0	154.7	32 00.0	+60.0	155.0	**32**
33	39 17.2	+59.9	152.7	38 23.8	+59.9	153.1	37 30.2	+60.0	153.5	36 36.5	+59.9	153.8	35 42.6	+59.9	154.1	34 48.5	+60.0	154.4	33 54.3	+60.0	154.7	33 00.0	+60.0	155.0	**33**
34	40 17.1	+59.9	152.7	39 23.7	+59.9	153.0	38 30.2	+59.9	153.4	37 36.4	+60.0	153.8	36 42.5	+60.0	154.1	35 48.5	+60.0	154.4	34 54.3	+60.0	154.7	34 00.0	+60.0	155.0	**34**
35	41 17.0	+59.8	152.6	40 23.6	+59.9	153.0	39 30.1	+59.9	153.3	38 36.4	+59.9	153.7	37 42.5	+60.0	154.1	36 48.5	+60.0	154.4	35 54.3	+60.0	154.7	35 00.0	+60.0	155.0	**35**
36	42 16.8	+59.9	152.5	41 23.5	+59.9	152.9	40 30.0	+59.9	153.3	39 36.3	+60.0	153.7	38 42.5	+60.0	154.0	37 48.5	+60.0	154.4	36 54.3	+60.0	154.7	36 00.0	+60.0	155.0	**36**
37	43 16.7	+59.8	152.4	42 23.4	+59.9	152.8	41 29.9	+60.0	153.2	40 36.3	+59.9	153.6	39 42.5	+59.9	154.0	38 48.5	+60.0	154.3	37 54.3	+60.0	154.7	37 00.0	+60.0	155.0	**37**
38	44 16.5	+59.9	152.3	43 23.3	+59.9	152.7	42 29.9	+59.9	153.1	41 36.2	+60.0	153.6	40 42.4	+60.0	153.9	39 48.5	+59.9	154.3	38 54.3	+60.0	154.7	38 00.0	+60.0	155.0	**38**
39	45 16.4	+59.8	152.2	44 23.2	+59.9	152.6	43 29.8	+59.9	153.1	42 36.2	+60.0	153.5	41 42.4	+60.0	153.9	40 48.4	+60.0	154.3	39 54.3	+60.0	154.6	39 00.0	+60.0	155.0	**39**
40	46 16.2	+59.8	152.1	45 23.1	+59.9	152.6	44 29.7	+59.9	153.0	43 36.2	+59.9	153.4	42 42.4	+60.0	153.9	41 48.4	+60.0	154.3	40 54.3	+60.0	154.6	40 00.0	+60.0	155.0	**40**
41	47 16.0	+59.9	152.0	46 23.0	+59.8	152.5	45 29.6	+60.0	152.9	44 36.1	+60.0	153.4	43 42.4	+59.9	153.8	42 48.4	+60.0	154.2	41 54.3	+60.0	154.6	41 00.0	+60.0	155.0	**41**
42	48 15.9	+59.8	151.8	47 22.8	+59.9	152.4	46 29.6	+59.9	152.9	45 36.1	+59.9	153.3	44 42.3	+60.0	153.8	43 48.4	+60.0	154.2	42 54.3	+60.0	154.6	42 00.0	+60.0	155.0	**42**
43	49 15.7	+59.8	151.7	48 22.7	+59.9	152.3	47 29.5	+59.9	152.8	46 36.0	+59.9	153.3	45 42.3	+60.0	153.7	44 48.4	+60.0	154.2	43 54.3	+60.0	154.6	43 00.0	+60.0	155.0	**43**
44	50 15.5	+59.8	151.6	49 22.6	+59.8	152.2	48 29.4	+59.9	152.7	47 35.9	+60.0	153.2	46 42.3	+59.9	153.7	45 48.4	+60.0	154.1	44 54.3	+60.0	154.6	44 00.0	+60.0	155.0	**44**
45	51 15.3	+59.8	151.5	50 22.4	+59.9	152.1	49 29.3	+59.9	152.6	48 35.9	+59.9	153.1	47 42.2	+60.0	153.6	46 48.4	+60.0	154.1	45 54.3	+60.0	154.6	45 00.0	+60.0	155.0	**45**
46	52 15.1	+59.8	151.3	51 22.3	+59.8	151.9	50 29.2	+59.9	152.5	49 35.8	+60.0	153.1	48 42.2	+60.0	153.6	47 48.4	+59.9	154.1	46 54.3	+60.0	154.6	46 00.0	+60.0	155.0	**46**
47	53 14.9	+59.7	151.2	52 22.1	+59.9	151.8	51 29.1	+59.9	152.4	50 35.8	+59.9	153.0	49 42.2	+59.9	153.5	48 48.3	+60.0	154.0	47 54.3	+60.0	154.5	47 00.0	+60.0	155.0	**47**
48	54 14.6	+59.8	151.1	53 22.0	+59.8	151.7	52 29.0	+59.9	152.3	51 35.7	+59.9	152.9	50 42.1	+60.0	153.5	49 48.3	+60.0	154.0	48 54.3	+60.0	154.5	48 00.0	+60.0	155.0	**48**
49	55 14.4	+59.7	150.9	54 21.8	+59.8	151.6	53 28.9	+59.8	152.2	52 35.6	+59.9	152.8	51 42.1	+60.0	153.4	50 48.3	+60.0	154.0	49 54.3	+60.0	154.5	49 00.0	+60.0	155.0	**49**
50	56 14.1	+59.8	150.7	55 21.6	+59.8	151.5	54 28.7	+59.9	152.1	53 35.5	+60.0	152.8	52 42.1	+59.9	153.4	51 48.3	+60.0	153.9	50 54.3	+60.0	154.5	50 00.0	+60.0	155.0	**50**
51	57 13.9	+59.7	150.6	56 21.4	+59.8	151.3	55 28.6	+59.9	152.0	54 35.5	+59.9	152.7	53 42.0	+60.0	153.3	52 48.3	+60.0	153.9	51 54.3	+60.0	154.5	51 00.0	+60.0	155.0	**51**
52	58 13.6	+59.7	150.4	57 21.2	+59.8	151.2	56 28.5	+59.9	151.9	55 35.4	+59.9	152.6	54 42.0	+59.9	153.2	53 48.3	+59.9	153.9	52 54.3	+60.0	154.4	52 00.0	+60.0	155.0	**52**
53	59 13.3	+59.7	150.2	58 21.0	+59.8	151.0	57 28.4	+59.8	151.8	56 35.3	+59.9	152.5	55 41.9	+60.0	153.2	54 48.2	+60.0	153.8	53 54.3	+59.9	154.4	53 00.0	+60.0	155.0	**53**
54	60 13.0	+59.7	150.0	59 20.8	+59.8	150.8	58 28.2	+59.9	151.6	57 35.2	+59.9	152.4	56 41.9	+59.9	153.1	55 48.2	+60.0	153.8	54 54.2	+60.0	154.4	54 00.0	+60.0	155.0	**54**
55	61 12.7	+59.6	149.8	60 20.6	+59.7	150.7	59 28.1	+59.8	151.5	58 35.1	+59.9	152.3	57 41.8	+60.0	153.0	56 48.2	+60.0	153.7	55 54.2	+60.0	154.4	55 00.0	+60.0	155.0	**55**
56	62 12.3	+59.6	149.5	61 20.3	+59.8	150.5	60 27.9	+59.8	151.4	59 35.0	+59.9	152.2	58 41.8	+59.9	152.9	57 48.2	+59.9	153.7	56 54.2	+60.0	154.4	56 00.0	+60.0	155.0	**56**
57	63 11.9	+59.6	149.3	62 20.1	+59.7	150.3	61 27.7	+59.8	151.2	60 34.9	+59.9	152.1	59 41.7	+60.0	152.9	58 48.1	+60.0	153.6	57 54.2	+60.0	154.3	57 00.0	+60.0	155.0	**57**
58	64 11.5	+59.6	149.0	63 19.8	+59.7	150.1	62 27.5	+59.8	151.0	61 34.8	+59.9	151.9	60 41.7	+59.9	152.8	59 48.1	+60.0	153.6	58 54.2	+60.0	154.3	58 00.0	+60.0	155.0	**58**
59	65 11.1	+59.5	148.8	64 19.5	+59.7	149.8	63 27.3	+59.8	150.9	62 34.7	+59.9	151.8	61 41.6	+59.9	152.7	60 48.1	+60.0	153.5	59 54.2	+60.0	154.3	59 00.0	+60.0	155.0	**59**
60	66 10.6	+59.5	148.5	65 19.2	+59.6	149.6	64 27.1	+59.8	150.7	63 34.6	+59.8	151.7	62 41.5	+60.0	152.6	61 48.1	+59.9	153.4	60 54.2	+60.0	154.2	60 00.0	+60.0	155.0	**60**
61	67 10.1	+59.4	148.1	66 18.8	+59.6	149.3	65 26.9	+59.8	150.5	64 34.4	+59.9	151.5	63 41.5	+59.9	152.5	62 48.0	+60.0	153.4	61 54.2	+60.0	154.2	61 00.0	+60.0	155.0	**61**
62	68 09.5	+59.4	147.8	67 18.4	+59.6	149.1	66 26.7	+59.7	150.2	65 34.3	+59.8	151.3	64 41.4	+59.9	152.3	63 48.0	+60.0	153.3	62 54.2	+60.0	154.2	62 00.0	+60.0	155.0	**62**
63	69 08.9	+59.4	147.4	68 18.0	+59.6	148.7	67 26.4	+59.7	150.0	66 34.1	+59.9	151.2	65 41.3	+59.9	152.2	64 48.0	+59.9	153.2	63 54.2	+60.0	154.1	63 00.0	+60.0	155.0	**63**
64	70 08.3	+59.2	147.0	69 17.6	+59.5	148.4	68 26.1	+59.7	149.7	67 34.0	+59.8	151.0	66 41.2	+59.9	152.1	65 47.9	+60.0	153.1	64 54.2	+60.0	154.1	64 00.0	+60.0	155.0	**64**
65	71 07.5	+59.2	146.5	70 17.1	+59.4	148.0	69 25.8	+59.6	149.4	68 33.8	+59.8	150.7	67 41.1	+59.9	151.9	66 47.9	+59.9	153.0	65 54.2	+60.0	154.1	65 00.0	+60.0	155.0	**65**
66	72 06.7	+59.1	146.0	71 16.5	+59.4	147.6	70 25.4	+59.7	149.1	69 33.6	+59.7	150.5	68 41.0	+59.9	151.8	67 47.8	+60.0	152.9	66 54.2	+59.9	154.0	66 00.0	+60.0	155.0	**66**
67	73 05.8	+59.0	145.4	72 15.9	+59.4	147.2	71 25.1	+59.5	148.8	70 33.3	+59.8	150.3	69 40.9	+59.9	151.6	68 47.8	+59.9	152.8	67 54.1	+60.0	154.0	67 00.0	+60.0	155.0	**67**
68	74 04.8	+58.9	144.7	73 15.3	+59.2	146.7	72 24.6	+59.6	148.4	71 33.1	+59.7	150.0	70 40.8	+59.8	151.4	69 47.7	+60.0	152.7	68 54.1	+60.0	153.9	68 00.0	+60.0	155.0	**68**
69	75 03.7	+58.7	144.0	74 14.5	+59.2	146.1	73 24.2	+59.4	148.0	72 32.8	+59.7	149.7	71 40.6	+59.9	151.2	70 47.7	+59.9	152.6	69 54.1	+60.0	153.8	69 00.0	+60.0	155.0	**69**
70	76 02.4	+58.5	143.2	75 13.7	+59.0	145.5	74 23.6	+59.4	147.5	73 32.5	+59.7	149.3	72 40.5	+59.8	151.0	71 47.6	+60.0	152.4	70 54.1	+60.0	153.8	70 00.0	+60.0	155.0	**70**
71	77 00.9	+58.3	142.2	76 12.7	+58.9	144.7	75 23.0	+59.3	147.0	74 32.2	+59.6	148.9	73 40.3	+59.8	150.7	72 47.6	+59.9	152.3	71 54.1	+60.0	153.7	71 00.0	+60.0	155.0	**71**
72	77 59.2	+58.0	141.1	77 11.6	+58.7	143.9	76 22.3	+59.2	146.3	75 31.8	+59.5	148.5	74 40.1	+59.8	150.4	73 47.5	+59.9	152.1	72 54.1	+60.0	153.6	72 00.0	+60.0	155.0	**72**
73	78 57.2	+57.5	139.8	78 10.3	+58.4	142.9	77 21.5	+59.1	145.6	76 31.3	+59.5	148.0	75 39.9	+59.7	150.1	74 47.4	+59.9	151.9	73 54.1	+59.9	153.5	73 00.0	+60.0	155.0	**73**
74	79 54.7	+57.1	138.3	79 08.7	+58.2	141.8	78 20.6	+58.9	144.8	77 30.8	+59.4	147.4	76 39.6	+59.7	149.7	75 47.3	+59.9	151.7	74 54.0	+60.0	153.4	74 00.0	+60.0	155.0	**74**
75	80 51.8	+56.4	136.5	80 06.9	+57.7	140.4	79 19.5	+58.7	143.8	78 30.2	+59.3	146.7	77 39.3	+59.7	149.2	76 47.2	+59.8	151.4	75 54.0	+60.0	153.3	75 00.0	+60.0	155.0	**75**
76	81 48.2	+55.4	134.2	81 04.6	+57.3	138.8	80 18.2	+58.4	142.6	79 29.5	+59.1	145.9	78 39.0	+59.5	148.7	77 47.0	+59.9	151.1	76 54.0	+59.9	153.2	76 00.0	+60.0	155.0	**76**
77	82 43.6	+54.0	131.3	82 01.9	+56.4	136.7	81 16.6	+58.0	141.2	80 28.6	+58.9	144.9	79 38.5	+59.5	148.1	78 46.9	+59.8	150.7	77 53.9	+60.0	153.0	77 00.0	+60.0	155.0	**77**
78	83 37.6	+52.0	•127.7	82 58.3	+55.3	134.1	82 14.6	+57.3	139.4	81 27.5	+58.7	143.7	80 38.0	+59.4	147.3	79 46.7	+59.8	150.3	78 53.9	+60.0	152.8	78 00.0	+60.0	155.0	**78**
79	84 29.6	+48.8	•122.8	83 53.6	+53.6	•130.7	83 11.9	+56.6	137.1	82 26.2	+58.2	142.2	81 37.4	+59.2	146.4	80 46.5	+59.7	149.8	79 53.9	+59.9	152.6	79 00.0	+60.0	155.0	**79**
80	85 18.4	+43.6	•116.2	84 47.2	+50.8	•126.1	84 08.5	+55.1	134.0	83 24.4	+57.7	140.3	82 36.6	+59.0	145.2	81 46.2	+59.6	149.2	80 53.8	+59.9	152.4	80 00.0	+60.0	155.0	**80**
81	86 02.0	+35.1	•107.1	85 38.0	+46.1	•119.7	85 03.6	+52.9	•129.8	84 22.1	+56.6	137.7	83 35.6	+58.6	143.7	82 45.8	+59.5	148.3	81 53.7	+59.9	152.0	81 00.0	+60.0	155.0	**81**
82	86 37.1	+21.5	• 94.4	86 24.1	+37.5	•110.4	85 56.5	+48.7	•123.8	85 18.7	+54.9	•134.0	84 34.2	+58.0	141.6	83 45.3	+59.4	147.3	82 53.6	+59.9	151.6	82 00.0	+60.0	155.0	**82**
83	86 58.6	+3.0	• 77.6	87 01.6	+22.8	• 96.8	86 45.2	+40.6	•114.5	86 13.6	+51.6	•128.5	85 32.2	+56.8	138.6	84 44.7	+59.0	145.8	83 53.5	+59.8	151.1	83 00.0	+60.0	155.0	**83**
84	87 01.6	–16.4	• 58.4	87 24.4	+1.4	• 77.6	87 25.8	+24.5	• 99.9	87 05.2	+44.2	•119.6	86 29.0	+54.5	•133.9	85 43.7	+58.5	143.6	84 53.3	+59.8	150.3	84 00.0	+60.0	155.0	**84**
85	86 45.2	–31.6	• 40.6	87 25.8	–20.6	• 55.2	87 50.3	–0.9	• 77.5	87 49.4	+26.8	•104.2	87 23.5	+48.4	•126.0	86 42.2	+57.1	•140.2	85 53.1	+59.6	149.1	85 00.0	+60.0	155.0	**85**
86	86 13.6	–41.4	• 26.6	87 05.2	–36.2	• 35.5	87 49.4	–25.9	• 50.9	88 16.2	–4.3	• 77.5	88 11.9	+30.2	•110.3	87 39.3	+53.3	•133.9	86 52.7	+59.1	147.2	86 00.0	+60.0	155.0	**86**
87	85 32.2	–47.5	• 16.5	86 29.0	–45.3	• 21.1	87 23.5	–41.3	• 29.1	88 11.9	–32.6	• 44.7	88 42.1	–9.5	• 77.5	88 32.6	+35.5	•119.6	87 51.8	+57.9	•143.6	87 00.0	+60.0	155.0	**87**
88	84 44.7	–51.2	• 9.3	85 43.7	–50.4	• 11.4	86 42.2	–49.1	• 14.9	87 39.3	–46.6	• 21.1	88 32.6	–40.8	• 35.4	89 08.1	–18.4	• 77.5	88 49.7	+44.3	•133.9	88 00.0	+60.0	155.0	**88**
89	83 53.5	–53.5	4.0	84 53.3	–53.3	• 4.7	85 53.1	–53.1	• 5.9	86 52.7	–52.7	• 7.8	87 51.8	–51.8	• 11.4	88 49.7	–49.7	• 21.1	89 34.0	–34.0	• 77.5	89 00.0	+60.0	155.0	**89**
90	83 00.0	–55.1	0.0	84 00.0	–55.2	0.0	85 00.0	–55.3	0.0	86 00.0	–55.5	• 0.0	87 00.0	–55.7	• 0.0	88 00.0	–56.2	• 0.0	89 00.0	–57.2	• 0.0	90 00.0	–60.0	77.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 25°, 335°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 20.5	−59.9	154.8	5 26.2	−60.0	154.9	4 31.8	−59.9	154.9	3 37.5	−60.0	154.9	2 43.1	−60.0	155.0	1 48.8	−60.0	155.0	0 54.4	−60.0	155.0	0 00.0	+60.0	25.0	**0**
1	5 20.6	−60.0	154.9	4 26.2	−59.9	154.9	3 31.9	−60.0	155.0	2 37.5	−60.0	155.0	1 43.1	−59.9	155.0	0 48.8	−60.0	155.0	0 05.6	+60.0	25.0	1 00.0	+60.0	25.0	**1**
2	4 20.6	−59.9	154.9	3 26.3	−60.0	155.0	2 31.9	−59.9	155.0	1 37.5	−59.9	155.0	0 43.2	−60.0	155.0	0 11.2	+60.0	25.0	1 05.6	+60.0	25.0	2 00.0	+60.0	25.0	**2**
3	3 20.7	−59.9	155.0	2 26.3	−60.0	155.0	1 32.0	−60.0	155.0	0 37.6	−60.0	155.0	0 16.8	+60.0	25.0	1 11.2	+60.0	25.0	2 05.6	+60.0	25.0	3 00.0	+60.0	25.0	**3**
4	2 20.8	−59.9	155.0	1 26.4	−59.9	155.1	0 32.0	−60.0	155.1	0 22.4	+60.0	24.9	1 16.8	+60.0	24.9	2 11.2	+60.0	25.0	3 05.6	+60.0	25.0	4 00.0	+60.0	25.0	**4**
5	1 20.9	−59.9	155.1	0 26.5	−60.0	155.1	0 28.0	+59.9	24.9	1 22.4	+60.0	24.9	2 16.8	+60.0	24.9	3 11.2	+60.0	24.9	4 05.6	+60.0	25.0	5 00.0	+60.0	25.0	**5**
6	0 21.0	−60.0	155.1	0 33.5	+59.9	24.9	1 27.9	+60.0	24.9	2 22.4	+59.9	24.9	3 16.8	+60.0	24.9	4 11.2	+60.0	24.9	5 05.6	+60.0	25.0	6 00.0	+60.0	25.0	**6**
7	0 39.0	+59.9	24.8	1 33.4	+60.0	24.8	2 27.9	+59.9	24.8	3 22.3	+60.0	24.8	4 16.8	+60.0	24.9	5 11.2	+60.0	24.9	6 05.6	+60.0	25.0	7 00.0	+60.0	25.0	**7**
8	1 38.9	+59.9	24.8	2 33.4	+59.9	24.8	3 27.8	+60.0	24.8	4 22.3	+60.0	24.8	5 16.8	+59.9	24.9	6 11.2	+60.0	24.9	7 05.6	+60.0	24.9	8 00.0	+60.0	25.0	**8**
9	2 38.8	+59.9	24.7	3 33.3	+59.9	24.7	4 27.8	+60.0	24.8	5 22.3	+60.0	24.8	6 16.7	+60.0	24.8	7 11.2	+60.0	24.9	8 05.6	+60.0	24.9	9 00.0	+60.0	25.0	**9**
10	3 38.7	+59.9	24.6	4 33.2	+60.0	24.7	5 27.8	+59.9	24.7	6 22.3	+59.9	24.8	7 16.7	+60.0	24.8	8 11.2	+60.0	24.9	9 05.6	+60.0	24.9	10 00.0	+60.0	25.0	**10**
11	4 38.6	+60.0	24.6	5 33.2	+59.9	24.6	6 27.7	+60.0	24.7	7 22.2	+60.0	24.7	8 16.7	+60.0	24.8	9 11.2	+60.0	24.8	10 05.6	+60.0	24.9	11 00.0	+60.0	25.0	**11**
12	5 38.6	+59.9	24.5	6 33.1	+60.0	24.6	7 27.7	+59.9	24.6	8 22.2	+60.0	24.7	9 16.7	+60.0	24.8	10 11.2	+60.0	24.8	11 05.6	+60.0	24.9	12 00.0	+60.0	25.0	**12**
13	6 38.5	+59.9	24.5	7 33.1	+59.9	24.5	8 27.6	+60.0	24.6	9 22.2	+59.9	24.7	10 16.7	+60.0	24.7	11 11.2	+60.0	24.8	12 05.6	+60.0	24.9	13 00.0	+60.0	25.0	**13**
14	7 38.4	+59.9	24.4	8 33.0	+60.0	24.5	9 27.6	+60.0	24.6	10 22.1	+60.0	24.6	11 16.7	+60.0	24.7	12 11.2	+59.9	24.8	13 05.6	+60.0	24.9	14 00.0	+60.0	25.0	**14**
15	8 38.3	+59.9	24.4	9 33.0	+59.9	24.5	10 27.6	+59.9	24.5	11 22.1	+60.0	24.6	12 16.7	+59.9	24.7	13 11.1	+60.0	24.8	14 05.6	+60.0	24.9	15 00.0	+60.0	25.0	**15**
16	9 38.2	+60.0	24.3	10 32.9	+59.9	24.4	11 27.5	+60.0	24.5	12 22.1	+60.0	24.6	13 16.6	+60.0	24.7	14 11.1	+60.0	24.8	15 05.6	+60.0	24.9	16 00.0	+60.0	25.0	**16**
17	10 38.2	+59.9	24.3	11 32.8	+60.0	24.4	12 27.5	+59.9	24.4	13 22.1	+59.9	24.5	14 16.6	+60.0	24.6	15 11.1	+60.0	24.8	16 05.6	+60.0	24.9	17 00.0	+60.0	25.0	**17**
18	11 38.1	+59.9	24.2	12 32.8	+59.9	24.3	13 27.4	+60.0	24.4	14 22.0	+60.0	24.5	15 16.6	+60.0	24.6	16 11.1	+60.0	24.7	17 05.6	+60.0	24.9	18 00.0	+60.0	25.0	**18**
19	12 38.0	+59.9	24.2	13 32.7	+59.9	24.3	14 27.4	+59.9	24.4	15 22.0	+60.0	24.5	16 16.6	+60.0	24.6	17 11.1	+60.0	24.7	18 05.6	+60.0	24.9	19 00.0	+60.0	25.0	**19**
20	13 37.9	+59.9	24.1	14 32.6	+60.0	24.2	15 27.3	+60.0	24.3	16 22.0	+60.0	24.5	17 16.6	+60.0	24.6	18 11.1	+60.0	24.7	19 05.6	+60.0	24.9	20 00.0	+60.0	25.0	**20**
21	14 37.8	+59.9	24.1	15 32.6	+59.9	24.2	16 27.3	+60.0	24.3	17 22.0	+59.9	24.4	18 16.6	+59.9	24.6	19 11.1	+60.0	24.7	20 05.6	+60.0	24.8	21 00.0	+60.0	25.0	**21**
22	15 37.7	+59.9	24.0	16 32.5	+60.0	24.1	17 27.3	+59.9	24.3	18 21.9	+60.0	24.4	19 16.5	+60.0	24.5	20 11.1	+60.0	24.7	21 05.6	+60.0	24.8	22 00.0	+60.0	25.0	**22**
23	16 37.6	+60.0	24.0	17 32.5	+59.9	24.1	18 27.2	+60.0	24.2	19 21.9	+60.0	24.4	20 16.5	+60.0	24.5	21 11.1	+60.0	24.7	22 05.6	+60.0	24.8	23 00.0	+60.0	25.0	**23**
24	17 37.6	+59.9	23.9	18 32.4	+59.9	24.0	19 27.2	+59.9	24.2	20 21.9	+59.9	24.3	21 16.5	+60.0	24.5	22 11.1	+60.0	24.6	23 05.6	+60.0	24.8	24 00.0	+60.0	25.0	**24**
25	18 37.5	+59.9	23.8	19 32.3	+60.0	24.0	20 27.1	+60.0	24.1	21 21.8	+60.0	24.3	22 16.5	+60.0	24.5	23 11.1	+60.0	24.6	24 05.6	+60.0	24.8	25 00.0	+60.0	25.0	**25**
26	19 37.4	+59.9	23.8	20 32.3	+59.9	23.9	21 27.1	+59.9	24.1	22 21.8	+60.0	24.3	23 16.5	+60.0	24.4	24 11.1	+60.0	24.6	25 05.6	+60.0	24.8	26 00.0	+60.0	25.0	**26**
27	20 37.3	+59.9	23.7	21 32.2	+59.9	23.9	22 27.0	+60.0	24.0	23 21.8	+59.9	24.2	24 16.5	+59.9	24.4	25 11.1	+60.0	24.6	26 05.6	+60.0	24.8	27 00.0	+60.0	25.0	**27**
28	21 37.2	+59.9	23.7	22 32.1	+60.0	23.8	23 27.0	+59.9	24.0	24 21.7	+60.0	24.2	25 16.4	+60.0	24.4	26 11.1	+59.9	24.6	27 05.6	+60.0	24.8	28 00.0	+60.0	25.0	**28**
29	22 37.1	+59.9	23.6	23 32.1	+59.9	23.8	24 26.9	+60.0	24.0	25 21.7	+60.0	24.1	26 16.4	+60.0	24.3	27 11.0	+60.0	24.6	28 05.6	+60.0	24.8	29 00.0	+60.0	25.0	**29**
30	23 37.0	+59.9	23.5	24 32.0	+59.9	23.7	25 26.9	+59.9	23.9	26 21.7	+59.9	24.1	27 16.4	+60.0	24.3	28 11.0	+60.0	24.5	29 05.6	+60.0	24.8	30 00.0	+60.0	25.0	**30**
31	24 36.9	+59.9	23.5	25 31.9	+59.9	23.7	26 26.8	+60.0	23.9	27 21.6	+60.0	24.1	28 16.4	+60.0	24.3	29 11.0	+60.0	24.5	30 05.6	+60.0	24.8	31 00.0	+60.0	25.0	**31**
32	25 36.8	+59.9	23.4	26 31.8	+60.0	23.6	27 26.8	+59.9	23.8	28 21.6	+60.0	24.0	29 16.4	+59.9	24.3	30 11.0	+60.0	24.5	31 05.6	+60.0	24.7	32 00.0	+60.0	25.0	**32**
33	26 36.7	+59.9	23.4	27 31.8	+59.9	23.6	28 26.7	+60.0	23.8	29 21.6	+59.9	24.0	30 16.3	+60.0	24.2	31 11.0	+60.0	24.5	32 05.6	+60.0	24.7	33 00.0	+60.0	25.0	**33**
34	27 36.6	+59.9	23.3	28 31.7	+59.9	23.5	29 26.7	+59.9	23.7	30 21.5	+60.0	24.0	31 16.3	+60.0	24.2	32 11.0	+60.0	24.5	33 05.6	+60.0	24.7	34 00.0	+60.0	25.0	**34**
35	28 36.5	+59.9	23.2	29 31.6	+59.9	23.4	30 26.6	+60.0	23.7	31 21.5	+60.0	23.9	32 16.3	+60.0	24.2	33 11.0	+60.0	24.4	34 05.6	+60.0	24.7	35 00.0	+60.0	25.0	**35**
36	29 36.4	+59.9	23.2	30 31.5	+60.0	23.4	31 26.6	+59.9	23.6	32 21.5	+59.9	23.9	33 16.3	+60.0	24.1	34 11.0	+60.0	24.4	35 05.6	+60.0	24.7	36 00.0	+60.0	25.0	**36**
37	30 36.3	+59.9	23.1	31 31.5	+59.9	23.3	32 26.5	+59.9	23.6	33 21.4	+60.0	23.8	34 16.3	+59.9	24.1	35 11.0	+60.0	24.4	36 05.6	+59.9	24.7	37 00.0	+60.0	25.0	**37**
38	31 36.2	+59.9	23.0	32 31.4	+59.9	23.3	33 26.4	+60.0	23.5	34 21.4	+60.0	23.8	35 16.2	+60.0	24.1	36 11.0	+60.0	24.4	37 05.5	+60.0	24.7	38 00.0	+60.0	25.0	**38**
39	32 36.1	+59.9	22.9	33 31.3	+59.9	23.2	34 26.4	+59.9	23.5	35 21.4	+59.9	23.7	36 16.2	+60.0	24.0	37 11.0	+59.9	24.3	38 05.5	+60.0	24.7	39 00.0	+60.0	25.0	**39**
40	33 36.0	+59.9	22.9	34 31.2	+59.9	23.1	35 26.3	+60.0	23.4	36 21.3	+60.0	23.7	37 16.2	+60.0	24.0	38 10.9	+60.0	24.3	39 05.5	+60.0	24.7	40 00.0	+60.0	25.0	**40**
41	34 35.9	+59.8	22.8	35 31.1	+59.9	23.1	36 26.3	+59.9	23.4	37 21.3	+59.9	23.7	38 16.2	+60.0	24.0	39 10.9	+60.0	24.3	40 05.5	+60.0	24.6	41 00.0	+60.0	25.0	**41**
42	35 35.7	+59.9	22.7	36 31.0	+59.9	23.0	37 26.2	+59.9	23.3	38 21.2	+60.0	23.6	39 16.2	+59.9	23.9	40 10.9	+60.0	24.3	41 05.5	+60.0	24.6	42 00.0	+60.0	25.0	**42**
43	36 35.6	+59.9	22.6	37 30.9	+59.9	22.9	38 26.1	+60.0	23.2	39 21.2	+60.0	23.6	40 16.1	+60.0	23.9	41 10.9	+60.0	24.2	42 05.5	+60.0	24.6	43 00.0	+60.0	25.0	**43**
44	37 35.5	+59.9	22.6	38 30.8	+59.9	22.9	39 26.1	+59.9	23.2	40 21.2	+59.9	23.5	41 16.1	+60.0	23.9	42 10.9	+60.0	24.2	43 05.5	+60.0	24.6	44 00.0	+60.0	25.0	**44**
45	38 35.4	+59.8	22.5	39 30.7	+59.9	22.8	40 26.0	+59.9	23.1	41 21.1	+60.0	23.5	42 16.1	+59.9	23.8	43 10.9	+60.0	24.2	44 05.5	+60.0	24.6	45 00.0	+60.0	25.0	**45**
46	39 35.2	+59.9	22.4	40 30.6	+59.9	22.7	41 25.9	+59.9	23.1	42 21.1	+59.9	23.4	43 16.0	+60.0	23.8	44 10.9	+60.0	24.2	45 05.5	+60.0	24.6	46 00.0	+60.0	25.0	**46**
47	40 35.1	+59.9	22.3	41 30.5	+59.9	22.6	42 25.8	+60.0	23.0	43 21.0	+60.0	23.4	44 16.0	+60.0	23.7	45 10.9	+59.9	24.1	46 05.5	+60.0	24.6	47 00.0	+60.0	25.0	**47**
48	41 35.0	+59.8	22.2	42 30.4	+59.9	22.6	43 25.8	+59.9	22.9	44 21.0	+59.9	23.3	45 16.0	+60.0	23.7	46 10.8	+60.0	24.1	47 05.5	+60.0	24.5	48 00.0	+60.0	25.0	**48**
49	42 34.8	+59.9	22.1	43 30.3	+59.9	22.5	44 25.7	+59.9	22.8	45 20.9	+60.0	23.2	46 16.0	+59.9	23.6	47 10.8	+60.0	24.1	48 05.5	+60.0	24.5	49 00.0	+60.0	25.0	**49**
50	43 34.7	+59.8	22.0	44 30.2	+59.9	22.4	45 25.6	+59.9	22.8	46 20.9	+59.9	23.2	47 15.9	+60.0	23.6	48 10.8	+60.0	24.0	49 05.5	+60.0	24.5	50 00.0	+60.0	25.0	**50**
51	44 34.5	+59.8	21.9	45 30.1	+59.9	22.3	46 25.5	+59.9	22.7	47 20.8	+59.9	23.1	48 15.9	+60.0	23.5	49 10.8	+60.0	24.0	50 05.5	+60.0	24.5	51 00.0	+60.0	25.0	**51**
52	45 34.3	+59.9	21.8	46 30.0	+59.8	22.2	47 25.4	+60.0	22.6	48 20.7	+60.0	23.0	49 15.9	+59.9	23.5	50 10.8	+60.0	24.0	51 05.5	+60.0	24.5	52 00.0	+60.0	25.0	**52**
53	46 34.2	+59.8	21.7	47 29.8	+59.9	22.1	48 25.4	+59.9	22.5	49 20.7	+59.9	23.0	50 15.8	+60.0	23.4	51 10.8	+60.0	23.9	52 05.5	+60.0	24.5	53 00.0	+60.0	25.0	**53**
54	47 34.0	+59.8	21.6	48 29.7	+59.9	22.0	49 25.3	+59.9	22.4	50 20.6	+60.0	22.9	51 15.8	+60.0	23.4	52 10.8	+59.9	23.9	53 05.5	+60.0	24.4	54 00.0	+60.0	25.0	**54**
55	48 33.8	+59.8	21.5	49 29.6	+59.8	21.9	50 25.2	+59.9	22.4	51 20.6	+59.9	22.8	52 15.8	+59.9	23.3	53 10.7	+60.0	23.9	54 05.5	+60.0	24.4	55 00.0	+60.0	25.0	**55**
56	49 33.6	+59.9	21.4	50 29.4	+59.9	21.8	51 25.1	+59.8	22.3	52 20.5	+59.9	22.8	53 15.7	+60.0	23.3	54 10.7	+60.0	23.8	55 05.5	+60.0	24.4	56 00.0	+60.0	25.0	**56**
57	50 33.5	+59.8	21.2	51 29.3	+59.8	21.7	52 24.9	+59.9	22.2	53 20.4	+59.9	22.7	54 15.7	+59.9	23.2	55 10.7	+60.0	23.8	56 05.5	+60.0	24.4	57 00.0	+60.0	25.0	**57**
58	51 33.3	+59.7	21.1	52 29.1	+59.9	21.6	53 24.8	+59.9	22.1	54 20.3	+60.0	22.6	55 15.6	+60.0	23.1	56 10.7	+60.0	23.7	57 05.5	+60.0	24.3	58 00.0	+60.0	25.0	**58**
59	52 33.0	+59.8	21.0	53 29.0	+59.8	21.5	54 24.7	+59.9	22.0	55 20.3	+59.9	22.5	56 15.6	+59.9	23.1	57 10.7	+59.9	23.7	58 05.5	+60.0	24.3	59 00.0	+60.0	25.0	**59**
60	53 32.8	+59.8	20.8	54 28.8	+59.8	21.3	55 24.6	+59.9	21.9	56 20.2	+59.9	22.4	57 15.5	+60.0	23.0	58 10.6	+60.0	23.6	59 05.5	+60.0	24.3	60 00.0	+60.0	25.0	**60**
61	54 32.6	+59.7	20.7	55 28.6	+59.8	21.2	56 24.5	+59.8	21.7	57 20.1	+59.9	22.3	58 15.5	+59.9	22.9	59 10.6	+60.0	23.6	60 05.5	+60.0	24.3	61 00.0	+60.0	25.0	**61**
62	55 32.3	+59.8	20.5	56 28.4	+59.8	21.1	57 24.3	+59.9	21.6	58 20.0	+59.9	22.2	59 15.4	+60.0	22.8	60 10.6	+60.0	23.5	61 05.5	+59.9	24.2	62 00.0	+60.0	25.0	**62**
63	56 32.1	+59.7	20.4	57 28.2	+59.8	20.9	58 24.2	+59.8	21.5	59 19.9	+59.9	22.1	60 15.4	+59.9	22.8	61 10.6	+59.9	23.5	62 05.4	+60.0	24.2	63 00.0	+60.0	25.0	**63**
64	57 31.8	+59.7	20.2	58 28.0	+59.8	20.7	59 24.0	+59.9	21.3	60 19.8	+59.9	22.0	61 15.3	+59.9	22.7	62 10.5	+60.0	23.4	63 05.4	+60.0	24.2	64 00.0	+60.0	25.0	**64**
65	58 31.5	+59.7	20.0	59 27.8	+59.8	20.6	60 23.9	+59.8	21.2	61 19.7	+59.9	21.9	62 15.2	+60.0	22.6	63 10.5	+60.0	23.3	64 05.4	+60.0	24.1	65 00.0	+60.0	25.0	**65**
66	59 31.2	+59.7	19.8	60 27.6	+59.7	20.4	61 23.7	+59.8	21.0	62 19.6	+59.8	21.7	63 15.2	+59.9	22.5	64 10.5	+59.9	23.2	65 05.4	+60.0	24.1	66 00.0	+60.0	25.0	**66**
67	60 30.9	+59.7	19.6	61 27.3	+59.8	20.2	62 23.5	+59.8	20.9	63 19.4	+59.9	21.6	64 15.1	+59.9	22.3	65 10.4	+60.0	23.2	66 05.4	+60.0	24.0	67 00.0	+60.0	25.0	**67**
68	61 30.6	+59.6	19.4	62 27.1	+59.7	20.0	63 23.3	+59.8	20.7	64 19.3	+59.9	21.4	65 15.0	+59.9	22.2	66 10.4	+59.9	23.1	67 05.4	+60.0	24.0	68 00.0	+60.0	25.0	**68**
69	62 30.2	+59.6	19.1	63 26.8	+59.7	19.8	64 23.1	+59.8	20.5	65 19.2	+59.8	21.3	66 14.9	+59.9	22.1	67 10.3	+60.0	23.0	68 05.4	+60.0	23.9	69 00.0	+60.0	25.0	**69**
70	63 29.8	+59.6	18.9	64 26.5	+59.6	19.6	65 22.9	+59.7	20.3	66 19.0	+59.8	21.1	67 14.8	+59.9	21.9	68 10.3	+60.0	22.9	69 05.4	+60.0	23.9	70 00.0	+60.0	25.0	**70**
71	64 29.4	+59.6	18.6	65 26.1	+59.7	19.3	66 22.6	+59.8	20.1	67 18.8	+59.9	20.9	68 14.7	+59.9	21.8	69 10.3	+59.9	22.8	70 05.4	+59.9	23.8	71 00.0	+60.0	25.0	**71**
72	65 29.0	+59.5	18.3	66 25.8	+59.6	19.1	67 22.4	+59.7	19.8	68 18.7	+59.8	20.7	69 14.6	+59.9	21.6	70 10.2	+59.9	22.6	71 05.3	+60.0	23.8	72 00.0	+60.0	25.0	**72**
73	66 28.5	+59.5	18.0	67 25.4	+59.6	18.8	68 22.1	+59.7	19.6	69 18.5	+59.7	20.5	70 14.5	+59.9	21.4	71 10.1	+60.0	22.5	72 05.3	+60.0	23.7	73 00.0	+60.0	25.0	**73**
74	67 28.0	+59.4	17.7	68 25.0	+59.5	18.5	69 21.8	+59.6	19.3	70 18.2	+59.8	20.2	71 14.4	+59.8	21.2	72 10.1	+59.9	22.4	73 05.3	+60.0	23.6	74 00.0	+60.0	25.0	**74**
75	68 27.4	+59.4	17.3	69 24.5	+59.5	18.1	70 21.4	+59.6	19.0	71 18.0	+59.7	19.9	72 14.2	+59.8	21.0	73 10.0	+59.9	22.2	74 05.3	+60.0	23.5	75 00.0	+60.0	25.0	**75**
76	69 26.8	+59.3	16.9	70 24.0	+59.5	17.7	71 21.0	+59.6	18.6	72 17.7	+59.7	19.6	73 14.0	+59.9	20.8	74 09.9	+59.9	22.0	75 05.3	+59.9	23.4	76 00.0	+60.0	25.0	**76**
77	70 26.1	+59.2	16.5	71 23.5	+59.4	17.3	72 20.6	+59.6	18.3	73 17.4	+59.7	19.3	74 13.9	+59.7	20.5	75 09.8	+59.9	21.8	76 05.2	+60.0	23.3	77 00.0	+60.0	25.0	**77**
78	71 25.3	+59.2	16.0	72 22.9	+59.3	16.9	73 20.2	+59.4	17.8	74 17.1	+59.6	18.9	75 13.6	+59.8	20.2	76 09.7	+59.9	21.6	77 05.2	+60.0	23.2	78 00.0	+60.0	25.0	**78**
79	72 24.5	+59.1	15.5	73 22.2	+59.2	16.4	74 19.6	+59.4	17.4	75 16.7	+59.6	18.5	76 13.4	+59.7	19.8	77 09.6	+59.8	21.3	78 05.2	+59.9	23.0	79 00.0	+60.0	25.0	**79**
80	73 23.6	+58.9	14.9	74 21.4	+59.2	15.8	75 19.0	+59.3	16.8	76 16.3	+59.5	18.0	77 13.1	+59.7	19.4	78 09.4	+59.9	21.0	79 05.1	+60.0	22.8	80 00.0	+60.0	25.0	**80**
81	74 22.5	+58.9	14.2	75 20.6	+59.0	15.1	76 18.3	+59.3	16.2	77 15.8	+59.4	17.4	78 12.8	+59.6	18.9	79 09.3	+59.8	20.6	80 05.1	+59.9	22.6	81 00.0	+60.0	25.0	**81**
82	75 21.4	+58.6	13.5	76 19.6	+58.9	14.4	77 17.6	+59.0	15.5	78 15.2	+59.3	16.8	79 12.4	+59.5	18.3	80 09.0	+59.7	20.1	81 05.0	+59.9	22.3	82 00.0	+60.0	25.0	**82**
83	76 20.0	+58.5	12.6	77 18.5	+58.6	13.6	78 16.6	+59.0	14.7	79 14.5	+59.2	16.0	80 11.9	+59.5	17.6	81 08.8	+59.7	19.6	82 04.9	+59.9	22.0	83 00.0	+60.0	25.0	**83**
84	77 18.5	+58.1	11.6	78 17.1	+58.5	12.6	79 15.6	+58.7	13.7	80 13.7	+59.0	15.1	81 11.4	+59.3	16.8	82 08.5	+59.6	18.9	83 04.8	+59.9	21.5	84 00.0	+60.0	25.0	**84**
85	78 16.6	+57.9	10.4	79 15.6	+58.1	11.4	80 14.3	+58.4	12.5	81 12.7	+58.7	13.9	82 10.7	+59.1	15.7	83 08.1	+59.5	17.9	84 04.7	+59.8	20.9	85 00.0	+60.0	25.0	**85**
86	79 14.5	+57.4	9.1	80 13.7	+57.7	10.0	81 12.7	+58.0	11.1	82 11.4	+58.4	12.5	83 09.8	+58.7	14.3	84 07.6	+59.2	16.7	85 04.5	+59.8	20.1	86 00.0	+60.0	25.0	**86**
87	80 11.9	+56.9	7.5	81 11.4	+57.1	8.3	82 10.7	+57.4	9.4	83 09.8	+57.8	10.7	84 08.5	+58.3	12.5	85 06.8	+58.9	15.1	86 04.3	+59.5	18.8	87 00.0	+60.0	25.0	**87**
88	81 08.8	+56.1	5.5	82 08.5	+56.3	6.2	83 08.1	+56.6	7.1	84 07.6	+56.9	8.3	85 06.8	+57.5	10.0	86 05.7	+58.1	12.5	87 03.8	+59.0	16.7	88 00.0	+60.0	25.0	**88**
89	82 04.9	+55.1	3.1	83 04.8	+55.2	3.5	84 04.7	+55.3	4.1	85 04.5	*+55.5*•	4.9	86 04.3	*+55.7*•	6.2	87 03.8	*+56.2*•	8.3	88 02.8	*+57.2*•	12.5	89 00.0	+60.0	25.0	**89**
90	83 00.0	+53.5	0.0	84 00.0	*+53.3*•	0.0	85 00.0	*+53.1*•	0.0	86 00.0	*+52.7*•	0.0	87 00.0	*+51.8*•	0.0	88 00.0	*+49.7*•	0.0	89 00.0	*+34.0*•	0.0	90 00.0	−60.0	12.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 155°, 205°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 17.3	+59.9	153.8	5 23.5	+59.9	153.9	4 29.6	+59.9	153.9	3 35.7	+59.9	153.9	2 41.8	+60.0	154.0	1 47.9	+59.9	154.0	0 53.9	+60.0	154.0	0 00.0	+60.0	154.0	**0**
1	7 17.2	+59.9	153.8	6 23.4	+59.9	153.8	5 29.5	+60.0	153.9	4 35.6	+60.0	153.9	3 41.8	+59.9	153.9	2 47.8	+60.0	154.0	1 53.9	+60.0	154.0	1 00.0	+60.0	154.0	**1**
2	8 17.1	+60.0	153.7	7 23.3	+60.0	153.8	6 29.5	+59.9	153.8	5 35.6	+60.0	153.9	4 41.7	+60.0	153.9	3 47.8	+60.0	154.0	2 53.9	+60.0	154.0	2 00.0	+60.0	154.0	**2**
3	9 17.1	+59.9	153.7	8 23.3	+59.9	153.7	7 29.4	+60.0	153.8	6 35.6	+60.0	153.9	5 41.7	+60.0	153.9	4 47.8	+60.0	153.9	3 53.9	+60.0	154.0	3 00.0	+60.0	154.0	**3**
4	10 17.0	+59.9	153.6	9 23.2	+59.9	153.7	8 29.4	+59.9	153.8	7 35.6	+59.9	153.8	6 41.7	+60.0	153.9	5 47.8	+60.0	153.9	4 53.9	+60.0	154.0	4 00.0	+60.0	154.0	**4**
5	11 16.9	+59.9	153.6	10 23.1	+60.0	153.6	9 29.3	+60.0	153.7	8 35.5	+60.0	153.8	7 41.7	+60.0	153.9	6 47.8	+60.0	153.9	5 53.9	+60.0	154.0	5 00.0	+60.0	154.0	**5**
6	12 16.8	+59.9	153.5	11 23.1	+59.9	153.6	10 29.3	+60.0	153.7	9 35.5	+60.0	153.8	8 41.7	+60.0	153.8	7 47.8	+60.0	153.9	6 53.9	+60.0	154.0	6 00.0	+60.0	154.0	**6**
7	13 16.7	+59.9	153.4	12 23.0	+59.9	153.5	11 29.3	+59.9	153.6	10 35.5	+59.9	153.7	9 41.7	+59.9	153.8	8 47.8	+60.0	153.9	7 53.9	+60.0	153.9	7 00.0	+60.0	154.0	**7**
8	14 16.6	+59.9	153.4	13 22.9	+60.0	153.5	12 29.2	+60.0	153.6	11 35.4	+60.0	153.7	10 41.6	+60.0	153.8	9 47.8	+60.0	153.9	8 53.9	+60.0	153.9	8 00.0	+60.0	154.0	**8**
9	15 16.5	+59.9	153.3	14 22.9	+59.9	153.4	13 29.2	+59.9	153.6	12 35.4	+60.0	153.7	11 41.6	+60.0	153.8	10 47.8	+60.0	153.8	9 53.9	+60.0	153.9	9 00.0	+60.0	154.0	**9**
10	16 16.4	+59.9	153.3	15 22.8	+59.9	153.4	14 29.1	+60.0	153.5	13 35.4	+60.0	153.6	12 41.6	+60.0	153.7	11 47.8	+60.0	153.8	10 53.9	+60.0	153.9	10 00.0	+60.0	154.0	**10**
11	17 16.3	+59.9	153.2	16 22.7	+60.0	153.4	15 29.1	+59.9	153.5	14 35.4	+59.9	153.6	13 41.6	+60.0	153.7	12 47.8	+60.0	153.8	11 53.9	+60.0	153.9	11 00.0	+60.0	154.0	**11**
12	18 16.2	+59.9	153.2	17 22.7	+59.9	153.3	16 29.0	+60.0	153.4	15 35.3	+60.0	153.6	14 41.6	+60.0	153.7	13 47.8	+60.0	153.8	12 53.9	+60.0	153.9	12 00.0	+60.0	154.0	**12**
13	19 16.1	+59.9	153.1	18 22.6	+59.9	153.3	17 29.0	+59.9	153.4	16 35.3	+60.0	153.5	15 41.6	+59.9	153.7	14 47.8	+59.9	153.8	13 53.9	+60.0	153.9	13 00.0	+60.0	154.0	**13**
14	20 16.0	+59.9	153.0	19 22.5	+60.0	153.2	18 28.9	+60.0	153.4	17 35.3	+59.9	153.5	16 41.5	+60.0	153.6	15 47.7	+60.0	153.8	14 53.9	+60.0	153.9	14 00.0	+60.0	154.0	**14**
15	21 15.9	+59.9	153.0	20 22.5	+59.9	153.1	19 28.9	+59.9	153.3	18 35.2	+60.0	153.5	17 41.5	+60.0	153.6	16 47.7	+60.0	153.7	15 53.9	+60.0	153.9	15 00.0	+60.0	154.0	**15**
16	22 15.8	+59.9	152.9	21 22.4	+59.9	153.1	20 28.8	+60.0	153.3	19 35.2	+60.0	153.4	18 41.5	+60.0	153.6	17 47.7	+60.0	153.7	16 53.9	+60.0	153.9	16 00.0	+60.0	154.0	**16**
17	23 15.7	+59.9	152.9	22 22.3	+59.9	153.0	21 28.8	+59.9	153.2	20 35.2	+59.9	153.4	19 41.5	+60.0	153.6	18 47.7	+60.0	153.7	17 53.9	+60.0	153.9	17 00.0	+60.0	154.0	**17**
18	24 15.6	+59.9	152.8	23 22.2	+60.0	153.0	22 28.7	+60.0	153.2	21 35.1	+60.0	153.4	20 41.5	+60.0	153.5	19 47.7	+60.0	153.7	18 53.9	+60.0	153.9	18 00.0	+60.0	154.0	**18**
19	25 15.5	+59.9	152.7	24 22.2	+59.9	152.9	23 28.7	+59.9	153.1	22 35.1	+60.0	153.3	21 41.5	+59.9	153.5	20 47.7	+60.0	153.7	19 53.9	+60.0	153.8	19 00.0	+60.0	154.0	**19**
20	26 15.4	+59.9	152.7	25 22.1	+59.9	152.9	24 28.6	+60.0	153.1	23 35.1	+59.9	153.3	22 41.4	+60.0	153.5	21 47.7	+60.0	153.7	20 53.9	+60.0	153.8	20 00.0	+60.0	154.0	**20**
21	27 15.3	+59.9	152.6	26 22.0	+59.9	152.8	25 28.6	+59.9	153.0	24 35.0	+60.0	153.3	23 41.4	+60.0	153.5	22 47.7	+60.0	153.6	21 53.9	+60.0	153.8	21 00.0	+60.0	154.0	**21**
22	28 15.2	+59.9	152.5	27 21.9	+59.9	152.8	26 28.5	+60.0	153.0	25 35.0	+60.0	153.2	24 41.4	+60.0	153.4	23 47.7	+60.0	153.6	22 53.9	+60.0	153.8	22 00.0	+60.0	154.0	**22**
23	29 15.1	+59.9	152.5	28 21.8	+60.0	152.7	27 28.5	+59.9	152.9	26 35.0	+59.9	153.2	25 41.4	+60.0	153.4	24 47.7	+60.0	153.6	23 53.9	+60.0	153.8	23 00.0	+60.0	154.0	**23**
24	30 15.0	+59.9	152.4	29 21.8	+59.9	152.6	28 28.4	+59.9	152.9	27 34.9	+60.0	153.1	26 41.4	+59.9	153.4	25 47.7	+60.0	153.6	24 53.9	+60.0	153.8	24 00.0	+60.0	154.0	**24**
25	31 14.9	+59.9	152.3	30 21.7	+59.9	152.6	29 28.3	+60.0	152.8	28 34.9	+60.0	153.1	27 41.3	+60.0	153.3	26 47.7	+60.0	153.6	25 53.9	+60.0	153.8	25 00.0	+60.0	154.0	**25**
26	32 14.8	+59.8	152.2	31 21.6	+59.9	152.5	30 28.3	+59.9	152.8	29 34.9	+59.9	153.1	28 41.3	+60.0	153.3	27 47.7	+59.9	153.6	26 53.9	+60.0	153.8	26 00.0	+60.0	154.0	**26**
27	33 14.6	+59.9	152.2	32 21.5	+59.9	152.5	31 28.2	+60.0	152.7	30 34.8	+60.0	153.0	29 41.3	+60.0	153.3	28 47.6	+60.0	153.5	27 53.9	+60.0	153.8	27 00.0	+60.0	154.0	**27**
28	34 14.5	+59.9	152.1	33 21.4	+59.9	152.4	32 28.2	+59.9	152.7	31 34.8	+59.9	153.0	30 41.3	+60.0	153.3	29 47.6	+60.0	153.5	28 53.9	+60.0	153.8	28 00.0	+60.0	154.0	**28**
29	35 14.4	+59.8	152.0	34 21.3	+59.9	152.3	33 28.1	+59.9	152.6	32 34.7	+60.0	152.9	31 41.3	+59.9	153.2	30 47.6	+60.0	153.5	29 53.9	+60.0	153.8	29 00.0	+60.0	154.0	**29**
30	36 14.2	+59.9	151.9	35 21.2	+59.9	152.3	34 28.0	+60.0	152.6	33 34.7	+60.0	152.9	32 41.2	+60.0	153.2	31 47.6	+60.0	153.5	30 53.9	+60.0	153.7	30 00.0	+60.0	154.0	**30**
31	37 14.1	+59.9	151.8	36 21.1	+59.9	152.2	35 28.0	+59.9	152.5	34 34.7	+59.9	152.8	33 41.2	+60.0	153.2	32 47.6	+60.0	153.4	31 53.9	+60.0	153.7	31 00.0	+60.0	154.0	**31**
32	38 14.0	+59.8	151.8	37 21.0	+59.9	152.1	36 27.9	+59.9	152.5	35 34.6	+60.0	152.8	34 41.2	+60.0	153.1	33 47.6	+60.0	153.4	32 53.9	+60.0	153.7	32 00.0	+60.0	154.0	**32**
33	39 13.8	+59.9	151.7	38 20.9	+59.9	152.0	37 27.8	+60.0	152.4	36 34.6	+59.9	152.8	35 41.2	+59.9	153.1	34 47.6	+60.0	153.4	33 53.9	+60.0	153.7	33 00.0	+60.0	154.0	**33**
34	40 13.7	+59.8	151.6	39 20.8	+59.9	152.0	38 27.8	+59.9	152.3	37 34.5	+60.0	152.7	36 41.1	+60.0	153.1	35 47.6	+60.0	153.4	34 53.9	+60.0	153.7	34 00.0	+60.0	154.0	**34**
35	41 13.5	+59.9	151.5	40 20.7	+59.9	151.9	39 27.7	+59.9	152.3	38 34.5	+59.9	152.7	37 41.1	+60.0	153.0	36 47.6	+60.0	153.4	35 53.9	+60.0	153.7	35 00.0	+60.0	154.0	**35**
36	42 13.4	+59.8	151.4	41 20.6	+59.9	151.8	40 27.6	+59.9	152.2	39 34.4	+60.0	152.6	38 41.1	+60.0	153.0	37 47.6	+59.9	153.3	36 53.9	+60.0	153.7	36 00.0	+60.0	154.0	**36**
37	43 13.2	+59.9	151.3	42 20.5	+59.9	151.7	41 27.5	+60.0	152.2	40 34.4	+60.0	152.6	39 41.1	+59.9	152.9	38 47.5	+60.0	153.3	37 53.9	+59.9	153.7	37 00.0	+60.0	154.0	**37**
38	44 13.1	+59.8	151.2	43 20.4	+59.9	151.6	42 27.5	+59.9	152.1	41 34.4	+59.9	152.5	40 41.0	+60.0	152.9	39 47.5	+60.0	153.3	38 53.8	+60.0	153.6	38 00.0	+60.0	154.0	**38**
39	45 12.9	+59.8	151.1	44 20.3	+59.8	151.6	43 27.4	+59.9	152.0	42 34.3	+59.9	152.4	41 41.0	+60.0	152.9	40 47.5	+60.0	153.3	39 53.8	+60.0	153.6	39 00.0	+60.0	154.0	**39**
40	46 12.7	+59.8	151.0	45 20.1	+59.9	151.5	44 27.3	+59.9	151.9	43 34.2	+60.0	152.4	42 41.0	+59.9	152.8	41 47.5	+60.0	153.2	40 53.8	+60.0	153.6	40 00.0	+60.0	154.0	**40**
41	47 12.5	+59.8	150.9	46 20.0	+59.9	151.4	45 27.2	+59.9	151.9	44 34.2	+59.9	152.3	43 40.9	+60.0	152.8	42 47.5	+60.0	153.2	41 53.8	+60.0	153.6	41 00.0	+60.0	154.0	**41**
42	48 12.3	+59.9	150.7	47 19.9	+59.8	151.3	46 27.1	+59.9	151.8	45 34.1	+60.0	152.3	44 40.9	+60.0	152.7	43 47.5	+60.0	153.2	42 53.8	+60.0	153.6	42 00.0	+60.0	154.0	**42**
43	49 12.2	+59.7	150.6	48 19.7	+59.9	151.2	47 27.0	+59.9	151.7	46 34.1	+59.9	152.2	45 40.9	+60.0	152.7	44 47.5	+60.0	153.1	43 53.8	+60.0	153.6	43 00.0	+60.0	154.0	**43**
44	50 11.9	+59.8	150.5	49 19.6	+59.8	151.1	48 26.9	+59.9	151.6	47 34.0	+60.0	152.1	46 40.9	+59.9	152.6	45 47.5	+59.9	153.1	44 53.8	+60.0	153.6	44 00.0	+60.0	154.0	**44**
45	51 11.7	+59.8	150.4	50 19.4	+59.9	151.0	49 26.8	+59.9	151.5	48 34.0	+59.9	152.1	47 40.8	+60.0	152.6	46 47.4	+60.0	153.1	45 53.8	+60.0	153.6	45 00.0	+60.0	154.0	**45**
46	52 11.5	+59.8	150.2	51 19.3	+59.8	150.8	50 26.7	+59.9	151.4	49 33.9	+59.9	152.0	48 40.8	+59.9	152.5	47 47.4	+60.0	153.0	46 53.8	+60.0	153.5	46 00.0	+60.0	154.0	**46**
47	53 11.3	+59.7	150.1	52 19.1	+59.8	150.7	51 26.6	+59.9	151.3	50 33.8	+60.0	151.9	49 40.7	+60.0	152.5	48 47.4	+60.0	153.0	47 53.8	+60.0	153.5	47 00.0	+60.0	154.0	**47**
48	54 11.0	+59.8	149.9	53 18.9	+59.9	150.6	52 26.5	+59.9	151.2	51 33.8	+59.9	151.8	50 40.7	+60.0	152.4	49 47.4	+60.0	153.0	48 53.8	+60.0	153.5	48 00.0	+60.0	154.0	**48**
49	55 10.8	+59.7	149.8	54 18.8	+59.8	150.5	53 26.4	+59.9	151.1	52 33.7	+59.9	151.8	51 40.7	+59.9	152.4	50 47.4	+60.0	152.9	49 53.8	+60.0	153.5	49 00.0	+60.0	154.0	**49**
50	56 10.5	+59.7	149.6	55 18.6	+59.8	150.3	54 26.3	+59.8	151.0	53 33.6	+59.9	151.7	52 40.6	+60.0	152.3	51 47.4	+59.9	152.9	50 53.8	+60.0	153.5	50 00.0	+60.0	154.0	**50**
51	57 10.2	+59.7	149.4	56 18.4	+59.8	150.2	55 26.1	+59.9	150.9	54 33.5	+59.9	151.6	53 40.6	+59.9	152.2	52 47.3	+60.0	152.9	51 53.8	+60.0	153.4	51 00.0	+60.0	154.0	**51**
52	58 09.9	+59.7	149.2	57 18.2	+59.7	150.0	56 26.0	+59.8	150.8	55 33.4	+59.9	151.5	54 40.5	+60.0	152.2	53 47.3	+60.0	152.8	52 53.8	+60.0	153.4	52 00.0	+60.0	154.0	**52**
53	59 09.6	+59.7	149.0	58 17.9	+59.8	149.9	57 25.8	+59.9	150.7	56 33.3	+59.9	151.4	55 40.5	+59.9	152.1	54 47.3	+60.0	152.8	53 53.8	+60.0	153.4	53 00.0	+60.0	154.0	**53**
54	60 09.3	+59.6	148.8	59 17.7	+59.7	149.7	58 25.7	+59.8	150.5	57 33.2	+59.9	151.3	56 40.4	+60.0	152.0	55 47.3	+59.9	152.7	54 53.8	+60.0	153.4	54 00.0	+60.0	154.0	**54**
55	61 08.9	+59.6	148.6	60 17.4	+59.8	149.5	59 25.5	+59.8	150.4	58 33.1	+59.9	151.2	57 40.4	+59.9	152.0	56 47.2	+60.0	152.7	55 53.8	+60.0	153.4	55 00.0	+60.0	154.0	**55**
56	62 08.5	+59.6	148.4	61 17.2	+59.7	149.3	60 25.3	+59.9	150.2	59 33.0	+59.9	151.1	58 40.3	+60.0	151.9	57 47.2	+60.0	152.6	56 53.8	+60.0	153.3	56 00.0	+60.0	154.0	**56**
57	63 08.1	+59.6	148.1	62 16.9	+59.7	149.1	61 25.2	+59.8	150.1	60 32.9	+59.9	150.9	59 40.3	+59.9	151.8	58 47.2	+60.0	152.6	57 53.8	+60.0	153.3	57 00.0	+60.0	154.0	**57**
58	64 07.7	+59.5	147.8	63 16.6	+59.7	148.9	62 25.0	+59.7	149.9	61 32.8	+59.9	150.8	60 40.2	+59.9	151.7	59 47.2	+59.9	152.5	58 53.8	+60.0	153.3	58 00.0	+60.0	154.0	**58**
59	65 07.2	+59.5	147.5	64 16.3	+59.6	148.7	63 24.7	+59.8	149.7	62 32.7	+59.8	150.7	61 40.1	+60.0	151.6	60 47.1	+60.0	152.4	59 53.8	+59.9	153.2	59 00.0	+60.0	154.0	**59**
60	66 06.7	+59.5	147.2	65 15.9	+59.7	148.4	64 24.5	+59.8	149.5	63 32.5	+59.9	150.5	62 40.1	+59.9	151.5	61 47.1	+60.0	152.4	60 53.7	+60.0	153.2	60 00.0	+60.0	154.0	**60**
61	67 06.2	+59.4	146.9	66 15.6	+59.5	148.1	65 24.3	+59.7	149.3	64 32.4	+59.8	150.4	63 40.0	+59.9	151.4	62 47.1	+59.9	152.3	61 53.7	+60.0	153.2	61 00.0	+60.0	154.0	**61**
62	68 05.6	+59.3	146.5	67 15.1	+59.6	147.8	66 24.0	+59.7	149.1	65 32.2	+59.9	150.2	64 39.9	+59.9	151.3	63 47.0	+60.0	152.2	62 53.7	+60.0	153.1	62 00.0	+60.0	154.0	**62**
63	69 04.9	+59.3	146.1	68 14.7	+59.5	147.5	67 23.7	+59.7	148.8	66 32.1	+59.8	150.0	65 39.8	+59.9	151.1	64 47.0	+60.0	152.2	63 53.7	+60.0	153.1	63 00.0	+60.0	154.0	**63**
64	70 04.2	+59.2	145.7	69 14.2	+59.5	147.2	68 23.4	+59.7	148.5	67 31.9	+59.8	149.8	66 39.7	+59.9	151.0	65 47.0	+59.9	152.1	64 53.7	+60.0	153.1	64 00.0	+60.0	154.0	**64**
65	71 03.4	+59.2	145.2	70 13.7	+59.4	146.8	69 23.1	+59.6	148.3	68 31.7	+59.8	149.6	67 39.6	+59.9	150.8	66 46.9	+60.0	152.0	65 53.7	+60.0	153.0	65 00.0	+60.0	154.0	**65**
66	72 02.6	+59.0	144.7	71 13.1	+59.4	146.4	70 22.7	+59.6	147.9	69 31.5	+59.7	149.4	68 39.5	+59.9	150.7	67 46.9	+59.9	151.9	66 53.7	+60.0	153.0	66 00.0	+60.0	154.0	**66**
67	73 01.6	+58.9	144.1	72 12.5	+59.3	145.9	71 22.3	+59.5	147.6	70 31.2	+59.8	149.1	69 39.4	+59.8	150.5	68 46.8	+60.0	151.8	67 53.7	+60.0	152.9	67 00.0	+60.0	154.0	**67**
68	74 00.5	+58.8	143.4	73 11.8	+59.1	145.4	72 21.8	+59.5	147.2	71 31.0	+59.7	148.8	70 39.2	+59.9	150.3	69 46.8	+59.9	151.6	68 53.7	+60.0	152.9	68 00.0	+60.0	154.0	**68**
69	74 59.3	+58.7	142.7	74 10.9	+59.1	144.8	73 21.3	+59.5	146.7	72 30.7	+59.6	148.5	71 39.1	+59.8	150.1	70 46.7	+59.9	151.5	69 53.7	+59.9	152.8	69 00.0	+60.0	154.0	**69**
70	75 58.0	+58.4	141.8	75 10.0	+59.0	144.1	74 20.8	+59.3	146.2	73 30.3	+59.7	148.1	72 38.9	+59.8	149.8	71 46.6	+60.0	151.3	70 53.6	+60.0	152.7	70 00.0	+60.0	154.0	**70**
71	76 56.4	+58.1	140.8	76 09.0	+58.8	143.4	75 20.1	+59.3	145.7	74 30.0	+59.5	147.7	73 38.7	+59.8	149.5	72 46.6	+59.9	151.2	71 53.6	+60.0	152.7	71 00.0	+60.0	154.0	**71**
72	77 54.5	+57.9	139.7	77 07.8	+58.6	142.5	76 19.4	+59.1	145.0	75 29.5	+59.6	147.3	74 38.5	+59.8	149.2	73 46.5	+59.9	151.0	72 53.6	+60.0	152.6	72 00.0	+60.0	154.0	**72**
73	78 52.4	+57.4	138.4	78 06.4	+58.4	141.5	77 18.5	+59.0	144.3	76 29.1	+59.4	146.7	75 38.3	+59.7	148.9	74 46.4	+59.9	150.8	73 53.6	+60.0	152.5	73 00.0	+60.0	154.0	**73**
74	79 49.8	+56.9	136.8	79 04.8	+58.0	140.4	78 17.5	+58.9	143.5	77 28.5	+59.4	146.1	76 38.0	+59.7	148.5	75 46.3	+59.9	150.6	74 53.6	+59.9	152.4	74 00.0	+60.0	154.0	**74**
75	80 46.7	+56.2	134.9	80 02.8	+57.6	139.0	79 16.4	+58.6	142.4	78 27.9	+59.2	145.4	77 37.7	+59.6	148.0	76 46.2	+59.8	150.3	75 53.5	+60.0	152.3	75 00.0	+60.0	154.0	**75**
76	81 42.9	+55.1	132.6	81 00.4	+57.1	137.3	80 15.0	+58.2	141.2	79 27.1	+59.1	144.6	78 37.3	+59.6	147.5	77 46.0	+59.8	150.0	76 53.5	+60.0	152.1	76 00.0	+60.0	154.0	**76**
77	82 38.0	+53.8	129.7	81 57.5	+56.2	135.2	81 13.2	+57.9	139.8	80 26.2	+58.8	143.6	79 36.9	+59.4	146.8	78 45.8	+59.8	149.6	77 53.5	+59.9	152.0	77 00.0	+60.0	154.0	**77**
78	83 31.8	*+51.6*	•126.0	82 53.7	+55.1	132.5	82 11.1	+57.2	137.9	81 25.0	+58.6	142.4	80 36.3	+59.3	146.1	79 45.6	+59.8	149.2	78 53.4	+60.0	151.8	78 00.0	+60.0	154.0	**78**
79	84 23.4	*+48.4*	•121.2	83 48.8	*+53.3*	•129.1	83 08.3	+56.4	135.6	82 23.6	+58.1	140.8	81 35.6	+59.2	145.1	80 45.4	+59.7	148.6	79 53.4	+59.9	151.5	79 00.0	+60.0	154.0	**79**
80	85 11.8	*+43.2*	•114.6	84 42.1	*+50.4*	•124.5	84 04.7	+54.9	132.5	83 21.7	+57.5	138.8	82 34.8	+58.9	143.9	81 45.1	+59.6	148.0	80 53.3	+59.9	151.3	80 00.0	+60.0	154.0	**80**
81	85 55.0	*+34.8*	•105.6	85 32.5	*+45.7*	•118.1	84 59.6	*+52.5*	•128.2	84 19.2	+56.5	136.1	83 33.7	+58.5	142.3	82 44.7	+59.5	147.1	81 53.2	+59.9	150.9	81 00.0	+60.0	154.0	**81**
82	86 29.8	*+21.7*	•93.3	86 18.2	*+37.2*	•108.9	85 52.1	*+48.4*	•122.1	85 15.7	*+54.6*	•132.4	84 32.2	+57.9	140.1	83 44.2	+59.3	146.0	82 53.1	+59.9	150.5	82 00.0	+60.0	154.0	**82**
83	86 51.5	*+3.9*	•77.1	86 55.4	*+22.9*	•95.5	86 40.5	*+40.1*	•112.9	86 10.3	*+51.2*	•126.8	85 30.1	+56.6	137.1	84 43.5	+58.9	144.5	83 53.0	+59.8	149.9	83 00.0	+60.0	154.0	**83**
84	86 55.4	*−14.9*	•58.6	87 18.3	*+2.3*	•77.1	87 20.6	*+24.6*	•98.6	87 01.5	*+43.8*	•118.0	86 26.7	*+54.2*	•132.4	85 42.4	+58.4	142.3	84 52.8	+59.7	149.1	84 00.0	+60.0	154.0	**84**
85	86 40.5	*−30.2*	•41.2	87 20.6	*−19.1*	•55.5	87 45.2	*+0.1*	•77.0	87 45.3	*+26.8*	•102.8	87 20.9	*+48.0*	•124.3	86 40.8	*+57.0*	•138.7	85 52.5	+59.6	147.9	85 00.0	+60.0	154.0	**85**
86	86 10.3	*−40.2*	•27.3	87 01.5	*−34.8*	•36.1	87 45.3	*−24.4*	•51.3	88 12.1	*−3.2*	•77.0	88 08.9	*+30.2*	•108.8	87 37.8	*+52.9*	•132.3	86 52.1	+59.1	146.0	86 00.0	+60.0	154.0	**86**
87	85 30.1	*−46.6*	•17.0	86 26.7	*−44.3*	•21.7	87 20.9	*−40.1*	•29.7	88 08.9	*−31.1*	•45.3	88 39.1	*−8.4*	•77.0	88 30.7	*+35.3*	•117.9	87 51.2	*+57.7*	•142.2	87 00.0	+60.0	154.0	**87**
88	84 43.5	*−50.5*	•9.6	85 42.4	*−49.6*	•11.8	86 40.8	*−48.3*	•15.3	87 37.8	*−45.7*	•21.7	88 30.7	*−39.5*	•36.1	89 06.0	*−17.1*	•77.0	88 48.9	*+44.1*	•132.3	88 00.0	+60.0	154.0	**88**
89	83 53.0	*−53.0*	•4.1	84 52.8	*−52.8*	•4.9	85 52.5	*−52.5*	•6.1	86 52.1	*−52.1*	•8.0	87 51.2	*−51.2*	•11.8	88 48.9	*−48.9*	•21.7	89 33.0	*−33.0*	•77.0	89 00.0	+60.0	154.0	**89**
90	83 00.0	−54.7	0.0	84 00.0	−54.8	0.0	85 00.0	−54.9	0.0	86 00.0	*−55.1*	•0.0	87 00.0	*−55.4*	•0.0	88 00.0	*−55.9*	•0.0	89 00.0	*−56.9*	•0.0	90 00.0	−60.0	77.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 26°, 334°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 17.3	–59.9	153.8	5 23.5	–60.0	153.9	4 29.6	–60.0	153.9	3 35.7	–60.0	153.9	2 41.8	–60.0	154.0	1 47.9	–60.0	154.0	0 53.9	–60.0	154.0	0 00.0	+60.0	26.0	**0**
1	5 17.4	–59.9	153.9	4 23.5	–59.9	153.9	3 29.6	–59.9	154.0	2 35.7	–60.0	154.0	1 41.8	–60.0	154.0	0 47.9	–60.0	154.0	0 06.1	+60.0	26.0	1 00.0	+60.0	26.0	**1**
2	4 17.5	–59.9	153.9	3 23.6	–60.0	154.0	2 29.7	–60.0	154.0	1 35.7	–59.9	154.0	0 41.8	–60.0	154.0	0 12.1	+60.0	26.0	1 06.1	+60.0	26.0	2 00.0	+60.0	26.0	**2**
3	3 17.6	–59.9	154.0	2 23.6	–59.9	154.0	1 29.7	–60.0	154.0	0 35.8	–60.0	154.0	0 18.2	+60.0	26.0	1 12.1	+60.0	26.0	2 06.1	+60.0	26.0	3 00.0	+60.0	26.0	**3**
4	2 17.7	–60.0	154.0	1 23.7	–59.9	154.1	0 29.7	–59.9	154.1	0 24.2	+60.0	25.9	1 18.2	+60.0	25.9	2 12.1	+60.0	26.0	3 06.1	+60.0	26.0	4 00.0	+60.0	26.0	**4**
5	1 17.7	–59.9	154.1	0 23.8	–60.0	154.1	0 30.2	+60.0	25.9	1 24.2	+60.0	25.9	2 18.2	+59.9	25.9	3 12.1	+60.0	25.9	4 06.1	+60.0	26.0	5 00.0	+60.0	26.0	**5**
6	0 17.8	–59.9	154.2	0 36.2	+59.9	25.8	1 30.2	+59.9	25.9	2 24.2	+59.9	25.9	3 18.1	+60.0	25.9	4 12.1	+60.0	25.9	5 06.1	+60.0	26.0	6 00.0	+60.0	26.0	**6**
7	0 42.1	+59.9	25.8	1 36.1	+59.9	25.8	2 30.1	+60.0	25.8	3 24.1	+60.0	25.8	4 18.1	+60.0	25.9	5 12.1	+60.0	25.9	6 06.1	+60.0	25.9	7 00.0	+60.0	26.0	**7**
8	1 42.0	+59.9	25.7	2 36.0	+60.0	25.8	3 30.1	+59.9	25.8	4 24.1	+60.0	25.8	5 18.1	+60.0	25.8	6 12.1	+60.0	25.9	7 06.1	+60.0	25.9	8 00.0	+60.0	26.0	**8**
9	2 41.9	+59.9	25.7	3 36.0	+59.9	25.7	4 30.0	+60.0	25.7	5 24.1	+59.9	25.8	6 18.1	+60.0	25.8	7 12.1	+60.0	25.9	8 06.1	+60.0	25.9	9 00.0	+60.0	26.0	**9**
10	3 41.8	+59.9	25.6	4 35.9	+60.0	25.7	5 30.0	+59.9	25.7	6 24.0	+60.0	25.7	7 18.1	+60.0	25.8	8 12.1	+60.0	25.9	9 06.1	+60.0	25.9	10 00.0	+60.0	26.0	**10**
11	4 41.7	+60.0	25.6	5 35.9	+59.9	25.6	6 29.9	+60.0	25.7	7 24.0	+60.0	25.7	8 18.1	+59.9	25.8	9 12.1	+60.0	25.8	10 06.1	+60.0	25.9	11 00.0	+60.0	26.0	**11**
12	5 41.7	+59.9	25.5	6 35.8	+59.9	25.6	7 29.9	+60.0	25.6	8 24.0	+60.0	25.7	9 18.0	+60.0	25.8	10 12.1	+60.0	25.8	11 06.1	+59.9	25.9	12 00.0	+60.0	26.0	**12**
13	6 41.6	+59.9	25.5	7 35.7	+60.0	25.5	8 29.9	+59.9	25.6	9 24.0	+59.9	25.7	10 18.0	+60.0	25.7	11 12.1	+59.9	25.8	12 06.0	+60.0	25.9	13 00.0	+60.0	26.0	**13**
14	7 41.5	+59.9	25.4	8 35.7	+59.9	25.5	9 29.8	+60.0	25.5	10 23.9	+60.0	25.6	11 18.0	+60.0	25.7	12 12.0	+60.0	25.8	13 06.0	+60.0	25.9	14 00.0	+60.0	26.0	**14**
15	8 41.4	+59.9	25.4	9 35.6	+59.9	25.4	10 29.8	+59.9	25.5	11 23.9	+60.0	25.6	12 18.0	+60.0	25.7	13 12.0	+60.0	25.8	14 06.0	+60.0	25.9	15 00.0	+60.0	26.0	**15**
16	9 41.3	+59.9	25.3	10 35.5	+60.0	25.4	11 29.7	+60.0	25.5	12 23.9	+59.9	25.6	13 18.0	+60.0	25.7	14 12.0	+60.0	25.8	15 06.0	+60.0	25.9	16 00.0	+60.0	26.0	**16**
17	10 41.2	+59.9	25.3	11 35.5	+59.9	25.3	12 29.7	+59.9	25.4	13 23.8	+60.0	25.5	14 18.0	+59.9	25.6	15 12.0	+60.0	25.7	16 06.0	+60.0	25.9	17 00.0	+60.0	26.0	**17**
18	11 41.1	+59.9	25.2	12 35.4	+59.9	25.3	13 29.6	+60.0	25.4	14 23.8	+60.0	25.5	15 17.9	+60.0	25.6	16 12.0	+60.0	25.7	17 06.0	+60.0	25.9	18 00.0	+60.0	26.0	**18**
19	12 41.0	+59.9	25.1	13 35.3	+60.0	25.2	14 29.6	+59.9	25.3	15 23.8	+59.9	25.5	16 17.9	+60.0	25.6	17 12.0	+60.0	25.7	18 06.0	+60.0	25.9	19 00.0	+60.0	26.0	**19**
20	13 40.9	+60.0	25.1	14 35.3	+59.9	25.2	15 29.5	+60.0	25.3	16 23.7	+60.0	25.4	17 17.9	+60.0	25.6	18 12.0	+60.0	25.7	19 06.0	+60.0	25.8	20 00.0	+60.0	26.0	**20**
21	14 40.9	+59.9	25.0	15 35.2	+59.9	25.1	16 29.5	+59.9	25.3	17 23.7	+60.0	25.4	18 17.9	+60.0	25.5	19 12.0	+60.0	25.7	20 06.0	+60.0	25.8	21 00.0	+60.0	26.0	**21**
22	15 40.8	+59.9	25.0	16 35.1	+60.0	25.1	17 29.4	+60.0	25.2	18 23.7	+60.0	25.4	19 17.9	+60.0	25.5	20 12.0	+60.0	25.7	21 06.0	+60.0	25.8	22 00.0	+60.0	26.0	**22**
23	16 40.7	+59.9	24.9	17 35.1	+59.9	25.0	18 29.4	+59.9	25.2	19 23.7	+59.9	25.3	20 17.9	+59.9	25.5	21 12.0	+60.0	25.6	22 06.0	+60.0	25.8	23 00.0	+60.0	26.0	**23**
24	17 40.6	+59.9	24.9	18 35.0	+59.9	25.0	19 29.3	+60.0	25.1	20 23.6	+60.0	25.3	21 17.8	+60.0	25.5	22 12.0	+60.0	25.6	23 06.0	+60.0	25.8	24 00.0	+60.0	26.0	**24**
25	18 40.5	+59.9	24.8	19 34.9	+59.9	24.9	20 29.3	+59.9	25.1	21 23.6	+60.0	25.3	22 17.8	+60.0	25.4	23 12.0	+60.0	25.6	24 06.0	+60.0	25.8	25 00.0	+60.0	26.0	**25**
26	19 40.4	+59.9	24.7	20 34.8	+60.0	24.9	21 29.2	+60.0	25.1	22 23.6	+59.9	25.2	23 17.8	+60.0	25.4	24 12.0	+59.9	25.6	25 06.0	+60.0	25.8	26 00.0	+60.0	26.0	**26**
27	20 40.3	+59.9	24.7	21 34.8	+59.9	24.8	22 29.2	+59.9	25.0	23 23.5	+60.0	25.2	24 17.8	+60.0	25.4	25 11.9	+60.0	25.6	26 06.0	+60.0	25.8	27 00.0	+60.0	26.0	**27**
28	21 40.2	+59.9	24.6	22 34.7	+59.9	24.8	23 29.1	+60.0	25.0	24 23.5	+60.0	25.2	25 17.8	+59.9	25.3	26 11.9	+60.0	25.6	27 06.0	+60.0	25.8	28 00.0	+60.0	26.0	**28**
29	22 40.1	+59.9	24.6	23 34.6	+60.0	24.7	24 29.1	+59.9	24.9	25 23.5	+59.9	25.1	26 17.7	+60.0	25.3	27 11.9	+60.0	25.5	28 06.0	+60.0	25.8	29 00.0	+60.0	26.0	**29**
30	23 40.0	+59.9	24.5	24 34.6	+59.9	24.7	25 29.0	+60.0	24.9	26 23.4	+60.0	25.1	27 17.7	+60.0	25.3	28 11.9	+60.0	25.5	29 06.0	+60.0	25.8	30 00.0	+60.0	26.0	**30**
31	24 39.9	+59.9	24.4	25 34.5	+59.9	24.6	26 29.0	+59.9	24.8	27 23.4	+60.0	25.0	28 17.7	+60.0	25.3	29 11.9	+60.0	25.5	30 06.0	+60.0	25.7	31 00.0	+60.0	26.0	**31**
32	25 39.8	+59.9	24.4	26 34.4	+59.9	24.6	27 28.9	+60.0	24.8	28 23.4	+59.9	25.0	29 17.7	+60.0	25.2	30 11.9	+60.0	25.5	31 06.0	+60.0	25.7	32 00.0	+60.0	26.0	**32**
33	26 39.7	+59.9	24.3	27 34.3	+59.9	24.5	28 28.9	+59.9	24.7	29 23.3	+60.0	25.0	30 17.7	+59.9	25.2	31 11.9	+60.0	25.5	32 06.0	+60.0	25.7	33 00.0	+60.0	26.0	**33**
34	27 39.6	+59.9	24.2	28 34.2	+60.0	24.4	29 28.8	+60.0	24.7	30 23.3	+59.9	24.9	31 17.6	+60.0	25.2	32 11.9	+60.0	25.4	33 06.0	+60.0	25.7	34 00.0	+60.0	26.0	**34**
35	28 39.5	+59.8	24.2	29 34.2	+59.9	24.4	30 28.8	+59.9	24.6	31 23.2	+60.0	24.9	32 17.6	+60.0	25.1	33 11.9	+60.0	25.4	34 06.0	+60.0	25.7	35 00.0	+60.0	26.0	**35**
36	29 39.3	+59.9	24.1	30 34.1	+59.9	24.3	31 28.7	+59.9	24.6	32 23.2	+60.0	24.8	33 17.6	+60.0	25.1	34 11.9	+60.0	25.4	35 06.0	+60.0	25.7	36 00.0	+60.0	26.0	**36**
37	30 39.2	+59.9	24.0	31 34.0	+59.9	24.3	32 28.6	+60.0	24.5	33 23.2	+59.9	24.8	34 17.6	+59.9	25.1	35 11.9	+59.9	25.4	36 06.0	+60.0	25.7	37 00.0	+60.0	26.0	**37**
38	31 39.1	+59.9	23.9	32 33.9	+59.9	24.2	33 28.6	+59.9	24.5	34 23.1	+60.0	24.7	35 17.5	+60.0	25.0	36 11.8	+60.0	25.3	37 06.0	+60.0	25.7	38 00.0	+60.0	26.0	**38**
39	32 39.0	+59.9	23.9	33 33.8	+59.9	24.1	34 28.5	+59.9	24.4	35 23.1	+59.9	24.7	36 17.5	+60.0	25.0	37 11.8	+60.0	25.3	38 06.0	+60.0	25.7	39 00.0	+60.0	26.0	**39**
40	33 38.9	+59.8	23.8	34 33.7	+59.9	24.1	35 28.4	+60.0	24.4	36 23.0	+60.0	24.7	37 17.5	+60.0	25.0	38 11.8	+60.0	25.3	39 06.0	+60.0	25.6	40 00.0	+60.0	26.0	**40**
41	34 38.7	+59.9	23.7	35 33.6	+59.9	24.0	36 28.4	+59.9	24.3	37 23.0	+59.9	24.6	38 17.5	+59.9	24.9	39 11.8	+60.0	25.3	40 06.0	+60.0	25.6	41 00.0	+60.0	26.0	**41**
42	35 38.6	+59.9	23.6	36 33.5	+59.9	23.9	37 28.3	+59.9	24.2	38 22.9	+60.0	24.6	39 17.4	+60.0	24.9	40 11.8	+60.0	25.2	41 06.0	+60.0	25.6	42 00.0	+60.0	26.0	**42**
43	36 38.5	+59.9	23.6	37 33.4	+59.9	23.9	38 28.2	+60.0	24.2	39 22.9	+60.0	24.5	40 17.4	+60.0	24.9	41 11.8	+60.0	25.2	42 06.0	+60.0	25.6	43 00.0	+60.0	26.0	**43**
44	37 38.4	+59.8	23.5	38 33.3	+59.9	23.8	39 28.2	+59.9	24.1	40 22.9	+59.9	24.5	41 17.4	+60.0	24.8	42 11.8	+60.0	25.2	43 06.0	+60.0	25.6	44 00.0	+60.0	26.0	**44**
45	38 38.2	+59.9	23.4	39 33.2	+59.9	23.7	40 28.1	+59.9	24.0	41 22.8	+60.0	24.4	42 17.4	+59.9	24.8	43 11.8	+59.9	25.2	44 06.0	+60.0	25.6	45 00.0	+60.0	26.0	**45**
46	39 38.1	+59.8	23.3	40 33.1	+59.9	23.6	41 28.0	+59.9	24.0	42 22.8	+59.9	24.3	43 17.3	+60.0	24.7	44 11.7	+60.0	25.1	45 06.0	+60.0	25.6	46 00.0	+60.0	26.0	**46**
47	40 37.9	+59.9	23.2	41 33.0	+59.9	23.5	42 27.9	+59.9	23.9	43 22.7	+59.9	24.3	44 17.3	+60.0	24.7	45 11.7	+60.0	25.1	46 06.0	+60.0	25.5	47 00.0	+60.0	26.0	**47**
48	41 37.8	+59.8	23.1	42 32.9	+59.9	23.5	43 27.8	+60.0	23.8	44 22.6	+60.0	24.2	45 17.3	+59.9	24.6	46 11.7	+60.0	25.1	47 06.0	+60.0	25.5	48 00.0	+60.0	26.0	**48**
49	42 37.6	+59.9	23.0	43 32.8	+59.8	23.4	44 27.8	+59.9	23.8	45 22.6	+59.9	24.2	46 17.2	+60.0	24.6	47 11.7	+60.0	25.0	48 06.0	+60.0	25.5	49 00.0	+60.0	26.0	**49**
50	43 37.5	+59.8	22.9	44 32.6	+59.9	23.3	45 27.7	+59.9	23.7	46 22.5	+60.0	24.1	47 17.2	+60.0	24.5	48 11.7	+60.0	25.0	49 06.0	+60.0	25.5	50 00.0	+60.0	26.0	**50**
51	44 37.3	+59.8	22.8	45 32.5	+59.9	23.2	46 27.6	+59.9	23.6	47 22.5	+59.9	24.0	48 17.2	+59.9	24.5	49 11.7	+60.0	25.0	50 06.0	+59.9	25.5	51 00.0	+60.0	26.0	**51**
52	45 37.1	+59.8	22.7	46 32.4	+59.9	23.1	47 27.5	+59.9	23.5	48 22.4	+59.9	24.0	49 17.1	+60.0	24.4	50 11.7	+59.9	24.9	51 05.9	+60.0	25.5	52 00.0	+60.0	26.0	**52**
53	46 36.9	+59.9	22.6	47 32.3	+59.8	23.0	48 27.4	+59.9	23.4	49 22.3	+60.0	23.9	50 17.1	+60.0	24.4	51 11.6	+60.0	24.9	52 05.9	+60.0	25.4	53 00.0	+60.0	26.0	**53**
54	47 36.8	+59.8	22.5	48 32.1	+59.9	22.9	49 27.3	+59.9	23.4	50 22.3	+59.9	23.8	51 17.1	+59.9	24.3	52 11.6	+60.0	24.9	53 05.9	+60.0	25.4	54 00.0	+60.0	26.0	**54**
55	48 36.6	+59.8	22.4	49 32.0	+59.8	22.8	50 27.2	+59.9	23.3	51 22.2	+59.9	23.8	52 17.0	+60.0	24.3	53 11.6	+60.0	24.8	54 05.9	+60.0	25.4	55 00.0	+60.0	26.0	**55**
56	49 36.4	+59.8	22.2	50 31.8	+59.9	22.7	51 27.1	+59.9	23.2	52 22.1	+60.0	23.7	53 17.0	+59.9	24.2	54 11.6	+60.0	24.8	55 05.9	+60.0	25.4	56 00.0	+60.0	26.0	**56**
57	50 36.2	+59.7	22.1	51 31.7	+59.8	22.6	52 27.0	+59.8	23.1	53 22.1	+59.9	23.6	54 16.9	+60.0	24.1	55 11.6	+59.9	24.7	56 05.9	+60.0	25.3	57 00.0	+60.0	26.0	**57**
58	51 35.9	+59.8	22.0	52 31.5	+59.8	22.4	53 26.8	+59.9	23.0	54 22.0	+59.9	23.5	55 16.9	+59.9	24.1	56 11.5	+60.0	24.7	57 05.9	+60.0	25.3	58 00.0	+60.0	26.0	**58**
59	52 35.7	+59.8	21.8	53 31.3	+59.8	22.3	54 26.7	+59.9	22.8	55 21.9	+59.9	23.4	56 16.8	+60.0	24.0	57 11.5	+60.0	24.6	58 05.9	+60.0	25.3	59 00.0	+60.0	26.0	**59**
60	53 35.5	+59.7	21.7	54 31.1	+59.8	22.2	55 26.6	+59.8	22.7	56 21.8	+59.9	23.3	57 16.8	+59.9	23.9	58 11.5	+60.0	24.6	59 05.9	+60.0	25.3	60 00.0	+60.0	26.0	**60**
61	54 35.2	+59.8	21.5	55 30.9	+59.8	22.0	56 26.4	+59.9	22.6	57 21.7	+59.9	23.2	58 16.7	+60.0	23.8	59 11.5	+59.9	24.5	60 05.9	+60.0	25.2	61 00.0	+60.0	26.0	**61**
62	55 35.0	+59.7	21.4	56 30.7	+59.8	21.9	57 26.3	+59.8	22.5	58 21.6	+59.9	23.1	59 16.7	+59.9	23.8	60 11.4	+60.0	24.5	61 05.9	+60.0	25.2	62 00.0	+60.0	26.0	**62**
63	56 34.7	+59.7	21.2	57 30.5	+59.8	21.7	58 26.1	+59.9	22.3	59 21.5	+59.9	23.0	60 16.6	+59.9	23.7	61 11.4	+60.0	24.4	62 05.9	+60.0	25.2	63 00.0	+60.0	26.0	**63**
64	57 34.4	+59.7	21.0	58 30.3	+59.8	21.6	59 26.0	+59.8	22.2	60 21.4	+59.9	22.9	61 16.5	+60.0	23.6	62 11.4	+59.9	24.3	63 05.9	+60.0	25.1	64 00.0	+60.0	26.0	**64**
65	58 34.1	+59.7	20.8	59 30.1	+59.7	21.4	60 25.8	+59.8	22.1	61 21.3	+59.8	22.7	62 16.5	+59.9	23.5	63 11.3	+60.0	24.3	64 05.9	+60.0	25.1	65 00.0	+60.0	26.0	**65**
66	59 33.8	+59.6	20.6	60 29.8	+59.7	21.2	61 25.6	+59.8	21.9	62 21.1	+59.9	22.6	63 16.4	+59.9	23.4	64 11.3	+60.0	24.2	65 05.9	+59.9	25.1	66 00.0	+60.0	26.0	**66**
67	60 33.4	+59.6	20.4	61 29.5	+59.8	21.0	62 25.4	+59.8	21.7	63 21.0	+59.9	22.4	64 16.3	+59.9	23.2	65 11.3	+59.9	24.1	66 05.8	+60.0	25.0	67 00.0	+60.0	26.0	**67**
68	61 33.0	+59.7	20.2	62 29.3	+59.6	20.8	63 25.2	+59.8	21.5	64 20.9	+59.8	22.3	65 16.2	+59.9	23.1	66 11.2	+60.0	24.0	67 05.8	+60.0	25.0	68 00.0	+60.0	26.0	**68**
69	62 32.7	+59.5	19.9	63 28.9	+59.7	20.6	64 25.0	+59.7	21.3	65 20.7	+59.8	22.1	66 16.1	+59.9	23.0	67 11.2	+59.9	23.9	68 05.8	+60.0	24.9	69 00.0	+60.0	26.0	**69**
70	63 32.2	+59.6	19.7	64 28.6	+59.7	20.4	65 24.7	+59.8	21.1	66 20.5	+59.9	21.9	67 16.0	+59.9	22.8	68 11.1	+60.0	23.8	69 05.8	+60.0	24.8	70 00.0	+60.0	26.0	**70**
71	64 31.8	+59.5	19.4	65 28.3	+59.6	20.1	66 24.5	+59.7	20.9	67 20.4	+59.8	21.7	68 15.9	+59.9	22.7	69 11.1	+59.9	23.7	70 05.8	+60.0	24.8	71 00.0	+60.0	26.0	**71**
72	65 31.3	+59.5	19.1	66 27.9	+59.6	19.8	67 24.2	+59.7	20.6	68 20.2	+59.8	21.5	69 15.8	+59.9	22.5	70 11.0	+60.0	23.6	71 05.8	+60.0	24.7	72 00.0	+60.0	26.0	**72**
73	66 30.8	+59.4	18.8	67 27.5	+59.5	19.5	68 23.9	+59.6	20.4	69 20.0	+59.7	21.3	70 15.7	+59.8	22.3	71 11.0	+59.9	23.4	72 05.8	+59.9	24.6	73 00.0	+60.0	26.0	**73**
74	67 30.2	+59.4	18.4	68 27.0	+59.5	19.2	69 23.5	+59.7	20.1	70 19.7	+59.8	21.0	71 15.5	+59.9	22.1	72 10.9	+59.9	23.3	73 05.7	+60.0	24.6	74 00.0	+60.0	26.0	**74**
75	68 29.6	+59.3	18.0	69 26.5	+59.5	18.9	70 23.2	+59.6	19.8	71 19.5	+59.7	20.8	72 15.4	+59.8	21.9	73 10.8	+59.9	23.1	74 05.7	+60.0	24.5	75 00.0	+60.0	26.0	**75**
76	69 28.9	+59.3	17.6	70 26.0	+59.4	18.5	71 22.8	+59.5	19.4	72 19.2	+59.6	20.4	73 15.2	+59.8	21.6	74 10.7	+59.9	22.9	75 05.7	+60.0	24.3	76 00.0	+60.0	26.0	**76**
77	70 28.2	+59.2	17.2	71 25.4	+59.3	18.0	72 22.3	+59.5	19.0	73 18.8	+59.7	20.1	74 15.0	+59.7	21.3	75 10.6	+59.9	22.7	76 05.7	+59.9	24.2	77 00.0	+60.0	26.0	**77**
78	71 27.4	+59.1	16.7	72 24.7	+59.3	17.6	73 21.8	+59.4	18.6	74 18.5	+59.6	19.7	75 14.7	+59.8	21.0	76 10.5	+59.9	22.4	77 05.6	+60.0	24.1	78 00.0	+60.0	26.0	**78**
79	72 26.5	+59.0	16.1	73 24.0	+59.2	17.0	74 21.2	+59.4	18.1	75 18.1	+59.5	19.2	76 14.5	+59.7	20.6	77 10.4	+59.8	22.1	78 05.6	+59.9	23.9	79 00.0	+60.0	26.0	**79**
80	73 25.5	+58.9	15.5	74 23.2	+59.1	16.4	75 20.6	+59.2	17.5	76 17.6	+59.5	18.7	77 14.2	+59.6	20.2	78 10.2	+59.8	21.8	79 05.5	+60.0	23.7	80 00.0	+60.0	26.0	**80**
81	74 24.4	+58.7	14.8	75 22.3	+58.9	15.8	76 19.8	+59.2	16.9	77 17.1	+59.3	18.2	78 13.8	+59.6	19.6	79 10.0	+59.8	21.4	80 05.5	+59.9	23.5	81 00.0	+60.0	26.0	**81**
82	75 23.1	+58.5	14.0	76 21.2	+58.8	15.0	77 19.0	+59.0	16.1	78 16.4	+59.3	17.5	79 13.4	+59.5	19.0	80 09.8	+59.7	20.9	81 05.4	+59.9	23.2	82 00.0	+60.0	26.0	**82**
83	76 21.6	+58.4	13.1	77 20.0	+58.5	14.1	78 18.0	+58.8	15.3	79 15.7	+59.1	16.7	80 12.9	+59.4	18.3	81 09.5	+59.7	20.3	82 05.3	+59.9	22.8	83 00.0	+60.0	26.0	**83**
84	77 20.0	+58.0	12.1	78 18.5	+58.3	13.1	79 16.8	+58.6	14.3	80 14.8	+58.9	15.7	81 12.3	+59.2	17.4	82 09.2	+59.6	19.6	83 05.2	+59.9	22.4	84 00.0	+60.0	26.0	**84**
85	78 18.0	+57.7	10.9	79 16.8	+58.0	11.9	80 15.4	+58.3	13.0	81 13.7	+58.6	14.5	82 11.5	+59.1	16.3	83 08.8	+59.4	18.7	84 05.1	+59.8	21.8	85 00.0	+60.0	26.0	**85**
86	79 15.7	+57.2	9.4	80 14.8	+57.5	10.4	81 13.7	+57.8	11.6	82 12.3	+58.3	13.0	83 10.6	+58.6	14.9	84 08.2	+59.2	17.4	85 04.9	+59.7	20.9	86 00.0	+60.0	26.0	**86**
87	80 12.9	+56.6	7.8	81 12.3	+56.9	8.6	82 11.5	+57.3	9.7	83 10.6	+57.6	11.1	84 09.2	+58.2	13.0	85 07.4	+58.8	15.7	86 04.6	+59.5	19.6	87 00.0	+60.0	26.0	**87**
88	81 09.5	+55.8	5.7	82 09.2	+56.0	6.4	83 08.8	+56.3	7.4	84 08.2	+56.7	8.6	85 07.4	+57.2	10.4	86 06.2	+57.9	13.0	87 04.1	+59.0	17.4	88 00.0	+60.0	26.0	**88**
89	82 05.3	+54.7	3.2	83 05.2	+54.8	3.6	84 05.1	+54.9	4.3	85 04.9	*+55.1* •	5.1	86 04.6	*+55.4* •	6.4	87 04.1	*+55.9* •	8.6	88 03.1	*+56.9* •	13.0	89 00.0	+60.0	26.0	**89**
90	83 00.0	*+53.0* •	0.0	84 00.0	*+52.8* •	0.0	85 00.0	*+52.5* •	0.0	86 00.0	*+52.1* •	0.0	87 00.0	*+51.2* •	0.0	88 00.0	*+48.9* •	0.0	89 00.0	*+33.0* •	0.0	90 00.0	–60.0	13.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 154°, 206°

27°, 333° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 14.0	+59.9	152.8	5 20.6	+60.0	152.9	4 27.2	+60.0	152.9	3 33.8	+60.0	152.9	2 40.4	+59.9	153.0	1 46.9	+60.0	153.0	0 53.5	+60.0	153.0	0 00.0	+60.0	153.0	**0**
1	7 13.9	+59.9	152.8	6 20.6	+59.9	152.8	5 27.2	+59.9	152.9	4 33.8	+59.9	152.9	3 40.3	+60.0	152.9	2 46.9	+60.0	153.0	1 53.5	+60.0	153.0	1 00.0	+60.0	153.0	**1**
2	8 13.8	+59.9	152.7	7 20.5	+59.9	152.8	6 27.1	+60.0	152.8	5 33.7	+60.0	152.9	4 40.3	+60.0	152.9	3 46.9	+60.0	153.0	2 53.5	+60.0	153.0	2 00.0	+60.0	153.0	**2**
3	9 13.7	+60.0	152.7	8 20.4	+60.0	152.7	7 27.1	+59.9	152.8	6 33.7	+60.0	152.8	5 40.3	+60.0	152.9	4 46.9	+60.0	152.9	3 53.5	+60.0	153.0	3 00.0	+60.0	153.0	**3**
4	10 13.7	+59.9	152.6	9 20.4	+59.9	152.7	8 27.0	+60.0	152.8	7 33.7	+60.0	152.8	6 40.3	+60.0	152.9	5 46.9	+60.0	152.9	4 53.5	+60.0	153.0	4 00.0	+60.0	153.0	**4**
5	11 13.6	+59.9	152.5	10 20.3	+59.9	152.6	9 27.0	+59.9	152.7	8 33.7	+59.9	152.8	7 40.3	+60.0	152.8	6 46.9	+60.0	152.9	5 53.5	+59.9	153.0	5 00.0	+60.0	153.0	**5**
6	12 13.5	+59.9	152.5	11 20.2	+60.0	152.6	10 26.9	+60.0	152.7	9 33.6	+60.0	152.8	8 40.3	+59.9	152.8	7 46.9	+60.0	152.9	6 53.4	+60.0	152.9	6 00.0	+60.0	153.0	**6**
7	13 13.4	+59.9	152.4	12 20.2	+59.9	152.5	11 26.9	+59.9	152.6	10 33.6	+60.0	152.7	9 40.2	+60.0	152.8	8 46.9	+60.0	152.9	7 53.4	+60.0	152.9	7 00.0	+60.0	153.0	**7**
8	14 13.3	+59.9	152.4	13 20.1	+59.9	152.5	12 26.8	+60.0	152.6	11 33.6	+59.9	152.7	10 40.2	+60.0	152.8	9 46.9	+59.9	152.9	8 53.4	+60.0	152.9	8 00.0	+60.0	153.0	**8**
9	15 13.2	+59.9	152.3	14 20.0	+59.9	152.4	13 26.8	+59.9	152.5	12 33.5	+60.0	152.7	11 40.2	+60.0	152.8	10 46.8	+60.0	152.8	9 53.4	+60.0	152.9	9 00.0	+60.0	153.0	**9**
10	16 13.1	+59.9	152.2	15 19.9	+60.0	152.4	14 26.7	+60.0	152.5	13 33.5	+60.0	152.6	12 40.2	+60.0	152.7	11 46.8	+60.0	152.8	10 53.4	+60.0	152.9	10 00.0	+60.0	153.0	**10**
11	17 13.0	+59.9	152.2	16 19.9	+59.9	152.3	15 26.7	+59.9	152.5	14 33.5	+59.9	152.6	13 40.2	+60.0	152.7	12 46.8	+60.0	152.8	11 53.4	+60.0	152.9	11 00.0	+60.0	153.0	**11**
12	18 12.9	+59.9	152.1	17 19.8	+59.9	152.3	16 26.6	+60.0	152.4	15 33.4	+60.0	152.6	14 40.2	+59.9	152.7	13 46.8	+60.0	152.8	12 53.4	+60.0	152.9	12 00.0	+60.0	153.0	**12**
13	19 12.8	+59.9	152.1	18 19.7	+59.9	152.2	17 26.6	+59.9	152.4	16 33.4	+60.0	152.5	15 40.1	+60.0	152.6	14 46.8	+60.0	152.8	13 53.4	+60.0	152.9	13 00.0	+60.0	153.0	**13**
14	20 12.7	+59.9	152.0	19 19.6	+60.0	152.2	18 26.5	+60.0	152.3	17 33.4	+59.9	152.5	16 40.1	+60.0	152.6	15 46.8	+60.0	152.8	14 53.4	+60.0	152.9	14 00.0	+60.0	153.0	**14**
15	21 12.6	+59.9	151.9	20 19.6	+59.9	152.1	19 26.5	+59.9	152.3	18 33.3	+60.0	152.4	17 40.1	+60.0	152.6	16 46.8	+60.0	152.7	15 53.4	+60.0	152.9	15 00.0	+60.0	153.0	**15**
16	22 12.5	+59.8	151.9	21 19.5	+59.9	152.1	20 26.4	+60.0	152.2	19 33.3	+60.0	152.4	18 40.1	+60.0	152.6	17 46.8	+60.0	152.7	16 53.4	+60.0	152.9	16 00.0	+60.0	153.0	**16**
17	23 12.3	+59.9	151.8	22 19.4	+59.9	152.0	21 26.4	+59.9	152.2	20 33.3	+59.9	152.4	19 40.1	+59.9	152.5	18 46.8	+60.0	152.7	17 53.4	+60.0	152.9	17 00.0	+60.0	153.0	**17**
18	24 12.2	+59.9	151.7	23 19.3	+60.0	152.0	22 26.3	+60.0	152.2	21 33.2	+60.0	152.3	20 40.0	+60.0	152.5	19 46.8	+60.0	152.7	18 53.4	+60.0	152.8	18 00.0	+60.0	153.0	**18**
19	25 12.1	+59.9	151.7	24 19.3	+59.9	151.9	23 26.3	+59.9	152.1	22 33.2	+60.0	152.3	21 40.0	+60.0	152.5	20 46.8	+60.0	152.7	19 53.4	+60.0	152.8	19 00.0	+60.0	153.0	**19**
20	26 12.0	+59.9	151.6	25 19.2	+59.9	151.8	24 26.2	+60.0	152.1	23 33.2	+59.9	152.3	22 40.0	+60.0	152.5	21 46.8	+59.9	152.7	20 53.4	+60.0	152.8	20 00.0	+60.0	153.0	**20**
21	27 11.9	+59.9	151.5	26 19.1	+59.9	151.8	25 26.2	+59.9	152.0	24 33.1	+60.0	152.2	23 40.0	+60.0	152.4	22 46.7	+60.0	152.6	21 53.4	+60.0	152.8	21 00.0	+60.0	153.0	**21**
22	28 11.8	+59.9	151.5	27 19.0	+59.9	151.7	26 26.1	+59.9	152.0	25 33.1	+60.0	152.2	24 40.0	+59.9	152.4	23 46.7	+60.0	152.6	22 53.4	+60.0	152.8	22 00.0	+60.0	153.0	**22**
23	29 11.7	+59.8	151.4	28 18.9	+59.9	151.7	27 26.0	+60.0	151.9	26 33.1	+59.9	152.1	25 39.9	+60.0	152.4	24 46.7	+60.0	152.6	23 53.4	+60.0	152.8	23 00.0	+60.0	153.0	**23**
24	30 11.5	+59.9	151.3	29 18.8	+59.9	151.6	28 26.0	+59.9	151.9	27 33.0	+60.0	152.1	26 39.9	+60.0	152.3	25 46.7	+60.0	152.6	24 53.4	+60.0	152.8	24 00.0	+60.0	153.0	**24**
25	31 11.4	+59.9	151.3	30 18.7	+59.9	151.5	29 25.9	+60.0	151.8	28 33.0	+59.9	152.1	27 39.9	+60.0	152.3	26 46.7	+60.0	152.6	25 53.4	+60.0	152.8	25 00.0	+60.0	153.0	**25**
26	32 11.3	+59.9	151.2	31 18.6	+60.0	151.5	30 25.9	+59.9	151.8	29 32.9	+60.0	152.0	28 39.9	+60.0	152.3	27 46.7	+60.0	152.5	26 53.4	+60.0	152.8	26 00.0	+60.0	153.0	**26**
27	33 11.2	+59.8	151.1	32 18.6	+59.9	151.4	31 25.8	+59.9	151.7	30 32.9	+60.0	152.0	29 39.9	+59.9	152.3	28 46.7	+60.0	152.5	27 53.4	+60.0	152.8	27 00.0	+60.0	153.0	**27**
28	34 11.0	+59.9	151.0	33 18.5	+59.9	151.3	32 25.7	+60.0	151.6	31 32.9	+59.9	151.9	30 39.8	+60.0	152.2	29 46.7	+60.0	152.5	28 53.4	+60.0	152.8	28 00.0	+60.0	153.0	**28**
29	35 10.9	+59.8	150.9	34 18.4	+59.9	151.3	33 25.7	+59.9	151.6	32 32.8	+60.0	151.9	31 39.8	+60.0	152.2	30 46.7	+60.0	152.5	29 53.4	+60.0	152.7	29 00.0	+60.0	153.0	**29**
30	36 10.7	+59.9	150.9	35 18.3	+59.9	151.2	34 25.6	+59.9	151.5	33 32.8	+59.9	151.9	32 39.8	+60.0	152.2	31 46.7	+60.0	152.5	30 53.4	+60.0	152.7	30 00.0	+60.0	153.0	**30**
31	37 10.6	+59.9	150.8	36 18.2	+59.8	151.1	35 25.5	+60.0	151.5	34 32.7	+60.0	151.8	33 39.8	+59.9	152.1	32 46.7	+59.9	152.4	31 53.4	+60.0	152.7	31 00.0	+60.0	153.0	**31**
32	38 10.5	+59.8	150.7	37 18.0	+59.9	151.1	36 25.5	+59.9	151.4	35 32.7	+59.9	151.8	34 39.7	+60.0	152.1	33 46.6	+60.0	152.4	32 53.4	+60.0	152.7	32 00.0	+60.0	153.0	**32**
33	39 10.3	+59.9	150.6	38 17.9	+59.9	151.0	37 25.4	+59.9	151.4	36 32.6	+60.0	151.7	35 39.7	+60.0	152.1	34 46.6	+60.0	152.4	33 53.4	+60.0	152.7	33 00.0	+60.0	153.0	**33**
34	40 10.2	+59.8	150.5	39 17.8	+59.9	150.9	38 25.3	+59.9	151.3	37 32.6	+59.9	151.7	36 39.7	+60.0	152.0	35 46.6	+60.0	152.4	34 53.4	+60.0	152.7	34 00.0	+60.0	153.0	**34**
35	41 10.0	+59.8	150.4	40 17.7	+59.9	150.8	39 25.2	+59.9	151.2	38 32.5	+60.0	151.6	37 39.7	+59.9	152.0	36 46.6	+60.0	152.3	35 53.4	+60.0	152.7	35 00.0	+60.0	153.0	**35**
36	42 09.8	+59.9	150.3	41 17.6	+59.9	150.7	40 25.1	+60.0	151.2	39 32.5	+59.9	151.6	38 39.6	+60.0	151.9	37 46.6	+60.0	152.3	36 53.4	+60.0	152.7	36 00.0	+60.0	153.0	**36**
37	43 09.7	+59.8	150.2	42 17.5	+59.8	150.7	41 25.1	+59.9	151.1	40 32.4	+60.0	151.5	39 39.6	+60.0	151.9	38 46.6	+60.0	152.3	37 53.4	+60.0	152.7	37 00.0	+60.0	153.0	**37**
38	44 09.5	+59.8	150.1	43 17.3	+59.9	150.6	42 25.0	+59.9	151.0	41 32.4	+59.9	151.4	40 39.6	+59.9	151.9	39 46.6	+60.0	152.3	38 53.4	+60.0	152.6	38 00.0	+60.0	153.0	**38**
39	45 09.3	+59.8	150.0	44 17.2	+59.9	150.5	43 24.9	+59.9	150.9	42 32.3	+60.0	151.4	41 39.5	+60.0	151.8	40 46.6	+59.9	152.2	39 53.4	+60.0	152.6	39 00.0	+60.0	153.0	**39**
40	46 09.1	+59.8	149.9	45 17.1	+59.8	150.4	44 24.8	+59.9	150.9	43 32.3	+59.9	151.3	42 39.5	+60.0	151.8	41 46.5	+60.0	152.2	40 53.4	+60.0	152.6	40 00.0	+60.0	153.0	**40**
41	47 08.9	+59.8	149.7	46 16.9	+59.9	150.3	45 24.7	+59.9	150.8	44 32.2	+60.0	151.3	43 39.5	+60.0	151.7	42 46.5	+60.0	152.2	41 53.4	+60.0	152.6	41 00.0	+60.0	153.0	**41**
42	48 08.7	+59.8	149.6	47 16.8	+59.9	150.2	46 24.6	+59.9	150.7	45 32.2	+59.9	151.2	44 39.5	+59.9	151.7	43 46.5	+60.0	152.1	42 53.4	+60.0	152.6	42 00.0	+60.0	153.0	**42**
43	49 08.5	+59.8	149.5	48 16.7	+59.8	150.1	47 24.5	+59.9	150.6	46 32.1	+59.9	151.1	45 39.4	+60.0	151.6	44 46.5	+60.0	152.1	43 53.4	+60.0	152.6	43 00.0	+60.0	153.0	**43**
44	50 08.3	+59.8	149.4	49 16.5	+59.8	150.0	48 24.4	+59.9	150.5	47 32.0	+60.0	151.1	46 39.4	+59.9	151.6	45 46.5	+60.0	152.1	44 53.4	+60.0	152.6	44 00.0	+60.0	153.0	**44**
45	51 08.1	+59.7	149.2	50 16.3	+59.9	149.8	49 24.3	+59.9	150.4	48 32.0	+59.9	151.0	47 39.3	+60.0	151.5	46 46.5	+60.0	152.0	45 53.4	+59.9	152.5	45 00.0	+60.0	153.0	**45**
46	52 07.8	+59.8	149.1	51 16.2	+59.8	149.7	50 24.2	+59.9	150.3	49 31.9	+59.9	150.9	48 39.3	+60.0	151.5	47 46.5	+59.9	152.0	46 53.3	+60.0	152.5	46 00.0	+60.0	153.0	**46**
47	53 07.6	+59.7	148.9	52 16.0	+59.8	149.6	51 24.1	+59.8	150.2	50 31.8	+59.9	150.9	49 39.3	+59.9	151.4	48 46.4	+60.0	152.0	47 53.3	+60.0	152.5	47 00.0	+60.0	153.0	**47**
48	54 07.3	+59.7	148.8	53 15.8	+59.8	149.5	52 23.9	+59.9	150.1	51 31.7	+60.0	150.8	50 39.2	+60.0	151.4	49 46.4	+60.0	151.9	48 53.3	+60.0	152.5	48 00.0	+60.0	153.0	**48**
49	55 07.0	+59.7	148.6	54 15.6	+59.8	149.3	53 23.8	+59.9	150.0	52 31.7	+59.9	150.7	51 39.2	+59.9	151.3	50 46.4	+60.0	151.9	49 53.3	+60.0	152.5	49 00.0	+60.0	153.0	**49**
50	56 06.7	+59.7	148.4	55 15.4	+59.8	149.2	54 23.7	+59.8	149.9	53 31.6	+59.9	150.6	52 39.1	+60.0	151.2	51 46.4	+60.0	151.9	50 53.3	+60.0	152.4	50 00.0	+60.0	153.0	**50**
51	57 06.4	+59.7	148.3	56 15.2	+59.8	149.0	55 23.5	+59.9	149.8	54 31.5	+59.9	150.5	53 39.1	+59.9	151.2	52 46.4	+59.9	151.8	51 53.3	+60.0	152.4	51 00.0	+60.0	153.0	**51**
52	58 06.1	+59.7	148.1	57 15.0	+59.7	148.9	56 23.4	+59.8	149.7	55 31.4	+59.9	150.4	54 39.0	+60.0	151.1	53 46.3	+60.0	151.8	52 53.3	+60.0	152.4	52 00.0	+60.0	153.0	**52**
53	59 05.8	+59.6	147.9	58 14.7	+59.8	148.7	57 23.2	+59.9	149.5	56 31.3	+59.9	150.3	55 39.0	+59.9	151.0	54 46.3	+60.0	151.7	53 53.3	+60.0	152.4	53 00.0	+60.0	153.0	**53**
54	60 05.4	+59.6	147.6	59 14.5	+59.7	148.5	58 23.1	+59.8	149.4	57 31.2	+59.9	150.2	56 38.9	+60.0	151.0	55 46.3	+60.0	151.7	54 53.3	+60.0	152.4	54 00.0	+60.0	153.0	**54**
55	61 05.0	+59.6	147.4	60 14.2	+59.7	148.4	59 22.9	+59.8	149.3	58 31.1	+59.9	150.1	57 38.9	+59.9	150.9	56 46.3	+59.9	151.6	55 53.3	+60.0	152.3	55 00.0	+60.0	153.0	**55**
56	62 04.6	+59.6	147.2	61 13.9	+59.7	148.2	60 22.7	+59.8	149.1	59 31.0	+59.9	150.0	58 38.8	+60.0	150.8	57 46.2	+60.0	151.6	56 53.3	+60.0	152.3	56 00.0	+60.0	153.0	**56**
57	63 04.2	+59.5	146.9	62 13.6	+59.7	148.0	61 22.5	+59.8	148.9	60 30.9	+59.8	149.8	59 38.8	+59.9	150.7	58 46.2	+60.0	151.5	57 53.3	+60.0	152.3	57 00.0	+60.0	153.0	**57**
58	64 03.7	+59.5	146.6	63 13.3	+59.7	147.7	62 22.3	+59.8	148.7	61 30.7	+59.9	149.7	60 38.7	+59.9	150.6	59 46.2	+60.0	151.5	58 53.3	+60.0	152.3	58 00.0	+60.0	153.0	**58**
59	65 03.2	+59.5	146.3	64 13.0	+59.6	147.5	63 22.1	+59.7	148.6	62 30.6	+59.8	149.6	61 38.6	+59.9	150.5	60 46.2	+59.9	151.4	59 53.3	+60.0	152.2	59 00.0	+60.0	153.0	**59**
60	66 02.7	+59.4	146.0	65 12.6	+59.6	147.2	64 21.8	+59.8	148.4	63 30.4	+59.9	149.4	62 38.5	+60.0	150.4	61 46.1	+60.0	151.3	60 53.3	+60.0	152.2	60 00.0	+60.0	153.0	**60**
61	67 02.1	+59.4	145.7	66 12.2	+59.6	146.9	65 21.6	+59.7	148.1	64 30.3	+59.8	149.2	63 38.5	+59.9	150.3	62 46.1	+60.0	151.2	61 53.3	+60.0	152.2	61 00.0	+60.0	153.0	**61**
62	68 01.5	+59.3	145.3	67 11.8	+59.5	146.6	66 21.3	+59.7	147.9	65 30.1	+59.8	149.1	64 38.4	+59.9	150.2	63 46.1	+59.9	151.2	62 53.3	+59.9	152.1	62 00.0	+60.0	153.0	**62**
63	69 00.8	+59.2	144.9	68 11.3	+59.5	146.3	67 21.0	+59.6	147.6	66 29.9	+59.8	148.9	65 38.3	+59.9	150.0	64 46.0	+60.0	151.1	63 53.2	+60.0	152.1	63 00.0	+60.0	153.0	**63**
64	70 00.0	+59.2	144.4	69 10.8	+59.4	146.0	68 20.6	+59.7	147.4	67 29.7	+59.8	148.7	66 38.2	+59.8	149.9	65 46.0	+59.9	151.0	64 53.2	+60.0	152.0	64 00.0	+60.0	153.0	**64**
65	70 59.2	+59.1	143.9	70 10.2	+59.4	145.6	69 20.3	+59.6	147.1	68 29.5	+59.8	148.4	67 38.0	+59.9	149.7	66 45.9	+60.0	150.9	65 53.2	+60.0	152.0	65 00.0	+60.0	153.0	**65**
66	71 58.3	+59.0	143.4	71 09.6	+59.3	145.1	70 19.9	+59.5	146.7	69 29.3	+59.7	148.2	68 37.9	+59.9	149.5	67 45.9	+59.9	150.8	66 53.2	+60.0	151.9	66 00.0	+60.0	153.0	**66**
67	72 57.3	+58.8	142.8	72 08.9	+59.2	144.6	71 19.4	+59.6	146.4	70 29.0	+59.8	147.9	69 37.8	+59.8	149.4	68 45.8	+60.0	150.7	67 53.2	+60.0	151.9	67 00.0	+60.0	153.0	**67**
68	73 56.1	+58.7	142.1	73 08.1	+59.2	144.1	72 19.0	+59.4	146.0	71 28.8	+59.6	147.6	70 37.6	+59.9	149.2	69 45.8	+59.9	150.6	68 53.2	+60.0	151.8	68 00.0	+60.0	153.0	**68**
69	74 54.8	+58.6	141.3	74 07.3	+59.0	143.5	73 18.4	+59.4	145.5	72 28.4	+59.7	147.3	71 37.5	+59.8	148.9	70 45.7	+59.9	150.4	69 53.2	+60.0	151.8	69 00.0	+60.0	153.0	**69**
70	75 53.4	+58.3	140.4	75 06.3	+58.9	142.8	74 17.8	+59.3	145.0	73 28.1	+59.6	146.9	72 37.3	+59.8	148.7	71 45.6	+59.9	150.3	70 53.2	+59.9	151.7	70 00.0	+60.0	153.0	**70**
71	76 51.7	+58.0	139.4	76 05.2	+58.7	142.1	75 17.1	+59.2	144.4	74 27.7	+59.5	146.5	73 37.1	+59.8	148.4	72 45.5	+59.9	150.1	71 53.1	+60.0	151.6	71 00.0	+60.0	153.0	**71**
72	77 49.7	+57.8	138.3	77 03.9	+58.6	141.2	76 16.3	+59.1	143.8	75 27.2	+59.5	146.0	74 36.9	+59.7	148.1	73 45.4	+59.9	149.9	72 53.1	+60.0	151.5	72 00.0	+60.0	153.0	**72**
73	78 47.5	+57.2	136.9	78 02.5	+58.2	140.2	77 15.4	+59.0	143.0	76 26.7	+59.4	145.5	75 36.6	+59.7	147.7	74 45.3	+59.9	149.7	73 53.1	+60.0	151.4	73 00.0	+60.0	153.0	**73**
74	79 44.7	+56.8	135.3	79 00.7	+58.0	139.0	78 14.4	+58.7	142.1	77 26.1	+59.3	144.9	76 36.3	+59.7	147.3	75 45.2	+59.9	149.4	74 53.1	+59.9	151.3	74 00.0	+60.0	153.0	**74**
75	80 41.5	+55.9	133.4	79 58.7	+57.4	137.5	79 13.1	+58.5	141.1	78 25.4	+59.2	144.2	77 36.0	+59.6	146.8	76 45.1	+59.8	149.2	75 53.0	+60.0	151.2	75 00.0	+60.0	153.0	**75**
76	81 37.4	+55.0	131.1	80 56.1	+56.9	135.8	80 11.6	+58.2	139.8	79 24.6	+59.0	143.3	78 35.6	+59.5	146.3	77 44.9	+59.9	148.8	76 53.0	+60.0	151.1	76 00.0	+60.0	153.0	**76**
77	82 32.4	+53.4	128.1	81 53.0	+56.1	133.7	81 09.8	+57.7	138.3	80 23.6	+58.8	142.3	79 35.1	+59.4	145.6	78 44.8	+59.7	148.4	77 53.0	+59.9	150.9	77 00.0	+60.0	153.0	**77**
78	83 25.8	*+51.3*	•124.4	82 49.1	+54.8	131.0	82 07.5	+57.1	136.5	81 22.4	+58.5	141.0	80 34.5	+59.3	144.8	79 44.5	+59.8	148.0	78 52.9	+60.0	150.7	78 00.0	+60.0	153.0	**78**
79	84 17.1	*+48.0*	•119.6	83 43.9	*+53.0*	•127.5	83 04.6	+56.2	134.1	82 20.9	+58.0	139.4	81 33.8	+59.1	143.8	80 44.3	+59.7	147.4	79 52.9	+59.9	150.5	79 00.0	+60.0	153.0	**79**
80	85 05.1	*+42.8*	•113.1	84 36.9	*+50.0*	•122.9	84 00.8	+54.6	130.9	83 18.9	+57.4	137.4	82 32.9	+58.9	142.6	81 44.0	+59.5	146.8	80 52.8	+59.9	150.2	80 00.0	+60.0	153.0	**80**
81	85 47.9	*+34.6*	•104.2	85 26.9	*+45.3*	•116.5	84 55.4	*+52.3*	•126.6	84 16.3	+56.2	134.6	83 31.8	+58.4	140.9	82 43.5	+59.5	145.9	81 52.7	+59.9	149.8	81 00.0	+60.0	153.0	**81**
82	86 22.5	*+21.9*	• 92.2	86 12.2	*+36.9*	•107.4	85 47.7	*+47.9*	•120.5	85 12.5	*+54.4*	•130.8	84 30.2	+57.7	138.7	83 43.0	+59.2	144.7	82 52.6	+59.9	149.4	82 00.0	+60.0	153.0	**82**
83	86 44.4	*+4.7*	• 76.6	86 49.1	*+23.1*	• 94.4	86 35.6	*+39.9*	•111.4	86 06.9	*+50.9*	•125.2	85 27.9	+56.5	135.6	84 42.2	+58.9	143.2	83 52.5	+59.8	148.8	83 00.0	+60.0	153.0	**83**
84	86 49.1	*−13.5*	• 58.8	87 12.2	*+3.3*	• 76.6	87 15.5	*+24.6*	• 97.3	86 57.8	*+43.4*	•116.4	86 24.4	*+53.9*	•130.8	85 41.1	+58.3	140.9	84 52.3	+59.7	147.9	84 00.0	+60.0	153.0	**84**
85	86 35.6	*−28.7*	• 41.8	87 15.5	*−17.7*	• 55.8	87 40.1	*+1.1*	• 76.5	87 41.2	*+26.8*	•101.4	87 18.3	*+47.7*	•122.7	86 39.4	*+56.8*	•137.3	85 52.0	+59.5	146.7	85 00.0	+60.0	153.0	**85**
86	86 06.9	*−39.0*	• 27.9	86 57.8	*−33.4*	• 36.7	87 41.2	*−22.9*	• 51.7	88 08.0	*−2.0*	• 76.5	88 06.0	*+30.0*	•107.3	87 36.2	*+52.7*	•130.8	86 51.5	+59.1	144.7	86 00.0	+60.0	153.0	**86**
87	85 27.9	*−45.7*	• 17.5	86 24.4	*−43.3*	• 22.3	87 18.3	*−38.9*	• 30.3	88 06.0	*−29.8*	• 45.8	88 36.0	*−7.1*	• 76.5	88 28.9	*+35.1*	•116.3	87 50.6	*+57.5*	•140.9	87 00.0	+60.0	153.0	**87**
88	84 42.2	*−49.7*	• 9.9	85 41.1	*−48.8*	• 12.2	86 39.4	*−47.4*	• 15.8	87 36.2	*−44.7*	• 22.3	88 28.9	*−38.3*	• 36.7	89 04.0	*−15.9*	• 76.5	88 48.1	*+43.9*	•130.7	88 00.0	+60.0	153.0	**88**
89	83 52.5	*−52.5*	• 4.3	84 52.3	*−52.3*	• 5.1	85 52.0	*−52.0*	• 6.3	86 51.5	*−51.5*	• 8.3	87 50.6	*−50.6*	• 12.2	88 48.1	*−48.1*	• 22.3	89 32.0	*−32.0*	• 76.5	89 00.0	+60.0	153.0	**89**
90	83 00.0	−54.2	0.0	84 00.0	−54.4	0.0	85 00.0	*−54.5*	• 0.0	86 00.0	*−54.7*	• 0.0	87 00.0	*−55.0*	• 0.0	88 00.0	*−55.6*	• 0.0	89 00.0	*−56.7*	• 0.0	90 00.0	−60.0	76.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 27°, 333°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 14.0	−59.9	152.8	5 20.6	−59.9	152.9	4 27.2	−59.9	152.9	3 33.8	−60.0	152.9	2 40.4	−60.0	153.0	1 46.9	−60.0	153.0	0 53.5	−60.0	153.0	0 00.0	+60.0	27.0	**0**
1	5 14.1	−59.9	152.9	4 20.7	−59.9	152.9	3 27.3	−60.0	153.0	2 33.8	−59.9	153.0	1 40.4	−60.0	153.0	0 46.9	−60.0	153.0	0 06.5	+60.0	27.0	1 00.0	+60.0	27.0	**1**
2	4 14.2	−59.9	152.9	3 20.8	−60.0	153.0	2 27.3	−59.9	153.0	1 33.9	−60.0	153.0	0 40.4	−60.0	153.0	0 13.1	+60.0	27.0	1 06.5	+60.0	27.0	2 00.0	+60.0	27.0	**2**
3	3 14.3	−59.9	153.0	2 20.8	−59.9	153.0	1 27.4	−60.0	153.0	0 33.9	−60.0	153.0	0 19.6	+60.0	27.0	1 13.1	+60.0	27.0	2 06.5	+60.0	27.0	3 00.0	+60.0	27.0	**3**
4	2 14.4	−59.9	153.0	1 20.9	−59.9	153.1	0 27.4	−59.9	153.1	0 26.1	+59.9	26.9	1 19.6	+59.9	26.9	2 13.1	+59.9	27.0	3 06.5	+60.0	27.0	4 00.0	+60.0	27.0	**4**
5	1 14.5	−59.9	153.1	0 21.0	−60.0	153.1	0 32.5	+60.0	26.9	1 26.0	+60.0	26.9	2 19.5	+60.0	26.9	3 13.0	+60.0	26.9	4 06.5	+60.0	27.0	5 00.0	+60.0	27.0	**5**
6	0 14.6	−59.9	153.2	0 39.0	+59.9	26.8	1 32.5	+59.9	26.9	2 26.0	+60.0	26.9	3 19.5	+60.0	26.9	4 13.0	+60.0	26.9	5 06.5	+60.0	27.0	6 00.0	+60.0	27.0	**6**
7	0 45.3	+59.9	26.8	1 38.9	+59.9	26.8	2 32.4	+60.0	26.8	3 26.0	+60.0	26.8	4 19.5	+60.0	26.9	5 13.0	+60.0	26.9	6 06.5	+60.0	26.9	7 00.0	+60.0	27.0	**7**
8	1 45.2	+59.9	26.7	2 38.8	+59.9	26.7	3 32.4	+59.9	26.8	4 26.0	+59.9	26.8	5 19.5	+60.0	26.8	6 13.0	+60.0	26.9	7 06.5	+60.0	26.9	8 00.0	+60.0	27.0	**8**
9	2 45.1	+59.9	26.7	3 38.7	+60.0	26.7	4 32.3	+60.0	26.7	5 25.9	+60.0	26.8	6 19.5	+60.0	26.8	7 13.0	+60.0	26.9	8 06.5	+60.0	26.9	9 00.0	+60.0	27.0	**9**
10	3 45.0	+60.0	26.6	4 38.7	+59.9	26.7	5 32.3	+59.9	26.7	6 25.9	+60.0	26.7	7 19.5	+59.9	26.8	8 13.0	+60.0	26.9	9 06.5	+60.0	26.9	10 00.0	+60.0	27.0	**10**
11	4 45.0	+59.9	26.6	5 38.6	+59.9	26.6	6 32.2	+60.0	26.7	7 25.9	+59.9	26.7	8 19.4	+60.0	26.8	9 13.0	+60.0	26.8	10 06.5	+60.0	26.9	11 00.0	+60.0	27.0	**11**
12	5 44.9	+59.9	26.5	6 38.5	+60.0	26.6	7 32.2	+60.0	26.6	8 25.8	+60.0	26.7	9 19.4	+60.0	26.7	10 13.0	+60.0	26.8	11 06.5	+60.0	26.9	12 00.0	+60.0	27.0	**12**
13	6 44.8	+59.9	26.5	7 38.5	+59.9	26.5	8 32.2	+59.9	26.6	9 25.8	+60.0	26.6	10 19.4	+60.0	26.7	11 13.0	+60.0	26.8	12 06.5	+60.0	26.9	13 00.0	+60.0	27.0	**13**
14	7 44.7	+59.9	26.4	8 38.4	+59.9	26.5	9 32.1	+60.0	26.5	10 25.8	+59.9	26.6	11 19.4	+60.0	26.7	12 13.0	+60.0	26.8	13 06.5	+60.0	26.9	14 00.0	+60.0	27.0	**14**
15	8 44.6	+59.9	26.3	9 38.3	+60.0	26.4	10 32.1	+59.9	26.5	11 25.7	+60.0	26.6	12 19.4	+60.0	26.7	13 13.0	+60.0	26.8	14 06.5	+60.0	26.9	15 00.0	+60.0	27.0	**15**
16	9 44.5	+59.9	26.3	10 38.3	+59.9	26.4	11 32.0	+60.0	26.4	12 25.7	+60.0	26.5	13 19.4	+59.9	26.6	14 13.0	+60.0	26.8	15 06.5	+60.0	26.9	16 00.0	+60.0	27.0	**16**
17	10 44.4	+59.9	26.2	11 38.2	+59.9	26.3	12 32.0	+59.9	26.4	13 25.7	+59.9	26.5	14 19.3	+60.0	26.6	15 13.0	+59.9	26.7	16 06.5	+60.0	26.9	17 00.0	+60.0	27.0	**17**
18	11 44.3	+59.9	26.2	12 38.1	+60.0	26.3	13 31.9	+60.0	26.4	14 25.6	+60.0	26.5	15 19.3	+60.0	26.6	16 12.9	+60.0	26.7	17 06.5	+60.0	26.9	18 00.0	+60.0	27.0	**18**
19	12 44.2	+59.9	26.1	13 38.1	+59.9	26.2	14 31.9	+59.9	26.3	15 25.6	+60.0	26.4	16 19.3	+60.0	26.6	17 12.9	+60.0	26.7	18 06.5	+60.0	26.8	19 00.0	+60.0	27.0	**19**
20	13 44.1	+59.9	26.1	14 38.0	+59.9	26.2	15 31.8	+60.0	26.3	16 25.6	+59.9	26.4	17 19.3	+60.0	26.5	18 12.9	+60.0	26.7	19 06.5	+60.0	26.8	20 00.0	+60.0	27.0	**20**
21	14 44.0	+59.9	26.0	15 37.9	+59.9	26.1	16 31.8	+59.9	26.2	17 25.5	+60.0	26.4	18 19.3	+59.9	26.5	19 12.9	+60.0	26.7	20 06.5	+60.0	26.8	21 00.0	+60.0	27.0	**21**
22	15 43.9	+59.9	25.9	16 37.8	+60.0	26.1	17 31.7	+60.0	26.2	18 25.5	+60.0	26.3	19 19.2	+60.0	26.5	20 12.9	+60.0	26.7	21 06.5	+60.0	26.8	22 00.0	+60.0	27.0	**22**
23	16 43.8	+59.9	25.9	17 37.8	+59.9	26.0	18 31.7	+59.9	26.2	19 25.5	+59.9	26.3	20 19.2	+60.0	26.5	21 12.9	+60.0	26.6	22 06.5	+60.0	26.8	23 00.0	+60.0	27.0	**23**
24	17 43.7	+59.9	25.8	18 37.7	+59.9	26.0	19 31.6	+59.9	26.1	20 25.4	+60.0	26.3	21 19.2	+60.0	26.4	22 12.9	+60.0	26.6	23 06.5	+60.0	26.8	24 00.0	+60.0	27.0	**24**
25	18 43.6	+59.9	25.8	19 37.6	+59.9	25.9	20 31.5	+60.0	26.1	21 25.4	+60.0	26.2	22 19.2	+60.0	26.4	23 12.9	+60.0	26.6	24 06.5	+60.0	26.8	25 00.0	+60.0	27.0	**25**
26	19 43.5	+59.9	25.7	20 37.5	+60.0	25.8	21 31.5	+59.9	26.0	22 25.4	+59.9	26.2	23 19.2	+59.9	26.4	24 12.9	+60.0	26.6	25 06.5	+60.0	26.8	26 00.0	+60.0	27.0	**26**
27	20 43.4	+59.9	25.6	21 37.5	+59.9	25.8	22 31.4	+60.0	26.0	23 25.3	+60.0	26.2	24 19.1	+60.0	26.4	25 12.9	+60.0	26.6	26 06.5	+60.0	26.8	27 00.0	+60.0	27.0	**27**
28	21 43.3	+59.9	25.6	22 37.4	+59.9	25.7	23 31.4	+59.9	25.9	24 25.3	+60.0	26.1	25 19.1	+60.0	26.3	26 12.9	+59.9	26.5	27 06.5	+60.0	26.8	28 00.0	+60.0	27.0	**28**
29	22 43.2	+59.9	25.5	23 37.3	+59.9	25.7	24 31.3	+60.0	25.9	25 25.3	+59.9	26.1	26 19.1	+60.0	26.3	27 12.8	+60.0	26.5	28 06.5	+60.0	26.8	29 00.0	+60.0	27.0	**29**
30	23 43.1	+59.9	25.4	24 37.2	+59.9	25.6	25 31.3	+59.9	25.8	26 25.2	+60.0	26.0	27 19.1	+60.0	26.3	28 12.8	+60.0	26.5	29 06.5	+60.0	26.7	30 00.0	+60.0	27.0	**30**
31	24 43.0	+59.9	25.4	25 37.1	+60.0	25.6	26 31.2	+60.0	25.8	27 25.2	+60.0	26.0	28 19.1	+59.9	26.2	29 12.8	+60.0	26.5	30 06.5	+60.0	26.7	31 00.0	+60.0	27.0	**31**
32	25 42.9	+59.8	25.3	26 37.1	+59.9	25.5	27 31.2	+59.9	25.7	28 25.2	+59.9	26.0	29 19.0	+60.0	26.2	30 12.8	+60.0	26.5	31 06.5	+60.0	26.7	32 00.0	+60.0	27.0	**32**
33	26 42.7	+59.9	25.2	27 37.0	+59.9	25.4	28 31.1	+59.9	25.7	29 25.1	+60.0	25.9	30 19.0	+60.0	26.2	31 12.8	+60.0	26.4	32 06.5	+60.0	26.7	33 00.0	+60.0	27.0	**33**
34	27 42.6	+59.9	25.2	28 36.9	+59.9	25.4	29 31.0	+60.0	25.6	30 25.1	+59.9	25.9	31 19.0	+60.0	26.1	32 12.8	+60.0	26.4	33 06.5	+60.0	26.7	34 00.0	+60.0	27.0	**34**
35	28 42.5	+59.9	25.1	29 36.8	+59.9	25.3	30 31.0	+59.9	25.6	31 25.0	+60.0	25.8	32 19.0	+60.0	26.1	33 12.8	+60.0	26.4	34 06.5	+60.0	26.7	35 00.0	+60.0	27.0	**35**
36	29 42.4	+59.9	25.0	30 36.7	+59.9	25.3	31 30.9	+59.9	25.5	32 25.0	+59.9	25.8	33 19.0	+59.9	26.1	34 12.8	+60.0	26.4	35 06.5	+60.0	26.7	36 00.0	+60.0	27.0	**36**
37	30 42.3	+59.8	24.9	31 36.6	+59.9	25.2	32 30.8	+60.0	25.5	33 24.9	+60.0	25.7	34 18.9	+60.0	26.0	35 12.8	+60.0	26.3	36 06.5	+60.0	26.7	37 00.0	+60.0	27.0	**37**
38	31 42.1	+59.9	24.9	32 36.5	+59.9	25.1	33 30.8	+59.9	25.4	34 24.9	+60.0	25.7	35 18.9	+60.0	26.0	36 12.8	+59.9	26.3	37 06.5	+60.0	26.7	38 00.0	+60.0	27.0	**38**
39	32 42.0	+59.9	24.8	33 36.4	+59.9	25.1	34 30.7	+59.9	25.4	35 24.9	+59.9	25.7	36 18.9	+59.9	26.0	37 12.7	+60.0	26.3	38 06.5	+60.0	26.6	39 00.0	+60.0	27.0	**39**
40	33 41.9	+59.8	24.7	34 36.3	+59.9	25.0	35 30.6	+60.0	25.3	36 24.8	+60.0	25.6	37 18.8	+60.0	25.9	38 12.7	+60.0	26.3	39 06.5	+59.9	26.6	40 00.0	+60.0	27.0	**40**
41	34 41.7	+59.9	24.6	35 36.2	+59.9	24.9	36 30.6	+59.9	25.2	37 24.8	+59.9	25.6	38 18.8	+60.0	25.9	39 12.7	+60.0	26.2	40 06.4	+60.0	26.6	41 00.0	+60.0	27.0	**41**
42	35 41.6	+59.9	24.5	36 36.1	+59.9	24.9	37 30.5	+59.9	25.2	38 24.7	+60.0	25.5	39 18.8	+60.0	25.9	40 12.7	+60.0	26.2	41 06.4	+60.0	26.6	42 00.0	+60.0	27.0	**42**
43	36 41.5	+59.8	24.5	37 36.0	+59.9	24.8	38 30.4	+59.9	25.1	39 24.7	+59.9	25.5	40 18.8	+59.9	25.8	41 12.7	+60.0	26.2	42 06.4	+60.0	26.6	43 00.0	+60.0	27.0	**43**
44	37 41.3	+59.9	24.4	38 35.9	+59.9	24.7	39 30.3	+60.0	25.0	40 24.6	+60.0	25.4	41 18.7	+60.0	25.8	42 12.7	+60.0	26.2	43 06.4	+60.0	26.6	44 00.0	+60.0	27.0	**44**
45	38 41.2	+59.8	24.3	39 35.8	+59.9	24.6	40 30.3	+59.9	25.0	41 24.6	+59.9	25.3	42 18.7	+60.0	25.7	43 12.7	+60.0	26.1	44 06.4	+60.0	26.6	45 00.0	+60.0	27.0	**45**
46	39 41.0	+59.9	24.2	40 35.7	+59.9	24.5	41 30.2	+59.9	24.9	42 24.5	+60.0	25.3	43 18.7	+59.9	25.7	44 12.7	+59.9	26.1	45 06.4	+60.0	26.5	46 00.0	+60.0	27.0	**46**
47	40 40.9	+59.8	24.1	41 35.6	+59.8	24.5	42 30.1	+59.9	24.8	43 24.5	+59.9	25.2	44 18.6	+60.0	25.6	45 12.6	+60.0	26.1	46 06.4	+60.0	26.5	47 00.0	+60.0	27.0	**47**
48	41 40.7	+59.8	24.0	42 35.4	+59.9	24.4	43 30.0	+59.9	24.8	44 24.4	+59.9	25.2	45 18.6	+60.0	25.6	46 12.6	+60.0	26.0	47 06.4	+60.0	26.5	48 00.0	+60.0	27.0	**48**
49	42 40.5	+59.9	23.9	43 35.3	+59.9	24.3	44 29.9	+59.9	24.7	45 24.3	+60.0	25.1	46 18.6	+59.9	25.5	47 12.6	+60.0	26.0	48 06.4	+60.0	26.5	49 00.0	+60.0	27.0	**49**
50	43 40.4	+59.8	23.8	44 35.2	+59.8	24.2	45 29.8	+59.9	24.6	46 24.3	+59.9	25.0	47 18.5	+60.0	25.5	48 12.6	+60.0	26.0	49 06.4	+60.0	26.5	50 00.0	+60.0	27.0	**50**
51	44 40.2	+59.8	23.7	45 35.0	+59.9	24.1	46 29.7	+59.9	24.5	47 24.2	+59.9	25.0	48 18.5	+60.0	25.4	49 12.6	+60.0	25.9	50 06.4	+60.0	26.5	51 00.0	+60.0	27.0	**51**
52	45 40.0	+59.8	23.6	46 34.9	+59.9	24.0	47 29.6	+59.9	24.4	48 24.1	+60.0	24.9	49 18.5	+59.9	25.4	50 12.6	+59.9	25.9	51 06.4	+60.0	26.4	52 00.0	+60.0	27.0	**52**
53	46 39.8	+59.8	23.5	47 34.8	+59.8	23.9	48 29.5	+59.9	24.3	49 24.1	+59.9	24.8	50 18.4	+60.0	25.3	51 12.5	+60.0	25.9	52 06.4	+60.0	26.4	53 00.0	+60.0	27.0	**53**
54	47 39.6	+59.8	23.3	48 34.6	+59.8	23.8	49 29.4	+59.9	24.3	50 24.0	+59.9	24.7	51 18.4	+59.9	25.3	52 12.5	+60.0	25.8	53 06.4	+60.0	26.4	54 00.0	+60.0	27.0	**54**
55	48 39.4	+59.8	23.2	49 34.4	+59.9	23.7	50 29.3	+59.9	24.2	51 23.9	+59.9	24.7	52 18.3	+60.0	25.2	53 12.5	+60.0	25.8	54 06.4	+60.0	26.4	55 00.0	+60.0	27.0	**55**
56	49 39.2	+59.8	23.1	50 34.3	+59.8	23.6	51 29.2	+59.8	24.1	52 23.8	+60.0	24.6	53 18.3	+59.9	25.1	54 12.5	+59.9	25.7	55 06.4	+60.0	26.3	56 00.0	+60.0	27.0	**56**
57	50 39.0	+59.7	23.0	51 34.1	+59.8	23.4	52 29.0	+59.9	24.0	53 23.8	+59.9	24.5	54 18.2	+60.0	25.1	55 12.4	+60.0	25.7	56 06.4	+60.0	26.3	57 00.0	+60.0	27.0	**57**
58	51 38.7	+59.8	22.8	52 33.9	+59.8	23.3	53 28.9	+59.9	23.8	54 23.7	+59.9	24.4	55 18.2	+59.9	25.0	56 12.4	+60.0	25.6	57 06.4	+60.0	26.3	58 00.0	+60.0	27.0	**58**
59	52 38.5	+59.7	22.7	53 33.7	+59.8	23.2	54 28.8	+59.8	23.7	55 23.6	+59.9	24.3	56 18.1	+60.0	24.9	57 12.4	+60.0	25.6	58 06.4	+60.0	26.3	59 00.0	+60.0	27.0	**59**
60	53 38.2	+59.8	22.5	54 33.5	+59.8	23.0	55 28.6	+59.9	23.6	56 23.5	+59.9	24.2	57 18.1	+59.9	24.8	58 12.4	+59.9	25.5	59 06.4	+60.0	26.2	60 00.0	+60.0	27.0	**60**
61	54 38.0	+59.7	22.3	55 33.3	+59.8	22.9	56 28.5	+59.8	23.5	57 23.4	+59.9	24.1	58 18.0	+60.0	24.8	59 12.3	+60.0	25.5	60 06.4	+59.9	26.2	61 00.0	+60.0	27.0	**61**
62	55 37.7	+59.7	22.2	56 33.1	+59.8	22.7	57 28.3	+59.9	23.4	58 23.3	+59.9	24.0	59 18.0	+59.9	24.7	60 12.3	+60.0	25.4	61 06.3	+60.0	26.2	62 00.0	+60.0	27.0	**62**
63	56 37.4	+59.7	22.0	57 32.9	+59.7	22.6	58 28.2	+59.8	23.2	59 23.2	+59.8	23.9	60 17.9	+59.9	24.6	61 12.3	+60.0	25.3	62 06.3	+60.0	26.1	63 00.0	+60.0	27.0	**63**
64	57 37.1	+59.6	21.8	58 32.6	+59.8	22.4	59 28.0	+59.8	23.1	60 23.0	+59.9	23.7	61 17.8	+59.9	24.5	62 12.3	+59.9	25.3	63 06.3	+60.0	26.1	64 00.0	+60.0	27.0	**64**
65	58 36.7	+59.7	21.6	59 32.4	+59.7	22.2	60 27.8	+59.8	22.9	61 22.9	+59.9	23.6	62 17.7	+60.0	24.4	63 12.2	+60.0	25.2	64 06.3	+60.0	26.1	65 00.0	+60.0	27.0	**65**
66	59 36.4	+59.6	21.4	60 32.1	+59.7	22.0	61 27.6	+59.8	22.7	62 22.8	+59.8	23.5	63 17.7	+59.9	24.3	64 12.2	+59.9	25.1	65 06.3	+60.0	26.0	66 00.0	+60.0	27.0	**66**
67	60 36.0	+59.6	21.2	61 31.8	+59.7	21.8	62 27.4	+59.8	22.6	63 22.6	+59.9	23.3	64 17.6	+59.9	24.1	65 12.1	+60.0	25.0	66 06.3	+60.0	26.0	67 00.0	+60.0	27.0	**67**
68	61 35.6	+59.6	20.9	62 31.5	+59.7	21.6	63 27.2	+59.7	22.4	64 22.5	+59.8	23.2	65 17.5	+59.9	24.0	66 12.1	+59.9	24.9	67 06.3	+60.0	25.9	68 00.0	+60.0	27.0	**68**
69	62 35.2	+59.5	20.7	63 31.2	+59.6	21.4	64 26.9	+59.8	22.2	65 22.3	+59.8	23.0	66 17.4	+59.9	23.9	67 12.0	+60.0	24.8	68 06.3	+60.0	25.9	69 00.0	+60.0	27.0	**69**
70	63 34.7	+59.6	20.4	64 30.8	+59.7	21.2	65 26.7	+59.7	21.9	66 22.1	+59.8	22.8	67 17.3	+59.8	23.7	68 12.0	+59.9	24.7	69 06.3	+59.9	25.8	70 00.0	+60.0	27.0	**70**
71	64 34.3	+59.4	20.1	65 30.5	+59.6	20.9	66 26.4	+59.7	21.7	67 21.9	+59.8	22.6	68 17.1	+59.9	23.5	69 11.9	+60.0	24.6	70 06.2	+60.0	25.7	71 00.0	+60.0	27.0	**71**
72	65 33.7	+59.5	19.8	66 30.1	+59.5	20.6	67 26.1	+59.6	21.4	68 21.7	+59.8	22.4	69 17.0	+59.9	23.4	70 11.9	+59.9	24.5	71 06.2	+60.0	25.7	72 00.0	+60.0	27.0	**72**
73	66 33.2	+59.4	19.5	67 29.6	+59.5	20.3	68 25.7	+59.7	21.2	69 21.5	+59.7	22.1	70 16.9	+59.8	23.2	71 11.8	+59.9	24.3	72 06.2	+60.0	25.6	73 00.0	+60.0	27.0	**73**
74	67 32.6	+59.3	19.1	68 29.1	+59.5	20.0	69 25.4	+59.6	20.9	70 21.2	+59.8	21.9	71 16.7	+59.8	22.9	72 11.7	+59.9	24.2	73 06.2	+60.0	25.5	74 00.0	+60.0	27.0	**74**
75	68 31.9	+59.3	18.7	69 28.6	+59.4	19.6	70 25.0	+59.5	20.5	71 21.0	+59.7	21.6	72 16.5	+59.9	22.7	73 11.6	+59.9	24.0	74 06.2	+59.9	25.4	75 00.0	+60.0	27.0	**75**
76	69 31.2	+59.2	18.3	70 28.0	+59.4	19.2	71 24.5	+59.5	20.2	72 20.7	+59.6	21.2	73 16.4	+59.7	22.4	74 11.5	+59.9	23.8	75 06.1	+60.0	25.3	76 00.0	+60.0	27.0	**76**
77	70 30.4	+59.1	17.8	71 27.4	+59.3	18.7	72 24.0	+59.5	19.7	73 20.3	+59.6	20.9	74 16.1	+59.8	22.1	75 11.4	+59.9	23.5	76 06.1	+60.0	25.2	77 00.0	+60.0	27.0	**77**
78	71 29.5	+59.1	17.3	72 26.7	+59.2	18.2	73 23.5	+59.4	19.3	74 19.9	+59.6	20.5	75 15.9	+59.7	21.8	76 11.3	+59.9	23.3	77 06.1	+59.9	25.0	78 00.0	+60.0	27.0	**78**
79	72 28.6	+58.9	16.7	73 25.9	+59.1	17.7	74 22.9	+59.3	18.8	75 19.5	+59.5	20.0	76 15.6	+59.7	21.4	77 11.2	+59.8	23.0	78 06.0	+60.0	24.8	79 00.0	+60.0	27.0	**79**
80	73 27.5	+58.8	16.1	74 25.0	+59.0	17.1	75 22.2	+59.2	18.2	76 19.0	+59.4	19.5	77 15.3	+59.6	20.9	78 11.0	+59.8	22.6	79 06.0	+59.9	24.6	80 00.0	+60.0	27.0	**80**
81	74 26.3	+58.6	15.4	75 24.0	+58.8	16.4	76 21.4	+59.1	17.5	77 18.4	+59.3	18.9	78 14.9	+59.6	20.4	79 10.8	+59.8	22.2	80 05.9	+59.9	24.4	81 00.0	+60.0	27.0	**81**
82	75 24.9	+58.4	14.5	76 22.8	+58.7	15.6	77 20.5	+58.9	16.8	78 17.7	+59.2	18.1	79 14.5	+59.4	19.8	80 10.6	+59.7	21.7	81 05.8	+60.0	24.1	82 00.0	+60.0	27.0	**82**
83	76 23.3	+58.2	13.6	77 21.5	+58.5	14.6	78 19.4	+58.7	15.9	79 16.9	+59.0	17.3	80 13.9	+59.4	19.0	81 10.3	+59.6	21.1	82 05.8	+59.8	23.7	83 00.0	+60.0	27.0	**83**
84	77 21.5	+57.9	12.5	78 20.0	+58.1	13.6	79 18.1	+58.5	14.8	80 15.9	+58.9	16.3	81 13.3	+59.1	18.1	82 09.9	+59.6	20.4	83 05.6	+59.9	23.2	84 00.0	+60.0	27.0	**84**
85	78 19.4	+57.5	11.3	79 18.1	+57.8	12.3	80 16.6	+58.2	13.5	81 14.8	+58.5	15.1	82 12.4	+59.0	17.0	83 09.5	+59.3	19.4	84 05.5	+59.8	22.6	85 00.0	+60.0	27.0	**85**
86	79 16.9	+57.0	9.8	80 15.9	+57.4	10.8	81 14.8	+57.6	12.0	82 13.3	+58.1	13.5	83 11.4	+58.6	15.5	84 08.8	+59.2	18.1	85 05.3	+59.7	21.7	86 00.0	+60.0	27.0	**86**
87	80 13.9	+56.4	8.1	81 13.3	+56.6	9.0	82 12.4	+57.1	10.1	83 11.4	+57.4	11.6	84 10.0	+58.0	13.5	85 08.0	+58.6	16.3	86 05.0	+59.4	20.4	87 00.0	+60.0	27.0	**87**
88	81 10.3	+55.5	5.9	82 09.9	+55.7	6.7	83 09.5	+56.0	7.6	84 08.8	+56.5	8.9	85 08.0	+57.0	10.8	86 06.6	+57.8	13.5	87 04.4	+58.9	18.1	88 00.0	+60.0	27.0	**88**
89	82 05.8	+54.2	3.3	83 05.6	+54.4	3.8	84 05.5	*+54.5* •	4.4	85 05.3	*+54.7* •	5.3	86 05.0	*+55.0* •	6.7	87 04.4	*+55.6* •	8.9	88 03.3	*+56.7* •	13.5	89 00.0	+60.0	27.0	**89**
90	83 00.0	*+52.5* •	0.0	84 00.0	*+52.3* •	0.0	85 00.0	*+52.0* •	0.0	86 00.0	*+51.5* •	0.0	87 00.0	*+50.6* •	0.0	88 00.0	*+48.1* •	0.0	89 00.0	*+32.0* •	0.0	90 00.0	−60.0	13.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 153°, 207°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 10.6	+59.9	151.8	5 17.7	+60.0	151.9	4 24.8	+60.0	151.9	3 31.9	+59.9	151.9	2 38.9	+60.0	152.0	1 45.9	+60.0	152.0	0 53.0	+60.0	152.0	0 00.0	+60.0	152.0	**0**
1	7 10.5	+59.9	151.8	6 17.7	+59.9	151.8	5 24.8	+59.9	151.9	4 31.8	+60.0	151.9	3 38.9	+60.0	151.9	2 45.9	+60.0	152.0	1 53.0	+60.0	152.0	1 00.0	+60.0	152.0	**1**
2	8 10.4	+59.9	151.7	7 17.6	+59.9	151.8	6 24.7	+60.0	151.8	5 31.8	+60.0	151.9	4 38.9	+60.0	151.9	3 45.9	+60.0	152.0	2 53.0	+60.0	152.0	2 00.0	+60.0	152.0	**2**
3	9 10.3	+59.9	151.6	8 17.5	+59.9	151.7	7 24.7	+59.9	151.8	6 31.8	+59.9	151.8	5 38.9	+59.9	151.9	4 45.9	+60.0	151.9	3 53.0	+60.0	152.0	3 00.0	+60.0	152.0	**3**
4	10 10.2	+59.9	151.6	9 17.4	+60.0	151.7	8 24.6	+60.0	151.7	7 31.7	+60.0	151.8	6 38.8	+60.0	151.9	5 45.9	+60.0	151.9	4 53.0	+60.0	152.0	4 00.0	+60.0	152.0	**4**
5	11 10.1	+59.9	151.5	10 17.4	+59.9	151.6	9 24.6	+59.9	151.7	8 31.7	+60.0	151.8	7 38.8	+60.0	151.8	6 45.9	+60.0	151.9	5 53.0	+60.0	152.0	5 00.0	+60.0	152.0	**5**
6	12 10.0	+59.9	151.5	11 17.3	+59.9	151.6	10 24.5	+60.0	151.7	9 31.7	+59.9	151.7	8 38.8	+60.0	151.8	7 45.9	+60.0	151.9	6 53.0	+60.0	151.9	6 00.0	+60.0	152.0	**6**
7	13 09.9	+59.9	151.4	12 17.2	+59.9	151.5	11 24.5	+59.9	151.6	10 31.6	+60.0	151.7	9 38.8	+60.0	151.8	8 45.9	+60.0	151.9	7 53.0	+60.0	151.9	7 00.0	+60.0	152.0	**7**
8	14 09.8	+59.9	151.3	13 17.1	+60.0	151.5	12 24.4	+59.9	151.6	11 31.6	+60.0	151.7	10 38.8	+59.9	151.8	9 45.9	+60.0	151.9	8 53.0	+60.0	151.9	8 00.0	+60.0	152.0	**8**
9	15 09.7	+59.9	151.3	14 17.1	+59.9	151.4	13 24.3	+60.0	151.5	12 31.6	+59.9	151.6	11 38.7	+60.0	151.7	10 45.9	+60.0	151.8	9 53.0	+60.0	151.9	9 00.0	+60.0	152.0	**9**
10	16 09.6	+59.9	151.2	15 17.0	+59.9	151.4	14 24.3	+59.9	151.5	13 31.5	+60.0	151.6	12 38.7	+60.0	151.7	11 45.9	+60.0	151.8	10 53.0	+60.0	151.9	10 00.0	+60.0	152.0	**10**
11	17 09.5	+59.9	151.2	16 16.9	+59.9	151.3	15 24.2	+60.0	151.4	14 31.5	+60.0	151.6	13 38.7	+60.0	151.7	12 45.9	+60.0	151.8	11 53.0	+60.0	151.9	11 00.0	+60.0	152.0	**11**
12	18 09.4	+59.9	151.1	17 16.8	+59.9	151.3	16 24.2	+59.9	151.4	15 31.5	+59.9	151.5	14 38.7	+60.0	151.7	13 45.9	+59.9	151.8	12 53.0	+59.9	151.9	12 00.0	+60.0	152.0	**12**
13	19 09.3	+59.9	151.0	18 16.7	+60.0	151.2	17 24.1	+60.0	151.4	16 31.4	+60.0	151.5	15 38.7	+60.0	151.6	14 45.8	+60.0	151.8	13 52.9	+60.0	151.9	13 00.0	+60.0	152.0	**13**
14	20 09.2	+59.9	151.0	19 16.7	+59.9	151.1	18 24.1	+59.9	151.3	17 31.4	+60.0	151.5	16 38.7	+59.9	151.6	15 45.8	+60.0	151.7	14 52.9	+60.0	151.9	14 00.0	+60.0	152.0	**14**
15	21 09.1	+59.8	150.9	20 16.6	+59.9	151.1	19 24.0	+60.0	151.3	18 31.4	+59.9	151.4	17 38.6	+60.0	151.6	16 45.8	+60.0	151.7	15 52.9	+60.0	151.9	15 00.0	+60.0	152.0	**15**
16	22 08.9	+59.9	150.8	21 16.5	+59.9	151.0	20 24.0	+59.9	151.2	19 31.3	+60.0	151.4	18 38.6	+60.0	151.6	17 45.8	+60.0	151.7	16 52.9	+60.0	151.9	16 00.0	+60.0	152.0	**16**
17	23 08.8	+59.9	150.8	22 16.4	+59.9	151.0	21 23.9	+59.9	151.2	20 31.3	+60.0	151.4	19 38.6	+60.0	151.5	18 45.8	+60.0	151.7	17 52.9	+60.0	151.9	17 00.0	+60.0	152.0	**17**
18	24 08.7	+59.9	150.7	23 16.3	+59.9	150.9	22 23.8	+60.0	151.1	21 31.3	+59.9	151.3	20 38.6	+60.0	151.5	19 45.8	+60.0	151.7	18 52.9	+60.0	151.8	18 00.0	+60.0	152.0	**18**
19	25 08.6	+59.9	150.6	24 16.2	+60.0	150.9	23 23.8	+59.9	151.1	22 31.2	+60.0	151.3	21 38.6	+59.9	151.5	20 45.8	+60.0	151.7	19 52.9	+60.0	151.8	19 00.0	+60.0	152.0	**19**
20	26 08.5	+59.9	150.6	25 16.2	+59.9	150.8	24 23.7	+60.0	151.0	23 31.2	+59.9	151.2	22 38.5	+60.0	151.4	21 45.8	+60.0	151.6	20 52.9	+60.0	151.8	20 00.0	+60.0	152.0	**20**
21	27 08.4	+59.8	150.5	26 16.1	+59.9	150.7	25 23.7	+59.9	151.0	24 31.1	+60.0	151.2	23 38.5	+60.0	151.4	22 45.8	+60.0	151.6	21 52.9	+60.0	151.8	21 00.0	+60.0	152.0	**21**
22	28 08.2	+59.9	150.4	27 16.0	+59.9	150.7	26 23.6	+59.9	150.9	25 31.1	+60.0	151.2	24 38.5	+60.0	151.4	23 45.8	+60.0	151.6	22 52.9	+60.0	151.8	22 00.0	+60.0	152.0	**22**
23	29 08.1	+59.9	150.3	28 15.9	+59.9	150.6	27 23.5	+60.0	150.9	26 31.1	+59.9	151.1	25 38.5	+59.9	151.4	24 45.8	+59.9	151.6	23 52.9	+60.0	151.8	23 00.0	+60.0	152.0	**23**
24	30 08.0	+59.8	150.3	29 15.8	+59.9	150.6	28 23.5	+59.9	150.8	27 31.0	+60.0	151.1	26 38.4	+60.0	151.3	25 45.7	+60.0	151.6	24 52.9	+60.0	151.8	24 00.0	+60.0	152.0	**24**
25	31 07.8	+59.9	150.2	30 15.7	+59.9	150.5	29 23.4	+59.9	150.8	28 31.0	+59.9	151.0	27 38.4	+60.0	151.3	26 45.7	+60.0	151.5	25 52.9	+60.0	151.8	25 00.0	+60.0	152.0	**25**
26	32 07.7	+59.9	150.1	31 15.6	+59.9	150.4	30 23.3	+60.0	150.7	29 30.9	+60.0	151.0	28 38.4	+60.0	151.3	27 45.7	+60.0	151.5	26 52.9	+60.0	151.8	26 00.0	+60.0	152.0	**26**
27	33 07.6	+59.8	150.0	32 15.5	+59.9	150.4	31 23.3	+59.9	150.7	30 30.9	+60.0	151.0	29 38.4	+59.9	151.2	28 45.7	+60.0	151.5	27 52.9	+60.0	151.8	27 00.0	+60.0	152.0	**27**
28	34 07.4	+59.9	150.0	33 15.4	+59.9	150.3	32 23.2	+59.9	150.6	31 30.9	+59.9	150.9	30 38.3	+60.0	151.2	29 45.7	+60.0	151.5	28 52.9	+60.0	151.7	28 00.0	+60.0	152.0	**28**
29	35 07.3	+59.8	149.9	34 15.3	+59.9	150.2	33 23.1	+60.0	150.5	32 30.8	+60.0	150.9	31 38.3	+60.0	151.2	30 45.7	+60.0	151.5	29 52.9	+60.0	151.7	29 00.0	+60.0	152.0	**29**
30	36 07.1	+59.9	149.8	35 15.2	+59.9	150.1	34 23.1	+59.9	150.5	33 30.8	+59.9	150.8	32 38.3	+60.0	151.1	31 45.7	+60.0	151.4	30 52.9	+60.0	151.7	30 00.0	+60.0	152.0	**30**
31	37 07.0	+59.8	149.7	36 15.1	+59.9	150.1	35 23.0	+59.9	150.4	34 30.7	+60.0	150.8	33 38.3	+59.9	151.1	32 45.7	+60.0	151.4	31 52.9	+60.0	151.7	31 00.0	+60.0	152.0	**31**
32	38 06.8	+59.9	149.6	37 15.0	+59.8	150.0	36 22.9	+59.9	150.4	35 30.7	+59.9	150.7	34 38.2	+60.0	151.1	33 45.7	+59.9	151.4	32 52.9	+60.0	151.7	32 00.0	+60.0	152.0	**32**
33	39 06.7	+59.8	149.5	38 14.8	+59.9	149.9	37 22.8	+59.9	150.3	36 30.6	+60.0	150.7	35 38.2	+60.0	151.0	34 45.6	+60.0	151.4	33 52.9	+60.0	151.7	33 00.0	+60.0	152.0	**33**
34	40 06.5	+59.8	149.4	39 14.7	+59.9	149.8	38 22.7	+60.0	150.2	37 30.6	+59.9	150.6	36 38.2	+60.0	151.0	35 45.6	+60.0	151.3	34 52.9	+60.0	151.7	34 00.0	+60.0	152.0	**34**
35	41 06.3	+59.8	149.3	40 14.6	+59.9	149.7	39 22.7	+59.9	150.2	38 30.5	+60.0	150.6	37 38.2	+59.9	150.9	36 45.6	+60.0	151.3	35 52.9	+60.0	151.7	35 00.0	+60.0	152.0	**35**
36	42 06.1	+59.9	149.2	41 14.5	+59.8	149.7	40 22.6	+59.9	150.1	39 30.5	+59.9	150.5	38 38.1	+60.0	150.9	37 45.6	+60.0	151.3	36 52.9	+60.0	151.7	36 00.0	+60.0	152.0	**36**
37	43 06.0	+59.8	149.1	42 14.3	+59.9	149.6	41 22.5	+59.9	150.0	40 30.4	+60.0	150.5	39 38.1	+60.0	150.9	38 45.6	+60.0	151.3	37 52.9	+60.0	151.6	37 00.0	+60.0	152.0	**37**
38	44 05.8	+59.8	149.0	43 14.2	+59.9	149.5	42 22.4	+59.9	149.9	41 30.4	+59.9	150.4	40 38.1	+59.9	150.8	39 45.6	+60.0	151.2	38 52.9	+60.0	151.6	38 00.0	+60.0	152.0	**38**
39	45 05.6	+59.8	148.9	44 14.1	+59.8	149.4	43 22.3	+59.9	149.9	42 30.3	+59.9	150.3	41 38.0	+60.0	150.8	40 45.6	+60.0	151.2	39 52.9	+60.0	151.6	39 00.0	+60.0	152.0	**39**
40	46 05.4	+59.8	148.8	45 13.9	+59.9	149.3	44 22.2	+59.9	149.8	43 30.2	+60.0	150.3	42 38.0	+60.0	150.7	41 45.6	+59.9	151.2	40 52.9	+60.0	151.6	40 00.0	+60.0	152.0	**40**
41	47 05.2	+59.8	148.6	46 13.8	+59.8	149.2	45 22.1	+59.9	149.7	44 30.2	+59.9	150.2	43 38.0	+59.9	150.7	42 45.5	+60.0	151.1	41 52.9	+60.0	151.6	41 00.0	+60.0	152.0	**41**
42	48 05.0	+59.7	148.5	47 13.6	+59.9	149.1	46 22.0	+59.9	149.6	45 30.1	+59.9	150.1	44 37.9	+60.0	150.6	43 45.5	+60.0	151.1	42 52.9	+60.0	151.6	42 00.0	+60.0	152.0	**42**
43	49 04.7	+59.8	148.4	48 13.5	+59.8	149.0	47 21.9	+59.9	149.5	46 30.0	+60.0	150.1	45 37.9	+60.0	150.6	44 45.5	+60.0	151.1	43 52.9	+60.0	151.6	43 00.0	+60.0	152.0	**43**
44	50 04.5	+59.8	148.3	49 13.3	+59.8	148.9	48 21.8	+59.9	149.5	47 30.0	+59.9	150.0	46 37.9	+59.9	150.5	45 45.5	+60.0	151.1	44 52.9	+60.0	151.5	44 00.0	+60.0	152.0	**44**
45	51 04.3	+59.7	148.1	50 13.1	+59.9	148.7	49 21.7	+59.9	149.4	48 29.9	+59.9	149.9	47 37.8	+60.0	150.5	46 45.5	+60.0	151.0	45 52.9	+60.0	151.5	45 00.0	+60.0	152.0	**45**
46	52 04.0	+59.7	148.0	51 13.0	+59.8	148.6	50 21.6	+59.8	149.3	49 29.8	+59.9	149.9	48 37.8	+59.9	150.4	47 45.5	+59.9	151.0	46 52.9	+60.0	151.5	46 00.0	+60.0	152.0	**46**
47	53 03.7	+59.8	147.8	52 12.8	+59.8	148.5	51 21.4	+59.9	149.2	50 29.7	+60.0	149.8	49 37.7	+60.0	150.4	48 45.4	+60.0	150.9	47 52.9	+59.9	151.5	47 00.0	+60.0	152.0	**47**
48	54 03.5	+59.7	147.6	53 12.6	+59.8	148.4	52 21.3	+59.9	149.0	51 29.7	+59.9	149.7	50 37.7	+60.0	150.3	49 45.4	+60.0	150.9	48 52.8	+60.0	151.5	48 00.0	+60.0	152.0	**48**
49	55 03.2	+59.7	147.5	54 12.4	+59.7	148.2	53 21.2	+59.8	148.9	52 29.6	+59.9	149.6	51 37.7	+59.9	150.3	50 45.4	+60.0	150.9	49 52.8	+60.0	151.4	49 00.0	+60.0	152.0	**49**
50	56 02.9	+59.6	147.3	55 12.1	+59.8	148.1	54 21.0	+59.9	148.8	53 29.5	+59.9	149.5	52 37.6	+60.0	150.2	51 45.4	+60.0	150.8	50 52.8	+60.0	151.4	50 00.0	+60.0	152.0	**50**
51	57 02.5	+59.7	147.1	56 11.9	+59.8	147.9	55 20.9	+59.8	148.7	54 29.4	+59.9	149.4	53 37.6	+59.9	150.1	52 45.4	+59.9	150.8	51 52.8	+60.0	151.4	51 00.0	+60.0	152.0	**51**
52	58 02.2	+59.6	146.9	57 11.7	+59.7	147.8	56 20.7	+59.8	148.6	55 29.3	+59.9	149.3	54 37.5	+59.9	150.0	53 45.3	+60.0	150.7	52 52.8	+60.0	151.4	52 00.0	+60.0	152.0	**52**
53	59 01.8	+59.6	146.7	58 11.4	+59.8	147.6	57 20.5	+59.9	148.4	56 29.2	+59.9	149.2	55 37.4	+60.0	150.0	54 45.3	+60.0	150.7	53 52.8	+60.0	151.4	53 00.0	+60.0	152.0	**53**
54	60 01.4	+59.6	146.5	59 11.2	+59.7	147.4	58 20.4	+59.8	148.3	57 29.1	+59.9	149.1	56 37.4	+59.9	149.9	55 45.3	+60.0	150.6	54 52.8	+60.0	151.3	54 00.0	+60.0	152.0	**54**
55	61 01.0	+59.6	146.2	60 10.9	+59.7	147.2	59 20.2	+59.8	148.1	58 29.0	+59.9	149.0	57 37.3	+60.0	149.8	56 45.3	+59.9	150.6	55 52.8	+60.0	151.3	55 00.0	+60.0	152.0	**55**
56	62 00.6	+59.5	146.0	61 10.6	+59.6	147.0	60 20.0	+59.8	148.0	59 28.9	+59.8	148.9	58 37.3	+59.9	149.7	57 45.2	+60.0	150.5	56 52.8	+60.0	151.3	56 00.0	+60.0	152.0	**56**
57	63 00.1	+59.5	145.7	62 10.2	+59.7	146.8	61 19.8	+59.7	147.8	60 28.7	+59.9	148.7	59 37.2	+59.9	149.6	58 45.2	+60.0	150.5	57 52.8	+60.0	151.3	57 00.0	+60.0	152.0	**57**
58	63 59.6	+59.5	145.4	63 09.9	+59.6	146.6	62 19.5	+59.8	147.6	61 28.6	+59.8	148.6	60 37.1	+59.9	149.5	59 45.2	+59.9	150.4	58 52.8	+60.0	151.2	58 00.0	+60.0	152.0	**58**
59	64 59.1	+59.4	145.1	64 09.5	+59.6	146.3	63 19.3	+59.7	147.4	62 28.4	+59.9	148.5	61 37.0	+60.0	149.4	60 45.1	+60.0	150.3	59 52.8	+60.0	151.2	59 00.0	+60.0	152.0	**59**
60	65 58.5	+59.4	144.8	65 09.1	+59.6	146.0	64 19.0	+59.8	147.2	63 28.3	+59.8	148.3	62 37.0	+59.9	149.3	61 45.1	+60.0	150.3	60 52.8	+60.0	151.2	60 00.0	+60.0	152.0	**60**
61	66 57.9	+59.3	144.4	66 08.7	+59.5	145.8	65 18.8	+59.7	147.0	64 28.1	+59.8	148.1	63 36.9	+59.9	149.2	62 45.1	+59.9	150.2	61 52.8	+60.0	151.1	61 00.0	+60.0	152.0	**61**
62	67 57.2	+59.3	144.0	67 08.2	+59.5	145.4	66 18.5	+59.6	146.7	65 27.9	+59.8	147.9	64 36.8	+59.9	149.1	63 45.0	+60.0	150.1	62 52.8	+59.9	151.1	62 00.0	+60.0	152.0	**62**
63	68 56.5	+59.2	143.6	68 07.7	+59.5	145.1	67 18.1	+59.7	146.5	66 27.7	+59.8	147.7	65 36.7	+59.9	148.9	64 45.0	+59.9	150.0	63 52.7	+60.0	151.0	63 00.0	+60.0	152.0	**63**
64	69 55.7	+59.1	143.2	69 07.2	+59.4	144.7	68 17.8	+59.6	146.2	67 27.5	+59.8	147.5	66 36.6	+59.8	148.8	65 44.9	+60.0	149.9	64 52.7	+60.0	151.0	64 00.0	+60.0	152.0	**64**
65	70 54.8	+59.1	142.6	70 06.6	+59.3	144.3	69 17.4	+59.6	145.9	68 27.3	+59.8	147.3	67 36.4	+59.9	148.6	66 44.9	+59.9	149.8	65 52.7	+60.0	151.0	65 00.0	+60.0	152.0	**65**
66	71 53.9	+58.9	142.1	71 05.9	+59.3	143.9	70 17.0	+59.5	145.5	69 27.1	+59.7	147.0	68 36.3	+59.9	148.4	67 44.8	+60.0	149.7	66 52.7	+60.0	150.9	66 00.0	+60.0	152.0	**66**
67	72 52.8	+58.8	141.5	72 05.2	+59.2	143.4	71 16.5	+59.5	145.2	70 26.8	+59.7	146.8	69 36.2	+59.8	148.2	68 44.8	+59.9	149.6	67 52.7	+60.0	150.8	67 00.0	+60.0	152.0	**67**
68	73 51.6	+58.6	140.8	73 04.4	+59.1	142.8	72 16.0	+59.4	144.7	71 26.5	+59.6	146.5	70 36.0	+59.8	148.0	69 44.7	+59.9	149.5	68 52.7	+60.0	150.8	68 00.0	+60.0	152.0	**68**
69	74 50.2	+58.4	140.0	74 03.5	+59.0	142.2	73 15.4	+59.4	144.3	72 26.1	+59.7	146.1	71 35.8	+59.8	147.8	70 44.6	+60.0	149.3	69 52.7	+59.9	150.7	69 00.0	+60.0	152.0	**69**
70	75 48.6	+58.3	139.1	75 02.5	+58.8	141.5	74 14.8	+59.2	143.7	73 25.8	+59.5	145.7	72 35.6	+59.8	147.5	71 44.6	+59.9	149.2	70 52.6	+60.0	150.6	70 00.0	+60.0	152.0	**70**
71	76 46.9	+57.9	138.1	76 01.3	+58.6	140.7	75 14.0	+59.2	143.2	74 25.3	+59.6	145.3	73 35.4	+59.8	147.2	72 44.5	+59.9	149.0	71 52.6	+60.0	150.6	71 00.0	+60.0	152.0	**71**
72	77 44.8	+57.6	136.9	76 59.9	+58.5	139.8	76 13.2	+59.0	142.5	75 24.9	+59.4	144.8	74 35.2	+59.7	146.9	73 44.4	+59.9	148.8	72 52.6	+60.0	150.5	72 00.0	+60.0	152.0	**72**
73	78 42.4	+57.1	135.5	77 58.4	+58.2	138.8	77 12.2	+58.9	141.7	76 24.3	+59.4	144.3	75 34.9	+59.7	146.5	74 44.3	+59.8	148.6	73 52.6	+60.0	150.4	73 00.0	+60.0	152.0	**73**
74	79 39.5	+56.6	133.9	78 56.6	+57.8	137.6	78 11.1	+58.7	140.8	77 23.7	+59.3	143.6	76 34.6	+59.6	146.1	75 44.1	+59.9	148.3	74 52.6	+59.9	150.3	74 00.0	+60.0	152.0	**74**
75	80 36.1	+55.7	131.9	79 54.4	+57.3	136.1	79 09.8	+58.4	139.7	78 23.0	+59.1	142.9	77 34.2	+59.6	145.6	76 44.0	+59.8	148.0	75 52.5	+60.0	150.1	75 00.0	+60.0	152.0	**75**
76	81 31.8	+54.7	129.5	80 51.7	+56.7	134.3	80 08.2	+58.1	138.5	79 22.1	+58.9	142.0	78 33.8	+59.5	145.1	77 43.8	+59.8	147.7	76 52.5	+59.9	150.0	76 00.0	+60.0	152.0	**76**
77	82 26.5	+53.2	126.6	81 48.4	+55.9	132.2	81 06.3	+57.6	136.9	80 21.0	+58.7	140.9	79 33.3	+59.4	144.4	78 43.6	+59.8	147.3	77 52.4	+60.0	149.8	77 00.0	+60.0	152.0	**77**
78	83 19.7	*+51.0* •	122.8	82 44.3	+54.6	129.5	82 03.9	+56.9	135.0	81 19.7	+58.4	139.7	80 32.7	+59.2	143.5	79 43.4	+59.7	146.8	78 52.4	+59.9	149.6	78 00.0	+60.0	152.0	**78**
79	84 10.7	*+47.6* •	118.0	83 38.9	*+52.7* •	125.9	83 00.8	+56.0	132.6	82 18.1	+57.9	138.0	81 31.9	+59.1	142.5	80 43.1	+59.7	146.3	79 52.3	+60.0	149.4	79 00.0	+60.0	152.0	**79**
80	84 58.3	*+42.5* •	111.5	84 31.6	*+49.7* •	121.3	83 56.8	*+54.4* •	129.4	83 16.0	+57.2	135.9	82 31.0	+58.7	141.2	81 42.8	+59.5	145.6	80 52.3	+59.9	149.1	80 00.0	+60.0	152.0	**80**
81	85 40.8	*+34.4* •	102.8	85 21.3	*+44.9* •	114.9	84 51.2	*+51.9* •	125.0	84 13.2	+56.1	133.2	83 29.7	+58.4	139.6	82 42.3	+59.5	144.7	81 52.2	+59.9	148.7	81 00.0	+60.0	152.0	**81**
82	86 15.2	*+22.1* •	91.1	86 06.2	*+36.7* •	106.0	85 43.1	*+47.6* •	118.9	85 09.3	*+54.2* •	129.3	84 28.1	+57.6	137.3	83 41.8	+59.2	143.5	82 52.1	+59.8	148.2	82 00.0	+60.0	152.0	**82**
83	86 37.3	*+5.6* •	76.1	86 42.9	*+23.2* •	93.3	86 30.7	*+39.6* •	109.9	86 03.5	*+50.5* •	123.7	85 25.7	*+56.3* •	134.1	84 41.0	+58.8	141.9	83 51.9	+59.8	147.6	83 00.0	+60.0	152.0	**83**
84	86 42.9	*−12.2* •	58.9	87 06.1	*+4.2* •	76.1	87 10.3	*+24.7* •	96.1	86 54.0	*+43.1* •	114.8	86 22.0	*+53.6* •	129.3	85 39.8	+58.2	139.5	84 51.7	+59.7	146.8	84 00.0	+60.0	152.0	**84**
85	86 30.7	*−27.2* •	42.3	87 10.3	*−16.3* •	56.0	87 35.0	*+2.1* •	76.1	87 37.1	*+26.9* •	100.1	87 15.6	*+47.3* •	121.1	86 38.0	*+56.6* •	135.8	85 51.4	+59.5	145.5	85 00.0	+60.0	152.0	**85**
86	86 03.5	*−37.8* •	28.5	86 54.0	*−32.0* •	37.3	87 37.1	*−21.5* •	52.0	88 04.0	*−1.1* •	76.0	88 02.9	*+30.0* •	105.9	87 34.6	*+52.4* •	129.2	86 50.9	+59.0	143.4	86 00.0	+60.0	152.0	**86**
87	85 25.7	*−44.7* •	18.0	86 22.0	*−42.2* •	22.8	87 15.6	*−37.6* •	30.9	88 02.9	*−28.3* •	46.2	88 32.9	*−5.9* •	76.0	88 27.0	*+34.9* •	114.8	87 49.9	*+57.4* •	139.5	87 00.0	+60.0	152.0	**87**
88	84 41.0	*−49.1* •	10.2	85 39.8	*−48.1* •	12.5	86 38.0	*−46.6* •	16.2	87 34.6	*−43.7* •	22.8	88 27.0	*−37.1* •	37.3	89 01.9	*−14.6* •	76.0	88 47.3	*+43.7* •	129.2	88 00.0	+60.0	152.0	**88**
89	83 51.9	*−51.9* •	4.4	84 51.7	*−51.7* •	5.2	85 51.4	*−51.4* •	6.5	86 50.9	*−50.9* •	8.6	87 49.9	*−49.9* •	12.5	88 47.3	*−47.3* •	22.8	89 31.0	*−31.0* •	76.0	89 00.0	+60.0	152.0	**89**
90	83 00.0	−53.8	0.0	84 00.0	−53.9	0.0	85 00.0	*−54.1* •	0.0	86 00.0	*−54.3* •	0.0	87 00.0	*−54.7* •	0.0	88 00.0	*−55.3* •	0.0	89 00.0	*−56.4* •	0.0	90 00.0	−60.0	76.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 28°, 332°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 10.6	−59.9	151.8	5 17.7	−59.9	151.9	4 24.8	−59.9	151.9	3 31.9	−60.0	151.9	2 38.9	−60.0	152.0	1 45.9	−59.9	152.0	0 53.0	−60.0	152.0	0 00.0	+60.0	28.0	**0**
1	5 10.7	−59.9	151.9	4 17.8	−59.9	151.9	3 24.9	−60.0	152.0	2 31.9	−60.0	152.0	1 38.9	−59.9	152.0	0 46.0	−60.0	152.0	0 07.0	+60.0	28.0	1 00.0	+60.0	28.0	**1**
2	4 10.8	−59.9	151.9	3 17.9	−59.9	152.0	2 24.9	−59.9	152.0	1 31.9	−59.9	152.0	0 39.0	−60.0	152.0	0 14.0	+60.0	28.0	1 07.0	+60.0	28.0	2 00.0	+60.0	28.0	**2**
3	3 10.9	−59.9	152.0	2 18.0	−60.0	152.0	1 25.0	−60.0	152.0	0 32.0	−60.0	152.0	0 21.0	+60.0	28.0	1 14.0	+60.0	28.0	2 07.0	+60.0	28.0	3 00.0	+60.0	28.0	**3**
4	2 11.0	−59.9	152.1	1 18.0	−59.9	152.1	0 25.0	−59.9	152.1	0 28.0	+60.0	27.9	1 21.0	+60.0	27.9	2 14.0	+60.0	27.9	3 07.0	+60.0	28.0	4 00.0	+60.0	28.0	**4**
5	1 11.1	−59.9	152.1	0 18.1	−59.9	152.1	0 34.9	+60.0	27.9	1 28.0	+59.9	27.9	2 21.0	+60.0	27.9	3 14.0	+60.0	27.9	4 07.0	+60.0	28.0	5 00.0	+60.0	28.0	**5**
6	0 11.2	−59.9	152.2	0 41.8	+60.0	27.8	1 34.9	+59.9	27.8	2 27.9	+60.0	27.9	3 21.0	+60.0	27.9	4 14.0	+60.0	27.9	5 07.0	+60.0	28.0	6 00.0	+60.0	28.0	**6**
7	0 48.7	+59.9	27.8	1 41.8	+59.9	27.8	2 34.8	+60.0	27.8	3 27.9	+60.0	27.8	4 21.0	+59.9	27.9	5 14.0	+60.0	27.9	6 07.0	+60.0	27.9	7 00.0	+60.0	28.0	**7**
8	1 48.6	+59.9	27.7	2 41.7	+59.9	27.7	3 34.8	+59.9	27.8	4 27.9	+59.9	27.8	5 20.9	+60.0	27.8	6 14.0	+60.0	27.9	7 07.0	+60.0	27.9	8 00.0	+60.0	28.0	**8**
9	2 48.5	+59.9	27.7	3 41.6	+59.9	27.7	4 34.7	+60.0	27.7	5 27.8	+60.0	27.8	6 20.9	+60.0	27.8	7 14.0	+60.0	27.9	8 07.0	+60.0	27.9	9 00.0	+60.0	28.0	**9**
10	3 48.4	+59.9	27.6	4 41.5	+60.0	27.6	5 34.7	+59.9	27.7	6 27.8	+60.0	27.7	7 20.9	+60.0	27.8	8 14.0	+60.0	27.8	9 07.0	+60.0	27.9	10 00.0	+60.0	28.0	**10**
11	4 48.3	+59.9	27.5	5 41.5	+59.9	27.6	6 34.6	+60.0	27.6	7 27.8	+59.9	27.7	8 20.9	+60.0	27.8	9 14.0	+60.0	27.8	10 07.0	+60.0	27.9	11 00.0	+60.0	28.0	**11**
12	5 48.2	+59.9	27.5	6 41.4	+59.9	27.5	7 34.6	+59.9	27.6	8 27.7	+60.0	27.7	9 20.9	+59.9	27.7	10 14.0	+59.9	27.8	11 07.0	+60.0	27.9	12 00.0	+60.0	28.0	**12**
13	6 48.1	+59.9	27.4	7 41.3	+59.9	27.5	8 34.5	+60.0	27.6	9 27.7	+60.0	27.6	10 20.8	+60.0	27.7	11 13.9	+60.0	27.8	12 07.0	+60.0	27.9	13 00.0	+60.0	28.0	**13**
14	7 48.0	+59.9	27.4	8 41.2	+60.0	27.4	9 34.5	+59.9	27.5	10 27.7	+59.9	27.6	11 20.8	+60.0	27.7	12 13.9	+60.0	27.8	13 07.0	+60.0	27.9	14 00.0	+60.0	28.0	**14**
15	8 47.9	+59.9	27.3	9 41.2	+59.9	27.4	10 34.4	+60.0	27.5	11 27.6	+60.0	27.6	12 20.8	+60.0	27.7	13 13.9	+60.0	27.8	14 07.0	+60.0	27.9	15 00.0	+60.0	28.0	**15**
16	9 47.8	+59.9	27.3	10 41.1	+59.9	27.3	11 34.4	+59.9	27.4	12 27.6	+60.0	27.5	13 20.8	+60.0	27.6	14 13.9	+60.0	27.7	15 07.0	+60.0	27.9	16 00.0	+60.0	28.0	**16**
17	10 47.7	+59.9	27.2	11 41.0	+59.9	27.3	12 34.3	+60.0	27.4	13 27.6	+59.9	27.5	14 20.8	+60.0	27.6	15 13.9	+60.0	27.7	16 07.0	+60.0	27.9	17 00.0	+60.0	28.0	**17**
18	11 47.6	+59.9	27.1	12 40.9	+60.0	27.2	13 34.3	+59.9	27.3	14 27.5	+60.0	27.5	15 20.8	+59.9	27.6	16 13.9	+60.0	27.7	17 07.0	+60.0	27.9	18 00.0	+60.0	28.0	**18**
19	12 47.5	+59.9	27.1	13 40.9	+59.9	27.2	14 34.2	+60.0	27.3	15 27.5	+60.0	27.4	16 20.7	+60.0	27.6	17 13.9	+60.0	27.7	18 07.0	+60.0	27.8	19 00.0	+60.0	28.0	**19**
20	13 47.4	+59.9	27.0	14 40.8	+59.9	27.1	15 34.2	+59.9	27.3	16 27.5	+59.9	27.4	17 20.7	+60.0	27.5	18 13.9	+60.0	27.7	19 07.0	+60.0	27.8	20 00.0	+60.0	28.0	**20**
21	14 47.3	+59.9	27.0	15 40.7	+59.9	27.1	16 34.1	+60.0	27.2	17 27.4	+60.0	27.4	18 20.7	+60.0	27.5	19 13.9	+60.0	27.7	20 07.0	+60.0	27.8	21 00.0	+60.0	28.0	**21**
22	15 47.2	+59.9	26.9	16 40.6	+60.0	27.0	17 34.1	+59.9	27.2	18 27.4	+60.0	27.3	19 20.7	+60.0	27.5	20 13.9	+60.0	27.6	21 07.0	+60.0	27.8	22 00.0	+60.0	28.0	**22**
23	16 47.1	+59.8	26.8	17 40.6	+59.9	27.0	18 34.0	+59.9	27.1	19 27.4	+59.9	27.3	20 20.7	+59.9	27.4	21 13.9	+59.9	27.6	22 07.0	+60.0	27.8	23 00.0	+60.0	28.0	**23**
24	17 46.9	+59.9	26.8	18 40.5	+59.9	26.9	19 33.9	+60.0	27.1	20 27.3	+60.0	27.2	21 20.6	+60.0	27.4	22 13.8	+60.0	27.6	23 07.0	+60.0	27.8	24 00.0	+60.0	28.0	**24**
25	18 46.8	+59.9	26.7	19 40.4	+59.9	26.9	20 33.9	+59.9	27.0	21 27.3	+60.0	27.2	22 20.6	+60.0	27.4	23 13.8	+60.0	27.6	24 07.0	+60.0	27.8	25 00.0	+60.0	28.0	**25**
26	19 46.7	+59.9	26.6	20 40.3	+59.9	26.8	21 33.8	+60.0	27.0	22 27.3	+59.9	27.2	23 20.6	+60.0	27.4	24 13.8	+60.0	27.6	25 07.0	+60.0	27.8	26 00.0	+60.0	28.0	**26**
27	20 46.6	+59.9	26.6	21 40.2	+60.0	26.8	22 33.8	+59.9	26.9	23 27.2	+60.0	27.1	24 20.6	+59.9	27.3	25 13.8	+60.0	27.5	26 07.0	+60.0	27.8	27 00.0	+60.0	28.0	**27**
28	21 46.5	+59.9	26.5	22 40.2	+59.9	26.7	23 33.7	+60.0	26.9	24 27.2	+59.9	27.1	25 20.5	+60.0	27.3	26 13.8	+60.0	27.5	27 07.0	+60.0	27.8	28 00.0	+60.0	28.0	**28**
29	22 46.4	+59.9	26.4	23 40.1	+59.9	26.6	24 33.7	+59.9	26.8	25 27.1	+60.0	27.0	26 20.5	+60.0	27.3	27 13.8	+60.0	27.5	28 07.0	+60.0	27.7	29 00.0	+60.0	28.0	**29**
30	23 46.3	+59.9	26.4	24 40.0	+59.9	26.6	25 33.6	+59.9	26.8	26 27.1	+60.0	27.0	27 20.5	+60.0	27.2	28 13.8	+60.0	27.5	29 07.0	+60.0	27.7	30 00.0	+60.0	28.0	**30**
31	24 46.2	+59.8	26.3	25 39.9	+59.9	26.5	26 33.5	+60.0	26.7	27 27.1	+59.9	27.0	28 20.5	+60.0	27.2	29 13.8	+60.0	27.5	30 07.0	+60.0	27.7	31 00.0	+60.0	28.0	**31**
32	25 46.0	+59.9	26.2	26 39.8	+59.9	26.5	27 33.5	+59.9	26.7	28 27.0	+60.0	26.9	29 20.5	+59.9	27.2	30 13.8	+60.0	27.4	31 07.0	+59.9	27.7	32 00.0	+60.0	28.0	**32**
33	26 45.9	+59.9	26.2	27 39.7	+59.9	26.4	28 33.4	+59.9	26.6	29 27.0	+59.9	26.9	30 20.4	+60.0	27.1	31 13.8	+59.9	27.4	32 06.9	+60.0	27.7	33 00.0	+60.0	28.0	**33**
34	27 45.8	+59.9	26.1	28 39.6	+59.9	26.3	29 33.3	+60.0	26.6	30 26.9	+60.0	26.8	31 20.4	+60.0	27.1	32 13.7	+60.0	27.4	33 06.9	+60.0	27.7	34 00.0	+60.0	28.0	**34**
35	28 45.7	+59.8	26.0	29 39.5	+59.9	26.3	30 33.3	+59.9	26.5	31 26.9	+59.9	26.8	32 20.4	+60.0	27.1	33 13.7	+60.0	27.4	34 06.9	+60.0	27.7	35 00.0	+60.0	28.0	**35**
36	29 45.5	+59.9	25.9	30 39.4	+59.9	26.2	31 33.2	+59.9	26.5	32 26.8	+60.0	26.7	33 20.4	+59.9	27.0	34 13.7	+60.0	27.3	35 06.9	+60.0	27.7	36 00.0	+60.0	28.0	**36**
37	30 45.4	+59.9	25.9	31 39.3	+59.9	26.1	32 33.1	+60.0	26.4	33 26.8	+60.0	26.7	34 20.3	+60.0	27.0	35 13.7	+60.0	27.3	36 06.9	+60.0	27.7	37 00.0	+60.0	28.0	**37**
38	31 45.3	+59.8	25.8	32 39.2	+59.9	26.1	33 33.1	+59.9	26.4	34 26.8	+59.9	26.7	35 20.3	+60.0	27.0	36 13.7	+60.0	27.3	37 06.9	+60.0	27.6	38 00.0	+60.0	28.0	**38**
39	32 45.1	+59.9	25.7	33 39.1	+59.9	26.0	34 33.0	+59.9	26.3	35 26.7	+60.0	26.6	36 20.3	+59.9	26.9	37 13.7	+60.0	27.3	38 06.9	+60.0	27.6	39 00.0	+60.0	28.0	**39**
40	33 45.0	+59.8	25.6	34 39.0	+59.9	25.9	35 32.9	+59.9	26.2	36 26.7	+59.9	26.6	37 20.2	+60.0	26.9	38 13.7	+60.0	27.2	39 06.9	+60.0	27.6	40 00.0	+60.0	28.0	**40**
41	34 44.8	+59.9	25.5	35 38.9	+59.9	25.9	36 32.8	+60.0	26.2	37 26.6	+60.0	26.5	38 20.2	+60.0	26.9	39 13.7	+59.9	27.2	40 06.9	+60.0	27.6	41 00.0	+60.0	28.0	**41**
42	35 44.7	+59.8	25.5	36 38.8	+59.9	25.8	37 32.8	+59.9	26.1	38 26.6	+59.9	26.5	39 20.2	+60.0	26.8	40 13.6	+60.0	27.2	41 06.9	+60.0	27.6	42 00.0	+60.0	28.0	**42**
43	36 44.5	+59.9	25.4	37 38.7	+59.9	25.7	38 32.7	+59.9	26.0	39 26.5	+59.9	26.4	40 20.2	+59.9	26.8	41 13.6	+60.0	27.2	42 06.9	+60.0	27.6	43 00.0	+60.0	28.0	**43**
44	37 44.4	+59.8	25.3	38 38.6	+59.8	25.6	39 32.6	+59.9	26.0	40 26.4	+60.0	26.3	41 20.1	+60.0	26.7	42 13.6	+60.0	27.1	43 06.9	+60.0	27.6	44 00.0	+60.0	28.0	**44**
45	38 44.2	+59.9	25.2	39 38.4	+59.9	25.5	40 32.5	+59.9	25.9	41 26.4	+59.9	26.3	42 20.1	+60.0	26.7	43 13.6	+60.0	27.1	44 06.9	+60.0	27.5	45 00.0	+60.0	28.0	**45**
46	39 44.1	+59.8	25.1	40 38.3	+59.9	25.5	41 32.4	+59.9	25.8	42 26.3	+60.0	26.2	43 20.1	+59.9	26.6	44 13.6	+60.0	27.1	45 06.9	+60.0	27.5	46 00.0	+60.0	28.0	**46**
47	40 43.9	+59.8	25.0	41 38.2	+59.9	25.4	42 32.3	+59.9	25.8	43 26.3	+59.9	26.2	44 20.0	+60.0	26.6	45 13.6	+60.0	27.0	46 06.9	+60.0	27.5	47 00.0	+60.0	28.0	**47**
48	41 43.7	+59.8	24.9	42 38.1	+59.8	25.3	43 32.2	+59.9	25.7	44 26.2	+59.9	26.1	45 20.0	+59.9	26.5	46 13.6	+59.9	27.0	47 06.9	+60.0	27.5	48 00.0	+60.0	28.0	**48**
49	42 43.5	+59.9	24.8	43 37.9	+59.9	25.2	44 32.1	+59.9	25.6	45 26.1	+60.0	26.0	46 19.9	+60.0	26.5	47 13.5	+60.0	27.0	48 06.9	+60.0	27.5	49 00.0	+60.0	28.0	**49**
50	43 43.4	+59.8	24.7	44 37.8	+59.8	25.1	45 32.0	+59.9	25.5	46 26.1	+59.9	26.0	47 19.9	+60.0	26.4	48 13.5	+60.0	26.9	49 06.9	+60.0	27.5	50 00.0	+60.0	28.0	**50**
51	44 43.2	+59.8	24.6	45 37.6	+59.9	25.0	46 31.9	+59.9	25.4	47 26.0	+59.9	25.9	48 19.9	+59.9	26.4	49 13.5	+60.0	26.9	50 06.9	+60.0	27.4	51 00.0	+60.0	28.0	**51**
52	45 43.0	+59.8	24.5	46 37.5	+59.8	24.9	47 31.8	+59.9	25.3	48 25.9	+60.0	25.8	49 19.8	+60.0	26.3	50 13.5	+60.0	26.9	51 06.9	+60.0	27.4	52 00.0	+60.0	28.0	**52**
53	46 42.8	+59.7	24.3	47 37.3	+59.9	24.8	48 31.7	+59.9	25.3	49 25.9	+59.9	25.7	50 19.8	+59.9	26.3	51 13.5	+59.9	26.8	52 06.9	+60.0	27.4	53 00.0	+60.0	28.0	**53**
54	47 42.5	+59.8	24.2	48 37.2	+59.8	24.7	49 31.6	+59.9	25.2	50 25.8	+59.9	25.7	51 19.7	+60.0	26.2	52 13.4	+60.0	26.8	53 06.9	+60.0	27.4	54 00.0	+60.0	28.0	**54**
55	48 42.3	+59.8	24.1	49 37.0	+59.8	24.6	50 31.5	+59.8	25.1	51 25.7	+59.9	25.6	52 19.7	+59.9	26.1	53 13.4	+60.0	26.7	54 06.9	+60.0	27.3	55 00.0	+60.0	28.0	**55**
56	49 42.1	+59.8	23.9	50 36.8	+59.8	24.4	51 31.3	+59.9	25.0	52 25.6	+59.9	25.5	53 19.6	+60.0	26.1	54 13.4	+60.0	26.7	55 06.9	+60.0	27.3	56 00.0	+60.0	28.0	**56**
57	50 41.9	+59.7	23.8	51 36.6	+59.9	24.3	52 31.2	+59.9	24.8	53 25.5	+59.9	25.4	54 19.6	+59.9	26.0	55 13.4	+59.9	26.6	56 06.9	+59.9	27.3	57 00.0	+60.0	28.0	**57**
58	51 41.6	+59.7	23.7	52 36.5	+59.8	24.2	53 31.1	+59.8	24.7	54 25.4	+59.9	25.3	55 19.5	+60.0	25.9	56 13.3	+60.0	26.6	57 06.8	+60.0	27.3	58 00.0	+60.0	28.0	**58**
59	52 41.3	+59.8	23.5	53 36.3	+59.7	24.0	54 30.9	+59.9	24.6	55 25.3	+59.9	25.2	56 19.5	+59.9	25.9	57 13.3	+60.0	26.5	58 06.8	+60.0	27.2	59 00.0	+60.0	28.0	**59**
60	53 41.1	+59.7	23.4	54 36.0	+59.8	23.9	55 30.8	+59.8	24.5	56 25.2	+59.9	25.1	57 19.4	+60.0	25.8	58 13.3	+60.0	26.5	59 06.8	+60.0	27.2	60 00.0	+60.0	28.0	**60**
61	54 40.8	+59.7	23.2	55 35.8	+59.8	23.8	56 30.6	+59.8	24.4	57 25.1	+59.9	25.0	58 19.4	+59.9	25.7	59 13.3	+59.9	26.4	60 06.8	+60.0	27.2	61 00.0	+60.0	28.0	**61**
62	55 40.5	+59.7	23.0	56 35.6	+59.7	23.6	57 30.4	+59.9	24.2	58 25.0	+59.9	24.9	59 19.3	+59.9	25.6	60 13.2	+60.0	26.3	61 06.8	+60.0	27.1	62 00.0	+60.0	28.0	**62**
63	56 40.2	+59.6	22.8	57 35.3	+59.8	23.4	58 30.3	+59.8	24.1	59 24.9	+59.9	24.8	60 19.2	+59.9	25.5	61 13.2	+60.0	26.3	62 06.8	+60.0	27.1	63 00.0	+60.0	28.0	**63**
64	57 39.8	+59.7	22.6	58 35.1	+59.7	23.3	59 30.1	+59.8	23.9	60 24.8	+59.8	24.6	61 19.1	+60.0	25.4	62 13.2	+59.9	26.2	63 06.8	+60.0	27.1	64 00.0	+60.0	28.0	**64**
65	58 39.5	+59.6	22.4	59 34.8	+59.7	23.1	60 29.9	+59.8	23.8	61 24.6	+59.9	24.5	62 19.1	+59.9	25.3	63 13.1	+60.0	26.1	64 06.8	+60.0	27.0	65 00.0	+60.0	28.0	**65**
66	59 39.1	+59.6	22.2	60 34.5	+59.7	22.9	61 29.7	+59.7	23.6	62 24.5	+59.8	24.3	63 19.0	+59.9	25.2	64 13.1	+59.9	26.0	65 06.8	+60.0	27.0	66 00.0	+60.0	28.0	**66**
67	60 38.7	+59.6	22.0	61 34.2	+59.7	22.7	62 29.4	+59.8	23.4	63 24.3	+59.9	24.2	64 18.9	+59.9	25.0	65 13.0	+60.0	26.0	66 06.8	+59.9	26.9	67 00.0	+60.0	28.0	**67**
68	61 38.3	+59.5	21.7	62 33.9	+59.6	22.4	63 29.2	+59.7	23.2	64 24.2	+59.8	24.0	65 18.8	+59.9	24.9	66 13.0	+59.9	25.9	67 06.7	+60.0	26.9	68 00.0	+60.0	28.0	**68**
69	62 37.8	+59.5	21.5	63 33.5	+59.6	22.2	64 28.9	+59.7	23.0	65 24.0	+59.8	23.8	66 18.7	+59.9	24.8	67 12.9	+60.0	25.7	68 06.7	+60.0	26.8	69 00.0	+60.0	28.0	**69**
70	63 37.3	+59.5	21.2	64 33.1	+59.6	21.9	65 28.6	+59.7	22.8	66 23.8	+59.8	23.6	67 18.6	+59.8	24.6	68 12.9	+59.9	25.6	69 06.7	+60.0	26.8	70 00.0	+60.0	28.0	**70**
71	64 36.8	+59.5	20.9	65 32.7	+59.6	21.7	66 28.3	+59.7	22.5	67 23.6	+59.8	23.4	68 18.4	+59.9	24.4	69 12.8	+60.0	25.5	70 06.7	+60.0	26.7	71 00.0	+60.0	28.0	**71**
72	65 36.3	+59.4	20.6	66 32.3	+59.5	21.4	67 28.0	+59.6	22.2	68 23.4	+59.7	23.2	69 18.3	+59.8	24.2	70 12.8	+59.9	25.4	71 06.7	+60.0	26.6	72 00.0	+60.0	28.0	**72**
73	66 35.7	+59.3	20.2	67 31.8	+59.5	21.0	68 27.6	+59.7	22.0	69 23.1	+59.7	22.9	70 18.1	+59.9	24.0	71 12.7	+59.9	25.2	72 06.7	+59.9	26.5	73 00.0	+60.0	28.0	**73**
74	67 35.0	+59.3	19.8	68 31.3	+59.4	20.7	69 27.3	+59.5	21.6	70 22.8	+59.7	22.7	71 18.0	+59.8	23.8	72 12.6	+59.9	25.1	73 06.6	+60.0	26.4	74 00.0	+60.0	28.0	**74**
75	68 34.3	+59.2	19.4	69 30.7	+59.4	20.3	70 26.8	+59.6	21.3	71 22.5	+59.7	22.4	72 17.8	+59.8	23.6	73 12.5	+59.9	24.9	74 06.6	+60.0	26.3	75 00.0	+60.0	28.0	**75**
76	69 33.5	+59.2	19.0	70 30.1	+59.3	19.9	71 26.4	+59.4	20.9	72 22.2	+59.6	22.0	73 17.6	+59.7	23.3	74 12.4	+59.9	24.7	75 06.6	+60.0	26.2	76 00.0	+60.0	28.0	**76**
77	70 32.7	+59.0	18.5	71 29.4	+59.3	19.4	72 25.8	+59.4	20.5	73 21.8	+59.6	21.6	74 17.3	+59.8	23.0	75 12.3	+59.9	24.4	76 06.6	+59.9	26.1	77 00.0	+60.0	28.0	**77**
78	71 31.7	+59.0	17.9	72 28.7	+59.1	18.9	73 25.2	+59.4	20.0	74 21.4	+59.5	21.2	75 17.1	+59.7	22.6	76 12.2	+59.8	24.2	77 06.5	+60.0	25.9	78 00.0	+60.0	28.0	**78**
79	72 30.7	+58.8	17.3	73 27.8	+59.1	18.3	74 24.6	+59.2	19.5	75 20.9	+59.5	20.7	76 16.8	+59.6	22.2	77 12.0	+59.8	23.8	78 06.5	+59.9	25.8	79 00.0	+60.0	28.0	**79**
80	73 29.5	+58.7	16.7	74 26.9	+58.9	17.7	75 23.8	+59.2	18.9	76 20.4	+59.4	20.2	77 16.4	+59.6	21.7	78 11.8	+59.8	23.5	79 06.4	+60.0	25.6	80 00.0	+60.0	28.0	**80**
81	74 28.2	+58.6	15.9	75 25.8	+58.7	17.0	76 23.0	+59.0	18.2	77 19.8	+59.2	19.6	78 16.0	+59.5	21.2	79 11.6	+59.8	23.1	80 06.4	+59.9	25.3	81 00.0	+60.0	28.0	**81**
82	75 26.8	+58.3	15.1	76 24.5	+58.6	16.1	77 22.0	+58.9	17.4	78 19.0	+59.2	18.8	79 15.5	+59.5	20.5	80 11.4	+59.7	22.5	81 06.3	+59.9	25.0	82 00.0	+60.0	28.0	**82**
83	76 25.1	+58.0	14.1	77 23.1	+58.4	15.2	78 20.9	+58.6	16.5	79 18.2	+58.9	18.0	80 15.0	+59.3	19.7	81 11.1	+59.6	21.9	82 06.2	+59.9	24.6	83 00.0	+60.0	28.0	**83**
84	77 23.1	+57.8	13.0	78 21.5	+58.0	14.1	79 19.5	+58.4	15.4	80 17.1	+58.8	16.9	81 14.3	+59.1	18.8	82 10.7	+59.5	21.1	83 06.1	+59.8	24.1	84 00.0	+60.0	28.0	**84**
85	78 20.9	+57.3	11.7	79 19.5	+57.6	12.8	80 17.9	+58.0	14.1	81 15.9	+58.4	15.6	82 13.4	+58.8	17.6	83 10.2	+59.3	20.1	84 05.9	+59.8	23.4	85 00.0	+60.0	28.0	**85**
86	79 18.2	+56.8	10.2	80 17.1	+57.2	11.2	81 15.9	+57.5	12.5	82 14.3	+57.9	14.0	83 12.2	+58.5	16.1	84 09.5	+59.1	18.8	85 05.7	+59.6	22.5	86 00.0	+60.0	28.0	**86**
87	80 15.0	+56.1	8.3	81 14.3	+56.4	9.3	82 13.4	+56.8	10.5	83 12.2	+57.3	12.0	84 10.7	+57.9	14.0	85 08.6	+58.5	16.9	86 05.3	+59.4	21.1	87 00.0	+60.0	28.0	**87**
88	81 11.1	+55.1	6.1	82 10.7	+55.4	6.9	83 10.2	+55.7	7.9	84 09.5	+56.2	9.3	85 08.6	+56.7	11.2	86 07.1	+57.6	14.0	87 04.7	+58.9	18.8	88 00.0	+60.0	28.0	**88**
89	82 06.2	+53.8	3.4	83 06.1	+53.9	3.9	84 05.9	*+54.1* •	4.6	85 05.7	*+54.3* •	5.5	86 05.3	*+54.7* •	6.9	87 04.7	*+55.3* •	9.3	88 03.6	*+56.4* •	14.0	89 00.0	+60.0	28.0	**89**
90	83 00.0	*+51.9* •	0.0	84 00.0	*+51.7* •	0.0	85 00.0	*+51.4* •	0.0	86 00.0	*+50.9* •	0.0	87 00.0	*+49.9* •	0.0	88 00.0	*+47.3* •	0.0	89 00.0	*+31.0* •	0.0	90 00.0	−60.0	14.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 152°, 208°

29°, 331° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 07.1	+59.9	150.8	5 14.7	+59.9	150.9	4 22.3	+60.0	150.9	3 29.9	+59.9	150.9	2 37.4	+60.0	151.0	1 44.9	+60.0	151.0	0 52.5	+60.0	151.0	0 00.0	+60.0	151.0	**0**
1	7 07.0	+59.9	150.8	6 14.6	+60.0	150.8	5 22.3	+59.9	150.9	4 29.8	+60.0	150.9	3 37.4	+60.0	150.9	2 44.9	+60.0	151.0	1 52.5	+60.0	151.0	1 00.0	+60.0	151.0	**1**
2	8 06.9	+59.9	150.7	7 14.6	+59.9	150.8	6 22.2	+59.9	150.8	5 29.8	+60.0	150.9	4 37.4	+60.0	150.9	3 44.9	+60.0	151.0	2 52.5	+60.0	151.0	2 00.0	+60.0	151.0	**2**
3	9 06.8	+59.9	150.6	8 14.5	+59.9	150.7	7 22.1	+60.0	150.8	6 29.8	+59.9	150.8	5 37.4	+59.9	150.9	4 44.9	+60.0	150.9	3 52.5	+60.0	151.0	3 00.0	+60.0	151.0	**3**
4	10 06.7	+59.9	150.6	9 14.4	+59.9	150.7	8 22.1	+59.9	150.7	7 29.7	+60.0	150.8	6 37.3	+60.0	150.9	5 44.9	+60.0	150.9	4 52.5	+60.0	151.0	4 00.0	+60.0	151.0	**4**
5	11 06.6	+59.9	150.5	10 14.3	+60.0	150.6	9 22.0	+60.0	150.7	8 29.7	+60.0	150.8	7 37.3	+60.0	150.8	6 44.9	+60.0	150.9	5 52.5	+60.0	151.0	5 00.0	+60.0	151.0	**5**
6	12 06.5	+59.9	150.5	11 14.3	+59.9	150.6	10 22.0	+59.9	150.6	9 29.7	+59.9	150.7	8 37.3	+60.0	150.8	7 44.9	+60.0	150.9	6 52.5	+60.0	150.9	6 00.0	+60.0	151.0	**6**
7	13 06.4	+59.9	150.4	12 14.2	+59.9	150.5	11 21.9	+60.0	150.6	10 29.6	+60.0	150.7	9 37.3	+60.0	150.8	8 44.9	+60.0	150.9	7 52.5	+60.0	150.9	7 00.0	+60.0	151.0	**7**
8	14 06.3	+59.8	150.3	13 14.1	+59.9	150.4	12 21.9	+59.9	150.6	11 29.6	+60.0	150.7	10 37.3	+59.9	150.8	9 44.9	+60.0	150.8	8 52.5	+60.0	150.9	8 00.0	+60.0	151.0	**8**
9	15 06.1	+59.9	150.3	14 14.0	+59.9	150.4	13 21.8	+60.0	150.5	12 29.6	+59.9	150.6	11 37.2	+60.0	150.7	10 44.9	+60.0	150.8	9 52.5	+60.0	150.9	9 00.0	+60.0	151.0	**9**
10	16 06.0	+59.9	150.2	15 13.9	+59.9	150.3	14 21.8	+59.9	150.5	13 29.5	+60.0	150.6	12 37.2	+60.0	150.7	11 44.9	+60.0	150.8	10 52.5	+60.0	150.9	10 00.0	+60.0	151.0	**10**
11	17 05.9	+59.9	150.1	16 13.8	+60.0	150.3	15 21.7	+59.9	150.4	14 29.5	+59.9	150.6	13 37.2	+60.0	150.7	12 44.9	+59.9	150.8	11 52.5	+60.0	150.9	11 00.0	+60.0	151.0	**11**
12	18 05.8	+59.9	150.1	17 13.8	+59.9	150.2	16 21.6	+60.0	150.4	15 29.4	+60.0	150.5	14 37.2	+60.0	150.7	13 44.8	+60.0	150.8	12 52.5	+59.9	150.9	12 00.0	+60.0	151.0	**12**
13	19 05.7	+59.9	150.0	18 13.7	+59.9	150.2	17 21.6	+59.9	150.3	16 29.4	+60.0	150.5	15 37.2	+59.9	150.6	14 44.8	+60.0	150.8	13 52.4	+60.0	150.9	13 00.0	+60.0	151.0	**13**
14	20 05.6	+59.8	149.9	19 13.6	+59.9	150.1	18 21.5	+60.0	150.3	17 29.4	+59.9	150.4	16 37.1	+60.0	150.6	15 44.8	+60.0	150.7	14 52.4	+60.0	150.9	14 00.0	+60.0	151.0	**14**
15	21 05.4	+59.9	149.9	20 13.5	+59.9	150.1	19 21.5	+59.9	150.2	18 29.3	+60.0	150.4	17 37.1	+60.0	150.6	16 44.8	+60.0	150.7	15 52.4	+60.0	150.9	15 00.0	+60.0	151.0	**15**
16	22 05.3	+59.9	149.8	21 13.4	+59.9	150.0	20 21.4	+59.9	150.2	19 29.3	+60.0	150.4	18 37.1	+60.0	150.5	17 44.8	+60.0	150.7	16 52.4	+60.0	150.9	16 00.0	+60.0	151.0	**16**
17	23 05.2	+59.9	149.7	22 13.3	+59.9	149.9	21 21.3	+60.0	150.1	20 29.3	+59.9	150.3	19 37.1	+59.9	150.5	18 44.8	+60.0	150.7	17 52.4	+60.0	150.8	17 00.0	+60.0	151.0	**17**
18	24 05.1	+59.9	149.7	23 13.2	+59.9	149.9	22 21.3	+59.9	150.1	21 29.2	+60.0	150.3	20 37.0	+60.0	150.5	19 44.8	+60.0	150.7	18 52.4	+60.0	150.8	18 00.0	+60.0	151.0	**18**
19	25 05.0	+59.8	149.6	24 13.1	+60.0	149.8	23 21.2	+60.0	150.0	22 29.2	+59.9	150.3	21 37.0	+60.0	150.5	20 44.8	+60.0	150.6	19 52.4	+60.0	150.8	19 00.0	+60.0	151.0	**19**
20	26 04.8	+59.9	149.5	25 13.1	+59.9	149.8	24 21.2	+59.9	150.0	23 29.1	+60.0	150.2	22 37.0	+60.0	150.4	21 44.8	+60.0	150.6	20 52.4	+60.0	150.8	20 00.0	+60.0	151.0	**20**
21	27 04.7	+59.9	149.4	26 13.0	+59.9	149.7	25 21.1	+59.9	149.9	24 29.1	+60.0	150.2	23 37.0	+60.0	150.4	22 44.8	+59.9	150.6	21 52.4	+60.0	150.8	21 00.0	+60.0	151.0	**21**
22	28 04.6	+59.8	149.4	27 12.9	+59.9	149.6	26 21.0	+60.0	149.9	25 29.1	+59.9	150.1	24 37.0	+59.9	150.4	23 44.7	+60.0	150.6	22 52.4	+60.0	150.8	22 00.0	+60.0	151.0	**22**
23	29 04.4	+59.9	149.3	28 12.8	+59.9	149.6	27 21.0	+59.9	149.8	26 29.0	+60.0	150.1	25 36.9	+60.0	150.3	24 44.7	+60.0	150.6	23 52.4	+60.0	150.8	23 00.0	+60.0	151.0	**23**
24	30 04.3	+59.8	149.2	29 12.7	+59.9	149.5	28 20.9	+59.9	149.8	27 29.0	+59.9	150.1	26 36.9	+60.0	150.3	25 44.7	+60.0	150.5	24 52.4	+60.0	150.8	24 00.0	+60.0	151.0	**24**
25	31 04.1	+59.9	149.1	30 12.6	+59.9	149.4	29 20.8	+59.9	149.7	28 28.9	+60.0	150.0	27 36.9	+60.0	150.3	26 44.7	+60.0	150.5	25 52.4	+60.0	150.8	25 00.0	+60.0	151.0	**25**
26	32 04.0	+59.9	149.1	31 12.5	+59.8	149.4	30 20.7	+60.0	149.7	29 28.9	+59.9	150.0	28 36.9	+59.9	150.2	27 44.7	+60.0	150.5	26 52.4	+60.0	150.8	26 00.0	+60.0	151.0	**26**
27	33 03.9	+59.8	149.0	32 12.3	+59.9	149.3	31 20.7	+59.9	149.6	30 28.8	+60.0	149.9	29 36.8	+60.0	150.2	28 44.7	+60.0	150.5	27 52.4	+60.0	150.7	27 00.0	+60.0	151.0	**27**
28	34 03.7	+59.8	148.9	33 12.2	+59.9	149.2	32 20.6	+59.9	149.6	31 28.8	+59.9	149.9	30 36.8	+60.0	150.2	29 44.7	+60.0	150.5	28 52.4	+60.0	150.7	28 00.0	+60.0	151.0	**28**
29	35 03.5	+59.9	148.8	34 12.1	+59.9	149.2	33 20.5	+59.9	149.5	32 28.7	+60.0	149.8	31 36.8	+60.0	150.1	30 44.7	+60.0	150.4	29 52.4	+60.0	150.7	29 00.0	+60.0	151.0	**29**
30	36 03.4	+59.8	148.7	35 12.0	+59.9	149.1	34 20.4	+60.0	149.4	33 28.7	+59.9	149.8	32 36.8	+59.9	150.1	31 44.7	+59.9	150.4	30 52.4	+60.0	150.7	30 00.0	+60.0	151.0	**30**
31	37 03.2	+59.9	148.6	36 11.9	+59.9	149.0	35 20.4	+59.9	149.4	34 28.6	+60.0	149.7	33 36.7	+60.0	150.1	32 44.6	+60.0	150.4	31 52.4	+60.0	150.7	31 00.0	+60.0	151.0	**31**
32	38 03.1	+59.8	148.5	37 11.8	+59.9	148.9	36 20.3	+59.9	149.3	35 28.6	+59.9	149.7	34 36.7	+60.0	150.0	33 44.6	+60.0	150.4	32 52.4	+60.0	150.7	32 00.0	+60.0	151.0	**32**
33	39 02.9	+59.8	148.4	38 11.7	+59.8	148.8	37 20.2	+59.9	149.2	36 28.5	+60.0	149.6	35 36.7	+59.9	150.0	34 44.6	+60.0	150.3	33 52.4	+60.0	150.7	33 00.0	+60.0	151.0	**33**
34	40 02.7	+59.8	148.3	39 11.5	+59.9	148.8	38 20.1	+59.9	149.2	37 28.5	+59.9	149.6	36 36.6	+60.0	150.0	35 44.6	+60.0	150.3	34 52.4	+60.0	150.7	34 00.0	+60.0	151.0	**34**
35	41 02.5	+59.8	148.2	40 11.4	+59.9	148.7	39 20.0	+59.9	149.1	38 28.4	+60.0	149.5	37 36.6	+60.0	149.9	36 44.6	+60.0	150.3	35 52.4	+60.0	150.7	35 00.0	+60.0	151.0	**35**
36	42 02.3	+59.8	148.1	41 11.3	+59.8	148.6	40 19.9	+59.9	149.0	39 28.4	+59.9	149.5	38 36.6	+59.9	149.9	37 44.6	+60.0	150.3	36 52.4	+60.0	150.6	36 00.0	+60.0	151.0	**36**
37	43 02.1	+59.8	148.0	42 11.1	+59.9	148.5	41 19.8	+59.9	149.0	40 28.3	+59.9	149.4	39 36.5	+60.0	149.8	38 44.6	+60.0	150.2	37 52.4	+60.0	150.6	37 00.0	+60.0	151.0	**37**
38	44 01.9	+59.8	147.9	43 11.0	+59.8	148.4	42 19.7	+59.9	148.9	41 28.2	+60.0	149.3	40 36.5	+60.0	149.8	39 44.6	+59.9	150.2	38 52.4	+60.0	150.6	38 00.0	+60.0	151.0	**38**
39	45 01.7	+59.8	147.8	44 10.8	+59.9	148.3	43 19.6	+59.9	148.8	42 28.2	+59.9	149.3	41 36.5	+59.9	149.7	40 44.5	+60.0	150.2	39 52.4	+60.0	150.6	39 00.0	+60.0	151.0	**39**
40	46 01.5	+59.8	147.7	45 10.7	+59.8	148.2	44 19.5	+59.9	148.7	43 28.1	+60.0	149.2	42 36.4	+60.0	149.7	41 44.5	+60.0	150.1	40 52.4	+60.0	150.6	40 00.0	+60.0	151.0	**40**
41	47 01.3	+59.8	147.5	46 10.5	+59.9	148.1	45 19.4	+59.9	148.6	44 28.1	+59.9	149.2	43 36.4	+60.0	149.6	42 44.5	+60.0	150.1	41 52.4	+60.0	150.6	41 00.0	+60.0	151.0	**41**
42	48 01.1	+59.7	147.4	47 10.4	+59.8	148.0	46 19.3	+59.9	148.6	45 28.0	+59.9	149.1	44 36.4	+59.9	149.6	43 44.5	+60.0	150.1	42 52.4	+60.0	150.6	42 00.0	+60.0	151.0	**42**
43	49 00.8	+59.8	147.3	48 10.2	+59.8	147.9	47 19.2	+59.9	148.5	46 27.9	+59.9	149.0	45 36.3	+60.0	149.5	44 44.5	+60.0	150.1	43 52.4	+60.0	150.5	43 00.0	+60.0	151.0	**43**
44	50 00.6	+59.7	147.1	49 10.0	+59.8	147.8	48 19.1	+59.9	148.4	47 27.8	+60.0	148.9	46 36.3	+60.0	149.5	45 44.5	+59.9	150.0	44 52.4	+60.0	150.5	44 00.0	+60.0	151.0	**44**
45	51 00.3	+59.8	147.0	50 09.8	+59.8	147.6	49 19.0	+59.8	148.3	48 27.8	+59.9	148.9	47 36.3	+59.9	149.4	46 44.4	+60.0	150.0	45 52.4	+59.9	150.5	45 00.0	+60.0	151.0	**45**
46	52 00.1	+59.7	146.8	51 09.6	+59.8	147.5	50 18.8	+59.9	148.2	49 27.7	+59.9	148.8	48 36.2	+60.0	149.4	47 44.4	+60.0	149.9	46 52.3	+60.0	150.5	46 00.0	+60.0	151.0	**46**
47	52 59.8	+59.7	146.7	52 09.4	+59.8	147.4	51 18.7	+59.9	148.1	50 27.6	+59.9	148.7	49 36.2	+59.9	149.3	48 44.4	+60.0	149.9	47 52.3	+60.0	150.5	47 00.0	+60.0	151.0	**47**
48	53 59.5	+59.7	146.5	53 09.2	+59.8	147.3	52 18.6	+59.8	148.0	51 27.5	+59.9	148.6	50 36.1	+60.0	149.3	49 44.4	+60.0	149.9	48 52.3	+60.0	150.4	48 00.0	+60.0	151.0	**48**
49	54 59.2	+59.6	146.3	54 09.0	+59.8	147.1	53 18.4	+59.9	147.8	52 27.4	+59.9	148.5	51 36.1	+59.9	149.2	50 44.4	+59.9	149.8	49 52.3	+60.0	150.4	49 00.0	+60.0	151.0	**49**
50	55 58.8	+59.7	146.2	55 08.8	+59.7	147.0	54 18.3	+59.8	147.7	53 27.3	+59.9	148.4	52 36.0	+60.0	149.1	51 44.3	+60.0	149.8	50 52.3	+60.0	150.4	50 00.0	+60.0	151.0	**50**
51	56 58.5	+59.6	146.0	56 08.5	+59.8	146.8	55 18.1	+59.8	147.6	54 27.2	+59.9	148.3	53 36.0	+59.9	149.1	52 44.3	+60.0	149.7	51 52.3	+60.0	150.4	51 00.0	+60.0	151.0	**51**
52	57 58.1	+59.6	145.8	57 08.3	+59.7	146.6	56 17.9	+59.9	147.5	55 27.1	+59.9	148.2	54 35.9	+59.9	149.0	53 44.3	+60.0	149.7	52 52.3	+60.0	150.4	52 00.0	+60.0	151.0	**52**
53	58 57.7	+59.6	145.5	58 08.0	+59.7	146.5	57 17.8	+59.8	147.3	56 27.0	+59.9	148.1	55 35.8	+60.0	148.9	54 44.3	+59.9	149.6	53 52.3	+60.0	150.3	53 00.0	+60.0	151.0	**53**
54	59 57.3	+59.6	145.3	59 07.7	+59.7	146.3	58 17.6	+59.8	147.2	57 26.9	+59.9	148.0	56 35.8	+59.9	148.8	55 44.2	+60.0	149.6	54 52.3	+60.0	150.3	54 00.0	+60.0	151.0	**54**
55	60 56.9	+59.5	145.1	60 07.4	+59.7	146.1	59 17.4	+59.8	147.0	58 26.8	+59.9	147.9	57 35.7	+60.0	148.7	56 44.2	+60.0	149.5	55 52.3	+60.0	150.3	55 00.0	+60.0	151.0	**55**
56	61 56.4	+59.6	144.8	61 07.1	+59.7	145.9	60 17.2	+59.7	146.8	59 26.7	+59.8	147.8	58 35.7	+59.9	148.7	57 44.2	+60.0	149.5	56 52.3	+60.0	150.3	56 00.0	+60.0	151.0	**56**
57	62 56.0	+59.4	144.5	62 06.8	+59.6	145.6	61 16.9	+59.8	146.7	60 26.5	+59.9	147.6	59 35.6	+59.9	148.6	58 44.2	+59.9	149.4	57 52.3	+60.0	150.2	57 00.0	+60.0	151.0	**57**
58	63 55.4	+59.5	144.2	63 06.4	+59.6	145.4	62 16.7	+59.7	146.5	61 26.4	+59.8	147.5	60 35.5	+59.9	148.5	59 44.1	+60.0	149.4	58 52.3	+60.0	150.2	58 00.0	+60.0	151.0	**58**
59	64 54.9	+59.4	143.9	64 06.0	+59.6	145.1	63 16.4	+59.8	146.3	62 26.2	+59.8	147.3	61 35.4	+59.9	148.3	60 44.1	+59.9	149.3	59 52.3	+60.0	150.2	59 00.0	+60.0	151.0	**59**
60	65 54.3	+59.3	143.6	65 05.6	+59.5	144.9	64 16.2	+59.7	146.1	63 26.0	+59.9	147.2	62 35.3	+59.9	148.2	61 44.0	+60.0	149.2	60 52.3	+59.9	150.1	60 00.0	+60.0	151.0	**60**
61	66 53.6	+59.3	143.2	66 05.1	+59.5	144.6	65 15.9	+59.6	145.8	64 25.9	+59.8	147.0	63 35.2	+59.9	148.1	62 44.0	+60.0	149.1	61 52.2	+60.0	150.1	61 00.0	+60.0	151.0	**61**
62	67 52.9	+59.2	142.8	67 04.6	+59.5	144.2	66 15.5	+59.7	145.6	65 25.7	+59.8	146.8	64 35.1	+59.9	148.0	63 44.0	+59.9	149.0	62 52.2	+60.0	150.1	62 00.0	+60.0	151.0	**62**
63	68 52.1	+59.2	142.4	68 04.1	+59.4	143.9	67 15.2	+59.6	145.3	66 25.5	+59.7	146.6	65 35.0	+59.9	147.8	64 43.9	+60.0	149.0	63 52.2	+60.0	150.0	63 00.0	+60.0	151.0	**63**
64	69 51.3	+59.0	141.9	69 03.5	+59.4	143.5	68 14.8	+59.6	145.0	67 25.2	+59.8	146.4	66 34.9	+59.9	147.7	65 43.9	+59.9	148.9	64 52.2	+60.0	150.0	64 00.0	+60.0	151.0	**64**
65	70 50.3	+59.0	141.4	70 02.9	+59.3	143.1	69 14.4	+59.6	144.7	68 25.0	+59.7	146.2	67 34.8	+59.8	147.5	66 43.8	+60.0	148.8	65 52.2	+60.0	149.9	65 00.0	+60.0	151.0	**65**
66	71 49.3	+58.9	140.8	71 02.2	+59.2	142.6	70 14.0	+59.5	144.3	69 24.7	+59.7	145.9	68 34.6	+59.9	147.3	67 43.8	+59.9	148.6	66 52.2	+60.0	149.9	66 00.0	+60.0	151.0	**66**
67	72 48.2	+58.7	140.2	72 01.4	+59.2	142.1	71 13.5	+59.4	143.9	70 24.4	+59.7	145.6	69 34.5	+59.8	147.1	68 43.7	+59.9	148.5	67 52.2	+60.0	149.8	67 00.0	+60.0	151.0	**67**
68	73 46.9	+58.5	139.4	73 00.6	+59.0	141.6	72 12.9	+59.4	143.5	71 24.1	+59.7	145.3	70 34.3	+59.8	146.9	69 43.6	+60.0	148.4	68 52.2	+59.9	149.7	68 00.0	+60.0	151.0	**68**
69	74 45.4	+58.4	138.6	73 59.6	+58.9	140.9	73 12.3	+59.3	143.0	72 23.8	+59.6	144.9	71 34.1	+59.8	146.7	70 43.6	+59.9	148.2	69 52.1	+60.0	149.7	69 00.0	+60.0	151.0	**69**
70	75 43.8	+58.1	137.7	74 58.5	+58.8	140.2	74 11.6	+59.3	142.5	73 23.4	+59.5	144.5	72 33.9	+59.8	146.4	71 43.5	+59.9	148.1	70 52.1	+60.0	149.6	70 00.0	+60.0	151.0	**70**
71	76 41.9	+57.8	136.7	75 57.3	+58.5	139.4	75 10.9	+59.1	141.9	74 22.9	+59.5	144.1	73 33.7	+59.7	146.1	72 43.4	+59.9	147.9	71 52.1	+60.0	149.5	71 00.0	+60.0	151.0	**71**
72	77 39.7	+57.5	135.5	76 55.8	+58.4	138.5	76 10.0	+59.0	141.2	75 22.4	+59.4	143.6	74 33.4	+59.8	145.8	73 43.3	+59.9	147.7	72 52.1	+60.0	149.4	72 00.0	+60.0	151.0	**72**
73	78 37.2	+57.0	134.1	77 54.2	+58.1	137.4	77 09.0	+58.8	140.4	76 21.8	+59.4	143.0	75 33.2	+59.6	145.4	74 43.2	+59.8	147.5	73 52.1	+59.9	149.3	73 00.0	+60.0	151.0	**73**
74	79 34.2	+56.4	132.4	78 52.3	+57.7	136.2	78 07.8	+58.6	139.5	77 21.2	+59.2	142.4	76 32.8	+59.6	144.9	75 43.0	+59.9	147.2	74 52.0	+60.0	149.2	74 00.0	+60.0	151.0	**74**
75	80 30.6	+55.5	130.4	79 50.0	+57.2	134.7	79 06.4	+58.3	138.4	78 20.4	+59.1	141.6	77 32.4	+59.6	144.4	76 42.9	+59.8	146.9	75 52.0	+60.0	149.1	75 00.0	+60.0	151.0	**75**
76	81 26.1	+54.5	128.0	80 47.2	+56.5	132.9	80 04.7	+58.0	137.1	79 19.5	+58.9	140.7	78 32.0	+59.4	143.8	77 42.7	+59.8	146.6	76 52.0	+59.9	148.9	76 00.0	+60.0	151.0	**76**
77	82 20.6	+52.9	125.1	81 43.7	+55.7	130.7	81 02.7	+57.5	135.5	80 18.4	+58.6	139.6	79 31.4	+59.4	143.1	78 42.5	+59.7	146.2	77 51.9	+60.0	148.7	77 00.0	+60.0	151.0	**77**
78	83 13.5	*+50.7*	•121.3	82 39.4	+54.3	127.9	82 00.2	+56.7	133.6	81 17.0	+58.3	138.3	80 30.8	+59.2	142.3	79 42.2	+59.8	145.7	78 51.9	+59.9	148.5	78 00.0	+60.0	151.0	**78**
79	84 04.2	*+47.3*	•116.4	83 33.7	*+52.5*	•124.4	82 56.9	+55.8	131.1	82 15.3	+57.8	136.7	81 30.0	+59.0	141.3	80 42.0	+59.6	145.1	79 51.8	+59.9	148.3	79 00.0	+60.0	151.0	**79**
80	84 51.5	*+42.2*	•110.1	84 26.2	*+49.4*	•119.7	83 52.7	*+54.2*	•127.9	83 13.1	+57.1	134.5	82 29.0	+58.7	139.9	81 41.6	+59.5	144.4	80 51.7	+59.9	148.0	80 00.0	+60.0	151.0	**80**
81	85 33.7	*+34.2*	•101.5	85 15.6	*+44.5*	•113.4	84 46.9	*+51.6*	•123.5	84 10.2	+55.9	131.7	83 27.7	+58.2	138.2	82 41.1	+59.4	143.4	81 51.6	+59.9	147.6	81 00.0	+60.0	151.0	**81**
82	86 07.9	*+22.3*	• 90.1	86 00.1	*+36.5*	•104.6	85 38.5	*+47.3*	•117.4	85 06.1	*+53.9*	•127.8	84 25.9	+57.5	135.9	83 40.5	+59.2	142.2	82 51.5	+59.8	147.1	82 00.0	+60.0	151.0	**82**
83	86 30.2	*+6.4*	• 75.6	86 36.6	*+23.4*	• 92.2	86 25.8	*+39.3*	•108.4	86 00.0	*+50.2*	•122.1	85 23.4	*+56.1*	•132.7	84 39.7	+58.7	140.6	83 51.3	+59.8	146.5	83 00.0	+60.0	151.0	**83**
84	86 36.6	*–10.8*	• 59.0	87 00.0	*+5.1*	• 75.6	87 05.1	*+24.9*	• 95.0	86 50.2	*+42.8*	•113.3	86 19.5	*+53.4*	•127.8	85 38.4	+58.1	138.2	84 51.1	+59.7	145.6	84 00.0	+60.0	151.0	**84**
85	86 25.8	*–25.8*	• 42.7	87 05.1	*–14.9*	• 56.2	87 30.0	*+3.0*	• 75.6	87 33.0	*+26.9*	• 98.8	87 12.9	*+47.0*	•119.6	86 36.5	*+56.5*	•134.4	85 50.8	+59.4	144.3	85 00.0	+60.0	151.0	**85**
86	86 00.0	*–36.6*	• 29.0	86 50.2	*–30.7*	• 37.8	87 33.0	*–20.1*	• 52.3	87 59.9	*0.0*	• 75.5	87 59.9	*+30.0*	•104.5	87 33.0	*+52.1*	•127.7	86 50.2	+59.0	142.2	86 00.0	+60.0	151.0	**86**
87	85 23.4	*–43.7*	• 18.4	86 19.5	*–41.1*	• 23.3	87 12.9	*–36.4*	• 31.5	87 59.9	*–26.9*	• 46.6	88 29.9	*–4.8*	• 75.5	88 25.1	*+34.8*	•113.2	87 49.2	*+57.3*	•138.2	87 00.0	+60.0	151.0	**87**
88	84 39.7	*–48.4*	• 10.5	85 38.4	*–47.3*	• 12.9	86 36.5	*–45.7*	• 16.6	87 33.0	*–42.8*	• 23.3	88 25.1	*–35.9*	• 37.8	88 59.9	*–13.4*	• 75.5	88 46.5	*+43.5*	•127.7	88 00.0	+60.0	151.0	**88**
89	83 51.3	*–51.3*	• 4.5	84 51.1	*–51.1*	• 5.4	85 50.8	*–50.8*	• 6.7	86 50.2	*–50.2*	• 8.8	87 49.2	*–49.2*	• 12.9	88 46.5	*–46.5*	• 23.3	89 30.0	*–30.0*	• 75.5	89 00.0	+60.0	151.0	**89**
90	83 00.0	–53.4	0.0	84 00.0	*–53.5*	• 0.0	85 00.0	*–53.7*	• 0.0	86 00.0	*–53.9*	• 0.0	87 00.0	*–54.3*	• 0.0	88 00.0	*–54.9*	• 0.0	89 00.0	*–56.2*	• 0.0	90 00.0	–60.0	75.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

29°, 331° L.H.A.   LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 29°, 331°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	6 07.1	−59.9	150.8	5 14.7	−59.9	150.9	4 22.3	−59.9	150.9	3 29.9	−60.0	150.9	2 37.4	−60.0	151.0	1 44.9	−59.9	151.0	0 52.5	−60.0	151.0	0 00.0	+60.0	29.0	**0**
1	5 07.2	−59.9	150.9	4 14.8	−59.9	150.9	3 22.4	−60.0	150.9	2 29.9	−60.0	151.0	1 37.4	−59.9	151.0	0 45.0	−60.0	151.0	0 07.5	+60.0	29.0	1 00.0	+60.0	29.0	**1**
2	4 07.3	−59.9	150.9	3 14.9	−59.9	151.0	2 22.4	−59.9	151.0	1 29.9	−59.9	151.0	0 37.5	−60.0	151.0	0 15.0	+60.0	29.0	1 07.5	+60.0	29.0	2 00.0	+60.0	29.0	**2**
3	3 07.4	−59.9	151.0	2 15.0	−60.0	151.0	1 22.5	−60.0	151.0	0 30.0	−60.0	151.0	0 22.5	+60.0	29.0	1 15.0	+60.0	29.0	2 07.5	+60.0	29.0	3 00.0	+60.0	29.0	**3**
4	2 07.5	−59.8	151.1	1 15.0	−59.9	151.1	0 22.5	−59.9	151.1	0 30.0	+60.0	28.9	1 22.5	+60.0	28.9	2 15.0	+60.0	28.9	3 07.5	+60.0	29.0	4 00.0	+60.0	29.0	**4**
5	1 07.7	−59.9	151.1	0 15.1	−59.9	151.1	0 37.4	+60.0	28.9	1 30.0	+59.9	28.9	2 22.5	+60.0	28.9	3 15.0	+60.0	28.9	4 07.5	+60.0	29.0	5 00.0	+60.0	29.0	**5**
6	0 07.8	−59.9	151.2	0 44.8	+59.9	28.8	1 37.4	+59.9	28.8	2 29.9	+60.0	28.9	3 22.5	+59.9	28.9	4 15.0	+60.0	28.9	5 07.5	+60.0	29.0	6 00.0	+60.0	29.0	**6**
7	0 52.1	+59.9	28.8	1 44.7	+60.0	28.8	2 37.3	+60.0	28.8	3 29.9	+60.0	28.8	4 22.4	+60.0	28.9	5 15.0	+60.0	28.9	6 07.5	+60.0	28.9	7 00.0	+60.0	29.0	**7**
8	1 52.0	+59.9	28.7	2 44.7	+59.9	28.7	3 37.3	+59.9	28.8	4 29.9	+59.9	28.8	5 22.4	+60.0	28.8	6 15.0	+60.0	28.9	7 07.5	+60.0	28.9	8 00.0	+60.0	29.0	**8**
9	2 51.9	+59.9	28.6	3 44.6	+59.9	28.7	4 37.2	+60.0	28.7	5 29.8	+60.0	28.8	6 22.4	+60.0	28.8	7 15.0	+60.0	28.9	8 07.5	+60.0	28.9	9 00.0	+60.0	29.0	**9**
10	3 51.8	+59.9	28.6	4 44.5	+59.9	28.6	5 37.2	+59.9	28.7	6 29.8	+60.0	28.7	7 22.4	+60.0	28.8	8 15.0	+60.0	28.8	9 07.5	+60.0	28.9	10 00.0	+60.0	29.0	**10**
11	4 51.7	+59.9	28.5	5 44.4	+59.9	28.6	6 37.1	+59.9	28.6	7 29.8	+59.9	28.7	8 22.4	+60.0	28.8	9 15.0	+59.9	28.8	10 07.5	+60.0	28.9	11 00.0	+60.0	29.0	**11**
12	5 51.6	+59.9	28.5	6 44.3	+60.0	28.5	7 37.0	+60.0	28.6	8 29.7	+60.0	28.7	9 22.4	+59.9	28.7	10 14.9	+60.0	28.8	11 07.5	+60.0	28.9	12 00.0	+60.0	29.0	**12**
13	6 51.5	+59.9	28.4	7 44.3	+59.9	28.5	8 37.0	+59.9	28.5	9 29.7	+59.9	28.6	10 22.3	+60.0	28.7	11 14.9	+60.0	28.8	12 07.5	+60.0	28.9	13 00.0	+60.0	29.0	**13**
14	7 51.4	+59.9	28.4	8 44.2	+59.9	28.4	9 36.9	+60.0	28.5	10 29.6	+60.0	28.6	11 22.3	+60.0	28.7	12 14.9	+60.0	28.8	13 07.5	+60.0	28.9	14 00.0	+60.0	29.0	**14**
15	8 51.3	+59.9	28.3	9 44.1	+59.9	28.4	10 36.9	+59.9	28.5	11 29.6	+60.0	28.5	12 22.3	+60.0	28.6	13 14.9	+60.0	28.8	14 07.5	+60.0	28.9	15 00.0	+60.0	29.0	**15**
16	9 51.2	+59.9	28.2	10 44.0	+59.9	28.3	11 36.8	+60.0	28.4	12 29.6	+59.9	28.5	13 22.3	+60.0	28.6	14 14.9	+60.0	28.7	15 07.5	+60.0	28.9	16 00.0	+60.0	29.0	**16**
17	10 51.1	+59.9	28.2	11 43.9	+60.0	28.3	12 36.8	+59.9	28.4	13 29.5	+60.0	28.5	14 22.3	+59.9	28.6	15 14.9	+60.0	28.7	16 07.5	+60.0	28.9	17 00.0	+60.0	29.0	**17**
18	11 51.0	+59.9	28.1	12 43.9	+59.9	28.2	13 36.7	+60.0	28.3	14 29.5	+60.0	28.4	15 22.2	+60.0	28.6	16 14.9	+60.0	28.7	17 07.5	+60.0	28.8	18 00.0	+60.0	29.0	**18**
19	12 50.9	+59.8	28.0	13 43.8	+59.9	28.2	14 36.7	+59.9	28.3	15 29.5	+59.9	28.4	16 22.2	+60.0	28.5	17 14.9	+60.0	28.7	18 07.5	+60.0	28.8	19 00.0	+60.0	29.0	**19**
20	13 50.7	+59.9	28.0	14 43.7	+59.9	28.1	15 36.6	+59.9	28.2	16 29.4	+60.0	28.4	17 22.2	+60.0	28.5	18 14.9	+60.0	28.7	19 07.5	+60.0	28.8	20 00.0	+60.0	29.0	**20**
21	14 50.6	+59.9	27.9	15 43.6	+59.9	28.0	16 36.5	+60.0	28.2	17 29.4	+60.0	28.3	18 22.2	+59.9	28.5	19 14.9	+60.0	28.6	20 07.5	+60.0	28.8	21 00.0	+60.0	29.0	**21**
22	15 50.5	+59.9	27.9	16 43.5	+60.0	28.0	17 36.5	+59.9	28.1	18 29.4	+59.9	28.3	19 22.1	+60.0	28.5	20 14.9	+59.9	28.6	21 07.5	+60.0	28.8	22 00.0	+60.0	29.0	**22**
23	16 50.4	+59.9	27.8	17 43.5	+59.9	27.9	18 36.4	+60.0	28.1	19 29.3	+60.0	28.3	20 22.1	+60.0	28.4	21 14.8	+60.0	28.6	22 07.5	+60.0	28.8	23 00.0	+60.0	29.0	**23**
24	17 50.3	+59.9	27.7	18 43.4	+59.9	27.9	19 36.4	+59.9	28.0	20 29.3	+59.9	28.2	21 22.1	+60.0	28.4	22 14.8	+60.0	28.6	23 07.5	+60.0	28.8	24 00.0	+60.0	29.0	**24**
25	18 50.2	+59.9	27.7	19 43.3	+59.9	27.8	20 36.3	+59.9	28.0	21 29.2	+60.0	28.2	22 22.1	+60.0	28.4	23 14.8	+60.0	28.6	24 07.5	+60.0	28.8	25 00.0	+60.0	29.0	**25**
26	19 50.1	+59.8	27.6	20 43.2	+59.9	27.8	21 36.2	+60.0	27.9	22 29.2	+60.0	28.1	23 22.1	+59.9	28.3	24 14.8	+60.0	28.5	25 07.5	+60.0	28.8	26 00.0	+60.0	29.0	**26**
27	20 49.9	+59.9	27.5	21 43.1	+59.9	27.7	22 36.2	+59.9	27.9	23 29.2	+59.9	28.1	24 22.0	+60.0	28.3	25 14.8	+60.0	28.5	26 07.5	+60.0	28.8	27 00.0	+60.0	29.0	**27**
28	21 49.8	+59.9	27.5	22 43.0	+59.9	27.6	23 36.1	+60.0	27.8	24 29.1	+60.0	28.1	25 22.0	+60.0	28.3	26 14.8	+60.0	28.5	27 07.5	+60.0	28.7	28 00.0	+60.0	29.0	**28**
29	22 49.7	+59.9	27.4	23 42.9	+59.9	27.6	24 36.1	+59.9	27.8	25 29.1	+59.9	28.0	26 22.0	+60.0	28.2	27 14.8	+60.0	28.5	28 07.5	+60.0	28.7	29 00.0	+60.0	29.0	**29**
30	23 49.6	+59.8	27.3	24 42.8	+59.9	27.5	25 36.0	+59.9	27.7	26 29.0	+60.0	28.0	27 22.0	+59.9	28.2	28 14.8	+60.0	28.5	29 07.5	+60.0	28.7	30 00.0	+60.0	29.0	**30**
31	24 49.4	+59.9	27.2	25 42.7	+59.9	27.5	26 35.9	+60.0	27.7	27 29.0	+59.9	27.9	28 21.9	+60.0	28.2	29 14.8	+59.9	28.4	30 07.5	+59.9	28.7	31 00.0	+60.0	29.0	**31**
32	25 49.3	+59.9	27.2	26 42.6	+59.9	27.4	27 35.9	+59.9	27.6	28 28.9	+60.0	27.9	29 21.9	+60.0	28.1	30 14.7	+60.0	28.4	31 07.4	+60.0	28.7	32 00.0	+60.0	29.0	**32**
33	26 49.2	+59.9	27.1	27 42.5	+59.9	27.3	28 35.8	+59.9	27.6	29 28.9	+60.0	27.8	30 21.9	+60.0	28.1	31 14.7	+60.0	28.4	32 07.4	+60.0	28.7	33 00.0	+60.0	29.0	**33**
34	27 49.1	+59.8	27.0	28 42.4	+59.9	27.3	29 35.7	+59.9	27.5	30 28.9	+59.9	27.8	31 21.9	+59.9	28.1	32 14.7	+60.0	28.4	33 07.4	+60.0	28.7	34 00.0	+60.0	29.0	**34**
35	28 48.9	+59.9	27.0	29 42.3	+59.9	27.2	30 35.6	+60.0	27.5	31 28.8	+60.0	27.8	32 21.8	+60.0	28.0	33 14.7	+60.0	28.3	34 07.4	+60.0	28.7	35 00.0	+60.0	29.0	**35**
36	29 48.8	+59.8	26.9	30 42.2	+59.9	27.1	31 35.6	+59.9	27.4	32 28.8	+59.9	27.7	33 21.8	+60.0	28.0	34 14.7	+60.0	28.3	35 07.4	+60.0	28.7	36 00.0	+60.0	29.0	**36**
37	30 48.6	+59.9	26.8	31 42.1	+59.9	27.1	32 35.5	+59.9	27.4	33 28.7	+60.0	27.7	34 21.8	+59.9	28.0	35 14.7	+60.0	28.3	36 07.4	+60.0	28.6	37 00.0	+60.0	29.0	**37**
38	31 48.5	+59.9	26.7	32 42.0	+59.9	27.0	33 35.4	+59.9	27.3	34 28.7	+59.9	27.6	35 21.7	+60.0	27.9	36 14.7	+60.0	28.3	37 07.4	+60.0	28.6	38 00.0	+60.0	29.0	**38**
39	32 48.4	+59.8	26.6	33 41.9	+59.9	26.9	34 35.3	+60.0	27.2	35 28.6	+60.0	27.6	36 21.7	+60.0	27.9	37 14.7	+59.9	28.2	38 07.4	+60.0	28.6	39 00.0	+60.0	29.0	**39**
40	33 48.2	+59.8	26.5	34 41.8	+59.9	26.9	35 35.3	+59.9	27.2	36 28.6	+59.9	27.5	37 21.7	+60.0	27.9	38 14.6	+60.0	28.2	39 07.4	+60.0	28.6	40 00.0	+60.0	29.0	**40**
41	34 48.0	+59.9	26.5	35 41.7	+59.9	26.8	36 35.2	+59.9	27.1	37 28.5	+59.9	27.5	38 21.7	+59.9	27.8	39 14.6	+60.0	28.2	40 07.4	+60.0	28.6	41 00.0	+60.0	29.0	**41**
42	35 47.9	+59.8	26.4	36 41.6	+59.8	26.7	37 35.1	+59.9	27.0	38 28.4	+60.0	27.4	39 21.6	+60.0	27.8	40 14.6	+60.0	28.2	41 07.4	+60.0	28.6	42 00.0	+60.0	29.0	**42**
43	36 47.7	+59.9	26.3	37 41.4	+59.9	26.6	38 35.0	+59.9	27.0	39 28.4	+59.9	27.3	40 21.6	+60.0	27.7	41 14.6	+60.0	28.1	42 07.4	+60.0	28.6	43 00.0	+60.0	29.0	**43**
44	37 47.6	+59.8	26.2	38 41.3	+59.9	26.5	39 34.9	+59.9	26.9	40 28.3	+60.0	27.3	41 21.6	+59.9	27.7	42 14.6	+60.0	28.1	43 07.4	+60.0	28.5	44 00.0	+60.0	29.0	**44**
45	38 47.4	+59.8	26.1	39 41.2	+59.9	26.5	40 34.8	+59.9	26.8	41 28.3	+59.9	27.2	42 21.5	+60.0	27.6	43 14.6	+60.0	28.1	44 07.4	+60.0	28.5	45 00.0	+60.0	29.0	**45**
46	39 47.2	+59.8	26.0	40 41.1	+59.8	26.4	41 34.7	+59.9	26.8	42 28.2	+59.9	27.2	43 21.5	+60.0	27.6	44 14.6	+59.9	28.0	45 07.4	+60.0	28.5	46 00.0	+60.0	29.0	**46**
47	40 47.0	+59.9	25.9	41 40.9	+59.9	26.3	42 34.6	+59.9	26.7	43 28.1	+60.0	27.1	44 21.5	+59.9	27.5	45 14.5	+60.0	28.0	46 07.4	+60.0	28.5	47 00.0	+60.0	29.0	**47**
48	41 46.9	+59.8	25.8	42 40.8	+59.8	26.2	43 34.5	+59.9	26.6	44 28.1	+59.9	27.0	45 21.4	+60.0	27.5	46 14.5	+60.0	28.0	47 07.4	+60.0	28.5	48 00.0	+60.0	29.0	**48**
49	42 46.7	+59.8	25.7	43 40.6	+59.9	26.1	44 34.4	+59.9	26.5	45 28.0	+59.9	27.0	46 21.4	+59.9	27.4	47 14.5	+60.0	27.9	48 07.4	+60.0	28.5	49 00.0	+60.0	29.0	**49**
50	43 46.5	+59.8	25.6	44 40.5	+59.8	26.0	45 34.3	+59.9	26.4	46 27.9	+60.0	26.9	47 21.3	+60.0	27.4	48 14.5	+60.0	27.9	49 07.4	+60.0	28.4	50 00.0	+60.0	29.0	**50**
51	44 46.3	+59.7	25.5	45 40.3	+59.9	25.9	46 34.2	+59.9	26.3	47 27.9	+59.9	26.8	48 21.3	+59.9	27.3	49 14.5	+59.9	27.9	50 07.4	+60.0	28.4	51 00.0	+60.0	29.0	**51**
52	45 46.0	+59.8	25.3	46 40.2	+59.8	25.8	47 34.1	+59.9	26.3	48 27.8	+59.9	26.8	49 21.2	+60.0	27.3	50 14.4	+60.0	27.8	51 07.4	+60.0	28.4	52 00.0	+60.0	29.0	**52**
53	46 45.8	+59.8	25.2	47 40.0	+59.8	25.7	48 34.0	+59.8	26.2	49 27.7	+59.9	26.7	50 21.2	+59.9	27.2	51 14.4	+60.0	27.8	52 07.4	+60.0	28.4	53 00.0	+60.0	29.0	**53**
54	47 45.6	+59.8	25.1	48 39.8	+59.9	25.6	49 33.8	+59.9	26.1	50 27.6	+59.9	26.6	51 21.1	+60.0	27.1	52 14.4	+60.0	27.7	53 07.4	+60.0	28.4	54 00.0	+60.0	29.0	**54**
55	48 45.4	+59.7	24.9	49 39.7	+59.8	25.4	50 33.7	+59.9	26.0	51 27.5	+59.9	26.5	52 21.1	+59.9	27.1	53 14.4	+60.0	27.7	54 07.4	+59.9	28.3	55 00.0	+60.0	29.0	**55**
56	49 45.1	+59.8	24.8	50 39.5	+59.8	25.3	51 33.6	+59.8	25.9	52 27.4	+60.0	26.4	53 21.0	+60.0	27.0	54 14.4	+59.9	27.6	55 07.3	+60.0	28.3	56 00.0	+60.0	29.0	**56**
57	50 44.9	+59.7	24.7	51 39.3	+59.8	25.2	52 33.4	+59.9	25.7	53 27.4	+59.9	26.3	54 21.0	+59.9	26.9	55 14.3	+60.0	27.6	56 07.3	+60.0	28.3	57 00.0	+60.0	29.0	**57**
58	51 44.6	+59.7	24.5	52 39.1	+59.8	25.1	53 33.3	+59.8	25.6	54 27.3	+59.9	26.2	55 20.9	+60.0	26.9	56 14.3	+60.0	27.5	57 07.3	+60.0	28.2	58 00.0	+60.0	29.0	**58**
59	52 44.3	+59.7	24.4	53 38.9	+59.7	24.9	54 33.1	+59.9	25.5	55 27.2	+59.8	26.1	56 20.9	+59.9	26.8	57 14.3	+59.9	27.5	58 07.3	+60.0	28.2	59 00.0	+60.0	29.0	**59**
60	53 44.0	+59.7	24.2	54 38.6	+59.8	24.8	55 33.0	+59.8	25.4	56 27.0	+59.9	26.0	57 20.8	+59.9	26.7	58 14.2	+60.0	27.4	59 07.3	+60.0	28.2	60 00.0	+60.0	29.0	**60**
61	54 43.7	+59.7	24.0	55 38.4	+59.7	24.6	56 32.8	+59.8	25.2	57 26.9	+59.9	25.9	58 20.7	+60.0	26.6	59 14.2	+60.0	27.4	60 07.3	+60.0	28.2	61 00.0	+60.0	29.0	**61**
62	55 43.4	+59.6	23.8	56 38.1	+59.8	24.4	57 32.6	+59.8	25.1	58 26.8	+59.9	25.8	59 20.7	+59.9	26.5	60 14.2	+59.9	27.3	61 07.3	+60.0	28.1	62 00.0	+60.0	29.0	**62**
63	56 43.0	+59.7	23.6	57 37.9	+59.7	24.3	58 32.4	+59.8	24.9	59 26.7	+59.8	25.7	60 20.6	+59.9	26.4	61 14.1	+60.0	27.2	62 07.3	+60.0	28.1	63 00.0	+60.0	29.0	**63**
64	57 42.7	+59.6	23.4	58 37.6	+59.7	24.1	59 32.2	+59.8	24.8	60 26.5	+59.9	25.5	61 20.5	+59.9	26.3	62 14.1	+60.0	27.1	63 07.3	+60.0	28.0	64 00.0	+60.0	29.0	**64**
65	58 42.3	+59.6	23.2	59 37.3	+59.7	23.9	60 32.0	+59.8	24.6	61 26.4	+59.8	25.4	62 20.4	+59.9	26.2	63 14.1	+59.9	27.1	64 07.3	+60.0	28.0	65 00.0	+60.0	29.0	**65**
66	59 41.9	+59.6	23.0	60 37.0	+59.7	23.7	61 31.8	+59.7	24.4	62 26.2	+59.9	25.2	63 20.3	+59.9	26.1	64 14.0	+60.0	27.0	65 07.3	+59.9	28.0	66 00.0	+60.0	29.0	**66**
67	60 41.5	+59.5	22.8	61 36.7	+59.6	23.5	62 31.5	+59.8	24.2	63 26.1	+59.8	25.1	64 20.2	+59.9	25.9	65 14.0	+59.9	26.9	66 07.2	+60.0	27.9	67 00.0	+60.0	29.0	**67**
68	61 41.0	+59.5	22.5	62 36.3	+59.6	23.2	63 31.3	+59.7	24.0	64 25.9	+59.8	24.9	65 20.1	+59.9	25.8	66 13.9	+60.0	26.8	67 07.2	+60.0	27.8	68 00.0	+60.0	29.0	**68**
69	62 40.5	+59.5	22.2	63 35.9	+59.6	23.0	64 31.0	+59.7	23.8	65 25.7	+59.8	24.7	66 20.0	+59.9	25.6	67 13.9	+59.9	26.7	68 07.2	+60.0	27.8	69 00.0	+60.0	29.0	**69**
70	63 40.0	+59.5	22.0	64 35.5	+59.6	22.7	65 30.7	+59.7	23.6	66 25.5	+59.8	24.5	67 19.9	+59.8	25.5	68 13.8	+59.9	26.6	69 07.2	+60.0	27.7	70 00.0	+60.0	29.0	**70**
71	64 39.5	+59.4	21.6	65 35.1	+59.5	22.4	66 30.4	+59.6	23.3	67 25.3	+59.7	24.3	68 19.7	+59.9	25.3	69 13.7	+60.0	26.4	70 07.2	+60.0	27.7	71 00.0	+60.0	29.0	**71**
72	65 38.9	+59.3	21.3	66 34.6	+59.5	22.1	67 30.0	+59.6	23.0	68 25.0	+59.8	24.0	69 19.6	+59.8	25.1	70 13.7	+59.9	26.3	71 07.2	+59.9	27.6	72 00.0	+60.0	29.0	**72**
73	66 38.2	+59.3	20.9	67 34.1	+59.5	21.8	68 29.6	+59.6	22.7	69 24.8	+59.7	23.8	70 19.4	+59.9	24.9	71 13.6	+59.9	26.1	72 07.1	+60.0	27.5	73 00.0	+60.0	29.0	**73**
74	67 37.5	+59.3	20.6	68 33.6	+59.4	21.4	69 29.2	+59.6	22.4	70 24.5	+59.6	23.5	71 19.3	+59.8	24.7	72 13.5	+59.9	26.0	73 07.1	+60.0	27.4	74 00.0	+60.0	29.0	**74**
75	68 36.8	+59.2	20.1	69 33.0	+59.3	21.0	70 28.8	+59.5	22.1	71 24.1	+59.7	23.2	72 19.1	+59.7	24.4	73 13.4	+59.9	25.8	74 07.1	+60.0	27.3	75 00.0	+60.0	29.0	**75**
76	69 36.0	+59.0	19.7	70 32.3	+59.3	20.6	71 28.3	+59.4	21.7	72 23.8	+59.6	22.8	73 18.8	+59.8	24.1	74 13.3	+59.9	25.6	75 07.1	+59.9	27.2	76 00.0	+60.0	29.0	**76**
77	70 35.0	+59.0	19.2	71 31.6	+59.1	20.1	72 27.7	+59.4	21.2	73 23.4	+59.5	22.4	74 18.6	+59.7	23.8	75 13.2	+59.8	25.3	76 07.0	+60.0	27.0	77 00.0	+60.0	29.0	**77**
78	71 34.0	+58.9	18.6	72 30.7	+59.1	19.6	73 27.1	+59.3	20.7	74 22.9	+59.5	22.0	75 18.3	+59.7	23.4	76 13.0	+59.9	25.0	77 07.0	+59.9	26.9	78 00.0	+60.0	29.0	**78**
79	72 32.9	+58.8	18.0	73 29.8	+59.0	19.0	74 26.4	+59.2	20.2	75 22.4	+59.5	21.5	76 18.0	+59.6	23.0	77 12.9	+59.8	24.7	78 06.9	+60.0	26.7	79 00.0	+60.0	29.0	**79**
80	73 31.7	+58.6	17.3	74 28.8	+58.8	18.3	75 25.6	+59.0	19.5	76 21.9	+59.3	20.9	77 17.6	+59.6	22.5	78 12.7	+59.7	24.3	79 06.9	+59.9	26.5	80 00.0	+60.0	29.0	**80**
81	74 30.3	+58.4	16.5	75 27.6	+58.7	17.6	76 24.6	+59.0	18.8	77 21.2	+59.2	20.3	78 17.2	+59.5	21.9	79 12.4	+59.8	23.9	80 06.8	+59.9	26.2	81 00.0	+60.0	29.0	**81**
82	75 28.7	+58.2	15.6	76 26.3	+58.5	16.7	77 23.6	+58.8	18.0	78 20.4	+59.1	19.5	79 16.7	+59.3	21.3	80 12.2	+59.6	23.4	81 06.7	+59.9	25.9	82 00.0	+60.0	29.0	**82**
83	76 26.9	+57.9	14.6	77 24.8	+58.2	15.7	78 22.4	+58.5	17.0	79 19.5	+58.9	18.6	80 16.0	+59.3	20.5	81 11.8	+59.6	22.7	82 06.6	+59.9	25.5	83 00.0	+60.0	29.0	**83**
84	77 24.8	+57.6	13.4	78 23.0	+57.9	14.6	79 20.9	+58.3	15.9	80 18.4	+58.6	17.5	81 15.3	+59.0	19.5	82 11.4	+59.5	21.9	83 06.5	+59.8	25.0	84 00.0	+60.0	29.0	**84**
85	78 22.4	+57.1	12.1	79 20.9	+57.5	13.2	80 19.2	+57.8	14.6	81 17.0	+58.3	16.2	82 14.3	+58.8	18.2	83 10.9	+59.3	20.8	84 06.3	+59.8	24.3	85 00.0	+60.0	29.0	**85**
86	79 19.5	+56.5	10.5	80 18.4	+56.9	11.6	81 17.0	+57.3	12.9	82 15.3	+57.8	14.5	83 13.1	+58.4	16.6	84 10.2	+59.0	19.4	85 06.1	+59.6	23.3	86 00.0	+60.0	29.0	**86**
87	80 16.0	+55.8	8.6	81 15.3	+56.1	9.6	82 14.3	+56.6	10.8	83 13.1	+57.1	12.4	84 11.5	+57.7	14.5	85 09.2	+58.4	17.5	86 05.7	+59.4	21.9	87 00.0	+60.0	29.0	**87**
88	81 11.8	+54.8	6.3	82 11.4	+55.1	7.2	83 10.9	+55.4	8.2	84 10.2	+55.9	9.6	85 09.2	+56.5	11.6	86 07.6	+57.5	14.5	87 05.1	+58.7	19.4	88 00.0	+60.0	29.0	**88**
89	82 06.6	+53.4	3.5	83 06.5	*+53.5* •	4.0	84 06.3	*+53.7* •	4.7	85 06.1	*+53.9* •	5.7	86 05.7	*+54.3* •	7.1	87 05.1	*+54.9* •	9.6	88 03.8	*+56.2* •	14.5	89 00.0	+60.0	29.0	**89**
90	83 00.0	*+51.3* •	0.0	84 00.0	*+51.1* •	0.0	85 00.0	*+50.8* •	0.0	86 00.0	*+50.2* •	0.0	87 00.0	*+49.2* •	0.0	88 00.0	*+46.5* •	0.0	89 00.0	*+30.0* •	0.0	90 00.0	−60.0	14.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 151°, 209°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 03.5	+59.9	149.8	5 11.6	+59.9	149.9	4 19.7	+60.0	149.9	3 27.8	+60.0	149.9	2 35.9	+59.9	150.0	1 43.9	+60.0	150.0	0 52.0	+60.0	150.0	0 00.0	+60.0	150.0	0
1	7 03.4	+59.9	149.8	6 11.5	+60.0	149.8	5 19.7	+59.9	149.9	4 27.8	+59.9	149.9	3 35.8	+60.0	149.9	2 43.9	+60.0	150.0	1 52.0	+60.0	150.0	1 00.0	+60.0	150.0	1
2	8 03.3	+59.9	149.7	7 11.5	+59.9	149.8	6 19.6	+60.0	149.8	5 27.7	+60.0	149.9	4 35.8	+60.0	149.9	3 43.9	+60.0	149.9	2 52.0	+60.0	150.0	2 00.0	+60.0	150.0	2
3	9 03.2	+59.8	149.6	8 11.4	+59.9	149.7	7 19.6	+59.9	149.8	6 27.7	+60.0	149.8	5 35.8	+60.0	149.9	4 43.9	+60.0	149.9	3 52.0	+60.0	150.0	3 00.0	+60.0	150.0	3
4	10 03.0	+59.9	149.6	9 11.3	+59.9	149.7	8 19.5	+59.9	149.7	7 27.7	+59.9	149.8	6 35.8	+60.0	149.9	5 43.9	+60.0	149.9	4 52.0	+59.9	150.0	4 00.0	+60.0	150.0	4
5	11 02.9	+59.9	149.5	10 11.2	+59.9	149.6	9 19.4	+60.0	149.7	8 27.6	+60.0	149.8	7 35.8	+59.9	149.8	6 43.9	+60.0	149.9	5 51.9	+60.0	150.0	5 00.0	+60.0	150.0	5
6	12 02.8	+59.9	149.4	11 11.1	+59.9	149.5	10 19.4	+59.9	149.6	9 27.6	+59.9	149.7	8 35.7	+60.0	149.8	7 43.9	+60.0	149.9	6 51.9	+60.0	149.9	6 00.0	+60.0	150.0	6
7	13 02.7	+59.9	149.4	12 11.0	+60.0	149.5	11 19.3	+60.0	149.6	10 27.5	+60.0	149.7	9 35.7	+60.0	149.8	8 43.9	+59.9	149.9	7 51.9	+60.0	149.9	7 00.0	+60.0	150.0	7
8	14 02.6	+59.9	149.3	13 11.0	+59.9	149.4	12 19.3	+59.9	149.5	11 27.5	+60.0	149.7	10 35.7	+60.0	149.8	9 43.8	+60.0	149.8	8 51.9	+60.0	149.9	8 00.0	+60.0	150.0	8
9	15 02.5	+59.8	149.2	14 10.9	+59.9	149.4	13 19.2	+59.9	149.5	12 27.5	+59.9	149.6	11 35.7	+60.0	149.7	10 43.8	+60.0	149.8	9 51.9	+60.0	149.9	9 00.0	+60.0	150.0	9
10	16 02.3	+59.9	149.2	15 10.8	+59.9	149.3	14 19.1	+60.0	149.5	13 27.4	+60.0	149.6	12 35.7	+59.9	149.7	11 43.8	+60.0	149.8	10 51.9	+60.0	149.9	10 00.0	+60.0	150.0	10
11	17 02.2	+59.9	149.1	16 10.7	+59.9	149.3	15 19.1	+59.9	149.4	14 27.4	+60.0	149.5	13 35.6	+60.0	149.7	12 43.8	+60.0	149.8	11 51.9	+60.0	149.9	11 00.0	+60.0	150.0	11
12	18 02.1	+59.9	149.0	17 10.6	+59.9	149.2	16 19.0	+60.0	149.4	15 27.4	+59.9	149.5	14 35.6	+60.0	149.6	13 43.8	+60.0	149.8	12 51.9	+60.0	149.9	12 00.0	+60.0	150.0	12
13	19 02.0	+59.8	149.0	18 10.5	+59.9	149.2	17 19.0	+59.9	149.3	16 27.3	+60.0	149.5	15 35.6	+60.0	149.6	14 43.8	+60.0	149.8	13 51.9	+60.0	149.9	13 00.0	+60.0	150.0	13
14	20 01.8	+59.9	148.9	19 10.4	+59.9	149.1	18 18.9	+59.9	149.3	17 27.3	+59.9	149.4	16 35.6	+59.9	149.6	15 43.8	+60.0	149.7	14 51.9	+60.0	149.9	14 00.0	+60.0	150.0	14
15	21 01.7	+59.9	148.8	20 10.3	+59.9	149.0	19 18.8	+60.0	149.2	18 27.2	+60.0	149.4	17 35.5	+60.0	149.6	16 43.8	+60.0	149.7	15 51.9	+60.0	149.9	15 00.0	+60.0	150.0	15
16	22 01.6	+59.9	148.8	21 10.2	+59.9	149.0	20 18.8	+59.9	149.2	19 27.2	+59.9	149.4	18 35.5	+60.0	149.5	17 43.8	+60.0	149.7	16 51.9	+60.0	149.9	16 00.0	+60.0	150.0	16
17	23 01.5	+59.8	148.7	22 10.1	+59.9	148.9	21 18.7	+59.9	149.1	20 27.1	+60.0	149.3	19 35.5	+60.0	149.5	18 43.8	+59.9	149.7	17 51.9	+60.0	149.8	17 00.0	+60.0	150.0	17
18	24 01.3	+59.9	148.6	23 10.0	+59.9	148.9	22 18.6	+60.0	149.1	21 27.1	+60.0	149.3	20 35.5	+60.0	149.5	19 43.7	+60.0	149.7	18 51.9	+60.0	149.8	18 00.0	+60.0	150.0	18
19	25 01.2	+59.9	148.6	24 09.9	+59.9	148.8	23 18.6	+59.9	149.0	22 27.1	+59.9	149.2	21 35.5	+59.9	149.4	20 43.7	+60.0	149.6	19 51.9	+60.0	149.8	19 00.0	+60.0	150.0	19
20	26 01.1	+59.8	148.5	25 09.8	+59.9	148.7	24 18.5	+59.9	149.0	23 27.0	+60.0	149.2	22 35.4	+60.0	149.4	21 43.7	+60.0	149.6	20 51.9	+60.0	149.8	20 00.0	+60.0	150.0	20
21	27 00.9	+59.9	148.4	26 09.7	+59.9	148.7	25 18.4	+60.0	148.9	24 27.0	+59.9	149.2	23 35.4	+60.0	149.4	22 43.7	+60.0	149.6	21 51.9	+60.0	149.8	21 00.0	+60.0	150.0	21
22	28 00.8	+59.8	148.3	27 09.6	+59.9	148.6	26 18.4	+59.9	148.9	25 26.9	+60.0	149.1	24 35.4	+60.0	149.3	23 43.7	+60.0	149.6	22 51.9	+60.0	149.8	22 00.0	+60.0	150.0	22
23	29 00.6	+59.9	148.2	28 09.5	+59.9	148.5	27 18.3	+59.9	148.8	26 26.9	+59.9	149.1	25 35.4	+59.9	149.3	24 43.7	+60.0	149.6	23 51.9	+60.0	149.8	23 00.0	+60.0	150.0	23
24	30 00.5	+59.8	148.2	29 09.4	+59.9	148.5	28 18.2	+59.9	148.7	27 26.8	+60.0	149.0	26 35.3	+60.0	149.3	25 43.7	+60.0	149.5	24 51.9	+60.0	149.8	24 00.0	+60.0	150.0	24
25	31 00.3	+59.9	148.1	30 09.3	+59.9	148.4	29 18.1	+60.0	148.7	28 26.8	+59.9	149.0	27 35.3	+60.0	149.3	26 43.7	+60.0	149.5	25 51.9	+60.0	149.8	25 00.0	+60.0	150.0	25
26	32 00.2	+59.8	148.0	31 09.2	+59.9	148.3	30 18.1	+59.9	148.6	29 26.7	+60.0	148.9	28 35.3	+60.0	149.2	27 43.7	+59.9	149.5	26 51.9	+60.0	149.8	26 00.0	+60.0	150.0	26
27	33 00.0	+59.9	147.9	32 09.1	+59.9	148.3	31 18.0	+59.9	148.6	30 26.7	+60.0	148.9	29 35.3	+59.9	149.2	28 43.6	+60.0	149.5	27 51.9	+60.0	149.7	27 00.0	+60.0	150.0	27
28	33 59.9	+59.8	147.8	33 09.0	+59.9	148.2	32 17.9	+59.9	148.5	31 26.7	+59.9	148.8	30 35.2	+60.0	149.1	29 43.6	+60.0	149.4	28 51.9	+60.0	149.7	28 00.0	+60.0	150.0	28
29	34 59.7	+59.8	147.7	34 08.9	+59.8	148.1	33 17.8	+59.9	148.5	32 26.6	+59.9	148.8	31 35.2	+60.0	149.1	30 43.6	+60.0	149.4	29 51.9	+60.0	149.7	29 00.0	+60.0	150.0	29
30	35 59.5	+59.9	147.6	35 08.7	+59.9	148.0	34 17.7	+60.0	148.4	33 26.5	+60.0	148.7	32 35.2	+59.9	149.1	31 43.6	+60.0	149.4	30 51.9	+60.0	149.7	30 00.0	+60.0	150.0	30
31	36 59.4	+59.8	147.5	36 08.6	+59.9	147.9	35 17.7	+59.9	148.3	34 26.5	+59.9	148.7	33 35.1	+60.0	149.0	32 43.6	+60.0	149.4	31 51.9	+60.0	149.7	31 00.0	+60.0	150.0	31
32	37 59.2	+59.8	147.5	37 08.5	+59.9	147.9	36 17.6	+59.9	148.3	35 26.4	+60.0	148.6	34 35.1	+60.0	149.0	33 43.6	+60.0	149.3	32 51.9	+60.0	149.7	32 00.0	+60.0	150.0	32
33	38 59.0	+59.8	147.4	38 08.4	+59.8	147.8	37 17.5	+59.9	148.2	36 26.4	+59.9	148.6	35 35.1	+59.9	149.0	34 43.6	+60.0	149.3	33 51.9	+60.0	149.7	33 00.0	+60.0	150.0	33
34	39 58.8	+59.8	147.3	39 08.2	+59.9	147.7	38 17.4	+59.9	148.1	37 26.3	+60.0	148.5	36 35.0	+60.0	148.9	35 43.6	+59.9	149.3	34 51.9	+60.0	149.7	34 00.0	+60.0	150.0	34
35	40 58.6	+59.8	147.1	40 08.1	+59.8	147.6	39 17.3	+59.9	148.0	38 26.3	+59.9	148.5	37 35.0	+60.0	148.9	36 43.5	+60.0	149.3	35 51.9	+60.0	149.6	35 00.0	+60.0	150.0	35
36	41 58.4	+59.8	147.0	41 07.9	+59.9	147.5	40 17.2	+59.9	148.0	39 26.2	+59.9	148.4	38 35.0	+59.9	148.8	37 43.5	+60.0	149.2	36 51.9	+60.0	149.6	36 00.0	+60.0	150.0	36
37	42 58.2	+59.8	146.9	42 07.8	+59.8	147.4	41 17.1	+59.9	147.9	40 26.1	+60.0	148.4	39 34.9	+60.0	148.8	38 43.5	+60.0	149.2	37 51.9	+60.0	149.6	37 00.0	+60.0	150.0	37
38	43 58.0	+59.8	146.8	43 07.6	+59.9	147.3	42 17.0	+59.9	147.8	41 26.1	+59.9	148.3	40 34.9	+60.0	148.7	39 43.5	+60.0	149.2	38 51.9	+60.0	149.6	38 00.0	+60.0	150.0	38
39	44 57.8	+59.8	146.7	44 07.5	+59.8	147.2	43 16.9	+59.9	147.7	42 26.0	+59.9	148.2	41 34.9	+59.9	148.7	40 43.5	+60.0	149.2	39 51.9	+59.9	149.6	39 00.0	+60.0	150.0	39
40	45 57.6	+59.7	146.6	45 07.3	+59.9	147.1	44 16.8	+59.9	147.7	43 25.9	+60.0	148.2	42 34.8	+60.0	148.7	41 43.5	+60.0	149.1	40 51.8	+60.0	149.6	40 00.0	+60.0	150.0	40
41	46 57.3	+59.8	146.4	46 07.2	+59.8	147.0	45 16.7	+59.9	147.6	44 25.9	+59.9	148.1	43 34.8	+60.0	148.6	42 43.5	+59.9	149.1	41 51.8	+60.0	149.6	41 00.0	+60.0	150.0	41
42	47 57.1	+59.7	146.3	47 07.0	+59.8	146.9	46 16.6	+59.8	147.5	45 25.8	+59.9	148.0	44 34.8	+59.9	148.6	43 43.4	+60.0	149.1	42 51.8	+60.0	149.5	42 00.0	+60.0	150.0	42
43	48 56.8	+59.8	146.2	48 06.8	+59.8	146.8	47 16.4	+59.9	147.4	46 25.7	+60.0	148.0	45 34.7	+60.0	148.5	44 43.4	+60.0	149.0	43 51.8	+60.0	149.5	43 00.0	+60.0	150.0	43
44	49 56.6	+59.7	146.0	49 06.6	+59.8	146.7	48 16.3	+59.9	147.3	47 25.7	+59.9	147.9	46 34.7	+59.9	148.4	45 43.4	+60.0	149.0	44 51.8	+60.0	149.5	44 00.0	+60.0	150.0	44
45	50 56.3	+59.7	145.9	50 06.4	+59.8	146.5	49 16.2	+59.8	147.2	48 25.6	+59.9	147.8	47 34.6	+60.0	148.4	46 43.4	+60.0	149.0	45 51.8	+60.0	149.5	45 00.0	+60.0	150.0	45
46	51 56.0	+59.7	145.7	51 06.2	+59.8	146.4	50 16.0	+59.9	147.1	49 25.5	+59.9	147.7	48 34.6	+59.9	148.3	47 43.4	+59.9	148.9	46 51.8	+60.0	149.5	46 00.0	+60.0	150.0	46
47	52 55.7	+59.7	145.6	52 06.0	+59.8	146.3	51 15.9	+59.8	147.0	50 25.4	+59.9	147.6	49 34.5	+60.0	148.3	48 43.3	+60.0	148.9	47 51.8	+60.0	149.5	47 00.0	+60.0	150.0	47
48	53 55.4	+59.7	145.4	53 05.8	+59.7	146.1	52 15.7	+59.9	146.9	51 25.3	+59.9	147.6	50 34.5	+59.9	148.2	49 43.3	+60.0	148.8	48 51.8	+60.0	149.4	48 00.0	+60.0	150.0	48
49	54 55.1	+59.6	145.2	54 05.5	+59.8	146.0	53 15.6	+59.8	146.7	52 25.2	+59.9	147.5	51 34.4	+60.0	148.1	50 43.3	+60.0	148.8	49 51.8	+60.0	149.4	49 00.0	+60.0	150.0	49
50	55 54.7	+59.6	145.0	55 05.3	+59.7	145.8	54 15.4	+59.9	146.6	53 25.1	+59.9	147.4	52 34.4	+59.9	148.1	51 43.3	+59.9	148.7	50 51.8	+60.0	149.4	50 00.0	+60.0	150.0	50
51	56 54.3	+59.7	144.8	56 05.0	+59.8	145.7	55 15.3	+59.8	146.5	54 25.0	+59.9	147.3	53 34.3	+60.0	148.0	52 43.2	+60.0	148.7	51 51.8	+60.0	149.4	51 00.0	+60.0	150.0	51
52	57 54.0	+59.5	144.6	57 04.8	+59.7	145.5	56 15.1	+59.8	146.4	55 24.9	+59.9	147.2	54 34.3	+59.9	147.9	53 43.2	+60.0	148.7	52 51.8	+60.0	149.3	52 00.0	+60.0	150.0	52
53	58 53.5	+59.6	144.4	58 04.5	+59.7	145.3	57 14.9	+59.8	146.2	56 24.8	+59.9	147.0	55 34.2	+59.9	147.8	54 43.2	+60.0	148.6	53 51.8	+60.0	149.3	53 00.0	+60.0	150.0	53
54	59 53.1	+59.6	144.1	59 04.2	+59.7	145.1	58 14.7	+59.8	146.1	57 24.7	+59.8	146.9	56 34.1	+60.0	147.8	55 43.2	+59.9	148.5	54 51.8	+60.0	149.3	54 00.0	+60.0	150.0	54
55	60 52.7	+59.5	143.9	60 03.9	+59.6	144.9	59 14.5	+59.7	145.9	58 24.5	+59.9	146.8	57 34.1	+59.9	147.7	56 43.1	+60.0	148.5	55 51.8	+60.0	149.3	55 00.0	+60.0	150.0	55
56	61 52.2	+59.5	143.6	61 03.5	+59.7	144.7	60 14.2	+59.8	145.7	59 24.4	+59.8	146.7	58 34.0	+59.9	147.6	57 43.1	+60.0	148.4	56 51.8	+60.0	149.2	56 00.0	+60.0	150.0	56
57	62 51.7	+59.4	143.3	62 03.2	+59.6	144.5	61 14.0	+59.8	145.5	60 24.2	+59.9	146.5	59 33.9	+59.9	147.5	58 43.1	+59.9	148.4	57 51.8	+59.9	149.2	57 00.0	+60.0	150.0	57
58	63 51.1	+59.4	143.0	63 02.8	+59.6	144.2	62 13.8	+59.7	145.3	61 24.1	+59.8	146.4	60 33.8	+59.9	147.4	59 43.0	+60.0	148.3	58 51.7	+60.0	149.2	58 00.0	+60.0	150.0	58
59	64 50.5	+59.4	142.7	64 02.4	+59.5	144.0	63 13.5	+59.7	145.1	62 23.9	+59.8	146.2	61 33.7	+60.0	147.3	60 43.0	+60.0	148.2	59 51.7	+60.0	149.1	59 00.0	+60.0	150.0	59
60	65 49.9	+59.3	142.4	65 01.9	+59.5	143.7	64 13.2	+59.7	144.9	63 23.7	+59.9	146.1	62 33.7	+59.9	147.1	61 43.0	+59.9	148.2	60 51.7	+60.0	149.1	60 00.0	+60.0	150.0	60
61	66 49.2	+59.2	142.0	66 01.4	+59.5	143.4	65 12.9	+59.6	144.7	64 23.6	+59.8	145.9	63 33.6	+59.8	147.0	62 42.9	+60.0	148.1	61 51.7	+60.0	149.1	61 00.0	+60.0	150.0	61
62	67 48.4	+59.2	141.6	67 00.9	+59.5	143.0	66 12.5	+59.7	144.4	65 23.4	+59.7	145.7	64 33.4	+59.9	146.9	63 42.9	+59.9	148.0	62 51.7	+60.0	149.0	62 00.0	+60.0	150.0	62
63	68 47.6	+59.1	141.1	68 00.4	+59.3	142.7	67 12.2	+59.6	144.1	66 23.1	+59.8	145.5	65 33.3	+59.9	146.7	64 42.8	+60.0	147.9	63 51.7	+60.0	149.0	63 00.0	+60.0	150.0	63
64	69 46.7	+59.0	140.6	68 59.7	+59.4	142.3	68 11.8	+59.5	143.8	67 22.9	+59.7	145.3	66 33.2	+59.9	146.6	65 42.8	+59.9	147.8	64 51.7	+60.0	148.9	64 00.0	+60.0	150.0	64
65	70 45.7	+58.9	140.1	69 59.1	+59.2	141.9	69 11.3	+59.6	143.5	68 22.6	+59.8	145.0	67 33.1	+59.8	146.4	66 42.7	+60.0	147.7	65 51.7	+60.0	148.9	65 00.0	+60.0	150.0	65
66	71 44.6	+58.8	139.5	70 58.3	+59.2	141.4	70 10.9	+59.4	143.1	69 22.4	+59.6	144.7	68 32.9	+59.9	146.2	67 42.7	+59.9	147.6	66 51.7	+59.9	148.8	66 00.0	+60.0	150.0	66
67	72 43.4	+58.7	138.9	71 57.5	+59.1	140.9	71 10.3	+59.5	142.7	70 22.0	+59.7	144.4	69 32.8	+59.8	146.0	68 42.6	+59.9	147.4	67 51.6	+60.0	148.8	67 00.0	+60.0	150.0	67
68	73 42.1	+58.4	138.1	72 56.6	+59.0	140.3	72 09.8	+59.3	142.3	71 21.7	+59.6	144.1	70 32.6	+59.8	145.8	69 42.5	+59.9	147.3	68 51.6	+60.0	148.7	68 00.0	+60.0	150.0	68
69	74 40.5	+58.3	137.3	73 55.6	+58.8	139.7	73 09.1	+59.3	141.8	72 21.3	+59.6	143.8	71 32.4	+59.8	145.5	70 42.4	+59.9	147.2	69 51.6	+60.0	148.6	69 00.0	+60.0	150.0	69
70	75 38.8	+58.0	136.4	74 54.4	+58.7	138.9	74 08.4	+59.2	141.3	73 20.9	+59.5	143.4	72 32.2	+59.7	145.3	71 42.3	+60.0	147.0	70 51.6	+60.0	148.6	70 00.0	+60.0	150.0	70
71	76 36.8	+57.8	135.3	75 53.1	+58.5	138.1	75 07.6	+59.0	140.6	74 20.4	+59.5	142.9	73 31.9	+59.8	145.0	72 42.3	+59.8	146.8	71 51.6	+59.9	148.5	71 00.0	+60.0	150.0	71
72	77 34.6	+57.3	134.1	76 51.6	+58.3	137.2	76 06.6	+59.0	139.9	75 19.9	+59.4	142.4	74 31.7	+59.6	144.6	73 42.1	+59.9	146.6	72 51.5	+60.0	148.4	72 00.0	+60.0	150.0	72
73	78 31.9	+56.8	132.7	77 49.9	+58.0	136.1	77 05.6	+58.7	139.1	76 19.3	+59.3	141.8	75 31.3	+59.7	144.2	74 42.0	+59.9	146.4	73 51.5	+60.0	148.3	73 00.0	+60.0	150.0	73
74	79 28.7	+56.3	131.0	78 47.9	+57.5	134.8	78 04.3	+58.6	138.2	77 18.6	+59.2	141.1	76 31.0	+59.6	143.8	75 41.9	+59.8	146.1	74 51.5	+59.9	148.2	74 00.0	+60.0	150.0	74
75	80 25.0	+55.3	129.0	79 45.4	+57.1	133.3	79 02.9	+58.2	137.1	78 17.8	+59.0	140.4	77 30.6	+59.5	143.2	76 41.7	+59.8	145.8	75 51.4	+60.0	148.0	75 00.0	+60.0	150.0	75
76	81 20.3	+54.3	126.6	80 42.5	+56.4	131.5	80 01.1	+57.9	135.7	79 16.8	+58.8	139.4	78 30.1	+59.4	142.6	77 41.5	+59.8	145.4	76 51.4	+60.0	147.9	76 00.0	+60.0	150.0	76
77	82 14.6	+52.6	123.6	81 38.9	+55.5	129.3	80 59.0	+57.3	134.1	80 15.6	+58.6	138.3	79 29.5	+59.4	141.9	78 41.3	+59.8	145.0	77 51.4	+59.9	147.7	77 00.0	+60.0	150.0	77
78	83 07.2	+50.4	•119.8	82 34.4	+54.1	126.5	81 56.3	+56.6	132.2	81 14.2	+58.2	137.0	80 28.9	+59.1	141.1	79 41.1	+59.6	144.5	78 51.3	+59.9	147.5	78 00.0	+60.0	150.0	78
79	83 57.6	+47.0	•114.9	83 28.5	+52.2	•122.9	82 52.9	+55.6	129.6	82 12.4	+57.7	135.3	81 28.0	+58.9	140.0	80 40.7	+59.6	143.9	79 51.2	+59.9	147.2	79 00.0	+60.0	150.0	79
80	84 44.6	+41.9	•108.6	84 20.7	+49.1	•118.2	83 48.5	+54.0	•126.4	83 10.1	+56.9	133.1	82 26.9	+58.7	138.6	81 40.3	+59.5	143.2	80 51.1	+59.9	146.9	80 00.0	+60.0	150.0	80
81	85 26.5	+34.1	•100.2	85 09.8	+44.3	•111.9	84 42.5	+51.3	•122.0	84 07.0	+55.7	130.3	83 25.6	+58.1	136.9	82 39.8	+59.4	142.2	81 51.0	+59.9	146.5	81 00.0	+60.0	150.0	81
82	86 00.6	+22.5	• 89.1	85 54.1	+36.3	•103.2	85 33.8	+47.0	•115.9	85 02.7	+53.7	•126.3	84 23.7	+57.3	134.6	83 39.2	+59.1	141.0	82 50.9	+59.8	146.0	82 00.0	+60.0	150.0	82
83	86 23.1	+7.3	• 75.1	86 30.4	+23.6	• 91.1	86 20.8	+39.0	•107.0	85 56.4	+50.0	•120.6	85 21.0	+56.0	•131.3	84 38.3	+58.7	139.3	83 50.7	+59.8	145.4	83 00.0	+60.0	150.0	83
84	86 30.4	−9.6	• 59.0	86 54.0	+5.8	• 75.1	86 59.8	+25.1	• 93.8	86 46.4	+42.4	•111.8	86 17.0	+53.2	•126.3	85 37.0	+58.0	136.9	84 50.5	+59.7	144.5	84 00.0	+60.0	150.0	84
85	86 20.8	−24.4	• 43.1	86 59.8	−13.4	• 56.3	87 24.9	+3.9	• 75.1	87 28.8	+27.1	• 97.6	87 10.2	+46.7	•118.1	86 35.0	+56.3	•133.0	85 50.2	+59.4	143.1	85 00.0	+60.0	150.0	85
86	85 56.4	−35.4	• 29.5	86 46.4	−29.4	• 38.3	87 28.8	−18.6	• 52.5	87 55.9	+1.0	• 75.0	87 56.9	+30.0	•103.1	87 31.3	+51.8	•126.2	86 49.6	+58.9	140.9	86 00.0	+60.0	150.0	86
87	85 21.0	−42.7	• 18.8	86 17.0	−40.0	• 23.8	87 10.2	−35.2	• 32.0	87 56.9	−25.6	• 46.9	88 26.9	−3.8	• 75.0	88 23.1	+34.8	•111.8	87 48.5	+57.1	•136.8	87 00.0	+60.0	150.0	87
88	84 38.3	−47.6	• 10.8	85 37.0	−46.5	• 13.2	86 35.0	−44.8	• 17.0	87 31.3	−41.7	• 23.8	88 23.1	−34.6	• 38.3	88 57.9	−12.3	• 75.0	88 45.6	+43.3	•126.2	88 00.0	+60.0	150.0	88
89	83 50.7	−50.7	• 4.7	84 50.5	−50.5	• 5.6	85 50.2	−50.2	• 6.9	86 49.6	−49.6	• 9.1	87 48.5	−48.5	• 13.2	88 45.6	−45.6	• 23.8	89 28.9	−28.9	• 75.0	89 00.0	+60.0	150.0	89
90	83 00.0	−52.9	0.0	84 00.0	−53.0	• 0.0	85 00.0	−53.2	• 0.0	86 00.0	−53.5	• 0.0	87 00.0	−53.9	• 0.0	88 00.0	−54.6	• 0.0	89 00.0	−55.9	• 0.0	90 00.0	−60.0	75.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 30°, 330°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 03.5	–59.9	149.8	5 11.6	–59.9	149.9	4 19.7	–59.9	149.9	3 27.8	–60.0	149.9	2 35.9	–60.0	150.0	1 43.9	–60.0	150.0	0 52.0	–60.0	150.0	0 00.0	+60.0	30.0	**0**
1	5 03.6	–59.9	149.9	4 11.7	–59.9	149.9	3 19.8	–60.0	149.9	2 27.8	–59.9	150.0	1 35.9	–60.0	150.0	0 43.9	–60.0	150.0	0 08.0	+60.0	30.0	1 00.0	+60.0	30.0	**1**
2	4 03.7	–59.9	149.9	3 11.8	–59.9	150.0	2 19.8	–59.9	150.0	1 27.9	–60.0	150.0	0 35.9	–60.0	150.0	0 16.1	+60.0	30.0	1 08.0	+60.0	30.0	2 00.0	+60.0	30.0	**2**
3	3 03.8	–59.8	150.0	2 11.9	–59.9	150.0	1 19.9	–59.9	150.0	0 27.9	–59.9	150.0	0 24.1	+60.0	30.0	1 16.1	+59.9	30.0	2 08.0	+60.0	30.0	3 00.0	+60.0	30.0	**3**
4	2 04.0	–59.9	150.1	1 12.0	–60.0	150.1	0 20.0	–60.0	150.1	0 32.0	+60.0	29.9	1 24.1	+59.9	29.9	2 16.0	+60.0	29.9	3 08.0	+60.0	30.0	4 00.0	+60.0	30.0	**4**
5	1 04.1	–59.9	150.1	0 12.0	–59.9	150.1	0 40.0	+59.9	29.9	1 32.0	+60.0	29.9	2 24.0	+60.0	29.9	3 16.0	+60.0	29.9	4 08.0	+60.0	30.0	5 00.0	+60.0	30.0	**5**
6	0 04.2	–59.9	150.2	0 47.9	+59.9	29.8	1 39.9	+60.0	29.8	2 32.0	+59.9	29.9	3 24.0	+60.0	29.9	4 16.0	+60.0	29.9	5 08.0	+60.0	30.0	6 00.0	+60.0	30.0	**6**
7	0 55.7	+59.9	29.8	1 47.8	+59.9	29.8	2 39.9	+59.9	29.8	3 31.9	+60.0	29.8	4 24.0	+60.0	29.9	5 16.0	+60.0	29.9	6 08.0	+60.0	29.9	7 00.0	+60.0	30.0	**7**
8	1 55.6	+59.9	29.7	2 47.7	+59.9	29.7	3 39.8	+60.0	29.7	4 31.9	+60.0	29.8	5 24.0	+59.9	29.8	6 16.0	+60.0	29.9	7 08.0	+60.0	29.9	8 00.0	+60.0	30.0	**8**
9	2 55.5	+59.9	29.6	3 47.6	+60.0	29.7	4 39.8	+59.9	29.7	5 31.9	+59.9	29.7	6 23.9	+60.0	29.8	7 16.0	+60.0	29.9	8 08.0	+60.0	29.9	9 00.0	+60.0	30.0	**9**
10	3 55.4	+59.9	29.6	4 47.6	+59.9	29.6	5 39.7	+59.9	29.7	6 31.8	+60.0	29.7	7 23.9	+60.0	29.8	8 16.0	+60.0	29.8	9 08.0	+60.0	29.9	10 00.0	+60.0	30.0	**10**
11	4 55.3	+59.9	29.5	5 47.5	+59.9	29.6	6 39.6	+60.0	29.6	7 31.8	+60.0	29.7	8 23.9	+60.0	29.7	9 16.0	+60.0	29.8	10 08.0	+60.0	29.9	11 00.0	+60.0	30.0	**11**
12	5 55.2	+59.8	29.5	6 47.4	+59.9	29.5	7 39.6	+59.9	29.6	8 31.8	+59.9	29.6	9 23.9	+60.0	29.7	10 16.0	+60.0	29.8	11 08.0	+60.0	29.9	12 00.0	+60.0	30.0	**12**
13	6 55.0	+59.9	29.4	7 47.3	+59.9	29.5	8 39.5	+60.0	29.5	9 31.7	+60.0	29.6	10 23.9	+59.9	29.7	11 16.0	+60.0	29.8	12 08.0	+60.0	29.9	13 00.0	+60.0	30.0	**13**
14	7 54.9	+59.9	29.3	8 47.2	+59.9	29.4	9 39.5	+59.9	29.5	10 31.7	+59.9	29.6	11 23.8	+60.0	29.7	12 16.0	+59.9	29.8	13 08.0	+60.0	29.9	14 00.0	+60.0	30.0	**14**
15	8 54.8	+59.9	29.3	9 47.1	+59.9	29.3	10 39.4	+60.0	29.4	11 31.6	+60.0	29.5	12 23.8	+60.0	29.6	13 15.9	+60.0	29.7	14 08.0	+60.0	29.9	15 00.0	+60.0	30.0	**15**
16	9 54.7	+59.9	29.2	10 47.0	+60.0	29.3	11 39.4	+59.9	29.4	12 31.6	+60.0	29.5	13 23.8	+60.0	29.6	14 15.9	+60.0	29.7	15 08.0	+60.0	29.9	16 00.0	+60.0	30.0	**16**
17	10 54.6	+59.9	29.1	11 47.0	+59.9	29.2	12 39.3	+59.9	29.3	13 31.6	+59.9	29.5	14 23.8	+60.0	29.6	15 15.9	+60.0	29.7	16 08.0	+60.0	29.9	17 00.0	+60.0	30.0	**17**
18	11 54.5	+59.9	29.1	12 46.9	+59.9	29.2	13 39.2	+60.0	29.3	14 31.5	+60.0	29.4	15 23.8	+59.9	29.6	16 15.9	+60.0	29.7	17 08.0	+60.0	29.8	18 00.0	+60.0	30.0	**18**
19	12 54.4	+59.8	29.0	13 46.8	+59.9	29.1	14 39.2	+59.9	29.3	15 31.5	+59.9	29.4	16 23.7	+60.0	29.5	17 15.9	+60.0	29.7	18 08.0	+60.0	29.8	19 00.0	+60.0	30.0	**19**
20	13 54.2	+59.9	28.9	14 46.7	+59.9	29.1	15 39.1	+59.9	29.2	16 31.4	+60.0	29.3	17 23.7	+60.0	29.5	18 15.9	+60.0	29.7	19 08.0	+60.0	29.8	20 00.0	+60.0	30.0	**20**
21	14 54.1	+59.9	28.9	15 46.6	+59.9	29.0	16 39.0	+60.0	29.2	17 31.4	+60.0	29.3	18 23.7	+60.0	29.5	19 15.9	+60.0	29.6	20 08.0	+60.0	29.8	21 00.0	+60.0	30.0	**21**
22	15 54.0	+59.9	28.8	16 46.5	+59.9	29.0	17 39.0	+59.9	29.1	18 31.4	+59.9	29.3	19 23.7	+59.9	29.4	20 15.9	+60.0	29.6	21 08.0	+60.0	29.8	22 00.0	+60.0	30.0	**22**
23	16 53.9	+59.9	28.8	17 46.4	+59.9	28.9	18 38.9	+60.0	29.1	19 31.3	+60.0	29.2	20 23.6	+60.0	29.4	21 15.9	+60.0	29.6	22 08.0	+60.0	29.8	23 00.0	+60.0	30.0	**23**
24	17 53.8	+59.8	28.7	18 46.3	+60.0	28.8	19 38.9	+59.9	29.0	20 31.3	+59.9	29.2	21 23.6	+60.0	29.4	22 15.9	+59.9	29.6	23 08.0	+60.0	29.8	24 00.0	+60.0	30.0	**24**
25	18 53.6	+59.9	28.6	19 46.3	+59.9	28.8	20 38.8	+59.9	29.0	21 31.2	+60.0	29.2	22 23.6	+60.0	29.3	23 15.8	+60.0	29.6	24 08.0	+60.0	29.8	25 00.0	+60.0	30.0	**25**
26	19 53.5	+59.9	28.5	20 46.2	+59.9	28.7	21 38.7	+60.0	28.9	22 31.2	+60.0	29.1	23 23.6	+59.9	29.3	24 15.8	+60.0	29.5	25 08.0	+60.0	29.8	26 00.0	+60.0	30.0	**26**
27	20 53.4	+59.8	28.5	21 46.1	+59.9	28.7	22 38.7	+59.9	28.9	23 31.2	+59.9	29.1	24 23.5	+60.0	29.3	25 15.8	+60.0	29.5	26 08.0	+60.0	29.8	27 00.0	+60.0	30.0	**27**
28	21 53.2	+59.9	28.4	22 46.0	+59.9	28.6	23 38.6	+59.9	28.8	24 31.1	+60.0	29.0	25 23.5	+60.0	29.3	26 15.8	+60.0	29.5	27 08.0	+60.0	29.7	28 00.0	+60.0	30.0	**28**
29	22 53.1	+59.9	28.3	23 45.9	+59.9	28.5	24 38.5	+60.0	28.8	25 31.1	+59.9	29.0	26 23.5	+60.0	29.2	27 15.8	+60.0	29.5	28 08.0	+60.0	29.7	29 00.0	+60.0	30.0	**29**
30	23 53.0	+59.8	28.3	24 45.8	+59.9	28.5	25 38.5	+59.9	28.7	26 31.0	+60.0	28.9	27 23.5	+59.9	29.2	28 15.8	+60.0	29.4	29 08.0	+60.0	29.7	30 00.0	+60.0	30.0	**30**
31	24 52.8	+59.9	28.2	25 45.7	+59.9	28.4	26 38.4	+59.9	28.7	27 31.0	+59.9	28.9	28 23.4	+60.0	29.2	29 15.8	+60.0	29.4	30 08.0	+60.0	29.7	31 00.0	+60.0	30.0	**31**
32	25 52.7	+59.9	28.1	26 45.6	+59.9	28.4	27 38.3	+59.9	28.6	28 30.9	+60.0	28.9	29 23.4	+60.0	29.1	30 15.8	+59.9	29.4	31 08.0	+60.0	29.7	32 00.0	+60.0	30.0	**32**
33	26 52.6	+59.8	28.0	27 45.5	+59.9	28.3	28 38.2	+60.0	28.5	29 30.9	+59.9	28.8	30 23.4	+60.0	29.1	31 15.7	+60.0	29.4	32 08.0	+60.0	29.7	33 00.0	+60.0	30.0	**33**
34	27 52.4	+59.9	28.0	28 45.4	+59.9	28.2	29 38.2	+59.9	28.5	30 30.8	+60.0	28.8	31 23.4	+59.9	29.1	32 15.7	+60.0	29.4	33 08.0	+59.9	29.7	34 00.0	+60.0	30.0	**34**
35	28 52.3	+59.8	27.9	29 45.3	+59.8	28.1	30 38.1	+59.9	28.4	31 30.8	+59.9	28.7	32 23.3	+60.0	29.0	33 15.7	+60.0	29.3	34 07.9	+60.0	29.7	35 00.0	+60.0	30.0	**35**
36	29 52.1	+59.9	27.8	30 45.1	+59.9	28.1	31 38.0	+59.9	28.4	32 30.7	+60.0	28.7	33 23.3	+60.0	29.0	34 15.7	+60.0	29.3	35 07.9	+60.0	29.6	36 00.0	+60.0	30.0	**36**
37	30 52.0	+59.8	27.7	31 45.0	+59.9	28.0	32 37.9	+60.0	28.3	33 30.7	+59.9	28.6	34 23.3	+59.9	28.9	35 15.7	+60.0	29.3	36 07.9	+60.0	29.6	37 00.0	+60.0	30.0	**37**
38	31 51.8	+59.9	27.6	32 44.9	+59.9	27.9	33 37.9	+59.9	28.2	34 30.6	+60.0	28.6	35 23.2	+60.0	28.9	36 15.7	+60.0	29.3	37 07.9	+60.0	29.6	38 00.0	+60.0	30.0	**38**
39	32 51.7	+59.8	27.6	33 44.8	+59.9	27.9	34 37.8	+59.9	28.2	35 30.6	+59.9	28.5	36 23.2	+60.0	28.9	37 15.7	+60.0	29.2	38 07.9	+60.0	29.6	39 00.0	+60.0	30.0	**39**
40	33 51.5	+59.9	27.5	34 44.7	+59.9	27.8	35 37.7	+59.9	28.1	36 30.5	+60.0	28.5	37 23.2	+59.9	28.8	38 15.7	+59.9	29.2	39 07.9	+60.0	29.6	40 00.0	+60.0	30.0	**40**
41	34 51.4	+59.8	27.4	35 44.6	+59.8	27.7	36 37.6	+59.9	28.0	37 30.5	+59.9	28.4	38 23.1	+60.0	28.8	39 15.6	+60.0	29.2	40 07.9	+60.0	29.6	41 00.0	+60.0	30.0	**41**
42	35 51.2	+59.8	27.3	36 44.4	+59.9	27.6	37 37.5	+59.9	28.0	38 30.4	+59.9	28.3	39 23.1	+60.0	28.7	40 15.6	+60.0	29.1	41 07.9	+60.0	29.6	42 00.0	+60.0	30.0	**42**
43	36 51.0	+59.8	27.2	37 44.3	+59.9	27.5	38 37.4	+59.9	27.9	39 30.3	+60.0	28.3	40 23.1	+59.9	28.7	41 15.6	+60.0	29.1	42 07.9	+60.0	29.5	43 00.0	+60.0	30.0	**43**
44	37 50.8	+59.9	27.1	38 44.2	+59.8	27.5	39 37.3	+59.9	27.8	40 30.3	+59.9	28.2	41 23.0	+60.0	28.6	42 15.6	+60.0	29.1	43 07.9	+60.0	29.5	44 00.0	+60.0	30.0	**44**
45	38 50.7	+59.8	27.0	39 44.0	+59.9	27.4	40 37.2	+59.9	27.8	41 30.2	+60.0	28.2	42 23.0	+60.0	28.6	43 15.6	+60.0	29.0	44 07.9	+60.0	29.5	45 00.0	+60.0	30.0	**45**
46	39 50.5	+59.8	26.9	40 43.9	+59.8	27.3	41 37.1	+59.9	27.7	42 30.2	+59.9	28.1	43 23.0	+59.9	28.5	44 15.6	+59.9	29.0	45 07.9	+60.0	29.5	46 00.0	+60.0	30.0	**46**
47	40 50.3	+59.8	26.8	41 43.7	+59.9	27.2	42 37.0	+59.9	27.6	43 30.1	+59.9	28.0	44 22.9	+60.0	28.5	45 15.5	+60.0	29.0	46 07.9	+60.0	29.5	47 00.0	+60.0	30.0	**47**
48	41 50.1	+59.8	26.7	42 43.6	+59.8	27.1	43 36.9	+59.9	27.5	44 30.0	+59.9	28.0	45 22.9	+59.9	28.4	46 15.5	+60.0	28.9	47 07.9	+60.0	29.5	48 00.0	+60.0	30.0	**48**
49	42 49.9	+59.8	26.6	43 43.4	+59.9	27.0	44 36.8	+59.9	27.4	45 29.9	+60.0	27.9	46 22.8	+60.0	28.4	47 15.5	+60.0	28.9	48 07.9	+60.0	29.4	49 00.0	+60.0	30.0	**49**
50	43 49.7	+59.8	26.5	44 43.3	+59.8	26.9	45 36.7	+59.9	27.4	46 29.9	+59.9	27.8	47 22.8	+60.0	28.3	48 15.5	+60.0	28.9	49 07.9	+60.0	29.4	50 00.0	+60.0	30.0	**50**
51	44 49.5	+59.7	26.3	45 43.1	+59.8	26.8	46 36.6	+59.8	27.3	47 29.8	+59.9	27.8	48 22.8	+59.9	28.3	49 15.5	+59.9	28.8	50 07.9	+60.0	29.4	51 00.0	+60.0	30.0	**51**
52	45 49.2	+59.8	26.2	46 42.9	+59.9	26.7	47 36.4	+59.9	27.2	48 29.7	+59.9	27.7	49 22.7	+60.0	28.2	50 15.4	+60.0	28.8	51 07.9	+60.0	29.4	52 00.0	+60.0	30.0	**52**
53	46 49.0	+59.7	26.1	47 42.8	+59.8	26.6	48 36.3	+59.9	27.1	49 29.6	+59.9	27.6	50 22.7	+59.9	28.2	51 15.4	+60.0	28.7	52 07.9	+60.0	29.4	53 00.0	+60.0	30.0	**53**
54	47 48.7	+59.8	26.0	48 42.6	+59.8	26.4	49 36.2	+59.8	27.0	50 29.5	+59.9	27.5	51 22.6	+60.0	28.1	52 15.4	+60.0	28.7	53 07.9	+60.0	29.3	54 00.0	+60.0	30.0	**54**
55	48 48.5	+59.7	25.8	49 42.4	+59.8	26.3	50 36.0	+59.9	26.9	51 29.4	+59.9	27.4	52 22.6	+59.9	28.0	53 15.4	+59.9	28.6	54 07.9	+59.9	29.3	55 00.0	+60.0	30.0	**55**
56	49 48.2	+59.8	25.7	50 42.2	+59.8	26.2	51 35.9	+59.8	26.8	52 29.3	+59.9	27.3	53 22.5	+59.9	27.9	54 15.3	+60.0	28.6	55 07.8	+60.0	29.3	56 00.0	+60.0	30.0	**56**
57	50 48.0	+59.7	25.5	51 42.0	+59.8	26.1	52 35.7	+59.9	26.6	53 29.2	+59.9	27.2	54 22.4	+60.0	27.9	55 15.3	+60.0	28.5	56 07.8	+60.0	29.3	57 00.0	+60.0	30.0	**57**
58	51 47.7	+59.7	25.4	52 41.8	+59.7	25.9	53 35.6	+59.8	26.5	54 29.1	+59.9	27.1	55 22.4	+59.9	27.8	56 15.3	+60.0	28.5	57 07.8	+60.0	29.2	58 00.0	+60.0	30.0	**58**
59	52 47.4	+59.7	25.2	53 41.5	+59.8	25.8	54 35.4	+59.9	26.4	55 29.0	+59.9	27.0	56 22.3	+59.9	27.7	57 15.3	+59.9	28.4	58 07.8	+60.0	29.2	59 00.0	+60.0	30.0	**59**
60	53 47.1	+59.6	25.0	54 41.3	+59.7	25.6	55 35.3	+59.8	26.3	56 28.9	+59.9	26.9	57 22.2	+60.0	27.6	58 15.2	+60.0	28.4	59 07.8	+60.0	29.2	60 00.0	+60.0	30.0	**60**
61	54 46.7	+59.7	24.9	55 41.0	+59.8	25.5	56 35.1	+59.8	26.1	57 28.8	+59.9	26.8	58 22.2	+59.9	27.5	59 15.2	+60.0	28.3	60 07.8	+60.0	29.1	61 00.0	+60.0	30.0	**61**
62	55 46.4	+59.6	24.7	56 40.8	+59.7	25.3	57 34.9	+59.8	26.0	58 28.7	+59.8	26.7	59 22.1	+59.9	27.4	60 15.2	+59.9	28.2	61 07.8	+60.0	29.1	62 00.0	+60.0	30.0	**62**
63	56 46.0	+59.6	24.5	57 40.5	+59.7	25.1	58 34.7	+59.8	25.8	59 28.5	+59.9	26.5	60 22.0	+59.9	27.3	61 15.1	+60.0	28.2	62 07.8	+60.0	29.1	63 00.0	+60.0	30.0	**63**
64	57 45.6	+59.6	24.3	58 40.2	+59.7	24.9	59 34.5	+59.7	25.6	60 28.4	+59.8	26.4	61 21.9	+59.9	27.2	62 15.1	+59.9	28.1	63 07.8	+60.0	29.0	64 00.0	+60.0	30.0	**64**
65	58 45.2	+59.6	24.0	59 39.9	+59.7	24.7	60 34.2	+59.8	25.5	61 28.2	+59.9	26.3	62 21.8	+59.9	27.1	63 15.0	+60.0	28.0	64 07.8	+60.0	29.0	65 00.0	+60.0	30.0	**65**
66	59 44.8	+59.6	23.8	60 39.6	+59.6	24.5	61 34.0	+59.7	25.3	62 28.1	+59.8	26.1	63 21.7	+59.9	27.0	64 15.0	+59.9	27.9	65 07.8	+59.9	28.9	66 00.0	+60.0	30.0	**66**
67	60 44.4	+59.5	23.6	61 39.2	+59.6	24.3	62 33.7	+59.7	25.1	63 27.9	+59.8	25.9	64 21.6	+59.9	26.8	65 14.9	+60.0	27.8	66 07.7	+60.0	28.9	67 00.0	+60.0	30.0	**67**
68	61 43.9	+59.5	23.3	62 38.8	+59.6	24.1	63 33.4	+59.7	24.9	64 27.7	+59.8	25.8	65 21.5	+59.9	26.7	66 14.9	+59.9	27.7	67 07.7	+60.0	28.8	68 00.0	+60.0	30.0	**68**
69	62 43.4	+59.4	23.0	63 38.4	+59.6	23.8	64 33.1	+59.7	24.6	65 27.5	+59.8	25.6	66 21.4	+59.9	26.5	67 14.8	+60.0	27.6	68 07.7	+60.0	28.8	69 00.0	+60.0	30.0	**69**
70	63 42.8	+59.4	22.7	64 38.0	+59.5	23.5	65 32.8	+59.7	24.4	66 27.3	+59.7	25.3	67 21.3	+59.8	26.4	68 14.8	+59.9	27.5	69 07.7	+60.0	28.7	70 00.0	+60.0	30.0	**70**
71	64 42.2	+59.4	22.4	65 37.5	+59.5	23.2	66 32.5	+59.6	24.1	67 27.0	+59.8	25.1	68 21.1	+59.9	26.2	69 14.7	+59.9	27.3	70 07.7	+60.0	28.6	71 00.0	+60.0	30.0	**71**
72	65 41.6	+59.3	22.0	66 37.0	+59.5	22.9	67 32.1	+59.6	23.9	68 26.8	+59.7	24.9	69 21.0	+59.8	26.0	70 14.6	+59.9	27.2	71 07.7	+59.9	28.5	72 00.0	+60.0	30.0	**72**
73	66 40.9	+59.2	21.7	67 36.5	+59.4	22.6	68 31.7	+59.5	23.5	69 26.5	+59.7	24.6	70 20.8	+59.8	25.8	71 14.5	+59.9	27.0	72 07.6	+60.0	28.4	73 00.0	+60.0	30.0	**73**
74	67 40.1	+59.2	21.3	68 35.9	+59.3	22.2	69 31.2	+59.6	23.2	70 26.2	+59.6	24.3	71 20.6	+59.8	25.5	72 14.4	+59.9	26.9	73 07.6	+60.0	28.3	74 00.0	+60.0	30.0	**74**
75	68 39.3	+59.2	20.8	69 35.2	+59.3	21.8	70 30.8	+59.4	22.8	71 25.8	+59.6	24.0	72 20.4	+59.7	25.2	73 14.3	+59.9	26.7	74 07.6	+59.9	28.2	75 00.0	+60.0	30.0	**75**
76	69 38.5	+59.0	20.3	70 34.5	+59.2	21.3	71 30.2	+59.4	22.4	72 25.4	+59.6	23.6	73 20.1	+59.8	24.9	74 14.2	+59.9	26.4	75 07.5	+60.0	28.1	76 00.0	+60.0	30.0	**76**
77	70 37.5	+58.9	19.8	71 33.7	+59.2	20.8	72 29.6	+59.3	22.0	73 25.0	+59.5	23.2	74 19.9	+59.7	24.6	75 14.1	+59.8	26.2	76 07.5	+60.0	28.0	77 00.0	+60.0	30.0	**77**
78	71 36.4	+58.8	19.2	72 32.9	+59.0	20.3	73 28.9	+59.3	21.4	74 24.5	+59.5	22.8	75 19.6	+59.6	24.2	76 13.9	+59.9	25.9	77 07.5	+59.9	27.8	78 00.0	+60.0	30.0	**78**
79	72 35.2	+58.7	18.6	73 31.9	+58.9	19.7	74 28.2	+59.1	20.9	75 24.0	+59.4	22.2	76 19.2	+59.6	23.8	77 13.8	+59.8	25.6	78 07.4	+60.0	27.6	79 00.0	+60.0	30.0	**79**
80	73 33.9	+58.5	17.9	74 30.8	+58.8	19.0	75 27.3	+59.1	20.2	76 23.4	+59.3	21.7	77 18.8	+59.6	23.3	78 13.6	+59.7	25.2	79 07.4	+59.9	27.4	80 00.0	+60.0	30.0	**80**
81	74 32.4	+58.3	17.1	75 29.6	+58.6	18.2	76 26.4	+58.8	19.5	77 22.7	+59.1	21.0	78 18.4	+59.4	22.7	79 13.3	+59.7	24.7	80 07.3	+59.9	27.1	81 00.0	+60.0	30.0	**81**
82	75 30.7	+58.1	16.1	76 28.2	+58.3	17.3	77 25.2	+58.7	18.6	78 21.8	+59.0	20.2	79 17.8	+59.4	22.0	80 13.0	+59.7	24.2	81 07.2	+59.9	26.8	82 00.0	+60.0	30.0	**82**
83	76 28.8	+57.7	15.1	77 26.5	+58.1	16.3	78 23.9	+58.5	17.6	79 20.8	+58.9	19.2	80 17.2	+59.2	21.2	81 12.7	+59.5	23.5	82 07.1	+59.9	26.4	83 00.0	+60.0	30.0	**83**
84	77 26.5	+57.4	13.9	78 24.6	+57.8	15.1	79 22.4	+58.1	16.5	80 19.7	+58.5	18.1	81 16.4	+58.9	20.1	82 12.2	+59.5	22.7	83 07.0	+59.8	25.9	84 00.0	+60.0	30.0	**84**
85	78 23.9	+56.9	12.5	79 22.4	+57.3	13.7	80 20.5	+57.7	15.1	81 18.2	+58.2	16.8	82 15.3	+58.7	18.9	83 11.7	+59.2	21.6	84 06.8	+59.7	25.1	85 00.0	+60.0	30.0	**85**
86	79 20.8	+56.4	10.9	80 19.7	+56.7	12.0	81 18.2	+57.1	13.3	82 16.4	+57.6	15.0	83 14.0	+58.3	17.2	84 10.9	+58.9	20.1	85 06.5	+59.6	24.1	86 00.0	+60.0	30.0	**86**
87	80 17.2	+55.5	8.9	81 16.4	+55.8	9.9	82 15.3	+56.4	11.2	83 14.0	+56.9	12.8	84 12.3	+57.5	15.0	85 09.8	+58.4	18.1	86 06.1	+59.3	22.6	87 00.0	+60.0	30.0	**87**
88	81 12.7	+54.4	6.6	82 12.2	+54.8	7.4	83 11.7	+55.1	8.5	84 10.9	+55.6	9.9	85 09.8	+56.3	11.9	86 08.2	+57.2	15.0	87 05.4	+58.7	20.1	88 00.0	+60.0	30.0	**88**
89	82 07.1	+52.9	3.6	83 07.0	*+53.0* •	4.2	84 06.8	*+53.2* •	4.9	85 06.5	*+53.5* •	5.9	86 06.1	*+53.9* •	7.4	87 05.4	*+54.6* •	9.9	88 04.1	*+55.9* •	15.0	89 00.0	+60.0	30.0	**89**
90	83 00.0	*+50.7* •	0.0	84 00.0	*+50.5* •	0.0	85 00.0	*+50.2* •	0.0	86 00.0	*+49.6* •	0.0	87 00.0	*+48.5* •	0.0	88 00.0	*+45.6* •	0.0	89 00.0	*+28.9* •	0.0	90 00.0	–60.0	15.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 150°, 210°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 59.8	+59.9	148.8	5 08.4	+59.9	148.9	4 17.1	+59.9	148.9	3 25.7	+59.9	148.9	2 34.3	+59.9	149.0	1 42.9	+59.9	149.0	0 51.4	+60.0	149.0	0 00.0	+60.0	149.0	**0**
1	6 59.7	+59.8	148.7	6 08.3	+60.0	148.8	5 17.0	+59.9	148.9	4 25.6	+60.0	148.9	3 34.2	+60.0	148.9	2 42.8	+60.0	149.0	1 51.4	+60.0	149.0	1 00.0	+60.0	149.0	**1**
2	7 59.5	+59.9	148.7	7 08.3	+59.9	148.8	6 16.9	+60.0	148.8	5 25.6	+60.0	148.9	4 34.2	+60.0	148.9	3 42.8	+60.0	148.9	2 51.4	+60.0	149.0	2 00.0	+60.0	149.0	**2**
3	8 59.4	+59.9	148.6	8 08.2	+59.9	148.7	7 16.9	+59.9	148.8	6 25.6	+59.9	148.8	5 34.2	+60.0	148.9	4 42.8	+60.0	148.9	3 51.4	+60.0	149.0	3 00.0	+60.0	149.0	**3**
4	9 59.3	+59.9	148.6	9 08.1	+59.9	148.6	8 16.8	+60.0	148.7	7 25.5	+60.0	148.8	6 34.2	+60.0	148.9	5 42.8	+60.0	148.9	4 51.4	+60.0	149.0	4 00.0	+60.0	149.0	**4**
5	10 59.2	+59.8	148.5	10 08.0	+59.9	148.6	9 16.8	+59.9	148.7	8 25.5	+59.9	148.8	7 34.2	+59.9	148.8	6 42.8	+60.0	148.9	5 51.4	+60.0	149.0	5 00.0	+60.0	149.0	**5**
6	11 59.0	+59.9	148.4	11 07.9	+59.9	148.5	10 16.7	+59.9	148.6	9 25.4	+60.0	148.7	8 34.1	+60.0	148.8	7 42.8	+60.0	148.9	6 51.4	+60.0	148.9	6 00.0	+60.0	149.0	**6**
7	12 58.9	+59.9	148.4	12 07.8	+59.9	148.5	11 16.6	+60.0	148.6	10 25.4	+60.0	148.7	9 34.1	+60.0	148.8	8 42.8	+60.0	148.9	7 51.4	+60.0	148.9	7 00.0	+60.0	149.0	**7**
8	13 58.8	+59.9	148.3	13 07.7	+59.9	148.4	12 16.6	+59.9	148.5	11 25.4	+59.9	148.6	10 34.1	+60.0	148.7	9 42.8	+60.0	148.8	8 51.4	+60.0	148.9	8 00.0	+60.0	149.0	**8**
9	14 58.7	+59.8	148.2	14 07.6	+59.9	148.4	13 16.5	+59.9	148.5	12 25.3	+60.0	148.6	11 34.1	+59.9	148.7	10 42.8	+60.0	148.8	9 51.4	+60.0	148.9	9 00.0	+60.0	149.0	**9**
10	15 58.5	+59.9	148.2	15 07.5	+59.9	148.3	14 16.4	+60.0	148.4	13 25.3	+59.9	148.6	12 34.0	+60.0	148.7	11 42.8	+59.9	148.8	10 51.4	+60.0	148.9	10 00.0	+60.0	149.0	**10**
11	16 58.4	+59.9	148.1	16 07.4	+59.9	148.2	15 16.4	+59.9	148.4	14 25.2	+60.0	148.5	13 34.0	+60.0	148.7	12 42.7	+60.0	148.8	11 51.4	+60.0	148.9	11 00.0	+60.0	149.0	**11**
12	17 58.3	+59.9	148.0	17 07.3	+59.9	148.2	16 16.3	+59.9	148.3	15 25.2	+60.0	148.5	14 34.0	+60.0	148.6	13 42.7	+60.0	148.8	12 51.4	+60.0	148.9	12 00.0	+60.0	149.0	**12**
13	18 58.2	+59.8	148.0	18 07.2	+59.9	148.1	17 16.2	+60.0	148.3	16 25.2	+59.9	148.5	15 34.0	+60.0	148.6	14 42.7	+60.0	148.7	13 51.4	+60.0	148.9	13 00.0	+60.0	149.0	**13**
14	19 58.0	+59.9	147.9	19 07.1	+60.0	148.1	18 16.2	+59.9	148.2	17 25.1	+60.0	148.4	16 34.0	+59.9	148.6	15 42.7	+60.0	148.7	14 51.4	+60.0	148.9	14 00.0	+60.0	149.0	**14**
15	20 57.9	+59.8	147.8	20 07.1	+59.9	148.0	19 16.1	+59.9	148.2	18 25.1	+59.9	148.4	17 33.9	+60.0	148.5	16 42.7	+60.0	148.7	15 51.4	+60.0	148.9	15 00.0	+60.0	149.0	**15**
16	21 57.7	+59.9	147.7	21 07.0	+59.9	147.9	20 16.0	+60.0	148.1	19 25.0	+60.0	148.3	18 33.9	+60.0	148.5	17 42.7	+60.0	148.7	16 51.4	+60.0	148.8	16 00.0	+60.0	149.0	**16**
17	22 57.6	+59.9	147.7	22 06.9	+59.8	147.9	21 16.0	+59.9	148.1	20 25.0	+59.9	148.3	19 33.9	+60.0	148.5	18 42.7	+60.0	148.7	17 51.4	+60.0	148.8	17 00.0	+60.0	149.0	**17**
18	23 57.5	+59.8	147.6	23 06.7	+59.9	147.8	22 15.9	+59.9	148.0	21 24.9	+60.0	148.3	20 33.9	+59.9	148.5	19 42.7	+60.0	148.6	18 51.4	+60.0	148.8	18 00.0	+60.0	149.0	**18**
19	24 57.3	+59.9	147.5	24 06.6	+59.9	147.8	23 15.8	+60.0	148.0	22 24.9	+59.9	148.2	21 33.8	+60.0	148.4	20 42.7	+60.0	148.6	19 51.4	+60.0	148.8	19 00.0	+60.0	149.0	**19**
20	25 57.2	+59.8	147.4	25 06.5	+59.9	147.7	24 15.8	+59.9	147.9	23 24.8	+60.0	148.2	22 33.8	+60.0	148.4	21 42.7	+59.9	148.6	20 51.4	+60.0	148.8	20 00.0	+60.0	149.0	**20**
21	26 57.0	+59.9	147.4	26 06.4	+59.9	147.6	25 15.7	+59.9	147.9	24 24.8	+60.0	148.1	23 33.8	+60.0	148.4	22 42.6	+60.0	148.6	21 51.4	+60.0	148.8	21 00.0	+60.0	149.0	**21**
22	27 56.9	+59.8	147.3	27 06.3	+59.9	147.6	26 15.6	+59.9	147.8	25 24.8	+59.9	148.1	24 33.8	+59.9	148.3	23 42.6	+60.0	148.6	22 51.4	+60.0	148.8	22 00.0	+60.0	149.0	**22**
23	28 56.7	+59.9	147.2	28 06.2	+59.9	147.5	27 15.5	+60.0	147.8	26 24.7	+60.0	148.0	25 33.7	+60.0	148.3	24 42.6	+60.0	148.5	23 51.4	+60.0	148.8	23 00.0	+60.0	149.0	**23**
24	29 56.6	+59.8	147.1	29 06.1	+59.9	147.4	28 15.5	+59.9	147.7	27 24.7	+59.9	148.0	26 33.7	+60.0	148.3	25 42.6	+60.0	148.5	24 51.4	+60.0	148.8	24 00.0	+60.0	149.0	**24**
25	30 56.4	+59.8	147.0	30 06.0	+59.9	147.3	29 15.4	+59.9	147.7	28 24.6	+60.0	147.9	27 33.7	+59.9	148.2	26 42.6	+60.0	148.5	25 51.4	+60.0	148.8	25 00.0	+60.0	149.0	**25**
26	31 56.2	+59.9	146.9	31 05.9	+59.8	147.3	30 15.3	+59.9	147.6	29 24.6	+59.9	147.9	28 33.6	+60.0	148.2	27 42.6	+60.0	148.5	26 51.4	+60.0	148.7	26 00.0	+60.0	149.0	**26**
27	32 56.1	+59.8	146.9	32 05.7	+59.9	147.2	31 15.2	+59.9	147.5	30 24.5	+60.0	147.9	29 33.6	+60.0	148.2	28 42.6	+60.0	148.5	27 51.4	+60.0	148.7	27 00.0	+60.0	149.0	**27**
28	33 55.9	+59.8	146.8	33 05.6	+59.9	147.1	32 15.1	+59.9	147.5	31 24.5	+59.9	147.8	30 33.6	+60.0	148.1	29 42.6	+59.9	148.4	28 51.4	+60.0	148.7	28 00.0	+60.0	149.0	**28**
29	34 55.7	+59.9	146.7	34 05.5	+59.9	147.0	33 15.0	+60.0	147.4	32 24.4	+59.9	147.8	31 33.6	+59.9	148.1	30 42.5	+60.0	148.4	29 51.4	+59.9	148.7	29 00.0	+60.0	149.0	**29**
30	35 55.6	+59.8	146.6	35 05.4	+59.8	147.0	34 15.0	+59.9	147.3	33 24.3	+60.0	147.7	32 33.5	+60.0	148.0	31 42.5	+60.0	148.4	30 51.3	+60.0	148.7	30 00.0	+60.0	149.0	**30**
31	36 55.4	+59.8	146.5	36 05.2	+59.9	146.9	35 14.9	+59.9	147.3	34 24.3	+59.9	147.7	33 33.5	+60.0	148.0	32 42.5	+60.0	148.4	31 51.3	+60.0	148.7	31 00.0	+60.0	149.0	**31**
32	37 55.2	+59.8	146.4	37 05.1	+59.9	146.8	36 14.8	+59.9	147.2	35 24.2	+60.0	147.6	34 33.5	+59.9	148.0	33 42.5	+60.0	148.3	32 51.3	+60.0	148.7	32 00.0	+60.0	149.0	**32**
33	38 55.0	+59.8	146.3	38 05.0	+59.8	146.7	37 14.7	+59.9	147.1	36 24.2	+59.9	147.5	35 33.4	+60.0	147.9	34 42.5	+60.0	148.3	33 51.3	+60.0	148.7	33 00.0	+60.0	149.0	**33**
34	39 54.8	+59.8	146.2	39 04.8	+59.9	146.6	38 14.6	+59.9	147.1	37 24.1	+59.9	147.5	36 33.4	+60.0	147.9	35 42.5	+60.0	148.3	34 51.3	+60.0	148.6	34 00.0	+60.0	149.0	**34**
35	40 54.6	+59.8	146.1	40 04.7	+59.8	146.5	39 14.5	+59.9	147.0	38 24.0	+60.0	147.4	37 33.4	+59.9	147.8	36 42.5	+59.9	148.2	35 51.3	+60.0	148.6	35 00.0	+60.0	149.0	**35**
36	41 54.4	+59.8	146.0	41 04.5	+59.9	146.4	40 14.4	+59.9	146.9	39 24.0	+59.9	147.4	38 33.3	+60.0	147.8	37 42.4	+60.0	148.2	36 51.3	+60.0	148.6	36 00.0	+60.0	149.0	**36**
37	42 54.2	+59.7	145.8	42 04.4	+59.8	146.3	41 14.3	+59.9	146.8	40 23.9	+60.0	147.3	39 33.3	+60.0	147.8	38 42.4	+60.0	148.2	37 51.3	+60.0	148.6	37 00.0	+60.0	149.0	**37**
38	43 53.9	+59.8	145.7	43 04.2	+59.8	146.2	42 14.2	+59.9	146.8	41 23.9	+59.9	147.2	40 33.3	+59.9	147.7	39 42.4	+60.0	148.2	38 51.3	+60.0	148.6	38 00.0	+60.0	149.0	**38**
39	44 53.7	+59.8	145.6	44 04.0	+59.9	146.1	43 14.1	+59.8	146.7	42 23.8	+59.9	147.2	41 33.2	+60.0	147.7	40 42.4	+60.0	148.1	39 51.3	+60.0	148.6	39 00.0	+60.0	149.0	**39**
40	45 53.5	+59.7	145.5	45 03.9	+59.8	146.0	44 13.9	+59.9	146.6	43 23.7	+59.9	147.1	42 33.2	+59.9	147.6	41 42.4	+60.0	148.1	40 51.3	+60.0	148.6	40 00.0	+60.0	149.0	**40**
41	46 53.2	+59.8	145.3	46 03.7	+59.8	145.9	45 13.8	+59.9	146.5	44 23.6	+60.0	147.0	43 33.1	+60.0	147.6	42 42.4	+59.9	148.1	41 51.3	+60.0	148.5	41 00.0	+60.0	149.0	**41**
42	47 53.0	+59.7	145.2	47 03.5	+59.8	145.8	46 13.7	+59.9	146.4	45 23.6	+59.9	147.0	44 33.1	+60.0	147.5	43 42.3	+60.0	148.0	42 51.3	+60.0	148.5	42 00.0	+60.0	149.0	**42**
43	48 52.7	+59.7	145.1	48 03.3	+59.8	145.7	47 13.6	+59.8	146.3	46 23.5	+59.9	146.9	45 33.1	+59.9	147.5	44 42.3	+60.0	148.0	43 51.3	+60.0	148.5	43 00.0	+60.0	149.0	**43**
44	49 52.4	+59.7	144.9	49 03.1	+59.8	145.6	48 13.4	+59.9	146.2	47 23.4	+59.9	146.8	46 33.0	+60.0	147.4	45 42.3	+60.0	148.0	44 51.3	+60.0	148.5	44 00.0	+60.0	149.0	**44**
45	50 52.1	+59.7	144.8	50 02.9	+59.8	145.4	49 13.3	+59.9	146.1	48 23.3	+59.9	146.7	47 33.0	+59.9	147.3	46 42.3	+60.0	147.9	45 51.3	+60.0	148.5	45 00.0	+60.0	149.0	**45**
46	51 51.8	+59.7	144.6	51 02.7	+59.8	145.3	50 13.2	+59.8	146.0	49 23.2	+59.9	146.7	48 32.9	+60.0	147.3	47 42.3	+59.9	147.9	46 51.3	+60.0	148.5	46 00.0	+60.0	149.0	**46**
47	52 51.5	+59.7	144.4	52 02.5	+59.7	145.2	51 13.0	+59.8	145.9	50 23.1	+59.9	146.6	49 32.9	+59.9	147.2	48 42.2	+60.0	147.8	47 51.3	+60.0	148.4	47 00.0	+60.0	149.0	**47**
48	53 51.2	+59.6	144.2	53 02.2	+59.8	145.0	52 12.8	+59.9	145.8	51 23.0	+59.9	146.5	50 32.8	+60.0	147.2	49 42.2	+60.0	147.8	48 51.3	+60.0	148.4	48 00.0	+60.0	149.0	**48**
49	54 50.8	+59.7	144.1	54 02.0	+59.7	144.9	53 12.7	+59.8	145.7	52 22.9	+59.9	146.4	51 32.8	+59.9	147.1	50 42.2	+60.0	147.8	49 51.3	+60.0	148.4	49 00.0	+60.0	149.0	**49**
50	55 50.5	+59.6	143.9	55 01.7	+59.8	144.7	54 12.5	+59.8	145.5	53 22.8	+59.9	146.3	52 32.7	+59.9	147.0	51 42.2	+59.9	147.7	50 51.3	+60.0	148.4	50 00.0	+60.0	149.0	**50**
51	56 50.1	+59.6	143.7	56 01.5	+59.7	144.5	55 12.3	+59.8	145.4	54 22.7	+59.9	146.2	53 32.6	+60.0	146.9	52 42.1	+60.0	147.7	51 51.3	+59.9	148.3	51 00.0	+60.0	149.0	**51**
52	57 49.7	+59.5	143.5	57 01.2	+59.7	144.4	56 12.1	+59.8	145.2	55 22.6	+59.9	146.1	54 32.6	+59.9	146.9	53 42.1	+60.0	147.6	52 51.2	+60.0	148.3	52 00.0	+60.0	149.0	**52**
53	58 49.2	+59.6	143.2	58 00.9	+59.7	144.2	57 11.9	+59.8	145.1	56 22.5	+59.8	146.0	55 32.5	+59.9	146.8	54 42.1	+60.0	147.6	53 51.2	+60.0	148.3	53 00.0	+60.0	149.0	**53**
54	59 48.8	+59.5	143.0	59 00.6	+59.6	144.0	58 11.7	+59.8	144.9	57 22.3	+59.9	145.8	56 32.4	+60.0	146.7	55 42.1	+59.9	147.5	54 51.2	+60.0	148.3	54 00.0	+60.0	149.0	**54**
55	60 48.3	+59.5	142.7	60 00.2	+59.7	143.8	59 11.5	+59.8	144.8	58 22.2	+59.9	145.7	57 32.4	+59.9	146.6	56 42.0	+60.0	147.4	55 51.2	+60.0	148.2	55 00.0	+60.0	149.0	**55**
56	61 47.8	+59.4	142.5	60 59.9	+59.6	143.6	60 11.3	+59.7	144.6	59 22.1	+59.8	145.6	58 32.3	+59.9	146.5	57 42.0	+60.0	147.4	56 51.2	+60.0	148.2	56 00.0	+60.0	149.0	**56**
57	62 47.2	+59.4	142.2	61 59.5	+59.6	143.3	61 11.0	+59.7	144.4	60 21.9	+59.8	145.4	59 32.2	+59.9	146.4	58 42.0	+59.9	147.3	57 51.2	+60.0	148.2	57 00.0	+60.0	149.0	**57**
58	63 46.6	+59.4	141.9	62 59.1	+59.5	143.1	62 10.7	+59.8	144.2	61 21.7	+59.9	145.3	60 32.1	+59.9	146.3	59 41.9	+60.0	147.3	58 51.2	+60.0	148.2	58 00.0	+60.0	149.0	**58**
59	64 46.0	+59.3	141.5	63 58.6	+59.6	142.8	63 10.5	+59.6	144.0	62 21.6	+59.8	145.1	61 32.0	+59.9	146.2	60 41.9	+59.9	147.2	59 51.2	+60.0	148.1	59 00.0	+60.0	149.0	**59**
60	65 45.3	+59.3	141.2	64 58.2	+59.4	142.5	64 10.1	+59.7	143.8	63 21.4	+59.8	145.0	62 31.9	+59.9	146.1	61 41.8	+60.0	147.1	60 51.2	+60.0	148.1	60 00.0	+60.0	149.0	**60**
61	66 44.6	+59.2	140.8	65 57.6	+59.5	142.2	65 09.8	+59.7	143.5	64 21.2	+59.8	144.8	63 31.8	+59.9	145.9	62 41.8	+59.9	147.0	61 51.2	+60.0	148.0	61 00.0	+60.0	149.0	**61**
62	67 43.8	+59.1	140.4	66 57.1	+59.4	141.9	66 09.5	+59.6	143.3	65 21.0	+59.7	144.6	64 31.7	+59.9	145.8	63 41.7	+60.0	146.9	62 51.2	+59.9	148.0	62 00.0	+60.0	149.0	**62**
63	68 42.9	+59.1	139.9	67 56.5	+59.4	141.5	67 09.1	+59.5	143.0	66 20.7	+59.8	144.4	65 31.6	+59.8	145.6	64 41.7	+59.9	146.8	63 51.1	+60.0	148.0	63 00.0	+60.0	149.0	**63**
64	69 42.0	+59.0	139.4	68 55.9	+59.2	141.1	68 08.6	+59.6	142.7	67 20.5	+59.7	144.1	66 31.4	+59.9	145.5	65 41.6	+60.0	146.7	64 51.1	+60.0	147.9	64 00.0	+60.0	149.0	**64**
65	70 41.0	+58.8	138.9	69 55.1	+59.3	140.7	69 08.2	+59.5	142.3	68 20.2	+59.7	143.9	67 31.3	+59.8	145.3	66 41.6	+59.9	146.6	65 51.1	+60.0	147.9	65 00.0	+60.0	149.0	**65**
66	71 39.8	+58.7	138.3	70 54.4	+59.1	140.2	70 07.7	+59.4	142.0	69 19.9	+59.7	143.6	68 31.1	+59.9	145.1	67 41.5	+59.9	146.5	66 51.1	+60.0	147.8	66 00.0	+60.0	149.0	**66**
67	72 38.5	+58.6	137.6	71 53.5	+59.0	139.6	71 07.1	+59.4	141.5	70 19.6	+59.6	143.3	69 31.0	+59.8	144.9	68 41.4	+60.0	146.4	67 51.1	+60.0	147.7	67 00.0	+60.0	149.0	**67**
68	73 37.1	+58.4	136.8	72 52.5	+59.0	139.1	72 06.5	+59.3	141.1	71 19.2	+59.6	143.0	70 30.8	+59.8	144.7	69 41.4	+59.9	146.2	68 51.1	+60.0	147.7	68 00.0	+60.0	149.0	**68**
69	74 35.5	+58.2	136.0	73 51.5	+58.8	138.4	73 05.8	+59.3	140.6	72 18.8	+59.6	142.6	71 30.6	+59.8	144.4	70 41.3	+59.9	146.1	69 51.1	+59.9	147.6	69 00.0	+60.0	149.0	**69**
70	75 33.7	+57.9	135.1	74 50.3	+58.6	137.7	74 05.1	+59.1	140.0	73 18.4	+59.5	142.2	72 30.4	+59.7	144.1	71 41.2	+59.9	145.9	70 51.0	+60.0	147.5	70 00.0	+60.0	149.0	**70**
71	76 31.6	+57.6	134.0	75 48.9	+58.4	136.8	75 04.2	+59.0	139.4	74 17.9	+59.4	141.7	73 30.1	+59.7	143.8	72 41.1	+59.9	145.7	71 51.0	+60.0	147.4	71 00.0	+60.0	149.0	**71**
72	77 29.2	+57.3	132.7	76 47.3	+58.2	135.9	76 03.2	+58.9	138.7	75 17.3	+59.4	141.2	74 29.8	+59.7	143.5	73 41.0	+59.8	145.5	72 51.0	+60.0	147.3	72 00.0	+60.0	149.0	**72**
73	78 26.5	+56.7	131.3	77 45.5	+57.9	134.8	77 02.1	+58.7	137.8	76 16.7	+59.2	140.6	75 29.5	+59.6	143.1	74 40.8	+59.9	145.3	73 51.0	+59.9	147.2	73 00.0	+60.0	149.0	**73**
74	79 23.2	+56.0	129.6	78 43.4	+57.4	133.5	78 00.8	+58.5	136.9	77 15.9	+59.2	139.9	76 29.1	+59.6	142.6	75 40.7	+59.8	145.0	74 50.9	+60.0	147.1	74 00.0	+60.0	149.0	**74**
75	80 19.2	+55.2	127.6	79 40.8	+57.0	131.9	78 59.3	+58.1	135.7	78 15.1	+58.9	139.1	77 28.7	+59.5	142.1	76 40.5	+59.8	144.7	75 50.9	+59.9	147.0	75 00.0	+60.0	149.0	**75**
76	81 14.4	+54.0	125.1	80 37.8	+56.2	130.1	79 57.4	+57.8	134.4	79 14.0	+58.8	138.2	78 28.2	+59.4	141.4	77 40.3	+59.8	144.3	76 50.8	+60.0	146.8	76 00.0	+60.0	149.0	**76**
77	82 08.4	+52.4	122.1	81 34.0	+55.3	127.8	80 55.2	+57.2	132.8	80 12.8	+58.5	137.0	79 27.6	+59.3	140.7	78 40.1	+59.7	143.9	77 50.8	+59.9	146.6	77 00.0	+60.0	149.0	**77**
78	83 00.8	+50.1•	118.3	82 29.3	+53.9	125.0	81 52.4	+56.5	130.8	81 11.3	+58.1	135.7	80 26.9	+59.1	139.8	79 39.8	+59.7	143.4	78 50.7	+60.0	146.4	78 00.0	+60.0	149.0	**78**
79	83 50.9	+46.7•	113.5	83 23.2	+51.9•	121.4	82 48.9	+55.4	128.2	82 09.4	+57.6	133.9	81 26.0	+58.8	138.7	80 39.5	+59.6	142.7	79 50.7	+59.9	146.1	79 00.0	+60.0	149.0	**79**
80	84 37.6	+41.7•	107.2	84 15.1	+48.8•	116.8	83 44.3	+53.7•	124.9	83 07.0	+56.8	131.7	82 24.8	+58.6	137.4	81 39.1	+59.4	142.0	80 50.6	+59.9	145.8	80 00.0	+60.0	149.0	**80**
81	85 19.3	+33.9•	99.0	85 03.9	+44.0•	110.5	84 38.0	+51.1•	120.5	84 03.8	+55.5	128.8	83 23.4	+58.0	135.6	82 38.5	+59.4	141.0	81 50.5	+59.8	145.4	81 00.0	+60.0	149.0	**81**
82	85 53.2	+22.8•	88.2	85 47.9	+36.2•	101.9	85 29.1	+46.7•	114.4	84 59.3	+53.5•	124.9	84 21.4	+57.3	133.2	83 37.9	+59.0	139.7	82 50.3	+59.8	144.9	82 00.0	+60.0	149.0	**82**
83	86 16.0	+8.1•	74.6	86 24.1	+23.8•	90.1	86 15.8	+38.8•	105.6	85 52.8	+49.7•	119.1	85 18.7	+55.7•	129.8	84 36.9	+58.7	138.0	83 50.1	+59.8	144.2	83 00.0	+60.0	149.0	**83**
84	86 24.1	−8.3•	59.1	86 47.9	+6.7•	74.6	86 54.6	+25.2•	92.7	86 42.5	+42.2•	110.4	86 14.4	+53.0•	124.8	85 35.6	+57.8	135.5	84 49.9	+59.6	143.3	84 00.0	+60.0	149.0	**84**
85	86 15.8	−23.0•	43.5	86 54.6	−12.1•	56.4	87 19.8	+4.9•	74.6	87 24.7	+27.1•	96.4	87 07.4	+46.4•	116.6	86 33.4	+56.2•	131.6	85 49.5	+59.4	141.9	85 00.0	+60.0	149.0	**85**
86	85 52.8	−34.1•	30.0	86 42.5	−28.1•	38.7	87 24.7	−17.3•	52.7	87 51.8	+2.0•	74.5	87 53.8	+30.0•	101.8	87 29.6	+51.6•	124.8	86 48.9	+58.9	139.7	86 00.0	+60.0	149.0	**86**
87	85 18.7	−41.8•	19.3	86 14.4	−38.8•	24.3	87 07.4	−34.0•	32.5	87 53.8	−24.2•	47.3	88 23.8	−2.6•	74.5	88 21.2	+34.7•	110.3	87 47.8	+57.0•	135.5	87 00.0	+60.0	149.0	**87**
88	84 36.9	−46.8•	11.0	85 35.6	−45.7•	13.5	86 33.4	−43.9•	17.4	87 29.6	−40.7•	24.3	88 21.2	−33.4•	38.7	88 55.9	−11.1•	74.5	88 44.8	+43.1•	124.7	88 00.0	+60.0	149.0	**88**
89	83 50.1	−50.1•	4.8	84 49.9	−49.9•	5.7	85 49.5	−49.5•	7.1	86 48.9	−48.9•	9.3	87 47.8	−47.8•	13.5	88 44.8	−44.8•	24.3	89 27.9	−27.9•	74.5	89 00.0	+60.0	149.0	**89**
90	83 00.0	−52.4•	0.0	84 00.0	−52.6•	0.0	85 00.0	−52.8•	0.0	86 00.0	−53.1•	0.0	87 00.0	−53.5•	0.0	88 00.0	−54.2•	0.0	89 00.0	−55.6•	0.0	90 00.0	−60.0	74.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 31°, 329°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 59.8	–59.9	148.8	5 08.4	–59.9	148.9	4 17.1	–60.0	148.9	3 25.7	–60.0	148.9	2 34.3	–60.0	149.0	1 42.9	–60.0	149.0	0 51.4	–60.0	149.0	0 00.0	+60.0	31.0	**0**
1	4 59.9	–59.9	148.9	4 08.5	–59.9	148.9	3 17.1	–59.9	148.9	2 25.7	–59.9	149.0	1 34.3	–60.0	149.0	0 42.9	–60.0	149.0	0 08.6	+60.0	31.0	1 00.0	+60.0	31.0	**1**
2	4 00.0	–59.9	148.9	3 08.6	–59.9	149.0	2 17.2	–60.0	149.0	1 25.8	–60.0	149.0	0 34.3	–60.0	149.0	0 17.1	+60.0	31.0	1 08.6	+60.0	31.0	2 00.0	+60.0	31.0	**2**
3	3 00.1	–59.9	149.0	2 08.7	–59.9	149.0	1 17.2	–59.9	149.0	0 25.8	–60.0	149.0	0 25.7	+59.9	31.0	1 17.1	+60.0	31.0	2 08.6	+60.0	31.0	3 00.0	+60.0	31.0	**3**
4	2 00.2	–59.8	149.1	1 08.8	–59.9	149.1	0 17.3	–59.9	149.1	0 34.2	+59.9	30.9	1 25.6	+60.0	30.9	2 17.1	+60.0	30.9	3 08.6	+60.0	31.0	4 00.0	+60.0	31.0	**4**
5	1 00.4	–59.9	149.1	0 08.9	–59.9	149.1	0 42.6	+60.0	30.9	1 34.1	+60.0	30.9	2 25.6	+60.0	30.9	3 17.1	+60.0	30.9	4 08.6	+60.0	31.0	5 00.0	+60.0	31.0	**5**
6	0 00.5	–59.9	149.2	0 51.0	+60.0	30.8	1 42.6	+59.9	30.8	2 34.1	+60.0	30.8	3 25.6	+60.0	30.9	4 17.1	+60.0	30.9	5 08.6	+60.0	30.9	6 00.0	+60.0	31.0	**6**
7	0 59.4	+59.9	30.7	1 51.0	+59.9	30.8	2 42.5	+60.0	30.8	3 34.1	+59.9	30.8	4 25.6	+60.0	30.8	5 17.1	+60.0	30.9	6 08.6	+60.0	30.9	7 00.0	+60.0	31.0	**7**
8	1 59.3	+59.9	30.7	2 50.9	+59.9	30.7	3 42.5	+59.9	30.7	4 34.0	+60.0	30.8	5 25.6	+59.9	30.8	6 17.1	+60.0	30.9	7 08.6	+59.9	30.9	8 00.0	+60.0	31.0	**8**
9	2 59.2	+59.8	30.6	3 50.8	+59.9	30.7	4 42.4	+59.9	30.7	5 34.0	+59.9	30.7	6 25.5	+60.0	30.8	7 17.1	+59.9	30.9	8 08.5	+60.0	30.9	9 00.0	+60.0	31.0	**9**
10	3 59.0	+59.9	30.6	4 50.7	+59.9	30.6	5 42.3	+60.0	30.6	6 33.9	+60.0	30.7	7 25.5	+60.0	30.8	8 17.0	+60.0	30.8	9 08.5	+60.0	30.9	10 00.0	+60.0	31.0	**10**
11	4 58.9	+59.9	30.5	5 50.6	+59.9	30.5	6 42.3	+59.9	30.6	7 33.9	+60.0	30.7	8 25.5	+60.0	30.7	9 17.0	+60.0	30.8	10 08.5	+60.0	30.9	11 00.0	+60.0	31.0	**11**
12	5 58.8	+59.9	30.4	6 50.5	+59.9	30.5	7 42.2	+59.9	30.6	8 33.9	+59.9	30.6	9 25.5	+59.9	30.7	10 17.0	+60.0	30.8	11 08.5	+60.0	30.9	12 00.0	+60.0	31.0	**12**
13	6 58.7	+59.9	30.4	7 50.4	+59.9	30.4	8 42.1	+60.0	30.5	9 33.8	+60.0	30.6	10 25.4	+60.0	30.7	11 17.0	+60.0	30.8	12 08.5	+60.0	30.9	13 00.0	+60.0	31.0	**13**
14	7 58.6	+59.8	30.3	8 50.3	+60.0	30.4	9 42.1	+59.9	30.5	10 33.8	+59.9	30.6	11 25.4	+60.0	30.7	12 17.0	+60.0	30.8	13 08.5	+60.0	30.9	14 00.0	+60.0	31.0	**14**
15	8 58.4	+59.9	30.2	9 50.3	+59.9	30.3	10 42.0	+60.0	30.4	11 33.7	+60.0	30.5	12 25.4	+60.0	30.6	13 17.0	+60.0	30.7	14 08.5	+60.0	30.9	15 00.0	+60.0	31.0	**15**
16	9 58.3	+59.9	30.2	10 50.2	+59.9	30.3	11 42.0	+59.9	30.4	12 33.7	+60.0	30.5	13 25.4	+60.0	30.6	14 17.0	+60.0	30.7	15 08.5	+60.0	30.9	16 00.0	+60.0	31.0	**16**
17	10 58.2	+59.9	30.1	11 50.1	+59.9	30.2	12 41.9	+59.9	30.3	13 33.7	+59.9	30.4	14 25.4	+59.9	30.6	15 17.0	+60.0	30.7	16 08.5	+60.0	30.8	17 00.0	+60.0	31.0	**17**
18	11 58.1	+59.9	30.0	12 50.0	+59.9	30.2	13 41.8	+60.0	30.3	14 33.6	+60.0	30.4	15 25.3	+60.0	30.5	16 17.0	+60.0	30.7	17 08.5	+60.0	30.8	18 00.0	+60.0	31.0	**18**
19	12 58.0	+59.8	30.0	13 49.9	+59.9	30.1	14 41.8	+59.9	30.2	15 33.6	+59.9	30.4	16 25.3	+60.0	30.5	17 17.0	+59.9	30.7	18 08.5	+60.0	30.8	19 00.0	+60.0	31.0	**19**
20	13 57.8	+59.9	29.9	14 49.8	+59.9	30.0	15 41.7	+59.9	30.2	16 33.5	+60.0	30.3	17 25.3	+60.0	30.5	18 16.9	+60.0	30.6	19 08.5	+60.0	30.8	20 00.0	+60.0	31.0	**20**
21	14 57.7	+59.9	29.8	15 49.7	+59.9	30.0	16 41.6	+60.0	30.1	17 33.5	+59.9	30.3	18 25.3	+59.9	30.5	19 16.9	+60.0	30.6	20 08.5	+60.0	30.8	21 00.0	+60.0	31.0	**21**
22	15 57.6	+59.8	29.8	16 49.6	+59.9	29.9	17 41.6	+59.9	30.1	18 33.4	+60.0	30.2	19 25.2	+60.0	30.4	20 16.9	+60.0	30.6	21 08.5	+60.0	30.8	22 00.0	+60.0	31.0	**22**
23	16 57.4	+59.9	29.7	17 49.5	+59.9	29.9	18 41.5	+59.9	30.0	19 33.4	+60.0	30.2	20 25.2	+60.0	30.4	21 16.9	+60.0	30.6	22 08.5	+60.0	30.8	23 00.0	+60.0	31.0	**23**
24	17 57.3	+59.9	29.6	18 49.4	+59.9	29.8	19 41.4	+60.0	30.0	20 33.4	+59.9	30.2	21 25.2	+60.0	30.4	22 16.9	+60.0	30.6	23 08.5	+60.0	30.8	24 00.0	+60.0	31.0	**24**
25	18 57.2	+59.8	29.6	19 49.3	+59.9	29.7	20 41.4	+59.9	29.9	21 33.3	+60.0	30.1	22 25.2	+59.9	30.3	23 16.9	+60.0	30.5	24 08.5	+60.0	30.8	25 00.0	+60.0	31.0	**25**
26	19 57.0	+59.9	29.5	20 49.2	+59.9	29.7	21 41.3	+59.9	29.9	22 33.3	+59.9	30.1	23 25.1	+60.0	30.3	24 16.9	+60.0	30.5	25 08.5	+60.0	30.8	26 00.0	+60.0	31.0	**26**
27	20 56.9	+59.9	29.4	21 49.1	+59.9	29.6	22 41.2	+60.0	29.8	23 33.2	+60.0	30.0	24 25.1	+60.0	30.3	25 16.9	+60.0	30.5	26 08.5	+60.0	30.7	27 00.0	+60.0	31.0	**27**
28	21 56.8	+59.8	29.4	22 49.0	+59.9	29.6	23 41.2	+59.9	29.8	24 33.2	+59.9	30.0	25 25.1	+60.0	30.2	26 16.9	+59.9	30.5	27 08.5	+60.0	30.7	28 00.0	+60.0	31.0	**28**
29	22 56.6	+59.9	29.3	23 48.9	+59.9	29.5	24 41.1	+59.9	29.7	25 33.1	+60.0	30.0	26 25.1	+59.9	30.2	27 16.8	+60.0	30.5	28 08.5	+60.0	30.7	29 00.0	+60.0	31.0	**29**
30	23 56.5	+59.9	29.2	24 48.8	+59.9	29.4	25 41.0	+59.9	29.7	26 33.1	+59.9	29.9	27 25.0	+60.0	30.2	28 16.8	+60.0	30.4	29 08.5	+60.0	30.7	30 00.0	+60.0	31.0	**30**
31	24 56.4	+59.8	29.1	25 48.7	+59.9	29.4	26 40.9	+60.0	29.6	27 33.0	+60.0	29.9	28 25.0	+60.0	30.1	29 16.8	+60.0	30.4	30 08.5	+60.0	30.7	31 00.0	+60.0	31.0	**31**
32	25 56.2	+59.9	29.1	26 48.6	+59.9	29.3	27 40.9	+59.9	29.6	28 33.0	+59.9	29.8	29 25.0	+59.9	30.1	30 16.8	+60.0	30.4	31 08.5	+60.0	30.7	32 00.0	+60.0	31.0	**32**
33	26 56.1	+59.8	29.0	27 48.5	+59.9	29.2	28 40.8	+59.9	29.5	29 32.9	+60.0	29.8	30 24.9	+60.0	30.1	31 16.8	+60.0	30.4	32 08.5	+60.0	30.7	33 00.0	+60.0	31.0	**33**
34	27 55.9	+59.9	28.9	28 48.4	+59.9	29.2	29 40.7	+59.9	29.4	30 32.9	+59.9	29.7	31 24.9	+60.0	30.0	32 16.8	+60.0	30.3	33 08.5	+60.0	30.7	34 00.0	+60.0	31.0	**34**
35	28 55.8	+59.8	28.8	29 48.3	+59.8	29.1	30 40.6	+59.9	29.4	31 32.8	+60.0	29.7	32 24.9	+59.9	30.0	33 16.8	+60.0	30.3	34 08.5	+60.0	30.6	35 00.0	+60.0	31.0	**35**
36	29 55.6	+59.8	28.7	30 48.1	+59.9	29.0	31 40.5	+60.0	29.3	32 32.8	+59.9	29.6	33 24.8	+60.0	29.9	34 16.8	+59.9	30.3	35 08.5	+60.0	30.6	36 00.0	+60.0	31.0	**36**
37	30 55.4	+59.9	28.7	31 48.0	+59.9	28.9	32 40.5	+59.9	29.3	33 32.7	+60.0	29.6	34 24.8	+60.0	29.9	35 16.7	+60.0	30.3	36 08.5	+60.0	30.6	37 00.0	+60.0	31.0	**37**
38	31 55.3	+59.8	28.6	32 47.9	+59.9	28.9	33 40.4	+59.9	29.2	34 32.7	+59.9	29.5	35 24.8	+60.0	29.9	36 16.7	+60.0	30.2	37 08.5	+60.0	30.6	38 00.0	+60.0	31.0	**38**
39	32 55.1	+59.8	28.5	33 47.8	+59.9	28.8	34 40.3	+59.9	29.1	35 32.6	+59.9	29.5	36 24.8	+59.9	29.8	37 16.7	+60.0	30.2	38 08.5	+60.0	30.6	39 00.0	+60.0	31.0	**39**
40	33 54.9	+59.9	28.4	34 47.7	+59.8	28.7	35 40.2	+59.9	29.1	36 32.5	+60.0	29.4	37 24.7	+60.0	29.8	38 16.7	+60.0	30.2	39 08.5	+60.0	30.6	40 00.0	+60.0	31.0	**40**
41	34 54.8	+59.8	28.3	35 47.5	+59.9	28.6	36 40.1	+59.9	29.0	37 32.5	+59.9	29.4	38 24.7	+59.9	29.7	39 16.7	+60.0	30.1	40 08.5	+59.9	30.6	41 00.0	+60.0	31.0	**41**
42	35 54.6	+59.8	28.2	36 47.4	+59.8	28.6	37 40.0	+59.9	28.9	38 32.4	+60.0	29.3	39 24.6	+60.0	29.7	40 16.7	+59.9	30.1	41 08.4	+60.0	30.5	42 00.0	+60.0	31.0	**42**
43	36 54.4	+59.8	28.1	37 47.2	+59.9	28.5	38 39.9	+59.9	28.8	39 32.4	+59.9	29.2	40 24.6	+60.0	29.6	41 16.6	+60.0	30.1	42 08.4	+60.0	30.5	43 00.0	+60.0	31.0	**43**
44	37 54.2	+59.8	28.0	38 47.1	+59.9	28.4	39 39.8	+59.9	28.8	40 32.3	+59.9	29.2	41 24.6	+59.9	29.6	42 16.6	+60.0	30.0	43 08.4	+60.0	30.5	44 00.0	+60.0	31.0	**44**
45	38 54.0	+59.8	27.9	39 47.0	+59.8	28.3	40 39.7	+59.9	28.7	41 32.2	+60.0	29.1	42 24.5	+60.0	29.6	43 16.6	+60.0	30.0	44 08.4	+60.0	30.5	45 00.0	+60.0	31.0	**45**
46	39 53.8	+59.8	27.8	40 46.8	+59.9	28.2	41 39.6	+59.9	28.6	42 32.2	+59.9	29.0	43 24.5	+59.9	29.5	44 16.6	+60.0	30.0	45 08.4	+60.0	30.5	46 00.0	+60.0	31.0	**46**
47	40 53.6	+59.8	27.7	41 46.7	+59.8	28.1	42 39.5	+59.9	28.5	43 32.1	+59.9	29.0	44 24.4	+60.0	29.5	45 16.6	+59.9	29.9	46 08.4	+60.0	30.5	47 00.0	+60.0	31.0	**47**
48	41 53.4	+59.8	27.6	42 46.5	+59.8	28.0	43 39.4	+59.8	28.4	44 32.0	+59.9	28.9	45 24.4	+60.0	29.4	46 16.5	+60.0	29.9	47 08.4	+60.0	30.4	48 00.0	+60.0	31.0	**48**
49	42 53.2	+59.8	27.5	43 46.3	+59.9	27.9	44 39.2	+59.9	28.4	45 31.9	+59.9	28.8	46 24.4	+59.9	29.3	47 16.5	+60.0	29.9	48 08.4	+60.0	30.4	49 00.0	+60.0	31.0	**49**
50	43 53.0	+59.7	27.3	44 46.2	+59.8	27.8	45 39.1	+59.9	28.3	46 31.8	+60.0	28.8	47 24.3	+60.0	29.3	48 16.5	+60.0	29.8	49 08.4	+60.0	30.4	50 00.0	+60.0	31.0	**50**
51	44 52.7	+59.8	27.2	45 46.0	+59.8	27.7	46 39.0	+59.9	28.2	47 31.8	+59.9	28.7	48 24.3	+59.9	29.2	49 16.5	+60.0	29.8	50 08.4	+60.0	30.4	51 00.0	+60.0	31.0	**51**
52	45 52.5	+59.8	27.1	46 45.8	+59.8	27.6	47 38.9	+59.8	28.1	48 31.7	+59.9	28.6	49 24.2	+60.0	29.2	50 16.5	+59.9	29.7	51 08.4	+60.0	30.4	52 00.0	+60.0	31.0	**52**
53	46 52.3	+59.7	27.0	47 45.6	+59.8	27.5	48 38.7	+59.9	28.0	49 31.6	+59.9	28.5	50 24.2	+59.9	29.1	51 16.4	+60.0	29.7	52 08.4	+60.0	30.3	53 00.0	+60.0	31.0	**53**
54	47 52.0	+59.7	26.8	48 45.4	+59.8	27.3	49 38.6	+59.8	27.9	50 31.5	+59.9	28.4	51 24.1	+59.9	29.0	52 16.4	+60.0	29.7	53 08.4	+60.0	30.3	54 00.0	+60.0	31.0	**54**
55	48 51.7	+59.8	26.7	49 45.2	+59.8	27.2	50 38.4	+59.9	27.8	51 31.4	+59.9	28.3	52 24.0	+60.0	29.0	53 16.4	+60.0	29.6	54 08.4	+60.0	30.3	55 00.0	+60.0	31.0	**55**
56	49 51.5	+59.7	26.5	50 45.0	+59.8	27.1	51 38.3	+59.8	27.6	52 31.3	+59.9	28.3	53 24.0	+59.9	28.9	54 16.4	+59.9	29.6	55 08.4	+60.0	30.3	56 00.0	+60.0	31.0	**56**
57	50 51.2	+59.7	26.4	51 44.8	+59.7	26.9	52 38.1	+59.9	27.5	53 31.2	+59.9	28.2	54 23.9	+60.0	28.8	55 16.3	+60.0	29.5	56 08.4	+60.0	30.2	57 00.0	+60.0	31.0	**57**
58	51 50.9	+59.6	26.2	52 44.5	+59.8	26.8	53 38.0	+59.8	27.4	54 31.1	+59.9	28.0	55 23.9	+59.9	28.7	56 16.3	+60.0	29.4	57 08.4	+59.9	30.2	58 00.0	+60.0	31.0	**58**
59	52 50.5	+59.7	26.1	53 44.3	+59.8	26.6	54 37.8	+59.8	27.3	55 31.0	+59.8	27.9	56 23.8	+59.9	28.6	57 16.3	+59.9	29.4	58 08.3	+60.0	30.2	59 00.0	+60.0	31.0	**59**
60	53 50.2	+59.7	25.9	54 44.1	+59.7	26.5	55 37.6	+59.8	27.1	56 30.8	+59.9	27.8	57 23.7	+59.9	28.5	58 16.2	+60.0	29.3	59 08.3	+60.0	30.1	60 00.0	+60.0	31.0	**60**
61	54 49.9	+59.6	25.7	55 43.8	+59.7	26.3	56 37.4	+59.8	27.0	57 30.7	+59.9	27.7	58 23.6	+60.0	28.5	59 16.2	+60.0	29.3	60 08.3	+60.0	30.1	61 00.0	+60.0	31.0	**61**
62	55 49.5	+59.6	25.5	56 43.5	+59.7	26.1	57 37.2	+59.8	26.8	58 30.6	+59.8	27.6	59 23.6	+59.9	28.4	60 16.2	+59.9	29.2	61 08.3	+60.0	30.1	62 00.0	+60.0	31.0	**62**
63	56 49.1	+59.6	25.3	57 43.2	+59.7	26.0	58 37.0	+59.8	26.7	59 30.4	+59.9	27.4	60 23.5	+59.9	28.2	61 16.1	+60.0	29.1	62 08.3	+60.0	30.0	63 00.0	+60.0	31.0	**63**
64	57 48.7	+59.6	25.1	58 42.9	+59.7	25.8	59 36.8	+59.7	26.5	60 30.3	+59.8	27.3	61 23.4	+59.9	28.1	62 16.1	+59.9	29.0	63 08.3	+60.0	30.0	64 00.0	+60.0	31.0	**64**
65	58 48.3	+59.5	24.8	59 42.6	+59.6	25.6	60 36.5	+59.7	26.3	61 30.1	+59.8	27.1	62 23.3	+59.9	28.0	63 16.0	+60.0	28.9	64 08.3	+60.0	29.9	65 00.0	+60.0	31.0	**65**
66	59 47.8	+59.5	24.6	60 42.2	+59.6	25.3	61 36.2	+59.8	26.1	62 29.9	+59.8	27.0	63 23.2	+59.9	27.9	64 16.0	+59.9	28.8	65 08.3	+60.0	29.9	66 00.0	+60.0	31.0	**66**
67	60 47.3	+59.5	24.4	61 41.8	+59.6	25.1	62 36.0	+59.7	25.9	63 29.7	+59.8	26.8	64 23.1	+59.8	27.7	65 15.9	+60.0	28.7	66 08.3	+59.9	29.8	67 00.0	+60.0	31.0	**67**
68	61 46.8	+59.5	24.1	62 41.4	+59.6	24.9	63 35.7	+59.7	25.7	64 29.5	+59.8	26.6	65 22.9	+59.9	27.6	66 15.9	+59.9	28.6	67 08.2	+60.0	29.8	68 00.0	+60.0	31.0	**68**
69	62 46.3	+59.4	23.8	63 41.0	+59.5	24.6	64 35.4	+59.6	25.5	65 29.3	+59.8	26.4	66 22.8	+59.9	27.4	67 15.8	+59.9	28.5	68 08.2	+60.0	29.7	69 00.0	+60.0	31.0	**69**
70	63 45.7	+59.3	23.5	64 40.5	+59.5	24.3	65 35.0	+59.6	25.2	66 29.1	+59.7	26.2	67 22.7	+59.8	27.3	68 15.7	+60.0	28.4	69 08.2	+60.0	29.6	70 00.0	+60.0	31.0	**70**
71	64 45.0	+59.4	23.1	65 40.0	+59.5	24.0	66 34.6	+59.6	24.9	67 28.8	+59.7	26.0	68 22.5	+59.8	27.1	69 15.7	+59.9	28.3	70 08.2	+60.0	29.6	71 00.0	+60.0	31.0	**71**
72	65 44.4	+59.2	22.8	66 39.5	+59.4	23.7	67 34.2	+59.6	24.7	68 28.5	+59.7	25.7	69 22.3	+59.9	26.9	70 15.6	+59.9	28.1	71 08.2	+59.9	29.5	72 00.0	+60.0	31.0	**72**
73	66 43.6	+59.2	22.4	67 38.9	+59.4	23.3	68 33.8	+59.5	24.3	69 28.2	+59.7	25.4	70 22.2	+59.8	26.6	71 15.5	+59.9	27.9	72 08.1	+60.0	29.4	73 00.0	+60.0	31.0	**73**
74	67 42.8	+59.2	22.0	68 38.3	+59.3	22.9	69 33.3	+59.5	24.0	70 27.9	+59.7	25.1	71 22.0	+59.7	26.4	72 15.4	+59.9	27.8	73 08.1	+60.0	29.3	74 00.0	+60.0	31.0	**74**
75	68 42.0	+59.0	21.5	69 37.6	+59.2	22.5	70 32.8	+59.4	23.6	71 27.6	+59.5	24.8	72 21.7	+59.8	26.1	73 15.3	+59.9	27.6	74 08.1	+59.9	29.2	75 00.0	+60.0	31.0	**75**
76	69 41.0	+59.0	21.0	70 36.8	+59.2	22.0	71 32.2	+59.4	23.2	72 27.1	+59.6	24.4	73 21.5	+59.7	25.8	74 15.2	+59.8	27.3	75 08.0	+60.0	29.1	76 00.0	+60.0	31.0	**76**
77	70 40.0	+58.9	20.5	71 36.0	+59.1	21.5	72 31.6	+59.3	22.7	73 26.7	+59.5	24.0	74 21.2	+59.7	25.4	75 15.0	+59.9	27.1	76 08.0	+60.0	28.9	77 00.0	+60.0	31.0	**77**
78	71 38.9	+58.7	19.9	72 35.1	+58.9	21.0	73 30.9	+59.2	22.2	74 26.2	+59.4	23.5	75 20.9	+59.6	25.0	76 14.9	+59.8	26.8	77 08.0	+59.9	28.7	78 00.0	+60.0	31.0	**78**
79	72 37.6	+58.6	19.2	73 34.0	+58.9	20.3	74 30.1	+59.1	21.6	75 25.6	+59.3	23.0	76 20.5	+59.6	24.6	77 14.7	+59.8	26.4	78 07.9	+59.9	28.5	79 00.0	+60.0	31.0	**79**
80	73 36.2	+58.4	18.5	74 32.9	+58.7	19.6	75 29.2	+58.9	20.9	76 24.9	+59.3	22.4	77 20.1	+59.5	24.1	78 14.5	+59.7	26.0	79 07.8	+60.0	28.3	80 00.0	+60.0	31.0	**80**
81	74 34.6	+58.2	17.6	75 31.6	+58.5	18.8	76 28.1	+58.8	20.1	77 24.2	+59.1	21.7	78 19.6	+59.4	23.5	79 14.2	+59.7	25.6	80 07.8	+59.9	28.0	81 00.0	+60.0	31.0	**81**
82	75 32.8	+57.9	16.7	76 30.1	+58.2	17.9	77 26.9	+58.6	19.3	78 23.3	+58.9	20.9	79 19.0	+59.3	22.7	80 13.9	+59.6	25.0	81 07.7	+59.9	27.7	82 00.0	+60.0	31.0	**82**
83	76 30.7	+57.6	15.6	77 28.3	+58.0	16.8	78 25.5	+58.4	18.2	79 22.2	+58.8	19.9	80 18.3	+59.2	21.9	81 13.5	+59.5	24.3	82 07.6	+59.8	27.3	83 00.0	+60.0	31.0	**83**
84	77 28.3	+57.2	14.4	78 26.3	+57.6	15.6	79 23.9	+58.0	17.0	80 21.0	+58.4	18.7	81 17.5	+58.9	20.8	82 13.0	+59.4	23.4	83 07.4	+59.8	26.7	84 00.0	+60.0	31.0	**84**
85	78 25.5	+56.7	12.9	79 23.9	+57.1	14.1	80 21.9	+57.5	15.6	81 19.4	+58.1	17.3	82 16.4	+58.6	19.5	83 12.4	+59.2	22.3	84 07.2	+59.7	26.0	85 00.0	+60.0	31.0	**85**
86	79 22.2	+56.1	11.2	80 21.0	+56.5	12.4	81 19.4	+57.0	13.8	82 17.5	+57.5	15.5	83 15.0	+58.1	17.8	84 11.6	+58.9	20.8	85 06.9	+59.6	25.0	86 00.0	+60.0	31.0	**86**
87	80 18.3	+55.2	9.2	81 17.5	+55.5	10.3	82 16.4	+56.0	11.6	83 15.0	+56.6	13.3	84 13.1	+57.4	15.5	85 10.5	+58.2	18.7	86 06.5	+59.3	23.4	87 00.0	+60.0	31.0	**87**
88	81 13.5	+54.1	6.8	82 13.0	+54.4	7.6	83 12.4	+54.8	8.7	84 11.6	+55.3	10.2	85 10.5	+56.0	12.3	86 08.7	*+57.1* •	15.5	87 05.8	+58.6	20.8	88 00.0	+60.0	31.0	**88**
89	82 07.6	*+52.4* •	3.8	83 07.4	*+52.6* •	4.3	84 07.2	*+52.8* •	5.0	85 06.9	*+53.1* •	6.1	86 06.5	*+53.5* •	7.6	87 05.8	*+54.2* •	10.2	88 04.4	*+55.6* •	15.5	89 00.0	+60.0	31.0	**89**
90	83 00.0	*+50.1* •	0.0	84 00.0	*+49.9* •	0.0	85 00.0	*+49.5* •	0.0	86 00.0	*+48.9* •	0.0	87 00.0	*+47.8* •	0.0	88 00.0	*+44.8* •	0.0	89 00.0	*+27.9* •	0.0	90 00.0	–60.0	15.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 149°, 211°

32°, 328° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 55.9	+59.9	147.8	5 05.1	+59.9	147.9	4 14.3	+60.0	147.9	3 23.5	+59.9	147.9	2 32.6	+60.0	148.0	1 41.8	+59.9	148.0	0 50.9	+60.0	148.0	0 00.0	+60.0	148.0	**0**
1	6 55.8	+59.9	147.7	6 05.0	+60.0	147.8	5 14.3	+59.9	147.9	4 23.4	+60.0	147.9	3 32.6	+60.0	147.9	2 41.7	+60.0	148.0	1 50.9	+60.0	148.0	1 00.0	+60.0	148.0	**1**
2	7 55.7	+59.8	147.7	7 05.0	+59.9	147.7	6 14.2	+59.9	147.8	5 23.4	+60.0	147.9	4 32.6	+60.0	147.9	3 41.7	+60.0	147.9	2 50.9	+60.0	148.0	2 00.0	+60.0	148.0	**2**
3	8 55.5	+59.9	147.6	8 04.9	+59.9	147.7	7 14.1	+60.0	147.8	6 23.4	+59.9	147.8	5 32.6	+59.9	147.9	4 41.7	+60.0	147.9	3 50.9	+60.0	148.0	3 00.0	+60.0	148.0	**3**
4	9 55.4	+59.9	147.5	9 04.8	+59.9	147.6	8 14.1	+59.9	147.7	7 23.3	+60.0	147.8	6 32.5	+60.0	147.9	5 41.7	+60.0	147.9	4 50.9	+60.0	148.0	4 00.0	+60.0	148.0	**4**
5	10 55.3	+59.9	147.5	10 04.7	+59.9	147.6	9 14.0	+59.9	147.7	8 23.3	+59.9	147.8	7 32.5	+60.0	147.8	6 41.7	+60.0	147.9	5 50.9	+60.0	147.9	5 00.0	+60.0	148.0	**5**
6	11 55.2	+59.8	147.4	11 04.6	+59.9	147.5	10 13.9	+60.0	147.6	9 23.2	+60.0	147.7	8 32.5	+60.0	147.8	7 41.7	+60.0	147.9	6 50.9	+60.0	147.9	6 00.0	+60.0	148.0	**6**
7	12 55.0	+59.9	147.3	12 04.5	+59.9	147.5	11 13.9	+59.9	147.6	10 23.2	+60.0	147.7	9 32.5	+59.9	147.8	8 41.7	+60.0	147.9	7 50.9	+60.0	147.9	7 00.0	+60.0	148.0	**7**
8	13 54.9	+59.9	147.3	13 04.4	+59.9	147.4	12 13.8	+59.9	147.5	11 23.2	+59.9	147.6	10 32.4	+60.0	147.7	9 41.7	+60.0	147.8	8 50.9	+60.0	147.9	8 00.0	+60.0	148.0	**8**
9	14 54.8	+59.8	147.2	14 04.3	+59.9	147.3	13 13.7	+60.0	147.5	12 23.1	+60.0	147.6	11 32.4	+60.0	147.7	10 41.7	+60.0	147.8	9 50.9	+60.0	147.9	9 00.0	+60.0	148.0	**9**
10	15 54.6	+59.9	147.1	15 04.2	+59.9	147.3	14 13.7	+59.9	147.4	13 23.1	+59.9	147.6	12 32.4	+60.0	147.7	11 41.7	+59.9	147.8	10 50.9	+60.0	147.9	10 00.0	+60.0	148.0	**10**
11	16 54.5	+59.9	147.1	16 04.1	+59.9	147.2	15 13.6	+59.9	147.4	14 23.0	+60.0	147.5	13 32.4	+59.9	147.7	12 41.6	+60.0	147.8	11 50.9	+60.0	147.9	11 00.0	+60.0	148.0	**11**
12	17 54.4	+59.8	147.0	17 04.0	+59.9	147.2	16 13.5	+60.0	147.3	15 23.0	+59.9	147.5	14 32.3	+60.0	147.6	13 41.6	+60.0	147.8	12 50.9	+59.9	147.9	12 00.0	+60.0	148.0	**12**
13	18 54.2	+59.9	146.9	18 03.9	+59.9	147.1	17 13.5	+59.9	147.3	16 22.9	+60.0	147.4	15 32.3	+60.0	147.6	14 41.6	+60.0	147.7	13 50.8	+60.0	147.9	13 00.0	+60.0	148.0	**13**
14	19 54.1	+59.8	146.8	19 03.8	+59.9	147.0	18 13.4	+59.9	147.2	17 22.9	+59.9	147.4	16 32.3	+60.0	147.6	15 41.6	+60.0	147.7	14 50.8	+60.0	147.9	14 00.0	+60.0	148.0	**14**
15	20 53.9	+59.9	146.8	20 03.7	+59.9	147.0	19 13.3	+59.9	147.2	18 22.8	+60.0	147.4	17 32.3	+59.9	147.5	16 41.6	+60.0	147.7	15 50.8	+60.0	147.9	15 00.0	+60.0	148.0	**15**
16	21 53.8	+59.8	146.7	21 03.6	+59.9	146.9	20 13.2	+60.0	147.1	19 22.8	+60.0	147.3	18 32.2	+60.0	147.5	17 41.6	+60.0	147.7	16 50.8	+60.0	147.8	16 00.0	+60.0	148.0	**16**
17	22 53.6	+59.9	146.6	22 03.5	+59.9	146.9	21 13.2	+59.9	147.1	20 22.8	+59.9	147.3	19 32.2	+60.0	147.5	18 41.6	+60.0	147.7	17 50.8	+60.0	147.8	17 00.0	+60.0	148.0	**17**
18	23 53.5	+59.8	146.5	23 03.4	+59.9	146.8	22 13.1	+59.9	147.0	21 22.7	+60.0	147.2	20 32.2	+60.0	147.4	19 41.6	+60.0	147.6	18 50.8	+60.0	147.8	18 00.0	+60.0	148.0	**18**
19	24 53.3	+59.9	146.5	24 03.3	+59.8	146.7	23 13.0	+59.9	147.0	22 22.7	+59.9	147.2	21 32.2	+59.9	147.4	20 41.6	+59.9	147.6	19 50.8	+60.0	147.8	19 00.0	+60.0	148.0	**19**
20	25 53.2	+59.8	146.4	25 03.1	+59.9	146.7	24 12.9	+60.0	146.9	23 22.6	+60.0	147.1	22 32.1	+60.0	147.4	21 41.5	+60.0	147.6	20 50.8	+60.0	147.8	20 00.0	+60.0	148.0	**20**
21	26 53.0	+59.9	146.3	26 03.0	+59.9	146.6	25 12.9	+59.9	146.9	24 22.6	+59.9	147.1	23 32.1	+60.0	147.3	22 41.5	+60.0	147.6	21 50.8	+60.0	147.8	21 00.0	+60.0	148.0	**21**
22	27 52.9	+59.8	146.2	27 02.9	+59.9	146.5	26 12.8	+59.9	146.8	25 22.5	+60.0	147.1	24 32.1	+60.0	147.3	23 41.5	+60.0	147.6	22 50.8	+60.0	147.8	22 00.0	+60.0	148.0	**22**
23	28 52.7	+59.8	146.1	28 02.8	+59.9	146.4	27 12.7	+59.9	146.7	26 22.5	+59.9	147.0	25 32.1	+59.9	147.3	24 41.5	+60.0	147.5	23 50.8	+60.0	147.8	23 00.0	+60.0	148.0	**23**
24	29 52.5	+59.9	146.1	29 02.7	+59.9	146.4	28 12.6	+59.9	146.7	27 22.4	+60.0	147.0	26 32.0	+60.0	147.2	25 41.5	+60.0	147.5	24 50.8	+60.0	147.8	24 00.0	+60.0	148.0	**24**
25	30 52.4	+59.8	146.0	30 02.6	+59.8	146.3	29 12.5	+60.0	146.6	28 22.4	+59.9	146.9	27 32.0	+60.0	147.2	26 41.5	+60.0	147.5	25 50.8	+60.0	147.7	25 00.0	+60.0	148.0	**25**
26	31 52.2	+59.8	145.9	31 02.4	+59.9	146.2	30 12.5	+59.9	146.6	29 22.3	+59.9	146.9	28 32.0	+59.9	147.2	27 41.5	+60.0	147.5	26 50.8	+60.0	147.7	26 00.0	+60.0	148.0	**26**
27	32 52.0	+59.8	145.8	32 02.3	+59.9	146.2	31 12.4	+59.9	146.5	30 22.2	+60.0	146.8	29 31.9	+60.0	147.1	28 41.5	+59.9	147.4	27 50.8	+60.0	147.7	27 00.0	+60.0	148.0	**27**
28	33 51.8	+59.9	145.7	33 02.2	+59.8	146.1	32 12.3	+59.9	146.4	31 22.2	+59.9	146.8	30 31.9	+60.0	147.1	29 41.4	+60.0	147.4	28 50.8	+60.0	147.7	28 00.0	+60.0	148.0	**28**
29	34 51.7	+59.8	145.6	34 02.0	+59.9	146.0	33 12.2	+59.9	146.4	32 22.1	+60.0	146.7	31 31.9	+59.9	147.1	30 41.4	+60.0	147.4	29 50.8	+60.0	147.7	29 00.0	+60.0	148.0	**29**
30	35 51.5	+59.8	145.5	35 01.9	+59.9	145.9	34 12.1	+59.9	146.3	33 22.1	+59.9	146.7	32 31.8	+60.0	147.0	31 41.4	+60.0	147.4	30 50.8	+60.0	147.7	30 00.0	+60.0	148.0	**30**
31	36 51.3	+59.8	145.4	36 01.8	+59.8	145.8	35 12.0	+59.9	146.2	34 22.0	+60.0	146.6	33 31.8	+60.0	147.0	32 41.4	+60.0	147.3	31 50.8	+60.0	147.7	31 00.0	+60.0	148.0	**31**
32	37 51.1	+59.8	145.3	37 01.6	+59.9	145.7	36 11.9	+59.9	146.2	35 22.0	+59.9	146.6	34 31.8	+59.9	146.9	33 41.4	+60.0	147.3	32 50.8	+60.0	147.7	32 00.0	+60.0	148.0	**32**
33	38 50.9	+59.8	145.2	38 01.5	+59.8	145.7	37 11.8	+59.9	146.1	36 21.9	+59.9	146.5	35 31.7	+60.0	146.9	34 41.4	+60.0	147.3	33 50.8	+60.0	147.6	33 00.0	+60.0	148.0	**33**
34	39 50.7	+59.8	145.1	39 01.3	+59.9	145.6	38 11.7	+59.9	146.0	37 21.8	+60.0	146.4	36 31.7	+60.0	146.9	35 41.4	+59.9	147.3	34 50.8	+60.0	147.6	34 00.0	+60.0	148.0	**34**
35	40 50.5	+59.7	145.0	40 01.2	+59.8	145.5	39 11.6	+59.9	145.9	38 21.8	+59.9	146.4	37 31.7	+59.9	146.8	36 41.3	+60.0	147.2	35 50.8	+60.0	147.6	35 00.0	+60.0	148.0	**35**
36	41 50.2	+59.8	144.9	41 01.0	+59.8	145.4	40 11.5	+59.9	145.9	39 21.7	+59.9	146.3	38 31.6	+60.0	146.8	37 41.3	+60.0	147.2	36 50.8	+60.0	147.6	36 00.0	+60.0	148.0	**36**
37	42 50.0	+59.8	144.8	42 00.8	+59.9	145.3	41 11.4	+59.9	145.8	40 21.6	+60.0	146.3	39 31.6	+60.0	146.7	38 41.3	+60.0	147.2	37 50.8	+60.0	147.6	37 00.0	+60.0	148.0	**37**
38	43 49.8	+59.7	144.6	43 00.7	+59.8	145.2	42 11.3	+59.8	145.7	41 21.6	+59.9	146.2	40 31.6	+59.9	146.7	39 41.3	+60.0	147.1	38 50.8	+60.0	147.6	38 00.0	+60.0	148.0	**38**
39	44 49.5	+59.8	144.5	44 00.5	+59.8	145.1	43 11.1	+59.9	145.6	42 21.5	+59.9	146.1	41 31.5	+60.0	146.6	40 41.3	+60.0	147.1	39 50.8	+60.0	147.6	39 00.0	+60.0	148.0	**39**
40	45 49.3	+59.7	144.4	45 00.3	+59.8	145.0	44 11.0	+59.9	145.5	43 21.4	+59.9	146.1	42 31.5	+59.9	146.6	41 41.3	+59.9	147.1	40 50.8	+60.0	147.5	40 00.0	+60.0	148.0	**40**
41	46 49.0	+59.7	144.2	46 00.1	+59.8	144.8	45 10.9	+59.9	145.4	44 21.3	+59.9	146.0	43 31.4	+60.0	146.5	42 41.2	+60.0	147.0	41 50.8	+59.9	147.5	41 00.0	+60.0	148.0	**41**
42	47 48.7	+59.7	144.1	46 59.9	+59.8	144.7	46 10.8	+59.8	145.3	45 21.2	+60.0	145.9	44 31.4	+59.9	146.5	43 41.2	+60.0	147.0	42 50.7	+60.0	147.5	42 00.0	+60.0	148.0	**42**
43	48 48.4	+59.8	144.0	47 59.7	+59.8	144.6	47 10.6	+59.9	145.2	46 21.2	+59.9	145.8	45 31.3	+60.0	146.4	44 41.2	+60.0	147.0	43 50.7	+60.0	147.5	43 00.0	+60.0	148.0	**43**
44	49 48.2	+59.6	143.8	48 59.5	+59.8	144.5	48 10.5	+59.8	145.1	47 21.1	+59.9	145.8	46 31.3	+59.9	146.4	45 41.2	+60.0	146.9	44 50.7	+60.0	147.5	44 00.0	+60.0	148.0	**44**
45	50 47.8	+59.7	143.6	49 59.3	+59.8	144.4	49 10.3	+59.9	145.0	48 21.0	+59.9	145.7	47 31.2	+60.0	146.3	46 41.2	+59.9	146.9	45 50.7	+60.0	147.5	45 00.0	+60.0	148.0	**45**
46	51 47.5	+59.7	143.5	50 59.1	+59.7	144.2	50 10.2	+59.8	144.9	49 20.9	+59.9	145.6	48 31.2	+59.9	146.2	47 41.1	+60.0	146.9	46 50.7	+60.0	147.4	46 00.0	+60.0	148.0	**46**
47	52 47.2	+59.6	143.3	51 58.8	+59.8	144.1	51 10.0	+59.9	144.8	50 20.8	+59.9	145.5	49 31.1	+60.0	146.2	48 41.1	+60.0	146.8	47 50.7	+60.0	147.4	47 00.0	+60.0	148.0	**47**
48	53 46.8	+59.7	143.1	52 58.6	+59.7	143.9	52 09.9	+59.8	144.7	51 20.7	+59.9	145.4	50 31.1	+59.9	146.1	49 41.1	+60.0	146.8	48 50.7	+60.0	147.4	48 00.0	+60.0	148.0	**48**
49	54 46.5	+59.6	142.9	53 58.3	+59.8	143.8	53 09.7	+59.8	144.6	52 20.6	+59.9	145.3	51 31.0	+60.0	146.0	50 41.1	+59.9	146.7	49 50.7	+60.0	147.4	49 00.0	+60.0	148.0	**49**
50	55 46.1	+59.6	142.7	54 58.1	+59.7	143.6	54 09.5	+59.8	144.4	53 20.5	+59.8	145.2	52 31.0	+59.9	146.0	51 41.0	+60.0	146.7	50 50.7	+60.0	147.4	50 00.0	+60.0	148.0	**50**
51	56 45.7	+59.5	142.5	55 57.8	+59.7	143.4	55 09.3	+59.8	144.3	54 20.3	+59.9	145.1	53 30.9	+59.9	145.9	52 41.0	+60.0	146.6	51 50.7	+60.0	147.3	51 00.0	+60.0	148.0	**51**
52	57 45.2	+59.6	142.3	56 57.5	+59.7	143.2	56 09.1	+59.8	144.1	55 20.2	+59.9	145.0	54 30.8	+60.0	145.8	53 41.0	+59.9	146.6	52 50.7	+60.0	147.3	52 00.0	+60.0	148.0	**52**
53	58 44.8	+59.5	142.1	57 57.2	+59.6	143.1	57 08.9	+59.8	144.0	56 20.1	+59.9	144.9	55 30.8	+59.9	145.7	54 40.9	+60.0	146.5	53 50.7	+60.0	147.3	53 00.0	+60.0	148.0	**53**
54	59 44.3	+59.5	141.8	58 56.8	+59.7	142.9	58 08.7	+59.7	143.8	57 20.0	+59.8	144.8	56 30.7	+59.9	145.6	55 40.9	+60.0	146.5	54 50.7	+60.0	147.3	54 00.0	+60.0	148.0	**54**
55	60 43.8	+59.5	141.6	59 56.5	+59.6	142.6	59 08.4	+59.8	143.7	58 19.8	+59.9	144.6	57 30.6	+59.9	145.5	56 40.9	+59.9	146.4	55 50.7	+60.0	147.2	55 00.0	+60.0	148.0	**55**
56	61 43.3	+59.4	141.3	60 56.1	+59.6	142.4	60 08.2	+59.7	143.5	59 19.7	+59.8	144.5	58 30.5	+59.9	145.4	57 40.8	+60.0	146.3	56 50.7	+60.0	147.2	56 00.0	+60.0	148.0	**56**
57	62 42.7	+59.4	141.0	61 55.7	+59.5	142.2	61 07.9	+59.7	143.3	60 19.5	+59.8	144.3	59 30.4	+59.9	145.3	58 40.8	+60.0	146.3	57 50.7	+59.9	147.2	57 00.0	+60.0	148.0	**57**
58	63 42.1	+59.3	140.7	62 55.2	+59.6	141.9	62 07.6	+59.7	143.1	61 19.3	+59.8	144.2	60 30.3	+59.9	145.2	59 40.8	+59.9	146.2	58 50.6	+60.0	147.1	58 00.0	+60.0	148.0	**58**
59	64 41.4	+59.3	140.3	63 54.8	+59.5	141.6	63 07.3	+59.7	142.9	62 19.1	+59.8	144.0	61 30.2	+59.9	145.1	60 40.7	+60.0	146.1	59 50.6	+60.0	147.1	59 00.0	+60.0	148.0	**59**
60	65 40.7	+59.2	140.0	64 54.3	+59.5	141.3	64 07.0	+59.7	142.6	63 18.9	+59.8	143.8	62 30.1	+59.9	145.0	61 40.7	+59.9	146.0	60 50.6	+60.0	147.1	60 00.0	+60.0	148.0	**60**
61	66 39.9	+59.2	139.6	65 53.8	+59.4	141.0	65 06.7	+59.6	142.4	64 18.7	+59.8	143.7	63 30.0	+59.9	144.8	62 40.6	+60.0	146.0	61 50.6	+60.0	147.0	61 00.0	+60.0	148.0	**61**
62	67 39.1	+59.1	139.1	66 53.2	+59.3	140.7	66 06.3	+59.6	142.1	65 18.5	+59.8	143.4	64 29.9	+59.9	144.7	63 40.6	+59.9	145.9	62 50.6	+60.0	147.0	62 00.0	+60.0	148.0	**62**
63	68 38.2	+59.0	138.7	67 52.5	+59.4	140.3	67 05.9	+59.5	141.8	66 18.3	+59.7	143.2	65 29.8	+59.8	144.5	64 40.5	+60.0	145.8	63 50.6	+60.0	146.9	63 00.0	+60.0	148.0	**63**
64	69 37.2	+58.9	138.2	68 51.9	+59.2	139.9	68 05.4	+59.6	141.5	67 18.0	+59.7	143.0	66 29.6	+59.9	144.4	65 40.5	+59.9	145.7	64 50.6	+60.0	146.9	64 00.0	+60.0	148.0	**64**
65	70 36.1	+58.8	137.6	69 51.1	+59.2	139.4	69 05.0	+59.4	141.2	68 17.7	+59.7	142.7	67 29.5	+59.8	144.2	66 40.4	+59.9	145.6	65 50.6	+59.9	146.8	65 00.0	+60.0	148.0	**65**
66	71 34.9	+58.6	137.0	70 50.3	+59.1	139.0	70 04.4	+59.4	140.8	69 17.4	+59.6	142.4	68 29.3	+59.8	144.0	67 40.3	+60.0	145.4	66 50.5	+60.0	146.8	66 00.0	+60.0	148.0	**66**
67	72 33.5	+58.5	136.3	71 49.4	+59.0	138.4	71 03.8	+59.4	140.4	70 17.0	+59.7	142.1	69 29.1	+59.8	143.8	68 40.3	+59.9	145.3	67 50.5	+60.0	146.7	67 00.0	+60.0	148.0	**67**
68	73 32.0	+58.4	135.5	72 48.4	+58.9	137.8	72 03.2	+59.3	139.9	71 16.7	+59.5	141.8	70 28.9	+59.8	143.5	69 40.2	+59.9	145.2	68 50.5	+60.0	146.6	68 00.0	+60.0	148.0	**68**
69	74 30.4	+58.1	134.7	73 47.3	+58.7	137.1	73 02.5	+59.2	139.4	72 16.2	+59.6	141.4	71 28.7	+59.8	143.3	70 40.1	+59.9	145.0	69 50.5	+60.0	146.6	69 00.0	+60.0	148.0	**69**
70	75 28.5	+57.8	133.7	74 46.0	+58.6	136.4	74 01.7	+59.1	138.8	73 15.8	+59.4	141.0	72 28.5	+59.7	143.0	71 40.0	+59.9	144.8	70 50.5	+59.9	146.5	70 00.0	+60.0	148.0	**70**
71	76 26.3	+57.5	132.6	75 44.6	+58.3	135.5	75 00.8	+58.9	138.2	74 15.2	+59.5	140.5	73 28.2	+59.7	142.7	72 39.9	+59.9	144.6	71 50.4	+60.0	146.4	71 00.0	+60.0	148.0	**71**
72	77 23.8	+57.1	131.4	76 42.9	+58.1	134.6	75 59.7	+58.9	137.4	75 14.7	+59.3	140.0	74 27.9	+59.7	142.3	73 39.8	+59.8	144.4	72 50.4	+60.0	146.3	72 00.0	+60.0	148.0	**72**
73	78 20.9	+56.6	129.9	77 41.0	+57.8	133.4	76 58.6	+58.6	136.6	76 14.0	+59.2	139.4	75 27.6	+59.6	141.9	74 39.6	+59.9	144.1	73 50.4	+59.9	146.2	73 00.0	+60.0	148.0	**73**
74	79 17.5	+55.9	128.2	78 38.8	+57.3	132.1	77 57.2	+58.4	135.6	77 13.2	+59.1	138.7	76 27.2	+59.5	141.4	75 39.5	+59.8	143.9	74 50.3	+60.0	146.0	74 00.0	+60.0	148.0	**74**
75	80 13.4	+55.0	126.1	79 36.1	+56.8	130.5	78 55.6	+58.0	134.4	78 12.3	+58.9	137.9	77 26.7	+59.5	140.9	76 39.3	+59.8	143.5	75 50.3	+60.0	145.9	75 00.0	+60.0	148.0	**75**
76	81 08.4	+53.8	123.7	80 32.9	+56.1	128.7	79 53.6	+57.7	133.1	79 11.2	+58.7	136.9	78 26.2	+59.4	140.2	77 39.1	+59.7	143.2	76 50.3	+59.9	145.7	76 00.0	+60.0	148.0	**76**
77	82 02.2	+52.2	•120.6	81 29.0	+55.1	126.4	80 51.3	+57.1	131.4	80 09.9	+58.4	135.7	79 25.6	+59.2	139.5	78 38.8	+59.8	142.7	77 50.2	+59.9	145.5	77 00.0	+60.0	148.0	**77**
78	82 54.4	+49.8	•116.9	82 24.1	+53.7	123.6	81 48.4	+56.3	129.4	81 08.3	+58.1	134.3	80 24.8	+59.1	138.6	79 38.6	+59.6	142.2	78 50.1	+60.0	145.3	78 00.0	+60.0	148.0	**78**
79	83 44.2	+46.4	•112.1	83 17.8	+51.7	•120.0	82 44.7	+55.2	126.8	82 06.4	+57.4	132.6	81 23.9	+58.8	137.5	80 38.2	+59.6	141.6	79 50.1	+59.9	145.0	79 00.0	+60.0	148.0	**79**
80	84 30.6	+41.4	•105.9	84 09.5	+48.5	•115.3	83 39.9	+53.6	•123.5	83 03.8	+56.7	130.4	82 22.7	+58.5	136.1	81 37.8	+59.4	140.8	80 50.0	+59.9	144.7	80 00.0	+60.0	148.0	**80**
81	85 12.0	+33.9	•97.8	84 58.0	+43.8	•109.1	84 33.5	+50.8	•119.1	84 00.5	+55.4	127.4	83 21.2	+57.9	134.3	82 37.2	+59.3	139.8	81 49.9	+59.8	144.3	81 00.0	+60.0	148.0	**81**
82	85 45.9	+23.1	•87.3	85 41.8	+36.0	•100.6	85 24.3	+46.4	•113.0	84 55.9	+53.2	•123.4	84 19.1	+57.1	131.8	83 36.5	+59.0	138.5	82 49.7	+59.8	143.8	82 00.0	+60.0	148.0	**82**
83	86 09.0	+8.8	•74.1	86 17.8	+24.1	•89.1	86 10.7	+38.7	•104.3	85 49.1	+49.4	•117.7	85 16.2	+55.6	•128.4	84 35.5	+58.6	136.7	83 49.5	+59.8	143.1	83 00.0	+60.0	148.0	**83**
84	86 17.8	−7.1	•59.0	86 41.9	+7.5	•74.1	86 49.4	+25.4	•91.7	86 38.5	+42.0	•109.0	86 11.8	+52.7	•123.4	85 34.1	+57.7	134.2	84 49.3	+59.6	142.1	84 00.0	+60.0	148.0	**84**
85	86 10.7	−21.6	•43.9	86 49.4	−10.9	•56.5	87 14.8	+5.7	•74.1	87 20.5	+27.3	•95.2	87 04.5	+46.2	•115.1	86 31.8	+56.1	•130.3	85 48.9	+59.3	140.7	85 00.0	+60.0	148.0	**85**
86	85 49.1	−32.9	•30.5	86 38.5	−26.7	•39.1	87 20.5	−16.0	•52.8	87 47.8	+2.9	•74.0	87 50.7	+30.1	•100.5	87 27.9	+51.3	•123.3	86 48.2	+58.8	138.5	86 00.0	+60.0	148.0	**86**
87	85 16.2	−40.7	•19.7	86 11.8	−37.7	•24.7	87 04.5	−32.7	•32.9	87 50.7	−22.8	•47.5	88 20.8	−1.6	•74.0	88 19.2	+34.7	•108.9	87 47.0	+56.9	•134.2	87 00.0	+60.0	148.0	**87**
88	84 35.5	−46.0	•11.3	85 34.1	−44.8	•13.8	86 31.8	−42.9	•17.8	87 27.9	−39.7	•24.7	88 19.2	−32.2	•39.1	88 53.9	−10.0	•74.0	88 43.9	+43.0	•123.3	88 00.0	+60.0	148.0	**88**
89	83 49.5	−49.5	•4.9	84 49.3	−49.3	•5.9	85 48.9	−48.9	•7.3	86 48.2	−48.2	•9.5	87 47.0	−47.0	•13.8	88 43.9	−43.9	•24.7	89 26.9	−26.9	•74.0	89 00.0	+60.0	148.0	**89**
90	83 00.0	−51.9	•0.0	84 00.0	−52.1	•0.0	85 00.0	−52.3	•0.0	86 00.0	−52.6	•0.0	87 00.0	−53.1	•0.0	88 00.0	−53.8	•0.0	89 00.0	−55.4	•0.0	90 00.0	−60.0	74.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

32°, 328° L.H.A.   LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 32°, 328°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 55.9	–59.8	147.8	5 05.1	–59.9	147.9	4 14.3	–59.9	147.9	3 23.5	–60.0	147.9	2 32.6	–59.9	148.0	1 41.8	–60.0	148.0	0 50.9	–60.0	148.0	0 00.0	+60.0	32.0	**0**
1	4 56.1	–59.9	147.9	4 05.2	–59.9	147.9	3 14.4	–59.9	147.9	2 23.5	–59.9	148.0	1 32.7	–60.0	148.0	0 41.8	–60.0	148.0	0 09.1	+60.0	32.0	1 00.0	+60.0	32.0	**1**
2	3 56.2	–59.9	147.9	3 05.3	–59.9	148.0	2 14.5	–60.0	148.0	1 23.6	–60.0	148.0	0 32.7	–60.0	148.0	0 18.2	+60.0	32.0	1 09.1	+60.0	32.0	2 00.0	+60.0	32.0	**2**
3	2 56.3	–59.9	148.0	2 05.4	–59.9	148.0	1 14.5	–59.9	148.0	0 23.6	–60.0	148.0	0 27.3	+60.0	32.0	1 18.2	+60.0	32.0	2 09.1	+60.0	32.0	3 00.0	+60.0	32.0	**3**
4	1 56.4	–59.8	148.1	1 05.5	–59.9	148.1	0 14.6	–60.0	148.1	0 36.4	+59.9	31.9	1 27.3	+60.0	31.9	2 18.2	+60.0	31.9	3 09.1	+60.0	32.0	4 00.0	+60.0	32.0	**4**
5	0 56.6	–59.9	148.1	0 05.6	–59.9	148.1	0 45.4	+59.9	31.9	1 36.3	+60.0	31.9	2 27.3	+59.9	31.9	3 18.2	+60.0	31.9	4 09.1	+60.0	32.0	5 00.0	+60.0	32.0	**5**
6	0 03.3	+59.9	31.8	0 54.3	+59.9	31.8	1 45.3	+59.9	31.8	2 36.3	+59.9	31.8	3 27.2	+60.0	31.9	4 18.2	+60.0	31.9	5 09.1	+60.0	31.9	6 00.0	+60.0	32.0	**6**
7	1 03.2	+59.9	31.7	1 54.2	+59.9	31.8	2 45.2	+60.0	31.8	3 36.2	+60.0	31.8	4 27.2	+60.0	31.8	5 18.2	+60.0	31.9	6 09.1	+60.0	31.9	7 00.0	+60.0	32.0	**7**
8	2 03.1	+59.8	31.7	2 54.1	+59.9	31.7	3 45.2	+59.9	31.7	4 36.2	+59.9	31.8	5 27.2	+60.0	31.8	6 18.2	+59.9	31.9	7 09.1	+60.0	31.9	8 00.0	+60.0	32.0	**8**
9	3 02.9	+59.9	31.6	3 54.0	+59.9	31.6	4 45.1	+59.9	31.7	5 36.1	+60.0	31.7	6 27.2	+59.9	31.8	7 18.1	+60.0	31.8	8 09.1	+60.0	31.9	9 00.0	+60.0	32.0	**9**
10	4 02.8	+59.9	31.5	4 53.9	+59.9	31.6	5 45.0	+60.0	31.6	6 36.1	+60.0	31.7	7 27.1	+60.0	31.8	8 18.1	+60.0	31.8	9 09.1	+60.0	31.9	10 00.0	+60.0	32.0	**10**
11	5 02.7	+59.9	31.5	5 53.8	+60.0	31.5	6 45.0	+59.9	31.6	7 36.1	+59.9	31.7	8 27.1	+60.0	31.7	9 18.1	+60.0	31.8	10 09.1	+60.0	31.9	11 00.0	+60.0	32.0	**11**
12	6 02.6	+59.8	31.4	6 53.8	+59.9	31.5	7 44.9	+59.9	31.5	8 36.0	+60.0	31.6	9 27.1	+60.0	31.7	10 18.1	+60.0	31.8	11 09.1	+60.0	31.9	12 00.0	+60.0	32.0	**12**
13	7 02.4	+59.9	31.3	7 53.7	+59.9	31.4	8 44.8	+60.0	31.5	9 36.0	+59.9	31.6	10 27.1	+59.9	31.7	11 18.1	+60.0	31.8	12 09.1	+60.0	31.9	13 00.0	+60.0	32.0	**13**
14	8 02.3	+59.9	31.3	8 53.6	+59.9	31.4	9 44.8	+59.9	31.4	10 35.9	+60.0	31.5	11 27.0	+60.0	31.6	12 18.1	+60.0	31.8	13 09.1	+60.0	31.9	14 00.0	+60.0	32.0	**14**
15	9 02.2	+59.8	31.2	9 53.5	+59.9	31.3	10 44.7	+59.9	31.4	11 35.9	+60.0	31.5	12 27.0	+60.0	31.6	13 18.1	+60.0	31.7	14 09.1	+60.0	31.9	15 00.0	+60.0	32.0	**15**
16	10 02.0	+59.9	31.2	10 53.4	+59.9	31.2	11 44.6	+60.0	31.4	12 35.9	+59.9	31.5	13 27.0	+60.0	31.6	14 18.1	+60.0	31.7	15 09.1	+60.0	31.9	16 00.0	+60.0	32.0	**16**
17	11 01.9	+59.9	31.1	11 53.3	+59.9	31.2	12 44.6	+59.9	31.3	13 35.8	+60.0	31.4	14 27.0	+59.9	31.6	15 18.1	+60.0	31.7	16 09.1	+60.0	31.8	17 00.0	+60.0	32.0	**17**
18	12 01.8	+59.9	31.0	12 53.2	+59.9	31.1	13 44.5	+59.9	31.3	14 35.8	+59.9	31.4	15 26.9	+60.0	31.5	16 18.1	+59.9	31.7	17 09.1	+60.0	31.8	18 00.0	+60.0	32.0	**18**
19	13 01.7	+59.8	30.9	13 53.1	+59.9	31.1	14 44.4	+60.0	31.2	15 35.7	+60.0	31.3	16 26.9	+60.0	31.5	17 18.0	+60.0	31.7	18 09.1	+60.0	31.8	19 00.0	+60.0	32.0	**19**
20	14 01.5	+59.9	30.9	14 53.0	+59.9	31.0	15 44.4	+59.9	31.2	16 35.7	+59.9	31.3	17 26.9	+60.0	31.5	18 18.0	+60.0	31.6	19 09.1	+60.0	31.8	20 00.0	+60.0	32.0	**20**
21	15 01.4	+59.9	30.8	15 52.9	+59.9	31.0	16 44.3	+59.9	31.1	17 35.6	+60.0	31.3	18 26.9	+59.9	31.4	19 18.0	+60.0	31.6	20 09.1	+60.0	31.8	21 00.0	+60.0	32.0	**21**
22	16 01.3	+59.8	30.7	16 52.8	+59.9	30.9	17 44.2	+60.0	31.1	18 35.6	+59.9	31.2	19 26.8	+60.0	31.4	20 18.0	+60.0	31.6	21 09.1	+60.0	31.8	22 00.0	+60.0	32.0	**22**
23	17 01.1	+59.9	30.7	17 52.7	+59.9	30.8	18 44.2	+59.9	31.0	19 35.5	+60.0	31.2	20 26.8	+60.0	31.4	21 18.0	+60.0	31.6	22 09.1	+60.0	31.8	23 00.0	+60.0	32.0	**23**
24	18 01.0	+59.8	30.6	18 52.6	+59.9	30.8	19 44.1	+59.9	31.0	20 35.5	+59.9	31.1	21 26.8	+60.0	31.3	22 18.0	+60.0	31.5	23 09.1	+59.9	31.8	24 00.0	+60.0	32.0	**24**
25	19 00.8	+59.9	30.5	19 52.5	+59.9	30.7	20 44.0	+59.9	30.9	21 35.4	+60.0	31.1	22 26.8	+59.9	31.3	23 18.0	+60.0	31.5	24 09.0	+60.0	31.8	25 00.0	+60.0	32.0	**25**
26	20 00.7	+59.9	30.5	20 52.4	+59.9	30.6	21 43.9	+60.0	30.8	22 35.4	+59.9	31.1	23 26.7	+60.0	31.3	24 18.0	+59.9	31.5	25 09.0	+60.0	31.7	26 00.0	+60.0	32.0	**26**
27	21 00.6	+59.8	30.4	21 52.3	+59.9	30.6	22 43.9	+59.9	30.8	23 35.3	+60.0	31.0	24 26.7	+60.0	31.2	25 17.9	+60.0	31.5	26 09.0	+60.0	31.7	27 00.0	+60.0	32.0	**27**
28	22 00.4	+59.9	30.3	22 52.2	+59.9	30.5	23 43.8	+59.9	30.7	24 35.3	+59.9	31.0	25 26.7	+60.0	31.2	26 17.9	+60.0	31.5	27 09.0	+60.0	31.7	28 00.0	+60.0	32.0	**28**
29	23 00.3	+59.8	30.2	23 52.1	+59.8	30.5	24 43.7	+59.9	30.7	25 35.2	+60.0	30.9	26 26.7	+59.9	31.2	27 17.9	+60.0	31.4	28 09.0	+60.0	31.7	29 00.0	+60.0	32.0	**29**
30	24 00.1	+59.9	30.2	24 51.9	+59.9	30.4	25 43.6	+60.0	30.6	26 35.2	+59.9	30.9	27 26.6	+60.0	31.1	28 17.9	+60.0	31.4	29 09.0	+60.0	31.7	30 00.0	+60.0	32.0	**30**
31	25 00.0	+59.8	30.1	25 51.8	+59.9	30.3	26 43.6	+59.9	30.6	27 35.1	+60.0	30.8	28 26.6	+60.0	31.1	29 17.9	+60.0	31.4	30 09.0	+60.0	31.7	31 00.0	+60.0	32.0	**31**
32	25 59.8	+59.9	30.0	26 51.7	+59.9	30.2	27 43.5	+59.9	30.5	28 35.1	+59.9	30.8	29 26.6	+59.9	31.1	30 17.9	+60.0	31.4	31 09.0	+60.0	31.7	32 00.0	+60.0	32.0	**32**
33	26 59.7	+59.8	29.9	27 51.6	+59.9	30.2	28 43.4	+59.9	30.5	29 35.0	+60.0	30.7	30 26.5	+60.0	31.0	31 17.9	+60.0	31.3	32 09.0	+60.0	31.7	33 00.0	+60.0	32.0	**33**
34	27 59.5	+59.8	29.8	28 51.5	+59.9	30.1	29 43.3	+59.9	30.4	30 35.0	+59.9	30.7	31 26.5	+60.0	31.0	32 17.9	+59.9	31.3	33 09.0	+60.0	31.6	34 00.0	+60.0	32.0	**34**
35	28 59.3	+59.9	29.8	29 51.4	+59.8	30.0	30 43.2	+59.9	30.3	31 34.9	+60.0	30.6	32 26.5	+59.9	31.0	33 17.8	+60.0	31.3	34 09.0	+60.0	31.6	35 00.0	+60.0	32.0	**35**
36	29 59.2	+59.8	29.7	30 51.2	+59.9	30.0	31 43.1	+59.9	30.3	32 34.9	+59.9	30.6	33 26.4	+60.0	30.9	34 17.8	+60.0	31.3	35 09.0	+60.0	31.6	36 00.0	+60.0	32.0	**36**
37	30 59.0	+59.8	29.6	31 51.1	+59.9	29.9	32 43.0	+60.0	30.2	33 34.8	+60.0	30.5	34 26.4	+60.0	30.9	35 17.8	+60.0	31.2	36 09.0	+60.0	31.6	37 00.0	+60.0	32.0	**37**
38	31 58.8	+59.9	29.5	32 51.0	+59.8	29.8	33 43.0	+59.9	30.1	34 34.8	+59.9	30.5	35 26.4	+59.9	30.8	36 17.8	+60.0	31.2	37 09.0	+60.0	31.6	38 00.0	+60.0	32.0	**38**
39	32 58.7	+59.8	29.4	33 50.8	+59.9	29.7	34 42.9	+59.9	30.1	35 34.7	+59.9	30.4	36 26.3	+60.0	30.8	37 17.8	+60.0	31.2	38 09.0	+60.0	31.6	39 00.0	+60.0	32.0	**39**
40	33 58.5	+59.8	29.3	34 50.7	+59.9	29.6	35 42.8	+59.9	30.0	36 34.6	+60.0	30.4	37 26.3	+60.0	30.7	38 17.8	+59.9	31.1	39 09.0	+60.0	31.6	40 00.0	+60.0	32.0	**40**
41	34 58.3	+59.8	29.2	35 50.6	+59.8	29.6	36 42.7	+59.9	29.9	37 34.6	+59.9	30.3	38 26.3	+59.9	30.7	39 17.7	+60.0	31.1	40 09.0	+60.0	31.5	41 00.0	+60.0	32.0	**41**
42	35 58.1	+59.8	29.1	36 50.4	+59.9	29.5	37 42.6	+59.9	29.9	38 34.5	+59.9	30.2	39 26.2	+60.0	30.7	40 17.7	+60.0	31.1	41 09.0	+60.0	31.5	42 00.0	+60.0	32.0	**42**
43	36 57.9	+59.8	29.0	37 50.3	+59.8	29.4	38 42.5	+59.9	29.8	39 34.4	+60.0	30.2	40 26.2	+59.9	30.6	41 17.7	+60.0	31.1	42 09.0	+60.0	31.5	43 00.0	+60.0	32.0	**43**
44	37 57.7	+59.8	28.9	38 50.1	+59.9	29.3	39 42.4	+59.8	29.7	40 34.4	+59.9	30.1	41 26.1	+60.0	30.6	42 17.7	+60.0	31.0	43 09.0	+60.0	31.5	44 00.0	+60.0	32.0	**44**
45	38 57.5	+59.8	28.8	39 50.0	+59.8	29.2	40 42.2	+59.9	29.6	41 34.3	+59.9	30.1	42 26.1	+60.0	30.5	43 17.7	+59.9	31.0	44 09.0	+60.0	31.5	45 00.0	+60.0	32.0	**45**
46	39 57.3	+59.8	28.7	40 49.8	+59.9	29.1	41 42.1	+59.9	29.5	42 34.2	+59.9	30.0	43 26.1	+59.9	30.5	44 17.6	+60.0	31.0	45 09.0	+60.0	31.5	46 00.0	+60.0	32.0	**46**
47	40 57.1	+59.8	28.6	41 49.7	+59.8	29.0	42 42.0	+59.9	29.5	43 34.1	+60.0	29.9	44 26.0	+60.0	30.4	45 17.6	+60.0	30.9	46 09.0	+60.0	31.4	47 00.0	+60.0	32.0	**47**
48	41 56.9	+59.7	28.5	42 49.5	+59.8	28.9	43 41.9	+59.9	29.4	44 34.1	+59.9	29.8	45 26.0	+59.9	30.4	46 17.6	+60.0	30.9	47 09.0	+60.0	31.4	48 00.0	+60.0	32.0	**48**
49	42 56.6	+59.8	28.4	43 49.3	+59.8	28.8	44 41.8	+59.8	29.3	45 34.0	+59.9	29.8	46 25.9	+60.0	30.3	47 17.6	+60.0	30.8	48 09.0	+59.9	31.4	49 00.0	+60.0	32.0	**49**
50	43 56.4	+59.7	28.2	44 49.1	+59.8	28.7	45 41.6	+59.9	29.2	46 33.9	+59.9	29.7	47 25.9	+59.9	30.2	48 17.6	+59.9	30.8	49 08.9	+60.0	31.4	50 00.0	+60.0	32.0	**50**
51	44 56.1	+59.8	28.1	45 48.9	+59.9	28.6	46 41.5	+59.9	29.1	47 33.8	+59.9	29.6	48 25.8	+60.0	30.2	49 17.5	+60.0	30.8	50 08.9	+60.0	31.4	51 00.0	+60.0	32.0	**51**
52	45 55.9	+59.7	28.0	46 48.8	+59.8	28.5	47 41.4	+59.8	29.0	48 33.7	+59.9	29.5	49 25.8	+59.9	30.1	50 17.5	+60.0	30.7	51 08.9	+60.0	31.3	52 00.0	+60.0	32.0	**52**
53	46 55.6	+59.7	27.8	47 48.6	+59.7	28.3	48 41.2	+59.9	28.9	49 33.6	+59.9	29.4	50 25.7	+60.0	30.0	51 17.5	+60.0	30.7	52 08.9	+60.0	31.3	53 00.0	+60.0	32.0	**53**
54	47 55.3	+59.8	27.7	48 48.3	+59.8	28.2	49 41.1	+59.8	28.8	50 33.5	+59.9	29.4	51 25.7	+59.9	30.0	52 17.5	+59.9	30.6	53 08.9	+60.0	31.3	54 00.0	+60.0	32.0	**54**
55	48 55.1	+59.7	27.6	49 48.1	+59.8	28.1	50 40.9	+59.9	28.7	51 33.4	+59.9	29.3	52 25.6	+59.9	29.9	53 17.4	+60.0	30.6	54 08.9	+60.0	31.3	55 00.0	+60.0	32.0	**55**
56	49 54.8	+59.7	27.4	50 47.9	+59.8	28.0	51 40.8	+59.8	28.5	52 33.3	+59.9	29.2	53 25.5	+60.0	29.8	54 17.4	+60.0	30.5	55 08.9	+60.0	31.2	56 00.0	+60.0	32.0	**56**
57	50 54.5	+59.6	27.2	51 47.7	+59.7	27.8	52 40.6	+59.8	28.4	53 33.2	+59.9	29.1	54 25.5	+59.9	29.7	55 17.4	+59.9	30.5	56 08.9	+60.0	31.2	57 00.0	+60.0	32.0	**57**
58	51 54.1	+59.7	27.1	52 47.4	+59.8	27.7	53 40.4	+59.8	28.3	54 33.1	+59.8	29.0	55 25.4	+59.9	29.7	56 17.3	+60.0	30.4	57 08.9	+60.0	31.2	58 00.0	+60.0	32.0	**58**
59	52 53.8	+59.6	26.9	53 47.2	+59.7	27.5	54 40.2	+59.8	28.2	55 32.9	+59.9	28.8	56 25.3	+59.9	29.6	57 17.3	+60.0	30.3	58 08.9	+60.0	31.1	59 00.0	+60.0	32.0	**59**
60	53 53.4	+59.7	26.7	54 46.9	+59.7	27.4	55 40.0	+59.8	28.0	56 32.8	+59.9	28.7	57 25.2	+60.0	29.5	58 17.3	+59.9	30.3	59 08.9	+60.0	31.1	60 00.0	+60.0	32.0	**60**
61	54 53.1	+59.6	26.5	55 46.6	+59.7	27.2	56 39.8	+59.8	27.9	57 32.7	+59.8	28.6	58 25.2	+59.9	29.4	59 17.2	+60.0	30.2	60 08.9	+59.9	31.1	61 00.0	+60.0	32.0	**61**
62	55 52.7	+59.6	26.3	56 46.3	+59.7	27.0	57 39.6	+59.8	27.7	58 32.5	+59.9	28.5	59 25.1	+59.9	29.3	60 17.2	+59.9	30.1	61 08.8	+60.0	31.0	62 00.0	+60.0	32.0	**62**
63	56 52.3	+59.5	26.1	57 46.0	+59.7	26.8	58 39.4	+59.7	27.5	59 32.4	+59.8	28.3	60 25.0	+59.9	29.2	61 17.1	+60.0	30.0	62 08.8	+60.0	31.0	63 00.0	+60.0	32.0	**63**
64	57 51.8	+59.6	25.9	58 45.7	+59.6	26.6	59 39.1	+59.8	27.4	60 32.2	+59.8	28.2	61 24.9	+59.9	29.0	62 17.1	+60.0	30.0	63 08.8	+60.0	30.9	64 00.0	+60.0	32.0	**64**
65	58 51.4	+59.5	25.7	59 45.3	+59.6	26.4	60 38.9	+59.7	27.2	61 32.0	+59.8	28.0	62 24.8	+59.9	28.9	63 17.1	+59.9	29.9	64 08.8	+60.0	30.9	65 00.0	+60.0	32.0	**65**
66	59 50.9	+59.5	25.4	60 44.9	+59.6	26.2	61 38.6	+59.7	27.0	62 31.8	+59.8	27.9	63 24.7	+59.8	28.8	64 17.0	+59.9	29.8	65 08.8	+60.0	30.9	66 00.0	+60.0	32.0	**66**
67	60 50.4	+59.4	25.1	61 44.5	+59.6	25.9	62 38.3	+59.7	26.8	63 31.6	+59.8	27.7	64 24.5	+59.9	28.6	65 16.9	+60.0	29.7	66 08.8	+60.0	30.8	67 00.0	+60.0	32.0	**67**
68	61 49.8	+59.5	24.9	62 44.1	+59.5	25.7	63 38.0	+59.6	26.5	64 31.4	+59.8	27.5	65 24.4	+59.9	28.5	66 16.9	+59.9	29.6	67 08.8	+59.9	30.7	68 00.0	+60.0	32.0	**68**
69	62 49.3	+59.3	24.6	63 43.6	+59.6	25.4	64 37.6	+59.7	26.3	65 31.2	+59.8	27.3	66 24.3	+59.8	28.3	67 16.8	+59.9	29.5	68 08.7	+60.0	30.7	69 00.0	+60.0	32.0	**69**
70	63 48.6	+59.4	24.2	64 43.2	+59.4	25.1	65 37.3	+59.6	26.0	66 31.0	+59.7	27.1	67 24.1	+59.9	28.1	68 16.7	+60.0	29.3	69 08.7	+60.0	30.6	70 00.0	+60.0	32.0	**70**
71	64 48.0	+59.2	23.9	65 42.6	+59.5	24.8	66 36.9	+59.6	25.8	67 30.7	+59.7	26.8	68 24.0	+59.8	27.9	69 16.7	+59.9	29.2	70 08.7	+60.0	30.5	71 00.0	+60.0	32.0	**71**
72	65 47.2	+59.3	23.5	66 42.1	+59.3	24.5	67 36.5	+59.5	25.5	68 30.4	+59.7	26.5	69 23.8	+59.8	27.7	70 16.6	+59.9	29.0	71 08.7	+60.0	30.4	72 00.0	+60.0	32.0	**72**
73	66 46.5	+59.1	23.1	67 41.4	+59.4	24.1	68 36.0	+59.5	25.1	69 30.1	+59.6	26.3	70 23.6	+59.8	27.5	71 16.5	+59.9	28.9	72 08.7	+59.9	30.4	73 00.0	+60.0	32.0	**73**
74	67 45.6	+59.1	22.7	68 40.8	+59.2	23.7	69 35.5	+59.4	24.8	70 29.7	+59.6	25.9	71 23.4	+59.7	27.2	72 16.4	+59.9	28.7	73 08.6	+60.0	30.2	74 00.0	+60.0	32.0	**74**
75	68 44.7	+59.0	22.2	69 40.0	+59.2	23.2	70 34.9	+59.4	24.4	71 29.3	+59.6	25.6	72 23.1	+59.8	27.0	73 16.3	+59.8	28.5	74 08.6	+60.0	30.1	75 00.0	+60.0	32.0	**75**
76	69 43.7	+58.9	21.7	70 39.2	+59.1	22.8	71 34.3	+59.3	23.9	72 28.9	+59.5	25.2	73 22.9	+59.7	26.6	74 16.1	+59.9	28.2	75 08.6	+59.9	30.0	76 00.0	+60.0	32.0	**76**
77	70 42.6	+58.8	21.2	71 38.3	+59.1	22.2	72 33.6	+59.3	23.4	73 28.4	+59.5	24.8	74 22.6	+59.6	26.3	75 16.0	+59.8	28.0	76 08.5	+60.0	29.8	77 00.0	+60.0	32.0	**77**
78	71 41.4	+58.6	20.5	72 37.4	+58.9	21.6	73 32.9	+59.1	22.9	74 27.9	+59.4	24.3	75 22.2	+59.6	25.9	76 15.8	+59.8	27.6	77 08.5	+59.9	29.7	78 00.0	+60.0	32.0	**78**
79	72 40.0	+58.5	19.8	73 36.3	+58.7	21.0	74 32.0	+59.1	22.3	75 27.3	+59.3	23.7	76 21.8	+59.6	25.4	77 15.6	+59.8	27.3	78 08.4	+59.9	29.5	79 00.0	+60.0	32.0	**79**
80	73 38.5	+58.3	19.1	74 35.0	+58.6	20.3	75 31.1	+58.9	21.6	76 26.6	+59.2	23.1	77 21.4	+59.5	24.9	78 15.4	+59.7	26.9	79 08.3	+60.0	29.2	80 00.0	+60.0	32.0	**80**
81	74 36.8	+58.1	18.2	75 33.6	+58.4	19.4	76 30.0	+58.7	20.8	77 25.8	+59.0	22.4	78 20.9	+59.3	24.2	79 15.1	+59.7	26.4	80 08.3	+59.9	28.9	81 00.0	+60.0	32.0	**81**
82	75 34.9	+57.8	17.2	76 32.0	+58.2	18.5	77 28.7	+58.5	19.9	78 24.8	+58.9	21.5	79 20.2	+59.3	23.5	80 14.8	+59.6	25.8	81 08.2	+59.9	28.6	82 00.0	+60.0	32.0	**82**
83	76 32.7	+57.5	16.1	77 30.2	+57.8	17.4	78 27.2	+58.2	18.8	79 23.7	+58.6	20.5	80 19.5	+59.1	22.6	81 14.4	+59.5	25.1	82 08.1	+59.8	28.2	83 00.0	+60.0	32.0	**83**
84	77 30.2	+57.0	14.8	78 28.0	+57.4	16.1	79 25.4	+57.9	17.6	80 22.3	+58.4	19.3	81 18.6	+58.8	21.5	82 13.9	+59.3	24.2	83 07.9	+59.8	27.6	84 00.0	+60.0	32.0	**84**
85	78 27.2	+56.5	13.3	79 25.4	+56.9	14.6	80 23.3	+57.4	16.1	81 20.7	+57.9	17.9	82 17.4	+58.5	20.1	83 13.2	+59.2	23.0	84 07.7	+59.7	26.8	85 00.0	+60.0	32.0	**85**
86	79 23.7	+55.8	11.6	80 22.3	+56.3	12.8	81 20.7	+56.7	14.2	82 18.6	+57.3	16.0	83 15.9	+58.1	18.4	84 12.4	+58.8	21.5	85 07.4	+59.5	25.8	86 00.0	+60.0	32.0	**86**
87	80 19.5	+54.9	9.5	81 18.6	+55.3	10.6	82 17.4	+55.8	11.9	83 15.9	+56.5	13.7	84 14.0	+57.2	16.0	85 11.2	+58.1	19.3	86 06.9	+59.3	24.2	87 00.0	+60.0	32.0	**87**
88	81 14.4	+53.7	7.0	82 13.9	+54.0	7.9	83 13.2	+54.5	9.0	84 12.4	+55.0	10.6	85 11.2	*+55.7* •	12.7	86 09.3	*+56.9* •	16.0	87 06.2	+58.4	21.5	88 00.0	+60.0	32.0	**88**
89	82 08.1	*+51.9* •	3.9	83 07.9	*+52.1* •	4.4	84 07.7	*+52.3* •	5.2	85 07.4	*+52.6* •	6.2	86 06.9	*+53.1* •	7.8	87 06.2	*+53.8* •	10.5	88 04.6	*+55.4* •	16.0	89 00.0	+60.0	32.0	**89**
90	83 00.0	*+49.5* •	0.0	84 00.0	*+49.3* •	0.0	85 00.0	*+48.9* •	0.0	86 00.0	*+48.2* •	0.0	87 00.0	*+47.0* •	0.0	88 00.0	*+43.9* •	0.0	89 00.0	*+26.9* •	0.0	90 00.0	–60.0	16.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 148°, 212°

33°, 327° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 52.0	+59.8	146.8	5 01.8	+59.9	146.9	4 11.5	+59.9	146.9	3 21.2	+60.0	146.9	2 30.9	+60.0	147.0	1 40.6	+60.0	147.0	0 50.3	+60.0	147.0	0 00.0	+60.0	147.0	**0**
1	6 51.8	+59.9	146.7	6 01.7	+59.9	146.8	5 11.4	+60.0	146.9	4 21.2	+59.9	146.9	3 30.9	+60.0	146.9	2 40.6	+60.0	147.0	1 50.3	+60.0	147.0	1 00.0	+60.0	147.0	**1**
2	7 51.7	+59.9	146.7	7 01.6	+59.9	146.7	6 11.4	+59.9	146.8	5 21.1	+60.0	146.9	4 30.9	+60.0	146.9	3 40.6	+60.0	146.9	2 50.3	+60.0	147.0	2 00.0	+60.0	147.0	**2**
3	8 51.6	+59.8	146.6	8 01.5	+59.9	146.7	7 11.3	+59.9	146.8	6 21.1	+60.0	146.8	5 30.9	+59.9	146.9	4 40.6	+60.0	146.9	3 50.3	+60.0	147.0	3 00.0	+60.0	147.0	**3**
4	9 51.4	+59.9	146.5	9 01.4	+59.9	146.6	8 11.2	+60.0	146.7	7 21.1	+59.9	146.8	6 30.8	+60.0	146.8	5 40.6	+60.0	146.9	4 50.3	+60.0	147.0	4 00.0	+60.0	147.0	**4**
5	10 51.3	+59.9	146.5	10 01.3	+59.9	146.6	9 11.2	+59.9	146.7	8 21.0	+60.0	146.7	7 30.8	+60.0	146.8	6 40.6	+60.0	146.9	5 50.3	+60.0	146.9	5 00.0	+60.0	147.0	**5**
6	11 51.2	+59.8	146.4	11 01.2	+59.9	146.5	10 11.1	+59.9	146.6	9 21.0	+59.9	146.7	8 30.8	+60.0	146.8	7 40.6	+60.0	146.9	6 50.3	+60.0	146.9	6 00.0	+60.0	147.0	**6**
7	12 51.0	+59.9	146.3	12 01.1	+59.9	146.4	11 11.0	+60.0	146.6	10 20.9	+60.0	146.7	9 30.8	+59.9	146.8	8 40.6	+59.9	146.8	7 50.3	+60.0	146.9	7 00.0	+60.0	147.0	**7**
8	13 50.9	+59.8	146.3	13 01.0	+59.9	146.4	12 11.0	+59.9	146.5	11 20.9	+59.9	146.6	10 30.7	+60.0	146.7	9 40.5	+60.0	146.8	8 50.3	+60.0	146.9	8 00.0	+60.0	147.0	**8**
9	14 50.7	+59.9	146.2	14 00.9	+59.9	146.3	13 10.9	+59.9	146.5	12 20.8	+60.0	146.6	11 30.7	+60.0	146.7	10 40.5	+60.0	146.8	9 50.3	+60.0	146.9	9 00.0	+60.0	147.0	**9**
10	15 50.6	+59.9	146.1	15 00.8	+59.8	146.3	14 10.8	+59.9	146.4	13 20.8	+59.9	146.5	12 30.7	+60.0	146.7	11 40.5	+60.0	146.8	10 50.3	+60.0	146.9	10 00.0	+60.0	147.0	**10**
11	16 50.5	+59.8	146.0	16 00.6	+59.9	146.2	15 10.7	+60.0	146.4	14 20.7	+60.0	146.5	13 30.7	+59.9	146.6	12 40.5	+60.0	146.8	11 50.3	+60.0	146.9	11 00.0	+60.0	147.0	**11**
12	17 50.3	+59.9	146.0	17 00.5	+59.9	146.1	16 10.7	+59.9	146.3	15 20.7	+59.9	146.5	14 30.6	+60.0	146.6	13 40.5	+60.0	146.8	12 50.3	+60.0	146.9	12 00.0	+60.0	147.0	**12**
13	18 50.2	+59.8	145.9	18 00.4	+59.9	146.1	17 10.6	+59.9	146.3	16 20.6	+60.0	146.4	15 30.6	+60.0	146.6	14 40.5	+60.0	146.7	13 50.3	+60.0	146.9	13 00.0	+60.0	147.0	**13**
14	19 50.0	+59.9	145.8	19 00.3	+59.9	146.0	18 10.5	+59.9	146.2	17 20.6	+60.0	146.4	16 30.6	+60.0	146.6	15 40.5	+60.0	146.7	14 50.3	+60.0	146.9	14 00.0	+60.0	147.0	**14**
15	20 49.9	+59.8	145.7	20 00.2	+59.9	146.0	19 10.4	+60.0	146.2	18 20.6	+59.9	146.3	17 30.6	+59.9	146.5	16 40.5	+60.0	146.7	15 50.3	+60.0	146.8	15 00.0	+60.0	147.0	**15**
16	21 49.7	+59.9	145.7	21 00.1	+59.9	145.9	20 10.4	+59.9	146.1	19 20.5	+60.0	146.3	18 30.5	+60.0	146.5	17 40.5	+59.9	146.7	16 50.3	+60.0	146.8	16 00.0	+60.0	147.0	**16**
17	22 49.6	+59.8	145.6	22 00.0	+59.9	145.8	21 10.3	+59.9	146.0	20 20.5	+59.9	146.3	19 30.5	+60.0	146.5	18 40.4	+60.0	146.6	17 50.3	+60.0	146.8	17 00.0	+60.0	147.0	**17**
18	23 49.4	+59.8	145.5	22 59.9	+59.9	145.8	22 10.2	+59.9	146.0	21 20.4	+60.0	146.2	20 30.5	+60.0	146.4	19 40.4	+60.0	146.6	18 50.3	+60.0	146.8	18 00.0	+60.0	147.0	**18**
19	24 49.2	+59.9	145.4	23 59.8	+59.9	145.7	23 10.1	+59.9	145.9	22 20.4	+59.9	146.2	21 30.5	+59.9	146.4	20 40.4	+60.0	146.6	19 50.3	+60.0	146.8	19 00.0	+60.0	147.0	**19**
20	25 49.1	+59.8	145.4	24 59.6	+59.9	145.6	24 10.0	+60.0	145.9	23 20.3	+60.0	146.1	22 30.4	+60.0	146.4	21 40.4	+60.0	146.6	20 50.3	+60.0	146.8	20 00.0	+60.0	147.0	**20**
21	26 48.9	+59.9	145.3	25 59.5	+59.9	145.6	25 10.0	+59.9	145.8	24 20.3	+59.9	146.1	23 30.4	+60.0	146.3	22 40.4	+60.0	146.6	21 50.3	+60.0	146.8	21 00.0	+60.0	147.0	**21**
22	27 48.8	+59.8	145.2	26 59.4	+59.9	145.5	26 09.9	+59.9	145.8	25 20.2	+59.9	146.0	24 30.4	+59.9	146.3	23 40.4	+60.0	146.5	22 50.3	+60.0	146.8	22 00.0	+60.0	147.0	**22**
23	28 48.6	+59.8	145.1	27 59.3	+59.9	145.4	27 09.8	+59.9	145.7	26 20.1	+60.0	146.0	25 30.3	+60.0	146.3	24 40.4	+60.0	146.5	23 50.3	+59.9	146.8	23 00.0	+60.0	147.0	**23**
24	29 48.4	+59.8	145.0	28 59.2	+59.8	145.3	28 09.7	+59.9	145.6	27 20.1	+59.9	145.9	26 30.3	+60.0	146.2	25 40.4	+59.9	146.5	24 50.2	+60.0	146.8	24 00.0	+60.0	147.0	**24**
25	30 48.2	+59.8	144.9	29 59.0	+59.9	145.3	29 09.6	+59.9	145.6	28 20.0	+60.0	145.9	27 30.3	+59.9	146.2	26 40.3	+60.0	146.5	25 50.2	+60.0	146.7	25 00.0	+60.0	147.0	**25**
26	31 48.0	+59.9	144.8	30 58.9	+59.9	145.2	30 09.5	+59.9	145.5	29 20.0	+59.9	145.8	28 30.2	+60.0	146.1	27 40.3	+60.0	146.4	26 50.2	+60.0	146.7	26 00.0	+60.0	147.0	**26**
27	32 47.9	+59.8	144.7	31 58.8	+59.8	145.1	31 09.4	+60.0	145.5	30 19.9	+60.0	145.8	29 30.2	+60.0	146.1	28 40.3	+60.0	146.4	27 50.2	+60.0	146.7	27 00.0	+60.0	147.0	**27**
28	33 47.7	+59.8	144.6	32 58.6	+59.9	145.0	32 09.4	+59.9	145.4	31 19.9	+59.9	145.7	30 30.2	+59.9	146.1	29 40.3	+60.0	146.4	28 50.2	+60.0	146.7	28 00.0	+60.0	147.0	**28**
29	34 47.5	+59.8	144.5	33 58.5	+59.8	144.9	33 09.3	+59.9	145.3	32 19.8	+59.9	145.7	31 30.1	+60.0	146.0	30 40.3	+60.0	146.4	29 50.2	+60.0	146.7	29 00.0	+60.0	147.0	**29**
30	35 47.3	+59.8	144.4	34 58.3	+59.9	144.9	34 09.2	+59.9	145.3	33 19.7	+60.0	145.6	32 30.1	+60.0	146.0	31 40.3	+60.0	146.3	30 50.2	+60.0	146.7	30 00.0	+60.0	147.0	**30**
31	36 47.1	+59.8	144.3	35 58.2	+59.8	144.8	35 09.1	+59.9	145.2	34 19.7	+59.9	145.6	33 30.1	+59.9	146.0	32 40.3	+59.9	146.3	31 50.2	+60.0	146.7	31 00.0	+60.0	147.0	**31**
32	37 46.9	+59.8	144.2	36 58.0	+59.9	144.7	36 09.0	+59.9	145.1	35 19.6	+60.0	145.5	34 30.0	+60.0	145.9	33 40.2	+60.0	146.3	32 50.2	+60.0	146.7	32 00.0	+60.0	147.0	**32**
33	38 46.7	+59.7	144.1	37 57.9	+59.8	144.6	37 08.9	+59.8	145.0	36 19.6	+59.9	145.5	35 30.0	+60.0	145.9	34 40.2	+60.0	146.3	33 50.2	+60.0	146.6	33 00.0	+60.0	147.0	**33**
34	39 46.4	+59.8	144.0	38 57.7	+59.9	144.5	38 08.7	+59.9	145.0	37 19.5	+59.9	145.4	36 30.0	+59.9	145.8	35 40.2	+60.0	146.2	34 50.2	+60.0	146.6	34 00.0	+60.0	147.0	**34**
35	40 46.2	+59.8	143.9	39 57.6	+59.8	144.4	39 08.6	+59.9	144.9	38 19.4	+59.9	145.3	37 29.9	+60.0	145.8	36 40.2	+60.0	146.2	35 50.2	+60.0	146.6	35 00.0	+60.0	147.0	**35**
36	41 46.0	+59.7	143.8	40 57.4	+59.8	144.3	40 08.5	+59.9	144.8	39 19.3	+60.0	145.3	38 29.9	+59.9	145.7	37 40.2	+60.0	146.2	36 50.2	+60.0	146.6	36 00.0	+60.0	147.0	**36**
37	42 45.7	+59.8	143.7	41 57.2	+59.8	144.2	41 08.4	+59.9	144.7	40 19.3	+59.9	145.2	39 29.8	+60.0	145.7	38 40.2	+59.9	146.1	37 50.2	+60.0	146.6	37 00.0	+60.0	147.0	**37**
38	43 45.5	+59.7	143.5	42 57.0	+59.9	144.1	42 08.3	+59.9	144.6	41 19.2	+59.9	145.1	40 29.8	+60.0	145.6	39 40.1	+60.0	146.1	38 50.2	+60.0	146.6	38 00.0	+60.0	147.0	**38**
39	44 45.2	+59.8	143.4	43 56.9	+59.8	144.0	43 08.2	+59.8	144.5	42 19.1	+59.9	145.1	41 29.8	+59.9	145.6	40 40.1	+60.0	146.1	39 50.2	+60.0	146.5	39 00.0	+60.0	147.0	**39**
40	45 45.0	+59.7	143.3	44 56.7	+59.8	143.9	44 08.0	+59.9	144.5	43 19.0	+60.0	145.0	42 29.7	+60.0	145.5	41 40.1	+60.0	146.0	40 50.2	+60.0	146.5	40 00.0	+60.0	147.0	**40**
41	46 44.7	+59.7	143.1	45 56.5	+59.8	143.8	45 07.9	+59.9	144.4	44 19.0	+59.9	144.9	43 29.7	+59.9	145.5	42 40.1	+60.0	146.0	41 50.2	+60.0	146.5	41 00.0	+60.0	147.0	**41**
42	47 44.4	+59.7	143.0	46 56.3	+59.8	143.6	46 07.8	+59.8	144.3	45 18.9	+59.9	144.9	44 29.6	+60.0	145.4	43 40.1	+59.9	146.0	42 50.2	+60.0	146.5	42 00.0	+60.0	147.0	**42**
43	48 44.1	+59.7	142.8	47 56.1	+59.7	143.5	47 07.6	+59.9	144.2	46 18.8	+59.9	144.8	45 29.6	+59.9	145.4	44 40.0	+60.0	145.9	43 50.2	+60.0	146.5	43 00.0	+60.0	147.0	**43**
44	49 43.8	+59.7	142.7	48 55.8	+59.8	143.4	48 07.5	+59.8	144.1	47 18.7	+59.9	144.7	46 29.5	+60.0	145.3	45 40.0	+60.0	145.9	44 50.2	+60.0	146.5	44 00.0	+60.0	147.0	**44**
45	50 43.5	+59.6	142.5	49 55.6	+59.8	143.3	49 07.3	+59.8	144.0	48 18.6	+59.9	144.6	47 29.5	+59.9	145.3	46 40.0	+60.0	145.9	45 50.2	+60.0	146.4	45 00.0	+60.0	147.0	**45**
46	51 43.1	+59.7	142.4	50 55.4	+59.7	143.1	50 07.1	+59.9	143.8	49 18.5	+59.9	144.5	48 29.4	+60.0	145.2	47 40.0	+59.9	145.8	46 50.2	+60.0	146.4	46 00.0	+60.0	147.0	**46**
47	52 42.8	+59.6	142.2	51 55.1	+59.8	143.0	51 07.0	+59.8	143.7	50 18.4	+59.9	144.4	49 29.4	+59.9	145.1	48 39.9	+60.0	145.8	47 50.2	+59.9	146.4	47 00.0	+60.0	147.0	**47**
48	53 42.4	+59.6	142.0	52 54.9	+59.7	142.8	52 06.8	+59.8	143.6	51 18.3	+59.9	144.3	50 29.3	+59.9	145.1	49 39.9	+60.0	145.7	48 50.1	+60.0	146.4	48 00.0	+60.0	147.0	**48**
49	54 42.0	+59.6	141.8	53 54.6	+59.7	142.7	53 06.6	+59.8	143.5	52 18.2	+59.8	144.2	51 29.2	+60.0	145.0	50 39.9	+60.0	145.7	49 50.1	+60.0	146.4	49 00.0	+60.0	147.0	**49**
50	55 41.6	+59.6	141.6	54 54.3	+59.7	142.5	54 06.4	+59.8	143.3	53 18.0	+59.9	144.1	52 29.2	+59.9	144.9	51 39.9	+59.9	145.6	50 50.1	+60.0	146.3	50 00.0	+60.0	147.0	**50**
51	56 41.2	+59.5	141.4	55 54.0	+59.7	142.3	55 06.2	+59.8	143.2	54 17.9	+59.9	144.0	53 29.1	+59.9	144.8	52 39.8	+60.0	145.6	51 50.1	+60.0	146.3	51 00.0	+60.0	147.0	**51**
52	57 40.7	+59.5	141.2	56 53.7	+59.6	142.1	56 06.0	+59.8	143.0	55 17.8	+59.9	143.9	54 29.0	+60.0	144.7	53 39.8	+60.0	145.5	52 50.1	+60.0	146.3	52 00.0	+60.0	147.0	**52**
53	58 40.2	+59.5	140.9	57 53.3	+59.7	141.9	57 05.8	+59.8	142.9	56 17.7	+59.9	143.8	55 29.0	+59.9	144.7	54 39.8	+59.9	145.5	53 50.1	+60.0	146.3	53 00.0	+60.0	147.0	**53**
54	59 39.7	+59.5	140.7	58 53.0	+59.6	141.7	58 05.6	+59.7	142.7	57 17.5	+59.9	143.7	56 28.9	+59.9	144.6	55 39.7	+60.0	145.4	54 50.1	+60.0	146.2	54 00.0	+60.0	147.0	**54**
55	60 39.2	+59.4	140.4	59 52.6	+59.6	141.5	59 05.3	+59.7	142.5	58 17.4	+59.8	143.5	57 28.8	+59.9	144.5	56 39.7	+60.0	145.4	55 50.1	+60.0	146.2	55 00.0	+60.0	147.0	**55**
56	61 38.6	+59.4	140.1	60 52.2	+59.6	141.3	60 05.0	+59.8	142.4	59 17.2	+59.8	143.4	58 28.7	+59.9	144.4	57 39.7	+59.9	145.3	56 50.1	+60.0	146.2	56 00.0	+60.0	147.0	**56**
57	62 38.0	+59.4	139.8	61 51.8	+59.5	141.0	61 04.8	+59.7	142.2	60 17.0	+59.8	143.2	59 28.6	+59.9	144.3	58 39.6	+60.0	145.2	57 50.1	+60.0	146.1	57 00.0	+60.0	147.0	**57**
58	63 37.4	+59.3	139.5	62 51.3	+59.5	140.8	62 04.5	+59.6	142.0	61 16.8	+59.8	143.1	60 28.5	+59.9	144.1	59 39.6	+59.9	145.2	58 50.1	+60.0	146.1	58 00.0	+60.0	147.0	**58**
59	64 36.7	+59.2	139.1	63 50.8	+59.5	140.5	63 04.1	+59.7	141.7	62 16.6	+59.8	142.9	61 28.4	+59.9	144.0	60 39.5	+60.0	145.1	59 50.1	+59.9	146.1	59 00.0	+60.0	147.0	**59**
60	65 35.9	+59.2	138.8	64 50.3	+59.5	140.2	64 03.8	+59.6	141.5	63 16.4	+59.8	142.7	62 28.3	+59.9	143.9	61 39.5	+60.0	145.0	60 50.0	+60.0	146.0	60 00.0	+60.0	147.0	**60**
61	66 35.1	+59.1	138.4	65 49.8	+59.3	139.8	65 03.4	+59.6	141.2	64 16.2	+59.8	142.5	63 28.2	+59.9	143.8	62 39.5	+59.9	144.9	61 50.0	+60.0	146.0	61 00.0	+60.0	147.0	**61**
62	67 34.2	+59.1	137.9	66 49.1	+59.4	139.5	66 03.0	+59.6	141.0	65 16.0	+59.7	142.3	64 28.1	+59.8	143.6	63 39.4	+59.9	144.8	62 50.0	+60.0	145.9	62 00.0	+60.0	147.0	**62**
63	68 33.3	+58.9	137.4	67 48.5	+59.3	139.1	67 02.6	+59.5	140.7	66 15.7	+59.7	142.1	65 27.9	+59.9	143.5	64 39.3	+60.0	144.7	63 50.0	+60.0	145.9	63 00.0	+60.0	147.0	**63**
64	69 32.2	+58.9	136.9	68 47.8	+59.2	138.7	68 02.1	+59.5	140.3	67 15.4	+59.7	141.9	66 27.8	+59.8	143.3	65 39.3	+59.9	144.6	64 50.0	+60.0	145.8	64 00.0	+60.0	147.0	**64**
65	70 31.1	+58.7	136.4	69 47.0	+59.1	138.2	69 01.6	+59.5	140.0	68 15.1	+59.7	141.6	67 27.6	+59.9	143.1	66 39.2	+59.9	144.5	65 50.0	+60.0	145.8	65 00.0	+60.0	147.0	**65**
66	71 29.8	+58.6	135.7	70 46.1	+59.1	137.7	70 01.1	+59.4	139.6	69 14.8	+59.6	141.3	68 27.5	+59.8	142.9	67 39.1	+60.0	144.4	66 50.0	+59.9	145.7	66 00.0	+60.0	147.0	**66**
67	72 28.4	+58.5	135.0	71 45.2	+58.9	137.2	71 00.5	+59.3	139.2	70 14.4	+59.6	141.0	69 27.3	+59.8	142.7	68 39.1	+59.9	144.2	67 49.9	+60.0	145.7	67 00.0	+60.0	147.0	**67**
68	73 26.9	+58.2	134.3	72 44.1	+58.8	136.6	71 59.8	+59.2	138.7	71 14.0	+59.6	140.6	70 27.1	+59.7	142.4	69 39.0	+59.9	144.1	68 49.9	+60.0	145.6	68 00.0	+60.0	147.0	**68**
69	74 25.1	+58.0	133.4	73 42.9	+58.7	135.9	72 59.0	+59.2	138.2	72 13.6	+59.5	140.3	71 26.8	+59.8	142.2	70 38.9	+59.9	143.9	69 49.9	+60.0	145.5	69 00.0	+60.0	147.0	**69**
70	75 23.1	+57.8	132.4	74 41.6	+58.5	135.1	73 58.2	+59.0	137.6	73 13.1	+59.5	139.8	72 26.6	+59.7	141.9	71 38.8	+59.9	143.7	70 49.9	+59.9	145.4	70 00.0	+60.0	147.0	**70**
71	76 20.9	+57.4	131.3	75 40.1	+58.3	134.2	74 57.2	+59.0	136.9	74 12.6	+59.3	139.3	73 26.3	+59.7	141.5	72 38.7	+59.8	143.5	71 49.8	+60.0	145.3	71 00.0	+60.0	147.0	**71**
72	77 18.3	+56.9	130.0	76 38.4	+58.0	133.3	75 56.2	+58.7	136.2	75 11.9	+59.3	138.8	74 26.0	+59.6	141.2	73 38.5	+59.9	143.3	72 49.8	+60.0	145.2	72 00.0	+60.0	147.0	**72**
73	78 15.2	+56.5	128.5	77 36.4	+57.7	132.1	76 54.9	+58.6	135.3	76 11.2	+59.2	138.2	75 25.6	+59.6	140.7	74 38.4	+59.8	143.0	73 49.8	+59.9	145.1	73 00.0	+60.0	147.0	**73**
74	79 11.7	+55.7	126.8	78 34.1	+57.2	130.8	77 53.5	+58.3	134.3	77 10.4	+59.0	137.5	76 25.2	+59.5	140.3	75 38.2	+59.8	142.8	74 49.7	+60.0	145.0	74 00.0	+60.0	147.0	**74**
75	80 07.4	+54.8	124.7	79 31.3	+56.7	129.2	78 51.8	+58.0	133.1	78 09.4	+58.9	136.6	77 24.7	+59.5	139.7	76 38.0	+59.8	142.4	75 49.7	+60.0	144.8	75 00.0	+60.0	147.0	**75**
76	81 02.2	+53.6	122.2	80 28.0	+55.9	127.3	79 49.8	+57.5	131.7	79 08.3	+58.6	135.6	78 24.2	+59.3	139.0	77 37.8	+59.8	142.0	76 49.7	+59.9	144.7	76 00.0	+60.0	147.0	**76**
77	81 55.8	*+52.0*•	119.2	81 23.9	+54.9	125.0	80 47.3	+57.0	130.1	80 06.9	+58.4	134.5	79 23.5	+59.2	138.3	78 37.6	+59.7	141.6	77 49.6	+59.9	144.5	77 00.0	+60.0	147.0	**77**
78	82 47.8	*+49.6*•	115.4	82 18.8	+53.5	122.1	81 44.3	+56.2	128.0	81 05.3	+57.9	133.0	80 22.7	+59.0	137.4	79 37.3	+59.6	141.1	78 49.5	+60.0	144.2	78 00.0	+60.0	147.0	**78**
79	83 37.4	*+46.2*•	110.7	83 12.3	*+51.5*•	118.5	82 40.5	+55.0	125.4	82 03.2	+57.4	131.3	81 21.7	+58.8	136.2	80 36.9	+59.5	140.4	79 49.5	+59.9	144.0	79 00.0	+60.0	147.0	**79**
80	84 23.6	*+41.2*•	104.5	84 03.8	*+48.3*•	113.9	83 35.5	*+53.4*•	122.1	83 00.6	+56.5	129.0	82 20.5	+58.4	134.8	81 36.4	+59.4	139.6	80 49.4	+59.8	143.6	80 00.0	+60.0	147.0	**80**
81	85 04.8	*+33.8*•	96.6	84 52.1	*+43.5*•	107.7	84 28.9	*+50.6*•	117.6	83 57.1	+55.2	126.0	83 18.9	+57.9	133.0	82 35.8	+59.3	138.6	81 49.2	+59.9	143.2	81 00.0	+60.0	147.0	**81**
82	85 38.6	*+23.4*•	86.4	85 35.6	*+35.9*•	99.4	85 19.5	*+46.1*•	111.6	84 52.3	*+53.1*•	122.0	84 16.8	+56.9	130.5	83 35.1	+59.0	137.3	82 49.1	+59.8	142.7	82 00.0	+60.0	147.0	**82**
83	86 02.0	*+9.5*•	73.6	86 11.5	*+24.4*•	88.2	86 05.6	*+38.6*•	103.0	85 45.4	*+49.1*•	116.2	85 13.7	*+55.5*•	127.1	84 34.1	+58.5	135.5	83 48.9	+59.7	142.0	83 00.0	+60.0	147.0	**83**
84	86 11.5	*−5.9*•	59.0	86 35.9	*+8.3*•	73.6	86 44.2	*+25.6*•	90.7	86 34.5	*+41.8*•	107.6	86 09.2	*+52.5*•	121.9	85 32.6	+57.6	132.9	84 48.6	+59.6	141.0	84 00.0	+60.0	147.0	**84**
85	86 05.6	*−20.2*•	44.2	86 44.2	*−9.7*•	56.5	87 09.8	*+6.5*•	73.6	87 16.3	*+27.5*•	94.1	87 01.7	*+45.9*•	113.7	86 30.2	*+55.9*•	128.9	85 48.2	+59.3	139.6	85 00.0	+60.0	147.0	**85**
86	85 45.4	*−31.7*•	30.9	86 34.5	*−25.3*•	39.5	87 16.3	*−14.6*•	53.0	87 43.8	*+3.8*•	73.5	87 47.6	*+30.2*•	99.3	87 26.1	*+51.1*•	121.9	86 47.5	+58.8	137.2	86 00.0	+60.0	147.0	**86**
87	85 13.7	*−39.6*•	20.0	86 09.2	*−36.6*•	25.1	87 01.7	*−31.5*•	33.4	87 47.6	*−21.5*•	47.8	88 17.8	*−0.6*•	73.5	88 17.2	*+34.6*•	107.5	87 46.3	*+56.7*•	132.9	87 00.0	+60.0	147.0	**87**
88	84 34.1	*−45.2*•	11.6	85 32.6	*−44.0*•	14.2	86 30.2	*−42.0*•	18.2	87 26.1	*−38.6*•	25.1	88 17.2	*−30.9*•	39.5	88 51.8	*−8.8*•	73.5	88 43.0	*+42.9*•	121.9	88 00.0	+60.0	147.0	**88**
89	83 48.9	*−48.9*•	5.1	84 48.6	*−48.6*•	6.0	85 48.2	*−48.2*•	7.5	86 47.5	*−47.5*•	9.8	87 46.3	*−46.3*•	14.1	88 43.0	*−43.0*•	25.1	89 25.9	*−25.9*•	73.5	89 00.0	+60.0	147.0	**89**
90	83 00.0	*−51.4*•	0.0	84 00.0	*−51.6*•	0.0	85 00.0	*−51.8*•	0.0	86 00.0	*−52.2*•	0.0	87 00.0	*−52.6*•	0.0	88 00.0	*−53.4*•	0.0	89 00.0	*−55.1*•	0.0	90 00.0	−60.0	73.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 52.0	–59.9	146.8	5 01.8	–59.9	146.9	4 11.5	–59.9	146.9	3 21.2	–59.9	146.9	2 30.9	–59.9	147.0	1 40.6	–60.0	147.0	0 50.3	–60.0	147.0	0 00.0	+60.0	33.0	**0**
1	4 52.1	–59.9	146.9	4 01.9	–59.9	146.9	3 11.6	–60.0	146.9	2 21.3	–60.0	147.0	1 31.0	–60.0	147.0	0 40.6	–59.9	147.0	0 09.7	+60.0	33.0	1 00.0	+60.0	33.0	**1**
2	3 52.2	–59.8	146.9	3 02.0	–59.9	147.0	2 11.6	–59.9	147.0	1 21.3	–59.9	147.0	0 31.0	–60.0	147.0	0 19.3	+60.0	33.0	1 09.7	+60.0	33.0	2 00.0	+60.0	33.0	**2**
3	2 52.4	–59.9	147.0	2 02.1	–60.0	147.0	1 11.7	–59.9	147.0	0 21.4	–60.0	147.1	0 29.0	+60.0	33.0	1 19.3	+60.0	33.0	2 09.7	+60.0	33.0	3 00.0	+60.0	33.0	**3**
4	1 52.5	–59.9	147.1	1 02.1	–59.9	147.1	0 11.8	–60.0	147.1	0 38.6	+60.0	32.9	1 29.0	+59.9	32.9	2 19.3	+60.0	32.9	3 09.7	+60.0	33.0	4 00.0	+60.0	33.0	**4**
5	0 52.6	–59.8	147.1	0 02.2	–59.9	147.1	0 48.2	+59.9	32.9	1 38.6	+59.9	32.9	2 28.9	+60.0	32.9	3 19.3	+60.0	32.9	4 09.7	+60.0	33.0	5 00.0	+60.0	33.0	**5**
6	0 07.2	+59.9	32.8	0 57.7	+59.9	32.8	1 48.1	+59.9	32.8	2 38.5	+60.0	32.8	3 28.9	+60.0	32.9	4 19.3	+60.0	32.9	5 09.7	+60.0	32.9	6 00.0	+60.0	33.0	**6**
7	1 07.1	+59.9	32.7	1 57.6	+59.9	32.7	2 48.0	+60.0	32.8	3 38.5	+59.9	32.8	4 28.9	+60.0	32.8	5 19.3	+60.0	32.9	6 09.7	+60.0	32.9	7 00.0	+60.0	33.0	**7**
8	2 07.0	+59.8	32.7	2 57.5	+59.9	32.7	3 48.0	+59.9	32.7	4 38.4	+60.0	32.8	5 28.9	+59.9	32.8	6 19.3	+60.0	32.9	7 09.7	+60.0	32.9	8 00.0	+60.0	33.0	**8**
9	3 06.8	+59.9	32.6	3 57.4	+59.9	32.6	4 47.9	+59.9	32.7	5 38.4	+59.9	32.7	6 28.8	+60.0	32.8	7 19.3	+60.0	32.8	8 09.7	+60.0	32.9	9 00.0	+60.0	33.0	**9**
10	4 06.7	+59.9	32.5	4 57.3	+59.9	32.6	5 47.8	+59.9	32.6	6 38.3	+60.0	32.7	7 28.8	+60.0	32.7	8 19.3	+59.9	32.8	9 09.7	+60.0	32.9	10 00.0	+60.0	33.0	**10**
11	5 06.6	+59.8	32.5	5 57.2	+59.9	32.5	6 47.7	+60.0	32.6	7 38.3	+59.9	32.6	8 28.8	+60.0	32.7	9 19.2	+60.0	32.8	10 09.7	+59.9	32.9	11 00.0	+60.0	33.0	**11**
12	6 06.4	+59.9	32.4	6 57.1	+59.9	32.5	7 47.7	+59.9	32.5	8 38.2	+60.0	32.6	9 28.8	+59.9	32.7	10 19.2	+60.0	32.8	11 09.6	+60.0	32.9	12 00.0	+60.0	33.0	**12**
13	7 06.3	+59.9	32.3	7 57.0	+59.9	32.4	8 47.6	+59.9	32.5	9 38.2	+60.0	32.6	10 28.7	+60.0	32.7	11 19.2	+60.0	32.8	12 09.6	+60.0	32.9	13 00.0	+60.0	33.0	**13**
14	8 06.2	+59.8	32.3	8 56.9	+59.9	32.3	9 47.5	+60.0	32.4	10 38.2	+59.9	32.5	11 28.7	+60.0	32.6	12 19.2	+60.0	32.7	13 09.6	+60.0	32.9	14 00.0	+60.0	33.0	**14**
15	9 06.0	+59.9	32.2	9 56.8	+59.9	32.3	10 47.5	+59.9	32.4	11 38.1	+60.0	32.5	12 28.7	+60.0	32.6	13 19.2	+60.0	32.7	14 09.6	+60.0	32.9	15 00.0	+60.0	33.0	**15**
16	10 05.9	+59.8	32.1	10 56.7	+59.9	32.2	11 47.4	+59.9	32.3	12 38.1	+59.9	32.4	13 28.7	+59.9	32.6	14 19.2	+60.0	32.7	15 09.6	+60.0	32.8	16 00.0	+60.0	33.0	**16**
17	11 05.7	+59.9	32.1	11 56.6	+59.9	32.2	12 47.3	+60.0	32.3	13 38.0	+60.0	32.4	14 28.6	+60.0	32.5	15 19.2	+60.0	32.7	16 09.6	+60.0	32.8	17 00.0	+60.0	33.0	**17**
18	12 05.6	+59.9	32.0	12 56.5	+59.9	32.1	13 47.3	+59.9	32.2	14 38.0	+59.9	32.4	15 28.6	+60.0	32.5	16 19.2	+60.0	32.7	17 09.6	+60.0	32.8	18 00.0	+60.0	33.0	**18**
19	13 05.5	+59.8	31.9	13 56.4	+59.9	32.0	14 47.2	+59.9	32.2	15 37.9	+60.0	32.3	16 28.6	+60.0	32.5	17 19.2	+59.9	32.6	18 09.6	+60.0	32.8	19 00.0	+60.0	33.0	**19**
20	14 05.3	+59.9	31.8	14 56.3	+59.9	32.0	15 47.1	+59.9	32.1	16 37.9	+59.9	32.3	17 28.6	+59.9	32.4	18 19.1	+60.0	32.6	19 09.6	+60.0	32.8	20 00.0	+60.0	33.0	**20**
21	15 05.2	+59.8	31.8	15 56.2	+59.9	31.9	16 47.0	+60.0	32.1	17 37.8	+60.0	32.2	18 28.5	+60.0	32.4	19 19.1	+60.0	32.6	20 09.6	+60.0	32.8	21 00.0	+60.0	33.0	**21**
22	16 05.0	+59.9	31.7	16 56.1	+59.8	31.9	17 47.0	+59.9	32.0	18 37.8	+59.9	32.2	19 28.5	+60.0	32.4	20 19.1	+60.0	32.6	21 09.6	+60.0	32.8	22 00.0	+60.0	33.0	**22**
23	17 04.9	+59.9	31.6	17 55.9	+59.9	31.8	18 46.9	+59.9	32.0	19 37.7	+60.0	32.2	20 28.5	+59.9	32.4	21 19.1	+60.0	32.6	22 09.6	+60.0	32.8	23 00.0	+60.0	33.0	**23**
24	18 04.8	+59.8	31.6	18 55.8	+59.9	31.7	19 46.8	+59.9	31.9	20 37.7	+59.9	32.1	21 28.4	+60.0	32.3	22 19.1	+60.0	32.5	23 09.6	+60.0	32.8	24 00.0	+60.0	33.0	**24**
25	19 04.6	+59.9	31.5	19 55.7	+59.9	31.7	20 46.7	+60.0	31.9	21 37.6	+60.0	32.1	22 28.4	+60.0	32.3	23 19.1	+60.0	32.5	24 09.6	+60.0	32.8	25 00.0	+60.0	33.0	**25**
26	20 04.5	+59.8	31.4	20 55.6	+59.9	31.6	21 46.7	+59.9	31.8	22 37.6	+59.9	32.0	23 28.4	+60.0	32.3	24 19.1	+60.0	32.5	25 09.6	+60.0	32.7	26 00.0	+60.0	33.0	**26**
27	21 04.3	+59.9	31.3	21 55.5	+59.9	31.5	22 46.6	+59.9	31.8	23 37.5	+60.0	32.0	24 28.4	+59.9	32.2	25 19.1	+59.9	32.5	26 09.6	+60.0	32.7	27 00.0	+60.0	33.0	**27**
28	22 04.2	+59.8	31.3	22 55.4	+59.9	31.5	23 46.5	+59.9	31.7	24 37.5	+59.9	31.9	25 28.3	+60.0	32.2	26 19.0	+60.0	32.4	27 09.6	+60.0	32.7	28 00.0	+60.0	33.0	**28**
29	23 04.0	+59.8	31.2	23 55.3	+59.9	31.4	24 46.4	+59.9	31.6	25 37.4	+60.0	31.9	26 28.3	+60.0	32.2	27 19.0	+60.0	32.4	28 09.6	+60.0	32.7	29 00.0	+60.0	33.0	**29**
30	24 03.8	+59.9	31.1	24 55.2	+59.8	31.3	25 46.3	+60.0	31.6	26 37.4	+59.9	31.8	27 28.3	+59.9	32.1	28 19.0	+60.0	32.4	29 09.6	+60.0	32.7	30 00.0	+60.0	33.0	**30**
31	25 03.7	+59.8	31.0	25 55.0	+59.9	31.3	26 46.3	+59.9	31.5	27 37.3	+60.0	31.8	28 28.2	+60.0	32.1	29 19.0	+60.0	32.4	30 09.6	+60.0	32.7	31 00.0	+60.0	33.0	**31**
32	26 03.5	+59.9	30.9	26 54.9	+59.9	31.2	27 46.2	+59.9	31.5	28 37.3	+59.9	31.7	29 28.2	+60.0	32.0	30 19.0	+60.0	32.3	31 09.6	+60.0	32.7	32 00.0	+60.0	33.0	**32**
33	27 03.4	+59.8	30.9	27 54.8	+59.9	31.1	28 46.1	+59.9	31.4	29 37.2	+60.0	31.7	30 28.2	+59.9	32.0	31 19.0	+60.0	32.3	32 09.6	+60.0	32.7	33 00.0	+60.0	33.0	**33**
34	28 03.2	+59.8	30.8	28 54.7	+59.8	31.1	29 46.0	+59.9	31.3	30 37.2	+59.9	31.6	31 28.1	+60.0	32.0	32 19.0	+59.9	32.3	33 09.6	+60.0	32.6	34 00.0	+60.0	33.0	**34**
35	29 03.0	+59.8	30.7	29 54.5	+59.9	31.0	30 45.9	+59.9	31.3	31 37.1	+59.9	31.6	32 28.1	+60.0	31.9	33 18.9	+60.0	32.3	34 09.6	+60.0	32.6	35 00.0	+60.0	33.0	**35**
36	30 02.8	+59.9	30.6	30 54.4	+59.9	30.9	31 45.8	+59.9	31.2	32 37.0	+60.0	31.5	33 28.1	+59.9	31.9	34 18.9	+60.0	32.2	35 09.6	+60.0	32.6	36 00.0	+60.0	33.0	**36**
37	31 02.7	+59.8	30.5	31 54.3	+59.8	30.8	32 45.7	+59.9	31.1	33 37.0	+59.9	31.5	34 28.0	+60.0	31.8	35 18.9	+60.0	32.2	36 09.6	+60.0	32.6	37 00.0	+60.0	33.0	**37**
38	32 02.5	+59.8	30.4	32 54.1	+59.9	30.7	33 45.6	+59.9	31.1	34 36.9	+59.9	31.4	35 28.0	+60.0	31.8	36 18.9	+60.0	32.2	37 09.6	+60.0	32.6	38 00.0	+60.0	33.0	**38**
39	33 02.3	+59.8	30.3	33 54.0	+59.9	30.7	34 45.5	+59.9	31.0	35 36.8	+60.0	31.4	36 28.0	+59.9	31.8	37 18.9	+60.0	32.2	38 09.6	+60.0	32.6	39 00.0	+60.0	33.0	**39**
40	34 02.1	+59.8	30.2	34 53.9	+59.8	30.6	35 45.4	+59.9	30.9	36 36.8	+59.9	31.3	37 27.9	+60.0	31.7	38 18.9	+59.9	32.1	39 09.6	+59.9	32.6	40 00.0	+60.0	33.0	**40**
41	35 01.9	+59.8	30.1	35 53.7	+59.9	30.5	36 45.3	+59.9	30.9	37 36.7	+59.9	31.3	38 27.9	+59.9	31.7	39 18.8	+60.0	32.1	40 09.5	+60.0	32.5	41 00.0	+60.0	33.0	**41**
42	36 01.7	+59.8	30.0	36 53.6	+59.8	30.4	37 45.2	+59.9	30.8	38 36.6	+60.0	31.2	39 27.8	+60.0	31.6	40 18.8	+60.0	32.1	41 09.5	+60.0	32.5	42 00.0	+60.0	33.0	**42**
43	37 01.5	+59.8	29.9	37 53.4	+59.8	30.3	38 45.1	+59.9	30.7	39 36.6	+59.9	31.1	40 27.8	+60.0	31.6	41 18.8	+60.0	32.0	42 09.5	+60.0	32.5	43 00.0	+60.0	33.0	**43**
44	38 01.3	+59.8	29.8	38 53.2	+59.9	30.2	39 45.0	+59.9	30.6	40 36.5	+59.9	31.1	41 27.8	+59.9	31.5	42 18.8	+60.0	32.0	43 09.5	+60.0	32.5	44 00.0	+60.0	33.0	**44**
45	39 01.1	+59.8	29.7	39 53.1	+59.8	30.1	40 44.9	+59.8	30.6	41 36.4	+59.9	31.0	42 27.7	+60.0	31.5	43 18.8	+59.9	32.0	44 09.5	+60.0	32.5	45 00.0	+60.0	33.0	**45**
46	40 00.9	+59.7	29.6	40 52.9	+59.8	30.0	41 44.7	+59.9	30.5	42 36.3	+60.0	30.9	43 27.7	+59.9	31.4	44 18.7	+60.0	31.9	45 09.5	+60.0	32.4	46 00.0	+60.0	33.0	**46**
47	41 00.6	+59.8	29.5	41 52.7	+59.9	29.9	42 44.6	+59.9	30.4	43 36.3	+59.9	30.9	44 27.6	+60.0	31.4	45 18.7	+60.0	31.9	46 09.5	+60.0	32.4	47 00.0	+60.0	33.0	**47**
48	42 00.4	+59.7	29.4	42 52.6	+59.8	29.8	43 44.5	+59.9	30.3	44 36.2	+59.9	30.8	45 27.6	+59.9	31.3	46 18.7	+60.0	31.8	47 09.5	+60.0	32.4	48 00.0	+60.0	33.0	**48**
49	43 00.1	+59.8	29.2	43 52.4	+59.8	29.7	44 44.4	+59.8	30.2	45 36.1	+59.9	30.7	46 27.5	+60.0	31.2	47 18.7	+59.9	31.8	48 09.5	+60.0	32.4	49 00.0	+60.0	33.0	**49**
50	43 59.9	+59.7	29.1	44 52.2	+59.8	29.6	45 44.2	+59.9	30.1	46 36.0	+59.9	30.6	47 27.5	+59.9	31.2	48 18.6	+60.0	31.8	49 09.5	+60.0	32.4	50 00.0	+60.0	33.0	**50**
51	44 59.6	+59.8	29.0	45 52.0	+59.8	29.5	46 44.1	+59.8	30.0	47 35.9	+59.9	30.6	48 27.4	+60.0	31.1	49 18.6	+60.0	31.7	50 09.5	+60.0	32.3	51 00.0	+60.0	33.0	**51**
52	45 59.4	+59.7	28.9	46 51.8	+59.8	29.4	47 43.9	+59.9	29.9	48 35.8	+59.9	30.5	49 27.4	+59.9	31.1	50 18.6	+60.0	31.7	51 09.5	+60.0	32.3	52 00.0	+60.0	33.0	**52**
53	46 59.1	+59.7	28.7	47 51.6	+59.8	29.2	48 43.8	+59.8	29.8	49 35.7	+59.9	30.4	50 27.3	+59.9	31.0	51 18.6	+59.9	31.6	52 09.5	+60.0	32.3	53 00.0	+60.0	33.0	**53**
54	47 58.8	+59.7	28.6	48 51.4	+59.7	29.1	49 43.6	+59.9	29.7	50 35.6	+59.9	30.3	51 27.2	+60.0	30.9	52 18.5	+60.0	31.6	53 09.5	+60.0	32.3	54 00.0	+60.0	33.0	**54**
55	48 58.5	+59.7	28.4	49 51.1	+59.8	29.0	50 43.5	+59.8	29.6	51 35.5	+59.9	30.2	52 27.2	+59.9	30.8	53 18.5	+60.0	31.5	54 09.5	+60.0	32.2	55 00.0	+60.0	33.0	**55**
56	49 58.2	+59.7	28.3	50 50.9	+59.7	28.8	51 43.3	+59.8	29.4	52 35.4	+59.9	30.1	53 27.1	+59.9	30.8	54 18.5	+59.9	31.5	55 09.5	+59.9	32.2	56 00.0	+60.0	33.0	**56**
57	50 57.9	+59.6	28.1	51 50.6	+59.8	28.7	52 43.1	+59.8	29.3	53 35.3	+59.8	30.0	54 27.0	+60.0	30.7	55 18.4	+60.0	31.4	56 09.4	+60.0	32.2	57 00.0	+60.0	33.0	**57**
58	51 57.5	+59.7	27.9	52 50.4	+59.7	28.5	53 42.9	+59.8	29.2	54 35.1	+59.9	29.9	55 27.0	+59.9	30.6	56 18.4	+60.0	31.4	57 09.4	+60.0	32.2	58 00.0	+60.0	33.0	**58**
59	52 57.2	+59.6	27.7	53 50.1	+59.7	28.4	54 42.7	+59.8	29.1	55 35.0	+59.9	29.8	56 26.9	+59.9	30.5	57 18.4	+59.9	31.3	58 09.4	+60.0	32.1	59 00.0	+60.0	33.0	**59**
60	53 56.8	+59.6	27.6	54 49.8	+59.7	28.2	55 42.5	+59.8	28.9	56 34.9	+59.8	29.6	57 26.8	+59.9	30.4	58 18.3	+60.0	31.2	59 09.4	+60.0	32.1	60 00.0	+60.0	33.0	**60**
61	54 56.4	+59.6	27.4	55 49.5	+59.7	28.0	56 42.3	+59.8	28.8	57 34.7	+59.9	29.5	58 26.7	+59.9	30.3	59 18.3	+60.0	31.1	60 09.4	+60.0	32.0	61 00.0	+60.0	33.0	**61**
62	55 56.0	+59.5	27.2	56 49.2	+59.7	27.9	57 42.1	+59.7	28.6	58 34.6	+59.8	29.4	59 26.6	+59.9	30.2	60 18.3	+59.9	31.1	61 09.4	+60.0	32.0	62 00.0	+60.0	33.0	**62**
63	56 55.5	+59.6	26.9	57 48.9	+59.6	27.7	58 41.8	+59.8	28.4	59 34.4	+59.8	29.2	60 26.5	+59.9	30.1	61 18.2	+60.0	31.0	62 09.4	+60.0	32.0	63 00.0	+60.0	33.0	**63**
64	57 55.1	+59.5	26.7	58 48.5	+59.6	27.5	59 41.6	+59.7	28.2	60 34.2	+59.8	29.1	61 26.4	+59.9	30.0	62 18.2	+59.9	30.9	63 09.4	+60.0	31.9	64 00.0	+60.0	33.0	**64**
65	58 54.6	+59.5	26.5	59 48.1	+59.6	27.2	60 41.3	+59.7	28.0	61 34.0	+59.8	28.9	62 26.3	+59.9	29.8	63 18.1	+60.0	30.8	64 09.4	+59.9	31.9	65 00.0	+60.0	33.0	**65**
66	59 54.1	+59.4	26.2	60 47.7	+59.6	27.0	61 41.0	+59.7	27.8	62 33.8	+59.8	28.7	63 26.2	+59.9	29.7	64 18.1	+59.9	30.7	65 09.3	+60.0	31.8	66 00.0	+60.0	33.0	**66**
67	60 53.5	+59.5	25.9	61 47.3	+59.6	26.8	62 40.7	+59.7	27.6	63 33.6	+59.8	28.6	64 26.1	+59.8	29.5	65 18.0	+59.9	30.6	66 09.3	+60.0	31.8	67 00.0	+60.0	33.0	**67**
68	61 53.0	+59.3	25.7	62 46.9	+59.5	26.5	63 40.4	+59.6	27.4	64 33.4	+59.7	28.4	65 25.9	+59.9	29.4	66 17.9	+60.0	30.5	67 09.3	+60.0	31.7	68 00.0	+60.0	33.0	**68**
69	62 52.3	+59.4	25.3	63 46.4	+59.5	26.2	64 40.0	+59.6	27.1	65 33.1	+59.8	28.1	66 25.8	+59.8	29.2	67 17.9	+59.9	30.4	68 09.3	+60.0	31.6	69 00.0	+60.0	33.0	**69**
70	63 51.7	+59.3	25.0	64 45.9	+59.4	25.9	65 39.6	+59.6	26.9	66 32.9	+59.7	27.9	67 25.6	+59.9	29.0	68 17.8	+59.9	30.2	69 09.3	+59.9	31.6	70 00.0	+60.0	33.0	**70**
71	64 51.0	+59.2	24.7	65 45.3	+59.4	25.6	66 39.2	+59.5	26.6	67 32.6	+59.7	27.7	68 25.5	+59.8	28.8	69 17.7	+59.9	30.1	70 09.2	+60.0	31.5	71 00.0	+60.0	33.0	**71**
72	65 50.2	+59.2	24.3	66 44.7	+59.3	25.2	67 38.7	+59.6	26.3	68 32.3	+59.7	27.4	69 25.3	+59.8	28.6	70 17.6	+59.9	29.9	71 09.2	+60.0	31.4	72 00.0	+60.0	33.0	**72**
73	66 49.4	+59.1	23.9	67 44.0	+59.3	24.9	68 38.3	+59.4	25.9	69 32.0	+59.6	27.1	70 25.1	+59.7	28.4	71 17.5	+59.9	29.8	72 09.2	+60.0	31.3	73 00.0	+60.0	33.0	**73**
74	67 48.5	+59.0	23.4	68 43.3	+59.3	24.4	69 37.7	+59.4	25.5	70 31.6	+59.6	26.8	71 24.8	+59.8	28.1	72 17.4	+59.9	29.6	73 09.2	+59.9	31.2	74 00.0	+60.0	33.0	**74**
75	68 47.5	+58.9	22.9	69 42.6	+59.1	24.0	70 37.1	+59.4	25.1	71 31.2	+59.5	26.4	72 24.6	+59.7	27.8	73 17.3	+59.8	29.4	74 09.1	+60.0	31.1	75 00.0	+60.0	33.0	**75**
76	69 46.4	+58.9	22.4	70 41.7	+59.1	23.5	71 36.5	+59.3	24.7	72 30.7	+59.5	26.0	73 24.3	+59.7	27.5	74 17.1	+59.9	29.1	75 09.1	+59.9	30.9	76 00.0	+60.0	33.0	**76**
77	70 45.3	+58.7	21.8	71 40.8	+58.9	22.9	72 35.8	+59.2	24.2	73 30.2	+59.4	25.6	74 24.0	+59.6	27.1	75 17.0	+59.8	28.8	76 09.0	+60.0	30.8	77 00.0	+60.0	33.0	**77**
78	71 44.0	+58.5	21.2	72 39.7	+58.8	22.3	73 35.0	+59.0	23.6	74 29.6	+59.4	25.1	75 23.6	+59.6	26.7	76 16.8	+59.8	28.5	77 09.0	+59.9	30.6	78 00.0	+60.0	33.0	**78**
79	72 42.5	+58.4	20.5	73 38.5	+58.7	21.7	74 34.0	+59.0	23.0	75 29.0	+59.2	24.5	76 23.2	+59.5	26.2	77 16.6	+59.7	28.2	78 08.9	+60.0	30.4	79 00.0	+60.0	33.0	**79**
80	73 40.9	+58.2	19.7	74 37.2	+58.5	20.9	75 33.0	+58.8	22.3	76 28.2	+59.2	23.8	77 22.7	+59.5	25.6	78 16.3	+59.8	27.7	79 08.9	+59.9	30.2	80 00.0	+60.0	33.0	**80**
81	74 39.1	+58.0	18.8	75 35.7	+58.3	20.0	76 31.8	+58.7	21.5	77 27.4	+59.0	23.1	78 22.2	+59.3	25.0	79 16.1	+59.6	27.2	80 08.8	+59.9	29.9	81 00.0	+60.0	33.0	**81**
82	75 37.1	+57.7	17.8	76 34.0	+58.1	19.0	77 30.5	+58.4	20.5	78 26.4	+58.8	22.2	79 21.5	+59.2	24.2	80 15.7	+59.6	26.6	81 08.7	+59.9	29.5	82 00.0	+60.0	33.0	**82**
83	76 34.8	+57.3	16.6	77 32.1	+57.7	17.9	78 28.9	+58.1	19.4	79 25.2	+58.6	21.2	80 20.7	+59.1	23.3	81 15.3	+59.5	25.9	82 08.6	+59.8	29.0	83 00.0	+60.0	33.0	**83**
84	77 32.1	+56.8	15.3	78 29.8	+57.2	16.6	79 27.0	+57.8	18.1	80 23.8	+58.2	20.0	81 19.8	+58.7	22.2	82 14.8	+59.3	25.0	83 08.4	+59.8	28.5	84 00.0	+60.0	33.0	**84**
85	78 28.9	+56.3	13.8	79 27.0	+56.8	15.0	80 24.8	+57.2	16.6	81 22.0	+57.8	18.4	82 18.5	+58.5	20.8	83 14.1	+59.1	23.8	84 08.2	+59.6	27.7	85 00.0	+60.0	33.0	**85**
86	79 25.2	+55.5	11.9	80 23.8	+56.0	13.2	81 22.0	+56.5	14.7	82 19.8	+57.2	16.5	83 17.0	+57.8	19.0	84 13.2	+58.7	22.2	85 07.8	+59.6	26.6	86 00.0	+60.0	33.0	**86**
87	80 20.7	+54.6	9.8	81 19.8	+55.0	10.9	82 18.5	+55.6	12.3	83 17.0	+56.2	14.1	84 14.8	+57.1	16.5	85 11.9	+58.0	19.9	86 07.4	+59.2	24.9	87 00.0	+60.0	33.0	**87**
88	81 15.3	+53.3	7.2	82 14.8	+53.6	8.1	83 14.1	+54.1	9.3	84 13.2	*+54.6*•	10.9	85 11.9	*+55.5*•	13.1	86 09.9	*+56.7*•	16.5	87 06.6	*+58.3*•	22.1	88 00.0	+60.0	33.0	**88**
89	82 08.6	*+51.4*•	4.0	83 08.4	*+51.6*•	4.6	84 08.2	*+51.8*•	5.3	85 07.8	*+52.2*•	6.4	86 07.4	*+52.6*•	8.1	87 06.6	*+53.4*•	10.9	88 04.9	*+55.1*•	16.5	89 00.0	+60.0	33.0	**89**
90	83 00.0	*+48.9*•	0.0	84 00.0	*+48.6*•	0.0	85 00.0	*+48.2*•	0.0	86 00.0	*+47.5*•	0.0	87 00.0	*+46.3*•	0.0	88 00.0	*+43.0*•	0.0	89 00.0	*+25.9*•	0.0	90 00.0	–60.0	16.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

34°, 326° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 47.9	+59.9	145.8	4 58.3	+59.9	145.9	4 08.6	+59.9	145.9	3 18.9	+60.0	145.9	2 29.2	+60.0	146.0	1 39.5	+60.0	146.0	0 49.7	+60.0	146.0	0 00.0	+60.0	146.0	0
1	6 47.8	+59.8	145.7	5 58.2	+59.9	145.8	5 08.5	+60.0	145.8	4 18.9	+59.9	145.9	3 29.2	+60.0	145.9	2 39.5	+60.0	146.0	1 49.7	+60.0	146.0	1 00.0	+60.0	146.0	1
2	7 47.6	+59.9	145.7	6 58.1	+59.9	145.7	6 08.5	+59.9	145.8	5 18.8	+60.0	145.9	4 29.2	+59.9	145.9	3 39.5	+59.9	145.9	2 49.7	+60.0	146.0	2 00.0	+60.0	146.0	2
3	8 47.5	+59.9	145.6	7 58.0	+59.9	145.7	7 08.4	+59.9	145.8	6 18.8	+59.9	145.8	5 29.1	+60.0	145.9	4 39.4	+60.0	145.9	3 49.7	+60.0	146.0	3 00.0	+60.0	146.0	3
4	9 47.4	+59.8	145.5	8 57.9	+59.9	145.6	8 08.3	+60.0	145.7	7 18.7	+60.0	145.8	6 29.1	+60.0	145.8	5 39.4	+60.0	145.9	4 49.7	+60.0	146.0	4 00.0	+60.0	146.0	4
5	10 47.2	+59.9	145.5	9 57.8	+59.9	145.6	9 08.3	+59.9	145.7	8 18.7	+59.9	145.7	7 29.1	+59.9	145.8	6 39.4	+60.0	145.9	5 49.7	+60.0	145.9	5 00.0	+60.0	146.0	5
6	11 47.1	+59.8	145.4	10 57.7	+59.8	145.5	10 08.2	+59.9	145.6	9 18.6	+60.0	145.7	8 29.0	+60.0	145.8	7 39.4	+60.0	145.9	6 49.7	+60.0	145.9	6 00.0	+60.0	146.0	6
7	12 46.9	+59.9	145.3	11 57.5	+59.9	145.4	11 08.1	+59.9	145.6	10 18.6	+59.9	145.7	9 29.0	+60.0	145.8	8 39.4	+60.0	145.8	7 49.7	+60.0	145.9	7 00.0	+60.0	146.0	7
8	13 46.8	+59.8	145.2	12 57.4	+59.9	145.4	12 08.0	+60.0	145.5	11 18.5	+60.0	145.6	10 29.0	+60.0	145.7	9 39.4	+60.0	145.8	8 49.7	+60.0	145.9	8 00.0	+60.0	146.0	8
9	14 46.6	+59.9	145.2	13 57.3	+59.9	145.3	13 08.0	+59.9	145.4	12 18.5	+60.0	145.6	11 29.0	+59.9	145.7	10 39.4	+60.0	145.8	9 49.7	+60.0	145.9	9 00.0	+60.0	146.0	9
10	15 46.5	+59.8	145.1	14 57.2	+59.9	145.2	14 07.9	+59.9	145.4	13 18.5	+59.9	145.5	12 28.9	+60.0	145.7	11 39.4	+60.0	145.8	10 49.7	+60.0	145.9	10 00.0	+60.0	146.0	10
11	16 46.3	+59.9	145.0	15 57.1	+59.9	145.2	15 07.8	+59.9	145.3	14 18.4	+60.0	145.5	13 28.9	+60.0	145.6	12 39.4	+59.9	145.8	11 49.7	+60.0	145.9	11 00.0	+60.0	146.0	11
12	17 46.2	+59.8	144.9	16 57.0	+59.9	145.1	16 07.7	+59.9	145.3	15 18.4	+59.9	145.5	14 28.9	+60.0	145.6	13 39.3	+60.0	145.7	12 49.7	+60.0	145.9	12 00.0	+60.0	146.0	12
13	18 46.0	+59.9	144.9	17 56.9	+59.9	145.1	17 07.6	+60.0	145.2	16 18.3	+60.0	145.4	15 28.9	+59.9	145.6	14 39.3	+60.0	145.7	13 49.7	+60.0	145.9	13 00.0	+60.0	146.0	13
14	19 45.9	+59.8	144.8	18 56.8	+59.9	145.0	18 07.6	+59.9	145.2	17 18.3	+59.9	145.4	16 28.8	+60.0	145.5	15 39.3	+60.0	145.7	14 49.7	+60.0	145.9	14 00.0	+60.0	146.0	14
15	20 45.7	+59.8	144.7	19 56.7	+59.8	144.9	19 07.5	+59.9	145.1	18 18.2	+60.0	145.3	17 28.8	+60.0	145.5	16 39.3	+60.0	145.7	15 49.7	+60.0	145.8	15 00.0	+60.0	146.0	15
16	21 45.5	+59.9	144.6	20 56.5	+59.9	144.9	20 07.4	+59.9	145.1	19 18.2	+59.9	145.3	18 28.8	+59.9	145.5	17 39.3	+60.0	145.7	16 49.7	+60.0	145.8	16 00.0	+60.0	146.0	16
17	22 45.4	+59.8	144.6	21 56.4	+59.9	144.8	21 07.3	+59.9	145.0	20 18.1	+59.9	145.2	19 28.7	+60.0	145.4	18 39.3	+60.0	145.6	17 49.7	+60.0	145.8	17 00.0	+60.0	146.0	17
18	23 45.2	+59.8	144.5	22 56.3	+59.9	144.7	22 07.2	+60.0	145.0	21 18.0	+60.0	145.2	20 28.7	+60.0	145.4	19 39.3	+60.0	145.6	18 49.7	+60.0	145.8	18 00.0	+60.0	146.0	18
19	24 45.0	+59.9	144.4	23 56.2	+59.9	144.7	23 07.2	+59.9	144.9	22 18.0	+59.9	145.1	21 28.7	+60.0	145.4	20 39.3	+59.9	145.6	19 49.7	+60.0	145.8	19 00.0	+60.0	146.0	19
20	25 44.9	+59.8	144.3	24 56.1	+59.8	144.6	24 07.1	+59.9	144.8	23 17.9	+60.0	145.1	22 28.7	+59.9	145.3	21 39.2	+60.0	145.6	20 49.7	+60.0	145.8	20 00.0	+60.0	146.0	20
21	26 44.7	+59.8	144.2	25 55.9	+59.9	144.5	25 07.0	+59.9	144.8	24 17.9	+59.9	145.1	23 28.6	+60.0	145.3	22 39.2	+60.0	145.5	21 49.7	+60.0	145.8	21 00.0	+60.0	146.0	21
22	27 44.5	+59.8	144.1	26 55.8	+59.9	144.4	26 06.9	+59.9	144.7	25 17.8	+60.0	145.0	24 28.6	+60.0	145.3	23 39.2	+60.0	145.5	22 49.7	+60.0	145.8	22 00.0	+60.0	146.0	22
23	28 44.3	+59.9	144.1	27 55.7	+59.8	144.4	27 06.8	+59.9	144.7	26 17.8	+59.9	145.0	25 28.6	+59.9	145.2	24 39.2	+60.0	145.5	23 49.7	+60.0	145.8	23 00.0	+60.0	146.0	23
24	29 44.2	+59.8	144.0	28 55.5	+59.9	144.3	28 06.7	+59.9	144.6	27 17.7	+60.0	144.9	26 28.5	+60.0	145.2	25 39.2	+60.0	145.5	24 49.7	+60.0	145.7	24 00.0	+60.0	146.0	24
25	30 44.0	+59.8	143.9	29 55.4	+59.9	144.2	29 06.6	+59.9	144.5	28 17.7	+59.9	144.9	27 28.5	+60.0	145.2	26 39.2	+60.0	145.5	25 49.7	+60.0	145.7	25 00.0	+60.0	146.0	25
26	31 43.8	+59.8	143.8	30 55.3	+59.8	144.1	30 06.5	+59.9	144.5	29 17.6	+59.9	144.8	28 28.5	+59.9	145.1	27 39.2	+59.9	145.4	26 49.7	+60.0	145.7	26 00.0	+60.0	146.0	26
27	32 43.6	+59.8	143.7	31 55.1	+59.9	144.1	31 06.4	+59.9	144.4	30 17.5	+60.0	144.8	29 28.4	+60.0	145.1	28 39.1	+60.0	145.4	27 49.7	+60.0	145.7	27 00.0	+60.0	146.0	27
28	33 43.4	+59.8	143.6	32 55.0	+59.8	144.0	32 06.3	+59.9	144.3	31 17.5	+59.9	144.7	30 28.4	+60.0	145.0	29 39.1	+60.0	145.4	28 49.7	+60.0	145.7	28 00.0	+60.0	146.0	28
29	34 43.2	+59.8	143.5	33 54.8	+59.9	143.9	33 06.2	+59.9	144.3	32 17.4	+60.0	144.7	31 28.4	+59.9	145.0	30 39.1	+60.0	145.4	29 49.7	+59.9	145.7	29 00.0	+60.0	146.0	29
30	35 43.0	+59.8	143.4	34 54.7	+59.8	143.8	34 06.1	+59.9	144.2	33 17.4	+59.9	144.6	32 28.3	+60.0	145.0	31 39.1	+60.0	145.3	30 49.6	+60.0	145.7	30 00.0	+60.0	146.0	30
31	36 42.8	+59.7	143.3	35 54.5	+59.9	143.7	35 06.0	+59.9	144.1	34 17.3	+59.9	144.5	33 28.3	+60.0	144.9	32 39.1	+60.0	145.3	31 49.6	+60.0	145.7	31 00.0	+60.0	146.0	31
32	37 42.5	+59.8	143.2	36 54.4	+59.8	143.6	36 05.9	+59.9	144.1	35 17.2	+59.9	144.5	34 28.3	+59.9	144.9	33 39.1	+59.9	145.3	32 49.6	+60.0	145.6	32 00.0	+60.0	146.0	32
33	38 42.3	+59.8	143.1	37 54.2	+59.8	143.5	37 05.8	+59.9	144.0	36 17.1	+60.0	144.4	35 28.2	+60.0	144.8	34 39.0	+60.0	145.2	33 49.6	+60.0	145.6	33 00.0	+60.0	146.0	33
34	39 42.1	+59.7	142.9	38 54.0	+59.9	143.4	38 05.7	+59.9	143.9	37 17.1	+59.9	144.4	36 28.2	+59.9	144.8	35 39.0	+60.0	145.2	34 49.6	+60.0	145.6	34 00.0	+60.0	146.0	34
35	40 41.8	+59.8	142.8	39 53.9	+59.8	143.3	39 05.6	+59.9	143.8	38 17.0	+59.9	144.3	37 28.1	+60.0	144.8	36 39.0	+60.0	145.2	35 49.6	+60.0	145.6	35 00.0	+60.0	146.0	35
36	41 41.6	+59.7	142.7	40 53.7	+59.8	143.2	40 05.5	+59.8	143.7	39 16.9	+60.0	144.2	38 28.1	+60.0	144.7	37 39.0	+60.0	145.2	36 49.6	+60.0	145.6	36 00.0	+60.0	146.0	36
37	42 41.3	+59.8	142.6	41 53.5	+59.8	143.1	41 05.3	+59.9	143.7	40 16.9	+59.9	144.2	39 28.1	+59.9	144.7	38 39.0	+60.0	145.1	37 49.6	+60.0	145.6	37 00.0	+60.0	146.0	37
38	43 41.1	+59.7	142.5	42 53.3	+59.8	143.0	42 05.2	+59.9	143.6	41 16.8	+59.9	144.1	40 28.0	+60.0	144.6	39 39.0	+59.9	145.1	38 49.6	+60.0	145.6	38 00.0	+60.0	146.0	38
39	44 40.8	+59.7	142.3	43 53.1	+59.8	142.9	43 05.1	+59.8	143.5	42 16.7	+59.9	144.0	41 28.0	+59.9	144.6	40 38.9	+60.0	145.1	39 49.6	+60.0	145.5	39 00.0	+60.0	146.0	39
40	45 40.5	+59.7	142.2	44 52.9	+59.8	142.8	44 04.9	+59.9	143.4	43 16.6	+59.9	144.0	42 27.9	+60.0	144.5	41 38.9	+60.0	145.0	40 49.6	+60.0	145.5	40 00.0	+60.0	146.0	40
41	46 40.2	+59.7	142.0	45 52.7	+59.8	142.7	45 04.8	+59.9	143.3	44 16.5	+59.9	143.9	43 27.9	+59.9	144.4	42 38.9	+60.0	145.0	41 49.6	+60.0	145.5	41 00.0	+60.0	146.0	41
42	47 39.9	+59.7	141.9	46 52.5	+59.8	142.6	46 04.7	+59.8	143.2	45 16.4	+59.9	143.8	44 27.8	+60.0	144.4	43 38.9	+60.0	144.9	42 49.6	+60.0	145.5	42 00.0	+60.0	146.0	42
43	48 39.6	+59.7	141.7	47 52.3	+59.7	142.4	47 04.5	+59.9	143.1	46 16.3	+59.9	143.7	45 27.8	+59.9	144.3	44 38.9	+59.9	144.9	43 49.6	+60.0	145.5	43 00.0	+60.0	146.0	43
44	49 39.3	+59.7	141.6	48 52.0	+59.8	142.3	48 04.4	+59.8	143.0	47 16.2	+59.9	143.6	46 27.7	+60.0	144.3	45 38.8	+60.0	144.9	44 49.6	+60.0	145.4	44 00.0	+60.0	146.0	44
45	50 39.0	+59.6	141.4	49 51.8	+59.8	142.2	49 04.2	+59.8	142.9	48 16.1	+59.9	143.6	47 27.7	+59.9	144.2	46 38.8	+60.0	144.8	45 49.6	+60.0	145.4	45 00.0	+60.0	146.0	45
46	51 38.6	+59.6	141.2	50 51.6	+59.7	142.0	50 04.0	+59.8	142.8	49 16.0	+59.9	143.5	48 27.6	+59.9	144.1	47 38.8	+60.0	144.8	46 49.6	+60.0	145.4	46 00.0	+60.0	146.0	46
47	52 38.2	+59.6	141.1	51 51.3	+59.7	141.9	51 03.8	+59.9	142.6	50 15.9	+59.9	143.4	49 27.5	+60.0	144.1	48 38.8	+59.9	144.7	47 49.6	+60.0	145.4	47 00.0	+60.0	146.0	47
48	53 37.8	+59.6	140.9	52 51.0	+59.7	141.7	52 03.7	+59.8	142.5	51 15.8	+59.9	143.3	50 27.5	+59.9	144.0	49 38.7	+60.0	144.7	48 49.6	+59.9	145.4	48 00.0	+60.0	146.0	48
49	54 37.4	+59.6	140.7	53 50.7	+59.7	141.5	53 03.5	+59.8	142.4	52 15.7	+59.9	143.2	51 27.4	+60.0	143.9	50 38.7	+60.0	144.7	49 49.5	+60.0	145.3	49 00.0	+60.0	146.0	49
50	55 37.0	+59.6	140.5	54 50.4	+59.7	141.4	54 03.3	+59.7	142.2	53 15.6	+59.8	143.1	52 27.4	+59.9	143.9	51 38.7	+59.9	144.6	50 49.5	+60.0	145.3	50 00.0	+60.0	146.0	50
51	56 36.6	+59.5	140.3	55 50.1	+59.7	141.2	55 03.0	+59.8	142.1	54 15.4	+59.9	143.0	53 27.3	+59.9	143.8	52 38.6	+60.0	144.6	51 49.5	+60.0	145.3	51 00.0	+60.0	146.0	51
52	57 36.1	+59.5	140.0	56 49.8	+59.6	141.0	56 02.8	+59.8	141.9	55 15.3	+59.8	142.8	54 27.2	+59.9	143.7	53 38.6	+60.0	144.5	52 49.5	+60.0	145.3	52 00.0	+60.0	146.0	52
53	58 35.6	+59.4	139.8	57 49.4	+59.6	140.8	57 02.6	+59.7	141.8	56 15.1	+59.9	142.7	55 27.1	+59.9	143.6	54 38.6	+59.9	144.4	53 49.5	+60.0	145.2	53 00.0	+60.0	146.0	53
54	59 35.0	+59.5	139.5	58 49.0	+59.6	140.6	58 02.3	+59.8	141.6	57 15.0	+59.8	142.6	56 27.0	+60.0	143.5	55 38.5	+60.0	144.4	54 49.5	+60.0	145.2	54 00.0	+60.0	146.0	54
55	60 34.5	+59.4	139.2	59 48.6	+59.6	140.4	59 02.1	+59.7	141.4	58 14.8	+59.9	142.4	57 27.0	+59.9	143.4	56 38.5	+60.0	144.3	55 49.5	+60.0	145.2	55 00.0	+60.0	146.0	55
56	61 33.9	+59.3	139.0	60 48.2	+59.6	140.1	60 01.8	+59.7	141.2	59 14.7	+59.8	142.3	58 26.9	+59.9	143.3	57 38.5	+59.9	144.3	56 49.5	+60.0	145.1	56 00.0	+60.0	146.0	56
57	62 33.2	+59.4	138.6	61 47.8	+59.5	139.9	61 01.5	+59.7	141.0	60 14.5	+59.8	142.1	59 26.8	+59.9	143.2	58 38.4	+60.0	144.2	57 49.5	+60.0	145.1	57 00.0	+60.0	146.0	57
58	63 32.6	+59.2	138.3	62 47.3	+59.5	139.6	62 01.2	+59.7	140.8	61 14.3	+59.8	142.0	60 26.7	+59.9	143.1	59 38.4	+59.9	144.1	58 49.5	+60.0	145.1	58 00.0	+60.0	146.0	58
59	64 31.8	+59.2	138.0	63 46.8	+59.5	139.3	63 00.9	+59.6	140.6	62 14.1	+59.8	141.8	61 26.6	+59.8	143.0	60 38.3	+60.0	144.0	59 49.5	+60.0	145.0	59 00.0	+60.0	146.0	59
60	65 31.0	+59.2	137.6	64 46.3	+59.4	139.0	64 00.5	+59.6	140.4	63 13.9	+59.7	141.6	62 26.4	+59.9	142.8	61 38.3	+59.9	143.9	60 49.5	+59.9	145.0	60 00.0	+60.0	146.0	60
61	66 30.2	+59.1	137.2	65 45.7	+59.3	138.7	65 00.1	+59.6	140.1	64 13.6	+59.8	141.4	63 26.3	+59.9	142.7	62 38.2	+60.0	143.9	61 49.4	+60.0	145.0	61 00.0	+60.0	146.0	61
62	67 29.3	+59.0	136.7	66 45.0	+59.3	138.3	65 59.7	+59.5	139.8	65 13.4	+59.7	141.2	64 26.2	+59.8	142.5	63 38.2	+59.9	143.8	62 49.4	+60.0	144.9	62 00.0	+60.0	146.0	62
63	68 28.3	+58.9	136.2	67 44.3	+59.3	137.9	66 59.2	+59.6	139.5	66 13.1	+59.7	141.0	65 26.0	+59.9	142.4	64 38.1	+60.0	143.7	63 49.4	+60.0	144.9	63 00.0	+60.0	146.0	63
64	69 27.2	+58.8	135.7	68 43.6	+59.2	137.5	67 58.8	+59.4	139.2	67 12.8	+59.7	140.7	66 25.9	+59.8	142.2	65 38.1	+59.9	143.5	64 49.4	+60.0	144.8	64 00.0	+60.0	146.0	64
65	70 26.0	+58.7	135.1	69 42.8	+59.1	137.0	68 58.2	+59.4	138.8	68 12.5	+59.7	140.5	67 25.7	+59.8	142.0	66 38.0	+59.9	143.4	65 49.4	+60.0	144.8	65 00.0	+60.0	146.0	65
66	71 24.7	+58.5	134.5	70 41.9	+59.0	136.5	69 57.6	+59.4	138.4	69 12.2	+59.6	140.2	68 25.5	+59.8	141.8	67 37.9	+59.9	143.3	66 49.4	+59.9	144.7	66 00.0	+60.0	146.0	66
67	72 23.2	+58.4	133.8	71 40.9	+58.9	136.0	70 57.0	+59.3	138.0	70 11.8	+59.6	139.8	69 25.3	+59.8	141.6	68 37.8	+59.9	143.2	67 49.3	+60.0	144.6	67 00.0	+60.0	146.0	67
68	73 21.6	+58.1	133.0	72 39.8	+58.7	135.3	71 56.3	+59.2	137.5	71 11.4	+59.5	139.5	70 25.1	+59.8	141.3	69 37.7	+59.9	143.0	68 49.3	+60.0	144.6	68 00.0	+60.0	146.0	68
69	74 19.7	+58.0	132.1	73 38.5	+58.6	134.6	72 55.5	+59.1	137.0	72 10.9	+59.5	139.1	71 24.9	+59.7	141.0	70 37.6	+59.9	142.8	69 49.3	+60.0	144.5	69 00.0	+60.0	146.0	69
70	75 17.7	+57.6	131.1	74 37.1	+58.5	133.9	73 54.6	+59.0	136.4	73 10.4	+59.4	138.6	72 24.6	+59.7	140.7	71 37.5	+59.9	142.6	70 49.3	+59.9	144.4	70 00.0	+60.0	146.0	70
71	76 15.3	+57.3	130.0	75 35.6	+58.2	133.0	74 53.6	+58.9	135.7	74 09.8	+59.3	138.2	73 24.3	+59.7	140.4	72 37.4	+59.9	142.4	71 49.2	+60.0	144.3	71 00.0	+60.0	146.0	71
72	77 12.6	+56.9	128.7	76 33.8	+57.9	132.0	75 52.5	+58.7	134.9	75 09.1	+59.3	137.6	74 24.0	+59.6	140.0	73 37.3	+59.8	142.2	72 49.2	+60.0	144.2	72 00.0	+60.0	146.0	72
73	78 09.5	+56.3	127.2	77 31.7	+57.6	130.8	76 51.2	+58.5	134.0	76 08.4	+59.1	137.0	75 23.6	+59.6	139.6	74 37.1	+59.8	141.9	73 49.2	+59.9	144.1	73 00.0	+60.0	146.0	73
74	79 05.8	+55.5	125.4	78 29.3	+57.1	129.4	77 49.7	+58.2	133.0	77 07.5	+59.0	136.2	76 23.2	+59.5	139.1	75 36.9	+59.8	141.7	74 49.1	+60.0	143.9	74 00.0	+60.0	146.0	74
75	80 01.3	+54.7	123.4	79 26.4	+56.5	127.8	78 47.9	+57.9	131.8	78 06.5	+58.8	135.4	77 22.7	+59.4	138.5	76 36.7	+59.8	141.3	75 49.1	+59.9	143.8	75 00.0	+60.0	146.0	75
76	80 56.0	+53.4	120.9	80 22.9	+55.8	125.9	79 45.8	+57.5	130.4	79 05.3	+58.6	134.4	78 22.1	+59.3	137.9	77 36.5	+59.7	140.9	76 49.0	+60.0	143.6	76 00.0	+60.0	146.0	76
77	81 49.4	+51.7	•117.8	81 18.7	+54.8	123.6	80 43.3	+56.9	128.7	80 03.9	+58.3	133.2	79 21.4	+59.1	137.1	78 36.2	+59.7	140.5	77 49.0	+59.9	143.4	77 00.0	+60.0	146.0	77
78	82 41.1	+49.4	•114.0	82 13.5	+53.3	120.8	81 40.2	+56.0	126.6	81 02.2	+57.9	131.7	80 20.5	+59.0	136.1	79 35.9	+59.6	139.9	78 48.9	+59.9	143.2	78 00.0	+60.0	146.0	78
79	83 30.5	+46.0	•109.3	83 06.8	+51.2	•117.1	82 36.2	+54.9	124.0	82 00.1	+57.2	129.9	81 19.5	+58.7	135.0	80 35.5	+59.6	139.3	79 48.8	+59.9	142.9	79 00.0	+60.0	146.0	79
80	84 16.5	+41.0	•103.3	83 58.0	+48.1	•112.5	83 31.1	+53.1	•120.7	82 57.3	+56.4	127.6	82 18.2	+58.4	133.5	81 35.1	+59.3	138.4	80 48.7	+59.9	142.5	80 00.0	+60.0	146.0	80
81	84 57.5	+33.8	• 95.5	84 46.1	+43.3	•106.4	84 24.2	+50.4	•116.2	83 53.7	+55.1	124.7	83 16.6	+57.7	131.7	82 34.4	+59.3	137.4	81 48.6	+59.8	142.1	81 00.0	+60.0	146.0	81
82	85 31.3	+23.7	• 85.5	85 29.4	+35.9	• 98.2	85 14.6	+45.9	•110.2	84 48.8	+52.8	•120.6	84 14.3	+56.9	129.2	83 33.7	+58.9	136.1	82 48.4	+59.8	141.6	82 00.0	+60.0	146.0	82
83	85 55.0	+10.3	• 73.1	86 05.3	+24.5	• 87.3	86 00.5	+38.4	•101.7	85 41.6	+48.9	•114.8	85 11.2	+55.3	•125.7	84 32.6	+58.4	134.2	83 48.2	+59.7	140.8	83 00.0	+60.0	146.0	83
84	86 05.3	–4.8	• 59.0	86 29.8	+9.1	• 73.1	86 38.9	+25.9	• 89.7	86 30.5	+41.7	•106.3	86 06.5	+52.3	•120.5	85 31.0	+57.6	131.6	84 47.9	+59.6	139.8	84 00.0	+60.0	146.0	84
85	86 00.5	–18.9	• 44.4	86 38.9	–8.4	• 56.5	87 04.8	+7.4	• 73.1	87 12.2	+27.6	• 93.0	86 58.8	+45.7	•112.3	86 28.6	+55.7	•127.5	85 47.5	+59.3	138.4	85 00.0	+60.0	146.0	85
86	85 41.6	–30.4	• 31.3	86 30.5	–24.0	• 39.8	87 12.2	–13.4	• 53.1	87 39.8	+4.7	• 73.0	87 44.5	+30.3	• 98.1	87 24.3	+50.9	•120.5	86 46.8	+58.7	136.0	86 00.0	+60.0	146.0	86
87	85 11.2	–38.6	• 20.4	86 06.5	–35.5	• 25.5	86 58.8	–30.2	• 33.7	87 44.5	–20.2	• 48.0	88 14.8	+0.4	• 73.0	88 15.2	+34.6	•106.2	87 45.5	+56.6	•131.6	87 00.0	+60.0	146.0	87
88	84 32.6	–44.4	• 11.8	85 31.0	–43.1	• 14.5	86 28.6	–41.1	• 18.5	87 24.3	–37.5	• 25.5	88 15.2	–29.7	• 39.8	88 49.8	–7.7	• 73.0	88 42.1	+42.8	•120.5	88 00.0	+60.0	146.0	88
89	83 48.2	–48.2	• 5.2	84 47.9	–47.9	• 6.2	85 47.5	–47.5	• 7.6	86 46.8	–46.8	• 10.0	87 45.5	–45.5	• 14.4	88 42.1	–42.1	• 25.5	89 24.9	–24.9	• 73.0	89 00.0	+60.0	146.0	89
90	83 00.0	–50.9	• 0.0	84 00.0	–51.1	• 0.0	85 00.0	–51.3	• 0.0	86 00.0	–51.7	• 0.0	87 00.0	–52.2	• 0.0	88 00.0	–53.0	• 0.0	89 00.0	–54.8	• 0.0	90 00.0	–60.0	73.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION **L.H.A. 34°, 326°**

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 47.9	–59.8	145.8	4 58.3	–59.9	145.9	4 08.6	–59.9	145.9	3 18.9	–59.9	145.9	2 29.2	–60.0	146.0	1 39.5	–60.0	146.0	0 49.7	–60.0	146.0	0 00.0	+60.0	34.0	0
1	4 48.1	–59.9	145.9	3 58.4	–59.9	145.9	3 08.7	–59.9	145.9	2 19.0	–60.0	146.0	1 29.2	–59.9	146.0	0 39.5	–60.0	146.0	0 10.3	+60.0	34.0	1 00.0	+60.0	34.0	1
2	3 48.2	–59.9	145.9	2 58.5	–59.9	146.0	2 08.8	–60.0	146.0	1 19.0	–59.9	146.0	0 29.3	–60.0	146.0	0 20.5	+60.0	34.0	1 10.3	+59.9	34.0	2 00.0	+60.0	34.0	2
3	2 48.3	–59.8	146.0	1 58.6	–59.9	146.0	1 08.8	–59.9	146.0	0 19.1	–60.0	146.1	0 30.7	+60.0	33.9	1 20.5	+60.0	34.0	2 10.2	+60.0	34.0	3 00.0	+60.0	34.0	3
4	1 48.5	–59.9	146.1	0 58.7	–59.9	146.1	0 08.9	–59.9	146.1	0 40.9	+60.0	33.9	1 30.7	+60.0	33.9	2 20.5	+60.0	33.9	3 10.2	+60.0	34.0	4 00.0	+60.0	34.0	4
5	0 48.6	–59.8	146.1	0 01.2	+59.9	33.9	0 51.0	+60.0	33.9	1 40.9	+59.9	33.9	2 30.7	+59.9	33.9	3 20.5	+60.0	33.9	4 10.2	+60.0	34.0	5 00.0	+60.0	34.0	5
6	0 11.2	+59.9	33.8	1 01.1	+59.9	33.8	1 51.0	+59.9	33.8	2 40.8	+60.0	33.8	3 30.6	+60.0	33.9	4 20.5	+59.9	33.9	5 10.2	+60.0	33.9	6 00.0	+60.0	34.0	6
7	1 11.1	+59.9	33.7	2 01.0	+59.9	33.7	2 50.9	+59.9	33.8	3 40.8	+59.9	33.8	4 30.6	+60.0	33.8	5 20.4	+60.0	33.9	6 10.2	+60.0	33.9	7 00.0	+60.0	34.0	7
8	2 11.0	+59.8	33.7	3 00.9	+59.9	33.7	3 50.8	+59.9	33.7	4 40.7	+60.0	33.8	5 30.6	+60.0	33.8	6 20.4	+60.0	33.9	7 10.2	+60.0	33.9	8 00.0	+60.0	34.0	8
9	3 10.8	+59.9	33.6	4 00.8	+59.9	33.6	4 50.7	+60.0	33.7	5 40.7	+59.9	33.7	6 30.6	+59.9	33.8	7 20.4	+60.0	33.8	8 10.2	+60.0	33.9	9 00.0	+60.0	34.0	9
10	4 10.7	+59.8	33.5	5 00.7	+59.9	33.6	5 50.7	+59.9	33.6	6 40.6	+60.0	33.7	7 30.5	+60.0	33.7	8 20.4	+60.0	33.8	9 10.2	+60.0	33.9	10 00.0	+60.0	34.0	10
11	5 10.5	+59.9	33.4	6 00.6	+59.9	33.5	6 50.6	+59.9	33.6	7 40.6	+59.9	33.6	8 30.5	+60.0	33.7	9 20.4	+60.0	33.8	10 10.2	+60.0	33.9	11 00.0	+60.0	34.0	11
12	6 10.4	+59.9	33.4	7 00.5	+59.9	33.4	7 50.5	+60.0	33.5	8 40.5	+60.0	33.6	9 30.5	+60.0	33.7	10 20.4	+60.0	33.8	11 10.2	+60.0	33.9	12 00.0	+60.0	34.0	12
13	7 10.3	+59.8	33.3	8 00.4	+59.9	33.4	8 50.5	+59.9	33.5	9 40.5	+59.9	33.6	10 30.5	+59.9	33.7	11 20.4	+60.0	33.8	12 10.2	+60.0	33.9	13 00.0	+60.0	34.0	13
14	8 10.1	+59.9	33.2	9 00.3	+59.9	33.3	9 50.4	+59.9	33.4	10 40.4	+60.0	33.5	11 30.4	+60.0	33.6	12 20.4	+59.9	33.7	13 10.2	+60.0	33.9	14 00.0	+60.0	34.0	14
15	9 10.0	+59.8	33.2	10 00.2	+59.9	33.3	10 50.3	+59.9	33.4	11 40.4	+59.9	33.5	12 30.4	+60.0	33.6	13 20.3	+60.0	33.7	14 10.2	+60.0	33.9	15 00.0	+60.0	34.0	15
16	10 09.8	+59.9	33.1	11 00.1	+59.9	33.2	11 50.2	+60.0	33.3	12 40.3	+60.0	33.4	13 30.4	+59.9	33.6	14 20.3	+60.0	33.7	15 10.2	+60.0	33.8	16 00.0	+60.0	34.0	16
17	11 09.7	+59.8	33.0	12 00.0	+59.8	33.1	12 50.2	+59.9	33.3	13 40.3	+59.9	33.4	14 30.3	+60.0	33.5	15 20.3	+60.0	33.7	16 10.2	+60.0	33.8	17 00.0	+60.0	34.0	17
18	12 09.5	+59.9	33.0	12 59.8	+59.9	33.1	13 50.1	+59.9	33.2	14 40.2	+60.0	33.3	15 30.3	+60.0	33.5	16 20.3	+60.0	33.7	17 10.2	+60.0	33.8	18 00.0	+60.0	34.0	18
19	13 09.4	+59.8	32.9	13 59.7	+59.9	33.0	14 50.0	+59.9	33.2	15 40.2	+59.9	33.3	16 30.3	+60.0	33.5	17 20.3	+60.0	33.6	18 10.2	+60.0	33.8	19 00.0	+60.0	34.0	19
20	14 09.2	+59.9	32.8	14 59.6	+59.9	33.0	15 49.9	+60.0	33.1	16 40.1	+60.0	33.3	17 30.3	+59.9	33.4	18 20.3	+60.0	33.6	19 10.2	+60.0	33.8	20 00.0	+60.0	34.0	20
21	15 09.1	+59.8	32.7	15 59.5	+59.9	32.9	16 49.9	+59.9	33.1	17 40.1	+59.9	33.2	18 30.2	+60.0	33.4	19 20.3	+60.0	33.6	20 10.2	+60.0	33.8	21 00.0	+60.0	34.0	21
22	16 08.9	+59.9	32.7	16 59.4	+59.9	32.8	17 49.8	+59.9	33.0	18 40.0	+60.0	33.2	19 30.2	+60.0	33.4	20 20.3	+59.9	33.6	21 10.2	+60.0	33.8	22 00.0	+60.0	34.0	22
23	17 08.8	+59.8	32.6	17 59.3	+59.9	32.8	18 49.7	+59.9	32.9	19 40.0	+59.9	33.1	20 30.2	+60.0	33.3	21 20.2	+60.0	33.5	22 10.2	+60.0	33.8	23 00.0	+60.0	34.0	23
24	18 08.6	+59.9	32.5	18 59.2	+59.9	32.7	19 49.6	+59.9	32.9	20 39.9	+60.0	33.1	21 30.2	+59.9	33.3	22 20.2	+60.0	33.5	23 10.2	+60.0	33.8	24 00.0	+60.0	34.0	24
25	19 08.5	+59.8	32.4	19 59.1	+59.8	32.6	20 49.5	+60.0	32.8	21 39.9	+59.9	33.0	22 30.1	+60.0	33.3	23 20.2	+60.0	33.5	24 10.2	+60.0	33.7	25 00.0	+60.0	34.0	25
26	20 08.3	+59.9	32.4	20 58.9	+59.9	32.6	21 49.5	+59.9	32.8	22 39.8	+60.0	33.0	23 30.1	+60.0	33.2	24 20.2	+60.0	33.5	25 10.2	+60.0	33.7	26 00.0	+60.0	34.0	26
27	21 08.2	+59.8	32.3	21 58.8	+59.9	32.5	22 49.4	+59.9	32.7	23 39.8	+59.9	33.0	24 30.1	+59.9	33.2	25 20.2	+60.0	33.5	26 10.2	+60.0	33.7	27 00.0	+60.0	34.0	27
28	22 08.0	+59.8	32.2	22 58.7	+59.9	32.4	23 49.3	+59.9	32.7	24 39.7	+60.0	32.9	25 30.0	+60.0	33.2	26 20.2	+60.0	33.4	27 10.2	+60.0	33.7	28 00.0	+60.0	34.0	28
29	23 07.8	+59.9	32.1	23 58.6	+59.9	32.4	24 49.2	+59.9	32.6	25 39.7	+59.9	32.9	26 30.0	+60.0	33.1	27 20.2	+59.9	33.4	28 10.2	+60.0	33.7	29 00.0	+60.0	34.0	29
30	24 07.7	+59.8	32.0	24 58.5	+59.8	32.3	25 49.1	+59.9	32.5	26 39.6	+60.0	32.8	27 30.0	+59.9	33.1	28 20.1	+60.0	33.4	29 10.2	+60.0	33.7	30 00.0	+60.0	34.0	30
31	25 07.5	+59.8	32.0	25 58.3	+59.9	32.2	26 49.0	+59.9	32.5	27 39.6	+59.9	32.8	28 29.9	+60.0	33.1	29 20.1	+60.0	33.4	30 10.2	+60.0	33.7	31 00.0	+60.0	34.0	31
32	26 07.3	+59.9	31.9	26 58.2	+59.9	32.1	27 48.9	+59.9	32.4	28 39.5	+59.9	32.7	29 29.9	+60.0	33.0	30 20.1	+60.0	33.3	31 10.2	+60.0	33.7	32 00.0	+60.0	34.0	32
33	27 07.2	+59.8	31.8	27 58.1	+59.8	32.1	28 48.8	+59.9	32.4	29 39.4	+60.0	32.7	30 29.9	+59.9	33.0	31 20.1	+60.0	33.3	32 10.2	+59.9	33.6	33 00.0	+60.0	34.0	33
34	28 07.0	+59.8	31.7	28 57.9	+59.9	32.0	29 48.7	+60.0	32.3	30 39.4	+59.9	32.6	31 29.8	+60.0	32.9	32 20.1	+60.0	33.3	33 10.1	+60.0	33.6	34 00.0	+60.0	34.0	34
35	29 06.8	+59.8	31.6	29 57.8	+59.9	31.9	30 48.7	+59.9	32.2	31 39.3	+60.0	32.6	32 29.8	+60.0	32.9	33 20.1	+60.0	33.2	34 10.1	+60.0	33.6	35 00.0	+60.0	34.0	35
36	30 06.6	+59.8	31.5	30 57.7	+59.8	31.8	31 48.6	+59.9	32.2	32 39.3	+59.9	32.5	33 29.8	+59.9	32.9	34 20.1	+59.9	33.2	35 10.1	+60.0	33.6	36 00.0	+60.0	34.0	36
37	31 06.4	+59.8	31.4	31 57.5	+59.9	31.8	32 48.5	+59.9	32.1	33 39.2	+59.9	32.4	34 29.7	+60.0	32.8	35 20.0	+60.0	33.2	36 10.1	+60.0	33.6	37 00.0	+60.0	34.0	37
38	32 06.2	+59.8	31.3	32 57.4	+59.8	31.7	33 48.4	+59.8	32.0	34 39.1	+60.0	32.4	35 29.7	+59.9	32.8	36 20.0	+60.0	33.2	37 10.1	+60.0	33.6	38 00.0	+60.0	34.0	38
39	33 06.0	+59.8	31.2	33 57.2	+59.9	31.6	34 48.2	+59.9	32.0	35 39.1	+59.9	32.3	36 29.6	+60.0	32.7	37 20.0	+60.0	33.1	38 10.1	+60.0	33.6	39 00.0	+60.0	34.0	39
40	34 05.8	+59.8	31.2	34 57.1	+59.8	31.5	35 48.1	+59.9	31.9	36 39.0	+59.9	32.3	37 29.6	+60.0	32.7	38 20.0	+60.0	33.1	39 10.1	+60.0	33.5	40 00.0	+60.0	34.0	40
41	35 05.6	+59.8	31.1	35 56.9	+59.9	31.4	36 48.0	+59.9	31.8	37 38.9	+59.9	32.2	38 29.6	+59.9	32.6	39 20.0	+59.9	33.1	40 10.1	+60.0	33.5	41 00.0	+60.0	34.0	41
42	36 05.4	+59.8	30.9	36 56.8	+59.8	31.3	37 47.9	+59.9	31.7	38 38.8	+60.0	32.1	39 29.5	+60.0	32.6	40 19.9	+60.0	33.0	41 10.1	+60.0	33.5	42 00.0	+60.0	34.0	42
43	37 05.2	+59.8	30.8	37 56.6	+59.8	31.2	38 47.8	+59.9	31.7	39 38.8	+59.9	32.1	40 29.5	+59.9	32.5	41 19.9	+60.0	33.0	42 10.1	+60.0	33.5	43 00.0	+60.0	34.0	43
44	38 05.0	+59.8	30.7	38 56.4	+59.9	31.1	39 47.7	+59.9	31.6	40 38.7	+59.9	32.0	41 29.4	+60.0	32.5	42 19.9	+60.0	33.0	43 10.1	+60.0	33.5	44 00.0	+60.0	34.0	44
45	39 04.8	+59.7	30.6	39 56.3	+59.8	31.0	40 47.6	+59.8	31.5	41 38.6	+59.9	31.9	42 29.4	+59.9	32.4	43 19.9	+60.0	32.9	44 10.1	+60.0	33.5	45 00.0	+60.0	34.0	45
46	40 04.5	+59.8	30.5	40 56.1	+59.8	30.9	41 47.4	+59.9	31.4	42 38.5	+59.9	31.9	43 29.3	+60.0	32.4	44 19.9	+59.9	32.9	45 10.1	+60.0	33.4	46 00.0	+60.0	34.0	46
47	41 04.3	+59.7	30.4	41 55.9	+59.8	30.8	42 47.3	+59.9	31.3	43 38.4	+59.9	31.8	44 29.3	+59.9	32.3	45 19.8	+60.0	32.9	46 10.1	+60.0	33.4	47 00.0	+60.0	34.0	47
48	42 04.0	+59.8	30.3	42 55.7	+59.8	30.7	43 47.2	+59.8	31.2	44 38.3	+60.0	31.7	45 29.2	+60.0	32.3	46 19.8	+60.0	32.8	47 10.1	+60.0	33.4	48 00.0	+60.0	34.0	48
49	43 03.8	+59.7	30.1	43 55.5	+59.8	30.6	44 47.0	+59.9	31.1	45 38.3	+59.9	31.6	46 29.2	+59.9	32.2	47 19.8	+60.0	32.8	48 10.1	+60.0	33.4	49 00.0	+60.0	34.0	49
50	44 03.5	+59.7	30.0	44 55.3	+59.8	30.5	45 46.9	+59.8	31.0	46 38.2	+59.9	31.6	47 29.1	+60.0	32.1	48 19.8	+59.9	32.7	49 10.1	+60.0	33.3	50 00.0	+60.0	34.0	50
51	45 03.2	+59.7	29.9	45 55.1	+59.8	30.4	46 46.7	+59.9	30.9	47 38.1	+59.9	31.5	48 29.1	+59.9	32.1	49 19.7	+60.0	32.7	50 10.1	+60.0	33.3	51 00.0	+60.0	34.0	51
52	46 02.9	+59.7	29.7	46 54.9	+59.8	30.3	47 46.6	+59.8	30.8	48 38.0	+59.8	31.4	49 29.0	+59.9	32.0	50 19.7	+60.0	32.6	51 10.1	+59.9	33.3	52 00.0	+60.0	34.0	52
53	47 02.6	+59.7	29.6	47 54.7	+59.7	30.1	48 46.4	+59.9	30.7	49 37.8	+59.9	31.3	50 28.9	+60.0	31.9	51 19.7	+60.0	32.6	52 10.0	+60.0	33.3	53 00.0	+60.0	34.0	53
54	48 02.3	+59.7	29.4	48 54.4	+59.8	30.0	49 46.3	+59.8	30.6	50 37.7	+59.9	31.2	51 28.9	+59.9	31.9	52 19.7	+59.9	32.5	53 10.0	+60.0	33.2	54 00.0	+60.0	34.0	54
55	49 02.0	+59.7	29.3	49 54.2	+59.8	29.9	50 46.1	+59.8	30.5	51 37.6	+59.9	31.1	52 28.8	+59.9	31.8	53 19.6	+60.0	32.5	54 10.0	+60.0	33.2	55 00.0	+60.0	34.0	55
56	50 01.7	+59.6	29.1	50 54.0	+59.7	29.7	51 45.9	+59.8	30.3	52 37.5	+59.9	31.0	53 28.7	+60.0	31.7	54 19.6	+60.0	32.4	55 10.0	+60.0	33.2	56 00.0	+60.0	34.0	56
57	51 01.3	+59.7	29.0	51 53.7	+59.7	29.6	52 45.7	+59.8	30.2	53 37.4	+59.8	30.9	54 28.7	+59.9	31.6	55 19.6	+59.9	32.4	56 10.0	+60.0	33.2	57 00.0	+60.0	34.0	57
58	52 01.0	+59.6	28.8	52 53.4	+59.7	29.4	53 45.5	+59.8	30.1	54 37.2	+59.9	30.8	55 28.6	+59.9	31.5	56 19.5	+60.0	32.3	57 10.0	+60.0	33.1	58 00.0	+60.0	34.0	58
59	53 00.6	+59.6	28.6	53 53.1	+59.7	29.3	54 45.3	+59.8	29.9	55 37.1	+59.9	30.7	56 28.5	+59.9	31.4	57 19.5	+59.9	32.2	58 10.0	+60.0	33.1	59 00.0	+60.0	34.0	59
60	54 00.2	+59.6	28.4	54 52.8	+59.7	29.1	55 45.1	+59.7	29.8	56 37.0	+59.8	30.5	57 28.4	+59.9	31.3	58 19.4	+60.0	32.2	59 10.0	+60.0	33.1	60 00.0	+60.0	34.0	60
61	54 59.8	+59.6	28.2	55 52.5	+59.7	28.9	56 44.8	+59.8	29.6	57 36.8	+59.8	30.4	58 28.3	+59.9	31.2	59 19.4	+60.0	32.1	60 10.0	+60.0	33.0	61 00.0	+60.0	34.0	61
62	55 59.4	+59.5	28.0	56 52.2	+59.6	28.7	57 44.6	+59.7	29.5	58 36.6	+59.9	30.3	59 28.2	+59.9	31.1	60 19.4	+59.9	32.0	61 10.0	+59.9	33.0	62 00.0	+60.0	34.0	62
63	56 58.9	+59.5	27.8	57 51.8	+59.6	28.5	58 44.3	+59.8	29.3	59 36.5	+59.8	30.1	60 28.1	+59.9	31.0	61 19.3	+60.0	31.9	62 09.9	+60.0	32.9	63 00.0	+60.0	34.0	63
64	57 58.4	+59.5	27.5	58 51.4	+59.6	28.3	59 44.1	+59.7	29.1	60 36.3	+59.8	30.0	61 28.0	+59.9	30.9	62 19.3	+59.9	31.9	63 09.9	+60.0	32.9	64 00.0	+60.0	34.0	64
65	58 57.9	+59.5	27.3	59 51.0	+59.6	28.1	60 43.8	+59.7	28.9	61 36.1	+59.8	29.8	62 27.9	+59.9	30.7	63 19.2	+59.9	31.8	64 09.9	+60.0	32.8	65 00.0	+60.0	34.0	65
66	59 57.4	+59.4	27.0	60 50.6	+59.6	27.8	61 43.5	+59.6	28.7	62 35.9	+59.7	29.6	63 27.8	+59.8	30.6	64 19.1	+60.0	31.7	65 09.9	+60.0	32.8	66 00.0	+60.0	34.0	66
67	60 56.8	+59.4	26.7	61 50.2	+59.5	27.6	62 43.1	+59.7	28.5	63 35.6	+59.8	29.4	64 27.6	+59.9	30.5	65 19.1	+59.9	31.5	66 09.9	+60.0	32.7	67 00.0	+60.0	34.0	67
68	61 56.2	+59.3	26.4	62 49.7	+59.5	27.3	63 42.8	+59.6	28.2	64 35.4	+59.8	29.2	65 27.5	+59.8	30.3	66 19.0	+59.9	31.4	67 09.9	+59.9	32.7	68 00.0	+60.0	34.0	68
69	62 55.5	+59.3	26.1	63 49.2	+59.4	27.0	64 42.4	+59.6	28.0	65 35.2	+59.7	29.0	66 27.3	+59.9	30.1	67 18.9	+60.0	31.3	68 09.8	+60.0	32.6	69 00.0	+60.0	34.0	69
70	63 54.8	+59.3	25.8	64 48.6	+59.4	26.7	65 42.0	+59.6	27.7	66 34.9	+59.7	28.8	67 27.2	+59.8	29.9	68 18.9	+59.9	31.2	69 09.8	+60.0	32.5	70 00.0	+60.0	34.0	70
71	64 54.1	+59.2	25.4	65 48.0	+59.4	26.4	66 41.6	+59.5	27.4	67 34.6	+59.6	28.5	68 27.0	+59.8	29.7	69 18.8	+59.9	31.0	70 09.8	+60.0	32.4	71 00.0	+60.0	34.0	71
72	65 53.3	+59.1	25.0	66 47.4	+59.3	26.0	67 41.1	+59.5	27.1	68 34.2	+59.7	28.2	69 26.8	+59.8	29.5	70 18.7	+59.9	30.9	71 09.8	+59.9	32.4	72 00.0	+60.0	34.0	72
73	66 52.4	+59.0	24.6	67 46.7	+59.3	25.6	68 40.6	+59.4	26.7	69 33.9	+59.6	27.9	70 26.6	+59.7	29.2	71 18.6	+59.8	30.7	72 09.7	+60.0	32.3	73 00.0	+60.0	34.0	73
74	67 51.4	+59.0	24.1	68 46.0	+59.1	25.2	69 40.0	+59.4	26.3	70 33.5	+59.6	27.6	71 26.3	+59.8	29.0	72 18.4	+59.9	30.5	73 09.7	+60.0	32.1	74 00.0	+60.0	34.0	74
75	68 50.4	+58.9	23.6	69 45.1	+59.1	24.7	70 39.4	+59.3	25.9	71 33.1	+59.5	27.2	72 26.1	+59.7	28.7	73 18.3	+59.9	30.3	74 09.7	+59.9	32.0	75 00.0	+60.0	34.0	75
76	69 49.3	+58.7	23.1	70 44.2	+59.0	24.2	71 38.7	+59.2	25.4	72 32.6	+59.4	26.8	73 25.8	+59.6	28.3	74 18.2	+59.8	30.0	75 09.6	+60.0	31.9	76 00.0	+60.0	34.0	76
77	70 48.0	+58.7	22.5	71 43.2	+58.9	23.6	72 37.9	+59.2	24.9	73 32.0	+59.4	26.3	74 25.4	+59.7	27.9	75 18.0	+59.8	29.7	76 09.6	+59.9	31.7	77 00.0	+60.0	34.0	77
78	71 46.7	+58.4	21.8	72 42.1	+58.8	23.0	73 37.1	+59.0	24.3	74 31.4	+59.3	25.8	75 25.1	+59.5	27.5	76 17.8	+59.8	29.4	77 09.5	+60.0	31.5	78 00.0	+60.0	34.0	78
79	72 45.1	+58.3	21.1	73 40.9	+58.6	22.3	74 36.1	+58.9	23.7	75 30.7	+59.3	25.2	76 24.6	+59.5	27.0	77 17.6	+59.7	29.0	78 09.5	+59.9	31.3	79 00.0	+60.0	34.0	79
80	73 43.4	+58.1	20.3	74 39.5	+58.4	21.5	75 35.0	+58.8	23.0	76 30.0	+59.0	24.6	77 24.1	+59.4	26.4	78 17.3	+59.7	28.6	79 09.4	+59.9	31.1	80 00.0	+60.0	34.0	80
81	74 41.5	+57.9	19.4	75 37.9	+58.2	20.6	76 33.8	+58.6	22.1	77 29.0	+59.0	23.8	78 23.5	+59.3	25.8	79 17.0	+59.7	28.1	80 09.3	+59.9	30.8	81 00.0	+60.0	34.0	81
82	75 39.4	+57.5	18.3	76 36.1	+57.9	19.6	77 32.4	+58.3	21.1	78 28.0	+58.7	22.9	79 22.8	+59.2	25.0	80 16.7	+59.5	27.4	81 09.2	+59.9	30.4	82 00.0	+60.0	34.0	82
83	76 36.9	+57.1	17.1	77 34.0	+57.6	18.5	78 30.7	+58.0	20.0	79 26.7	+58.5	21.8	80 22.0	+59.0	24.0	81 16.2	+59.5	26.7	82 09.1	+59.8	29.9	83 00.0	+60.0	34.0	83
84	77 34.0	+56.7	15.8	78 31.6	+57.1	17.1	79 28.7	+57.6	18.7	80 25.2	+58.1	20.6	81 21.0	+58.7	22.9	82 15.7	+59.2	25.7	83 08.9	+59.8	29.3	84 00.0	+60.0	34.0	84
85	78 30.7	+56.0	14.2	79 28.7	+56.5	15.5	80 26.3	+57.0	17.1	81 23.3	+57.7	19.0	82 19.7	+58.3	21.4	83 14.9	+59.1	24.5	84 08.7	+59.6	28.5	85 00.0	+60.0	34.0	85
86	79 26.7	+55.3	12.3	80 25.2	+55.8	13.6	81 23.3	+56.4	15.1	82 21.0	+57.0	17.0	83 18.0	+57.7	19.5	84 14.0	+58.6	22.8	85 08.3	+59.5	27.4	86 00.0	+60.0	34.0	86
87	80 22.0	+54.2	10.1	81 21.0	+54.7	11.2	82 19.7	+55.2	12.7	83 18.0	+56.0	14.5	84 15.7	+56.9	17.0	85 12.6	+57.9	20.5	86 07.8	+59.2	25.7	87 00.0	+60.0	34.0	87
88	81 16.2	+52.9	7.4	82 15.7	+53.2	8.3	83 14.9	+53.8	9.6	84 14.0	*+54.3* •	11.2	85 12.6	*+55.2* •	13.5	86 10.5	*+56.5* •	17.0	87 07.0	*+58.2* •	22.8	88 00.0	+60.0	34.0	88
89	82 09.1	*+50.9* •	4.1	83 08.9	*+51.1* •	4.7	84 08.7	*+51.3* •	5.5	85 08.3	*+51.7* •	6.6	86 07.8	*+52.2* •	8.3	87 07.0	*+53.0* •	11.2	88 05.2	*+54.8* •	17.0	89 00.0	+60.0	34.0	89
90	83 00.0	*+48.2* •	0.0	84 00.0	*+47.9* •	0.0	85 00.0	*+47.5* •	0.0	86 00.0	*+46.8* •	0.0	87 00.0	*+45.5* •	0.0	88 00.0	*+42.1* •	0.0	89 00.0	*+24.9* •	0.0	90 00.0	–60.0	17.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION **L.H.A. 146°, 214°**

35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 43.8	+59.8	144.8	4 54.7	+59.9	144.9	4 05.6	+60.0	144.9	3 16.5	+60.0	144.9	2 27.4	+60.0	145.0	1 38.3	+60.0	145.0	0 49.1	+60.0	145.0	0 00.0	+60.0	145.0	0
1	6 43.6	+59.9	144.7	5 54.6	+59.9	144.8	5 05.6	+59.9	144.8	4 16.5	+59.9	144.9	3 27.4	+60.0	144.9	2 38.3	+60.0	145.0	1 49.1	+60.0	145.0	1 00.0	+60.0	145.0	1
2	7 43.5	+59.8	144.7	6 54.5	+59.9	144.7	6 05.5	+59.9	144.8	5 16.4	+60.0	144.9	4 27.4	+59.9	144.9	3 38.3	+60.0	144.9	2 49.1	+60.0	145.0	2 00.0	+60.0	145.0	2
3	8 43.3	+59.9	144.6	7 54.4	+59.9	144.7	7 05.4	+59.9	144.7	6 16.4	+59.9	144.8	5 27.3	+60.0	144.9	4 38.3	+59.9	144.9	3 49.1	+60.0	145.0	3 00.0	+60.0	145.0	3
4	9 43.2	+59.8	144.5	8 54.3	+59.9	144.6	8 05.3	+60.0	144.7	7 16.3	+60.0	144.8	6 27.3	+60.0	144.8	5 38.2	+60.0	144.9	4 49.1	+60.0	145.0	4 00.0	+60.0	145.0	4
5	10 43.0	+59.9	144.4	9 54.2	+59.9	144.5	9 05.3	+59.9	144.6	8 16.3	+60.0	144.7	7 27.3	+60.0	144.8	6 38.2	+60.0	144.9	5 49.1	+60.0	144.9	5 00.0	+60.0	145.0	5
6	11 42.9	+59.8	144.4	10 54.1	+59.8	144.5	10 05.2	+59.9	144.6	9 16.3	+59.9	144.7	8 27.3	+59.9	144.8	7 38.2	+60.0	144.9	6 49.1	+60.0	144.9	6 00.0	+60.0	145.0	6
7	12 42.7	+59.9	144.3	11 53.9	+59.9	144.4	11 05.1	+59.9	144.5	10 16.2	+60.0	144.6	9 27.2	+60.0	144.8	8 38.2	+60.0	144.8	7 49.1	+60.0	144.9	7 00.0	+60.0	145.0	7
8	13 42.6	+59.8	144.2	12 53.8	+59.9	144.4	12 05.0	+60.0	144.5	11 16.2	+59.9	144.6	10 27.2	+60.0	144.7	9 38.2	+60.0	144.8	8 49.1	+60.0	144.9	8 00.0	+60.0	145.0	8
9	14 42.4	+59.8	144.1	13 53.7	+59.9	144.3	13 05.0	+59.9	144.4	12 16.1	+60.0	144.6	11 27.2	+59.9	144.7	10 38.2	+60.0	144.8	9 49.1	+60.0	144.9	9 00.0	+60.0	145.0	9
10	15 42.2	+59.9	144.1	14 53.6	+59.9	144.2	14 04.9	+59.9	144.4	13 16.1	+59.9	144.5	12 27.1	+60.0	144.7	11 38.2	+60.0	144.8	10 49.1	+60.0	144.9	10 00.0	+60.0	145.0	10
11	16 42.1	+59.8	144.0	15 53.5	+59.9	144.2	15 04.8	+59.9	144.3	14 16.0	+59.9	144.5	13 27.1	+60.0	144.6	12 38.2	+59.9	144.8	11 49.1	+60.0	144.9	11 00.0	+60.0	145.0	11
12	17 41.9	+59.9	143.9	16 53.4	+59.8	144.1	16 04.7	+59.9	144.3	15 15.9	+60.0	144.4	14 27.1	+60.0	144.6	13 38.1	+60.0	144.7	12 49.1	+60.0	144.9	12 00.0	+60.0	145.0	12
13	18 41.8	+59.8	143.8	17 53.2	+59.9	144.0	17 04.6	+59.9	144.2	16 15.9	+59.9	144.4	15 27.1	+59.9	144.6	14 38.1	+60.0	144.7	13 49.1	+60.0	144.9	13 00.0	+60.0	145.0	13
14	19 41.6	+59.8	143.8	18 53.1	+59.9	144.0	18 04.5	+60.0	144.2	17 15.8	+60.0	144.4	16 27.0	+60.0	144.5	15 38.1	+60.0	144.7	14 49.1	+60.0	144.9	14 00.0	+60.0	145.0	14
15	20 41.4	+59.9	143.7	19 53.0	+59.9	143.9	19 04.5	+59.9	144.1	18 15.8	+59.9	144.3	17 27.0	+60.0	144.5	16 38.1	+60.0	144.7	15 49.1	+60.0	144.8	15 00.0	+60.0	145.0	15
16	21 41.3	+59.8	143.6	20 52.9	+59.9	143.8	20 04.4	+59.9	144.1	19 15.7	+60.0	144.3	18 27.0	+59.9	144.5	17 38.1	+60.0	144.7	16 49.1	+60.0	144.8	16 00.0	+60.0	145.0	16
17	22 41.1	+59.8	143.5	21 52.8	+59.8	143.8	21 04.3	+59.9	144.0	20 15.7	+59.9	144.2	19 26.9	+60.0	144.4	18 38.1	+60.0	144.6	17 49.1	+60.0	144.8	17 00.0	+60.0	145.0	17
18	23 40.9	+59.8	143.4	22 52.6	+59.9	143.7	22 04.2	+59.9	143.9	21 15.6	+60.0	144.2	20 26.9	+60.0	144.4	19 38.1	+60.0	144.6	18 49.1	+60.0	144.8	18 00.0	+60.0	145.0	18
19	24 40.7	+59.9	143.4	23 52.5	+59.9	143.6	23 04.1	+59.9	143.9	22 15.6	+59.9	144.1	21 26.9	+60.0	144.4	20 38.1	+59.9	144.6	19 49.1	+60.0	144.8	19 00.0	+60.0	145.0	19
20	25 40.6	+59.8	143.3	24 52.4	+59.8	143.6	24 04.0	+59.9	143.8	23 15.5	+60.0	144.1	22 26.9	+59.9	144.3	21 38.0	+60.0	144.6	20 49.1	+60.0	144.8	20 00.0	+60.0	145.0	20
21	26 40.4	+59.8	143.2	25 52.2	+59.9	143.5	25 03.9	+59.9	143.8	24 15.5	+59.9	144.0	23 26.8	+60.0	144.3	22 38.0	+60.0	144.5	21 49.1	+60.0	144.8	21 00.0	+60.0	145.0	21
22	27 40.2	+59.8	143.1	26 52.1	+59.9	143.4	26 03.8	+60.0	143.7	25 15.4	+59.9	144.0	24 26.8	+60.0	144.3	23 38.0	+60.0	144.5	22 49.1	+60.0	144.8	22 00.0	+60.0	145.0	22
23	28 40.0	+59.8	143.0	27 52.0	+59.8	143.3	27 03.8	+59.9	143.6	26 15.3	+60.0	143.9	25 26.8	+59.9	144.2	24 38.0	+60.0	144.5	23 49.1	+60.0	144.8	23 00.0	+60.0	145.0	23
24	29 39.8	+59.8	142.9	28 51.8	+59.9	143.3	28 03.7	+59.9	143.6	27 15.3	+59.9	143.9	26 26.7	+60.0	144.2	25 38.0	+60.0	144.5	24 49.1	+60.0	144.7	24 00.0	+60.0	145.0	24
25	30 39.6	+59.8	142.8	29 51.7	+59.8	143.2	29 03.6	+59.9	143.5	28 15.2	+60.0	143.8	27 26.7	+60.0	144.1	26 38.0	+60.0	144.4	25 49.1	+60.0	144.7	25 00.0	+60.0	145.0	25
26	31 39.4	+59.8	142.7	30 51.5	+59.9	143.1	30 03.5	+59.9	143.4	29 15.2	+59.9	143.8	28 26.7	+59.9	144.1	27 38.0	+59.9	144.4	26 49.1	+60.0	144.7	26 00.0	+60.0	145.0	26
27	32 39.2	+59.8	142.6	31 51.4	+59.8	143.0	31 03.4	+59.9	143.4	30 15.1	+59.9	143.7	29 26.6	+60.0	144.1	28 37.9	+60.0	144.4	27 49.1	+60.0	144.7	27 00.0	+60.0	145.0	27
28	33 39.0	+59.8	142.5	32 51.2	+59.9	142.9	32 03.3	+59.8	143.3	31 15.0	+60.0	143.7	30 26.6	+59.9	144.0	29 37.9	+60.0	144.4	28 49.1	+60.0	144.7	28 00.0	+60.0	145.0	28
29	34 38.8	+59.8	142.4	33 51.1	+59.8	142.8	33 03.1	+59.9	143.2	32 15.0	+59.9	143.6	31 26.5	+60.0	144.0	30 37.9	+60.0	144.3	29 49.1	+59.9	144.7	29 00.0	+60.0	145.0	29
30	35 38.6	+59.7	142.3	34 50.9	+59.9	142.8	34 03.0	+59.9	143.2	33 14.9	+59.9	143.6	32 26.5	+60.0	143.9	31 37.9	+60.0	144.3	30 49.0	+60.0	144.7	30 00.0	+60.0	145.0	30
31	36 38.3	+59.8	142.2	35 50.8	+59.8	142.7	35 02.9	+59.9	143.1	34 14.8	+60.0	143.5	33 26.5	+59.9	143.9	32 37.9	+60.0	144.3	31 49.0	+60.0	144.6	31 00.0	+60.0	145.0	31
32	37 38.1	+59.8	142.1	36 50.6	+59.8	142.6	36 02.8	+59.9	143.0	35 14.8	+59.9	143.4	34 26.4	+60.0	143.9	33 37.9	+59.9	144.3	32 49.0	+60.0	144.6	32 00.0	+60.0	145.0	32
33	38 37.9	+59.7	142.0	37 50.4	+59.9	142.5	37 02.7	+59.9	142.9	36 14.7	+59.9	143.4	35 26.4	+59.9	143.8	34 37.8	+60.0	144.2	33 49.0	+60.0	144.6	33 00.0	+60.0	145.0	33
34	39 37.6	+59.8	141.9	38 50.3	+59.8	142.4	38 02.6	+59.9	142.9	37 14.6	+59.9	143.3	36 26.3	+60.0	143.8	35 37.8	+60.0	144.2	34 49.0	+60.0	144.6	34 00.0	+60.0	145.0	34
35	40 37.4	+59.7	141.8	39 50.1	+59.8	142.3	39 02.5	+59.8	142.8	38 14.5	+60.0	143.3	37 26.3	+60.0	143.7	36 37.8	+60.0	144.2	35 49.0	+60.0	144.6	35 00.0	+60.0	145.0	35
36	41 37.1	+59.7	141.6	40 49.9	+59.8	142.2	40 02.3	+59.9	142.7	39 14.5	+59.9	143.2	38 26.3	+59.9	143.7	37 37.8	+60.0	144.1	36 49.0	+60.0	144.6	36 00.0	+60.0	145.0	36
37	42 36.8	+59.8	141.5	41 49.7	+59.8	142.1	41 02.2	+59.9	142.6	40 14.4	+59.9	143.1	39 26.2	+60.0	143.6	38 37.8	+59.9	144.1	37 49.0	+60.0	144.6	37 00.0	+60.0	145.0	37
38	43 36.6	+59.7	141.4	42 49.5	+59.8	142.0	42 02.1	+59.8	142.5	41 14.3	+59.9	143.1	40 26.2	+59.9	143.6	39 37.7	+60.0	144.1	38 49.0	+60.0	144.5	38 00.0	+60.0	145.0	38
39	44 36.3	+59.7	141.2	43 49.3	+59.8	141.8	43 01.9	+59.9	142.4	42 14.2	+59.9	143.0	41 26.1	+60.0	143.5	40 37.7	+60.0	144.0	39 49.0	+60.0	144.5	39 00.0	+60.0	145.0	39
40	45 36.0	+59.7	141.1	44 49.1	+59.8	141.7	44 01.8	+59.8	142.3	43 14.1	+59.9	142.9	42 26.1	+59.9	143.5	41 37.7	+60.0	144.0	40 49.0	+60.0	144.5	40 00.0	+60.0	145.0	40
41	46 35.7	+59.7	141.0	45 48.9	+59.7	141.6	45 01.6	+59.9	142.2	44 14.0	+59.9	142.8	43 26.0	+60.0	143.4	42 37.7	+60.0	144.0	41 49.0	+60.0	144.5	41 00.0	+60.0	145.0	41
42	47 35.4	+59.6	140.8	46 48.6	+59.8	141.5	46 01.5	+59.8	142.1	45 13.9	+59.9	142.8	44 26.0	+59.9	143.3	43 37.7	+59.9	143.9	42 49.0	+60.0	144.5	42 00.0	+60.0	145.0	42
43	48 35.0	+59.7	140.6	47 48.4	+59.8	141.3	47 01.3	+59.9	142.0	46 13.8	+59.9	142.7	45 25.9	+60.0	143.3	44 37.6	+60.0	143.9	43 49.0	+60.0	144.5	43 00.0	+60.0	145.0	43
44	49 34.7	+59.6	140.5	48 48.2	+59.7	141.2	48 01.2	+59.8	141.9	47 13.7	+59.9	142.6	46 25.9	+59.9	143.2	45 37.6	+60.0	143.8	44 49.0	+60.0	144.4	44 00.0	+60.0	145.0	44
45	50 34.3	+59.7	140.3	49 47.9	+59.7	141.1	49 01.0	+59.8	141.8	48 13.6	+59.9	142.5	47 25.8	+59.9	143.2	46 37.6	+60.0	143.8	45 49.0	+60.0	144.4	45 00.0	+60.0	145.0	45
46	51 34.0	+59.6	140.1	50 47.6	+59.8	140.9	50 00.8	+59.8	141.7	49 13.5	+59.9	142.4	48 25.7	+60.0	143.1	47 37.6	+59.9	143.8	46 49.0	+60.0	144.4	46 00.0	+60.0	145.0	46
47	52 33.6	+59.6	140.0	51 47.4	+59.7	140.8	51 00.6	+59.8	141.6	50 13.4	+59.9	142.3	49 25.7	+59.9	143.0	48 37.5	+60.0	143.7	47 49.0	+60.0	144.4	47 00.0	+60.0	145.0	47
48	53 33.2	+59.5	139.8	52 47.1	+59.7	140.6	52 00.4	+59.8	141.4	51 13.3	+59.8	142.2	50 25.6	+59.9	143.0	49 37.5	+60.0	143.7	48 49.0	+59.9	144.3	48 00.0	+60.0	145.0	48
49	54 32.7	+59.6	139.6	53 46.8	+59.7	140.4	53 00.2	+59.8	141.3	52 13.1	+59.9	142.1	51 25.5	+60.0	142.9	50 37.5	+59.9	143.6	49 48.9	+60.0	144.3	49 00.0	+60.0	145.0	49
50	55 32.3	+59.5	139.3	54 46.5	+59.6	140.3	54 00.0	+59.8	141.2	53 13.0	+59.9	142.0	52 25.5	+59.9	142.8	51 37.4	+60.0	143.6	50 48.9	+60.0	144.3	50 00.0	+60.0	145.0	50
51	56 31.8	+59.5	139.1	55 46.1	+59.7	140.1	54 59.8	+59.8	141.0	54 12.9	+59.8	141.9	53 25.4	+59.9	142.7	52 37.4	+60.0	143.5	51 48.9	+60.0	144.3	51 00.0	+60.0	145.0	51
52	57 31.3	+59.5	138.9	56 45.8	+59.6	139.9	55 59.6	+59.7	140.8	55 12.7	+59.9	141.8	54 25.3	+59.9	142.6	53 37.4	+59.9	143.5	52 48.9	+60.0	144.2	52 00.0	+60.0	145.0	52
53	58 30.8	+59.4	138.6	57 45.4	+59.6	139.7	56 59.3	+59.8	140.7	56 12.6	+59.8	141.6	55 25.2	+60.0	142.5	54 37.3	+60.0	143.4	53 48.9	+60.0	144.2	53 00.0	+60.0	145.0	53
54	59 30.2	+59.5	138.4	58 45.0	+59.6	139.5	57 59.1	+59.7	140.5	57 12.4	+59.9	141.5	56 25.2	+59.9	142.4	55 37.3	+60.0	143.3	54 48.9	+60.0	144.2	54 00.0	+60.0	145.0	54
55	60 29.7	+59.3	138.1	59 44.6	+59.6	139.2	58 58.8	+59.7	140.3	58 12.3	+59.8	141.4	57 25.1	+59.9	142.3	56 37.3	+59.9	143.3	55 48.9	+60.0	144.2	55 00.0	+60.0	145.0	55
56	61 29.0	+59.4	137.8	60 44.2	+59.5	139.0	59 58.5	+59.7	140.1	59 12.1	+59.8	141.2	58 25.0	+59.9	142.2	57 37.2	+60.0	143.2	56 48.9	+60.0	144.1	56 00.0	+60.0	145.0	56
57	62 28.4	+59.2	137.5	61 43.7	+59.5	138.7	60 58.2	+59.7	139.9	60 11.9	+59.8	141.1	59 24.9	+59.9	142.1	58 37.2	+59.9	143.1	57 48.9	+60.0	144.1	57 00.0	+60.0	145.0	57
58	63 27.6	+59.3	137.1	62 43.2	+59.5	138.5	61 57.9	+59.6	139.7	61 11.7	+59.8	140.9	60 24.8	+59.8	142.0	59 37.1	+60.0	143.1	58 48.9	+60.0	144.1	58 00.0	+60.0	145.0	58
59	64 26.9	+59.2	136.8	63 42.7	+59.4	138.2	62 57.5	+59.6	139.5	62 11.5	+59.7	140.7	61 24.6	+59.9	141.9	60 37.1	+59.9	143.0	59 48.9	+59.9	144.0	59 00.0	+60.0	145.0	59
60	65 26.1	+59.1	136.4	64 42.1	+59.4	137.8	63 57.1	+59.6	139.2	63 11.2	+59.8	140.5	62 24.5	+59.9	141.7	61 37.0	+60.0	142.9	60 48.8	+60.0	144.0	60 00.0	+60.0	145.0	60
61	66 25.2	+59.0	136.0	65 41.5	+59.3	137.5	64 56.7	+59.6	139.0	64 11.0	+59.7	140.3	63 24.4	+59.9	141.6	62 37.0	+59.9	142.8	61 48.8	+60.0	143.9	61 00.0	+60.0	145.0	61
62	67 24.2	+59.0	135.5	66 40.8	+59.3	137.1	65 56.3	+59.5	138.7	65 10.7	+59.7	140.1	64 24.3	+59.8	141.4	63 36.9	+60.0	142.7	62 48.8	+60.0	143.9	62 00.0	+60.0	145.0	62
63	68 23.2	+58.8	135.0	67 40.1	+59.2	136.7	66 55.8	+59.5	138.4	66 10.4	+59.7	139.9	65 24.1	+59.8	141.3	64 36.9	+59.9	142.6	63 48.8	+60.0	143.8	63 00.0	+60.0	145.0	63
64	69 22.0	+58.8	134.5	68 39.3	+59.1	136.3	67 55.3	+59.4	138.0	67 10.1	+59.7	139.6	66 23.9	+59.9	141.1	65 36.8	+59.9	142.5	64 48.8	+60.0	143.8	64 00.0	+60.0	145.0	64
65	70 20.8	+58.6	133.9	69 38.4	+59.1	135.8	68 54.7	+59.4	137.6	68 09.8	+59.6	139.3	67 23.8	+59.8	140.9	66 36.7	+59.9	142.4	65 48.8	+59.9	143.7	65 00.0	+60.0	145.0	65
66	71 19.4	+58.5	133.2	70 37.5	+59.0	135.3	69 54.1	+59.4	137.2	69 09.4	+59.6	139.0	68 23.6	+59.8	140.7	67 36.6	+60.0	142.2	66 48.7	+60.0	143.7	66 00.0	+60.0	145.0	66
67	72 17.9	+58.3	132.5	71 36.5	+58.8	134.7	70 53.5	+59.2	136.8	70 09.0	+59.6	138.7	69 23.4	+59.7	140.5	68 36.6	+59.9	142.1	67 48.7	+60.0	143.6	67 00.0	+60.0	145.0	67
68	73 16.2	+58.1	131.7	72 35.3	+58.7	134.1	71 52.7	+59.2	136.3	71 08.6	+59.5	138.3	70 23.1	+59.8	140.2	69 36.5	+59.9	141.9	68 48.7	+60.0	143.5	68 00.0	+60.0	145.0	68
69	74 14.3	+57.8	130.8	73 34.0	+58.6	133.4	72 51.9	+59.1	135.8	72 08.1	+59.5	137.9	71 22.9	+59.7	139.9	70 36.4	+59.8	141.8	69 48.7	+60.0	143.4	69 00.0	+60.0	145.0	69
70	75 12.1	+57.6	129.8	74 32.6	+58.3	132.6	73 51.0	+58.9	135.1	73 07.6	+59.4	137.5	72 22.6	+59.7	139.6	71 36.2	+59.9	141.6	70 48.7	+59.9	143.4	70 00.0	+60.0	145.0	70
71	76 09.7	+57.2	128.7	75 30.9	+58.2	131.7	74 49.9	+58.9	134.5	74 07.0	+59.3	137.0	73 22.3	+59.6	139.3	72 36.1	+59.9	141.4	71 48.6	+60.0	143.3	71 00.0	+60.0	145.0	71
72	77 06.9	+56.7	127.4	76 29.1	+57.8	130.7	75 48.8	+58.6	133.7	75 06.3	+59.2	136.4	74 21.9	+59.6	138.9	73 36.0	+59.8	141.1	72 48.6	+60.0	143.1	72 00.0	+60.0	145.0	72
73	78 03.6	+56.2	125.8	77 26.9	+57.5	129.5	76 47.4	+58.4	132.8	76 05.5	+59.1	135.8	75 21.5	+59.6	138.4	74 35.8	+59.8	140.8	73 48.6	+59.9	143.0	73 00.0	+60.0	145.0	73
74	78 59.8	+55.4	124.1	78 24.4	+57.0	128.1	77 45.8	+58.2	131.8	77 04.6	+59.0	135.0	76 21.1	+59.5	137.9	75 35.6	+59.8	140.5	74 48.5	+60.0	142.9	74 00.0	+60.0	145.0	74
75	79 55.2	+54.5	122.0	79 21.4	+56.4	126.5	78 44.0	+57.8	130.6	78 03.6	+58.7	134.2	77 20.6	+59.3	137.4	76 35.4	+59.8	140.2	75 48.5	+59.9	142.7	75 00.0	+60.0	145.0	75
76	80 49.7	+53.2	119.5	80 17.8	+55.7	124.6	79 41.8	+57.4	129.1	79 02.3	+58.5	133.1	78 19.9	+59.3	136.7	77 35.2	+59.7	139.8	76 48.4	+60.0	142.6	76 00.0	+60.0	145.0	76
77	81 42.9	+51.5	•116.4	81 13.5	+54.6	122.3	80 39.2	+56.7	127.4	80 00.8	+58.3	131.9	79 19.2	+59.1	135.9	78 34.9	+59.7	139.3	77 48.4	+59.9	142.3	77 00.0	+60.0	145.0	77
78	82 34.4	+49.2	•112.7	82 08.1	+53.1	119.4	81 35.9	+55.9	125.3	80 59.1	+57.7	130.4	80 18.3	+59.0	134.9	79 34.6	+59.5	138.8	78 48.3	+59.9	142.1	78 00.0	+60.0	145.0	78
79	83 23.6	+45.7	•108.0	83 01.2	+51.0	•115.8	82 31.8	+54.7	122.7	81 56.8	+57.2	128.6	81 17.3	+58.6	133.7	80 34.1	+59.5	138.1	79 48.2	+59.9	141.8	79 00.0	+60.0	145.0	79
80	84 09.3	+40.9	•102.0	83 52.2	+47.9	•111.1	83 26.5	+53.0	•119.3	82 54.0	+56.2	126.3	82 15.9	+58.3	132.3	81 33.6	+59.4	137.3	80 48.1	+59.9	141.5	80 00.0	+60.0	145.0	80
81	84 50.2	+33.9	• 94.3	84 40.1	+43.1	•105.1	84 19.5	+50.2	•114.9	83 50.2	+54.9	123.3	83 14.2	+57.7	130.4	82 33.0	+59.2	136.2	81 48.0	+59.8	141.0	81 00.0	+60.0	145.0	81
82	85 24.1	+23.9	• 84.6	85 23.2	+35.8	• 97.0	85 09.7	+45.7	•108.9	84 45.1	+52.7	•119.2	84 11.9	+56.7	127.8	83 32.2	+58.9	134.8	82 47.8	+59.8	140.5	82 00.0	+60.0	145.0	82
83	85 48.0	+11.0	• 72.6	85 59.0	+24.9	• 86.3	85 55.4	+38.3	•100.5	85 37.8	+48.7	•113.5	85 08.6	+55.2	•124.3	84 31.1	+58.3	133.0	83 47.6	+59.7	139.7	83 00.0	+60.0	145.0	83
84	85 59.0	−3.6	• 58.9	86 23.9	+9.8	• 72.6	86 33.7	+26.1	• 88.7	86 26.5	+41.5	•105.0	86 03.8	+52.1	•119.2	85 29.4	+57.5	130.3	84 47.3	+59.5	138.7	84 00.0	+60.0	145.0	84
85	85 55.4	−17.6	• 44.7	86 33.7	−7.2	• 56.5	86 59.8	+8.2	• 72.6	87 08.0	+27.8	• 92.0	86 55.9	+45.5	•111.0	86 26.9	+55.6	•126.2	85 46.8	+59.3	137.2	85 00.0	+60.0	145.0	85
86	85 37.8	−29.2	• 31.7	86 26.5	−22.7	• 40.1	87 08.0	−12.1	• 53.1	87 35.8	+5.6	• 72.5	87 41.4	+30.4	• 96.9	87 22.5	+50.7	•119.1	86 46.1	+58.6	134.8	86 00.0	+60.0	145.0	86
87	85 08.6	−37.5	• 20.8	86 03.8	−34.4	• 25.9	86 55.9	−29.0	• 34.1	87 41.4	−18.9	• 48.1	88 11.8	+1.4	• 72.5	88 13.2	+34.6	•104.9	87 44.7	+56.5	•130.3	87 00.0	+60.0	145.0	87
88	84 31.1	−43.5	• 12.1	85 29.4	−42.1	• 14.7	86 26.9	−40.1	• 18.9	87 22.5	−36.4	• 25.9	88 13.2	−28.5	• 40.1	88 47.8	−6.6	• 72.5	88 41.2	+42.7	•119.1	88 00.0	+60.0	145.0	88
89	83 47.6	−47.6	• 5.3	84 47.3	−47.3	• 6.3	85 46.8	−46.8	• 7.8	86 46.1	−46.1	• 10.2	87 44.7	−44.7	• 14.7	88 41.2	−41.2	• 25.9	89 23.9	−23.9	• 72.5	89 00.0	+60.0	145.0	89
90	83 00.0	−50.4	• 0.0	84 00.0	−50.6	• 0.0	85 00.0	−50.8	• 0.0	86 00.0	−51.2	• 0.0	87 00.0	−51.7	• 0.0	88 00.0	−52.6	• 0.0	89 00.0	−54.4	• 0.0	90 00.0	−60.0	72.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 35°, 325°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 43.8	–59.9	144.8	4 54.7	–59.9	144.9	4 05.6	–59.9	144.9	3 16.5	–59.9	144.9	2 27.4	–59.9	145.0	1 38.3	–60.0	145.0	0 49.1	–59.9	145.0	0 00.0	+60.0	35.0	**0**
1	4 43.9	–59.8	144.9	3 54.8	–59.9	144.9	3 05.7	–59.9	144.9	2 16.6	–60.0	145.0	1 27.5	–60.0	145.0	0 38.3	–60.0	145.0	0 10.8	+60.0	35.0	1 00.0	+60.0	35.0	**1**
2	3 44.1	–59.9	144.9	2 54.9	–59.9	145.0	2 05.8	–59.9	145.0	1 16.6	–59.9	145.0	0 27.5	–60.0	145.0	0 21.7	+60.0	35.0	1 10.8	+60.0	35.0	2 00.0	+60.0	35.0	**2**
3	2 44.2	–59.8	145.0	1 55.0	–59.9	145.0	1 05.9	–60.0	145.0	0 16.7	–60.0	145.1	0 32.5	+60.0	34.9	1 21.7	+60.0	35.0	2 10.8	+60.0	35.0	3 00.0	+60.0	35.0	**3**
4	1 44.4	–59.9	145.1	0 55.1	–59.8	145.1	0 05.9	–59.9	145.1	0 43.3	+59.9	34.9	1 32.5	+59.9	34.9	2 21.7	+59.9	34.9	3 10.8	+60.0	35.0	4 00.0	+60.0	35.0	**4**
5	0 44.5	–59.9	145.1	0 04.7	+59.9	34.8	0 54.0	+59.9	34.9	1 43.2	+60.0	34.9	2 32.4	+60.0	34.9	3 21.6	+60.0	34.9	4 10.8	+60.0	35.0	5 00.0	+60.0	35.0	**5**
6	0 15.4	+59.8	34.8	1 04.6	+59.9	34.8	1 53.9	+59.9	34.8	2 43.2	+59.9	34.8	3 32.4	+60.0	34.9	4 21.6	+60.0	34.9	5 10.8	+60.0	34.9	6 00.0	+60.0	35.0	**6**
7	1 15.2	+59.9	34.7	2 04.5	+59.9	34.7	2 53.8	+60.0	34.8	3 43.1	+60.0	34.8	4 32.4	+60.0	34.8	5 21.6	+60.0	34.9	6 10.8	+60.0	34.9	7 00.0	+60.0	35.0	**7**
8	2 15.1	+59.8	34.6	3 04.4	+59.9	34.7	3 53.8	+59.9	34.7	4 43.1	+59.9	34.7	5 32.4	+59.9	34.8	6 21.6	+60.0	34.9	7 10.8	+60.0	34.9	8 00.0	+60.0	35.0	**8**
9	3 14.9	+59.9	34.6	4 04.3	+59.9	34.6	4 53.7	+59.9	34.7	5 43.0	+60.0	34.7	6 32.3	+60.0	34.8	7 21.6	+60.0	34.8	8 10.8	+60.0	34.9	9 00.0	+60.0	35.0	**9**
10	4 14.8	+59.8	34.5	5 04.2	+59.9	34.5	5 53.6	+59.9	34.6	6 43.0	+59.9	34.7	7 32.3	+60.0	34.7	8 21.6	+60.0	34.8	9 10.8	+60.0	34.9	10 00.0	+60.0	35.0	**10**
11	5 14.6	+59.9	34.4	6 04.1	+59.9	34.5	6 53.5	+60.0	34.6	7 42.9	+60.0	34.6	8 32.3	+59.9	34.7	9 21.6	+60.0	34.8	10 10.8	+60.0	34.9	11 00.0	+60.0	35.0	**11**
12	6 14.5	+59.8	34.4	7 04.0	+59.9	34.4	7 53.5	+59.9	34.5	8 42.9	+59.9	34.6	9 32.2	+60.0	34.7	10 21.6	+60.0	34.8	11 10.8	+60.0	34.9	12 00.0	+60.0	35.0	**12**
13	7 14.3	+59.9	34.3	8 03.9	+59.9	34.4	8 53.4	+59.9	34.4	9 42.8	+60.0	34.5	10 32.2	+60.0	34.6	11 21.6	+59.9	34.8	12 10.8	+60.0	34.9	13 00.0	+60.0	35.0	**13**
14	8 14.2	+59.8	34.2	9 03.8	+59.9	34.3	9 53.3	+59.9	34.4	10 42.8	+59.9	34.5	11 32.2	+60.0	34.6	12 21.5	+60.0	34.7	13 10.8	+60.0	34.9	14 00.0	+60.0	35.0	**14**
15	9 14.0	+59.9	34.1	10 03.7	+59.8	34.2	10 53.2	+59.9	34.3	11 42.7	+60.0	34.5	12 32.2	+59.9	34.6	13 21.5	+60.0	34.7	14 10.8	+60.0	34.9	15 00.0	+60.0	35.0	**15**
16	10 13.9	+59.8	34.1	11 03.5	+59.9	34.2	11 53.1	+60.0	34.3	12 42.7	+59.9	34.4	13 32.1	+60.0	34.5	14 21.5	+60.0	34.7	15 10.8	+60.0	34.8	16 00.0	+60.0	35.0	**16**
17	11 13.7	+59.9	34.0	12 03.4	+59.9	34.1	12 53.1	+59.9	34.2	13 42.6	+60.0	34.4	14 32.1	+60.0	34.5	15 21.5	+60.0	34.7	16 10.8	+60.0	34.8	17 00.0	+60.0	35.0	**17**
18	12 13.6	+59.8	33.9	13 03.3	+59.9	34.1	13 53.0	+59.9	34.2	14 42.6	+59.9	34.3	15 32.1	+59.9	34.5	16 21.5	+60.0	34.6	17 10.8	+60.0	34.8	18 00.0	+60.0	35.0	**18**
19	13 13.4	+59.9	33.9	14 03.2	+59.9	34.0	14 52.9	+59.9	34.1	15 42.5	+60.0	34.3	16 32.0	+60.0	34.5	17 21.5	+60.0	34.6	18 10.8	+60.0	34.8	19 00.0	+60.0	35.0	**19**
20	14 13.3	+59.8	33.8	15 03.1	+59.9	33.9	15 52.8	+59.9	34.1	16 42.5	+59.9	34.2	17 32.0	+60.0	34.4	18 21.5	+59.9	34.6	19 10.8	+60.0	34.8	20 00.0	+60.0	35.0	**20**
21	15 13.1	+59.8	33.7	16 03.0	+59.9	33.9	16 52.7	+60.0	34.0	17 42.4	+60.0	34.2	18 32.0	+60.0	34.4	19 21.4	+60.0	34.6	20 10.8	+60.0	34.8	21 00.0	+60.0	35.0	**21**
22	16 12.9	+59.9	33.6	17 02.9	+59.8	33.8	17 52.7	+59.9	34.0	18 42.4	+59.9	34.2	19 32.0	+59.9	34.4	20 21.4	+60.0	34.6	21 10.8	+60.0	34.8	22 00.0	+60.0	35.0	**22**
23	17 12.8	+59.8	33.6	18 02.7	+59.9	33.7	18 52.6	+59.9	33.9	19 42.3	+60.0	34.1	20 31.9	+60.0	34.3	21 21.4	+60.0	34.5	22 10.8	+60.0	34.8	23 00.0	+60.0	35.0	**23**
24	18 12.6	+59.9	33.5	19 02.6	+59.9	33.7	19 52.5	+59.9	33.9	20 42.3	+59.9	34.1	21 31.9	+60.0	34.3	22 21.4	+60.0	34.5	23 10.8	+60.0	34.8	24 00.0	+60.0	35.0	**24**
25	19 12.5	+59.8	33.4	20 02.5	+59.9	33.6	20 52.4	+59.9	33.8	21 42.2	+59.9	34.0	22 31.9	+59.9	34.2	23 21.4	+60.0	34.5	24 10.8	+60.0	34.7	25 00.0	+60.0	35.0	**25**
26	20 12.3	+59.8	33.3	21 02.4	+59.8	33.5	21 52.3	+59.9	33.7	22 42.1	+60.0	34.0	23 31.8	+60.0	34.2	24 21.4	+60.0	34.5	25 10.8	+60.0	34.7	26 00.0	+60.0	35.0	**26**
27	21 12.1	+59.9	33.2	22 02.2	+59.9	33.5	22 52.2	+59.9	33.7	23 42.1	+59.9	33.9	24 31.8	+60.0	34.2	25 21.4	+59.9	34.4	26 10.8	+60.0	34.7	27 00.0	+60.0	35.0	**27**
28	22 12.0	+59.8	33.2	23 02.1	+59.9	33.4	23 52.1	+60.0	33.6	24 42.0	+60.0	33.9	25 31.8	+59.9	34.1	26 21.3	+60.0	34.4	27 10.8	+60.0	34.7	28 00.0	+60.0	35.0	**28**
29	23 11.8	+59.8	33.1	24 02.0	+59.9	33.3	24 52.1	+59.9	33.6	25 42.0	+59.9	33.8	26 31.7	+60.0	34.1	27 21.3	+60.0	34.4	28 10.8	+60.0	34.7	29 00.0	+60.0	35.0	**29**
30	24 11.6	+59.8	33.0	25 01.9	+59.8	33.2	25 52.0	+59.9	33.5	26 41.9	+60.0	33.8	27 31.7	+60.0	34.1	28 21.3	+60.0	34.4	29 10.8	+59.9	34.7	30 00.0	+60.0	35.0	**30**
31	25 11.4	+59.8	32.9	26 01.7	+59.9	33.2	26 51.9	+59.9	33.4	27 41.9	+59.9	33.7	28 31.7	+59.9	34.0	29 21.3	+60.0	34.3	30 10.7	+60.0	34.7	31 00.0	+60.0	35.0	**31**
32	26 11.2	+59.9	32.8	27 01.6	+59.9	33.1	27 51.8	+59.9	33.4	28 41.8	+59.9	33.7	29 31.6	+60.0	34.0	30 21.3	+60.0	34.3	31 10.7	+60.0	34.6	32 00.0	+60.0	35.0	**32**
33	27 11.1	+59.8	32.7	28 01.5	+59.8	33.0	28 51.7	+59.9	33.3	29 41.7	+60.0	33.6	30 31.6	+60.0	33.9	31 21.3	+60.0	34.3	32 10.7	+60.0	34.6	33 00.0	+60.0	35.0	**33**
34	28 10.9	+59.8	32.6	29 01.3	+59.9	32.9	29 51.6	+59.9	33.3	30 41.7	+59.9	33.6	31 31.6	+59.9	33.9	32 21.3	+59.9	34.3	33 10.7	+60.0	34.6	34 00.0	+60.0	35.0	**34**
35	29 10.7	+59.8	32.6	30 01.2	+59.8	32.9	30 51.5	+59.9	33.2	31 41.6	+59.9	33.5	32 31.5	+60.0	33.9	33 21.2	+60.0	34.2	34 10.7	+60.0	34.6	35 00.0	+60.0	35.0	**35**
36	30 10.5	+59.8	32.5	31 01.0	+59.9	32.8	31 51.4	+59.9	33.1	32 41.5	+60.0	33.5	33 31.5	+59.9	33.8	34 21.2	+60.0	34.2	35 10.7	+60.0	34.6	36 00.0	+60.0	35.0	**36**
37	31 10.3	+59.8	32.4	32 00.9	+59.8	32.7	32 51.3	+59.9	33.0	33 41.5	+59.9	33.4	34 31.4	+60.0	33.8	35 21.2	+60.0	34.2	36 10.7	+60.0	34.6	37 00.0	+60.0	35.0	**37**
38	32 10.1	+59.8	32.3	33 00.7	+59.9	32.6	33 51.2	+59.9	33.0	34 41.4	+59.9	33.3	35 31.4	+60.0	33.7	36 21.2	+60.0	34.1	37 10.7	+60.0	34.6	38 00.0	+60.0	35.0	**38**
39	33 09.9	+59.8	32.2	34 00.6	+59.8	32.5	34 51.1	+59.8	32.9	35 41.3	+59.9	33.3	36 31.4	+59.9	33.7	37 21.2	+59.9	34.1	38 10.7	+60.0	34.5	39 00.0	+60.0	35.0	**39**
40	34 09.7	+59.8	32.1	35 00.4	+59.8	32.4	35 50.9	+59.9	32.8	36 41.2	+60.0	33.2	37 31.3	+60.0	33.6	38 21.1	+60.0	34.1	39 10.7	+60.0	34.5	40 00.0	+60.0	35.0	**40**
41	35 09.5	+59.7	32.0	36 00.2	+59.9	32.4	36 50.8	+59.9	32.7	37 41.2	+59.9	33.2	38 31.3	+59.9	33.6	39 21.1	+60.0	34.0	40 10.7	+60.0	34.5	41 00.0	+60.0	35.0	**41**
42	36 09.2	+59.8	31.9	37 00.1	+59.8	32.3	37 50.7	+59.9	32.7	38 41.1	+59.9	33.1	39 31.2	+60.0	33.5	40 21.1	+60.0	34.0	41 10.7	+60.0	34.5	42 00.0	+60.0	35.0	**42**
43	37 09.0	+59.8	31.8	37 59.9	+59.8	32.2	38 50.6	+59.9	32.6	39 41.0	+59.9	33.0	40 31.2	+59.9	33.5	41 21.1	+60.0	34.0	42 10.7	+60.0	34.5	43 00.0	+60.0	35.0	**43**
44	38 08.8	+59.7	31.6	38 59.7	+59.9	32.1	39 50.5	+59.8	32.5	40 40.9	+59.9	33.0	41 31.1	+60.0	33.4	42 21.1	+59.9	33.9	43 10.7	+60.0	34.5	44 00.0	+60.0	35.0	**44**
45	39 08.5	+59.8	31.5	39 59.6	+59.8	32.0	40 50.3	+59.9	32.4	41 40.8	+60.0	32.9	42 31.1	+59.9	33.4	43 21.0	+60.0	33.9	44 10.7	+60.0	34.4	45 00.0	+60.0	35.0	**45**
46	40 08.3	+59.7	31.4	40 59.4	+59.8	31.9	41 50.2	+59.9	32.3	42 40.8	+59.9	32.8	43 31.0	+60.0	33.3	44 21.0	+60.0	33.9	45 10.7	+60.0	34.4	46 00.0	+60.0	35.0	**46**
47	41 08.0	+59.8	31.3	41 59.2	+59.8	31.8	42 50.1	+59.8	32.2	43 40.7	+59.9	32.7	44 31.0	+59.9	33.3	45 21.0	+60.0	33.8	46 10.7	+60.0	34.4	47 00.0	+60.0	35.0	**47**
48	42 07.8	+59.7	31.2	42 59.0	+59.8	31.6	43 49.9	+59.9	32.1	44 40.6	+59.9	32.7	45 30.9	+60.0	33.2	46 21.0	+59.9	33.8	47 10.7	+60.0	34.4	48 00.0	+60.0	35.0	**48**
49	43 07.5	+59.7	31.0	43 58.8	+59.8	31.5	44 49.8	+59.8	32.0	45 40.5	+59.9	32.6	46 30.9	+59.9	33.1	47 20.9	+60.0	33.7	48 10.7	+59.9	34.4	49 00.0	+60.0	35.0	**49**
50	44 07.2	+59.7	30.9	44 58.6	+59.7	31.4	45 49.6	+59.9	31.9	46 40.4	+59.9	32.5	47 30.8	+60.0	33.1	48 20.9	+60.0	33.7	49 10.6	+60.0	34.3	50 00.0	+60.0	35.0	**50**
51	45 06.9	+59.7	30.8	45 58.3	+59.8	31.3	46 49.5	+59.8	31.8	47 40.3	+59.9	32.4	48 30.8	+59.9	33.0	49 20.9	+60.0	33.6	50 10.6	+60.0	34.3	51 00.0	+60.0	35.0	**51**
52	46 06.6	+59.7	30.6	46 58.1	+59.8	31.2	47 49.3	+59.8	31.7	48 40.2	+59.9	32.3	49 30.7	+59.9	32.9	50 20.9	+59.9	33.6	51 10.6	+60.0	34.3	52 00.0	+60.0	35.0	**52**
53	47 06.3	+59.7	30.5	47 57.9	+59.7	31.0	48 49.1	+59.8	31.6	49 40.1	+59.8	32.2	50 30.6	+60.0	32.9	51 20.8	+60.0	33.5	52 10.6	+60.0	34.3	53 00.0	+60.0	35.0	**53**
54	48 06.0	+59.6	30.3	48 57.6	+59.8	30.9	49 48.9	+59.9	31.5	50 39.9	+59.9	32.1	51 30.6	+59.9	32.8	52 20.8	+60.0	33.5	53 10.6	+60.0	34.2	54 00.0	+60.0	35.0	**54**
55	49 05.6	+59.7	30.2	49 57.4	+59.7	30.8	50 48.8	+59.8	31.4	51 39.8	+59.9	32.0	52 30.5	+59.9	32.7	53 20.8	+59.9	33.4	54 10.6	+60.0	34.2	55 00.0	+60.0	35.0	**55**
56	50 05.3	+59.6	30.0	50 57.1	+59.7	30.6	51 48.6	+59.8	31.2	52 39.7	+59.9	31.9	53 30.4	+59.9	32.6	54 20.7	+60.0	33.4	55 10.6	+60.0	34.2	56 00.0	+60.0	35.0	**56**
57	51 04.9	+59.7	29.8	51 56.8	+59.7	30.5	52 48.4	+59.8	31.1	53 39.6	+59.8	31.8	54 30.3	+60.0	32.5	55 20.7	+60.0	33.3	56 10.6	+60.0	34.1	57 00.0	+60.0	35.0	**57**
58	52 04.6	+59.6	29.6	52 56.5	+59.7	30.3	53 48.2	+59.7	31.0	54 39.4	+59.9	31.7	55 30.3	+59.9	32.5	56 20.7	+59.9	33.3	57 10.6	+60.0	34.1	58 00.0	+60.0	35.0	**58**
59	53 04.2	+59.5	29.4	53 56.2	+59.7	30.1	54 47.9	+59.8	30.8	55 39.3	+59.8	31.6	56 30.2	+59.9	32.4	57 20.6	+60.0	33.2	58 10.6	+60.0	34.1	59 00.0	+60.0	35.0	**59**
60	54 03.7	+59.6	29.3	54 55.9	+59.7	29.9	55 47.7	+59.8	30.7	56 39.1	+59.8	31.4	57 30.1	+59.9	32.3	58 20.6	+59.9	33.1	59 10.6	+59.9	34.0	60 00.0	+60.0	35.0	**60**
61	55 03.3	+59.5	29.0	55 55.6	+59.6	29.8	56 47.5	+59.7	30.5	57 38.9	+59.9	31.3	58 30.0	+59.9	32.2	59 20.5	+60.0	33.0	60 10.5	+60.0	34.0	61 00.0	+60.0	35.0	**61**
62	56 02.8	+59.6	28.8	56 55.2	+59.6	29.6	57 47.2	+59.7	30.3	58 38.8	+59.8	31.2	59 29.9	+59.9	32.0	60 20.5	+59.9	33.0	61 10.5	+60.0	34.0	62 00.0	+60.0	35.0	**62**
63	57 02.4	+59.4	28.6	57 54.8	+59.7	29.4	58 46.9	+59.7	30.2	59 38.6	+59.8	31.0	60 29.8	+59.9	31.9	61 20.4	+60.0	32.9	62 10.5	+60.0	33.9	63 00.0	+60.0	35.0	**63**
64	58 01.8	+59.5	28.4	58 54.5	+59.5	29.1	59 46.6	+59.7	30.0	60 38.4	+59.8	30.9	61 29.7	+59.8	31.8	62 20.4	+59.9	32.8	63 10.5	+60.0	33.9	64 00.0	+60.0	35.0	**64**
65	59 01.3	+59.4	28.1	59 54.0	+59.6	28.9	60 46.3	+59.7	29.8	61 38.2	+59.8	30.7	62 29.5	+59.9	31.7	63 20.3	+60.0	32.7	64 10.5	+60.0	33.8	65 00.0	+60.0	35.0	**65**
66	60 00.7	+59.4	27.8	60 53.6	+59.5	28.7	61 46.0	+59.7	29.5	62 38.0	+59.7	30.5	63 29.4	+59.9	31.5	64 20.3	+59.9	32.6	65 10.5	+60.0	33.8	66 00.0	+60.0	35.0	**66**
67	61 00.1	+59.4	27.5	61 53.1	+59.5	28.4	62 45.7	+59.6	29.3	63 37.7	+59.8	30.3	64 29.3	+59.8	31.4	65 20.2	+59.9	32.5	66 10.5	+59.9	33.7	67 00.0	+60.0	35.0	**67**
68	61 59.5	+59.3	27.2	62 52.6	+59.5	28.1	63 45.3	+59.6	29.1	64 37.5	+59.7	30.1	65 29.1	+59.8	31.2	66 20.1	+59.9	32.4	67 10.4	+60.0	33.6	68 00.0	+60.0	35.0	**68**
69	62 58.8	+59.2	26.9	63 52.1	+59.4	27.8	64 44.9	+59.6	28.8	65 37.2	+59.7	29.9	66 28.9	+59.9	31.0	67 20.0	+60.0	32.2	68 10.4	+60.0	33.6	69 00.0	+60.0	35.0	**69**
70	63 58.0	+59.3	26.6	64 51.5	+59.4	27.5	65 44.5	+59.5	28.5	66 36.9	+59.7	29.6	67 28.8	+59.8	30.8	68 20.0	+59.9	32.1	69 10.4	+60.0	33.5	70 00.0	+60.0	35.0	**70**
71	64 57.3	+59.1	26.2	65 50.9	+59.3	27.2	66 44.0	+59.5	28.2	67 36.6	+59.6	29.4	68 28.6	+59.8	30.6	69 19.9	+59.9	31.9	70 10.4	+59.9	33.4	71 00.0	+60.0	35.0	**71**
72	65 56.4	+59.1	25.8	66 50.2	+59.3	26.8	67 43.5	+59.5	27.9	68 36.2	+59.7	29.1	69 28.4	+59.7	30.4	70 19.8	+59.8	31.8	71 10.3	+60.0	33.3	72 00.0	+60.0	35.0	**72**
73	66 55.5	+59.0	25.3	67 49.5	+59.2	26.4	68 43.0	+59.4	27.5	69 35.9	+59.6	28.8	70 28.1	+59.8	30.1	71 19.6	+59.9	31.6	72 10.3	+60.0	33.2	73 00.0	+60.0	35.0	**73**
74	67 54.5	+58.9	24.9	68 48.7	+59.1	25.9	69 42.4	+59.3	27.1	70 35.5	+59.5	28.4	71 27.9	+59.7	29.8	72 19.5	+59.9	31.4	73 10.3	+59.9	33.1	74 00.0	+60.0	35.0	**74**
75	68 53.4	+58.8	24.3	69 47.8	+59.0	25.5	70 41.7	+59.3	26.7	71 35.0	+59.5	28.0	72 27.6	+59.7	29.5	73 19.4	+59.8	31.2	74 10.2	+60.0	33.0	75 00.0	+60.0	35.0	**75**
76	69 52.2	+58.7	23.8	70 46.8	+59.0	24.9	71 41.0	+59.2	26.2	72 34.5	+59.4	27.6	73 27.3	+59.6	29.2	74 19.2	+59.9	30.9	75 10.2	+59.9	32.8	76 00.0	+60.0	35.0	**76**
77	70 50.9	+58.5	23.2	71 45.8	+58.8	24.3	72 40.2	+59.1	25.7	73 33.9	+59.4	27.1	74 26.9	+59.6	28.8	75 19.1	+59.8	30.6	76 10.1	+60.0	32.7	77 00.0	+60.0	35.0	**77**
78	71 49.4	+58.4	22.5	72 44.6	+58.7	23.7	73 39.3	+59.0	25.1	74 33.3	+59.2	26.6	75 26.5	+59.6	28.3	76 18.9	+59.7	30.3	77 10.1	+59.9	32.5	78 00.0	+60.0	35.0	**78**
79	72 47.8	+58.2	21.7	73 43.3	+58.5	23.0	74 38.3	+58.8	24.4	75 32.5	+59.2	26.0	76 26.1	+59.4	27.8	77 18.6	+59.8	29.9	78 10.0	+59.9	32.3	79 00.0	+60.0	35.0	**79**
80	73 46.0	+58.0	20.9	74 41.8	+58.4	22.2	75 37.1	+58.7	23.6	76 31.7	+59.1	25.3	77 25.5	+59.4	27.2	78 18.4	+59.6	29.4	79 09.9	+60.0	32.0	80 00.0	+60.0	35.0	**80**
81	74 44.0	+57.7	19.9	75 40.2	+58.0	21.3	76 35.8	+58.5	22.8	77 30.8	+58.8	24.5	78 24.9	+59.3	26.5	79 18.0	+59.6	28.9	80 09.9	+59.8	31.7	81 00.0	+60.0	35.0	**81**
82	75 41.7	+57.4	18.8	76 38.2	+57.8	20.2	77 34.3	+58.2	21.8	78 29.6	+58.7	23.6	79 24.2	+59.1	25.7	80 17.6	+59.6	28.3	81 09.7	+59.9	31.3	82 00.0	+60.0	35.0	**82**
83	76 39.1	+56.9	17.6	77 36.0	+57.4	19.0	78 32.5	+57.9	20.6	79 28.3	+58.4	22.5	80 23.3	+58.9	24.7	81 17.2	+59.4	27.5	82 09.6	+59.8	30.8	83 00.0	+60.0	35.0	**83**
84	77 36.0	+56.5	16.2	78 33.4	+57.0	17.6	79 30.4	+57.4	19.2	80 26.7	+58.0	21.2	81 22.2	+58.6	23.6	82 16.6	+59.2	26.5	83 09.4	+59.8	30.2	84 00.0	+60.0	35.0	**84**
85	78 32.5	+55.8	14.6	79 30.4	+56.3	15.9	80 27.8	+56.9	17.6	81 24.7	+57.5	19.6	82 20.8	+58.3	22.0	83 15.8	+59.0	25.2	84 09.2	+59.6	29.4	85 00.0	+60.0	35.0	**85**
86	79 28.3	+55.0	12.6	80 26.7	+55.5	13.9	81 24.7	+56.1	15.5	82 22.2	+56.9	17.5	83 19.1	+57.6	20.1	84 14.8	+58.5	23.5	85 08.8	+59.5	28.2	86 00.0	+60.0	35.0	**86**
87	80 23.3	+53.9	10.4	81 22.2	+54.4	11.5	82 20.8	+55.0	13.0	83 19.1	+55.7	14.9	84 16.7	+56.6	17.5	85 13.3	+57.8	21.1	86 08.3	+59.1	26.5	87 00.0	+60.0	35.0	**87**
88	81 17.2	+52.4	7.6	82 16.6	+52.8	8.6	83 15.8	*+53.4* •	9.8	84 14.8	*+54.0* •	11.5	85 13.3	*+55.0* •	13.9	86 11.1	*+56.3* •	17.5	87 07.4	*+58.2* •	23.5	88 00.0	+60.0	35.0	**88**
89	82 09.6	*+50.4* •	4.2	83 09.4	*+50.6* •	4.8	84 09.2	*+50.8* •	5.6	85 08.8	*+51.2* •	6.8	86 08.3	*+51.7* •	8.5	87 07.4	*+52.6* •	11.5	88 05.6	*+54.4* •	17.5	89 00.0	+60.0	35.0	**89**
90	83 00.0	*+47.6* •	0.0	84 00.0	*+47.3* •	0.0	85 00.0	*+46.8* •	0.0	86 00.0	*+46.1* •	0.0	87 00.0	*+44.7* •	0.0	88 00.0	*+41.2* •	0.0	89 00.0	*+23.9* •	0.0	90 00.0	–60.0	17.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 145°, 215°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 39.5	+59.8	143.8	4 51.1	+59.8	143.9	4 02.6	+59.9	143.9	3 14.1	+60.0	143.9	2 25.6	+60.0	144.0	1 37.1	+60.0	144.0	0 48.5	+60.0	144.0	0 00.0	+60.0	144.0	**0**
1	6 39.3	+59.9	143.7	5 50.9	+59.9	143.8	5 02.5	+59.9	143.8	4 14.1	+59.9	143.9	3 25.6	+59.9	143.9	2 37.1	+59.9	144.0	1 48.5	+60.0	144.0	1 00.0	+60.0	144.0	**1**
2	7 39.2	+59.8	143.7	6 50.8	+59.9	143.7	6 02.4	+60.0	143.8	5 14.0	+60.0	143.9	4 25.5	+60.0	143.9	3 37.0	+60.0	143.9	2 48.5	+60.0	144.0	2 00.0	+60.0	144.0	**2**
3	8 39.0	+59.9	143.6	7 50.7	+59.9	143.7	7 02.4	+59.9	143.7	6 14.0	+59.9	143.8	5 25.5	+60.0	143.9	4 37.0	+60.0	143.9	3 48.5	+60.0	144.0	3 00.0	+60.0	144.0	**3**
4	9 38.9	+59.8	143.5	8 50.6	+59.9	143.6	8 02.3	+59.9	143.7	7 13.9	+60.0	143.8	6 25.5	+60.0	143.8	5 37.0	+60.0	143.9	4 48.5	+60.0	144.0	4 00.0	+60.0	144.0	**4**
5	10 38.7	+59.8	143.4	9 50.5	+59.9	143.5	9 02.2	+59.9	143.6	8 13.9	+59.9	143.7	7 25.5	+59.9	143.8	6 37.0	+60.0	143.9	5 48.5	+60.0	143.9	5 00.0	+60.0	144.0	**5**
6	11 38.5	+59.9	143.4	10 50.4	+59.9	143.5	10 02.1	+59.9	143.6	9 13.8	+60.0	143.7	8 25.4	+60.0	143.8	7 37.0	+60.0	143.9	6 48.5	+60.0	143.9	6 00.0	+60.0	144.0	**6**
7	12 38.4	+59.8	143.3	11 50.3	+59.8	143.4	11 02.0	+60.0	143.5	10 13.8	+59.9	143.6	9 25.4	+60.0	143.7	8 37.0	+60.0	143.8	7 48.5	+60.0	143.9	7 00.0	+60.0	144.0	**7**
8	13 38.2	+59.9	143.2	12 50.1	+59.9	143.3	12 02.0	+59.9	143.5	11 13.7	+59.9	143.6	10 25.4	+59.9	143.7	9 37.0	+60.0	143.8	8 48.5	+60.0	143.9	8 00.0	+60.0	144.0	**8**
9	14 38.1	+59.8	143.1	13 50.0	+59.9	143.3	13 01.9	+59.9	143.4	12 13.6	+60.0	143.6	11 25.3	+60.0	143.7	10 37.0	+59.9	143.8	9 48.5	+60.0	143.9	9 00.0	+60.0	144.0	**9**
10	15 37.9	+59.8	143.1	14 49.9	+59.9	143.2	14 01.8	+59.9	143.4	13 13.6	+59.9	143.5	12 25.3	+60.0	143.6	11 36.9	+60.0	143.8	10 48.5	+60.0	143.9	10 00.0	+60.0	144.0	**10**
11	16 37.7	+59.9	143.0	15 49.8	+59.8	143.1	15 01.7	+59.9	143.3	14 13.5	+60.0	143.5	13 25.3	+60.0	143.6	12 36.9	+60.0	143.8	11 48.5	+60.0	143.9	11 00.0	+60.0	144.0	**11**
12	17 37.6	+59.8	142.9	16 49.6	+59.9	143.1	16 01.6	+59.9	143.3	15 13.5	+59.9	143.4	14 25.3	+59.9	143.6	13 36.9	+60.0	143.7	12 48.5	+60.0	143.9	12 00.0	+60.0	144.0	**12**
13	18 37.4	+59.8	142.8	17 49.5	+59.9	143.0	17 01.5	+59.9	143.2	16 13.4	+60.0	143.4	15 25.2	+60.0	143.6	14 36.9	+60.0	143.7	13 48.5	+60.0	143.9	13 00.0	+60.0	144.0	**13**
14	19 37.2	+59.8	142.7	18 49.4	+59.9	142.9	18 01.4	+60.0	143.1	17 13.4	+59.9	143.3	16 25.2	+60.0	143.5	15 36.9	+60.0	143.7	14 48.5	+60.0	143.8	14 00.0	+60.0	144.0	**14**
15	20 37.0	+59.9	142.7	19 49.3	+59.8	142.9	19 01.4	+59.9	143.1	18 13.3	+60.0	143.3	17 25.2	+59.9	143.5	16 36.9	+60.0	143.7	15 48.5	+60.0	143.8	15 00.0	+60.0	144.0	**15**
16	21 36.9	+59.8	142.6	20 49.1	+59.9	142.8	20 01.3	+59.9	143.0	19 13.3	+59.9	143.2	18 25.1	+60.0	143.5	17 36.9	+60.0	143.6	16 48.5	+60.0	143.8	16 00.0	+60.0	144.0	**16**
17	22 36.7	+59.8	142.5	21 49.0	+59.9	142.7	21 01.2	+59.9	143.0	20 13.2	+59.9	143.2	19 25.1	+60.0	143.4	18 36.9	+59.9	143.6	17 48.5	+60.0	143.8	17 00.0	+60.0	144.0	**17**
18	23 36.5	+59.8	142.4	22 48.9	+59.8	142.7	22 01.1	+59.9	142.9	21 13.1	+60.0	143.2	20 25.1	+59.9	143.4	19 36.8	+60.0	143.6	18 48.5	+60.0	143.8	18 00.0	+60.0	144.0	**18**
19	24 36.3	+59.8	142.3	23 48.7	+59.9	142.6	23 01.0	+59.9	142.9	22 13.1	+59.9	143.1	21 25.0	+60.0	143.3	20 36.8	+60.0	143.6	19 48.5	+60.0	143.8	19 00.0	+60.0	144.0	**19**
20	25 36.1	+59.8	142.2	24 48.6	+59.9	142.5	24 00.9	+59.9	142.8	23 13.0	+60.0	143.1	22 25.0	+60.0	143.3	21 36.8	+60.0	143.6	20 48.5	+60.0	143.8	20 00.0	+60.0	144.0	**20**
21	26 35.9	+59.8	142.1	25 48.5	+59.8	142.4	25 00.8	+59.9	142.7	24 13.0	+59.9	143.0	23 25.0	+59.9	143.3	22 36.8	+60.0	143.5	21 48.5	+60.0	143.8	21 00.0	+60.0	144.0	**21**
22	27 35.7	+59.8	142.1	26 48.3	+59.9	142.4	26 00.7	+59.9	142.7	25 12.9	+59.9	143.0	24 24.9	+60.0	143.2	23 36.8	+60.0	143.5	22 48.5	+60.0	143.8	22 00.0	+60.0	144.0	**22**
23	28 35.5	+59.8	142.0	27 48.2	+59.8	142.3	27 00.6	+59.9	142.6	26 12.8	+60.0	142.9	25 24.9	+60.0	143.2	24 36.8	+59.9	143.5	23 48.5	+60.0	143.7	23 00.0	+60.0	144.0	**23**
24	29 35.3	+59.8	141.9	28 48.0	+59.9	142.2	28 00.5	+59.9	142.5	27 12.8	+59.9	142.9	26 24.9	+59.9	143.2	25 36.7	+60.0	143.5	24 48.5	+60.0	143.7	24 00.0	+60.0	144.0	**24**
25	30 35.1	+59.8	141.8	29 47.9	+59.8	142.1	29 00.4	+59.9	142.5	28 12.7	+60.0	142.8	27 24.8	+60.0	143.1	26 36.7	+60.0	143.4	25 48.5	+60.0	143.7	25 00.0	+60.0	144.0	**25**
26	31 34.9	+59.8	141.7	30 47.7	+59.9	142.0	30 00.3	+59.9	142.4	29 12.7	+59.9	142.8	28 24.8	+60.0	143.1	27 36.7	+60.0	143.4	26 48.5	+59.9	143.7	26 00.0	+60.0	144.0	**26**
27	32 34.7	+59.8	141.6	31 47.6	+59.8	142.0	31 00.2	+59.9	142.3	30 12.6	+59.9	142.7	29 24.8	+59.9	143.0	28 36.7	+60.0	143.4	27 48.4	+60.0	143.7	27 00.0	+60.0	144.0	**27**
28	33 34.5	+59.8	141.5	32 47.4	+59.9	141.9	32 00.1	+59.9	142.3	31 12.5	+60.0	142.6	30 24.7	+60.0	143.0	29 36.7	+60.0	143.3	28 48.4	+60.0	143.7	28 00.0	+60.0	144.0	**28**
29	34 34.3	+59.7	141.4	33 47.3	+59.8	141.8	33 00.0	+59.9	142.2	32 12.5	+59.9	142.6	31 24.7	+60.0	143.0	30 36.7	+60.0	143.3	29 48.4	+60.0	143.7	29 00.0	+60.0	144.0	**29**
30	35 34.0	+59.8	141.3	34 47.1	+59.8	141.7	33 59.9	+59.9	142.1	33 12.4	+59.9	142.5	32 24.6	+60.0	142.9	31 36.7	+59.9	143.3	30 48.4	+60.0	143.7	30 00.0	+60.0	144.0	**30**
31	36 33.8	+59.8	141.2	35 46.9	+59.8	141.6	34 59.8	+59.8	142.0	34 12.3	+59.9	142.5	33 24.6	+60.0	142.9	32 36.6	+60.0	143.3	31 48.4	+60.0	143.6	31 00.0	+60.0	144.0	**31**
32	37 33.6	+59.7	141.0	36 46.7	+59.9	141.5	35 59.6	+59.9	142.0	35 12.2	+60.0	142.4	34 24.6	+59.9	142.8	33 36.6	+60.0	143.2	32 48.4	+60.0	143.6	32 00.0	+60.0	144.0	**32**
33	38 33.3	+59.8	140.9	37 46.6	+59.8	141.4	36 59.5	+59.9	141.9	36 12.2	+59.9	142.3	35 24.5	+60.0	142.8	34 36.6	+60.0	143.2	33 48.4	+60.0	143.6	33 00.0	+60.0	144.0	**33**
34	39 33.1	+59.7	140.8	38 46.4	+59.8	141.3	37 59.4	+59.9	141.8	37 12.1	+59.9	142.3	36 24.5	+59.9	142.7	35 36.6	+60.0	143.2	34 48.4	+60.0	143.6	34 00.0	+60.0	144.0	**34**
35	40 32.8	+59.7	140.7	39 46.2	+59.8	141.2	38 59.3	+59.8	141.7	38 12.0	+59.9	142.2	37 24.4	+60.0	142.7	36 36.6	+59.9	143.1	35 48.4	+60.0	143.6	35 00.0	+60.0	144.0	**35**
36	41 32.5	+59.7	140.6	40 46.0	+59.8	141.1	39 59.1	+59.9	141.6	39 11.9	+59.9	142.1	38 24.4	+59.9	142.6	37 36.5	+60.0	143.1	36 48.4	+60.0	143.6	36 00.0	+60.0	144.0	**36**
37	42 32.2	+59.7	140.4	41 45.8	+59.8	141.0	40 59.0	+59.8	141.5	40 11.8	+59.9	142.1	39 24.3	+60.0	142.6	38 36.5	+60.0	143.1	37 48.4	+60.0	143.5	37 00.0	+60.0	144.0	**37**
38	43 31.9	+59.8	140.3	42 45.6	+59.8	140.9	41 58.8	+59.9	141.5	41 11.7	+59.9	142.0	40 24.3	+59.9	142.5	39 36.5	+60.0	143.0	38 48.4	+60.0	143.5	38 00.0	+60.0	144.0	**38**
39	44 31.7	+59.6	140.2	43 45.4	+59.8	140.8	42 58.7	+59.9	141.4	42 11.6	+60.0	141.9	41 24.2	+60.0	142.5	40 36.5	+60.0	143.0	39 48.4	+60.0	143.5	39 00.0	+60.0	144.0	**39**
40	45 31.3	+59.7	140.0	44 45.2	+59.7	140.7	43 58.6	+59.8	141.3	43 11.6	+59.9	141.9	42 24.2	+59.9	142.4	41 36.5	+59.9	143.0	40 48.4	+60.0	143.5	40 00.0	+60.0	144.0	**40**
41	46 31.0	+59.7	139.9	45 44.9	+59.8	140.5	44 58.4	+59.8	141.2	44 11.5	+59.9	141.8	43 24.1	+60.0	142.4	42 36.4	+60.0	142.9	41 48.4	+60.0	143.5	41 00.0	+60.0	144.0	**41**
42	47 30.7	+59.6	139.7	46 44.7	+59.7	140.4	45 58.2	+59.9	141.1	45 11.4	+59.9	141.7	44 24.1	+59.9	142.3	43 36.4	+60.0	142.9	42 48.4	+60.0	143.5	42 00.0	+60.0	144.0	**42**
43	48 30.3	+59.7	139.5	47 44.4	+59.8	140.3	46 58.1	+59.8	141.0	46 11.3	+59.8	141.6	45 24.0	+60.0	142.2	44 36.4	+60.0	142.9	43 48.4	+60.0	143.4	43 00.0	+60.0	144.0	**43**
44	49 30.0	+59.6	139.4	48 44.2	+59.7	140.1	47 57.9	+59.8	140.8	47 11.1	+59.9	141.5	46 24.0	+59.9	142.2	45 36.4	+59.9	142.8	44 48.4	+60.0	143.4	44 00.0	+60.0	144.0	**44**
45	50 29.6	+59.6	139.2	49 43.9	+59.7	140.0	48 57.7	+59.8	140.7	48 11.0	+59.9	141.4	47 23.9	+59.9	142.1	46 36.3	+60.0	142.8	45 48.4	+60.0	143.4	45 00.0	+60.0	144.0	**45**
46	51 29.2	+59.6	139.0	50 43.6	+59.8	139.8	49 57.5	+59.8	140.6	49 10.9	+59.9	141.3	48 23.8	+60.0	142.1	47 36.3	+60.0	142.7	46 48.4	+59.9	143.4	46 00.0	+60.0	144.0	**46**
47	52 28.8	+59.6	138.8	51 43.4	+59.7	139.7	50 57.3	+59.8	140.5	50 10.8	+59.9	141.2	49 23.8	+59.9	142.0	48 36.3	+59.9	142.7	47 48.3	+60.0	143.4	47 00.0	+60.0	144.0	**47**
48	53 28.4	+59.5	138.6	52 43.1	+59.6	139.5	51 57.1	+59.8	140.3	51 10.7	+59.8	141.1	50 23.7	+59.9	141.9	49 36.2	+60.0	142.6	48 48.3	+60.0	143.3	48 00.0	+60.0	144.0	**48**
49	54 27.9	+59.6	138.4	53 42.7	+59.7	139.3	52 56.9	+59.8	140.2	52 10.5	+59.9	141.0	51 23.6	+60.0	141.8	50 36.2	+60.0	142.6	49 48.3	+60.0	143.3	49 00.0	+60.0	144.0	**49**
50	55 27.5	+59.5	138.2	54 42.4	+59.7	139.2	53 56.7	+59.8	140.1	53 10.4	+59.9	140.9	52 23.6	+59.9	141.7	51 36.2	+59.9	142.5	50 48.3	+60.0	143.3	50 00.0	+60.0	144.0	**50**
51	56 27.0	+59.5	138.0	55 42.1	+59.6	139.0	54 56.5	+59.7	139.9	54 10.3	+59.8	140.8	53 23.5	+59.9	141.7	52 36.1	+60.0	142.5	51 48.3	+60.0	143.3	51 00.0	+60.0	144.0	**51**
52	57 26.5	+59.4	137.7	56 41.7	+59.6	138.8	55 56.2	+59.8	139.8	55 10.1	+59.9	140.7	54 23.4	+59.9	141.6	53 36.1	+60.0	142.4	52 48.3	+60.0	143.2	52 00.0	+60.0	144.0	**52**
53	58 25.9	+59.4	137.5	57 41.3	+59.6	138.6	56 56.0	+59.7	139.6	56 10.0	+59.8	140.6	55 23.3	+59.9	141.5	54 36.1	+59.9	142.4	53 48.3	+60.0	143.2	53 00.0	+60.0	144.0	**53**
54	59 25.3	+59.4	137.2	58 40.9	+59.6	138.3	57 55.7	+59.7	139.4	57 09.8	+59.8	140.4	56 23.2	+59.9	141.4	55 36.0	+60.0	142.3	54 48.3	+60.0	143.2	54 00.0	+60.0	144.0	**54**
55	60 24.7	+59.4	136.9	59 40.5	+59.5	138.1	58 55.4	+59.7	139.2	58 09.6	+59.8	140.3	57 23.1	+59.9	141.3	56 36.0	+60.0	142.2	55 48.3	+60.0	143.1	55 00.0	+60.0	144.0	**55**
56	61 24.1	+59.3	136.6	60 40.0	+59.5	137.9	59 55.1	+59.7	139.0	59 09.4	+59.8	140.1	58 23.0	+59.9	141.2	57 36.0	+59.9	142.2	56 48.3	+60.0	143.1	56 00.0	+60.0	144.0	**56**
57	62 23.4	+59.2	136.3	61 39.5	+59.5	137.6	60 54.8	+59.6	138.8	60 09.2	+59.8	140.0	59 22.9	+59.9	141.1	58 35.9	+60.0	142.1	57 48.3	+59.9	143.1	57 00.0	+60.0	144.0	**57**
58	63 22.6	+59.2	136.0	62 39.0	+59.4	137.3	61 54.4	+59.7	138.6	61 09.0	+59.8	139.8	60 22.8	+59.9	140.9	59 35.9	+59.9	142.0	58 48.2	+60.0	143.0	58 00.0	+60.0	144.0	**58**
59	64 21.8	+59.2	135.6	63 38.4	+59.4	137.0	62 54.1	+59.6	138.4	62 08.8	+59.8	139.6	61 22.7	+59.9	140.8	60 35.8	+60.0	141.9	59 48.2	+60.0	143.0	59 00.0	+60.0	144.0	**59**
60	65 21.0	+59.0	135.2	64 37.8	+59.4	136.7	63 53.7	+59.5	138.1	63 08.6	+59.7	139.4	62 22.6	+59.8	140.7	61 35.8	+59.9	141.8	60 48.2	+60.0	143.0	60 00.0	+60.0	144.0	**60**
61	66 20.0	+59.0	134.8	65 37.2	+59.3	136.3	64 53.2	+59.6	137.8	64 08.3	+59.7	139.2	63 22.4	+59.9	140.5	62 35.7	+59.9	141.7	61 48.2	+60.0	142.9	61 00.0	+60.0	144.0	**61**
62	67 19.0	+58.9	134.3	66 36.5	+59.2	136.0	65 52.8	+59.5	137.5	65 08.0	+59.7	139.0	64 22.3	+59.8	140.4	63 35.6	+60.0	141.6	62 48.2	+60.0	142.9	62 00.0	+60.0	144.0	**62**
63	68 17.9	+58.9	133.8	67 35.7	+59.2	135.6	66 52.3	+59.5	137.2	66 07.7	+59.7	138.7	65 22.1	+59.8	140.2	64 35.6	+59.9	141.5	63 48.2	+60.0	142.8	63 00.0	+60.0	144.0	**63**
64	69 16.8	+58.6	133.3	68 34.9	+59.1	135.1	67 51.8	+59.4	136.9	67 07.4	+59.7	138.5	66 21.9	+59.9	140.0	65 35.5	+59.9	141.4	64 48.2	+59.9	142.8	64 00.0	+60.0	144.0	**64**
65	70 15.4	+58.6	132.7	69 34.0	+59.0	134.6	68 51.2	+59.3	136.5	68 07.1	+59.6	138.2	67 21.8	+59.8	139.8	66 35.4	+59.9	141.3	65 48.1	+60.0	142.7	65 00.0	+60.0	144.0	**65**
66	71 14.0	+58.4	132.0	70 33.0	+59.0	134.1	69 50.5	+59.3	136.1	69 06.7	+59.6	137.9	68 21.6	+59.7	139.6	67 35.3	+59.9	141.2	66 48.1	+60.0	142.6	66 00.0	+60.0	144.0	**66**
67	72 12.4	+58.3	131.3	71 32.0	+58.8	133.5	70 49.8	+59.3	135.6	70 06.3	+59.5	137.6	69 21.3	+59.8	139.4	68 35.2	+60.0	141.0	67 48.1	+60.0	142.6	67 00.0	+60.0	144.0	**67**
68	73 10.7	+58.0	130.5	72 30.8	+58.6	132.9	71 49.1	+59.1	135.1	71 05.8	+59.5	137.2	70 21.1	+59.7	139.1	69 35.2	+59.8	140.9	68 48.1	+60.0	142.5	68 00.0	+60.0	144.0	**68**
69	74 08.7	+57.7	129.6	73 29.4	+58.5	132.2	72 48.2	+59.1	134.6	72 05.3	+59.4	136.8	71 20.8	+59.7	138.8	70 35.0	+59.9	140.7	69 48.1	+59.9	142.4	69 00.0	+60.0	144.0	**69**
70	75 06.4	+57.5	128.5	74 27.9	+58.3	131.4	73 47.3	+58.9	133.9	73 04.7	+59.4	136.3	72 20.5	+59.7	138.5	71 34.9	+59.9	140.5	70 48.0	+60.0	142.3	70 00.0	+60.0	144.0	**70**
71	76 03.9	+57.1	127.4	75 26.2	+58.1	130.4	74 46.2	+58.7	133.2	74 04.1	+59.3	135.8	73 20.2	+59.6	138.1	72 34.8	+59.8	140.3	71 48.0	+60.0	142.2	71 00.0	+60.0	144.0	**71**
72	77 01.0	+56.6	126.1	76 24.3	+57.7	129.4	75 44.9	+58.6	132.5	75 03.4	+59.2	135.2	74 19.8	+59.6	137.7	73 34.6	+59.9	140.0	72 48.0	+59.9	142.1	72 00.0	+60.0	144.0	**72**
73	77 57.6	+56.0	124.5	77 22.0	+57.4	128.2	76 43.5	+58.4	131.5	76 02.6	+59.0	134.6	75 19.4	+59.6	137.3	74 34.5	+59.8	139.8	73 47.9	+60.0	142.0	73 00.0	+60.0	144.0	**73**
74	78 53.6	+55.3	122.7	78 19.4	+56.9	126.8	77 41.9	+58.1	130.5	77 01.6	+58.9	133.8	76 19.0	+59.4	136.8	75 34.3	+59.8	139.4	74 47.9	+59.9	141.8	74 00.0	+60.0	144.0	**74**
75	79 48.9	+54.4	120.6	79 16.3	+56.3	125.2	78 40.0	+57.7	129.3	78 00.5	+58.7	132.9	77 18.4	+59.4	136.2	76 34.1	+59.7	139.1	75 47.8	+60.0	141.7	75 00.0	+60.0	144.0	**75**
76	80 43.3	+53.0	118.1	80 12.6	+55.5	123.2	79 37.7	+57.3	127.8	78 59.2	+58.5	131.9	78 17.8	+59.2	135.5	77 33.8	+59.7	138.7	76 47.8	+59.9	141.5	76 00.0	+60.0	144.0	**76**
77	81 36.3	+51.4	•115.1	81 08.1	+54.5	120.9	80 35.0	+56.6	126.1	79 57.7	+58.1	130.7	79 17.0	+59.1	134.7	78 33.5	+59.7	138.2	77 47.7	+59.9	141.3	77 00.0	+60.0	144.0	**77**
78	82 27.7	+48.9	•111.3	82 02.6	+52.9	118.0	81 31.6	+55.8	124.0	80 55.8	+57.7	129.2	80 16.1	+58.9	133.7	79 33.2	+59.5	137.6	78 47.6	+59.9	141.0	78 00.0	+60.0	144.0	**78**
79	83 16.6	+45.6	•106.7	82 55.5	+50.8	•114.4	82 27.4	+54.6	121.3	81 53.5	+57.1	127.3	81 15.0	+58.6	132.5	80 32.7	+59.5	136.9	79 47.5	+59.9	140.7	79 00.0	+60.0	144.0	**79**
80	84 02.2	+40.7	•100.8	83 46.3	+47.7	•109.8	83 22.0	+52.7	•117.9	82 50.6	+56.1	125.0	82 13.6	+58.2	131.0	81 32.2	+59.3	136.1	80 47.4	+59.9	140.4	80 00.0	+60.0	144.0	**80**
81	84 42.9	+33.9	• 93.3	84 34.0	+43.0	•103.8	84 14.7	+50.0	•113.5	83 46.7	+54.8	122.0	83 11.8	+57.6	129.1	82 31.5	+59.2	135.0	81 47.3	+59.8	139.9	81 00.0	+60.0	144.0	**81**
82	85 16.8	+24.2	• 83.8	85 17.0	+35.8	• 95.9	85 04.7	+45.6	•107.5	84 41.5	+52.4	•117.9	84 09.4	+56.6	126.5	83 30.7	+58.8	133.6	82 47.1	+59.8	139.4	82 00.0	+60.0	144.0	**82**
83	85 41.0	+11.8	• 72.1	85 52.8	+25.1	• 85.5	85 50.3	+38.2	• 99.3	85 33.9	+48.5	•112.1	85 06.0	+55.0	•123.0	84 29.5	+58.3	131.7	83 46.9	+59.7	138.6	83 00.0	+60.0	144.0	**83**
84	85 52.8	−2.5	• 58.8	86 17.9	+10.6	• 72.1	86 28.5	+26.3	• 87.7	86 22.4	+41.4	•103.7	86 01.0	+51.9	•117.8	85 27.8	+57.4	129.0	84 46.6	+59.5	137.6	84 00.0	+60.0	144.0	**84**
85	85 50.3	−16.4	• 44.9	86 28.5	−6.1	• 56.4	86 54.8	+9.0	• 72.1	87 03.8	+28.0	• 90.9	86 52.9	+45.4	•109.6	86 25.2	+55.4	•124.9	85 46.1	+59.2	136.0	85 00.0	+60.0	144.0	**85**
86	85 33.9	−27.9	• 32.0	86 22.4	−21.4	• 40.4	87 03.8	−10.9	• 53.2	87 31.8	+6.5	• 72.0	87 38.3	+30.5	• 95.8	87 20.6	+50.6	•117.8	86 45.3	+58.6	133.6	86 00.0	+60.0	144.0	**86**
87	85 06.0	−36.5	• 21.1	86 01.0	−33.2	• 26.3	86 52.9	−27.7	• 34.4	87 38.3	−17.7	• 48.3	88 08.8	+2.4	• 72.0	88 11.2	+34.6	•103.6	87 43.9	+56.4	•129.0	87 00.0	+60.0	144.0	**87**
88	84 29.5	−42.6	• 12.3	85 27.8	−41.2	• 15.0	86 25.2	−39.1	• 19.2	87 20.6	−35.3	• 26.3	88 11.2	−27.3	• 40.4	88 45.8	−5.5	• 72.0	88 40.3	+42.6	•117.7	88 00.0	+60.0	144.0	**88**
89	83 46.9	−46.9	• 5.4	84 46.6	−46.6	• 6.5	85 46.1	−46.1	• 8.0	86 45.3	−45.3	• 10.4	87 43.9	−43.9	• 15.0	88 40.3	−40.3	• 26.3	89 22.9	−22.9	• 72.0	89 00.0	+60.0	144.0	**89**
90	83 00.0	−49.9	• 0.0	84 00.0	−50.1	• 0.0	85 00.0	−50.3	• 0.0	86 00.0	−50.7	• 0.0	87 00.0	−51.2	• 0.0	88 00.0	−52.2	• 0.0	89 00.0	−54.1	• 0.0	90 00.0	−60.0	72.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 36°, 324°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 39.5	−59.9	143.8	4 51.1	−59.9	143.9	4 02.6	−59.9	143.9	3 14.1	−59.9	143.9	2 25.6	−60.0	144.0	1 37.1	−60.0	144.0	0 48.5	−60.0	144.0	0 00.0	+60.0	36.0	0
1	4 39.6	−59.8	143.9	3 51.2	−59.9	143.9	3 02.7	−59.9	143.9	2 14.2	−60.0	144.0	1 25.6	−59.9	144.0	0 37.1	−60.0	144.0	0 11.5	+60.0	36.0	1 00.0	+60.0	36.0	1
2	3 39.8	−59.8	143.9	2 51.3	−59.9	144.0	2 02.8	−60.0	144.0	1 14.2	−59.9	144.0	0 25.7	−60.0	144.0	0 22.9	+60.0	36.0	1 11.5	+60.0	36.0	2 00.0	+60.0	36.0	2
3	2 40.0	−59.9	144.0	1 51.4	−59.9	144.0	1 02.8	−59.9	144.1	0 14.3	−60.0	144.1	0 34.3	+60.0	35.9	1 22.9	+60.0	36.0	2 11.5	+59.9	36.0	3 00.0	+60.0	36.0	3
4	1 40.1	−59.8	144.1	0 51.5	−59.9	144.1	0 02.9	−59.9	144.1	0 45.7	+59.9	35.9	1 34.3	+60.0	35.9	2 22.9	+60.0	35.9	3 11.4	+60.0	36.0	4 00.0	+60.0	36.0	4
5	0 40.3	−59.9	144.2	0 08.4	+59.9	35.8	0 57.0	+59.9	35.8	1 45.6	+60.0	35.9	2 34.3	+59.9	35.9	3 22.9	+59.9	35.9	4 11.4	+60.0	36.0	5 00.0	+60.0	36.0	5
6	0 19.6	+59.8	35.8	1 08.3	+59.8	35.8	1 56.9	+59.9	35.8	2 45.6	+59.9	35.8	3 34.2	+60.0	35.9	4 22.8	+60.0	35.9	5 11.4	+60.0	35.9	6 00.0	+60.0	36.0	6
7	1 19.4	+59.9	35.7	2 08.1	+59.9	35.7	2 56.8	+60.0	35.7	3 45.5	+60.0	35.8	4 34.2	+60.0	35.8	5 22.8	+60.0	35.9	6 11.4	+60.0	35.9	7 00.0	+60.0	36.0	7
8	2 19.3	+59.8	35.6	3 08.0	+59.9	35.7	3 56.8	+59.9	35.7	4 45.5	+59.9	35.7	5 34.2	+59.9	35.8	6 22.8	+60.0	35.9	7 11.4	+60.0	35.9	8 00.0	+60.0	36.0	8
9	3 19.1	+59.9	35.6	4 07.9	+59.9	35.6	4 56.7	+59.9	35.6	5 45.4	+60.0	35.7	6 34.1	+60.0	35.8	7 22.8	+60.0	35.8	8 11.4	+60.0	35.9	9 00.0	+60.0	36.0	9
10	4 19.0	+59.8	35.5	5 07.8	+59.9	35.5	5 56.6	+59.9	35.6	6 45.4	+59.9	35.7	7 34.1	+60.0	35.7	8 22.8	+60.0	35.8	9 11.4	+60.0	35.9	10 00.0	+60.0	36.0	10
11	5 18.8	+59.8	35.4	6 07.7	+59.9	35.5	6 56.5	+60.0	35.5	7 45.3	+60.0	35.6	8 34.1	+60.0	35.7	9 22.8	+60.0	35.8	10 11.4	+60.0	35.9	11 00.0	+60.0	36.0	11
12	6 18.6	+59.9	35.3	7 07.6	+59.9	35.4	7 56.5	+59.9	35.5	8 45.3	+59.9	35.6	9 34.1	+59.9	35.7	10 22.8	+60.0	35.8	11 11.4	+60.0	35.9	12 00.0	+60.0	36.0	12
13	7 18.5	+59.8	35.3	8 07.5	+59.8	35.3	8 56.4	+59.9	35.4	9 45.2	+60.0	35.5	10 34.0	+60.0	35.6	11 22.8	+59.9	35.7	12 11.4	+60.0	35.9	13 00.0	+60.0	36.0	13
14	8 18.3	+59.9	35.2	9 07.3	+59.9	35.3	9 56.3	+59.9	35.4	10 45.2	+59.9	35.5	11 34.0	+60.0	35.6	12 22.7	+60.0	35.7	13 11.4	+60.0	35.9	14 00.0	+60.0	36.0	14
15	9 18.2	+59.8	35.1	10 07.2	+59.9	35.2	10 56.2	+59.9	35.3	11 45.1	+60.0	35.4	12 34.0	+59.9	35.6	13 22.7	+60.0	35.7	14 11.4	+60.0	35.8	15 00.0	+60.0	36.0	15
16	10 18.0	+59.9	35.0	11 07.1	+59.9	35.2	11 56.1	+59.9	35.3	12 45.1	+59.9	35.4	13 33.9	+60.0	35.5	14 22.7	+60.0	35.7	15 11.4	+60.0	35.8	16 00.0	+60.0	36.0	16
17	11 17.9	+59.8	35.0	12 07.0	+59.9	35.1	12 56.0	+60.0	35.2	13 45.0	+60.0	35.4	14 33.9	+60.0	35.5	15 22.7	+60.0	35.7	16 11.4	+60.0	35.8	17 00.0	+60.0	36.0	17
18	12 17.7	+59.8	34.9	13 06.9	+59.8	35.0	13 56.0	+59.9	35.2	14 45.0	+59.9	35.3	15 33.9	+59.9	35.5	16 22.7	+60.0	35.6	17 11.4	+60.0	35.8	18 00.0	+60.0	36.0	18
19	13 17.5	+59.9	34.8	14 06.7	+59.9	35.0	14 55.9	+59.9	35.1	15 44.9	+60.0	35.3	16 33.8	+60.0	35.4	17 22.7	+60.0	35.6	18 11.4	+60.0	35.8	19 00.0	+60.0	36.0	19
20	14 17.4	+59.8	34.7	15 06.6	+59.9	34.9	15 55.8	+59.9	35.1	16 44.9	+59.9	35.2	17 33.8	+60.0	35.4	18 22.7	+59.9	35.6	19 11.4	+60.0	35.8	20 00.0	+60.0	36.0	20
21	15 17.2	+59.8	34.7	16 06.5	+59.9	34.8	16 55.7	+59.9	35.0	17 44.8	+59.9	35.2	18 33.8	+60.0	35.4	19 22.6	+60.0	35.6	20 11.4	+60.0	35.8	21 00.0	+60.0	36.0	21
22	16 17.0	+59.9	34.6	17 06.4	+59.9	34.8	17 55.6	+59.9	34.9	18 44.7	+60.0	35.1	19 33.8	+59.9	35.3	20 22.6	+60.0	35.5	21 11.4	+60.0	35.8	22 00.0	+60.0	36.0	22
23	17 16.9	+59.8	34.5	18 06.3	+59.8	34.7	18 55.5	+59.9	34.9	19 44.7	+59.9	35.1	20 33.7	+60.0	35.3	21 22.6	+60.0	35.5	22 11.4	+60.0	35.8	23 00.0	+60.0	36.0	23
24	18 16.7	+59.8	34.4	19 06.1	+59.9	34.6	19 55.4	+60.0	34.8	20 44.6	+60.0	35.0	21 33.7	+60.0	35.3	22 22.6	+60.0	35.5	23 11.4	+60.0	35.7	24 00.0	+60.0	36.0	24
25	19 16.5	+59.9	34.4	20 06.0	+59.9	34.6	20 55.4	+59.9	34.8	21 44.6	+59.9	35.0	22 33.7	+59.9	35.2	23 22.6	+60.0	35.5	24 11.4	+60.0	35.7	25 00.0	+60.0	36.0	25
26	20 16.4	+59.8	34.3	21 05.9	+59.8	34.5	21 55.3	+59.9	34.7	22 44.5	+60.0	34.9	23 33.6	+60.0	35.2	24 22.6	+60.0	35.5	25 11.4	+60.0	35.7	26 00.0	+60.0	36.0	26
27	21 16.2	+59.8	34.2	22 05.7	+59.9	34.4	22 55.2	+59.9	34.7	23 44.5	+59.9	34.9	24 33.6	+60.0	35.2	25 22.6	+59.9	35.4	26 11.4	+60.0	35.7	27 00.0	+60.0	36.0	27
28	22 16.0	+59.8	34.1	23 05.6	+59.9	34.3	23 55.1	+59.9	34.6	24 44.4	+59.9	34.9	25 33.6	+59.9	35.1	26 22.5	+60.0	35.4	27 11.4	+60.0	35.7	28 00.0	+60.0	36.0	28
29	23 15.8	+59.8	34.0	24 05.5	+59.8	34.3	24 55.0	+59.9	34.5	25 44.3	+60.0	34.8	26 33.5	+60.0	35.1	27 22.5	+60.0	35.4	28 11.4	+60.0	35.7	29 00.0	+60.0	36.0	29
30	24 15.6	+59.9	33.9	25 05.3	+59.9	34.2	25 54.9	+59.9	34.5	26 44.3	+59.9	34.7	27 33.5	+59.9	35.0	28 22.5	+60.0	35.3	29 11.4	+60.0	35.7	30 00.0	+60.0	36.0	30
31	25 15.5	+59.8	33.9	26 05.2	+59.9	34.1	26 54.8	+59.9	34.4	27 44.2	+59.9	34.7	28 33.4	+60.0	35.0	29 22.5	+60.0	35.3	30 11.4	+59.9	35.7	31 00.0	+60.0	36.0	31
32	26 15.3	+59.8	33.8	27 05.1	+59.8	34.0	27 54.7	+59.9	34.3	28 44.1	+60.0	34.6	29 33.4	+60.0	35.0	30 22.5	+60.0	35.3	31 11.3	+60.0	35.6	32 00.0	+60.0	36.0	32
33	27 15.1	+59.8	33.7	28 04.9	+59.9	34.0	28 54.6	+59.9	34.3	29 44.1	+59.9	34.6	30 33.4	+59.9	34.9	31 22.5	+59.9	35.3	32 11.3	+60.0	35.6	33 00.0	+60.0	36.0	33
34	28 14.9	+59.8	33.6	29 04.8	+59.8	33.9	29 54.5	+59.9	34.2	30 44.0	+59.9	34.5	31 33.3	+60.0	34.9	32 22.4	+60.0	35.2	33 11.3	+60.0	35.6	34 00.0	+60.0	36.0	34
35	29 14.7	+59.8	33.5	30 04.6	+59.9	33.8	30 54.4	+59.9	34.1	31 43.9	+60.0	34.5	32 33.3	+60.0	34.8	33 22.4	+60.0	35.2	34 11.3	+60.0	35.6	35 00.0	+60.0	36.0	35
36	30 14.5	+59.8	33.4	31 04.5	+59.8	33.7	31 54.3	+59.9	34.1	32 43.9	+59.9	34.4	33 33.3	+59.9	34.8	34 22.4	+60.0	35.2	35 11.3	+60.0	35.6	36 00.0	+60.0	36.0	36
37	31 14.3	+59.7	33.3	32 04.3	+59.8	33.6	32 54.2	+59.8	34.0	33 43.8	+59.9	34.4	34 33.2	+60.0	34.7	35 22.4	+60.0	35.1	36 11.3	+60.0	35.6	37 00.0	+60.0	36.0	37
38	32 14.0	+59.8	33.2	33 04.1	+59.9	33.6	33 54.0	+59.9	33.9	34 43.7	+59.9	34.3	35 33.2	+59.9	34.7	36 22.4	+60.0	35.1	37 11.3	+60.0	35.5	38 00.0	+60.0	36.0	38
39	33 13.8	+59.8	33.1	34 04.0	+59.8	33.5	34 53.9	+59.9	33.8	35 43.6	+60.0	34.2	36 33.1	+60.0	34.7	37 22.4	+59.9	35.1	38 11.3	+60.0	35.5	39 00.0	+60.0	36.0	39
40	34 13.6	+59.8	33.0	35 03.8	+59.8	33.4	35 53.8	+59.9	33.8	36 43.6	+59.9	34.2	37 33.1	+59.9	34.6	38 22.3	+60.0	35.1	39 11.3	+60.0	35.5	40 00.0	+60.0	36.0	40
41	35 13.4	+59.7	32.9	36 03.6	+59.9	33.3	36 53.7	+59.9	33.7	37 43.5	+59.9	34.1	38 33.0	+60.0	34.6	39 22.3	+60.0	35.0	40 11.3	+60.0	35.5	41 00.0	+60.0	36.0	41
42	36 13.1	+59.8	32.8	37 03.5	+59.8	33.2	37 53.6	+59.8	33.6	38 43.4	+59.9	34.0	39 33.0	+59.9	34.5	40 22.3	+60.0	35.0	41 11.3	+60.0	35.5	42 00.0	+60.0	36.0	42
43	37 12.9	+59.8	32.7	38 03.3	+59.8	33.1	38 53.4	+59.9	33.5	39 43.3	+59.9	34.0	40 32.9	+60.0	34.5	41 22.3	+59.9	34.9	42 11.3	+60.0	35.5	43 00.0	+60.0	36.0	43
44	38 12.7	+59.7	32.6	39 03.1	+59.8	33.0	39 53.3	+59.9	33.4	40 43.2	+59.9	33.9	41 32.9	+59.9	34.4	42 22.2	+60.0	34.9	43 11.3	+60.0	35.4	44 00.0	+60.0	36.0	44
45	39 12.4	+59.7	32.4	40 02.9	+59.8	32.9	40 53.2	+59.8	33.4	41 43.1	+60.0	33.8	42 32.8	+60.0	34.3	43 22.2	+60.0	34.9	44 11.3	+60.0	35.4	45 00.0	+60.0	36.0	45
46	40 12.1	+59.8	32.3	41 02.7	+59.8	32.8	41 53.0	+59.9	33.3	42 43.1	+59.9	33.8	43 32.8	+59.9	34.3	44 22.2	+60.0	34.8	45 11.3	+60.0	35.4	46 00.0	+60.0	36.0	46
47	41 11.9	+59.7	32.2	42 02.5	+59.8	32.7	42 52.9	+59.8	33.2	43 43.0	+59.9	33.7	44 32.7	+60.0	34.2	45 22.2	+59.9	34.8	46 11.3	+60.0	35.4	47 00.0	+60.0	36.0	47
48	42 11.6	+59.7	32.1	43 02.3	+59.8	32.6	43 52.7	+59.9	33.1	44 42.9	+59.9	33.6	45 32.7	+59.9	34.2	46 22.1	+60.0	34.8	47 11.3	+60.0	35.4	48 00.0	+60.0	36.0	48
49	43 11.3	+59.7	31.9	44 02.1	+59.8	32.4	44 52.6	+59.8	33.0	45 42.8	+59.9	33.5	46 32.6	+60.0	34.1	47 22.1	+60.0	34.7	48 11.3	+59.9	35.3	49 00.0	+60.0	36.0	49
50	44 11.0	+59.7	31.8	45 01.9	+59.7	32.3	45 52.4	+59.9	32.9	46 42.7	+59.8	33.4	47 32.6	+59.9	34.0	48 22.1	+60.0	34.7	49 11.2	+60.0	35.3	50 00.0	+60.0	36.0	50
51	45 10.7	+59.7	31.7	46 01.6	+59.8	32.2	46 52.3	+59.8	32.8	47 42.5	+59.9	33.3	48 32.5	+59.9	34.0	49 22.1	+59.9	34.6	50 11.2	+60.0	35.3	51 00.0	+60.0	36.0	51
52	46 10.4	+59.7	31.5	47 01.4	+59.7	32.1	47 52.1	+59.8	32.6	48 42.4	+59.9	33.3	49 32.4	+60.0	33.9	50 22.0	+60.0	34.6	51 11.2	+60.0	35.3	52 00.0	+60.0	36.0	52
53	47 10.1	+59.6	31.4	48 01.1	+59.8	31.9	48 51.9	+59.8	32.5	49 42.3	+59.9	33.2	50 32.4	+59.9	33.8	51 22.0	+60.0	34.5	52 11.2	+60.0	35.2	53 00.0	+60.0	36.0	53
54	48 09.7	+59.7	31.2	49 00.9	+59.7	31.8	49 51.7	+59.8	32.4	50 42.2	+59.9	33.1	51 32.3	+59.9	33.7	52 22.0	+59.9	34.5	53 11.2	+60.0	35.2	54 00.0	+60.0	36.0	54
55	49 09.4	+59.6	31.0	50 00.6	+59.7	31.6	50 51.5	+59.8	32.3	51 42.1	+59.8	33.0	52 32.2	+59.9	33.7	53 21.9	+60.0	34.4	54 11.2	+60.0	35.2	55 00.0	+60.0	36.0	55
56	50 09.0	+59.6	30.9	51 00.3	+59.7	31.5	51 51.3	+59.8	32.2	52 41.9	+59.9	32.8	53 32.1	+59.9	33.6	54 21.9	+60.0	34.3	55 11.2	+60.0	35.2	56 00.0	+60.0	36.0	56
57	51 08.6	+59.6	30.7	52 00.0	+59.7	31.3	52 51.1	+59.8	32.0	53 41.8	+59.8	32.7	54 32.0	+60.0	33.5	55 21.9	+59.9	34.3	56 11.2	+60.0	35.1	57 00.0	+60.0	36.0	57
58	52 08.2	+59.6	30.5	52 59.7	+59.7	31.2	53 50.9	+59.8	31.9	54 41.6	+59.9	32.6	55 32.0	+59.9	33.4	56 21.8	+60.0	34.2	57 11.2	+60.0	35.1	58 00.0	+60.0	36.0	58
59	53 07.8	+59.6	30.3	53 59.4	+59.7	31.0	54 50.7	+59.7	31.7	55 41.5	+59.8	32.5	56 31.9	+59.9	33.3	57 21.8	+59.9	34.1	58 11.2	+60.0	35.0	59 00.0	+60.0	36.0	59
60	54 07.4	+59.5	30.1	54 59.1	+59.6	30.8	55 50.4	+59.8	31.6	56 41.3	+59.8	32.4	57 31.8	+59.9	33.2	58 21.7	+60.0	34.1	59 11.2	+59.9	35.0	60 00.0	+60.0	36.0	60
61	55 06.9	+59.5	29.9	55 58.7	+59.7	30.6	56 50.2	+59.7	31.4	57 41.1	+59.9	32.2	58 31.7	+59.9	33.1	59 21.7	+59.9	34.0	60 11.1	+60.0	35.0	61 00.0	+60.0	36.0	61
62	56 06.4	+59.5	29.7	56 58.4	+59.6	30.4	57 49.9	+59.7	31.2	58 41.0	+59.8	32.1	59 31.6	+59.8	33.0	60 21.6	+60.0	33.9	61 11.1	+60.0	34.9	62 00.0	+60.0	36.0	62
63	57 05.9	+59.5	29.4	57 58.0	+59.5	30.2	58 49.6	+59.7	31.0	59 40.8	+59.8	31.9	60 31.4	+59.9	32.8	61 21.6	+59.9	33.8	62 11.1	+60.0	34.9	63 00.0	+60.0	36.0	63
64	58 05.4	+59.4	29.2	58 57.5	+59.6	30.0	59 49.3	+59.7	30.8	60 40.6	+59.8	31.7	61 31.3	+59.9	32.7	62 21.5	+60.0	33.7	63 11.1	+60.0	34.8	64 00.0	+60.0	36.0	64
65	59 04.8	+59.4	28.9	59 57.1	+59.5	29.7	60 49.0	+59.6	30.6	61 40.4	+59.7	31.6	62 31.2	+59.9	32.6	63 21.5	+59.9	33.6	64 11.1	+60.0	34.8	65 00.0	+60.0	36.0	65
66	60 04.2	+59.3	28.6	60 56.6	+59.5	29.5	61 48.6	+59.7	30.4	62 40.1	+59.8	31.4	63 31.1	+59.8	32.4	64 21.4	+59.9	33.5	65 11.1	+59.9	34.7	66 00.0	+60.0	36.0	66
67	61 03.5	+59.4	28.3	61 56.1	+59.5	29.2	62 48.3	+59.6	30.2	63 39.9	+59.7	31.2	64 30.9	+59.9	32.3	65 21.3	+60.0	33.4	66 11.0	+60.0	34.7	67 00.0	+60.0	36.0	67
68	62 02.9	+59.2	28.0	62 55.6	+59.4	28.9	63 47.9	+59.6	29.9	64 39.6	+59.7	31.0	65 30.8	+59.8	32.1	66 21.3	+59.9	33.3	67 11.0	+60.0	34.6	68 00.0	+60.0	36.0	68
69	63 02.1	+59.3	27.7	63 55.0	+59.4	28.6	64 47.5	+59.5	29.6	65 39.3	+59.7	30.7	66 30.6	+59.8	31.9	67 21.2	+59.9	33.2	68 11.0	+60.0	34.5	69 00.0	+60.0	36.0	69
70	64 01.4	+59.1	27.3	64 54.4	+59.4	28.3	65 47.0	+59.5	29.3	66 39.0	+59.7	30.5	67 30.4	+59.8	31.7	68 21.1	+59.9	33.0	69 11.0	+60.0	34.4	70 00.0	+60.0	36.0	70
71	65 00.5	+59.1	26.9	65 53.8	+59.3	27.9	66 46.5	+59.5	29.0	67 38.7	+59.6	30.2	68 30.2	+59.8	31.5	69 21.0	+59.9	32.9	70 11.0	+59.9	34.4	71 00.0	+60.0	36.0	71
72	65 59.6	+59.0	26.5	66 53.1	+59.2	27.6	67 46.0	+59.4	28.7	68 38.3	+59.6	29.9	69 30.0	+59.7	31.2	70 20.9	+59.9	32.7	71 10.9	+60.0	34.3	72 00.0	+60.0	36.0	72
73	66 58.6	+59.0	26.1	67 52.3	+59.2	27.1	68 45.4	+59.4	28.3	69 37.9	+59.6	29.6	70 29.7	+59.8	31.0	71 20.8	+59.8	32.5	72 10.9	+60.0	34.2	73 00.0	+60.0	36.0	73
74	67 57.6	+58.8	25.6	68 51.5	+59.0	26.7	69 44.8	+59.3	27.9	70 37.5	+59.5	29.2	71 29.5	+59.7	30.7	72 20.6	+59.9	32.3	73 10.9	+59.9	34.1	74 00.0	+60.0	36.0	74
75	68 56.4	+58.8	25.0	69 50.5	+59.0	26.2	70 44.1	+59.2	27.5	71 37.0	+59.4	28.8	72 29.2	+59.6	30.4	73 20.5	+59.8	32.1	74 10.8	+60.0	33.9	75 00.0	+60.0	36.0	75
76	69 55.2	+58.6	24.5	70 49.5	+58.9	25.7	71 43.3	+59.2	27.0	72 36.4	+59.4	28.4	73 28.8	+59.7	30.0	74 20.3	+59.8	31.8	75 10.8	+59.9	33.8	76 00.0	+60.0	36.0	76
77	70 53.8	+58.5	23.8	71 48.4	+58.8	25.1	72 42.5	+59.0	26.4	73 35.8	+59.4	27.9	74 28.5	+59.5	29.6	75 20.1	+59.8	31.5	76 10.7	+60.0	33.6	77 00.0	+60.0	36.0	77
78	71 52.3	+58.3	23.1	72 47.2	+58.6	24.4	73 41.5	+58.9	25.8	74 35.2	+59.2	27.4	75 28.0	+59.5	29.1	76 19.9	+59.8	31.1	77 10.7	+59.9	33.4	78 00.0	+60.0	36.0	78
79	72 50.6	+58.0	22.3	73 45.8	+58.4	23.6	74 40.4	+58.8	25.1	75 34.4	+59.1	26.8	76 27.5	+59.5	28.6	77 19.7	+59.7	30.7	78 10.6	+59.9	33.2	79 00.0	+60.0	36.0	79
80	73 48.6	+57.9	21.5	74 44.2	+58.3	22.8	75 39.2	+58.6	24.3	76 33.5	+59.0	26.0	77 27.0	+59.3	28.0	78 19.4	+59.7	30.3	79 10.5	+59.9	32.9	80 00.0	+60.0	36.0	80
81	74 46.5	+57.6	20.5	75 42.5	+57.9	21.9	76 37.8	+58.4	23.4	77 32.5	+58.8	25.2	78 26.3	+59.3	27.3	79 19.1	+59.6	29.7	80 10.4	+59.9	32.6	81 00.0	+60.0	36.0	81
82	75 44.1	+57.2	19.4	76 40.4	+57.7	20.8	77 36.2	+58.1	22.4	78 31.3	+58.6	24.3	79 25.6	+59.0	26.5	80 18.7	+59.5	29.1	81 10.3	+59.8	32.2	82 00.0	+60.0	36.0	82
83	76 41.3	+56.8	18.1	77 38.1	+57.3	19.5	78 34.3	+57.8	21.2	79 29.9	+58.3	23.1	80 24.6	+58.9	25.5	81 18.2	+59.3	28.3	82 10.1	+59.8	31.7	83 00.0	+60.0	36.0	83
84	77 38.1	+56.2	16.7	78 35.4	+56.7	18.1	79 32.1	+57.3	19.8	80 28.2	+57.9	21.8	81 23.5	+58.5	24.2	82 17.5	+59.2	27.3	83 09.9	+59.8	31.1	84 00.0	+60.0	36.0	84
85	78 34.3	+55.6	15.0	79 32.1	+56.1	16.4	80 29.4	+56.7	18.1	81 26.1	+57.4	20.1	82 22.0	+58.1	22.7	83 16.7	+58.9	26.0	84 09.7	+59.6	30.2	85 00.0	+60.0	36.0	85
86	79 29.9	+54.7	13.0	80 28.2	+55.3	14.3	81 26.1	+55.9	16.0	82 23.5	+56.6	18.0	83 20.1	+57.5	20.7	84 15.6	+58.5	24.2	85 09.3	+59.5	29.0	86 00.0	+60.0	36.0	86
87	80 24.6	+53.6	10.6	81 23.5	+54.0	11.9	82 22.0	+54.7	13.4	83 20.1	+55.5	15.4	84 17.6	+56.5	18.0	85 14.1	+57.7	21.7	86 08.8	+59.0	27.2	87 00.0	+60.0	36.0	87
88	81 18.2	+51.9	7.8	82 17.5	+52.4	8.8	83 16.7	*+53.0* •	10.1	84 15.6	*+53.7* •	11.8	85 14.1	*+54.7* •	14.3	86 11.8	*+56.0* •	18.0	87 07.8	*+58.1* •	24.2	88 00.0	+60.0	36.0	88
89	82 10.1	*+49.9* •	4.3	83 09.9	*+50.1* •	4.9	84 09.7	*+50.3* •	5.8	85 09.3	*+50.7* •	7.0	86 08.8	*+51.2* •	8.8	87 07.8	*+52.2* •	11.8	88 05.9	*+54.1* •	18.0	89 00.0	+60.0	36.0	89
90	83 00.0	*+46.9* •	0.0	84 00.0	*+46.6* •	0.0	85 00.0	*+46.1* •	0.0	86 00.0	*+45.3* •	0.0	87 00.0	*+43.9* •	0.0	88 00.0	*+40.3* •	0.0	89 00.0	*+22.9* •	0.0	90 00.0	−60.0	18.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 144°, 216°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 35.1	+59.9	142.8	4 47.3	+59.9	142.8	3 59.5	+59.9	142.9	3 11.6	+60.0	142.9	2 23.7	+60.0	143.0	1 35.8	+60.0	143.0	0 47.9	+60.0	143.0	0 00.0	+60.0	143.0	0
1	6 35.0	+59.8	142.7	5 47.2	+59.9	142.8	4 59.4	+59.9	142.8	4 11.6	+59.9	142.9	3 23.7	+60.0	142.9	2 35.8	+60.0	143.0	1 47.9	+60.0	143.0	1 00.0	+60.0	143.0	1
2	7 34.8	+59.8	142.6	6 47.1	+59.9	142.7	5 59.3	+59.9	142.8	5 11.5	+60.0	142.8	4 23.7	+59.9	142.9	3 35.8	+60.0	142.9	2 47.9	+60.0	143.0	2 00.0	+60.0	143.0	2
3	8 34.6	+59.9	142.6	7 47.0	+59.8	142.7	6 59.2	+59.9	142.7	6 11.5	+59.9	142.8	5 23.6	+60.0	142.9	4 35.8	+60.0	142.9	3 47.9	+60.0	143.0	3 00.0	+60.0	143.0	3
4	9 34.5	+59.8	142.5	8 46.8	+59.9	142.6	7 59.1	+60.0	142.7	7 11.4	+59.9	142.8	6 23.6	+60.0	142.8	5 35.8	+60.0	142.9	4 47.9	+60.0	143.0	4 00.0	+60.0	143.0	4
5	10 34.3	+59.8	142.4	9 46.7	+59.9	142.5	8 59.1	+59.9	142.6	8 11.3	+60.0	142.7	7 23.6	+60.0	142.8	6 35.8	+59.9	142.9	5 47.9	+60.0	142.9	5 00.0	+60.0	143.0	5
6	11 34.1	+59.9	142.3	10 46.6	+59.9	142.5	9 59.0	+59.9	142.6	9 11.3	+59.9	142.7	8 23.6	+59.9	142.8	7 35.7	+60.0	142.9	6 47.9	+60.0	142.9	6 00.0	+60.0	143.0	6
7	12 34.0	+59.8	142.3	11 46.5	+59.8	142.4	10 58.9	+59.9	142.5	10 11.2	+60.0	142.6	9 23.5	+60.0	142.7	8 35.7	+60.0	142.8	7 47.9	+60.0	142.9	7 00.0	+60.0	143.0	7
8	13 33.8	+59.8	142.2	12 46.3	+59.9	142.3	11 58.8	+59.9	142.5	11 11.2	+59.9	142.6	10 23.5	+60.0	142.7	9 35.7	+60.0	142.8	8 47.9	+60.0	142.9	8 00.0	+60.0	143.0	8
9	14 33.6	+59.8	142.1	13 46.2	+59.9	142.3	12 58.7	+59.9	142.4	12 11.1	+60.0	142.5	11 23.5	+59.9	142.7	10 35.7	+60.0	142.8	9 47.9	+60.0	142.9	9 00.0	+60.0	143.0	9
10	15 33.4	+59.9	142.0	14 46.1	+59.9	142.2	13 58.6	+59.9	142.4	13 11.1	+59.9	142.5	12 23.4	+60.0	142.6	11 35.7	+60.0	142.8	10 47.9	+60.0	142.9	10 00.0	+60.0	143.0	10
11	16 33.3	+59.8	142.0	15 46.0	+59.8	142.1	14 58.5	+60.0	142.3	14 11.0	+60.0	142.5	13 23.4	+60.0	142.6	12 35.7	+60.0	142.7	11 47.9	+60.0	142.9	11 00.0	+60.0	143.0	11
12	17 33.1	+59.8	141.9	16 45.8	+59.9	142.1	15 58.5	+59.9	142.2	15 11.0	+59.9	142.4	14 23.4	+59.9	142.6	13 35.7	+60.0	142.7	12 47.9	+60.0	142.9	12 00.0	+60.0	143.0	12
13	18 32.9	+59.8	141.8	17 45.7	+59.9	142.0	16 58.4	+59.9	142.2	16 10.9	+59.9	142.4	15 23.3	+60.0	142.5	14 35.7	+59.9	142.7	13 47.9	+60.0	142.9	13 00.0	+60.0	143.0	13
14	19 32.7	+59.9	141.7	18 45.6	+59.8	141.9	17 58.3	+59.9	142.1	17 10.8	+60.0	142.3	16 23.3	+60.0	142.5	15 35.6	+60.0	142.7	14 47.9	+60.0	142.8	14 00.0	+60.0	143.0	14
15	20 32.6	+59.8	141.6	19 45.4	+59.9	141.9	18 58.2	+59.9	142.1	18 10.8	+59.9	142.3	17 23.3	+59.9	142.5	16 35.6	+60.0	142.7	15 47.9	+60.0	142.8	15 00.0	+60.0	143.0	15
16	21 32.4	+59.8	141.5	20 45.3	+59.9	141.8	19 58.1	+59.9	142.0	19 10.7	+60.0	142.2	18 23.2	+60.0	142.4	17 35.6	+60.0	142.6	16 47.9	+60.0	142.8	16 00.0	+60.0	143.0	16
17	22 32.2	+59.8	141.5	21 45.2	+59.8	141.7	20 58.0	+59.9	142.0	20 10.7	+59.9	142.2	19 23.2	+60.0	142.4	18 35.6	+60.0	142.6	17 47.9	+60.0	142.8	17 00.0	+60.0	143.0	17
18	23 32.0	+59.8	141.4	22 45.0	+59.9	141.6	21 57.9	+59.9	141.9	21 10.6	+59.9	142.1	20 23.2	+59.9	142.4	19 35.6	+60.0	142.6	18 47.9	+60.0	142.8	18 00.0	+60.0	143.0	18
19	24 31.8	+59.8	141.3	23 44.9	+59.8	141.6	22 57.8	+59.9	141.8	22 10.5	+60.0	142.1	21 23.1	+60.0	142.3	20 35.6	+60.0	142.6	19 47.9	+59.9	142.8	19 00.0	+60.0	143.0	19
20	25 31.6	+59.8	141.2	24 44.7	+59.9	141.5	23 57.7	+59.9	141.8	23 10.5	+59.9	142.0	22 23.1	+60.0	142.3	21 35.6	+59.9	142.5	20 47.8	+60.0	142.8	20 00.0	+60.0	143.0	20
21	26 31.4	+59.8	141.1	25 44.6	+59.9	141.4	24 57.6	+59.9	141.7	24 10.4	+60.0	142.0	23 23.1	+59.9	142.3	22 35.5	+60.0	142.5	21 47.8	+60.0	142.8	21 00.0	+60.0	143.0	21
22	27 31.2	+59.8	141.0	26 44.5	+59.8	141.3	25 57.5	+59.9	141.6	25 10.4	+59.9	141.9	24 23.0	+60.0	142.2	23 35.5	+60.0	142.5	22 47.8	+60.0	142.8	22 00.0	+60.0	143.0	22
23	28 31.0	+59.8	140.9	27 44.3	+59.8	141.3	26 57.4	+59.9	141.6	26 10.3	+59.9	141.9	25 23.0	+60.0	142.2	24 35.5	+60.0	142.5	23 47.8	+60.0	142.7	23 00.0	+60.0	143.0	23
24	29 30.8	+59.8	140.8	28 44.1	+59.9	141.2	27 57.3	+59.9	141.5	27 10.2	+60.0	141.8	26 23.0	+59.9	142.1	25 35.5	+60.0	142.4	24 47.8	+60.0	142.7	24 00.0	+60.0	143.0	24
25	30 30.6	+59.7	140.7	29 44.0	+59.8	141.1	28 57.2	+59.9	141.4	28 10.2	+59.9	141.8	27 22.9	+60.0	142.1	26 35.5	+60.0	142.4	25 47.8	+60.0	142.7	25 00.0	+60.0	143.0	25
26	31 30.3	+59.8	140.6	30 43.8	+59.9	141.0	29 57.1	+59.9	141.4	29 10.1	+59.9	141.7	28 22.9	+59.9	142.1	27 35.5	+59.9	142.4	26 47.8	+60.0	142.7	26 00.0	+60.0	143.0	26
27	32 30.1	+59.8	140.5	31 43.7	+59.8	140.9	30 57.0	+59.9	141.3	30 10.0	+60.0	141.7	29 22.8	+60.0	142.0	28 35.4	+60.0	142.4	27 47.8	+60.0	142.7	27 00.0	+60.0	143.0	27
28	33 29.9	+59.7	140.4	32 43.5	+59.8	140.8	31 56.9	+59.8	141.2	31 10.0	+59.9	141.6	30 22.8	+60.0	142.0	29 35.4	+60.0	142.3	28 47.8	+60.0	142.7	28 00.0	+60.0	143.0	28
29	34 29.6	+59.8	140.3	33 43.3	+59.9	140.7	32 56.7	+59.9	141.2	32 09.9	+59.9	141.6	31 22.8	+59.9	141.9	30 35.4	+60.0	142.3	29 47.8	+60.0	142.7	29 00.0	+60.0	143.0	29
30	35 29.4	+59.8	140.2	34 43.2	+59.8	140.6	33 56.6	+59.9	141.1	33 09.8	+59.9	141.5	32 22.7	+60.0	141.9	31 35.4	+60.0	142.3	30 47.8	+60.0	142.6	30 00.0	+60.0	143.0	30
31	36 29.2	+59.7	140.1	35 43.0	+59.8	140.6	34 56.5	+59.9	141.0	34 09.7	+59.9	141.4	33 22.7	+59.9	141.8	32 35.4	+59.9	142.2	31 47.8	+60.0	142.6	31 00.0	+60.0	143.0	31
32	37 28.9	+59.7	140.0	36 42.8	+59.8	140.5	35 56.4	+59.8	140.9	35 09.6	+60.0	141.4	34 22.6	+60.0	141.8	33 35.3	+60.0	142.2	32 47.8	+60.0	142.6	32 00.0	+60.0	143.0	32
33	38 28.6	+59.8	139.9	37 42.6	+59.8	140.4	36 56.2	+59.9	140.8	36 09.6	+59.9	141.3	35 22.6	+59.9	141.8	34 35.3	+60.0	142.2	33 47.8	+60.0	142.6	33 00.0	+60.0	143.0	33
34	39 28.4	+59.7	139.7	38 42.4	+59.8	140.3	37 56.1	+59.9	140.8	37 09.5	+59.9	141.2	36 22.5	+60.0	141.7	35 35.3	+60.0	142.2	34 47.8	+60.0	142.6	34 00.0	+60.0	143.0	34
35	40 28.1	+59.7	139.6	39 42.2	+59.8	140.2	38 56.0	+59.8	140.7	38 09.4	+59.9	141.2	37 22.5	+60.0	141.7	36 35.3	+60.0	142.1	35 47.8	+60.0	142.6	35 00.0	+60.0	143.0	35
36	41 27.8	+59.7	139.5	40 42.0	+59.8	140.0	39 55.8	+59.9	140.6	39 09.3	+59.9	141.1	38 22.5	+59.9	141.6	37 35.3	+59.9	142.1	36 47.8	+60.0	142.6	36 00.0	+60.0	143.0	36
37	42 27.5	+59.7	139.3	41 41.8	+59.8	139.9	40 55.7	+59.9	140.5	40 09.2	+59.9	141.0	39 22.4	+60.0	141.6	38 35.2	+60.0	142.1	37 47.8	+60.0	142.5	37 00.0	+60.0	143.0	37
38	43 27.2	+59.7	139.2	42 41.6	+59.8	139.8	41 55.6	+59.8	140.4	41 09.1	+59.9	141.0	40 22.4	+59.9	141.5	39 35.2	+60.0	142.0	38 47.8	+60.0	142.5	38 00.0	+60.0	143.0	38
39	44 26.9	+59.7	139.1	43 41.4	+59.7	139.7	42 55.4	+59.8	140.3	42 09.0	+59.9	140.9	41 22.3	+59.9	141.4	40 35.2	+60.0	142.0	39 47.8	+60.0	142.5	39 00.0	+60.0	143.0	39
40	45 26.6	+59.7	138.9	44 41.1	+59.8	139.6	43 55.2	+59.9	140.2	43 08.9	+59.9	140.8	42 22.2	+60.0	141.4	41 35.2	+60.0	141.9	40 47.8	+60.0	142.5	40 00.0	+60.0	143.0	40
41	46 26.3	+59.6	138.8	45 40.9	+59.7	139.5	44 55.1	+59.8	140.1	44 08.8	+59.9	140.7	43 22.2	+59.9	141.3	42 35.2	+59.9	141.9	41 47.8	+59.9	142.5	41 00.0	+60.0	143.0	41
42	47 25.9	+59.6	138.6	46 40.6	+59.8	139.3	45 54.9	+59.8	140.0	45 08.7	+59.9	140.6	44 22.1	+60.0	141.3	43 35.1	+60.0	141.9	42 47.7	+60.0	142.4	42 00.0	+60.0	143.0	42
43	48 25.5	+59.7	138.5	47 40.4	+59.7	139.2	46 54.7	+59.9	139.9	46 08.6	+59.9	140.6	45 22.1	+59.9	141.2	44 35.1	+60.0	141.8	43 47.7	+60.0	142.4	43 00.0	+60.0	143.0	43
44	49 25.2	+59.6	138.3	48 40.1	+59.7	139.0	47 54.6	+59.8	139.8	47 08.5	+59.9	140.5	46 22.0	+59.9	141.1	45 35.1	+59.9	141.8	44 47.7	+60.0	142.4	44 00.0	+60.0	143.0	44
45	50 24.8	+59.6	138.1	49 39.8	+59.8	138.9	48 54.4	+59.8	139.7	48 08.4	+59.9	140.4	47 21.9	+60.0	141.1	46 35.0	+60.0	141.7	45 47.7	+60.0	142.4	45 00.0	+60.0	143.0	45
46	51 24.4	+59.5	137.9	50 39.6	+59.7	138.7	49 54.2	+59.8	139.5	49 08.3	+59.9	140.3	48 21.9	+59.9	141.0	47 35.0	+60.0	141.7	46 47.7	+60.0	142.4	46 00.0	+60.0	143.0	46
47	52 23.9	+59.6	137.7	51 39.3	+59.6	138.6	50 54.0	+59.8	139.4	50 08.2	+59.8	140.2	49 21.8	+59.9	140.9	48 35.0	+60.0	141.7	47 47.7	+60.0	142.3	47 00.0	+60.0	143.0	47
48	53 23.5	+59.5	137.5	52 38.9	+59.7	138.4	51 53.8	+59.7	139.3	51 08.0	+59.9	140.1	50 21.7	+60.0	140.9	49 35.0	+59.9	141.6	48 47.7	+60.0	142.3	48 00.0	+60.0	143.0	48
49	54 23.0	+59.5	137.3	53 38.6	+59.7	138.2	52 53.5	+59.8	139.1	52 07.9	+59.8	140.0	51 21.7	+59.9	140.8	50 34.9	+60.0	141.6	49 47.7	+60.0	142.3	49 00.0	+60.0	143.0	49
50	55 22.5	+59.5	137.1	54 38.3	+59.6	138.1	53 53.3	+59.8	139.0	53 07.7	+59.9	139.9	52 21.6	+59.9	140.7	51 34.9	+60.0	141.5	50 47.7	+60.0	142.3	50 00.0	+60.0	143.0	50
51	56 22.0	+59.5	136.9	55 37.9	+59.6	137.9	54 53.1	+59.7	138.8	54 07.6	+59.8	139.7	53 21.5	+59.9	140.6	52 34.9	+59.9	141.4	51 47.7	+60.0	142.2	51 00.0	+60.0	143.0	51
52	57 21.5	+59.4	136.6	56 37.5	+59.6	137.7	55 52.8	+59.7	138.7	55 07.4	+59.9	139.6	54 21.4	+59.9	140.5	53 34.8	+60.0	141.4	52 47.7	+60.0	142.2	52 00.0	+60.0	143.0	52
53	58 20.9	+59.4	136.4	57 37.1	+59.6	137.4	56 52.5	+59.8	138.5	56 07.3	+59.8	139.5	55 21.3	+59.9	140.4	54 34.8	+59.9	141.3	53 47.7	+60.0	142.2	53 00.0	+60.0	143.0	53
54	59 20.3	+59.4	136.1	58 36.7	+59.5	137.2	57 52.3	+59.7	138.3	57 07.1	+59.8	139.3	56 21.2	+59.9	140.3	55 34.7	+60.0	141.3	54 47.7	+59.9	142.2	54 00.0	+60.0	143.0	54
55	60 19.7	+59.3	135.8	59 36.2	+59.5	137.0	58 52.0	+59.6	138.1	58 06.9	+59.8	139.2	57 21.1	+59.9	140.2	56 34.7	+60.0	141.2	55 47.6	+60.0	142.1	55 00.0	+60.0	143.0	55
56	61 19.0	+59.3	135.5	60 35.7	+59.5	136.7	59 51.6	+59.7	137.9	59 06.7	+59.8	139.0	58 21.0	+59.9	140.1	57 34.7	+59.9	141.1	56 47.6	+60.0	142.1	56 00.0	+60.0	143.0	56
57	62 18.3	+59.2	135.2	61 35.2	+59.5	136.5	60 51.3	+59.6	137.7	60 06.5	+59.8	138.9	59 20.9	+59.9	140.0	58 34.6	+60.0	141.0	57 47.6	+60.0	142.0	57 00.0	+60.0	143.0	57
58	63 17.5	+59.1	134.8	62 34.7	+59.4	136.2	61 50.9	+59.6	137.5	61 06.3	+59.7	138.7	60 20.8	+59.9	139.9	59 34.6	+59.9	141.0	58 47.6	+60.0	142.0	58 00.0	+60.0	143.0	58
59	64 16.6	+59.2	134.4	63 34.1	+59.4	135.9	62 50.5	+59.6	137.2	62 06.0	+59.8	138.5	61 20.7	+59.8	139.7	60 34.5	+59.9	140.9	59 47.6	+60.0	142.0	59 00.0	+60.0	143.0	59
60	65 15.8	+59.0	134.0	64 33.5	+59.3	135.5	63 50.1	+59.6	137.0	63 05.8	+59.7	138.3	62 20.5	+59.9	139.6	61 34.4	+60.0	140.8	60 47.6	+60.0	141.9	60 00.0	+60.0	143.0	60
61	66 14.8	+58.9	133.6	65 32.8	+59.3	135.2	64 49.7	+59.5	136.7	64 05.5	+59.7	138.1	63 20.4	+59.8	139.4	62 34.4	+59.9	140.7	61 47.6	+60.0	141.9	61 00.0	+60.0	143.0	61
62	67 13.7	+58.9	133.1	66 32.1	+59.2	134.8	65 49.2	+59.5	136.4	65 05.2	+59.7	137.9	64 20.2	+59.9	139.3	63 34.3	+60.0	140.6	62 47.6	+59.9	141.8	62 00.0	+60.0	143.0	62
63	68 12.6	+58.8	132.6	67 31.3	+59.2	134.4	66 48.7	+59.4	136.1	66 04.9	+59.7	137.6	65 20.1	+59.8	139.1	64 34.3	+59.9	140.5	63 47.5	+60.0	141.8	63 00.0	+60.0	143.0	63
64	69 11.4	+58.6	132.0	68 30.5	+59.0	133.9	67 48.1	+59.4	135.7	67 04.6	+59.6	137.4	66 19.9	+59.8	138.9	65 34.2	+59.9	140.4	64 47.5	+60.0	141.7	64 00.0	+60.0	143.0	64
65	70 10.0	+58.5	131.4	69 29.5	+59.0	133.4	68 47.5	+59.4	135.3	68 04.2	+59.6	137.1	67 19.7	+59.8	138.7	66 34.1	+59.9	140.2	65 47.5	+60.0	141.7	65 00.0	+60.0	143.0	65
66	71 08.5	+58.4	130.8	70 28.5	+58.9	132.9	69 46.9	+59.2	134.9	69 03.8	+59.6	136.8	68 19.5	+59.8	138.5	67 34.0	+59.9	140.1	66 47.5	+60.0	141.6	66 00.0	+60.0	143.0	66
67	72 06.9	+58.1	130.0	71 27.4	+58.7	132.3	70 46.1	+59.2	134.4	70 03.4	+59.5	136.4	69 19.3	+59.7	138.2	68 33.9	+59.9	139.9	67 47.5	+59.9	141.5	67 00.0	+60.0	143.0	67
68	73 05.0	+58.0	129.2	72 26.1	+58.6	131.7	71 45.3	+59.1	133.9	71 02.9	+59.5	136.0	70 19.0	+59.7	138.0	69 33.8	+59.9	139.8	68 47.4	+60.0	141.5	68 00.0	+60.0	143.0	68
69	74 03.0	+57.7	128.3	73 24.7	+58.5	130.9	72 44.4	+59.0	133.4	72 02.4	+59.4	135.6	71 18.7	+59.7	137.7	70 33.7	+59.9	139.6	69 47.4	+60.0	141.4	69 00.0	+60.0	143.0	69
70	75 00.7	+57.3	127.3	74 23.2	+58.2	130.1	73 43.4	+58.9	132.7	73 01.8	+59.3	135.2	72 18.4	+59.7	137.4	71 33.6	+59.8	139.4	70 47.4	+59.9	141.3	70 00.0	+60.0	143.0	70
71	75 58.0	+57.0	126.1	75 21.4	+58.0	129.2	74 42.3	+58.7	132.0	74 01.1	+59.3	134.6	73 18.1	+59.6	137.0	72 33.4	+59.9	139.2	71 47.3	+60.0	141.2	71 00.0	+60.0	143.0	71
72	76 55.0	+56.5	124.8	76 19.4	+57.6	128.1	75 41.0	+58.6	131.2	75 00.4	+59.1	134.0	74 17.7	+59.6	136.6	73 33.3	+59.8	138.9	72 47.3	+60.0	141.1	72 00.0	+60.0	143.0	72
73	77 51.5	+56.0	123.2	77 17.0	+57.3	126.9	76 39.6	+58.3	130.3	75 59.5	+59.1	133.4	75 17.3	+59.5	136.1	74 33.1	+59.8	138.7	73 47.3	+59.9	140.9	73 00.0	+60.0	143.0	73
74	78 47.5	+55.1	121.4	78 14.3	+56.8	125.5	77 37.9	+58.0	129.2	76 58.6	+58.8	132.6	76 16.8	+59.4	135.6	75 32.9	+59.8	138.3	74 47.2	+60.0	140.8	74 00.0	+60.0	143.0	74
75	79 42.6	+54.2	119.3	79 11.1	+56.2	123.9	78 35.9	+57.7	128.0	77 57.4	+58.7	131.7	77 16.2	+59.3	135.0	76 32.7	+59.7	138.0	75 47.2	+59.9	140.6	75 00.0	+60.0	143.0	75
76	80 36.8	+52.9	116.8	80 07.3	+55.4	121.9	79 33.6	+57.1	126.5	78 56.1	+58.4	130.7	78 15.5	+59.3	134.3	77 32.4	+59.7	137.6	76 47.1	+59.9	140.4	76 00.0	+60.0	143.0	76
77	81 29.7	+51.1	•113.8	81 02.7	+54.3	119.6	80 30.7	+56.5	124.8	79 54.5	+58.1	129.4	79 14.8	+59.0	133.5	78 32.1	+59.6	137.1	77 47.0	+60.0	140.2	77 00.0	+60.0	143.0	77
78	82 20.8	+48.8	•110.0	81 57.0	+52.8	116.7	81 27.2	+55.7	122.6	80 52.6	+57.6	127.9	80 13.8	+58.8	132.5	79 31.7	+59.6	136.5	78 47.0	+59.9	140.0	78 00.0	+60.0	143.0	78
79	83 09.6	+45.4	•105.4	82 49.8	+50.6	•113.1	82 22.9	+54.4	120.0	81 50.2	+56.9	126.0	81 12.6	+58.6	131.3	80 31.3	+59.4	135.8	79 46.9	+59.9	139.7	79 00.0	+60.0	143.0	79
80	83 55.0	+40.6	• 99.6	83 40.4	+47.5	•108.5	83 17.3	+52.6	•116.6	82 47.1	+56.0	123.7	82 11.2	+58.1	129.8	81 30.7	+59.4	134.9	80 46.8	+59.8	139.3	80 00.0	+60.0	143.0	80
81	84 35.6	+33.9	• 92.2	84 27.9	+42.8	•102.6	84 09.9	+49.8	•112.2	83 43.1	+54.6	120.6	83 09.3	+57.5	127.8	82 30.1	+59.1	133.8	81 46.6	+59.8	138.8	81 00.0	+60.0	143.0	81
82	85 09.5	+24.6	• 82.9	85 10.7	+35.8	• 94.8	84 59.7	+45.4	•106.3	84 37.7	+52.3	•116.5	84 06.8	+56.6	125.2	83 29.2	+58.7	132.4	82 46.4	+59.8	138.3	82 00.0	+60.0	143.0	82
83	85 34.1	+12.4	• 71.6	85 46.5	+25.4	• 84.6	85 45.1	+38.2	• 98.1	85 30.0	+48.4	•110.8	85 03.4	+54.8	•121.7	84 27.9	+58.3	130.5	83 46.2	+59.6	137.5	83 00.0	+60.0	143.0	83
84	85 46.5	–1.4	• 58.6	86 11.9	+11.4	• 71.6	86 23.3	+26.5	• 86.8	86 18.4	+41.2	•102.5	85 58.2	+51.8	•116.5	85 26.2	+57.3	127.8	84 45.8	+59.6	136.4	84 00.0	+60.0	143.0	84
85	85 45.1	–15.1	• 45.1	86 23.3	–4.9	• 56.4	86 49.8	+9.8	• 71.6	86 59.6	+28.2	• 89.9	86 50.0	+45.2	•108.3	86 23.5	+55.3	•123.6	85 45.4	+59.2	134.9	85 00.0	+60.0	143.0	85
86	85 30.0	–26.6	• 32.4	86 18.4	–20.2	• 40.7	86 59.6	–9.6	• 53.2	87 27.8	+7.4	• 71.5	87 35.2	+30.6	• 94.7	87 18.8	+50.3	•116.4	86 44.6	+58.5	132.4	86 00.0	+60.0	143.0	86
87	85 03.4	–35.5	• 21.4	85 58.2	–32.0	• 26.6	86 50.0	–26.5	• 34.8	87 35.2	–16.4	• 48.4	88 05.8	+3.3	• 71.5	88 09.1	+34.8	•102.4	87 43.1	+56.3	•127.7	87 00.0	+60.0	143.0	87
88	84 27.9	–41.7	• 12.6	85 26.2	–40.4	• 15.3	86 23.5	–38.1	• 19.5	87 18.8	–34.2	• 26.6	88 09.1	–26.0	• 40.6	88 43.9	–4.5	• 71.5	88 39.4	+42.5	•116.4	88 00.0	+60.0	143.0	88
89	83 46.2	–46.2	• 5.6	84 45.8	–45.8	• 6.6	85 45.4	–45.4	• 8.2	86 44.6	–44.6	• 10.7	87 43.1	–43.1	• 15.3	88 39.4	–39.4	• 26.6	89 21.9	–21.9	• 71.5	89 00.0	+60.0	143.0	89
90	83 00.0	–49.3	• 0.0	84 00.0	–49.5	• 0.0	85 00.0	–49.8	• 0.0	86 00.0	–50.2	• 0.0	87 00.0	–50.8	• 0.0	88 00.0	–51.8	• 0.0	89 00.0	–53.8	• 0.0	90 00.0	–60.0	71.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 37°, 323°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 35.1	−59.8	142.8	4 47.3	−59.9	142.8	3 59.5	−59.9	142.9	3 11.6	−59.9	142.9	2 23.7	−59.9	143.0	1 35.8	−60.0	143.0	0 47.9	−60.0	143.0	0 00.0	+60.0	37.0	**0**
1	4 35.3	−59.9	142.9	3 47.4	−59.8	142.9	2 59.6	−60.0	142.9	2 11.7	−60.0	143.0	1 23.8	−60.0	143.0	0 35.8	−59.9	143.0	0 12.1	+60.0	37.0	1 00.0	+60.0	37.0	**1**
2	3 35.4	−59.8	142.9	2 47.6	−59.9	143.0	1 59.6	−59.9	143.0	1 11.7	−59.9	143.0	0 23.8	−60.0	143.0	0 24.1	+60.0	37.0	1 12.1	+60.0	37.0	2 00.0	+60.0	37.0	**2**
3	2 35.6	−59.8	143.0	1 47.7	−59.9	143.0	0 59.7	−59.9	143.1	0 11.8	−60.0	143.1	0 36.2	+60.0	36.9	1 24.1	+60.0	37.0	2 12.1	+60.0	37.0	3 00.0	+60.0	37.0	**3**
4	1 35.8	−59.9	143.1	0 47.8	−59.9	143.1	0 00.2	+59.9	36.9	0 48.2	+59.9	36.9	1 36.2	+59.9	36.9	2 24.1	+60.0	36.9	3 12.1	+60.0	37.0	4 00.0	+60.0	37.0	**4**
5	0 35.9	−59.8	143.2	0 12.1	+59.9	36.8	1 00.1	+59.9	36.8	1 48.1	+60.0	36.9	2 36.1	+60.0	36.9	3 24.1	+60.0	36.9	4 12.1	+60.0	37.0	5 00.0	+60.0	37.0	**5**
6	0 23.9	+59.8	36.8	1 12.0	+59.8	36.8	2 00.0	+59.9	36.8	2 48.1	+59.9	36.8	3 36.1	+60.0	36.8	4 24.1	+60.0	36.9	5 12.1	+60.0	36.9	6 00.0	+60.0	37.0	**6**
7	1 23.7	+59.9	36.7	2 11.8	+59.9	36.7	2 59.9	+60.0	36.7	3 48.0	+60.0	36.8	4 36.1	+59.9	36.8	5 24.1	+60.0	36.9	6 12.1	+60.0	36.9	7 00.0	+60.0	37.0	**7**
8	2 23.6	+59.8	36.6	3 11.7	+59.9	36.6	3 59.9	+59.9	36.7	4 48.0	+59.9	36.7	5 36.0	+60.0	36.8	6 24.1	+60.0	36.8	7 12.1	+60.0	36.9	8 00.0	+60.0	37.0	**8**
9	3 23.4	+59.9	36.5	4 11.6	+59.9	36.6	4 59.8	+59.9	36.6	5 47.9	+60.0	36.7	6 36.0	+60.0	36.8	7 24.1	+59.9	36.8	8 12.1	+59.9	36.9	9 00.0	+60.0	37.0	**9**
10	4 23.3	+59.8	36.5	5 11.5	+59.9	36.5	5 59.7	+59.9	36.6	6 47.9	+59.9	36.6	7 36.0	+59.9	36.7	8 24.0	+60.0	36.8	9 12.0	+60.0	36.9	10 00.0	+60.0	37.0	**10**
11	5 23.1	+59.8	36.4	6 11.4	+59.9	36.5	6 59.6	+59.9	36.5	7 47.8	+59.9	36.6	8 35.9	+60.0	36.7	9 24.0	+60.0	36.8	10 12.0	+60.0	36.9	11 00.0	+60.0	37.0	**11**
12	6 22.9	+59.9	36.3	7 11.3	+59.8	36.4	7 59.5	+59.9	36.5	8 47.7	+60.0	36.6	9 35.9	+60.0	36.7	10 24.0	+60.0	36.8	11 12.0	+60.0	36.9	12 00.0	+60.0	37.0	**12**
13	7 22.8	+59.8	36.2	8 11.1	+59.9	36.3	8 59.4	+60.0	36.4	9 47.7	+59.9	36.5	10 35.9	+59.9	36.6	11 24.0	+60.0	36.7	12 12.0	+60.0	36.9	13 00.0	+60.0	37.0	**13**
14	8 22.6	+59.8	36.2	9 11.0	+59.9	36.3	9 59.4	+59.9	36.4	10 47.6	+60.0	36.5	11 35.8	+60.0	36.6	12 24.0	+60.0	36.7	13 12.0	+60.0	36.9	14 00.0	+60.0	37.0	**14**
15	9 22.4	+59.9	36.1	10 10.9	+59.9	36.2	10 59.3	+59.9	36.3	11 47.6	+59.9	36.4	12 35.8	+60.0	36.6	13 24.0	+60.0	36.7	14 12.0	+60.0	36.8	15 00.0	+60.0	37.0	**15**
16	10 22.3	+59.8	36.0	11 10.8	+59.8	36.1	11 59.2	+59.9	36.3	12 47.5	+60.0	36.4	13 35.8	+60.0	36.5	14 24.0	+59.9	36.7	15 12.0	+60.0	36.8	16 00.0	+60.0	37.0	**16**
17	11 22.1	+59.8	35.9	12 10.6	+59.9	36.1	12 59.1	+59.9	36.2	13 47.5	+59.9	36.3	14 35.8	+59.9	36.5	15 23.9	+60.0	36.7	16 12.0	+60.0	36.8	17 00.0	+60.0	37.0	**17**
18	12 21.9	+59.9	35.9	13 10.5	+59.9	36.0	13 59.0	+59.9	36.1	14 47.4	+60.0	36.3	15 35.7	+60.0	36.5	16 23.9	+60.0	36.6	17 12.0	+60.0	36.8	18 00.0	+60.0	37.0	**18**
19	13 21.8	+59.8	35.8	14 10.4	+59.9	35.9	14 58.9	+59.9	36.1	15 47.4	+59.9	36.3	16 35.7	+60.0	36.4	17 23.9	+60.0	36.6	18 12.0	+60.0	36.8	19 00.0	+60.0	37.0	**19**
20	14 21.6	+59.8	35.7	15 10.3	+59.8	35.9	15 58.8	+59.9	36.0	16 47.3	+59.9	36.2	17 35.7	+59.9	36.4	18 23.9	+60.0	36.6	19 12.0	+60.0	36.8	20 00.0	+60.0	37.0	**20**
21	15 21.4	+59.8	35.6	16 10.1	+59.9	35.8	16 58.7	+60.0	36.0	17 47.2	+60.0	36.2	18 35.6	+60.0	36.4	19 23.9	+60.0	36.6	20 12.0	+60.0	36.8	21 00.0	+60.0	37.0	**21**
22	16 21.2	+59.9	35.6	17 10.0	+59.9	35.7	17 58.7	+59.9	35.9	18 47.2	+59.9	36.1	19 35.6	+60.0	36.3	20 23.9	+60.0	36.5	21 12.0	+60.0	36.8	22 00.0	+60.0	37.0	**22**
23	17 21.1	+59.8	35.5	18 09.9	+59.8	35.7	18 58.6	+59.9	35.9	19 47.1	+60.0	36.1	20 35.6	+59.9	36.3	21 23.9	+59.9	36.5	22 12.0	+60.0	36.8	23 00.0	+60.0	37.0	**23**
24	18 20.9	+59.8	35.4	19 09.7	+59.9	35.6	19 58.5	+59.9	35.8	20 47.1	+59.9	36.0	21 35.5	+60.0	36.2	22 23.8	+60.0	36.5	23 12.0	+60.0	36.7	24 00.0	+60.0	37.0	**24**
25	19 20.7	+59.8	35.3	20 09.6	+59.9	35.5	20 58.4	+59.9	35.7	21 47.0	+59.9	36.0	22 35.5	+60.0	36.2	23 23.8	+60.0	36.5	24 12.0	+60.0	36.7	25 00.0	+60.0	37.0	**25**
26	20 20.5	+59.8	35.2	21 09.5	+59.8	35.5	21 58.3	+59.9	35.7	22 46.9	+60.0	35.9	23 35.5	+59.9	36.2	24 23.8	+60.0	36.4	25 12.0	+60.0	36.7	26 00.0	+60.0	37.0	**26**
27	21 20.3	+59.9	35.1	22 09.3	+59.9	35.4	22 58.2	+59.9	35.6	23 46.9	+59.9	35.9	24 35.4	+60.0	36.1	25 23.8	+60.0	36.4	26 12.0	+60.0	36.7	27 00.0	+60.0	37.0	**27**
28	22 20.2	+59.8	35.1	23 09.2	+59.9	35.3	23 58.1	+59.9	35.6	24 46.8	+59.9	35.8	25 35.4	+59.9	36.1	26 23.8	+60.0	36.4	27 12.0	+60.0	36.7	28 00.0	+60.0	37.0	**28**
29	23 20.0	+59.8	35.0	24 09.1	+59.8	35.2	24 58.0	+59.9	35.5	25 46.7	+60.0	35.8	26 35.3	+60.0	36.1	27 23.8	+59.9	36.4	28 12.0	+60.0	36.7	29 00.0	+60.0	37.0	**29**
30	24 19.8	+59.8	34.9	25 08.9	+59.9	35.2	25 57.9	+59.9	35.4	26 46.7	+59.9	35.7	27 35.3	+60.0	36.0	28 23.7	+60.0	36.3	29 12.0	+60.0	36.7	30 00.0	+60.0	37.0	**30**
31	25 19.6	+59.8	34.8	26 08.8	+59.8	35.1	26 57.8	+59.9	35.4	27 46.6	+59.9	35.7	28 35.3	+59.9	36.0	29 23.7	+60.0	36.3	30 12.0	+60.0	36.6	31 00.0	+60.0	37.0	**31**
32	26 19.4	+59.8	34.7	27 08.6	+59.9	35.0	27 57.7	+59.9	35.3	28 46.5	+60.0	35.6	29 35.2	+60.0	35.9	30 23.7	+60.0	36.3	31 12.0	+60.0	36.6	32 00.0	+60.0	37.0	**32**
33	27 19.2	+59.8	34.6	28 08.5	+59.8	34.9	28 57.6	+59.9	35.2	29 46.5	+59.9	35.6	30 35.2	+59.9	35.9	31 23.7	+60.0	36.2	32 12.0	+60.0	36.6	33 00.0	+60.0	37.0	**33**
34	28 19.0	+59.8	34.5	29 08.3	+59.8	34.8	29 57.5	+59.8	35.2	30 46.4	+59.9	35.5	31 35.1	+60.0	35.9	32 23.7	+59.9	36.2	33 12.0	+60.0	36.6	34 00.0	+60.0	37.0	**34**
35	29 18.8	+59.7	34.4	30 08.1	+59.9	34.8	30 57.3	+59.9	35.1	31 46.3	+60.0	35.4	32 35.1	+60.0	35.8	33 23.6	+60.0	36.2	34 12.0	+59.9	36.6	35 00.0	+60.0	37.0	**35**
36	30 18.5	+59.8	34.3	31 08.0	+59.8	34.7	31 57.2	+59.9	35.0	32 46.3	+59.9	35.4	33 35.1	+59.9	35.8	34 23.6	+60.0	36.2	35 11.9	+60.0	36.6	36 00.0	+60.0	37.0	**36**
37	31 18.3	+59.8	34.2	32 07.8	+59.9	34.6	32 57.1	+59.9	34.9	33 46.2	+59.9	35.3	34 35.0	+60.0	35.7	35 23.6	+60.0	36.1	36 11.9	+60.0	36.6	37 00.0	+60.0	37.0	**37**
38	32 18.1	+59.8	34.1	33 07.7	+59.8	34.5	33 57.0	+59.9	34.9	34 46.1	+59.9	35.3	35 35.0	+59.9	35.7	36 23.6	+60.0	36.1	37 11.9	+60.0	36.5	38 00.0	+60.0	37.0	**38**
39	33 17.9	+59.7	34.0	34 07.5	+59.8	34.4	34 56.9	+59.9	34.8	35 46.0	+59.9	35.2	36 34.9	+60.0	35.6	37 23.6	+59.9	36.1	38 11.9	+60.0	36.5	39 00.0	+60.0	37.0	**39**
40	34 17.6	+59.8	33.9	35 07.3	+59.8	34.3	35 56.8	+59.8	34.7	36 45.9	+60.0	35.1	37 34.9	+59.9	35.6	38 23.5	+60.0	36.0	39 11.9	+60.0	36.5	40 00.0	+60.0	37.0	**40**
41	35 17.4	+59.7	33.8	36 07.1	+59.8	34.2	36 56.6	+59.9	34.6	37 45.9	+59.9	35.1	38 34.8	+60.0	35.5	39 23.5	+60.0	36.0	40 11.9	+60.0	36.5	41 00.0	+60.0	37.0	**41**
42	36 17.1	+59.8	33.7	37 06.9	+59.9	34.1	37 56.5	+59.9	34.5	38 45.8	+59.9	35.0	39 34.8	+59.9	35.5	40 23.5	+60.0	36.0	41 11.9	+60.0	36.5	42 00.0	+60.0	37.0	**42**
43	37 16.9	+59.7	33.6	38 06.8	+59.8	34.0	38 56.4	+59.8	34.5	39 45.7	+59.9	34.9	40 34.7	+60.0	35.4	41 23.5	+60.0	35.9	42 11.9	+60.0	36.5	43 00.0	+60.0	37.0	**43**
44	38 16.6	+59.8	33.5	39 06.6	+59.8	33.9	39 56.2	+59.9	34.4	40 45.6	+59.9	34.9	41 34.7	+59.9	35.4	42 23.5	+59.9	35.9	43 11.9	+60.0	36.4	44 00.0	+60.0	37.0	**44**
45	39 16.4	+59.7	33.3	40 06.4	+59.8	33.8	40 56.1	+59.8	34.3	41 45.5	+59.9	34.8	42 34.6	+60.0	35.3	43 23.4	+60.0	35.8	44 11.9	+60.0	36.4	45 00.0	+60.0	37.0	**45**
46	40 16.1	+59.7	33.2	41 06.2	+59.7	33.7	41 55.9	+59.9	34.2	42 45.4	+59.9	34.7	43 34.6	+59.9	35.2	44 23.4	+60.0	35.8	45 11.9	+60.0	36.4	46 00.0	+60.0	37.0	**46**
47	41 15.8	+59.7	33.1	42 05.9	+59.8	33.6	42 55.8	+59.8	34.1	43 45.3	+59.9	34.6	44 34.5	+60.0	35.2	45 23.4	+60.0	35.8	46 11.9	+60.0	36.4	47 00.0	+60.0	37.0	**47**
48	42 15.5	+59.7	33.0	43 05.7	+59.8	33.5	43 55.6	+59.9	34.0	44 45.2	+59.9	34.5	45 34.5	+59.9	35.1	46 23.4	+59.9	35.7	47 11.9	+60.0	36.3	48 00.0	+60.0	37.0	**48**
49	43 15.2	+59.7	32.8	44 05.5	+59.8	33.3	44 55.5	+59.8	33.9	45 45.1	+59.9	34.5	46 34.4	+59.9	35.1	47 23.3	+60.0	35.7	48 11.9	+60.0	36.3	49 00.0	+60.0	37.0	**49**
50	44 14.9	+59.7	32.7	45 05.3	+59.7	33.2	45 55.3	+59.8	33.8	46 45.0	+59.9	34.4	47 34.3	+60.0	35.0	48 23.3	+60.0	35.6	49 11.9	+60.0	36.3	50 00.0	+60.0	37.0	**50**
51	45 14.6	+59.7	32.5	46 05.0	+59.8	33.1	46 55.1	+59.8	33.7	47 44.9	+59.9	34.3	48 34.3	+59.9	34.9	49 23.3	+59.9	35.6	50 11.9	+59.9	36.3	51 00.0	+60.0	37.0	**51**
52	46 14.3	+59.6	32.4	47 04.8	+59.7	33.0	47 54.9	+59.8	33.6	48 44.8	+59.8	34.2	49 34.2	+59.9	34.8	50 23.2	+60.0	35.5	51 11.8	+60.0	36.2	52 00.0	+60.0	37.0	**52**
53	47 13.9	+59.7	32.2	48 04.5	+59.7	32.8	48 54.7	+59.9	33.4	49 44.6	+59.9	34.1	50 34.1	+59.9	34.8	51 23.2	+60.0	35.5	52 11.8	+60.0	36.2	53 00.0	+60.0	37.0	**53**
54	48 13.6	+59.6	32.1	49 04.2	+59.7	32.7	49 54.6	+59.8	33.3	50 44.5	+59.9	34.0	51 34.0	+60.0	34.7	52 23.2	+59.9	35.4	53 11.8	+60.0	36.2	54 00.0	+60.0	37.0	**54**
55	49 13.2	+59.6	31.9	50 03.9	+59.8	32.5	50 54.4	+59.7	33.2	51 44.4	+59.8	33.9	52 34.0	+59.9	34.6	53 23.1	+60.0	35.4	54 11.8	+60.0	36.2	55 00.0	+60.0	37.0	**55**
56	50 12.8	+59.6	31.7	51 03.7	+59.6	32.4	51 54.1	+59.8	33.1	52 44.2	+59.9	33.8	53 33.9	+59.9	34.5	54 23.1	+60.0	35.3	55 11.8	+60.0	36.1	56 00.0	+60.0	37.0	**56**
57	51 12.4	+59.6	31.5	52 03.3	+59.7	32.2	52 53.9	+59.8	32.9	53 44.1	+59.8	33.6	54 33.8	+59.9	34.4	55 23.1	+59.9	35.2	56 11.8	+60.0	36.1	57 00.0	+60.0	37.0	**57**
58	52 12.0	+59.5	31.4	53 03.0	+59.7	32.0	53 53.7	+59.7	32.8	54 43.9	+59.9	33.5	55 33.7	+59.9	34.3	56 23.0	+60.0	35.2	57 11.8	+60.0	36.1	58 00.0	+60.0	37.0	**58**
59	53 11.5	+59.6	31.2	54 02.7	+59.6	31.9	54 53.4	+59.8	32.6	55 43.8	+59.8	33.4	56 33.6	+59.9	34.2	57 23.0	+59.9	35.1	58 11.8	+60.0	36.0	59 00.0	+60.0	37.0	**59**
60	54 11.1	+59.5	30.9	55 02.3	+59.7	31.7	55 53.2	+59.7	32.4	56 43.6	+59.8	33.3	57 33.5	+59.9	34.1	58 22.9	+60.0	35.0	59 11.8	+59.9	36.0	60 00.0	+60.0	37.0	**60**
61	55 10.6	+59.5	30.7	56 02.0	+59.6	31.5	56 52.9	+59.7	32.3	57 43.4	+59.8	33.1	58 33.4	+59.9	34.0	59 22.9	+59.9	34.9	60 11.7	+60.0	35.9	61 00.0	+60.0	37.0	**61**
62	56 10.1	+59.4	30.5	57 01.6	+59.6	31.3	57 52.6	+59.7	32.1	58 43.2	+59.8	33.0	59 33.3	+59.9	33.9	60 22.8	+60.0	34.9	61 11.7	+60.0	35.9	62 00.0	+60.0	37.0	**62**
63	57 09.5	+59.5	30.3	58 01.2	+59.5	31.1	58 52.3	+59.7	31.9	59 43.0	+59.8	32.8	60 33.2	+59.8	33.8	61 22.8	+59.9	34.8	62 11.7	+60.0	35.9	63 00.0	+60.0	37.0	**63**
64	58 09.0	+59.4	30.0	59 00.7	+59.6	30.8	59 52.0	+59.7	31.7	60 42.8	+59.8	32.6	61 33.0	+59.9	33.6	62 22.7	+59.9	34.7	63 11.7	+60.0	35.8	64 00.0	+60.0	37.0	**64**
65	59 08.4	+59.3	29.7	60 00.3	+59.5	30.6	60 51.7	+59.6	31.5	61 42.6	+59.7	32.5	62 32.9	+59.9	33.5	63 22.6	+60.0	34.6	64 11.7	+60.0	35.8	65 00.0	+60.0	37.0	**65**
66	60 07.7	+59.4	29.4	60 59.8	+59.4	30.3	61 51.3	+59.6	31.3	62 42.3	+59.8	32.3	63 32.8	+59.8	33.3	64 22.6	+59.9	34.5	65 11.7	+60.0	35.7	66 00.0	+60.0	37.0	**66**
67	61 07.1	+59.2	29.1	61 59.2	+59.5	30.0	62 50.9	+59.6	31.0	63 42.1	+59.7	32.1	64 32.6	+59.8	33.2	65 22.5	+59.9	34.4	66 11.7	+59.9	35.6	67 00.0	+60.0	37.0	**67**
68	62 06.3	+59.3	28.8	62 58.7	+59.4	29.7	63 50.5	+59.6	30.8	64 41.8	+59.7	31.8	65 32.4	+59.9	33.0	66 22.4	+59.9	34.2	67 11.6	+60.0	35.6	68 00.0	+60.0	37.0	**68**
69	63 05.6	+59.2	28.5	63 58.1	+59.3	29.4	64 50.1	+59.5	30.5	65 41.5	+59.7	31.6	66 32.3	+59.8	32.8	67 22.3	+59.9	34.1	68 11.6	+60.0	35.5	69 00.0	+60.0	37.0	**69**
70	64 04.8	+59.1	28.1	64 57.4	+59.3	29.1	65 49.6	+59.5	30.2	66 41.2	+59.6	31.3	67 32.1	+59.8	32.6	68 22.2	+59.9	33.9	69 11.6	+60.0	35.4	70 00.0	+60.0	37.0	**70**
71	65 03.9	+59.0	27.7	65 56.7	+59.3	28.7	66 49.1	+59.4	29.8	67 40.8	+59.6	31.1	68 31.9	+59.7	32.4	69 22.1	+59.9	33.8	70 11.6	+59.9	35.3	71 00.0	+60.0	37.0	**71**
72	66 02.9	+59.0	27.3	66 56.0	+59.2	28.3	67 48.5	+59.4	29.5	68 40.4	+59.6	30.8	69 31.6	+59.8	32.1	70 22.0	+59.9	33.6	71 11.5	+60.0	35.2	72 00.0	+60.0	37.0	**72**
73	67 01.9	+58.9	26.8	67 55.2	+59.1	27.9	68 47.9	+59.4	29.1	69 40.0	+59.5	30.4	70 31.4	+59.7	31.9	71 21.9	+59.9	33.4	72 11.5	+60.0	35.1	73 00.0	+60.0	37.0	**73**
74	68 00.8	+58.8	26.3	68 54.3	+59.0	27.4	69 47.3	+59.2	28.7	70 39.5	+59.5	30.1	71 31.1	+59.7	31.6	72 21.8	+59.8	33.2	73 11.5	+59.9	35.0	74 00.0	+60.0	37.0	**74**
75	68 59.6	+58.6	25.8	69 53.3	+59.0	26.9	70 46.5	+59.2	28.2	71 39.0	+59.5	29.7	72 30.8	+59.6	31.2	73 21.6	+59.8	33.0	74 11.4	+60.0	34.9	75 00.0	+60.0	37.0	**75**
76	69 58.2	+58.6	25.2	70 52.3	+58.8	26.4	71 45.7	+59.1	27.7	72 38.5	+59.3	29.2	73 30.4	+59.6	30.9	74 21.4	+59.8	32.7	75 11.4	+59.9	34.7	76 00.0	+60.0	37.0	**76**
77	70 56.8	+58.4	24.5	71 51.1	+58.7	25.8	72 44.8	+59.0	27.2	73 37.8	+59.3	28.7	74 30.0	+59.6	30.4	75 21.2	+59.8	32.4	76 11.3	+59.9	34.5	77 00.0	+60.0	37.0	**77**
78	71 55.2	+58.2	23.8	72 49.8	+58.5	25.1	73 43.8	+58.9	26.5	74 37.1	+59.2	28.1	75 29.6	+59.5	30.0	76 21.0	+59.8	32.0	77 11.2	+60.0	34.3	78 00.0	+60.0	37.0	**78**
79	72 53.4	+58.0	23.0	73 48.3	+58.4	24.3	74 42.7	+58.7	25.8	75 36.3	+59.1	27.5	76 29.1	+59.4	29.4	77 20.8	+59.7	31.6	78 11.2	+59.9	34.1	79 00.0	+60.0	37.0	**79**
80	73 51.4	+57.7	22.1	74 46.7	+58.1	23.5	75 41.4	+58.5	25.0	76 35.4	+58.9	26.8	77 28.5	+59.3	28.8	78 20.5	+59.6	31.1	79 11.1	+59.9	33.8	80 00.0	+60.0	37.0	**80**
81	74 49.1	+57.4	21.1	75 44.8	+57.9	22.5	76 39.9	+58.3	24.1	77 34.3	+58.8	25.9	78 27.8	+59.2	28.1	79 20.1	+59.6	30.6	80 11.0	+59.9	33.5	81 00.0	+60.0	37.0	**81**
82	75 46.5	+57.1	19.9	76 42.7	+57.5	21.4	77 38.2	+58.1	23.0	78 33.1	+58.5	25.0	79 27.0	+59.0	27.2	80 19.7	+59.5	29.9	81 10.9	+59.8	33.1	82 00.0	+60.0	37.0	**82**
83	76 43.6	+56.6	18.6	77 40.2	+57.1	20.1	78 36.3	+57.6	21.8	79 31.6	+58.2	23.8	80 26.0	+58.8	26.2	81 19.2	+59.3	29.1	82 10.7	+59.8	32.6	83 00.0	+60.0	37.0	**83**
84	77 40.2	+56.1	17.1	78 37.3	+56.6	18.6	79 33.9	+57.2	20.3	80 29.8	+57.8	22.4	81 24.8	+58.4	24.9	82 18.5	+59.1	28.0	83 10.5	+59.7	32.0	84 00.0	+60.0	37.0	**84**
85	78 36.3	+55.3	15.4	79 33.9	+55.9	16.8	80 31.1	+56.5	18.6	81 27.6	+57.2	20.7	82 23.2	+58.1	23.3	83 17.6	+58.9	26.7	84 10.2	+59.6	31.1	85 00.0	+60.0	37.0	**85**
86	79 31.6	+54.4	13.4	80 29.8	+55.0	14.7	81 27.6	+55.6	16.4	82 24.8	+56.5	18.5	83 21.3	+57.3	21.3	84 16.5	+58.4	24.9	85 09.8	+59.4	29.9	86 00.0	+60.0	37.0	**86**
87	80 26.0	+53.2	10.9	81 24.8	+53.7	12.2	82 23.2	+54.4	13.8	83 21.3	+55.2	15.8	84 18.6	+56.3	18.5	85 14.9	+57.5	22.3	86 09.2	+59.0	28.0	87 00.0	+60.0	37.0	**87**
88	81 19.2	+51.5	8.0	82 18.5	*+52.0* •	9.0	83 17.6	*+52.6* •	10.4	84 16.5	*+53.3* •	12.2	85 14.9	*+54.3* •	14.7	86 12.4	*+55.8* •	18.5	87 08.2	*+58.0* •	24.9	88 00.0	+60.0	37.0	**88**
89	82 10.7	*+49.3* •	4.4	83 10.5	*+49.5* •	5.1	84 10.2	*+49.8* •	5.9	85 09.8	*+50.2* •	7.2	86 09.2	*+50.8* •	9.0	87 08.2	*+51.8* •	12.1	88 06.2	*+53.8* •	18.5	89 00.0	+60.0	37.0	**89**
90	83 00.0	*+46.2* •	0.0	84 00.0	*+45.8* •	0.0	85 00.0	*+45.4* •	0.0	86 00.0	*+44.6* •	0.0	87 00.0	*+43.1* •	0.0	88 00.0	*+39.4* •	0.0	89 00.0	*+21.9* •	0.0	90 00.0	−60.0	18.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 143°, 217°

38°, 322° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 30.7	+59.8	141.8	4 43.5	+59.9	141.8	3 56.3	+59.9	141.9	3 09.1	+59.9	141.9	2 21.8	+60.0	142.0	1 34.6	+59.9	142.0	0 47.3	+60.0	142.0	0 00.0	+60.0	142.0	0
1	6 30.5	+59.8	141.7	5 43.4	+59.8	141.8	4 56.2	+59.9	141.8	4 09.0	+60.0	141.9	3 21.8	+60.0	141.9	2 34.5	+60.0	142.0	1 47.3	+60.0	142.0	1 00.0	+60.0	142.0	1
2	7 30.3	+59.8	141.6	6 43.2	+59.9	141.7	5 56.1	+59.9	141.8	5 09.0	+59.9	141.8	4 21.8	+59.9	141.9	3 34.5	+60.0	141.9	2 47.3	+60.0	142.0	2 00.0	+60.0	142.0	2
3	8 30.1	+59.9	141.6	7 43.1	+59.9	141.7	6 56.0	+59.9	141.7	6 08.9	+59.9	141.8	5 21.7	+60.0	141.9	4 34.5	+60.0	141.9	3 47.3	+60.0	142.0	3 00.0	+60.0	142.0	3
4	9 30.0	+59.8	141.5	8 43.0	+59.9	141.6	7 55.9	+60.0	141.7	7 08.8	+60.0	141.8	6 21.7	+60.0	141.8	5 34.5	+60.0	141.9	4 47.3	+60.0	142.0	4 00.0	+60.0	142.0	4
5	10 29.8	+59.8	141.4	9 42.9	+59.8	141.5	8 55.9	+59.9	141.6	8 08.8	+59.9	141.7	7 21.7	+59.9	141.8	6 34.5	+60.0	141.9	5 47.3	+60.0	141.9	5 00.0	+60.0	142.0	5
6	11 29.6	+59.8	141.3	10 42.7	+59.9	141.5	9 55.8	+59.9	141.6	9 08.7	+60.0	141.7	8 21.6	+60.0	141.8	7 34.5	+60.0	141.9	6 47.3	+60.0	141.9	6 00.0	+60.0	142.0	6
7	12 29.4	+59.9	141.3	11 42.6	+59.9	141.4	10 55.7	+59.9	141.5	10 08.7	+59.9	141.6	9 21.6	+60.0	141.7	8 34.5	+59.9	141.8	7 47.3	+60.0	141.9	7 00.0	+60.0	142.0	7
8	13 29.3	+59.8	141.2	12 42.5	+59.8	141.3	11 55.6	+59.9	141.5	11 08.6	+60.0	141.6	10 21.6	+59.9	141.7	9 34.4	+60.0	141.8	8 47.3	+59.9	141.9	8 00.0	+60.0	142.0	8
9	14 29.1	+59.8	141.1	13 42.3	+59.9	141.3	12 55.5	+59.9	141.4	12 08.6	+59.9	141.5	11 21.5	+60.0	141.7	10 34.4	+60.0	141.8	9 47.2	+60.0	141.9	9 00.0	+60.0	142.0	9
10	15 28.9	+59.8	141.0	14 42.2	+59.9	141.2	13 55.4	+59.9	141.3	13 08.5	+59.9	141.5	12 21.5	+60.0	141.6	11 34.4	+60.0	141.8	10 47.2	+60.0	141.9	10 00.0	+60.0	142.0	10
11	16 28.7	+59.8	140.9	15 42.1	+59.8	141.1	14 55.3	+59.9	141.3	14 08.4	+60.0	141.4	13 21.5	+59.9	141.6	12 34.4	+60.0	141.7	11 47.2	+60.0	141.9	11 00.0	+60.0	142.0	11
12	17 28.5	+59.8	140.9	16 41.9	+59.9	141.0	15 55.2	+59.9	141.2	15 08.4	+59.9	141.4	14 21.4	+60.0	141.6	13 34.4	+60.0	141.7	12 47.2	+60.0	141.9	12 00.0	+60.0	142.0	12
13	18 28.3	+59.9	140.8	17 41.8	+59.9	141.0	16 55.1	+59.9	141.2	16 08.3	+60.0	141.4	15 21.4	+60.0	141.5	14 34.4	+60.0	141.7	13 47.2	+60.0	141.9	13 00.0	+60.0	142.0	13
14	19 28.2	+59.8	140.7	18 41.7	+59.8	140.9	17 55.0	+59.9	141.1	17 08.3	+59.9	141.3	16 21.4	+59.9	141.5	15 34.4	+59.9	141.7	14 47.2	+60.0	141.8	14 00.0	+60.0	142.0	14
15	20 28.0	+59.8	140.6	19 41.5	+59.9	140.8	18 54.9	+59.9	141.1	18 08.2	+59.9	141.3	17 21.3	+60.0	141.5	16 34.3	+60.0	141.7	15 47.2	+60.0	141.8	15 00.0	+60.0	142.0	15
16	21 27.8	+59.8	140.5	20 41.4	+59.8	140.8	19 54.8	+59.9	141.0	19 08.1	+60.0	141.2	18 21.3	+60.0	141.4	17 34.3	+60.0	141.6	16 47.2	+60.0	141.8	16 00.0	+60.0	142.0	16
17	22 27.6	+59.8	140.4	21 41.2	+59.9	140.7	20 54.7	+59.9	140.9	20 08.1	+59.9	141.2	19 21.3	+59.9	141.4	18 34.3	+60.0	141.6	17 47.2	+60.0	141.8	17 00.0	+60.0	142.0	17
18	23 27.4	+59.8	140.3	22 41.1	+59.8	140.6	21 54.6	+59.9	140.9	21 08.0	+59.9	141.1	20 21.2	+60.0	141.4	19 34.3	+60.0	141.6	18 47.2	+60.0	141.8	18 00.0	+60.0	142.0	18
19	24 27.2	+59.8	140.2	23 40.9	+59.9	140.5	22 54.5	+59.9	140.8	22 07.9	+60.0	141.1	21 21.2	+60.0	141.3	20 34.3	+60.0	141.6	19 47.2	+60.0	141.8	19 00.0	+60.0	142.0	19
20	25 27.0	+59.8	140.2	24 40.8	+59.8	140.5	23 54.4	+59.9	140.7	23 07.9	+59.9	141.0	22 21.2	+59.9	141.3	21 34.3	+59.9	141.5	20 47.2	+60.0	141.8	20 00.0	+60.0	142.0	20
21	26 26.8	+59.7	140.1	25 40.6	+59.9	140.4	24 54.3	+59.9	140.7	24 07.8	+59.9	141.0	23 21.1	+60.0	141.2	22 34.2	+60.0	141.5	21 47.2	+60.0	141.8	21 00.0	+60.0	142.0	21
22	27 26.5	+59.8	140.0	26 40.5	+59.8	140.3	25 54.2	+59.9	140.6	25 07.7	+60.0	140.9	24 21.1	+59.9	141.2	23 34.2	+60.0	141.5	22 47.2	+60.0	141.7	22 00.0	+60.0	142.0	22
23	28 26.3	+59.8	139.9	27 40.3	+59.9	140.2	26 54.1	+59.9	140.5	26 07.7	+59.9	140.9	25 21.0	+60.0	141.2	24 34.2	+60.0	141.5	23 47.2	+60.0	141.7	23 00.0	+60.0	142.0	23
24	29 26.1	+59.8	139.8	28 40.2	+59.8	140.1	27 54.0	+59.9	140.5	27 07.6	+59.9	140.8	26 21.0	+60.0	141.1	25 34.2	+60.0	141.4	24 47.2	+60.0	141.7	24 00.0	+60.0	142.0	24
25	30 25.9	+59.7	139.7	29 40.0	+59.8	140.0	28 53.9	+59.9	140.4	28 07.5	+60.0	140.8	27 21.0	+59.9	141.1	26 34.2	+60.0	141.4	25 47.2	+60.0	141.7	25 00.0	+60.0	142.0	25
26	31 25.6	+59.8	139.6	30 39.8	+59.9	140.0	29 53.8	+59.9	140.3	29 07.5	+59.9	140.7	28 20.9	+60.0	141.0	27 34.2	+59.9	141.4	26 47.2	+60.0	141.7	26 00.0	+60.0	142.0	26
27	32 25.4	+59.8	139.5	31 39.7	+59.8	139.9	30 53.7	+59.8	140.3	30 07.4	+59.9	140.6	29 20.9	+59.9	141.0	28 34.1	+60.0	141.3	27 47.2	+60.0	141.7	27 00.0	+60.0	142.0	27
28	33 25.2	+59.7	139.4	32 39.5	+59.8	139.8	31 53.5	+59.9	140.2	31 07.3	+59.9	140.6	30 20.8	+60.0	141.0	29 34.1	+60.0	141.3	28 47.2	+60.0	141.7	28 00.0	+60.0	142.0	28
29	34 24.9	+59.8	139.3	33 39.3	+59.8	139.7	32 53.4	+59.9	140.1	32 07.2	+60.0	140.5	31 20.8	+60.0	140.9	30 34.1	+60.0	141.3	29 47.2	+60.0	141.7	29 00.0	+60.0	142.0	29
30	35 24.7	+59.7	139.1	34 39.1	+59.9	139.6	33 53.3	+59.9	140.0	33 07.2	+59.9	140.5	32 20.8	+59.9	140.9	31 34.1	+60.0	141.3	30 47.2	+60.0	141.6	30 00.0	+60.0	142.0	30
31	36 24.4	+59.8	139.0	35 39.0	+59.8	139.5	34 53.2	+59.8	140.0	34 07.1	+59.9	140.4	33 20.7	+60.0	140.8	32 34.1	+59.9	141.2	31 47.2	+60.0	141.6	31 00.0	+60.0	142.0	31
32	37 24.2	+59.7	138.9	36 38.8	+59.8	139.4	35 53.0	+59.9	139.9	35 07.0	+59.9	140.3	34 20.7	+59.9	140.8	33 34.0	+60.0	141.2	32 47.2	+59.9	141.6	32 00.0	+60.0	142.0	32
33	38 23.9	+59.7	138.8	37 38.6	+59.8	139.3	36 52.9	+59.9	139.8	36 06.9	+59.9	140.3	35 20.6	+60.0	140.7	34 34.0	+60.0	141.2	33 47.1	+60.0	141.6	33 00.0	+60.0	142.0	33
34	39 23.6	+59.7	138.7	38 38.4	+59.8	139.2	37 52.8	+59.8	139.7	37 06.8	+59.9	140.2	36 20.6	+59.9	140.7	35 34.0	+60.0	141.1	34 47.1	+60.0	141.6	34 00.0	+60.0	142.0	34
35	40 23.3	+59.7	138.5	39 38.2	+59.7	139.1	38 52.6	+59.9	139.6	38 06.7	+60.0	140.1	37 20.5	+60.0	140.6	36 34.0	+60.0	141.1	35 47.1	+60.0	141.6	35 00.0	+60.0	142.0	35
36	41 23.0	+59.7	138.4	40 37.9	+59.8	139.0	39 52.5	+59.8	139.5	39 06.7	+59.9	140.1	38 20.5	+59.9	140.6	37 34.0	+59.9	141.1	36 47.1	+60.0	141.5	36 00.0	+60.0	142.0	36
37	42 22.7	+59.7	138.3	41 37.7	+59.8	138.9	40 52.3	+59.9	139.4	40 06.6	+59.9	140.0	39 20.4	+60.0	140.5	38 33.9	+60.0	141.0	37 47.1	+60.0	141.5	37 00.0	+60.0	142.0	37
38	43 22.4	+59.7	138.1	42 37.5	+59.8	138.8	41 52.2	+59.8	139.3	41 06.5	+59.9	139.9	40 20.4	+59.9	140.5	39 33.9	+60.0	141.0	38 47.1	+60.0	141.5	38 00.0	+60.0	142.0	38
39	44 22.1	+59.6	138.0	43 37.3	+59.7	138.6	42 52.0	+59.9	139.2	42 06.4	+59.9	139.8	41 20.3	+60.0	140.4	40 33.9	+60.0	141.0	39 47.1	+60.0	141.5	39 00.0	+60.0	142.0	39
40	45 21.7	+59.7	137.8	44 37.0	+59.8	138.5	43 51.9	+59.8	139.1	43 06.3	+59.9	139.8	42 20.3	+59.9	140.4	41 33.9	+59.9	140.9	40 47.1	+60.0	141.5	40 00.0	+60.0	142.0	40
41	46 21.4	+59.6	137.7	45 36.8	+59.7	138.4	44 51.7	+59.8	139.0	44 06.2	+59.9	139.7	43 20.2	+59.9	140.3	42 33.8	+60.0	140.9	41 47.1	+60.0	141.5	41 00.0	+60.0	142.0	41
42	47 21.0	+59.6	137.5	46 36.5	+59.7	138.2	45 51.5	+59.8	138.9	45 06.1	+59.8	139.6	44 20.1	+60.0	140.2	43 33.8	+60.0	140.8	42 47.1	+60.0	141.4	42 00.0	+60.0	142.0	42
43	48 20.6	+59.7	137.4	47 36.2	+59.8	138.1	46 51.3	+59.8	138.8	46 05.9	+59.9	139.5	45 20.1	+59.9	140.2	44 33.8	+60.0	140.8	43 47.1	+60.0	141.4	43 00.0	+60.0	142.0	43
44	49 20.3	+59.5	137.2	48 36.0	+59.7	138.0	47 51.1	+59.9	138.7	47 05.8	+59.9	139.4	46 20.0	+60.0	140.1	45 33.8	+59.9	140.8	44 47.1	+60.0	141.4	44 00.0	+60.0	142.0	44
45	50 19.8	+59.6	137.0	49 35.7	+59.7	137.8	48 51.0	+59.7	138.6	48 05.7	+59.9	139.3	47 20.0	+59.9	140.0	46 33.7	+60.0	140.7	45 47.1	+60.0	141.4	45 00.0	+60.0	142.0	45
46	51 19.4	+59.6	136.8	50 35.4	+59.7	137.7	49 50.7	+59.8	138.5	49 05.6	+59.8	139.2	48 19.9	+59.9	140.0	47 33.7	+60.0	140.7	46 47.1	+60.0	141.3	46 00.0	+60.0	142.0	46
47	52 19.0	+59.5	136.6	51 35.1	+59.6	137.5	50 50.5	+59.8	138.3	50 05.4	+59.9	139.1	49 19.8	+59.9	139.9	48 33.7	+59.9	140.6	47 47.1	+60.0	141.3	47 00.0	+60.0	142.0	47
48	53 18.5	+59.5	136.4	52 34.7	+59.7	137.3	51 50.3	+59.8	138.2	51 05.3	+59.9	139.0	50 19.7	+60.0	139.8	49 33.6	+60.0	140.6	48 47.1	+59.9	141.3	48 00.0	+60.0	142.0	48
49	54 18.0	+59.5	136.2	53 34.4	+59.6	137.1	52 50.1	+59.7	138.0	52 05.2	+59.8	138.9	51 19.7	+59.9	139.7	50 33.6	+60.0	140.5	49 47.0	+60.0	141.3	49 00.0	+60.0	142.0	49
50	55 17.5	+59.5	136.0	54 34.0	+59.6	137.0	53 49.8	+59.8	137.9	53 05.0	+59.9	138.8	52 19.6	+59.9	139.6	51 33.6	+59.9	140.5	50 47.0	+60.0	141.2	50 00.0	+60.0	142.0	50
51	56 17.0	+59.4	135.7	55 33.6	+59.6	136.8	54 49.6	+59.7	137.7	54 04.9	+59.8	138.7	53 19.5	+59.9	139.6	52 33.5	+60.0	140.4	51 47.0	+60.0	141.2	51 00.0	+60.0	142.0	51
52	57 16.4	+59.4	135.5	56 33.2	+59.6	136.5	55 49.3	+59.7	137.6	55 04.7	+59.8	138.5	54 19.4	+59.9	139.5	53 33.5	+60.0	140.3	52 47.0	+60.0	141.2	52 00.0	+60.0	142.0	52
53	58 15.8	+59.4	135.2	57 32.8	+59.6	136.3	56 49.0	+59.7	137.4	56 04.5	+59.8	138.4	55 19.3	+59.9	139.4	54 33.5	+59.9	140.3	53 47.0	+60.0	141.2	53 00.0	+60.0	142.0	53
54	59 15.2	+59.3	134.9	58 32.4	+59.5	136.1	57 48.7	+59.7	137.2	57 04.3	+59.8	138.3	56 19.2	+59.9	139.3	55 33.4	+60.0	140.2	54 47.0	+60.0	141.1	54 00.0	+60.0	142.0	54
55	60 14.5	+59.3	134.6	59 31.9	+59.5	135.9	58 48.4	+59.7	137.0	58 04.1	+59.8	138.1	57 19.1	+59.9	139.2	56 33.4	+59.9	140.2	55 47.0	+60.0	141.1	55 00.0	+60.0	142.0	55
56	61 13.8	+59.2	134.3	60 31.4	+59.5	135.6	59 48.1	+59.6	136.8	59 03.9	+59.8	138.0	58 19.0	+59.9	139.0	57 33.3	+60.0	140.1	56 47.0	+60.0	141.1	56 00.0	+60.0	142.0	56
57	62 13.0	+59.2	134.0	61 30.9	+59.4	135.3	60 47.7	+59.7	136.6	60 03.7	+59.8	137.8	59 18.9	+59.9	138.9	58 33.3	+59.9	140.0	57 47.0	+60.0	141.0	57 00.0	+60.0	142.0	57
58	63 12.2	+59.2	133.6	62 30.3	+59.4	135.0	61 47.4	+59.6	136.4	61 03.5	+59.7	137.6	60 18.8	+59.8	138.8	59 33.2	+60.0	139.9	58 47.0	+59.9	141.0	58 00.0	+60.0	142.0	58
59	64 11.4	+59.0	133.3	63 29.7	+59.3	134.7	62 47.0	+59.5	136.1	62 03.2	+59.8	137.4	61 18.6	+59.9	138.7	60 33.2	+59.9	139.8	59 46.9	+60.0	140.9	59 00.0	+60.0	142.0	59
60	65 10.4	+59.0	132.8	64 29.0	+59.3	134.4	63 46.5	+59.6	135.8	63 03.0	+59.7	137.2	62 18.5	+59.8	138.5	61 33.1	+59.9	139.7	60 46.9	+60.0	140.9	60 00.0	+60.0	142.0	60
61	66 09.4	+59.0	132.4	65 28.3	+59.3	134.0	64 46.1	+59.5	135.6	64 02.7	+59.7	137.0	63 18.3	+59.9	138.4	62 33.0	+60.0	139.6	61 46.9	+60.0	140.9	61 00.0	+60.0	142.0	61
62	67 08.4	+58.8	131.9	66 27.6	+59.2	133.6	65 45.6	+59.4	135.3	65 02.4	+59.7	136.8	64 18.2	+59.8	138.2	63 33.0	+59.9	139.5	62 46.9	+60.0	140.8	62 00.0	+60.0	142.0	62
63	68 07.2	+58.7	131.4	67 26.8	+59.1	133.2	66 45.0	+59.5	134.9	66 02.1	+59.6	136.5	65 18.0	+59.8	138.0	64 32.9	+59.9	139.4	63 46.9	+60.0	140.8	63 00.0	+60.0	142.0	63
64	69 05.9	+58.6	130.8	68 25.9	+59.0	132.8	67 44.5	+59.3	134.6	67 01.7	+59.7	136.2	66 17.8	+59.8	137.8	65 32.8	+59.9	139.3	64 46.9	+59.9	140.7	64 00.0	+60.0	142.0	64
65	70 04.5	+58.4	130.2	69 24.9	+59.0	132.3	68 43.8	+59.3	134.2	68 01.4	+59.5	136.0	67 17.6	+59.8	137.6	66 32.7	+60.0	139.2	65 46.8	+60.0	140.6	65 00.0	+60.0	142.0	65
66	71 02.9	+58.3	129.5	70 23.9	+58.8	131.7	69 43.1	+59.3	133.7	69 00.9	+59.6	135.6	68 17.4	+59.8	137.4	67 32.7	+59.9	139.0	66 46.8	+60.0	140.6	66 00.0	+60.0	142.0	66
67	72 01.2	+58.1	128.8	71 22.7	+58.7	131.1	70 42.4	+59.1	133.3	70 00.5	+59.5	135.3	69 17.2	+59.7	137.1	68 32.6	+59.8	138.9	67 46.8	+60.0	140.5	67 00.0	+60.0	142.0	67
68	72 59.3	+57.9	128.0	72 21.4	+58.5	130.5	71 41.5	+59.1	132.8	71 00.0	+59.4	134.9	70 16.9	+59.7	136.9	69 32.4	+59.9	138.7	68 46.8	+59.9	140.4	68 00.0	+60.0	142.0	68
69	73 57.2	+57.6	127.0	73 19.9	+58.4	129.7	72 40.6	+59.0	132.2	71 59.4	+59.4	134.5	71 16.6	+59.7	136.6	70 32.3	+59.9	138.5	69 46.7	+60.0	140.3	69 00.0	+60.0	142.0	69
70	74 54.8	+57.3	126.0	74 18.3	+58.2	128.9	73 39.6	+58.8	131.5	72 58.8	+59.3	134.0	72 16.3	+59.6	136.3	71 32.2	+59.8	138.3	70 46.7	+60.0	140.2	70 00.0	+60.0	142.0	70
71	75 52.1	+56.9	124.8	75 16.5	+57.9	127.9	74 38.4	+58.7	130.8	73 58.1	+59.3	133.5	73 15.9	+59.6	135.9	72 32.0	+59.9	138.1	71 46.7	+59.9	140.1	71 00.0	+60.0	142.0	71
72	76 49.0	+56.4	123.5	76 14.4	+57.6	126.9	75 37.1	+58.5	130.0	74 57.4	+59.1	132.9	74 15.5	+59.6	135.5	73 31.9	+59.8	137.8	72 46.6	+60.0	140.0	72 00.0	+60.0	142.0	72
73	77 45.4	+55.8	121.9	77 12.0	+57.2	125.7	76 35.6	+58.2	129.1	75 56.5	+59.0	132.2	75 15.1	+59.5	135.0	74 31.7	+59.8	137.6	73 46.6	+60.0	139.9	73 00.0	+60.0	142.0	73
74	78 41.2	+55.0	120.1	78 09.2	+56.7	124.2	77 33.8	+57.9	128.0	76 55.5	+58.8	131.4	76 14.6	+59.4	134.5	75 31.5	+59.8	137.2	74 46.6	+59.9	139.7	74 00.0	+60.0	142.0	74
75	79 36.2	+54.0	118.0	79 05.9	+56.1	122.6	78 31.7	+57.6	126.8	77 54.3	+58.6	130.5	77 14.0	+59.3	133.9	76 31.3	+59.7	136.9	75 46.5	+59.9	139.6	75 00.0	+60.0	142.0	75
76	80 30.2	+52.7	115.5	80 02.0	+55.2	120.6	79 29.3	+57.1	125.3	78 52.9	+58.3	129.4	78 13.3	+59.2	133.1	77 31.0	+59.7	136.4	76 46.4	+60.0	139.4	76 00.0	+60.0	142.0	76
77	81 22.9	*+51.0* •	112.4	80 57.2	+54.2	118.3	80 26.4	+56.4	123.5	79 51.2	+58.0	128.2	79 12.5	+59.0	132.3	78 30.7	+59.6	135.9	77 46.4	+59.9	139.2	77 00.0	+60.0	142.0	77
78	82 13.9	*+48.6* •	108.7	81 51.4	+52.6	115.4	81 22.8	+55.5	121.3	80 49.2	+57.6	126.6	80 11.5	+58.8	131.3	79 30.3	+59.5	135.4	78 46.3	+59.9	138.9	78 00.0	+60.0	142.0	78
79	83 02.5	*+45.3* •	104.1	82 44.0	*+50.4* •	111.8	82 18.3	+54.3	118.7	81 46.8	+56.8	124.8	81 10.3	+58.5	130.1	80 29.8	+59.4	134.6	79 46.2	+59.9	138.6	79 00.0	+60.0	142.0	79
80	83 47.8	*+40.5* •	98.4	83 34.4	*+47.3* •	107.2	83 12.6	*+52.4* •	115.3	82 43.6	+55.9	122.4	82 08.8	+58.0	128.5	81 29.2	+59.3	133.8	80 46.1	+59.8	138.2	80 00.0	+60.0	142.0	80
81	84 28.3	*+34.0* •	91.2	84 21.7	*+42.8* •	101.4	84 05.0	*+49.7* •	110.9	83 39.5	+54.5	119.3	83 06.8	+57.5	126.6	82 28.5	+59.1	132.7	81 45.9	+59.8	137.7	81 00.0	+60.0	142.0	81
82	85 02.3	*+24.8* •	82.1	85 04.5	*+35.8* •	93.7	84 54.7	*+45.2* •	105.0	84 34.0	*+52.1* •	115.2	84 04.3	+56.4	124.0	83 27.6	+58.7	131.2	82 45.7	+59.8	137.2	82 00.0	+60.0	142.0	82
83	85 27.1	*+13.2* •	71.1	85 40.3	*+25.7* •	83.7	85 39.9	*+38.1* •	97.0	85 26.1	*+48.2* •	109.5	85 00.7	*+54.7* •	120.4	84 26.3	+58.2	129.3	83 45.5	+59.6	136.4	83 00.0	+60.0	142.0	83
84	85 40.3	*–0.4* •	58.5	86 06.0	*+12.0* •	71.1	86 18.0	*+26.9* •	85.9	86 14.3	*+41.1* •	101.2	85 55.4	*+51.6* •	115.1	85 24.5	+57.2	126.5	84 45.1	+59.5	135.3	84 00.0	+60.0	142.0	84
85	85 39.9	*–13.8* •	45.2	86 18.0	*–3.7* •	56.3	86 44.9	*+10.5* •	71.1	86 55.4	*+28.4* •	89.0	86 47.0	*+45.0* •	107.0	86 21.7	*+55.2* •	122.3	85 44.6	+59.2	133.7	85 00.0	+60.0	142.0	85
86	85 26.1	*–25.4* •	32.7	86 14.3	*–18.9* •	40.9	86 55.4	*–8.4* •	53.2	87 23.8	*+8.2* •	71.0	87 32.0	*+30.8* •	93.6	87 16.9	*+50.2* •	115.1	86 43.8	+58.4	131.2	86 00.0	+60.0	142.0	86
87	85 00.7	*–34.4* •	21.7	85 55.4	*–30.9* •	27.0	86 47.0	*–25.3* •	35.0	87 32.0	*–15.1* •	48.5	88 02.8	*+4.3* •	71.0	88 07.1	*+34.8* •	101.2	87 42.2	*+56.2* •	126.5	87 00.0	+60.0	142.0	87
88	84 26.3	*–40.8* •	12.8	85 24.5	*–39.4* •	15.6	86 21.7	*–37.1* •	19.8	87 16.9	*–33.1* •	26.9	88 07.1	*–24.9* •	40.9	88 41.9	*–3.5* •	71.0	88 38.4	*+42.5* •	115.1	88 00.0	+60.0	142.0	88
89	83 45.5	*–45.5* •	5.7	84 45.1	*–45.1* •	6.7	85 44.6	*–44.6* •	8.3	86 43.8	*–43.8* •	10.9	87 42.2	*–42.2* •	15.6	88 38.4	*–38.4* •	26.9	89 20.9	*–20.9* •	71.0	89 00.0	+60.0	142.0	89
90	83 00.0	*–48.7* •	0.0	84 00.0	*–48.9* •	0.0	85 00.0	*–49.2* •	0.0	86 00.0	*–49.6* •	0.0	87 00.0	*–50.3* •	0.0	88 00.0	*–51.3* •	0.0	89 00.0	*–53.5* •	0.0	90 00.0	–60.0	71.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 38°, 322°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 30.7	−59.9	141.8	4 43.5	−59.9	141.8	3 56.3	−59.9	141.9	3 09.1	−60.0	141.9	2 21.8	−60.0	142.0	1 34.6	−60.0	142.0	0 47.3	−60.0	142.0	0 00.0	+60.0	38.0	**0**
1	4 30.8	−59.8	141.9	3 43.6	−59.9	141.9	2 56.4	−59.9	141.9	2 09.1	−59.9	142.0	1 21.8	−59.9	142.0	0 34.6	−60.0	142.0	0 12.7	+60.0	38.0	1 00.0	+60.0	38.0	**1**
2	3 31.0	−59.8	141.9	2 43.7	−59.8	142.0	1 56.5	−60.0	142.0	1 09.2	−60.0	142.0	0 21.9	−60.0	142.0	0 25.4	+60.0	38.0	1 12.7	+60.0	38.0	2 00.0	+60.0	38.0	**2**
3	2 31.2	−59.9	142.0	1 43.9	−59.9	142.0	0 56.5	−59.9	142.1	0 09.2	−59.9	142.1	0 38.1	+60.0	37.9	1 25.4	+60.0	38.0	2 12.7	+60.0	38.0	3 00.0	+60.0	38.0	**3**
4	1 31.3	−59.8	142.1	0 44.0	−59.9	142.1	0 03.4	+59.9	37.9	0 50.7	+60.0	37.9	1 38.1	+59.9	37.9	2 25.4	+60.0	37.9	3 12.7	+60.0	38.0	4 00.0	+60.0	38.0	**4**
5	0 31.5	−59.8	142.2	0 15.9	+59.9	37.8	1 03.3	+59.9	37.8	1 50.7	+59.9	37.9	2 38.0	+60.0	37.9	3 25.4	+60.0	37.9	4 12.7	+60.0	38.0	5 00.0	+60.0	38.0	**5**
6	0 28.3	+59.9	37.8	1 15.8	+59.8	37.8	2 03.2	+59.9	37.8	2 50.6	+59.9	37.8	3 38.0	+60.0	37.8	4 25.4	+59.9	37.9	5 12.7	+60.0	37.9	6 00.0	+60.0	38.0	**6**
7	1 28.2	+59.8	37.7	2 15.6	+59.9	37.7	3 03.1	+59.9	37.7	3 50.5	+60.0	37.8	4 38.0	+59.9	37.8	5 25.3	+60.0	37.9	6 12.7	+60.0	37.9	7 00.0	+60.0	38.0	**7**
8	2 28.0	+59.8	37.6	3 15.5	+59.9	37.6	4 03.0	+59.9	37.7	4 50.5	+59.9	37.7	5 37.9	+60.0	37.8	6 25.3	+60.0	37.8	7 12.7	+60.0	37.9	8 00.0	+60.0	38.0	**8**
9	3 27.8	+59.9	37.5	4 15.4	+59.9	37.6	5 02.9	+59.9	37.6	5 50.4	+60.0	37.7	6 37.9	+60.0	37.7	7 25.3	+60.0	37.8	8 12.7	+60.0	37.9	9 00.0	+60.0	38.0	**9**
10	4 27.7	+59.8	37.5	5 15.3	+59.8	37.5	6 02.8	+60.0	37.6	6 50.4	+59.9	37.6	7 37.9	+59.9	37.7	8 25.3	+60.0	37.8	9 12.7	+60.0	37.9	10 00.0	+60.0	38.0	**10**
11	5 27.5	+59.8	37.4	6 15.1	+59.9	37.4	7 02.8	+59.9	37.5	7 50.3	+60.0	37.6	8 37.8	+60.0	37.7	9 25.3	+60.0	37.8	10 12.7	+60.0	37.9	11 00.0	+60.0	38.0	**11**
12	6 27.3	+59.8	37.3	7 15.0	+59.9	37.4	8 02.7	+59.9	37.5	8 50.3	+59.9	37.5	9 37.8	+60.0	37.6	10 25.3	+60.0	37.8	11 12.7	+60.0	37.9	12 00.0	+60.0	38.0	**12**
13	7 27.1	+59.9	37.2	8 14.9	+59.9	37.3	9 02.6	+59.9	37.4	9 50.2	+60.0	37.5	10 37.8	+59.9	37.6	11 25.3	+59.9	37.7	12 12.7	+60.0	37.9	13 00.0	+60.0	38.0	**13**
14	8 27.0	+59.8	37.2	9 14.8	+59.8	37.2	10 02.5	+59.9	37.3	10 50.2	+59.9	37.5	11 37.7	+60.0	37.6	12 25.2	+60.0	37.7	13 12.7	+60.0	37.9	14 00.0	+60.0	38.0	**14**
15	9 26.8	+59.8	37.1	10 14.6	+59.9	37.2	11 02.4	+59.9	37.3	11 50.1	+59.9	37.4	12 37.7	+60.0	37.5	13 25.2	+60.0	37.7	14 12.7	+60.0	37.8	15 00.0	+60.0	38.0	**15**
16	10 26.6	+59.8	37.0	11 14.5	+59.9	37.1	12 02.3	+59.9	37.2	12 50.0	+60.0	37.4	13 37.7	+59.9	37.5	14 25.2	+60.0	37.7	15 12.7	+60.0	37.8	16 00.0	+60.0	38.0	**16**
17	11 26.4	+59.9	36.9	12 14.4	+59.8	37.0	13 02.2	+59.9	37.2	13 50.0	+59.9	37.3	14 37.6	+60.0	37.5	15 25.2	+60.0	37.6	16 12.7	+60.0	37.8	17 00.0	+60.0	38.0	**17**
18	12 26.3	+59.8	36.8	13 14.2	+59.9	37.0	14 02.1	+59.9	37.1	14 49.9	+60.0	37.3	15 37.6	+60.0	37.4	16 25.2	+60.0	37.6	17 12.7	+60.0	37.8	18 00.0	+60.0	38.0	**18**
19	13 26.1	+59.8	36.8	14 14.1	+59.9	36.9	15 02.0	+59.9	37.1	15 49.9	+59.9	37.2	16 37.6	+59.9	37.4	17 25.2	+60.0	37.6	18 12.7	+59.9	37.8	19 00.0	+60.0	38.0	**19**
20	14 25.9	+59.8	36.7	15 14.0	+59.8	36.8	16 01.9	+59.9	37.0	16 49.8	+59.9	37.2	17 37.5	+60.0	37.4	18 25.2	+59.9	37.6	19 12.6	+60.0	37.8	20 00.0	+60.0	38.0	**20**
21	15 25.7	+59.8	36.6	16 13.8	+59.9	36.8	17 01.8	+60.0	37.0	17 49.7	+60.0	37.1	18 37.5	+60.0	37.3	19 25.1	+60.0	37.5	20 12.6	+60.0	37.8	21 00.0	+60.0	38.0	**21**
22	16 25.5	+59.9	36.5	17 13.7	+59.9	36.7	18 01.8	+59.9	36.9	18 49.7	+59.9	37.1	19 37.5	+59.9	37.3	20 25.1	+60.0	37.5	21 12.6	+60.0	37.8	22 00.0	+60.0	38.0	**22**
23	17 25.4	+59.8	36.4	18 13.6	+59.8	36.6	19 01.7	+59.9	36.8	19 49.6	+60.0	37.0	20 37.4	+60.0	37.3	21 25.1	+60.0	37.5	22 12.6	+60.0	37.7	23 00.0	+60.0	38.0	**23**
24	18 25.2	+59.8	36.4	19 13.4	+59.9	36.6	20 01.6	+59.9	36.8	20 49.6	+59.9	37.0	21 37.4	+60.0	37.2	22 25.1	+60.0	37.5	23 12.6	+60.0	37.7	24 00.0	+60.0	38.0	**24**
25	19 25.0	+59.8	36.3	20 13.3	+59.9	36.5	21 01.5	+59.9	36.7	21 49.5	+59.9	36.9	22 37.4	+59.9	37.2	23 25.1	+60.0	37.4	24 12.6	+60.0	37.7	25 00.0	+60.0	38.0	**25**
26	20 24.8	+59.8	36.2	21 13.2	+59.8	36.4	22 01.4	+59.9	36.6	22 49.4	+60.0	36.9	23 37.3	+60.0	37.2	24 25.1	+59.9	37.4	25 12.6	+60.0	37.7	26 00.0	+60.0	38.0	**26**
27	21 24.6	+59.8	36.1	22 13.0	+59.9	36.3	23 01.3	+59.9	36.6	23 49.4	+59.9	36.8	24 37.3	+60.0	37.1	25 25.0	+60.0	37.4	26 12.6	+60.0	37.7	27 00.0	+60.0	38.0	**27**
28	22 24.4	+59.8	36.0	23 12.9	+59.8	36.3	24 01.2	+59.9	36.5	24 49.3	+59.9	36.8	25 37.3	+59.9	37.1	26 25.0	+60.0	37.4	27 12.6	+60.0	37.7	28 00.0	+60.0	38.0	**28**
29	23 24.2	+59.8	35.9	24 12.7	+59.9	36.2	25 01.1	+59.8	36.5	25 49.2	+60.0	36.7	26 37.2	+60.0	37.0	27 25.0	+60.0	37.3	28 12.6	+60.0	37.7	29 00.0	+60.0	38.0	**29**
30	24 24.0	+59.8	35.8	25 12.6	+59.8	36.1	26 00.9	+59.9	36.4	26 49.2	+59.9	36.7	27 37.2	+59.9	37.0	28 25.0	+60.0	37.3	29 12.6	+60.0	37.7	30 00.0	+60.0	38.0	**30**
31	25 23.8	+59.8	35.7	26 12.4	+59.9	36.0	27 00.8	+59.9	36.3	27 49.1	+59.9	36.6	28 37.1	+60.0	37.0	29 25.0	+60.0	37.3	30 12.6	+60.0	37.6	31 00.0	+60.0	38.0	**31**
32	26 23.6	+59.8	35.7	27 12.3	+59.8	35.9	28 00.7	+59.9	36.3	28 49.0	+59.9	36.6	29 37.1	+60.0	36.9	30 25.0	+59.9	37.3	31 12.6	+60.0	37.6	32 00.0	+60.0	38.0	**32**
33	27 23.4	+59.8	35.6	28 12.1	+59.8	35.9	29 00.6	+59.9	36.2	29 48.9	+60.0	36.5	30 37.1	+59.9	36.9	31 24.9	+60.0	37.2	32 12.6	+60.0	37.6	33 00.0	+60.0	38.0	**33**
34	28 23.2	+59.7	35.5	29 11.9	+59.9	35.8	30 00.5	+59.9	36.1	30 48.9	+59.9	36.5	31 37.0	+60.0	36.8	32 24.9	+60.0	37.2	33 12.6	+60.0	37.6	34 00.0	+60.0	38.0	**34**
35	29 22.9	+59.8	35.4	30 11.8	+59.8	35.7	31 00.4	+59.9	36.0	31 48.8	+59.9	36.4	32 37.0	+59.9	36.8	33 24.9	+60.0	37.2	34 12.6	+60.0	37.6	35 00.0	+60.0	38.0	**35**
36	30 22.7	+59.8	35.3	31 11.6	+59.8	35.6	32 00.3	+59.8	36.0	32 48.7	+59.9	36.3	33 36.9	+60.0	36.7	34 24.9	+60.0	37.1	35 12.6	+60.0	37.6	36 00.0	+60.0	38.0	**36**
37	31 22.5	+59.7	35.2	32 11.4	+59.9	35.5	33 00.1	+59.9	35.9	33 48.6	+60.0	36.3	34 36.9	+59.9	36.7	35 24.9	+59.9	37.1	36 12.6	+60.0	37.5	37 00.0	+60.0	38.0	**37**
38	32 22.2	+59.8	35.1	33 11.3	+59.8	35.4	34 00.0	+59.9	35.8	34 48.6	+59.9	36.2	35 36.8	+60.0	36.6	36 24.8	+60.0	37.1	37 12.6	+60.0	37.5	38 00.0	+60.0	38.0	**38**
39	33 22.0	+59.8	35.0	34 11.1	+59.8	35.3	34 59.9	+59.9	35.7	35 48.5	+59.9	36.2	36 36.8	+59.9	36.6	37 24.8	+60.0	37.0	38 12.6	+60.0	37.5	39 00.0	+60.0	38.0	**39**
40	34 21.8	+59.7	34.8	35 10.9	+59.8	35.2	35 59.8	+59.8	35.7	36 48.4	+59.9	36.1	37 36.7	+60.0	36.5	38 24.8	+60.0	37.0	39 12.6	+59.9	37.5	40 00.0	+60.0	38.0	**40**
41	35 21.5	+59.8	34.7	36 10.7	+59.8	35.1	36 59.6	+59.9	35.6	37 48.3	+59.9	36.0	38 36.7	+59.9	36.5	39 24.8	+59.9	37.0	40 12.5	+60.0	37.5	41 00.0	+60.0	38.0	**41**
42	36 21.3	+59.7	34.6	37 10.5	+59.8	35.0	37 59.5	+59.9	35.5	38 48.2	+59.9	36.0	39 36.6	+60.0	36.4	40 24.7	+60.0	36.9	41 12.5	+60.0	37.5	42 00.0	+60.0	38.0	**42**
43	37 21.0	+59.7	34.5	38 10.3	+59.8	34.9	38 59.4	+59.8	35.4	39 48.1	+59.9	35.9	40 36.6	+59.9	36.4	41 24.7	+60.0	36.9	42 12.5	+60.0	37.4	43 00.0	+60.0	38.0	**43**
44	38 20.7	+59.7	34.4	39 10.1	+59.8	34.8	39 59.2	+59.9	35.3	40 48.0	+59.9	35.8	41 36.5	+60.0	36.3	42 24.7	+60.0	36.9	43 12.5	+60.0	37.4	44 00.0	+60.0	38.0	**44**
45	39 20.4	+59.8	34.3	40 09.9	+59.8	34.7	40 59.1	+59.8	35.2	41 47.9	+59.9	35.7	42 36.5	+59.9	36.3	43 24.7	+59.9	36.8	44 12.5	+60.0	37.4	45 00.0	+60.0	38.0	**45**
46	40 20.2	+59.7	34.1	41 09.7	+59.8	34.6	41 58.9	+59.8	35.1	42 47.8	+59.9	35.7	43 36.4	+59.9	36.2	44 24.6	+60.0	36.8	45 12.5	+60.0	37.4	46 00.0	+60.0	38.0	**46**
47	41 19.9	+59.7	34.0	42 09.5	+59.7	34.5	42 58.7	+59.9	35.0	43 47.7	+59.9	35.6	44 36.3	+60.0	36.1	45 24.6	+60.0	36.7	46 12.5	+60.0	37.4	47 00.0	+60.0	38.0	**47**
48	42 19.6	+59.6	33.9	43 09.2	+59.8	34.4	43 58.6	+59.8	34.9	44 47.6	+59.9	35.5	45 36.3	+59.9	36.1	46 24.6	+60.0	36.7	47 12.5	+60.0	37.3	48 00.0	+60.0	38.0	**48**
49	43 19.2	+59.7	33.7	44 09.0	+59.7	34.3	44 58.4	+59.8	34.8	45 47.5	+59.9	35.4	46 36.2	+60.0	36.0	47 24.6	+59.9	36.6	48 12.5	+60.0	37.3	49 00.0	+60.0	38.0	**49**
50	44 18.9	+59.7	33.6	45 08.7	+59.8	34.1	45 58.2	+59.9	34.7	46 47.4	+59.9	35.3	47 36.2	+59.9	35.9	48 24.5	+60.0	36.6	49 12.5	+60.0	37.3	50 00.0	+60.0	38.0	**50**
51	45 18.6	+59.6	33.4	46 08.5	+59.7	34.0	46 58.1	+59.8	34.6	47 47.3	+59.8	35.2	48 36.1	+59.9	35.9	49 24.5	+60.0	36.5	50 12.5	+60.0	37.3	51 00.0	+60.0	38.0	**51**
52	46 18.2	+59.7	33.3	47 08.2	+59.7	33.9	47 57.9	+59.8	34.5	48 47.1	+59.9	35.1	49 36.0	+59.9	35.8	50 24.5	+59.9	36.5	51 12.5	+60.0	37.2	52 00.0	+60.0	38.0	**52**
53	47 17.9	+59.6	33.1	48 07.9	+59.8	33.7	48 57.7	+59.8	34.4	49 47.0	+59.9	35.0	50 35.9	+60.0	35.7	51 24.4	+60.0	36.4	52 12.5	+60.0	37.2	53 00.0	+60.0	38.0	**53**
54	48 17.5	+59.6	32.9	49 07.7	+59.7	33.6	49 57.5	+59.7	34.2	50 46.9	+59.8	34.9	51 35.9	+59.9	35.6	52 24.4	+60.0	36.4	53 12.5	+59.9	37.2	54 00.0	+60.0	38.0	**54**
55	49 17.1	+59.6	32.8	50 07.4	+59.7	33.4	50 57.2	+59.8	34.1	51 46.7	+59.9	34.8	52 35.8	+59.9	35.5	53 24.4	+59.9	36.3	54 12.4	+60.0	37.1	55 00.0	+60.0	38.0	**55**
56	50 16.7	+59.6	32.6	51 07.1	+59.6	33.3	51 57.0	+59.8	34.0	52 46.6	+59.8	34.7	53 35.7	+59.9	35.5	54 24.3	+60.0	36.3	55 12.4	+60.0	37.1	56 00.0	+60.0	38.0	**56**
57	51 16.3	+59.5	32.4	52 06.7	+59.7	33.1	52 56.8	+59.7	33.8	53 46.4	+59.9	34.6	54 35.6	+59.9	35.4	55 24.3	+59.9	36.2	56 12.4	+60.0	37.1	57 00.0	+60.0	38.0	**57**
58	52 15.8	+59.6	32.2	53 06.4	+59.6	32.9	53 56.5	+59.8	33.7	54 46.3	+59.8	34.4	55 35.5	+59.9	35.3	56 24.2	+60.0	36.1	57 12.4	+60.0	37.0	58 00.0	+60.0	38.0	**58**
59	53 15.4	+59.5	32.0	54 06.0	+59.7	32.7	54 56.3	+59.7	33.5	55 46.1	+59.8	34.3	56 35.4	+59.9	35.2	57 24.2	+59.9	36.1	58 12.4	+60.0	37.0	59 00.0	+60.0	38.0	**59**
60	54 14.9	+59.5	31.8	55 05.7	+59.6	32.5	55 56.0	+59.7	33.3	56 45.9	+59.8	34.2	57 35.3	+59.9	35.1	58 24.1	+60.0	36.0	59 12.4	+60.0	37.0	60 00.0	+60.0	38.0	**60**
61	55 14.4	+59.4	31.6	56 05.3	+59.6	32.3	56 55.7	+59.7	33.2	57 45.7	+59.8	34.0	58 35.2	+59.9	34.9	59 24.1	+59.9	35.9	60 12.4	+60.0	36.9	61 00.0	+60.0	38.0	**61**
62	56 13.8	+59.5	31.3	57 04.9	+59.5	32.1	57 55.4	+59.7	33.0	58 45.5	+59.8	33.9	59 35.1	+59.8	34.8	60 24.0	+60.0	35.8	61 12.4	+59.9	36.9	62 00.0	+60.0	38.0	**62**
63	57 13.3	+59.4	31.1	58 04.4	+59.6	31.9	58 55.1	+59.7	32.8	59 45.3	+59.8	33.7	60 34.9	+59.9	34.7	61 24.0	+59.9	35.7	62 12.3	+60.0	36.8	63 00.0	+60.0	38.0	**63**
64	58 12.7	+59.3	30.8	59 04.0	+59.5	31.7	59 54.8	+59.6	32.6	60 45.1	+59.7	33.5	61 34.8	+59.9	34.5	62 23.9	+59.9	35.6	63 12.3	+60.0	36.8	64 00.0	+60.0	38.0	**64**
65	59 12.0	+59.4	30.5	60 03.5	+59.5	31.4	60 54.4	+59.7	32.4	61 44.8	+59.8	33.3	62 34.7	+59.8	34.4	63 23.8	+60.0	35.5	64 12.3	+60.0	36.7	65 00.0	+60.0	38.0	**65**
66	60 11.4	+59.3	30.2	61 03.0	+59.4	31.2	61 54.1	+59.6	32.1	62 44.6	+59.7	33.1	63 34.5	+59.8	34.2	64 23.8	+59.9	35.4	65 12.3	+60.0	36.7	66 00.0	+60.0	38.0	**66**
67	61 10.7	+59.2	29.9	62 02.4	+59.4	30.9	62 53.7	+59.5	31.9	63 44.3	+59.7	32.9	64 34.3	+59.9	34.1	65 23.7	+59.9	35.3	66 12.3	+59.9	36.6	67 00.0	+60.0	38.0	**67**
68	62 09.9	+59.2	29.6	63 01.8	+59.4	30.6	63 53.2	+59.6	31.6	64 44.0	+59.7	32.7	65 34.2	+59.8	33.9	66 23.6	+59.9	35.2	67 12.2	+60.0	36.5	68 00.0	+60.0	38.0	**68**
69	63 09.1	+59.1	29.2	64 01.2	+59.3	30.2	64 52.8	+59.5	31.3	65 43.7	+59.7	32.5	66 34.0	+59.8	33.7	67 23.5	+59.9	35.0	68 12.2	+60.0	36.5	69 00.0	+60.0	38.0	**69**
70	64 08.2	+59.1	28.9	65 00.5	+59.3	29.9	65 52.3	+59.4	31.0	66 43.4	+59.6	32.2	67 33.8	+59.8	33.5	68 23.4	+59.9	34.9	69 12.2	+60.0	36.4	70 00.0	+60.0	38.0	**70**
71	65 07.3	+59.0	28.5	65 59.8	+59.2	29.5	66 51.7	+59.4	30.7	67 43.0	+59.6	31.9	68 33.6	+59.7	33.3	69 23.3	+59.9	34.7	70 12.2	+59.9	36.3	71 00.0	+60.0	38.0	**71**
72	66 06.3	+58.9	28.0	66 59.0	+59.2	29.1	67 51.1	+59.4	30.3	68 42.6	+59.5	31.6	69 33.3	+59.7	33.0	70 23.2	+59.9	34.5	71 12.1	+60.0	36.2	72 00.0	+60.0	38.0	**72**
73	67 05.2	+58.9	27.5	67 58.2	+59.0	28.7	68 50.5	+59.3	29.9	69 42.1	+59.6	31.3	70 33.0	+59.7	32.7	71 23.1	+59.8	34.3	72 12.1	+60.0	36.1	73 00.0	+60.0	38.0	**73**
74	68 04.1	+58.7	27.0	68 57.2	+59.0	28.2	69 49.8	+59.2	29.5	70 41.7	+59.4	30.9	71 32.7	+59.7	32.4	72 22.9	+59.9	34.1	73 12.1	+59.9	36.0	74 00.0	+60.0	38.0	**74**
75	69 02.8	+58.6	26.5	69 56.2	+58.9	27.7	70 49.0	+59.2	29.0	71 41.1	+59.4	30.5	72 32.4	+59.6	32.1	73 22.8	+59.8	33.9	74 12.0	+60.0	35.8	75 00.0	+60.0	38.0	**75**
76	70 01.4	+58.4	25.8	70 55.1	+58.8	27.1	71 48.2	+59.0	28.5	72 40.5	+59.4	30.0	73 32.0	+59.6	31.7	74 22.6	+59.8	33.6	75 12.0	+59.9	35.7	76 00.0	+60.0	38.0	**76**
77	70 59.8	+58.3	25.2	71 53.9	+58.6	26.5	72 47.2	+59.0	27.9	73 39.9	+59.2	29.5	74 31.6	+59.6	31.3	75 22.4	+59.7	33.3	76 11.9	+59.9	35.5	77 00.0	+60.0	38.0	**77**
78	71 58.1	+58.2	24.4	72 52.5	+58.5	25.8	73 46.2	+58.8	27.3	74 39.1	+59.2	28.9	75 31.2	+59.4	30.8	76 22.1	+59.8	32.9	77 11.8	+60.0	35.3	78 00.0	+60.0	38.0	**78**
79	72 56.3	+57.8	23.6	73 51.0	+58.2	25.0	74 45.0	+58.6	26.5	75 38.3	+59.0	28.3	76 30.6	+59.4	30.2	77 21.9	+59.7	32.5	78 11.8	+59.9	35.0	79 00.0	+60.0	38.0	**79**
80	73 54.1	+57.7	22.7	74 49.2	+58.1	24.1	75 43.6	+58.5	25.7	76 37.3	+58.9	27.5	77 30.0	+59.3	29.6	78 21.6	+59.6	32.0	79 11.7	+59.9	34.8	80 00.0	+60.0	38.0	**80**
81	74 51.8	+57.3	21.6	75 47.3	+57.7	23.1	76 42.1	+58.2	24.8	77 36.2	+58.7	26.7	78 29.3	+59.1	28.9	79 21.2	+59.5	31.4	80 11.6	+59.8	34.4	81 00.0	+60.0	38.0	**81**
82	75 49.1	+56.9	20.5	76 45.0	+57.4	22.0	77 40.3	+57.9	23.7	78 34.9	+58.4	25.6	79 28.4	+59.0	28.0	80 20.7	+59.5	30.7	81 11.4	+59.9	34.0	82 00.0	+60.0	38.0	**82**
83	76 46.0	+56.4	19.1	77 42.4	+57.0	20.6	78 38.2	+57.6	22.4	79 33.3	+58.1	24.4	80 27.4	+58.7	26.9	81 20.2	+59.3	29.9	82 11.3	+59.8	33.5	83 00.0	+60.0	38.0	**83**
84	77 42.4	+55.8	17.6	78 39.4	+56.4	19.1	79 35.8	+57.0	20.9	80 31.4	+57.7	23.0	81 26.1	+58.4	25.6	82 19.5	+59.1	28.8	83 11.1	+59.7	32.8	84 00.0	+60.0	38.0	**84**
85	78 38.2	+55.1	15.8	79 35.8	+55.6	17.3	80 32.8	+56.3	19.1	81 29.1	+57.1	21.2	82 24.5	+57.9	24.0	83 18.6	+58.8	27.4	84 10.8	+59.6	31.9	85 00.0	+60.0	38.0	**85**
86	79 33.3	+54.1	13.7	80 31.4	+54.7	15.1	81 29.1	+55.4	16.9	82 26.2	+56.2	19.0	83 22.4	+57.2	21.9	84 17.4	+58.3	25.6	85 10.4	+59.3	30.7	86 00.0	+60.0	38.0	**86**
87	80 27.4	+52.8	11.2	81 26.1	+53.4	12.5	82 24.5	+54.1	14.1	83 22.4	+55.0	16.2	84 19.6	+56.1	19.0	85 15.7	+57.4	23.0	86 09.7	+59.0	28.8	87 00.0	+60.0	38.0	**87**
88	81 20.2	*+51.1* •	8.2	82 19.5	*+51.6* •	9.3	83 18.6	*+52.2* •	10.6	84 17.4	*+53.0* •	12.5	85 15.7	*+54.0* •	15.1	86 13.1	*+55.6* •	19.0	87 08.7	*+57.8* •	25.6	88 00.0	+60.0	38.0	**88**
89	82 11.3	*+48.7* •	4.5	83 11.1	*+48.9* •	5.2	84 10.8	*+49.2* •	6.1	85 10.4	*+49.6* •	7.3	86 09.7	*+50.3* •	9.2	87 08.7	*+51.3* •	12.5	88 06.5	*+53.5* •	19.0	89 00.0	+60.0	38.0	**89**
90	83 00.0	*+45.5* •	0.0	84 00.0	*+45.1* •	0.0	85 00.0	*+44.6* •	0.0	86 00.0	*+43.8* •	0.0	87 00.0	*+42.2* •	0.0	88 00.0	*+38.4* •	0.0	89 00.0	*+20.9* •	0.0	90 00.0	−60.0	19.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 142°, 218°

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 26.1	+59.8	140.8	4 39.6	+59.8	140.8	3 53.0	+59.9	140.9	3 06.5	+59.9	140.9	2 19.9	+59.9	141.0	1 33.3	+59.9	141.0	0 46.6	+60.0	141.0	0 00.0	+60.0	141.0	0
1	6 25.9	+59.8	140.7	5 39.4	+59.9	140.8	4 52.9	+59.9	140.8	4 06.4	+59.9	140.9	3 19.8	+60.0	140.9	2 33.2	+60.0	141.0	1 46.6	+60.0	141.0	1 00.0	+60.0	141.0	1
2	7 25.7	+59.8	140.6	6 39.3	+59.9	140.7	5 52.8	+60.0	140.8	5 06.3	+60.0	140.8	4 19.8	+60.0	140.9	3 33.2	+60.0	140.9	2 46.6	+60.0	141.0	2 00.0	+60.0	141.0	2
3	8 25.5	+59.9	140.6	7 39.2	+59.8	140.6	6 52.8	+59.9	140.7	6 06.3	+59.9	140.8	5 19.8	+59.9	140.9	4 33.2	+60.0	140.9	3 46.6	+60.0	141.0	3 00.0	+60.0	141.0	3
4	9 25.4	+59.8	140.5	8 39.0	+59.9	140.6	7 52.7	+59.9	140.7	7 06.2	+60.0	140.8	6 19.7	+60.0	140.8	5 33.2	+60.0	140.9	4 46.6	+60.0	141.0	4 00.0	+60.0	141.0	4
5	10 25.2	+59.8	140.4	9 38.9	+59.9	140.5	8 52.6	+59.9	140.6	8 06.2	+59.9	140.7	7 19.7	+60.0	140.8	6 33.2	+60.0	140.9	5 46.6	+60.0	140.9	5 00.0	+60.0	141.0	5
6	11 25.0	+59.8	140.3	10 38.8	+59.8	140.4	9 52.5	+59.9	140.6	9 06.1	+59.9	140.7	8 19.7	+59.9	140.8	7 33.2	+59.9	140.9	6 46.6	+60.0	140.9	6 00.0	+60.0	141.0	6
7	12 24.8	+59.8	140.2	11 38.6	+59.9	140.4	10 52.4	+59.9	140.5	10 06.0	+60.0	140.6	9 19.6	+60.0	140.7	8 33.1	+60.0	140.8	7 46.6	+60.0	140.9	7 00.0	+60.0	141.0	7
8	13 24.6	+59.8	140.2	12 38.5	+59.9	140.3	11 52.3	+59.9	140.4	11 06.0	+59.9	140.6	10 19.6	+60.0	140.7	9 33.1	+60.0	140.8	8 46.6	+60.0	140.9	8 00.0	+60.0	141.0	8
9	14 24.4	+59.8	140.1	13 38.4	+59.8	140.2	12 52.2	+59.9	140.4	12 05.9	+60.0	140.5	11 19.6	+59.9	140.7	10 33.1	+60.0	140.8	9 46.6	+60.0	140.9	9 00.0	+60.0	141.0	9
10	15 24.2	+59.9	140.0	14 38.2	+59.9	140.2	13 52.1	+59.9	140.3	13 05.9	+59.9	140.5	12 19.5	+60.0	140.6	11 33.1	+60.0	140.8	10 46.6	+60.0	140.9	10 00.0	+60.0	141.0	10
11	16 24.1	+59.8	139.9	15 38.1	+59.8	140.1	14 52.0	+59.9	140.3	14 05.8	+59.9	140.4	13 19.5	+60.0	140.6	12 33.1	+60.0	140.7	11 46.6	+60.0	140.9	11 00.0	+60.0	141.0	11
12	17 23.9	+59.8	139.8	16 37.9	+59.9	140.0	15 51.9	+59.9	140.2	15 05.7	+60.0	140.4	14 19.5	+59.9	140.6	13 33.1	+60.0	140.7	12 46.6	+60.0	140.9	12 00.0	+60.0	141.0	12
13	18 23.7	+59.8	139.7	17 37.8	+59.9	140.0	16 51.8	+59.9	140.2	16 05.7	+59.9	140.3	15 19.4	+60.0	140.5	14 33.1	+59.9	140.7	13 46.6	+60.0	140.8	13 00.0	+60.0	141.0	13
14	19 23.5	+59.8	139.7	18 37.7	+59.8	139.9	17 51.7	+59.9	140.1	17 05.6	+60.0	140.3	16 19.4	+60.0	140.5	15 33.0	+60.0	140.7	14 46.6	+60.0	140.8	14 00.0	+60.0	141.0	14
15	20 23.3	+59.8	139.6	19 37.5	+59.9	139.8	18 51.6	+59.9	140.0	18 05.6	+59.9	140.2	17 19.4	+59.9	140.4	16 33.0	+60.0	140.6	15 46.6	+60.0	140.8	15 00.0	+60.0	141.0	15
16	21 23.1	+59.8	139.5	20 37.4	+59.8	139.7	19 51.5	+59.9	140.0	19 05.5	+59.9	140.2	18 19.3	+60.0	140.4	17 33.0	+60.0	140.6	16 46.6	+60.0	140.8	16 00.0	+60.0	141.0	16
17	22 22.9	+59.8	139.4	21 37.2	+59.9	139.7	20 51.4	+59.9	139.9	20 05.4	+60.0	140.1	19 19.3	+59.9	140.4	18 33.0	+60.0	140.6	17 46.6	+60.0	140.8	17 00.0	+60.0	141.0	17
18	23 22.7	+59.7	139.3	22 37.1	+59.8	139.6	21 51.3	+59.9	139.8	21 05.4	+59.9	140.1	20 19.2	+60.0	140.3	19 33.0	+60.0	140.6	18 46.6	+60.0	140.8	18 00.0	+60.0	141.0	18
19	24 22.4	+59.8	139.2	23 36.9	+59.9	139.5	22 51.2	+59.9	139.8	22 05.3	+59.9	140.0	21 19.2	+60.0	140.3	20 33.0	+59.9	140.5	19 46.6	+60.0	140.8	19 00.0	+60.0	141.0	19
20	25 22.2	+59.8	139.1	24 36.8	+59.8	139.4	23 51.1	+59.9	139.7	23 05.2	+60.0	140.0	22 19.2	+59.9	140.3	21 32.9	+60.0	140.5	20 46.6	+59.9	140.8	20 00.0	+60.0	141.0	20
21	26 22.0	+59.8	139.0	25 36.6	+59.8	139.3	24 51.0	+59.9	139.6	24 05.2	+59.9	139.9	23 19.1	+60.0	140.2	22 32.9	+60.0	140.5	21 46.5	+60.0	140.8	21 00.0	+60.0	141.0	21
22	27 21.8	+59.8	138.9	26 36.4	+59.9	139.3	25 50.9	+59.9	139.6	25 05.1	+59.9	139.9	24 19.1	+60.0	140.2	23 32.9	+60.0	140.5	22 46.5	+60.0	140.7	22 00.0	+60.0	141.0	22
23	28 21.6	+59.7	138.8	27 36.3	+59.8	139.2	26 50.8	+59.8	139.5	26 05.0	+59.9	139.8	25 19.1	+59.9	140.1	24 32.9	+60.0	140.4	23 46.5	+60.0	140.7	23 00.0	+60.0	141.0	23
24	29 21.3	+59.8	138.7	28 36.1	+59.8	139.1	27 50.6	+59.9	139.4	27 04.9	+60.0	139.8	26 19.0	+60.0	140.1	25 32.9	+60.0	140.4	24 46.5	+60.0	140.7	24 00.0	+60.0	141.0	24
25	30 21.1	+59.8	138.6	29 35.9	+59.9	139.0	28 50.5	+59.9	139.4	28 04.9	+59.9	139.7	27 19.0	+59.9	140.1	26 32.9	+59.9	140.4	25 46.5	+60.0	140.7	25 00.0	+60.0	141.0	25
26	31 20.9	+59.7	138.5	30 35.8	+59.8	138.9	29 50.4	+59.9	139.3	29 04.8	+59.9	139.7	28 18.9	+60.0	140.0	27 32.8	+60.0	140.4	26 46.5	+60.0	140.7	26 00.0	+60.0	141.0	26
27	32 20.6	+59.8	138.4	31 35.6	+59.8	138.8	30 50.3	+59.9	139.2	30 04.7	+59.9	139.6	29 18.9	+59.9	140.0	28 32.8	+60.0	140.3	27 46.5	+60.0	140.7	27 00.0	+60.0	141.0	27
28	33 20.4	+59.7	138.3	32 35.4	+59.8	138.7	31 50.2	+59.8	139.2	31 04.6	+60.0	139.6	30 18.8	+60.0	139.9	29 32.8	+60.0	140.3	28 46.5	+60.0	140.7	28 00.0	+60.0	141.0	28
29	34 20.1	+59.7	138.2	33 35.2	+59.8	138.6	32 50.0	+59.9	139.1	32 04.6	+59.9	139.5	31 18.8	+60.0	139.9	30 32.8	+60.0	140.3	29 46.5	+60.0	140.6	29 00.0	+60.0	141.0	29
30	35 19.8	+59.8	138.1	34 35.0	+59.8	138.5	33 49.9	+59.9	139.0	33 04.5	+59.9	139.4	32 18.8	+59.9	139.8	31 32.8	+59.9	140.2	30 46.5	+60.0	140.6	30 00.0	+60.0	141.0	30
31	36 19.6	+59.7	138.0	35 34.8	+59.8	138.5	34 49.8	+59.8	138.9	34 04.4	+59.9	139.4	33 18.7	+60.0	139.8	32 32.7	+60.0	140.2	31 46.5	+60.0	140.6	31 00.0	+60.0	141.0	31
32	37 19.3	+59.7	137.8	36 34.6	+59.8	138.3	35 49.6	+59.9	138.8	35 04.3	+59.9	139.3	34 18.7	+59.9	139.7	33 32.7	+60.0	140.2	32 46.5	+60.0	140.6	32 00.0	+60.0	141.0	32
33	38 19.0	+59.7	137.7	37 34.4	+59.8	138.2	36 49.5	+59.9	138.7	36 04.2	+59.9	139.2	35 18.6	+60.0	139.7	34 32.7	+60.0	140.2	33 46.5	+60.0	140.6	33 00.0	+60.0	141.0	33
34	39 18.7	+59.7	137.6	38 34.2	+59.8	138.1	37 49.4	+59.8	138.7	37 04.1	+59.9	139.2	36 18.6	+59.9	139.7	35 32.7	+60.0	140.1	34 46.5	+60.0	140.6	34 00.0	+60.0	141.0	34
35	40 18.4	+59.7	137.5	39 34.0	+59.8	138.0	38 49.2	+59.9	138.6	38 04.0	+59.9	139.1	37 18.5	+60.0	139.6	36 32.7	+59.9	140.1	35 46.5	+60.0	140.6	35 00.0	+60.0	141.0	35
36	41 18.1	+59.7	137.3	40 33.8	+59.8	137.9	39 49.1	+59.8	138.5	39 03.9	+59.9	139.0	38 18.5	+59.9	139.5	37 32.6	+60.0	140.0	36 46.5	+60.0	140.5	36 00.0	+60.0	141.0	36
37	42 17.8	+59.7	137.2	41 33.6	+59.7	137.8	40 48.9	+59.8	138.4	40 03.8	+59.9	139.0	39 18.4	+60.0	139.5	38 32.6	+60.0	140.0	37 46.5	+60.0	140.5	37 00.0	+60.0	141.0	37
38	43 17.5	+59.6	137.1	42 33.3	+59.8	137.7	41 48.7	+59.9	138.3	41 03.7	+59.9	138.9	40 18.4	+59.9	139.4	39 32.6	+60.0	140.0	38 46.5	+60.0	140.5	38 00.0	+60.0	141.0	38
39	44 17.1	+59.7	136.9	43 33.1	+59.7	137.6	42 48.6	+59.8	138.2	42 03.6	+59.9	138.8	41 18.3	+59.9	139.4	40 32.6	+59.9	139.9	39 46.5	+60.0	140.5	39 00.0	+60.0	141.0	39
40	45 16.8	+59.6	136.8	44 32.8	+59.8	137.4	43 48.4	+59.8	138.1	43 03.5	+59.9	138.7	42 18.2	+60.0	139.3	41 32.5	+60.0	139.9	40 46.5	+59.9	140.5	40 00.0	+60.0	141.0	40
41	46 16.4	+59.6	136.6	45 32.6	+59.7	137.3	44 48.2	+59.8	138.0	44 03.4	+59.9	138.6	43 18.2	+59.9	139.3	42 32.5	+60.0	139.9	41 46.4	+60.0	140.4	41 00.0	+60.0	141.0	41
42	47 16.0	+59.6	136.4	46 32.3	+59.7	137.2	45 48.0	+59.9	137.9	45 03.3	+59.9	138.5	44 18.1	+60.0	139.2	43 32.5	+60.0	139.8	42 46.4	+60.0	140.4	42 00.0	+60.0	141.0	42
43	48 15.6	+59.6	136.3	47 32.0	+59.7	137.0	46 47.9	+59.8	137.8	46 03.2	+59.9	138.5	45 18.1	+59.9	139.1	44 32.5	+59.9	139.8	43 46.4	+60.0	140.4	43 00.0	+60.0	141.0	43
44	49 15.2	+59.6	136.1	48 31.7	+59.7	136.9	47 47.7	+59.8	137.6	47 03.1	+59.8	138.4	46 18.0	+59.9	139.1	45 32.4	+60.0	139.7	44 46.4	+60.0	140.4	44 00.0	+60.0	141.0	44
45	50 14.8	+59.6	135.9	49 31.4	+59.7	136.7	48 47.5	+59.7	137.5	48 02.9	+59.9	138.3	47 17.9	+59.9	139.0	46 32.4	+60.0	139.7	45 46.4	+60.0	140.4	45 00.0	+60.0	141.0	45
46	51 14.4	+59.5	135.7	50 31.1	+59.7	136.6	49 47.2	+59.8	137.4	49 02.8	+59.9	138.2	48 17.8	+60.0	138.9	47 32.4	+59.9	139.6	46 46.4	+60.0	140.3	46 00.0	+60.0	141.0	46
47	52 13.9	+59.5	135.5	51 30.8	+59.6	136.4	50 47.0	+59.8	137.2	50 02.7	+59.8	138.1	49 17.8	+59.9	138.8	48 32.3	+60.0	139.6	47 46.4	+60.0	140.3	47 00.0	+60.0	141.0	47
48	53 13.4	+59.5	135.3	52 30.4	+59.7	136.2	51 46.8	+59.7	137.1	51 02.5	+59.9	138.0	50 17.7	+59.9	138.8	49 32.3	+60.0	139.5	48 46.4	+60.0	140.3	48 00.0	+60.0	141.0	48
49	54 12.9	+59.5	135.1	53 30.1	+59.6	136.0	52 46.5	+59.8	137.0	52 02.4	+59.8	137.8	51 17.6	+59.9	138.7	50 32.3	+59.9	139.5	49 46.4	+60.0	140.3	49 00.0	+60.0	141.0	49
50	55 12.4	+59.4	134.9	54 29.7	+59.6	135.9	53 46.3	+59.7	136.8	53 02.2	+59.9	137.7	52 17.5	+59.9	138.6	51 32.2	+60.0	139.4	50 46.4	+60.0	140.2	50 00.0	+60.0	141.0	50
51	56 11.8	+59.4	134.6	55 29.3	+59.6	135.7	54 46.0	+59.8	136.6	54 02.1	+59.8	137.6	53 17.4	+59.9	138.5	52 32.2	+59.9	139.4	51 46.4	+60.0	140.2	51 00.0	+60.0	141.0	51
52	57 11.2	+59.4	134.4	56 28.9	+59.5	135.4	55 45.8	+59.7	136.5	55 01.9	+59.8	137.5	54 17.3	+59.9	138.4	53 32.1	+60.0	139.3	52 46.4	+59.9	140.2	52 00.0	+60.0	141.0	52
53	58 10.6	+59.4	134.1	57 28.4	+59.6	135.2	56 45.5	+59.6	136.3	56 01.7	+59.8	137.3	55 17.2	+59.9	138.3	54 32.1	+60.0	139.2	53 46.3	+60.0	140.1	53 00.0	+60.0	141.0	53
54	59 10.0	+59.3	133.8	58 28.0	+59.5	135.0	57 45.1	+59.7	136.1	57 01.5	+59.8	137.2	56 17.1	+59.9	138.2	55 32.1	+59.9	139.2	54 46.3	+60.0	140.1	54 00.0	+60.0	141.0	54
55	60 09.3	+59.2	133.5	59 27.5	+59.5	134.7	58 44.8	+59.7	135.9	58 01.3	+59.8	137.0	57 17.0	+59.9	138.1	56 32.0	+60.0	139.1	55 46.3	+60.0	140.1	55 00.0	+60.0	141.0	55
56	61 08.5	+59.2	133.2	60 27.0	+59.4	134.5	59 44.5	+59.6	135.7	59 01.1	+59.8	136.9	58 16.9	+59.9	138.0	57 32.0	+59.9	139.0	56 46.3	+60.0	140.0	56 00.0	+60.0	141.0	56
57	62 07.7	+59.2	132.8	61 26.4	+59.4	134.2	60 44.1	+59.6	135.5	60 00.9	+59.7	136.7	59 16.8	+59.9	137.9	58 31.9	+60.0	139.0	57 46.3	+60.0	140.0	57 00.0	+60.0	141.0	57
58	63 06.9	+59.1	132.5	62 25.8	+59.4	133.9	61 43.7	+59.6	135.2	61 00.6	+59.8	136.5	60 16.7	+59.8	137.7	59 31.9	+59.9	138.9	58 46.3	+60.0	140.0	58 00.0	+60.0	141.0	58
59	64 06.0	+59.0	132.1	63 25.2	+59.3	133.6	62 43.3	+59.6	135.0	62 00.4	+59.7	136.3	61 16.5	+59.9	137.6	60 31.8	+59.9	138.8	59 46.3	+60.0	139.9	59 00.0	+60.0	141.0	59
60	65 05.0	+59.0	131.7	64 24.5	+59.3	133.2	63 42.9	+59.5	134.7	63 00.1	+59.7	136.1	62 16.4	+59.8	137.4	61 31.7	+60.0	138.7	60 46.3	+59.9	139.9	60 00.0	+60.0	141.0	60
61	66 04.0	+58.9	131.2	65 23.8	+59.2	132.9	64 42.4	+59.5	134.4	63 59.8	+59.7	135.9	63 16.2	+59.9	137.3	62 31.7	+59.9	138.6	61 46.2	+60.0	139.8	61 00.0	+60.0	141.0	61
62	67 02.9	+58.7	130.7	66 23.0	+59.2	132.5	65 41.9	+59.4	134.1	64 59.5	+59.7	135.7	64 16.1	+59.8	137.1	63 31.6	+59.9	138.5	62 46.2	+60.0	139.8	62 00.0	+60.0	141.0	62
63	68 01.6	+58.7	130.2	67 22.2	+59.0	132.1	66 41.3	+59.4	133.8	65 59.2	+59.6	135.4	65 15.9	+59.8	136.9	64 31.5	+59.9	138.4	63 46.2	+60.0	139.7	63 00.0	+60.0	141.0	63
64	69 00.3	+58.6	129.6	68 21.2	+59.0	131.6	67 40.7	+59.3	133.4	66 58.8	+59.6	135.1	66 15.7	+59.8	136.7	65 31.4	+60.0	138.3	64 46.2	+60.0	139.7	64 00.0	+60.0	141.0	64
65	69 58.9	+58.4	129.0	69 20.2	+58.9	131.1	68 40.0	+59.3	133.0	67 58.4	+59.6	134.8	67 15.5	+59.8	136.5	66 31.4	+59.9	138.1	65 46.2	+59.9	139.6	65 00.0	+60.0	141.0	65
66	70 57.3	+58.2	128.3	70 19.1	+58.8	130.5	69 39.3	+59.2	132.6	68 58.0	+59.5	134.5	68 15.3	+59.7	136.3	67 31.3	+59.9	138.0	66 46.1	+60.0	139.5	66 00.0	+60.0	141.0	66
67	71 55.5	+58.0	127.6	71 17.9	+58.7	129.9	70 38.5	+59.2	132.1	69 57.5	+59.5	134.1	69 15.0	+59.7	136.0	68 31.2	+59.9	137.8	67 46.1	+60.0	139.5	67 00.0	+60.0	141.0	67
68	72 53.5	+57.8	126.7	72 16.6	+58.5	129.2	71 37.7	+59.0	131.6	70 57.0	+59.4	133.8	70 14.7	+59.7	135.8	69 31.1	+59.8	137.6	68 46.1	+60.0	139.4	68 00.0	+60.0	141.0	68
69	73 51.3	+57.5	125.8	73 15.1	+58.3	128.5	72 36.7	+58.9	131.0	71 56.4	+59.4	133.3	71 14.4	+59.7	135.5	70 30.9	+59.9	137.5	69 46.1	+59.9	139.3	69 00.0	+60.0	141.0	69
70	74 48.8	+57.2	124.7	74 13.4	+58.1	127.7	73 35.6	+58.8	130.4	72 55.8	+59.3	132.8	72 14.1	+59.6	135.1	71 30.8	+59.8	137.2	70 46.0	+60.0	139.2	70 00.0	+60.0	141.0	70
71	75 46.0	+56.8	123.6	75 11.5	+57.8	126.7	74 34.4	+58.6	129.6	73 55.1	+59.2	132.3	73 13.7	+59.6	134.8	72 30.6	+59.9	137.0	71 46.0	+60.0	139.1	71 00.0	+60.0	141.0	71
72	76 42.8	+56.3	122.2	76 09.3	+57.6	125.6	75 33.0	+58.5	128.8	74 54.3	+59.0	131.7	74 13.3	+59.5	134.3	73 30.5	+59.8	136.8	72 46.0	+59.9	139.0	72 00.0	+60.0	141.0	72
73	77 39.1	+55.7	120.6	77 06.9	+57.1	124.4	76 31.5	+58.1	127.9	75 53.3	+59.0	131.0	75 12.8	+59.5	133.9	74 30.3	+59.8	136.5	73 45.9	+60.0	138.8	73 00.0	+60.0	141.0	73
74	78 34.8	+54.9	118.8	78 04.0	+56.6	123.0	77 29.6	+57.9	126.8	76 52.3	+58.8	130.2	76 12.3	+59.4	133.3	75 30.1	+59.7	136.1	74 45.9	+59.9	138.7	74 00.0	+60.0	141.0	74
75	79 29.7	+53.9	116.7	79 00.6	+55.9	121.3	78 27.5	+57.5	125.5	77 51.1	+58.5	129.3	77 11.7	+59.3	132.7	76 29.8	+59.7	135.8	75 45.8	+59.9	138.5	75 00.0	+60.0	141.0	75
76	80 23.6	+52.6	114.2	79 56.5	+55.2	119.3	79 25.0	+57.0	124.0	78 49.6	+58.3	128.2	78 11.0	+59.1	132.0	77 29.5	+59.7	135.3	76 45.7	+60.0	138.3	76 00.0	+60.0	141.0	76
77	81 16.2	+50.8	•111.2	80 51.7	+54.0	117.0	80 22.0	+56.3	122.2	79 47.9	+57.9	126.9	79 10.1	+59.0	131.1	78 29.2	+59.6	134.8	77 45.7	+59.9	138.1	77 00.0	+60.0	141.0	77
78	82 07.0	+48.4	•107.5	81 45.7	+52.4	114.1	81 18.3	+55.4	120.1	80 45.8	+57.5	125.4	80 09.1	+58.7	130.1	79 28.8	+59.5	134.2	78 45.6	+59.9	137.8	78 00.0	+60.0	141.0	78
79	82 55.4	+45.1	•102.9	82 38.1	+50.3	•110.5	82 13.7	+54.2	117.4	81 43.3	+56.8	123.5	81 07.8	+58.5	128.8	80 28.3	+59.4	133.5	79 45.5	+59.9	137.5	79 00.0	+60.0	141.0	79
80	83 40.5	+40.5	• 97.3	83 28.4	+47.2	•106.0	83 07.9	+52.2	•114.0	82 40.1	+55.7	121.1	82 06.3	+58.0	127.3	81 27.7	+59.3	132.6	80 45.4	+59.8	137.1	80 00.0	+60.0	141.0	80
81	84 21.0	+34.0	• 90.2	84 15.6	+42.6	•100.2	84 00.1	+49.5	•109.6	83 35.8	+54.4	118.0	83 04.3	+57.3	125.3	82 27.0	+59.0	131.5	81 45.2	+59.8	136.7	81 00.0	+60.0	141.0	81
82	84 55.0	+25.2	• 81.3	84 58.2	+35.8	• 92.7	84 49.6	+45.1	•103.8	84 30.2	+51.9	•113.9	84 01.6	+56.4	122.7	83 26.0	+58.7	130.0	82 45.0	+59.7	136.1	82 00.0	+60.0	141.0	82
83	85 20.2	+13.8	• 70.6	85 34.0	+26.0	• 82.9	85 34.7	+38.1	• 95.8	85 22.1	+48.1	•108.2	84 58.0	+54.5	•119.1	84 24.7	+58.1	128.0	83 44.7	+59.7	135.3	83 00.0	+60.0	141.0	83
84	85 34.0	+0.7	• 58.3	86 00.0	+12.8	• 70.6	86 12.8	+27.1	• 85.0	86 10.2	+41.0	•100.1	85 52.5	+51.4	•113.8	85 22.8	+57.1	125.2	84 44.4	+59.4	134.2	84 00.0	+60.0	141.0	84
85	85 34.7	−12.6	• 45.4	86 12.8	−2.6	• 56.2	86 39.9	+11.3	• 70.6	86 51.2	+28.7	• 88.0	86 43.9	+45.0	•105.8	86 19.9	+55.1	•121.0	85 43.8	+59.2	132.5	85 00.0	+60.0	141.0	85
86	85 22.1	−24.1	• 32.9	86 10.2	−17.7	• 41.1	86 51.2	−7.3	• 53.1	87 19.9	+9.0	• 70.5	87 28.9	+31.0	• 92.5	87 15.0	+50.0	•113.8	86 43.0	+58.4	130.0	86 00.0	+60.0	141.0	86
87	84 58.0	−33.3	• 22.0	85 52.5	−29.7	• 27.3	86 43.9	−24.0	• 35.3	87 28.9	−13.9	• 48.6	87 59.9	+5.1	• 70.5	88 05.0	+34.9	•100.0	87 41.4	+56.1	•125.2	87 00.0	+60.0	141.0	87
88	84 24.7	−40.0	• 13.0	85 22.8	−38.4	• 15.8	86 19.9	−36.1	• 20.1	87 15.0	−32.0	• 27.2	88 05.0	−23.6	• 41.1	88 39.9	−2.4	• 70.5	88 37.5	+42.4	•113.8	88 00.0	+60.0	141.0	88
89	83 44.7	−44.7	• 5.8	84 44.4	−44.4	• 6.9	85 43.8	−43.8	• 8.5	86 43.0	−43.0	• 11.1	87 41.4	−41.4	• 15.8	88 37.5	−37.5	• 27.2	89 19.9	−19.9	• 70.5	89 00.0	+60.0	141.0	89
90	83 00.0	−48.1	• 0.0	84 00.0	−48.4	• 0.0	85 00.0	−48.7	• 0.0	86 00.0	−49.1	• 0.0	87 00.0	−49.7	• 0.0	88 00.0	−50.9	• 0.0	89 00.0	−53.1	• 0.0	90 00.0	−60.0	70.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 39°, 321°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 26.1	−59.8	140.8	4 39.6	−59.9	140.8	3 53.0	−59.9	140.9	3 06.5	−60.0	140.9	2 19.9	−60.0	141.0	1 33.3	−60.0	141.0	0 46.6	−60.0	141.0	0 00.0	+60.0	39.0	**0**
1	4 26.3	−59.9	140.9	3 39.7	−59.9	140.9	2 53.1	−59.9	140.9	2 06.5	−59.9	141.0	1 19.9	−60.0	141.0	0 33.3	−60.0	141.0	0 13.4	+60.0	39.0	1 00.0	+60.0	39.0	**1**
2	3 26.4	−59.8	140.9	2 39.8	−59.8	141.0	1 53.2	−59.9	141.0	1 06.6	−60.0	141.0	0 19.9	−59.9	141.0	0 26.7	+60.0	39.0	1 13.4	+60.0	39.0	2 00.0	+60.0	39.0	**2**
3	2 26.6	−59.8	141.0	1 40.0	−59.9	141.0	0 53.3	−59.9	141.1	0 06.6	−59.9	141.1	0 40.0	+60.0	38.9	1 26.7	+60.0	39.0	2 13.4	+60.0	39.0	3 00.0	+60.0	39.0	**3**
4	1 26.8	−59.8	141.1	0 40.1	−59.9	141.1	0 06.6	+59.9	38.9	0 53.3	+60.0	38.9	1 40.0	+60.0	38.9	2 26.7	+60.0	38.9	3 13.4	+60.0	39.0	4 00.0	+60.0	39.0	**4**
5	0 27.0	−59.9	141.2	0 19.8	+59.8	38.8	1 06.5	+59.9	38.8	1 53.3	+59.9	38.8	2 40.0	+59.9	38.9	3 26.7	+60.0	38.9	4 13.4	+60.0	38.9	5 00.0	+60.0	39.0	**5**
6	0 32.9	+59.8	38.7	1 19.6	+59.9	38.8	2 06.4	+59.9	38.8	2 53.2	+59.9	38.8	3 39.9	+60.0	38.8	4 26.7	+59.9	38.9	5 13.4	+59.9	38.9	6 00.0	+60.0	39.0	**6**
7	1 32.7	+59.8	38.7	2 19.5	+59.9	38.7	3 06.3	+59.9	38.7	3 53.1	+60.0	38.8	4 39.9	+60.0	38.8	5 26.6	+60.0	38.9	6 13.3	+60.0	38.9	7 00.0	+60.0	39.0	**7**
8	2 32.5	+59.8	38.6	3 19.4	+59.9	38.6	4 06.2	+60.0	38.7	4 53.1	+59.9	38.7	5 39.9	+59.9	38.8	6 26.6	+60.0	38.8	7 13.3	+60.0	38.9	8 00.0	+60.0	39.0	**8**
9	3 32.3	+59.8	38.5	4 19.3	+59.8	38.6	5 06.2	+59.9	38.6	5 53.0	+60.0	38.7	6 39.8	+60.0	38.7	7 26.6	+60.0	38.8	8 13.3	+60.0	38.9	9 00.0	+60.0	39.0	**9**
10	4 32.1	+59.9	38.4	5 19.1	+59.9	38.5	6 06.1	+59.9	38.6	6 53.0	+59.9	38.6	7 39.8	+60.0	38.7	8 26.6	+60.0	38.8	9 13.3	+60.0	38.9	10 00.0	+60.0	39.0	**10**
11	5 32.0	+59.8	38.4	6 19.0	+59.9	38.4	7 06.0	+59.9	38.5	7 52.9	+59.9	38.6	8 39.8	+59.9	38.7	9 26.6	+60.0	38.8	10 13.3	+60.0	38.9	11 00.0	+60.0	39.0	**11**
12	6 31.8	+59.8	38.3	7 18.9	+59.8	38.4	8 05.9	+59.9	38.4	8 52.8	+60.0	38.5	9 39.7	+60.0	38.6	10 26.6	+60.0	38.8	11 13.3	+60.0	38.9	12 00.0	+60.0	39.0	**12**
13	7 31.6	+59.8	38.2	8 18.7	+59.9	38.3	9 05.8	+59.9	38.4	9 52.8	+59.9	38.5	10 39.7	+60.0	38.6	11 26.6	+59.9	38.7	12 13.3	+60.0	38.9	13 00.0	+60.0	39.0	**13**
14	8 31.4	+59.9	38.1	9 18.6	+59.9	38.2	10 05.7	+59.9	38.3	10 52.7	+60.0	38.4	11 39.7	+59.9	38.6	12 26.5	+60.0	38.7	13 13.3	+60.0	38.8	14 00.0	+60.0	39.0	**14**
15	9 31.3	+59.8	38.1	10 18.5	+59.8	38.2	11 05.6	+59.9	38.3	11 52.7	+59.9	38.4	12 39.6	+60.0	38.5	13 26.5	+60.0	38.7	14 13.3	+60.0	38.8	15 00.0	+60.0	39.0	**15**
16	10 31.1	+59.8	38.0	11 18.3	+59.9	38.1	12 05.5	+59.9	38.2	12 52.6	+59.9	38.4	13 39.6	+60.0	38.5	14 26.5	+60.0	38.7	15 13.3	+60.0	38.8	16 00.0	+60.0	39.0	**16**
17	11 30.9	+59.8	37.9	12 18.2	+59.9	38.0	13 05.4	+59.9	38.2	13 52.5	+60.0	38.3	14 39.6	+59.9	38.5	15 26.5	+60.0	38.6	16 13.3	+60.0	38.8	17 00.0	+60.0	39.0	**17**
18	12 30.7	+59.8	37.8	13 18.1	+59.8	38.0	14 05.3	+59.9	38.1	14 52.5	+59.9	38.3	15 39.5	+60.0	38.4	16 26.5	+60.0	38.6	17 13.3	+60.0	38.8	18 00.0	+60.0	39.0	**18**
19	13 30.5	+59.8	37.7	14 17.9	+59.9	37.9	15 05.2	+59.9	38.0	15 52.4	+60.0	38.2	16 39.5	+60.0	38.4	17 26.5	+60.0	38.6	18 13.3	+60.0	38.8	19 00.0	+60.0	39.0	**19**
20	14 30.3	+59.8	37.7	15 17.8	+59.8	37.8	16 05.1	+59.9	38.0	16 52.4	+59.9	38.2	17 39.5	+59.9	38.4	18 26.5	+59.9	38.6	19 13.3	+60.0	38.8	20 00.0	+60.0	39.0	**20**
21	15 30.1	+59.8	37.6	16 17.6	+59.9	37.7	17 05.0	+59.9	37.9	17 52.3	+59.9	38.1	18 39.4	+60.0	38.3	19 26.4	+60.0	38.5	20 13.3	+60.0	38.8	21 00.0	+60.0	39.0	**21**
22	16 29.9	+59.9	37.5	17 17.5	+59.9	37.7	18 04.9	+59.9	37.9	18 52.2	+60.0	38.1	19 39.4	+60.0	38.3	20 26.4	+60.0	38.5	21 13.3	+60.0	38.8	22 00.0	+60.0	39.0	**22**
23	17 29.8	+59.8	37.4	18 17.4	+59.8	37.6	19 04.8	+59.9	37.8	19 52.2	+59.9	38.0	20 39.4	+59.9	38.2	21 26.4	+60.0	38.5	22 13.3	+60.0	38.7	23 00.0	+60.0	39.0	**23**
24	18 29.6	+59.8	37.3	19 17.2	+59.9	37.5	20 04.7	+59.9	37.7	20 52.1	+59.9	38.0	21 39.3	+60.0	38.2	22 26.4	+60.0	38.5	23 13.3	+60.0	38.7	24 00.0	+60.0	39.0	**24**
25	19 29.4	+59.8	37.2	20 17.1	+59.8	37.4	21 04.6	+59.9	37.7	21 52.0	+60.0	37.9	22 39.3	+59.9	38.2	23 26.4	+60.0	38.4	24 13.3	+60.0	38.7	25 00.0	+60.0	39.0	**25**
26	20 29.2	+59.8	37.1	21 16.9	+59.9	37.4	22 04.5	+59.9	37.6	22 52.0	+59.9	37.9	23 39.2	+60.0	38.1	24 26.4	+59.9	38.4	25 13.3	+60.0	38.7	26 00.0	+60.0	39.0	**26**
27	21 29.0	+59.8	37.1	22 16.8	+59.8	37.3	23 04.4	+59.9	37.6	23 51.9	+59.9	37.8	24 39.2	+60.0	38.1	25 26.3	+60.0	38.4	26 13.3	+60.0	38.7	27 00.0	+60.0	39.0	**27**
28	22 28.8	+59.7	37.0	23 16.6	+59.9	37.2	24 04.3	+59.9	37.5	24 51.8	+60.0	37.8	25 39.2	+59.9	38.1	26 26.3	+60.0	38.4	27 13.3	+60.0	38.7	28 00.0	+60.0	39.0	**28**
29	23 28.5	+59.8	36.9	24 16.5	+59.8	37.1	25 04.2	+59.9	37.4	25 51.8	+59.9	37.7	26 39.1	+60.0	38.0	27 26.3	+60.0	38.3	28 13.3	+60.0	38.7	29 00.0	+60.0	39.0	**29**
30	24 28.3	+59.8	36.8	25 16.3	+59.8	37.1	26 04.1	+59.9	37.4	26 51.7	+59.9	37.7	27 39.1	+59.9	38.0	28 26.3	+60.0	38.3	29 13.3	+59.9	38.6	30 00.0	+60.0	39.0	**30**
31	25 28.1	+59.8	36.7	26 16.1	+59.9	37.0	27 04.0	+59.9	37.3	27 51.6	+59.9	37.6	28 39.0	+60.0	37.9	29 26.3	+59.9	38.3	30 13.2	+60.0	38.6	31 00.0	+60.0	39.0	**31**
32	26 27.9	+59.8	36.6	27 16.0	+59.8	36.9	28 03.9	+59.8	37.2	28 51.5	+60.0	37.5	29 39.0	+60.0	37.9	30 26.2	+60.0	38.2	31 13.2	+60.0	38.6	32 00.0	+60.0	39.0	**32**
33	27 27.7	+59.7	36.5	28 15.8	+59.8	36.8	29 03.7	+59.9	37.1	29 51.5	+59.9	37.5	30 39.0	+59.9	37.8	31 26.2	+60.0	38.2	32 13.2	+60.0	38.6	33 00.0	+60.0	39.0	**33**
34	28 27.4	+59.8	36.4	29 15.6	+59.9	36.7	30 03.6	+59.9	37.1	30 51.4	+59.9	37.4	31 38.9	+60.0	37.8	32 26.2	+60.0	38.2	33 13.2	+60.0	38.6	34 00.0	+60.0	39.0	**34**
35	29 27.2	+59.8	36.3	30 15.5	+59.8	36.6	31 03.5	+59.9	37.0	31 51.3	+59.9	37.4	32 38.9	+59.9	37.8	33 26.2	+60.0	38.2	34 13.2	+60.0	38.6	35 00.0	+60.0	39.0	**35**
36	30 27.0	+59.7	36.2	31 15.3	+59.8	36.6	32 03.4	+59.8	36.9	32 51.2	+59.9	37.3	33 38.8	+60.0	37.7	34 26.2	+59.9	38.1	35 13.2	+60.0	38.6	36 00.0	+60.0	39.0	**36**
37	31 26.7	+59.8	36.1	32 15.1	+59.8	36.5	33 03.2	+59.9	36.8	33 51.1	+60.0	37.2	34 38.8	+59.9	37.7	35 26.1	+60.0	38.1	36 13.2	+60.0	38.5	37 00.0	+60.0	39.0	**37**
38	32 26.5	+59.7	36.0	33 14.9	+59.8	36.4	34 03.1	+59.9	36.8	34 51.1	+59.9	37.2	35 38.7	+60.0	37.6	36 26.1	+60.0	38.1	37 13.2	+60.0	38.5	38 00.0	+60.0	39.0	**38**
39	33 26.2	+59.8	35.9	34 14.7	+59.8	36.3	35 03.0	+59.8	36.7	35 51.0	+59.9	37.1	36 38.7	+59.9	37.6	37 26.1	+60.0	38.0	38 13.2	+60.0	38.5	39 00.0	+60.0	39.0	**39**
40	34 26.0	+59.7	35.8	35 14.5	+59.8	36.2	36 02.8	+59.9	36.6	36 50.9	+59.9	37.0	37 38.6	+60.0	37.5	38 26.1	+59.9	38.0	39 13.2	+60.0	38.5	40 00.0	+60.0	39.0	**40**
41	35 25.7	+59.8	35.7	36 14.3	+59.8	36.1	37 02.7	+59.9	36.5	37 50.8	+59.9	37.0	38 38.6	+59.9	37.5	39 26.0	+60.0	37.9	40 13.2	+60.0	38.5	41 00.0	+60.0	39.0	**41**
42	36 25.5	+59.7	35.5	37 14.1	+59.8	36.0	38 02.6	+59.8	36.4	38 50.7	+59.9	36.9	39 38.5	+60.0	37.4	40 26.0	+60.0	37.9	41 13.2	+60.0	38.4	42 00.0	+60.0	39.0	**42**
43	37 25.2	+59.7	35.4	38 13.9	+59.8	35.9	39 02.4	+59.9	36.3	39 50.6	+59.9	36.8	40 38.5	+59.9	37.3	41 26.0	+60.0	37.9	42 13.2	+60.0	38.4	43 00.0	+60.0	39.0	**43**
44	38 24.9	+59.7	35.3	39 13.7	+59.8	35.8	40 02.3	+59.8	36.2	40 50.5	+59.9	36.8	41 38.4	+59.9	37.3	42 26.0	+59.9	37.8	43 13.2	+60.0	38.4	44 00.0	+60.0	39.0	**44**
45	39 24.6	+59.7	35.2	40 13.5	+59.8	35.6	41 02.1	+59.8	36.2	41 50.4	+59.9	36.7	42 38.3	+60.0	37.2	43 25.9	+60.0	37.8	44 13.2	+60.0	38.4	45 00.0	+60.0	39.0	**45**
46	40 24.3	+59.7	35.0	41 13.3	+59.7	35.5	42 01.9	+59.9	36.1	42 50.3	+59.9	36.6	43 38.3	+59.9	37.2	44 25.9	+60.0	37.7	45 13.2	+60.0	38.4	46 00.0	+60.0	39.0	**46**
47	41 24.0	+59.7	34.9	42 13.0	+59.8	35.4	43 01.8	+59.8	36.0	43 50.2	+59.9	36.5	44 38.2	+60.0	37.1	45 25.9	+60.0	37.7	46 13.2	+59.9	38.3	47 00.0	+60.0	39.0	**47**
48	42 23.7	+59.6	34.8	43 12.8	+59.8	35.3	44 01.6	+59.8	35.8	44 50.1	+59.8	36.4	45 38.2	+59.9	37.0	46 25.9	+59.9	37.7	47 13.1	+60.0	38.3	48 00.0	+60.0	39.0	**48**
49	43 23.3	+59.7	34.6	44 12.6	+59.7	35.2	45 01.4	+59.8	35.7	45 49.9	+59.9	36.3	46 38.1	+59.9	37.0	47 25.8	+60.0	37.6	48 13.1	+60.0	38.3	49 00.0	+60.0	39.0	**49**
50	44 23.0	+59.6	34.5	45 12.3	+59.7	35.0	46 01.2	+59.9	35.6	46 49.8	+59.9	36.2	47 38.0	+59.9	36.9	48 25.8	+60.0	37.6	49 13.1	+60.0	38.3	50 00.0	+60.0	39.0	**50**
51	45 22.6	+59.7	34.3	46 12.0	+59.8	34.9	47 01.1	+59.8	35.5	47 49.7	+59.9	36.2	48 37.9	+60.0	36.8	49 25.8	+59.9	37.5	50 13.1	+60.0	38.2	51 00.0	+60.0	39.0	**51**
52	46 22.3	+59.6	34.2	47 11.8	+59.7	34.8	48 00.9	+59.8	35.4	48 49.6	+59.8	36.1	49 37.9	+59.9	36.7	50 25.7	+60.0	37.5	51 13.1	+60.0	38.2	52 00.0	+60.0	39.0	**52**
53	47 21.9	+59.6	34.0	48 11.5	+59.7	34.6	49 00.7	+59.7	35.3	49 49.4	+59.9	35.9	50 37.8	+59.9	36.7	51 25.7	+59.9	37.4	52 13.1	+60.0	38.2	53 00.0	+60.0	39.0	**53**
54	48 21.5	+59.6	33.8	49 11.2	+59.7	34.5	50 00.4	+59.8	35.1	50 49.3	+59.8	35.8	51 37.7	+59.9	36.6	52 25.6	+60.0	37.3	53 13.1	+60.0	38.2	54 00.0	+60.0	39.0	**54**
55	49 21.1	+59.6	33.7	50 10.9	+59.6	34.3	51 00.2	+59.8	35.0	51 49.1	+59.9	35.7	52 37.6	+59.9	36.5	53 25.6	+60.0	37.3	54 13.1	+60.0	38.1	55 00.0	+60.0	39.0	**55**
56	50 20.7	+59.5	33.5	51 10.5	+59.7	34.1	52 00.0	+59.7	34.9	52 49.0	+59.8	35.6	53 37.5	+59.9	36.4	54 25.6	+59.9	37.2	55 13.1	+60.0	38.1	56 00.0	+60.0	39.0	**56**
57	51 20.2	+59.6	33.3	52 10.2	+59.6	34.0	52 59.7	+59.8	34.7	53 48.8	+59.9	35.5	54 37.4	+59.9	36.3	55 25.5	+60.0	37.2	56 13.1	+59.9	38.1	57 00.0	+60.0	39.0	**57**
58	52 19.8	+59.5	33.1	53 09.8	+59.7	33.8	53 59.5	+59.7	34.6	54 48.7	+59.8	35.4	55 37.3	+59.9	36.2	56 25.5	+59.9	37.1	57 13.0	+60.0	38.0	58 00.0	+60.0	39.0	**58**
59	53 19.3	+59.5	32.9	54 09.5	+59.6	33.6	54 59.2	+59.7	34.4	55 48.5	+59.8	35.2	56 37.2	+59.9	36.1	57 25.4	+60.0	37.0	58 13.0	+60.0	38.0	59 00.0	+60.0	39.0	**59**
60	54 18.8	+59.4	32.6	55 09.1	+59.6	33.4	55 58.9	+59.7	34.2	56 48.3	+59.8	35.1	57 37.1	+59.9	36.0	58 25.4	+59.9	36.9	59 13.0	+60.0	37.9	60 00.0	+60.0	39.0	**60**
61	55 18.2	+59.5	32.4	56 08.7	+59.5	33.2	56 58.6	+59.7	34.0	57 48.1	+59.8	34.9	58 37.0	+59.9	35.9	59 25.3	+60.0	36.9	60 13.0	+60.0	37.9	61 00.0	+60.0	39.0	**61**
62	56 17.7	+59.4	32.2	57 08.2	+59.6	33.0	57 58.3	+59.7	33.9	58 47.9	+59.8	34.8	59 36.9	+59.8	35.7	60 25.3	+59.9	36.8	61 13.0	+60.0	37.9	62 00.0	+60.0	39.0	**62**
63	57 17.1	+59.4	31.9	58 07.8	+59.5	32.8	58 58.0	+59.6	33.7	59 47.7	+59.7	34.6	60 36.7	+59.9	35.6	61 25.2	+59.9	36.7	62 13.0	+60.0	37.8	63 00.0	+60.0	39.0	**63**
64	58 16.5	+59.3	31.6	59 07.3	+59.5	32.5	59 57.6	+59.7	33.4	60 47.4	+59.8	34.4	61 36.6	+59.9	35.5	62 25.1	+60.0	36.6	63 13.0	+59.9	37.7	64 00.0	+60.0	39.0	**64**
65	59 15.8	+59.3	31.4	60 06.8	+59.5	32.3	60 57.3	+59.6	33.2	61 47.2	+59.7	34.2	62 36.5	+59.8	35.3	63 25.1	+59.9	36.5	64 12.9	+60.0	37.7	65 00.0	+60.0	39.0	**65**
66	60 15.1	+59.3	31.1	61 06.3	+59.4	32.0	61 56.9	+59.5	33.0	62 46.9	+59.7	34.0	63 36.3	+59.8	35.2	64 25.0	+59.9	36.4	65 12.9	+60.0	37.6	66 00.0	+60.0	39.0	**66**
67	61 14.4	+59.2	30.7	62 05.7	+59.4	31.7	62 56.4	+59.6	32.7	63 46.6	+59.7	33.8	64 36.1	+59.8	35.0	65 24.9	+59.9	36.2	66 12.9	+60.0	37.6	67 00.0	+60.0	39.0	**67**
68	62 13.6	+59.1	30.4	63 05.1	+59.3	31.4	63 56.0	+59.5	32.4	64 46.3	+59.7	33.6	65 35.9	+59.8	34.8	66 24.8	+59.9	36.1	67 12.9	+60.0	37.5	68 00.0	+60.0	39.0	**68**
69	63 12.7	+59.1	30.0	64 04.4	+59.3	31.1	64 55.5	+59.5	32.2	65 46.0	+59.6	33.3	66 35.7	+59.8	34.6	67 24.7	+59.9	36.0	68 12.9	+59.9	37.4	69 00.0	+60.0	39.0	**69**
70	64 11.8	+59.0	29.6	65 03.7	+59.2	30.7	65 55.0	+59.4	31.8	66 45.6	+59.6	33.1	67 35.5	+59.8	34.4	68 24.6	+59.9	35.8	69 12.8	+60.0	37.3	70 00.0	+60.0	39.0	**70**
71	65 10.8	+59.0	29.2	66 02.9	+59.2	30.3	66 54.4	+59.4	31.5	67 45.2	+59.6	32.8	68 35.3	+59.7	34.1	69 24.5	+59.9	35.6	70 12.8	+60.0	37.2	71 00.0	+60.0	39.0	**71**
72	66 09.8	+58.9	28.8	67 02.1	+59.1	29.9	67 53.8	+59.3	31.1	68 44.8	+59.5	32.4	69 35.0	+59.8	33.9	70 24.4	+59.9	35.4	71 12.8	+59.9	37.1	72 00.0	+60.0	39.0	**72**
73	67 08.7	+58.7	28.3	68 01.2	+59.0	29.4	68 53.1	+59.3	30.7	69 44.3	+59.5	32.1	70 34.8	+59.6	33.6	71 24.3	+59.8	35.2	72 12.7	+60.0	37.0	73 00.0	+60.0	39.0	**73**
74	68 07.4	+58.7	27.7	69 00.2	+59.0	29.0	69 52.4	+59.2	30.3	70 43.8	+59.5	31.7	71 34.4	+59.7	33.3	72 24.1	+59.8	35.0	73 12.7	+59.9	36.9	74 00.0	+60.0	39.0	**74**
75	69 06.1	+58.5	27.2	69 59.2	+58.8	28.4	70 51.6	+59.1	29.8	71 43.3	+59.4	31.3	72 34.1	+59.6	32.9	73 23.9	+59.9	34.8	74 12.6	+60.0	36.8	75 00.0	+60.0	39.0	**75**
76	70 04.6	+58.4	26.5	70 58.0	+58.7	27.8	71 50.7	+59.0	29.2	72 42.7	+59.3	30.8	73 33.7	+59.6	32.5	74 23.8	+59.7	34.5	75 12.6	+59.9	36.6	76 00.0	+60.0	39.0	**76**
77	71 03.0	+58.2	25.8	71 56.7	+58.5	27.2	72 49.7	+58.9	28.7	73 42.0	+59.2	30.3	74 33.3	+59.5	32.1	75 23.5	+59.8	34.1	76 12.5	+60.0	36.4	77 00.0	+60.0	39.0	**77**
78	72 01.2	+58.0	25.1	72 55.2	+58.4	26.5	73 48.6	+58.8	28.0	74 41.2	+59.1	29.7	75 32.8	+59.4	31.6	76 23.3	+59.7	33.8	77 12.5	+59.9	36.2	78 00.0	+60.0	39.0	**78**
79	72 59.2	+57.8	24.2	73 53.6	+58.2	25.6	74 47.4	+58.5	27.2	75 40.3	+59.0	29.0	76 32.2	+59.4	31.0	77 23.0	+59.7	33.4	78 12.4	+59.9	36.0	79 00.0	+60.0	39.0	**79**
80	73 57.0	+57.5	23.3	74 51.8	+57.9	24.7	75 45.9	+58.4	26.4	76 39.3	+58.8	28.3	77 31.6	+59.2	30.4	78 22.7	+59.6	32.9	79 12.3	+59.9	35.7	80 00.0	+60.0	39.0	**80**
81	74 54.5	+57.2	22.2	75 49.7	+57.7	23.7	76 44.3	+58.1	25.4	77 38.1	+58.6	27.4	78 30.8	+59.1	29.6	79 22.3	+59.5	32.3	80 12.2	+59.8	35.3	81 00.0	+60.0	39.0	**81**
82	75 51.7	+56.7	21.0	76 47.4	+57.2	22.5	77 42.4	+57.8	24.3	78 36.7	+58.4	26.3	79 29.9	+58.9	28.7	80 21.8	+59.4	31.5	81 12.0	+59.9	34.9	82 00.0	+60.0	39.0	**82**
83	76 48.4	+56.2	19.6	77 44.6	+56.8	21.2	78 40.2	+57.4	23.0	79 35.1	+58.0	25.1	80 28.8	+58.7	27.6	81 21.2	+59.3	30.7	82 11.9	+59.7	34.4	83 00.0	+60.0	39.0	**83**
84	77 44.6	+55.6	18.1	78 41.4	+56.2	19.6	79 37.6	+56.9	21.4	80 33.1	+57.5	23.6	81 27.5	+58.3	26.3	82 20.5	+59.1	29.6	83 11.6	+59.7	33.7	84 00.0	+60.0	39.0	**84**
85	78 40.2	+54.9	16.2	79 37.6	+55.5	17.7	80 34.5	+56.1	19.6	81 30.6	+57.0	21.8	82 25.8	+57.8	24.6	83 19.6	+58.7	28.2	84 11.3	+59.6	32.8	85 00.0	+60.0	39.0	**85**
86	79 35.1	+53.7	14.1	80 33.1	+54.4	15.5	81 30.6	+55.2	17.3	82 27.6	+56.0	19.5	83 23.6	+57.1	22.4	84 18.3	+58.2	26.3	85 10.9	+59.4	31.5	86 00.0	+60.0	39.0	**86**
87	80 28.8	+52.4	11.5	81 27.5	+53.0	12.8	82 25.8	+53.8	14.5	83 23.6	+54.7	16.6	84 20.7	+55.8	19.5	85 16.5	+57.3	23.6	86 10.3	+58.8	29.6	87 00.0	+60.0	39.0	**87**
88	81 21.2	*+50.7* •	8.4	82 20.5	*+51.1* •	9.5	83 19.6	*+51.7* •	10.9	84 18.3	*+52.6* •	12.8	85 16.5	*+53.8* •	15.5	86 13.8	*+55.3* •	19.5	87 09.1	*+57.8* •	26.2	88 00.0	+60.0	39.0	**88**
89	82 11.9	*+48.1* •	4.6	83 11.6	*+48.4* •	5.3	84 11.3	*+48.7* •	6.2	85 10.9	*+49.1* •	7.5	86 10.3	*+49.7* •	9.5	87 09.1	*+50.9* •	12.8	88 06.9	*+53.1* •	19.5	89 00.0	+60.0	39.0	**89**
90	83 00.0	*+44.7* •	0.0	84 00.0	*+44.4* •	0.0	85 00.0	*+43.8* •	0.0	86 00.0	*+43.0* •	0.0	87 00.0	*+41.4* •	0.0	88 00.0	*+37.5* •	0.0	89 00.0	*+19.9* •	0.0	90 00.0	−60.0	19.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 141°, 219°

40°, 320° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	5 21.4	+59.8	139.8	4 35.6	+59.8	139.8	3 49.7	+59.9	139.9	3 03.8	+59.9	139.9	2 17.9	+59.9	140.0	1 31.9	+60.0	140.0	0 46.0	+60.0	140.0	0 00.0	+60.0	140.0	**0**
1	6 21.2	+59.8	139.7	5 35.4	+59.9	139.8	4 49.6	+59.9	139.8	4 03.7	+60.0	139.9	3 17.8	+60.0	139.9	2 31.9	+60.0	140.0	1 46.0	+60.0	140.0	1 00.0	+60.0	140.0	**1**
2	7 21.0	+59.8	139.6	6 35.3	+59.9	139.7	5 49.5	+59.9	139.8	5 03.7	+59.9	139.8	4 17.8	+60.0	139.9	3 31.9	+60.0	139.9	2 46.0	+60.0	140.0	2 00.0	+60.0	140.0	**2**
3	8 20.8	+59.9	139.6	7 35.2	+59.8	139.6	6 49.4	+59.9	139.7	6 03.6	+59.9	139.8	5 17.8	+59.9	139.9	4 31.9	+60.0	139.9	3 46.0	+59.9	140.0	3 00.0	+60.0	140.0	**3**
4	9 20.7	+59.8	139.5	8 35.0	+59.9	139.6	7 49.3	+59.9	139.7	7 03.5	+60.0	139.8	6 17.7	+60.0	139.8	5 31.9	+59.9	139.9	4 45.9	+60.0	140.0	4 00.0	+60.0	140.0	**4**
5	10 20.5	+59.8	139.4	9 34.9	+59.8	139.5	8 49.2	+59.9	139.6	8 03.5	+59.9	139.7	7 17.7	+60.0	139.8	6 31.8	+60.0	139.9	5 45.9	+60.0	139.9	5 00.0	+60.0	140.0	**5**
6	11 20.3	+59.8	139.3	10 34.7	+59.9	139.4	9 49.1	+59.9	139.6	9 03.4	+60.0	139.7	8 17.7	+59.9	139.8	7 31.8	+60.0	139.8	6 45.9	+60.0	139.9	6 00.0	+60.0	140.0	**6**
7	12 20.1	+59.8	139.2	11 34.6	+59.9	139.4	10 49.0	+59.9	139.5	10 03.4	+59.9	139.6	9 17.6	+60.0	139.7	8 31.8	+60.0	139.8	7 45.9	+60.0	139.9	7 00.0	+60.0	140.0	**7**
8	13 19.9	+59.8	139.1	12 34.5	+59.8	139.3	11 48.9	+59.9	139.4	11 03.3	+59.9	139.6	10 17.6	+60.0	139.7	9 31.8	+60.0	139.8	8 45.9	+60.0	139.9	8 00.0	+60.0	140.0	**8**
9	14 19.7	+59.8	139.1	13 34.3	+59.9	139.2	12 48.8	+59.9	139.4	12 03.2	+60.0	139.5	11 17.6	+59.9	139.7	10 31.8	+60.0	139.8	9 45.9	+60.0	139.9	9 00.0	+60.0	140.0	**9**
10	15 19.5	+59.8	139.0	14 34.2	+59.8	139.2	13 48.7	+59.9	139.3	13 03.2	+59.9	139.5	12 17.5	+60.0	139.6	11 31.8	+59.9	139.8	10 45.9	+60.0	139.9	10 00.0	+60.0	140.0	**10**
11	16 19.3	+59.8	138.9	15 34.0	+59.9	139.1	14 48.6	+59.9	139.3	14 03.1	+59.9	139.4	13 17.5	+59.9	139.6	12 31.7	+60.0	139.7	11 45.9	+60.0	139.9	11 00.0	+60.0	140.0	**11**
12	17 19.1	+59.8	138.8	16 33.9	+59.8	139.0	15 48.5	+59.9	139.2	15 03.0	+60.0	139.4	14 17.4	+60.0	139.5	13 31.7	+60.0	139.7	12 45.9	+60.0	139.9	12 00.0	+60.0	140.0	**12**
13	18 18.9	+59.8	138.7	17 33.7	+59.9	138.9	16 48.4	+59.9	139.1	16 03.0	+59.9	139.3	15 17.4	+60.0	139.5	14 31.7	+60.0	139.7	13 45.9	+60.0	139.8	13 00.0	+60.0	140.0	**13**
14	19 18.7	+59.8	138.6	18 33.6	+59.8	138.9	17 48.3	+59.9	139.1	17 02.9	+59.9	139.3	16 17.4	+59.9	139.5	15 31.7	+60.0	139.7	14 45.9	+60.0	139.8	14 00.0	+60.0	140.0	**14**
15	20 18.5	+59.8	138.5	19 33.4	+59.9	138.8	18 48.2	+59.9	139.0	18 02.8	+60.0	139.2	17 17.3	+60.0	139.4	16 31.7	+60.0	139.6	15 45.9	+60.0	139.8	15 00.0	+60.0	140.0	**15**
16	21 18.3	+59.8	138.5	20 33.3	+59.8	138.7	19 48.1	+59.9	138.9	19 02.8	+59.9	139.2	18 17.3	+60.0	139.4	17 31.7	+60.0	139.6	16 45.9	+60.0	139.8	16 00.0	+60.0	140.0	**16**
17	22 18.1	+59.7	138.4	21 33.1	+59.9	138.6	20 48.0	+59.9	138.9	20 02.7	+59.9	139.1	19 17.3	+59.9	139.4	18 31.7	+59.9	139.6	17 45.9	+60.0	139.8	17 00.0	+60.0	140.0	**17**
18	23 17.8	+59.8	138.3	22 33.0	+59.8	138.6	21 47.9	+59.9	138.8	21 02.6	+60.0	139.1	20 17.2	+60.0	139.3	19 31.6	+60.0	139.6	18 45.9	+60.0	139.8	18 00.0	+60.0	140.0	**18**
19	24 17.6	+59.8	138.2	23 32.8	+59.8	138.5	22 47.8	+59.9	138.8	22 02.6	+59.9	139.0	21 17.2	+59.9	139.3	20 31.6	+60.0	139.5	19 45.9	+60.0	139.8	19 00.0	+60.0	140.0	**19**
20	25 17.4	+59.8	138.1	24 32.6	+59.9	138.4	23 47.7	+59.9	138.7	23 02.5	+59.9	139.0	22 17.1	+60.0	139.2	21 31.6	+60.0	139.5	20 45.9	+60.0	139.8	20 00.0	+60.0	140.0	**20**
21	26 17.2	+59.7	138.0	25 32.5	+59.8	138.3	24 47.6	+59.8	138.6	24 02.4	+60.0	138.9	23 17.1	+60.0	139.2	22 31.6	+60.0	139.5	21 45.9	+60.0	139.7	21 00.0	+60.0	140.0	**21**
22	27 16.9	+59.8	137.9	26 32.3	+59.8	138.2	25 47.4	+59.9	138.6	25 02.4	+59.9	138.9	24 17.1	+59.9	139.2	23 31.6	+59.9	139.5	22 45.9	+60.0	139.7	22 00.0	+60.0	140.0	**22**
23	28 16.7	+59.8	137.8	27 32.1	+59.9	138.1	26 47.3	+59.9	138.5	26 02.3	+59.9	138.8	25 17.0	+60.0	139.1	24 31.5	+60.0	139.4	23 45.9	+60.0	139.7	23 00.0	+60.0	140.0	**23**
24	29 16.5	+59.7	137.7	28 32.0	+59.8	138.1	27 47.2	+59.9	138.4	27 02.2	+59.9	138.8	26 17.0	+59.9	139.1	25 31.5	+60.0	139.4	24 45.9	+60.0	139.7	24 00.0	+60.0	140.0	**24**
25	30 16.2	+59.8	137.6	29 31.8	+59.8	138.0	28 47.1	+59.9	138.3	28 02.1	+60.0	138.7	27 16.9	+60.0	139.0	26 31.5	+60.0	139.4	25 45.9	+60.0	139.7	25 00.0	+60.0	140.0	**25**
26	31 16.0	+59.7	137.5	30 31.6	+59.8	137.9	29 47.0	+59.8	138.3	29 02.1	+59.9	138.6	28 16.9	+59.9	139.0	27 31.5	+60.0	139.3	26 45.9	+60.0	139.7	26 00.0	+60.0	140.0	**26**
27	32 15.7	+59.7	137.4	31 31.4	+59.8	137.8	30 46.8	+59.9	138.2	30 02.0	+59.9	138.6	29 16.8	+60.0	139.0	28 31.5	+60.0	139.3	27 45.9	+59.9	139.7	27 00.0	+60.0	140.0	**27**
28	33 15.4	+59.8	137.3	32 31.2	+59.8	137.7	31 46.7	+59.9	138.1	31 01.9	+59.9	138.5	30 16.8	+60.0	138.9	29 31.5	+59.9	139.3	28 45.8	+60.0	139.7	28 00.0	+60.0	140.0	**28**
29	34 15.2	+59.7	137.1	33 31.0	+59.8	137.6	32 46.6	+59.8	138.0	32 01.8	+59.9	138.5	31 16.8	+59.9	138.9	30 31.4	+60.0	139.3	29 45.8	+60.0	139.6	29 00.0	+60.0	140.0	**29**
30	35 14.9	+59.7	137.0	34 30.8	+59.8	137.5	33 46.4	+59.9	138.0	33 01.7	+59.9	138.4	32 16.7	+60.0	138.8	31 31.4	+60.0	139.2	30 45.8	+60.0	139.6	30 00.0	+60.0	140.0	**30**
31	36 14.6	+59.7	136.9	35 30.6	+59.8	137.4	34 46.3	+59.9	137.9	34 01.6	+59.9	138.3	33 16.7	+59.9	138.8	32 31.4	+60.0	139.2	31 45.8	+60.0	139.6	31 00.0	+60.0	140.0	**31**
32	37 14.3	+59.7	136.8	36 30.4	+59.8	137.3	35 46.2	+59.8	137.8	35 01.5	+60.0	138.3	34 16.6	+60.0	138.7	33 31.4	+59.9	139.2	32 45.8	+60.0	139.6	32 00.0	+60.0	140.0	**32**
33	38 14.0	+59.7	136.7	37 30.2	+59.8	137.2	36 46.0	+59.9	137.7	36 01.5	+59.9	138.2	35 16.6	+59.9	138.7	34 31.3	+60.0	139.1	33 45.8	+60.0	139.6	33 00.0	+60.0	140.0	**33**
34	39 13.7	+59.7	136.5	38 30.0	+59.8	137.1	37 45.9	+59.8	137.6	37 01.4	+59.9	138.1	36 16.5	+60.0	138.6	35 31.3	+60.0	139.1	34 45.8	+60.0	139.6	34 00.0	+60.0	140.0	**34**
35	40 13.4	+59.7	136.4	39 29.8	+59.7	137.0	38 45.7	+59.9	137.5	38 01.3	+59.9	138.1	37 16.5	+59.9	138.6	36 31.3	+60.0	139.1	35 45.8	+60.0	139.5	35 00.0	+60.0	140.0	**35**
36	41 13.1	+59.7	136.3	40 29.5	+59.8	136.9	39 45.6	+59.8	137.4	39 01.2	+59.9	138.0	38 16.4	+59.9	138.5	37 31.3	+60.0	139.0	36 45.8	+60.0	139.5	36 00.0	+60.0	140.0	**36**
37	42 12.8	+59.6	136.1	41 29.3	+59.8	136.7	40 45.4	+59.8	137.3	40 01.1	+59.9	137.9	39 16.3	+60.0	138.5	38 31.3	+59.9	139.0	37 45.8	+60.0	139.5	37 00.0	+60.0	140.0	**37**
38	43 12.4	+59.7	136.0	42 29.1	+59.7	136.6	41 45.2	+59.9	137.2	41 01.0	+59.9	137.8	40 16.3	+59.9	138.4	39 31.2	+60.0	139.0	38 45.8	+60.0	139.5	38 00.0	+60.0	140.0	**38**
39	44 12.1	+59.6	135.8	43 28.8	+59.7	136.5	42 45.1	+59.8	137.1	42 00.9	+59.8	137.8	41 16.2	+60.0	138.3	40 31.2	+60.0	138.9	39 45.8	+60.0	139.5	39 00.0	+60.0	140.0	**39**
40	45 11.7	+59.6	135.7	44 28.5	+59.8	136.4	43 44.9	+59.8	137.0	43 00.7	+59.9	137.7	42 16.2	+59.9	138.3	41 31.2	+59.9	138.9	40 45.8	+60.0	139.5	40 00.0	+60.0	140.0	**40**
41	46 11.3	+59.6	135.5	45 28.3	+59.7	136.2	44 44.7	+59.8	136.9	44 00.6	+59.9	137.6	43 16.1	+59.9	138.2	42 31.1	+60.0	138.8	41 45.8	+60.0	139.4	41 00.0	+60.0	140.0	**41**
42	47 10.9	+59.6	135.3	46 28.0	+59.7	136.1	45 44.5	+59.8	136.8	45 00.5	+59.9	137.5	44 16.0	+60.0	138.2	43 31.1	+60.0	138.8	42 45.8	+60.0	139.4	42 00.0	+60.0	140.0	**42**
43	48 10.5	+59.6	135.2	47 27.7	+59.7	135.9	46 44.3	+59.8	136.7	46 00.4	+59.9	137.4	45 16.0	+59.9	138.1	44 31.1	+60.0	138.8	43 45.8	+60.0	139.4	43 00.0	+60.0	140.0	**43**
44	49 10.1	+59.6	135.0	48 27.4	+59.7	135.8	47 44.1	+59.8	136.6	47 00.3	+59.8	137.3	46 15.9	+59.9	138.0	45 31.1	+59.9	138.7	44 45.8	+59.9	139.4	44 00.0	+60.0	140.0	**44**
45	50 09.7	+59.5	134.8	49 27.1	+59.6	135.6	48 43.9	+59.8	136.4	48 00.1	+59.9	137.2	47 15.8	+60.0	138.0	46 31.0	+60.0	138.7	45 45.7	+60.0	139.3	45 00.0	+60.0	140.0	**45**
46	51 09.2	+59.5	134.6	50 26.7	+59.7	135.5	49 43.7	+59.7	136.3	49 00.0	+59.8	137.1	48 15.8	+59.9	137.9	47 31.0	+60.0	138.6	46 45.7	+60.0	139.3	46 00.0	+60.0	140.0	**46**
47	52 08.7	+59.5	134.4	51 26.4	+59.7	135.3	50 43.4	+59.8	136.2	49 59.8	+59.9	137.0	49 15.7	+59.9	137.8	48 31.0	+59.9	138.6	47 45.7	+60.0	139.3	47 00.0	+60.0	140.0	**47**
48	53 08.2	+59.5	134.2	52 26.1	+59.6	135.1	51 43.2	+59.7	136.0	50 59.7	+59.8	136.9	50 15.6	+59.9	137.7	49 30.9	+60.0	138.5	48 45.7	+60.0	139.3	48 00.0	+60.0	140.0	**48**
49	54 07.7	+59.5	134.0	53 25.7	+59.6	134.9	52 42.9	+59.8	135.9	51 59.5	+59.9	136.8	51 15.5	+59.9	137.6	50 30.9	+60.0	138.5	49 45.7	+60.0	139.2	49 00.0	+60.0	140.0	**49**
50	55 07.2	+59.4	133.7	54 25.3	+59.6	134.8	53 42.7	+59.7	135.7	52 59.4	+59.8	136.7	52 15.4	+59.9	137.5	51 30.9	+59.9	138.4	50 45.7	+60.0	139.2	50 00.0	+60.0	140.0	**50**
51	56 06.6	+59.4	133.5	55 24.9	+59.5	134.5	54 42.4	+59.7	135.6	53 59.2	+59.8	136.5	53 15.3	+59.9	137.5	52 30.8	+60.0	138.3	51 45.7	+60.0	139.2	51 00.0	+60.0	140.0	**51**
52	57 06.0	+59.3	133.2	56 24.4	+59.6	134.3	55 42.1	+59.7	135.4	54 59.0	+59.8	136.4	54 15.2	+59.9	137.4	53 30.8	+59.9	138.3	52 45.7	+60.0	139.2	52 00.0	+60.0	140.0	**52**
53	58 05.3	+59.3	133.0	57 24.0	+59.5	134.1	56 41.8	+59.7	135.2	55 58.8	+59.8	136.3	55 15.1	+59.9	137.3	54 30.7	+60.0	138.2	53 45.7	+60.0	139.1	53 00.0	+60.0	140.0	**53**
54	59 04.6	+59.3	132.7	58 23.5	+59.5	133.9	57 41.5	+59.6	135.0	56 58.6	+59.8	136.1	56 15.0	+59.9	137.2	55 30.7	+59.9	138.1	54 45.7	+59.9	139.1	54 00.0	+60.0	140.0	**54**
55	60 03.9	+59.2	132.4	59 23.0	+59.5	133.6	58 41.1	+59.7	134.8	57 58.4	+59.8	136.0	57 14.9	+59.9	137.0	56 30.6	+60.0	138.1	55 45.6	+60.0	139.1	55 00.0	+60.0	140.0	**55**
56	61 03.1	+59.2	132.0	60 22.5	+59.4	133.4	59 40.8	+59.6	134.6	58 58.2	+59.8	135.8	58 14.8	+59.9	136.9	57 30.6	+59.9	138.0	56 45.6	+60.0	139.0	56 00.0	+60.0	140.0	**56**
57	62 02.3	+59.2	131.7	61 21.9	+59.4	133.1	60 40.4	+59.6	134.4	59 58.0	+59.7	135.6	59 14.7	+59.8	136.8	58 30.5	+60.0	137.9	57 45.6	+60.0	139.0	57 00.0	+60.0	140.0	**57**
58	63 01.5	+59.0	131.3	62 21.3	+59.3	132.8	61 40.0	+59.6	134.1	60 57.7	+59.8	135.4	60 14.5	+59.9	136.7	59 30.5	+59.9	137.8	58 45.6	+60.0	138.9	58 00.0	+60.0	140.0	**58**
59	64 00.5	+59.0	130.9	63 20.6	+59.3	132.4	62 39.6	+59.5	133.9	61 57.5	+59.7	135.2	61 14.4	+59.8	136.5	60 30.4	+59.9	137.7	59 45.6	+60.0	138.9	59 00.0	+60.0	140.0	**59**
60	64 59.5	+58.9	130.5	64 19.9	+59.3	132.1	63 39.1	+59.5	133.6	62 57.2	+59.7	135.0	62 14.2	+59.9	136.4	61 30.3	+60.0	137.6	60 45.6	+60.0	138.9	60 00.0	+60.0	140.0	**60**
61	65 58.4	+58.9	130.1	65 19.2	+59.1	131.7	64 38.6	+59.5	133.3	63 56.9	+59.7	134.8	63 14.1	+59.8	136.2	62 30.3	+59.9	137.5	61 45.6	+59.9	138.8	61 00.0	+60.0	140.0	**61**
62	66 57.3	+58.7	129.6	66 18.3	+59.2	131.3	65 38.1	+59.4	133.0	64 56.6	+59.6	134.6	64 13.9	+59.8	136.0	63 30.2	+59.9	137.4	62 45.5	+60.0	138.8	62 00.0	+60.0	140.0	**62**
63	67 56.0	+58.6	129.0	67 17.5	+59.0	130.9	66 37.5	+59.4	132.6	65 56.2	+59.6	134.3	65 13.7	+59.8	135.9	64 30.1	+59.9	137.3	63 45.5	+60.0	138.7	63 00.0	+60.0	140.0	**63**
64	68 54.6	+58.5	128.5	68 16.5	+59.0	130.4	67 36.9	+59.3	132.3	66 55.8	+59.6	134.0	66 13.5	+59.8	135.7	65 30.0	+59.9	137.2	64 45.5	+60.0	138.6	64 00.0	+60.0	140.0	**64**
65	69 53.1	+58.4	127.8	69 15.5	+58.8	129.9	68 36.2	+59.2	131.9	67 55.4	+59.6	133.7	67 13.3	+59.8	135.4	66 29.9	+60.0	137.1	65 45.5	+60.0	138.6	65 00.0	+60.0	140.0	**65**
66	70 51.5	+58.1	127.1	70 14.3	+58.8	129.4	69 35.4	+59.2	131.4	68 55.0	+59.5	133.4	68 13.1	+59.7	135.2	67 29.9	+59.8	136.9	66 45.5	+59.9	138.5	66 00.0	+60.0	140.0	**66**
67	71 49.6	+58.0	126.4	71 13.1	+58.6	128.7	70 34.6	+59.1	131.0	69 54.5	+59.4	133.0	69 12.8	+59.7	135.0	68 29.7	+59.9	136.8	67 45.4	+60.0	138.4	67 00.0	+60.0	140.0	**67**
68	72 47.6	+57.7	125.5	72 11.7	+58.4	128.1	71 33.7	+59.0	130.4	70 53.9	+59.4	132.6	70 12.5	+59.7	134.7	69 29.6	+59.9	136.6	68 45.4	+60.0	138.4	68 00.0	+60.0	140.0	**68**
69	73 45.3	+57.5	124.6	73 10.1	+58.3	127.3	72 32.7	+58.9	129.8	71 53.3	+59.4	132.2	71 12.2	+59.7	134.4	70 29.5	+59.9	136.4	69 45.4	+59.9	138.3	69 00.0	+60.0	140.0	**69**
70	74 42.8	+57.1	123.5	74 08.4	+58.0	126.4	73 31.6	+58.7	129.2	72 52.7	+59.2	131.7	72 11.9	+59.6	134.0	71 29.4	+59.8	136.2	70 45.3	+60.0	138.2	70 00.0	+60.0	140.0	**70**
71	75 39.9	+56.7	122.3	75 06.4	+57.8	125.5	74 30.3	+58.6	128.4	73 51.9	+59.2	131.1	73 11.5	+59.5	133.6	72 29.2	+59.8	135.9	71 45.3	+60.0	138.1	71 00.0	+60.0	140.0	**71**
72	76 36.6	+56.2	120.9	76 04.2	+57.4	124.4	75 28.9	+58.4	127.6	74 51.1	+59.1	130.5	74 11.0	+59.6	133.2	73 29.0	+59.8	135.7	72 45.3	+59.9	137.9	72 00.0	+60.0	140.0	**72**
73	77 32.8	+55.6	119.4	77 01.6	+57.1	123.2	76 27.3	+58.1	126.6	75 50.2	+58.9	129.8	75 10.6	+59.4	132.7	74 28.8	+59.8	135.4	73 45.2	+60.0	137.8	73 00.0	+60.0	140.0	**73**
74	78 28.4	+54.7	117.5	77 58.7	+56.5	121.7	77 25.4	+57.8	125.5	76 49.1	+58.7	129.0	76 10.0	+59.4	132.2	75 28.6	+59.7	135.0	74 45.2	+59.9	137.6	74 00.0	+60.0	140.0	**74**
75	79 23.1	+53.8	115.4	78 55.2	+55.8	120.0	78 23.2	+57.4	124.3	77 47.8	+58.5	128.1	77 09.4	+59.2	131.5	76 28.3	+59.7	134.7	75 45.1	+59.9	137.5	75 00.0	+60.0	140.0	**75**
76	80 16.9	+52.4	112.9	79 51.0	+55.0	118.1	79 20.6	+56.9	122.8	78 46.3	+58.2	127.0	78 08.6	+59.1	130.8	77 28.0	+59.7	134.2	76 45.0	+60.0	137.3	76 00.0	+60.0	140.0	**76**
77	81 09.3	*+50.7*	•109.9	80 46.0	+53.9	115.7	80 17.5	+56.3	121.0	79 44.5	+57.9	125.7	79 07.7	+59.0	129.9	78 27.7	+59.6	133.7	77 45.0	+59.9	137.0	77 00.0	+60.0	140.0	**77**
78	82 00.0	*+48.2*	•106.2	81 39.9	+52.3	112.8	81 13.8	+55.3	118.8	80 42.4	+57.4	124.1	80 06.7	+58.7	128.9	79 27.3	+59.5	133.1	78 44.9	+59.9	136.8	78 00.0	+60.0	140.0	**78**
79	82 48.2	*+45.1*	•101.7	82 32.2	*+50.1*	•109.2	82 09.1	+54.0	116.1	81 39.8	+56.6	122.2	81 05.4	+58.4	127.6	80 26.8	+59.4	132.4	79 44.8	+59.8	136.4	79 00.0	+60.0	140.0	**79**
80	83 33.3	*+40.4*	• 96.1	83 22.3	*+47.1*	•104.7	83 03.1	*+52.1*	•112.7	82 36.4	+55.7	119.8	82 03.8	+57.9	126.1	81 26.2	+59.2	131.4	80 44.6	+59.9	136.1	80 00.0	+60.0	140.0	**80**
81	84 13.7	*+34.1*	• 89.2	84 09.4	*+42.5*	• 99.0	83 55.2	*+49.3*	•108.3	83 32.1	+54.2	116.7	83 01.7	+57.3	124.1	82 25.4	+59.0	130.3	81 44.5	+59.8	135.6	81 00.0	+60.0	140.0	**81**
82	84 47.8	*+25.5*	• 80.6	84 51.9	*+35.9*	• 91.6	84 44.5	*+45.0*	•102.5	84 26.3	*+51.8*	•112.6	83 59.0	+56.2	121.4	83 24.4	+58.6	128.8	82 44.3	+59.7	135.0	82 00.0	+60.0	140.0	**82**
83	85 13.3	*+14.5*	• 70.1	85 27.8	*+26.3*	• 82.1	85 29.5	*+38.1*	• 94.7	85 18.1	*+47.9*	•107.0	84 55.2	*+54.5*	•117.8	84 23.0	+58.1	126.8	83 44.0	+59.6	134.1	83 00.0	+60.0	140.0	**83**
84	85 27.8	*+1.7*	• 58.2	85 54.1	*+13.5*	• 70.1	86 07.6	*+27.4*	• 84.1	86 06.0	*+41.1*	• 98.9	85 49.7	*+51.2*	•112.6	85 21.1	+57.0	124.0	84 43.6	+59.5	133.0	84 00.0	+60.0	140.0	**84**
85	85 29.5	*−11.4*	• 45.5	86 07.6	*−1.6*	• 56.0	86 35.0	*+12.1*	• 70.1	86 47.1	*+28.8*	• 87.0	86 40.9	*+44.9*	•104.5	86 18.1	*+55.0*	•119.7	85 43.1	+59.1	131.4	85 00.0	+60.0	140.0	**85**
86	85 18.1	*−22.9*	• 33.2	86 06.0	*−16.3*	• 41.2	86 47.1	*−6.2*	• 53.1	87 15.9	*+9.9*	• 70.0	87 25.8	*+31.1*	• 91.5	87 13.1	*+49.8*	•112.5	86 42.2	+58.3	128.8	86 00.0	+60.0	140.0	**86**
87	84 55.2	*−32.2*	• 22.3	85 49.7	*−28.6*	• 27.5	86 40.9	*−22.8*	• 35.5	87 25.8	*−12.7*	• 48.6	87 56.9	*+6.0*	• 70.0	88 02.9	*+35.0*	• 98.8	87 40.5	*+56.0*	•124.0	87 00.0	+60.0	140.0	**87**
88	84 23.0	*−39.0*	• 13.3	85 21.1	*−37.5*	• 16.1	86 18.1	*−35.0*	• 20.4	87 13.1	*−30.9*	• 27.5	88 02.9	*−22.4*	• 41.2	88 37.9	*−1.4*	• 70.0	88 36.5	*+42.5*	•112.5	88 00.0	+60.0	140.0	**88**
89	83 44.0	*−44.0*	• 5.9	84 43.6	*−43.6*	• 7.0	85 43.1	*−43.1*	• 8.6	86 42.2	*−42.2*	• 11.2	87 40.5	*−40.5*	• 16.1	88 36.5	*−36.5*	• 27.5	89 19.0	*−19.0*	• 70.0	89 00.0	+60.0	140.0	**89**
90	83 00.0	*−47.5*	• 0.0	84 00.0	*−47.8*	• 0.0	85 00.0	*−48.1*	• 0.0	86 00.0	*−48.5*	• 0.0	87 00.0	*−49.2*	• 0.0	88 00.0	*−50.4*	• 0.0	89 00.0	*−52.8*	• 0.0	90 00.0	−60.0	70.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 40°, 320°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 21.4	–59.8	139.8	4 35.6	–59.9	139.8	3 49.7	–59.9	139.9	3 03.8	–60.0	139.9	2 17.9	–60.0	140.0	1 31.9	–60.0	140.0	0 46.0	–60.0	140.0	0 00.0	+60.0	40.0	0
1	4 21.6	–59.8	139.9	3 35.7	–59.9	139.8	2 49.8	–59.9	139.9	2 03.8	–59.9	140.0	1 17.9	–60.0	140.0	0 31.9	–60.0	140.0	0 14.0	+60.0	40.0	1 00.0	+60.0	40.0	1
2	3 21.8	–59.8	139.9	2 35.8	–59.9	140.0	1 49.9	–59.9	140.0	1 03.9	–59.9	140.0	0 17.9	–59.9	140.0	0 28.1	+59.9	40.0	1 14.0	+60.0	40.0	2 00.0	+60.0	40.0	2
3	2 22.0	–59.9	140.0	1 36.0	–59.9	140.0	0 50.0	–59.9	140.1	0 04.0	–60.0	140.1	0 42.0	+60.0	39.9	1 28.0	+60.0	39.9	2 14.0	+60.0	40.0	3 00.0	+60.0	40.0	3
4	1 22.1	–59.8	140.1	0 36.1	–59.9	140.1	0 09.9	+59.9	39.9	0 56.0	+59.9	39.9	1 42.0	+60.0	39.9	2 28.0	+60.0	39.9	3 14.0	+60.0	40.0	4 00.0	+60.0	40.0	4
5	0 22.3	–59.8	140.2	0 23.8	+59.8	39.8	1 09.8	+59.9	39.8	1 55.9	+59.9	39.8	2 42.0	+59.9	39.9	3 28.0	+60.0	39.9	4 14.0	+60.0	39.9	5 00.0	+60.0	40.0	5
6	0 37.5	+59.8	39.7	1 23.6	+59.9	39.8	2 09.7	+59.9	39.8	2 55.8	+60.0	39.8	3 41.9	+60.0	39.8	4 28.0	+60.0	39.9	5 14.0	+60.0	39.9	6 00.0	+60.0	40.0	6
7	1 37.3	+59.8	39.7	2 23.5	+59.8	39.7	3 09.6	+60.0	39.7	3 55.8	+59.9	39.8	4 41.9	+60.0	39.8	5 28.0	+60.0	39.8	6 14.0	+60.0	39.9	7 00.0	+60.0	40.0	7
8	2 37.1	+59.8	39.6	3 23.3	+59.9	39.6	4 09.6	+59.9	39.7	4 55.7	+60.0	39.7	5 41.9	+59.9	39.8	6 28.0	+59.9	39.8	7 14.0	+60.0	39.9	8 00.0	+60.0	40.0	8
9	3 36.9	+59.8	39.5	4 23.2	+59.9	39.5	5 09.5	+59.9	39.6	5 55.7	+59.9	39.7	6 41.8	+60.0	39.7	7 27.9	+60.0	39.8	8 14.0	+60.0	39.9	9 00.0	+60.0	40.0	9
10	4 36.7	+59.9	39.4	5 23.1	+59.8	39.5	6 09.4	+59.9	39.5	6 55.6	+59.9	39.6	7 41.8	+60.0	39.7	8 27.9	+60.0	39.8	9 14.0	+60.0	39.9	10 00.0	+60.0	40.0	10
11	5 36.6	+59.8	39.3	6 22.9	+59.9	39.4	7 09.3	+59.9	39.5	7 55.5	+60.0	39.6	8 41.8	+59.9	39.7	9 27.9	+60.0	39.8	10 14.0	+60.0	39.9	11 00.0	+60.0	40.0	11
12	6 36.4	+59.8	39.3	7 22.8	+59.9	39.3	8 09.2	+59.9	39.4	8 55.5	+59.9	39.5	9 41.7	+60.0	39.6	10 27.9	+60.0	39.7	11 14.0	+60.0	39.9	12 00.0	+60.0	40.0	12
13	7 36.2	+59.8	39.2	8 22.7	+59.8	39.3	9 09.1	+59.9	39.4	9 55.4	+60.0	39.5	10 41.7	+60.0	39.6	11 27.9	+60.0	39.7	12 14.0	+60.0	39.9	13 00.0	+60.0	40.0	13
14	8 36.0	+59.8	39.1	9 22.5	+59.9	39.2	10 09.0	+59.9	39.3	10 55.4	+59.9	39.4	11 41.7	+59.9	39.6	12 27.9	+60.0	39.7	13 14.0	+60.0	39.8	14 00.0	+60.0	40.0	14
15	9 35.8	+59.8	39.0	10 22.4	+59.8	39.1	11 08.9	+59.9	39.3	11 55.3	+59.9	39.4	12 41.6	+60.0	39.5	13 27.9	+59.9	39.7	14 14.0	+60.0	39.8	15 00.0	+60.0	40.0	15
16	10 35.6	+59.8	38.9	11 22.2	+59.9	39.1	12 08.8	+59.9	39.2	12 55.2	+60.0	39.3	13 41.6	+59.9	39.5	14 27.8	+60.0	39.7	15 14.0	+60.0	39.8	16 00.0	+60.0	40.0	16
17	11 35.4	+59.8	38.9	12 22.1	+59.9	39.0	13 08.7	+59.9	39.1	13 55.2	+59.9	39.3	14 41.5	+60.0	39.5	15 27.8	+60.0	39.6	16 14.0	+60.0	39.8	17 00.0	+60.0	40.0	17
18	12 35.2	+59.8	38.8	13 22.0	+59.8	38.9	14 08.6	+59.9	39.1	14 55.1	+59.9	39.2	15 41.5	+60.0	39.4	16 27.8	+60.0	39.6	17 14.0	+60.0	39.8	18 00.0	+60.0	40.0	18
19	13 35.0	+59.8	38.7	14 21.8	+59.9	38.9	15 08.5	+59.9	39.0	15 55.0	+60.0	39.2	16 41.5	+59.9	39.4	17 27.8	+60.0	39.6	18 14.0	+60.0	39.8	19 00.0	+60.0	40.0	19
20	14 34.8	+59.8	38.6	15 21.7	+59.8	38.8	16 08.4	+59.9	39.0	16 55.0	+59.9	39.1	17 41.4	+60.0	39.3	18 27.8	+60.0	39.6	19 14.0	+60.0	39.8	20 00.0	+60.0	40.0	20
21	15 34.6	+59.8	38.5	16 21.5	+59.9	38.7	17 08.3	+59.9	38.9	17 54.9	+59.9	39.1	18 41.4	+60.0	39.3	19 27.8	+59.9	39.5	20 14.0	+60.0	39.8	21 00.0	+60.0	40.0	21
22	16 34.4	+59.8	38.4	17 21.4	+59.8	38.6	18 08.2	+59.9	38.8	18 54.8	+60.0	39.1	19 41.4	+59.9	39.3	20 27.7	+60.0	39.5	21 14.0	+59.9	39.7	22 00.0	+60.0	40.0	22
23	17 34.2	+59.8	38.4	18 21.2	+59.9	38.6	19 08.1	+59.9	38.8	19 54.8	+59.9	39.0	20 41.3	+60.0	39.2	21 27.7	+60.0	39.5	22 13.9	+60.0	39.7	23 00.0	+60.0	40.0	23
24	18 34.0	+59.8	38.3	19 21.1	+59.8	38.5	20 08.0	+59.9	38.7	20 54.7	+59.9	38.9	21 41.3	+59.9	39.2	22 27.7	+60.0	39.5	23 13.9	+60.0	39.7	24 00.0	+60.0	40.0	24
25	19 33.8	+59.8	38.2	20 20.9	+59.9	38.4	21 07.9	+59.8	38.6	21 54.6	+60.0	38.9	22 41.2	+60.0	39.2	23 27.7	+60.0	39.4	24 13.9	+60.0	39.7	25 00.0	+60.0	40.0	25
26	20 33.6	+59.8	38.1	21 20.8	+59.8	38.3	22 07.7	+59.9	38.6	22 54.6	+59.9	38.8	23 41.2	+60.0	39.1	24 27.7	+59.9	39.4	25 13.9	+60.0	39.7	26 00.0	+60.0	40.0	26
27	21 33.4	+59.8	38.0	22 20.6	+59.8	38.3	23 07.6	+59.9	38.5	23 54.5	+59.9	38.8	24 41.2	+59.9	39.1	25 27.6	+60.0	39.4	26 13.9	+60.0	39.7	27 00.0	+60.0	40.0	27
28	22 33.2	+59.8	37.9	23 20.4	+59.9	38.2	24 07.5	+59.9	38.5	24 54.4	+59.9	38.7	25 41.1	+60.0	39.0	26 27.6	+60.0	39.3	27 13.9	+60.0	39.7	28 00.0	+60.0	40.0	28
29	23 33.0	+59.8	37.8	24 20.3	+59.8	38.1	25 07.4	+59.9	38.4	25 54.3	+60.0	38.7	26 41.1	+59.9	39.0	27 27.6	+60.0	39.3	28 13.9	+60.0	39.7	29 00.0	+60.0	40.0	29
30	24 32.8	+59.7	37.7	25 20.1	+59.9	38.0	26 07.3	+59.9	38.3	26 54.3	+59.9	38.6	27 41.0	+60.0	38.9	28 27.6	+60.0	39.3	29 13.9	+60.0	39.6	30 00.0	+60.0	40.0	30
31	25 32.5	+59.8	37.6	26 20.0	+59.8	37.9	27 07.2	+59.9	38.2	27 54.2	+59.9	38.6	28 41.0	+60.0	38.9	29 27.6	+60.0	39.3	30 13.9	+60.0	39.6	31 00.0	+60.0	40.0	31
32	26 32.3	+59.8	37.5	27 19.8	+59.8	37.9	28 07.1	+59.8	38.2	28 54.1	+59.9	38.5	29 41.0	+59.9	38.9	30 27.6	+59.9	39.2	31 13.9	+60.0	39.6	32 00.0	+60.0	40.0	32
33	27 32.1	+59.7	37.4	28 19.6	+59.8	37.8	29 06.9	+59.9	38.1	29 54.0	+60.0	38.5	30 40.9	+60.0	38.8	31 27.5	+60.0	39.2	32 13.9	+60.0	39.6	33 00.0	+60.0	40.0	33
34	28 31.8	+59.8	37.3	29 19.4	+59.9	37.7	30 06.8	+59.9	38.0	30 54.0	+59.9	38.4	31 40.9	+59.9	38.8	32 27.5	+60.0	39.2	33 13.9	+60.0	39.6	34 00.0	+60.0	40.0	34
35	29 31.6	+59.7	37.2	30 19.3	+59.8	37.6	31 06.7	+59.9	38.0	31 53.9	+59.9	38.3	32 40.8	+60.0	38.7	33 27.5	+60.0	39.1	34 13.9	+60.0	39.6	35 00.0	+60.0	40.0	35
36	30 31.3	+59.8	37.1	31 19.1	+59.8	37.5	32 06.6	+59.8	37.9	32 53.8	+59.9	38.3	33 40.8	+59.9	38.7	34 27.5	+59.9	39.1	35 13.9	+60.0	39.5	36 00.0	+60.0	40.0	36
37	31 31.1	+59.7	37.0	32 18.9	+59.8	37.4	33 06.4	+59.9	37.8	33 53.7	+59.9	38.2	34 40.7	+60.0	38.6	35 27.4	+60.0	39.1	36 13.9	+60.0	39.5	37 00.0	+60.0	40.0	37
38	32 30.8	+59.8	36.9	33 18.7	+59.8	37.3	34 06.3	+59.8	37.7	34 53.6	+59.9	38.1	35 40.7	+59.9	38.6	36 27.4	+60.0	39.0	37 13.9	+60.0	39.5	38 00.0	+60.0	40.0	38
39	33 30.6	+59.7	36.8	34 18.5	+59.8	37.2	35 06.1	+59.9	37.6	35 53.5	+59.9	38.1	36 40.6	+60.0	38.5	37 27.4	+60.0	39.0	38 13.9	+60.0	39.5	39 00.0	+60.0	40.0	39
40	34 30.3	+59.7	36.7	35 18.3	+59.8	37.1	36 06.0	+59.9	37.5	36 53.4	+59.9	38.0	37 40.6	+59.9	38.5	38 27.4	+59.9	39.0	39 13.9	+60.0	39.5	40 00.0	+60.0	40.0	40
41	35 30.0	+59.8	36.6	36 18.1	+59.8	37.0	37 05.9	+59.8	37.5	37 53.3	+59.9	37.9	38 40.5	+59.9	38.4	39 27.3	+60.0	38.9	40 13.9	+59.9	39.5	41 00.0	+60.0	40.0	41
42	36 29.8	+59.7	36.5	37 17.9	+59.8	36.9	38 05.7	+59.8	37.4	38 53.2	+59.9	37.9	39 40.4	+60.0	38.4	40 27.3	+60.0	38.9	41 13.8	+60.0	39.4	42 00.0	+60.0	40.0	42
43	37 29.5	+59.7	36.3	38 17.7	+59.7	36.8	39 05.5	+59.9	37.3	39 53.1	+59.9	37.8	40 40.4	+59.9	38.3	41 27.3	+60.0	38.8	42 13.8	+60.0	39.4	43 00.0	+60.0	40.0	43
44	38 29.2	+59.7	36.2	39 17.4	+59.8	36.7	40 05.4	+59.8	37.2	40 53.0	+59.9	37.7	41 40.3	+60.0	38.2	42 27.3	+59.9	38.8	43 13.8	+60.0	39.4	44 00.0	+60.0	40.0	44
45	39 28.9	+59.6	36.1	40 17.2	+59.8	36.6	41 05.2	+59.9	37.1	41 52.9	+59.9	37.6	42 40.3	+59.9	38.2	43 27.2	+60.0	38.8	44 13.8	+60.0	39.4	45 00.0	+60.0	40.0	45
46	40 28.5	+59.7	35.9	41 17.0	+59.7	36.5	42 05.1	+59.8	37.0	42 52.8	+59.9	37.5	43 40.2	+59.9	38.1	44 27.2	+60.0	38.7	45 13.8	+60.0	39.3	46 00.0	+60.0	40.0	46
47	41 28.2	+59.7	35.8	42 16.7	+59.8	36.3	43 04.9	+59.8	36.9	43 52.7	+59.9	37.5	44 40.1	+60.0	38.1	45 27.2	+59.9	38.7	46 13.8	+60.0	39.3	47 00.0	+60.0	40.0	47
48	42 27.9	+59.6	35.7	43 16.5	+59.7	36.2	44 04.7	+59.8	36.8	44 52.6	+59.9	37.4	45 40.1	+59.9	38.0	46 27.1	+60.0	38.6	47 13.8	+60.0	39.3	48 00.0	+60.0	40.0	48
49	43 27.5	+59.7	35.5	44 16.2	+59.7	36.1	45 04.5	+59.8	36.7	45 52.5	+59.8	37.3	46 40.0	+59.9	37.9	47 27.1	+60.0	38.6	48 13.8	+60.0	39.3	49 00.0	+60.0	40.0	49
50	44 27.2	+59.6	35.4	45 15.9	+59.8	35.9	46 04.3	+59.8	36.6	46 52.3	+59.9	37.2	47 39.9	+59.9	37.8	48 27.1	+59.9	38.5	49 13.8	+60.0	39.3	50 00.0	+60.0	40.0	50
51	45 26.8	+59.6	35.2	46 15.7	+59.7	35.8	47 04.1	+59.8	36.4	47 52.2	+59.9	37.1	48 39.8	+60.0	37.8	49 27.0	+60.0	38.5	50 13.8	+60.0	39.2	51 00.0	+60.0	40.0	51
52	46 26.4	+59.6	35.0	47 15.4	+59.7	35.7	48 03.9	+59.8	36.3	48 52.1	+59.8	37.0	49 39.8	+59.9	37.7	50 27.0	+60.0	38.4	51 13.8	+60.0	39.2	52 00.0	+60.0	40.0	52
53	47 26.0	+59.6	34.9	48 15.1	+59.7	35.5	49 03.7	+59.8	36.2	49 51.9	+59.9	36.9	50 39.7	+59.9	37.6	51 27.0	+59.9	38.4	52 13.8	+59.9	39.2	53 00.0	+60.0	40.0	53
54	48 25.6	+59.6	34.7	49 14.8	+59.6	35.4	50 03.5	+59.7	36.1	50 51.8	+59.8	36.8	51 39.6	+59.9	37.5	52 26.9	+60.0	38.3	53 13.7	+60.0	39.1	54 00.0	+60.0	40.0	54
55	49 25.2	+59.6	34.5	50 14.4	+59.7	35.2	51 03.2	+59.8	35.9	51 51.6	+59.9	36.7	52 39.5	+59.9	37.4	53 26.9	+59.9	38.2	54 13.7	+60.0	39.1	55 00.0	+60.0	40.0	55
56	50 24.8	+59.5	34.3	51 14.1	+59.6	35.0	52 03.0	+59.7	35.8	52 51.5	+59.8	36.5	53 39.4	+59.9	37.3	54 26.8	+60.0	38.2	55 13.7	+60.0	39.1	56 00.0	+60.0	40.0	56
57	51 24.3	+59.5	34.1	52 13.7	+59.7	34.9	53 02.7	+59.8	35.6	53 51.3	+59.8	36.4	54 39.3	+59.9	37.2	55 26.8	+60.0	38.1	56 13.7	+60.0	39.0	57 00.0	+60.0	40.0	57
58	52 23.8	+59.5	33.9	53 13.4	+59.6	34.7	54 02.5	+59.7	35.5	54 51.1	+59.8	36.3	55 39.2	+59.9	37.1	56 26.8	+59.9	38.0	57 13.7	+60.0	39.0	58 00.0	+60.0	40.0	58
59	53 23.3	+59.5	33.7	54 13.0	+59.6	34.5	55 02.2	+59.7	35.3	55 50.9	+59.8	36.1	56 39.1	+59.9	37.0	57 26.7	+59.9	38.0	58 13.7	+60.0	39.0	59 00.0	+60.0	40.0	59
60	54 22.8	+59.4	33.5	55 12.6	+59.5	34.3	56 01.9	+59.7	35.1	56 50.7	+59.8	36.0	57 39.0	+59.9	36.9	58 26.6	+60.0	37.9	59 13.7	+60.0	38.9	60 00.0	+60.0	40.0	60
61	55 22.2	+59.4	33.3	56 12.1	+59.6	34.1	57 01.6	+59.7	34.9	57 50.5	+59.8	35.8	58 38.9	+59.8	36.8	59 26.6	+59.9	37.8	60 13.7	+59.9	38.9	61 00.0	+60.0	40.0	61
62	56 21.6	+59.4	33.0	57 11.7	+59.5	33.8	58 01.3	+59.6	34.7	58 50.3	+59.8	35.7	59 38.7	+59.9	36.7	60 26.5	+60.0	37.7	61 13.6	+60.0	38.8	62 00.0	+60.0	40.0	62
63	57 21.0	+59.3	32.7	58 11.2	+59.5	33.6	59 00.9	+59.7	34.5	59 50.1	+59.7	35.5	60 38.6	+59.8	36.5	61 26.5	+59.9	37.6	62 13.6	+60.0	38.8	63 00.0	+60.0	40.0	63
64	58 20.3	+59.4	32.5	59 10.7	+59.5	33.4	60 00.6	+59.6	34.3	60 49.8	+59.8	35.3	61 38.4	+59.9	36.4	62 26.4	+59.9	37.5	63 13.6	+60.0	38.7	64 00.0	+60.0	40.0	64
65	59 19.7	+59.2	32.2	60 10.2	+59.4	33.1	61 00.2	+59.5	34.1	61 49.6	+59.7	35.1	62 38.3	+59.8	36.2	63 26.3	+59.9	37.4	64 13.6	+60.0	38.7	65 00.0	+60.0	40.0	65
66	60 18.9	+59.2	31.9	61 09.6	+59.4	32.8	61 59.7	+59.6	33.8	62 49.3	+59.7	34.9	63 38.1	+59.8	36.1	64 26.2	+60.0	37.3	65 13.6	+59.9	38.6	66 00.0	+60.0	40.0	66
67	61 18.1	+59.2	31.5	62 09.0	+59.4	32.5	62 59.3	+59.5	33.6	63 49.0	+59.7	34.7	64 37.9	+59.9	35.9	65 26.2	+59.9	37.2	66 13.5	+60.0	38.5	67 00.0	+60.0	40.0	67
68	62 17.3	+59.1	31.2	63 08.4	+59.3	32.2	63 58.8	+59.5	33.3	64 48.7	+59.6	34.5	65 37.8	+59.7	35.7	66 26.1	+59.9	37.0	67 13.5	+60.0	38.5	68 00.0	+60.0	40.0	68
69	63 16.4	+59.1	30.8	64 07.7	+59.2	31.9	64 58.3	+59.5	33.0	65 48.3	+59.6	34.2	66 37.5	+59.8	35.5	67 26.0	+59.9	36.9	68 13.5	+60.0	38.4	69 00.0	+60.0	40.0	69
70	64 15.5	+59.0	30.4	65 06.9	+59.2	31.5	65 57.8	+59.4	32.7	66 47.9	+59.6	33.9	67 37.3	+59.8	35.3	68 25.9	+59.9	36.7	69 13.5	+59.9	38.3	70 00.0	+60.0	40.0	70
71	65 14.5	+58.9	30.0	66 06.1	+59.2	31.1	66 57.2	+59.3	32.3	67 47.5	+59.6	33.6	68 37.1	+59.7	35.0	69 25.8	+59.8	36.6	70 13.4	+60.0	38.2	71 00.0	+60.0	40.0	71
72	66 13.4	+58.8	29.5	67 05.3	+59.0	30.7	67 56.5	+59.3	31.9	68 47.1	+59.5	33.3	69 36.8	+59.7	34.8	70 25.6	+59.9	36.4	71 13.4	+60.0	38.1	72 00.0	+60.0	40.0	72
73	67 12.2	+58.7	29.0	68 04.3	+59.0	30.2	68 55.8	+59.3	31.5	69 46.6	+59.5	32.9	70 36.5	+59.7	34.5	71 25.5	+59.8	36.2	72 13.4	+59.9	38.0	73 00.0	+60.0	40.0	73
74	68 10.9	+58.6	28.5	69 03.3	+58.9	29.7	69 55.1	+59.1	31.1	70 46.1	+59.4	32.5	71 36.2	+59.6	34.2	72 25.3	+59.8	35.9	73 13.3	+60.0	37.9	74 00.0	+60.0	40.0	74
75	69 09.5	+58.4	27.9	70 02.2	+58.8	29.2	70 54.2	+59.1	30.6	71 45.5	+59.3	32.1	72 35.8	+59.6	33.8	73 25.1	+59.9	35.7	74 13.3	+59.9	37.7	75 00.0	+60.0	40.0	75
76	70 07.9	+58.3	27.2	71 01.0	+58.6	28.6	71 53.3	+59.0	30.0	72 44.8	+59.3	31.6	73 35.4	+59.6	33.4	74 25.0	+59.7	35.4	75 13.2	+60.0	37.6	76 00.0	+60.0	40.0	76
77	71 06.2	+58.1	26.5	71 59.6	+58.5	27.9	72 52.3	+58.8	29.4	73 44.1	+59.2	31.1	74 35.0	+59.5	33.0	75 24.7	+59.8	35.0	76 13.2	+59.9	37.4	77 00.0	+60.0	40.0	77
78	72 04.3	+58.0	25.7	72 58.1	+58.3	27.1	73 51.1	+58.7	28.7	74 43.3	+59.0	30.5	75 34.5	+59.4	32.4	76 24.5	+59.7	34.7	77 13.1	+59.9	37.2	78 00.0	+60.0	40.0	78
79	73 02.3	+57.6	24.9	73 56.4	+58.1	26.3	74 49.8	+58.5	27.9	75 42.3	+59.0	29.8	76 33.9	+59.3	31.9	77 24.2	+59.6	34.2	78 13.0	+59.9	36.9	79 00.0	+60.0	40.0	79
80	73 59.9	+57.4	23.9	74 54.5	+57.8	25.4	75 48.3	+58.3	27.1	76 41.3	+58.7	29.0	77 33.2	+59.2	31.2	78 23.8	+59.6	33.7	79 12.9	+59.9	36.6	80 00.0	+60.0	40.0	80
81	74 57.3	+57.0	22.8	75 52.3	+57.5	24.3	76 46.6	+58.0	26.1	77 40.0	+58.6	28.1	78 32.4	+59.0	30.4	79 23.4	+59.5	33.1	80 12.8	+59.8	36.3	81 00.0	+60.0	40.0	81
82	75 54.3	+56.6	21.6	76 49.8	+57.1	23.1	77 44.6	+57.7	24.9	78 38.6	+58.3	27.0	79 31.4	+58.9	29.5	80 22.9	+59.4	32.4	81 12.6	+59.9	35.8	82 00.0	+60.0	40.0	82
83	76 50.9	+56.0	20.1	77 46.9	+56.7	21.7	78 42.3	+57.3	23.6	79 36.9	+57.9	25.8	80 30.3	+58.6	28.4	81 22.3	+59.3	31.5	82 12.5	+59.7	35.3	83 00.0	+60.0	40.0	83
84	77 46.9	+55.4	18.5	78 43.6	+56.0	20.0	79 39.6	+56.7	22.0	80 34.8	+57.4	24.2	81 28.9	+58.2	27.0	82 21.6	+59.0	30.4	83 12.2	+59.7	34.6	84 00.0	+60.0	40.0	84
85	78 42.3	+54.6	16.6	79 39.6	+55.2	18.2	80 36.3	+55.9	20.1	81 32.2	+56.8	22.4	82 27.1	+57.7	25.2	83 20.6	+58.6	28.9	84 11.9	+59.6	33.7	85 00.0	+60.0	40.0	85
86	79 36.9	+53.4	14.4	80 34.8	+54.1	15.9	81 32.2	+54.9	17.7	82 29.0	+55.8	20.0	83 24.8	+56.9	23.0	84 19.2	+58.2	26.9	85 11.5	+59.3	32.3	86 00.0	+60.0	40.0	86
87	80 30.3	+52.0	11.8	81 28.9	+52.7	13.1	82 27.1	+53.5	14.8	83 24.8	+54.4	17.1	84 21.7	+55.7	20.0	85 17.4	+57.1	24.2	86 10.8	+58.8	30.3	87 00.0	+60.0	40.0	87
88	81 22.3	*+50.2* •	8.6	82 21.6	*+50.6* •	9.7	83 20.6	*+51.3* •	11.2	84 19.2	*+52.3* •	13.1	85 17.4	*+53.4* •	15.9	86 14.5	*+55.1* •	20.0	87 09.6	*+57.6* •	26.9	88 00.0	+60.0	40.0	88
89	82 12.5	*+47.5* •	4.7	83 12.2	*+47.8* •	5.4	84 11.9	*+48.1* •	6.4	85 11.5	*+48.5* •	7.7	86 10.8	*+49.2* •	9.7	87 09.6	*+50.4* •	13.1	88 07.2	*+52.8* •	20.0	89 00.0	+60.0	40.0	89
90	83 00.0	*+44.0* •	0.0	84 00.0	*+43.6* •	0.0	85 00.0	*+43.1* •	0.0	86 00.0	*+42.2* •	0.0	87 00.0	*+40.5* •	0.0	88 00.0	*+36.5* •	0.0	89 00.0	*+19.0* •	0.0	90 00.0	–60.0	20.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 140°, 220°

41°, 319° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 16.6	+59.8	138.8	4 31.5	+59.8	138.8	3 46.3	+59.9	138.9	3 01.1	+59.9	138.9	2 15.8	+60.0	139.0	1 30.6	+59.9	139.0	0 45.3	+60.0	139.0	0 00.0	+60.0	139.0	**0**
1	6 16.4	+59.8	138.7	5 31.3	+59.9	138.8	4 46.2	+59.9	138.8	4 01.0	+59.9	138.9	3 15.8	+59.9	138.9	2 30.5	+60.0	139.0	1 45.3	+60.0	139.0	1 00.0	+60.0	139.0	**1**
2	7 16.2	+59.9	138.6	6 31.2	+59.9	138.7	5 46.1	+59.9	138.8	5 00.9	+60.0	138.8	4 15.7	+60.0	138.9	3 30.5	+60.0	138.9	2 45.3	+60.0	139.0	2 00.0	+60.0	139.0	**2**
3	8 16.1	+59.8	138.5	7 31.1	+59.8	138.6	6 46.0	+59.9	138.7	6 00.9	+59.9	138.8	5 15.7	+60.0	138.9	4 30.5	+60.0	138.9	3 45.3	+60.0	139.0	3 00.0	+60.0	139.0	**3**
4	9 15.9	+59.8	138.5	8 30.9	+59.9	138.6	7 45.9	+59.9	138.7	7 00.8	+59.9	138.7	6 15.7	+59.9	138.8	5 30.5	+60.0	138.9	4 45.3	+60.0	138.9	4 00.0	+60.0	139.0	**4**
5	10 15.7	+59.8	138.4	9 30.8	+59.8	138.5	8 45.8	+59.9	138.6	8 00.7	+60.0	138.7	7 15.6	+60.0	138.8	6 30.5	+60.0	138.9	5 45.3	+60.0	138.9	5 00.0	+60.0	139.0	**5**
6	11 15.5	+59.8	138.3	10 30.6	+59.9	138.4	9 45.7	+59.9	138.5	9 00.7	+59.9	138.7	8 15.6	+60.0	138.8	7 30.5	+59.9	138.8	6 45.3	+60.0	138.9	6 00.0	+60.0	139.0	**6**
7	12 15.3	+59.8	138.2	11 30.5	+59.8	138.4	10 45.6	+59.9	138.5	10 00.6	+60.0	138.6	9 15.6	+59.9	138.7	8 30.4	+60.0	138.8	7 45.3	+59.9	138.9	7 00.0	+60.0	139.0	**7**
8	13 15.1	+59.8	138.1	12 30.3	+59.9	138.3	11 45.5	+59.9	138.4	11 00.6	+59.9	138.6	10 15.5	+60.0	138.7	9 30.4	+60.0	138.8	8 45.2	+60.0	138.9	8 00.0	+60.0	139.0	**8**
9	14 14.9	+59.7	138.0	13 30.2	+59.8	138.2	12 45.4	+59.9	138.4	12 00.5	+59.9	138.5	11 15.5	+60.0	138.6	10 30.4	+60.0	138.8	9 45.2	+60.0	138.9	9 00.0	+60.0	139.0	**9**
10	15 14.6	+59.8	138.0	14 30.0	+59.9	138.1	13 45.3	+59.9	138.3	13 00.4	+60.0	138.5	12 15.5	+59.9	138.6	11 30.4	+60.0	138.8	10 45.2	+60.0	138.9	10 00.0	+60.0	139.0	**10**
11	16 14.4	+59.8	137.9	15 29.9	+59.8	138.1	14 45.2	+59.9	138.2	14 00.4	+59.9	138.4	13 15.4	+60.0	138.6	12 30.4	+60.0	138.7	11 45.2	+60.0	138.9	11 00.0	+60.0	139.0	**11**
12	17 14.2	+59.8	137.8	16 29.7	+59.9	138.0	15 45.1	+59.9	138.2	15 00.3	+59.9	138.4	14 15.4	+59.9	138.5	13 30.4	+59.9	138.7	12 45.2	+60.0	138.9	12 00.0	+60.0	139.0	**12**
13	18 14.0	+59.8	137.7	17 29.6	+59.8	137.9	16 45.0	+59.9	138.1	16 00.2	+60.0	138.3	15 15.3	+60.0	138.5	14 30.3	+60.0	138.7	13 45.2	+60.0	138.8	13 00.0	+60.0	139.0	**13**
14	19 13.8	+59.8	137.6	18 29.4	+59.9	137.8	17 44.9	+59.8	138.1	17 00.2	+59.9	138.3	16 15.3	+60.0	138.5	15 30.3	+60.0	138.7	14 45.2	+60.0	138.8	14 00.0	+60.0	139.0	**14**
15	20 13.6	+59.8	137.5	19 29.3	+59.8	137.8	18 44.7	+59.9	138.0	18 00.1	+59.9	138.2	17 15.3	+59.9	138.4	16 30.3	+60.0	138.6	15 45.2	+60.0	138.8	15 00.0	+60.0	139.0	**15**
16	21 13.4	+59.7	137.4	20 29.1	+59.8	137.7	19 44.6	+59.9	137.9	19 00.0	+59.9	138.2	18 15.2	+60.0	138.4	17 30.3	+60.0	138.6	16 45.2	+60.0	138.8	16 00.0	+60.0	139.0	**16**
17	22 13.1	+59.8	137.3	21 28.9	+59.9	137.6	20 44.5	+59.9	137.9	19 59.9	+60.0	138.1	19 15.2	+60.0	138.4	18 30.3	+60.0	138.6	17 45.2	+60.0	138.8	17 00.0	+60.0	139.0	**17**
18	23 12.9	+59.8	137.2	22 28.8	+59.8	137.5	21 44.4	+59.9	137.8	20 59.9	+59.9	138.1	20 15.2	+59.9	138.3	19 30.3	+59.9	138.6	18 45.2	+60.0	138.8	18 00.0	+60.0	139.0	**18**
19	24 12.7	+59.8	137.1	23 28.6	+59.8	137.4	22 44.3	+59.9	137.7	21 59.8	+59.9	138.0	21 15.1	+60.0	138.3	20 30.2	+60.0	138.5	19 45.2	+60.0	138.8	19 00.0	+60.0	139.0	**19**
20	25 12.5	+59.7	137.0	24 28.4	+59.9	137.4	23 44.2	+59.9	137.7	22 59.7	+60.0	138.0	22 15.1	+59.9	138.2	21 30.2	+60.0	138.5	20 45.2	+60.0	138.8	20 00.0	+60.0	139.0	**20**
21	26 12.2	+59.8	136.9	25 28.3	+59.8	137.3	24 44.1	+59.8	137.6	23 59.7	+59.9	137.9	23 15.0	+60.0	138.2	22 30.2	+60.0	138.5	21 45.2	+60.0	138.7	21 00.0	+60.0	139.0	**21**
22	27 12.0	+59.7	136.8	26 28.1	+59.8	137.2	25 43.9	+59.9	137.5	24 59.6	+59.9	137.8	24 15.0	+59.9	138.2	23 30.2	+60.0	138.4	22 45.2	+60.0	138.7	22 00.0	+60.0	139.0	**22**
23	28 11.7	+59.8	136.7	27 27.9	+59.8	137.1	26 43.8	+59.9	137.5	25 59.5	+59.9	137.8	25 14.9	+60.0	138.1	24 30.2	+60.0	138.4	23 45.2	+60.0	138.7	23 00.0	+60.0	139.0	**23**
24	29 11.5	+59.7	136.6	28 27.7	+59.8	137.0	27 43.7	+59.9	137.4	26 59.4	+59.9	137.7	26 14.9	+60.0	138.1	25 30.2	+59.9	138.4	24 45.2	+60.0	138.7	24 00.0	+60.0	139.0	**24**
25	30 11.2	+59.8	136.5	29 27.5	+59.9	136.9	28 43.6	+59.8	137.3	27 59.3	+60.0	137.7	27 14.9	+59.9	138.0	26 30.1	+60.0	138.4	25 45.2	+60.0	138.7	25 00.0	+60.0	139.0	**25**
26	31 11.0	+59.7	136.4	30 27.4	+59.8	136.8	29 43.4	+59.9	137.2	28 59.3	+59.9	137.6	28 14.8	+60.0	138.0	27 30.1	+60.0	138.3	26 45.2	+60.0	138.7	26 00.0	+60.0	139.0	**26**
27	32 10.7	+59.7	136.3	31 27.2	+59.8	136.7	30 43.3	+59.9	137.2	29 59.2	+59.9	137.6	29 14.8	+59.9	137.9	28 30.1	+60.0	138.3	27 45.2	+60.0	138.7	27 00.0	+60.0	139.0	**27**
28	33 10.4	+59.8	136.2	32 27.0	+59.8	136.7	31 43.2	+59.8	137.1	30 59.1	+59.9	137.5	30 14.7	+60.0	137.9	29 30.1	+59.9	138.3	28 45.2	+60.0	138.6	28 00.0	+60.0	139.0	**28**
29	34 10.2	+59.7	136.1	33 26.8	+59.8	136.6	32 43.0	+59.9	137.0	31 59.0	+59.9	137.4	31 14.7	+59.9	137.8	30 30.0	+60.0	138.2	29 45.2	+60.0	138.6	29 00.0	+60.0	139.0	**29**
30	35 09.9	+59.7	136.0	34 26.6	+59.7	136.5	33 42.9	+59.9	136.9	32 58.9	+59.9	137.4	32 14.6	+60.0	137.8	31 30.0	+60.0	138.2	30 45.2	+59.9	138.6	30 00.0	+60.0	139.0	**30**
31	36 09.6	+59.7	135.9	35 26.3	+59.8	136.4	34 42.8	+59.8	136.8	33 58.8	+59.9	137.3	33 14.6	+59.9	137.7	32 30.0	+60.0	138.2	31 45.1	+60.0	138.6	31 00.0	+60.0	139.0	**31**
32	37 09.3	+59.7	135.7	36 26.1	+59.8	136.2	35 42.6	+59.9	136.7	34 58.7	+59.9	137.2	34 14.5	+60.0	137.7	33 30.0	+60.0	138.1	32 45.1	+60.0	138.6	32 00.0	+60.0	139.0	**32**
33	38 09.0	+59.7	135.6	37 25.9	+59.8	136.1	36 42.5	+59.8	136.7	35 58.6	+59.9	137.2	35 14.5	+59.9	137.6	34 30.0	+59.9	138.1	33 45.1	+60.0	138.6	33 00.0	+60.0	139.0	**33**
34	39 08.7	+59.6	135.5	38 25.7	+59.7	136.0	37 42.3	+59.8	136.6	36 58.5	+59.9	137.1	36 14.4	+60.0	137.6	35 29.9	+60.0	138.1	34 45.1	+60.0	138.5	34 00.0	+60.0	139.0	**34**
35	40 08.3	+59.7	135.3	39 25.4	+59.8	135.9	38 42.1	+59.9	136.5	37 58.4	+59.9	137.0	37 14.4	+59.9	137.5	36 29.9	+60.0	138.0	35 45.1	+60.0	138.5	35 00.0	+60.0	139.0	**35**
36	41 08.0	+59.7	135.2	40 25.2	+59.8	135.8	39 42.0	+59.8	136.4	38 58.3	+59.9	136.9	38 14.3	+59.9	137.5	37 29.9	+60.0	138.0	36 45.1	+60.0	138.5	36 00.0	+60.0	139.0	**36**
37	42 07.7	+59.6	135.1	41 25.0	+59.7	135.7	40 41.8	+59.8	136.3	39 58.2	+59.9	136.9	39 14.2	+60.0	137.4	38 29.9	+59.9	138.0	37 45.1	+60.0	138.5	37 00.0	+60.0	139.0	**37**
38	43 07.3	+59.6	134.9	42 24.7	+59.7	135.6	41 41.6	+59.9	136.2	40 58.1	+59.9	136.8	40 14.2	+59.9	137.4	39 29.8	+60.0	137.9	38 45.1	+60.0	138.5	38 00.0	+60.0	139.0	**38**
39	44 06.9	+59.7	134.8	43 24.4	+59.8	135.4	42 41.5	+59.8	136.1	41 58.0	+59.9	136.7	41 14.1	+60.0	137.3	40 29.8	+60.0	137.9	39 45.1	+60.0	138.5	39 00.0	+60.0	139.0	**39**
40	45 06.6	+59.6	134.6	44 24.2	+59.7	135.3	43 41.3	+59.8	136.0	42 57.9	+59.9	136.6	42 14.1	+59.9	137.3	41 29.8	+60.0	137.9	40 45.1	+60.0	138.4	40 00.0	+60.0	139.0	**40**
41	46 06.2	+59.6	134.4	45 23.9	+59.7	135.2	44 41.1	+59.8	135.9	43 57.8	+59.9	136.5	43 14.0	+59.9	137.2	42 29.8	+59.9	137.8	41 45.1	+60.0	138.4	41 00.0	+60.0	139.0	**41**
42	47 05.8	+59.5	134.3	46 23.6	+59.7	135.0	45 40.9	+59.8	135.7	44 57.7	+59.8	136.4	44 13.9	+60.0	137.1	43 29.7	+60.0	137.8	42 45.1	+60.0	138.4	42 00.0	+60.0	139.0	**42**
43	48 05.3	+59.6	134.1	47 23.3	+59.7	134.9	46 40.7	+59.8	135.6	45 57.5	+59.9	136.4	45 13.9	+59.9	137.1	44 29.7	+60.0	137.7	43 45.1	+60.0	138.4	43 00.0	+60.0	139.0	**43**
44	49 04.9	+59.5	133.9	48 23.0	+59.7	134.7	47 40.5	+59.7	135.5	46 57.4	+59.9	136.3	46 13.8	+59.9	137.0	45 29.7	+59.9	137.7	44 45.1	+60.0	138.4	44 00.0	+60.0	139.0	**44**
45	50 04.4	+59.6	133.7	49 22.7	+59.6	134.6	48 40.2	+59.8	135.4	47 57.3	+59.8	136.2	47 13.7	+59.9	136.9	46 29.6	+60.0	137.6	45 45.1	+59.9	138.3	45 00.0	+60.0	139.0	**45**
46	51 04.0	+59.5	133.5	50 22.3	+59.7	134.4	49 40.0	+59.8	135.2	48 57.1	+59.9	136.1	48 13.6	+59.9	136.8	47 29.6	+60.0	137.6	46 45.0	+60.0	138.3	46 00.0	+60.0	139.0	**46**
47	52 03.5	+59.4	133.3	51 22.0	+59.6	134.2	50 39.8	+59.7	135.1	49 57.0	+59.8	135.9	49 13.5	+60.0	136.8	48 29.6	+59.9	137.5	47 45.0	+60.0	138.3	47 00.0	+60.0	139.0	**47**
48	53 02.9	+59.5	133.1	52 21.6	+59.6	134.0	51 39.5	+59.8	135.0	50 56.8	+59.8	135.8	50 13.5	+59.9	136.7	49 29.5	+60.0	137.5	48 45.0	+60.0	138.3	48 00.0	+60.0	139.0	**48**
49	54 02.4	+59.4	132.9	53 21.2	+59.6	133.9	52 39.3	+59.7	134.8	51 56.6	+59.9	135.7	51 13.4	+59.9	136.6	50 29.5	+59.9	137.4	49 45.0	+60.0	138.2	49 00.0	+60.0	139.0	**49**
50	55 01.8	+59.4	132.6	54 20.8	+59.6	133.7	53 39.0	+59.7	134.6	52 56.5	+59.8	135.6	52 13.3	+59.9	136.5	51 29.4	+60.0	137.4	50 45.0	+60.0	138.2	50 00.0	+60.0	139.0	**50**
51	56 01.2	+59.4	132.4	55 20.4	+59.5	133.5	54 38.7	+59.7	134.5	53 56.3	+59.8	135.5	53 13.2	+59.9	136.4	52 29.4	+60.0	137.3	51 45.0	+60.0	138.2	51 00.0	+60.0	139.0	**51**
52	57 00.6	+59.3	132.1	56 19.9	+59.5	133.2	55 38.4	+59.7	134.3	54 56.1	+59.8	135.3	54 13.1	+59.9	136.3	53 29.4	+59.9	137.2	52 45.0	+60.0	138.1	52 00.0	+60.0	139.0	**52**
53	57 59.9	+59.3	131.8	57 19.4	+59.5	133.0	56 38.1	+59.7	134.1	55 55.9	+59.8	135.2	55 13.0	+59.9	136.2	54 29.3	+60.0	137.2	53 45.0	+60.0	138.1	53 00.0	+60.0	139.0	**53**
54	58 59.2	+59.3	131.5	58 18.9	+59.5	132.8	57 37.8	+59.6	133.9	56 55.7	+59.8	135.0	56 12.9	+59.9	136.1	55 29.3	+59.9	137.1	54 45.0	+60.0	138.1	54 00.0	+60.0	139.0	**54**
55	59 58.5	+59.2	131.2	59 18.4	+59.5	132.5	58 37.4	+59.6	133.7	57 55.5	+59.8	134.9	57 12.8	+59.8	136.0	56 29.2	+60.0	137.0	55 45.0	+59.9	138.0	55 00.0	+60.0	139.0	**55**
56	60 57.7	+59.1	130.9	60 17.9	+59.4	132.2	59 37.0	+59.6	133.5	58 55.3	+59.7	134.7	58 12.6	+59.9	135.9	57 29.2	+59.9	137.0	56 44.9	+60.0	138.0	56 00.0	+60.0	139.0	**56**
57	61 56.8	+59.1	130.6	61 17.3	+59.3	131.9	60 36.6	+59.6	133.3	59 55.0	+59.8	134.5	59 12.5	+59.9	135.7	58 29.1	+60.0	136.9	57 44.9	+60.0	138.0	57 00.0	+60.0	139.0	**57**
58	62 55.9	+59.1	130.2	62 16.6	+59.3	131.6	61 36.2	+59.6	133.0	60 54.8	+59.7	134.3	60 12.4	+59.8	135.6	59 29.1	+59.9	136.8	58 44.9	+60.0	137.9	58 00.0	+60.0	139.0	**58**
59	63 55.0	+58.9	129.8	63 15.9	+59.3	131.3	62 35.8	+59.5	132.8	61 54.5	+59.7	134.1	61 12.2	+59.8	135.5	60 29.0	+59.9	136.7	59 44.9	+60.0	137.9	59 00.0	+60.0	139.0	**59**
60	64 53.9	+58.9	129.4	64 15.2	+59.2	131.0	63 35.3	+59.5	132.5	62 54.2	+59.7	133.9	62 12.0	+59.9	135.3	61 28.9	+59.9	136.6	60 44.9	+60.0	137.8	60 00.0	+60.0	139.0	**60**
61	65 52.8	+58.8	128.9	65 14.4	+59.2	130.6	64 34.8	+59.4	132.2	63 53.9	+59.6	133.7	63 11.9	+59.8	135.1	62 28.8	+60.0	136.5	61 44.9	+59.9	137.8	61 00.0	+60.0	139.0	**61**
62	66 51.6	+58.7	128.4	66 13.6	+59.1	130.2	65 34.2	+59.4	131.9	64 53.5	+59.7	133.5	64 11.7	+59.8	135.0	63 28.8	+59.9	136.4	62 44.8	+60.0	137.7	62 00.0	+60.0	139.0	**62**
63	67 50.3	+58.6	127.9	67 12.7	+59.0	129.7	66 33.6	+59.4	131.5	65 53.2	+59.6	133.2	65 11.5	+59.8	134.8	64 28.7	+59.9	136.3	63 44.8	+60.0	137.7	63 00.0	+60.0	139.0	**63**
64	68 48.9	+58.4	127.3	68 11.7	+58.9	129.3	67 33.0	+59.3	131.1	66 52.8	+59.6	132.9	66 11.3	+59.8	134.6	65 28.6	+59.9	136.1	64 44.8	+60.0	137.6	64 00.0	+60.0	139.0	**64**
65	69 47.3	+58.3	126.6	69 10.6	+58.8	128.7	68 32.3	+59.2	130.7	67 52.4	+59.5	132.6	67 11.1	+59.7	134.4	66 28.5	+59.9	136.0	65 44.8	+60.0	137.5	65 00.0	+60.0	139.0	**65**
66	70 45.6	+58.1	125.9	70 09.4	+58.7	128.2	69 31.5	+59.1	130.3	68 51.9	+59.5	132.3	68 10.8	+59.8	134.1	67 28.4	+59.9	135.9	66 44.8	+59.9	137.5	66 00.0	+60.0	139.0	**66**
67	71 43.7	+57.9	125.2	71 08.1	+58.6	127.5	70 30.6	+59.1	129.8	69 51.4	+59.4	131.9	69 10.6	+59.7	133.9	68 28.3	+59.9	135.7	67 44.7	+60.0	137.4	67 00.0	+60.0	139.0	**67**
68	72 41.6	+57.7	124.3	72 06.7	+58.4	126.9	71 29.7	+59.0	129.3	70 50.8	+59.4	131.5	70 10.3	+59.6	133.6	69 28.2	+59.8	135.5	68 44.7	+60.0	137.3	68 00.0	+60.0	139.0	**68**
69	73 39.3	+57.4	123.3	73 05.1	+58.2	126.1	72 28.7	+58.8	128.7	71 50.2	+59.3	131.0	71 09.9	+59.7	133.3	70 28.0	+59.9	135.3	69 44.7	+59.9	137.2	69 00.0	+60.0	139.0	**69**
70	74 36.7	+57.0	122.3	74 03.3	+58.0	125.2	73 27.5	+58.7	128.0	72 49.5	+59.3	130.5	72 09.6	+59.6	132.9	71 27.9	+59.8	135.1	70 44.6	+60.0	137.1	70 00.0	+60.0	139.0	**70**
71	75 33.7	+56.6	121.1	75 01.3	+57.7	124.3	74 26.2	+58.5	127.2	73 48.8	+59.1	130.0	73 09.2	+59.5	132.5	72 27.7	+59.8	134.9	71 44.6	+60.0	137.0	71 00.0	+60.0	139.0	**71**
72	76 30.3	+56.1	119.7	75 59.0	+57.4	123.2	75 24.7	+58.4	126.4	74 47.9	+59.0	129.4	74 08.7	+59.5	132.1	73 27.5	+59.8	134.6	72 44.6	+59.9	136.9	72 00.0	+60.0	139.0	**72**
73	77 26.4	+55.4	118.1	76 56.4	+56.9	121.9	76 23.1	+58.0	125.4	75 46.9	+58.9	128.7	75 08.2	+59.4	131.6	74 27.3	+59.8	134.3	73 44.5	+60.0	136.8	73 00.0	+60.0	139.0	**73**
74	78 21.8	+54.7	116.3	77 53.3	+56.4	120.5	77 21.1	+57.8	124.3	76 45.8	+58.7	127.8	76 07.6	+59.4	131.0	75 27.1	+59.7	134.0	74 44.5	+59.9	136.6	74 00.0	+60.0	139.0	**74**
75	79 16.5	+53.6	114.2	78 49.7	+55.8	118.8	78 18.9	+57.3	123.0	77 44.5	+58.4	126.9	77 07.0	+59.2	130.4	76 26.8	+59.7	133.6	75 44.4	+59.9	136.4	75 00.0	+60.0	139.0	**75**
76	80 10.1	+52.3	111.6	79 45.5	+54.9	116.8	79 16.2	+56.8	121.5	78 42.9	+58.2	125.8	78 06.2	+59.1	129.7	77 26.5	+59.7	133.1	76 44.3	+59.9	136.2	76 00.0	+60.0	139.0	**76**
77	81 02.4	*+50.5* •	108.6	80 40.4	+53.7	114.4	80 13.0	+56.2	119.7	79 41.1	+57.8	124.5	79 05.3	+58.9	128.8	78 26.2	+59.5	132.6	77 44.2	+60.0	136.0	77 00.0	+60.0	139.0	**77**
78	81 52.9	*+48.2* •	105.0	81 34.1	+52.2	111.5	81 09.2	+55.1	117.5	80 38.9	+57.3	122.9	80 04.2	+58.7	127.7	79 25.7	+59.5	132.0	78 44.2	+59.8	135.7	78 00.0	+60.0	139.0	**78**
79	82 41.1	*+44.9* •	100.5	82 26.3	*+50.0* •	108.0	82 04.3	+53.9	114.8	81 36.2	+56.6	121.0	81 02.9	+58.3	126.4	80 25.2	+59.4	131.2	79 44.0	+59.9	135.4	79 00.0	+60.0	139.0	**79**
80	83 26.0	*+40.4* •	95.0	83 16.3	*+46.9* •	103.5	82 58.2	*+52.0* •	111.4	82 32.8	+55.6	118.6	82 01.2	+57.9	124.9	81 24.6	+59.2	130.3	80 43.9	+59.8	135.0	80 00.0	+60.0	139.0	**80**
81	84 06.4	*+34.2* •	88.2	84 03.2	*+42.5* •	97.9	83 50.2	*+49.2* •	107.1	83 28.4	+54.0	115.5	82 59.1	+57.2	122.8	82 23.8	+58.9	129.1	81 43.7	+59.8	134.5	81 00.0	+60.0	139.0	**81**
82	84 40.6	*+25.9* •	79.8	84 45.7	*+35.9* •	90.6	84 39.4	*+44.9* •	101.4	84 22.4	*+51.7* •	111.4	83 56.3	+56.1	120.2	83 22.7	+58.6	127.6	82 43.5	+59.7	133.9	82 00.0	+60.0	139.0	**82**
83	85 06.5	*+15.1* •	69.6	85 21.6	*+26.7* •	81.3	85 24.3	*+38.1* •	93.7	85 14.1	*+47.8* •	105.7	84 52.4	*+54.3* •	116.5	84 21.3	+58.0	125.6	83 43.2	+59.6	133.0	83 00.0	+60.0	139.0	**83**
84	85 21.6	*+2.7* •	58.0	85 48.3	*+14.1* •	69.6	86 02.4	*+27.7* •	83.3	86 01.9	*+41.0* •	97.7	85 46.7	*+51.2* •	111.3	85 19.3	+57.0	122.8	84 42.8	+59.5	131.9	84 00.0	+60.0	139.0	**84**
85	85 24.3	*−10.2* •	45.5	86 02.4	*−0.5* •	55.9	86 30.1	*+12.8* •	69.6	86 42.9	*+29.1* •	86.1	86 37.9	*+44.7* •	103.3	86 16.3	*+54.8* •	118.4	85 42.3	+59.0	130.2	85 00.0	+60.0	139.0	**85**
86	85 14.1	*−21.7* •	33.4	86 01.9	*−15.2* •	41.4	86 42.9	*−5.0* •	53.0	87 12.0	*+10.6* •	69.5	87 22.6	*+31.4* •	90.5	87 11.1	*+49.8* •	111.3	86 41.3	+58.4	127.6	86 00.0	+60.0	139.0	**86**
87	84 52.4	*−31.1* •	22.6	85 46.7	*−27.4* •	27.8	86 37.9	*−21.6* •	35.8	87 22.6	*−11.5* •	48.6	87 54.0	*+6.9* •	69.5	88 00.9	*+35.1* •	97.7	87 39.7	*+55.9* •	122.7	87 00.0	+60.0	139.0	**87**
88	84 21.3	*−38.1* •	13.5	85 19.3	*−36.5* •	16.3	86 16.3	*−34.0* •	20.6	87 11.1	*−29.8* •	27.8	88 00.9	*−21.2* •	41.4	88 36.0	*−0.4* •	69.5	88 35.6	*+42.4* •	111.2	88 00.0	+60.0	139.0	**88**
89	83 43.2	*−43.2* •	6.0	84 42.8	*−42.8* •	7.1	85 42.3	*−42.3* •	8.8	86 41.3	*−41.3* •	11.4	87 39.7	*−39.7* •	16.3	88 35.6	*−35.6* •	27.8	89 18.0	*−18.0* •	69.5	89 00.0	+60.0	139.0	**89**
90	83 00.0	*−46.9* •	0.0	84 00.0	*−47.2* •	0.0	85 00.0	*−47.5* •	0.0	86 00.0	*−48.0* •	0.0	87 00.0	*−48.7* •	0.0	88 00.0	*−49.9* •	0.0	89 00.0	*−52.4* •	0.0	90 00.0	*−60.0*	69.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 41°, 319°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	5 16.6	– 59.8	138.8	4 31.5	– 59.9	138.8	3 46.3	– 59.9	138.9	3 01.1	– 60.0	138.9	2 15.8	– 59.9	139.0	1 30.6	– 60.0	139.0	0 45.3	– 60.0	139.0	0 00.0	+ 60.0	41.0	0
1	4 16.8	– 59.8	138.9	3 31.6	– 59.8	138.9	2 46.4	– 59.9	138.9	2 01.1	– 59.9	139.0	1 15.9	– 60.0	139.0	0 30.6	– 60.0	139.0	0 14.7	+ 60.0	41.0	1 00.0	+ 60.0	41.0	1
2	3 17.0	– 59.8	138.9	2 31.8	– 59.9	139.0	1 46.5	– 59.9	139.0	1 01.2	– 59.9	139.0	0 15.9	– 60.0	139.0	0 29.4	+ 60.0	41.0	1 14.7	+ 60.0	41.0	2 00.0	+ 60.0	41.0	2
3	2 17.2	– 59.8	139.0	1 31.9	– 59.9	139.1	0 46.6	– 59.9	139.1	0 01.3	– 60.0	139.1	0 44.1	+ 59.9	40.9	1 29.4	+ 60.0	40.9	2 14.7	+ 60.0	41.0	3 00.0	+ 60.0	41.0	3
4	1 17.4	– 59.8	139.1	0 32.0	– 59.8	139.1	0 13.3	+ 59.9	40.9	0 58.7	+ 59.9	40.9	1 44.0	+ 60.0	40.9	2 29.4	+ 60.0	40.9	3 14.7	+ 60.0	41.0	4 00.0	+ 60.0	41.0	4
5	0 17.6	– 59.8	139.2	0 27.8	+ 59.9	40.8	1 13.2	+ 59.9	40.8	1 58.6	+ 60.0	40.8	2 44.0	+ 60.0	40.9	3 29.4	+ 59.9	40.9	4 14.7	+ 60.0	40.9	5 00.0	+ 60.0	41.0	5
6	0 42.2	+ 59.8	40.7	1 27.7	+ 59.8	40.7	2 13.1	+ 59.9	40.8	2 58.6	+ 59.9	40.8	3 44.0	+ 59.9	40.8	4 29.3	+ 60.0	40.9	5 14.7	+ 60.0	40.9	6 00.0	+ 60.0	41.0	6
7	1 42.0	+ 59.8	40.7	2 27.5	+ 59.9	40.7	3 13.0	+ 59.9	40.7	3 58.5	+ 59.9	40.7	4 43.9	+ 60.0	40.8	5 29.3	+ 60.0	40.9	6 14.7	+ 60.0	40.9	7 00.0	+ 60.0	41.0	7
8	2 41.8	+ 59.8	40.6	3 27.4	+ 59.8	40.6	4 12.9	+ 59.9	40.7	4 58.4	+ 60.0	40.7	5 43.9	+ 60.0	40.8	6 29.3	+ 60.0	40.8	7 14.7	+ 60.0	40.9	8 00.0	+ 60.0	41.0	8
9	3 41.6	+ 59.8	40.5	4 27.2	+ 59.9	40.5	5 12.8	+ 59.9	40.6	5 58.4	+ 59.9	40.7	6 43.9	+ 59.9	40.7	7 29.3	+ 60.0	40.8	8 14.7	+ 60.0	40.9	9 00.0	+ 60.0	41.0	9
10	4 41.4	+ 59.8	40.4	5 27.1	+ 59.9	40.5	6 12.7	+ 59.9	40.5	6 58.3	+ 59.9	40.6	7 43.8	+ 60.0	40.7	8 29.3	+ 60.0	40.8	9 14.7	+ 60.0	40.9	10 00.0	+ 60.0	41.0	10
11	5 41.2	+ 59.8	40.3	6 27.0	+ 59.8	40.4	7 12.6	+ 59.9	40.5	7 58.2	+ 60.0	40.6	8 43.8	+ 60.0	40.7	9 29.3	+ 60.0	40.8	10 14.7	+ 60.0	40.9	11 00.0	+ 60.0	41.0	11
12	6 41.0	+ 59.9	40.2	7 26.8	+ 59.9	40.3	8 12.5	+ 59.9	40.4	8 58.2	+ 59.9	40.5	9 43.8	+ 59.9	40.6	10 29.3	+ 59.9	40.7	11 14.7	+ 60.0	40.9	12 00.0	+ 60.0	41.0	12
13	7 40.9	+ 59.8	40.2	8 26.7	+ 59.8	40.3	9 12.4	+ 59.9	40.4	9 58.1	+ 59.9	40.5	10 43.7	+ 60.0	40.6	11 29.2	+ 60.0	40.7	12 14.7	+ 60.0	40.9	13 00.0	+ 60.0	41.0	13
14	8 40.7	+ 59.8	40.1	9 26.5	+ 59.9	40.2	10 12.3	+ 59.9	40.3	10 58.0	+ 60.0	40.4	11 43.7	+ 59.9	40.6	12 29.2	+ 60.0	40.7	13 14.7	+ 60.0	40.8	14 00.0	+ 60.0	41.0	14
15	9 40.5	+ 59.8	40.0	10 26.4	+ 59.8	40.1	11 12.2	+ 59.9	40.2	11 58.0	+ 59.9	40.4	12 43.6	+ 60.0	40.5	13 29.2	+ 60.0	40.7	14 14.7	+ 60.0	40.8	15 00.0	+ 60.0	41.0	15
16	10 40.3	+ 59.8	39.9	11 26.2	+ 59.9	40.0	12 12.1	+ 59.9	40.2	12 57.9	+ 59.9	40.3	13 43.6	+ 60.0	40.5	14 29.2	+ 60.0	40.6	15 14.7	+ 59.9	40.8	16 00.0	+ 60.0	41.0	16
17	11 40.1	+ 59.8	39.8	12 26.1	+ 59.8	40.0	13 12.0	+ 59.9	40.1	13 57.8	+ 60.0	40.3	14 43.6	+ 59.9	40.4	15 29.2	+ 60.0	40.6	16 14.6	+ 60.0	40.8	17 00.0	+ 60.0	41.0	17
18	12 39.9	+ 59.8	39.8	13 25.9	+ 59.9	39.9	14 11.9	+ 59.9	40.1	14 57.8	+ 59.9	40.2	15 43.5	+ 60.0	40.4	16 29.2	+ 59.9	40.6	17 14.6	+ 60.0	40.8	18 00.0	+ 60.0	41.0	18
19	13 39.7	+ 59.8	39.7	14 25.8	+ 59.8	39.8	15 11.8	+ 59.9	40.0	15 57.7	+ 59.9	40.2	16 43.5	+ 60.0	40.4	17 29.1	+ 60.0	40.6	18 14.6	+ 60.0	40.8	19 00.0	+ 60.0	41.0	19
20	14 39.5	+ 59.7	39.6	15 25.6	+ 59.9	39.8	16 11.7	+ 59.9	39.9	16 57.6	+ 60.0	40.1	17 43.5	+ 59.9	40.3	18 29.1	+ 60.0	40.5	19 14.6	+ 60.0	40.8	20 00.0	+ 60.0	41.0	20
21	15 39.2	+ 59.8	39.5	16 25.5	+ 59.8	39.7	17 11.6	+ 59.9	39.9	17 57.6	+ 59.9	40.1	18 43.4	+ 60.0	40.3	19 29.1	+ 60.0	40.5	20 14.6	+ 60.0	40.8	21 00.0	+ 60.0	41.0	21
22	16 39.0	+ 59.8	39.4	17 25.3	+ 59.9	39.6	18 11.5	+ 59.9	39.8	18 57.5	+ 59.9	40.0	19 43.4	+ 59.9	40.3	20 29.1	+ 60.0	40.5	21 14.6	+ 60.0	40.7	22 00.0	+ 60.0	41.0	22
23	17 38.8	+ 59.8	39.3	18 25.2	+ 59.8	39.5	19 11.4	+ 59.9	39.7	19 57.4	+ 60.0	40.0	20 43.3	+ 60.0	40.2	21 29.1	+ 59.9	40.5	22 14.6	+ 60.0	40.7	23 00.0	+ 60.0	41.0	23
24	18 38.6	+ 59.8	39.2	19 25.0	+ 59.9	39.5	20 11.3	+ 59.9	39.7	20 57.4	+ 59.9	39.9	21 43.3	+ 59.9	40.2	22 29.0	+ 60.0	40.4	23 14.6	+ 60.0	40.7	24 00.0	+ 60.0	41.0	24
25	19 38.4	+ 59.8	39.1	20 24.9	+ 59.8	39.4	21 11.2	+ 59.8	39.6	21 57.3	+ 59.9	39.9	22 43.2	+ 60.0	40.1	23 29.0	+ 60.0	40.4	24 14.6	+ 60.0	40.7	25 00.0	+ 60.0	41.0	25
26	20 38.2	+ 59.8	39.1	21 24.7	+ 59.8	39.3	22 11.0	+ 59.9	39.6	22 57.2	+ 59.9	39.8	23 43.2	+ 60.0	40.1	24 29.0	+ 60.0	40.4	25 14.6	+ 60.0	40.7	26 00.0	+ 60.0	41.0	26
27	21 38.0	+ 59.7	39.0	22 24.5	+ 59.9	39.2	23 10.9	+ 59.9	39.5	23 57.1	+ 60.0	39.8	24 43.2	+ 59.9	40.1	25 29.0	+ 60.0	40.4	26 14.6	+ 60.0	40.7	27 00.0	+ 60.0	41.0	27
28	22 37.7	+ 59.8	38.9	23 24.4	+ 59.8	39.1	24 10.8	+ 59.9	39.4	24 57.1	+ 59.9	39.7	25 43.1	+ 60.0	40.0	26 29.0	+ 60.0	40.3	27 14.6	+ 60.0	40.7	28 00.0	+ 60.0	41.0	28
29	23 37.5	+ 59.8	38.8	24 24.2	+ 59.8	39.1	25 10.7	+ 59.9	39.3	25 57.0	+ 59.9	39.7	26 43.1	+ 59.9	40.0	27 29.0	+ 59.9	40.3	28 14.6	+ 60.0	40.6	29 00.0	+ 60.0	41.0	29
30	24 37.3	+ 59.7	38.7	25 24.0	+ 59.8	39.0	26 10.6	+ 59.8	39.3	26 56.9	+ 59.9	39.6	27 43.0	+ 60.0	39.9	28 28.9	+ 60.0	40.3	29 14.6	+ 60.0	40.6	30 00.0	+ 60.0	41.0	30
31	25 37.0	+ 59.8	38.6	26 23.8	+ 59.9	38.9	27 10.4	+ 59.9	39.2	27 56.8	+ 59.9	39.5	28 43.0	+ 59.9	39.9	29 28.9	+ 60.0	40.2	30 14.6	+ 60.0	40.6	31 00.0	+ 60.0	41.0	31
32	26 36.8	+ 59.8	38.5	27 23.7	+ 59.8	38.8	28 10.3	+ 59.9	39.1	28 56.7	+ 60.0	39.5	29 42.9	+ 60.0	39.8	30 28.9	+ 60.0	40.2	31 14.6	+ 60.0	40.6	32 00.0	+ 60.0	41.0	32
33	27 36.6	+ 59.7	38.4	28 23.5	+ 59.8	38.7	29 10.2	+ 59.9	39.1	29 56.7	+ 59.9	39.4	30 42.9	+ 59.9	39.8	31 28.9	+ 59.9	40.2	32 14.6	+ 60.0	40.6	33 00.0	+ 60.0	41.0	33
34	28 36.3	+ 59.8	38.3	29 23.3	+ 59.8	38.6	30 10.1	+ 59.8	39.0	30 56.6	+ 59.9	39.4	31 42.8	+ 60.0	39.7	32 28.8	+ 60.0	40.1	33 14.6	+ 60.0	40.6	34 00.0	+ 60.0	41.0	34
35	29 36.1	+ 59.7	38.2	30 23.1	+ 59.8	38.5	31 09.9	+ 59.9	38.9	31 56.5	+ 59.9	39.3	32 42.8	+ 59.9	39.7	33 28.8	+ 60.0	40.1	34 14.6	+ 60.0	40.5	35 00.0	+ 60.0	41.0	35
36	30 35.8	+ 59.7	38.1	31 22.9	+ 59.8	38.4	32 09.8	+ 59.9	38.8	32 56.4	+ 59.9	39.2	33 42.7	+ 60.0	39.6	34 28.8	+ 60.0	40.1	35 14.6	+ 60.0	40.5	36 00.0	+ 60.0	41.0	36
37	31 35.5	+ 59.8	38.0	32 22.7	+ 59.8	38.3	33 09.7	+ 59.8	38.7	33 56.3	+ 59.9	39.2	34 42.7	+ 59.9	39.6	35 28.8	+ 60.0	40.0	36 14.6	+ 59.9	40.5	37 00.0	+ 60.0	41.0	37
38	32 35.3	+ 59.7	37.8	33 22.5	+ 59.8	38.2	34 09.5	+ 59.9	38.7	34 56.2	+ 59.9	39.1	35 42.6	+ 60.0	39.5	36 28.8	+ 59.9	40.0	37 14.5	+ 60.0	40.5	38 00.0	+ 60.0	41.0	38
39	33 35.0	+ 59.7	37.7	34 22.3	+ 59.8	38.1	35 09.4	+ 59.8	38.6	35 56.1	+ 59.9	39.0	36 42.6	+ 59.9	39.5	37 28.7	+ 60.0	40.0	38 14.5	+ 60.0	40.5	39 00.0	+ 60.0	41.0	39
40	34 34.7	+ 59.7	37.6	35 22.1	+ 59.8	38.0	36 09.2	+ 59.9	38.5	36 56.0	+ 59.9	39.0	37 42.5	+ 60.0	39.4	38 28.7	+ 60.0	39.9	39 14.5	+ 60.0	40.5	40 00.0	+ 60.0	41.0	40
41	35 34.4	+ 59.7	37.5	36 21.9	+ 59.8	37.9	37 09.1	+ 59.8	38.4	37 55.9	+ 59.9	38.9	38 42.5	+ 59.9	39.4	39 28.7	+ 59.9	39.9	40 14.5	+ 60.0	40.4	41 00.0	+ 60.0	41.0	41
42	36 34.1	+ 59.7	37.4	37 21.7	+ 59.8	37.8	38 08.9	+ 59.9	38.3	38 55.8	+ 59.9	38.8	39 42.4	+ 60.0	39.3	40 28.6	+ 60.0	39.9	41 14.5	+ 60.0	40.4	42 00.0	+ 60.0	41.0	42
43	37 33.8	+ 59.7	37.3	38 21.5	+ 59.7	37.7	39 08.8	+ 59.8	38.2	39 55.7	+ 59.9	38.7	40 42.4	+ 59.9	39.3	41 28.6	+ 60.0	39.8	42 14.5	+ 60.0	40.4	43 00.0	+ 60.0	41.0	43
44	38 33.5	+ 59.7	37.1	39 21.2	+ 59.8	37.6	40 08.6	+ 59.8	38.1	40 55.6	+ 59.9	38.7	41 42.3	+ 59.9	39.2	42 28.6	+ 60.0	39.8	43 14.5	+ 60.0	40.4	44 00.0	+ 60.0	41.0	44
45	39 33.2	+ 59.7	37.0	40 21.0	+ 59.7	37.5	41 08.4	+ 59.8	38.0	41 55.5	+ 59.9	38.6	42 42.2	+ 60.0	39.1	43 28.6	+ 59.9	39.7	44 14.5	+ 60.0	40.4	45 00.0	+ 60.0	41.0	45
46	40 32.9	+ 59.6	36.9	41 20.7	+ 59.8	37.4	42 08.2	+ 59.9	37.9	42 55.4	+ 59.9	38.5	43 42.2	+ 59.9	39.1	44 28.5	+ 60.0	39.7	45 14.5	+ 60.0	40.3	46 00.0	+ 60.0	41.0	46
47	41 32.5	+ 59.7	36.7	42 20.5	+ 59.7	37.3	43 08.1	+ 59.8	37.8	43 55.3	+ 59.8	38.4	44 42.1	+ 59.9	39.0	45 28.5	+ 60.0	39.6	46 14.5	+ 60.0	40.3	47 00.0	+ 60.0	41.0	47
48	42 32.2	+ 59.6	36.6	43 20.2	+ 59.7	37.1	44 07.9	+ 59.8	37.7	44 55.1	+ 59.9	38.3	45 42.0	+ 59.9	38.9	46 28.5	+ 59.9	39.6	47 14.5	+ 60.0	40.3	48 00.0	+ 60.0	41.0	48
49	43 31.8	+ 59.7	36.4	44 19.9	+ 59.8	37.0	45 07.7	+ 59.8	37.6	45 55.0	+ 59.9	38.2	46 41.9	+ 60.0	38.9	47 28.4	+ 60.0	39.6	48 14.5	+ 60.0	40.3	49 00.0	+ 60.0	41.0	49
50	44 31.5	+ 59.6	36.3	45 19.7	+ 59.7	36.9	46 07.5	+ 59.8	37.5	46 54.9	+ 59.8	38.1	47 41.9	+ 59.9	38.8	48 28.4	+ 60.0	39.5	49 14.5	+ 59.9	40.2	50 00.0	+ 60.0	41.0	50
51	45 31.1	+ 59.6	36.1	46 19.4	+ 59.7	36.7	47 07.3	+ 59.8	37.4	47 54.7	+ 59.9	38.0	48 41.8	+ 59.9	38.7	49 28.4	+ 59.9	39.4	50 14.4	+ 60.0	40.2	51 00.0	+ 60.0	41.0	51
52	46 30.7	+ 59.6	35.9	47 19.1	+ 59.7	36.6	48 07.1	+ 59.7	37.2	48 54.6	+ 59.9	37.9	49 41.7	+ 59.9	38.6	50 28.3	+ 60.0	39.4	51 14.4	+ 60.0	40.2	52 00.0	+ 60.0	41.0	52
53	47 30.3	+ 59.5	35.8	48 18.8	+ 59.6	36.4	49 06.8	+ 59.8	37.1	49 54.5	+ 59.8	37.8	50 41.6	+ 59.9	38.6	51 28.3	+ 59.9	39.3	52 14.4	+ 60.0	40.1	53 00.0	+ 60.0	41.0	53
54	48 29.8	+ 59.6	35.6	49 18.4	+ 59.7	36.3	50 06.6	+ 59.7	37.0	50 54.3	+ 59.8	37.7	51 41.5	+ 59.9	38.5	52 28.2	+ 60.0	39.3	53 14.4	+ 60.0	40.1	54 00.0	+ 60.0	41.0	54
55	49 29.4	+ 59.5	35.4	50 18.1	+ 59.6	36.1	51 06.3	+ 59.8	36.8	51 54.1	+ 59.9	37.6	52 41.4	+ 59.9	38.4	53 28.2	+ 60.0	39.2	54 14.4	+ 60.0	40.1	55 00.0	+ 60.0	41.0	55
56	50 28.9	+ 59.5	35.2	51 17.7	+ 59.7	35.9	52 06.1	+ 59.7	36.7	52 54.0	+ 59.8	37.5	53 41.3	+ 59.9	38.3	54 28.2	+ 59.9	39.1	55 14.4	+ 60.0	40.1	56 00.0	+ 60.0	41.0	56
57	51 28.4	+ 59.5	35.0	52 17.4	+ 59.6	35.7	53 05.8	+ 59.7	36.5	53 53.8	+ 59.8	37.3	54 41.2	+ 59.9	38.2	55 28.1	+ 60.0	39.1	56 14.4	+ 60.0	40.0	57 00.0	+ 60.0	41.0	57
58	52 27.9	+ 59.5	34.8	53 17.0	+ 59.6	35.6	54 05.5	+ 59.8	36.4	54 53.6	+ 59.8	37.2	55 41.1	+ 59.9	38.1	56 28.1	+ 59.9	39.0	57 14.4	+ 60.0	40.0	58 00.0	+ 60.0	41.0	58
59	53 27.4	+ 59.4	34.6	54 16.6	+ 59.5	35.4	55 05.3	+ 59.6	36.2	55 53.4	+ 59.8	37.1	56 41.0	+ 59.9	38.0	57 28.0	+ 59.9	38.9	58 14.4	+ 59.9	39.9	59 00.0	+ 60.0	41.0	59
60	54 26.8	+ 59.5	34.3	55 16.1	+ 59.6	35.2	56 04.9	+ 59.7	36.0	56 53.2	+ 59.8	36.9	57 40.9	+ 59.9	37.8	58 27.9	+ 60.0	38.8	59 14.3	+ 60.0	39.9	60 00.0	+ 60.0	41.0	60
61	55 26.3	+ 59.3	34.1	56 15.7	+ 59.5	34.9	57 04.6	+ 59.7	35.8	57 53.0	+ 59.8	36.7	58 40.8	+ 59.8	37.7	59 27.9	+ 59.9	38.8	60 14.3	+ 60.0	39.8	61 00.0	+ 60.0	41.0	61
62	56 25.6	+ 59.4	33.8	57 15.2	+ 59.5	34.7	58 04.3	+ 59.6	35.6	58 52.8	+ 59.7	36.6	59 40.6	+ 59.9	37.6	60 27.8	+ 60.0	38.7	61 14.3	+ 60.0	39.8	62 00.0	+ 60.0	41.0	62
63	57 25.0	+ 59.3	33.6	58 14.7	+ 59.5	34.5	59 03.9	+ 59.6	35.4	59 52.5	+ 59.8	36.4	60 40.5	+ 59.8	37.5	61 27.8	+ 59.9	38.6	62 14.3	+ 60.0	39.7	63 00.0	+ 60.0	41.0	63
64	58 24.3	+ 59.3	33.3	59 14.2	+ 59.4	34.2	60 03.5	+ 59.6	35.2	60 52.3	+ 59.7	36.2	61 40.3	+ 59.9	37.3	62 27.7	+ 59.9	38.5	63 14.3	+ 59.9	39.7	64 00.0	+ 60.0	41.0	64
65	59 23.6	+ 59.2	33.0	60 13.6	+ 59.5	33.9	61 03.1	+ 59.6	34.9	61 52.0	+ 59.7	36.0	62 40.2	+ 59.8	37.1	63 27.6	+ 59.9	38.4	64 14.2	+ 60.0	39.6	65 00.0	+ 60.0	41.0	65
66	60 22.8	+ 59.2	32.7	61 13.1	+ 59.3	33.7	62 02.7	+ 59.5	34.7	62 51.7	+ 59.7	35.8	63 40.0	+ 59.8	37.0	64 27.5	+ 59.9	38.2	65 14.2	+ 60.0	39.6	66 00.0	+ 60.0	41.0	66
67	61 22.0	+ 59.1	32.3	62 12.4	+ 59.3	33.4	63 02.2	+ 59.5	34.4	63 51.4	+ 59.6	35.6	64 39.8	+ 59.8	36.8	65 27.4	+ 59.9	38.1	66 14.2	+ 60.0	39.5	67 00.0	+ 60.0	41.0	67
68	62 21.1	+ 59.1	32.0	63 11.7	+ 59.3	33.0	64 01.7	+ 59.5	34.1	64 51.0	+ 59.7	35.3	65 39.6	+ 59.8	36.6	66 27.3	+ 59.9	38.0	67 14.2	+ 60.0	39.4	68 00.0	+ 60.0	41.0	68
69	63 20.2	+ 59.0	31.6	64 11.0	+ 59.2	32.7	65 01.2	+ 59.4	33.8	65 50.7	+ 59.6	35.1	66 39.4	+ 59.8	36.4	67 27.2	+ 59.9	37.8	68 14.2	+ 59.9	39.4	69 00.0	+ 60.0	41.0	69
70	64 19.2	+ 58.9	31.2	65 10.2	+ 59.2	32.3	66 00.6	+ 59.4	33.5	66 50.3	+ 59.6	34.8	67 39.2	+ 59.7	36.2	68 27.1	+ 59.9	37.7	69 14.1	+ 60.0	39.3	70 00.0	+ 60.0	41.0	70
71	65 18.1	+ 58.9	30.7	66 09.4	+ 59.1	31.9	67 00.0	+ 59.3	33.1	67 49.9	+ 59.5	34.5	68 38.9	+ 59.7	35.9	69 27.0	+ 59.9	37.5	70 14.1	+ 60.0	39.2	71 00.0	+ 60.0	41.0	71
72	66 17.0	+ 58.8	30.3	67 08.5	+ 59.0	31.5	67 59.3	+ 59.3	32.7	68 49.4	+ 59.5	34.1	69 38.6	+ 59.7	35.6	70 26.9	+ 59.8	37.3	71 14.1	+ 59.9	39.1	72 00.0	+ 60.0	41.0	72
73	67 15.8	+ 58.6	29.8	68 07.5	+ 58.9	31.0	68 58.6	+ 59.2	32.3	69 48.9	+ 59.4	33.8	70 38.3	+ 59.7	35.4	71 26.7	+ 59.9	37.1	72 14.0	+ 60.0	38.9	73 00.0	+ 60.0	41.0	73
74	68 14.4	+ 58.5	29.2	69 06.4	+ 58.9	30.5	69 57.8	+ 59.1	31.9	70 48.3	+ 59.4	33.4	71 38.0	+ 59.6	35.0	72 26.6	+ 59.8	36.8	73 14.0	+ 59.9	38.8	74 00.0	+ 60.0	41.0	74
75	69 12.9	+ 58.4	28.6	70 05.3	+ 58.7	29.9	70 56.9	+ 59.0	31.3	71 47.7	+ 59.3	32.9	72 37.6	+ 59.6	34.7	73 26.4	+ 59.8	36.6	74 13.9	+ 60.0	38.7	75 00.0	+ 60.0	41.0	75
76	70 11.3	+ 58.2	27.9	71 04.0	+ 58.6	29.3	71 55.9	+ 58.9	30.8	72 47.0	+ 59.3	32.4	73 37.2	+ 59.5	34.2	74 26.2	+ 59.7	36.3	75 13.9	+ 59.9	38.5	76 00.0	+ 60.0	41.0	76
77	71 09.5	+ 58.1	27.2	72 02.6	+ 58.4	28.6	72 54.8	+ 58.8	30.2	73 46.3	+ 59.1	31.9	74 36.7	+ 59.5	33.8	75 25.9	+ 59.8	35.9	76 13.8	+ 59.9	38.3	77 00.0	+ 60.0	41.0	77
78	72 07.6	+ 57.8	26.4	73 01.0	+ 58.2	27.8	73 53.6	+ 58.7	29.5	74 45.4	+ 59.0	31.3	75 36.2	+ 59.3	33.3	76 25.7	+ 59.7	35.5	77 13.7	+ 59.9	38.1	78 00.0	+ 60.0	41.0	78
79	73 05.4	+ 57.5	25.5	73 59.2	+ 58.0	27.0	74 52.3	+ 58.4	28.7	75 44.4	+ 58.9	30.5	76 35.5	+ 59.3	32.7	77 25.4	+ 59.6	35.1	78 13.6	+ 59.9	37.8	79 00.0	+ 60.0	41.0	79
80	74 02.9	+ 57.3	24.5	74 57.2	+ 57.7	26.0	75 50.7	+ 58.2	27.8	76 43.3	+ 58.7	29.7	77 34.8	+ 59.2	32.0	78 25.0	+ 59.6	34.6	79 13.5	+ 59.9	37.5	80 00.0	+ 60.0	41.0	80
81	75 00.2	+ 56.8	23.4	75 54.9	+ 57.4	24.9	76 48.9	+ 58.0	26.7	77 42.0	+ 58.5	28.8	78 34.0	+ 59.0	31.2	79 24.6	+ 59.5	33.9	80 13.4	+ 59.9	37.2	81 00.0	+ 60.0	41.0	81
82	75 57.0	+ 56.4	22.1	76 52.3	+ 57.0	23.7	77 46.9	+ 57.5	25.6	78 40.5	+ 58.2	27.7	79 33.0	+ 58.8	30.2	80 24.1	+ 59.3	33.2	81 13.3	+ 59.8	36.7	82 00.0	+ 60.0	41.0	82
83	76 53.4	+ 55.9	20.6	77 49.3	+ 56.4	22.3	78 44.4	+ 57.2	24.2	79 38.7	+ 57.8	26.4	80 31.8	+ 58.5	29.1	81 23.4	+ 59.2	32.3	82 13.1	+ 59.7	36.2	83 00.0	+ 60.0	41.0	83
84	77 49.3	+ 55.1	19.0	78 45.7	+ 55.9	20.6	79 41.6	+ 56.5	22.5	80 36.5	+ 57.3	24.9	81 30.3	+ 58.2	27.7	82 22.6	+ 59.0	31.1	83 12.8	+ 59.7	35.5	84 00.0	+ 60.0	41.0	84
85	78 44.4	+ 54.3	17.0	79 41.6	+ 54.9	18.6	80 38.1	+ 55.7	20.6	81 33.8	+ 56.6	22.9	82 28.5	+ 57.6	25.9	83 21.6	+ 58.6	29.6	84 12.5	+ 59.5	34.5	85 00.0	+ 60.0	41.0	85
86	79 38.7	+ 53.1	14.7	80 36.5	+ 53.8	16.3	81 33.8	+ 54.7	18.2	82 30.4	+ 55.7	20.5	83 26.1	+ 56.7	23.6	84 20.2	+ 58.0	27.6	85 12.0	+ 59.3	33.2	86 00.0	+ 60.0	41.0	86
87	80 31.8	+ 51.6	12.0	81 30.3	+ 52.3	13.4	82 28.5	+ 53.1	15.2	83 26.1	+ 54.1	17.5	84 22.8	+ 55.4	20.5	85 18.2	+ 57.0	24.8	86 11.3	+ 58.8	31.1	87 00.0	+ 60.0	41.0	87
88	81 23.4	*+ 49.7*•	8.8	82 22.6	*+ 50.2*•	9.9	83 21.6	*+ 50.9*•	11.4	84 20.2	*+ 51.8*•	13.4	85 18.2	*+ 53.1*•	16.2	86 15.2	*+ 54.9*•	20.5	87 10.1	*+ 57.5*•	27.6	88 00.0	+ 60.0	41.0	88
89	82 13.1	*+ 46.9*•	4.9	83 12.8	*+ 47.2*•	5.6	84 12.5	*+ 47.5*•	6.5	85 12.0	*+ 48.0*•	7.9	86 11.3	*+ 48.7*•	9.9	87 10.1	*+ 49.9*•	13.4	88 07.6	*+ 52.4*•	20.5	89 00.0	+ 60.0	41.0	89
90	83 00.0	*+ 43.2*•	0.0	84 00.0	*+ 42.8*•	0.0	85 00.0	*+ 42.3*•	0.0	86 00.0	*+ 41.3*•	0.0	87 00.0	*+ 39.7*•	0.0	88 00.0	*+ 35.6*•	0.0	89 00.0	*+ 18.0*•	0.0	90 00.0	– 60.0	20.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 139°, 221°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 11.8	+59.8	137.8	4 27.3	+59.9	137.8	3 42.8	+59.9	137.9	2 58.3	+59.9	137.9	2 13.7	+60.0	138.0	1 29.2	+60.0	138.0	0 44.6	+60.0	138.0	0 00.0	+60.0	138.0	0
1	6 11.6	+59.8	137.7	5 27.2	+59.8	137.8	4 42.7	+59.9	137.8	3 58.2	+60.0	137.9	3 13.7	+60.0	137.9	2 29.2	+59.9	138.0	1 44.6	+60.0	138.0	1 00.0	+60.0	138.0	1
2	7 11.4	+59.8	137.6	6 27.0	+59.9	137.7	5 42.6	+59.9	137.8	4 58.2	+59.9	137.8	4 13.7	+59.9	137.9	3 29.1	+60.0	137.9	2 44.6	+60.0	138.0	2 00.0	+60.0	138.0	2
3	8 11.2	+59.8	137.5	7 26.9	+59.8	137.6	6 42.5	+59.9	137.7	5 58.1	+59.9	137.8	5 13.6	+60.0	137.9	4 29.1	+60.0	137.9	3 44.6	+60.0	138.0	3 00.0	+60.0	138.0	3
4	9 11.0	+59.8	137.5	8 26.7	+59.9	137.6	7 42.4	+59.9	137.7	6 58.0	+60.0	137.7	6 13.6	+60.0	137.8	5 29.1	+60.0	137.9	4 44.6	+60.0	137.9	4 00.0	+60.0	138.0	4
5	10 10.8	+59.7	137.4	9 26.6	+59.8	137.5	8 42.3	+59.9	137.6	7 58.0	+59.9	137.7	7 13.6	+59.9	137.8	6 29.1	+60.0	137.9	5 44.6	+60.0	137.9	5 00.0	+60.0	138.0	5
6	11 10.5	+59.8	137.3	10 26.4	+59.9	137.4	9 42.2	+59.9	137.5	8 57.9	+59.9	137.6	8 13.5	+60.0	137.7	7 29.1	+60.0	137.8	6 44.6	+60.0	137.9	6 00.0	+60.0	138.0	6
7	12 10.3	+59.8	137.2	11 26.3	+59.8	137.3	10 42.1	+59.9	137.5	9 57.8	+60.0	137.6	9 13.5	+59.9	137.7	8 29.1	+59.9	137.8	7 44.6	+60.0	137.9	7 00.0	+60.0	138.0	7
8	13 10.1	+59.8	137.1	12 26.1	+59.9	137.3	11 42.0	+59.9	137.4	10 57.8	+59.9	137.6	10 13.4	+60.0	137.7	9 29.0	+60.0	137.8	8 44.6	+60.0	137.9	8 00.0	+60.0	138.0	8
9	14 09.9	+59.8	137.0	13 26.0	+59.8	137.2	12 41.9	+59.9	137.4	11 57.7	+59.9	137.5	11 13.4	+60.0	137.6	10 29.0	+60.0	137.8	9 44.6	+59.9	137.9	9 00.0	+60.0	138.0	9
10	15 09.7	+59.8	136.9	14 25.8	+59.8	137.1	13 41.8	+59.9	137.3	12 57.6	+60.0	137.5	12 13.4	+59.9	137.6	11 29.0	+60.0	137.7	10 44.5	+60.0	137.9	10 00.0	+60.0	138.0	10
11	16 09.5	+59.8	136.9	15 25.6	+59.9	137.0	14 41.7	+59.9	137.2	13 57.6	+59.9	137.4	13 13.3	+60.0	137.6	12 29.0	+60.0	137.7	11 44.5	+60.0	137.9	11 00.0	+60.0	138.0	11
12	17 09.3	+59.8	136.8	16 25.5	+59.8	137.0	15 41.6	+59.8	137.2	14 57.5	+59.9	137.4	14 13.3	+59.9	137.5	13 29.0	+60.0	137.7	12 44.5	+60.0	137.9	12 00.0	+60.0	138.0	12
13	18 09.1	+59.7	136.7	17 25.3	+59.9	136.9	16 41.4	+59.9	137.1	15 57.4	+59.9	137.3	15 13.2	+60.0	137.5	14 29.0	+59.9	137.7	13 44.5	+60.0	137.8	13 00.0	+60.0	138.0	13
14	19 08.8	+59.8	136.6	18 25.2	+59.8	136.8	17 41.3	+59.9	137.0	16 57.3	+60.0	137.3	16 13.2	+60.0	137.5	15 28.9	+60.0	137.6	14 44.5	+60.0	137.8	14 00.0	+60.0	138.0	14
15	20 08.6	+59.8	136.5	19 25.0	+59.8	136.7	18 41.2	+59.9	137.0	17 57.3	+59.9	137.2	17 13.2	+59.9	137.4	16 28.9	+60.0	137.6	15 44.5	+60.0	137.8	15 00.0	+60.0	138.0	15
16	21 08.4	+59.7	136.4	20 24.8	+59.9	136.7	19 41.1	+59.9	136.9	18 57.2	+59.9	137.2	18 13.1	+60.0	137.4	17 28.9	+60.0	137.6	16 44.5	+60.0	137.8	16 00.0	+60.0	138.0	16
17	22 08.1	+59.8	136.3	21 24.7	+59.8	136.6	20 41.0	+59.9	136.8	19 57.1	+59.9	137.1	19 13.1	+59.9	137.3	18 28.9	+60.0	137.6	17 44.5	+60.0	137.8	17 00.0	+60.0	138.0	17
18	23 07.9	+59.8	136.2	22 24.5	+59.8	136.5	21 40.9	+59.8	136.8	20 57.0	+60.0	137.0	20 13.0	+60.0	137.3	19 28.9	+59.9	137.5	18 44.5	+60.0	137.8	18 00.0	+60.0	138.0	18
19	24 07.7	+59.7	136.1	23 24.3	+59.8	136.4	22 40.7	+59.9	136.7	21 57.0	+59.9	137.0	21 13.0	+60.0	137.3	20 28.8	+60.0	137.5	19 44.5	+60.0	137.8	19 00.0	+60.0	138.0	19
20	25 07.4	+59.8	136.0	24 24.1	+59.9	136.3	23 40.6	+59.9	136.6	22 56.9	+59.9	136.9	22 13.0	+59.9	137.2	21 28.8	+60.0	137.5	20 44.5	+60.0	137.8	20 00.0	+60.0	138.0	20
21	26 07.2	+59.7	135.9	25 24.0	+59.8	136.2	24 40.5	+59.9	136.6	23 56.8	+59.9	136.9	23 12.9	+60.0	137.2	22 28.8	+60.0	137.5	21 44.5	+60.0	137.7	21 00.0	+60.0	138.0	21
22	27 06.9	+59.8	135.8	26 23.8	+59.8	136.2	25 40.4	+59.9	136.5	24 56.7	+60.0	136.8	24 12.9	+59.9	137.1	23 28.8	+60.0	137.4	22 44.5	+60.0	137.7	22 00.0	+60.0	138.0	22
23	28 06.7	+59.7	135.7	27 23.6	+59.8	136.1	26 40.3	+59.8	136.4	25 56.7	+59.9	136.8	25 12.8	+60.0	137.1	24 28.8	+59.9	137.4	23 44.5	+60.0	137.7	23 00.0	+60.0	138.0	23
24	29 06.4	+59.8	135.6	28 23.4	+59.8	136.0	27 40.1	+59.9	136.4	26 56.6	+59.9	136.7	26 12.8	+59.9	137.1	25 28.7	+60.0	137.4	24 44.5	+60.0	137.7	24 00.0	+60.0	138.0	24
25	30 06.2	+59.7	135.5	29 23.2	+59.8	135.9	28 40.0	+59.9	136.3	27 56.5	+59.9	136.6	27 12.7	+60.0	137.0	26 28.7	+60.0	137.4	25 44.5	+60.0	137.7	25 00.0	+60.0	138.0	25
26	31 05.9	+59.7	135.4	30 23.0	+59.8	135.8	29 39.9	+59.8	136.2	28 56.4	+59.9	136.6	28 12.7	+59.9	137.0	27 28.7	+60.0	137.3	26 44.5	+60.0	137.7	26 00.0	+60.0	138.0	26
27	32 05.6	+59.7	135.3	31 22.8	+59.8	135.7	30 39.7	+59.9	136.1	29 56.3	+59.9	136.5	29 12.6	+60.0	136.9	28 28.7	+60.0	137.3	27 44.5	+60.0	137.7	27 00.0	+60.0	138.0	27
28	33 05.3	+59.7	135.2	32 22.6	+59.8	135.6	31 39.6	+59.8	136.0	30 56.2	+59.9	136.5	30 12.6	+59.9	136.9	29 28.7	+59.9	137.3	28 44.5	+60.0	137.6	28 00.0	+60.0	138.0	28
29	34 05.0	+59.7	135.0	33 22.4	+59.8	135.5	32 39.4	+59.9	136.0	31 56.1	+60.0	136.4	31 12.5	+60.0	136.8	30 28.6	+60.0	137.2	29 44.5	+60.0	137.6	29 00.0	+60.0	138.0	29
30	35 04.7	+59.7	134.9	34 22.2	+59.8	135.4	33 39.3	+59.8	135.9	32 56.1	+59.9	136.3	32 12.5	+59.9	136.8	31 28.6	+60.0	137.2	30 44.5	+59.9	137.6	30 00.0	+60.0	138.0	30
31	36 04.4	+59.7	134.8	35 22.0	+59.8	135.3	34 39.1	+59.9	135.8	33 56.0	+59.9	136.3	33 12.4	+60.0	136.7	32 28.6	+60.0	137.2	31 44.4	+60.0	137.6	31 00.0	+60.0	138.0	31
32	37 04.1	+59.7	134.7	36 21.8	+59.7	135.2	35 39.0	+59.8	135.7	34 55.9	+59.9	136.2	34 12.4	+59.9	136.7	33 28.6	+59.9	137.1	32 44.4	+60.0	137.6	32 00.0	+60.0	138.0	32
33	38 03.8	+59.7	134.5	37 21.5	+59.8	135.1	36 38.8	+59.9	135.6	35 55.8	+59.9	136.1	35 12.3	+60.0	136.6	34 28.5	+60.0	137.1	33 44.4	+60.0	137.6	33 00.0	+60.0	138.0	33
34	39 03.5	+59.6	134.4	38 21.3	+59.7	135.0	37 38.7	+59.8	135.5	36 55.7	+59.9	136.1	36 12.3	+59.9	136.6	35 28.5	+60.0	137.1	34 44.4	+60.0	137.5	34 00.0	+60.0	138.0	34
35	40 03.1	+59.7	134.3	39 21.0	+59.8	134.9	38 38.5	+59.8	135.4	37 55.6	+59.9	136.0	37 12.2	+60.0	136.5	36 28.5	+60.0	137.0	35 44.4	+60.0	137.5	35 00.0	+60.0	138.0	35
36	41 02.8	+59.6	134.1	40 20.8	+59.7	134.7	39 38.3	+59.9	135.3	38 55.5	+59.8	135.9	38 12.2	+59.9	136.5	37 28.5	+59.9	137.0	36 44.4	+60.0	137.5	36 00.0	+60.0	138.0	36
37	42 02.4	+59.7	134.0	41 20.5	+59.8	134.6	40 38.2	+59.8	135.2	39 55.3	+59.9	135.8	39 12.1	+59.9	136.4	38 28.4	+60.0	137.0	37 44.4	+60.0	137.5	37 00.0	+60.0	138.0	37
38	43 02.1	+59.6	133.8	42 20.3	+59.7	134.5	41 38.0	+59.8	135.1	40 55.2	+59.9	135.7	40 12.0	+60.0	136.3	39 28.4	+60.0	136.9	38 44.4	+60.0	137.5	38 00.0	+60.0	138.0	38
39	44 01.7	+59.6	133.7	43 20.0	+59.7	134.4	42 37.8	+59.8	135.0	41 55.1	+59.9	135.7	41 12.0	+59.9	136.3	40 28.4	+60.0	136.9	39 44.4	+60.0	137.4	39 00.0	+60.0	138.0	39
40	45 01.3	+59.6	133.5	44 19.7	+59.7	134.2	43 37.6	+59.8	134.9	42 55.0	+59.9	135.6	42 11.9	+59.9	136.2	41 28.4	+59.9	136.8	40 44.4	+60.0	137.4	40 00.0	+60.0	138.0	40
41	46 00.9	+59.6	133.4	45 19.4	+59.7	134.1	44 37.4	+59.8	134.8	43 54.9	+59.8	135.5	43 11.8	+60.0	136.2	42 28.3	+60.0	136.8	41 44.4	+60.0	137.4	41 00.0	+60.0	138.0	41
42	47 00.5	+59.5	133.2	46 19.1	+59.7	133.9	45 37.2	+59.8	134.7	44 54.7	+59.9	135.4	44 11.8	+59.9	136.1	43 28.3	+60.0	136.7	42 44.4	+60.0	137.4	42 00.0	+60.0	138.0	42
43	48 00.0	+59.6	133.0	47 18.8	+59.7	133.8	46 37.0	+59.8	134.6	45 54.6	+59.9	135.3	45 11.7	+59.9	136.0	44 28.3	+59.9	136.7	43 44.4	+60.0	137.4	43 00.0	+60.0	138.0	43
44	48 59.6	+59.5	132.8	48 18.5	+59.6	133.6	47 36.8	+59.7	134.4	46 54.5	+59.8	135.2	46 11.6	+59.9	135.9	45 28.2	+60.0	136.7	44 44.4	+60.0	137.3	44 00.0	+60.0	138.0	44
45	49 59.1	+59.5	132.6	49 18.1	+59.7	133.5	48 36.5	+59.8	134.3	47 54.3	+59.9	135.1	47 11.5	+60.0	135.9	46 28.2	+60.0	136.6	45 44.4	+59.9	137.3	45 00.0	+60.0	138.0	45
46	50 58.6	+59.5	132.4	50 17.8	+59.6	133.3	49 36.3	+59.8	134.2	48 54.2	+59.8	135.0	48 11.5	+59.9	135.8	47 28.2	+59.9	136.6	46 44.3	+60.0	137.3	46 00.0	+60.0	138.0	46
47	51 58.1	+59.4	132.2	51 17.4	+59.6	133.1	50 36.1	+59.7	134.0	49 54.0	+59.9	134.9	49 11.4	+59.9	135.7	48 28.1	+60.0	136.5	47 44.3	+60.0	137.3	47 00.0	+60.0	138.0	47
48	52 57.5	+59.5	132.0	52 17.0	+59.6	133.0	51 35.8	+59.7	133.9	50 53.9	+59.8	134.8	50 11.3	+59.9	135.6	49 28.1	+60.0	136.5	48 44.3	+60.0	137.2	48 00.0	+60.0	138.0	48
49	53 57.0	+59.4	131.8	53 16.6	+59.6	132.8	52 35.5	+59.7	133.7	51 53.7	+59.8	134.7	51 11.2	+59.9	135.5	50 28.1	+59.9	136.4	49 44.3	+60.0	137.2	49 00.0	+60.0	138.0	49
50	54 56.4	+59.4	131.5	54 16.2	+59.6	132.6	53 35.2	+59.7	133.6	52 53.5	+59.8	134.5	52 11.1	+59.9	135.5	51 28.0	+60.0	136.3	50 44.3	+60.0	137.2	50 00.0	+60.0	138.0	50
51	55 55.8	+59.3	131.3	55 15.8	+59.5	132.4	54 34.9	+59.7	133.4	53 53.3	+59.8	134.4	53 11.0	+59.9	135.4	52 28.0	+59.9	136.3	51 44.3	+60.0	137.2	51 00.0	+60.0	138.0	51
52	56 55.1	+59.3	131.0	56 15.3	+59.5	132.1	55 34.6	+59.7	133.2	54 53.1	+59.8	134.3	54 10.9	+59.9	135.3	53 27.9	+60.0	136.2	52 44.3	+60.0	137.1	52 00.0	+60.0	138.0	52
53	57 54.4	+59.3	130.7	57 14.8	+59.5	131.9	56 34.3	+59.7	133.0	55 52.9	+59.8	134.1	55 10.8	+59.9	135.2	54 27.9	+59.9	136.1	53 44.3	+60.0	137.1	53 00.0	+60.0	138.0	53
54	58 53.7	+59.2	130.4	58 14.3	+59.4	131.7	57 34.0	+59.6	132.8	56 52.7	+59.8	134.0	56 10.7	+59.8	135.0	55 27.8	+60.0	136.1	54 44.3	+59.9	137.1	54 00.0	+60.0	138.0	54
55	59 52.9	+59.2	130.1	59 13.7	+59.5	131.4	58 33.6	+59.6	132.6	57 52.5	+59.8	133.8	57 10.5	+59.9	134.9	56 27.8	+59.9	136.0	55 44.2	+60.0	137.0	55 00.0	+60.0	138.0	55
56	60 52.1	+59.1	129.8	60 13.2	+59.3	131.1	59 33.2	+59.6	132.4	58 52.3	+59.7	133.6	58 10.4	+59.9	134.8	57 27.7	+60.0	135.9	56 44.2	+60.0	137.0	56 00.0	+60.0	138.0	56
57	61 51.2	+59.1	129.4	61 12.5	+59.4	130.8	60 32.8	+59.6	132.2	59 52.0	+59.7	133.5	59 10.3	+59.8	134.7	58 27.7	+59.9	135.8	57 44.2	+60.0	136.9	57 00.0	+60.0	138.0	57
58	62 50.3	+59.0	129.0	62 11.9	+59.3	130.5	61 32.4	+59.5	131.9	60 51.7	+59.8	133.3	60 10.1	+59.9	134.5	59 27.6	+59.9	135.7	58 44.2	+60.0	136.9	58 00.0	+60.0	138.0	58
59	63 49.3	+58.9	128.6	63 11.2	+59.2	130.2	62 31.9	+59.5	131.7	61 51.5	+59.7	133.1	61 10.0	+59.8	134.4	60 27.5	+60.0	135.7	59 44.2	+60.0	136.9	59 00.0	+60.0	138.0	59
60	64 48.2	+58.9	128.2	64 10.4	+59.2	129.8	63 31.4	+59.5	131.4	62 51.2	+59.6	132.8	62 09.8	+59.8	134.2	61 27.5	+59.9	135.6	60 44.2	+60.0	136.8	60 00.0	+60.0	138.0	60
61	65 47.1	+58.7	127.7	65 09.6	+59.2	129.4	64 30.9	+59.4	131.1	63 50.8	+59.7	132.6	63 09.6	+59.9	134.1	62 27.4	+59.9	135.5	61 44.2	+59.9	136.8	61 00.0	+60.0	138.0	61
62	66 45.8	+58.7	127.2	66 08.8	+59.0	129.0	65 30.3	+59.4	130.7	64 50.5	+59.6	132.4	64 09.5	+59.8	133.9	63 27.3	+59.9	135.3	62 44.1	+60.0	136.7	62 00.0	+60.0	138.0	62
63	67 44.5	+58.5	126.7	67 07.8	+59.0	128.6	66 29.7	+59.3	130.4	65 50.1	+59.6	132.1	65 09.3	+59.7	133.7	64 27.2	+59.9	135.2	63 44.1	+60.0	136.6	63 00.0	+60.0	138.0	63
64	68 43.0	+58.4	126.1	68 06.8	+58.9	128.1	67 29.0	+59.3	130.0	66 49.7	+59.6	131.8	66 09.0	+59.8	133.5	65 27.1	+59.9	135.1	64 44.1	+60.0	136.6	64 00.0	+60.0	138.0	64
65	69 41.4	+58.2	125.4	69 05.7	+58.8	127.6	68 28.3	+59.2	129.6	67 49.3	+59.5	131.5	67 08.8	+59.8	133.3	66 27.0	+59.9	134.9	65 44.1	+59.9	136.5	65 00.0	+60.0	138.0	65
66	70 39.6	+58.1	124.7	70 04.5	+58.6	127.0	69 27.5	+59.1	129.1	68 48.8	+59.4	131.1	68 08.6	+59.7	133.0	67 26.9	+59.9	134.8	66 44.0	+60.0	136.4	66 00.0	+60.0	138.0	66
67	71 37.7	+57.8	124.0	71 03.1	+58.5	126.4	70 26.6	+59.0	128.6	69 48.2	+59.5	130.8	69 08.3	+59.7	132.8	68 26.8	+59.9	134.6	67 44.0	+60.0	136.4	67 00.0	+60.0	138.0	67
68	72 35.5	+57.6	123.1	72 01.6	+58.4	125.7	71 25.6	+59.0	128.1	70 47.7	+59.3	130.4	70 08.0	+59.6	132.5	69 26.7	+59.9	134.4	68 44.0	+60.0	136.3	68 00.0	+60.0	138.0	68
69	73 33.1	+57.3	122.1	73 00.0	+58.1	124.9	72 24.6	+58.8	127.5	71 47.0	+59.3	129.9	71 07.6	+59.7	132.2	70 26.6	+59.8	134.2	69 44.0	+59.9	136.2	69 00.0	+60.0	138.0	69
70	74 30.4	+57.0	121.0	73 58.1	+58.0	124.0	73 23.4	+58.6	126.8	72 46.3	+59.2	129.4	72 07.3	+59.5	131.8	71 26.4	+59.8	134.0	70 43.9	+60.0	136.1	70 00.0	+60.0	138.0	70
71	75 27.4	+56.5	119.8	74 56.1	+57.6	123.1	74 22.0	+58.5	126.1	73 45.5	+59.1	128.8	73 06.8	+59.6	131.4	72 26.2	+59.8	133.8	71 43.9	+59.9	136.0	71 00.0	+60.0	138.0	71
72	76 23.9	+56.0	118.4	75 53.7	+57.3	122.0	75 20.5	+58.3	125.2	74 44.6	+59.0	128.2	74 06.4	+59.5	131.0	73 26.0	+59.8	133.5	72 43.8	+60.0	135.9	72 00.0	+60.0	138.0	72
73	77 19.9	+55.3	116.9	76 51.0	+56.9	120.7	76 18.8	+58.0	124.2	75 43.6	+58.8	127.5	75 05.9	+59.4	130.5	74 25.8	+59.8	133.2	73 43.8	+59.9	135.7	73 00.0	+60.0	138.0	73
74	78 15.2	+54.6	115.0	77 47.9	+56.3	119.2	77 16.8	+57.7	123.1	76 42.4	+58.7	126.7	76 05.3	+59.3	129.9	75 25.6	+59.7	132.9	74 43.7	+60.0	135.6	74 00.0	+60.0	138.0	74
75	79 09.8	+53.5	112.9	78 44.2	+55.6	117.5	78 14.5	+57.2	121.8	77 41.1	+58.4	125.7	77 04.6	+59.2	129.3	76 25.3	+59.7	132.5	75 43.7	+59.9	135.4	75 00.0	+60.0	138.0	75
76	80 03.3	+52.1	110.4	79 39.8	+54.8	115.5	79 11.7	+56.8	120.3	78 39.5	+58.1	124.6	78 03.8	+59.0	128.5	77 25.0	+59.6	132.0	76 43.6	+59.9	135.2	76 00.0	+60.0	138.0	76
77	80 55.4	+50.4•	107.4	80 34.6	+53.6	113.2	80 08.5	+56.0	118.5	79 37.6	+57.8	123.3	79 02.8	+58.9	127.6	78 24.6	+59.6	131.5	77 43.5	+59.9	134.9	77 00.0	+60.0	138.0	77
78	81 45.8	+48.1•	103.8	81 28.2	+52.1	110.3	81 04.5	+55.1	116.3	80 35.4	+57.2	121.7	80 01.7	+58.6	126.5	79 24.2	+59.4	130.8	78 43.4	+59.9	134.6	78 00.0	+60.0	138.0	78
79	82 33.9	+44.8•	99.4	82 20.3	+49.9•	106.7	81 59.6	+53.7	113.6	81 32.6	+56.5	119.8	81 00.3	+58.3	125.2	80 23.6	+59.4	130.1	79 43.3	+59.9	134.3	79 00.0	+60.0	138.0	79
80	83 18.7	+40.4•	94.0	83 10.2	+46.8•	102.3	82 53.3	+51.9•	110.2	82 29.1	+55.5	117.3	81 58.6	+57.8	123.6	81 23.0	+59.1	129.2	80 43.2	+59.8	133.9	80 00.0	+60.0	138.0	80
81	83 59.1	+34.3•	87.3	83 57.0	+42.4•	96.7	83 45.2	+49.1•	105.9	83 24.6	+53.9	114.2	82 56.4	+57.1	121.6	82 22.1	+59.0	128.0	81 43.0	+59.8	133.4	81 00.0	+60.0	138.0	81
82	84 33.4	+26.2•	79.0	84 39.4	+36.0•	89.6	84 34.3	+44.8•	100.2	84 18.5	+51.6•	110.1	83 53.5	+56.1	118.9	83 21.1	+58.5	126.5	82 42.8	+59.7	132.8	82 00.0	+60.0	138.0	82
83	84 59.6	+15.8•	69.1	85 15.4	+27.0•	80.5	85 19.1	+38.1•	92.6	85 10.1	+47.6•	104.5	84 49.6	+54.2•	115.3	84 19.6	+58.0	124.4	83 42.5	+59.6	131.9	83 00.0	+60.0	138.0	83
84	85 15.4	+3.7•	57.8	85 42.4	+14.8•	69.1	85 57.2	+28.0•	82.4	85 57.7	+41.0•	96.6	85 43.8	+51.0•	110.0	85 17.6	+56.8	121.5	84 42.1	+59.4	130.8	84 00.0	+60.0	138.0	84
85	85 19.1	−9.0•	45.6	85 57.2	+0.5•	55.7	86 25.2	+13.5•	69.1	86 38.7	+29.4•	85.2	86 34.8	+44.7•	102.1	86 14.4	+54.8•	117.2	85 41.5	+59.0	129.1	85 00.0	+60.0	138.0	85
86	85 10.1	−20.5•	33.7	85 57.7	−13.9•	41.5	86 38.7	−3.9•	52.9	87 08.1	+11.4•	69.0	87 19.5	+31.5•	89.5	87 09.2	+49.6•	110.0	86 40.5	+58.3	126.4	86 00.0	+60.0	138.0	86
87	84 49.6	−30.0•	22.9	85 43.8	−26.2•	28.1	86 34.8	−20.4•	35.9	87 19.5	−10.3•	48.6	87 51.0	+7.8•	69.0	87 58.8	+35.2•	96.5	87 38.8	+55.8•	121.5	87 00.0	+60.0	138.0	87
88	84 19.6	−37.1•	13.7	85 17.6	−35.5•	16.5	86 14.4	−32.9•	20.9	87 09.2	−28.7•	28.0	87 58.8	−20.0•	41.5	88 34.0	+0.6•	69.0	88 34.6	+42.4•	110.0	88 00.0	+60.0	138.0	88
89	83 42.5	−42.5•	6.1	84 42.1	−42.1•	7.3	85 41.5	−41.5•	8.9	86 40.5	−40.5•	11.6	87 38.8	−38.8•	16.5	88 34.6	−34.6•	28.0	89 17.0	−17.0•	69.0	89 00.0	+60.0	138.0	89
90	83 00.0	−46.3•	0.0	84 00.0	−46.6•	0.0	85 00.0	−46.9•	0.0	86 00.0	−47.4•	0.0	87 00.0	−48.1•	0.0	88 00.0	−49.4•	0.0	89 00.0	−52.0•	0.0	90 00.0	−60.0	69.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 42°, 318°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 11.8	−59.8	137.8	4 27.3	−59.8	137.8	3 42.8	−59.9	137.9	2 58.3	−59.9	137.9	2 13.7	−59.9	138.0	1 29.2	−60.0	138.0	0 44.6	−60.0	138.0	0 00.0	+60.0	42.0	**0**
1	4 12.0	−59.8	137.9	3 27.5	−59.9	137.9	2 42.9	−59.9	137.9	1 58.4	−60.0	138.0	1 13.8	−60.0	138.0	0 29.2	−60.0	138.0	0 15.4	+60.0	42.0	1 00.0	+60.0	42.0	**1**
2	3 12.2	−59.8	138.0	2 27.6	−59.8	138.0	1 43.0	−59.9	138.0	0 58.4	−59.9	138.0	0 13.8	−60.0	138.0	0 30.8	+60.0	42.0	1 15.4	+60.0	42.0	2 00.0	+60.0	42.0	**2**
3	2 12.4	−59.8	138.0	1 27.8	−59.9	138.1	0 43.1	−59.9	138.1	0 01.5	+59.9	41.9	0 46.2	+59.9	41.9	1 30.8	+60.0	41.9	2 15.4	+60.0	42.0	3 00.0	+60.0	42.0	**3**
4	1 12.6	−59.8	138.1	0 27.9	−59.9	138.1	0 16.8	+59.9	41.9	1 01.4	+60.0	41.9	1 46.1	+60.0	41.9	2 30.8	+59.9	41.9	3 15.4	+60.0	42.0	4 00.0	+60.0	42.0	**4**
5	0 12.8	−59.8	138.2	0 32.0	+59.8	41.8	1 16.7	+59.9	41.8	2 01.4	+59.9	41.8	2 46.1	+59.9	41.9	3 30.7	+60.0	41.9	4 15.4	+60.0	41.9	5 00.0	+60.0	42.0	**5**
6	0 47.0	+59.8	41.7	1 31.8	+59.9	41.7	2 16.6	+59.9	41.8	3 01.3	+60.0	41.8	3 46.0	+60.0	41.8	4 30.7	+60.0	41.9	5 15.4	+60.0	41.9	6 00.0	+60.0	42.0	**6**
7	1 46.8	+59.8	41.6	2 31.7	+59.8	41.7	3 16.5	+59.9	41.7	4 01.3	+59.9	41.7	4 46.0	+60.0	41.8	5 30.7	+60.0	41.9	6 15.4	+60.0	41.9	7 00.0	+60.0	42.0	**7**
8	2 46.6	+59.8	41.6	3 31.5	+59.9	41.6	4 16.4	+59.9	41.6	5 01.2	+59.9	41.7	5 46.0	+59.9	41.8	6 30.7	+60.0	41.8	7 15.4	+60.0	41.9	8 00.0	+60.0	42.0	**8**
9	3 46.4	+59.8	41.5	4 31.4	+59.8	41.5	5 16.3	+59.9	41.6	6 01.1	+60.0	41.6	6 45.9	+60.0	41.7	7 30.7	+60.0	41.8	8 15.4	+60.0	41.9	9 00.0	+60.0	42.0	**9**
10	4 46.2	+59.8	41.4	5 31.2	+59.9	41.5	6 16.2	+59.9	41.5	7 01.1	+59.9	41.6	7 45.9	+60.0	41.7	8 30.7	+59.9	41.8	9 15.4	+60.0	41.9	10 00.0	+60.0	42.0	**10**
11	5 46.0	+59.8	41.3	6 31.1	+59.8	41.4	7 16.1	+59.9	41.5	8 01.0	+59.9	41.6	8 45.9	+59.9	41.7	9 30.6	+60.0	41.8	10 15.4	+60.0	41.9	11 00.0	+60.0	42.0	**11**
12	6 45.8	+59.8	41.2	7 30.9	+59.9	41.3	8 16.0	+59.8	41.4	9 00.9	+60.0	41.5	9 45.8	+60.0	41.6	10 30.6	+60.0	41.7	11 15.4	+60.0	41.9	12 00.0	+60.0	42.0	**12**
13	7 45.6	+59.8	41.1	8 30.8	+59.8	41.2	9 15.8	+59.9	41.3	10 00.9	+59.9	41.5	10 45.8	+59.9	41.6	11 30.6	+60.0	41.7	12 15.4	+60.0	41.9	13 00.0	+60.0	42.0	**13**
14	8 45.4	+59.8	41.1	9 30.6	+59.9	41.2	10 15.7	+59.9	41.3	11 00.8	+59.9	41.4	11 45.7	+60.0	41.5	12 30.6	+60.0	41.7	13 15.4	+59.9	41.8	14 00.0	+60.0	42.0	**14**
15	9 45.2	+59.8	41.0	10 30.5	+59.8	41.1	11 15.6	+59.9	41.2	12 00.7	+59.9	41.4	12 45.7	+60.0	41.5	13 30.6	+60.0	41.7	14 15.3	+60.0	41.8	15 00.0	+60.0	42.0	**15**
16	10 45.0	+59.8	40.9	11 30.3	+59.9	41.0	12 15.5	+59.9	41.2	13 00.6	+60.0	41.3	13 45.7	+59.9	41.5	14 30.6	+59.9	41.6	15 15.3	+60.0	41.8	16 00.0	+60.0	42.0	**16**
17	11 44.8	+59.8	40.8	12 30.2	+59.8	41.0	13 15.4	+59.9	41.1	14 00.6	+59.9	41.3	14 45.6	+60.0	41.4	15 30.5	+60.0	41.6	16 15.3	+60.0	41.8	17 00.0	+60.0	42.0	**17**
18	12 44.6	+59.8	40.7	13 30.0	+59.8	40.9	14 15.3	+59.9	41.0	15 00.5	+59.9	41.2	15 45.6	+59.9	41.4	16 30.5	+60.0	41.6	17 15.3	+60.0	41.8	18 00.0	+60.0	42.0	**18**
19	13 44.4	+59.8	40.6	14 29.8	+59.9	40.8	15 15.2	+59.9	41.0	16 00.4	+60.0	41.2	16 45.5	+60.0	41.4	17 30.5	+60.0	41.6	18 15.3	+60.0	41.8	19 00.0	+60.0	42.0	**19**
20	14 44.2	+59.7	40.6	15 29.7	+59.8	40.7	16 15.1	+59.9	40.9	17 00.4	+59.9	41.1	17 45.5	+60.0	41.3	18 30.5	+60.0	41.5	19 15.3	+60.0	41.8	20 00.0	+60.0	42.0	**20**
21	15 43.9	+59.8	40.5	16 29.5	+59.9	40.7	17 15.0	+59.9	40.9	18 00.3	+59.9	41.1	18 45.5	+59.9	41.3	19 30.5	+60.0	41.5	20 15.3	+60.0	41.7	21 00.0	+60.0	42.0	**21**
22	16 43.7	+59.8	40.4	17 29.4	+59.8	40.6	18 14.9	+59.9	40.8	19 00.2	+59.9	41.0	19 45.4	+60.0	41.2	20 30.5	+59.9	41.5	21 15.3	+60.0	41.7	22 00.0	+60.0	42.0	**22**
23	17 43.5	+59.8	40.3	18 29.2	+59.8	40.5	19 14.8	+59.8	40.7	20 00.1	+60.0	41.0	20 45.4	+59.9	41.2	21 30.4	+60.0	41.5	22 15.3	+60.0	41.7	23 00.0	+60.0	42.0	**23**
24	18 43.3	+59.8	40.2	19 29.0	+59.9	40.4	20 14.6	+59.9	40.7	21 00.1	+59.9	40.9	21 45.3	+60.0	41.2	22 30.4	+60.0	41.4	23 15.3	+60.0	41.7	24 00.0	+60.0	42.0	**24**
25	19 43.1	+59.7	40.1	20 28.9	+59.8	40.3	21 14.5	+59.9	40.6	22 00.0	+59.9	40.8	22 45.3	+60.0	41.1	23 30.4	+60.0	41.4	24 15.3	+60.0	41.7	25 00.0	+60.0	42.0	**25**
26	20 42.8	+59.8	40.0	21 28.7	+59.8	40.3	22 14.4	+59.9	40.5	22 59.9	+59.9	40.8	23 45.3	+59.9	41.1	24 30.4	+60.0	41.4	25 15.3	+60.0	41.7	26 00.0	+60.0	42.0	**26**
27	21 42.6	+59.8	39.9	22 28.5	+59.9	40.2	23 14.3	+59.9	40.5	23 59.8	+60.0	40.7	24 45.2	+60.0	41.0	25 30.4	+59.9	41.3	26 15.3	+60.0	41.7	27 00.0	+60.0	42.0	**27**
28	22 42.4	+59.7	39.8	23 28.4	+59.8	40.1	24 14.2	+59.8	40.4	24 59.8	+59.9	40.7	25 45.2	+59.9	41.0	26 30.3	+60.0	41.3	27 15.3	+60.0	41.7	28 00.0	+60.0	42.0	**28**
29	23 42.1	+59.8	39.7	24 28.2	+59.8	40.0	25 14.0	+59.9	40.3	25 59.7	+59.9	40.6	26 45.1	+60.0	40.9	27 30.3	+60.0	41.3	28 15.3	+60.0	41.6	29 00.0	+60.0	42.0	**29**
30	24 41.9	+59.8	39.6	25 28.0	+59.8	39.9	26 13.9	+59.9	40.2	26 59.6	+59.9	40.6	27 45.1	+59.9	40.9	28 30.3	+60.0	41.3	29 15.3	+60.0	41.6	30 00.0	+60.0	42.0	**30**
31	25 41.7	+59.7	39.5	26 27.8	+59.8	39.8	27 13.8	+59.9	40.2	27 59.5	+59.9	40.5	28 45.0	+60.0	40.9	29 30.3	+60.0	41.2	30 15.3	+60.0	41.6	31 00.0	+60.0	42.0	**31**
32	26 41.4	+59.8	39.4	27 27.6	+59.9	39.8	28 13.7	+59.8	40.1	28 59.4	+60.0	40.4	29 45.0	+59.9	40.8	30 30.3	+59.9	41.2	31 15.3	+60.0	41.6	32 00.0	+60.0	42.0	**32**
33	27 41.2	+59.7	39.3	28 27.5	+59.8	39.7	29 13.5	+59.9	40.0	29 59.4	+59.9	40.4	30 44.9	+60.0	40.8	31 30.2	+60.0	41.2	32 15.3	+60.0	41.6	33 00.0	+60.0	42.0	**33**
34	28 40.9	+59.7	39.2	29 27.3	+59.8	39.6	30 13.4	+59.8	39.9	30 59.3	+59.9	40.3	31 44.9	+59.9	40.7	32 30.2	+60.0	41.1	33 15.3	+59.9	41.6	34 00.0	+60.0	42.0	**34**
35	29 40.6	+59.8	39.1	30 27.1	+59.8	39.5	31 13.2	+59.9	39.9	31 59.2	+59.9	40.3	32 44.8	+60.0	40.7	33 30.2	+60.0	41.1	34 15.2	+60.0	41.5	35 00.0	+60.0	42.0	**35**
36	30 40.4	+59.7	39.0	31 26.9	+59.8	39.4	32 13.1	+59.9	39.8	32 59.1	+59.9	40.2	33 44.8	+59.9	40.6	34 30.2	+59.9	41.1	35 15.2	+60.0	41.5	36 00.0	+60.0	42.0	**36**
37	31 40.1	+59.7	38.9	32 26.7	+59.8	39.3	33 13.0	+59.8	39.7	33 59.0	+59.9	40.1	34 44.7	+60.0	40.6	35 30.1	+60.0	41.0	36 15.2	+60.0	41.5	37 00.0	+60.0	42.0	**37**
38	32 39.8	+59.7	38.8	33 26.5	+59.7	39.2	34 12.8	+59.9	39.6	34 58.9	+59.9	40.1	35 44.7	+59.9	40.5	36 30.1	+60.0	41.0	37 15.2	+60.0	41.5	38 00.0	+60.0	42.0	**38**
39	33 39.5	+59.7	38.7	34 26.2	+59.8	39.1	35 12.7	+59.8	39.5	35 58.8	+59.9	40.0	36 44.6	+59.9	40.5	37 30.1	+60.0	41.0	38 15.2	+60.0	41.5	39 00.0	+60.0	42.0	**39**
40	34 39.2	+59.7	38.5	35 26.0	+59.8	39.0	36 12.5	+59.9	39.4	36 58.7	+59.9	39.9	37 44.5	+60.0	40.4	38 30.1	+59.9	40.9	39 15.2	+60.0	41.4	40 00.0	+60.0	42.0	**40**
41	35 38.9	+59.7	38.4	36 25.8	+59.8	38.9	37 12.4	+59.8	39.3	37 58.6	+59.9	39.8	38 44.5	+59.9	40.3	39 30.0	+60.0	40.9	40 15.2	+60.0	41.4	41 00.0	+60.0	42.0	**41**
42	36 38.6	+59.7	38.3	37 25.6	+59.7	38.8	38 12.2	+59.8	39.3	38 58.5	+59.9	39.8	39 44.4	+60.0	40.3	40 30.0	+60.0	40.8	41 15.2	+60.0	41.4	42 00.0	+60.0	42.0	**42**
43	37 38.3	+59.7	38.2	38 25.3	+59.8	38.7	39 12.0	+59.8	39.2	39 58.4	+59.9	39.7	40 44.4	+59.9	40.2	41 30.0	+59.9	40.8	42 15.2	+60.0	41.4	43 00.0	+60.0	42.0	**43**
44	38 38.0	+59.7	38.0	39 25.1	+59.7	38.5	40 11.8	+59.9	39.1	40 58.3	+59.8	39.6	41 44.3	+59.9	40.2	42 29.9	+60.0	40.8	43 15.2	+60.0	41.4	44 00.0	+60.0	42.0	**44**
45	39 37.7	+59.6	37.9	40 24.8	+59.8	38.4	41 11.7	+59.8	39.0	41 58.1	+59.9	39.5	42 44.2	+60.0	40.1	43 29.9	+60.0	40.7	44 15.2	+60.0	41.3	45 00.0	+60.0	42.0	**45**
46	40 37.3	+59.7	37.8	41 24.6	+59.7	38.3	42 11.5	+59.8	38.9	42 58.0	+59.9	39.4	43 44.2	+59.9	40.0	44 29.9	+60.0	40.7	45 15.2	+60.0	41.3	46 00.0	+60.0	42.0	**46**
47	41 37.0	+59.6	37.6	42 24.3	+59.7	38.2	43 11.3	+59.8	38.7	43 57.9	+59.9	39.3	44 44.1	+59.9	40.0	45 29.9	+59.9	40.6	46 15.2	+60.0	41.3	47 00.0	+60.0	42.0	**47**
48	42 36.6	+59.6	37.5	43 24.0	+59.8	38.0	44 11.1	+59.8	38.6	44 57.8	+59.8	39.3	45 44.0	+59.9	39.9	46 29.8	+60.0	40.6	47 15.2	+59.9	41.3	48 00.0	+60.0	42.0	**48**
49	43 36.2	+59.6	37.3	44 23.8	+59.7	37.9	45 10.9	+59.8	38.5	45 57.6	+59.9	39.2	46 43.9	+60.0	39.8	47 29.8	+59.9	40.5	48 15.1	+60.0	41.2	49 00.0	+60.0	42.0	**49**
50	44 35.8	+59.6	37.2	45 23.5	+59.7	37.8	46 10.7	+59.8	38.4	46 57.5	+59.9	39.1	47 43.9	+59.9	39.8	48 29.7	+60.0	40.5	49 15.1	+60.0	41.2	50 00.0	+60.0	42.0	**50**
51	45 35.4	+59.6	37.0	46 23.2	+59.6	37.6	47 10.5	+59.7	38.3	47 57.4	+59.8	39.0	48 43.8	+59.9	39.7	49 29.7	+60.0	40.4	50 15.1	+60.0	41.2	51 00.0	+60.0	42.0	**51**
52	46 35.0	+59.6	36.8	47 22.8	+59.7	37.5	48 10.2	+59.8	38.1	48 57.2	+59.8	38.9	49 43.7	+59.9	39.6	50 29.7	+59.9	40.4	51 15.1	+60.0	41.2	52 00.0	+60.0	42.0	**52**
53	47 34.6	+59.5	36.7	48 22.5	+59.7	37.3	49 10.0	+59.8	38.0	49 57.0	+59.9	38.7	50 43.6	+59.9	39.5	51 29.6	+60.0	40.3	52 15.1	+60.0	41.1	53 00.0	+60.0	42.0	**53**
54	48 34.1	+59.6	36.5	49 22.2	+59.6	37.2	50 09.8	+59.7	37.9	50 56.9	+59.8	38.6	51 43.5	+59.9	39.4	52 29.6	+59.9	40.2	53 15.1	+60.0	41.1	54 00.0	+60.0	42.0	**54**
55	49 33.7	+59.5	36.3	50 21.8	+59.7	37.0	51 09.5	+59.7	37.7	51 56.7	+59.8	38.5	52 43.4	+59.9	39.3	53 29.5	+60.0	40.2	54 15.1	+60.0	41.1	55 00.0	+60.0	42.0	**55**
56	50 33.2	+59.5	36.1	51 21.5	+59.6	36.8	52 09.2	+59.8	37.6	52 56.5	+59.9	38.4	53 43.3	+59.9	39.2	54 29.5	+59.9	40.1	55 15.1	+60.0	41.0	56 00.0	+60.0	42.0	**56**
57	51 32.7	+59.5	35.9	52 21.1	+59.6	36.6	53 09.0	+59.7	37.4	53 56.4	+59.8	38.3	54 43.2	+59.9	39.1	55 29.4	+60.0	40.0	56 15.1	+59.9	41.0	57 00.0	+60.0	42.0	**57**
58	52 32.2	+59.4	35.7	53 20.7	+59.5	36.4	54 08.7	+59.7	37.3	54 56.2	+59.8	38.1	55 43.1	+59.9	39.0	56 29.4	+59.9	40.0	57 15.0	+60.0	41.0	58 00.0	+60.0	42.0	**58**
59	53 31.6	+59.4	35.4	54 20.2	+59.6	36.2	55 08.4	+59.7	37.1	55 56.0	+59.7	38.0	56 43.0	+59.8	38.9	57 29.3	+60.0	39.9	58 15.0	+60.0	40.9	59 00.0	+60.0	42.0	**59**
60	54 31.0	+59.4	35.2	55 19.8	+59.5	36.0	56 08.1	+59.6	36.9	56 55.7	+59.8	37.8	57 42.8	+59.9	38.8	58 29.3	+59.9	39.8	59 15.0	+60.0	40.9	60 00.0	+60.0	42.0	**60**
61	55 30.4	+59.4	34.9	56 19.3	+59.5	35.8	57 07.7	+59.7	36.7	57 55.5	+59.8	37.7	58 42.7	+59.9	38.7	59 29.2	+59.9	39.7	60 15.0	+60.0	40.8	61 00.0	+60.0	42.0	**61**
62	56 29.8	+59.3	34.7	57 18.8	+59.5	35.6	58 07.4	+59.6	36.5	58 55.3	+59.7	37.5	59 42.6	+59.8	38.5	60 29.1	+60.0	39.6	61 15.0	+60.0	40.8	62 00.0	+60.0	42.0	**62**
63	57 29.1	+59.3	34.4	58 18.3	+59.5	35.3	59 07.0	+59.6	36.3	59 55.0	+59.8	37.3	60 42.4	+59.9	38.4	61 29.1	+59.9	39.5	62 15.0	+59.9	40.7	63 00.0	+60.0	42.0	**63**
64	58 28.4	+59.2	34.1	59 17.8	+59.4	35.1	60 06.6	+59.6	36.1	60 54.8	+59.7	37.1	61 42.3	+59.8	38.2	62 29.0	+59.9	39.4	63 14.9	+60.0	40.7	64 00.0	+60.0	42.0	**64**
65	59 27.6	+59.2	33.8	60 17.2	+59.4	34.8	61 06.2	+59.5	35.8	61 54.5	+59.7	36.9	62 42.1	+59.8	38.1	63 28.9	+59.9	39.3	64 14.9	+60.0	40.6	65 00.0	+60.0	42.0	**65**
66	60 26.8	+59.2	33.5	61 16.6	+59.3	34.5	62 05.7	+59.5	35.6	62 54.2	+59.6	36.7	63 41.9	+59.8	37.9	64 28.8	+59.9	39.2	65 14.9	+60.0	40.5	66 00.0	+60.0	42.0	**66**
67	61 26.0	+59.1	33.1	62 15.9	+59.3	34.2	63 05.2	+59.5	35.3	63 53.8	+59.7	36.5	64 41.7	+59.8	37.7	65 28.7	+60.0	39.0	66 14.9	+60.0	40.5	67 00.0	+60.0	42.0	**67**
68	62 25.1	+59.0	32.8	63 15.2	+59.2	33.8	64 04.7	+59.4	35.0	64 53.5	+59.6	36.2	65 41.5	+59.8	37.5	66 28.7	+59.8	38.9	67 14.9	+59.9	40.4	68 00.0	+60.0	42.0	**68**
69	63 24.1	+58.9	32.4	64 14.4	+59.2	33.5	65 04.1	+59.4	34.7	65 53.1	+59.6	35.9	66 41.3	+59.7	37.3	67 28.5	+59.9	38.8	68 14.8	+60.0	40.3	69 00.0	+60.0	42.0	**69**
70	64 23.0	+58.9	32.0	65 13.6	+59.2	33.1	66 03.5	+59.4	34.3	66 52.7	+59.6	35.6	67 41.0	+59.8	37.1	68 28.4	+59.9	38.6	69 14.8	+60.0	40.2	70 00.0	+60.0	42.0	**70**
71	65 21.9	+58.8	31.5	66 12.8	+59.0	32.7	67 02.9	+59.3	34.0	67 52.3	+59.5	35.3	68 40.8	+59.7	36.8	69 28.3	+59.9	38.4	70 14.8	+59.9	40.1	71 00.0	+60.0	42.0	**71**
72	66 20.7	+58.7	31.0	67 11.8	+59.0	32.2	68 02.2	+59.2	33.6	68 51.8	+59.4	35.0	69 40.5	+59.6	36.5	70 28.2	+59.8	38.2	71 14.7	+60.0	40.0	72 00.0	+60.0	42.0	**72**
73	67 19.4	+58.6	30.5	68 10.8	+58.9	31.8	69 01.4	+59.2	33.1	69 51.2	+59.5	34.6	70 40.1	+59.7	36.2	71 28.0	+59.8	38.0	72 14.7	+59.9	39.9	73 00.0	+60.0	42.0	**73**
74	68 18.0	+58.5	29.9	69 09.7	+58.7	31.2	70 00.6	+59.1	32.7	70 50.7	+59.3	34.2	71 39.8	+59.6	35.9	72 27.8	+59.8	37.7	73 14.6	+60.0	39.8	74 00.0	+60.0	42.0	**74**
75	69 16.5	+58.3	29.3	70 08.4	+58.7	30.7	70 59.7	+58.9	32.1	71 50.0	+59.3	33.7	72 39.4	+59.6	35.5	73 27.6	+59.8	37.5	74 14.6	+59.9	39.6	75 00.0	+60.0	42.0	**75**
76	70 14.8	+58.1	28.6	71 07.1	+58.5	30.0	71 58.6	+58.9	31.5	72 49.3	+59.2	33.2	73 39.0	+59.5	35.1	74 27.4	+59.8	37.2	75 14.5	+60.0	39.5	76 00.0	+60.0	42.0	**76**
77	71 12.9	+57.9	27.9	72 05.6	+58.3	29.3	72 57.5	+58.7	30.9	73 48.5	+59.1	32.7	74 38.5	+59.4	34.6	75 27.2	+59.7	36.8	76 14.5	+59.9	39.3	77 00.0	+60.0	42.0	**77**
78	72 10.8	+57.8	27.0	73 03.9	+58.2	28.5	73 56.2	+58.6	30.2	74 47.6	+59.0	32.0	75 37.9	+59.4	34.1	76 26.9	+59.7	36.4	77 14.4	+59.9	39.0	78 00.0	+60.0	42.0	**78**
79	73 08.6	+57.4	26.1	74 02.1	+57.9	27.7	74 54.8	+58.4	29.4	75 46.6	+58.8	31.3	76 37.3	+59.2	33.5	77 26.6	+59.6	36.0	78 14.3	+59.9	38.8	79 00.0	+60.0	42.0	**79**
80	74 06.0	+57.1	25.1	75 00.0	+57.6	26.7	75 53.2	+58.1	28.5	76 45.4	+58.7	30.5	77 36.5	+59.1	32.8	78 26.2	+59.6	35.4	79 14.2	+59.8	38.5	80 00.0	+60.0	42.0	**80**
81	75 03.1	+56.7	23.9	75 57.6	+57.3	25.6	76 51.3	+57.8	27.4	77 44.1	+58.4	29.5	78 35.6	+59.0	32.0	79 25.8	+59.4	34.8	80 14.0	+59.9	38.1	81 00.0	+60.0	42.0	**81**
82	75 59.8	+56.2	22.6	76 54.9	+56.8	24.3	77 49.1	+57.5	26.2	78 42.5	+58.1	28.4	79 34.6	+58.8	31.0	80 25.2	+59.4	34.0	81 13.9	+59.8	37.7	82 00.0	+60.0	42.0	**82**
83	76 56.0	+55.7	21.1	77 51.7	+56.3	22.8	78 46.6	+57.0	24.8	79 40.6	+57.7	27.1	80 33.4	+58.4	29.8	81 24.6	+59.1	33.1	82 13.7	+59.7	37.1	83 00.0	+60.0	42.0	**83**
84	77 51.7	+54.9	19.4	78 48.0	+55.6	21.1	79 43.6	+56.3	23.1	80 38.3	+57.2	25.5	81 31.8	+58.1	28.4	82 23.7	+58.9	31.9	83 13.4	+59.7	36.4	84 00.0	+60.0	42.0	**84**
85	78 46.6	+54.0	17.4	79 43.6	+54.7	19.1	80 39.9	+55.6	21.1	81 35.5	+56.4	23.5	82 29.9	+57.4	26.5	83 22.6	+58.6	30.4	84 13.1	+59.5	35.4	85 00.0	+60.0	42.0	**85**
86	79 40.6	+52.8	15.1	80 38.3	+53.5	16.7	81 35.5	+54.4	18.6	82 31.9	+55.4	21.0	83 27.3	+56.6	24.2	84 21.2	+57.9	28.3	85 12.6	+59.3	34.0	86 00.0	+60.0	42.0	**86**
87	80 33.4	+51.2	12.3	81 31.8	+51.9	13.8	82 29.9	+52.7	15.6	83 27.3	*+53.9* •	17.9	84 23.9	+55.2	21.0	85 19.1	+56.8	25.4	86 11.9	+58.7	31.9	87 00.0	+60.0	42.0	**87**
88	81 24.6	*+49.1* •	9.0	82 23.7	*+49.7* •	10.2	83 22.6	*+50.5* •	11.7	84 21.2	*+51.4* •	13.7	85 19.1	*+52.8* •	16.6	86 15.9	*+54.7* •	21.0	87 10.6	*+57.4* •	28.3	88 00.0	+60.0	42.0	**88**
89	82 13.7	*+46.3* •	5.0	83 13.4	*+46.6* •	5.7	84 13.1	*+46.9* •	6.7	85 12.6	*+47.4* •	8.0	86 11.9	*+48.1* •	10.1	87 10.6	*+49.4* •	13.7	88 08.0	*+52.0* •	21.0	89 00.0	+60.0	42.0	**89**
90	83 00.0	*+42.5* •	0.0	84 00.0	*+42.1* •	0.0	85 00.0	*+41.5* •	0.0	86 00.0	*+40.5* •	0.0	87 00.0	*+38.8* •	0.0	88 00.0	*+34.6* •	0.0	89 00.0	*+17.0* •	0.0	90 00.0	−60.0	21.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 138°, 222°

43°, 317° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 06.8	+59.8	136.8	4 23.1	+59.8	136.8	3 39.3	+59.9	136.9	2 55.5	+59.9	136.9	2 11.6	+60.0	137.0	1 27.8	+59.9	137.0	0 43.9	+60.0	137.0	0 00.0	+60.0	137.0	**0**
1	6 06.6	+59.8	136.7	5 22.9	+59.9	136.8	4 39.2	+59.9	136.8	3 55.4	+59.9	136.9	3 11.6	+59.9	136.9	2 27.7	+60.0	137.0	1 43.9	+60.0	137.0	1 00.0	+60.0	137.0	**1**
2	7 06.4	+59.8	136.6	6 22.8	+59.8	136.7	5 39.1	+59.9	136.8	4 55.3	+60.0	136.8	4 11.5	+60.0	136.9	3 27.7	+60.0	136.9	2 43.9	+60.0	137.0	2 00.0	+60.0	137.0	**2**
3	8 06.2	+59.8	136.5	7 22.6	+59.8	136.6	6 39.0	+59.8	136.7	5 55.3	+59.9	136.8	5 11.5	+60.0	136.9	4 27.7	+60.0	136.9	3 43.9	+60.0	137.0	3 00.0	+60.0	137.0	**3**
4	9 06.0	+59.8	136.4	8 22.4	+59.9	136.6	7 38.8	+59.9	136.7	6 55.2	+59.9	136.7	6 11.5	+59.9	136.8	5 27.7	+60.0	136.9	4 43.9	+60.0	136.9	4 00.0	+60.0	137.0	**4**
5	10 05.8	+59.7	136.4	9 22.3	+59.8	136.5	8 38.7	+59.9	136.6	7 55.1	+59.9	136.7	7 11.4	+60.0	136.8	6 27.7	+60.0	136.9	5 43.9	+60.0	136.9	5 00.0	+60.0	137.0	**5**
6	11 05.5	+59.8	136.3	10 22.1	+59.9	136.4	9 38.6	+59.9	136.5	8 55.0	+60.0	136.6	8 11.4	+59.9	136.7	7 27.7	+59.9	136.8	6 43.9	+60.0	136.9	6 00.0	+60.0	137.0	**6**
7	12 05.3	+59.8	136.2	11 22.0	+59.8	136.3	10 38.5	+59.9	136.5	9 55.0	+59.9	136.6	9 11.3	+60.0	136.7	8 27.6	+60.0	136.8	7 43.9	+59.9	136.9	7 00.0	+60.0	137.0	**7**
8	13 05.1	+59.8	136.1	12 21.8	+59.9	136.3	11 38.4	+59.9	136.4	10 54.9	+59.9	136.5	10 11.3	+60.0	136.7	9 27.6	+60.0	136.8	8 43.8	+60.0	136.9	8 00.0	+60.0	137.0	**8**
9	14 04.9	+59.8	136.0	13 21.7	+59.8	136.2	12 38.3	+59.9	136.3	11 54.8	+60.0	136.5	11 11.3	+59.9	136.6	10 27.6	+60.0	136.8	9 43.8	+60.0	136.9	9 00.0	+60.0	137.0	**9**
10	15 04.7	+59.7	135.9	14 21.5	+59.8	136.1	13 38.2	+59.9	136.3	12 54.8	+59.9	136.4	12 11.2	+60.0	136.6	11 27.6	+60.0	136.7	10 43.8	+60.0	136.9	10 00.0	+60.0	137.0	**10**
11	16 04.4	+59.8	135.8	15 21.3	+59.9	136.0	14 38.1	+59.9	136.2	13 54.7	+59.9	136.4	13 11.2	+59.9	136.6	12 27.6	+59.9	136.7	11 43.8	+60.0	136.9	11 00.0	+60.0	137.0	**11**
12	17 04.2	+59.8	135.7	16 21.2	+59.8	136.0	15 38.0	+59.8	136.2	14 54.6	+59.9	136.3	14 11.1	+60.0	136.5	13 27.5	+60.0	136.7	12 43.8	+60.0	136.9	12 00.0	+60.0	137.0	**12**
13	18 04.0	+59.8	135.7	17 21.0	+59.8	135.9	16 37.8	+59.9	136.1	15 54.5	+60.0	136.3	15 11.1	+60.0	136.5	14 27.5	+60.0	136.7	13 43.8	+60.0	136.8	13 00.0	+60.0	137.0	**13**
14	19 03.8	+59.7	135.6	18 20.8	+59.9	135.8	17 37.7	+59.9	136.0	16 54.5	+59.9	136.2	16 11.1	+59.9	136.4	15 27.5	+60.0	136.6	14 43.8	+60.0	136.8	14 00.0	+60.0	137.0	**14**
15	20 03.5	+59.8	135.5	19 20.7	+59.8	135.7	18 37.6	+59.9	136.0	17 54.4	+59.9	136.2	17 11.0	+60.0	136.4	16 27.5	+60.0	136.6	15 43.8	+60.0	136.8	15 00.0	+60.0	137.0	**15**
16	21 03.3	+59.7	135.4	20 20.5	+59.8	135.6	19 37.5	+59.9	135.9	18 54.3	+59.9	136.1	18 11.0	+59.9	136.4	17 27.5	+60.0	136.6	16 43.8	+60.0	136.8	16 00.0	+60.0	137.0	**16**
17	22 03.0	+59.8	135.3	21 20.3	+59.8	135.6	20 37.4	+59.9	135.8	19 54.2	+60.0	136.1	19 10.9	+60.0	136.3	18 27.5	+59.9	136.6	17 43.8	+60.0	136.8	17 00.0	+60.0	137.0	**17**
18	23 02.8	+59.8	135.2	22 20.1	+59.9	135.5	21 37.3	+59.8	135.8	20 54.2	+59.9	136.0	20 10.9	+60.0	136.3	19 27.4	+60.0	136.5	18 43.8	+60.0	136.8	18 00.0	+60.0	137.0	**18**
19	24 02.6	+59.7	135.1	23 20.0	+59.8	135.4	22 37.1	+59.9	135.7	21 54.1	+59.9	136.0	21 10.9	+59.9	136.2	20 27.4	+60.0	136.5	19 43.8	+60.0	136.8	19 00.0	+60.0	137.0	**19**
20	25 02.3	+59.7	135.0	24 19.8	+59.8	135.3	23 37.0	+59.9	135.6	22 54.0	+59.9	135.9	22 10.8	+60.0	136.2	21 27.4	+60.0	136.5	20 43.8	+60.0	136.7	20 00.0	+60.0	137.0	**20**
21	26 02.0	+59.8	134.9	25 19.6	+59.8	135.2	24 36.9	+59.8	135.5	23 53.9	+59.9	135.9	23 10.8	+59.9	136.2	22 27.4	+60.0	136.5	21 43.8	+60.0	136.7	21 00.0	+60.0	137.0	**21**
22	27 01.8	+59.7	134.8	26 19.4	+59.8	135.1	25 36.7	+59.9	135.5	24 53.8	+60.0	135.8	24 10.7	+60.0	136.1	23 27.4	+59.9	136.4	22 43.8	+60.0	136.7	22 00.0	+60.0	137.0	**22**
23	28 01.5	+59.8	134.7	27 19.2	+59.8	135.0	26 36.6	+59.9	135.4	25 53.8	+59.9	135.7	25 10.7	+59.9	136.1	24 27.3	+60.0	136.4	23 43.8	+60.0	136.7	23 00.0	+60.0	137.0	**23**
24	29 01.3	+59.7	134.6	28 19.0	+59.8	134.9	27 36.5	+59.8	135.3	26 53.7	+59.9	135.7	26 10.6	+60.0	136.0	25 27.3	+60.0	136.4	24 43.8	+60.0	136.7	24 00.0	+60.0	137.0	**24**
25	30 01.0	+59.7	134.5	29 18.8	+59.8	134.9	28 36.3	+59.9	135.2	27 53.6	+59.9	135.6	27 10.6	+59.9	136.0	26 27.3	+60.0	136.3	25 43.8	+60.0	136.7	25 00.0	+60.0	137.0	**25**
26	31 00.7	+59.7	134.3	30 18.6	+59.8	134.8	29 36.2	+59.9	135.2	28 53.5	+59.9	135.6	28 10.5	+60.0	135.9	27 27.3	+60.0	136.3	26 43.8	+60.0	136.7	26 00.0	+60.0	137.0	**26**
27	32 00.4	+59.7	134.2	31 18.4	+59.8	134.7	30 36.1	+59.8	135.1	29 53.4	+59.9	135.5	29 10.5	+59.9	135.9	28 27.3	+59.9	136.3	27 43.8	+59.9	136.6	27 00.0	+60.0	137.0	**27**
28	33 00.1	+59.7	134.1	32 18.2	+59.8	134.6	31 35.9	+59.9	135.0	30 53.3	+59.9	135.4	30 10.4	+60.0	135.8	29 27.2	+60.0	136.2	28 43.7	+60.0	136.6	28 00.0	+60.0	137.0	**28**
29	33 59.8	+59.7	134.0	33 18.0	+59.8	134.5	32 35.8	+59.8	134.9	31 53.2	+59.9	135.4	31 10.4	+59.9	135.8	30 27.2	+60.0	136.2	29 43.7	+60.0	136.6	29 00.0	+60.0	137.0	**29**
30	34 59.5	+59.7	133.9	34 17.8	+59.7	134.4	33 35.6	+59.9	134.8	32 53.1	+59.9	135.3	32 10.3	+60.0	135.8	31 27.2	+60.0	136.2	30 43.7	+60.0	136.6	30 00.0	+60.0	137.0	**30**
31	35 59.2	+59.7	133.7	35 17.5	+59.8	134.3	34 35.5	+59.8	134.8	33 53.0	+59.9	135.2	33 10.3	+59.9	135.7	32 27.2	+59.9	136.1	31 43.7	+60.0	136.6	31 00.0	+60.0	137.0	**31**
32	36 58.9	+59.7	133.6	36 17.3	+59.8	134.1	35 35.3	+59.8	134.7	34 52.9	+59.9	135.2	34 10.2	+60.0	135.6	33 27.1	+60.0	136.1	32 43.7	+60.0	136.6	32 00.0	+60.0	137.0	**32**
33	37 58.6	+59.6	133.5	37 17.1	+59.7	134.0	36 35.1	+59.9	134.6	35 52.8	+59.9	135.1	35 10.2	+59.9	135.6	34 27.1	+60.0	136.1	33 43.7	+60.0	136.5	33 00.0	+60.0	137.0	**33**
34	38 58.2	+59.7	133.3	38 16.8	+59.8	133.9	37 35.0	+59.8	134.5	36 52.7	+59.9	135.0	36 10.1	+59.9	135.5	35 27.1	+60.0	136.0	34 43.7	+60.0	136.5	34 00.0	+60.0	137.0	**34**
35	39 57.9	+59.6	133.2	39 16.6	+59.7	133.8	38 34.8	+59.8	134.4	37 52.6	+59.9	134.9	37 10.0	+60.0	135.5	36 27.1	+59.9	136.0	35 43.7	+60.0	136.5	35 00.0	+60.0	137.0	**35**
36	40 57.5	+59.6	133.1	40 16.3	+59.7	133.7	39 34.6	+59.8	134.3	38 52.5	+59.9	134.9	38 10.0	+59.9	135.4	37 27.0	+60.0	136.0	36 43.7	+60.0	136.5	36 00.0	+60.0	137.0	**36**
37	41 57.1	+59.7	132.9	41 16.0	+59.8	133.6	40 34.4	+59.9	134.2	39 52.4	+59.9	134.8	39 09.9	+59.9	135.4	38 27.0	+60.0	135.9	37 43.7	+60.0	136.5	37 00.0	+60.0	137.0	**37**
38	42 56.8	+59.6	132.8	42 15.8	+59.7	133.4	41 34.3	+59.8	134.1	40 52.3	+59.9	134.7	40 09.8	+60.0	135.3	39 27.0	+59.9	135.9	38 43.7	+60.0	136.5	38 00.0	+60.0	137.0	**38**
39	43 56.4	+59.6	132.6	43 15.5	+59.7	133.3	42 34.1	+59.8	134.0	41 52.2	+59.8	134.6	41 09.8	+59.9	135.2	40 26.9	+60.0	135.9	39 43.7	+60.0	136.4	39 00.0	+60.0	137.0	**39**
40	44 56.0	+59.5	132.4	44 15.2	+59.7	133.2	43 33.9	+59.8	133.9	42 52.0	+59.9	134.5	42 09.7	+59.9	135.2	41 26.9	+60.0	135.8	40 43.7	+60.0	136.4	40 00.0	+60.0	137.0	**40**
41	45 55.5	+59.6	132.3	45 14.9	+59.7	133.0	44 33.7	+59.8	133.7	43 51.9	+59.9	134.4	43 09.6	+60.0	135.1	42 26.9	+60.0	135.8	41 43.7	+60.0	136.4	41 00.0	+60.0	137.0	**41**
42	46 55.1	+59.5	132.1	46 14.6	+59.6	132.9	45 33.5	+59.7	133.6	44 51.8	+59.8	134.4	44 09.6	+59.9	135.1	43 26.9	+59.9	135.7	42 43.7	+60.0	136.4	42 00.0	+60.0	137.0	**42**
43	47 54.6	+59.6	131.9	47 14.2	+59.7	132.7	46 33.2	+59.8	133.5	45 51.6	+59.9	134.3	45 09.5	+59.9	135.0	44 26.8	+60.0	135.7	43 43.7	+59.9	136.4	43 00.0	+60.0	137.0	**43**
44	48 54.2	+59.5	131.7	48 13.9	+59.6	132.6	47 33.0	+59.8	133.4	46 51.5	+59.8	134.2	46 09.4	+59.9	134.9	45 26.8	+60.0	135.6	44 43.6	+60.0	136.3	44 00.0	+60.0	137.0	**44**
45	49 53.7	+59.5	131.5	49 13.5	+59.7	132.4	48 32.8	+59.7	133.2	47 51.3	+59.9	134.1	47 09.3	+60.0	134.8	46 26.8	+59.9	135.6	45 43.6	+60.0	136.3	45 00.0	+60.0	137.0	**45**
46	50 53.2	+59.4	131.3	50 13.2	+59.6	132.2	49 32.5	+59.8	133.1	48 51.2	+59.8	133.9	48 09.3	+59.9	134.8	47 26.7	+60.0	135.5	46 43.6	+60.0	136.3	46 00.0	+60.0	137.0	**46**
47	51 52.6	+59.5	131.1	51 12.8	+59.6	132.1	50 32.3	+59.7	133.0	49 51.0	+59.9	133.8	49 09.2	+59.9	134.7	48 26.7	+59.9	135.5	47 43.6	+60.0	136.3	47 00.0	+60.0	137.0	**47**
48	52 52.1	+59.4	130.9	52 12.4	+59.6	131.9	51 32.0	+59.7	132.8	50 50.9	+59.8	133.7	50 09.1	+59.9	134.6	49 26.6	+60.0	135.4	48 43.6	+60.0	136.2	48 00.0	+60.0	137.0	**48**
49	53 51.5	+59.4	130.7	53 12.0	+59.6	131.7	52 31.7	+59.7	132.7	51 50.7	+59.8	133.6	51 09.0	+59.9	134.5	50 26.6	+60.0	135.4	49 43.6	+60.0	136.2	49 00.0	+60.0	137.0	**49**
50	54 50.9	+59.3	130.4	54 11.6	+59.5	131.5	53 31.4	+59.7	132.5	52 50.5	+59.8	133.5	52 08.9	+59.9	134.4	51 26.6	+59.9	135.3	50 43.6	+60.0	136.2	50 00.0	+60.0	137.0	**50**
51	55 50.2	+59.3	130.2	55 11.1	+59.5	131.3	54 31.1	+59.7	132.3	53 50.3	+59.8	133.3	53 08.8	+59.9	134.3	52 26.5	+60.0	135.2	51 43.6	+60.0	136.1	51 00.0	+60.0	137.0	**51**
52	56 49.5	+59.3	129.9	56 10.6	+59.5	131.0	55 30.8	+59.6	132.1	54 50.1	+59.8	133.2	54 08.7	+59.9	134.2	53 26.5	+59.9	135.2	52 43.6	+60.0	136.1	52 00.0	+60.0	137.0	**52**
53	57 48.8	+59.3	129.6	57 10.1	+59.5	130.8	56 30.4	+59.7	131.9	55 49.9	+59.8	133.0	55 08.6	+59.8	134.1	54 26.4	+60.0	135.1	53 43.6	+59.9	136.1	53 00.0	+60.0	137.0	**53**
54	58 48.1	+59.2	129.3	58 09.6	+59.4	130.5	57 30.1	+59.6	131.7	56 49.7	+59.8	132.9	56 08.4	+59.9	134.0	55 26.4	+59.9	135.0	54 43.5	+60.0	136.0	54 00.0	+60.0	137.0	**54**
55	59 47.3	+59.1	129.0	59 09.0	+59.4	130.3	58 29.7	+59.6	131.5	57 49.5	+59.7	132.7	57 08.3	+59.9	133.9	56 26.3	+60.0	135.0	55 43.5	+60.0	136.0	55 00.0	+60.0	137.0	**55**
56	60 46.4	+59.1	128.6	60 08.4	+59.4	130.0	59 29.3	+59.6	131.3	58 49.2	+59.7	132.6	58 08.2	+59.8	133.7	57 26.3	+59.9	134.9	56 43.5	+60.0	136.0	56 00.0	+60.0	137.0	**56**
57	61 45.5	+59.1	128.3	61 07.8	+59.3	129.7	60 28.9	+59.5	131.1	59 48.9	+59.8	132.4	59 08.0	+59.9	133.6	58 26.2	+59.9	134.8	57 43.5	+60.0	135.9	57 00.0	+60.0	137.0	**57**
58	62 44.6	+58.9	127.9	62 07.1	+59.3	129.4	61 28.4	+59.5	130.8	60 48.7	+59.7	132.2	60 07.9	+59.8	133.5	59 26.1	+60.0	134.7	58 43.5	+60.0	135.9	58 00.0	+60.0	137.0	**58**
59	63 43.5	+58.9	127.5	63 06.4	+59.2	129.1	62 27.9	+59.5	130.6	61 48.4	+59.7	132.0	61 07.7	+59.9	133.3	60 26.1	+59.9	134.6	59 43.5	+59.9	135.8	59 00.0	+60.0	137.0	**59**
60	64 42.4	+58.8	127.0	64 05.6	+59.1	128.7	63 27.4	+59.5	130.3	62 48.1	+59.6	131.8	62 07.6	+59.8	133.2	61 26.0	+59.9	134.5	60 43.4	+60.0	135.8	60 00.0	+60.0	137.0	**60**
61	65 41.2	+58.7	126.6	65 04.7	+59.2	128.3	64 26.9	+59.4	130.0	63 47.7	+59.7	131.5	63 07.4	+59.8	133.0	62 25.9	+59.9	134.4	61 43.4	+60.0	135.7	61 00.0	+60.0	137.0	**61**
62	66 39.9	+58.7	126.1	66 03.9	+59.0	127.9	65 26.3	+59.3	129.6	64 47.4	+59.6	131.3	64 07.2	+59.8	132.8	63 25.8	+59.9	134.3	62 43.4	+60.0	135.7	62 00.0	+60.0	137.0	**62**
63	67 38.6	+58.4	125.5	67 02.9	+58.9	127.4	66 25.6	+59.3	129.3	65 47.0	+59.5	131.0	65 07.0	+59.7	132.6	64 25.7	+59.9	134.2	63 43.4	+60.0	135.6	63 00.0	+60.0	137.0	**63**
64	68 37.0	+58.4	124.9	68 01.8	+58.9	127.0	67 24.9	+59.3	128.9	66 46.5	+59.6	130.7	66 06.7	+59.8	132.4	65 25.6	+59.9	134.0	64 43.4	+59.9	135.6	64 00.0	+60.0	137.0	**64**
65	69 35.4	+58.2	124.3	69 00.7	+58.7	126.4	68 24.2	+59.2	128.5	67 46.1	+59.5	130.4	67 06.5	+59.7	132.2	66 25.5	+59.9	133.9	65 43.3	+60.0	135.5	65 00.0	+60.0	137.0	**65**
66	70 33.6	+58.0	123.5	69 59.4	+58.6	125.8	69 23.4	+59.1	128.0	68 45.6	+59.4	130.0	68 06.2	+59.7	131.9	67 25.4	+59.9	133.7	66 43.3	+60.0	135.4	66 00.0	+60.0	137.0	**66**
67	71 31.6	+57.8	122.8	70 58.0	+58.5	125.2	70 22.5	+59.0	127.5	69 45.0	+59.5	129.7	69 05.9	+59.7	131.7	68 25.3	+59.9	133.6	67 43.3	+60.0	135.3	67 00.0	+60.0	137.0	**67**
68	72 29.4	+57.5	121.9	71 56.5	+58.3	124.5	71 21.5	+58.9	126.9	70 44.5	+59.3	129.2	70 05.6	+59.7	131.4	69 25.2	+59.8	133.4	68 43.3	+59.9	135.3	68 00.0	+60.0	137.0	**68**
69	73 26.9	+57.2	120.9	72 54.8	+58.1	123.7	72 20.4	+58.7	126.3	71 43.8	+59.3	128.8	71 05.3	+59.6	131.1	70 25.0	+59.9	133.2	69 43.2	+60.0	135.2	69 00.0	+60.0	137.0	**69**
70	74 24.1	+56.9	119.8	73 52.9	+57.9	122.8	73 19.1	+58.7	125.6	72 43.1	+59.1	128.3	72 04.9	+59.6	130.7	71 24.9	+59.8	133.0	70 43.2	+59.9	135.1	70 00.0	+60.0	137.0	**70**
71	75 21.0	+56.4	118.6	74 50.8	+57.5	121.9	74 17.8	+58.4	124.9	73 42.2	+59.1	127.7	73 04.5	+59.5	130.3	72 24.7	+59.8	132.7	71 43.1	+60.0	134.9	71 00.0	+60.0	137.0	**71**
72	76 17.4	+55.9	117.2	75 48.3	+57.3	120.7	75 16.2	+58.2	124.0	74 41.3	+59.0	127.1	74 04.0	+59.4	129.9	73 24.5	+59.8	132.4	72 43.1	+59.9	134.8	72 00.0	+60.0	137.0	**72**
73	77 13.3	+55.3	115.6	76 45.6	+56.8	119.5	76 14.4	+58.0	123.0	75 40.3	+58.8	126.3	75 03.4	+59.4	129.3	74 24.3	+59.7	132.1	73 43.0	+60.0	134.7	73 00.0	+60.0	137.0	**73**
74	78 08.6	+54.4	113.8	77 42.4	+56.2	118.0	77 12.4	+57.6	121.9	76 39.1	+58.6	125.5	76 02.8	+59.3	128.8	75 24.0	+59.7	131.8	74 43.0	+59.9	134.5	74 00.0	+60.0	137.0	**74**
75	79 03.0	+53.4	111.7	78 38.6	+55.6	116.3	78 10.0	+57.2	120.6	77 37.7	+58.4	124.5	77 02.1	+59.2	128.1	76 23.7	+59.7	131.4	75 42.9	+60.0	134.3	75 00.0	+60.0	137.0	**75**
76	79 56.4	+52.0	109.2	79 34.2	+54.6	114.3	79 07.2	+56.6	119.1	78 36.1	+58.0	123.4	78 01.3	+59.0	127.3	77 23.4	+59.6	130.9	76 42.9	+59.9	134.1	76 00.0	+60.0	137.0	**76**
77	80 48.4	*+50.3*	•106.2	80 28.8	+53.5	111.9	80 03.8	+56.0	117.2	79 34.1	+57.7	122.1	79 00.3	+58.9	126.4	78 23.0	+59.6	130.4	77 42.8	+59.9	133.9	77 00.0	+60.0	137.0	**77**
78	81 38.7	*+47.9*	•102.6	81 22.3	+52.0	109.1	80 59.8	+54.9	115.0	80 31.8	+57.1	120.5	79 59.2	+58.5	125.4	79 22.6	+59.4	129.7	78 42.7	+59.8	133.6	78 00.0	+60.0	137.0	**78**
79	82 26.6	*+44.8*	• 98.3	82 14.3	*+49.7*	•105.5	81 54.7	+53.7	112.3	81 28.9	+56.5	118.5	80 57.7	+58.3	124.1	80 22.0	+59.3	129.0	79 42.5	+59.9	133.2	79 00.0	+60.0	137.0	**79**
80	83 11.4	*+40.4*	• 92.9	83 04.0	*+46.7*	•101.2	82 48.4	*+51.7*	•109.0	82 25.4	+55.3	116.1	81 56.0	+57.7	122.4	81 21.3	+59.2	128.0	80 42.4	+59.8	132.8	80 00.0	+60.0	137.0	**80**
81	83 51.8	*+34.5*	• 86.3	83 50.7	*+42.4*	• 95.6	83 40.1	*+49.0*	•104.7	83 20.7	+53.9	113.0	82 53.7	+57.1	120.4	82 20.5	+58.9	126.8	81 42.2	+59.8	132.3	81 00.0	+60.0	137.0	**81**
82	84 26.3	*+26.5*	• 78.3	84 33.1	*+36.1*	• 88.6	84 29.1	*+44.7*	• 99.0	84 14.6	*+51.4*	•108.9	83 50.8	+55.9	117.7	83 19.4	+58.5	125.3	82 42.0	+59.7	131.7	82 00.0	+60.0	137.0	**82**
83	84 52.8	*+16.4*	• 68.6	85 09.2	*+27.3*	• 79.7	85 13.8	*+38.3*	• 91.6	85 06.0	*+47.6*	•103.3	84 46.7	*+54.1*	•114.0	84 17.9	+57.9	123.2	83 41.7	+59.6	130.8	83 00.0	+60.0	137.0	**83**
84	85 09.2	*+4.6*	• 57.6	85 36.5	*+15.6*	• 68.6	85 52.1	*+28.2*	• 81.6	85 53.6	*+40.9*	• 95.5	85 40.8	*+50.9*	•108.8	85 15.8	+56.8	120.3	84 41.3	+59.3	129.6	84 00.0	+60.0	137.0	**84**
85	85 13.8	*−7.8*	• 45.6	85 52.1	*+1.5*	• 55.6	86 20.3	*+14.2*	• 68.6	86 34.5	*+29.7*	• 84.3	86 31.7	*+44.6*	•101.0	86 12.6	*+54.6*	•116.0	85 40.6	+59.1	127.9	85 00.0	+60.0	137.0	**85**
86	85 06.0	*−19.3*	• 33.8	85 53.6	*−12.8*	• 41.6	86 34.5	*−2.8*	• 52.8	87 04.2	*+12.1*	• 68.5	87 16.3	*+31.8*	• 88.5	87 07.2	*+49.5*	•108.8	86 39.7	+58.2	125.2	86 00.0	+60.0	137.0	**86**
87	84 46.7	*−28.8*	• 23.1	85 40.8	*−25.0*	• 28.3	86 31.7	*−19.1*	• 36.1	87 16.3	*−9.1*	• 48.6	87 48.1	*+8.6*	• 68.5	87 56.7	*+35.4*	• 95.4	87 37.9	*+55.7*	•120.3	87 00.0	+60.0	137.0	**87**
88	84 17.9	*−36.2*	• 13.9	85 15.8	*−34.5*	• 16.8	86 12.6	*−32.0*	• 21.1	87 07.2	*−27.5*	• 28.3	87 56.7	*−18.8*	• 41.6	88 32.1	*+1.5*	• 68.5	88 33.6	*+42.4*	•108.7	88 00.0	+60.0	137.0	**88**
89	83 41.7	*−41.7*	• 6.2	84 41.3	*−41.3*	• 7.4	85 40.6	*−40.6*	• 9.1	86 39.7	*−39.7*	• 11.8	87 37.9	*−37.9*	• 16.7	88 33.6	*−33.6*	• 28.3	89 16.0	*−16.0*	• 68.5	89 00.0	+60.0	137.0	**89**
90	83 00.0	*−45.7*	• 0.0	84 00.0	*−45.9*	• 0.0	85 00.0	*−46.3*	• 0.0	86 00.0	*−46.8*	• 0.0	87 00.0	*−47.6*	• 0.0	88 00.0	*−48.9*	• 0.0	89 00.0	*−51.6*	• 0.0	90 00.0	−60.0	68.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 43°, 317°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 06.8	−59.8	136.8	4 23.1	−59.9	136.8	3 39.3	−59.9	136.9	2 55.5	−60.0	136.9	2 11.6	−59.9	137.0	1 27.8	−60.0	137.0	0 43.9	−60.0	137.0	0 00.0	+60.0	43.0	0
1	4 07.0	−59.8	136.9	3 23.2	−59.8	136.9	2 39.4	−59.9	137.0	1 55.5	−59.9	137.0	1 11.7	−60.0	137.0	0 27.8	−60.0	137.0	0 16.1	+60.0	43.0	1 00.0	+60.0	43.0	1
2	3 07.2	−59.8	137.0	2 23.4	−59.9	137.0	1 39.5	−59.9	137.0	0 55.6	−59.9	137.0	0 11.7	−60.0	137.0	0 32.2	+60.0	43.0	1 16.1	+60.0	43.0	2 00.0	+60.0	43.0	2
3	2 07.4	−59.8	137.0	1 23.5	−59.8	137.1	0 39.6	−59.9	137.1	0 04.3	+60.0	42.9	0 48.3	+59.9	42.9	1 32.2	+60.0	42.9	2 16.1	+60.0	43.0	3 00.0	+60.0	43.0	3
4	1 07.6	−59.7	137.1	0 23.7	−59.9	137.1	0 20.3	+59.9	42.9	1 04.3	+59.9	42.9	1 48.2	+60.0	42.9	2 32.2	+60.0	42.9	3 16.1	+60.0	43.0	4 00.0	+60.0	43.0	4
5	0 07.9	−59.8	137.2	0 36.2	+59.8	42.8	1 20.2	+59.9	42.8	2 04.2	+59.9	42.8	2 48.2	+60.0	42.9	3 32.2	+59.9	42.9	4 16.1	+60.0	42.9	5 00.0	+60.0	43.0	5
6	0 51.9	+59.8	42.7	1 36.0	+59.9	42.7	2 20.1	+59.9	42.8	3 04.1	+60.0	42.8	3 48.2	+59.9	42.8	4 32.1	+60.0	42.9	5 16.1	+60.0	42.9	6 00.0	+60.0	43.0	6
7	1 51.7	+59.8	42.6	2 35.9	+59.8	42.7	3 20.0	+59.9	42.7	4 04.1	+59.9	42.7	4 48.1	+60.0	42.8	5 32.1	+60.0	42.9	6 16.1	+60.0	42.9	7 00.0	+60.0	43.0	7
8	2 51.5	+59.8	42.5	3 35.7	+59.9	42.6	4 19.9	+59.9	42.6	5 04.0	+59.9	42.7	5 48.1	+59.9	42.8	6 32.1	+60.0	42.8	7 16.1	+60.0	42.9	8 00.0	+60.0	43.0	8
9	3 51.3	+59.8	42.5	4 35.6	+59.8	42.5	5 19.8	+59.9	42.6	6 03.9	+60.0	42.6	6 48.0	+60.0	42.7	7 32.1	+60.0	42.8	8 16.1	+60.0	42.9	9 00.0	+60.0	43.0	9
10	4 51.1	+59.8	42.4	5 35.4	+59.9	42.4	6 19.7	+59.9	42.5	7 03.9	+59.9	42.6	7 48.0	+60.0	42.7	8 32.1	+60.0	42.8	9 16.1	+60.0	42.9	10 00.0	+60.0	43.0	10
11	5 50.9	+59.8	42.3	6 35.3	+59.8	42.4	7 19.6	+59.8	42.5	8 03.8	+59.9	42.5	8 48.0	+59.9	42.6	9 32.1	+59.9	42.8	10 16.1	+60.0	42.9	11 00.0	+60.0	43.0	11
12	6 50.7	+59.8	42.2	7 35.1	+59.8	42.3	8 19.4	+59.9	42.4	9 03.7	+60.0	42.5	9 47.9	+60.0	42.6	10 32.0	+60.0	42.7	11 16.1	+60.0	42.9	12 00.0	+60.0	43.0	12
13	7 50.5	+59.8	42.1	8 34.9	+59.9	42.2	9 19.3	+59.9	42.3	10 03.7	+59.9	42.4	10 47.9	+59.9	42.6	11 32.0	+60.0	42.7	12 16.1	+60.0	42.8	13 00.0	+60.0	43.0	13
14	8 50.3	+59.8	42.0	9 34.8	+59.8	42.2	10 19.2	+59.9	42.3	11 03.6	+59.9	42.4	11 47.8	+60.0	42.5	12 32.0	+60.0	42.7	13 16.1	+60.0	42.8	14 00.0	+60.0	43.0	14
15	9 50.1	+59.7	42.0	10 34.6	+59.9	42.1	11 19.1	+59.9	42.2	12 03.5	+59.9	42.3	12 47.8	+60.0	42.5	13 32.0	+60.0	42.7	14 16.1	+60.0	42.8	15 00.0	+60.0	43.0	15
16	10 49.8	+59.8	41.9	11 34.5	+59.8	42.0	12 19.0	+59.9	42.1	13 03.4	+60.0	42.3	13 47.8	+59.9	42.5	14 32.0	+60.0	42.6	15 16.1	+59.9	42.8	16 00.0	+60.0	43.0	16
17	11 49.6	+59.8	41.8	12 34.3	+59.8	41.9	13 18.9	+59.9	42.1	14 03.4	+59.9	42.2	14 47.7	+60.0	42.4	15 32.0	+59.9	42.6	16 16.0	+60.0	42.8	17 00.0	+60.0	43.0	17
18	12 49.4	+59.8	41.7	13 34.1	+59.9	41.9	14 18.8	+59.9	42.0	15 03.3	+59.9	42.2	15 47.7	+59.9	42.4	16 31.9	+60.0	42.6	17 16.0	+60.0	42.8	18 00.0	+60.0	43.0	18
19	13 49.2	+59.8	41.6	14 34.0	+59.8	41.8	15 18.7	+59.9	42.0	16 03.2	+59.9	42.1	16 47.6	+60.0	42.3	17 31.9	+60.0	42.6	18 16.0	+60.0	42.8	19 00.0	+60.0	43.0	19
20	14 49.0	+59.7	41.5	15 33.8	+59.9	41.7	16 18.6	+59.8	41.9	17 03.1	+60.0	42.1	17 47.6	+60.0	42.3	18 31.9	+60.0	42.5	19 16.0	+60.0	42.8	20 00.0	+60.0	43.0	20
21	15 48.7	+59.8	41.4	16 33.7	+59.8	41.6	17 18.4	+59.9	41.8	18 03.1	+59.9	42.0	18 47.6	+59.9	42.3	19 31.9	+60.0	42.5	20 16.0	+60.0	42.7	21 00.0	+60.0	43.0	21
22	16 48.5	+59.8	41.3	17 33.5	+59.8	41.5	18 18.3	+59.9	41.8	19 03.0	+59.9	42.0	19 47.5	+60.0	42.2	20 31.9	+59.9	42.5	21 16.0	+60.0	42.7	22 00.0	+60.0	43.0	22
23	17 48.3	+59.8	41.3	18 33.3	+59.8	41.5	19 18.2	+59.9	41.7	20 02.9	+59.9	41.9	20 47.5	+59.9	42.2	21 31.8	+60.0	42.4	22 16.0	+60.0	42.7	23 00.0	+60.0	43.0	23
24	18 48.1	+59.7	41.2	19 33.1	+59.9	41.4	20 18.1	+59.9	41.6	21 02.8	+60.0	41.9	21 47.4	+60.0	42.1	22 31.8	+60.0	42.4	23 16.0	+60.0	42.7	24 00.0	+60.0	43.0	24
25	19 47.8	+59.8	41.1	20 33.0	+59.8	41.3	21 18.0	+59.8	41.6	22 02.8	+59.9	41.8	22 47.4	+59.9	42.1	23 31.8	+60.0	42.4	24 16.0	+60.0	42.7	25 00.0	+60.0	43.0	25
26	20 47.6	+59.7	41.0	21 32.8	+59.8	41.2	22 17.8	+59.9	41.5	23 02.7	+59.9	41.8	23 47.3	+60.0	42.1	24 31.8	+60.0	42.4	25 16.0	+60.0	42.7	26 00.0	+60.0	43.0	26
27	21 47.3	+59.8	40.9	22 32.6	+59.8	41.1	23 17.7	+59.9	41.4	24 02.6	+59.9	41.7	24 47.3	+59.9	42.0	25 31.8	+59.9	42.3	26 16.0	+60.0	42.7	27 00.0	+60.0	43.0	27
28	22 47.1	+59.8	40.8	23 32.4	+59.9	41.1	24 17.6	+59.9	41.4	25 02.5	+59.9	41.7	25 47.2	+60.0	42.0	26 31.7	+60.0	42.3	27 16.0	+60.0	42.6	28 00.0	+60.0	43.0	28
29	23 46.9	+59.7	40.7	24 32.3	+59.8	41.0	25 17.5	+59.8	41.3	26 02.4	+60.0	41.6	26 47.2	+59.9	41.9	27 31.7	+60.0	42.3	28 16.0	+60.0	42.6	29 00.0	+60.0	43.0	29
30	24 46.6	+59.8	40.6	25 32.1	+59.8	40.9	26 17.3	+59.9	41.2	27 02.4	+59.9	41.5	27 47.1	+60.0	41.9	28 31.7	+60.0	42.2	29 16.0	+60.0	42.6	30 00.0	+60.0	43.0	30
31	25 46.4	+59.7	40.5	26 31.9	+59.8	40.8	27 17.2	+59.9	41.1	28 02.3	+59.9	41.5	28 47.1	+59.9	41.8	29 31.7	+59.9	42.2	30 16.0	+60.0	42.6	31 00.0	+60.0	43.0	31
32	26 46.1	+59.7	40.4	27 31.7	+59.8	40.7	28 17.1	+59.8	41.1	29 02.2	+59.9	41.4	29 47.0	+60.0	41.8	30 31.6	+60.0	42.2	31 16.0	+60.0	42.6	32 00.0	+60.0	43.0	32
33	27 45.8	+59.8	40.3	28 31.5	+59.8	40.6	29 16.9	+59.9	41.0	30 02.1	+59.9	41.4	30 47.0	+59.9	41.7	31 31.6	+60.0	42.1	32 16.0	+60.0	42.6	33 00.0	+60.0	43.0	33
34	28 45.6	+59.7	40.2	29 31.3	+59.8	40.5	30 16.8	+59.8	40.9	31 02.0	+59.9	41.3	31 46.9	+60.0	41.7	32 31.6	+60.0	42.1	33 16.0	+60.0	42.5	34 00.0	+60.0	43.0	34
35	29 45.3	+59.7	40.1	30 31.1	+59.8	40.4	31 16.6	+59.9	40.8	32 01.9	+59.9	41.2	32 46.9	+59.9	41.6	33 31.6	+60.0	42.1	34 16.0	+59.9	42.5	35 00.0	+60.0	43.0	35
36	30 45.0	+59.7	39.9	31 30.9	+59.8	40.3	32 16.5	+59.8	40.7	33 01.8	+59.9	41.2	33 46.8	+60.0	41.6	34 31.6	+59.9	42.0	35 15.9	+60.0	42.5	36 00.0	+60.0	43.0	36
37	31 44.7	+59.7	39.8	32 30.7	+59.8	40.2	33 16.3	+59.9	40.7	34 01.7	+59.9	41.1	34 46.8	+59.9	41.5	35 31.5	+60.0	42.0	36 15.9	+60.0	42.5	37 00.0	+60.0	43.0	37
38	32 44.4	+59.7	39.7	33 30.5	+59.7	40.1	34 16.2	+59.8	40.6	35 01.6	+59.9	41.0	35 46.7	+60.0	41.5	36 31.5	+60.0	42.0	37 15.9	+60.0	42.5	38 00.0	+60.0	43.0	38
39	33 44.1	+59.7	39.6	34 30.2	+59.8	40.0	35 16.0	+59.9	40.5	36 01.5	+59.9	40.9	36 46.7	+59.9	41.4	37 31.5	+59.9	41.9	38 15.9	+60.0	42.5	39 00.0	+60.0	43.0	39
40	34 43.8	+59.7	39.5	35 30.0	+59.8	39.9	36 15.9	+59.8	40.4	37 01.4	+59.9	40.9	37 46.6	+59.9	41.4	38 31.4	+60.0	41.9	39 15.9	+60.0	42.4	40 00.0	+60.0	43.0	40
41	35 43.5	+59.7	39.3	36 29.8	+59.7	39.8	37 15.7	+59.8	40.3	38 01.3	+59.9	40.8	38 46.5	+60.0	41.3	39 31.4	+60.0	41.9	40 15.9	+60.0	42.4	41 00.0	+60.0	43.0	41
42	36 43.2	+59.7	39.2	37 29.5	+59.8	39.7	38 15.5	+59.9	40.2	39 01.2	+59.9	40.7	39 46.5	+59.9	41.3	40 31.4	+60.0	41.8	41 15.9	+60.0	42.4	42 00.0	+60.0	43.0	42
43	37 42.9	+59.6	39.1	38 29.3	+59.7	39.6	39 15.4	+59.8	40.1	40 01.1	+59.9	40.6	40 46.4	+59.9	41.2	41 31.4	+59.9	41.8	42 15.9	+60.0	42.4	43 00.0	+60.0	43.0	43
44	38 42.5	+59.7	39.0	39 29.0	+59.8	39.5	40 15.2	+59.8	40.0	41 01.0	+59.8	40.6	41 46.3	+60.0	41.1	42 31.3	+60.0	41.7	43 15.9	+60.0	42.4	44 00.0	+60.0	43.0	44
45	39 42.2	+59.6	38.8	40 28.8	+59.7	39.3	41 15.0	+59.8	39.9	42 00.8	+59.9	40.5	42 46.3	+59.9	41.1	43 31.3	+60.0	41.7	44 15.9	+60.0	42.3	45 00.0	+60.0	43.0	45
46	40 41.8	+59.7	38.7	41 28.5	+59.7	39.2	42 14.8	+59.8	39.8	43 00.7	+59.9	40.4	43 46.2	+59.9	41.0	44 31.3	+59.9	41.6	45 15.9	+60.0	42.3	46 00.0	+60.0	43.0	46
47	41 41.5	+59.6	38.5	42 28.2	+59.7	39.1	43 14.6	+59.8	39.7	44 00.6	+59.8	40.3	44 46.1	+59.9	40.9	45 31.2	+60.0	41.6	46 15.9	+60.0	42.3	47 00.0	+60.0	43.0	47
48	42 41.1	+59.6	38.4	43 27.9	+59.7	39.0	44 14.4	+59.8	39.6	45 00.4	+59.9	40.2	45 46.0	+60.0	40.9	46 31.2	+60.0	41.5	47 15.9	+59.9	42.3	48 00.0	+60.0	43.0	48
49	43 40.7	+59.6	38.2	44 27.6	+59.7	38.8	45 14.2	+59.8	39.4	46 00.3	+59.9	40.1	46 46.0	+59.9	40.8	47 31.2	+59.9	41.5	48 15.8	+60.0	42.2	49 00.0	+60.0	43.0	49
50	44 40.3	+59.6	38.1	45 27.3	+59.7	38.7	46 14.0	+59.7	39.3	47 00.2	+59.8	40.0	47 45.9	+59.9	40.7	48 31.1	+60.0	41.4	49 15.8	+60.0	42.2	50 00.0	+60.0	43.0	50
51	45 39.9	+59.5	37.9	46 27.0	+59.7	38.5	47 13.7	+59.8	39.2	48 00.0	+59.9	39.9	48 45.8	+59.9	40.6	49 31.1	+59.9	41.4	50 15.8	+60.0	42.2	51 00.0	+60.0	43.0	51
52	46 39.4	+59.6	37.7	47 26.7	+59.7	38.4	48 13.5	+59.8	39.1	48 59.9	+59.8	39.8	49 45.7	+59.9	40.5	50 31.0	+60.0	41.3	51 15.8	+60.0	42.1	52 00.0	+60.0	43.0	52
53	47 39.0	+59.5	37.5	48 26.4	+59.6	38.2	49 13.3	+59.7	38.9	49 59.7	+59.8	39.7	50 45.6	+59.9	40.5	51 31.0	+60.0	41.3	52 15.8	+60.0	42.1	53 00.0	+60.0	43.0	53
54	48 38.5	+59.5	37.3	49 26.0	+59.6	38.1	50 13.0	+59.7	38.8	50 59.5	+59.9	39.6	51 45.5	+59.9	40.4	52 31.0	+59.9	41.2	53 15.8	+60.0	42.1	54 00.0	+60.0	43.0	54
55	49 38.0	+59.5	37.2	50 25.6	+59.6	37.9	51 12.7	+59.8	38.6	51 59.4	+59.8	39.4	52 45.4	+59.9	40.3	53 30.9	+60.0	41.1	54 15.8	+60.0	42.0	55 00.0	+60.0	43.0	55
56	50 37.5	+59.5	37.0	51 25.2	+59.6	37.7	52 12.5	+59.7	38.5	52 59.2	+59.8	39.3	53 45.3	+59.9	40.2	54 30.9	+59.9	41.1	55 15.8	+60.0	42.0	56 00.0	+60.0	43.0	56
57	51 37.0	+59.5	36.7	52 24.8	+59.6	37.5	53 12.2	+59.7	38.3	53 59.0	+59.8	39.2	54 45.2	+59.9	40.1	55 30.8	+59.9	41.0	56 15.8	+59.9	42.0	57 00.0	+60.0	43.0	57
58	52 36.5	+59.4	36.5	53 24.4	+59.6	37.3	54 11.9	+59.7	38.2	54 58.8	+59.8	39.0	55 45.1	+59.9	40.0	56 30.7	+60.0	40.9	57 15.7	+60.0	41.9	58 00.0	+60.0	43.0	58
59	53 35.9	+59.4	36.3	54 24.0	+59.5	37.1	55 11.6	+59.6	38.0	55 58.6	+59.7	38.9	56 45.0	+59.8	39.8	57 30.7	+59.9	40.8	58 15.7	+60.0	41.9	59 00.0	+60.0	43.0	59
60	54 35.3	+59.3	36.0	55 23.5	+59.5	36.9	56 11.2	+59.7	37.8	56 58.3	+59.8	38.7	57 44.8	+59.9	39.7	58 30.6	+60.0	40.8	59 15.7	+60.0	41.8	60 00.0	+60.0	43.0	60
61	55 34.6	+59.4	35.8	56 23.0	+59.5	36.7	57 10.9	+59.6	37.6	57 58.1	+59.8	38.6	58 44.7	+59.8	39.6	59 30.6	+59.9	40.7	60 15.7	+60.0	41.8	61 00.0	+60.0	43.0	61
62	56 34.0	+59.3	35.5	57 22.5	+59.5	36.4	58 10.5	+59.6	37.4	58 57.9	+59.7	38.4	59 44.5	+59.9	39.5	60 30.5	+59.9	40.6	61 15.7	+60.0	41.8	62 00.0	+60.0	43.0	62
63	57 33.3	+59.2	35.2	58 22.0	+59.4	36.2	59 10.1	+59.6	37.2	59 57.6	+59.7	38.2	60 44.4	+59.8	39.3	61 30.4	+59.9	40.5	62 15.7	+59.9	41.7	63 00.0	+60.0	43.0	63
64	58 32.5	+59.2	35.0	59 21.4	+59.4	35.9	60 09.7	+59.5	36.9	60 57.3	+59.7	38.0	61 44.2	+59.8	39.2	62 30.3	+60.0	40.4	63 15.6	+60.0	41.6	64 00.0	+60.0	43.0	64
65	59 31.7	+59.2	34.6	60 20.8	+59.4	35.6	61 09.2	+59.6	36.7	61 57.0	+59.7	37.8	62 44.0	+59.9	39.0	63 30.3	+59.9	40.2	64 15.6	+60.0	41.6	65 00.0	+60.0	43.0	65
66	60 30.9	+59.1	34.3	61 20.2	+59.3	35.3	62 08.8	+59.5	36.4	62 56.7	+59.7	37.6	63 43.9	+59.8	38.8	64 30.2	+59.9	40.1	65 15.6	+60.0	41.5	66 00.0	+60.0	43.0	66
67	61 30.0	+59.1	34.0	62 19.5	+59.2	35.0	63 08.3	+59.4	36.1	63 56.4	+59.6	37.3	64 43.7	+59.7	38.6	65 30.1	+59.9	40.0	66 15.6	+59.9	41.4	67 00.0	+60.0	43.0	67
68	62 29.1	+58.9	33.6	63 18.7	+59.2	34.7	64 07.7	+59.5	35.8	64 56.0	+59.6	37.1	65 43.4	+59.8	38.4	66 30.0	+59.9	39.8	67 15.5	+60.0	41.4	68 00.0	+60.0	43.0	68
69	63 28.0	+59.0	33.2	64 17.9	+59.2	34.3	65 07.2	+59.3	35.5	65 55.6	+59.6	36.8	66 43.2	+59.7	38.2	67 29.9	+59.8	39.7	68 15.5	+60.0	41.3	69 00.0	+60.0	43.0	69
70	64 27.0	+58.8	32.7	65 17.1	+59.1	33.9	66 06.5	+59.3	35.2	66 55.2	+59.5	36.5	67 42.9	+59.8	38.0	68 29.7	+59.9	39.5	69 15.5	+59.9	41.2	70 00.0	+60.0	43.0	70
71	65 25.8	+58.7	32.3	66 16.2	+59.0	33.5	67 05.8	+59.3	34.8	67 54.7	+59.5	36.2	68 42.7	+59.7	37.7	69 29.6	+59.9	39.3	70 15.4	+60.0	41.1	71 00.0	+60.0	43.0	71
72	66 24.5	+58.7	31.8	67 15.2	+58.9	33.0	68 05.1	+59.2	34.4	68 54.2	+59.5	35.8	69 42.4	+59.6	37.4	70 29.5	+59.8	39.1	71 15.4	+60.0	41.0	72 00.0	+60.0	43.0	72
73	67 23.2	+58.5	31.2	68 14.1	+58.9	32.5	69 04.3	+59.1	33.9	69 53.7	+59.3	35.5	70 42.0	+59.7	37.1	71 29.3	+59.8	38.9	72 15.4	+59.9	40.9	73 00.0	+60.0	43.0	73
74	68 21.7	+58.4	30.6	69 13.0	+58.7	32.0	70 03.4	+59.1	33.4	70 53.0	+59.4	35.0	71 41.7	+59.5	36.8	72 29.1	+59.8	38.7	73 15.3	+60.0	40.7	74 00.0	+60.0	43.0	74
75	69 20.1	+58.2	30.0	70 11.7	+58.6	31.4	71 02.5	+58.9	32.9	71 52.4	+59.2	34.6	72 41.2	+59.6	36.4	73 28.9	+59.8	38.4	74 15.3	+59.9	40.6	75 00.0	+60.0	43.0	75
76	70 18.3	+58.1	29.3	71 10.3	+58.4	30.7	72 01.4	+58.8	32.3	72 51.6	+59.2	34.0	73 40.8	+59.5	36.0	74 28.7	+59.8	38.1	75 15.2	+59.9	40.4	76 00.0	+60.0	43.0	76
77	71 16.4	+57.8	28.5	72 08.7	+58.3	30.0	73 00.2	+58.7	31.7	73 50.8	+59.1	33.5	74 40.3	+59.4	35.5	75 28.5	+59.7	37.7	76 15.1	+59.9	40.2	77 00.0	+60.0	43.0	77
78	72 14.2	+57.6	27.7	73 07.0	+58.0	29.2	73 58.9	+58.5	30.9	74 49.9	+58.9	32.8	75 39.7	+59.3	34.9	76 28.2	+59.6	37.3	77 15.0	+59.9	40.0	78 00.0	+60.0	43.0	78
79	73 11.8	+57.3	26.8	74 05.0	+57.8	28.3	74 57.4	+58.3	30.1	75 48.8	+58.8	32.1	76 39.0	+59.2	34.3	77 27.8	+59.6	36.8	78 14.9	+59.9	39.7	79 00.0	+60.0	43.0	79
80	74 09.1	+57.0	25.7	75 02.8	+57.5	27.3	75 55.7	+58.0	29.1	76 47.6	+58.5	31.2	77 38.2	+59.1	33.6	78 27.4	+59.6	36.3	79 14.8	+59.9	39.4	80 00.0	+60.0	43.0	80
81	75 06.1	+56.6	24.5	76 00.3	+57.2	26.2	76 53.7	+57.8	28.1	77 46.1	+58.4	30.2	78 37.3	+58.9	32.7	79 27.0	+59.4	35.6	80 14.7	+59.8	39.0	81 00.0	+60.0	43.0	81
82	76 02.7	+56.0	23.2	76 57.5	+56.6	24.9	77 51.5	+57.3	26.8	78 44.5	+58.0	29.1	79 36.2	+58.7	31.7	80 26.4	+59.3	34.9	81 14.5	+59.8	38.6	82 00.0	+60.0	43.0	82
83	76 58.7	+55.4	21.6	77 54.1	+56.2	23.4	78 48.8	+56.9	25.4	79 42.5	+57.6	27.7	80 34.9	+58.4	30.5	81 25.7	+59.1	33.9	82 14.3	+59.8	38.0	83 00.0	+60.0	43.0	83
84	77 54.1	+54.7	19.9	78 50.3	+55.4	21.6	79 45.7	+56.1	23.6	80 40.1	+57.1	26.1	81 33.3	+58.0	29.0	82 24.8	+58.9	32.7	83 14.1	+59.6	37.2	84 00.0	+60.0	43.0	84
85	78 48.8	+53.7	17.8	79 45.7	+54.4	19.5	80 41.8	+55.4	21.6	81 37.2	+56.2	24.1	82 31.3	+57.3	27.2	83 23.7	+58.5	31.1	84 13.7	+59.5	36.2	85 00.0	+60.0	43.0	85
86	79 42.5	+52.4	15.4	80 40.1	+53.2	17.1	81 37.2	+54.1	19.1	82 33.4	+55.2	21.5	83 28.6	+56.5	24.8	84 22.2	+57.8	29.0	85 13.2	+59.2	34.8	86 00.0	+60.0	43.0	86
87	80 34.9	+50.8	12.6	81 33.3	+51.5	14.1	82 31.3	*+52.4* •	15.9	83 28.6	*+53.6* •	18.3	84 25.1	*+54.9* •	21.5	85 20.0	+56.7	26.0	86 12.4	+58.7	32.7	87 00.0	+60.0	43.0	87
88	81 25.7	*+48.6* •	9.2	82 24.8	*+49.3* •	10.4	83 23.7	*+50.0* •	11.9	84 22.2	*+51.0* •	14.0	85 20.0	*+52.4* •	17.0	86 16.7	*+54.4* •	21.5	87 11.1	*+57.3* •	29.0	88 00.0	+60.0	43.0	88
89	82 14.3	*+45.7* •	5.1	83 14.1	*+45.9* •	5.8	84 13.7	*+46.3* •	6.8	85 13.2	*+46.8* •	8.2	86 12.4	*+47.6* •	10.4	87 11.1	*+48.9* •	14.0	88 08.4	*+51.6* •	21.5	89 00.0	+60.0	43.0	89
90	83 00.0	*+41.7* •	0.0	84 00.0	*+41.3* •	0.0	85 00.0	*+40.6* •	0.0	86 00.0	*+39.7* •	0.0	87 00.0	*+37.9* •	0.0	88 00.0	*+33.6* •	0.0	89 00.0	*+16.0* •	0.0	90 00.0	−60.0	21.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 137°, 223°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 01.8	+59.7	135.8	4 18.7	+59.9	135.8	3 35.7	+59.9	135.9	2 52.6	+59.9	135.9	2 09.5	+59.9	136.0	1 26.3	+60.0	136.0	0 43.2	+60.0	136.0	0 00.0	+60.0	136.0	**0**
1	6 01.5	+59.8	135.7	5 18.6	+59.8	135.8	4 35.6	+59.8	135.8	3 52.5	+59.9	135.9	3 09.4	+60.0	135.9	2 26.3	+60.0	136.0	1 43.2	+60.0	136.0	1 00.0	+60.0	136.0	**1**
2	7 01.3	+59.8	135.6	6 18.4	+59.9	135.7	5 35.4	+59.9	135.8	4 52.4	+60.0	135.8	4 09.4	+59.9	135.9	3 26.3	+60.0	135.9	2 43.2	+59.9	136.0	2 00.0	+60.0	136.0	**2**
3	8 01.1	+59.8	135.5	7 18.3	+59.8	135.6	6 35.3	+59.9	135.7	5 52.4	+59.9	135.8	5 09.3	+60.0	135.9	4 26.3	+59.9	135.9	3 43.1	+60.0	136.0	3 00.0	+60.0	136.0	**3**
4	9 00.9	+59.8	135.4	8 18.1	+59.8	135.5	7 35.2	+59.9	135.6	6 52.3	+59.9	135.7	6 09.3	+60.0	135.8	5 26.2	+60.0	135.9	4 43.1	+60.0	135.9	4 00.0	+60.0	136.0	**4**
5	10 00.7	+59.7	135.4	9 17.9	+59.9	135.5	8 35.1	+59.9	135.6	7 52.2	+59.9	135.7	7 09.3	+59.9	135.8	6 26.2	+60.0	135.9	5 43.1	+60.0	135.9	5 00.0	+60.0	136.0	**5**
6	11 00.4	+59.8	135.3	10 17.8	+59.8	135.4	9 35.0	+59.9	135.5	8 52.1	+60.0	135.6	8 09.2	+60.0	135.7	7 26.2	+60.0	135.8	6 43.1	+60.0	135.9	6 00.0	+60.0	136.0	**6**
7	12 00.2	+59.8	135.2	11 17.6	+59.8	135.3	10 34.9	+59.9	135.5	9 52.1	+59.9	135.6	9 09.2	+59.9	135.7	8 26.2	+60.0	135.8	7 43.1	+60.0	135.9	7 00.0	+60.0	136.0	**7**
8	13 00.0	+59.8	135.1	12 17.4	+59.9	135.2	11 34.8	+59.9	135.4	10 52.0	+59.9	135.5	10 09.1	+60.0	135.7	9 26.2	+60.0	135.8	8 43.1	+60.0	135.9	8 00.0	+60.0	136.0	**8**
9	13 59.8	+59.7	135.0	13 17.3	+59.8	135.2	12 34.7	+59.8	135.3	11 51.9	+60.0	135.5	11 09.1	+59.9	135.6	10 26.2	+59.9	135.8	9 43.1	+60.0	135.9	9 00.0	+60.0	136.0	**9**
10	14 59.5	+59.8	134.9	14 17.1	+59.8	135.1	13 34.5	+59.9	135.3	12 51.9	+59.9	135.4	12 09.0	+60.0	135.6	11 26.1	+60.0	135.7	10 43.1	+60.0	135.9	10 00.0	+60.0	136.0	**10**
11	15 59.3	+59.8	134.8	15 16.9	+59.9	135.0	14 34.4	+59.9	135.2	13 51.8	+59.9	135.4	13 09.0	+60.0	135.6	12 26.1	+60.0	135.7	11 43.1	+60.0	135.9	11 00.0	+60.0	136.0	**11**
12	16 59.1	+59.7	134.7	16 16.8	+59.8	134.9	15 34.3	+59.9	135.1	14 51.7	+59.9	135.3	14 09.0	+59.9	135.5	13 26.1	+60.0	135.7	12 43.1	+60.0	135.8	12 00.0	+60.0	136.0	**12**
13	17 58.8	+59.8	134.6	17 16.6	+59.8	134.9	16 34.2	+59.9	135.1	15 51.6	+60.0	135.3	15 08.9	+60.0	135.5	14 26.1	+60.0	135.7	13 43.1	+60.0	135.8	13 00.0	+60.0	136.0	**13**
14	18 58.6	+59.7	134.5	18 16.4	+59.8	134.8	17 34.1	+59.8	135.0	16 51.6	+59.9	135.2	16 08.9	+59.9	135.4	15 26.1	+59.9	135.6	14 43.1	+60.0	135.8	14 00.0	+60.0	136.0	**14**
15	19 58.3	+59.8	134.4	19 16.2	+59.9	134.7	18 33.9	+59.9	134.9	17 51.5	+59.9	135.2	17 08.8	+60.0	135.4	16 26.0	+60.0	135.6	15 43.1	+60.0	135.8	15 00.0	+60.0	136.0	**15**
16	20 58.1	+59.8	134.3	20 16.1	+59.8	134.6	19 33.8	+59.9	134.9	18 51.4	+59.9	135.1	18 08.8	+59.9	135.4	17 26.0	+60.0	135.6	16 43.1	+60.0	135.8	16 00.0	+60.0	136.0	**16**
17	21 57.9	+59.7	134.3	21 15.9	+59.8	134.5	20 33.7	+59.9	134.8	19 51.3	+59.9	135.1	19 08.7	+60.0	135.3	18 26.0	+60.0	135.6	17 43.1	+60.0	135.8	17 00.0	+60.0	136.0	**17**
18	22 57.6	+59.7	134.2	22 15.7	+59.8	134.4	21 33.6	+59.8	134.7	20 51.2	+60.0	135.0	20 08.7	+60.0	135.3	19 26.0	+60.0	135.5	18 43.1	+60.0	135.8	18 00.0	+60.0	136.0	**18**
19	23 57.3	+59.8	134.1	23 15.5	+59.8	134.4	22 33.4	+59.9	134.7	21 51.2	+59.9	135.0	21 08.7	+59.9	135.2	20 26.0	+59.9	135.5	19 43.1	+60.0	135.8	19 00.0	+60.0	136.0	**19**
20	24 57.1	+59.7	133.9	24 15.3	+59.8	134.3	23 33.3	+59.9	134.6	22 51.1	+59.9	134.9	22 08.6	+60.0	135.2	21 25.9	+60.0	135.5	20 43.1	+60.0	135.7	20 00.0	+60.0	136.0	**20**
21	25 56.8	+59.8	133.8	25 15.1	+59.8	134.2	24 33.2	+59.8	134.5	23 51.0	+59.9	134.8	23 08.6	+59.9	135.1	22 25.9	+60.0	135.4	21 43.1	+60.0	135.7	21 00.0	+60.0	136.0	**21**
22	26 56.6	+59.7	133.7	26 14.9	+59.8	134.1	25 33.0	+59.9	134.4	24 50.9	+59.9	134.8	24 08.5	+60.0	135.1	23 25.9	+60.0	135.4	22 43.1	+60.0	135.7	22 00.0	+60.0	136.0	**22**
23	27 56.3	+59.7	133.6	27 14.7	+59.8	134.0	26 32.9	+59.9	134.4	25 50.8	+59.9	134.7	25 08.5	+59.9	135.1	24 25.9	+60.0	135.4	23 43.1	+59.9	135.7	23 00.0	+60.0	136.0	**23**
24	28 56.0	+59.7	133.5	28 14.5	+59.8	133.9	27 32.8	+59.8	134.3	26 50.7	+59.9	134.7	26 08.4	+60.0	135.0	25 25.9	+59.9	135.4	24 43.0	+60.0	135.7	24 00.0	+60.0	136.0	**24**
25	29 55.7	+59.7	133.4	29 14.3	+59.8	133.8	28 32.6	+59.9	134.2	27 50.6	+59.9	134.6	27 08.4	+59.9	135.0	26 25.8	+60.0	135.3	25 43.0	+60.0	135.7	25 00.0	+60.0	136.0	**25**
26	30 55.4	+59.7	133.3	30 14.1	+59.8	133.7	29 32.5	+59.8	134.1	28 50.5	+60.0	134.5	28 08.3	+60.0	134.9	27 25.8	+60.0	135.3	26 43.0	+60.0	135.7	26 00.0	+60.0	136.0	**26**
27	31 55.1	+59.7	133.2	31 13.9	+59.8	133.6	30 32.3	+59.9	134.1	29 50.5	+59.9	134.5	29 08.3	+59.9	134.9	28 25.8	+60.0	135.3	27 43.0	+60.0	135.6	27 00.0	+60.0	136.0	**27**
28	32 54.8	+59.7	133.1	32 13.7	+59.8	133.5	31 32.2	+59.8	134.0	30 50.4	+59.9	134.4	30 08.2	+60.0	134.8	29 25.8	+59.9	135.2	28 43.0	+60.0	135.6	28 00.0	+60.0	136.0	**28**
29	33 54.5	+59.7	132.9	33 13.5	+59.7	133.4	32 32.0	+59.9	133.9	31 50.3	+59.9	134.3	31 08.2	+59.9	134.8	30 25.7	+60.0	135.2	29 43.0	+60.0	135.6	29 00.0	+60.0	136.0	**29**
30	34 54.2	+59.7	132.8	34 13.2	+59.8	133.3	33 31.9	+59.8	133.8	32 50.2	+59.9	134.3	32 08.1	+60.0	134.7	31 25.7	+60.0	135.2	30 43.0	+60.0	135.6	30 00.0	+60.0	136.0	**30**
31	35 53.9	+59.6	132.7	35 13.0	+59.8	133.2	34 31.7	+59.9	133.7	33 50.1	+59.9	134.2	33 08.1	+59.9	134.7	32 25.7	+60.0	135.1	31 43.0	+60.0	135.6	31 00.0	+60.0	136.0	**31**
32	36 53.5	+59.7	132.6	36 12.8	+59.7	133.1	35 31.6	+59.8	133.6	34 50.0	+59.9	134.1	34 08.0	+59.9	134.6	33 25.7	+59.9	135.1	32 43.0	+60.0	135.6	32 00.0	+60.0	136.0	**32**
33	37 53.2	+59.7	132.4	37 12.5	+59.8	133.0	36 31.4	+59.8	133.5	35 49.9	+59.8	134.1	35 07.9	+60.0	134.6	34 25.6	+60.0	135.1	33 43.0	+60.0	135.5	33 00.0	+60.0	136.0	**33**
34	38 52.9	+59.6	132.3	38 12.3	+59.7	132.9	37 31.2	+59.8	133.4	36 49.7	+59.9	134.0	36 07.9	+59.9	134.5	35 25.6	+60.0	135.0	34 43.0	+60.0	135.5	34 00.0	+60.0	136.0	**34**
35	39 52.5	+59.6	132.1	39 12.0	+59.7	132.8	38 31.0	+59.9	133.3	37 49.6	+59.9	133.9	37 07.8	+60.0	134.5	36 25.6	+60.0	135.0	35 43.0	+60.0	135.5	35 00.0	+60.0	136.0	**35**
36	40 52.1	+59.6	132.0	40 11.7	+59.7	132.6	39 30.9	+59.8	133.2	38 49.5	+59.9	133.8	38 07.8	+59.9	134.4	37 25.6	+59.9	135.0	36 43.0	+60.0	135.5	36 00.0	+60.0	136.0	**36**
37	41 51.7	+59.6	131.8	41 11.4	+59.8	132.5	40 30.7	+59.8	133.1	39 49.4	+59.9	133.8	39 07.7	+59.9	134.3	38 25.5	+60.0	134.9	37 43.0	+60.0	135.5	37 00.0	+60.0	136.0	**37**
38	42 51.3	+59.6	131.7	42 11.2	+59.7	132.4	41 30.5	+59.8	133.0	40 49.3	+59.9	133.7	40 07.6	+60.0	134.3	39 25.5	+60.0	134.9	38 43.0	+60.0	135.4	38 00.0	+60.0	136.0	**38**
39	43 50.9	+59.6	131.5	43 10.9	+59.7	132.2	42 30.3	+59.8	132.9	41 49.2	+59.8	133.6	41 07.6	+59.9	134.2	40 25.5	+59.9	134.8	39 43.0	+59.9	135.4	39 00.0	+60.0	136.0	**39**
40	44 50.5	+59.6	131.4	44 10.6	+59.7	132.1	43 30.1	+59.8	132.8	42 49.0	+59.9	133.5	42 07.5	+59.9	134.2	41 25.4	+60.0	134.8	40 42.9	+60.0	135.4	40 00.0	+60.0	136.0	**40**
41	45 50.1	+59.5	131.2	45 10.3	+59.6	132.0	44 29.9	+59.7	132.7	43 48.9	+59.9	133.4	43 07.4	+59.9	134.1	42 25.4	+60.0	134.7	41 42.9	+60.0	135.4	41 00.0	+60.0	136.0	**41**
42	46 49.6	+59.6	131.0	46 09.9	+59.7	131.8	45 29.6	+59.8	132.6	44 48.8	+59.8	133.3	44 07.3	+60.0	134.0	43 25.4	+59.9	134.7	42 42.9	+60.0	135.4	42 00.0	+60.0	136.0	**42**
43	47 49.2	+59.5	130.8	47 09.6	+59.6	131.7	46 29.4	+59.8	132.4	45 48.6	+59.9	133.2	45 07.3	+59.9	133.9	44 25.3	+60.0	134.7	43 42.9	+60.0	135.3	43 00.0	+60.0	136.0	**43**
44	48 48.7	+59.5	130.6	48 09.2	+59.7	131.5	47 29.2	+59.7	132.3	46 48.5	+59.8	133.1	46 07.2	+59.9	133.9	45 25.3	+60.0	134.6	44 42.9	+60.0	135.3	44 00.0	+60.0	136.0	**44**
45	49 48.2	+59.4	130.4	49 08.9	+59.6	131.3	48 28.9	+59.8	132.2	47 48.3	+59.9	133.0	47 07.1	+59.9	133.8	46 25.3	+59.9	134.6	45 42.9	+60.0	135.3	45 00.0	+60.0	136.0	**45**
46	50 47.6	+59.5	130.2	50 08.5	+59.6	131.2	49 28.7	+59.7	132.0	48 48.2	+59.8	132.9	48 07.0	+59.9	133.7	47 25.2	+60.0	134.5	46 42.9	+60.0	135.3	46 00.0	+60.0	136.0	**46**
47	51 47.1	+59.4	130.0	51 08.1	+59.6	131.0	50 28.4	+59.7	131.9	49 48.0	+59.8	132.8	49 06.9	+59.9	133.6	48 25.2	+60.0	134.5	47 42.9	+60.0	135.2	47 00.0	+60.0	136.0	**47**
48	52 46.5	+59.4	129.8	52 07.7	+59.6	130.8	51 28.1	+59.7	131.7	50 47.8	+59.8	132.7	50 06.8	+59.9	133.5	49 25.2	+59.9	134.4	48 42.9	+60.0	135.2	48 00.0	+60.0	136.0	**48**
49	53 45.9	+59.4	129.6	53 07.3	+59.5	130.6	52 27.8	+59.7	131.6	51 47.6	+59.8	132.5	51 06.7	+59.9	133.5	50 25.1	+60.0	134.3	49 42.9	+60.0	135.2	49 00.0	+60.0	136.0	**49**
50	54 45.3	+59.3	129.3	54 06.8	+59.5	130.4	53 27.5	+59.7	131.4	52 47.4	+59.8	132.4	52 06.6	+59.9	133.4	51 25.1	+59.9	134.3	50 42.9	+59.9	135.2	50 00.0	+60.0	136.0	**50**
51	55 44.6	+59.3	129.0	55 06.3	+59.5	130.2	54 27.2	+59.7	131.2	53 47.2	+59.8	132.3	53 06.5	+59.9	133.3	52 25.0	+60.0	134.2	51 42.8	+60.0	135.1	51 00.0	+60.0	136.0	**51**
52	56 43.9	+59.3	128.8	56 05.8	+59.5	129.9	55 26.9	+59.6	131.1	54 47.0	+59.8	132.1	54 06.4	+59.9	133.2	53 25.0	+59.9	134.1	52 42.8	+60.0	135.1	52 00.0	+60.0	136.0	**52**
53	57 43.2	+59.2	128.5	57 05.3	+59.5	129.7	56 26.5	+59.7	130.9	55 46.8	+59.8	132.0	55 06.3	+59.9	133.0	54 24.9	+60.0	134.1	53 42.8	+60.0	135.1	53 00.0	+60.0	136.0	**53**
54	58 42.4	+59.1	128.2	58 04.8	+59.4	129.4	57 26.2	+59.6	130.7	56 46.6	+59.8	131.8	56 06.2	+59.8	132.9	55 24.9	+59.9	134.0	54 42.8	+60.0	135.0	54 00.0	+60.0	136.0	**54**
55	59 41.5	+59.2	127.9	59 04.2	+59.4	129.2	58 25.8	+59.5	130.4	57 46.4	+59.7	131.7	57 06.0	+59.9	132.8	56 24.8	+60.0	133.9	55 42.8	+60.0	135.0	55 00.0	+60.0	136.0	**55**
56	60 40.7	+59.0	127.5	60 03.6	+59.3	128.9	59 25.3	+59.6	130.2	58 46.1	+59.7	131.5	58 05.9	+59.8	132.7	57 24.8	+59.9	133.8	56 42.8	+60.0	134.9	56 00.0	+60.0	136.0	**56**
57	61 39.7	+59.0	127.1	61 02.9	+59.3	128.6	60 24.9	+59.5	130.0	59 45.8	+59.7	131.3	59 05.7	+59.9	132.6	58 24.7	+59.9	133.8	57 42.8	+59.9	134.9	57 00.0	+60.0	136.0	**57**
58	62 38.7	+59.0	126.8	62 02.2	+59.3	128.3	61 24.4	+59.5	129.7	60 45.5	+59.7	131.1	60 05.6	+59.8	132.4	59 24.6	+60.0	133.7	58 42.7	+60.0	134.9	58 00.0	+60.0	136.0	**58**
59	63 37.7	+58.8	126.3	63 01.5	+59.2	127.9	62 23.9	+59.5	129.4	61 45.2	+59.7	130.9	61 05.4	+59.8	132.3	60 24.6	+59.9	133.6	59 42.7	+60.0	134.8	59 00.0	+60.0	136.0	**59**
60	64 36.5	+58.8	125.9	64 00.7	+59.1	127.6	63 23.4	+59.4	129.2	62 44.9	+59.7	130.7	62 05.2	+59.9	132.1	61 24.5	+59.9	133.5	60 42.7	+60.0	134.8	60 00.0	+60.0	136.0	**60**
61	65 35.3	+58.7	125.4	64 59.8	+59.1	127.2	64 22.8	+59.4	128.8	63 44.6	+59.6	130.4	63 05.1	+59.8	131.9	62 24.4	+59.9	133.4	61 42.7	+60.0	134.7	61 00.0	+60.0	136.0	**61**
62	66 34.0	+58.6	124.9	65 58.9	+59.0	126.8	65 22.2	+59.4	128.5	64 44.2	+59.6	130.2	64 04.9	+59.7	131.7	63 24.3	+59.9	133.2	62 42.7	+60.0	134.7	62 00.0	+60.0	136.0	**62**
63	67 32.6	+58.4	124.4	66 57.9	+58.9	126.3	66 21.6	+59.2	128.1	65 43.8	+59.5	129.9	65 04.6	+59.8	131.5	64 24.2	+59.9	133.1	63 42.7	+59.9	134.6	63 00.0	+60.0	136.0	**63**
64	68 31.0	+58.3	123.7	67 56.8	+58.8	125.8	67 20.8	+59.3	127.8	66 43.3	+59.6	129.6	66 04.4	+59.8	131.3	65 24.1	+59.9	133.0	64 42.6	+60.0	134.5	64 00.0	+60.0	136.0	**64**
65	69 29.3	+58.1	123.1	68 55.6	+58.7	125.3	68 20.1	+59.1	127.3	67 42.9	+59.5	129.3	67 04.2	+59.7	131.1	66 24.0	+59.9	132.8	65 42.6	+60.0	134.5	65 00.0	+60.0	136.0	**65**
66	70 27.4	+58.0	122.4	69 54.3	+58.6	124.7	69 19.2	+59.1	126.9	68 42.4	+59.4	128.9	68 03.9	+59.7	130.9	67 23.9	+59.9	132.7	66 42.6	+59.9	134.4	66 00.0	+60.0	136.0	**66**
67	71 25.4	+57.7	121.6	70 52.9	+58.4	124.0	70 18.3	+59.0	126.4	69 41.8	+59.4	128.5	69 03.6	+59.7	130.6	68 23.8	+59.8	132.5	67 42.5	+60.0	134.3	67 00.0	+60.0	136.0	**67**
68	72 23.1	+57.5	120.7	71 51.3	+58.3	123.3	71 17.3	+58.8	125.8	70 41.2	+59.3	128.1	70 03.3	+59.6	130.3	69 23.6	+59.9	132.3	68 42.5	+60.0	134.2	68 00.0	+60.0	136.0	**68**
69	73 20.6	+57.1	119.7	72 49.6	+58.0	122.5	72 16.1	+58.8	125.2	71 40.5	+59.2	127.6	71 02.9	+59.6	130.0	70 23.5	+59.8	132.1	69 42.5	+59.9	134.1	69 00.0	+60.0	136.0	**69**
70	74 17.7	+56.8	118.6	73 47.6	+57.8	121.7	73 14.9	+58.5	124.5	72 39.7	+59.2	127.1	72 02.5	+59.6	129.6	71 23.3	+59.8	131.9	70 42.4	+60.0	134.0	70 00.0	+60.0	136.0	**70**
71	75 14.5	+56.4	117.4	74 45.4	+57.5	120.7	74 13.4	+58.4	123.7	73 38.9	+59.0	126.6	73 02.1	+59.5	129.2	72 23.1	+59.8	131.6	71 42.4	+60.0	133.9	71 00.0	+60.0	136.0	**71**
72	76 10.9	+55.8	116.0	75 42.9	+57.2	119.5	75 11.8	+58.2	122.8	74 37.9	+59.0	125.9	74 01.6	+59.4	128.7	73 22.9	+59.8	131.4	72 42.4	+59.9	133.8	72 00.0	+60.0	136.0	**72**
73	77 06.7	+55.2	114.4	76 40.1	+56.7	118.3	76 10.0	+57.9	121.8	75 36.9	+58.7	125.2	75 01.0	+59.4	128.2	74 22.7	+59.8	131.0	73 42.3	+59.9	133.6	73 00.0	+60.0	136.0	**73**
74	78 01.9	+54.3	112.6	77 36.8	+56.1	116.8	77 07.9	+57.6	120.7	76 35.6	+58.6	124.3	76 00.4	+59.2	127.6	75 22.5	+59.7	130.7	74 42.2	+60.0	133.5	74 00.0	+60.0	136.0	**74**
75	78 56.2	+53.3	110.5	78 32.9	+55.5	115.1	78 05.5	+57.1	119.4	77 34.2	+58.3	123.4	76 59.6	+59.2	127.0	76 22.2	+59.6	130.3	75 42.2	+59.9	133.3	75 00.0	+60.0	136.0	**75**
76	79 49.5	+51.9	108.0	79 28.4	+54.6	113.1	79 02.6	+56.6	117.9	78 32.5	+58.1	122.2	77 58.8	+59.0	126.2	77 21.8	+59.6	129.8	76 42.1	+59.9	133.1	76 00.0	+60.0	136.0	**76**
77	80 41.4	*+50.2*•	105.0	80 23.0	+53.4	110.7	79 59.2	+55.8	116.0	79 30.6	+57.6	120.9	78 57.8	+58.8	125.3	78 21.4	+59.5	129.3	77 42.0	+59.9	132.8	77 00.0	+60.0	136.0	**77**
78	81 31.6	*+47.8*•	101.4	81 16.4	+51.8	107.8	80 55.0	+54.9	113.8	80 28.2	+57.0	119.3	79 56.6	+58.5	124.2	79 20.9	+59.5	128.6	78 41.9	+59.9	132.5	78 00.0	+60.0	136.0	**78**
79	82 19.4	*+44.7*•	97.1	82 08.2	*+49.6*•	104.3	81 49.9	+53.5	111.1	81 25.2	+56.4	117.3	80 55.1	+58.2	122.9	80 20.4	+59.3	127.8	79 41.8	+59.8	132.2	79 00.0	+60.0	136.0	**79**
80	83 04.1	*+40.4*•	91.9	82 57.8	*+46.7*•	100.0	82 43.4	*+51.7*•	107.7	82 21.6	+55.3	114.9	81 53.3	+57.7	121.3	81 19.7	+59.1	126.9	80 41.6	+59.8	131.8	80 00.0	+60.0	136.0	**80**
81	83 44.5	*+34.6*•	85.4	83 44.5	*+42.3*•	94.6	83 35.1	*+48.8*•	103.5	83 16.9	*+53.7*•	111.8	82 51.0	+57.0	119.2	82 18.8	+58.8	125.7	81 41.4	+59.8	131.2	81 00.0	+60.0	136.0	**81**
82	84 19.1	*+26.9*•	77.6	84 26.8	*+36.3*•	87.7	84 23.9	*+44.7*•	97.9	84 10.6	*+51.3*•	107.7	83 48.0	+55.8	116.5	83 17.6	+58.5	124.1	82 41.2	+59.7	130.6	82 00.0	+60.0	136.0	**82**
83	84 46.0	*+17.1*•	68.1	85 03.1	*+27.6*•	78.9	85 08.6	*+38.3*•	90.6	85 01.9	*+47.5*•	102.1	84 43.8	*+54.1*•	112.8	84 16.1	+57.9	122.0	83 40.9	+59.5	129.7	83 00.0	+60.0	136.0	**83**
84	85 03.1	*+5.5*•	57.3	85 30.7	*+16.2*•	68.1	85 46.9	*+28.6*•	80.8	85 49.4	*+41.0*•	94.4	85 37.9	*+50.7*•	107.6	85 14.0	+56.7	119.1	84 40.4	+59.4	128.5	84 00.0	+60.0	136.0	**84**
85	85 08.6	*−6.7*•	45.7	85 46.9	*+2.5*•	55.4	86 15.5	*+14.9*•	68.1	86 30.4	*+29.9*•	83.5	86 28.6	*+44.6*•	99.8	86 10.7	*+54.5*•	114.7	85 39.8	+59.0	126.8	85 00.0	+60.0	136.0	**85**
86	85 01.9	*−18.1*•	34.0	85 49.4	*−11.5*•	41.7	86 30.4	*−1.8*•	52.7	87 00.3	*+12.9*•	68.0	87 13.2	*+32.0*•	87.5	87 05.2	*+49.4*•	107.6	86 38.8	+58.2	124.1	86 00.0	+60.0	136.0	**86**
87	84 43.8	*−27.7*•	23.3	85 37.9	*−23.9*•	28.5	86 28.6	*−17.9*•	36.3	87 13.2	*−8.0*•	48.6	87 45.2	*+9.4*•	68.0	87 54.6	*+35.5*•	94.4	87 37.0	*+55.6*•	119.1	87 00.0	+60.0	136.0	**87**
88	84 16.1	*−35.2*•	14.0	85 14.0	*−33.6*•	17.0	86 10.7	*−30.9*•	21.3	87 05.2	*−26.4*•	28.5	87 54.6	*−17.6*•	41.7	88 30.1	*+2.5*•	68.0	88 32.6	*+42.4*•	107.5	88 00.0	+60.0	136.0	**88**
89	83 40.9	*−40.9*•	6.3	84 40.4	*−40.4*•	7.5	85 39.8	*−39.8*•	9.2	86 38.8	*−38.8*•	12.0	87 37.0	*−37.0*•	16.9	88 32.6	*−32.6*•	28.5	89 15.0	*−15.0*•	68.0	89 00.0	+60.0	136.0	**89**
90	83 00.0	*−45.0*•	0.0	84 00.0	*−45.3*•	0.0	85 00.0	*−45.7*•	0.0	86 00.0	*−46.2*•	0.0	87 00.0	*−47.0*•	0.0	88 00.0	*−48.4*•	0.0	89 00.0	*−51.3*•	0.0	90 00.0	−60.0	68.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 44°, 316°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 01.8	−59.8	135.8	4 18.7	−59.8	135.8	3 35.7	−59.9	135.9	2 52.6	−60.0	135.9	2 09.5	−60.0	136.0	1 26.3	−60.0	136.0	0 43.2	−60.0	136.0	0 00.0	+60.0	44.0	**0**
1	4 02.0	−59.8	135.9	3 18.9	−59.8	135.9	2 35.8	−59.9	136.0	1 52.6	−59.9	136.0	1 09.5	−60.0	136.0	0 26.3	−60.0	136.0	0 16.8	+60.0	44.0	1 00.0	+60.0	44.0	**1**
2	3 02.2	−59.8	136.0	2 19.1	−59.9	136.0	1 35.9	−59.9	136.0	0 52.7	−59.9	136.0	0 09.5	−59.9	136.0	0 33.7	+59.9	44.0	1 16.8	+60.0	44.0	2 00.0	+60.0	44.0	**2**
3	2 02.4	−59.8	136.0	1 19.2	−59.8	136.1	0 36.0	−59.9	136.1	0 07.2	+59.9	43.9	0 50.4	+60.0	43.9	1 33.6	+60.0	43.9	2 16.8	+60.0	44.0	3 00.0	+60.0	44.0	**3**
4	1 02.6	−59.8	136.1	0 19.4	−59.9	136.1	0 23.9	+59.9	43.9	1 07.1	+60.0	43.9	1 50.4	+59.9	43.9	2 33.6	+60.0	43.9	3 16.8	+60.0	44.0	4 00.0	+60.0	44.0	**4**
5	0 02.8	−59.7	136.2	0 40.5	+59.8	43.8	1 23.8	+59.9	43.8	2 07.1	+59.9	43.8	2 50.3	+60.0	43.9	3 33.6	+60.0	43.9	4 16.8	+60.0	43.9	5 00.0	+60.0	44.0	**5**
6	0 56.9	+59.8	43.7	1 40.3	+59.9	43.7	2 23.7	+59.9	43.7	3 07.0	+59.9	43.8	3 50.3	+60.0	43.8	4 33.6	+60.0	43.9	5 16.8	+60.0	43.9	6 00.0	+60.0	44.0	**6**
7	1 56.7	+59.8	43.6	2 40.2	+59.8	43.6	3 23.6	+59.8	43.7	4 06.9	+60.0	43.7	4 50.3	+59.9	43.8	5 33.6	+59.9	43.8	6 16.8	+60.0	43.9	7 00.0	+60.0	44.0	**7**
8	2 56.5	+59.8	43.5	3 40.0	+59.8	43.6	4 23.4	+59.9	43.6	5 06.9	+59.9	43.7	5 50.2	+60.0	43.7	6 33.5	+60.0	43.8	7 16.8	+60.0	43.9	8 00.0	+60.0	44.0	**8**
9	3 56.3	+59.8	43.5	4 39.8	+59.9	43.5	5 23.3	+59.9	43.6	6 06.8	+59.9	43.6	6 50.2	+59.9	43.7	7 33.5	+60.0	43.8	8 16.8	+60.0	43.9	9 00.0	+60.0	44.0	**9**
10	4 56.1	+59.8	43.4	5 39.7	+59.8	43.4	6 23.2	+59.9	43.5	7 06.7	+59.9	43.6	7 50.1	+60.0	43.7	8 33.5	+60.0	43.8	9 16.8	+60.0	43.9	10 00.0	+60.0	44.0	**10**
11	5 55.9	+59.7	43.3	6 39.5	+59.9	43.4	7 23.1	+59.9	43.4	8 06.6	+60.0	43.5	8 50.1	+60.0	43.6	9 33.5	+60.0	43.7	10 16.8	+60.0	43.9	11 00.0	+60.0	44.0	**11**
12	6 55.6	+59.8	43.2	7 39.4	+59.8	43.3	8 23.0	+59.9	43.4	9 06.6	+59.9	43.5	9 50.1	+59.9	43.6	10 33.5	+60.0	43.7	11 16.8	+60.0	43.9	12 00.0	+60.0	44.0	**12**
13	7 55.4	+59.8	43.1	8 39.2	+59.8	43.2	9 22.9	+59.9	43.3	10 06.5	+59.9	43.4	10 50.0	+60.0	43.6	11 33.5	+59.9	43.7	12 16.8	+60.0	43.8	13 00.0	+60.0	44.0	**13**
14	8 55.2	+59.8	43.0	9 39.0	+59.9	43.1	10 22.8	+59.9	43.3	11 06.4	+60.0	43.4	11 50.0	+59.9	43.5	12 33.4	+60.0	43.7	13 16.8	+60.0	43.8	14 00.0	+60.0	44.0	**14**
15	9 55.0	+59.8	42.9	10 38.9	+59.8	43.1	11 22.7	+59.8	43.2	12 06.4	+59.9	43.3	12 49.9	+60.0	43.5	13 33.4	+60.0	43.6	14 16.8	+60.0	43.8	15 00.0	+60.0	44.0	**15**
16	10 54.8	+59.7	42.8	11 38.7	+59.8	43.0	12 22.5	+59.9	43.1	13 06.3	+59.9	43.3	13 49.9	+60.0	43.4	14 33.4	+60.0	43.6	15 16.8	+60.0	43.8	16 00.0	+60.0	44.0	**16**
17	11 54.5	+59.8	42.8	12 38.5	+59.9	42.9	13 22.4	+59.9	43.1	14 06.2	+59.9	43.2	14 49.9	+59.9	43.4	15 33.4	+60.0	43.6	16 16.8	+60.0	43.8	17 00.0	+60.0	44.0	**17**
18	12 54.3	+59.8	42.7	13 38.4	+59.8	42.8	14 22.3	+59.9	43.0	15 06.1	+60.0	43.2	15 49.8	+60.0	43.4	16 33.4	+59.9	43.6	17 16.8	+60.0	43.8	18 00.0	+60.0	44.0	**18**
19	13 54.1	+59.8	42.6	14 38.2	+59.8	42.8	15 22.2	+59.9	42.9	16 06.1	+59.9	43.1	16 49.8	+59.9	43.3	17 33.3	+60.0	43.5	18 16.8	+59.9	43.8	19 00.0	+60.0	44.0	**19**
20	14 53.9	+59.7	42.5	15 38.0	+59.9	42.7	16 22.1	+59.9	42.9	17 06.0	+59.9	43.1	17 49.7	+60.0	43.3	18 33.3	+60.0	43.5	19 16.7	+60.0	43.8	20 00.0	+60.0	44.0	**20**
21	15 53.6	+59.8	42.4	16 37.9	+59.8	42.6	17 22.0	+59.8	42.8	18 05.9	+59.9	43.0	18 49.7	+59.9	43.2	19 33.3	+60.0	43.5	20 16.7	+60.0	43.7	21 00.0	+60.0	44.0	**21**
22	16 53.4	+59.8	42.3	17 37.7	+59.8	42.5	18 21.8	+59.9	42.7	19 05.8	+59.9	43.0	19 49.6	+60.0	43.2	20 33.3	+60.0	43.5	21 16.7	+60.0	43.7	22 00.0	+60.0	44.0	**22**
23	17 53.2	+59.7	42.2	18 37.5	+59.8	42.4	19 21.7	+59.9	42.7	20 05.7	+60.0	42.9	20 49.6	+60.0	43.2	21 33.3	+59.9	43.4	22 16.7	+60.0	43.7	23 00.0	+60.0	44.0	**23**
24	18 52.9	+59.8	42.1	19 37.3	+59.9	42.4	20 21.6	+59.9	42.6	21 05.7	+59.9	42.9	21 49.6	+59.9	43.1	22 33.2	+60.0	43.4	23 16.7	+60.0	43.7	24 00.0	+60.0	44.0	**24**
25	19 52.7	+59.7	42.0	20 37.2	+59.8	42.3	21 21.5	+59.8	42.5	22 05.6	+59.9	42.8	22 49.5	+60.0	43.1	23 33.2	+60.0	43.4	24 16.7	+60.0	43.7	25 00.0	+60.0	44.0	**25**
26	20 52.4	+59.8	41.9	21 37.0	+59.8	42.2	22 21.3	+59.9	42.5	23 05.5	+59.9	42.7	23 49.5	+59.9	43.0	24 33.2	+60.0	43.3	25 16.7	+60.0	43.7	26 00.0	+60.0	44.0	**26**
27	21 52.2	+59.7	41.8	22 36.8	+59.8	42.1	23 21.2	+59.9	42.4	24 05.4	+59.9	42.7	24 49.4	+60.0	43.0	25 33.2	+60.0	43.3	26 16.7	+60.0	43.7	27 00.0	+60.0	44.0	**27**
28	22 51.9	+59.8	41.7	23 36.6	+59.8	42.0	24 21.1	+59.8	42.3	25 05.3	+59.9	42.6	25 49.4	+59.9	43.0	26 33.2	+59.9	43.3	27 16.7	+60.0	43.6	28 00.0	+60.0	44.0	**28**
29	23 51.7	+59.7	41.6	24 36.4	+59.8	41.9	25 20.9	+59.9	42.2	26 05.2	+60.0	42.6	26 49.3	+60.0	42.9	27 33.1	+60.0	43.3	28 16.7	+60.0	43.6	29 00.0	+60.0	44.0	**29**
30	24 51.4	+59.7	41.5	25 36.2	+59.8	41.8	26 20.8	+59.9	42.2	27 05.2	+59.9	42.5	27 49.3	+59.9	42.9	28 33.1	+60.0	43.2	29 16.7	+60.0	43.6	30 00.0	+60.0	44.0	**30**
31	25 51.1	+59.8	41.4	26 36.0	+59.8	41.8	27 20.7	+59.8	42.1	28 05.1	+59.9	42.4	28 49.2	+60.0	42.8	29 33.1	+60.0	43.2	30 16.7	+60.0	43.6	31 00.0	+60.0	44.0	**31**
32	26 50.9	+59.7	41.3	27 35.8	+59.8	41.7	28 20.5	+59.9	42.0	29 05.0	+59.9	42.4	29 49.2	+59.9	42.8	30 33.1	+59.9	43.2	31 16.7	+60.0	43.6	32 00.0	+60.0	44.0	**32**
33	27 50.6	+59.7	41.2	28 35.6	+59.8	41.6	29 20.4	+59.8	41.9	30 04.9	+59.9	42.3	30 49.1	+60.0	42.7	31 33.0	+60.0	43.1	32 16.7	+60.0	43.6	33 00.0	+60.0	44.0	**33**
34	28 50.3	+59.7	41.1	29 35.4	+59.8	41.5	30 20.2	+59.9	41.9	31 04.8	+59.9	42.3	31 49.1	+59.9	42.7	32 33.0	+60.0	43.1	33 16.7	+60.0	43.5	34 00.0	+60.0	44.0	**34**
35	29 50.0	+59.8	41.0	30 35.2	+59.8	41.4	31 20.1	+59.8	41.8	32 04.7	+59.9	42.2	32 49.0	+59.9	42.6	33 33.0	+60.0	43.1	34 16.7	+60.0	43.5	35 00.0	+60.0	44.0	**35**
36	30 49.8	+59.7	40.9	31 35.0	+59.8	41.3	32 19.9	+59.9	41.7	33 04.6	+59.9	42.1	33 48.9	+60.0	42.6	34 33.0	+59.9	43.0	35 16.7	+60.0	43.5	36 00.0	+60.0	44.0	**36**
37	31 49.5	+59.7	40.8	32 34.8	+59.7	41.2	33 19.8	+59.8	41.6	34 04.5	+59.9	42.0	34 48.9	+59.9	42.5	35 32.9	+60.0	43.0	36 16.7	+59.9	43.5	37 00.0	+60.0	44.0	**37**
38	32 49.2	+59.6	40.6	33 34.5	+59.8	41.1	34 19.6	+59.9	41.5	35 04.4	+59.9	42.0	35 48.8	+60.0	42.5	36 32.9	+60.0	43.0	37 16.6	+60.0	43.5	38 00.0	+60.0	44.0	**38**
39	33 48.8	+59.7	40.5	34 34.3	+59.8	41.0	35 19.5	+59.8	41.4	36 04.3	+59.9	41.9	36 48.8	+59.9	42.4	37 32.9	+60.0	42.9	38 16.6	+60.0	43.4	39 00.0	+60.0	44.0	**39**
40	34 48.5	+59.7	40.4	35 34.1	+59.7	40.9	36 19.3	+59.8	41.3	37 04.2	+59.9	41.8	37 48.7	+59.9	42.3	38 32.9	+59.9	42.9	39 16.6	+60.0	43.4	40 00.0	+60.0	44.0	**40**
41	35 48.2	+59.7	40.3	36 33.8	+59.8	40.7	37 19.1	+59.8	41.2	38 04.1	+59.8	41.8	38 48.6	+60.0	42.3	39 32.8	+60.0	42.8	40 16.6	+60.0	43.4	41 00.0	+60.0	44.0	**41**
42	36 47.9	+59.6	40.1	37 33.6	+59.7	40.6	38 18.9	+59.9	41.1	39 03.9	+59.9	41.7	39 48.6	+59.9	42.2	40 32.8	+60.0	42.8	41 16.6	+60.0	43.4	42 00.0	+60.0	44.0	**42**
43	37 47.5	+59.7	40.0	38 33.3	+59.8	40.5	39 18.8	+59.8	41.0	40 03.8	+59.9	41.6	40 48.5	+59.9	42.2	41 32.8	+59.9	42.8	42 16.6	+60.0	43.4	43 00.0	+60.0	44.0	**43**
44	38 47.2	+59.6	39.9	39 33.1	+59.7	40.4	40 18.6	+59.8	40.9	41 03.7	+59.9	41.5	41 48.4	+60.0	42.1	42 32.7	+60.0	42.7	43 16.6	+60.0	43.3	44 00.0	+60.0	44.0	**44**
45	39 46.8	+59.7	39.7	40 32.8	+59.7	40.3	41 18.4	+59.8	40.8	42 03.6	+59.8	41.4	42 48.4	+59.9	42.0	43 32.7	+60.0	42.7	44 16.6	+60.0	43.3	45 00.0	+60.0	44.0	**45**
46	40 46.5	+59.6	39.6	41 32.5	+59.7	40.1	42 18.2	+59.8	40.7	43 03.4	+59.9	41.3	43 48.3	+59.9	42.0	44 32.7	+59.9	42.6	45 16.6	+60.0	43.3	46 00.0	+60.0	44.0	**46**
47	41 46.1	+59.6	39.4	42 32.2	+59.7	40.0	43 18.0	+59.8	40.6	44 03.3	+59.9	41.2	44 48.2	+59.9	41.9	45 32.6	+60.0	42.6	46 16.6	+60.0	43.3	47 00.0	+60.0	44.0	**47**
48	42 45.7	+59.6	39.3	43 31.9	+59.7	39.9	44 17.8	+59.7	40.5	45 03.2	+59.8	41.1	45 48.1	+59.9	41.8	46 32.6	+60.0	42.5	47 16.6	+60.0	43.2	48 00.0	+60.0	44.0	**48**
49	43 45.3	+59.6	39.1	44 31.6	+59.7	39.7	45 17.5	+59.8	40.4	46 03.0	+59.9	41.0	46 48.0	+60.0	41.7	47 32.6	+59.9	42.5	48 16.6	+59.9	43.2	49 00.0	+60.0	44.0	**49**
50	44 44.9	+59.5	39.0	45 31.3	+59.7	39.6	46 17.3	+59.8	40.3	47 02.9	+59.8	40.9	47 48.0	+59.9	41.7	48 32.5	+60.0	42.4	49 16.5	+60.0	43.2	50 00.0	+60.0	44.0	**50**
51	45 44.4	+59.6	38.8	46 31.0	+59.6	39.4	47 17.1	+59.7	40.1	48 02.7	+59.9	40.8	48 47.9	+59.9	41.6	49 32.5	+59.9	42.4	50 16.5	+60.0	43.2	51 00.0	+60.0	44.0	**51**
52	46 44.0	+59.5	38.6	47 30.6	+59.7	39.3	48 16.8	+59.8	40.0	49 02.6	+59.8	40.7	49 47.8	+59.9	41.5	50 32.4	+60.0	42.3	51 16.5	+60.0	43.1	52 00.0	+60.0	44.0	**52**
53	47 43.5	+59.5	38.4	48 30.3	+59.6	39.1	49 16.6	+59.7	39.9	50 02.4	+59.8	40.6	50 47.7	+59.9	41.4	51 32.4	+59.9	42.2	52 16.5	+60.0	43.1	53 00.0	+60.0	44.0	**53**
54	48 43.0	+59.5	38.2	49 29.9	+59.6	39.0	50 16.3	+59.7	39.7	51 02.2	+59.8	40.5	51 47.6	+59.9	41.3	52 32.3	+60.0	42.2	53 16.5	+60.0	43.1	54 00.0	+60.0	44.0	**54**
55	49 42.5	+59.5	38.0	50 29.5	+59.6	38.8	51 16.0	+59.8	39.6	52 02.0	+59.8	40.4	52 47.5	+59.9	41.2	53 32.3	+59.9	42.1	54 16.5	+60.0	43.0	55 00.0	+60.0	44.0	**55**
56	50 42.0	+59.4	37.8	51 29.1	+59.6	38.6	52 15.8	+59.7	39.4	53 01.8	+59.8	40.2	53 47.4	+59.8	41.1	54 32.2	+60.0	42.0	55 16.5	+60.0	43.0	56 00.0	+60.0	44.0	**56**
57	51 41.4	+59.5	37.6	52 28.7	+59.6	38.4	53 15.5	+59.6	39.2	54 01.6	+59.8	40.1	54 47.2	+59.9	41.0	55 32.2	+59.9	42.0	56 16.5	+59.9	43.0	57 00.0	+60.0	44.0	**57**
58	52 40.9	+59.4	37.4	53 28.3	+59.5	38.2	54 15.1	+59.7	39.1	55 01.4	+59.8	40.0	55 47.1	+59.9	40.9	56 32.1	+60.0	41.9	57 16.4	+60.0	42.9	58 00.0	+60.0	44.0	**58**
59	53 40.3	+59.3	37.2	54 27.8	+59.5	38.0	55 14.8	+59.7	38.9	56 01.2	+59.8	39.8	56 47.0	+59.8	40.8	57 32.1	+59.9	41.8	58 16.4	+60.0	42.9	59 00.0	+60.0	44.0	**59**
60	54 39.6	+59.4	36.9	55 27.3	+59.5	37.8	56 14.5	+59.6	38.7	57 01.0	+59.7	39.6	57 46.8	+59.9	40.7	58 32.0	+59.9	41.7	59 16.4	+60.0	42.8	60 00.0	+60.0	44.0	**60**
61	55 39.0	+59.3	36.6	56 26.8	+59.5	37.5	57 14.1	+59.6	38.5	58 00.7	+59.8	39.5	58 46.7	+59.9	40.5	59 31.9	+60.0	41.6	60 16.4	+60.0	42.8	61 00.0	+60.0	44.0	**61**
62	56 38.3	+59.2	36.4	57 26.3	+59.4	37.3	58 13.7	+59.6	38.3	59 00.5	+59.7	39.3	59 46.6	+59.8	40.4	60 31.9	+59.9	41.5	61 16.4	+60.0	42.7	62 00.0	+60.0	44.0	**62**
63	57 37.5	+59.3	36.1	58 25.7	+59.4	37.0	59 13.3	+59.6	38.0	60 00.2	+59.7	39.1	60 46.4	+59.8	40.2	61 31.8	+59.9	41.4	62 16.4	+59.9	42.7	63 00.0	+60.0	44.0	**63**
64	58 36.8	+59.1	35.8	59 25.1	+59.4	36.8	60 12.9	+59.5	37.8	60 59.9	+59.7	38.9	61 46.2	+59.8	40.1	62 31.7	+59.9	41.3	63 16.3	+60.0	42.6	64 00.0	+60.0	44.0	**64**
65	59 35.9	+59.2	35.5	60 24.5	+59.3	36.5	61 12.4	+59.5	37.6	61 59.6	+59.7	38.7	62 46.0	+59.8	39.9	63 31.6	+59.9	41.2	64 16.3	+60.0	42.6	65 00.0	+60.0	44.0	**65**
66	60 35.1	+59.0	35.1	61 23.8	+59.3	36.2	62 11.9	+59.5	37.3	62 59.3	+59.6	38.5	63 45.8	+59.8	39.7	64 31.5	+59.9	41.1	65 16.3	+60.0	42.5	66 00.0	+60.0	44.0	**66**
67	61 34.1	+59.0	34.8	62 23.1	+59.2	35.8	63 11.4	+59.4	37.0	63 58.9	+59.6	38.2	64 45.6	+59.8	39.5	65 31.4	+59.9	40.9	66 16.3	+59.9	42.4	67 00.0	+60.0	44.0	**67**
68	62 33.1	+59.0	34.4	63 22.3	+59.2	35.5	64 10.8	+59.4	36.7	64 58.5	+59.6	38.0	65 45.4	+59.8	39.3	66 31.3	+59.9	40.8	67 16.2	+60.0	42.3	68 00.0	+60.0	44.0	**68**
69	63 32.1	+58.9	34.0	64 21.5	+59.1	35.1	65 10.2	+59.4	36.4	65 58.1	+59.6	37.7	66 45.2	+59.7	39.1	67 31.2	+59.9	40.6	68 16.2	+60.0	42.3	69 00.0	+60.0	44.0	**69**
70	64 31.0	+58.7	33.5	65 20.6	+59.1	34.7	66 09.6	+59.3	36.0	66 57.7	+59.5	37.4	67 44.9	+59.7	38.9	68 31.1	+59.9	40.4	69 16.2	+59.9	42.2	70 00.0	+60.0	44.0	**70**
71	65 29.7	+58.7	33.0	66 19.7	+59.0	34.3	67 08.9	+59.2	35.6	67 57.2	+59.5	37.0	68 44.6	+59.7	38.6	69 31.0	+59.8	40.3	70 16.1	+60.0	42.1	71 00.0	+60.0	44.0	**71**
72	66 28.4	+58.6	32.5	67 18.7	+58.8	33.8	68 08.1	+59.2	35.2	68 56.7	+59.4	36.7	69 44.3	+59.6	38.3	70 30.8	+59.8	40.1	71 16.1	+59.9	41.9	72 00.0	+60.0	44.0	**72**
73	67 27.0	+58.5	32.0	68 17.5	+58.8	33.3	69 07.3	+59.1	34.7	69 56.1	+59.4	36.3	70 43.9	+59.7	38.0	71 30.6	+59.9	39.8	72 16.0	+60.0	41.8	73 00.0	+60.0	44.0	**73**
74	68 25.5	+58.3	31.4	69 16.3	+58.7	32.8	70 06.4	+58.9	34.2	70 55.5	+59.3	35.9	71 43.6	+59.5	37.6	72 30.5	+59.7	39.6	73 16.0	+59.9	41.7	74 00.0	+60.0	44.0	**74**
75	69 23.8	+58.1	30.7	70 15.0	+58.5	32.1	71 05.3	+58.9	33.7	71 54.8	+59.2	35.4	72 43.1	+59.5	37.2	73 30.2	+59.8	39.3	74 15.9	+60.0	41.5	75 00.0	+60.0	44.0	**75**
76	70 21.9	+58.0	30.0	71 13.5	+58.4	31.5	72 04.2	+58.8	33.1	72 54.0	+59.1	34.9	73 42.6	+59.5	36.8	74 30.0	+59.7	39.0	75 15.9	+59.9	41.4	76 00.0	+60.0	44.0	**76**
77	71 19.9	+57.7	29.2	72 11.9	+58.2	30.7	73 03.0	+58.6	32.4	73 53.1	+59.0	34.3	74 42.1	+59.4	36.3	75 29.7	+59.7	38.6	76 15.8	+59.9	41.2	77 00.0	+60.0	44.0	**77**
78	72 17.6	+57.5	28.4	73 10.1	+57.9	29.9	74 01.6	+58.4	31.7	74 52.1	+58.9	33.6	75 41.5	+59.3	35.8	76 29.4	+59.7	38.2	77 15.7	+59.9	40.9	78 00.0	+60.0	44.0	**78**
79	73 15.1	+57.2	27.4	74 08.0	+57.7	29.0	75 00.0	+58.3	30.8	75 51.0	+58.8	32.8	76 40.8	+59.2	35.1	77 29.1	+59.6	37.7	78 15.6	+59.9	40.7	79 00.0	+60.0	44.0	**79**
80	74 12.3	+56.9	26.3	75 05.7	+57.4	28.0	75 58.3	+57.9	29.8	76 49.8	+58.5	32.0	77 40.0	+59.0	34.4	78 28.7	+59.5	37.2	79 15.5	+59.9	40.3	80 00.0	+60.0	44.0	**80**
81	75 09.2	+56.4	25.1	76 03.1	+57.0	26.8	76 56.2	+57.7	28.7	77 48.3	+58.2	31.0	78 39.0	+58.9	33.5	79 28.2	+59.4	36.5	80 15.4	+59.8	39.9	81 00.0	+60.0	44.0	**81**
82	76 05.6	+55.8	23.7	77 00.1	+56.6	25.5	77 53.9	+57.2	27.5	78 46.5	+58.0	29.8	79 37.9	+58.6	32.5	80 27.6	+59.3	35.7	81 15.2	+59.8	39.5	82 00.0	+60.0	44.0	**82**
83	77 01.4	+55.3	22.1	77 56.7	+55.9	23.9	78 51.1	+56.7	26.0	79 44.5	+57.5	28.4	80 36.5	+58.4	31.3	81 26.9	+59.1	34.7	82 15.0	+59.7	38.9	83 00.0	+60.0	44.0	**83**
84	77 56.7	+54.4	20.3	78 52.6	+55.2	22.1	79 47.8	+56.0	24.2	80 42.0	+56.9	26.7	81 34.9	+57.8	29.7	82 26.0	+58.8	33.5	83 14.7	+59.6	38.1	84 00.0	+60.0	44.0	**84**
85	78 51.1	+53.4	18.2	79 47.8	+54.2	20.0	80 43.8	+55.1	22.1	81 38.9	+56.1	24.6	82 32.7	+57.3	27.8	83 24.8	+58.4	31.9	84 14.3	+59.5	37.1	85 00.0	+60.0	44.0	**85**
86	79 44.5	+52.0	15.8	80 42.0	+52.9	17.4	81 38.9	+53.8	19.5	82 35.0	+55.0	22.0	83 30.0	+56.2	25.3	84 23.2	+57.7	29.7	85 13.8	+59.2	35.6	86 00.0	+60.0	44.0	**86**
87	80 36.5	+50.4	12.9	81 34.9	*+51.1* •	14.4	82 32.7	*+52.1* •	16.3	83 30.0	*+53.2* •	18.7	84 26.2	*+54.7* •	22.0	85 20.9	+56.6	26.6	86 13.0	+58.6	33.4	87 00.0	+60.0	44.0	**87**
88	81 26.9	*+48.1* •	9.4	82 26.0	*+48.7* •	10.6	83 24.8	*+49.5* •	12.2	84 23.2	*+50.6* •	14.4	85 20.9	*+52.1* •	17.4	86 17.5	*+54.1* •	22.0	87 11.6	*+57.1* •	29.7	88 00.0	+60.0	44.0	**88**
89	82 15.0	*+45.0* •	5.2	83 14.7	*+45.3* •	5.9	84 14.3	*+45.7* •	6.9	85 13.8	*+46.2* •	8.4	86 13.0	*+47.0* •	10.6	87 11.6	*+48.4* •	14.3	88 08.7	*+51.3* •	22.0	89 00.0	+60.0	44.0	**89**
90	83 00.0	*+40.9* •	0.0	84 00.0	*+40.4* •	0.0	85 00.0	*+39.8* •	0.0	86 00.0	*+38.8* •	0.0	87 00.0	*+37.0* •	0.0	88 00.0	*+32.6* •	0.0	89 00.0	*+15.0* •	0.0	90 00.0	−60.0	22.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 136°, 224°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 56.6	+59.8	134.8	4 14.3	+59.9	134.8	3 32.0	+59.9	134.9	2 49.6	+60.0	134.9	2 07.3	+59.9	135.0	1 24.8	+60.0	135.0	0 42.4	+60.0	135.0	0 00.0	+60.0	135.0	0
1	5 56.4	+59.8	134.7	5 14.2	+59.8	134.8	4 31.9	+59.9	134.8	3 49.6	+59.9	134.9	3 07.2	+60.0	134.9	2 24.8	+60.0	135.0	1 42.4	+60.0	135.0	1 00.0	+60.0	135.0	1
2	6 56.2	+59.7	134.6	6 14.0	+59.8	134.7	5 31.8	+59.9	134.8	4 49.5	+59.9	134.8	4 07.2	+59.9	134.9	3 24.8	+60.0	134.9	2 42.4	+60.0	135.0	2 00.0	+60.0	135.0	2
3	7 55.9	+59.8	134.5	7 13.8	+59.9	134.6	6 31.7	+59.8	134.7	5 49.4	+59.9	134.8	5 07.1	+60.0	134.8	4 24.8	+60.0	134.9	3 42.4	+60.0	134.9	3 00.0	+60.0	135.0	3
4	8 55.7	+59.8	134.4	8 13.7	+59.8	134.5	7 31.5	+59.9	134.6	6 49.3	+60.0	134.7	6 07.1	+59.9	134.8	5 24.8	+60.0	134.9	4 42.4	+60.0	134.9	4 00.0	+60.0	135.0	4
5	9 55.5	+59.7	134.3	9 13.5	+59.8	134.5	8 31.4	+59.9	134.6	7 49.3	+59.9	134.7	7 07.0	+60.0	134.8	6 24.8	+59.9	134.9	5 42.4	+60.0	134.9	5 00.0	+60.0	135.0	5
6	10 55.2	+59.8	134.3	10 13.3	+59.9	134.4	9 31.3	+59.9	134.5	8 49.2	+59.9	134.6	8 07.0	+60.0	134.7	7 24.7	+60.0	134.8	6 42.4	+60.0	134.9	6 00.0	+60.0	135.0	6
7	11 55.0	+59.8	134.2	11 13.2	+59.8	134.3	10 31.2	+59.9	134.5	9 49.1	+59.9	134.6	9 07.0	+59.9	134.7	8 24.7	+60.0	134.8	7 42.4	+60.0	134.9	7 00.0	+60.0	135.0	7
8	12 54.8	+59.7	134.1	12 13.0	+59.8	134.2	11 31.1	+59.8	134.4	10 49.0	+60.0	134.5	10 06.9	+60.0	134.7	9 24.7	+60.0	134.8	8 42.4	+60.0	134.9	8 00.0	+60.0	135.0	8
9	13 54.5	+59.8	134.0	13 12.8	+59.8	134.2	12 30.9	+59.9	134.3	11 49.0	+59.9	134.5	11 06.9	+59.9	134.6	10 24.7	+60.0	134.8	9 42.4	+60.0	134.9	9 00.0	+60.0	135.0	9
10	14 54.3	+59.8	133.9	14 12.6	+59.9	134.1	13 30.8	+59.9	134.3	12 48.9	+59.9	134.4	12 06.8	+60.0	134.6	11 24.7	+59.9	134.7	10 42.4	+60.0	134.9	10 00.0	+60.0	135.0	10
11	15 54.1	+59.7	133.8	15 12.5	+59.8	134.0	14 30.7	+59.9	134.2	13 48.8	+59.9	134.4	13 06.8	+59.9	134.5	12 24.6	+60.0	134.7	11 42.4	+60.0	134.9	11 00.0	+60.0	135.0	11
12	16 53.8	+59.8	133.7	16 12.3	+59.8	133.9	15 30.6	+59.9	134.1	14 48.7	+60.0	134.3	14 06.7	+60.0	134.5	13 24.6	+60.0	134.7	12 42.4	+60.0	134.8	12 00.0	+60.0	135.0	12
13	17 53.6	+59.7	133.6	17 12.1	+59.8	133.8	16 30.5	+59.8	134.1	15 48.7	+59.9	134.3	15 06.7	+60.0	134.5	14 24.6	+60.0	134.7	13 42.4	+60.0	134.8	13 00.0	+60.0	135.0	13
14	18 53.3	+59.8	133.5	18 11.9	+59.8	133.8	17 30.3	+59.9	134.0	16 48.6	+59.9	134.2	16 06.7	+59.9	134.4	15 24.6	+60.0	134.6	14 42.4	+60.0	134.8	14 00.0	+60.0	135.0	14
15	19 53.1	+59.7	133.4	19 11.7	+59.9	133.7	18 30.2	+59.9	133.9	17 48.5	+59.9	134.2	17 06.6	+60.0	134.4	16 24.6	+59.9	134.6	15 42.4	+60.0	134.8	15 00.0	+60.0	135.0	15
16	20 52.8	+59.8	133.3	20 11.6	+59.8	133.6	19 30.1	+59.9	133.9	18 48.4	+59.9	134.1	18 06.6	+59.9	134.3	17 24.5	+60.0	134.6	16 42.4	+59.9	134.8	16 00.0	+60.0	135.0	16
17	21 52.6	+59.7	133.2	21 11.4	+59.8	133.5	20 30.0	+59.8	133.8	19 48.3	+60.0	134.1	19 06.5	+60.0	134.3	18 24.5	+60.0	134.5	17 42.3	+60.0	134.8	17 00.0	+60.0	135.0	17
18	22 52.3	+59.7	133.1	22 11.2	+59.8	133.4	21 29.8	+59.9	133.7	20 48.3	+59.9	134.0	20 06.5	+59.9	134.3	19 24.5	+60.0	134.5	18 42.3	+60.0	134.8	18 00.0	+60.0	135.0	18
19	23 52.0	+59.8	133.0	23 11.0	+59.8	133.3	22 29.7	+59.9	133.6	21 48.2	+59.9	133.9	21 06.4	+60.0	134.2	20 24.5	+60.0	134.5	19 42.3	+60.0	134.8	19 00.0	+60.0	135.0	19
20	24 51.8	+59.7	132.9	24 10.8	+59.8	133.3	23 29.6	+59.8	133.6	22 48.1	+59.9	133.9	22 06.4	+59.9	134.2	21 24.5	+59.9	134.5	20 42.3	+60.0	134.7	20 00.0	+60.0	135.0	20
21	25 51.5	+59.7	132.8	25 10.6	+59.8	133.2	24 29.4	+59.9	133.5	23 48.0	+59.9	133.8	23 06.3	+60.0	134.1	22 24.4	+60.0	134.4	21 42.3	+60.0	134.7	21 00.0	+60.0	135.0	21
22	26 51.2	+59.7	132.7	26 10.4	+59.8	133.1	25 29.3	+59.8	133.4	24 47.9	+59.9	133.8	24 06.3	+59.9	134.1	23 24.4	+60.0	134.4	22 42.3	+60.0	134.7	22 00.0	+60.0	135.0	22
23	27 50.9	+59.8	132.6	27 10.2	+59.8	133.0	26 29.1	+59.9	133.3	25 47.8	+59.9	133.7	25 06.2	+60.0	134.0	24 24.4	+60.0	134.4	23 42.3	+60.0	134.7	23 00.0	+60.0	135.0	23
24	28 50.7	+59.7	132.5	28 10.0	+59.8	132.9	27 29.0	+59.8	133.3	26 47.7	+59.9	133.6	26 06.2	+59.9	134.0	25 24.4	+60.0	134.3	24 42.3	+60.0	134.7	24 00.0	+60.0	135.0	24
25	29 50.4	+59.7	132.4	29 09.8	+59.7	132.8	28 28.8	+59.9	133.2	27 47.6	+59.9	133.6	27 06.1	+60.0	134.0	26 24.4	+59.9	134.3	25 42.3	+60.0	134.7	25 00.0	+60.0	135.0	25
26	30 50.1	+59.7	132.3	30 09.5	+59.8	132.7	29 28.7	+59.8	133.1	28 47.5	+59.9	133.5	28 06.1	+59.9	133.9	27 24.3	+60.0	134.3	26 42.3	+60.0	134.6	26 00.0	+60.0	135.0	26
27	31 49.8	+59.6	132.1	31 09.3	+59.8	132.6	30 28.5	+59.9	133.0	29 47.4	+59.9	133.4	29 06.0	+60.0	133.9	28 24.3	+60.0	134.3	27 42.3	+60.0	134.6	27 00.0	+60.0	135.0	27
28	32 49.4	+59.7	132.0	32 09.1	+59.8	132.5	31 28.4	+59.8	132.9	30 47.3	+59.9	133.4	30 06.0	+59.9	133.8	29 24.3	+60.0	134.2	28 42.3	+60.0	134.6	28 00.0	+60.0	135.0	28
29	33 49.1	+59.7	131.9	33 08.9	+59.7	132.4	32 28.2	+59.9	132.9	31 47.2	+59.9	133.3	31 05.9	+60.0	133.8	30 24.3	+59.9	134.2	29 42.3	+60.0	134.6	29 00.0	+60.0	135.0	29
30	34 48.8	+59.7	131.8	34 08.6	+59.8	132.3	33 28.1	+59.8	132.8	32 47.1	+59.9	133.2	32 05.9	+59.9	133.7	31 24.2	+60.0	134.2	30 42.3	+60.0	134.6	30 00.0	+60.0	135.0	30
31	35 48.5	+59.6	131.6	35 08.4	+59.7	132.2	34 27.9	+59.8	132.7	33 47.0	+59.9	133.2	33 05.8	+59.9	133.7	32 24.2	+60.0	134.1	31 42.3	+60.0	134.6	31 00.0	+60.0	135.0	31
32	36 48.1	+59.7	131.5	36 08.1	+59.8	132.1	35 27.7	+59.9	132.6	34 46.9	+59.9	133.1	34 05.7	+60.0	133.6	33 24.2	+60.0	134.1	32 42.3	+60.0	134.6	32 00.0	+60.0	135.0	32
33	37 47.8	+59.6	131.4	37 07.9	+59.7	131.9	36 27.6	+59.8	132.5	35 46.8	+59.9	133.0	35 05.7	+59.9	133.5	34 24.2	+59.9	134.0	33 42.3	+59.9	134.5	33 00.0	+60.0	135.0	33
34	38 47.4	+59.6	131.2	38 07.6	+59.7	131.8	37 27.4	+59.8	132.4	36 46.7	+59.9	133.0	36 05.6	+60.0	133.5	35 24.1	+60.0	134.0	34 42.2	+60.0	134.5	34 00.0	+60.0	135.0	34
35	39 47.0	+59.6	131.1	39 07.3	+59.8	131.7	38 27.2	+59.8	132.3	37 46.6	+59.9	132.9	37 05.6	+59.9	133.4	36 24.1	+60.0	134.0	35 42.2	+60.0	134.5	35 00.0	+60.0	135.0	35
36	40 46.6	+59.6	130.9	40 07.1	+59.7	131.6	39 27.0	+59.8	132.2	38 46.5	+59.9	132.8	38 05.5	+59.9	133.4	37 24.1	+59.9	133.9	36 42.2	+60.0	134.5	36 00.0	+60.0	135.0	36
37	41 46.2	+59.6	130.8	41 06.8	+59.7	131.4	40 26.8	+59.8	132.1	39 46.4	+59.8	132.7	39 05.4	+60.0	133.3	38 24.0	+60.0	133.9	37 42.2	+60.0	134.5	37 00.0	+60.0	135.0	37
38	42 45.8	+59.6	130.6	42 06.5	+59.7	131.3	41 26.6	+59.8	132.0	40 46.2	+59.9	132.6	40 05.4	+59.9	133.3	39 24.0	+60.0	133.9	38 42.2	+60.0	134.4	38 00.0	+60.0	135.0	38
39	43 45.4	+59.6	130.5	43 06.2	+59.7	131.2	42 26.4	+59.8	131.9	41 46.1	+59.9	132.5	41 05.3	+59.9	133.2	40 24.0	+59.9	133.8	39 42.2	+60.0	134.4	39 00.0	+60.0	135.0	39
40	44 45.0	+59.5	130.3	44 05.9	+59.7	131.0	43 26.2	+59.8	131.8	42 46.0	+59.8	132.5	42 05.2	+59.9	133.1	41 23.9	+60.0	133.8	40 42.2	+60.0	134.4	40 00.0	+60.0	135.0	40
41	45 44.5	+59.6	130.1	45 05.6	+59.6	130.9	44 26.0	+59.7	131.6	43 45.8	+59.9	132.4	43 05.1	+60.0	133.1	42 23.9	+60.0	133.7	41 42.2	+60.0	134.4	41 00.0	+60.0	135.0	41
42	46 44.1	+59.5	129.9	46 05.2	+59.7	130.7	45 25.7	+59.8	131.5	44 45.7	+59.8	132.3	44 05.1	+59.9	133.0	43 23.9	+59.9	133.7	42 42.2	+60.0	134.4	42 00.0	+60.0	135.0	42
43	47 43.6	+59.5	129.8	47 04.9	+59.6	130.6	46 25.5	+59.8	131.4	45 45.5	+59.9	132.2	45 05.0	+59.9	132.9	44 23.8	+60.0	133.6	43 42.2	+60.0	134.3	43 00.0	+60.0	135.0	43
44	48 43.1	+59.4	129.6	48 04.5	+59.6	130.4	47 25.3	+59.7	131.3	46 45.4	+59.8	132.1	46 04.9	+59.9	132.8	45 23.8	+60.0	133.6	44 42.2	+60.0	134.3	44 00.0	+60.0	135.0	44
45	49 42.5	+59.5	129.4	49 04.1	+59.6	130.3	48 25.0	+59.7	131.1	47 45.2	+59.9	132.0	47 04.8	+59.9	132.8	46 23.8	+59.9	133.5	45 42.2	+60.0	134.3	45 00.0	+60.0	135.0	45
46	50 42.0	+59.4	129.1	50 03.7	+59.6	130.1	49 24.7	+59.8	131.0	48 45.1	+59.8	131.8	48 04.7	+59.9	132.7	47 23.7	+60.0	133.5	46 42.2	+59.9	134.3	46 00.0	+60.0	135.0	46
47	51 41.4	+59.4	128.9	51 03.3	+59.6	129.9	50 24.5	+59.7	130.8	49 44.9	+59.8	131.7	49 04.6	+59.9	132.6	48 23.7	+59.9	133.4	47 42.1	+60.0	134.2	47 00.0	+60.0	135.0	47
48	52 40.8	+59.4	128.7	52 02.9	+59.6	129.7	51 24.2	+59.7	130.7	50 44.7	+59.8	131.6	50 04.5	+59.9	132.5	49 23.6	+60.0	133.4	48 42.1	+60.0	134.2	48 00.0	+60.0	135.0	48
49	53 40.2	+59.4	128.5	53 02.5	+59.5	129.5	52 23.9	+59.7	130.5	51 44.5	+59.8	131.5	51 04.4	+59.9	132.4	50 23.6	+60.0	133.3	49 42.1	+60.0	134.2	49 00.0	+60.0	135.0	49
50	54 39.6	+59.3	128.2	54 02.0	+59.5	129.3	53 23.6	+59.6	130.3	52 44.3	+59.8	131.3	52 04.3	+59.9	132.3	51 23.6	+59.9	133.2	50 42.1	+60.0	134.1	50 00.0	+60.0	135.0	50
51	55 38.9	+59.2	127.9	55 01.5	+59.5	129.1	54 23.2	+59.7	130.2	53 44.1	+59.8	131.2	53 04.2	+59.9	132.2	52 23.5	+60.0	133.2	51 42.1	+60.0	134.1	51 00.0	+60.0	135.0	51
52	56 38.1	+59.3	127.7	56 01.0	+59.5	128.8	55 22.9	+59.6	130.0	54 43.9	+59.8	131.1	54 04.1	+59.9	132.1	53 23.5	+59.9	133.1	52 42.1	+60.0	134.1	52 00.0	+60.0	135.0	52
53	57 37.4	+59.2	127.4	57 00.5	+59.4	128.6	56 22.5	+59.7	129.8	55 43.7	+59.8	130.9	55 04.0	+59.8	132.0	54 23.4	+60.0	133.0	53 42.1	+60.0	134.0	53 00.0	+60.0	135.0	53
54	58 36.6	+59.1	127.1	57 59.9	+59.4	128.3	57 22.2	+59.5	129.6	56 43.5	+59.7	130.8	56 03.8	+59.9	131.9	55 23.4	+59.9	133.0	54 42.1	+59.9	134.0	54 00.0	+60.0	135.0	54
55	59 35.7	+59.1	126.7	58 59.3	+59.3	128.1	58 21.7	+59.6	129.4	57 43.2	+59.7	130.6	57 03.7	+59.9	131.8	56 23.3	+59.9	132.9	55 42.0	+60.0	134.0	55 00.0	+60.0	135.0	55
56	60 34.8	+59.1	126.4	59 58.6	+59.4	127.8	59 21.3	+59.6	129.1	58 42.9	+59.8	130.4	58 03.6	+59.8	131.6	57 23.2	+60.0	132.8	56 42.0	+60.0	133.9	56 00.0	+60.0	135.0	56
57	61 33.9	+58.9	126.0	60 58.0	+59.2	127.5	60 20.9	+59.5	128.9	59 42.7	+59.7	130.2	59 03.4	+59.8	131.5	58 23.2	+59.9	132.7	57 42.0	+60.0	133.9	57 00.0	+60.0	135.0	57
58	62 32.8	+58.9	125.6	61 57.2	+59.3	127.2	61 20.4	+59.5	128.6	60 42.4	+59.6	130.0	60 03.2	+59.9	131.4	59 23.1	+59.9	132.6	58 42.0	+60.0	133.8	58 00.0	+60.0	135.0	58
59	63 31.7	+58.9	125.2	62 56.5	+59.1	126.8	62 19.9	+59.4	128.3	61 42.0	+59.7	129.8	61 03.1	+59.8	131.2	60 23.0	+59.9	132.5	59 42.0	+60.0	133.8	59 00.0	+60.0	135.0	59
60	64 30.6	+58.7	124.8	63 55.6	+59.2	126.4	63 19.3	+59.4	128.1	62 41.7	+59.6	129.6	62 02.9	+59.8	131.0	61 22.9	+60.0	132.4	60 42.0	+59.9	133.7	60 00.0	+60.0	135.0	60
61	65 29.3	+58.7	124.3	64 54.8	+59.0	126.0	64 18.7	+59.4	127.7	63 41.3	+59.7	129.3	63 02.7	+59.8	130.9	62 22.9	+59.9	132.3	61 41.9	+60.0	133.7	61 00.0	+60.0	135.0	61
62	66 28.0	+58.5	123.8	65 53.8	+59.0	125.6	65 18.1	+59.3	127.4	64 41.0	+59.5	129.1	64 02.5	+59.8	130.7	63 22.8	+59.9	132.2	62 41.9	+60.0	133.6	62 00.0	+60.0	135.0	62
63	67 26.5	+58.4	123.2	66 52.8	+58.9	125.2	66 17.4	+59.3	127.0	65 40.5	+59.6	128.8	65 02.3	+59.7	130.5	64 22.7	+59.9	132.1	63 41.9	+60.0	133.6	63 00.0	+60.0	135.0	63
64	68 24.9	+58.2	122.6	67 51.7	+58.7	124.7	67 16.7	+59.2	126.6	66 40.1	+59.5	128.5	66 02.0	+59.8	130.3	65 22.6	+59.9	131.9	64 41.9	+59.9	133.5	64 00.0	+60.0	135.0	64
65	69 23.1	+58.1	121.9	68 50.4	+58.7	124.1	68 15.9	+59.1	126.2	67 39.6	+59.5	128.2	67 01.8	+59.7	130.0	66 22.5	+59.9	131.8	65 41.8	+60.0	133.4	65 00.0	+60.0	135.0	65
66	70 21.2	+57.9	121.2	69 49.1	+58.5	123.5	69 15.0	+59.0	125.7	68 39.1	+59.4	127.8	68 01.5	+59.7	129.8	67 22.4	+59.8	131.6	66 41.8	+60.0	133.4	66 00.0	+60.0	135.0	66
67	71 19.1	+57.7	120.4	70 47.6	+58.4	122.9	70 14.0	+59.0	125.2	69 38.5	+59.4	127.4	69 01.2	+59.6	129.5	68 22.2	+59.9	131.4	67 41.8	+60.0	133.3	67 00.0	+60.0	135.0	67
68	72 16.8	+57.4	119.5	71 46.0	+58.2	122.2	71 13.0	+58.8	124.6	70 37.9	+59.3	127.0	70 00.8	+59.7	129.2	69 22.1	+59.8	131.2	68 41.8	+59.9	133.2	68 00.0	+60.0	135.0	68
69	73 14.2	+57.1	118.5	72 44.2	+58.0	121.4	72 11.8	+58.7	124.0	71 37.2	+59.2	126.5	71 00.5	+59.6	128.9	70 21.9	+59.9	131.0	69 41.7	+60.0	133.1	69 00.0	+60.0	135.0	69
70	74 11.3	+56.7	117.4	73 42.2	+57.8	120.5	73 10.5	+58.6	123.3	72 36.4	+59.1	126.0	72 00.1	+59.5	128.5	71 21.8	+59.8	130.8	70 41.7	+59.9	133.0	70 00.0	+60.0	135.0	70
71	75 08.0	+56.3	116.2	74 40.0	+57.4	119.5	74 09.1	+58.3	122.5	73 35.5	+59.0	125.4	72 59.6	+59.5	128.1	72 21.6	+59.8	130.6	71 41.6	+60.0	132.9	71 00.0	+60.0	135.0	71
72	76 04.3	+55.7	114.8	75 37.4	+57.1	118.3	75 07.4	+58.1	121.7	74 34.5	+58.9	124.8	73 59.1	+59.4	127.6	73 21.4	+59.7	130.3	72 41.6	+59.9	132.7	72 00.0	+60.0	135.0	72
73	77 00.0	+55.1	113.2	76 34.5	+56.7	117.1	76 05.5	+57.9	120.7	75 33.4	+58.8	124.0	74 58.5	+59.4	127.1	74 21.1	+59.8	130.0	73 41.5	+60.0	132.6	73 00.0	+60.0	135.0	73
74	77 55.1	+54.2	111.4	77 31.2	+56.0	115.6	77 03.4	+57.5	119.5	76 32.2	+58.5	123.2	75 57.9	+59.2	126.5	75 20.9	+59.6	129.6	74 41.5	+59.9	132.4	74 00.0	+60.0	135.0	74
75	78 49.3	+53.2	109.3	78 27.2	+55.4	113.9	78 00.9	+57.0	118.2	77 30.7	+58.3	122.2	76 57.1	+59.1	125.8	76 20.5	+59.7	129.2	75 41.4	+59.9	132.2	75 00.0	+60.0	135.0	75
76	79 42.5	+51.8	106.8	79 22.6	+54.5	111.9	78 57.9	+56.5	116.6	78 29.0	+57.9	121.0	77 56.2	+59.0	125.1	77 20.2	+59.6	128.7	76 41.3	+59.9	132.0	76 00.0	+60.0	135.0	76
77	80 34.3	+50.1•	103.8	80 17.1	+53.3	109.5	79 54.4	+55.8	114.8	79 26.9	+57.6	119.7	78 55.2	+58.8	124.1	78 19.8	+59.5	128.2	77 41.2	+59.9	131.8	77 00.0	+60.0	135.0	77
78	81 24.4	+47.7•	100.3	81 10.4	+51.7	106.6	80 50.2	+54.8	112.6	80 24.5	+57.0	118.1	79 54.0	+58.5	123.0	79 19.3	+59.4	127.5	78 41.1	+59.9	131.5	78 00.0	+60.0	135.0	78
79	82 12.1	+44.7•	96.0	82 02.1	+49.6•	103.2	81 45.0	+53.4	109.9	81 21.5	+56.3	116.1	80 52.5	+58.1	121.7	80 18.7	+59.3	126.7	79 41.0	+59.8	131.1	79 00.0	+60.0	135.0	79
80	82 56.8	+40.4•	90.9	82 51.7	+46.5•	98.9	82 38.4	+51.6•	106.6	82 17.8	+55.2	113.7	81 50.6	+57.7	120.1	81 18.0	+59.1	125.7	80 40.8	+59.8	130.7	80 00.0	+60.0	135.0	80
81	83 37.2	+34.8•	84.5	83 38.2	+42.4•	93.5	83 30.0	+48.7•	102.3	83 13.0	+53.6•	110.5	82 48.3	+56.9	118.0	82 17.1	+58.8	124.5	81 40.6	+59.8	130.2	81 00.0	+60.0	135.0	81
82	84 12.0	+27.2•	76.8	84 20.6	+36.3•	86.7	84 18.7	+44.7•	96.8	84 06.6	+51.2•	106.5	83 45.2	+55.7	115.3	83 15.9	+58.4	123.0	82 40.4	+59.7	129.5	82 00.0	+60.0	135.0	82
83	84 39.2	+17.7•	67.7	84 56.9	+28.0•	78.2	85 03.4	+38.3•	89.6	84 57.8	+47.4•	101.0	84 40.9	+54.0•	111.6	84 14.3	+57.8	120.9	83 40.1	+59.5	128.6	83 00.0	+60.0	135.0	83
84	84 56.9	+6.5•	57.1	85 24.9	+16.8•	67.6	85 41.7	+28.9•	80.0	85 45.2	+41.0•	93.4	85 34.9	+50.6•	106.4	85 12.1	+56.7	117.9	84 39.6	+59.4	127.4	84 00.0	+60.0	135.0	84
85	85 03.4	−5.6•	45.7	85 41.7	+3.5•	55.2	86 10.6	+15.6•	67.6	86 26.2	+30.2•	82.6	86 25.5	+44.6•	98.7	86 08.8	+54.4•	113.5	85 39.0	+58.9	125.7	85 00.0	+60.0	135.0	85
86	84 57.8	−16.9•	34.2	85 45.2	−10.3•	41.8	86 26.2	−0.7•	52.5	86 56.4	+13.7•	67.5	87 10.1	+32.2•	86.6	87 03.2	+49.3•	106.4	86 37.9	+58.1	122.9	86 00.0	+60.0	135.0	86
87	84 40.9	−26.6•	23.5	85 34.9	−22.8•	28.7	86 25.5	−16.7•	36.4	87 10.1	−6.9•	48.5	87 42.3	+10.2•	67.5	87 52.5	+35.7•	93.3	87 36.0	+55.6•	117.9	87 00.0	+60.0	135.0	87
88	84 14.3	−34.2•	14.2	85 12.1	−32.5•	17.2	86 08.8	−29.8•	21.5	87 03.2	−25.3•	28.7	87 52.5	−16.5•	41.7	88 28.2	+3.4•	67.5	88 31.6	+42.5•	106.3	88 00.0	+60.0	135.0	88
89	83 40.1	−40.1•	6.4	84 39.6	−39.6•	7.6	85 39.0	−39.0•	9.4	86 37.9	−37.9•	12.1	87 36.0	−36.0•	17.1	88 31.6	−31.6•	28.7	89 14.1	−14.1•	67.5	89 00.0	+60.0	135.0	89
90	83 00.0	−44.4•	0.0	84 00.0	−44.6•	0.0	85 00.0	−45.0•	0.0	86 00.0	−45.6•	0.0	87 00.0	−46.4•	0.0	88 00.0	−47.9•	0.0	89 00.0	−50.9•	0.0	90 00.0	−60.0	67.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 45°, 315°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 56.6	−59.8	134.8	4 14.3	−59.8	134.8	3 32.0	−59.9	134.9	2 49.6	−59.9	134.9	2 07.3	−60.0	135.0	1 24.8	−59.9	135.0	0 42.4	−60.0	135.0	0 00.0	+60.0	45.0	0
1	3 56.8	−59.7	134.9	3 14.5	−59.8	134.9	2 32.1	−59.9	135.0	1 49.7	−59.9	135.0	1 07.3	−60.0	135.0	0 24.9	−60.0	135.0	0 17.6	+60.0	45.0	1 00.0	+60.0	45.0	1
2	2 57.1	−59.8	135.0	2 14.7	−59.9	135.0	1 32.2	−59.9	135.0	0 49.8	−59.9	135.0	0 07.3	−59.9	135.0	0 35.1	+60.0	45.0	1 17.6	+60.0	45.0	2 00.0	+60.0	45.0	2
3	1 57.3	−59.8	135.0	1 14.8	−59.8	135.1	0 32.3	−59.8	135.1	0 10.1	+60.0	44.9	0 52.6	+60.0	44.9	1 35.1	+60.0	44.9	2 17.6	+60.0	45.0	3 00.0	+60.0	45.0	3
4	0 57.5	−59.8	135.1	0 15.0	−59.9	135.1	0 27.5	+59.9	44.9	1 10.1	+59.9	44.9	1 52.6	+59.9	44.9	2 35.1	+60.0	44.9	3 17.6	+60.0	45.0	4 00.0	+60.0	45.0	4
5	0 02.3	+59.7	44.8	0 44.9	+59.8	44.8	1 27.4	+59.9	44.8	2 10.0	+59.9	44.8	2 52.5	+60.0	44.9	3 35.1	+59.9	44.9	4 17.6	+59.9	44.9	5 00.0	+60.0	45.0	5
6	1 02.0	+59.8	44.7	1 44.7	+59.8	44.7	2 27.3	+59.9	44.7	3 09.9	+60.0	44.8	3 52.5	+60.0	44.8	4 35.0	+60.0	44.9	5 17.5	+60.0	44.9	6 00.0	+60.0	45.0	6
7	2 01.8	+59.8	44.6	2 44.5	+59.9	44.6	3 27.2	+59.9	44.7	4 09.9	+59.9	44.7	4 52.5	+59.9	44.8	5 35.0	+60.0	44.8	6 17.5	+60.0	44.9	7 00.0	+60.0	45.0	7
8	3 01.6	+59.8	44.5	3 44.4	+59.8	44.6	4 27.1	+59.9	44.6	5 09.8	+59.9	44.7	5 52.4	+60.0	44.7	6 35.0	+60.0	44.8	7 17.5	+60.0	44.9	8 00.0	+60.0	45.0	8
9	4 01.4	+59.7	44.4	4 44.2	+59.8	44.5	5 27.0	+59.9	44.6	6 09.7	+59.9	44.6	6 52.4	+59.9	44.7	7 35.0	+60.0	44.8	8 17.5	+60.0	44.9	9 00.0	+60.0	45.0	9
10	5 01.1	+59.8	44.4	5 44.0	+59.9	44.4	6 26.9	+59.8	44.5	7 09.6	+60.0	44.6	7 52.3	+60.0	44.7	8 35.0	+60.0	44.8	9 17.5	+60.0	44.9	10 00.0	+60.0	45.0	10
11	6 00.9	+59.8	44.3	6 43.9	+59.8	44.3	7 26.7	+59.9	44.4	8 09.6	+59.9	44.5	8 52.3	+60.0	44.6	9 35.0	+59.9	44.7	10 17.5	+60.0	44.9	11 00.0	+60.0	45.0	11
12	7 00.7	+59.8	44.2	7 43.7	+59.8	44.3	8 26.6	+59.9	44.4	9 09.5	+59.9	44.5	9 52.3	+59.9	44.6	10 34.9	+60.0	44.7	11 17.5	+60.0	44.9	12 00.0	+60.0	45.0	12
13	8 00.5	+59.7	44.1	8 43.5	+59.9	44.2	9 26.5	+59.9	44.3	10 09.4	+59.9	44.4	10 52.2	+60.0	44.6	11 34.9	+60.0	44.7	12 17.5	+60.0	44.8	13 00.0	+60.0	45.0	13
14	9 00.2	+59.8	44.0	9 43.4	+59.8	44.1	10 26.4	+59.9	44.2	11 09.3	+60.0	44.4	11 52.2	+59.9	44.5	12 34.9	+60.0	44.7	13 17.5	+60.0	44.8	14 00.0	+60.0	45.0	14
15	10 00.0	+59.8	43.9	10 43.2	+59.8	44.0	11 26.3	+59.9	44.2	12 09.3	+59.9	44.3	12 52.1	+60.0	44.5	13 34.9	+60.0	44.6	14 17.5	+60.0	44.8	15 00.0	+60.0	45.0	15
16	10 59.8	+59.7	43.8	11 43.0	+59.8	44.0	12 26.2	+59.8	44.1	13 09.2	+59.9	44.3	13 52.1	+59.9	44.4	14 34.9	+59.9	44.6	15 17.5	+60.0	44.8	16 00.0	+60.0	45.0	16
17	11 59.5	+59.8	43.7	12 42.8	+59.9	43.9	13 26.0	+59.9	44.0	14 09.1	+59.9	44.2	14 52.0	+60.0	44.4	15 34.8	+60.0	44.6	16 17.5	+60.0	44.8	17 00.0	+60.0	45.0	17
18	12 59.3	+59.8	43.6	13 42.7	+59.8	43.8	14 25.9	+59.9	44.0	15 09.0	+59.9	44.2	15 52.0	+59.9	44.4	16 34.8	+60.0	44.6	17 17.5	+60.0	44.8	18 00.0	+60.0	45.0	18
19	13 59.1	+59.7	43.6	14 42.5	+59.8	43.7	15 25.8	+59.9	43.9	16 08.9	+60.0	44.1	16 51.9	+60.0	44.3	17 34.8	+60.0	44.5	18 17.5	+60.0	44.8	19 00.0	+60.0	45.0	19
20	14 58.8	+59.8	43.5	15 42.3	+59.8	43.6	16 25.7	+59.8	43.8	17 08.9	+59.9	44.1	17 51.9	+60.0	44.3	18 34.8	+60.0	44.5	19 17.5	+60.0	44.7	20 00.0	+60.0	45.0	20
21	15 58.6	+59.8	43.4	16 42.1	+59.9	43.6	17 25.5	+59.9	43.8	18 08.8	+59.9	44.0	18 51.9	+59.9	44.2	19 34.8	+59.9	44.5	20 17.5	+60.0	44.7	21 00.0	+60.0	45.0	21
22	16 58.4	+59.7	43.3	17 42.0	+59.8	43.5	18 25.4	+59.9	43.7	19 08.7	+59.9	43.9	19 51.8	+60.0	44.2	20 34.7	+60.0	44.5	21 17.5	+60.0	44.7	22 00.0	+60.0	45.0	22
23	17 58.1	+59.8	43.2	18 41.8	+59.8	43.4	19 25.3	+59.9	43.6	20 08.6	+59.9	43.9	20 51.8	+59.9	44.2	21 34.7	+60.0	44.4	22 17.5	+60.0	44.7	23 00.0	+60.0	45.0	23
24	18 57.9	+59.7	43.1	19 41.6	+59.8	43.3	20 25.2	+59.8	43.6	21 08.5	+60.0	43.8	21 51.7	+60.0	44.1	22 34.7	+60.0	44.4	23 17.5	+60.0	44.7	24 00.0	+60.0	45.0	24
25	19 57.6	+59.8	43.0	20 41.4	+59.8	43.2	21 25.0	+59.9	43.5	22 08.5	+59.9	43.8	22 51.7	+59.9	44.1	23 34.7	+60.0	44.4	24 17.5	+59.9	44.7	25 00.0	+60.0	45.0	25
26	20 57.4	+59.7	42.9	21 41.2	+59.8	43.2	22 24.9	+59.9	43.4	23 08.4	+59.9	43.7	23 51.6	+60.0	44.0	24 34.7	+59.9	44.3	25 17.4	+60.0	44.7	26 00.0	+60.0	45.0	26
27	21 57.1	+59.7	42.8	22 41.0	+59.8	43.1	23 24.8	+59.8	43.4	24 08.3	+59.9	43.7	24 51.6	+59.9	44.0	25 34.6	+60.0	44.3	26 17.4	+60.0	44.6	27 00.0	+60.0	45.0	27
28	22 56.8	+59.8	42.7	23 40.8	+59.8	43.0	24 24.6	+59.9	43.3	25 08.2	+59.9	43.6	25 51.5	+60.0	43.9	26 34.6	+60.0	44.3	27 17.4	+60.0	44.6	28 00.0	+60.0	45.0	28
29	23 56.6	+59.7	42.6	24 40.6	+59.8	42.9	25 24.5	+59.8	43.2	26 08.1	+59.9	43.5	26 51.5	+59.9	43.9	27 34.6	+60.0	44.2	28 17.4	+60.0	44.6	29 00.0	+60.0	45.0	29
30	24 56.3	+59.7	42.5	25 40.4	+59.8	42.8	26 24.3	+59.9	43.1	27 08.0	+59.9	43.5	27 51.4	+60.0	43.8	28 34.6	+59.9	44.2	29 17.4	+60.0	44.6	30 00.0	+60.0	45.0	30
31	25 56.0	+59.8	42.4	26 40.2	+59.8	42.7	27 24.2	+59.9	43.1	28 07.9	+59.9	43.4	28 51.4	+59.9	43.8	29 34.5	+60.0	44.2	30 17.4	+60.0	44.6	31 00.0	+60.0	45.0	31
32	26 55.8	+59.7	42.3	27 40.0	+59.8	42.6	28 24.1	+59.8	43.0	29 07.8	+59.9	43.4	29 51.3	+60.0	43.7	30 34.5	+60.0	44.1	31 17.4	+60.0	44.6	32 00.0	+60.0	45.0	32
33	27 55.5	+59.7	42.2	28 39.8	+59.8	42.5	29 23.9	+59.9	42.9	30 07.7	+59.9	43.3	30 51.3	+59.9	43.7	31 34.5	+60.0	44.1	32 17.4	+60.0	44.5	33 00.0	+60.0	45.0	33
34	28 55.2	+59.7	42.0	29 39.6	+59.8	42.4	30 23.8	+59.8	42.8	31 07.6	+59.9	43.2	31 51.2	+59.9	43.6	32 34.5	+59.9	44.1	33 17.4	+60.0	44.5	34 00.0	+60.0	45.0	34
35	29 54.9	+59.7	41.9	30 39.4	+59.8	42.3	31 23.6	+59.8	42.7	32 07.5	+59.9	43.2	32 51.1	+60.0	43.6	33 34.4	+60.0	44.0	34 17.4	+60.0	44.5	35 00.0	+60.0	45.0	35
36	30 54.6	+59.7	41.8	31 39.2	+59.7	42.2	32 23.4	+59.9	42.6	33 07.4	+59.9	43.1	33 51.1	+59.9	43.5	34 34.4	+60.0	44.0	35 17.4	+60.0	44.5	36 00.0	+60.0	45.0	36
37	31 54.3	+59.7	41.7	32 38.9	+59.8	42.1	33 23.3	+59.8	42.6	34 07.3	+59.9	43.0	34 51.0	+60.0	43.5	35 34.4	+60.0	44.0	36 17.4	+60.0	44.5	37 00.0	+60.0	45.0	37
38	32 54.0	+59.6	41.6	33 38.7	+59.8	42.0	34 23.1	+59.8	42.5	35 07.2	+59.9	42.9	35 51.0	+59.9	43.4	36 34.4	+59.9	43.9	37 17.4	+60.0	44.5	38 00.0	+60.0	45.0	38
39	33 53.6	+59.7	41.5	34 38.5	+59.7	41.9	35 22.9	+59.9	42.4	36 07.1	+59.9	42.9	36 50.9	+59.9	43.4	37 34.3	+60.0	43.9	38 17.4	+60.0	44.4	39 00.0	+60.0	45.0	39
40	34 53.3	+59.7	41.3	35 38.2	+59.8	41.8	36 22.8	+59.8	42.3	37 07.0	+59.9	42.8	37 50.8	+60.0	43.3	38 34.3	+60.0	43.9	39 17.4	+59.9	44.4	40 00.0	+60.0	45.0	40
41	35 53.0	+59.6	41.2	36 38.0	+59.7	41.7	37 22.6	+59.8	42.2	38 06.9	+59.8	42.7	38 50.8	+59.9	43.3	39 34.3	+59.9	43.8	40 17.3	+60.0	44.4	41 00.0	+60.0	45.0	41
42	36 52.6	+59.7	41.1	37 37.7	+59.7	41.6	38 22.4	+59.8	42.1	39 06.7	+59.9	42.6	39 50.7	+59.9	43.2	40 34.2	+60.0	43.8	41 17.3	+60.0	44.4	42 00.0	+60.0	45.0	42
43	37 52.3	+59.6	40.9	38 37.4	+59.8	41.4	39 22.2	+59.8	42.0	40 06.6	+59.9	42.5	40 50.6	+60.0	43.1	41 34.2	+60.0	43.7	42 17.3	+60.0	44.4	43 00.0	+60.0	45.0	43
44	38 51.9	+59.6	40.8	39 37.2	+59.7	41.3	40 22.0	+59.8	41.9	41 06.5	+59.9	42.5	41 50.6	+59.9	43.1	42 34.2	+59.9	43.7	43 17.3	+60.0	44.3	44 00.0	+60.0	45.0	44
45	39 51.5	+59.7	40.6	40 36.9	+59.7	41.2	41 21.8	+59.8	41.8	42 06.4	+59.8	42.4	42 50.5	+59.9	43.0	43 34.1	+60.0	43.6	44 17.3	+60.0	44.3	45 00.0	+60.0	45.0	45
46	40 51.2	+59.6	40.5	41 36.6	+59.7	41.1	42 21.6	+59.8	41.7	43 06.2	+59.9	42.3	43 50.4	+59.9	42.9	44 34.1	+60.0	43.6	45 17.3	+60.0	44.3	46 00.0	+60.0	45.0	46
47	41 50.8	+59.6	40.3	42 36.3	+59.7	40.9	43 21.4	+59.8	41.5	44 06.1	+59.8	42.2	44 50.3	+59.9	42.9	45 34.1	+59.9	43.5	46 17.3	+60.0	44.3	47 00.0	+60.0	45.0	47
48	42 50.4	+59.5	40.2	43 36.0	+59.7	40.8	44 21.2	+59.8	41.4	45 05.9	+59.9	42.1	45 50.2	+59.9	42.8	46 34.0	+60.0	43.5	47 17.3	+60.0	44.2	48 00.0	+60.0	45.0	48
49	43 49.9	+59.6	40.0	44 35.7	+59.6	40.7	45 21.0	+59.7	41.3	46 05.8	+59.8	42.0	46 50.1	+60.0	42.7	47 34.0	+59.9	43.4	48 17.3	+60.0	44.2	49 00.0	+60.0	45.0	49
50	44 49.5	+59.5	39.9	45 35.3	+59.7	40.5	46 20.7	+59.8	41.2	47 05.6	+59.9	41.9	47 50.1	+59.9	42.6	48 33.9	+60.0	43.4	49 17.3	+60.0	44.2	50 00.0	+60.0	45.0	50
51	45 49.0	+59.6	39.7	46 35.0	+59.6	40.4	47 20.5	+59.7	41.0	48 05.5	+59.8	41.8	48 50.0	+59.9	42.5	49 33.9	+60.0	43.3	50 17.3	+59.9	44.1	51 00.0	+60.0	45.0	51
52	46 48.6	+59.5	39.5	47 34.6	+59.7	40.2	48 20.2	+59.8	40.9	49 05.3	+59.8	41.7	49 49.9	+59.9	42.4	50 33.9	+59.9	43.3	51 17.2	+60.0	44.1	52 00.0	+60.0	45.0	52
53	47 48.1	+59.5	39.3	48 34.3	+59.6	40.0	49 20.0	+59.7	40.8	50 05.1	+59.9	41.5	50 49.8	+59.9	42.4	51 33.8	+60.0	43.2	52 17.2	+60.0	44.1	53 00.0	+60.0	45.0	53
54	48 47.6	+59.5	39.1	49 33.9	+59.6	39.9	50 19.7	+59.7	40.6	51 05.0	+59.8	41.4	51 49.7	+59.9	42.3	52 33.8	+59.9	43.1	53 17.2	+60.0	44.0	54 00.0	+60.0	45.0	54
55	49 47.1	+59.4	38.9	50 33.5	+59.6	39.7	51 19.4	+59.7	40.5	52 04.8	+59.8	41.3	52 49.6	+59.8	42.2	53 33.7	+60.0	43.1	54 17.2	+60.0	44.0	55 00.0	+60.0	45.0	55
56	50 46.5	+59.4	38.7	51 33.1	+59.5	39.5	52 19.1	+59.7	40.3	53 04.6	+59.8	41.2	53 49.4	+59.9	42.1	54 33.7	+59.9	43.0	55 17.2	+60.0	44.0	56 00.0	+60.0	45.0	56
57	51 45.9	+59.4	38.5	52 32.6	+59.6	39.3	53 18.8	+59.7	40.1	54 04.4	+59.8	41.0	54 49.3	+59.9	41.9	55 33.6	+59.9	42.9	56 17.2	+60.0	43.9	57 00.0	+60.0	45.0	57
58	52 45.3	+59.4	38.3	53 32.2	+59.5	39.1	54 18.5	+59.6	40.0	55 04.2	+59.7	40.9	55 49.2	+59.9	41.8	56 33.5	+60.0	42.8	57 17.2	+59.9	43.9	58 00.0	+60.0	45.0	58
59	53 44.7	+59.4	38.0	54 31.7	+59.5	38.9	55 18.1	+59.7	39.8	56 03.9	+59.8	40.7	56 49.1	+59.8	41.7	57 33.5	+59.9	42.8	58 17.1	+60.0	43.9	59 00.0	+60.0	45.0	59
60	54 44.1	+59.3	37.8	55 31.2	+59.5	38.6	56 17.8	+59.6	39.6	57 03.7	+59.7	40.6	57 48.9	+59.9	41.6	58 33.4	+59.9	42.7	59 17.1	+60.0	43.8	60 00.0	+60.0	45.0	60
61	55 43.4	+59.2	37.5	56 30.7	+59.4	38.4	57 17.4	+59.6	39.4	58 03.4	+59.8	40.4	58 48.8	+59.8	41.5	59 33.3	+60.0	42.6	60 17.1	+60.0	43.8	61 00.0	+60.0	45.0	61
62	56 42.6	+59.3	37.2	57 30.1	+59.4	38.2	58 17.0	+59.6	39.2	59 03.2	+59.7	40.2	59 48.6	+59.8	41.3	60 33.3	+59.9	42.5	61 17.1	+60.0	43.7	62 00.0	+60.0	45.0	62
63	57 41.9	+59.2	36.9	58 29.5	+59.4	37.9	59 16.6	+59.5	38.9	60 02.9	+59.7	40.0	60 48.4	+59.9	41.2	61 33.2	+59.9	42.4	62 17.1	+60.0	43.6	63 00.0	+60.0	45.0	63
64	58 41.1	+59.1	36.6	59 28.9	+59.4	37.6	60 16.1	+59.5	38.7	61 02.6	+59.6	39.8	61 48.3	+59.8	41.0	62 33.1	+59.9	42.3	63 17.1	+59.9	43.6	64 00.0	+60.0	45.0	64
65	59 40.2	+59.1	36.3	60 28.3	+59.3	37.3	61 15.6	+59.5	38.4	62 02.2	+59.7	39.6	62 48.1	+59.8	40.8	63 33.0	+59.9	42.1	64 17.0	+60.0	43.5	65 00.0	+60.0	45.0	65
66	60 39.3	+59.0	35.9	61 27.6	+59.2	37.0	62 15.1	+59.5	38.2	63 01.9	+59.6	39.4	63 47.9	+59.7	40.6	64 32.9	+59.9	42.0	65 17.0	+60.0	43.5	66 00.0	+60.0	45.0	66
67	61 38.3	+59.0	35.6	62 26.8	+59.2	36.7	63 14.6	+59.4	37.9	64 01.5	+59.6	39.1	64 47.6	+59.8	40.4	65 32.8	+59.9	41.9	66 17.0	+59.9	43.4	67 00.0	+60.0	45.0	67
68	62 37.3	+58.9	35.2	63 26.0	+59.2	36.3	64 14.0	+59.4	37.5	65 01.1	+59.6	38.8	65 47.4	+59.8	40.2	66 32.7	+59.9	41.7	67 16.9	+60.0	43.3	68 00.0	+60.0	45.0	68
69	63 36.2	+58.8	34.7	64 25.2	+59.0	35.9	65 13.4	+59.3	37.2	66 00.7	+59.6	38.6	66 47.2	+59.7	40.0	67 32.6	+59.9	41.6	68 16.9	+60.0	43.2	69 00.0	+60.0	45.0	69
70	64 35.0	+58.8	34.3	65 24.2	+59.0	35.5	66 12.7	+59.2	36.8	67 00.3	+59.4	38.2	67 46.9	+59.7	39.8	68 32.5	+59.8	41.4	69 16.9	+59.9	43.1	70 00.0	+60.0	45.0	70
71	65 33.8	+58.6	33.8	66 23.2	+59.0	35.1	67 11.9	+59.2	36.4	67 59.7	+59.5	37.9	68 46.6	+59.7	39.5	69 32.3	+59.9	41.2	70 16.8	+60.0	43.0	71 00.0	+60.0	45.0	71
72	66 32.4	+58.5	33.3	67 22.2	+58.8	34.6	68 11.1	+59.2	36.0	68 59.2	+59.4	37.5	69 46.3	+59.6	39.2	70 32.2	+59.8	41.0	71 16.8	+60.0	42.9	72 00.0	+60.0	45.0	72
73	67 30.9	+58.4	32.7	68 21.0	+58.7	34.1	69 10.3	+59.0	35.6	69 58.6	+59.3	37.1	70 45.9	+59.6	38.9	71 32.0	+59.8	40.7	72 16.8	+59.9	42.8	73 00.0	+60.0	45.0	73
74	68 29.3	+58.2	32.1	69 19.7	+58.6	33.5	70 09.3	+59.0	35.0	70 57.9	+59.3	36.7	71 45.5	+59.5	38.5	72 31.8	+59.8	40.5	73 16.7	+59.9	42.6	74 00.0	+60.0	45.0	74
75	69 27.5	+58.1	31.4	70 18.3	+58.5	32.9	71 08.3	+58.8	34.5	71 57.2	+59.2	36.2	72 45.0	+59.5	38.1	73 31.6	+59.7	40.2	74 16.6	+60.0	42.5	75 00.0	+60.0	45.0	75
76	70 25.6	+57.9	30.7	71 16.8	+58.3	32.2	72 07.1	+58.7	33.9	72 56.4	+59.1	35.7	73 44.5	+59.5	37.7	74 31.3	+59.8	39.9	75 16.6	+59.9	42.3	76 00.0	+60.0	45.0	76
77	71 23.5	+57.7	29.9	72 15.1	+58.1	31.5	73 05.8	+58.6	33.2	73 55.5	+59.0	35.1	74 44.0	+59.4	37.2	75 31.1	+59.7	39.5	76 16.5	+59.9	42.1	77 00.0	+60.0	45.0	77
78	72 21.2	+57.3	29.0	73 13.2	+57.9	30.6	74 04.4	+58.3	32.4	74 54.5	+58.8	34.4	75 43.4	+59.2	36.6	76 30.8	+59.6	39.1	77 16.4	+59.9	41.9	78 00.0	+60.0	45.0	78
79	73 18.5	+57.1	28.0	74 11.1	+57.6	29.7	75 02.7	+58.2	31.5	75 53.3	+58.7	33.6	76 42.6	+59.2	35.9	77 30.4	+59.6	38.6	78 16.3	+59.9	41.6	79 00.0	+60.0	45.0	79
80	74 15.6	+56.7	26.9	75 08.7	+57.3	28.6	76 00.9	+57.9	30.5	76 52.0	+58.4	32.7	77 41.8	+59.0	35.2	78 30.0	+59.5	38.0	79 16.2	+59.8	41.3	80 00.0	+60.0	45.0	80
81	75 12.3	+56.2	25.7	76 06.0	+56.9	27.4	76 58.8	+57.5	29.4	77 50.4	+58.2	31.7	78 40.8	+58.8	34.3	79 29.5	+59.4	37.3	80 16.0	+59.9	40.9	81 00.0	+60.0	45.0	81
82	76 08.5	+55.7	24.3	77 02.9	+56.3	26.0	77 56.3	+57.1	28.1	78 48.6	+57.9	30.5	79 39.6	+58.6	33.2	80 28.9	+59.2	36.5	81 15.9	+59.7	40.4	82 00.0	+60.0	45.0	82
83	77 04.2	+55.0	22.7	77 59.2	+55.8	24.5	78 53.4	+56.5	26.6	79 46.5	+57.4	29.0	80 38.2	+58.2	32.0	81 28.1	+59.1	35.5	82 15.6	+59.8	39.8	83 00.0	+60.0	45.0	83
84	77 59.2	+54.2	20.8	78 55.0	+54.9	22.6	79 49.9	+55.9	24.8	80 43.9	+56.8	27.3	81 36.4	+57.8	30.4	82 27.2	+58.7	34.2	83 15.4	+59.6	39.0	84 00.0	+60.0	45.0	84
85	78 53.4	+53.1	18.7	79 49.9	+54.0	20.4	80 45.8	+54.9	22.6	81 40.7	+55.9	25.2	82 34.2	+57.1	28.5	83 25.9	+58.4	32.6	84 15.0	+59.4	38.0	85 00.0	+60.0	45.0	85
86	79 46.5	+51.7	16.1	80 43.9	+52.5	17.8	81 40.7	+53.5	19.9	82 36.6	+54.7	22.5	83 31.3	+56.1	25.9	84 24.3	+57.6	30.4	85 14.4	+59.2	36.5	86 00.0	+60.0	45.0	86
87	80 38.2	*+49.9* •	13.1	81 36.4	*+50.8* •	14.7	82 34.2	*+51.7* •	16.6	83 31.3	*+53.0* •	19.1	84 27.4	*+54.5* •	22.5	85 21.9	+56.4	27.3	86 13.6	+58.5	34.2	87 00.0	+60.0	45.0	87
88	81 28.1	*+47.5* •	9.6	82 27.2	*+48.2* •	10.8	83 25.9	*+49.1* •	12.5	84 24.3	*+50.1* •	14.7	85 21.9	*+51.7* •	17.8	86 18.3	*+53.8* •	22.5	87 12.1	*+57.0* •	30.4	88 00.0	+60.0	45.0	88
89	82 15.6	*+44.4* •	5.3	83 15.4	*+44.6* •	6.0	84 15.0	*+45.0* •	7.1	85 14.4	*+45.6* •	8.6	86 13.6	*+46.4* •	10.8	87 12.1	*+47.9* •	14.6	88 09.1	*+50.9* •	22.5	89 00.0	+60.0	45.0	89
90	83 00.0	*+40.1* •	0.0	84 00.0	*+39.6* •	0.0	85 00.0	*+39.0* •	0.0	86 00.0	*+37.9* •	0.0	87 00.0	*+36.0* •	0.0	88 00.0	*+31.6* •	0.0	89 00.0	*+14.1* •	0.0	90 00.0	−60.0	22.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 135°, 225°

46°, 314° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 51.4	+59.7	133.8	4 09.8	+59.9	133.8	3 28.3	+59.8	133.9	2 46.6	+60.0	133.9	2 05.0	+60.0	134.0	1 23.4	+59.9	134.0	0 41.7	+60.0	134.0	0 00.0	+60.0	134.0	**0**
1	5 51.1	+59.8	133.7	5 09.7	+59.8	133.8	4 28.1	+59.9	133.8	3 46.6	+59.9	133.9	3 05.0	+59.9	133.9	2 23.3	+60.0	134.0	1 41.7	+60.0	134.0	1 00.0	+60.0	134.0	**1**
2	6 50.9	+59.8	133.6	6 09.5	+59.8	133.7	5 28.0	+59.9	133.8	4 46.5	+59.9	133.8	4 04.9	+60.0	133.9	3 23.3	+60.0	133.9	2 41.7	+60.0	134.0	2 00.0	+60.0	134.0	**2**
3	7 50.7	+59.7	133.5	7 09.3	+59.9	133.6	6 27.9	+59.9	133.7	5 46.4	+59.9	133.8	5 04.9	+59.9	133.8	4 23.3	+60.0	133.9	3 41.7	+60.0	134.0	3 00.0	+60.0	134.0	**3**
4	8 50.4	+59.8	133.4	8 09.2	+59.8	133.5	7 27.8	+59.9	133.6	6 46.3	+60.0	133.7	6 04.8	+60.0	133.8	5 23.3	+60.0	133.9	4 41.7	+60.0	133.9	4 00.0	+60.0	134.0	**4**
5	9 50.2	+59.8	133.3	9 09.0	+59.8	133.5	8 27.7	+59.8	133.6	7 46.3	+59.9	133.7	7 04.8	+60.0	133.8	6 23.3	+59.9	133.9	5 41.7	+59.9	133.9	5 00.0	+60.0	134.0	**5**
6	10 50.0	+59.7	133.2	10 08.8	+59.8	133.4	9 27.5	+59.9	133.5	8 46.2	+59.9	133.6	8 04.8	+59.9	133.7	7 23.2	+60.0	133.8	6 41.6	+60.0	133.9	6 00.0	+60.0	134.0	**6**
7	11 49.7	+59.8	133.2	11 08.6	+59.9	133.3	10 27.4	+59.9	133.4	9 46.1	+59.9	133.6	9 04.7	+60.0	133.7	8 23.2	+60.0	133.8	7 41.6	+60.0	133.9	7 00.0	+60.0	134.0	**7**
8	12 49.5	+59.7	133.1	12 08.5	+59.8	133.2	11 27.3	+59.9	133.4	10 46.0	+60.0	133.5	10 04.7	+59.9	133.7	9 23.2	+60.0	133.8	8 41.6	+60.0	133.9	8 00.0	+60.0	134.0	**8**
9	13 49.2	+59.8	133.0	13 08.3	+59.8	133.1	12 27.2	+59.9	133.3	11 46.0	+59.9	133.5	11 04.6	+60.0	133.6	10 23.2	+60.0	133.8	9 41.6	+60.0	133.9	9 00.0	+60.0	134.0	**9**
10	14 49.0	+59.7	132.9	14 08.1	+59.8	133.1	13 27.1	+59.8	133.2	12 45.9	+59.9	133.4	12 04.6	+59.9	133.6	11 23.2	+59.9	133.7	10 41.6	+60.0	133.9	10 00.0	+60.0	134.0	**10**
11	15 48.7	+59.8	132.8	15 07.9	+59.8	133.0	14 26.9	+59.9	133.2	13 45.8	+59.9	133.4	13 04.5	+60.0	133.5	12 23.1	+60.0	133.7	11 41.6	+60.0	133.9	11 00.0	+60.0	134.0	**11**
12	16 48.5	+59.7	132.7	16 07.7	+59.8	132.9	15 26.8	+59.9	133.1	14 45.7	+59.9	133.3	14 04.5	+59.9	133.5	13 23.1	+60.0	133.7	12 41.6	+60.0	133.8	12 00.0	+60.0	134.0	**12**
13	17 48.2	+59.8	132.6	17 07.5	+59.9	132.8	16 26.7	+59.8	133.0	15 45.6	+60.0	133.3	15 04.4	+60.0	133.5	14 23.1	+60.0	133.6	13 41.6	+60.0	133.8	13 00.0	+60.0	134.0	**13**
14	18 48.0	+59.7	132.5	18 07.4	+59.8	132.7	17 26.5	+59.9	133.0	16 45.6	+59.9	133.2	16 04.4	+59.9	133.4	15 23.1	+60.0	133.6	14 41.6	+60.0	133.8	14 00.0	+60.0	134.0	**14**
15	19 47.7	+59.8	132.4	19 07.2	+59.8	132.7	18 26.4	+59.9	132.9	17 45.5	+59.9	133.1	17 04.3	+60.0	133.4	16 23.1	+59.9	133.6	15 41.6	+60.0	133.8	15 00.0	+60.0	134.0	**15**
16	20 47.5	+59.7	132.3	20 07.0	+59.8	132.6	19 26.3	+59.8	132.8	18 45.4	+59.9	133.1	18 04.3	+60.0	133.3	17 23.0	+60.0	133.6	16 41.6	+60.0	133.8	16 00.0	+60.0	134.0	**16**
17	21 47.2	+59.7	132.2	21 06.8	+59.8	132.5	20 26.1	+59.9	132.8	19 45.3	+59.9	133.0	19 04.3	+59.9	133.3	18 23.0	+60.0	133.5	17 41.6	+60.0	133.8	17 00.0	+60.0	134.0	**17**
18	22 46.9	+59.8	132.1	22 06.6	+59.8	132.4	21 26.0	+59.9	132.7	20 45.2	+59.9	133.0	20 04.2	+60.0	133.3	19 23.0	+60.0	133.5	18 41.6	+60.0	133.8	18 00.0	+60.0	134.0	**18**
19	23 46.7	+59.7	132.0	23 06.4	+59.8	132.3	22 25.9	+59.8	132.6	21 45.1	+59.9	132.9	21 04.2	+59.9	133.2	20 23.0	+60.0	133.5	19 41.6	+60.0	133.7	19 00.0	+60.0	134.0	**19**
20	24 46.4	+59.7	131.9	24 06.2	+59.8	132.2	23 25.7	+59.9	132.5	22 45.0	+60.0	132.9	22 04.1	+60.0	133.2	21 23.0	+59.9	133.5	20 41.6	+60.0	133.7	20 00.0	+60.0	134.0	**20**
21	25 46.1	+59.7	131.8	25 06.0	+59.8	132.1	24 25.6	+59.8	132.5	23 45.0	+59.9	132.8	23 04.1	+59.9	133.1	22 22.9	+60.0	133.4	21 41.6	+60.0	133.7	21 00.0	+60.0	134.0	**21**
22	26 45.8	+59.7	131.7	26 05.8	+59.8	132.0	25 25.4	+59.9	132.4	24 44.9	+59.9	132.7	24 04.0	+60.0	133.1	23 22.9	+60.0	133.4	22 41.6	+60.0	133.7	22 00.0	+60.0	134.0	**22**
23	27 45.5	+59.7	131.6	27 05.6	+59.7	131.9	26 25.3	+59.9	132.3	25 44.8	+59.9	132.7	25 04.0	+59.9	133.0	24 22.9	+60.0	133.4	23 41.6	+60.0	133.7	23 00.0	+60.0	134.0	**23**
24	28 45.2	+59.7	131.4	28 05.3	+59.8	131.9	27 25.2	+59.8	132.2	26 44.7	+59.9	132.6	26 03.9	+60.0	133.0	25 22.9	+59.9	133.3	24 41.6	+60.0	133.7	24 00.0	+60.0	134.0	**24**
25	29 44.9	+59.7	131.3	29 05.1	+59.8	131.8	28 25.0	+59.8	132.2	27 44.6	+59.9	132.6	27 03.9	+59.9	132.9	26 22.8	+60.0	133.3	25 41.6	+59.9	133.7	25 00.0	+60.0	134.0	**25**
26	30 44.6	+59.7	131.2	30 04.9	+59.8	131.7	29 24.8	+59.9	132.1	28 44.5	+59.9	132.5	28 03.8	+59.9	132.9	27 22.8	+60.0	133.3	26 41.5	+60.0	133.6	26 00.0	+60.0	134.0	**26**
27	31 44.3	+59.7	131.1	31 04.7	+59.7	131.6	30 24.7	+59.8	132.0	29 44.4	+59.9	132.4	29 03.7	+60.0	132.8	28 22.8	+60.0	133.2	27 41.5	+60.0	133.6	27 00.0	+60.0	134.0	**27**
28	32 44.0	+59.6	131.0	32 04.4	+59.8	131.4	31 24.5	+59.9	131.9	30 44.3	+59.9	132.4	30 03.7	+59.9	132.8	29 22.8	+59.9	133.2	28 41.5	+60.0	133.6	28 00.0	+60.0	134.0	**28**
29	33 43.6	+59.7	130.8	33 04.2	+59.7	131.3	32 24.4	+59.8	131.8	31 44.2	+59.9	132.3	31 03.6	+60.0	132.7	30 22.7	+60.0	133.2	29 41.5	+60.0	133.6	29 00.0	+60.0	134.0	**29**
30	34 43.3	+59.6	130.7	34 03.9	+59.8	131.2	33 24.2	+59.8	131.7	32 44.1	+59.9	132.2	32 03.6	+59.9	132.7	31 22.7	+60.0	133.1	30 41.5	+60.0	133.6	30 00.0	+60.0	134.0	**30**
31	35 42.9	+59.7	130.6	35 03.7	+59.7	131.1	34 24.0	+59.9	131.6	33 44.0	+59.9	132.1	33 03.5	+59.9	132.6	32 22.7	+60.0	133.1	31 41.5	+60.0	133.6	31 00.0	+60.0	134.0	**31**
32	36 42.6	+59.6	130.5	36 03.4	+59.8	131.0	35 23.9	+59.8	131.6	34 43.9	+59.8	132.1	34 03.4	+60.0	132.6	33 22.7	+59.9	133.1	32 41.5	+60.0	133.5	32 00.0	+60.0	134.0	**32**
33	37 42.2	+59.7	130.3	37 03.2	+59.7	130.9	36 23.7	+59.8	131.5	35 43.7	+59.9	132.0	35 03.4	+59.9	132.5	34 22.6	+60.0	133.0	33 41.5	+60.0	133.5	33 00.0	+60.0	134.0	**33**
34	38 41.9	+59.6	130.2	38 02.9	+59.7	130.8	37 23.5	+59.8	131.4	36 43.6	+59.9	131.9	36 03.3	+60.0	132.5	35 22.6	+60.0	133.0	34 41.5	+60.0	133.5	34 00.0	+60.0	134.0	**34**
35	39 41.5	+59.6	130.0	39 02.6	+59.7	130.7	38 23.3	+59.8	131.3	37 43.5	+59.9	131.8	37 03.3	+59.9	132.4	36 22.6	+59.9	133.0	35 41.5	+60.0	133.5	35 00.0	+60.0	134.0	**35**
36	40 41.1	+59.6	129.9	40 02.3	+59.7	130.5	39 23.1	+59.8	131.2	38 43.4	+59.9	131.8	38 03.2	+59.9	132.3	37 22.5	+60.0	132.9	36 41.5	+60.0	133.5	36 00.0	+60.0	134.0	**36**
37	41 40.7	+59.5	129.7	41 02.0	+59.7	130.4	40 22.9	+59.8	131.0	39 43.3	+59.8	131.7	39 03.1	+59.9	132.3	38 22.5	+60.0	132.9	37 41.5	+60.0	133.4	37 00.0	+60.0	134.0	**37**
38	42 40.2	+59.6	129.6	42 01.7	+59.7	130.3	41 22.7	+59.8	130.9	40 43.1	+59.9	131.6	40 03.0	+60.0	132.2	39 22.5	+60.0	132.8	38 41.5	+60.0	133.4	38 00.0	+60.0	134.0	**38**
39	43 39.8	+59.6	129.4	43 01.4	+59.7	130.1	42 22.5	+59.8	130.8	41 43.0	+59.9	131.5	41 03.0	+59.9	132.2	40 22.5	+59.9	132.8	39 41.5	+59.9	133.4	39 00.0	+60.0	134.0	**39**
40	44 39.4	+59.5	129.2	44 01.1	+59.7	130.0	43 22.3	+59.7	130.7	42 42.9	+59.8	131.4	42 02.9	+59.9	132.1	41 22.4	+60.0	132.8	40 41.4	+60.0	133.4	40 00.0	+60.0	134.0	**40**
41	45 38.9	+59.5	129.0	45 00.8	+59.6	129.8	44 22.0	+59.8	130.6	43 42.7	+59.9	131.3	43 02.8	+59.9	132.0	42 22.4	+60.0	132.7	41 41.4	+60.0	133.4	41 00.0	+60.0	134.0	**41**
42	46 38.4	+59.5	128.9	46 00.4	+59.7	129.7	45 21.8	+59.8	130.5	44 42.6	+59.8	131.2	44 02.7	+60.0	132.0	43 22.4	+59.9	132.7	42 41.4	+60.0	133.3	42 00.0	+60.0	134.0	**42**
43	47 37.9	+59.5	128.7	47 00.1	+59.6	129.5	46 21.6	+59.7	130.3	45 42.4	+59.9	131.1	45 02.7	+59.9	131.9	44 22.3	+60.0	132.6	43 41.4	+60.0	133.3	43 00.0	+60.0	134.0	**43**
44	48 37.4	+59.4	128.5	47 59.7	+59.6	129.4	47 21.3	+59.7	130.2	46 42.3	+59.8	131.0	46 02.6	+59.9	131.8	45 22.3	+59.9	132.6	44 41.4	+60.0	133.3	44 00.0	+60.0	134.0	**44**
45	49 36.8	+59.5	128.3	48 59.3	+59.6	129.2	48 21.0	+59.8	130.1	47 42.1	+59.8	130.9	47 02.5	+59.9	131.7	46 22.2	+60.0	132.5	45 41.4	+60.0	133.3	45 00.0	+60.0	134.0	**45**
46	50 36.3	+59.4	128.1	49 58.9	+59.6	129.0	49 20.8	+59.7	129.9	48 41.9	+59.8	130.8	48 02.4	+59.9	131.6	47 22.2	+60.0	132.5	46 41.4	+60.0	133.2	46 00.0	+60.0	134.0	**46**
47	51 35.7	+59.4	127.8	50 58.5	+59.5	128.8	50 20.5	+59.7	129.8	49 41.7	+59.9	130.7	49 02.3	+59.9	131.6	48 22.2	+59.9	132.4	47 41.4	+60.0	133.2	47 00.0	+60.0	134.0	**47**
48	52 35.1	+59.3	127.6	51 58.0	+59.6	128.6	51 20.2	+59.7	129.6	50 41.6	+59.8	130.6	50 02.2	+59.9	131.5	49 22.1	+60.0	132.3	48 41.4	+60.0	133.2	48 00.0	+60.0	134.0	**48**
49	53 34.4	+59.4	127.4	52 57.6	+59.5	128.4	52 19.9	+59.7	129.4	51 41.4	+59.8	130.4	51 02.1	+59.9	131.4	50 22.1	+59.9	132.3	49 41.4	+60.0	133.2	49 00.0	+60.0	134.0	**49**
50	54 33.8	+59.3	127.1	53 57.1	+59.5	128.2	53 19.6	+59.6	129.3	52 41.2	+59.8	130.3	52 02.0	+59.9	131.3	51 22.0	+60.0	132.2	50 41.4	+59.9	133.1	50 00.0	+60.0	134.0	**50**
51	55 33.1	+59.2	126.8	54 56.6	+59.5	128.0	54 19.2	+59.7	129.1	53 41.0	+59.7	130.2	53 01.9	+59.8	131.2	52 22.0	+59.9	132.2	51 41.3	+60.0	133.1	51 00.0	+60.0	134.0	**51**
52	56 32.3	+59.2	126.6	55 56.1	+59.4	127.8	55 18.9	+59.6	128.9	54 40.7	+59.8	130.0	54 01.7	+59.9	131.1	53 21.9	+60.0	132.1	52 41.3	+60.0	133.1	52 00.0	+60.0	134.0	**52**
53	57 31.5	+59.2	126.3	56 55.5	+59.4	127.5	56 18.5	+59.6	128.7	55 40.5	+59.8	129.9	55 01.6	+59.9	131.0	54 21.9	+59.9	132.0	53 41.3	+60.0	133.0	53 00.0	+60.0	134.0	**53**
54	58 30.7	+59.1	126.0	57 54.9	+59.4	127.2	57 18.1	+59.6	128.5	56 40.3	+59.7	129.7	56 01.5	+59.8	130.8	55 21.8	+59.9	131.9	54 41.3	+60.0	133.0	54 00.0	+60.0	134.0	**54**
55	59 29.8	+59.1	125.6	58 54.3	+59.3	127.0	58 17.7	+59.5	128.3	57 40.0	+59.7	129.5	57 01.3	+59.9	130.7	56 21.7	+60.0	131.9	55 41.3	+60.0	133.0	55 00.0	+60.0	134.0	**55**
56	60 28.9	+59.0	125.3	59 53.6	+59.3	126.7	59 17.2	+59.6	128.0	58 39.7	+59.7	129.3	58 01.2	+59.8	130.6	57 21.7	+59.9	131.8	56 41.3	+60.0	132.9	56 00.0	+60.0	134.0	**56**
57	61 27.9	+59.0	124.9	60 52.9	+59.3	126.4	60 16.8	+59.5	127.8	59 39.4	+59.7	129.1	59 01.0	+59.9	130.4	58 21.6	+59.9	131.7	57 41.3	+59.9	132.9	57 00.0	+60.0	134.0	**57**
58	62 26.9	+58.8	124.5	61 52.2	+59.2	126.0	61 16.3	+59.4	127.5	60 39.1	+59.7	128.9	60 00.9	+59.8	130.3	59 21.5	+60.0	131.6	58 41.2	+60.0	132.8	58 00.0	+60.0	134.0	**58**
59	63 25.7	+58.8	124.1	62 51.4	+59.2	125.7	62 15.7	+59.5	127.2	61 38.8	+59.7	128.7	61 00.7	+59.8	130.1	60 21.5	+59.9	131.5	59 41.2	+60.0	132.8	59 00.0	+60.0	134.0	**59**
60	64 24.5	+58.7	123.6	63 50.6	+59.0	125.3	63 15.2	+59.4	126.9	62 38.5	+59.6	128.5	62 00.5	+59.8	130.0	61 21.4	+59.9	131.4	60 41.2	+60.0	132.7	60 00.0	+60.0	134.0	**60**
61	65 23.2	+58.6	123.1	64 49.6	+59.1	124.9	64 14.6	+59.3	126.6	63 38.1	+59.6	128.3	63 00.3	+59.8	129.8	62 21.3	+59.9	131.3	61 41.2	+60.0	132.7	61 00.0	+60.0	134.0	**61**
62	66 21.8	+58.5	122.6	65 48.7	+58.9	124.5	65 13.9	+59.3	126.3	64 37.7	+59.6	128.0	64 00.1	+59.8	129.6	63 21.2	+59.9	131.1	62 41.2	+59.9	132.6	62 00.0	+60.0	134.0	**62**
63	67 20.3	+58.4	122.0	66 47.6	+58.9	124.0	66 13.2	+59.3	125.9	65 37.3	+59.5	127.7	64 59.9	+59.7	129.4	64 21.1	+59.9	131.0	63 41.1	+60.0	132.5	63 00.0	+60.0	134.0	**63**
64	68 18.7	+58.2	121.4	67 46.5	+58.7	123.5	67 12.5	+59.1	125.5	66 36.8	+59.5	127.4	65 59.6	+59.7	129.2	65 21.0	+59.9	130.9	64 41.1	+60.0	132.5	64 00.0	+60.0	134.0	**64**
65	69 16.9	+58.0	120.8	68 45.2	+58.6	123.0	68 11.6	+59.1	125.1	67 36.3	+59.5	127.1	66 59.3	+59.8	129.0	66 20.9	+59.9	130.7	65 41.1	+60.0	132.4	65 00.0	+60.0	134.0	**65**
66	70 14.9	+57.9	120.0	69 43.8	+58.5	122.4	69 10.7	+59.0	124.6	68 35.8	+59.4	126.7	67 59.1	+59.6	128.7	67 20.8	+59.8	130.6	66 41.1	+59.9	132.3	66 00.0	+60.0	134.0	**66**
67	71 12.8	+57.6	119.2	70 42.3	+58.4	121.7	70 09.7	+59.0	124.1	69 35.2	+59.3	126.3	68 58.7	+59.7	128.4	68 20.6	+59.9	130.4	67 41.0	+60.0	132.3	67 00.0	+60.0	134.0	**67**
68	72 10.4	+57.3	118.3	71 40.7	+58.1	121.0	71 08.7	+58.8	123.5	70 34.5	+59.3	125.9	69 58.4	+59.6	128.1	69 20.5	+59.8	130.2	68 41.0	+59.9	132.2	68 00.0	+60.0	134.0	**68**
69	73 07.7	+57.1	117.3	72 38.8	+58.0	120.2	72 07.5	+58.6	122.9	71 33.8	+59.2	125.4	70 58.0	+59.6	127.8	70 20.3	+59.9	130.0	69 40.9	+60.0	132.1	69 00.0	+60.0	134.0	**69**
70	74 04.8	+56.6	116.2	73 36.8	+57.7	119.3	73 06.1	+58.5	122.2	72 33.0	+59.1	124.9	71 57.6	+59.5	127.4	71 20.2	+59.8	129.8	70 40.9	+60.0	132.0	70 00.0	+60.0	134.0	**70**
71	75 01.4	+56.2	115.0	74 34.5	+57.4	118.3	74 04.6	+58.3	121.4	73 32.1	+59.0	124.3	72 57.1	+59.5	127.0	72 20.0	+59.8	129.5	71 40.9	+59.9	131.8	71 00.0	+60.0	134.0	**71**
72	75 57.6	+55.7	113.6	75 31.9	+57.0	117.2	75 02.9	+58.1	120.5	74 31.1	+58.8	123.6	73 56.6	+59.4	126.5	73 19.8	+59.7	129.2	72 40.8	+60.0	131.7	72 00.0	+60.0	134.0	**72**
73	76 53.3	+55.0	112.0	76 28.9	+56.6	115.9	76 01.0	+57.8	119.5	75 29.9	+58.7	122.9	74 56.0	+59.3	126.0	74 19.5	+59.7	128.9	73 40.8	+59.9	131.5	73 00.0	+60.0	134.0	**73**
74	77 48.3	+54.1	110.2	77 25.5	+56.0	114.4	76 58.8	+57.4	118.3	76 28.6	+58.5	122.0	75 55.3	+59.2	125.4	75 19.2	+59.7	128.5	74 40.7	+59.9	131.4	74 00.0	+60.0	134.0	**74**
75	78 42.4	+53.1	108.1	78 21.5	+55.3	112.7	77 56.2	+57.0	117.0	77 27.1	+58.3	121.0	76 54.5	+59.1	124.7	76 18.9	+59.6	128.1	75 40.6	+59.9	131.2	75 00.0	+60.0	134.0	**75**
76	79 35.5	+51.7	105.6	79 16.8	+54.4	110.7	78 53.2	+56.5	115.5	78 25.4	+57.9	119.9	77 53.6	+59.0	123.9	77 18.5	+59.6	127.6	76 40.5	+59.9	131.0	76 00.0	+60.0	134.0	**76**
77	80 27.2	*+50.0*	•102.7	80 11.2	+53.2	108.3	79 49.7	+55.7	113.6	79 23.3	+57.5	118.5	78 52.6	+58.7	123.0	78 18.1	+59.5	127.1	77 40.4	+59.9	130.7	77 00.0	+60.0	134.0	**77**
78	81 17.2	*+47.7*	• 99.2	81 04.4	+51.6	105.5	80 45.4	+54.7	111.4	80 20.8	+56.9	116.9	79 51.3	+58.5	121.9	79 17.6	+59.4	126.4	78 40.3	+59.9	130.4	78 00.0	+60.0	134.0	**78**
79	82 04.9	*+44.6*	• 95.0	81 56.0	*+49.5*	•102.0	81 40.1	+53.3	108.7	81 17.7	+56.2	114.9	80 49.8	+58.1	120.5	80 17.0	+59.3	125.6	79 40.2	+59.8	130.1	79 00.0	+60.0	134.0	**79**
80	82 49.5	*+40.4*	• 89.9	82 45.5	*+46.5*	• 97.8	82 33.4	*+51.4*	•105.4	82 13.9	+55.1	112.5	81 47.9	+57.6	118.9	81 16.3	+59.0	124.6	80 40.0	+59.8	129.6	80 00.0	+60.0	134.0	**80**
81	83 29.9	*+35.0*	• 83.7	83 32.0	*+42.3*	• 92.5	83 24.8	*+48.7*	•101.1	83 09.0	*+53.6*	•109.3	82 45.5	+56.8	116.8	82 15.3	+58.8	123.4	81 39.8	+59.8	129.1	81 00.0	+60.0	134.0	**81**
82	84 04.9	*+27.6*	• 76.1	84 14.3	*+36.5*	• 85.8	84 13.5	*+44.6*	• 95.7	84 02.6	*+51.1*	•105.3	83 42.3	+55.7	114.1	83 14.1	+58.4	121.8	82 39.6	+59.6	128.4	82 00.0	+60.0	134.0	**82**
83	84 32.5	*+18.3*	• 67.2	84 50.8	*+28.3*	• 77.4	84 58.1	*+38.5*	• 88.6	84 53.7	*+47.4*	• 99.8	84 38.0	*+53.8*	•110.4	84 12.5	+57.8	119.7	83 39.2	+59.6	127.5	83 00.0	+60.0	134.0	**83**
84	84 50.8	*+7.3*	• 56.8	85 19.1	*+17.5*	• 67.1	85 36.6	*+29.2*	• 79.2	85 41.1	*+41.0*	• 92.3	85 31.8	*+50.6*	•105.2	85 10.3	+56.5	116.7	84 38.8	+59.3	126.3	84 00.0	+60.0	134.0	**84**
85	84 58.1	*−4.4*	• 45.6	85 36.6	*+4.5*	• 55.0	86 05.8	*+16.3*	• 67.1	86 22.1	*+30.5*	• 81.7	86 22.4	*+44.5*	• 97.6	86 06.8	*+54.4*	•112.3	85 38.1	+58.9	124.5	85 00.0	+60.0	134.0	**85**
86	84 53.7	*−15.7*	• 34.3	85 41.1	*−9.3*	• 41.8	86 22.1	*+0.3*	• 52.4	86 52.6	*+14.3*	• 67.1	87 06.9	*+32.5*	• 85.6	87 01.2	*+49.2*	•105.2	86 37.0	+58.1	121.7	86 00.0	+60.0	134.0	**86**
87	84 38.0	*−25.5*	• 23.7	85 31.8	*−21.5*	• 28.9	86 22.4	*−15.6*	• 36.5	87 06.9	*−5.7*	• 48.4	87 39.4	*+11.0*	• 67.0	87 50.4	*+35.8*	• 92.3	87 35.1	*+55.5*	•116.7	87 00.0	+60.0	134.0	**87**
88	84 12.5	*−33.3*	• 14.4	85 10.3	*−31.5*	• 17.4	86 06.8	*−28.7*	• 21.7	87 01.2	*−24.2*	• 28.9	87 50.4	*−15.3*	• 41.8	88 26.2	*+4.4*	• 67.0	88 30.6	*+42.5*	•105.2	88 00.0	+60.0	134.0	**88**
89	83 39.2	*−39.2*	• 6.5	84 38.8	*−38.8*	• 7.7	85 38.1	*−38.1*	• 9.5	86 37.0	*−37.0*	• 12.3	87 35.1	*−35.1*	• 17.3	88 30.6	*−30.6*	• 28.9	89 13.1	*−13.1*	• 67.0	89 00.0	+60.0	134.0	**89**
90	83 00.0	*−43.7*	• 0.0	84 00.0	*−44.0*	• 0.0	85 00.0	*−44.4*	• 0.0	86 00.0	*−45.0*	• 0.0	87 00.0	*−45.8*	• 0.0	88 00.0	*−47.3*	• 0.0	89 00.0	*−50.5*	• 0.0	90 00.0	−60.0	67.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 46°, 314°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec. °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Hc** ° ′	**d** ′	**Z** °	**Dec.** °
0	4 51.4	−59.8	133.8	4 09.8	−59.8	133.8	3 28.3	−59.9	133.9	2 46.6	−59.9	133.9	2 05.0	−59.9	134.0	1 23.4	−60.0	134.0	0 41.7	−60.0	134.0	0 00.0	+60.0	46.0	**0**
1	3 51.6	−59.8	133.9	3 10.0	−59.8	133.9	2 28.4	−59.9	134.0	1 46.7	−59.9	134.0	1 05.1	−60.0	134.0	0 23.4	−60.0	134.0	0 18.3	+60.0	46.0	1 00.0	+60.0	46.0	**1**
2	2 51.8	−59.7	134.0	2 10.2	−59.8	134.0	1 28.5	−59.9	134.0	0 46.8	−59.9	134.0	0 05.1	−60.0	134.0	0 36.6	+60.0	46.0	1 18.3	+60.0	46.0	2 00.0	+60.0	46.0	**2**
3	1 52.1	−59.8	134.0	1 10.4	−59.9	134.1	0 28.6	−59.9	134.1	0 13.1	+59.9	45.9	0 54.9	+59.9	45.9	1 36.6	+60.0	45.9	2 18.3	+60.0	46.0	3 00.0	+60.0	46.0	**3**
4	0 52.3	−59.8	134.1	0 10.5	−59.8	134.1	0 31.3	+59.8	45.9	1 13.0	+60.0	45.9	1 54.8	+60.0	45.9	2 36.6	+60.0	45.9	3 18.3	+60.0	46.0	4 00.0	+60.0	46.0	**4**
5	0 07.5	+59.7	45.8	0 49.3	+59.8	45.8	1 31.1	+59.9	45.8	2 13.0	+59.9	45.8	2 54.8	+59.9	45.9	3 36.6	+59.9	45.9	4 18.3	+60.0	45.9	5 00.0	+60.0	46.0	**5**
6	1 07.2	+59.8	45.7	1 49.1	+59.9	45.7	2 31.0	+59.9	45.7	3 12.9	+59.9	45.8	3 54.7	+60.0	45.8	4 36.5	+60.0	45.9	5 18.3	+60.0	45.9	6 00.0	+60.0	46.0	**6**
7	2 07.0	+59.8	45.6	2 49.0	+59.8	45.6	3 30.9	+59.9	45.7	4 12.8	+59.9	45.7	4 54.7	+59.9	45.8	5 36.5	+60.0	45.8	6 18.3	+60.0	45.9	7 00.0	+60.0	46.0	**7**
8	3 06.8	+59.7	45.5	3 48.8	+59.8	45.6	4 30.8	+59.9	45.6	5 12.7	+60.0	45.7	5 54.6	+60.0	45.7	6 36.5	+60.0	45.8	7 18.3	+60.0	45.9	8 00.0	+60.0	46.0	**8**
9	4 06.5	+59.8	45.4	4 48.6	+59.9	45.5	5 30.7	+59.9	45.5	6 12.7	+59.9	45.6	6 54.6	+60.0	45.7	7 36.5	+60.0	45.8	8 18.3	+60.0	45.9	9 00.0	+60.0	46.0	**9**
10	5 06.3	+59.8	45.3	5 48.5	+59.8	45.4	6 30.6	+59.8	45.5	7 12.6	+59.9	45.6	7 54.6	+59.9	45.7	8 36.5	+59.9	45.8	9 18.3	+60.0	45.9	10 00.0	+60.0	46.0	**10**
11	6 06.1	+59.7	45.2	6 48.3	+59.8	45.3	7 30.4	+59.9	45.4	8 12.5	+59.9	45.5	8 54.5	+60.0	45.6	9 36.4	+60.0	45.7	10 18.3	+60.0	45.9	11 00.0	+60.0	46.0	**11**
12	7 05.8	+59.8	45.2	7 48.1	+59.8	45.3	8 30.3	+59.9	45.4	9 12.4	+60.0	45.5	9 54.5	+59.9	45.6	10 36.4	+60.0	45.7	11 18.3	+60.0	45.9	12 00.0	+60.0	46.0	**12**
13	8 05.6	+59.8	45.1	8 47.9	+59.9	45.2	9 30.2	+59.9	45.3	10 12.4	+59.9	45.4	10 54.4	+60.0	45.5	11 36.4	+60.0	45.7	12 18.3	+60.0	45.8	13 00.0	+60.0	46.0	**13**
14	9 05.4	+59.7	45.0	9 47.8	+59.8	45.1	10 30.1	+59.8	45.2	11 12.3	+59.9	45.4	11 54.4	+59.9	45.5	12 36.4	+60.0	45.7	13 18.3	+59.9	45.8	14 00.0	+60.0	46.0	**14**
15	10 05.1	+59.8	44.9	10 47.6	+59.8	45.0	11 29.9	+59.9	45.2	12 12.2	+59.9	45.3	12 54.3	+60.0	45.5	13 36.4	+59.9	45.6	14 18.2	+60.0	45.8	15 00.0	+60.0	46.0	**15**
16	11 04.9	+59.7	44.8	11 47.4	+59.8	44.9	12 29.8	+59.9	45.1	13 12.1	+59.9	45.3	13 54.3	+60.0	45.4	14 36.3	+60.0	45.6	15 18.2	+60.0	45.8	16 00.0	+60.0	46.0	**16**
17	12 04.6	+59.8	44.7	12 47.2	+59.9	44.9	13 29.7	+59.9	45.0	14 12.0	+60.0	45.2	14 54.3	+59.9	45.4	15 36.3	+60.0	45.6	16 18.2	+60.0	45.8	17 00.0	+60.0	46.0	**17**
18	13 04.4	+59.8	44.6	13 47.1	+59.8	44.8	14 29.6	+59.9	45.0	15 12.0	+59.9	45.1	15 54.2	+60.0	45.3	16 36.3	+60.0	45.6	17 18.2	+60.0	45.8	18 00.0	+60.0	46.0	**18**
19	14 04.2	+59.7	44.5	14 46.9	+59.8	44.7	15 29.5	+59.8	44.9	16 11.9	+59.9	45.1	16 54.2	+59.9	45.3	17 36.3	+60.0	45.5	18 18.2	+60.0	45.8	19 00.0	+60.0	46.0	**19**
20	15 03.9	+59.8	44.4	15 46.7	+59.8	44.6	16 29.3	+59.9	44.8	17 11.8	+59.9	45.0	17 54.1	+60.0	45.3	18 36.3	+59.9	45.5	19 18.2	+60.0	45.7	20 00.0	+60.0	46.0	**20**
21	16 03.7	+59.7	44.3	16 46.5	+59.8	44.5	17 29.2	+59.9	44.8	18 11.7	+59.9	45.0	18 54.1	+59.9	45.2	19 36.2	+60.0	45.5	20 18.2	+60.0	45.7	21 00.0	+60.0	46.0	**21**
22	17 03.4	+59.8	44.2	17 46.3	+59.8	44.5	18 29.1	+59.8	44.7	19 11.6	+59.9	44.9	19 54.0	+60.0	45.2	20 36.2	+60.0	45.4	21 18.2	+60.0	45.7	22 00.0	+60.0	46.0	**22**
23	18 03.2	+59.7	44.1	18 46.1	+59.8	44.4	19 28.9	+59.9	44.6	20 11.5	+60.0	44.9	20 54.0	+59.9	45.1	21 36.2	+60.0	45.4	22 18.2	+60.0	45.7	23 00.0	+60.0	46.0	**23**
24	19 02.9	+59.7	44.0	19 45.9	+59.8	44.3	20 28.8	+59.9	44.5	21 11.5	+59.9	44.8	21 53.9	+60.0	45.1	22 36.2	+59.9	45.4	23 18.2	+60.0	45.7	24 00.0	+60.0	46.0	**24**
25	20 02.6	+59.8	43.9	20 45.7	+59.9	44.2	21 28.7	+59.8	44.5	22 11.4	+59.9	44.8	22 53.9	+59.9	45.0	23 36.1	+60.0	45.4	24 18.2	+60.0	45.7	25 00.0	+60.0	46.0	**25**
26	21 02.4	+59.7	43.8	21 45.6	+59.8	44.1	22 28.5	+59.9	44.4	23 11.3	+59.9	44.7	23 53.8	+60.0	45.0	24 36.1	+60.0	45.3	25 18.2	+60.0	45.7	26 00.0	+60.0	46.0	**26**
27	22 02.1	+59.7	43.7	22 45.4	+59.8	44.0	23 28.4	+59.8	44.3	24 11.2	+59.9	44.6	24 53.8	+59.9	45.0	25 36.1	+60.0	45.3	26 18.2	+60.0	45.6	27 00.0	+60.0	46.0	**27**
28	23 01.8	+59.8	43.6	23 45.2	+59.7	43.9	24 28.2	+59.9	44.3	25 11.1	+59.9	44.6	25 53.7	+60.0	44.9	26 36.1	+60.0	45.3	27 18.2	+60.0	45.6	28 00.0	+60.0	46.0	**28**
29	24 01.6	+59.7	43.5	24 44.9	+59.8	43.9	25 28.1	+59.9	44.2	26 11.0	+59.9	44.5	26 53.7	+59.9	44.9	27 36.1	+59.9	45.2	28 18.2	+60.0	45.6	29 00.0	+60.0	46.0	**29**
30	25 01.3	+59.7	43.4	25 44.7	+59.8	43.8	26 28.0	+59.8	44.1	27 10.9	+59.9	44.5	27 53.6	+60.0	44.8	28 36.0	+60.0	45.2	29 18.2	+60.0	45.6	30 00.0	+60.0	46.0	**30**
31	26 01.0	+59.7	43.3	26 44.5	+59.8	43.7	27 27.8	+59.9	44.0	28 10.8	+59.9	44.4	28 53.6	+59.9	44.8	29 36.0	+60.0	45.2	30 18.2	+60.0	45.6	31 00.0	+60.0	46.0	**31**
32	27 00.7	+59.7	43.2	27 44.3	+59.8	43.6	28 27.7	+59.8	43.9	29 10.7	+59.9	44.3	29 53.5	+59.9	44.7	30 36.0	+60.0	45.1	31 18.2	+59.9	45.6	32 00.0	+60.0	46.0	**32**
33	28 00.4	+59.7	43.1	28 44.1	+59.8	43.5	29 27.5	+59.8	43.9	30 10.6	+59.9	44.3	30 53.4	+60.0	44.7	31 36.0	+59.9	45.1	32 18.1	+60.0	45.5	33 00.0	+60.0	46.0	**33**
34	29 00.1	+59.7	43.0	29 43.9	+59.7	43.4	30 27.3	+59.9	43.8	31 10.5	+59.9	44.2	31 53.4	+59.9	44.6	32 35.9	+60.0	45.1	33 18.1	+60.0	45.5	34 00.0	+60.0	46.0	**34**
35	29 59.8	+59.7	42.9	30 43.6	+59.8	43.3	31 27.2	+59.8	43.7	32 10.4	+59.9	44.1	32 53.3	+60.0	44.6	33 35.9	+60.0	45.0	34 18.1	+60.0	45.5	35 00.0	+60.0	46.0	**35**
36	30 59.5	+59.7	42.8	31 43.4	+59.8	43.2	32 27.0	+59.9	43.6	33 10.3	+59.9	44.0	33 53.3	+59.9	44.5	34 35.9	+59.9	45.0	35 18.1	+60.0	45.5	36 00.0	+60.0	46.0	**36**
37	31 59.2	+59.7	42.6	32 43.2	+59.7	43.1	33 26.9	+59.8	43.5	34 10.2	+59.9	44.0	34 53.2	+59.9	44.5	35 35.8	+60.0	45.0	36 18.1	+60.0	45.5	37 00.0	+60.0	46.0	**37**
38	32 58.9	+59.6	42.5	33 42.9	+59.8	43.0	34 26.7	+59.8	43.4	35 10.1	+59.9	43.9	35 53.1	+60.0	44.4	36 35.8	+60.0	44.9	37 18.1	+60.0	45.4	38 00.0	+60.0	46.0	**38**
39	33 58.5	+59.7	42.4	34 42.7	+59.7	42.8	35 26.5	+59.8	43.3	36 10.0	+59.9	43.8	36 53.1	+59.9	44.3	37 35.8	+60.0	44.9	38 18.1	+60.0	45.4	39 00.0	+60.0	46.0	**39**
40	34 58.2	+59.6	42.3	35 42.4	+59.8	42.7	36 26.3	+59.8	43.2	37 09.9	+59.8	43.7	37 53.0	+59.9	44.3	38 35.8	+59.9	44.8	39 18.1	+60.0	45.4	40 00.0	+60.0	46.0	**40**
41	35 57.8	+59.7	42.1	36 42.2	+59.7	42.6	37 26.1	+59.8	43.1	38 09.7	+59.9	43.7	38 52.9	+60.0	44.2	39 35.7	+60.0	44.8	40 18.1	+60.0	45.4	41 00.0	+60.0	46.0	**41**
42	36 57.5	+59.6	42.0	37 41.9	+59.7	42.5	38 25.9	+59.9	43.0	39 09.6	+59.9	43.6	39 52.9	+59.9	44.2	40 35.7	+60.0	44.7	41 18.1	+60.0	45.4	42 00.0	+60.0	46.0	**42**
43	37 57.1	+59.6	41.9	38 41.6	+59.7	42.4	39 25.8	+59.8	42.9	40 09.5	+59.8	43.5	40 52.8	+59.9	44.1	41 35.7	+59.9	44.7	42 18.1	+60.0	45.3	43 00.0	+60.0	46.0	**43**
44	38 56.7	+59.7	41.7	39 41.3	+59.8	42.3	40 25.6	+59.7	42.8	41 09.3	+59.9	43.4	41 52.7	+59.9	44.0	42 35.6	+60.0	44.7	43 18.1	+60.0	45.3	44 00.0	+60.0	46.0	**44**
45	39 56.4	+59.6	41.6	40 41.1	+59.7	42.1	41 25.3	+59.8	42.7	42 09.2	+59.9	43.3	42 52.6	+60.0	44.0	43 35.6	+60.0	44.6	44 18.1	+59.9	45.3	45 00.0	+60.0	46.0	**45**
46	40 56.0	+59.5	41.4	41 40.8	+59.6	42.0	42 25.1	+59.8	42.6	43 09.1	+59.8	43.2	43 52.6	+59.9	43.9	44 35.6	+59.9	44.6	45 18.0	+60.0	45.3	46 00.0	+60.0	46.0	**46**
47	41 55.5	+59.6	41.3	42 40.4	+59.7	41.9	43 24.9	+59.8	42.5	44 08.9	+59.9	43.1	44 52.5	+59.9	43.8	45 35.5	+60.0	44.5	46 18.0	+60.0	45.2	47 00.0	+60.0	46.0	**47**
48	42 55.1	+59.6	41.1	43 40.1	+59.7	41.7	44 24.7	+59.7	42.4	45 08.8	+59.8	43.0	45 52.4	+59.9	43.7	46 35.5	+59.9	44.5	47 18.0	+60.0	45.2	48 00.0	+60.0	46.0	**48**
49	43 54.7	+59.5	40.9	44 39.8	+59.6	41.6	45 24.4	+59.8	42.2	46 08.6	+59.9	42.9	46 52.3	+59.9	43.7	47 35.4	+60.0	44.4	48 18.0	+60.0	45.2	49 00.0	+60.0	46.0	**49**
50	44 54.2	+59.6	40.8	45 39.4	+59.7	41.4	46 24.2	+59.8	42.1	47 08.5	+59.8	42.8	47 52.2	+59.9	43.6	48 35.4	+60.0	44.4	49 18.0	+60.0	45.2	50 00.0	+60.0	46.0	**50**
51	45 53.8	+59.5	40.6	46 39.1	+59.6	41.3	47 24.0	+59.7	42.0	48 08.3	+59.8	42.7	48 52.1	+59.9	43.5	49 35.4	+59.9	44.3	50 18.0	+60.0	45.1	51 00.0	+60.0	46.0	**51**
52	46 53.3	+59.5	40.4	47 38.7	+59.6	41.1	48 23.7	+59.7	41.8	49 08.1	+59.8	42.6	49 52.0	+59.9	43.4	50 35.3	+60.0	44.2	51 18.0	+60.0	45.1	52 00.0	+60.0	46.0	**52**
53	47 52.8	+59.4	40.2	48 38.3	+59.6	40.9	49 23.4	+59.7	41.7	50 07.9	+59.9	42.5	50 51.9	+59.9	43.3	51 35.3	+59.9	44.2	52 18.0	+60.0	45.1	53 00.0	+60.0	46.0	**53**
54	48 52.2	+59.5	40.0	49 37.9	+59.6	40.8	50 23.1	+59.7	41.5	51 07.8	+59.8	42.4	51 51.8	+59.9	43.2	52 35.2	+60.0	44.1	53 18.0	+59.9	45.0	54 00.0	+60.0	46.0	**54**
55	49 51.7	+59.4	39.8	50 37.5	+59.6	40.6	51 22.8	+59.7	41.4	52 07.6	+59.8	42.2	52 51.7	+59.9	43.1	53 35.2	+59.9	44.0	54 17.9	+60.0	45.0	55 00.0	+60.0	46.0	**55**
56	50 51.1	+59.4	39.6	51 37.1	+59.5	40.4	52 22.5	+59.7	41.2	53 07.4	+59.7	42.1	53 51.6	+59.8	43.0	54 35.1	+59.9	44.0	55 17.9	+60.0	45.0	56 00.0	+60.0	46.0	**56**
57	51 50.5	+59.4	39.4	52 36.6	+59.6	40.2	53 22.2	+59.7	41.0	54 07.1	+59.8	41.9	54 51.4	+59.9	42.9	55 35.0	+60.0	43.9	56 17.9	+60.0	44.9	57 00.0	+60.0	46.0	**57**
58	52 49.9	+59.4	39.1	53 36.2	+59.5	40.0	54 21.9	+59.6	40.9	55 06.9	+59.8	41.8	55 51.3	+59.9	42.8	56 35.0	+59.9	43.8	57 17.9	+60.0	44.9	58 00.0	+60.0	46.0	**58**
59	53 49.3	+59.3	38.9	54 35.7	+59.5	39.8	55 21.5	+59.6	40.7	56 06.7	+59.7	41.6	56 51.2	+59.8	42.7	57 34.9	+59.9	43.7	58 17.9	+60.0	44.8	59 00.0	+60.0	46.0	**59**
60	54 48.6	+59.3	38.6	55 35.2	+59.4	39.5	56 21.1	+59.6	40.5	57 06.4	+59.8	41.5	57 51.0	+59.9	42.5	58 34.8	+60.0	43.6	59 17.9	+59.9	44.8	60 00.0	+60.0	46.0	**60**
61	55 47.9	+59.2	38.3	56 34.6	+59.4	39.3	57 20.7	+59.6	40.3	58 06.2	+59.7	41.3	58 50.9	+59.8	42.4	59 34.8	+59.9	43.5	60 17.8	+60.0	44.7	61 00.0	+60.0	46.0	**61**
62	56 47.1	+59.2	38.1	57 34.0	+59.4	39.0	58 20.3	+59.6	40.0	59 05.9	+59.7	41.1	59 50.7	+59.8	42.2	60 34.7	+59.9	43.4	61 17.8	+60.0	44.7	62 00.0	+60.0	46.0	**62**
63	57 46.3	+59.2	37.8	58 33.4	+59.4	38.8	59 19.9	+59.5	39.8	60 05.6	+59.7	40.9	60 50.5	+59.8	42.1	61 34.6	+59.9	43.3	62 17.8	+60.0	44.6	63 00.0	+60.0	46.0	**63**
64	58 45.5	+59.1	37.4	59 32.8	+59.3	38.5	60 19.4	+59.5	39.6	61 05.3	+59.6	40.7	61 50.3	+59.8	41.9	62 34.5	+59.9	43.2	63 17.8	+60.0	44.6	64 00.0	+60.0	46.0	**64**
65	59 44.6	+59.0	37.1	60 32.1	+59.3	38.2	61 18.9	+59.5	39.3	62 04.9	+59.7	40.5	62 50.1	+59.8	41.8	63 34.4	+59.9	43.1	64 17.8	+59.9	44.5	65 00.0	+60.0	46.0	**65**
66	60 43.6	+59.0	36.8	61 31.4	+59.2	37.9	62 18.4	+59.4	39.0	63 04.6	+59.6	40.3	63 49.9	+59.8	41.6	64 34.3	+59.9	43.0	65 17.7	+60.0	44.4	66 00.0	+60.0	46.0	**66**
67	61 42.6	+59.0	36.4	62 30.6	+59.2	37.5	63 17.8	+59.4	38.7	64 04.2	+59.6	40.0	64 49.7	+59.8	41.4	65 34.2	+59.9	42.8	66 17.7	+60.0	44.4	67 00.0	+60.0	46.0	**67**
68	62 41.6	+58.8	36.0	63 29.8	+59.1	37.1	64 17.2	+59.3	38.4	65 03.8	+59.5	39.7	65 49.5	+59.7	41.1	66 34.1	+59.9	42.7	67 17.7	+59.9	44.3	68 00.0	+60.0	46.0	**68**
69	63 40.4	+58.8	35.5	64 28.9	+59.0	36.8	65 16.5	+59.3	38.0	66 03.3	+59.6	39.4	66 49.2	+59.7	40.9	67 34.0	+59.9	42.5	68 17.6	+60.0	44.2	69 00.0	+60.0	46.0	**69**
70	64 39.2	+58.7	35.1	65 27.9	+59.0	36.3	66 15.8	+59.3	37.7	67 02.9	+59.4	39.1	67 48.9	+59.7	40.7	68 33.9	+59.8	42.3	69 17.6	+60.0	44.1	70 00.0	+60.0	46.0	**70**
71	65 37.9	+58.6	34.6	66 26.9	+58.9	35.9	67 15.1	+59.1	37.3	68 02.3	+59.5	38.8	68 48.6	+59.7	40.4	69 33.7	+59.8	42.1	70 17.6	+59.9	44.0	71 00.0	+60.0	46.0	**71**
72	66 36.5	+58.4	34.0	67 25.8	+58.8	35.4	68 14.2	+59.1	36.8	69 01.8	+59.4	38.4	69 48.3	+59.6	40.1	70 33.5	+59.9	41.9	71 17.5	+60.0	43.9	72 00.0	+60.0	46.0	**72**
73	67 34.9	+58.3	33.5	68 24.6	+58.6	34.9	69 13.3	+59.1	36.4	70 01.2	+59.3	38.0	70 47.9	+59.6	39.8	71 33.4	+59.8	41.7	72 17.5	+59.9	43.7	73 00.0	+60.0	46.0	**73**
74	68 33.2	+58.2	32.8	69 23.2	+58.6	34.3	70 12.4	+58.9	35.8	71 00.5	+59.2	37.5	71 47.5	+59.5	39.4	72 33.2	+59.7	41.4	73 17.4	+60.0	43.6	74 00.0	+60.0	46.0	**74**
75	69 31.4	+58.0	32.2	70 21.8	+58.4	33.6	71 11.3	+58.8	35.3	71 59.7	+59.2	37.0	72 47.0	+59.5	39.0	73 32.9	+59.8	41.1	74 17.4	+59.9	43.4	75 00.0	+60.0	46.0	**75**
76	70 29.4	+57.8	31.4	71 20.2	+58.2	32.9	72 10.1	+58.6	34.6	72 58.9	+59.0	36.5	73 46.5	+59.4	38.5	74 32.7	+59.7	40.8	75 17.3	+59.9	43.3	76 00.0	+60.0	46.0	**76**
77	71 27.2	+57.5	30.6	72 18.4	+58.0	32.2	73 08.7	+58.5	33.9	73 57.9	+59.0	35.9	74 45.9	+59.3	38.0	75 32.4	+59.7	40.4	76 17.2	+59.9	43.0	77 00.0	+60.0	46.0	**77**
78	72 24.7	+57.3	29.7	73 16.4	+57.8	31.3	74 07.2	+58.3	33.1	74 56.9	+58.8	35.2	75 45.2	+59.3	37.4	76 32.1	+59.6	40.0	77 17.1	+59.9	42.8	78 00.0	+60.0	46.0	**78**
79	73 22.0	+57.0	28.7	74 14.2	+57.5	30.3	75 05.5	+58.1	32.2	75 55.7	+58.6	34.4	76 44.5	+59.1	36.8	77 31.7	+59.6	39.5	78 17.0	+59.9	42.5	79 00.0	+60.0	46.0	**79**
80	74 19.0	+56.5	27.5	75 11.7	+57.2	29.3	76 03.6	+57.8	31.2	76 54.3	+58.4	33.5	77 43.6	+59.0	36.0	78 31.3	+59.4	38.9	79 16.9	+59.8	42.2	80 00.0	+60.0	46.0	**80**
81	75 15.5	+56.1	26.2	76 08.9	+56.7	28.0	77 01.4	+57.4	30.1	77 52.7	+58.1	32.4	78 42.6	+58.8	35.1	79 30.7	+59.4	38.2	80 16.7	+59.8	41.8	81 00.0	+60.0	46.0	**81**
82	76 11.6	+55.5	24.8	77 05.6	+56.3	26.6	77 58.8	+57.0	28.7	78 50.8	+57.7	31.2	79 41.4	+58.5	34.0	80 30.1	+59.2	37.4	81 16.5	+59.8	41.3	82 00.0	+60.0	46.0	**82**
83	77 07.1	+54.8	23.2	78 01.9	+55.5	25.0	78 55.8	+56.4	27.2	79 48.5	+57.3	29.7	80 39.9	+58.1	32.7	81 29.3	+59.0	36.3	82 16.3	+59.7	40.7	83 00.0	+60.0	46.0	**83**
84	78 01.9	+53.9	21.3	78 57.4	+54.8	23.1	79 52.2	+55.6	25.3	80 45.8	+56.7	27.9	81 38.0	+57.7	31.1	82 28.3	+58.8	35.0	83 16.0	+59.6	39.9	84 00.0	+60.0	46.0	**84**
85	78 55.8	+52.7	19.1	79 52.2	+53.6	20.9	80 47.8	+54.7	23.1	81 42.5	+55.7	25.8	82 35.7	+57.0	29.1	83 27.1	+58.2	33.3	84 15.6	+59.4	38.8	85 00.0	+60.0	46.0	**85**
86	79 48.5	+51.4	16.5	80 45.8	+52.2	18.2	81 42.5	+53.2	20.4	82 38.2	+54.5	23.1	83 32.7	+55.9	26.5	84 25.3	+57.6	31.1	85 15.0	+59.2	37.3	86 00.0	+60.0	46.0	**86**
87	80 39.9	*+49.4* •	13.4	81 38.0	*+50.3* •	15.0	82 35.7	*+51.4* •	17.0	83 32.7	*+52.6* •	19.6	84 28.6	*+54.3* •	23.0	85 22.9	*+56.2* •	27.9	86 14.2	+58.5	35.0	87 00.0	+60.0	46.0	**87**
88	81 29.3	*+47.0* •	9.8	82 28.3	*+47.7* •	11.0	83 27.1	*+48.5* •	12.7	84 25.3	*+49.7* •	15.0	85 22.9	*+51.3* •	18.2	86 19.1	*+53.6* •	23.0	87 12.7	*+56.8* •	31.1	88 00.0	+60.0	46.0	**88**
89	82 16.3	*+43.7* •	5.4	83 16.0	*+44.0* •	6.1	84 15.6	*+44.4* •	7.2	85 15.0	*+45.0* •	8.7	86 14.2	*+45.8* •	11.0	87 12.7	*+47.3* •	15.0	88 09.5	*+50.5* •	23.0	89 00.0	+60.0	46.0	**89**
90	83 00.0	*+39.2* •	0.0	84 00.0	*+38.8* •	0.0	85 00.0	*+38.1* •	0.0	86 00.0	*+37.0* •	0.0	87 00.0	*+35.1* •	0.0	88 00.0	*+30.6* •	0.0	89 00.0	*+13.1* •	0.0	90 00.0	−60.0	23.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 134°, 226°

47°, 313° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 46.1	+59.7	132.8	4 05.3	+59.8	132.8	3 24.5	+59.8	132.9	2 43.6	+59.9	132.9	2 02.7	+60.0	133.0	1 21.8	+60.0	133.0	0 40.9	+60.0	133.0	0 00.0	+60.0	133.0	**0**
1	5 45.8	+59.8	132.7	5 05.1	+59.8	132.8	4 24.3	+59.9	132.8	3 43.5	+60.0	132.9	3 02.7	+59.9	132.9	2 21.8	+60.0	133.0	1 40.9	+60.0	133.0	1 00.0	+60.0	133.0	**1**
2	6 45.6	+59.7	132.6	6 04.9	+59.8	132.7	5 24.2	+59.9	132.8	4 43.5	+59.9	132.8	4 02.6	+60.0	132.9	3 21.8	+60.0	132.9	2 40.9	+60.0	133.0	2 00.0	+60.0	133.0	**2**
3	7 45.3	+59.8	132.5	7 04.7	+59.9	132.6	6 24.1	+59.9	132.7	5 43.4	+59.9	132.8	5 02.6	+60.0	132.8	4 21.8	+60.0	132.9	3 40.9	+60.0	133.0	3 00.0	+60.0	133.0	**3**
4	8 45.1	+59.7	132.4	8 04.6	+59.8	132.5	7 24.0	+59.8	132.6	6 43.3	+59.9	132.7	6 02.6	+59.9	132.8	5 21.8	+59.9	132.9	4 40.9	+60.0	132.9	4 00.0	+60.0	133.0	**4**
5	9 44.8	+59.8	132.3	9 04.4	+59.8	132.5	8 23.8	+59.9	132.6	7 43.2	+59.9	132.7	7 02.5	+60.0	132.8	6 21.7	+60.0	132.9	5 40.9	+60.0	132.9	5 00.0	+60.0	133.0	**5**
6	10 44.6	+59.7	132.2	10 04.2	+59.8	132.4	9 23.7	+59.9	132.5	8 43.1	+60.0	132.6	8 02.5	+59.9	132.7	7 21.7	+60.0	132.8	6 40.9	+60.0	132.9	6 00.0	+60.0	133.0	**6**
7	11 44.3	+59.8	132.1	11 04.0	+59.8	132.3	10 23.6	+59.9	132.4	9 43.1	+59.9	132.6	9 02.4	+60.0	132.7	8 21.7	+60.0	132.8	7 40.9	+60.0	132.9	7 00.0	+60.0	133.0	**7**
8	12 44.1	+59.7	132.1	12 03.8	+59.9	132.2	11 23.5	+59.8	132.4	10 43.0	+59.9	132.5	10 02.4	+59.9	132.7	9 21.7	+60.0	132.8	8 40.9	+60.0	132.9	8 00.0	+60.0	133.0	**8**
9	13 43.8	+59.8	132.0	13 03.7	+59.8	132.1	12 23.3	+59.9	132.3	11 42.9	+59.9	132.5	11 02.3	+60.0	132.6	10 21.7	+59.9	132.7	9 40.9	+60.0	132.9	9 00.0	+60.0	133.0	**9**
10	14 43.6	+59.7	131.9	14 03.5	+59.8	132.1	13 23.2	+59.9	132.2	12 42.8	+59.9	132.4	12 02.3	+59.9	132.6	11 21.6	+60.0	132.7	10 40.9	+60.0	132.9	10 00.0	+60.0	133.0	**10**
11	15 43.3	+59.8	131.8	15 03.3	+59.8	132.0	14 23.1	+59.9	132.2	13 42.7	+59.9	132.4	13 02.2	+60.0	132.5	12 21.6	+60.0	132.7	11 40.9	+60.0	132.9	11 00.0	+60.0	133.0	**11**
12	16 43.1	+59.7	131.7	16 03.1	+59.8	131.9	15 23.0	+59.8	132.1	14 42.6	+60.0	132.3	14 02.2	+59.9	132.5	13 21.6	+60.0	132.7	12 40.9	+60.0	132.8	12 00.0	+60.0	133.0	**12**
13	17 42.8	+59.7	131.6	17 02.9	+59.8	131.8	16 22.8	+59.9	132.0	15 42.6	+59.9	132.2	15 02.1	+60.0	132.4	14 21.6	+59.9	132.6	13 40.9	+59.9	132.8	13 00.0	+60.0	133.0	**13**
14	18 42.5	+59.8	131.5	18 02.7	+59.8	131.7	17 22.7	+59.9	132.0	16 42.5	+59.9	132.2	16 02.1	+59.9	132.4	15 21.5	+60.0	132.6	14 40.8	+60.0	132.8	14 00.0	+60.0	133.0	**14**
15	19 42.3	+59.7	131.4	19 02.5	+59.8	131.6	18 22.6	+59.8	131.9	17 42.4	+59.9	132.1	17 02.0	+60.0	132.4	16 21.5	+60.0	132.6	15 40.8	+60.0	132.8	15 00.0	+60.0	133.0	**15**
16	20 42.0	+59.7	131.3	20 02.3	+59.8	131.6	19 22.4	+59.9	131.8	18 42.3	+59.9	132.1	18 02.0	+60.0	132.3	17 21.5	+60.0	132.6	16 40.8	+60.0	132.8	16 00.0	+60.0	133.0	**16**
17	21 41.7	+59.8	131.2	21 02.1	+59.8	131.5	20 22.3	+59.8	131.7	19 42.2	+59.9	132.0	19 02.0	+59.9	132.3	18 21.5	+60.0	132.5	17 40.8	+60.0	132.8	17 00.0	+60.0	133.0	**17**
18	22 41.5	+59.7	131.1	22 01.9	+59.8	131.4	21 22.1	+59.9	131.7	20 42.1	+59.9	132.0	20 01.9	+60.0	132.2	19 21.5	+59.9	132.5	18 40.8	+60.0	132.8	18 00.0	+60.0	133.0	**18**
19	23 41.2	+59.7	131.0	23 01.7	+59.8	131.3	22 22.0	+59.9	131.6	21 42.0	+59.9	131.9	21 01.9	+59.9	132.2	20 21.4	+60.0	132.5	19 40.8	+60.0	132.7	19 00.0	+60.0	133.0	**19**
20	24 40.9	+59.7	130.9	24 01.5	+59.8	131.2	23 21.9	+59.8	131.5	22 41.9	+60.0	131.8	22 01.8	+59.9	132.2	21 21.4	+60.0	132.4	20 40.8	+60.0	132.7	20 00.0	+60.0	133.0	**20**
21	25 40.6	+59.7	130.7	25 01.3	+59.8	131.1	24 21.7	+59.9	131.5	23 41.9	+59.9	131.8	23 01.7	+60.0	132.1	22 21.4	+60.0	132.4	21 40.8	+60.0	132.7	21 00.0	+60.0	133.0	**21**
22	26 40.3	+59.7	130.6	26 01.1	+59.8	131.0	25 21.6	+59.8	131.4	24 41.8	+59.9	131.7	24 01.7	+59.9	132.1	23 21.4	+60.0	132.4	22 40.8	+60.0	132.7	22 00.0	+60.0	133.0	**22**
23	27 40.0	+59.7	130.5	27 00.9	+59.7	130.9	26 21.4	+59.9	131.3	25 41.7	+59.9	131.7	25 01.6	+60.0	132.0	24 21.4	+59.9	132.4	23 40.8	+60.0	132.7	23 00.0	+60.0	133.0	**23**
24	28 39.7	+59.7	130.4	28 00.6	+59.8	130.8	27 21.3	+59.8	131.2	26 41.6	+59.9	131.6	26 01.6	+59.9	132.0	25 21.3	+60.0	132.3	24 40.8	+60.0	132.7	24 00.0	+60.0	133.0	**24**
25	29 39.4	+59.7	130.3	29 00.4	+59.8	130.7	28 21.1	+59.8	131.1	27 41.5	+59.9	131.5	27 01.5	+60.0	131.9	26 21.3	+60.0	132.3	25 40.8	+60.0	132.7	25 00.0	+60.0	133.0	**25**
26	30 39.1	+59.6	130.2	30 00.2	+59.7	130.6	29 20.9	+59.9	131.1	28 41.4	+59.9	131.5	28 01.5	+59.9	131.9	27 21.3	+60.0	132.3	26 40.8	+60.0	132.6	26 00.0	+60.0	133.0	**26**
27	31 38.7	+59.7	130.1	30 59.9	+59.8	130.5	30 20.8	+59.8	131.0	29 41.3	+59.9	131.4	29 01.4	+60.0	131.8	28 21.3	+59.9	132.2	27 40.8	+60.0	132.6	27 00.0	+60.0	133.0	**27**
28	32 38.4	+59.7	129.9	31 59.7	+59.7	130.4	31 20.6	+59.8	130.9	30 41.2	+59.9	131.3	30 01.4	+59.9	131.8	29 21.2	+60.0	132.2	28 40.8	+60.0	132.6	28 00.0	+60.0	133.0	**28**
29	33 38.1	+59.6	129.8	32 59.4	+59.8	130.3	32 20.4	+59.9	130.8	31 41.1	+59.8	131.3	31 01.3	+59.9	131.7	30 21.2	+60.0	132.2	29 40.8	+60.0	132.6	29 00.0	+60.0	133.0	**29**
30	34 37.7	+59.7	129.7	33 59.2	+59.7	130.2	33 20.3	+59.8	130.7	32 40.9	+59.9	131.2	32 01.2	+60.0	131.7	31 21.2	+59.9	132.1	30 40.8	+59.9	132.6	30 00.0	+60.0	133.0	**30**
31	35 37.4	+59.6	129.5	34 58.9	+59.8	130.1	34 20.1	+59.8	130.6	33 40.8	+59.9	131.1	33 01.2	+59.9	131.6	32 21.1	+60.0	132.1	31 40.7	+60.0	132.6	31 00.0	+60.0	133.0	**31**
32	36 37.0	+59.6	129.4	35 58.7	+59.7	130.0	35 19.9	+59.8	130.5	34 40.7	+59.9	131.0	34 01.1	+60.0	131.6	33 21.1	+60.0	132.1	32 40.7	+60.0	132.5	32 00.0	+60.0	133.0	**32**
33	37 36.6	+59.6	129.3	36 58.4	+59.7	129.8	36 19.7	+59.8	130.4	35 40.6	+59.9	131.0	35 01.1	+59.9	131.5	34 21.1	+60.0	132.0	33 40.7	+60.0	132.5	33 00.0	+60.0	133.0	**33**
34	38 36.2	+59.6	129.1	37 58.1	+59.7	129.7	37 19.5	+59.8	130.3	36 40.5	+59.9	130.9	36 01.0	+59.9	131.4	35 21.1	+59.9	132.0	34 40.7	+60.0	132.5	34 00.0	+60.0	133.0	**34**
35	39 35.8	+59.6	129.0	38 57.8	+59.7	129.6	38 19.3	+59.8	130.2	37 40.4	+59.8	130.8	37 00.9	+59.9	131.4	36 21.0	+60.0	131.9	35 40.7	+60.0	132.5	35 00.0	+60.0	133.0	**35**
36	40 35.4	+59.6	128.8	39 57.5	+59.7	129.5	39 19.1	+59.8	130.1	38 40.2	+59.9	130.7	38 00.8	+60.0	131.3	37 21.0	+60.0	131.9	36 40.7	+60.0	132.5	36 00.0	+60.0	133.0	**36**
37	41 35.0	+59.6	128.7	40 57.2	+59.7	129.3	40 18.9	+59.8	130.0	39 40.1	+59.9	130.6	39 00.8	+59.9	131.3	38 21.0	+59.9	131.9	37 40.7	+60.0	132.4	37 00.0	+60.0	133.0	**37**
38	42 34.6	+59.5	128.5	41 56.9	+59.7	129.2	41 18.7	+59.8	129.9	40 40.0	+59.8	130.6	40 00.7	+59.9	131.2	39 20.9	+60.0	131.8	38 40.7	+60.0	132.4	38 00.0	+60.0	133.0	**38**
39	43 34.1	+59.5	128.3	42 56.6	+59.7	129.1	42 18.5	+59.8	129.8	41 39.8	+59.9	130.5	41 00.6	+59.9	131.1	40 20.9	+60.0	131.8	39 40.7	+60.0	132.4	39 00.0	+60.0	133.0	**39**
40	44 33.6	+59.6	128.2	43 56.3	+59.6	128.9	43 18.3	+59.7	129.7	42 39.7	+59.8	130.4	42 00.5	+60.0	131.1	41 20.9	+59.9	131.7	40 40.7	+60.0	132.4	40 00.0	+60.0	133.0	**40**
41	45 33.2	+59.5	128.0	44 55.9	+59.7	128.8	44 18.0	+59.8	129.5	43 39.5	+59.9	130.3	43 00.5	+59.9	131.0	42 20.8	+60.0	131.7	41 40.7	+60.0	132.4	41 00.0	+60.0	133.0	**41**
42	46 32.7	+59.5	127.8	45 55.6	+59.6	128.6	45 17.8	+59.7	129.4	44 39.4	+59.8	130.2	44 00.4	+59.9	130.9	43 20.8	+60.0	131.6	42 40.7	+60.0	132.3	42 00.0	+60.0	133.0	**42**
43	47 32.2	+59.4	127.6	46 55.2	+59.6	128.5	46 17.5	+59.8	129.3	45 39.2	+59.9	130.1	45 00.3	+59.9	130.8	44 20.8	+59.9	131.6	43 40.7	+59.9	132.3	43 00.0	+60.0	133.0	**43**
44	48 31.6	+59.5	127.4	47 54.8	+59.6	128.3	47 17.3	+59.7	129.1	46 39.1	+59.8	130.0	46 00.2	+59.9	130.8	45 20.7	+60.0	131.5	44 40.6	+60.0	132.3	44 00.0	+60.0	133.0	**44**
45	49 31.1	+59.4	127.2	48 54.4	+59.6	128.1	48 17.0	+59.7	129.0	47 38.9	+59.8	129.9	47 00.1	+59.9	130.7	46 20.7	+59.9	131.5	45 40.6	+60.0	132.3	45 00.0	+60.0	133.0	**45**
46	50 30.5	+59.4	127.0	49 54.0	+59.6	127.9	49 16.7	+59.7	128.9	48 38.7	+59.8	129.7	48 00.0	+59.9	130.6	47 20.6	+60.0	131.4	46 40.6	+60.0	132.2	46 00.0	+60.0	133.0	**46**
47	51 29.9	+59.3	126.8	50 53.6	+59.5	127.7	50 16.4	+59.7	128.7	49 38.5	+59.9	129.6	48 59.9	+59.9	130.5	48 20.6	+60.0	131.4	47 40.6	+60.0	132.2	47 00.0	+60.0	133.0	**47**
48	52 29.2	+59.4	126.5	51 53.1	+59.5	127.5	51 16.1	+59.7	128.5	50 38.4	+59.8	129.5	49 59.8	+59.9	130.4	49 20.6	+59.9	131.3	48 40.6	+60.0	132.2	48 00.0	+60.0	133.0	**48**
49	53 28.6	+59.3	126.3	52 52.6	+59.5	127.3	52 15.8	+59.7	128.4	51 38.2	+59.7	129.4	50 59.7	+59.9	130.3	50 20.5	+60.0	131.3	49 40.6	+60.0	132.1	49 00.0	+60.0	133.0	**49**
50	54 27.9	+59.3	126.0	53 52.1	+59.5	127.1	53 15.5	+59.6	128.2	52 37.9	+59.8	129.2	51 59.6	+59.9	130.2	51 20.5	+59.9	131.2	50 40.6	+60.0	132.1	50 00.0	+60.0	133.0	**50**
51	55 27.2	+59.2	125.7	54 51.6	+59.5	126.9	54 15.1	+59.7	128.0	53 37.7	+59.8	129.1	52 59.5	+59.8	130.1	52 20.4	+60.0	131.1	51 40.6	+60.0	132.1	51 00.0	+60.0	133.0	**51**
52	56 26.4	+59.2	125.5	55 51.1	+59.4	126.7	55 14.8	+59.6	127.8	54 37.5	+59.8	128.9	53 59.3	+59.9	130.0	53 20.4	+59.9	131.1	52 40.6	+59.9	132.0	52 00.0	+60.0	133.0	**52**
53	57 25.6	+59.1	125.2	56 50.5	+59.4	126.4	56 14.4	+59.6	127.6	55 37.3	+59.7	128.8	54 59.2	+59.9	129.9	54 20.3	+59.9	131.0	53 40.5	+60.0	132.0	53 00.0	+60.0	133.0	**53**
54	58 24.7	+59.1	124.8	57 49.9	+59.4	126.2	57 14.0	+59.5	127.4	56 37.0	+59.7	128.6	55 59.1	+59.8	129.8	55 20.2	+60.0	130.9	54 40.5	+60.0	132.0	54 00.0	+60.0	133.0	**54**
55	59 23.8	+59.1	124.5	58 49.3	+59.3	125.9	58 13.5	+59.6	127.2	57 36.7	+59.8	128.5	56 58.9	+59.9	129.7	56 20.2	+59.9	130.8	55 40.5	+60.0	131.9	55 00.0	+60.0	133.0	**55**
56	60 22.9	+59.0	124.2	59 48.6	+59.3	125.6	59 13.1	+59.5	127.0	58 36.5	+59.7	128.3	57 58.8	+59.8	129.5	57 20.1	+59.9	130.7	56 40.5	+60.0	131.9	56 00.0	+60.0	133.0	**56**
57	61 21.9	+58.9	123.8	60 47.9	+59.2	125.3	60 12.6	+59.5	126.7	59 36.2	+59.7	128.1	58 58.6	+59.9	129.4	58 20.0	+60.0	130.6	57 40.5	+60.0	131.8	57 00.0	+60.0	133.0	**57**
58	62 20.8	+58.8	123.4	61 47.1	+59.2	124.9	61 12.1	+59.4	126.4	60 35.9	+59.6	127.9	59 58.5	+59.8	129.2	59 20.0	+59.9	130.5	58 40.5	+59.9	131.8	58 00.0	+60.0	133.0	**58**
59	63 19.6	+58.8	123.0	62 46.3	+59.1	124.6	62 11.5	+59.5	126.2	61 35.5	+59.7	127.7	60 58.3	+59.8	129.1	60 19.9	+59.9	130.4	59 40.4	+60.0	131.8	59 00.0	+60.0	133.0	**59**
60	64 18.4	+58.7	122.5	63 45.4	+59.1	124.2	63 11.0	+59.3	125.9	62 35.2	+59.6	127.4	61 58.1	+59.8	128.9	61 19.8	+59.9	130.3	60 40.4	+60.0	131.7	60 00.0	+60.0	133.0	**60**
61	65 17.1	+58.5	122.0	64 44.5	+59.0	123.8	64 10.3	+59.4	125.5	63 34.8	+59.6	127.2	62 57.9	+59.8	128.7	62 19.7	+59.9	130.2	61 40.4	+60.0	131.6	61 00.0	+60.0	133.0	**61**
62	66 15.6	+58.5	121.5	65 43.5	+58.9	123.4	65 09.7	+59.2	125.2	64 34.4	+59.5	126.9	63 57.7	+59.7	128.5	63 19.6	+59.9	130.1	62 40.4	+60.0	131.6	62 00.0	+60.0	133.0	**62**
63	67 14.1	+58.3	120.9	66 42.4	+58.8	122.9	66 08.9	+59.3	124.8	65 33.9	+59.5	126.6	64 57.4	+59.8	128.3	64 19.5	+59.9	130.0	63 40.4	+59.9	131.5	63 00.0	+60.0	133.0	**63**
64	68 12.4	+58.2	120.3	67 41.2	+58.7	122.4	67 08.2	+59.1	124.4	66 33.4	+59.5	126.3	65 57.2	+59.7	128.1	65 19.4	+59.9	129.8	64 40.3	+60.0	131.5	64 00.0	+60.0	133.0	**64**
65	69 10.6	+58.0	119.6	68 39.9	+58.6	121.8	68 07.3	+59.1	124.0	67 32.9	+59.5	126.0	66 56.9	+59.7	127.9	66 19.3	+59.9	129.7	65 40.3	+60.0	131.4	65 00.0	+60.0	133.0	**65**
66	70 08.6	+57.8	118.9	69 38.5	+58.5	121.2	69 06.4	+59.0	123.5	68 32.4	+59.4	125.6	67 56.6	+59.7	127.6	67 19.2	+59.8	129.5	66 40.3	+59.9	131.3	66 00.0	+60.0	133.0	**66**
67	71 06.4	+57.5	118.1	70 37.0	+58.3	120.6	70 05.4	+58.9	123.0	69 31.8	+59.3	125.2	68 56.3	+59.6	127.3	68 19.0	+59.9	129.3	67 40.2	+60.0	131.2	67 00.0	+60.0	133.0	**67**
68	72 03.9	+57.3	117.2	71 35.3	+58.1	119.8	71 04.3	+58.7	122.4	70 31.1	+59.2	124.8	69 55.9	+59.6	127.0	69 18.9	+59.8	129.1	68 40.2	+60.0	131.1	68 00.0	+60.0	133.0	**68**
69	73 01.2	+57.0	116.2	72 33.4	+57.9	119.0	72 03.0	+58.7	121.7	71 30.3	+59.2	124.3	70 55.5	+59.6	126.7	70 18.7	+59.8	128.9	69 40.2	+59.9	131.0	69 00.0	+60.0	133.0	**69**
70	73 58.2	+56.6	115.1	73 31.3	+57.6	118.1	73 01.7	+58.4	121.0	72 29.5	+59.1	123.8	71 55.1	+59.5	126.3	71 18.5	+59.8	128.7	70 40.1	+60.0	130.9	70 00.0	+60.0	133.0	**70**
71	74 54.8	+56.1	113.8	74 28.9	+57.4	117.1	74 00.1	+58.3	120.2	73 28.6	+59.0	123.2	72 54.6	+59.4	125.9	72 18.3	+59.8	128.4	71 40.1	+59.9	130.8	71 00.0	+60.0	133.0	**71**
72	75 50.9	+55.6	112.4	75 26.3	+56.9	116.0	74 58.4	+58.0	119.3	74 27.6	+58.8	122.5	73 54.0	+59.4	125.4	73 18.1	+59.8	128.1	72 40.0	+60.0	130.7	72 00.0	+60.0	133.0	**72**
73	76 46.5	+54.9	110.8	76 23.2	+56.5	114.7	75 56.4	+57.8	118.3	75 26.4	+58.7	121.7	74 53.4	+59.3	124.9	74 17.9	+59.7	127.8	73 40.0	+59.9	130.5	73 00.0	+60.0	133.0	**73**
74	77 41.4	+54.0	109.0	77 19.7	+56.0	113.2	76 54.2	+57.4	117.2	76 25.1	+58.4	120.9	75 52.7	+59.2	124.3	75 17.6	+59.7	127.4	74 39.9	+59.9	130.3	74 00.0	+60.0	133.0	**74**
75	78 35.4	+53.0	106.9	78 15.7	+55.2	111.5	77 51.6	+56.9	115.8	77 23.5	+58.2	119.9	76 51.9	+59.1	123.6	76 17.3	+59.6	127.0	75 39.8	+59.9	130.1	75 00.0	+60.0	133.0	**75**
76	79 28.4	+51.7	104.4	79 10.9	+54.3	109.5	78 48.5	+56.4	114.3	78 21.7	+57.9	118.7	77 51.0	+58.9	122.8	77 16.9	+59.5	126.5	76 39.7	+59.9	129.9	76 00.0	+60.0	133.0	**76**
77	80 20.1	*+49.9*	•101.5	80 05.2	+53.1	107.1	79 44.9	+55.6	112.4	79 19.6	+57.4	117.3	78 49.9	+58.7	121.9	78 16.4	+59.5	126.0	77 39.6	+59.9	129.7	77 00.0	+60.0	133.0	**77**
78	81 10.0	*+47.6*	• 98.1	80 58.3	+51.5	104.3	80 40.5	+54.6	110.2	80 17.0	+56.9	115.7	79 48.6	+58.5	120.7	79 15.9	+59.4	125.3	78 39.5	+59.9	129.4	78 00.0	+60.0	133.0	**78**
79	81 57.6	*+44.5*	• 93.9	81 49.8	*+49.4*	•100.9	81 35.1	+53.2	107.5	81 13.9	+56.1	113.7	80 47.1	+58.0	119.4	80 15.3	+59.2	124.5	79 39.4	+59.8	129.0	79 00.0	+60.0	133.0	**79**
80	82 42.1	*+40.6*	• 88.9	82 39.2	*+46.5*	• 96.7	82 28.3	*+51.4*	•104.2	82 10.0	+55.1	111.3	81 45.1	+57.5	117.7	81 14.5	+59.1	123.5	80 39.2	+59.8	128.6	80 00.0	+60.0	133.0	**80**
81	83 22.7	*+35.1*	• 82.8	83 25.7	*+42.4*	• 91.4	83 19.7	*+48.6*	•100.0	83 05.1	*+53.4*	•108.2	82 42.6	+56.8	115.6	82 13.6	+58.7	122.2	81 39.0	+59.7	128.0	81 00.0	+60.0	133.0	**81**
82	83 57.8	*+28.0*	• 75.4	84 08.1	*+36.6*	• 84.9	84 08.3	*+44.6*	• 94.6	83 58.5	*+51.1*	•104.1	83 39.4	+55.6	112.9	83 12.3	+58.4	120.6	82 38.7	+59.7	127.3	82 00.0	+60.0	133.0	**82**
83	84 25.8	*+18.9*	• 66.7	84 44.7	*+28.6*	• 76.7	84 52.9	*+38.6*	• 87.6	84 49.6	*+47.3*	• 98.7	84 35.0	*+53.8*	•109.2	84 10.7	+57.7	118.5	83 38.4	+59.5	126.4	83 00.0	+60.0	133.0	**83**
84	84 44.7	*+8.2*	• 56.6	85 13.3	*+18.2*	• 66.6	85 31.5	*+29.5*	• 78.4	85 36.9	*+41.0*	• 91.3	85 28.8	*+50.5*	•104.1	85 08.4	+56.5	115.5	84 37.9	+59.3	125.2	84 00.0	+60.0	133.0	**84**
85	84 52.9	*−3.3*	• 45.6	85 31.5	*+5.4*	• 54.8	86 01.0	*+16.9*	• 66.6	86 17.9	*+30.8*	• 80.9	86 19.3	*+44.5*	• 96.5	86 04.9	*+54.3*	•111.1	85 37.2	+58.9	123.4	85 00.0	+60.0	133.0	**85**
86	84 49.6	*−14.6*	• 34.5	85 36.9	*−8.1*	• 41.8	86 17.9	*+1.4*	• 52.2	86 48.7	*+15.1*	• 66.6	87 03.8	*+32.7*	• 84.7	86 59.2	*+49.2*	•104.0	86 36.1	+58.1	120.6	86 00.0	+60.0	133.0	**86**
87	84 35.0	*−24.3*	• 23.9	85 28.8	*−20.4*	• 29.1	86 19.3	*−14.4*	• 36.6	87 03.8	*−4.6*	• 48.3	87 36.5	*+11.9*	• 66.5	87 48.4	*+35.9*	• 91.2	87 34.2	*+55.4*	•115.5	87 00.0	+60.0	133.0	**87**
88	84 10.7	*−32.3*	• 14.6	85 08.4	*−30.5*	• 17.5	86 04.9	*−27.7*	• 21.9	86 59.2	*−23.1*	• 29.0	87 48.4	*−14.2*	• 41.8	88 24.3	*+5.3*	• 66.5	88 29.6	*+42.6*	•104.0	88 00.0	+60.0	133.0	**88**
89	83 38.4	*−38.4*	• 6.6	84 37.9	*−37.9*	• 7.8	85 37.2	*−37.2*	• 9.6	86 36.1	*−36.1*	• 12.4	87 34.2	*−34.2*	• 17.5	88 29.6	*−29.6*	• 29.0	89 12.2	*−12.2*	• 66.5	89 00.0	+60.0	133.0	**89**
90	83 00.0	*−43.0*	• 0.0	84 00.0	*−43.3*	• 0.0	85 00.0	*−43.7*	• 0.0	86 00.0	*−44.3*	• 0.0	87 00.0	*−45.2*	• 0.0	88 00.0	*−46.8*	• 0.0	89 00.0	*−50.0*	• 0.0	90 00.0	−60.0	66.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 47°, 313°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 46.1	– 59.8	132.8	4 05.3	– 59.8	132.8	3 24.5	– 59.9	132.9	2 43.6	– 59.9	132.9	2 02.7	– 59.9	133.0	1 21.8	– 59.9	133.0	0 40.9	– 60.0	133.0	0 00.0	+ 60.0	47.0	**0**
1	3 46.3	– 59.8	132.9	3 05.5	– 59.9	132.9	2 24.6	– 59.9	133.0	1 43.7	– 59.9	133.0	1 02.8	– 60.0	133.0	0 21.9	– 60.0	133.0	0 19.1	+ 60.0	47.0	1 00.0	+ 60.0	47.0	**1**
2	2 46.5	– 59.7	133.0	2 05.6	– 59.8	133.0	1 24.7	– 59.9	133.0	0 43.8	– 60.0	133.0	0 02.8	– 59.9	133.0	0 38.1	+ 60.0	47.0	1 19.1	+ 60.0	47.0	2 00.0	+ 60.0	47.0	**2**
3	1 46.8	– 59.8	133.1	1 05.8	– 59.8	133.1	0 24.8	– 59.9	133.1	0 16.2	+ 59.9	46.9	0 57.1	+ 60.0	46.9	1 38.1	+ 60.0	46.9	2 19.1	+ 60.0	47.0	3 00.0	+ 60.0	47.0	**3**
4	0 47.0	– 59.7	133.1	0 06.0	– 59.8	133.1	0 35.1	+ 59.8	46.9	1 16.1	+ 59.9	46.9	1 57.1	+ 60.0	46.9	2 38.1	+ 60.0	46.9	3 19.1	+ 60.0	47.0	4 00.0	+ 60.0	47.0	**4**
5	0 12.7	+ 59.8	46.8	0 53.8	+ 59.9	46.8	1 34.9	+ 59.9	46.8	2 16.0	+ 59.9	46.8	2 57.1	+ 59.9	46.8	3 38.1	+ 60.0	46.9	4 19.1	+ 60.0	46.9	5 00.0	+ 60.0	47.0	**5**
6	1 12.5	+ 59.8	46.7	1 53.7	+ 59.8	46.7	2 34.8	+ 59.9	46.7	3 15.9	+ 59.9	46.8	3 57.0	+ 60.0	46.8	4 38.1	+ 59.9	46.9	5 19.1	+ 59.9	46.9	6 00.0	+ 60.0	47.0	**6**
7	2 12.3	+ 59.7	46.6	2 53.5	+ 59.8	46.6	3 34.7	+ 59.9	46.7	4 15.8	+ 60.0	46.7	4 57.0	+ 59.9	46.8	5 38.0	+ 60.0	46.8	6 19.0	+ 60.0	46.9	7 00.0	+ 60.0	47.0	**7**
8	3 12.0	+ 59.8	46.5	3 53.3	+ 59.8	46.5	4 34.6	+ 59.8	46.6	5 15.8	+ 59.9	46.7	5 56.9	+ 60.0	46.7	6 38.0	+ 60.0	46.8	7 19.0	+ 60.0	46.9	8 00.0	+ 60.0	47.0	**8**
9	4 11.8	+ 59.7	46.4	4 53.1	+ 59.9	46.5	5 34.4	+ 59.9	46.5	6 15.7	+ 59.9	46.6	6 56.9	+ 59.9	46.7	7 38.0	+ 60.0	46.8	8 19.0	+ 60.0	46.9	9 00.0	+ 60.0	47.0	**9**
10	5 11.5	+ 59.8	46.3	5 53.0	+ 59.8	46.4	6 34.3	+ 59.9	46.5	7 15.6	+ 59.9	46.6	7 56.8	+ 60.0	46.7	8 38.0	+ 60.0	46.8	9 19.0	+ 60.0	46.9	10 00.0	+ 60.0	47.0	**10**
11	6 11.3	+ 59.8	46.2	6 52.8	+ 59.8	46.3	7 34.2	+ 59.9	46.4	8 15.5	+ 59.9	46.5	8 56.8	+ 59.9	46.6	9 38.0	+ 59.9	46.7	10 19.0	+ 60.0	46.9	11 00.0	+ 60.0	47.0	**11**
12	7 11.1	+ 59.7	46.1	7 52.6	+ 59.8	46.2	8 34.1	+ 59.8	46.3	9 15.4	+ 60.0	46.5	9 56.7	+ 60.0	46.6	10 37.9	+ 60.0	46.7	11 19.0	+ 60.0	46.8	12 00.0	+ 60.0	47.0	**12**
13	8 10.8	+ 59.8	46.0	8 52.4	+ 59.8	46.2	9 33.9	+ 59.9	46.3	10 15.4	+ 59.9	46.4	10 56.7	+ 59.9	46.5	11 37.9	+ 60.0	46.7	12 19.0	+ 60.0	46.8	13 00.0	+ 60.0	47.0	**13**
14	9 10.6	+ 59.7	46.0	9 52.2	+ 59.9	46.1	10 33.8	+ 59.9	46.2	11 15.3	+ 59.9	46.3	11 56.6	+ 60.0	46.5	12 37.9	+ 60.0	46.7	13 19.0	+ 60.0	46.8	14 00.0	+ 60.0	47.0	**14**
15	10 10.3	+ 59.8	45.9	10 52.1	+ 59.8	46.0	11 33.7	+ 59.9	46.1	12 15.2	+ 59.9	46.3	12 56.6	+ 60.0	46.5	13 37.9	+ 59.9	46.6	14 19.0	+ 60.0	46.8	15 00.0	+ 60.0	47.0	**15**
16	11 10.1	+ 59.7	45.8	11 51.9	+ 59.8	45.9	12 33.6	+ 59.8	46.1	13 15.1	+ 59.9	46.2	13 56.6	+ 59.9	46.4	14 37.8	+ 60.0	46.6	15 19.0	+ 60.0	46.8	16 00.0	+ 60.0	47.0	**16**
17	12 09.8	+ 59.8	45.7	12 51.7	+ 59.8	45.8	13 33.4	+ 59.9	46.0	14 15.0	+ 60.0	46.2	14 56.5	+ 60.0	46.4	15 37.8	+ 60.0	46.6	16 19.0	+ 60.0	46.8	17 00.0	+ 60.0	47.0	**17**
18	13 09.6	+ 59.7	45.6	13 51.5	+ 59.8	45.8	14 33.3	+ 59.9	45.9	15 15.0	+ 59.9	46.1	15 56.5	+ 59.9	46.3	16 37.8	+ 60.0	46.5	17 19.0	+ 60.0	46.8	18 00.0	+ 60.0	47.0	**18**
19	14 09.3	+ 59.8	45.5	14 51.3	+ 59.8	45.7	15 33.2	+ 59.8	45.9	16 14.9	+ 59.9	46.1	16 56.4	+ 60.0	46.3	17 37.8	+ 60.0	46.5	18 19.0	+ 60.0	46.8	19 00.0	+ 60.0	47.0	**19**
20	15 09.1	+ 59.7	45.4	15 51.1	+ 59.8	45.6	16 33.0	+ 59.9	45.8	17 14.8	+ 59.9	46.0	17 56.4	+ 59.9	46.3	18 37.8	+ 59.9	46.5	19 19.0	+ 60.0	46.7	20 00.0	+ 60.0	47.0	**20**
21	16 08.8	+ 59.8	45.3	16 50.9	+ 59.9	45.5	17 32.9	+ 59.9	45.7	18 14.7	+ 59.9	46.0	18 56.3	+ 60.0	46.2	19 37.7	+ 60.0	46.5	20 19.0	+ 60.0	46.7	21 00.0	+ 60.0	47.0	**21**
22	17 08.6	+ 59.7	45.2	17 50.8	+ 59.8	45.4	18 32.8	+ 59.8	45.7	19 14.6	+ 59.9	45.9	19 56.3	+ 59.9	46.2	20 37.7	+ 60.0	46.4	21 19.0	+ 60.0	46.7	22 00.0	+ 60.0	47.0	**22**
23	18 08.3	+ 59.7	45.1	18 50.6	+ 59.8	45.3	19 32.6	+ 59.9	45.6	20 14.5	+ 59.9	45.9	20 56.2	+ 60.0	46.1	21 37.7	+ 60.0	46.4	22 19.0	+ 60.0	46.7	23 00.0	+ 60.0	47.0	**23**
24	19 08.0	+ 59.8	45.0	19 50.4	+ 59.8	45.3	20 32.5	+ 59.9	45.5	21 14.4	+ 59.9	45.8	21 56.2	+ 59.9	46.1	22 37.7	+ 60.0	46.4	23 19.0	+ 60.0	46.7	24 00.0	+ 60.0	47.0	**24**
25	20 07.8	+ 59.7	44.9	20 50.2	+ 59.8	45.2	21 32.4	+ 59.8	45.4	22 14.3	+ 60.0	45.7	22 56.1	+ 60.0	46.0	23 37.7	+ 59.9	46.3	24 19.0	+ 59.9	46.7	25 00.0	+ 60.0	47.0	**25**
26	21 07.5	+ 59.7	44.8	21 50.0	+ 59.8	45.1	22 32.2	+ 59.9	45.4	23 14.3	+ 59.9	45.7	23 56.1	+ 59.9	46.0	24 37.6	+ 60.0	46.3	25 18.9	+ 60.0	46.6	26 00.0	+ 60.0	47.0	**26**
27	22 07.2	+ 59.7	44.7	22 49.8	+ 59.7	45.0	23 32.1	+ 59.8	45.3	24 14.2	+ 59.9	45.6	24 56.0	+ 60.0	45.9	25 37.6	+ 60.0	46.3	26 18.9	+ 60.0	46.6	27 00.0	+ 60.0	47.0	**27**
28	23 06.9	+ 59.7	44.6	23 49.5	+ 59.8	44.9	24 31.9	+ 59.9	45.2	25 14.1	+ 59.9	45.6	25 56.0	+ 59.9	45.9	26 37.6	+ 60.0	46.2	27 18.9	+ 60.0	46.6	28 00.0	+ 60.0	47.0	**28**
29	24 06.6	+ 59.8	44.5	24 49.3	+ 59.8	44.8	25 31.8	+ 59.8	45.1	26 14.0	+ 59.9	45.5	26 55.9	+ 59.9	45.8	27 37.6	+ 59.9	46.2	28 18.9	+ 60.0	46.6	29 00.0	+ 60.0	47.0	**29**
30	25 06.4	+ 59.7	44.4	25 49.1	+ 59.8	44.7	26 31.6	+ 59.9	45.1	27 13.9	+ 59.9	45.4	27 55.8	+ 60.0	45.8	28 37.5	+ 60.0	46.2	29 18.9	+ 60.0	46.6	30 00.0	+ 60.0	47.0	**30**
31	26 06.1	+ 59.7	44.3	26 48.9	+ 59.8	44.6	27 31.5	+ 59.8	45.0	28 13.8	+ 59.9	45.4	28 55.8	+ 59.9	45.7	29 37.5	+ 60.0	46.2	30 18.9	+ 60.0	46.6	31 00.0	+ 60.0	47.0	**31**
32	27 05.8	+ 59.7	44.2	27 48.7	+ 59.7	44.5	28 31.3	+ 59.9	44.9	29 13.7	+ 59.9	45.3	29 55.7	+ 60.0	45.7	30 37.5	+ 60.0	46.1	31 18.9	+ 60.0	46.6	32 00.0	+ 60.0	47.0	**32**
33	28 05.5	+ 59.7	44.0	28 48.4	+ 59.8	44.4	29 31.2	+ 59.8	44.8	30 13.6	+ 59.9	45.2	30 55.7	+ 59.9	45.6	31 37.5	+ 59.9	46.1	32 18.9	+ 60.0	46.5	33 00.0	+ 60.0	47.0	**33**
34	29 05.2	+ 59.6	43.9	29 48.2	+ 59.8	44.3	30 31.0	+ 59.8	44.7	31 13.5	+ 59.9	45.2	31 55.6	+ 59.9	45.6	32 37.4	+ 60.0	46.0	33 18.9	+ 60.0	46.5	34 00.0	+ 60.0	47.0	**34**
35	30 04.8	+ 59.7	43.8	30 48.0	+ 59.7	44.2	31 30.8	+ 59.9	44.6	32 13.4	+ 59.8	45.1	32 55.5	+ 60.0	45.5	33 37.4	+ 60.0	46.0	34 18.9	+ 60.0	46.5	35 00.0	+ 60.0	47.0	**35**
36	31 04.5	+ 59.7	43.7	31 47.7	+ 59.8	44.1	32 30.7	+ 59.8	44.6	33 13.2	+ 59.9	45.0	33 55.5	+ 59.9	45.5	34 37.4	+ 59.9	46.0	35 18.9	+ 60.0	46.5	36 00.0	+ 60.0	47.0	**36**
37	32 04.2	+ 59.6	43.6	32 47.5	+ 59.7	44.0	33 30.5	+ 59.8	44.5	34 13.1	+ 59.9	44.9	34 55.4	+ 60.0	45.4	35 37.3	+ 60.0	45.9	36 18.9	+ 60.0	46.5	37 00.0	+ 60.0	47.0	**37**
38	33 03.8	+ 59.7	43.4	33 47.2	+ 59.8	43.9	34 30.3	+ 59.8	44.4	35 13.0	+ 59.9	44.9	35 55.4	+ 59.9	45.4	36 37.3	+ 60.0	45.9	37 18.9	+ 60.0	46.4	38 00.0	+ 60.0	47.0	**38**
39	34 03.5	+ 59.7	43.3	34 47.0	+ 59.7	43.8	35 30.1	+ 59.8	44.3	36 12.9	+ 59.9	44.8	36 55.3	+ 59.9	45.3	37 37.3	+ 59.9	45.9	38 18.9	+ 59.9	46.4	39 00.0	+ 60.0	47.0	**39**
40	35 03.2	+ 59.6	43.2	35 46.7	+ 59.8	43.7	36 29.9	+ 59.8	44.2	37 12.8	+ 59.8	44.7	37 55.2	+ 59.9	45.3	38 37.2	+ 60.0	45.8	39 18.8	+ 60.0	46.4	40 00.0	+ 60.0	47.0	**40**
41	36 02.8	+ 59.6	43.1	36 46.5	+ 59.7	43.6	37 29.7	+ 59.8	44.1	38 12.6	+ 59.9	44.6	38 55.1	+ 60.0	45.2	39 37.2	+ 60.0	45.8	40 18.8	+ 60.0	46.4	41 00.0	+ 60.0	47.0	**41**
42	37 02.4	+ 59.6	42.9	37 46.2	+ 59.7	43.4	38 29.5	+ 59.8	44.0	39 12.5	+ 59.9	44.5	39 55.1	+ 59.9	45.1	40 37.2	+ 59.9	45.7	41 18.8	+ 60.0	46.4	42 00.0	+ 60.0	47.0	**42**
43	38 02.0	+ 59.6	42.8	38 45.9	+ 59.7	43.3	39 29.3	+ 59.8	43.9	40 12.4	+ 59.9	44.5	40 55.0	+ 59.9	45.1	41 37.1	+ 60.0	45.7	42 18.8	+ 60.0	46.3	43 00.0	+ 60.0	47.0	**43**
44	39 01.6	+ 59.6	42.6	39 45.6	+ 59.7	43.2	40 29.1	+ 59.8	43.8	41 12.3	+ 59.8	44.4	41 54.9	+ 59.9	45.0	42 37.1	+ 60.0	45.6	43 18.8	+ 60.0	46.3	44 00.0	+ 60.0	47.0	**44**
45	40 01.2	+ 59.6	42.5	40 45.3	+ 59.7	43.1	41 28.9	+ 59.8	43.7	42 12.1	+ 59.9	44.3	42 54.8	+ 60.0	44.9	43 37.1	+ 59.9	45.6	44 18.8	+ 60.0	46.3	45 00.0	+ 60.0	47.0	**45**
46	41 00.8	+ 59.6	42.3	41 45.0	+ 59.7	42.9	42 28.7	+ 59.8	43.5	43 12.0	+ 59.8	44.2	43 54.8	+ 59.9	44.8	44 37.0	+ 60.0	45.5	45 18.8	+ 60.0	46.3	46 00.0	+ 60.0	47.0	**46**
47	42 00.4	+ 59.6	42.2	42 44.7	+ 59.6	42.8	43 28.5	+ 59.7	43.4	44 11.8	+ 59.9	44.1	44 54.7	+ 59.9	44.8	45 37.0	+ 60.0	45.5	46 18.8	+ 60.0	46.2	47 00.0	+ 60.0	47.0	**47**
48	43 00.0	+ 59.5	42.0	43 44.3	+ 59.7	42.6	44 28.2	+ 59.8	43.3	45 11.7	+ 59.8	44.0	45 54.6	+ 59.9	44.7	46 37.0	+ 59.9	45.4	47 18.8	+ 60.0	46.2	48 00.0	+ 60.0	47.0	**48**
49	43 59.5	+ 59.5	41.8	44 44.0	+ 59.6	42.5	45 28.0	+ 59.7	43.2	46 11.5	+ 59.8	43.9	46 54.5	+ 59.9	44.6	47 36.9	+ 60.0	45.4	48 18.8	+ 60.0	46.2	49 00.0	+ 60.0	47.0	**49**
50	44 59.0	+ 59.6	41.7	45 43.6	+ 59.7	42.3	46 27.7	+ 59.8	43.0	47 11.3	+ 59.9	43.8	47 54.4	+ 59.9	44.5	48 36.9	+ 59.9	45.3	49 18.8	+ 59.9	46.1	50 00.0	+ 60.0	47.0	**50**
51	45 58.6	+ 59.4	41.5	46 43.3	+ 59.6	42.2	47 27.5	+ 59.7	42.9	48 11.2	+ 59.8	43.7	48 54.3	+ 59.9	44.4	49 36.8	+ 60.0	45.3	50 18.7	+ 60.0	46.1	51 00.0	+ 60.0	47.0	**51**
52	46 58.0	+ 59.5	41.3	47 42.9	+ 59.6	42.0	48 27.2	+ 59.7	42.8	49 11.0	+ 59.8	43.5	49 54.2	+ 59.9	44.4	50 36.8	+ 59.9	45.2	51 18.7	+ 60.0	46.1	52 00.0	+ 60.0	47.0	**52**
53	47 57.5	+ 59.5	41.1	48 42.5	+ 59.6	41.8	49 26.9	+ 59.7	42.6	50 10.8	+ 59.8	43.4	50 54.1	+ 59.9	44.3	51 36.7	+ 60.0	45.1	52 18.7	+ 60.0	46.0	53 00.0	+ 60.0	47.0	**53**
54	48 57.0	+ 59.4	40.9	49 42.1	+ 59.5	41.7	50 26.6	+ 59.7	42.5	51 10.6	+ 59.8	43.3	51 54.0	+ 59.8	44.2	52 36.7	+ 59.9	45.1	53 18.7	+ 60.0	46.0	54 00.0	+ 60.0	47.0	**54**
55	49 56.4	+ 59.4	40.7	50 41.6	+ 59.6	41.5	51 26.3	+ 59.7	42.3	52 10.4	+ 59.8	43.2	52 53.8	+ 59.9	44.1	53 36.6	+ 60.0	45.0	54 18.7	+ 60.0	46.0	55 00.0	+ 60.0	47.0	**55**
56	50 55.8	+ 59.4	40.5	51 41.2	+ 59.5	41.3	52 26.0	+ 59.7	42.1	53 10.2	+ 59.8	43.0	53 53.7	+ 59.9	44.0	54 36.6	+ 59.9	44.9	55 18.7	+ 60.0	45.9	56 00.0	+ 60.0	47.0	**56**
57	51 55.2	+ 59.4	40.2	52 40.7	+ 59.5	41.1	53 25.7	+ 59.6	42.0	54 10.0	+ 59.7	42.9	54 53.6	+ 59.9	43.8	55 36.5	+ 59.9	44.8	56 18.7	+ 59.9	45.9	57 00.0	+ 60.0	47.0	**57**
58	52 54.6	+ 59.3	40.0	53 40.2	+ 59.5	40.9	54 25.3	+ 59.6	41.8	55 09.7	+ 59.8	42.7	55 53.5	+ 59.8	43.7	56 36.4	+ 60.0	44.8	57 18.6	+ 60.0	45.9	58 00.0	+ 60.0	47.0	**58**
59	53 53.9	+ 59.3	39.7	54 39.7	+ 59.5	40.6	55 24.9	+ 59.7	41.6	56 09.5	+ 59.7	42.6	56 53.3	+ 59.9	43.6	57 36.4	+ 59.9	44.7	58 18.6	+ 60.0	45.8	59 00.0	+ 60.0	47.0	**59**
60	54 53.2	+ 59.2	39.5	55 39.2	+ 59.4	40.4	56 24.6	+ 59.5	41.4	57 09.2	+ 59.8	42.4	57 53.2	+ 59.8	43.5	58 36.3	+ 59.9	44.6	59 18.6	+ 60.0	45.8	60 00.0	+ 60.0	47.0	**60**
61	55 52.4	+ 59.3	39.2	56 38.6	+ 59.4	40.2	57 24.1	+ 59.6	41.2	58 09.0	+ 59.7	42.2	58 53.0	+ 59.8	43.3	59 36.2	+ 60.0	44.5	60 18.6	+ 60.0	45.7	61 00.0	+ 60.0	47.0	**61**
62	56 51.7	+ 59.1	38.9	57 38.0	+ 59.4	39.9	58 23.7	+ 59.5	40.9	59 08.7	+ 59.7	42.0	59 52.8	+ 59.8	43.2	60 36.2	+ 59.9	44.4	61 18.6	+ 59.9	45.7	62 00.0	+ 60.0	47.0	**62**
63	57 50.8	+ 59.2	38.6	58 37.4	+ 59.3	39.6	59 23.2	+ 59.6	40.7	60 08.4	+ 59.6	41.8	60 52.6	+ 59.9	43.0	61 36.1	+ 59.9	44.3	62 18.5	+ 60.0	45.6	63 00.0	+ 60.0	47.0	**63**
64	58 50.0	+ 59.0	38.3	59 36.7	+ 59.3	39.3	60 22.8	+ 59.4	40.4	61 08.0	+ 59.7	41.6	61 52.5	+ 59.8	42.9	62 36.0	+ 59.9	44.2	63 18.5	+ 60.0	45.5	64 00.0	+ 60.0	47.0	**64**
65	59 49.0	+ 59.1	37.9	60 36.0	+ 59.3	39.0	61 22.2	+ 59.5	40.2	62 07.7	+ 59.6	41.4	62 52.3	+ 59.7	42.7	63 35.9	+ 59.9	44.0	64 18.5	+ 60.0	45.5	65 00.0	+ 60.0	47.0	**65**
66	60 48.1	+ 58.9	37.6	61 35.3	+ 59.1	38.7	62 21.7	+ 59.4	39.9	63 07.3	+ 59.6	41.1	63 52.0	+ 59.8	42.5	64 35.8	+ 59.9	43.9	65 18.5	+ 59.9	45.4	66 00.0	+ 60.0	47.0	**66**
67	61 47.0	+ 58.9	37.2	62 34.4	+ 59.2	38.3	63 21.1	+ 59.4	39.6	64 06.9	+ 59.6	40.9	64 51.8	+ 59.7	42.3	65 35.7	+ 59.9	43.8	66 18.4	+ 60.0	45.3	67 00.0	+ 60.0	47.0	**67**
68	62 45.9	+ 58.8	36.8	63 33.6	+ 59.1	38.0	64 20.5	+ 59.3	39.3	65 06.5	+ 59.5	40.6	65 51.5	+ 59.8	42.1	66 35.6	+ 59.8	43.6	67 18.4	+ 60.0	45.2	68 00.0	+ 60.0	47.0	**68**
69	63 44.7	+ 58.7	36.3	64 32.7	+ 59.0	37.6	65 19.8	+ 59.3	38.9	66 06.0	+ 59.5	40.3	66 51.3	+ 59.7	41.8	67 35.4	+ 59.9	43.4	68 18.4	+ 59.9	45.2	69 00.0	+ 60.0	47.0	**69**
70	64 43.4	+ 58.7	35.9	65 31.7	+ 58.9	37.1	66 19.1	+ 59.2	38.5	67 05.5	+ 59.5	40.0	67 51.0	+ 59.6	41.6	68 35.3	+ 59.8	43.2	69 18.3	+ 60.0	45.1	70 00.0	+ 60.0	47.0	**70**
71	65 42.1	+ 58.5	35.4	66 30.6	+ 58.8	36.7	67 18.3	+ 59.1	38.1	68 05.0	+ 59.4	39.6	68 50.6	+ 59.7	41.3	69 35.1	+ 59.9	43.0	70 18.3	+ 59.9	45.0	71 00.0	+ 60.0	47.0	**71**
72	66 40.6	+ 58.4	34.8	67 29.4	+ 58.8	36.2	68 17.4	+ 59.1	37.7	69 04.4	+ 59.4	39.3	69 50.3	+ 59.6	41.0	70 35.0	+ 59.8	42.8	71 18.2	+ 60.0	44.8	72 00.0	+ 60.0	47.0	**72**
73	67 39.0	+ 58.2	34.2	68 28.2	+ 58.6	35.6	69 16.5	+ 58.9	37.2	70 03.8	+ 59.2	38.8	70 49.9	+ 59.6	40.6	71 34.8	+ 59.8	42.6	72 18.2	+ 59.9	44.7	73 00.0	+ 60.0	47.0	**73**
74	68 37.2	+ 58.1	33.6	69 26.8	+ 58.5	35.0	70 15.4	+ 58.9	36.6	71 03.0	+ 59.3	38.4	71 49.5	+ 59.5	40.3	72 34.6	+ 59.7	42.3	73 18.1	+ 60.0	44.6	74 00.0	+ 60.0	47.0	**74**
75	69 35.3	+ 57.9	32.9	70 25.3	+ 58.3	34.4	71 14.3	+ 58.8	36.1	72 02.3	+ 59.1	37.9	72 49.0	+ 59.5	39.8	73 34.3	+ 59.8	42.0	74 18.1	+ 59.9	44.4	75 00.0	+ 60.0	47.0	**75**
76	70 33.2	+ 57.7	32.1	71 23.6	+ 58.2	33.7	72 13.1	+ 58.6	35.4	73 01.4	+ 59.0	37.3	73 48.5	+ 59.4	39.4	74 34.1	+ 59.7	41.7	75 18.0	+ 59.9	44.2	76 00.0	+ 60.0	47.0	**76**
77	71 30.9	+ 57.5	31.3	72 21.8	+ 57.9	32.9	73 11.7	+ 58.4	34.7	74 00.4	+ 58.9	36.7	74 47.9	+ 59.3	38.9	75 33.8	+ 59.6	41.3	76 17.9	+ 59.9	44.0	77 00.0	+ 60.0	47.0	**77**
78	72 28.4	+ 57.1	30.3	73 19.7	+ 57.7	32.0	74 10.1	+ 58.2	33.9	74 59.3	+ 58.8	35.9	75 47.2	+ 59.2	38.3	76 33.4	+ 59.7	40.9	77 17.8	+ 59.9	43.7	78 00.0	+ 60.0	47.0	**78**
79	73 25.5	+ 56.9	29.3	74 17.4	+ 57.4	31.0	75 08.3	+ 58.0	33.0	75 58.1	+ 58.5	35.1	76 46.4	+ 59.1	37.6	77 33.1	+ 59.5	40.3	78 17.7	+ 59.9	43.5	79 00.0	+ 60.0	47.0	**79**
80	74 22.4	+ 56.4	28.1	75 14.8	+ 57.1	29.9	76 06.3	+ 57.7	31.9	76 56.6	+ 58.3	34.2	77 45.5	+ 58.9	36.8	78 32.6	+ 59.4	39.7	79 17.6	+ 59.8	43.1	80 00.0	+ 60.0	47.0	**80**
81	75 18.8	+ 55.9	26.8	76 11.9	+ 56.6	28.7	77 04.0	+ 57.3	30.7	77 54.9	+ 58.1	33.1	78 44.4	+ 58.7	35.9	79 32.0	+ 59.4	39.0	80 17.4	+ 59.8	42.7	81 00.0	+ 60.0	47.0	**81**
82	76 14.7	+ 55.3	25.3	77 08.5	+ 56.0	27.2	78 01.3	+ 56.9	29.4	78 53.0	+ 57.6	31.9	79 43.1	+ 58.5	34.8	80 31.4	+ 59.2	38.2	81 17.2	+ 59.8	42.2	82 00.0	+ 60.0	47.0	**82**
83	77 10.0	+ 54.5	23.7	78 04.5	+ 55.4	25.6	78 58.2	+ 56.2	27.8	79 50.6	+ 57.2	30.4	80 41.6	+ 58.1	33.4	81 30.6	+ 59.0	37.1	82 17.0	+ 59.7	41.6	83 00.0	+ 60.0	47.0	**83**
84	78 04.5	+ 53.7	21.7	78 59.9	+ 54.5	23.6	79 54.4	+ 55.5	25.9	80 47.8	+ 56.5	28.6	81 39.7	+ 57.6	31.8	82 29.6	+ 58.6	35.8	83 16.7	+ 59.6	40.8	84 00.0	+ 60.0	47.0	**84**
85	78 58.2	+ 52.4	19.5	79 54.4	+ 53.4	21.3	80 49.9	+ 54.4	23.6	81 44.3	+ 55.6	26.3	82 37.3	+ 56.8	29.8	83 28.2	+ 58.2	34.1	84 16.3	+ 59.4	39.7	85 00.0	+ 60.0	47.0	**85**
86	79 50.6	+ 51.0	16.8	80 47.8	+ 51.9	18.6	81 44.3	+ 53.0	20.8	82 39.9	+ 54.2	23.6	83 34.1	+ 55.8	27.1	84 26.4	+ 57.5	31.8	85 15.7	+ 59.1	38.1	86 00.0	+ 60.0	47.0	**86**
87	80 41.6	*+ 49.0* •	13.7	81 39.7	*+ 49.9* •	15.3	82 37.3	*+ 50.9* •	17.3	83 34.1	*+ 52.3* •	20.0	84 29.9	*+ 54.0* •	23.5	85 23.9	*+ 56.0* •	28.5	86 14.8	+ 58.4	35.8	87 00.0	+ 60.0	47.0	**87**
88	81 30.6	*+ 46.4* •	10.0	82 29.6	*+ 47.1* •	11.3	83 28.2	*+ 48.1* •	13.0	84 26.4	*+ 49.3* •	15.3	85 23.9	*+ 50.9* •	18.5	86 19.9	*+ 53.3* •	23.5	87 13.2	*+ 56.8* •	31.8	88 00.0	+ 60.0	47.0	**88**
89	82 17.0	*+ 43.0* •	5.5	83 16.7	*+ 43.3* •	6.3	84 16.3	*+ 43.7* •	7.3	85 15.7	*+ 44.3* •	8.9	86 14.8	*+ 45.2* •	11.2	87 13.2	*+ 46.8* •	15.3	88 10.0	*+ 50.0* •	23.5	89 00.0	+ 60.0	47.0	**89**
90	83 00.0	*+ 38.4* •	0.0	84 00.0	*+ 37.9* •	0.0	85 00.0	*+ 37.2* •	0.0	86 00.0	*+ 36.1* •	0.0	87 00.0	*+ 34.2* •	0.0	88 00.0	*+ 29.6* •	0.0	89 00.0	*+ 12.2* •	0.0	90 00.0	– 60.0	23.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 133°, 227°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 40.6	+59.8	131.8	4 00.6	+59.9	131.8	3 20.6	+59.9	131.9	2 40.5	+59.9	131.9	2 00.4	+60.0	132.0	1 20.3	+60.0	132.0	0 40.1	+60.0	132.0	0 00.0	+60.0	132.0	0
1	5 40.4	+59.7	131.7	5 00.5	+59.8	131.8	4 20.5	+59.8	131.8	3 40.4	+60.0	131.9	3 00.4	+59.9	131.9	2 20.3	+59.9	132.0	1 40.1	+60.0	132.0	1 00.0	+60.0	132.0	1
2	6 40.1	+59.8	131.6	6 00.3	+59.8	131.7	5 20.3	+59.9	131.8	4 40.4	+59.9	131.8	4 00.3	+60.0	131.9	3 20.2	+60.0	131.9	2 40.1	+60.0	132.0	2 00.0	+60.0	132.0	2
3	7 39.9	+59.7	131.5	7 00.1	+59.8	131.6	6 20.2	+59.9	131.7	5 40.3	+59.9	131.8	5 00.3	+59.9	131.8	4 20.2	+60.0	131.9	3 40.1	+60.0	132.0	3 00.0	+60.0	132.0	3
4	8 39.6	+59.8	131.4	7 59.9	+59.8	131.5	7 20.1	+59.9	131.6	6 40.2	+59.9	131.7	6 00.2	+60.0	131.8	5 20.2	+60.0	131.9	4 40.1	+60.0	131.9	4 00.0	+60.0	132.0	4
5	9 39.4	+59.7	131.3	8 59.7	+59.8	131.4	8 20.0	+59.8	131.6	7 40.1	+59.9	131.7	7 00.2	+59.9	131.8	6 20.2	+60.0	131.9	5 40.1	+60.0	131.9	5 00.0	+60.0	132.0	5
6	10 39.1	+59.8	131.2	9 59.5	+59.9	131.4	9 19.8	+59.9	131.5	8 40.0	+59.9	131.6	8 00.1	+60.0	131.7	7 20.2	+59.9	131.8	6 40.1	+60.0	131.9	6 00.0	+60.0	132.0	6
7	11 38.9	+59.7	131.1	10 59.4	+59.8	131.3	10 19.7	+59.9	131.4	9 39.9	+60.0	131.6	9 00.1	+59.9	131.7	8 20.1	+60.0	131.8	7 40.1	+60.0	131.9	7 00.0	+60.0	132.0	7
8	12 38.6	+59.8	131.0	11 59.2	+59.8	131.2	11 19.6	+59.8	131.4	10 39.9	+59.9	131.5	10 00.0	+60.0	131.6	9 20.1	+60.0	131.8	8 40.1	+60.0	131.9	8 00.0	+60.0	132.0	8
9	13 38.4	+59.7	130.9	12 59.0	+59.8	131.1	12 19.4	+59.9	131.3	11 39.8	+59.9	131.5	11 00.0	+60.0	131.6	10 20.1	+60.0	131.7	9 40.1	+60.0	131.9	9 00.0	+60.0	132.0	9
10	14 38.1	+59.7	130.9	13 58.8	+59.8	131.0	13 19.3	+59.9	131.2	12 39.7	+59.9	131.4	12 00.0	+59.9	131.6	11 20.1	+60.0	131.7	10 40.1	+60.0	131.9	10 00.0	+60.0	132.0	10
11	15 37.8	+59.8	130.8	14 58.6	+59.8	131.0	14 19.2	+59.8	131.2	13 39.6	+59.9	131.3	12 59.9	+60.0	131.5	12 20.1	+59.9	131.7	11 40.1	+60.0	131.9	11 00.0	+60.0	132.0	11
12	16 37.6	+59.7	130.7	15 58.4	+59.8	130.9	15 19.0	+59.9	131.1	14 39.5	+59.9	131.3	13 59.9	+59.9	131.5	13 20.0	+60.0	131.7	12 40.1	+60.0	131.8	12 00.0	+60.0	132.0	12
13	17 37.3	+59.7	130.6	16 58.2	+59.8	130.8	16 18.9	+59.9	131.0	15 39.4	+60.0	131.2	14 59.8	+60.0	131.4	14 20.0	+60.0	131.6	13 40.1	+60.0	131.8	13 00.0	+60.0	132.0	13
14	18 37.0	+59.8	130.5	17 58.0	+59.8	130.7	17 18.8	+59.8	130.9	16 39.4	+59.9	131.2	15 59.8	+59.9	131.4	15 20.0	+60.0	131.6	14 40.1	+60.0	131.8	14 00.0	+60.0	132.0	14
15	19 36.8	+59.7	130.4	18 57.8	+59.8	130.6	18 18.6	+59.9	130.9	17 39.3	+59.9	131.1	16 59.7	+60.0	131.4	16 20.0	+60.0	131.6	15 40.1	+60.0	131.8	15 00.0	+60.0	132.0	15
16	20 36.5	+59.7	130.3	19 57.6	+59.8	130.5	19 18.5	+59.8	130.8	18 39.2	+59.9	131.1	17 59.7	+59.9	131.3	17 20.0	+59.9	131.6	16 40.1	+60.0	131.8	16 00.0	+60.0	132.0	16
17	21 36.2	+59.7	130.1	20 57.4	+59.8	130.4	20 18.3	+59.9	130.7	19 39.1	+59.9	131.0	18 59.6	+60.0	131.3	18 19.9	+60.0	131.5	17 40.1	+60.0	131.8	17 00.0	+60.0	132.0	17
18	22 35.9	+59.7	130.0	21 57.2	+59.8	130.4	21 18.2	+59.9	130.7	20 39.0	+59.9	130.9	19 59.6	+59.9	131.2	19 19.9	+60.0	131.5	18 40.1	+59.9	131.8	18 00.0	+60.0	132.0	18
19	23 35.6	+59.7	129.9	22 57.0	+59.7	130.3	22 18.1	+59.8	130.6	21 38.9	+59.9	130.9	20 59.5	+60.0	131.2	20 19.9	+60.0	131.5	19 40.0	+60.0	131.7	19 00.0	+60.0	132.0	19
20	24 35.3	+59.7	129.8	23 56.7	+59.8	130.2	23 17.9	+59.9	130.5	22 38.8	+59.9	130.8	21 59.5	+59.9	131.1	21 19.9	+59.9	131.4	20 40.0	+60.0	131.7	20 00.0	+60.0	132.0	20
21	25 35.0	+59.7	129.7	24 56.5	+59.8	130.1	24 17.8	+59.8	130.4	23 38.7	+59.9	130.8	22 59.4	+59.9	131.1	22 19.8	+60.0	131.4	21 40.0	+60.0	131.7	21 00.0	+60.0	132.0	21
22	26 34.7	+59.7	129.6	25 56.3	+59.8	130.0	25 17.6	+59.8	130.4	24 38.6	+59.9	130.7	23 59.3	+60.0	131.0	23 19.8	+60.0	131.4	22 40.0	+60.0	131.7	22 00.0	+60.0	132.0	22
23	27 34.4	+59.7	129.5	26 56.1	+59.7	129.9	26 17.4	+59.9	130.3	25 38.5	+59.9	130.6	24 59.3	+59.9	131.0	24 19.8	+60.0	131.3	23 40.0	+60.0	131.7	23 00.0	+60.0	132.0	23
24	28 34.1	+59.7	129.4	27 55.8	+59.8	129.8	27 17.3	+59.8	130.2	26 38.4	+59.9	130.6	25 59.2	+60.0	131.0	25 19.8	+59.9	131.3	24 40.0	+60.0	131.7	24 00.0	+60.0	132.0	24
25	29 33.8	+59.6	129.3	28 55.6	+59.8	129.7	28 17.1	+59.9	130.1	27 38.3	+59.9	130.5	26 59.2	+59.9	130.9	26 19.7	+60.0	131.3	25 40.0	+60.0	131.6	25 00.0	+60.0	132.0	25
26	30 33.4	+59.7	129.1	29 55.4	+59.7	129.6	29 17.0	+59.8	130.0	28 38.2	+59.9	130.4	27 59.1	+60.0	130.9	27 19.7	+60.0	131.2	26 40.0	+60.0	131.6	26 00.0	+60.0	132.0	26
27	31 33.1	+59.6	129.0	30 55.1	+59.8	129.5	30 16.8	+59.8	129.9	29 38.1	+59.9	130.4	28 59.1	+59.9	130.8	28 19.7	+60.0	131.2	27 40.0	+60.0	131.6	27 00.0	+60.0	132.0	27
28	32 32.7	+59.7	128.9	31 54.9	+59.7	129.4	31 16.6	+59.9	129.8	30 38.0	+59.9	130.3	29 59.0	+59.9	130.8	29 19.7	+59.9	131.2	28 40.0	+60.0	131.6	28 00.0	+60.0	132.0	28
29	33 32.4	+59.6	128.8	32 54.6	+59.8	129.3	32 16.5	+59.8	129.8	31 37.9	+59.9	130.2	30 58.9	+60.0	130.7	30 19.6	+60.0	131.1	29 40.0	+60.0	131.6	29 00.0	+60.0	132.0	29
30	34 32.0	+59.7	128.6	33 54.4	+59.7	129.2	33 16.3	+59.8	129.7	32 37.8	+59.9	130.2	31 58.9	+59.9	130.6	31 19.6	+60.0	131.1	30 40.0	+60.0	131.6	30 00.0	+60.0	132.0	30
31	35 31.7	+59.6	128.5	34 54.1	+59.7	129.0	34 16.1	+59.8	129.6	33 37.7	+59.8	130.1	32 58.8	+59.9	130.6	32 19.6	+60.0	131.1	31 40.0	+60.0	131.5	31 00.0	+60.0	132.0	31
32	36 31.3	+59.6	128.4	35 53.8	+59.7	128.9	35 15.9	+59.8	129.5	34 37.5	+59.9	130.0	33 58.7	+60.0	130.5	33 19.6	+59.9	131.0	32 40.0	+60.0	131.5	32 00.0	+60.0	132.0	32
33	37 30.9	+59.6	128.2	36 53.5	+59.8	128.8	36 15.7	+59.8	129.4	35 37.4	+59.9	129.9	34 58.7	+59.9	130.5	34 19.5	+60.0	131.0	33 40.0	+60.0	131.5	33 00.0	+60.0	132.0	33
34	38 30.5	+59.6	128.1	37 53.3	+59.7	128.7	37 15.5	+59.8	129.3	36 37.3	+59.9	129.9	35 58.6	+59.9	130.4	35 19.5	+60.0	131.0	34 40.0	+59.9	131.5	34 00.0	+60.0	132.0	34
35	39 30.1	+59.6	127.9	38 53.0	+59.7	128.6	38 15.3	+59.8	129.2	37 37.2	+59.9	129.8	36 58.5	+60.0	130.4	36 19.5	+59.9	130.9	35 39.9	+60.0	131.5	35 00.0	+60.0	132.0	35
36	40 29.7	+59.5	127.8	39 52.7	+59.6	128.4	39 15.1	+59.8	129.1	38 37.0	+59.9	129.7	37 58.5	+59.9	130.3	37 19.4	+60.0	130.9	36 39.9	+60.0	131.5	36 00.0	+60.0	132.0	36
37	41 29.2	+59.6	127.6	40 52.3	+59.7	128.3	40 14.9	+59.8	129.0	39 36.9	+59.9	129.6	38 58.4	+59.9	130.2	38 19.4	+60.0	130.8	37 39.9	+60.0	131.4	37 00.0	+60.0	132.0	37
38	42 28.8	+59.5	127.4	41 52.0	+59.7	128.2	41 14.7	+59.7	128.8	40 36.8	+59.8	129.5	39 58.3	+59.9	130.2	39 19.4	+59.9	130.8	38 39.9	+60.0	131.4	38 00.0	+60.0	132.0	38
39	43 28.3	+59.6	127.3	42 51.7	+59.6	128.0	42 14.4	+59.8	128.7	41 36.6	+59.9	129.4	40 58.2	+60.0	130.1	40 19.3	+60.0	130.8	39 39.9	+60.0	131.4	39 00.0	+60.0	132.0	39
40	44 27.9	+59.5	127.1	43 51.3	+59.7	127.9	43 14.2	+59.8	128.6	42 36.5	+59.8	129.3	41 58.2	+59.9	130.0	41 19.3	+60.0	130.7	40 39.9	+60.0	131.4	40 00.0	+60.0	132.0	40
41	45 27.4	+59.5	126.9	44 51.0	+59.6	127.7	44 14.0	+59.7	128.5	43 36.3	+59.9	129.2	42 58.1	+59.9	130.0	42 19.3	+59.9	130.7	41 39.9	+60.0	131.3	41 00.0	+60.0	132.0	41
42	46 26.9	+59.4	126.7	45 50.6	+59.6	127.6	45 13.7	+59.8	128.4	44 36.2	+59.8	129.1	43 58.0	+59.9	129.9	43 19.2	+60.0	130.6	42 39.9	+60.0	131.3	42 00.0	+60.0	132.0	42
43	47 26.3	+59.5	126.5	46 50.2	+59.6	127.4	46 13.5	+59.7	128.2	45 36.0	+59.8	129.0	44 57.9	+59.9	129.8	44 19.2	+59.9	130.6	43 39.9	+60.0	131.3	43 00.0	+60.0	132.0	43
44	48 25.8	+59.4	126.3	47 49.8	+59.6	127.2	47 13.2	+59.7	128.1	46 35.8	+59.9	128.9	45 57.8	+59.9	129.7	45 19.1	+60.0	130.5	44 39.9	+60.0	131.3	44 00.0	+60.0	132.0	44
45	49 25.2	+59.4	126.1	48 49.4	+59.6	127.0	48 12.9	+59.7	127.9	47 35.7	+59.8	128.8	46 57.7	+59.9	129.7	46 19.1	+60.0	130.5	45 39.9	+59.9	131.2	45 00.0	+60.0	132.0	45
46	50 24.6	+59.4	125.9	49 49.0	+59.6	126.9	49 12.6	+59.7	127.8	48 35.5	+59.8	128.7	47 57.6	+59.9	129.6	47 19.1	+59.9	130.4	46 39.8	+60.0	131.2	46 00.0	+60.0	132.0	46
47	51 24.0	+59.3	125.7	50 48.6	+59.5	126.7	50 12.3	+59.7	127.6	49 35.3	+59.8	128.6	48 57.5	+59.9	129.5	48 19.0	+60.0	130.3	47 39.8	+60.0	131.2	47 00.0	+60.0	132.0	47
48	52 23.3	+59.4	125.4	51 48.1	+59.5	126.5	51 12.0	+59.7	127.5	50 35.1	+59.8	128.4	49 57.4	+59.9	129.4	49 19.0	+59.9	130.3	48 39.8	+60.0	131.2	48 00.0	+60.0	132.0	48
49	53 22.7	+59.2	125.2	52 47.6	+59.5	126.3	52 11.7	+59.6	127.3	51 34.9	+59.8	128.3	50 57.3	+59.9	129.3	50 18.9	+60.0	130.2	49 39.8	+60.0	131.1	49 00.0	+60.0	132.0	49
50	54 21.9	+59.3	124.9	53 47.1	+59.5	126.0	53 11.3	+59.7	127.1	52 34.7	+59.8	128.2	51 57.2	+59.9	129.2	51 18.9	+59.9	130.2	50 39.8	+60.0	131.1	50 00.0	+60.0	132.0	50
51	55 21.2	+59.2	124.7	54 46.6	+59.4	125.8	54 11.0	+59.6	126.9	53 34.5	+59.7	128.0	52 57.1	+59.8	129.1	52 18.8	+60.0	130.1	51 39.8	+60.0	131.1	51 00.0	+60.0	132.0	51
52	56 20.4	+59.2	124.4	55 46.0	+59.4	125.6	55 10.6	+59.6	126.8	54 34.2	+59.8	127.9	53 56.9	+59.9	129.0	53 18.8	+59.9	130.0	52 39.8	+60.0	131.0	52 00.0	+60.0	132.0	52
53	57 19.6	+59.1	124.1	56 45.4	+59.4	125.3	56 10.2	+59.6	126.6	55 34.0	+59.7	127.7	54 56.8	+59.8	128.9	54 18.7	+59.9	129.9	53 39.8	+59.9	131.0	53 00.0	+60.0	132.0	53
54	58 18.7	+59.1	123.7	57 44.8	+59.3	125.1	57 09.8	+59.5	126.3	56 33.7	+59.7	127.6	55 56.7	+59.8	128.7	55 18.6	+60.0	129.9	54 39.7	+60.0	131.0	54 00.0	+60.0	132.0	54
55	59 17.8	+59.0	123.4	58 44.1	+59.3	124.8	58 09.3	+59.6	126.1	57 33.4	+59.8	127.4	56 56.5	+59.8	128.6	56 18.6	+59.9	129.8	55 39.7	+60.0	130.9	55 00.0	+60.0	132.0	55
56	60 16.8	+59.0	123.0	59 43.4	+59.3	124.5	59 08.9	+59.5	125.9	58 33.2	+59.6	127.2	57 56.3	+59.9	128.5	57 18.5	+59.9	129.7	56 39.7	+60.0	130.9	56 00.0	+60.0	132.0	56
57	61 15.8	+58.8	122.7	60 42.7	+59.2	124.2	60 08.4	+59.5	125.6	59 32.8	+59.7	127.0	58 56.2	+59.8	128.3	58 18.4	+60.0	129.6	57 39.7	+60.0	130.8	57 00.0	+60.0	132.0	57
58	62 14.6	+58.9	122.3	61 41.9	+59.2	123.8	61 07.9	+59.4	125.3	60 32.5	+59.7	126.8	59 56.0	+59.8	128.2	59 18.4	+59.9	129.5	58 39.7	+60.0	130.8	58 00.0	+60.0	132.0	58
59	63 13.5	+58.7	121.8	62 41.1	+59.1	123.5	62 07.3	+59.4	125.1	61 32.2	+59.6	126.6	60 55.8	+59.8	128.0	60 18.3	+59.9	129.4	59 39.7	+59.9	130.7	59 00.0	+60.0	132.0	59
60	64 12.2	+58.6	121.4	63 40.2	+59.0	123.1	63 06.7	+59.4	124.8	62 31.8	+59.6	126.3	61 55.6	+59.8	127.9	61 18.2	+59.9	129.3	60 39.6	+60.0	130.7	60 00.0	+60.0	132.0	60
61	65 10.8	+58.6	120.9	64 39.2	+59.0	122.7	64 06.1	+59.3	124.4	63 31.4	+59.6	126.1	62 55.4	+59.8	127.7	62 18.1	+59.9	129.2	61 39.6	+60.0	130.6	61 00.0	+60.0	132.0	61
62	66 09.4	+58.4	120.3	65 38.2	+58.9	122.2	65 05.4	+59.2	124.1	64 31.0	+59.5	125.8	63 55.2	+59.7	127.5	63 18.0	+59.9	129.1	62 39.6	+60.0	130.6	62 00.0	+60.0	132.0	62
63	67 07.8	+58.3	119.8	66 37.1	+58.8	121.8	66 04.6	+59.2	123.7	65 30.5	+59.6	125.5	64 54.9	+59.8	127.3	64 17.9	+59.9	128.9	63 39.6	+59.9	130.5	63 00.0	+60.0	132.0	63
64	68 06.1	+58.1	119.1	67 35.9	+58.7	121.3	67 03.8	+59.2	123.3	66 30.1	+59.4	125.2	65 54.7	+59.7	127.0	65 17.8	+59.9	128.8	64 39.5	+60.0	130.4	64 00.0	+60.0	132.0	64
65	69 04.2	+57.9	118.5	68 34.6	+58.5	120.7	68 03.0	+59.0	122.8	67 29.5	+59.4	124.9	66 54.4	+59.7	126.8	66 17.7	+59.8	128.6	65 39.5	+60.0	130.4	65 00.0	+60.0	132.0	65
66	70 02.1	+57.8	117.7	69 33.1	+58.4	120.1	69 02.0	+59.0	122.4	68 28.9	+59.4	124.5	67 54.1	+59.6	126.5	67 17.5	+59.9	128.5	66 39.5	+59.9	130.3	66 00.0	+60.0	132.0	66
67	70 59.9	+57.5	116.9	70 31.5	+58.3	119.4	70 01.0	+58.8	121.8	69 28.3	+59.3	124.1	68 53.7	+59.7	126.3	68 17.4	+59.9	128.3	67 39.4	+60.0	130.2	67 00.0	+60.0	132.0	67
68	71 57.4	+57.2	116.0	71 29.8	+58.1	118.7	70 59.8	+58.8	121.2	70 27.6	+59.3	123.7	69 53.4	+59.6	125.9	69 17.3	+59.8	128.1	68 39.4	+60.0	130.1	68 00.0	+60.0	132.0	68
69	72 54.6	+56.9	115.0	72 27.9	+57.8	117.9	71 58.6	+58.6	120.6	71 26.9	+59.1	123.2	70 53.0	+59.5	125.6	70 17.1	+59.8	127.9	69 39.4	+59.9	130.0	69 00.0	+60.0	132.0	69
70	73 51.5	+56.5	113.9	73 25.7	+57.6	117.0	72 57.2	+58.4	119.9	72 26.0	+59.1	122.6	71 52.5	+59.5	125.2	71 16.9	+59.8	127.6	70 39.3	+60.0	129.9	70 00.0	+60.0	132.0	70
71	74 48.0	+56.1	112.7	74 23.3	+57.3	116.0	73 55.6	+58.2	119.1	73 25.1	+58.9	122.0	72 52.0	+59.5	124.8	72 16.7	+59.8	127.4	71 39.3	+59.9	129.8	71 00.0	+60.0	132.0	71
72	75 44.1	+55.5	111.3	75 20.6	+56.9	114.8	74 53.8	+58.0	118.2	74 24.0	+58.8	121.4	73 51.5	+59.3	124.3	73 16.5	+59.7	127.1	72 39.2	+60.0	129.6	72 00.0	+60.0	132.0	72
73	76 39.6	+54.8	109.7	76 17.5	+56.4	113.5	75 51.8	+57.7	117.2	75 22.8	+58.6	120.6	74 50.8	+59.3	123.8	74 16.2	+59.7	126.7	73 39.2	+59.9	129.5	73 00.0	+60.0	132.0	73
74	77 34.4	+54.0	107.8	77 13.9	+55.9	112.0	76 49.5	+57.3	116.0	76 21.4	+58.5	119.7	75 50.1	+59.2	123.2	75 15.9	+59.7	126.4	74 39.1	+59.9	129.3	74 00.0	+60.0	132.0	74
75	78 28.4	+52.9	105.7	78 09.8	+55.2	110.3	77 46.8	+56.9	114.7	77 19.9	+58.1	118.7	76 49.3	+59.1	122.5	76 15.6	+59.6	125.9	75 39.0	+59.9	129.1	75 00.0	+60.0	132.0	75
76	79 21.3	+51.6	103.3	79 05.0	+54.2	108.3	78 43.7	+56.3	113.1	78 18.0	+57.8	117.6	77 48.4	+58.8	121.7	77 15.2	+59.5	125.4	76 38.9	+59.9	128.9	76 00.0	+60.0	132.0	76
77	80 12.9	+49.8•	100.4	79 59.2	+53.0	106.0	79 40.0	+55.5	111.3	79 15.8	+57.4	116.2	78 47.2	+58.7	120.7	78 14.7	+59.5	124.9	77 38.8	+59.9	128.6	77 00.0	+60.0	132.0	77
78	81 02.7	+47.6•	97.0	80 52.2	+51.5	103.2	80 35.5	+54.6	109.0	80 13.2	+56.9	114.5	79 45.9	+58.4	119.6	79 14.2	+59.4	124.2	78 38.7	+59.9	128.3	78 00.0	+60.0	132.0	78
79	81 50.3	+44.5•	92.9	81 43.7	+49.3•	99.8	81 30.1	+53.2	106.4	81 10.1	+56.0	112.6	80 44.3	+58.0	118.2	80 13.6	+59.2	123.4	79 38.6	+59.8	127.9	79 00.0	+60.0	132.0	79
80	82 34.8	+40.6•	87.9	82 33.0	+46.4•	95.6	82 23.3	+51.2•	103.1	82 06.1	+55.0	110.1	81 42.3	+57.5	116.6	81 12.8	+59.0	122.4	80 38.4	+59.8	127.5	80 00.0	+60.0	132.0	80
81	83 15.4	+35.3•	81.9	83 19.4	+42.4•	90.4	83 14.5	+48.6•	98.9	83 01.1	+53.4•	107.0	82 39.8	+56.7	114.4	82 11.8	+58.7	121.1	81 38.2	+59.7	126.9	81 00.0	+60.0	132.0	81
82	83 50.7	+28.4•	74.7	84 01.8	+36.8•	84.0	84 03.1	+44.6•	93.6	83 54.5	+50.9•	103.0	83 36.5	+55.6	111.7	83 10.5	+58.3	119.5	82 37.9	+59.7	126.2	82 00.0	+60.0	132.0	82
83	84 19.1	+19.5•	66.2	84 38.6	+29.0•	76.0	84 47.7	+38.6•	86.7	84 45.4	+47.3•	97.6	84 32.1	+53.6•	108.0	84 08.8	+57.7	117.4	83 37.6	+59.5	125.3	83 00.0	+60.0	132.0	83
84	84 38.6	+9.1•	56.3	85 07.6	+18.7•	66.1	85 26.3	+29.9•	77.7	85 32.7	+41.1•	90.3	85 25.7	+50.5•	102.9	85 06.5	+56.4	114.4	84 37.1	+59.3	124.1	84 00.0	+60.0	132.0	84
85	84 47.7	−2.3•	45.6	85 26.3	+6.4•	54.5	85 56.2	+17.6•	66.1	86 13.8	+31.1•	80.1	86 16.2	+44.5•	95.4	86 02.9	+54.2•	110.0	85 36.4	+58.8	122.3	85 00.0	+60.0	132.0	85
86	84 45.4	−13.3•	34.6	85 32.7	−7.0•	41.9	86 13.8	+2.4•	52.0	86 44.9	+15.8•	66.1	87 00.7	+32.9•	83.8	86 57.1	+49.2•	102.9	86 35.2	+58.0	119.4	86 00.0	+60.0	132.0	86
87	84 32.1	−23.3•	24.1	85 25.7	−19.2•	29.2	86 16.2	−13.3•	36.7	87 00.7	−3.6•	48.2	87 33.6	+12.7•	66.0	87 46.3	+36.1•	90.2	87 33.2	+55.3•	114.3	87 00.0	+60.0	132.0	87
88	84 08.8	−31.2•	14.7	85 06.5	−29.4•	17.7	86 02.9	−26.5•	22.1	86 57.1	−21.9•	29.2	87 46.3	−13.1•	41.8	88 22.4	+6.1•	66.0	88 28.5	+42.7•	102.8	88 00.0	+60.0	132.0	88
89	83 37.6	−37.6•	6.7	84 37.1	−37.1•	7.9	85 36.4	−36.4•	9.7	86 35.2	−35.2•	12.6	87 33.2	−33.2•	17.7	88 28.5	−28.5•	29.2	89 11.2	−11.2•	66.0	89 00.0	+60.0	132.0	89
90	83 00.0	−42.3•	0.0	84 00.0	−42.6•	0.0	85 00.0	−43.1•	0.0	86 00.0	−43.7•	0.0	87 00.0	−44.6•	0.0	88 00.0	−46.2•	0.0	89 00.0	−49.6•	0.0	90 00.0	−60.0	66.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 48°, 312°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 40.6	−59.7	131.8	4 00.6	−59.8	131.8	3 20.6	−59.9	131.9	2 40.5	−59.9	131.9	2 00.4	−59.9	132.0	1 20.3	−60.0	132.0	0 40.1	−59.9	132.0	0 00.0	+60.0	48.0	**0**
1	3 40.9	−59.8	131.9	3 00.8	−59.8	131.9	2 20.7	−59.8	132.0	1 40.6	−59.9	132.0	1 00.5	−60.0	132.0	0 20.3	−60.0	132.0	0 19.8	+60.0	48.0	1 00.0	+60.0	48.0	**1**
2	2 41.1	−59.7	132.0	2 01.0	−59.8	132.0	1 20.9	−59.9	132.0	0 40.7	−59.9	132.0	0 00.5	−60.0	132.0	0 39.7	+60.0	48.0	1 19.8	+60.0	48.0	2 00.0	+60.0	48.0	**2**
3	1 41.4	−59.8	132.1	1 01.2	−59.8	132.1	0 21.0	−59.9	132.1	0 19.2	+60.0	47.9	0 59.5	+59.9	47.9	1 39.7	+59.9	47.9	2 19.8	+60.0	48.0	3 00.0	+60.0	48.0	**3**
4	0 41.6	−59.7	132.2	0 01.4	−59.8	132.2	0 38.9	+59.9	47.8	1 19.2	+59.9	47.9	1 59.4	+60.0	47.9	2 39.6	+60.0	47.9	3 19.8	+60.0	48.0	4 00.0	+60.0	48.0	**4**
5	0 18.1	+59.8	47.8	0 58.4	+59.9	47.8	1 38.8	+59.8	47.8	2 19.1	+59.9	47.8	2 59.4	+59.9	47.8	3 39.6	+60.0	47.9	4 19.8	+60.0	47.9	5 00.0	+60.0	48.0	**5**
6	1 17.9	+59.7	47.7	1 58.3	+59.8	47.7	2 38.6	+59.9	47.7	3 19.0	+59.9	47.8	3 59.3	+60.0	47.8	4 39.6	+60.0	47.9	5 19.8	+60.0	47.9	6 00.0	+60.0	48.0	**6**
7	2 17.6	+59.8	47.6	2 58.1	+59.8	47.6	3 38.5	+59.9	47.7	4 18.9	+59.9	47.7	4 59.3	+59.9	47.8	5 39.6	+60.0	47.8	6 19.8	+60.0	47.9	7 00.0	+60.0	48.0	**7**
8	3 17.4	+59.7	47.5	3 57.9	+59.8	47.5	4 38.4	+59.9	47.6	5 18.8	+60.0	47.7	5 59.2	+60.0	47.7	6 39.6	+59.9	47.8	7 19.8	+60.0	47.9	8 00.0	+60.0	48.0	**8**
9	4 17.1	+59.8	47.4	4 57.7	+59.8	47.5	5 38.3	+59.8	47.5	6 18.8	+59.9	47.6	6 59.2	+59.9	47.7	7 39.5	+60.0	47.8	8 19.8	+60.0	47.9	9 00.0	+60.0	48.0	**9**
10	5 16.9	+59.7	47.3	5 57.5	+59.9	47.4	6 38.1	+59.9	47.5	7 18.7	+59.9	47.5	7 59.1	+60.0	47.6	8 39.5	+60.0	47.8	9 19.8	+60.0	47.9	10 00.0	+60.0	48.0	**10**
11	6 16.6	+59.8	47.2	6 57.4	+59.8	47.3	7 38.0	+59.9	47.4	8 18.6	+59.9	47.5	8 59.1	+59.9	47.6	9 39.5	+60.0	47.7	10 19.8	+60.0	47.9	11 00.0	+60.0	48.0	**11**
12	7 16.4	+59.7	47.1	7 57.2	+59.8	47.2	8 37.9	+59.9	47.3	9 18.5	+59.9	47.4	9 59.0	+60.0	47.6	10 39.5	+59.9	47.7	11 19.8	+60.0	47.8	12 00.0	+60.0	48.0	**12**
13	8 16.1	+59.8	47.0	8 57.0	+59.8	47.1	9 37.8	+59.8	47.3	10 18.4	+59.9	47.4	10 59.0	+59.9	47.5	11 39.4	+60.0	47.7	12 19.8	+60.0	47.8	13 00.0	+60.0	48.0	**13**
14	9 15.9	+59.7	46.9	9 56.8	+59.8	47.1	10 37.6	+59.9	47.2	11 18.3	+60.0	47.3	11 58.9	+60.0	47.5	12 39.4	+60.0	47.6	13 19.8	+60.0	47.8	14 00.0	+60.0	48.0	**14**
15	10 15.6	+59.8	46.8	10 56.6	+59.8	47.0	11 37.5	+59.9	47.1	12 18.3	+59.9	47.3	12 58.9	+59.9	47.4	13 39.4	+60.0	47.6	14 19.8	+60.0	47.8	15 00.0	+60.0	48.0	**15**
16	11 15.4	+59.7	46.7	11 56.4	+59.8	46.9	12 37.4	+59.8	47.1	13 18.2	+59.9	47.2	13 58.8	+60.0	47.4	14 39.4	+60.0	47.6	15 19.8	+60.0	47.8	16 00.0	+60.0	48.0	**16**
17	12 15.1	+59.8	46.7	12 56.2	+59.8	46.8	13 37.2	+59.9	47.0	14 18.1	+59.9	47.2	14 58.8	+60.0	47.4	15 39.4	+59.9	47.6	16 19.8	+60.0	47.8	17 00.0	+60.0	48.0	**17**
18	13 14.9	+59.7	46.6	13 56.0	+59.8	46.7	14 37.1	+59.9	46.9	15 18.0	+59.9	47.1	15 58.8	+59.9	47.3	16 39.3	+60.0	47.5	17 19.8	+60.0	47.8	18 00.0	+60.0	48.0	**18**
19	14 14.6	+59.7	46.5	14 55.8	+59.9	46.7	15 37.0	+59.8	46.9	16 17.9	+59.9	47.1	16 58.7	+60.0	47.3	17 39.3	+60.0	47.5	18 19.8	+59.9	47.7	19 00.0	+60.0	48.0	**19**
20	15 14.3	+59.8	46.4	15 55.7	+59.8	46.6	16 36.8	+59.9	46.8	17 17.8	+59.9	47.0	17 58.7	+59.9	47.2	18 39.3	+60.0	47.5	19 19.7	+60.0	47.7	20 00.0	+60.0	48.0	**20**
21	16 14.1	+59.7	46.3	16 55.5	+59.8	46.5	17 36.7	+59.8	46.7	18 17.7	+59.9	46.9	18 58.6	+59.9	47.2	19 39.3	+60.0	47.5	20 19.7	+60.0	47.7	21 00.0	+60.0	48.0	**21**
22	17 13.8	+59.7	46.2	17 55.3	+59.8	46.4	18 36.5	+59.9	46.6	19 17.6	+60.0	46.9	19 58.5	+60.0	47.2	20 39.3	+59.9	47.4	21 19.7	+60.0	47.7	22 00.0	+60.0	48.0	**22**
23	18 13.5	+59.7	46.1	18 55.1	+59.8	46.3	19 36.4	+59.9	46.6	20 17.6	+59.9	46.8	20 58.5	+59.9	47.1	21 39.2	+60.0	47.4	22 19.7	+60.0	47.7	23 00.0	+60.0	48.0	**23**
24	19 13.2	+59.8	46.0	19 54.9	+59.7	46.2	20 36.3	+59.8	46.5	21 17.5	+59.9	46.8	21 58.4	+60.0	47.1	22 39.2	+60.0	47.4	23 19.7	+60.0	47.7	24 00.0	+60.0	48.0	**24**
25	20 13.0	+59.7	45.9	20 54.6	+59.8	46.1	21 36.1	+59.9	46.4	22 17.4	+59.9	46.7	22 58.4	+59.9	47.0	23 39.2	+60.0	47.3	24 19.7	+60.0	47.7	25 00.0	+60.0	48.0	**25**
26	21 12.7	+59.7	45.8	21 54.4	+59.8	46.0	22 36.0	+59.8	46.3	23 17.3	+59.9	46.7	23 58.3	+60.0	47.0	24 39.2	+59.9	47.3	25 19.7	+60.0	47.6	26 00.0	+60.0	48.0	**26**
27	22 12.4	+59.7	45.7	22 54.2	+59.8	46.0	23 35.8	+59.9	46.3	24 17.2	+59.9	46.6	24 58.3	+59.9	46.9	25 39.1	+60.0	47.3	26 19.7	+60.0	47.6	27 00.0	+60.0	48.0	**27**
28	23 12.1	+59.7	45.6	23 54.0	+59.8	45.9	24 35.7	+59.8	46.2	25 17.1	+59.9	46.5	25 58.2	+60.0	46.9	26 39.1	+60.0	47.2	27 19.7	+60.0	47.6	28 00.0	+60.0	48.0	**28**
29	24 11.8	+59.7	45.4	24 53.8	+59.8	45.8	25 35.5	+59.9	46.1	26 17.0	+59.9	46.5	26 58.2	+59.9	46.8	27 39.1	+60.0	47.2	28 19.7	+60.0	47.6	29 00.0	+60.0	48.0	**29**
30	25 11.5	+59.7	45.3	25 53.6	+59.7	45.7	26 35.4	+59.8	46.0	27 16.9	+59.9	46.4	27 58.1	+60.0	46.8	28 39.1	+59.9	47.2	29 19.7	+60.0	47.6	30 00.0	+60.0	48.0	**30**
31	26 11.2	+59.7	45.2	26 53.3	+59.8	45.6	27 35.2	+59.8	45.9	28 16.8	+59.9	46.3	28 58.1	+59.9	46.7	29 39.0	+60.0	47.1	30 19.7	+60.0	47.6	31 00.0	+60.0	48.0	**31**
32	27 10.9	+59.7	45.1	27 53.1	+59.8	45.5	28 35.0	+59.9	45.9	29 16.7	+59.9	46.3	29 58.0	+59.9	46.7	30 39.0	+60.0	47.1	31 19.7	+60.0	47.5	32 00.0	+60.0	48.0	**32**
33	28 10.6	+59.7	45.0	28 52.9	+59.7	45.4	29 34.9	+59.8	45.8	30 16.6	+59.9	46.2	30 57.9	+60.0	46.6	31 39.0	+59.9	47.1	32 19.7	+60.0	47.5	33 00.0	+60.0	48.0	**33**
34	29 10.3	+59.6	44.9	29 52.6	+59.8	45.3	30 34.7	+59.8	45.7	31 16.5	+59.8	46.1	31 57.9	+59.9	46.6	32 38.9	+60.0	47.0	33 19.7	+60.0	47.5	34 00.0	+60.0	48.0	**34**
35	30 09.9	+59.7	44.8	30 52.4	+59.7	45.2	31 34.5	+59.9	45.6	32 16.3	+59.9	46.1	32 57.8	+59.9	46.5	33 38.9	+60.0	47.0	34 19.7	+59.9	47.5	35 00.0	+60.0	48.0	**35**
36	31 09.6	+59.7	44.6	31 52.1	+59.8	45.1	32 34.4	+59.8	45.5	33 16.2	+59.9	46.0	33 57.7	+60.0	46.5	34 38.9	+60.0	47.0	35 19.6	+60.0	47.5	36 00.0	+60.0	48.0	**36**
37	32 09.3	+59.6	44.5	32 51.9	+59.7	45.0	33 34.2	+59.8	45.4	34 16.1	+59.9	45.9	34 57.7	+59.9	46.4	35 38.9	+59.9	46.9	36 19.6	+60.0	47.4	37 00.0	+60.0	48.0	**37**
38	33 08.9	+59.7	44.4	33 51.6	+59.8	44.8	34 34.0	+59.8	45.3	35 16.0	+59.9	45.8	35 57.6	+59.9	46.3	36 38.8	+60.0	46.9	37 19.6	+60.0	47.4	38 00.0	+60.0	48.0	**38**
39	34 08.6	+59.6	44.3	34 51.4	+59.7	44.7	35 33.8	+59.8	45.2	36 15.9	+59.8	45.7	36 57.5	+60.0	46.3	37 38.8	+60.0	46.8	38 19.6	+60.0	47.4	39 00.0	+60.0	48.0	**39**
40	35 08.2	+59.6	44.1	35 51.1	+59.7	44.6	36 33.6	+59.8	45.1	37 15.7	+59.9	45.7	37 57.5	+59.9	46.2	38 38.8	+59.9	46.8	39 19.6	+60.0	47.4	40 00.0	+60.0	48.0	**40**
41	36 07.8	+59.6	44.0	36 50.8	+59.7	44.5	37 33.4	+59.8	45.0	38 15.6	+59.9	45.6	38 57.4	+59.9	46.2	39 38.7	+60.0	46.8	40 19.6	+60.0	47.4	41 00.0	+60.0	48.0	**41**
42	37 07.4	+59.6	43.8	37 50.5	+59.7	44.4	38 33.2	+59.8	44.9	39 15.5	+59.8	45.5	39 57.3	+59.9	46.1	40 38.7	+60.0	46.7	41 19.6	+60.0	47.3	42 00.0	+60.0	48.0	**42**
43	38 07.0	+59.6	43.7	38 50.2	+59.7	44.2	39 33.0	+59.8	44.8	40 15.3	+59.9	45.4	40 57.2	+60.0	46.0	41 38.7	+59.9	46.7	42 19.6	+60.0	47.3	43 00.0	+60.0	48.0	**43**
44	39 06.6	+59.6	43.5	39 49.9	+59.7	44.1	40 32.8	+59.8	44.7	41 15.2	+59.9	45.3	41 57.2	+59.9	46.0	42 38.6	+60.0	46.6	43 19.6	+60.0	47.3	44 00.0	+60.0	48.0	**44**
45	40 06.2	+59.6	43.4	40 49.6	+59.7	44.0	41 32.6	+59.7	44.6	42 15.1	+59.8	45.2	42 57.1	+59.9	45.9	43 38.6	+59.9	46.6	44 19.6	+60.0	47.3	45 00.0	+60.0	48.0	**45**
46	41 05.8	+59.6	43.2	41 49.3	+59.7	43.8	42 32.3	+59.8	44.5	43 14.9	+59.9	45.1	43 57.0	+59.9	45.8	44 38.5	+60.0	46.5	45 19.6	+59.9	47.2	46 00.0	+60.0	48.0	**46**
47	42 05.4	+59.5	43.1	42 49.0	+59.6	43.7	43 32.1	+59.8	44.4	44 14.8	+59.8	45.0	44 56.9	+59.9	45.7	45 38.5	+60.0	46.5	46 19.5	+60.0	47.2	47 00.0	+60.0	48.0	**47**
48	43 04.9	+59.5	42.9	43 48.6	+59.7	43.6	44 31.9	+59.7	44.2	45 14.6	+59.8	44.9	45 56.8	+59.9	45.7	46 38.5	+59.9	46.4	47 19.5	+60.0	47.2	48 00.0	+60.0	48.0	**48**
49	44 04.4	+59.5	42.7	44 48.3	+59.6	43.4	45 31.6	+59.7	44.1	46 14.4	+59.9	44.8	46 56.7	+59.9	45.6	47 38.4	+60.0	46.4	48 19.5	+60.0	47.2	49 00.0	+60.0	48.0	**49**
50	45 03.9	+59.5	42.6	45 47.9	+59.6	43.2	46 31.3	+59.8	44.0	47 14.3	+59.8	44.7	47 56.6	+59.9	45.5	48 38.4	+59.9	46.3	49 19.5	+60.0	47.1	50 00.0	+60.0	48.0	**50**
51	46 03.4	+59.5	42.4	46 47.5	+59.6	43.1	47 31.1	+59.7	43.8	48 14.1	+59.8	44.6	48 56.5	+59.9	45.4	49 38.3	+60.0	46.2	50 19.5	+60.0	47.1	51 00.0	+60.0	48.0	**51**
52	47 02.9	+59.5	42.2	47 47.1	+59.6	42.9	48 30.8	+59.7	43.7	49 13.9	+59.8	44.5	49 56.4	+59.9	45.3	50 38.3	+59.9	46.2	51 19.5	+60.0	47.1	52 00.0	+60.0	48.0	**52**
53	48 02.4	+59.4	42.0	48 46.7	+59.6	42.7	49 30.5	+59.7	43.5	50 13.7	+59.8	44.4	50 56.3	+59.9	45.2	51 38.2	+60.0	46.1	52 19.5	+60.0	47.0	53 00.0	+60.0	48.0	**53**
54	49 01.8	+59.4	41.8	49 46.3	+59.5	42.6	50 30.2	+59.7	43.4	51 13.5	+59.8	44.2	51 56.2	+59.8	45.1	52 38.2	+59.9	46.0	53 19.5	+59.9	47.0	54 00.0	+60.0	48.0	**54**
55	50 01.2	+59.4	41.6	50 45.8	+59.6	42.4	51 29.9	+59.6	43.2	52 13.3	+59.8	44.1	52 56.0	+59.9	45.0	53 38.1	+60.0	46.0	54 19.4	+60.0	47.0	55 00.0	+60.0	48.0	**55**
56	51 00.6	+59.4	41.3	51 45.4	+59.5	42.2	52 29.5	+59.7	43.0	53 13.1	+59.7	43.9	53 55.9	+59.9	44.9	54 38.1	+59.9	45.9	55 19.4	+60.0	46.9	56 00.0	+60.0	48.0	**56**
57	52 00.0	+59.3	41.1	52 44.9	+59.5	42.0	53 29.2	+59.6	42.9	54 12.8	+59.8	43.8	54 55.8	+59.8	44.8	55 38.0	+59.9	45.8	56 19.4	+60.0	46.9	57 00.0	+60.0	48.0	**57**
58	52 59.3	+59.3	40.9	53 44.4	+59.4	41.7	54 28.8	+59.6	42.7	55 12.6	+59.7	43.6	55 55.6	+59.9	44.7	56 37.9	+60.0	45.7	57 19.4	+60.0	46.8	58 00.0	+60.0	48.0	**58**
59	53 58.6	+59.3	40.6	54 43.8	+59.5	41.5	55 28.4	+59.6	42.5	56 12.3	+59.8	43.5	56 55.5	+59.8	44.5	57 37.9	+59.9	45.6	58 19.4	+60.0	46.8	59 00.0	+60.0	48.0	**59**
60	54 57.9	+59.2	40.3	55 43.3	+59.4	41.3	56 28.0	+59.6	42.3	57 12.1	+59.7	43.3	57 55.3	+59.9	44.4	58 37.8	+59.9	45.5	59 19.4	+59.9	46.7	60 00.0	+60.0	48.0	**60**
61	55 57.1	+59.2	40.1	56 42.7	+59.4	41.0	57 27.6	+59.6	42.1	58 11.8	+59.7	43.1	58 55.2	+59.8	44.3	59 37.7	+59.9	45.4	60 19.3	+60.0	46.7	61 00.0	+60.0	48.0	**61**
62	56 56.3	+59.1	39.8	57 42.1	+59.3	40.8	58 27.2	+59.5	41.8	59 11.5	+59.7	42.9	59 55.0	+59.8	44.1	60 37.6	+59.9	45.3	61 19.3	+60.0	46.6	62 00.0	+60.0	48.0	**62**
63	57 55.4	+59.1	39.4	58 41.4	+59.3	40.5	59 26.7	+59.5	41.6	60 11.2	+59.6	42.7	60 54.8	+59.8	43.9	61 37.5	+60.0	45.2	62 19.3	+60.0	46.6	63 00.0	+60.0	48.0	**63**
64	58 54.5	+59.1	39.1	59 40.7	+59.3	40.2	60 26.2	+59.4	41.3	61 10.8	+59.7	42.5	61 54.6	+59.8	43.8	62 37.5	+59.9	45.1	63 19.3	+59.9	46.5	64 00.0	+60.0	48.0	**64**
65	59 53.6	+59.0	38.8	60 40.0	+59.2	39.9	61 25.6	+59.5	41.0	62 10.5	+59.6	42.3	62 54.4	+59.8	43.6	63 37.4	+59.8	45.0	64 19.2	+60.0	46.4	65 00.0	+60.0	48.0	**65**
66	60 52.6	+58.9	38.4	61 39.2	+59.2	39.5	62 25.1	+59.4	40.8	63 10.1	+59.6	42.0	63 54.2	+59.7	43.4	64 37.2	+59.9	44.8	65 19.2	+60.0	46.4	66 00.0	+60.0	48.0	**66**
67	61 51.5	+58.8	38.0	62 38.4	+59.1	39.2	63 24.5	+59.3	40.4	64 09.7	+59.5	41.8	64 53.9	+59.8	43.2	65 37.1	+59.9	44.7	66 19.2	+60.0	46.3	67 00.0	+60.0	48.0	**67**
68	62 50.3	+58.8	37.6	63 37.5	+59.0	38.8	64 23.8	+59.3	40.1	65 09.2	+59.6	41.5	65 53.7	+59.7	43.0	66 37.0	+59.9	44.5	67 19.2	+59.9	46.2	68 00.0	+60.0	48.0	**68**
69	63 49.1	+58.7	37.1	64 36.5	+59.0	38.4	65 23.1	+59.3	39.7	66 08.8	+59.4	41.2	66 53.4	+59.7	42.7	67 36.9	+59.8	44.4	68 19.1	+60.0	46.1	69 00.0	+60.0	48.0	**69**
70	64 47.8	+58.5	36.6	65 35.5	+58.9	38.0	66 22.4	+59.1	39.4	67 08.2	+59.5	40.9	67 53.1	+59.6	42.5	68 36.7	+59.9	44.2	69 19.1	+59.9	46.0	70 00.0	+60.0	48.0	**70**
71	65 46.3	+58.5	36.1	66 34.4	+58.8	37.5	67 21.5	+59.1	38.9	68 07.7	+59.4	40.5	68 52.7	+59.7	42.2	69 36.6	+59.8	44.0	70 19.0	+60.0	45.9	71 00.0	+60.0	48.0	**71**
72	66 44.8	+58.3	35.6	67 33.2	+58.7	37.0	68 20.6	+59.1	38.5	69 07.1	+59.3	40.1	69 52.4	+59.6	41.9	70 36.4	+59.8	43.8	71 19.0	+59.9	45.8	72 00.0	+60.0	48.0	**72**
73	67 43.1	+58.2	35.0	68 31.9	+58.5	36.4	69 19.7	+58.9	38.0	70 06.4	+59.3	39.7	70 52.0	+59.5	41.5	71 36.2	+59.8	43.5	72 18.9	+60.0	45.7	73 00.0	+60.0	48.0	**73**
74	68 41.3	+58.0	34.3	69 30.4	+58.5	35.8	70 18.6	+58.8	37.4	71 05.7	+59.2	39.2	71 51.5	+59.5	41.1	72 36.0	+59.7	43.2	73 18.9	+59.9	45.5	74 00.0	+60.0	48.0	**74**
75	69 39.3	+57.9	33.6	70 28.9	+58.2	35.1	71 17.4	+58.7	36.8	72 04.9	+59.1	38.7	72 51.0	+59.5	40.7	73 35.7	+59.8	42.9	74 18.8	+59.9	45.3	75 00.0	+60.0	48.0	**75**
76	70 37.2	+57.6	32.8	71 27.1	+58.1	34.4	72 16.1	+58.6	36.2	73 04.0	+58.9	38.1	73 50.5	+59.3	40.2	74 35.5	+59.7	42.6	75 18.7	+60.0	45.2	76 00.0	+60.0	48.0	**76**
77	71 34.8	+57.3	31.9	72 25.2	+57.9	33.6	73 14.7	+58.3	35.4	74 02.9	+58.9	37.5	74 49.8	+59.3	39.7	75 35.2	+59.6	42.2	76 18.7	+59.9	44.9	77 00.0	+60.0	48.0	**77**
78	72 32.1	+57.1	31.0	73 23.1	+57.6	32.7	74 13.0	+58.2	34.6	75 01.8	+58.7	36.7	75 49.1	+59.2	39.1	76 34.8	+59.6	41.7	77 18.6	+59.9	44.7	78 00.0	+60.0	48.0	**78**
79	73 29.2	+56.6	29.9	74 20.7	+57.3	31.7	75 11.2	+57.9	33.7	76 00.5	+58.5	35.9	76 48.3	+59.1	38.4	77 34.4	+59.5	41.2	78 18.5	+59.8	44.4	79 00.0	+60.0	48.0	**79**
80	74 25.8	+56.3	28.7	75 18.0	+56.9	30.6	76 09.1	+57.6	32.6	76 59.0	+58.2	35.0	77 47.4	+58.9	37.6	78 33.9	+59.5	40.6	79 18.3	+59.9	44.1	80 00.0	+60.0	48.0	**80**
81	75 22.1	+55.7	27.4	76 14.9	+56.5	29.3	77 06.7	+57.2	31.4	77 57.2	+58.0	33.9	78 46.3	+58.6	36.7	79 33.4	+59.3	39.9	80 18.2	+59.8	43.6	81 00.0	+60.0	48.0	**81**
82	76 17.8	+55.1	25.9	77 11.4	+55.9	27.8	78 03.9	+56.7	30.0	78 55.2	+57.6	32.6	79 44.9	+58.4	35.5	80 32.7	+59.2	39.0	81 18.0	+59.7	43.1	82 00.0	+60.0	48.0	**82**
83	77 12.9	+54.4	24.2	78 07.3	+55.1	26.1	79 00.6	+56.1	28.4	79 52.8	+57.0	31.0	80 43.3	+58.0	34.2	81 31.9	+58.9	37.9	82 17.7	+59.7	42.5	83 00.0	+60.0	48.0	**83**
84	78 07.3	+53.3	22.2	79 02.4	+54.3	24.1	79 56.7	+55.3	26.4	80 49.8	+56.4	29.2	81 41.3	+57.5	32.5	82 30.8	+58.6	36.6	83 17.4	+59.5	41.7	84 00.0	+60.0	48.0	**84**
85	79 00.6	+52.2	19.9	79 56.7	+53.1	21.8	80 52.0	+54.2	24.1	81 46.2	+55.4	26.9	82 38.8	+56.8	30.4	83 29.4	+58.1	34.8	84 16.9	+59.4	40.6	85 00.0	+60.0	48.0	**85**
86	79 52.8	+50.5	17.2	80 49.8	+51.5	19.0	81 46.2	+52.6	21.2	82 41.6	+54.0	24.1	83 35.6	+55.5	27.7	84 27.5	+57.4	32.5	85 16.3	+59.1	39.0	86 00.0	+60.0	48.0	**86**
87	80 43.3	*+48.6* •	14.0	81 41.3	*+49.5* •	15.6	82 38.8	*+50.6* •	17.7	83 35.6	*+51.9* •	20.4	84 31.1	*+53.8* •	24.0	85 24.9	*+55.9* •	29.1	86 15.4	+58.4	36.6	87 00.0	+60.0	48.0	**87**
88	81 31.9	*+45.8* •	10.1	82 30.8	*+46.6* •	11.5	83 29.4	*+47.5* •	13.2	84 27.5	*+48.8* •	15.6	85 24.9	*+50.5* •	18.9	86 20.8	*+53.0* •	24.0	87 13.8	*+56.6* •	32.4	88 00.0	+60.0	48.0	**88**
89	82 17.7	*+42.3* •	5.6	83 17.4	*+42.6* •	6.4	84 16.9	*+43.1* •	7.5	85 16.3	*+43.7* •	9.1	86 15.4	*+44.6* •	11.5	87 13.8	*+46.2* •	15.6	88 10.4	*+49.6* •	24.0	89 00.0	+60.0	48.0	**89**
90	83 00.0	*+37.6* •	0.0	84 00.0	*+37.1* •	0.0	85 00.0	*+36.4* •	0.0	86 00.0	*+35.2* •	0.0	87 00.0	*+33.2* •	0.0	88 00.0	*+28.5* •	0.0	89 00.0	*+11.2* •	0.0	90 00.0	−60.0	24.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 132°, 228°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 35.2	+59.7	130.8	3 55.9	+59.8	130.8	3 16.7	+59.8	130.9	2 37.4	+59.9	130.9	1 58.1	+59.9	131.0	1 18.7	+60.0	131.0	0 39.4	+60.0	131.0	0 00.0	+60.0	131.0	0
1	5 34.9	+59.7	130.7	4 55.7	+59.9	130.8	4 16.5	+59.9	130.8	3 37.3	+59.9	130.9	2 58.0	+60.0	130.9	2 18.7	+60.0	131.0	1 39.4	+60.0	131.0	1 00.0	+60.0	131.0	1
2	6 34.6	+59.8	130.6	5 55.6	+59.8	130.7	5 16.4	+59.9	130.8	4 37.2	+59.9	130.8	3 58.0	+59.9	130.9	3 18.7	+60.0	130.9	2 39.4	+59.9	131.0	2 00.0	+60.0	131.0	2
3	7 34.4	+59.7	130.5	6 55.4	+59.8	130.6	6 16.3	+59.9	130.7	5 37.1	+59.9	130.8	4 57.9	+60.0	130.8	4 18.7	+59.9	130.9	3 39.3	+60.0	131.0	3 00.0	+60.0	131.0	3
4	8 34.1	+59.8	130.4	7 55.2	+59.8	130.5	7 16.2	+59.8	130.6	6 37.0	+60.0	130.7	5 57.9	+59.9	130.8	5 18.6	+60.0	130.9	4 39.3	+60.0	130.9	4 00.0	+60.0	131.0	4
5	9 33.9	+59.7	130.3	8 55.0	+59.8	130.4	8 16.0	+59.9	130.6	7 37.0	+59.9	130.7	6 57.8	+60.0	130.8	6 18.6	+60.0	130.9	5 39.3	+60.0	130.9	5 00.0	+60.0	131.0	5
6	10 33.6	+59.7	130.2	9 54.8	+59.8	130.4	9 15.9	+59.9	130.5	8 36.9	+59.9	130.6	7 57.8	+59.9	130.7	7 18.6	+60.0	130.8	6 39.3	+60.0	130.9	6 00.0	+60.0	131.0	6
7	11 33.3	+59.8	130.1	10 54.6	+59.8	130.3	10 15.8	+59.8	130.4	9 36.8	+59.9	130.6	8 57.7	+60.0	130.7	8 18.6	+59.9	130.8	7 39.3	+60.0	130.9	7 00.0	+60.0	131.0	7
8	12 33.1	+59.7	130.0	11 54.4	+59.8	130.2	11 15.6	+59.9	130.4	10 36.7	+59.9	130.5	9 57.7	+59.9	130.6	9 18.5	+60.0	130.8	8 39.3	+60.0	130.9	8 00.0	+60.0	131.0	8
9	13 32.8	+59.7	129.9	12 54.2	+59.8	130.1	12 15.5	+59.8	130.3	11 36.6	+59.9	130.4	10 57.6	+60.0	130.6	10 18.5	+60.0	130.7	9 39.3	+60.0	130.9	9 00.0	+60.0	131.0	9
10	14 32.5	+59.8	129.8	13 54.0	+59.8	130.0	13 15.3	+59.9	130.2	12 36.5	+59.9	130.4	11 57.6	+59.9	130.6	11 18.5	+60.0	130.7	10 39.3	+60.0	130.9	10 00.0	+60.0	131.0	10
11	15 32.3	+59.7	129.7	14 53.8	+59.8	129.9	14 15.2	+59.9	130.1	13 36.4	+60.0	130.3	12 57.5	+60.0	130.5	12 18.5	+60.0	130.7	11 39.3	+60.0	130.8	11 00.0	+60.0	131.0	11
12	16 32.0	+59.7	129.6	15 53.6	+59.8	129.9	15 15.1	+59.8	130.1	14 36.4	+59.9	130.3	13 57.5	+59.9	130.5	13 18.5	+59.9	130.7	12 39.3	+60.0	130.8	12 00.0	+60.0	131.0	12
13	17 31.7	+59.7	129.5	16 53.4	+59.8	129.8	16 14.9	+59.9	130.0	15 36.3	+59.9	130.2	14 57.4	+60.0	130.4	14 18.4	+60.0	130.6	13 39.3	+60.0	130.8	13 00.0	+60.0	131.0	13
14	18 31.4	+59.7	129.4	17 53.2	+59.8	129.7	17 14.8	+59.8	129.9	16 36.2	+59.9	130.2	15 57.4	+59.9	130.4	15 18.4	+60.0	130.6	14 39.3	+60.0	130.8	14 00.0	+60.0	131.0	14
15	19 31.1	+59.8	129.3	18 53.0	+59.8	129.6	18 14.6	+59.9	129.9	17 36.1	+59.9	130.1	16 57.3	+60.0	130.3	16 18.4	+60.0	130.6	15 39.3	+60.0	130.8	15 00.0	+60.0	131.0	15
16	20 30.9	+59.7	129.2	19 52.8	+59.8	129.5	19 14.5	+59.9	129.8	18 36.0	+59.9	130.1	17 57.3	+59.9	130.3	17 18.4	+60.0	130.5	16 39.3	+60.0	130.8	16 00.0	+60.0	131.0	16
17	21 30.6	+59.7	129.1	20 52.6	+59.8	129.4	20 14.4	+59.8	129.7	19 35.9	+59.9	130.0	18 57.2	+60.0	130.3	18 18.4	+59.9	130.5	17 39.3	+60.0	130.8	17 00.0	+60.0	131.0	17
18	22 30.3	+59.7	129.0	21 52.4	+59.7	129.3	21 14.2	+59.9	129.6	20 35.8	+59.9	129.9	19 57.2	+59.9	130.2	19 18.3	+60.0	130.5	18 39.3	+60.0	130.7	18 00.0	+60.0	131.0	18
19	23 30.0	+59.7	128.9	22 52.1	+59.8	129.2	22 14.1	+59.8	129.6	21 35.7	+59.9	129.9	20 57.1	+60.0	130.2	20 18.3	+60.0	130.5	19 39.3	+60.0	130.7	19 00.0	+60.0	131.0	19
20	24 29.7	+59.6	128.8	23 51.9	+59.8	129.1	23 13.9	+59.8	129.5	22 35.6	+59.9	129.8	21 57.1	+59.9	130.1	21 18.3	+60.0	130.4	20 39.3	+59.9	130.7	20 00.0	+60.0	131.0	20
21	25 29.3	+59.7	128.7	24 51.7	+59.8	129.1	24 13.7	+59.9	129.4	23 35.5	+59.9	129.7	22 57.0	+60.0	130.1	22 18.3	+59.9	130.4	21 39.2	+60.0	130.7	21 00.0	+60.0	131.0	21
22	26 29.0	+59.7	128.6	25 51.5	+59.7	129.0	25 13.6	+59.8	129.3	24 35.4	+59.9	129.7	23 57.0	+59.9	130.0	23 18.2	+60.0	130.4	22 39.2	+60.0	130.7	22 00.0	+60.0	131.0	22
23	27 28.7	+59.7	128.5	26 51.2	+59.8	128.9	26 13.4	+59.9	129.2	25 35.3	+59.9	129.6	24 56.9	+59.9	130.0	24 18.2	+60.0	130.3	23 39.2	+60.0	130.7	23 00.0	+60.0	131.0	23
24	28 28.4	+59.7	128.3	27 51.0	+59.8	128.8	27 13.3	+59.8	129.2	26 35.2	+59.9	129.6	25 56.8	+60.0	129.9	25 18.2	+60.0	130.3	24 39.2	+60.0	130.7	24 00.0	+60.0	131.0	24
25	29 28.1	+59.6	128.2	28 50.8	+59.7	128.7	28 13.1	+59.8	129.1	27 35.1	+59.9	129.5	26 56.8	+59.9	129.9	26 18.2	+59.9	130.3	25 39.2	+60.0	130.6	25 00.0	+60.0	131.0	25
26	30 27.7	+59.7	128.1	29 50.5	+59.8	128.6	29 12.9	+59.9	129.0	28 35.0	+59.9	129.4	27 56.7	+60.0	129.8	27 18.1	+60.0	130.2	26 39.2	+60.0	130.6	26 00.0	+60.0	131.0	26
27	31 27.4	+59.6	128.0	30 50.3	+59.7	128.4	30 12.8	+59.8	128.9	29 34.9	+59.9	129.4	28 56.7	+59.9	129.8	28 18.1	+60.0	130.2	27 39.2	+60.0	130.6	27 00.0	+60.0	131.0	27
28	32 27.0	+59.7	127.8	31 50.0	+59.7	128.3	31 12.6	+59.8	128.8	30 34.8	+59.9	129.3	29 56.6	+59.9	129.7	29 18.1	+59.9	130.2	28 39.2	+60.0	130.6	28 00.0	+60.0	131.0	28
29	33 26.7	+59.6	127.7	32 49.7	+59.8	128.2	32 12.4	+59.8	128.7	31 34.7	+59.8	129.2	30 56.5	+60.0	129.7	30 18.0	+60.0	130.1	29 39.2	+60.0	130.6	29 00.0	+60.0	131.0	29
30	34 26.3	+59.6	127.6	33 49.5	+59.7	128.1	33 12.2	+59.8	128.6	32 34.5	+59.9	129.1	31 56.5	+59.9	129.6	31 18.0	+60.0	130.1	30 39.2	+60.0	130.6	30 00.0	+60.0	131.0	30
31	35 25.9	+59.6	127.4	34 49.2	+59.7	128.0	34 12.0	+59.8	128.5	33 34.4	+59.9	129.1	32 56.4	+59.9	129.6	32 18.0	+60.0	130.1	31 39.2	+60.0	130.5	31 00.0	+60.0	131.0	31
32	36 25.5	+59.6	127.3	35 48.9	+59.7	127.9	35 11.8	+59.8	128.4	34 34.3	+59.9	129.0	33 56.3	+60.0	129.5	33 18.0	+59.9	130.0	32 39.2	+60.0	130.5	32 00.0	+60.0	131.0	32
33	37 25.1	+59.6	127.2	36 48.6	+59.7	127.8	36 11.6	+59.8	128.3	35 34.2	+59.9	128.9	34 56.3	+59.9	129.5	34 17.9	+60.0	130.0	33 39.2	+60.0	130.5	33 00.0	+60.0	131.0	33
34	38 24.7	+59.6	127.0	37 48.3	+59.7	127.6	37 11.4	+59.8	128.2	36 34.1	+59.8	128.8	35 56.2	+59.9	129.4	35 17.9	+60.0	129.9	34 39.2	+60.0	130.5	34 00.0	+60.0	131.0	34
35	39 24.3	+59.6	126.9	38 48.0	+59.7	127.5	38 11.2	+59.8	128.1	37 33.9	+59.9	128.7	36 56.1	+60.0	129.3	36 17.9	+59.9	129.9	35 39.2	+59.9	130.5	35 00.0	+60.0	131.0	35
36	40 23.9	+59.5	126.7	39 47.7	+59.7	127.4	39 11.0	+59.8	128.0	38 33.8	+59.9	128.7	37 56.1	+59.9	129.3	37 17.8	+60.0	129.9	36 39.1	+60.0	130.4	36 00.0	+60.0	131.0	36
37	41 23.4	+59.5	126.5	40 47.4	+59.7	127.2	40 10.8	+59.8	127.9	39 33.7	+59.8	128.6	38 56.0	+59.9	129.2	38 17.8	+60.0	129.8	37 39.1	+60.0	130.4	37 00.0	+60.0	131.0	37
38	42 22.9	+59.6	126.4	41 47.1	+59.6	127.1	41 10.6	+59.7	127.8	40 33.5	+59.9	128.5	39 55.9	+59.9	129.1	39 17.8	+59.9	129.8	38 39.1	+60.0	130.4	38 00.0	+60.0	131.0	38
39	43 22.5	+59.5	126.2	42 46.7	+59.7	127.0	42 10.3	+59.8	127.7	41 33.4	+59.8	128.4	40 55.8	+59.9	129.1	40 17.7	+60.0	129.7	39 39.1	+60.0	130.4	39 00.0	+60.0	131.0	39
40	44 22.0	+59.5	126.0	43 46.4	+59.6	126.8	43 10.1	+59.7	127.6	42 33.2	+59.9	128.3	41 55.7	+60.0	129.0	41 17.7	+60.0	129.7	40 39.1	+60.0	130.4	40 00.0	+60.0	131.0	40
41	45 21.5	+59.5	125.8	44 46.0	+59.6	126.7	44 09.8	+59.8	127.4	43 33.1	+59.8	128.2	42 55.7	+59.9	128.9	42 17.7	+59.9	129.6	41 39.1	+60.0	130.3	41 00.0	+60.0	131.0	41
42	46 21.0	+59.4	125.7	45 45.6	+59.6	126.5	45 09.6	+59.7	127.3	44 32.9	+59.8	128.1	43 55.6	+59.9	128.9	43 17.6	+60.0	129.6	42 39.1	+60.0	130.3	42 00.0	+60.0	131.0	42
43	47 20.4	+59.4	125.5	46 45.2	+59.6	126.3	46 09.3	+59.7	127.2	45 32.7	+59.9	128.0	44 55.5	+59.9	128.8	44 17.6	+59.9	129.5	43 39.1	+60.0	130.3	43 00.0	+60.0	131.0	43
44	48 19.8	+59.5	125.3	47 44.8	+59.6	126.2	47 09.0	+59.8	127.0	46 32.6	+59.8	127.9	45 55.4	+59.9	128.7	45 17.5	+60.0	129.5	44 39.1	+60.0	130.3	44 00.0	+60.0	131.0	44
45	49 19.3	+59.3	125.0	48 44.4	+59.6	126.0	48 08.8	+59.7	126.9	47 32.4	+59.8	127.8	46 55.3	+59.9	128.6	46 17.5	+60.0	129.4	45 39.1	+59.9	130.2	45 00.0	+60.0	131.0	45
46	50 18.6	+59.4	124.8	49 44.0	+59.5	125.8	49 08.5	+59.7	126.7	48 32.2	+59.8	127.6	47 55.2	+59.9	128.5	47 17.5	+59.9	129.4	46 39.0	+60.0	130.2	46 00.0	+60.0	131.0	46
47	51 18.0	+59.3	124.6	50 43.5	+59.5	125.6	50 08.2	+59.6	126.6	49 32.0	+59.8	127.5	48 55.1	+59.9	128.4	48 17.4	+60.0	129.3	47 39.0	+60.0	130.2	47 00.0	+60.0	131.0	47
48	52 17.3	+59.3	124.4	51 43.0	+59.5	125.4	51 07.8	+59.7	126.4	50 31.8	+59.8	127.4	49 55.0	+59.8	128.3	49 17.4	+59.9	129.3	48 39.0	+60.0	130.1	48 00.0	+60.0	131.0	48
49	53 16.6	+59.3	124.1	52 42.5	+59.5	125.2	52 07.5	+59.6	126.2	51 31.6	+59.8	127.3	50 54.8	+59.9	128.2	50 17.3	+60.0	129.2	49 39.0	+60.0	130.1	49 00.0	+60.0	131.0	49
50	54 15.9	+59.2	123.8	53 42.0	+59.5	125.0	53 07.1	+59.7	126.1	52 31.4	+59.7	127.1	51 54.7	+59.9	128.1	51 17.3	+59.9	129.1	50 39.0	+60.0	130.1	50 00.0	+60.0	131.0	50
51	55 15.1	+59.2	123.6	54 41.5	+59.4	124.7	54 06.8	+59.6	125.9	53 31.1	+59.8	127.0	52 54.6	+59.9	128.0	52 17.2	+59.9	129.1	51 39.0	+60.0	130.1	51 00.0	+60.0	131.0	51
52	56 14.3	+59.2	123.3	55 40.9	+59.4	124.5	55 06.4	+59.6	125.7	54 30.9	+59.7	126.8	53 54.5	+59.8	127.9	53 17.1	+60.0	129.0	52 39.0	+60.0	130.0	52 00.0	+60.0	131.0	52
53	57 13.5	+59.1	123.0	56 40.3	+59.3	124.2	56 06.0	+59.5	125.5	55 30.6	+59.8	126.7	54 54.3	+59.9	127.8	54 17.1	+59.9	128.9	53 39.0	+59.9	130.0	53 00.0	+60.0	131.0	53
54	58 12.6	+59.0	122.6	57 39.6	+59.4	124.0	57 05.5	+59.6	125.3	56 30.4	+59.7	126.5	55 54.2	+59.8	127.7	55 17.0	+60.0	128.8	54 38.9	+60.0	129.9	54 00.0	+60.0	131.0	54
55	59 11.6	+59.0	122.3	58 39.0	+59.2	123.7	58 05.1	+59.5	125.0	57 30.1	+59.7	126.3	56 54.0	+59.9	127.6	56 17.0	+59.9	128.8	55 38.9	+60.0	129.9	55 00.0	+60.0	131.0	55
56	60 10.6	+59.0	121.9	59 38.2	+59.3	123.4	59 04.6	+59.5	124.8	58 29.8	+59.7	126.1	57 53.9	+59.8	127.4	57 16.9	+59.9	128.7	56 38.9	+60.0	129.9	56 00.0	+60.0	131.0	56
57	61 09.6	+58.8	121.6	60 37.5	+59.2	123.1	60 04.1	+59.5	124.5	59 29.5	+59.6	125.9	58 53.7	+59.8	127.3	58 16.8	+59.9	128.6	57 38.9	+60.0	129.8	57 00.0	+60.0	131.0	57
58	62 08.4	+58.8	121.1	61 36.7	+59.1	122.7	61 03.6	+59.4	124.3	60 29.1	+59.7	125.7	59 53.5	+59.8	127.1	59 16.7	+60.0	128.5	58 38.9	+60.0	129.8	58 00.0	+60.0	131.0	58
59	63 07.2	+58.7	120.7	62 35.8	+59.1	122.4	62 03.0	+59.4	124.0	61 28.8	+59.6	125.5	60 53.3	+59.8	127.0	60 16.7	+59.9	128.4	59 38.9	+59.9	129.7	59 00.0	+60.0	131.0	59
60	64 05.9	+58.6	120.2	63 34.9	+59.0	122.0	63 02.4	+59.3	123.7	62 28.4	+59.6	125.3	61 53.1	+59.8	126.8	61 16.6	+59.9	128.3	60 38.8	+60.0	129.7	60 00.0	+60.0	131.0	60
61	65 04.5	+58.5	119.7	64 33.9	+59.0	121.6	64 01.7	+59.3	123.3	63 28.0	+59.6	125.0	62 52.9	+59.8	126.6	62 16.5	+59.9	128.1	61 38.8	+60.0	129.6	61 00.0	+60.0	131.0	61
62	66 03.0	+58.4	119.2	65 32.9	+58.8	121.1	65 01.0	+59.2	123.0	64 27.6	+59.5	124.7	63 52.7	+59.7	126.4	63 16.4	+59.9	128.0	62 38.8	+60.0	129.5	62 00.0	+60.0	131.0	62
63	67 01.4	+58.2	118.6	66 31.7	+58.8	120.7	66 00.2	+59.2	122.6	65 27.1	+59.5	124.4	64 52.4	+59.7	126.2	64 16.3	+59.9	127.9	63 38.8	+59.9	129.5	63 00.0	+60.0	131.0	63
64	67 59.6	+58.1	118.0	67 30.5	+58.6	120.1	66 59.4	+59.1	122.2	66 26.6	+59.5	124.1	65 52.1	+59.8	126.0	65 16.2	+59.8	127.7	64 38.7	+60.0	129.4	64 00.0	+60.0	131.0	64
65	68 57.7	+57.9	117.3	68 29.1	+58.6	119.6	67 58.5	+59.1	121.7	67 26.1	+59.4	123.8	66 51.9	+59.6	125.7	66 16.0	+59.9	127.6	65 38.7	+60.0	129.3	65 00.0	+60.0	131.0	65
66	69 55.6	+57.7	116.6	69 27.7	+58.4	119.0	68 57.6	+58.9	121.2	68 25.5	+59.3	123.4	67 51.5	+59.7	125.5	67 15.9	+59.8	127.4	66 38.7	+59.9	129.3	66 00.0	+60.0	131.0	66
67	70 53.3	+57.5	115.8	70 26.1	+58.2	118.3	69 56.5	+58.8	120.7	69 24.8	+59.3	123.0	68 51.2	+59.6	125.2	68 15.7	+59.9	127.2	67 38.6	+60.0	129.2	67 00.0	+60.0	131.0	67
68	71 50.8	+57.2	114.9	71 24.3	+58.0	117.6	70 55.3	+58.7	120.1	70 24.1	+59.2	122.6	69 50.8	+59.6	124.9	69 15.6	+59.8	127.0	68 38.6	+60.0	129.1	68 00.0	+60.0	131.0	68
69	72 48.0	+56.8	113.9	72 22.3	+57.8	116.7	71 54.0	+58.6	119.5	71 23.3	+59.2	122.1	70 50.4	+59.5	124.5	70 15.4	+59.8	126.8	69 38.6	+59.9	129.0	69 00.0	+60.0	131.0	69
70	73 44.8	+56.5	112.7	73 20.1	+57.6	115.8	72 52.6	+58.4	118.8	72 22.5	+59.0	121.5	71 49.9	+59.5	124.1	71 15.2	+59.8	126.6	70 38.5	+60.0	128.9	70 00.0	+60.0	131.0	70
71	74 41.3	+56.0	111.5	74 17.7	+57.2	114.8	73 51.0	+58.2	118.0	73 21.5	+58.9	120.9	72 49.4	+59.5	123.7	72 15.0	+59.8	126.3	71 38.5	+59.9	128.7	71 00.0	+60.0	131.0	71
72	75 37.3	+55.4	110.1	75 14.9	+56.8	113.7	74 49.2	+57.9	117.0	74 20.4	+58.8	120.2	73 48.9	+59.3	123.2	73 14.8	+59.7	126.0	72 38.4	+59.9	128.6	72 00.0	+60.0	131.0	72
73	76 32.7	+54.7	108.5	76 11.7	+56.4	112.4	75 47.1	+57.7	116.0	75 19.2	+58.6	119.5	74 48.2	+59.3	122.7	74 14.5	+59.7	125.7	73 38.3	+60.0	128.4	73 00.0	+60.0	131.0	73
74	77 27.4	+53.9	106.7	77 08.1	+55.8	110.9	76 44.8	+57.3	114.9	76 17.8	+58.4	118.6	75 47.5	+59.1	122.1	75 14.2	+59.7	125.3	74 38.3	+59.9	128.3	74 00.0	+60.0	131.0	74
75	78 21.3	+52.9	104.6	78 03.9	+55.1	109.2	77 42.1	+56.8	113.5	77 16.2	+58.1	117.6	76 46.6	+59.1	121.4	76 13.9	+59.6	124.8	75 38.2	+59.9	128.1	75 00.0	+60.0	131.0	75
76	79 14.2	+51.5	102.1	78 59.0	+54.1	107.2	78 38.9	+56.2	111.9	78 14.3	+57.8	116.4	77 45.7	+58.8	120.5	77 13.5	+59.5	124.3	76 38.1	+59.9	127.8	76 00.0	+60.0	131.0	76
77	80 05.7	+49.7	99.3	79 53.1	+53.0	104.8	79 35.1	+55.5	110.1	79 12.1	+57.3	115.0	78 44.5	+58.7	119.6	78 13.0	+59.5	123.8	77 38.0	+59.9	127.6	77 00.0	+60.0	131.0	77
78	80 55.4	+47.6•	95.9	80 46.1	+51.4	102.0	80 30.6	+54.5	107.9	80 09.4	+56.8	113.4	79 43.2	+58.3	118.5	79 12.5	+59.3	123.1	78 37.9	+59.8	127.2	78 00.0	+60.0	131.0	78
79	81 43.0	+44.5•	91.8	81 37.5	+49.3•	98.6	81 25.1	+53.1	105.2	81 06.2	+56.0	111.4	80 41.5	+58.0	117.1	80 11.8	+59.2	122.2	79 37.7	+59.9	126.9	79 00.0	+60.0	131.0	79
80	82 27.5	+40.7•	87.0	82 26.8	+46.4•	94.5	82 18.2	+51.2•	101.9	82 02.2	+54.9	108.9	81 39.5	+57.4	115.4	81 11.0	+59.0	121.2	80 37.6	+59.7	126.4	80 00.0	+60.0	131.0	80
81	83 08.2	+35.5•	81.1	83 13.2	+42.4•	89.4	83 09.4	+48.5•	97.8	82 57.1	+53.3•	105.8	82 36.9	+56.7	113.3	82 10.0	+58.7	120.0	81 37.3	+59.8	125.9	81 00.0	+60.0	131.0	81
82	83 43.7	+28.7•	74.0	83 55.6	+36.9•	83.1	83 57.9	+44.6•	92.5	83 50.4	+50.9•	101.8	83 33.6	+55.5	110.5	83 08.7	+58.3	118.4	82 37.1	+59.6	125.2	82 00.0	+60.0	131.0	82
83	84 12.4	+20.1•	65.7	84 32.5	+29.4•	75.2	84 42.5	+38.7•	85.7	84 41.3	+47.2•	96.5	84 29.1	+53.6•	106.9	84 07.0	+57.6	116.2	83 36.7	+59.5	124.2	83 00.0	+60.0	131.0	83
84	84 32.5	+10.0•	56.0	85 01.9	+19.3•	65.6	85 21.2	+30.2•	76.9	85 28.5	+41.2•	89.3	85 22.7	+50.4•	101.8	85 04.6	+56.4	113.2	84 36.2	+59.3	123.0	84 00.0	+60.0	131.0	84
85	84 42.5	−1.2•	45.5	85 21.2	+7.3•	54.3	85 51.4	+18.3•	65.6	86 09.7	+31.4•	79.3	86 13.1	+44.5•	94.3	86 01.0	+54.1•	108.8	85 35.5	+58.8	121.2	85 00.0	+60.0	131.0	85
86	84 41.3	−12.2•	34.7	85 28.5	−5.8•	41.9	86 09.7	+3.4•	51.9	86 41.1	+16.5•	65.6	86 57.6	+33.2•	83.0	86 55.1	+49.1•	101.7	86 34.3	+58.0	118.3	86 00.0	+60.0	131.0	86
87	84 29.1	−22.1•	24.3	85 22.7	−18.1•	29.4	86 13.1	−12.1•	36.8	86 57.6	−2.5•	48.1	87 30.8	+13.4•	65.5	87 44.2	+36.3•	89.2	87 32.3	+55.2•	113.2	87 00.0	+60.0	131.0	87
88	84 07.0	−30.3•	14.9	85 04.6	−28.4•	17.9	86 01.0	−25.5•	22.3	86 55.1	−20.8•	29.3	87 44.2	−11.9•	41.8	88 20.5	+7.0•	65.5	88 27.5	+42.7•	101.7	88 00.0	+60.0	131.0	88
89	83 36.7	−36.7•	6.8	84 36.2	−36.2•	8.1	85 35.5	−35.5•	9.9	86 34.3	−34.3•	12.7	87 32.3	−32.3•	17.9	88 27.5	−27.5•	29.3	89 10.2	−10.2•	65.5	89 00.0	+60.0	131.0	89
90	83 00.0	−41.6•	0.0	84 00.0	−41.9•	0.0	85 00.0	−42.4•	0.0	86 00.0	−43.0•	0.0	87 00.0	−44.0•	0.0	88 00.0	−45.7•	0.0	89 00.0	−49.2•	0.0	90 00.0	−60.0	65.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 35.2	–59.8	130.8	3 55.9	–59.8	130.8	3 16.7	–59.9	130.9	2 37.4	–59.9	130.9	1 58.1	–60.0	131.0	1 18.7	–60.0	131.0	0 39.4	–60.0	131.0	0 00.0	+60.0	49.0	0
1	3 35.4	–59.7	130.9	2 56.1	–59.8	130.9	2 16.8	–59.9	131.0	1 37.5	–60.0	131.0	0 58.1	–59.9	131.0	0 18.7	–59.9	131.0	0 20.6	+60.0	49.0	1 00.0	+60.0	49.0	1
2	2 35.7	–59.8	131.0	1 56.3	–59.8	131.0	1 16.9	–59.8	131.0	0 37.5	–59.9	131.0	0 01.8	+60.0	49.0	0 41.2	+60.0	49.0	1 20.6	+60.0	49.0	2 00.0	+60.0	49.0	2
3	1 35.9	–59.7	131.1	0 56.5	–59.8	131.1	0 17.1	–59.9	131.1	0 22.4	+59.9	48.9	1 01.8	+60.0	48.9	1 41.2	+60.0	48.9	2 20.6	+60.0	49.0	3 00.0	+60.0	49.0	3
4	0 36.2	–59.8	131.2	0 03.3	+59.8	48.8	0 42.8	+59.9	48.8	1 22.3	+59.9	48.9	2 01.8	+59.9	48.9	2 41.2	+60.0	48.9	3 20.6	+60.0	49.0	4 00.0	+60.0	49.0	4
5	0 23.6	+59.7	48.8	1 03.1	+59.8	48.8	1 42.7	+59.8	48.8	2 22.2	+59.9	48.8	3 01.7	+60.0	48.8	3 41.2	+60.0	48.9	4 20.6	+60.0	48.9	5 00.0	+60.0	49.0	5
6	1 23.3	+59.8	48.7	2 02.9	+59.9	48.7	2 42.5	+59.9	48.7	3 22.1	+59.9	48.8	4 01.7	+59.9	48.8	4 41.2	+59.9	48.9	5 20.6	+60.0	48.9	6 00.0	+60.0	49.0	6
7	2 23.1	+59.7	48.6	3 02.8	+59.8	48.6	3 42.4	+59.9	48.6	4 22.0	+60.0	48.7	5 01.6	+60.0	48.8	5 41.1	+60.0	48.8	6 20.6	+60.0	48.9	7 00.0	+60.0	49.0	7
8	3 22.8	+59.8	48.5	4 02.6	+59.8	48.5	4 42.3	+59.9	48.6	5 22.0	+59.9	48.6	6 01.6	+59.9	48.7	6 41.1	+60.0	48.8	7 20.6	+60.0	48.9	8 00.0	+60.0	49.0	8
9	4 22.6	+59.7	48.4	5 02.4	+59.8	48.4	5 42.2	+59.8	48.5	6 21.9	+59.9	48.6	7 01.5	+60.0	48.7	7 41.1	+60.0	48.8	8 20.6	+60.0	48.9	9 00.0	+60.0	49.0	9
10	5 22.3	+59.7	48.3	6 02.2	+59.8	48.4	6 42.0	+59.9	48.4	7 21.8	+59.9	48.5	8 01.5	+59.9	48.6	8 41.1	+60.0	48.8	9 20.6	+60.0	48.9	10 00.0	+60.0	49.0	10
11	6 22.0	+59.8	48.2	7 02.0	+59.8	48.3	7 41.9	+59.9	48.4	8 21.7	+59.9	48.5	9 01.4	+60.0	48.6	9 41.1	+59.9	48.7	10 20.6	+60.0	48.9	11 00.0	+60.0	49.0	11
12	7 21.8	+59.7	48.1	8 01.8	+59.8	48.2	8 41.8	+59.8	48.3	9 21.6	+59.9	48.4	10 01.4	+59.9	48.6	10 41.0	+60.0	48.7	11 20.6	+60.0	48.8	12 00.0	+60.0	49.0	12
13	8 21.5	+59.8	48.0	9 01.6	+59.8	48.1	9 41.6	+59.9	48.2	10 21.5	+59.9	48.4	11 01.3	+60.0	48.5	11 41.0	+60.0	48.7	12 20.6	+60.0	48.8	13 00.0	+60.0	49.0	13
14	9 21.3	+59.7	47.9	10 01.4	+59.8	48.0	10 41.5	+59.9	48.2	11 21.4	+60.0	48.3	12 01.3	+59.9	48.5	12 41.0	+60.0	48.6	13 20.6	+60.0	48.8	14 00.0	+60.0	49.0	14
15	10 21.0	+59.7	47.8	11 01.2	+59.8	48.0	11 41.4	+59.8	48.1	12 21.4	+59.9	48.3	13 01.2	+60.0	48.4	13 41.0	+59.9	48.6	14 20.6	+60.0	48.8	15 00.0	+60.0	49.0	15
16	11 20.7	+59.8	47.7	12 01.0	+59.8	47.9	12 41.2	+59.9	48.0	13 21.3	+59.9	48.2	14 01.2	+59.9	48.4	14 40.9	+60.0	48.6	15 20.6	+59.9	48.8	16 00.0	+60.0	49.0	16
17	12 20.5	+59.7	47.6	13 00.8	+59.8	47.8	13 41.1	+59.8	48.0	14 21.2	+59.9	48.2	15 01.1	+60.0	48.4	15 40.9	+60.0	48.6	16 20.5	+60.0	48.8	17 00.0	+60.0	49.0	17
18	13 20.2	+59.7	47.5	14 00.6	+59.8	47.7	14 40.9	+59.9	47.9	15 21.1	+59.9	48.1	16 01.1	+59.9	48.3	16 40.9	+60.0	48.5	17 20.5	+60.0	48.8	18 00.0	+60.0	49.0	18
19	14 19.9	+59.8	47.4	15 00.4	+59.8	47.6	15 40.8	+59.9	47.8	16 21.0	+59.9	48.0	17 01.0	+60.0	48.3	17 40.9	+60.0	48.5	18 20.5	+60.0	48.7	19 00.0	+60.0	49.0	19
20	15 19.7	+59.7	47.3	16 00.2	+59.8	47.5	16 40.7	+59.8	47.8	17 20.9	+59.9	48.0	18 01.0	+59.9	48.2	18 40.9	+59.9	48.5	19 20.5	+60.0	48.7	20 00.0	+60.0	49.0	20
21	16 19.4	+59.7	47.2	17 00.0	+59.8	47.5	17 40.5	+59.9	47.7	18 20.8	+59.9	47.9	19 00.9	+60.0	48.2	19 40.8	+60.0	48.4	20 20.5	+60.0	48.7	21 00.0	+60.0	49.0	21
22	17 19.1	+59.7	47.1	17 59.8	+59.8	47.4	18 40.4	+59.8	47.6	19 20.7	+59.9	47.9	20 00.9	+59.9	48.1	20 40.8	+60.0	48.4	21 20.5	+60.0	48.7	22 00.0	+60.0	49.0	22
23	18 18.8	+59.7	47.0	18 59.6	+59.8	47.3	19 40.2	+59.9	47.5	20 20.6	+59.9	47.8	21 00.8	+60.0	48.1	21 40.8	+60.0	48.4	22 20.5	+60.0	48.7	23 00.0	+60.0	49.0	23
24	19 18.5	+59.8	46.9	19 59.4	+59.8	47.2	20 40.1	+59.8	47.5	21 20.5	+59.9	47.8	22 00.8	+59.9	48.0	22 40.8	+59.9	48.4	23 20.5	+60.0	48.7	24 00.0	+60.0	49.0	24
25	20 18.3	+59.7	46.8	20 59.2	+59.8	47.1	21 39.9	+59.9	47.4	22 20.4	+59.9	47.7	23 00.7	+60.0	48.0	23 40.7	+60.0	48.3	24 20.5	+60.0	48.7	25 00.0	+60.0	49.0	25
26	21 18.0	+59.7	46.7	21 59.0	+59.8	47.0	22 39.8	+59.8	47.3	23 20.3	+59.9	47.6	24 00.7	+59.9	48.0	24 40.7	+60.0	48.3	25 20.5	+60.0	48.6	26 00.0	+60.0	49.0	26
27	22 17.7	+59.7	46.6	22 58.8	+59.7	46.9	23 39.6	+59.9	47.2	24 20.2	+59.9	47.6	25 00.6	+59.9	47.9	25 40.7	+60.0	48.3	26 20.5	+60.0	48.6	27 00.0	+60.0	49.0	27
28	23 17.4	+59.7	46.5	23 58.5	+59.8	46.8	24 39.5	+59.8	47.2	25 20.1	+59.9	47.5	26 00.5	+60.0	47.9	26 40.7	+59.9	48.2	27 20.5	+60.0	48.6	28 00.0	+60.0	49.0	28
29	24 17.1	+59.7	46.4	24 58.3	+59.8	46.7	25 39.3	+59.9	47.1	26 20.0	+59.9	47.4	27 00.5	+59.9	47.8	27 40.6	+60.0	48.2	28 20.5	+60.0	48.6	29 00.0	+60.0	49.0	29
30	25 16.8	+59.6	46.3	25 58.1	+59.8	46.6	26 39.2	+59.8	47.0	27 19.9	+59.9	47.4	28 00.4	+60.0	47.8	28 40.6	+60.0	48.2	29 20.5	+60.0	48.6	30 00.0	+60.0	49.0	30
31	26 16.4	+59.7	46.2	26 57.9	+59.7	46.5	27 39.0	+59.8	46.9	28 19.8	+59.9	47.3	29 00.4	+59.9	47.7	29 40.6	+59.9	48.1	30 20.5	+60.0	48.6	31 00.0	+60.0	49.0	31
32	27 16.1	+59.7	46.1	27 57.6	+59.8	46.4	28 38.8	+59.8	46.8	29 19.7	+59.9	47.2	30 00.3	+59.9	47.7	30 40.5	+60.0	48.1	31 20.5	+59.9	48.5	32 00.0	+60.0	49.0	32
33	28 15.8	+59.7	45.9	28 57.4	+59.7	46.3	29 38.6	+59.9	46.7	30 19.6	+59.9	47.2	31 00.2	+60.0	47.6	31 40.5	+60.0	48.1	32 20.4	+60.0	48.5	33 00.0	+60.0	49.0	33
34	29 15.5	+59.6	45.8	29 57.1	+59.8	46.2	30 38.5	+59.8	46.7	31 19.5	+59.9	47.1	32 00.2	+59.9	47.5	32 40.5	+60.0	48.0	33 20.4	+60.0	48.5	34 00.0	+60.0	49.0	34
35	30 15.1	+59.7	45.7	30 56.9	+59.7	46.1	31 38.3	+59.8	46.6	32 19.4	+59.9	47.0	33 00.1	+59.9	47.5	33 40.5	+59.9	48.0	34 20.4	+60.0	48.5	35 00.0	+60.0	49.0	35
36	31 14.8	+59.6	45.6	31 56.6	+59.8	46.0	32 38.1	+59.8	46.5	33 19.3	+59.8	46.9	34 00.0	+60.0	47.4	34 40.4	+60.0	47.9	35 20.4	+60.0	48.5	36 00.0	+60.0	49.0	36
37	32 14.4	+59.7	45.4	32 56.4	+59.7	45.9	33 37.9	+59.8	46.4	34 19.1	+59.9	46.9	35 00.0	+59.9	47.4	35 40.4	+60.0	47.9	36 20.4	+60.0	48.4	37 00.0	+60.0	49.0	37
38	33 14.1	+59.6	45.3	33 56.1	+59.7	45.8	34 37.7	+59.8	46.3	35 19.0	+59.9	46.8	35 59.9	+59.9	47.3	36 40.4	+59.9	47.9	37 20.4	+60.0	48.4	38 00.0	+60.0	49.0	38
39	34 13.7	+59.6	45.2	34 55.8	+59.7	45.7	35 37.5	+59.8	46.2	36 18.9	+59.9	46.7	36 59.8	+60.0	47.3	37 40.3	+60.0	47.8	38 20.4	+60.0	48.4	39 00.0	+60.0	49.0	39
40	35 13.3	+59.6	45.0	35 55.5	+59.7	45.6	36 37.3	+59.8	46.1	37 18.8	+59.8	46.6	37 59.8	+59.9	47.2	38 40.3	+60.0	47.8	39 20.4	+60.0	48.4	40 00.0	+60.0	49.0	40
41	36 12.9	+59.6	44.9	36 55.2	+59.7	45.4	37 37.1	+59.8	46.0	38 18.6	+59.9	46.5	38 59.7	+59.9	47.1	39 40.3	+59.9	47.7	40 20.4	+60.0	48.4	41 00.0	+60.0	49.0	41
42	37 12.5	+59.6	44.8	37 54.9	+59.7	45.3	38 36.9	+59.8	45.9	39 18.5	+59.8	46.5	39 59.6	+59.9	47.1	40 40.2	+60.0	47.7	41 20.4	+60.0	48.3	42 00.0	+60.0	49.0	42
43	38 12.1	+59.6	44.6	38 54.6	+59.7	45.2	39 36.7	+59.8	45.8	40 18.3	+59.9	46.4	40 59.5	+59.9	47.0	41 40.2	+60.0	47.6	42 20.4	+60.0	48.3	43 00.0	+60.0	49.0	43
44	39 11.7	+59.6	44.5	39 54.3	+59.7	45.0	40 36.5	+59.8	45.7	41 18.2	+59.9	46.3	41 59.4	+59.9	46.9	42 40.2	+59.9	47.6	43 20.4	+59.9	48.3	44 00.0	+60.0	49.0	44
45	40 11.3	+59.5	44.3	40 54.0	+59.7	44.9	41 36.3	+59.7	45.5	42 18.1	+59.8	46.2	42 59.3	+60.0	46.8	43 40.1	+60.0	47.5	44 20.3	+60.0	48.3	45 00.0	+60.0	49.0	45
46	41 10.8	+59.6	44.2	41 53.7	+59.6	44.8	42 36.0	+59.8	45.4	43 17.9	+59.8	46.1	43 59.3	+59.9	46.8	44 40.1	+59.9	47.5	45 20.3	+60.0	48.2	46 00.0	+60.0	49.0	46
47	42 10.4	+59.5	44.0	42 53.3	+59.7	44.6	43 35.8	+59.7	45.3	44 17.7	+59.9	46.0	44 59.2	+59.9	46.7	45 40.0	+60.0	47.4	46 20.3	+60.0	48.2	47 00.0	+60.0	49.0	47
48	43 09.9	+59.5	43.8	43 53.0	+59.6	44.5	44 35.5	+59.8	45.2	45 17.6	+59.8	45.9	45 59.1	+59.9	46.6	46 40.0	+59.9	47.4	47 20.3	+60.0	48.2	48 00.0	+60.0	49.0	48
49	44 09.4	+59.5	43.6	44 52.6	+59.6	44.3	45 35.3	+59.7	45.0	46 17.4	+59.8	45.8	46 59.0	+59.9	46.5	47 39.9	+60.0	47.3	48 20.3	+60.0	48.1	49 00.0	+60.0	49.0	49
50	45 08.9	+59.5	43.5	45 52.2	+59.6	44.2	46 35.0	+59.7	44.9	47 17.2	+59.8	45.7	47 58.9	+59.9	46.4	48 39.9	+59.9	47.3	49 20.3	+60.0	48.1	50 00.0	+60.0	49.0	50
51	46 08.4	+59.5	43.3	46 51.8	+59.6	44.0	47 34.7	+59.7	44.8	48 17.0	+59.8	45.5	48 58.8	+59.8	46.4	49 39.8	+60.0	47.2	50 20.3	+60.0	48.1	51 00.0	+60.0	49.0	51
52	47 07.9	+59.4	43.1	47 51.4	+59.6	43.8	48 34.4	+59.7	44.6	49 16.8	+59.8	45.4	49 58.6	+59.9	46.3	50 39.8	+59.9	47.1	51 20.3	+59.9	48.1	52 00.0	+60.0	49.0	52
53	48 07.3	+59.4	42.9	48 51.0	+59.6	43.6	49 34.1	+59.7	44.5	50 16.6	+59.8	45.3	50 58.5	+59.9	46.2	51 39.7	+60.0	47.1	52 20.2	+60.0	48.0	53 00.0	+60.0	49.0	53
54	49 06.7	+59.4	42.7	49 50.6	+59.5	43.5	50 33.8	+59.7	44.3	51 16.4	+59.8	45.2	51 58.4	+59.9	46.1	52 39.7	+59.9	47.0	53 20.2	+60.0	48.0	54 00.0	+60.0	49.0	54
55	50 06.1	+59.4	42.4	50 50.1	+59.5	43.3	51 33.5	+59.6	44.1	52 16.2	+59.8	45.0	52 58.3	+59.9	46.0	53 39.6	+60.0	46.9	54 20.2	+60.0	47.9	55 00.0	+60.0	49.0	55
56	51 05.5	+59.3	42.2	51 49.6	+59.5	43.1	52 33.1	+59.7	44.0	53 16.0	+59.8	44.9	53 58.2	+59.8	45.8	54 39.6	+59.9	46.9	55 20.2	+60.0	47.9	56 00.0	+60.0	49.0	56
57	52 04.8	+59.3	42.0	52 49.1	+59.5	42.9	53 32.8	+59.6	43.8	54 15.8	+59.7	44.7	54 58.0	+59.9	45.7	55 39.5	+59.9	46.8	56 20.2	+60.0	47.9	57 00.0	+60.0	49.0	57
58	53 04.1	+59.3	41.7	53 48.6	+59.4	42.6	54 32.4	+59.6	43.6	55 15.5	+59.7	44.6	55 57.9	+59.8	45.6	56 39.4	+60.0	46.7	57 20.2	+60.0	47.8	58 00.0	+60.0	49.0	58
59	54 03.4	+59.2	41.5	54 48.0	+59.5	42.4	55 32.0	+59.6	43.4	56 15.2	+59.8	44.4	56 57.7	+59.9	45.5	57 39.4	+59.9	46.6	58 20.2	+59.9	47.8	59 00.0	+60.0	49.0	59
60	55 02.6	+59.2	41.2	55 47.5	+59.4	42.2	56 31.6	+59.5	43.2	57 15.0	+59.7	44.2	57 57.6	+59.8	45.3	58 39.3	+59.9	46.5	59 20.1	+60.0	47.7	60 00.0	+60.0	49.0	60
61	56 01.8	+59.2	40.9	56 46.9	+59.3	41.9	57 31.1	+59.6	42.9	58 14.7	+59.7	44.0	58 57.4	+59.8	45.2	59 39.2	+59.9	46.4	60 20.1	+60.0	47.7	61 00.0	+60.0	49.0	61
62	57 01.0	+59.1	40.6	57 46.2	+59.3	41.6	58 30.7	+59.5	42.7	59 14.4	+59.6	43.8	59 57.2	+59.8	45.0	60 39.1	+59.9	46.3	61 20.1	+60.0	47.6	62 00.0	+60.0	49.0	62
63	58 00.1	+59.1	40.3	58 45.5	+59.3	41.3	59 30.2	+59.5	42.5	60 14.0	+59.7	43.6	60 57.0	+59.8	44.9	61 39.0	+59.9	46.2	62 20.1	+59.9	47.6	63 00.0	+60.0	49.0	63
64	58 59.2	+59.0	39.9	59 44.8	+59.3	41.0	60 29.7	+59.4	42.2	61 13.7	+59.6	43.4	61 56.8	+59.8	44.7	62 38.9	+59.9	46.1	63 20.0	+60.0	47.5	64 00.0	+60.0	49.0	64
65	59 58.2	+58.9	39.6	60 44.1	+59.1	40.7	61 29.1	+59.4	41.9	62 13.3	+59.6	43.2	62 56.6	+59.7	44.5	63 38.8	+59.9	45.9	64 20.0	+60.0	47.4	65 00.0	+60.0	49.0	65
66	60 57.1	+58.9	39.2	61 43.2	+59.2	40.4	62 28.5	+59.4	41.6	63 12.9	+59.6	42.9	63 56.3	+59.8	44.3	64 38.7	+59.9	45.8	65 20.0	+60.0	47.4	66 00.0	+60.0	49.0	66
67	61 56.0	+58.8	38.8	62 42.4	+59.0	40.0	63 27.9	+59.3	41.3	64 12.5	+59.5	42.7	64 56.1	+59.7	44.1	65 38.6	+59.9	45.6	66 20.0	+59.9	47.3	67 00.0	+60.0	49.0	67
68	62 54.8	+58.7	38.4	63 41.4	+59.1	39.6	64 27.2	+59.3	41.0	65 12.0	+59.5	42.4	65 55.8	+59.7	43.9	66 38.5	+59.9	45.5	67 19.9	+60.0	47.2	68 00.0	+60.0	49.0	68
69	63 53.5	+58.7	37.9	64 40.5	+58.9	39.2	65 26.5	+59.2	40.6	66 11.5	+59.5	42.1	66 55.5	+59.7	43.6	67 38.4	+59.8	45.3	68 19.9	+59.9	47.1	69 00.0	+60.0	49.0	69
70	64 52.2	+58.5	37.4	65 39.4	+58.8	38.8	66 25.7	+59.1	40.2	67 11.0	+59.4	41.7	67 55.2	+59.7	43.4	68 38.2	+59.8	45.1	69 19.8	+60.0	47.0	70 00.0	+60.0	49.0	70
71	65 50.7	+58.4	36.9	66 38.2	+58.8	38.3	67 24.8	+59.1	39.8	68 10.4	+59.4	41.4	68 54.9	+59.6	43.1	69 38.0	+59.9	44.9	70 19.8	+60.0	46.9	71 00.0	+60.0	49.0	71
72	66 49.1	+58.3	36.3	67 37.0	+58.6	37.8	68 23.9	+59.0	39.3	69 09.8	+59.3	41.0	69 54.5	+59.6	42.8	70 37.9	+59.8	44.7	71 19.8	+59.9	46.8	72 00.0	+60.0	49.0	72
73	67 47.4	+58.1	35.7	68 35.6	+58.5	37.2	69 22.9	+58.9	38.8	70 09.1	+59.2	40.5	70 54.1	+59.5	42.4	71 37.7	+59.7	44.4	72 19.7	+59.9	46.6	73 00.0	+60.0	49.0	73
74	68 45.5	+57.9	35.0	69 34.1	+58.4	36.6	70 21.8	+58.8	38.2	71 08.3	+59.2	40.1	71 53.6	+59.5	42.0	72 37.4	+59.8	44.2	73 19.6	+60.0	46.5	74 00.0	+60.0	49.0	74
75	69 43.4	+57.8	34.3	70 32.5	+58.2	35.9	71 20.6	+58.6	37.6	72 07.5	+59.1	39.5	72 53.1	+59.4	41.6	73 37.2	+59.7	43.8	74 19.6	+59.9	46.3	75 00.0	+60.0	49.0	75
76	70 41.2	+57.5	33.5	71 30.7	+58.0	35.2	72 19.2	+58.5	37.0	73 06.6	+58.9	38.9	73 52.5	+59.4	41.1	74 36.9	+59.7	43.5	75 19.5	+59.9	46.1	76 00.0	+60.0	49.0	76
77	71 38.7	+57.2	32.6	72 28.7	+57.8	34.3	73 17.7	+58.3	36.2	74 05.5	+58.8	38.3	74 51.9	+59.2	40.6	75 36.6	+59.6	43.1	76 19.4	+59.9	45.9	77 00.0	+60.0	49.0	77
78	72 35.9	+56.9	31.6	73 26.5	+57.5	33.4	74 16.0	+58.1	35.4	75 04.3	+58.7	37.5	75 51.1	+59.2	39.9	76 36.2	+59.6	42.6	77 19.3	+59.9	45.6	78 00.0	+60.0	49.0	78
79	73 32.8	+56.6	30.6	74 24.0	+57.2	32.4	75 14.1	+57.9	34.4	76 03.0	+58.4	36.7	76 50.3	+59.0	39.2	77 35.8	+59.5	42.1	78 19.2	+59.9	45.3	79 00.0	+60.0	49.0	79
80	74 29.4	+56.1	29.3	75 21.2	+56.8	31.2	76 12.0	+57.5	33.3	77 01.4	+58.2	35.7	77 49.3	+58.8	38.4	78 35.3	+59.4	41.5	79 19.1	+59.8	45.0	80 00.0	+60.0	49.0	80
81	75 25.5	+55.6	28.0	76 18.0	+56.3	29.9	77 09.5	+57.1	32.1	77 59.6	+57.9	34.6	78 48.1	+58.7	37.4	79 34.7	+59.3	40.7	80 18.9	+59.8	44.6	81 00.0	+60.0	49.0	81
82	76 21.1	+54.9	26.4	77 14.3	+55.8	28.4	78 06.6	+56.5	30.6	78 57.5	+57.4	33.3	79 46.8	+58.3	36.3	80 34.0	+59.2	39.9	81 18.7	+59.7	44.1	82 00.0	+60.0	49.0	82
83	77 16.0	+54.1	24.7	78 10.1	+54.9	26.7	79 03.1	+56.0	29.0	79 54.9	+57.0	31.7	80 45.1	+58.0	34.9	81 33.2	+58.9	38.8	82 18.4	+59.7	43.4	83 00.0	+60.0	49.0	83
84	78 10.1	+53.0	22.6	79 05.0	+54.1	24.6	79 59.1	+55.0	27.0	80 51.9	+56.2	29.8	81 43.1	+57.3	33.2	82 32.1	+58.5	37.4	83 18.1	+59.5	42.6	84 00.0	+60.0	49.0	84
85	79 03.1	+51.8	20.3	79 59.1	+52.8	22.2	80 54.1	+54.0	24.6	81 48.1	+55.2	27.5	82 40.4	+56.6	31.1	83 30.6	+58.1	35.6	84 17.6	+59.4	41.4	85 00.0	+60.0	49.0	85
86	79 54.9	+50.2	17.5	80 51.9	+51.2	19.4	81 48.1	+52.3	21.7	82 43.3	+53.7	24.6	83 37.0	+55.4	28.3	84 28.7	+57.2	33.2	85 17.0	+59.0	39.8	86 00.0	+60.0	49.0	86
87	80 45.1	*+48.1* •	14.2	81 43.1	*+49.0* •	15.9	82 40.4	*+50.2* •	18.0	83 37.0	*+51.7* •	20.8	84 32.4	*+53.5* •	24.5	85 25.9	*+55.7* •	29.7	86 16.0	+58.3	37.3	87 00.0	+60.0	49.0	87
88	81 33.2	*+45.2* •	10.3	82 32.1	*+46.0* •	11.7	83 30.6	*+47.0* •	13.5	84 28.7	*+48.3* •	15.9	85 25.9	*+50.1* •	19.3	86 21.6	*+52.7* •	24.5	87 14.3	*+56.5* •	33.1	88 00.0	+60.0	49.0	88
89	82 18.4	*+41.6* •	5.6	83 18.1	*+41.9* •	6.5	84 17.6	*+42.4* •	7.6	85 17.0	*+43.0* •	9.2	86 16.0	*+44.0* •	11.7	87 14.3	*+45.7* •	15.9	88 10.8	*+49.2* •	24.5	89 00.0	+60.0	49.0	89
90	83 00.0	*+36.7* •	0.0	84 00.0	*+36.2* •	0.0	85 00.0	*+35.5* •	0.0	86 00.0	*+34.3* •	0.0	87 00.0	*+32.3* •	0.0	88 00.0	*+27.5* •	0.0	89 00.0	*+10.2* •	0.0	90 00.0	–60.0	24.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

50°, 310° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83° Hc	d	Z	84° Hc	d	Z	85° Hc	d	Z	86° Hc	d	Z	87° Hc	d	Z	88° Hc	d	Z	89° Hc	d	Z	90° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 29.6	+59.7	129.8	3 51.2	+59.8	129.8	3 12.7	+59.9	129.9	2 34.2	+59.9	129.9	1 55.7	+59.9	130.0	1 17.1	+60.0	130.0	0 38.6	+60.0	130.0	0 00.0	+60.0	130.0	0
1	5 29.3	+59.7	129.7	4 51.0	+59.8	129.8	4 12.6	+59.8	129.8	3 34.1	+59.9	129.9	2 55.6	+60.0	129.9	2 17.1	+60.0	130.0	1 38.6	+60.0	130.0	1 00.0	+60.0	130.0	1
2	6 29.0	+59.8	129.6	5 50.8	+59.8	129.7	5 12.4	+59.9	129.8	4 34.0	+59.9	129.8	3 55.6	+59.9	129.9	3 17.1	+60.0	129.9	2 38.6	+59.9	130.0	2 00.0	+60.0	130.0	2
3	7 28.8	+59.7	129.5	6 50.6	+59.8	129.6	6 12.3	+59.9	129.7	5 33.9	+60.0	129.8	4 55.5	+60.0	129.8	4 17.1	+59.9	129.9	3 38.5	+60.0	130.0	3 00.0	+60.0	130.0	3
4	8 28.5	+59.7	129.4	7 50.4	+59.8	129.5	7 12.2	+59.8	129.6	6 33.9	+59.9	129.7	5 55.5	+59.9	129.8	5 17.0	+60.0	129.9	4 38.5	+60.0	129.9	4 00.0	+60.0	130.0	4
5	9 28.2	+59.8	129.3	8 50.2	+59.8	129.4	8 12.0	+59.9	129.6	7 33.8	+59.9	129.7	6 55.4	+60.0	129.8	6 17.0	+60.0	129.8	5 38.5	+60.0	129.9	5 00.0	+60.0	130.0	5
6	10 28.0	+59.7	129.2	9 50.0	+59.8	129.4	9 11.9	+59.8	129.5	8 33.7	+59.9	129.6	7 55.4	+59.9	129.7	7 17.0	+60.0	129.8	6 38.5	+60.0	129.9	6 00.0	+60.0	130.0	6
7	11 27.7	+59.7	129.1	10 49.8	+59.8	129.3	10 11.7	+59.9	129.4	9 33.6	+59.9	129.6	8 55.3	+60.0	129.7	8 17.0	+60.0	129.8	7 38.5	+60.0	129.9	7 00.0	+60.0	130.0	7
8	12 27.4	+59.8	129.0	11 49.6	+59.8	129.2	11 11.6	+59.9	129.3	10 33.5	+59.9	129.5	9 55.3	+59.9	129.6	9 17.0	+59.9	129.8	8 38.5	+60.0	129.9	8 00.0	+60.0	130.0	8
9	13 27.2	+59.7	128.9	12 49.4	+59.8	129.1	12 11.5	+59.8	129.3	11 33.4	+59.9	129.4	10 55.2	+60.0	129.6	10 16.9	+60.0	129.7	9 38.5	+60.0	129.9	9 00.0	+60.0	130.0	9
10	14 26.9	+59.7	128.8	13 49.2	+59.8	129.0	13 11.3	+59.9	129.2	12 33.3	+59.9	129.4	11 55.2	+59.9	129.6	11 16.9	+60.0	129.7	10 38.5	+60.0	129.9	10 00.0	+60.0	130.0	10
11	15 26.6	+59.7	128.7	14 49.0	+59.8	128.9	14 11.2	+59.8	129.1	13 33.2	+59.9	129.3	12 55.1	+60.0	129.5	12 16.9	+60.0	129.7	11 38.5	+60.0	129.8	11 00.0	+60.0	130.0	11
12	16 26.3	+59.7	128.6	15 48.8	+59.8	128.9	15 11.0	+59.9	129.1	14 33.1	+59.9	129.3	13 55.1	+59.9	129.5	13 16.9	+59.9	129.7	12 38.5	+60.0	129.8	12 00.0	+60.0	130.0	12
13	17 26.0	+59.7	128.5	16 48.6	+59.7	128.8	16 10.9	+59.8	129.0	15 33.0	+60.0	129.2	14 55.0	+60.0	129.4	14 16.8	+60.0	129.6	13 38.5	+60.0	129.8	13 00.0	+60.0	130.0	13
14	18 25.7	+59.7	128.4	17 48.3	+59.8	128.7	17 10.7	+59.9	128.9	16 33.0	+59.9	129.2	15 55.0	+59.9	129.4	15 16.8	+60.0	129.6	14 38.5	+60.0	129.8	14 00.0	+60.0	130.0	14
15	19 25.4	+59.7	128.3	18 48.1	+59.8	128.6	18 10.6	+59.9	128.8	17 32.9	+59.9	129.1	16 54.9	+60.0	129.3	16 16.8	+60.0	129.6	15 38.5	+60.0	129.8	15 00.0	+60.0	130.0	15
16	20 25.1	+59.7	128.2	19 47.9	+59.8	128.5	19 10.5	+59.8	128.8	18 32.8	+59.9	129.0	17 54.9	+59.9	129.3	17 16.8	+59.9	129.5	16 38.5	+60.0	129.8	16 00.0	+60.0	130.0	16
17	21 24.8	+59.7	128.1	20 47.7	+59.8	128.4	20 10.3	+59.8	128.7	19 32.7	+59.9	129.0	18 54.8	+60.0	129.3	18 16.7	+60.0	129.5	17 38.5	+60.0	129.8	17 00.0	+60.0	130.0	17
18	22 24.5	+59.7	128.0	21 47.5	+59.7	128.3	21 10.1	+59.9	128.6	20 32.6	+59.9	128.9	19 54.8	+59.9	129.2	19 16.7	+60.0	129.5	18 38.5	+60.0	129.7	18 00.0	+60.0	130.0	18
19	23 24.2	+59.7	127.9	22 47.2	+59.8	128.2	22 10.0	+59.8	128.5	21 32.5	+59.9	128.9	20 54.7	+60.0	129.2	20 16.7	+60.0	129.5	19 38.5	+60.0	129.7	19 00.0	+60.0	130.0	19
20	24 23.9	+59.7	127.8	23 47.0	+59.8	128.1	23 09.8	+59.9	128.5	22 32.4	+59.9	128.8	21 54.7	+59.9	129.1	21 16.7	+59.9	129.4	20 38.5	+59.9	129.7	20 00.0	+60.0	130.0	20
21	25 23.6	+59.7	127.7	24 46.8	+59.8	128.0	24 09.7	+59.8	128.4	23 32.3	+59.9	128.7	22 54.6	+59.9	129.1	22 16.6	+60.0	129.4	21 38.4	+60.0	129.7	21 00.0	+60.0	130.0	21
22	26 23.3	+59.6	127.5	25 46.6	+59.7	127.9	25 09.5	+59.8	128.3	24 32.2	+59.9	128.7	23 54.5	+60.0	129.0	23 16.6	+60.0	129.4	22 38.4	+60.0	129.7	22 00.0	+60.0	130.0	22
23	27 22.9	+59.7	127.4	26 46.3	+59.8	127.8	26 09.3	+59.9	128.2	25 32.1	+59.9	128.6	24 54.5	+59.9	129.0	24 16.6	+60.0	129.3	23 38.4	+60.0	129.7	23 00.0	+60.0	130.0	23
24	28 22.6	+59.7	127.3	27 46.1	+59.7	127.7	27 09.2	+59.8	128.1	26 32.0	+59.9	128.5	25 54.4	+60.0	128.9	25 16.6	+59.9	129.3	24 38.4	+60.0	129.7	24 00.0	+60.0	130.0	24
25	29 22.3	+59.6	127.2	28 45.8	+59.8	127.6	28 09.0	+59.8	128.1	27 31.9	+59.8	128.5	26 54.4	+59.9	128.9	26 16.5	+60.0	129.3	25 38.4	+60.0	129.6	25 00.0	+60.0	130.0	25
26	30 21.9	+59.7	127.1	29 45.6	+59.7	127.5	29 08.8	+59.9	128.0	28 31.7	+59.9	128.4	27 54.3	+59.9	128.8	27 16.5	+60.0	129.2	26 38.4	+60.0	129.6	26 00.0	+60.0	130.0	26
27	31 21.6	+59.6	126.9	30 45.3	+59.7	127.4	30 08.7	+59.8	127.9	29 31.6	+59.9	128.3	28 54.2	+60.0	128.8	28 16.5	+60.0	129.2	27 38.4	+60.0	129.6	27 00.0	+60.0	130.0	27
28	32 21.2	+59.6	126.8	31 45.0	+59.8	127.3	31 08.5	+59.8	127.8	30 31.5	+59.9	128.3	29 54.2	+59.9	128.7	29 16.5	+59.9	129.2	28 38.4	+60.0	129.6	28 00.0	+60.0	130.0	28
29	33 20.8	+59.6	126.7	32 44.8	+59.7	127.2	32 08.3	+59.8	127.7	31 31.4	+59.9	128.2	30 54.1	+59.9	128.7	30 16.4	+60.0	129.1	29 38.4	+60.0	129.6	29 00.0	+60.0	130.0	29
30	34 20.4	+59.7	126.5	33 44.5	+59.7	127.1	33 08.1	+59.8	127.6	32 31.3	+59.9	128.1	31 54.0	+60.0	128.6	31 16.4	+60.0	129.1	30 38.4	+60.0	129.6	30 00.0	+60.0	130.0	30
31	35 20.1	+59.6	126.4	34 44.2	+59.7	127.0	34 07.9	+59.8	127.5	33 31.2	+59.8	128.0	32 54.0	+59.9	128.6	32 16.4	+59.9	129.0	31 38.4	+60.0	129.5	31 00.0	+60.0	130.0	31
32	36 19.7	+59.5	126.3	35 43.9	+59.7	126.8	35 07.7	+59.8	127.4	34 31.0	+59.9	128.0	33 53.9	+59.9	128.5	33 16.3	+60.0	129.0	32 38.4	+60.0	129.5	32 00.0	+60.0	130.0	32
33	37 19.2	+59.6	126.1	36 43.6	+59.7	126.7	36 07.5	+59.8	127.3	35 30.9	+59.9	127.9	34 53.8	+60.0	128.4	34 16.3	+60.0	129.0	33 38.4	+60.0	129.5	33 00.0	+60.0	130.0	33
34	38 18.8	+59.6	126.0	37 43.3	+59.7	126.6	37 07.3	+59.8	127.2	36 30.8	+59.8	127.8	35 53.8	+59.9	128.4	35 16.3	+60.0	128.9	34 38.4	+59.9	129.5	34 00.0	+60.0	130.0	34
35	39 18.4	+59.6	125.8	38 43.0	+59.7	126.5	38 07.1	+59.8	127.1	37 30.6	+59.9	127.7	36 53.7	+59.9	128.3	36 16.3	+59.9	128.9	35 38.3	+60.0	129.5	35 00.0	+60.0	130.0	35
36	40 18.0	+59.5	125.7	39 42.7	+59.7	126.3	39 06.9	+59.7	127.0	38 30.5	+59.9	127.6	37 53.6	+59.9	128.2	37 16.2	+60.0	128.9	36 38.3	+60.0	129.4	36 00.0	+60.0	130.0	36
37	41 17.5	+59.5	125.5	40 42.4	+59.6	126.2	40 06.6	+59.8	126.9	39 30.4	+59.8	127.5	38 53.5	+60.0	128.2	38 16.2	+59.9	128.8	37 38.3	+60.0	129.4	37 00.0	+60.0	130.0	37
38	42 17.0	+59.5	125.3	41 42.0	+59.7	126.1	41 06.4	+59.8	126.8	40 30.2	+59.9	127.4	39 53.5	+59.9	128.1	39 16.1	+60.0	128.8	38 38.3	+60.0	129.4	38 00.0	+60.0	130.0	38
39	43 16.5	+59.5	125.1	42 41.7	+59.6	125.9	42 06.2	+59.7	126.6	41 30.1	+59.8	127.4	40 53.4	+59.9	128.0	40 16.1	+60.0	128.7	39 38.3	+60.0	129.4	39 00.0	+60.0	130.0	39
40	44 16.0	+59.5	125.0	43 41.3	+59.6	125.8	43 05.9	+59.8	126.5	42 29.9	+59.8	127.3	41 53.3	+59.9	128.0	41 16.1	+59.9	128.7	40 38.3	+60.0	129.3	40 00.0	+60.0	130.0	40
41	45 15.5	+59.5	124.8	44 40.9	+59.6	125.6	44 05.7	+59.7	126.4	43 29.7	+59.9	127.2	42 53.2	+59.9	127.9	42 16.0	+60.0	128.6	41 38.3	+60.0	129.3	41 00.0	+60.0	130.0	41
42	46 15.0	+59.4	124.6	45 40.5	+59.6	125.4	45 05.4	+59.7	126.3	44 29.6	+59.8	127.1	43 53.1	+59.9	127.8	43 16.0	+60.0	128.6	42 38.3	+60.0	129.3	42 00.0	+60.0	130.0	42
43	47 14.4	+59.4	124.4	46 40.1	+59.6	125.3	46 05.1	+59.7	126.1	45 29.4	+59.8	126.9	44 53.0	+59.9	127.7	44 16.0	+59.9	128.5	43 38.3	+60.0	129.3	43 00.0	+60.0	130.0	43
44	48 13.8	+59.4	124.2	47 39.7	+59.6	125.1	47 04.8	+59.8	126.0	46 29.2	+59.8	126.8	45 52.9	+59.9	127.7	45 15.9	+60.0	128.5	44 38.3	+60.0	129.2	44 00.0	+60.0	130.0	44
45	49 13.2	+59.4	124.0	48 39.3	+59.5	124.9	48 04.6	+59.6	125.8	47 29.0	+59.9	126.7	46 52.8	+59.9	127.6	46 15.9	+59.9	128.4	45 38.3	+59.9	129.2	45 00.0	+60.0	130.0	45
46	50 12.6	+59.3	123.7	49 38.8	+59.6	124.7	49 04.2	+59.7	125.7	48 28.9	+59.8	126.6	47 52.7	+59.9	127.5	47 15.8	+60.0	128.4	46 38.2	+60.0	129.2	46 00.0	+60.0	130.0	46
47	51 11.9	+59.4	123.5	50 38.4	+59.5	124.5	50 03.9	+59.7	125.5	49 28.7	+59.7	126.5	48 52.6	+59.9	127.4	48 15.8	+59.9	128.3	47 38.2	+60.0	129.2	47 00.0	+60.0	130.0	47
48	52 11.3	+59.2	123.3	51 37.9	+59.5	124.3	51 03.6	+59.6	125.4	50 28.4	+59.8	126.4	49 52.5	+59.9	127.3	49 15.7	+60.0	128.2	48 38.2	+60.0	129.1	48 00.0	+60.0	130.0	48
49	53 10.5	+59.3	123.0	52 37.4	+59.4	124.1	52 03.2	+59.7	125.2	51 28.2	+59.8	126.2	50 52.4	+59.8	127.2	50 15.7	+59.9	128.2	49 38.2	+60.0	129.1	49 00.0	+60.0	130.0	49
50	54 09.8	+59.2	122.8	53 36.8	+59.5	123.9	53 02.9	+59.6	125.0	52 28.0	+59.8	126.1	51 52.2	+59.9	127.1	51 15.6	+60.0	128.1	50 38.2	+60.0	129.1	50 00.0	+60.0	130.0	50
51	55 09.0	+59.2	122.5	54 36.3	+59.4	123.7	54 02.5	+59.6	124.8	53 27.8	+59.7	125.9	52 52.1	+59.9	127.0	52 15.6	+59.9	128.0	51 38.2	+60.0	129.0	51 00.0	+60.0	130.0	51
52	56 08.2	+59.1	122.2	55 35.7	+59.4	123.4	55 02.1	+59.6	124.6	54 27.5	+59.8	125.8	53 52.0	+59.8	126.9	53 15.5	+59.9	128.0	52 38.2	+60.0	129.0	52 00.0	+60.0	130.0	52
53	57 07.3	+59.1	121.9	56 35.1	+59.3	123.2	56 01.7	+59.5	124.4	55 27.3	+59.7	125.6	54 51.8	+59.9	126.8	54 15.4	+60.0	127.9	53 38.2	+59.9	129.0	53 00.0	+60.0	130.0	53
54	58 06.4	+59.0	121.5	57 34.4	+59.3	122.9	57 01.2	+59.6	124.2	56 27.0	+59.7	125.4	55 51.7	+59.8	126.6	55 15.4	+59.9	127.8	54 38.1	+60.0	128.9	54 00.0	+60.0	130.0	54
55	59 05.4	+59.0	121.2	58 33.7	+59.3	122.6	58 00.8	+59.5	124.0	57 26.7	+59.7	125.3	56 51.5	+59.9	126.5	56 15.3	+59.9	127.7	55 38.1	+60.0	128.9	55 00.0	+60.0	130.0	55
56	60 04.4	+58.9	120.8	59 33.0	+59.2	122.3	59 00.3	+59.5	123.7	58 26.4	+59.7	125.1	57 51.4	+59.8	126.4	57 15.2	+60.0	127.6	56 38.1	+60.0	128.8	56 00.0	+60.0	130.0	56
57	61 03.3	+58.8	120.4	60 32.2	+59.2	122.0	59 59.8	+59.4	123.5	59 26.1	+59.6	124.9	58 51.2	+59.8	126.2	58 15.2	+59.9	127.5	57 38.1	+60.0	128.8	57 00.0	+60.0	130.0	57
58	62 02.1	+58.8	120.0	61 31.4	+59.1	121.6	60 59.2	+59.4	123.2	60 25.7	+59.7	124.7	59 51.0	+59.8	126.1	59 15.1	+59.9	127.4	58 38.1	+59.9	128.7	58 00.0	+60.0	130.0	58
59	63 00.9	+58.7	119.6	62 30.5	+59.1	121.3	61 58.6	+59.4	122.9	61 25.4	+59.6	124.4	60 50.8	+59.8	125.9	60 15.0	+59.9	127.3	59 38.0	+60.0	128.7	59 00.0	+60.0	130.0	59
60	63 59.6	+58.5	119.1	63 29.6	+58.9	120.9	62 58.0	+59.3	122.6	62 25.0	+59.6	124.2	61 50.6	+59.8	125.7	61 14.9	+59.9	127.2	60 38.0	+60.0	128.6	60 00.0	+60.0	130.0	60
61	64 58.1	+58.5	118.6	64 28.5	+59.0	120.5	63 57.3	+59.3	122.2	63 24.6	+59.5	123.9	62 50.4	+59.7	125.6	62 14.8	+59.9	127.1	61 38.0	+60.0	128.6	61 00.0	+60.0	130.0	61
62	65 56.6	+58.3	118.1	65 27.5	+58.8	120.0	64 56.6	+59.2	121.9	64 24.1	+59.5	123.7	63 50.1	+59.8	125.4	63 14.7	+59.9	127.0	62 38.0	+59.9	128.5	62 00.0	+60.0	130.0	62
63	66 54.9	+58.2	117.5	66 26.3	+58.7	119.5	65 55.8	+59.2	121.5	65 23.6	+59.5	123.4	64 49.9	+59.7	125.1	64 14.6	+59.9	126.8	63 37.9	+60.0	128.5	63 00.0	+60.0	130.0	63
64	67 53.1	+58.1	116.9	67 25.0	+58.6	119.0	66 55.0	+59.1	121.1	66 23.1	+59.5	123.0	65 49.6	+59.7	124.9	65 14.5	+59.9	126.7	64 37.9	+60.0	128.4	64 00.0	+60.0	130.0	64
65	68 51.2	+57.8	116.2	68 23.6	+58.5	118.5	67 54.1	+59.0	120.6	67 22.6	+59.4	122.7	66 49.3	+59.7	124.7	66 14.4	+59.8	126.5	65 37.9	+60.0	128.3	65 00.0	+60.0	130.0	65
66	69 49.0	+57.7	115.4	69 22.1	+58.4	117.8	68 53.1	+58.9	120.1	68 22.0	+59.3	122.3	67 49.0	+59.6	124.4	67 14.2	+59.9	126.4	66 37.9	+59.9	128.2	66 00.0	+60.0	130.0	66
67	70 46.7	+57.4	114.6	70 20.5	+58.2	117.2	69 52.0	+58.8	119.6	69 21.3	+59.3	121.9	68 48.6	+59.6	124.1	68 14.1	+59.8	126.2	67 37.8	+60.0	128.1	67 00.0	+60.0	130.0	67
68	71 44.1	+57.1	113.7	71 18.7	+58.0	116.4	70 50.8	+58.7	119.0	70 20.6	+59.2	121.5	69 48.2	+59.6	123.8	69 13.9	+59.8	126.0	68 37.8	+59.9	128.0	68 00.0	+60.0	130.0	68
69	72 41.2	+56.8	112.7	72 16.7	+57.7	115.6	71 49.5	+58.5	118.3	71 19.8	+59.1	121.0	70 47.8	+59.5	123.4	70 13.7	+59.8	125.8	69 37.7	+60.0	127.9	69 00.0	+60.0	130.0	69
70	73 38.0	+56.4	111.6	73 14.4	+57.5	114.7	72 48.0	+58.4	117.6	72 18.9	+59.0	120.4	71 47.3	+59.5	123.0	71 13.5	+59.8	125.5	70 37.7	+59.9	127.8	70 00.0	+60.0	130.0	70
71	74 34.4	+56.0	110.3	74 11.9	+57.2	113.7	73 46.4	+58.1	116.8	73 17.9	+58.9	119.8	72 46.8	+59.4	122.6	72 13.3	+59.8	125.2	71 37.6	+60.0	127.7	71 00.0	+60.0	130.0	71
72	75 30.4	+55.3	108.9	75 09.1	+56.8	112.5	74 44.5	+57.9	115.9	74 16.8	+58.7	119.1	73 46.2	+59.4	122.1	73 13.1	+59.7	124.9	72 37.6	+59.9	127.6	72 00.0	+60.0	130.0	72
73	76 25.7	+54.7	107.4	76 05.9	+56.3	111.2	75 42.4	+57.6	114.9	75 15.5	+58.6	118.3	74 45.6	+59.2	121.6	74 12.8	+59.7	124.6	73 37.5	+60.0	127.4	73 00.0	+60.0	130.0	73
74	77 20.4	+53.8	105.5	77 02.2	+55.8	109.7	76 40.0	+57.2	113.7	76 14.1	+58.3	117.5	75 44.8	+59.1	121.0	75 12.5	+59.6	124.2	74 37.5	+59.9	127.2	74 00.0	+60.0	130.0	74
75	78 14.2	+52.8	103.4	77 58.0	+55.0	108.0	77 37.2	+56.8	112.4	77 12.4	+58.1	116.4	76 43.9	+59.1	120.2	76 12.1	+59.6	123.8	75 37.4	+59.9	127.0	75 00.0	+60.0	130.0	75
76	79 07.0	+51.4	101.0	78 53.0	+54.1	106.0	78 34.0	+56.2	110.8	78 10.5	+57.8	115.3	77 43.0	+58.8	119.4	77 11.7	+59.6	123.3	76 37.3	+59.9	126.8	76 00.0	+60.0	130.0	76
77	79 58.4	+49.8	98.2	79 47.1	+52.8	103.7	79 30.2	+55.4	108.9	79 08.3	+57.3	113.9	78 41.8	+58.6	118.5	78 11.3	+59.4	122.7	77 37.2	+59.8	126.5	77 00.0	+60.0	130.0	77
78	80 48.2	+47.5•	94.8	80 39.9	+51.4	100.9	80 25.6	+54.4	106.7	80 05.6	+56.7	112.2	79 40.4	+58.3	117.3	79 10.7	+59.3	122.0	78 37.0	+59.9	126.2	78 00.0	+60.0	130.0	78
79	81 35.7	+44.5•	90.8	81 31.3	+49.2•	97.5	81 20.0	+53.0	104.1	81 02.3	+55.9	110.2	80 38.7	+57.9	115.9	80 10.0	+59.2	121.1	79 36.9	+59.8	125.8	79 00.0	+60.0	130.0	79
80	82 20.2	+40.8•	86.0	82 20.5	+46.4•	93.5	82 13.0	+51.2•	100.8	81 58.2	+54.8	107.8	81 36.6	+57.4	114.3	81 09.2	+59.0	120.1	80 36.7	+59.8	125.4	80 00.0	+60.0	130.0	80
81	83 01.0	+35.7•	80.3	83 06.9	+42.5•	88.5	83 04.2	+48.5•	96.7	82 53.0	+53.3•	104.7	82 34.0	+56.6	112.1	82 08.2	+58.6	118.9	81 36.5	+59.7	124.8	81 00.0	+60.0	130.0	81
82	83 36.7	+29.0•	73.3	83 49.4	+37.1•	82.2	83 52.7	+44.6•	91.5	83 46.3	+50.8•	100.7	83 30.6	+55.5	109.4	83 06.8	+58.3	117.2	82 36.2	+59.6	124.1	82 00.0	+60.0	130.0	82
83	84 05.7	+20.8•	65.2	84 26.5	+29.7•	74.5	84 37.3	+38.9•	84.8	84 37.1	+47.2•	95.5	84 26.1	+53.5•	105.7	84 05.1	+57.5	115.1	83 35.8	+59.5	123.2	83 00.0	+60.0	130.0	83
84	84 26.5	+10.8•	55.8	84 56.2	+20.0•	65.1	85 16.2	+30.5•	76.1	85 24.3	+41.3•	88.3	85 19.6	+50.3•	100.6	85 02.6	+56.4	112.1	84 35.3	+59.3	121.9	84 00.0	+60.0	130.0	84
85	84 37.3	−0.2•	45.4	85 16.2	+8.1•	54.1	85 46.7	+18.9•	65.1	86 05.6	+31.7•	78.5	86 09.9	+44.5•	93.3	85 59.0	+54.0•	107.6	85 34.6	+58.8	120.1	85 00.0	+60.0	130.0	85
86	84 37.1	−11.0•	34.7	85 24.3	−4.7•	41.8	86 05.6	+4.3•	51.7	86 37.3	+17.1•	65.1	86 54.4	+33.5•	82.1	86 53.0	+49.1•	100.6	86 33.4	+57.9	117.2	86 00.0	+60.0	130.0	86
87	84 26.1	−21.0•	24.4	85 19.6	−17.0•	29.5	86 09.9	−10.9•	36.8	86 54.4	−1.4•	48.0	87 27.9	+14.2•	65.0	87 42.1	+36.5•	88.2	87 31.3	+55.2•	112.0	87 00.0	+60.0	130.0	87
88	84 05.1	−29.3•	15.0	85 02.6	−27.3•	18.0	85 59.0	−24.4•	22.4	86 53.0	−19.6•	29.5	87 42.1	−10.8•	41.8	88 18.6	+7.9•	65.0	88 26.5	+42.8•	100.6	88 00.0	+60.0	130.0	88
89	83 35.8	−35.8•	6.9	84 35.3	−35.3•	8.1	85 34.6	−34.6•	10.0	86 33.4	−33.4•	12.9	87 31.3	−31.3•	18.0	88 26.5	−26.5•	29.4	89 09.3	−9.3•	65.0	89 00.0	+60.0	130.0	89
90	83 00.0	−40.9•	0.0	84 00.0	−41.2•	0.0	85 00.0	−41.7•	0.0	86 00.0	−42.3•	0.0	87 00.0	−43.3•	0.0	88 00.0	−45.1•	0.0	89 00.0	−48.8•	0.0	90 00.0	−60.0	65.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 50°, 310°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 29.6	–59.8	129.8	3 51.2	–59.9	129.8	3 12.7	–59.9	129.9	2 34.2	–59.9	129.9	1 55.7	–60.0	130.0	1 17.1	–60.0	130.0	0 38.6	–60.0	130.0	0 00.0	+60.0	50.0	0
1	3 29.8	–59.7	129.9	2 51.3	–59.8	129.9	2 12.8	–59.8	130.0	1 34.3	–59.9	130.0	0 55.7	–59.9	130.0	0 17.1	–59.9	130.0	0 21.4	+60.0	50.0	1 00.0	+60.0	50.0	1
2	2 30.1	–59.7	130.0	1 51.5	–59.8	130.0	1 13.0	–59.9	130.0	0 34.4	–59.9	130.0	0 04.2	+60.0	50.0	0 42.8	+60.0	50.0	1 21.4	+60.0	50.0	2 00.0	+60.0	50.0	2
3	1 30.4	–59.8	130.1	0 51.7	–59.8	130.1	0 13.1	–59.9	130.1	0 25.5	+60.0	49.9	1 04.2	+59.9	49.9	1 42.8	+60.0	49.9	2 21.4	+60.0	50.0	3 00.0	+60.0	50.0	3
4	0 30.6	–59.7	130.2	0 08.1	+59.8	49.8	0 46.8	+59.8	49.8	1 25.5	+59.9	49.9	2 04.1	+60.0	49.9	2 42.8	+60.0	49.9	3 21.4	+60.0	50.0	4 00.0	+60.0	50.0	4
5	0 29.1	+59.7	49.7	1 07.9	+59.8	49.8	1 46.6	+59.9	49.8	2 25.4	+59.9	49.8	3 04.1	+59.9	49.8	3 42.8	+59.9	49.9	4 21.4	+60.0	49.9	5 00.0	+60.0	50.0	5
6	1 28.8	+59.8	49.6	2 07.7	+59.8	49.7	2 46.5	+59.9	49.7	3 25.3	+59.9	49.7	4 04.0	+60.0	49.8	4 42.7	+60.0	49.9	5 21.4	+60.0	49.9	6 00.0	+60.0	50.0	6
7	2 28.6	+59.7	49.6	3 07.5	+59.8	49.6	3 46.4	+59.8	49.6	4 25.2	+59.9	49.7	5 04.0	+59.9	49.8	5 42.7	+60.0	49.8	6 21.4	+60.0	49.9	7 00.0	+60.0	50.0	7
8	3 28.3	+59.8	49.5	4 07.3	+59.8	49.5	4 46.2	+59.9	49.6	5 25.1	+59.9	49.6	6 03.9	+60.0	49.7	6 42.7	+60.0	49.8	7 21.4	+60.0	49.9	8 00.0	+60.0	50.0	8
9	4 28.1	+59.7	49.4	5 07.1	+59.8	49.4	5 46.1	+59.9	49.5	6 25.0	+59.9	49.6	7 03.9	+59.9	49.7	7 42.7	+60.0	49.8	8 21.4	+60.0	49.9	9 00.0	+60.0	50.0	9
10	5 27.8	+59.7	49.3	6 06.9	+59.8	49.4	6 46.0	+59.8	49.4	7 24.9	+60.0	49.5	8 03.8	+60.0	49.6	8 42.7	+59.9	49.7	9 21.4	+60.0	49.9	10 00.0	+60.0	50.0	10
11	6 27.5	+59.8	49.2	7 06.7	+59.8	49.3	7 45.8	+59.9	49.4	8 24.9	+59.9	49.5	9 03.8	+59.9	49.6	9 42.6	+60.0	49.7	10 21.4	+60.0	49.9	11 00.0	+60.0	50.0	11
12	7 27.3	+59.7	49.1	8 06.5	+59.8	49.2	8 45.7	+59.9	49.3	9 24.8	+59.9	49.4	10 03.7	+60.0	49.6	10 42.6	+60.0	49.7	11 21.4	+60.0	49.8	12 00.0	+60.0	50.0	12
13	8 27.0	+59.7	49.0	9 06.3	+59.8	49.1	9 45.6	+59.8	49.2	10 24.7	+59.9	49.4	11 03.7	+59.9	49.5	11 42.6	+60.0	49.7	12 21.4	+60.0	49.8	13 00.0	+60.0	50.0	13
14	9 26.7	+59.8	48.9	10 06.1	+59.8	49.0	10 45.4	+59.9	49.2	11 24.6	+59.9	49.3	12 03.6	+60.0	49.5	12 42.6	+59.9	49.6	13 21.4	+60.0	49.8	14 00.0	+60.0	50.0	14
15	10 26.5	+59.7	48.8	11 05.9	+59.8	48.9	11 45.3	+59.8	49.1	12 24.5	+59.9	49.3	13 03.6	+59.9	49.4	13 42.5	+60.0	49.6	14 21.4	+59.9	49.8	15 00.0	+60.0	50.0	15
16	11 26.2	+59.7	48.7	12 05.7	+59.8	48.9	12 45.1	+59.9	49.0	13 24.4	+59.9	49.2	14 03.5	+60.0	49.4	14 42.5	+60.0	49.6	15 21.3	+60.0	49.8	16 00.0	+60.0	50.0	16
17	12 25.9	+59.7	48.6	13 05.5	+59.8	48.8	13 45.0	+59.9	49.0	14 24.3	+59.9	49.1	15 03.5	+59.9	49.3	15 42.5	+60.0	49.6	16 21.3	+60.0	49.8	17 00.0	+60.0	50.0	17
18	13 25.6	+59.8	48.5	14 05.3	+59.8	48.7	14 44.9	+59.8	48.9	15 24.2	+59.9	49.1	16 03.4	+60.0	49.3	16 42.5	+60.0	49.5	17 21.3	+60.0	49.8	18 00.0	+60.0	50.0	18
19	14 25.4	+59.7	48.4	15 05.1	+59.8	48.6	15 44.7	+59.9	48.8	16 24.1	+59.9	49.0	17 03.4	+59.9	49.3	17 42.5	+59.9	49.5	18 21.3	+60.0	49.7	19 00.0	+60.0	50.0	19
20	15 25.1	+59.7	48.3	16 04.9	+59.8	48.5	16 44.6	+59.8	48.7	17 24.0	+59.9	49.0	18 03.3	+60.0	49.2	18 42.4	+60.0	49.5	19 21.3	+60.0	49.7	20 00.0	+60.0	50.0	20
21	16 24.8	+59.7	48.2	17 04.7	+59.8	48.4	17 44.4	+59.9	48.7	18 23.9	+60.0	48.9	19 03.3	+59.9	49.2	19 42.4	+60.0	49.4	20 21.3	+60.0	49.7	21 00.0	+60.0	50.0	21
22	17 24.5	+59.7	48.1	18 04.5	+59.8	48.3	18 44.3	+59.8	48.6	19 23.9	+59.9	48.9	20 03.2	+60.0	49.1	20 42.4	+60.0	49.4	21 21.3	+60.0	49.7	22 00.0	+60.0	50.0	22
23	18 24.2	+59.7	48.0	19 04.3	+59.8	48.3	19 44.1	+59.9	48.5	20 23.8	+59.9	48.8	21 03.2	+59.9	49.1	21 42.4	+59.9	49.4	22 21.3	+60.0	49.7	23 00.0	+60.0	50.0	23
24	19 23.9	+59.7	47.9	20 04.1	+59.7	48.2	20 44.0	+59.8	48.4	21 23.7	+59.9	48.7	22 03.1	+60.0	49.0	22 42.3	+60.0	49.3	23 21.3	+60.0	49.7	24 00.0	+60.0	50.0	24
25	20 23.6	+59.7	47.8	21 03.8	+59.8	48.1	21 43.8	+59.9	48.4	22 23.6	+59.9	48.7	23 03.1	+59.9	49.0	23 42.3	+60.0	49.3	24 21.3	+60.0	49.6	25 00.0	+60.0	50.0	25
26	21 23.3	+59.7	47.7	22 03.6	+59.8	48.0	22 43.7	+59.8	48.3	23 23.5	+59.9	48.6	24 03.0	+59.9	48.9	24 42.3	+60.0	49.3	25 21.3	+60.0	49.6	26 00.0	+60.0	50.0	26
27	22 23.0	+59.7	47.6	23 03.4	+59.8	47.9	23 43.5	+59.8	48.2	24 23.4	+59.8	48.5	25 02.9	+60.0	48.9	25 42.3	+59.9	49.2	26 21.3	+60.0	49.6	27 00.0	+60.0	50.0	27
28	23 22.7	+59.7	47.5	24 03.2	+59.7	47.8	24 43.3	+59.9	48.1	25 23.2	+59.9	48.5	26 02.9	+59.9	48.8	26 42.2	+60.0	49.2	27 21.3	+60.0	49.6	28 00.0	+60.0	50.0	28
29	24 22.4	+59.7	47.4	25 02.9	+59.8	47.7	25 43.2	+59.8	48.0	26 23.1	+59.9	48.4	27 02.8	+60.0	48.8	27 42.2	+60.0	49.2	28 21.3	+60.0	49.6	29 00.0	+60.0	50.0	29
30	25 22.1	+59.7	47.2	26 02.7	+59.7	47.6	26 43.0	+59.8	48.0	27 23.0	+59.9	48.3	28 02.8	+59.9	48.7	28 42.2	+59.9	49.1	29 21.3	+60.0	49.6	30 00.0	+60.0	50.0	30
31	26 21.8	+59.6	47.1	27 02.4	+59.8	47.5	27 42.8	+59.9	47.9	28 22.9	+59.9	48.3	29 02.7	+59.9	48.7	29 42.1	+60.0	49.1	30 21.3	+59.9	49.5	31 00.0	+60.0	50.0	31
32	27 21.4	+59.7	47.0	28 02.2	+59.7	47.4	28 42.7	+59.8	47.8	29 22.8	+59.9	48.2	30 02.6	+60.0	48.6	30 42.1	+60.0	49.1	31 21.2	+60.0	49.5	32 00.0	+60.0	50.0	32
33	28 21.1	+59.7	46.9	29 01.9	+59.8	47.3	29 42.5	+59.8	47.7	30 22.7	+59.9	48.1	31 02.6	+59.9	48.6	31 42.1	+60.0	49.0	32 21.2	+60.0	49.5	33 00.0	+60.0	50.0	33
34	29 20.8	+59.6	46.8	30 01.7	+59.7	47.2	30 42.3	+59.8	47.6	31 22.6	+59.9	48.1	32 02.5	+59.9	48.5	32 42.1	+59.9	49.0	33 21.2	+60.0	49.5	34 00.0	+60.0	50.0	34
35	30 20.4	+59.7	46.6	31 01.4	+59.8	47.1	31 42.1	+59.8	47.5	32 22.5	+59.8	48.0	33 02.4	+60.0	48.5	33 42.0	+60.0	49.0	34 21.2	+60.0	49.5	35 00.0	+60.0	50.0	35
36	31 20.1	+59.6	46.5	32 01.2	+59.7	47.0	32 41.9	+59.8	47.4	33 22.3	+59.9	47.9	34 02.4	+59.9	48.4	34 42.0	+60.0	48.9	35 21.2	+60.0	49.5	36 00.0	+60.0	50.0	36
37	32 19.7	+59.6	46.4	33 00.9	+59.7	46.9	33 41.7	+59.9	47.3	34 22.2	+59.9	47.8	35 02.3	+59.9	48.3	35 42.0	+59.9	48.9	36 21.2	+60.0	49.4	37 00.0	+60.0	50.0	37
38	33 19.3	+59.6	46.3	34 00.6	+59.7	46.7	34 41.6	+59.8	47.2	35 22.1	+59.9	47.8	36 02.2	+59.9	48.3	36 41.9	+60.0	48.8	37 21.2	+60.0	49.4	38 00.0	+60.0	50.0	38
39	34 18.9	+59.6	46.1	35 00.3	+59.7	46.6	35 41.4	+59.7	47.1	36 22.0	+59.8	47.7	37 02.1	+60.0	48.2	37 41.9	+60.0	48.8	38 21.2	+60.0	49.4	39 00.0	+60.0	50.0	39
40	35 18.5	+59.6	46.0	36 00.0	+59.7	46.5	36 41.1	+59.8	47.0	37 21.8	+59.9	47.6	38 02.1	+59.9	48.2	38 41.9	+59.9	48.8	39 21.2	+60.0	49.4	40 00.0	+60.0	50.0	40
41	36 18.1	+59.6	45.8	36 59.7	+59.7	46.4	37 40.9	+59.8	46.9	38 21.7	+59.8	47.5	39 02.0	+59.9	48.1	39 41.8	+60.0	48.7	40 21.2	+60.0	49.3	41 00.0	+60.0	50.0	41
42	37 17.7	+59.6	45.7	37 59.4	+59.7	46.2	38 40.7	+59.8	46.8	39 21.5	+59.9	47.4	40 01.9	+59.9	48.0	40 41.8	+60.0	48.7	41 21.2	+60.0	49.3	42 00.0	+60.0	50.0	42
43	38 17.3	+59.6	45.5	38 59.1	+59.7	46.1	39 40.5	+59.8	46.7	40 21.4	+59.9	47.3	41 01.8	+59.9	48.0	41 41.8	+59.9	48.6	42 21.2	+59.9	49.3	43 00.0	+60.0	50.0	43
44	39 16.9	+59.5	45.4	39 58.8	+59.7	46.0	40 40.3	+59.7	46.6	41 21.3	+59.8	47.2	42 01.7	+60.0	47.9	42 41.7	+60.0	48.6	43 21.1	+60.0	49.3	44 00.0	+60.0	50.0	44
45	40 16.4	+59.6	45.2	40 58.5	+59.6	45.8	41 40.0	+59.8	46.5	42 21.1	+59.8	47.1	43 01.7	+59.9	47.8	43 41.7	+59.9	48.5	44 21.1	+60.0	49.2	45 00.0	+60.0	50.0	45
46	41 16.0	+59.5	45.1	41 58.1	+59.7	45.7	42 39.8	+59.7	46.4	43 20.9	+59.9	47.0	44 01.6	+59.9	47.7	44 41.6	+60.0	48.5	45 21.1	+60.0	49.2	46 00.0	+60.0	50.0	46
47	42 15.5	+59.5	44.9	42 57.8	+59.6	45.6	43 39.5	+59.8	46.2	44 20.8	+59.8	46.9	45 01.5	+59.9	47.7	45 41.6	+59.9	48.4	46 21.1	+60.0	49.2	47 00.0	+60.0	50.0	47
48	43 15.0	+59.5	44.7	43 57.4	+59.6	45.4	44 39.3	+59.7	46.1	45 20.6	+59.8	46.8	46 01.4	+59.9	47.6	46 41.5	+60.0	48.4	47 21.1	+60.0	49.2	48 00.0	+60.0	50.0	48
49	44 14.5	+59.5	44.5	44 57.0	+59.6	45.2	45 39.0	+59.7	46.0	46 20.4	+59.8	46.7	47 01.3	+59.9	47.5	47 41.5	+59.9	48.3	48 21.1	+60.0	49.1	49 00.0	+60.0	50.0	49
50	45 14.0	+59.5	44.4	45 56.6	+59.6	45.1	46 38.7	+59.7	45.8	47 20.2	+59.9	46.6	48 01.2	+59.9	47.4	48 41.4	+60.0	48.2	49 21.1	+60.0	49.1	50 00.0	+60.0	50.0	50
51	46 13.5	+59.4	44.2	46 56.2	+59.6	44.9	47 38.4	+59.7	45.7	48 20.1	+59.8	46.5	49 01.1	+59.8	47.3	49 41.4	+59.9	48.2	50 21.1	+59.9	49.1	51 00.0	+60.0	50.0	51
52	47 12.9	+59.4	44.0	47 55.8	+59.6	44.7	48 38.1	+59.7	45.5	49 19.9	+59.7	46.4	50 00.9	+59.9	47.2	50 41.3	+60.0	48.1	51 21.0	+60.0	49.0	52 00.0	+60.0	50.0	52
53	48 12.3	+59.4	43.8	48 55.4	+59.5	44.6	49 37.8	+59.7	45.4	50 19.6	+59.8	46.2	51 00.8	+59.9	47.1	51 41.3	+59.9	48.0	52 21.0	+60.0	49.0	53 00.0	+60.0	50.0	53
54	49 11.7	+59.4	43.6	49 54.9	+59.5	44.4	50 37.5	+59.7	45.2	51 19.4	+59.8	46.1	52 00.7	+59.9	47.0	52 41.2	+60.0	48.0	53 21.0	+60.0	49.0	54 00.0	+60.0	50.0	54
55	50 11.1	+59.3	43.3	50 54.4	+59.5	44.2	51 37.2	+59.6	45.0	52 19.2	+59.8	46.0	53 00.6	+59.8	46.9	53 41.2	+59.9	47.9	54 21.0	+60.0	48.9	55 00.0	+60.0	50.0	55
56	51 10.4	+59.4	43.1	51 53.9	+59.5	44.0	52 36.8	+59.6	44.9	53 19.0	+59.7	45.8	54 00.4	+59.9	46.8	54 41.1	+59.9	47.8	55 21.0	+60.0	48.9	56 00.0	+60.0	50.0	56
57	52 09.8	+59.2	42.9	52 53.4	+59.5	43.7	53 36.4	+59.6	44.7	54 18.7	+59.8	45.7	55 00.3	+59.8	46.7	55 41.0	+60.0	47.7	56 21.0	+60.0	48.8	57 00.0	+60.0	50.0	57
58	53 09.0	+59.3	42.6	53 52.9	+59.4	43.5	54 36.0	+59.6	44.5	55 18.5	+59.7	45.5	56 00.1	+59.9	46.6	56 41.0	+59.9	47.7	57 21.0	+59.9	48.8	58 00.0	+60.0	50.0	58
59	54 08.3	+59.2	42.3	54 52.3	+59.4	43.3	55 35.6	+59.6	44.3	56 18.2	+59.7	45.3	57 00.0	+59.8	46.4	57 40.9	+59.9	47.6	58 20.9	+60.0	48.8	59 00.0	+60.0	50.0	59
60	55 07.5	+59.2	42.1	55 51.7	+59.4	43.0	56 35.2	+59.5	44.1	57 17.9	+59.7	45.2	57 59.8	+59.8	46.3	58 40.8	+59.9	47.5	59 20.9	+60.0	48.7	60 00.0	+60.0	50.0	60
61	56 06.7	+59.1	41.8	56 51.1	+59.3	42.8	57 34.7	+59.6	43.8	58 17.6	+59.7	45.0	58 59.6	+59.8	46.1	59 40.7	+60.0	47.4	60 20.9	+60.0	48.6	61 00.0	+60.0	50.0	61
62	57 05.8	+59.1	41.5	57 50.4	+59.3	42.5	58 34.3	+59.4	43.6	59 17.3	+59.6	44.8	59 59.4	+59.8	46.0	60 40.7	+59.9	47.3	61 20.9	+59.9	48.6	62 00.0	+60.0	50.0	62
63	58 04.9	+59.0	41.1	58 49.7	+59.3	42.2	59 33.7	+59.5	43.4	60 16.9	+59.7	44.6	60 59.2	+59.8	45.8	61 40.6	+59.9	47.1	62 20.8	+60.0	48.5	63 00.0	+60.0	50.0	63
64	59 03.9	+59.0	40.8	59 49.0	+59.2	41.9	60 33.2	+59.4	43.1	61 16.6	+59.6	44.3	61 59.0	+59.8	45.6	62 40.5	+59.9	47.0	63 20.8	+60.0	48.5	64 00.0	+60.0	50.0	64
65	60 02.9	+58.9	40.4	60 48.2	+59.1	41.6	61 32.6	+59.4	42.8	62 16.2	+59.6	44.1	62 58.8	+59.8	45.4	63 40.4	+59.8	46.9	64 20.8	+60.0	48.4	65 00.0	+60.0	50.0	65
66	61 01.8	+58.8	40.0	61 47.3	+59.1	41.2	62 32.0	+59.4	42.5	63 15.8	+59.6	43.8	63 58.6	+59.7	45.2	64 40.2	+59.9	46.7	65 20.8	+59.9	48.3	66 00.0	+60.0	50.0	66
67	62 00.6	+58.8	39.6	62 46.4	+59.1	40.9	63 31.4	+59.3	42.2	64 15.4	+59.5	43.6	64 58.3	+59.7	45.0	65 40.1	+59.9	46.6	66 20.7	+60.0	48.2	67 00.0	+60.0	50.0	67
68	62 59.4	+58.7	39.2	63 45.5	+59.0	40.5	64 30.7	+59.2	41.8	65 14.9	+59.5	43.3	65 58.0	+59.7	44.8	66 40.0	+59.9	46.4	67 20.7	+60.0	48.2	68 00.0	+60.0	50.0	68
69	63 58.1	+58.6	38.7	64 44.5	+58.8	40.0	65 29.9	+59.2	41.4	66 14.4	+59.4	42.9	66 57.7	+59.7	44.5	67 39.9	+59.8	46.3	68 20.7	+59.9	48.1	69 00.0	+60.0	50.0	69
70	64 56.7	+58.4	38.2	65 43.3	+58.9	39.6	66 29.1	+59.1	41.0	67 13.8	+59.4	42.6	67 57.4	+59.6	44.3	68 39.7	+59.8	46.1	69 20.6	+60.0	48.0	70 00.0	+60.0	50.0	70
71	65 55.1	+58.4	37.7	66 42.2	+58.7	39.1	67 28.2	+59.1	40.6	68 13.2	+59.4	42.2	68 57.0	+59.6	44.0	69 39.5	+59.8	45.8	70 20.6	+59.9	47.9	71 00.0	+60.0	50.0	71
72	66 53.5	+58.2	37.1	67 40.9	+58.6	38.6	68 27.3	+58.9	40.1	69 12.6	+59.2	41.8	69 56.6	+59.6	43.7	70 39.3	+59.8	45.6	71 20.5	+60.0	47.7	72 00.0	+60.0	50.0	72
73	67 51.7	+58.0	36.5	68 39.5	+58.4	38.0	69 26.2	+58.9	39.6	70 11.8	+59.3	41.4	70 56.2	+59.5	43.3	71 39.1	+59.8	45.4	72 20.5	+59.9	47.6	73 00.0	+60.0	50.0	73
74	68 49.7	+57.9	35.8	69 37.9	+58.3	37.3	70 25.1	+58.7	39.1	71 11.1	+59.1	40.9	71 55.7	+59.5	42.9	72 38.9	+59.7	45.1	73 20.4	+59.9	47.4	74 00.0	+60.0	50.0	74
75	69 47.6	+57.6	35.0	70 36.2	+58.2	36.7	71 23.8	+58.6	38.4	72 10.2	+59.0	40.4	72 55.2	+59.4	42.5	73 38.6	+59.8	44.8	74 20.3	+60.0	47.3	75 00.0	+60.0	50.0	75
76	70 45.2	+57.5	34.2	71 34.4	+57.9	35.9	72 22.4	+58.4	37.7	73 09.2	+58.9	39.8	73 54.6	+59.3	42.0	74 38.4	+59.6	44.4	75 20.3	+59.9	47.1	76 00.0	+60.0	50.0	76
77	71 42.7	+57.1	33.3	72 32.3	+57.7	35.0	73 20.8	+58.3	37.0	74 08.1	+58.8	39.1	74 53.9	+59.3	41.4	75 38.0	+59.7	44.0	76 20.2	+59.9	46.8	77 00.0	+60.0	50.0	77
78	72 39.8	+56.8	32.3	73 30.0	+57.4	34.1	74 19.1	+58.0	36.1	75 06.9	+58.6	38.3	75 53.2	+59.1	40.8	76 37.7	+59.5	43.5	77 20.1	+59.8	46.6	78 00.0	+60.0	50.0	78
79	73 36.6	+56.4	31.2	74 27.4	+57.1	33.1	75 17.1	+57.8	35.1	76 05.5	+58.4	37.5	76 52.3	+59.0	40.1	77 37.2	+59.5	43.0	78 19.9	+59.9	46.3	79 00.0	+60.0	50.0	79
80	74 33.0	+56.0	30.0	75 24.5	+56.7	31.9	76 14.9	+57.4	34.0	77 03.9	+58.1	36.5	77 51.3	+58.8	39.2	78 36.7	+59.4	42.4	79 19.8	+59.8	45.9	80 00.0	+60.0	50.0	80
81	75 29.0	+55.3	28.6	76 21.2	+56.1	30.5	77 12.3	+56.9	32.8	78 02.0	+57.8	35.3	78 50.1	+58.5	38.2	79 36.1	+59.3	41.6	80 19.6	+59.8	45.5	81 00.0	+60.0	50.0	81
82	76 24.3	+54.7	27.0	77 17.3	+55.6	29.0	78 09.2	+56.5	31.3	78 59.8	+57.4	34.0	79 48.6	+58.3	37.1	80 35.4	+59.1	40.7	81 19.4	+59.7	45.0	82 00.0	+60.0	50.0	82
83	77 19.0	+53.9	25.2	78 12.9	+54.8	27.2	79 05.7	+55.8	29.6	79 57.2	+56.8	32.4	80 46.9	+57.9	35.6	81 34.5	+58.8	39.6	82 19.1	+59.7	44.3	83 00.0	+60.0	50.0	83
84	78 12.9	+52.8	23.1	79 07.7	+53.8	25.1	80 01.5	+54.8	27.5	80 54.0	+56.0	30.4	81 44.8	+57.3	33.9	82 33.3	+58.6	38.2	83 18.8	+59.5	43.4	84 00.0	+60.0	50.0	84
85	79 05.7	+51.5	20.7	80 01.5	+52.5	22.7	80 56.3	+53.7	25.1	81 50.0	+55.0	28.0	82 42.1	+56.4	31.7	83 31.9	+57.9	36.3	84 18.3	+59.4	42.3	85 00.0	+60.0	50.0	85
86	79 57.2	+49.7	17.8	80 54.0	*+50.8* •	19.7	81 50.0	+52.1	22.1	82 45.0	+53.5	25.1	83 38.5	+55.3	28.9	84 29.8	+57.1	33.9	85 17.7	+59.0	40.6	86 00.0	+60.0	50.0	86
87	80 46.9	*+47.6* •	14.5	81 44.8	*+48.5* •	16.2	82 42.1	*+49.8* •	18.4	83 38.5	*+51.3* •	21.2	84 33.8	*+53.1* •	25.0	85 26.9	*+55.6* •	30.3	86 16.7	+58.2	38.1	87 00.0	+60.0	50.0	87
88	81 34.5	*+44.6* •	10.5	82 33.3	*+45.5* •	11.9	83 31.9	*+46.4* •	13.7	84 29.8	*+47.9* •	16.2	85 26.9	*+49.8* •	19.7	86 22.5	*+52.4* •	25.0	87 14.9	*+56.3* •	33.8	88 00.0	+60.0	50.0	88
89	82 19.1	*+40.9* •	5.7	83 18.8	*+41.2* •	6.6	84 18.3	*+41.7* •	7.7	85 17.7	*+42.3* •	9.4	86 16.7	*+43.3* •	11.9	87 14.9	*+45.1* •	16.2	88 11.2	*+48.8* •	25.0	89 00.0	+60.0	50.0	89
90	83 00.0	*+35.8* •	0.0	84 00.0	*+35.3* •	0.0	85 00.0	*+34.6* •	0.0	86 00.0	*+33.4* •	0.0	87 00.0	*+31.3* •	0.0	88 00.0	*+26.5* •	0.0	89 00.0	*+9.3* •	0.0	90 00.0	–60.0	25.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 130°, 230°

51°, 309° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 23.9	+59.7	128.8	3 46.3	+59.8	128.8	3 08.7	+59.8	128.9	2 31.0	+59.9	128.9	1 53.2	+60.0	129.0	1 15.5	+60.0	129.0	0 37.8	+60.0	129.0	0 00.0	+60.0	129.0	**0**
1	5 23.6	+59.8	128.7	4 46.1	+59.8	128.8	4 08.5	+59.9	128.8	3 30.9	+59.9	128.9	2 53.2	+59.9	128.9	2 15.5	+60.0	129.0	1 37.8	+59.9	129.0	1 00.0	+60.0	129.0	**1**
2	6 23.4	+59.7	128.6	5 45.9	+59.8	128.7	5 08.4	+59.8	128.8	4 30.8	+59.9	128.8	3 53.1	+60.0	128.9	3 15.5	+59.9	128.9	2 37.7	+60.0	129.0	2 00.0	+60.0	129.0	**2**
3	7 23.1	+59.7	128.5	6 45.7	+59.8	128.6	6 08.2	+59.9	128.7	5 30.7	+59.9	128.8	4 53.1	+59.9	128.8	4 15.4	+60.0	128.9	3 37.7	+60.0	129.0	3 00.0	+60.0	129.0	**3**
4	8 22.8	+59.7	128.4	7 45.5	+59.8	128.5	7 08.1	+59.9	128.6	6 30.6	+59.9	128.7	5 53.0	+60.0	128.8	5 15.4	+60.0	128.9	4 37.7	+60.0	128.9	4 00.0	+60.0	129.0	**4**
5	9 22.5	+59.8	128.3	8 45.3	+59.8	128.4	8 08.0	+59.8	128.6	7 30.5	+59.9	128.7	6 53.0	+59.9	128.8	6 15.4	+60.0	128.8	5 37.7	+60.0	128.9	5 00.0	+60.0	129.0	**5**
6	10 22.3	+59.7	128.2	9 45.1	+59.8	128.4	9 07.8	+59.9	128.5	8 30.4	+59.9	128.6	7 52.9	+60.0	128.7	7 15.4	+60.0	128.8	6 37.7	+60.0	128.9	6 00.0	+60.0	129.0	**6**
7	11 22.0	+59.7	128.1	10 44.9	+59.8	128.3	10 07.7	+59.8	128.4	9 30.3	+59.9	128.5	8 52.9	+59.9	128.7	8 15.4	+59.9	128.8	7 37.7	+60.0	128.9	7 00.0	+60.0	129.0	**7**
8	12 21.7	+59.7	128.0	11 44.7	+59.8	128.2	11 07.5	+59.9	128.3	10 30.2	+60.0	128.5	9 52.8	+60.0	128.6	9 15.3	+60.0	128.8	8 37.7	+60.0	128.9	8 00.0	+60.0	129.0	**8**
9	13 21.4	+59.7	127.9	12 44.5	+59.8	128.1	12 07.4	+59.8	128.3	11 30.2	+59.9	128.4	10 52.8	+59.9	128.6	10 15.3	+60.0	128.7	9 37.7	+60.0	128.9	9 00.0	+60.0	129.0	**9**
10	14 21.1	+59.7	127.8	13 44.3	+59.8	128.0	13 07.2	+59.9	128.2	12 30.1	+59.9	128.4	11 52.7	+60.0	128.5	11 15.3	+60.0	128.7	10 37.7	+60.0	128.9	10 00.0	+60.0	129.0	**10**
11	15 20.8	+59.8	127.7	14 44.1	+59.7	127.9	14 07.1	+59.8	128.1	13 30.0	+59.9	128.3	12 52.7	+59.9	128.5	12 15.3	+59.9	128.7	11 37.7	+60.0	128.8	11 00.0	+60.0	129.0	**11**
12	16 20.6	+59.7	127.6	15 43.8	+59.8	127.8	15 06.9	+59.9	128.1	14 29.9	+59.9	128.3	13 52.6	+60.0	128.5	13 15.2	+60.0	128.7	12 37.7	+60.0	128.8	12 00.0	+60.0	129.0	**12**
13	17 20.3	+59.7	127.5	16 43.6	+59.8	127.8	16 06.8	+59.8	128.0	15 29.8	+59.9	128.2	14 52.6	+59.9	128.4	14 15.2	+60.0	128.6	13 37.7	+60.0	128.8	13 00.0	+60.0	129.0	**13**
14	18 20.0	+59.7	127.4	17 43.4	+59.8	127.7	17 06.6	+59.9	127.9	16 29.7	+59.9	128.1	15 52.5	+60.0	128.4	15 15.2	+60.0	128.6	14 37.7	+60.0	128.8	14 00.0	+60.0	129.0	**14**
15	19 19.7	+59.7	127.3	18 43.2	+59.8	127.6	18 06.5	+59.8	127.8	17 29.6	+59.9	128.1	16 52.5	+59.9	128.3	16 15.2	+59.9	128.6	15 37.7	+60.0	128.8	15 00.0	+60.0	129.0	**15**
16	20 19.4	+59.7	127.2	19 43.0	+59.7	127.5	19 06.3	+59.9	127.8	18 29.5	+59.9	128.0	17 52.4	+60.0	128.3	17 15.1	+60.0	128.5	16 37.7	+60.0	128.8	16 00.0	+60.0	129.0	**16**
17	21 19.1	+59.6	127.1	20 42.7	+59.8	127.4	20 06.2	+59.8	127.7	19 29.4	+59.9	128.0	18 52.4	+59.9	128.2	18 15.1	+60.0	128.5	17 37.7	+60.0	128.8	17 00.0	+60.0	129.0	**17**
18	22 18.7	+59.7	127.0	21 42.5	+59.8	127.3	21 06.0	+59.9	127.6	20 29.3	+59.9	127.9	19 52.3	+60.0	128.2	19 15.1	+60.0	128.5	18 37.7	+59.9	128.7	18 00.0	+60.0	129.0	**18**
19	23 18.4	+59.7	126.9	22 42.3	+59.8	127.2	22 05.9	+59.8	127.5	21 29.2	+59.9	127.8	20 52.3	+59.9	128.1	20 15.1	+59.9	128.4	19 37.6	+60.0	128.7	19 00.0	+60.0	129.0	**19**
20	24 18.1	+59.7	126.7	23 42.1	+59.7	127.1	23 05.7	+59.8	127.4	22 29.1	+59.9	127.8	21 52.2	+59.9	128.1	21 15.0	+60.0	128.4	20 37.6	+60.0	128.7	20 00.0	+60.0	129.0	**20**
21	25 17.8	+59.6	126.6	24 41.8	+59.8	127.0	24 05.5	+59.9	127.4	23 29.0	+59.9	127.7	22 52.1	+60.0	128.1	22 15.0	+60.0	128.4	21 37.6	+60.0	128.7	21 00.0	+60.0	129.0	**21**
22	26 17.4	+59.7	126.5	25 41.6	+59.7	126.9	25 05.4	+59.8	127.3	24 28.9	+59.9	127.7	23 52.1	+59.9	128.0	23 15.0	+60.0	128.3	22 37.6	+60.0	128.7	22 00.0	+60.0	129.0	**22**
23	27 17.1	+59.7	126.4	26 41.3	+59.8	126.8	26 05.2	+59.8	127.2	25 28.8	+59.9	127.6	24 52.0	+60.0	128.0	24 15.0	+59.9	128.3	23 37.6	+60.0	128.7	23 00.0	+60.0	129.0	**23**
24	28 16.8	+59.6	126.3	27 41.1	+59.7	126.7	27 05.0	+59.9	127.1	26 28.7	+59.9	127.5	25 52.0	+59.9	127.9	25 14.9	+60.0	128.3	24 37.6	+60.0	128.6	24 00.0	+60.0	129.0	**24**
25	29 16.4	+59.6	126.2	28 40.8	+59.8	126.6	28 04.9	+59.8	127.0	27 28.6	+59.8	127.5	26 51.9	+59.9	127.9	26 14.9	+60.0	128.3	25 37.6	+60.0	128.6	25 00.0	+60.0	129.0	**25**
26	30 16.0	+59.7	126.0	29 40.6	+59.7	126.5	29 04.7	+59.8	126.9	28 28.4	+59.9	127.4	27 51.8	+60.0	127.8	27 14.9	+60.0	128.2	26 37.6	+60.0	128.6	26 00.0	+60.0	129.0	**26**
27	31 15.7	+59.6	125.9	30 40.3	+59.7	126.4	30 04.5	+59.8	126.9	29 28.3	+59.9	127.3	28 51.8	+59.9	127.8	28 14.9	+59.9	128.2	27 37.6	+60.0	128.6	27 00.0	+60.0	129.0	**27**
28	32 15.3	+59.6	125.8	31 40.0	+59.7	126.3	31 04.3	+59.8	126.8	30 28.2	+59.9	127.2	29 51.7	+59.9	127.7	29 14.8	+60.0	128.1	28 37.6	+60.0	128.6	28 00.0	+60.0	129.0	**28**
29	33 14.9	+59.6	125.6	32 39.7	+59.8	126.2	32 04.1	+59.8	126.7	31 28.1	+59.9	127.2	30 51.6	+60.0	127.6	30 14.8	+60.0	128.1	29 37.6	+60.0	128.6	29 00.0	+60.0	129.0	**29**
30	34 14.5	+59.6	125.5	33 39.5	+59.7	126.0	33 03.9	+59.8	126.6	32 28.0	+59.8	127.1	31 51.6	+59.9	127.6	31 14.8	+59.9	128.1	30 37.6	+60.0	128.5	30 00.0	+60.0	129.0	**30**
31	35 14.1	+59.6	125.4	34 39.2	+59.7	125.9	34 03.7	+59.8	126.5	33 27.8	+59.9	127.0	32 51.5	+59.9	127.5	32 14.7	+60.0	128.0	31 37.6	+60.0	128.5	31 00.0	+60.0	129.0	**31**
32	36 13.7	+59.6	125.2	35 38.9	+59.7	125.8	35 03.5	+59.8	126.4	34 27.7	+59.9	126.9	33 51.4	+60.0	127.5	33 14.7	+60.0	128.0	32 37.6	+60.0	128.5	32 00.0	+60.0	129.0	**32**
33	37 13.3	+59.6	125.1	36 38.6	+59.7	125.7	36 03.3	+59.8	126.3	35 27.6	+59.8	126.9	34 51.4	+59.9	127.4	34 14.7	+59.9	128.0	33 37.6	+59.9	128.5	33 00.0	+60.0	129.0	**33**
34	38 12.9	+59.5	124.9	37 38.3	+59.6	125.6	37 03.1	+59.8	126.2	36 27.4	+59.9	126.8	35 51.3	+59.9	127.4	35 14.6	+60.0	127.9	34 37.5	+60.0	128.5	34 00.0	+60.0	129.0	**34**
35	39 12.4	+59.6	124.8	38 37.9	+59.7	125.4	38 02.9	+59.8	126.1	37 27.3	+59.9	126.7	36 51.2	+59.9	127.3	36 14.6	+60.0	127.9	35 37.5	+60.0	128.4	35 00.0	+60.0	129.0	**35**
36	40 12.0	+59.5	124.6	39 37.6	+59.7	125.3	39 02.7	+59.7	126.0	38 27.2	+59.8	126.6	37 51.1	+59.9	127.2	37 14.6	+59.9	127.8	36 37.5	+60.0	128.4	36 00.0	+60.0	129.0	**36**
37	41 11.5	+59.5	124.4	40 37.3	+59.6	125.1	40 02.4	+59.8	125.8	39 27.0	+59.9	126.5	38 51.0	+60.0	127.2	38 14.5	+60.0	127.8	37 37.5	+60.0	128.4	37 00.0	+60.0	129.0	**37**
38	42 11.0	+59.5	124.3	41 36.9	+59.7	125.0	41 02.2	+59.7	125.7	40 26.9	+59.8	126.4	39 51.0	+59.9	127.1	39 14.5	+60.0	127.7	38 37.5	+60.0	128.4	38 00.0	+60.0	129.0	**38**
39	43 10.5	+59.5	124.1	42 36.6	+59.6	124.9	42 01.9	+59.8	125.6	41 26.7	+59.9	126.3	40 50.9	+59.9	127.0	40 14.5	+59.9	127.7	39 37.5	+60.0	128.4	39 00.0	+60.0	129.0	**39**
40	44 10.0	+59.5	123.9	43 36.2	+59.6	124.7	43 01.7	+59.7	125.5	42 26.6	+59.8	126.2	41 50.8	+59.9	126.9	41 14.4	+60.0	127.7	40 37.5	+60.0	128.3	40 00.0	+60.0	129.0	**40**
41	45 09.5	+59.4	123.7	44 35.8	+59.6	124.5	44 01.4	+59.8	125.3	43 26.4	+59.8	126.1	42 50.7	+59.9	126.9	42 14.4	+59.9	127.6	41 37.5	+60.0	128.3	41 00.0	+60.0	129.0	**41**
42	46 08.9	+59.4	123.5	45 35.4	+59.6	124.4	45 01.2	+59.7	125.2	44 26.2	+59.8	126.0	43 50.6	+59.9	126.8	43 14.3	+60.0	127.6	42 37.5	+60.0	128.3	42 00.0	+60.0	129.0	**42**
43	47 08.3	+59.4	123.3	46 35.0	+59.6	124.2	46 00.9	+59.7	125.1	45 26.0	+59.9	125.9	44 50.5	+59.9	126.7	44 14.3	+60.0	127.5	43 37.5	+59.9	128.3	43 00.0	+60.0	129.0	**43**
44	48 07.7	+59.4	123.1	47 34.6	+59.5	124.0	47 00.6	+59.7	124.9	46 25.9	+59.8	125.8	45 50.4	+59.9	126.6	45 14.3	+59.9	127.4	44 37.4	+60.0	128.2	44 00.0	+60.0	129.0	**44**
45	49 07.1	+59.4	122.9	48 34.1	+59.6	123.9	48 00.3	+59.7	124.8	47 25.7	+59.8	125.7	46 50.3	+59.9	126.6	46 14.2	+60.0	127.4	45 37.4	+60.0	128.2	45 00.0	+60.0	129.0	**45**
46	50 06.5	+59.3	122.7	49 33.7	+59.5	123.7	49 00.0	+59.6	124.6	48 25.5	+59.8	125.6	47 50.2	+59.9	126.5	47 14.2	+59.9	127.3	46 37.4	+60.0	128.2	46 00.0	+60.0	129.0	**46**
47	51 05.8	+59.3	122.4	50 33.2	+59.5	123.5	49 59.6	+59.7	124.5	49 25.3	+59.8	125.4	48 50.1	+59.9	126.4	48 14.1	+60.0	127.3	47 37.4	+60.0	128.2	47 00.0	+60.0	129.0	**47**
48	52 05.1	+59.3	122.2	51 32.7	+59.4	123.3	50 59.3	+59.6	124.3	50 25.1	+59.7	125.3	49 50.0	+59.8	126.3	49 14.1	+59.9	127.2	48 37.4	+60.0	128.1	48 00.0	+60.0	129.0	**48**
49	53 04.4	+59.2	121.9	52 32.1	+59.5	123.0	51 58.9	+59.7	124.1	51 24.8	+59.8	125.2	50 49.8	+59.9	126.2	50 14.0	+60.0	127.1	49 37.4	+60.0	128.1	49 00.0	+60.0	129.0	**49**
50	54 03.6	+59.2	121.7	53 31.6	+59.4	122.8	52 58.6	+59.6	123.9	52 24.6	+59.8	125.0	51 49.7	+59.9	126.1	51 14.0	+59.9	127.1	50 37.4	+60.0	128.1	50 00.0	+60.0	129.0	**50**
51	55 02.8	+59.2	121.4	54 31.0	+59.4	122.6	53 58.2	+59.6	123.8	53 24.4	+59.7	124.9	52 49.6	+59.8	126.0	52 13.9	+59.9	127.0	51 37.4	+59.9	128.0	51 00.0	+60.0	129.0	**51**
52	56 02.0	+59.1	121.1	55 30.4	+59.4	122.3	54 57.8	+59.5	123.6	54 24.1	+59.7	124.7	53 49.4	+59.9	125.8	53 13.8	+60.0	126.9	52 37.3	+60.0	128.0	52 00.0	+60.0	129.0	**52**
53	57 01.1	+59.0	120.8	56 29.8	+59.3	122.1	55 57.3	+59.6	123.3	55 23.8	+59.8	124.6	54 49.3	+59.8	125.7	54 13.8	+59.9	126.9	53 37.3	+60.0	127.9	53 00.0	+60.0	129.0	**53**
54	58 00.1	+59.0	120.5	57 29.1	+59.3	121.8	56 56.9	+59.5	123.1	56 23.6	+59.7	124.4	55 49.1	+59.9	125.6	55 13.7	+59.9	126.8	54 37.3	+60.0	127.9	54 00.0	+60.0	129.0	**54**
55	58 59.1	+59.0	120.1	58 28.4	+59.2	121.5	57 56.4	+59.5	122.9	57 23.3	+59.6	124.2	56 49.0	+59.8	125.5	56 13.6	+60.0	126.7	55 37.3	+60.0	127.9	55 00.0	+60.0	129.0	**55**
56	59 58.1	+58.9	119.7	59 27.6	+59.2	121.2	58 55.9	+59.5	122.6	58 22.9	+59.7	124.0	57 48.8	+59.8	125.3	57 13.6	+59.9	126.6	56 37.3	+60.0	127.8	56 00.0	+60.0	129.0	**56**
57	60 57.0	+58.8	119.3	60 26.8	+59.2	120.9	59 55.4	+59.4	122.4	59 22.6	+59.7	123.8	58 48.6	+59.8	125.2	58 13.5	+59.9	126.5	57 37.3	+59.9	127.8	57 00.0	+60.0	129.0	**57**
58	61 55.8	+58.7	118.9	61 26.0	+59.1	120.5	60 54.8	+59.4	122.1	60 22.3	+59.6	123.6	59 48.4	+59.8	125.0	59 13.4	+59.9	126.4	58 37.2	+60.0	127.7	58 00.0	+60.0	129.0	**58**
59	62 54.5	+58.6	118.5	62 25.1	+59.0	120.2	61 54.2	+59.4	121.8	61 21.9	+59.6	123.4	60 48.2	+59.8	124.9	60 13.3	+59.9	126.3	59 37.2	+60.0	127.7	59 00.0	+60.0	129.0	**59**
60	63 53.1	+58.6	118.0	63 24.1	+59.0	119.8	62 53.6	+59.3	121.5	62 21.5	+59.6	123.1	61 48.0	+59.8	124.7	61 13.2	+59.9	126.2	60 37.2	+60.0	127.6	60 00.0	+60.0	129.0	**60**
61	64 51.7	+58.4	117.5	64 23.1	+58.9	119.4	63 52.9	+59.2	121.1	63 21.1	+59.5	122.9	62 47.8	+59.7	124.5	62 13.1	+59.9	126.1	61 37.2	+60.0	127.6	61 00.0	+60.0	129.0	**61**
62	65 50.1	+58.3	117.0	65 22.0	+58.8	118.9	64 52.1	+59.2	120.8	64 20.6	+59.5	122.6	63 47.5	+59.8	124.3	63 13.0	+59.9	125.9	62 37.2	+59.9	127.5	62 00.0	+60.0	129.0	**62**
63	66 48.4	+58.2	116.4	66 20.8	+58.7	118.4	65 51.3	+59.2	120.4	65 20.1	+59.5	122.3	64 47.3	+59.7	124.1	64 12.9	+59.9	125.8	63 37.1	+60.0	127.4	63 00.0	+60.0	129.0	**63**
64	67 46.6	+58.0	115.7	67 19.5	+58.6	117.9	66 50.5	+59.0	120.0	66 19.6	+59.4	122.0	65 47.0	+59.7	123.8	65 12.8	+59.9	125.6	64 37.1	+60.0	127.4	64 00.0	+60.0	129.0	**64**
65	68 44.6	+57.8	115.1	68 18.1	+58.5	117.3	67 49.5	+59.0	119.5	67 19.0	+59.4	121.6	66 46.7	+59.7	123.6	66 12.7	+59.8	125.5	65 37.1	+59.9	127.3	65 00.0	+60.0	129.0	**65**
66	69 42.4	+57.6	114.3	69 16.6	+58.3	116.7	68 48.5	+58.9	119.0	68 18.4	+59.3	121.2	67 46.4	+59.6	123.3	67 12.5	+59.9	125.3	66 37.0	+60.0	127.2	66 00.0	+60.0	129.0	**66**
67	70 40.0	+57.4	113.5	70 14.9	+58.1	116.0	69 47.4	+58.8	118.5	69 17.7	+59.3	120.8	68 46.0	+59.6	123.0	68 12.4	+59.8	125.1	67 37.0	+60.0	127.1	67 00.0	+60.0	129.0	**67**
68	71 37.4	+57.1	112.6	71 13.0	+58.0	115.3	70 46.2	+58.6	117.9	70 17.0	+59.2	120.4	69 45.6	+59.6	122.7	69 12.2	+59.8	124.9	68 37.0	+59.9	127.0	68 00.0	+60.0	129.0	**68**
69	72 34.5	+56.7	111.6	72 11.0	+57.7	114.5	71 44.8	+58.5	117.2	71 16.2	+59.1	119.9	70 45.2	+59.5	122.3	70 12.0	+59.8	124.7	69 36.9	+60.0	126.9	69 00.0	+60.0	129.0	**69**
70	73 31.2	+56.4	110.5	73 08.7	+57.5	113.5	72 43.3	+58.4	116.5	72 15.3	+58.9	119.3	71 44.7	+59.4	121.9	71 11.8	+59.8	124.4	70 36.9	+59.9	126.8	70 00.0	+60.0	129.0	**70**
71	74 27.6	+55.8	109.2	74 06.2	+57.1	112.5	73 41.7	+58.1	115.7	73 14.2	+58.9	118.7	72 44.1	+59.4	121.5	72 11.6	+59.7	124.2	71 36.8	+60.0	126.7	71 00.0	+60.0	129.0	**71**
72	75 23.4	+55.3	107.8	75 03.3	+56.7	111.4	74 39.8	+57.8	114.8	74 13.1	+58.7	118.0	73 43.5	+59.4	121.0	73 11.3	+59.8	123.9	72 36.8	+59.9	126.5	72 00.0	+60.0	129.0	**72**
73	76 18.7	+54.7	106.2	76 00.0	+56.3	110.1	75 37.6	+57.6	113.7	75 11.8	+58.6	117.2	74 42.9	+59.2	120.5	74 11.1	+59.6	123.5	73 36.7	+59.9	126.4	73 00.0	+60.0	129.0	**73**
74	77 13.4	+53.7	104.4	76 56.3	+55.7	108.6	76 35.2	+57.2	112.6	76 10.4	+58.3	116.3	75 42.1	+59.1	119.8	75 10.7	+59.7	123.1	74 36.6	+59.9	126.2	74 00.0	+60.0	129.0	**74**
75	78 07.1	+52.7	102.3	77 52.0	+54.9	106.9	77 32.4	+56.7	111.2	77 08.7	+58.0	115.3	76 41.2	+59.0	119.1	76 10.4	+59.6	122.7	75 36.5	+59.9	126.0	75 00.0	+60.0	129.0	**75**
76	78 59.8	+51.4	99.9	78 46.9	+54.0	104.9	78 29.1	+56.1	109.6	78 06.7	+57.7	114.1	77 40.2	+58.8	118.3	77 10.0	+59.5	122.2	76 36.4	+59.9	125.7	76 00.0	+60.0	129.0	**76**
77	79 51.2	*+49.7*•	97.1	79 40.9	+52.9	102.6	79 25.2	+55.4	107.8	79 04.4	+57.3	112.7	78 39.0	+58.6	117.3	78 09.5	+59.4	121.6	77 36.3	+59.9	125.5	77 00.0	+60.0	129.0	**77**
78	80 40.9	*+47.4*•	93.8	80 33.8	+51.2	99.8	80 20.6	+54.3	105.6	80 01.7	+56.6	111.1	79 37.6	+58.3	116.2	79 08.9	+59.3	120.9	78 36.2	+59.8	125.1	78 00.0	+60.0	129.0	**78**
79	81 28.3	*+44.6*•	89.8	81 25.0	*+49.2*•	96.5	81 14.9	+53.0	102.9	80 58.3	+55.9	109.1	80 35.9	+57.9	114.8	80 08.2	+59.2	120.0	79 36.0	+59.8	124.8	79 00.0	+60.0	129.0	**79**
80	82 12.9	*+40.9*•	85.1	82 14.2	*+46.4*•	92.4	82 07.9	*+51.1*•	99.7	81 54.2	+54.8	106.6	81 33.8	+57.3	113.1	81 07.4	+58.9	119.0	80 35.8	+59.8	124.3	80 00.0	+60.0	129.0	**80**
81	82 53.8	*+35.9*•	79.4	83 00.6	*+42.6*•	87.5	82 59.0	*+48.4*•	95.6	82 49.0	+53.1	103.6	82 31.1	+56.6	111.0	82 06.3	+58.7	117.7	81 35.6	+59.7	123.7	81 00.0	+60.0	129.0	**81**
82	83 29.7	*+29.4*•	72.7	83 43.2	*+37.2*•	81.4	83 47.4	*+44.7*•	90.5	83 42.1	*+50.9*•	99.6	83 27.7	+55.3	108.2	83 05.0	+58.2	116.1	82 35.3	+59.6	123.0	82 00.0	+60.0	129.0	**82**
83	83 59.1	*+21.3*•	64.7	84 20.4	*+30.1*•	73.8	84 32.1	*+39.0*•	83.9	84 33.0	*+47.1*•	94.4	84 23.0	*+53.5*•	104.6	84 03.2	+57.5	113.9	83 34.9	+59.5	122.1	83 00.0	+60.0	129.0	**83**
84	84 20.4	*+11.7*•	55.5	84 50.5	*+20.6*•	64.6	85 11.1	*+30.9*•	75.4	85 20.1	*+41.4*•	87.4	85 16.5	*+50.3*•	99.5	85 00.7	+56.3	110.9	84 34.4	+59.3	120.8	84 00.0	+60.0	129.0	**84**
85	84 32.1	*+0.9*•	45.3	85 11.1	*+9.0*•	53.8	85 42.0	*+19.5*•	64.6	86 01.5	*+32.0*•	77.7	86 06.8	*+44.5*•	92.2	85 57.0	*+54.0*•	106.5	85 33.7	+58.8	118.9	85 00.0	+60.0	129.0	**85**
86	84 33.0	*–10.0*•	34.8	85 20.1	*–3.6*•	41.8	86 01.5	*+5.3*•	51.4	86 33.5	*+17.8*•	64.6	86 51.3	*+33.8*•	81.2	86 51.0	*+49.0*•	99.5	86 32.5	+57.8	116.0	86 00.0	+60.0	129.0	**86**
87	84 23.0	*–19.8*•	24.6	85 16.5	*–15.8*•	29.6	86 06.8	*–9.8*•	36.9	86 51.3	*–0.3*•	47.9	87 25.1	*+14.9*•	64.5	87 40.0	*+36.7*•	87.3	87 30.3	*+55.2*•	110.9	87 00.0	+60.0	129.0	**87**
88	84 03.2	*–28.3*•	15.2	85 00.7	*–26.3*•	18.2	85 57.0	*–23.3*•	22.6	86 51.0	*–18.5*•	29.6	87 40.0	*–9.7*•	41.8	88 16.7	*+8.8*•	64.5	88 25.5	*+42.8*•	99.5	88 00.0	+60.0	129.0	**88**
89	83 34.9	*–34.9*•	7.0	84 34.4	*–34.4*•	8.2	85 33.7	*–33.7*•	10.1	86 32.5	*–32.5*•	13.0	87 30.3	*–30.3*•	18.2	88 25.5	*–25.5*•	29.6	89 08.3	*–8.3*•	64.5	89 00.0	+60.0	129.0	**89**
90	83 00.0	*–40.1*•	0.0	84 00.0	*–40.5*•	0.0	85 00.0	*–41.0*•	0.0	86 00.0	*–41.6*•	0.0	87 00.0	*–42.7*•	0.0	88 00.0	*–44.5*•	0.0	89 00.0	*–48.3*•	0.0	90 00.0	–60.0	64.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 23.9	−59.7	128.8	3 46.3	−59.8	128.8	3 08.7	−59.9	128.9	2 31.0	−59.9	128.9	1 53.2	−59.9	129.0	1 15.5	−60.0	129.0	0 37.8	−60.0	129.0	0 00.0	+60.0	51.0	0
1	3 24.2	−59.7	128.9	2 46.5	−59.8	128.9	2 08.8	−59.9	129.0	1 31.1	−60.0	129.0	0 53.3	−60.0	129.0	0 15.5	−59.9	129.0	0 22.2	+60.0	51.0	1 00.0	+60.0	51.0	1
2	2 24.5	−59.8	129.0	1 46.7	−59.8	129.0	1 08.9	−59.8	129.0	0 31.1	−59.9	129.0	0 06.7	+59.9	51.0	0 44.4	+60.0	51.0	1 22.2	+60.0	51.0	2 00.0	+60.0	51.0	2
3	1 24.7	−59.7	129.1	0 46.9	−59.8	129.1	0 09.1	−59.9	129.1	0 28.8	+59.9	50.9	1 06.6	+60.0	50.9	1 44.4	+60.0	50.9	2 22.2	+60.0	51.0	3 00.0	+60.0	51.0	3
4	0 25.0	−59.7	129.2	0 12.9	+59.8	50.8	0 50.8	+59.9	50.8	1 28.7	+59.9	50.9	2 06.6	+59.9	50.9	2 44.4	+60.0	50.9	3 22.2	+60.0	50.9	4 00.0	+60.0	51.0	4
5	0 34.7	+59.8	50.7	1 12.7	+59.8	50.7	1 50.7	+59.8	50.8	2 28.6	+59.9	50.8	3 06.5	+60.0	50.8	3 44.4	+60.0	50.9	4 22.2	+60.0	50.9	5 00.0	+60.0	51.0	5
6	1 34.5	+59.7	50.6	2 12.5	+59.8	50.7	2 50.5	+59.9	50.7	3 28.5	+59.9	50.7	4 06.5	+59.9	50.8	4 44.4	+59.9	50.9	5 22.2	+60.0	50.9	6 00.0	+60.0	51.0	6
7	2 34.2	+59.7	50.5	3 12.3	+59.8	50.6	3 50.4	+59.8	50.6	4 28.4	+59.9	50.7	5 06.4	+60.0	50.8	5 44.3	+60.0	50.8	6 22.2	+60.0	50.9	7 00.0	+60.0	51.0	7
8	3 33.9	+59.8	50.5	4 12.1	+59.8	50.5	4 50.2	+59.9	50.6	5 28.3	+59.9	50.6	6 06.4	+59.9	50.7	6 44.3	+60.0	50.8	7 22.2	+60.0	50.9	8 00.0	+60.0	51.0	8
9	4 33.7	+59.7	50.4	5 11.9	+59.8	50.4	5 50.1	+59.9	50.5	6 28.2	+60.0	50.6	7 06.3	+60.0	50.7	7 44.3	+60.0	50.8	8 22.2	+60.0	50.9	9 00.0	+60.0	51.0	9
10	5 33.4	+59.7	50.3	6 11.7	+59.8	50.3	6 50.0	+59.8	50.4	7 28.2	+59.9	50.5	8 06.3	+59.9	50.6	8 44.3	+59.9	50.7	9 22.2	+60.0	50.9	10 00.0	+60.0	51.0	10
11	6 33.1	+59.7	50.2	7 11.5	+59.8	50.3	7 49.8	+59.9	50.4	8 28.1	+59.9	50.5	9 06.2	+60.0	50.6	9 44.2	+60.0	50.7	10 22.2	+60.0	50.9	11 00.0	+60.0	51.0	11
12	7 32.8	+59.8	50.1	8 11.3	+59.8	50.2	8 49.7	+59.8	50.3	9 28.0	+59.9	50.4	10 06.2	+59.9	50.5	10 44.2	+60.0	50.7	11 22.2	+60.0	50.8	12 00.0	+60.0	51.0	12
13	8 32.6	+59.7	50.0	9 11.1	+59.8	50.1	9 49.5	+59.9	50.2	10 27.9	+59.9	50.4	11 06.1	+59.9	50.5	11 44.2	+60.0	50.7	12 22.2	+60.0	50.8	13 00.0	+60.0	51.0	13
14	9 32.3	+59.7	49.9	10 10.9	+59.8	50.0	10 49.4	+59.9	50.1	11 27.8	+59.9	50.3	12 06.0	+60.0	50.5	12 44.2	+60.0	50.6	13 22.2	+60.0	50.8	14 00.0	+60.0	51.0	14
15	10 32.0	+59.7	49.8	11 10.7	+59.8	49.9	11 49.3	+59.8	50.1	12 27.7	+59.9	50.2	13 06.0	+59.9	50.4	13 44.2	+59.9	50.6	14 22.2	+60.0	50.8	15 00.0	+60.0	51.0	15
16	11 31.7	+59.7	49.7	12 10.5	+59.8	49.8	12 49.1	+59.9	50.0	13 27.6	+59.9	50.2	14 05.9	+60.0	50.4	14 44.1	+60.0	50.6	15 22.2	+59.9	50.8	16 00.0	+60.0	51.0	16
17	12 31.4	+59.8	49.6	13 10.3	+59.8	49.8	13 49.0	+59.8	49.9	14 27.5	+59.9	50.1	15 05.9	+59.9	50.3	15 44.1	+60.0	50.5	16 22.1	+60.0	50.8	17 00.0	+60.0	51.0	17
18	13 31.2	+59.7	49.5	14 10.1	+59.8	49.7	14 48.8	+59.9	49.9	15 27.4	+59.9	50.1	16 05.8	+60.0	50.3	16 44.1	+60.0	50.5	17 22.1	+60.0	50.8	18 00.0	+60.0	51.0	18
19	14 30.9	+59.7	49.4	15 09.9	+59.7	49.6	15 48.7	+59.8	49.8	16 27.3	+59.9	50.0	17 05.8	+59.9	50.2	17 44.1	+59.9	50.5	18 22.1	+60.0	50.7	19 00.0	+60.0	51.0	19
20	15 30.6	+59.7	49.3	16 09.6	+59.8	49.5	16 48.5	+59.9	49.7	17 27.2	+59.9	50.0	18 05.7	+60.0	50.2	18 44.0	+60.0	50.5	19 22.1	+60.0	50.7	20 00.0	+60.0	51.0	20
21	16 30.3	+59.7	49.2	17 09.4	+59.8	49.4	17 48.4	+59.8	49.6	18 27.1	+59.9	49.9	19 05.7	+59.9	50.2	19 44.0	+60.0	50.4	20 22.1	+60.0	50.7	21 00.0	+60.0	51.0	21
22	17 30.0	+59.7	49.1	18 09.2	+59.8	49.3	18 48.2	+59.9	49.6	19 27.0	+59.9	49.8	20 05.6	+60.0	50.1	20 44.0	+60.0	50.4	21 22.1	+60.0	50.7	22 00.0	+60.0	51.0	22
23	18 29.7	+59.7	49.0	19 09.0	+59.8	49.2	19 48.1	+59.8	49.5	20 26.9	+59.9	49.8	21 05.6	+59.9	50.1	21 44.0	+59.9	50.4	22 22.1	+60.0	50.7	23 00.0	+60.0	51.0	23
24	19 29.4	+59.7	48.9	20 08.8	+59.7	49.1	20 47.9	+59.8	49.4	21 26.8	+59.9	49.7	22 05.5	+59.9	50.0	22 43.9	+60.0	50.3	23 22.1	+60.0	50.7	24 00.0	+60.0	51.0	24
25	20 29.1	+59.7	48.8	21 08.5	+59.8	49.0	21 47.7	+59.9	49.3	22 26.7	+59.9	49.6	23 05.4	+60.0	50.0	23 43.9	+60.0	50.3	24 22.1	+60.0	50.6	25 00.0	+60.0	51.0	25
26	21 28.8	+59.7	48.6	22 08.3	+59.8	48.9	22 47.6	+59.8	49.3	23 26.6	+59.9	49.6	24 05.4	+59.9	49.9	24 43.9	+60.0	50.3	25 22.1	+60.0	50.6	26 00.0	+60.0	51.0	26
27	22 28.5	+59.6	48.5	23 08.1	+59.7	48.9	23 47.4	+59.9	49.2	24 26.5	+59.9	49.5	25 05.3	+60.0	49.9	25 43.9	+59.9	50.2	26 22.1	+60.0	50.6	27 00.0	+60.0	51.0	27
28	23 28.1	+59.7	48.4	24 07.8	+59.8	48.8	24 47.3	+59.8	49.1	25 26.4	+59.9	49.5	26 05.3	+59.9	49.8	26 43.8	+60.0	50.2	27 22.1	+60.0	50.6	28 00.0	+60.0	51.0	28
29	24 27.8	+59.7	48.3	25 07.6	+59.8	48.7	25 47.1	+59.8	49.0	26 26.3	+59.9	49.4	27 05.2	+59.9	49.8	27 43.8	+60.0	50.2	28 22.1	+60.0	50.6	29 00.0	+60.0	51.0	29
30	25 27.5	+59.7	48.2	26 07.4	+59.7	48.6	26 46.9	+59.8	48.9	27 26.2	+59.9	49.3	28 05.1	+60.0	49.7	28 43.8	+59.9	50.1	29 22.1	+60.0	50.6	30 00.0	+60.0	51.0	30
31	26 27.2	+59.6	48.1	27 07.1	+59.8	48.5	27 46.7	+59.9	48.8	28 26.1	+59.9	49.2	29 05.1	+59.9	49.7	29 43.7	+60.0	50.1	30 22.1	+59.9	50.5	31 00.0	+60.0	51.0	31
32	27 26.8	+59.7	48.0	28 06.9	+59.7	48.4	28 46.6	+59.8	48.8	29 26.0	+59.8	49.2	30 05.0	+59.9	49.6	30 43.7	+60.0	50.1	31 22.0	+60.0	50.5	32 00.0	+60.0	51.0	32
33	28 26.5	+59.6	47.8	29 06.6	+59.7	48.2	29 46.4	+59.8	48.7	30 25.8	+59.9	49.1	31 04.9	+60.0	49.6	31 43.7	+60.0	50.0	32 22.0	+60.0	50.5	33 00.0	+60.0	51.0	33
34	29 26.1	+59.7	47.7	30 06.3	+59.8	48.1	30 46.2	+59.8	48.6	31 25.7	+59.9	49.0	32 04.9	+59.9	49.5	32 43.7	+59.9	50.0	33 22.0	+60.0	50.5	34 00.0	+60.0	51.0	34
35	30 25.8	+59.6	47.6	31 06.1	+59.7	48.0	31 46.0	+59.8	48.5	32 25.6	+59.9	49.0	33 04.8	+59.9	49.4	33 43.6	+60.0	49.9	34 22.0	+60.0	50.5	35 00.0	+60.0	51.0	35
36	31 25.4	+59.6	47.5	32 05.8	+59.7	47.9	32 45.8	+59.8	48.4	33 25.5	+59.8	48.9	34 04.7	+60.0	49.4	34 43.6	+60.0	49.9	35 22.0	+60.0	50.4	36 00.0	+60.0	51.0	36
37	32 25.0	+59.6	47.3	33 05.5	+59.7	47.8	33 45.6	+59.8	48.3	34 25.3	+59.9	48.8	35 04.7	+59.9	49.3	35 43.6	+59.9	49.9	36 22.0	+60.0	50.4	37 00.0	+60.0	51.0	37
38	33 24.6	+59.6	47.2	34 05.2	+59.7	47.7	34 45.4	+59.8	48.2	35 25.2	+59.9	48.7	36 04.6	+59.9	49.3	36 43.5	+60.0	49.8	37 22.0	+60.0	50.4	38 00.0	+60.0	51.0	38
39	34 24.2	+59.6	47.1	35 04.9	+59.7	47.6	35 45.2	+59.8	48.1	36 25.1	+59.8	48.6	37 04.5	+59.9	49.2	37 43.5	+59.9	49.8	38 22.0	+60.0	50.4	39 00.0	+60.0	51.0	39
40	35 23.8	+59.6	46.9	36 04.6	+59.7	47.4	36 45.0	+59.8	48.0	37 24.9	+59.9	48.6	38 04.4	+59.9	49.1	38 43.4	+60.0	49.7	39 22.0	+60.0	50.4	40 00.0	+60.0	51.0	40
41	36 23.4	+59.6	46.8	37 04.3	+59.7	47.3	37 44.8	+59.8	47.9	38 24.8	+59.9	48.5	39 04.3	+60.0	49.1	39 43.4	+60.0	49.7	40 22.0	+60.0	50.3	41 00.0	+60.0	51.0	41
42	37 23.0	+59.6	46.6	38 04.0	+59.7	47.2	38 44.6	+59.7	47.8	39 24.7	+59.8	48.4	40 04.3	+59.9	49.0	40 43.4	+59.9	49.6	41 22.0	+59.9	50.3	42 00.0	+60.0	51.0	42
43	38 22.6	+59.5	46.5	39 03.7	+59.6	47.1	39 44.3	+59.8	47.7	40 24.5	+59.8	48.3	41 04.2	+59.9	48.9	41 43.3	+60.0	49.6	42 21.9	+60.0	50.3	43 00.0	+60.0	51.0	43
44	39 22.1	+59.6	46.3	40 03.3	+59.7	46.9	40 44.1	+59.7	47.5	41 24.3	+59.9	48.2	42 04.1	+59.9	48.9	42 43.3	+60.0	49.5	43 21.9	+60.0	50.3	44 00.0	+60.0	51.0	44
45	40 21.7	+59.5	46.2	41 03.0	+59.6	46.8	41 43.8	+59.8	47.4	42 24.2	+59.8	48.1	43 04.0	+59.9	48.8	43 43.3	+59.9	49.5	44 21.9	+60.0	50.2	45 00.0	+60.0	51.0	45
46	41 21.2	+59.5	46.0	42 02.6	+59.7	46.6	42 43.6	+59.7	47.3	43 24.0	+59.9	48.0	44 03.9	+59.9	48.7	44 43.2	+60.0	49.4	45 21.9	+60.0	50.2	46 00.0	+60.0	51.0	46
47	42 20.7	+59.5	45.8	43 02.3	+59.6	46.5	43 43.3	+59.8	47.2	44 23.9	+59.8	47.9	45 03.8	+59.9	48.6	45 43.2	+59.9	49.4	46 21.9	+60.0	50.2	47 00.0	+60.0	51.0	47
48	43 20.2	+59.5	45.6	44 01.9	+59.6	46.3	44 43.1	+59.7	47.0	45 23.7	+59.8	47.8	46 03.7	+59.9	48.5	46 43.1	+60.0	49.3	47 21.9	+60.0	50.2	48 00.0	+60.0	51.0	48
49	44 19.7	+59.5	45.5	45 01.5	+59.6	46.2	45 42.8	+59.7	46.9	46 23.5	+59.8	47.7	47 03.6	+59.9	48.5	47 43.1	+59.9	49.3	48 21.9	+60.0	50.1	49 00.0	+60.0	51.0	49
50	45 19.2	+59.4	45.3	46 01.1	+59.6	46.0	46 42.5	+59.7	46.8	47 23.3	+59.8	47.5	48 03.5	+59.9	48.4	48 43.0	+60.0	49.2	49 21.9	+60.0	50.1	50 00.0	+60.0	51.0	50
51	46 18.6	+59.4	45.1	47 00.7	+59.6	45.8	47 42.2	+59.7	46.6	48 23.1	+59.8	47.4	49 03.4	+59.9	48.3	49 43.0	+59.9	49.1	50 21.9	+59.9	50.1	51 00.0	+60.0	51.0	51
52	47 18.0	+59.4	44.9	48 00.3	+59.5	45.7	48 41.9	+59.7	46.5	49 22.9	+59.8	47.3	50 03.3	+59.8	48.2	50 42.9	+60.0	49.1	51 21.8	+60.0	50.0	52 00.0	+60.0	51.0	52
53	48 17.4	+59.4	44.7	48 59.8	+59.5	45.5	49 41.6	+59.6	46.3	50 22.7	+59.8	47.2	51 03.1	+59.9	48.1	51 42.9	+59.9	49.0	52 21.8	+60.0	50.0	53 00.0	+60.0	51.0	53
54	49 16.8	+59.4	44.4	49 59.3	+59.5	45.3	50 41.2	+59.7	46.1	51 22.5	+59.7	47.0	52 03.0	+59.9	48.0	52 42.8	+59.9	48.9	53 21.8	+60.0	50.0	54 00.0	+60.0	51.0	54
55	50 16.2	+59.3	44.2	50 58.8	+59.5	45.1	51 40.9	+59.6	46.0	52 22.2	+59.8	46.9	53 02.9	+59.8	47.9	53 42.7	+60.0	48.9	54 21.8	+60.0	49.9	55 00.0	+60.0	51.0	55
56	51 15.5	+59.3	44.0	51 58.3	+59.5	44.9	52 40.5	+59.6	45.8	53 22.0	+59.7	46.7	54 02.7	+59.9	47.7	54 42.7	+59.9	48.8	55 21.8	+60.0	49.9	56 00.0	+60.0	51.0	56
57	52 14.8	+59.2	43.7	52 57.8	+59.4	44.6	53 40.1	+59.6	45.6	54 21.7	+59.8	46.6	55 02.6	+59.8	47.6	55 42.6	+59.9	48.7	56 21.8	+59.9	49.8	57 00.0	+60.0	51.0	57
58	53 14.0	+59.3	43.5	53 57.2	+59.4	44.4	54 39.7	+59.6	45.4	55 21.5	+59.7	46.4	56 02.4	+59.9	47.5	56 42.5	+60.0	48.6	57 21.7	+60.0	49.8	58 00.0	+60.0	51.0	58
59	54 13.3	+59.1	43.2	54 56.6	+59.4	44.2	55 39.3	+59.6	45.2	56 21.2	+59.7	46.3	57 02.3	+59.8	47.4	57 42.5	+59.9	48.5	58 21.7	+60.0	49.7	59 00.0	+60.0	51.0	59
60	55 12.4	+59.2	42.9	55 56.0	+59.4	43.9	56 38.9	+59.5	45.0	57 20.9	+59.7	46.1	58 02.1	+59.8	47.2	58 42.4	+59.9	48.4	59 21.7	+60.0	49.7	60 00.0	+60.0	51.0	60
61	56 11.6	+59.1	42.6	56 55.4	+59.3	43.7	57 38.4	+59.5	44.7	58 20.6	+59.7	45.9	59 01.9	+59.8	47.1	59 42.3	+59.9	48.3	60 21.7	+60.0	49.6	61 00.0	+60.0	51.0	61
62	57 10.7	+59.0	42.3	57 54.7	+59.3	43.4	58 37.9	+59.5	44.5	59 20.3	+59.6	45.7	60 01.7	+59.8	46.9	60 42.2	+59.9	48.2	61 21.7	+59.9	49.6	62 00.0	+60.0	51.0	62
63	58 09.7	+59.0	42.0	58 54.0	+59.2	43.1	59 37.4	+59.4	44.2	60 19.9	+59.6	45.5	61 01.5	+59.8	46.7	61 42.1	+59.9	48.1	62 21.6	+60.0	49.5	63 00.0	+60.0	51.0	63
64	59 08.7	+59.0	41.6	59 53.2	+59.2	42.8	60 36.8	+59.4	44.0	61 19.5	+59.6	45.2	62 01.3	+59.8	46.6	62 42.0	+59.9	48.0	63 21.6	+60.0	49.4	64 00.0	+60.0	51.0	64
65	60 07.7	+58.8	41.3	60 52.4	+59.1	42.4	61 36.2	+59.4	43.7	62 19.1	+59.6	45.0	63 01.1	+59.7	46.4	63 41.9	+59.9	47.8	64 21.6	+59.9	49.4	65 00.0	+60.0	51.0	65
66	61 06.5	+58.8	40.9	61 51.5	+59.1	42.1	62 35.6	+59.3	43.4	63 18.7	+59.6	44.7	64 00.8	+59.7	46.2	64 41.8	+59.9	47.7	65 21.5	+60.0	49.3	66 00.0	+60.0	51.0	66
67	62 05.3	+58.8	40.4	62 50.6	+59.0	41.7	63 34.9	+59.3	43.0	64 18.3	+59.5	44.5	65 00.5	+59.8	46.0	65 41.7	+59.8	47.5	66 21.5	+60.0	49.2	67 00.0	+60.0	51.0	67
68	63 04.1	+58.6	40.0	63 49.6	+58.9	41.3	64 34.2	+59.2	42.7	65 17.8	+59.4	44.2	66 00.3	+59.6	45.7	66 41.5	+59.9	47.4	67 21.5	+59.9	49.1	68 00.0	+60.0	51.0	68
69	64 02.7	+58.5	39.5	64 48.5	+58.9	40.9	65 33.4	+59.2	42.3	66 17.2	+59.5	43.8	66 59.9	+59.7	45.5	67 41.4	+59.8	47.2	68 21.4	+60.0	49.0	69 00.0	+60.0	51.0	69
70	65 01.2	+58.4	39.0	65 47.4	+58.7	40.4	66 32.6	+59.1	41.9	67 16.7	+59.4	43.5	67 59.6	+59.6	45.2	68 41.2	+59.8	47.0	69 21.4	+60.0	48.9	70 00.0	+60.0	51.0	70
71	65 59.6	+58.3	38.5	66 46.1	+58.7	39.9	67 31.7	+59.0	41.4	68 16.1	+59.3	43.1	68 59.2	+59.6	44.9	69 41.0	+59.8	46.8	70 21.4	+59.9	48.8	71 00.0	+60.0	51.0	71
72	66 57.9	+58.2	37.9	67 44.8	+58.5	39.4	68 30.7	+58.9	41.0	69 15.4	+59.2	42.7	69 58.8	+59.6	44.5	70 40.8	+59.8	46.5	71 21.3	+59.9	48.7	72 00.0	+60.0	51.0	72
73	67 56.1	+57.9	37.2	68 43.3	+58.5	38.8	69 29.6	+58.8	40.4	70 14.6	+59.2	42.2	70 58.4	+59.5	44.2	71 40.6	+59.8	46.3	72 21.2	+60.0	48.6	73 00.0	+60.0	51.0	73
74	68 54.0	+57.8	36.5	69 41.8	+58.2	38.1	70 28.4	+58.7	39.9	71 13.8	+59.1	41.7	71 57.9	+59.4	43.8	72 40.4	+59.7	46.0	73 21.2	+59.9	48.4	74 00.0	+60.0	51.0	74
75	69 51.8	+57.6	35.8	70 40.0	+58.1	37.4	71 27.1	+58.5	39.2	72 12.9	+59.0	41.2	72 57.3	+59.4	43.3	73 40.1	+59.7	45.7	74 21.1	+59.9	48.2	75 00.0	+60.0	51.0	75
76	70 49.4	+57.3	34.9	71 38.1	+57.8	36.6	72 25.6	+58.4	38.5	73 11.9	+58.9	40.6	73 56.7	+59.3	42.8	74 39.8	+59.7	45.3	75 21.0	+59.9	48.0	76 00.0	+60.0	51.0	76
77	71 46.7	+57.0	34.0	72 35.9	+57.6	35.8	73 24.0	+58.2	37.7	74 10.8	+58.7	39.9	74 56.0	+59.2	42.3	75 39.5	+59.6	44.9	76 20.9	+59.9	47.8	77 00.0	+60.0	51.0	77
78	72 43.7	+56.7	33.0	73 33.5	+57.4	34.8	74 22.2	+57.9	36.8	75 09.5	+58.6	39.1	75 55.2	+59.1	41.6	76 39.1	+59.6	44.4	77 20.8	+59.9	47.5	78 00.0	+60.0	51.0	78
79	73 40.4	+56.3	31.8	74 30.9	+56.9	33.7	75 20.1	+57.7	35.9	76 08.1	+58.3	38.2	76 54.3	+59.0	40.9	77 38.7	+59.4	43.9	78 20.7	+59.9	47.2	79 00.0	+60.0	51.0	79
80	74 36.7	+55.8	30.6	75 27.8	+56.6	32.5	76 17.8	+57.3	34.7	77 06.4	+58.0	37.2	77 53.3	+58.7	40.0	78 38.1	+59.4	43.2	79 20.6	+59.8	46.9	80 00.0	+60.0	51.0	80
81	75 32.5	+55.2	29.1	76 24.4	+56.0	31.1	77 15.1	+56.9	33.4	78 04.4	+57.7	36.0	78 52.0	+58.6	39.0	79 37.5	+59.3	42.5	80 20.4	+59.8	46.4	81 00.0	+60.0	51.0	81
82	76 27.7	+54.5	27.5	77 20.4	+55.4	29.6	78 12.0	+56.3	31.9	79 02.1	+57.3	34.7	79 50.6	+58.2	37.8	80 36.8	+59.0	41.5	81 20.2	+59.7	45.9	82 00.0	+60.0	51.0	82
83	77 22.2	+53.6	25.7	78 15.8	+54.6	27.7	79 08.3	+55.6	30.2	79 59.4	+56.7	33.0	80 48.8	+57.8	36.4	81 35.8	+58.8	40.4	82 19.9	+59.6	45.2	83 00.0	+60.0	51.0	83
84	78 15.8	+52.5	23.5	79 10.4	+53.5	25.6	80 03.9	+54.7	28.1	80 56.1	+55.9	31.0	81 46.6	+57.1	34.6	82 34.6	+58.5	39.0	83 19.5	+59.5	44.3	84 00.0	+60.0	51.0	84
85	79 08.3	+51.1	21.1	80 03.9	+52.2	23.1	80 58.6	+53.4	25.6	81 52.0	+54.8	28.6	82 43.7	+56.4	32.4	83 33.1	+57.9	37.1	84 19.0	+59.4	43.2	85 00.0	+60.0	51.0	85
86	79 59.4	*+49.4*•	18.2	80 56.1	*+50.5*•	20.1	81 52.0	*+51.7*•	22.5	82 46.8	+53.3	25.6	83 40.1	+55.0	29.4	84 31.0	+57.0	34.6	85 18.4	+58.9	41.5	86 00.0	+60.0	51.0	86
87	80 48.8	*+47.0*•	14.8	81 46.6	*+48.0*•	16.5	82 43.7	*+49.4*•	18.7	83 40.1	*+50.9*•	21.6	84 35.1	*+52.9*•	25.5	85 28.0	*+55.4*•	31.0	86 17.3	+58.2	38.9	87 00.0	+60.0	51.0	87
88	81 35.8	*+44.1*•	10.7	82 34.6	*+44.9*•	12.1	83 33.1	*+45.9*•	14.0	84 31.0	*+47.4*•	16.5	85 28.0	*+49.3*•	20.1	86 23.4	*+52.1*•	25.5	87 15.5	*+56.2*•	34.5	88 00.0	+60.0	51.0	88
89	82 19.9	*+40.1*•	5.8	83 19.5	*+40.5*•	6.7	84 19.0	*+41.0*•	7.9	85 18.4	*+41.6*•	9.5	86 17.3	*+42.7*•	12.1	87 15.5	*+44.5*•	16.5	88 11.7	*+48.3*•	25.5	89 00.0	+60.0	51.0	89
90	83 00.0	*+34.9*•	0.0	84 00.0	*+34.4*•	0.0	85 00.0	*+33.7*•	0.0	86 00.0	*+32.5*•	0.0	87 00.0	*+30.3*•	0.0	88 00.0	*+25.5*•	0.0	89 00.0	*+8.3*•	0.0	90 00.0	−60.0	25.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

52°, 308° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 18.2	+59.7	127.8	3 41.4	+59.8	127.8	3 04.6	+59.8	127.9	2 27.7	+59.9	127.9	1 50.8	+59.9	128.0	1 13.9	+59.9	128.0	0 36.9	+60.0	128.0	0 00.0	+60.0	128.0	0
1	5 17.9	+59.7	127.7	4 41.2	+59.8	127.8	4 04.4	+59.9	127.8	3 27.6	+59.9	127.9	2 50.7	+60.0	127.9	2 13.8	+60.0	128.0	1 36.9	+60.0	128.0	1 00.0	+60.0	128.0	1
2	6 17.6	+59.7	127.6	5 41.0	+59.8	127.7	5 04.3	+59.8	127.8	4 27.5	+59.9	127.8	3 50.7	+59.9	127.9	3 13.8	+60.0	127.9	2 36.9	+60.0	128.0	2 00.0	+60.0	128.0	2
3	7 17.3	+59.8	127.5	6 40.8	+59.8	127.6	6 04.1	+59.9	127.7	5 27.4	+59.9	127.8	4 50.6	+60.0	127.8	4 13.8	+60.0	127.9	3 36.9	+60.0	128.0	3 00.0	+60.0	128.0	3
4	8 17.1	+59.7	127.4	7 40.6	+59.8	127.5	7 04.0	+59.8	127.6	6 27.3	+59.9	127.7	5 50.6	+59.9	127.8	5 13.8	+60.0	127.9	4 36.9	+60.0	127.9	4 00.0	+60.0	128.0	4
5	9 16.8	+59.7	127.3	8 40.4	+59.7	127.4	8 03.8	+59.9	127.5	7 27.2	+59.9	127.7	6 50.5	+60.0	127.8	6 13.8	+59.9	127.8	5 36.9	+60.0	127.9	5 00.0	+60.0	128.0	5
6	10 16.5	+59.7	127.2	9 40.1	+59.8	127.3	9 03.7	+59.8	127.5	8 27.1	+59.9	127.6	7 50.5	+59.9	127.7	7 13.7	+60.0	127.8	6 36.9	+60.0	127.9	6 00.0	+60.0	128.0	6
7	11 16.2	+59.7	127.1	10 39.9	+59.8	127.3	10 03.5	+59.9	127.4	9 27.0	+59.9	127.5	8 50.4	+60.0	127.7	8 13.7	+60.0	127.8	7 36.9	+60.0	127.9	7 00.0	+60.0	128.0	7
8	12 15.9	+59.7	127.0	11 39.7	+59.8	127.2	11 03.4	+59.9	127.3	10 26.9	+60.0	127.5	9 50.4	+59.9	127.6	9 13.7	+60.0	127.8	8 36.9	+60.0	127.9	8 00.0	+60.0	128.0	8
9	13 15.6	+59.7	126.9	12 39.5	+59.8	127.1	12 03.3	+59.8	127.3	11 26.9	+59.9	127.4	10 50.3	+60.0	127.6	10 13.7	+59.9	127.7	9 36.9	+60.0	127.9	9 00.0	+60.0	128.0	9
10	14 15.3	+59.7	126.8	13 39.3	+59.8	127.0	13 03.1	+59.9	127.2	12 26.8	+59.9	127.4	11 50.3	+59.9	127.5	11 13.6	+60.0	127.7	10 36.9	+60.0	127.9	10 00.0	+60.0	128.0	10
11	15 15.0	+59.7	126.7	14 39.1	+59.8	126.9	14 03.0	+59.8	127.1	13 26.7	+59.9	127.3	12 50.2	+60.0	127.5	12 13.6	+60.0	127.7	11 36.9	+60.0	127.8	11 00.0	+60.0	128.0	11
12	16 14.7	+59.7	126.6	15 38.9	+59.7	126.8	15 02.8	+59.8	127.0	14 26.6	+59.9	127.3	13 50.2	+59.9	127.5	13 13.6	+60.0	127.6	12 36.9	+60.0	127.8	12 00.0	+60.0	128.0	12
13	17 14.4	+59.7	126.5	16 38.6	+59.8	126.7	16 02.6	+59.9	127.0	15 26.5	+59.9	127.2	14 50.1	+60.0	127.4	14 13.6	+59.9	127.6	13 36.9	+60.0	127.8	13 00.0	+60.0	128.0	13
14	18 14.1	+59.7	126.4	17 38.4	+59.8	126.6	17 02.5	+59.8	126.9	16 26.4	+59.9	127.1	15 50.1	+59.9	127.4	15 13.5	+60.0	127.6	14 36.9	+60.0	127.8	14 00.0	+60.0	128.0	14
15	19 13.8	+59.7	126.3	18 38.2	+59.8	126.6	18 02.3	+59.9	126.8	17 26.3	+59.9	127.1	16 50.0	+59.9	127.3	16 13.5	+60.0	127.6	15 36.9	+59.9	127.8	15 00.0	+60.0	128.0	15
16	20 13.5	+59.7	126.2	19 38.0	+59.7	126.5	19 02.2	+59.8	126.7	18 26.2	+59.9	127.0	17 49.9	+60.0	127.3	17 13.5	+60.0	127.5	16 36.8	+60.0	127.8	16 00.0	+60.0	128.0	16
17	21 13.2	+59.7	126.1	20 37.7	+59.8	126.4	20 02.0	+59.9	126.7	19 26.1	+59.9	127.0	18 49.9	+59.9	127.2	18 13.5	+59.9	127.5	17 36.8	+60.0	127.8	17 00.0	+60.0	128.0	17
18	22 12.9	+59.6	126.0	21 37.5	+59.8	126.3	21 01.9	+59.8	126.6	20 26.0	+59.9	126.9	19 49.8	+60.0	127.2	19 13.4	+60.0	127.5	18 36.8	+60.0	127.7	18 00.0	+60.0	128.0	18
19	23 12.5	+59.7	125.8	22 37.3	+59.7	126.2	22 01.7	+59.8	126.5	21 25.9	+59.9	126.8	20 49.8	+59.9	127.1	20 13.4	+60.0	127.4	19 36.8	+60.0	127.7	19 00.0	+60.0	128.0	19
20	24 12.2	+59.7	125.7	23 37.0	+59.8	126.1	23 01.5	+59.9	126.4	22 25.8	+59.9	126.8	21 49.7	+59.9	127.1	21 13.4	+60.0	127.4	20 36.8	+60.0	127.7	20 00.0	+60.0	128.0	20
21	25 11.9	+59.6	125.6	24 36.8	+59.7	126.0	24 01.4	+59.8	126.3	23 25.7	+59.8	126.7	22 49.6	+60.0	127.0	22 13.4	+59.9	127.4	21 36.8	+60.0	127.7	21 00.0	+60.0	128.0	21
22	26 11.5	+59.7	125.5	25 36.5	+59.8	125.9	25 01.2	+59.8	126.3	24 25.5	+59.9	126.6	23 49.6	+59.9	127.0	23 13.3	+60.0	127.3	22 36.8	+60.0	127.7	22 00.0	+60.0	128.0	22
23	27 11.2	+59.6	125.4	26 36.3	+59.7	125.8	26 01.0	+59.8	126.2	25 25.4	+59.9	126.6	24 49.5	+60.0	126.9	24 13.3	+60.0	127.3	23 36.8	+60.0	127.7	23 00.0	+60.0	128.0	23
24	28 10.8	+59.7	125.2	27 36.0	+59.7	125.7	27 00.8	+59.9	126.1	26 25.3	+59.9	126.5	25 49.5	+59.9	126.9	25 13.3	+60.0	127.3	24 36.8	+60.0	127.6	24 00.0	+60.0	128.0	24
25	29 10.5	+59.6	125.1	28 35.7	+59.8	125.6	28 00.7	+59.8	126.0	27 25.2	+59.9	126.4	26 49.4	+59.9	126.8	26 13.3	+59.9	127.2	25 36.8	+60.0	127.6	25 00.0	+60.0	128.0	25
26	30 10.1	+59.6	125.0	29 35.5	+59.7	125.5	29 00.5	+59.8	125.9	28 25.1	+59.9	126.4	27 49.3	+60.0	126.8	27 13.2	+60.0	127.2	26 36.8	+60.0	127.6	26 00.0	+60.0	128.0	26
27	31 09.7	+59.6	124.9	30 35.2	+59.7	125.4	30 00.3	+59.8	125.8	29 25.0	+59.9	126.3	28 49.3	+59.9	126.7	28 13.2	+60.0	127.2	27 36.8	+60.0	127.6	27 00.0	+60.0	128.0	27
28	32 09.3	+59.6	124.7	31 34.9	+59.7	125.2	31 00.1	+59.8	125.7	30 24.9	+59.8	126.2	29 49.2	+59.9	126.7	29 13.2	+59.9	127.1	28 36.8	+60.0	127.6	28 00.0	+60.0	128.0	28
29	33 08.9	+59.6	124.6	32 34.6	+59.8	125.1	31 59.9	+59.8	125.6	31 24.7	+59.9	126.1	30 49.1	+60.0	126.6	30 13.1	+60.0	127.1	29 36.8	+59.9	127.6	29 00.0	+60.0	128.0	29
30	34 08.5	+59.6	124.5	33 34.4	+59.7	125.0	32 59.7	+59.8	125.5	32 24.6	+59.9	126.1	31 49.1	+59.9	126.6	31 13.1	+60.0	127.1	30 36.7	+60.0	127.5	30 00.0	+60.0	128.0	30
31	35 08.1	+59.6	124.3	34 34.1	+59.7	124.9	33 59.5	+59.8	125.4	33 24.5	+59.8	126.0	32 49.0	+59.9	126.5	32 13.1	+59.9	127.0	31 36.7	+60.0	127.5	31 00.0	+60.0	128.0	31
32	36 07.7	+59.6	124.2	35 33.8	+59.6	124.8	34 59.3	+59.8	125.3	34 24.3	+59.9	125.9	33 48.9	+59.9	126.5	33 13.0	+60.0	127.0	32 36.7	+60.0	127.5	32 00.0	+60.0	128.0	32
33	37 07.3	+59.5	124.0	36 33.4	+59.7	124.6	35 59.1	+59.8	125.2	35 24.2	+59.9	125.8	34 48.8	+60.0	126.4	34 13.0	+60.0	126.9	33 36.7	+60.0	127.5	33 00.0	+60.0	128.0	33
34	38 06.8	+59.6	123.9	37 33.1	+59.7	124.5	36 58.9	+59.7	125.1	36 24.1	+59.8	125.7	35 48.8	+59.9	126.3	35 13.0	+59.9	126.9	34 36.7	+60.0	127.5	34 00.0	+60.0	128.0	34
35	39 06.4	+59.5	123.7	38 32.8	+59.7	124.4	37 58.6	+59.8	125.0	37 23.9	+59.9	125.7	36 48.7	+59.9	126.3	36 12.9	+60.0	126.9	35 36.7	+60.0	127.4	35 00.0	+60.0	128.0	35
36	40 05.9	+59.5	123.5	39 32.5	+59.6	124.2	38 58.4	+59.8	124.9	38 23.8	+59.8	125.6	37 48.6	+59.9	126.2	37 12.9	+60.0	126.8	36 36.7	+60.0	127.4	36 00.0	+60.0	128.0	36
37	41 05.4	+59.5	123.4	40 32.1	+59.6	124.1	39 58.2	+59.7	124.8	39 23.6	+59.9	125.5	38 48.5	+59.9	126.1	38 12.9	+59.9	126.8	37 36.7	+60.0	127.4	37 00.0	+60.0	128.0	37
38	42 04.9	+59.5	123.2	41 31.7	+59.7	124.0	40 57.9	+59.8	124.7	40 23.5	+59.8	125.4	39 48.4	+60.0	126.1	39 12.8	+60.0	126.7	38 36.7	+60.0	127.4	38 00.0	+60.0	128.0	38
39	43 04.4	+59.5	123.0	42 31.4	+59.6	123.8	41 57.7	+59.7	124.6	41 23.3	+59.9	125.3	40 48.4	+59.9	126.0	40 12.8	+60.0	126.7	39 36.7	+60.0	127.4	39 00.0	+60.0	128.0	39
40	44 03.9	+59.4	122.8	43 31.0	+59.6	123.7	42 57.4	+59.7	124.4	42 23.2	+59.8	125.2	41 48.3	+59.9	125.9	41 12.8	+59.9	126.6	40 36.7	+60.0	127.3	40 00.0	+60.0	128.0	40
41	45 03.3	+59.5	122.7	44 30.6	+59.6	123.5	43 57.1	+59.8	124.3	43 23.0	+59.8	125.1	42 48.2	+59.9	125.8	42 12.7	+60.0	126.6	41 36.7	+59.9	127.3	41 00.0	+60.0	128.0	41
42	46 02.8	+59.4	122.5	45 30.2	+59.6	123.3	44 56.9	+59.7	124.2	44 22.8	+59.8	125.0	43 48.1	+59.9	125.8	43 12.7	+59.9	126.5	42 36.6	+60.0	127.3	42 00.0	+60.0	128.0	42
43	47 02.2	+59.4	122.3	46 29.8	+59.5	123.2	45 56.6	+59.7	124.0	45 22.6	+59.8	124.9	44 48.0	+59.9	125.7	44 12.6	+60.0	126.5	43 36.6	+60.0	127.3	43 00.0	+60.0	128.0	43
44	48 01.6	+59.3	122.1	47 29.3	+59.6	123.0	46 56.3	+59.7	123.9	46 22.4	+59.8	124.8	45 47.9	+59.9	125.6	45 12.6	+59.9	126.4	44 36.6	+60.0	127.2	44 00.0	+60.0	128.0	44
45	49 00.9	+59.4	121.8	48 28.9	+59.5	122.8	47 56.0	+59.6	123.7	47 22.2	+59.8	124.6	46 47.8	+59.9	125.5	46 12.5	+60.0	126.4	45 36.6	+60.0	127.2	45 00.0	+60.0	128.0	45
46	50 00.3	+59.3	121.6	49 28.4	+59.5	122.6	48 55.6	+59.7	123.6	48 22.0	+59.8	124.5	47 47.7	+59.8	125.4	47 12.5	+59.9	126.3	46 36.6	+60.0	127.2	46 00.0	+60.0	128.0	46
47	50 59.6	+59.3	121.4	50 27.9	+59.5	122.4	49 55.3	+59.7	123.4	49 21.8	+59.8	124.4	48 47.5	+59.9	125.3	48 12.4	+60.0	126.3	47 36.6	+60.0	127.1	47 00.0	+60.0	128.0	47
48	51 58.9	+59.2	121.1	51 27.4	+59.5	122.2	50 55.0	+59.6	123.2	50 21.6	+59.8	124.3	49 47.4	+59.9	125.2	49 12.4	+59.9	126.2	48 36.6	+60.0	127.1	48 00.0	+60.0	128.0	48
49	52 58.1	+59.2	120.9	52 26.9	+59.4	122.0	51 54.6	+59.6	123.1	51 21.4	+59.8	124.1	50 47.3	+59.9	125.1	50 12.3	+60.0	126.1	49 36.6	+59.9	127.1	49 00.0	+60.0	128.0	49
50	53 57.3	+59.2	120.6	53 26.3	+59.4	121.8	52 54.2	+59.6	122.9	52 21.2	+59.7	124.0	51 47.2	+59.8	125.0	51 12.3	+59.9	126.1	50 36.5	+60.0	127.0	50 00.0	+60.0	128.0	50
51	54 56.5	+59.2	120.3	54 25.7	+59.4	121.5	53 53.8	+59.6	122.7	53 20.9	+59.7	123.8	52 47.0	+59.9	124.9	52 12.2	+60.0	126.0	51 36.5	+60.0	127.0	51 00.0	+60.0	128.0	51
52	55 55.7	+59.0	120.0	55 25.1	+59.3	121.3	54 53.4	+59.5	122.5	54 20.6	+59.8	123.7	53 46.9	+59.8	124.8	53 12.2	+59.9	125.9	52 36.5	+60.0	127.0	52 00.0	+60.0	128.0	52
53	56 54.7	+59.1	119.7	56 24.4	+59.3	121.0	55 52.9	+59.6	122.3	55 20.4	+59.7	123.5	54 46.7	+59.9	124.7	54 12.1	+59.9	125.8	53 36.5	+60.0	126.9	53 00.0	+60.0	128.0	53
54	57 53.8	+59.0	119.4	57 23.7	+59.3	120.7	56 52.5	+59.5	122.0	56 20.1	+59.7	123.3	55 46.6	+59.8	124.6	55 12.0	+60.0	125.7	54 36.5	+60.0	126.9	54 00.0	+60.0	128.0	54
55	58 52.8	+58.9	119.0	58 23.0	+59.2	120.4	57 52.0	+59.5	121.8	57 19.8	+59.7	123.1	56 46.4	+59.8	124.4	56 12.0	+59.9	125.7	55 36.5	+59.9	126.9	55 00.0	+60.0	128.0	55
56	59 51.7	+58.8	118.6	59 22.2	+59.2	120.1	58 51.5	+59.4	121.6	58 19.5	+59.6	122.9	57 46.2	+59.8	124.3	57 11.9	+59.9	125.6	56 36.4	+60.0	126.8	56 00.0	+60.0	128.0	56
57	60 50.5	+58.8	118.2	60 21.4	+59.2	119.8	59 50.9	+59.5	121.3	59 19.1	+59.7	122.7	58 46.0	+59.9	124.1	58 11.8	+59.9	125.5	57 36.4	+60.0	126.8	57 00.0	+60.0	128.0	57
58	61 49.3	+58.7	117.8	61 20.6	+59.0	119.5	60 50.4	+59.3	121.0	60 18.8	+59.6	122.5	59 45.9	+59.7	124.0	59 11.7	+59.9	125.4	58 36.4	+60.0	126.7	58 00.0	+60.0	128.0	58
59	62 48.0	+58.7	117.4	62 19.6	+59.1	119.1	61 49.7	+59.4	120.7	61 18.4	+59.6	122.3	60 45.6	+59.8	123.8	60 11.6	+59.9	125.3	59 36.4	+60.0	126.7	59 00.0	+60.0	128.0	59
60	63 46.7	+58.5	116.9	63 18.7	+58.9	118.7	62 49.1	+59.3	120.4	62 18.0	+59.5	122.0	61 45.4	+59.8	123.6	61 11.5	+59.9	125.1	60 36.4	+59.9	126.6	60 00.0	+60.0	128.0	60
61	64 45.2	+58.4	116.4	64 17.6	+58.9	118.3	63 48.4	+59.2	120.1	63 17.5	+59.6	121.8	62 45.2	+59.7	123.4	62 11.4	+59.9	125.0	61 36.3	+60.0	126.5	61 00.0	+60.0	128.0	61
62	65 43.6	+58.2	115.9	65 16.5	+58.8	117.8	64 47.6	+59.2	119.7	64 17.1	+59.5	121.5	63 44.9	+59.8	123.2	63 11.3	+59.9	124.9	62 36.3	+60.0	126.5	62 00.0	+60.0	128.0	62
63	66 41.8	+58.2	115.3	66 15.3	+58.6	117.3	65 46.8	+59.1	119.3	65 16.6	+59.4	121.2	64 44.7	+59.7	123.0	64 11.2	+59.9	124.8	63 36.3	+60.0	126.4	63 00.0	+60.0	128.0	63
64	67 40.0	+57.9	114.6	67 13.9	+58.6	116.8	66 45.9	+59.1	118.9	66 16.0	+59.4	120.9	65 44.4	+59.7	122.8	65 11.1	+59.8	124.6	64 36.3	+59.9	126.3	64 00.0	+60.0	128.0	64
65	68 37.9	+57.8	113.9	68 12.5	+58.4	116.2	67 45.0	+58.9	118.4	67 15.4	+59.4	120.5	66 44.1	+59.6	122.5	66 10.9	+59.9	124.4	65 36.2	+60.0	126.3	65 00.0	+60.0	128.0	65
66	69 35.7	+57.6	113.2	69 10.9	+58.3	115.6	68 43.9	+58.9	117.9	68 14.8	+59.3	120.1	67 43.7	+59.6	122.3	67 10.8	+59.8	124.3	66 36.2	+60.0	126.2	66 00.0	+60.0	128.0	66
67	70 33.3	+57.3	112.3	70 09.2	+58.1	114.9	69 42.8	+58.7	117.4	69 14.1	+59.2	119.7	68 43.3	+59.6	122.0	68 10.6	+59.9	124.1	67 36.2	+59.9	126.1	67 00.0	+60.0	128.0	67
68	71 30.6	+57.0	111.4	71 07.3	+58.0	114.2	70 41.5	+58.7	116.8	70 13.3	+59.2	119.3	69 42.9	+59.6	121.6	69 10.5	+59.8	123.9	68 36.1	+60.0	126.0	68 00.0	+60.0	128.0	68
69	72 27.6	+56.7	110.4	72 05.3	+57.7	113.3	71 40.2	+58.4	116.1	71 12.5	+59.1	118.8	70 42.5	+59.5	121.3	70 10.3	+59.8	123.6	69 36.1	+59.9	125.9	69 00.0	+60.0	128.0	69
70	73 24.3	+56.3	109.3	73 03.0	+57.4	112.4	72 38.6	+58.3	115.4	72 11.6	+58.9	118.2	71 42.0	+59.4	120.9	71 10.1	+59.7	123.4	70 36.0	+60.0	125.8	70 00.0	+60.0	128.0	70
71	74 20.6	+55.8	108.1	74 00.4	+57.0	111.4	73 36.9	+58.1	114.6	73 10.5	+58.9	117.6	72 41.4	+59.4	120.4	72 09.8	+59.8	123.1	71 36.0	+59.9	125.6	71 00.0	+60.0	128.0	71
72	75 16.4	+55.3	106.7	74 57.4	+56.7	110.2	74 35.0	+57.8	113.6	74 09.4	+58.7	116.9	73 40.8	+59.3	119.9	73 09.6	+59.7	122.8	72 35.9	+59.9	125.5	72 00.0	+60.0	128.0	72
73	76 11.7	+54.6	105.1	75 54.1	+56.2	108.9	75 32.8	+57.6	112.6	75 08.1	+58.5	116.1	74 40.1	+59.3	119.4	74 09.3	+59.7	122.5	73 35.8	+60.0	125.3	73 00.0	+60.0	128.0	73
74	77 06.3	+53.7	103.3	76 50.3	+55.7	107.5	76 30.4	+57.1	111.4	76 06.6	+58.3	115.2	75 39.4	+59.1	118.7	75 09.0	+59.6	122.1	74 35.8	+59.9	125.1	74 00.0	+60.0	128.0	74
75	78 00.0	+52.6	101.2	77 46.0	+54.8	105.7	77 27.5	+56.7	110.1	77 04.9	+58.0	114.2	76 38.5	+58.9	118.0	76 08.6	+59.6	121.6	75 35.7	+59.9	124.9	75 00.0	+60.0	128.0	75
76	78 52.6	+51.3	98.8	78 40.8	+54.0	103.8	78 24.2	+56.0	108.5	78 02.9	+57.6	113.0	77 37.4	+58.8	117.2	77 08.2	+59.5	121.1	76 35.6	+59.9	124.7	76 00.0	+60.0	128.0	76
77	79 43.9	+49.7	96.0	79 34.8	+52.8	101.4	79 20.2	+55.3	106.7	79 00.5	+57.3	111.6	78 36.2	+58.6	116.2	78 07.7	+59.4	120.5	77 35.5	+59.8	124.4	77 00.0	+60.0	128.0	77
78	80 33.6	+47.4•	92.7	80 27.6	+51.2	98.7	80 15.5	+54.3	104.5	79 57.8	+56.6	109.9	79 34.8	+58.2	115.1	79 07.1	+59.3	119.8	78 35.3	+59.9	124.1	78 00.0	+60.0	128.0	78
79	81 21.0	+44.7•	88.8	81 18.8	+49.2•	95.4	81 09.8	+52.9	101.8	80 54.4	+55.8	108.0	80 33.0	+57.9	113.7	80 06.4	+59.1	118.9	79 35.2	+59.8	123.7	79 00.0	+60.0	128.0	79
80	82 05.7	+40.9•	84.2	82 08.0	+46.4•	91.4	82 02.7	+51.1•	98.6	81 50.2	+54.7	105.5	81 30.9	+57.3	112.0	81 05.5	+59.0	117.9	80 35.0	+59.7	123.2	80 00.0	+60.0	128.0	80
81	82 46.6	+36.1•	78.6	82 54.4	+42.6•	86.5	82 53.8	+48.4•	94.6	82 44.9	+53.1	102.4	82 28.2	+56.5	109.8	82 04.5	+58.6	116.6	81 34.7	+59.7	122.7	81 00.0	+60.0	128.0	81
82	83 22.7	+29.8•	72.0	83 37.0	+37.4•	80.5	83 42.2	+44.7•	89.5	83 38.0	+50.8•	98.5	83 24.7	+55.3	107.1	83 03.1	+58.2	115.0	82 34.4	+59.6	121.9	82 00.0	+60.0	128.0	82
83	83 52.5	+21.9•	64.2	84 14.4	+30.4•	73.1	84 26.9	+39.1•	83.0	84 28.8	+47.2•	93.3	84 20.0	+53.4•	103.5	84 01.3	+57.4	112.8	83 34.0	+59.5	121.0	83 00.0	+60.0	128.0	83
84	84 14.4	+12.5•	55.2	84 44.8	+21.2•	64.1	85 06.0	+31.2•	74.7	85 16.0	+41.4•	86.4	85 13.4	+50.3•	98.4	84 58.7	+56.2	109.8	84 33.5	+59.2	119.7	84 00.0	+60.0	128.0	84
85	84 26.9	+1.9•	45.2	85 06.0	+10.0•	53.5	85 37.2	+20.2•	64.1	85 57.4	+32.3•	76.9	86 03.7	+44.5•	91.2	85 54.9	+54.0•	105.4	85 32.7	+58.8	117.8	85 00.0	+60.0	128.0	85
86	84 28.8	−8.8•	34.8	85 16.0	−2.6•	41.8	85 57.4	+6.3•	51.2	86 29.7	+18.5•	64.1	86 48.2	+34.0•	80.4	86 48.9	+49.0•	98.4	86 31.5	+57.8	114.9	86 00.0	+60.0	128.0	86
87	84 20.0	−18.7•	24.7	85 13.4	−14.7•	29.7	86 03.7	−8.8•	36.9	86 48.2	+0.7•	47.7	87 22.2	+15.7•	64.0	87 37.9	+36.9•	86.3	87 29.3	+55.1•	109.7	87 00.0	+60.0	128.0	87
88	84 01.3	−27.3•	15.3	84 58.7	−25.2•	18.3	85 54.9	−22.2•	22.7	86 48.9	−17.4•	29.7	87 37.9	−8.6•	41.7	88 14.8	+9.6•	64.0	88 24.4	+43.0•	98.4	88 00.0	+60.0	128.0	88
89	83 34.0	−34.0•	7.1	84 33.5	−33.5•	8.3	85 32.7	−32.7•	10.2	86 31.5	−31.5•	13.1	87 29.3	−29.3•	18.3	88 24.4	−24.4•	29.7	89 07.4	−7.4•	64.0	89 00.0	+60.0	128.0	89
90	83 00.0	−39.4•	0.0	84 00.0	−39.7•	0.0	85 00.0	−40.2•	0.0	86 00.0	−40.9•	0.0	87 00.0	−42.0•	0.0	88 00.0	−43.9•	0.0	89 00.0	−47.9•	0.0	90 00.0	−60.0	64.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 52°, 308°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 18.2	–59.7	127.8	3 41.4	–59.8	127.8	3 04.6	–59.9	127.9	2 27.7	–59.9	127.9	1 50.8	–60.0	128.0	1 13.9	–60.0	128.0	0 36.9	–60.0	128.0	0 00.0	+60.0	52.0	**0**
1	3 18.5	–59.8	127.9	2 41.6	–59.8	127.9	2 04.7	–59.9	128.0	1 27.8	–59.9	128.0	0 50.8	–59.9	128.0	0 13.9	–60.0	128.0	0 23.1	+60.0	52.0	1 00.0	+60.0	52.0	**1**
2	2 18.7	–59.7	128.0	1 41.8	–59.8	128.0	1 04.8	–59.8	128.0	0 27.9	–59.9	128.0	0 09.1	+60.0	52.0	0 46.1	+60.0	52.0	1 23.1	+59.9	52.0	2 00.0	+60.0	52.0	**2**
3	1 19.0	–59.7	128.1	0 42.0	–59.8	128.1	0 05.0	–59.9	128.1	0 32.0	+60.0	51.9	1 09.1	+59.9	51.9	1 46.1	+59.9	51.9	2 23.0	+60.0	52.0	3 00.0	+60.0	52.0	**3**
4	0 19.3	–59.7	128.2	0 17.8	+59.8	51.8	0 54.9	+59.8	51.8	1 32.0	+59.9	51.8	2 09.0	+60.0	51.9	2 46.0	+60.0	51.9	3 23.0	+60.0	51.9	4 00.0	+60.0	52.0	**4**
5	0 40.4	+59.8	51.7	1 17.6	+59.8	51.7	1 54.7	+59.9	51.8	2 31.9	+59.9	51.8	3 09.0	+59.9	51.8	3 46.0	+60.0	51.9	4 23.0	+60.0	51.9	5 00.0	+60.0	52.0	**5**
6	1 40.2	+59.7	51.6	2 17.4	+59.8	51.7	2 54.6	+59.9	51.7	3 31.8	+59.9	51.7	4 08.9	+60.0	51.8	4 46.0	+60.0	51.9	5 23.0	+60.0	51.9	6 00.0	+60.0	52.0	**6**
7	2 39.9	+59.7	51.5	3 17.2	+59.8	51.6	3 54.5	+59.8	51.6	4 31.7	+59.9	51.7	5 08.9	+59.9	51.7	5 46.0	+59.9	51.8	6 23.0	+60.0	51.9	7 00.0	+60.0	52.0	**7**
8	3 39.6	+59.7	51.4	4 17.0	+59.8	51.5	4 54.3	+59.9	51.6	5 31.6	+59.9	51.6	6 08.8	+60.0	51.7	6 45.9	+60.0	51.8	7 23.0	+60.0	51.9	8 00.0	+60.0	52.0	**8**
9	4 39.3	+59.7	51.3	5 16.8	+59.8	51.4	5 54.2	+59.8	51.5	6 31.5	+59.9	51.6	7 08.8	+59.9	51.7	7 45.9	+60.0	51.8	8 23.0	+60.0	51.9	9 00.0	+60.0	52.0	**9**
10	5 39.0	+59.8	51.2	6 16.6	+59.8	51.3	6 54.0	+59.9	51.4	7 31.4	+59.9	51.5	8 08.7	+59.9	51.6	8 45.9	+60.0	51.7	9 23.0	+60.0	51.9	10 00.0	+60.0	52.0	**10**
11	6 38.8	+59.7	51.1	7 16.4	+59.8	51.2	7 53.9	+59.8	51.3	8 31.3	+59.9	51.5	9 08.6	+60.0	51.6	9 45.9	+60.0	51.7	10 23.0	+60.0	51.9	11 00.0	+60.0	52.0	**11**
12	7 38.5	+59.7	51.1	8 16.2	+59.7	51.2	8 53.7	+59.9	51.3	9 31.2	+59.9	51.4	10 08.6	+59.9	51.5	10 45.9	+59.9	51.7	11 23.0	+60.0	51.8	12 00.0	+60.0	52.0	**12**
13	8 38.2	+59.7	51.0	9 15.9	+59.8	51.1	9 53.6	+59.8	51.2	10 31.1	+59.9	51.3	11 08.5	+60.0	51.5	11 45.8	+60.0	51.7	12 23.0	+60.0	51.8	13 00.0	+60.0	52.0	**13**
14	9 37.9	+59.7	50.9	10 15.7	+59.8	51.0	10 53.4	+59.9	51.1	11 31.0	+59.9	51.3	12 08.5	+59.9	51.5	12 45.8	+60.0	51.6	13 23.0	+60.0	51.8	14 00.0	+60.0	52.0	**14**
15	10 37.6	+59.7	50.8	11 15.5	+59.8	50.9	11 53.3	+59.8	51.1	12 30.9	+59.9	51.2	13 08.4	+60.0	51.4	13 45.8	+60.0	51.6	14 23.0	+60.0	51.8	15 00.0	+60.0	52.0	**15**
16	11 37.3	+59.7	50.7	12 15.3	+59.8	50.8	12 53.1	+59.9	51.0	13 30.8	+59.9	51.2	14 08.4	+59.9	51.4	14 45.8	+59.9	51.6	15 23.0	+60.0	51.8	16 00.0	+60.0	52.0	**16**
17	12 37.0	+59.8	50.6	13 15.1	+59.8	50.7	13 53.0	+59.8	50.9	14 30.7	+59.9	51.1	15 08.3	+60.0	51.3	15 45.7	+60.0	51.5	16 23.0	+60.0	51.8	17 00.0	+60.0	52.0	**17**
18	13 36.8	+59.7	50.5	14 14.9	+59.8	50.6	14 52.8	+59.9	50.8	15 30.6	+59.9	51.1	16 08.3	+59.9	51.3	16 45.7	+60.0	51.5	17 23.0	+59.9	51.7	18 00.0	+60.0	52.0	**18**
19	14 36.5	+59.7	50.4	15 14.7	+59.7	50.6	15 52.7	+59.8	50.8	16 30.5	+59.9	51.0	17 08.2	+60.0	51.2	17 45.7	+60.0	51.5	18 22.9	+60.0	51.7	19 00.0	+60.0	52.0	**19**
20	15 36.2	+59.7	50.2	16 14.4	+59.8	50.5	16 52.5	+59.9	50.7	17 30.4	+59.9	50.9	18 08.2	+59.9	51.2	18 45.7	+59.9	51.4	19 22.9	+60.0	51.7	20 00.0	+60.0	52.0	**20**
21	16 35.9	+59.7	50.1	17 14.2	+59.8	50.4	17 52.4	+59.8	50.6	18 30.3	+59.9	50.9	19 08.1	+59.9	51.1	19 45.6	+60.0	51.4	20 22.9	+60.0	51.7	21 00.0	+60.0	52.0	**21**
22	17 35.6	+59.7	50.0	18 14.0	+59.8	50.3	18 52.2	+59.9	50.5	19 30.2	+59.9	50.8	20 08.0	+60.0	51.1	20 45.6	+60.0	51.4	21 22.9	+60.0	51.7	22 00.0	+60.0	52.0	**22**
23	18 35.3	+59.6	49.9	19 13.8	+59.7	50.2	19 52.1	+59.8	50.5	20 30.1	+59.9	50.8	21 08.0	+59.9	51.0	21 45.6	+60.0	51.4	22 22.9	+60.0	51.7	23 00.0	+60.0	52.0	**23**
24	19 34.9	+59.7	49.8	20 13.5	+59.8	50.1	20 51.9	+59.8	50.4	21 30.0	+59.9	50.7	22 07.9	+60.0	51.0	22 45.6	+59.9	51.3	23 22.9	+60.0	51.7	24 00.0	+60.0	52.0	**24**
25	20 34.6	+59.7	49.7	21 13.3	+59.8	50.0	21 51.7	+59.9	50.3	22 29.9	+59.9	50.6	23 07.9	+59.9	51.0	23 45.5	+60.0	51.3	24 22.9	+60.0	51.6	25 00.0	+60.0	52.0	**25**
26	21 34.3	+59.7	49.6	22 13.1	+59.7	49.9	22 51.6	+59.8	50.2	23 29.8	+59.9	50.6	24 07.8	+59.9	50.9	24 45.5	+60.0	51.3	25 22.9	+60.0	51.6	26 00.0	+60.0	52.0	**26**
27	22 34.0	+59.7	49.5	23 12.8	+59.8	49.8	23 51.4	+59.8	50.1	24 29.7	+59.9	50.5	25 07.7	+60.0	50.9	25 45.5	+59.9	51.2	26 22.9	+60.0	51.6	27 00.0	+60.0	52.0	**27**
28	23 33.7	+59.6	49.4	24 12.6	+59.7	49.7	24 51.2	+59.9	50.1	25 29.6	+59.9	50.4	26 07.7	+59.9	50.8	26 45.4	+60.0	51.2	27 22.9	+60.0	51.6	28 00.0	+60.0	52.0	**28**
29	24 33.3	+59.7	49.3	25 12.3	+59.8	49.6	25 51.1	+59.8	50.0	26 29.5	+59.9	50.4	27 07.6	+60.0	50.8	27 45.4	+60.0	51.2	28 22.9	+60.0	51.6	29 00.0	+60.0	52.0	**29**
30	25 33.0	+59.6	49.1	26 12.1	+59.7	49.5	26 50.9	+59.8	49.9	27 29.4	+59.9	50.3	28 07.6	+59.9	50.7	28 45.4	+60.0	51.1	29 22.9	+60.0	51.6	30 00.0	+60.0	52.0	**30**
31	26 32.6	+59.7	49.0	27 11.8	+59.8	49.4	27 50.7	+59.8	49.8	28 29.3	+59.8	50.2	29 07.5	+59.9	50.6	29 45.4	+59.9	51.1	30 22.9	+60.0	51.5	31 00.0	+60.0	52.0	**31**
32	27 32.3	+59.6	48.9	28 11.6	+59.7	49.3	28 50.5	+59.8	49.7	29 29.1	+59.9	50.1	30 07.4	+60.0	50.6	30 45.3	+60.0	51.0	31 22.9	+60.0	51.5	32 00.0	+60.0	52.0	**32**
33	28 31.9	+59.7	48.8	29 11.3	+59.7	49.2	29 50.3	+59.9	49.6	30 29.0	+59.9	50.1	31 07.4	+59.9	50.5	31 45.3	+60.0	51.0	32 22.9	+59.9	51.5	33 00.0	+60.0	52.0	**33**
34	29 31.6	+59.6	48.7	30 11.0	+59.8	49.1	30 50.2	+59.8	49.5	31 28.9	+59.9	50.0	32 07.3	+59.9	50.5	32 45.3	+59.9	51.0	33 22.8	+60.0	51.5	34 00.0	+60.0	52.0	**34**
35	30 31.2	+59.6	48.5	31 10.8	+59.7	49.0	31 50.0	+59.8	49.4	32 28.8	+59.8	49.9	33 07.2	+59.9	50.4	33 45.2	+60.0	50.9	34 22.8	+60.0	51.5	35 00.0	+60.0	52.0	**35**
36	31 30.8	+59.6	48.4	32 10.5	+59.7	48.9	32 49.8	+59.8	49.3	33 28.6	+59.9	49.8	34 07.1	+60.0	50.4	34 45.2	+60.0	50.9	35 22.8	+60.0	51.4	36 00.0	+60.0	52.0	**36**
37	32 30.4	+59.6	48.3	33 10.2	+59.7	48.8	33 49.6	+59.7	49.2	34 28.5	+59.9	49.8	35 07.1	+59.9	50.3	35 45.2	+59.9	50.8	36 22.8	+60.0	51.4	37 00.0	+60.0	52.0	**37**
38	33 30.0	+59.6	48.1	34 09.9	+59.7	48.6	34 49.3	+59.8	49.1	35 28.4	+59.8	49.7	36 07.0	+59.9	50.2	36 45.1	+60.0	50.8	37 22.8	+60.0	51.4	38 00.0	+60.0	52.0	**38**
39	34 29.6	+59.6	48.0	35 09.6	+59.7	48.5	35 49.1	+59.8	49.0	36 28.2	+59.9	49.6	37 06.9	+59.9	50.2	37 45.1	+60.0	50.8	38 22.8	+60.0	51.4	39 00.0	+60.0	52.0	**39**
40	35 29.2	+59.6	47.8	36 09.3	+59.7	48.4	36 48.9	+59.8	48.9	37 28.1	+59.9	49.5	38 06.8	+59.9	50.1	38 45.1	+59.9	50.7	39 22.8	+60.0	51.3	40 00.0	+60.0	52.0	**40**
41	36 28.8	+59.6	47.7	37 09.0	+59.6	48.3	37 48.7	+59.8	48.8	38 28.0	+59.8	49.4	39 06.7	+60.0	50.0	39 45.0	+60.0	50.7	40 22.8	+60.0	51.3	41 00.0	+60.0	52.0	**41**
42	37 28.4	+59.5	47.6	38 08.6	+59.7	48.1	38 48.5	+59.7	48.7	39 27.8	+59.8	49.3	40 06.7	+59.9	50.0	40 45.0	+59.9	50.6	41 22.8	+60.0	51.3	42 00.0	+60.0	52.0	**42**
43	38 27.9	+59.6	47.4	39 08.3	+59.7	48.0	39 48.2	+59.8	48.6	40 27.6	+59.9	49.2	41 06.6	+59.9	49.9	41 44.9	+60.0	50.6	42 22.8	+60.0	51.3	43 00.0	+60.0	52.0	**43**
44	39 27.5	+59.5	47.2	40 08.0	+59.6	47.9	40 48.0	+59.7	48.5	41 27.5	+59.8	49.1	42 06.5	+59.9	49.8	42 44.9	+60.0	50.5	43 22.8	+59.9	51.3	44 00.0	+60.0	52.0	**44**
45	40 27.0	+59.5	47.1	41 07.6	+59.6	47.7	41 47.7	+59.8	48.4	42 27.3	+59.9	49.0	43 06.4	+59.9	49.7	43 44.9	+59.9	50.5	44 22.7	+60.0	51.2	45 00.0	+60.0	52.0	**45**
46	41 26.5	+59.5	46.9	42 07.2	+59.7	47.6	42 47.5	+59.7	48.2	43 27.2	+59.8	48.9	44 06.3	+59.9	49.7	44 44.8	+60.0	50.4	45 22.7	+60.0	51.2	46 00.0	+60.0	52.0	**46**
47	42 26.0	+59.5	46.7	43 06.9	+59.6	47.4	43 47.2	+59.7	48.1	44 27.0	+59.8	48.8	45 06.2	+59.9	49.6	45 44.8	+59.9	50.4	46 22.7	+60.0	51.2	47 00.0	+60.0	52.0	**47**
48	43 25.5	+59.4	46.6	44 06.5	+59.6	47.3	44 46.9	+59.7	48.0	45 26.8	+59.8	48.7	46 06.1	+59.9	49.5	46 44.7	+60.0	50.3	47 22.7	+60.0	51.1	48 00.0	+60.0	52.0	**48**
49	44 24.9	+59.5	46.4	45 06.1	+59.6	47.1	45 46.6	+59.7	47.8	46 26.6	+59.8	48.6	47 06.0	+59.9	49.4	47 44.7	+59.9	50.2	48 22.7	+60.0	51.1	49 00.0	+60.0	52.0	**49**
50	45 24.4	+59.4	46.2	46 05.7	+59.5	46.9	46 46.3	+59.7	47.7	47 26.4	+59.8	48.5	48 05.9	+59.8	49.3	48 44.6	+60.0	50.2	49 22.7	+60.0	51.1	50 00.0	+60.0	52.0	**50**
51	46 23.8	+59.4	46.0	47 05.2	+59.6	46.7	47 46.0	+59.7	47.5	48 26.2	+59.8	48.4	49 05.7	+59.9	49.2	49 44.6	+59.9	50.1	50 22.7	+60.0	51.0	51 00.0	+60.0	52.0	**51**
52	47 23.2	+59.4	45.8	48 04.8	+59.5	46.6	48 45.7	+59.7	47.4	49 26.0	+59.8	48.2	50 05.6	+59.9	49.1	50 44.5	+60.0	50.1	51 22.7	+59.9	51.0	52 00.0	+60.0	52.0	**52**
53	48 22.6	+59.4	45.6	49 04.3	+59.5	46.4	49 45.4	+59.6	47.2	50 25.8	+59.8	48.1	51 05.5	+59.9	49.0	51 44.5	+59.9	50.0	52 22.6	+60.0	51.0	53 00.0	+60.0	52.0	**53**
54	49 22.0	+59.3	45.3	50 03.8	+59.5	46.2	50 45.0	+59.7	47.1	51 25.6	+59.7	48.0	52 05.4	+59.8	48.9	52 44.4	+59.9	49.9	53 22.6	+60.0	50.9	54 00.0	+60.0	52.0	**54**
55	50 21.3	+59.3	45.1	51 03.3	+59.5	46.0	51 44.7	+59.6	46.9	52 25.3	+59.8	47.8	53 05.2	+59.9	48.8	53 44.3	+60.0	49.8	54 22.6	+60.0	50.9	55 00.0	+60.0	52.0	**55**
56	51 20.6	+59.3	44.9	52 02.8	+59.4	45.8	52 44.3	+59.6	46.7	53 25.1	+59.7	47.7	54 05.1	+59.8	48.7	54 44.3	+59.9	49.8	55 22.6	+60.0	50.9	56 00.0	+60.0	52.0	**56**
57	52 19.9	+59.2	44.6	53 02.2	+59.5	45.5	53 43.9	+59.6	46.5	54 24.8	+59.7	47.5	55 04.9	+59.9	48.6	55 44.2	+59.9	49.7	56 22.6	+60.0	50.8	57 00.0	+60.0	52.0	**57**
58	53 19.1	+59.2	44.3	54 01.7	+59.3	45.3	54 43.5	+59.5	46.3	55 24.5	+59.7	47.4	56 04.8	+59.8	48.4	56 44.1	+59.9	49.6	57 22.6	+59.9	50.8	58 00.0	+60.0	52.0	**58**
59	54 18.3	+59.2	44.1	55 01.0	+59.4	45.1	55 43.0	+59.6	46.1	56 24.2	+59.7	47.2	57 04.6	+59.8	48.3	57 44.0	+60.0	49.5	58 22.5	+60.0	50.7	59 00.0	+60.0	52.0	**59**
60	55 17.5	+59.1	43.8	56 00.4	+59.3	44.8	56 42.6	+59.5	45.9	57 23.9	+59.7	47.0	58 04.4	+59.8	48.2	58 44.0	+59.9	49.4	59 22.5	+60.0	50.7	60 00.0	+60.0	52.0	**60**
61	56 16.6	+59.1	43.5	56 59.7	+59.3	44.5	57 42.1	+59.5	45.6	58 23.6	+59.7	46.8	59 04.2	+59.8	48.0	59 43.9	+59.9	49.3	60 22.5	+60.0	50.6	61 00.0	+60.0	52.0	**61**
62	57 15.7	+59.0	43.2	57 59.0	+59.3	44.3	58 41.6	+59.4	45.4	59 23.3	+59.6	46.6	60 04.0	+59.8	47.9	60 43.8	+59.9	49.2	61 22.5	+59.9	50.6	62 00.0	+60.0	52.0	**62**
63	58 14.7	+58.9	42.8	58 58.3	+59.2	43.9	59 41.0	+59.5	45.1	60 22.9	+59.6	46.4	61 03.8	+59.8	47.7	61 43.7	+59.9	49.1	62 22.4	+60.0	50.5	63 00.0	+60.0	52.0	**63**
64	59 13.6	+58.9	42.5	59 57.5	+59.1	43.6	60 40.5	+59.4	44.9	61 22.5	+59.6	46.1	62 03.6	+59.7	47.5	62 43.6	+59.9	48.9	63 22.4	+60.0	50.4	64 00.0	+60.0	52.0	**64**
65	60 12.5	+58.9	42.1	60 56.6	+59.1	43.3	61 39.9	+59.3	44.6	62 22.1	+59.6	45.9	63 03.3	+59.8	47.3	63 43.5	+59.8	48.8	64 22.4	+59.9	50.4	65 00.0	+60.0	52.0	**65**
66	61 11.4	+58.7	41.7	61 55.7	+59.1	42.9	62 39.2	+59.3	44.2	63 21.7	+59.5	45.6	64 03.1	+59.7	47.1	64 43.3	+59.9	48.6	65 22.3	+60.0	50.3	66 00.0	+60.0	52.0	**66**
67	62 10.1	+58.7	41.3	62 54.8	+59.0	42.5	63 38.5	+59.3	43.9	64 21.2	+59.5	45.3	65 02.8	+59.7	46.9	65 43.2	+59.9	48.5	66 22.3	+60.0	50.2	67 00.0	+60.0	52.0	**67**
68	63 08.8	+58.6	40.8	63 53.8	+58.9	42.1	64 37.8	+59.2	43.5	65 20.7	+59.5	45.0	66 02.5	+59.7	46.6	66 43.1	+59.8	48.3	67 22.3	+59.9	50.1	68 00.0	+60.0	52.0	**68**
69	64 07.4	+58.5	40.3	64 52.7	+58.8	41.7	65 37.0	+59.1	43.2	66 20.2	+59.4	44.7	67 02.2	+59.6	46.4	67 42.9	+59.9	48.1	68 22.2	+60.0	50.0	69 00.0	+60.0	52.0	**69**
70	65 05.9	+58.3	39.8	65 51.5	+58.7	41.2	66 36.1	+59.0	42.7	67 19.6	+59.3	44.4	68 01.8	+59.7	46.1	68 42.8	+59.8	47.9	69 22.2	+59.9	49.9	70 00.0	+60.0	52.0	**70**
71	66 04.2	+58.2	39.2	66 50.2	+58.6	40.7	67 35.1	+59.0	42.3	68 18.9	+59.3	44.0	69 01.5	+59.5	45.8	69 42.6	+59.8	47.7	70 22.1	+60.0	49.8	71 00.0	+60.0	52.0	**71**
72	67 02.4	+58.1	38.6	67 48.8	+58.5	40.2	68 34.1	+58.9	41.8	69 18.2	+59.3	43.6	70 01.0	+59.6	45.4	70 42.4	+59.8	47.5	71 22.1	+59.9	49.7	72 00.0	+60.0	52.0	**72**
73	68 00.5	+57.9	38.0	68 47.3	+58.4	39.6	69 33.0	+58.8	41.3	70 17.5	+59.1	43.1	71 00.6	+59.5	45.1	71 42.2	+59.7	47.2	72 22.0	+60.0	49.5	73 00.0	+60.0	52.0	**73**
74	68 58.4	+57.7	37.3	69 45.7	+58.1	38.9	70 31.8	+58.6	40.7	71 16.6	+59.1	42.6	72 00.1	+59.4	44.7	72 41.9	+59.7	46.9	73 22.0	+59.9	49.4	74 00.0	+60.0	52.0	**74**
75	69 56.1	+57.5	36.5	70 43.8	+58.0	38.2	71 30.4	+58.5	40.0	72 15.7	+59.0	42.0	72 59.5	+59.4	44.2	73 41.6	+59.7	46.6	74 21.9	+59.9	49.2	75 00.0	+60.0	52.0	**75**
76	70 53.6	+57.2	35.6	71 41.8	+57.8	37.4	72 28.9	+58.3	39.3	73 14.7	+58.8	41.4	73 58.9	+59.3	43.7	74 41.3	+59.7	46.2	75 21.8	+59.9	49.0	76 00.0	+60.0	52.0	**76**
77	71 50.8	+57.0	34.7	72 39.6	+57.6	36.5	73 27.2	+58.2	38.5	74 13.5	+58.7	40.7	74 58.2	+59.1	43.1	75 41.0	+59.6	45.8	76 21.7	+59.9	48.7	77 00.0	+60.0	52.0	**77**
78	72 47.8	+56.5	33.6	73 37.2	+57.2	35.5	74 25.4	+57.8	37.6	75 12.2	+58.5	39.9	75 57.3	+59.1	42.5	76 40.6	+59.5	45.3	77 21.6	+59.9	48.5	78 00.0	+60.0	52.0	**78**
79	73 44.3	+56.1	32.5	74 34.4	+56.8	34.4	75 23.2	+57.6	36.6	76 10.7	+58.2	39.0	76 56.4	+58.9	41.7	77 40.1	+59.5	44.8	78 21.5	+59.8	48.2	79 00.0	+60.0	52.0	**79**
80	74 40.4	+55.7	31.2	75 31.2	+56.5	33.2	76 20.8	+57.2	35.4	77 08.9	+58.0	38.0	77 55.3	+58.7	40.8	78 39.6	+59.3	44.1	79 21.3	+59.8	47.8	80 00.0	+60.0	52.0	**80**
81	75 36.1	+55.0	29.7	76 27.7	+55.8	31.8	77 18.0	+56.8	34.1	78 06.9	+57.6	36.8	78 54.0	+58.5	39.8	79 38.9	+59.3	43.3	80 21.1	+59.8	47.4	81 00.0	+60.0	52.0	**81**
82	76 31.1	+54.3	28.1	77 23.5	+55.2	30.2	78 14.8	+56.1	32.6	79 04.5	+57.2	35.4	79 52.5	+58.1	38.6	80 38.2	+59.0	42.4	81 20.9	+59.7	46.8	82 00.0	+60.0	52.0	**82**
83	77 25.4	+53.3	26.2	78 18.7	+54.4	28.3	79 10.9	+55.5	30.8	80 01.7	+56.6	33.7	80 50.6	+57.8	37.1	81 37.2	+58.8	41.2	82 20.6	+59.7	46.1	83 00.0	+60.0	52.0	**83**
84	78 18.7	+52.2	24.0	79 13.1	+53.3	26.1	80 06.4	+54.5	28.6	80 58.3	+55.7	31.7	81 48.4	+57.0	35.3	82 36.0	+58.4	39.8	83 20.3	+59.5	45.2	84 00.0	+60.0	52.0	**84**
85	79 10.9	+50.8	21.5	80 06.4	+51.9	23.6	81 00.9	+53.1	26.1	81 54.0	+54.6	29.2	82 45.4	+56.2	33.0	83 34.4	+57.8	37.8	84 19.8	+59.3	44.0	85 00.0	+60.0	52.0	**85**
86	80 01.7	*+48.9* •	18.5	80 58.3	*+50.1* •	20.5	81 54.0	*+51.4* •	23.0	82 48.6	*+53.0* •	26.1	83 41.6	+54.9	30.0	84 32.2	+56.9	35.3	85 19.1	+58.9	42.3	86 00.0	+60.0	52.0	**86**
87	80 50.6	*+46.6* •	15.0	81 48.4	*+47.6* •	16.8	82 45.4	*+49.0* •	19.1	83 41.6	*+50.6* •	22.1	84 36.5	*+52.6* •	26.0	85 29.1	*+55.2* •	31.6	86 18.0	+58.1	39.7	87 00.0	+60.0	52.0	**87**
88	81 37.2	*+43.4* •	10.9	82 36.0	*+44.3* •	12.3	83 34.4	*+45.4* •	14.2	84 32.2	*+46.9* •	16.8	85 29.1	*+48.9* •	20.4	86 24.3	*+51.8* •	26.0	87 16.1	*+56.0* •	35.2	88 00.0	+60.0	52.0	**88**
89	82 20.6	*+39.4* •	5.9	83 20.3	*+39.7* •	6.8	84 19.8	*+40.2* •	8.0	85 19.1	*+40.9* •	9.7	86 18.0	*+42.0* •	12.3	87 16.1	*+43.9* •	16.8	88 12.1	*+47.9* •	26.0	89 00.0	+60.0	52.0	**89**
90	83 00.0	*+34.0* •	0.0	84 00.0	*+33.5* •	0.0	85 00.0	*+32.7* •	0.0	86 00.0	*+31.5* •	0.0	87 00.0	*+29.3* •	0.0	88 00.0	*+24.4* •	0.0	89 00.0	*+7.4* •	0.0	90 00.0	–60.0	26.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 128°, 232°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 12.4	+59.7	126.8	3 36.4	+59.8	126.8	3 00.4	+59.9	126.9	2 24.4	+59.9	126.9	1 48.3	+59.9	127.0	1 12.2	+60.0	127.0	0 36.1	+60.0	127.0	0 00.0	+60.0	127.0	0
1	5 12.1	+59.7	126.7	4 36.2	+59.8	126.8	4 00.3	+59.8	126.8	3 24.3	+59.9	126.9	2 48.2	+60.0	126.9	2 12.2	+60.0	127.0	1 36.1	+60.0	127.0	1 00.0	+60.0	127.0	1
2	6 11.8	+59.7	126.6	5 36.0	+59.8	126.7	5 00.1	+59.9	126.8	4 24.2	+59.9	126.8	3 48.2	+59.9	126.9	3 12.2	+59.9	126.9	2 36.1	+60.0	127.0	2 00.0	+60.0	127.0	2
3	7 11.5	+59.7	126.5	6 35.8	+59.8	126.6	6 00.0	+59.8	126.7	5 24.1	+59.9	126.8	4 48.1	+60.0	126.8	4 12.1	+60.0	126.9	3 36.1	+60.0	127.0	3 00.0	+60.0	127.0	3
4	8 11.2	+59.7	126.4	7 35.6	+59.7	126.5	6 59.8	+59.9	126.6	6 24.0	+59.9	126.7	5 48.1	+59.9	126.8	5 12.1	+60.0	126.9	4 36.1	+60.0	126.9	4 00.0	+60.0	127.0	4
5	9 10.9	+59.7	126.3	8 35.3	+59.8	126.4	7 59.7	+59.8	126.5	7 23.9	+59.9	126.7	6 48.0	+60.0	126.8	6 12.1	+60.0	126.8	5 36.1	+60.0	126.9	5 00.0	+60.0	127.0	5
6	10 10.6	+59.7	126.2	9 35.1	+59.8	126.3	8 59.5	+59.9	126.5	8 23.8	+59.9	126.6	7 48.0	+59.9	126.7	7 12.1	+59.9	126.8	6 36.1	+60.0	126.9	6 00.0	+60.0	127.0	6
7	11 10.3	+59.7	126.1	10 34.9	+59.8	126.3	9 59.4	+59.8	126.4	9 23.7	+59.9	126.5	8 47.9	+60.0	126.7	8 12.0	+60.0	126.8	7 36.1	+60.0	126.9	7 00.0	+60.0	127.0	7
8	12 10.0	+59.7	126.0	11 34.7	+59.8	126.2	10 59.2	+59.9	126.3	10 23.6	+59.9	126.5	9 47.9	+59.9	126.6	9 12.0	+60.0	126.8	8 36.1	+60.0	126.9	8 00.0	+60.0	127.0	8
9	13 09.7	+59.7	125.9	12 34.5	+59.8	126.1	11 59.1	+59.8	126.3	11 23.5	+59.9	126.4	10 47.8	+60.0	126.6	10 12.0	+60.0	126.7	9 36.1	+59.9	126.9	9 00.0	+60.0	127.0	9
10	14 09.4	+59.7	125.8	13 34.3	+59.7	126.0	12 58.9	+59.9	126.2	12 23.4	+59.9	126.4	11 47.8	+59.9	126.5	11 12.0	+59.9	126.7	10 36.0	+60.0	126.9	10 00.0	+60.0	127.0	10
11	15 09.1	+59.7	125.7	14 34.0	+59.8	125.9	13 58.8	+59.8	126.1	13 23.3	+59.9	126.3	12 47.7	+60.0	126.5	12 11.9	+60.0	126.7	11 36.0	+60.0	126.8	11 00.0	+60.0	127.0	11
12	16 08.8	+59.7	125.6	15 33.8	+59.8	125.8	14 58.6	+59.8	126.0	14 23.2	+59.9	126.2	13 47.7	+59.9	126.4	13 11.9	+60.0	126.6	12 36.0	+60.0	126.8	12 00.0	+60.0	127.0	12
13	17 08.5	+59.7	125.5	16 33.6	+59.7	125.7	15 58.4	+59.9	126.0	15 23.1	+59.9	126.2	14 47.6	+59.9	126.4	14 11.9	+60.0	126.6	13 36.0	+60.0	126.8	13 00.0	+60.0	127.0	13
14	18 08.2	+59.7	125.4	17 33.3	+59.8	125.6	16 58.3	+59.8	125.9	16 23.0	+59.9	126.1	15 47.5	+60.0	126.4	15 11.9	+59.9	126.6	14 36.0	+60.0	126.8	14 00.0	+60.0	127.0	14
15	19 07.9	+59.7	125.3	18 33.1	+59.8	125.5	17 58.1	+59.9	125.8	17 22.9	+59.9	126.1	16 47.5	+59.9	126.3	16 11.8	+60.0	126.6	15 36.0	+60.0	126.8	15 00.0	+60.0	127.0	15
16	20 07.6	+59.6	125.2	19 32.9	+59.7	125.4	18 58.0	+59.8	125.7	18 22.8	+59.9	126.0	17 47.4	+60.0	126.3	17 11.8	+60.0	126.5	16 36.0	+60.0	126.8	16 00.0	+60.0	127.0	16
17	21 07.2	+59.7	125.0	20 32.6	+59.8	125.4	19 57.8	+59.8	125.7	19 22.7	+59.9	125.9	18 47.4	+59.9	126.2	18 11.8	+60.0	126.5	17 36.0	+60.0	126.8	17 00.0	+60.0	127.0	17
18	22 06.9	+59.7	124.9	21 32.4	+59.8	125.3	20 57.6	+59.9	125.6	20 22.6	+59.9	125.9	19 47.3	+59.9	126.2	19 11.8	+59.9	126.5	18 36.0	+60.0	126.7	18 00.0	+60.0	127.0	18
19	23 06.6	+59.6	124.8	22 32.2	+59.7	125.2	21 57.5	+59.8	125.5	21 22.5	+59.9	125.8	20 47.2	+60.0	126.1	20 11.7	+60.0	126.4	19 36.0	+60.0	126.7	19 00.0	+60.0	127.0	19
20	24 06.2	+59.7	124.7	23 31.9	+59.8	125.1	22 57.3	+59.8	125.4	22 22.4	+59.9	125.8	21 47.2	+59.9	126.1	21 11.7	+60.0	126.4	20 36.0	+60.0	126.7	20 00.0	+60.0	127.0	20
21	25 05.9	+59.6	124.6	24 31.7	+59.7	125.0	23 57.1	+59.8	125.3	23 22.3	+59.9	125.7	22 47.1	+60.0	126.0	22 11.7	+60.0	126.4	21 36.0	+60.0	126.7	21 00.0	+60.0	127.0	21
22	26 05.5	+59.7	124.5	25 31.4	+59.7	124.9	24 56.9	+59.9	125.2	24 22.2	+59.8	125.6	23 47.1	+59.9	126.0	23 11.7	+59.9	126.3	22 36.0	+60.0	126.7	22 00.0	+60.0	127.0	22
23	27 05.2	+59.6	124.3	26 31.1	+59.8	124.8	25 56.8	+59.8	125.2	25 22.0	+59.9	125.6	24 47.0	+59.9	125.9	24 11.6	+60.0	126.3	23 36.0	+60.0	126.7	23 00.0	+60.0	127.0	23
24	28 04.8	+59.6	124.2	27 30.9	+59.7	124.7	26 56.6	+59.8	125.1	26 21.9	+59.9	125.5	25 46.9	+60.0	125.9	25 11.6	+60.0	126.3	24 36.0	+60.0	126.6	24 00.0	+60.0	127.0	24
25	29 04.4	+59.7	124.1	28 30.6	+59.7	124.5	27 56.4	+59.8	125.0	27 21.8	+59.9	125.4	26 46.9	+59.9	125.8	26 11.6	+60.0	126.2	25 36.0	+59.9	126.6	25 00.0	+60.0	127.0	25
26	30 04.1	+59.6	124.0	29 30.3	+59.8	124.4	28 56.2	+59.8	124.9	28 21.7	+59.9	125.3	27 46.8	+59.9	125.8	27 11.6	+59.9	126.2	26 35.9	+60.0	126.6	26 00.0	+60.0	127.0	26
27	31 03.7	+59.6	123.8	30 30.1	+59.7	124.3	29 56.0	+59.8	124.8	29 21.6	+59.9	125.3	28 46.7	+60.0	125.7	28 11.5	+60.0	126.2	27 35.9	+60.0	126.6	27 00.0	+60.0	127.0	27
28	32 03.3	+59.6	123.7	31 29.8	+59.7	124.2	30 55.8	+59.8	124.7	30 21.5	+59.8	125.2	29 46.7	+59.9	125.7	29 11.5	+60.0	126.1	28 35.9	+60.0	126.6	28 00.0	+60.0	127.0	28
29	33 02.9	+59.6	123.6	32 29.5	+59.7	124.1	31 55.6	+59.8	124.6	31 21.3	+59.9	125.1	30 46.6	+59.9	125.6	30 11.5	+59.9	126.1	29 35.9	+60.0	126.6	29 00.0	+60.0	127.0	29
30	34 02.5	+59.6	123.4	33 29.2	+59.7	124.0	32 55.4	+59.8	124.5	32 21.2	+59.9	125.0	31 46.5	+60.0	125.6	31 11.4	+60.0	126.0	30 35.9	+60.0	126.5	30 00.0	+60.0	127.0	30
31	35 02.1	+59.5	123.3	34 28.9	+59.7	123.9	33 55.2	+59.8	124.4	33 21.1	+59.8	125.0	32 46.5	+59.9	125.5	32 11.4	+60.0	126.0	31 35.9	+60.0	126.5	31 00.0	+60.0	127.0	31
32	36 01.6	+59.6	123.1	35 28.6	+59.7	123.7	34 55.0	+59.8	124.3	34 20.9	+59.9	124.9	33 46.4	+59.9	125.4	33 11.4	+59.9	126.0	32 35.9	+60.0	126.5	32 00.0	+60.0	127.0	32
33	37 01.2	+59.5	123.0	36 28.3	+59.6	123.6	35 54.8	+59.8	124.2	35 20.8	+59.8	124.8	34 46.3	+59.9	125.4	34 11.3	+60.0	125.9	33 35.9	+60.0	126.5	33 00.0	+60.0	127.0	33
34	38 00.7	+59.6	122.8	37 27.9	+59.7	123.5	36 54.6	+59.7	124.1	36 20.6	+59.9	124.7	35 46.2	+59.9	125.3	35 11.3	+60.0	125.9	34 35.9	+60.0	126.5	34 00.0	+60.0	127.0	34
35	39 00.3	+59.5	122.7	38 27.6	+59.6	123.3	37 54.3	+59.8	124.0	37 20.5	+59.9	124.6	36 46.1	+60.0	125.2	36 11.3	+59.9	125.8	35 35.9	+60.0	126.4	35 00.0	+60.0	127.0	35
36	39 59.8	+59.5	122.5	39 27.2	+59.7	123.2	38 54.1	+59.7	123.9	38 20.4	+59.8	124.5	37 46.1	+59.9	125.2	37 11.2	+60.0	125.8	36 35.9	+60.0	126.4	36 00.0	+60.0	127.0	36
37	40 59.3	+59.5	122.3	40 26.9	+59.6	123.1	39 53.8	+59.8	123.8	39 20.2	+59.8	124.4	38 46.0	+59.9	125.1	38 11.2	+59.9	125.8	37 35.9	+59.9	126.4	37 00.0	+60.0	127.0	37
38	41 58.8	+59.5	122.2	41 26.5	+59.6	122.9	40 53.6	+59.7	123.6	40 20.0	+59.9	124.4	39 45.9	+59.9	125.0	39 11.1	+60.0	125.7	38 35.8	+60.0	126.4	38 00.0	+60.0	127.0	38
39	42 58.3	+59.4	122.0	42 26.1	+59.6	122.8	41 53.3	+59.8	123.5	41 19.9	+59.8	124.3	40 45.8	+59.9	125.0	40 11.1	+60.0	125.7	39 35.8	+60.0	126.3	39 00.0	+60.0	127.0	39
40	43 57.7	+59.5	121.8	43 25.7	+59.6	122.6	42 53.1	+59.7	123.4	42 19.7	+59.8	124.2	41 45.7	+59.9	124.9	41 11.1	+59.9	125.6	40 35.8	+60.0	126.3	40 00.0	+60.0	127.0	40
41	44 57.2	+59.4	121.6	44 25.3	+59.6	122.4	43 52.8	+59.7	123.3	43 19.5	+59.9	124.1	42 45.6	+59.9	124.8	42 11.0	+60.0	125.6	41 35.8	+60.0	126.3	41 00.0	+60.0	127.0	41
42	45 56.6	+59.4	121.4	45 24.9	+59.6	122.3	44 52.5	+59.7	123.1	44 19.4	+59.8	123.9	43 45.5	+59.9	124.7	43 11.0	+59.9	125.5	42 35.8	+60.0	126.3	42 00.0	+60.0	127.0	42
43	46 56.0	+59.3	121.2	46 24.5	+59.5	122.1	45 52.2	+59.7	123.0	45 19.2	+59.8	123.8	44 45.4	+59.9	124.7	44 10.9	+60.0	125.5	43 35.8	+60.0	126.2	43 00.0	+60.0	127.0	43
44	47 55.3	+59.4	121.0	47 24.0	+59.6	121.9	46 51.9	+59.7	122.8	46 19.0	+59.8	123.7	45 45.3	+59.9	124.6	45 10.9	+59.9	125.4	44 35.8	+60.0	126.2	44 00.0	+60.0	127.0	44
45	48 54.7	+59.3	120.8	48 23.6	+59.5	121.7	47 51.6	+59.7	122.7	47 18.8	+59.8	123.6	46 45.2	+59.9	124.5	46 10.8	+60.0	125.4	45 35.8	+60.0	126.2	45 00.0	+60.0	127.0	45
46	49 54.0	+59.3	120.5	49 23.1	+59.5	121.5	48 51.3	+59.6	122.5	48 18.6	+59.8	123.5	47 45.1	+59.9	124.4	47 10.8	+59.9	125.3	46 35.8	+59.9	126.2	46 00.0	+60.0	127.0	46
47	50 53.3	+59.3	120.3	50 22.6	+59.5	121.3	49 50.9	+59.7	122.4	49 18.4	+59.7	123.3	48 45.0	+59.8	124.3	48 10.7	+60.0	125.2	47 35.7	+60.0	126.1	47 00.0	+60.0	127.0	47
48	51 52.6	+59.2	120.0	51 22.1	+59.4	121.1	50 50.6	+59.6	122.2	50 18.1	+59.8	123.2	49 44.8	+59.9	124.2	49 10.7	+59.9	125.2	48 35.7	+60.0	126.1	48 00.0	+60.0	127.0	48
49	52 51.8	+59.2	119.8	52 21.5	+59.4	120.9	51 50.2	+59.6	122.0	51 17.9	+59.8	123.1	50 44.7	+59.9	124.1	50 10.6	+60.0	125.1	49 35.7	+60.0	126.1	49 00.0	+60.0	127.0	49
50	53 51.0	+59.2	119.5	53 20.9	+59.4	120.7	52 49.8	+59.6	121.8	52 17.7	+59.7	122.9	51 44.6	+59.8	124.0	51 10.6	+59.9	125.0	50 35.7	+60.0	126.0	50 00.0	+60.0	127.0	50
51	54 50.2	+59.1	119.2	54 20.3	+59.4	120.4	53 49.4	+59.6	121.6	53 17.4	+59.7	122.8	52 44.4	+59.9	123.9	52 10.5	+60.0	125.0	51 35.7	+60.0	126.0	51 00.0	+60.0	127.0	51
52	55 49.3	+59.1	118.9	55 19.7	+59.3	120.2	54 49.0	+59.5	121.4	54 17.1	+59.8	122.6	53 44.3	+59.8	123.8	53 10.5	+59.9	124.9	52 35.7	+60.0	126.0	52 00.0	+60.0	127.0	52
53	56 48.4	+59.0	118.6	56 19.0	+59.3	119.9	55 48.5	+59.5	121.2	55 16.9	+59.7	122.4	54 44.1	+59.9	123.6	54 10.4	+59.9	124.8	53 35.7	+59.9	125.9	53 00.0	+60.0	127.0	53
54	57 47.4	+58.9	118.3	57 18.3	+59.3	119.7	56 48.0	+59.5	121.0	56 16.6	+59.6	122.3	55 44.0	+59.8	123.5	55 10.3	+59.9	124.7	54 35.6	+60.0	125.9	54 00.0	+60.0	127.0	54
55	58 46.3	+58.9	117.9	58 17.6	+59.2	119.4	57 47.5	+59.5	120.7	57 16.2	+59.7	122.1	56 43.8	+59.8	123.4	56 10.2	+60.0	124.6	55 35.6	+60.0	125.8	55 00.0	+60.0	127.0	55
56	59 45.2	+58.9	117.6	59 16.8	+59.2	119.0	58 47.0	+59.4	120.5	58 15.9	+59.7	121.9	57 43.6	+59.8	123.2	57 10.2	+59.9	124.5	56 35.6	+60.0	125.8	56 00.0	+60.0	127.0	56
57	60 44.1	+58.7	117.2	60 16.0	+59.1	118.7	59 46.4	+59.4	120.2	59 15.6	+59.6	121.7	58 43.4	+59.8	123.1	58 10.1	+59.9	124.4	57 35.6	+60.0	125.7	57 00.0	+60.0	127.0	57
58	61 42.8	+58.7	116.7	61 15.1	+59.0	118.4	60 45.8	+59.4	119.9	60 15.2	+59.6	121.5	59 43.2	+59.8	122.9	59 10.0	+59.9	124.3	58 35.6	+59.9	125.7	58 00.0	+60.0	127.0	58
59	62 41.5	+58.6	116.3	62 14.1	+59.0	118.0	61 45.2	+59.3	119.6	61 14.8	+59.6	121.2	60 43.0	+59.8	122.8	60 09.9	+59.9	124.2	59 35.5	+60.0	125.6	59 00.0	+60.0	127.0	59
60	63 40.1	+58.5	115.8	63 13.1	+59.0	117.6	62 44.5	+59.3	119.3	62 14.4	+59.6	121.0	61 42.8	+59.8	122.6	61 09.8	+59.9	124.1	60 35.5	+60.0	125.6	60 00.0	+60.0	127.0	60
61	64 38.6	+58.4	115.3	64 12.1	+58.8	117.2	63 43.8	+59.2	119.0	63 14.0	+59.5	120.7	62 42.6	+59.7	122.4	62 09.7	+59.9	124.0	61 35.5	+60.0	125.5	61 00.0	+60.0	127.0	61
62	65 37.0	+58.2	114.7	65 10.9	+58.8	116.7	64 43.0	+59.2	118.6	64 13.5	+59.5	120.4	63 42.3	+59.7	122.2	63 09.6	+59.9	123.9	62 35.5	+59.9	125.5	62 00.0	+60.0	127.0	62
63	66 35.2	+58.1	114.2	66 09.7	+58.6	116.2	65 42.2	+59.1	118.2	65 13.0	+59.4	120.1	64 42.0	+59.7	122.0	64 09.5	+59.8	123.7	63 35.4	+60.0	125.4	63 00.0	+60.0	127.0	63
64	67 33.3	+57.9	113.5	67 08.3	+58.6	115.7	66 41.3	+59.0	117.8	66 12.4	+59.4	119.8	65 41.7	+59.7	121.7	65 09.3	+59.9	123.6	64 35.4	+60.0	125.3	64 00.0	+60.0	127.0	64
65	68 31.2	+57.8	112.8	68 06.9	+58.4	115.1	67 40.3	+59.0	117.3	67 11.8	+59.4	119.4	66 41.4	+59.6	121.5	66 09.2	+59.9	123.4	65 35.4	+59.9	125.2	65 00.0	+60.0	127.0	65
66	69 29.0	+57.5	112.1	69 05.3	+58.2	114.5	68 39.3	+58.8	116.8	68 11.2	+59.3	119.1	67 41.0	+59.7	121.2	67 09.1	+59.8	123.2	66 35.3	+60.0	125.2	66 00.0	+60.0	127.0	66
67	70 26.5	+57.3	111.2	70 03.5	+58.1	113.8	69 38.1	+58.7	116.3	69 10.5	+59.2	118.6	68 40.7	+59.5	120.9	68 08.9	+59.8	123.0	67 35.3	+60.0	125.1	67 00.0	+60.0	127.0	67
68	71 23.8	+57.0	110.3	71 01.6	+57.9	113.0	70 36.8	+58.6	115.7	70 09.7	+59.1	118.2	69 40.2	+59.6	120.6	69 08.7	+59.8	122.8	68 35.3	+59.9	125.0	68 00.0	+60.0	127.0	68
69	72 20.8	+56.6	109.3	71 59.5	+57.6	112.2	71 35.4	+58.5	115.0	71 08.8	+59.1	117.7	70 39.8	+59.5	120.2	70 08.5	+59.8	122.6	69 35.2	+60.0	124.9	69 00.0	+60.0	127.0	69
70	73 17.4	+56.3	108.2	72 57.1	+57.4	111.3	72 33.9	+58.2	114.3	72 07.9	+58.9	117.1	71 39.3	+59.4	119.8	71 08.3	+59.8	122.3	70 35.2	+59.9	124.7	70 00.0	+60.0	127.0	70
71	74 13.7	+55.7	106.9	73 54.5	+57.0	110.3	73 32.1	+58.1	113.4	73 06.8	+58.8	116.5	72 38.7	+59.4	119.3	72 08.1	+59.7	122.1	71 35.1	+59.9	124.6	71 00.0	+60.0	127.0	71
72	75 09.4	+55.2	105.6	74 51.5	+56.7	109.1	74 30.2	+57.8	112.5	74 05.6	+58.7	115.8	73 38.1	+59.3	118.8	73 07.8	+59.7	121.7	72 35.0	+60.0	124.5	72 00.0	+60.0	127.0	72
73	76 04.6	+54.5	104.0	75 48.2	+56.1	107.8	75 28.0	+57.5	111.5	75 04.3	+58.5	115.0	74 37.4	+59.2	118.3	74 07.5	+59.7	121.4	73 35.0	+59.9	124.3	73 00.0	+60.0	127.0	73
74	76 59.1	+53.7	102.2	76 44.3	+55.6	106.3	76 25.5	+57.1	110.3	76 02.8	+58.2	114.1	75 36.6	+59.1	117.7	75 07.2	+59.6	121.0	74 34.9	+59.9	124.1	74 00.0	+60.0	127.0	74
75	77 52.8	+52.6	100.1	77 39.9	+54.8	104.6	77 22.6	+56.6	109.0	77 01.0	+58.0	113.1	76 35.7	+58.9	116.9	76 06.8	+59.6	120.5	75 34.8	+59.9	123.9	75 00.0	+60.0	127.0	75
76	78 45.4	+51.3	97.7	78 34.7	+54.0	102.7	78 19.2	+56.0	107.4	77 59.0	+57.6	111.9	77 34.6	+58.8	116.1	77 06.4	+59.5	120.0	76 34.7	+59.9	123.7	76 00.0	+60.0	127.0	76
77	79 36.7	+49.6	95.0	79 28.7	+52.7	100.3	79 15.2	+55.2	105.5	78 56.6	+57.2	110.5	78 33.4	+58.5	115.1	78 05.9	+59.4	119.4	77 34.6	+59.9	123.4	77 00.0	+60.0	127.0	77
78	80 26.3	+47.4 •	91.7	80 21.4	+51.2	97.6	80 10.4	+54.3	103.3	79 53.8	+56.6	108.8	79 31.9	+58.2	114.0	79 05.3	+59.3	118.7	78 34.5	+59.8	123.0	78 00.0	+60.0	127.0	78
79	81 13.7	+44.7 •	87.9	81 12.6	+49.1 •	94.4	81 04.7	+52.8	100.7	80 50.4	+55.7	106.8	80 30.1	+57.8	112.6	80 04.6	+59.1	117.8	79 34.3	+59.8	122.7	79 00.0	+60.0	127.0	79
80	81 58.4	+41.0 •	83.3	82 01.7	+46.4 •	90.4	81 57.5	+51.1 •	97.5	81 46.1	+54.7	104.4	81 27.9	+57.3	110.9	81 03.7	+58.9	116.8	80 34.1	+59.8	122.2	80 00.0	+60.0	127.0	80
81	82 39.4	+36.4 •	77.8	82 48.1	+42.7 •	85.6	82 48.6	+48.4 •	93.5	82 40.8	+53.1 •	101.3	82 25.2	+56.5	108.7	82 02.6	+58.6	115.5	81 33.9	+59.6	121.6	81 00.0	+60.0	127.0	81
82	83 15.8	+30.1 •	71.3	83 30.8	+37.6 •	79.7	83 37.0	+44.7 •	88.5	83 33.9	+50.7 •	97.4	83 21.7	+55.2	106.0	83 01.2	+58.1	113.9	82 33.5	+59.6	120.9	82 00.0	+60.0	127.0	82
83	83 45.9	+22.5 •	63.7	84 08.4	+30.8 •	72.4	84 21.7	+39.3 •	82.1	84 24.6	+47.2 •	92.3	84 16.9	+53.4 •	102.3	83 59.3	+57.4	111.7	83 33.1	+59.5	119.9	83 00.0	+60.0	127.0	83
84	84 08.4	+13.3 •	54.9	84 39.2	+21.8 •	63.6	85 01.0	+31.6 •	74.0	85 11.8	+41.5 •	85.5	85 10.3	+50.2 •	97.4	84 56.7	+56.2	108.6	84 32.6	+59.2	118.6	84 00.0	+60.0	127.0	84
85	84 21.7	+2.9 •	45.1	85 01.0	+10.8 •	53.3	85 32.6	+20.7 •	63.6	85 53.3	+32.7 •	76.1	86 00.5	+44.6 •	90.2	85 52.9	+53.9 •	104.2	85 31.8	+58.8	116.7	85 00.0	+60.0	127.0	85
86	84 24.6	−7.7 •	34.9	85 11.8	−1.5 •	41.7	85 53.3	+7.2 •	51.0	86 26.0	+19.1 •	63.6	86 45.1	+34.3 •	79.5	86 46.8	+49.0 •	97.3	86 30.6	+57.7	113.8	86 00.0	+60.0	127.0	86
87	84 16.9	−17.6 •	24.8	85 10.3	−13.6 •	29.8	86 00.5	−7.6 •	36.9	86 45.1	+1.7 •	47.5	87 19.4	+16.4 •	63.5	87 35.8	+37.1 •	85.4	87 28.3	+55.1 •	108.6	87 00.0	+60.0	127.0	87
88	83 59.3	−26.2 •	15.4	84 56.7	−24.1 •	18.4	85 52.9	−21.1 •	22.8	86 46.8	−16.2 •	29.8	87 35.8	−7.5 •	41.7	88 12.9	+10.5 •	63.5	88 23.4	+43.1 •	97.3	88 00.0	+60.0	127.0	88
89	83 33.1	−33.1 •	7.1	84 32.6	−32.6 •	8.4	85 31.8	−31.8 •	10.3	86 30.6	−30.6 •	13.2	87 28.3	−28.3 •	18.4	88 23.4	−23.4 •	29.7	89 06.5	−6.5 •	63.5	89 00.0	+60.0	127.0	89
90	83 00.0	−38.6 •	0.0	84 00.0	−39.0 •	0.0	85 00.0	−39.5 •	0.0	86 00.0	−40.2 •	0.0	87 00.0	−41.4 •	0.0	88 00.0	−43.3 •	0.0	89 00.0	−47.4 •	0.0	90 00.0	−60.0	63.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 53°, 307°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 12.4	−59.8	126.8	3 36.4	−59.8	126.8	3 00.4	−59.9	126.9	2 24.4	−59.9	126.9	1 48.3	−60.0	127.0	1 12.2	−60.0	127.0	0 36.1	−60.0	127.0	0 00.0	+60.0	53.0	**0**
1	3 12.6	−59.7	126.9	2 36.6	−59.8	126.9	2 00.5	−59.8	127.0	1 24.5	−60.0	127.0	0 48.3	−59.9	127.0	0 12.2	−59.9	127.0	0 23.9	+60.0	53.0	1 00.0	+60.0	53.0	**1**
2	2 12.9	−59.7	127.0	1 36.8	−59.8	127.0	1 00.7	−59.9	127.0	0 24.5	−59.9	127.0	0 11.6	+59.9	53.0	0 47.7	+60.0	53.0	1 23.9	+60.0	53.0	2 00.0	+60.0	53.0	**2**
3	1 13.2	−59.7	127.1	0 37.0	−59.8	127.1	0 00.8	−59.8	127.1	0 35.4	+59.9	52.9	1 11.5	+60.0	52.9	1 47.7	+60.0	52.9	2 23.9	+60.0	53.0	3 00.0	+60.0	53.0	**3**
4	0 13.5	−59.7	127.2	0 22.8	+59.8	52.8	0 59.0	+59.9	52.8	1 35.3	+59.9	52.8	2 11.5	+59.9	52.9	2 47.7	+60.0	52.9	3 23.9	+60.0	52.9	4 00.0	+60.0	53.0	**4**
5	0 46.2	+59.7	52.7	1 22.6	+59.7	52.7	1 58.9	+59.8	52.8	2 35.2	+59.9	52.8	3 11.4	+60.0	52.8	3 47.7	+60.0	52.9	4 23.9	+60.0	52.9	5 00.0	+60.0	53.0	**5**
6	1 45.9	+59.7	52.6	2 22.3	+59.8	52.6	2 58.7	+59.9	52.7	3 35.1	+59.9	52.7	4 11.4	+59.9	52.8	4 47.7	+59.9	52.8	5 23.9	+60.0	52.9	6 00.0	+60.0	53.0	**6**
7	2 45.6	+59.8	52.5	3 22.1	+59.8	52.6	3 58.6	+59.9	52.6	4 35.0	+59.9	52.7	5 11.3	+60.0	52.7	5 47.6	+60.0	52.8	6 23.9	+59.9	52.9	7 00.0	+60.0	53.0	**7**
8	3 45.4	+59.7	52.4	4 21.9	+59.8	52.5	4 58.4	+59.9	52.5	5 34.9	+59.9	52.6	6 11.3	+59.9	52.7	6 47.6	+60.0	52.8	7 23.8	+60.0	52.9	8 00.0	+60.0	53.0	**8**
9	4 45.1	+59.7	52.3	5 21.7	+59.8	52.4	5 58.3	+59.8	52.5	6 34.8	+59.9	52.6	7 11.2	+60.0	52.7	7 47.6	+60.0	52.8	8 23.8	+60.0	52.9	9 00.0	+60.0	53.0	**9**
10	5 44.8	+59.7	52.2	6 21.5	+59.8	52.3	6 58.1	+59.9	52.4	7 34.7	+59.9	52.5	8 11.2	+59.9	52.6	8 47.6	+59.9	52.7	9 23.8	+60.0	52.9	10 00.0	+60.0	53.0	**10**
11	6 44.5	+59.7	52.1	7 21.3	+59.8	52.2	7 58.0	+59.8	52.3	8 34.6	+59.9	52.5	9 11.1	+60.0	52.6	9 47.5	+60.0	52.7	10 23.8	+60.0	52.8	11 00.0	+60.0	53.0	**11**
12	7 44.2	+59.7	52.0	8 21.1	+59.8	52.1	8 57.8	+59.9	52.3	9 34.5	+59.9	52.4	10 11.1	+59.9	52.5	10 47.5	+60.0	52.7	11 23.8	+60.0	52.8	12 00.0	+60.0	53.0	**12**
13	8 43.9	+59.7	51.9	9 20.9	+59.7	52.1	9 57.7	+59.8	52.2	10 34.4	+59.9	52.3	11 11.0	+60.0	52.5	11 47.5	+60.0	52.6	12 23.8	+60.0	52.8	13 00.0	+60.0	53.0	**13**
14	9 43.6	+59.7	51.8	10 20.6	+59.8	52.0	10 57.5	+59.9	52.1	11 34.3	+59.9	52.3	12 11.0	+59.9	52.4	12 47.5	+59.9	52.6	13 23.8	+60.0	52.8	14 00.0	+60.0	53.0	**14**
15	10 43.3	+59.7	51.7	11 20.4	+59.8	51.9	11 57.4	+59.8	52.0	12 34.2	+59.9	52.2	13 10.9	+60.0	52.4	13 47.4	+60.0	52.6	14 23.8	+60.0	52.8	15 00.0	+60.0	53.0	**15**
16	11 43.0	+59.7	51.6	12 20.2	+59.8	51.8	12 57.2	+59.9	52.0	13 34.1	+59.9	52.2	14 10.9	+59.9	52.4	14 47.4	+60.0	52.6	15 23.8	+60.0	52.8	16 00.0	+60.0	53.0	**16**
17	12 42.7	+59.7	51.5	13 20.0	+59.8	51.7	13 57.1	+59.8	51.9	14 34.0	+59.9	52.1	15 10.8	+59.9	52.3	15 47.4	+60.0	52.5	16 23.8	+60.0	52.8	17 00.0	+60.0	53.0	**17**
18	13 42.4	+59.7	51.4	14 19.8	+59.7	51.6	14 56.9	+59.9	51.8	15 33.9	+59.9	52.0	16 10.7	+60.0	52.3	16 47.4	+59.9	52.5	17 23.8	+60.0	52.7	18 00.0	+60.0	53.0	**18**
19	14 42.1	+59.7	51.3	15 19.5	+59.8	51.5	15 56.8	+59.8	51.8	16 33.8	+59.9	52.0	17 10.7	+59.9	52.2	17 47.3	+60.0	52.5	18 23.8	+60.0	52.7	19 00.0	+60.0	53.0	**19**
20	15 41.8	+59.7	51.2	16 19.3	+59.8	51.4	16 56.6	+59.9	51.7	17 33.7	+59.9	51.9	18 10.6	+60.0	52.2	18 47.3	+60.0	52.4	19 23.8	+60.0	52.7	20 00.0	+60.0	53.0	**20**
21	16 41.5	+59.7	51.1	17 19.1	+59.8	51.4	17 56.5	+59.8	51.6	18 33.6	+59.9	51.9	19 10.6	+59.9	52.1	19 47.3	+60.0	52.4	20 23.8	+60.0	52.7	21 00.0	+60.0	53.0	**21**
22	17 41.2	+59.7	51.0	18 18.9	+59.7	51.3	18 56.3	+59.8	51.5	19 33.5	+59.9	51.8	20 10.5	+59.9	52.1	20 47.3	+59.9	52.4	21 23.8	+60.0	52.7	22 00.0	+60.0	53.0	**22**
23	18 40.9	+59.7	50.9	19 18.6	+59.8	51.2	19 56.1	+59.9	51.4	20 33.4	+59.9	51.7	21 10.4	+60.0	52.0	21 47.2	+60.0	52.3	22 23.8	+59.9	52.7	23 00.0	+60.0	53.0	**23**
24	19 40.6	+59.6	50.8	20 18.4	+59.7	51.1	20 56.0	+59.8	51.4	21 33.3	+59.9	51.7	22 10.4	+59.9	52.0	22 47.2	+60.0	52.3	23 23.7	+60.0	52.7	24 00.0	+60.0	53.0	**24**
25	20 40.2	+59.7	50.7	21 18.1	+59.8	51.0	21 55.8	+59.8	51.3	22 33.2	+59.9	51.6	23 10.3	+60.0	51.9	23 47.2	+59.9	52.3	24 23.7	+60.0	52.6	25 00.0	+60.0	53.0	**25**
26	21 39.9	+59.7	50.6	22 17.9	+59.8	50.9	22 55.6	+59.9	51.2	23 33.1	+59.9	51.5	24 10.3	+59.9	51.9	24 47.1	+60.0	52.2	25 23.7	+60.0	52.6	26 00.0	+60.0	53.0	**26**
27	22 39.6	+59.6	50.5	23 17.7	+59.7	50.8	23 55.5	+59.8	51.1	24 33.0	+59.9	51.5	25 10.2	+59.9	51.8	25 47.1	+60.0	52.2	26 23.7	+60.0	52.6	27 00.0	+60.0	53.0	**27**
28	23 39.2	+59.7	50.3	24 17.4	+59.7	50.7	24 55.3	+59.8	51.0	25 32.9	+59.8	51.4	26 10.1	+60.0	51.8	26 47.1	+60.0	52.2	27 23.7	+60.0	52.6	28 00.0	+60.0	53.0	**28**
29	24 38.9	+59.7	50.2	25 17.1	+59.8	50.6	25 55.1	+59.8	51.0	26 32.7	+59.9	51.3	27 10.1	+59.9	51.7	27 47.1	+59.9	52.1	28 23.7	+60.0	52.6	29 00.0	+60.0	53.0	**29**
30	25 38.6	+59.6	50.1	26 16.9	+59.7	50.5	26 54.9	+59.8	50.9	27 32.6	+59.9	51.3	28 10.0	+59.9	51.7	28 47.0	+60.0	52.1	29 23.7	+60.0	52.5	30 00.0	+60.0	53.0	**30**
31	26 38.2	+59.6	50.0	27 16.6	+59.8	50.4	27 54.7	+59.8	50.8	28 32.5	+59.9	51.2	29 09.9	+60.0	51.6	29 47.0	+60.0	52.1	30 23.7	+60.0	52.5	31 00.0	+60.0	53.0	**31**
32	27 37.8	+59.7	49.9	28 16.4	+59.7	50.3	28 54.5	+59.9	50.7	29 32.4	+59.9	51.1	30 09.9	+59.9	51.6	30 47.0	+59.9	52.0	31 23.7	+60.0	52.5	32 00.0	+60.0	53.0	**32**
33	28 37.5	+59.6	49.7	29 16.1	+59.7	50.2	29 54.4	+59.8	50.6	30 32.3	+59.8	51.0	31 09.8	+59.9	51.5	31 46.9	+60.0	52.0	32 23.7	+60.0	52.5	33 00.0	+60.0	53.0	**33**
34	29 37.1	+59.6	49.6	30 15.8	+59.7	50.0	30 54.2	+59.8	50.5	31 32.1	+59.9	51.0	32 09.7	+59.9	51.5	32 46.9	+60.0	52.0	33 23.7	+60.0	52.5	34 00.0	+60.0	53.0	**34**
35	30 36.7	+59.6	49.5	31 15.5	+59.7	49.9	31 54.0	+59.8	50.4	32 32.0	+59.9	50.9	33 09.6	+60.0	51.4	33 46.9	+59.9	51.9	34 23.7	+60.0	52.4	35 00.0	+60.0	53.0	**35**
36	31 36.3	+59.6	49.3	32 15.2	+59.7	49.8	32 53.8	+59.7	50.3	33 31.9	+59.8	50.8	34 09.6	+59.9	51.3	34 46.8	+60.0	51.9	35 23.7	+59.9	52.4	36 00.0	+60.0	53.0	**36**
37	32 35.9	+59.6	49.2	33 14.9	+59.7	49.7	33 53.5	+59.8	50.2	34 31.7	+59.9	50.7	35 09.5	+59.9	51.3	35 46.8	+60.0	51.8	36 23.6	+60.0	52.4	37 00.0	+60.0	53.0	**37**
38	33 35.5	+59.6	49.1	34 14.6	+59.7	49.6	34 53.3	+59.8	50.1	35 31.6	+59.9	50.6	36 09.4	+59.9	51.2	36 46.8	+59.9	51.8	37 23.6	+60.0	52.4	38 00.0	+60.0	53.0	**38**
39	34 35.1	+59.6	48.9	35 14.3	+59.7	49.5	35 53.1	+59.8	50.0	36 31.5	+59.8	50.6	37 09.3	+59.9	51.1	37 46.7	+60.0	51.7	38 23.6	+60.0	52.4	39 00.0	+60.0	53.0	**39**
40	35 34.7	+59.6	48.8	36 14.0	+59.7	49.3	36 52.9	+59.8	49.9	37 31.3	+59.9	50.5	38 09.2	+60.0	51.1	38 46.7	+60.0	51.7	39 23.6	+60.0	52.3	40 00.0	+60.0	53.0	**40**
41	36 34.3	+59.5	48.6	37 13.7	+59.6	49.2	37 52.7	+59.7	49.8	38 31.2	+59.8	50.4	39 09.2	+59.9	51.0	39 46.7	+59.9	51.7	40 23.6	+60.0	52.3	41 00.0	+60.0	53.0	**41**
42	37 33.8	+59.5	48.5	38 13.3	+59.7	49.1	38 52.4	+59.8	49.7	39 31.0	+59.8	50.3	40 09.1	+59.9	50.9	40 46.6	+60.0	51.6	41 23.6	+60.0	52.3	42 00.0	+60.0	53.0	**42**
43	38 33.3	+59.6	48.3	39 13.0	+59.6	48.9	39 52.2	+59.7	49.6	40 30.8	+59.9	50.2	41 09.0	+59.9	50.9	41 46.6	+59.9	51.6	42 23.6	+60.0	52.3	43 00.0	+60.0	53.0	**43**
44	39 32.9	+59.5	48.2	40 12.6	+59.7	48.8	40 51.9	+59.8	49.4	41 30.7	+59.8	50.1	42 08.9	+59.9	50.8	42 46.5	+60.0	51.5	43 23.6	+60.0	52.2	44 00.0	+60.0	53.0	**44**
45	40 32.4	+59.5	48.0	41 12.3	+59.6	48.6	41 51.7	+59.7	49.3	42 30.5	+59.8	50.0	43 08.8	+59.9	50.7	43 46.5	+59.9	51.5	44 23.6	+60.0	52.2	45 00.0	+60.0	53.0	**45**
46	41 31.9	+59.5	47.8	42 11.9	+59.6	48.5	42 51.4	+59.7	49.2	43 30.3	+59.9	49.9	44 08.7	+59.9	50.6	44 46.4	+60.0	51.4	45 23.6	+59.9	52.2	46 00.0	+60.0	53.0	**46**
47	42 31.4	+59.4	47.6	43 11.5	+59.6	48.3	43 51.1	+59.7	49.1	44 30.2	+59.8	49.8	45 08.6	+59.9	50.6	45 46.4	+59.9	51.3	46 23.5	+60.0	52.2	47 00.0	+60.0	53.0	**47**
48	43 30.8	+59.5	47.5	44 11.1	+59.6	48.2	44 50.8	+59.7	48.9	45 30.0	+59.8	49.7	46 08.5	+59.9	50.5	46 46.3	+60.0	51.3	47 23.5	+60.0	52.1	48 00.0	+60.0	53.0	**48**
49	44 30.3	+59.4	47.3	45 10.7	+59.6	48.0	45 50.5	+59.7	48.8	46 29.8	+59.8	49.6	47 08.4	+59.9	50.4	47 46.3	+59.9	51.2	48 23.5	+60.0	52.1	49 00.0	+60.0	53.0	**49**
50	45 29.7	+59.4	47.1	46 10.3	+59.5	47.8	46 50.2	+59.7	48.6	47 29.6	+59.8	49.4	48 08.3	+59.8	50.3	48 46.2	+60.0	51.2	49 23.5	+60.0	52.1	50 00.0	+60.0	53.0	**50**
51	46 29.1	+59.4	46.9	47 09.8	+59.6	47.7	47 49.9	+59.7	48.5	48 29.4	+59.8	49.3	49 08.1	+59.9	50.2	49 46.2	+59.9	51.1	50 23.5	+60.0	52.0	51 00.0	+60.0	53.0	**51**
52	47 28.5	+59.4	46.7	48 09.4	+59.5	47.5	48 49.6	+59.6	48.3	49 29.2	+59.7	49.2	50 08.0	+59.9	50.1	50 46.1	+60.0	51.0	51 23.5	+60.0	52.0	52 00.0	+60.0	53.0	**52**
53	48 27.9	+59.3	46.5	49 08.9	+59.5	47.3	49 49.2	+59.7	48.2	50 28.9	+59.8	49.1	51 07.9	+59.8	50.0	51 46.1	+59.9	51.0	52 23.5	+59.9	52.0	53 00.0	+60.0	53.0	**53**
54	49 27.2	+59.3	46.2	50 08.4	+59.5	47.1	50 48.9	+59.6	48.0	51 28.7	+59.7	48.9	52 07.7	+59.9	49.9	52 46.0	+59.9	50.9	53 23.4	+60.0	51.9	54 00.0	+60.0	53.0	**54**
55	50 26.5	+59.3	46.0	51 07.9	+59.4	46.9	51 48.5	+59.6	47.8	52 28.4	+59.8	48.8	53 07.6	+59.8	49.8	53 45.9	+60.0	50.8	54 23.4	+60.0	51.9	55 00.0	+60.0	53.0	**55**
56	51 25.8	+59.2	45.7	52 07.3	+59.4	46.7	52 48.1	+59.6	47.6	53 28.2	+59.7	48.6	54 07.4	+59.9	49.6	54 45.9	+59.9	50.7	55 23.4	+60.0	51.8	56 00.0	+60.0	53.0	**56**
57	52 25.0	+59.3	45.5	53 06.7	+59.4	46.4	53 47.7	+59.6	47.4	54 27.9	+59.7	48.5	55 07.3	+59.8	49.5	55 45.8	+59.9	50.6	56 23.4	+60.0	51.8	57 00.0	+60.0	53.0	**57**
58	53 24.3	+59.1	45.2	54 06.1	+59.4	46.2	54 47.3	+59.5	47.2	55 27.6	+59.7	48.3	56 07.1	+59.9	49.4	56 45.7	+59.9	50.5	57 23.4	+59.9	51.7	58 00.0	+60.0	53.0	**58**
59	54 23.4	+59.2	44.9	55 05.5	+59.4	46.0	55 46.8	+59.6	47.0	56 27.3	+59.7	48.1	57 07.0	+59.8	49.3	57 45.6	+60.0	50.4	58 23.3	+60.0	51.7	59 00.0	+60.0	53.0	**59**
60	55 22.6	+59.1	44.7	56 04.9	+59.3	45.7	56 46.4	+59.5	46.8	57 27.0	+59.7	47.9	58 06.8	+59.8	49.1	58 45.6	+59.9	50.3	59 23.3	+60.0	51.6	60 00.0	+60.0	53.0	**60**
61	56 21.7	+59.0	44.3	57 04.2	+59.2	45.4	57 45.9	+59.4	46.5	58 26.7	+59.6	47.7	59 06.6	+59.8	49.0	59 45.5	+59.9	50.2	60 23.3	+60.0	51.6	61 00.0	+60.0	53.0	**61**
62	57 20.7	+59.0	44.0	58 03.4	+59.3	45.1	58 45.3	+59.5	46.3	59 26.3	+59.7	47.5	60 06.4	+59.8	48.8	60 45.4	+59.9	50.1	61 23.3	+60.0	51.5	62 00.0	+60.0	53.0	**62**
63	58 19.7	+58.9	43.7	59 02.7	+59.1	44.8	59 44.8	+59.4	46.0	60 26.0	+59.6	47.3	61 06.2	+59.7	48.6	61 45.3	+59.9	50.0	62 23.3	+59.9	51.5	63 00.0	+60.0	53.0	**63**
64	59 18.6	+58.9	43.3	60 01.8	+59.2	44.5	60 44.2	+59.4	45.7	61 25.6	+59.5	47.1	62 05.9	+59.8	48.4	62 45.2	+59.9	49.9	63 23.2	+60.0	51.4	64 00.0	+60.0	53.0	**64**
65	60 17.5	+58.8	42.9	61 01.0	+59.1	44.2	61 43.6	+59.3	45.4	62 25.1	+59.6	46.8	63 05.7	+59.7	48.2	63 45.1	+59.8	49.7	64 23.2	+60.0	51.3	65 00.0	+60.0	53.0	**65**
66	61 16.3	+58.7	42.5	62 00.1	+59.0	43.8	62 42.9	+59.3	45.1	63 24.7	+59.5	46.5	64 05.4	+59.7	48.0	64 44.9	+59.9	49.6	65 23.2	+59.9	51.3	66 00.0	+60.0	53.0	**66**
67	62 15.0	+58.6	42.1	62 59.1	+58.9	43.4	63 42.2	+59.2	44.8	64 24.2	+59.5	46.2	65 05.1	+59.7	47.8	65 44.8	+59.9	49.4	66 23.1	+60.0	51.2	67 00.0	+60.0	53.0	**67**
68	63 13.6	+58.6	41.6	63 58.0	+58.9	43.0	64 41.4	+59.2	44.4	65 23.7	+59.4	45.9	66 04.8	+59.7	47.6	66 44.7	+59.8	49.3	67 23.1	+59.9	51.1	68 00.0	+60.0	53.0	**68**
69	64 12.2	+58.4	41.1	64 56.9	+58.7	42.5	65 40.6	+59.1	44.0	66 23.1	+59.4	45.6	67 04.5	+59.6	47.3	67 44.5	+59.8	49.1	68 23.0	+60.0	51.0	69 00.0	+60.0	53.0	**69**
70	65 10.6	+58.3	40.6	65 55.6	+58.7	42.0	66 39.7	+59.0	43.6	67 22.5	+59.4	45.2	68 04.1	+59.6	47.0	68 44.3	+59.8	48.9	69 23.0	+60.0	50.9	70 00.0	+60.0	53.0	**70**
71	66 08.9	+58.1	40.0	66 54.3	+58.6	41.5	67 38.7	+58.9	43.1	68 21.9	+59.2	44.8	69 03.7	+59.6	46.7	69 44.1	+59.8	48.7	70 23.0	+59.9	50.8	71 00.0	+60.0	53.0	**71**
72	67 07.0	+58.1	39.4	67 52.9	+58.4	41.0	68 37.6	+58.9	42.6	69 21.1	+59.3	44.4	70 03.3	+59.5	46.3	70 43.9	+59.8	48.4	71 22.9	+59.9	50.6	72 00.0	+60.0	53.0	**72**
73	68 05.1	+57.8	38.7	68 51.3	+58.3	40.3	69 36.5	+58.7	42.1	70 20.4	+59.1	43.9	71 02.8	+59.5	46.0	71 43.7	+59.8	48.1	72 22.8	+60.0	50.5	73 00.0	+60.0	53.0	**73**
74	69 02.9	+57.6	38.0	69 49.6	+58.2	39.7	70 35.2	+58.6	41.5	71 19.5	+59.0	43.4	72 02.3	+59.4	45.5	72 43.5	+59.7	47.8	73 22.8	+59.9	50.3	74 00.0	+60.0	53.0	**74**
75	70 00.5	+57.4	37.2	70 47.8	+57.9	38.9	71 33.8	+58.5	40.8	72 18.5	+58.9	42.9	73 01.7	+59.4	45.1	73 43.2	+59.7	47.5	74 22.7	+59.9	50.1	75 00.0	+60.0	53.0	**75**
76	70 57.9	+57.1	36.3	71 45.7	+57.7	38.1	72 32.3	+58.2	40.1	73 17.4	+58.8	42.2	74 01.1	+59.2	44.6	74 42.9	+59.6	47.1	75 22.6	+59.9	49.9	76 00.0	+60.0	53.0	**76**
77	71 55.0	+56.8	35.4	72 43.4	+57.4	37.2	73 30.5	+58.1	39.3	74 16.2	+58.7	41.5	75 00.3	+59.2	44.0	75 42.5	+59.6	46.7	76 22.5	+59.9	49.7	77 00.0	+60.0	53.0	**77**
78	72 51.8	+56.5	34.3	73 40.8	+57.2	36.2	74 28.6	+57.8	38.3	75 14.9	+58.4	40.7	75 59.5	+59.0	43.3	76 42.1	+59.5	46.2	77 22.4	+59.9	49.4	78 00.0	+60.0	53.0	**78**
79	73 48.3	+56.0	33.1	74 38.0	+56.7	35.1	75 26.4	+57.5	37.3	76 13.3	+58.2	39.8	76 58.5	+58.9	42.5	77 41.6	+59.5	45.6	78 22.3	+59.8	49.1	79 00.0	+60.0	53.0	**79**
80	74 44.3	+55.4	31.8	75 34.7	+56.3	33.8	76 23.9	+57.1	36.1	77 11.5	+57.9	38.7	77 57.4	+58.7	41.7	78 41.1	+59.3	45.0	79 22.1	+59.8	48.7	80 00.0	+60.0	53.0	**80**
81	75 39.7	+54.9	30.3	76 31.0	+55.7	32.4	77 21.0	+56.6	34.8	78 09.4	+57.6	37.5	78 56.1	+58.4	40.6	79 40.4	+59.2	44.2	80 21.9	+59.8	48.3	81 00.0	+60.0	53.0	**81**
82	76 34.6	+54.0	28.6	77 26.7	+55.0	30.8	78 17.6	+56.0	33.2	79 07.0	+57.1	36.1	79 54.5	+58.1	39.4	80 39.6	+59.0	43.2	81 21.7	+59.7	47.7	82 00.0	+60.0	53.0	**82**
83	77 28.6	+53.1	26.7	78 21.7	+54.2	28.8	79 13.6	+55.3	31.4	80 04.1	+56.4	34.4	80 52.6	+57.6	37.9	81 38.6	+58.7	42.0	82 21.4	+59.6	47.0	83 00.0	+60.0	53.0	**83**
84	78 21.7	+51.9	24.4	79 15.9	+53.0	26.6	80 08.9	+54.3	29.2	81 00.5	+55.6	32.3	81 50.2	+57.0	36.0	82 37.3	+58.4	40.5	83 21.0	+59.5	46.1	84 00.0	+60.0	53.0	**84**
85	79 13.6	+50.5	21.9	80 08.9	+51.6	24.0	81 03.2	+52.9	26.6	81 56.1	+54.4	29.7	82 47.2	+56.0	33.7	83 35.7	+57.7	38.6	84 20.5	+59.3	44.9	85 00.0	+60.0	53.0	**85**
86	80 04.1	*+48.5* •	18.8	81 00.5	*+49.7* •	20.9	81 56.1	*+51.1* •	23.4	82 50.5	*+52.7* •	26.6	83 43.2	+54.7	30.6	84 33.4	+56.8	36.0	85 19.8	+58.8	43.2	86 00.0	+60.0	53.0	**86**
87	80 52.6	*+46.0* •	15.3	81 50.2	*+47.1* •	17.1	82 47.2	*+48.5* •	19.4	83 43.2	*+50.2* •	22.5	84 37.9	*+52.3* •	26.5	85 30.2	*+55.0* •	32.2	86 18.6	+58.1	40.5	87 00.0	+60.0	53.0	**87**
88	81 38.6	*+42.8* •	11.1	82 37.3	*+43.7* •	12.5	83 35.7	*+44.8* •	14.5	84 33.4	*+46.4* •	17.1	85 30.2	*+48.4* •	20.8	86 25.2	*+51.5* •	26.5	87 16.7	*+55.9* •	35.9	88 00.0	+60.0	53.0	**88**
89	82 21.4	*+38.6* •	6.0	83 21.0	*+39.0* •	6.9	84 20.5	*+39.5* •	8.1	85 19.8	*+40.2* •	9.9	86 18.6	*+41.4* •	12.5	87 16.7	*+43.3* •	17.1	88 12.6	*+47.4* •	26.5	89 00.0	+60.0	53.0	**89**
90	83 00.0	*+33.1* •	0.0	84 00.0	*+32.6* •	0.0	85 00.0	*+31.8* •	0.0	86 00.0	*+30.6* •	0.0	87 00.0	*+28.3* •	0.0	88 00.0	*+23.4* •	0.0	89 00.0	*+6.5* •	0.0	90 00.0	−60.0	26.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 127°, 233°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 06.5	+59.7	125.8	3 31.3	+59.8	125.9	2 56.2	+59.8	125.9	2 21.0	+59.9	125.9	1 45.8	+59.9	126.0	1 10.5	+60.0	126.0	0 35.3	+60.0	126.0	0 00.0	+60.0	126.0	0
1	5 06.2	+59.7	125.7	4 31.1	+59.8	125.8	3 56.0	+59.9	125.8	3 20.9	+59.9	125.9	2 45.7	+60.0	125.9	2 10.5	+60.0	126.0	1 35.3	+60.0	126.0	1 00.0	+60.0	126.0	1
2	6 05.9	+59.7	125.6	5 30.9	+59.8	125.7	4 55.9	+59.8	125.8	4 20.8	+59.9	125.8	3 45.7	+59.9	125.9	3 10.5	+60.0	125.9	2 35.3	+59.9	126.0	2 00.0	+60.0	126.0	2
3	7 05.6	+59.7	125.5	6 30.7	+59.8	125.6	5 55.7	+59.9	125.7	5 20.7	+59.9	125.8	4 45.6	+60.0	125.8	4 10.5	+59.9	125.9	3 35.2	+60.0	126.0	3 00.0	+60.0	126.0	3
4	8 05.3	+59.7	125.4	7 30.5	+59.8	125.5	6 55.6	+59.8	125.6	6 20.6	+59.9	125.7	5 45.6	+59.9	125.8	5 10.4	+60.0	125.9	4 35.2	+60.0	125.9	4 00.0	+60.0	126.0	4
5	9 05.0	+59.7	125.3	8 30.3	+59.7	125.4	7 55.4	+59.9	125.5	7 20.5	+59.9	125.6	6 45.5	+59.9	125.7	6 10.4	+60.0	125.8	5 35.2	+60.0	125.9	5 00.0	+60.0	126.0	5
6	10 04.7	+59.7	125.2	9 30.0	+59.8	125.3	8 55.3	+59.8	125.5	8 20.4	+59.9	125.6	7 45.4	+60.0	125.7	7 10.4	+60.0	125.8	6 35.2	+60.0	125.9	6 00.0	+60.0	126.0	6
7	11 04.4	+59.7	125.1	10 29.8	+59.8	125.2	9 55.1	+59.9	125.4	9 20.3	+59.9	125.5	8 45.4	+59.9	125.7	8 10.4	+59.9	125.8	7 35.2	+60.0	125.9	7 00.0	+60.0	126.0	7
8	12 04.1	+59.7	125.0	11 29.6	+59.8	125.2	10 55.0	+59.8	125.3	10 20.2	+59.9	125.5	9 45.3	+60.0	125.6	9 10.3	+60.0	125.8	8 35.2	+60.0	125.9	8 00.0	+60.0	126.0	8
9	13 03.8	+59.7	124.9	12 29.4	+59.7	125.1	11 54.8	+59.9	125.2	11 20.1	+59.9	125.4	10 45.3	+59.9	125.6	10 10.3	+60.0	125.7	9 35.2	+60.0	125.9	9 00.0	+60.0	126.0	9
10	14 03.5	+59.6	124.8	13 29.1	+59.8	125.0	12 54.7	+59.8	125.2	12 20.0	+59.9	125.4	11 45.2	+60.0	125.5	11 10.3	+60.0	125.7	10 35.2	+60.0	125.9	10 00.0	+60.0	126.0	10
11	15 03.1	+59.7	124.7	14 28.9	+59.8	124.9	13 54.5	+59.8	125.1	13 19.9	+59.9	125.3	12 45.2	+59.9	125.5	12 10.3	+59.9	125.7	11 35.2	+60.0	125.8	11 00.0	+60.0	126.0	11
12	16 02.8	+59.7	124.6	15 28.7	+59.8	124.8	14 54.3	+59.9	125.0	14 19.8	+59.9	125.2	13 45.1	+60.0	125.4	13 10.2	+60.0	125.6	12 35.2	+60.0	125.8	12 00.0	+60.0	126.0	12
13	17 02.5	+59.7	124.5	16 28.5	+59.7	124.7	15 54.2	+59.8	124.9	15 19.7	+59.9	125.2	14 45.1	+59.9	125.4	14 10.2	+60.0	125.6	13 35.2	+60.0	125.8	13 00.0	+60.0	126.0	13
14	18 02.2	+59.7	124.4	17 28.2	+59.8	124.6	16 54.0	+59.9	124.9	16 19.6	+59.9	125.1	15 45.0	+59.9	125.4	15 10.2	+60.0	125.6	14 35.2	+60.0	125.8	14 00.0	+60.0	126.0	14
15	19 01.9	+59.6	124.2	18 28.0	+59.7	124.5	17 53.9	+59.8	124.8	17 19.5	+59.9	125.1	16 44.9	+60.0	125.3	16 10.2	+59.9	125.5	15 35.2	+60.0	125.8	15 00.0	+60.0	126.0	15
16	20 01.5	+59.7	124.1	19 27.7	+59.8	124.4	18 53.7	+59.8	124.7	18 19.4	+59.9	125.0	17 44.9	+59.9	125.3	17 10.1	+60.0	125.5	16 35.2	+60.0	125.8	16 00.0	+60.0	126.0	16
17	21 01.2	+59.7	124.0	20 27.5	+59.8	124.3	19 53.5	+59.9	124.6	19 19.3	+59.9	124.9	18 44.8	+60.0	125.2	18 10.1	+60.0	125.5	17 35.2	+60.0	125.7	17 00.0	+60.0	126.0	17
18	22 00.9	+59.6	123.9	21 27.3	+59.7	124.2	20 53.4	+59.8	124.6	20 19.2	+59.9	124.9	19 44.8	+59.9	125.2	19 10.1	+59.9	125.5	18 35.2	+59.9	125.7	18 00.0	+60.0	126.0	18
19	23 00.5	+59.7	123.8	22 27.0	+59.7	124.1	21 53.2	+59.8	124.5	21 19.1	+59.9	124.8	20 44.7	+59.9	125.1	20 10.0	+60.0	125.4	19 35.1	+60.0	125.7	19 00.0	+60.0	126.0	19
20	24 00.2	+59.6	123.7	23 26.7	+59.8	124.0	22 53.0	+59.8	124.4	22 19.0	+59.9	124.7	21 44.6	+60.0	125.1	21 10.0	+60.0	125.4	20 35.1	+60.0	125.7	20 00.0	+60.0	126.0	20
21	24 59.8	+59.7	123.6	24 26.5	+59.7	123.9	23 52.8	+59.9	124.3	23 18.9	+59.8	124.7	22 44.6	+59.9	125.0	22 10.0	+60.0	125.4	21 35.1	+60.0	125.7	21 00.0	+60.0	126.0	21
22	25 59.5	+59.6	123.4	25 26.2	+59.8	123.8	24 52.7	+59.8	124.2	24 18.7	+59.9	124.6	23 44.5	+59.9	125.0	23 10.0	+59.9	125.3	22 35.1	+60.0	125.7	22 00.0	+60.0	126.0	22
23	26 59.1	+59.6	123.3	26 26.0	+59.7	123.7	25 52.5	+59.8	124.1	25 18.6	+59.9	124.5	24 44.4	+60.0	124.9	24 09.9	+60.0	125.3	23 35.1	+60.0	125.7	23 00.0	+60.0	126.0	23
24	27 58.7	+59.6	123.2	27 25.7	+59.7	123.6	26 52.3	+59.8	124.1	26 18.5	+59.9	124.5	25 44.4	+59.9	124.9	25 09.9	+60.0	125.3	24 35.1	+60.0	125.6	24 00.0	+60.0	126.0	24
25	28 58.3	+59.7	123.1	28 25.4	+59.7	123.5	27 52.1	+59.8	124.0	27 18.4	+59.9	124.4	26 44.3	+59.9	124.8	26 09.9	+59.9	125.2	25 35.1	+60.0	125.6	25 00.0	+60.0	126.0	25
26	29 58.0	+59.6	122.9	29 25.1	+59.8	123.4	28 51.9	+59.8	123.9	28 18.3	+59.8	124.3	27 44.2	+60.0	124.8	27 09.8	+60.0	125.2	26 35.1	+60.0	125.6	26 00.0	+60.0	126.0	26
27	30 57.6	+59.6	122.8	30 24.9	+59.7	123.3	29 51.7	+59.8	123.8	29 18.1	+59.9	124.2	28 44.2	+59.9	124.7	28 09.8	+60.0	125.2	27 35.1	+60.0	125.6	27 00.0	+60.0	126.0	27
28	31 57.2	+59.6	122.7	31 24.6	+59.7	123.2	30 51.5	+59.8	123.7	30 18.0	+59.9	124.2	29 44.1	+59.9	124.7	29 09.8	+60.0	125.1	28 35.1	+60.0	125.6	28 00.0	+60.0	126.0	28
29	32 56.8	+59.5	122.5	32 24.3	+59.7	123.1	31 51.3	+59.8	123.6	31 17.9	+59.8	124.1	30 44.0	+60.0	124.6	30 09.8	+59.9	125.1	29 35.1	+60.0	125.5	29 00.0	+60.0	126.0	29
30	33 56.3	+59.6	122.4	33 24.0	+59.6	122.9	32 51.1	+59.8	123.5	32 17.7	+59.9	124.0	31 44.0	+59.9	124.5	31 09.7	+60.0	125.0	30 35.1	+60.0	125.5	30 00.0	+60.0	126.0	30
31	34 55.9	+59.6	122.2	34 23.6	+59.7	122.8	33 50.9	+59.8	123.4	33 17.6	+59.9	123.9	32 43.9	+59.9	124.5	32 09.7	+60.0	125.0	31 35.1	+60.0	125.5	31 00.0	+60.0	126.0	31
32	35 55.5	+59.5	122.1	35 23.3	+59.7	122.7	34 50.7	+59.7	123.3	34 17.5	+59.8	123.9	33 43.8	+59.9	124.4	33 09.7	+59.9	125.0	32 35.1	+59.9	125.5	32 00.0	+60.0	126.0	32
33	36 55.0	+59.5	121.9	36 23.0	+59.7	122.6	35 50.4	+59.8	123.2	35 17.3	+59.9	123.8	34 43.7	+59.9	124.4	34 09.6	+60.0	124.9	33 35.0	+60.0	125.5	33 00.0	+60.0	126.0	33
34	37 54.5	+59.6	121.8	37 22.7	+59.6	122.4	36 50.2	+59.8	123.1	36 17.2	+59.8	123.7	35 43.6	+60.0	124.3	35 09.6	+60.0	124.9	34 35.0	+60.0	125.4	34 00.0	+60.0	126.0	34
35	38 54.1	+59.5	121.6	38 22.3	+59.7	122.3	37 50.0	+59.7	123.0	37 17.0	+59.9	123.6	36 43.6	+59.9	124.2	36 09.6	+59.9	124.8	35 35.0	+60.0	125.4	35 00.0	+60.0	126.0	35
36	39 53.6	+59.5	121.5	39 22.0	+59.6	122.2	38 49.7	+59.8	122.8	38 16.9	+59.8	123.5	37 43.5	+59.9	124.2	37 09.5	+60.0	124.8	36 35.0	+60.0	125.4	36 00.0	+60.0	126.0	36
37	40 53.1	+59.5	121.3	40 21.6	+59.6	122.0	39 49.5	+59.7	122.7	39 16.7	+59.9	123.4	38 43.4	+59.9	124.1	38 09.5	+59.9	124.7	37 35.0	+60.0	125.4	37 00.0	+60.0	126.0	37
38	41 52.6	+59.4	121.1	41 21.2	+59.6	121.9	40 49.2	+59.7	122.6	40 16.6	+59.8	123.3	39 43.3	+59.9	124.0	39 09.4	+60.0	124.7	38 35.0	+60.0	125.4	38 00.0	+60.0	126.0	38
39	42 52.0	+59.5	120.9	42 20.8	+59.6	121.7	41 48.9	+59.8	122.5	41 16.4	+59.8	123.2	40 43.2	+59.9	123.9	40 09.4	+60.0	124.7	39 35.0	+60.0	125.3	39 00.0	+60.0	126.0	39
40	43 51.5	+59.4	120.7	43 20.4	+59.6	121.6	42 48.7	+59.7	122.3	42 16.2	+59.8	123.1	41 43.1	+59.9	123.9	41 09.4	+59.9	124.6	40 35.0	+60.0	125.3	40 00.0	+60.0	126.0	40
41	44 50.9	+59.4	120.5	44 20.0	+59.6	121.4	43 48.4	+59.7	122.2	43 16.0	+59.9	123.0	42 43.0	+59.9	123.8	42 09.3	+60.0	124.6	41 35.0	+60.0	125.3	41 00.0	+60.0	126.0	41
42	45 50.3	+59.4	120.3	45 19.6	+59.5	121.2	44 48.1	+59.7	122.1	44 15.9	+59.8	122.9	43 42.9	+59.9	123.7	43 09.3	+59.9	124.5	42 35.0	+59.9	125.3	42 00.0	+60.0	126.0	42
43	46 49.7	+59.3	120.1	46 19.1	+59.6	121.1	45 47.8	+59.7	121.9	45 15.7	+59.8	122.8	44 42.8	+59.9	123.6	44 09.2	+60.0	124.4	43 34.9	+60.0	125.2	43 00.0	+60.0	126.0	43
44	47 49.0	+59.4	119.9	47 18.7	+59.5	120.9	46 47.5	+59.7	121.8	46 15.5	+59.8	122.7	45 42.7	+59.9	123.5	45 09.2	+59.9	124.4	44 34.9	+60.0	125.2	44 00.0	+60.0	126.0	44
45	48 48.4	+59.3	119.7	48 18.2	+59.5	120.7	47 47.2	+59.6	121.6	47 15.3	+59.8	122.6	46 42.6	+59.9	123.5	46 09.1	+60.0	124.3	45 34.9	+60.0	125.2	45 00.0	+60.0	126.0	45
46	49 47.7	+59.3	119.5	49 17.7	+59.5	120.5	48 46.8	+59.7	121.5	48 15.1	+59.7	122.4	47 42.5	+59.8	123.4	47 09.1	+59.9	124.3	46 34.9	+60.0	125.1	46 00.0	+60.0	126.0	46
47	50 47.0	+59.2	119.2	50 17.2	+59.5	120.3	49 46.5	+59.6	121.3	49 14.8	+59.8	122.3	48 42.3	+59.9	123.3	48 09.0	+60.0	124.2	47 34.9	+60.0	125.1	47 00.0	+60.0	126.0	47
48	51 46.2	+59.2	119.0	51 16.7	+59.4	120.1	50 46.1	+59.6	121.1	50 14.6	+59.8	122.2	49 42.2	+59.9	123.2	49 09.0	+59.9	124.1	48 34.9	+60.0	125.1	48 00.0	+60.0	126.0	48
49	52 45.4	+59.2	118.7	52 16.1	+59.4	119.9	51 45.7	+59.6	121.0	51 14.4	+59.7	122.0	50 42.1	+59.9	123.1	50 08.9	+60.0	124.1	49 34.9	+60.0	125.1	49 00.0	+60.0	126.0	49
50	53 44.6	+59.2	118.4	53 15.5	+59.4	119.6	52 45.3	+59.6	120.8	52 14.1	+59.8	121.9	51 42.0	+59.8	123.0	51 08.9	+59.9	124.0	50 34.9	+59.9	125.0	50 00.0	+60.0	126.0	50
51	54 43.8	+59.1	118.2	54 14.9	+59.3	119.4	53 44.9	+59.6	120.6	53 13.9	+59.7	121.7	52 41.8	+59.9	122.8	52 08.8	+59.9	123.9	51 34.8	+60.0	125.0	51 00.0	+60.0	126.0	51
52	55 42.9	+59.0	117.8	55 14.2	+59.4	119.1	54 44.5	+59.5	120.4	54 13.6	+59.7	121.6	53 41.7	+59.8	122.7	53 08.7	+60.0	123.9	52 34.8	+60.0	124.9	52 00.0	+60.0	126.0	52
53	56 41.9	+59.0	117.5	56 13.6	+59.2	118.9	55 44.0	+59.5	120.1	55 13.3	+59.7	121.4	54 41.5	+59.8	122.6	54 08.7	+59.9	123.8	53 34.8	+60.0	124.9	53 00.0	+60.0	126.0	53
54	57 40.9	+58.9	117.2	57 12.8	+59.3	118.6	56 43.5	+59.5	119.9	56 13.0	+59.7	121.2	55 41.3	+59.9	122.5	55 08.6	+59.9	123.7	54 34.8	+60.0	124.9	54 00.0	+60.0	126.0	54
55	58 39.8	+58.9	116.8	58 12.1	+59.2	118.3	57 43.0	+59.5	119.7	57 12.7	+59.6	121.0	56 41.2	+59.8	122.3	56 08.5	+59.9	123.6	55 34.8	+59.9	124.8	55 00.0	+60.0	126.0	55
56	59 38.7	+58.8	116.5	59 11.3	+59.1	118.0	58 42.5	+59.4	119.4	58 12.3	+59.7	120.8	57 41.0	+59.8	122.2	57 08.4	+59.9	123.5	56 34.7	+60.0	124.8	56 00.0	+60.0	126.0	56
57	60 37.5	+58.8	116.1	60 10.4	+59.1	117.6	59 41.9	+59.4	119.2	59 12.0	+59.6	120.6	58 40.8	+59.8	122.0	58 08.3	+60.0	123.4	57 34.7	+60.0	124.7	57 00.0	+60.0	126.0	57
58	61 36.3	+58.6	115.6	61 09.5	+59.1	117.3	60 41.3	+59.3	118.9	60 11.6	+59.6	120.4	59 40.6	+59.8	121.9	59 08.3	+59.9	123.3	58 34.7	+60.0	124.7	58 00.0	+60.0	126.0	58
59	62 34.9	+58.6	115.2	62 08.6	+58.9	116.9	61 40.6	+59.4	118.6	61 11.2	+59.6	120.2	60 40.4	+59.7	121.7	60 08.2	+59.9	123.2	59 34.7	+60.0	124.6	59 00.0	+60.0	126.0	59
60	63 33.5	+58.4	114.7	63 07.5	+59.0	116.5	62 40.0	+59.2	118.2	62 10.8	+59.5	119.9	61 40.1	+59.8	121.5	61 08.1	+59.9	123.1	60 34.7	+59.9	124.6	60 00.0	+60.0	126.0	60
61	64 31.9	+58.4	114.2	64 06.5	+58.8	116.1	63 39.2	+59.2	117.9	63 10.3	+59.5	119.6	62 39.9	+59.7	121.3	62 08.0	+59.8	123.0	61 34.6	+60.0	124.5	61 00.0	+60.0	126.0	61
62	65 30.3	+58.2	113.6	65 05.3	+58.7	115.6	64 38.4	+59.2	117.5	64 09.8	+59.5	119.4	63 39.6	+59.7	121.1	63 07.8	+59.9	122.8	62 34.6	+60.0	124.4	62 00.0	+60.0	126.0	62
63	66 28.5	+58.1	113.0	66 04.0	+58.6	115.1	65 37.6	+59.1	117.1	65 09.3	+59.5	119.1	64 39.3	+59.7	120.9	64 07.7	+59.9	122.7	63 34.6	+59.9	124.4	63 00.0	+60.0	126.0	63
64	67 26.6	+57.9	112.4	67 02.6	+58.5	114.6	66 36.7	+59.0	116.7	66 08.8	+59.3	118.7	65 39.0	+59.7	120.7	65 07.6	+59.9	122.5	64 34.5	+60.0	124.3	64 00.0	+60.0	126.0	64
65	68 24.5	+57.7	111.7	68 01.1	+58.4	114.0	67 35.7	+58.9	116.2	67 08.1	+59.4	118.4	66 38.7	+59.6	120.4	66 07.5	+59.8	122.4	65 34.5	+60.0	124.2	65 00.0	+60.0	126.0	65
66	69 22.2	+57.5	110.9	68 59.5	+58.3	113.4	68 34.6	+58.8	115.7	68 07.5	+59.3	118.0	67 38.3	+59.7	120.1	67 07.3	+59.8	122.2	66 34.5	+59.9	124.1	66 00.0	+60.0	126.0	66
67	70 19.7	+57.2	110.1	69 57.8	+58.0	112.7	69 33.4	+58.7	115.2	69 06.8	+59.2	117.5	68 38.0	+59.5	119.8	68 07.1	+59.9	122.0	67 34.4	+60.0	124.0	67 00.0	+60.0	126.0	67
68	71 16.9	+56.9	109.2	70 55.8	+57.9	111.9	70 32.1	+58.6	114.6	70 06.0	+59.1	117.1	69 37.5	+59.6	119.5	69 07.0	+59.8	121.8	68 34.4	+59.9	123.9	68 00.0	+60.0	126.0	68
69	72 13.8	+56.6	108.2	71 53.7	+57.6	111.1	71 30.7	+58.4	113.9	71 05.1	+59.0	116.6	70 37.1	+59.4	119.1	70 06.8	+59.7	121.5	69 34.3	+60.0	123.8	69 00.0	+60.0	126.0	69
70	73 10.4	+56.2	107.1	72 51.3	+57.3	110.2	72 29.1	+58.2	113.2	72 04.1	+59.0	116.0	71 36.5	+59.5	118.7	71 06.5	+59.8	121.3	70 34.3	+59.9	123.7	70 00.0	+60.0	126.0	70
71	74 06.6	+55.8	105.8	73 48.6	+57.0	109.2	73 27.3	+58.0	112.3	73 03.1	+58.8	115.4	72 36.0	+59.3	118.3	72 06.3	+59.7	121.0	71 34.2	+60.0	123.6	71 00.0	+60.0	126.0	71
72	75 02.4	+55.1	104.4	74 45.6	+56.6	108.0	74 25.3	+57.8	111.4	74 01.9	+58.6	114.7	73 35.3	+59.3	117.8	73 06.0	+59.7	120.7	72 34.2	+59.9	123.4	72 00.0	+60.0	126.0	72
73	75 57.5	+54.5	102.9	75 42.2	+56.1	106.7	75 23.1	+57.4	110.4	75 00.5	+58.4	113.9	74 34.6	+59.2	117.2	74 05.7	+59.7	120.3	73 34.1	+59.9	123.3	73 00.0	+60.0	126.0	73
74	76 52.0	+53.6	101.1	76 38.3	+55.5	105.2	76 20.5	+57.1	109.2	75 58.9	+58.3	113.0	75 33.8	+59.1	116.6	75 05.4	+59.6	119.9	74 34.0	+59.9	123.1	74 00.0	+60.0	126.0	74
75	77 45.6	+52.5	99.0	77 33.8	+54.8	103.5	77 17.6	+56.6	107.8	76 57.2	+57.9	111.9	76 32.9	+58.9	115.8	76 05.0	+59.6	119.5	75 33.9	+59.9	122.9	75 00.0	+60.0	126.0	75
76	78 38.1	+51.3	96.7	78 28.6	+53.9	101.5	78 14.2	+56.0	106.3	77 55.1	+57.6	110.8	77 31.8	+58.7	115.0	77 04.6	+59.4	118.9	76 33.8	+59.9	122.6	76 00.0	+60.0	126.0	76
77	79 29.4	+49.5	93.9	79 22.5	+52.6	99.3	79 10.1	+55.2	104.4	78 52.7	+57.1	109.4	78 30.5	+58.5	114.0	78 04.0	+59.4	118.3	77 33.7	+59.9	122.3	77 00.0	+60.0	126.0	77
78	80 18.9	+47.5 •	90.7	80 15.1	+51.2	96.5	80 05.3	+54.2	102.2	79 49.8	+56.6	107.7	79 29.0	+58.2	112.8	79 03.4	+59.3	117.6	78 33.6	+59.8	122.0	78 00.0	+60.0	126.0	78
79	81 06.4	+44.7 •	86.9	81 06.3	+49.1 •	93.3	80 59.5	+52.9	99.6	80 46.4	+55.7	105.7	80 27.2	+57.8	111.4	80 02.7	+59.1	116.8	79 33.4	+59.8	121.6	79 00.0	+60.0	126.0	79
80	81 51.1	+41.2 •	82.4	81 55.4	+46.5 •	89.4	81 52.4	+50.9 •	96.4	81 42.1	+54.6	103.3	81 25.0	+57.2	109.7	81 01.8	+58.9	115.7	80 33.2	+59.8	121.1	80 00.0	+60.0	126.0	80
81	82 32.3	+36.5 •	77.0	82 41.9	+42.7 •	84.7	82 43.3	+48.5 •	92.5	82 36.7	+53.0	100.2	82 22.2	+56.4	107.6	82 00.7	+58.6	114.4	81 33.0	+59.6	120.6	81 00.0	+60.0	126.0	81
82	83 08.8	+30.6 •	70.7	83 24.6	+37.9 •	78.9	83 31.8	+44.7 •	87.6	83 29.7	+50.7 •	96.3	83 18.6	+55.2	104.9	82 59.3	+58.1	112.7	82 32.6	+59.6	119.8	82 00.0	+60.0	126.0	82
83	83 39.4	+23.1 •	63.2	84 02.5	+31.1 •	71.8	84 16.5	+39.5 •	81.3	84 20.4	+47.2 •	91.3	84 13.8	+53.4 •	101.2	83 57.4	+57.3	110.5	83 32.2	+59.5	118.8	83 00.0	+60.0	126.0	83
84	84 02.5	+14.0 •	54.5	84 33.6	+22.4 •	63.1	84 56.0	+31.9 •	73.2	85 07.6	+41.7 •	84.5	85 07.2	+50.2 •	96.3	84 54.7	+56.2	107.5	84 31.7	+59.2	117.5	84 00.0	+60.0	126.0	84
85	84 16.5	+3.9 •	45.0	84 56.0	+11.6 •	53.0	85 27.9	+21.4 •	63.1	85 49.3	+32.9 •	75.4	85 57.4	+44.7 •	89.2	85 50.9	+53.8 •	103.1	85 30.9	+58.7	115.6	85 00.0	+60.0	126.0	85
86	84 20.4	–6.6 •	34.9	85 07.6	–0.4 •	41.6	85 49.3	+8.1 •	50.8	86 22.2	+19.9 •	63.1	86 42.1	+34.5 •	78.7	86 44.7	+49.0 •	96.2	86 29.6	+57.8	112.7	86 00.0	+60.0	126.0	86
87	84 13.8	–16.4 •	24.9	85 07.2	–12.5 •	29.8	85 57.4	–6.5 •	36.9	86 42.1	+2.6 •	47.4	87 16.6	+17.1 •	63.0	87 33.7	+37.4 •	84.5	87 27.4	+55.0 •	107.5	87 00.0	+60.0	126.0	87
88	83 57.4	–25.2 •	15.6	84 54.7	–23.0 •	18.6	85 50.9	–20.0 •	23.0	86 44.7	–15.1 •	29.8	87 33.7	–6.3 •	41.6	88 11.1	+11.3 •	63.0	88 22.4	+43.1 •	96.2	88 00.0	+60.0	126.0	88
89	83 32.2	–32.2 •	7.2	84 31.7	–31.7 •	8.5	85 30.9	–30.9 •	10.4	86 29.6	–29.6 •	13.3	87 27.4	–27.4 •	18.5	88 22.4	–22.4 •	29.8	89 05.5	–5.5 •	63.0	89 00.0	+60.0	126.0	89
90	83 00.0	–37.8 •	0.0	84 00.0	–38.2 •	0.0	85 00.0	–38.8 •	0.0	86 00.0	–39.5 •	0.0	87 00.0	–40.7 •	0.0	88 00.0	–42.7 •	0.0	89 00.0	–46.9 •	0.0	90 00.0	–60.0	63.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 54°, 306°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 06.5	–59.7	125.8	3 31.3	–59.7	125.9	2 56.2	–59.9	125.9	2 21.0	–59.9	125.9	1 45.8	–60.0	126.0	1 10.5	–60.0	126.0	0 35.3	–60.0	126.0	0 00.0	+60.0	54.0	**0**
1	3 06.8	–59.7	125.9	2 31.6	–59.8	125.9	1 56.3	–59.8	126.0	1 21.1	–59.9	126.0	0 45.8	–59.9	126.0	0 10.5	–59.9	126.0	0 24.7	+60.0	54.0	1 00.0	+60.0	54.0	**1**
2	2 07.1	–59.8	126.0	1 31.8	–59.8	126.0	0 56.5	–59.9	126.0	0 21.2	–59.9	126.0	0 14.1	+60.0	54.0	0 49.4	+60.0	54.0	1 24.7	+60.0	54.0	2 00.0	+60.0	54.0	**2**
3	1 07.3	–59.7	126.1	0 32.0	–59.8	126.1	0 03.4	+59.8	53.9	0 38.7	+59.9	53.9	1 14.1	+59.9	53.9	1 49.4	+60.0	53.9	2 24.7	+60.0	54.0	3 00.0	+60.0	54.0	**3**
4	0 07.6	–59.7	126.2	0 27.8	+59.8	53.8	1 03.2	+59.9	53.8	1 38.6	+59.9	53.8	2 14.0	+60.0	53.9	2 49.4	+60.0	53.9	3 24.7	+60.0	53.9	4 00.0	+60.0	54.0	**4**
5	0 52.1	+59.7	53.7	1 27.6	+59.8	53.7	2 03.1	+59.8	53.8	2 38.5	+59.9	53.8	3 14.0	+59.9	53.8	3 49.4	+59.9	53.9	4 24.7	+60.0	53.9	5 00.0	+60.0	54.0	**5**
6	1 51.8	+59.7	53.6	2 27.4	+59.7	53.6	3 02.9	+59.9	53.7	3 38.4	+59.9	53.7	4 13.9	+60.0	53.8	4 49.3	+60.0	53.8	5 24.7	+60.0	53.9	6 00.0	+60.0	54.0	**6**
7	2 51.5	+59.7	53.5	3 27.1	+59.8	53.6	4 02.8	+59.8	53.6	4 38.3	+59.9	53.7	5 13.9	+59.9	53.7	5 49.3	+60.0	53.8	6 24.7	+60.0	53.9	7 00.0	+60.0	54.0	**7**
8	3 51.2	+59.7	53.4	4 26.9	+59.8	53.5	5 02.6	+59.9	53.5	5 38.2	+59.9	53.6	6 13.8	+59.9	53.7	6 49.3	+60.0	53.8	7 24.7	+60.0	53.9	8 00.0	+60.0	54.0	**8**
9	4 50.9	+59.7	53.3	5 26.7	+59.8	53.4	6 02.5	+59.8	53.5	6 38.1	+59.9	53.6	7 13.7	+60.0	53.7	7 49.3	+59.9	53.8	8 24.7	+60.0	53.9	9 00.0	+60.0	54.0	**9**
10	5 50.6	+59.7	53.2	6 26.5	+59.8	53.3	7 02.3	+59.9	53.4	7 38.0	+59.9	53.5	8 13.7	+59.9	53.6	8 49.2	+60.0	53.7	9 24.7	+60.0	53.9	10 00.0	+60.0	54.0	**10**
11	6 50.3	+59.7	53.1	7 26.3	+59.8	53.2	8 02.2	+59.8	53.3	8 37.9	+60.0	53.4	9 13.6	+60.0	53.6	9 49.2	+60.0	53.7	10 24.7	+60.0	53.8	11 00.0	+60.0	54.0	**11**
12	7 50.0	+59.7	53.0	8 26.1	+59.7	53.1	9 02.0	+59.9	53.3	9 37.9	+59.9	53.4	10 13.6	+59.9	53.5	10 49.2	+60.0	53.7	11 24.7	+60.0	53.8	12 00.0	+60.0	54.0	**12**
13	8 49.7	+59.7	52.9	9 25.8	+59.8	53.0	10 01.9	+59.8	53.2	10 37.8	+59.9	53.3	11 13.5	+60.0	53.5	11 49.2	+59.9	53.6	12 24.7	+59.9	53.8	13 00.0	+60.0	54.0	**13**
14	9 49.4	+59.7	52.8	10 25.6	+59.8	53.0	11 01.7	+59.8	53.1	11 37.7	+59.9	53.3	12 13.5	+59.9	53.4	12 49.1	+60.0	53.6	13 24.6	+60.0	53.8	14 00.0	+60.0	54.0	**14**
15	10 49.1	+59.7	52.7	11 25.4	+59.8	52.9	12 01.5	+59.9	53.0	12 37.6	+59.9	53.2	13 13.4	+60.0	53.4	13 49.1	+60.0	53.6	14 24.6	+60.0	53.8	15 00.0	+60.0	54.0	**15**
16	11 48.8	+59.7	52.6	12 25.2	+59.7	52.8	13 01.4	+59.8	53.0	13 37.5	+59.8	53.1	14 13.4	+59.9	53.3	14 49.1	+60.0	53.6	15 24.6	+60.0	53.8	16 00.0	+60.0	54.0	**16**
17	12 48.5	+59.7	52.5	13 24.9	+59.8	52.7	14 01.2	+59.9	52.9	14 37.3	+59.9	53.1	15 13.3	+59.9	53.3	15 49.1	+59.9	53.5	16 24.6	+60.0	53.8	17 00.0	+60.0	54.0	**17**
18	13 48.2	+59.7	52.4	14 24.7	+59.8	52.6	15 01.1	+59.8	52.8	15 37.2	+59.9	53.0	16 13.2	+60.0	53.3	16 49.0	+60.0	53.5	17 24.6	+60.0	53.7	18 00.0	+60.0	54.0	**18**
19	14 47.9	+59.7	52.3	15 24.5	+59.8	52.5	16 00.9	+59.8	52.7	16 37.1	+59.9	53.0	17 13.2	+59.9	53.2	17 49.0	+60.0	53.5	18 24.6	+60.0	53.7	19 00.0	+60.0	54.0	**19**
20	15 47.6	+59.6	52.2	16 24.3	+59.7	52.4	17 00.7	+59.9	52.7	17 37.0	+59.9	52.9	18 13.1	+60.0	53.2	18 49.0	+60.0	53.4	19 24.6	+60.0	53.7	20 00.0	+60.0	54.0	**20**
21	16 47.2	+59.7	52.1	17 24.0	+59.8	52.3	18 00.6	+59.8	52.6	18 36.9	+59.9	52.8	19 13.1	+59.9	53.1	19 49.0	+59.9	53.4	20 24.6	+60.0	53.7	21 00.0	+60.0	54.0	**21**
22	17 46.9	+59.7	52.0	18 23.8	+59.7	52.2	19 00.4	+59.8	52.5	19 36.8	+59.9	52.8	20 13.0	+59.9	53.1	20 48.9	+60.0	53.4	21 24.6	+60.0	53.7	22 00.0	+60.0	54.0	**22**
23	18 46.6	+59.7	51.9	19 23.5	+59.8	52.1	20 00.2	+59.9	52.4	20 36.7	+59.9	52.7	21 12.9	+60.0	53.0	21 48.9	+60.0	53.3	22 24.6	+60.0	53.7	23 00.0	+60.0	54.0	**23**
24	19 46.3	+59.6	51.8	20 23.3	+59.7	52.0	21 00.1	+59.8	52.3	21 36.6	+59.9	52.7	22 12.9	+59.9	53.0	22 48.9	+59.9	53.3	23 24.6	+60.0	53.6	24 00.0	+60.0	54.0	**24**
25	20 45.9	+59.7	51.6	21 23.0	+59.8	51.9	21 59.9	+59.8	52.3	22 36.5	+59.9	52.6	23 12.8	+59.9	52.9	23 48.8	+60.0	53.3	24 24.6	+60.0	53.6	25 00.0	+60.0	54.0	**25**
26	21 45.6	+59.7	51.5	22 22.8	+59.7	51.8	22 59.7	+59.9	52.2	23 36.4	+59.9	52.5	24 12.7	+60.0	52.9	24 48.8	+60.0	53.2	25 24.6	+60.0	53.6	26 00.0	+60.0	54.0	**26**
27	22 45.3	+59.6	51.4	23 22.5	+59.8	51.7	23 59.6	+59.8	52.1	24 36.3	+59.9	52.5	25 12.7	+59.9	52.8	25 48.8	+60.0	53.2	26 24.6	+60.0	53.6	27 00.0	+60.0	54.0	**27**
28	23 44.9	+59.7	51.3	24 22.3	+59.7	51.6	24 59.4	+59.8	52.0	25 36.2	+59.8	52.4	26 12.6	+59.9	52.8	26 48.8	+59.9	53.2	27 24.6	+59.9	53.6	28 00.0	+60.0	54.0	**28**
29	24 44.6	+59.6	51.2	25 22.0	+59.8	51.5	25 59.2	+59.8	51.9	26 36.0	+59.9	52.3	27 12.5	+60.0	52.7	27 48.7	+60.0	53.1	28 24.5	+60.0	53.6	29 00.0	+60.0	54.0	**29**
30	25 44.2	+59.6	51.1	26 21.8	+59.7	51.4	26 59.0	+59.8	51.8	27 35.9	+59.9	52.2	28 12.5	+59.9	52.7	28 48.7	+60.0	53.1	29 24.5	+60.0	53.5	30 00.0	+60.0	54.0	**30**
31	26 43.8	+59.7	50.9	27 21.5	+59.7	51.3	27 58.8	+59.8	51.7	28 35.8	+59.9	52.2	29 12.4	+59.9	52.6	29 48.7	+59.9	53.1	30 24.5	+60.0	53.5	31 00.0	+60.0	54.0	**31**
32	27 43.5	+59.6	50.8	28 21.2	+59.7	51.2	28 58.6	+59.8	51.7	29 35.7	+59.8	52.1	30 12.3	+60.0	52.5	30 48.6	+60.0	53.0	31 24.5	+60.0	53.5	32 00.0	+60.0	54.0	**32**
33	28 43.1	+59.6	50.7	29 20.9	+59.8	51.1	29 58.4	+59.8	51.6	30 35.5	+59.9	52.0	31 12.3	+59.9	52.5	31 48.6	+60.0	53.0	32 24.5	+60.0	53.5	33 00.0	+60.0	54.0	**33**
34	29 42.7	+59.6	50.6	30 20.7	+59.7	51.0	30 58.2	+59.8	51.5	31 35.4	+59.9	51.9	32 12.2	+59.9	52.4	32 48.6	+59.9	52.9	33 24.5	+60.0	53.5	34 00.0	+60.0	54.0	**34**
35	30 42.3	+59.6	50.4	31 20.4	+59.7	50.9	31 58.0	+59.8	51.4	32 35.3	+59.8	51.9	33 12.1	+59.9	52.4	33 48.5	+60.0	52.9	34 24.5	+60.0	53.4	35 00.0	+60.0	54.0	**35**
36	31 41.9	+59.6	50.3	32 20.1	+59.7	50.8	32 57.8	+59.8	51.3	33 35.1	+59.9	51.8	34 12.0	+60.0	52.3	34 48.5	+60.0	52.9	35 24.5	+60.0	53.4	36 00.0	+60.0	54.0	**36**
37	32 41.5	+59.6	50.2	33 19.8	+59.6	50.7	33 57.6	+59.8	51.2	34 35.0	+59.9	51.7	35 12.0	+59.9	52.2	35 48.5	+59.9	52.8	36 24.5	+60.0	53.4	37 00.0	+60.0	54.0	**37**
38	33 41.1	+59.6	50.0	34 19.4	+59.7	50.5	34 57.4	+59.7	51.1	35 34.9	+59.8	51.6	36 11.9	+59.9	52.2	36 48.4	+60.0	52.8	37 24.5	+60.0	53.4	38 00.0	+60.0	54.0	**38**
39	34 40.7	+59.5	49.9	35 19.1	+59.7	50.4	35 57.1	+59.8	51.0	36 34.7	+59.9	51.5	37 11.8	+59.9	52.1	37 48.4	+59.9	52.7	38 24.5	+59.9	53.4	39 00.0	+60.0	54.0	**39**
40	35 40.2	+59.6	49.7	36 18.8	+59.7	50.3	36 56.9	+59.8	50.8	37 34.6	+59.8	51.4	38 11.7	+59.9	52.1	38 48.3	+60.0	52.7	39 24.4	+60.0	53.3	40 00.0	+60.0	54.0	**40**
41	36 39.8	+59.5	49.6	37 18.5	+59.6	50.1	37 56.7	+59.7	50.7	38 34.4	+59.8	51.3	39 11.6	+59.9	52.0	39 48.3	+60.0	52.6	40 24.4	+60.0	53.3	41 00.0	+60.0	54.0	**41**
42	37 39.3	+59.5	49.4	38 18.1	+59.7	50.0	38 56.4	+59.8	50.6	39 34.2	+59.9	51.3	40 11.5	+59.9	51.9	40 48.3	+59.9	52.6	41 24.4	+60.0	53.3	42 00.0	+60.0	54.0	**42**
43	38 38.8	+59.6	49.3	39 17.8	+59.6	49.9	39 56.2	+59.7	50.5	40 34.1	+59.8	51.2	41 11.4	+59.9	51.8	41 48.2	+60.0	52.5	42 24.4	+60.0	53.3	43 00.0	+60.0	54.0	**43**
44	39 38.4	+59.5	49.1	40 17.4	+59.6	49.7	40 55.9	+59.8	50.4	41 33.9	+59.8	51.1	42 11.3	+59.9	51.8	42 48.2	+59.9	52.5	43 24.4	+60.0	53.2	44 00.0	+60.0	54.0	**44**
45	40 37.9	+59.4	48.9	41 17.0	+59.6	49.6	41 55.7	+59.7	50.3	42 33.7	+59.9	51.0	43 11.2	+59.9	51.7	43 48.1	+60.0	52.4	44 24.4	+60.0	53.2	45 00.0	+60.0	54.0	**45**
46	41 37.3	+59.5	48.7	42 16.6	+59.6	49.4	42 55.4	+59.7	50.1	43 33.6	+59.8	50.9	44 11.1	+59.9	51.6	44 48.1	+59.9	52.4	45 24.4	+60.0	53.2	46 00.0	+60.0	54.0	**46**
47	42 36.8	+59.5	48.6	43 16.2	+59.6	49.3	43 55.1	+59.7	50.0	44 33.4	+59.8	50.7	45 11.0	+59.9	51.5	45 48.0	+60.0	52.3	46 24.4	+60.0	53.1	47 00.0	+60.0	54.0	**47**
48	43 36.3	+59.4	48.4	44 15.8	+59.6	49.1	44 54.8	+59.7	49.9	45 33.2	+59.8	50.6	46 10.9	+59.9	51.4	46 48.0	+59.9	52.3	47 24.4	+59.9	53.1	48 00.0	+60.0	54.0	**48**
49	44 35.7	+59.4	48.2	45 15.4	+59.6	48.9	45 54.5	+59.7	49.7	46 33.0	+59.8	50.5	47 10.8	+59.9	51.3	47 47.9	+60.0	52.2	48 24.3	+60.0	53.1	49 00.0	+60.0	54.0	**49**
50	45 35.1	+59.4	48.0	46 15.0	+59.5	48.8	46 54.2	+59.7	49.6	47 32.8	+59.8	50.4	48 10.7	+59.9	51.2	48 47.9	+59.9	52.1	49 24.3	+60.0	53.1	50 00.0	+60.0	54.0	**50**
51	46 34.5	+59.4	47.8	47 14.5	+59.5	48.6	47 53.9	+59.6	49.4	48 32.6	+59.7	50.3	49 10.6	+59.8	51.2	49 47.8	+60.0	52.1	50 24.3	+60.0	53.0	51 00.0	+60.0	54.0	**51**
52	47 33.9	+59.3	47.6	48 14.0	+59.5	48.4	48 53.5	+59.7	49.2	49 32.3	+59.8	50.1	50 10.4	+59.9	51.0	50 47.8	+59.9	52.0	51 24.3	+60.0	53.0	52 00.0	+60.0	54.0	**52**
53	48 33.2	+59.3	47.4	49 13.5	+59.5	48.2	49 53.2	+59.6	49.1	50 32.1	+59.8	50.0	51 10.3	+59.9	50.9	51 47.7	+59.9	51.9	52 24.3	+60.0	52.9	53 00.0	+60.0	54.0	**53**
54	49 32.5	+59.3	47.1	50 13.0	+59.5	48.0	50 52.8	+59.6	48.9	51 31.9	+59.7	49.9	52 10.2	+59.8	50.8	52 47.6	+60.0	51.9	53 24.3	+60.0	52.9	54 00.0	+60.0	54.0	**54**
55	50 31.8	+59.3	46.9	51 12.5	+59.4	47.8	51 52.4	+59.6	48.7	52 31.6	+59.7	49.7	53 10.0	+59.9	50.7	53 47.6	+59.9	51.8	54 24.3	+59.9	52.9	55 00.0	+60.0	54.0	**55**
56	51 31.1	+59.2	46.6	52 11.9	+59.4	47.6	52 52.0	+59.6	48.5	53 31.3	+59.8	49.5	54 09.9	+59.8	50.6	54 47.5	+59.9	51.7	55 24.2	+60.0	52.8	56 00.0	+60.0	54.0	**56**
57	52 30.3	+59.2	46.4	53 11.3	+59.4	47.3	53 51.6	+59.6	48.3	54 31.1	+59.7	49.4	55 09.7	+59.8	50.5	55 47.4	+60.0	51.6	56 24.2	+60.0	52.8	57 00.0	+60.0	54.0	**57**
58	53 29.5	+59.1	46.1	54 10.7	+59.4	47.1	54 51.2	+59.5	48.1	55 30.8	+59.7	49.2	56 09.5	+59.9	50.3	56 47.4	+59.9	51.5	57 24.2	+60.0	52.7	58 00.0	+60.0	54.0	**58**
59	54 28.6	+59.1	45.8	55 10.1	+59.3	46.8	55 50.7	+59.5	47.9	56 30.5	+59.7	49.0	57 09.4	+59.8	50.2	57 47.3	+59.9	51.4	58 24.2	+60.0	52.7	59 00.0	+60.0	54.0	**59**
60	55 27.7	+59.1	45.5	56 09.4	+59.3	46.6	56 50.2	+59.5	47.7	57 30.2	+59.6	48.8	58 09.2	+59.8	50.1	58 47.2	+59.9	51.3	59 24.2	+59.9	52.6	60 00.0	+60.0	54.0	**60**
61	56 26.8	+59.0	45.2	57 08.7	+59.2	46.3	57 49.7	+59.4	47.4	58 29.8	+59.6	48.6	59 09.0	+59.8	49.9	59 47.1	+59.9	51.2	60 24.1	+60.0	52.6	61 00.0	+60.0	54.0	**61**
62	57 25.8	+59.0	44.9	58 07.9	+59.2	46.0	58 49.1	+59.5	47.2	59 29.4	+59.7	48.4	60 08.8	+59.7	49.7	60 47.0	+59.9	51.1	61 24.1	+60.0	52.5	62 00.0	+60.0	54.0	**62**
63	58 24.8	+58.9	44.5	59 07.1	+59.2	45.7	59 48.6	+59.4	46.9	60 29.1	+59.6	48.2	61 08.5	+59.8	49.6	61 46.9	+59.9	51.0	62 24.1	+59.9	52.4	63 00.0	+60.0	54.0	**63**
64	59 23.7	+58.8	44.2	60 06.3	+59.1	45.4	60 48.0	+59.3	46.6	61 28.7	+59.5	48.0	62 08.3	+59.7	49.4	62 46.8	+59.9	50.8	63 24.0	+60.0	52.4	64 00.0	+60.0	54.0	**64**
65	60 22.5	+58.8	43.8	61 05.4	+59.0	45.0	61 47.3	+59.3	46.3	62 28.2	+59.6	47.7	63 08.0	+59.8	49.2	63 46.7	+59.8	50.7	64 24.0	+60.0	52.3	65 00.0	+60.0	54.0	**65**
66	61 21.3	+58.6	43.3	62 04.4	+59.0	44.6	62 46.6	+59.3	46.0	63 27.8	+59.5	47.4	64 07.8	+59.7	48.9	64 46.5	+59.9	50.5	65 24.0	+59.9	52.2	66 00.0	+60.0	54.0	**66**
67	62 19.9	+58.6	42.9	63 03.4	+58.9	44.2	63 45.9	+59.2	45.6	64 27.3	+59.4	47.1	65 07.5	+59.7	48.7	65 46.4	+59.8	50.4	66 23.9	+60.0	52.1	67 00.0	+60.0	54.0	**67**
68	63 18.5	+58.5	42.4	64 02.3	+58.8	43.8	64 45.1	+59.1	45.3	65 26.7	+59.4	46.8	66 07.2	+59.6	48.5	66 46.2	+59.9	50.2	67 23.9	+60.0	52.1	68 00.0	+60.0	54.0	**68**
69	64 17.0	+58.4	41.9	65 01.1	+58.8	43.4	65 44.2	+59.1	44.9	66 26.1	+59.4	46.5	67 06.8	+59.6	48.2	67 46.1	+59.8	50.0	68 23.9	+59.9	52.0	69 00.0	+60.0	54.0	**69**
70	65 15.4	+58.2	41.4	65 59.9	+58.6	42.9	66 43.3	+59.0	44.4	67 25.5	+59.3	46.1	68 06.4	+59.6	47.9	68 45.9	+59.8	49.8	69 23.8	+60.0	51.8	70 00.0	+60.0	54.0	**70**
71	66 13.6	+58.1	40.8	66 58.5	+58.5	42.3	67 42.3	+58.9	44.0	68 24.8	+59.3	45.7	69 06.0	+59.6	47.6	69 45.7	+59.8	49.6	70 23.8	+59.9	51.7	71 00.0	+60.0	54.0	**71**
72	67 11.7	+58.0	40.2	67 57.0	+58.4	41.8	68 41.2	+58.8	43.5	69 24.1	+59.2	45.3	70 05.6	+59.5	47.2	70 45.5	+59.8	49.3	71 23.7	+59.9	51.6	72 00.0	+60.0	54.0	**72**
73	68 09.7	+57.7	39.5	68 55.4	+58.3	41.1	69 40.0	+58.7	42.9	70 23.3	+59.1	44.8	71 05.1	+59.5	46.9	71 45.3	+59.7	49.1	72 23.6	+60.0	51.4	73 00.0	+60.0	54.0	**73**
74	69 07.4	+57.6	38.7	69 53.7	+58.0	40.4	70 38.7	+58.6	42.3	71 22.4	+59.0	44.3	72 04.6	+59.4	46.4	72 45.0	+59.7	48.8	73 23.6	+59.9	51.3	74 00.0	+60.0	54.0	**74**
75	70 05.0	+57.3	37.9	70 51.7	+57.9	39.7	71 37.3	+58.4	41.6	72 21.4	+58.9	43.7	73 04.0	+59.3	46.0	73 44.7	+59.7	48.4	74 23.5	+59.9	51.1	75 00.0	+60.0	54.0	**75**
76	71 02.3	+57.0	37.0	71 49.6	+57.6	38.9	72 35.7	+58.2	40.9	73 20.3	+58.7	43.0	74 03.3	+59.2	45.4	74 44.4	+59.6	48.0	75 23.4	+59.9	50.9	76 00.0	+60.0	54.0	**76**
77	71 59.3	+56.7	36.1	72 47.2	+57.4	38.0	73 33.9	+58.0	40.0	74 19.0	+58.6	42.3	75 02.5	+59.1	44.8	75 44.0	+59.6	47.6	76 23.3	+59.9	50.7	77 00.0	+60.0	54.0	**77**
78	72 56.0	+56.3	35.0	73 44.6	+57.0	36.9	74 31.9	+57.7	39.1	75 17.6	+58.4	41.5	76 01.6	+59.0	44.2	76 43.6	+59.5	47.1	77 23.2	+59.9	50.4	78 00.0	+60.0	54.0	**78**
79	73 52.3	+55.9	33.8	74 41.6	+56.6	35.8	75 29.6	+57.4	38.0	76 16.0	+58.2	40.6	77 00.6	+58.9	43.4	77 43.1	+59.4	46.5	78 23.1	+59.8	50.1	79 00.0	+60.0	54.0	**79**
80	74 48.2	+55.3	32.4	75 38.2	+56.2	34.5	76 27.0	+57.0	36.8	77 14.2	+57.8	39.5	77 59.5	+58.6	42.5	78 42.5	+59.4	45.9	79 22.9	+59.8	49.7	80 00.0	+60.0	54.0	**80**
81	75 43.5	+54.6	30.9	76 34.4	+55.5	33.0	77 24.0	+56.5	35.5	78 12.0	+57.5	38.2	78 58.1	+58.4	41.4	79 41.9	+59.1	45.0	80 22.7	+59.8	49.2	81 00.0	+60.0	54.0	**81**
82	76 38.1	+53.8	29.1	77 29.9	+54.9	31.3	78 20.5	+55.9	33.9	79 09.5	+56.9	36.8	79 56.5	+58.0	40.1	80 41.0	+59.0	44.1	81 22.5	+59.7	48.7	82 00.0	+60.0	54.0	**82**
83	77 31.9	+52.9	27.2	78 24.8	+53.9	29.4	79 16.4	+55.1	32.0	80 06.4	+56.4	35.0	80 54.5	+57.5	38.6	81 40.0	+58.7	42.9	82 22.2	+59.6	47.9	83 00.0	+60.0	54.0	**83**
84	78 24.8	+51.6	24.9	79 18.7	+52.8	27.1	80 11.5	+54.0	29.8	81 02.8	+55.4	32.9	81 52.0	+56.9	36.7	82 38.7	+58.3	41.3	83 21.8	+59.4	47.0	84 00.0	+60.0	54.0	**84**
85	79 16.4	+50.0	22.3	80 11.5	+51.3	24.5	81 05.5	+52.7	27.1	81 58.2	+54.2	30.3	82 48.9	+55.9	34.3	83 37.0	+57.7	39.4	84 21.2	+59.3	45.8	85 00.0	+60.0	54.0	**85**
86	80 06.4	*+48.1* •	19.2	81 02.8	*+49.2* •	21.3	81 58.2	*+50.7* •	23.8	82 52.4	*+52.4* •	27.1	83 44.8	+54.5	31.2	84 34.7	+56.6	36.7	85 20.5	+58.8	44.0	86 00.0	+60.0	54.0	**86**
87	80 54.5	*+45.5* •	15.5	81 52.0	*+46.7* •	17.4	82 48.9	*+48.1* •	19.8	83 44.8	*+49.9* •	22.9	84 39.3	*+52.0* •	27.0	85 31.3	*+54.9* •	32.8	86 19.3	+58.0	41.3	87 00.0	+60.0	54.0	**87**
88	81 40.0	*+42.2* •	11.2	82 38.7	*+43.1* •	12.7	83 37.0	*+44.2* •	14.7	84 34.7	*+45.8* •	17.4	85 31.3	*+48.0* •	21.2	86 26.2	*+51.1* •	27.0	87 17.3	*+55.8* •	36.6	88 00.0	+60.0	54.0	**88**
89	82 22.2	*+37.8* •	6.1	83 21.8	*+38.2* •	7.0	84 21.2	*+38.8* •	8.3	85 20.5	*+39.5* •	10.0	86 19.3	*+40.7* •	12.7	87 17.3	*+42.7* •	17.4	88 13.1	*+46.9* •	27.0	89 00.0	+60.0	54.0	**89**
90	83 00.0	*+32.2* •	0.0	84 00.0	*+31.7* •	0.0	85 00.0	*+30.9* •	0.0	86 00.0	*+29.6* •	0.0	87 00.0	*+27.4* •	0.0	88 00.0	*+22.4* •	0.0	89 00.0	*+5.5* •	0.0	90 00.0	–60.0	27.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 126°, 234°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 00.5	+59.7	124.8	3 26.2	+59.8	124.9	2 51.9	+59.9	124.9	2 17.6	+59.9	124.9	1 43.2	+60.0	125.0	1 08.8	+60.0	125.0	0 34.4	+60.0	125.0	0 00.0	+60.0	125.0	0
1	5 00.2	+59.7	124.7	4 26.0	+59.8	124.8	3 51.8	+59.8	124.8	3 17.5	+59.9	124.9	2 43.2	+59.9	124.9	2 08.8	+60.0	125.0	1 34.4	+60.0	125.0	1 00.0	+60.0	125.0	1
2	5 59.9	+59.7	124.6	5 25.8	+59.8	124.7	4 51.6	+59.9	124.8	4 17.4	+59.9	124.8	3 43.1	+59.9	124.9	3 08.8	+59.9	124.9	2 34.4	+60.0	125.0	2 00.0	+60.0	125.0	2
3	6 59.6	+59.7	124.5	6 25.6	+59.7	124.6	5 51.5	+59.8	124.7	5 17.3	+59.9	124.8	4 43.0	+60.0	124.8	4 08.7	+60.0	124.9	3 34.4	+60.0	125.0	3 00.0	+60.0	125.0	3
4	7 59.3	+59.7	124.4	7 25.3	+59.8	124.5	6 51.3	+59.9	124.6	6 17.2	+59.9	124.7	5 43.0	+59.9	124.8	5 08.7	+60.0	124.9	4 34.4	+60.0	124.9	4 00.0	+60.0	125.0	4
5	8 59.0	+59.7	124.3	8 25.1	+59.8	124.4	7 51.2	+59.8	124.5	7 17.1	+59.9	124.6	6 42.9	+60.0	124.7	6 08.7	+60.0	124.8	5 34.4	+60.0	124.9	5 00.0	+60.0	125.0	5
6	9 58.7	+59.7	124.2	9 24.9	+59.8	124.3	8 51.0	+59.8	124.5	8 17.0	+59.9	124.6	7 42.9	+59.9	124.7	7 08.7	+59.9	124.8	6 34.4	+60.0	124.9	6 00.0	+60.0	125.0	6
7	10 58.4	+59.7	124.1	10 24.7	+59.7	124.2	9 50.8	+59.9	124.4	9 16.9	+59.9	124.5	8 42.8	+60.0	124.7	8 08.6	+60.0	124.8	7 34.4	+60.0	124.9	7 00.0	+60.0	125.0	7
8	11 58.1	+59.6	124.0	11 24.4	+59.8	124.2	10 50.7	+59.8	124.3	10 16.8	+59.9	124.5	9 42.8	+59.9	124.6	9 08.6	+60.0	124.8	8 34.4	+60.0	124.9	8 00.0	+60.0	125.0	8
9	12 57.7	+59.7	123.9	12 24.2	+59.8	124.1	11 50.5	+59.9	124.2	11 16.7	+59.9	124.4	10 42.7	+60.0	124.6	10 08.6	+60.0	124.7	9 34.4	+60.0	124.9	9 00.0	+60.0	125.0	9
10	13 57.4	+59.7	123.8	13 24.0	+59.7	124.0	12 50.4	+59.8	124.2	12 16.6	+59.9	124.4	11 42.7	+59.9	124.5	11 08.6	+59.9	124.7	10 34.4	+59.9	124.9	10 00.0	+60.0	125.0	10
11	14 57.1	+59.7	123.7	14 23.7	+59.8	123.9	13 50.2	+59.8	124.1	13 16.5	+59.9	124.3	12 42.6	+59.9	124.5	12 08.5	+60.0	124.7	11 34.3	+60.0	124.8	11 00.0	+60.0	125.0	11
12	15 56.8	+59.7	123.6	15 23.5	+59.8	123.8	14 50.0	+59.9	124.0	14 16.4	+59.9	124.2	13 42.5	+60.0	124.4	13 08.5	+60.0	124.6	12 34.3	+60.0	124.8	12 00.0	+60.0	125.0	12
13	16 56.5	+59.6	123.5	16 23.3	+59.7	123.7	15 49.9	+59.8	123.9	15 16.3	+59.9	124.2	14 42.5	+59.9	124.4	14 08.5	+60.0	124.6	13 34.3	+60.0	124.8	13 00.0	+60.0	125.0	13
14	17 56.1	+59.7	123.3	17 23.0	+59.8	123.6	16 49.7	+59.8	123.9	16 16.2	+59.9	124.1	15 42.4	+60.0	124.3	15 08.5	+59.9	124.6	14 34.3	+60.0	124.8	14 00.0	+60.0	125.0	14
15	18 55.8	+59.7	123.2	18 22.8	+59.7	123.5	17 49.5	+59.9	123.8	17 16.1	+59.9	124.0	16 42.4	+59.9	124.3	16 08.4	+60.0	124.5	15 34.3	+60.0	124.8	15 00.0	+60.0	125.0	15
16	19 55.5	+59.6	123.1	19 22.5	+59.8	123.4	18 49.4	+59.8	123.7	18 16.0	+59.8	124.0	17 42.3	+59.9	124.3	17 08.4	+60.0	124.5	16 34.3	+60.0	124.8	16 00.0	+60.0	125.0	16
17	20 55.1	+59.7	123.0	20 22.3	+59.7	123.3	19 49.2	+59.8	123.6	19 15.8	+59.9	123.9	18 42.2	+60.0	124.2	18 08.4	+60.0	124.5	17 34.3	+60.0	124.7	17 00.0	+60.0	125.0	17
18	21 54.8	+59.6	122.9	21 22.0	+59.8	123.2	20 49.0	+59.8	123.5	20 15.7	+59.9	123.9	19 42.2	+59.9	124.2	19 08.4	+59.9	124.4	18 34.3	+60.0	124.7	18 00.0	+60.0	125.0	18
19	22 54.4	+59.7	122.8	22 21.8	+59.7	123.1	21 48.8	+59.9	123.5	21 15.6	+59.9	123.8	20 42.1	+59.9	124.1	20 08.3	+60.0	124.4	19 34.3	+60.0	124.7	19 00.0	+60.0	125.0	19
20	23 54.1	+59.6	122.7	23 21.5	+59.8	123.0	22 48.7	+59.8	123.4	22 15.5	+59.9	123.7	21 42.0	+60.0	124.1	21 08.3	+60.0	124.4	20 34.3	+60.0	124.7	20 00.0	+60.0	125.0	20
21	24 53.7	+59.6	122.5	24 21.3	+59.7	122.9	23 48.5	+59.8	123.3	23 15.4	+59.9	123.7	22 42.0	+59.9	124.0	22 08.3	+59.9	124.3	21 34.3	+60.0	124.7	21 00.0	+60.0	125.0	21
22	25 53.3	+59.7	122.4	25 21.0	+59.7	122.8	24 48.3	+59.8	123.2	24 15.3	+59.9	123.6	23 41.9	+60.0	124.0	23 08.2	+60.0	124.3	22 34.3	+60.0	124.7	22 00.0	+60.0	125.0	22
23	26 53.0	+59.6	122.3	26 20.7	+59.7	122.7	25 48.1	+59.8	123.1	25 15.2	+59.8	123.5	24 41.9	+59.9	123.9	24 08.2	+60.0	124.3	23 34.3	+60.0	124.6	23 00.0	+60.0	125.0	23
24	27 52.6	+59.6	122.2	27 20.4	+59.8	122.6	26 47.9	+59.8	123.0	26 15.0	+59.9	123.4	25 41.8	+59.9	123.9	25 08.2	+60.0	124.2	24 34.3	+59.9	124.6	24 00.0	+60.0	125.0	24
25	28 52.2	+59.6	122.0	28 20.2	+59.7	122.5	27 47.7	+59.8	122.9	27 14.9	+59.9	123.4	26 41.7	+59.9	123.8	26 08.2	+59.9	124.2	25 34.2	+60.0	124.6	25 00.0	+60.0	125.0	25
26	29 51.8	+59.6	121.9	29 19.9	+59.7	122.4	28 47.5	+59.8	122.8	28 14.8	+59.9	123.3	27 41.6	+60.0	123.7	27 08.1	+60.0	124.2	26 34.2	+60.0	124.6	26 00.0	+60.0	125.0	26
27	30 51.4	+59.6	121.8	30 19.6	+59.7	122.3	29 47.3	+59.8	122.8	29 14.7	+59.8	123.2	28 41.6	+59.9	123.7	28 08.1	+60.0	124.1	27 34.2	+60.0	124.6	27 00.0	+60.0	125.0	27
28	31 51.0	+59.6	121.6	31 19.3	+59.7	122.2	30 47.1	+59.8	122.7	30 14.5	+59.9	123.2	29 41.5	+59.9	123.6	29 08.1	+59.9	124.1	28 34.2	+60.0	124.6	28 00.0	+60.0	125.0	28
29	32 50.6	+59.5	121.5	32 19.0	+59.7	122.0	31 46.9	+59.8	122.6	31 14.4	+59.9	123.1	30 41.4	+60.0	123.6	30 08.0	+60.0	124.1	29 34.2	+60.0	124.5	29 00.0	+60.0	125.0	29
30	33 50.1	+59.6	121.3	33 18.7	+59.6	121.9	32 46.7	+59.8	122.5	32 14.3	+59.8	123.0	31 41.4	+59.9	123.5	31 08.0	+60.0	124.0	30 34.2	+60.0	124.5	30 00.0	+60.0	125.0	30
31	34 49.7	+59.5	121.2	34 18.3	+59.7	121.8	33 46.5	+59.8	122.4	33 14.1	+59.9	122.9	32 41.3	+59.9	123.5	32 08.0	+59.9	124.0	31 34.2	+60.0	124.5	31 00.0	+60.0	125.0	31
32	35 49.2	+59.6	121.0	35 18.0	+59.7	121.7	34 46.3	+59.7	122.3	34 14.0	+59.8	122.8	33 41.2	+59.9	123.4	33 07.9	+60.0	123.9	32 34.2	+60.0	124.5	32 00.0	+60.0	125.0	32
33	36 48.8	+59.5	120.9	36 17.7	+59.6	121.5	35 46.0	+59.8	122.1	35 13.8	+59.9	122.7	34 41.1	+59.9	123.3	34 07.9	+60.0	123.9	33 34.2	+60.0	124.5	33 00.0	+60.0	125.0	33
34	37 48.3	+59.5	120.7	37 17.3	+59.7	121.4	36 45.8	+59.7	122.0	36 13.7	+59.8	122.7	35 41.0	+60.0	123.3	35 07.9	+59.9	123.9	34 34.2	+60.0	124.4	34 00.0	+60.0	125.0	34
35	38 47.8	+59.5	120.6	38 17.0	+59.6	121.3	37 45.5	+59.8	121.9	37 13.5	+59.9	122.6	36 41.0	+59.9	123.2	36 07.8	+60.0	123.8	35 34.2	+60.0	124.4	35 00.0	+60.0	125.0	35
36	39 47.3	+59.5	120.4	39 16.6	+59.6	121.1	38 45.3	+59.7	121.8	38 13.4	+59.8	122.5	37 40.9	+59.9	123.1	37 07.8	+59.9	123.8	36 34.2	+59.9	124.4	36 00.0	+60.0	125.0	36
37	40 46.8	+59.5	120.2	40 16.2	+59.7	121.0	39 45.0	+59.8	121.7	39 13.2	+59.8	122.4	38 40.8	+59.9	123.1	38 07.7	+60.0	123.7	37 34.1	+60.0	124.4	37 00.0	+60.0	125.0	37
38	41 46.3	+59.4	120.1	41 15.9	+59.6	120.8	40 44.8	+59.7	121.6	40 13.0	+59.9	122.3	39 40.7	+59.9	123.0	39 07.7	+60.0	123.7	38 34.1	+60.0	124.4	38 00.0	+60.0	125.0	38
39	42 45.7	+59.4	119.9	42 15.5	+59.6	120.7	41 44.5	+59.7	121.4	41 12.9	+59.8	122.2	40 40.6	+59.9	122.9	40 07.7	+59.9	123.6	39 34.1	+60.0	124.3	39 00.0	+60.0	125.0	39
40	43 45.1	+59.5	119.7	43 15.1	+59.5	120.5	42 44.2	+59.7	121.3	42 12.7	+59.8	122.1	41 40.5	+59.9	122.8	41 07.6	+60.0	123.6	40 34.1	+60.0	124.3	40 00.0	+60.0	125.0	40
41	44 44.6	+59.4	119.5	44 14.6	+59.6	120.3	43 43.9	+59.7	121.2	43 12.5	+59.8	122.0	42 40.4	+59.9	122.8	42 07.6	+59.9	123.5	41 34.1	+60.0	124.3	41 00.0	+60.0	125.0	41
42	45 44.0	+59.3	119.3	45 14.2	+59.5	120.2	44 43.6	+59.7	121.0	44 12.3	+59.8	121.9	43 40.3	+59.9	122.7	43 07.5	+60.0	123.5	42 34.1	+60.0	124.3	42 00.0	+60.0	125.0	42
43	46 43.3	+59.4	119.1	46 13.7	+59.6	120.0	45 43.3	+59.7	120.9	45 12.1	+59.8	121.8	44 40.2	+59.9	122.6	44 07.5	+59.9	123.4	43 34.1	+60.0	124.2	43 00.0	+60.0	125.0	43
44	47 42.7	+59.3	118.9	47 13.3	+59.5	119.8	46 43.0	+59.7	120.7	46 11.9	+59.8	121.6	45 40.1	+59.9	122.5	45 07.4	+60.0	123.4	44 34.1	+60.0	124.2	44 00.0	+60.0	125.0	44
45	48 42.0	+59.3	118.6	48 12.8	+59.5	119.6	47 42.7	+59.6	120.6	47 11.7	+59.8	121.5	46 40.0	+59.8	122.4	46 07.4	+59.9	123.3	45 34.1	+59.9	124.2	45 00.0	+60.0	125.0	45
46	49 41.3	+59.3	118.4	49 12.3	+59.4	119.4	48 42.3	+59.7	120.4	48 11.5	+59.8	121.4	47 39.8	+59.9	122.3	47 07.3	+60.0	123.3	46 34.0	+60.0	124.1	46 00.0	+60.0	125.0	46
47	50 40.6	+59.2	118.2	50 11.7	+59.5	119.2	49 42.0	+59.6	120.3	49 11.3	+59.8	121.3	48 39.7	+59.9	122.2	48 07.3	+59.9	123.2	47 34.0	+60.0	124.1	47 00.0	+60.0	125.0	47
48	51 39.8	+59.2	117.9	51 11.2	+59.4	119.0	50 41.6	+59.6	120.1	50 11.1	+59.7	121.1	49 39.6	+59.8	122.1	49 07.2	+60.0	123.1	48 34.0	+60.0	124.1	48 00.0	+60.0	125.0	48
49	52 39.0	+59.2	117.6	52 10.6	+59.4	118.8	51 41.2	+59.6	119.9	51 10.8	+59.8	121.0	50 39.4	+59.9	122.0	50 07.2	+59.9	123.1	49 34.0	+60.0	124.0	49 00.0	+60.0	125.0	49
50	53 38.2	+59.1	117.4	53 10.0	+59.4	118.6	52 40.8	+59.6	119.7	52 10.6	+59.7	120.8	51 39.3	+59.9	121.9	51 07.1	+59.9	123.0	50 34.0	+60.0	124.0	50 00.0	+60.0	125.0	50
51	54 37.3	+59.1	117.1	54 09.4	+59.3	118.3	53 40.4	+59.5	119.5	53 10.3	+59.7	120.7	52 39.2	+59.8	121.8	52 07.0	+60.0	122.9	51 34.0	+60.0	124.0	51 00.0	+60.0	125.0	51
52	55 36.4	+59.0	116.8	55 08.7	+59.3	118.1	54 39.9	+59.6	119.3	54 10.0	+59.7	120.5	53 39.0	+59.8	121.7	53 07.0	+59.9	122.8	52 34.0	+59.9	123.9	52 00.0	+60.0	125.0	52
53	56 35.4	+59.0	116.5	56 08.0	+59.3	117.8	55 39.5	+59.5	119.1	55 09.7	+59.7	120.3	54 38.8	+59.9	121.6	54 06.9	+59.9	122.8	53 33.9	+60.0	123.9	53 00.0	+60.0	125.0	53
54	57 34.4	+58.9	116.1	57 07.3	+59.2	117.5	56 39.0	+59.4	118.9	56 09.4	+59.7	120.2	55 38.7	+59.8	121.4	55 06.8	+60.0	122.7	54 33.9	+60.0	123.9	54 00.0	+60.0	125.0	54
55	58 33.3	+58.9	115.8	58 06.5	+59.2	117.2	57 38.4	+59.5	118.6	57 09.1	+59.6	120.0	56 38.5	+59.8	121.3	56 06.8	+59.9	122.6	55 33.9	+60.0	123.8	55 00.0	+60.0	125.0	55
56	59 32.2	+58.7	115.4	59 05.7	+59.2	116.9	58 37.9	+59.4	118.4	58 08.7	+59.7	119.8	57 38.3	+59.8	121.2	57 06.7	+59.9	122.5	56 33.9	+60.0	123.8	56 00.0	+60.0	125.0	56
57	60 30.9	+58.8	115.0	60 04.9	+59.0	116.6	59 37.3	+59.4	118.1	59 08.4	+59.6	119.6	58 38.1	+59.8	121.0	58 06.6	+59.9	122.4	57 33.9	+59.9	123.7	57 00.0	+60.0	125.0	57
58	61 29.7	+58.6	114.6	61 03.9	+59.1	116.2	60 36.7	+59.3	117.8	60 08.0	+59.6	119.3	59 37.9	+59.8	120.8	59 06.5	+59.9	122.3	58 33.8	+60.0	123.7	58 00.0	+60.0	125.0	58
59	62 28.3	+58.5	114.1	62 03.0	+58.9	115.8	61 36.0	+59.3	117.5	61 07.6	+59.5	119.1	60 37.7	+59.7	120.7	60 06.4	+59.9	122.2	59 33.8	+60.0	123.6	59 00.0	+60.0	125.0	59
60	63 26.8	+58.4	113.6	63 01.9	+58.9	115.4	62 35.3	+59.3	117.2	62 07.1	+59.6	118.9	61 37.4	+59.8	120.5	61 06.3	+59.9	122.0	60 33.8	+60.0	123.6	60 00.0	+60.0	125.0	60
61	64 25.2	+58.4	113.1	64 00.8	+58.8	115.0	63 34.6	+59.2	116.8	63 06.7	+59.5	118.6	62 37.2	+59.7	120.3	62 06.2	+59.9	121.9	61 33.8	+59.9	123.5	61 00.0	+60.0	125.0	61
62	65 23.6	+58.1	112.5	64 59.6	+58.7	114.5	64 33.8	+59.1	116.4	64 06.2	+59.4	118.3	63 36.9	+59.7	120.1	63 06.1	+59.9	121.8	62 33.7	+60.0	123.4	62 00.0	+60.0	125.0	62
63	66 21.7	+58.1	111.9	65 58.3	+58.6	114.0	65 32.9	+59.1	116.0	65 05.6	+59.5	118.0	64 36.6	+59.7	119.8	64 06.0	+59.8	121.6	63 33.7	+60.0	123.4	63 00.0	+60.0	125.0	63
64	67 19.8	+57.8	111.3	66 56.9	+58.5	113.5	66 32.0	+59.0	115.6	66 05.1	+59.3	117.7	65 36.3	+59.7	119.6	65 05.8	+59.9	121.5	64 33.7	+59.9	123.3	64 00.0	+60.0	125.0	64
65	68 17.6	+57.7	110.6	67 55.4	+58.3	112.9	67 31.0	+58.9	115.1	67 04.4	+59.4	117.3	66 36.0	+59.6	119.3	66 05.7	+59.8	121.3	65 33.6	+60.0	123.2	65 00.0	+60.0	125.0	65
66	69 15.3	+57.5	109.8	68 53.7	+58.2	112.3	68 29.9	+58.8	114.6	68 03.8	+59.2	116.9	67 35.6	+59.6	119.1	67 05.5	+59.8	121.1	66 33.6	+60.0	123.1	66 00.0	+60.0	125.0	66
67	70 12.8	+57.2	109.0	69 51.9	+58.1	111.6	69 28.7	+58.6	114.1	69 03.0	+59.2	116.5	68 35.2	+59.6	118.8	68 05.3	+59.9	120.9	67 33.6	+59.9	123.0	67 00.0	+60.0	125.0	67
68	71 10.0	+56.9	108.1	70 50.0	+57.8	110.8	70 27.3	+58.6	113.5	70 02.2	+59.1	116.0	69 34.8	+59.5	118.4	69 05.2	+59.8	120.7	68 33.5	+60.0	122.9	68 00.0	+60.0	125.0	68
69	72 06.9	+56.5	107.1	71 47.8	+57.6	110.0	71 25.9	+58.4	112.8	71 01.3	+59.1	115.5	70 34.3	+59.5	118.0	70 05.0	+59.7	120.5	69 33.5	+59.9	122.8	69 00.0	+60.0	125.0	69
70	73 03.4	+56.2	106.0	72 45.4	+57.3	109.1	72 24.3	+58.2	112.1	72 00.4	+58.9	114.9	71 33.8	+59.4	117.6	71 04.7	+59.8	120.2	70 33.4	+60.0	122.7	70 00.0	+60.0	125.0	70
71	73 59.6	+55.7	104.7	73 42.7	+56.9	108.0	73 22.5	+58.0	111.2	72 59.3	+58.7	114.3	72 33.2	+59.3	117.2	72 04.5	+59.7	119.9	71 33.4	+59.9	122.5	71 00.0	+60.0	125.0	71
72	74 55.3	+55.1	103.3	74 39.6	+56.6	106.9	74 20.5	+57.7	110.3	73 58.0	+58.7	113.6	73 32.5	+59.3	116.7	73 04.2	+59.7	119.6	72 33.3	+59.9	122.4	72 00.0	+60.0	125.0	72
73	75 50.4	+54.4	101.8	75 36.2	+56.0	105.6	75 18.2	+57.4	109.3	74 56.7	+58.4	112.8	74 31.8	+59.2	116.1	74 03.9	+59.7	119.3	73 33.2	+59.9	122.2	73 00.0	+60.0	125.0	73
74	76 44.8	+53.5	100.0	76 32.2	+55.5	104.1	76 15.6	+57.0	108.1	75 55.1	+58.2	111.9	75 31.0	+59.0	115.5	75 03.6	+59.6	118.9	74 33.1	+60.0	122.0	74 00.0	+60.0	125.0	74
75	77 38.3	+52.5	98.0	77 27.7	+54.8	102.4	77 12.6	+56.5	106.7	76 53.3	+57.9	110.8	76 30.0	+58.9	114.7	76 03.2	+59.5	118.4	75 33.1	+59.8	121.8	75 00.0	+60.0	125.0	75
76	78 30.8	+51.3	95.6	78 22.5	+53.8	100.5	78 09.1	+56.0	105.2	77 51.2	+57.5	109.6	77 28.9	+58.7	113.9	77 02.7	+59.5	117.9	76 32.9	+59.9	121.6	76 00.0	+60.0	125.0	76
77	79 22.1	+49.5	92.9	79 16.3	+52.6	98.2	79 05.1	+55.1	103.3	78 48.7	+57.1	108.2	78 27.6	+58.5	112.9	78 02.2	+59.4	117.3	77 32.8	+59.9	121.3	77 00.0	+60.0	125.0	77
78	80 11.6	*+47.5* •	89.7	80 08.9	+51.1	95.5	80 00.2	+54.2	101.1	79 45.8	+56.5	106.6	79 26.1	+58.2	111.7	79 01.6	+59.2	116.5	78 32.7	+59.8	121.0	78 00.0	+60.0	125.0	78
79	80 59.1	*+44.8* •	86.0	81 00.0	*+49.2* •	92.3	80 54.4	+52.8	98.5	80 42.3	+55.7	104.6	80 24.3	+57.7	110.3	80 00.8	+59.1	115.7	79 32.5	+59.8	120.6	79 00.0	+60.0	125.0	79
80	81 43.9	*+41.3* •	81.5	81 49.2	*+46.4* •	88.4	81 47.2	*+50.9* •	95.4	81 38.0	+54.6	102.2	81 22.0	+57.2	108.6	80 59.9	+58.9	114.6	80 32.3	+59.8	120.1	80 00.0	+60.0	125.0	80
81	82 25.2	*+36.8* •	76.3	82 35.6	*+42.9* •	83.8	82 38.1	*+48.4* •	91.5	82 32.6	+52.9	99.1	82 19.2	+56.4	106.5	81 58.8	+58.5	113.3	81 32.1	+59.6	119.5	81 00.0	+60.0	125.0	81
82	83 02.0	*+30.9* •	70.0	83 18.5	*+38.0* •	78.1	83 26.5	*+44.8* •	86.6	83 25.5	*+50.7* •	95.3	83 15.6	+55.2	103.7	82 57.3	+58.1	111.6	82 31.7	+59.6	118.7	82 00.0	+60.0	125.0	82
83	83 32.9	*+23.6* •	62.7	83 56.5	*+31.5* •	71.1	84 11.3	*+39.7* •	80.4	84 16.2	*+47.2* •	90.3	84 10.8	*+53.3* •	100.1	83 55.4	+57.3	109.4	83 31.3	+59.4	117.8	83 00.0	+60.0	125.0	83
84	83 56.5	*+14.8* •	54.2	84 28.0	*+23.0* •	62.6	84 51.0	*+32.2* •	72.5	85 03.4	*+41.8* •	83.6	85 04.1	*+50.1* •	95.2	84 52.7	+56.1	106.4	84 30.7	+59.2	116.4	84 00.0	+60.0	125.0	84
85	84 11.3	*+4.9* •	44.8	84 51.0	*+12.4* •	52.7	85 23.2	*+22.0* •	62.6	85 45.2	*+33.3* •	74.6	85 54.2	*+44.8* •	88.2	85 48.8	*+53.9* •	102.0	85 29.9	+58.7	114.5	85 00.0	+60.0	125.0	85
86	84 16.2	*−5.4* •	34.9	85 03.4	*+0.7* •	41.5	85 45.2	*+9.0* •	50.5	86 18.5	*+20.5* •	62.6	86 39.0	*+34.8* •	77.9	86 42.7	*+48.9* •	95.2	86 28.6	+57.7	111.6	86 00.0	+60.0	125.0	86
87	84 10.8	*−15.4* •	25.0	85 04.1	*−11.4* •	29.9	85 54.2	*−5.4* •	36.9	86 39.0	*+3.7* •	47.2	87 13.8	*+17.8* •	62.5	87 31.6	*+37.6* •	83.5	87 26.3	*+55.0* •	106.4	87 00.0	+60.0	125.0	87
88	83 55.4	*−24.1* •	15.7	84 52.7	*−22.0* •	18.7	85 48.8	*−18.9* •	23.1	86 42.7	*−14.1* •	29.9	87 31.6	*−5.3* •	41.5	88 09.2	*+12.1* •	62.5	88 21.3	*+43.3* •	95.1	88 00.0	+60.0	125.0	88
89	83 31.3	*−31.3* •	7.3	84 30.7	*−30.7* •	8.6	85 29.9	*−29.9* •	10.5	86 28.6	*−28.6* •	13.5	87 26.3	*−26.3* •	18.7	88 21.3	*−21.3* •	29.9	89 04.6	*−4.6* •	62.5	89 00.0	+60.0	125.0	89
90	83 00.0	*−37.1* •	0.0	84 00.0	*−37.5* •	0.0	85 00.0	*−38.0* •	0.0	86 00.0	*−38.8* •	0.0	87 00.0	*−40.0* •	0.0	88 00.0	*−42.0* •	0.0	89 00.0	*−46.4* •	0.0	90 00.0	−60.0	62.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 55°, 305°

Dec.	83°			84°			85°			86°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	4 00.5	−59.7	124.8	3 26.2	−59.7	124.9	2 51.9	−59.8	124.9	2 17.6	−59.9	124.9	0
1	3 00.8	−59.7	124.9	2 26.5	−59.8	124.9	1 52.1	−59.9	125.0	1 17.7	−59.9	125.0	1
2	2 01.1	−59.7	125.0	1 26.7	−59.8	125.0	0 52.2	−59.8	125.0	0 17.8	−59.9	125.0	2
3	1 01.4	−59.7	125.1	0 26.9	−59.8	125.1	0 07.6	+59.9	54.9	0 42.1	+59.9	54.9	3
4	0 01.7	−59.7	125.2	0 32.9	+59.8	54.8	1 07.5	+59.8	54.8	1 42.0	+59.9	54.8	4
5	0 58.0	+59.7	54.7	1 32.7	+59.7	54.7	2 07.3	+59.9	54.7	2 41.9	+59.9	54.8	5
6	1 57.7	+59.7	54.6	2 32.4	+59.8	54.6	3 07.2	+59.8	54.7	3 41.8	+59.9	54.7	6
7	2 57.4	+59.7	54.5	3 32.2	+59.8	54.5	4 07.0	+59.8	54.6	4 41.7	+59.9	54.7	7
8	3 57.1	+59.7	54.4	4 32.0	+59.8	54.5	5 06.8	+59.9	54.5	5 41.6	+59.9	54.6	8
9	4 56.8	+59.7	54.3	5 31.8	+59.8	54.4	6 06.7	+59.8	54.5	6 41.5	+59.9	54.5	9
10	5 56.5	+59.7	54.2	6 31.6	+59.7	54.3	7 06.5	+59.9	54.4	7 41.4	+59.9	54.5	10
11	6 56.2	+59.7	54.1	7 31.3	+59.8	54.2	8 06.4	+59.8	54.3	8 41.3	+59.9	54.4	11
12	7 55.9	+59.7	54.0	8 31.1	+59.8	54.1	9 06.2	+59.9	54.2	9 41.2	+59.9	54.4	12
13	8 55.6	+59.7	53.9	9 30.9	+59.8	54.0	10 06.1	+59.8	54.2	10 41.1	+59.9	54.3	13
14	9 55.3	+59.7	53.8	10 30.7	+59.7	53.9	11 05.9	+59.8	54.1	11 41.0	+59.9	54.3	14
15	10 55.0	+59.7	53.7	11 30.4	+59.8	53.8	12 05.7	+59.9	54.0	12 40.9	+59.9	54.2	15
16	11 54.7	+59.6	53.6	12 30.2	+59.8	53.8	13 05.6	+59.8	53.9	13 40.8	+59.9	54.1	16
17	12 54.3	+59.7	53.5	13 30.0	+59.7	53.7	14 05.4	+59.9	53.9	14 40.7	+59.9	54.1	17
18	13 54.0	+59.7	53.4	14 29.7	+59.8	53.6	15 05.3	+59.8	53.8	15 40.6	+59.9	54.0	18
19	14 53.7	+59.7	53.3	15 29.5	+59.8	53.5	16 05.1	+59.8	53.7	16 40.5	+59.9	54.0	19
20	15 53.4	+59.7	53.2	16 29.3	+59.7	53.4	17 04.9	+59.9	53.6	17 40.4	+59.9	53.9	20
21	16 53.1	+59.6	53.1	17 29.0	+59.8	53.3	18 04.8	+59.8	53.6	18 40.3	+59.9	53.8	21
22	17 52.7	+59.7	52.9	18 28.8	+59.7	53.2	19 04.6	+59.8	53.5	19 40.2	+59.9	53.8	22
23	18 52.4	+59.7	52.8	19 28.5	+59.8	53.1	20 04.4	+59.8	53.4	20 40.1	+59.9	53.7	23
24	19 52.1	+59.6	52.7	20 28.3	+59.7	53.0	21 04.2	+59.9	53.3	21 40.0	+59.8	53.6	24
25	20 51.7	+59.7	52.6	21 28.0	+59.8	52.9	22 04.1	+59.8	53.2	22 39.8	+59.9	53.6	25
26	21 51.4	+59.6	52.5	22 27.8	+59.7	52.8	23 03.9	+59.8	53.2	23 39.7	+59.9	53.5	26
27	22 51.0	+59.7	52.4	23 27.5	+59.7	52.7	24 03.7	+59.8	53.1	24 39.6	+59.9	53.4	27
28	23 50.7	+59.6	52.3	24 27.2	+59.8	52.6	25 03.5	+59.8	53.0	25 39.5	+59.9	53.4	28
29	24 50.3	+59.6	52.1	25 27.0	+59.7	52.5	26 03.3	+59.8	52.9	26 39.4	+59.8	53.3	29
30	25 49.9	+59.7	52.0	26 26.7	+59.7	52.4	27 03.1	+59.8	52.8	27 39.2	+59.9	53.2	30
31	26 49.6	+59.6	51.9	27 26.4	+59.7	52.3	28 02.9	+59.8	52.7	28 39.1	+59.9	53.1	31
32	27 49.2	+59.6	51.8	28 26.1	+59.8	52.2	29 02.7	+59.8	52.6	29 39.0	+59.9	53.1	32
33	28 48.8	+59.6	51.6	29 25.9	+59.7	52.1	30 02.5	+59.8	52.5	30 38.9	+59.8	53.0	33
34	29 48.4	+59.6	51.5	30 25.6	+59.7	52.0	31 02.3	+59.8	52.4	31 38.7	+59.9	52.9	34
35	30 48.0	+59.6	51.4	31 25.3	+59.7	51.8	32 02.1	+59.8	52.3	32 38.6	+59.8	52.8	35
36	31 47.6	+59.6	51.2	32 25.0	+59.6	51.7	33 01.9	+59.8	52.2	33 38.4	+59.9	52.8	36
37	32 47.2	+59.5	51.1	33 24.6	+59.7	51.6	34 01.7	+59.8	52.1	34 38.3	+59.9	52.7	37
38	33 46.7	+59.6	51.0	34 24.3	+59.7	51.5	35 01.5	+59.7	52.0	35 38.2	+59.8	52.6	38
39	34 46.3	+59.5	50.8	35 24.0	+59.7	51.4	36 01.2	+59.8	51.9	36 38.0	+59.9	52.5	39
40	35 45.8	+59.6	50.7	36 23.7	+59.6	51.2	37 01.0	+59.8	51.8	37 37.9	+59.8	52.4	40
41	36 45.4	+59.5	50.5	37 23.3	+59.7	51.1	38 00.8	+59.7	51.7	38 37.7	+59.8	52.3	41
42	37 44.9	+59.5	50.3	38 23.0	+59.6	50.9	39 00.5	+59.7	51.6	39 37.5	+59.9	52.2	42
43	38 44.4	+59.5	50.2	39 22.6	+59.6	50.8	40 00.2	+59.8	51.5	40 37.4	+59.8	52.1	43
44	39 43.9	+59.5	50.0	40 22.2	+59.6	50.7	41 00.0	+59.7	51.3	41 37.2	+59.8	52.0	44
45	40 43.4	+59.5	49.8	41 21.8	+59.6	50.5	41 59.7	+59.7	51.2	42 37.0	+59.8	51.9	45
46	41 42.9	+59.4	49.7	42 21.4	+59.6	50.4	42 59.4	+59.7	51.1	43 36.8	+59.8	51.8	46
47	42 42.3	+59.5	49.5	43 21.0	+59.6	50.2	43 59.1	+59.7	50.9	44 36.6	+59.8	51.7	47
48	43 41.8	+59.4	49.3	44 20.6	+59.6	50.0	44 58.8	+59.7	50.8	45 36.4	+59.8	51.6	48
49	44 41.2	+59.4	49.1	45 20.2	+59.5	49.9	45 58.5	+59.7	50.7	46 36.2	+59.8	51.5	49
50	45 40.6	+59.3	48.9	46 19.7	+59.5	49.7	46 58.2	+59.7	50.5	47 36.0	+59.8	51.3	50
51	46 39.9	+59.4	48.7	47 19.2	+59.5	49.5	47 57.9	+59.6	50.3	48 35.8	+59.8	51.2	51
52	47 39.3	+59.3	48.5	48 18.7	+59.5	49.3	48 57.5	+59.7	50.2	49 35.6	+59.7	51.1	52
53	48 38.6	+59.3	48.3	49 18.2	+59.5	49.1	49 57.2	+59.6	50.0	50 35.3	+59.8	50.9	53
54	49 37.9	+59.3	48.0	50 17.7	+59.5	48.9	50 56.8	+59.6	49.8	51 35.1	+59.7	50.8	54
55	50 37.2	+59.2	47.8	51 17.2	+59.4	48.7	51 56.4	+59.6	49.7	52 34.8	+59.8	50.6	55
56	51 36.4	+59.2	47.5	52 16.6	+59.4	48.5	52 56.0	+59.5	49.5	53 34.6	+59.7	50.5	56
57	52 35.6	+59.2	47.3	53 16.0	+59.3	48.2	53 55.5	+59.6	49.3	54 34.3	+59.7	50.3	57
58	53 34.8	+59.1	47.0	54 15.3	+59.4	48.0	54 55.1	+59.5	49.0	55 34.0	+59.7	50.1	58
59	54 33.9	+59.1	46.7	55 14.7	+59.3	47.7	55 54.6	+59.5	48.8	56 33.7	+59.6	50.0	59
60	55 33.0	+59.0	46.4	56 14.0	+59.2	47.5	56 54.1	+59.5	48.6	57 33.3	+59.7	49.8	60
61	56 32.0	+59.0	46.1	57 13.2	+59.3	47.2	57 53.6	+59.4	48.3	58 33.0	+59.6	49.6	61
62	57 31.0	+58.9	45.7	58 12.5	+59.1	46.9	58 53.0	+59.4	48.1	59 32.6	+59.6	49.3	62
63	58 29.9	+58.9	45.4	59 11.6	+59.2	46.6	59 52.4	+59.4	47.8	60 32.2	+59.6	49.1	63
64	59 28.8	+58.8	45.0	60 10.8	+59.0	46.2	60 51.8	+59.3	47.5	61 31.8	+59.5	48.9	64
65	60 27.6	+58.7	44.6	61 09.8	+59.1	45.9	61 51.1	+59.3	47.2	62 31.3	+59.6	48.6	65
66	61 26.3	+58.6	44.2	62 08.9	+58.9	45.5	62 50.4	+59.2	46.9	63 30.9	+59.5	48.3	66
67	62 24.9	+58.6	43.7	63 07.8	+58.9	45.1	63 49.6	+59.2	46.5	64 30.4	+59.4	48.0	67
68	63 23.5	+58.4	43.2	64 06.7	+58.8	44.7	64 48.8	+59.1	46.1	65 29.8	+59.4	47.7	68
69	64 21.9	+58.3	42.7	65 05.5	+58.7	44.2	65 47.9	+59.1	45.7	66 29.2	+59.4	47.4	69
70	65 20.2	+58.2	42.2	66 04.2	+58.6	43.7	66 47.0	+59.0	45.3	67 28.6	+59.3	47.0	70
71	66 18.4	+58.1	41.6	67 02.8	+58.4	43.1	67 46.0	+58.8	44.8	68 27.9	+59.2	46.6	71
72	67 16.5	+57.8	40.9	68 01.2	+58.4	42.6	68 44.8	+58.8	44.3	69 27.1	+59.2	46.2	72
73	68 14.3	+57.7	40.2	68 59.6	+58.2	41.9	69 43.6	+58.6	43.7	70 26.3	+59.0	45.7	73
74	69 12.0	+57.5	39.5	69 57.8	+58.0	41.2	70 42.2	+58.6	43.1	71 25.3	+59.0	45.1	74
75	70 09.5	+57.2	38.7	70 55.8	+57.8	40.5	71 40.8	+58.3	42.4	72 24.3	+58.9	44.5	75
76	71 06.7	+56.9	37.7	71 53.6	+57.5	39.6	72 39.1	+58.2	41.7	73 23.2	+58.7	43.9	76
77	72 03.6	+56.6	36.7	72 51.1	+57.3	38.7	73 37.3	+57.9	40.8	74 21.9	+58.5	43.1	77
78	73 00.2	+56.2	35.6	73 48.4	+56.9	37.6	74 35.2	+57.6	39.9	75 20.4	+58.4	42.3	78
79	73 56.4	+55.7	34.4	74 45.3	+56.5	36.5	75 32.8	+57.3	38.8	76 18.8	+58.1	41.3	79
80	74 52.1	+55.1	33.0	75 41.8	+56.0	35.2	76 30.1	+56.9	37.5	77 16.9	+57.7	40.2	80
81	75 47.2	+54.5	31.5	76 37.8	+55.4	33.7	77 27.0	+56.4	36.1	78 14.6	+57.4	39.0	81
82	76 41.7	+53.6	29.7	77 33.2	+54.7	31.9	78 23.4	+55.8	34.5	79 12.0	+56.9	37.5	82
83	77 35.3	+52.6	27.7	78 27.9	+53.7	29.9	79 19.2	+54.9	32.6	80 08.9	+56.1	35.7	83
84	78 27.9	+51.3	25.4	79 21.6	+52.5	27.6	80 14.1	+53.8	30.3	81 05.0	+55.3	33.5	84
85	79 19.2	+49.7	22.7	80 14.1	+50.9	24.9	81 07.9	+52.4	27.6	82 00.3	+54.0	30.9	85
86	80 08.9	*+47.6* •	19.5	81 05.0	*+48.9* •	21.6	82 00.3	*+50.4* •	24.3	82 54.3	*+52.2* •	27.6	86
87	80 56.5	*+44.9* •	15.8	81 53.9	*+46.2* •	17.7	82 50.7	*+47.6* •	20.1	83 46.5	*+49.4* •	23.3	87
88	81 41.4	*+41.5* •	11.4	82 40.1	*+42.4* •	12.9	83 38.3	*+43.7* •	15.0	84 35.9	*+45.3* •	17.7	88
89	82 22.9	*+37.1* •	6.2	83 22.5	*+37.5* •	7.1	84 22.0	*+38.0* •	8.4	85 21.2	*+38.8* •	10.2	89
90	83 00.0	*+31.3* •	0.0	84 00.0	*+30.7* •	0.0	85 00.0	*+29.9* •	0.0	86 00.0	*+28.6* •	0.0	90
	83°			84°			85°			86°			

Dec.	87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 43.2	−59.9	125.0	1 08.8	−60.0	125.0	0 34.4	−60.0	125.0	0 00.0	+60.0	55.0	0
1	0 43.3	−60.0	125.0	0 08.8	−59.9	125.0	0 25.6	+60.0	55.0	1 00.0	+60.0	55.0	1
2	0 16.7	+59.9	55.0	0 51.1	+60.0	55.0	1 25.6	+60.0	55.0	2 00.0	+60.0	55.0	2
3	1 16.6	+60.0	54.9	1 51.1	+60.0	54.9	2 25.6	+60.0	55.0	3 00.0	+60.0	55.0	3
4	2 16.6	+59.9	54.9	2 51.1	+60.0	54.9	3 25.6	+60.0	54.9	4 00.0	+60.0	55.0	4
5	3 16.5	+60.0	54.8	3 51.1	+59.9	54.9	4 25.6	+59.9	54.9	5 00.0	+60.0	55.0	5
6	4 16.5	+59.9	54.8	4 51.0	+60.0	54.8	5 25.5	+60.0	54.9	6 00.0	+60.0	55.0	6
7	5 16.4	+59.9	54.7	5 51.0	+60.0	54.8	6 25.5	+60.0	54.9	7 00.0	+60.0	55.0	7
8	6 16.3	+60.0	54.7	6 51.0	+60.0	54.8	7 25.5	+60.0	54.9	8 00.0	+60.0	55.0	8
9	7 16.3	+59.9	54.6	7 51.0	+59.9	54.8	8 25.5	+60.0	54.9	9 00.0	+60.0	55.0	9
10	8 16.2	+60.0	54.6	8 50.9	+60.0	54.7	9 25.5	+60.0	54.9	10 00.0	+60.0	55.0	10
11	9 16.2	+59.9	54.6	9 50.9	+60.0	54.7	10 25.5	+60.0	54.8	11 00.0	+60.0	55.0	11
12	10 16.1	+60.0	54.5	10 50.9	+60.0	54.7	11 25.5	+60.0	54.8	12 00.0	+60.0	55.0	12
13	11 16.1	+59.9	54.5	11 50.9	+59.9	54.6	12 25.5	+60.0	54.8	13 00.0	+60.0	55.0	13
14	12 16.0	+59.9	54.4	12 50.8	+60.0	54.6	13 25.5	+60.0	54.8	14 00.0	+60.0	55.0	14
15	13 15.9	+60.0	54.4	13 50.8	+60.0	54.6	14 25.5	+60.0	54.8	15 00.0	+60.0	55.0	15
16	14 15.9	+59.9	54.3	14 50.8	+60.0	54.5	15 25.5	+60.0	54.8	16 00.0	+60.0	55.0	16
17	15 15.8	+60.0	54.3	15 50.8	+59.9	54.5	16 25.5	+60.0	54.8	17 00.0	+60.0	55.0	17
18	16 15.8	+59.9	54.2	16 50.7	+60.0	54.5	17 25.5	+60.0	54.7	18 00.0	+60.0	55.0	18
19	17 15.7	+59.9	54.2	17 50.7	+60.0	54.5	18 25.5	+60.0	54.7	19 00.0	+60.0	55.0	19
20	18 15.6	+60.0	54.2	18 50.7	+59.9	54.4	19 25.5	+60.0	54.7	20 00.0	+60.0	55.0	20
21	19 15.6	+59.9	54.1	19 50.6	+60.0	54.4	20 25.5	+59.9	54.7	21 00.0	+60.0	55.0	21
22	20 15.5	+60.0	54.1	20 50.6	+60.0	54.4	21 25.4	+60.0	54.7	22 00.0	+60.0	55.0	22
23	21 15.5	+59.9	54.0	21 50.6	+60.0	54.3	22 25.4	+60.0	54.7	23 00.0	+60.0	55.0	23
24	22 15.4	+59.9	54.0	22 50.6	+59.9	54.3	23 25.4	+60.0	54.6	24 00.0	+60.0	55.0	24
25	23 15.3	+60.0	53.9	23 50.5	+60.0	54.3	24 25.4	+60.0	54.6	25 00.0	+60.0	55.0	25
26	24 15.3	+59.9	53.9	24 50.5	+60.0	54.2	25 25.4	+60.0	54.6	26 00.0	+60.0	55.0	26
27	25 15.2	+59.9	53.8	25 50.5	+59.9	54.2	26 25.4	+60.0	54.6	27 00.0	+60.0	55.0	27
28	26 15.1	+60.0	53.8	26 50.4	+60.0	54.2	27 25.4	+60.0	54.6	28 00.0	+60.0	55.0	28
29	27 15.1	+59.9	53.7	27 50.4	+60.0	54.1	28 25.4	+60.0	54.6	29 00.0	+60.0	55.0	29
30	28 15.0	+59.9	53.6	28 50.4	+59.9	54.1	29 25.4	+60.0	54.5	30 00.0	+60.0	55.0	30
31	29 14.9	+59.9	53.6	29 50.3	+60.0	54.0	30 25.4	+60.0	54.5	31 00.0	+60.0	55.0	31
32	30 14.8	+60.0	53.5	30 50.3	+60.0	54.0	31 25.4	+60.0	54.5	32 00.0	+60.0	55.0	32
33	31 14.8	+59.9	53.5	31 50.3	+59.9	54.0	32 25.4	+60.0	54.5	33 00.0	+60.0	55.0	33
34	32 14.7	+59.9	53.4	32 50.2	+60.0	53.9	33 25.4	+59.9	54.5	34 00.0	+60.0	55.0	34
35	33 14.6	+59.9	53.4	33 50.2	+60.0	53.9	34 25.3	+60.0	54.4	35 00.0	+60.0	55.0	35
36	34 14.5	+60.0	53.3	34 50.2	+59.9	53.8	35 25.3	+60.0	54.4	36 00.0	+60.0	55.0	36
37	35 14.5	+59.9	53.2	35 50.1	+60.0	53.8	36 25.3	+60.0	54.4	37 00.0	+60.0	55.0	37
38	36 14.4	+59.9	53.2	36 50.1	+60.0	53.8	37 25.3	+60.0	54.4	38 00.0	+60.0	55.0	38
39	37 14.3	+59.9	53.1	37 50.1	+59.9	53.7	38 25.3	+60.0	54.3	39 00.0	+60.0	55.0	39
40	38 14.2	+59.9	53.0	38 50.0	+60.0	53.7	39 25.3	+60.0	54.3	40 00.0	+60.0	55.0	40
41	39 14.1	+59.9	53.0	39 50.0	+59.9	53.6	40 25.3	+60.0	54.3	41 00.0	+60.0	55.0	41
42	40 14.0	+59.9	52.9	40 49.9	+60.0	53.6	41 25.3	+60.0	54.3	42 00.0	+60.0	55.0	42
43	41 13.9	+59.9	52.8	41 49.9	+59.9	53.5	42 25.3	+60.0	54.2	43 00.0	+60.0	55.0	43
44	42 13.8	+59.9	52.7	42 49.8	+60.0	53.5	43 25.3	+59.9	54.2	44 00.0	+60.0	55.0	44
45	43 13.7	+59.9	52.7	43 49.8	+60.0	53.4	44 25.2	+60.0	54.2	45 00.0	+60.0	55.0	45
46	44 13.6	+59.9	52.6	44 49.8	+59.9	53.4	45 25.2	+60.0	54.2	46 00.0	+60.0	55.0	46
47	45 13.5	+59.9	52.5	45 49.7	+60.0	53.3	46 25.2	+60.0	54.1	47 00.0	+60.0	55.0	47
48	46 13.4	+59.9	52.4	46 49.7	+59.9	53.2	47 25.2	+60.0	54.1	48 00.0	+60.0	55.0	48
49	47 13.3	+59.9	52.3	47 49.6	+59.9	53.2	48 25.2	+60.0	54.1	49 00.0	+60.0	55.0	49
50	48 13.2	+59.8	52.2	48 49.5	+60.0	53.1	49 25.2	+60.0	54.0	50 00.0	+60.0	55.0	50
51	49 13.0	+59.9	52.1	49 49.5	+59.9	53.0	50 25.2	+59.9	54.0	51 00.0	+60.0	55.0	51
52	50 12.9	+59.9	52.0	50 49.4	+60.0	53.0	51 25.1	+60.0	54.0	52 00.0	+60.0	55.0	52
53	51 12.8	+59.8	51.9	51 49.4	+59.9	52.9	52 25.1	+60.0	53.9	53 00.0	+60.0	55.0	53
54	52 12.6	+59.9	51.8	52 49.3	+59.9	52.8	53 25.1	+60.0	53.9	54 00.0	+60.0	55.0	54
55	53 12.5	+59.8	51.7	53 49.2	+60.0	52.7	54 25.1	+60.0	53.9	55 00.0	+60.0	55.0	55
56	54 12.3	+59.8	51.6	54 49.2	+59.9	52.7	55 25.1	+60.0	53.8	56 00.0	+60.0	55.0	56
57	55 12.1	+59.9	51.4	55 49.1	+59.9	52.6	56 25.1	+59.9	53.8	57 00.0	+60.0	55.0	57
58	56 12.0	+59.8	51.3	56 49.0	+59.9	52.5	57 25.0	+60.0	53.7	58 00.0	+60.0	55.0	58
59	57 11.8	+59.8	51.1	57 48.9	+59.9	52.4	58 25.0	+60.0	53.7	59 00.0	+60.0	55.0	59
60	58 11.6	+59.8	51.0	58 48.8	+59.9	52.3	59 25.0	+60.0	53.6	60 00.0	+60.0	55.0	60
61	59 11.4	+59.8	50.8	59 48.7	+59.9	52.2	60 25.0	+59.9	53.6	61 00.0	+60.0	55.0	61
62	60 11.2	+59.7	50.7	60 48.6	+59.9	52.0	61 24.9	+60.0	53.5	62 00.0	+60.0	55.0	62
63	61 10.9	+59.8	50.5	61 48.5	+59.9	51.9	62 24.9	+60.0	53.4	63 00.0	+60.0	55.0	63
64	62 10.7	+59.7	50.3	62 48.4	+59.9	51.8	63 24.9	+59.9	53.4	64 00.0	+60.0	55.0	64
65	63 10.4	+59.7	50.1	63 48.3	+59.9	51.7	64 24.8	+60.0	53.3	65 00.0	+60.0	55.0	65
66	64 10.1	+59.7	49.9	64 48.2	+59.8	51.5	65 24.8	+60.0	53.2	66 00.0	+60.0	55.0	66
67	65 09.8	+59.7	49.6	65 48.0	+59.9	51.3	66 24.8	+59.9	53.1	67 00.0	+60.0	55.0	67
68	66 09.5	+59.7	49.4	66 47.9	+59.8	51.2	67 24.7	+60.0	53.0	68 00.0	+60.0	55.0	68
69	67 09.2	+59.6	49.1	67 47.7	+59.8	51.0	68 24.7	+59.9	52.9	69 00.0	+60.0	55.0	69
70	68 08.8	+59.6	48.8	68 47.5	+59.8	50.8	69 24.6	+60.0	52.8	70 00.0	+60.0	55.0	70
71	69 08.4	+59.5	48.5	69 47.3	+59.8	50.5	70 24.6	+59.9	52.7	71 00.0	+60.0	55.0	71
72	70 07.9	+59.5	48.1	70 47.1	+59.8	50.3	71 24.5	+60.0	52.6	72 00.0	+60.0	55.0	72
73	71 07.4	+59.4	47.8	71 46.9	+59.7	50.0	72 24.5	+59.9	52.4	73 00.0	+60.0	55.0	73
74	72 06.8	+59.4	47.3	72 46.6	+59.7	49.7	73 24.4	+59.9	52.2	74 00.0	+60.0	55.0	74
75	73 06.2	+59.3	46.8	73 46.3	+59.7	49.3	74 24.3	+59.9	52.1	75 00.0	+60.0	55.0	75
76	74 05.5	+59.2	46.3	74 46.0	+59.6	49.0	75 24.2	+59.9	51.8	76 00.0	+60.0	55.0	76
77	75 04.7	+59.1	45.7	75 45.6	+59.6	48.5	76 24.1	+59.9	51.6	77 00.0	+60.0	55.0	77
78	76 03.8	+59.0	45.0	76 45.2	+59.5	48.0	77 24.0	+59.9	51.3	78 00.0	+60.0	55.0	78
79	77 02.8	+58.8	44.2	77 44.7	+59.4	47.4	78 23.9	+59.8	51.0	79 00.0	+60.0	55.0	79
80	78 01.6	+58.6	43.3	78 44.1	+59.3	46.7	79 23.7	+59.8	50.6	80 00.0	+60.0	55.0	80
81	79 00.2	+58.3	42.2	79 43.4	+59.1	45.9	80 23.5	+59.8	50.2	81 00.0	+60.0	55.0	81
82	79 58.5	+58.0	40.9	80 42.5	+58.9	44.9	81 23.3	+59.6	49.6	82 00.0	+60.0	55.0	82
83	80 56.5	+57.4	39.3	81 41.4	+58.7	43.7	82 22.9	+59.6	48.9	83 00.0	+60.0	55.0	83
84	81 53.9	+56.8	37.4	82 40.1	+58.2	42.1	83 22.5	+59.5	47.9	84 00.0	+60.0	55.0	84
85	82 50.7	+55.8	35.0	83 38.3	+57.6	40.1	84 22.0	+59.2	46.7	85 00.0	+60.0	55.0	85
86	83 46.5	*+54.2* •	31.8	84 35.9	+56.6	37.4	85 21.2	+58.8	44.9	86 00.0	+60.0	55.0	86
87	84 40.7	*+51.8* •	27.5	85 32.5	*+54.6* •	33.5	86 20.0	+58.0	42.1	87 00.0	+60.0	55.0	87
88	85 32.5	*+47.5* •	21.6	86 27.1	*+50.9* •	27.5	87 18.0	*+55.6* •	37.4	88 00.0	+60.0	55.0	88
89	86 20.0	*+40.0* •	12.9	87 18.0	*+42.0* •	17.7	88 13.6	*+46.4* •	27.5	89 00.0	+60.0	55.0	89
90	87 00.0	*+26.3* •	0.0	88 00.0	*+21.3* •	0.0	89 00.0	*+4.6* •	0.0	90 00.0	−60.0	27.5	90
	87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 125°, 235°

56°, 304° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 54.5	+59.7	123.8	3 21.1	+59.7	123.9	2 47.6	+59.9	123.9	2 14.1	+59.9	123.9	1 40.6	+60.0	124.0	1 07.1	+60.0	124.0	0 33.6	+59.9	124.0	0 00.0	+60.0	124.0	0
1	4 54.2	+59.6	123.7	4 20.8	+59.8	123.8	3 47.5	+59.8	123.8	3 14.0	+59.9	123.9	2 40.6	+59.9	123.9	2 07.1	+59.9	124.0	1 33.5	+60.0	124.0	1 00.0	+60.0	124.0	1
2	5 53.8	+59.7	123.6	5 20.6	+59.8	123.7	4 47.3	+59.8	123.8	4 13.9	+59.9	123.8	3 40.5	+60.0	123.9	3 07.0	+60.0	123.9	2 33.5	+60.0	124.0	2 00.0	+60.0	124.0	2
3	6 53.5	+59.7	123.5	6 20.4	+59.7	123.6	5 47.1	+59.9	123.7	5 13.8	+59.9	123.8	4 40.5	+59.9	123.8	4 07.0	+60.0	123.9	3 33.5	+60.0	123.9	3 00.0	+60.0	124.0	3
4	7 53.2	+59.7	123.4	7 20.1	+59.8	123.5	6 47.0	+59.8	123.6	6 13.7	+59.9	123.7	5 40.4	+59.9	123.8	5 07.0	+60.0	123.9	4 33.5	+60.0	123.9	4 00.0	+60.0	124.0	4
5	8 52.9	+59.7	123.3	8 19.9	+59.8	123.4	7 46.8	+59.9	123.5	7 13.6	+59.9	123.6	6 40.3	+60.0	123.7	6 07.0	+59.9	123.8	5 33.5	+60.0	123.9	5 00.0	+60.0	124.0	5
6	9 52.6	+59.7	123.2	9 19.7	+59.8	123.3	8 46.7	+59.8	123.5	8 13.5	+59.9	123.6	7 40.3	+59.9	123.7	7 06.9	+60.0	123.8	6 33.5	+60.0	123.9	6 00.0	+60.0	124.0	6
7	10 52.3	+59.7	123.1	10 19.5	+59.7	123.2	9 46.5	+59.8	123.4	9 13.4	+59.9	123.5	8 40.2	+60.0	123.7	8 06.9	+60.0	123.8	7 33.5	+60.0	123.9	7 00.0	+60.0	124.0	7
8	11 52.0	+59.6	123.0	11 19.2	+59.8	123.1	10 46.3	+59.9	123.3	10 13.3	+59.9	123.5	9 40.2	+59.9	123.6	9 06.9	+60.0	123.8	8 33.5	+60.0	123.9	8 00.0	+60.0	124.0	8
9	12 51.6	+59.7	122.9	12 19.0	+59.7	123.1	11 46.2	+59.8	123.2	11 13.2	+59.9	123.4	10 40.1	+59.9	123.6	10 06.9	+59.9	123.7	9 33.5	+60.0	123.9	9 00.0	+60.0	124.0	9
10	13 51.3	+59.7	122.8	13 18.7	+59.8	123.0	12 46.0	+59.8	123.2	12 13.1	+59.9	123.3	11 40.0	+60.0	123.5	11 06.8	+60.0	123.7	10 33.5	+60.0	123.8	10 00.0	+60.0	124.0	10
11	14 51.0	+59.6	122.7	14 18.5	+59.8	122.9	13 45.8	+59.9	123.1	13 13.0	+59.9	123.3	12 40.0	+59.9	123.5	12 06.8	+60.0	123.7	11 33.5	+60.0	123.8	11 00.0	+60.0	124.0	11
12	15 50.6	+59.7	122.5	15 18.3	+59.7	122.8	14 45.7	+59.8	123.0	14 12.9	+59.9	123.2	13 39.9	+60.0	123.4	13 06.8	+60.0	123.6	12 33.5	+60.0	123.8	12 00.0	+60.0	124.0	12
13	16 50.3	+59.7	122.4	16 18.0	+59.8	122.7	15 45.5	+59.8	122.9	15 12.8	+59.9	123.2	14 39.9	+59.9	123.4	14 06.8	+59.9	123.6	13 33.5	+60.0	123.8	13 00.0	+60.0	124.0	13
14	17 50.0	+59.6	122.3	17 17.8	+59.7	122.6	16 45.3	+59.9	122.9	16 12.7	+59.9	123.1	15 39.8	+59.9	123.3	15 06.7	+60.0	123.6	14 33.5	+60.0	123.8	14 00.0	+60.0	124.0	14
15	18 49.6	+59.7	122.2	18 17.5	+59.8	122.5	17 45.2	+59.8	122.8	17 12.6	+59.9	123.0	16 39.7	+60.0	123.3	16 06.7	+60.0	123.5	15 33.5	+59.9	123.8	15 00.0	+60.0	124.0	15
16	19 49.3	+59.6	122.1	19 17.3	+59.7	122.4	18 45.0	+59.8	122.7	18 12.5	+59.9	123.0	17 39.7	+59.9	123.2	17 06.7	+60.0	123.5	16 33.4	+60.0	123.8	16 00.0	+60.0	124.0	16
17	20 48.9	+59.7	122.0	20 17.0	+59.8	122.3	19 44.8	+59.8	122.6	19 12.3	+59.9	122.9	18 39.6	+60.0	123.2	18 06.7	+59.9	123.5	17 33.4	+60.0	123.7	17 00.0	+60.0	124.0	17
18	21 48.6	+59.6	121.9	21 16.8	+59.7	122.2	20 44.6	+59.9	122.5	20 12.2	+59.9	122.8	19 39.6	+59.9	123.1	19 06.6	+60.0	123.4	18 33.4	+60.0	123.7	18 00.0	+60.0	124.0	18
19	22 48.2	+59.7	121.8	22 16.5	+59.7	122.1	21 44.5	+59.8	122.4	21 12.1	+59.9	122.8	20 39.5	+59.9	123.1	20 06.6	+60.0	123.4	19 33.4	+60.0	123.7	19 00.0	+60.0	124.0	19
20	23 47.9	+59.6	121.6	23 16.2	+59.8	122.0	22 44.3	+59.8	122.4	22 12.0	+59.9	122.7	21 39.4	+60.0	123.0	21 06.6	+59.9	123.4	20 33.4	+60.0	123.7	20 00.0	+60.0	124.0	20
21	24 47.5	+59.6	121.5	24 16.0	+59.7	121.9	23 44.1	+59.8	122.3	23 11.9	+59.9	122.6	22 39.4	+59.9	123.0	22 06.5	+60.0	123.3	21 33.4	+60.0	123.7	21 00.0	+60.0	124.0	21
22	25 47.1	+59.6	121.4	25 15.7	+59.7	121.8	24 43.9	+59.8	122.2	24 11.8	+59.8	122.6	23 39.3	+59.9	122.9	23 06.5	+60.0	123.3	22 33.4	+60.0	123.7	22 00.0	+60.0	124.0	22
23	26 46.7	+59.6	121.3	26 15.4	+59.7	121.7	25 43.7	+59.8	122.1	25 11.6	+59.9	122.5	24 39.2	+60.0	122.9	24 06.5	+59.9	123.3	23 33.4	+60.0	123.6	23 00.0	+60.0	124.0	23
24	27 46.3	+59.7	121.1	27 15.1	+59.7	121.6	26 43.5	+59.8	122.0	26 11.5	+59.9	122.4	25 39.2	+59.9	122.8	25 06.4	+60.0	123.2	24 33.4	+60.0	123.6	24 00.0	+60.0	124.0	24
25	28 46.0	+59.5	121.0	28 14.8	+59.7	121.5	27 43.3	+59.8	121.9	27 11.4	+59.9	122.4	26 39.1	+59.9	122.8	26 06.4	+60.0	123.2	25 33.4	+60.0	123.6	25 00.0	+60.0	124.0	25
26	29 45.5	+59.6	120.9	29 14.5	+59.7	121.4	28 43.1	+59.8	121.8	28 11.3	+59.8	122.3	27 39.0	+59.9	122.7	27 06.4	+60.0	123.2	26 33.4	+60.0	123.6	26 00.0	+60.0	124.0	26
27	30 45.1	+59.6	120.7	30 14.2	+59.7	121.2	29 42.9	+59.8	121.7	29 11.1	+59.9	122.2	28 38.9	+60.0	122.7	28 06.4	+59.9	123.1	27 33.4	+60.0	123.6	27 00.0	+60.0	124.0	27
28	31 44.7	+59.6	120.6	31 13.9	+59.7	121.1	30 42.7	+59.8	121.6	30 11.0	+59.9	122.1	29 38.9	+59.9	122.6	29 06.3	+60.0	123.1	28 33.4	+59.9	123.6	28 00.0	+60.0	124.0	28
29	32 44.3	+59.5	120.5	32 13.6	+59.7	121.0	31 42.5	+59.8	121.5	31 10.9	+59.8	122.1	30 38.8	+59.9	122.6	30 06.3	+60.0	123.1	29 33.3	+60.0	123.5	29 00.0	+60.0	124.0	29
30	33 43.8	+59.6	120.3	33 13.3	+59.7	120.9	32 42.3	+59.7	121.4	32 10.7	+59.9	122.0	31 38.7	+59.9	122.5	31 06.3	+59.9	123.0	30 33.3	+60.0	123.5	30 00.0	+60.0	124.0	30
31	34 43.4	+59.5	120.2	34 13.0	+59.6	120.8	33 42.0	+59.8	121.3	33 10.6	+59.8	121.9	32 38.6	+60.0	122.4	32 06.2	+60.0	123.0	31 33.3	+60.0	123.5	31 00.0	+60.0	124.0	31
32	35 42.9	+59.6	120.0	35 12.6	+59.7	120.6	34 41.8	+59.8	121.2	34 10.4	+59.9	121.8	33 38.6	+59.9	122.4	33 06.2	+59.9	122.9	32 33.3	+60.0	123.5	32 00.0	+60.0	124.0	32
33	36 42.5	+59.5	119.9	36 12.3	+59.7	120.5	35 41.6	+59.7	121.1	35 10.3	+59.8	121.7	34 38.5	+59.9	122.3	34 06.1	+60.0	122.9	33 33.3	+60.0	123.5	33 00.0	+60.0	124.0	33
34	37 42.0	+59.5	119.7	37 12.0	+59.6	120.4	36 41.3	+59.8	121.0	36 10.1	+59.9	121.6	35 38.4	+59.9	122.3	35 06.1	+60.0	122.9	34 33.3	+60.0	123.4	34 00.0	+60.0	124.0	34
35	38 41.5	+59.5	119.5	38 11.6	+59.6	120.2	37 41.1	+59.7	120.9	37 10.0	+59.8	121.5	36 38.3	+59.9	122.2	36 06.1	+59.9	122.8	35 33.3	+60.0	123.4	35 00.0	+60.0	124.0	35
36	39 41.0	+59.4	119.4	39 11.2	+59.6	120.1	38 40.8	+59.8	120.8	38 09.8	+59.9	121.5	37 38.2	+59.9	122.1	37 06.0	+60.0	122.8	36 33.3	+60.0	123.4	36 00.0	+60.0	124.0	36
37	40 40.4	+59.5	119.2	40 10.8	+59.6	119.9	39 40.6	+59.7	120.7	39 09.7	+59.8	121.4	38 38.1	+59.9	122.0	38 06.0	+60.0	122.7	37 33.3	+60.0	123.4	37 00.0	+60.0	124.0	37
38	41 39.9	+59.4	119.0	41 10.4	+59.6	119.8	40 40.3	+59.7	120.5	40 09.5	+59.8	121.3	39 38.0	+59.9	122.0	39 06.0	+59.9	122.7	38 33.3	+60.0	123.3	38 00.0	+60.0	124.0	38
39	42 39.3	+59.5	118.8	42 10.0	+59.6	119.6	41 40.0	+59.7	120.4	41 09.3	+59.8	121.2	40 37.9	+59.9	121.9	40 05.9	+60.0	122.6	39 33.3	+59.9	123.3	39 00.0	+60.0	124.0	39
40	43 38.8	+59.4	118.6	43 09.6	+59.6	119.5	42 39.7	+59.7	120.3	42 09.1	+59.9	121.1	41 37.8	+59.9	121.8	41 05.9	+59.9	122.6	40 33.2	+60.0	123.3	40 00.0	+60.0	124.0	40
41	44 38.2	+59.3	118.4	44 09.2	+59.5	119.3	43 39.4	+59.7	120.1	43 09.0	+59.8	121.0	42 37.7	+59.9	121.7	42 05.8	+60.0	122.5	41 33.2	+60.0	123.3	41 00.0	+60.0	124.0	41
42	45 37.5	+59.4	118.2	45 08.7	+59.6	119.1	44 39.1	+59.7	120.0	44 08.8	+59.8	120.8	43 37.6	+59.9	121.7	43 05.8	+59.9	122.5	42 33.2	+60.0	123.2	42 00.0	+60.0	124.0	42
43	46 36.9	+59.3	118.0	46 08.3	+59.5	119.0	45 38.8	+59.7	119.9	45 08.6	+59.8	120.7	44 37.5	+59.9	121.6	44 05.7	+60.0	122.4	43 33.2	+60.0	123.2	43 00.0	+60.0	124.0	43
44	47 36.2	+59.3	117.8	47 07.8	+59.5	118.8	46 38.5	+59.7	119.7	46 08.4	+59.7	120.6	45 37.4	+59.9	121.5	45 05.7	+59.9	122.4	44 33.2	+60.0	123.2	44 00.0	+60.0	124.0	44
45	48 35.5	+59.3	117.6	48 07.3	+59.5	118.6	47 38.2	+59.6	119.5	47 08.1	+59.8	120.5	46 37.3	+59.9	121.4	46 05.6	+60.0	122.3	45 33.2	+60.0	123.2	45 00.0	+60.0	124.0	45
46	49 34.8	+59.3	117.4	49 06.8	+59.4	118.4	48 37.8	+59.6	119.4	48 07.9	+59.8	120.4	47 37.2	+59.8	121.3	47 05.6	+59.9	122.2	46 33.2	+60.0	123.1	46 00.0	+60.0	124.0	46
47	50 34.1	+59.2	117.1	50 06.2	+59.5	118.2	49 37.4	+59.7	119.2	49 07.7	+59.7	120.2	48 37.0	+59.9	121.2	48 05.5	+60.0	122.2	47 33.2	+59.9	123.1	47 00.0	+60.0	124.0	47
48	51 33.3	+59.2	116.8	51 05.7	+59.4	118.0	50 37.1	+59.6	119.0	50 07.4	+59.8	120.1	49 36.9	+59.9	121.1	49 05.5	+59.9	122.1	48 33.1	+60.0	123.1	48 00.0	+60.0	124.0	48
49	52 32.5	+59.1	116.6	52 05.1	+59.4	117.7	51 36.7	+59.5	118.9	51 07.2	+59.7	119.9	50 36.8	+59.8	121.0	50 05.4	+59.9	122.0	49 33.1	+60.0	123.0	49 00.0	+60.0	124.0	49
50	53 31.6	+59.1	116.3	53 04.5	+59.3	117.5	52 36.2	+59.6	118.7	52 06.9	+59.8	119.8	51 36.6	+59.9	120.9	51 05.3	+60.0	122.0	50 33.1	+60.0	123.0	50 00.0	+60.0	124.0	50
51	54 30.7	+59.1	116.0	54 03.8	+59.4	117.3	53 35.8	+59.5	118.5	53 06.7	+59.7	119.6	52 36.5	+59.8	120.8	52 05.3	+59.9	121.9	51 33.1	+60.0	123.0	51 00.0	+60.0	124.0	51
52	55 29.8	+59.0	115.7	55 03.2	+59.3	117.0	54 35.3	+59.6	118.3	54 06.4	+59.7	119.5	53 36.3	+59.9	120.7	53 05.2	+59.9	121.8	52 33.1	+60.0	122.9	52 00.0	+60.0	124.0	52
53	56 28.8	+59.0	115.4	56 02.5	+59.2	116.7	55 34.9	+59.5	118.0	55 06.1	+59.7	119.3	54 36.2	+59.8	120.5	54 05.1	+60.0	121.7	53 33.1	+59.9	122.9	53 00.0	+60.0	124.0	53
54	57 27.8	+58.9	115.0	57 01.7	+59.2	116.4	56 34.4	+59.4	117.8	56 05.8	+59.6	119.1	55 36.0	+59.8	120.4	55 05.1	+59.9	121.6	54 33.0	+60.0	122.8	54 00.0	+60.0	124.0	54
55	58 26.7	+58.8	114.7	58 00.9	+59.2	116.1	57 33.8	+59.5	117.6	57 05.4	+59.7	118.9	56 35.8	+59.8	120.3	56 05.0	+59.9	121.5	55 33.0	+60.0	122.8	55 00.0	+60.0	124.0	55
56	59 25.5	+58.8	114.3	59 00.1	+59.1	115.8	58 33.3	+59.4	117.3	58 05.1	+59.6	118.7	57 35.6	+59.8	120.1	57 04.9	+59.9	121.5	56 33.0	+60.0	122.7	56 00.0	+60.0	124.0	56
57	60 24.3	+58.7	113.9	59 59.2	+59.1	115.5	59 32.7	+59.3	117.0	59 04.7	+59.6	118.5	58 35.4	+59.8	120.0	58 04.8	+59.9	121.4	57 33.0	+60.0	122.7	57 00.0	+60.0	124.0	57
58	61 23.0	+58.6	113.5	60 58.3	+59.0	115.1	60 32.0	+59.4	116.7	60 04.3	+59.6	118.3	59 35.2	+59.8	119.8	59 04.7	+59.9	121.2	58 33.0	+59.9	122.6	58 00.0	+60.0	124.0	58
59	62 21.6	+58.5	113.0	61 57.3	+58.9	114.7	61 31.4	+59.3	116.4	61 03.9	+59.6	118.1	60 35.0	+59.7	119.6	60 04.6	+59.9	121.1	59 32.9	+60.0	122.6	59 00.0	+60.0	124.0	59
60	63 20.1	+58.4	112.5	62 56.2	+58.9	114.3	62 30.7	+59.2	116.1	62 03.5	+59.5	117.8	61 34.7	+59.8	119.4	61 04.5	+59.9	121.0	60 32.9	+60.0	122.5	60 00.0	+60.0	124.0	60
61	64 18.5	+58.3	112.0	63 55.1	+58.8	113.9	63 29.9	+59.2	115.7	63 03.0	+59.5	117.5	62 34.5	+59.7	119.2	62 04.4	+59.9	120.9	61 32.9	+60.0	122.5	61 00.0	+60.0	124.0	61
62	65 16.8	+58.1	111.5	64 53.9	+58.7	113.4	64 29.1	+59.1	115.4	64 02.5	+59.4	117.2	63 34.2	+59.7	119.0	63 04.3	+59.9	120.7	62 32.9	+59.9	122.4	62 00.0	+60.0	124.0	62
63	66 14.9	+58.0	110.9	65 52.6	+58.5	112.9	65 28.2	+59.0	115.0	65 01.9	+59.4	116.9	64 33.9	+59.7	118.8	64 04.2	+59.8	120.6	63 32.8	+60.0	122.3	63 00.0	+60.0	124.0	63
64	67 12.9	+57.9	110.2	66 51.1	+58.5	112.4	66 27.2	+59.0	114.5	66 01.3	+59.4	116.6	65 33.6	+59.6	118.6	65 04.0	+59.9	120.4	64 32.8	+60.0	122.3	64 00.0	+60.0	124.0	64
65	68 10.8	+57.6	109.5	67 49.6	+58.3	111.8	67 26.2	+58.9	114.1	67 00.7	+59.3	116.2	66 33.2	+59.7	118.3	66 03.9	+59.8	120.3	65 32.8	+59.9	122.2	65 00.0	+60.0	124.0	65
66	69 08.4	+57.4	108.7	68 47.9	+58.2	111.2	68 25.1	+58.8	113.5	68 00.0	+59.3	115.8	67 32.9	+59.5	118.0	67 03.7	+59.8	120.1	66 32.7	+60.0	122.1	66 00.0	+60.0	124.0	66
67	70 05.8	+57.2	107.9	69 46.1	+58.0	110.5	69 23.9	+58.6	113.0	68 59.3	+59.1	115.4	68 32.4	+59.6	117.7	68 03.5	+59.9	119.9	67 32.7	+59.9	122.0	67 00.0	+60.0	124.0	67
68	71 03.0	+56.9	107.0	70 44.1	+57.8	109.7	70 22.5	+58.5	112.4	69 58.4	+59.1	114.9	69 32.0	+59.5	117.4	69 03.4	+59.7	119.7	68 32.6	+60.0	121.9	68 00.0	+60.0	124.0	68
69	71 59.9	+56.5	106.0	71 41.9	+57.5	108.9	71 21.0	+58.4	111.7	70 57.5	+59.0	114.4	70 31.5	+59.5	117.0	70 03.1	+59.8	119.4	69 32.6	+59.9	121.8	69 00.0	+60.0	124.0	69
70	72 56.4	+56.1	104.9	72 39.4	+57.3	108.0	72 19.4	+58.2	111.0	71 56.5	+58.9	113.8	71 31.0	+59.4	116.6	71 02.9	+59.8	119.2	70 32.5	+60.0	121.7	70 00.0	+60.0	124.0	70
71	73 52.5	+55.6	103.6	73 36.7	+56.9	106.9	73 17.6	+57.9	110.1	72 55.4	+58.8	113.2	72 30.4	+59.3	116.1	72 02.7	+59.7	118.9	71 32.5	+59.9	121.5	71 00.0	+60.0	124.0	71
72	74 48.1	+55.1	102.2	74 33.6	+56.5	105.8	74 15.5	+57.7	109.2	73 54.2	+58.6	112.5	73 29.7	+59.3	115.6	73 02.4	+59.7	118.6	72 32.4	+59.9	121.4	72 00.0	+60.0	124.0	72
73	75 43.2	+54.4	100.7	75 30.1	+56.0	104.5	75 13.2	+57.4	108.2	74 52.8	+58.4	111.7	74 29.0	+59.1	115.0	74 02.1	+59.6	118.2	73 32.3	+60.0	121.2	73 00.0	+60.0	124.0	73
74	76 37.6	+53.5	98.9	76 26.1	+55.5	103.0	76 10.6	+57.0	107.0	75 51.2	+58.2	110.8	75 28.1	+59.1	114.4	75 01.7	+59.6	117.8	74 32.3	+59.9	121.0	74 00.0	+60.0	124.0	74
75	77 31.1	+52.5	96.9	77 21.6	+54.7	101.3	77 07.6	+56.5	105.6	76 49.4	+57.8	109.7	76 27.2	+58.8	113.7	76 01.3	+59.6	117.3	75 32.2	+59.8	120.8	75 00.0	+60.0	124.0	75
76	78 23.6	+51.2	94.6	78 16.3	+53.8	99.4	78 04.1	+55.9	104.1	77 47.2	+57.6	108.5	77 26.0	+58.7	112.8	77 00.9	+59.4	116.8	76 32.0	+59.9	120.5	76 00.0	+60.0	124.0	76
77	79 14.8	+49.5	91.9	79 10.1	+52.6	97.1	79 00.0	+55.1	102.2	78 44.8	+57.0	107.1	78 24.7	+58.5	111.8	78 00.3	+59.4	116.2	77 31.9	+59.9	120.3	77 00.0	+60.0	124.0	77
78	80 04.3	+47.5•	88.7	80 02.7	+51.1	94.4	79 55.1	+54.1	100.1	79 41.8	+56.5	105.5	79 23.2	+58.1	110.6	78 59.7	+59.2	115.5	78 31.8	+59.8	119.9	78 00.0	+60.0	124.0	78
79	80 51.8	+44.9•	85.0	80 53.8	+49.1•	91.3	80 49.2	+52.7	97.5	80 38.3	+55.6	103.5	80 21.3	+57.8	109.2	79 58.9	+59.1	114.6	79 31.6	+59.8	119.5	79 00.0	+60.0	124.0	79
80	81 36.7	+41.4•	80.7	81 42.9	+46.5•	87.5	81 41.9	+51.0•	94.3	81 33.9	+54.5	101.1	81 19.1	+57.1	107.5	80 58.0	+58.8	113.5	80 31.4	+59.7	119.0	80 00.0	+60.0	124.0	80
81	82 18.1	+37.0•	75.5	82 29.4	+43.0•	82.9	82 32.9	+48.4•	90.5	82 28.4	+53.0	98.1	82 16.2	+56.3	105.4	81 56.8	+58.6	112.2	81 31.1	+59.7	118.4	81 00.0	+60.0	124.0	81
82	82 55.1	+31.3•	69.4	83 12.4	+38.2•	77.2	83 21.3	+44.9•	85.6	83 21.4	+50.6•	94.2	83 12.5	+55.2	102.6	82 55.4	+58.0	110.5	82 30.8	+59.6	117.7	82 00.0	+60.0	124.0	82
83	83 26.4	+24.2•	62.2	83 50.6	+31.9•	70.4	84 06.2	+39.8•	79.6	84 12.0	+47.3•	89.3	84 07.7	+53.2•	99.1	83 53.4	+57.3	108.3	83 30.4	+59.4	116.7	83 00.0	+60.0	124.0	83
84	83 50.6	+15.6•	53.9	84 22.5	+23.5•	62.1	84 46.0	+32.6•	71.8	84 59.3	+41.9•	82.7	85 00.9	+50.2•	94.2	84 50.7	+56.1	105.3	84 29.8	+59.2	115.4	84 00.0	+60.0	124.0	84
85	84 06.2	+5.8•	44.7	84 46.0	+13.3•	52.4	85 18.6	+22.6•	62.1	85 41.2	+33.6•	73.9	85 51.1	+44.8•	87.3	85 46.8	+53.8•	100.9	85 29.0	+58.7	113.5	85 00.0	+60.0	124.0	85
86	84 12.0	−4.3•	34.9	84 59.3	+1.6•	41.5	85 41.2	+9.9•	50.3	86 14.8	+21.1•	62.1	86 35.9	+35.2•	77.1	86 40.6	+49.0•	94.1	86 27.7	+57.6	110.5	86 00.0	+60.0	124.0	86
87	84 07.7	−14.3•	25.1	85 00.9	−10.2•	30.0	85 51.1	−4.3•	36.9	86 35.9	+4.7•	47.0	87 11.1	+18.5•	62.0	87 29.6	+37.7•	82.6	87 25.3	+55.0•	105.3	87 00.0	+60.0	124.0	87
88	83 53.4	−23.0•	15.8	84 50.7	−20.9•	18.8	85 46.8	−17.8•	23.2	86 40.6	−12.9•	29.9	87 29.6	−4.3•	41.4	88 07.3	+13.0•	62.0	88 20.3	+43.4•	94.1	88 00.0	+60.0	124.0	88
89	83 30.4	−30.4•	7.4	84 29.8	−29.8•	8.7	85 29.0	−29.0•	10.6	86 27.7	−27.7•	13.6	87 25.3	−25.3•	18.8	88 20.3	−20.3•	29.9	89 03.7	−3.7•	62.0	89 00.0	+60.0	124.0	89
90	83 00.0	−36.3•	0.0	84 00.0	−36.7•	0.0	85 00.0	−37.2•	0.0	86 00.0	−38.0•	0.0	87 00.0	−39.3•	0.0	88 00.0	−41.4•	0.0	89 00.0	−46.0•	0.0	90 00.0	−60.0	62.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 56°, 304°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	3 54.5	−59.7	123.8	3 21.1	−59.8	123.9	2 47.6	−59.8	123.9	2 14.1	−59.9	123.9	1 40.6	−59.9	124.0	1 07.1	−60.0	124.0	0 33.6	−60.0	124.0	0 00.0	+60.0	56.0	**0**
1	2 54.8	−59.7	123.9	2 21.3	−59.8	123.9	1 47.8	−59.9	124.0	1 14.2	−59.9	124.0	0 40.7	−60.0	124.0	0 07.1	−60.0	124.0	0 26.4	+60.0	56.0	1 00.0	+60.0	56.0	**1**
2	1 55.1	−59.7	124.0	1 21.5	−59.8	124.0	0 47.9	−59.8	124.0	0 14.3	−59.9	124.1	0 19.3	+59.9	55.9	0 52.9	+59.9	56.0	1 26.4	+60.0	56.0	2 00.0	+60.0	56.0	**2**
3	0 55.4	−59.7	124.1	0 21.7	−59.7	124.1	0 11.9	+59.9	55.9	0 45.6	+59.9	55.9	1 19.2	+60.0	55.9	1 52.8	+60.0	55.9	2 26.4	+60.0	56.0	3 00.0	+60.0	56.0	**3**
4	0 04.3	+59.7	55.8	0 38.0	+59.8	55.8	1 11.8	+59.8	55.8	1 45.5	+59.9	55.8	2 19.2	+59.9	55.9	2 52.8	+60.0	55.9	3 26.4	+60.0	55.9	4 00.0	+60.0	56.0	**4**
5	1 04.0	+59.7	55.7	1 37.8	+59.8	55.7	2 11.6	+59.8	55.7	2 45.4	+59.9	55.8	3 19.1	+59.9	55.8	3 52.8	+60.0	55.9	4 26.4	+60.0	55.9	5 00.0	+60.0	56.0	**5**
6	2 03.7	+59.7	55.6	2 37.6	+59.8	55.6	3 11.4	+59.9	55.7	3 45.3	+59.9	55.7	4 19.0	+60.0	55.8	4 52.8	+59.9	55.8	5 26.4	+60.0	55.9	6 00.0	+60.0	56.0	**6**
7	3 03.4	+59.7	55.5	3 37.4	+59.7	55.5	4 11.3	+59.8	55.6	4 45.2	+59.9	55.7	5 19.0	+59.9	55.7	5 52.7	+60.0	55.8	6 26.4	+60.0	55.9	7 00.0	+60.0	56.0	**7**
8	4 03.1	+59.7	55.4	4 37.1	+59.8	55.5	5 11.1	+59.9	55.5	5 45.1	+59.9	55.6	6 18.9	+60.0	55.7	6 52.7	+60.0	55.8	7 26.4	+60.0	55.9	8 00.0	+60.0	56.0	**8**
9	5 02.8	+59.7	55.3	5 36.9	+59.8	55.4	6 11.0	+59.8	55.4	6 45.0	+59.9	55.5	7 18.9	+59.9	55.6	7 52.7	+60.0	55.8	8 26.4	+60.0	55.9	9 00.0	+60.0	56.0	**9**
10	6 02.5	+59.7	55.2	6 36.7	+59.7	55.3	7 10.8	+59.9	55.4	7 44.9	+59.9	55.5	8 18.8	+60.0	55.6	8 52.7	+59.9	55.7	9 26.4	+60.0	55.9	10 00.0	+60.0	56.0	**10**
11	7 02.2	+59.6	55.1	7 36.4	+59.8	55.2	8 10.7	+59.8	55.3	8 44.8	+59.9	55.4	9 18.8	+59.9	55.6	9 52.6	+60.0	55.7	10 26.4	+60.0	55.8	11 00.0	+60.0	56.0	**11**
12	8 01.8	+59.7	55.0	8 36.2	+59.8	55.1	9 10.5	+59.8	55.2	9 44.7	+59.9	55.4	10 18.7	+59.9	55.5	10 52.6	+60.0	55.7	11 26.4	+60.0	55.8	12 00.0	+60.0	56.0	**12**
13	9 01.5	+59.7	54.9	9 36.0	+59.8	55.0	10 10.3	+59.9	55.2	10 44.6	+59.8	55.3	11 18.6	+60.0	55.5	11 52.6	+59.9	55.6	12 26.4	+60.0	55.8	13 00.0	+60.0	56.0	**13**
14	10 01.2	+59.7	54.8	10 35.8	+59.7	54.9	11 10.2	+59.8	55.1	11 44.4	+59.9	55.2	12 18.6	+59.9	55.4	12 52.5	+60.0	55.6	13 26.4	+60.0	55.8	14 00.0	+60.0	56.0	**14**
15	11 00.9	+59.7	54.7	11 35.5	+59.8	54.8	12 10.0	+59.8	55.0	12 44.3	+59.9	55.2	13 18.5	+60.0	55.4	13 52.5	+60.0	55.6	14 26.4	+59.9	55.8	15 00.0	+60.0	56.0	**15**
16	12 00.6	+59.6	54.6	12 35.3	+59.7	54.7	13 09.8	+59.9	54.9	13 44.2	+59.9	55.1	14 18.5	+59.9	55.3	14 52.5	+60.0	55.5	15 26.3	+60.0	55.8	16 00.0	+60.0	56.0	**16**
17	13 00.2	+59.7	54.5	13 35.0	+59.8	54.6	14 09.7	+59.8	54.9	14 44.1	+59.9	55.1	15 18.4	+59.9	55.3	15 52.5	+59.9	55.5	16 26.3	+60.0	55.8	17 00.0	+60.0	56.0	**17**
18	13 59.9	+59.7	54.4	14 34.8	+59.8	54.6	15 09.5	+59.8	54.8	15 44.0	+59.9	55.0	16 18.3	+60.0	55.2	16 52.4	+60.0	55.5	17 26.3	+60.0	55.7	18 00.0	+60.0	56.0	**18**
19	14 59.6	+59.7	54.2	15 34.6	+59.7	54.5	16 09.3	+59.9	54.7	16 43.9	+59.9	54.9	17 18.3	+59.9	55.2	17 52.4	+60.0	55.4	18 26.3	+60.0	55.7	19 00.0	+60.0	56.0	**19**
20	15 59.3	+59.6	54.1	16 34.3	+59.8	54.4	17 09.2	+59.8	54.6	17 43.8	+59.9	54.9	18 18.2	+59.9	55.1	18 52.4	+60.0	55.4	19 26.3	+60.0	55.7	20 00.0	+60.0	56.0	**20**
21	16 58.9	+59.7	54.0	17 34.1	+59.7	54.3	18 09.0	+59.8	54.5	18 43.7	+59.9	54.8	19 18.1	+60.0	55.1	19 52.4	+59.9	55.4	20 26.3	+60.0	55.7	21 00.0	+60.0	56.0	**21**
22	17 58.6	+59.7	53.9	18 33.8	+59.8	54.2	19 08.8	+59.8	54.5	19 43.6	+59.9	54.7	20 18.1	+59.9	55.0	20 52.3	+60.0	55.4	21 26.3	+60.0	55.7	22 00.0	+60.0	56.0	**22**
23	18 58.3	+59.6	53.8	19 33.6	+59.7	54.1	20 08.6	+59.9	54.4	20 43.5	+59.8	54.7	21 18.0	+60.0	55.0	21 52.3	+60.0	55.3	22 26.3	+60.0	55.7	23 00.0	+60.0	56.0	**23**
24	19 57.9	+59.7	53.7	20 33.3	+59.8	54.0	21 08.5	+59.8	54.3	21 43.3	+59.9	54.6	22 18.0	+59.9	54.9	22 52.3	+59.9	55.3	23 26.3	+60.0	55.6	24 00.0	+60.0	56.0	**24**
25	20 57.6	+59.6	53.6	21 33.1	+59.7	53.9	22 08.3	+59.8	54.2	22 43.2	+59.9	54.5	23 17.9	+59.9	54.9	23 52.2	+60.0	55.2	24 26.3	+60.0	55.6	25 00.0	+60.0	56.0	**25**
26	21 57.2	+59.6	53.5	22 32.8	+59.7	53.8	23 08.1	+59.8	54.1	23 43.1	+59.9	54.5	24 17.8	+60.0	54.8	24 52.2	+60.0	55.2	25 26.3	+60.0	55.6	26 00.0	+60.0	56.0	**26**
27	22 56.8	+59.7	53.3	23 32.5	+59.8	53.7	24 07.9	+59.8	54.0	24 43.0	+59.9	54.4	25 17.8	+59.9	54.8	25 52.2	+59.9	55.2	26 26.3	+60.0	55.6	27 00.0	+60.0	56.0	**27**
28	23 56.5	+59.6	53.2	24 32.3	+59.7	53.6	25 07.7	+59.8	54.0	25 42.9	+59.8	54.3	26 17.7	+59.9	54.7	26 52.1	+60.0	55.1	27 26.3	+60.0	55.6	28 00.0	+60.0	56.0	**28**
29	24 56.1	+59.6	53.1	25 32.0	+59.7	53.5	26 07.5	+59.8	53.9	26 42.7	+59.9	54.3	27 17.6	+59.9	54.7	27 52.1	+60.0	55.1	28 26.3	+59.9	55.5	29 00.0	+60.0	56.0	**29**
30	25 55.7	+59.6	53.0	26 31.7	+59.7	53.4	27 07.3	+59.8	53.8	27 42.6	+59.9	54.2	28 17.5	+60.0	54.6	28 52.1	+60.0	55.1	29 26.2	+60.0	55.5	30 00.0	+60.0	56.0	**30**
31	26 55.3	+59.7	52.8	27 31.4	+59.7	53.3	28 07.1	+59.8	53.7	28 42.5	+59.9	54.1	29 17.5	+59.9	54.6	29 52.1	+59.9	55.0	30 26.2	+60.0	55.5	31 00.0	+60.0	56.0	**31**
32	27 55.0	+59.6	52.7	28 31.1	+59.7	53.1	29 06.9	+59.8	53.6	29 42.4	+59.8	54.0	30 17.4	+59.9	54.5	30 52.0	+60.0	55.0	31 26.2	+60.0	55.5	32 00.0	+60.0	56.0	**32**
33	28 54.6	+59.6	52.6	29 30.8	+59.7	53.0	30 06.7	+59.8	53.5	30 42.2	+59.9	54.0	31 17.3	+59.9	54.5	31 52.0	+59.9	55.0	32 26.2	+60.0	55.5	33 00.0	+60.0	56.0	**33**
34	29 54.2	+59.5	52.5	30 30.5	+59.7	52.9	31 06.5	+59.8	53.4	31 42.1	+59.8	53.9	32 17.2	+60.0	54.4	32 51.9	+60.0	54.9	33 26.2	+60.0	55.4	34 00.0	+60.0	56.0	**34**
35	30 53.7	+59.6	52.3	31 30.2	+59.7	52.8	32 06.3	+59.8	53.3	32 41.9	+59.9	53.8	33 17.2	+59.9	54.3	33 51.9	+60.0	54.9	34 26.2	+60.0	55.4	35 00.0	+60.0	56.0	**35**
36	31 53.3	+59.6	52.2	32 29.9	+59.7	52.7	33 06.1	+59.7	53.2	33 41.8	+59.9	53.7	34 17.1	+59.9	54.3	34 51.9	+59.9	54.8	35 26.2	+60.0	55.4	36 00.0	+60.0	56.0	**36**
37	32 52.9	+59.5	52.0	33 29.6	+59.7	52.6	34 05.8	+59.8	53.1	34 41.7	+59.8	53.6	35 17.0	+59.9	54.2	35 51.8	+60.0	54.8	36 26.2	+60.0	55.4	37 00.0	+60.0	56.0	**37**
38	33 52.4	+59.6	51.9	34 29.3	+59.6	52.4	35 05.6	+59.8	53.0	35 41.5	+59.8	53.6	36 16.9	+59.9	54.1	36 51.8	+60.0	54.7	37 26.2	+60.0	55.4	38 00.0	+60.0	56.0	**38**
39	34 52.0	+59.5	51.7	35 28.9	+59.7	52.3	36 05.4	+59.7	52.9	36 41.3	+59.9	53.5	37 16.8	+59.9	54.1	37 51.8	+59.9	54.7	38 26.2	+60.0	55.3	39 00.0	+60.0	56.0	**39**
40	35 51.5	+59.6	51.6	36 28.6	+59.6	52.2	37 05.1	+59.8	52.8	37 41.2	+59.8	53.4	38 16.7	+59.9	54.0	38 51.7	+60.0	54.6	39 26.2	+59.9	55.3	40 00.0	+60.0	56.0	**40**
41	36 51.1	+59.5	51.4	37 28.2	+59.7	52.0	38 04.9	+59.7	52.6	38 41.0	+59.9	53.3	39 16.6	+59.9	53.9	39 51.7	+59.9	54.6	40 26.1	+60.0	55.3	41 00.0	+60.0	56.0	**41**
42	37 50.6	+59.5	51.3	38 27.9	+59.6	51.9	39 04.6	+59.8	52.5	39 40.9	+59.8	53.2	40 16.5	+59.9	53.9	40 51.6	+60.0	54.5	41 26.1	+60.0	55.3	42 00.0	+60.0	56.0	**42**
43	38 50.1	+59.5	51.1	39 27.5	+59.6	51.7	40 04.4	+59.7	52.4	40 40.7	+59.8	53.1	41 16.4	+59.9	53.8	41 51.6	+59.9	54.5	42 26.1	+60.0	55.2	43 00.0	+60.0	56.0	**43**
44	39 49.6	+59.4	50.9	40 27.1	+59.6	51.6	41 04.1	+59.7	52.3	41 40.5	+59.8	53.0	42 16.3	+59.9	53.7	42 51.5	+60.0	54.4	43 26.1	+60.0	55.2	44 00.0	+60.0	56.0	**44**
45	40 49.0	+59.5	50.8	41 26.7	+59.6	51.4	42 03.8	+59.7	52.2	42 40.3	+59.8	52.9	43 16.2	+59.9	53.6	43 51.5	+59.9	54.4	44 26.1	+60.0	55.2	45 00.0	+60.0	56.0	**45**
46	41 48.5	+59.4	50.6	42 26.3	+59.6	51.3	43 03.5	+59.7	52.0	43 40.1	+59.8	52.8	44 16.1	+59.9	53.5	44 51.4	+60.0	54.3	45 26.1	+60.0	55.2	46 00.0	+60.0	56.0	**46**
47	42 47.9	+59.4	50.4	43 25.9	+59.5	51.1	44 03.2	+59.7	51.9	44 39.9	+59.8	52.7	45 16.0	+59.9	53.5	45 51.4	+59.9	54.3	46 26.1	+60.0	55.1	47 00.0	+60.0	56.0	**47**
48	43 47.3	+59.4	50.2	44 25.4	+59.6	51.0	45 02.9	+59.7	51.7	45 39.7	+59.8	52.5	46 15.9	+59.9	53.4	46 51.3	+60.0	54.2	47 26.1	+59.9	55.1	48 00.0	+60.0	56.0	**48**
49	44 46.7	+59.4	50.0	45 25.0	+59.5	50.8	46 02.6	+59.7	51.6	46 39.5	+59.8	52.4	47 15.8	+59.8	53.3	47 51.3	+59.9	54.2	48 26.0	+60.0	55.1	49 00.0	+60.0	56.0	**49**
50	45 46.1	+59.4	49.8	46 24.5	+59.5	50.6	47 02.3	+59.6	51.4	47 39.3	+59.8	52.3	48 15.6	+59.9	53.2	48 51.2	+60.0	54.1	49 26.0	+60.0	55.0	50 00.0	+60.0	56.0	**50**
51	46 45.5	+59.3	49.6	47 24.0	+59.5	50.4	48 01.9	+59.7	51.3	48 39.1	+59.8	52.2	49 15.5	+59.9	53.1	49 51.2	+59.9	54.0	50 26.0	+60.0	55.0	51 00.0	+60.0	56.0	**51**
52	47 44.8	+59.3	49.4	48 23.5	+59.5	50.2	49 01.6	+59.6	51.1	49 38.9	+59.7	52.0	50 15.4	+59.8	53.0	50 51.1	+59.9	53.9	51 26.0	+60.0	55.0	52 00.0	+60.0	56.0	**52**
53	48 44.1	+59.3	49.2	49 23.0	+59.5	50.0	50 01.2	+59.6	50.9	50 38.6	+59.8	51.9	51 15.2	+59.9	52.9	51 51.0	+60.0	53.9	52 26.0	+60.0	54.9	53 00.0	+60.0	56.0	**53**
54	49 43.4	+59.2	48.9	50 22.5	+59.4	49.8	51 00.8	+59.6	50.8	51 38.4	+59.7	51.7	52 15.1	+59.8	52.7	52 51.0	+59.9	53.8	53 26.0	+59.9	54.9	54 00.0	+60.0	56.0	**54**
55	50 42.6	+59.3	48.7	51 21.9	+59.4	49.6	52 00.4	+59.6	50.6	52 38.1	+59.7	51.6	53 14.9	+59.9	52.6	53 50.9	+59.9	53.7	54 25.9	+60.0	54.8	55 00.0	+60.0	56.0	**55**
56	51 41.9	+59.1	48.4	52 21.3	+59.4	49.4	53 00.0	+59.5	50.4	53 37.8	+59.7	51.4	54 14.8	+59.8	52.5	54 50.8	+60.0	53.6	55 25.9	+60.0	54.8	56 00.0	+60.0	56.0	**56**
57	52 41.0	+59.2	48.1	53 20.7	+59.3	49.1	53 59.5	+59.6	50.2	54 37.5	+59.7	51.3	55 14.6	+59.8	52.4	55 50.8	+59.9	53.5	56 25.9	+60.0	54.7	57 00.0	+60.0	56.0	**57**
58	53 40.2	+59.1	47.9	54 20.0	+59.3	48.9	54 59.1	+59.5	50.0	55 37.2	+59.7	51.1	56 14.4	+59.8	52.2	56 50.7	+59.9	53.4	57 25.9	+60.0	54.7	58 00.0	+60.0	56.0	**58**
59	54 39.3	+59.0	47.6	55 19.3	+59.3	48.6	55 58.6	+59.4	49.7	56 36.9	+59.6	50.9	57 14.2	+59.8	52.1	57 50.6	+59.9	53.3	58 25.9	+59.9	54.6	59 00.0	+60.0	56.0	**59**
60	55 38.3	+59.0	47.3	56 18.6	+59.3	48.4	56 58.0	+59.5	49.5	57 36.5	+59.7	50.7	58 14.0	+59.8	51.9	58 50.5	+59.9	53.2	59 25.8	+60.0	54.6	60 00.0	+60.0	56.0	**60**
61	56 37.3	+59.0	46.9	57 17.9	+59.2	48.1	57 57.5	+59.4	49.3	58 36.2	+59.6	50.5	59 13.8	+59.8	51.8	59 50.4	+59.9	53.1	60 25.8	+60.0	54.5	61 00.0	+60.0	56.0	**61**
62	57 36.3	+58.9	46.6	58 17.1	+59.1	47.8	58 56.9	+59.4	49.0	59 35.8	+59.6	50.3	60 13.6	+59.8	51.6	60 50.3	+59.9	53.0	61 25.8	+60.0	54.5	62 00.0	+60.0	56.0	**62**
63	58 35.2	+58.8	46.2	59 16.2	+59.1	47.4	59 56.3	+59.4	48.7	60 35.4	+59.6	50.0	61 13.4	+59.7	51.4	61 50.2	+59.9	52.9	62 25.8	+59.9	54.4	63 00.0	+60.0	56.0	**63**
64	59 34.0	+58.8	45.8	60 15.3	+59.1	47.1	60 55.7	+59.3	48.4	61 35.0	+59.5	49.8	62 13.1	+59.8	51.2	62 50.1	+59.8	52.8	63 25.7	+60.0	54.3	64 00.0	+60.0	56.0	**64**
65	60 32.8	+58.6	45.4	61 14.4	+59.0	46.7	61 55.0	+59.3	48.1	62 34.5	+59.5	49.5	63 12.9	+59.7	51.0	63 49.9	+59.9	52.6	64 25.7	+60.0	54.3	65 00.0	+60.0	56.0	**65**
66	61 31.4	+58.6	45.0	62 13.4	+58.9	46.3	62 54.3	+59.2	47.8	63 34.0	+59.5	49.2	64 12.6	+59.7	50.8	64 49.8	+59.9	52.5	65 25.7	+59.9	54.2	66 00.0	+60.0	56.0	**66**
67	62 30.0	+58.5	44.6	63 12.3	+58.8	45.9	63 53.5	+59.1	47.4	64 33.5	+59.4	48.9	65 12.3	+59.6	50.6	65 49.7	+59.8	52.3	66 25.6	+60.0	54.1	67 00.0	+60.0	56.0	**67**
68	63 28.5	+58.4	44.1	64 11.1	+58.8	45.5	64 52.6	+59.1	47.0	65 32.9	+59.4	48.6	66 11.9	+59.7	50.3	66 49.5	+59.8	52.1	67 25.6	+59.9	54.0	68 00.0	+60.0	56.0	**68**
69	64 26.9	+58.3	43.5	65 09.9	+58.6	45.0	65 51.7	+59.0	46.6	66 32.3	+59.3	48.3	67 11.6	+59.6	50.0	67 49.3	+59.9	51.9	68 25.5	+60.0	53.9	69 00.0	+60.0	56.0	**69**
70	65 25.2	+58.1	43.0	66 08.5	+58.6	44.5	66 50.7	+59.0	46.1	67 31.6	+59.3	47.9	68 11.2	+59.5	49.7	68 49.2	+59.8	51.7	69 25.5	+59.9	53.8	70 00.0	+60.0	56.0	**70**
71	66 23.3	+58.0	42.4	67 07.1	+58.4	44.0	67 49.7	+58.8	45.7	68 30.9	+59.2	47.5	69 10.7	+59.6	49.4	69 49.0	+59.7	51.5	70 25.4	+60.0	53.7	71 00.0	+60.0	56.0	**71**
72	67 21.3	+57.8	41.7	68 05.5	+58.3	43.4	68 48.5	+58.7	45.1	69 30.1	+59.2	47.0	70 10.3	+59.4	49.0	70 48.7	+59.8	51.2	71 25.4	+59.9	53.5	72 00.0	+60.0	56.0	**72**
73	68 19.1	+57.6	41.0	69 03.8	+58.1	42.7	69 47.2	+58.6	44.6	70 29.3	+59.0	46.5	71 09.7	+59.5	48.7	71 48.5	+59.7	50.9	72 25.3	+59.9	53.4	73 00.0	+60.0	56.0	**73**
74	69 16.7	+57.4	40.2	70 01.9	+58.0	42.0	70 45.8	+58.5	43.9	71 28.3	+59.0	46.0	72 09.2	+59.3	48.2	72 48.2	+59.7	50.6	73 25.2	+60.0	53.2	74 00.0	+60.0	56.0	**74**
75	70 14.1	+57.1	39.4	70 59.9	+57.7	41.2	71 44.3	+58.3	43.2	72 27.3	+58.8	45.4	73 08.5	+59.3	47.7	73 47.9	+59.7	50.3	74 25.2	+59.9	53.0	75 00.0	+60.0	56.0	**75**
76	71 11.2	+56.8	38.5	71 57.6	+57.5	40.4	72 42.6	+58.1	42.4	73 26.1	+58.7	44.7	74 07.8	+59.2	47.2	74 47.6	+59.6	49.9	75 25.1	+59.9	52.8	76 00.0	+60.0	56.0	**76**
77	72 08.0	+56.5	37.4	72 55.1	+57.1	39.4	73 40.7	+57.9	41.6	74 24.8	+58.5	44.0	75 07.0	+59.1	46.6	75 47.2	+59.5	49.4	76 25.0	+59.8	52.6	77 00.0	+60.0	56.0	**77**
78	73 04.5	+56.1	36.3	73 52.2	+56.9	38.3	74 38.6	+57.5	40.6	75 23.3	+58.2	43.1	76 06.1	+58.9	45.9	76 46.7	+59.5	48.9	77 24.8	+59.9	52.3	78 00.0	+60.0	56.0	**78**
79	74 00.6	+55.5	35.0	74 49.1	+56.3	37.2	75 36.1	+57.3	39.5	76 21.5	+58.1	42.1	77 05.0	+58.8	45.0	77 46.2	+59.4	48.3	78 24.7	+59.8	51.9	79 00.0	+60.0	56.0	**79**
80	74 56.1	+55.0	33.6	75 45.4	+55.9	35.8	76 33.4	+56.8	38.3	77 19.6	+57.7	41.0	78 03.8	+58.5	44.1	78 45.6	+59.3	47.6	79 24.5	+59.8	51.6	80 00.0	+60.0	56.0	**80**
81	75 51.1	+54.2	32.0	76 41.3	+55.3	34.3	77 30.2	+56.2	36.8	78 17.3	+57.3	39.7	79 02.3	+58.3	43.0	79 44.9	+59.1	46.8	80 24.3	+59.8	51.1	81 00.0	+60.0	56.0	**81**
82	76 45.3	+53.4	30.2	77 36.6	+54.4	32.5	78 26.4	+55.6	35.2	79 14.6	+56.7	38.2	80 00.6	+57.9	41.7	80 44.0	+58.9	45.8	81 24.1	+59.6	50.5	82 00.0	+60.0	56.0	**82**
83	77 38.7	+52.3	28.2	78 31.0	+53.5	30.5	79 22.0	+54.8	33.2	80 11.3	+56.1	36.4	80 58.5	+57.4	40.1	81 42.9	+58.6	44.5	82 23.7	+59.6	49.8	83 00.0	+60.0	56.0	**83**
84	78 31.0	+51.0	25.8	79 24.5	+52.3	28.1	80 16.8	+53.6	30.9	81 07.4	+55.1	34.2	81 55.9	+56.6	38.1	82 41.5	+58.2	42.9	83 23.3	+59.5	48.8	84 00.0	+60.0	56.0	**84**
85	79 22.0	+49.3	23.1	80 16.8	+50.6	25.3	81 10.4	+52.1	28.1	82 02.5	+53.8	31.5	82 52.5	+55.6	35.6	83 39.7	+57.5	40.9	84 22.8	+59.2	47.5	85 00.0	+60.0	56.0	**85**
86	80 11.3	*+47.2*•	19.8	81 07.4	*+48.5*•	22.0	82 02.5	*+50.0*•	24.7	82 56.3	*+51.8*•	28.1	83 48.1	*+54.1*•	32.4	84 37.2	+56.4	38.1	85 22.0	+58.7	45.7	86 00.0	+60.0	56.0	**86**
87	80 58.5	*+44.4*•	16.1	81 55.9	*+45.6*•	18.0	82 52.5	*+47.2*•	20.5	83 48.1	*+49.1*•	23.7	84 42.2	*+51.4*•	28.0	85 33.6	*+54.5*•	34.1	86 20.7	+57.9	42.9	87 00.0	+60.0	56.0	**87**
88	81 42.9	*+40.8*•	11.6	82 41.5	*+41.8*•	13.1	83 39.7	*+43.1*•	15.2	84 37.2	*+44.8*•	18.0	85 33.6	*+47.1*•	21.9	86 28.1	*+50.5*•	28.0	87 18.6	*+55.4*•	38.1	88 00.0	+60.0	56.0	**88**
89	82 23.7	*+36.3*•	6.3	83 23.3	*+36.7*•	7.2	84 22.8	*+37.2*•	8.5	85 22.0	*+38.0*•	10.3	86 20.7	*+39.3*•	13.1	87 18.6	*+41.4*•	18.0	88 14.0	*+46.0*•	28.0	89 00.0	+60.0	56.0	**89**
90	83 00.0	*+30.4*•	0.0	84 00.0	*+29.8*•	0.0	85 00.0	*+29.0*•	0.0	86 00.0	*+27.7*•	0.0	87 00.0	*+25.3*•	0.0	88 00.0	*+20.3*•	0.0	89 00.0	*+3.7*•	0.0	90 00.0	−60.0	28.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 124°, 236°

57°, 303° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 48.3	+59.7	122.8	3 15.8	+59.8	122.9	2 43.2	+59.9	122.9	2 10.6	+59.9	122.9	1 38.0	+59.9	123.0	1 05.3	+60.0	123.0	0 32.7	+60.0	123.0	0 00.0	+60.0	123.0	0
1	4 48.0	+59.7	122.7	4 15.6	+59.8	122.8	3 43.1	+59.8	122.8	3 10.5	+59.9	122.9	2 37.9	+60.0	122.9	2 05.3	+60.0	123.0	1 32.7	+60.0	123.0	1 00.0	+60.0	123.0	1
2	5 47.7	+59.7	122.6	5 15.4	+59.7	122.7	4 42.9	+59.9	122.8	4 10.4	+59.9	122.8	3 37.9	+59.9	122.9	3 05.3	+60.0	122.9	2 32.7	+60.0	123.0	2 00.0	+60.0	123.0	2
3	6 47.4	+59.7	122.5	6 15.1	+59.8	122.6	5 42.8	+59.8	122.7	5 10.3	+59.9	122.8	4 37.8	+60.0	122.8	4 05.3	+59.9	122.9	3 32.7	+60.0	123.0	3 00.0	+60.0	123.0	3
4	7 47.1	+59.7	122.4	7 14.9	+59.8	122.5	6 42.6	+59.8	122.6	6 10.2	+59.9	122.7	5 37.8	+59.9	122.8	5 05.2	+60.0	122.9	4 32.7	+59.9	122.9	4 00.0	+60.0	123.0	4
5	8 46.8	+59.6	122.3	8 14.7	+59.7	122.4	7 42.4	+59.9	122.5	7 10.1	+59.9	122.6	6 37.7	+60.0	122.7	6 05.2	+60.0	122.8	5 32.6	+60.0	122.9	5 00.0	+60.0	123.0	5
6	9 46.4	+59.7	122.2	9 14.4	+59.8	122.3	8 42.3	+59.8	122.5	8 10.0	+59.9	122.6	7 37.7	+59.9	122.7	7 05.2	+60.0	122.8	6 32.6	+60.0	122.9	6 00.0	+60.0	123.0	6
7	10 46.1	+59.7	122.1	10 14.2	+59.7	122.2	9 42.1	+59.8	122.4	9 09.9	+59.9	122.5	8 37.6	+59.9	122.7	8 05.2	+59.9	122.8	7 32.6	+60.0	122.9	7 00.0	+60.0	123.0	7
8	11 45.8	+59.7	122.0	11 13.9	+59.8	122.1	10 41.9	+59.9	122.3	10 09.8	+59.9	122.5	9 37.5	+60.0	122.6	9 05.1	+60.0	122.7	8 32.6	+60.0	122.9	8 00.0	+60.0	123.0	8
9	12 45.5	+59.6	121.9	12 13.7	+59.8	122.1	11 41.8	+59.8	122.2	11 09.7	+59.9	122.4	10 37.5	+59.9	122.6	10 05.1	+60.0	122.7	9 32.6	+60.0	122.9	9 00.0	+60.0	123.0	9
10	13 45.1	+59.7	121.8	13 13.5	+59.7	122.0	12 41.6	+59.8	122.2	12 09.6	+59.9	122.3	11 37.4	+60.0	122.5	11 05.1	+60.0	122.7	10 32.6	+60.0	122.8	10 00.0	+60.0	123.0	10
11	14 44.8	+59.6	121.6	14 13.2	+59.8	121.9	13 41.4	+59.9	122.1	13 09.5	+59.9	122.3	12 37.4	+59.9	122.5	12 05.1	+59.9	122.7	11 32.6	+60.0	122.8	11 00.0	+60.0	123.0	11
12	15 44.4	+59.7	121.5	15 13.0	+59.7	121.8	14 41.3	+59.8	122.0	14 09.4	+59.9	122.2	13 37.3	+59.9	122.4	13 05.0	+60.0	122.6	12 32.6	+60.0	122.8	12 00.0	+60.0	123.0	12
13	16 44.1	+59.7	121.4	16 12.7	+59.8	121.7	15 41.1	+59.8	121.9	15 09.3	+59.9	122.2	14 37.2	+60.0	122.4	14 05.0	+60.0	122.6	13 32.6	+60.0	122.8	13 00.0	+60.0	123.0	13
14	17 43.8	+59.6	121.3	17 12.5	+59.7	121.6	16 40.9	+59.8	121.8	16 09.2	+59.8	122.1	15 37.2	+59.9	122.3	15 05.0	+60.0	122.6	14 32.6	+60.0	122.8	14 00.0	+60.0	123.0	14
15	18 43.4	+59.7	121.2	18 12.2	+59.7	121.5	17 40.7	+59.9	121.8	17 09.0	+59.9	122.0	16 37.1	+59.9	122.3	16 05.0	+59.9	122.5	15 32.6	+60.0	122.8	15 00.0	+60.0	123.0	15
16	19 43.1	+59.6	121.1	19 11.9	+59.8	121.4	18 40.6	+59.8	121.7	18 08.9	+59.9	122.0	17 37.0	+60.0	122.2	17 04.9	+60.0	122.5	16 32.6	+60.0	122.8	16 00.0	+60.0	123.0	16
17	20 42.7	+59.6	121.0	20 11.7	+59.7	121.3	19 40.4	+59.8	121.6	19 08.8	+59.9	121.9	18 37.0	+59.9	122.2	18 04.9	+60.0	122.5	17 32.6	+60.0	122.7	17 00.0	+60.0	123.0	17
18	21 42.3	+59.7	120.9	21 11.4	+59.8	121.2	20 40.2	+59.8	121.5	20 08.7	+59.9	121.8	19 36.9	+60.0	122.1	19 04.9	+59.9	122.4	18 32.6	+59.9	122.7	18 00.0	+60.0	123.0	18
19	22 42.0	+59.6	120.7	22 11.2	+59.7	121.1	21 40.0	+59.8	121.4	21 08.6	+59.9	121.8	20 36.9	+59.9	122.1	20 04.8	+60.0	122.4	19 32.5	+60.0	122.7	19 00.0	+60.0	123.0	19
20	23 41.6	+59.6	120.6	23 10.9	+59.7	121.0	22 39.8	+59.8	121.3	22 08.5	+59.8	121.7	21 36.8	+59.9	122.0	21 04.8	+60.0	122.4	20 32.5	+60.0	122.7	20 00.0	+60.0	123.0	20
21	24 41.2	+59.6	120.5	24 10.6	+59.7	120.9	23 39.6	+59.9	121.3	23 08.3	+59.9	121.6	22 36.7	+59.9	122.0	22 04.8	+59.9	122.3	21 32.5	+60.0	122.7	21 00.0	+60.0	123.0	21
22	25 40.8	+59.7	120.4	25 10.3	+59.7	120.8	24 39.5	+59.8	121.2	24 08.2	+59.9	121.6	23 36.6	+60.0	121.9	23 04.7	+60.0	122.3	22 32.5	+60.0	122.7	22 00.0	+60.0	123.0	22
23	26 40.5	+59.6	120.2	26 10.0	+59.8	120.7	25 39.3	+59.8	121.1	25 08.1	+59.9	121.5	24 36.6	+59.9	121.9	24 04.7	+60.0	122.3	23 32.5	+60.0	122.6	23 00.0	+60.0	123.0	23
24	27 40.1	+59.6	120.1	27 09.8	+59.7	120.6	26 39.1	+59.8	121.0	26 08.0	+59.8	121.4	25 36.5	+59.9	121.8	25 04.7	+60.0	122.2	24 32.5	+60.0	122.6	24 00.0	+60.0	123.0	24
25	28 39.7	+59.5	120.0	28 09.5	+59.7	120.4	27 38.9	+59.7	120.9	27 07.8	+59.9	121.3	26 36.4	+60.0	121.8	26 04.7	+59.9	122.2	25 32.5	+60.0	122.6	25 00.0	+60.0	123.0	25
26	29 39.2	+59.6	119.8	29 09.2	+59.7	120.3	28 38.6	+59.8	120.8	28 07.7	+59.9	121.3	27 36.4	+59.9	121.7	27 04.6	+60.0	122.2	26 32.5	+60.0	122.6	26 00.0	+60.0	123.0	26
27	30 38.8	+59.6	119.7	30 08.9	+59.6	120.2	29 38.4	+59.8	120.7	29 07.6	+59.8	121.2	28 36.3	+59.9	121.7	28 04.6	+60.0	122.1	27 32.5	+60.0	122.6	27 00.0	+60.0	123.0	27
28	31 38.4	+59.6	119.6	31 08.5	+59.7	120.1	30 38.2	+59.8	120.6	30 07.4	+59.9	121.1	29 36.2	+59.9	121.6	29 04.6	+59.9	122.1	28 32.5	+60.0	122.5	28 00.0	+60.0	123.0	28
29	32 38.0	+59.5	119.4	32 08.2	+59.7	120.0	31 38.0	+59.8	120.5	31 07.3	+59.9	121.0	30 36.1	+60.0	121.5	30 04.5	+60.0	122.0	29 32.5	+60.0	122.5	29 00.0	+60.0	123.0	29
30	33 37.5	+59.5	119.3	33 07.9	+59.7	119.9	32 37.8	+59.7	120.4	32 07.2	+59.8	121.0	31 36.1	+59.9	121.5	31 04.5	+60.0	122.0	30 32.5	+60.0	122.5	30 00.0	+60.0	123.0	30
31	34 37.0	+59.6	119.1	34 07.6	+59.6	119.7	33 37.5	+59.8	120.3	33 07.0	+59.9	120.9	32 36.0	+59.9	121.4	32 04.5	+59.9	122.0	31 32.5	+59.9	122.5	31 00.0	+60.0	123.0	31
32	35 36.6	+59.5	119.0	35 07.2	+59.7	119.6	34 37.3	+59.8	120.2	34 06.9	+59.8	120.8	33 35.9	+59.9	121.4	33 04.4	+60.0	121.9	32 32.4	+60.0	122.5	32 00.0	+60.0	123.0	32
33	36 36.1	+59.5	118.8	36 06.9	+59.6	119.5	35 37.1	+59.7	120.1	35 06.7	+59.9	120.7	34 35.8	+59.9	121.3	34 04.4	+59.9	121.9	33 32.4	+60.0	122.4	33 00.0	+60.0	123.0	33
34	37 35.6	+59.5	118.7	37 06.5	+59.6	119.3	36 36.8	+59.8	120.0	36 06.6	+59.8	120.6	35 35.7	+59.9	121.2	35 04.3	+60.0	121.8	34 32.4	+60.0	122.4	34 00.0	+60.0	123.0	34
35	38 35.1	+59.5	118.5	38 06.1	+59.7	119.2	37 36.6	+59.7	119.9	37 06.4	+59.8	120.5	36 35.6	+59.9	121.2	36 04.3	+60.0	121.8	35 32.4	+60.0	122.4	35 00.0	+60.0	123.0	35
36	39 34.6	+59.4	118.3	39 05.8	+59.6	119.0	38 36.3	+59.7	119.7	38 06.2	+59.9	120.4	37 35.5	+60.0	121.1	37 04.3	+59.9	121.7	36 32.4	+60.0	122.4	36 00.0	+60.0	123.0	36
37	40 34.0	+59.5	118.1	40 05.4	+59.6	118.9	39 36.0	+59.8	119.6	39 06.1	+59.8	120.3	38 35.5	+59.9	121.0	38 04.2	+60.0	121.7	37 32.4	+60.0	122.4	37 00.0	+60.0	123.0	37
38	41 33.5	+59.4	118.0	41 05.0	+59.6	118.7	40 35.8	+59.7	119.5	40 05.9	+59.8	120.2	39 35.4	+59.9	121.0	39 04.2	+59.9	121.7	38 32.4	+60.0	122.3	38 00.0	+60.0	123.0	38
39	42 32.9	+59.4	117.8	42 04.6	+59.5	118.6	41 35.5	+59.7	119.4	41 05.7	+59.8	120.1	40 35.3	+59.9	120.9	40 04.1	+60.0	121.6	39 32.4	+60.0	122.3	39 00.0	+60.0	123.0	39
40	43 32.3	+59.4	117.6	43 04.1	+59.6	118.4	42 35.2	+59.7	119.2	42 05.5	+59.8	120.0	41 35.2	+59.8	120.8	41 04.1	+59.9	121.6	40 32.4	+60.0	122.3	40 00.0	+60.0	123.0	40
41	44 31.7	+59.4	117.4	44 03.7	+59.5	118.3	43 34.9	+59.7	119.1	43 05.3	+59.8	119.9	42 35.0	+59.9	120.7	42 04.0	+60.0	121.5	41 32.4	+59.9	122.3	41 00.0	+60.0	123.0	41
42	45 31.1	+59.3	117.2	45 03.2	+59.6	118.1	44 34.6	+59.7	119.0	44 05.1	+59.8	119.8	43 34.9	+59.9	120.6	43 04.0	+59.9	121.4	42 32.3	+60.0	122.2	42 00.0	+60.0	123.0	42
43	46 30.4	+59.3	117.0	46 02.8	+59.5	117.9	45 34.3	+59.6	118.8	45 04.9	+59.8	119.7	44 34.8	+59.9	120.6	44 03.9	+60.0	121.4	43 32.3	+60.0	122.2	43 00.0	+60.0	123.0	43
44	47 29.7	+59.3	116.8	47 02.3	+59.5	117.7	46 33.9	+59.7	118.7	46 04.7	+59.8	119.6	45 34.7	+59.9	120.5	45 03.9	+59.9	121.3	44 32.3	+60.0	122.2	44 00.0	+60.0	123.0	44
45	48 29.0	+59.3	116.5	48 01.8	+59.4	117.5	47 33.6	+59.6	118.5	47 04.5	+59.8	119.5	46 34.6	+59.9	120.4	46 03.8	+60.0	121.3	45 32.3	+60.0	122.1	45 00.0	+60.0	123.0	45
46	49 28.3	+59.2	116.3	49 01.2	+59.5	117.3	48 33.2	+59.6	118.3	48 04.3	+59.8	119.3	47 34.5	+59.8	120.3	47 03.8	+59.9	121.2	46 32.3	+60.0	122.1	46 00.0	+60.0	123.0	46
47	50 27.5	+59.2	116.0	50 00.7	+59.4	117.1	49 32.8	+59.7	118.2	49 04.1	+59.7	119.2	48 34.3	+59.9	120.2	48 03.7	+60.0	121.1	47 32.3	+60.0	122.1	47 00.0	+60.0	123.0	47
48	51 26.7	+59.2	115.8	51 00.1	+59.4	116.9	50 32.5	+59.6	118.0	50 03.8	+59.8	119.1	49 34.2	+59.9	120.1	49 03.7	+59.9	121.1	48 32.3	+59.9	122.1	48 00.0	+60.0	123.0	48
49	52 25.9	+59.1	115.5	51 59.5	+59.4	116.7	51 32.1	+59.5	117.8	51 03.6	+59.7	118.9	50 34.1	+59.8	120.0	50 03.6	+60.0	121.0	49 32.2	+60.0	122.0	49 00.0	+60.0	123.0	49
50	53 25.0	+59.1	115.2	52 58.9	+59.3	116.4	52 31.6	+59.6	117.6	52 03.3	+59.7	118.8	51 33.9	+59.9	119.9	51 03.6	+59.9	120.9	50 32.2	+60.0	122.0	50 00.0	+60.0	123.0	50
51	54 24.1	+59.1	114.9	53 58.2	+59.4	116.2	53 31.2	+59.5	117.4	53 03.0	+59.7	118.6	52 33.8	+59.8	119.7	52 03.5	+59.9	120.9	51 32.2	+60.0	121.9	51 00.0	+60.0	123.0	51
52	55 23.2	+59.0	114.6	54 57.6	+59.2	115.9	54 30.7	+59.5	117.2	54 02.7	+59.7	118.4	53 33.6	+59.8	119.6	53 03.4	+59.9	120.8	52 32.2	+60.0	121.9	52 00.0	+60.0	123.0	52
53	56 22.2	+58.9	114.3	55 56.8	+59.3	115.7	55 30.2	+59.5	117.0	55 02.4	+59.7	118.3	54 33.4	+59.9	119.5	54 03.3	+60.0	120.7	53 32.2	+60.0	121.9	53 00.0	+60.0	123.0	53
54	57 21.1	+58.9	114.0	56 56.1	+59.2	115.4	56 29.7	+59.5	116.7	56 02.1	+59.7	118.1	55 33.3	+59.8	119.4	55 03.3	+59.9	120.6	54 32.2	+59.9	121.8	54 00.0	+60.0	123.0	54
55	58 20.0	+58.8	113.6	57 55.3	+59.1	115.1	57 29.2	+59.4	116.5	57 01.8	+59.6	117.9	56 33.1	+59.8	119.2	56 03.2	+59.9	120.5	55 32.1	+60.0	121.8	55 00.0	+60.0	123.0	55
56	59 18.8	+58.8	113.2	58 54.4	+59.1	114.8	58 28.6	+59.4	116.2	58 01.4	+59.6	117.7	57 32.9	+59.8	119.1	57 03.1	+59.9	120.4	56 32.1	+60.0	121.7	56 00.0	+60.0	123.0	56
57	60 17.6	+58.6	112.8	59 53.5	+59.1	114.4	59 28.0	+59.3	116.0	59 01.0	+59.6	117.5	58 32.7	+59.8	118.9	58 03.0	+59.9	120.3	57 32.1	+60.0	121.7	57 00.0	+60.0	123.0	57
58	61 16.2	+58.6	112.4	60 52.6	+59.0	114.1	60 27.3	+59.4	115.7	60 00.6	+59.6	117.2	59 32.5	+59.7	118.8	59 02.9	+59.9	120.2	58 32.1	+60.0	121.6	58 00.0	+60.0	123.0	58
59	62 14.8	+58.5	111.9	61 51.6	+58.9	113.7	61 26.7	+59.2	115.4	61 00.2	+59.5	117.0	60 32.2	+59.8	118.6	60 02.8	+59.9	120.1	59 32.1	+59.9	121.6	59 00.0	+60.0	123.0	59
60	63 13.3	+58.4	111.4	62 50.5	+58.8	113.3	62 25.9	+59.3	115.0	61 59.7	+59.6	116.7	61 32.0	+59.7	118.4	61 02.7	+59.9	120.0	60 32.0	+60.0	121.5	60 00.0	+60.0	123.0	60
61	64 11.7	+58.3	110.9	63 49.3	+58.8	112.8	63 25.2	+59.1	114.7	62 59.3	+59.4	116.5	62 31.7	+59.7	118.2	62 02.6	+59.9	119.9	61 32.0	+60.0	121.5	61 00.0	+60.0	123.0	61
62	65 10.0	+58.1	110.4	64 48.1	+58.7	112.4	64 24.3	+59.1	114.3	63 58.7	+59.5	116.2	63 31.4	+59.7	118.0	63 02.5	+59.8	119.7	62 32.0	+59.9	121.4	62 00.0	+60.0	123.0	62
63	66 08.1	+58.0	109.8	65 46.8	+58.5	111.9	65 23.4	+59.1	113.9	64 58.2	+59.4	115.9	64 31.1	+59.7	117.7	64 02.3	+59.9	119.6	63 31.9	+60.0	121.3	63 00.0	+60.0	123.0	63
64	67 06.1	+57.8	109.1	66 45.3	+58.4	111.3	66 22.5	+58.9	113.5	65 57.6	+59.3	115.5	65 30.8	+59.6	117.5	65 02.2	+59.9	119.4	64 31.9	+60.0	121.2	64 00.0	+60.0	123.0	64
65	68 03.9	+57.6	108.4	67 43.7	+58.4	110.7	67 21.4	+58.9	113.0	66 56.9	+59.3	115.1	66 30.4	+59.7	117.2	66 02.1	+59.8	119.2	65 31.9	+59.9	121.2	65 00.0	+60.0	123.0	65
66	69 01.5	+57.4	107.7	68 42.1	+58.1	110.1	68 20.3	+58.7	112.5	67 56.2	+59.3	114.8	67 30.1	+59.6	116.9	67 01.9	+59.8	119.1	66 31.8	+60.0	121.1	66 00.0	+60.0	123.0	66
67	69 58.9	+57.1	106.8	69 40.2	+58.0	109.4	69 19.0	+58.7	111.9	68 55.5	+59.1	114.3	68 29.7	+59.5	116.6	68 01.7	+59.8	118.9	67 31.8	+59.9	121.0	67 00.0	+60.0	123.0	67
68	70 56.0	+56.8	105.9	70 38.2	+57.7	108.6	70 17.7	+58.5	111.3	69 54.6	+59.1	113.8	69 29.2	+59.5	116.3	69 01.5	+59.8	118.6	68 31.7	+60.0	120.9	68 00.0	+60.0	123.0	68
69	71 52.8	+56.5	104.9	71 35.9	+57.5	107.8	71 16.2	+58.3	110.6	70 53.7	+59.0	113.3	70 28.7	+59.5	115.9	70 01.3	+59.8	118.4	69 31.7	+59.9	120.8	69 00.0	+60.0	123.0	69
70	72 49.3	+56.1	103.8	72 33.4	+57.3	106.9	72 14.5	+58.2	109.9	71 52.7	+58.9	112.7	71 28.2	+59.4	115.5	71 01.1	+59.7	118.1	70 31.6	+60.0	120.6	70 00.0	+60.0	123.0	70
71	73 45.4	+55.6	102.5	73 30.7	+56.8	105.8	73 12.7	+57.9	109.0	72 51.6	+58.7	112.1	72 27.6	+59.3	115.0	72 00.8	+59.7	117.8	71 31.6	+59.9	120.5	71 00.0	+60.0	123.0	71
72	74 41.0	+55.0	101.2	74 27.5	+56.5	104.7	74 10.6	+57.6	108.1	73 50.3	+58.6	111.4	73 26.9	+59.2	114.5	73 00.5	+59.7	117.5	72 31.5	+59.9	120.3	72 00.0	+60.0	123.0	72
73	75 36.0	+54.3	99.6	75 24.0	+56.0	103.4	75 08.2	+57.4	107.1	74 48.9	+58.4	110.6	74 26.1	+59.2	114.0	74 00.2	+59.7	117.2	73 31.4	+59.9	120.2	73 00.0	+60.0	123.0	73
74	76 30.3	+53.5	97.8	76 20.0	+55.4	101.9	76 05.6	+56.9	105.9	75 47.3	+58.1	109.7	75 25.3	+59.0	113.3	74 59.9	+59.5	116.7	74 31.3	+60.0	120.0	74 00.0	+60.0	123.0	74
75	77 23.8	+52.5	95.8	77 15.4	+54.7	100.2	77 02.5	+56.5	104.5	76 45.4	+57.9	108.6	76 24.3	+58.8	112.6	75 59.4	+59.6	116.3	75 31.3	+59.8	119.8	75 00.0	+60.0	123.0	75
76	78 16.3	+51.1	93.5	78 10.1	+53.7	98.3	77 59.0	+55.9	103.0	77 43.3	+57.4	107.4	77 23.1	+58.7	111.7	76 59.0	+59.4	115.7	76 31.1	+59.9	119.5	76 00.0	+60.0	123.0	76
77	79 07.4	+49.6	90.9	79 03.8	+52.6	96.1	78 54.9	+55.0	101.1	78 40.7	+57.1	106.0	78 21.8	+58.4	110.7	77 58.4	+59.4	115.1	77 31.0	+59.9	119.2	77 00.0	+60.0	123.0	77
78	79 57.0	+47.5 •	87.8	79 56.4	+51.1	93.4	79 49.9	+54.1	99.0	79 37.8	+56.4	104.4	79 20.2	+58.2	109.5	78 57.8	+59.2	114.4	78 30.9	+59.8	118.9	78 00.0	+60.0	123.0	78
79	80 44.5	+45.0 •	84.1	80 47.5	+49.1 •	90.3	80 44.0	+52.7	96.4	80 34.2	+55.6	102.4	80 18.4	+57.6	108.1	79 57.0	+59.1	113.5	79 30.7	+59.8	118.5	79 00.0	+60.0	123.0	79
80	81 29.5	+41.5 •	79.8	81 36.6	+46.6 •	86.5	81 36.7	+51.0 •	93.3	81 29.8	+54.5	100.0	81 16.0	+57.2	106.4	80 56.1	+58.8	112.4	80 30.5	+59.7	118.0	80 00.0	+60.0	123.0	80
81	82 11.0	+37.3 •	74.7	82 23.2	+43.1 •	82.0	82 27.7	+48.4 •	89.5	82 24.3	+52.9	97.0	82 13.2	+56.3	104.3	81 54.9	+58.5	111.1	81 30.2	+59.7	117.4	81 00.0	+60.0	123.0	81
82	82 48.3	+31.7 •	68.7	83 06.3	+38.4 •	76.5	83 16.1	+45.0 •	84.7	83 17.2	+50.7 •	93.2	83 09.5	+55.1	101.6	82 53.4	+58.0	109.4	82 29.9	+59.5	116.6	82 00.0	+60.0	123.0	82
83	83 20.0	+24.7 •	61.7	83 44.7	+32.2 •	69.7	84 01.1	+40.0 •	78.7	84 07.9	+47.2 •	88.3	84 04.6	+53.2 •	98.0	83 51.4	+57.3	107.2	83 29.4	+59.4	115.6	83 00.0	+60.0	123.0	83
84	83 44.7	+16.4 •	53.6	84 16.9	+24.2 •	61.6	84 41.1	+32.9 •	71.1	84 55.1	+42.1 •	81.8	84 57.8	+50.2 •	93.1	84 48.7	+56.0	104.2	84 28.8	+59.2	114.3	84 00.0	+60.0	123.0	84
85	84 01.1	+6.8 •	44.5	84 41.1	+14.0 •	52.1	85 14.0	+23.2 •	61.6	85 37.2	+33.9 •	73.2	85 48.0	+44.9 •	86.3	85 44.7	+53.8 •	99.8	85 28.0	+58.7	112.4	85 00.0	+60.0	123.0	85
86	84 07.9	−3.3 •	34.9	84 55.1	+2.7 •	41.3	85 37.2	+10.8 •	50.0	86 11.1	+21.8 •	61.6	86 32.9	+35.4 •	76.3	86 38.5	+49.0 •	93.1	86 26.7	+57.6	109.4	86 00.0	+60.0	123.0	86
87	84 04.6	−13.2 •	25.2	84 57.8	−9.1 •	30.0	85 48.0	−3.3 •	36.8	86 32.9	+5.6 •	46.8	87 08.3	+19.2 •	61.5	87 27.5	+38.0 •	81.7	87 24.3	+54.9 •	104.2	87 00.0	+60.0	123.0	87
88	83 51.4	−22.0 •	15.9	84 48.7	−19.9 •	18.9	85 44.7	−16.7 •	23.2	86 38.5	−11.8 •	30.0	87 27.5	−3.2 •	41.3	88 05.5	+13.7 •	61.5	88 19.2	+43.5 •	93.1	88 00.0	+60.0	123.0	88
89	83 29.4	−29.4 •	7.4	84 28.8	−28.8 •	8.8	85 28.0	−28.0 •	10.7	86 26.7	−26.7 •	13.7	87 24.3	−24.3 •	18.9	88 19.2	−19.2 •	30.0	89 02.7	−2.7 •	61.5	89 00.0	+60.0	123.0	89
90	83 00.0	−35.5 •	0.0	84 00.0	−35.9 •	0.0	85 00.0	−36.5 •	0.0	86 00.0	−37.3 •	0.0	87 00.0	−38.5 •	0.0	88 00.0	−40.8 •	0.0	89 00.0	−45.5 •	0.0	90 00.0	−60.0	61.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 57°, 303°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 48.3	–59.6	122.8	3 15.8	–59.8	122.9	2 43.2	–59.8	122.9	2 10.6	–59.9	122.9	1 38.0	–59.9	123.0	1 05.3	–59.9	123.0	0 32.7	–60.0	123.0	0 00.0	+60.0	57.0	0
1	2 48.7	–59.7	122.9	2 16.0	–59.7	122.9	1 43.4	–59.8	123.0	1 10.7	–59.9	123.0	0 38.1	–60.0	123.0	0 05.4	–60.0	123.0	0 27.3	+60.0	57.0	1 00.0	+60.0	57.0	1
2	1 49.0	–59.7	123.0	1 16.3	–59.8	123.0	0 43.6	–59.9	123.0	0 10.8	–59.9	123.1	0 21.9	+59.9	56.9	0 54.6	+60.0	57.0	1 27.3	+60.0	57.0	2 00.0	+60.0	57.0	2
3	0 49.3	–59.7	123.1	0 16.5	–59.8	123.1	0 16.3	+59.8	56.9	0 49.1	+59.9	56.9	1 21.8	+60.0	56.9	1 54.6	+59.9	56.9	2 27.3	+60.0	57.0	3 00.0	+60.0	57.0	3
4	0 10.4	+59.7	56.8	0 43.3	+59.7	56.8	1 16.1	+59.9	56.8	1 49.0	+59.8	56.8	2 21.8	+59.9	56.9	2 54.5	+60.0	56.9	3 27.3	+60.0	56.9	4 00.0	+60.0	57.0	4
5	1 10.1	+59.7	56.7	1 43.0	+59.8	56.7	2 16.0	+59.8	56.7	2 48.8	+59.9	56.8	3 21.7	+59.9	56.8	3 54.5	+60.0	56.9	4 27.3	+60.0	56.9	5 00.0	+60.0	57.0	5
6	2 09.8	+59.7	56.6	2 42.8	+59.8	56.6	3 15.8	+59.8	56.7	3 48.7	+59.9	56.7	4 21.6	+60.0	56.8	4 54.5	+60.0	56.8	5 27.3	+60.0	56.9	6 00.0	+60.0	57.0	6
7	3 09.5	+59.6	56.5	3 42.6	+59.7	56.5	4 15.6	+59.9	56.6	4 48.6	+59.9	56.7	5 21.6	+59.9	56.7	5 54.5	+59.9	56.8	6 27.3	+60.0	56.9	7 00.0	+60.0	57.0	7
8	4 09.1	+59.7	56.4	4 42.3	+59.8	56.4	5 15.5	+59.8	56.5	5 48.5	+59.9	56.6	6 21.5	+60.0	56.7	6 54.4	+60.0	56.8	7 27.3	+60.0	56.9	8 00.0	+60.0	57.0	8
9	5 08.8	+59.7	56.3	5 42.1	+59.8	56.4	6 15.3	+59.8	56.4	6 48.4	+59.9	56.5	7 21.5	+59.9	56.6	7 54.4	+60.0	56.8	8 27.3	+60.0	56.9	9 00.0	+60.0	57.0	9
10	6 08.5	+59.7	56.2	6 41.9	+59.7	56.3	7 15.1	+59.9	56.4	7 48.3	+59.9	56.5	8 21.4	+60.0	56.6	8 54.4	+60.0	56.7	9 27.3	+60.0	56.9	10 00.0	+60.0	57.0	10
11	7 08.2	+59.7	56.1	7 41.6	+59.8	56.2	8 15.0	+59.8	56.3	8 48.2	+59.9	56.4	9 21.4	+59.9	56.5	9 54.4	+59.9	56.7	10 27.3	+59.9	56.8	11 00.0	+60.0	57.0	11
12	8 07.9	+59.6	56.0	8 41.4	+59.8	56.1	9 14.8	+59.8	56.2	9 48.1	+59.9	56.4	10 21.3	+59.9	56.5	10 54.3	+60.0	56.7	11 27.2	+60.0	56.8	12 00.0	+60.0	57.0	12
13	9 07.5	+59.7	55.9	9 41.2	+59.7	56.0	10 14.6	+59.9	56.1	10 48.0	+59.9	56.3	11 21.2	+60.0	56.5	11 54.3	+60.0	56.6	12 27.2	+60.0	56.8	13 00.0	+60.0	57.0	13
14	10 07.2	+59.7	55.8	10 40.9	+59.8	55.9	11 14.5	+59.8	56.1	11 47.9	+59.9	56.2	12 21.2	+59.9	56.4	12 54.3	+60.0	56.6	13 27.2	+60.0	56.8	14 00.0	+60.0	57.0	14
15	11 06.9	+59.7	55.6	11 40.7	+59.7	55.8	12 14.3	+59.8	56.0	12 47.8	+59.9	56.2	13 21.1	+60.0	56.4	13 54.3	+59.9	56.6	14 27.2	+60.0	56.8	15 00.0	+60.0	57.0	15
16	12 06.6	+59.6	55.5	12 40.4	+59.8	55.7	13 14.1	+59.9	55.9	13 47.7	+59.9	56.1	14 21.1	+59.9	56.3	14 54.2	+60.0	56.5	15 27.2	+60.0	56.8	16 00.0	+60.0	57.0	16
17	13 06.2	+59.7	55.4	13 40.2	+59.7	55.6	14 14.0	+59.8	55.8	14 47.6	+59.9	56.0	15 21.0	+59.9	56.3	15 54.2	+60.0	56.5	16 27.2	+60.0	56.7	17 00.0	+60.0	57.0	17
18	14 05.9	+59.7	55.3	14 39.9	+59.8	55.5	15 13.8	+59.8	55.8	15 47.5	+59.9	56.0	16 20.9	+60.0	56.2	16 54.2	+59.9	56.5	17 27.2	+60.0	56.7	18 00.0	+60.0	57.0	18
19	15 05.6	+59.6	55.2	15 39.7	+59.7	55.4	16 13.6	+59.9	55.7	16 47.4	+59.8	55.9	17 20.9	+59.9	56.2	17 54.1	+60.0	56.4	18 27.2	+60.0	56.7	19 00.0	+60.0	57.0	19
20	16 05.2	+59.7	55.1	16 39.4	+59.8	55.3	17 13.5	+59.8	55.6	17 47.2	+59.9	55.9	18 20.8	+59.9	56.1	18 54.1	+60.0	56.4	19 27.2	+60.0	56.7	20 00.0	+60.0	57.0	20
21	17 04.9	+59.6	55.0	17 39.2	+59.7	55.3	18 13.3	+59.8	55.5	18 47.1	+59.9	55.8	19 20.7	+60.0	56.1	19 54.1	+60.0	56.4	20 27.2	+60.0	56.7	21 00.0	+60.0	57.0	21
22	18 04.5	+59.7	54.9	18 38.9	+59.8	55.2	19 13.1	+59.8	55.4	19 47.0	+59.9	55.7	20 20.7	+59.9	56.0	20 54.1	+59.9	56.3	21 27.2	+60.0	56.7	22 00.0	+60.0	57.0	22
23	19 04.2	+59.6	54.8	19 38.7	+59.7	55.1	20 12.9	+59.8	55.4	20 46.9	+59.9	55.7	21 20.6	+59.9	56.0	21 54.0	+60.0	56.3	22 27.2	+60.0	56.6	23 00.0	+60.0	57.0	23
24	20 03.8	+59.7	54.7	20 38.4	+59.8	55.0	21 12.7	+59.9	55.3	21 46.8	+59.9	55.6	22 20.5	+60.0	55.9	22 54.0	+60.0	56.3	23 27.2	+60.0	56.6	24 00.0	+60.0	57.0	24
25	21 03.5	+59.6	54.5	21 38.2	+59.7	54.9	22 12.6	+59.8	55.2	22 46.7	+59.8	55.5	23 20.5	+59.9	55.9	23 54.0	+59.9	56.2	24 27.2	+59.9	56.6	25 00.0	+60.0	57.0	25
26	22 03.1	+59.6	54.4	22 37.9	+59.7	54.8	23 12.4	+59.8	55.1	23 46.5	+59.9	55.5	24 20.4	+59.9	55.8	24 53.9	+60.0	56.2	25 27.1	+60.0	56.6	26 00.0	+60.0	57.0	26
27	23 02.7	+59.7	54.3	23 37.6	+59.7	54.6	24 12.2	+59.8	55.0	24 46.4	+59.9	55.4	25 20.3	+60.0	55.8	25 53.9	+60.0	56.2	26 27.1	+60.0	56.6	27 00.0	+60.0	57.0	27
28	24 02.4	+59.6	54.2	24 37.3	+59.8	54.5	25 12.0	+59.8	54.9	25 46.3	+59.9	55.3	26 20.3	+59.9	55.7	26 53.9	+59.9	56.1	27 27.1	+60.0	56.6	28 00.0	+60.0	57.0	28
29	25 02.0	+59.6	54.1	25 37.1	+59.7	54.4	26 11.8	+59.8	54.8	26 46.2	+59.8	55.2	27 20.2	+59.9	55.7	27 53.8	+60.0	56.1	28 27.1	+60.0	56.5	29 00.0	+60.0	57.0	29
30	26 01.6	+59.6	53.9	26 36.8	+59.7	54.3	27 11.6	+59.8	54.7	27 46.0	+59.9	55.2	28 20.1	+59.9	55.6	28 53.8	+60.0	56.1	29 27.1	+60.0	56.5	30 00.0	+60.0	57.0	30
31	27 01.2	+59.6	53.8	27 36.5	+59.7	54.2	28 11.4	+59.8	54.6	28 45.9	+59.9	55.1	29 20.0	+60.0	55.5	29 53.8	+59.9	56.0	30 27.1	+60.0	56.5	31 00.0	+60.0	57.0	31
32	28 00.8	+59.6	53.7	28 36.2	+59.7	54.1	29 11.2	+59.8	54.6	29 45.8	+59.8	55.0	30 20.0	+59.9	55.5	30 53.7	+60.0	56.0	31 27.1	+60.0	56.5	32 00.0	+60.0	57.0	32
33	29 00.4	+59.6	53.5	29 35.9	+59.7	54.0	30 11.0	+59.7	54.5	30 45.6	+59.9	54.9	31 19.9	+59.9	55.4	31 53.7	+60.0	55.9	32 27.1	+60.0	56.5	33 00.0	+60.0	57.0	33
34	30 00.0	+59.6	53.4	30 35.6	+59.6	53.9	31 10.7	+59.8	54.4	31 45.5	+59.8	54.9	32 19.8	+59.9	55.4	32 53.7	+59.9	55.9	33 27.1	+60.0	56.4	34 00.0	+60.0	57.0	34
35	30 59.6	+59.5	53.3	31 35.2	+59.7	53.8	32 10.5	+59.8	54.3	32 45.3	+59.9	54.8	33 19.7	+59.9	55.3	33 53.6	+60.0	55.9	34 27.1	+60.0	56.4	35 00.0	+60.0	57.0	35
36	31 59.1	+59.6	53.1	32 34.9	+59.7	53.6	33 10.3	+59.8	54.2	33 45.2	+59.8	54.7	34 19.6	+60.0	55.2	34 53.6	+60.0	55.8	35 27.1	+59.9	56.4	36 00.0	+60.0	57.0	36
37	32 58.7	+59.5	53.0	33 34.6	+59.7	53.5	34 10.1	+59.7	54.0	34 45.0	+59.9	54.6	35 19.6	+59.9	55.2	35 53.6	+59.9	55.8	36 27.0	+60.0	56.4	37 00.0	+60.0	57.0	37
38	33 58.2	+59.6	52.8	34 34.3	+59.6	53.4	35 09.8	+59.8	53.9	35 44.9	+59.8	54.5	36 19.5	+59.9	55.1	36 53.5	+60.0	55.7	37 27.0	+60.0	56.4	38 00.0	+60.0	57.0	38
39	34 57.8	+59.5	52.7	35 33.9	+59.7	53.2	36 09.6	+59.7	53.8	36 44.7	+59.9	54.4	37 19.4	+59.9	55.0	37 53.5	+59.9	55.7	38 27.0	+60.0	56.3	39 00.0	+60.0	57.0	39
40	35 57.3	+59.5	52.5	36 33.6	+59.6	53.1	37 09.3	+59.8	53.7	37 44.6	+59.8	54.3	38 19.3	+59.9	55.0	38 53.4	+60.0	55.6	39 27.0	+60.0	56.3	40 00.0	+60.0	57.0	40
41	36 56.8	+59.5	52.4	37 33.2	+59.6	53.0	38 09.1	+59.7	53.6	38 44.4	+59.8	54.2	39 19.2	+59.9	54.9	39 53.4	+59.9	55.6	40 27.0	+60.0	56.3	41 00.0	+60.0	57.0	41
42	37 56.3	+59.5	52.2	38 32.8	+59.6	52.8	39 08.8	+59.7	53.5	39 44.2	+59.9	54.1	40 19.1	+59.9	54.8	40 53.3	+60.0	55.5	41 27.0	+60.0	56.3	42 00.0	+60.0	57.0	42
43	38 55.8	+59.5	52.0	39 32.4	+59.6	52.7	40 08.5	+59.8	53.4	40 44.1	+59.8	54.0	41 19.0	+59.9	54.8	41 53.3	+60.0	55.5	42 27.0	+60.0	56.2	43 00.0	+60.0	57.0	43
44	39 55.3	+59.4	51.9	40 32.0	+59.6	52.5	41 08.3	+59.7	53.2	41 43.9	+59.8	53.9	42 18.9	+59.9	54.7	42 53.3	+59.9	55.4	43 27.0	+60.0	56.2	44 00.0	+60.0	57.0	44
45	40 54.7	+59.5	51.7	41 31.6	+59.6	52.4	42 08.0	+59.7	53.1	42 43.7	+59.8	53.8	43 18.8	+59.9	54.6	43 53.2	+60.0	55.4	44 27.0	+59.9	56.2	45 00.0	+60.0	57.0	45
46	41 54.2	+59.4	51.5	42 31.2	+59.6	52.2	43 07.7	+59.7	53.0	43 43.5	+59.8	53.7	44 18.7	+59.8	54.5	44 53.2	+59.9	55.3	45 26.9	+60.0	56.1	46 00.0	+60.0	57.0	46
47	42 53.6	+59.4	51.3	43 30.8	+59.5	52.1	44 07.4	+59.6	52.8	44 43.3	+59.8	53.6	45 18.5	+59.9	54.4	45 53.1	+60.0	55.3	46 26.9	+60.0	56.1	47 00.0	+60.0	57.0	47
48	43 53.0	+59.4	51.1	44 30.3	+59.6	51.9	45 07.0	+59.7	52.7	45 43.1	+59.8	53.5	46 18.4	+59.9	54.3	46 53.1	+59.9	55.2	47 26.9	+60.0	56.1	48 00.0	+60.0	57.0	48
49	44 52.4	+59.3	50.9	45 29.9	+59.5	51.7	46 06.7	+59.7	52.5	46 42.9	+59.7	53.4	47 18.3	+59.9	54.2	47 53.0	+59.9	55.1	48 26.9	+60.0	56.0	49 00.0	+60.0	57.0	49
50	45 51.7	+59.4	50.7	46 29.4	+59.5	51.5	47 06.4	+59.6	52.4	47 42.6	+59.8	53.2	48 18.2	+59.8	54.1	48 52.9	+60.0	55.1	49 26.9	+60.0	56.0	50 00.0	+60.0	57.0	50
51	46 51.1	+59.3	50.5	47 28.9	+59.5	51.3	48 06.0	+59.7	52.2	48 42.4	+59.8	53.1	49 18.0	+59.9	54.0	49 52.9	+59.9	55.0	50 26.9	+60.0	56.0	51 00.0	+60.0	57.0	51
52	47 50.4	+59.3	50.3	48 28.4	+59.4	51.2	49 05.7	+59.6	52.0	49 42.2	+59.7	53.0	50 17.9	+59.9	53.9	50 52.8	+59.9	54.9	51 26.9	+59.9	55.9	52 00.0	+60.0	57.0	52
53	48 49.7	+59.2	50.1	49 27.8	+59.5	50.9	50 05.3	+59.6	51.9	50 41.9	+59.8	52.8	51 17.8	+59.8	53.8	51 52.7	+60.0	54.8	52 26.8	+60.0	55.9	53 00.0	+60.0	57.0	53
54	49 48.9	+59.3	49.8	50 27.3	+59.4	50.7	51 04.9	+59.6	51.7	51 41.7	+59.7	52.7	52 17.6	+59.9	53.7	52 52.7	+59.9	54.8	53 26.8	+60.0	55.9	54 00.0	+60.0	57.0	54
55	50 48.2	+59.2	49.6	51 26.7	+59.4	50.5	52 04.5	+59.5	51.5	52 41.4	+59.7	52.5	53 17.5	+59.8	53.6	53 52.6	+59.9	54.7	54 26.8	+60.0	55.8	55 00.0	+60.0	57.0	55
56	51 47.4	+59.1	49.3	52 26.1	+59.4	50.3	53 04.0	+59.6	51.3	53 41.1	+59.7	52.4	54 17.3	+59.8	53.5	54 52.5	+59.9	54.6	55 26.8	+60.0	55.8	56 00.0	+60.0	57.0	56
57	52 46.5	+59.1	49.0	53 25.5	+59.3	50.0	54 03.6	+59.5	51.1	54 40.8	+59.7	52.2	55 17.1	+59.8	53.3	55 52.4	+60.0	54.5	56 26.8	+59.9	55.7	57 00.0	+60.0	57.0	57
58	53 45.6	+59.1	48.7	54 24.8	+59.3	49.8	55 03.1	+59.5	50.9	55 40.5	+59.7	52.0	56 16.9	+59.8	53.2	56 52.4	+59.9	54.4	57 26.7	+60.0	55.7	58 00.0	+60.0	57.0	58
59	54 44.7	+59.0	48.4	55 24.1	+59.2	49.5	56 02.6	+59.5	50.7	56 40.2	+59.6	51.8	57 16.7	+59.8	53.0	57 52.3	+59.9	54.3	58 26.7	+60.0	55.6	59 00.0	+60.0	57.0	59
60	55 43.7	+59.0	48.1	56 23.3	+59.3	49.2	57 02.1	+59.4	50.4	57 39.8	+59.6	51.6	58 16.5	+59.8	52.9	58 52.2	+59.9	54.2	59 26.7	+60.0	55.6	60 00.0	+60.0	57.0	60
61	56 42.7	+58.9	47.8	57 22.6	+59.1	49.0	58 01.5	+59.4	50.2	58 39.4	+59.6	51.4	59 16.3	+59.8	52.7	59 52.1	+59.9	54.1	60 26.7	+59.9	55.5	61 00.0	+60.0	57.0	61
62	57 41.6	+58.9	47.5	58 21.7	+59.2	48.6	59 00.9	+59.4	49.9	59 39.0	+59.6	51.2	60 16.1	+59.7	52.6	60 52.0	+59.9	54.0	61 26.6	+60.0	55.5	62 00.0	+60.0	57.0	62
63	58 40.5	+58.8	47.1	59 20.9	+59.1	48.3	60 00.3	+59.3	49.6	60 38.6	+59.6	51.0	61 15.8	+59.8	52.4	61 51.9	+59.8	53.8	62 26.6	+60.0	55.4	63 00.0	+60.0	57.0	63
64	59 39.3	+58.7	46.7	60 20.0	+59.0	48.0	60 59.6	+59.3	49.3	61 38.2	+59.5	50.7	62 15.6	+59.7	52.2	62 51.7	+59.9	53.7	63 26.6	+59.9	55.3	64 00.0	+60.0	57.0	64
65	60 38.0	+58.7	46.3	61 19.0	+58.9	47.6	61 58.9	+59.2	49.0	62 37.7	+59.5	50.4	63 15.3	+59.7	52.0	63 51.6	+59.9	53.6	64 26.5	+60.0	55.2	65 00.0	+60.0	57.0	65
66	61 36.7	+58.5	45.8	62 17.9	+58.9	47.2	62 58.1	+59.2	48.6	63 37.2	+59.5	50.2	64 15.0	+59.7	51.7	64 51.5	+59.8	53.4	65 26.5	+60.0	55.2	66 00.0	+60.0	57.0	66
67	62 35.2	+58.5	45.4	63 16.8	+58.8	46.8	63 57.3	+59.2	48.3	64 36.7	+59.4	49.8	65 14.7	+59.7	51.5	65 51.3	+59.9	53.2	66 26.5	+59.9	55.1	67 00.0	+60.0	57.0	67
68	63 33.7	+58.3	44.9	64 15.6	+58.8	46.3	64 56.5	+59.0	47.9	65 36.1	+59.4	49.5	66 14.4	+59.6	51.2	66 51.2	+59.8	53.1	67 26.4	+60.0	55.0	68 00.0	+60.0	57.0	68
69	64 32.0	+58.2	44.3	65 14.4	+58.6	45.9	65 55.5	+59.0	47.5	66 35.5	+59.3	49.2	67 14.0	+59.6	51.0	67 51.0	+59.8	52.9	68 26.4	+59.9	54.9	69 00.0	+60.0	57.0	69
70	65 30.2	+58.1	43.8	66 13.0	+58.5	45.3	66 54.5	+58.9	47.0	67 34.8	+59.2	48.8	68 13.6	+59.5	50.6	68 50.8	+59.8	52.6	69 26.3	+60.0	54.8	70 00.0	+60.0	57.0	70
71	66 28.3	+57.9	43.2	67 11.5	+58.4	44.8	67 53.4	+58.8	46.5	68 34.0	+59.2	48.4	69 13.1	+59.6	50.3	69 50.6	+59.8	52.4	70 26.3	+59.9	54.6	71 00.0	+60.0	57.0	71
72	67 26.2	+57.7	42.5	68 09.9	+58.2	44.2	68 52.2	+58.7	46.0	69 33.2	+59.1	47.9	70 12.7	+59.4	50.0	70 50.4	+59.7	52.1	71 26.2	+60.0	54.5	72 00.0	+60.0	57.0	72
73	68 23.9	+57.6	41.8	69 08.1	+58.1	43.5	69 50.9	+58.6	45.4	70 32.3	+59.0	47.4	71 12.1	+59.4	49.5	71 50.1	+59.7	51.9	72 26.2	+59.9	54.3	73 00.0	+60.0	57.0	73
74	69 21.5	+57.3	41.0	70 06.2	+57.8	42.8	70 49.5	+58.4	44.7	71 31.3	+59.0	46.8	72 11.5	+59.4	49.1	72 49.8	+59.7	51.5	73 26.1	+59.9	54.2	74 00.0	+60.0	57.0	74
75	70 18.8	+57.0	40.1	71 04.0	+57.7	42.0	71 47.9	+58.3	44.0	72 30.3	+58.7	46.2	73 10.9	+59.2	48.6	73 49.5	+59.7	51.2	74 26.0	+59.9	54.0	75 00.0	+60.0	57.0	75
76	71 15.8	+56.7	39.2	72 01.7	+57.4	41.1	72 46.2	+58.0	43.2	73 29.0	+58.7	45.5	74 10.1	+59.2	48.1	74 49.2	+59.6	50.8	75 25.9	+59.9	53.8	76 00.0	+60.0	57.0	76
77	72 12.5	+56.4	38.1	72 59.1	+57.1	40.1	73 44.2	+57.8	42.3	74 27.7	+58.4	44.8	75 09.3	+59.1	47.4	75 48.8	+59.5	50.3	76 25.8	+59.9	53.5	77 00.0	+60.0	57.0	77
78	73 08.9	+55.9	37.0	73 56.2	+56.7	39.1	74 42.0	+57.5	41.4	75 26.1	+58.3	43.9	76 08.4	+58.9	46.7	76 48.3	+59.5	49.8	77 25.7	+59.8	53.2	78 00.0	+60.0	57.0	78
79	74 04.8	+55.4	35.7	74 52.9	+56.2	37.8	75 39.5	+57.1	40.2	76 24.4	+57.9	42.9	77 07.3	+58.7	45.9	77 47.8	+59.4	49.2	78 25.5	+59.8	52.9	79 00.0	+60.0	57.0	79
80	75 00.2	+54.8	34.3	75 49.1	+55.8	36.5	76 36.6	+56.7	39.0	77 22.3	+57.7	41.8	78 06.0	+58.5	44.9	78 47.2	+59.2	48.5	79 25.3	+59.8	52.5	80 00.0	+60.0	57.0	80
81	75 55.0	+54.1	32.6	76 44.9	+55.1	34.9	77 33.3	+56.2	37.5	78 20.0	+57.2	40.4	79 04.5	+58.2	43.8	79 46.4	+59.1	47.6	80 25.1	+59.8	52.0	81 00.0	+60.0	57.0	81
82	76 49.1	+53.1	30.8	77 40.0	+54.3	33.1	78 29.5	+55.4	35.8	79 17.2	+56.6	38.9	80 02.7	+57.8	42.5	80 45.5	+58.9	46.6	81 24.9	+59.6	51.4	82 00.0	+60.0	57.0	82
83	77 42.2	+52.1	28.7	78 34.3	+53.2	31.1	79 24.9	+54.6	33.8	80 13.8	+55.9	37.0	81 00.5	+57.3	40.8	81 44.4	+58.5	45.3	82 24.5	+59.6	50.7	83 00.0	+60.0	57.0	83
84	78 34.3	+50.6	26.3	79 27.5	+52.0	28.6	80 19.5	+53.4	31.4	81 09.7	+55.0	34.8	81 57.8	+56.6	38.8	82 42.9	+58.2	43.7	83 24.1	+59.4	49.7	84 00.0	+60.0	57.0	84
85	79 24.9	+48.9	23.4	80 19.5	+50.2	25.8	81 12.9	+51.8	28.6	82 04.7	+53.5	32.0	82 54.4	+55.4	36.3	83 41.1	+57.4	41.6	84 23.5	+59.2	48.4	85 00.0	+60.0	57.0	85
86	80 13.8	*+46.7* •	20.2	81 09.7	*+48.1* •	22.4	82 04.7	*+49.7* •	25.1	82 58.2	*+51.6* •	28.6	83 49.8	*+53.9* •	33.0	84 38.5	+56.3	38.8	85 22.7	+58.8	46.6	86 00.0	+60.0	57.0	86
87	81 00.5	*+43.9* •	16.3	81 57.8	*+45.1* •	18.3	82 54.4	*+46.7* •	20.8	83 49.8	*+48.7* •	24.1	84 43.7	*+51.1* •	28.5	85 34.8	*+54.3* •	34.7	86 21.5	+57.7	43.7	87 00.0	+60.0	57.0	87
88	81 44.4	*+40.1* •	11.8	82 42.9	*+41.2* •	13.3	83 41.1	*+42.4* •	15.4	84 38.5	*+44.2* •	18.3	85 34.8	*+46.7* •	22.3	86 29.1	*+50.1* •	28.5	87 19.2	*+55.3* •	38.8	88 00.0	+60.0	57.0	88
89	82 24.5	*+35.5* •	6.4	83 24.1	*+35.9* •	7.3	84 23.5	*+36.5* •	8.6	85 22.7	*+37.3* •	10.5	86 21.5	*+38.5* •	13.3	87 19.2	*+40.8* •	18.2	88 14.5	*+45.5* •	28.5	89 00.0	+60.0	57.0	89
90	83 00.0	*+29.4* •	0.0	84 00.0	*+28.8* •	0.0	85 00.0	*+28.0* •	0.0	86 00.0	*+26.7* •	0.0	87 00.0	*+24.3* •	0.0	88 00.0	*+19.2* •	0.0	89 00.0	*+2.7* •	0.0	90 00.0	–60.0	28.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 123°, 237°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 42.2	+59.6	121.8	3 10.5	+59.8	121.9	2 38.8	+59.9	121.9	2 07.1	+59.9	121.9	1 35.4	+59.9	122.0	1 03.6	+60.0	122.0	0 31.8	+60.0	122.0	0 00.0	+60.0	122.0	0
1	4 41.8	+59.7	121.7	4 10.3	+59.7	121.8	3 38.7	+59.8	121.8	3 07.0	+59.9	121.9	2 35.3	+59.9	121.9	2 03.6	+59.9	122.0	1 31.8	+60.0	122.0	1 00.0	+60.0	122.0	1
2	5 41.5	+59.7	121.6	5 10.0	+59.8	121.7	4 38.5	+59.8	121.8	4 06.9	+59.9	121.8	3 35.2	+60.0	121.9	3 03.5	+60.0	121.9	2 31.8	+60.0	122.0	2 00.0	+60.0	122.0	2
3	6 41.2	+59.7	121.5	6 09.8	+59.8	121.6	5 38.3	+59.9	121.7	5 06.8	+59.9	121.8	4 35.2	+59.9	121.8	4 03.5	+60.0	121.9	3 31.8	+60.0	121.9	3 00.0	+60.0	122.0	3
4	7 40.9	+59.6	121.4	7 09.6	+59.7	121.5	6 38.2	+59.8	121.6	6 06.7	+59.9	121.7	5 35.1	+60.0	121.8	5 03.5	+59.9	121.9	4 31.8	+60.0	121.9	4 00.0	+60.0	122.0	4
5	8 40.5	+59.7	121.3	8 09.3	+59.8	121.4	7 38.0	+59.8	121.5	7 06.6	+59.9	121.6	6 35.1	+59.9	121.7	6 03.4	+60.0	121.8	5 31.8	+60.0	121.9	5 00.0	+60.0	122.0	5
6	9 40.2	+59.7	121.2	9 09.1	+59.7	121.3	8 37.8	+59.9	121.5	8 06.5	+59.9	121.6	7 35.0	+59.9	121.7	7 03.4	+60.0	121.8	6 31.8	+59.9	121.9	6 00.0	+60.0	122.0	6
7	10 39.9	+59.6	121.1	10 08.8	+59.8	121.2	9 37.7	+59.8	121.4	9 06.4	+59.9	121.5	8 34.9	+60.0	121.7	8 03.4	+60.0	121.8	7 31.7	+60.0	121.9	7 00.0	+60.0	122.0	7
8	11 39.5	+59.7	121.0	11 08.6	+59.8	121.1	10 37.5	+59.8	121.3	10 06.3	+59.8	121.5	9 34.9	+59.9	121.6	9 03.4	+59.9	121.7	8 31.7	+60.0	121.9	8 00.0	+60.0	122.0	8
9	12 39.2	+59.7	120.9	12 08.4	+59.7	121.0	11 37.3	+59.9	121.2	11 06.1	+59.9	121.4	10 34.8	+60.0	121.6	10 03.3	+60.0	121.7	9 31.7	+60.0	121.9	9 00.0	+60.0	122.0	9
10	13 38.9	+59.6	120.7	13 08.1	+59.8	121.0	12 37.2	+59.8	121.1	12 06.0	+59.9	121.3	11 34.8	+59.9	121.5	11 03.3	+60.0	121.7	10 31.7	+60.0	121.8	10 00.0	+60.0	122.0	10
11	14 38.5	+59.7	120.6	14 07.9	+59.7	120.9	13 37.0	+59.8	121.1	13 05.9	+59.9	121.3	12 34.7	+59.9	121.5	12 03.3	+60.0	121.7	11 31.7	+60.0	121.8	11 00.0	+60.0	122.0	11
12	15 38.2	+59.6	120.5	15 07.6	+59.7	120.8	14 36.8	+59.8	121.0	14 05.8	+59.9	121.2	13 34.6	+60.0	121.4	13 03.3	+59.9	121.6	12 31.7	+60.0	121.8	12 00.0	+60.0	122.0	12
13	16 37.8	+59.7	120.4	16 07.3	+59.8	120.7	15 36.6	+59.9	120.9	15 05.7	+59.9	121.1	14 34.6	+59.9	121.4	14 03.2	+60.0	121.6	13 31.7	+60.0	121.8	13 00.0	+60.0	122.0	13
14	17 37.5	+59.6	120.3	17 07.1	+59.7	120.6	16 36.5	+59.8	120.8	16 05.6	+59.9	121.1	15 34.5	+59.9	121.3	15 03.2	+60.0	121.6	14 31.7	+60.0	121.8	14 00.0	+60.0	122.0	14
15	18 37.1	+59.7	120.2	18 06.8	+59.8	120.5	17 36.3	+59.8	120.8	17 05.5	+59.9	121.0	16 34.4	+60.0	121.3	16 03.2	+59.9	121.5	15 31.7	+60.0	121.8	15 00.0	+60.0	122.0	15
16	19 36.8	+59.6	120.1	19 06.6	+59.7	120.4	18 36.1	+59.8	120.7	18 05.4	+59.8	121.0	17 34.4	+59.9	121.2	17 03.1	+60.0	121.5	16 31.7	+60.0	121.8	16 00.0	+60.0	122.0	16
17	20 36.4	+59.6	120.0	20 06.3	+59.7	120.3	19 35.9	+59.8	120.6	19 05.2	+59.9	120.9	18 34.3	+59.9	121.2	18 03.1	+60.0	121.5	17 31.7	+60.0	121.7	17 00.0	+60.0	122.0	17
18	21 36.0	+59.7	119.8	21 06.0	+59.8	120.2	20 35.7	+59.8	120.5	20 05.1	+59.9	120.8	19 34.2	+60.0	121.1	19 03.1	+60.0	121.4	18 31.7	+60.0	121.7	18 00.0	+60.0	122.0	18
19	22 35.7	+59.6	119.7	22 05.8	+59.7	120.1	21 35.5	+59.8	120.4	21 05.0	+59.9	120.8	20 34.2	+59.9	121.1	20 03.1	+59.9	121.4	19 31.7	+60.0	121.7	19 00.0	+60.0	122.0	19
20	23 35.3	+59.6	119.6	23 05.5	+59.7	120.0	22 35.3	+59.8	120.3	22 04.9	+59.9	120.7	21 34.1	+59.9	121.0	21 03.0	+60.0	121.4	20 31.7	+59.9	121.7	20 00.0	+60.0	122.0	20
21	24 34.9	+59.6	119.5	24 05.2	+59.7	119.9	23 35.1	+59.9	120.2	23 04.8	+59.8	120.6	22 34.0	+60.0	121.0	22 03.0	+60.0	121.3	21 31.6	+60.0	121.7	21 00.0	+60.0	122.0	21
22	25 34.5	+59.6	119.3	25 04.9	+59.7	119.8	24 35.0	+59.8	120.2	24 04.6	+59.9	120.5	23 34.0	+59.9	120.9	23 03.0	+59.9	121.3	22 31.6	+60.0	121.7	22 00.0	+60.0	122.0	22
23	26 34.1	+59.6	119.2	26 04.6	+59.7	119.6	25 34.8	+59.7	120.1	25 04.5	+59.9	120.5	24 33.9	+59.9	120.9	24 02.9	+60.0	121.3	23 31.6	+60.0	121.6	23 00.0	+60.0	122.0	23
24	27 33.7	+59.6	119.1	27 04.3	+59.7	119.5	26 34.5	+59.8	120.0	26 04.4	+59.8	120.4	25 33.8	+60.0	120.8	25 02.9	+60.0	121.2	24 31.6	+60.0	121.6	24 00.0	+60.0	122.0	24
25	28 33.3	+59.6	119.0	28 04.0	+59.7	119.4	27 34.3	+59.8	119.9	27 04.2	+59.9	120.3	26 33.8	+59.9	120.8	26 02.9	+59.9	121.2	25 31.6	+60.0	121.6	25 00.0	+60.0	122.0	25
26	29 32.9	+59.5	118.8	29 03.7	+59.7	119.3	28 34.1	+59.8	119.8	28 04.1	+59.9	120.3	27 33.7	+59.9	120.7	27 02.8	+60.0	121.1	26 31.6	+60.0	121.6	26 00.0	+60.0	122.0	26
27	30 32.4	+59.6	118.7	30 03.4	+59.7	119.2	29 33.9	+59.8	119.7	29 04.0	+59.8	120.2	28 33.6	+59.9	120.6	28 02.8	+60.0	121.1	27 31.6	+60.0	121.6	27 00.0	+60.0	122.0	27
28	31 32.0	+59.5	118.5	31 03.1	+59.7	119.1	30 33.7	+59.8	119.6	30 03.8	+59.9	120.1	29 33.5	+59.9	120.6	29 02.8	+59.9	121.1	28 31.6	+60.0	121.5	28 00.0	+60.0	122.0	28
29	32 31.5	+59.6	118.4	32 02.8	+59.6	118.9	31 33.5	+59.7	119.5	31 03.7	+59.9	120.0	30 33.4	+60.0	120.5	30 02.7	+60.0	121.0	29 31.6	+60.0	121.5	29 00.0	+60.0	122.0	29
30	33 31.1	+59.5	118.2	33 02.4	+59.7	118.8	32 33.2	+59.8	119.4	32 03.6	+59.8	119.9	31 33.4	+59.9	120.5	31 02.7	+60.0	121.0	30 31.6	+60.0	121.5	30 00.0	+60.0	122.0	30
31	34 30.6	+59.5	118.1	34 02.1	+59.6	118.7	33 33.0	+59.8	119.3	33 03.4	+59.9	119.9	32 33.3	+59.9	120.4	32 02.7	+59.9	121.0	31 31.6	+60.0	121.5	31 00.0	+60.0	122.0	31
32	35 30.1	+59.6	117.9	35 01.7	+59.7	118.6	34 32.8	+59.7	119.2	34 03.3	+59.8	119.8	33 33.2	+59.9	120.3	33 02.6	+60.0	120.9	32 31.6	+59.9	121.5	32 00.0	+60.0	122.0	32
33	36 29.7	+59.4	117.8	36 01.4	+59.6	118.4	35 32.5	+59.8	119.1	35 03.1	+59.8	119.7	34 33.1	+59.9	120.3	34 02.6	+60.0	120.9	33 31.5	+60.0	121.4	33 00.0	+60.0	122.0	33
34	37 29.1	+59.5	117.6	37 01.0	+59.6	118.3	36 32.3	+59.7	119.0	36 02.9	+59.9	119.6	35 33.0	+59.9	120.2	35 02.6	+59.9	120.8	34 31.5	+60.0	121.4	34 00.0	+60.0	122.0	34
35	38 28.6	+59.5	117.5	38 00.6	+59.7	118.2	37 32.0	+59.8	118.8	37 02.8	+59.8	119.5	36 32.9	+59.9	120.1	36 02.5	+60.0	120.8	35 31.5	+60.0	121.4	35 00.0	+60.0	122.0	35
36	39 28.1	+59.4	117.3	39 00.3	+59.6	118.0	38 31.8	+59.7	118.7	38 02.6	+59.8	119.4	37 32.8	+59.9	120.1	37 02.5	+59.9	120.7	36 31.5	+60.0	121.4	36 00.0	+60.0	122.0	36
37	40 27.5	+59.5	117.1	39 59.9	+59.5	117.9	39 31.5	+59.7	118.6	39 02.4	+59.9	119.3	38 32.7	+59.9	120.0	38 02.4	+60.0	120.7	37 31.5	+60.0	121.4	37 00.0	+60.0	122.0	37
38	41 27.0	+59.4	116.9	40 59.4	+59.6	117.7	40 31.2	+59.7	118.5	40 02.3	+59.8	119.2	39 32.6	+59.9	119.9	39 02.4	+59.9	120.6	38 31.5	+60.0	121.3	38 00.0	+60.0	122.0	38
39	42 26.4	+59.4	116.7	41 59.0	+59.6	117.5	41 30.9	+59.7	118.3	41 02.1	+59.8	119.1	40 32.5	+59.9	119.9	40 02.3	+60.0	120.6	39 31.5	+60.0	121.3	39 00.0	+60.0	122.0	39
40	43 25.8	+59.4	116.5	42 58.6	+59.5	117.4	42 30.6	+59.7	118.2	42 01.9	+59.8	119.0	41 32.4	+59.9	119.8	41 02.3	+60.0	120.5	40 31.5	+60.0	121.3	40 00.0	+60.0	122.0	40
41	44 25.2	+59.3	116.3	43 58.1	+59.6	117.2	43 30.3	+59.7	118.1	43 01.7	+59.8	118.9	42 32.3	+59.9	119.7	42 02.3	+59.9	120.5	41 31.5	+60.0	121.3	41 00.0	+60.0	122.0	41
42	45 24.5	+59.4	116.1	44 57.7	+59.5	117.0	44 30.0	+59.7	117.9	44 01.5	+59.8	118.8	43 32.2	+59.9	119.6	43 02.2	+60.0	120.4	42 31.5	+59.9	121.2	42 00.0	+60.0	122.0	42
43	46 23.9	+59.3	115.9	45 57.2	+59.5	116.9	45 29.7	+59.6	117.8	45 01.3	+59.8	118.7	44 32.1	+59.9	119.5	44 02.2	+59.9	120.4	43 31.4	+60.0	121.2	43 00.0	+60.0	122.0	43
44	47 23.2	+59.3	115.7	46 56.7	+59.5	116.7	46 29.3	+59.7	117.6	46 01.1	+59.8	118.5	45 32.0	+59.9	119.4	45 02.1	+59.9	120.3	44 31.4	+60.0	121.2	44 00.0	+60.0	122.0	44
45	48 22.5	+59.2	115.5	47 56.2	+59.4	116.5	47 29.0	+59.6	117.5	47 00.9	+59.7	118.4	46 31.9	+59.8	119.3	46 02.0	+60.0	120.3	45 31.4	+60.0	121.1	45 00.0	+60.0	122.0	45
46	49 21.7	+59.2	115.2	48 55.6	+59.5	116.3	48 28.6	+59.6	117.3	48 00.6	+59.8	118.3	47 31.7	+59.9	119.3	47 02.0	+59.9	120.2	46 31.4	+60.0	121.1	46 00.0	+60.0	122.0	46
47	50 20.9	+59.2	115.0	49 55.1	+59.4	116.1	49 28.2	+59.6	117.1	49 00.4	+59.7	118.2	48 31.6	+59.9	119.2	48 01.9	+60.0	120.1	47 31.4	+60.0	121.1	47 00.0	+60.0	122.0	47
48	51 20.1	+59.2	114.7	50 54.5	+59.4	115.9	50 27.8	+59.6	116.9	50 00.1	+59.8	118.0	49 31.5	+59.8	119.1	49 01.9	+59.9	120.1	48 31.4	+60.0	121.0	48 00.0	+60.0	122.0	48
49	52 19.3	+59.1	114.5	51 53.9	+59.4	115.6	51 27.4	+59.6	116.8	50 59.9	+59.7	117.9	50 31.3	+59.9	118.9	50 01.8	+59.9	120.0	49 31.4	+59.9	121.0	49 00.0	+60.0	122.0	49
50	53 18.4	+59.1	114.2	52 53.3	+59.3	115.4	52 27.0	+59.5	116.6	51 59.6	+59.7	117.7	51 31.2	+59.8	118.8	51 01.7	+60.0	119.9	50 31.3	+60.0	121.0	50 00.0	+60.0	122.0	50
51	54 17.5	+59.0	113.9	53 52.6	+59.3	115.1	53 26.5	+59.5	116.4	52 59.3	+59.7	117.6	52 31.0	+59.9	118.7	52 01.7	+59.9	119.8	51 31.3	+60.0	120.9	51 00.0	+60.0	122.0	51
52	55 16.5	+59.0	113.6	54 51.9	+59.3	114.9	54 26.0	+59.5	116.1	53 59.0	+59.7	117.4	53 30.9	+59.8	118.6	53 01.6	+59.9	119.8	52 31.3	+60.0	120.9	52 00.0	+60.0	122.0	52
53	56 15.5	+58.9	113.2	55 51.2	+59.2	114.6	55 25.5	+59.5	115.9	54 58.7	+59.7	117.2	54 30.7	+59.8	118.5	54 01.5	+60.0	119.7	53 31.3	+60.0	120.9	53 00.0	+60.0	122.0	53
54	57 14.4	+58.9	112.9	56 50.4	+59.2	114.3	56 25.0	+59.5	115.7	55 58.4	+59.6	117.0	55 30.5	+59.8	118.3	55 01.5	+59.9	119.6	54 31.3	+59.9	120.8	54 00.0	+60.0	122.0	54
55	58 13.3	+58.8	112.5	57 49.6	+59.1	114.0	57 24.5	+59.4	115.4	56 58.0	+59.7	116.8	56 30.3	+59.8	118.2	56 01.4	+59.9	119.5	55 31.2	+60.0	120.8	55 00.0	+60.0	122.0	55
56	59 12.1	+58.7	112.2	58 48.7	+59.1	113.7	58 23.9	+59.4	115.2	57 57.7	+59.6	116.6	57 30.1	+59.8	118.0	57 01.3	+59.9	119.4	56 31.2	+60.0	120.7	56 00.0	+60.0	122.0	56
57	60 10.8	+58.7	111.7	59 47.8	+59.0	113.3	59 23.3	+59.3	114.9	58 57.3	+59.6	116.4	58 29.9	+59.8	117.9	58 01.2	+59.9	119.3	57 31.2	+60.0	120.7	57 00.0	+60.0	122.0	57
58	61 09.5	+58.5	111.3	60 46.8	+59.0	113.0	60 22.6	+59.3	114.6	59 56.9	+59.5	116.2	59 29.7	+59.7	117.7	59 01.1	+59.9	119.2	58 31.2	+60.0	120.6	58 00.0	+60.0	122.0	58
59	62 08.0	+58.5	110.9	61 45.8	+58.9	112.6	61 21.9	+59.3	114.3	60 56.4	+59.6	115.9	60 29.4	+59.8	117.5	60 01.0	+59.9	119.1	59 31.2	+59.9	120.6	59 00.0	+60.0	122.0	59
60	63 06.5	+58.3	110.4	62 44.7	+58.8	112.2	62 21.2	+59.2	114.0	61 56.0	+59.5	115.7	61 29.2	+59.7	117.3	61 00.9	+59.9	119.0	60 31.1	+60.0	120.5	60 00.0	+60.0	122.0	60
61	64 04.8	+58.3	109.8	63 43.5	+58.8	111.8	63 20.4	+59.1	113.6	62 55.5	+59.5	115.4	62 28.9	+59.7	117.1	62 00.8	+59.8	118.8	61 31.1	+60.0	120.4	61 00.0	+60.0	122.0	61
62	65 03.1	+58.1	109.3	64 42.3	+58.6	111.3	64 19.5	+59.1	113.2	63 55.0	+59.4	115.1	63 28.6	+59.7	116.9	63 00.6	+59.9	118.7	62 31.1	+59.9	120.4	62 00.0	+60.0	122.0	62
63	66 01.2	+57.9	108.7	65 40.9	+58.5	110.8	65 18.6	+59.0	112.8	64 54.4	+59.4	114.8	64 28.3	+59.7	116.7	64 00.5	+59.9	118.5	63 31.0	+60.0	120.3	63 00.0	+60.0	122.0	63
64	66 59.1	+57.8	108.0	66 39.4	+58.5	110.2	66 17.6	+59.0	112.4	65 53.8	+59.3	114.5	65 28.0	+59.6	116.4	65 00.4	+59.8	118.4	64 31.0	+60.0	120.2	64 00.0	+60.0	122.0	64
65	67 56.9	+57.6	107.3	67 37.9	+58.2	109.7	67 16.6	+58.8	111.9	66 53.1	+59.3	114.1	66 27.6	+59.7	116.2	66 00.2	+59.9	118.2	65 31.0	+59.9	120.1	65 00.0	+60.0	122.0	65
66	68 54.5	+57.3	106.6	68 36.1	+58.2	109.0	68 15.4	+58.8	111.4	67 52.4	+59.2	113.7	67 27.3	+59.5	115.9	67 00.1	+59.8	118.0	66 30.9	+60.0	120.1	66 00.0	+60.0	122.0	66
67	69 51.8	+57.1	105.7	69 34.3	+57.9	108.3	69 14.2	+58.6	110.8	68 51.6	+59.2	113.2	68 26.8	+59.6	115.6	67 59.9	+59.8	117.8	67 30.9	+59.9	120.0	67 00.0	+60.0	122.0	67
68	70 48.9	+56.8	104.8	70 32.2	+57.7	107.6	70 12.8	+58.5	110.2	69 50.8	+59.1	112.8	69 26.4	+59.5	115.2	68 59.7	+59.8	117.6	68 30.8	+60.0	119.8	68 00.0	+60.0	122.0	68
69	71 45.7	+56.5	103.8	71 29.9	+57.5	106.7	71 11.3	+58.3	109.5	70 49.9	+58.9	112.2	70 25.9	+59.4	114.9	69 59.5	+59.7	117.4	69 30.8	+59.9	119.7	69 00.0	+60.0	122.0	69
70	72 42.2	+56.0	102.7	72 27.4	+57.2	105.8	72 09.6	+58.1	108.8	71 48.8	+58.9	111.7	71 25.3	+59.4	114.4	70 59.2	+59.8	117.1	70 30.7	+60.0	119.6	70 00.0	+60.0	122.0	70
71	73 38.2	+55.6	101.5	73 24.6	+56.9	104.8	73 07.7	+57.9	108.0	72 47.7	+58.7	111.0	72 24.7	+59.3	114.0	71 59.0	+59.7	116.8	71 30.7	+59.9	119.5	71 00.0	+60.0	122.0	71
72	74 33.8	+55.0	100.1	74 21.5	+56.4	103.6	74 05.6	+57.6	107.0	73 46.4	+58.5	110.3	73 24.0	+59.2	113.5	72 58.7	+59.6	116.5	72 30.6	+59.9	119.3	72 00.0	+60.0	122.0	72
73	75 28.8	+54.3	98.5	75 17.9	+56.0	102.3	75 03.2	+57.3	106.0	74 44.9	+58.4	109.5	74 23.2	+59.2	112.9	73 58.3	+59.7	116.1	73 30.5	+59.9	119.1	73 00.0	+60.0	122.0	73
74	76 23.1	+53.4	96.8	76 13.9	+55.3	100.8	76 00.5	+57.0	104.8	75 43.3	+58.1	108.6	75 22.4	+59.0	112.2	74 58.0	+59.6	115.7	74 30.4	+59.9	118.9	74 00.0	+60.0	122.0	74
75	77 16.5	+52.5	94.8	77 09.2	+54.7	99.2	76 57.5	+56.4	103.4	76 41.4	+57.9	107.6	76 21.4	+58.8	111.5	75 57.6	+59.5	115.2	75 30.3	+59.9	118.7	75 00.0	+60.0	122.0	75
76	78 09.0	+51.1	92.5	78 03.9	+53.7	97.2	77 53.9	+55.8	101.9	77 39.3	+57.4	106.4	77 20.2	+58.7	110.6	76 57.1	+59.4	114.7	76 30.2	+59.9	118.5	76 00.0	+60.0	122.0	76
77	79 00.1	+49.6	89.9	78 57.6	+52.5	95.0	78 49.7	+55.1	100.1	78 36.7	+57.0	105.0	78 18.9	+58.4	109.6	77 56.5	+59.4	114.0	77 30.1	+59.8	118.2	77 00.0	+60.0	122.0	77
78	79 49.7	*+47.6* •	86.8	79 50.1	+51.1	92.4	79 44.8	+54.0	97.9	79 33.7	+56.4	103.3	79 17.3	+58.1	108.5	78 55.9	+59.2	113.3	78 29.9	+59.9	117.8	78 00.0	+60.0	122.0	78
79	80 37.3	*+45.0* •	83.2	80 41.2	*+49.2* •	89.3	80 38.8	+52.7	95.4	80 30.1	+55.5	101.3	80 15.4	+57.6	107.0	79 55.1	+59.0	112.4	79 29.8	+59.7	117.4	79 00.0	+60.0	122.0	79
80	81 22.3	*+41.7* •	79.0	81 30.4	*+46.6* •	85.6	81 31.5	*+50.9* •	92.3	81 25.6	+54.5	98.9	81 13.0	+57.1	105.3	80 54.1	+58.8	111.4	80 29.5	+59.8	116.9	80 00.0	+60.0	122.0	80
81	82 04.0	*+37.5* •	74.0	82 17.0	*+43.2* •	81.1	82 22.4	*+48.5* •	88.5	82 20.1	+52.9	95.9	82 10.1	+56.3	103.2	81 52.9	+58.5	110.0	81 29.3	+59.6	116.3	81 00.0	+60.0	122.0	81
82	82 41.5	*+32.0* •	68.1	83 00.2	*+38.6* •	75.7	83 10.9	*+45.0* •	83.8	83 13.0	*+50.7* •	92.2	83 06.4	+55.0	100.5	82 51.4	+58.0	108.3	82 28.9	+59.6	115.6	82 00.0	+60.0	122.0	82
83	83 13.5	*+25.3* •	61.2	83 38.8	*+32.6* •	69.1	83 55.9	*+40.2* •	77.9	84 03.7	*+47.3* •	87.3	84 01.4	*+53.3* •	96.9	83 49.4	+57.3	106.1	83 28.5	+59.4	114.6	83 00.0	+60.0	122.0	83
84	83 38.8	*+17.1* •	53.2	84 11.4	*+24.7* •	61.1	84 36.1	*+33.3* •	70.4	84 51.0	*+42.2* •	81.0	84 54.7	*+50.1* •	92.1	84 46.7	+56.0	103.1	84 27.9	+59.1	113.2	84 00.0	+60.0	122.0	84
85	83 55.9	*+7.8* •	44.4	84 36.1	*+14.9* •	51.8	85 09.4	*+23.8* •	61.1	85 33.2	*+34.2* •	72.4	85 44.8	*+45.0* •	85.3	85 42.7	*+53.7* •	98.8	85 27.0	+58.7	111.3	85 00.0	+60.0	122.0	85
86	84 03.7	*−2.3* •	34.9	84 51.0	*+3.7* •	41.2	85 33.2	*+11.6* •	49.7	86 07.4	*+22.4* •	61.1	86 29.8	*+35.7* •	75.5	86 36.4	*+49.0* •	92.1	86 25.7	+57.6	108.3	86 00.0	+60.0	122.0	86
87	84 01.4	*−12.0* •	25.2	84 54.7	*−8.0* •	30.0	85 44.8	*−2.1* •	36.8	86 29.8	*+6.6* •	46.6	87 05.5	*+19.9* •	61.0	87 25.4	*+38.3* •	80.9	87 23.3	*+54.9* •	103.1	87 00.0	+60.0	122.0	87
88	83 49.4	*−20.9* •	16.0	84 46.7	*−18.8* •	19.0	85 42.7	*−15.7* •	23.3	86 36.4	*−10.7* •	30.0	87 25.4	*−2.1* •	41.2	88 03.7	*+14.5* •	61.0	88 18.2	*+43.6* •	92.0	88 00.0	+60.0	122.0	88
89	83 28.5	*−28.5* •	7.5	84 27.9	*−27.9* •	8.8	85 27.0	*−27.0* •	10.8	86 25.7	*−25.7* •	13.7	87 23.3	*−23.3* •	19.0	88 18.2	*−18.2* •	30.0	89 01.8	*−1.8* •	61.0	89 00.0	+60.0	122.0	89
90	83 00.0	*−34.6* •	0.0	84 00.0	*−35.1* •	0.0	85 00.0	*−35.7* •	0.0	86 00.0	*−36.5* •	0.0	87 00.0	*−37.8* •	0.0	88 00.0	*−40.1* •	0.0	89 00.0	*−45.0* •	0.0	90 00.0	−60.0	61.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 58°, 302°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 42.2	−59.7	121.8	3 10.5	−59.7	121.9	2 38.8	−59.8	121.9	2 07.1	−59.9	121.9	1 35.4	−60.0	122.0	1 03.6	−60.0	122.0	0 31.8	−60.0	122.0	0 00.0	+60.0	58.0	**0**
1	2 42.5	−59.7	121.9	2 10.8	−59.8	121.9	1 39.0	−59.8	122.0	1 07.2	−59.9	122.0	0 35.4	−59.9	122.0	0 03.6	−60.0	122.0	0 28.2	+60.0	58.0	1 00.0	+60.0	58.0	**1**
2	1 42.8	−59.7	122.0	1 11.0	−59.8	122.0	0 39.2	−59.9	122.0	0 07.3	−59.9	122.1	0 24.5	+60.0	57.9	0 56.4	+59.9	58.0	1 28.2	+60.0	58.0	2 00.0	+60.0	58.0	**2**
3	0 43.1	−59.6	122.1	0 11.2	−59.7	122.1	0 20.7	+59.8	57.9	0 52.6	+59.9	57.9	1 24.5	+59.9	57.9	1 56.3	+60.0	57.9	2 28.2	+60.0	58.0	3 00.0	+60.0	58.0	**3**
4	0 16.5	+59.7	57.8	0 48.5	+59.8	57.8	1 20.5	+59.8	57.8	1 52.5	+59.9	57.8	2 24.4	+59.9	57.9	2 56.3	+60.0	57.9	3 28.2	+60.0	57.9	4 00.0	+60.0	58.0	**4**
5	1 16.2	+59.7	57.7	1 48.3	+59.8	57.7	2 20.3	+59.9	57.7	2 52.4	+59.9	57.8	3 24.3	+60.0	57.8	3 56.3	+60.0	57.9	4 28.2	+60.0	57.9	5 00.0	+60.0	58.0	**5**
6	2 15.9	+59.7	57.6	2 48.1	+59.7	57.6	3 20.2	+59.8	57.7	3 52.3	+59.9	57.7	4 24.3	+59.9	57.8	4 56.3	+59.9	57.8	5 28.2	+60.0	57.9	6 00.0	+60.0	58.0	**6**
7	3 15.6	+59.7	57.5	3 47.8	+59.8	57.5	4 20.0	+59.9	57.6	4 52.2	+59.9	57.6	5 24.2	+60.0	57.7	5 56.2	+60.0	57.8	6 28.2	+60.0	57.9	7 00.0	+60.0	58.0	**7**
8	4 15.3	+59.6	57.4	4 47.6	+59.7	57.4	5 19.9	+59.8	57.5	5 52.1	+59.8	57.6	6 24.2	+59.9	57.7	6 56.2	+60.0	57.8	7 28.2	+59.9	57.9	8 00.0	+60.0	58.0	**8**
9	5 14.9	+59.7	57.3	5 47.3	+59.8	57.3	6 19.7	+59.8	57.4	6 51.9	+59.9	57.5	7 24.1	+60.0	57.6	7 56.2	+60.0	57.7	8 28.1	+60.0	57.9	9 00.0	+60.0	58.0	**9**
10	6 14.6	+59.7	57.2	6 47.1	+59.8	57.3	7 19.5	+59.9	57.4	7 51.8	+59.9	57.5	8 24.1	+59.9	57.6	8 56.2	+59.9	57.7	9 28.1	+60.0	57.9	10 00.0	+60.0	58.0	**10**
11	7 14.3	+59.7	57.1	7 46.9	+59.7	57.2	8 19.4	+59.8	57.3	8 51.7	+59.9	57.4	9 24.0	+59.9	57.5	9 56.1	+60.0	57.7	10 28.1	+60.0	57.8	11 00.0	+60.0	58.0	**11**
12	8 14.0	+59.6	56.9	8 46.6	+59.8	57.1	9 19.2	+59.8	57.2	9 51.6	+59.9	57.3	10 23.9	+60.0	57.5	10 56.1	+60.0	57.7	11 28.1	+60.0	57.8	12 00.0	+60.0	58.0	**12**
13	9 13.6	+59.7	56.8	9 46.4	+59.7	57.0	10 19.0	+59.8	57.1	10 51.5	+59.9	57.3	11 23.9	+59.9	57.5	11 56.1	+59.9	57.6	12 28.1	+60.0	57.8	13 00.0	+60.0	58.0	**13**
14	10 13.3	+59.7	56.7	10 46.1	+59.8	56.9	11 18.8	+59.9	57.1	11 51.4	+59.9	57.2	12 23.8	+59.9	57.4	12 56.0	+60.0	57.6	13 28.1	+60.0	57.8	14 00.0	+60.0	58.0	**14**
15	11 13.0	+59.6	56.6	11 45.9	+59.7	56.8	12 18.7	+59.8	57.0	12 51.3	+59.9	57.2	13 23.7	+60.0	57.4	13 56.0	+60.0	57.6	14 28.1	+60.0	57.8	15 00.0	+60.0	58.0	**15**
16	12 12.6	+59.7	56.5	12 45.6	+59.8	56.7	13 18.5	+59.8	56.9	13 51.2	+59.9	57.1	14 23.7	+59.9	57.3	14 56.0	+60.0	57.5	15 28.1	+60.0	57.8	16 00.0	+60.0	58.0	**16**
17	13 12.3	+59.7	56.4	13 45.4	+59.7	56.6	14 18.3	+59.9	56.8	14 51.1	+59.9	57.0	15 23.6	+60.0	57.3	15 56.0	+59.9	57.5	16 28.1	+60.0	57.7	17 00.0	+60.0	58.0	**17**
18	14 12.0	+59.6	56.3	14 45.1	+59.8	56.5	15 18.2	+59.8	56.7	15 51.0	+59.8	57.0	16 23.6	+59.9	57.2	16 55.9	+60.0	57.5	17 28.1	+60.0	57.7	18 00.0	+60.0	58.0	**18**
19	15 11.6	+59.7	56.2	15 44.9	+59.7	56.4	16 18.0	+59.8	56.7	16 50.8	+59.9	56.9	17 23.5	+59.9	57.2	17 55.9	+60.0	57.4	18 28.1	+60.0	57.7	19 00.0	+60.0	58.0	**19**
20	16 11.3	+59.6	56.1	16 44.6	+59.8	56.3	17 17.8	+59.8	56.6	17 50.7	+59.9	56.8	18 23.4	+60.0	57.1	18 55.9	+59.9	57.4	19 28.1	+60.0	57.7	20 00.0	+60.0	58.0	**20**
21	17 10.9	+59.7	56.0	17 44.4	+59.7	56.2	18 17.6	+59.8	56.5	18 50.6	+59.9	56.8	19 23.4	+59.9	57.1	19 55.8	+60.0	57.4	20 28.1	+60.0	57.7	21 00.0	+60.0	58.0	**21**
22	18 10.6	+59.6	55.9	18 44.1	+59.8	56.1	19 17.4	+59.8	56.4	19 50.5	+59.9	56.7	20 23.3	+59.9	57.0	20 55.8	+60.0	57.3	21 28.1	+59.9	57.7	22 00.0	+60.0	58.0	**22**
23	19 10.2	+59.6	55.7	19 43.9	+59.7	56.0	20 17.2	+59.9	56.3	20 50.4	+59.9	56.6	21 23.2	+60.0	57.0	21 55.8	+60.0	57.3	22 28.0	+60.0	57.6	23 00.0	+60.0	58.0	**23**
24	20 09.8	+59.7	55.6	20 43.6	+59.7	55.9	21 17.1	+59.8	56.2	21 50.3	+59.8	56.6	22 23.2	+59.9	56.9	22 55.8	+59.9	57.3	23 28.0	+60.0	57.6	24 00.0	+60.0	58.0	**24**
25	21 09.5	+59.6	55.5	21 43.3	+59.7	55.8	22 16.9	+59.8	56.2	22 50.1	+59.9	56.5	23 23.1	+59.9	56.9	23 55.7	+60.0	57.2	24 28.0	+60.0	57.6	25 00.0	+60.0	58.0	**25**
26	22 09.1	+59.6	55.4	22 43.0	+59.8	55.7	23 16.7	+59.8	56.1	23 50.0	+59.9	56.4	24 23.0	+59.9	56.8	24 55.7	+60.0	57.2	25 28.0	+60.0	57.6	26 00.0	+60.0	58.0	**26**
27	23 08.7	+59.6	55.3	23 42.8	+59.7	55.6	24 16.5	+59.8	56.0	24 49.9	+59.9	56.4	25 22.9	+60.0	56.8	25 55.7	+59.9	57.2	26 28.0	+60.0	57.6	27 00.0	+60.0	58.0	**27**
28	24 08.3	+59.6	55.1	24 42.5	+59.7	55.5	25 16.3	+59.8	55.9	25 49.8	+59.8	56.3	26 22.9	+59.9	56.7	26 55.6	+60.0	57.1	27 28.0	+60.0	57.6	28 00.0	+60.0	58.0	**28**
29	25 07.9	+59.7	55.0	25 42.2	+59.7	55.4	26 16.1	+59.8	55.8	26 49.6	+59.9	56.2	27 22.8	+59.9	56.6	27 55.6	+60.0	57.1	28 28.0	+60.0	57.5	29 00.0	+60.0	58.0	**29**
30	26 07.6	+59.5	54.9	26 41.9	+59.7	55.3	27 15.9	+59.8	55.7	27 49.5	+59.9	56.1	28 22.7	+59.9	56.6	28 55.6	+59.9	57.0	29 28.0	+60.0	57.5	30 00.0	+60.0	58.0	**30**
31	27 07.1	+59.6	54.8	27 41.6	+59.7	55.2	28 15.7	+59.7	55.6	28 49.4	+59.8	56.1	29 22.6	+60.0	56.5	29 55.5	+60.0	57.0	30 28.0	+60.0	57.5	31 00.0	+60.0	58.0	**31**
32	28 06.7	+59.6	54.6	28 41.3	+59.7	55.1	29 15.4	+59.8	55.5	29 49.2	+59.9	56.0	30 22.6	+59.9	56.5	30 55.5	+60.0	57.0	31 28.0	+60.0	57.5	32 00.0	+60.0	58.0	**32**
33	29 06.3	+59.6	54.5	29 41.0	+59.7	55.0	30 15.2	+59.8	55.4	30 49.1	+59.8	55.9	31 22.5	+59.9	56.4	31 55.5	+59.9	56.9	32 28.0	+60.0	57.5	33 00.0	+60.0	58.0	**33**
34	30 05.9	+59.6	54.4	30 40.7	+59.6	54.8	31 15.0	+59.8	55.3	31 48.9	+59.9	55.8	32 22.4	+59.9	56.4	32 55.4	+60.0	56.9	33 28.0	+59.9	57.4	34 00.0	+60.0	58.0	**34**
35	31 05.5	+59.5	54.2	31 40.3	+59.7	54.7	32 14.8	+59.7	55.2	32 48.8	+59.8	55.7	33 22.3	+59.9	56.3	33 55.4	+59.9	56.8	34 27.9	+60.0	57.4	35 00.0	+60.0	58.0	**35**
36	32 05.0	+59.6	54.1	32 40.0	+59.7	54.6	33 14.5	+59.8	55.1	33 48.6	+59.9	55.7	34 22.2	+59.9	56.2	34 55.3	+60.0	56.8	35 27.9	+60.0	57.4	36 00.0	+60.0	58.0	**36**
37	33 04.6	+59.5	53.9	33 39.7	+59.6	54.5	34 14.3	+59.8	55.0	34 48.5	+59.8	55.6	35 22.1	+60.0	56.2	35 55.3	+60.0	56.8	36 27.9	+60.0	57.4	37 00.0	+60.0	58.0	**37**
38	34 04.1	+59.5	53.8	34 39.3	+59.7	54.3	35 14.1	+59.7	54.9	35 48.3	+59.9	55.5	36 22.1	+59.9	56.1	36 55.3	+59.9	56.7	37 27.9	+60.0	57.3	38 00.0	+60.0	58.0	**38**
39	35 03.6	+59.5	53.6	35 39.0	+59.6	54.2	36 13.8	+59.8	54.8	36 48.2	+59.8	55.4	37 22.0	+59.9	56.0	37 55.2	+60.0	56.7	38 27.9	+60.0	57.3	39 00.0	+60.0	58.0	**39**
40	36 03.1	+59.5	53.5	36 38.6	+59.6	54.1	37 13.6	+59.7	54.7	37 48.0	+59.8	55.3	38 21.9	+59.9	55.9	38 55.2	+59.9	56.6	39 27.9	+60.0	57.3	40 00.0	+60.0	58.0	**40**
41	37 02.6	+59.5	53.3	37 38.2	+59.7	53.9	38 13.3	+59.7	54.6	38 47.8	+59.8	55.2	39 21.8	+59.9	55.9	39 55.1	+60.0	56.6	40 27.9	+60.0	57.3	41 00.0	+60.0	58.0	**41**
42	38 02.1	+59.5	53.1	38 37.9	+59.6	53.8	39 13.0	+59.8	54.4	39 47.6	+59.9	55.1	40 21.7	+59.9	55.8	40 55.1	+59.9	56.5	41 27.9	+60.0	57.2	42 00.0	+60.0	58.0	**42**
43	39 01.6	+59.5	53.0	39 37.5	+59.6	53.6	40 12.8	+59.7	54.3	40 47.5	+59.8	55.0	41 21.6	+59.9	55.7	41 55.0	+60.0	56.5	42 27.9	+59.9	57.2	43 00.0	+60.0	58.0	**43**
44	40 01.1	+59.4	52.8	40 37.1	+59.5	53.5	41 12.5	+59.7	54.2	41 47.3	+59.8	54.9	42 21.5	+59.8	55.6	42 55.0	+59.9	56.4	43 27.8	+60.0	57.2	44 00.0	+60.0	58.0	**44**
45	41 00.5	+59.4	52.6	41 36.6	+59.6	53.3	42 12.2	+59.7	54.0	42 47.1	+59.8	54.8	43 21.3	+59.9	55.6	43 54.9	+60.0	56.4	44 27.8	+60.0	57.2	45 00.0	+60.0	58.0	**45**
46	41 59.9	+59.4	52.4	42 36.2	+59.6	53.2	43 11.9	+59.7	53.9	43 46.9	+59.8	54.7	44 21.2	+59.9	55.5	44 54.9	+59.9	56.3	45 27.8	+60.0	57.1	46 00.0	+60.0	58.0	**46**
47	42 59.3	+59.4	52.2	43 35.8	+59.5	53.0	44 11.6	+59.6	53.8	44 46.7	+59.8	54.6	45 21.1	+59.9	55.4	45 54.8	+60.0	56.2	46 27.8	+60.0	57.1	47 00.0	+60.0	58.0	**47**
48	43 58.7	+59.4	52.1	44 35.3	+59.5	52.8	45 11.2	+59.7	53.6	45 46.5	+59.7	54.4	46 21.0	+59.9	55.3	46 54.8	+59.9	56.2	47 27.8	+60.0	57.1	48 00.0	+60.0	58.0	**48**
49	44 58.1	+59.3	51.8	45 34.8	+59.5	52.6	46 10.9	+59.6	53.5	46 46.2	+59.8	54.3	47 20.9	+59.8	55.2	47 54.7	+60.0	56.1	48 27.8	+60.0	57.0	49 00.0	+60.0	58.0	**49**
50	45 57.4	+59.4	51.6	46 34.3	+59.5	52.5	47 10.5	+59.7	53.3	47 46.0	+59.8	54.2	48 20.7	+59.9	55.1	48 54.7	+59.9	56.0	49 27.8	+59.9	57.0	50 00.0	+60.0	58.0	**50**
51	46 56.8	+59.3	51.4	47 33.8	+59.5	52.3	48 10.2	+59.6	53.2	48 45.8	+59.7	54.1	49 20.6	+59.9	55.0	49 54.6	+59.9	56.0	50 27.7	+60.0	57.0	51 00.0	+60.0	58.0	**51**
52	47 56.1	+59.2	51.2	48 33.3	+59.4	52.1	49 09.8	+59.6	53.0	49 45.5	+59.8	53.9	50 20.5	+59.8	54.9	50 54.5	+60.0	55.9	51 27.7	+60.0	56.9	52 00.0	+60.0	58.0	**52**
53	48 55.3	+59.3	51.0	49 32.7	+59.5	51.9	50 09.4	+59.6	52.8	50 45.3	+59.7	53.8	51 20.3	+59.9	54.8	51 54.5	+59.9	55.8	52 27.7	+60.0	56.9	53 00.0	+60.0	58.0	**53**
54	49 54.6	+59.2	50.7	50 32.2	+59.4	51.7	51 09.0	+59.6	52.6	51 45.0	+59.7	53.6	52 20.2	+59.8	54.7	52 54.4	+59.9	55.7	53 27.7	+60.0	56.9	54 00.0	+60.0	58.0	**54**
55	50 53.8	+59.1	50.5	51 31.6	+59.3	51.4	52 08.6	+59.5	52.4	52 44.7	+59.7	53.5	53 20.0	+59.8	54.5	53 54.3	+59.9	55.7	54 27.7	+60.0	56.8	55 00.0	+60.0	58.0	**55**
56	51 52.9	+59.2	50.2	52 30.9	+59.4	51.2	53 08.1	+59.6	52.2	53 44.4	+59.7	53.3	54 19.8	+59.8	54.4	54 54.2	+60.0	55.6	55 27.7	+59.9	56.8	56 00.0	+60.0	58.0	**56**
57	52 52.1	+59.1	49.9	53 30.3	+59.3	50.9	54 07.7	+59.5	52.0	54 44.1	+59.7	53.1	55 19.6	+59.9	54.3	55 54.2	+59.9	55.5	56 27.6	+60.0	56.7	57 00.0	+60.0	58.0	**57**
58	53 51.2	+59.0	49.6	54 29.6	+59.3	50.7	55 07.2	+59.5	51.8	55 43.8	+59.7	52.9	56 19.5	+59.8	54.1	56 54.1	+59.9	55.4	57 27.6	+60.0	56.7	58 00.0	+60.0	58.0	**58**
59	54 50.2	+59.0	49.3	55 28.9	+59.2	50.4	56 06.7	+59.4	51.6	56 43.5	+59.6	52.8	57 19.3	+59.8	54.0	57 54.0	+59.9	55.3	58 27.6	+60.0	56.6	59 00.0	+60.0	58.0	**59**
60	55 49.2	+59.0	49.0	56 28.1	+59.2	50.1	57 06.1	+59.4	51.3	57 43.1	+59.6	52.6	58 19.1	+59.7	53.8	58 53.9	+59.9	55.2	59 27.6	+59.9	56.6	60 00.0	+60.0	58.0	**60**
61	56 48.2	+58.9	48.7	57 27.3	+59.2	49.8	58 05.5	+59.4	51.1	58 42.7	+59.6	52.3	59 18.8	+59.8	53.7	59 53.8	+59.9	55.1	60 27.5	+60.0	56.5	61 00.0	+60.0	58.0	**61**
62	57 47.1	+58.8	48.3	58 26.5	+59.1	49.5	59 04.9	+59.4	50.8	59 42.3	+59.6	52.1	60 18.6	+59.7	53.5	60 53.7	+59.9	54.9	61 27.5	+60.0	56.4	62 00.0	+60.0	58.0	**62**
63	58 45.9	+58.7	47.9	59 25.6	+59.0	49.2	60 04.3	+59.3	50.5	60 41.9	+59.5	51.9	61 18.3	+59.8	53.3	61 53.6	+59.8	54.8	62 27.5	+59.9	56.4	63 00.0	+60.0	58.0	**63**
64	59 44.6	+58.7	47.5	60 24.6	+59.0	48.8	61 03.6	+59.3	50.2	61 41.4	+59.6	51.6	62 18.1	+59.7	53.1	62 53.4	+59.9	54.7	63 27.4	+60.0	56.3	64 00.0	+60.0	58.0	**64**
65	60 43.3	+58.6	47.1	61 23.6	+59.0	48.5	62 02.9	+59.2	49.9	62 41.0	+59.4	51.3	63 17.8	+59.7	52.9	63 53.3	+59.9	54.5	64 27.4	+60.0	56.2	65 00.0	+60.0	58.0	**65**
66	61 41.9	+58.5	46.7	62 22.6	+58.8	48.1	63 02.1	+59.2	49.5	63 40.4	+59.5	51.1	64 17.5	+59.7	52.7	64 53.2	+59.8	54.4	65 27.4	+59.9	56.1	66 00.0	+60.0	58.0	**66**
67	62 40.4	+58.5	46.2	63 21.4	+58.8	47.6	64 01.3	+59.1	49.2	64 39.9	+59.4	50.7	65 17.2	+59.6	52.4	65 53.0	+59.9	54.2	66 27.3	+60.0	56.0	67 00.0	+60.0	58.0	**67**
68	63 38.9	+58.2	45.7	64 20.2	+58.7	47.2	65 00.4	+59.0	48.8	65 39.3	+59.3	50.4	66 16.8	+59.6	52.2	66 52.9	+59.8	54.0	67 27.3	+59.9	56.0	68 00.0	+60.0	58.0	**68**
69	64 37.1	+58.2	45.2	65 18.9	+58.6	46.7	65 59.4	+59.0	48.3	66 38.6	+59.3	50.0	67 16.4	+59.6	51.9	67 52.7	+59.8	53.8	68 27.2	+60.0	55.8	69 00.0	+60.0	58.0	**69**
70	65 35.3	+58.0	44.6	66 17.5	+58.4	46.2	66 58.4	+58.9	47.9	67 37.9	+59.3	49.7	68 16.0	+59.6	51.6	68 52.5	+59.8	53.6	69 27.2	+59.9	55.7	70 00.0	+60.0	58.0	**70**
71	66 33.3	+57.9	43.9	67 15.9	+58.4	45.6	67 57.3	+58.7	47.4	68 37.2	+59.1	49.2	69 15.6	+59.5	51.2	69 52.3	+59.7	53.4	70 27.1	+60.0	55.6	71 00.0	+60.0	58.0	**71**
72	67 31.2	+57.7	43.3	68 14.3	+58.1	45.0	68 56.0	+58.7	46.8	69 36.3	+59.1	48.8	70 15.1	+59.4	50.9	70 52.0	+59.8	53.1	71 27.1	+59.9	55.5	72 00.0	+60.0	58.0	**72**
73	68 28.9	+57.4	42.5	69 12.4	+58.0	44.3	69 54.7	+58.5	46.2	70 35.4	+59.0	48.3	71 14.5	+59.4	50.4	71 51.8	+59.7	52.8	72 27.0	+59.9	55.3	73 00.0	+60.0	58.0	**73**
74	69 26.3	+57.2	41.7	70 10.4	+57.9	43.6	70 53.2	+58.4	45.6	71 34.4	+58.9	47.7	72 13.9	+59.3	50.0	72 51.5	+59.7	52.5	73 26.9	+59.9	55.1	74 00.0	+60.0	58.0	**74**
75	70 23.5	+57.0	40.8	71 08.3	+57.5	42.8	71 51.6	+58.2	44.8	72 33.3	+58.8	47.1	73 13.2	+59.3	49.5	73 51.2	+59.6	52.1	74 26.8	+60.0	54.9	75 00.0	+60.0	58.0	**75**
76	71 20.5	+56.6	39.9	72 05.8	+57.3	41.9	72 49.8	+57.9	44.0	73 32.1	+58.6	46.4	74 12.5	+59.1	48.9	74 50.8	+59.6	51.7	75 26.8	+59.8	54.7	76 00.0	+60.0	58.0	**76**
77	72 17.1	+56.2	38.8	73 03.1	+57.0	40.9	73 47.7	+57.8	43.1	74 30.7	+58.4	45.6	75 11.6	+59.1	48.3	75 50.4	+59.5	51.2	76 26.6	+59.9	54.5	77 00.0	+60.0	58.0	**77**
78	73 13.3	+55.8	37.6	74 00.1	+56.6	39.8	74 45.5	+57.4	42.1	75 29.1	+58.1	44.7	76 10.7	+58.8	47.6	76 49.9	+59.5	50.7	77 26.5	+59.9	54.2	78 00.0	+60.0	58.0	**78**
79	74 09.1	+55.3	36.3	74 56.7	+56.2	38.5	75 42.9	+57.0	41.0	76 27.2	+58.0	43.7	77 09.5	+58.7	46.7	77 49.4	+59.3	50.1	78 26.4	+59.8	53.8	79 00.0	+60.0	58.0	**79**
80	75 04.4	+54.6	34.9	75 52.9	+55.6	37.1	76 39.9	+56.6	39.7	77 25.2	+57.5	42.5	78 08.2	+58.5	45.8	78 48.7	+59.3	49.4	79 26.2	+59.8	53.4	80 00.0	+60.0	58.0	**80**
81	75 59.0	+53.8	33.2	76 48.5	+54.9	35.5	77 36.5	+56.0	38.2	78 22.7	+57.1	41.2	79 06.7	+58.1	44.6	79 48.0	+59.0	48.5	80 26.0	+59.7	53.0	81 00.0	+60.0	58.0	**81**
82	76 52.8	+53.0	31.3	77 43.4	+54.1	33.7	78 32.5	+55.3	36.5	79 19.8	+56.6	39.6	80 04.8	+57.8	43.2	80 47.0	+58.9	47.5	81 25.7	+59.7	52.4	82 00.0	+60.0	58.0	**82**
83	77 45.8	+51.7	29.2	78 37.5	+53.0	31.6	79 27.8	+54.4	34.4	80 16.4	+55.8	37.7	81 02.6	+57.2	41.6	81 45.9	+58.5	46.2	82 25.4	+59.5	51.6	83 00.0	+60.0	58.0	**83**
84	78 37.5	+50.3	26.7	79 30.5	+51.7	29.1	80 22.2	+53.2	32.0	81 12.2	+54.7	35.4	81 59.8	+56.4	39.5	82 44.4	+58.1	44.5	83 24.9	+59.4	50.6	84 00.0	+60.0	58.0	**84**
85	79 27.8	*+48.6* •	23.8	80 22.2	*+50.0* •	26.2	81 15.4	+51.5	29.1	82 06.9	+53.4	32.6	82 56.2	+55.4	37.0	83 42.5	+57.3	42.4	84 24.3	+59.2	49.3	85 00.0	+60.0	58.0	**85**
86	80 16.4	*+46.2* •	20.5	81 12.2	*+47.6* •	22.8	82 06.9	*+49.3* •	25.5	83 00.3	*+51.3* •	29.1	83 51.6	*+53.6* •	33.6	84 39.8	+56.2	39.5	85 23.5	+58.7	47.4	86 00.0	+60.0	58.0	**86**
87	81 02.6	*+43.3* •	16.6	81 59.8	*+44.6* •	18.6	82 56.2	*+46.3* •	21.2	83 51.6	*+48.2* •	24.5	84 45.2	*+50.8* •	29.0	85 36.0	*+54.1* •	35.4	86 22.2	+57.7	44.5	87 00.0	+60.0	58.0	**87**
88	81 45.9	*+39.5* •	11.9	82 44.4	*+40.5* •	13.5	83 42.5	*+41.8* •	15.7	84 39.8	*+43.7* •	18.6	85 36.0	*+46.2* •	22.7	86 30.1	*+49.8* •	29.0	87 19.9	*+55.1* •	39.5	88 00.0	+60.0	58.0	**88**
89	82 25.4	*+34.6* •	6.4	83 24.9	*+35.1* •	7.4	84 24.3	*+35.7* •	8.7	85 23.5	*+36.5* •	10.6	86 22.2	*+37.8* •	13.5	87 19.9	*+40.1* •	18.5	88 15.0	*+45.0* •	29.0	89 00.0	+60.0	58.0	**89**
90	83 00.0	*+28.5* •	0.0	84 00.0	*+27.9* •	0.0	85 00.0	*+27.0* •	0.0	86 00.0	*+25.7* •	0.0	87 00.0	*+23.3* •	0.0	88 00.0	*+18.2* •	0.0	89 00.0	*+1.8* •	0.0	90 00.0	−60.0	29.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 122°, 238°

59°, 301° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 35.9	+59.7	120.8	3 05.2	+59.7	120.9	2 34.4	+59.8	120.9	2 03.5	+59.9	120.9	1 32.7	+59.9	121.0	1 01.8	+60.0	121.0	0 30.9	+60.0	121.0	0 00.0	+60.0	121.0	0
1	4 35.6	+59.7	120.7	4 04.9	+59.8	120.8	3 34.2	+59.8	120.8	3 03.4	+59.9	120.9	2 32.6	+60.0	120.9	2 01.8	+59.9	121.0	1 30.9	+60.0	121.0	1 00.0	+60.0	121.0	1
2	5 35.3	+59.6	120.6	5 04.7	+59.7	120.7	4 34.0	+59.9	120.8	4 03.3	+59.9	120.8	3 32.6	+59.9	120.9	3 01.7	+60.0	120.9	2 30.9	+60.0	121.0	2 00.0	+60.0	121.0	2
3	6 34.9	+59.7	120.5	6 04.4	+59.8	120.6	5 33.9	+59.8	120.7	5 03.2	+59.9	120.8	4 32.5	+59.9	120.8	4 01.7	+60.0	120.9	3 30.9	+60.0	121.0	3 00.0	+60.0	121.0	3
4	7 34.6	+59.7	120.4	7 04.2	+59.7	120.5	6 33.7	+59.8	120.6	6 03.1	+59.9	120.7	5 32.4	+60.0	120.8	5 01.7	+60.0	120.9	4 30.9	+60.0	120.9	4 00.0	+60.0	121.0	4
5	8 34.3	+59.6	120.3	8 03.9	+59.8	120.4	7 33.5	+59.9	120.5	7 03.0	+59.9	120.6	6 32.4	+59.9	120.7	6 01.7	+59.9	120.8	5 30.9	+60.0	120.9	5 00.0	+60.0	121.0	5
6	9 33.9	+59.7	120.2	9 03.7	+59.8	120.3	8 33.4	+59.8	120.5	8 02.9	+59.9	120.6	7 32.3	+59.9	120.7	7 01.6	+60.0	120.8	6 30.9	+60.0	120.9	6 00.0	+60.0	121.0	6
7	10 33.6	+59.6	120.1	10 03.5	+59.7	120.2	9 33.2	+59.8	120.4	9 02.8	+59.9	120.5	8 32.2	+60.0	120.6	8 01.6	+60.0	120.8	7 30.9	+59.9	120.9	7 00.0	+60.0	121.0	7
8	11 33.2	+59.7	120.0	11 03.2	+59.7	120.1	10 33.0	+59.8	120.3	10 02.7	+59.9	120.5	9 32.2	+59.9	120.6	9 01.6	+60.0	120.7	8 30.8	+60.0	120.9	8 00.0	+60.0	121.0	8
9	12 32.9	+59.7	119.8	12 02.9	+59.8	120.0	11 32.8	+59.9	120.2	11 02.6	+59.8	120.4	10 32.1	+60.0	120.6	10 01.6	+59.9	120.7	9 30.8	+60.0	120.9	9 00.0	+60.0	121.0	9
10	13 32.6	+59.6	119.7	13 02.7	+59.7	119.9	12 32.7	+59.8	120.1	12 02.4	+59.9	120.3	11 32.1	+59.9	120.5	11 01.5	+60.0	120.7	10 30.8	+60.0	120.8	10 00.0	+60.0	121.0	10
11	14 32.2	+59.7	119.6	14 02.4	+59.8	119.9	13 32.5	+59.8	120.1	13 02.3	+59.9	120.3	12 32.0	+59.9	120.5	12 01.5	+60.0	120.7	11 30.8	+60.0	120.8	11 00.0	+60.0	121.0	11
12	15 31.9	+59.6	119.5	15 02.2	+59.7	119.8	14 32.3	+59.8	120.0	14 02.2	+59.9	120.2	13 31.9	+60.0	120.4	13 01.5	+59.9	120.6	12 30.8	+60.0	120.8	12 00.0	+60.0	121.0	12
13	16 31.5	+59.6	119.4	16 01.9	+59.8	119.7	15 32.1	+59.8	119.9	15 02.1	+59.9	120.1	14 31.9	+59.9	120.4	14 01.4	+60.0	120.6	13 30.8	+60.0	120.8	13 00.0	+60.0	121.0	13
14	17 31.1	+59.7	119.3	17 01.7	+59.7	119.6	16 31.9	+59.9	119.8	16 02.0	+59.9	120.1	15 31.8	+59.9	120.3	15 01.4	+60.0	120.6	14 30.8	+60.0	120.8	14 00.0	+60.0	121.0	14
15	18 30.8	+59.6	119.2	18 01.4	+59.7	119.5	17 31.8	+59.8	119.7	17 01.9	+59.9	120.0	16 31.7	+60.0	120.3	16 01.4	+60.0	120.5	15 30.8	+60.0	120.8	15 00.0	+60.0	121.0	15
16	19 30.4	+59.6	119.1	19 01.1	+59.8	119.4	18 31.6	+59.8	119.7	18 01.8	+59.8	119.9	17 31.7	+59.9	120.2	17 01.4	+59.9	120.5	16 30.8	+60.0	120.7	16 00.0	+60.0	121.0	16
17	20 30.0	+59.7	118.9	20 00.9	+59.7	119.3	19 31.4	+59.8	119.6	19 01.6	+59.9	119.9	18 31.6	+59.9	120.2	18 01.3	+60.0	120.5	17 30.8	+60.0	120.7	17 00.0	+60.0	121.0	17
18	21 29.7	+59.6	118.8	21 00.6	+59.7	119.2	20 31.2	+59.8	119.5	20 01.5	+59.9	119.8	19 31.5	+60.0	120.1	19 01.3	+60.0	120.4	18 30.8	+60.0	120.7	18 00.0	+60.0	121.0	18
19	22 29.3	+59.6	118.7	22 00.3	+59.7	119.1	21 31.0	+59.8	119.4	21 01.4	+59.9	119.7	20 31.5	+59.9	120.1	20 01.3	+59.9	120.4	19 30.8	+60.0	120.7	19 00.0	+60.0	121.0	19
20	23 28.9	+59.6	118.6	23 00.0	+59.7	119.0	22 30.8	+59.8	119.3	22 01.3	+59.8	119.7	21 31.4	+59.9	120.0	21 01.2	+60.0	120.4	20 30.8	+60.0	120.7	20 00.0	+60.0	121.0	20
21	24 28.5	+59.6	118.4	23 59.7	+59.7	118.8	23 30.6	+59.8	119.2	23 01.1	+59.9	119.6	22 31.3	+60.0	120.0	22 01.2	+60.0	120.3	21 30.8	+59.9	120.7	21 00.0	+60.0	121.0	21
22	25 28.1	+59.6	118.3	24 59.4	+59.7	118.7	24 30.4	+59.8	119.1	24 01.0	+59.9	119.5	23 31.3	+59.9	119.9	23 01.2	+59.9	120.3	22 30.7	+60.0	120.6	22 00.0	+60.0	121.0	22
23	26 27.7	+59.6	118.2	25 59.1	+59.7	118.6	25 30.2	+59.8	119.0	25 00.9	+59.8	119.5	24 31.2	+59.9	119.9	24 01.1	+60.0	120.3	23 30.7	+60.0	120.6	23 00.0	+60.0	121.0	23
24	27 27.3	+59.6	118.1	26 58.8	+59.7	118.5	26 30.0	+59.8	119.0	26 00.7	+59.9	119.4	25 31.1	+59.9	119.8	25 01.1	+60.0	120.2	24 30.7	+60.0	120.6	24 00.0	+60.0	121.0	24
25	28 26.9	+59.5	117.9	27 58.5	+59.7	118.4	27 29.8	+59.8	118.9	27 00.6	+59.9	119.3	26 31.0	+60.0	119.8	26 01.1	+59.9	120.2	25 30.7	+60.0	120.6	25 00.0	+60.0	121.0	25
26	29 26.4	+59.6	117.8	28 58.2	+59.7	118.3	28 29.6	+59.7	118.8	28 00.5	+59.8	119.2	27 31.0	+59.9	119.7	27 01.0	+60.0	120.1	26 30.7	+60.0	120.6	26 00.0	+60.0	121.0	26
27	30 26.0	+59.5	117.7	29 57.9	+59.7	118.2	29 29.3	+59.8	118.7	29 00.3	+59.9	119.2	28 30.9	+59.9	119.6	28 01.0	+60.0	120.1	27 30.7	+60.0	120.6	27 00.0	+60.0	121.0	27
28	31 25.5	+59.6	117.5	30 57.6	+59.6	118.0	30 29.1	+59.8	118.6	30 00.2	+59.9	119.1	29 30.8	+59.9	119.6	29 01.0	+59.9	120.1	28 30.7	+60.0	120.5	28 00.0	+60.0	121.0	28
29	32 25.1	+59.5	117.4	31 57.2	+59.7	117.9	31 28.9	+59.8	118.5	31 00.1	+59.8	119.0	30 30.7	+59.9	119.5	30 00.9	+60.0	120.0	29 30.7	+60.0	120.5	29 00.0	+60.0	121.0	29
30	33 24.6	+59.5	117.2	32 56.9	+59.7	117.8	32 28.7	+59.7	118.4	31 59.9	+59.9	118.9	31 30.6	+60.0	119.5	31 00.9	+60.0	120.0	30 30.7	+60.0	120.5	30 00.0	+60.0	121.0	30
31	34 24.1	+59.6	117.1	33 56.6	+59.6	117.7	33 28.4	+59.8	118.3	32 59.8	+59.8	118.8	32 30.6	+59.9	119.4	32 00.9	+59.9	119.9	31 30.7	+60.0	120.5	31 00.0	+60.0	121.0	31
32	35 23.7	+59.5	116.9	34 56.2	+59.6	117.5	34 28.2	+59.7	118.1	33 59.6	+59.8	118.7	33 30.5	+59.9	119.3	33 00.8	+60.0	119.9	32 30.7	+59.9	120.5	32 00.0	+60.0	121.0	32
33	36 23.2	+59.4	116.8	35 55.8	+59.7	117.4	35 27.9	+59.8	118.0	34 59.4	+59.9	118.7	34 30.4	+59.9	119.3	34 00.8	+59.9	119.9	33 30.6	+60.0	120.4	33 00.0	+60.0	121.0	33
34	37 22.6	+59.5	116.6	36 55.5	+59.6	117.3	36 27.7	+59.7	117.9	35 59.3	+59.8	118.6	35 30.3	+59.9	119.2	35 00.7	+60.0	119.8	34 30.6	+60.0	120.4	34 00.0	+60.0	121.0	34
35	38 22.1	+59.5	116.4	37 55.1	+59.6	117.1	37 27.4	+59.7	117.8	36 59.1	+59.8	118.5	36 30.2	+59.9	119.1	36 00.7	+60.0	119.8	35 30.6	+60.0	120.4	35 00.0	+60.0	121.0	35
36	39 21.6	+59.4	116.2	38 54.7	+59.6	117.0	38 27.1	+59.8	117.7	37 58.9	+59.9	118.4	37 30.1	+59.9	119.1	37 00.7	+59.9	119.7	36 30.6	+60.0	120.4	36 00.0	+60.0	121.0	36
37	40 21.0	+59.4	116.1	39 54.3	+59.6	116.8	39 26.9	+59.7	117.6	38 58.8	+59.8	118.3	38 30.0	+59.9	119.0	38 00.6	+60.0	119.7	37 30.6	+60.0	120.3	37 00.0	+60.0	121.0	37
38	41 20.4	+59.4	115.9	40 53.9	+59.5	116.7	40 26.6	+59.7	117.4	39 58.6	+59.8	118.2	39 29.9	+59.9	118.9	39 00.6	+59.9	119.6	38 30.6	+60.0	120.3	38 00.0	+60.0	121.0	38
39	42 19.8	+59.4	115.7	41 53.4	+59.6	116.5	41 26.3	+59.7	117.3	40 58.4	+59.8	118.1	40 29.8	+59.9	118.8	40 00.5	+60.0	119.6	39 30.6	+60.0	120.3	39 00.0	+60.0	121.0	39
40	43 19.2	+59.4	115.5	42 53.0	+59.5	116.3	42 26.0	+59.7	117.2	41 58.2	+59.8	118.0	41 29.7	+59.9	118.8	41 00.5	+59.9	119.5	40 30.6	+60.0	120.3	40 00.0	+60.0	121.0	40
41	44 18.6	+59.3	115.3	43 52.5	+59.6	116.2	43 25.7	+59.6	117.0	42 58.0	+59.8	117.9	42 29.6	+59.9	118.7	42 00.4	+60.0	119.5	41 30.6	+60.0	120.2	41 00.0	+60.0	121.0	41
42	45 17.9	+59.4	115.1	44 52.1	+59.5	116.0	44 25.3	+59.7	116.9	43 57.8	+59.8	117.7	43 29.5	+59.9	118.6	43 00.4	+59.9	119.4	42 30.6	+59.9	120.2	42 00.0	+60.0	121.0	42
43	46 17.3	+59.3	114.9	45 51.6	+59.5	115.8	45 25.0	+59.7	116.7	44 57.6	+59.8	117.6	44 29.4	+59.8	118.5	44 00.3	+60.0	119.4	43 30.5	+60.0	120.2	43 00.0	+60.0	121.0	43
44	47 16.6	+59.2	114.7	46 51.1	+59.4	115.6	46 24.7	+59.6	116.6	45 57.4	+59.8	117.5	45 29.2	+59.9	118.4	45 00.3	+59.9	119.3	44 30.5	+60.0	120.2	44 00.0	+60.0	121.0	44
45	48 15.8	+59.3	114.4	47 50.5	+59.5	115.4	47 24.3	+59.6	116.4	46 57.2	+59.7	117.4	46 29.1	+59.9	118.3	46 00.2	+60.0	119.2	45 30.5	+60.0	120.1	45 00.0	+60.0	121.0	45
46	49 15.1	+59.2	114.2	48 50.0	+59.4	115.2	48 23.9	+59.6	116.3	47 56.9	+59.8	117.3	47 29.0	+59.9	118.2	47 00.2	+59.9	119.2	46 30.5	+60.0	120.1	46 00.0	+60.0	121.0	46
47	50 14.3	+59.2	113.9	49 49.4	+59.4	115.0	49 23.5	+59.6	116.1	48 56.7	+59.7	117.1	48 28.9	+59.8	118.1	48 00.1	+60.0	119.1	47 30.5	+60.0	120.1	47 00.0	+60.0	121.0	47
48	51 13.5	+59.1	113.7	50 48.8	+59.4	114.8	50 23.1	+59.6	115.9	49 56.4	+59.8	117.0	49 28.7	+59.9	118.0	49 00.1	+59.9	119.0	48 30.5	+60.0	120.0	48 00.0	+60.0	121.0	48
49	52 12.6	+59.1	113.4	51 48.2	+59.4	114.6	51 22.7	+59.6	115.7	50 56.2	+59.7	116.8	50 28.6	+59.8	117.9	50 00.0	+59.9	119.0	49 30.5	+59.9	120.0	49 00.0	+60.0	121.0	49
50	53 11.7	+59.1	113.1	52 47.6	+59.3	114.3	52 22.3	+59.5	115.5	51 55.9	+59.7	116.7	51 28.4	+59.9	117.8	50 59.9	+60.0	118.9	50 30.4	+60.0	120.0	50 00.0	+60.0	121.0	50
51	54 10.8	+59.0	112.8	53 46.9	+59.3	114.1	53 21.8	+59.5	115.3	52 55.6	+59.7	116.5	52 28.3	+59.8	117.7	51 59.9	+59.9	118.8	51 30.4	+60.0	119.9	51 00.0	+60.0	121.0	51
52	55 09.8	+58.9	112.5	54 46.2	+59.2	113.8	54 21.3	+59.5	115.1	53 55.3	+59.7	116.3	53 28.1	+59.8	117.6	52 59.8	+59.9	118.7	52 30.4	+60.0	119.9	52 00.0	+60.0	121.0	52
53	56 08.7	+58.9	112.2	55 45.4	+59.2	113.5	55 20.8	+59.5	114.9	54 55.0	+59.6	116.2	54 27.9	+59.8	117.4	53 59.7	+59.9	118.7	53 30.4	+60.0	119.8	53 00.0	+60.0	121.0	53
54	57 07.6	+58.9	111.8	56 44.6	+59.2	113.3	56 20.3	+59.4	114.6	55 54.6	+59.7	116.0	55 27.7	+59.8	117.3	54 59.6	+59.9	118.6	54 30.4	+59.9	119.8	54 00.0	+60.0	121.0	54
55	58 06.5	+58.8	111.5	57 43.8	+59.1	112.9	57 19.7	+59.4	114.4	56 54.3	+59.6	115.8	56 27.5	+59.8	117.2	55 59.5	+60.0	118.5	55 30.3	+60.0	119.8	55 00.0	+60.0	121.0	55
56	59 05.3	+58.7	111.1	58 42.9	+59.1	112.6	58 19.1	+59.4	114.1	57 53.9	+59.6	115.6	57 27.3	+59.8	117.0	56 59.5	+59.9	118.4	56 30.3	+60.0	119.7	56 00.0	+60.0	121.0	56
57	60 04.0	+58.6	110.7	59 42.0	+59.0	112.3	59 18.5	+59.3	113.8	58 53.5	+59.6	115.4	58 27.1	+59.8	116.8	57 59.4	+59.9	118.3	57 30.3	+60.0	119.7	57 00.0	+60.0	121.0	57
58	61 02.6	+58.6	110.2	60 41.0	+59.0	111.9	60 17.8	+59.3	113.6	59 53.1	+59.6	115.1	59 26.9	+59.8	116.7	58 59.3	+59.9	118.2	58 30.3	+60.0	119.6	58 00.0	+60.0	121.0	58
59	62 01.2	+58.4	109.8	61 40.0	+58.9	111.5	61 17.1	+59.3	113.2	60 52.7	+59.5	114.9	60 26.7	+59.7	116.5	59 59.2	+59.8	118.0	59 30.3	+59.9	119.5	59 00.0	+60.0	121.0	59
60	62 59.6	+58.3	109.3	62 38.9	+58.8	111.1	62 16.4	+59.2	112.9	61 52.2	+59.5	114.6	61 26.4	+59.7	116.3	60 59.0	+59.9	117.9	60 30.2	+60.0	119.5	60 00.0	+60.0	121.0	60
61	63 57.9	+58.2	108.8	63 37.7	+58.7	110.7	63 15.6	+59.1	112.5	62 51.7	+59.5	114.4	62 26.1	+59.7	116.1	61 58.9	+59.9	117.8	61 30.2	+60.0	119.4	61 00.0	+60.0	121.0	61
62	64 56.1	+58.1	108.2	64 36.4	+58.6	110.2	64 14.7	+59.1	112.2	63 51.2	+59.4	114.1	63 25.8	+59.7	115.9	62 58.8	+59.9	117.7	62 30.2	+59.9	119.4	62 00.0	+60.0	121.0	62
63	65 54.2	+57.9	107.6	65 35.0	+58.5	109.7	65 13.8	+59.0	111.8	64 50.6	+59.4	113.7	64 25.5	+59.7	115.7	63 58.7	+59.8	117.5	63 30.1	+60.0	119.3	63 00.0	+60.0	121.0	63
64	66 52.1	+57.8	107.0	66 33.5	+58.4	109.2	66 12.8	+58.9	111.3	65 50.0	+59.3	113.4	65 25.2	+59.6	115.4	64 58.5	+59.9	117.3	64 30.1	+60.0	119.2	64 00.0	+60.0	121.0	64
65	67 49.9	+57.5	106.3	67 31.9	+58.3	108.6	67 11.7	+58.8	110.8	66 49.3	+59.3	113.0	66 24.8	+59.6	115.1	65 58.4	+59.8	117.2	65 30.1	+59.9	119.1	65 00.0	+60.0	121.0	65
66	68 47.4	+57.4	105.5	68 30.2	+58.1	107.9	68 10.5	+58.8	110.3	67 48.6	+59.2	112.6	67 24.4	+59.6	114.8	66 58.2	+59.8	117.0	66 30.0	+60.0	119.0	66 00.0	+60.0	121.0	66
67	69 44.8	+57.0	104.7	69 28.3	+57.9	107.2	69 09.3	+58.6	109.7	68 47.8	+59.1	112.2	68 24.0	+59.5	114.5	67 58.0	+59.8	116.8	67 30.0	+59.9	118.9	67 00.0	+60.0	121.0	67
68	70 41.8	+56.8	103.7	70 26.2	+57.7	106.5	70 07.9	+58.4	109.1	69 46.9	+59.1	111.7	69 23.5	+59.5	114.2	68 57.8	+59.8	116.6	68 29.9	+60.0	118.8	68 00.0	+60.0	121.0	68
69	71 38.6	+56.4	102.7	71 23.9	+57.5	105.6	71 06.3	+58.3	108.5	70 46.0	+58.9	111.2	70 23.0	+59.4	113.8	69 57.6	+59.8	116.3	69 29.9	+59.9	118.7	69 00.0	+60.0	121.0	69
70	72 35.0	+56.0	101.6	72 21.4	+57.1	104.7	72 04.6	+58.1	107.7	71 44.9	+58.9	110.6	71 22.4	+59.4	113.4	70 57.4	+59.7	116.0	70 29.8	+60.0	118.6	70 00.0	+60.0	121.0	70
71	73 31.0	+55.6	100.4	73 18.5	+56.8	103.7	73 02.7	+57.9	106.9	72 43.8	+58.6	110.0	72 21.8	+59.3	112.9	71 57.1	+59.7	115.7	71 29.8	+59.9	118.4	71 00.0	+60.0	121.0	71
72	74 26.6	+54.9	99.0	74 15.3	+56.5	102.5	74 00.6	+57.6	105.9	73 42.4	+58.6	109.2	73 21.1	+59.2	112.4	72 56.8	+59.7	115.4	72 29.7	+59.9	118.3	72 00.0	+60.0	121.0	72
73	75 21.5	+54.3	97.5	75 11.8	+55.9	101.2	74 58.2	+57.3	104.9	74 41.0	+58.3	108.4	74 20.3	+59.1	111.8	73 56.5	+59.6	115.0	73 29.6	+59.9	118.1	73 00.0	+60.0	121.0	73
74	76 15.8	+53.4	95.7	76 07.7	+55.3	99.8	75 55.5	+56.9	103.7	75 39.3	+58.1	107.5	75 19.4	+59.0	111.2	74 56.1	+59.6	114.6	74 29.5	+59.9	117.9	74 00.0	+60.0	121.0	74
75	77 09.2	+52.5	93.8	77 03.0	+54.6	98.1	76 52.4	+56.4	102.4	76 37.4	+57.8	106.5	76 18.4	+58.9	110.4	75 55.7	+59.5	114.2	75 29.4	+59.9	117.7	75 00.0	+60.0	121.0	75
76	78 01.7	+51.1	91.5	77 57.6	+53.7	96.2	77 48.8	+55.8	100.8	77 35.2	+57.5	105.3	77 17.3	+58.6	109.6	76 55.2	+59.4	113.6	76 29.3	+59.9	117.4	76 00.0	+60.0	121.0	76
77	78 52.8	+49.6	88.9	78 51.3	+52.6	94.0	78 44.6	+55.0	99.0	78 32.7	+56.9	103.9	78 15.9	+58.4	108.6	77 54.6	+59.3	113.0	77 29.2	+59.8	117.1	77 00.0	+60.0	121.0	77
78	79 42.4	+47.6 •	85.9	79 43.9	+51.0	91.4	79 39.6	+54.0	96.9	79 29.6	+56.4	102.2	79 14.3	+58.0	107.4	78 53.9	+59.2	112.2	78 29.0	+59.8	116.8	78 00.0	+60.0	121.0	78
79	80 30.0	+45.1 •	82.3	80 34.9	+49.2 •	88.3	80 33.6	+52.7	94.3	80 26.0	+55.5	100.2	80 12.3	+57.7	106.0	79 53.1	+59.1	111.4	79 28.8	+59.8	116.4	79 00.0	+60.0	121.0	79
80	81 15.1	+41.9 •	78.1	81 24.1	+46.7 •	84.6	81 26.3	+50.9 •	91.3	81 21.5	+54.4	97.8	81 10.0	+57.1	104.2	80 52.2	+58.8	110.3	80 28.6	+59.7	115.9	80 00.0	+60.0	121.0	80
81	81 57.0	+37.7 •	73.2	82 10.8	+43.3 •	80.2	82 17.2	+48.5 •	87.5	82 15.9	+52.9	94.9	82 07.1	+56.2	102.1	81 51.0	+58.4	109.0	81 28.3	+59.7	115.3	81 00.0	+60.0	121.0	81
82	82 34.7	+32.4 •	67.4	82 54.1	+38.9 •	74.9	83 05.7	+45.1 •	82.9	83 08.8	+50.7 •	91.2	83 03.3	+55.0	99.4	82 49.4	+58.0	107.3	82 28.0	+59.5	114.5	82 00.0	+60.0	121.0	82
83	83 07.1	+25.9 •	60.7	83 33.0	+32.9 •	68.4	83 50.8	+40.4 •	77.1	83 59.5	+47.4 •	86.4	83 58.3	+53.2 •	95.9	83 47.4	+57.2	105.1	83 27.5	+59.4	113.5	83 00.0	+60.0	121.0	83
84	83 33.0	+17.8 •	52.9	84 05.9	+25.3 •	60.6	84 31.2	+33.6 •	69.8	84 46.9	+42.3 •	80.1	84 51.5	+50.2 •	91.1	84 44.6	+56.0	102.0	84 26.9	+59.1	112.1	84 00.0	+60.0	121.0	84
85	83 50.8	+8.7 •	44.2	84 31.2	+15.7 •	51.5	85 04.8	+24.4 •	60.6	85 29.2	+34.6 •	71.7	85 41.7	+45.1 •	84.4	85 40.6	+53.7 •	97.7	85 26.0	+58.7	110.2	85 00.0	+60.0	121.0	85
86	83 59.5	−1.2 •	34.8	84 46.9	+4.6 •	41.1	85 29.2	+12.5 •	49.5	86 03.8	+23.0 •	60.6	86 26.8	+36.0 •	74.7	86 34.3	+49.0 •	91.0	86 24.7	+57.6	107.2	86 00.0	+60.0	121.0	86
87	83 58.3	−10.9 •	25.3	84 51.5	−6.9 •	30.0	85 41.7	−1.1 •	36.7	86 26.8	+7.5 •	46.4	87 02.8	+20.5 •	60.5	87 23.3	+38.5 •	80.0	87 22.3	+54.8 •	102.0	87 00.0	+60.0	121.0	87
88	83 47.4	−19.9 •	16.1	84 44.6	−17.7 •	19.1	85 40.6	−14.6 •	23.4	86 34.3	−9.6 •	30.0	87 23.3	−1.0 •	41.0	88 01.8	+15.3 •	60.5	88 17.1	+43.8 •	91.0	88 00.0	+60.0	121.0	88
89	83 27.5	−27.5 •	7.5	84 26.9	−26.9 •	8.9	85 26.0	−26.0 •	10.8	86 24.7	−24.7 •	13.8	87 22.3	−22.3 •	19.0	88 17.1	−17.1 •	30.0	89 00.9	−0.9 •	60.5	89 00.0	+60.0	121.0	89
90	83 00.0	−33.8 •	0.0	84 00.0	−34.3 •	0.0	85 00.0	−34.9 •	0.0	86 00.0	−35.7 •	0.0	87 00.0	−37.1 •	0.0	88 00.0	−39.4 •	0.0	89 00.0	−44.4 •	0.0	90 00.0	−60.0	60.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 59°, 301°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 35.9	−59.7	120.8	3 05.2	−59.8	120.9	2 34.4	−59.9	120.9	2 03.5	−59.9	120.9	1 32.7	−60.0	121.0	1 01.8	−60.0	121.0	0 30.9	−60.0	121.0	0 00.0	+60.0	59.0	0
1	2 36.2	−59.6	120.9	2 05.4	−59.8	121.0	1 34.5	−59.8	121.0	1 03.6	−59.8	121.0	0 32.7	−59.9	121.0	0 01.8	−60.0	121.0	0 29.1	+60.0	59.0	1 00.0	+60.0	59.0	1
2	1 36.6	−59.7	121.0	1 05.6	−59.7	121.0	0 34.7	−59.8	121.1	0 03.8	−59.9	121.1	0 27.2	+59.9	58.9	0 58.2	+59.9	59.0	1 29.1	+60.0	59.0	2 00.0	+60.0	59.0	2
3	0 36.9	−59.7	121.1	0 05.9	−59.8	121.1	0 25.1	+59.9	58.9	0 56.1	+59.9	58.9	1 27.1	+60.0	58.9	1 58.1	+60.0	58.9	2 29.1	+60.0	59.0	3 00.0	+60.0	59.0	3
4	0 22.8	+59.6	58.8	0 53.9	+59.7	58.8	1 25.0	+59.8	58.8	1 56.0	+59.9	58.8	2 27.1	+59.9	58.9	2 58.1	+60.0	58.9	3 29.1	+60.0	58.9	4 00.0	+60.0	59.0	4
5	1 22.4	+59.7	58.7	1 53.6	+59.8	58.7	2 24.8	+59.8	58.7	2 55.9	+59.9	58.8	3 27.0	+60.0	58.8	3 58.1	+59.9	58.9	4 29.1	+60.0	58.9	5 00.0	+60.0	59.0	5
6	2 22.1	+59.7	58.6	2 53.4	+59.7	58.6	3 24.6	+59.9	58.6	3 55.8	+59.9	58.7	4 27.0	+59.9	58.8	4 58.0	+60.0	58.8	5 29.1	+60.0	58.9	6 00.0	+60.0	59.0	6
7	3 21.8	+59.6	58.5	3 53.1	+59.8	58.5	4 24.5	+59.8	58.6	4 55.7	+59.9	58.6	5 26.9	+59.9	58.7	5 58.0	+60.0	58.8	6 29.1	+59.9	58.9	7 00.0	+60.0	59.0	7
8	4 21.4	+59.7	58.4	4 52.9	+59.8	58.4	5 24.3	+59.8	58.5	5 55.6	+59.9	58.6	6 26.8	+60.0	58.7	6 58.0	+60.0	58.8	7 29.0	+60.0	58.9	8 00.0	+60.0	59.0	8
9	5 21.1	+59.7	58.2	5 52.7	+59.7	58.3	6 24.1	+59.8	58.4	6 55.5	+59.9	58.5	7 26.8	+59.9	58.6	7 58.0	+59.9	58.7	8 29.0	+60.0	58.9	9 00.0	+60.0	59.0	9
10	6 20.8	+59.7	58.1	6 52.4	+59.8	58.2	7 23.9	+59.9	58.3	7 55.4	+59.9	58.5	8 26.7	+60.0	58.6	8 57.9	+60.0	58.7	9 29.0	+60.0	58.9	10 00.0	+60.0	59.0	10
11	7 20.5	+59.6	58.0	7 52.2	+59.7	58.1	8 23.8	+59.8	58.3	8 55.3	+59.9	58.4	9 26.7	+59.9	58.5	9 57.9	+60.0	58.7	10 29.0	+60.0	58.8	11 00.0	+60.0	59.0	11
12	8 20.1	+59.7	57.9	8 51.9	+59.8	58.1	9 23.6	+59.8	58.2	9 55.2	+59.9	58.3	10 26.6	+59.9	58.5	10 57.9	+60.0	58.7	11 29.0	+60.0	58.8	12 00.0	+60.0	59.0	12
13	9 19.8	+59.6	57.8	9 51.7	+59.7	58.0	10 23.4	+59.9	58.1	10 55.1	+59.8	58.3	11 26.5	+60.0	58.4	11 57.9	+59.9	58.6	12 29.0	+60.0	58.8	13 00.0	+60.0	59.0	13
14	10 19.4	+59.7	57.7	10 51.4	+59.8	57.9	11 23.3	+59.8	58.0	11 54.9	+59.9	58.2	12 26.5	+59.9	58.4	12 57.8	+60.0	58.6	13 29.0	+60.0	58.8	14 00.0	+60.0	59.0	14
15	11 19.1	+59.7	57.6	11 51.2	+59.7	57.8	12 23.1	+59.8	58.0	12 54.8	+59.9	58.2	13 26.4	+59.9	58.4	13 57.8	+60.0	58.6	14 29.0	+60.0	58.8	15 00.0	+60.0	59.0	15
16	12 18.8	+59.6	57.5	12 50.9	+59.8	57.7	13 22.9	+59.8	57.9	13 54.7	+59.9	58.1	14 26.3	+60.0	58.3	14 57.8	+59.9	58.5	15 29.0	+60.0	58.8	16 00.0	+60.0	59.0	16
17	13 18.4	+59.7	57.4	13 50.7	+59.7	57.6	14 22.7	+59.9	57.8	14 54.6	+59.9	58.0	15 26.3	+59.9	58.3	15 57.7	+60.0	58.5	16 29.0	+60.0	58.7	17 00.0	+60.0	59.0	17
18	14 18.1	+59.6	57.3	14 50.4	+59.7	57.5	15 22.6	+59.8	57.7	15 54.5	+59.9	58.0	16 26.2	+59.9	58.2	16 57.7	+60.0	58.5	17 29.0	+60.0	58.7	18 00.0	+60.0	59.0	18
19	15 17.7	+59.7	57.2	15 50.1	+59.8	57.4	16 22.4	+59.8	57.6	16 54.4	+59.9	57.9	17 26.1	+60.0	58.2	17 57.7	+59.9	58.4	18 29.0	+60.0	58.7	19 00.0	+60.0	59.0	19
20	16 17.4	+59.6	57.1	16 49.9	+59.7	57.3	17 22.2	+59.8	57.6	17 54.3	+59.8	57.8	18 26.1	+59.9	58.1	18 57.6	+60.0	58.4	19 29.0	+60.0	58.7	20 00.0	+60.0	59.0	20
21	17 17.0	+59.6	56.9	17 49.6	+59.8	57.2	18 22.0	+59.8	57.5	18 54.1	+59.9	57.8	19 26.0	+59.9	58.1	19 57.6	+60.0	58.4	20 29.0	+59.9	58.7	21 00.0	+60.0	59.0	21
22	18 16.6	+59.7	56.8	18 49.4	+59.7	57.1	19 21.8	+59.8	57.4	19 54.0	+59.9	57.7	20 25.9	+60.0	58.0	20 57.6	+60.0	58.3	21 28.9	+60.0	58.7	22 00.0	+60.0	59.0	22
23	19 16.3	+59.6	56.7	19 49.1	+59.7	57.0	20 21.6	+59.8	57.3	20 53.9	+59.9	57.6	21 25.9	+59.9	58.0	21 57.6	+59.9	58.3	22 28.9	+60.0	58.6	23 00.0	+60.0	59.0	23
24	20 15.9	+59.6	56.6	20 48.8	+59.7	56.9	21 21.4	+59.8	57.2	21 53.8	+59.8	57.6	22 25.8	+59.9	57.9	22 57.5	+60.0	58.3	23 28.9	+60.0	58.6	24 00.0	+60.0	59.0	24
25	21 15.5	+59.6	56.5	21 48.5	+59.7	56.8	22 21.2	+59.8	57.1	22 53.6	+59.9	57.5	23 25.7	+60.0	57.9	23 57.5	+60.0	58.2	24 28.9	+60.0	58.6	25 00.0	+60.0	59.0	25
26	22 15.1	+59.7	56.3	22 48.2	+59.8	56.7	23 21.0	+59.8	57.1	23 53.5	+59.9	57.4	24 25.7	+59.9	57.8	24 57.5	+59.9	58.2	25 28.9	+60.0	58.6	26 00.0	+60.0	59.0	26
27	23 14.8	+59.6	56.2	23 48.0	+59.7	56.6	24 20.8	+59.8	57.0	24 53.4	+59.9	57.3	25 25.6	+59.9	57.7	25 57.4	+60.0	58.1	26 28.9	+60.0	58.6	27 00.0	+60.0	59.0	27
28	24 14.4	+59.6	56.1	24 47.7	+59.7	56.5	25 20.6	+59.8	56.9	25 53.3	+59.8	57.3	26 25.5	+59.9	57.7	26 57.4	+60.0	58.1	27 28.9	+60.0	58.6	28 00.0	+60.0	59.0	28
29	25 14.0	+59.6	56.0	25 47.4	+59.7	56.4	26 20.4	+59.8	56.8	26 53.1	+59.9	57.2	27 25.4	+60.0	57.6	27 57.4	+59.9	58.1	28 28.9	+60.0	58.5	29 00.0	+60.0	59.0	29
30	26 13.6	+59.6	55.8	26 47.1	+59.7	56.3	27 20.2	+59.8	56.7	27 53.0	+59.8	57.1	28 25.4	+59.9	57.6	28 57.3	+60.0	58.0	29 28.9	+60.0	58.5	30 00.0	+60.0	59.0	30
31	27 13.2	+59.5	55.7	27 46.8	+59.7	56.1	28 20.0	+59.8	56.6	28 52.8	+59.9	57.0	29 25.3	+59.9	57.5	29 57.3	+60.0	58.0	30 28.9	+60.0	58.5	31 00.0	+60.0	59.0	31
32	28 12.7	+59.6	55.6	28 46.5	+59.6	56.0	29 19.8	+59.8	56.5	29 52.7	+59.9	57.0	30 25.2	+59.9	57.5	30 57.3	+59.9	58.0	31 28.9	+60.0	58.5	32 00.0	+60.0	59.0	32
33	29 12.3	+59.6	55.4	29 46.1	+59.7	55.9	30 19.6	+59.7	56.4	30 52.6	+59.8	56.9	31 25.1	+59.9	57.4	31 57.2	+60.0	57.9	32 28.9	+59.9	58.5	33 00.0	+60.0	59.0	33
34	30 11.9	+59.5	55.3	30 45.8	+59.7	55.8	31 19.3	+59.8	56.3	31 52.4	+59.9	56.8	32 25.0	+59.9	57.3	32 57.2	+59.9	57.9	33 28.8	+60.0	58.4	34 00.0	+60.0	59.0	34
35	31 11.4	+59.6	55.2	31 45.5	+59.6	55.7	32 19.1	+59.8	56.2	32 52.3	+59.8	56.7	33 24.9	+60.0	57.3	33 57.1	+60.0	57.8	34 28.8	+60.0	58.4	35 00.0	+60.0	59.0	35
36	32 11.0	+59.5	55.0	32 45.1	+59.7	55.5	33 18.9	+59.7	56.1	33 52.1	+59.8	56.6	34 24.9	+59.9	57.2	34 57.1	+60.0	57.8	35 28.8	+60.0	58.4	36 00.0	+60.0	59.0	36
37	33 10.5	+59.5	54.9	33 44.8	+59.7	55.4	34 18.6	+59.8	56.0	34 51.9	+59.9	56.5	35 24.8	+59.9	57.1	35 57.1	+59.9	57.7	36 28.8	+60.0	58.4	37 00.0	+60.0	59.0	37
38	34 10.0	+59.6	54.7	34 44.5	+59.6	55.3	35 18.4	+59.7	55.9	35 51.8	+59.8	56.5	36 24.7	+59.9	57.1	36 57.0	+60.0	57.7	37 28.8	+60.0	58.3	38 00.0	+60.0	59.0	38
39	35 09.6	+59.5	54.6	35 44.1	+59.6	55.1	36 18.1	+59.8	55.7	36 51.6	+59.9	56.4	37 24.6	+59.9	57.0	37 57.0	+59.9	57.6	38 28.8	+60.0	58.3	39 00.0	+60.0	59.0	39
40	36 09.1	+59.4	54.4	36 43.7	+59.6	55.0	37 17.9	+59.7	55.6	37 51.5	+59.8	56.3	38 24.5	+59.9	56.9	38 56.9	+60.0	57.6	39 28.8	+60.0	58.3	40 00.0	+60.0	59.0	40
41	37 08.5	+59.5	54.2	37 43.3	+59.6	54.9	38 17.6	+59.7	55.5	38 51.3	+59.8	56.2	39 24.4	+59.9	56.9	39 56.9	+59.9	57.5	40 28.8	+60.0	58.3	41 00.0	+60.0	59.0	41
42	38 08.0	+59.5	54.1	38 42.9	+59.6	54.7	39 17.3	+59.7	55.4	39 51.1	+59.8	56.1	40 24.3	+59.9	56.8	40 56.8	+60.0	57.5	41 28.8	+59.9	58.2	42 00.0	+60.0	59.0	42
43	39 07.5	+59.4	53.9	39 42.5	+59.6	54.6	40 17.0	+59.7	55.3	40 50.9	+59.8	56.0	41 24.2	+59.9	56.7	41 56.8	+59.9	57.4	42 28.7	+60.0	58.2	43 00.0	+60.0	59.0	43
44	40 06.9	+59.5	53.7	40 42.1	+59.6	54.4	41 16.7	+59.7	55.1	41 50.7	+59.8	55.9	42 24.1	+59.9	56.6	42 56.7	+60.0	57.4	43 28.7	+60.0	58.2	44 00.0	+60.0	59.0	44
45	41 06.4	+59.4	53.6	41 41.7	+59.6	54.3	42 16.4	+59.7	55.0	42 50.5	+59.8	55.8	43 24.0	+59.8	56.5	43 56.7	+59.9	57.3	44 28.7	+60.0	58.2	45 00.0	+60.0	59.0	45
46	42 05.8	+59.4	53.4	42 41.3	+59.5	54.1	43 16.1	+59.7	54.9	43 50.3	+59.8	55.6	44 23.8	+59.9	56.4	44 56.6	+60.0	57.3	45 28.7	+60.0	58.1	46 00.0	+60.0	59.0	46
47	43 05.2	+59.3	53.2	43 40.8	+59.5	53.9	44 15.8	+59.7	54.7	44 50.1	+59.8	55.5	45 23.7	+59.9	56.4	45 56.6	+59.9	57.2	46 28.7	+60.0	58.1	47 00.0	+60.0	59.0	47
48	44 04.5	+59.4	53.0	44 40.3	+59.5	53.8	45 15.5	+59.6	54.6	45 49.9	+59.8	55.4	46 23.6	+59.9	56.3	46 56.5	+60.0	57.1	47 28.7	+60.0	58.1	48 00.0	+60.0	59.0	48
49	45 03.9	+59.3	52.8	45 39.8	+59.5	53.6	46 15.1	+59.7	54.4	46 49.7	+59.7	55.3	47 23.5	+59.8	56.2	47 56.5	+59.9	57.1	48 28.7	+59.9	58.0	49 00.0	+60.0	59.0	49
50	46 03.2	+59.3	52.6	46 39.3	+59.5	53.4	47 14.8	+59.6	54.3	47 49.4	+59.8	55.1	48 23.3	+59.9	56.1	48 56.4	+59.9	57.0	49 28.6	+60.0	58.0	50 00.0	+60.0	59.0	50
51	47 02.5	+59.3	52.3	47 38.8	+59.5	53.2	48 14.4	+59.6	54.1	48 49.2	+59.7	55.0	49 23.2	+59.8	56.0	49 56.3	+60.0	56.9	50 28.6	+60.0	58.0	51 00.0	+60.0	59.0	51
52	48 01.8	+59.2	52.1	48 38.3	+59.4	53.0	49 14.0	+59.6	53.9	49 48.9	+59.8	54.9	50 23.0	+59.9	55.9	50 56.3	+59.9	56.9	51 28.6	+60.0	57.9	52 00.0	+60.0	59.0	52
53	49 01.0	+59.3	51.9	49 37.7	+59.4	52.8	50 13.6	+59.6	53.7	50 48.7	+59.7	54.7	51 22.9	+59.8	55.7	51 56.2	+59.9	56.8	52 28.6	+60.0	57.9	53 00.0	+60.0	59.0	53
54	50 00.3	+59.1	51.6	50 37.1	+59.4	52.6	51 13.2	+59.5	53.6	51 48.4	+59.7	54.6	52 22.7	+59.9	55.6	52 56.1	+60.0	56.7	53 28.6	+60.0	57.8	54 00.0	+60.0	59.0	54
55	50 59.4	+59.2	51.4	51 36.5	+59.4	52.3	52 12.7	+59.6	53.4	52 48.1	+59.7	54.4	53 22.6	+59.8	55.5	53 56.1	+59.9	56.6	54 28.6	+59.9	57.8	55 00.0	+60.0	59.0	55
56	51 58.6	+59.1	51.1	52 35.9	+59.3	52.1	53 12.3	+59.5	53.2	53 47.8	+59.7	54.2	54 22.4	+59.8	55.4	54 56.0	+59.9	56.5	55 28.5	+60.0	57.7	56 00.0	+60.0	59.0	56
57	52 57.7	+59.1	50.8	53 35.2	+59.3	51.9	54 11.8	+59.5	52.9	54 47.5	+59.7	54.1	55 22.2	+59.8	55.2	55 55.9	+59.9	56.4	56 28.5	+60.0	57.7	57 00.0	+60.0	59.0	57
58	53 56.8	+59.0	50.5	54 34.5	+59.3	51.6	55 11.3	+59.5	52.7	55 47.2	+59.6	53.9	56 22.0	+59.8	55.1	56 55.8	+59.9	56.4	57 28.5	+60.0	57.7	58 00.0	+60.0	59.0	58
59	54 55.8	+59.0	50.2	55 33.8	+59.2	51.3	56 10.8	+59.4	52.5	56 46.8	+59.6	53.7	57 21.8	+59.8	54.9	57 55.7	+59.9	56.2	58 28.5	+59.9	57.6	59 00.0	+60.0	59.0	59
60	55 54.8	+58.9	49.9	56 33.0	+59.2	51.0	57 10.2	+59.4	52.2	57 46.4	+59.7	53.5	58 21.6	+59.8	54.8	58 55.6	+59.9	56.1	59 28.4	+60.0	57.5	60 00.0	+60.0	59.0	60
61	56 53.7	+58.9	49.5	57 32.2	+59.1	50.7	58 09.6	+59.4	52.0	58 46.1	+59.5	53.3	59 21.4	+59.7	54.6	59 55.5	+59.9	56.0	60 28.4	+60.0	57.5	61 00.0	+60.0	59.0	61
62	57 52.6	+58.8	49.2	58 31.3	+59.1	50.4	59 09.0	+59.3	51.7	59 45.6	+59.6	53.0	60 21.1	+59.8	54.4	60 55.4	+59.9	55.9	61 28.4	+60.0	57.4	62 00.0	+60.0	59.0	62
63	58 51.4	+58.7	48.8	59 30.4	+59.0	50.1	60 08.3	+59.3	51.4	60 45.2	+59.5	52.8	61 20.9	+59.7	54.3	61 55.3	+59.9	55.8	62 28.4	+59.9	57.4	63 00.0	+60.0	59.0	63
64	59 50.1	+58.6	48.4	60 29.4	+59.0	49.7	61 07.6	+59.3	51.1	61 44.7	+59.5	52.5	62 20.6	+59.7	54.0	62 55.2	+59.8	55.6	63 28.3	+60.0	57.3	64 00.0	+60.0	59.0	64
65	60 48.7	+58.6	48.0	61 28.4	+58.9	49.3	62 06.9	+59.2	50.8	62 44.2	+59.5	52.3	63 20.3	+59.7	53.8	63 55.0	+59.9	55.5	64 28.3	+60.0	57.2	65 00.0	+60.0	59.0	65
66	61 47.3	+58.5	47.5	62 27.3	+58.8	48.9	63 06.1	+59.2	50.4	63 43.7	+59.4	52.0	64 20.0	+59.7	53.6	64 54.9	+59.8	55.3	65 28.3	+59.9	57.1	66 00.0	+60.0	59.0	66
67	62 45.8	+58.3	47.0	63 26.1	+58.7	48.5	64 05.3	+59.0	50.0	64 43.1	+59.4	51.7	65 19.7	+59.6	53.4	65 54.7	+59.9	55.1	66 28.2	+60.0	57.0	67 00.0	+60.0	59.0	67
68	63 44.1	+58.3	46.5	64 24.8	+58.7	48.0	65 04.3	+59.0	49.6	65 42.5	+59.4	51.3	66 19.3	+59.6	53.1	66 54.6	+59.8	55.0	67 28.2	+59.9	56.9	68 00.0	+60.0	59.0	68
69	64 42.4	+58.1	46.0	65 23.5	+58.5	47.5	66 03.3	+59.0	49.2	66 41.9	+59.2	50.9	67 18.9	+59.6	52.8	67 54.4	+59.8	54.8	68 28.1	+60.0	56.8	69 00.0	+60.0	59.0	69
70	65 40.5	+57.9	45.4	66 22.0	+58.4	47.0	67 02.3	+58.8	48.7	67 41.1	+59.3	50.5	68 18.5	+59.5	52.5	68 54.2	+59.8	54.5	69 28.1	+59.9	56.7	70 00.0	+60.0	59.0	70
71	66 38.4	+57.8	44.7	67 20.4	+58.3	46.4	68 01.1	+58.8	48.2	68 40.4	+59.1	50.1	69 18.0	+59.5	52.1	69 54.0	+59.7	54.3	70 28.0	+59.9	56.6	71 00.0	+60.0	59.0	71
72	67 36.2	+57.6	44.0	68 18.7	+58.2	45.8	68 59.9	+58.6	47.7	69 39.5	+59.1	49.6	70 17.5	+59.5	51.8	70 53.7	+59.8	54.0	71 27.9	+60.0	56.4	72 00.0	+60.0	59.0	72
73	68 33.8	+57.4	43.3	69 16.9	+57.9	45.1	69 58.5	+58.5	47.0	70 38.6	+58.9	49.1	71 17.0	+59.3	51.3	71 53.5	+59.7	53.7	72 27.9	+59.9	56.3	73 00.0	+60.0	59.0	73
74	69 31.2	+57.1	42.5	70 14.8	+57.7	44.4	70 57.0	+58.3	46.4	71 37.5	+58.9	48.5	72 16.3	+59.3	50.9	72 53.2	+59.6	53.4	73 27.8	+59.9	56.1	74 00.0	+60.0	59.0	74
75	70 28.3	+56.9	41.6	71 12.5	+57.6	43.5	71 55.3	+58.1	45.6	72 36.4	+58.7	47.9	73 15.6	+59.3	50.4	73 52.8	+59.7	53.0	74 27.7	+59.9	55.9	75 00.0	+60.0	59.0	75
76	71 25.2	+56.5	40.6	72 10.1	+57.2	42.6	72 53.4	+57.9	44.8	73 35.1	+58.6	47.2	74 14.9	+59.1	49.8	74 52.5	+59.5	52.6	75 27.6	+59.9	55.7	76 00.0	+60.0	59.0	76
77	72 21.7	+56.1	39.5	73 07.3	+56.9	41.6	73 51.3	+57.7	43.9	74 33.7	+58.3	46.4	75 14.0	+59.0	49.2	75 52.0	+59.6	52.2	76 27.5	+59.9	55.4	77 00.0	+60.0	59.0	77
78	73 17.8	+55.7	38.3	74 04.2	+56.5	40.5	74 49.0	+57.3	42.9	75 32.0	+58.2	45.5	76 13.0	+58.8	48.4	76 51.6	+59.4	51.6	77 27.4	+59.8	55.1	78 00.0	+60.0	59.0	78
79	74 13.5	+55.1	37.0	75 00.7	+56.0	39.2	75 46.3	+57.0	41.7	76 30.2	+57.8	44.5	77 11.8	+58.7	47.6	77 51.0	+59.3	51.0	78 27.2	+59.8	54.8	79 00.0	+60.0	59.0	79
80	75 08.6	+54.4	35.5	75 56.7	+55.5	37.8	76 43.3	+56.5	40.4	77 28.0	+57.5	43.3	78 10.5	+58.4	46.6	78 50.3	+59.2	50.3	79 27.0	+59.8	54.4	80 00.0	+60.0	59.0	80
81	76 03.0	+53.7	33.8	76 52.2	+54.7	36.2	77 39.8	+55.9	38.9	78 25.5	+57.0	41.9	79 08.9	+58.1	45.4	79 49.5	+59.1	49.4	80 26.8	+59.7	53.9	81 00.0	+60.0	59.0	81
82	76 56.7	+52.6	31.9	77 46.9	+53.9	34.3	78 35.7	+55.1	37.1	79 22.5	+56.4	40.3	80 07.0	+57.7	44.0	80 48.6	+58.8	48.3	81 26.5	+59.7	53.3	82 00.0	+60.0	59.0	82
83	77 49.3	+51.5	29.7	78 40.8	+52.8	32.2	79 30.8	+54.2	35.0	80 18.9	+55.7	38.4	81 04.7	+57.1	42.3	81 47.4	+58.5	47.0	82 26.2	+59.5	52.5	83 00.0	+60.0	59.0	83
84	78 40.8	+50.0	27.2	79 33.6	+51.4	29.6	80 25.0	+52.9	32.6	81 14.6	+54.6	36.1	82 01.8	+56.3	40.3	82 45.9	+58.0	45.3	83 25.7	+59.4	51.5	84 00.0	+60.0	59.0	84
85	79 30.8	*+48.1* •	24.2	80 25.0	*+49.6* •	26.7	81 17.9	*+51.3* •	29.6	82 09.2	+53.1	33.2	82 58.1	+55.2	37.6	83 43.9	+57.3	43.2	84 25.1	+59.2	50.2	85 00.0	+60.0	59.0	85
86	80 18.9	*+45.8* •	20.8	81 14.6	*+47.2* •	23.1	82 09.2	*+48.9* •	26.0	83 02.3	*+51.0* •	29.6	83 53.3	*+53.4* •	34.2	84 41.2	+56.0	40.2	85 24.3	+58.6	48.3	86 00.0	+60.0	59.0	86
87	81 04.7	*+42.7* •	16.8	82 01.8	*+44.1* •	18.9	82 58.1	*+45.8* •	21.5	83 53.3	*+47.9* •	24.9	84 46.7	*+50.5* •	29.5	85 37.2	*+53.9* •	36.0	86 22.9	+57.7	45.3	87 00.0	+60.0	59.0	87
88	81 47.4	*+38.8* •	12.1	82 45.9	*+39.8* •	13.7	83 43.9	*+41.2* •	15.9	84 41.2	*+43.1* •	18.8	85 37.2	*+45.7* •	23.1	86 31.1	*+49.5* •	29.5	87 20.6	*+55.0* •	40.2	88 00.0	+60.0	59.0	88
89	82 26.2	*+33.8* •	6.5	83 25.7	*+34.3* •	7.5	84 25.1	*+34.9* •	8.8	85 24.3	*+35.7* •	10.8	86 22.9	*+37.1* •	13.7	87 20.6	*+39.4* •	18.8	88 15.6	*+44.4* •	29.5	89 00.0	+60.0	59.0	89
90	83 00.0	*+27.5* •	0.0	84 00.0	*+26.9* •	0.0	85 00.0	*+26.0* •	0.0	86 00.0	*+24.7* •	0.0	87 00.0	*+22.3* •	0.0	88 00.0	*+17.1* •	0.0	89 00.0	*+0.9* •	0.0	90 00.0	−60.0	29.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 121°, 239°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 29.6	+59.7	119.8	2 59.8	+59.7	119.9	2 29.9	+59.8	119.9	1 59.9	+59.9	119.9	1 30.0	+59.9	120.0	1 00.0	+60.0	120.0	0 30.0	+60.0	120.0	0 00.0	+60.0	120.0	**0**
1	4 29.3	+59.6	119.7	3 59.5	+59.8	119.8	3 29.7	+59.8	119.8	2 59.8	+59.9	119.9	2 29.9	+59.9	119.9	2 00.0	+59.9	120.0	1 30.0	+60.0	120.0	1 00.0	+60.0	120.0	**1**
2	5 28.9	+59.7	119.6	4 59.3	+59.7	119.7	4 29.5	+59.8	119.8	3 59.7	+59.9	119.8	3 29.8	+60.0	119.9	2 59.9	+60.0	119.9	2 30.0	+60.0	120.0	2 00.0	+60.0	120.0	**2**
3	6 28.6	+59.7	119.5	5 59.0	+59.8	119.6	5 29.3	+59.9	119.7	4 59.6	+59.9	119.8	4 29.8	+59.9	119.8	3 59.9	+60.0	119.9	3 30.0	+60.0	120.0	3 00.0	+60.0	120.0	**3**
4	7 28.3	+59.6	119.4	6 58.8	+59.7	119.5	6 29.2	+59.8	119.6	5 59.5	+59.9	119.7	5 29.7	+60.0	119.8	4 59.9	+60.0	119.9	4 30.0	+60.0	119.9	4 00.0	+60.0	120.0	**4**
5	8 27.9	+59.7	119.3	7 58.5	+59.8	119.4	7 29.0	+59.8	119.5	6 59.4	+59.9	119.6	6 29.7	+59.9	119.7	5 59.9	+59.9	119.8	5 30.0	+60.0	119.9	5 00.0	+60.0	120.0	**5**
6	9 27.6	+59.6	119.2	8 58.3	+59.7	119.3	8 28.8	+59.8	119.4	7 59.3	+59.9	119.6	7 29.6	+59.9	119.7	6 59.8	+60.0	119.8	6 30.0	+60.0	119.9	6 00.0	+60.0	120.0	**6**
7	10 27.2	+59.7	119.1	9 58.0	+59.7	119.2	9 28.6	+59.9	119.4	8 59.2	+59.8	119.5	8 29.5	+60.0	119.6	7 59.8	+60.0	119.8	7 30.0	+59.9	119.9	7 00.0	+60.0	120.0	**7**
8	11 26.9	+59.6	119.0	10 57.7	+59.8	119.1	10 28.5	+59.8	119.3	9 59.0	+59.9	119.5	9 29.5	+59.9	119.6	8 59.8	+59.9	119.7	8 29.9	+60.0	119.9	8 00.0	+60.0	120.0	**8**
9	12 26.5	+59.7	118.8	11 57.5	+59.7	119.0	11 28.3	+59.8	119.2	10 58.9	+59.9	119.4	10 29.4	+59.9	119.6	9 59.7	+60.0	119.7	9 29.9	+60.0	119.9	9 00.0	+60.0	120.0	**9**
10	13 26.2	+59.6	118.7	12 57.2	+59.8	118.9	12 28.1	+59.8	119.1	11 58.8	+59.9	119.3	11 29.3	+60.0	119.5	10 59.7	+60.0	119.7	10 29.9	+60.0	119.8	10 00.0	+60.0	120.0	**10**
11	14 25.8	+59.7	118.6	13 57.0	+59.7	118.8	13 27.9	+59.8	119.1	12 58.7	+59.9	119.3	12 29.3	+59.9	119.5	11 59.7	+60.0	119.6	11 29.9	+60.0	119.8	11 00.0	+60.0	120.0	**11**
12	15 25.5	+59.6	118.5	14 56.7	+59.7	118.7	14 27.7	+59.9	119.0	13 58.6	+59.9	119.2	13 29.2	+59.9	119.4	12 59.7	+59.9	119.6	12 29.9	+60.0	119.8	12 00.0	+60.0	120.0	**12**
13	16 25.1	+59.6	118.4	15 56.4	+59.8	118.6	15 27.6	+59.8	118.9	14 58.5	+59.8	119.1	14 29.1	+60.0	119.4	13 59.6	+60.0	119.6	13 29.9	+60.0	119.8	13 00.0	+60.0	120.0	**13**
14	17 24.7	+59.7	118.3	16 56.2	+59.7	118.6	16 27.4	+59.8	118.8	15 58.3	+59.9	119.1	15 29.1	+59.9	119.3	14 59.6	+60.0	119.6	14 29.9	+60.0	119.8	14 00.0	+60.0	120.0	**14**
15	18 24.4	+59.6	118.2	17 55.9	+59.7	118.5	17 27.2	+59.8	118.7	16 58.2	+59.9	119.0	16 29.0	+59.9	119.3	15 59.6	+59.9	119.5	15 29.9	+60.0	119.8	15 00.0	+60.0	120.0	**15**
16	19 24.0	+59.6	118.0	18 55.6	+59.8	118.4	18 27.0	+59.8	118.6	17 58.1	+59.9	118.9	17 28.9	+60.0	119.2	16 59.5	+60.0	119.5	16 29.9	+60.0	119.7	16 00.0	+60.0	120.0	**16**
17	20 23.6	+59.6	117.9	19 55.4	+59.7	118.2	19 26.8	+59.8	118.6	18 58.0	+59.9	118.9	18 28.9	+59.9	119.2	17 59.5	+60.0	119.5	17 29.9	+60.0	119.7	17 00.0	+60.0	120.0	**17**
18	21 23.2	+59.6	117.8	20 55.1	+59.7	118.1	20 26.6	+59.8	118.5	19 57.9	+59.8	118.8	19 28.8	+59.9	119.1	18 59.5	+59.9	119.4	18 29.9	+60.0	119.7	18 00.0	+60.0	120.0	**18**
19	22 22.8	+59.6	117.7	21 54.8	+59.7	118.0	21 26.4	+59.8	118.4	20 57.7	+59.9	118.7	20 28.7	+60.0	119.1	19 59.4	+60.0	119.4	19 29.9	+60.0	119.7	19 00.0	+60.0	120.0	**19**
20	23 22.4	+59.6	117.6	22 54.5	+59.7	117.9	22 26.2	+59.8	118.3	21 57.6	+59.9	118.7	21 28.7	+59.9	119.0	20 59.4	+60.0	119.4	20 29.9	+59.9	119.7	20 00.0	+60.0	120.0	**20**
21	24 22.0	+59.6	117.4	23 54.2	+59.7	117.8	23 26.0	+59.8	118.2	22 57.5	+59.9	118.6	22 28.6	+59.9	119.0	21 59.4	+60.0	119.3	21 29.8	+60.0	119.7	21 00.0	+60.0	120.0	**21**
22	25 21.6	+59.6	117.3	24 53.9	+59.7	117.7	24 25.8	+59.8	118.1	23 57.4	+59.8	118.5	23 28.5	+60.0	118.9	22 59.4	+59.9	119.3	22 29.8	+60.0	119.6	22 00.0	+60.0	120.0	**22**
23	26 21.2	+59.6	117.2	25 53.6	+59.7	117.6	25 25.6	+59.8	118.0	24 57.2	+59.9	118.4	24 28.5	+59.9	118.9	23 59.3	+60.0	119.2	23 29.8	+60.0	119.6	23 00.0	+60.0	120.0	**23**
24	27 20.8	+59.6	117.0	26 53.3	+59.7	117.5	26 25.4	+59.8	117.9	25 57.1	+59.8	118.4	25 28.4	+59.9	118.8	24 59.3	+60.0	119.2	24 29.8	+60.0	119.6	24 00.0	+60.0	120.0	**24**
25	28 20.4	+59.5	116.9	27 53.0	+59.7	117.4	27 25.2	+59.8	117.8	26 56.9	+59.9	118.3	26 28.3	+59.9	118.7	25 59.3	+59.9	119.2	25 29.8	+60.0	119.6	25 00.0	+60.0	120.0	**25**
26	29 19.9	+59.6	116.8	28 52.7	+59.6	117.3	28 25.0	+59.7	117.7	27 56.8	+59.9	118.2	27 28.2	+59.9	118.7	26 59.2	+60.0	119.1	26 29.8	+60.0	119.6	26 00.0	+60.0	120.0	**26**
27	30 19.5	+59.5	116.6	29 52.3	+59.7	117.1	29 24.7	+59.8	117.6	28 56.7	+59.8	118.1	28 28.1	+60.0	118.6	27 59.2	+59.9	119.1	27 29.8	+60.0	119.6	27 00.0	+60.0	120.0	**27**
28	31 19.0	+59.6	116.5	30 52.0	+59.7	117.0	30 24.5	+59.8	117.5	29 56.5	+59.9	118.1	29 28.1	+59.9	118.6	28 59.1	+60.0	119.1	28 29.8	+60.0	119.5	28 00.0	+60.0	120.0	**28**
29	32 18.6	+59.5	116.3	31 51.7	+59.6	116.9	31 24.3	+59.7	117.4	30 56.4	+59.8	118.0	30 28.0	+59.9	118.5	29 59.1	+60.0	119.0	29 29.8	+60.0	119.5	29 00.0	+60.0	120.0	**29**
30	33 18.1	+59.5	116.2	32 51.3	+59.7	116.8	32 24.0	+59.8	117.3	31 56.2	+59.9	117.9	31 27.9	+59.9	118.4	30 59.1	+59.9	119.0	30 29.8	+60.0	119.5	30 00.0	+60.0	120.0	**30**
31	34 17.6	+59.5	116.0	33 51.0	+59.6	116.6	33 23.8	+59.7	117.2	32 56.1	+59.8	117.8	32 27.8	+59.9	118.4	31 59.0	+60.0	118.9	31 29.8	+60.0	119.5	31 00.0	+60.0	120.0	**31**
32	35 17.1	+59.5	115.9	34 50.6	+59.6	116.5	34 23.5	+59.8	117.1	33 55.9	+59.9	117.7	33 27.7	+59.9	118.3	32 59.0	+60.0	118.9	32 29.8	+59.9	119.5	32 00.0	+60.0	120.0	**32**
33	36 16.6	+59.5	115.7	35 50.2	+59.7	116.4	35 23.3	+59.7	117.0	34 55.8	+59.8	117.6	34 27.6	+59.9	118.2	33 59.0	+59.9	118.8	33 29.7	+60.0	119.4	33 00.0	+60.0	120.0	**33**
34	37 16.1	+59.4	115.6	36 49.9	+59.6	116.2	36 23.0	+59.8	116.9	35 55.6	+59.8	117.5	35 27.5	+59.9	118.2	34 58.9	+60.0	118.8	34 29.7	+60.0	119.4	34 00.0	+60.0	120.0	**34**
35	38 15.5	+59.5	115.4	37 49.5	+59.6	116.1	37 22.8	+59.7	116.8	36 55.4	+59.8	117.5	36 27.4	+60.0	118.1	35 58.9	+59.9	118.8	35 29.7	+60.0	119.4	35 00.0	+60.0	120.0	**35**
36	39 15.0	+59.4	115.2	38 49.1	+59.6	115.9	38 22.5	+59.7	116.7	37 55.2	+59.9	117.4	37 27.4	+59.9	118.0	36 58.8	+60.0	118.7	36 29.7	+60.0	119.4	36 00.0	+60.0	120.0	**36**
37	40 14.4	+59.4	115.0	39 48.7	+59.5	115.8	39 22.2	+59.7	116.5	38 55.1	+59.8	117.3	38 27.3	+59.9	118.0	37 58.8	+59.9	118.7	37 29.7	+60.0	119.3	37 00.0	+60.0	120.0	**37**
38	41 13.8	+59.4	114.8	40 48.2	+59.6	115.6	40 21.9	+59.7	116.4	39 54.9	+59.8	117.2	39 27.2	+59.8	117.9	38 58.7	+60.0	118.6	38 29.7	+60.0	119.3	38 00.0	+60.0	120.0	**38**
39	42 13.2	+59.4	114.7	41 47.8	+59.6	115.5	41 21.6	+59.7	116.3	40 54.7	+59.8	117.1	40 27.0	+59.9	117.8	39 58.7	+60.0	118.6	39 29.7	+60.0	119.3	39 00.0	+60.0	120.0	**39**
40	43 12.6	+59.4	114.5	42 47.4	+59.5	115.3	42 21.3	+59.7	116.1	41 54.5	+59.8	116.9	41 26.9	+59.9	117.7	40 58.7	+59.9	118.5	40 29.7	+60.0	119.3	40 00.0	+60.0	120.0	**40**
41	44 12.0	+59.3	114.3	43 46.9	+59.5	115.1	43 21.0	+59.7	116.0	42 54.3	+59.8	116.8	42 26.8	+59.9	117.7	41 58.6	+60.0	118.5	41 29.7	+59.9	119.2	41 00.0	+60.0	120.0	**41**
42	45 11.3	+59.3	114.1	44 46.4	+59.5	115.0	44 20.7	+59.6	115.9	43 54.1	+59.8	116.7	43 26.7	+59.9	117.6	42 58.6	+59.9	118.4	42 29.6	+60.0	119.2	42 00.0	+60.0	120.0	**42**
43	46 10.6	+59.3	113.8	45 45.9	+59.5	114.8	45 20.3	+59.7	115.7	44 53.9	+59.8	116.6	44 26.6	+59.9	117.5	43 58.5	+59.9	118.3	43 29.6	+60.0	119.2	43 00.0	+60.0	120.0	**43**
44	47 09.9	+59.3	113.6	46 45.4	+59.5	114.6	46 20.0	+59.6	115.5	45 53.7	+59.7	116.5	45 26.5	+59.8	117.4	44 58.4	+60.0	118.3	44 29.6	+60.0	119.2	44 00.0	+60.0	120.0	**44**
45	48 09.2	+59.2	113.4	47 44.9	+59.4	114.4	47 19.6	+59.6	115.4	46 53.4	+59.8	116.4	46 26.3	+59.9	117.3	45 58.4	+59.9	118.2	45 29.6	+60.0	119.1	45 00.0	+60.0	120.0	**45**
46	49 08.4	+59.2	113.1	48 44.3	+59.4	114.2	48 19.2	+59.6	115.2	47 53.2	+59.7	116.2	47 26.2	+59.9	117.2	46 58.3	+60.0	118.2	46 29.6	+60.0	119.1	46 00.0	+60.0	120.0	**46**
47	50 07.6	+59.1	112.9	49 43.7	+59.4	114.0	49 18.8	+59.6	115.0	48 52.9	+59.8	116.1	48 26.1	+59.8	117.1	47 58.3	+59.9	118.1	47 29.6	+60.0	119.1	47 00.0	+60.0	120.0	**47**
48	51 06.7	+59.2	112.6	50 43.1	+59.4	113.8	50 18.4	+59.6	114.9	49 52.7	+59.7	115.9	49 25.9	+59.9	117.0	48 58.2	+59.9	118.0	48 29.6	+59.9	119.0	48 00.0	+60.0	120.0	**48**
49	52 05.9	+59.1	112.4	51 42.5	+59.3	113.5	51 18.0	+59.5	114.7	50 52.4	+59.7	115.8	50 25.8	+59.8	116.9	49 58.1	+60.0	118.0	49 29.5	+60.0	119.0	49 00.0	+60.0	120.0	**49**
50	53 05.0	+59.0	112.1	52 41.8	+59.3	113.3	52 17.5	+59.6	114.5	51 52.1	+59.7	115.6	51 25.6	+59.9	116.8	50 58.1	+59.9	117.9	50 29.5	+60.0	119.0	50 00.0	+60.0	120.0	**50**
51	54 04.0	+59.0	111.8	53 41.1	+59.3	113.0	53 17.1	+59.5	114.3	52 51.8	+59.7	115.5	52 25.5	+59.8	116.7	51 58.0	+59.9	117.8	51 29.5	+60.0	118.9	51 00.0	+60.0	120.0	**51**
52	55 03.0	+58.9	111.5	54 40.4	+59.3	112.8	54 16.6	+59.5	114.1	53 51.5	+59.7	115.3	53 25.3	+59.8	116.5	52 57.9	+60.0	117.7	52 29.5	+60.0	118.9	52 00.0	+60.0	120.0	**52**
53	56 01.9	+58.9	111.1	55 39.7	+59.2	112.5	55 16.1	+59.4	113.8	54 51.2	+59.7	115.1	54 25.1	+59.8	116.4	53 57.9	+59.9	117.6	53 29.5	+60.0	118.8	53 00.0	+60.0	120.0	**53**
54	57 00.8	+58.9	110.8	56 38.9	+59.1	112.2	56 15.5	+59.4	113.6	55 50.9	+59.6	114.9	55 24.9	+59.8	116.3	54 57.8	+59.9	117.5	54 29.5	+59.9	118.8	54 00.0	+60.0	120.0	**54**
55	57 59.7	+58.7	110.4	57 38.0	+59.1	111.9	57 14.9	+59.4	113.3	56 50.5	+59.6	114.7	56 24.7	+59.8	116.1	55 57.7	+59.9	117.4	55 29.4	+60.0	118.7	55 00.0	+60.0	120.0	**55**
56	58 58.4	+58.7	110.0	58 37.1	+59.1	111.6	58 14.3	+59.4	113.1	57 50.1	+59.6	114.5	57 24.5	+59.8	116.0	56 57.6	+59.9	117.4	56 29.4	+60.0	118.7	56 00.0	+60.0	120.0	**56**
57	59 57.1	+58.6	109.6	59 36.2	+59.0	111.2	59 13.7	+59.3	112.8	58 49.7	+59.6	114.3	58 24.3	+59.8	115.8	57 57.5	+59.9	117.2	57 29.4	+60.0	118.6	57 00.0	+60.0	120.0	**57**
58	60 55.7	+58.6	109.2	60 35.2	+58.9	110.9	60 13.0	+59.3	112.5	59 49.3	+59.6	114.1	59 24.1	+59.7	115.6	58 57.4	+59.9	117.1	58 29.4	+59.9	118.6	58 00.0	+60.0	120.0	**58**
59	61 54.3	+58.4	108.7	61 34.1	+58.9	110.5	61 12.3	+59.2	112.2	60 48.9	+59.5	113.8	60 23.8	+59.8	115.5	59 57.3	+59.9	117.0	59 29.3	+60.0	118.5	59 00.0	+60.0	120.0	**59**
60	62 52.7	+58.3	108.2	62 33.0	+58.8	110.1	62 11.5	+59.2	111.8	61 48.4	+59.5	113.6	61 23.6	+59.7	115.3	60 57.2	+59.9	116.9	60 29.3	+60.0	118.5	60 00.0	+60.0	120.0	**60**
61	63 51.0	+58.2	107.7	63 31.8	+58.7	109.6	63 10.7	+59.1	111.5	62 47.9	+59.4	113.3	62 23.3	+59.7	115.1	61 57.1	+59.8	116.8	61 29.3	+59.9	118.4	61 00.0	+60.0	120.0	**61**
62	64 49.2	+58.0	107.1	64 30.5	+58.6	109.1	64 09.8	+59.1	111.1	63 47.3	+59.4	113.0	63 23.0	+59.7	114.8	62 56.9	+59.9	116.6	62 29.2	+60.0	118.3	62 00.0	+60.0	120.0	**62**
63	65 47.2	+57.9	106.5	65 29.1	+58.5	108.6	65 08.9	+59.0	110.7	64 46.7	+59.4	112.7	64 22.7	+59.6	114.6	63 56.8	+59.9	116.5	63 29.2	+60.0	118.3	63 00.0	+60.0	120.0	**63**
64	66 45.1	+57.8	105.9	66 27.6	+58.4	108.1	66 07.9	+58.9	110.2	65 46.1	+59.3	112.3	65 22.3	+59.7	114.4	64 56.7	+59.8	116.3	64 29.2	+59.9	118.2	64 00.0	+60.0	120.0	**64**
65	67 42.9	+57.5	105.2	67 26.0	+58.2	107.5	67 06.8	+58.8	109.8	66 45.4	+59.3	112.0	66 22.0	+59.6	114.1	65 56.5	+59.8	116.1	65 29.1	+60.0	118.1	65 00.0	+60.0	120.0	**65**
66	68 40.4	+57.3	104.4	68 24.2	+58.1	106.9	68 05.6	+58.7	109.2	67 44.7	+59.2	111.6	67 21.6	+59.5	113.8	66 56.3	+59.8	115.9	66 29.1	+60.0	118.0	66 00.0	+60.0	120.0	**66**
67	69 37.7	+57.0	103.6	69 22.3	+57.9	106.2	69 04.3	+58.6	108.7	68 43.9	+59.1	111.1	68 21.1	+59.5	113.5	67 56.1	+59.8	115.7	67 29.1	+59.9	117.9	67 00.0	+60.0	120.0	**67**
68	70 34.7	+56.8	102.7	70 20.2	+57.6	105.4	70 02.9	+58.4	108.1	69 43.0	+59.0	110.6	69 20.6	+59.5	113.1	68 55.9	+59.8	115.5	68 29.0	+60.0	117.8	68 00.0	+60.0	120.0	**68**
69	71 31.5	+56.4	101.7	71 17.8	+57.5	104.6	71 01.3	+58.3	107.4	70 42.0	+59.0	110.1	70 20.1	+59.5	112.7	69 55.7	+59.8	115.3	69 29.0	+59.9	117.7	69 00.0	+60.0	120.0	**69**
70	72 27.9	+55.9	100.6	72 15.3	+57.1	103.6	71 59.6	+58.1	106.6	71 41.0	+58.8	109.5	71 19.6	+59.3	112.3	70 55.5	+59.7	115.0	70 28.9	+59.9	117.6	70 00.0	+60.0	120.0	**70**
71	73 23.8	+55.5	99.3	73 12.4	+56.8	102.6	72 57.7	+57.8	105.8	72 39.8	+58.7	108.9	72 18.9	+59.3	111.9	71 55.2	+59.7	114.7	71 28.8	+60.0	117.4	71 00.0	+60.0	120.0	**71**
72	74 19.3	+55.0	98.0	74 09.2	+56.4	101.5	73 55.5	+57.6	104.9	73 38.5	+58.5	108.2	73 18.2	+59.2	111.3	72 54.9	+59.7	114.4	72 28.8	+59.9	117.3	72 00.0	+60.0	120.0	**72**
73	75 14.3	+54.2	96.4	75 05.6	+55.9	100.2	74 53.1	+57.3	103.8	74 37.0	+58.3	107.4	74 17.4	+59.1	110.8	73 54.6	+59.6	114.0	73 28.7	+59.9	117.1	73 00.0	+60.0	120.0	**73**
74	76 08.5	+53.4	94.7	76 01.5	+55.3	98.7	75 50.4	+56.8	102.6	75 35.3	+58.1	106.4	75 16.5	+59.0	110.1	74 54.2	+59.5	113.6	74 28.6	+59.9	116.9	74 00.0	+60.0	120.0	**74**
75	77 01.9	+52.5	92.7	76 56.8	+54.6	97.1	76 47.2	+56.4	101.3	76 33.4	+57.8	105.4	76 15.5	+58.8	109.3	75 53.7	+59.5	113.1	75 28.5	+59.9	116.7	75 00.0	+60.0	120.0	**75**
76	77 54.4	+51.1	90.5	77 51.4	+53.7	95.1	77 43.6	+55.8	99.7	77 31.2	+57.4	104.2	77 14.3	+58.6	108.5	76 53.2	+59.5	112.6	76 28.4	+59.8	116.4	76 00.0	+60.0	120.0	**76**
77	78 45.5	+49.6	87.9	78 45.1	+52.5	92.9	78 39.4	+55.0	97.9	78 28.6	+56.9	102.8	78 12.9	+58.4	107.5	77 52.7	+59.3	111.9	77 28.2	+59.9	116.1	77 00.0	+60.0	120.0	**77**
78	79 35.1	*+47.7*•	84.9	79 37.6	+51.1	90.4	79 34.4	+54.0	95.8	79 25.5	+56.3	101.1	79 11.3	+58.0	106.3	78 52.0	+59.2	111.2	78 28.1	+59.8	115.8	78 00.0	+60.0	120.0	**78**
79	80 22.8	*+45.2*•	81.4	80 28.7	*+49.2*•	87.3	80 28.4	+52.6	93.3	80 21.8	+55.6	99.2	80 09.3	+57.6	104.9	79 51.2	+59.0	110.3	79 27.9	+59.8	115.3	79 00.0	+60.0	120.0	**79**
80	81 08.0	*+42.0*•	77.3	81 17.9	*+46.7*•	83.7	81 21.0	*+51.0*•	90.3	81 17.4	+54.4	96.8	81 06.9	+57.1	103.2	80 50.2	+58.8	109.2	80 27.7	+59.7	114.8	80 00.0	+60.0	120.0	**80**
81	81 50.0	*+38.0*•	72.5	82 04.6	*+43.5*•	79.4	82 12.0	*+48.5*•	86.6	82 11.8	+52.8	93.9	82 04.0	+56.2	101.0	81 49.0	+58.4	107.9	81 27.4	+59.6	114.2	81 00.0	+60.0	120.0	**81**
82	82 28.0	*+32.8*•	66.8	82 48.1	*+39.1*•	74.1	83 00.5	*+45.2*•	82.0	83 04.6	*+50.7*•	90.2	83 00.2	+55.0	98.3	82 47.4	+58.0	106.2	82 27.0	+59.6	113.5	82 00.0	+60.0	120.0	**82**
83	83 00.8	*+26.4*•	60.2	83 27.2	*+33.3*•	67.8	83 45.7	*+40.6*•	76.3	83 55.3	*+47.5*•	85.4	83 55.2	*+53.2*•	94.8	83 45.4	+57.2	104.0	83 26.6	+59.3	112.4	83 00.0	+60.0	120.0	**83**
84	83 27.2	*+18.5*•	52.6	84 00.5	*+25.8*•	60.1	84 26.3	*+34.0*•	69.1	84 42.8	*+42.4*•	79.2	84 48.4	*+50.2*•	90.1	84 42.6	+55.9	101.0	84 25.9	+59.2	111.1	84 00.0	+60.0	120.0	**84**
85	83 45.7	*+9.6*•	44.0	84 26.3	*+16.5*•	51.2	85 00.3	*+24.9*•	60.1	85 25.2	*+34.9*•	71.0	85 38.6	*+45.2*•	83.5	85 38.5	*+53.7*•	96.6	85 25.1	+58.6	109.1	85 00.0	+60.0	120.0	**85**
86	83 55.3	*–0.1*•	34.8	84 42.8	*+5.6*•	41.0	85 25.2	*+13.4*•	49.2	86 00.1	*+23.7*•	60.1	86 23.8	*+36.3*•	74.0	86 32.2	*+49.1*•	90.0	86 23.7	+57.6	106.1	86 00.0	+60.0	120.0	**86**
87	83 55.2	*–9.8*•	25.3	84 48.4	*–5.8*•	30.0	85 38.6	*–0.1*•	36.6	86 23.8	*+8.4*•	46.1	87 00.1	*+21.2*•	60.0	87 21.3	*+38.7*•	79.1	87 21.3	*+54.8*•	100.9	87 00.0	+60.0	120.0	**87**
88	83 45.4	*–18.8*•	16.1	84 42.6	*–16.7*•	19.1	85 38.5	*–13.4*•	23.4	86 32.2	*–8.5*•	30.0	87 21.3	*0.0*•	40.9	88 00.0	*+16.1*•	60.0	88 16.1	*+43.9*•	90.0	88 00.0	+60.0	120.0	**88**
89	83 26.6	*–26.6*•	7.6	84 25.9	*–25.9*•	9.0	85 25.1	*–25.1*•	10.9	86 23.7	*–23.7*•	13.9	87 21.3	*–21.3*•	19.1	88 16.1	*–16.1*•	30.0	89 00.0	*0.0*•	60.0	89 00.0	+60.0	120.0	**89**
90	83 00.0	*–33.0*•	0.0	84 00.0	*–33.4*•	0.0	85 00.0	*–34.1*•	0.0	86 00.0	*–34.9*•	0.0	87 00.0	*–36.3*•	0.0	88 00.0	*–38.7*•	0.0	89 00.0	*–43.9*•	0.0	90 00.0	–60.0	60.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 60°, 300°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 29.6	−59.7	119.8	2 59.8	−59.8	119.9	2 29.9	−59.9	119.9	1 59.9	−59.9	119.9	1 30.0	−60.0	120.0	1 00.0	−60.0	120.0	0 30.0	−60.0	120.0	0 00.0	+60.0	60.0	**0**
1	2 29.9	−59.6	119.9	2 00.0	−59.8	120.0	1 30.0	−59.8	120.0	1 00.0	−59.9	120.0	0 30.0	−59.9	120.0	0 00.0	−60.0	120.0	0 30.0	+60.0	60.0	1 00.0	+60.0	60.0	**1**
2	1 30.3	−59.7	120.0	1 00.2	−59.7	120.0	0 30.2	−59.8	120.1	0 00.1	−59.8	120.1	0 29.9	+59.9	59.9	1 00.0	+59.9	60.0	1 30.0	+60.0	60.0	2 00.0	+60.0	60.0	**2**
3	0 30.6	−59.7	120.1	0 00.5	−59.8	120.1	0 29.6	+59.9	59.9	0 59.7	+59.9	59.9	1 29.8	+60.0	59.9	1 59.9	+60.0	59.9	2 30.0	+60.0	60.0	3 00.0	+60.0	60.0	**3**
4	0 29.1	+59.6	59.8	0 59.3	+59.7	59.8	1 29.5	+59.8	59.8	1 59.6	+59.9	59.8	2 29.8	+59.9	59.9	2 59.9	+60.0	59.9	3 30.0	+60.0	59.9	4 00.0	+60.0	60.0	**4**
5	1 28.7	+59.7	59.7	1 59.0	+59.8	59.7	2 29.3	+59.8	59.7	2 59.5	+59.9	59.8	3 29.7	+60.0	59.8	3 59.9	+59.9	59.9	4 30.0	+60.0	59.9	5 00.0	+60.0	60.0	**5**
6	2 28.4	+59.6	59.6	2 58.8	+59.7	59.6	3 29.1	+59.8	59.6	3 59.4	+59.9	59.7	4 29.7	+59.9	59.8	4 59.8	+60.0	59.8	5 30.0	+60.0	59.9	6 00.0	+60.0	60.0	**6**
7	3 28.0	+59.7	59.4	3 58.5	+59.8	59.5	4 28.9	+59.9	59.6	4 59.3	+59.9	59.6	5 29.6	+59.9	59.7	5 59.8	+60.0	59.8	6 30.0	+59.9	59.9	7 00.0	+60.0	60.0	**7**
8	4 27.7	+59.7	59.3	4 58.3	+59.7	59.4	5 28.8	+59.8	59.5	5 59.2	+59.9	59.6	6 29.5	+60.0	59.7	6 59.8	+60.0	59.8	7 29.9	+60.0	59.9	8 00.0	+60.0	60.0	**8**
9	5 27.4	+59.6	59.2	5 58.0	+59.8	59.3	6 28.6	+59.8	59.4	6 59.1	+59.9	59.5	7 29.5	+59.9	59.6	7 59.8	+59.9	59.7	8 29.9	+60.0	59.9	9 00.0	+60.0	60.0	**9**
10	6 27.0	+59.7	59.1	6 57.8	+59.7	59.2	7 28.4	+59.8	59.3	7 59.0	+59.9	59.5	8 29.4	+59.9	59.6	8 59.7	+60.0	59.7	9 29.9	+60.0	59.9	10 00.0	+60.0	60.0	**10**
11	7 26.7	+59.6	59.0	7 57.5	+59.8	59.1	8 28.2	+59.9	59.3	8 58.9	+59.8	59.4	9 29.3	+60.0	59.5	9 59.7	+60.0	59.7	10 29.9	+60.0	59.8	11 00.0	+60.0	60.0	**11**
12	8 26.3	+59.7	58.9	8 57.3	+59.7	59.0	9 28.1	+59.8	59.2	9 58.7	+59.9	59.3	10 29.3	+59.9	59.5	10 59.7	+59.9	59.6	11 29.9	+60.0	59.8	12 00.0	+60.0	60.0	**12**
13	9 26.0	+59.7	58.8	9 57.0	+59.8	58.9	10 27.9	+59.8	59.1	10 58.6	+59.9	59.3	11 29.2	+60.0	59.4	11 59.6	+60.0	59.6	12 29.9	+60.0	59.8	13 00.0	+60.0	60.0	**13**
14	10 25.7	+59.6	58.7	10 56.8	+59.7	58.9	11 27.7	+59.8	59.0	11 58.5	+59.9	59.2	12 29.2	+59.9	59.4	12 59.6	+60.0	59.6	13 29.9	+60.0	59.8	14 00.0	+60.0	60.0	**14**
15	11 25.3	+59.7	58.6	11 56.5	+59.7	58.8	12 27.5	+59.9	58.9	12 58.4	+59.9	59.1	13 29.1	+59.9	59.3	13 59.6	+60.0	59.6	14 29.9	+60.0	59.8	15 00.0	+60.0	60.0	**15**
16	12 25.0	+59.6	58.5	12 56.2	+59.8	58.7	13 27.4	+59.8	58.9	13 58.3	+59.9	59.1	14 29.0	+60.0	59.3	14 59.6	+59.9	59.5	15 29.9	+60.0	59.8	16 00.0	+60.0	60.0	**16**
17	13 24.6	+59.7	58.4	13 56.0	+59.7	58.6	14 27.2	+59.8	58.8	14 58.2	+59.9	59.0	15 29.0	+59.9	59.2	15 59.5	+60.0	59.5	16 29.9	+60.0	59.7	17 00.0	+60.0	60.0	**17**
18	14 24.3	+59.6	58.3	14 55.7	+59.8	58.5	15 27.0	+59.8	58.7	15 58.1	+59.8	58.9	16 28.9	+59.9	59.2	16 59.5	+60.0	59.5	17 29.9	+60.0	59.7	18 00.0	+60.0	60.0	**18**
19	15 23.9	+59.6	58.1	15 55.5	+59.7	58.4	16 26.8	+59.8	58.6	16 57.9	+59.9	58.9	17 28.8	+60.0	59.1	17 59.5	+59.9	59.4	18 29.9	+60.0	59.7	19 00.0	+60.0	60.0	**19**
20	16 23.5	+59.7	58.0	16 55.2	+59.7	58.3	17 26.6	+59.8	58.5	17 57.8	+59.9	58.8	18 28.8	+59.9	59.1	18 59.4	+60.0	59.4	19 29.9	+60.0	59.7	20 00.0	+60.0	60.0	**20**
21	17 23.2	+59.6	57.9	17 54.9	+59.7	58.2	18 26.4	+59.8	58.5	18 57.7	+59.9	58.7	19 28.7	+59.9	59.0	19 59.4	+60.0	59.4	20 29.9	+59.9	59.7	21 00.0	+60.0	60.0	**21**
22	18 22.8	+59.6	57.8	18 54.6	+59.8	58.1	19 26.2	+59.8	58.4	19 57.6	+59.8	58.7	20 28.6	+59.9	59.0	20 59.4	+59.9	59.3	21 29.8	+60.0	59.7	22 00.0	+60.0	60.0	**22**
23	19 22.4	+59.6	57.7	19 54.4	+59.7	58.0	20 26.0	+59.9	58.3	20 57.4	+59.9	58.6	21 28.5	+60.0	58.9	21 59.3	+60.0	59.3	22 29.8	+60.0	59.6	23 00.0	+60.0	60.0	**23**
24	20 22.0	+59.7	57.6	20 54.1	+59.7	57.9	21 25.9	+59.8	58.2	21 57.3	+59.9	58.5	22 28.5	+59.9	58.9	22 59.3	+60.0	59.2	23 29.8	+60.0	59.6	24 00.0	+60.0	60.0	**24**
25	21 21.7	+59.6	57.4	21 53.8	+59.7	57.8	22 25.7	+59.8	58.1	22 57.2	+59.9	58.5	23 28.4	+59.9	58.8	23 59.3	+59.9	59.2	24 29.8	+60.0	59.6	25 00.0	+60.0	60.0	**25**
26	22 21.3	+59.6	57.3	22 53.5	+59.7	57.7	23 25.5	+59.7	58.0	23 57.1	+59.8	58.4	24 28.3	+60.0	58.8	24 59.2	+60.0	59.2	25 29.8	+60.0	59.6	26 00.0	+60.0	60.0	**26**
27	23 20.9	+59.6	57.2	23 53.2	+59.7	57.6	24 25.2	+59.8	57.9	24 56.9	+59.9	58.3	25 28.3	+59.9	58.7	25 59.2	+60.0	59.1	26 29.8	+60.0	59.6	27 00.0	+60.0	60.0	**27**
28	24 20.5	+59.6	57.1	24 52.9	+59.7	57.4	25 25.0	+59.8	57.8	25 56.8	+59.9	58.3	26 28.2	+59.9	58.7	26 59.2	+59.9	59.1	27 29.8	+60.0	59.5	28 00.0	+60.0	60.0	**28**
29	25 20.1	+59.6	56.9	25 52.6	+59.7	57.3	26 24.8	+59.8	57.8	26 56.7	+59.8	58.2	27 28.1	+59.9	58.6	27 59.1	+60.0	59.1	28 29.8	+60.0	59.5	29 00.0	+60.0	60.0	**29**
30	26 19.7	+59.5	56.8	26 52.3	+59.7	57.2	27 24.6	+59.8	57.7	27 56.5	+59.9	58.1	28 28.0	+59.9	58.6	28 59.1	+60.0	59.0	29 29.8	+60.0	59.5	30 00.0	+60.0	60.0	**30**
31	27 19.2	+59.6	56.7	27 52.0	+59.7	57.1	28 24.4	+59.8	57.6	28 56.4	+59.8	58.0	29 27.9	+60.0	58.5	29 59.1	+59.9	59.0	30 29.8	+60.0	59.5	31 00.0	+60.0	60.0	**31**
32	28 18.8	+59.6	56.5	28 51.7	+59.7	57.0	29 24.2	+59.7	57.5	29 56.2	+59.9	57.9	30 27.9	+59.9	58.4	30 59.0	+60.0	58.9	31 29.8	+59.9	59.5	32 00.0	+60.0	60.0	**32**
33	29 18.4	+59.5	56.4	29 51.4	+59.6	56.9	30 23.9	+59.8	57.4	30 56.1	+59.8	57.9	31 27.8	+59.9	58.4	31 59.0	+60.0	58.9	32 29.7	+60.0	59.4	33 00.0	+60.0	60.0	**33**
34	30 17.9	+59.6	56.3	30 51.0	+59.7	56.8	31 23.7	+59.8	57.3	31 55.9	+59.9	57.8	32 27.7	+59.9	58.3	32 59.0	+59.9	58.9	33 29.7	+60.0	59.4	34 00.0	+60.0	60.0	**34**
35	31 17.5	+59.5	56.1	31 50.7	+59.6	56.6	32 23.5	+59.7	57.2	32 55.8	+59.8	57.7	33 27.6	+59.9	58.2	33 58.9	+60.0	58.8	34 29.7	+60.0	59.4	35 00.0	+60.0	60.0	**35**
36	32 17.0	+59.5	56.0	32 50.3	+59.7	56.5	33 23.2	+59.8	57.0	33 55.6	+59.9	57.6	34 27.5	+59.9	58.2	34 58.9	+59.9	58.8	35 29.7	+60.0	59.4	36 00.0	+60.0	60.0	**36**
37	33 16.5	+59.5	55.8	33 50.0	+59.6	56.4	34 23.0	+59.7	56.9	34 55.5	+59.8	57.5	35 27.4	+59.9	58.1	35 58.8	+60.0	58.7	36 29.7	+60.0	59.4	37 00.0	+60.0	60.0	**37**
38	34 16.0	+59.5	55.7	34 49.6	+59.7	56.2	35 22.7	+59.8	56.8	35 55.3	+59.8	57.4	36 27.3	+59.9	58.0	36 58.8	+60.0	58.7	37 29.7	+60.0	59.3	38 00.0	+60.0	60.0	**38**
39	35 15.5	+59.5	55.5	35 49.3	+59.6	56.1	36 22.5	+59.7	56.7	36 55.1	+59.9	57.3	37 27.2	+59.9	58.0	37 58.8	+59.9	58.6	38 29.7	+60.0	59.3	39 00.0	+60.0	60.0	**39**
40	36 15.0	+59.5	55.4	36 48.9	+59.6	56.0	37 22.2	+59.7	56.6	37 55.0	+59.8	57.2	38 27.1	+59.9	57.9	38 58.7	+60.0	58.6	39 29.7	+60.0	59.3	40 00.0	+60.0	60.0	**40**
41	37 14.5	+59.5	55.2	37 48.5	+59.6	55.8	38 21.9	+59.7	56.5	38 54.8	+59.8	57.1	39 27.0	+59.9	57.8	39 58.7	+59.9	58.5	40 29.7	+60.0	59.3	41 00.0	+60.0	60.0	**41**
42	38 14.0	+59.4	55.0	38 48.1	+59.6	55.7	39 21.6	+59.7	56.3	39 54.6	+59.8	57.0	40 26.9	+59.9	57.7	40 58.6	+60.0	58.5	41 29.7	+59.9	59.2	42 00.0	+60.0	60.0	**42**
43	39 13.4	+59.5	54.8	39 47.7	+59.6	55.5	40 21.3	+59.7	56.2	40 54.4	+59.8	56.9	41 26.8	+59.9	57.7	41 58.6	+59.9	58.4	42 29.6	+60.0	59.2	43 00.0	+60.0	60.0	**43**
44	40 12.9	+59.4	54.7	40 47.3	+59.5	55.4	41 21.0	+59.7	56.1	41 54.2	+59.8	56.8	42 26.7	+59.9	57.6	42 58.5	+60.0	58.4	43 29.6	+60.0	59.2	44 00.0	+60.0	60.0	**44**
45	41 12.3	+59.4	54.5	41 46.8	+59.6	55.2	42 20.7	+59.7	55.9	42 54.0	+59.8	56.7	43 26.6	+59.9	57.5	43 58.5	+59.9	58.3	44 29.6	+60.0	59.1	45 00.0	+60.0	60.0	**45**
46	42 11.7	+59.3	54.3	42 46.4	+59.5	55.0	43 20.4	+59.7	55.8	43 53.8	+59.8	56.6	44 26.5	+59.8	57.4	44 58.4	+60.0	58.3	45 29.6	+60.0	59.1	46 00.0	+60.0	60.0	**46**
47	43 11.0	+59.4	54.1	43 45.9	+59.5	54.9	44 20.1	+59.7	55.7	44 53.6	+59.8	56.5	45 26.3	+59.9	57.3	45 58.4	+59.9	58.2	46 29.6	+60.0	59.1	47 00.0	+60.0	60.0	**47**
48	44 10.4	+59.3	53.9	44 45.4	+59.5	54.7	45 19.8	+59.6	55.5	45 53.4	+59.7	56.4	46 26.2	+59.9	57.2	46 58.3	+59.9	58.1	47 29.6	+60.0	59.1	48 00.0	+60.0	60.0	**48**
49	45 09.7	+59.4	53.7	45 44.9	+59.5	54.5	46 19.4	+59.6	55.4	46 53.1	+59.8	56.2	47 26.1	+59.8	57.1	47 58.2	+60.0	58.1	48 29.6	+59.9	59.0	49 00.0	+60.0	60.0	**49**
50	46 09.1	+59.2	53.5	46 44.4	+59.5	54.3	47 19.0	+59.7	55.2	47 52.9	+59.7	56.1	48 25.9	+59.9	57.0	48 58.2	+59.9	58.0	49 29.5	+60.0	59.0	50 00.0	+60.0	60.0	**50**
51	47 08.3	+59.3	53.2	47 43.9	+59.4	54.1	48 18.7	+59.6	55.0	48 52.6	+59.8	56.0	49 25.8	+59.9	56.9	49 58.1	+59.9	57.9	50 29.5	+60.0	58.9	51 00.0	+60.0	60.0	**51**
52	48 07.6	+59.2	53.0	48 43.3	+59.4	53.9	49 18.3	+59.5	54.9	49 52.4	+59.7	55.8	50 25.7	+59.8	56.8	50 58.0	+60.0	57.8	51 29.5	+60.0	58.9	52 00.0	+60.0	60.0	**52**
53	49 06.8	+59.2	52.8	49 42.7	+59.4	53.7	50 17.8	+59.6	54.7	50 52.1	+59.7	55.7	51 25.5	+59.8	56.7	51 58.0	+59.9	57.8	52 29.5	+60.0	58.9	53 00.0	+60.0	60.0	**53**
54	50 06.0	+59.2	52.5	50 42.1	+59.4	53.5	51 17.4	+59.6	54.5	51 51.8	+59.7	55.5	52 25.3	+59.9	56.6	52 57.9	+59.9	57.7	53 29.5	+59.9	58.8	54 00.0	+60.0	60.0	**54**
55	51 05.2	+59.1	52.3	51 41.5	+59.3	53.3	52 17.0	+59.5	54.3	52 51.5	+59.7	55.4	53 25.2	+59.8	56.5	53 57.8	+59.9	57.6	54 29.4	+60.0	58.8	55 00.0	+60.0	60.0	**55**
56	52 04.3	+59.1	52.0	52 40.8	+59.4	53.0	53 16.5	+59.5	54.1	53 51.2	+59.7	55.2	54 25.0	+59.8	56.3	54 57.7	+60.0	57.5	55 29.4	+60.0	58.7	56 00.0	+60.0	60.0	**56**
57	53 03.4	+59.1	51.7	53 40.2	+59.2	52.8	54 16.0	+59.5	53.9	54 50.9	+59.7	55.0	55 24.8	+59.8	56.2	55 57.7	+59.9	57.4	56 29.4	+60.0	58.7	57 00.0	+60.0	60.0	**57**
58	54 02.5	+59.0	51.4	54 39.4	+59.3	52.5	55 15.5	+59.4	53.6	55 50.6	+59.6	54.8	56 24.6	+59.8	56.0	56 57.6	+59.9	57.3	57 29.4	+60.0	58.6	58 00.0	+60.0	60.0	**58**
59	55 01.5	+58.9	51.1	55 38.7	+59.2	52.2	56 14.9	+59.5	53.4	56 50.2	+59.6	54.6	57 24.4	+59.8	55.9	57 57.5	+59.9	57.2	58 29.4	+59.9	58.6	59 00.0	+60.0	60.0	**59**
60	56 00.4	+58.9	50.8	56 37.9	+59.1	51.9	57 14.4	+59.4	53.1	57 49.8	+59.6	54.4	58 24.2	+59.7	55.7	58 57.4	+59.9	57.1	59 29.3	+60.0	58.5	60 00.0	+60.0	60.0	**60**
61	56 59.3	+58.8	50.4	57 37.0	+59.2	51.6	58 13.8	+59.3	52.9	58 49.4	+59.6	54.2	59 23.9	+59.8	55.6	59 57.3	+59.9	57.0	60 29.3	+60.0	58.5	61 00.0	+60.0	60.0	**61**
62	57 58.1	+58.8	50.0	58 36.2	+59.0	51.3	59 13.1	+59.4	52.6	59 49.0	+59.6	54.0	60 23.7	+59.7	55.4	60 57.2	+59.8	56.9	61 29.3	+59.9	58.4	62 00.0	+60.0	60.0	**62**
63	58 56.9	+58.7	49.7	59 35.2	+59.0	51.0	60 12.5	+59.2	52.3	60 48.6	+59.5	53.7	61 23.4	+59.8	55.2	61 57.0	+59.9	56.7	62 29.2	+60.0	58.3	63 00.0	+60.0	60.0	**63**
64	59 55.6	+58.6	49.3	60 34.2	+59.0	50.6	61 11.7	+59.3	52.0	61 48.1	+59.5	53.5	62 23.2	+59.7	55.0	62 56.9	+59.9	56.6	63 29.2	+60.0	58.3	64 00.0	+60.0	60.0	**64**
65	60 54.2	+58.5	48.8	61 33.2	+58.8	50.2	62 11.0	+59.2	51.7	62 47.6	+59.4	53.2	63 22.9	+59.6	54.8	63 56.8	+59.8	56.4	64 29.2	+59.9	58.2	65 00.0	+60.0	60.0	**65**
66	61 52.7	+58.4	48.4	62 32.0	+58.8	49.8	63 10.2	+59.1	51.3	63 47.0	+59.4	52.9	64 22.5	+59.7	54.5	64 56.6	+59.9	56.3	65 29.1	+60.0	58.1	66 00.0	+60.0	60.0	**66**
67	62 51.1	+58.4	47.9	63 30.8	+58.7	49.4	64 09.3	+59.0	50.9	64 46.4	+59.4	52.6	65 22.2	+59.6	54.3	65 56.5	+59.8	56.1	66 29.1	+60.0	58.0	67 00.0	+60.0	60.0	**67**
68	63 49.5	+58.2	47.3	64 29.5	+58.6	48.9	65 08.3	+59.0	50.5	65 45.8	+59.3	52.2	66 21.8	+59.6	54.0	66 56.3	+59.8	55.9	67 29.1	+59.9	57.9	68 00.0	+60.0	60.0	**68**
69	64 47.7	+58.0	46.8	65 28.1	+58.5	48.4	66 07.3	+58.9	50.1	66 45.1	+59.3	51.8	67 21.4	+59.6	53.7	67 56.1	+59.8	55.7	68 29.0	+59.9	57.8	69 00.0	+60.0	60.0	**69**
70	65 45.7	+57.9	46.2	66 26.6	+58.4	47.8	67 06.2	+58.8	49.6	67 44.4	+59.2	51.4	68 21.0	+59.5	53.4	68 55.9	+59.8	55.5	69 28.9	+60.0	57.7	70 00.0	+60.0	60.0	**70**
71	66 43.6	+57.7	45.5	67 25.0	+58.2	47.2	68 05.0	+58.8	49.1	68 43.6	+59.1	51.0	69 20.5	+59.5	53.1	69 55.7	+59.7	55.2	70 28.9	+59.9	57.6	71 00.0	+60.0	60.0	**71**
72	67 41.3	+57.6	44.8	68 23.2	+58.1	46.6	69 03.8	+58.5	48.5	69 42.7	+59.1	50.5	70 20.0	+59.4	52.7	70 55.4	+59.8	55.0	71 28.8	+60.0	57.4	72 00.0	+60.0	60.0	**72**
73	68 38.9	+57.3	44.1	69 21.3	+57.9	45.9	70 02.3	+58.5	47.9	70 41.8	+58.9	50.0	71 19.4	+59.4	52.3	71 55.2	+59.7	54.7	72 28.8	+59.9	57.3	73 00.0	+60.0	60.0	**73**
74	69 36.2	+57.0	43.2	70 19.2	+57.7	45.1	71 00.8	+58.3	47.2	71 40.7	+58.8	49.4	72 18.8	+59.3	51.8	72 54.9	+59.6	54.3	73 28.7	+59.9	57.1	74 00.0	+60.0	60.0	**74**
75	70 33.2	+56.8	42.3	71 16.9	+57.4	44.3	71 59.1	+58.0	46.4	72 39.5	+58.7	48.8	73 18.1	+59.2	51.3	73 54.5	+59.6	54.0	74 28.6	+59.9	56.9	75 00.0	+60.0	60.0	**75**
76	71 30.0	+56.4	41.3	72 14.3	+57.2	43.4	72 57.1	+57.9	45.6	73 38.2	+58.5	48.0	74 17.3	+59.1	50.7	74 54.1	+59.6	53.5	75 28.5	+59.9	56.7	76 00.0	+60.0	60.0	**76**
77	72 26.4	+56.0	40.2	73 11.5	+56.8	42.4	73 55.0	+57.6	44.7	74 36.7	+58.3	47.2	75 16.4	+59.0	50.0	75 53.7	+59.5	53.1	76 28.4	+59.8	56.4	77 00.0	+60.0	60.0	**77**
78	73 22.4	+55.5	39.0	74 08.3	+56.4	41.2	74 52.6	+57.2	43.6	75 35.0	+58.1	46.3	76 15.4	+58.8	49.3	76 53.2	+59.4	52.5	77 28.2	+59.9	56.1	78 00.0	+60.0	60.0	**78**
79	74 17.9	+54.9	37.6	75 04.7	+55.9	39.9	75 49.8	+56.9	42.5	76 33.1	+57.8	45.3	77 14.2	+58.6	48.4	77 52.6	+59.4	51.9	78 28.1	+59.8	55.7	79 00.0	+60.0	60.0	**79**
80	75 12.8	+54.3	36.1	76 00.6	+55.3	38.5	76 46.7	+56.4	41.1	77 30.9	+57.4	44.1	78 12.8	+58.4	47.4	78 52.0	+59.1	51.1	79 27.9	+59.8	55.3	80 00.0	+60.0	60.0	**80**
81	76 07.1	+53.5	34.4	76 55.9	+54.6	36.8	77 43.1	+55.8	39.6	78 28.3	+56.9	42.7	79 11.2	+58.0	46.2	79 51.1	+59.1	50.3	80 27.7	+59.7	54.8	81 00.0	+60.0	60.0	**81**
82	77 00.6	+52.4	32.4	77 50.5	+53.7	34.9	78 38.9	+55.0	37.8	79 25.2	+56.4	41.0	80 09.2	+57.6	44.8	80 50.2	+58.7	49.2	81 27.4	+59.6	54.2	82 00.0	+60.0	60.0	**82**
83	77 53.0	+51.2	30.2	78 44.2	+52.5	32.7	79 33.9	+54.0	35.6	80 21.6	+55.5	39.1	81 06.8	+57.1	43.1	81 48.9	+58.5	47.8	82 27.0	+59.6	53.4	83 00.0	+60.0	60.0	**83**
84	78 44.2	+49.7	27.6	79 36.7	+51.2	30.1	80 27.9	+52.6	33.1	81 17.1	+54.4	36.7	82 03.9	+56.2	41.0	82 47.4	+57.9	46.2	83 26.6	+59.3	52.4	84 00.0	+60.0	60.0	**84**
85	79 33.9	*+47.7* •	24.6	80 27.9	*+49.2* •	27.1	81 20.5	*+51.0* •	30.1	82 11.5	+52.9	33.7	83 00.1	+55.0	38.3	83 45.3	+57.2	43.9	84 25.9	+59.2	51.1	85 00.0	+60.0	60.0	**85**
86	80 21.6	*+45.2* •	21.1	81 17.1	*+46.8* •	23.5	82 11.5	*+48.6* •	26.4	83 04.4	*+50.7* •	30.1	83 55.1	*+53.2* •	34.8	84 42.5	+56.0	40.9	85 25.1	+58.6	49.1	86 00.0	+60.0	60.0	**86**
87	81 06.8	*+42.1* •	17.1	82 03.9	*+43.5* •	19.2	83 00.1	*+45.2* •	21.8	83 55.1	*+47.4* •	25.3	84 48.3	*+50.2* •	30.0	85 38.5	*+53.7* •	36.6	86 23.7	+57.6	46.1	87 00.0	+60.0	60.0	**87**
88	81 48.9	*+38.1* •	12.3	82 47.4	*+39.2* •	13.9	83 45.3	*+40.6* •	16.1	84 42.5	*+42.6* •	19.1	85 38.5	*+45.2* •	23.4	86 32.2	*+49.1* •	30.0	87 21.3	*+54.8* •	40.9	88 00.0	+60.0	60.0	**88**
89	82 27.0	*+33.0* •	6.6	83 26.6	*+33.4* •	7.6	84 25.9	*+34.1* •	9.0	85 25.1	*+34.9* •	10.9	86 23.7	*+36.3* •	13.9	87 21.3	*+38.7* •	19.1	88 16.1	*+43.9* •	30.0	89 00.0	+60.0	60.0	**89**
90	83 00.0	*+26.6* •	0.0	84 00.0	*+25.9* •	0.0	85 00.0	*+25.1* •	0.0	86 00.0	*+23.7* •	0.0	87 00.0	*+21.3* •	0.0	88 00.0	*+16.1* •	0.0	89 00.0	*0.0* •	0.0	90 00.0	−60.0	30.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 120°, 240°

61°, 299° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	3 23.2	+59.7	118.8	2 54.3	+59.7	118.9	2 25.3	+59.8	118.9	1 56.3	+59.9	118.9	1 27.2	+60.0	119.0	0 58.2	+59.9	119.0	0 29.1	+60.0	119.0	0 00.0	+60.0	119.0	0
1	4 22.9	+59.6	118.7	3 54.0	+59.8	118.8	3 25.1	+59.9	118.8	2 56.2	+59.9	118.9	2 27.2	+59.9	118.9	1 58.1	+60.0	119.0	1 29.1	+60.0	119.0	1 00.0	+60.0	119.0	1
2	5 22.5	+59.7	118.6	4 53.8	+59.7	118.7	4 25.0	+59.8	118.8	3 56.1	+59.8	118.8	3 27.1	+59.9	118.9	2 58.1	+60.0	118.9	2 29.1	+60.0	119.0	2 00.0	+60.0	119.0	2
3	6 22.2	+59.7	118.5	5 53.5	+59.8	118.6	5 24.8	+59.8	118.7	4 55.9	+59.9	118.8	4 27.0	+60.0	118.8	3 58.1	+60.0	118.9	3 29.1	+60.0	119.0	3 00.0	+60.0	119.0	3
4	7 21.9	+59.6	118.4	6 53.3	+59.7	118.5	6 24.6	+59.8	118.6	5 55.8	+59.9	118.7	5 27.0	+59.9	118.8	4 58.1	+59.9	118.9	4 29.1	+60.0	118.9	4 00.0	+60.0	119.0	4
5	8 21.5	+59.7	118.3	7 53.0	+59.8	118.4	7 24.4	+59.8	118.5	6 55.7	+59.9	118.6	6 26.9	+60.0	118.7	5 58.0	+60.0	118.8	5 29.1	+59.9	118.9	5 00.0	+60.0	119.0	5
6	9 21.2	+59.6	118.2	8 52.8	+59.7	118.3	8 24.2	+59.9	118.4	7 55.6	+59.9	118.6	7 26.9	+59.9	118.7	6 58.0	+60.0	118.8	6 29.0	+60.0	118.9	6 00.0	+60.0	119.0	6
7	10 20.8	+59.6	118.1	9 52.5	+59.7	118.2	9 24.1	+59.8	118.4	8 55.5	+59.9	118.5	8 26.8	+59.9	118.6	7 58.0	+59.9	118.8	7 29.0	+60.0	118.9	7 00.0	+60.0	119.0	7
8	11 20.4	+59.7	118.0	10 52.2	+59.8	118.1	10 23.9	+59.8	118.3	9 55.4	+59.9	118.4	9 26.7	+60.0	118.6	8 57.9	+60.0	118.7	8 29.0	+60.0	118.9	8 00.0	+60.0	119.0	8
9	12 20.1	+59.6	117.8	11 52.0	+59.7	118.0	11 23.7	+59.8	118.2	10 55.3	+59.8	118.4	10 26.7	+59.9	118.5	9 57.9	+60.0	118.7	9 29.0	+60.0	118.9	9 00.0	+60.0	119.0	9
10	13 19.7	+59.7	117.7	12 51.7	+59.8	117.9	12 23.5	+59.8	118.1	11 55.1	+59.9	118.3	11 26.6	+59.9	118.5	10 57.9	+60.0	118.7	10 29.0	+60.0	118.8	10 00.0	+60.0	119.0	10
11	14 19.4	+59.6	117.6	13 51.5	+59.7	117.8	13 23.3	+59.9	118.1	12 55.0	+59.9	118.3	12 26.5	+60.0	118.5	11 57.9	+59.9	118.6	11 29.0	+60.0	118.8	11 00.0	+60.0	119.0	11
12	15 19.0	+59.6	117.5	14 51.2	+59.7	117.7	14 23.2	+59.8	118.0	13 54.9	+59.9	118.2	13 26.5	+59.9	118.4	12 57.8	+60.0	118.6	12 29.0	+60.0	118.8	12 00.0	+60.0	119.0	12
13	16 18.6	+59.7	117.4	15 50.9	+59.7	117.6	15 23.0	+59.8	117.9	14 54.8	+59.9	118.1	14 26.4	+59.9	118.4	13 57.8	+60.0	118.6	13 29.0	+60.0	118.8	13 00.0	+60.0	119.0	13
14	17 18.3	+59.6	117.3	16 50.6	+59.8	117.5	16 22.8	+59.8	117.8	15 54.7	+59.8	118.1	15 26.3	+60.0	118.3	14 57.8	+59.9	118.5	14 29.0	+60.0	118.8	14 00.0	+60.0	119.0	14
15	18 17.9	+59.6	117.2	17 50.4	+59.7	117.4	17 22.6	+59.8	117.7	16 54.5	+59.9	118.0	16 26.3	+59.9	118.3	15 57.7	+60.0	118.5	15 29.0	+60.0	118.8	15 00.0	+60.0	119.0	15
16	19 17.5	+59.6	117.0	18 50.1	+59.7	117.3	18 22.4	+59.8	117.6	17 54.4	+59.9	117.9	17 26.2	+59.9	118.2	16 57.7	+60.0	118.5	16 29.0	+60.0	118.7	16 00.0	+60.0	119.0	16
17	20 17.1	+59.6	116.9	19 49.8	+59.7	117.2	19 22.2	+59.8	117.6	18 54.3	+59.9	117.9	18 26.1	+60.0	118.2	17 57.7	+59.9	118.4	17 29.0	+60.0	118.7	17 00.0	+60.0	119.0	17
18	21 16.7	+59.6	116.8	20 49.5	+59.7	117.1	20 22.0	+59.8	117.5	19 54.2	+59.8	117.8	19 26.1	+59.9	118.1	18 57.6	+60.0	118.4	18 29.0	+59.9	118.7	18 00.0	+60.0	119.0	18
19	22 16.3	+59.6	116.7	21 49.2	+59.7	117.0	21 21.8	+59.8	117.4	20 54.0	+59.9	117.7	20 26.0	+59.9	118.1	19 57.6	+60.0	118.4	19 28.9	+60.0	118.7	19 00.0	+60.0	119.0	19
20	23 15.9	+59.6	116.5	22 48.9	+59.7	116.9	22 21.6	+59.8	117.3	21 53.9	+59.9	117.7	21 25.9	+59.9	118.0	20 57.6	+59.9	118.3	20 28.9	+60.0	118.7	20 00.0	+60.0	119.0	20
21	24 15.5	+59.6	116.4	23 48.6	+59.7	116.8	23 21.4	+59.8	117.2	22 53.8	+59.9	117.6	22 25.8	+60.0	117.9	21 57.5	+60.0	118.3	21 28.9	+60.0	118.7	21 00.0	+60.0	119.0	21
22	25 15.1	+59.6	116.3	24 48.3	+59.7	116.7	24 21.2	+59.8	117.1	23 53.7	+59.8	117.5	23 25.8	+59.9	117.9	22 57.5	+60.0	118.3	22 28.9	+60.0	118.6	22 00.0	+60.0	119.0	22
23	26 14.7	+59.6	116.2	25 48.0	+59.7	116.6	25 21.0	+59.8	117.0	24 53.5	+59.9	117.4	24 25.7	+59.9	117.8	23 57.5	+59.9	118.2	23 28.9	+60.0	118.6	23 00.0	+60.0	119.0	23
24	27 14.3	+59.5	116.0	26 47.7	+59.7	116.5	26 20.8	+59.7	116.9	25 53.4	+59.8	117.4	25 25.6	+59.9	117.8	24 57.4	+60.0	118.2	24 28.9	+60.0	118.6	24 00.0	+60.0	119.0	24
25	28 13.8	+59.6	115.9	27 47.4	+59.7	116.4	27 20.5	+59.8	116.8	26 53.2	+59.9	117.3	26 25.5	+60.0	117.7	25 57.4	+60.0	118.2	25 28.9	+60.0	118.6	25 00.0	+60.0	119.0	25
26	29 13.4	+59.5	115.7	28 47.1	+59.6	116.2	28 20.3	+59.8	116.7	27 53.1	+59.9	117.2	27 25.5	+59.9	117.7	26 57.4	+59.9	118.1	26 28.9	+60.0	118.6	26 00.0	+60.0	119.0	26
27	30 12.9	+59.6	115.6	29 46.7	+59.7	116.1	29 20.1	+59.8	116.6	28 53.0	+59.8	117.1	28 25.4	+59.9	117.6	27 57.3	+60.0	118.1	27 28.9	+60.0	118.5	27 00.0	+60.0	119.0	27
28	31 12.5	+59.5	115.5	30 46.4	+59.7	116.0	30 19.9	+59.7	116.5	29 52.8	+59.9	117.0	29 25.3	+59.9	117.6	28 57.3	+60.0	118.0	28 28.9	+60.0	118.5	28 00.0	+60.0	119.0	28
29	32 12.0	+59.5	115.3	31 46.1	+59.6	115.9	31 19.6	+59.8	116.4	30 52.7	+59.8	117.0	30 25.2	+59.9	117.5	29 57.3	+59.9	118.0	29 28.9	+60.0	118.5	29 00.0	+60.0	119.0	29
30	33 11.5	+59.5	115.2	32 45.7	+59.6	115.7	32 19.4	+59.7	116.3	31 52.5	+59.9	116.9	31 25.1	+59.9	117.4	30 57.2	+60.0	118.0	30 28.9	+59.9	118.5	30 00.0	+60.0	119.0	30
31	34 11.0	+59.5	115.0	33 45.3	+59.7	115.6	33 19.1	+59.8	116.2	32 52.4	+59.8	116.8	32 25.0	+59.9	117.4	31 57.2	+60.0	117.9	31 28.8	+60.0	118.5	31 00.0	+60.0	119.0	31
32	35 10.5	+59.5	114.8	34 45.0	+59.6	115.5	34 18.9	+59.7	116.1	33 52.2	+59.8	116.7	33 24.9	+60.0	117.3	32 57.2	+59.9	117.9	32 28.8	+60.0	118.4	32 00.0	+60.0	119.0	32
33	36 10.0	+59.4	114.7	35 44.6	+59.6	115.3	35 18.6	+59.7	116.0	34 52.0	+59.9	116.6	34 24.9	+59.9	117.2	33 57.1	+60.0	117.8	33 28.8	+60.0	118.4	33 00.0	+60.0	119.0	33
34	37 09.4	+59.5	114.5	36 44.2	+59.6	115.2	36 18.3	+59.8	115.9	35 51.9	+59.8	116.5	35 24.8	+59.9	117.2	34 57.1	+59.9	117.8	34 28.8	+60.0	118.4	34 00.0	+60.0	119.0	34
35	38 08.9	+59.4	114.4	37 43.8	+59.6	115.1	37 18.1	+59.7	115.8	36 51.7	+59.8	116.4	36 24.7	+59.9	117.1	35 57.0	+60.0	117.7	35 28.8	+60.0	118.4	35 00.0	+60.0	119.0	35
36	39 08.3	+59.5	114.2	38 43.4	+59.6	114.9	38 17.8	+59.7	115.6	37 51.5	+59.8	116.3	37 24.6	+59.9	117.0	36 57.0	+59.9	117.7	36 28.8	+60.0	118.4	36 00.0	+60.0	119.0	36
37	40 07.8	+59.4	114.0	39 43.0	+59.6	114.8	39 17.5	+59.7	115.5	38 51.3	+59.8	116.2	38 24.5	+59.9	117.0	37 56.9	+60.0	117.7	37 28.8	+60.0	118.3	37 00.0	+60.0	119.0	37
38	41 07.2	+59.4	113.8	40 42.6	+59.5	114.6	40 17.2	+59.7	115.4	39 51.1	+59.8	116.1	39 24.4	+59.9	116.9	38 56.9	+60.0	117.6	38 28.8	+60.0	118.3	38 00.0	+60.0	119.0	38
39	42 06.6	+59.3	113.6	41 42.1	+59.6	114.4	41 16.9	+59.7	115.2	40 50.9	+59.8	116.0	40 24.3	+59.8	116.8	39 56.9	+59.9	117.5	39 28.8	+59.9	118.3	39 00.0	+60.0	119.0	39
40	43 05.9	+59.4	113.4	42 41.7	+59.5	114.3	42 16.6	+59.7	115.1	41 50.7	+59.8	115.9	41 24.1	+59.9	116.7	40 56.8	+60.0	117.5	40 28.7	+60.0	118.3	40 00.0	+60.0	119.0	40
41	44 05.3	+59.3	113.2	43 41.2	+59.5	114.1	43 16.3	+59.6	115.0	42 50.5	+59.8	115.8	42 24.0	+59.9	116.6	41 56.8	+59.9	117.4	41 28.7	+60.0	118.2	41 00.0	+60.0	119.0	41
42	45 04.6	+59.3	113.0	44 40.7	+59.5	113.9	44 15.9	+59.7	114.8	43 50.3	+59.8	115.7	43 23.9	+59.9	116.5	42 56.7	+60.0	117.4	42 28.7	+60.0	118.2	42 00.0	+60.0	119.0	42
43	46 03.9	+59.3	112.8	45 40.2	+59.5	113.7	45 15.6	+59.6	114.7	44 50.1	+59.8	115.6	44 23.8	+59.9	116.5	43 56.7	+59.9	117.3	43 28.7	+60.0	118.2	43 00.0	+60.0	119.0	43
44	47 03.2	+59.2	112.6	46 39.7	+59.4	113.6	46 15.2	+59.7	114.5	45 49.9	+59.8	115.5	45 23.7	+59.8	116.4	44 56.6	+59.9	117.3	44 28.7	+60.0	118.1	44 00.0	+60.0	119.0	44
45	48 02.4	+59.2	112.3	47 39.1	+59.5	113.4	47 14.9	+59.6	114.3	46 49.7	+59.7	115.3	46 23.5	+59.9	116.3	45 56.5	+60.0	117.2	45 28.7	+60.0	118.1	45 00.0	+60.0	119.0	45
46	49 01.6	+59.2	112.1	48 38.6	+59.4	113.1	48 14.5	+59.6	114.2	47 49.4	+59.8	115.2	47 23.4	+59.9	116.2	46 56.5	+59.9	117.1	46 28.7	+60.0	118.1	46 00.0	+60.0	119.0	46
47	50 00.8	+59.2	111.8	49 38.0	+59.4	112.9	49 14.1	+59.5	114.0	48 49.2	+59.7	115.1	48 23.3	+59.8	116.1	47 56.4	+60.0	117.1	47 28.7	+59.9	118.0	47 00.0	+60.0	119.0	47
48	51 00.0	+59.1	111.6	50 37.4	+59.3	112.7	50 13.6	+59.6	113.8	49 48.9	+59.7	114.9	49 23.1	+59.9	116.0	48 56.4	+59.9	117.0	48 28.6	+60.0	118.0	48 00.0	+60.0	119.0	48
49	51 59.1	+59.1	111.3	51 36.7	+59.3	112.5	51 13.2	+59.6	113.6	50 48.6	+59.7	114.8	50 23.0	+59.8	115.9	49 56.3	+59.9	116.9	49 28.6	+60.0	118.0	49 00.0	+60.0	119.0	49
50	52 58.2	+59.0	111.0	52 36.0	+59.3	112.2	52 12.8	+59.5	113.4	51 48.3	+59.7	114.6	51 22.8	+59.8	115.7	50 56.2	+59.9	116.9	50 28.6	+60.0	117.9	50 00.0	+60.0	119.0	50
51	53 57.2	+59.0	110.7	53 35.3	+59.3	112.0	53 12.3	+59.5	113.2	52 48.0	+59.7	114.4	52 22.6	+59.9	115.6	51 56.1	+60.0	116.8	51 28.6	+60.0	117.9	51 00.0	+60.0	119.0	51
52	54 56.2	+58.9	110.4	54 34.6	+59.2	111.7	54 11.8	+59.5	113.0	53 47.7	+59.7	114.3	53 22.5	+59.8	115.5	52 56.1	+59.9	116.7	52 28.6	+59.9	117.9	52 00.0	+60.0	119.0	52
53	55 55.1	+58.9	110.1	55 33.8	+59.2	111.4	55 11.3	+59.4	112.8	54 47.4	+59.6	114.1	54 22.3	+59.8	115.4	53 56.0	+59.9	116.6	53 28.5	+60.0	117.8	53 00.0	+60.0	119.0	53
54	56 54.0	+58.8	109.7	56 33.0	+59.2	111.1	56 10.7	+59.4	112.5	55 47.0	+59.7	113.9	55 22.1	+59.8	115.2	54 55.9	+59.9	116.5	54 28.5	+60.0	117.8	54 00.0	+60.0	119.0	54
55	57 52.8	+58.7	109.4	57 32.2	+59.1	110.8	57 10.1	+59.4	112.3	56 46.7	+59.6	113.7	56 21.9	+59.8	115.1	55 55.8	+59.9	116.4	55 28.5	+60.0	117.7	55 00.0	+60.0	119.0	55
56	58 51.5	+58.7	109.0	58 31.3	+59.0	110.5	58 09.5	+59.4	112.0	57 46.3	+59.6	113.5	57 21.7	+59.8	114.9	56 55.7	+59.9	116.3	56 28.5	+60.0	117.7	56 00.0	+60.0	119.0	56
57	59 50.2	+58.6	108.6	59 30.3	+59.0	110.2	59 08.9	+59.3	111.7	58 45.9	+59.6	113.3	58 21.5	+59.7	114.8	57 55.6	+59.9	116.2	57 28.5	+59.9	117.6	57 00.0	+60.0	119.0	57
58	60 48.8	+58.5	108.1	60 29.3	+58.9	109.8	60 08.2	+59.2	111.4	59 45.5	+59.5	113.0	59 21.2	+59.8	114.6	58 55.5	+59.9	116.1	58 28.4	+60.0	117.6	58 00.0	+60.0	119.0	58
59	61 47.3	+58.4	107.7	61 28.2	+58.9	109.4	61 07.4	+59.3	111.1	60 45.0	+59.5	112.8	60 21.0	+59.7	114.4	59 55.4	+59.9	116.0	59 28.4	+60.0	117.5	59 00.0	+60.0	119.0	59
60	62 45.7	+58.3	107.2	62 27.1	+58.8	109.0	62 06.7	+59.1	110.8	61 44.5	+59.5	112.5	61 20.7	+59.7	114.2	60 55.3	+59.9	115.9	60 28.4	+60.0	117.5	60 00.0	+60.0	119.0	60
61	63 44.0	+58.2	106.6	63 25.9	+58.7	108.6	63 05.8	+59.2	110.4	62 44.0	+59.5	112.2	62 20.4	+59.7	114.0	61 55.2	+59.9	115.7	61 28.4	+59.9	117.4	61 00.0	+60.0	119.0	61
62	64 42.2	+58.0	106.1	64 24.6	+58.5	108.1	64 05.0	+59.0	110.0	63 43.5	+59.4	111.9	63 20.1	+59.7	113.8	62 55.1	+59.8	115.6	62 28.3	+60.0	117.3	62 00.0	+60.0	119.0	62
63	65 40.2	+57.9	105.5	65 23.1	+58.5	107.6	65 04.0	+59.0	109.6	64 42.9	+59.3	111.6	64 19.8	+59.7	113.6	63 54.9	+59.9	115.4	63 28.3	+60.0	117.3	63 00.0	+60.0	119.0	63
64	66 38.1	+57.7	104.8	66 21.6	+58.4	107.0	66 03.0	+58.9	109.2	65 42.2	+59.3	111.3	65 19.5	+59.6	113.3	64 54.8	+59.8	115.3	64 28.3	+59.9	117.2	64 00.0	+60.0	119.0	64
65	67 35.8	+57.5	104.1	67 20.0	+58.2	106.4	67 01.9	+58.8	108.7	66 41.5	+59.3	110.9	66 19.1	+59.6	113.0	65 54.6	+59.8	115.1	65 28.2	+60.0	117.1	65 00.0	+60.0	119.0	65
66	68 33.3	+57.3	103.3	68 18.2	+58.0	105.8	68 00.7	+58.6	108.2	67 40.8	+59.2	110.5	67 18.7	+59.5	112.7	66 54.4	+59.8	114.9	66 28.2	+59.9	117.0	66 00.0	+60.0	119.0	66
67	69 30.6	+57.0	102.5	69 16.2	+57.9	105.1	68 59.3	+58.6	107.6	68 40.0	+59.1	110.1	68 18.2	+59.5	112.4	67 54.2	+59.8	114.7	67 28.1	+60.0	116.9	67 00.0	+60.0	119.0	67
68	70 27.6	+56.7	101.6	70 14.1	+57.7	104.3	69 57.9	+58.4	107.0	69 39.1	+59.0	109.6	69 17.7	+59.5	112.1	68 54.0	+59.8	114.5	68 28.1	+59.9	116.8	68 00.0	+60.0	119.0	68
69	71 24.3	+56.4	100.6	71 11.8	+57.4	103.5	70 56.3	+58.3	106.3	70 38.1	+58.9	109.0	70 17.2	+59.4	111.7	69 53.8	+59.8	114.2	69 28.0	+60.0	116.7	69 00.0	+60.0	119.0	69
70	72 20.7	+55.9	99.5	72 09.2	+57.1	102.6	71 54.6	+58.0	105.6	71 37.0	+58.8	108.5	71 16.6	+59.4	111.3	70 53.6	+59.7	114.0	70 28.0	+59.9	116.5	70 00.0	+60.0	119.0	70
71	73 16.6	+55.5	98.3	73 06.3	+56.8	101.5	72 52.6	+57.9	104.7	72 35.8	+58.7	107.8	72 16.0	+59.3	110.8	71 53.3	+59.7	113.7	71 27.9	+59.9	116.4	71 00.0	+60.0	119.0	71
72	74 12.1	+54.9	96.9	74 03.1	+56.3	100.4	73 50.5	+57.5	103.8	73 34.5	+58.5	107.1	73 15.3	+59.2	110.3	72 53.0	+59.6	113.3	72 27.8	+59.9	116.2	72 00.0	+60.0	119.0	72
73	75 07.0	+54.2	95.4	74 59.4	+55.9	99.1	74 48.0	+57.3	102.7	74 33.0	+58.3	106.3	74 14.5	+59.0	109.7	73 52.6	+59.6	113.0	73 27.7	+59.9	116.1	73 00.0	+60.0	119.0	73
74	76 01.2	+53.4	93.7	75 55.3	+55.3	97.7	75 45.3	+56.8	101.6	75 31.3	+58.1	105.4	75 13.5	+59.0	109.0	74 52.2	+59.6	112.5	74 27.6	+59.9	115.9	74 00.0	+60.0	119.0	74
75	76 54.6	+52.4	91.7	76 50.6	+54.5	96.0	76 42.1	+56.4	100.2	76 29.4	+57.7	104.3	76 12.5	+58.8	108.3	75 51.8	+59.5	112.1	75 27.5	+59.9	115.6	75 00.0	+60.0	119.0	75
76	77 47.0	+51.2	89.5	77 45.1	+53.7	94.1	77 38.5	+55.7	98.7	77 27.1	+57.4	103.1	77 11.3	+58.6	107.4	76 51.3	+59.4	111.5	76 27.4	+59.9	115.4	76 00.0	+60.0	119.0	76
77	78 38.2	+49.7	86.9	78 38.8	+52.5	91.9	78 34.2	+55.0	96.9	78 24.5	+56.9	101.7	78 09.9	+58.4	106.4	77 50.7	+59.3	110.9	77 27.3	+59.8	115.1	77 00.0	+60.0	119.0	77
78	79 27.9	*+47.7* •	84.0	79 31.3	+51.1	89.4	79 29.2	+53.9	94.8	79 21.4	+56.3	100.1	79 08.3	+58.0	105.2	78 50.0	+59.2	110.1	78 27.1	+59.8	114.7	78 00.0	+60.0	119.0	78
79	80 15.6	*+45.2* •	80.5	80 22.4	*+49.2* •	86.4	80 23.1	+52.7	92.3	80 17.7	+55.5	98.1	80 06.3	+57.6	103.8	79 49.2	+59.0	109.2	79 26.9	+59.8	114.3	79 00.0	+60.0	119.0	79
80	81 00.8	*+42.2* •	76.5	81 11.6	*+46.9* •	82.8	81 15.8	*+51.0* •	89.3	81 13.2	+54.4	95.7	81 03.9	+57.0	102.1	80 48.2	+58.8	108.1	80 26.7	+59.7	113.8	80 00.0	+60.0	119.0	80
81	81 43.0	*+38.3* •	71.8	81 58.5	*+43.5* •	78.5	82 06.8	*+48.6* •	85.6	82 07.6	+52.9	92.8	82 00.9	+56.2	100.0	81 47.0	+58.4	106.8	81 26.4	+59.7	113.2	81 00.0	+60.0	119.0	81
82	82 21.3	*+33.2* •	66.2	82 42.0	*+39.4* •	73.3	82 55.4	*+45.3* •	81.1	83 00.5	*+50.7* •	89.2	82 57.1	+55.0	97.3	82 45.4	+57.9	105.1	82 26.1	+59.5	112.4	82 00.0	+60.0	119.0	82
83	82 54.5	*+26.9* •	59.7	83 21.4	*+33.7* •	67.1	83 40.7	*+40.7* •	75.5	83 51.2	*+47.5* •	84.5	83 52.1	*+53.1* •	93.8	83 43.3	+57.2	102.9	83 25.6	+59.4	111.4	83 00.0	+60.0	119.0	83
84	83 21.4	*+19.3* •	52.2	83 55.1	*+26.3* •	59.6	84 21.4	*+34.4* •	68.4	84 38.7	*+42.6* •	78.4	84 45.2	*+50.3* •	89.1	84 40.5	+55.9	99.9	84 25.0	+59.1	110.0	84 00.0	+60.0	119.0	84
85	83 40.7	*+10.5* •	43.8	84 21.4	*+17.3* •	50.8	84 55.8	*+25.5* •	59.6	85 21.3	*+35.2* •	70.3	85 35.5	*+45.2* •	82.6	85 36.4	*+53.7* •	95.6	85 24.1	+58.6	108.1	85 00.0	+60.0	119.0	85
86	83 51.2	*+0.9* •	34.7	84 38.7	*+6.5* •	40.8	85 21.3	*+14.2* •	48.9	85 56.5	*+24.2* •	59.6	86 20.7	*+36.6* •	73.2	86 30.1	*+49.1* •	89.0	86 22.7	+57.5	105.0	86 00.0	+60.0	119.0	86
87	83 52.1	*–8.8* •	25.4	84 45.2	*–4.7* •	30.0	85 35.5	*+0.9* •	36.5	86 20.7	*+9.4* •	45.9	86 57.3	*+21.9* •	59.5	87 19.2	*+39.0* •	78.3	87 20.2	*+54.8* •	99.8	87 00.0	+60.0	119.0	87
88	83 43.3	*–17.7* •	16.2	84 40.5	*–15.5* •	19.2	85 36.4	*–12.3* •	23.5	86 30.1	*–7.4* •	30.0	87 19.2	*+1.0* •	40.8	87 58.2	*+16.8* •	59.5	88 15.0	*+44.1* •	89.0	88 00.0	+60.0	119.0	88
89	83 25.6	*–25.6* •	7.7	84 25.0	*–25.0* •	9.0	85 24.1	*–24.1* •	11.0	86 22.7	*–22.7* •	14.0	87 20.2	*–20.2* •	19.2	88 15.0	*–15.0* •	30.0	88 59.1	*+0.9* •	59.5	89 00.0	+60.0	119.0	89
90	83 00.0	*–32.1* •	0.0	84 00.0	*–32.6* •	0.0	85 00.0	*–33.2* •	0.0	86 00.0	*–34.1* •	0.0	87 00.0	*–35.6* •	0.0	88 00.0	*–38.1* •	0.0	89 00.0	*–43.4* •	0.0	90 00.0	–60.0	59.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 23.2	–59.6	118.8	2 54.3	–59.8	118.9	2 25.3	–59.8	118.9	1 56.3	–59.9	118.9	1 27.2	–59.9	119.0	0 58.2	–60.0	119.0	0 29.1	–60.0	119.0	0 00.0	+60.0	61.0	**0**
1	2 23.6	–59.7	118.9	1 54.5	–59.7	119.0	1 25.5	–59.8	119.0	0 56.4	–59.9	119.0	0 27.3	–59.9	119.0	0 01.8	+60.0	61.0	0 30.9	+60.0	61.0	1 00.0	+60.0	61.0	**1**
2	1 23.9	–59.6	119.0	0 54.8	–59.8	119.0	0 25.7	–59.9	119.1	0 03.5	+59.9	60.9	0 32.6	+60.0	60.9	1 01.8	+59.9	61.0	1 30.9	+60.0	61.0	2 00.0	+60.0	61.0	**2**
3	0 24.3	–59.7	119.1	0 05.0	+59.7	60.9	0 34.2	+59.8	60.9	1 03.4	+59.9	60.9	1 32.6	+59.9	60.9	2 01.7	+60.0	60.9	2 30.9	+60.0	61.0	3 00.0	+60.0	61.0	**3**
4	0 35.4	+59.7	60.8	1 04.7	+59.8	60.8	1 34.0	+59.8	60.8	2 03.3	+59.9	60.8	2 32.5	+60.0	60.9	3 01.7	+60.0	60.9	3 30.9	+60.0	60.9	4 00.0	+60.0	61.0	**4**
5	1 35.1	+59.6	60.6	2 04.5	+59.7	60.7	2 33.8	+59.8	60.7	3 03.2	+59.8	60.8	3 32.5	+59.9	60.8	4 01.7	+60.0	60.9	4 30.9	+60.0	60.9	5 00.0	+60.0	61.0	**5**
6	2 34.7	+59.7	60.5	3 04.2	+59.8	60.6	3 33.6	+59.9	60.6	4 03.0	+59.9	60.7	4 32.4	+59.9	60.8	5 01.7	+59.9	60.8	5 30.9	+60.0	60.9	6 00.0	+60.0	61.0	**6**
7	3 34.4	+59.6	60.4	4 04.0	+59.7	60.5	4 33.5	+59.8	60.6	5 02.9	+59.9	60.6	5 32.3	+60.0	60.7	6 01.6	+60.0	60.8	6 30.9	+60.0	60.9	7 00.0	+60.0	61.0	**7**
8	4 34.0	+59.7	60.3	5 03.7	+59.7	60.4	5 33.3	+59.8	60.5	6 02.8	+59.9	60.6	6 32.3	+59.9	60.7	7 01.6	+60.0	60.8	7 30.9	+59.9	60.9	8 00.0	+60.0	61.0	**8**
9	5 33.7	+59.6	60.2	6 03.4	+59.8	60.3	6 33.1	+59.8	60.4	7 02.7	+59.9	60.5	7 32.2	+59.9	60.6	8 01.6	+60.0	60.7	8 30.8	+60.0	60.9	9 00.0	+60.0	61.0	**9**
10	6 33.3	+59.7	60.1	7 03.2	+59.7	60.2	7 32.9	+59.9	60.3	8 02.6	+59.9	60.4	8 32.1	+60.0	60.6	9 01.6	+59.9	60.7	9 30.8	+60.0	60.8	10 00.0	+60.0	61.0	**10**
11	7 33.0	+59.6	60.0	8 02.9	+59.8	60.1	8 32.8	+59.8	60.2	9 02.5	+59.9	60.4	9 32.1	+59.9	60.5	10 01.5	+60.0	60.7	10 30.8	+60.0	60.8	11 00.0	+60.0	61.0	**11**
12	8 32.6	+59.7	59.9	9 02.7	+59.7	60.0	9 32.6	+59.8	60.2	10 02.4	+59.8	60.3	10 32.0	+59.9	60.5	11 01.5	+60.0	60.6	11 30.8	+60.0	60.8	12 00.0	+60.0	61.0	**12**
13	9 32.3	+59.6	59.8	10 02.4	+59.8	59.9	10 32.4	+59.8	60.1	11 02.2	+59.9	60.3	11 31.9	+60.0	60.4	12 01.5	+59.9	60.6	12 30.8	+60.0	60.8	13 00.0	+60.0	61.0	**13**
14	10 31.9	+59.7	59.7	11 02.2	+59.7	59.8	11 32.2	+59.8	60.0	12 02.1	+59.9	60.2	12 31.9	+59.9	60.4	13 01.4	+60.0	60.6	13 30.8	+60.0	60.8	14 00.0	+60.0	61.0	**14**
15	11 31.6	+59.6	59.6	12 01.9	+59.7	59.7	12 32.0	+59.9	59.9	13 02.0	+59.9	60.1	13 31.8	+59.9	60.3	14 01.4	+60.0	60.5	14 30.8	+60.0	60.8	15 00.0	+60.0	61.0	**15**
16	12 31.2	+59.7	59.5	13 01.6	+59.8	59.6	13 31.9	+59.8	59.9	14 01.9	+59.9	60.1	14 31.7	+60.0	60.3	15 01.4	+59.9	60.5	15 30.8	+60.0	60.8	16 00.0	+60.0	61.0	**16**
17	13 30.9	+59.6	59.3	14 01.4	+59.7	59.6	14 31.7	+59.8	59.8	15 01.8	+59.9	60.0	15 31.7	+59.9	60.2	16 01.3	+60.0	60.5	16 30.8	+60.0	60.7	17 00.0	+60.0	61.0	**17**
18	14 30.5	+59.6	59.2	15 01.1	+59.7	59.5	15 31.5	+59.8	59.7	16 01.7	+59.8	59.9	16 31.6	+59.9	60.2	17 01.3	+60.0	60.4	17 30.8	+60.0	60.7	18 00.0	+60.0	61.0	**18**
19	15 30.1	+59.7	59.1	16 00.8	+59.8	59.4	16 31.3	+59.8	59.6	17 01.5	+59.9	59.9	17 31.5	+60.0	60.1	18 01.3	+60.0	60.4	18 30.8	+60.0	60.7	19 00.0	+60.0	61.0	**19**
20	16 29.8	+59.6	59.0	17 00.6	+59.7	59.3	17 31.1	+59.8	59.5	18 01.4	+59.9	59.8	18 31.5	+59.9	60.1	19 01.3	+59.9	60.4	19 30.8	+60.0	60.7	20 00.0	+60.0	61.0	**20**
21	17 29.4	+59.6	58.9	18 00.3	+59.7	59.2	18 30.9	+59.8	59.4	19 01.3	+59.9	59.7	19 31.4	+59.9	60.0	20 01.2	+60.0	60.3	20 30.8	+60.0	60.7	21 00.0	+60.0	61.0	**21**
22	18 29.0	+59.6	58.8	19 00.0	+59.7	59.1	19 30.7	+59.8	59.4	20 01.2	+59.8	59.7	20 31.3	+60.0	60.0	21 01.2	+60.0	60.3	21 30.8	+59.9	60.7	22 00.0	+60.0	61.0	**22**
23	19 28.6	+59.6	58.6	19 59.7	+59.7	59.0	20 30.5	+59.8	59.3	21 01.0	+59.9	59.6	21 31.3	+59.9	59.9	22 01.2	+59.9	60.3	22 30.7	+60.0	60.6	23 00.0	+60.0	61.0	**23**
24	20 28.2	+59.7	58.5	20 59.4	+59.7	58.8	21 30.3	+59.8	59.2	22 00.9	+59.9	59.5	22 31.2	+59.9	59.9	23 01.1	+60.0	60.2	23 30.7	+60.0	60.6	24 00.0	+60.0	61.0	**24**
25	21 27.9	+59.6	58.4	21 59.1	+59.7	58.7	22 30.1	+59.8	59.1	23 00.8	+59.8	59.5	23 31.1	+59.9	59.8	24 01.1	+60.0	60.2	24 30.7	+60.0	60.6	25 00.0	+60.0	61.0	**25**
26	22 27.5	+59.6	58.3	22 58.8	+59.7	58.6	23 29.9	+59.8	59.0	24 00.6	+59.9	59.4	24 31.0	+60.0	59.8	25 01.1	+59.9	60.2	25 30.7	+60.0	60.6	26 00.0	+60.0	61.0	**26**
27	23 27.1	+59.5	58.2	23 58.5	+59.7	58.5	24 29.7	+59.8	58.9	25 00.5	+59.9	59.3	25 31.0	+59.9	59.7	26 01.0	+60.0	60.1	26 30.7	+60.0	60.6	27 00.0	+60.0	61.0	**27**
28	24 26.6	+59.6	58.0	24 58.2	+59.7	58.4	25 29.5	+59.8	58.8	26 00.4	+59.8	59.2	26 30.9	+59.9	59.7	27 01.0	+60.0	60.1	27 30.7	+60.0	60.5	28 00.0	+60.0	61.0	**28**
29	25 26.2	+59.6	57.9	25 57.9	+59.7	58.3	26 29.3	+59.8	58.7	27 00.2	+59.9	59.2	27 30.8	+59.9	59.6	28 01.0	+59.9	60.1	28 30.7	+60.0	60.5	29 00.0	+60.0	61.0	**29**
30	26 25.8	+59.6	57.8	26 57.6	+59.7	58.2	27 29.1	+59.7	58.6	28 00.1	+59.8	59.1	28 30.7	+59.9	59.5	29 00.9	+60.0	60.0	29 30.7	+60.0	60.5	30 00.0	+60.0	61.0	**30**
31	27 25.4	+59.5	57.6	27 57.3	+59.7	58.1	28 28.8	+59.8	58.5	28 59.9	+59.9	59.0	29 30.6	+59.9	59.5	30 00.9	+59.9	60.0	30 30.7	+60.0	60.5	31 00.0	+60.0	61.0	**31**
32	28 24.9	+59.6	57.5	28 57.0	+59.6	58.0	29 28.6	+59.8	58.4	29 59.8	+59.8	58.9	30 30.5	+60.0	59.4	31 00.8	+60.0	59.9	31 30.7	+60.0	60.5	32 00.0	+60.0	61.0	**32**
33	29 24.5	+59.5	57.4	29 56.6	+59.7	57.8	30 28.4	+59.7	58.3	30 59.6	+59.9	58.8	31 30.5	+59.9	59.4	32 00.8	+60.0	59.9	32 30.7	+59.9	60.4	33 00.0	+60.0	61.0	**33**
34	30 24.0	+59.6	57.2	30 56.3	+59.7	57.7	31 28.1	+59.8	58.2	31 59.5	+59.8	58.8	32 30.4	+59.9	59.3	33 00.8	+59.9	59.8	33 30.6	+60.0	60.4	34 00.0	+60.0	61.0	**34**
35	31 23.6	+59.5	57.1	31 56.0	+59.6	57.6	32 27.9	+59.7	58.1	32 59.3	+59.9	58.7	33 30.3	+59.9	59.2	34 00.7	+60.0	59.8	34 30.6	+60.0	60.4	35 00.0	+60.0	61.0	**35**
36	32 23.1	+59.5	56.9	32 55.6	+59.6	57.5	33 27.6	+59.8	58.0	33 59.2	+59.8	58.6	34 30.2	+59.9	59.2	35 00.7	+59.9	59.8	35 30.6	+60.0	60.4	36 00.0	+60.0	61.0	**36**
37	33 22.6	+59.5	56.8	33 55.2	+59.7	57.3	34 27.4	+59.7	57.9	34 59.0	+59.8	58.5	35 30.1	+59.9	59.1	36 00.6	+60.0	59.7	36 30.6	+60.0	60.3	37 00.0	+60.0	61.0	**37**
38	34 22.1	+59.5	56.6	34 54.9	+59.6	57.2	35 27.1	+59.8	57.8	35 58.8	+59.9	58.4	36 30.0	+59.9	59.0	37 00.6	+60.0	59.7	37 30.6	+60.0	60.3	38 00.0	+60.0	61.0	**38**
39	35 21.6	+59.5	56.5	35 54.5	+59.6	57.1	36 26.9	+59.7	57.7	36 58.7	+59.8	58.3	37 29.9	+59.9	59.0	38 00.6	+59.9	59.6	38 30.6	+60.0	60.3	39 00.0	+60.0	61.0	**39**
40	36 21.1	+59.4	56.3	36 54.1	+59.6	56.9	37 26.6	+59.7	57.6	37 58.5	+59.8	58.2	38 29.8	+59.9	58.9	39 00.5	+60.0	59.6	39 30.6	+60.0	60.3	40 00.0	+60.0	61.0	**40**
41	37 20.5	+59.5	56.1	37 53.7	+59.6	56.8	38 26.3	+59.7	57.4	38 58.3	+59.8	58.1	39 29.7	+59.9	58.8	40 00.5	+59.9	59.5	40 30.6	+60.0	60.2	41 00.0	+60.0	61.0	**41**
42	38 20.0	+59.4	56.0	38 53.3	+59.6	56.6	39 26.0	+59.7	57.3	39 58.1	+59.8	58.0	40 29.6	+59.9	58.7	41 00.4	+60.0	59.5	41 30.6	+59.9	60.2	42 00.0	+60.0	61.0	**42**
43	39 19.4	+59.5	55.8	39 52.9	+59.5	56.5	40 25.7	+59.7	57.2	40 57.9	+59.8	57.9	41 29.5	+59.9	58.6	42 00.4	+59.9	59.4	42 30.5	+60.0	60.2	43 00.0	+60.0	61.0	**43**
44	40 18.9	+59.4	55.6	40 52.4	+59.6	56.3	41 25.4	+59.7	57.0	41 57.7	+59.8	57.8	42 29.4	+59.9	58.6	43 00.3	+60.0	59.4	43 30.5	+60.0	60.2	44 00.0	+60.0	61.0	**44**
45	41 18.3	+59.3	55.4	41 52.0	+59.5	56.1	42 25.1	+59.7	56.9	42 57.5	+59.8	57.7	43 29.3	+59.8	58.5	44 00.3	+59.9	59.3	44 30.5	+60.0	60.1	45 00.0	+60.0	61.0	**45**
46	42 17.6	+59.4	55.2	42 51.5	+59.6	56.0	43 24.8	+59.6	56.8	43 57.3	+59.8	57.6	44 29.1	+59.9	58.4	45 00.2	+59.9	59.2	45 30.5	+60.0	60.1	46 00.0	+60.0	61.0	**46**
47	43 17.0	+59.3	55.0	43 51.1	+59.5	55.8	44 24.4	+59.7	56.6	44 57.1	+59.8	57.4	45 29.0	+59.9	58.3	46 00.1	+60.0	59.2	46 30.5	+60.0	60.1	47 00.0	+60.0	61.0	**47**
48	44 16.3	+59.4	54.8	44 50.6	+59.5	55.6	45 24.1	+59.6	56.5	45 56.9	+59.7	57.3	46 28.9	+59.8	58.2	47 00.1	+59.9	59.1	47 30.5	+60.0	60.0	48 00.0	+60.0	61.0	**48**
49	45 15.7	+59.3	54.6	45 50.1	+59.4	55.4	46 23.7	+59.7	56.3	46 56.6	+59.8	57.2	47 28.7	+59.9	58.1	48 00.0	+60.0	59.0	48 30.5	+59.9	60.0	49 00.0	+60.0	61.0	**49**
50	46 15.0	+59.2	54.4	46 49.5	+59.5	55.3	47 23.4	+59.6	56.1	47 56.4	+59.7	57.1	48 28.6	+59.9	58.0	49 00.0	+59.9	59.0	49 30.4	+60.0	60.0	50 00.0	+60.0	61.0	**50**
51	47 14.2	+59.3	54.2	47 49.0	+59.4	55.1	48 23.0	+59.6	56.0	48 56.1	+59.8	56.9	49 28.5	+59.8	57.9	49 59.9	+59.9	58.9	50 30.4	+60.0	59.9	51 00.0	+60.0	61.0	**51**
52	48 13.5	+59.2	53.9	48 48.4	+59.4	54.8	49 22.6	+59.5	55.8	49 55.9	+59.7	56.8	50 28.3	+59.8	57.8	50 59.8	+60.0	58.8	51 30.4	+60.0	59.9	52 00.0	+60.0	61.0	**52**
53	49 12.7	+59.2	53.7	49 47.8	+59.4	54.6	50 22.1	+59.6	55.6	50 55.6	+59.7	56.6	51 28.1	+59.9	57.7	51 59.8	+59.9	58.7	52 30.4	+60.0	59.9	53 00.0	+60.0	61.0	**53**
54	50 11.9	+59.1	53.4	50 47.2	+59.4	54.4	51 21.7	+59.5	55.4	51 55.3	+59.7	56.5	52 28.0	+59.8	57.5	52 59.7	+59.9	58.7	53 30.4	+59.9	59.8	54 00.0	+60.0	61.0	**54**
55	51 11.0	+59.1	53.2	51 46.6	+59.3	54.2	52 21.2	+59.6	55.2	52 55.0	+59.7	56.3	53 27.8	+59.8	57.4	53 59.6	+59.9	58.6	54 30.3	+60.0	59.8	55 00.0	+60.0	61.0	**55**
56	52 10.1	+59.1	52.9	52 45.9	+59.3	53.9	53 20.8	+59.5	55.0	53 54.7	+59.7	56.1	54 27.6	+59.8	57.3	54 59.5	+59.9	58.5	55 30.3	+60.0	59.7	56 00.0	+60.0	61.0	**56**
57	53 09.2	+59.0	52.6	53 45.2	+59.2	53.7	54 20.3	+59.4	54.8	54 54.4	+59.6	56.0	55 27.4	+59.8	57.1	55 59.4	+59.9	58.4	56 30.3	+60.0	59.7	57 00.0	+60.0	61.0	**57**
58	54 08.2	+59.0	52.3	54 44.4	+59.3	53.4	55 19.7	+59.5	54.6	55 54.0	+59.6	55.8	56 27.2	+59.8	57.0	56 59.3	+59.9	58.3	57 30.3	+60.0	59.6	58 00.0	+60.0	61.0	**58**
59	55 07.2	+58.9	52.0	55 43.7	+59.1	53.1	56 19.2	+59.4	54.3	56 53.6	+59.7	55.6	57 27.0	+59.8	56.8	57 59.2	+59.9	58.2	58 30.3	+59.9	59.6	59 00.0	+60.0	61.0	**59**
60	56 06.1	+58.9	51.6	56 42.8	+59.2	52.8	57 18.6	+59.4	54.1	57 53.3	+59.5	55.4	58 26.8	+59.8	56.7	58 59.1	+59.9	58.1	59 30.2	+60.0	59.5	60 00.0	+60.0	61.0	**60**
61	57 05.0	+58.8	51.3	57 42.0	+59.1	52.5	58 18.0	+59.3	53.8	58 52.8	+59.6	55.1	59 26.6	+59.7	56.5	59 59.0	+59.9	58.0	60 30.2	+60.0	59.4	61 00.0	+60.0	61.0	**61**
62	58 03.8	+58.7	50.9	58 41.1	+59.0	52.2	59 17.3	+59.3	53.5	59 52.4	+59.6	54.9	60 26.3	+59.7	56.3	60 58.9	+59.9	57.8	61 30.2	+59.9	59.4	62 00.0	+60.0	61.0	**62**
63	59 02.5	+58.7	50.5	59 40.1	+59.0	51.8	60 16.6	+59.3	53.2	60 52.0	+59.5	54.6	61 26.0	+59.8	56.1	61 58.8	+59.9	57.7	62 30.1	+60.0	59.3	63 00.0	+60.0	61.0	**63**
64	60 01.2	+58.5	50.1	60 39.1	+58.9	51.5	61 15.9	+59.2	52.9	61 51.5	+59.4	54.4	62 25.8	+59.6	55.9	62 58.7	+59.8	57.6	63 30.1	+60.0	59.2	64 00.0	+60.0	61.0	**64**
65	60 59.7	+58.5	49.7	61 38.0	+58.8	51.1	62 15.1	+59.2	52.6	62 50.9	+59.5	54.1	63 25.4	+59.7	55.7	63 58.5	+59.9	57.4	64 30.1	+59.9	59.2	65 00.0	+60.0	61.0	**65**
66	61 58.2	+58.4	49.2	62 36.8	+58.8	50.7	63 14.3	+59.1	52.2	63 50.4	+59.4	53.8	64 25.1	+59.7	55.5	64 58.4	+59.8	57.2	65 30.0	+60.0	59.1	66 00.0	+60.0	61.0	**66**
67	62 56.6	+58.3	48.7	63 35.6	+58.7	50.2	64 13.4	+59.0	51.8	64 49.8	+59.3	53.5	65 24.8	+59.6	55.2	65 58.2	+59.8	57.1	66 30.0	+59.9	59.0	67 00.0	+60.0	61.0	**67**
68	63 54.9	+58.1	48.2	64 34.3	+58.6	49.7	65 12.4	+59.0	51.4	65 49.1	+59.3	53.1	66 24.4	+59.6	54.9	66 58.0	+59.8	56.9	67 29.9	+60.0	58.9	68 00.0	+60.0	61.0	**68**
69	64 53.0	+58.0	47.6	65 32.9	+58.4	49.2	66 11.4	+58.8	50.9	66 48.4	+59.3	52.7	67 24.0	+59.5	54.6	67 57.8	+59.8	56.7	68 29.9	+59.9	58.8	69 00.0	+60.0	61.0	**69**
70	65 51.0	+57.9	47.0	66 31.3	+58.3	48.7	67 10.2	+58.8	50.4	67 47.7	+59.2	52.3	68 23.5	+59.5	54.3	68 57.6	+59.8	56.4	69 29.8	+60.0	58.7	70 00.0	+60.0	61.0	**70**
71	66 48.9	+57.6	46.3	67 29.6	+58.2	48.1	68 09.0	+58.7	49.9	68 46.9	+59.1	51.9	69 23.0	+59.5	54.0	69 57.4	+59.8	56.2	70 29.8	+59.9	58.5	71 00.0	+60.0	61.0	**71**
72	67 46.5	+57.5	45.6	68 27.8	+58.1	47.4	69 07.7	+58.5	49.3	69 46.0	+59.0	51.4	70 22.5	+59.4	53.6	70 57.2	+59.7	55.9	71 29.7	+59.9	58.4	72 00.0	+60.0	61.0	**72**
73	68 44.0	+57.2	44.8	69 25.9	+57.8	46.7	70 06.2	+58.4	48.7	70 45.0	+58.9	50.9	71 21.9	+59.4	53.2	71 56.9	+59.7	55.6	72 29.6	+60.0	58.2	73 00.0	+60.0	61.0	**73**
74	69 41.2	+57.0	44.0	70 23.7	+57.6	45.9	71 04.6	+58.3	48.0	71 43.9	+58.8	50.3	72 21.3	+59.2	52.7	72 56.6	+59.6	55.3	73 29.6	+59.9	58.0	74 00.0	+60.0	61.0	**74**
75	70 38.2	+56.6	43.1	71 21.3	+57.4	45.1	72 02.9	+58.0	47.3	72 42.7	+58.6	49.6	73 20.5	+59.2	52.2	73 56.2	+59.6	54.9	74 29.5	+59.9	57.8	75 00.0	+60.0	61.0	**75**
76	71 34.8	+56.3	42.0	72 18.7	+57.0	44.1	73 00.9	+57.8	46.4	73 41.3	+58.5	48.9	74 19.7	+59.1	51.6	74 55.8	+59.6	54.5	75 29.4	+59.8	57.6	76 00.0	+60.0	61.0	**76**
77	72 31.1	+55.9	40.9	73 15.7	+56.7	43.1	73 58.7	+57.5	45.5	74 39.8	+58.3	48.1	75 18.8	+58.9	50.9	75 55.4	+59.5	54.0	76 29.2	+59.9	57.4	77 00.0	+60.0	61.0	**77**
78	73 27.0	+55.4	39.7	74 12.4	+56.3	41.9	74 56.2	+57.2	44.4	75 38.1	+58.0	47.1	76 17.7	+58.8	50.1	76 54.9	+59.4	53.4	77 29.1	+59.8	57.1	78 00.0	+60.0	61.0	**78**
79	74 22.4	+54.8	38.3	75 08.7	+55.8	40.6	75 53.4	+56.8	43.2	76 36.1	+57.7	46.1	77 16.5	+58.6	49.3	77 54.3	+59.3	52.8	78 28.9	+59.8	56.7	79 00.0	+60.0	61.0	**79**
80	75 17.2	+54.1	36.7	76 04.5	+55.2	39.1	76 50.2	+56.2	41.8	77 33.8	+57.4	44.8	78 15.1	+58.3	48.2	78 53.6	+59.2	52.0	79 28.7	+59.8	56.3	80 00.0	+60.0	61.0	**80**
81	76 11.3	+53.2	35.0	76 59.7	+54.4	37.4	77 46.4	+55.7	40.2	78 31.2	+56.8	43.4	79 13.4	+58.0	47.0	79 52.8	+58.9	51.1	80 28.5	+59.7	55.8	81 00.0	+60.0	61.0	**81**
82	77 04.5	+52.2	33.0	77 54.1	+53.5	35.5	78 42.1	+54.8	38.4	79 28.0	+56.2	41.7	80 11.4	+57.6	45.6	80 51.7	+58.8	50.0	81 28.2	+59.7	55.2	82 00.0	+60.0	61.0	**82**
83	77 56.7	+50.9	30.7	78 47.6	+52.3	33.3	79 36.9	+53.8	36.3	80 24.2	+55.4	39.7	81 09.0	+56.9	43.9	81 50.5	+58.4	48.7	82 27.9	+59.5	54.4	83 00.0	+60.0	61.0	**83**
84	78 47.6	+49.3	28.1	79 39.9	+50.8	30.6	80 30.7	+52.5	33.7	81 19.6	+54.2	37.3	82 05.9	+56.1	41.7	82 48.9	+57.9	47.0	83 27.4	+59.4	53.3	84 00.0	+60.0	61.0	**84**
85	79 36.9	*+47.3* •	25.0	80 30.7	*+48.9* •	27.5	81 23.2	*+50.6* •	30.6	82 13.8	+52.7	34.3	83 02.0	+54.9	38.9	83 46.8	+57.1	44.7	84 26.8	+59.1	52.0	85 00.0	+60.0	61.0	**85**
86	80 24.2	*+44.8* •	21.5	81 19.6	*+46.3* •	23.9	82 13.8	*+48.2* •	26.8	83 06.5	*+50.4* •	30.6	83 56.9	*+52.9* •	35.4	84 43.9	+55.8	41.6	85 25.9	+58.5	50.0	86 00.0	+60.0	61.0	**86**
87	81 09.0	*+41.5* •	17.3	82 05.9	*+43.0* •	19.5	83 02.0	*+44.8* •	22.2	83 56.9	*+47.0* •	25.7	84 49.9	*+49.8* •	30.5	85 39.7	*+53.5* •	37.2	86 24.4	+57.5	46.9	87 00.0	+60.0	61.0	**87**
88	81 50.5	*+37.4* •	12.4	82 48.9	*+38.5* •	14.1	83 46.8	*+40.0* •	16.4	84 43.9	*+42.0* •	19.4	85 39.7	*+44.7* •	23.8	86 33.2	*+48.7* •	30.5	87 21.9	*+54.7* •	41.6	88 00.0	+60.0	61.0	**88**
89	82 27.9	*+32.1* •	6.7	83 27.4	*+32.6* •	7.7	84 26.8	*+33.2* •	9.1	85 25.9	*+34.1* •	11.0	86 24.4	*+35.6* •	14.1	87 21.9	*+38.1* •	19.4	88 16.6	*+43.4* •	30.5	89 00.0	+60.0	61.0	**89**
90	83 00.0	*+25.6* •	0.0	84 00.0	*+25.0* •	0.0	85 00.0	*+24.1* •	0.0	86 00.0	*+22.7* •	0.0	87 00.0	*+20.2* •	0.0	88 00.0	*+15.0* •	0.0	89 00.0	*–0.9* •	0.0	90 00.0	–60.0	30.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 119°, 241°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 16.8	+59.6	117.8	2 48.8	+59.7	117.9	2 20.7	+59.8	117.9	1 52.6	+59.9	117.9	1 24.5	+59.9	118.0	0 56.3	+60.0	118.0	0 28.2	+60.0	118.0	0 00.0	+60.0	118.0	**0**
1	4 16.4	+59.7	117.7	3 48.5	+59.8	117.8	3 20.5	+59.8	117.8	2 52.5	+59.9	117.9	2 24.4	+59.9	117.9	1 56.3	+60.0	118.0	1 28.2	+60.0	118.0	1 00.0	+60.0	118.0	**1**
2	5 16.1	+59.6	117.6	4 48.3	+59.7	117.7	4 20.3	+59.9	117.8	3 52.4	+59.9	117.8	3 24.3	+60.0	117.9	2 56.3	+59.9	117.9	2 28.2	+59.9	118.0	2 00.0	+60.0	118.0	**2**
3	6 15.7	+59.7	117.5	5 48.0	+59.7	117.6	5 20.2	+59.8	117.7	4 52.3	+59.8	117.8	4 24.3	+59.9	117.8	3 56.2	+60.0	117.9	3 28.1	+60.0	118.0	3 00.0	+60.0	118.0	**3**
4	7 15.4	+59.6	117.4	6 47.7	+59.8	117.5	6 20.0	+59.8	117.6	5 52.1	+59.9	117.7	5 24.2	+60.0	117.8	4 56.2	+60.0	117.9	4 28.1	+60.0	117.9	4 00.0	+60.0	118.0	**4**
5	8 15.0	+59.7	117.3	7 47.5	+59.7	117.4	7 19.8	+59.8	117.5	6 52.0	+59.9	117.6	6 24.2	+59.9	117.7	5 56.2	+60.0	117.8	5 28.1	+60.0	117.9	5 00.0	+60.0	118.0	**5**
6	9 14.7	+59.6	117.2	8 47.2	+59.8	117.3	8 19.6	+59.8	117.4	7 51.9	+59.9	117.6	7 24.1	+59.9	117.7	6 56.2	+59.9	117.8	6 28.1	+60.0	117.9	6 00.0	+60.0	118.0	**6**
7	10 14.3	+59.7	117.1	9 47.0	+59.7	117.2	9 19.4	+59.9	117.4	8 51.8	+59.9	117.5	8 24.0	+60.0	117.6	7 56.1	+60.0	117.8	7 28.1	+60.0	117.9	7 00.0	+60.0	118.0	**7**
8	11 14.0	+59.6	116.9	10 46.7	+59.7	117.1	10 19.3	+59.8	117.3	9 51.7	+59.9	117.4	9 24.0	+59.9	117.6	8 56.1	+60.0	117.7	8 28.1	+60.0	117.9	8 00.0	+60.0	118.0	**8**
9	12 13.6	+59.6	116.8	11 46.4	+59.8	117.0	11 19.1	+59.8	117.2	10 51.6	+59.8	117.4	10 23.9	+59.9	117.5	9 56.1	+59.9	117.7	9 28.1	+60.0	117.9	9 00.0	+60.0	118.0	**9**
10	13 13.2	+59.7	116.7	12 46.2	+59.7	116.9	12 18.9	+59.8	117.1	11 51.4	+59.9	117.3	11 23.8	+60.0	117.5	10 56.0	+60.0	117.7	10 28.1	+60.0	117.8	10 00.0	+60.0	118.0	**10**
11	14 12.9	+59.6	116.6	13 45.9	+59.7	116.8	13 18.7	+59.8	117.0	12 51.3	+59.9	117.3	12 23.8	+59.9	117.5	11 56.0	+60.0	117.6	11 28.1	+60.0	117.8	11 00.0	+60.0	118.0	**11**
12	15 12.5	+59.6	116.5	14 45.6	+59.7	116.7	14 18.5	+59.8	117.0	13 51.2	+59.9	117.2	13 23.7	+59.9	117.4	12 56.0	+59.9	117.6	12 28.1	+60.0	117.8	12 00.0	+60.0	118.0	**12**
13	16 12.1	+59.6	116.4	15 45.3	+59.8	116.6	15 18.3	+59.8	116.9	14 51.1	+59.9	117.1	14 23.6	+60.0	117.4	13 55.9	+60.0	117.6	13 28.1	+60.0	117.8	13 00.0	+60.0	118.0	**13**
14	17 11.7	+59.6	116.3	16 45.1	+59.7	116.5	16 18.1	+59.8	116.8	15 51.0	+59.8	117.1	15 23.6	+59.9	117.3	14 55.9	+60.0	117.5	14 28.1	+60.0	117.8	14 00.0	+60.0	118.0	**14**
15	18 11.3	+59.7	116.1	17 44.8	+59.7	116.4	17 17.9	+59.8	116.7	16 50.8	+59.9	117.0	16 23.5	+59.9	117.3	15 55.9	+60.0	117.5	15 28.1	+59.9	117.8	15 00.0	+60.0	118.0	**15**
16	19 11.0	+59.6	116.0	18 44.5	+59.7	116.3	18 17.7	+59.8	116.6	17 50.7	+59.9	116.9	17 23.4	+59.9	117.2	16 55.9	+59.9	117.5	16 28.0	+60.0	117.7	16 00.0	+60.0	118.0	**16**
17	20 10.6	+59.6	115.9	19 44.2	+59.7	116.2	19 17.5	+59.8	116.5	18 50.6	+59.9	116.9	18 23.3	+60.0	117.2	17 55.8	+60.0	117.4	17 28.0	+60.0	117.7	17 00.0	+60.0	118.0	**17**
18	21 10.2	+59.6	115.8	20 43.9	+59.7	116.1	20 17.3	+59.8	116.5	19 50.5	+59.8	116.8	19 23.3	+59.9	117.1	18 55.8	+60.0	117.4	18 28.0	+60.0	117.7	18 00.0	+60.0	118.0	**18**
19	22 09.8	+59.6	115.7	21 43.6	+59.7	116.0	21 17.1	+59.8	116.4	20 50.3	+59.9	116.7	20 23.2	+59.9	117.0	19 55.8	+59.9	117.4	19 28.0	+60.0	117.7	19 00.0	+60.0	118.0	**19**
20	23 09.4	+59.5	115.5	22 43.3	+59.7	115.9	22 16.9	+59.8	116.3	21 50.2	+59.9	116.6	21 23.1	+60.0	117.0	20 55.7	+60.0	117.3	20 28.0	+60.0	117.7	20 00.0	+60.0	118.0	**20**
21	24 08.9	+59.6	115.4	23 43.0	+59.7	115.8	23 16.7	+59.8	116.2	22 50.1	+59.8	116.6	22 23.1	+59.9	116.9	21 55.7	+60.0	117.3	21 28.0	+60.0	117.7	21 00.0	+60.0	118.0	**21**
22	25 08.5	+59.6	115.3	24 42.7	+59.7	115.7	24 16.5	+59.8	116.1	23 49.9	+59.9	116.5	23 23.0	+59.9	116.9	22 55.7	+59.9	117.3	22 28.0	+60.0	117.6	22 00.0	+60.0	118.0	**22**
23	26 08.1	+59.6	115.1	25 42.4	+59.7	115.6	25 16.3	+59.8	116.0	24 49.8	+59.9	116.4	24 22.9	+59.9	116.8	23 55.6	+60.0	117.2	23 28.0	+60.0	117.6	23 00.0	+60.0	118.0	**23**
24	27 07.7	+59.5	115.0	26 42.1	+59.7	115.5	26 16.1	+59.7	115.9	25 49.7	+59.8	116.3	25 22.8	+59.9	116.8	24 55.6	+60.0	117.2	24 28.0	+60.0	117.6	24 00.0	+60.0	118.0	**24**
25	28 07.2	+59.6	114.9	27 41.8	+59.6	115.3	27 15.8	+59.8	115.8	26 49.5	+59.9	116.3	26 22.7	+60.0	116.7	25 55.6	+59.9	117.2	25 28.0	+60.0	117.6	25 00.0	+60.0	118.0	**25**
26	29 06.8	+59.5	114.7	28 41.4	+59.7	115.2	28 15.6	+59.8	115.7	27 49.4	+59.8	116.2	27 22.7	+59.9	116.7	26 55.5	+60.0	117.1	26 28.0	+60.0	117.6	26 00.0	+60.0	118.0	**26**
27	30 06.3	+59.5	114.6	29 41.1	+59.6	115.1	29 15.4	+59.8	115.6	28 49.2	+59.9	116.1	28 22.6	+59.9	116.6	27 55.5	+60.0	117.1	27 28.0	+59.9	117.5	27 00.0	+60.0	118.0	**27**
28	31 05.8	+59.5	114.4	30 40.7	+59.7	115.0	30 15.2	+59.7	115.5	29 49.1	+59.8	116.0	29 22.5	+59.9	116.5	28 55.5	+59.9	117.0	28 27.9	+60.0	117.5	28 00.0	+60.0	118.0	**28**
29	32 05.3	+59.6	114.3	31 40.4	+59.6	114.9	31 14.9	+59.8	115.4	30 48.9	+59.9	115.9	30 22.4	+59.9	116.5	29 55.4	+60.0	117.0	29 27.9	+60.0	117.5	29 00.0	+60.0	118.0	**29**
30	33 04.9	+59.4	114.1	32 40.0	+59.7	114.7	32 14.7	+59.7	115.3	31 48.8	+59.8	115.9	31 22.3	+59.9	116.4	30 55.4	+59.9	117.0	30 27.9	+60.0	117.5	30 00.0	+60.0	118.0	**30**
31	34 04.3	+59.5	114.0	33 39.7	+59.6	114.6	33 14.4	+59.8	115.2	32 48.6	+59.8	115.8	32 22.2	+59.9	116.4	31 55.3	+60.0	116.9	31 27.9	+60.0	117.5	31 00.0	+60.0	118.0	**31**
32	35 03.8	+59.5	113.8	34 39.3	+59.6	114.5	34 14.2	+59.7	115.1	33 48.4	+59.9	115.7	33 22.1	+60.0	116.3	32 55.3	+60.0	116.9	32 27.9	+60.0	117.4	32 00.0	+60.0	118.0	**32**
33	36 03.3	+59.5	113.7	35 38.9	+59.6	114.3	35 13.9	+59.7	115.0	34 48.3	+59.8	115.6	34 22.1	+59.9	116.2	33 55.3	+59.9	116.8	33 27.9	+60.0	117.4	33 00.0	+60.0	118.0	**33**
34	37 02.8	+59.4	113.5	36 38.5	+59.6	114.2	36 13.6	+59.7	114.8	35 48.1	+59.8	115.5	35 22.0	+59.9	116.2	34 55.2	+60.0	116.8	34 27.9	+60.0	117.4	34 00.0	+60.0	118.0	**34**
35	38 02.2	+59.4	113.3	37 38.1	+59.6	114.0	37 13.3	+59.8	114.7	36 47.9	+59.8	115.4	36 21.9	+59.9	116.1	35 55.2	+59.9	116.7	35 27.9	+60.0	117.4	35 00.0	+60.0	118.0	**35**
36	39 01.6	+59.5	113.1	38 37.7	+59.6	113.9	38 13.1	+59.7	114.6	37 47.7	+59.9	115.3	37 21.8	+59.9	116.0	36 55.1	+60.0	116.7	36 27.9	+60.0	117.4	36 00.0	+60.0	118.0	**36**
37	40 01.1	+59.3	113.0	39 37.3	+59.5	113.7	39 12.8	+59.7	114.5	38 47.6	+59.8	115.2	38 21.7	+59.8	115.9	37 55.1	+59.9	116.6	37 27.9	+59.9	117.3	37 00.0	+60.0	118.0	**37**
38	41 00.4	+59.4	112.8	40 36.8	+59.6	113.6	40 12.5	+59.7	114.3	39 47.4	+59.8	115.1	39 21.5	+59.9	115.9	38 55.0	+60.0	116.6	38 27.8	+60.0	117.3	38 00.0	+60.0	118.0	**38**
39	41 59.8	+59.4	112.6	41 36.4	+59.5	113.4	41 12.2	+59.6	114.2	40 47.2	+59.8	115.0	40 21.4	+59.9	115.8	39 55.0	+59.9	116.5	39 27.8	+60.0	117.3	39 00.0	+60.0	118.0	**39**
40	42 59.2	+59.3	112.4	42 35.9	+59.5	113.2	42 11.8	+59.7	114.1	41 47.0	+59.8	114.9	41 21.3	+59.9	115.7	40 54.9	+60.0	116.5	40 27.8	+60.0	117.3	40 00.0	+60.0	118.0	**40**
41	43 58.5	+59.3	112.2	43 35.4	+59.5	113.1	43 11.5	+59.7	113.9	42 46.8	+59.7	114.8	42 21.2	+59.9	115.6	41 54.9	+59.9	116.4	41 27.8	+60.0	117.2	41 00.0	+60.0	118.0	**41**
42	44 57.8	+59.3	112.0	44 34.9	+59.5	112.9	44 11.2	+59.6	113.8	43 46.5	+59.8	114.7	43 21.1	+59.9	115.5	42 54.8	+60.0	116.4	42 27.8	+60.0	117.2	42 00.0	+60.0	118.0	**42**
43	45 57.1	+59.3	111.8	45 34.4	+59.5	112.7	45 10.8	+59.7	113.6	44 46.3	+59.8	114.5	44 21.0	+59.8	115.4	43 54.8	+59.9	116.3	43 27.8	+60.0	117.2	43 00.0	+60.0	118.0	**43**
44	46 56.4	+59.2	111.5	46 33.9	+59.4	112.5	46 10.5	+59.6	113.5	45 46.1	+59.8	114.4	45 20.8	+59.9	115.3	44 54.7	+60.0	116.3	44 27.8	+60.0	117.1	44 00.0	+60.0	118.0	**44**
45	47 55.6	+59.2	111.3	47 33.3	+59.5	112.3	47 10.1	+59.6	113.3	46 45.9	+59.7	114.3	46 20.7	+59.9	115.3	45 54.7	+59.9	116.2	45 27.8	+59.9	117.1	45 00.0	+60.0	118.0	**45**
46	48 54.8	+59.2	111.0	48 32.8	+59.4	112.1	48 09.7	+59.6	113.1	47 45.6	+59.7	114.2	47 20.6	+59.8	115.2	46 54.6	+59.9	116.1	46 27.7	+60.0	117.1	46 00.0	+60.0	118.0	**46**
47	49 54.0	+59.1	110.8	49 32.2	+59.3	111.9	49 09.3	+59.5	113.0	48 45.3	+59.8	114.0	48 20.4	+59.9	115.1	47 54.5	+60.0	116.1	47 27.7	+60.0	117.0	47 00.0	+60.0	118.0	**47**
48	50 53.1	+59.1	110.5	50 31.5	+59.4	111.7	50 08.8	+59.6	112.8	49 45.1	+59.7	113.9	49 20.3	+59.8	114.9	48 54.5	+59.9	116.0	48 27.7	+60.0	117.0	48 00.0	+60.0	118.0	**48**
49	51 52.2	+59.1	110.3	51 30.9	+59.3	111.4	51 08.4	+59.5	112.6	50 44.8	+59.7	113.7	50 20.1	+59.9	114.8	49 54.4	+59.9	115.9	49 27.7	+60.0	117.0	49 00.0	+60.0	118.0	**49**
50	52 51.3	+59.0	110.0	52 30.2	+59.3	111.2	52 07.9	+59.6	112.4	51 44.5	+59.7	113.6	51 20.0	+59.8	114.7	50 54.3	+60.0	115.8	50 27.7	+60.0	116.9	50 00.0	+60.0	118.0	**50**
51	53 50.3	+59.0	109.7	53 29.5	+59.3	110.9	53 07.5	+59.4	112.2	52 44.2	+59.7	113.4	52 19.8	+59.8	114.6	51 54.3	+59.9	115.8	51 27.7	+59.9	116.9	51 00.0	+60.0	118.0	**51**
52	54 49.3	+58.9	109.3	54 28.8	+59.2	110.7	54 06.9	+59.5	112.0	53 43.9	+59.7	113.2	53 19.6	+59.8	114.5	52 54.2	+59.9	115.7	52 27.6	+60.0	116.9	52 00.0	+60.0	118.0	**52**
53	55 48.2	+58.9	109.0	55 28.0	+59.2	110.4	55 06.4	+59.5	111.7	54 43.6	+59.6	113.1	54 19.4	+59.8	114.3	53 54.1	+59.9	115.6	53 27.6	+60.0	116.8	53 00.0	+60.0	118.0	**53**
54	56 47.1	+58.8	108.7	56 27.2	+59.1	110.1	56 05.9	+59.4	111.5	55 43.2	+59.6	112.9	55 19.2	+59.8	114.2	54 54.0	+59.9	115.5	54 27.6	+60.0	116.8	54 00.0	+60.0	118.0	**54**
55	57 45.9	+58.7	108.3	57 26.3	+59.1	109.8	57 05.3	+59.3	111.2	56 42.8	+59.6	112.7	56 19.0	+59.8	114.1	55 53.9	+59.9	115.4	55 27.6	+60.0	116.7	55 00.0	+60.0	118.0	**55**
56	58 44.6	+58.7	107.9	58 25.4	+59.0	109.5	58 04.6	+59.4	111.0	57 42.4	+59.6	112.5	57 18.8	+59.8	113.9	56 53.8	+59.9	115.3	56 27.6	+59.9	116.7	56 00.0	+60.0	118.0	**56**
57	59 43.3	+58.5	107.5	59 24.4	+59.0	109.1	59 04.0	+59.3	110.7	58 42.0	+59.6	112.2	58 18.6	+59.8	113.7	57 53.7	+59.9	115.2	57 27.5	+60.0	116.6	57 00.0	+60.0	118.0	**57**
58	60 41.8	+58.5	107.1	60 23.4	+58.9	108.7	60 03.3	+59.3	110.4	59 41.6	+59.5	112.0	59 18.4	+59.7	113.6	58 53.6	+59.9	115.1	58 27.5	+60.0	116.6	58 00.0	+60.0	118.0	**58**
59	61 40.3	+58.4	106.6	61 22.3	+58.8	108.4	61 02.6	+59.2	110.1	60 41.1	+59.5	111.7	60 18.1	+59.7	113.4	59 53.5	+59.9	115.0	59 27.5	+60.0	116.5	59 00.0	+60.0	118.0	**59**
60	62 38.7	+58.3	106.1	62 21.1	+58.8	107.9	62 01.8	+59.1	109.7	61 40.6	+59.5	111.5	61 17.8	+59.8	113.2	60 53.4	+59.9	114.8	60 27.5	+59.9	116.4	60 00.0	+60.0	118.0	**60**
61	63 37.0	+58.1	105.6	63 19.9	+58.7	107.5	63 00.9	+59.1	109.4	62 40.1	+59.5	111.2	62 17.6	+59.6	113.0	61 53.3	+59.9	114.7	61 27.4	+60.0	116.4	61 00.0	+60.0	118.0	**61**
62	64 35.1	+58.0	105.0	64 18.6	+58.5	107.0	64 00.0	+59.1	109.0	63 39.6	+59.4	110.9	63 17.2	+59.7	112.8	62 53.2	+59.8	114.6	62 27.4	+60.0	116.3	62 00.0	+60.0	118.0	**62**
63	65 33.1	+57.9	104.4	65 17.1	+58.5	106.5	64 59.1	+58.9	108.6	64 39.0	+59.3	110.6	64 16.9	+59.7	112.5	63 53.0	+59.9	114.4	63 27.4	+59.9	116.2	63 00.0	+60.0	118.0	**63**
64	66 31.0	+57.7	103.8	66 15.6	+58.3	106.0	65 58.0	+58.9	108.1	65 38.3	+59.3	110.2	65 16.6	+59.6	112.3	64 52.9	+59.8	114.2	64 27.3	+60.0	116.2	64 00.0	+60.0	118.0	**64**
65	67 28.7	+57.5	103.0	67 13.9	+58.2	105.4	66 56.9	+58.8	107.6	66 37.6	+59.2	109.8	66 16.2	+59.6	112.0	65 52.7	+59.8	114.1	65 27.3	+59.9	116.1	65 00.0	+60.0	118.0	**65**
66	68 26.2	+57.2	102.3	68 12.1	+58.1	104.7	67 55.7	+58.6	107.1	67 36.8	+59.2	109.4	67 15.8	+59.5	111.7	66 52.5	+59.8	113.9	66 27.2	+60.0	116.0	66 00.0	+60.0	118.0	**66**
67	69 23.4	+57.0	101.5	69 10.2	+57.8	104.0	68 54.3	+58.6	106.5	68 36.0	+59.1	109.0	68 15.3	+59.5	111.4	67 52.3	+59.8	113.7	67 27.2	+59.9	115.9	67 00.0	+60.0	118.0	**67**
68	70 20.4	+56.7	100.5	70 08.0	+57.7	103.3	69 52.9	+58.4	105.9	69 35.1	+59.0	108.5	69 14.8	+59.5	111.0	68 52.1	+59.8	113.4	68 27.1	+60.0	115.8	68 00.0	+60.0	118.0	**68**
69	71 17.1	+56.3	99.5	71 05.7	+57.3	102.4	70 51.3	+58.2	105.2	70 34.1	+58.9	108.0	70 14.3	+59.4	110.6	69 51.9	+59.7	113.2	69 27.1	+59.9	115.6	69 00.0	+60.0	118.0	**69**
70	72 13.4	+56.0	98.4	72 03.0	+57.1	101.5	71 49.5	+58.1	104.5	71 33.0	+58.8	107.4	71 13.7	+59.3	110.2	70 51.6	+59.8	112.9	70 27.0	+60.0	115.5	70 00.0	+60.0	118.0	**70**
71	73 09.4	+55.4	97.2	73 00.1	+56.8	100.5	72 47.6	+57.8	103.7	72 31.8	+58.7	106.8	72 13.0	+59.3	109.7	71 51.4	+59.6	112.6	71 27.0	+59.9	115.4	71 00.0	+60.0	118.0	**71**
72	74 04.8	+54.9	95.9	73 56.9	+56.3	99.3	73 45.4	+57.5	102.7	73 30.5	+58.5	106.0	73 12.3	+59.2	109.2	72 51.0	+59.7	112.3	72 26.9	+59.9	115.2	72 00.0	+60.0	118.0	**72**
73	74 59.7	+54.2	94.4	74 53.2	+55.9	98.1	74 42.9	+57.2	101.7	74 29.0	+58.2	105.2	74 11.5	+59.1	108.6	73 50.7	+59.6	111.9	73 26.8	+59.9	115.0	73 00.0	+60.0	118.0	**73**
74	75 53.9	+53.4	92.7	75 49.1	+55.2	96.6	75 40.1	+56.9	100.5	75 27.2	+58.1	104.3	75 10.6	+58.9	108.0	74 50.3	+59.6	111.5	74 26.7	+59.9	114.8	74 00.0	+60.0	118.0	**74**
75	76 47.3	+52.4	90.7	76 44.3	+54.6	95.0	76 37.0	+56.3	99.2	76 25.3	+57.7	103.3	76 09.5	+58.8	107.2	75 49.9	+59.4	111.0	75 26.6	+59.9	114.6	75 00.0	+60.0	118.0	**75**
76	77 39.7	+51.2	88.5	77 38.9	+53.6	93.1	77 33.3	+55.7	97.6	77 23.0	+57.4	102.1	77 08.3	+58.6	106.3	76 49.3	+59.5	110.4	76 26.5	+59.8	114.3	76 00.0	+60.0	118.0	**76**
77	78 30.9	+49.7	86.0	78 32.5	+52.6	90.9	78 29.0	+54.9	95.8	78 20.4	+56.9	100.7	78 06.9	+58.3	105.3	77 48.8	+59.3	109.8	77 26.3	+59.9	114.0	77 00.0	+60.0	118.0	**77**
78	79 20.6	*+47.8*•	83.1	79 25.1	+51.1	88.4	79 23.9	+54.0	93.7	79 17.3	+56.3	99.0	79 05.2	+58.0	104.2	78 48.1	+59.1	109.1	78 26.2	+59.8	113.7	78 00.0	+60.0	118.0	**78**
79	80 08.4	*+45.3*•	79.7	80 16.2	*+49.2*•	85.4	80 17.9	+52.7	91.3	80 13.6	+55.4	97.1	80 03.2	+57.6	102.7	79 47.2	+59.0	108.2	79 26.0	+59.7	113.3	79 00.0	+60.0	118.0	**79**
80	80 53.7	*+42.4*•	75.7	81 05.4	*+46.9*•	81.9	81 10.6	*+51.0*•	88.3	81 09.0	+54.4	94.7	81 00.8	+57.0	101.0	80 46.2	+58.8	107.1	80 25.7	+59.8	112.8	80 00.0	+60.0	118.0	**80**
81	81 36.1	*+38.5*•	71.0	81 52.3	*+43.7*•	77.7	82 01.6	*+48.6*•	84.7	82 03.4	+52.9	91.8	81 57.8	+56.2	98.9	81 45.0	+58.4	105.7	81 25.5	+59.6	112.1	81 00.0	+60.0	118.0	**81**
82	82 14.6	*+33.6*•	65.6	82 36.0	*+39.6*•	72.6	82 50.2	*+45.4*•	80.2	82 56.3	*+50.7*•	88.2	82 54.0	+54.9	96.2	82 43.4	+57.9	104.0	82 25.1	+59.5	111.4	82 00.0	+60.0	118.0	**82**
83	82 48.2	*+27.4*•	59.2	83 15.6	*+34.1*•	66.5	83 35.6	*+41.0*•	74.7	83 47.0	*+47.6*•	83.6	83 48.9	*+53.2*•	92.8	83 41.3	+57.1	101.8	83 24.6	+59.4	110.3	83 00.0	+60.0	118.0	**83**
84	83 15.6	*+20.0*•	51.9	83 49.7	*+26.9*•	59.1	84 16.6	*+34.7*•	67.7	84 34.6	*+42.8*•	77.5	84 42.1	*+50.3*•	88.1	84 38.4	+56.0	98.8	84 24.0	+59.1	109.0	84 00.0	+60.0	118.0	**84**
85	83 35.6	*+11.4*•	43.6	84 16.6	*+18.0*•	50.5	84 51.3	*+26.1*•	59.1	85 17.4	*+35.5*•	69.6	85 32.4	*+45.3*•	81.7	85 34.4	*+53.6*•	94.6	85 23.1	+58.6	107.0	85 00.0	+60.0	118.0	**85**
86	83 47.0	*+1.9*•	34.7	84 34.6	*+7.5*•	40.7	85 17.4	*+15.0*•	48.6	85 52.9	*+24.8*•	59.1	86 17.7	*+36.9*•	72.4	86 28.0	*+49.2*•	88.1	86 21.7	+57.5	104.0	86 00.0	+60.0	118.0	**86**
87	83 48.9	*−7.6*•	25.4	84 42.1	*−3.7*•	30.0	85 32.4	*+2.0*•	36.5	86 17.7	*+10.3*•	45.7	86 54.6	*+22.6*•	59.0	87 17.2	*+39.2*•	77.4	87 19.2	*+54.8*•	98.8	87 00.0	+60.0	118.0	**87**
88	83 41.3	*−16.7*•	16.3	84 38.4	*−14.4*•	19.3	85 34.4	*−11.3*•	23.5	86 28.0	*−6.3*•	30.0	87 17.2	*+2.0*•	40.6	87 56.4	*+17.6*•	59.0	88 14.0	*+44.2*•	88.0	88 00.0	+60.0	118.0	**88**
89	83 24.6	*−24.6*•	7.7	84 24.0	*−24.0*•	9.1	85 23.1	*−23.1*•	11.0	86 21.7	*−21.7*•	14.1	87 19.2	*−19.2*•	19.2	88 14.0	*−14.0*•	30.0	88 58.2	*+1.8*•	59.0	89 00.0	+60.0	118.0	**89**
90	83 00.0	*−31.3*•	0.0	84 00.0	*−31.8*•	0.0	85 00.0	*−32.4*•	0.0	86 00.0	*−33.3*•	0.0	87 00.0	*−34.8*•	0.0	88 00.0	*−37.4*•	0.0	89 00.0	*−42.9*•	0.0	90 00.0	*−60.0*	59.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 62°, 298°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 16.8	–59.7	117.8	2 48.8	–59.8	117.9	2 20.7	–59.8	117.9	1 52.6	–59.9	117.9	1 24.5	–60.0	118.0	0 56.3	–59.9	118.0	0 28.2	–60.0	118.0	0 00.0	+60.0	62.0	**0**
1	2 17.1	–59.6	117.9	1 49.0	–59.7	118.0	1 20.9	–59.8	118.0	0 52.7	–59.9	118.0	0 24.5	–59.9	118.0	0 03.6	+60.0	62.0	0 31.8	+60.0	62.0	1 00.0	+60.0	62.0	**1**
2	1 17.5	–59.7	118.0	0 49.3	–59.8	118.1	0 21.1	–59.9	118.1	0 07.2	+59.9	61.9	0 35.4	+59.9	61.9	1 03.6	+60.0	62.0	1 31.8	+60.0	62.0	2 00.0	+60.0	62.0	**2**
3	0 17.8	–59.6	118.1	0 10.5	+59.7	61.9	0 38.8	+59.8	61.9	1 07.1	+59.8	61.9	1 35.3	+60.0	61.9	2 03.6	+60.0	61.9	2 31.8	+60.0	62.0	3 00.0	+60.0	62.0	**3**
4	0 41.8	+59.7	61.7	1 10.2	+59.7	61.8	1 38.6	+59.8	61.8	2 06.9	+59.9	61.8	2 35.3	+59.9	61.8	3 03.6	+59.9	61.9	3 31.8	+60.0	61.9	4 00.0	+60.0	62.0	**4**
5	1 41.5	+59.6	61.6	2 09.9	+59.8	61.7	2 38.4	+59.8	61.7	3 06.8	+59.9	61.7	3 35.2	+59.9	61.8	4 03.5	+60.0	61.9	4 31.8	+60.0	61.9	5 00.0	+60.0	62.0	**5**
6	2 41.1	+59.7	61.5	3 09.7	+59.7	61.6	3 38.2	+59.9	61.6	4 06.7	+59.9	61.7	4 35.1	+60.0	61.8	5 03.5	+60.0	61.8	5 31.8	+60.0	61.9	6 00.0	+60.0	62.0	**6**
7	3 40.8	+59.6	61.4	4 09.4	+59.8	61.5	4 38.1	+59.8	61.6	5 06.6	+59.9	61.6	5 35.1	+59.9	61.7	6 03.5	+59.9	61.8	6 31.8	+60.0	61.9	7 00.0	+60.0	62.0	**7**
8	4 40.4	+59.7	61.3	5 09.2	+59.7	61.4	5 37.9	+59.8	61.5	6 06.5	+59.9	61.6	6 35.0	+59.9	61.7	7 03.4	+60.0	61.8	7 31.8	+60.0	61.9	8 00.0	+60.0	62.0	**8**
9	5 40.1	+59.6	61.2	6 08.9	+59.8	61.3	6 37.7	+59.8	61.4	7 06.4	+59.9	61.5	7 34.9	+60.0	61.6	8 03.4	+60.0	61.7	8 31.8	+60.0	61.9	9 00.0	+60.0	62.0	**9**
10	6 39.7	+59.7	61.1	7 08.7	+59.7	61.2	7 37.5	+59.8	61.3	8 06.3	+59.8	61.4	8 34.9	+59.9	61.6	9 03.4	+60.0	61.7	9 31.8	+60.0	61.8	10 00.0	+60.0	62.0	**10**
11	7 39.4	+59.6	61.0	8 08.4	+59.7	61.1	8 37.3	+59.8	61.2	9 06.1	+59.9	61.4	9 34.8	+59.9	61.5	10 03.4	+59.9	61.7	10 31.8	+59.9	61.8	11 00.0	+60.0	62.0	**11**
12	8 39.0	+59.6	60.9	9 08.1	+59.8	61.0	9 37.1	+59.9	61.2	10 06.0	+59.9	61.3	10 34.7	+60.0	61.5	11 03.3	+60.0	61.6	11 31.7	+60.0	61.8	12 00.0	+60.0	62.0	**12**
13	9 38.6	+59.7	60.8	10 07.9	+59.7	60.9	10 37.0	+59.8	61.1	11 05.9	+59.9	61.2	11 34.7	+59.9	61.4	12 03.3	+60.0	61.6	12 31.7	+60.0	61.8	13 00.0	+60.0	62.0	**13**
14	10 38.3	+59.6	60.7	11 07.6	+59.7	60.8	11 36.8	+59.8	61.0	12 05.8	+59.9	61.2	12 34.6	+59.9	61.4	13 03.3	+59.9	61.6	13 31.7	+60.0	61.8	14 00.0	+60.0	62.0	**14**
15	11 37.9	+59.7	60.5	12 07.3	+59.8	60.7	12 36.6	+59.8	60.9	13 05.7	+59.8	61.1	13 34.5	+60.0	61.3	14 03.2	+60.0	61.5	14 31.7	+60.0	61.8	15 00.0	+60.0	62.0	**15**
16	12 37.6	+59.6	60.4	13 07.1	+59.7	60.6	13 36.4	+59.8	60.8	14 05.5	+59.9	61.1	14 34.5	+59.9	61.3	15 03.2	+60.0	61.5	15 31.7	+60.0	61.8	16 00.0	+60.0	62.0	**16**
17	13 37.2	+59.6	60.3	14 06.8	+59.7	60.5	14 36.2	+59.8	60.8	15 05.4	+59.9	61.0	15 34.4	+59.9	61.2	16 03.2	+59.9	61.5	16 31.7	+60.0	61.7	17 00.0	+60.0	62.0	**17**
18	14 36.8	+59.6	60.2	15 06.5	+59.8	60.4	15 36.0	+59.8	60.7	16 05.3	+59.9	60.9	16 34.3	+60.0	61.2	17 03.1	+60.0	61.4	17 31.7	+60.0	61.7	18 00.0	+60.0	62.0	**18**
19	15 36.4	+59.7	60.1	16 06.3	+59.7	60.3	16 35.8	+59.8	60.6	17 05.2	+59.8	60.9	17 34.3	+59.9	61.1	18 03.1	+60.0	61.4	18 31.7	+60.0	61.7	19 00.0	+60.0	62.0	**19**
20	16 36.1	+59.6	60.0	17 06.0	+59.7	60.2	17 35.6	+59.8	60.5	18 05.0	+59.9	60.8	18 34.2	+59.9	61.1	19 03.1	+59.9	61.4	19 31.7	+60.0	61.7	20 00.0	+60.0	62.0	**20**
21	17 35.7	+59.6	59.9	18 05.7	+59.7	60.1	18 35.4	+59.8	60.4	19 04.9	+59.9	60.7	19 34.1	+60.0	61.0	20 03.0	+60.0	61.3	20 31.7	+60.0	61.7	21 00.0	+60.0	62.0	**21**
22	18 35.3	+59.6	59.7	19 05.4	+59.7	60.0	19 35.2	+59.8	60.3	20 04.8	+59.9	60.6	20 34.1	+59.9	61.0	21 03.0	+60.0	61.3	21 31.7	+60.0	61.6	22 00.0	+60.0	62.0	**22**
23	19 34.9	+59.6	59.6	20 05.1	+59.7	59.9	20 35.0	+59.8	60.2	21 04.7	+59.8	60.6	21 34.0	+59.9	60.9	22 03.0	+60.0	61.3	22 31.7	+60.0	61.6	23 00.0	+60.0	62.0	**23**
24	20 34.5	+59.6	59.5	21 04.8	+59.7	59.8	21 34.8	+59.8	60.2	22 04.5	+59.9	60.5	22 33.9	+59.9	60.9	23 03.0	+59.9	61.2	23 31.7	+59.9	61.6	24 00.0	+60.0	62.0	**24**
25	21 34.1	+59.6	59.4	22 04.5	+59.7	59.7	22 34.6	+59.8	60.1	23 04.4	+59.9	60.4	23 33.8	+60.0	60.8	24 02.9	+60.0	61.2	24 31.6	+60.0	61.6	25 00.0	+60.0	62.0	**25**
26	22 33.7	+59.6	59.2	23 04.2	+59.7	59.6	23 34.4	+59.8	60.0	24 04.3	+59.8	60.4	24 33.8	+59.9	60.8	25 02.9	+59.9	61.2	25 31.6	+60.0	61.6	26 00.0	+60.0	62.0	**26**
27	23 33.3	+59.6	59.1	24 03.9	+59.7	59.5	24 34.2	+59.8	59.9	25 04.1	+59.9	60.3	25 33.7	+59.9	60.7	26 02.8	+60.0	61.1	26 31.6	+60.0	61.6	27 00.0	+60.0	62.0	**27**
28	24 32.9	+59.6	59.0	25 03.6	+59.7	59.4	25 34.0	+59.8	59.8	26 04.0	+59.8	60.2	26 33.6	+59.9	60.6	27 02.8	+60.0	61.1	27 31.6	+60.0	61.5	28 00.0	+60.0	62.0	**28**
29	25 32.5	+59.5	58.9	26 03.3	+59.7	59.3	26 33.8	+59.7	59.7	27 03.8	+59.9	60.1	27 33.5	+59.9	60.6	28 02.8	+59.9	61.0	28 31.6	+60.0	61.5	29 00.0	+60.0	62.0	**29**
30	26 32.0	+59.6	58.7	27 03.0	+59.7	59.2	27 33.5	+59.8	59.6	28 03.7	+59.8	60.1	28 33.4	+59.9	60.5	29 02.7	+60.0	61.0	29 31.6	+60.0	61.5	30 00.0	+60.0	62.0	**30**
31	27 31.6	+59.5	58.6	28 02.7	+59.6	59.0	28 33.3	+59.8	59.5	29 03.5	+59.9	60.0	29 33.3	+60.0	60.5	30 02.7	+60.0	61.0	30 31.6	+60.0	61.5	31 00.0	+60.0	62.0	**31**
32	28 31.1	+59.6	58.5	29 02.3	+59.7	58.9	29 33.1	+59.7	59.4	30 03.4	+59.8	59.9	30 33.3	+59.9	60.4	31 02.7	+59.9	60.9	31 31.6	+60.0	61.5	32 00.0	+60.0	62.0	**32**
33	29 30.7	+59.5	58.3	30 02.0	+59.6	58.8	30 32.8	+59.8	59.3	31 03.2	+59.9	59.8	31 33.2	+59.9	60.3	32 02.6	+60.0	60.9	32 31.6	+60.0	61.4	33 00.0	+60.0	62.0	**33**
34	30 30.2	+59.5	58.2	31 01.6	+59.7	58.7	31 32.6	+59.8	59.2	32 03.1	+59.8	59.7	32 33.1	+59.9	60.3	33 02.6	+59.9	60.8	33 31.6	+59.9	61.4	34 00.0	+60.0	62.0	**34**
35	31 29.7	+59.6	58.0	32 01.3	+59.6	58.5	32 32.4	+59.7	59.1	33 02.9	+59.9	59.6	33 33.0	+59.9	60.2	34 02.5	+60.0	60.8	34 31.5	+60.0	61.4	35 00.0	+60.0	62.0	**35**
36	32 29.3	+59.5	57.9	33 00.9	+59.7	58.4	33 32.1	+59.7	59.0	34 02.8	+59.8	59.6	34 32.9	+59.9	60.1	35 02.5	+60.0	60.7	35 31.5	+60.0	61.4	36 00.0	+60.0	62.0	**36**
37	33 28.8	+59.5	57.7	34 00.6	+59.6	58.3	34 31.8	+59.8	58.9	35 02.6	+59.8	59.5	35 32.8	+59.9	60.1	36 02.5	+59.9	60.7	36 31.5	+60.0	61.3	37 00.0	+60.0	62.0	**37**
38	34 28.3	+59.4	57.6	35 00.2	+59.6	58.1	35 31.6	+59.7	58.8	36 02.4	+59.8	59.4	36 32.7	+59.9	60.0	37 02.4	+60.0	60.7	37 31.5	+60.0	61.3	38 00.0	+60.0	62.0	**38**
39	35 27.7	+59.5	57.4	35 59.8	+59.6	58.0	36 31.3	+59.7	58.6	37 02.2	+59.9	59.3	37 32.6	+59.9	59.9	38 02.4	+59.9	60.6	38 31.5	+60.0	61.3	39 00.0	+60.0	62.0	**39**
40	36 27.2	+59.5	57.2	36 59.4	+59.6	57.9	37 31.0	+59.7	58.5	38 02.1	+59.8	59.2	38 32.5	+59.9	59.9	39 02.3	+60.0	60.6	39 31.5	+60.0	61.3	40 00.0	+60.0	62.0	**40**
41	37 26.7	+59.4	57.1	37 59.0	+59.6	57.7	38 30.7	+59.7	58.4	39 01.9	+59.8	59.1	39 32.4	+59.9	59.8	40 02.3	+59.9	60.5	40 31.5	+60.0	61.2	41 00.0	+60.0	62.0	**41**
42	38 26.1	+59.4	56.9	38 58.6	+59.5	57.6	39 30.4	+59.7	58.3	40 01.7	+59.8	59.0	40 32.3	+59.9	59.7	41 02.2	+60.0	60.4	41 31.5	+60.0	61.2	42 00.0	+60.0	62.0	**42**
43	39 25.5	+59.4	56.7	39 58.1	+59.6	57.4	40 30.1	+59.7	58.1	41 01.5	+59.8	58.9	41 32.2	+59.9	59.6	42 02.2	+59.9	60.4	42 31.5	+59.9	61.2	43 00.0	+60.0	62.0	**43**
44	40 24.9	+59.4	56.5	40 57.7	+59.5	57.3	41 29.8	+59.7	58.0	42 01.3	+59.8	58.8	42 32.1	+59.8	59.5	43 02.1	+60.0	60.3	43 31.4	+60.0	61.2	44 00.0	+60.0	62.0	**44**
45	41 24.3	+59.4	56.3	41 57.2	+59.6	57.1	42 29.5	+59.7	57.9	43 01.1	+59.8	58.6	43 31.9	+59.9	59.4	44 02.1	+59.9	60.3	44 31.4	+60.0	61.1	45 00.0	+60.0	62.0	**45**
46	42 23.7	+59.3	56.2	42 56.8	+59.5	56.9	43 29.2	+59.6	57.7	44 00.9	+59.7	58.5	44 31.8	+59.9	59.4	45 02.0	+60.0	60.2	45 31.4	+60.0	61.1	46 00.0	+60.0	62.0	**46**
47	43 23.0	+59.4	56.0	43 56.3	+59.5	56.7	44 28.8	+59.7	57.6	45 00.6	+59.8	58.4	45 31.7	+59.9	59.3	46 02.0	+59.9	60.2	46 31.4	+60.0	61.1	47 00.0	+60.0	62.0	**47**
48	44 22.4	+59.3	55.7	44 55.8	+59.5	56.6	45 28.5	+59.6	57.4	46 00.4	+59.8	58.3	46 31.6	+59.8	59.2	47 01.9	+59.9	60.1	47 31.4	+60.0	61.0	48 00.0	+60.0	62.0	**48**
49	45 21.7	+59.2	55.5	45 55.3	+59.4	56.4	46 28.1	+59.6	57.2	47 00.2	+59.7	58.1	47 31.4	+59.9	59.1	48 01.8	+60.0	60.0	48 31.4	+60.0	61.0	49 00.0	+60.0	62.0	**49**
50	46 20.9	+59.3	55.3	46 54.7	+59.5	56.2	47 27.7	+59.6	57.1	47 59.9	+59.8	58.0	48 31.3	+59.8	59.0	49 01.8	+59.9	60.0	49 31.4	+59.9	61.0	50 00.0	+60.0	62.0	**50**
51	47 20.2	+59.2	55.1	47 54.2	+59.4	56.0	48 27.3	+59.6	56.9	48 59.7	+59.7	57.9	49 31.1	+59.9	58.9	50 01.7	+59.9	59.9	50 31.3	+60.0	60.9	51 00.0	+60.0	62.0	**51**
52	48 19.4	+59.2	54.8	48 53.6	+59.4	55.8	49 26.9	+59.6	56.7	49 59.4	+59.7	57.7	50 31.0	+59.8	58.7	51 01.6	+60.0	59.8	51 31.3	+60.0	60.9	52 00.0	+60.0	62.0	**52**
53	49 18.6	+59.2	54.6	49 53.0	+59.3	55.6	50 26.5	+59.5	56.5	50 59.1	+59.7	57.6	51 30.8	+59.8	58.6	52 01.6	+59.9	59.7	52 31.3	+60.0	60.8	53 00.0	+60.0	62.0	**53**
54	50 17.8	+59.1	54.3	50 52.3	+59.4	55.3	51 26.0	+59.6	56.4	51 58.8	+59.7	57.4	52 30.6	+59.9	58.5	53 01.5	+59.9	59.6	53 31.3	+60.0	60.8	54 00.0	+60.0	62.0	**54**
55	51 16.9	+59.1	54.1	51 51.7	+59.3	55.1	52 25.6	+59.5	56.2	52 58.5	+59.7	57.2	53 30.5	+59.8	58.4	54 01.4	+59.9	59.6	54 31.3	+59.9	60.8	55 00.0	+60.0	62.0	**55**
56	52 16.0	+59.0	53.8	52 51.0	+59.3	54.8	53 25.1	+59.5	55.9	53 58.2	+59.6	57.1	54 30.3	+59.8	58.2	55 01.3	+59.9	59.5	55 31.2	+60.0	60.7	56 00.0	+60.0	62.0	**56**
57	53 15.0	+59.0	53.5	53 50.3	+59.2	54.6	54 24.6	+59.4	55.7	54 57.8	+59.7	56.9	55 30.1	+59.8	58.1	56 01.2	+59.9	59.4	56 31.2	+60.0	60.7	57 00.0	+60.0	62.0	**57**
58	54 14.0	+59.0	53.2	54 49.5	+59.2	54.3	55 24.0	+59.4	55.5	55 57.5	+59.6	56.7	56 29.9	+59.8	58.0	57 01.1	+59.9	59.3	57 31.2	+60.0	60.6	58 00.0	+60.0	62.0	**58**
59	55 13.0	+58.9	52.9	55 48.7	+59.2	54.0	56 23.4	+59.4	55.2	56 57.1	+59.6	56.5	57 29.7	+59.7	57.8	58 01.0	+59.9	59.2	58 31.2	+59.9	60.6	59 00.0	+60.0	62.0	**59**
60	56 11.9	+58.8	52.5	56 47.9	+59.1	53.7	57 22.8	+59.4	55.0	57 56.7	+59.6	56.3	58 29.4	+59.8	57.6	59 00.9	+59.9	59.0	59 31.1	+60.0	60.5	60 00.0	+60.0	62.0	**60**
61	57 10.7	+58.8	52.2	57 47.0	+59.1	53.4	58 22.2	+59.3	54.7	58 56.3	+59.6	56.1	59 29.2	+59.7	57.5	60 00.8	+59.9	58.9	60 31.1	+60.0	60.4	61 00.0	+60.0	62.0	**61**
62	58 09.5	+58.7	51.8	58 46.1	+59.0	53.1	59 21.5	+59.3	54.4	59 55.9	+59.5	55.8	60 28.9	+59.8	57.3	61 00.7	+59.9	58.8	61 31.1	+59.9	60.4	62 00.0	+60.0	62.0	**62**
63	59 08.2	+58.6	51.4	59 45.1	+58.9	52.7	60 20.8	+59.3	54.1	60 55.4	+59.5	55.6	61 28.7	+59.7	57.1	62 00.6	+59.8	58.7	62 31.0	+60.0	60.3	63 00.0	+60.0	62.0	**63**
64	60 06.8	+58.5	51.0	60 44.0	+58.9	52.3	61 20.1	+59.2	53.8	61 54.9	+59.5	55.3	62 28.4	+59.7	56.9	63 00.4	+59.9	58.5	63 31.0	+60.0	60.2	64 00.0	+60.0	62.0	**64**
65	61 05.3	+58.5	50.5	61 42.9	+58.8	52.0	62 19.3	+59.1	53.4	62 54.4	+59.4	55.0	63 28.1	+59.6	56.7	64 00.3	+59.8	58.4	64 31.0	+59.9	60.1	65 00.0	+60.0	62.0	**65**
66	62 03.8	+58.3	50.0	62 41.7	+58.8	51.5	63 18.4	+59.1	53.1	63 53.8	+59.4	54.7	64 27.7	+59.7	56.4	65 00.1	+59.9	58.2	65 30.9	+60.0	60.1	66 00.0	+60.0	62.0	**66**
67	63 02.1	+58.3	49.5	63 40.5	+58.6	51.1	64 17.5	+59.0	52.7	64 53.2	+59.3	54.4	65 27.4	+59.6	56.2	66 00.0	+59.8	58.0	66 30.9	+59.9	60.0	67 00.0	+60.0	62.0	**67**
68	64 00.4	+58.1	49.0	64 39.1	+58.5	50.6	65 16.5	+59.0	52.3	65 52.5	+59.3	54.0	66 27.0	+59.6	55.9	66 59.8	+59.8	57.8	67 30.8	+60.0	59.9	68 00.0	+60.0	62.0	**68**
69	64 58.5	+57.9	48.4	65 37.6	+58.5	50.1	66 15.5	+58.8	51.8	66 51.8	+59.2	53.6	67 26.6	+59.5	55.6	67 59.6	+59.8	57.6	68 30.8	+59.9	59.8	69 00.0	+60.0	62.0	**69**
70	65 56.4	+57.8	47.8	66 36.1	+58.2	49.5	67 14.3	+58.8	51.3	67 51.0	+59.2	53.2	68 26.1	+59.5	55.2	68 59.4	+59.8	57.4	69 30.7	+60.0	59.6	70 00.0	+60.0	62.0	**70**
71	66 54.2	+57.6	47.1	67 34.3	+58.2	48.9	68 13.1	+58.6	50.8	68 50.2	+59.1	52.8	69 25.6	+59.5	54.9	69 59.2	+59.7	57.1	70 30.7	+59.9	59.5	71 00.0	+60.0	62.0	**71**
72	67 51.8	+57.4	46.4	68 32.5	+58.0	48.2	69 11.7	+58.5	50.2	69 49.3	+59.0	52.3	70 25.1	+59.4	54.5	70 58.9	+59.7	56.9	71 30.6	+59.9	59.4	72 00.0	+60.0	62.0	**72**
73	68 49.2	+57.1	45.6	69 30.5	+57.7	47.5	70 10.2	+58.4	49.6	70 48.3	+58.8	51.7	71 24.5	+59.3	54.1	71 58.6	+59.7	56.5	72 30.5	+59.9	59.2	73 00.0	+60.0	62.0	**73**
74	69 46.3	+56.9	44.7	70 28.2	+57.6	46.7	71 08.6	+58.1	48.8	71 47.1	+58.8	51.1	72 23.8	+59.2	53.6	72 58.3	+59.6	56.2	73 30.4	+60.0	59.0	74 00.0	+60.0	62.0	**74**
75	70 43.2	+56.6	43.8	71 25.8	+57.3	45.9	72 06.7	+58.0	48.1	72 45.9	+58.6	50.5	73 23.0	+59.2	53.0	73 57.9	+59.6	55.8	74 30.4	+59.8	58.8	75 00.0	+60.0	62.0	**75**
76	71 39.8	+56.2	42.8	72 23.1	+56.9	44.9	73 04.7	+57.8	47.2	73 44.5	+58.4	49.7	74 22.2	+59.1	52.4	74 57.5	+59.6	55.4	75 30.2	+59.9	58.6	76 00.0	+60.0	62.0	**76**
77	72 36.0	+55.7	41.6	73 20.0	+56.7	43.8	74 02.5	+57.4	46.3	74 42.9	+58.3	48.9	75 21.3	+58.9	51.8	75 57.1	+59.5	54.9	76 30.1	+59.9	58.3	77 00.0	+60.0	62.0	**77**
78	73 31.7	+55.3	40.3	74 16.7	+56.1	42.6	74 59.9	+57.1	45.2	75 41.2	+57.9	47.9	76 20.2	+58.7	51.0	76 56.6	+59.4	54.3	77 30.0	+59.8	58.0	78 00.0	+60.0	62.0	**78**
79	74 27.0	+54.6	38.9	75 12.8	+55.7	41.3	75 57.0	+56.7	43.9	76 39.1	+57.7	46.9	77 18.9	+58.6	50.1	77 56.0	+59.3	53.7	78 29.8	+59.8	57.7	79 00.0	+60.0	62.0	**79**
80	75 21.6	+53.9	37.3	76 08.5	+55.0	39.8	76 53.7	+56.1	42.5	77 36.8	+57.3	45.6	78 17.5	+58.3	49.1	78 55.3	+59.1	52.9	79 29.6	+59.8	57.2	80 00.0	+60.0	62.0	**80**
81	76 15.5	+53.0	35.6	77 03.5	+54.3	38.1	77 49.8	+55.6	40.9	78 34.1	+56.7	44.2	79 15.8	+57.9	47.8	79 54.4	+59.0	52.0	80 29.4	+59.7	56.7	81 00.0	+60.0	62.0	**81**
82	77 08.5	+52.0	33.5	77 57.8	+53.3	36.1	78 45.4	+54.6	39.1	79 30.8	+56.1	42.5	80 13.7	+57.5	46.4	80 53.4	+58.7	50.9	81 29.1	+59.6	56.1	82 00.0	+60.0	62.0	**82**
83	78 00.5	+50.6	31.2	78 51.1	+52.0	33.8	79 40.0	+53.7	36.9	80 26.9	+55.3	40.4	81 11.2	+56.8	44.6	81 52.1	+58.3	49.5	82 28.7	+59.5	55.3	83 00.0	+60.0	62.0	**83**
84	78 51.1	+48.9	28.5	79 43.1	+50.6	31.1	80 33.7	+52.2	34.2	81 22.2	+54.0	38.0	82 08.0	+56.0	42.4	82 50.4	+57.9	47.8	83 28.2	+59.4	54.3	84 00.0	+60.0	62.0	**84**
85	79 40.0	*+46.9* •	25.4	80 33.7	*+48.5* •	28.0	81 25.9	*+50.3* •	31.1	82 16.2	+52.4	34.9	83 04.0	+54.7	39.6	83 48.3	+57.0	45.5	84 27.6	+59.1	52.9	85 00.0	+60.0	62.0	**85**
86	80 26.9	*+44.3* •	21.8	81 22.2	*+45.8* •	24.2	82 16.2	*+47.8* •	27.3	83 08.6	*+50.1* •	31.1	83 58.7	*+52.8* •	36.0	84 45.3	+55.7	42.4	85 26.7	+58.5	50.8	86 00.0	+60.0	62.0	**86**
87	81 11.2	*+40.9* •	17.6	82 08.0	*+42.4* •	19.7	83 04.0	*+44.3* •	22.5	83 58.7	*+46.6* •	26.1	84 51.5	*+49.5* •	31.0	85 41.0	*+53.3* •	37.9	86 25.2	*+57.4* •	47.7	87 00.0	+60.0	62.0	**87**
88	81 52.1	*+36.6* •	12.6	82 50.4	*+37.8* •	14.3	83 48.3	*+39.3* •	16.6	84 45.3	*+41.4* •	19.7	85 41.0	*+44.2* •	24.2	86 34.3	*+48.3* •	31.0	87 22.6	*+54.5* •	42.3	88 00.0	+60.0	62.0	**88**
89	82 28.7	*+31.3* •	6.8	83 28.2	*+31.8* •	7.8	84 27.6	*+32.4* •	9.2	85 26.7	*+33.3* •	11.2	86 25.2	*+34.8* •	14.3	87 22.6	*+37.4* •	19.7	88 17.1	*+42.9* •	31.0	89 00.0	+60.0	62.0	**89**
90	83 00.0	*+24.6* •	0.0	84 00.0	*+24.0* •	0.0	85 00.0	*+23.1* •	0.0	86 00.0	*+21.7* •	0.0	87 00.0	*+19.2* •	0.0	88 00.0	*+14.0* •	0.0	89 00.0	*–1.8* •	0.0	90 00.0	–60.0	31.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 118°, 242°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 10.3	+59.6	116.8	2 43.2	+59.7	116.9	2 16.1	+59.8	116.9	1 48.9	+59.9	116.9	1 21.7	+59.9	117.0	0 54.5	+59.9	117.0	0 27.2	+60.0	117.0	0 00.0	+60.0	117.0	**0**
1	4 09.9	+59.7	116.7	3 42.9	+59.8	116.8	3 15.9	+59.8	116.8	2 48.8	+59.9	116.9	2 21.6	+60.0	116.9	1 54.4	+60.0	117.0	1 27.2	+60.0	117.0	1 00.0	+60.0	117.0	**1**
2	5 09.6	+59.6	116.6	4 42.7	+59.7	116.7	4 15.7	+59.8	116.8	3 48.7	+59.8	116.8	3 21.6	+59.9	116.9	2 54.4	+60.0	116.9	2 27.2	+60.0	117.0	2 00.0	+60.0	117.0	**2**
3	6 09.2	+59.7	116.5	5 42.4	+59.7	116.6	5 15.5	+59.8	116.7	4 48.5	+59.9	116.8	4 21.5	+59.9	116.8	3 54.4	+60.0	116.9	3 27.2	+60.0	116.9	3 00.0	+60.0	117.0	**3**
4	7 08.9	+59.6	116.4	6 42.1	+59.8	116.5	6 15.3	+59.8	116.6	5 48.4	+59.9	116.7	5 21.4	+60.0	116.8	4 54.4	+59.9	116.9	4 27.2	+60.0	116.9	4 00.0	+60.0	117.0	**4**
5	8 08.5	+59.6	116.3	7 41.9	+59.7	116.4	7 15.1	+59.9	116.5	6 48.3	+59.9	116.6	6 21.4	+59.9	116.7	5 54.3	+60.0	116.8	5 27.2	+60.0	116.9	5 00.0	+60.0	117.0	**5**
6	9 08.1	+59.7	116.2	8 41.6	+59.7	116.3	8 15.0	+59.8	116.4	7 48.2	+59.9	116.6	7 21.3	+59.9	116.7	6 54.3	+60.0	116.8	6 27.2	+60.0	116.9	6 00.0	+60.0	117.0	**6**
7	10 07.8	+59.6	116.1	9 41.3	+59.8	116.2	9 14.8	+59.8	116.4	8 48.1	+59.8	116.5	8 21.2	+60.0	116.6	7 54.3	+59.9	116.8	7 27.2	+60.0	116.9	7 00.0	+60.0	117.0	**7**
8	11 07.4	+59.6	115.9	10 41.1	+59.7	116.1	10 14.6	+59.8	116.3	9 47.9	+59.9	116.4	9 21.2	+59.9	116.6	8 54.2	+60.0	116.7	8 27.2	+60.0	116.9	8 00.0	+60.0	117.0	**8**
9	12 07.0	+59.7	115.8	11 40.8	+59.7	116.0	11 14.4	+59.8	116.2	10 47.8	+59.9	116.4	10 21.1	+59.9	116.5	9 54.2	+60.0	116.7	9 27.2	+60.0	116.9	9 00.0	+60.0	117.0	**9**
10	13 06.7	+59.6	115.7	12 40.5	+59.8	115.9	12 14.2	+59.8	116.1	11 47.7	+59.9	116.3	11 21.0	+60.0	116.5	10 54.2	+59.9	116.7	10 27.2	+60.0	116.8	10 00.0	+60.0	117.0	**10**
11	14 06.3	+59.6	115.6	13 40.3	+59.7	115.8	13 14.0	+59.8	116.0	12 47.6	+59.9	116.2	12 21.0	+59.9	116.4	11 54.1	+60.0	116.6	11 27.2	+59.9	116.8	11 00.0	+60.0	117.0	**11**
12	15 05.9	+59.6	115.5	14 40.0	+59.7	115.7	14 13.8	+59.8	116.0	13 47.5	+59.8	116.2	13 20.9	+59.9	116.4	12 54.1	+60.0	116.6	12 27.1	+60.0	116.8	12 00.0	+60.0	117.0	**12**
13	16 05.5	+59.6	115.4	15 39.7	+59.7	115.6	15 13.6	+59.8	115.9	14 47.3	+59.9	116.1	14 20.8	+60.0	116.3	13 54.1	+60.0	116.6	13 27.1	+60.0	116.8	13 00.0	+60.0	117.0	**13**
14	17 05.1	+59.7	115.2	16 39.4	+59.7	115.5	16 13.4	+59.8	115.8	15 47.2	+59.9	116.0	15 20.8	+59.9	116.3	14 54.1	+59.9	116.5	14 27.1	+60.0	116.8	14 00.0	+60.0	117.0	**14**
15	18 04.8	+59.6	115.1	17 39.1	+59.7	115.4	17 13.2	+59.8	115.7	16 47.1	+59.9	116.0	16 20.7	+59.9	116.2	15 54.0	+60.0	116.5	15 27.1	+60.0	116.8	15 00.0	+60.0	117.0	**15**
16	19 04.4	+59.6	115.0	18 38.8	+59.8	115.3	18 13.0	+59.8	115.6	17 47.0	+59.8	115.9	17 20.6	+59.9	116.2	16 54.0	+60.0	116.5	16 27.1	+60.0	116.7	16 00.0	+60.0	117.0	**16**
17	20 04.0	+59.6	114.9	19 38.6	+59.7	115.2	19 12.8	+59.8	115.5	18 46.8	+59.9	115.8	18 20.5	+60.0	116.1	17 54.0	+59.9	116.4	17 27.1	+60.0	116.7	17 00.0	+60.0	117.0	**17**
18	21 03.6	+59.5	114.8	20 38.3	+59.7	115.1	20 12.6	+59.8	115.4	19 46.7	+59.9	115.8	19 20.5	+59.9	116.1	18 53.9	+60.0	116.4	18 27.1	+60.0	116.7	18 00.0	+60.0	117.0	**18**
19	22 03.1	+59.6	114.6	21 38.0	+59.7	115.0	21 12.4	+59.8	115.4	20 46.6	+59.8	115.7	20 20.4	+59.9	116.0	19 53.9	+60.0	116.4	19 27.1	+60.0	116.7	19 00.0	+60.0	117.0	**19**
20	23 02.7	+59.6	114.5	22 37.7	+59.6	114.9	22 12.2	+59.8	115.3	21 46.4	+59.9	115.6	21 20.3	+59.9	116.0	20 53.9	+59.9	116.3	20 27.1	+60.0	116.7	20 00.0	+60.0	117.0	**20**
21	24 02.3	+59.6	114.4	23 37.3	+59.7	114.8	23 12.0	+59.8	115.2	22 46.3	+59.9	115.6	22 20.2	+60.0	115.9	21 53.8	+60.0	116.3	21 27.1	+60.0	116.7	21 00.0	+60.0	117.0	**21**
22	25 01.9	+59.5	114.2	24 37.0	+59.7	114.7	24 11.8	+59.8	115.1	23 46.2	+59.8	115.5	23 20.2	+59.9	115.9	22 53.8	+60.0	116.3	22 27.1	+60.0	116.6	22 00.0	+60.0	117.0	**22**
23	26 01.4	+59.6	114.1	25 36.7	+59.7	114.6	25 11.6	+59.7	115.0	24 46.0	+59.9	115.4	24 20.1	+59.9	115.8	23 53.8	+59.9	116.2	23 27.1	+60.0	116.6	23 00.0	+60.0	117.0	**23**
24	27 01.0	+59.5	114.0	26 36.4	+59.7	114.4	26 11.3	+59.8	114.9	25 45.9	+59.8	115.3	25 20.0	+59.9	115.8	24 53.7	+60.0	116.2	24 27.1	+59.9	116.6	24 00.0	+60.0	117.0	**24**
25	28 00.5	+59.6	113.8	27 36.1	+59.6	114.3	27 11.1	+59.8	114.8	26 45.7	+59.9	115.3	26 19.9	+59.9	115.7	25 53.7	+60.0	116.1	25 27.0	+60.0	116.6	25 00.0	+60.0	117.0	**25**
26	29 00.1	+59.5	113.7	28 35.7	+59.7	114.2	28 10.9	+59.8	114.7	27 45.6	+59.8	115.2	27 19.8	+60.0	115.6	26 53.7	+59.9	116.1	26 27.0	+60.0	116.6	26 00.0	+60.0	117.0	**26**
27	29 59.6	+59.5	113.6	29 35.4	+59.6	114.1	29 10.7	+59.7	114.6	28 45.4	+59.9	115.1	28 19.8	+59.9	115.6	27 53.6	+60.0	116.1	27 27.0	+60.0	116.5	27 00.0	+60.0	117.0	**27**
28	30 59.1	+59.6	113.4	30 35.0	+59.7	114.0	30 10.4	+59.8	114.5	29 45.3	+59.8	115.0	29 19.7	+59.9	115.5	28 53.6	+59.9	116.0	28 27.0	+60.0	116.5	28 00.0	+60.0	117.0	**28**
29	31 58.7	+59.5	113.3	31 34.7	+59.6	113.8	31 10.2	+59.7	114.4	30 45.1	+59.9	114.9	30 19.6	+59.9	115.5	29 53.5	+60.0	116.0	29 27.0	+60.0	116.5	29 00.0	+60.0	117.0	**29**
30	32 58.2	+59.4	113.1	32 34.3	+59.6	113.7	32 09.9	+59.8	114.3	31 45.0	+59.8	114.8	31 19.5	+59.9	115.4	30 53.5	+60.0	115.9	30 27.0	+60.0	116.5	30 00.0	+60.0	117.0	**30**
31	33 57.6	+59.5	113.0	33 33.9	+59.7	113.6	33 09.7	+59.7	114.2	32 44.8	+59.8	114.8	32 19.4	+59.9	115.3	31 53.5	+59.9	115.9	31 27.0	+60.0	116.5	31 00.0	+60.0	117.0	**31**
32	34 57.1	+59.5	112.8	34 33.6	+59.6	113.4	34 09.4	+59.7	114.1	33 44.6	+59.9	114.7	33 19.3	+59.9	115.3	32 53.4	+60.0	115.9	32 27.0	+60.0	116.4	32 00.0	+60.0	117.0	**32**
33	35 56.6	+59.4	112.6	35 33.2	+59.6	113.3	35 09.1	+59.8	113.9	34 44.5	+59.8	114.6	34 19.2	+59.9	115.2	33 53.4	+59.9	115.8	33 27.0	+60.0	116.4	33 00.0	+60.0	117.0	**33**
34	36 56.0	+59.5	112.5	36 32.8	+59.6	113.2	36 08.9	+59.7	113.8	35 44.3	+59.8	114.5	35 19.1	+59.9	115.1	34 53.3	+60.0	115.8	34 27.0	+59.9	116.4	34 00.0	+60.0	117.0	**34**
35	37 55.5	+59.4	112.3	37 32.4	+59.5	113.0	37 08.6	+59.7	113.7	36 44.1	+59.8	114.4	36 19.0	+59.9	115.1	35 53.3	+59.9	115.7	35 26.9	+60.0	116.4	35 00.0	+60.0	117.0	**35**
36	38 54.9	+59.4	112.1	38 31.9	+59.6	112.9	38 08.3	+59.7	113.6	37 43.9	+59.9	114.3	37 18.9	+59.9	115.0	36 53.2	+60.0	115.7	36 26.9	+60.0	116.3	36 00.0	+60.0	117.0	**36**
37	39 54.3	+59.4	111.9	39 31.5	+59.6	112.7	39 08.0	+59.7	113.5	38 43.8	+59.8	114.2	38 18.8	+59.9	114.9	37 53.2	+60.0	115.6	37 26.9	+60.0	116.3	37 00.0	+60.0	117.0	**37**
38	40 53.7	+59.4	111.7	40 31.1	+59.5	112.5	40 07.7	+59.7	113.3	39 43.6	+59.8	114.1	39 18.7	+59.9	114.8	38 53.2	+59.9	115.6	38 26.9	+60.0	116.3	38 00.0	+60.0	117.0	**38**
39	41 53.1	+59.3	111.6	41 30.6	+59.5	112.4	41 07.4	+59.6	113.2	40 43.4	+59.8	114.0	40 18.6	+59.9	114.8	39 53.1	+60.0	115.5	39 26.9	+60.0	116.3	39 00.0	+60.0	117.0	**39**
40	42 52.4	+59.3	111.4	42 30.1	+59.5	112.2	42 07.0	+59.7	113.1	41 43.2	+59.7	113.9	41 18.5	+59.9	114.7	40 53.1	+59.9	115.5	40 26.9	+60.0	116.2	40 00.0	+60.0	117.0	**40**
41	43 51.7	+59.3	111.1	43 29.6	+59.5	112.0	43 06.7	+59.7	112.9	42 42.9	+59.8	113.8	42 18.4	+59.8	114.6	41 53.0	+60.0	115.4	41 26.9	+60.0	116.2	41 00.0	+60.0	117.0	**41**
42	44 51.0	+59.3	110.9	44 29.1	+59.5	111.9	44 06.4	+59.6	112.8	43 42.7	+59.8	113.6	43 18.2	+59.9	114.5	42 53.0	+59.9	115.4	42 26.9	+59.9	116.2	42 00.0	+60.0	117.0	**42**
43	45 50.3	+59.3	110.7	45 28.6	+59.5	111.7	45 06.0	+59.6	112.6	44 42.5	+59.8	113.5	44 18.1	+59.9	114.4	43 52.9	+59.9	115.3	43 26.8	+60.0	116.2	43 00.0	+60.0	117.0	**43**
44	46 49.6	+59.2	110.5	46 28.1	+59.4	111.5	46 05.6	+59.7	112.4	45 42.3	+59.7	113.4	45 18.0	+59.9	114.3	44 52.8	+60.0	115.2	44 26.8	+60.0	116.1	44 00.0	+60.0	117.0	**44**
45	47 48.8	+59.2	110.3	47 27.5	+59.4	111.3	47 05.3	+59.6	112.3	46 42.0	+59.8	113.3	46 17.9	+59.8	114.2	45 52.8	+59.9	115.2	45 26.8	+60.0	116.1	45 00.0	+60.0	117.0	**45**
46	48 48.0	+59.1	110.0	48 26.9	+59.4	111.1	48 04.9	+59.5	112.1	47 41.8	+59.7	113.1	47 17.7	+59.9	114.1	46 52.7	+60.0	115.1	46 26.8	+60.0	116.1	46 00.0	+60.0	117.0	**46**
47	49 47.1	+59.2	109.8	49 26.3	+59.4	110.9	49 04.4	+59.6	111.9	48 41.5	+59.7	113.0	48 17.6	+59.8	114.0	47 52.7	+59.9	115.0	47 26.8	+60.0	116.0	47 00.0	+60.0	117.0	**47**
48	50 46.3	+59.1	109.5	50 25.7	+59.3	110.6	50 04.0	+59.6	111.7	49 41.2	+59.8	112.8	49 17.4	+59.9	113.9	48 52.6	+59.9	115.0	48 26.8	+60.0	116.0	48 00.0	+60.0	117.0	**48**
49	51 45.4	+59.0	109.2	51 25.0	+59.3	110.4	51 03.6	+59.5	111.6	50 41.0	+59.7	112.7	50 17.3	+59.8	113.8	49 52.5	+60.0	114.9	49 26.8	+59.9	116.0	49 00.0	+60.0	117.0	**49**
50	52 44.4	+59.0	108.9	52 24.3	+59.3	110.1	52 03.1	+59.5	111.4	51 40.7	+59.7	112.5	51 17.1	+59.8	113.7	50 52.5	+59.9	114.8	50 26.7	+60.0	115.9	50 00.0	+60.0	117.0	**50**
51	53 43.4	+59.0	108.6	53 23.6	+59.3	109.9	53 02.6	+59.5	111.1	52 40.4	+59.6	112.4	52 16.9	+59.9	113.6	51 52.4	+59.9	114.7	51 26.7	+60.0	115.9	51 00.0	+60.0	117.0	**51**
52	54 42.4	+58.9	108.3	54 22.9	+59.2	109.6	54 02.1	+59.4	110.9	53 40.0	+59.7	112.2	53 16.8	+59.8	113.4	52 52.3	+59.9	114.7	52 26.7	+60.0	115.8	52 00.0	+60.0	117.0	**52**
53	55 41.3	+58.8	108.0	55 22.1	+59.2	109.3	55 01.5	+59.5	110.7	54 39.7	+59.6	112.0	54 16.6	+59.8	113.3	53 52.2	+59.9	114.6	53 26.7	+60.0	115.8	53 00.0	+60.0	117.0	**53**
54	56 40.1	+58.8	107.6	56 21.3	+59.1	109.0	56 01.0	+59.4	110.5	55 39.3	+59.7	111.8	55 16.4	+59.8	113.2	54 52.1	+59.9	114.5	54 26.7	+59.9	115.8	54 00.0	+60.0	117.0	**54**
55	57 38.9	+58.7	107.2	57 20.4	+59.0	108.7	57 00.4	+59.3	110.2	56 39.0	+59.6	111.6	56 16.2	+59.7	113.0	55 52.0	+59.9	114.4	55 26.6	+60.0	115.7	55 00.0	+60.0	117.0	**55**
56	58 37.6	+58.7	106.9	58 19.4	+59.1	108.4	57 59.7	+59.4	109.9	57 38.6	+59.5	111.4	57 15.9	+59.8	112.9	56 51.9	+59.9	114.3	56 26.6	+60.0	115.7	56 00.0	+60.0	117.0	**56**
57	59 36.3	+58.5	106.4	59 18.5	+58.9	108.1	58 59.1	+59.3	109.6	58 38.1	+59.6	111.2	58 15.7	+59.8	112.7	57 51.8	+59.9	114.2	57 26.6	+60.0	115.6	57 00.0	+60.0	117.0	**57**
58	60 34.8	+58.5	106.0	60 17.4	+58.9	107.7	59 58.4	+59.2	109.3	59 37.7	+59.5	111.0	59 15.5	+59.7	112.5	58 51.7	+59.9	114.1	58 26.6	+59.9	115.6	58 00.0	+60.0	117.0	**58**
59	61 33.3	+58.4	105.5	61 16.3	+58.9	107.3	60 57.6	+59.2	109.0	60 37.2	+59.5	110.7	60 15.2	+59.7	112.3	59 51.6	+59.9	113.9	59 26.5	+60.0	115.5	59 00.0	+60.0	117.0	**59**
60	62 31.7	+58.2	105.0	62 15.2	+58.7	106.9	61 56.8	+59.2	108.7	61 36.7	+59.5	110.4	61 14.9	+59.7	112.2	60 51.5	+59.9	113.8	60 26.5	+60.0	115.4	60 00.0	+60.0	117.0	**60**
61	63 29.9	+58.1	104.5	63 13.9	+58.7	106.4	62 56.0	+59.1	108.3	62 36.2	+59.4	110.2	62 14.6	+59.7	111.9	61 51.4	+59.8	113.7	61 26.5	+59.9	115.4	61 00.0	+60.0	117.0	**61**
62	64 28.0	+58.0	104.0	64 12.6	+58.5	106.0	63 55.1	+59.0	107.9	63 35.6	+59.4	109.9	63 14.3	+59.7	111.7	62 51.2	+59.9	113.5	62 26.4	+60.0	115.3	62 00.0	+60.0	117.0	**62**
63	65 26.0	+57.9	103.3	65 11.1	+58.5	105.5	64 54.1	+58.9	107.5	64 35.0	+59.4	109.5	64 14.0	+59.6	111.5	63 51.1	+59.9	113.4	63 26.4	+60.0	115.2	63 00.0	+60.0	117.0	**63**
64	66 23.9	+57.6	102.7	66 09.6	+58.3	104.9	65 53.0	+58.9	107.1	65 34.4	+59.3	109.2	65 13.6	+59.7	111.2	64 51.0	+59.8	113.2	64 26.4	+59.9	115.1	64 00.0	+60.0	117.0	**64**
65	67 21.5	+57.5	102.0	67 07.9	+58.2	104.3	66 51.9	+58.8	106.6	66 33.7	+59.2	108.8	66 13.3	+59.5	110.9	65 50.8	+59.8	113.0	65 26.3	+60.0	115.1	65 00.0	+60.0	117.0	**65**
66	68 19.0	+57.2	101.2	68 06.1	+58.0	103.7	67 50.7	+58.6	106.1	67 32.9	+59.2	108.4	67 12.8	+59.6	110.7	66 50.6	+59.8	112.8	66 26.3	+59.9	115.0	66 00.0	+60.0	117.0	**66**
67	69 16.2	+57.0	100.4	69 04.1	+57.8	103.0	68 49.3	+58.6	105.5	68 32.1	+59.0	107.9	68 12.4	+59.5	110.3	67 50.4	+59.8	112.6	67 26.2	+60.0	114.9	67 00.0	+60.0	117.0	**67**
68	70 13.2	+56.7	99.5	70 01.9	+57.6	102.2	69 47.9	+58.3	104.9	69 31.1	+59.0	107.5	69 11.9	+59.4	110.0	68 50.2	+59.8	112.4	68 26.2	+59.9	114.7	68 00.0	+60.0	117.0	**68**
69	71 09.9	+56.3	98.5	70 59.5	+57.4	101.4	70 46.2	+58.3	104.2	70 30.1	+58.9	106.9	70 11.3	+59.4	109.6	69 50.0	+59.7	112.2	69 26.1	+60.0	114.6	69 00.0	+60.0	117.0	**69**
70	72 06.2	+55.9	97.4	71 56.9	+57.1	100.4	71 44.5	+58.0	103.4	71 29.0	+58.8	106.3	71 10.7	+59.4	109.2	70 49.7	+59.7	111.9	70 26.1	+59.9	114.5	70 00.0	+60.0	117.0	**70**
71	73 02.1	+55.4	96.2	72 54.0	+56.7	99.4	72 42.5	+57.8	102.6	72 27.8	+58.7	105.7	72 10.1	+59.2	108.7	71 49.4	+59.7	111.6	71 26.0	+59.9	114.3	71 00.0	+60.0	117.0	**71**
72	73 57.5	+54.9	94.8	73 50.7	+56.3	98.3	73 40.3	+57.5	101.7	73 26.5	+58.4	105.0	73 09.3	+59.2	108.2	72 49.1	+59.7	111.2	72 25.9	+59.9	114.2	72 00.0	+60.0	117.0	**72**
73	74 52.4	+54.2	93.3	74 47.0	+55.8	97.0	74 37.8	+57.2	100.6	74 24.9	+58.3	104.2	74 08.5	+59.1	107.6	73 48.8	+59.6	110.9	73 25.8	+59.9	114.0	73 00.0	+60.0	117.0	**73**
74	75 46.6	+53.4	91.6	75 42.8	+55.3	95.6	75 35.0	+56.8	99.5	75 23.2	+58.0	103.2	75 07.6	+58.9	106.9	74 48.4	+59.5	110.4	74 25.7	+59.9	113.8	74 00.0	+60.0	117.0	**74**
75	76 40.0	+52.4	89.7	76 38.1	+54.5	93.9	76 31.8	+56.3	98.1	76 21.2	+57.7	102.2	76 06.5	+58.8	106.2	75 47.9	+59.5	110.0	75 25.6	+59.9	113.6	75 00.0	+60.0	117.0	**75**
76	77 32.4	+51.2	87.5	77 32.6	+53.7	92.1	77 28.1	+55.7	96.6	77 18.9	+57.4	101.0	77 05.3	+58.5	105.3	76 47.4	+59.4	109.4	76 25.5	+59.9	113.3	76 00.0	+60.0	117.0	**76**
77	78 23.6	+49.7	85.0	78 26.3	+52.5	89.9	78 23.8	+54.9	94.8	78 16.3	+56.8	99.6	78 03.8	+58.4	104.3	77 46.8	+59.3	108.8	77 25.4	+59.8	113.0	77 00.0	+60.0	117.0	**77**
78	79 13.3	*+47.9*•	82.2	79 18.8	+51.1	87.4	79 18.7	+54.0	92.7	79 13.1	+56.3	98.0	79 02.2	+58.0	103.1	78 46.1	+59.1	108.0	78 25.2	+59.8	112.7	78 00.0	+60.0	117.0	**78**
79	80 01.2	*+45.5*•	78.8	80 09.9	*+49.3*•	84.5	80 12.7	+52.7	90.2	80 09.4	+55.4	96.0	80 00.2	+57.5	101.7	79 45.2	+59.0	107.1	79 25.0	+59.8	112.2	79 00.0	+60.0	117.0	**79**
80	80 46.7	*+42.5*•	74.9	80 59.2	*+47.0*•	81.0	81 05.4	*+50.9*•	87.3	81 04.8	+54.4	93.7	80 57.7	+57.0	100.0	80 44.2	+58.7	106.0	80 24.8	+59.7	111.7	80 00.0	+60.0	117.0	**80**
81	81 29.2	*+38.7*•	70.3	81 46.2	*+43.9*•	76.8	81 56.3	*+48.7*•	83.7	81 59.2	+52.9	90.8	81 54.7	+56.1	97.9	81 42.9	+58.4	104.7	81 24.5	+59.6	111.1	81 00.0	+60.0	117.0	**81**
82	82 07.9	*+34.0*•	64.9	82 30.1	*+39.8*•	71.8	82 45.0	*+45.6*•	79.3	82 52.1	*+50.7*•	87.2	82 50.8	+55.0	95.2	82 41.3	+57.9	103.0	82 24.1	+59.5	110.3	82 00.0	+60.0	117.0	**82**
83	82 41.9	*+28.0*•	58.7	83 09.9	*+34.4*•	65.8	83 30.6	*+41.2*•	73.9	83 42.8	*+47.7*•	82.6	83 45.8	*+53.2*•	91.7	83 39.2	+57.2	100.8	83 23.6	+59.4	109.3	83 00.0	+60.0	117.0	**83**
84	83 09.9	*+20.7*•	51.5	83 44.3	*+27.5*•	58.6	84 11.8	*+35.0*•	67.1	84 30.5	*+43.0*•	76.7	84 39.0	*+50.3*•	87.1	84 36.4	+55.9	97.8	84 23.0	+59.1	107.9	84 00.0	+60.0	117.0	**84**
85	83 30.6	*+12.2*•	43.4	84 11.8	*+18.7*•	50.2	84 46.8	*+26.7*•	58.6	85 13.5	*+35.8*•	68.9	85 29.3	*+45.5*•	80.8	85 32.3	*+53.6*•	93.5	85 22.1	+58.5	105.9	85 00.0	+60.0	117.0	**85**
86	83 42.8	*+3.0*•	34.6	84 30.5	*+8.5*•	40.5	85 13.5	*+15.8*•	48.3	85 49.3	*+25.5*•	58.6	86 14.8	*+37.2*•	71.7	86 25.9	*+49.2*•	87.1	86 20.6	+57.6	102.9	86 00.0	+60.0	117.0	**86**
87	83 45.8	*–6.6*•	25.4	84 39.0	*–2.6*•	30.0	85 29.3	*+3.0*•	36.3	86 14.8	*+11.1*•	45.4	86 52.0	*+23.1*•	58.5	87 15.1	*+39.5*•	76.6	87 18.2	*+54.7*•	97.7	87 00.0	+60.0	117.0	**87**
88	83 39.2	*–15.6*•	16.3	84 36.4	*–13.4*•	19.3	85 32.3	*–10.2*•	23.6	86 25.9	*–5.3*•	30.0	87 15.1	*+3.1*•	40.4	87 54.6	*+18.3*•	58.5	88 12.9	*+44.4*•	87.1	88 00.0	+60.0	117.0	**88**
89	83 23.6	*–23.6*•	7.8	84 23.0	*–23.0*•	9.1	85 22.1	*–22.1*•	11.1	86 20.6	*–20.6*•	14.1	87 18.2	*–18.2*•	19.3	88 12.9	*–12.9*•	30.0	88 57.3	*+2.7*•	58.5	89 00.0	+60.0	117.0	**89**
90	83 00.0	*–30.4*•	0.0	84 00.0	*–30.9*•	0.0	85 00.0	*–31.6*•	0.0	86 00.0	*–32.5*•	0.0	87 00.0	*–34.0*•	0.0	88 00.0	*–36.6*•	0.0	89 00.0	*–42.3*•	0.0	90 00.0	–60.0	58.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 63°, 297°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 10.3	−59.6	116.8	2 43.2	−59.7	116.9	2 16.1	−59.9	116.9	1 48.9	−59.9	116.9	1 21.7	−59.9	117.0	0 54.5	−60.0	117.0	0 27.2	−60.0	117.0	0 00.0	+60.0	63.0	0
1	2 10.7	−59.7	116.9	1 43.5	−59.8	117.0	1 16.2	−59.8	117.0	0 49.0	−59.9	117.0	0 21.8	−60.0	117.0	0 05.5	+60.0	63.0	0 32.8	+59.9	63.0	1 00.0	+60.0	63.0	1
2	1 11.0	−59.6	117.0	0 43.7	−59.7	117.1	0 16.4	−59.8	117.1	0 10.9	+59.9	62.9	0 38.2	+59.9	62.9	1 05.5	+59.9	63.0	1 32.7	+60.0	63.0	2 00.0	+60.0	63.0	2
3	0 11.4	−59.7	117.2	0 16.0	+59.8	62.8	0 43.4	+59.8	62.9	1 10.8	+59.8	62.9	1 38.1	+60.0	62.9	2 05.4	+60.0	62.9	2 32.7	+60.0	63.0	3 00.0	+60.0	63.0	3
4	0 48.3	+59.6	62.7	1 15.8	+59.7	62.8	1 43.2	+59.8	62.8	2 10.6	+59.9	62.8	2 38.1	+59.9	62.8	3 05.4	+60.0	62.9	3 32.7	+60.0	62.9	4 00.0	+60.0	63.0	4
5	1 47.9	+59.7	62.6	2 15.5	+59.7	62.7	2 43.0	+59.9	62.7	3 10.5	+59.9	62.7	3 38.0	+59.9	62.8	4 05.4	+60.0	62.9	4 32.7	+60.0	62.9	5 00.0	+60.0	63.0	5
6	2 47.6	+59.6	62.5	3 15.2	+59.8	62.6	3 42.9	+59.8	62.6	4 10.4	+59.9	62.7	4 37.9	+60.0	62.8	5 05.4	+59.9	62.8	5 32.7	+60.0	62.9	6 00.0	+60.0	63.0	6
7	3 47.2	+59.7	62.4	4 15.0	+59.7	62.5	4 42.7	+59.8	62.5	5 10.3	+59.9	62.6	5 37.9	+59.9	62.7	6 05.3	+60.0	62.8	6 32.7	+60.0	62.9	7 00.0	+60.0	63.0	7
8	4 46.9	+59.6	62.3	5 14.7	+59.7	62.4	5 42.5	+59.8	62.5	6 10.2	+59.9	62.6	6 37.8	+59.9	62.7	7 05.3	+60.0	62.8	7 32.7	+60.0	62.9	8 00.0	+60.0	63.0	8
9	5 46.5	+59.6	62.2	6 14.4	+59.8	62.3	6 42.3	+59.8	62.4	7 10.1	+59.8	62.5	7 37.7	+60.0	62.6	8 05.3	+59.9	62.7	8 32.7	+60.0	62.9	9 00.0	+60.0	63.0	9
10	6 46.1	+59.7	62.1	7 14.2	+59.7	62.2	7 42.1	+59.8	62.3	8 09.9	+59.9	62.4	8 37.7	+59.9	62.6	9 05.2	+60.0	62.7	9 32.7	+60.0	62.8	10 00.0	+60.0	63.0	10
11	7 45.8	+59.6	62.0	8 13.9	+59.7	62.1	8 41.9	+59.8	62.2	9 09.8	+59.9	62.4	9 37.6	+59.9	62.5	10 05.2	+60.0	62.7	10 32.7	+60.0	62.8	11 00.0	+60.0	63.0	11
12	8 45.4	+59.7	61.9	9 13.6	+59.8	62.0	9 41.7	+59.9	62.1	10 09.7	+59.9	62.3	10 37.5	+60.0	62.5	11 05.2	+59.9	62.6	11 32.7	+60.0	62.8	12 00.0	+60.0	63.0	12
13	9 45.1	+59.6	61.8	10 13.4	+59.7	61.9	10 41.6	+59.8	62.1	11 09.6	+59.9	62.2	11 37.5	+59.9	62.4	12 05.1	+60.0	62.6	12 32.7	+60.0	62.8	13 00.0	+60.0	63.0	13
14	10 44.7	+59.6	61.6	11 13.1	+59.7	61.8	11 41.4	+59.8	62.0	12 09.5	+59.8	62.2	12 37.4	+59.9	62.4	13 05.1	+60.0	62.6	13 32.7	+60.0	62.8	14 00.0	+60.0	63.0	14
15	11 44.3	+59.6	61.5	12 12.8	+59.8	61.7	12 41.2	+59.8	61.9	13 09.3	+59.9	62.1	13 37.3	+59.9	62.3	14 05.1	+60.0	62.5	14 32.7	+59.9	62.8	15 00.0	+60.0	63.0	15
16	12 43.9	+59.7	61.4	13 12.6	+59.7	61.6	13 41.0	+59.8	61.8	14 09.2	+59.9	62.0	14 37.2	+60.0	62.3	15 05.1	+59.9	62.5	15 32.6	+60.0	62.7	16 00.0	+60.0	63.0	16
17	13 43.6	+59.6	61.3	14 12.3	+59.7	61.5	14 40.8	+59.8	61.7	15 09.1	+59.9	62.0	15 37.2	+59.9	62.2	16 05.0	+60.0	62.5	16 32.6	+60.0	62.7	17 00.0	+60.0	63.0	17
18	14 43.2	+59.6	61.2	15 12.0	+59.7	61.4	15 40.6	+59.8	61.7	16 09.0	+59.8	61.9	16 37.1	+59.9	62.2	17 05.0	+60.0	62.4	17 32.6	+60.0	62.7	18 00.0	+60.0	63.0	18
19	15 42.8	+59.6	61.1	16 11.7	+59.7	61.3	16 40.4	+59.8	61.6	17 08.8	+59.9	61.8	17 37.0	+60.0	62.1	18 05.0	+59.9	62.4	18 32.6	+60.0	62.7	19 00.0	+60.0	63.0	19
20	16 42.4	+59.6	60.9	17 11.4	+59.8	61.2	17 40.2	+59.8	61.5	18 08.7	+59.9	61.8	18 37.0	+59.9	62.1	19 04.9	+60.0	62.4	19 32.6	+60.0	62.7	20 00.0	+60.0	63.0	20
21	17 42.0	+59.6	60.8	18 11.2	+59.7	61.1	18 40.0	+59.8	61.4	19 08.6	+59.9	61.7	19 36.9	+59.9	62.0	20 04.9	+60.0	62.3	20 32.6	+60.0	62.7	21 00.0	+60.0	63.0	21
22	18 41.6	+59.6	60.7	19 10.9	+59.7	61.0	19 39.8	+59.8	61.3	20 08.5	+59.8	61.6	20 36.8	+59.9	62.0	21 04.9	+59.9	62.3	21 32.6	+60.0	62.6	22 00.0	+60.0	63.0	22
23	19 41.2	+59.6	60.6	20 10.6	+59.7	60.9	20 39.6	+59.8	61.2	21 08.3	+59.9	61.6	21 36.7	+60.0	61.9	22 04.8	+60.0	62.3	22 32.6	+60.0	62.6	23 00.0	+60.0	63.0	23
24	20 40.8	+59.6	60.5	21 10.3	+59.7	60.8	21 39.4	+59.8	61.1	22 08.2	+59.9	61.5	22 36.7	+59.9	61.9	23 04.8	+60.0	62.2	23 32.6	+60.0	62.6	24 00.0	+60.0	63.0	24
25	21 40.4	+59.6	60.3	22 10.0	+59.7	60.7	22 39.2	+59.8	61.0	23 08.1	+59.8	61.4	23 36.6	+59.9	61.8	24 04.8	+59.9	62.2	24 32.6	+60.0	62.6	25 00.0	+60.0	63.0	25
26	22 40.0	+59.6	60.2	23 09.7	+59.7	60.6	23 39.0	+59.7	61.0	24 07.9	+59.9	61.3	24 36.5	+59.9	61.7	25 04.7	+60.0	62.2	25 32.6	+60.0	62.6	26 00.0	+60.0	63.0	26
27	23 39.6	+59.6	60.1	24 09.4	+59.6	60.5	24 38.7	+59.8	60.9	25 07.8	+59.8	61.3	25 36.4	+59.9	61.7	26 04.7	+60.0	62.1	26 32.6	+59.9	62.6	27 00.0	+60.0	63.0	27
28	24 39.2	+59.5	60.0	25 09.0	+59.7	60.4	25 38.5	+59.8	60.8	26 07.6	+59.9	61.2	26 36.3	+60.0	61.6	27 04.7	+59.9	62.1	27 32.5	+60.0	62.5	28 00.0	+60.0	63.0	28
29	25 38.7	+59.6	59.8	26 08.7	+59.7	60.2	26 38.3	+59.8	60.7	27 07.5	+59.8	61.1	27 36.3	+59.9	61.6	28 04.6	+60.0	62.0	28 32.5	+60.0	62.5	29 00.0	+60.0	63.0	29
30	26 38.3	+59.6	59.7	27 08.4	+59.7	60.1	27 38.1	+59.7	60.6	28 07.3	+59.9	61.0	28 36.2	+59.9	61.5	29 04.6	+59.9	62.0	29 32.5	+60.0	62.5	30 00.0	+60.0	63.0	30
31	27 37.9	+59.5	59.5	28 08.1	+59.6	60.0	28 37.8	+59.8	60.5	29 07.2	+59.8	61.0	29 36.1	+59.9	61.4	30 04.5	+60.0	62.0	30 32.5	+60.0	62.5	31 00.0	+60.0	63.0	31
32	28 37.4	+59.5	59.4	29 07.7	+59.7	59.9	29 37.6	+59.8	60.4	30 07.0	+59.9	60.9	30 36.0	+59.9	61.4	31 04.5	+60.0	61.9	31 32.5	+60.0	62.4	32 00.0	+60.0	63.0	32
33	29 36.9	+59.6	59.3	30 07.4	+59.6	59.8	30 37.4	+59.7	60.3	31 06.9	+59.8	60.8	31 35.9	+59.9	61.3	32 04.5	+59.9	61.9	32 32.5	+60.0	62.4	33 00.0	+60.0	63.0	33
34	30 36.5	+59.5	59.1	31 07.0	+59.7	59.6	31 37.1	+59.8	60.2	32 06.7	+59.9	60.7	32 35.8	+59.9	61.3	33 04.4	+60.0	61.8	33 32.5	+60.0	62.4	34 00.0	+60.0	63.0	34
35	31 36.0	+59.5	59.0	32 06.7	+59.6	59.5	32 36.9	+59.7	60.1	33 06.6	+59.8	60.6	33 35.7	+59.9	61.2	34 04.4	+59.9	61.8	34 32.5	+60.0	62.4	35 00.0	+60.0	63.0	35
36	32 35.5	+59.5	58.8	33 06.3	+59.6	59.4	33 36.6	+59.7	59.9	34 06.4	+59.8	60.5	34 35.6	+59.9	61.1	35 04.3	+60.0	61.7	35 32.5	+60.0	62.4	36 00.0	+60.0	63.0	36
37	33 35.0	+59.5	58.7	34 05.9	+59.6	59.2	34 36.3	+59.8	59.8	35 06.2	+59.8	60.4	35 35.5	+59.9	61.1	36 04.3	+59.9	61.7	36 32.5	+59.9	62.3	37 00.0	+60.0	63.0	37
38	34 34.5	+59.4	58.5	35 05.5	+59.6	59.1	35 36.1	+59.7	59.7	36 06.0	+59.9	60.3	36 35.4	+59.9	61.0	37 04.2	+60.0	61.6	37 32.4	+60.0	62.3	38 00.0	+60.0	63.0	38
39	35 33.9	+59.5	58.3	36 05.1	+59.6	59.0	36 35.8	+59.7	59.6	37 05.9	+59.8	60.2	37 35.3	+59.9	60.9	38 04.2	+60.0	61.6	38 32.4	+60.0	62.3	39 00.0	+60.0	63.0	39
40	36 33.4	+59.4	58.2	37 04.7	+59.6	58.8	37 35.5	+59.7	59.5	38 05.7	+59.8	60.1	38 35.2	+59.9	60.8	39 04.2	+59.9	61.5	39 32.4	+60.0	62.3	40 00.0	+60.0	63.0	40
41	37 32.8	+59.4	58.0	38 04.3	+59.6	58.7	38 35.2	+59.7	59.3	39 05.5	+59.8	60.0	39 35.1	+59.9	60.8	40 04.1	+60.0	61.5	40 32.4	+60.0	62.2	41 00.0	+60.0	63.0	41
42	38 32.2	+59.5	57.8	39 03.9	+59.5	58.5	39 34.9	+59.7	59.2	40 05.3	+59.8	59.9	40 35.0	+59.9	60.7	41 04.1	+59.9	61.4	41 32.4	+60.0	62.2	42 00.0	+60.0	63.0	42
43	39 31.7	+59.4	57.7	40 03.4	+59.6	58.4	40 34.6	+59.7	59.1	41 05.1	+59.8	59.8	41 34.9	+59.9	60.6	42 04.0	+59.9	61.4	42 32.4	+60.0	62.2	43 00.0	+60.0	63.0	43
44	40 31.1	+59.3	57.5	41 03.0	+59.5	58.2	41 34.3	+59.7	59.0	42 04.9	+59.8	59.7	42 34.8	+59.9	60.5	43 03.9	+60.0	61.3	43 32.4	+59.9	62.1	44 00.0	+60.0	63.0	44
45	41 30.4	+59.4	57.3	42 02.5	+59.5	58.0	42 34.0	+59.6	58.8	43 04.7	+59.7	59.6	43 34.7	+59.8	60.4	44 03.9	+59.9	61.3	44 32.3	+60.0	62.1	45 00.0	+60.0	63.0	45
46	42 29.8	+59.3	57.1	43 02.0	+59.6	57.9	43 33.6	+59.7	58.7	44 04.4	+59.8	59.5	44 34.5	+59.9	60.3	45 03.8	+60.0	61.2	45 32.3	+60.0	62.1	46 00.0	+60.0	63.0	46
47	43 29.1	+59.3	56.9	44 01.6	+59.4	57.7	44 33.3	+59.6	58.5	45 04.2	+59.8	59.4	45 34.4	+59.9	60.2	46 03.8	+59.9	61.1	46 32.3	+60.0	62.1	47 00.0	+60.0	63.0	47
48	44 28.4	+59.3	56.7	45 01.0	+59.5	57.5	45 32.9	+59.6	58.4	46 04.0	+59.7	59.2	46 34.3	+59.8	60.1	47 03.7	+60.0	61.1	47 32.3	+60.0	62.0	48 00.0	+60.0	63.0	48
49	45 27.7	+59.3	56.5	46 00.5	+59.5	57.3	46 32.5	+59.6	58.2	47 03.7	+59.8	59.1	47 34.1	+59.9	60.0	48 03.7	+59.9	61.0	48 32.3	+60.0	62.0	49 00.0	+60.0	63.0	49
50	46 27.0	+59.2	56.2	47 00.0	+59.4	57.1	47 32.1	+59.6	58.0	48 03.5	+59.7	59.0	48 34.0	+59.8	59.9	49 03.6	+59.9	60.9	49 32.3	+60.0	62.0	50 00.0	+60.0	63.0	50
51	47 26.2	+59.2	56.0	47 59.4	+59.4	56.9	48 31.7	+59.6	57.9	49 03.2	+59.7	58.8	49 33.8	+59.9	59.8	50 03.5	+59.9	60.9	50 32.3	+59.9	61.9	51 00.0	+60.0	63.0	51
52	48 25.4	+59.2	55.8	48 58.8	+59.4	56.7	49 31.3	+59.6	57.7	50 02.9	+59.8	58.7	50 33.7	+59.8	59.7	51 03.4	+60.0	60.8	51 32.2	+60.0	61.9	52 00.0	+60.0	63.0	52
53	49 24.6	+59.1	55.5	49 58.2	+59.3	56.5	50 30.9	+59.5	57.5	51 02.7	+59.7	58.5	51 33.5	+59.8	59.6	52 03.4	+59.9	60.7	52 32.2	+60.0	61.8	53 00.0	+60.0	63.0	53
54	50 23.7	+59.1	55.2	50 57.5	+59.3	56.2	51 30.4	+59.5	57.3	52 02.4	+59.6	58.4	52 33.3	+59.8	59.5	53 03.3	+59.9	60.6	53 32.2	+60.0	61.8	54 00.0	+60.0	63.0	54
55	51 22.8	+59.1	55.0	51 56.8	+59.3	56.0	52 29.9	+59.5	57.1	53 02.0	+59.7	58.2	53 33.1	+59.9	59.3	54 03.2	+59.9	60.5	54 32.2	+60.0	61.7	55 00.0	+60.0	63.0	55
56	52 21.9	+59.0	54.7	52 56.1	+59.3	55.8	53 29.4	+59.5	56.9	54 01.7	+59.7	58.0	54 33.0	+59.8	59.2	55 03.1	+59.9	60.4	55 32.2	+59.9	61.7	56 00.0	+60.0	63.0	56
57	53 20.9	+59.0	54.4	53 55.4	+59.2	55.5	54 28.9	+59.4	56.6	55 01.4	+59.6	57.8	55 32.8	+59.7	59.1	56 03.0	+59.9	60.3	56 32.1	+60.0	61.6	57 00.0	+60.0	63.0	57
58	54 19.9	+58.9	54.1	54 54.6	+59.2	55.2	55 28.3	+59.5	56.4	56 01.0	+59.6	57.6	56 32.5	+59.8	58.9	57 02.9	+59.9	60.2	57 32.1	+60.0	61.6	58 00.0	+60.0	63.0	58
59	55 18.8	+58.9	53.7	55 53.8	+59.2	54.9	56 27.8	+59.4	56.2	57 00.6	+59.6	57.4	57 32.3	+59.8	58.8	58 02.8	+59.9	60.1	58 32.1	+60.0	61.5	59 00.0	+60.0	63.0	59
60	56 17.7	+58.8	53.4	56 53.0	+59.1	54.6	57 27.2	+59.3	55.9	58 00.2	+59.6	57.2	58 32.1	+59.7	58.6	59 02.7	+59.9	60.0	59 32.1	+59.9	61.5	60 00.0	+60.0	63.0	60
61	57 16.5	+58.8	53.0	57 52.1	+59.0	54.3	58 26.5	+59.3	55.6	58 59.8	+59.5	57.0	59 31.8	+59.8	58.4	60 02.6	+59.9	59.9	60 32.0	+60.0	61.4	61 00.0	+60.0	63.0	61
62	58 15.3	+58.6	52.7	58 51.1	+59.0	54.0	59 25.8	+59.3	55.3	59 59.3	+59.6	56.8	60 31.6	+59.7	58.2	61 02.5	+59.9	59.8	61 32.0	+60.0	61.4	62 00.0	+60.0	63.0	62
63	59 13.9	+58.6	52.3	59 50.1	+58.9	53.6	60 25.1	+59.2	55.0	60 58.9	+59.4	56.5	61 31.3	+59.7	58.0	62 02.4	+59.8	59.6	62 32.0	+59.9	61.3	63 00.0	+60.0	63.0	63
64	60 12.5	+58.5	51.8	60 49.0	+58.9	53.2	61 24.3	+59.2	54.7	61 58.3	+59.5	56.2	62 31.0	+59.7	57.8	63 02.2	+59.9	59.5	63 31.9	+60.0	61.2	64 00.0	+60.0	63.0	64
65	61 11.0	+58.4	51.4	61 47.9	+58.8	52.8	62 23.5	+59.1	54.3	62 57.8	+59.4	55.9	63 30.7	+59.7	57.6	64 02.1	+59.8	59.3	64 31.9	+59.9	61.1	65 00.0	+60.0	63.0	65
66	62 09.4	+58.3	50.9	62 46.7	+58.7	52.4	63 22.6	+59.1	54.0	63 57.2	+59.4	55.6	64 30.4	+59.6	57.4	65 01.9	+59.9	59.2	65 31.8	+60.0	61.0	66 00.0	+60.0	63.0	66
67	63 07.7	+58.2	50.4	63 45.4	+58.6	51.9	64 21.7	+59.0	53.6	64 56.6	+59.3	55.3	65 30.0	+59.6	57.1	66 01.8	+59.8	59.0	66 31.8	+60.0	60.9	67 00.0	+60.0	63.0	67
68	64 05.9	+58.1	49.8	64 44.0	+58.5	51.4	65 20.7	+58.9	53.1	65 55.9	+59.3	54.9	66 29.6	+59.6	56.8	67 01.6	+59.8	58.8	67 31.8	+59.9	60.8	68 00.0	+60.0	63.0	68
69	65 04.0	+57.9	49.2	65 42.5	+58.4	50.9	66 19.6	+58.8	52.7	66 55.2	+59.2	54.5	67 29.2	+59.5	56.5	68 01.4	+59.8	58.6	68 31.7	+59.9	60.7	69 00.0	+60.0	63.0	69
70	66 01.9	+57.7	48.6	66 40.9	+58.2	50.3	67 18.4	+58.7	52.2	67 54.4	+59.1	54.1	68 28.7	+59.5	56.2	69 01.2	+59.7	58.3	69 31.6	+60.0	60.6	70 00.0	+60.0	63.0	70
71	66 59.6	+57.5	47.9	67 39.1	+58.1	49.7	68 17.1	+58.6	51.6	68 53.5	+59.1	53.7	69 28.2	+59.4	55.8	70 00.9	+59.8	58.1	70 31.6	+59.9	60.5	71 00.0	+60.0	63.0	71
72	67 57.1	+57.3	47.2	68 37.2	+57.9	49.0	69 15.7	+58.5	51.0	69 52.6	+59.0	53.2	70 27.6	+59.4	55.4	71 00.7	+59.7	57.8	71 31.5	+59.9	60.3	72 00.0	+60.0	63.0	72
73	68 54.4	+57.1	46.4	69 35.1	+57.7	48.3	70 14.2	+58.3	50.4	70 51.6	+58.8	52.6	71 27.0	+59.3	55.0	72 00.4	+59.6	57.5	72 31.4	+60.0	60.2	73 00.0	+60.0	63.0	73
74	69 51.5	+56.8	45.5	70 32.8	+57.5	47.5	71 12.5	+58.1	49.7	71 50.4	+58.7	52.0	72 26.3	+59.3	54.5	73 00.0	+59.7	57.1	73 31.4	+59.9	60.0	74 00.0	+60.0	63.0	74
75	70 48.3	+56.5	44.5	71 30.3	+57.2	46.6	72 10.6	+58.0	48.9	72 49.1	+58.6	51.3	73 25.6	+59.1	53.9	73 59.7	+59.6	56.8	74 31.3	+59.8	59.8	75 00.0	+60.0	63.0	75
76	71 44.8	+56.1	43.5	72 27.5	+56.9	45.7	73 08.6	+57.7	48.0	73 47.7	+58.4	50.6	74 24.7	+59.0	53.3	74 59.3	+59.5	56.3	75 31.1	+59.9	59.5	76 00.0	+60.0	63.0	76
77	72 40.9	+55.6	42.3	73 24.4	+56.5	44.6	74 06.3	+57.3	47.0	74 46.1	+58.2	49.7	75 23.7	+58.9	52.6	75 58.8	+59.5	55.8	76 31.0	+59.9	59.3	77 00.0	+60.0	63.0	77
78	73 36.5	+55.1	41.0	74 20.9	+56.1	43.4	75 03.6	+57.1	45.9	75 44.3	+57.9	48.8	76 22.6	+58.7	51.9	76 58.3	+59.4	55.3	77 30.9	+59.8	59.0	78 00.0	+60.0	63.0	78
79	74 31.6	+54.5	39.6	75 17.0	+55.5	42.0	76 00.7	+56.5	44.7	76 42.2	+57.6	47.7	77 21.3	+58.6	51.0	77 57.7	+59.2	54.6	78 30.7	+59.8	58.6	79 00.0	+60.0	63.0	79
80	75 26.1	+53.7	38.0	76 12.5	+54.9	40.5	76 57.2	+56.1	43.3	77 39.8	+57.2	46.4	78 19.9	+58.2	49.9	78 56.9	+59.2	53.8	79 30.5	+59.8	58.2	80 00.0	+60.0	63.0	80
81	76 19.8	+52.8	36.1	77 07.4	+54.1	38.7	77 53.3	+55.4	41.6	78 37.0	+56.7	44.9	79 18.1	+57.9	48.7	79 56.1	+58.9	52.9	80 30.3	+59.7	57.7	81 00.0	+60.0	63.0	81
82	77 12.6	+51.7	34.1	78 01.5	+53.1	36.7	78 48.7	+54.5	39.7	79 33.7	+56.0	43.2	80 16.0	+57.4	47.2	80 55.0	+58.7	51.8	81 30.0	+59.6	57.0	82 00.0	+60.0	63.0	82
83	78 04.3	+50.3	31.7	78 54.6	+51.8	34.4	79 43.2	+53.4	37.5	80 29.7	+55.1	41.1	81 13.4	+56.8	45.4	81 53.7	+58.3	50.4	82 29.6	+59.5	56.2	83 00.0	+60.0	63.0	83
84	78 54.6	+48.6	29.0	79 46.4	+50.2	31.6	80 36.6	+52.0	34.8	81 24.8	+53.8	38.6	82 10.2	+55.8	43.1	82 52.0	+57.8	48.6	83 29.1	+59.3	55.2	84 00.0	+60.0	63.0	84
85	79 43.2	*+46.5* •	25.8	80 36.6	*+48.2* •	28.4	81 28.6	*+50.0* •	31.6	82 18.6	*+52.2* •	35.5	83 06.0	+54.6	40.3	83 49.8	+56.9	46.3	84 28.4	+59.1	53.7	85 00.0	+60.0	63.0	85
86	80 29.7	*+43.7* •	22.1	81 24.8	*+45.4* •	24.6	82 18.6	*+47.4* •	27.7	83 10.8	*+49.8* •	31.6	84 00.6	*+52.5* •	36.6	84 46.7	+55.6	43.1	85 27.5	+58.5	51.7	86 00.0	+60.0	63.0	86
87	81 13.4	*+40.3* •	17.8	82 10.2	*+41.8* •	20.0	83 06.0	*+43.8* •	22.8	84 00.6	*+46.1* •	26.5	84 53.1	*+49.2* •	31.5	85 42.3	*+53.1* •	38.5	86 26.0	*+57.4* •	48.5	87 00.0	+60.0	63.0	87
88	81 53.7	*+35.9* •	12.7	82 52.0	*+37.1* •	14.5	83 49.8	*+38.6* •	16.8	84 46.7	*+40.8* •	20.0	85 42.3	*+43.7* •	24.5	86 35.4	*+48.0* •	31.5	87 23.4	*+54.3* •	43.1	88 00.0	+60.0	63.0	88
89	82 29.6	*+30.4* •	6.8	83 29.1	*+30.9* •	7.9	84 28.4	*+31.6* •	9.3	85 27.5	*+32.5* •	11.3	86 26.0	*+34.0* •	14.5	87 23.4	*+36.6* •	20.0	88 17.7	*+42.3* •	31.5	89 00.0	+60.0	63.0	89
90	83 00.0	*+23.6* •	0.0	84 00.0	*+23.0* •	0.0	85 00.0	*+22.1* •	0.0	86 00.0	*+20.6* •	0.0	87 00.0	*+18.2* •	0.0	88 00.0	*+12.9* •	0.0	89 00.0	*−2.7* •	0.0	90 00.0	−60.0	31.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 117°, 243°

64°, 296° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 03.7	+59.7	115.8	2 37.6	+59.7	115.9	2 11.4	+59.8	115.9	1 45.1	+59.9	115.9	1 18.9	+59.9	116.0	0 52.6	+60.0	116.0	0 26.3	+60.0	116.0	0 00.0	+60.0	116.0	**0**
1	4 03.4	+59.6	115.7	3 37.3	+59.7	115.8	3 11.2	+59.8	115.8	2 45.0	+59.9	115.9	2 18.8	+59.9	115.9	1 52.6	+59.9	116.0	1 26.3	+60.0	116.0	1 00.0	+60.0	116.0	**1**
2	5 03.0	+59.7	115.6	4 37.0	+59.8	115.7	4 11.0	+59.8	115.8	3 44.9	+59.9	115.8	3 18.7	+60.0	115.9	2 52.5	+60.0	115.9	2 26.3	+60.0	116.0	2 00.0	+60.0	116.0	**2**
3	6 02.7	+59.6	115.5	5 36.8	+59.7	115.6	5 10.8	+59.8	115.7	4 44.8	+59.9	115.8	4 18.7	+59.9	115.8	3 52.5	+60.0	115.9	3 26.3	+60.0	115.9	3 00.0	+60.0	116.0	**3**
4	7 02.3	+59.6	115.4	6 36.5	+59.7	115.5	6 10.6	+59.8	115.6	5 44.7	+59.8	115.7	5 18.6	+59.9	115.8	4 52.5	+59.9	115.9	4 26.3	+60.0	115.9	4 00.0	+60.0	116.0	**4**
5	8 01.9	+59.7	115.3	7 36.2	+59.8	115.4	7 10.4	+59.9	115.5	6 44.5	+59.9	115.6	6 18.5	+60.0	115.7	5 52.4	+60.0	115.8	5 26.3	+60.0	115.9	5 00.0	+60.0	116.0	**5**
6	9 01.6	+59.6	115.2	8 36.0	+59.7	115.3	8 10.3	+59.8	115.4	7 44.4	+59.9	115.6	7 18.5	+59.9	115.7	6 52.4	+60.0	115.8	6 26.3	+59.9	115.9	6 00.0	+60.0	116.0	**6**
7	10 01.2	+59.6	115.1	9 35.7	+59.7	115.2	9 10.1	+59.8	115.4	8 44.3	+59.9	115.5	8 18.4	+59.9	115.6	7 52.4	+60.0	115.8	7 26.2	+60.0	115.9	7 00.0	+60.0	116.0	**7**
8	11 00.8	+59.6	114.9	10 35.4	+59.7	115.1	10 09.9	+59.8	115.3	9 44.2	+59.9	115.4	9 18.3	+60.0	115.6	8 52.4	+59.9	115.7	8 26.2	+60.0	115.9	8 00.0	+60.0	116.0	**8**
9	12 00.4	+59.7	114.8	11 35.1	+59.8	115.0	11 09.7	+59.8	115.2	10 44.1	+59.8	115.4	10 18.3	+59.9	115.5	9 52.3	+60.0	115.7	9 26.2	+60.0	115.9	9 00.0	+60.0	116.0	**9**
10	13 00.1	+59.6	114.7	12 34.9	+59.7	114.9	12 09.5	+59.8	115.1	11 43.9	+59.9	115.3	11 18.2	+59.9	115.5	10 52.3	+60.0	115.7	10 26.2	+60.0	115.8	10 00.0	+60.0	116.0	**10**
11	13 59.7	+59.6	114.6	13 34.6	+59.7	114.8	13 09.3	+59.8	115.0	12 43.8	+59.9	115.2	12 18.1	+60.0	115.4	11 52.3	+59.9	115.6	11 26.2	+60.0	115.8	11 00.0	+60.0	116.0	**11**
12	14 59.3	+59.6	114.5	14 34.3	+59.7	114.7	14 09.1	+59.8	115.0	13 43.7	+59.9	115.2	13 18.1	+59.9	115.4	12 52.2	+60.0	115.6	12 26.2	+60.0	115.8	12 00.0	+60.0	116.0	**12**
13	15 58.9	+59.6	114.4	15 34.0	+59.7	114.6	15 08.9	+59.8	114.9	14 43.6	+59.8	115.1	14 18.0	+59.9	115.3	13 52.2	+60.0	115.6	13 26.2	+60.0	115.8	13 00.0	+60.0	116.0	**13**
14	16 58.5	+59.6	114.2	16 33.7	+59.7	114.5	16 08.7	+59.8	114.8	15 43.4	+59.9	115.0	15 17.9	+60.0	115.3	14 52.2	+59.9	115.5	14 26.2	+60.0	115.8	14 00.0	+60.0	116.0	**14**
15	17 58.1	+59.6	114.1	17 33.4	+59.8	114.4	17 08.5	+59.8	114.7	16 43.3	+59.9	115.0	16 17.9	+59.9	115.2	15 52.1	+60.0	115.5	15 26.2	+60.0	115.8	15 00.0	+60.0	116.0	**15**
16	18 57.7	+59.6	114.0	18 33.2	+59.7	114.3	18 08.3	+59.8	114.6	17 43.2	+59.9	114.9	17 17.8	+59.9	115.2	16 52.1	+60.0	115.5	16 26.2	+60.0	115.7	16 00.0	+60.0	116.0	**16**
17	19 57.3	+59.6	113.9	19 32.9	+59.7	114.2	19 08.1	+59.8	114.5	18 43.1	+59.8	114.8	18 17.7	+59.9	115.1	17 52.1	+59.9	115.4	17 26.2	+60.0	115.7	17 00.0	+60.0	116.0	**17**
18	20 56.9	+59.6	113.8	20 32.6	+59.7	114.1	20 07.9	+59.8	114.4	19 42.9	+59.9	114.8	19 17.6	+60.0	115.1	18 52.0	+60.0	115.4	18 26.2	+60.0	115.7	18 00.0	+60.0	116.0	**18**
19	21 56.5	+59.5	113.6	21 32.3	+59.6	114.0	21 07.7	+59.8	114.3	20 42.8	+59.8	114.7	20 17.6	+59.9	115.0	19 52.0	+60.0	115.4	19 26.2	+59.9	115.7	19 00.0	+60.0	116.0	**19**
20	22 56.0	+59.6	113.5	22 31.9	+59.7	113.9	22 07.5	+59.8	114.3	21 42.6	+59.9	114.6	21 17.5	+59.9	115.0	20 52.0	+59.9	115.3	20 26.1	+60.0	115.7	20 00.0	+60.0	116.0	**20**
21	23 55.6	+59.6	113.4	23 31.6	+59.7	113.8	23 07.3	+59.7	114.2	22 42.5	+59.9	114.5	22 17.4	+59.9	114.9	21 51.9	+60.0	115.3	21 26.1	+60.0	115.7	21 00.0	+60.0	116.0	**21**
22	24 55.2	+59.5	113.2	24 31.3	+59.7	113.7	24 07.0	+59.8	114.1	23 42.4	+59.8	114.5	23 17.3	+59.9	114.9	22 51.9	+60.0	115.3	22 26.1	+60.0	115.6	22 00.0	+60.0	116.0	**22**
23	25 54.7	+59.6	113.1	25 31.0	+59.7	113.5	25 06.8	+59.8	114.0	24 42.2	+59.9	114.4	24 17.2	+60.0	114.8	23 51.9	+59.9	115.2	23 26.1	+60.0	115.6	23 00.0	+60.0	116.0	**23**
24	26 54.3	+59.5	113.0	26 30.7	+59.6	113.4	26 06.6	+59.8	113.9	25 42.1	+59.8	114.3	25 17.2	+59.9	114.8	24 51.8	+60.0	115.2	24 26.1	+60.0	115.6	24 00.0	+60.0	116.0	**24**
25	27 53.8	+59.6	112.8	27 30.3	+59.7	113.3	27 06.4	+59.7	113.8	26 41.9	+59.9	114.2	26 17.1	+59.9	114.7	25 51.8	+60.0	115.1	25 26.1	+60.0	115.6	25 00.0	+60.0	116.0	**25**
26	28 53.4	+59.5	112.7	28 30.0	+59.6	113.2	28 06.1	+59.8	113.7	27 41.8	+59.8	114.2	27 17.0	+59.9	114.6	26 51.8	+59.9	115.1	26 26.1	+60.0	115.6	26 00.0	+60.0	116.0	**26**
27	29 52.9	+59.5	112.5	29 29.6	+59.7	113.1	29 05.9	+59.7	113.6	28 41.6	+59.9	114.1	28 16.9	+59.9	114.6	27 51.7	+60.0	115.1	27 26.1	+60.0	115.5	27 00.0	+60.0	116.0	**27**
28	30 52.4	+59.5	112.4	30 29.3	+59.6	112.9	30 05.6	+59.8	113.5	29 41.5	+59.8	114.0	29 16.8	+59.9	114.5	28 51.7	+60.0	115.0	28 26.1	+60.0	115.5	28 00.0	+60.0	116.0	**28**
29	31 51.9	+59.5	112.2	31 28.9	+59.7	112.8	31 05.4	+59.7	113.4	30 41.3	+59.9	113.9	30 16.7	+60.0	114.5	29 51.7	+59.9	115.0	29 26.1	+60.0	115.5	29 00.0	+60.0	116.0	**29**
30	32 51.4	+59.5	112.1	32 28.6	+59.6	112.7	32 05.1	+59.8	113.3	31 41.2	+59.8	113.8	31 16.7	+59.9	114.4	30 51.6	+60.0	114.9	30 26.1	+59.9	115.5	30 00.0	+60.0	116.0	**30**
31	33 50.9	+59.5	111.9	33 28.2	+59.6	112.5	33 04.9	+59.7	113.2	32 41.0	+59.8	113.7	32 16.6	+59.9	114.3	31 51.6	+59.9	114.9	31 26.0	+60.0	115.5	31 00.0	+60.0	116.0	**31**
32	34 50.4	+59.4	111.8	34 27.8	+59.6	112.4	34 04.6	+59.7	113.0	33 40.8	+59.9	113.7	33 16.5	+59.9	114.3	32 51.5	+60.0	114.9	32 26.0	+60.0	115.4	32 00.0	+60.0	116.0	**32**
33	35 49.8	+59.5	111.6	35 27.4	+59.6	112.3	35 04.3	+59.8	112.9	34 40.7	+59.8	113.6	34 16.4	+59.9	114.2	33 51.5	+59.9	114.8	33 26.0	+60.0	115.4	33 00.0	+60.0	116.0	**33**
34	36 49.3	+59.4	111.4	36 27.0	+59.6	112.1	36 04.1	+59.7	112.8	35 40.5	+59.8	113.5	35 16.3	+59.9	114.1	34 51.4	+60.0	114.8	34 26.0	+60.0	115.4	34 00.0	+60.0	116.0	**34**
35	37 48.7	+59.4	111.3	37 26.6	+59.5	112.0	37 03.8	+59.7	112.7	36 40.3	+59.8	113.4	36 16.2	+59.9	114.1	35 51.4	+60.0	114.7	35 26.0	+60.0	115.4	35 00.0	+60.0	116.0	**35**
36	38 48.1	+59.4	111.1	38 26.1	+59.6	111.8	38 03.5	+59.7	112.6	37 40.1	+59.8	113.3	37 16.1	+59.9	114.0	36 51.4	+59.9	114.7	36 26.0	+60.0	115.3	36 00.0	+60.0	116.0	**36**
37	39 47.5	+59.4	110.9	39 25.7	+59.6	111.7	39 03.2	+59.7	112.4	38 39.9	+59.8	113.2	38 16.0	+59.8	113.9	37 51.3	+60.0	114.6	37 26.0	+60.0	115.3	37 00.0	+60.0	116.0	**37**
38	40 46.9	+59.3	110.7	40 25.3	+59.5	111.5	40 02.9	+59.6	112.3	39 39.7	+59.8	113.1	39 15.8	+59.9	113.8	38 51.3	+59.9	114.6	38 26.0	+60.0	115.3	38 00.0	+60.0	116.0	**38**
39	41 46.2	+59.4	110.5	41 24.8	+59.5	111.3	41 02.5	+59.7	112.2	40 39.5	+59.8	113.0	40 15.7	+59.9	113.7	39 51.2	+60.0	114.5	39 26.0	+59.9	115.3	39 00.0	+60.0	116.0	**39**
40	42 45.6	+59.3	110.3	42 24.3	+59.5	111.2	42 02.2	+59.7	112.0	41 39.3	+59.8	112.9	41 15.6	+59.9	113.7	40 51.2	+59.9	114.5	40 25.9	+60.0	115.2	40 00.0	+60.0	116.0	**40**
41	43 44.9	+59.3	110.1	43 23.8	+59.5	111.0	43 01.9	+59.6	111.9	42 39.1	+59.8	112.7	42 15.5	+59.9	113.6	41 51.1	+60.0	114.4	41 25.9	+60.0	115.2	41 00.0	+60.0	116.0	**41**
42	44 44.2	+59.2	109.9	44 23.3	+59.5	110.8	44 01.5	+59.7	111.7	43 38.9	+59.7	112.6	43 15.4	+59.9	113.5	42 51.1	+59.9	114.3	42 25.9	+60.0	115.2	42 00.0	+60.0	116.0	**42**
43	45 43.4	+59.3	109.7	45 22.8	+59.4	110.6	45 01.2	+59.6	111.6	44 38.6	+59.8	112.5	44 15.3	+59.8	113.4	43 51.0	+59.9	114.3	43 25.9	+60.0	115.2	43 00.0	+60.0	116.0	**43**
44	46 42.7	+59.2	109.5	46 22.2	+59.5	110.4	46 00.8	+59.6	111.4	45 38.4	+59.8	112.4	45 15.1	+59.9	113.3	44 50.9	+60.0	114.2	44 25.9	+60.0	115.1	44 00.0	+60.0	116.0	**44**
45	47 41.9	+59.2	109.2	47 21.7	+59.4	110.2	47 00.4	+59.6	111.3	46 38.2	+59.7	112.2	46 15.0	+59.8	113.2	45 50.9	+59.9	114.2	45 25.9	+60.0	115.1	45 00.0	+60.0	116.0	**45**
46	48 41.1	+59.1	109.0	48 21.1	+59.3	110.0	48 00.0	+59.6	111.1	47 37.9	+59.7	112.1	47 14.8	+59.9	113.1	46 50.8	+60.0	114.1	46 25.9	+59.9	115.1	46 00.0	+60.0	116.0	**46**
47	49 40.2	+59.2	108.7	49 20.4	+59.4	109.8	48 59.6	+59.5	110.9	48 37.6	+59.8	112.0	48 14.7	+59.8	113.0	47 50.8	+59.9	114.0	47 25.8	+60.0	115.0	47 00.0	+60.0	116.0	**47**
48	50 39.4	+59.0	108.4	50 19.8	+59.3	109.6	49 59.1	+59.6	110.7	49 37.4	+59.7	111.8	49 14.5	+59.9	112.9	48 50.7	+59.9	114.0	48 25.8	+60.0	115.0	48 00.0	+60.0	116.0	**48**
49	51 38.4	+59.1	108.2	51 19.1	+59.3	109.4	50 58.7	+59.5	110.5	50 37.1	+59.7	111.7	50 14.4	+59.8	112.8	49 50.6	+59.9	113.9	49 25.8	+60.0	115.0	49 00.0	+60.0	116.0	**49**
50	52 37.5	+59.0	107.9	52 18.4	+59.3	109.1	51 58.2	+59.5	110.3	51 36.8	+59.7	111.5	51 14.2	+59.8	112.7	50 50.5	+60.0	113.8	50 25.8	+60.0	114.9	50 00.0	+60.0	116.0	**50**
51	53 36.5	+58.9	107.6	53 17.7	+59.2	108.9	52 57.7	+59.5	110.1	52 36.5	+59.6	111.3	52 14.0	+59.9	112.5	51 50.5	+59.9	113.7	51 25.8	+60.0	114.9	51 00.0	+60.0	116.0	**51**
52	54 35.4	+58.9	107.3	54 16.9	+59.2	108.6	53 57.2	+59.4	109.9	53 36.1	+59.7	111.2	53 13.9	+59.8	112.4	52 50.4	+59.9	113.6	52 25.8	+59.9	114.8	52 00.0	+60.0	116.0	**52**
53	55 34.3	+58.8	106.9	55 16.1	+59.2	108.3	54 56.6	+59.5	109.7	54 35.8	+59.6	111.0	54 13.7	+59.8	112.3	53 50.3	+59.9	113.6	53 25.7	+60.0	114.8	53 00.0	+60.0	116.0	**53**
54	56 33.1	+58.8	106.6	56 15.3	+59.1	108.0	55 56.1	+59.4	109.4	55 35.4	+59.7	110.8	55 13.5	+59.8	112.1	54 50.2	+59.9	113.5	54 25.7	+60.0	114.7	54 00.0	+60.0	116.0	**54**
55	57 31.9	+58.7	106.2	57 14.4	+59.1	107.7	56 55.5	+59.3	109.2	56 35.1	+59.6	110.6	56 13.3	+59.7	112.0	55 50.1	+59.9	113.4	55 25.7	+60.0	114.7	55 00.0	+60.0	116.0	**55**
56	58 30.6	+58.6	105.8	58 13.5	+59.0	107.4	57 54.8	+59.3	108.9	57 34.7	+59.5	110.4	57 13.0	+59.8	111.8	56 50.0	+59.9	113.3	56 25.7	+59.9	114.6	56 00.0	+60.0	116.0	**56**
57	59 29.2	+58.6	105.4	59 12.5	+58.9	107.0	58 54.1	+59.3	108.6	58 34.2	+59.6	110.2	58 12.8	+59.8	111.7	57 49.9	+59.9	113.2	57 25.6	+60.0	114.6	57 00.0	+60.0	116.0	**57**
58	60 27.8	+58.4	105.0	60 11.4	+58.9	106.6	59 53.4	+59.3	108.3	59 33.8	+59.5	109.9	59 12.6	+59.7	111.5	58 49.8	+59.9	113.0	58 25.6	+60.0	114.5	58 00.0	+60.0	116.0	**58**
59	61 26.2	+58.4	104.5	61 10.3	+58.8	106.3	60 52.7	+59.2	108.0	60 33.3	+59.5	109.7	60 12.3	+59.7	111.3	59 49.7	+59.9	112.9	59 25.6	+60.0	114.5	59 00.0	+60.0	116.0	**59**
60	62 24.6	+58.2	104.0	62 09.1	+58.8	105.8	61 51.9	+59.1	107.6	61 32.8	+59.5	109.4	61 12.0	+59.7	111.1	60 49.6	+59.9	112.8	60 25.6	+59.9	114.4	60 00.0	+60.0	116.0	**60**
61	63 22.8	+58.1	103.5	63 07.9	+58.6	105.4	62 51.0	+59.1	107.3	62 32.3	+59.4	109.1	62 11.7	+59.7	110.9	61 49.5	+59.8	112.7	61 25.5	+60.0	114.4	61 00.0	+60.0	116.0	**61**
62	64 20.9	+58.0	102.9	64 06.5	+58.6	104.9	63 50.1	+59.0	106.9	63 31.7	+59.4	108.8	63 11.4	+59.7	110.7	62 49.3	+59.9	112.5	62 25.5	+60.0	114.3	62 00.0	+60.0	116.0	**62**
63	65 18.9	+57.8	102.3	65 05.1	+58.4	104.4	64 49.1	+58.9	106.5	64 31.1	+59.3	108.5	64 11.1	+59.6	110.4	63 49.2	+59.8	112.4	63 25.5	+59.9	114.2	63 00.0	+60.0	116.0	**63**
64	66 16.7	+57.7	101.6	66 03.5	+58.3	103.9	65 48.0	+58.9	106.0	65 30.4	+59.3	108.1	65 10.7	+59.6	110.2	64 49.0	+59.8	112.2	64 25.4	+60.0	114.1	64 00.0	+60.0	116.0	**64**
65	67 14.4	+57.4	100.9	67 01.8	+58.2	103.3	66 46.9	+58.7	105.5	66 29.7	+59.2	107.8	66 10.3	+59.6	109.9	65 48.8	+59.9	112.0	65 25.4	+59.9	114.0	65 00.0	+60.0	116.0	**65**
66	68 11.8	+57.2	100.2	68 00.0	+57.9	102.6	67 45.6	+58.7	105.0	67 28.9	+59.2	107.3	67 09.9	+59.5	109.6	66 48.7	+59.8	111.8	66 25.3	+60.0	113.9	66 00.0	+60.0	116.0	**66**
67	69 09.0	+57.0	99.4	68 57.9	+57.9	101.9	68 44.3	+58.5	104.4	68 28.1	+59.0	106.9	68 09.4	+59.5	109.3	67 48.5	+59.8	111.6	67 25.3	+59.9	113.8	67 00.0	+60.0	116.0	**67**
68	70 06.0	+56.6	98.4	69 55.8	+57.6	101.2	69 42.8	+58.4	103.8	69 27.1	+59.0	106.4	69 08.9	+59.5	108.9	68 48.3	+59.7	111.4	68 25.2	+60.0	113.7	68 00.0	+60.0	116.0	**68**
69	71 02.6	+56.3	97.5	70 53.4	+57.3	100.3	70 41.2	+58.2	103.1	70 26.1	+58.9	105.9	70 08.4	+59.4	108.5	69 48.0	+59.8	111.1	69 25.2	+59.9	113.6	69 00.0	+60.0	116.0	**69**
70	71 58.9	+55.9	96.4	71 50.7	+57.1	99.4	71 39.4	+58.0	102.4	71 25.0	+58.8	105.3	71 07.8	+59.3	108.1	70 47.8	+59.7	110.8	70 25.1	+59.9	113.5	70 00.0	+60.0	116.0	**70**
71	72 54.8	+55.5	95.2	72 47.8	+56.7	98.4	72 37.4	+57.7	101.5	72 23.8	+58.6	104.6	72 07.1	+59.2	107.6	71 47.5	+59.6	110.5	71 25.0	+60.0	113.3	71 00.0	+60.0	116.0	**71**
72	73 50.3	+54.8	93.8	73 44.5	+56.3	97.2	73 35.1	+57.6	100.6	73 22.4	+58.4	103.9	73 06.3	+59.2	107.1	72 47.1	+59.7	110.2	72 25.0	+59.9	113.2	72 00.0	+60.0	116.0	**72**
73	74 45.1	+54.2	92.3	74 40.8	+55.8	96.0	74 32.7	+57.1	99.6	74 20.8	+58.3	103.1	74 05.5	+59.1	106.5	73 46.8	+59.6	109.8	73 24.9	+59.9	113.0	73 00.0	+60.0	116.0	**73**
74	75 39.3	+53.4	90.6	75 36.6	+55.2	94.5	75 29.8	+56.8	98.4	75 19.1	+58.0	102.2	75 04.6	+58.9	105.9	74 46.4	+59.5	109.4	74 24.8	+59.9	112.8	74 00.0	+60.0	116.0	**74**
75	76 32.7	+52.4	88.7	76 31.8	+54.6	92.9	76 26.6	+56.3	97.1	76 17.1	+57.7	101.1	76 03.5	+58.7	105.1	75 45.9	+59.5	108.9	75 24.7	+59.9	112.5	75 00.0	+60.0	116.0	**75**
76	77 25.1	+51.2	86.6	77 26.4	+53.6	91.1	77 22.9	+55.7	95.5	77 14.8	+57.3	99.9	77 02.2	+58.6	104.2	76 45.4	+59.4	108.4	76 24.6	+59.8	112.3	76 00.0	+60.0	116.0	**76**
77	78 16.3	+49.8	84.1	78 20.0	+52.5	88.9	78 18.6	+54.9	93.8	78 12.1	+56.9	98.6	78 00.8	+58.3	103.2	77 44.8	+59.3	107.7	77 24.4	+59.8	112.0	77 00.0	+60.0	116.0	**77**
78	79 06.1	*+47.9*•	81.3	79 12.5	+51.2	86.4	79 13.5	+54.0	91.7	79 09.0	+56.2	96.9	78 59.1	+58.0	102.0	78 44.1	+59.1	106.9	78 24.2	+59.8	111.6	78 00.0	+60.0	116.0	**78**
79	79 54.0	*+45.6*•	78.0	80 03.7	*+49.3*•	83.5	80 07.5	+52.6	89.3	80 05.2	+55.5	95.0	79 57.1	+57.5	100.6	79 43.2	+59.0	106.0	79 24.0	+59.8	111.2	79 00.0	+60.0	116.0	**79**
80	80 39.6	*+42.7*•	74.1	80 53.0	*+47.1*•	80.1	81 00.1	+51.1	86.3	81 00.7	+54.3	92.7	80 54.6	+57.0	98.9	80 42.2	+58.7	105.0	80 23.8	+59.7	110.7	80 00.0	+60.0	116.0	**80**
81	81 22.3	*+39.0*•	69.6	81 40.1	*+44.0*•	76.0	81 51.2	*+48.7*•	82.8	81 55.0	+52.9	89.8	81 51.6	+56.1	96.8	81 40.9	+58.4	103.6	81 23.5	+59.6	110.1	81 00.0	+60.0	116.0	**81**
82	82 01.3	*+34.4*•	64.3	82 24.1	*+40.1*•	71.1	82 39.9	*+45.7*•	78.5	82 47.9	*+50.8*•	86.2	82 47.7	+55.0	94.2	82 39.3	+57.9	101.9	82 23.1	+59.5	109.3	82 00.0	+60.0	116.0	**82**
83	82 35.7	*+28.5*•	58.2	83 04.2	*+34.8*•	65.2	83 25.6	*+41.3*•	73.1	83 38.7	*+47.7*•	81.7	83 42.7	*+53.1*•	90.7	83 37.2	+57.1	99.7	83 22.6	+59.4	108.2	83 00.0	+60.0	116.0	**83**
84	83 04.2	*+21.4*•	51.1	83 39.0	*+27.9*•	58.1	84 06.9	*+35.4*•	66.4	84 26.4	*+43.2*•	75.9	84 35.8	*+50.4*•	86.2	84 34.3	+55.9	96.7	84 22.0	+59.1	106.9	84 00.0	+60.0	116.0	**84**
85	83 25.6	*+13.1*•	43.2	84 06.9	*+19.5*•	49.8	84 42.3	*+27.3*•	58.1	85 09.6	*+36.2*•	68.2	85 26.2	*+45.6*•	79.9	85 30.2	*+53.6*•	92.5	85 21.1	+58.5	104.9	85 00.0	+60.0	116.0	**85**
86	83 38.7	*+4.0*•	34.5	84 26.4	*+9.4*•	40.3	85 09.6	*+16.6*•	48.0	85 45.8	*+26.0*•	58.1	86 11.8	*+37.5*•	70.9	86 23.8	*+49.3*•	86.1	86 19.6	+57.5	101.9	86 00.0	+60.0	116.0	**86**
87	83 42.7	*–5.5*•	25.4	84 35.8	*–1.5*•	30.0	85 26.2	*+4.0*•	36.2	86 11.8	*+12.0*•	45.2	86 49.3	*+23.8*•	58.0	87 13.1	*+39.7*•	75.8	87 17.1	*+54.8*•	96.7	87 00.0	+60.0	116.0	**87**
88	83 37.2	*–14.6*•	16.4	84 34.3	*–12.3*•	19.4	85 30.2	*–9.1*•	23.6	86 23.8	*–4.2*•	29.9	87 13.1	*+4.0*•	40.3	87 52.8	*+19.1*•	58.0	88 11.9	*+44.5*•	86.1	88 00.0	+60.0	116.0	**88**
89	83 22.6	*–22.6*•	7.8	84 22.0	*–22.0*•	9.2	85 21.1	*–21.1*•	11.2	86 19.6	*–19.6*•	14.2	87 17.1	*–17.1*•	19.3	88 11.9	*–11.9*•	29.9	88 56.4	*+3.6*•	58.0	89 00.0	+60.0	116.0	**89**
90	83 00.0	*–29.5*•	0.0	84 00.0	*–30.0*•	0.0	85 00.0	*–30.7*•	0.0	86 00.0	*–31.7*•	0.0	87 00.0	*–33.2*•	0.0	88 00.0	*–35.9*•	0.0	89 00.0	*–41.8*•	0.0	90 00.0	–60.0	58.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	3 03.7	−59.6	115.8	2 37.6	−59.8	115.9	2 11.4	−59.8	115.9	1 45.1	−59.8	115.9	1 18.9	−60.0	116.0	0 52.6	−60.0	116.0	0 26.3	−60.0	116.0	0 00.0	+60.0	64.0	**0**
1	2 04.1	−59.6	115.9	1 37.8	−59.7	116.0	1 11.6	−59.9	116.0	0 45.3	−59.9	116.0	0 18.9	−59.9	116.0	0 07.4	+59.9	64.0	0 33.7	+60.0	64.0	1 00.0	+60.0	64.0	**1**
2	1 04.5	−59.7	116.1	0 38.1	−59.7	116.1	0 11.7	−59.8	116.1	0 14.6	+59.9	63.9	0 41.0	+59.9	63.9	1 07.3	+60.0	64.0	1 33.7	+60.0	64.0	2 00.0	+60.0	64.0	**2**
3	0 04.8	−59.6	116.2	0 21.6	+59.8	63.8	0 48.1	+59.8	63.9	1 14.5	+59.9	63.9	1 40.9	+60.0	63.9	2 07.3	+60.0	63.9	2 33.7	+60.0	64.0	3 00.0	+60.0	64.0	**3**
4	0 54.8	+59.6	63.7	1 21.4	+59.7	63.7	1 47.9	+59.8	63.8	2 14.4	+59.9	63.8	2 40.9	+59.9	63.8	3 07.3	+60.0	63.9	3 33.7	+60.0	63.9	4 00.0	+60.0	64.0	**4**
5	1 54.4	+59.7	63.6	2 21.1	+59.7	63.7	2 47.7	+59.8	63.7	3 14.3	+59.9	63.7	3 40.8	+59.9	63.8	4 07.3	+59.9	63.9	4 33.7	+60.0	63.9	5 00.0	+60.0	64.0	**5**
6	2 54.1	+59.6	63.5	3 20.8	+59.8	63.6	3 47.5	+59.8	63.6	4 14.2	+59.8	63.7	4 40.7	+60.0	63.7	5 07.2	+60.0	63.8	5 33.7	+59.9	63.9	6 00.0	+60.0	64.0	**6**
7	3 53.7	+59.7	63.4	4 20.6	+59.7	63.5	4 47.3	+59.8	63.5	5 14.0	+59.9	63.6	5 40.7	+59.9	63.7	6 07.2	+60.0	63.8	6 33.6	+60.0	63.9	7 00.0	+60.0	64.0	**7**
8	4 53.4	+59.6	63.3	5 20.3	+59.7	63.4	5 47.1	+59.9	63.5	6 13.9	+59.9	63.6	6 40.6	+59.9	63.7	7 07.2	+59.9	63.8	7 33.6	+60.0	63.9	8 00.0	+60.0	64.0	**8**
9	5 53.0	+59.6	63.2	6 20.0	+59.8	63.3	6 47.0	+59.8	63.4	7 13.8	+59.9	63.5	7 40.5	+60.0	63.6	8 07.1	+60.0	63.7	8 33.6	+60.0	63.9	9 00.0	+60.0	64.0	**9**
10	6 52.6	+59.7	63.1	7 19.8	+59.7	63.2	7 46.8	+59.8	63.3	8 13.7	+59.9	63.4	8 40.5	+59.9	63.6	9 07.1	+60.0	63.7	9 33.6	+60.0	63.8	10 00.0	+60.0	64.0	**10**
11	7 52.3	+59.6	63.0	8 19.5	+59.7	63.1	8 46.6	+59.8	63.2	9 13.6	+59.8	63.4	9 40.4	+59.9	63.5	10 07.1	+59.9	63.7	10 33.6	+60.0	63.8	11 00.0	+60.0	64.0	**11**
12	8 51.9	+59.6	62.8	9 19.2	+59.7	63.0	9 46.4	+59.8	63.1	10 13.4	+59.9	63.3	10 40.3	+59.9	63.5	11 07.0	+60.0	63.6	11 33.6	+60.0	63.8	12 00.0	+60.0	64.0	**12**
13	9 51.5	+59.7	62.7	10 18.9	+59.8	62.9	10 46.2	+59.8	63.1	11 13.3	+59.9	63.2	11 40.2	+60.0	63.4	12 07.0	+60.0	63.6	12 33.6	+60.0	63.8	13 00.0	+60.0	64.0	**13**
14	10 51.2	+59.6	62.6	11 18.7	+59.7	62.8	11 46.0	+59.8	63.0	12 13.2	+59.9	63.2	12 40.2	+59.9	63.4	13 07.0	+60.0	63.6	13 33.6	+60.0	63.8	14 00.0	+60.0	64.0	**14**
15	11 50.8	+59.6	62.5	12 18.4	+59.7	62.7	12 45.8	+59.8	62.9	13 13.1	+59.8	63.1	13 40.1	+59.9	63.3	14 07.0	+59.9	63.5	14 33.6	+60.0	63.8	15 00.0	+60.0	64.0	**15**
16	12 50.4	+59.6	62.4	13 18.1	+59.7	62.6	13 45.6	+59.8	62.8	14 12.9	+59.9	63.0	14 40.0	+60.0	63.3	15 06.9	+60.0	63.5	15 33.6	+60.0	63.7	16 00.0	+60.0	64.0	**16**
17	13 50.0	+59.6	62.3	14 17.8	+59.7	62.5	14 45.4	+59.8	62.7	15 12.8	+59.9	63.0	15 40.0	+59.9	63.2	16 06.9	+60.0	63.5	16 33.6	+60.0	63.7	17 00.0	+60.0	64.0	**17**
18	14 49.6	+59.6	62.2	15 17.5	+59.8	62.4	15 45.2	+59.8	62.6	16 12.7	+59.9	62.9	16 39.9	+59.9	63.2	17 06.9	+59.9	63.4	17 33.6	+60.0	63.7	18 00.0	+60.0	64.0	**18**
19	15 49.2	+59.7	62.0	16 17.3	+59.7	62.3	16 45.0	+59.8	62.6	17 12.6	+59.8	62.8	17 39.8	+59.9	63.1	18 06.8	+60.0	63.4	18 33.6	+59.9	63.7	19 00.0	+60.0	64.0	**19**
20	16 48.9	+59.6	61.9	17 17.0	+59.7	62.2	17 44.8	+59.8	62.5	18 12.4	+59.9	62.8	18 39.7	+60.0	63.1	19 06.8	+60.0	63.4	19 33.5	+60.0	63.7	20 00.0	+60.0	64.0	**20**
21	17 48.5	+59.6	61.8	18 16.7	+59.7	62.1	18 44.6	+59.8	62.4	19 12.3	+59.9	62.7	19 39.7	+59.9	63.0	20 06.8	+59.9	63.3	20 33.5	+60.0	63.7	21 00.0	+60.0	64.0	**21**
22	18 48.1	+59.5	61.7	19 16.4	+59.7	62.0	19 44.4	+59.8	62.3	20 12.2	+59.8	62.6	20 39.6	+59.9	63.0	21 06.7	+60.0	63.3	21 33.5	+60.0	63.6	22 00.0	+60.0	64.0	**22**
23	19 47.6	+59.6	61.6	20 16.1	+59.7	61.9	20 44.2	+59.8	62.2	21 12.0	+59.9	62.5	21 39.5	+59.9	62.9	22 06.7	+60.0	63.3	22 33.5	+60.0	63.6	23 00.0	+60.0	64.0	**23**
24	20 47.2	+59.6	61.4	21 15.8	+59.7	61.8	21 44.0	+59.8	62.1	22 11.9	+59.8	62.5	22 39.4	+60.0	62.8	23 06.7	+59.9	63.2	23 33.5	+60.0	63.6	24 00.0	+60.0	64.0	**24**
25	21 46.8	+59.6	61.3	22 15.5	+59.7	61.7	22 43.8	+59.8	62.0	23 11.7	+59.9	62.4	23 39.4	+59.9	62.8	24 06.6	+60.0	63.2	24 33.5	+60.0	63.6	25 00.0	+60.0	64.0	**25**
26	22 46.4	+59.6	61.2	23 15.2	+59.6	61.6	23 43.6	+59.7	61.9	24 11.6	+59.9	62.3	24 39.3	+59.9	62.7	25 06.6	+59.9	63.1	25 33.5	+60.0	63.6	26 00.0	+60.0	64.0	**26**
27	23 46.0	+59.5	61.0	24 14.8	+59.7	61.4	24 43.3	+59.8	61.8	25 11.5	+59.8	62.3	25 39.2	+59.9	62.7	26 06.5	+60.0	63.1	26 33.5	+60.0	63.5	27 00.0	+60.0	64.0	**27**
28	24 45.5	+59.6	60.9	25 14.5	+59.7	61.3	25 43.1	+59.8	61.7	26 11.3	+59.9	62.2	26 39.1	+59.9	62.6	27 06.5	+60.0	63.1	27 33.5	+60.0	63.5	28 00.0	+60.0	64.0	**28**
29	25 45.1	+59.5	60.8	26 14.2	+59.7	61.2	26 42.9	+59.8	61.6	27 11.2	+59.8	62.1	27 39.0	+60.0	62.6	28 06.5	+59.9	63.0	28 33.5	+60.0	63.5	29 00.0	+60.0	64.0	**29**
30	26 44.6	+59.6	60.6	27 13.9	+59.6	61.1	27 42.7	+59.7	61.5	28 11.0	+59.9	62.0	28 39.0	+59.9	62.5	29 06.4	+60.0	63.0	29 33.5	+59.9	63.5	30 00.0	+60.0	64.0	**30**
31	27 44.2	+59.5	60.5	28 13.5	+59.7	61.0	28 42.4	+59.8	61.4	29 10.9	+59.8	61.9	29 38.9	+59.9	62.4	30 06.4	+60.0	62.9	30 33.4	+60.0	63.5	31 00.0	+60.0	64.0	**31**
32	28 43.7	+59.5	60.4	29 13.2	+59.6	60.9	29 42.2	+59.7	61.3	30 10.7	+59.9	61.9	30 38.8	+59.9	62.4	31 06.4	+59.9	62.9	31 33.4	+60.0	63.4	32 00.0	+60.0	64.0	**32**
33	29 43.2	+59.6	60.2	30 12.8	+59.7	60.7	30 41.9	+59.8	61.2	31 10.6	+59.8	61.8	31 38.7	+59.9	62.3	32 06.3	+60.0	62.9	32 33.4	+60.0	63.4	33 00.0	+60.0	64.0	**33**
34	30 42.8	+59.5	60.1	31 12.5	+59.6	60.6	31 41.7	+59.7	61.1	32 10.4	+59.8	61.7	32 38.6	+59.9	62.2	33 06.3	+59.9	62.8	33 33.4	+60.0	63.4	34 00.0	+60.0	64.0	**34**
35	31 42.3	+59.5	59.9	32 12.1	+59.6	60.5	32 41.4	+59.8	61.0	33 10.2	+59.9	61.6	33 38.5	+59.9	62.2	34 06.2	+60.0	62.8	34 33.4	+60.0	63.4	35 00.0	+60.0	64.0	**35**
36	32 41.8	+59.4	59.8	33 11.7	+59.6	60.3	33 41.2	+59.7	60.9	34 10.1	+59.8	61.5	34 38.4	+59.9	62.1	35 06.2	+59.9	62.7	35 33.4	+60.0	63.4	36 00.0	+60.0	64.0	**36**
37	33 41.2	+59.5	59.6	34 11.3	+59.6	60.2	34 40.9	+59.7	60.8	35 09.9	+59.8	61.4	35 38.3	+59.9	62.0	36 06.1	+60.0	62.7	36 33.4	+60.0	63.3	37 00.0	+60.0	64.0	**37**
38	34 40.7	+59.5	59.5	35 10.9	+59.6	60.1	35 40.6	+59.7	60.7	36 09.7	+59.8	61.3	36 38.2	+59.9	62.0	37 06.1	+60.0	62.6	37 33.4	+60.0	63.3	38 00.0	+60.0	64.0	**38**
39	35 40.2	+59.4	59.3	36 10.5	+59.6	59.9	36 40.3	+59.7	60.6	37 09.5	+59.8	61.2	37 38.1	+59.9	61.9	38 06.1	+59.9	62.6	38 33.4	+59.9	63.3	39 00.0	+60.0	64.0	**39**
40	36 39.6	+59.5	59.1	37 10.1	+59.6	59.8	37 40.0	+59.7	60.4	38 09.3	+59.8	61.1	38 38.0	+59.9	61.8	39 06.0	+60.0	62.5	39 33.3	+60.0	63.3	40 00.0	+60.0	64.0	**40**
41	37 39.1	+59.4	59.0	38 09.7	+59.6	59.6	38 39.7	+59.7	60.3	39 09.1	+59.8	61.0	39 37.9	+59.9	61.7	40 06.0	+59.9	62.5	40 33.3	+60.0	63.2	41 00.0	+60.0	64.0	**41**
42	38 38.5	+59.4	58.8	39 09.3	+59.5	59.5	39 39.4	+59.7	60.2	40 08.9	+59.8	60.9	40 37.8	+59.8	61.7	41 05.9	+59.9	62.4	41 33.3	+60.0	63.2	42 00.0	+60.0	64.0	**42**
43	39 37.9	+59.4	58.6	40 08.8	+59.6	59.3	40 39.1	+59.7	60.0	41 08.7	+59.8	60.8	41 37.6	+59.9	61.6	42 05.8	+60.0	62.4	42 33.3	+60.0	63.2	43 00.0	+60.0	64.0	**43**
44	40 37.3	+59.3	58.4	41 08.4	+59.5	59.1	41 38.8	+59.6	59.9	42 08.5	+59.8	60.7	42 37.5	+59.9	61.5	43 05.8	+59.9	62.3	43 33.3	+60.0	63.1	44 00.0	+60.0	64.0	**44**
45	41 36.6	+59.4	58.2	42 07.9	+59.5	59.0	42 38.4	+59.7	59.8	43 08.3	+59.8	60.6	43 37.4	+59.9	61.4	44 05.7	+60.0	62.2	44 33.3	+60.0	63.1	45 00.0	+60.0	64.0	**45**
46	42 36.0	+59.3	58.0	43 07.4	+59.5	58.8	43 38.1	+59.6	59.6	44 08.1	+59.7	60.5	44 37.3	+59.8	61.3	45 05.7	+59.9	62.2	45 33.3	+59.9	63.1	46 00.0	+60.0	64.0	**46**
47	43 35.3	+59.3	57.8	44 06.9	+59.5	58.6	44 37.7	+59.7	59.5	45 07.8	+59.8	60.3	45 37.1	+59.9	61.2	46 05.6	+60.0	62.1	46 33.2	+60.0	63.0	47 00.0	+60.0	64.0	**47**
48	44 34.6	+59.2	57.6	45 06.4	+59.4	58.4	45 37.4	+59.6	59.3	46 07.6	+59.7	60.2	46 37.0	+59.9	61.1	47 05.6	+59.9	62.1	47 33.2	+60.0	63.0	48 00.0	+60.0	64.0	**48**
49	45 33.8	+59.3	57.4	46 05.8	+59.4	58.2	46 37.0	+59.6	59.1	47 07.3	+59.8	60.1	47 36.9	+59.8	61.0	48 05.5	+59.9	62.0	48 33.2	+60.0	63.0	49 00.0	+60.0	64.0	**49**
50	46 33.1	+59.2	57.2	47 05.2	+59.5	58.0	47 36.6	+59.6	59.0	48 07.1	+59.7	59.9	48 36.7	+59.9	60.9	49 05.4	+60.0	61.9	49 33.2	+60.0	62.9	50 00.0	+60.0	64.0	**50**
51	47 32.3	+59.2	56.9	48 04.7	+59.4	57.8	48 36.2	+59.5	58.8	49 06.8	+59.7	59.8	49 36.6	+59.8	60.8	50 05.4	+59.9	61.8	50 33.2	+60.0	62.9	51 00.0	+60.0	64.0	**51**
52	48 31.5	+59.2	56.7	49 04.1	+59.3	57.6	49 35.7	+59.6	58.6	50 06.5	+59.7	59.6	50 36.4	+59.8	60.7	51 05.3	+59.9	61.8	51 33.2	+59.9	62.9	52 00.0	+60.0	64.0	**52**
53	49 30.7	+59.1	56.4	50 03.4	+59.4	57.4	50 35.3	+59.5	58.4	51 06.2	+59.7	59.5	51 36.2	+59.8	60.6	52 05.2	+59.9	61.7	52 33.1	+60.0	62.8	53 00.0	+60.0	64.0	**53**
54	50 29.8	+59.1	56.1	51 02.8	+59.3	57.2	51 34.8	+59.5	58.2	52 05.9	+59.7	59.3	52 36.0	+59.9	60.4	53 05.1	+59.9	61.6	53 33.1	+60.0	62.8	54 00.0	+60.0	64.0	**54**
55	51 28.9	+59.0	55.9	52 02.1	+59.3	56.9	52 34.3	+59.5	58.0	53 05.6	+59.7	59.1	53 35.9	+59.8	60.3	54 05.0	+60.0	61.5	54 33.1	+60.0	62.7	55 00.0	+60.0	64.0	**55**
56	52 27.9	+59.0	55.6	53 01.4	+59.2	56.7	53 33.8	+59.5	57.8	54 05.3	+59.6	59.0	54 35.7	+59.8	60.2	55 05.0	+59.9	61.4	55 33.1	+60.0	62.7	56 00.0	+60.0	64.0	**56**
57	53 26.9	+59.0	55.3	54 00.6	+59.2	56.4	54 33.3	+59.4	57.6	55 04.9	+59.7	58.8	55 35.5	+59.8	60.0	56 04.9	+59.9	61.3	56 33.1	+59.9	62.6	57 00.0	+60.0	64.0	**57**
58	54 25.9	+58.9	55.0	54 59.8	+59.2	56.1	55 32.7	+59.4	57.3	56 04.6	+59.6	58.6	56 35.3	+59.7	59.9	57 04.8	+59.9	61.2	57 33.0	+60.0	62.6	58 00.0	+60.0	64.0	**58**
59	55 24.8	+58.8	54.6	55 59.0	+59.1	55.8	56 32.1	+59.4	57.1	57 04.2	+59.6	58.4	57 35.0	+59.8	59.7	58 04.7	+59.9	61.1	58 33.0	+60.0	62.5	59 00.0	+60.0	64.0	**59**
60	56 23.6	+58.8	54.3	56 58.1	+59.1	55.5	57 31.5	+59.3	56.8	58 03.8	+59.5	58.2	58 34.8	+59.7	59.5	59 04.6	+59.8	61.0	59 33.0	+59.9	62.5	60 00.0	+60.0	64.0	**60**
61	57 22.4	+58.7	53.9	57 57.2	+59.0	55.2	58 30.8	+59.3	56.5	59 03.3	+59.6	57.9	59 34.5	+59.8	59.4	60 04.4	+59.9	60.9	60 32.9	+60.0	62.4	61 00.0	+60.0	64.0	**61**
62	58 21.1	+58.6	53.5	58 56.2	+59.0	54.9	59 30.1	+59.3	56.2	60 02.9	+59.5	57.7	60 34.3	+59.7	59.2	61 04.3	+59.9	60.7	61 32.9	+60.0	62.3	62 00.0	+60.0	64.0	**62**
63	59 19.7	+58.6	53.1	59 55.2	+58.9	54.5	60 29.4	+59.2	55.9	61 02.4	+59.4	57.4	61 34.0	+59.7	59.0	62 04.2	+59.8	60.6	62 32.9	+59.9	62.3	63 00.0	+60.0	64.0	**63**
64	60 18.3	+58.5	52.7	60 54.1	+58.8	54.1	61 28.6	+59.2	55.6	62 01.8	+59.5	57.2	62 33.7	+59.7	58.8	63 04.0	+59.9	60.4	63 32.8	+60.0	62.2	64 00.0	+60.0	64.0	**64**
65	61 16.8	+58.3	52.2	61 52.9	+58.8	53.7	62 27.8	+59.1	55.2	63 01.3	+59.4	56.9	63 33.4	+59.6	58.5	64 03.9	+59.8	60.3	64 32.8	+60.0	62.1	65 00.0	+60.0	64.0	**65**
66	62 15.1	+58.3	51.7	62 51.7	+58.6	53.3	63 26.9	+59.0	54.9	64 00.7	+59.4	56.5	64 33.0	+59.6	58.3	65 03.7	+59.9	60.1	65 32.8	+59.9	62.0	66 00.0	+60.0	64.0	**66**
67	63 13.4	+58.1	51.2	63 50.3	+58.6	52.8	64 25.9	+59.0	54.5	65 00.1	+59.3	56.2	65 32.6	+59.6	58.0	66 03.6	+59.8	59.9	66 32.7	+60.0	61.9	67 00.0	+60.0	64.0	**67**
68	64 11.5	+58.0	50.7	64 48.9	+58.5	52.3	65 24.9	+58.9	54.0	65 59.4	+59.2	55.8	66 32.2	+59.6	57.7	67 03.4	+59.8	59.7	67 32.7	+59.9	61.8	68 00.0	+60.0	64.0	**68**
69	65 09.5	+57.9	50.1	65 47.4	+58.3	51.8	66 23.8	+58.8	53.6	66 58.6	+59.2	55.4	67 31.8	+59.5	57.4	68 03.2	+59.8	59.5	68 32.6	+60.0	61.7	69 00.0	+60.0	64.0	**69**
70	66 07.4	+57.6	49.4	66 45.7	+58.2	51.2	67 22.6	+58.7	53.0	67 57.8	+59.1	55.0	68 31.3	+59.5	57.1	69 03.0	+59.7	59.3	69 32.6	+59.9	61.6	70 00.0	+60.0	64.0	**70**
71	67 05.0	+57.5	48.7	67 43.9	+58.1	50.6	68 21.3	+58.5	52.5	68 56.9	+59.1	54.6	69 30.8	+59.4	56.7	70 02.7	+59.7	59.0	70 32.5	+59.9	61.5	71 00.0	+60.0	64.0	**71**
72	68 02.5	+57.3	48.0	68 42.0	+57.8	49.9	69 19.8	+58.5	51.9	69 56.0	+58.9	54.0	70 30.2	+59.4	56.3	71 02.4	+59.7	58.7	71 32.4	+59.9	61.3	72 00.0	+60.0	64.0	**72**
73	68 59.8	+57.0	47.2	69 39.8	+57.7	49.1	70 18.3	+58.2	51.2	70 54.9	+58.8	53.5	71 29.6	+59.3	55.9	72 02.1	+59.7	58.4	72 32.3	+60.0	61.1	73 00.0	+60.0	64.0	**73**
74	69 56.8	+56.7	46.3	70 37.5	+57.4	48.3	71 16.5	+58.1	50.5	71 53.7	+58.7	52.9	72 28.9	+59.2	55.4	73 01.8	+59.6	58.1	73 32.3	+59.9	61.0	74 00.0	+60.0	64.0	**74**
75	70 53.5	+56.3	45.3	71 34.9	+57.1	47.4	72 14.6	+57.9	49.7	72 52.4	+58.6	52.2	73 28.1	+59.1	54.8	74 01.4	+59.6	57.7	74 32.2	+59.9	60.7	75 00.0	+60.0	64.0	**75**
76	71 49.8	+56.0	44.2	72 32.0	+56.8	46.4	73 12.5	+57.6	48.8	73 51.0	+58.3	51.4	74 27.2	+59.0	54.2	75 01.0	+59.6	57.3	75 32.1	+59.8	60.5	76 00.0	+60.0	64.0	**76**
77	72 45.8	+55.5	43.0	73 28.8	+56.5	45.3	74 10.1	+57.3	47.8	74 49.3	+58.2	50.6	75 26.2	+58.9	53.5	76 00.6	+59.4	56.8	76 31.9	+59.9	60.2	77 00.0	+60.0	64.0	**77**
78	73 41.3	+55.0	41.7	74 25.3	+55.9	44.1	75 07.4	+57.0	46.7	75 47.5	+57.8	49.6	76 25.1	+58.7	52.7	77 00.0	+59.4	56.2	77 31.8	+59.8	59.9	78 00.0	+60.0	64.0	**78**
79	74 36.3	+54.3	40.2	75 21.2	+55.4	42.7	76 04.4	+56.5	45.4	76 45.3	+57.6	48.5	77 23.8	+58.5	51.8	77 59.4	+59.2	55.5	78 31.6	+59.8	59.6	79 00.0	+60.0	64.0	**79**
80	75 30.6	+53.5	38.6	76 16.6	+54.8	41.1	77 00.9	+55.9	44.0	77 42.9	+57.1	47.2	78 22.3	+58.2	50.7	78 58.6	+59.1	54.7	79 31.4	+59.8	59.1	80 00.0	+60.0	64.0	**80**
81	76 24.1	+52.6	36.7	77 11.4	+53.9	39.4	77 56.8	+55.2	42.3	78 40.0	+56.5	45.7	79 20.5	+57.8	49.5	79 57.7	+59.0	53.8	80 31.2	+59.7	58.6	81 00.0	+60.0	64.0	**81**
82	77 16.7	+51.4	34.6	78 05.3	+52.9	37.3	78 52.0	+54.4	40.4	79 36.5	+55.9	43.9	80 18.3	+57.3	48.0	80 56.7	+58.6	52.6	81 30.9	+59.6	58.0	82 00.0	+60.0	64.0	**82**
83	78 08.1	+50.1	32.2	78 58.2	+51.5	34.9	79 46.4	+53.2	38.1	80 32.4	+55.0	41.8	81 15.6	+56.7	46.1	81 55.3	+58.3	51.2	82 30.5	+59.5	57.1	83 00.0	+60.0	64.0	**83**
84	78 58.2	*+48.2* •	29.4	79 49.7	+49.9	32.1	80 39.6	+51.8	35.4	81 27.4	+53.7	39.2	82 12.3	+55.8	43.8	82 53.6	+57.7	49.4	83 30.0	+59.3	56.1	84 00.0	+60.0	64.0	**84**
85	79 46.4	*+46.0* •	26.2	80 39.6	*+47.8* •	28.9	81 31.4	*+49.7* •	32.1	82 21.1	*+51.9* •	36.1	83 08.1	+54.4	40.9	83 51.3	+56.9	47.0	84 29.3	+59.0	54.6	85 00.0	+60.0	64.0	**85**
86	80 32.4	*+43.2* •	22.4	81 27.4	*+44.9* •	25.0	82 21.1	*+47.0* •	28.1	83 13.0	*+49.5* •	32.1	84 02.5	*+52.2* •	37.2	84 48.2	*+55.4* •	43.8	85 28.3	+58.5	52.6	86 00.0	+60.0	64.0	**86**
87	81 15.6	*+39.7* •	18.0	82 12.3	*+41.3* •	20.3	83 08.1	*+43.2* •	23.2	84 02.5	*+45.7* •	26.9	84 54.7	*+48.9* •	32.0	85 43.6	*+52.9* •	39.1	86 26.8	*+57.3* •	49.4	87 00.0	+60.0	64.0	**87**
88	81 55.3	*+35.2* •	12.9	82 53.6	*+36.4* •	14.7	83 51.3	*+38.0* •	17.0	84 48.2	*+40.1* •	20.3	85 43.6	*+43.2* •	24.9	86 36.5	*+47.6* •	32.0	87 24.1	*+54.1* •	43.8	88 00.0	+60.0	64.0	**88**
89	82 30.5	*+29.5* •	6.9	83 30.0	*+30.0* •	8.0	84 29.3	*+30.7* •	9.4	85 28.3	*+31.7* •	11.5	86 26.8	*+33.2* •	14.7	87 24.1	*+35.9* •	20.2	88 18.2	*+41.8* •	32.0	89 00.0	+60.0	64.0	**89**
90	83 00.0	*+22.6* •	0.0	84 00.0	*+22.0* •	0.0	85 00.0	*+21.1* •	0.0	86 00.0	*+19.6* •	0.0	87 00.0	*+17.1* •	0.0	88 00.0	*+11.9* •	0.0	89 00.0	*−3.6* •	0.0	90 00.0	−60.0	32.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

65°, 295° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 57.1	+59.7	114.8	2 31.9	+59.7	114.9	2 06.7	+59.8	114.9	1 41.4	+59.8	114.9	1 16.0	+60.0	115.0	0 50.7	+60.0	115.0	0 25.4	+59.9	115.0	0 00.0	+60.0	115.0	0
1	3 56.8	+59.6	114.7	3 31.6	+59.8	114.8	3 06.5	+59.8	114.8	2 41.2	+59.9	114.9	2 16.0	+59.9	114.9	1 50.7	+59.9	115.0	1 25.3	+60.0	115.0	1 00.0	+60.0	115.0	1
2	4 56.4	+59.6	114.6	4 31.4	+59.7	114.7	4 06.3	+59.8	114.8	3 41.1	+59.9	114.8	3 15.9	+59.9	114.9	2 50.6	+60.0	114.9	2 25.3	+60.0	115.0	2 00.0	+60.0	115.0	2
3	5 56.0	+59.7	114.5	5 31.1	+59.7	114.6	5 06.1	+59.8	114.7	4 41.0	+59.9	114.8	4 15.8	+60.0	114.8	3 50.6	+60.0	114.9	3 25.3	+60.0	114.9	3 00.0	+60.0	115.0	3
4	6 55.7	+59.6	114.4	6 30.8	+59.8	114.5	6 05.9	+59.8	114.6	5 40.9	+59.9	114.7	5 15.8	+59.9	114.8	4 50.6	+60.0	114.9	4 25.3	+60.0	114.9	4 00.0	+60.0	115.0	4
5	7 55.3	+59.6	114.3	7 30.6	+59.7	114.4	7 05.7	+59.8	114.5	6 40.8	+59.8	114.6	6 15.7	+59.9	114.7	5 50.6	+59.9	114.8	5 25.3	+60.0	114.9	5 00.0	+60.0	115.0	5
6	8 54.9	+59.6	114.2	8 30.3	+59.7	114.3	8 05.5	+59.8	114.4	7 40.6	+59.9	114.6	7 15.6	+60.0	114.7	6 50.5	+60.0	114.8	6 25.3	+60.0	114.9	6 00.0	+60.0	115.0	6
7	9 54.5	+59.7	114.1	9 30.0	+59.7	114.2	9 05.3	+59.8	114.4	8 40.5	+59.9	114.5	8 15.6	+59.9	114.6	7 50.5	+60.0	114.8	7 25.3	+60.0	114.9	7 00.0	+60.0	115.0	7
8	10 54.2	+59.6	113.9	10 29.7	+59.7	114.1	10 05.1	+59.8	114.3	9 40.4	+59.9	114.4	9 15.5	+59.9	114.6	8 50.5	+59.9	114.7	8 25.3	+60.0	114.9	8 00.0	+60.0	115.0	8
9	11 53.8	+59.6	113.8	11 29.4	+59.8	114.0	11 04.9	+59.8	114.2	10 40.3	+59.8	114.4	10 15.4	+60.0	114.5	9 50.4	+60.0	114.7	9 25.3	+60.0	114.9	9 00.0	+60.0	115.0	9
10	12 53.4	+59.6	113.7	12 29.2	+59.7	113.9	12 04.7	+59.8	114.1	11 40.1	+59.9	114.3	11 15.4	+59.9	114.5	10 50.4	+60.0	114.7	10 25.3	+60.0	114.8	10 00.0	+60.0	115.0	10
11	13 53.0	+59.6	113.6	13 28.9	+59.7	113.8	13 04.5	+59.8	114.0	12 40.0	+59.9	114.2	12 15.3	+59.9	114.4	11 50.4	+59.9	114.6	11 25.3	+60.0	114.8	11 00.0	+60.0	115.0	11
12	14 52.6	+59.6	113.5	14 28.6	+59.7	113.7	14 04.3	+59.8	113.9	13 39.9	+59.9	114.2	13 15.2	+59.9	114.4	12 50.3	+60.0	114.6	12 25.3	+60.0	114.8	12 00.0	+60.0	115.0	12
13	15 52.2	+59.6	113.4	15 28.3	+59.7	113.6	15 04.1	+59.8	113.9	14 39.8	+59.8	114.1	14 15.1	+60.0	114.3	13 50.3	+60.0	114.6	13 25.3	+59.9	114.8	13 00.0	+60.0	115.0	13
14	16 51.8	+59.6	113.2	16 28.0	+59.7	113.5	16 03.9	+59.8	113.8	15 39.6	+59.9	114.0	15 15.1	+59.9	114.3	14 50.3	+59.9	114.5	14 25.2	+60.0	114.8	14 00.0	+60.0	115.0	14
15	17 51.4	+59.6	113.1	17 27.7	+59.7	113.4	17 03.7	+59.8	113.7	16 39.5	+59.9	114.0	16 15.0	+59.9	114.2	15 50.2	+60.0	114.5	15 25.2	+60.0	114.8	15 00.0	+60.0	115.0	15
16	18 51.0	+59.6	113.0	18 27.4	+59.7	113.3	18 03.5	+59.8	113.6	17 39.4	+59.8	113.9	17 14.9	+60.0	114.2	16 50.2	+60.0	114.5	16 25.2	+60.0	114.7	16 00.0	+60.0	115.0	16
17	19 50.6	+59.6	112.9	19 27.1	+59.7	113.2	19 03.3	+59.8	113.5	18 39.2	+59.9	113.8	18 14.9	+59.9	114.1	17 50.2	+59.9	114.4	17 25.2	+60.0	114.7	17 00.0	+60.0	115.0	17
18	20 50.2	+59.5	112.7	20 26.8	+59.7	113.1	20 03.1	+59.8	113.4	19 39.1	+59.9	113.8	19 14.8	+59.9	114.1	18 50.1	+60.0	114.4	18 25.2	+60.0	114.7	18 00.0	+60.0	115.0	18
19	21 49.7	+59.6	112.6	21 26.5	+59.7	113.0	21 02.9	+59.8	113.3	20 39.0	+59.9	113.7	20 14.7	+59.9	114.0	19 50.1	+60.0	114.4	19 25.2	+60.0	114.7	19 00.0	+60.0	115.0	19
20	22 49.3	+59.6	112.5	22 26.2	+59.7	112.9	22 02.7	+59.8	113.2	21 38.8	+59.9	113.6	21 14.6	+59.9	114.0	20 50.1	+59.9	114.3	20 25.2	+60.0	114.7	20 00.0	+60.0	115.0	20
21	23 48.9	+59.5	112.4	23 25.9	+59.6	112.8	23 02.5	+59.7	113.2	22 38.7	+59.8	113.5	22 14.5	+60.0	113.9	21 50.0	+60.0	114.3	21 25.2	+60.0	114.6	21 00.0	+60.0	115.0	21
22	24 48.4	+59.6	112.2	24 25.5	+59.7	112.6	24 02.2	+59.8	113.1	23 38.5	+59.9	113.5	23 14.5	+59.9	113.9	22 50.0	+60.0	114.2	22 25.2	+60.0	114.6	22 00.0	+60.0	115.0	22
23	25 48.0	+59.5	112.1	25 25.2	+59.7	112.5	25 02.0	+59.8	113.0	24 38.4	+59.9	113.4	24 14.4	+59.9	113.8	23 50.0	+59.9	114.2	23 25.2	+60.0	114.6	23 00.0	+60.0	115.0	23
24	26 47.5	+59.6	111.9	26 24.9	+59.6	112.4	26 01.8	+59.8	112.9	25 38.3	+59.8	113.3	25 14.3	+59.9	113.7	24 49.9	+60.0	114.2	24 25.2	+60.0	114.6	24 00.0	+60.0	115.0	24
25	27 47.1	+59.5	111.8	27 24.5	+59.7	112.3	27 01.6	+59.7	112.8	26 38.1	+59.9	113.2	26 14.2	+59.9	113.7	25 49.9	+60.0	114.1	25 25.2	+59.9	114.6	25 00.0	+60.0	115.0	25
26	28 46.6	+59.5	111.7	28 24.2	+59.6	112.2	28 01.3	+59.8	112.7	27 38.0	+59.8	113.2	27 14.1	+59.9	113.6	26 49.9	+59.9	114.1	26 25.1	+60.0	114.6	26 00.0	+60.0	115.0	26
27	29 46.1	+59.5	111.5	29 23.8	+59.7	112.0	29 01.1	+59.7	112.6	28 37.8	+59.8	113.1	28 14.0	+60.0	113.6	27 49.8	+60.0	114.1	27 25.1	+60.0	114.5	27 00.0	+60.0	115.0	27
28	30 45.6	+59.5	111.4	30 23.5	+59.6	111.9	30 00.8	+59.8	112.5	29 37.6	+59.9	113.0	29 14.0	+59.9	113.5	28 49.8	+59.9	114.0	28 25.1	+60.0	114.5	28 00.0	+60.0	115.0	28
29	31 45.1	+59.5	111.2	31 23.1	+59.6	111.8	31 00.6	+59.7	112.4	30 37.5	+59.8	112.9	30 13.9	+59.9	113.4	29 49.7	+60.0	114.0	29 25.1	+60.0	114.5	29 00.0	+60.0	115.0	29
30	32 44.6	+59.5	111.1	32 22.7	+59.7	111.7	32 00.3	+59.7	112.2	31 37.3	+59.9	112.8	31 13.8	+59.9	113.4	30 49.7	+60.0	113.9	30 25.1	+60.0	114.5	30 00.0	+60.0	115.0	30
31	33 44.1	+59.4	110.9	33 22.4	+59.6	111.5	33 00.0	+59.8	112.1	32 37.2	+59.8	112.7	32 13.7	+59.9	113.3	31 49.7	+59.9	113.9	31 25.1	+60.0	114.4	31 00.0	+60.0	115.0	31
32	34 43.5	+59.5	110.7	34 22.0	+59.6	111.4	33 59.8	+59.7	112.0	33 37.0	+59.8	112.6	33 13.6	+59.9	113.2	32 49.6	+60.0	113.8	32 25.1	+60.0	114.4	32 00.0	+60.0	115.0	32
33	35 43.0	+59.4	110.6	35 21.6	+59.6	111.2	34 59.5	+59.7	111.9	34 36.8	+59.8	112.5	34 13.5	+59.9	113.2	33 49.6	+59.9	113.8	33 25.1	+60.0	114.4	33 00.0	+60.0	115.0	33
34	36 42.4	+59.4	110.4	36 21.2	+59.5	111.1	35 59.2	+59.7	111.8	35 36.6	+59.8	112.5	35 13.4	+59.9	113.1	34 49.5	+60.0	113.8	34 25.1	+60.0	114.4	34 00.0	+60.0	115.0	34
35	37 41.8	+59.4	110.2	37 20.7	+59.6	111.0	36 58.9	+59.7	111.7	36 36.4	+59.9	112.4	36 13.3	+59.9	113.0	35 49.5	+59.9	113.7	35 25.1	+59.9	114.4	35 00.0	+60.0	115.0	35
36	38 41.2	+59.4	110.1	38 20.3	+59.6	110.8	37 58.6	+59.7	111.5	37 36.3	+59.8	112.3	37 13.2	+59.9	113.0	36 49.4	+60.0	113.7	36 25.0	+60.0	114.3	36 00.0	+60.0	115.0	36
37	39 40.6	+59.4	109.9	39 19.9	+59.5	110.6	38 58.3	+59.7	111.4	38 36.1	+59.8	112.2	38 13.1	+59.9	112.9	37 49.4	+59.9	113.6	37 25.0	+60.0	114.3	37 00.0	+60.0	115.0	37
38	40 40.0	+59.4	109.7	40 19.4	+59.5	110.5	39 58.0	+59.7	111.3	39 35.9	+59.8	112.0	39 13.0	+59.9	112.8	38 49.3	+60.0	113.6	38 25.0	+60.0	114.3	38 00.0	+60.0	115.0	38
39	41 39.4	+59.3	109.5	41 18.9	+59.5	110.3	40 57.7	+59.7	111.1	40 35.7	+59.7	111.9	40 12.9	+59.8	112.7	39 49.3	+59.9	113.5	39 25.0	+60.0	114.3	39 00.0	+60.0	115.0	39
40	42 38.7	+59.3	109.3	42 18.4	+59.5	110.2	41 57.4	+59.6	111.0	41 35.4	+59.8	111.8	41 12.7	+59.9	112.6	40 49.2	+60.0	113.4	40 25.0	+60.0	114.2	40 00.0	+60.0	115.0	40
41	43 38.0	+59.3	109.1	43 17.9	+59.5	110.0	42 57.0	+59.7	110.9	42 35.2	+59.8	111.7	42 12.6	+59.9	112.6	41 49.2	+59.9	113.4	41 25.0	+60.0	114.2	41 00.0	+60.0	115.0	41
42	44 37.3	+59.2	108.9	44 17.4	+59.5	109.8	43 56.7	+59.6	110.7	43 35.0	+59.8	111.6	43 12.5	+59.9	112.5	42 49.1	+60.0	113.3	42 25.0	+60.0	114.2	42 00.0	+60.0	115.0	42
43	45 36.5	+59.3	108.6	45 16.9	+59.4	109.6	44 56.3	+59.6	110.5	44 34.8	+59.7	111.5	44 12.4	+59.8	112.4	43 49.1	+59.9	113.3	43 25.0	+59.9	114.1	43 00.0	+60.0	115.0	43
44	46 35.8	+59.2	108.4	46 16.3	+59.4	109.4	45 55.9	+59.6	110.4	45 34.5	+59.8	111.3	45 12.2	+59.9	112.3	44 49.0	+60.0	113.2	44 24.9	+60.0	114.1	44 00.0	+60.0	115.0	44
45	47 35.0	+59.2	108.2	47 15.7	+59.4	109.2	46 55.5	+59.6	110.2	46 34.3	+59.7	111.2	46 12.1	+59.8	112.2	45 49.0	+59.9	113.1	45 24.9	+60.0	114.1	45 00.0	+60.0	115.0	45
46	48 34.2	+59.1	107.9	48 15.1	+59.4	109.0	47 55.1	+59.6	110.0	47 34.0	+59.7	111.1	47 11.9	+59.9	112.1	46 48.9	+59.9	113.1	46 24.9	+60.0	114.1	46 00.0	+60.0	115.0	46
47	49 33.3	+59.1	107.7	49 14.5	+59.4	108.8	48 54.7	+59.5	109.9	48 33.7	+59.8	110.9	48 11.8	+59.8	112.0	47 48.8	+60.0	113.0	47 24.9	+60.0	114.0	47 00.0	+60.0	115.0	47
48	50 32.4	+59.1	107.4	50 13.9	+59.3	108.6	49 54.2	+59.6	109.7	49 33.5	+59.7	110.8	49 11.6	+59.9	111.9	48 48.8	+59.9	112.9	48 24.9	+60.0	114.0	48 00.0	+60.0	115.0	48
49	51 31.5	+59.0	107.1	51 13.2	+59.3	108.3	50 53.8	+59.5	109.5	50 33.2	+59.7	110.6	50 11.5	+59.8	111.8	49 48.7	+59.9	112.9	49 24.9	+59.9	113.9	49 00.0	+60.0	115.0	49
50	52 30.5	+59.0	106.8	52 12.5	+59.3	108.1	51 53.3	+59.5	109.3	51 32.9	+59.7	110.5	51 11.3	+59.8	111.6	50 48.6	+59.9	112.8	50 24.8	+60.0	113.9	50 00.0	+60.0	115.0	50
51	53 29.5	+58.9	106.5	53 11.8	+59.2	107.8	52 52.8	+59.4	109.1	52 32.6	+59.6	110.3	52 11.1	+59.8	111.5	51 48.5	+60.0	112.7	51 24.8	+60.0	113.9	51 00.0	+60.0	115.0	51
52	54 28.4	+58.9	106.2	54 11.0	+59.2	107.5	53 52.2	+59.5	108.9	53 32.2	+59.7	110.1	53 10.9	+59.9	111.4	52 48.5	+59.9	112.6	52 24.8	+60.0	113.8	52 00.0	+60.0	115.0	52
53	55 27.3	+58.8	105.9	55 10.2	+59.1	107.3	54 51.7	+59.4	108.6	54 31.9	+59.6	110.0	54 10.8	+59.8	111.3	53 48.4	+59.9	112.5	53 24.8	+60.0	113.8	53 00.0	+60.0	115.0	53
54	56 26.1	+58.8	105.5	56 09.3	+59.1	107.0	55 51.1	+59.4	108.4	55 31.5	+59.6	109.8	55 10.6	+59.7	111.1	54 48.3	+59.9	112.4	54 24.8	+59.9	113.7	54 00.0	+60.0	115.0	54
55	57 24.9	+58.7	105.2	57 08.4	+59.1	106.6	56 50.5	+59.4	108.1	56 31.1	+59.6	109.6	56 10.3	+59.8	111.0	55 48.2	+59.9	112.3	55 24.7	+60.0	113.7	55 00.0	+60.0	115.0	55
56	58 23.6	+58.6	104.8	58 07.5	+59.0	106.3	57 49.9	+59.3	107.8	57 30.7	+59.6	109.3	57 10.1	+59.8	110.8	56 48.1	+59.9	112.2	56 24.7	+60.0	113.6	56 00.0	+60.0	115.0	56
57	59 22.2	+58.5	104.3	59 06.5	+58.9	106.0	58 49.2	+59.2	107.6	58 30.3	+59.5	109.1	58 09.9	+59.7	110.6	57 48.0	+59.9	112.1	57 24.7	+60.0	113.6	57 00.0	+60.0	115.0	57
58	60 20.7	+58.4	103.9	60 05.4	+58.9	105.6	59 48.4	+59.3	107.3	59 29.8	+59.6	108.9	59 09.6	+59.8	110.5	58 47.9	+59.9	112.0	58 24.7	+59.9	113.5	58 00.0	+60.0	115.0	58
59	61 19.1	+58.4	103.4	61 04.3	+58.8	105.2	60 47.7	+59.2	106.9	60 29.4	+59.4	108.6	60 09.4	+59.7	110.3	59 47.8	+59.9	111.9	59 24.6	+60.0	113.5	59 00.0	+60.0	115.0	59
60	62 17.5	+58.2	102.9	62 03.1	+58.7	104.8	61 46.9	+59.1	106.6	61 28.8	+59.5	108.4	61 09.1	+59.7	110.1	60 47.7	+59.8	111.8	60 24.6	+60.0	113.4	60 00.0	+60.0	115.0	60
61	63 15.7	+58.1	102.4	63 01.8	+58.6	104.3	62 46.0	+59.1	106.2	62 28.3	+59.4	108.1	62 08.8	+59.7	109.9	61 47.5	+59.9	111.6	61 24.6	+59.9	113.3	61 00.0	+60.0	115.0	61
62	64 13.8	+58.0	101.9	64 00.4	+58.6	103.9	63 45.1	+59.0	105.8	63 27.7	+59.4	107.8	63 08.5	+59.6	109.6	62 47.4	+59.8	111.5	62 24.5	+60.0	113.3	62 00.0	+60.0	115.0	62
63	65 11.8	+57.8	101.3	64 59.0	+58.4	103.4	64 44.1	+58.9	105.4	64 27.1	+59.3	107.4	64 08.1	+59.6	109.4	63 47.2	+59.9	111.3	63 24.5	+60.0	113.2	63 00.0	+60.0	115.0	63
64	66 09.6	+57.6	100.6	65 57.4	+58.3	102.8	65 43.0	+58.8	105.0	65 26.4	+59.3	107.1	65 07.7	+59.7	109.2	64 47.1	+59.8	111.2	64 24.5	+59.9	113.1	64 00.0	+60.0	115.0	64
65	67 07.2	+57.4	99.9	66 55.7	+58.1	102.2	66 41.8	+58.8	104.5	66 25.7	+59.2	106.7	66 07.4	+59.5	108.9	65 46.9	+59.8	111.0	65 24.4	+60.0	113.0	65 00.0	+60.0	115.0	65
66	68 04.6	+57.2	99.1	67 53.8	+58.0	101.6	67 40.6	+58.6	104.0	67 24.9	+59.1	106.3	67 06.9	+59.6	108.6	66 46.7	+59.8	110.8	66 24.4	+59.9	112.9	66 00.0	+60.0	115.0	66
67	69 01.8	+56.9	98.3	68 51.8	+57.8	100.9	68 39.2	+58.5	103.4	68 24.0	+59.1	105.8	68 06.5	+59.4	108.2	67 46.5	+59.8	110.6	67 24.3	+60.0	112.8	67 00.0	+60.0	115.0	67
68	69 58.7	+56.7	97.4	69 49.6	+57.6	100.1	69 37.7	+58.4	102.8	69 23.1	+59.0	105.4	69 05.9	+59.5	107.9	68 46.3	+59.8	110.3	68 24.3	+59.9	112.7	68 00.0	+60.0	115.0	68
69	70 55.4	+56.3	96.4	70 47.2	+57.3	99.3	70 36.1	+58.1	102.1	70 22.1	+58.9	104.8	70 05.4	+59.4	107.5	69 46.1	+59.7	110.1	69 24.2	+60.0	112.6	69 00.0	+60.0	115.0	69
70	71 51.7	+55.8	95.3	71 44.5	+57.0	98.4	71 34.2	+58.0	101.3	71 21.0	+58.7	104.2	71 04.8	+59.3	107.1	70 45.8	+59.7	109.8	70 24.2	+59.9	112.5	70 00.0	+60.0	115.0	70
71	72 47.5	+55.5	94.1	72 41.5	+56.7	97.3	72 32.2	+57.8	100.5	72 19.7	+58.6	103.6	72 04.1	+59.2	106.6	71 45.5	+59.7	109.5	71 24.1	+59.9	112.3	71 00.0	+60.0	115.0	71
72	73 43.0	+54.8	92.8	73 38.2	+56.3	96.2	73 30.0	+57.5	99.6	73 18.3	+58.5	102.9	73 03.3	+59.2	106.1	72 45.2	+59.6	109.2	72 24.0	+59.9	112.1	72 00.0	+60.0	115.0	72
73	74 37.8	+54.2	91.3	74 34.5	+55.8	94.9	74 27.5	+57.1	98.5	74 16.8	+58.2	102.0	74 02.5	+59.0	105.5	73 44.8	+59.6	108.8	73 23.9	+59.9	112.0	73 00.0	+60.0	115.0	73
74	75 32.0	+53.4	89.6	75 30.3	+55.3	93.5	75 24.6	+56.8	97.4	75 15.0	+58.0	101.1	75 01.5	+58.9	104.8	74 44.4	+59.5	108.4	74 23.8	+59.9	111.8	74 00.0	+60.0	115.0	74
75	76 25.4	+52.4	87.8	76 25.6	+54.5	91.9	76 21.4	+56.3	96.0	76 13.0	+57.7	100.1	76 00.4	+58.8	104.0	75 43.9	+59.5	107.9	75 23.7	+59.9	111.5	75 00.0	+60.0	115.0	75
76	77 17.8	+51.3	85.6	77 20.1	+53.6	90.1	77 17.7	+55.7	94.5	77 10.7	+57.3	98.9	76 59.2	+58.5	103.2	76 43.4	+59.4	107.3	76 23.6	+59.8	111.3	76 00.0	+60.0	115.0	76
77	78 09.1	+49.8	83.2	78 13.7	+52.6	87.9	78 13.4	+54.9	92.7	78 08.0	+56.8	97.5	77 57.7	+58.3	102.2	77 42.8	+59.3	106.7	77 23.4	+59.9	110.9	77 00.0	+60.0	115.0	77
78	78 58.9	+48.0•	80.4	79 06.3	+51.2	85.5	79 08.3	+53.9	90.7	79 04.8	+56.3	95.9	78 56.0	+58.0	101.0	78 42.1	+59.1	105.9	78 23.3	+59.8	110.6	78 00.0	+60.0	115.0	78
79	79 46.9	+45.7•	77.1	79 57.5	+49.4•	82.6	80 02.2	+52.7	88.3	80 01.1	+55.4	94.0	79 54.0	+57.5	99.6	79 41.2	+59.0	105.0	79 23.1	+59.7	110.2	79 00.0	+60.0	115.0	79
80	80 32.6	+42.9•	73.3	80 46.9	+47.1•	79.2	80 54.9	+51.1	85.4	80 56.5	+54.3	91.6	80 51.5	+56.9	97.9	80 40.2	+58.7	103.9	80 22.8	+59.7	109.6	80 00.0	+60.0	115.0	80
81	81 15.5	+39.3•	68.9	81 34.0	+44.2•	75.2	81 46.0	+48.8•	81.9	81 50.8	+52.9	88.8	81 48.4	+56.2	95.8	81 38.9	+58.3	102.6	81 22.5	+59.6	109.0	81 00.0	+60.0	115.0	81
82	81 54.8	+34.7•	63.7	82 18.2	+40.3•	70.4	82 34.8	+45.8•	77.6	82 43.7	+50.9•	85.3	82 44.6	+54.9	93.1	82 37.2	+57.9	100.9	82 22.1	+59.5	108.2	82 00.0	+60.0	115.0	82
83	82 29.5	+29.0•	57.7	82 58.5	+35.1•	64.6	83 20.6	+41.6•	72.3	83 34.6	+47.8•	80.8	83 39.5	+53.2•	89.7	83 35.1	+57.1	98.7	83 21.6	+59.4	107.2	83 00.0	+60.0	115.0	83
84	82 58.5	+22.1•	50.8	83 33.6	+28.6•	57.6	84 02.2	+35.7•	65.8	84 22.4	+43.3•	75.0	84 32.7	+50.4•	85.2	84 32.2	+55.9	95.7	84 21.0	+59.0	105.8	84 00.0	+60.0	115.0	84
85	83 20.6	+14.0•	43.0	84 02.2	+20.2•	49.5	84 37.9	+27.8•	57.6	85 05.7	+36.5•	67.5	85 23.1	+45.7•	79.0	85 28.1	+53.6•	91.5	85 20.0	+58.6	103.8	85 00.0	+60.0	115.0	85
86	83 34.6	+4.9•	34.4	84 22.4	+10.3•	40.1	85 05.7	+17.4•	47.7	85 42.2	+26.6•	57.6	86 08.8	+37.8•	70.2	86 21.7	+49.4•	85.2	86 18.6	+57.5	100.8	86 00.0	+60.0	115.0	86
87	83 39.5	−4.4•	25.4	84 32.7	−0.5•	29.9	85 23.1	+5.0•	36.1	86 08.8	+12.9•	44.9	86 46.6	+24.5•	57.5	87 11.1	+40.0•	75.0	87 16.1	+54.8•	95.6	87 00.0	+60.0	115.0	87
88	83 35.1	−13.5•	16.4	84 32.2	−11.2•	19.4	85 28.1	−8.1•	23.6	86 21.7	−3.1•	29.9	87 11.1	+5.0•	40.1	87 51.1	+19.8•	57.5	88 10.9	+44.6•	85.1	88 00.0	+60.0	115.0	88
89	83 21.6	−21.6•	7.9	84 21.0	−21.0•	9.2	85 20.0	−20.0•	11.2	86 18.6	−18.6•	14.2	87 16.1	−16.1•	19.4	88 10.9	−10.9•	29.9	88 55.5	+4.5•	57.5	89 00.0	+60.0	115.0	89
90	83 00.0	−28.6•	0.0	84 00.0	−29.2•	0.0	85 00.0	−29.9•	0.0	86 00.0	−30.9•	0.0	87 00.0	−32.4•	0.0	88 00.0	−35.2•	0.0	89 00.0	−41.2•	0.0	90 00.0	−60.0	57.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 65°, 295°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 57.1	–59.6	114.8	2 31.9	–59.7	114.9	2 06.7	–59.9	114.9	1 41.4	–59.9	114.9	1 16.0	–59.9	115.0	0 50.7	–60.0	115.0	0 25.4	–60.0	115.0	0 00.0	+60.0	65.0	0
1	1 57.5	–59.6	114.9	1 32.2	–59.7	115.0	1 06.8	–59.8	115.0	0 41.5	–59.9	115.0	0 16.1	–59.9	115.0	0 09.3	+59.9	65.0	0 34.6	+60.0	65.0	1 00.0	+60.0	65.0	1
2	0 57.9	–59.7	115.1	0 32.5	–59.8	115.1	0 07.0	–59.8	115.1	0 18.4	+59.9	64.9	0 43.8	+60.0	64.9	1 09.2	+60.0	65.0	1 34.6	+60.0	65.0	2 00.0	+60.0	65.0	2
3	0 01.8	+59.6	64.8	0 27.3	+59.7	64.8	0 52.8	+59.8	64.8	1 18.3	+59.9	64.9	1 43.8	+59.9	64.9	2 09.2	+60.0	64.9	2 34.6	+60.0	65.0	3 00.0	+60.0	65.0	3
4	1 01.4	+59.6	64.7	1 27.0	+59.7	64.7	1 52.6	+59.8	64.8	2 18.2	+59.8	64.8	2 43.7	+59.9	64.8	3 09.2	+59.9	64.9	3 34.6	+60.0	64.9	4 00.0	+60.0	65.0	4
5	2 01.0	+59.7	64.6	2 26.7	+59.8	64.6	2 52.4	+59.8	64.7	3 18.0	+59.9	64.7	3 43.6	+60.0	64.8	4 09.1	+60.0	64.9	4 34.6	+60.0	64.9	5 00.0	+60.0	65.0	5
6	3 00.7	+59.6	64.5	3 26.5	+59.7	64.6	3 52.2	+59.8	64.6	4 17.9	+59.9	64.7	4 43.6	+59.9	64.7	5 09.1	+60.0	64.8	5 34.6	+60.0	64.9	6 00.0	+60.0	65.0	6
7	4 00.3	+59.6	64.4	4 26.2	+59.7	64.5	4 52.0	+59.8	64.5	5 17.8	+59.9	64.6	5 43.5	+59.9	64.7	6 09.1	+60.0	64.8	6 34.6	+60.0	64.9	7 00.0	+60.0	65.0	7
8	4 59.9	+59.7	64.3	5 25.9	+59.7	64.4	5 51.8	+59.9	64.4	6 17.7	+59.9	64.5	6 43.4	+59.9	64.6	7 09.1	+59.9	64.8	7 34.6	+60.0	64.9	8 00.0	+60.0	65.0	8
9	5 59.6	+59.6	64.2	6 25.6	+59.8	64.3	6 51.7	+59.8	64.4	7 17.6	+59.8	64.5	7 43.3	+60.0	64.6	8 09.0	+60.0	64.7	8 34.6	+60.0	64.9	9 00.0	+60.0	65.0	9
10	6 59.2	+59.6	64.1	7 25.4	+59.7	64.2	7 51.5	+59.8	64.3	8 17.4	+59.9	64.4	8 43.3	+59.9	64.6	9 09.0	+60.0	64.7	9 34.6	+60.0	64.8	10 00.0	+60.0	65.0	10
11	7 58.8	+59.6	63.9	8 25.1	+59.7	64.1	8 51.3	+59.8	64.2	9 17.3	+59.9	64.4	9 43.2	+59.9	64.5	10 09.0	+59.9	64.7	10 34.6	+60.0	64.8	11 00.0	+60.0	65.0	11
12	8 58.4	+59.7	63.8	9 24.8	+59.7	64.0	9 51.1	+59.8	64.1	10 17.2	+59.9	64.3	10 43.1	+60.0	64.5	11 08.9	+60.0	64.6	11 34.6	+59.9	64.8	12 00.0	+60.0	65.0	12
13	9 58.1	+59.6	63.7	10 24.5	+59.8	63.9	10 50.9	+59.8	64.0	11 17.1	+59.8	64.2	11 43.1	+59.9	64.4	12 08.9	+60.0	64.6	12 34.5	+60.0	64.8	13 00.0	+60.0	65.0	13
14	10 57.7	+59.6	63.6	11 24.3	+59.7	63.8	11 50.7	+59.8	64.0	12 16.9	+59.9	64.2	12 43.0	+59.9	64.4	13 08.9	+59.9	64.6	13 34.5	+60.0	64.8	14 00.0	+60.0	65.0	14
15	11 57.3	+59.6	63.5	12 24.0	+59.7	63.7	12 50.5	+59.8	63.9	13 16.8	+59.9	64.1	13 42.9	+60.0	64.3	14 08.8	+60.0	64.5	14 34.5	+60.0	64.8	15 00.0	+60.0	65.0	15
16	12 56.9	+59.6	63.4	13 23.7	+59.7	63.6	13 50.3	+59.8	63.8	14 16.7	+59.9	64.0	14 42.9	+59.9	64.3	15 08.8	+60.0	64.5	15 34.5	+60.0	64.7	16 00.0	+60.0	65.0	16
17	13 56.5	+59.6	63.3	14 23.4	+59.7	63.5	14 50.1	+59.8	63.7	15 16.6	+59.8	64.0	15 42.8	+59.9	64.2	16 08.8	+59.9	64.5	16 34.5	+60.0	64.7	17 00.0	+60.0	65.0	17
18	14 56.1	+59.6	63.1	15 23.1	+59.7	63.4	15 49.9	+59.8	63.6	16 16.4	+59.9	63.9	16 42.7	+59.9	64.2	17 08.7	+60.0	64.4	17 34.5	+60.0	64.7	18 00.0	+60.0	65.0	18
19	15 55.7	+59.6	63.0	16 22.8	+59.7	63.3	16 49.7	+59.8	63.5	17 16.3	+59.9	63.8	17 42.6	+60.0	64.1	18 08.7	+60.0	64.4	18 34.5	+60.0	64.7	19 00.0	+60.0	65.0	19
20	16 55.3	+59.6	62.9	17 22.5	+59.7	63.2	17 49.5	+59.8	63.5	18 16.2	+59.8	63.7	18 42.6	+59.9	64.0	19 08.7	+59.9	64.4	19 34.5	+60.0	64.7	20 00.0	+60.0	65.0	20
21	17 54.9	+59.6	62.8	18 22.2	+59.7	63.1	18 49.3	+59.8	63.4	19 16.0	+59.9	63.7	19 42.5	+59.9	64.0	20 08.6	+60.0	64.3	20 34.5	+60.0	64.7	21 00.0	+60.0	65.0	21
22	18 54.5	+59.6	62.7	19 21.9	+59.7	63.0	19 49.1	+59.8	63.3	20 15.9	+59.9	63.6	20 42.4	+59.9	63.9	21 08.6	+60.0	64.3	21 34.5	+60.0	64.6	22 00.0	+60.0	65.0	22
23	19 54.1	+59.6	62.5	20 21.6	+59.7	62.9	20 48.9	+59.7	63.2	21 15.8	+59.8	63.5	21 42.3	+60.0	63.9	22 08.6	+59.9	64.2	22 34.5	+60.0	64.6	23 00.0	+60.0	65.0	23
24	20 53.7	+59.6	62.4	21 21.3	+59.7	62.7	21 48.6	+59.8	63.1	22 15.6	+59.9	63.5	22 42.3	+59.9	63.8	23 08.5	+60.0	64.2	23 34.5	+59.9	64.6	24 00.0	+60.0	65.0	24
25	21 53.3	+59.5	62.3	22 21.0	+59.7	62.6	22 48.4	+59.8	63.0	23 15.5	+59.8	63.4	23 42.2	+59.9	63.8	24 08.5	+60.0	64.2	24 34.4	+60.0	64.6	25 00.0	+60.0	65.0	25
26	22 52.8	+59.6	62.1	23 20.7	+59.7	62.5	23 48.2	+59.8	62.9	24 15.3	+59.9	63.3	24 42.1	+59.9	63.7	25 08.5	+59.9	64.1	25 34.4	+60.0	64.6	26 00.0	+60.0	65.0	26
27	23 52.4	+59.6	62.0	24 20.4	+59.6	62.4	24 48.0	+59.7	62.8	25 15.2	+59.8	63.2	25 42.0	+59.9	63.7	26 08.4	+60.0	64.1	26 34.4	+60.0	64.5	27 00.0	+60.0	65.0	27
28	24 52.0	+59.5	61.9	25 20.0	+59.7	62.3	25 47.7	+59.8	62.7	26 15.0	+59.9	63.2	26 41.9	+59.9	63.6	27 08.4	+59.9	64.1	27 34.4	+60.0	64.5	28 00.0	+60.0	65.0	28
29	25 51.5	+59.5	61.7	26 19.7	+59.7	62.2	26 47.5	+59.8	62.6	27 14.9	+59.8	63.1	27 41.8	+60.0	63.5	28 08.3	+60.0	64.0	28 34.4	+60.0	64.5	29 00.0	+60.0	65.0	29
30	26 51.0	+59.6	61.6	27 19.4	+59.6	62.1	27 47.3	+59.7	62.5	28 14.7	+59.9	63.0	28 41.8	+59.9	63.5	29 08.3	+60.0	64.0	29 34.4	+60.0	64.5	30 00.0	+60.0	65.0	30
31	27 50.6	+59.5	61.5	28 19.0	+59.7	61.9	28 47.0	+59.8	62.4	29 14.6	+59.8	62.9	29 41.7	+59.9	63.4	30 08.3	+59.9	63.9	30 34.4	+60.0	64.5	31 00.0	+60.0	65.0	31
32	28 50.1	+59.5	61.3	29 18.7	+59.6	61.8	29 46.8	+59.7	62.3	30 14.4	+59.9	62.8	30 41.6	+59.9	63.4	31 08.2	+60.0	63.9	31 34.4	+60.0	64.4	32 00.0	+60.0	65.0	32
33	29 49.6	+59.5	61.2	30 18.3	+59.6	61.7	30 46.5	+59.8	62.2	31 14.3	+59.8	62.7	31 41.5	+59.9	63.3	32 08.2	+59.9	63.8	32 34.4	+60.0	64.4	33 00.0	+60.0	65.0	33
34	30 49.1	+59.5	61.0	31 17.9	+59.7	61.6	31 46.3	+59.7	62.1	32 14.1	+59.8	62.7	32 41.4	+59.9	63.2	33 08.1	+60.0	63.8	33 34.4	+59.9	64.4	34 00.0	+60.0	65.0	34
35	31 48.6	+59.5	60.9	32 17.6	+59.6	61.4	32 46.0	+59.7	62.0	33 13.9	+59.8	62.6	33 41.3	+59.9	63.2	34 08.1	+60.0	63.8	34 34.3	+60.0	64.4	35 00.0	+60.0	65.0	35
36	32 48.1	+59.5	60.7	33 17.2	+59.6	61.3	33 45.7	+59.8	61.9	34 13.7	+59.9	62.5	34 41.2	+59.9	63.1	35 08.1	+59.9	63.7	35 34.3	+60.0	64.3	36 00.0	+60.0	65.0	36
37	33 47.6	+59.4	60.6	34 16.8	+59.6	61.2	34 45.5	+59.7	61.8	35 13.6	+59.8	62.4	35 41.1	+59.9	63.0	36 08.0	+60.0	63.7	36 34.3	+60.0	64.3	37 00.0	+60.0	65.0	37
38	34 47.0	+59.5	60.4	35 16.4	+59.6	61.0	35 45.2	+59.7	61.6	36 13.4	+59.8	62.3	36 41.0	+59.9	62.9	37 08.0	+59.9	63.6	37 34.3	+60.0	64.3	38 00.0	+60.0	65.0	38
39	35 46.5	+59.4	60.2	36 16.0	+59.6	60.9	36 44.9	+59.7	61.5	37 13.2	+59.8	62.2	37 40.9	+59.9	62.9	38 07.9	+60.0	63.6	38 34.3	+60.0	64.3	39 00.0	+60.0	65.0	39
40	36 45.9	+59.5	60.1	37 15.6	+59.5	60.7	37 44.6	+59.7	61.4	38 13.0	+59.8	62.1	38 40.8	+59.9	62.8	39 07.9	+59.9	63.5	39 34.3	+60.0	64.2	40 00.0	+60.0	65.0	40
41	37 45.4	+59.4	59.9	38 15.1	+59.6	60.6	38 44.3	+59.7	61.3	39 12.8	+59.8	62.0	39 40.7	+59.8	62.7	40 07.8	+60.0	63.5	40 34.3	+60.0	64.2	41 00.0	+60.0	65.0	41
42	38 44.8	+59.3	59.7	39 14.7	+59.5	60.4	39 44.0	+59.7	61.1	40 12.6	+59.8	61.9	40 40.5	+59.9	62.6	41 07.8	+59.9	63.4	41 34.3	+59.9	64.2	42 00.0	+60.0	65.0	42
43	39 44.1	+59.4	59.5	40 14.2	+59.6	60.3	40 43.7	+59.6	61.0	41 12.4	+59.8	61.8	41 40.4	+59.9	62.5	42 07.7	+60.0	63.3	42 34.2	+60.0	64.2	43 00.0	+60.0	65.0	43
44	40 43.5	+59.4	59.3	41 13.8	+59.5	60.1	41 43.3	+59.7	60.9	42 12.2	+59.8	61.7	42 40.3	+59.9	62.5	43 07.7	+59.9	63.3	43 34.2	+60.0	64.1	44 00.0	+60.0	65.0	44
45	41 42.9	+59.3	59.2	42 13.3	+59.5	59.9	42 43.0	+59.6	60.7	43 12.0	+59.7	61.5	43 40.2	+59.8	62.4	44 07.6	+59.9	63.2	44 34.2	+60.0	64.1	45 00.0	+60.0	65.0	45
46	42 42.2	+59.3	58.9	43 12.8	+59.5	59.7	43 42.6	+59.7	60.6	44 11.7	+59.8	61.4	44 40.0	+59.9	62.3	45 07.5	+60.0	63.2	45 34.2	+60.0	64.1	46 00.0	+60.0	65.0	46
47	43 41.5	+59.3	58.7	44 12.3	+59.4	59.6	44 42.3	+59.6	60.4	45 11.5	+59.7	61.3	45 39.9	+59.9	62.2	46 07.5	+59.9	63.1	46 34.2	+60.0	64.0	47 00.0	+60.0	65.0	47
48	44 40.8	+59.2	58.5	45 11.7	+59.5	59.4	45 41.9	+59.6	60.3	46 11.2	+59.8	61.2	46 39.8	+59.8	62.1	47 07.4	+59.9	63.0	47 34.2	+60.0	64.0	48 00.0	+60.0	65.0	48
49	45 40.0	+59.3	58.3	46 11.2	+59.4	59.2	46 41.5	+59.6	60.1	47 11.0	+59.7	61.0	47 39.6	+59.9	62.0	48 07.3	+60.0	63.0	48 34.2	+59.9	64.0	49 00.0	+60.0	65.0	49
50	46 39.3	+59.2	58.1	47 10.6	+59.4	59.0	47 41.1	+59.6	59.9	48 10.7	+59.7	60.9	48 39.5	+59.8	61.9	49 07.3	+59.9	62.9	49 34.1	+60.0	63.9	50 00.0	+60.0	65.0	50
51	47 38.5	+59.1	57.8	48 10.0	+59.4	58.8	48 40.7	+59.5	59.7	49 10.4	+59.8	60.7	49 39.3	+59.8	61.8	50 07.2	+59.9	62.8	50 34.1	+60.0	63.9	51 00.0	+60.0	65.0	51
52	48 37.6	+59.2	57.6	49 09.4	+59.3	58.6	49 40.2	+59.6	59.6	50 10.2	+59.7	60.6	50 39.1	+59.9	61.6	51 07.1	+60.0	62.7	51 34.1	+60.0	63.9	52 00.0	+60.0	65.0	52
53	49 36.8	+59.1	57.3	50 08.7	+59.4	58.3	50 39.8	+59.5	59.4	51 09.9	+59.7	60.4	51 39.0	+59.8	61.5	52 07.1	+59.9	62.7	52 34.1	+60.0	63.8	53 00.0	+60.0	65.0	53
54	50 35.9	+59.1	57.1	51 08.1	+59.3	58.1	51 39.3	+59.5	59.2	52 09.6	+59.6	60.3	52 38.8	+59.8	61.4	53 07.0	+59.9	62.6	53 34.1	+59.9	63.8	54 00.0	+60.0	65.0	54
55	51 35.0	+59.0	56.8	52 07.4	+59.2	57.9	52 38.8	+59.5	59.0	53 09.2	+59.7	60.1	53 38.6	+59.8	61.3	54 06.9	+59.9	62.5	54 34.0	+60.0	63.7	55 00.0	+60.0	65.0	55
56	52 34.0	+59.0	56.5	53 06.6	+59.3	57.6	53 38.3	+59.4	58.7	54 08.9	+59.6	59.9	54 38.4	+59.8	61.1	55 06.8	+59.9	62.4	55 34.0	+60.0	63.7	56 00.0	+60.0	65.0	56
57	53 33.0	+58.9	56.2	54 05.9	+59.1	57.3	54 37.7	+59.4	58.5	55 08.5	+59.6	59.7	55 38.2	+59.8	61.0	56 06.7	+59.9	62.3	56 34.0	+60.0	63.6	57 00.0	+60.0	65.0	57
58	54 31.9	+58.9	55.9	55 05.0	+59.2	57.0	55 37.1	+59.4	58.3	56 08.1	+59.6	59.5	56 38.0	+59.8	60.8	57 06.6	+59.9	62.2	57 34.0	+59.9	63.6	58 00.0	+60.0	65.0	58
59	55 30.8	+58.8	55.5	56 04.2	+59.1	56.7	56 36.5	+59.4	58.0	57 07.7	+59.6	59.3	57 37.8	+59.7	60.7	58 06.5	+59.9	62.1	58 33.9	+60.0	63.5	59 00.0	+60.0	65.0	59
60	56 29.6	+58.7	55.2	57 03.3	+59.1	56.4	57 35.9	+59.3	57.7	58 07.3	+59.6	59.1	58 37.5	+59.8	60.5	59 06.4	+59.9	62.0	59 33.9	+60.0	63.5	60 00.0	+60.0	65.0	60
61	57 28.3	+58.7	54.8	58 02.4	+59.0	56.1	58 35.2	+59.3	57.5	59 06.9	+59.5	58.9	59 37.3	+59.7	60.3	60 06.3	+59.8	61.8	60 33.9	+59.9	63.4	61 00.0	+60.0	65.0	61
62	58 27.0	+58.6	54.4	59 01.4	+58.9	55.8	59 34.5	+59.3	57.2	60 06.4	+59.5	58.6	60 37.0	+59.7	60.1	61 06.1	+59.9	61.7	61 33.8	+60.0	63.3	62 00.0	+60.0	65.0	62
63	59 25.6	+58.6	54.0	60 00.3	+58.9	55.4	60 33.8	+59.2	56.8	61 05.9	+59.5	58.4	61 36.7	+59.7	59.9	62 06.0	+59.9	61.6	62 33.8	+60.0	63.3	63 00.0	+60.0	65.0	63
64	60 24.2	+58.4	53.6	60 59.2	+58.8	55.0	61 33.0	+59.1	56.5	62 05.4	+59.4	58.1	62 36.4	+59.6	59.7	63 05.9	+59.8	61.4	63 33.8	+59.9	63.2	64 00.0	+60.0	65.0	64
65	61 22.6	+58.3	53.1	61 58.0	+58.7	54.6	62 32.1	+59.1	56.1	63 04.8	+59.4	57.8	63 36.0	+59.7	59.5	64 05.7	+59.9	61.3	64 33.7	+60.0	63.1	65 00.0	+60.0	65.0	65
66	62 20.9	+58.2	52.6	62 56.7	+58.7	54.1	63 31.2	+59.0	55.8	64 04.2	+59.3	57.5	64 35.7	+59.6	59.2	65 05.6	+59.8	61.1	65 33.7	+59.9	63.0	66 00.0	+60.0	65.0	66
67	63 19.1	+58.1	52.1	63 55.4	+58.5	53.7	64 30.2	+58.9	55.4	65 03.5	+59.3	57.1	65 35.3	+59.6	59.0	66 05.4	+59.8	60.9	66 33.6	+60.0	62.9	67 00.0	+60.0	65.0	67
68	64 17.2	+58.0	51.5	64 53.9	+58.4	53.2	65 29.1	+58.9	54.9	66 02.8	+59.3	56.7	66 34.9	+59.6	58.7	67 05.2	+59.8	60.7	67 33.6	+59.9	62.8	68 00.0	+60.0	65.0	68
69	65 15.2	+57.8	50.9	65 52.3	+58.3	52.6	66 28.0	+58.8	54.4	67 02.1	+59.2	56.3	67 34.5	+59.5	58.4	68 05.0	+59.8	60.5	68 33.5	+60.0	62.7	69 00.0	+60.0	65.0	69
70	66 13.0	+57.6	50.2	66 50.6	+58.2	52.0	67 26.8	+58.6	53.9	68 01.3	+59.1	55.9	68 34.0	+59.4	58.0	69 04.8	+59.7	60.2	69 33.5	+59.9	62.6	70 00.0	+60.0	65.0	70
71	67 10.6	+57.4	49.5	67 48.8	+58.0	51.4	68 25.4	+58.6	53.4	69 00.4	+59.0	55.4	69 33.4	+59.5	57.7	70 04.5	+59.7	60.0	70 33.4	+60.0	62.4	71 00.0	+60.0	65.0	71
72	68 08.0	+57.2	48.8	68 46.8	+57.8	50.7	69 24.0	+58.4	52.7	69 59.4	+58.9	54.9	70 32.9	+59.3	57.2	71 04.2	+59.7	59.7	71 33.4	+59.9	62.3	72 00.0	+60.0	65.0	72
73	69 05.2	+56.9	47.9	69 44.6	+57.6	49.9	70 22.4	+58.2	52.1	70 58.3	+58.8	54.4	71 32.2	+59.3	56.8	72 03.9	+59.7	59.4	72 33.3	+59.9	62.1	73 00.0	+60.0	65.0	73
74	70 02.1	+56.6	47.0	70 42.2	+57.3	49.1	71 20.6	+58.0	51.3	71 57.1	+58.7	53.7	72 31.5	+59.2	56.3	73 03.6	+59.6	59.0	73 33.2	+59.9	61.9	74 00.0	+60.0	65.0	74
75	70 58.7	+56.3	46.0	71 39.5	+57.1	48.2	72 18.6	+57.8	50.5	72 55.8	+58.5	53.0	73 30.7	+59.1	55.7	74 03.2	+59.6	58.6	74 33.1	+59.9	61.7	75 00.0	+60.0	65.0	75
76	71 55.0	+55.8	44.9	72 36.6	+56.7	47.2	73 16.4	+57.6	49.6	73 54.3	+58.3	52.3	74 29.8	+59.0	55.1	75 02.8	+59.5	58.2	75 33.0	+59.8	61.5	76 00.0	+60.0	65.0	76
77	72 50.8	+55.4	43.7	73 33.3	+56.4	46.1	74 14.0	+57.2	48.6	74 52.6	+58.1	51.4	75 28.8	+58.8	54.4	76 02.3	+59.5	57.7	76 32.8	+59.9	61.2	77 00.0	+60.0	65.0	77
78	73 46.2	+54.8	42.4	74 29.7	+55.8	44.8	75 11.2	+56.9	47.5	75 50.7	+57.8	50.4	76 27.6	+58.7	53.6	77 01.8	+59.3	57.1	77 32.7	+59.8	60.9	78 00.0	+60.0	65.0	78
79	74 41.0	+54.2	40.9	75 25.5	+55.3	43.4	76 08.1	+56.4	46.2	76 48.5	+57.4	49.3	77 26.3	+58.4	52.7	78 01.1	+59.3	56.4	78 32.5	+59.8	60.5	79 00.0	+60.0	65.0	79
80	75 35.2	+53.3	39.2	76 20.8	+54.6	41.8	77 04.5	+55.8	44.7	77 45.9	+57.1	48.0	78 24.7	+58.2	51.6	79 00.4	+59.0	55.6	79 32.3	+59.8	60.1	80 00.0	+60.0	65.0	80
81	76 28.5	+52.4	37.3	77 15.4	+53.7	40.0	78 00.3	+55.1	43.0	78 43.0	+56.5	46.4	79 22.9	+57.7	50.3	79 59.4	+58.9	54.7	80 32.1	+59.6	59.6	81 00.0	+60.0	65.0	81
82	77 20.9	+51.2	35.2	78 09.1	+52.7	37.9	78 55.4	+54.2	41.0	79 39.5	+55.7	44.6	80 20.6	+57.3	48.8	80 58.3	+58.6	53.5	81 31.7	+59.7	58.9	82 00.0	+60.0	65.0	82
83	78 12.1	+49.7	32.7	79 01.8	+51.3	35.5	79 49.6	+53.1	38.7	80 35.2	+54.8	42.5	81 17.9	+56.6	46.9	81 56.9	+58.3	52.1	82 31.4	+59.4	58.1	83 00.0	+60.0	65.0	83
84	79 01.8	*+47.8*•	29.9	79 53.1	*+49.6*•	32.6	80 42.7	+51.5	35.9	81 30.0	+53.6	39.9	82 14.5	+55.7	44.6	82 55.2	+57.7	50.2	83 30.8	+59.3	57.0	84 00.0	+60.0	65.0	84
85	79 49.6	*+45.6*•	26.6	80 42.7	*+47.3*•	29.3	81 34.2	*+49.4*•	32.6	82 23.6	*+51.7*•	36.6	83 10.2	+54.2	41.6	83 52.9	+56.7	47.8	84 30.1	+59.0	55.5	85 00.0	+60.0	65.0	85
86	80 35.2	*+42.7*•	22.7	81 30.0	*+44.5*•	25.3	82 23.6	*+46.6*•	28.5	83 15.3	*+49.1*•	32.6	84 04.4	*+52.0*•	37.8	84 49.6	*+55.4*•	44.5	85 29.1	+58.5	53.4	86 00.0	+60.0	65.0	86
87	81 17.9	*+39.0*•	18.3	82 14.5	*+40.7*•	20.6	83 10.2	*+42.7*•	23.5	84 04.4	*+45.2*•	27.3	84 56.4	*+48.6*•	32.5	85 45.0	*+52.6*•	39.8	86 27.6	*+57.2*•	50.2	87 00.0	+60.0	65.0	87
88	81 56.9	*+34.5*•	13.1	82 55.2	*+35.6*•	14.9	83 52.9	*+37.2*•	17.3	84 49.6	*+39.5*•	20.5	85 45.0	*+42.6*•	25.3	86 37.6	*+47.2*•	32.5	87 24.8	*+54.0*•	44.5	88 00.0	+60.0	65.0	88
89	82 31.4	*+28.6*•	7.0	83 30.8	*+29.2*•	8.0	84 30.1	*+29.9*•	9.5	85 29.1	*+30.9*•	11.6	86 27.6	*+32.4*•	14.8	87 24.8	*+35.2*•	20.5	88 18.8	*+41.2*•	32.5	89 00.0	+60.0	65.0	89
90	83 00.0	*+21.6*•	0.0	84 00.0	*+21.0*•	0.0	85 00.0	*+20.0*•	0.0	86 00.0	*+18.6*•	0.0	87 00.0	*+16.1*•	0.0	88 00.0	*+10.9*•	0.0	89 00.0	*–4.5*•	0.0	90 00.0	–60.0	32.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 115°, 245°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 50.5	+59.6	113.8	2 26.2	+59.7	113.9	2 01.9	+59.8	113.9	1 37.6	+59.8	113.9	1 13.2	+59.9	114.0	0 48.8	+60.0	114.0	0 24.4	+60.0	114.0	0 00.0	+60.0	114.0	0
1	3 50.1	+59.6	113.7	3 25.9	+59.8	113.8	3 01.7	+59.8	113.8	2 37.4	+59.9	113.9	2 13.1	+59.9	113.9	1 48.8	+59.9	114.0	1 24.4	+60.0	114.0	1 00.0	+60.0	114.0	1
2	4 49.7	+59.6	113.6	4 25.7	+59.7	113.7	4 01.5	+59.8	113.8	3 37.3	+59.9	113.8	3 13.0	+60.0	113.9	2 48.7	+60.0	113.9	2 24.4	+60.0	114.0	2 00.0	+60.0	114.0	2
3	5 49.3	+59.7	113.5	5 25.4	+59.7	113.6	5 01.3	+59.8	113.7	4 37.2	+59.9	113.8	4 13.0	+59.9	113.8	3 48.7	+60.0	113.9	3 24.4	+60.0	113.9	3 00.0	+60.0	114.0	3
4	6 49.0	+59.6	113.4	6 25.1	+59.7	113.5	6 01.1	+59.8	113.6	5 37.1	+59.8	113.7	5 12.9	+59.9	113.8	4 48.7	+59.9	113.9	4 24.4	+60.0	113.9	4 00.0	+60.0	114.0	4
5	7 48.6	+59.6	113.3	7 24.8	+59.7	113.4	7 00.9	+59.8	113.5	6 36.9	+59.9	113.6	6 12.8	+60.0	113.7	5 48.6	+60.0	113.8	5 24.4	+60.0	113.9	5 00.0	+60.0	114.0	5
6	8 48.2	+59.6	113.2	8 24.5	+59.8	113.3	8 00.7	+59.8	113.4	7 36.8	+59.9	113.6	7 12.8	+59.9	113.7	6 48.6	+60.0	113.8	6 24.4	+59.9	113.9	6 00.0	+60.0	114.0	6
7	9 47.8	+59.6	113.1	9 24.3	+59.7	113.2	9 00.5	+59.8	113.4	8 36.7	+59.9	113.5	8 12.7	+59.9	113.6	7 48.6	+60.0	113.8	7 24.3	+60.0	113.9	7 00.0	+60.0	114.0	7
8	10 47.4	+59.7	112.9	10 24.0	+59.7	113.1	10 00.3	+59.9	113.3	9 36.6	+59.8	113.4	9 12.6	+60.0	113.6	8 48.6	+59.9	113.7	8 24.3	+60.0	113.9	8 00.0	+60.0	114.0	8
9	11 47.1	+59.6	112.8	11 23.7	+59.7	113.0	11 00.2	+59.8	113.2	10 36.4	+59.9	113.4	10 12.6	+59.9	113.5	9 48.5	+60.0	113.7	9 24.3	+60.0	113.9	9 00.0	+60.0	114.0	9
10	12 46.7	+59.6	112.7	12 23.4	+59.7	112.9	12 00.0	+59.8	113.1	11 36.3	+59.9	113.3	11 12.5	+59.9	113.5	10 48.5	+60.0	113.7	10 24.3	+60.0	113.8	10 00.0	+60.0	114.0	10
11	13 46.3	+59.6	112.6	13 23.1	+59.7	112.8	12 59.8	+59.8	113.0	12 36.2	+59.9	113.2	12 12.4	+59.9	113.4	11 48.5	+59.9	113.6	11 24.3	+60.0	113.8	11 00.0	+60.0	114.0	11
12	14 45.9	+59.6	112.5	14 22.8	+59.7	112.7	13 59.6	+59.7	112.9	13 36.1	+59.8	113.2	13 12.3	+60.0	113.4	12 48.4	+60.0	113.6	12 24.3	+60.0	113.8	12 00.0	+60.0	114.0	12
13	15 45.5	+59.6	112.3	15 22.5	+59.7	112.6	14 59.3	+59.8	112.9	14 35.9	+59.9	113.1	14 12.3	+59.9	113.3	13 48.4	+60.0	113.6	13 24.3	+60.0	113.8	13 00.0	+60.0	114.0	13
14	16 45.1	+59.6	112.2	16 22.2	+59.7	112.5	15 59.1	+59.8	112.8	15 35.8	+59.9	113.0	15 12.2	+59.9	113.3	14 48.4	+59.9	113.5	14 24.3	+60.0	113.8	14 00.0	+60.0	114.0	14
15	17 44.7	+59.5	112.1	17 21.9	+59.7	112.4	16 58.9	+59.8	112.7	16 35.7	+59.8	113.0	16 12.1	+59.9	113.2	15 48.3	+60.0	113.5	15 24.3	+60.0	113.8	15 00.0	+60.0	114.0	15
16	18 44.2	+59.6	112.0	18 21.6	+59.7	112.3	17 58.7	+59.8	112.6	17 35.5	+59.9	112.9	17 12.0	+60.0	113.2	16 48.3	+60.0	113.5	16 24.3	+60.0	113.7	16 00.0	+60.0	114.0	16
17	19 43.8	+59.6	111.9	19 21.3	+59.7	112.2	18 58.5	+59.8	112.5	18 35.4	+59.9	112.8	18 12.0	+59.9	113.1	17 48.3	+59.9	113.4	17 24.3	+60.0	113.7	17 00.0	+60.0	114.0	17
18	20 43.4	+59.6	111.7	20 21.0	+59.7	112.1	19 58.3	+59.8	112.4	19 35.3	+59.8	112.7	19 11.9	+59.9	113.1	18 48.2	+60.0	113.4	18 24.3	+60.0	113.7	18 00.0	+60.0	114.0	18
19	21 43.0	+59.5	111.6	21 20.7	+59.7	112.0	20 58.1	+59.8	112.3	20 35.1	+59.9	112.7	20 11.8	+59.9	113.0	19 48.2	+60.0	113.4	19 24.3	+59.9	113.7	19 00.0	+60.0	114.0	19
20	22 42.5	+59.6	111.5	22 20.4	+59.7	111.9	21 57.9	+59.7	112.2	21 35.0	+59.8	112.6	21 11.7	+60.0	113.0	20 48.2	+59.9	113.3	20 24.2	+60.0	113.7	20 00.0	+60.0	114.0	20
21	23 42.1	+59.5	111.3	23 20.1	+59.6	111.7	22 57.6	+59.8	112.1	22 34.8	+59.9	112.5	22 11.7	+59.9	112.9	21 48.1	+60.0	113.3	21 24.2	+60.0	113.6	21 00.0	+60.0	114.0	21
22	24 41.6	+59.6	111.2	24 19.7	+59.7	111.6	23 57.4	+59.8	112.0	23 34.7	+59.8	112.5	23 11.6	+59.9	112.9	22 48.1	+60.0	113.2	22 24.2	+60.0	113.6	22 00.0	+60.0	114.0	22
23	25 41.2	+59.5	111.1	25 19.4	+59.7	111.5	24 57.2	+59.7	112.0	24 34.5	+59.9	112.4	24 11.5	+59.9	112.8	23 48.1	+59.9	113.2	23 24.2	+60.0	113.6	23 00.0	+60.0	114.0	23
24	26 40.7	+59.6	110.9	26 19.1	+59.6	111.4	25 56.9	+59.8	111.9	25 34.4	+59.8	112.3	25 11.4	+59.9	112.7	24 48.0	+60.0	113.2	24 24.2	+60.0	113.6	24 00.0	+60.0	114.0	24
25	27 40.3	+59.5	110.8	27 18.7	+59.7	111.3	26 56.7	+59.8	111.8	26 34.2	+59.9	112.2	26 11.3	+59.9	112.7	25 48.0	+59.9	113.1	25 24.2	+60.0	113.6	25 00.0	+60.0	114.0	25
26	28 39.8	+59.5	110.6	28 18.4	+59.6	111.2	27 56.5	+59.7	111.7	27 34.1	+59.8	112.1	27 11.2	+60.0	112.6	26 47.9	+60.0	113.1	26 24.2	+60.0	113.5	26 00.0	+60.0	114.0	26
27	29 39.3	+59.5	110.5	29 18.0	+59.6	111.0	28 56.2	+59.8	111.6	28 33.9	+59.9	112.1	28 11.2	+59.9	112.6	27 47.9	+60.0	113.0	27 24.2	+60.0	113.5	27 00.0	+60.0	114.0	27
28	30 38.8	+59.5	110.4	30 17.6	+59.7	110.9	29 56.0	+59.7	111.4	29 33.8	+59.8	112.0	29 11.1	+59.9	112.5	28 47.9	+59.9	113.0	28 24.2	+60.0	113.5	28 00.0	+60.0	114.0	28
29	31 38.3	+59.5	110.2	31 17.3	+59.6	110.8	30 55.7	+59.8	111.3	30 33.6	+59.8	111.9	30 11.0	+59.9	112.4	29 47.8	+60.0	113.0	29 24.2	+59.9	113.5	29 00.0	+60.0	114.0	29
30	32 37.8	+59.4	110.0	32 16.9	+59.6	110.6	31 55.5	+59.7	111.2	31 33.4	+59.9	111.8	31 10.9	+59.9	112.4	30 47.8	+59.9	112.9	30 24.1	+60.0	113.5	30 00.0	+60.0	114.0	30
31	33 37.2	+59.5	109.9	33 16.5	+59.6	110.5	32 55.2	+59.7	111.1	32 33.3	+59.8	111.7	32 10.8	+59.9	112.3	31 47.7	+60.0	112.9	31 24.1	+60.0	113.4	31 00.0	+60.0	114.0	31
32	34 36.7	+59.4	109.7	34 16.1	+59.6	110.4	33 54.9	+59.7	111.0	33 33.1	+59.8	111.6	33 10.7	+59.9	112.2	32 47.7	+60.0	112.8	32 24.1	+60.0	113.4	32 00.0	+60.0	114.0	32
33	35 36.1	+59.4	109.6	35 15.7	+59.6	110.2	34 54.6	+59.7	110.9	34 32.9	+59.8	111.5	34 10.6	+59.9	112.2	33 47.7	+59.9	112.8	33 24.1	+60.0	113.4	33 00.0	+60.0	114.0	33
34	36 35.5	+59.5	109.4	36 15.3	+59.6	110.1	35 54.3	+59.8	110.8	35 32.7	+59.9	111.4	35 10.5	+59.9	112.1	34 47.6	+60.0	112.7	34 24.1	+60.0	113.4	34 00.0	+60.0	114.0	34
35	37 35.0	+59.4	109.2	37 14.9	+59.5	109.9	36 54.1	+59.6	110.6	36 32.6	+59.8	111.3	36 10.4	+59.9	112.0	35 47.6	+59.9	112.7	35 24.1	+60.0	113.4	35 00.0	+60.0	114.0	35
36	38 34.4	+59.3	109.0	38 14.4	+59.6	109.8	37 53.7	+59.7	110.5	37 32.4	+59.8	111.2	37 10.3	+59.9	111.9	36 47.5	+60.0	112.6	36 24.1	+60.0	113.3	36 00.0	+60.0	114.0	36
37	39 33.7	+59.4	108.8	39 14.0	+59.5	109.6	38 53.4	+59.7	110.4	38 32.2	+59.8	111.1	38 10.2	+59.9	111.9	37 47.5	+59.9	112.6	37 24.1	+60.0	113.3	37 00.0	+60.0	114.0	37
38	40 33.1	+59.3	108.7	40 13.5	+59.5	109.5	39 53.1	+59.7	110.3	39 32.0	+59.8	111.0	39 10.1	+59.8	111.8	38 47.4	+60.0	112.5	38 24.1	+59.9	113.3	38 00.0	+60.0	114.0	38
39	41 32.4	+59.4	108.5	41 13.0	+59.5	109.3	40 52.8	+59.7	110.1	40 31.8	+59.7	110.9	40 09.9	+59.9	111.7	39 47.4	+59.9	112.5	39 24.0	+60.0	113.3	39 00.0	+60.0	114.0	39
40	42 31.8	+59.3	108.3	42 12.5	+59.5	109.1	41 52.5	+59.6	110.0	41 31.5	+59.8	110.8	41 09.8	+59.9	111.6	40 47.3	+60.0	112.4	40 24.0	+60.0	113.2	40 00.0	+60.0	114.0	40
41	43 31.1	+59.2	108.1	43 12.0	+59.5	108.9	42 52.1	+59.6	109.8	42 31.3	+59.8	110.7	42 09.7	+59.9	111.5	41 47.3	+59.9	112.4	41 24.0	+60.0	113.2	41 00.0	+60.0	114.0	41
42	44 30.3	+59.3	107.8	44 11.5	+59.5	108.8	43 51.7	+59.7	109.7	43 31.1	+59.8	110.6	43 09.6	+59.8	111.5	42 47.2	+59.9	112.3	42 24.0	+60.0	113.2	42 00.0	+60.0	114.0	42
43	45 29.6	+59.2	107.6	45 11.0	+59.4	108.6	44 51.4	+59.6	109.5	44 30.9	+59.7	110.5	44 09.4	+59.9	111.4	43 47.1	+60.0	112.3	43 24.0	+60.0	113.1	43 00.0	+60.0	114.0	43
44	46 28.8	+59.2	107.4	46 10.4	+59.4	108.4	45 51.0	+59.6	109.4	45 30.6	+59.8	110.3	45 09.3	+59.9	111.3	44 47.1	+59.9	112.2	44 24.0	+60.0	113.1	44 00.0	+60.0	114.0	44
45	47 28.0	+59.2	107.1	47 09.8	+59.4	108.2	46 50.6	+59.6	109.2	46 30.4	+59.7	110.2	46 09.2	+59.8	111.2	45 47.0	+60.0	112.1	45 24.0	+59.9	113.1	45 00.0	+60.0	114.0	45
46	48 27.2	+59.1	106.9	48 09.2	+59.4	108.0	47 50.2	+59.5	109.0	47 30.1	+59.7	110.1	47 09.0	+59.9	111.1	46 47.0	+59.9	112.1	46 23.9	+60.0	113.0	46 00.0	+60.0	114.0	46
47	49 26.3	+59.1	106.6	49 08.6	+59.3	107.7	48 49.7	+59.6	108.8	48 29.8	+59.7	109.9	48 08.9	+59.9	111.0	47 46.9	+59.9	112.0	47 23.9	+60.0	113.0	47 00.0	+60.0	114.0	47
48	50 25.4	+59.1	106.4	50 07.9	+59.3	107.5	49 49.3	+59.5	108.7	49 29.5	+59.7	109.8	49 08.7	+59.9	110.9	48 46.8	+60.0	111.9	48 23.9	+60.0	113.0	48 00.0	+60.0	114.0	48
49	51 24.5	+59.0	106.1	51 07.2	+59.3	107.3	50 48.8	+59.5	108.5	50 29.2	+59.7	109.6	50 08.6	+59.8	110.7	49 46.8	+59.9	111.9	49 23.9	+60.0	112.9	49 00.0	+60.0	114.0	49
50	52 23.5	+58.9	105.8	52 06.5	+59.3	107.0	51 48.3	+59.5	108.3	51 28.9	+59.7	109.5	51 08.4	+59.8	110.6	50 46.7	+59.9	111.8	50 23.9	+60.0	112.9	50 00.0	+60.0	114.0	50
51	53 22.4	+59.0	105.5	53 05.8	+59.2	106.8	52 47.8	+59.5	108.0	52 28.6	+59.7	109.3	52 08.2	+59.8	110.5	51 46.6	+59.9	111.7	51 23.9	+59.9	112.9	51 00.0	+60.0	114.0	51
52	54 21.4	+58.8	105.2	54 05.0	+59.2	106.5	53 47.3	+59.4	107.8	53 28.3	+59.6	109.1	53 08.0	+59.8	110.4	52 46.5	+59.9	111.6	52 23.8	+60.0	112.8	52 00.0	+60.0	114.0	52
53	55 20.2	+58.8	104.8	55 04.2	+59.1	106.2	54 46.7	+59.4	107.6	54 27.9	+59.7	108.9	54 07.8	+59.8	110.2	53 46.4	+59.9	111.5	53 23.8	+60.0	112.8	53 00.0	+60.0	114.0	53
54	56 19.0	+58.8	104.5	56 03.3	+59.1	105.9	55 46.1	+59.4	107.3	55 27.6	+59.6	108.7	55 07.6	+59.8	110.1	54 46.3	+60.0	111.4	54 23.8	+60.0	112.7	54 00.0	+60.0	114.0	54
55	57 17.8	+58.7	104.1	57 02.4	+59.0	105.6	56 45.5	+59.4	107.1	56 27.2	+59.6	108.5	56 07.4	+59.8	109.9	55 46.3	+59.9	111.3	55 23.8	+59.9	112.7	55 00.0	+60.0	114.0	55
56	58 16.5	+58.6	103.7	58 01.4	+59.0	105.3	57 44.9	+59.3	106.8	57 26.8	+59.5	108.3	57 07.2	+59.7	109.8	56 46.2	+59.8	111.2	56 23.7	+60.0	112.6	56 00.0	+60.0	114.0	56
57	59 15.1	+58.5	103.3	59 00.4	+59.0	104.9	58 44.2	+59.2	106.5	58 26.3	+59.6	108.1	58 06.9	+59.8	109.6	57 46.0	+59.9	111.1	57 23.7	+60.0	112.6	57 00.0	+60.0	114.0	57
58	60 13.6	+58.4	102.9	59 59.4	+58.8	104.6	59 43.4	+59.3	106.2	59 25.9	+59.5	107.8	59 06.7	+59.7	109.4	58 45.9	+59.9	111.0	58 23.7	+60.0	112.5	58 00.0	+60.0	114.0	58
59	61 12.0	+58.3	102.4	60 58.2	+58.8	104.2	60 42.7	+59.1	105.9	60 25.4	+59.5	107.6	60 06.4	+59.7	109.3	59 45.8	+59.9	110.9	59 23.7	+59.9	112.5	59 00.0	+60.0	114.0	59
60	62 10.3	+58.2	101.9	61 57.0	+58.7	103.7	61 41.8	+59.2	105.6	61 24.9	+59.4	107.3	61 06.1	+59.7	109.1	60 45.7	+59.9	110.7	60 23.6	+60.0	112.4	60 00.0	+60.0	114.0	60
61	63 08.5	+58.1	101.4	62 55.7	+58.6	103.3	62 41.0	+59.0	105.2	62 24.3	+59.4	107.0	62 05.8	+59.7	108.8	61 45.6	+59.8	110.6	61 23.6	+60.0	112.3	61 00.0	+60.0	114.0	61
62	64 06.6	+58.0	100.8	63 54.3	+58.6	102.8	63 40.0	+59.0	104.8	63 23.7	+59.4	106.7	63 05.5	+59.6	108.6	62 45.4	+59.9	110.5	62 23.6	+59.9	112.3	62 00.0	+60.0	114.0	62
63	65 04.6	+57.8	100.2	64 52.9	+58.4	102.3	64 39.0	+58.9	104.4	64 23.1	+59.3	106.4	64 05.1	+59.7	108.4	63 45.3	+59.8	110.3	63 23.5	+60.0	112.2	63 00.0	+60.0	114.0	63
64	66 02.4	+57.6	99.6	65 51.3	+58.2	101.8	65 37.9	+58.8	103.9	65 22.4	+59.3	106.0	65 04.8	+59.6	108.1	64 45.1	+59.8	110.1	64 23.5	+60.0	112.1	64 00.0	+60.0	114.0	64
65	67 00.0	+57.4	98.9	66 49.5	+58.2	101.2	66 36.7	+58.8	103.4	66 21.7	+59.2	105.7	66 04.4	+59.5	107.8	65 44.9	+59.9	110.0	65 23.5	+59.9	112.0	65 00.0	+60.0	114.0	65
66	67 57.4	+57.2	98.1	67 47.7	+57.9	100.5	67 35.5	+58.6	102.9	67 20.9	+59.1	105.3	67 03.9	+59.6	107.5	66 44.8	+59.7	109.8	66 23.4	+60.0	111.9	66 00.0	+60.0	114.0	66
67	68 54.6	+56.9	97.3	68 45.6	+57.8	99.8	68 34.1	+58.5	102.3	68 20.0	+59.1	104.8	68 03.5	+59.4	107.2	67 44.5	+59.8	109.5	67 23.4	+59.9	111.8	67 00.0	+60.0	114.0	67
68	69 51.5	+56.6	96.4	69 43.4	+57.6	99.1	69 32.6	+58.3	101.7	69 19.1	+58.9	104.3	69 02.9	+59.5	106.8	68 44.3	+59.8	109.3	68 23.3	+59.9	111.7	68 00.0	+60.0	114.0	68
69	70 48.1	+56.3	95.4	70 41.0	+57.3	98.2	70 30.9	+58.2	101.0	70 18.0	+58.9	103.8	70 02.4	+59.4	106.5	69 44.1	+59.7	109.1	69 23.2	+60.0	111.6	69 00.0	+60.0	114.0	69
70	71 44.4	+55.8	94.3	71 38.3	+57.0	97.3	71 29.1	+58.0	100.3	71 16.9	+58.7	103.2	71 01.8	+59.3	106.0	70 43.8	+59.7	108.8	70 23.2	+59.9	111.4	70 00.0	+60.0	114.0	70
71	72 40.2	+55.4	93.1	72 35.3	+56.7	96.3	72 27.1	+57.7	99.5	72 15.6	+58.6	102.5	72 01.1	+59.2	105.5	71 43.5	+59.7	108.5	71 23.1	+59.9	111.3	71 00.0	+60.0	114.0	71
72	73 35.6	+54.9	91.8	73 32.0	+56.3	95.2	73 24.8	+57.5	98.5	73 14.2	+58.5	101.8	73 00.3	+59.2	105.0	72 43.2	+59.6	108.1	72 23.0	+59.9	111.1	72 00.0	+60.0	114.0	72
73	74 30.5	+54.2	90.3	74 28.3	+55.8	93.9	74 22.3	+57.2	97.5	74 12.7	+58.2	101.0	73 59.5	+59.0	104.4	73 42.8	+59.6	107.7	73 22.9	+59.9	110.9	73 00.0	+60.0	114.0	73
74	75 24.7	+53.4	88.7	75 24.1	+55.2	92.5	75 19.5	+56.7	96.3	75 10.9	+58.0	100.1	74 58.5	+58.9	103.8	74 42.4	+59.5	107.3	74 22.8	+59.9	110.7	74 00.0	+60.0	114.0	74
75	76 18.1	+52.4	86.8	76 19.3	+54.5	90.9	76 16.2	+56.3	95.0	76 08.9	+57.6	99.0	75 57.4	+58.7	103.0	75 41.9	+59.5	106.8	75 22.7	+59.9	110.5	75 00.0	+60.0	114.0	75
76	77 10.5	+51.3	84.7	77 13.8	+53.7	89.1	77 12.5	+55.6	93.5	77 06.5	+57.3	97.9	76 56.1	+58.6	102.1	76 41.4	+59.4	106.3	76 22.6	+59.9	110.2	76 00.0	+60.0	114.0	76
77	78 01.8	+49.9	82.3	78 07.5	+52.5	87.0	78 08.1	+54.9	91.7	78 03.8	+56.9	96.5	77 54.7	+58.2	101.1	77 40.8	+59.2	105.6	77 22.5	+59.8	109.9	77 00.0	+60.0	114.0	77
78	78 51.7	*+48.1* •	79.5	79 00.0	+51.2	84.5	79 03.0	+54.0	89.7	79 00.7	+56.2	94.9	78 52.9	+58.0	99.9	78 40.0	+59.2	104.9	78 22.3	+59.8	109.6	78 00.0	+60.0	114.0	78
79	79 39.8	*+45.8* •	76.3	79 51.2	+49.5	81.7	79 57.0	+52.7	87.3	79 56.9	+55.4	92.9	79 50.9	+57.5	98.5	79 39.2	+58.9	104.0	79 22.1	+59.7	109.1	79 00.0	+60.0	114.0	79
80	80 25.6	*+43.1* •	72.5	80 40.7	*+47.3* •	78.4	80 49.7	+51.1	84.4	80 52.3	+54.4	90.6	80 48.4	+56.9	96.8	80 38.1	+58.7	102.9	80 21.8	+59.7	108.6	80 00.0	+60.0	114.0	80
81	81 08.7	*+39.5* •	68.2	81 28.0	*+44.3* •	74.4	81 40.8	*+48.9* •	81.0	81 46.7	+52.9	87.8	81 45.3	+56.1	94.7	81 36.8	+58.4	101.5	81 21.5	+59.6	108.0	81 00.0	+60.0	114.0	81
82	81 48.2	*+35.1* •	63.1	82 12.3	*+40.5* •	69.6	82 29.7	*+45.9* •	76.8	82 39.6	*+50.8* •	84.3	82 41.4	+55.0	92.1	82 35.2	+57.8	99.8	82 21.1	+59.5	107.2	82 00.0	+60.0	114.0	82
83	82 23.3	*+29.5* •	57.2	82 52.8	*+35.6* •	63.9	83 15.6	*+41.8* •	71.6	83 30.4	*+47.9* •	79.9	83 36.4	*+53.2* •	88.7	83 33.0	+57.1	97.6	83 20.6	+59.4	106.1	83 00.0	+60.0	114.0	83
84	82 52.8	*+22.8* •	50.4	83 28.4	*+29.0* •	57.1	83 57.4	*+36.1* •	65.1	84 18.3	*+43.5* •	74.2	84 29.6	*+50.4* •	84.3	84 30.1	+55.9	94.7	84 20.0	+59.0	104.8	84 00.0	+60.0	114.0	84
85	83 15.6	*+14.8* •	42.7	83 57.4	*+20.9* •	49.1	84 33.5	*+28.3* •	57.1	85 01.8	*+36.9* •	66.8	85 20.0	*+45.9* •	78.1	85 26.0	*+53.7* •	90.5	85 19.0	+58.6	102.8	85 00.0	+60.0	114.0	85
86	83 30.4	*+6.0* •	34.3	84 18.3	*+11.3* •	40.0	85 01.8	*+18.2* •	47.4	85 38.7	*+27.2* •	57.1	86 05.9	*+38.1* •	69.5	86 19.7	*+49.4* •	84.2	86 17.6	+57.4	99.8	86 00.0	+60.0	114.0	86
87	83 36.4	*−3.4* •	25.4	84 29.6	*+0.5* •	29.9	85 20.0	*+6.0* •	36.0	86 05.9	*+13.8* •	44.6	86 44.0	*+25.1* •	57.0	87 09.1	*+40.2* •	74.1	87 15.0	*+54.8* •	94.6	87 00.0	+60.0	114.0	87
88	83 33.0	*−12.4* •	16.5	84 30.1	*−10.1* •	19.4	85 26.0	*−7.0* •	23.6	86 19.7	*−2.1* •	29.9	87 09.1	*+5.9* •	39.9	87 49.3	*+20.5* •	57.0	88 09.8	*+44.8* •	84.2	88 00.0	+60.0	114.0	88
89	83 20.6	*−20.6* •	7.9	84 20.0	*−20.0* •	9.3	85 19.0	*−19.0* •	11.3	86 17.6	*−17.6* •	14.3	87 15.0	*−15.0* •	19.4	88 09.8	*−9.8* •	29.8	88 54.6	*+5.4* •	57.0	89 00.0	+60.0	114.0	89
90	83 00.0	*−27.8* •	0.0	84 00.0	*−28.3* •	0.0	85 00.0	*−29.0* •	0.0	86 00.0	*−30.0* •	0.0	87 00.0	*−31.6* •	0.0	88 00.0	*−34.5* •	0.0	89 00.0	*−40.6* •	0.0	90 00.0	−60.0	57.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 66°, 294°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 50.5	−59.7	113.8	2 26.2	−59.7	113.9	2 01.9	−59.8	113.9	1 37.6	−59.9	113.9	1 13.2	−59.9	114.0	0 48.8	−60.0	114.0	0 24.4	−60.0	114.0	0 00.0	+60.0	66.0	0
1	1 50.8	−59.6	114.0	1 26.5	−59.7	114.0	1 02.1	−59.8	114.0	0 37.7	−59.9	114.0	0 13.3	−60.0	114.0	0 11.2	+59.9	66.0	0 35.6	+60.0	66.0	1 00.0	+60.0	66.0	1
2	0 51.2	−59.6	114.1	0 26.8	−59.8	114.1	0 02.3	−59.8	114.1	0 22.2	+59.9	65.9	0 46.7	+59.9	65.9	1 11.1	+60.0	65.9	1 35.6	+60.0	66.0	2 00.0	+60.0	66.0	2
3	0 08.4	+59.6	65.8	0 33.0	+59.7	65.8	0 57.5	+59.8	65.8	1 22.1	+59.9	65.9	1 46.6	+59.9	65.9	2 11.1	+60.0	65.9	2 35.6	+60.0	66.0	3 00.0	+60.0	66.0	3
4	1 08.0	+59.7	65.7	1 32.7	+59.7	65.7	1 57.3	+59.9	65.8	2 22.0	+59.8	65.8	2 46.5	+60.0	65.8	3 11.1	+59.9	65.9	3 35.6	+60.0	65.9	4 00.0	+60.0	66.0	4
5	2 07.7	+59.6	65.6	2 32.4	+59.8	65.6	2 57.2	+59.8	65.7	3 21.8	+59.9	65.7	3 46.5	+59.9	65.8	4 11.0	+60.0	65.9	4 35.6	+60.0	65.9	5 00.0	+60.0	66.0	5
6	3 07.3	+59.6	65.5	3 32.2	+59.7	65.5	3 57.0	+59.8	65.6	4 21.7	+59.9	65.7	4 46.4	+59.9	65.7	5 11.0	+60.0	65.8	5 35.6	+59.9	65.9	6 00.0	+60.0	66.0	6
7	4 06.9	+59.6	65.4	4 31.9	+59.7	65.4	4 56.8	+59.8	65.5	5 21.6	+59.9	65.6	5 46.3	+60.0	65.7	6 11.0	+60.0	65.8	6 35.5	+60.0	65.9	7 00.0	+60.0	66.0	7
8	5 06.5	+59.7	65.3	5 31.6	+59.7	65.4	5 56.6	+59.8	65.4	6 21.5	+59.8	65.5	6 46.3	+59.9	65.6	7 11.0	+59.9	65.8	7 35.5	+60.0	65.9	8 00.0	+60.0	66.0	8
9	6 06.2	+59.6	65.2	6 31.3	+59.7	65.3	6 56.4	+59.8	65.4	7 21.3	+59.9	65.5	7 46.2	+59.9	65.6	8 10.9	+60.0	65.7	8 35.5	+60.0	65.9	9 00.0	+60.0	66.0	9
10	7 05.8	+59.6	65.0	7 31.0	+59.8	65.2	7 56.2	+59.8	65.3	8 21.2	+59.9	65.4	8 46.1	+60.0	65.5	9 10.9	+60.0	65.7	9 35.5	+60.0	65.8	10 00.0	+60.0	66.0	10
11	8 05.4	+59.6	64.9	8 30.8	+59.7	65.1	8 56.0	+59.8	65.2	9 21.1	+59.9	65.3	9 46.1	+59.9	65.5	10 10.9	+59.9	65.7	10 35.5	+60.0	65.8	11 00.0	+60.0	66.0	11
12	9 05.0	+59.6	64.8	9 30.5	+59.7	65.0	9 55.8	+59.8	65.1	10 21.0	+59.8	65.3	10 46.0	+59.9	65.4	11 10.8	+60.0	65.6	11 35.5	+60.0	65.8	12 00.0	+60.0	66.0	12
13	10 04.6	+59.6	64.7	10 30.2	+59.7	64.9	10 55.6	+59.8	65.0	11 20.8	+59.9	65.2	11 45.9	+59.9	65.4	12 10.8	+60.0	65.6	12 35.5	+60.0	65.8	13 00.0	+60.0	66.0	13
14	11 04.2	+59.7	64.6	11 29.9	+59.7	64.8	11 55.4	+59.8	65.0	12 20.7	+59.9	65.1	12 45.8	+60.0	65.3	13 10.8	+59.9	65.6	13 35.5	+60.0	65.8	14 00.0	+60.0	66.0	14
15	12 03.9	+59.6	64.5	12 29.6	+59.7	64.7	12 55.2	+59.8	64.9	13 20.6	+59.9	65.1	13 45.8	+59.9	65.3	14 10.7	+60.0	65.5	14 35.5	+60.0	65.8	15 00.0	+60.0	66.0	15
16	13 03.5	+59.6	64.4	13 29.3	+59.7	64.6	13 55.0	+59.8	64.8	14 20.5	+59.8	65.0	14 45.7	+59.9	65.2	15 10.7	+60.0	65.5	15 35.5	+60.0	65.7	16 00.0	+60.0	66.0	16
17	14 03.1	+59.6	64.2	14 29.0	+59.8	64.5	14 54.8	+59.8	64.7	15 20.3	+59.9	64.9	15 45.6	+59.9	65.2	16 10.7	+59.9	65.5	16 35.5	+60.0	65.7	17 00.0	+60.0	66.0	17
18	15 02.7	+59.6	64.1	15 28.8	+59.7	64.4	15 54.6	+59.8	64.6	16 20.2	+59.9	64.9	16 45.5	+60.0	65.1	17 10.6	+60.0	65.4	17 35.5	+59.9	65.7	18 00.0	+60.0	66.0	18
19	16 02.3	+59.6	64.0	16 28.5	+59.7	64.3	16 54.4	+59.8	64.5	17 20.1	+59.8	64.8	17 45.5	+59.9	65.1	18 10.6	+60.0	65.4	18 35.4	+60.0	65.7	19 00.0	+60.0	66.0	19
20	17 01.9	+59.6	63.9	17 28.2	+59.7	64.2	17 54.2	+59.8	64.4	18 19.9	+59.9	64.7	18 45.4	+59.9	65.0	19 10.6	+59.9	65.4	19 35.4	+60.0	65.7	20 00.0	+60.0	66.0	20
21	18 01.5	+59.5	63.8	18 27.9	+59.6	64.0	18 54.0	+59.8	64.4	19 19.8	+59.9	64.7	19 45.3	+59.9	65.0	20 10.5	+60.0	65.3	20 35.4	+60.0	65.7	21 00.0	+60.0	66.0	21
22	19 01.0	+59.6	63.6	19 27.5	+59.7	63.9	19 53.8	+59.7	64.3	20 19.7	+59.8	64.6	20 45.2	+60.0	64.9	21 10.5	+60.0	65.3	21 35.4	+60.0	65.6	22 00.0	+60.0	66.0	22
23	20 00.6	+59.6	63.5	20 27.2	+59.7	63.8	20 53.5	+59.8	64.2	21 19.5	+59.9	64.5	21 45.2	+59.9	64.9	22 10.5	+59.9	65.2	22 35.4	+60.0	65.6	23 00.0	+60.0	66.0	23
24	21 00.2	+59.6	63.4	21 26.9	+59.7	63.7	21 53.3	+59.8	64.1	22 19.4	+59.8	64.4	22 45.1	+59.9	64.8	23 10.4	+60.0	65.2	23 35.4	+60.0	65.6	24 00.0	+60.0	66.0	24
25	21 59.8	+59.5	63.2	22 26.6	+59.7	63.6	22 53.1	+59.8	64.0	23 19.2	+59.9	64.4	23 45.0	+59.9	64.8	24 10.4	+60.0	65.2	24 35.4	+60.0	65.6	25 00.0	+60.0	66.0	25
26	22 59.3	+59.6	63.1	23 26.3	+59.7	63.5	23 52.9	+59.7	63.9	24 19.1	+59.8	64.3	24 44.9	+59.9	64.7	25 10.4	+59.9	65.1	25 35.4	+60.0	65.6	26 00.0	+60.0	66.0	26
27	23 58.9	+59.5	63.0	24 26.0	+59.6	63.4	24 52.6	+59.8	63.8	25 18.9	+59.9	64.2	25 44.8	+59.9	64.6	26 10.3	+60.0	65.1	26 35.4	+60.0	65.5	27 00.0	+60.0	66.0	27
28	24 58.4	+59.6	62.8	25 25.6	+59.7	63.3	25 52.4	+59.8	63.7	26 18.8	+59.8	64.1	26 44.7	+60.0	64.6	27 10.3	+59.9	65.0	27 35.4	+60.0	65.5	28 00.0	+60.0	66.0	28
29	25 58.0	+59.5	62.7	26 25.3	+59.6	63.2	26 52.2	+59.7	63.6	27 18.6	+59.9	64.1	27 44.7	+59.9	64.5	28 10.2	+60.0	65.0	28 35.4	+59.9	65.5	29 00.0	+60.0	66.0	29
30	26 57.5	+59.5	62.6	27 24.9	+59.7	63.0	27 51.9	+59.8	63.5	28 18.5	+59.8	64.0	28 44.6	+59.9	64.5	29 10.2	+60.0	65.0	29 35.3	+60.0	65.5	30 00.0	+60.0	66.0	30
31	27 57.0	+59.6	62.4	28 24.6	+59.6	62.9	28 51.7	+59.7	63.4	29 18.3	+59.9	63.9	29 44.5	+59.9	64.4	30 10.2	+59.9	64.9	30 35.3	+60.0	65.5	31 00.0	+60.0	66.0	31
32	28 56.6	+59.5	62.3	29 24.2	+59.7	62.8	29 51.4	+59.8	63.3	30 18.2	+59.8	63.8	30 44.4	+59.9	64.3	31 10.1	+60.0	64.9	31 35.3	+60.0	65.4	32 00.0	+60.0	66.0	32
33	29 56.1	+59.5	62.1	30 23.9	+59.6	62.7	30 51.2	+59.7	63.2	31 18.0	+59.8	63.7	31 44.3	+59.9	64.3	32 10.1	+59.9	64.8	32 35.3	+60.0	65.4	33 00.0	+60.0	66.0	33
34	30 55.6	+59.4	62.0	31 23.5	+59.6	62.5	31 50.9	+59.7	63.1	32 17.8	+59.9	63.6	32 44.2	+59.9	64.2	33 10.0	+60.0	64.8	33 35.3	+60.0	65.4	34 00.0	+60.0	66.0	34
35	31 55.0	+59.5	61.8	32 23.1	+59.6	62.4	32 50.6	+59.8	63.0	33 17.7	+59.8	63.5	33 44.1	+59.9	64.1	34 10.0	+59.9	64.7	34 35.3	+60.0	65.4	35 00.0	+60.0	66.0	35
36	32 54.5	+59.5	61.7	33 22.7	+59.6	62.3	33 50.4	+59.7	62.8	34 17.5	+59.8	63.5	34 44.0	+59.9	64.1	35 09.9	+60.0	64.7	35 35.3	+60.0	65.3	36 00.0	+60.0	66.0	36
37	33 54.0	+59.4	61.5	34 22.3	+59.6	62.1	34 50.1	+59.7	62.7	35 17.3	+59.8	63.4	35 43.9	+59.9	64.0	36 09.9	+59.9	64.7	36 35.3	+60.0	65.3	37 00.0	+60.0	66.0	37
38	34 53.4	+59.5	61.4	35 21.9	+59.6	62.0	35 49.8	+59.7	62.6	36 17.1	+59.8	63.3	36 43.8	+59.9	63.9	37 09.8	+60.0	64.6	37 35.3	+59.9	65.3	38 00.0	+60.0	66.0	38
39	35 52.9	+59.4	61.2	36 21.5	+59.6	61.8	36 49.5	+59.7	62.5	37 16.9	+59.8	63.2	37 43.7	+59.9	63.8	38 09.8	+60.0	64.6	38 35.2	+60.0	65.3	39 00.0	+60.0	66.0	39
40	36 52.3	+59.4	61.0	37 21.1	+59.5	61.7	37 49.2	+59.7	62.4	38 16.7	+59.8	63.1	38 43.6	+59.9	63.8	39 09.8	+59.9	64.5	39 35.2	+60.0	65.2	40 00.0	+60.0	66.0	40
41	37 51.7	+59.4	60.8	38 20.6	+59.6	61.5	38 48.9	+59.7	62.2	39 16.5	+59.8	63.0	39 43.5	+59.8	63.7	40 09.7	+59.9	64.4	40 35.2	+60.0	65.2	41 00.0	+60.0	66.0	41
42	38 51.1	+59.4	60.7	39 20.2	+59.5	61.4	39 48.6	+59.7	62.1	40 16.3	+59.8	62.8	40 43.3	+59.9	63.6	41 09.6	+60.0	64.4	41 35.2	+60.0	65.2	42 00.0	+60.0	66.0	42
43	39 50.5	+59.3	60.5	40 19.7	+59.5	61.2	40 48.3	+59.6	62.0	41 16.1	+59.8	62.7	41 43.2	+59.9	63.5	42 09.6	+59.9	64.3	42 35.2	+60.0	65.2	43 00.0	+60.0	66.0	43
44	40 49.8	+59.4	60.3	41 19.2	+59.5	61.0	41 47.9	+59.7	61.8	42 15.9	+59.8	62.6	42 43.1	+59.9	63.4	43 09.5	+60.0	64.3	43 35.2	+60.0	65.1	44 00.0	+60.0	66.0	44
45	41 49.2	+59.3	60.1	42 18.7	+59.5	60.9	42 47.6	+59.6	61.7	43 15.7	+59.7	62.5	43 43.0	+59.8	63.3	44 09.5	+59.9	64.2	44 35.2	+59.9	65.1	45 00.0	+60.0	66.0	45
46	42 48.5	+59.3	59.9	43 18.2	+59.5	60.7	43 47.2	+59.6	61.5	44 15.4	+59.8	62.4	44 42.8	+59.9	63.3	45 09.4	+60.0	64.1	45 35.1	+60.0	65.1	46 00.0	+60.0	66.0	46
47	43 47.8	+59.2	59.7	44 17.7	+59.4	60.5	44 46.8	+59.7	61.4	45 15.2	+59.7	62.3	45 42.7	+59.9	63.2	46 09.4	+59.9	64.1	46 35.1	+60.0	65.0	47 00.0	+60.0	66.0	47
48	44 47.0	+59.3	59.5	45 17.1	+59.5	60.3	45 46.5	+59.6	61.2	46 14.9	+59.8	62.1	46 42.6	+59.8	63.1	47 09.3	+59.9	64.0	47 35.1	+60.0	65.0	48 00.0	+60.0	66.0	48
49	45 46.3	+59.2	59.2	46 16.6	+59.4	60.1	46 46.1	+59.5	61.0	47 14.7	+59.7	62.0	47 42.4	+59.8	63.0	48 09.2	+60.0	63.9	48 35.1	+60.0	65.0	49 00.0	+60.0	66.0	49
50	46 45.5	+59.2	59.0	47 16.0	+59.4	59.9	47 45.6	+59.6	60.9	48 14.4	+59.7	61.8	48 42.2	+59.9	62.8	49 09.2	+59.9	63.9	49 35.1	+60.0	64.9	50 00.0	+60.0	66.0	50
51	47 44.7	+59.2	58.8	48 15.4	+59.4	59.7	48 45.2	+59.6	60.7	49 14.1	+59.7	61.7	49 42.1	+59.8	62.7	50 09.1	+59.9	63.8	50 35.1	+59.9	64.9	51 00.0	+60.0	66.0	51
52	48 43.9	+59.1	58.5	49 14.8	+59.3	59.5	49 44.8	+59.5	60.5	50 13.8	+59.7	61.5	50 41.9	+59.8	62.6	51 09.0	+59.9	63.7	51 35.0	+60.0	64.8	52 00.0	+60.0	66.0	52
53	49 43.0	+59.1	58.2	50 14.1	+59.3	59.3	50 44.3	+59.5	60.3	51 13.5	+59.7	61.4	51 41.7	+59.9	62.5	52 08.9	+59.9	63.6	52 35.0	+60.0	64.8	53 00.0	+60.0	66.0	53
54	50 42.1	+59.0	58.0	51 13.4	+59.3	59.0	51 43.8	+59.5	60.1	52 13.2	+59.7	61.2	52 41.6	+59.8	62.4	53 08.8	+60.0	63.5	53 35.0	+60.0	64.8	54 00.0	+60.0	66.0	54
55	51 41.1	+59.0	57.7	52 12.7	+59.2	58.8	52 43.3	+59.5	59.9	53 12.9	+59.6	61.0	53 41.4	+59.8	62.2	54 08.8	+59.9	63.5	54 35.0	+60.0	64.7	55 00.0	+60.0	66.0	55
56	52 40.1	+59.0	57.4	53 11.9	+59.3	58.5	53 42.8	+59.4	59.7	54 12.5	+59.7	60.9	54 41.2	+59.8	62.1	55 08.7	+59.9	63.4	55 35.0	+59.9	64.7	56 00.0	+60.0	66.0	56
57	53 39.1	+58.9	57.1	54 11.2	+59.1	58.2	54 42.2	+59.4	59.4	55 12.2	+59.6	60.7	55 41.0	+59.7	61.9	56 08.6	+59.9	63.3	56 34.9	+60.0	64.6	57 00.0	+60.0	66.0	57
58	54 38.0	+58.8	56.8	55 10.3	+59.2	58.0	55 41.6	+59.4	59.2	56 11.8	+59.6	60.5	56 40.7	+59.8	61.8	57 08.5	+59.9	63.2	57 34.9	+60.0	64.6	58 00.0	+60.0	66.0	58
59	55 36.8	+58.8	56.4	56 09.5	+59.1	57.7	56 41.0	+59.3	58.9	57 11.4	+59.5	60.3	57 40.5	+59.8	61.6	58 08.4	+59.8	63.0	58 34.9	+59.9	64.5	59 00.0	+60.0	66.0	59
60	56 35.6	+58.7	56.1	57 08.6	+59.0	57.3	57 40.3	+59.4	58.7	58 10.9	+59.6	60.0	58 40.3	+59.7	61.5	59 08.2	+59.9	62.9	59 34.8	+60.0	64.4	60 00.0	+60.0	66.0	60
61	57 34.3	+58.7	55.7	58 07.6	+59.0	57.0	58 39.7	+59.2	58.4	59 10.5	+59.5	59.8	59 40.0	+59.7	61.3	60 08.1	+59.9	62.8	60 34.8	+60.0	64.4	61 00.0	+60.0	66.0	61
62	58 33.0	+58.6	55.3	59 06.6	+58.9	56.7	59 38.9	+59.3	58.1	60 10.0	+59.5	59.6	60 39.7	+59.7	61.1	61 08.0	+59.9	62.7	61 34.8	+60.0	64.3	62 00.0	+60.0	66.0	62
63	59 31.6	+58.5	54.9	60 05.5	+58.9	56.3	60 38.2	+59.1	57.8	61 09.5	+59.5	59.3	61 39.4	+59.7	60.9	62 07.9	+59.8	62.5	62 34.8	+59.9	64.2	63 00.0	+60.0	66.0	63
64	60 30.1	+58.4	54.4	61 04.4	+58.7	55.9	61 37.3	+59.2	57.4	62 09.0	+59.4	59.0	62 39.1	+59.7	60.7	63 07.7	+59.9	62.4	63 34.7	+60.0	64.2	64 00.0	+60.0	66.0	64
65	61 28.5	+58.3	53.9	62 03.1	+58.7	55.5	62 36.5	+59.0	57.1	63 08.4	+59.3	58.7	63 38.8	+59.6	60.4	64 07.6	+59.8	62.2	64 34.7	+59.9	64.1	65 00.0	+60.0	66.0	65
66	62 26.8	+58.1	53.4	63 01.8	+58.6	55.0	63 35.5	+59.0	56.7	64 07.7	+59.4	58.4	64 38.4	+59.6	60.2	65 07.4	+59.8	62.0	65 34.6	+60.0	64.0	66 00.0	+60.0	66.0	66
67	63 24.9	+58.1	52.9	64 00.4	+58.5	54.5	64 34.5	+58.9	56.2	65 07.1	+59.3	58.0	65 38.0	+59.6	59.9	66 07.2	+59.8	61.9	66 34.6	+59.9	63.9	67 00.0	+60.0	66.0	67
68	64 23.0	+57.9	52.3	64 58.9	+58.4	54.0	65 33.4	+58.9	55.8	66 06.4	+59.2	57.7	66 37.6	+59.5	59.6	67 07.0	+59.8	61.7	67 34.5	+60.0	63.8	68 00.0	+60.0	66.0	68
69	65 20.9	+57.7	51.7	65 57.3	+58.3	53.5	66 32.3	+58.7	55.3	67 05.6	+59.1	57.3	67 37.1	+59.5	59.3	68 06.8	+59.8	61.4	68 34.5	+59.9	63.7	69 00.0	+60.0	66.0	69
70	66 18.6	+57.6	51.0	66 55.6	+58.1	52.9	67 31.0	+58.6	54.8	68 04.7	+59.1	56.8	68 36.6	+59.5	59.0	69 06.6	+59.7	61.2	69 34.4	+60.0	63.5	70 00.0	+60.0	66.0	70
71	67 16.2	+57.3	50.3	67 53.7	+58.0	52.2	68 29.6	+58.5	54.2	69 03.8	+59.0	56.3	69 36.1	+59.4	58.6	70 06.3	+59.8	60.9	70 34.4	+59.9	63.4	71 00.0	+60.0	66.0	71
72	68 13.5	+57.1	49.6	68 51.7	+57.7	51.5	69 28.1	+58.4	53.6	70 02.8	+58.9	55.8	70 35.5	+59.4	58.2	71 06.1	+59.6	60.6	71 34.3	+59.9	63.3	72 00.0	+60.0	66.0	72
73	69 10.6	+56.9	48.7	69 49.4	+57.6	50.7	70 26.5	+58.2	52.9	71 01.7	+58.8	55.2	71 34.9	+59.2	57.7	72 05.7	+59.7	60.3	72 34.2	+59.9	63.1	73 00.0	+60.0	66.0	73
74	70 07.5	+56.5	47.8	70 47.0	+57.2	49.9	71 24.7	+58.0	52.2	72 00.5	+58.6	54.6	72 34.1	+59.2	57.2	73 05.4	+59.6	60.0	73 34.1	+59.9	62.9	74 00.0	+60.0	66.0	74
75	71 04.0	+56.2	46.8	71 44.2	+57.0	49.0	72 22.7	+57.8	51.4	72 59.1	+58.5	53.9	73 33.3	+59.1	56.6	74 05.0	+59.6	59.6	74 34.0	+59.9	62.7	75 00.0	+60.0	66.0	75
76	72 00.2	+55.7	45.7	72 41.2	+56.7	48.0	73 20.5	+57.5	50.4	73 57.6	+58.3	53.1	74 32.4	+59.0	56.0	75 04.6	+59.5	59.1	75 33.9	+59.9	62.4	76 00.0	+60.0	66.0	76
77	72 55.9	+55.3	44.4	73 37.9	+56.2	46.8	74 18.0	+57.1	49.4	74 55.9	+58.0	52.2	75 31.4	+58.8	55.3	76 04.1	+59.4	58.6	76 33.8	+59.8	62.2	77 00.0	+60.0	66.0	77
78	73 51.2	+54.6	43.1	74 34.1	+55.8	45.5	75 15.1	+56.8	48.3	75 53.9	+57.8	51.2	76 30.2	+58.6	54.5	77 03.5	+59.4	58.0	77 33.6	+59.8	61.9	78 00.0	+60.0	66.0	78
79	74 45.8	+54.0	41.6	75 29.9	+55.1	44.1	76 11.9	+56.3	46.9	76 51.7	+57.4	50.1	77 28.8	+58.4	53.5	78 02.9	+59.2	57.3	78 33.4	+59.8	61.5	79 00.0	+60.0	66.0	79
80	75 39.8	+53.2	39.8	76 25.0	+54.4	42.5	77 08.2	+55.7	45.4	77 49.1	+56.9	48.7	78 27.2	+58.1	52.4	79 02.1	+59.1	56.5	79 33.2	+59.8	61.0	80 00.0	+60.0	66.0	80
81	76 33.0	+52.1	37.9	77 19.4	+53.6	40.6	78 03.9	+55.0	43.7	78 46.0	+56.4	47.2	79 25.3	+57.7	51.1	80 01.2	+58.8	55.5	80 33.0	+59.6	60.5	81 00.0	+60.0	66.0	81
82	77 25.1	+50.9	35.7	78 13.0	+52.4	38.5	78 58.9	+54.0	41.7	79 42.4	+55.7	45.4	80 23.0	+57.2	49.6	81 00.0	+58.6	54.4	81 32.6	+59.6	59.8	82 00.0	+60.0	66.0	82
83	78 16.0	+49.4	33.2	79 05.4	+51.1	36.0	79 52.9	+52.9	39.3	80 38.1	+54.6	43.2	81 20.2	+56.5	47.7	81 58.6	+58.2	52.9	82 32.2	+59.5	59.0	83 00.0	+60.0	66.0	83
84	79 05.4	+47.5 •	30.3	79 56.5	+49.3 •	33.1	80 45.8	+51.2	36.5	81 32.7	+53.4	40.5	82 16.7	+55.6	45.3	82 56.8	+57.6	51.0	83 31.7	+59.3	57.9	84 00.0	+60.0	66.0	84
85	79 52.9	+45.2 •	27.0	80 45.8	+46.9 •	29.7	81 37.0	+49.1 •	33.1	82 26.1	+51.4 •	37.2	83 12.3	+54.0	42.3	83 54.4	+56.7	48.6	84 31.0	+59.0	56.4	85 00.0	+60.0	66.0	85
86	80 38.1	+42.1 •	23.1	81 32.7	+44.0 •	25.7	82 26.1	+46.2 •	28.9	83 17.5	+48.8 •	33.1	84 06.3	+51.8 •	38.4	84 51.1	+55.2 •	45.3	85 30.0	+58.4	54.3	86 00.0	+60.0	66.0	86
87	81 20.2	+38.4 •	18.5	82 16.7	+40.1 •	20.8	83 12.3	+42.1 •	23.8	84 06.3	+44.8 •	27.7	84 58.1	+48.2 •	33.0	85 46.3	+52.4 •	40.4	86 28.4	+57.1 •	51.0	87 00.0	+60.0	66.0	87
88	81 58.6	+33.6 •	13.2	82 56.8	+34.9 •	15.0	83 54.4	+36.6 •	17.5	84 51.1	+38.9 •	20.8	85 46.3	+42.1 •	25.6	86 38.7	+46.8 •	33.0	87 25.5	+53.9 •	45.2	88 00.0	+60.0	66.0	88
89	82 32.2	+27.8 •	7.1	83 31.7	+28.3 •	8.1	84 31.0	+29.0 •	9.6	85 30.0	+30.0 •	11.7	86 28.4	+31.6 •	15.0	87 25.5	+34.5 •	20.8	88 19.4	+40.6 •	33.0	89 00.0	+60.0	66.0	89
90	83 00.0	+20.6 •	0.0	84 00.0	+20.0 •	0.0	85 00.0	+19.0 •	0.0	86 00.0	+17.6 •	0.0	87 00.0	+15.0 •	0.0	88 00.0	+9.8 •	0.0	89 00.0	−5.4 •	0.0	90 00.0	−60.0	33.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 114°, 246°

67°, 293° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 43.8	+59.6	112.8	2 20.4	+59.8	112.9	1 57.1	+59.8	112.9	1 33.7	+59.9	112.9	1 10.3	+59.9	113.0	0 46.9	+59.9	113.0	0 23.4	+60.0	113.0	0 00.0	+60.0	113.0	0
1	3 43.4	+59.6	112.7	3 20.2	+59.7	112.8	2 56.9	+59.8	112.8	2 33.6	+59.9	112.9	2 10.2	+60.0	112.9	1 46.8	+60.0	113.0	1 23.4	+60.0	113.0	1 00.0	+60.0	113.0	1
2	4 43.0	+59.6	112.6	4 19.9	+59.7	112.7	3 56.7	+59.8	112.8	3 33.5	+59.8	112.8	3 10.2	+59.9	112.9	2 46.8	+60.0	112.9	2 23.4	+60.0	113.0	2 00.0	+60.0	113.0	2
3	5 42.6	+59.6	112.5	5 19.6	+59.7	112.6	4 56.5	+59.8	112.7	4 33.3	+59.9	112.8	4 10.1	+59.9	112.8	3 46.8	+60.0	112.9	3 23.4	+60.0	112.9	3 00.0	+60.0	113.0	3
4	6 42.2	+59.7	112.4	6 19.3	+59.7	112.5	5 56.3	+59.8	112.6	5 33.2	+59.9	112.7	5 10.0	+60.0	112.8	4 46.8	+59.9	112.9	4 23.4	+60.0	112.9	4 00.0	+60.0	113.0	4
5	7 41.9	+59.6	112.3	7 19.0	+59.8	112.4	6 56.1	+59.8	112.5	6 33.1	+59.9	112.6	6 10.0	+59.9	112.7	5 46.7	+60.0	112.8	5 23.4	+60.0	112.9	5 00.0	+60.0	113.0	5
6	8 41.5	+59.6	112.2	8 18.8	+59.7	112.3	7 55.9	+59.8	112.4	7 33.0	+59.8	112.6	7 09.9	+59.9	112.7	6 46.7	+60.0	112.8	6 23.4	+60.0	112.9	6 00.0	+60.0	113.0	6
7	9 41.1	+59.6	112.1	9 18.5	+59.7	112.2	8 55.7	+59.8	112.4	8 32.8	+59.9	112.5	8 09.8	+59.9	112.6	7 46.7	+59.9	112.8	7 23.4	+60.0	112.9	7 00.0	+60.0	113.0	7
8	10 40.7	+59.6	111.9	10 18.2	+59.7	112.1	9 55.5	+59.8	112.3	9 32.7	+59.9	112.4	9 09.7	+60.0	112.6	8 46.6	+60.0	112.7	8 23.4	+60.0	112.9	8 00.0	+60.0	113.0	8
9	11 40.3	+59.6	111.8	11 17.9	+59.7	112.0	10 55.3	+59.8	112.2	10 32.6	+59.9	112.4	10 09.7	+59.9	112.5	9 46.6	+60.0	112.7	9 23.4	+60.0	112.9	9 00.0	+60.0	113.0	9
10	12 39.9	+59.6	111.7	12 17.6	+59.7	111.9	11 55.1	+59.8	112.1	11 32.5	+59.8	112.3	11 09.6	+59.9	112.5	10 46.6	+59.9	112.7	10 23.4	+60.0	112.8	10 00.0	+60.0	113.0	10
11	13 39.5	+59.6	111.6	13 17.3	+59.7	111.8	12 54.9	+59.8	112.0	12 32.3	+59.9	112.2	12 09.5	+60.0	112.4	11 46.5	+60.0	112.6	11 23.4	+59.9	112.8	11 00.0	+60.0	113.0	11
12	14 39.1	+59.6	111.5	14 17.0	+59.7	111.7	13 54.7	+59.8	111.9	13 32.2	+59.9	112.2	13 09.5	+59.9	112.4	12 46.5	+60.0	112.6	12 23.3	+60.0	112.8	12 00.0	+60.0	113.0	12
13	15 38.7	+59.6	111.3	15 16.7	+59.7	111.6	14 54.5	+59.8	111.9	14 32.1	+59.8	112.1	14 09.4	+59.9	112.3	13 46.5	+59.9	112.6	13 23.3	+60.0	112.8	13 00.0	+60.0	113.0	13
14	16 38.3	+59.6	111.2	16 16.4	+59.7	111.5	15 54.3	+59.8	111.8	15 31.9	+59.9	112.0	15 09.3	+59.9	112.3	14 46.4	+60.0	112.5	14 23.3	+60.0	112.8	14 00.0	+60.0	113.0	14
15	17 37.9	+59.5	111.1	17 16.1	+59.7	111.4	16 54.1	+59.8	111.7	16 31.8	+59.9	112.0	16 09.2	+60.0	112.2	15 46.4	+60.0	112.5	15 23.3	+60.0	112.7	15 00.0	+60.0	113.0	15
16	18 37.4	+59.6	111.0	18 15.8	+59.7	111.3	17 53.9	+59.8	111.6	17 31.7	+59.8	111.9	17 09.2	+59.9	112.2	16 46.4	+59.9	112.5	16 23.3	+60.0	112.7	16 00.0	+60.0	113.0	16
17	19 37.0	+59.6	110.8	19 15.5	+59.7	111.2	18 53.7	+59.7	111.5	18 31.5	+59.9	111.8	18 09.1	+59.9	112.1	17 46.3	+60.0	112.4	17 23.3	+60.0	112.7	17 00.0	+60.0	113.0	17
18	20 36.6	+59.6	110.7	20 15.2	+59.7	111.1	19 53.4	+59.8	111.4	19 31.4	+59.8	111.7	19 09.0	+59.9	112.1	18 46.3	+60.0	112.4	18 23.3	+60.0	112.7	18 00.0	+60.0	113.0	18
19	21 36.2	+59.5	110.6	21 14.9	+59.6	111.0	20 53.2	+59.8	111.3	20 31.2	+59.9	111.7	20 08.9	+59.9	112.0	19 46.3	+59.9	112.4	19 23.3	+60.0	112.7	19 00.0	+60.0	113.0	19
20	22 35.7	+59.6	110.5	22 14.5	+59.7	110.8	21 53.0	+59.8	111.2	21 31.1	+59.9	111.6	21 08.8	+60.0	112.0	20 46.2	+60.0	112.3	20 23.3	+60.0	112.7	20 00.0	+60.0	113.0	20
21	23 35.3	+59.5	110.3	23 14.2	+59.7	110.7	22 52.8	+59.7	111.1	22 31.0	+59.8	111.5	22 08.8	+59.9	111.9	21 46.2	+60.0	112.3	21 23.3	+60.0	112.6	21 00.0	+60.0	113.0	21
22	24 34.8	+59.5	110.2	24 13.9	+59.6	110.6	23 52.5	+59.8	111.0	23 30.8	+59.9	111.4	23 08.7	+59.9	111.8	22 46.2	+59.9	112.2	22 23.3	+60.0	112.6	22 00.0	+60.0	113.0	22
23	25 34.3	+59.6	110.1	25 13.5	+59.7	110.5	24 52.3	+59.8	110.9	24 30.7	+59.8	111.4	24 08.6	+59.9	111.8	23 46.1	+60.0	112.2	23 23.3	+59.9	112.6	23 00.0	+60.0	113.0	23
24	26 33.9	+59.5	109.9	26 13.2	+59.7	110.4	25 52.1	+59.7	110.8	25 30.5	+59.9	111.3	25 08.5	+59.9	111.7	24 46.1	+59.9	112.2	24 23.2	+60.0	112.6	24 00.0	+60.0	113.0	24
25	27 33.4	+59.5	109.8	27 12.9	+59.6	110.3	26 51.8	+59.8	110.7	26 30.4	+59.8	111.2	26 08.4	+59.9	111.7	25 46.0	+60.0	112.1	25 23.2	+60.0	112.6	25 00.0	+60.0	113.0	25
26	28 32.9	+59.5	109.6	28 12.5	+59.6	110.1	27 51.6	+59.7	110.6	27 30.2	+59.8	111.1	27 08.3	+59.9	111.6	26 46.0	+60.0	112.1	26 23.2	+60.0	112.5	26 00.0	+60.0	113.0	26
27	29 32.4	+59.5	109.5	29 12.1	+59.7	110.0	28 51.3	+59.8	110.5	28 30.0	+59.9	111.0	28 08.2	+60.0	111.6	27 46.0	+59.9	112.0	27 23.2	+60.0	112.5	27 00.0	+60.0	113.0	27
28	30 31.9	+59.5	109.3	30 11.8	+59.6	109.9	29 51.1	+59.7	110.4	29 29.9	+59.8	111.0	29 08.2	+59.9	111.5	28 45.9	+60.0	112.0	28 23.2	+60.0	112.5	28 00.0	+60.0	113.0	28
29	31 31.4	+59.5	109.2	31 11.4	+59.6	109.8	30 50.8	+59.8	110.3	30 29.7	+59.8	110.9	30 08.1	+59.9	111.4	29 45.9	+59.9	112.0	29 23.2	+60.0	112.5	29 00.0	+60.0	113.0	29
30	32 30.9	+59.4	109.0	32 11.0	+59.6	109.6	31 50.6	+59.7	110.2	31 29.5	+59.9	110.8	31 08.0	+59.9	111.4	30 45.8	+60.0	111.9	30 23.2	+60.0	112.5	30 00.0	+60.0	113.0	30
31	33 30.3	+59.5	108.9	33 10.6	+59.6	109.5	32 50.3	+59.7	110.1	32 29.4	+59.8	110.7	32 07.9	+59.9	111.3	31 45.8	+60.0	111.9	31 23.2	+60.0	112.4	31 00.0	+60.0	113.0	31
32	34 29.8	+59.4	108.7	34 10.2	+59.6	109.4	33 50.0	+59.7	110.0	33 29.2	+59.8	110.6	33 07.8	+59.9	111.2	32 45.8	+59.9	111.8	32 23.2	+60.0	112.4	32 00.0	+60.0	113.0	32
33	35 29.2	+59.4	108.5	35 09.8	+59.6	109.2	34 49.7	+59.7	109.9	34 29.0	+59.8	110.5	34 07.7	+59.9	111.2	33 45.7	+60.0	111.8	33 23.2	+59.9	112.4	33 00.0	+60.0	113.0	33
34	36 28.6	+59.4	108.4	36 09.4	+59.5	109.1	35 49.4	+59.7	109.7	35 28.8	+59.8	110.4	35 07.6	+59.9	111.1	34 45.7	+59.9	111.7	34 23.1	+60.0	112.4	34 00.0	+60.0	113.0	34
35	37 28.0	+59.4	108.2	37 08.9	+59.6	108.9	36 49.1	+59.7	109.6	36 28.6	+59.9	110.3	36 07.5	+59.9	111.0	35 45.6	+60.0	111.7	35 23.1	+60.0	112.3	35 00.0	+60.0	113.0	35
36	38 27.4	+59.4	108.0	38 08.5	+59.5	108.8	37 48.8	+59.7	109.5	37 28.5	+59.8	110.2	37 07.4	+59.8	110.9	36 45.6	+59.9	111.6	36 23.1	+60.0	112.3	36 00.0	+60.0	113.0	36
37	39 26.8	+59.3	107.8	39 08.0	+59.6	108.6	38 48.5	+59.7	109.4	38 28.3	+59.7	110.1	38 07.2	+59.9	110.9	37 45.5	+60.0	111.6	37 23.1	+60.0	112.3	37 00.0	+60.0	113.0	37
38	40 26.1	+59.4	107.6	40 07.6	+59.5	108.4	39 48.2	+59.7	109.2	39 28.0	+59.8	110.0	39 07.1	+59.9	110.8	38 45.5	+59.9	111.5	38 23.1	+60.0	112.3	38 00.0	+60.0	113.0	38
39	41 25.5	+59.3	107.4	41 07.1	+59.5	108.3	40 47.9	+59.6	109.1	40 27.8	+59.8	109.9	40 07.0	+59.9	110.7	39 45.4	+60.0	111.5	39 23.1	+60.0	112.2	39 00.0	+60.0	113.0	39
40	42 24.8	+59.3	107.2	42 06.6	+59.5	108.1	41 47.5	+59.7	109.0	41 27.6	+59.8	109.8	41 06.9	+59.9	110.6	40 45.4	+59.9	111.4	40 23.1	+60.0	112.2	40 00.0	+60.0	113.0	40
41	43 24.1	+59.3	107.0	43 06.1	+59.4	107.9	42 47.2	+59.6	108.8	42 27.4	+59.8	109.7	42 06.8	+59.8	110.5	41 45.3	+60.0	111.4	41 23.1	+59.9	112.2	41 00.0	+60.0	113.0	41
42	44 23.4	+59.2	106.8	44 05.5	+59.5	107.7	43 46.8	+59.6	108.7	43 27.2	+59.7	109.6	43 06.6	+59.9	110.4	42 45.3	+59.9	111.3	42 23.0	+60.0	112.2	42 00.0	+60.0	113.0	42
43	45 22.6	+59.2	106.6	45 05.0	+59.4	107.5	44 46.4	+59.6	108.5	44 26.9	+59.8	109.4	44 06.5	+59.9	110.3	43 45.2	+59.9	111.2	43 23.0	+60.0	112.1	43 00.0	+60.0	113.0	43
44	46 21.8	+59.2	106.4	46 04.4	+59.4	107.4	45 46.0	+59.6	108.3	45 26.7	+59.7	109.3	45 06.4	+59.8	110.3	44 45.1	+60.0	111.2	44 23.0	+60.0	112.1	44 00.0	+60.0	113.0	44
45	47 21.0	+59.2	106.1	47 03.8	+59.4	107.1	46 45.6	+59.6	108.2	46 26.4	+59.8	109.2	46 06.2	+59.9	110.2	45 45.1	+59.9	111.1	45 23.0	+60.0	112.1	45 00.0	+60.0	113.0	45
46	48 20.2	+59.1	105.9	48 03.2	+59.4	106.9	47 45.2	+59.6	108.0	47 26.2	+59.7	109.0	47 06.1	+59.8	110.1	46 45.0	+59.9	111.1	46 23.0	+60.0	112.0	46 00.0	+60.0	113.0	46
47	49 19.3	+59.1	105.6	49 02.6	+59.3	106.7	48 44.8	+59.5	107.8	48 25.9	+59.7	108.9	48 05.9	+59.9	109.9	47 44.9	+60.0	111.0	47 23.0	+59.9	112.0	47 00.0	+60.0	113.0	47
48	50 18.4	+59.0	105.3	50 01.9	+59.3	106.5	49 44.3	+59.5	107.6	49 25.6	+59.7	108.7	49 05.8	+59.8	109.8	48 44.9	+59.9	110.9	48 22.9	+60.0	112.0	48 00.0	+60.0	113.0	48
49	51 17.4	+59.0	105.1	51 01.2	+59.3	106.3	50 43.8	+59.5	107.4	50 25.3	+59.7	108.6	50 05.6	+59.8	109.7	49 44.8	+59.9	110.8	49 22.9	+60.0	111.9	49 00.0	+60.0	113.0	49
50	52 16.4	+59.0	104.8	52 00.5	+59.2	106.0	51 43.3	+59.5	107.2	51 25.0	+59.7	108.4	51 05.4	+59.9	109.6	50 44.7	+60.0	110.8	50 22.9	+60.0	111.9	50 00.0	+60.0	113.0	50
51	53 15.4	+58.9	104.5	52 59.7	+59.3	105.7	52 42.8	+59.5	107.0	52 24.7	+59.6	108.3	52 05.3	+59.8	109.5	51 44.7	+59.9	110.7	51 22.9	+60.0	111.9	51 00.0	+60.0	113.0	51
52	54 14.3	+58.8	104.1	53 59.0	+59.1	105.5	53 42.3	+59.4	106.8	53 24.3	+59.7	108.1	53 05.1	+59.8	109.3	52 44.6	+59.9	110.6	52 22.9	+59.9	111.8	52 00.0	+60.0	113.0	52
53	55 13.1	+58.8	103.8	54 58.1	+59.2	105.2	54 41.7	+59.4	106.6	54 24.0	+59.6	107.9	54 04.9	+59.8	109.2	53 44.5	+59.9	110.5	53 22.8	+60.0	111.8	53 00.0	+60.0	113.0	53
54	56 11.9	+58.8	103.4	55 57.3	+59.0	104.9	55 41.1	+59.4	106.3	55 23.6	+59.6	107.7	55 04.7	+59.7	109.1	54 44.4	+59.9	110.4	54 22.8	+60.0	111.7	54 00.0	+60.0	113.0	54
55	57 10.7	+58.6	103.1	56 56.3	+59.1	104.6	56 40.5	+59.3	106.0	56 23.2	+59.6	107.5	56 04.4	+59.8	108.9	55 44.3	+59.9	110.3	55 22.8	+60.0	111.7	55 00.0	+60.0	113.0	55
56	58 09.3	+58.6	102.7	57 55.4	+59.0	104.2	57 39.8	+59.3	105.8	57 22.8	+59.5	107.3	57 04.2	+59.8	108.8	56 44.2	+59.9	110.2	56 22.8	+60.0	111.6	56 00.0	+60.0	113.0	56
57	59 07.9	+58.5	102.3	58 54.4	+58.9	103.9	58 39.1	+59.3	105.5	58 22.3	+59.6	107.1	58 04.0	+59.7	108.6	57 44.1	+59.9	110.1	57 22.8	+59.9	111.6	57 00.0	+60.0	113.0	57
58	60 06.4	+58.5	101.8	59 53.3	+58.8	103.5	59 38.4	+59.2	105.2	59 21.9	+59.5	106.8	59 03.7	+59.7	108.4	58 44.0	+59.9	110.0	58 22.7	+60.0	111.5	58 00.0	+60.0	113.0	58
59	61 04.9	+58.3	101.4	60 52.1	+58.8	103.1	60 37.6	+59.2	104.9	60 21.4	+59.4	106.6	60 03.4	+59.7	108.2	59 43.9	+59.8	109.9	59 22.7	+60.0	111.4	59 00.0	+60.0	113.0	59
60	62 03.2	+58.2	100.9	61 50.9	+58.7	102.7	61 36.8	+59.1	104.5	61 20.8	+59.5	106.3	61 03.1	+59.7	108.0	60 43.7	+59.9	109.7	60 22.7	+59.9	111.4	60 00.0	+60.0	113.0	60
61	63 01.4	+58.0	100.3	62 49.6	+58.6	102.3	62 35.9	+59.0	104.1	62 20.3	+59.4	106.0	62 02.8	+59.7	107.8	61 43.6	+59.9	109.6	61 22.6	+60.0	111.3	61 00.0	+60.0	113.0	61
62	63 59.4	+58.0	99.8	63 48.2	+58.5	101.8	63 34.9	+59.0	103.8	63 19.7	+59.4	105.7	63 02.5	+59.7	107.6	62 43.5	+59.8	109.4	62 22.6	+60.0	111.2	62 00.0	+60.0	113.0	62
63	64 57.4	+57.7	99.2	64 46.7	+58.4	101.3	64 33.9	+58.9	103.3	64 19.1	+59.3	105.4	64 02.2	+59.6	107.3	63 43.3	+59.8	109.3	63 22.6	+59.9	111.2	63 00.0	+60.0	113.0	63
64	65 55.1	+57.6	98.5	65 45.1	+58.3	100.7	65 32.8	+58.8	102.9	65 18.4	+59.2	105.0	65 01.8	+59.6	107.1	64 43.1	+59.9	109.1	64 22.5	+60.0	111.1	64 00.0	+60.0	113.0	64
65	66 52.7	+57.4	97.8	66 43.4	+58.1	100.1	66 31.6	+58.8	102.4	66 17.6	+59.2	104.6	66 01.4	+59.5	106.8	65 43.0	+59.8	108.9	65 22.5	+59.9	111.0	65 00.0	+60.0	113.0	65
66	67 50.1	+57.2	97.1	67 41.5	+57.9	99.5	67 30.4	+58.6	101.9	67 16.8	+59.2	104.2	67 00.9	+59.6	106.5	66 42.8	+59.8	108.7	66 22.4	+60.0	110.9	66 00.0	+60.0	113.0	66
67	68 47.3	+56.9	96.2	68 39.4	+57.8	98.8	68 29.0	+58.5	101.3	68 16.0	+59.0	103.8	68 00.5	+59.4	106.2	67 42.6	+59.7	108.5	67 22.4	+59.9	110.8	67 00.0	+60.0	113.0	67
68	69 44.2	+56.6	95.3	69 37.2	+57.6	98.0	69 27.5	+58.3	100.7	69 15.0	+59.0	103.3	68 59.9	+59.5	105.8	68 42.3	+59.8	108.3	68 22.3	+60.0	110.7	68 00.0	+60.0	113.0	68
69	70 40.8	+56.3	94.4	70 34.8	+57.3	97.2	70 25.8	+58.2	100.0	70 14.0	+58.8	102.7	69 59.4	+59.3	105.4	69 42.1	+59.7	108.0	69 22.3	+59.9	110.6	69 00.0	+60.0	113.0	69
70	71 37.1	+55.8	93.3	71 32.1	+57.0	96.3	71 24.0	+57.9	99.2	71 12.8	+58.7	102.1	70 58.7	+59.3	105.0	70 41.8	+59.7	107.7	70 22.2	+59.9	110.4	70 00.0	+60.0	113.0	70
71	72 32.9	+55.4	92.1	72 29.1	+56.6	95.3	72 21.9	+57.8	98.4	72 11.5	+58.6	101.5	71 58.0	+59.3	104.5	71 41.5	+59.7	107.4	71 22.1	+59.9	110.3	71 00.0	+60.0	113.0	71
72	73 28.3	+54.9	90.8	73 25.7	+56.3	94.2	73 19.7	+57.4	97.5	73 10.1	+58.4	100.8	72 57.3	+59.1	104.0	72 41.2	+59.6	107.1	72 22.0	+60.0	110.1	72 00.0	+60.0	113.0	72
73	74 23.2	+54.2	89.3	74 22.0	+55.8	92.9	74 17.1	+57.2	96.5	74 08.5	+58.3	100.0	73 56.4	+59.0	103.4	73 40.8	+59.6	106.7	73 22.0	+59.9	109.9	73 00.0	+60.0	113.0	73
74	75 17.4	+53.4	87.7	75 17.8	+55.2	91.5	75 14.3	+56.7	95.3	75 06.8	+57.9	99.0	74 55.4	+58.9	102.7	74 40.4	+59.5	106.3	74 21.9	+59.8	109.7	74 00.0	+60.0	113.0	74
75	76 10.8	+52.5	85.8	76 13.0	+54.5	89.9	76 11.0	+56.2	94.0	76 04.7	+57.7	98.0	75 54.3	+58.7	102.0	75 39.9	+59.5	105.8	75 21.7	+59.9	109.5	75 00.0	+60.0	113.0	75
76	77 03.3	+51.3	83.7	77 07.5	+53.7	88.1	77 07.2	+55.7	92.5	77 02.4	+57.3	96.8	76 53.0	+58.6	101.1	76 39.4	+59.4	105.2	76 21.6	+59.9	109.2	76 00.0	+60.0	113.0	76
77	77 54.6	+49.9	81.3	78 01.2	+52.6	86.0	78 02.9	+54.9	90.7	77 59.7	+56.8	95.4	77 51.6	+58.2	100.1	77 38.8	+59.2	104.6	77 21.5	+59.8	108.9	77 00.0	+60.0	113.0	77
78	78 44.5	+48.2	78.6	78 53.8	+51.2	83.6	78 57.8	+54.0	88.7	78 56.5	+56.2	93.8	78 49.8	+58.0	98.9	78 38.0	+59.1	103.8	78 21.3	+59.8	108.5	78 00.0	+60.0	113.0	78
79	79 32.7	+46.0 •	75.4	79 45.0	+49.6	80.8	79 51.8	+52.7	86.3	79 52.7	+55.4	91.9	79 47.8	+57.5	97.5	79 37.1	+59.0	102.9	79 21.1	+59.7	108.1	79 00.0	+60.0	113.0	79
80	80 18.7	+43.2 •	71.8	80 34.6	+47.3 •	77.5	80 44.5	+51.1	83.5	80 48.1	+54.4	89.6	80 45.3	+56.9	95.8	80 36.1	+58.7	101.8	80 20.8	+59.7	107.6	80 00.0	+60.0	113.0	80
81	81 01.9	+39.8 •	67.5	81 21.9	+44.6 •	73.6	81 35.6	+49.0 •	80.1	81 42.5	+52.9	86.9	81 42.2	+56.1	93.7	81 34.8	+58.3	100.5	81 20.5	+59.6	106.9	81 00.0	+60.0	113.0	81
82	81 41.7	+35.5 •	62.5	82 06.5	+40.7 •	68.9	82 24.6	+46.1 •	75.9	82 35.4	+50.9 •	83.4	82 38.3	+54.9	91.1	82 33.1	+57.9	98.8	82 20.1	+59.5	106.1	82 00.0	+60.0	113.0	82
83	82 17.2	+30.0 •	56.7	82 47.2	+35.9 •	63.3	83 10.7	+42.0 •	70.8	83 26.3	+48.0 •	79.0	83 33.2	+53.2 •	87.8	83 31.0	+57.0	96.6	83 19.6	+59.4	105.1	83 00.0	+60.0	113.0	83
84	82 47.2	+23.5 •	50.0	83 23.1	+29.6 •	56.6	83 52.7	+36.4 •	64.5	84 14.3	+43.7 •	73.4	84 26.4	+50.5 •	83.3	84 28.0	+55.9	93.6	84 19.0	+59.0	103.7	84 00.0	+60.0	113.0	84
85	83 10.7	+15.6 •	42.5	83 52.7	+21.6 •	48.8	84 29.1	+28.9 •	56.6	84 58.0	+37.2 •	66.1	85 16.9	+46.0 •	77.3	85 23.9	+53.7 •	89.5	85 18.0	+58.5	101.7	85 00.0	+60.0	113.0	85
86	83 26.3	+6.9 •	34.2	84 14.3	+12.1 •	39.8	84 58.0	+18.9 •	47.0	85 35.2	+27.7 •	56.6	86 02.9	+38.5 •	68.7	86 17.6	+49.5 •	83.3	86 16.5	+57.5	98.7	86 00.0	+60.0	113.0	86
87	83 33.2	−2.2 •	25.4	84 26.4	+1.6 •	29.8	85 16.9	+7.0 •	35.9	86 02.9	+14.7 •	44.4	86 41.4	+25.7 •	56.5	87 07.1	+40.5 •	73.3	87 14.0	+54.8 •	93.6	87 00.0	+60.0	113.0	87
88	83 31.0	−11.4 •	16.5	84 28.0	−9.0 •	19.5	85 23.9	−5.9 •	23.6	86 17.6	−1.1 •	29.8	87 07.1	+6.9 •	39.7	87 47.6	+21.2 •	56.5	88 08.8	+45.0 •	83.2	88 00.0	+60.0	113.0	88
89	83 19.6	−19.6 •	7.9	84 19.0	−19.0 •	9.3	85 18.0	−18.0 •	11.3	86 16.5	−16.5 •	14.3	87 14.0	−14.0 •	19.4	88 08.8	−8.8 •	29.8	88 53.8	+6.2 •	56.5	89 00.0	+60.0	113.0	89
90	83 00.0	−26.9 •	0.0	84 00.0	−27.4 •	0.0	85 00.0	−28.1 •	0.0	86 00.0	−29.2 •	0.0	87 00.0	−30.8 •	0.0	88 00.0	−33.7 •	0.0	89 00.0	−40.1 •	0.0	90 00.0	−60.0	56.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 67°, 293°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 43.8	−59.7	112.8	2 20.4	−59.7	112.9	1 57.1	−59.8	112.9	1 33.7	−59.9	112.9	1 10.3	−59.9	113.0	0 46.9	−60.0	113.0	0 23.4	−59.9	113.0	0 00.0	+60.0	67.0	0
1	1 44.1	−59.6	113.0	1 20.7	−59.7	113.0	0 57.3	−59.8	113.0	0 33.8	−59.8	113.0	0 10.4	−60.0	113.0	0 13.1	+60.0	67.0	0 36.5	+60.0	67.0	1 00.0	+60.0	67.0	1
2	0 44.5	−59.6	113.1	0 21.0	−59.7	113.1	0 02.5	+59.8	66.9	0 26.0	+59.9	66.9	0 49.6	+59.9	66.9	1 13.1	+59.9	66.9	1 36.5	+60.0	67.0	2 00.0	+60.0	67.0	2
3	0 15.1	+59.6	66.8	0 38.7	+59.7	66.8	1 02.3	+59.8	66.8	1 25.9	+59.9	66.9	1 49.5	+59.9	66.9	2 13.0	+60.0	66.9	2 36.5	+60.0	67.0	3 00.0	+60.0	67.0	3
4	1 14.7	+59.6	66.7	1 38.4	+59.8	66.7	2 02.1	+59.8	66.8	2 25.8	+59.9	66.8	2 49.4	+59.9	66.8	3 13.0	+60.0	66.9	3 36.5	+60.0	66.9	4 00.0	+60.0	67.0	4
5	2 14.3	+59.7	66.6	2 38.2	+59.7	66.6	3 01.9	+59.8	66.7	3 25.7	+59.8	66.7	3 49.3	+60.0	66.8	4 13.0	+59.9	66.9	4 36.5	+60.0	66.9	5 00.0	+60.0	67.0	5
6	3 14.0	+59.6	66.5	3 37.9	+59.7	66.5	4 01.7	+59.9	66.6	4 25.5	+59.9	66.7	4 49.3	+59.9	66.7	5 12.9	+60.0	66.8	5 36.5	+60.0	66.9	6 00.0	+60.0	67.0	6
7	4 13.6	+59.6	66.4	4 37.6	+59.7	66.4	5 01.6	+59.8	66.5	5 25.4	+59.9	66.6	5 49.2	+59.9	66.7	6 12.9	+60.0	66.8	6 36.5	+60.0	66.9	7 00.0	+60.0	67.0	7
8	5 13.2	+59.6	66.3	5 37.3	+59.7	66.3	6 01.4	+59.8	66.4	6 25.3	+59.9	66.5	6 49.1	+60.0	66.6	7 12.9	+59.9	66.8	7 36.5	+60.0	66.9	8 00.0	+60.0	67.0	8
9	6 12.8	+59.6	66.1	6 37.0	+59.8	66.2	7 01.2	+59.8	66.4	7 25.2	+59.8	66.5	7 49.1	+59.9	66.6	8 12.8	+60.0	66.7	8 36.5	+60.0	66.9	9 00.0	+60.0	67.0	9
10	7 12.4	+59.7	66.0	7 36.8	+59.7	66.1	8 01.0	+59.8	66.3	8 25.0	+59.9	66.4	8 49.0	+59.9	66.5	9 12.8	+60.0	66.7	9 36.5	+60.0	66.8	10 00.0	+60.0	67.0	10
11	8 12.1	+59.6	65.9	8 36.5	+59.7	66.0	9 00.8	+59.8	66.2	9 24.9	+59.9	66.3	9 48.9	+60.0	66.5	10 12.8	+59.9	66.7	10 36.5	+60.0	66.8	11 00.0	+60.0	67.0	11
12	9 11.7	+59.6	65.8	9 36.2	+59.7	65.9	10 00.6	+59.8	66.1	10 24.8	+59.9	66.3	10 48.9	+59.9	66.4	11 12.7	+60.0	66.6	11 36.5	+60.0	66.8	12 00.0	+60.0	67.0	12
13	10 11.3	+59.6	65.7	10 35.9	+59.7	65.9	11 00.4	+59.8	66.0	11 24.7	+59.8	66.2	11 48.8	+59.9	66.4	12 12.7	+60.0	66.6	12 36.5	+59.9	66.8	13 00.0	+60.0	67.0	13
14	11 10.9	+59.6	65.6	11 35.6	+59.7	65.8	12 00.2	+59.8	65.9	12 24.5	+59.9	66.1	12 48.7	+59.9	66.3	13 12.7	+59.9	66.6	13 36.4	+60.0	66.8	14 00.0	+60.0	67.0	14
15	12 10.5	+59.6	65.4	12 35.3	+59.7	65.6	13 00.0	+59.8	65.9	13 24.4	+59.9	66.1	13 48.6	+60.0	66.3	14 12.6	+60.0	66.5	14 36.4	+60.0	66.8	15 00.0	+60.0	67.0	15
16	13 10.1	+59.6	65.3	13 35.0	+59.7	65.5	13 59.8	+59.8	65.8	14 24.3	+59.8	66.0	14 48.6	+59.9	66.2	15 12.6	+60.0	66.5	15 36.4	+60.0	66.7	16 00.0	+60.0	67.0	16
17	14 09.7	+59.6	65.2	14 34.7	+59.7	65.4	14 59.6	+59.7	65.7	15 24.1	+59.9	65.9	15 48.5	+59.9	66.2	16 12.6	+59.9	66.5	16 36.4	+60.0	66.7	17 00.0	+60.0	67.0	17
18	15 09.3	+59.6	65.1	15 34.4	+59.7	65.3	15 59.3	+59.8	65.6	16 24.0	+59.9	65.9	16 48.4	+59.9	66.1	17 12.5	+60.0	66.4	17 36.4	+60.0	66.7	18 00.0	+60.0	67.0	18
19	16 08.9	+59.6	65.0	16 34.1	+59.7	65.2	16 59.1	+59.8	65.5	17 23.9	+59.8	65.8	17 48.3	+60.0	66.1	18 12.5	+60.0	66.4	18 36.4	+60.0	66.7	19 00.0	+60.0	67.0	19
20	17 08.5	+59.5	64.9	17 33.8	+59.7	65.1	17 58.9	+59.8	65.4	18 23.7	+59.9	65.7	18 48.3	+59.9	66.0	19 12.5	+59.9	66.3	19 36.4	+60.0	66.7	20 00.0	+60.0	67.0	20
21	18 08.0	+59.6	64.7	18 33.5	+59.7	65.0	18 58.7	+59.8	65.3	19 23.6	+59.9	65.7	19 48.2	+59.9	66.0	20 12.4	+60.0	66.3	20 36.4	+60.0	66.7	21 00.0	+60.0	67.0	21
22	19 07.6	+59.6	64.6	19 33.2	+59.7	64.9	19 58.5	+59.8	65.2	20 23.5	+59.8	65.6	20 48.1	+59.9	65.9	21 12.4	+60.0	66.3	21 36.4	+60.0	66.6	22 00.0	+60.0	67.0	22
23	20 07.2	+59.6	64.5	20 32.9	+59.7	64.8	20 58.3	+59.7	65.2	21 23.3	+59.9	65.5	21 48.0	+59.9	65.9	22 12.4	+59.9	66.2	22 36.4	+60.0	66.6	23 00.0	+60.0	67.0	23
24	21 06.8	+59.5	64.3	21 32.6	+59.6	64.7	21 58.0	+59.8	65.1	22 23.2	+59.8	65.4	22 47.9	+60.0	65.8	23 12.3	+60.0	66.2	23 36.4	+60.0	66.6	24 00.0	+60.0	67.0	24
25	22 06.3	+59.6	64.2	22 32.2	+59.7	64.6	22 57.8	+59.8	65.0	23 23.0	+59.9	65.4	23 47.9	+59.9	65.8	24 12.3	+60.0	66.2	24 36.4	+59.9	66.6	25 00.0	+60.0	67.0	25
26	23 05.9	+59.5	64.1	23 31.9	+59.7	64.5	23 57.6	+59.8	64.9	24 22.9	+59.8	65.3	24 47.8	+59.9	65.7	25 12.3	+59.9	66.1	25 36.3	+60.0	66.6	26 00.0	+60.0	67.0	26
27	24 05.4	+59.6	64.0	24 31.6	+59.6	64.4	24 57.4	+59.7	64.8	25 22.7	+59.9	65.2	25 47.7	+59.9	65.6	26 12.2	+60.0	66.1	26 36.3	+60.0	66.5	27 00.0	+60.0	67.0	27
28	25 05.0	+59.5	63.8	25 31.2	+59.7	64.2	25 57.1	+59.8	64.7	26 22.6	+59.8	65.1	26 47.6	+59.9	65.6	27 12.2	+59.9	66.0	27 36.3	+60.0	66.5	28 00.0	+60.0	67.0	28
29	26 04.5	+59.5	63.7	26 30.9	+59.6	64.1	26 56.9	+59.7	64.6	27 22.4	+59.9	65.0	27 47.5	+59.9	65.5	28 12.1	+60.0	66.0	28 36.3	+60.0	66.5	29 00.0	+60.0	67.0	29
30	27 04.0	+59.5	63.5	27 30.5	+59.7	64.0	27 56.6	+59.8	64.5	28 22.3	+59.8	65.0	28 47.4	+59.9	65.5	29 12.1	+60.0	66.0	29 36.3	+60.0	66.5	30 00.0	+60.0	67.0	30
31	28 03.5	+59.6	63.4	28 30.2	+59.6	63.9	28 56.4	+59.7	64.4	29 22.1	+59.8	64.9	29 47.3	+59.9	65.4	30 12.1	+59.9	65.9	30 36.3	+60.0	66.5	31 00.0	+60.0	67.0	31
32	29 03.1	+59.5	63.3	29 29.8	+59.7	63.8	29 56.1	+59.8	64.3	30 21.9	+59.9	64.8	30 47.2	+59.9	65.3	31 12.0	+60.0	65.9	31 36.3	+60.0	66.4	32 00.0	+60.0	67.0	32
33	30 02.6	+59.4	63.1	30 29.5	+59.6	63.6	30 55.9	+59.7	64.2	31 21.8	+59.8	64.7	31 47.1	+59.9	65.3	32 12.0	+59.9	65.8	32 36.3	+60.0	66.4	33 00.0	+60.0	67.0	33
34	31 02.0	+59.5	63.0	31 29.1	+59.6	63.5	31 55.6	+59.7	64.0	32 21.6	+59.8	64.6	32 47.0	+59.9	65.2	33 11.9	+60.0	65.8	33 36.3	+59.9	66.4	34 00.0	+60.0	67.0	34
35	32 01.5	+59.5	62.8	32 28.7	+59.6	63.4	32 55.3	+59.7	63.9	33 21.4	+59.8	64.5	33 46.9	+59.9	65.1	34 11.9	+59.9	65.7	34 36.2	+60.0	66.4	35 00.0	+60.0	67.0	35
36	33 01.0	+59.4	62.6	33 28.3	+59.6	63.2	33 55.0	+59.8	63.8	34 21.2	+59.8	64.4	34 46.8	+59.9	65.1	35 11.8	+60.0	65.7	35 36.2	+60.0	66.3	36 00.0	+60.0	67.0	36
37	34 00.4	+59.5	62.5	34 27.9	+59.6	63.1	34 54.8	+59.7	63.7	35 21.0	+59.9	64.3	35 46.7	+59.9	65.0	36 11.8	+59.9	65.6	36 36.2	+60.0	66.3	37 00.0	+60.0	67.0	37
38	34 59.9	+59.4	62.3	35 27.5	+59.5	62.9	35 54.5	+59.7	63.6	36 20.9	+59.8	64.2	36 46.6	+59.9	64.9	37 11.7	+60.0	65.6	37 36.2	+60.0	66.3	38 00.0	+60.0	67.0	38
39	35 59.3	+59.4	62.1	36 27.0	+59.6	62.8	36 54.2	+59.7	63.5	37 20.7	+59.8	64.1	37 46.5	+59.9	64.8	38 11.7	+59.9	65.5	38 36.2	+60.0	66.3	39 00.0	+60.0	67.0	39
40	36 58.7	+59.4	62.0	37 26.6	+59.6	62.6	37 53.9	+59.7	63.3	38 20.5	+59.8	64.0	38 46.4	+59.9	64.8	39 11.6	+60.0	65.5	39 36.2	+60.0	66.2	40 00.0	+60.0	67.0	40
41	37 58.1	+59.4	61.8	38 26.2	+59.5	62.5	38 53.6	+59.6	63.2	39 20.3	+59.8	63.9	39 46.3	+59.9	64.7	40 11.6	+59.9	65.4	40 36.2	+60.0	66.2	41 00.0	+60.0	67.0	41
42	38 57.5	+59.4	61.6	39 25.7	+59.5	62.3	39 53.2	+59.7	63.1	40 20.1	+59.7	63.8	40 46.2	+59.8	64.6	41 11.5	+60.0	65.4	41 36.2	+59.9	66.2	42 00.0	+60.0	67.0	42
43	39 56.9	+59.3	61.4	40 25.2	+59.5	62.2	40 52.9	+59.6	62.9	41 19.8	+59.8	63.7	41 46.0	+59.9	64.5	42 11.5	+59.9	65.3	42 36.1	+60.0	66.2	43 00.0	+60.0	67.0	43
44	40 56.2	+59.3	61.2	41 24.7	+59.5	62.0	41 52.5	+59.7	62.8	42 19.6	+59.8	63.6	42 45.9	+59.9	64.4	43 11.4	+60.0	65.3	43 36.1	+60.0	66.1	44 00.0	+60.0	67.0	44
45	41 55.5	+59.3	61.0	42 24.2	+59.5	61.8	42 52.2	+59.6	62.6	43 19.4	+59.7	63.5	43 45.8	+59.8	64.3	44 11.4	+59.9	65.2	44 36.1	+60.0	66.1	45 00.0	+60.0	67.0	45
46	42 54.8	+59.3	60.8	43 23.7	+59.5	61.6	43 51.8	+59.6	62.5	44 19.1	+59.8	63.3	44 45.6	+59.9	64.2	45 11.3	+59.9	65.1	45 36.1	+60.0	66.1	46 00.0	+60.0	67.0	46
47	43 54.1	+59.3	60.6	44 23.2	+59.4	61.5	44 51.4	+59.7	62.3	45 18.9	+59.7	63.2	45 45.5	+59.9	64.1	46 11.2	+60.0	65.1	46 36.1	+60.0	66.0	47 00.0	+60.0	67.0	47
48	44 53.4	+59.2	60.4	45 22.6	+59.4	61.3	45 51.1	+59.5	62.2	46 18.6	+59.8	63.1	46 45.4	+59.8	64.0	47 11.2	+59.9	65.0	47 36.1	+60.0	66.0	48 00.0	+60.0	67.0	48
49	45 52.6	+59.2	60.2	46 22.0	+59.5	61.1	46 50.6	+59.6	62.0	47 18.4	+59.7	63.0	47 45.2	+59.9	63.9	48 11.1	+59.9	64.9	48 36.1	+59.9	66.0	49 00.0	+60.0	67.0	49
50	46 51.8	+59.2	59.9	47 21.5	+59.3	60.9	47 50.2	+59.6	61.8	48 18.1	+59.7	62.8	48 45.1	+59.8	63.8	49 11.0	+60.0	64.9	49 36.0	+60.0	65.9	50 00.0	+60.0	67.0	50
51	47 51.0	+59.1	59.7	48 20.8	+59.4	60.6	48 49.8	+59.5	61.6	49 17.8	+59.7	62.7	49 44.9	+59.8	63.7	50 11.0	+59.9	64.8	50 36.0	+60.0	65.9	51 00.0	+60.0	67.0	51
52	48 50.1	+59.1	59.4	49 20.2	+59.3	60.4	49 49.3	+59.6	61.5	50 17.5	+59.7	62.5	50 44.7	+59.8	63.6	51 10.9	+59.9	64.7	51 36.0	+60.0	65.8	52 00.0	+60.0	67.0	52
53	49 49.2	+59.1	59.2	50 19.5	+59.3	60.2	50 48.9	+59.5	61.3	51 17.2	+59.7	62.3	51 44.5	+59.9	63.5	52 10.8	+59.9	64.6	52 36.0	+60.0	65.8	53 00.0	+60.0	67.0	53
54	50 48.3	+59.0	58.9	51 18.8	+59.3	60.0	51 48.4	+59.4	61.0	52 16.9	+59.6	62.2	52 44.4	+59.8	63.3	53 10.7	+59.9	64.5	53 36.0	+59.9	65.7	54 00.0	+60.0	67.0	54
55	51 47.3	+59.0	58.6	52 18.1	+59.2	59.7	52 47.8	+59.5	60.8	53 16.5	+59.7	62.0	53 44.2	+59.8	63.2	54 10.6	+59.9	64.4	54 35.9	+60.0	65.7	55 00.0	+60.0	67.0	55
56	52 46.3	+58.9	58.3	53 17.3	+59.2	59.4	53 47.3	+59.4	60.6	54 16.2	+59.6	61.8	54 44.0	+59.7	63.1	55 10.5	+59.9	64.3	55 35.9	+60.0	65.7	56 00.0	+60.0	67.0	56
57	53 45.2	+58.9	58.0	54 16.5	+59.2	59.2	54 46.7	+59.4	60.4	55 15.8	+59.6	61.6	55 43.7	+59.8	62.9	56 10.4	+59.9	64.2	56 35.9	+60.0	65.6	57 00.0	+60.0	67.0	57
58	54 44.1	+58.8	57.7	55 15.7	+59.1	58.9	55 46.1	+59.4	60.1	56 15.4	+59.6	61.4	56 43.5	+59.8	62.8	57 10.3	+59.9	64.1	57 35.9	+59.9	65.5	58 00.0	+60.0	67.0	58
59	55 42.9	+58.8	57.3	56 14.8	+59.1	58.6	56 45.5	+59.3	59.9	57 15.0	+59.6	61.2	57 43.3	+59.7	62.6	58 10.2	+59.9	64.0	58 35.8	+60.0	65.5	59 00.0	+60.0	67.0	59
60	56 41.7	+58.7	57.0	57 13.9	+59.0	58.2	57 44.8	+59.3	59.6	58 14.6	+59.5	61.0	58 43.0	+59.8	62.4	59 10.1	+59.9	63.9	59 35.8	+60.0	65.4	60 00.0	+60.0	67.0	60
61	57 40.4	+58.6	56.6	58 12.9	+58.9	57.9	58 44.1	+59.3	59.3	59 14.1	+59.5	60.7	59 42.8	+59.7	62.2	60 10.0	+59.9	63.8	60 35.8	+59.9	65.4	61 00.0	+60.0	67.0	61
62	58 39.0	+58.6	56.2	59 11.8	+58.9	57.6	59 43.4	+59.2	59.0	60 13.6	+59.5	60.5	60 42.5	+59.7	62.0	61 09.9	+59.8	63.6	61 35.7	+60.0	65.3	62 00.0	+60.0	67.0	62
63	59 37.6	+58.4	55.7	60 10.7	+58.9	57.2	60 42.6	+59.2	58.7	61 13.1	+59.5	60.2	61 42.2	+59.7	61.8	62 09.7	+59.9	63.5	62 35.7	+60.0	65.2	63 00.0	+60.0	67.0	63
64	60 36.0	+58.4	55.3	61 09.6	+58.7	56.8	61 41.8	+59.1	58.3	62 12.6	+59.4	59.9	62 41.9	+59.6	61.6	63 09.6	+59.8	63.3	63 35.7	+59.9	65.1	64 00.0	+60.0	67.0	64
65	61 34.4	+58.3	54.8	62 08.3	+58.7	56.3	62 40.9	+59.0	58.0	63 12.0	+59.3	59.6	63 41.5	+59.6	61.4	64 09.4	+59.9	63.2	64 35.6	+60.0	65.1	65 00.0	+60.0	67.0	65
66	62 32.7	+58.1	54.3	63 07.0	+58.6	55.9	63 39.9	+59.0	57.6	64 11.3	+59.4	59.3	64 41.1	+59.6	61.1	65 09.3	+59.8	63.0	65 35.6	+59.9	65.0	66 00.0	+60.0	67.0	66
67	63 30.8	+58.0	53.8	64 05.6	+58.4	55.4	64 38.9	+58.9	57.1	65 10.7	+59.2	59.0	65 40.7	+59.6	60.8	66 09.1	+59.8	62.8	66 35.5	+60.0	64.9	67 00.0	+60.0	67.0	67
68	64 28.8	+57.9	53.2	65 04.0	+58.4	54.9	65 37.8	+58.8	56.7	66 09.9	+59.2	58.6	66 40.3	+59.6	60.6	67 08.9	+59.8	62.6	67 35.5	+59.9	64.8	68 00.0	+60.0	67.0	68
69	65 26.7	+57.6	52.5	66 02.4	+58.2	54.3	66 36.6	+58.7	56.2	67 09.1	+59.2	58.2	67 39.9	+59.4	60.2	68 08.7	+59.7	62.4	68 35.4	+60.0	64.6	69 00.0	+60.0	67.0	69
70	66 24.3	+57.5	51.9	67 00.6	+58.1	53.7	67 35.3	+58.6	55.7	68 08.3	+59.0	57.7	68 39.3	+59.5	59.9	69 08.4	+59.8	62.1	69 35.4	+59.9	64.5	70 00.0	+60.0	67.0	70
71	67 21.8	+57.3	51.1	67 58.7	+57.9	53.1	68 33.9	+58.5	55.1	69 07.3	+59.0	57.2	69 38.8	+59.4	59.5	70 08.2	+59.7	61.9	70 35.3	+59.9	64.4	71 00.0	+60.0	67.0	71
72	68 19.1	+57.1	50.3	68 56.6	+57.7	52.3	69 32.4	+58.3	54.5	70 06.3	+58.9	56.7	70 38.2	+59.3	59.1	71 07.9	+59.7	61.6	71 35.2	+59.9	64.2	72 00.0	+60.0	67.0	72
73	69 16.2	+56.7	49.5	69 54.3	+57.5	51.6	70 30.7	+58.1	53.8	71 05.2	+58.7	56.1	71 37.5	+59.3	58.6	72 07.6	+59.6	61.3	72 35.1	+59.9	64.1	73 00.0	+60.0	67.0	73
74	70 12.9	+56.5	48.6	70 51.8	+57.2	50.7	71 28.8	+58.0	53.0	72 03.9	+58.6	55.5	72 36.8	+59.1	58.1	73 07.2	+59.6	60.9	73 35.0	+59.9	63.9	74 00.0	+60.0	67.0	74
75	71 09.4	+56.0	47.5	71 49.0	+56.9	49.8	72 26.8	+57.7	52.2	73 02.5	+58.5	54.8	73 35.9	+59.1	57.5	74 06.8	+59.6	60.5	74 34.9	+59.9	63.7	75 00.0	+60.0	67.0	75
76	72 05.4	+55.7	46.4	72 45.9	+56.6	48.7	73 24.5	+57.4	51.2	74 01.0	+58.2	54.0	74 35.0	+58.9	56.9	75 06.4	+59.5	60.0	75 34.8	+59.9	63.4	76 00.0	+60.0	67.0	76
77	73 01.1	+55.1	45.2	73 42.5	+56.1	47.6	74 21.9	+57.1	50.2	74 59.2	+58.0	53.1	75 33.9	+58.8	56.2	76 05.9	+59.4	59.5	76 34.7	+59.8	63.1	77 00.0	+60.0	67.0	77
78	73 56.2	+54.5	43.8	74 38.6	+55.7	46.3	75 19.0	+56.7	49.0	75 57.2	+57.7	52.0	76 32.7	+58.6	55.3	77 05.3	+59.3	58.9	77 34.5	+59.9	62.8	78 00.0	+60.0	67.0	78
79	74 50.7	+53.8	42.2	75 34.3	+55.0	44.8	76 15.7	+56.3	47.7	76 54.9	+57.3	50.9	77 31.3	+58.4	54.4	78 04.6	+59.2	58.2	78 34.4	+59.7	62.4	79 00.0	+60.0	67.0	79
80	75 44.5	+53.0	40.5	76 29.3	+54.3	43.2	77 12.0	+55.6	46.2	77 52.2	+56.9	49.5	78 29.7	+58.1	53.3	79 03.8	+59.1	57.4	79 34.1	+59.8	62.0	80 00.0	+60.0	67.0	80
81	76 37.5	+51.9	38.5	77 23.6	+53.3	41.3	78 07.6	+54.8	44.4	78 49.1	+56.3	48.0	79 27.8	+57.6	51.9	80 02.9	+58.8	56.4	80 33.9	+59.7	61.4	81 00.0	+60.0	67.0	81
82	77 29.4	+50.7	36.3	78 16.9	+52.2	39.1	79 02.4	+53.9	42.4	79 45.4	+55.6	46.1	80 25.4	+57.2	50.4	81 01.7	+58.6	55.2	81 33.6	+59.5	60.8	82 00.0	+60.0	67.0	82
83	78 20.1	+49.0	33.7	79 09.1	+50.8	36.6	79 56.3	+52.6	39.9	80 41.0	+54.5	43.9	81 22.6	+56.4	48.4	82 00.3	+58.1	53.8	82 33.1	+59.5	59.9	83 00.0	+60.0	67.0	83
84	79 09.1	+47.2 •	30.7	79 59.9	+49.0 •	33.6	80 48.9	+51.0	37.1	81 35.5	+53.1	41.1	82 19.0	+55.4	46.0	82 58.4	+57.6	51.9	83 32.6	+59.3	58.8	84 00.0	+60.0	67.0	84
85	79 56.3	+44.7 •	27.3	80 48.9	+46.6 •	30.2	81 39.9	+48.7 •	33.6	82 28.6	+51.2 •	37.8	83 14.4	+53.9	43.0	83 56.0	+56.6	49.4	84 31.9	+58.9	57.3	85 00.0	+60.0	67.0	85
86	80 41.0	+41.6 •	23.4	81 35.5	+43.5 •	26.0	82 28.6	+45.8 •	29.4	83 19.8	+48.5 •	33.6	84 08.3	+51.5 •	39.0	84 52.6	+55.1 •	46.0	85 30.8	+58.4	55.2	86 00.0	+60.0	67.0	86
87	81 22.6	+37.7 •	18.7	82 19.0	+39.4 •	21.1	83 14.4	+41.6 •	24.2	84 08.3	+44.3 •	28.1	84 59.8	+47.9 •	33.5	85 47.7	+52.2 •	41.1	86 29.2	+57.1 •	51.8	87 00.0	+60.0	67.0	87
88	82 00.3	+32.8 •	13.4	82 58.4	+34.2 •	15.2	83 56.0	+35.9 •	17.7	84 52.6	+38.2 •	21.1	85 47.7	+41.5 •	26.0	86 39.9	+46.4 •	33.5	87 26.3	+53.6 •	46.0	88 00.0	+60.0	67.0	88
89	82 33.1	+26.9 •	7.1	83 32.6	+27.4 •	8.2	84 31.9	+28.1 •	9.7	85 30.8	+29.2 •	11.9	86 29.2	+30.8 •	15.2	87 26.3	+33.7 •	21.1	88 19.9	+40.1 •	33.5	89 00.0	+60.0	67.0	89
90	83 00.0	+19.6 •	0.0	84 00.0	+19.0 •	0.0	85 00.0	+18.0 •	0.0	86 00.0	+16.5 •	0.0	87 00.0	+14.0 •	0.0	88 00.0	+8.8 •	0.0	89 00.0	−6.2 •	0.0	90 00.0	−60.0	33.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 113°, 247°

68°, 292° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 37.0	+59.6	111.9	2 14.6	+59.8	111.9	1 52.3	+59.8	111.9	1 29.8	+59.9	112.0	1 07.4	+59.9	112.0	0 44.9	+60.0	112.0	0 22.5	+60.0	112.0	0 00.0	+60.0	112.0	**0**
1	3 36.6	+59.6	111.7	3 14.4	+59.7	111.8	2 52.1	+59.8	111.8	2 29.7	+59.9	111.9	2 07.3	+60.0	111.9	1 44.9	+60.0	112.0	1 22.5	+60.0	112.0	1 00.0	+60.0	112.0	**1**
2	4 36.2	+59.6	111.6	4 14.1	+59.7	111.7	3 51.9	+59.8	111.8	3 29.6	+59.9	111.8	3 07.3	+59.9	111.9	2 44.9	+60.0	111.9	2 22.5	+60.0	112.0	2 00.0	+60.0	112.0	**2**
3	5 35.8	+59.7	111.5	5 13.8	+59.7	111.6	4 51.7	+59.8	111.7	4 29.5	+59.8	111.8	4 07.2	+59.9	111.8	3 44.9	+59.9	111.9	3 22.5	+59.9	111.9	3 00.0	+60.0	112.0	**3**
4	6 35.5	+59.6	111.4	6 13.5	+59.7	111.5	5 51.5	+59.8	111.6	5 29.3	+59.9	111.7	5 07.1	+59.9	111.8	4 44.8	+60.0	111.9	4 22.4	+60.0	111.9	4 00.0	+60.0	112.0	**4**
5	7 35.1	+59.6	111.3	7 13.2	+59.7	111.4	6 51.3	+59.8	111.5	6 29.2	+59.9	111.6	6 07.0	+60.0	111.7	5 44.8	+60.0	111.8	5 22.4	+60.0	111.9	5 00.0	+60.0	112.0	**5**
6	8 34.7	+59.6	111.2	8 12.9	+59.7	111.3	7 51.1	+59.8	111.4	7 29.1	+59.9	111.6	7 07.0	+59.9	111.7	6 44.8	+59.9	111.8	6 22.4	+60.0	111.9	6 00.0	+60.0	112.0	**6**
7	9 34.3	+59.6	111.1	9 12.6	+59.8	111.2	8 50.9	+59.8	111.4	8 29.0	+59.8	111.5	8 06.9	+59.9	111.6	7 44.7	+60.0	111.8	7 22.4	+60.0	111.9	7 00.0	+60.0	112.0	**7**
8	10 33.9	+59.6	110.9	10 12.4	+59.7	111.1	9 50.7	+59.8	111.3	9 28.8	+59.9	111.4	9 06.8	+60.0	111.6	8 44.7	+60.0	111.7	8 22.4	+60.0	111.9	8 00.0	+60.0	112.0	**8**
9	11 33.5	+59.6	110.8	11 12.1	+59.7	111.0	10 50.5	+59.8	111.2	10 28.7	+59.9	111.4	10 06.8	+59.9	111.5	9 44.7	+59.9	111.7	9 22.4	+60.0	111.8	9 00.0	+60.0	112.0	**9**
10	12 33.1	+59.6	110.7	12 11.8	+59.7	110.9	11 50.3	+59.8	111.1	11 28.6	+59.8	111.3	11 06.7	+59.9	111.5	10 44.6	+60.0	111.7	10 22.4	+60.0	111.8	10 00.0	+60.0	112.0	**10**
11	13 32.7	+59.6	110.6	13 11.5	+59.7	110.8	12 50.1	+59.8	111.0	12 28.4	+59.9	111.2	12 06.6	+59.9	111.4	11 44.6	+60.0	111.6	11 22.4	+60.0	111.8	11 00.0	+60.0	112.0	**11**
12	14 32.3	+59.6	110.5	14 11.2	+59.7	110.7	13 49.9	+59.7	110.9	13 28.3	+59.9	111.2	13 06.5	+60.0	111.4	12 44.6	+59.9	111.6	12 22.4	+60.0	111.8	12 00.0	+60.0	112.0	**12**
13	15 31.9	+59.5	110.3	15 10.9	+59.7	110.6	14 49.6	+59.8	110.8	14 28.2	+59.8	111.1	14 06.5	+59.9	111.3	13 44.5	+60.0	111.6	13 22.4	+60.0	111.8	13 00.0	+60.0	112.0	**13**
14	16 31.4	+59.6	110.2	16 10.6	+59.7	110.5	15 49.4	+59.8	110.8	15 28.0	+59.9	111.0	15 06.4	+59.9	111.3	14 44.5	+60.0	111.5	14 22.4	+60.0	111.8	14 00.0	+60.0	112.0	**14**
15	17 31.0	+59.6	110.1	17 10.3	+59.6	110.4	16 49.2	+59.8	110.7	16 27.9	+59.9	111.0	16 06.3	+59.9	111.2	15 44.5	+59.9	111.5	15 22.4	+59.9	111.7	15 00.0	+60.0	112.0	**15**
16	18 30.6	+59.6	110.0	18 09.9	+59.7	110.3	17 49.0	+59.8	110.6	17 27.8	+59.8	110.9	17 06.2	+60.0	111.2	16 44.4	+60.0	111.5	16 22.3	+60.0	111.7	16 00.0	+60.0	112.0	**16**
17	19 30.2	+59.5	109.8	19 09.6	+59.7	110.2	18 48.8	+59.8	110.5	18 27.6	+59.9	110.8	18 06.2	+59.9	111.1	17 44.4	+60.0	111.4	17 22.3	+60.0	111.7	17 00.0	+60.0	112.0	**17**
18	20 29.7	+59.6	109.7	20 09.3	+59.7	110.1	19 48.6	+59.7	110.4	19 27.5	+59.8	110.7	19 06.1	+59.9	111.1	18 44.4	+59.9	111.4	18 22.3	+60.0	111.7	18 00.0	+60.0	112.0	**18**
19	21 29.3	+59.5	109.6	21 09.0	+59.7	110.0	20 48.3	+59.8	110.3	20 27.3	+59.9	110.7	20 06.0	+59.9	111.0	19 44.3	+60.0	111.3	19 22.3	+60.0	111.7	19 00.0	+60.0	112.0	**19**
20	22 28.8	+59.6	109.5	22 08.7	+59.6	109.8	21 48.1	+59.8	110.2	21 27.2	+59.9	110.6	21 05.9	+59.9	111.0	20 44.3	+60.0	111.3	20 22.3	+60.0	111.7	20 00.0	+60.0	112.0	**20**
21	23 28.4	+59.5	109.3	23 08.3	+59.7	109.7	22 47.9	+59.8	110.1	22 27.1	+59.8	110.5	22 05.8	+60.0	110.9	21 44.3	+59.9	111.3	21 22.3	+60.0	111.6	21 00.0	+60.0	112.0	**21**
22	24 27.9	+59.6	109.2	24 08.0	+59.7	109.6	23 47.7	+59.7	110.0	23 26.9	+59.9	110.4	23 05.8	+59.9	110.8	22 44.2	+60.0	111.2	22 22.3	+60.0	111.6	22 00.0	+60.0	112.0	**22**
23	25 27.5	+59.5	109.0	25 07.7	+59.6	109.5	24 47.4	+59.8	109.9	24 26.8	+59.8	110.4	24 05.7	+59.9	110.8	23 44.2	+59.9	111.2	23 22.3	+60.0	111.6	23 00.0	+60.0	112.0	**23**
24	26 27.0	+59.5	108.9	26 07.3	+59.7	109.4	25 47.2	+59.7	109.8	25 26.6	+59.8	110.3	25 05.6	+59.9	110.7	24 44.1	+60.0	111.2	24 22.3	+60.0	111.6	24 00.0	+60.0	112.0	**24**
25	27 26.5	+59.5	108.8	27 07.0	+59.6	109.3	26 46.9	+59.8	109.7	26 26.4	+59.9	110.2	26 05.5	+59.9	110.7	25 44.1	+60.0	111.1	25 22.3	+60.0	111.6	25 00.0	+60.0	112.0	**25**
26	28 26.0	+59.5	108.6	28 06.6	+59.6	109.1	27 46.7	+59.7	109.6	27 26.3	+59.8	110.1	27 05.4	+59.9	110.6	26 44.1	+59.9	111.1	26 22.3	+59.9	111.5	26 00.0	+60.0	112.0	**26**
27	29 25.5	+59.5	108.5	29 06.2	+59.7	109.0	28 46.4	+59.8	109.5	28 26.1	+59.9	110.0	28 05.3	+59.9	110.5	27 44.0	+60.0	111.0	27 22.2	+60.0	111.5	27 00.0	+60.0	112.0	**27**
28	30 25.0	+59.5	108.3	30 05.9	+59.6	108.9	29 46.2	+59.7	109.4	29 26.0	+59.8	110.0	29 05.2	+59.9	110.5	28 44.0	+59.9	111.0	28 22.2	+60.0	111.5	28 00.0	+60.0	112.0	**28**
29	31 24.5	+59.4	108.2	31 05.5	+59.6	108.7	30 45.9	+59.7	109.3	30 25.8	+59.8	109.9	30 05.1	+59.9	110.4	29 43.9	+60.0	111.0	29 22.2	+60.0	111.5	29 00.0	+60.0	112.0	**29**
30	32 23.9	+59.5	108.0	32 05.1	+59.6	108.6	31 45.6	+59.8	109.2	31 25.6	+59.8	109.8	31 05.0	+59.9	110.3	30 43.9	+60.0	110.9	30 22.2	+60.0	111.5	30 00.0	+60.0	112.0	**30**
31	33 23.4	+59.4	107.9	33 04.7	+59.6	108.5	32 45.4	+59.7	109.1	32 25.4	+59.9	109.7	32 04.9	+59.9	110.3	31 43.9	+59.9	110.9	31 22.2	+60.0	111.4	31 00.0	+60.0	112.0	**31**
32	34 22.8	+59.5	107.7	34 04.3	+59.6	108.3	33 45.1	+59.7	109.0	33 25.3	+59.8	109.6	33 04.8	+59.9	110.2	32 43.8	+60.0	110.8	32 22.2	+60.0	111.4	32 00.0	+60.0	112.0	**32**
33	35 22.3	+59.4	107.5	35 03.9	+59.5	108.2	34 44.8	+59.7	108.9	34 25.1	+59.8	109.5	34 04.7	+59.9	110.1	33 43.8	+59.9	110.8	33 22.2	+60.0	111.4	33 00.0	+60.0	112.0	**33**
34	36 21.7	+59.4	107.3	36 03.4	+59.6	108.0	35 44.5	+59.7	108.7	35 24.9	+59.8	109.4	35 04.6	+59.9	110.1	34 43.7	+60.0	110.7	34 22.2	+60.0	111.4	34 00.0	+60.0	112.0	**34**
35	37 21.1	+59.3	107.2	37 03.0	+59.5	107.9	36 44.2	+59.7	108.6	36 24.7	+59.8	109.3	36 04.5	+59.9	110.0	35 43.7	+59.9	110.7	35 22.2	+59.9	111.3	35 00.0	+60.0	112.0	**35**
36	38 20.4	+59.4	107.0	38 02.5	+59.6	107.7	37 43.9	+59.7	108.5	37 24.5	+59.8	109.2	37 04.4	+59.9	109.9	36 43.6	+60.0	110.6	36 22.1	+60.0	111.3	36 00.0	+60.0	112.0	**36**
37	39 19.8	+59.4	106.8	39 02.1	+59.5	107.6	38 43.6	+59.6	108.3	38 24.3	+59.8	109.1	38 04.3	+59.9	109.8	37 43.6	+59.9	110.6	37 22.1	+60.0	111.3	37 00.0	+60.0	112.0	**37**
38	40 19.2	+59.3	106.6	40 01.6	+59.5	107.4	39 43.2	+59.7	108.2	39 24.1	+59.8	109.0	39 04.2	+59.9	109.8	38 43.5	+60.0	110.5	38 22.1	+60.0	111.3	38 00.0	+60.0	112.0	**38**
39	41 18.5	+59.3	106.4	41 01.1	+59.5	107.3	40 42.9	+59.7	108.1	40 23.9	+59.8	108.9	40 04.1	+59.8	109.7	39 43.5	+59.9	110.5	39 22.1	+60.0	111.2	39 00.0	+60.0	112.0	**39**
40	42 17.8	+59.3	106.2	42 00.6	+59.5	107.1	41 42.6	+59.6	107.9	41 23.7	+59.7	108.8	41 03.9	+59.9	109.6	40 43.4	+60.0	110.4	40 22.1	+60.0	111.2	40 00.0	+60.0	112.0	**40**
41	43 17.1	+59.2	106.0	43 00.1	+59.5	106.9	42 42.2	+59.6	107.8	42 23.4	+59.8	108.7	42 03.8	+59.9	109.5	41 43.4	+59.9	110.4	41 22.1	+60.0	111.2	41 00.0	+60.0	112.0	**41**
42	44 16.3	+59.3	105.8	43 59.6	+59.4	106.7	43 41.8	+59.7	107.6	43 23.2	+59.8	108.5	43 03.7	+59.9	109.4	42 43.3	+59.9	110.3	42 22.1	+60.0	111.2	42 00.0	+60.0	112.0	**42**
43	45 15.6	+59.2	105.6	44 59.0	+59.4	106.5	44 41.5	+59.6	107.5	44 23.0	+59.7	108.4	44 03.6	+59.8	109.3	43 43.2	+60.0	110.2	43 22.1	+59.9	111.1	43 00.0	+60.0	112.0	**43**
44	46 14.8	+59.2	105.3	45 58.4	+59.4	106.3	45 41.1	+59.5	107.3	45 22.7	+59.8	108.3	45 03.4	+59.9	109.2	44 43.2	+59.9	110.2	44 22.0	+60.0	111.1	44 00.0	+60.0	112.0	**44**
45	47 14.0	+59.1	105.1	46 57.8	+59.4	106.1	46 40.6	+59.6	107.1	46 22.5	+59.7	108.1	46 03.3	+59.8	109.1	45 43.1	+60.0	110.1	45 22.0	+60.0	111.1	45 00.0	+60.0	112.0	**45**
46	48 13.1	+59.1	104.8	47 57.2	+59.4	105.9	47 40.2	+59.6	107.0	47 22.2	+59.7	108.0	47 03.1	+59.9	109.0	46 43.1	+59.9	110.0	46 22.0	+60.0	111.0	46 00.0	+60.0	112.0	**46**
47	49 12.2	+59.1	104.6	48 56.6	+59.3	105.7	48 39.8	+59.5	106.8	48 21.9	+59.7	107.9	48 03.0	+59.8	108.9	47 43.0	+59.9	110.0	47 22.0	+60.0	111.0	47 00.0	+60.0	112.0	**47**
48	50 11.3	+59.0	104.3	49 55.9	+59.3	105.5	49 39.3	+59.5	106.6	49 21.6	+59.7	107.7	49 02.8	+59.8	108.8	48 42.9	+59.9	109.9	48 22.0	+60.0	111.0	48 00.0	+60.0	112.0	**48**
49	51 10.3	+59.0	104.0	50 55.2	+59.3	105.2	50 38.8	+59.5	106.4	50 21.3	+59.7	107.6	50 02.6	+59.9	108.7	49 42.8	+60.0	109.8	49 22.0	+59.9	110.9	49 00.0	+60.0	112.0	**49**
50	52 09.3	+59.0	103.7	51 54.5	+59.2	105.0	51 38.3	+59.5	106.2	51 21.0	+59.7	107.4	51 02.5	+59.8	108.6	50 42.8	+59.9	109.7	50 21.9	+60.0	110.9	50 00.0	+60.0	112.0	**50**
51	53 08.3	+58.9	103.4	52 53.7	+59.2	104.7	52 37.8	+59.5	106.0	52 20.7	+59.6	107.2	52 02.3	+59.8	108.5	51 42.7	+59.9	109.7	51 21.9	+60.0	110.8	51 00.0	+60.0	112.0	**51**
52	54 07.2	+58.8	103.1	53 52.9	+59.2	104.4	53 37.3	+59.4	105.8	53 20.3	+59.7	107.1	53 02.1	+59.8	108.3	52 42.6	+59.9	109.6	52 21.9	+60.0	110.8	52 00.0	+60.0	112.0	**52**
53	55 06.0	+58.8	102.8	54 52.1	+59.1	104.2	54 36.7	+59.4	105.5	54 20.0	+59.6	106.9	54 01.9	+59.8	108.2	53 42.5	+59.9	109.5	53 21.9	+60.0	110.8	53 00.0	+60.0	112.0	**53**
54	56 04.8	+58.7	102.4	55 51.2	+59.1	103.9	55 36.1	+59.4	105.3	55 19.6	+59.6	106.7	55 01.7	+59.8	108.0	54 42.4	+59.9	109.4	54 21.9	+59.9	110.7	54 00.0	+60.0	112.0	**54**
55	57 03.5	+58.7	102.0	56 50.3	+59.0	103.5	56 35.5	+59.3	105.0	56 19.2	+59.6	106.5	56 01.5	+59.7	107.9	55 42.3	+59.9	109.3	55 21.8	+60.0	110.7	55 00.0	+60.0	112.0	**55**
56	58 02.2	+58.6	101.6	57 49.3	+59.0	103.2	57 34.8	+59.3	104.7	57 18.8	+59.5	106.3	57 01.2	+59.8	107.7	56 42.2	+59.9	109.2	56 21.8	+60.0	110.6	56 00.0	+60.0	112.0	**56**
57	59 00.8	+58.5	101.2	58 48.3	+58.9	102.9	58 34.1	+59.2	104.5	58 18.3	+59.5	106.0	58 01.0	+59.7	107.6	57 42.1	+59.9	109.1	57 21.8	+59.9	110.6	57 00.0	+60.0	112.0	**57**
58	59 59.3	+58.4	100.8	59 47.2	+58.8	102.5	59 33.3	+59.3	104.1	59 17.8	+59.6	105.8	59 00.7	+59.7	107.4	58 42.0	+59.9	109.0	58 21.7	+60.0	110.5	58 00.0	+60.0	112.0	**58**
59	60 57.7	+58.3	100.3	60 46.0	+58.8	102.1	60 32.6	+59.1	103.8	60 17.4	+59.4	105.5	60 00.4	+59.8	107.2	59 41.9	+59.9	108.8	59 21.7	+60.0	110.4	59 00.0	+60.0	112.0	**59**
60	61 56.0	+58.2	99.8	61 44.8	+58.7	101.7	61 31.7	+59.1	103.5	61 16.8	+59.5	105.3	61 00.2	+59.6	107.0	60 41.8	+59.8	108.7	60 21.7	+60.0	110.4	60 00.0	+60.0	112.0	**60**
61	62 54.2	+58.0	99.3	62 43.5	+58.6	101.2	62 30.8	+59.1	103.1	62 16.3	+59.4	105.0	61 59.8	+59.7	106.8	61 41.6	+59.9	108.6	61 21.7	+59.9	110.3	61 00.0	+60.0	112.0	**61**
62	63 52.2	+57.9	98.7	63 42.1	+58.5	100.7	63 29.9	+58.9	102.7	63 15.7	+59.3	104.7	62 59.5	+59.7	106.6	62 41.5	+59.8	108.4	62 21.6	+60.0	110.2	62 00.0	+60.0	112.0	**62**
63	64 50.1	+57.8	98.1	64 40.6	+58.3	100.2	64 28.8	+58.9	102.3	64 15.0	+59.3	104.3	63 59.2	+59.6	106.3	63 41.3	+59.9	108.3	63 21.6	+59.9	110.2	63 00.0	+60.0	112.0	**63**
64	65 47.9	+57.6	97.5	65 38.9	+58.3	99.7	65 27.7	+58.8	101.8	65 14.3	+59.3	104.0	64 58.8	+59.6	106.1	64 41.2	+59.8	108.1	64 21.5	+60.0	110.1	64 00.0	+60.0	112.0	**64**
65	66 45.5	+57.4	96.8	66 37.2	+58.1	99.1	66 26.5	+58.7	101.4	66 13.6	+59.2	103.6	65 58.4	+59.5	105.8	65 41.0	+59.8	107.9	65 21.5	+59.9	110.0	65 00.0	+60.0	112.0	**65**
66	67 42.9	+57.1	96.0	67 35.3	+57.9	98.5	67 25.2	+58.6	100.8	67 12.8	+59.1	103.2	66 57.9	+59.5	105.5	66 40.8	+59.8	107.7	66 21.4	+60.0	109.9	66 00.0	+60.0	112.0	**66**
67	68 40.0	+56.9	95.2	68 33.2	+57.8	97.8	68 23.8	+58.5	100.3	68 11.9	+59.0	102.7	67 57.4	+59.5	105.1	67 40.6	+59.7	107.5	67 21.4	+59.9	109.8	67 00.0	+60.0	112.0	**67**
68	69 36.9	+56.6	94.3	69 31.0	+57.5	97.0	69 22.3	+58.3	99.6	69 10.9	+59.0	102.2	68 56.9	+59.4	104.8	68 40.3	+59.8	107.3	68 21.3	+60.0	109.7	68 00.0	+60.0	112.0	**68**
69	70 33.5	+56.3	93.4	70 28.5	+57.3	96.2	70 20.6	+58.2	99.0	70 09.9	+58.8	101.7	69 56.3	+59.4	104.4	69 40.1	+59.7	107.0	69 21.3	+59.9	109.5	69 00.0	+60.0	112.0	**69**
70	71 29.8	+55.8	92.3	71 25.8	+57.0	95.3	71 18.8	+57.9	98.2	71 08.7	+58.7	101.1	70 55.7	+59.3	103.9	70 39.8	+59.7	106.7	70 21.2	+59.9	109.4	70 00.0	+60.0	112.0	**70**
71	72 25.6	+55.4	91.1	72 22.8	+56.7	94.3	72 16.7	+57.8	97.4	72 07.4	+58.6	100.5	71 55.0	+59.2	103.5	71 39.5	+59.7	106.4	71 21.1	+60.0	109.3	71 00.0	+60.0	112.0	**71**
72	73 21.0	+54.9	89.8	73 19.5	+56.3	93.1	73 14.5	+57.4	96.5	73 06.0	+58.4	99.7	72 54.2	+59.1	102.9	72 39.2	+59.6	106.1	72 21.1	+59.9	109.1	72 00.0	+60.0	112.0	**72**
73	74 15.9	+54.2	88.3	74 15.8	+55.7	91.9	74 11.9	+57.1	95.4	74 04.4	+58.2	98.9	73 53.3	+59.1	102.3	73 38.8	+59.6	105.7	73 21.0	+59.9	108.9	73 00.0	+60.0	112.0	**73**
74	75 10.1	+53.4	86.7	75 11.5	+55.3	90.5	75 09.0	+56.8	94.3	75 02.6	+58.0	98.0	74 52.4	+58.8	101.7	74 38.4	+59.5	105.2	74 20.9	+59.9	108.7	74 00.0	+60.0	112.0	**74**
75	76 03.5	+52.5	84.9	76 06.8	+54.5	88.9	76 05.8	+56.2	93.0	76 00.6	+57.6	97.0	75 51.2	+58.8	100.9	75 37.9	+59.5	104.8	75 20.8	+59.8	108.5	75 00.0	+60.0	112.0	**75**
76	76 56.0	+51.4	82.8	77 01.3	+53.6	87.1	77 02.0	+55.7	91.5	76 58.2	+57.3	95.8	76 50.0	+58.5	100.0	76 37.4	+59.3	104.2	76 20.6	+59.9	108.2	76 00.0	+60.0	112.0	**76**
77	77 47.4	+49.9	80.4	77 54.9	+52.7	85.1	77 57.7	+54.9	89.7	77 55.5	+56.8	94.4	77 48.5	+58.2	99.0	77 36.7	+59.3	103.5	77 20.5	+59.8	107.9	77 00.0	+60.0	112.0	**77**
78	78 37.3	+48.3	77.7	78 47.6	+51.3	82.7	78 52.6	+54.0	87.7	78 52.3	+56.2	92.8	78 46.7	+58.0	97.9	78 36.0	+59.1	102.8	78 20.3	+59.8	107.5	78 00.0	+60.0	112.0	**78**
79	79 25.6	*+46.1* •	74.6	79 38.9	+49.6	79.9	79 46.6	+52.7	85.4	79 48.5	+55.4	90.9	79 44.7	+57.4	96.5	79 35.1	+58.9	101.9	79 20.1	+59.7	107.1	79 00.0	+60.0	112.0	**79**
80	80 11.7	*+43.5* •	71.0	80 28.5	*+47.4* •	76.6	80 39.3	+51.2	82.6	80 43.9	+54.4	88.6	80 42.1	+57.0	94.8	80 34.0	+58.7	100.8	80 19.8	+59.7	106.6	80 00.0	+60.0	112.0	**80**
81	80 55.2	*+40.0* •	66.8	81 15.9	*+44.7* •	72.8	81 30.5	*+49.1* •	79.2	81 38.3	+53.0	85.9	81 39.1	+56.1	92.7	81 32.7	+58.3	99.4	81 19.5	+59.6	105.9	81 00.0	+60.0	112.0	**81**
82	81 35.2	*+35.9* •	61.9	82 00.6	*+41.0* •	68.2	82 19.6	*+46.1* •	75.1	82 31.3	*+50.9* •	82.5	82 35.2	+54.9	90.1	82 31.0	+57.9	97.7	82 19.1	+59.5	105.1	82 00.0	+60.0	112.0	**82**
83	82 11.1	*+30.5* •	56.2	82 41.6	*+36.3* •	62.7	83 05.7	*+42.3* •	70.0	83 22.2	*+48.1* •	78.2	83 30.1	*+53.2* •	86.8	83 28.9	+57.1	95.6	83 18.6	+59.3	104.1	83 00.0	+60.0	112.0	**83**
84	82 41.6	*+24.1* •	49.7	83 17.9	*+30.1* •	56.1	83 48.0	*+36.8* •	63.8	84 10.3	*+43.9* •	72.6	84 23.3	*+50.6* •	82.4	84 26.0	+55.8	92.6	84 17.9	+59.1	102.7	84 00.0	+60.0	112.0	**84**
85	83 05.7	*+16.5* •	42.2	83 48.0	*+22.3* •	48.4	84 24.8	*+29.4* •	56.1	84 54.2	*+37.5* •	65.4	85 13.9	*+46.1* •	76.4	85 21.8	*+53.7* •	88.5	85 17.0	+58.5	100.7	85 00.0	+60.0	112.0	**85**
86	83 22.2	*+7.9* •	34.1	84 10.3	*+13.0* •	39.6	84 54.2	*+19.7* •	46.7	85 31.7	*+28.3* •	56.1	86 00.0	*+38.8* •	68.0	86 15.5	*+49.6* •	82.3	86 15.5	+57.4	97.7	86 00.0	+60.0	112.0	**86**
87	83 30.1	*−1.2* •	25.4	84 23.3	*+2.7* •	29.8	85 13.9	*+7.9* •	35.7	86 00.0	*+15.5* •	44.1	86 38.8	*+26.3* •	56.0	87 05.1	*+40.7* •	72.5	87 12.9	*+54.8* •	92.6	87 00.0	+60.0	112.0	**87**
88	83 28.9	*−10.3* •	16.6	84 26.0	*−8.1* •	19.5	85 21.8	*−4.8* •	23.6	86 15.5	*0.0* •	29.7	87 05.1	*+7.8* •	39.5	87 45.8	*+21.9* •	56.0	88 07.7	*+45.2* •	82.3	88 00.0	+60.0	112.0	**88**
89	83 18.6	*−18.6* •	8.0	84 17.9	*−17.9* •	9.4	85 17.0	*−17.0* •	11.3	86 15.5	*−15.5* •	14.4	87 12.9	*−12.9* •	19.5	88 07.7	*−7.7* •	29.7	88 52.9	*+7.1* •	56.0	89 00.0	+60.0	112.0	**89**
90	83 00.0	*−25.9* •	0.0	84 00.0	*−26.5* •	0.0	85 00.0	*−27.2* •	0.0	86 00.0	*−28.3* •	0.0	87 00.0	*−30.0* •	0.0	88 00.0	*−32.9* •	0.0	89 00.0	*−39.5* •	0.0	90 00.0	−60.0	56.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 68°, 292°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 37.0	−59.6	111.9	2 14.6	−59.7	111.9	1 52.3	−59.8	111.9	1 29.8	−59.8	112.0	1 07.4	−59.9	112.0	0 44.9	−59.9	112.0	0 22.5	−60.0	112.0	0 00.0	+60.0	68.0	**0**
1	1 37.4	−59.6	112.0	1 14.9	−59.7	112.0	0 52.5	−59.8	112.0	0 30.0	−59.9	112.0	0 07.5	−60.0	112.0	0 15.0	+60.0	68.0	0 37.5	+60.0	68.0	1 00.0	+60.0	68.0	**1**
2	0 37.8	−59.6	112.1	0 15.2	−59.7	112.1	0 07.3	+59.9	67.9	0 29.9	+59.9	67.9	0 52.5	+59.9	67.9	1 15.0	+60.0	67.9	1 37.5	+60.0	68.0	2 00.0	+60.0	68.0	**2**
3	0 21.8	+59.7	67.8	0 44.5	+59.7	67.8	1 07.2	+59.8	67.8	1 29.8	+59.9	67.9	1 52.4	+59.9	67.9	2 15.0	+59.9	67.9	2 37.5	+60.0	68.0	3 00.0	+60.0	68.0	**3**
4	1 21.5	+59.6	67.7	1 44.2	+59.7	67.7	2 07.0	+59.8	67.8	2 29.7	+59.8	67.8	2 52.3	+59.9	67.8	3 14.9	+60.0	67.9	3 37.5	+60.0	67.9	4 00.0	+60.0	68.0	**4**
5	2 21.1	+59.6	67.6	2 43.9	+59.8	67.6	3 06.8	+59.8	67.7	3 29.5	+59.9	67.7	3 52.2	+60.0	67.8	4 14.9	+60.0	67.9	4 37.5	+60.0	67.9	5 00.0	+60.0	68.0	**5**
6	3 20.7	+59.6	67.5	3 43.7	+59.7	67.5	4 06.6	+59.8	67.6	4 29.4	+59.9	67.7	4 52.2	+59.9	67.7	5 14.9	+59.9	67.8	5 37.5	+60.0	67.9	6 00.0	+60.0	68.0	**6**
7	4 20.3	+59.6	67.4	4 43.4	+59.7	67.4	5 06.4	+59.8	67.5	5 29.3	+59.8	67.6	5 52.1	+59.9	67.7	6 14.8	+60.0	67.8	6 37.5	+60.0	67.9	7 00.0	+60.0	68.0	**7**
8	5 19.9	+59.6	67.2	5 43.1	+59.7	67.3	6 06.2	+59.8	67.4	6 29.1	+59.9	67.5	6 52.0	+60.0	67.6	7 14.8	+60.0	67.8	7 37.5	+60.0	67.9	8 00.0	+60.0	68.0	**8**
9	6 19.5	+59.6	67.1	6 42.8	+59.7	67.2	7 06.0	+59.8	67.3	7 29.0	+59.9	67.5	7 52.0	+59.9	67.6	8 14.8	+59.9	67.7	8 37.5	+59.9	67.9	9 00.0	+60.0	68.0	**9**
10	7 19.1	+59.7	67.0	7 42.5	+59.7	67.1	8 05.8	+59.8	67.3	8 28.9	+59.9	67.4	8 51.9	+59.9	67.5	9 14.7	+60.0	67.7	9 37.4	+60.0	67.8	10 00.0	+60.0	68.0	**10**
11	8 18.8	+59.6	66.9	8 42.2	+59.7	67.0	9 05.6	+59.8	67.2	9 28.8	+59.8	67.3	9 51.8	+59.9	67.5	10 14.7	+60.0	67.7	10 37.4	+60.0	67.8	11 00.0	+60.0	68.0	**11**
12	9 18.4	+59.6	66.8	9 41.9	+59.7	66.9	10 05.4	+59.8	67.1	10 28.6	+59.9	67.3	10 51.7	+60.0	67.4	11 14.7	+59.9	67.6	11 37.4	+60.0	67.8	12 00.0	+60.0	68.0	**12**
13	10 18.0	+59.6	66.7	10 41.6	+59.8	66.8	11 05.2	+59.8	67.0	11 28.5	+59.9	67.2	11 51.7	+59.9	67.4	12 14.6	+60.0	67.6	12 37.4	+60.0	67.8	13 00.0	+60.0	68.0	**13**
14	11 17.6	+59.6	66.5	11 41.4	+59.7	66.7	12 05.0	+59.8	66.9	12 28.4	+59.8	67.1	12 51.6	+59.9	67.3	13 14.6	+60.0	67.6	13 37.4	+60.0	67.8	14 00.0	+60.0	68.0	**14**
15	12 17.2	+59.6	66.4	12 41.1	+59.7	66.6	13 04.8	+59.7	66.8	13 28.2	+59.9	67.1	13 51.5	+59.9	67.3	14 14.6	+59.9	67.5	14 37.4	+60.0	67.8	15 00.0	+60.0	68.0	**15**
16	13 16.8	+59.6	66.3	13 40.8	+59.7	66.5	14 04.5	+59.8	66.8	14 28.1	+59.9	67.0	14 51.4	+60.0	67.2	15 14.5	+60.0	67.5	15 37.4	+60.0	67.7	16 00.0	+60.0	68.0	**16**
17	14 16.4	+59.5	66.2	14 40.5	+59.7	66.4	15 04.3	+59.8	66.7	15 28.0	+59.8	66.9	15 51.4	+59.9	67.2	16 14.5	+60.0	67.4	16 37.4	+60.0	67.7	17 00.0	+60.0	68.0	**17**
18	15 15.9	+59.6	66.1	15 40.2	+59.6	66.3	16 04.1	+59.8	66.6	16 27.8	+59.9	66.9	16 51.3	+59.9	67.1	17 14.5	+59.9	67.4	17 37.4	+60.0	67.7	18 00.0	+60.0	68.0	**18**
19	16 15.5	+59.6	66.0	16 39.8	+59.7	66.2	17 03.9	+59.8	66.5	17 27.7	+59.9	66.8	17 51.2	+59.9	67.1	18 14.4	+60.0	67.4	18 37.4	+60.0	67.7	19 00.0	+60.0	68.0	**19**
20	17 15.1	+59.6	65.8	17 39.5	+59.7	66.1	18 03.7	+59.8	66.4	18 27.6	+59.8	66.7	18 51.1	+60.0	67.0	19 14.4	+60.0	67.3	19 37.4	+60.0	67.7	20 00.0	+60.0	68.0	**20**
21	18 14.7	+59.6	65.7	18 39.2	+59.7	66.0	19 03.5	+59.8	66.3	19 27.4	+59.9	66.6	19 51.1	+59.9	67.0	20 14.4	+59.9	67.3	20 37.4	+59.9	67.6	21 00.0	+60.0	68.0	**21**
22	19 14.3	+59.5	65.6	19 38.9	+59.7	65.9	20 03.3	+59.7	66.2	20 27.3	+59.8	66.6	20 51.0	+59.9	66.9	21 14.3	+60.0	67.3	21 37.3	+60.0	67.6	22 00.0	+60.0	68.0	**22**
23	20 13.8	+59.6	65.4	20 38.6	+59.7	65.8	21 03.0	+59.8	66.1	21 27.1	+59.9	66.5	21 50.9	+59.9	66.9	22 14.3	+60.0	67.2	22 37.3	+60.0	67.6	23 00.0	+60.0	68.0	**23**
24	21 13.4	+59.5	65.3	21 38.3	+59.6	65.7	22 02.8	+59.8	66.0	22 27.0	+59.8	66.4	22 50.8	+59.9	66.8	23 14.3	+59.9	67.2	23 37.3	+60.0	67.6	24 00.0	+60.0	68.0	**24**
25	22 12.9	+59.6	65.2	22 37.9	+59.7	65.6	23 02.6	+59.7	65.9	23 26.8	+59.9	66.3	23 50.7	+59.9	66.7	24 14.2	+60.0	67.2	24 37.3	+60.0	67.6	25 00.0	+60.0	68.0	**25**
26	23 12.5	+59.5	65.1	23 37.6	+59.7	65.4	24 02.3	+59.8	65.9	24 26.7	+59.8	66.3	24 50.6	+60.0	66.7	25 14.2	+59.9	67.1	25 37.3	+60.0	67.6	26 00.0	+60.0	68.0	**26**
27	24 12.0	+59.6	64.9	24 37.3	+59.6	65.3	25 02.1	+59.8	65.8	25 26.5	+59.9	66.2	25 50.6	+59.9	66.6	26 14.1	+60.0	67.1	26 37.3	+60.0	67.5	27 00.0	+60.0	68.0	**27**
28	25 11.6	+59.5	64.8	25 36.9	+59.7	65.2	26 01.9	+59.7	65.7	26 26.4	+59.8	66.1	26 50.5	+59.9	66.6	27 14.1	+60.0	67.0	27 37.3	+60.0	67.5	28 00.0	+60.0	68.0	**28**
29	26 11.1	+59.5	64.6	26 36.6	+59.6	65.1	27 01.6	+59.8	65.6	27 26.2	+59.9	66.0	27 50.4	+59.9	66.5	28 14.1	+59.9	67.0	28 37.3	+60.0	67.5	29 00.0	+60.0	68.0	**29**
30	27 10.6	+59.5	64.5	27 36.2	+59.6	65.0	28 01.4	+59.7	65.5	28 26.1	+59.8	65.9	28 50.3	+59.9	66.4	29 14.0	+60.0	66.9	29 37.3	+60.0	67.5	30 00.0	+60.0	68.0	**30**
31	28 10.1	+59.5	64.4	28 35.8	+59.7	64.8	29 01.1	+59.8	65.3	29 25.9	+59.8	65.9	29 50.2	+59.9	66.4	30 14.0	+59.9	66.9	30 37.3	+59.9	67.4	31 00.0	+60.0	68.0	**31**
32	29 09.6	+59.5	64.2	29 35.5	+59.6	64.7	30 00.9	+59.7	65.2	30 25.7	+59.9	65.8	30 50.1	+59.9	66.3	31 13.9	+60.0	66.9	31 37.2	+60.0	67.4	32 00.0	+60.0	68.0	**32**
33	30 09.1	+59.5	64.1	30 35.1	+59.6	64.6	31 00.6	+59.7	65.1	31 25.6	+59.8	65.7	31 50.0	+59.9	66.2	32 13.9	+60.0	66.8	32 37.2	+60.0	67.4	33 00.0	+60.0	68.0	**33**
34	31 08.6	+59.5	63.9	31 34.7	+59.6	64.5	32 00.3	+59.7	65.0	32 25.4	+59.8	65.6	32 49.9	+59.9	66.2	33 13.9	+59.9	66.8	33 37.2	+60.0	67.4	34 00.0	+60.0	68.0	**34**
35	32 08.1	+59.4	63.8	32 34.3	+59.6	64.3	33 00.0	+59.8	64.9	33 25.2	+59.8	65.5	33 49.8	+59.9	66.1	34 13.8	+60.0	66.7	34 37.2	+60.0	67.4	35 00.0	+60.0	68.0	**35**
36	33 07.5	+59.5	63.6	33 33.9	+59.6	64.2	33 59.8	+59.7	64.8	34 25.0	+59.8	65.4	34 49.7	+59.9	66.0	35 13.8	+59.9	66.7	35 37.2	+60.0	67.3	36 00.0	+60.0	68.0	**36**
37	34 07.0	+59.4	63.4	34 33.5	+59.6	64.0	34 59.5	+59.7	64.7	35 24.8	+59.8	65.3	35 49.6	+59.9	66.0	36 13.7	+60.0	66.6	36 37.2	+60.0	67.3	37 00.0	+60.0	68.0	**37**
38	35 06.4	+59.4	63.3	35 33.1	+59.5	63.9	35 59.2	+59.7	64.5	36 24.6	+59.8	65.2	36 49.5	+59.9	65.9	37 13.7	+59.9	66.6	37 37.2	+60.0	67.3	38 00.0	+60.0	68.0	**38**
39	36 05.8	+59.4	63.1	36 32.6	+59.6	63.8	36 58.9	+59.7	64.4	37 24.4	+59.8	65.1	37 49.4	+59.9	65.8	38 13.6	+60.0	66.5	38 37.2	+59.9	67.3	39 00.0	+60.0	68.0	**39**
40	37 05.2	+59.4	62.9	37 32.2	+59.5	63.6	37 58.6	+59.6	64.3	38 24.2	+59.8	65.0	38 49.3	+59.8	65.7	39 13.6	+59.9	66.5	39 37.1	+60.0	67.2	40 00.0	+60.0	68.0	**40**
41	38 04.6	+59.4	62.7	38 31.7	+59.6	63.4	38 58.2	+59.7	64.2	39 24.0	+59.8	64.9	39 49.1	+59.9	65.7	40 13.5	+60.0	66.4	40 37.1	+60.0	67.2	41 00.0	+60.0	68.0	**41**
42	39 04.0	+59.3	62.6	39 31.3	+59.5	63.3	39 57.9	+59.7	64.0	40 23.8	+59.8	64.8	40 49.0	+59.9	65.6	41 13.5	+59.9	66.4	41 37.1	+60.0	67.2	42 00.0	+60.0	68.0	**42**
43	40 03.3	+59.3	62.4	40 30.8	+59.5	63.1	40 57.6	+59.6	63.9	41 23.6	+59.8	64.7	41 48.9	+59.9	65.5	42 13.4	+59.9	66.3	42 37.1	+60.0	67.1	43 00.0	+60.0	68.0	**43**
44	41 02.6	+59.4	62.2	41 30.3	+59.5	62.9	41 57.2	+59.7	63.7	42 23.4	+59.7	64.6	42 48.8	+59.8	65.4	43 13.3	+60.0	66.2	43 37.1	+60.0	67.1	44 00.0	+60.0	68.0	**44**
45	42 02.0	+59.3	62.0	42 29.8	+59.5	62.8	42 56.9	+59.6	63.6	43 23.1	+59.8	64.4	43 48.6	+59.9	65.3	44 13.3	+59.9	66.2	44 37.1	+60.0	67.1	45 00.0	+60.0	68.0	**45**
46	43 01.3	+59.2	61.8	43 29.3	+59.4	62.6	43 56.5	+59.6	63.4	44 22.9	+59.8	64.3	44 48.5	+59.8	65.2	45 13.2	+60.0	66.1	45 37.1	+59.9	67.0	46 00.0	+60.0	68.0	**46**
47	44 00.5	+59.3	61.5	44 28.7	+59.4	62.4	44 56.1	+59.6	63.3	45 22.7	+59.7	64.2	45 48.3	+59.9	65.1	46 13.2	+59.9	66.1	46 37.0	+60.0	67.0	47 00.0	+60.0	68.0	**47**
48	44 59.8	+59.2	61.3	45 28.1	+59.5	62.2	45 55.7	+59.6	63.1	46 22.4	+59.7	64.1	46 48.2	+59.8	65.0	47 13.1	+59.9	66.0	47 37.0	+60.0	67.0	48 00.0	+60.0	68.0	**48**
49	45 59.0	+59.2	61.1	46 27.6	+59.4	62.0	46 55.3	+59.6	63.0	47 22.1	+59.7	63.9	47 48.0	+59.9	64.9	48 13.0	+59.9	65.9	48 37.0	+60.0	66.9	49 00.0	+60.0	68.0	**49**
50	46 58.2	+59.1	60.9	47 27.0	+59.3	61.8	47 54.9	+59.5	62.8	48 21.8	+59.8	63.8	48 47.9	+59.8	64.8	49 12.9	+60.0	65.8	49 37.0	+60.0	66.9	50 00.0	+60.0	68.0	**50**
51	47 57.3	+59.1	60.6	48 26.3	+59.4	61.6	48 54.4	+59.5	62.6	49 21.6	+59.7	63.6	49 47.7	+59.8	64.7	50 12.9	+59.9	65.8	50 37.0	+60.0	66.9	51 00.0	+60.0	68.0	**51**
52	48 56.4	+59.1	60.3	49 25.7	+59.3	61.4	49 53.9	+59.6	62.4	50 21.3	+59.6	63.5	50 47.5	+59.9	64.6	51 12.8	+59.9	65.7	51 37.0	+59.9	66.8	52 00.0	+60.0	68.0	**52**
53	49 55.5	+59.1	60.1	50 25.0	+59.3	61.1	50 53.5	+59.5	62.2	51 20.9	+59.7	63.3	51 47.4	+59.8	64.4	52 12.7	+59.9	65.6	52 36.9	+60.0	66.8	53 00.0	+60.0	68.0	**53**
54	50 54.6	+59.0	59.8	51 24.3	+59.2	60.9	51 53.0	+59.4	62.0	52 20.6	+59.7	63.1	52 47.2	+59.8	64.3	53 12.6	+59.9	65.5	53 36.9	+60.0	66.7	54 00.0	+60.0	68.0	**54**
55	51 53.6	+58.9	59.5	52 23.5	+59.2	60.6	52 52.4	+59.5	61.8	53 20.3	+59.6	63.0	53 47.0	+59.8	64.2	54 12.5	+59.9	65.4	54 36.9	+60.0	66.7	55 00.0	+60.0	68.0	**55**
56	52 52.5	+59.0	59.2	53 22.7	+59.2	60.4	53 51.9	+59.4	61.5	54 19.9	+59.6	62.8	54 46.8	+59.7	64.0	55 12.4	+59.9	65.3	55 36.9	+59.9	66.6	56 00.0	+60.0	68.0	**56**
57	53 51.5	+58.8	58.9	54 21.9	+59.2	60.1	54 51.3	+59.4	61.3	55 19.5	+59.6	62.6	55 46.5	+59.8	63.9	56 12.3	+59.9	65.2	56 36.8	+60.0	66.6	57 00.0	+60.0	68.0	**57**
58	54 50.3	+58.8	58.6	55 21.1	+59.1	59.8	55 50.7	+59.3	61.1	56 19.1	+59.6	62.4	56 46.3	+59.8	63.7	57 12.2	+59.9	65.1	57 36.8	+60.0	66.5	58 00.0	+60.0	68.0	**58**
59	55 49.1	+58.8	58.2	56 20.2	+59.0	59.5	56 50.0	+59.4	60.8	57 18.7	+59.6	62.2	57 46.1	+59.7	63.6	58 12.1	+59.9	65.0	58 36.8	+60.0	66.5	59 00.0	+60.0	68.0	**59**
60	56 47.9	+58.6	57.8	57 19.2	+59.0	59.2	57 49.4	+59.3	60.5	58 18.3	+59.5	61.9	58 45.8	+59.8	63.4	59 12.0	+59.9	64.9	59 36.8	+59.9	66.4	60 00.0	+60.0	68.0	**60**
61	57 46.5	+58.6	57.5	58 18.2	+59.0	58.8	58 48.7	+59.2	60.2	59 17.8	+59.5	61.7	59 45.6	+59.7	63.2	60 11.9	+59.9	64.7	60 36.7	+60.0	66.4	61 00.0	+60.0	68.0	**61**
62	58 45.1	+58.6	57.0	59 17.2	+58.8	58.5	59 47.9	+59.2	59.9	60 17.3	+59.5	61.4	60 45.3	+59.7	63.0	61 11.8	+59.8	64.6	61 36.7	+60.0	66.3	62 00.0	+60.0	68.0	**62**
63	59 43.7	+58.4	56.6	60 16.0	+58.8	58.1	60 47.1	+59.1	59.6	61 16.8	+59.4	61.2	61 45.0	+59.6	62.8	62 11.6	+59.9	64.5	62 36.7	+59.9	66.2	63 00.0	+60.0	68.0	**63**
64	60 42.1	+58.3	56.2	61 14.8	+58.8	57.7	61 46.2	+59.1	59.2	62 16.2	+59.4	60.9	62 44.6	+59.7	62.6	63 11.5	+59.8	64.3	63 36.6	+60.0	66.1	64 00.0	+60.0	68.0	**64**
65	61 40.4	+58.2	55.7	62 13.6	+58.6	57.2	62 45.3	+59.1	58.9	63 15.6	+59.3	60.6	63 44.3	+59.6	62.3	64 11.3	+59.8	64.1	64 36.6	+59.9	66.0	65 00.0	+60.0	68.0	**65**
66	62 38.6	+58.1	55.2	63 12.2	+58.6	56.8	63 44.4	+58.9	58.5	64 14.9	+59.4	60.2	64 43.9	+59.6	62.1	65 11.1	+59.8	64.0	65 36.5	+60.0	66.0	66 00.0	+60.0	68.0	**66**
67	63 36.7	+58.0	54.6	64 10.8	+58.4	56.3	64 43.3	+58.9	58.0	65 14.3	+59.2	59.9	65 43.5	+59.6	61.8	66 10.9	+59.8	63.8	66 36.5	+59.9	65.9	67 00.0	+60.0	68.0	**67**
68	64 34.7	+57.8	54.0	65 09.2	+58.3	55.8	65 42.2	+58.8	57.6	66 13.5	+59.2	59.5	66 43.1	+59.5	61.5	67 10.7	+59.8	63.6	67 36.4	+60.0	65.7	68 00.0	+60.0	68.0	**68**
69	65 32.5	+57.6	53.4	66 07.5	+58.2	55.2	66 41.0	+58.7	57.1	67 12.7	+59.1	59.1	67 42.6	+59.5	61.2	68 10.5	+59.8	63.4	68 36.4	+59.9	65.6	69 00.0	+60.0	68.0	**69**
70	66 30.1	+57.5	52.7	67 05.7	+58.0	54.6	67 39.7	+58.5	56.5	68 11.8	+59.1	58.6	68 42.1	+59.4	60.8	69 10.3	+59.7	63.1	69 36.3	+59.9	65.5	70 00.0	+60.0	68.0	**70**
71	67 27.6	+57.2	51.9	68 03.7	+57.9	53.9	68 38.2	+58.5	56.0	69 10.9	+58.9	58.1	69 41.5	+59.4	60.4	70 10.0	+59.7	62.8	70 36.2	+60.0	65.4	71 00.0	+60.0	68.0	**71**
72	68 24.8	+56.9	51.1	69 01.6	+57.6	53.2	69 36.7	+58.2	55.3	70 09.8	+58.9	57.6	70 40.9	+59.3	60.0	71 09.7	+59.7	62.5	71 36.2	+59.9	65.2	72 00.0	+60.0	68.0	**72**
73	69 21.7	+56.7	50.3	69 59.2	+57.5	52.4	70 34.9	+58.1	54.6	71 08.7	+58.7	57.0	71 40.2	+59.3	59.5	72 09.4	+59.7	62.2	72 36.1	+59.9	65.0	73 00.0	+60.0	68.0	**73**
74	70 18.4	+56.4	49.3	70 56.7	+57.1	51.5	71 33.0	+57.9	53.9	72 07.4	+58.6	56.4	72 39.5	+59.1	59.0	73 09.1	+59.6	61.9	73 36.0	+59.9	64.8	74 00.0	+60.0	68.0	**74**
75	71 14.8	+56.0	48.3	71 53.8	+56.9	50.6	72 30.9	+57.7	53.0	73 06.0	+58.4	55.6	73 38.6	+59.1	58.4	74 08.7	+59.5	61.4	74 35.9	+59.9	64.6	75 00.0	+60.0	68.0	**75**
76	72 10.8	+55.5	47.1	72 50.7	+56.4	49.5	73 28.6	+57.4	52.1	74 04.4	+58.2	54.8	74 37.7	+58.9	57.8	75 08.2	+59.5	61.0	75 35.8	+59.8	64.4	76 00.0	+60.0	68.0	**76**
77	73 06.3	+55.0	45.9	73 47.1	+56.1	48.3	74 26.0	+57.0	51.0	75 02.6	+57.9	53.9	75 36.6	+58.7	57.1	76 07.7	+59.4	60.5	76 35.6	+59.9	64.1	77 00.0	+60.0	68.0	**77**
78	74 01.3	+54.4	44.4	74 43.2	+55.5	47.0	75 23.0	+56.6	49.8	76 00.5	+57.7	52.9	76 35.3	+58.6	56.2	77 07.1	+59.3	59.8	77 35.5	+59.8	63.8	78 00.0	+60.0	68.0	**78**
79	74 55.7	+53.6	42.9	75 38.7	+54.9	45.5	76 19.6	+56.2	48.5	76 58.2	+57.2	51.7	77 33.9	+58.3	55.2	78 06.4	+59.2	59.1	78 35.3	+59.8	63.4	79 00.0	+60.0	68.0	**79**
80	75 49.3	+52.8	41.1	76 33.6	+54.1	43.8	77 15.8	+55.4	46.9	77 55.4	+56.9	50.3	78 32.2	+58.0	54.1	79 05.6	+59.0	58.3	79 35.1	+59.7	62.9	80 00.0	+60.0	68.0	**80**
81	76 42.1	+51.7	39.1	77 27.7	+53.2	41.9	78 11.2	+54.7	45.1	78 52.3	+56.2	48.7	79 30.2	+57.7	52.8	80 04.6	+58.9	57.3	80 34.8	+59.7	62.4	81 00.0	+60.0	68.0	**81**
82	77 33.8	+50.4	36.8	78 20.9	+52.0	39.7	79 05.9	+53.8	43.0	79 48.5	+55.4	46.8	80 27.9	+57.0	51.2	81 03.5	+58.5	56.1	81 34.5	+59.6	61.7	82 00.0	+60.0	68.0	**82**
83	78 24.2	+48.7	34.2	79 12.9	+50.5	37.1	79 59.7	+52.4	40.6	80 43.9	+54.4	44.6	81 24.9	+56.4	49.2	82 02.0	+58.1	54.6	82 34.1	+59.4	60.9	83 00.0	+60.0	68.0	**83**
84	79 12.9	*+46.8* •	31.2	80 03.4	*+48.7* •	34.1	80 52.1	*+50.7* •	37.6	81 38.3	+52.9	41.8	82 21.3	+55.2	46.8	83 00.1	+57.5	52.7	83 33.5	+59.3	59.8	84 00.0	+60.0	68.0	**84**
85	79 59.7	*+44.2* •	27.7	80 52.1	*+46.2* •	30.6	81 42.8	*+48.4* •	34.1	82 31.2	*+51.0* •	38.4	83 16.5	+53.8	43.6	83 57.6	+56.5	50.2	84 32.8	+58.9	58.2	85 00.0	+60.0	68.0	**85**
86	80 43.9	*+41.0* •	23.7	81 38.3	*+43.0* •	26.4	82 31.2	*+45.3* •	29.8	83 22.2	*+48.1* •	34.1	84 10.3	*+51.3* •	39.6	84 54.1	*+55.0* •	46.7	85 31.7	+58.3	56.1	86 00.0	+60.0	68.0	**86**
87	81 24.9	*+37.1* •	19.0	82 21.3	*+38.8* •	21.4	83 16.5	*+41.1* •	24.5	84 10.3	*+43.8* •	28.5	85 01.6	*+47.5* •	34.0	85 49.1	*+51.9* •	41.7	86 30.0	*+57.1* •	52.7	87 00.0	+60.0	68.0	**87**
88	82 02.0	*+32.1* •	13.5	83 00.1	*+33.4* •	15.4	83 57.6	*+35.2* •	17.9	84 54.1	*+37.6* •	21.4	85 49.1	*+40.9* •	26.3	86 41.0	*+46.1* •	34.0	87 27.1	*+53.4* •	46.7	88 00.0	+60.0	68.0	**88**
89	82 34.1	*+25.9* •	7.2	83 33.5	*+26.5* •	8.3	84 32.8	*+27.2* •	9.8	85 31.7	*+28.3* •	12.0	86 30.0	*+30.0* •	15.4	87 27.1	*+32.9* •	21.3	88 20.5	*+39.5* •	34.0	89 00.0	+60.0	68.0	**89**
90	83 00.0	*+18.6* •	0.0	84 00.0	*+17.9* •	0.0	85 00.0	*+17.0* •	0.0	86 00.0	*+15.5* •	0.0	87 00.0	*+12.9* •	0.0	88 00.0	*+7.7* •	0.0	89 00.0	*−7.1* •	0.0	90 00.0	−60.0	34.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 112°, 248°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 30.2	+59.6	110.9	2 08.8	+59.7	110.9	1 47.4	+59.8	110.9	1 25.9	+59.9	111.0	1 04.5	+59.9	111.0	0 43.0	+60.0	111.0	0 21.5	+60.0	111.0	0 00.0	+60.0	111.0	**0**
1	3 29.8	+59.6	110.7	3 08.5	+59.7	110.8	2 47.2	+59.8	110.8	2 25.8	+59.9	110.9	2 04.4	+59.9	110.9	1 43.0	+59.9	111.0	1 21.5	+60.0	111.0	1 00.0	+60.0	111.0	**1**
2	4 29.4	+59.6	110.6	4 08.2	+59.7	110.7	3 47.0	+59.8	110.8	3 25.7	+59.9	110.8	3 04.3	+60.0	110.9	2 42.9	+60.0	110.9	2 21.5	+60.0	111.0	2 00.0	+60.0	111.0	**2**
3	5 29.0	+59.6	110.5	5 07.9	+59.8	110.6	4 46.8	+59.8	110.7	4 25.6	+59.8	110.8	4 04.3	+59.9	110.8	3 42.9	+60.0	110.9	3 21.5	+60.0	110.9	3 00.0	+60.0	111.0	**3**
4	6 28.6	+59.6	110.4	6 07.7	+59.7	110.5	5 46.6	+59.8	110.6	5 25.4	+59.9	110.7	5 04.2	+59.9	110.8	4 42.9	+59.9	110.9	4 21.5	+60.0	110.9	4 00.0	+60.0	111.0	**4**
5	7 28.2	+59.6	110.3	7 07.4	+59.7	110.4	6 46.4	+59.8	110.5	6 25.3	+59.9	110.6	6 04.1	+59.9	110.7	5 42.8	+60.0	110.8	5 21.5	+60.0	110.9	5 00.0	+60.0	111.0	**5**
6	8 27.8	+59.6	110.2	8 07.1	+59.7	110.3	7 46.2	+59.8	110.4	7 25.2	+59.8	110.6	7 04.0	+60.0	110.7	6 42.8	+60.0	110.8	6 21.5	+59.9	110.9	6 00.0	+60.0	111.0	**6**
7	9 27.4	+59.6	110.1	9 06.8	+59.7	110.2	8 46.0	+59.8	110.4	8 25.0	+59.9	110.5	8 04.0	+59.9	110.6	7 42.8	+59.9	110.8	7 21.4	+60.0	110.9	7 00.0	+60.0	111.0	**7**
8	10 27.0	+59.6	109.9	10 06.5	+59.7	110.1	9 45.8	+59.8	110.3	9 24.9	+59.9	110.4	9 03.9	+59.9	110.6	8 42.7	+60.0	110.7	8 21.4	+60.0	110.9	8 00.0	+60.0	111.0	**8**
9	11 26.6	+59.6	109.8	11 06.2	+59.7	110.0	10 45.6	+59.8	110.2	10 24.8	+59.9	110.4	10 03.8	+60.0	110.5	9 42.7	+60.0	110.7	9 21.4	+60.0	110.8	9 00.0	+60.0	111.0	**9**
10	12 26.2	+59.6	109.7	12 05.9	+59.7	109.9	11 45.4	+59.8	110.1	11 24.7	+59.8	110.3	11 03.8	+59.9	110.5	10 42.7	+59.9	110.7	10 21.4	+60.0	110.8	10 00.0	+60.0	111.0	**10**
11	13 25.8	+59.6	109.6	13 05.6	+59.7	109.8	12 45.2	+59.8	110.0	12 24.5	+59.9	110.2	12 03.7	+59.9	110.4	11 42.6	+60.0	110.6	11 21.4	+60.0	110.8	11 00.0	+60.0	111.0	**11**
12	14 25.4	+59.6	109.5	14 05.3	+59.7	109.7	13 45.0	+59.7	109.9	13 24.4	+59.9	110.2	13 03.6	+59.9	110.4	12 42.6	+60.0	110.6	12 21.4	+60.0	110.8	12 00.0	+60.0	111.0	**12**
13	15 25.0	+59.6	109.3	15 05.0	+59.7	109.6	14 44.7	+59.8	109.8	14 24.3	+59.8	110.1	14 03.5	+60.0	110.3	13 42.6	+59.9	110.6	13 21.4	+60.0	110.8	13 00.0	+60.0	111.0	**13**
14	16 24.6	+59.5	109.2	16 04.7	+59.7	109.5	15 44.5	+59.8	109.8	15 24.1	+59.9	110.0	15 03.5	+59.9	110.3	14 42.5	+60.0	110.5	14 21.4	+60.0	110.8	14 00.0	+60.0	111.0	**14**
15	17 24.1	+59.6	109.1	17 04.4	+59.6	109.4	16 44.3	+59.8	109.7	16 24.0	+59.8	109.9	16 03.4	+59.9	110.2	15 42.5	+60.0	110.5	15 21.4	+60.0	110.7	15 00.0	+60.0	111.0	**15**
16	18 23.7	+59.6	109.0	18 04.0	+59.7	109.3	17 44.1	+59.8	109.6	17 23.8	+59.9	109.9	17 03.3	+59.9	110.2	16 42.5	+59.9	110.5	16 21.4	+60.0	110.7	16 00.0	+60.0	111.0	**16**
17	19 23.3	+59.5	108.8	19 03.7	+59.7	109.2	18 43.9	+59.7	109.5	18 23.7	+59.9	109.8	18 03.2	+59.9	110.1	17 42.4	+60.0	110.4	17 21.4	+60.0	110.7	17 00.0	+60.0	111.0	**17**
18	20 22.8	+59.6	108.7	20 03.4	+59.7	109.1	19 43.6	+59.8	109.4	19 23.6	+59.8	109.7	19 03.1	+60.0	110.1	18 42.4	+60.0	110.4	18 21.4	+59.9	110.7	18 00.0	+60.0	111.0	**18**
19	21 22.4	+59.5	108.6	21 03.1	+59.6	108.9	20 43.4	+59.8	109.3	20 23.4	+59.9	109.7	20 03.1	+59.9	110.0	19 42.4	+59.9	110.3	19 21.3	+60.0	110.7	19 00.0	+60.0	111.0	**19**
20	22 21.9	+59.6	108.4	22 02.7	+59.7	108.8	21 43.2	+59.8	109.2	21 23.3	+59.8	109.6	21 03.0	+59.9	109.9	20 42.3	+60.0	110.3	20 21.3	+60.0	110.7	20 00.0	+60.0	111.0	**20**
21	23 21.5	+59.5	108.3	23 02.4	+59.7	108.7	22 43.0	+59.7	109.1	22 23.1	+59.9	109.5	22 02.9	+59.9	109.9	21 42.3	+60.0	110.3	21 21.3	+60.0	110.6	21 00.0	+60.0	111.0	**21**
22	24 21.0	+59.5	108.2	24 02.1	+59.6	108.6	23 42.7	+59.8	109.0	23 23.0	+59.8	109.4	23 02.8	+59.9	109.8	22 42.3	+59.9	110.2	22 21.3	+60.0	110.6	22 00.0	+60.0	111.0	**22**
23	25 20.5	+59.5	108.0	25 01.7	+59.7	108.5	24 42.5	+59.7	108.9	24 22.8	+59.9	109.4	24 02.7	+59.9	109.8	23 42.2	+60.0	110.2	23 21.3	+60.0	110.6	23 00.0	+60.0	111.0	**23**
24	26 20.0	+59.6	107.9	26 01.4	+59.6	108.4	25 42.2	+59.8	108.8	25 22.7	+59.8	109.3	25 02.6	+59.9	109.7	24 42.2	+59.9	110.2	24 21.3	+60.0	110.6	24 00.0	+60.0	111.0	**24**
25	27 19.6	+59.5	107.8	27 01.0	+59.6	108.2	26 42.0	+59.7	108.7	26 22.5	+59.8	109.2	26 02.5	+60.0	109.7	25 42.1	+60.0	110.1	25 21.3	+60.0	110.6	25 00.0	+60.0	111.0	**25**
26	28 19.1	+59.4	107.6	28 00.6	+59.7	108.1	27 41.7	+59.8	108.6	27 22.3	+59.9	109.1	27 02.5	+59.9	109.6	26 42.1	+60.0	110.1	26 21.3	+60.0	110.5	26 00.0	+60.0	111.0	**26**
27	29 18.5	+59.5	107.5	29 00.3	+59.6	108.0	28 41.5	+59.7	108.5	28 22.2	+59.8	109.0	28 02.4	+59.9	109.5	27 42.1	+59.9	110.0	27 21.3	+60.0	110.5	27 00.0	+60.0	111.0	**27**
28	30 18.0	+59.5	107.3	29 59.9	+59.6	107.9	29 41.2	+59.8	108.4	29 22.0	+59.8	108.9	29 02.3	+59.9	109.5	28 42.0	+60.0	110.0	28 21.3	+59.9	110.5	28 00.0	+60.0	111.0	**28**
29	31 17.5	+59.5	107.2	30 59.5	+59.6	107.7	30 41.0	+59.7	108.3	30 21.8	+59.9	108.9	30 02.2	+59.9	109.4	29 42.0	+59.9	109.9	29 21.2	+60.0	110.5	29 00.0	+60.0	111.0	**29**
30	32 17.0	+59.4	107.0	31 59.1	+59.6	107.6	31 40.7	+59.7	108.2	31 21.7	+59.8	108.8	31 02.1	+59.9	109.3	30 41.9	+60.0	109.9	30 21.2	+60.0	110.5	30 00.0	+60.0	111.0	**30**
31	33 16.4	+59.4	106.8	32 58.7	+59.6	107.5	32 40.4	+59.7	108.1	32 21.5	+59.8	108.7	32 02.0	+59.9	109.3	31 41.9	+59.9	109.9	31 21.2	+60.0	110.4	31 00.0	+60.0	111.0	**31**
32	34 15.8	+59.5	106.7	33 58.3	+59.6	107.3	33 40.1	+59.7	108.0	33 21.3	+59.8	108.6	33 01.9	+59.9	109.2	32 41.8	+60.0	109.8	32 21.2	+60.0	110.4	32 00.0	+60.0	111.0	**32**
33	35 15.3	+59.4	106.5	34 57.9	+59.6	107.2	34 39.8	+59.7	107.8	34 21.1	+59.8	108.5	34 01.8	+59.9	109.1	33 41.8	+60.0	109.8	33 21.2	+60.0	110.4	33 00.0	+60.0	111.0	**33**
34	36 14.7	+59.4	106.3	35 57.5	+59.5	107.0	35 39.5	+59.7	107.7	35 20.9	+59.8	108.4	35 01.7	+59.9	109.1	34 41.8	+59.9	109.7	34 21.2	+60.0	110.4	34 00.0	+60.0	111.0	**34**
35	37 14.1	+59.3	106.2	36 57.0	+59.6	106.9	36 39.2	+59.7	107.6	36 20.7	+59.8	108.3	36 01.6	+59.9	109.0	35 41.7	+60.0	109.7	35 21.2	+60.0	110.3	35 00.0	+60.0	111.0	**35**
36	38 13.4	+59.4	106.0	37 56.6	+59.5	106.7	37 38.9	+59.7	107.5	37 20.5	+59.8	108.2	37 01.5	+59.8	108.9	36 41.7	+59.9	109.6	36 21.2	+60.0	110.3	36 00.0	+60.0	111.0	**36**
37	39 12.8	+59.3	105.8	38 56.1	+59.5	106.6	38 38.6	+59.7	107.3	38 20.3	+59.8	108.1	38 01.3	+59.9	108.8	37 41.6	+60.0	109.6	37 21.2	+59.9	110.3	37 00.0	+60.0	111.0	**37**
38	40 12.1	+59.4	105.6	39 55.6	+59.5	106.4	39 38.3	+59.6	107.2	39 20.1	+59.8	108.0	39 01.2	+59.9	108.8	38 41.6	+59.9	109.5	38 21.1	+60.0	110.3	38 00.0	+60.0	111.0	**38**
39	41 11.5	+59.3	105.4	40 55.1	+59.5	106.2	40 37.9	+59.7	107.1	40 19.9	+59.8	107.9	40 01.1	+59.9	108.7	39 41.5	+59.9	109.5	39 21.1	+60.0	110.2	39 00.0	+60.0	111.0	**39**
40	42 10.8	+59.2	105.2	41 54.6	+59.5	106.1	41 37.6	+59.6	106.9	41 19.7	+59.8	107.8	41 01.0	+59.9	108.6	40 41.4	+60.0	109.4	40 21.1	+60.0	110.2	40 00.0	+60.0	111.0	**40**
41	43 10.0	+59.3	105.0	42 54.1	+59.4	105.9	42 37.2	+59.6	106.8	42 19.5	+59.7	107.6	42 00.9	+59.8	108.5	41 41.4	+59.9	109.3	41 21.1	+60.0	110.2	41 00.0	+60.0	111.0	**41**
42	44 09.3	+59.2	104.8	43 53.5	+59.5	105.7	43 36.8	+59.6	106.6	43 19.2	+59.8	107.5	43 00.7	+59.9	108.4	42 41.3	+60.0	109.3	42 21.1	+60.0	110.2	42 00.0	+60.0	111.0	**42**
43	45 08.5	+59.2	104.5	44 53.0	+59.4	105.5	44 36.4	+59.6	106.5	44 19.0	+59.7	107.4	44 00.6	+59.8	108.3	43 41.3	+59.9	109.2	43 21.1	+60.0	110.1	43 00.0	+60.0	111.0	**43**
44	46 07.7	+59.2	104.3	45 52.4	+59.4	105.3	45 36.0	+59.6	106.3	45 18.7	+59.8	107.3	45 00.4	+59.9	108.2	44 41.2	+59.9	109.2	44 21.1	+59.9	110.1	44 00.0	+60.0	111.0	**44**
45	47 06.9	+59.1	104.1	46 51.8	+59.4	105.1	46 35.6	+59.6	106.1	46 18.5	+59.7	107.1	46 00.3	+59.8	108.1	45 41.1	+60.0	109.1	45 21.0	+60.0	110.1	45 00.0	+60.0	111.0	**45**
46	48 06.0	+59.1	103.8	47 51.2	+59.3	104.9	47 35.2	+59.6	105.9	47 18.2	+59.7	107.0	47 00.1	+59.9	108.0	46 41.1	+59.9	109.0	46 21.0	+60.0	110.0	46 00.0	+60.0	111.0	**46**
47	49 05.1	+59.1	103.6	48 50.5	+59.3	104.7	48 34.8	+59.5	105.8	48 17.9	+59.7	106.8	48 00.0	+59.8	107.9	47 41.0	+59.9	109.0	47 21.0	+60.0	110.0	47 00.0	+60.0	111.0	**47**
48	50 04.2	+59.0	103.3	49 49.8	+59.3	104.4	49 34.3	+59.5	105.6	49 17.6	+59.7	106.7	48 59.8	+59.9	107.8	48 40.9	+60.0	108.9	48 21.0	+60.0	110.0	48 00.0	+60.0	111.0	**48**
49	51 03.2	+59.0	103.0	50 49.1	+59.3	104.2	50 33.8	+59.5	105.4	50 17.3	+59.7	106.5	49 59.7	+59.8	107.7	49 40.9	+59.9	108.8	49 21.0	+60.0	109.9	49 00.0	+60.0	111.0	**49**
50	52 02.2	+59.0	102.7	51 48.4	+59.2	103.9	51 33.3	+59.5	105.2	51 17.0	+59.7	106.4	50 59.5	+59.8	107.6	50 40.8	+59.9	108.7	50 21.0	+59.9	109.9	50 00.0	+60.0	111.0	**50**
51	53 01.2	+58.8	102.4	52 47.6	+59.2	103.7	52 32.8	+59.4	105.0	52 16.7	+59.6	106.2	51 59.3	+59.8	107.4	51 40.7	+59.9	108.6	51 20.9	+60.0	109.8	51 00.0	+60.0	111.0	**51**
52	54 00.0	+58.9	102.1	53 46.8	+59.2	103.4	53 32.2	+59.4	104.7	53 16.3	+59.6	106.0	52 59.1	+59.8	107.3	52 40.6	+59.9	108.6	52 20.9	+60.0	109.8	52 00.0	+60.0	111.0	**52**
53	54 58.9	+58.8	101.7	54 46.0	+59.1	103.1	54 31.6	+59.4	104.5	54 15.9	+59.7	105.8	53 58.9	+59.8	107.2	53 40.5	+59.9	108.5	53 20.9	+60.0	109.7	53 00.0	+60.0	111.0	**53**
54	55 57.7	+58.7	101.4	55 45.1	+59.1	102.8	55 31.0	+59.4	104.2	55 15.6	+59.6	105.6	54 58.7	+59.8	107.0	54 40.4	+59.9	108.4	54 20.9	+59.9	109.7	54 00.0	+60.0	111.0	**54**
55	56 56.4	+58.6	101.0	56 44.2	+59.0	102.5	56 30.4	+59.3	104.0	56 15.2	+59.5	105.4	55 58.5	+59.7	106.9	55 40.3	+59.9	108.3	55 20.8	+60.0	109.7	55 00.0	+60.0	111.0	**55**
56	57 55.0	+58.6	100.6	57 43.2	+58.9	102.2	57 29.7	+59.3	103.7	57 14.7	+59.6	105.2	56 58.2	+59.8	106.7	56 40.2	+59.9	108.2	56 20.8	+60.0	109.6	56 00.0	+60.0	111.0	**56**
57	58 53.6	+58.5	100.2	58 42.1	+58.9	101.8	58 29.0	+59.3	103.4	58 14.3	+59.5	105.0	57 58.0	+59.7	106.5	57 40.1	+59.9	108.1	57 20.8	+60.0	109.5	57 00.0	+60.0	111.0	**57**
58	59 52.1	+58.4	99.8	59 41.0	+58.9	101.5	59 28.3	+59.2	103.1	59 13.8	+59.5	104.8	58 57.7	+59.7	106.4	58 40.0	+59.9	107.9	58 20.8	+59.9	109.5	58 00.0	+60.0	111.0	**58**
59	60 50.5	+58.3	99.3	60 39.9	+58.7	101.1	60 27.5	+59.1	102.8	60 13.3	+59.5	104.5	59 57.4	+59.7	106.2	59 39.9	+59.9	107.8	59 20.7	+60.0	109.4	59 00.0	+60.0	111.0	**59**
60	61 48.8	+58.1	98.8	61 38.6	+58.7	100.6	61 26.6	+59.1	102.4	61 12.8	+59.4	104.2	60 57.1	+59.7	106.0	60 39.8	+59.8	107.7	60 20.7	+60.0	109.4	60 00.0	+60.0	111.0	**60**
61	62 46.9	+58.1	98.3	62 37.3	+58.6	100.2	62 25.7	+59.0	102.1	62 12.2	+59.4	103.9	61 56.8	+59.7	105.8	61 39.6	+59.9	107.5	61 20.7	+59.9	109.3	61 00.0	+60.0	111.0	**61**
62	63 45.0	+57.9	97.7	63 35.9	+58.5	99.7	63 24.7	+59.0	101.7	63 11.6	+59.3	103.6	62 56.5	+59.6	105.5	62 39.5	+59.8	107.4	62 20.6	+60.0	109.2	62 00.0	+60.0	111.0	**62**
63	64 42.9	+57.7	97.1	64 34.4	+58.3	99.2	64 23.7	+58.9	101.3	64 10.9	+59.3	103.3	63 56.1	+59.6	105.3	63 39.3	+59.9	107.2	63 20.6	+60.0	109.1	63 00.0	+60.0	111.0	**63**
64	65 40.6	+57.6	96.5	65 32.7	+58.3	98.7	65 22.6	+58.8	100.8	65 10.2	+59.3	102.9	64 55.7	+59.6	105.0	64 39.2	+59.8	107.1	64 20.6	+59.9	109.1	64 00.0	+60.0	111.0	**64**
65	66 38.2	+57.4	95.8	66 31.0	+58.1	98.1	66 21.4	+58.7	100.3	66 09.5	+59.2	102.6	65 55.3	+59.6	104.7	65 39.0	+59.8	106.9	65 20.5	+60.0	109.0	65 00.0	+60.0	111.0	**65**
66	67 35.6	+57.1	95.0	67 29.1	+57.9	97.4	67 20.1	+58.6	99.8	67 08.7	+59.1	102.1	66 54.9	+59.5	104.4	66 38.8	+59.8	106.7	66 20.5	+59.9	108.9	66 00.0	+60.0	111.0	**66**
67	68 32.7	+56.9	94.2	68 27.0	+57.8	96.7	68 18.7	+58.4	99.2	68 07.8	+59.0	101.7	67 54.4	+59.5	104.1	67 38.6	+59.7	106.5	67 20.4	+60.0	108.8	67 00.0	+60.0	111.0	**67**
68	69 29.6	+56.6	93.3	69 24.8	+57.5	96.0	69 17.1	+58.4	98.6	69 06.8	+59.0	101.2	68 53.9	+59.4	103.7	68 38.3	+59.8	106.2	68 20.4	+59.9	108.7	68 00.0	+60.0	111.0	**68**
69	70 26.2	+56.3	92.3	70 22.3	+57.3	95.1	70 15.5	+58.1	97.9	70 05.8	+58.8	100.7	69 53.3	+59.3	103.3	69 38.1	+59.7	106.0	69 20.3	+59.9	108.5	69 00.0	+60.0	111.0	**69**
70	71 22.5	+55.8	91.3	71 19.6	+57.0	94.2	71 13.6	+57.9	97.2	71 04.6	+58.7	100.1	70 52.6	+59.3	102.9	70 37.8	+59.7	105.7	70 20.2	+60.0	108.4	70 00.0	+60.0	111.0	**70**
71	72 18.3	+55.4	90.1	72 16.6	+56.6	93.2	72 11.5	+57.8	96.3	72 03.3	+58.6	99.4	71 51.9	+59.2	102.4	71 37.5	+59.7	105.4	71 20.2	+59.9	108.2	71 00.0	+60.0	111.0	**71**
72	73 13.7	+54.9	88.8	73 13.2	+56.3	92.1	73 09.3	+57.4	95.4	73 01.9	+58.4	98.7	72 51.1	+59.2	101.9	72 37.2	+59.6	105.0	72 20.1	+59.9	108.1	72 00.0	+60.0	111.0	**72**
73	74 08.6	+54.2	87.4	74 09.5	+55.8	90.9	74 06.7	+57.1	94.4	74 00.3	+58.2	97.9	73 50.3	+59.0	101.3	73 36.8	+59.6	104.6	73 20.0	+59.9	107.9	73 00.0	+60.0	111.0	**73**
74	75 02.8	+53.4	85.8	75 05.3	+55.2	89.5	75 03.8	+56.7	93.3	74 58.5	+57.9	97.0	74 49.3	+58.9	100.6	74 36.4	+59.5	104.2	74 19.9	+59.9	107.7	74 00.0	+60.0	111.0	**74**
75	75 56.2	+52.6	83.9	76 00.5	+54.5	87.9	76 00.5	+56.3	91.9	75 56.4	+57.7	95.9	75 48.2	+58.7	99.9	75 35.9	+59.4	103.7	75 19.8	+59.8	107.4	75 00.0	+60.0	111.0	**75**
76	76 48.8	+51.4	81.9	76 55.0	+53.7	86.1	76 56.8	+55.6	90.5	76 54.1	+57.2	94.8	76 46.9	+58.5	99.0	76 35.3	+59.4	103.2	76 19.6	+59.9	107.2	76 00.0	+60.0	111.0	**76**
77	77 40.2	+50.0	79.6	77 48.7	+52.6	84.1	77 52.4	+55.0	88.7	77 51.3	+56.8	93.4	77 45.4	+58.2	98.0	77 34.7	+59.2	102.5	77 19.5	+59.8	106.8	77 00.0	+60.0	111.0	**77**
78	78 30.2	+48.4	76.9	78 41.3	+51.4	81.7	78 47.4	+54.0	86.7	78 48.1	+56.2	91.8	78 43.6	+57.9	96.8	78 33.9	+59.1	101.7	78 19.3	+59.8	106.5	78 00.0	+60.0	111.0	**78**
79	79 18.6	*+46.2* •	73.8	79 32.7	+49.7	79.0	79 41.4	+52.7	84.4	79 44.3	+55.5	89.9	79 41.5	+57.5	95.4	79 33.0	+59.0	100.8	79 19.1	+59.7	106.0	79 00.0	+60.0	111.0	**79**
80	80 04.8	*+43.7* •	70.2	80 22.4	*+47.6* •	75.8	80 34.1	+51.3	81.6	80 39.8	+54.3	87.7	80 39.0	+56.9	93.7	80 32.0	+58.6	99.7	80 18.8	+59.7	105.5	80 00.0	+60.0	111.0	**80**
81	80 48.5	*+40.3* •	66.1	81 10.0	*+44.8* •	72.0	81 25.4	*+49.1* •	78.3	81 34.1	+53.0	84.9	81 35.9	+56.1	91.7	81 30.6	+58.4	98.4	81 18.5	+59.6	104.9	81 00.0	+60.0	111.0	**81**
82	81 28.8	*+36.2* •	61.3	81 54.8	*+41.3* •	67.5	82 14.5	*+46.3* •	74.3	82 27.1	*+51.0* •	81.5	82 32.0	+55.0	89.1	82 29.0	+57.8	96.7	82 18.1	+59.5	104.1	82 00.0	+60.0	111.0	**82**
83	82 05.0	*+31.1* •	55.7	82 36.1	*+36.6* •	62.1	83 00.8	*+42.5* •	69.3	83 18.1	*+48.2* •	77.3	83 27.0	*+53.2* •	85.8	83 26.8	+57.1	94.5	83 17.6	+59.3	103.0	83 00.0	+60.0	111.0	**83**
84	82 36.1	*+24.7* •	49.3	83 12.7	*+30.6* •	55.6	83 43.3	*+37.1* •	63.2	84 06.3	*+44.1* •	71.8	84 20.2	*+50.6* •	81.5	84 23.9	+55.8	91.6	84 16.9	+59.0	101.6	84 00.0	+60.0	111.0	**84**
85	83 00.8	*+17.3* •	42.0	83 43.3	*+23.0* •	48.1	84 20.4	*+30.0* •	55.6	84 50.4	*+37.9* •	64.8	85 10.8	*+46.3* •	75.6	85 19.7	*+53.7* •	87.5	85 15.9	+58.5	99.7	85 00.0	+60.0	111.0	**85**
86	83 18.1	*+8.9* •	33.9	84 06.3	*+13.9* •	39.4	84 50.4	*+20.4* •	46.4	85 28.3	*+28.8* •	55.6	85 57.1	*+39.1* •	67.3	86 13.4	*+49.7* •	81.4	86 14.4	+57.5	96.6	86 00.0	+60.0	111.0	**86**
87	83 27.0	*−0.2* •	25.4	84 20.2	*+3.7* •	29.7	85 10.8	*+8.9* •	35.6	85 57.1	*+16.3* •	43.8	86 36.2	*+26.9* •	55.5	87 03.1	*+41.0* •	71.8	87 11.9	*+54.8* •	91.6	87 00.0	+60.0	111.0	**87**
88	83 26.8	*−9.2* •	16.6	84 23.9	*−7.0* •	19.5	85 19.7	*−3.8* •	23.6	86 13.4	*+1.0* •	29.6	87 03.1	*+8.8* •	39.3	87 44.1	*+22.6* •	55.5	88 06.7	*+45.3* •	81.4	88 00.0	+60.0	111.0	**88**
89	83 17.6	*−17.6* •	8.0	84 16.9	*−16.9* •	9.4	85 15.9	*−15.9* •	11.4	86 14.4	*−14.4* •	14.4	87 11.9	*−11.9* •	19.5	88 06.7	*−6.7* •	29.6	88 52.0	*+8.0* •	55.5	89 00.0	+60.0	111.0	**89**
90	83 00.0	*−25.0* •	0.0	84 00.0	*−25.6* •	0.0	85 00.0	*−26.3* •	0.0	86 00.0	*−27.4* •	0.0	87 00.0	*−29.1* •	0.0	88 00.0	*−32.2* •	0.0	89 00.0	*−38.9* •	0.0	90 00.0	−60.0	55.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION **L.H.A. 69°, 291°**

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 30.2	−59.6	110.9	2 08.8	−59.7	110.9	1 47.4	−59.8	110.9	1 25.9	−59.8	111.0	1 04.5	−59.9	111.0	0 43.0	−60.0	111.0	0 21.5	−60.0	111.0	0 00.0	+60.0	69.0	**0**
1	1 30.6	−59.6	111.0	1 09.1	−59.7	111.0	0 47.6	−59.8	111.0	0 26.1	−59.9	111.0	0 04.6	−60.0	111.0	0 17.0	+59.9	69.0	0 38.5	+60.0	69.0	1 00.0	+60.0	69.0	**1**
2	0 31.0	−59.6	111.1	0 09.4	−59.7	111.1	0 12.2	+59.8	68.9	0 33.8	+59.9	68.9	0 55.4	+59.9	68.9	1 16.9	+60.0	68.9	1 38.5	+60.0	69.0	2 00.0	+60.0	69.0	**2**
3	0 28.6	+59.7	68.8	0 50.3	+59.7	68.8	1 12.0	+59.8	68.8	1 33.7	+59.8	68.9	1 55.3	+59.9	68.9	2 16.9	+60.0	68.9	2 38.5	+60.0	69.0	3 00.0	+60.0	69.0	**3**
4	1 28.3	+59.6	68.7	1 50.0	+59.8	68.7	2 11.8	+59.8	68.7	2 33.5	+59.9	68.8	2 55.2	+60.0	68.8	3 16.9	+59.9	68.9	3 38.5	+60.0	68.9	4 00.0	+60.0	69.0	**4**
5	2 27.9	+59.6	68.6	2 49.8	+59.7	68.6	3 11.6	+59.8	68.7	3 33.4	+59.9	68.7	3 55.2	+59.9	68.8	4 16.8	+60.0	68.8	4 38.5	+60.0	68.9	5 00.0	+60.0	69.0	**5**
6	3 27.5	+59.6	68.5	3 49.5	+59.7	68.5	4 11.4	+59.8	68.6	4 33.3	+59.9	68.7	4 55.1	+59.9	68.7	5 16.8	+60.0	68.8	5 38.5	+59.9	68.9	6 00.0	+60.0	69.0	**6**
7	4 27.1	+59.6	68.3	4 49.2	+59.7	68.4	5 11.2	+59.8	68.5	5 33.2	+59.8	68.6	5 55.0	+59.9	68.7	6 16.8	+59.9	68.8	6 38.4	+60.0	68.9	7 00.0	+60.0	69.0	**7**
8	5 26.7	+59.6	68.2	5 48.9	+59.7	68.3	6 11.0	+59.8	68.4	6 33.0	+59.9	68.5	6 54.9	+60.0	68.6	7 16.7	+60.0	68.7	7 38.4	+60.0	68.9	8 00.0	+60.0	69.0	**8**
9	6 26.3	+59.6	68.1	6 48.6	+59.7	68.2	7 10.8	+59.8	68.3	7 32.9	+59.9	68.5	7 54.9	+59.9	68.6	8 16.7	+60.0	68.7	8 38.4	+60.0	68.9	9 00.0	+60.0	69.0	**9**
10	7 25.9	+59.6	68.0	7 48.3	+59.7	68.1	8 10.6	+59.8	68.3	8 32.8	+59.8	68.4	8 54.8	+59.9	68.5	9 16.7	+59.9	68.7	9 38.4	+60.0	68.8	10 00.0	+60.0	69.0	**10**
11	8 25.5	+59.6	67.9	8 48.0	+59.7	68.0	9 10.4	+59.8	68.2	9 32.6	+59.9	68.3	9 54.7	+59.9	68.5	10 16.6	+60.0	68.6	10 38.4	+60.0	68.8	11 00.0	+60.0	69.0	**11**
12	9 25.1	+59.6	67.8	9 47.7	+59.7	67.9	10 10.2	+59.8	68.1	10 32.5	+59.9	68.3	10 54.6	+60.0	68.4	11 16.6	+60.0	68.6	11 38.4	+60.0	68.8	12 00.0	+60.0	69.0	**12**
13	10 24.7	+59.6	67.7	10 47.4	+59.7	67.8	11 10.0	+59.8	68.0	11 32.4	+59.8	68.2	11 54.6	+59.9	68.4	12 16.6	+59.9	68.6	12 38.4	+60.0	68.8	13 00.0	+60.0	69.0	**13**
14	11 24.3	+59.6	67.5	11 47.1	+59.7	67.7	12 09.8	+59.8	67.9	12 32.2	+59.9	68.1	12 54.5	+59.9	68.3	13 16.5	+60.0	68.5	13 38.4	+60.0	68.8	14 00.0	+60.0	69.0	**14**
15	12 23.9	+59.6	67.4	12 46.8	+59.7	67.6	13 09.6	+59.8	67.8	13 32.1	+59.9	68.1	13 54.4	+59.9	68.3	14 16.5	+60.0	68.5	14 38.4	+60.0	68.8	15 00.0	+60.0	69.0	**15**
16	13 23.5	+59.6	67.3	13 46.5	+59.7	67.5	14 09.4	+59.8	67.7	14 32.0	+59.8	68.0	14 54.3	+60.0	68.2	15 16.5	+59.9	68.5	15 38.4	+60.0	68.7	16 00.0	+60.0	69.0	**16**
17	14 23.1	+59.5	67.2	14 46.2	+59.7	67.4	15 09.2	+59.7	67.7	15 31.8	+59.9	67.9	15 54.3	+59.9	68.2	16 16.4	+60.0	68.4	16 38.4	+60.0	68.7	17 00.0	+60.0	69.0	**17**
18	15 22.6	+59.6	67.1	15 45.9	+59.7	67.3	16 08.9	+59.8	67.6	16 31.7	+59.9	67.8	16 54.2	+59.9	68.1	17 16.4	+60.0	68.4	17 38.4	+59.9	68.7	18 00.0	+60.0	69.0	**18**
19	16 22.2	+59.6	66.9	16 45.6	+59.7	67.2	17 08.7	+59.8	67.5	17 31.6	+59.8	67.8	17 54.1	+59.9	68.1	18 16.4	+59.9	68.4	18 38.3	+60.0	68.7	19 00.0	+60.0	69.0	**19**
20	17 21.8	+59.6	66.8	17 45.3	+59.7	67.1	18 08.5	+59.8	67.4	18 31.4	+59.9	67.7	18 54.0	+60.0	68.0	19 16.3	+60.0	68.3	19 38.3	+60.0	68.7	20 00.0	+60.0	69.0	**20**
21	18 21.4	+59.5	66.7	18 45.0	+59.7	67.0	19 08.3	+59.8	67.3	19 31.3	+59.8	67.6	19 54.0	+59.9	68.0	20 16.3	+60.0	68.3	20 38.3	+60.0	68.6	21 00.0	+60.0	69.0	**21**
22	19 20.9	+59.6	66.6	19 44.7	+59.6	66.9	20 08.1	+59.7	67.2	20 31.1	+59.9	67.6	20 53.9	+59.9	67.9	21 16.3	+59.9	68.3	21 38.3	+60.0	68.6	22 00.0	+60.0	69.0	**22**
23	20 20.5	+59.5	66.4	20 44.3	+59.7	66.8	21 07.8	+59.8	67.1	21 31.0	+59.8	67.5	21 53.8	+59.9	67.8	22 16.2	+60.0	68.2	22 38.3	+60.0	68.6	23 00.0	+60.0	69.0	**23**
24	21 20.0	+59.6	66.3	21 44.0	+59.7	66.7	22 07.6	+59.8	67.0	22 30.8	+59.9	67.4	22 53.7	+59.9	67.8	23 16.2	+60.0	68.2	23 38.3	+60.0	68.6	24 00.0	+60.0	69.0	**24**
25	22 19.6	+59.5	66.2	22 43.7	+59.6	66.5	23 07.4	+59.7	66.9	23 30.7	+59.8	67.3	23 53.6	+59.9	67.7	24 16.2	+59.9	68.1	24 38.3	+60.0	68.6	25 00.0	+60.0	69.0	**25**
26	23 19.1	+59.6	66.0	23 43.3	+59.7	66.4	24 07.1	+59.8	66.8	24 30.5	+59.9	67.2	24 53.5	+59.9	67.7	25 16.1	+60.0	68.1	25 38.3	+60.0	68.5	26 00.0	+60.0	69.0	**26**
27	24 18.7	+59.5	65.9	24 43.0	+59.6	66.3	25 06.9	+59.7	66.7	25 30.4	+59.8	67.2	25 53.4	+60.0	67.6	26 16.1	+59.9	68.1	26 38.3	+60.0	68.5	27 00.0	+60.0	69.0	**27**
28	25 18.2	+59.5	65.8	25 42.6	+59.7	66.2	26 06.6	+59.8	66.6	26 30.2	+59.9	67.1	26 53.4	+59.9	67.6	27 16.0	+60.0	68.0	27 38.3	+59.9	68.5	28 00.0	+60.0	69.0	**28**
29	26 17.7	+59.5	65.6	26 42.3	+59.6	66.1	27 06.4	+59.7	66.5	27 30.1	+59.8	67.0	27 53.3	+59.9	67.5	28 16.0	+60.0	68.0	28 38.2	+60.0	68.5	29 00.0	+60.0	69.0	**29**
30	27 17.2	+59.5	65.5	27 41.9	+59.6	65.9	28 06.1	+59.8	66.4	28 29.9	+59.8	66.9	28 53.2	+59.9	67.4	29 16.0	+59.9	67.9	29 38.2	+60.0	68.5	30 00.0	+60.0	69.0	**30**
31	28 16.7	+59.5	65.3	28 41.5	+59.7	65.8	29 05.9	+59.7	66.3	29 29.7	+59.9	66.8	29 53.1	+59.9	67.4	30 15.9	+60.0	67.9	30 38.2	+60.0	68.4	31 00.0	+60.0	69.0	**31**
32	29 16.2	+59.5	65.2	29 41.2	+59.6	65.7	30 05.6	+59.8	66.2	30 29.6	+59.8	66.8	30 53.0	+59.9	67.3	31 15.9	+59.9	67.9	31 38.2	+60.0	68.4	32 00.0	+60.0	69.0	**32**
33	30 15.7	+59.5	65.0	30 40.8	+59.6	65.6	31 05.4	+59.7	66.1	31 29.4	+59.8	66.7	31 52.9	+59.9	67.2	32 15.8	+60.0	67.8	32 38.2	+60.0	68.4	33 00.0	+60.0	69.0	**33**
34	31 15.2	+59.4	64.9	31 40.4	+59.6	65.4	32 05.1	+59.7	66.0	32 29.2	+59.8	66.6	32 52.8	+59.9	67.2	33 15.8	+59.9	67.8	33 38.2	+60.0	68.4	34 00.0	+60.0	69.0	**34**
35	32 14.6	+59.5	64.7	32 40.0	+59.6	65.3	33 04.8	+59.7	65.9	33 29.0	+59.8	66.5	33 52.7	+59.9	67.1	34 15.7	+60.0	67.7	34 38.2	+60.0	68.4	35 00.0	+60.0	69.0	**35**
36	33 14.1	+59.4	64.6	33 39.6	+59.6	65.2	34 04.5	+59.7	65.8	34 28.8	+59.9	66.4	34 52.6	+59.9	67.0	35 15.7	+59.9	67.7	35 38.2	+60.0	68.3	36 00.0	+60.0	69.0	**36**
37	34 13.5	+59.4	64.4	34 39.2	+59.5	65.0	35 04.2	+59.7	65.6	35 28.7	+59.8	66.3	35 52.5	+59.9	66.9	36 15.6	+60.0	67.6	36 38.2	+59.9	68.3	37 00.0	+60.0	69.0	**37**
38	35 12.9	+59.5	64.2	35 38.7	+59.6	64.9	36 03.9	+59.7	65.5	36 28.5	+59.8	66.2	36 52.4	+59.8	66.9	37 15.6	+59.9	67.6	37 38.1	+60.0	68.3	38 00.0	+60.0	69.0	**38**
39	36 12.4	+59.3	64.0	36 38.3	+59.5	64.7	37 03.6	+59.7	65.4	37 28.3	+59.8	66.1	37 52.2	+59.9	66.8	38 15.5	+60.0	67.5	38 38.1	+60.0	68.3	39 00.0	+60.0	69.0	**39**
40	37 11.7	+59.4	63.9	37 37.8	+59.6	64.6	38 03.3	+59.7	65.3	38 28.1	+59.7	66.0	38 52.1	+59.9	66.7	39 15.5	+59.9	67.5	39 38.1	+60.0	68.2	40 00.0	+60.0	69.0	**40**
41	38 11.1	+59.4	63.7	38 37.4	+59.5	64.4	39 03.0	+59.6	65.1	39 27.8	+59.8	65.9	39 52.0	+59.9	66.6	40 15.4	+60.0	67.4	40 38.1	+60.0	68.2	41 00.0	+60.0	69.0	**41**
42	39 10.5	+59.3	63.5	39 36.9	+59.5	64.2	40 02.6	+59.7	65.0	40 27.6	+59.8	65.8	40 51.9	+59.9	66.5	41 15.4	+59.9	67.3	41 38.1	+60.0	68.2	42 00.0	+60.0	69.0	**42**
43	40 09.8	+59.3	63.3	40 36.4	+59.5	64.1	41 02.3	+59.6	64.9	41 27.4	+59.8	65.6	41 51.8	+59.8	66.5	42 15.3	+60.0	67.3	42 38.1	+60.0	68.1	43 00.0	+60.0	69.0	**43**
44	41 09.1	+59.3	63.1	41 35.9	+59.5	63.9	42 01.9	+59.7	64.7	42 27.2	+59.7	65.5	42 51.6	+59.9	66.4	43 15.3	+59.9	67.2	43 38.1	+59.9	68.1	44 00.0	+60.0	69.0	**44**
45	42 08.4	+59.3	62.9	42 35.4	+59.5	63.7	43 01.6	+59.6	64.6	43 26.9	+59.8	65.4	43 51.5	+59.8	66.3	44 15.2	+59.9	67.2	44 38.0	+60.0	68.1	45 00.0	+60.0	69.0	**45**
46	43 07.7	+59.3	62.7	43 34.9	+59.4	63.5	44 01.2	+59.6	64.4	44 26.7	+59.7	65.3	44 51.3	+59.9	66.2	45 15.1	+60.0	67.1	45 38.0	+60.0	68.0	46 00.0	+60.0	69.0	**46**
47	44 07.0	+59.2	62.5	44 34.3	+59.4	63.4	45 00.8	+59.6	64.2	45 26.4	+59.8	65.2	45 51.2	+59.9	66.1	46 15.1	+59.9	67.0	46 38.0	+60.0	68.0	47 00.0	+60.0	69.0	**47**
48	45 06.2	+59.2	62.3	45 33.7	+59.4	63.2	46 00.4	+59.6	64.1	46 26.2	+59.7	65.0	46 51.1	+59.8	66.0	47 15.0	+59.9	67.0	47 38.0	+60.0	68.0	48 00.0	+60.0	69.0	**48**
49	46 05.4	+59.2	62.0	46 33.1	+59.4	63.0	47 00.0	+59.5	63.9	47 25.9	+59.7	64.9	47 50.9	+59.8	65.9	48 14.9	+60.0	66.9	48 38.0	+60.0	67.9	49 00.0	+60.0	69.0	**49**
50	47 04.6	+59.1	61.8	47 32.5	+59.4	62.7	47 59.5	+59.6	63.7	48 25.6	+59.7	64.7	48 50.7	+59.9	65.8	49 14.9	+59.9	66.8	49 38.0	+59.9	67.9	50 00.0	+60.0	69.0	**50**
51	48 03.7	+59.1	61.5	48 31.9	+59.3	62.5	48 59.1	+59.5	63.5	49 25.3	+59.7	64.6	49 50.6	+59.8	65.7	50 14.8	+59.9	66.7	50 37.9	+60.0	67.9	51 00.0	+60.0	69.0	**51**
52	49 02.8	+59.1	61.3	49 31.2	+59.3	62.3	49 58.6	+59.5	63.3	50 25.0	+59.7	64.4	50 50.4	+59.8	65.5	51 14.7	+59.9	66.7	51 37.9	+60.0	67.8	52 00.0	+60.0	69.0	**52**
53	50 01.9	+59.0	61.0	50 30.5	+59.3	62.1	50 58.1	+59.5	63.1	51 24.7	+59.7	64.3	51 50.2	+59.8	65.4	52 14.6	+59.9	66.6	52 37.9	+60.0	67.8	53 00.0	+60.0	69.0	**53**
54	51 00.9	+59.0	60.7	51 29.8	+59.2	61.8	51 57.6	+59.5	62.9	52 24.4	+59.6	64.1	52 50.0	+59.8	65.3	53 14.5	+59.9	66.5	53 37.9	+60.0	67.7	54 00.0	+60.0	69.0	**54**
55	51 59.9	+59.0	60.4	52 29.0	+59.2	61.6	52 57.1	+59.4	62.7	53 24.0	+59.6	63.9	53 49.8	+59.8	65.1	54 14.4	+59.9	66.4	54 37.9	+59.9	67.7	55 00.0	+60.0	69.0	**55**
56	52 58.9	+58.9	60.1	53 28.2	+59.2	61.3	53 56.5	+59.4	62.5	54 23.6	+59.6	63.7	54 49.6	+59.8	65.0	55 14.3	+59.9	66.3	55 37.8	+60.0	67.6	56 00.0	+60.0	69.0	**56**
57	53 57.8	+58.8	59.8	54 27.4	+59.1	61.0	54 55.9	+59.4	62.2	55 23.2	+59.6	63.5	55 49.4	+59.7	64.8	56 14.2	+59.9	66.2	56 37.8	+60.0	67.6	57 00.0	+60.0	69.0	**57**
58	54 56.6	+58.8	59.5	55 26.5	+59.1	60.7	55 55.3	+59.3	62.0	56 22.8	+59.6	63.3	56 49.1	+59.8	64.7	57 14.1	+59.9	66.1	57 37.8	+59.9	67.5	58 00.0	+60.0	69.0	**58**
59	55 55.4	+58.7	59.1	56 25.6	+59.0	60.4	56 54.6	+59.3	61.7	57 22.4	+59.6	63.1	57 48.9	+59.7	64.5	58 14.0	+59.9	66.0	58 37.7	+60.0	67.5	59 00.0	+60.0	69.0	**59**
60	56 54.1	+58.6	58.7	57 24.6	+59.0	60.1	57 53.9	+59.3	61.4	58 22.0	+59.5	62.9	58 48.6	+59.8	64.3	59 13.9	+59.9	65.8	59 37.7	+60.0	67.4	60 00.0	+60.0	69.0	**60**
61	57 52.7	+58.6	58.3	58 23.6	+58.9	59.7	58 53.2	+59.2	61.2	59 21.5	+59.5	62.6	59 48.4	+59.7	64.2	60 13.8	+59.9	65.7	60 37.7	+60.0	67.3	61 00.0	+60.0	69.0	**61**
62	58 51.3	+58.5	57.9	59 22.5	+58.9	59.4	59 52.4	+59.2	60.8	60 21.0	+59.4	62.4	60 48.1	+59.7	64.0	61 13.7	+59.8	65.6	61 37.7	+59.9	67.3	62 00.0	+60.0	69.0	**62**
63	59 49.8	+58.4	57.5	60 21.4	+58.8	59.0	60 51.6	+59.2	60.5	61 20.4	+59.5	62.1	61 47.8	+59.6	63.7	62 13.5	+59.9	65.4	62 37.6	+60.0	67.2	63 00.0	+60.0	69.0	**63**
64	60 48.2	+58.3	57.0	61 20.2	+58.7	58.6	61 50.8	+59.0	60.2	62 19.9	+59.4	61.8	62 47.4	+59.7	63.5	63 13.4	+59.8	65.3	63 37.6	+59.9	67.1	64 00.0	+60.0	69.0	**64**
65	61 46.5	+58.2	56.5	62 18.9	+58.6	58.1	62 49.8	+59.0	59.8	63 19.3	+59.3	61.5	63 47.1	+59.6	63.3	64 13.2	+59.8	65.1	64 37.5	+60.0	67.0	65 00.0	+60.0	69.0	**65**
66	62 44.7	+58.0	56.0	63 17.5	+58.5	57.7	63 48.8	+59.0	59.4	64 18.6	+59.3	61.2	64 46.7	+59.6	63.0	65 13.0	+59.8	64.9	65 37.5	+59.9	66.9	66 00.0	+60.0	69.0	**66**
67	63 42.7	+57.9	55.5	64 16.0	+58.4	57.2	64 47.8	+58.8	58.9	65 17.9	+59.2	60.8	65 46.3	+59.5	62.7	66 12.8	+59.8	64.7	66 37.4	+60.0	66.8	67 00.0	+60.0	69.0	**67**
68	64 40.6	+57.8	54.9	65 14.4	+58.3	56.6	65 46.6	+58.8	58.5	66 17.1	+59.2	60.4	66 45.8	+59.6	62.4	67 12.6	+59.8	64.5	67 37.4	+59.9	66.7	68 00.0	+60.0	69.0	**68**
69	65 38.4	+57.6	54.2	66 12.7	+58.1	56.0	66 45.4	+58.6	58.0	67 16.3	+59.1	60.0	67 45.4	+59.4	62.1	68 12.4	+59.8	64.3	68 37.3	+60.0	66.6	69 00.0	+60.0	69.0	**69**
70	66 36.0	+57.3	53.5	67 10.8	+58.0	55.4	67 44.0	+58.6	57.4	68 15.4	+59.0	59.5	68 44.8	+59.5	61.7	69 12.2	+59.7	64.1	69 37.3	+59.9	66.5	70 00.0	+60.0	69.0	**70**
71	67 33.3	+57.2	52.8	68 08.8	+57.8	54.7	68 42.6	+58.4	56.8	69 14.4	+59.0	59.0	69 44.3	+59.3	61.4	70 11.9	+59.7	63.8	70 37.2	+59.9	66.3	71 00.0	+60.0	69.0	**71**
72	68 30.5	+56.9	51.9	69 06.6	+57.6	54.0	69 41.0	+58.2	56.2	70 13.4	+58.8	58.5	70 43.6	+59.3	60.9	71 11.6	+59.7	63.5	71 37.1	+59.9	66.2	72 00.0	+60.0	69.0	**72**
73	69 27.4	+56.6	51.1	70 04.2	+57.4	53.2	70 39.2	+58.1	55.5	71 12.2	+58.7	57.9	71 42.9	+59.3	60.5	72 11.3	+59.6	63.2	72 37.0	+59.9	66.0	73 00.0	+60.0	69.0	**73**
74	70 24.0	+56.3	50.1	71 01.6	+57.1	52.3	71 37.3	+57.8	54.7	72 10.9	+58.5	57.2	72 42.2	+59.1	59.9	73 10.9	+59.6	62.8	73 36.9	+59.9	65.8	74 00.0	+60.0	69.0	**74**
75	71 20.3	+55.8	49.0	71 58.7	+56.8	51.4	72 35.1	+57.7	53.8	73 09.4	+58.4	56.5	73 41.3	+59.0	59.4	74 10.5	+59.6	62.4	74 36.8	+59.9	65.6	75 00.0	+60.0	69.0	**75**
76	72 16.1	+55.5	47.9	72 55.5	+56.4	50.3	73 32.8	+57.3	52.9	74 07.8	+58.2	55.7	74 40.3	+58.9	58.7	75 10.1	+59.4	61.9	75 36.7	+59.9	65.4	76 00.0	+60.0	69.0	**76**
77	73 11.6	+54.8	46.6	73 51.9	+55.9	49.1	74 30.1	+56.9	51.8	75 06.0	+57.9	54.8	75 39.2	+58.8	57.9	76 09.5	+59.4	61.4	76 36.6	+59.8	65.1	77 00.0	+60.0	69.0	**77**
78	74 06.4	+54.3	45.1	74 47.8	+55.4	47.7	75 27.0	+56.6	50.6	76 03.9	+57.6	53.7	76 38.0	+58.5	57.1	77 08.9	+59.3	60.8	77 36.4	+59.8	64.7	78 00.0	+60.0	69.0	**78**
79	75 00.7	+53.5	43.5	75 43.2	+54.8	46.2	76 23.6	+56.0	49.2	77 01.5	+57.2	52.5	77 36.5	+58.3	56.1	78 08.2	+59.2	60.1	78 36.2	+59.8	64.4	79 00.0	+60.0	69.0	**79**
80	75 54.2	+52.5	41.7	76 38.0	+53.9	44.5	77 19.6	+55.4	47.6	77 58.7	+56.7	51.1	78 34.8	+58.0	55.0	79 07.4	+59.0	59.2	79 36.0	+59.7	63.9	80 00.0	+60.0	69.0	**80**
81	76 46.7	+51.5	39.7	77 31.9	+53.0	42.6	78 15.0	+54.5	45.8	78 55.4	+56.1	49.5	79 32.8	+57.5	53.6	80 06.4	+58.8	58.2	80 35.7	+59.7	63.4	81 00.0	+60.0	69.0	**81**
82	77 38.2	+50.1	37.4	78 24.9	+51.8	40.3	79 09.5	+53.6	43.7	79 51.5	+55.3	47.6	80 30.3	+57.0	52.0	81 05.2	+58.5	57.0	81 35.4	+59.6	62.7	82 00.0	+60.0	69.0	**82**
83	78 28.3	+48.4	34.7	79 16.7	+50.3	37.7	80 03.1	+52.2	41.2	80 46.8	+54.3	45.2	81 27.3	+56.3	50.0	82 03.7	+58.1	55.5	82 35.0	+59.4	61.8	83 00.0	+60.0	69.0	**83**
84	79 16.7	*+46.4* •	31.6	80 07.0	*+48.3* •	34.6	80 55.3	*+50.4* •	38.2	81 41.1	+52.7	42.4	82 23.6	+55.1	47.5	83 01.8	+57.4	53.5	83 34.4	+59.3	60.7	84 00.0	+60.0	69.0	**84**
85	80 03.1	*+43.7* •	28.1	80 55.3	*+45.8* •	31.0	81 45.7	*+48.1* •	34.6	82 33.8	*+50.7* •	39.0	83 18.7	*+53.6* •	44.3	83 59.2	+56.5	51.0	84 33.7	+58.9	59.1	85 00.0	+60.0	69.0	**85**
86	80 46.8	*+40.5* •	24.0	81 41.1	*+42.5* •	26.8	82 33.8	*+44.9* •	30.2	83 24.5	*+47.8* •	34.6	84 12.3	*+51.1* •	40.2	84 55.7	*+54.8* •	47.4	85 32.6	+58.3	56.9	86 00.0	+60.0	69.0	**86**
87	81 27.3	*+36.4* •	19.2	82 23.6	*+38.2* •	21.7	83 18.7	*+40.5* •	24.8	84 12.3	*+43.4* •	28.9	85 03.4	*+47.1* •	34.5	85 50.5	*+51.7* •	42.4	86 30.9	*+56.9* •	53.5	87 00.0	+60.0	69.0	**87**
88	82 03.7	*+31.3* •	13.6	83 01.8	*+32.6* •	15.6	83 59.2	*+34.5* •	18.1	84 55.7	*+36.9* •	21.6	85 50.5	*+40.4* •	26.7	86 42.2	*+45.6* •	34.5	87 27.8	*+53.3* •	47.4	88 00.0	+60.0	69.0	**88**
89	82 35.0	*+25.0* •	7.3	83 34.4	*+25.6* •	8.4	84 33.7	*+26.3* •	9.9	85 32.6	*+27.4* •	12.1	86 30.9	*+29.1* •	15.5	87 27.8	*+32.2* •	21.6	88 21.1	*+38.9* •	34.5	89 00.0	+60.0	69.0	**89**
90	83 00.0	*+17.6* •	0.0	84 00.0	*+16.9* •	0.0	85 00.0	*+15.9* •	0.0	86 00.0	*+14.4* •	0.0	87 00.0	*+11.9* •	0.0	88 00.0	*+6.7* •	0.0	89 00.0	*−8.0* •	0.0	90 00.0	−60.0	34.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION **L.H.A. 111°, 249°**

70°, 290° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 23.3	+59.6	109.9	2 02.9	+59.7	109.9	1 42.5	+59.8	109.9	1 22.0	+59.9	110.0	1 01.5	+60.0	110.0	0 41.0	+60.0	110.0	0 20.5	+60.0	110.0	0 00.0	+60.0	110.0	**0**
1	3 22.9	+59.6	109.7	3 02.6	+59.7	109.8	2 42.3	+59.8	109.8	2 21.9	+59.9	109.9	2 01.5	+59.9	109.9	1 41.0	+60.0	110.0	1 20.5	+60.0	110.0	1 00.0	+60.0	110.0	**1**
2	4 22.5	+59.6	109.6	4 02.3	+59.8	109.7	3 42.1	+59.8	109.8	3 21.8	+59.8	109.8	3 01.4	+59.9	109.9	2 41.0	+59.9	109.9	2 20.5	+60.0	110.0	2 00.0	+60.0	110.0	**2**
3	5 22.1	+59.6	109.5	5 02.1	+59.7	109.6	4 41.9	+59.8	109.7	4 21.6	+59.9	109.8	4 01.3	+59.9	109.8	3 40.9	+60.0	109.9	3 20.5	+60.0	109.9	3 00.0	+60.0	110.0	**3**
4	6 21.7	+59.6	109.4	6 01.8	+59.7	109.5	5 41.7	+59.8	109.6	5 21.5	+59.9	109.7	5 01.2	+60.0	109.8	4 40.9	+60.0	109.9	4 20.5	+60.0	109.9	4 00.0	+60.0	110.0	**4**
5	7 21.3	+59.6	109.3	7 01.5	+59.7	109.4	6 41.5	+59.8	109.5	6 21.4	+59.8	109.6	6 01.2	+59.9	109.7	5 40.9	+59.9	109.8	5 20.5	+60.0	109.9	5 00.0	+60.0	110.0	**5**
6	8 20.9	+59.6	109.2	8 01.2	+59.7	109.3	7 41.3	+59.8	109.4	7 21.2	+59.9	109.6	7 01.1	+59.9	109.7	6 40.8	+60.0	109.8	6 20.5	+60.0	109.9	6 00.0	+60.0	110.0	**6**
7	9 20.5	+59.6	109.1	9 00.9	+59.7	109.2	8 41.1	+59.8	109.4	8 21.1	+59.9	109.5	8 01.0	+60.0	109.6	7 40.8	+60.0	109.8	7 20.5	+60.0	109.9	7 00.0	+60.0	110.0	**7**
8	10 20.1	+59.6	108.9	10 00.6	+59.7	109.1	9 40.9	+59.8	109.3	9 21.0	+59.8	109.4	9 01.0	+59.9	109.6	8 40.8	+59.9	109.7	8 20.5	+59.9	109.9	8 00.0	+60.0	110.0	**8**
9	11 19.7	+59.6	108.8	11 00.3	+59.7	109.0	10 40.7	+59.7	109.2	10 20.8	+59.9	109.4	10 00.9	+59.9	109.5	9 40.7	+60.0	109.7	9 20.4	+60.0	109.8	9 00.0	+60.0	110.0	**9**
10	12 19.3	+59.6	108.7	12 00.0	+59.7	108.9	11 40.4	+59.8	109.1	11 20.7	+59.9	109.3	11 00.8	+59.9	109.5	10 40.7	+60.0	109.7	10 20.4	+60.0	109.8	10 00.0	+60.0	110.0	**10**
11	13 18.9	+59.6	108.6	12 59.7	+59.7	108.8	12 40.2	+59.8	109.0	12 20.6	+59.8	109.2	12 00.7	+60.0	109.4	11 40.7	+59.9	109.6	11 20.4	+60.0	109.8	11 00.0	+60.0	110.0	**11**
12	14 18.5	+59.6	108.5	13 59.4	+59.7	108.7	13 40.0	+59.8	108.9	13 20.4	+59.9	109.2	13 00.7	+59.9	109.4	12 40.6	+60.0	109.6	12 20.4	+60.0	109.8	12 00.0	+60.0	110.0	**12**
13	15 18.1	+59.5	108.3	14 59.1	+59.6	108.6	14 39.8	+59.8	108.8	14 20.3	+59.9	109.1	14 00.6	+59.9	109.3	13 40.6	+60.0	109.6	13 20.4	+60.0	109.8	13 00.0	+60.0	110.0	**13**
14	16 17.6	+59.6	108.2	15 58.7	+59.7	108.5	15 39.6	+59.8	108.8	15 20.2	+59.8	109.0	15 00.5	+59.9	109.3	14 40.6	+59.9	109.5	14 20.4	+60.0	109.8	14 00.0	+60.0	110.0	**14**
15	17 17.2	+59.6	108.1	16 58.4	+59.7	108.4	16 39.4	+59.7	108.7	16 20.0	+59.9	108.9	16 00.4	+59.9	109.2	15 40.5	+60.0	109.5	15 20.4	+60.0	109.7	15 00.0	+60.0	110.0	**15**
16	18 16.8	+59.5	108.0	17 58.1	+59.7	108.3	17 39.1	+59.8	108.6	17 19.9	+59.8	108.9	17 00.3	+60.0	109.2	16 40.5	+60.0	109.4	16 20.4	+60.0	109.7	16 00.0	+60.0	110.0	**16**
17	19 16.3	+59.6	107.8	18 57.8	+59.7	108.2	18 38.9	+59.8	108.5	18 19.7	+59.9	108.8	18 00.3	+59.9	109.1	17 40.5	+59.9	109.4	17 20.4	+60.0	109.7	17 00.0	+60.0	110.0	**17**
18	20 15.9	+59.5	107.7	19 57.5	+59.6	108.0	19 38.7	+59.8	108.4	19 19.6	+59.9	108.7	19 00.2	+59.9	109.1	18 40.4	+60.0	109.4	18 20.4	+60.0	109.7	18 00.0	+60.0	110.0	**18**
19	21 15.4	+59.6	107.6	20 57.1	+59.7	107.9	20 38.5	+59.7	108.3	20 19.5	+59.8	108.7	20 00.1	+59.9	109.0	19 40.4	+60.0	109.3	19 20.4	+60.0	109.7	19 00.0	+60.0	110.0	**19**
20	22 15.0	+59.5	107.4	21 56.8	+59.7	107.8	21 38.2	+59.8	108.2	21 19.3	+59.9	108.6	21 00.0	+59.9	108.9	20 40.4	+59.9	109.3	20 20.4	+59.9	109.7	20 00.0	+60.0	110.0	**20**
21	23 14.5	+59.5	107.3	22 56.5	+59.6	107.7	22 38.0	+59.8	108.1	22 19.2	+59.8	108.5	21 59.9	+59.9	108.9	21 40.3	+60.0	109.3	21 20.3	+60.0	109.6	21 00.0	+60.0	110.0	**21**
22	24 14.0	+59.5	107.2	23 56.1	+59.7	107.6	23 37.8	+59.7	108.0	23 19.0	+59.9	108.4	22 59.8	+60.0	108.8	22 40.3	+59.9	109.2	22 20.3	+60.0	109.6	22 00.0	+60.0	110.0	**22**
23	25 13.5	+59.6	107.0	24 55.8	+59.6	107.5	24 37.5	+59.8	107.9	24 18.9	+59.8	108.3	23 59.8	+59.9	108.8	23 40.2	+60.0	109.2	23 20.3	+60.0	109.6	23 00.0	+60.0	110.0	**23**
24	26 13.1	+59.5	106.9	25 55.4	+59.6	107.4	25 37.3	+59.7	107.8	25 18.7	+59.8	108.3	24 59.7	+59.9	108.7	24 40.2	+60.0	109.1	24 20.3	+60.0	109.6	24 00.0	+60.0	110.0	**24**
25	27 12.6	+59.5	106.7	26 55.0	+59.7	107.2	26 37.0	+59.8	107.7	26 18.5	+59.9	108.2	25 59.6	+59.9	108.6	25 40.2	+59.9	109.1	25 20.3	+60.0	109.6	25 00.0	+60.0	110.0	**25**
26	28 12.1	+59.4	106.6	27 54.7	+59.6	107.1	27 36.8	+59.7	107.6	27 18.4	+59.8	108.1	26 59.5	+59.9	108.6	26 40.1	+60.0	109.1	26 20.3	+60.0	109.5	26 00.0	+60.0	110.0	**26**
27	29 11.5	+59.5	106.4	28 54.3	+59.6	107.0	28 36.5	+59.7	107.5	28 18.2	+59.8	108.0	27 59.4	+59.9	108.5	27 40.1	+59.9	109.0	27 20.3	+60.0	109.5	27 00.0	+60.0	110.0	**27**
28	30 11.0	+59.5	106.3	29 53.9	+59.6	106.8	29 36.2	+59.8	107.4	29 18.0	+59.9	107.9	28 59.3	+59.9	108.5	28 40.0	+60.0	109.0	28 20.3	+60.0	109.5	28 00.0	+60.0	110.0	**28**
29	31 10.5	+59.4	106.1	30 53.5	+59.6	106.7	30 36.0	+59.7	107.3	30 17.9	+59.8	107.8	29 59.2	+59.9	108.4	29 40.0	+60.0	108.9	29 20.3	+60.0	109.5	29 00.0	+60.0	110.0	**29**
30	32 09.9	+59.5	106.0	31 53.1	+59.6	106.6	31 35.7	+59.7	107.2	31 17.7	+59.8	107.8	30 59.1	+59.9	108.3	30 40.0	+59.9	108.9	30 20.3	+59.9	109.5	30 00.0	+60.0	110.0	**30**
31	33 09.4	+59.4	105.8	32 52.7	+59.6	106.4	32 35.4	+59.7	107.1	32 17.5	+59.8	107.7	31 59.0	+59.9	108.3	31 39.9	+60.0	108.9	31 20.2	+60.0	109.4	31 00.0	+60.0	110.0	**31**
32	34 08.8	+59.4	105.7	33 52.3	+59.6	106.3	33 35.1	+59.7	106.9	33 17.3	+59.8	107.6	32 58.9	+59.9	108.2	32 39.9	+59.9	108.8	32 20.2	+60.0	109.4	32 00.0	+60.0	110.0	**32**
33	35 08.2	+59.4	105.5	34 51.9	+59.5	106.2	34 34.8	+59.7	106.8	34 17.1	+59.9	107.5	33 58.8	+59.9	108.1	33 39.8	+60.0	108.8	33 20.2	+60.0	109.4	33 00.0	+60.0	110.0	**33**
34	36 07.6	+59.4	105.3	35 51.4	+59.6	106.0	35 34.5	+59.7	106.7	35 17.0	+59.8	107.4	34 58.7	+59.9	108.1	34 39.8	+59.9	108.7	34 20.2	+60.0	109.4	34 00.0	+60.0	110.0	**34**
35	37 07.0	+59.4	105.1	36 51.0	+59.5	105.9	36 34.2	+59.7	106.6	36 16.8	+59.8	107.3	35 58.6	+59.9	108.0	35 39.7	+60.0	108.7	35 20.2	+60.0	109.3	35 00.0	+60.0	110.0	**35**
36	38 06.4	+59.3	105.0	37 50.5	+59.6	105.7	37 33.9	+59.7	106.4	37 16.6	+59.8	107.2	36 58.5	+59.9	107.9	36 39.7	+59.9	108.6	36 20.2	+60.0	109.3	36 00.0	+60.0	110.0	**36**
37	39 05.7	+59.4	104.8	38 50.1	+59.5	105.5	38 33.6	+59.7	106.3	38 16.4	+59.7	107.1	37 58.4	+59.8	107.8	37 39.6	+60.0	108.6	37 20.2	+60.0	109.3	37 00.0	+60.0	110.0	**37**
38	40 05.1	+59.3	104.6	39 49.6	+59.5	105.4	39 33.3	+59.6	106.2	39 16.1	+59.8	107.0	38 58.2	+59.9	107.7	38 39.6	+59.9	108.5	38 20.2	+59.9	109.3	38 00.0	+60.0	110.0	**38**
39	41 04.4	+59.3	104.4	40 49.1	+59.5	105.2	40 32.9	+59.7	106.0	40 15.9	+59.8	106.9	39 58.1	+59.9	107.7	39 39.5	+60.0	108.5	39 20.1	+60.0	109.2	39 00.0	+60.0	110.0	**39**
40	42 03.7	+59.3	104.2	41 48.6	+59.4	105.0	41 32.6	+59.6	105.9	41 15.7	+59.8	106.7	40 58.0	+59.9	107.6	40 39.5	+59.9	108.4	40 20.1	+60.0	109.2	40 00.0	+60.0	110.0	**40**
41	43 03.0	+59.2	104.0	42 48.0	+59.5	104.9	42 32.2	+59.6	105.7	42 15.5	+59.7	106.6	41 57.9	+59.8	107.5	41 39.4	+60.0	108.3	41 20.1	+60.0	109.2	41 00.0	+60.0	110.0	**41**
42	44 02.2	+59.2	103.7	43 47.5	+59.4	104.7	43 31.8	+59.6	105.6	43 15.2	+59.8	106.5	42 57.7	+59.9	107.4	42 39.4	+59.9	108.3	42 20.1	+60.0	109.1	42 00.0	+60.0	110.0	**42**
43	45 01.4	+59.2	103.5	44 46.9	+59.4	104.5	44 31.4	+59.6	105.4	44 15.0	+59.7	106.4	43 57.6	+59.9	107.3	43 39.3	+59.9	108.2	43 20.1	+60.0	109.1	43 00.0	+60.0	110.0	**43**
44	46 00.6	+59.2	103.3	45 46.3	+59.4	104.3	45 31.0	+59.6	105.3	45 14.7	+59.8	106.2	44 57.5	+59.8	107.2	44 39.2	+60.0	108.2	44 20.1	+60.0	109.1	44 00.0	+60.0	110.0	**44**
45	46 59.8	+59.1	103.0	46 45.7	+59.4	104.1	46 30.6	+59.6	105.1	46 14.5	+59.7	106.1	45 57.3	+59.9	107.1	45 39.2	+59.9	108.1	45 20.1	+59.9	109.1	45 00.0	+60.0	110.0	**45**
46	47 58.9	+59.1	102.8	47 45.1	+59.3	103.9	47 30.2	+59.5	104.9	47 14.2	+59.7	106.0	46 57.2	+59.8	107.0	46 39.1	+59.9	108.0	46 20.0	+60.0	109.0	46 00.0	+60.0	110.0	**46**
47	48 58.0	+59.1	102.5	48 44.4	+59.3	103.6	48 29.7	+59.5	104.7	48 13.9	+59.7	105.8	47 57.0	+59.8	106.9	47 39.0	+60.0	107.9	47 20.0	+60.0	109.0	47 00.0	+60.0	110.0	**47**
48	49 57.1	+59.0	102.3	49 43.7	+59.3	103.4	49 29.2	+59.6	104.6	49 13.6	+59.7	105.7	48 56.8	+59.9	106.8	48 39.0	+59.9	107.9	48 20.0	+60.0	108.9	48 00.0	+60.0	110.0	**48**
49	50 56.1	+59.0	102.0	50 43.0	+59.3	103.2	50 28.8	+59.4	104.4	50 13.3	+59.7	105.5	49 56.7	+59.8	106.7	49 38.9	+59.9	107.8	49 20.0	+60.0	108.9	49 00.0	+60.0	110.0	**49**
50	51 55.1	+58.9	101.7	51 42.3	+59.2	102.9	51 28.2	+59.5	104.1	51 13.0	+59.6	105.4	50 56.5	+59.8	106.5	50 38.8	+59.9	107.7	50 20.0	+59.9	108.9	50 00.0	+60.0	110.0	**50**
51	52 54.0	+58.9	101.4	52 41.5	+59.2	102.7	52 27.7	+59.5	103.9	52 12.6	+59.7	105.2	51 56.3	+59.8	106.4	51 38.7	+59.9	107.6	51 19.9	+60.0	108.8	51 00.0	+60.0	110.0	**51**
52	53 52.9	+58.8	101.0	53 40.7	+59.1	102.4	53 27.2	+59.4	103.7	53 12.3	+59.6	105.0	52 56.1	+59.8	106.3	52 38.6	+59.9	107.5	52 19.9	+60.0	108.8	52 00.0	+60.0	110.0	**52**
53	54 51.7	+58.8	100.7	54 39.8	+59.2	102.1	54 26.6	+59.4	103.5	54 11.9	+59.6	104.8	53 55.9	+59.8	106.1	53 38.5	+59.9	107.5	53 19.9	+60.0	108.7	53 00.0	+60.0	110.0	**53**
54	55 50.5	+58.7	100.4	55 39.0	+59.0	101.8	55 26.0	+59.3	103.2	55 11.5	+59.6	104.6	54 55.7	+59.7	106.0	54 38.4	+59.9	107.4	54 19.9	+60.0	108.7	54 00.0	+60.0	110.0	**54**
55	56 49.2	+58.6	100.0	56 38.0	+59.0	101.5	56 25.3	+59.3	103.0	56 11.1	+59.6	104.4	55 55.4	+59.8	105.9	55 38.3	+59.9	107.3	55 19.9	+59.9	108.6	55 00.0	+60.0	110.0	**55**
56	57 47.8	+58.6	99.6	57 37.0	+59.0	101.1	57 24.6	+59.3	102.7	57 10.7	+59.5	104.2	56 55.2	+59.8	105.7	56 38.2	+59.9	107.2	56 19.8	+60.0	108.6	56 00.0	+60.0	110.0	**56**
57	58 46.4	+58.5	99.2	58 36.0	+58.9	100.8	58 23.9	+59.3	102.4	58 10.2	+59.6	104.0	57 55.0	+59.7	105.5	57 38.1	+59.9	107.0	57 19.8	+60.0	108.5	57 00.0	+60.0	110.0	**57**
58	59 44.9	+58.3	98.7	59 34.9	+58.8	100.4	59 23.2	+59.2	102.1	59 09.8	+59.4	103.7	58 54.7	+59.7	105.3	58 38.0	+59.9	106.9	58 19.8	+59.9	108.5	58 00.0	+60.0	110.0	**58**
59	60 43.2	+58.3	98.3	60 33.7	+58.7	100.0	60 22.4	+59.1	101.8	60 09.2	+59.5	103.5	59 54.4	+59.7	105.2	59 37.9	+59.9	106.8	59 19.7	+60.0	108.4	59 00.0	+60.0	110.0	**59**
60	61 41.5	+58.2	97.8	61 32.4	+58.7	99.6	61 21.5	+59.1	101.4	61 08.7	+59.4	103.2	60 54.1	+59.7	104.9	60 37.8	+59.8	106.7	60 19.7	+60.0	108.4	60 00.0	+60.0	110.0	**60**
61	62 39.7	+58.0	97.3	62 31.1	+58.6	99.2	62 20.6	+59.0	101.0	62 08.1	+59.4	102.9	61 53.8	+59.7	104.7	61 37.6	+59.9	106.5	61 19.7	+59.9	108.3	61 00.0	+60.0	110.0	**61**
62	63 37.7	+57.9	96.7	63 29.7	+58.5	98.7	63 19.6	+59.0	100.7	63 07.5	+59.4	102.6	62 53.5	+59.6	104.5	62 37.5	+59.8	106.4	62 19.6	+60.0	108.2	62 00.0	+60.0	110.0	**62**
63	64 35.6	+57.8	96.1	64 28.2	+58.3	98.2	64 18.6	+58.8	100.2	64 06.9	+59.3	102.3	63 53.1	+59.6	104.3	63 37.3	+59.9	106.2	63 19.6	+60.0	108.1	63 00.0	+60.0	110.0	**63**
64	65 33.4	+57.5	95.4	65 26.5	+58.3	97.6	65 17.4	+58.8	99.8	65 06.2	+59.2	101.9	64 52.7	+59.6	104.0	64 37.2	+59.8	106.0	64 19.6	+59.9	108.0	64 00.0	+60.0	110.0	**64**
65	66 30.9	+57.4	94.8	66 24.8	+58.1	97.0	66 16.2	+58.7	99.3	66 05.4	+59.2	101.5	65 52.3	+59.5	103.7	65 37.0	+59.8	105.9	65 19.5	+60.0	108.0	65 00.0	+60.0	110.0	**65**
66	67 28.3	+57.1	94.0	67 22.9	+57.9	96.4	67 14.9	+58.6	98.8	67 04.6	+59.1	101.1	66 51.8	+59.5	103.4	66 36.8	+59.8	105.7	66 19.5	+59.9	107.9	66 00.0	+60.0	110.0	**66**
67	68 25.4	+56.9	93.2	68 20.8	+57.7	95.7	68 13.5	+58.5	98.2	68 03.7	+59.0	100.7	67 51.3	+59.5	103.1	67 36.6	+59.7	105.4	67 19.4	+60.0	107.8	67 00.0	+60.0	110.0	**67**
68	69 22.3	+56.6	92.3	69 18.5	+57.5	95.0	69 12.0	+58.3	97.6	69 02.7	+58.9	100.2	68 50.8	+59.4	102.7	68 36.3	+59.8	105.2	68 19.4	+59.9	107.6	68 00.0	+60.0	110.0	**68**
69	70 18.9	+56.3	91.3	70 16.0	+57.3	94.1	70 10.3	+58.1	96.9	70 01.6	+58.9	99.6	69 50.2	+59.4	102.3	69 36.1	+59.7	104.9	69 19.3	+59.9	107.5	69 00.0	+60.0	110.0	**69**
70	71 15.2	+55.8	90.3	71 13.3	+57.0	93.2	71 08.4	+57.9	96.2	71 00.5	+58.7	99.0	70 49.6	+59.3	101.9	70 35.8	+59.7	104.7	70 19.2	+60.0	107.4	70 00.0	+60.0	110.0	**70**
71	72 11.0	+55.4	89.1	72 10.3	+56.7	92.2	72 06.3	+57.8	95.3	71 59.2	+58.5	98.4	71 48.9	+59.2	101.4	71 35.5	+59.6	104.4	71 19.2	+59.9	107.2	71 00.0	+60.0	110.0	**71**
72	73 06.4	+54.9	87.8	73 07.0	+56.2	91.1	73 04.1	+57.4	94.4	72 57.7	+58.4	97.7	72 48.1	+59.1	100.9	72 35.1	+59.7	104.0	72 19.1	+59.9	107.1	72 00.0	+60.0	110.0	**72**
73	74 01.3	+54.2	86.4	74 03.2	+55.8	89.9	74 01.5	+57.1	93.4	73 56.1	+58.2	96.9	73 47.2	+59.0	100.3	73 34.8	+59.5	103.6	73 19.0	+59.9	106.9	73 00.0	+60.0	110.0	**73**
74	74 55.5	+53.5	84.8	74 59.0	+55.2	88.5	74 58.6	+56.7	92.2	74 54.3	+57.9	95.9	74 46.2	+58.9	99.6	74 34.3	+59.5	103.2	74 18.9	+59.9	106.7	74 00.0	+60.0	110.0	**74**
75	75 49.0	+52.5	83.0	75 54.2	+54.6	87.0	75 55.3	+56.3	90.9	75 52.2	+57.7	94.9	75 45.1	+58.7	98.8	75 33.8	+59.5	102.7	75 18.8	+59.8	106.4	75 00.0	+60.0	110.0	**75**
76	76 41.5	+51.5	81.0	76 48.8	+53.7	85.2	76 51.6	+55.6	89.5	76 49.9	+57.2	93.7	76 43.8	+58.5	98.0	76 33.3	+59.3	102.1	76 18.6	+59.9	106.1	76 00.0	+60.0	110.0	**76**
77	77 33.0	+50.1	78.7	77 42.5	+52.6	83.2	77 47.2	+54.9	87.8	77 47.1	+56.8	92.4	77 42.3	+58.2	97.0	77 32.6	+59.3	101.5	77 18.5	+59.8	105.8	77 00.0	+60.0	110.0	**77**
78	78 23.1	+48.5	76.0	78 35.1	+51.4	80.8	78 42.1	+54.1	85.8	78 43.9	+56.2	90.8	78 40.5	+57.9	95.8	78 31.9	+59.1	100.7	78 18.3	+59.8	105.5	78 00.0	+60.0	110.0	**78**
79	79 11.6	*+46.4*•	73.0	79 26.5	+49.8	78.1	79 36.2	+52.8	83.5	79 40.1	+55.5	88.9	79 38.4	+57.5	94.4	79 31.0	+58.9	99.8	79 18.1	+59.7	105.0	79 00.0	+60.0	110.0	**79**
80	79 58.0	*+43.8*•	69.5	80 16.3	*+47.7*•	75.0	80 29.0	+51.3	80.7	80 35.6	+54.4	86.7	80 35.9	+56.9	92.7	80 29.9	+58.7	98.7	80 17.8	+59.7	104.5	80 00.0	+60.0	110.0	**80**
81	80 41.8	*+40.6*•	65.4	81 04.0	*+45.0*•	71.2	81 20.3	*+49.2*•	77.4	81 30.0	+53.0	84.0	81 32.8	+56.1	90.7	81 28.6	+58.3	97.4	81 17.5	+59.6	103.9	81 00.0	+60.0	110.0	**81**
82	81 22.4	*+36.6*•	60.7	81 49.0	*+41.6*•	66.8	82 09.5	*+46.5*•	73.4	82 23.0	*+51.0*•	80.6	82 28.9	+54.9	88.1	82 26.9	+57.8	95.7	82 17.1	+59.5	103.0	82 00.0	+60.0	110.0	**82**
83	81 59.0	*+31.6*•	55.2	82 30.6	*+36.9*•	61.5	82 56.0	*+42.6*•	68.6	83 14.0	*+48.4*•	76.4	83 23.8	*+53.3*•	84.9	83 24.7	+57.1	93.5	83 16.6	+59.3	102.0	83 00.0	+60.0	110.0	**83**
84	82 30.6	*+25.4*•	48.9	83 07.5	*+31.1*•	55.1	83 38.6	*+37.5*•	62.5	84 02.4	*+44.2*•	71.1	84 17.1	*+50.7*•	80.6	84 21.8	+55.8	90.6	84 15.9	+59.0	100.6	84 00.0	+60.0	110.0	**84**
85	82 56.0	*+18.0*•	41.7	83 38.6	*+23.8*•	47.7	84 16.1	*+30.5*•	55.1	84 46.6	*+38.2*•	64.1	85 07.8	*+46.4*•	74.7	85 17.6	*+53.8*•	86.5	85 14.9	+58.5	98.6	85 00.0	+60.0	110.0	**85**
86	83 14.0	*+9.8*•	33.8	84 02.4	*+14.7*•	39.1	84 46.6	*+21.2*•	46.1	85 24.8	*+29.4*•	55.1	85 54.2	*+39.4*•	66.6	86 11.4	*+49.7*•	80.5	86 13.4	+57.5	95.6	86 00.0	+60.0	110.0	**86**
87	83 23.8	*+0.9*•	25.3	84 17.1	*+4.7*•	29.6	85 07.8	*+9.8*•	35.4	85 54.2	*+17.2*•	43.5	86 33.6	*+27.5*•	55.0	87 01.1	*+41.3*•	71.0	87 10.9	*+54.8*•	90.5	87 00.0	+60.0	110.0	**87**
88	83 24.7	*–8.1*•	16.6	84 21.8	*–5.9*•	19.5	85 17.6	*–2.7*•	23.6	86 11.4	*+2.0*•	29.6	87 01.1	*+9.8*•	39.1	87 42.4	*+23.3*•	55.0	88 05.7	*+45.5*•	80.5	88 00.0	+60.0	110.0	**88**
89	83 16.6	*–16.6*•	8.1	84 15.9	*–15.9*•	9.4	85 14.9	*–14.9*•	11.4	86 13.4	*–13.4*•	14.4	87 10.9	*–10.9*•	19.5	88 05.7	*–5.7*•	29.5	88 51.2	*+8.8*•	55.0	89 00.0	+60.0	110.0	**89**
90	83 00.0	*–24.1*•	0.0	84 00.0	*–24.7*•	0.0	85 00.0	*–25.4*•	0.0	86 00.0	*–26.5*•	0.0	87 00.0	*–28.3*•	0.0	88 00.0	*–31.4*•	0.0	89 00.0	*–38.3*•	0.0	90 00.0	–60.0	55.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 70°, 290°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	2 23.3	–59.6	109.9	2 02.9	–59.7	109.9	1 42.5	–59.8	109.9	1 22.0	–59.8	110.0	1 01.5	–59.9	110.0	0 41.0	–59.9	110.0	0 20.5	–60.0	110.0	0 00.0	+60.0	70.0	**0**
1	1 23.7	–59.6	110.0	1 03.2	–59.7	110.0	0 42.7	–59.8	110.0	0 22.2	–59.9	110.0	0 01.6	–59.9	110.0	0 18.9	+60.0	70.0	0 39.5	+60.0	70.0	1 00.0	+60.0	70.0	**1**
2	0 24.1	–59.6	110.1	0 03.5	–59.7	110.1	0 17.1	+59.8	69.9	0 37.7	+59.9	69.9	0 58.3	+59.9	69.9	1 18.9	+60.0	69.9	1 39.5	+60.0	70.0	2 00.0	+60.0	70.0	**2**
3	0 35.5	+59.6	69.8	0 56.2	+59.7	69.8	1 16.9	+59.8	69.8	1 37.6	+59.9	69.8	1 58.2	+60.0	69.9	2 18.9	+59.9	69.9	2 39.5	+59.9	70.0	3 00.0	+60.0	70.0	**3**
4	1 35.1	+59.6	69.7	1 55.9	+59.7	69.7	2 16.7	+59.8	69.7	2 37.5	+59.8	69.8	2 58.2	+59.9	69.8	3 18.8	+60.0	69.9	3 39.4	+60.0	69.9	4 00.0	+60.0	70.0	**4**
5	2 34.7	+59.6	69.6	2 55.6	+59.7	69.6	3 16.5	+59.8	69.7	3 37.3	+59.9	69.7	3 58.1	+59.9	69.8	4 18.8	+60.0	69.8	4 39.4	+60.0	69.9	5 00.0	+60.0	70.0	**5**
6	3 34.3	+59.6	69.4	3 55.3	+59.7	69.5	4 16.3	+59.8	69.6	4 37.2	+59.9	69.7	4 58.0	+60.0	69.7	5 18.8	+59.9	69.8	5 39.4	+60.0	69.9	6 00.0	+60.0	70.0	**6**
7	4 33.9	+59.6	69.3	4 55.0	+59.7	69.4	5 16.1	+59.8	69.5	5 37.1	+59.8	69.6	5 58.0	+59.9	69.7	6 18.7	+60.0	69.8	6 39.4	+60.0	69.9	7 00.0	+60.0	70.0	**7**
8	5 33.5	+59.6	69.2	5 54.7	+59.8	69.3	6 15.9	+59.8	69.4	6 36.9	+59.9	69.5	6 57.9	+59.9	69.6	7 18.7	+60.0	69.7	7 39.4	+60.0	69.9	8 00.0	+60.0	70.0	**8**
9	6 33.1	+59.6	69.1	6 54.5	+59.7	69.2	7 15.7	+59.8	69.3	7 36.8	+59.9	69.5	7 57.8	+59.9	69.6	8 18.7	+59.9	69.7	8 39.4	+60.0	69.9	9 00.0	+60.0	70.0	**9**
10	7 32.7	+59.6	69.0	7 54.2	+59.7	69.1	8 15.5	+59.8	69.2	8 36.7	+59.8	69.4	8 57.7	+60.0	69.5	9 18.6	+60.0	69.7	9 39.4	+60.0	69.8	10 00.0	+60.0	70.0	**10**
11	8 32.3	+59.6	68.9	8 53.9	+59.7	69.0	9 15.3	+59.8	69.2	9 36.5	+59.9	69.3	9 57.7	+59.9	69.5	10 18.6	+60.0	69.6	10 39.4	+60.0	69.8	11 00.0	+60.0	70.0	**11**
12	9 31.9	+59.6	68.8	9 53.6	+59.7	68.9	10 15.1	+59.8	69.1	10 36.4	+59.9	69.3	10 57.6	+59.9	69.4	11 18.6	+59.9	69.6	11 39.4	+60.0	69.8	12 00.0	+60.0	70.0	**12**
13	10 31.5	+59.6	68.6	10 53.3	+59.7	68.8	11 14.9	+59.7	69.0	11 36.3	+59.8	69.2	11 57.5	+59.9	69.4	12 18.5	+60.0	69.6	12 39.4	+60.0	69.8	13 00.0	+60.0	70.0	**13**
14	11 31.1	+59.6	68.5	11 53.0	+59.7	68.7	12 14.6	+59.8	68.9	12 36.1	+59.9	69.1	12 57.4	+60.0	69.3	13 18.5	+60.0	69.5	13 39.4	+60.0	69.8	14 00.0	+60.0	70.0	**14**
15	12 30.7	+59.5	68.4	12 52.7	+59.6	68.6	13 14.4	+59.8	68.8	13 36.0	+59.9	69.0	13 57.4	+59.9	69.3	14 18.5	+59.9	69.5	14 39.4	+59.9	69.8	15 00.0	+60.0	70.0	**15**
16	13 30.2	+59.6	68.3	13 52.3	+59.7	68.5	14 14.2	+59.8	68.7	14 35.9	+59.8	69.0	14 57.3	+59.9	69.2	15 18.4	+60.0	69.5	15 39.3	+60.0	69.7	16 00.0	+60.0	70.0	**16**
17	14 29.8	+59.6	68.2	14 52.0	+59.7	68.4	15 14.0	+59.8	68.6	15 35.7	+59.9	68.9	15 57.2	+59.9	69.2	16 18.4	+60.0	69.4	16 39.3	+60.0	69.7	17 00.0	+60.0	70.0	**17**
18	15 29.4	+59.6	68.0	15 51.7	+59.7	68.3	16 13.8	+59.8	68.6	16 35.6	+59.8	68.8	16 57.1	+59.9	69.1	17 18.4	+59.9	69.4	17 39.3	+60.0	69.7	18 00.0	+60.0	70.0	**18**
19	16 29.0	+59.5	67.9	16 51.4	+59.7	68.2	17 13.6	+59.7	68.5	17 35.4	+59.9	68.8	17 57.0	+60.0	69.1	18 18.3	+60.0	69.4	18 39.3	+60.0	69.7	19 00.0	+60.0	70.0	**19**
20	17 28.5	+59.6	67.8	17 51.1	+59.7	68.1	18 13.3	+59.8	68.4	18 35.3	+59.9	68.7	18 57.0	+59.9	69.0	19 18.3	+60.0	69.3	19 39.3	+60.0	69.7	20 00.0	+60.0	70.0	**20**
21	18 28.1	+59.6	67.7	18 50.8	+59.6	68.0	19 13.1	+59.8	68.3	19 35.2	+59.8	68.6	19 56.9	+59.9	69.0	20 18.3	+59.9	69.3	20 39.3	+60.0	69.6	21 00.0	+60.0	70.0	**21**
22	19 27.7	+59.5	67.5	19 50.4	+59.7	67.9	20 12.9	+59.8	68.2	20 35.0	+59.9	68.5	20 56.8	+59.9	68.9	21 18.2	+60.0	69.3	21 39.3	+60.0	69.6	22 00.0	+60.0	70.0	**22**
23	20 27.2	+59.6	67.4	20 50.1	+59.7	67.7	21 12.7	+59.7	68.1	21 34.9	+59.8	68.5	21 56.7	+59.9	68.8	22 18.2	+59.9	69.2	22 39.3	+60.0	69.6	23 00.0	+60.0	70.0	**23**
24	21 26.8	+59.5	67.3	21 49.8	+59.6	67.6	22 12.4	+59.8	68.0	22 34.7	+59.9	68.4	22 56.6	+59.9	68.8	23 18.1	+60.0	69.2	23 39.3	+60.0	69.6	24 00.0	+60.0	70.0	**24**
25	22 26.3	+59.5	67.1	22 49.4	+59.7	67.5	23 12.2	+59.8	67.9	23 34.6	+59.8	68.3	23 56.5	+59.9	68.7	24 18.1	+60.0	69.1	24 39.3	+60.0	69.6	25 00.0	+60.0	70.0	**25**
26	23 25.8	+59.6	67.0	23 49.1	+59.6	67.4	24 12.0	+59.7	67.8	24 34.4	+59.9	68.2	24 56.4	+60.0	68.7	25 18.1	+59.9	69.1	25 39.3	+59.9	69.5	26 00.0	+60.0	70.0	**26**
27	24 25.4	+59.5	66.9	24 48.7	+59.7	67.3	25 11.7	+59.8	67.7	25 34.3	+59.8	68.2	25 56.4	+59.9	68.6	26 18.0	+60.0	69.1	26 39.2	+60.0	69.5	27 00.0	+60.0	70.0	**27**
28	25 24.9	+59.5	66.7	25 48.4	+59.6	67.2	26 11.5	+59.7	67.6	26 34.1	+59.8	68.1	26 56.3	+59.9	68.5	27 18.0	+59.9	69.0	27 39.2	+60.0	69.5	28 00.0	+60.0	70.0	**28**
29	26 24.4	+59.5	66.6	26 48.0	+59.7	67.0	27 11.2	+59.8	67.5	27 33.9	+59.9	68.0	27 56.2	+59.9	68.5	28 17.9	+60.0	69.0	28 39.2	+60.0	69.5	29 00.0	+60.0	70.0	**29**
30	27 23.9	+59.5	66.4	27 47.7	+59.6	66.9	28 11.0	+59.7	67.4	28 33.8	+59.8	67.9	28 56.1	+59.9	68.4	29 17.9	+60.0	68.9	29 39.2	+60.0	69.5	30 00.0	+60.0	70.0	**30**
31	28 23.4	+59.5	66.3	28 47.3	+59.6	66.8	29 10.7	+59.7	67.3	29 33.6	+59.8	67.8	29 56.0	+59.9	68.4	30 17.9	+59.9	68.9	30 39.2	+60.0	69.4	31 00.0	+60.0	70.0	**31**
32	29 22.9	+59.5	66.1	29 46.9	+59.6	66.7	30 10.4	+59.7	67.2	30 33.4	+59.8	67.7	30 55.9	+59.9	68.3	31 17.8	+60.0	68.8	31 39.2	+60.0	69.4	32 00.0	+60.0	70.0	**32**
33	30 22.4	+59.4	66.0	30 46.5	+59.6	66.5	31 10.1	+59.8	67.1	31 33.2	+59.9	67.6	31 55.8	+59.9	68.2	32 17.8	+59.9	68.8	32 39.2	+60.0	69.4	33 00.0	+60.0	70.0	**33**
34	31 21.8	+59.5	65.8	31 46.1	+59.6	66.4	32 09.9	+59.7	67.0	32 33.1	+59.8	67.6	32 55.7	+59.9	68.1	33 17.7	+60.0	68.8	33 39.2	+60.0	69.4	34 00.0	+60.0	70.0	**34**
35	32 21.3	+59.4	65.7	32 45.7	+59.6	66.3	33 09.6	+59.7	66.9	33 32.9	+59.8	67.5	33 55.6	+59.9	68.1	34 17.7	+59.9	68.7	34 39.2	+59.9	69.3	35 00.0	+60.0	70.0	**35**
36	33 20.7	+59.4	65.5	33 45.3	+59.6	66.1	34 09.3	+59.7	66.7	34 32.7	+59.8	67.4	34 55.5	+59.9	68.0	35 17.6	+60.0	68.7	35 39.1	+60.0	69.3	36 00.0	+60.0	70.0	**36**
37	34 20.1	+59.5	65.3	34 44.9	+59.5	66.0	35 09.0	+59.7	66.6	35 32.5	+59.8	67.3	35 55.4	+59.9	67.9	36 17.6	+59.9	68.6	36 39.1	+60.0	69.3	37 00.0	+60.0	70.0	**37**
38	35 19.6	+59.4	65.2	35 44.4	+59.6	65.8	36 08.7	+59.7	66.5	36 32.3	+59.8	67.2	36 55.3	+59.8	67.9	37 17.5	+60.0	68.6	37 39.1	+60.0	69.3	38 00.0	+60.0	70.0	**38**
39	36 19.0	+59.3	65.0	36 44.0	+59.5	65.7	37 08.4	+59.7	66.4	37 32.1	+59.8	67.1	37 55.1	+59.9	67.8	38 17.5	+59.9	68.5	38 39.1	+60.0	69.2	39 00.0	+60.0	70.0	**39**
40	37 18.3	+59.4	64.8	37 43.5	+59.6	65.5	38 08.1	+59.6	66.2	38 31.9	+59.8	67.0	38 55.0	+59.9	67.7	39 17.4	+60.0	68.5	39 39.1	+60.0	69.2	40 00.0	+60.0	70.0	**40**
41	38 17.7	+59.4	64.6	38 43.1	+59.5	65.4	39 07.7	+59.7	66.1	39 31.7	+59.8	66.8	39 54.9	+59.9	67.6	40 17.4	+59.9	68.4	40 39.1	+60.0	69.2	41 00.0	+60.0	70.0	**41**
42	39 17.1	+59.3	64.5	39 42.6	+59.5	65.2	40 07.4	+59.6	66.0	40 31.5	+59.7	66.7	40 54.8	+59.8	67.5	41 17.3	+60.0	68.3	41 39.1	+60.0	69.2	42 00.0	+60.0	70.0	**42**
43	40 16.4	+59.3	64.3	40 42.1	+59.5	65.0	41 07.0	+59.7	65.8	41 31.2	+59.8	66.6	41 54.6	+59.9	67.4	42 17.3	+59.9	68.3	42 39.1	+59.9	69.1	43 00.0	+60.0	70.0	**43**
44	41 15.7	+59.3	64.1	41 41.6	+59.4	64.9	42 06.7	+59.6	65.7	42 31.0	+59.8	66.5	42 54.5	+59.9	67.4	43 17.2	+59.9	68.2	43 39.0	+60.0	69.1	44 00.0	+60.0	70.0	**44**
45	42 15.0	+59.2	63.9	42 41.0	+59.5	64.7	43 06.3	+59.6	65.5	43 30.8	+59.7	66.4	43 54.4	+59.8	67.3	44 17.1	+60.0	68.2	44 39.0	+60.0	69.1	45 00.0	+60.0	70.0	**45**
46	43 14.2	+59.3	63.6	43 40.5	+59.4	64.5	44 05.9	+59.6	65.4	44 30.5	+59.7	66.3	44 54.2	+59.9	67.2	45 17.1	+59.9	68.1	45 39.0	+60.0	69.0	46 00.0	+60.0	70.0	**46**
47	44 13.5	+59.2	63.4	44 39.9	+59.4	64.3	45 05.5	+59.6	65.2	45 30.2	+59.8	66.1	45 54.1	+59.8	67.1	46 17.0	+59.9	68.0	46 39.0	+60.0	69.0	47 00.0	+60.0	70.0	**47**
48	45 12.7	+59.2	63.2	45 39.3	+59.4	64.1	46 05.1	+59.6	65.0	46 30.0	+59.7	66.0	46 53.9	+59.9	67.0	47 16.9	+60.0	68.0	47 39.0	+60.0	69.0	48 00.0	+60.0	70.0	**48**
49	46 11.9	+59.1	63.0	46 38.7	+59.4	63.9	47 04.7	+59.5	64.9	47 29.7	+59.7	65.8	47 53.8	+59.8	66.9	48 16.9	+59.9	67.9	48 39.0	+59.9	68.9	49 00.0	+60.0	70.0	**49**
50	47 11.0	+59.2	62.7	47 38.1	+59.4	63.7	48 04.2	+59.6	64.7	48 29.4	+59.7	65.7	48 53.6	+59.8	66.7	49 16.8	+59.9	67.8	49 38.9	+60.0	68.9	50 00.0	+60.0	70.0	**50**
51	48 10.2	+59.1	62.5	48 37.5	+59.3	63.5	49 03.8	+59.5	64.5	49 29.1	+59.7	65.5	49 53.4	+59.9	66.6	50 16.7	+59.9	67.7	50 38.9	+60.0	68.9	51 00.0	+60.0	70.0	**51**
52	49 09.3	+59.0	62.2	49 36.8	+59.3	63.2	50 03.3	+59.5	64.3	50 28.8	+59.7	65.4	50 53.3	+59.8	66.5	51 16.6	+59.9	67.6	51 38.9	+60.0	68.8	52 00.0	+60.0	70.0	**52**
53	50 08.3	+59.0	61.9	50 36.1	+59.2	63.0	51 02.8	+59.5	64.1	51 28.5	+59.6	65.2	51 53.1	+59.8	66.4	52 16.5	+60.0	67.6	52 38.9	+59.9	68.8	53 00.0	+60.0	70.0	**53**
54	51 07.3	+59.0	61.6	51 35.3	+59.3	62.7	52 02.3	+59.4	63.9	52 28.1	+59.7	65.0	52 52.9	+59.8	66.2	53 16.5	+59.9	67.5	53 38.8	+60.0	68.7	54 00.0	+60.0	70.0	**54**
55	52 06.3	+58.9	61.3	52 34.6	+59.1	62.5	53 01.7	+59.5	63.7	53 27.8	+59.6	64.9	53 52.7	+59.8	66.1	54 16.4	+59.9	67.4	54 38.8	+60.0	68.7	55 00.0	+60.0	70.0	**55**
56	53 05.2	+58.9	61.0	53 33.7	+59.2	62.2	54 01.2	+59.4	63.4	54 27.4	+59.6	64.7	54 52.5	+59.7	66.0	55 16.3	+59.9	67.3	55 38.8	+60.0	68.6	56 00.0	+60.0	70.0	**56**
57	54 04.1	+58.8	60.7	54 32.9	+59.1	61.9	55 00.6	+59.3	63.2	55 27.0	+59.6	64.5	55 52.2	+59.8	65.8	56 16.2	+59.9	67.2	56 38.8	+59.9	68.6	57 00.0	+60.0	70.0	**57**
58	55 02.9	+58.8	60.4	55 32.0	+59.1	61.6	55 59.9	+59.4	62.9	56 26.6	+59.6	64.3	56 52.0	+59.7	65.6	57 16.1	+59.8	67.1	57 38.7	+60.0	68.5	58 00.0	+60.0	70.0	**58**
59	56 01.7	+58.7	60.0	56 31.1	+59.0	61.3	56 59.3	+59.3	62.7	57 26.2	+59.5	64.1	57 51.7	+59.8	65.5	58 15.9	+59.9	66.9	58 38.7	+60.0	68.5	59 00.0	+60.0	70.0	**59**
60	57 00.4	+58.6	59.6	57 30.1	+59.0	61.0	57 58.6	+59.2	62.4	58 25.7	+59.5	63.8	58 51.5	+59.7	65.3	59 15.8	+59.9	66.8	59 38.7	+60.0	68.4	60 00.0	+60.0	70.0	**60**
61	57 59.0	+58.5	59.2	58 29.1	+58.9	60.6	58 57.8	+59.2	62.1	59 25.2	+59.5	63.6	59 51.2	+59.7	65.1	60 15.7	+59.9	66.7	60 38.7	+59.9	68.3	61 00.0	+60.0	70.0	**61**
62	58 57.5	+58.5	58.8	59 28.0	+58.8	60.3	59 57.0	+59.2	61.8	60 24.7	+59.5	63.3	60 50.9	+59.7	64.9	61 15.6	+59.8	66.6	61 38.6	+60.0	68.3	62 00.0	+60.0	70.0	**62**
63	59 56.0	+58.4	58.4	60 26.8	+58.7	59.9	60 56.2	+59.1	61.4	61 24.2	+59.4	63.0	61 50.6	+59.7	64.7	62 15.4	+59.9	66.4	62 38.6	+59.9	68.2	63 00.0	+60.0	70.0	**63**
64	60 54.4	+58.2	57.9	61 25.5	+58.7	59.5	61 55.3	+59.1	61.1	62 23.6	+59.3	62.7	62 50.3	+59.6	64.5	63 15.3	+59.8	66.3	63 38.5	+60.0	68.1	64 00.0	+60.0	70.0	**64**
65	61 52.6	+58.2	57.4	62 24.2	+58.6	59.0	62 54.4	+59.0	60.7	63 22.9	+59.4	62.4	63 49.9	+59.6	64.2	64 15.1	+59.8	66.1	64 38.5	+60.0	68.0	65 00.0	+60.0	70.0	**65**
66	62 50.8	+58.0	56.9	63 22.8	+58.5	58.5	63 53.4	+58.9	60.3	64 22.3	+59.3	62.1	64 49.5	+59.6	64.0	65 14.9	+59.8	65.9	65 38.5	+59.9	67.9	66 00.0	+60.0	70.0	**66**
67	63 48.8	+57.8	56.3	64 21.3	+58.4	58.0	64 52.3	+58.8	59.8	65 21.6	+59.2	61.7	65 49.1	+59.5	63.7	66 14.7	+59.8	65.7	66 38.4	+60.0	67.8	67 00.0	+60.0	70.0	**67**
68	64 46.6	+57.7	55.7	65 19.7	+58.2	57.5	65 51.1	+58.7	59.4	66 20.8	+59.1	61.3	66 48.6	+59.5	63.4	67 14.5	+59.8	65.5	67 38.4	+59.9	67.7	68 00.0	+60.0	70.0	**68**
69	65 44.3	+57.6	55.0	66 17.9	+58.1	56.9	66 49.8	+58.7	58.9	67 19.9	+59.1	60.9	67 48.1	+59.5	63.0	68 14.3	+59.8	65.3	68 38.3	+59.9	67.6	69 00.0	+60.0	70.0	**69**
70	66 41.9	+57.3	54.3	67 16.0	+58.0	56.3	67 48.5	+58.5	58.3	68 19.0	+59.0	60.4	68 47.6	+59.4	62.7	69 14.1	+59.7	65.0	69 38.2	+60.0	67.5	70 00.0	+60.0	70.0	**70**
71	67 39.2	+57.1	53.6	68 14.0	+57.7	55.6	68 47.0	+58.3	57.7	69 18.0	+58.9	59.9	69 47.0	+59.4	62.3	70 13.8	+59.7	64.8	70 38.2	+59.9	67.3	71 00.0	+60.0	70.0	**71**
72	68 36.3	+56.8	52.8	69 11.7	+57.6	54.8	69 45.3	+58.3	57.1	70 16.9	+58.8	59.4	70 46.4	+59.3	61.9	71 13.5	+59.7	64.4	71 38.1	+59.9	67.2	72 00.0	+60.0	70.0	**72**
73	69 33.1	+56.6	51.9	70 09.3	+57.3	54.0	70 43.6	+58.0	56.3	71 15.7	+58.7	58.8	71 45.7	+59.2	61.4	72 13.2	+59.6	64.1	72 38.0	+59.9	67.0	73 00.0	+60.0	70.0	**73**
74	70 29.7	+56.1	50.9	71 06.6	+57.0	53.1	71 41.6	+57.8	55.5	72 14.4	+58.5	58.1	72 44.9	+59.1	60.9	73 12.8	+59.6	63.7	73 37.9	+59.9	66.8	74 00.0	+60.0	70.0	**74**
75	71 25.8	+55.8	49.8	72 03.6	+56.7	52.1	72 39.4	+57.6	54.7	73 12.9	+58.4	57.4	73 44.0	+59.0	60.3	74 12.4	+59.5	63.3	74 37.8	+59.9	66.6	75 00.0	+60.0	70.0	**75**
76	72 21.6	+55.3	48.6	73 00.3	+56.3	51.1	73 37.0	+57.2	53.7	74 11.3	+58.1	56.5	74 43.0	+58.9	59.6	75 11.9	+59.5	62.9	75 37.7	+59.8	66.3	76 00.0	+60.0	70.0	**76**
77	73 16.9	+54.8	47.3	73 56.6	+55.9	49.8	74 34.2	+56.9	52.6	75 09.4	+57.9	55.6	75 41.9	+58.7	58.8	76 11.4	+59.4	62.3	76 37.5	+59.9	66.0	77 00.0	+60.0	70.0	**77**
78	74 11.7	+54.0	45.8	74 52.5	+55.3	48.5	75 31.1	+56.5	51.4	76 07.3	+57.5	54.5	76 40.6	+58.5	58.0	77 10.8	+59.3	61.7	77 37.4	+59.8	65.7	78 00.0	+60.0	70.0	**78**
79	75 05.7	+53.4	44.2	75 47.8	+54.6	46.9	76 27.6	+55.9	50.0	77 04.8	+57.2	53.3	77 39.1	+58.3	57.0	78 10.1	+59.1	61.0	78 37.2	+59.7	65.3	79 00.0	+60.0	70.0	**79**
80	75 59.1	+52.3	42.4	76 42.4	+53.8	45.2	77 23.5	+55.2	48.4	78 02.0	+56.6	51.9	78 37.4	+57.9	55.8	79 09.2	+59.0	60.1	79 36.9	+59.8	64.9	80 00.0	+60.0	70.0	**80**
81	76 51.4	+51.2	40.3	77 36.2	+52.8	43.2	78 18.7	+54.5	46.5	78 58.6	+56.0	50.2	79 35.3	+57.5	54.4	80 08.2	+58.8	59.1	80 36.7	+59.6	64.3	81 00.0	+60.0	70.0	**81**
82	77 42.6	+49.9	37.9	78 29.0	+51.6	40.9	79 13.2	+53.3	44.4	79 54.6	+55.2	48.3	80 32.8	+56.9	52.8	81 07.0	+58.4	57.9	81 36.3	+59.6	63.6	82 00.0	+60.0	70.0	**82**
83	78 32.5	*+48.1* •	35.2	79 20.6	+50.0	38.3	80 06.5	+52.0	41.8	80 49.8	+54.1	45.9	81 29.7	+56.2	50.7	82 05.4	+58.1	56.3	82 35.9	+59.4	62.7	83 00.0	+60.0	70.0	**83**
84	79 20.6	*+45.9* •	32.1	80 10.6	*+47.9* •	35.1	80 58.5	*+50.2* •	38.8	81 43.9	+52.6	43.1	82 25.9	+55.0	48.2	83 03.5	+57.3	54.4	83 35.3	+59.3	61.6	84 00.0	+60.0	70.0	**84**
85	80 06.5	*+43.3* •	28.5	80 58.5	*+45.4* •	31.5	81 48.7	*+47.8* •	35.1	82 36.5	*+50.4* •	39.5	83 20.9	*+53.4* •	45.0	84 00.8	+56.4	51.8	84 34.6	+58.9	60.0	85 00.0	+60.0	70.0	**85**
86	80 49.8	*+39.9* •	24.3	81 43.9	*+42.0* •	27.1	82 36.5	*+44.4* •	30.6	83 26.9	*+47.4* •	35.1	84 14.3	*+50.8* •	40.8	84 57.2	*+54.7* •	48.2	85 33.5	+58.2	57.8	86 00.0	+60.0	70.0	**86**
87	81 29.7	*+35.7* •	19.4	82 25.9	*+37.6* •	21.9	83 20.9	*+39.9* •	25.1	84 14.3	*+42.9* •	29.3	85 05.1	*+46.8* •	35.0	85 51.9	*+51.5* •	43.0	86 31.7	*+56.9* •	54.3	87 00.0	+60.0	70.0	**87**
88	82 05.4	*+30.5* •	13.8	83 03.5	*+31.8* •	15.7	84 00.8	*+33.8* •	18.3	84 57.2	*+36.3* •	21.9	85 51.9	*+39.8* •	27.1	86 43.4	*+45.2* •	35.0	87 28.6	*+53.1* •	48.1	88 00.0	+60.0	70.0	**88**
89	82 35.9	*+24.1* •	7.3	83 35.3	*+24.7* •	8.4	84 34.6	*+25.4* •	10.0	85 33.5	*+26.5* •	12.2	86 31.7	*+28.3* •	15.7	87 28.6	*+31.4* •	21.9	88 21.7	*+38.3* •	35.0	89 00.0	+60.0	70.0	**89**
90	83 00.0	*+16.6* •	0.0	84 00.0	*+15.9* •	0.0	85 00.0	*+14.9* •	0.0	86 00.0	*+13.4* •	0.0	87 00.0	*+10.9* •	0.0	88 00.0	*+5.7* •	0.0	89 00.0	*–8.8* •	0.0	90 00.0	–60.0	35.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 110°, 250°

71°, 289° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 16.4	+59.6	108.9	1 57.0	+59.7	108.9	1 37.6	+59.8	108.9	1 18.1	+59.8	109.0	0 58.6	+59.9	109.0	0 39.1	+59.9	109.0	0 19.5	+60.0	109.0	0 00.0	+60.0	109.0	0
1	3 16.0	+59.6	108.8	2 56.7	+59.7	108.8	2 37.4	+59.8	108.9	2 17.9	+59.9	108.9	1 58.5	+59.9	108.9	1 39.0	+60.0	109.0	1 19.5	+60.0	109.0	1 00.0	+60.0	109.0	1
2	4 15.6	+59.6	108.6	3 56.4	+59.7	108.7	3 37.2	+59.7	108.8	3 17.8	+59.9	108.8	2 58.4	+60.0	108.9	2 39.0	+60.0	108.9	2 19.5	+60.0	109.0	2 00.0	+60.0	109.0	2
3	5 15.2	+59.6	108.5	4 56.1	+59.7	108.6	4 36.9	+59.8	108.7	4 17.7	+59.9	108.8	3 58.4	+59.9	108.8	3 39.0	+59.9	108.9	3 19.5	+60.0	108.9	3 00.0	+60.0	109.0	3
4	6 14.8	+59.6	108.4	5 55.8	+59.7	108.5	5 36.7	+59.8	108.6	5 17.6	+59.8	108.7	4 58.3	+59.9	108.8	4 38.9	+60.0	108.9	4 19.5	+60.0	108.9	4 00.0	+60.0	109.0	4
5	7 14.4	+59.6	108.3	6 55.5	+59.7	108.4	6 36.5	+59.8	108.5	6 17.4	+59.9	108.6	5 58.2	+59.9	108.7	5 38.9	+60.0	108.8	5 19.5	+60.0	108.9	5 00.0	+60.0	109.0	5
6	8 14.0	+59.6	108.2	7 55.2	+59.7	108.3	7 36.3	+59.8	108.4	7 17.3	+59.9	108.6	6 58.1	+60.0	108.7	6 38.9	+59.9	108.8	6 19.5	+60.0	108.9	6 00.0	+60.0	109.0	6
7	9 13.6	+59.6	108.1	8 54.9	+59.7	108.2	8 36.1	+59.8	108.4	8 17.2	+59.8	108.5	7 58.1	+59.9	108.6	7 38.8	+60.0	108.8	7 19.5	+60.0	108.9	7 00.0	+60.0	109.0	7
8	10 13.2	+59.6	107.9	9 54.6	+59.7	108.1	9 35.9	+59.8	108.3	9 17.0	+59.9	108.4	8 58.0	+59.9	108.6	8 38.8	+60.0	108.7	8 19.5	+60.0	108.9	8 00.0	+60.0	109.0	8
9	11 12.8	+59.6	107.8	10 54.3	+59.7	108.0	10 35.7	+59.8	108.2	10 16.9	+59.9	108.4	9 57.9	+59.9	108.5	9 38.8	+59.9	108.7	9 19.5	+60.0	108.8	9 00.0	+60.0	109.0	9
10	12 12.4	+59.5	107.7	11 54.0	+59.7	107.9	11 35.5	+59.8	108.1	11 16.8	+59.8	108.3	10 57.8	+60.0	108.5	10 38.7	+60.0	108.7	10 19.5	+59.9	108.8	10 00.0	+60.0	109.0	10
11	13 11.9	+59.6	107.6	12 53.7	+59.7	107.8	12 35.3	+59.8	108.0	12 16.6	+59.9	108.2	11 57.8	+59.9	108.4	11 38.7	+60.0	108.6	11 19.4	+60.0	108.8	11 00.0	+60.0	109.0	11
12	14 11.5	+59.6	107.5	13 53.4	+59.7	107.7	13 35.1	+59.7	107.9	13 16.5	+59.8	108.1	12 57.7	+59.9	108.4	12 38.7	+59.9	108.6	12 19.4	+60.0	108.8	12 00.0	+60.0	109.0	12
13	15 11.1	+59.6	107.3	14 53.1	+59.7	107.6	14 34.8	+59.8	107.8	14 16.3	+59.9	108.1	13 57.6	+59.9	108.3	13 38.6	+60.0	108.6	13 19.4	+60.0	108.8	13 00.0	+60.0	109.0	13
14	16 10.7	+59.5	107.2	15 52.8	+59.7	107.5	15 34.6	+59.8	107.7	15 16.2	+59.9	108.0	14 57.5	+59.9	108.3	14 38.6	+60.0	108.5	14 19.4	+60.0	108.8	14 00.0	+60.0	109.0	14
15	17 10.2	+59.6	107.1	16 52.5	+59.6	107.4	16 34.4	+59.8	107.7	16 16.1	+59.8	107.9	15 57.4	+60.0	108.2	15 38.6	+59.9	108.5	15 19.4	+60.0	108.7	15 00.0	+60.0	109.0	15
16	18 09.8	+59.5	107.0	17 52.1	+59.7	107.3	17 34.2	+59.8	107.6	17 15.9	+59.9	107.9	16 57.4	+59.9	108.2	16 38.5	+60.0	108.4	16 19.4	+60.0	108.7	16 00.0	+60.0	109.0	16
17	19 09.3	+59.6	106.8	18 51.8	+59.7	107.2	18 34.0	+59.7	107.5	18 15.8	+59.8	107.8	17 57.3	+59.9	108.1	17 38.5	+60.0	108.4	17 19.4	+60.0	108.7	17 00.0	+60.0	109.0	17
18	20 08.9	+59.5	106.7	19 51.5	+59.6	107.0	19 33.7	+59.8	107.4	19 15.6	+59.9	107.7	18 57.2	+59.9	108.0	18 38.5	+59.9	108.4	18 19.4	+60.0	108.7	18 00.0	+60.0	109.0	18
19	21 08.4	+59.6	106.6	20 51.1	+59.7	106.9	20 33.5	+59.8	107.3	20 15.5	+59.8	107.6	19 57.1	+59.9	108.0	19 38.4	+60.0	108.3	19 19.4	+60.0	108.7	19 00.0	+60.0	109.0	19
20	22 08.0	+59.5	106.4	21 50.8	+59.7	106.8	21 33.3	+59.7	107.2	21 15.3	+59.9	107.6	20 57.0	+60.0	107.9	20 38.4	+59.9	108.3	20 19.4	+60.0	108.7	20 00.0	+60.0	109.0	20
21	23 07.5	+59.5	106.3	22 50.5	+59.6	106.7	22 33.0	+59.8	107.1	22 15.2	+59.8	107.5	21 57.0	+59.9	107.9	21 38.3	+60.0	108.3	21 19.4	+59.9	108.6	21 00.0	+60.0	109.0	21
22	24 07.0	+59.5	106.2	23 50.1	+59.7	106.6	23 32.8	+59.7	107.0	23 15.0	+59.9	107.4	22 56.9	+59.9	107.8	22 38.3	+60.0	108.2	22 19.3	+60.0	108.6	22 00.0	+60.0	109.0	22
23	25 06.5	+59.5	106.0	24 49.8	+59.6	106.5	24 32.5	+59.8	106.9	24 14.9	+59.8	107.3	23 56.8	+59.9	107.8	23 38.3	+59.9	108.2	23 19.3	+60.0	108.6	23 00.0	+60.0	109.0	23
24	26 06.0	+59.5	105.9	25 49.4	+59.6	106.3	25 32.3	+59.7	106.8	25 14.7	+59.9	107.3	24 56.7	+59.9	107.7	24 38.2	+60.0	108.1	24 19.3	+60.0	108.6	24 00.0	+60.0	109.0	24
25	27 05.5	+59.5	105.7	26 49.0	+59.7	106.2	26 32.0	+59.8	106.7	26 14.6	+59.8	107.2	25 56.6	+59.9	107.6	25 38.2	+59.9	108.1	25 19.3	+60.0	108.6	25 00.0	+60.0	109.0	25
26	28 05.0	+59.5	105.6	27 48.7	+59.6	106.1	27 31.8	+59.7	106.6	27 14.4	+59.8	107.1	26 56.5	+59.9	107.6	26 38.1	+60.0	108.1	26 19.3	+60.0	108.5	26 00.0	+60.0	109.0	26
27	29 04.5	+59.5	105.4	28 48.3	+59.6	106.0	28 31.5	+59.7	106.5	28 14.2	+59.8	107.0	27 56.4	+59.9	107.5	27 38.1	+60.0	108.0	27 19.3	+60.0	108.5	27 00.0	+60.0	109.0	27
28	30 04.0	+59.4	105.3	29 47.9	+59.6	105.8	29 31.2	+59.8	106.4	29 14.0	+59.9	106.9	28 56.3	+59.9	107.5	28 38.1	+59.9	108.0	28 19.3	+60.0	108.5	28 00.0	+60.0	109.0	28
29	31 03.4	+59.5	105.1	30 47.5	+59.6	105.7	30 31.0	+59.7	106.3	30 13.9	+59.8	106.8	29 56.2	+59.9	107.4	29 38.0	+60.0	107.9	29 19.3	+60.0	108.5	29 00.0	+60.0	109.0	29
30	32 02.9	+59.4	105.0	31 47.1	+59.6	105.6	31 30.7	+59.7	106.2	31 13.7	+59.8	106.7	30 56.1	+59.9	107.3	30 38.0	+59.9	107.9	30 19.3	+60.0	108.4	30 00.0	+60.0	109.0	30
31	33 02.3	+59.5	104.8	32 46.7	+59.6	105.4	32 30.4	+59.7	106.0	32 13.5	+59.8	106.7	31 56.0	+59.9	107.3	31 37.9	+60.0	107.8	31 19.3	+59.9	108.4	31 00.0	+60.0	109.0	31
32	34 01.8	+59.4	104.6	33 46.3	+59.5	105.3	33 30.1	+59.7	105.9	33 13.3	+59.8	106.6	32 55.9	+59.9	107.2	32 37.9	+59.9	107.8	32 19.2	+60.0	108.4	32 00.0	+60.0	109.0	32
33	35 01.2	+59.4	104.5	34 45.8	+59.6	105.1	34 29.8	+59.7	105.8	34 13.1	+59.9	106.5	33 55.8	+59.9	107.1	33 37.8	+60.0	107.8	33 19.2	+60.0	108.4	33 00.0	+60.0	109.0	33
34	36 00.6	+59.3	104.3	35 45.4	+59.5	105.0	35 29.5	+59.7	105.7	35 13.0	+59.8	106.4	34 55.7	+59.9	107.0	34 37.8	+59.9	107.7	34 19.2	+60.0	108.4	34 00.0	+60.0	109.0	34
35	36 59.9	+59.4	104.1	36 44.9	+59.6	104.8	36 29.2	+59.7	105.6	36 12.8	+59.8	106.3	35 55.6	+59.9	107.0	35 37.7	+60.0	107.7	35 19.2	+60.0	108.3	35 00.0	+60.0	109.0	35
36	37 59.3	+59.4	103.9	37 44.5	+59.5	104.7	37 28.9	+59.7	105.4	37 12.6	+59.7	106.2	36 55.5	+59.9	106.9	36 37.7	+59.9	107.6	36 19.2	+60.0	108.3	36 00.0	+60.0	109.0	36
37	38 58.7	+59.3	103.7	38 44.0	+59.5	104.5	38 28.6	+59.6	105.3	38 12.3	+59.8	106.1	37 55.4	+59.8	106.8	37 37.6	+60.0	107.6	37 19.2	+60.0	108.3	37 00.0	+60.0	109.0	37
38	39 58.0	+59.3	103.6	39 43.5	+59.5	104.4	39 28.2	+59.7	105.2	39 12.1	+59.8	106.0	38 55.2	+59.9	106.7	38 37.6	+59.9	107.5	38 19.2	+60.0	108.3	38 00.0	+60.0	109.0	38
39	40 57.3	+59.3	103.4	40 43.0	+59.5	104.2	40 27.9	+59.6	105.0	40 11.9	+59.8	105.8	39 55.1	+59.9	106.6	39 37.5	+60.0	107.4	39 19.2	+59.9	108.2	39 00.0	+60.0	109.0	39
40	41 56.6	+59.2	103.1	41 42.5	+59.4	104.0	41 27.5	+59.6	104.9	41 11.7	+59.7	105.7	40 55.0	+59.9	106.6	40 37.5	+59.9	107.4	40 19.1	+60.0	108.2	40 00.0	+60.0	109.0	40
41	42 55.8	+59.3	102.9	42 41.9	+59.5	103.8	42 27.1	+59.7	104.7	42 11.4	+59.8	105.6	41 54.9	+59.8	106.5	41 37.4	+60.0	107.3	41 19.1	+60.0	108.2	41 00.0	+60.0	109.0	41
42	43 55.1	+59.2	102.7	43 41.4	+59.4	103.7	43 26.8	+59.6	104.6	43 11.2	+59.8	105.5	42 54.7	+59.9	106.4	42 37.4	+59.9	107.3	42 19.1	+60.0	108.1	42 00.0	+60.0	109.0	42
43	44 54.3	+59.2	102.5	44 40.8	+59.4	103.5	44 26.4	+59.6	104.4	44 11.0	+59.7	105.4	43 54.6	+59.8	106.3	43 37.3	+59.9	107.2	43 19.1	+60.0	108.1	43 00.0	+60.0	109.0	43
44	45 53.5	+59.1	102.3	45 40.2	+59.4	103.3	45 26.0	+59.5	104.3	45 10.7	+59.7	105.2	44 54.4	+59.9	106.2	44 37.2	+60.0	107.1	44 19.1	+60.0	108.1	44 00.0	+60.0	109.0	44
45	46 52.6	+59.2	102.0	46 39.6	+59.4	103.1	46 25.5	+59.6	104.1	46 10.4	+59.7	105.1	45 54.3	+59.8	106.1	45 37.2	+59.9	107.1	45 19.1	+59.9	108.0	45 00.0	+60.0	109.0	45
46	47 51.8	+59.1	101.8	47 39.0	+59.3	102.8	47 25.1	+59.5	103.9	47 10.1	+59.8	105.0	46 54.1	+59.9	106.0	46 37.1	+59.9	107.0	46 19.0	+60.0	108.0	46 00.0	+60.0	109.0	46
47	48 50.9	+59.0	101.5	48 38.3	+59.3	102.6	48 24.6	+59.6	103.7	48 09.9	+59.7	104.8	47 54.0	+59.8	105.9	47 37.0	+60.0	106.9	47 19.0	+60.0	108.0	47 00.0	+60.0	109.0	47
48	49 49.9	+59.0	101.2	49 37.6	+59.3	102.4	49 24.2	+59.5	103.5	49 09.6	+59.6	104.7	48 53.8	+59.8	105.8	48 37.0	+59.9	106.9	48 19.0	+60.0	107.9	48 00.0	+60.0	109.0	48
49	50 48.9	+59.0	101.0	50 36.9	+59.3	102.1	50 23.7	+59.5	103.3	50 09.2	+59.7	104.5	49 53.6	+59.9	105.7	49 36.9	+59.9	106.8	49 19.0	+60.0	107.9	49 00.0	+60.0	109.0	49
50	51 47.9	+58.9	100.7	51 36.2	+59.2	101.9	51 23.2	+59.4	103.1	51 08.9	+59.7	104.3	50 53.5	+59.8	105.5	50 36.8	+59.9	106.7	50 19.0	+60.0	107.9	50 00.0	+60.0	109.0	50
51	52 46.8	+58.9	100.3	52 35.4	+59.2	101.6	52 22.6	+59.5	102.9	52 08.6	+59.6	104.2	51 53.3	+59.8	105.4	51 36.7	+59.9	106.6	51 19.0	+59.9	107.8	51 00.0	+60.0	109.0	51
52	53 45.7	+58.8	100.0	53 34.6	+59.1	101.4	53 22.1	+59.4	102.7	53 08.2	+59.7	104.0	52 53.1	+59.8	105.3	52 36.6	+59.9	106.5	52 18.9	+60.0	107.8	52 00.0	+60.0	109.0	52
53	54 44.5	+58.8	99.7	54 33.7	+59.1	101.1	54 21.5	+59.4	102.4	54 07.9	+59.6	103.8	53 52.9	+59.7	105.1	53 36.5	+59.9	106.4	53 18.9	+60.0	107.7	53 00.0	+60.0	109.0	53
54	55 43.3	+58.7	99.3	55 32.8	+59.1	100.8	55 20.9	+59.3	102.2	55 07.5	+59.6	103.6	54 52.6	+59.8	105.0	54 36.4	+59.9	106.3	54 18.9	+60.0	107.7	54 00.0	+60.0	109.0	54
55	56 42.0	+58.6	99.0	56 31.9	+59.0	100.5	56 20.2	+59.3	101.9	56 07.1	+59.5	103.4	55 52.4	+59.8	104.8	55 36.3	+59.9	106.2	55 18.9	+59.9	107.6	55 00.0	+60.0	109.0	55
56	57 40.6	+58.6	98.6	57 30.9	+58.9	100.1	57 19.5	+59.3	101.7	57 06.6	+59.6	103.2	56 52.2	+59.7	104.7	56 36.2	+59.9	106.1	56 18.8	+60.0	107.6	56 00.0	+60.0	109.0	56
57	58 39.2	+58.4	98.2	58 29.8	+58.9	99.8	58 18.8	+59.2	101.4	58 06.2	+59.5	102.9	57 51.9	+59.8	104.5	57 36.1	+59.9	106.0	57 18.8	+60.0	107.5	57 00.0	+60.0	109.0	57
58	59 37.6	+58.4	97.7	59 28.7	+58.8	99.4	59 18.0	+59.2	101.1	59 05.7	+59.5	102.7	58 51.7	+59.7	104.3	58 36.0	+59.9	105.9	58 18.8	+59.9	107.5	58 00.0	+60.0	109.0	58
59	60 36.0	+58.3	97.3	60 27.5	+58.8	99.0	60 17.2	+59.2	100.7	60 05.2	+59.4	102.4	59 51.4	+59.7	104.1	59 35.9	+59.9	105.8	59 18.7	+60.0	107.4	59 00.0	+60.0	109.0	59
60	61 34.3	+58.1	96.8	61 26.3	+58.6	98.6	61 16.4	+59.0	100.4	61 04.6	+59.4	102.2	60 51.1	+59.7	103.9	60 35.8	+59.8	105.7	60 18.7	+60.0	107.3	60 00.0	+60.0	109.0	60
61	62 32.4	+58.1	96.2	62 24.9	+58.6	98.1	62 15.4	+59.1	100.0	62 04.0	+59.4	101.9	61 50.8	+59.6	103.7	61 35.6	+59.9	105.5	61 18.7	+59.9	107.3	61 00.0	+60.0	109.0	61
62	63 30.5	+57.8	95.7	63 23.5	+58.5	97.7	63 14.5	+58.9	99.6	63 03.4	+59.4	101.6	62 50.4	+59.6	103.5	62 35.5	+59.8	105.4	62 18.6	+60.0	107.2	62 00.0	+60.0	109.0	62
63	64 28.3	+57.8	95.1	64 22.0	+58.3	97.2	64 13.4	+58.9	99.2	64 02.8	+59.3	101.2	63 50.0	+59.7	103.2	63 35.3	+59.8	105.2	63 18.6	+60.0	107.1	63 00.0	+60.0	109.0	63
64	65 26.1	+57.5	94.4	65 20.3	+58.2	96.6	65 12.3	+58.8	98.8	65 02.1	+59.2	100.9	64 49.7	+59.5	103.0	64 35.1	+59.9	105.0	64 18.6	+59.9	107.0	64 00.0	+60.0	109.0	64
65	66 23.6	+57.4	93.7	66 18.5	+58.1	96.0	66 11.1	+58.7	98.3	66 01.3	+59.2	100.5	65 49.2	+59.6	102.7	65 35.0	+59.8	104.8	65 18.5	+60.0	106.9	65 00.0	+60.0	109.0	65
66	67 21.0	+57.1	93.0	67 16.6	+57.9	95.4	67 09.8	+58.5	97.7	67 00.5	+59.1	100.1	66 48.8	+59.5	102.4	66 34.8	+59.7	104.6	66 18.5	+59.9	106.8	66 00.0	+60.0	109.0	66
67	68 18.1	+56.9	92.2	68 14.5	+57.8	94.7	68 08.3	+58.5	97.2	67 59.6	+59.0	99.6	67 48.3	+59.4	102.0	67 34.5	+59.8	104.4	67 18.4	+60.0	106.7	67 00.0	+60.0	109.0	67
68	69 15.0	+56.6	91.3	69 12.3	+57.5	93.9	69 06.8	+58.3	96.6	68 58.6	+58.9	99.1	68 47.7	+59.4	101.7	68 34.3	+59.7	104.2	68 18.4	+59.9	106.6	68 00.0	+60.0	109.0	68
69	70 11.6	+56.2	90.3	70 09.8	+57.2	93.1	70 05.1	+58.1	95.9	69 57.5	+58.8	98.6	69 47.1	+59.4	101.3	69 34.0	+59.8	103.9	69 18.3	+59.9	106.5	69 00.0	+60.0	109.0	69
70	71 07.8	+55.9	89.3	71 07.0	+57.0	92.2	71 03.2	+57.9	95.1	70 56.3	+58.7	98.0	70 46.5	+59.3	100.9	70 33.8	+59.7	103.6	70 18.2	+60.0	106.4	70 00.0	+60.0	109.0	70
71	72 03.7	+55.4	88.1	72 04.0	+56.7	91.2	72 01.1	+57.7	94.3	71 55.0	+58.6	97.4	71 45.8	+59.2	100.4	71 33.5	+59.6	103.3	71 18.2	+59.9	106.2	71 00.0	+60.0	109.0	71
72	72 59.1	+54.9	86.9	73 00.7	+56.2	90.1	72 58.8	+57.5	93.4	72 53.6	+58.4	96.6	72 45.0	+59.1	99.8	72 33.1	+59.6	103.0	72 18.1	+59.9	106.0	72 00.0	+60.0	109.0	72
73	73 54.0	+54.2	85.4	73 56.9	+55.8	88.9	73 56.3	+57.1	92.4	73 52.0	+58.1	95.8	73 44.1	+59.0	99.2	73 32.7	+59.6	102.6	73 18.0	+59.9	105.8	73 00.0	+60.0	109.0	73
74	74 48.2	+53.5	83.9	74 52.7	+55.3	87.5	74 53.4	+56.7	91.2	74 50.1	+58.0	94.9	74 43.1	+58.8	98.6	74 32.3	+59.5	102.2	74 17.9	+59.9	105.6	74 00.0	+60.0	109.0	74
75	75 41.7	+52.6	82.1	75 48.0	+54.5	86.0	75 50.1	+56.2	89.9	75 48.1	+57.6	93.9	75 41.9	+58.7	97.8	75 31.8	+59.4	101.7	75 17.8	+59.8	105.4	75 00.0	+60.0	109.0	75
76	76 34.3	+51.5	80.1	76 42.5	+53.7	84.2	76 46.3	+55.7	88.5	76 45.7	+57.3	92.7	76 40.6	+58.5	96.9	76 31.2	+59.4	101.1	76 17.6	+59.9	105.1	76 00.0	+60.0	109.0	76
77	77 25.8	+50.2	77.8	77 36.2	+52.8	82.2	77 42.0	+54.9	86.8	77 43.0	+56.8	91.4	77 39.1	+58.3	95.9	77 30.6	+59.2	100.4	77 17.5	+59.8	104.8	77 00.0	+60.0	109.0	77
78	78 16.0	+48.6	75.2	78 29.0	+51.4	79.9	78 36.9	+54.1	84.8	78 39.8	+56.2	89.8	78 37.4	+57.9	94.8	78 29.8	+59.1	99.7	78 17.3	+59.8	104.4	78 00.0	+60.0	109.0	78
79	79 04.6	*+46.5* •	72.2	79 20.4	+49.9	77.2	79 31.0	+52.8	82.5	79 36.0	+55.4	87.9	79 35.3	+57.4	93.4	79 28.9	+58.9	98.8	79 17.1	+59.7	104.0	79 00.0	+60.0	109.0	79
80	79 51.1	*+44.1* •	68.7	80 10.3	*+47.8* •	74.1	80 23.8	+51.4	79.8	80 31.4	+54.4	85.7	80 32.7	+56.9	91.7	80 27.8	+58.7	97.7	80 16.8	+59.7	103.5	80 00.0	+60.0	109.0	80
81	80 35.2	*+40.9* •	64.7	80 58.1	*+45.2* •	70.4	81 15.2	*+49.3* •	76.6	81 25.8	+53.1	83.0	81 29.6	+56.1	89.7	81 26.5	+58.3	96.3	81 16.5	+59.6	102.8	81 00.0	+60.0	109.0	81
82	81 16.1	*+36.9* •	60.1	81 43.3	*+41.8* •	66.1	82 04.5	*+46.6* •	72.6	82 18.9	*+51.1* •	79.7	82 25.7	+55.0	87.1	82 24.8	+57.8	94.7	82 16.1	+59.5	102.0	82 00.0	+60.0	109.0	82
83	81 53.0	*+32.1* •	54.7	82 25.1	*+37.3* •	60.8	82 51.1	*+42.9* •	67.8	83 10.0	*+48.4* •	75.6	83 20.7	*+53.3* •	83.9	83 22.6	+57.1	92.5	83 15.6	+59.3	101.0	83 00.0	+60.0	109.0	83
84	82 25.1	*+26.0* •	48.5	83 02.4	*+31.6* •	54.6	83 34.0	*+37.9* •	61.9	83 58.4	*+44.4* •	70.3	84 14.0	*+50.8* •	79.6	84 19.7	+55.8	89.6	84 14.9	+59.0	99.6	84 00.0	+60.0	109.0	84
85	82 51.1	*+18.9* •	41.5	83 34.0	*+24.4* •	47.3	84 11.9	*+30.9* •	54.6	84 42.8	*+38.6* •	63.4	85 04.8	*+46.6* •	73.9	85 15.5	*+53.8* •	85.6	85 13.9	+58.5	97.6	85 00.0	+60.0	109.0	85
86	83 10.0	*+10.7* •	33.7	83 58.4	*+15.6* •	38.9	84 42.8	*+22.0* •	45.7	85 21.4	*+30.0* •	54.6	85 51.4	*+39.6* •	65.9	86 09.3	*+49.8* •	79.6	86 12.4	+57.4	94.6	86 00.0	+60.0	109.0	86
87	83 20.7	*+1.9* •	25.3	84 14.0	*+5.7* •	29.5	85 04.8	*+10.7* •	35.2	85 51.4	*+17.9* •	43.2	86 31.0	*+28.1* •	54.5	86 59.1	*+41.5* •	70.2	87 09.8	*+54.8* •	89.5	87 00.0	+60.0	109.0	87
88	83 22.6	*–7.0* •	16.6	84 19.7	*–4.8* •	19.5	85 15.5	*–1.6* •	23.5	86 09.3	*+3.1* •	29.5	86 59.1	*+10.7* •	38.9	87 40.6	*+24.0* •	54.5	88 04.6	*+45.7* •	79.6	88 00.0	+60.0	109.0	88
89	83 15.6	*–15.6* •	8.1	84 14.9	*–14.9* •	9.5	85 13.9	*–13.9* •	11.4	86 12.4	*–12.4* •	14.4	87 09.8	*–9.8* •	19.5	88 04.6	*–4.6* •	29.5	88 50.3	*+9.7* •	54.5	89 00.0	+60.0	109.0	89
90	83 00.0	*–23.2* •	0.0	84 00.0	*–23.7* •	0.0	85 00.0	*–24.5* •	0.0	86 00.0	*–25.7* •	0.0	87 00.0	*–27.4* •	0.0	88 00.0	*–30.6* •	0.0	89 00.0	*–37.7* •	0.0	90 00.0	–60.0	54.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 71°, 289°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 16.4	−59.6	108.9	1 57.0	−59.7	108.9	1 37.6	−59.8	108.9	1 18.1	−59.9	109.0	0 58.6	−59.9	109.0	0 39.1	−60.0	109.0	0 19.5	−60.0	109.0	0 00.0	+60.0	71.0	0
1	1 16.8	−59.6	109.0	0 57.3	−59.7	109.0	0 37.8	−59.8	109.0	0 18.2	−59.9	109.0	0 01.3	+60.0	71.0	0 20.9	+60.0	71.0	0 40.5	+60.0	71.0	1 00.0	+60.0	71.0	1
2	0 17.2	−59.6	109.1	0 02.4	+59.7	70.9	0 22.0	+59.8	70.9	0 41.7	+59.8	70.9	1 01.3	+59.9	70.9	1 20.9	+60.0	70.9	1 40.5	+59.9	71.0	2 00.0	+60.0	71.0	2
3	0 42.4	+59.6	70.8	1 02.1	+59.7	70.8	1 21.8	+59.8	70.8	1 41.5	+59.9	70.8	2 01.2	+59.9	70.9	2 20.8	+60.0	70.9	2 40.4	+60.0	71.0	3 00.0	+60.0	71.0	3
4	1 42.0	+59.6	70.7	2 01.8	+59.7	70.7	2 21.6	+59.8	70.7	2 41.4	+59.8	70.8	3 01.1	+60.0	70.8	3 20.8	+60.0	70.9	3 40.4	+60.0	70.9	4 00.0	+60.0	71.0	4
5	2 41.6	+59.6	70.6	3 01.5	+59.7	70.6	3 21.4	+59.8	70.7	3 41.3	+59.8	70.7	4 01.1	+59.9	70.8	4 20.8	+59.9	70.8	4 40.4	+60.0	70.9	5 00.0	+60.0	71.0	5
6	3 41.2	+59.6	70.4	4 01.2	+59.7	70.5	4 21.2	+59.8	70.6	4 41.1	+59.9	70.6	5 01.0	+59.9	70.7	5 20.7	+60.0	70.8	5 40.4	+60.0	70.9	6 00.0	+60.0	71.0	6
7	4 40.8	+59.6	70.3	5 00.9	+59.7	70.4	5 21.0	+59.8	70.5	5 41.0	+59.9	70.6	6 00.9	+59.9	70.7	6 20.7	+60.0	70.8	6 40.4	+60.0	70.9	7 00.0	+60.0	71.0	7
8	5 40.4	+59.6	70.2	6 00.6	+59.7	70.3	6 20.8	+59.8	70.4	6 40.9	+59.8	70.5	7 00.8	+60.0	70.6	7 20.7	+59.9	70.7	7 40.4	+60.0	70.9	8 00.0	+60.0	71.0	8
9	6 40.0	+59.5	70.1	7 00.3	+59.7	70.2	7 20.6	+59.8	70.3	7 40.7	+59.9	70.4	8 00.8	+59.9	70.6	8 20.6	+60.0	70.7	8 40.4	+60.0	70.9	9 00.0	+60.0	71.0	9
10	7 39.5	+59.6	70.0	8 00.0	+59.7	70.1	8 20.4	+59.8	70.2	8 40.6	+59.9	70.4	9 00.7	+59.9	70.5	9 20.6	+60.0	70.7	9 40.4	+60.0	70.8	10 00.0	+60.0	71.0	10
11	8 39.1	+59.6	69.9	8 59.7	+59.7	70.0	9 20.2	+59.8	70.2	9 40.5	+59.8	70.3	10 00.6	+59.9	70.5	10 20.6	+59.9	70.6	10 40.4	+60.0	70.8	11 00.0	+60.0	71.0	11
12	9 38.7	+59.6	69.7	9 59.4	+59.7	69.9	10 20.0	+59.8	70.1	10 40.3	+59.9	70.2	11 00.5	+60.0	70.4	11 20.5	+60.0	70.6	11 40.4	+60.0	70.8	12 00.0	+60.0	71.0	12
13	10 38.3	+59.6	69.6	10 59.1	+59.7	69.8	11 19.8	+59.7	70.0	11 40.2	+59.9	70.2	12 00.5	+59.9	70.4	12 20.5	+60.0	70.6	12 40.4	+60.0	70.8	13 00.0	+60.0	71.0	13
14	11 37.9	+59.6	69.5	11 58.8	+59.7	69.7	12 19.5	+59.8	69.9	12 40.1	+59.8	70.1	13 00.4	+59.9	70.3	13 20.5	+59.9	70.5	13 40.4	+59.9	70.8	14 00.0	+60.0	71.0	14
15	12 37.5	+59.6	69.4	12 58.5	+59.7	69.6	13 19.3	+59.8	69.8	13 39.9	+59.9	70.0	14 00.3	+59.9	70.3	14 20.4	+60.0	70.5	14 40.3	+60.0	70.7	15 00.0	+60.0	71.0	15
16	13 37.1	+59.5	69.3	13 58.2	+59.7	69.5	14 19.1	+59.8	69.7	14 39.8	+59.8	70.0	15 00.2	+59.9	70.2	15 20.4	+60.0	70.5	15 40.3	+60.0	70.7	16 00.0	+60.0	71.0	16
17	14 36.6	+59.6	69.1	14 57.9	+59.7	69.4	15 18.9	+59.8	69.6	15 39.6	+59.9	69.9	16 00.1	+60.0	70.2	16 20.4	+59.9	70.4	16 40.3	+60.0	70.7	17 00.0	+60.0	71.0	17
18	15 36.2	+59.6	69.0	15 57.6	+59.7	69.3	16 18.7	+59.8	69.5	16 39.5	+59.9	69.8	17 00.1	+59.9	70.1	17 20.3	+60.0	70.4	17 40.3	+60.0	70.7	18 00.0	+60.0	71.0	18
19	16 35.8	+59.5	68.9	16 57.3	+59.6	69.2	17 18.5	+59.7	69.5	17 39.4	+59.8	69.8	18 00.0	+59.9	70.1	18 20.3	+60.0	70.4	18 40.3	+60.0	70.7	19 00.0	+60.0	71.0	19
20	17 35.3	+59.6	68.8	17 56.9	+59.7	69.1	18 18.2	+59.8	69.4	18 39.2	+59.9	69.7	18 59.9	+59.9	70.0	19 20.3	+59.9	70.3	19 40.3	+60.0	70.7	20 00.0	+60.0	71.0	20
21	18 34.9	+59.5	68.6	18 56.6	+59.7	68.9	19 18.0	+59.8	69.3	19 39.1	+59.8	69.6	19 59.8	+59.9	69.9	20 20.2	+60.0	70.3	20 40.3	+60.0	70.6	21 00.0	+60.0	71.0	21
22	19 34.4	+59.6	68.5	19 56.3	+59.6	68.8	20 17.8	+59.7	69.2	20 38.9	+59.9	69.5	20 59.7	+59.9	69.9	21 20.2	+59.9	70.3	21 40.3	+60.0	70.6	22 00.0	+60.0	71.0	22
23	20 34.0	+59.5	68.4	20 55.9	+59.7	68.7	21 17.5	+59.8	69.1	21 38.8	+59.8	69.5	21 59.6	+60.0	69.8	22 20.1	+60.0	70.2	22 40.3	+60.0	70.6	23 00.0	+60.0	71.0	23
24	21 33.5	+59.6	68.2	21 55.6	+59.7	68.6	22 17.3	+59.8	69.0	22 38.6	+59.9	69.4	22 59.6	+59.9	69.8	23 20.1	+60.0	70.2	23 40.3	+59.9	70.6	24 00.0	+60.0	71.0	24
25	22 33.1	+59.5	68.1	22 55.3	+59.6	68.5	23 17.1	+59.7	68.9	23 38.5	+59.8	69.3	23 59.5	+59.9	69.7	24 20.1	+59.9	70.1	24 40.2	+60.0	70.6	25 00.0	+60.0	71.0	25
26	23 32.6	+59.5	68.0	23 54.9	+59.7	68.4	24 16.8	+59.8	68.8	24 38.3	+59.8	69.2	24 59.4	+59.9	69.7	25 20.0	+60.0	70.1	25 40.2	+60.0	70.5	26 00.0	+60.0	71.0	26
27	24 32.1	+59.5	67.8	24 54.6	+59.6	68.3	25 16.6	+59.7	68.7	25 38.1	+59.9	69.1	25 59.3	+59.9	69.6	26 20.0	+59.9	70.1	26 40.2	+60.0	70.5	27 00.0	+60.0	71.0	27
28	25 31.6	+59.5	67.7	25 54.2	+59.6	68.1	26 16.3	+59.8	68.6	26 38.0	+59.8	69.1	26 59.2	+59.9	69.5	27 19.9	+60.0	70.0	27 40.2	+60.0	70.5	28 00.0	+60.0	71.0	28
29	26 31.1	+59.5	67.5	26 53.8	+59.7	68.0	27 16.1	+59.7	68.5	27 37.8	+59.9	69.0	27 59.1	+59.9	69.5	28 19.9	+60.0	70.0	28 40.2	+60.0	70.5	29 00.0	+60.0	71.0	29
30	27 30.6	+59.5	67.4	27 53.5	+59.6	67.9	28 15.8	+59.7	68.4	28 37.7	+59.8	68.9	28 59.0	+59.9	69.4	29 19.9	+59.9	69.9	29 40.2	+60.0	70.5	30 00.0	+60.0	71.0	30
31	28 30.1	+59.5	67.3	28 53.1	+59.6	67.8	29 15.5	+59.8	68.3	29 37.5	+59.8	68.8	29 58.9	+59.9	69.3	30 19.8	+60.0	69.9	30 40.2	+60.0	70.4	31 00.0	+60.0	71.0	31
32	29 29.6	+59.5	67.1	29 52.7	+59.6	67.6	30 15.3	+59.7	68.2	30 37.3	+59.8	68.7	30 58.8	+59.9	69.3	31 19.8	+59.9	69.8	31 40.2	+60.0	70.4	32 00.0	+60.0	71.0	32
33	30 29.1	+59.4	67.0	30 52.3	+59.6	67.5	31 15.0	+59.7	68.1	31 37.1	+59.8	68.6	31 58.7	+59.9	69.2	32 19.7	+60.0	69.8	32 40.2	+60.0	70.4	33 00.0	+60.0	71.0	33
34	31 28.5	+59.5	66.8	31 51.9	+59.6	67.4	32 14.7	+59.7	67.9	32 36.9	+59.9	68.5	32 58.6	+59.9	69.1	33 19.7	+59.9	69.7	33 40.2	+59.9	70.4	34 00.0	+60.0	71.0	34
35	32 28.0	+59.4	66.6	32 51.5	+59.6	67.2	33 14.4	+59.7	67.8	33 36.8	+59.8	68.4	33 58.5	+59.9	69.1	34 19.6	+60.0	69.7	34 40.1	+60.0	70.3	35 00.0	+60.0	71.0	35
36	33 27.4	+59.4	66.5	33 51.1	+59.5	67.1	34 14.1	+59.7	67.7	34 36.6	+59.8	68.3	34 58.4	+59.9	69.0	35 19.6	+59.9	69.6	35 40.1	+60.0	70.3	36 00.0	+60.0	71.0	36
37	34 26.8	+59.4	66.3	34 50.6	+59.6	66.9	35 13.8	+59.7	67.6	35 36.4	+59.8	68.2	35 58.3	+59.9	68.9	36 19.5	+60.0	69.6	36 40.1	+60.0	70.3	37 00.0	+60.0	71.0	37
38	35 26.2	+59.4	66.1	35 50.2	+59.5	66.8	36 13.5	+59.7	67.5	36 36.2	+59.8	68.1	36 58.2	+59.9	68.8	37 19.5	+59.9	69.5	37 40.1	+60.0	70.3	38 00.0	+60.0	71.0	38
39	36 25.6	+59.4	66.0	36 49.7	+59.6	66.6	37 13.2	+59.7	67.3	37 36.0	+59.8	68.0	37 58.1	+59.8	68.8	38 19.4	+60.0	69.5	38 40.1	+60.0	70.2	39 00.0	+60.0	71.0	39
40	37 25.0	+59.3	65.8	37 49.3	+59.5	66.5	38 12.9	+59.6	67.2	38 35.8	+59.7	67.9	38 57.9	+59.9	68.7	39 19.4	+59.9	69.4	39 40.1	+60.0	70.2	40 00.0	+60.0	71.0	40
41	38 24.3	+59.4	65.6	38 48.8	+59.5	66.3	39 12.5	+59.7	67.1	39 35.5	+59.8	67.8	39 57.8	+59.9	68.6	40 19.3	+60.0	69.4	40 40.1	+59.9	70.2	41 00.0	+60.0	71.0	41
42	39 23.7	+59.3	65.4	39 48.3	+59.5	66.2	40 12.2	+59.6	66.9	40 35.3	+59.8	67.7	40 57.7	+59.9	68.5	41 19.3	+59.9	69.3	41 40.0	+60.0	70.2	42 00.0	+60.0	71.0	42
43	40 23.0	+59.3	65.2	40 47.8	+59.5	66.0	41 11.8	+59.7	66.8	41 35.1	+59.7	67.6	41 57.6	+59.8	68.4	42 19.2	+60.0	69.3	42 40.0	+60.0	70.1	43 00.0	+60.0	71.0	43
44	41 22.3	+59.3	65.0	41 47.3	+59.4	65.8	42 11.5	+59.6	66.6	42 34.8	+59.8	67.5	42 57.4	+59.9	68.3	43 19.2	+59.9	69.2	43 40.0	+60.0	70.1	44 00.0	+60.0	71.0	44
45	42 21.6	+59.2	64.8	42 46.7	+59.5	65.6	43 11.1	+59.6	66.5	43 34.6	+59.8	67.4	43 57.3	+59.8	68.2	44 19.1	+59.9	69.1	44 40.0	+60.0	70.1	45 00.0	+60.0	71.0	45
46	43 20.8	+59.3	64.6	43 46.2	+59.4	65.4	44 10.7	+59.6	66.3	44 34.4	+59.7	67.2	44 57.1	+59.9	68.1	45 19.0	+60.0	69.1	45 40.0	+60.0	70.0	46 00.0	+60.0	71.0	46
47	44 20.1	+59.2	64.4	44 45.6	+59.4	65.3	45 10.3	+59.6	66.2	45 34.1	+59.7	67.1	45 57.0	+59.8	68.0	46 19.0	+59.9	69.0	46 40.0	+60.0	70.0	47 00.0	+60.0	71.0	47
48	45 19.3	+59.1	64.1	45 45.0	+59.4	65.1	46 09.9	+59.5	66.0	46 33.8	+59.7	67.0	46 56.8	+59.9	67.9	47 18.9	+59.9	68.9	47 40.0	+59.9	70.0	48 00.0	+60.0	71.0	48
49	46 18.4	+59.2	63.9	46 44.4	+59.3	64.8	47 09.4	+59.6	65.8	47 33.5	+59.7	66.8	47 56.7	+59.8	67.8	48 18.8	+59.9	68.9	48 39.9	+60.0	69.9	49 00.0	+60.0	71.0	49
50	47 17.6	+59.1	63.6	47 43.7	+59.4	64.6	48 09.0	+59.5	65.6	48 33.2	+59.7	66.7	48 56.5	+59.8	67.7	49 18.7	+60.0	68.8	49 39.9	+60.0	69.9	50 00.0	+60.0	71.0	50
51	48 16.7	+59.1	63.4	48 43.1	+59.3	64.4	49 08.5	+59.5	65.4	49 32.9	+59.7	66.5	49 56.3	+59.8	67.6	50 18.7	+59.9	68.7	50 39.9	+60.0	69.8	51 00.0	+60.0	71.0	51
52	49 15.8	+59.0	63.1	49 42.4	+59.3	64.2	50 08.0	+59.5	65.3	50 32.6	+59.7	66.4	50 56.1	+59.9	67.5	51 18.6	+59.9	68.6	51 39.9	+60.0	69.8	52 00.0	+60.0	71.0	52
53	50 14.8	+59.0	62.9	50 41.7	+59.2	63.9	51 07.5	+59.5	65.0	51 32.3	+59.6	66.2	51 56.0	+59.8	67.3	52 18.5	+59.9	68.5	52 39.9	+59.9	69.8	53 00.0	+60.0	71.0	53
54	51 13.8	+58.9	62.6	51 40.9	+59.2	63.7	52 07.0	+59.4	64.8	52 31.9	+59.7	66.0	52 55.8	+59.8	67.2	53 18.4	+59.9	68.4	53 39.8	+60.0	69.7	54 00.0	+60.0	71.0	54
55	52 12.7	+59.0	62.3	52 40.1	+59.2	63.4	53 06.4	+59.4	64.6	53 31.6	+59.6	65.8	53 55.6	+59.7	67.1	54 18.3	+59.9	68.4	54 39.8	+60.0	69.7	55 00.0	+60.0	71.0	55
56	53 11.7	+58.8	61.9	53 39.3	+59.2	63.1	54 05.8	+59.4	64.4	54 31.2	+59.6	65.6	54 55.3	+59.8	66.9	55 18.2	+59.9	68.3	55 39.8	+60.0	69.6	56 00.0	+60.0	71.0	56
57	54 10.5	+58.8	61.6	54 38.5	+59.1	62.9	55 05.2	+59.4	64.1	55 30.8	+59.6	65.4	55 55.1	+59.8	66.8	56 18.1	+59.9	68.2	56 39.8	+59.9	69.6	57 00.0	+60.0	71.0	57
58	55 09.3	+58.7	61.3	55 37.6	+59.0	62.6	56 04.6	+59.3	63.9	56 30.4	+59.5	65.2	56 54.9	+59.7	66.6	57 18.0	+59.9	68.0	57 39.7	+60.0	69.5	58 00.0	+60.0	71.0	58
59	56 08.0	+58.7	60.9	56 36.6	+59.0	62.2	57 03.9	+59.3	63.6	57 29.9	+59.6	65.0	57 54.6	+59.7	66.4	58 17.9	+59.9	67.9	58 39.7	+60.0	69.4	59 00.0	+60.0	71.0	59
60	57 06.7	+58.6	60.5	57 35.6	+58.9	61.9	58 03.2	+59.3	63.3	58 29.5	+59.5	64.8	58 54.3	+59.8	66.3	59 17.8	+59.8	67.8	59 39.7	+59.9	69.4	60 00.0	+60.0	71.0	60
61	58 05.3	+58.5	60.1	58 34.5	+58.9	61.5	59 02.5	+59.2	63.0	59 29.0	+59.5	64.5	59 54.1	+59.7	66.1	60 17.6	+59.9	67.7	60 39.6	+60.0	69.3	61 00.0	+60.0	71.0	61
62	59 03.8	+58.4	59.7	59 33.4	+58.8	61.2	60 01.7	+59.1	62.7	60 28.5	+59.4	64.3	60 53.8	+59.6	65.9	61 17.5	+59.8	67.5	61 39.6	+60.0	69.2	62 00.0	+60.0	71.0	62
63	60 02.2	+58.4	59.3	60 32.2	+58.8	60.8	61 00.8	+59.1	62.3	61 27.9	+59.4	64.0	61 53.4	+59.7	65.7	62 17.3	+59.9	67.4	62 39.6	+59.9	69.2	63 00.0	+60.0	71.0	63
64	61 00.6	+58.2	58.8	61 31.0	+58.6	60.4	61 59.9	+59.0	62.0	62 27.3	+59.4	63.7	62 53.1	+59.6	65.4	63 17.2	+59.8	67.2	63 39.5	+60.0	69.1	64 00.0	+60.0	71.0	64
65	61 58.8	+58.1	58.3	62 29.6	+58.6	59.9	62 58.9	+59.0	61.6	63 26.7	+59.3	63.4	63 52.7	+59.6	65.2	64 17.0	+59.8	67.1	64 39.5	+59.9	69.0	65 00.0	+60.0	71.0	65
66	62 56.9	+58.0	57.7	63 28.2	+58.4	59.4	63 57.9	+58.9	61.2	64 26.0	+59.3	63.0	64 52.3	+59.6	64.9	65 16.8	+59.8	66.9	65 39.4	+60.0	68.9	66 00.0	+60.0	71.0	66
67	63 54.9	+57.8	57.2	64 26.6	+58.4	58.9	64 56.8	+58.8	60.7	65 25.3	+59.2	62.6	65 51.9	+59.6	64.6	66 16.6	+59.8	66.7	66 39.4	+59.9	68.8	67 00.0	+60.0	71.0	67
68	64 52.7	+57.7	56.5	65 25.0	+58.2	58.4	65 55.6	+58.7	60.3	66 24.5	+59.1	62.3	66 51.5	+59.5	64.3	67 16.4	+59.8	66.5	67 39.3	+60.0	68.7	68 00.0	+60.0	71.0	68
69	65 50.4	+57.4	55.9	66 23.2	+58.1	57.8	66 54.3	+58.6	59.8	67 23.6	+59.1	61.8	67 51.0	+59.4	64.0	68 16.2	+59.8	66.2	68 39.3	+59.9	68.6	69 00.0	+60.0	71.0	69
70	66 47.8	+57.3	55.2	67 21.3	+57.9	57.1	67 52.9	+58.5	59.2	68 22.7	+59.0	61.4	68 50.4	+59.4	63.6	69 16.0	+59.7	66.0	69 39.2	+59.9	68.4	70 00.0	+60.0	71.0	70
71	67 45.1	+57.0	54.4	68 19.2	+57.7	56.4	68 51.4	+58.4	58.6	69 21.7	+58.9	60.8	69 49.8	+59.4	63.2	70 15.7	+59.7	65.7	70 39.1	+60.0	68.3	71 00.0	+60.0	71.0	71
72	68 42.1	+56.8	53.6	69 16.9	+57.5	55.7	69 49.8	+58.1	57.9	70 20.6	+58.7	60.3	70 49.2	+59.2	62.8	71 15.4	+59.7	65.4	71 39.1	+59.9	68.1	72 00.0	+60.0	71.0	72
73	69 38.9	+56.5	52.6	70 14.4	+57.2	54.9	70 47.9	+58.0	57.2	71 19.3	+58.7	59.7	71 48.4	+59.2	62.3	72 15.1	+59.6	65.1	72 39.0	+59.9	68.0	73 00.0	+60.0	71.0	73
74	70 35.4	+56.0	51.6	71 11.6	+57.0	53.9	71 45.9	+57.8	56.4	72 18.0	+58.5	59.0	72 47.6	+59.1	61.8	73 14.7	+59.6	64.7	73 38.9	+59.9	67.8	74 00.0	+60.0	71.0	74
75	71 31.4	+55.7	50.6	72 08.6	+56.6	52.9	72 43.7	+57.5	55.5	73 16.5	+58.3	58.2	73 46.7	+59.0	61.2	74 14.3	+59.5	64.3	74 38.8	+59.8	67.6	75 00.0	+60.0	71.0	75
76	72 27.1	+55.2	49.3	73 05.2	+56.2	51.8	73 41.2	+57.2	54.5	74 14.8	+58.1	57.4	74 45.7	+58.9	60.5	75 13.8	+59.4	63.8	75 38.6	+59.9	67.3	76 00.0	+60.0	71.0	76
77	73 22.3	+54.6	48.0	74 01.4	+55.8	50.6	74 38.4	+56.8	53.4	75 12.9	+57.8	56.5	75 44.6	+58.7	59.7	76 13.2	+59.4	63.3	76 38.5	+59.8	67.0	77 00.0	+60.0	71.0	77
78	74 16.9	+54.0	46.5	74 57.2	+55.2	49.2	75 35.2	+56.4	52.2	76 10.7	+57.5	55.4	76 43.3	+58.5	58.9	77 12.6	+59.3	62.6	77 38.3	+59.8	66.7	78 00.0	+60.0	71.0	78
79	75 10.9	+53.1	44.9	75 52.4	+54.5	47.7	76 31.6	+55.8	50.7	77 08.2	+57.1	54.1	77 41.8	+58.2	57.8	78 11.9	+59.1	61.9	78 38.1	+59.8	66.3	79 00.0	+60.0	71.0	79
80	76 04.0	+52.2	43.0	76 46.9	+53.6	45.9	77 27.4	+55.2	49.1	78 05.3	+56.5	52.7	78 40.0	+57.9	56.7	79 11.0	+59.0	61.0	79 37.9	+59.7	65.8	80 00.0	+60.0	71.0	80
81	76 56.2	+51.0	40.9	77 40.5	+52.7	43.9	78 22.6	+54.3	47.2	79 01.8	+56.0	51.0	79 37.9	+57.4	55.3	80 10.0	+58.8	60.0	80 37.6	+59.7	65.3	81 00.0	+60.0	71.0	81
82	77 47.2	+49.5	38.5	78 33.2	+51.3	41.5	79 16.9	+53.1	45.0	79 57.8	+55.0	49.0	80 35.3	+56.9	53.6	81 08.8	+58.4	58.8	81 37.3	+59.5	64.6	82 00.0	+60.0	71.0	82
83	78 36.7	*+47.8* •	35.7	79 24.5	+49.7	38.8	80 10.0	+51.8	42.4	80 52.8	+54.0	46.6	81 32.2	+56.0	51.5	82 07.2	+58.0	57.2	82 36.8	+59.5	63.7	83 00.0	+60.0	71.0	83
84	79 24.5	*+45.5* •	32.5	80 14.2	*+47.6* •	35.6	81 01.8	*+49.9* •	39.3	81 46.8	+52.3	43.7	82 28.2	+55.0	49.0	83 05.2	+57.3	55.2	83 36.3	+59.2	62.5	84 00.0	+60.0	71.0	84
85	80 10.0	*+42.8* •	28.9	81 01.8	*+45.0* •	31.9	81 51.7	*+47.4* •	35.6	82 39.1	*+50.2* •	40.1	83 23.2	*+53.2* •	45.7	84 02.5	+56.3	52.5	84 35.5	+58.8	61.0	85 00.0	+60.0	71.0	85
86	80 52.8	*+39.4* •	24.6	81 46.8	*+41.4* •	27.5	82 39.1	*+44.1* •	31.0	83 29.3	*+47.1* •	35.6	84 16.4	*+50.6* •	41.4	84 58.8	*+54.5* •	48.9	85 34.3	+58.3	58.7	86 00.0	+60.0	71.0	86
87	81 32.2	*+35.0* •	19.6	82 28.2	*+37.0* •	22.2	83 23.2	*+39.3* •	25.4	84 16.4	*+42.4* •	29.7	85 07.0	*+46.3* •	35.5	85 53.3	*+51.3* •	43.6	86 32.6	*+56.8* •	55.1	87 00.0	+60.0	71.0	87
88	82 07.2	*+29.6* •	13.9	83 05.2	*+31.1* •	15.9	84 02.5	*+33.0* •	18.5	84 58.8	*+35.5* •	22.2	85 53.3	*+39.3* •	27.4	86 44.6	*+44.8* •	35.5	87 29.4	*+52.9* •	48.9	88 00.0	+60.0	71.0	88
89	82 36.8	*+23.2* •	7.4	83 36.3	*+23.7* •	8.5	84 35.5	*+24.5* •	10.1	85 34.3	*+25.7* •	12.3	86 32.6	*+27.4* •	15.9	87 29.4	*+30.6* •	22.1	88 22.3	*+37.7* •	35.5	89 00.0	+60.0	71.0	89
90	83 00.0	*+15.6* •	0.0	84 00.0	*+14.9* •	0.0	85 00.0	*+13.9* •	0.0	86 00.0	*+12.4* •	0.0	87 00.0	*+9.8* •	0.0	88 00.0	*+4.6* •	0.0	89 00.0	*−9.7* •	0.0	90 00.0	−60.0	35.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 109°, 251°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 09.5	+59.6	107.9	1 51.1	+59.7	107.9	1 32.6	+59.8	107.9	1 14.1	+59.9	108.0	0 55.6	+59.9	108.0	0 37.1	+59.9	108.0	0 18.5	+60.0	108.0	0 00.0	+60.0	108.0	**0**
1	3 09.1	+59.6	107.8	2 50.8	+59.7	107.8	2 32.4	+59.8	107.9	2 14.0	+59.8	107.9	1 55.5	+60.0	107.9	1 37.0	+60.0	108.0	1 18.5	+60.0	108.0	1 00.0	+60.0	108.0	**1**
2	4 08.7	+59.6	107.6	3 50.5	+59.7	107.7	3 32.2	+59.8	107.8	3 13.8	+59.9	107.8	2 55.5	+59.9	107.9	2 37.0	+60.0	107.9	2 18.5	+60.0	108.0	2 00.0	+60.0	108.0	**2**
3	5 08.3	+59.6	107.5	4 50.2	+59.7	107.6	4 32.0	+59.8	107.7	4 13.7	+59.9	107.8	3 55.4	+59.9	107.8	3 37.0	+59.9	107.9	3 18.5	+60.0	107.9	3 00.0	+60.0	108.0	**3**
4	6 07.9	+59.6	107.4	5 49.9	+59.7	107.5	5 31.8	+59.8	107.6	5 13.6	+59.8	107.7	4 55.3	+59.9	107.8	4 36.9	+60.0	107.9	4 18.5	+60.0	107.9	4 00.0	+60.0	108.0	**4**
5	7 07.5	+59.5	107.3	6 49.6	+59.7	107.4	6 31.6	+59.8	107.5	6 13.4	+59.9	107.6	5 55.2	+60.0	107.7	5 36.9	+60.0	107.8	5 18.5	+60.0	107.9	5 00.0	+60.0	108.0	**5**
6	8 07.0	+59.6	107.2	7 49.3	+59.7	107.3	7 31.4	+59.7	107.4	7 13.3	+59.9	107.6	6 55.2	+59.9	107.7	6 36.9	+59.9	107.8	6 18.5	+60.0	107.9	6 00.0	+60.0	108.0	**6**
7	9 06.6	+59.6	107.1	8 49.0	+59.7	107.2	8 31.1	+59.8	107.4	8 13.2	+59.8	107.5	7 55.1	+59.9	107.6	7 36.8	+60.0	107.8	7 18.5	+60.0	107.9	7 00.0	+60.0	108.0	**7**
8	10 06.2	+59.6	106.9	9 48.7	+59.6	107.1	9 30.9	+59.8	107.3	9 13.0	+59.9	107.4	8 55.0	+59.9	107.6	8 36.8	+60.0	107.7	8 18.5	+60.0	107.9	8 00.0	+60.0	108.0	**8**
9	11 05.8	+59.6	106.8	10 48.3	+59.7	107.0	10 30.7	+59.8	107.2	10 12.9	+59.9	107.4	9 54.9	+59.9	107.5	9 36.8	+59.9	107.7	9 18.5	+60.0	107.8	9 00.0	+60.0	108.0	**9**
10	12 05.4	+59.6	106.7	11 48.0	+59.7	106.9	11 30.5	+59.8	107.1	11 12.8	+59.8	107.3	10 54.8	+60.0	107.5	10 36.7	+60.0	107.7	10 18.5	+59.9	107.8	10 00.0	+60.0	108.0	**10**
11	13 05.0	+59.5	106.6	12 47.7	+59.7	106.8	12 30.3	+59.8	107.0	12 12.6	+59.9	107.2	11 54.8	+59.9	107.4	11 36.7	+60.0	107.6	11 18.4	+60.0	107.8	11 00.0	+60.0	108.0	**11**
12	14 04.5	+59.6	106.4	13 47.4	+59.7	106.7	13 30.1	+59.7	106.9	13 12.5	+59.9	107.1	12 54.7	+59.9	107.4	12 36.7	+59.9	107.6	12 18.4	+60.0	107.8	12 00.0	+60.0	108.0	**12**
13	15 04.1	+59.6	106.3	14 47.1	+59.7	106.6	14 29.8	+59.8	106.8	14 12.4	+59.8	107.1	13 54.6	+59.9	107.3	13 36.6	+60.0	107.5	13 18.4	+60.0	107.8	13 00.0	+60.0	108.0	**13**
14	16 03.7	+59.5	106.2	15 46.8	+59.7	106.5	15 29.6	+59.8	106.7	15 12.2	+59.9	107.0	14 54.5	+60.0	107.3	14 36.6	+60.0	107.5	14 18.4	+60.0	107.8	14 00.0	+60.0	108.0	**14**
15	17 03.2	+59.6	106.1	16 46.5	+59.6	106.4	16 29.4	+59.8	106.7	16 12.1	+59.8	106.9	15 54.5	+59.9	107.2	15 36.6	+59.9	107.5	15 18.4	+60.0	107.7	15 00.0	+60.0	108.0	**15**
16	18 02.8	+59.5	105.9	17 46.1	+59.7	106.3	17 29.2	+59.7	106.6	17 11.9	+59.9	106.9	16 54.4	+59.9	107.2	16 36.5	+60.0	107.4	16 18.4	+60.0	107.7	16 00.0	+60.0	108.0	**16**
17	19 02.3	+59.6	105.8	18 45.8	+59.7	106.1	18 28.9	+59.8	106.5	18 11.8	+59.8	106.8	17 54.3	+59.9	107.1	17 36.5	+60.0	107.4	17 18.4	+60.0	107.7	17 00.0	+60.0	108.0	**17**
18	20 01.9	+59.5	105.7	19 45.5	+59.6	106.0	19 28.7	+59.8	106.4	19 11.6	+59.9	106.7	18 54.2	+59.9	107.0	18 36.5	+59.9	107.4	18 18.4	+60.0	107.7	18 00.0	+60.0	108.0	**18**
19	21 01.4	+59.5	105.6	20 45.1	+59.7	105.9	20 28.5	+59.7	106.3	20 11.5	+59.8	106.6	19 54.1	+59.9	107.0	19 36.4	+60.0	107.3	19 18.4	+60.0	107.7	19 00.0	+60.0	108.0	**19**
20	22 00.9	+59.6	105.4	21 44.8	+59.6	105.8	21 28.2	+59.8	106.2	21 11.3	+59.9	106.6	20 54.0	+60.0	106.9	20 36.4	+59.9	107.3	20 18.4	+60.0	107.7	20 00.0	+60.0	108.0	**20**
21	23 00.5	+59.5	105.3	22 44.4	+59.7	105.7	22 28.0	+59.8	106.1	22 11.2	+59.8	106.5	21 54.0	+59.9	106.9	21 36.3	+60.0	107.3	21 18.4	+59.9	107.6	21 00.0	+60.0	108.0	**21**
22	24 00.0	+59.5	105.1	23 44.1	+59.6	105.6	23 27.8	+59.7	106.0	23 11.0	+59.9	106.4	22 53.9	+59.9	106.8	22 36.3	+60.0	107.2	22 18.3	+60.0	107.6	22 00.0	+60.0	108.0	**22**
23	24 59.5	+59.5	105.0	24 43.7	+59.7	105.5	24 27.5	+59.8	105.9	24 10.9	+59.8	106.3	23 53.8	+59.9	106.8	23 36.3	+59.9	107.2	23 18.3	+60.0	107.6	23 00.0	+60.0	108.0	**23**
24	25 59.0	+59.5	104.9	25 43.4	+59.6	105.3	25 27.3	+59.7	105.8	25 10.7	+59.8	106.2	24 53.7	+59.9	106.7	24 36.2	+60.0	107.1	24 18.3	+60.0	107.6	24 00.0	+60.0	108.0	**24**
25	26 58.5	+59.5	104.7	26 43.0	+59.6	105.2	26 27.0	+59.8	105.7	26 10.5	+59.9	106.2	25 53.6	+59.9	106.6	25 36.2	+59.9	107.1	25 18.3	+60.0	107.6	25 00.0	+60.0	108.0	**25**
26	27 58.0	+59.5	104.6	27 42.6	+59.6	105.1	27 26.8	+59.7	105.6	27 10.4	+59.8	106.1	26 53.5	+59.9	106.6	26 36.1	+60.0	107.1	26 18.3	+60.0	107.5	26 00.0	+60.0	108.0	**26**
27	28 57.5	+59.4	104.4	28 42.2	+59.6	105.0	28 26.5	+59.7	105.5	28 10.2	+59.8	106.0	27 53.4	+59.9	106.5	27 36.1	+60.0	107.0	27 18.3	+60.0	107.5	27 00.0	+60.0	108.0	**27**
28	29 56.9	+59.5	104.3	29 41.8	+59.6	104.8	29 26.2	+59.7	105.4	29 10.0	+59.9	105.9	28 53.3	+59.9	106.4	28 36.1	+59.9	107.0	28 18.3	+60.0	107.5	28 00.0	+60.0	108.0	**28**
29	30 56.4	+59.4	104.1	30 41.4	+59.6	104.7	30 25.9	+59.8	105.3	30 09.9	+59.8	105.8	29 53.2	+59.9	106.4	29 36.0	+60.0	106.9	29 18.3	+60.0	107.5	29 00.0	+60.0	108.0	**29**
30	31 55.8	+59.5	104.0	31 41.0	+59.6	104.6	31 25.7	+59.7	105.2	31 09.7	+59.8	105.7	30 53.1	+59.9	106.3	30 36.0	+59.9	106.9	30 18.3	+60.0	107.4	30 00.0	+60.0	108.0	**30**
31	32 55.3	+59.4	103.8	32 40.6	+59.6	104.4	32 25.4	+59.7	105.0	32 09.5	+59.8	105.6	31 53.0	+59.9	106.2	31 35.9	+60.0	106.8	31 18.3	+59.9	107.4	31 00.0	+60.0	108.0	**31**
32	33 54.7	+59.4	103.6	33 40.2	+59.6	104.3	33 25.1	+59.7	104.9	33 09.3	+59.8	105.6	32 52.9	+59.9	106.2	32 35.9	+59.9	106.8	32 18.2	+60.0	107.4	32 00.0	+60.0	108.0	**32**
33	34 54.1	+59.4	103.5	34 39.8	+59.5	104.1	34 24.8	+59.7	104.8	34 09.1	+59.8	105.5	33 52.8	+59.9	106.1	33 35.8	+60.0	106.7	33 18.2	+60.0	107.4	33 00.0	+60.0	108.0	**33**
34	35 53.5	+59.3	103.3	35 39.3	+59.6	104.0	35 24.5	+59.7	104.7	35 08.9	+59.8	105.4	34 52.7	+59.9	106.0	34 35.8	+59.9	106.7	34 18.2	+60.0	107.4	34 00.0	+60.0	108.0	**34**
35	36 52.8	+59.4	103.1	36 38.9	+59.5	103.8	36 24.2	+59.6	104.5	36 08.7	+59.8	105.3	35 52.6	+59.9	106.0	35 35.7	+60.0	106.6	35 18.2	+60.0	107.3	35 00.0	+60.0	108.0	**35**
36	37 52.2	+59.3	102.9	37 38.4	+59.5	103.7	37 23.8	+59.7	104.4	37 08.5	+59.8	105.2	36 52.5	+59.8	105.9	36 35.7	+59.9	106.6	36 18.2	+60.0	107.3	36 00.0	+60.0	108.0	**36**
37	38 51.5	+59.4	102.7	38 37.9	+59.5	103.5	38 23.5	+59.7	104.3	38 08.3	+59.8	105.0	37 52.3	+59.9	105.8	37 35.6	+60.0	106.5	37 18.2	+60.0	107.3	37 00.0	+60.0	108.0	**37**
38	39 50.9	+59.3	102.5	39 37.4	+59.5	103.3	39 23.2	+59.6	104.1	39 08.1	+59.8	104.9	38 52.2	+59.9	105.7	38 35.6	+59.9	106.5	38 18.2	+60.0	107.3	38 00.0	+60.0	108.0	**38**
39	40 50.2	+59.2	102.3	40 36.9	+59.5	103.2	40 22.8	+59.6	104.0	40 07.9	+59.7	104.8	39 52.1	+59.9	105.6	39 35.5	+60.0	106.4	39 18.2	+59.9	107.2	39 00.0	+60.0	108.0	**39**
40	41 49.4	+59.3	102.1	41 36.4	+59.4	103.0	41 22.4	+59.7	103.9	41 07.6	+59.8	104.7	40 52.0	+59.8	105.6	40 35.5	+59.9	106.4	40 18.1	+60.0	107.2	40 00.0	+60.0	108.0	**40**
41	42 48.7	+59.2	101.9	42 35.8	+59.5	102.8	42 22.1	+59.6	103.7	42 07.4	+59.8	104.6	41 51.8	+59.9	105.5	41 35.4	+60.0	106.3	41 18.1	+60.0	107.2	41 00.0	+60.0	108.0	**41**
42	43 47.9	+59.2	101.7	43 35.3	+59.4	102.6	43 21.7	+59.6	103.6	43 07.2	+59.7	104.5	42 51.7	+59.9	105.4	42 35.4	+59.9	106.3	42 18.1	+60.0	107.1	42 00.0	+60.0	108.0	**42**
43	44 47.1	+59.2	101.5	44 34.7	+59.4	102.4	44 21.3	+59.6	103.4	44 06.9	+59.7	104.3	43 51.6	+59.8	105.3	43 35.3	+59.9	106.2	43 18.1	+60.0	107.1	43 00.0	+60.0	108.0	**43**
44	45 46.3	+59.2	101.2	45 34.1	+59.4	102.2	45 20.9	+59.6	103.2	45 06.6	+59.8	104.2	44 51.4	+59.9	105.2	44 35.2	+60.0	106.1	44 18.1	+60.0	107.1	44 00.0	+60.0	108.0	**44**
45	46 45.5	+59.1	101.0	46 33.5	+59.4	102.0	46 20.5	+59.5	103.1	46 06.4	+59.7	104.1	45 51.3	+59.8	105.1	45 35.2	+59.9	106.1	45 18.1	+59.9	107.0	45 00.0	+60.0	108.0	**45**
46	47 44.6	+59.1	100.7	47 32.9	+59.3	101.8	47 20.0	+59.6	102.9	47 06.1	+59.7	103.9	46 51.1	+59.9	105.0	46 35.1	+59.9	106.0	46 18.0	+60.0	107.0	46 00.0	+60.0	108.0	**46**
47	48 43.7	+59.0	100.5	48 32.2	+59.3	101.6	48 19.6	+59.5	102.7	48 05.8	+59.7	103.8	47 51.0	+59.8	104.9	47 35.0	+59.9	105.9	47 18.0	+60.0	107.0	47 00.0	+60.0	108.0	**47**
48	49 42.7	+59.0	100.2	49 31.5	+59.3	101.4	49 19.1	+59.5	102.5	49 05.5	+59.7	103.6	48 50.8	+59.8	104.8	48 34.9	+60.0	105.9	48 18.0	+60.0	106.9	48 00.0	+60.0	108.0	**48**
49	50 41.7	+59.0	99.9	50 30.8	+59.2	101.1	50 18.6	+59.5	102.3	50 05.2	+59.7	103.5	49 50.6	+59.8	104.6	49 34.9	+59.9	105.8	49 18.0	+60.0	106.9	49 00.0	+60.0	108.0	**49**
50	51 40.7	+58.9	99.6	51 30.0	+59.2	100.9	51 18.1	+59.4	102.1	51 04.9	+59.6	103.3	50 50.4	+59.8	104.5	50 34.8	+59.9	105.7	50 18.0	+60.0	106.9	50 00.0	+60.0	108.0	**50**
51	52 39.6	+58.9	99.3	52 29.2	+59.2	100.6	52 17.5	+59.5	101.9	52 04.5	+59.7	103.1	51 50.2	+59.8	104.4	51 34.7	+59.9	105.6	51 18.0	+59.9	106.8	51 00.0	+60.0	108.0	**51**
52	53 38.5	+58.8	99.0	53 28.4	+59.1	100.3	53 17.0	+59.4	101.7	53 04.2	+59.6	103.0	52 50.0	+59.8	104.3	52 34.6	+59.9	105.5	52 17.9	+60.0	106.8	52 00.0	+60.0	108.0	**52**
53	54 37.3	+58.8	98.7	54 27.5	+59.1	100.1	54 16.4	+59.3	101.4	54 03.8	+59.6	102.8	53 49.8	+59.8	104.1	53 34.5	+59.9	105.4	53 17.9	+60.0	106.7	53 00.0	+60.0	108.0	**53**
54	55 36.1	+58.6	98.3	55 26.6	+59.1	99.8	55 15.7	+59.4	101.2	55 03.4	+59.6	102.6	54 49.6	+59.8	104.0	54 34.4	+59.9	105.3	54 17.9	+60.0	106.7	54 00.0	+60.0	108.0	**54**
55	56 34.7	+58.7	97.9	56 25.7	+59.0	99.4	56 15.1	+59.3	100.9	56 03.0	+59.5	102.4	55 49.4	+59.7	103.8	55 34.3	+59.9	105.2	55 17.9	+59.9	106.6	55 00.0	+60.0	108.0	**55**
56	57 33.4	+58.5	97.5	57 24.7	+58.9	99.1	57 14.4	+59.3	100.6	57 02.5	+59.6	102.2	56 49.1	+59.8	103.7	56 34.2	+59.9	105.1	56 17.8	+60.0	106.6	56 00.0	+60.0	108.0	**56**
57	58 31.9	+58.5	97.1	58 23.6	+58.9	98.7	58 13.7	+59.2	100.3	58 02.1	+59.5	101.9	57 48.9	+59.7	103.5	57 34.1	+59.9	105.0	57 17.8	+60.0	106.5	57 00.0	+60.0	108.0	**57**
58	59 30.4	+58.3	96.7	59 22.5	+58.8	98.4	59 12.9	+59.2	100.0	59 01.6	+59.5	101.7	58 48.6	+59.7	103.3	58 34.0	+59.9	104.9	58 17.8	+59.9	106.5	58 00.0	+60.0	108.0	**58**
59	60 28.7	+58.3	96.2	60 21.3	+58.7	98.0	60 12.1	+59.1	99.7	60 01.1	+59.4	101.4	59 48.3	+59.7	103.1	59 33.9	+59.8	104.8	59 17.7	+60.0	106.4	59 00.0	+60.0	108.0	**59**
60	61 27.0	+58.1	95.7	61 20.0	+58.7	97.6	61 11.2	+59.1	99.4	61 00.5	+59.4	101.1	60 48.0	+59.7	102.9	60 33.7	+59.9	104.6	60 17.7	+60.0	106.3	60 00.0	+60.0	108.0	**60**
61	62 25.1	+58.1	95.2	62 18.7	+58.6	97.1	62 10.3	+59.0	99.0	61 59.9	+59.4	100.9	61 47.7	+59.7	102.7	61 33.6	+59.8	104.5	61 17.7	+59.9	106.3	61 00.0	+60.0	108.0	**61**
62	63 23.2	+57.9	94.7	63 17.3	+58.4	96.6	63 09.3	+58.9	98.6	62 59.3	+59.4	100.5	62 47.4	+59.6	102.5	62 33.4	+59.9	104.3	62 17.6	+60.0	106.2	62 00.0	+60.0	108.0	**62**
63	64 21.1	+57.7	94.1	64 15.7	+58.4	96.1	64 08.2	+58.9	98.2	63 58.7	+59.2	100.2	63 47.0	+59.6	102.2	63 33.3	+59.8	104.2	63 17.6	+60.0	106.1	63 00.0	+60.0	108.0	**63**
64	65 18.8	+57.5	93.4	65 14.1	+58.2	95.6	65 07.1	+58.8	97.7	64 57.9	+59.3	99.9	64 46.6	+59.6	102.0	64 33.1	+59.8	104.0	64 17.6	+59.9	106.0	64 00.0	+60.0	108.0	**64**
65	66 16.3	+57.4	92.7	66 12.3	+58.1	95.0	66 05.9	+58.7	97.2	65 57.2	+59.1	99.5	65 46.2	+59.5	101.7	65 32.9	+59.8	103.8	65 17.5	+60.0	105.9	65 00.0	+60.0	108.0	**65**
66	67 13.7	+57.1	92.0	67 10.4	+57.9	94.4	67 04.6	+58.5	96.7	66 56.3	+59.1	99.1	66 45.7	+59.5	101.4	66 32.7	+59.8	103.6	66 17.5	+59.9	105.8	66 00.0	+60.0	108.0	**66**
67	68 10.8	+56.9	91.2	68 08.3	+57.7	93.7	68 03.1	+58.5	96.2	67 55.4	+59.0	98.6	67 45.2	+59.5	101.0	67 32.5	+59.8	103.4	67 17.4	+60.0	105.7	67 00.0	+60.0	108.0	**67**
68	69 07.7	+56.6	90.3	69 06.0	+57.5	92.9	69 01.6	+58.3	95.5	68 54.4	+59.0	98.1	68 44.7	+59.4	100.7	68 32.3	+59.7	103.2	68 17.4	+59.9	105.6	68 00.0	+60.0	108.0	**68**
69	70 04.3	+56.2	89.4	70 03.5	+57.3	92.1	69 59.9	+58.1	94.9	69 53.4	+58.8	97.6	69 44.1	+59.3	100.3	69 32.0	+59.7	102.9	69 17.3	+59.9	105.5	69 00.0	+60.0	108.0	**69**
70	71 00.5	+55.9	88.3	71 00.8	+57.0	91.2	70 58.0	+57.9	94.1	70 52.2	+58.7	97.0	70 43.4	+59.3	99.8	70 31.7	+59.7	102.6	70 17.2	+59.9	105.3	70 00.0	+60.0	108.0	**70**
71	71 56.4	+55.4	87.2	71 57.8	+56.6	90.2	71 55.9	+57.7	93.3	71 50.9	+58.5	96.3	71 42.7	+59.2	99.4	71 31.4	+59.7	102.3	71 17.1	+60.0	105.2	71 00.0	+60.0	108.0	**71**
72	72 51.8	+54.9	85.9	72 54.4	+56.3	89.1	72 53.6	+57.4	92.4	72 49.4	+58.4	95.6	72 41.9	+59.1	98.8	72 31.1	+59.6	102.0	72 17.1	+59.9	105.0	72 00.0	+60.0	108.0	**72**
73	73 46.7	+54.3	84.5	73 50.7	+55.8	87.9	73 51.0	+57.1	91.4	73 47.8	+58.2	94.8	73 41.0	+59.0	98.2	73 30.7	+59.5	101.6	73 17.0	+59.9	104.8	73 00.0	+60.0	108.0	**73**
74	74 41.0	+53.5	82.9	74 46.5	+55.2	86.6	74 48.1	+56.8	90.2	74 46.0	+57.9	93.9	74 40.0	+58.8	97.6	74 30.2	+59.5	101.1	74 16.9	+59.8	104.6	74 00.0	+60.0	108.0	**74**
75	75 34.5	+52.6	81.1	75 41.7	+54.6	85.0	75 44.9	+56.2	89.0	75 43.9	+57.6	92.9	75 38.8	+58.7	96.8	75 29.7	+59.5	100.6	75 16.7	+59.9	104.4	75 00.0	+60.0	108.0	**75**
76	76 27.1	+51.6	79.2	76 36.3	+53.7	83.3	76 41.1	+55.7	87.5	76 41.5	+57.3	91.7	76 37.5	+58.5	95.9	76 29.2	+59.3	100.1	76 16.6	+59.8	104.1	76 00.0	+60.0	108.0	**76**
77	77 18.7	+50.3	76.9	77 30.0	+52.8	81.3	77 36.8	+54.9	85.8	77 38.8	+56.8	90.4	77 36.0	+58.2	94.9	77 28.5	+59.2	99.4	77 16.4	+59.9	103.8	77 00.0	+60.0	108.0	**77**
78	78 09.0	+48.6	74.3	78 22.8	+51.5	79.0	78 31.7	+54.1	83.9	78 35.6	+56.2	88.8	78 34.2	+57.9	93.8	78 27.7	+59.1	98.6	78 16.3	+59.7	103.4	78 00.0	+60.0	108.0	**78**
79	78 57.6	*+46.7* •	71.4	79 14.3	+50.0	76.4	79 25.8	+52.9	81.6	79 31.8	+55.4	87.0	79 32.1	+57.5	92.4	79 26.8	+58.9	97.7	79 16.0	+59.8	103.0	79 00.0	+60.0	108.0	**79**
80	79 44.3	*+44.3* •	68.0	80 04.3	*+47.9* •	73.3	80 18.7	+51.4	78.9	80 27.2	+54.5	84.8	80 29.6	+56.9	90.7	80 25.7	+58.7	96.7	80 15.8	+59.7	102.5	80 00.0	+60.0	108.0	**80**
81	80 28.6	*+41.1* •	64.1	80 52.2	*+45.4* •	69.7	81 10.1	*+49.4* •	75.7	81 21.7	+53.0	82.1	81 26.5	+56.1	88.7	81 24.4	+58.3	95.3	81 15.5	+59.5	101.8	81 00.0	+60.0	108.0	**81**
82	81 09.7	*+37.4* •	59.5	81 37.6	*+42.0* •	65.3	81 59.5	*+46.8* •	71.8	82 14.7	*+51.2* •	78.8	82 22.6	+55.0	86.2	82 22.7	+57.8	93.6	82 15.0	+59.5	101.0	82 00.0	+60.0	108.0	**82**
83	81 47.1	*+32.5* •	54.2	82 19.6	*+37.7* •	60.2	82 46.3	*+43.1* •	67.1	83 05.9	*+48.6* •	74.7	83 17.6	*+53.3* •	82.9	83 20.5	+57.1	91.5	83 14.5	+59.3	99.9	83 00.0	+60.0	108.0	**83**
84	82 19.6	*+26.7* •	48.1	82 57.3	*+32.1* •	54.1	83 29.4	*+38.2* •	61.3	83 54.5	*+44.6* •	69.5	84 10.9	*+50.9* •	78.7	84 17.6	+55.8	88.6	84 13.8	+59.0	98.5	84 00.0	+60.0	108.0	**84**
85	82 46.3	*+19.6* •	41.2	83 29.4	*+25.1* •	47.0	84 07.6	*+31.5* •	54.1	84 39.1	*+38.9* •	62.8	85 01.8	*+46.7* •	73.1	85 13.4	*+53.8* •	84.6	85 12.8	+58.5	96.6	85 00.0	+60.0	108.0	**85**
86	83 05.9	*+11.7* •	33.5	83 54.5	*+16.4* •	38.7	84 39.1	*+22.7* •	45.4	85 18.0	*+30.5* •	54.1	85 48.5	*+40.0* •	65.2	86 07.2	*+49.9* •	78.7	86 11.3	+57.5	93.6	86 00.0	+60.0	108.0	**86**
87	83 17.6	*+2.9* •	25.2	84 10.9	*+6.7* •	29.4	85 01.8	*+11.6* •	35.1	85 48.5	*+18.7* •	42.9	86 28.5	*+28.6* •	54.0	86 57.1	*+41.9* •	69.4	87 08.8	*+54.8* •	88.6	87 00.0	+60.0	108.0	**87**
88	83 20.5	*−6.0* •	16.6	84 17.6	*−3.8* •	19.5	85 13.4	*−0.6* •	23.5	86 07.2	*+4.1* •	29.4	86 57.1	*+11.7* •	38.6	87 39.0	*+24.6* •	54.0	88 03.6	*+45.9* •	78.7	88 00.0	+60.0	108.0	**88**
89	83 14.5	*−14.5* •	8.1	84 13.8	*−13.8* •	9.5	85 12.8	*−12.8* •	11.5	86 11.3	*−11.3* •	14.5	87 08.8	*−8.8* •	19.5	88 03.6	*−3.6* •	29.4	88 49.5	*+10.5* •	54.0	89 00.0	+60.0	108.0	**89**
90	83 00.0	*−22.2* •	0.0	84 00.0	*−22.8* •	0.0	85 00.0	*−23.6* •	0.0	86 00.0	*−24.8* •	0.0	87 00.0	*−26.6* •	0.0	88 00.0	*−29.8* •	0.0	89 00.0	*−37.1* •	0.0	90 00.0	−60.0	54.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 72°, 288°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 09.5	−59.6	107.9	1 51.1	−59.7	107.9	1 32.6	−59.8	107.9	1 14.1	−59.9	108.0	0 55.6	−59.9	108.0	0 37.1	−60.0	108.0	0 18.5	−60.0	108.0	0 00.0	+60.0	72.0	0
1	1 09.9	−59.6	108.0	0 51.4	−59.7	108.0	0 32.8	−59.8	108.0	0 14.2	−59.8	108.0	0 04.3	+60.0	72.0	0 22.9	+60.0	72.0	0 41.5	+59.9	72.0	1 00.0	+60.0	72.0	1
2	0 10.3	−59.6	108.1	0 08.3	+59.7	71.9	0 27.0	+59.8	71.9	0 45.6	+59.9	71.9	1 04.3	+59.9	71.9	1 22.9	+59.9	71.9	1 41.4	+60.0	72.0	2 00.0	+60.0	72.0	2
3	0 49.3	+59.6	71.8	1 08.0	+59.7	71.8	1 26.8	+59.8	71.8	1 45.5	+59.9	71.8	2 04.2	+59.9	71.9	2 22.8	+60.0	71.9	2 41.4	+60.0	72.0	3 00.0	+60.0	72.0	3
4	1 48.9	+59.6	71.7	2 07.7	+59.8	71.7	2 26.6	+59.8	71.7	2 45.4	+59.8	71.8	3 04.1	+59.9	71.8	3 22.8	+60.0	71.9	3 41.4	+60.0	71.9	4 00.0	+60.0	72.0	4
5	2 48.5	+59.6	71.5	3 07.5	+59.7	71.6	3 26.4	+59.8	71.6	3 45.2	+59.9	71.7	4 04.0	+60.0	71.8	4 22.8	+59.9	71.8	4 41.4	+60.0	71.9	5 00.0	+60.0	72.0	5
6	3 48.1	+59.6	71.4	4 07.2	+59.7	71.5	4 26.2	+59.8	71.6	4 45.1	+59.9	71.6	5 04.0	+59.9	71.7	5 22.7	+60.0	71.8	5 41.4	+60.0	71.9	6 00.0	+60.0	72.0	6
7	4 47.7	+59.6	71.3	5 06.9	+59.7	71.4	5 26.0	+59.7	71.5	5 45.0	+59.8	71.6	6 03.9	+59.9	71.7	6 22.7	+60.0	71.8	6 41.4	+60.0	71.9	7 00.0	+60.0	72.0	7
8	5 47.3	+59.6	71.2	6 06.6	+59.7	71.3	6 25.7	+59.8	71.4	6 44.8	+59.9	71.5	7 03.8	+59.9	71.6	7 22.7	+59.9	71.7	7 41.4	+60.0	71.9	8 00.0	+60.0	72.0	8
9	6 46.9	+59.5	71.1	7 06.3	+59.6	71.2	7 25.5	+59.8	71.3	7 44.7	+59.9	71.4	8 03.7	+60.0	71.6	8 22.6	+60.0	71.7	8 41.4	+60.0	71.9	9 00.0	+60.0	72.0	9
10	7 46.4	+59.6	71.0	8 05.9	+59.7	71.1	8 25.3	+59.8	71.2	8 44.6	+59.8	71.4	9 03.7	+59.9	71.5	9 22.6	+60.0	71.7	9 41.4	+60.0	71.8	10 00.0	+60.0	72.0	10
11	8 46.0	+59.6	70.8	9 05.6	+59.7	71.0	9 25.1	+59.8	71.1	9 44.4	+59.9	71.3	10 03.6	+59.9	71.5	10 22.6	+59.9	71.6	10 41.4	+60.0	71.8	11 00.0	+60.0	72.0	11
12	9 45.6	+59.6	70.7	10 05.3	+59.7	70.9	10 24.9	+59.8	71.1	10 44.3	+59.8	71.2	11 03.5	+59.9	71.4	11 22.5	+60.0	71.6	11 41.4	+60.0	71.8	12 00.0	+60.0	72.0	12
13	10 45.2	+59.6	70.6	11 05.0	+59.7	70.8	11 24.7	+59.8	71.0	11 44.1	+59.9	71.2	12 03.4	+59.9	71.4	12 22.5	+60.0	71.6	12 41.4	+59.9	71.8	13 00.0	+60.0	72.0	13
14	11 44.8	+59.6	70.5	12 04.7	+59.7	70.7	12 24.5	+59.8	70.9	12 44.0	+59.9	71.1	13 03.3	+60.0	71.3	13 22.5	+59.9	71.5	13 41.3	+60.0	71.8	14 00.0	+60.0	72.0	14
15	12 44.4	+59.5	70.4	13 04.4	+59.7	70.6	13 24.3	+59.7	70.8	13 43.9	+59.8	71.0	14 03.3	+59.9	71.3	14 22.4	+60.0	71.5	14 41.3	+60.0	71.7	15 00.0	+60.0	72.0	15
16	13 43.9	+59.6	70.2	14 04.1	+59.7	70.5	14 24.0	+59.8	70.7	14 43.7	+59.9	71.0	15 03.2	+59.9	71.2	15 22.4	+59.9	71.5	15 41.3	+60.0	71.7	16 00.0	+60.0	72.0	16
17	14 43.5	+59.6	70.1	15 03.8	+59.7	70.4	15 23.8	+59.8	70.6	15 43.6	+59.8	70.9	16 03.1	+59.9	71.2	16 22.3	+60.0	71.4	16 41.3	+60.0	71.7	17 00.0	+60.0	72.0	17
18	15 43.1	+59.5	70.0	16 03.5	+59.6	70.3	16 23.6	+59.8	70.5	16 43.4	+59.9	70.8	17 03.0	+59.9	71.1	17 22.3	+60.0	71.4	17 41.3	+60.0	71.7	18 00.0	+60.0	72.0	18
19	16 42.6	+59.6	69.9	17 03.1	+59.7	70.2	17 23.4	+59.7	70.4	17 43.3	+59.9	70.7	18 02.9	+60.0	71.0	18 22.3	+59.9	71.4	18 41.3	+60.0	71.7	19 00.0	+60.0	72.0	19
20	17 42.2	+59.5	69.7	18 02.8	+59.7	70.0	18 23.1	+59.8	70.4	18 43.2	+59.8	70.7	19 02.9	+59.9	71.0	19 22.2	+60.0	71.3	19 41.3	+60.0	71.7	20 00.0	+60.0	72.0	20
21	18 41.7	+59.6	69.6	19 02.5	+59.6	69.9	19 22.9	+59.8	70.3	19 43.0	+59.9	70.6	20 02.8	+59.9	70.9	20 22.2	+60.0	71.3	20 41.3	+60.0	71.6	21 00.0	+60.0	72.0	21
22	19 41.3	+59.5	69.5	20 02.1	+59.7	69.8	20 22.7	+59.7	70.2	20 42.9	+59.8	70.5	21 02.7	+59.9	70.9	21 22.2	+59.9	71.2	21 41.3	+60.0	71.6	22 00.0	+60.0	72.0	22
23	20 40.8	+59.6	69.3	21 01.8	+59.7	69.7	21 22.4	+59.8	70.1	21 42.7	+59.8	70.4	22 02.6	+59.9	70.8	22 22.1	+60.0	71.2	22 41.3	+59.9	71.6	23 00.0	+60.0	72.0	23
24	21 40.4	+59.5	69.2	22 01.5	+59.6	69.6	22 22.2	+59.8	70.0	22 42.5	+59.9	70.4	23 02.5	+59.9	70.8	23 22.1	+59.9	71.2	23 41.2	+60.0	71.6	24 00.0	+60.0	72.0	24
25	22 39.9	+59.5	69.1	23 01.1	+59.7	69.5	23 22.0	+59.7	69.9	23 42.4	+59.8	70.3	24 02.4	+59.9	70.7	24 22.0	+60.0	71.1	24 41.2	+60.0	71.6	25 00.0	+60.0	72.0	25
26	23 39.4	+59.5	68.9	24 00.8	+59.6	69.4	24 21.7	+59.8	69.8	24 42.2	+59.9	70.2	25 02.3	+59.9	70.6	25 22.0	+60.0	71.1	25 41.2	+60.0	71.5	26 00.0	+60.0	72.0	26
27	24 38.9	+59.5	68.8	25 00.4	+59.6	69.2	25 21.5	+59.7	69.7	25 42.1	+59.8	70.1	26 02.2	+60.0	70.6	26 22.0	+59.9	71.0	26 41.2	+60.0	71.5	27 00.0	+60.0	72.0	27
28	25 38.4	+59.5	68.7	26 00.0	+59.7	69.1	26 21.2	+59.7	69.6	26 41.9	+59.8	70.0	27 02.2	+59.9	70.5	27 21.9	+60.0	71.0	27 41.2	+60.0	71.5	28 00.0	+60.0	72.0	28
29	26 37.9	+59.5	68.5	26 59.7	+59.6	69.0	27 20.9	+59.8	69.5	27 41.7	+59.9	70.0	28 02.1	+59.9	70.5	28 21.9	+59.9	71.0	28 41.2	+60.0	71.5	29 00.0	+60.0	72.0	29
30	27 37.4	+59.5	68.4	27 59.3	+59.6	68.9	28 20.7	+59.7	69.4	28 41.6	+59.8	69.9	29 02.0	+59.9	70.4	29 21.8	+60.0	70.9	29 41.2	+60.0	71.5	30 00.0	+60.0	72.0	30
31	28 36.9	+59.5	68.2	28 58.9	+59.6	68.7	29 20.4	+59.7	69.3	29 41.4	+59.8	69.8	30 01.9	+59.9	70.3	30 21.8	+59.9	70.9	30 41.2	+60.0	71.4	31 00.0	+60.0	72.0	31
32	29 36.4	+59.4	68.1	29 58.5	+59.6	68.6	30 20.1	+59.8	69.1	30 41.2	+59.8	69.7	31 01.8	+59.9	70.3	31 21.7	+60.0	70.8	31 41.2	+60.0	71.4	32 00.0	+60.0	72.0	32
33	30 35.8	+59.5	67.9	30 58.1	+59.6	68.5	31 19.9	+59.7	69.0	31 41.0	+59.9	69.6	32 01.7	+59.9	70.2	32 21.7	+60.0	70.8	32 41.2	+59.9	71.4	33 00.0	+60.0	72.0	33
34	31 35.3	+59.4	67.8	31 57.7	+59.6	68.3	32 19.6	+59.7	68.9	32 40.9	+59.8	69.5	33 01.6	+59.8	70.1	33 21.7	+59.9	70.7	33 41.1	+60.0	71.4	34 00.0	+60.0	72.0	34
35	32 34.7	+59.4	67.6	32 57.3	+59.6	68.2	33 19.3	+59.7	68.8	33 40.7	+59.8	69.4	34 01.4	+59.9	70.0	34 21.6	+60.0	70.7	34 41.1	+60.0	71.3	35 00.0	+60.0	72.0	35
36	33 34.1	+59.4	67.4	33 56.9	+59.5	68.1	34 19.0	+59.7	68.7	34 40.5	+59.8	69.3	35 01.3	+59.9	70.0	35 21.6	+59.9	70.6	35 41.1	+60.0	71.3	36 00.0	+60.0	72.0	36
37	34 33.5	+59.4	67.3	34 56.4	+59.6	67.9	35 18.7	+59.7	68.6	35 40.3	+59.8	69.2	36 01.2	+59.9	69.9	36 21.5	+60.0	70.6	36 41.1	+60.0	71.3	37 00.0	+60.0	72.0	37
38	35 32.9	+59.4	67.1	35 56.0	+59.5	67.8	36 18.4	+59.6	68.4	36 40.1	+59.8	69.1	37 01.1	+59.9	69.8	37 21.5	+59.9	70.5	37 41.1	+60.0	71.3	38 00.0	+60.0	72.0	38
39	36 32.3	+59.4	66.9	36 55.5	+59.5	67.6	37 18.0	+59.7	68.3	37 39.9	+59.7	69.0	38 01.0	+59.9	69.7	38 21.4	+59.9	70.5	38 41.1	+60.0	71.2	39 00.0	+60.0	72.0	39
40	37 31.7	+59.3	66.7	37 55.0	+59.5	67.4	38 17.7	+59.7	68.2	38 39.6	+59.8	68.9	39 00.9	+59.8	69.7	39 21.3	+60.0	70.4	39 41.1	+60.0	71.2	40 00.0	+60.0	72.0	40
41	38 31.0	+59.3	66.5	38 54.5	+59.5	67.3	39 17.4	+59.6	68.0	39 39.4	+59.8	68.8	40 00.7	+59.9	69.6	40 21.3	+59.9	70.4	40 41.1	+59.9	71.2	41 00.0	+60.0	72.0	41
42	39 30.3	+59.4	66.4	39 54.0	+59.5	67.1	40 17.0	+59.6	67.9	40 39.2	+59.8	68.7	41 00.6	+59.9	69.5	41 21.2	+60.0	70.3	41 41.0	+60.0	71.2	42 00.0	+60.0	72.0	42
43	40 29.7	+59.2	66.2	40 53.5	+59.5	66.9	41 16.6	+59.7	67.7	41 39.0	+59.7	68.6	42 00.5	+59.8	69.4	42 21.2	+59.9	70.3	42 41.0	+60.0	71.1	43 00.0	+60.0	72.0	43
44	41 28.9	+59.3	66.0	41 53.0	+59.5	66.8	42 16.3	+59.6	67.6	42 38.7	+59.8	68.4	43 00.3	+59.9	69.3	43 21.1	+60.0	70.2	43 41.0	+60.0	71.1	44 00.0	+60.0	72.0	44
45	42 28.2	+59.3	65.7	42 52.5	+59.4	66.6	43 15.9	+59.6	67.4	43 38.5	+59.7	68.3	44 00.2	+59.9	69.2	44 21.1	+59.9	70.1	44 41.0	+60.0	71.1	45 00.0	+60.0	72.0	45
46	43 27.5	+59.2	65.5	43 51.9	+59.4	66.4	44 15.5	+59.6	67.3	44 38.2	+59.8	68.2	45 00.1	+59.8	69.1	45 21.0	+59.9	70.1	45 41.0	+60.0	71.0	46 00.0	+60.0	72.0	46
47	44 26.7	+59.2	65.3	44 51.3	+59.4	66.2	45 15.1	+59.6	67.1	45 38.0	+59.7	68.1	45 59.9	+59.9	69.0	46 20.9	+59.9	70.0	46 41.0	+59.9	71.0	47 00.0	+60.0	72.0	47
48	45 25.9	+59.1	65.1	45 50.7	+59.4	66.0	46 14.7	+59.5	67.0	46 37.7	+59.7	67.9	46 59.8	+59.8	68.9	47 20.8	+60.0	69.9	47 40.9	+60.0	71.0	48 00.0	+60.0	72.0	48
49	46 25.0	+59.2	64.8	46 50.1	+59.3	65.8	47 14.2	+59.6	66.8	47 37.4	+59.7	67.8	47 59.6	+59.8	68.8	48 20.8	+59.9	69.9	48 40.9	+60.0	70.9	49 00.0	+60.0	72.0	49
50	47 24.2	+59.0	64.6	47 49.4	+59.4	65.6	48 13.8	+59.5	66.6	48 37.1	+59.7	67.6	48 59.4	+59.8	68.7	49 20.7	+59.9	69.8	49 40.9	+60.0	70.9	50 00.0	+60.0	72.0	50
51	48 23.2	+59.1	64.3	48 48.8	+59.3	65.4	49 13.3	+59.5	66.4	49 36.8	+59.7	67.5	49 59.2	+59.9	68.6	50 20.6	+59.9	69.7	50 40.9	+60.0	70.8	51 00.0	+60.0	72.0	51
52	49 22.3	+59.0	64.1	49 48.1	+59.2	65.1	50 12.8	+59.5	66.2	50 36.5	+59.6	67.3	50 59.1	+59.8	68.5	51 20.5	+59.9	69.6	51 40.9	+59.9	70.8	52 00.0	+60.0	72.0	52
53	50 21.3	+59.0	63.8	50 47.3	+59.3	64.9	51 12.3	+59.4	66.0	51 36.1	+59.7	67.1	51 58.9	+59.8	68.3	52 20.4	+60.0	69.5	52 40.8	+60.0	70.7	53 00.0	+60.0	72.0	53
54	51 20.3	+58.9	63.5	51 46.6	+59.2	64.6	52 11.7	+59.5	65.8	52 35.8	+59.6	67.0	52 58.7	+59.8	68.2	53 20.4	+59.9	69.4	53 40.8	+60.0	70.7	54 00.0	+60.0	72.0	54
55	52 19.2	+58.9	63.2	52 45.8	+59.1	64.4	53 11.2	+59.4	65.6	53 35.4	+59.6	66.8	53 58.5	+59.7	68.0	54 20.3	+59.9	69.3	54 40.8	+60.0	70.7	55 00.0	+60.0	72.0	55
56	53 18.1	+58.9	62.9	53 44.9	+59.2	64.1	54 10.6	+59.4	65.3	54 35.0	+59.6	66.6	54 58.2	+59.8	67.9	55 20.2	+59.9	69.2	55 40.8	+59.9	70.6	56 00.0	+60.0	72.0	56
57	54 17.0	+58.7	62.5	54 44.1	+59.0	63.8	55 10.0	+59.3	65.1	55 34.6	+59.6	66.4	55 58.0	+59.8	67.7	56 20.1	+59.8	69.1	56 40.7	+60.0	70.6	57 00.0	+60.0	72.0	57
58	55 15.7	+58.8	62.2	55 43.1	+59.1	63.5	56 09.3	+59.3	64.8	56 34.2	+59.6	66.2	56 57.8	+59.7	67.6	57 19.9	+59.9	69.0	57 40.7	+60.0	70.5	58 00.0	+60.0	72.0	58
59	56 14.5	+58.6	61.8	56 42.2	+59.0	63.2	57 08.6	+59.3	64.5	57 33.8	+59.5	66.0	57 57.5	+59.7	67.4	58 19.8	+59.9	68.9	58 40.7	+59.9	70.4	59 00.0	+60.0	72.0	59
60	57 13.1	+58.6	61.4	57 41.2	+58.9	62.8	58 07.9	+59.2	64.2	58 33.3	+59.5	65.7	58 57.2	+59.7	67.2	59 19.7	+59.9	68.8	59 40.6	+60.0	70.4	60 00.0	+60.0	72.0	60
61	58 11.7	+58.5	61.0	58 40.1	+58.8	62.5	59 07.1	+59.2	63.9	59 32.8	+59.4	65.5	59 56.9	+59.7	67.0	60 19.6	+59.8	68.6	60 40.6	+60.0	70.3	61 00.0	+60.0	72.0	61
62	59 10.2	+58.4	60.6	59 38.9	+58.8	62.1	60 06.3	+59.2	63.6	60 32.2	+59.5	65.2	60 56.6	+59.7	66.8	61 19.4	+59.9	68.5	61 40.6	+59.9	70.2	62 00.0	+60.0	72.0	62
63	60 08.6	+58.3	60.1	60 37.7	+58.7	61.7	61 05.5	+59.0	63.3	61 31.7	+59.4	64.9	61 56.3	+59.7	66.6	62 19.3	+59.8	68.4	62 40.5	+60.0	70.2	63 00.0	+60.0	72.0	63
64	61 06.9	+58.2	59.7	61 36.4	+58.7	61.3	62 04.5	+59.1	62.9	62 31.1	+59.3	64.6	62 56.0	+59.6	66.4	63 19.1	+59.9	68.2	63 40.5	+60.0	70.1	64 00.0	+60.0	72.0	64
65	62 05.1	+58.0	59.2	62 35.1	+58.5	60.8	63 03.6	+58.9	62.5	63 30.4	+59.3	64.3	63 55.6	+59.6	66.1	64 19.0	+59.8	68.0	64 40.5	+59.9	70.0	65 00.0	+60.0	72.0	65
66	63 03.1	+58.0	58.6	63 33.6	+58.4	60.3	64 02.5	+58.9	62.1	64 29.7	+59.3	63.9	64 55.2	+59.6	65.9	65 18.8	+59.8	67.8	65 40.4	+60.0	69.9	66 00.0	+60.0	72.0	66
67	64 01.1	+57.7	58.0	64 32.0	+58.4	59.8	65 01.4	+58.8	61.6	65 29.0	+59.2	63.6	65 54.8	+59.5	65.6	66 18.6	+59.8	67.6	66 40.4	+59.9	69.8	67 00.0	+60.0	72.0	67
68	64 58.8	+57.7	57.4	65 30.4	+58.1	59.2	66 00.2	+58.7	61.2	66 28.2	+59.1	63.2	66 54.3	+59.5	65.3	67 18.4	+59.7	67.4	67 40.3	+59.9	69.7	68 00.0	+60.0	72.0	68
69	65 56.5	+57.4	56.7	66 28.5	+58.1	58.6	66 58.9	+58.5	60.6	67 27.3	+59.1	62.7	67 53.8	+59.4	64.9	68 18.1	+59.8	67.2	68 40.2	+60.0	69.6	69 00.0	+60.0	72.0	69
70	66 53.9	+57.2	56.0	67 26.6	+57.8	58.0	67 57.4	+58.5	60.1	68 26.4	+58.9	62.3	68 53.2	+59.4	64.6	69 17.9	+59.7	66.9	69 40.2	+59.9	69.4	70 00.0	+60.0	72.0	70
71	67 51.1	+57.0	55.2	68 24.4	+57.7	57.3	68 55.9	+58.3	59.5	69 25.3	+58.9	61.8	69 52.6	+59.4	64.2	70 17.6	+59.7	66.7	70 40.1	+59.9	69.3	71 00.0	+60.0	72.0	71
72	68 48.1	+56.6	54.4	69 22.1	+57.4	56.5	69 54.2	+58.1	58.8	70 24.2	+58.8	61.2	70 52.0	+59.2	63.7	71 17.3	+59.7	66.4	71 40.0	+59.9	69.1	72 00.0	+60.0	72.0	72
73	69 44.7	+56.4	53.4	70 19.5	+57.2	55.7	70 52.3	+58.0	58.1	71 23.0	+58.6	60.6	71 51.2	+59.2	63.2	72 17.0	+59.6	66.0	72 39.9	+59.9	68.9	73 00.0	+60.0	72.0	73
74	70 41.1	+56.0	52.4	71 16.7	+56.9	54.8	71 50.3	+57.7	57.2	72 21.6	+58.5	59.9	72 50.4	+59.1	62.7	73 16.6	+59.6	65.6	73 39.8	+59.9	68.8	74 00.0	+60.0	72.0	74
75	71 37.1	+55.6	51.3	72 13.6	+56.6	53.7	72 48.0	+57.5	56.3	73 20.1	+58.2	59.1	73 49.5	+59.0	62.1	74 16.2	+59.5	65.2	74 39.7	+59.9	68.5	75 00.0	+60.0	72.0	75
76	72 32.7	+55.1	50.1	73 10.2	+56.1	52.6	73 45.5	+57.1	55.3	74 18.3	+58.1	58.3	74 48.5	+58.8	61.4	75 15.7	+59.4	64.7	75 39.6	+59.9	68.3	76 00.0	+60.0	72.0	76
77	73 27.8	+54.5	48.7	74 06.3	+55.7	51.4	74 42.6	+56.8	54.2	75 16.4	+57.7	57.3	75 47.3	+58.7	60.6	76 15.1	+59.4	64.2	76 39.5	+59.8	68.0	77 00.0	+60.0	72.0	77
78	74 22.3	+53.8	47.2	75 02.0	+55.0	50.0	75 39.4	+56.3	53.0	76 14.1	+57.5	56.2	76 46.0	+58.4	59.7	77 14.5	+59.3	63.6	77 39.3	+59.8	67.6	78 00.0	+60.0	72.0	78
79	75 16.1	+52.9	45.5	75 57.0	+54.4	48.4	76 35.7	+55.7	51.5	77 11.6	+57.0	55.0	77 44.4	+58.2	58.7	78 13.8	+59.1	62.8	78 39.1	+59.8	67.3	79 00.0	+60.0	72.0	79
80	76 09.0	+52.0	43.6	76 51.4	+53.5	46.6	77 31.4	+55.0	49.9	78 08.6	+56.5	53.5	78 42.6	+57.9	57.5	79 12.9	+58.9	61.9	79 38.9	+59.7	66.8	80 00.0	+60.0	72.0	80
81	77 01.0	+50.7	41.5	77 44.9	+52.4	44.5	78 26.4	+54.2	47.9	79 05.1	+55.9	51.8	79 40.5	+57.4	56.1	80 11.8	+58.8	60.9	80 38.6	+59.6	66.2	81 00.0	+60.0	72.0	81
82	77 51.7	+49.3	39.0	78 37.3	+51.1	42.1	79 20.6	+53.0	45.7	80 01.0	+54.9	49.8	80 37.9	+56.8	54.4	81 10.6	+58.4	59.6	81 38.2	+59.6	65.5	82 00.0	+60.0	72.0	82
83	78 41.0	*+47.4*•	36.2	79 28.4	+49.5	39.4	80 13.6	+51.6	43.1	80 55.9	+53.8	47.3	81 34.7	+55.9	52.3	82 09.0	+57.9	58.1	82 37.8	+59.4	64.6	83 00.0	+60.0	72.0	83
84	79 28.4	*+45.2*•	33.0	80 17.9	*+47.3*•	36.1	81 05.2	*+49.6*•	39.9	81 49.7	+52.2	44.4	82 30.6	+54.8	49.7	83 06.9	+57.3	56.0	83 37.2	+59.2	63.5	84 00.0	+60.0	72.0	84
85	80 13.6	*+42.3*•	29.2	81 05.2	*+44.5*•	32.3	81 54.8	*+47.1*•	36.1	82 41.9	*+49.9*•	40.7	83 25.4	*+53.1*•	46.4	84 04.2	+56.2	53.3	84 36.4	+58.8	61.9	85 00.0	+60.0	72.0	85
86	80 55.9	*+38.8*•	24.9	81 49.7	*+40.9*•	27.8	82 41.9	*+43.5*•	31.5	83 31.8	*+46.7*•	36.1	84 18.5	*+50.3*•	42.0	85 00.4	*+54.4*•	49.7	85 35.2	+58.2	59.6	86 00.0	+60.0	72.0	86
87	81 34.7	*+34.3*•	19.9	82 30.6	*+36.3*•	22.4	83 25.4	*+38.8*•	25.8	84 18.5	*+41.9*•	30.1	85 08.8	*+46.0*•	36.0	85 54.8	*+51.0*•	44.3	86 33.4	*+56.8*•	56.0	87 00.0	+60.0	72.0	87
88	82 09.0	*+28.8*•	14.1	83 06.9	*+30.3*•	16.1	84 04.2	*+32.2*•	18.7	85 00.4	*+34.8*•	22.4	85 54.8	*+38.6*•	27.8	86 45.8	*+44.4*•	36.0	87 30.2	*+52.7*•	49.6	88 00.0	+60.0	72.0	88
89	82 37.8	*+22.2*•	7.4	83 37.2	*+22.8*•	8.6	84 36.4	*+23.6*•	10.2	85 35.2	*+24.8*•	12.5	86 33.4	*+26.6*•	16.0	87 30.2	*+29.8*•	22.4	88 22.9	*+37.1*•	36.0	89 00.0	+60.0	72.0	89
90	83 00.0	*+14.5*•	0.0	84 00.0	*+13.8*•	0.0	85 00.0	*+12.8*•	0.0	86 00.0	*+11.3*•	0.0	87 00.0	*+8.8*•	0.0	88 00.0	*+3.6*•	0.0	89 00.0	*−10.5*•	0.0	90 00.0	−60.0	36.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 108°, 252°

73°, 287° L.H.A.

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 02.5	+59.6	106.9	1 45.1	+59.7	106.9	1 27.6	+59.8	106.9	1 10.1	+59.9	107.0	0 52.6	+59.9	107.0	0 35.1	+59.9	107.0	0 17.5	+60.0	107.0	0 00.0	+60.0	107.0	**0**
1	3 02.1	+59.6	106.8	2 44.8	+59.7	106.8	2 27.4	+59.8	106.9	2 10.0	+59.8	106.9	1 52.5	+60.0	106.9	1 35.0	+60.0	107.0	1 17.5	+60.0	107.0	1 00.0	+60.0	107.0	**1**
2	4 01.7	+59.6	106.6	3 44.5	+59.7	106.7	3 27.2	+59.8	106.8	3 09.8	+59.9	106.8	2 52.5	+59.9	106.9	2 35.0	+60.0	106.9	2 17.5	+60.0	107.0	2 00.0	+60.0	107.0	**2**
3	5 01.3	+59.6	106.5	4 44.2	+59.7	106.6	4 27.0	+59.8	106.7	4 09.7	+59.9	106.8	3 52.4	+59.9	106.8	3 35.0	+59.9	106.9	3 17.5	+60.0	106.9	3 00.0	+60.0	107.0	**3**
4	6 00.9	+59.6	106.4	5 43.9	+59.7	106.5	5 26.8	+59.8	106.6	5 09.6	+59.8	106.7	4 52.3	+59.9	106.8	4 34.9	+60.0	106.9	4 17.5	+60.0	106.9	4 00.0	+60.0	107.0	**4**
5	7 00.5	+59.5	106.3	6 43.6	+59.7	106.4	6 26.6	+59.7	106.5	6 09.4	+59.9	106.6	5 52.2	+60.0	106.7	5 34.9	+60.0	106.8	5 17.5	+60.0	106.9	5 00.0	+60.0	107.0	**5**
6	8 00.0	+59.6	106.2	7 43.3	+59.7	106.3	7 26.3	+59.8	106.4	7 09.3	+59.9	106.6	6 52.2	+59.9	106.7	6 34.9	+59.9	106.8	6 17.5	+60.0	106.9	6 00.0	+60.0	107.0	**6**
7	8 59.6	+59.6	106.1	8 43.0	+59.6	106.2	8 26.1	+59.8	106.4	8 09.2	+59.8	106.5	7 52.1	+59.9	106.6	7 34.8	+60.0	106.8	7 17.5	+60.0	106.9	7 00.0	+60.0	107.0	**7**
8	9 59.2	+59.6	105.9	9 42.6	+59.7	106.1	9 25.9	+59.8	106.3	9 09.0	+59.9	106.4	8 52.0	+59.9	106.6	8 34.8	+60.0	106.7	8 17.5	+60.0	106.9	8 00.0	+60.0	107.0	**8**
9	10 58.8	+59.6	105.8	10 42.3	+59.7	106.0	10 25.7	+59.8	106.2	10 08.9	+59.9	106.4	9 51.9	+59.9	106.5	9 34.8	+59.9	106.7	9 17.5	+60.0	106.8	9 00.0	+60.0	107.0	**9**
10	11 58.4	+59.5	105.7	11 42.0	+59.7	105.9	11 25.5	+59.8	106.1	11 08.8	+59.8	106.3	10 51.8	+60.0	106.5	10 34.7	+60.0	106.7	10 17.5	+59.9	106.8	10 00.0	+60.0	107.0	**10**
11	12 57.9	+59.6	105.6	12 41.7	+59.7	105.8	12 25.3	+59.8	106.0	12 08.6	+59.9	106.2	11 51.8	+59.9	106.4	11 34.7	+60.0	106.6	11 17.4	+60.0	106.8	11 00.0	+60.0	107.0	**11**
12	13 57.5	+59.6	105.4	13 41.4	+59.7	105.7	13 25.1	+59.7	105.9	13 08.5	+59.8	106.1	12 51.7	+59.9	106.4	12 34.7	+59.9	106.6	12 17.4	+60.0	106.8	12 00.0	+60.0	107.0	**12**
13	14 57.1	+59.5	105.3	14 41.1	+59.6	105.6	14 24.8	+59.8	105.8	14 08.3	+59.9	106.1	13 51.6	+59.9	106.3	13 34.6	+60.0	106.5	13 17.4	+60.0	106.8	13 00.0	+60.0	107.0	**13**
14	15 56.6	+59.6	105.2	15 40.7	+59.7	105.5	15 24.6	+59.8	105.7	15 08.2	+59.9	106.0	14 51.5	+59.9	106.3	14 34.6	+60.0	106.5	14 17.4	+60.0	106.8	14 00.0	+60.0	107.0	**14**
15	16 56.2	+59.5	105.1	16 40.4	+59.7	105.4	16 24.4	+59.8	105.7	16 08.1	+59.8	105.9	15 51.4	+60.0	106.2	15 34.6	+59.9	106.5	15 17.4	+60.0	106.7	15 00.0	+60.0	107.0	**15**
16	17 55.7	+59.6	104.9	17 40.1	+59.7	105.3	17 24.2	+59.7	105.6	17 07.9	+59.9	105.9	16 51.4	+59.9	106.2	16 34.5	+60.0	106.4	16 17.4	+60.0	106.7	16 00.0	+60.0	107.0	**16**
17	18 55.3	+59.5	104.8	18 39.8	+59.6	105.1	18 23.9	+59.8	105.5	18 07.8	+59.8	105.8	17 51.3	+59.9	106.1	17 34.5	+60.0	106.4	17 17.4	+60.0	106.7	17 00.0	+60.0	107.0	**17**
18	19 54.8	+59.5	104.7	19 39.4	+59.7	105.0	19 23.7	+59.8	105.4	19 07.6	+59.9	105.7	18 51.2	+59.9	106.0	18 34.5	+59.9	106.4	18 17.4	+60.0	106.7	18 00.0	+60.0	107.0	**18**
19	20 54.3	+59.6	104.6	20 39.1	+59.6	104.9	20 23.5	+59.7	105.3	20 07.5	+59.8	105.6	19 51.1	+59.9	106.0	19 34.4	+60.0	106.3	19 17.4	+60.0	106.7	19 00.0	+60.0	107.0	**19**
20	21 53.9	+59.5	104.4	21 38.7	+59.7	104.8	21 23.2	+59.8	105.2	21 07.3	+59.9	105.6	20 51.0	+59.9	105.9	20 34.4	+59.9	106.3	20 17.4	+60.0	106.6	20 00.0	+60.0	107.0	**20**
21	22 53.4	+59.5	104.3	22 38.4	+59.6	104.7	22 23.0	+59.7	105.1	22 07.2	+59.8	105.5	21 50.9	+60.0	105.9	21 34.3	+60.0	106.3	21 17.4	+59.9	106.6	21 00.0	+60.0	107.0	**21**
22	23 52.9	+59.5	104.1	23 38.0	+59.7	104.6	23 22.7	+59.8	105.0	23 07.0	+59.8	105.4	22 50.9	+59.9	105.8	22 34.3	+60.0	106.2	22 17.3	+60.0	106.6	22 00.0	+60.0	107.0	**22**
23	24 52.4	+59.5	104.0	24 37.7	+59.6	104.4	24 22.5	+59.7	104.9	24 06.8	+59.9	105.3	23 50.8	+59.9	105.8	23 34.3	+59.9	106.2	23 17.3	+60.0	106.6	23 00.0	+60.0	107.0	**23**
24	25 51.9	+59.5	103.9	25 37.3	+59.6	104.3	25 22.2	+59.8	104.8	25 06.7	+59.8	105.2	24 50.7	+59.9	105.7	24 34.2	+60.0	106.1	24 17.3	+60.0	106.6	24 00.0	+60.0	107.0	**24**
25	26 51.4	+59.5	103.7	26 36.9	+59.7	104.2	26 22.0	+59.7	104.7	26 06.5	+59.8	105.2	25 50.6	+59.9	105.6	25 34.2	+59.9	106.1	25 17.3	+60.0	106.6	25 00.0	+60.0	107.0	**25**
26	27 50.9	+59.5	103.6	27 36.6	+59.6	104.1	27 21.7	+59.7	104.6	27 06.3	+59.9	105.1	26 50.5	+59.9	105.6	26 34.1	+60.0	106.1	26 17.3	+60.0	106.5	26 00.0	+60.0	107.0	**26**
27	28 50.4	+59.4	103.4	28 36.2	+59.6	103.9	28 21.4	+59.8	104.5	28 06.2	+59.8	105.0	27 50.4	+59.9	105.5	27 34.1	+60.0	106.0	27 17.3	+60.0	106.5	27 00.0	+60.0	107.0	**27**
28	29 49.8	+59.5	103.3	29 35.8	+59.6	103.8	29 21.2	+59.7	104.4	29 06.0	+59.8	104.9	28 50.3	+59.9	105.4	28 34.1	+59.9	106.0	28 17.3	+60.0	106.5	28 00.0	+60.0	107.0	**28**
29	30 49.3	+59.4	103.1	30 35.4	+59.6	103.7	30 20.9	+59.7	104.3	30 05.8	+59.8	104.8	29 50.2	+59.9	105.4	29 34.0	+60.0	105.9	29 17.3	+60.0	106.5	29 00.0	+60.0	107.0	**29**
30	31 48.7	+59.4	102.9	31 35.0	+59.5	103.5	31 20.6	+59.7	104.1	31 05.6	+59.9	104.7	30 50.1	+59.9	105.3	30 34.0	+59.9	105.9	30 17.3	+60.0	106.4	30 00.0	+60.0	107.0	**30**
31	32 48.1	+59.4	102.8	32 34.5	+59.6	103.4	32 20.3	+59.7	104.0	32 05.5	+59.8	104.6	31 50.0	+59.9	105.2	31 33.9	+60.0	105.8	31 17.3	+59.9	106.4	31 00.0	+60.0	107.0	**31**
32	33 47.5	+59.4	102.6	33 34.1	+59.6	103.3	33 20.0	+59.7	103.9	33 05.3	+59.8	104.5	32 49.9	+59.9	105.2	32 33.9	+59.9	105.8	32 17.2	+60.0	106.4	32 00.0	+60.0	107.0	**32**
33	34 46.9	+59.4	102.4	34 33.7	+59.5	103.1	34 19.7	+59.7	103.8	34 05.1	+59.8	104.4	33 49.8	+59.9	105.1	33 33.8	+60.0	105.7	33 17.2	+60.0	106.4	33 00.0	+60.0	107.0	**33**
34	35 46.3	+59.4	102.3	35 33.2	+59.6	103.0	35 19.4	+59.7	103.7	35 04.9	+59.8	104.3	34 49.7	+59.9	105.0	34 33.8	+59.9	105.7	34 17.2	+60.0	106.4	34 00.0	+60.0	107.0	**34**
35	36 45.7	+59.4	102.1	36 32.8	+59.5	102.8	36 19.1	+59.7	103.5	36 04.7	+59.8	104.2	35 49.6	+59.8	104.9	35 33.7	+60.0	105.6	35 17.2	+60.0	106.3	35 00.0	+60.0	107.0	**35**
36	37 45.1	+59.3	101.9	37 32.3	+59.5	102.7	37 18.8	+59.6	103.4	37 04.5	+59.8	104.1	36 49.4	+59.9	104.9	36 33.7	+59.9	105.6	36 17.2	+60.0	106.3	36 00.0	+60.0	107.0	**36**
37	38 44.4	+59.3	101.7	38 31.8	+59.5	102.5	38 18.4	+59.7	103.3	38 04.3	+59.7	104.0	37 49.3	+59.9	104.8	37 33.6	+60.0	105.5	37 17.2	+60.0	106.3	37 00.0	+60.0	107.0	**37**
38	39 43.7	+59.3	101.5	39 31.3	+59.5	102.3	39 18.1	+59.6	103.1	39 04.0	+59.8	103.9	38 49.2	+59.9	104.7	38 33.6	+59.9	105.5	38 17.2	+60.0	106.2	38 00.0	+60.0	107.0	**38**
39	40 43.0	+59.3	101.3	40 30.8	+59.5	102.2	40 17.7	+59.7	103.0	40 03.8	+59.8	103.8	39 49.1	+59.8	104.6	39 33.5	+60.0	105.4	39 17.2	+59.9	106.2	39 00.0	+60.0	107.0	**39**
40	41 42.3	+59.2	101.1	41 30.3	+59.4	102.0	41 17.4	+59.6	102.8	41 03.6	+59.7	103.7	40 48.9	+59.9	104.5	40 33.5	+59.9	105.4	40 17.1	+60.0	106.2	40 00.0	+60.0	107.0	**40**
41	42 41.5	+59.3	100.9	42 29.7	+59.5	101.8	42 17.0	+59.6	102.7	42 03.3	+59.8	103.6	41 48.8	+59.9	104.5	41 33.4	+59.9	105.3	41 17.1	+60.0	106.2	41 00.0	+60.0	107.0	**41**
42	43 40.8	+59.2	100.7	43 29.2	+59.4	101.6	43 16.6	+59.6	102.5	43 03.1	+59.7	103.5	42 48.7	+59.8	104.4	42 33.3	+60.0	105.3	42 17.1	+60.0	106.1	42 00.0	+60.0	107.0	**42**
43	44 40.0	+59.1	100.5	44 28.6	+59.4	101.4	44 16.2	+59.6	102.4	44 02.8	+59.8	103.3	43 48.5	+59.9	104.3	43 33.3	+59.9	105.2	43 17.1	+60.0	106.1	43 00.0	+60.0	107.0	**43**
44	45 39.1	+59.2	100.2	45 28.0	+59.3	101.2	45 15.8	+59.6	102.2	45 02.6	+59.7	103.2	44 48.4	+59.8	104.2	44 33.2	+59.9	105.1	44 17.1	+60.0	106.1	44 00.0	+60.0	107.0	**44**
45	46 38.3	+59.1	100.0	46 27.3	+59.4	101.0	46 15.4	+59.5	102.0	46 02.3	+59.7	103.1	45 48.2	+59.9	104.1	45 33.1	+60.0	105.1	45 17.1	+59.9	106.0	45 00.0	+60.0	107.0	**45**
46	47 37.4	+59.1	99.7	47 26.7	+59.3	100.8	47 14.9	+59.5	101.9	47 02.0	+59.7	102.9	46 48.1	+59.8	104.0	46 33.1	+59.9	105.0	46 17.0	+60.0	106.0	46 00.0	+60.0	107.0	**46**
47	48 36.5	+59.0	99.5	48 26.0	+59.3	100.6	48 14.4	+59.6	101.7	48 01.7	+59.7	102.8	47 47.9	+59.8	103.9	47 33.0	+59.9	104.9	47 17.0	+60.0	106.0	47 00.0	+60.0	107.0	**47**
48	49 35.5	+59.0	99.2	49 25.3	+59.3	100.4	49 14.0	+59.5	101.5	49 01.4	+59.7	102.6	48 47.7	+59.9	103.7	48 32.9	+59.9	104.8	48 17.0	+60.0	105.9	48 00.0	+60.0	107.0	**48**
49	50 34.5	+59.0	98.9	50 24.6	+59.2	100.1	50 13.5	+59.4	101.3	50 01.1	+59.7	102.5	49 47.6	+59.8	103.6	49 32.8	+60.0	104.8	49 17.0	+60.0	105.9	49 00.0	+60.0	107.0	**49**
50	51 33.5	+58.9	98.6	51 23.8	+59.3	99.9	51 12.9	+59.5	101.1	51 00.8	+59.6	102.3	50 47.4	+59.8	103.5	50 32.8	+59.9	104.7	50 17.0	+59.9	105.9	50 00.0	+60.0	107.0	**50**
51	52 32.4	+58.9	98.3	52 23.1	+59.1	99.6	52 12.4	+59.4	100.9	52 00.4	+59.7	102.1	51 47.2	+59.8	103.4	51 32.7	+59.9	104.6	51 16.9	+60.0	105.8	51 00.0	+60.0	107.0	**51**
52	53 31.3	+58.8	98.0	53 22.2	+59.2	99.3	53 11.8	+59.4	100.6	53 00.1	+59.6	101.9	52 47.0	+59.8	103.2	52 32.6	+59.9	104.5	52 16.9	+60.0	105.8	52 00.0	+60.0	107.0	**52**
53	54 30.1	+58.7	97.7	54 21.4	+59.0	99.0	54 11.2	+59.4	100.4	53 59.7	+59.6	101.8	53 46.8	+59.8	103.1	53 32.5	+59.9	104.4	53 16.9	+60.0	105.7	53 00.0	+60.0	107.0	**53**
54	55 28.8	+58.7	97.3	55 20.4	+59.1	98.7	55 10.6	+59.3	100.2	54 59.3	+59.6	101.6	54 46.6	+59.7	103.0	54 32.4	+59.9	104.3	54 16.9	+60.0	105.7	54 00.0	+60.0	107.0	**54**
55	56 27.5	+58.6	96.9	56 19.5	+59.0	98.4	56 09.9	+59.3	99.9	55 58.9	+59.5	101.4	55 46.3	+59.8	102.8	55 32.3	+59.9	104.2	55 16.9	+59.9	105.6	55 00.0	+60.0	107.0	**55**
56	57 26.1	+58.5	96.5	57 18.5	+58.9	98.1	57 09.2	+59.3	99.6	56 58.4	+59.6	101.1	56 46.1	+59.7	102.6	56 32.2	+59.9	104.1	56 16.8	+60.0	105.6	56 00.0	+60.0	107.0	**56**
57	58 24.6	+58.5	96.1	58 17.4	+58.9	97.7	58 08.5	+59.2	99.3	57 58.0	+59.5	100.9	57 45.8	+59.7	102.5	57 32.1	+59.9	104.0	57 16.8	+60.0	105.5	57 00.0	+60.0	107.0	**57**
58	59 23.1	+58.4	95.7	59 16.3	+58.8	97.4	59 07.7	+59.2	99.0	58 57.5	+59.5	100.7	58 45.5	+59.8	102.3	58 32.0	+59.8	103.9	58 16.8	+59.9	105.5	58 00.0	+60.0	107.0	**58**
59	60 21.5	+58.2	95.2	60 15.1	+58.7	97.0	60 06.9	+59.1	98.7	59 57.0	+59.4	100.4	59 45.3	+59.7	102.1	59 31.8	+59.9	103.8	59 16.7	+60.0	105.4	59 00.0	+60.0	107.0	**59**
60	61 19.7	+58.2	94.7	61 13.8	+58.7	96.5	61 06.0	+59.1	98.3	60 56.4	+59.4	100.1	60 45.0	+59.6	101.9	60 31.7	+59.9	103.6	60 16.7	+60.0	105.3	60 00.0	+60.0	107.0	**60**
61	62 17.9	+58.0	94.2	62 12.5	+58.5	96.1	62 05.1	+59.0	98.0	61 55.8	+59.4	99.8	61 44.6	+59.7	101.7	61 31.6	+59.8	103.5	61 16.7	+59.9	105.3	61 00.0	+60.0	107.0	**61**
62	63 15.9	+57.9	93.6	63 11.0	+58.5	95.6	63 04.1	+59.0	97.6	62 55.2	+59.3	99.5	62 44.3	+59.6	101.4	62 31.4	+59.8	103.3	62 16.6	+60.0	105.2	62 00.0	+60.0	107.0	**62**
63	64 13.8	+57.7	93.1	64 09.5	+58.3	95.1	64 03.1	+58.8	97.2	63 54.5	+59.3	99.2	63 43.9	+59.6	101.2	63 31.2	+59.9	103.2	63 16.6	+59.9	105.1	63 00.0	+60.0	107.0	**63**
64	65 11.5	+57.5	92.4	65 07.8	+58.2	94.6	65 01.9	+58.8	96.7	64 53.8	+59.2	98.8	64 43.5	+59.6	100.9	64 31.1	+59.8	103.0	64 16.5	+60.0	105.0	64 00.0	+60.0	107.0	**64**
65	66 09.0	+57.4	91.7	66 06.0	+58.1	94.0	66 00.7	+58.7	96.2	65 53.0	+59.2	98.4	65 43.1	+59.5	100.6	65 30.9	+59.8	102.8	65 16.5	+60.0	104.9	65 00.0	+60.0	107.0	**65**
66	67 06.4	+57.1	91.0	67 04.1	+57.9	93.4	66 59.4	+58.5	95.7	66 52.2	+59.1	98.0	66 42.6	+59.5	100.3	66 30.7	+59.8	102.6	66 16.5	+59.9	104.8	66 00.0	+60.0	107.0	**66**
67	68 03.5	+56.9	90.2	68 02.0	+57.7	92.7	67 57.9	+58.5	95.1	67 51.3	+59.0	97.6	67 42.1	+59.5	100.0	67 30.5	+59.7	102.4	67 16.4	+59.9	104.7	67 00.0	+60.0	107.0	**67**
68	69 00.4	+56.6	89.3	68 59.7	+57.5	91.9	68 56.4	+58.3	94.5	68 50.3	+58.9	97.1	68 41.6	+59.4	99.6	68 30.2	+59.8	102.1	68 16.3	+60.0	104.6	68 00.0	+60.0	107.0	**68**
69	69 57.0	+56.2	88.4	69 57.2	+57.3	91.1	69 54.7	+58.1	93.8	69 49.2	+58.8	96.6	69 41.0	+59.3	99.2	69 30.0	+59.7	101.9	69 16.3	+59.9	104.5	69 00.0	+60.0	107.0	**69**
70	70 53.2	+55.9	87.3	70 54.5	+57.0	90.2	70 52.8	+57.9	93.1	70 48.0	+58.7	96.0	70 40.3	+59.3	98.8	70 29.7	+59.7	101.6	70 16.2	+59.9	104.3	70 00.0	+60.0	107.0	**70**
71	71 49.1	+55.4	86.2	71 51.5	+56.6	89.2	71 50.7	+57.7	92.3	71 46.7	+58.6	95.3	71 39.6	+59.2	98.3	71 29.4	+59.6	101.3	71 16.1	+59.9	104.2	71 00.0	+60.0	107.0	**71**
72	72 44.5	+54.9	84.9	72 48.1	+56.3	88.1	72 48.4	+57.4	91.4	72 45.3	+58.3	94.6	72 38.8	+59.1	97.8	72 29.0	+59.6	100.9	72 16.0	+60.0	104.0	72 00.0	+60.0	107.0	**72**
73	73 39.4	+54.3	83.5	73 44.4	+55.8	86.9	73 45.8	+57.1	90.4	73 43.6	+58.2	93.8	73 37.9	+59.0	97.2	73 28.6	+59.6	100.5	73 16.0	+59.8	103.8	73 00.0	+60.0	107.0	**73**
74	74 33.7	+53.6	82.0	74 40.2	+55.3	85.6	74 42.9	+56.7	89.2	74 41.8	+57.9	92.9	74 36.9	+58.8	96.5	74 28.2	+59.5	100.1	74 15.8	+59.9	103.6	74 00.0	+60.0	107.0	**74**
75	75 27.3	+52.6	80.2	75 35.5	+54.6	84.1	75 39.6	+56.3	88.0	75 39.7	+57.6	91.9	75 35.7	+58.7	95.8	75 27.7	+59.4	99.6	75 15.7	+59.9	103.4	75 00.0	+60.0	107.0	**75**
76	76 19.9	+51.7	78.3	76 30.1	+53.7	82.3	76 35.9	+55.7	86.5	76 37.3	+57.3	90.7	76 34.4	+58.5	94.9	76 27.1	+59.3	99.0	76 15.6	+59.8	103.1	76 00.0	+60.0	107.0	**76**
77	77 11.6	+50.3	76.0	77 23.8	+52.9	80.4	77 31.6	+54.9	84.8	77 34.6	+56.8	89.4	77 32.9	+58.2	93.9	77 26.4	+59.3	98.4	77 15.4	+59.8	102.8	77 00.0	+60.0	107.0	**77**
78	78 01.9	+48.8	73.5	78 16.7	+51.5	78.1	78 26.5	+54.1	82.9	78 31.4	+56.2	87.8	78 31.1	+57.9	92.7	78 25.7	+59.1	97.6	78 15.2	+59.8	102.4	78 00.0	+60.0	107.0	**78**
79	78 50.7	*+46.9* •	70.6	79 08.2	+50.1	75.5	79 20.6	+53.0	80.7	79 27.6	+55.5	86.0	79 29.0	+57.5	91.4	79 24.8	+58.9	96.7	79 15.0	+59.8	102.0	79 00.0	+60.0	107.0	**79**
80	79 37.6	*+44.4* •	67.3	79 58.3	*+48.0* •	72.5	80 13.6	+51.4	78.0	80 23.1	+54.4	83.8	80 26.5	+56.9	89.7	80 23.7	+58.6	95.6	80 14.8	+59.6	101.4	80 00.0	+60.0	107.0	**80**
81	80 22.0	*+41.5* •	63.4	80 46.3	*+45.6* •	68.9	81 05.0	*+49.5* •	74.8	81 17.5	+53.1	81.2	81 23.4	+56.1	87.7	81 22.3	+58.3	94.3	81 14.4	+59.6	100.8	81 00.0	+60.0	107.0	**81**
82	81 03.5	*+37.7* •	58.9	81 31.9	*+42.3* •	64.7	81 54.5	*+47.0* •	71.0	82 10.6	*+51.3* •	77.9	82 19.5	+55.0	85.2	82 20.6	+57.8	92.6	82 14.0	+59.5	100.0	82 00.0	+60.0	107.0	**82**
83	81 41.2	*+33.0* •	53.7	82 14.2	*+38.0* •	59.6	82 41.5	*+43.3* •	66.4	83 01.9	*+48.7* •	73.9	83 14.5	*+53.4* •	82.0	83 18.4	+57.1	90.5	83 13.5	+59.3	98.9	83 00.0	+60.0	107.0	**83**
84	82 14.2	*+27.3* •	47.7	82 52.2	*+32.6* •	53.7	83 24.8	*+38.6* •	60.6	83 50.6	*+44.8* •	68.7	84 07.9	*+50.9* •	77.8	84 15.5	+55.9	87.6	84 12.8	+59.0	97.5	84 00.0	+60.0	107.0	**84**
85	82 41.5	*+20.4* •	40.9	83 24.8	*+25.8* •	46.6	84 03.4	*+32.0* •	53.6	84 35.4	*+39.2* •	62.1	84 58.8	*+46.9* •	72.2	85 11.4	*+53.8* •	83.6	85 11.8	+58.5	95.5	85 00.0	+60.0	107.0	**85**
86	83 01.9	*+12.6* •	33.4	83 50.6	*+17.3* •	38.5	84 35.4	*+23.4* •	45.0	85 14.6	*+31.1* •	53.6	85 45.7	*+40.2* •	64.5	86 05.2	*+50.0* •	77.8	86 10.3	+57.4	92.6	86 00.0	+60.0	107.0	**86**
87	83 14.5	*+3.9* •	25.2	84 07.9	*+7.6* •	29.3	84 58.8	*+12.6* •	34.9	85 45.7	*+19.5* •	42.6	86 25.9	*+29.3* •	53.5	86 55.2	*+42.1* •	68.7	87 07.7	*+54.9* •	87.6	87 00.0	+60.0	107.0	**87**
88	83 18.4	*–4.9* •	16.6	84 15.5	*–2.7* •	19.5	85 11.4	*+0.4* •	23.5	86 05.2	*+5.1* •	29.3	86 55.2	*+12.5* •	38.4	87 37.3	*+25.3* •	53.5	88 02.6	*+46.0* •	77.8	88 00.0	+60.0	107.0	**88**
89	83 13.5	*–13.5* •	8.1	84 12.8	*–12.8* •	9.5	85 11.8	*–11.8* •	11.5	86 10.3	*–10.3* •	14.5	87 07.7	*–7.7* •	19.5	88 02.6	*–2.6* •	29.3	88 48.6	*+11.4* •	53.5	89 00.0	+60.0	107.0	**89**
90	83 00.0	*–21.3* •	0.0	84 00.0	*–21.9* •	0.0	85 00.0	*–22.7* •	0.0	86 00.0	*–23.8* •	0.0	87 00.0	*–25.7* •	0.0	88 00.0	*–29.0* •	0.0	89 00.0	*–36.5* •	0.0	90 00.0	–60.0	53.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 73°, 287°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	2 02.5	−59.6	106.9	1 45.1	−59.7	106.9	1 27.6	−59.8	106.9	1 10.1	−59.8	107.0	0 52.6	−59.9	107.0	0 35.1	−60.0	107.0	0 17.5	−60.0	107.0	0 00.0	+60.0	73.0	0
1	1 02.9	−59.6	107.0	0 45.4	−59.7	107.0	0 27.8	−59.8	107.0	0 10.3	−59.9	107.0	0 07.3	+59.9	73.0	0 24.9	+60.0	73.0	0 42.5	+59.9	73.0	1 00.0	+60.0	73.0	1
2	0 03.3	−59.6	107.1	0 14.3	+59.7	72.9	0 32.0	+59.8	72.9	0 49.6	+59.9	72.9	1 07.2	+60.0	72.9	1 24.9	+59.9	72.9	1 42.4	+60.0	73.0	2 00.0	+60.0	73.0	2
3	0 56.3	+59.5	72.8	1 14.0	+59.7	72.8	1 31.8	+59.8	72.8	1 49.5	+59.8	72.8	2 07.2	+59.9	72.9	2 24.8	+60.0	72.9	2 42.4	+60.0	73.0	3 00.0	+60.0	73.0	3
4	1 55.8	+59.6	72.7	2 13.7	+59.7	72.7	2 31.6	+59.7	72.7	2 49.3	+59.9	72.8	3 07.1	+59.9	72.8	3 24.8	+60.0	72.9	3 42.4	+60.0	72.9	4 00.0	+60.0	73.0	4
5	2 55.4	+59.6	72.5	3 13.4	+59.7	72.6	3 31.3	+59.8	72.6	3 49.2	+59.9	72.7	4 07.0	+59.9	72.8	4 24.8	+59.9	72.8	4 42.4	+60.0	72.9	5 00.0	+60.0	73.0	5
6	3 55.0	+59.6	72.4	4 13.1	+59.7	72.5	4 31.1	+59.8	72.6	4 49.1	+59.8	72.6	5 06.9	+60.0	72.7	5 24.7	+60.0	72.8	5 42.4	+60.0	72.9	6 00.0	+60.0	73.0	6
7	4 54.6	+59.6	72.3	5 12.8	+59.7	72.4	5 30.9	+59.8	72.5	5 48.9	+59.9	72.6	6 06.9	+59.9	72.7	6 24.7	+60.0	72.8	6 42.4	+60.0	72.9	7 00.0	+60.0	73.0	7
8	5 54.2	+59.6	72.2	6 12.5	+59.7	72.3	6 30.7	+59.8	72.4	6 48.8	+59.9	72.5	7 06.8	+59.9	72.6	7 24.7	+59.9	72.7	7 42.4	+60.0	72.9	8 00.0	+60.0	73.0	8
9	6 53.8	+59.6	72.1	7 12.2	+59.7	72.2	7 30.5	+59.8	72.3	7 48.7	+59.8	72.4	8 06.7	+59.9	72.6	8 24.6	+60.0	72.7	8 42.4	+60.0	72.9	9 00.0	+60.0	73.0	9
10	7 53.4	+59.6	71.9	8 11.9	+59.7	72.1	8 30.3	+59.8	72.2	8 48.5	+59.9	72.4	9 06.6	+60.0	72.5	9 24.6	+60.0	72.7	9 42.4	+60.0	72.8	10 00.0	+60.0	73.0	10
11	8 53.0	+59.5	71.8	9 11.6	+59.7	72.0	9 30.1	+59.8	72.1	9 48.4	+59.9	72.3	10 06.6	+59.9	72.5	10 24.6	+59.9	72.6	10 42.4	+60.0	72.8	11 00.0	+60.0	73.0	11
12	9 52.5	+59.6	71.7	10 11.3	+59.7	71.9	10 29.9	+59.7	72.1	10 48.3	+59.8	72.2	11 06.5	+59.9	72.4	11 24.5	+60.0	72.6	11 42.4	+59.9	72.8	12 00.0	+60.0	73.0	12
13	10 52.1	+59.6	71.6	11 11.0	+59.7	71.8	11 29.6	+59.8	72.0	11 48.1	+59.9	72.2	12 06.4	+59.9	72.4	12 24.5	+59.9	72.6	12 42.3	+60.0	72.8	13 00.0	+60.0	73.0	13
14	11 51.7	+59.6	71.5	12 10.7	+59.6	71.7	12 29.4	+59.8	71.9	12 48.0	+59.8	72.1	13 06.3	+59.9	72.3	13 24.4	+60.0	72.5	13 42.3	+60.0	72.8	14 00.0	+60.0	73.0	14
15	12 51.3	+59.5	71.3	13 10.3	+59.7	71.6	13 29.2	+59.8	71.8	13 47.8	+59.9	72.0	14 06.2	+60.0	72.3	14 24.4	+60.0	72.5	14 42.3	+60.0	72.7	15 00.0	+60.0	73.0	15
16	13 50.8	+59.6	71.2	14 10.0	+59.7	71.5	14 29.0	+59.8	71.7	14 47.7	+59.9	71.9	15 06.2	+59.9	72.2	15 24.4	+59.9	72.5	15 42.3	+60.0	72.7	16 00.0	+60.0	73.0	16
17	14 50.4	+59.6	71.1	15 09.7	+59.7	71.4	15 28.8	+59.7	71.6	15 47.6	+59.8	71.9	16 06.1	+59.9	72.1	16 24.3	+60.0	72.4	16 42.3	+60.0	72.7	17 00.0	+60.0	73.0	17
18	15 50.0	+59.5	71.0	16 09.4	+59.7	71.2	16 28.5	+59.8	71.5	16 47.4	+59.9	71.8	17 06.0	+59.9	72.1	17 24.3	+60.0	72.4	17 42.3	+60.0	72.7	18 00.0	+60.0	73.0	18
19	16 49.5	+59.6	70.8	17 09.1	+59.6	71.1	17 28.3	+59.8	71.4	17 47.3	+59.8	71.7	18 05.9	+59.9	72.0	18 24.3	+59.9	72.4	18 42.3	+60.0	72.7	19 00.0	+60.0	73.0	19
20	17 49.1	+59.5	70.7	18 08.7	+59.7	71.0	18 28.1	+59.7	71.3	18 47.1	+59.9	71.7	19 05.8	+60.0	72.0	19 24.2	+60.0	72.3	19 42.3	+60.0	72.7	20 00.0	+60.0	73.0	20
21	18 48.6	+59.5	70.6	19 08.4	+59.6	70.9	19 27.8	+59.8	71.2	19 47.0	+59.8	71.6	20 05.8	+59.9	71.9	20 24.2	+60.0	72.3	20 42.3	+60.0	72.6	21 00.0	+60.0	73.0	21
22	19 48.1	+59.6	70.5	20 08.0	+59.7	70.8	20 27.6	+59.8	71.2	20 46.8	+59.9	71.5	21 05.7	+59.9	71.9	21 24.2	+59.9	72.2	21 42.3	+60.0	72.6	22 00.0	+60.0	73.0	22
23	20 47.7	+59.5	70.3	21 07.7	+59.7	70.7	21 27.4	+59.7	71.1	21 46.7	+59.8	71.4	22 05.6	+59.9	71.8	22 24.1	+60.0	72.2	22 42.3	+59.9	72.6	23 00.0	+60.0	73.0	23
24	21 47.2	+59.5	70.2	22 07.4	+59.6	70.6	22 27.1	+59.8	71.0	22 46.5	+59.8	71.4	23 05.5	+59.9	71.8	23 24.1	+59.9	72.2	23 42.2	+60.0	72.6	24 00.0	+60.0	73.0	24
25	22 46.7	+59.5	70.1	23 07.0	+59.6	70.5	23 26.9	+59.7	70.9	23 46.3	+59.9	71.3	24 05.4	+59.9	71.7	24 24.0	+60.0	72.1	24 42.2	+60.0	72.6	25 00.0	+60.0	73.0	25
26	23 46.2	+59.6	69.9	24 06.6	+59.7	70.3	24 26.6	+59.8	70.8	24 46.2	+59.8	71.2	25 05.3	+59.9	71.6	25 24.0	+60.0	72.1	25 42.2	+60.0	72.5	26 00.0	+60.0	73.0	26
27	24 45.8	+59.5	69.8	25 06.3	+59.6	70.2	25 26.4	+59.7	70.7	25 46.0	+59.9	71.1	26 05.2	+59.9	71.6	26 24.0	+59.9	72.0	26 42.2	+60.0	72.5	27 00.0	+60.0	73.0	27
28	25 45.3	+59.4	69.6	26 05.9	+59.6	70.1	26 26.1	+59.8	70.6	26 45.9	+59.8	71.0	27 05.1	+59.9	71.5	27 23.9	+60.0	72.0	27 42.2	+60.0	72.5	28 00.0	+60.0	73.0	28
29	26 44.7	+59.5	69.5	27 05.5	+59.7	70.0	27 25.9	+59.7	70.5	27 45.7	+59.8	70.9	28 05.0	+59.9	71.4	28 23.9	+59.9	72.0	28 42.2	+60.0	72.5	29 00.0	+60.0	73.0	29
30	27 44.2	+59.5	69.3	28 05.2	+59.6	69.8	28 25.6	+59.7	70.3	28 45.5	+59.8	70.9	29 04.9	+59.9	71.4	29 23.8	+60.0	71.9	29 42.2	+60.0	72.5	30 00.0	+60.0	73.0	30
31	28 43.7	+59.5	69.2	29 04.8	+59.6	69.7	29 25.3	+59.7	70.2	29 45.3	+59.9	70.8	30 04.8	+59.9	71.3	30 23.8	+59.9	71.9	30 42.2	+60.0	72.4	31 00.0	+60.0	73.0	31
32	29 43.2	+59.4	69.0	30 04.4	+59.6	69.6	30 25.0	+59.7	70.1	30 45.2	+59.8	70.7	31 04.7	+59.9	71.2	31 23.7	+60.0	71.8	31 42.2	+59.9	72.4	32 00.0	+60.0	73.0	32
33	30 42.6	+59.5	68.9	31 04.0	+59.5	69.4	31 24.7	+59.8	70.0	31 45.0	+59.8	70.6	32 04.6	+59.9	71.2	32 23.7	+59.9	71.8	32 42.1	+60.0	72.4	33 00.0	+60.0	73.0	33
34	31 42.1	+59.4	68.7	32 03.5	+59.6	69.3	32 24.5	+59.7	69.9	32 44.8	+59.8	70.5	33 04.5	+59.9	71.1	33 23.6	+60.0	71.7	33 42.1	+60.0	72.4	34 00.0	+60.0	73.0	34
35	32 41.5	+59.4	68.6	33 03.1	+59.6	69.2	33 24.2	+59.7	69.8	33 44.6	+59.8	70.4	34 04.4	+59.9	71.0	34 23.6	+59.9	71.7	34 42.1	+60.0	72.3	35 00.0	+60.0	73.0	35
36	33 40.9	+59.4	68.4	34 02.7	+59.5	69.0	34 23.9	+59.6	69.7	34 44.4	+59.8	70.3	35 04.3	+59.9	71.0	35 23.5	+60.0	71.6	35 42.1	+60.0	72.3	36 00.0	+60.0	73.0	36
37	34 40.3	+59.4	68.2	35 02.2	+59.6	68.9	35 23.5	+59.7	69.5	35 44.2	+59.8	70.2	36 04.2	+59.9	70.9	36 23.5	+59.9	71.6	36 42.1	+60.0	72.3	37 00.0	+60.0	73.0	37
38	35 39.7	+59.4	68.0	36 01.8	+59.5	68.7	36 23.2	+59.7	69.4	36 44.0	+59.8	70.1	37 04.1	+59.8	70.8	37 23.4	+60.0	71.5	37 42.1	+60.0	72.3	38 00.0	+60.0	73.0	38
39	36 39.1	+59.3	67.9	37 01.3	+59.5	68.6	37 22.9	+59.7	69.3	37 43.8	+59.8	70.0	38 03.9	+59.9	70.7	38 23.4	+59.9	71.5	38 42.1	+60.0	72.2	39 00.0	+60.0	73.0	39
40	37 38.4	+59.4	67.7	38 00.8	+59.6	68.4	38 22.6	+59.6	69.1	38 43.6	+59.7	69.9	39 03.8	+59.9	70.6	39 23.3	+60.0	71.4	39 42.1	+59.9	72.2	40 00.0	+60.0	73.0	40
41	38 37.8	+59.3	67.5	39 00.4	+59.4	68.2	39 22.2	+59.7	69.0	39 43.3	+59.8	69.8	40 03.7	+59.9	70.6	40 23.3	+59.9	71.4	40 42.0	+60.0	72.2	41 00.0	+60.0	73.0	41
42	39 37.1	+59.3	67.3	39 59.8	+59.5	68.1	40 21.9	+59.6	68.9	40 43.1	+59.8	69.7	41 03.6	+59.8	70.5	41 23.2	+60.0	71.3	41 42.0	+60.0	72.1	42 00.0	+60.0	73.0	42
43	40 36.4	+59.2	67.1	40 59.3	+59.5	67.9	41 21.5	+59.6	68.7	41 42.9	+59.7	69.5	42 03.4	+59.9	70.4	42 23.2	+59.9	71.2	42 42.0	+60.0	72.1	43 00.0	+60.0	73.0	43
44	41 35.6	+59.3	66.9	41 58.8	+59.4	67.7	42 21.1	+59.6	68.6	42 42.6	+59.8	69.4	43 03.3	+59.9	70.3	43 23.1	+59.9	71.2	43 42.0	+60.0	72.1	44 00.0	+60.0	73.0	44
45	42 34.9	+59.2	66.7	42 58.2	+59.5	67.5	43 20.7	+59.6	68.4	43 42.4	+59.7	69.3	44 03.2	+59.8	70.2	44 23.0	+60.0	71.1	44 42.0	+60.0	72.1	45 00.0	+60.0	73.0	45
46	43 34.1	+59.2	66.5	43 57.7	+59.4	67.4	44 20.3	+59.6	68.3	44 42.1	+59.8	69.2	45 03.0	+59.9	70.1	45 23.0	+59.9	71.1	45 42.0	+59.9	72.0	46 00.0	+60.0	73.0	46
47	44 33.3	+59.2	66.2	44 57.1	+59.4	67.2	45 19.9	+59.6	68.1	45 41.9	+59.7	69.0	46 02.9	+59.8	70.0	46 22.9	+59.9	71.0	46 41.9	+60.0	72.0	47 00.0	+60.0	73.0	47
48	45 32.5	+59.2	66.0	45 56.5	+59.3	67.0	46 19.5	+59.5	67.9	46 41.6	+59.7	68.9	47 02.7	+59.8	69.9	47 22.8	+59.9	70.9	47 41.9	+60.0	71.9	48 00.0	+60.0	73.0	48
49	46 31.7	+59.1	65.8	46 55.8	+59.4	66.7	47 19.0	+59.6	67.7	47 41.3	+59.7	68.7	48 02.5	+59.9	69.8	48 22.7	+60.0	70.8	48 41.9	+60.0	71.9	49 00.0	+60.0	73.0	49
50	47 30.8	+59.1	65.5	47 55.2	+59.3	66.5	48 18.6	+59.5	67.6	48 41.0	+59.7	68.6	49 02.4	+59.8	69.7	49 22.7	+59.9	70.8	49 41.9	+60.0	71.9	50 00.0	+60.0	73.0	50
51	48 29.9	+59.0	65.3	48 54.5	+59.3	66.3	49 18.1	+59.5	67.4	49 40.7	+59.6	68.4	50 02.2	+59.8	69.5	50 22.6	+59.9	70.7	50 41.9	+59.9	71.8	51 00.0	+60.0	73.0	51
52	49 28.9	+59.0	65.0	49 53.8	+59.2	66.1	50 17.6	+59.5	67.2	50 40.3	+59.7	68.3	51 02.0	+59.8	69.4	51 22.5	+59.9	70.6	51 41.8	+60.0	71.8	52 00.0	+60.0	73.0	52
53	50 27.9	+59.0	64.7	50 53.0	+59.3	65.8	51 17.1	+59.4	66.9	51 40.0	+59.6	68.1	52 01.8	+59.8	69.3	52 22.4	+59.9	70.5	52 41.8	+60.0	71.7	53 00.0	+60.0	73.0	53
54	51 26.9	+58.9	64.4	51 52.3	+59.1	65.6	52 16.5	+59.4	66.7	52 39.6	+59.7	67.9	53 01.6	+59.8	69.2	53 22.3	+59.9	70.4	53 41.8	+60.0	71.7	54 00.0	+60.0	73.0	54
55	52 25.8	+58.9	64.1	52 51.4	+59.2	65.3	53 15.9	+59.5	66.5	53 39.3	+59.6	67.7	54 01.4	+59.8	69.0	54 22.2	+59.9	70.3	54 41.8	+60.0	71.6	55 00.0	+60.0	73.0	55
56	53 24.7	+58.8	63.8	53 50.6	+59.1	65.0	54 15.4	+59.3	66.3	54 38.9	+59.6	67.6	55 01.2	+59.7	68.9	55 22.1	+59.9	70.2	55 41.8	+59.9	71.6	56 00.0	+60.0	73.0	56
57	54 23.5	+58.7	63.4	54 49.7	+59.1	64.7	55 14.7	+59.4	66.0	55 38.5	+59.5	67.3	56 00.9	+59.8	68.7	56 22.0	+59.9	70.1	56 41.7	+60.0	71.5	57 00.0	+60.0	73.0	57
58	55 22.2	+58.7	63.1	55 48.8	+59.0	64.4	56 14.1	+59.3	65.8	56 38.0	+59.6	67.1	57 00.7	+59.7	68.6	57 21.9	+59.9	70.0	57 41.7	+60.0	71.5	58 00.0	+60.0	73.0	58
59	56 20.9	+58.7	62.7	56 47.8	+59.0	64.1	57 13.4	+59.2	65.5	57 37.6	+59.5	66.9	58 00.4	+59.7	68.4	58 21.8	+59.9	69.9	58 41.7	+59.9	71.4	59 00.0	+60.0	73.0	59
60	57 19.6	+58.5	62.3	57 46.8	+58.9	63.7	58 12.6	+59.3	65.2	58 37.1	+59.5	66.7	59 00.1	+59.7	68.2	59 21.7	+59.8	69.8	59 41.6	+60.0	71.4	60 00.0	+60.0	73.0	60
61	58 18.1	+58.5	61.9	58 45.7	+58.8	63.4	59 11.9	+59.1	64.9	59 36.6	+59.5	66.4	59 59.8	+59.7	68.0	60 21.5	+59.9	69.6	60 41.6	+60.0	71.3	61 00.0	+60.0	73.0	61
62	59 16.6	+58.3	61.5	59 44.5	+58.8	63.0	60 11.0	+59.2	64.5	60 36.1	+59.4	66.1	60 59.5	+59.7	67.8	61 21.4	+59.8	69.5	61 41.6	+59.9	71.2	62 00.0	+60.0	73.0	62
63	60 14.9	+58.3	61.0	60 43.3	+58.7	62.6	61 10.2	+59.0	64.2	61 35.5	+59.4	65.9	61 59.2	+59.6	67.6	62 21.2	+59.9	69.3	62 41.5	+60.0	71.1	63 00.0	+60.0	73.0	63
64	61 13.2	+58.2	60.5	61 42.0	+58.6	62.2	62 09.2	+59.0	63.8	62 34.9	+59.3	65.6	62 58.8	+59.7	67.3	63 21.1	+59.8	69.2	63 41.5	+59.9	71.1	64 00.0	+60.0	73.0	64
65	62 11.4	+58.0	60.0	62 40.6	+58.5	61.7	63 08.2	+59.0	63.4	63 34.2	+59.3	65.2	63 58.5	+59.6	67.1	64 20.9	+59.8	69.0	64 41.4	+60.0	71.0	65 00.0	+60.0	73.0	65
66	63 09.4	+57.9	59.5	63 39.1	+58.4	61.2	64 07.2	+58.8	63.0	64 33.5	+59.3	64.9	64 58.1	+59.5	66.8	65 20.7	+59.8	68.8	65 41.4	+59.9	70.9	66 00.0	+60.0	73.0	66
67	64 07.3	+57.7	58.9	64 37.5	+58.3	60.7	65 06.0	+58.8	62.6	65 32.8	+59.1	64.5	65 57.6	+59.6	66.5	66 20.5	+59.8	68.6	66 41.3	+60.0	70.8	67 00.0	+60.0	73.0	67
68	65 05.0	+57.6	58.2	65 35.8	+58.1	60.1	66 04.8	+58.6	62.1	66 31.9	+59.2	64.1	66 57.2	+59.4	66.2	67 20.3	+59.8	68.4	67 41.3	+59.9	70.7	68 00.0	+60.0	73.0	68
69	66 02.6	+57.4	57.6	66 33.9	+58.0	59.5	67 03.4	+58.6	61.5	67 31.1	+59.0	63.7	67 56.6	+59.5	65.9	68 20.1	+59.7	68.2	68 41.2	+60.0	70.5	69 00.0	+60.0	73.0	69
70	67 00.0	+57.1	56.8	67 31.9	+57.8	58.9	68 02.0	+58.4	61.0	68 30.1	+59.0	63.2	68 56.1	+59.4	65.5	69 19.8	+59.7	67.9	69 41.2	+59.9	70.4	70 00.0	+60.0	73.0	70
71	67 57.1	+56.9	56.0	68 29.7	+57.7	58.1	69 00.4	+58.3	60.3	69 29.1	+58.8	62.7	69 55.5	+59.3	65.1	70 19.5	+59.7	67.6	70 41.1	+59.9	70.3	71 00.0	+60.0	73.0	71
72	68 54.0	+56.7	55.2	69 27.4	+57.4	57.4	69 58.7	+58.1	59.7	70 27.9	+58.7	62.1	70 54.8	+59.3	64.7	71 19.2	+59.7	67.3	71 41.0	+59.9	70.1	72 00.0	+60.0	73.0	72
73	69 50.7	+56.2	54.2	70 24.8	+57.1	56.5	70 56.8	+57.9	58.9	71 26.6	+58.6	61.5	71 54.1	+59.1	64.2	72 18.9	+59.6	67.0	72 40.9	+59.9	69.9	73 00.0	+60.0	73.0	73
74	70 46.9	+56.0	53.2	71 21.9	+56.8	55.6	71 54.7	+57.7	58.1	72 25.2	+58.5	60.8	72 53.2	+59.1	63.6	73 18.5	+59.6	66.6	73 40.8	+59.9	69.7	74 00.0	+60.0	73.0	74
75	71 42.9	+55.4	52.1	72 18.7	+56.5	54.5	72 52.4	+57.4	57.2	73 23.7	+58.2	60.0	73 52.3	+59.0	63.0	74 18.1	+59.5	66.2	74 40.7	+59.9	69.5	75 00.0	+60.0	73.0	75
76	72 38.3	+55.0	50.8	73 15.2	+56.0	53.4	73 49.8	+57.1	56.2	74 21.9	+58.0	59.1	74 51.3	+58.8	62.3	75 17.6	+59.4	65.7	75 40.6	+59.8	69.2	76 00.0	+60.0	73.0	76
77	73 33.3	+54.4	49.5	74 11.2	+55.6	52.1	74 46.9	+56.7	55.0	75 19.9	+57.7	58.2	75 50.1	+58.6	61.5	76 17.0	+59.4	65.1	76 40.4	+59.9	69.0	77 00.0	+60.0	73.0	77
78	74 27.7	+53.6	47.9	75 06.8	+54.9	50.7	75 43.6	+56.2	53.7	76 17.6	+57.4	57.1	76 48.7	+58.4	60.6	77 16.4	+59.2	64.5	77 40.3	+59.8	68.6	78 00.0	+60.0	73.0	78
79	75 21.3	+52.8	46.2	76 01.7	+54.3	49.1	76 39.8	+55.6	52.3	77 15.0	+57.0	55.8	77 47.1	+58.2	59.6	78 15.6	+59.1	63.7	78 40.1	+59.7	68.2	79 00.0	+60.0	73.0	79
80	76 14.1	+51.8	44.3	76 56.0	+53.3	47.3	77 35.4	+54.9	50.6	78 12.0	+56.4	54.3	78 45.3	+57.8	58.4	79 14.7	+59.0	62.9	79 39.8	+59.7	67.7	80 00.0	+60.0	73.0	80
81	77 05.9	+50.5	42.1	77 49.3	+52.3	45.2	78 30.3	+54.0	48.7	79 08.4	+55.8	52.6	79 43.1	+57.3	56.9	80 13.7	+58.7	61.8	80 39.5	+59.7	67.2	81 00.0	+60.0	73.0	81
82	77 56.4	+49.0	39.6	78 41.6	+50.8	42.7	79 24.3	+52.9	46.4	80 04.2	+54.8	50.5	80 40.4	+56.7	55.2	81 12.4	+58.3	60.5	81 39.2	+59.5	66.5	82 00.0	+60.0	73.0	82
83	78 45.4	*+47.0* •	36.7	79 32.4	+49.2	39.9	80 17.2	+51.3	43.7	80 59.0	+53.6	48.0	81 37.1	+55.9	53.1	82 10.7	+57.9	58.9	82 38.7	+59.4	65.6	83 00.0	+60.0	73.0	83
84	79 32.4	*+44.8* •	33.4	80 21.6	*+46.9* •	36.7	81 08.5	*+49.4* •	40.5	81 52.6	+52.0	45.0	82 33.0	+54.7	50.4	83 08.6	+57.3	56.9	83 38.1	+59.2	64.4	84 00.0	+60.0	73.0	84
85	80 17.2	*+41.8* •	29.6	81 08.5	*+44.1* •	32.8	81 57.9	*+46.7* •	36.6	82 44.6	*+49.7* •	41.3	83 27.7	*+52.9* •	47.1	84 05.9	+56.1	54.1	84 37.3	+58.9	62.8	85 00.0	+60.0	73.0	85
86	80 59.0	*+38.1* •	25.2	81 52.6	*+40.4* •	28.2	82 44.6	*+43.1* •	31.9	83 34.3	*+46.3* •	36.6	84 20.6	*+50.1* •	42.6	85 02.0	*+54.2* •	50.4	85 36.2	+58.1	60.5	86 00.0	+60.0	73.0	86
87	81 37.1	*+33.6* •	20.1	82 33.0	*+35.6* •	22.7	83 27.7	*+38.2* •	26.1	84 20.6	*+41.4* •	30.5	85 10.7	*+45.5* •	36.5	85 56.2	*+50.9* •	44.9	86 34.3	*+56.7* •	56.8	87 00.0	+60.0	73.0	87
88	82 10.7	*+28.0* •	14.2	83 08.6	*+29.5* •	16.2	84 05.9	*+31.4* •	18.9	85 02.0	*+34.2* •	22.7	85 56.2	*+38.1* •	28.1	86 47.1	*+43.9* •	36.5	87 31.0	*+52.5* •	50.4	88 00.0	+60.0	73.0	88
89	82 38.7	*+21.3* •	7.5	83 38.1	*+21.9* •	8.7	84 37.3	*+22.7* •	10.3	85 36.2	*+23.8* •	12.6	86 34.3	*+25.7* •	16.2	87 31.0	*+29.0* •	22.7	88 23.5	*+36.5* •	36.5	89 00.0	+60.0	73.0	89
90	83 00.0	*+13.5* •	0.0	84 00.0	*+12.8* •	0.0	85 00.0	*+11.8* •	0.0	86 00.0	*+10.3* •	0.0	87 00.0	*+7.7* •	0.0	88 00.0	*+2.6* •	0.0	89 00.0	*−11.4* •	0.0	90 00.0	−60.0	36.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 107°, 253°

74°, 286° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	1 55.5	+59.6	105.9	1 39.1	+59.7	105.9	1 22.6	+59.8	105.9	1 06.1	+59.9	106.0	0 49.6	+59.9	106.0	0 33.1	+59.9	106.0	0 16.5	+60.0	106.0	0 00.0	+60.0	106.0	**0**
1	2 55.1	+59.6	105.8	2 38.8	+59.7	105.8	2 22.4	+59.8	105.9	2 06.0	+59.8	105.9	1 49.5	+59.9	105.9	1 33.0	+60.0	106.0	1 16.5	+60.0	106.0	1 00.0	+60.0	106.0	**1**
2	3 54.7	+59.6	105.7	3 38.5	+59.6	105.7	3 22.2	+59.8	105.8	3 05.8	+59.9	105.8	2 49.4	+60.0	105.9	2 33.0	+60.0	105.9	2 16.5	+60.0	106.0	2 00.0	+60.0	106.0	**2**
3	4 54.3	+59.5	105.5	4 38.1	+59.7	105.6	4 22.0	+59.7	105.7	4 05.7	+59.9	105.8	3 49.4	+59.9	105.8	3 33.0	+59.9	105.9	3 16.5	+60.0	105.9	3 00.0	+60.0	106.0	**3**
4	5 53.8	+59.6	105.4	5 37.8	+59.7	105.5	5 21.7	+59.8	105.6	5 05.6	+59.8	105.7	4 49.3	+59.9	105.8	4 32.9	+60.0	105.9	4 16.5	+60.0	105.9	4 00.0	+60.0	106.0	**4**
5	6 53.4	+59.6	105.3	6 37.5	+59.7	105.4	6 21.5	+59.8	105.5	6 05.4	+59.9	105.6	5 49.2	+59.9	105.7	5 32.9	+60.0	105.8	5 16.5	+60.0	105.9	5 00.0	+60.0	106.0	**5**
6	7 53.0	+59.6	105.2	7 37.2	+59.7	105.3	7 21.3	+59.8	105.4	7 05.3	+59.9	105.6	6 49.1	+60.0	105.7	6 32.9	+59.9	105.8	6 16.5	+60.0	105.9	6 00.0	+60.0	106.0	**6**
7	8 52.6	+59.6	105.1	8 36.9	+59.7	105.2	8 21.1	+59.8	105.4	8 05.2	+59.8	105.5	7 49.1	+59.9	105.6	7 32.8	+60.0	105.8	7 16.5	+60.0	105.9	7 00.0	+60.0	106.0	**7**
8	9 52.2	+59.5	104.9	9 36.6	+59.7	105.1	9 20.9	+59.8	105.3	9 05.0	+59.9	105.4	8 49.0	+59.9	105.6	8 32.8	+60.0	105.7	8 16.5	+60.0	105.9	8 00.0	+60.0	106.0	**8**
9	10 51.7	+59.6	104.8	10 36.3	+59.7	105.0	10 20.7	+59.8	105.2	10 04.9	+59.8	105.4	9 48.9	+59.9	105.5	9 32.8	+59.9	105.7	9 16.5	+60.0	105.8	9 00.0	+60.0	106.0	**9**
10	11 51.3	+59.6	104.7	11 36.0	+59.7	104.9	11 20.5	+59.7	105.1	11 04.7	+59.9	105.3	10 48.8	+59.9	105.5	10 32.7	+60.0	105.7	10 16.5	+59.9	105.8	10 00.0	+60.0	106.0	**10**
11	12 50.9	+59.5	104.6	12 35.7	+59.6	104.8	12 20.2	+59.8	105.0	12 04.6	+59.9	105.2	11 48.7	+60.0	105.4	11 32.7	+60.0	105.6	11 16.4	+60.0	105.8	11 00.0	+60.0	106.0	**11**
12	13 50.4	+59.6	104.4	13 35.3	+59.7	104.7	13 20.0	+59.8	104.9	13 04.5	+59.8	105.1	12 48.7	+59.9	105.4	12 32.7	+59.9	105.6	12 16.4	+60.0	105.8	12 00.0	+60.0	106.0	**12**
13	14 50.0	+59.5	104.3	14 35.0	+59.7	104.6	14 19.8	+59.8	104.8	14 04.3	+59.9	105.1	13 48.6	+59.9	105.3	13 32.6	+60.0	105.5	13 16.4	+60.0	105.8	13 00.0	+60.0	106.0	**13**
14	15 49.5	+59.6	104.2	15 34.7	+59.7	104.5	15 19.6	+59.7	104.7	15 04.2	+59.8	105.0	14 48.5	+59.9	105.3	14 32.6	+60.0	105.5	14 16.4	+60.0	105.8	14 00.0	+60.0	106.0	**14**
15	16 49.1	+59.5	104.1	16 34.4	+59.6	104.4	16 19.3	+59.8	104.6	16 04.0	+59.9	104.9	15 48.4	+59.9	105.2	15 32.6	+59.9	105.5	15 16.4	+60.0	105.7	15 00.0	+60.0	106.0	**15**
16	17 48.6	+59.6	103.9	17 34.0	+59.7	104.3	17 19.1	+59.8	104.6	17 03.9	+59.8	104.9	16 48.3	+60.0	105.1	16 32.5	+60.0	105.4	16 16.4	+60.0	105.7	16 00.0	+60.0	106.0	**16**
17	18 48.2	+59.5	103.8	18 33.7	+59.7	104.1	18 18.9	+59.7	104.5	18 03.7	+59.9	104.8	17 48.3	+59.9	105.1	17 32.5	+59.9	105.4	17 16.4	+60.0	105.7	17 00.0	+60.0	106.0	**17**
18	19 47.7	+59.6	103.7	19 33.4	+59.6	104.0	19 18.6	+59.8	104.4	19 03.6	+59.8	104.7	18 48.2	+59.9	105.0	18 32.4	+60.0	105.4	18 16.4	+60.0	105.7	18 00.0	+60.0	106.0	**18**
19	20 47.3	+59.5	103.5	20 33.0	+59.7	103.9	20 18.4	+59.8	104.3	20 03.4	+59.9	104.6	19 48.1	+59.9	105.0	19 32.4	+60.0	105.3	19 16.4	+60.0	105.7	19 00.0	+60.0	106.0	**19**
20	21 46.8	+59.5	103.4	21 32.7	+59.6	103.8	21 18.2	+59.7	104.2	21 03.3	+59.8	104.6	20 48.0	+59.9	104.9	20 32.4	+59.9	105.3	20 16.4	+60.0	105.6	20 00.0	+60.0	106.0	**20**
21	22 46.3	+59.5	103.3	22 32.3	+59.6	103.7	22 17.9	+59.8	104.1	22 03.1	+59.9	104.5	21 47.9	+59.9	104.9	21 32.3	+60.0	105.3	21 16.4	+59.9	105.6	21 00.0	+60.0	106.0	**21**
22	23 45.8	+59.5	103.1	23 31.9	+59.7	103.6	23 17.7	+59.7	104.0	23 03.0	+59.8	104.4	22 47.8	+59.9	104.8	22 32.3	+59.9	105.2	22 16.3	+60.0	105.6	22 00.0	+60.0	106.0	**22**
23	24 45.3	+59.5	103.0	24 31.6	+59.6	103.4	24 17.4	+59.8	103.9	24 02.8	+59.8	104.3	23 47.7	+59.9	104.7	23 32.2	+60.0	105.2	23 16.3	+60.0	105.6	23 00.0	+60.0	106.0	**23**
24	25 44.8	+59.5	102.9	25 31.2	+59.6	103.3	25 17.2	+59.7	103.8	25 02.6	+59.9	104.2	24 47.6	+60.0	104.7	24 32.2	+60.0	105.1	24 16.3	+60.0	105.6	24 00.0	+60.0	106.0	**24**
25	26 44.3	+59.5	102.7	26 30.8	+59.7	103.2	26 16.9	+59.7	103.7	26 02.5	+59.8	104.2	25 47.6	+59.9	104.6	25 32.2	+59.9	105.1	25 16.3	+60.0	105.5	25 00.0	+60.0	106.0	**25**
26	27 43.8	+59.4	102.6	27 30.5	+59.6	103.1	27 16.6	+59.8	103.6	27 02.3	+59.8	104.1	26 47.5	+59.9	104.6	26 32.1	+60.0	105.0	26 16.3	+60.0	105.5	26 00.0	+60.0	106.0	**26**
27	28 43.2	+59.5	102.4	28 30.1	+59.6	102.9	28 16.4	+59.7	103.5	28 02.1	+59.8	104.0	27 47.4	+59.9	104.5	27 32.1	+59.9	105.0	27 16.3	+60.0	105.5	27 00.0	+60.0	106.0	**27**
28	29 42.7	+59.4	102.3	29 29.7	+59.6	102.8	29 16.1	+59.7	103.4	29 01.9	+59.9	103.9	28 47.3	+59.9	104.4	28 32.0	+60.0	105.0	28 16.3	+60.0	105.5	28 00.0	+60.0	106.0	**28**
29	30 42.1	+59.5	102.1	30 29.3	+59.5	102.7	30 15.8	+59.7	103.2	30 01.8	+59.8	103.8	29 47.2	+59.9	104.4	29 32.0	+59.9	104.9	29 16.3	+60.0	105.5	29 00.0	+60.0	106.0	**29**
30	31 41.6	+59.4	101.9	31 28.8	+59.6	102.5	31 15.5	+59.7	103.1	31 01.6	+59.8	103.7	30 47.1	+59.9	104.3	30 31.9	+60.0	104.9	30 16.3	+59.9	105.4	30 00.0	+60.0	106.0	**30**
31	32 41.0	+59.4	101.8	32 28.4	+59.6	102.4	32 15.2	+59.7	103.0	32 01.4	+59.8	103.6	31 47.0	+59.8	104.2	31 31.9	+60.0	104.8	31 16.2	+60.0	105.4	31 00.0	+60.0	106.0	**31**
32	33 40.4	+59.4	101.6	33 28.0	+59.6	102.3	33 14.9	+59.7	102.9	33 01.2	+59.8	103.5	32 46.8	+59.9	104.2	32 31.9	+59.9	104.8	32 16.2	+60.0	105.4	32 00.0	+60.0	106.0	**32**
33	34 39.8	+59.4	101.4	34 27.6	+59.5	102.1	34 14.6	+59.7	102.8	34 01.0	+59.8	103.4	33 46.7	+59.9	104.1	33 31.8	+60.0	104.7	33 16.2	+60.0	105.4	33 00.0	+60.0	106.0	**33**
34	35 39.2	+59.3	101.3	35 27.1	+59.5	102.0	35 14.3	+59.7	102.7	35 00.8	+59.8	103.3	34 46.6	+59.9	104.0	34 31.8	+59.9	104.7	34 16.2	+60.0	105.3	34 00.0	+60.0	106.0	**34**
35	36 38.5	+59.4	101.1	36 26.6	+59.6	101.8	36 14.0	+59.7	102.5	36 00.6	+59.8	103.2	35 46.5	+59.9	103.9	35 31.7	+60.0	104.6	35 16.2	+60.0	105.3	35 00.0	+60.0	106.0	**35**
36	37 37.9	+59.3	100.9	37 26.2	+59.5	101.6	37 13.7	+59.6	102.4	37 00.4	+59.8	103.1	36 46.4	+59.9	103.9	36 31.7	+59.9	104.6	36 16.2	+60.0	105.3	36 00.0	+60.0	106.0	**36**
37	38 37.2	+59.3	100.7	38 25.7	+59.5	101.5	38 13.3	+59.7	102.3	38 00.2	+59.8	103.0	37 46.3	+59.9	103.8	37 31.6	+59.9	104.5	37 16.2	+60.0	105.3	37 00.0	+60.0	106.0	**37**
38	39 36.5	+59.3	100.5	39 25.2	+59.5	101.3	39 13.0	+59.6	102.1	39 00.0	+59.7	102.9	38 46.2	+59.8	103.7	38 31.5	+60.0	104.5	38 16.2	+59.9	105.2	38 00.0	+60.0	106.0	**38**
39	40 35.8	+59.3	100.3	40 24.7	+59.4	101.2	40 12.6	+59.7	102.0	39 59.7	+59.8	102.8	39 46.0	+59.9	103.6	39 31.5	+59.9	104.4	39 16.1	+60.0	105.2	39 00.0	+60.0	106.0	**39**
40	41 35.1	+59.2	100.1	41 24.1	+59.5	101.0	41 12.3	+59.6	101.8	40 59.5	+59.8	102.7	40 45.9	+59.9	103.5	40 31.4	+60.0	104.4	40 16.1	+60.0	105.2	40 00.0	+60.0	106.0	**40**
41	42 34.3	+59.3	99.9	42 23.6	+59.4	100.8	42 11.9	+59.6	101.7	41 59.3	+59.7	102.6	41 45.8	+59.8	103.4	41 31.4	+59.9	104.3	41 16.1	+60.0	105.2	41 00.0	+60.0	106.0	**41**
42	43 33.6	+59.2	99.7	43 23.0	+59.4	100.6	43 11.5	+59.6	101.5	42 59.0	+59.8	102.4	42 45.6	+59.9	103.4	42 31.3	+59.9	104.2	42 16.1	+60.0	105.1	42 00.0	+60.0	106.0	**42**
43	44 32.8	+59.1	99.4	44 22.4	+59.4	100.4	44 11.1	+59.6	101.4	43 58.8	+59.7	102.3	43 45.5	+59.8	103.3	43 31.2	+60.0	104.2	43 16.1	+60.0	105.1	43 00.0	+60.0	106.0	**43**
44	45 31.9	+59.2	99.2	45 21.8	+59.4	100.2	45 10.7	+59.5	101.2	44 58.5	+59.7	102.2	44 45.3	+59.9	103.2	44 31.2	+59.9	104.1	44 16.1	+60.0	105.1	44 00.0	+60.0	106.0	**44**
45	46 31.1	+59.1	99.0	46 21.2	+59.3	100.0	46 10.2	+59.6	101.0	45 58.2	+59.7	102.1	45 45.2	+59.8	103.1	45 31.1	+59.9	104.1	45 16.1	+59.9	105.0	45 00.0	+60.0	106.0	**45**
46	47 30.2	+59.1	98.7	47 20.5	+59.4	99.8	47 09.8	+59.5	100.9	46 57.9	+59.7	101.9	46 45.0	+59.9	103.0	46 31.0	+60.0	104.0	46 16.0	+60.0	105.0	46 00.0	+60.0	106.0	**46**
47	48 29.3	+59.0	98.5	48 19.9	+59.3	99.6	48 09.3	+59.5	100.7	47 57.6	+59.7	101.8	47 44.9	+59.8	102.8	47 31.0	+59.9	103.9	47 16.0	+60.0	105.0	47 00.0	+60.0	106.0	**47**
48	49 28.3	+59.0	98.2	49 19.2	+59.2	99.3	49 08.8	+59.5	100.5	48 57.3	+59.7	101.6	48 44.7	+59.8	102.7	48 30.9	+59.9	103.8	48 16.0	+60.0	104.9	48 00.0	+60.0	106.0	**48**
49	50 27.3	+58.9	97.9	50 18.4	+59.3	99.1	50 08.3	+59.5	100.3	49 57.0	+59.7	101.5	49 44.5	+59.8	102.6	49 30.8	+59.9	103.8	49 16.0	+60.0	104.9	49 00.0	+60.0	106.0	**49**
50	51 26.2	+58.9	97.6	51 17.7	+59.2	98.8	51 07.8	+59.4	100.1	50 56.7	+59.6	101.3	50 44.3	+59.8	102.5	50 30.7	+60.0	103.7	50 16.0	+59.9	104.8	50 00.0	+60.0	106.0	**50**
51	52 25.1	+58.9	97.3	52 16.9	+59.1	98.6	52 07.2	+59.5	99.9	51 56.3	+59.7	101.1	51 44.1	+59.8	102.4	51 30.7	+59.9	103.6	51 15.9	+60.0	104.8	51 00.0	+60.0	106.0	**51**
52	53 24.0	+58.8	97.0	53 16.0	+59.2	98.3	53 06.7	+59.4	99.6	52 56.0	+59.6	100.9	52 43.9	+59.8	102.2	52 30.6	+59.9	103.5	52 15.9	+60.0	104.8	52 00.0	+60.0	106.0	**52**
53	54 22.8	+58.7	96.6	54 15.2	+59.0	98.0	54 06.1	+59.3	99.4	53 55.6	+59.6	100.7	53 43.7	+59.8	102.1	53 30.5	+59.9	103.4	53 15.9	+60.0	104.7	53 00.0	+60.0	106.0	**53**
54	55 21.5	+58.7	96.3	55 14.2	+59.1	97.7	55 05.4	+59.4	99.1	54 55.2	+59.6	100.5	54 43.5	+59.8	101.9	54 30.4	+59.9	103.3	54 15.9	+59.9	104.7	54 00.0	+60.0	106.0	**54**
55	56 20.2	+58.6	95.9	56 13.3	+59.0	97.4	56 04.8	+59.3	98.9	55 54.8	+59.5	100.3	55 43.3	+59.7	101.8	55 30.3	+59.9	103.2	55 15.8	+60.0	104.6	55 00.0	+60.0	106.0	**55**
56	57 18.8	+58.6	95.5	57 12.3	+58.9	97.1	57 04.1	+59.2	98.6	56 54.3	+59.6	100.1	56 43.0	+59.7	101.6	56 30.2	+59.8	103.1	56 15.8	+60.0	104.6	56 00.0	+60.0	106.0	**56**
57	58 17.4	+58.4	95.1	58 11.2	+58.9	96.7	58 03.3	+59.3	98.3	57 53.9	+59.5	99.9	57 42.7	+59.8	101.4	57 30.0	+59.9	103.0	57 15.8	+60.0	104.5	57 00.0	+60.0	106.0	**57**
58	59 15.8	+58.4	94.7	59 10.1	+58.8	96.3	59 02.6	+59.1	98.0	58 53.4	+59.4	99.6	58 42.5	+59.7	101.3	58 29.9	+59.9	102.9	58 15.8	+59.9	104.4	58 00.0	+60.0	106.0	**58**
59	60 14.2	+58.2	94.2	60 08.9	+58.7	95.9	60 01.7	+59.2	97.7	59 52.8	+59.5	99.4	59 42.2	+59.7	101.1	59 29.8	+59.9	102.7	59 15.7	+60.0	104.4	59 00.0	+60.0	106.0	**59**
60	61 12.4	+58.2	93.7	61 07.6	+58.6	95.5	61 00.9	+59.0	97.3	60 52.3	+59.4	99.1	60 41.9	+59.6	100.9	60 29.7	+59.8	102.6	60 15.7	+60.0	104.3	60 00.0	+60.0	106.0	**60**
61	62 10.6	+58.0	93.2	62 06.2	+58.6	95.1	61 59.9	+59.0	97.0	61 51.7	+59.4	98.8	61 41.5	+59.7	100.7	61 29.5	+59.9	102.5	61 15.7	+59.9	104.2	61 00.0	+60.0	106.0	**61**
62	63 08.6	+57.9	92.6	63 04.8	+58.4	94.6	62 58.9	+59.0	96.6	62 51.1	+59.3	98.5	62 41.2	+59.6	100.4	62 29.4	+59.8	102.3	62 15.6	+60.0	104.2	62 00.0	+60.0	106.0	**62**
63	64 06.5	+57.7	92.0	64 03.2	+58.4	94.1	63 57.9	+58.8	96.1	63 50.4	+59.3	98.2	63 40.8	+59.6	100.2	63 29.2	+59.8	102.2	63 15.6	+59.9	104.1	63 00.0	+60.0	106.0	**63**
64	65 04.2	+57.5	91.4	65 01.6	+58.2	93.6	64 56.7	+58.8	95.7	64 49.7	+59.2	97.8	64 40.4	+59.6	99.9	64 29.0	+59.8	102.0	64 15.5	+60.0	104.0	64 00.0	+60.0	106.0	**64**
65	66 01.7	+57.4	90.7	65 59.8	+58.0	93.0	65 55.5	+58.7	95.2	65 48.9	+59.1	97.4	65 40.0	+59.5	99.6	65 28.8	+59.8	101.8	65 15.5	+59.9	103.9	65 00.0	+60.0	106.0	**65**
66	66 59.1	+57.1	90.0	66 57.8	+57.9	92.3	66 54.2	+58.5	94.7	66 48.0	+59.1	97.0	66 39.5	+59.5	99.3	66 28.6	+59.8	101.6	66 15.4	+60.0	103.8	66 00.0	+60.0	106.0	**66**
67	67 56.2	+56.9	89.2	67 55.7	+57.8	91.7	67 52.7	+58.5	94.1	67 47.1	+59.0	96.6	67 39.0	+59.5	99.0	67 28.4	+59.8	101.4	67 15.4	+59.9	103.7	67 00.0	+60.0	106.0	**67**
68	68 53.1	+56.6	88.3	68 53.5	+57.5	90.9	68 51.2	+58.2	93.5	68 46.1	+59.0	96.1	68 38.5	+59.4	98.6	68 28.2	+59.7	101.1	68 15.3	+60.0	103.6	68 00.0	+60.0	106.0	**68**
69	69 49.7	+56.2	87.4	69 51.0	+57.2	90.1	69 49.4	+58.1	92.8	69 45.1	+58.8	95.5	69 37.9	+59.3	98.2	69 27.9	+59.7	100.9	69 15.3	+59.9	103.5	69 00.0	+60.0	106.0	**69**
70	70 45.9	+55.9	86.4	70 48.2	+57.0	89.2	70 47.5	+58.0	92.1	70 43.9	+58.6	95.0	70 37.2	+59.3	97.8	70 27.6	+59.7	100.6	70 15.2	+59.9	103.3	70 00.0	+60.0	106.0	**70**
71	71 41.8	+55.4	85.2	71 45.2	+56.7	88.2	71 45.5	+57.7	91.3	71 42.5	+58.6	94.3	71 36.5	+59.2	97.3	71 27.3	+59.6	100.3	71 15.1	+59.9	103.2	71 00.0	+60.0	106.0	**71**
72	72 37.2	+55.0	84.0	72 41.9	+56.2	87.2	72 43.2	+57.4	90.4	72 41.1	+58.3	93.6	72 35.7	+59.1	96.8	72 26.9	+59.7	99.9	72 15.0	+59.9	103.0	72 00.0	+60.0	106.0	**72**
73	73 32.2	+54.3	82.6	73 38.1	+55.9	86.0	73 40.6	+57.1	89.4	73 39.4	+58.2	92.8	73 34.8	+58.9	96.2	73 26.6	+59.5	99.5	73 14.9	+59.9	102.8	73 00.0	+60.0	106.0	**73**
74	74 26.5	+53.6	81.0	74 34.0	+55.2	84.6	74 37.7	+56.7	88.3	74 37.6	+57.9	91.9	74 33.7	+58.9	95.5	74 26.1	+59.5	99.1	74 14.8	+59.9	102.6	74 00.0	+60.0	106.0	**74**
75	75 20.1	+52.7	79.3	75 29.2	+54.6	83.1	75 34.4	+56.3	87.0	75 35.5	+57.7	90.9	75 32.6	+58.7	94.8	75 25.6	+59.4	98.6	75 14.7	+59.9	102.3	75 00.0	+60.0	106.0	**75**
76	76 12.8	+51.7	77.4	76 23.8	+53.9	81.4	76 30.7	+55.7	85.5	76 33.2	+57.2	89.7	76 31.3	+58.4	93.9	76 25.0	+59.4	98.0	76 14.6	+59.8	102.1	76 00.0	+60.0	106.0	**76**
77	77 04.5	+50.4	75.2	77 17.7	+52.8	79.5	77 26.4	+55.0	83.9	77 30.4	+56.8	88.4	77 29.7	+58.3	92.9	77 24.4	+59.2	97.4	77 14.4	+59.8	101.8	77 00.0	+60.0	106.0	**77**
78	77 54.9	+48.9	72.7	78 10.5	+51.7	77.2	78 21.4	+54.1	82.0	78 27.2	+56.2	86.8	78 28.0	+57.9	91.7	78 23.6	+59.1	96.6	78 14.2	+59.8	101.4	78 00.0	+60.0	106.0	**78**
79	78 43.8	*+47.1* •	69.8	79 02.2	+50.1	74.7	79 15.5	+53.0	79.8	79 23.4	+55.5	85.0	79 25.9	+57.4	90.4	79 22.7	+58.9	95.7	79 14.0	+59.7	100.9	79 00.0	+60.0	106.0	**79**
80	79 30.9	*+44.6* •	66.5	79 52.3	*+48.2* •	71.7	80 08.5	+51.5	77.1	80 18.9	+54.5	82.8	80 23.3	+56.9	88.7	80 21.6	+58.6	94.6	80 13.7	+59.7	100.4	80 00.0	+60.0	106.0	**80**
81	80 15.5	*+41.7* •	62.7	80 40.5	*+45.7* •	68.1	81 00.0	*+49.6* •	74.0	81 13.4	+53.2	80.2	81 20.2	+56.1	86.7	81 20.2	+58.3	93.3	81 13.4	+59.6	99.8	81 00.0	+60.0	106.0	**81**
82	80 57.2	*+38.1* •	58.3	81 26.2	*+42.6* •	64.0	81 49.6	*+47.1* •	70.2	82 06.6	*+51.3* •	77.0	82 16.3	+55.1	84.2	82 18.5	+57.8	91.6	82 13.0	+59.5	99.0	82 00.0	+60.0	106.0	**82**
83	81 35.3	*+33.5* •	53.2	82 08.8	*+38.4* •	59.0	82 36.7	*+43.6* •	65.6	82 57.9	*+48.8* •	73.0	83 11.4	*+53.4* •	81.1	83 16.3	+57.1	89.5	83 12.5	+59.2	97.9	83 00.0	+60.0	106.0	**83**
84	82 08.8	*+27.9* •	47.3	82 47.2	*+33.1* •	53.2	83 20.3	*+38.9* •	60.0	83 46.7	*+45.0* •	68.0	84 04.8	*+51.0* •	77.0	84 13.4	+55.9	86.6	84 11.7	+59.0	96.5	84 00.0	+60.0	106.0	**84**
85	82 36.7	*+21.2* •	40.7	83 20.3	*+26.4* •	46.2	83 59.2	*+32.5* •	53.1	84 31.7	*+39.6* •	61.5	84 55.8	*+47.0* •	71.4	85 09.3	*+53.8* •	82.7	85 10.7	+58.5	94.5	85 00.0	+60.0	106.0	**85**
86	82 57.9	*+13.5* •	33.2	83 46.7	*+18.1* •	38.2	84 31.7	*+24.1* •	44.7	85 11.3	*+31.5* •	53.1	85 42.8	*+40.6* •	63.8	86 03.1	*+50.1* •	76.9	86 09.2	+57.5	91.6	86 00.0	+60.0	106.0	**86**
87	83 11.4	*+4.9* •	25.1	84 04.8	*+8.6* •	29.2	84 55.8	*+13.5* •	34.7	85 42.8	*+20.3* •	42.3	86 23.4	*+29.8* •	53.0	86 53.2	*+42.4* •	67.9	87 06.7	*+54.9* •	86.6	87 00.0	+60.0	106.0	**87**
88	83 16.3	*–3.8* •	16.6	84 13.4	*–1.7* •	19.5	85 09.3	*+1.4* •	23.4	86 03.1	*+6.1* •	29.2	86 53.2	*+13.5* •	38.2	87 35.6	*+26.0* •	53.0	88 01.6	*+46.2* •	76.9	88 00.0	+60.0	106.0	**88**
89	83 12.5	*–12.5* •	8.2	84 11.7	*–11.7* •	9.5	85 10.7	*–10.7* •	11.5	86 09.2	*–9.2* •	14.5	87 06.7	*–6.7* •	19.4	88 01.6	*–1.6* •	29.1	88 47.8	*+12.2* •	53.0	89 00.0	+60.0	106.0	**89**
90	83 00.0	*–20.3* •	0.0	84 00.0	*–20.9* •	0.0	85 00.0	*–21.7* •	0.0	86 00.0	*–22.9* •	0.0	87 00.0	*–24.8* •	0.0	88 00.0	*–28.2* •	0.0	89 00.0	*–35.8* •	0.0	90 00.0	–60.0	53.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 74°, 286°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	1 55.5	−59.6	105.9	1 39.1	−59.7	105.9	1 22.6	−59.8	105.9	1 06.1	−59.9	106.0	0 49.6	−59.9	106.0	0 33.1	−60.0	106.0	0 16.5	−60.0	106.0	0 00.0	+60.0	74.0	**0**
1	0 55.9	−59.6	106.0	0 39.4	−59.7	106.0	0 22.8	−59.8	106.0	0 06.2	−59.8	106.0	0 10.3	+60.0	74.0	0 26.9	+60.0	74.0	0 43.5	+59.9	74.0	1 00.0	+60.0	74.0	**1**
2	0 03.7	+59.6	73.9	0 20.3	+59.7	73.9	0 37.0	+59.8	73.9	0 53.6	+59.9	73.9	1 10.3	+59.9	73.9	1 26.9	+59.9	73.9	1 43.4	+60.0	74.0	2 00.0	+60.0	74.0	**2**
3	1 03.3	+59.5	73.8	1 20.0	+59.7	73.8	1 36.8	+59.8	73.8	1 53.5	+59.9	73.8	2 10.2	+59.9	73.9	2 26.8	+60.0	73.9	2 43.4	+60.0	74.0	3 00.0	+60.0	74.0	**3**
4	2 02.8	+59.6	73.6	2 19.7	+59.7	73.7	2 36.6	+59.7	73.7	2 53.4	+59.8	73.8	3 10.1	+59.9	73.8	3 26.8	+60.0	73.9	3 43.4	+60.0	73.9	4 00.0	+60.0	74.0	**4**
5	3 02.4	+59.6	73.5	3 19.4	+59.7	73.6	3 36.3	+59.8	73.6	3 53.2	+59.9	73.7	4 10.0	+59.9	73.8	4 26.8	+59.9	73.8	4 43.4	+60.0	73.9	5 00.0	+60.0	74.0	**5**
6	4 02.0	+59.6	73.4	4 19.1	+59.7	73.5	4 36.1	+59.8	73.6	4 53.1	+59.8	73.6	5 09.9	+60.0	73.7	5 26.7	+60.0	73.8	5 43.4	+60.0	73.9	6 00.0	+60.0	74.0	**6**
7	5 01.6	+59.6	73.3	5 18.8	+59.7	73.4	5 35.9	+59.8	73.5	5 52.9	+59.9	73.6	6 09.9	+59.9	73.7	6 26.7	+60.0	73.8	6 43.4	+60.0	73.9	7 00.0	+60.0	74.0	**7**
8	6 01.2	+59.6	73.2	6 18.5	+59.7	73.3	6 35.7	+59.8	73.4	6 52.8	+59.9	73.5	7 09.8	+59.9	73.6	7 26.7	+59.9	73.7	7 43.4	+60.0	73.9	8 00.0	+60.0	74.0	**8**
9	7 00.8	+59.5	73.1	7 18.2	+59.7	73.2	7 35.5	+59.8	73.3	7 52.7	+59.8	73.4	8 09.7	+59.9	73.6	8 26.6	+60.0	73.7	8 43.4	+60.0	73.9	9 00.0	+60.0	74.0	**9**
10	8 00.3	+59.6	72.9	8 17.9	+59.7	73.1	8 35.3	+59.8	73.2	8 52.5	+59.9	73.4	9 09.6	+60.0	73.5	9 26.6	+60.0	73.7	9 43.4	+60.0	73.8	10 00.0	+60.0	74.0	**10**
11	8 59.9	+59.6	72.8	9 17.6	+59.7	73.0	9 35.1	+59.7	73.1	9 52.4	+59.9	73.3	10 09.6	+59.9	73.5	10 26.6	+59.9	73.6	10 43.4	+60.0	73.8	11 00.0	+60.0	74.0	**11**
12	9 59.5	+59.6	72.7	10 17.3	+59.6	72.9	10 34.8	+59.8	73.0	10 52.3	+59.8	73.2	11 09.5	+59.9	73.4	11 26.5	+60.0	73.6	11 43.4	+60.0	73.8	12 00.0	+60.0	74.0	**12**
13	10 59.1	+59.5	72.6	11 16.9	+59.7	72.8	11 34.6	+59.8	73.0	11 52.1	+59.9	73.2	12 09.4	+59.9	73.4	12 26.5	+59.9	73.6	12 43.4	+59.9	73.8	13 00.0	+60.0	74.0	**13**
14	11 58.6	+59.6	72.5	12 16.6	+59.7	72.7	12 34.4	+59.8	72.9	12 52.0	+59.8	73.1	13 09.3	+59.9	73.3	13 26.4	+60.0	73.5	13 43.3	+60.0	73.8	14 00.0	+60.0	74.0	**14**
15	12 58.2	+59.6	72.3	13 16.3	+59.7	72.6	13 34.2	+59.8	72.8	13 51.8	+59.9	73.0	14 09.2	+60.0	73.3	14 26.4	+60.0	73.5	14 43.3	+60.0	73.7	15 00.0	+60.0	74.0	**15**
16	13 57.8	+59.5	72.2	14 16.0	+59.7	72.4	14 34.0	+59.7	72.7	14 51.7	+59.8	72.9	15 09.2	+59.9	73.2	15 26.4	+59.9	73.5	15 43.3	+60.0	73.7	16 00.0	+60.0	74.0	**16**
17	14 57.3	+59.6	72.1	15 15.7	+59.6	72.3	15 33.7	+59.8	72.6	15 51.5	+59.9	72.9	16 09.1	+59.9	73.1	16 26.3	+60.0	73.4	16 43.3	+60.0	73.7	17 00.0	+60.0	74.0	**17**
18	15 56.9	+59.5	72.0	16 15.3	+59.7	72.2	16 33.5	+59.8	72.5	16 51.4	+59.8	72.8	17 09.0	+59.9	73.1	17 26.3	+60.0	73.4	17 43.3	+60.0	73.7	18 00.0	+60.0	74.0	**18**
19	16 56.4	+59.6	71.8	17 15.0	+59.7	72.1	17 33.3	+59.7	72.4	17 51.2	+59.9	72.7	18 08.9	+59.9	73.0	18 26.3	+59.9	73.3	18 43.3	+60.0	73.7	19 00.0	+60.0	74.0	**19**
20	17 56.0	+59.5	71.7	18 14.7	+59.6	72.0	18 33.0	+59.8	72.3	18 51.1	+59.8	72.6	19 08.8	+59.9	73.0	19 26.2	+60.0	73.3	19 43.3	+60.0	73.7	20 00.0	+60.0	74.0	**20**
21	18 55.5	+59.6	71.6	19 14.3	+59.7	71.9	19 32.8	+59.8	72.2	19 50.9	+59.9	72.6	20 08.7	+60.0	72.9	20 26.2	+60.0	73.3	20 43.3	+60.0	73.6	21 00.0	+60.0	74.0	**21**
22	19 55.1	+59.5	71.4	20 14.0	+59.6	71.8	20 32.6	+59.7	72.1	20 50.8	+59.8	72.5	21 08.7	+59.9	72.9	21 26.2	+59.9	73.2	21 43.3	+60.0	73.6	22 00.0	+60.0	74.0	**22**
23	20 54.6	+59.5	71.3	21 13.6	+59.7	71.7	21 32.3	+59.8	72.0	21 50.6	+59.9	72.4	22 08.6	+59.9	72.8	22 26.1	+60.0	73.2	22 43.3	+59.9	73.6	23 00.0	+60.0	74.0	**23**
24	21 54.1	+59.5	71.2	22 13.3	+59.6	71.6	22 32.1	+59.7	71.9	22 50.5	+59.8	72.3	23 08.5	+59.9	72.7	23 26.1	+59.9	73.2	23 43.2	+60.0	73.6	24 00.0	+60.0	74.0	**24**
25	22 53.6	+59.5	71.0	23 12.9	+59.7	71.4	23 31.8	+59.8	71.8	23 50.3	+59.9	72.3	24 08.4	+59.9	72.7	24 26.0	+60.0	73.1	24 43.2	+60.0	73.6	25 00.0	+60.0	74.0	**25**
26	23 53.1	+59.5	70.9	24 12.6	+59.6	71.3	24 31.6	+59.7	71.7	24 50.2	+59.8	72.2	25 08.3	+59.9	72.6	25 26.0	+59.9	73.1	25 43.2	+60.0	73.5	26 00.0	+60.0	74.0	**26**
27	24 52.6	+59.5	70.8	25 12.2	+59.6	71.2	25 31.3	+59.8	71.6	25 50.0	+59.8	72.1	26 08.2	+59.9	72.6	26 25.9	+60.0	73.0	26 43.2	+60.0	73.5	27 00.0	+60.0	74.0	**27**
28	25 52.1	+59.5	70.6	26 11.8	+59.6	71.1	26 31.1	+59.7	71.5	26 49.8	+59.9	72.0	27 08.1	+59.9	72.5	27 25.9	+60.0	73.0	27 43.2	+60.0	73.5	28 00.0	+60.0	74.0	**28**
29	26 51.6	+59.5	70.5	27 11.4	+59.7	70.9	27 30.8	+59.7	71.4	27 49.7	+59.8	71.9	28 08.0	+59.9	72.4	28 25.9	+59.9	72.9	28 43.2	+60.0	73.5	29 00.0	+60.0	74.0	**29**
30	27 51.1	+59.5	70.3	28 11.1	+59.6	70.8	28 30.5	+59.7	71.3	28 49.5	+59.8	71.8	29 07.9	+59.9	72.4	29 25.8	+60.0	72.9	29 43.2	+60.0	73.4	30 00.0	+60.0	74.0	**30**
31	28 50.6	+59.4	70.2	29 10.7	+59.6	70.7	29 30.2	+59.8	71.2	29 49.3	+59.8	71.8	30 07.8	+59.9	72.3	30 25.8	+59.9	72.9	30 43.2	+60.0	73.4	31 00.0	+60.0	74.0	**31**
32	29 50.0	+59.5	70.0	30 10.3	+59.5	70.6	30 30.0	+59.7	71.1	30 49.1	+59.8	71.7	31 07.7	+59.9	72.2	31 25.7	+60.0	72.8	31 43.2	+59.9	73.4	32 00.0	+60.0	74.0	**32**
33	30 49.5	+59.4	69.8	31 09.8	+59.6	70.4	31 29.7	+59.7	71.0	31 48.9	+59.8	71.6	32 07.6	+59.9	72.2	32 25.7	+59.9	72.8	32 43.1	+60.0	73.4	33 00.0	+60.0	74.0	**33**
34	31 48.9	+59.4	69.7	32 09.4	+59.6	70.3	32 29.4	+59.7	70.9	32 48.7	+59.9	71.5	33 07.5	+59.9	72.1	33 25.6	+60.0	72.7	33 43.1	+60.0	73.4	34 00.0	+60.0	74.0	**34**
35	32 48.3	+59.4	69.5	33 09.0	+59.6	70.1	33 29.1	+59.7	70.8	33 48.6	+59.8	71.4	34 07.4	+59.9	72.0	34 25.6	+59.9	72.7	34 43.1	+60.0	73.3	35 00.0	+60.0	74.0	**35**
36	33 47.7	+59.4	69.4	34 08.6	+59.5	70.0	34 28.8	+59.7	70.6	34 48.4	+59.8	71.3	35 07.3	+59.9	71.9	35 25.5	+60.0	72.6	35 43.1	+60.0	73.3	36 00.0	+60.0	74.0	**36**
37	34 47.1	+59.4	69.2	35 08.1	+59.6	69.8	35 28.5	+59.6	70.5	35 48.2	+59.7	71.2	36 07.2	+59.8	71.9	36 25.5	+59.9	72.6	36 43.1	+60.0	73.3	37 00.0	+60.0	74.0	**37**
38	35 46.5	+59.4	69.0	36 07.7	+59.5	69.7	36 28.1	+59.7	70.4	36 47.9	+59.8	71.1	37 07.0	+59.9	71.8	37 25.4	+60.0	72.5	37 43.1	+60.0	73.3	38 00.0	+60.0	74.0	**38**
39	36 45.9	+59.3	68.8	37 07.2	+59.5	69.5	37 27.8	+59.7	70.2	37 47.7	+59.8	71.0	38 06.9	+59.9	71.7	38 25.4	+59.9	72.5	38 43.1	+60.0	73.2	39 00.0	+60.0	74.0	**39**
40	37 45.2	+59.3	68.6	38 06.7	+59.5	69.4	38 27.5	+59.6	70.1	38 47.5	+59.8	70.9	39 06.8	+59.9	71.6	39 25.3	+60.0	72.4	39 43.1	+59.9	73.2	40 00.0	+60.0	74.0	**40**
41	38 44.5	+59.3	68.5	39 06.2	+59.5	69.2	39 27.1	+59.7	70.0	39 47.3	+59.8	70.8	40 06.7	+59.8	71.5	40 25.3	+59.9	72.4	40 43.0	+60.0	73.2	41 00.0	+60.0	74.0	**41**
42	39 43.8	+59.3	68.3	40 05.7	+59.5	69.0	40 26.8	+59.6	69.8	40 47.1	+59.7	70.6	41 06.5	+59.9	71.5	41 25.2	+59.9	72.3	41 43.0	+60.0	73.1	42 00.0	+60.0	74.0	**42**
43	40 43.1	+59.3	68.1	41 05.2	+59.4	68.9	41 26.4	+59.6	69.7	41 46.8	+59.8	70.5	42 06.4	+59.9	71.4	42 25.1	+60.0	72.2	42 43.0	+60.0	73.1	43 00.0	+60.0	74.0	**43**
44	41 42.4	+59.2	67.9	42 04.6	+59.5	68.7	42 26.0	+59.6	69.5	42 46.6	+59.7	70.4	43 06.3	+59.8	71.3	43 25.1	+59.9	72.2	43 43.0	+60.0	73.1	44 00.0	+60.0	74.0	**44**
45	42 41.6	+59.3	67.6	43 04.1	+59.4	68.5	43 25.6	+59.6	69.4	43 46.3	+59.7	70.3	44 06.1	+59.9	71.2	44 25.0	+59.9	72.1	44 43.0	+60.0	73.0	45 00.0	+60.0	74.0	**45**
46	43 40.9	+59.2	67.4	44 03.5	+59.4	68.3	44 25.2	+59.6	69.2	44 46.0	+59.8	70.1	45 06.0	+59.8	71.1	45 24.9	+60.0	72.0	45 43.0	+59.9	73.0	46 00.0	+60.0	74.0	**46**
47	44 40.1	+59.1	67.2	45 02.9	+59.4	68.1	45 24.8	+59.6	69.0	45 45.8	+59.7	70.0	46 05.8	+59.9	71.0	46 24.9	+59.9	72.0	46 42.9	+60.0	73.0	47 00.0	+60.0	74.0	**47**
48	45 39.2	+59.2	67.0	46 02.3	+59.3	67.9	46 24.4	+59.5	68.9	46 45.5	+59.7	69.9	47 05.7	+59.8	70.9	47 24.8	+59.9	71.9	47 42.9	+60.0	72.9	48 00.0	+60.0	74.0	**48**
49	46 38.4	+59.1	66.7	47 01.6	+59.3	67.7	47 23.9	+59.5	68.7	47 45.2	+59.7	69.7	48 05.5	+59.8	70.8	48 24.7	+60.0	71.8	48 42.9	+60.0	72.9	49 00.0	+60.0	74.0	**49**
50	47 37.5	+59.0	66.5	48 00.9	+59.3	67.5	48 23.4	+59.5	68.5	48 44.9	+59.7	69.6	49 05.3	+59.8	70.6	49 24.7	+59.9	71.7	49 42.9	+60.0	72.9	50 00.0	+60.0	74.0	**50**
51	48 36.5	+59.1	66.2	49 00.2	+59.3	67.2	49 22.9	+59.5	68.3	49 44.6	+59.6	69.4	50 05.1	+59.8	70.5	50 24.6	+59.9	71.7	50 42.9	+59.9	72.8	51 00.0	+60.0	74.0	**51**
52	49 35.6	+59.0	65.9	49 59.5	+59.3	67.0	50 22.4	+59.5	68.1	50 44.2	+59.7	69.2	51 04.9	+59.8	70.4	51 24.5	+59.9	71.6	51 42.8	+60.0	72.8	52 00.0	+60.0	74.0	**52**
53	50 34.6	+58.9	65.6	50 58.8	+59.2	66.8	51 21.9	+59.4	67.9	51 43.9	+59.6	69.1	52 04.7	+59.8	70.3	52 24.4	+59.9	71.5	52 42.8	+60.0	72.7	53 00.0	+60.0	74.0	**53**
54	51 33.5	+58.9	65.3	51 58.0	+59.2	66.5	52 21.3	+59.5	67.7	52 43.5	+59.7	68.9	53 04.5	+59.8	70.1	53 24.3	+59.9	71.4	53 42.8	+60.0	72.7	54 00.0	+60.0	74.0	**54**
55	52 32.4	+58.9	65.0	52 57.2	+59.1	66.2	53 20.8	+59.4	67.5	53 43.2	+59.6	68.7	54 04.3	+59.8	70.0	54 24.2	+59.9	71.3	54 42.8	+60.0	72.6	55 00.0	+60.0	74.0	**55**
56	53 31.3	+58.7	64.7	53 56.3	+59.1	65.9	54 20.2	+59.3	67.2	54 42.8	+59.5	68.5	55 04.1	+59.8	69.8	55 24.1	+59.9	71.2	55 42.8	+59.9	72.6	56 00.0	+60.0	74.0	**56**
57	54 30.0	+58.8	64.4	54 55.4	+59.1	65.6	55 19.5	+59.3	67.0	55 42.3	+59.6	68.3	56 03.9	+59.7	69.7	56 24.0	+59.9	71.1	56 42.7	+60.0	72.5	57 00.0	+60.0	74.0	**57**
58	55 28.8	+58.7	64.0	55 54.5	+59.0	65.3	56 18.8	+59.3	66.7	56 41.9	+59.6	68.1	57 03.6	+59.7	69.5	57 23.9	+59.9	71.0	57 42.7	+60.0	72.5	58 00.0	+60.0	74.0	**58**
59	56 27.5	+58.6	63.6	56 53.5	+58.9	65.0	57 18.1	+59.3	66.4	57 41.5	+59.5	67.9	58 03.3	+59.8	69.3	58 23.8	+59.8	70.9	58 42.7	+59.9	72.4	59 00.0	+60.0	74.0	**59**
60	57 26.1	+58.5	63.2	57 52.4	+58.9	64.7	58 17.4	+59.2	66.1	58 41.0	+59.4	67.6	59 03.1	+59.7	69.2	59 23.6	+59.9	70.7	59 42.6	+60.0	72.4	60 00.0	+60.0	74.0	**60**
61	58 24.6	+58.4	62.8	58 51.3	+58.8	64.3	59 16.6	+59.2	65.8	59 40.4	+59.5	67.4	60 02.8	+59.7	69.0	60 23.5	+59.9	70.6	60 42.6	+60.0	72.3	61 00.0	+60.0	74.0	**61**
62	59 23.0	+58.4	62.4	59 50.1	+58.8	63.9	60 15.8	+59.1	65.5	60 39.9	+59.4	67.1	61 02.5	+59.6	68.8	61 23.4	+59.8	70.5	61 42.6	+59.9	72.2	62 00.0	+60.0	74.0	**62**
63	60 21.4	+58.2	61.9	60 48.9	+58.6	63.5	61 14.9	+59.0	65.1	61 39.3	+59.4	66.8	62 02.1	+59.7	68.5	62 23.2	+59.8	70.3	62 42.5	+60.0	72.1	63 00.0	+60.0	74.0	**63**
64	61 19.6	+58.1	61.4	61 47.5	+58.6	63.1	62 13.9	+59.0	64.8	62 38.7	+59.3	66.5	63 01.8	+59.6	68.3	63 23.0	+59.9	70.1	63 42.5	+59.9	72.1	64 00.0	+60.0	74.0	**64**
65	62 17.7	+58.0	60.9	62 46.1	+58.5	62.6	63 12.9	+58.9	64.4	63 38.0	+59.3	66.2	64 01.4	+59.6	68.0	64 22.9	+59.8	70.0	64 42.4	+60.0	72.0	65 00.0	+60.0	74.0	**65**
66	63 15.7	+57.9	60.3	63 44.6	+58.4	62.1	64 11.8	+58.9	63.9	64 37.3	+59.3	65.8	65 01.0	+59.5	67.8	65 22.7	+59.8	69.8	65 42.4	+59.9	71.9	66 00.0	+60.0	74.0	**66**
67	64 13.6	+57.7	59.7	64 43.0	+58.2	61.6	65 10.7	+58.7	63.5	65 36.6	+59.1	65.4	66 00.5	+59.5	67.5	66 22.5	+59.8	69.6	66 42.3	+60.0	71.8	67 00.0	+60.0	74.0	**67**
68	65 11.3	+57.5	59.1	65 41.2	+58.1	61.0	66 09.4	+58.7	63.0	66 35.7	+59.1	65.0	67 00.0	+59.5	67.2	67 22.3	+59.7	69.4	67 42.3	+59.9	71.7	68 00.0	+60.0	74.0	**68**
69	66 08.8	+57.3	58.4	66 39.3	+58.0	60.4	67 08.1	+58.5	62.4	67 34.8	+59.0	64.6	67 59.5	+59.4	66.8	68 22.0	+59.8	69.1	68 42.2	+60.0	71.5	69 00.0	+60.0	74.0	**69**
70	67 06.1	+57.1	57.7	67 37.3	+57.8	59.7	68 06.6	+58.4	61.9	68 33.8	+59.0	64.1	68 58.9	+59.4	66.4	69 21.8	+59.7	68.9	69 42.2	+59.9	71.4	70 00.0	+60.0	74.0	**70**
71	68 03.2	+56.9	56.9	68 35.1	+57.6	59.0	69 05.0	+58.2	61.2	69 32.8	+58.8	63.6	69 58.3	+59.3	66.0	70 21.5	+59.7	68.6	70 42.1	+59.9	71.3	71 00.0	+60.0	74.0	**71**
72	69 00.1	+56.5	56.0	69 32.7	+57.3	58.2	70 03.2	+58.1	60.5	70 31.6	+58.7	63.0	70 57.6	+59.3	65.6	71 21.2	+59.6	68.3	71 42.0	+59.9	71.1	72 00.0	+60.0	74.0	**72**
73	69 56.6	+56.2	55.0	70 30.0	+57.1	57.3	71 01.3	+57.9	59.8	71 30.3	+58.6	62.4	71 56.9	+59.1	65.1	72 20.8	+59.6	67.9	72 41.9	+59.9	70.9	73 00.0	+60.0	74.0	**73**
74	70 52.8	+55.9	54.0	71 27.1	+56.7	56.4	71 59.2	+57.6	59.0	72 28.9	+58.4	61.7	72 56.0	+59.1	64.5	73 20.4	+59.6	67.6	73 41.8	+59.9	70.7	74 00.0	+60.0	74.0	**74**
75	71 48.7	+55.3	52.8	72 23.8	+56.4	55.4	72 56.8	+57.4	58.0	73 27.3	+58.2	60.9	73 55.1	+58.9	63.9	74 20.0	+59.5	67.1	74 41.7	+59.9	70.5	75 00.0	+60.0	74.0	**75**
76	72 44.0	+54.9	51.6	73 20.2	+56.0	54.2	73 54.2	+57.0	57.0	74 25.5	+58.0	60.0	74 54.0	+58.8	63.2	75 19.5	+59.4	66.6	75 41.6	+59.8	70.2	76 00.0	+60.0	74.0	**76**
77	73 38.9	+54.2	50.2	74 16.2	+55.5	52.9	74 51.2	+56.6	55.8	75 23.5	+57.7	59.0	75 52.8	+58.7	62.4	76 18.9	+59.4	66.1	76 41.4	+59.8	69.9	77 00.0	+60.0	74.0	**77**
78	74 33.1	+53.5	48.6	75 11.7	+54.8	51.5	75 47.8	+56.1	54.5	76 21.2	+57.3	57.9	76 51.5	+58.3	61.5	77 18.3	+59.2	65.4	77 41.2	+59.8	69.6	78 00.0	+60.0	74.0	**78**
79	75 26.6	+52.6	46.9	76 06.5	+54.1	49.8	76 43.9	+55.6	53.1	77 18.5	+56.9	56.6	77 49.8	+58.2	60.5	78 17.5	+59.1	64.7	78 41.0	+59.8	69.2	79 00.0	+60.0	74.0	**79**
80	76 19.2	+51.6	44.9	77 00.6	+53.2	48.0	77 39.5	+54.8	51.3	78 15.4	+56.4	55.1	78 48.0	+57.7	59.2	79 16.6	+58.9	63.8	79 40.8	+59.7	68.7	80 00.0	+60.0	74.0	**80**
81	77 10.8	+50.3	42.7	77 53.8	+52.0	45.8	78 34.3	+53.8	49.4	79 11.8	+55.6	53.3	79 45.7	+57.3	57.8	80 15.5	+58.7	62.7	80 40.5	+59.6	68.1	81 00.0	+60.0	74.0	**81**
82	78 01.1	+48.7	40.1	78 45.8	+50.7	43.4	79 28.1	+52.7	47.1	80 07.4	+54.7	51.3	80 43.0	+56.7	56.0	81 14.2	+58.3	61.4	81 40.1	+59.6	67.4	82 00.0	+60.0	74.0	**82**
83	78 49.8	*+46.7* •	37.2	79 36.5	*+48.9* •	40.5	80 20.8	+51.2	44.3	81 02.1	+53.5	48.7	81 39.7	+55.8	53.9	82 12.5	+57.9	59.8	82 39.7	+59.4	66.5	83 00.0	+60.0	74.0	**83**
84	79 36.5	*+44.3* •	33.9	80 25.4	*+46.6* •	37.2	81 12.0	*+49.0* •	41.1	81 55.6	*+51.8* •	45.7	82 35.5	+54.5	51.2	83 10.4	+57.2	57.7	83 39.1	+59.2	65.3	84 00.0	+60.0	74.0	**84**
85	80 20.8	*+41.3* •	30.0	81 12.0	*+43.6* •	33.2	82 01.0	*+46.4* •	37.1	82 47.4	*+49.4* •	41.9	83 30.0	*+52.7* •	47.7	84 07.6	+56.0	54.9	84 38.3	+58.8	63.7	85 00.0	+60.0	74.0	**85**
86	81 02.1	*+37.6* •	25.5	81 55.6	*+39.9* •	28.5	82 47.4	*+42.6* •	32.3	83 36.8	*+45.9* •	37.1	84 22.7	*+49.8* •	43.2	85 03.6	*+54.1* •	51.1	85 37.1	+58.1	61.4	86 00.0	+60.0	74.0	**86**
87	81 39.7	*+32.8* •	20.3	82 35.5	*+34.9* •	23.0	83 30.0	*+37.6* •	26.4	84 22.7	*+40.9* •	30.9	85 12.5	*+45.2* •	37.0	85 57.7	*+50.6* •	45.6	86 35.2	*+56.6* •	57.7	87 00.0	+60.0	74.0	**87**
88	82 12.5	*+27.2* •	14.3	83 10.4	*+28.7* •	16.4	84 07.6	*+30.7* •	19.1	85 03.6	*+33.5* •	22.9	85 57.7	*+37.5* •	28.5	86 48.3	*+43.5* •	37.0	87 31.8	*+52.4* •	51.1	88 00.0	+60.0	74.0	**88**
89	82 39.7	*+20.3* •	7.5	83 39.1	*+20.9* •	8.7	84 38.3	*+21.7* •	10.3	85 37.1	*+22.9* •	12.7	86 35.2	*+24.8* •	16.4	87 31.8	*+28.2* •	22.9	88 24.2	*+35.8* •	37.0	89 00.0	+60.0	74.0	**89**
90	83 00.0	*+12.5* •	0.0	84 00.0	*+11.7* •	0.0	85 00.0	*+10.7* •	0.0	86 00.0	*+9.2* •	0.0	87 00.0	*+6.7* •	0.0	88 00.0	*+1.6* •	0.0	89 00.0	*−12.2* •	0.0	90 00.0	−60.0	37.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 106°, 254°

75°, 285° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 48.5	+59.5	104.9	1 33.0	+59.7	104.9	1 17.6	+59.7	104.9	1 02.1	+59.8	105.0	0 46.6	+59.9	105.0	0 31.1	+59.9	105.0	0 15.5	+60.0	105.0	0 00.0	+60.0	105.0	0
1	2 48.0	+59.6	104.8	2 32.7	+59.7	104.8	2 17.3	+59.8	104.9	2 01.9	+59.9	104.9	1 46.5	+59.9	104.9	1 31.0	+60.0	105.0	1 15.5	+60.0	105.0	1 00.0	+60.0	105.0	1
2	3 47.6	+59.6	104.7	3 32.4	+59.7	104.7	3 17.1	+59.8	104.8	3 01.8	+59.9	104.8	2 46.4	+59.9	104.9	2 31.0	+59.9	104.9	2 15.5	+60.0	105.0	2 00.0	+60.0	105.0	2
3	4 47.2	+59.6	104.5	4 32.1	+59.7	104.6	4 16.9	+59.8	104.7	4 01.7	+59.8	104.8	3 46.3	+60.0	104.8	3 30.9	+60.0	104.9	3 15.5	+60.0	104.9	3 00.0	+60.0	105.0	3
4	5 46.8	+59.6	104.4	5 31.8	+59.7	104.5	5 16.7	+59.8	104.6	5 01.5	+59.9	104.7	4 46.3	+59.9	104.8	4 30.9	+60.0	104.9	4 15.5	+60.0	104.9	4 00.0	+60.0	105.0	4
5	6 46.4	+59.5	104.3	6 31.5	+59.7	104.4	6 16.5	+59.8	104.5	6 01.4	+59.8	104.6	5 46.2	+59.9	104.7	5 30.9	+59.9	104.8	5 15.5	+60.0	104.9	5 00.0	+60.0	105.0	5
6	7 45.9	+59.6	104.2	7 31.2	+59.7	104.3	7 16.3	+59.8	104.4	7 01.2	+59.9	104.6	6 46.1	+59.9	104.7	6 30.8	+60.0	104.8	6 15.5	+60.0	104.9	6 00.0	+60.0	105.0	6
7	8 45.5	+59.6	104.1	8 30.9	+59.6	104.2	8 16.1	+59.7	104.4	8 01.1	+59.9	104.5	7 46.0	+59.9	104.6	7 30.8	+60.0	104.8	7 15.5	+60.0	104.9	7 00.0	+60.0	105.0	7
8	9 45.1	+59.5	103.9	9 30.5	+59.7	104.1	9 15.8	+59.8	104.3	9 01.0	+59.8	104.4	8 45.9	+60.0	104.6	8 30.8	+59.9	104.7	8 15.5	+60.0	104.9	8 00.0	+60.0	105.0	8
9	10 44.6	+59.6	103.8	10 30.2	+59.7	104.0	10 15.6	+59.8	104.2	10 00.8	+59.9	104.4	9 45.9	+59.9	104.5	9 30.7	+60.0	104.7	9 15.5	+59.9	104.8	9 00.0	+60.0	105.0	9
10	11 44.2	+59.6	103.7	11 29.9	+59.7	103.9	11 15.4	+59.8	104.1	11 00.7	+59.8	104.3	10 45.8	+59.9	104.5	10 30.7	+60.0	104.7	10 15.4	+60.0	104.8	10 00.0	+60.0	105.0	10
11	12 43.8	+59.5	103.6	12 29.6	+59.7	103.8	12 15.2	+59.7	104.0	12 00.5	+59.9	104.2	11 45.7	+59.9	104.4	11 30.7	+59.9	104.6	11 15.4	+60.0	104.8	11 00.0	+60.0	105.0	11
12	13 43.3	+59.6	103.4	13 29.3	+59.6	103.7	13 14.9	+59.8	103.9	13 00.4	+59.9	104.1	12 45.6	+59.9	104.4	12 30.6	+60.0	104.6	12 15.4	+60.0	104.8	12 00.0	+60.0	105.0	12
13	14 42.9	+59.5	103.3	14 28.9	+59.7	103.6	14 14.7	+59.8	103.8	14 00.3	+59.8	104.1	13 45.5	+60.0	104.3	13 30.6	+60.0	104.5	13 15.4	+60.0	104.8	13 00.0	+60.0	105.0	13
14	15 42.4	+59.6	103.2	15 28.6	+59.7	103.5	15 14.5	+59.8	103.7	15 00.1	+59.9	104.0	14 45.5	+59.9	104.3	14 30.6	+59.9	104.5	14 15.4	+60.0	104.8	14 00.0	+60.0	105.0	14
15	16 42.0	+59.5	103.1	16 28.3	+59.6	103.4	16 14.3	+59.7	103.6	16 00.0	+59.8	103.9	15 45.4	+59.9	104.2	15 30.5	+60.0	104.5	15 15.4	+60.0	104.7	15 00.0	+60.0	105.0	15
16	17 41.5	+59.6	102.9	17 27.9	+59.7	103.2	17 14.0	+59.8	103.6	16 59.8	+59.9	103.9	16 45.3	+59.9	104.1	16 30.5	+60.0	104.4	16 15.4	+60.0	104.7	16 00.0	+60.0	105.0	16
17	18 41.1	+59.5	102.8	18 27.6	+59.7	103.1	18 13.8	+59.8	103.5	17 59.7	+59.8	103.8	17 45.2	+59.9	104.1	17 30.5	+59.9	104.4	17 15.4	+60.0	104.7	17 00.0	+60.0	105.0	17
18	19 40.6	+59.5	102.7	19 27.3	+59.6	103.0	19 13.6	+59.7	103.4	18 59.5	+59.9	103.7	18 45.1	+59.9	104.0	18 30.4	+60.0	104.4	18 15.4	+60.0	104.7	18 00.0	+60.0	105.0	18
19	20 40.1	+59.5	102.5	20 26.9	+59.7	102.9	20 13.3	+59.8	103.3	19 59.4	+59.8	103.6	19 45.0	+60.0	104.0	19 30.4	+59.9	104.3	19 15.4	+60.0	104.7	19 00.0	+60.0	105.0	19
20	21 39.6	+59.6	102.4	21 26.6	+59.6	102.8	21 13.1	+59.7	103.2	20 59.2	+59.8	103.6	20 45.0	+59.9	103.9	20 30.3	+60.0	104.3	20 15.4	+59.9	104.6	20 00.0	+60.0	105.0	20
21	22 39.2	+59.5	102.3	22 26.2	+59.6	102.7	22 12.8	+59.8	103.1	21 59.0	+59.9	103.5	21 44.9	+59.9	103.9	21 30.3	+60.0	104.2	21 15.3	+60.0	104.6	21 00.0	+60.0	105.0	21
22	23 38.7	+59.5	102.1	23 25.8	+59.7	102.6	23 12.6	+59.7	103.0	22 58.9	+59.8	103.4	22 44.8	+59.9	103.8	22 30.3	+59.9	104.2	22 15.3	+60.0	104.6	22 00.0	+60.0	105.0	22
23	24 38.2	+59.5	102.0	24 25.5	+59.6	102.4	24 12.3	+59.8	102.9	23 58.7	+59.9	103.3	23 44.7	+59.9	103.7	23 30.2	+60.0	104.2	23 15.3	+60.0	104.6	23 00.0	+60.0	105.0	23
24	25 37.7	+59.4	101.8	25 25.1	+59.6	102.3	25 12.1	+59.7	102.8	24 58.6	+59.8	103.2	24 44.6	+59.9	103.7	24 30.2	+59.9	104.1	24 15.3	+60.0	104.6	24 00.0	+60.0	105.0	24
25	26 37.1	+59.5	101.7	26 24.7	+59.6	102.2	26 11.8	+59.7	102.7	25 58.4	+59.8	103.1	25 44.5	+59.9	103.6	25 30.1	+60.0	104.1	25 15.3	+60.0	104.5	25 00.0	+60.0	105.0	25
26	27 36.6	+59.5	101.6	27 24.3	+59.6	102.1	27 11.5	+59.8	102.6	26 58.2	+59.9	103.1	26 44.4	+59.9	103.6	26 30.1	+60.0	104.0	26 15.3	+60.0	104.5	26 00.0	+60.0	105.0	26
27	28 36.1	+59.4	101.4	28 23.9	+59.6	101.9	28 11.3	+59.7	102.5	27 58.1	+59.8	103.0	27 44.3	+59.9	103.5	27 30.1	+59.9	104.0	27 15.3	+60.0	104.5	27 00.0	+60.0	105.0	27
28	29 35.5	+59.5	101.2	29 23.5	+59.6	101.8	29 11.0	+59.7	102.4	28 57.9	+59.8	102.9	28 44.2	+59.9	103.4	28 30.0	+60.0	104.0	28 15.3	+60.0	104.5	28 00.0	+60.0	105.0	28
29	30 35.0	+59.4	101.1	30 23.1	+59.6	101.7	30 10.7	+59.7	102.2	29 57.7	+59.8	102.8	29 44.1	+59.9	103.4	29 30.0	+59.9	103.9	29 15.3	+59.9	104.5	29 00.0	+60.0	105.0	29
30	31 34.4	+59.4	100.9	31 22.7	+59.6	101.5	31 10.4	+59.7	102.1	30 57.5	+59.8	102.7	30 44.0	+59.9	103.3	30 29.9	+60.0	103.9	30 15.2	+60.0	104.4	30 00.0	+60.0	105.0	30
31	32 33.8	+59.4	100.8	32 22.3	+59.6	101.4	32 10.1	+59.7	102.0	31 57.3	+59.8	102.6	31 43.9	+59.9	103.2	31 29.9	+59.9	103.8	31 15.2	+60.0	104.4	31 00.0	+60.0	105.0	31
32	33 33.2	+59.4	100.6	33 21.9	+59.5	101.2	33 09.8	+59.7	101.9	32 57.1	+59.8	102.5	32 43.8	+59.9	103.2	32 29.8	+60.0	103.8	32 15.2	+60.0	104.4	32 00.0	+60.0	105.0	32
33	34 32.6	+59.4	100.4	34 21.4	+59.6	101.1	34 09.5	+59.7	101.8	33 56.9	+59.8	102.4	33 43.7	+59.9	103.1	33 29.8	+59.9	103.7	33 15.2	+60.0	104.4	33 00.0	+60.0	105.0	33
34	35 32.0	+59.4	100.3	35 21.0	+59.5	101.0	35 09.2	+59.7	101.6	34 56.7	+59.8	102.3	34 43.6	+59.9	103.0	34 29.7	+60.0	103.7	34 15.2	+60.0	104.3	34 00.0	+60.0	105.0	34
35	36 31.4	+59.3	100.1	36 20.5	+59.5	100.8	36 08.9	+59.6	101.5	35 56.5	+59.8	102.2	35 43.5	+59.8	102.9	35 29.7	+59.9	103.6	35 15.2	+60.0	104.3	35 00.0	+60.0	105.0	35
36	37 30.7	+59.3	99.9	37 20.0	+59.5	100.6	37 08.5	+59.7	101.4	36 56.3	+59.8	102.1	36 43.3	+59.9	102.9	36 29.6	+60.0	103.6	36 15.2	+60.0	104.3	36 00.0	+60.0	105.0	36
37	38 30.0	+59.3	99.7	38 19.5	+59.5	100.5	38 08.2	+59.7	101.3	37 56.1	+59.8	102.0	37 43.2	+59.9	102.8	37 29.6	+59.9	103.5	37 15.2	+59.9	104.3	37 00.0	+60.0	105.0	37
38	39 29.3	+59.3	99.5	39 19.0	+59.5	100.3	39 07.9	+59.6	101.1	38 55.9	+59.8	101.9	38 43.1	+59.9	102.7	38 29.5	+60.0	103.5	38 15.1	+60.0	104.2	38 00.0	+60.0	105.0	38
39	40 28.6	+59.3	99.3	40 18.5	+59.5	100.1	40 07.5	+59.6	101.0	39 55.7	+59.7	101.8	39 43.0	+59.8	102.6	39 29.5	+59.9	103.4	39 15.1	+60.0	104.2	39 00.0	+60.0	105.0	39
40	41 27.9	+59.2	99.1	41 18.0	+59.4	100.0	41 07.1	+59.6	100.8	40 55.4	+59.8	101.7	40 42.8	+59.9	102.5	40 29.4	+59.9	103.4	40 15.1	+60.0	104.2	40 00.0	+60.0	105.0	40
41	42 27.1	+59.2	98.9	42 17.4	+59.4	99.8	42 06.7	+59.6	100.7	41 55.2	+59.7	101.6	41 42.7	+59.9	102.4	41 29.3	+60.0	103.3	41 15.1	+60.0	104.2	41 00.0	+60.0	105.0	41
42	43 26.3	+59.2	98.7	43 16.8	+59.4	99.6	43 06.3	+59.6	100.5	42 54.9	+59.8	101.4	42 42.6	+59.8	102.3	42 29.3	+59.9	103.2	42 15.1	+60.0	104.1	42 00.0	+60.0	105.0	42
43	44 25.5	+59.2	98.4	44 16.2	+59.4	99.4	44 05.9	+59.6	100.4	43 54.7	+59.7	101.3	43 42.4	+59.9	102.2	43 29.2	+59.9	103.2	43 15.1	+60.0	104.1	43 00.0	+60.0	105.0	43
44	45 24.7	+59.1	98.2	45 15.6	+59.4	99.2	45 05.5	+59.6	100.2	44 54.4	+59.7	101.2	44 42.3	+59.8	102.1	44 29.1	+60.0	103.1	44 15.1	+59.9	104.1	44 00.0	+60.0	105.0	44
45	46 23.8	+59.1	98.0	46 15.0	+59.3	99.0	46 05.1	+59.5	100.0	45 54.1	+59.7	101.0	45 42.1	+59.9	102.0	45 29.1	+59.9	103.0	45 15.0	+60.0	104.0	45 00.0	+60.0	105.0	45
46	47 22.9	+59.1	97.7	47 14.3	+59.4	98.8	47 04.6	+59.6	99.8	46 53.8	+59.7	100.9	46 42.0	+59.8	101.9	46 29.0	+59.9	103.0	46 15.0	+60.0	104.0	46 00.0	+60.0	105.0	46
47	48 22.0	+59.0	97.4	48 13.7	+59.3	98.6	48 04.2	+59.5	99.7	47 53.5	+59.7	100.7	47 41.8	+59.8	101.8	47 28.9	+60.0	102.9	47 15.0	+60.0	104.0	47 00.0	+60.0	105.0	47
48	49 21.0	+59.0	97.2	49 13.0	+59.2	98.3	49 03.7	+59.5	99.5	48 53.2	+59.7	100.6	48 41.6	+59.8	101.7	48 28.9	+59.9	102.8	48 15.0	+60.0	103.9	48 00.0	+60.0	105.0	48
49	50 20.0	+59.0	96.9	50 12.2	+59.3	98.1	50 03.2	+59.4	99.3	49 52.9	+59.7	100.4	49 41.4	+59.8	101.6	49 28.8	+59.9	102.7	49 15.0	+59.9	103.9	49 00.0	+60.0	105.0	49
50	51 19.0	+58.9	96.6	51 11.5	+59.2	97.8	51 02.6	+59.5	99.1	50 52.6	+59.6	100.3	50 41.2	+59.9	101.5	50 28.7	+59.9	102.7	50 14.9	+60.0	103.8	50 00.0	+60.0	105.0	50
51	52 17.9	+58.8	96.3	52 10.7	+59.1	97.6	52 02.1	+59.4	98.8	51 52.2	+59.7	100.1	51 41.1	+59.7	101.3	51 28.6	+59.9	102.6	51 14.9	+60.0	103.8	51 00.0	+60.0	105.0	51
52	53 16.7	+58.8	96.0	53 09.8	+59.1	97.3	53 01.5	+59.4	98.6	52 51.9	+59.6	99.9	52 40.8	+59.8	101.2	52 28.5	+59.9	102.5	52 14.9	+60.0	103.8	52 00.0	+60.0	105.0	52
53	54 15.5	+58.8	95.6	54 08.9	+59.1	97.0	54 00.9	+59.4	98.4	53 51.5	+59.6	99.7	53 40.6	+59.8	101.1	53 28.4	+59.9	102.4	53 14.9	+60.0	103.7	53 00.0	+60.0	105.0	53
54	55 14.3	+58.6	95.3	55 08.0	+59.0	96.7	55 00.3	+59.3	98.1	54 51.1	+59.5	99.5	54 40.4	+59.8	100.9	54 28.3	+59.9	102.3	54 14.9	+59.9	103.7	54 00.0	+60.0	105.0	54
55	56 12.9	+58.7	94.9	56 07.0	+59.0	96.4	55 59.6	+59.3	97.9	55 50.6	+59.6	99.3	55 40.2	+59.7	100.8	55 28.2	+59.9	102.2	55 14.8	+60.0	103.6	55 00.0	+60.0	105.0	55
56	57 11.6	+58.5	94.5	57 06.0	+59.0	96.1	56 58.9	+59.3	97.6	56 50.2	+59.5	99.1	56 39.9	+59.8	100.6	56 28.1	+59.9	102.1	56 14.8	+60.0	103.6	56 00.0	+60.0	105.0	56
57	58 10.1	+58.4	94.1	58 05.0	+58.8	95.7	57 58.2	+59.2	97.3	57 49.7	+59.5	98.9	57 39.7	+59.7	100.4	57 28.0	+59.9	102.0	57 14.8	+59.9	103.5	57 00.0	+60.0	105.0	57
58	59 08.5	+58.4	93.7	59 03.8	+58.8	95.3	58 57.4	+59.2	97.0	58 49.2	+59.5	98.6	58 39.4	+59.7	100.3	58 27.9	+59.9	101.9	58 14.7	+60.0	103.4	58 00.0	+60.0	105.0	58
59	60 06.9	+58.2	93.2	60 02.6	+58.7	94.9	59 56.6	+59.1	96.7	59 48.7	+59.4	98.4	59 39.1	+59.7	100.1	59 27.8	+59.8	101.7	59 14.7	+60.0	103.4	59 00.0	+60.0	105.0	59
60	61 05.1	+58.2	92.7	61 01.3	+58.7	94.5	60 55.7	+59.0	96.3	60 48.1	+59.5	98.1	60 38.8	+59.7	99.9	60 27.6	+59.9	101.6	60 14.7	+59.9	103.3	60 00.0	+60.0	105.0	60
61	62 03.3	+58.0	92.2	62 00.0	+58.5	94.1	61 54.7	+59.0	95.9	61 47.6	+59.3	97.8	61 38.5	+59.6	99.6	61 27.5	+59.8	101.5	61 14.6	+60.0	103.2	61 00.0	+60.0	105.0	61
62	63 01.3	+57.8	91.6	62 58.5	+58.5	93.6	62 53.7	+59.0	95.6	62 46.9	+59.3	97.5	62 38.1	+59.6	99.4	62 27.3	+59.9	101.3	62 14.6	+60.0	103.2	62 00.0	+60.0	105.0	62
63	63 59.1	+57.8	91.1	63 57.0	+58.3	93.1	63 52.7	+58.8	95.1	63 46.2	+59.3	97.2	63 37.7	+59.6	99.2	63 27.2	+59.8	101.1	63 14.6	+59.9	103.1	63 00.0	+60.0	105.0	63
64	64 56.9	+57.5	90.4	64 55.3	+58.2	92.6	64 51.5	+58.8	94.7	64 45.5	+59.2	96.8	64 37.3	+59.6	98.9	64 27.0	+59.8	101.0	64 14.5	+60.0	103.0	64 00.0	+60.0	105.0	64
65	65 54.4	+57.4	89.7	65 53.5	+58.1	92.0	65 50.3	+58.6	94.2	65 44.7	+59.2	96.4	65 36.9	+59.5	98.6	65 26.8	+59.8	100.8	65 14.5	+59.9	102.9	65 00.0	+60.0	105.0	65
66	66 51.8	+57.1	89.0	66 51.6	+57.9	91.3	66 48.9	+58.6	93.7	66 43.9	+59.1	96.0	66 36.4	+59.5	98.3	66 26.6	+59.8	100.6	66 14.4	+60.0	102.8	66 00.0	+60.0	105.0	66
67	67 48.9	+56.9	88.2	67 49.5	+57.7	90.7	67 47.5	+58.4	93.1	67 43.0	+59.0	95.5	67 35.9	+59.5	98.0	67 26.4	+59.7	100.4	67 14.4	+59.9	102.7	67 00.0	+60.0	105.0	67
68	68 45.8	+56.6	87.3	68 47.2	+57.5	89.9	68 45.9	+58.3	92.5	68 42.0	+58.9	95.1	68 35.4	+59.4	97.6	68 26.1	+59.7	100.1	68 14.3	+59.9	102.6	68 00.0	+60.0	105.0	68
69	69 42.4	+56.2	86.4	69 44.7	+57.3	89.1	69 44.2	+58.1	91.8	69 40.9	+58.8	94.5	69 34.8	+59.3	97.2	69 25.8	+59.8	99.9	69 14.2	+60.0	102.5	69 00.0	+60.0	105.0	69
70	70 38.6	+55.9	85.4	70 42.0	+57.0	88.2	70 42.3	+57.9	91.1	70 39.7	+58.7	93.9	70 34.1	+59.3	96.8	70 25.6	+59.6	99.6	70 14.2	+59.9	102.3	70 00.0	+60.0	105.0	70
71	71 34.5	+55.5	84.3	71 39.0	+56.6	87.3	71 40.2	+57.7	90.3	71 38.4	+58.5	93.3	71 33.4	+59.1	96.3	71 25.2	+59.7	99.2	71 14.1	+59.9	102.2	71 00.0	+60.0	105.0	71
72	72 30.0	+54.9	83.0	72 35.6	+56.3	86.2	72 37.9	+57.5	89.4	72 36.9	+58.4	92.6	72 32.5	+59.1	95.8	72 24.9	+59.6	98.9	72 14.0	+59.9	102.0	72 00.0	+60.0	105.0	72
73	73 24.9	+54.4	81.7	73 31.9	+55.8	85.0	73 35.4	+57.1	88.4	73 35.3	+58.1	91.8	73 31.6	+59.0	95.2	73 24.5	+59.5	98.5	73 13.9	+59.9	101.8	73 00.0	+60.0	105.0	73
74	74 19.3	+53.6	80.1	74 27.7	+55.3	83.7	74 32.5	+56.7	87.3	74 33.4	+57.9	90.9	74 30.6	+58.9	94.5	74 24.0	+59.5	98.1	74 13.8	+59.9	101.6	74 00.0	+60.0	105.0	74
75	75 12.9	+52.8	78.4	75 23.0	+54.7	82.2	75 29.2	+56.3	86.0	75 31.3	+57.7	89.9	75 29.5	+58.6	93.7	75 23.5	+59.5	97.6	75 13.7	+59.8	101.3	75 00.0	+60.0	105.0	75
76	76 05.7	+51.7	76.5	76 17.7	+53.8	80.5	76 25.5	+55.7	84.6	76 29.0	+57.2	88.7	76 28.1	+58.5	92.9	76 23.0	+59.3	97.0	76 13.5	+59.9	101.1	76 00.0	+60.0	105.0	76
77	76 57.4	+50.6	74.3	77 11.5	+52.9	78.6	77 21.2	+55.0	82.9	77 26.2	+56.8	87.4	77 26.6	+58.2	91.9	77 22.3	+59.2	96.4	77 13.4	+59.8	100.7	77 00.0	+60.0	105.0	77
78	77 48.0	+49.0	71.9	78 04.4	+51.7	76.4	78 16.2	+54.1	81.0	78 23.0	+56.3	85.9	78 24.8	+57.9	90.7	78 21.5	+59.1	95.6	78 13.2	+59.8	100.4	78 00.0	+60.0	105.0	78
79	78 37.0	*+47.2*•	69.0	78 56.1	+50.3	73.8	79 10.3	+53.1	78.8	79 19.3	+55.5	84.0	79 22.7	+57.5	89.4	79 20.6	+58.9	94.7	79 13.0	+59.7	99.9	79 00.0	+60.0	105.0	79
80	79 24.2	*+44.8*•	65.8	79 46.4	*+48.3*•	70.9	80 03.4	+51.6	76.2	80 14.8	+54.5	81.9	80 20.2	+56.9	87.7	80 19.5	+58.6	93.6	80 12.7	+59.7	99.4	80 00.0	+60.0	105.0	80
81	80 09.0	*+42.0*•	62.0	80 34.7	*+45.9*•	67.4	80 55.0	*+49.7*•	73.2	81 09.3	+53.2	79.3	81 17.1	+56.1	85.7	81 18.1	+58.3	92.3	81 12.4	+59.6	98.7	81 00.0	+60.0	105.0	81
82	80 51.0	*+38.4*•	57.7	81 20.6	*+42.8*•	63.3	81 44.7	*+47.2*•	69.4	82 02.5	*+51.4*•	76.1	82 13.2	+55.1	83.3	82 16.4	+57.8	90.6	82 12.0	+59.4	97.9	82 00.0	+60.0	105.0	82
83	81 29.4	*+34.0*•	52.7	82 03.4	*+38.8*•	58.4	82 31.9	*+43.9*•	64.9	82 53.9	*+48.9*•	72.2	83 08.3	*+53.4*•	80.1	83 14.2	+57.1	88.5	83 11.4	+59.3	96.9	83 00.0	+60.0	105.0	83
84	82 03.4	*+28.5*•	46.9	82 42.2	*+33.6*•	52.7	83 15.8	*+39.2*•	59.4	83 42.8	*+45.2*•	67.2	84 01.7	*+51.1*•	76.1	84 11.3	+55.9	85.7	84 10.7	+59.0	95.5	84 00.0	+60.0	105.0	84
85	82 31.9	*+22.0*•	40.4	83 15.8	*+27.0*•	45.9	83 55.0	*+33.0*•	52.6	84 28.0	*+39.9*•	60.8	84 52.8	*+47.2*•	70.6	85 07.2	*+53.9*•	81.7	85 09.7	+58.5	93.5	85 00.0	+60.0	105.0	85
86	82 53.9	*+14.4*•	33.0	83 42.8	*+18.9*•	38.0	84 28.0	*+24.8*•	44.3	85 07.9	*+32.1*•	52.6	85 40.0	*+40.9*•	63.1	86 01.1	*+50.2*•	76.0	86 08.2	+57.4	90.5	86 00.0	+60.0	105.0	86
87	83 08.3	*+5.9*•	25.0	84 01.7	*+9.6*•	29.1	84 52.8	*+14.4*•	34.5	85 40.0	*+21.1*•	42.0	86 20.9	*+30.4*•	52.5	86 51.3	*+42.6*•	67.1	87 05.6	*+54.9*•	85.6	87 00.0	+60.0	105.0	87
88	83 14.2	*−2.8*•	16.6	84 11.3	*−0.6*•	19.4	85 07.2	*+2.5*•	23.3	86 01.1	*+7.1*•	29.0	86 51.3	*+14.3*•	37.9	87 33.9	*+26.6*•	52.5	88 00.5	*+46.5*•	76.0	88 00.0	+60.0	105.0	88
89	83 11.4	*−11.4*•	8.2	84 10.7	*−10.7*•	9.6	85 09.7	*−9.7*•	11.5	86 08.2	*−8.2*•	14.5	87 05.6	*−5.6*•	19.4	88 00.5	*−0.5*•	29.0	88 47.0	*+13.0*•	52.5	89 00.0	+60.0	105.0	89
90	83 00.0	*−19.3*•	0.0	84 00.0	*−20.0*•	0.0	85 00.0	*−20.8*•	0.0	86 00.0	*−22.0*•	0.0	87 00.0	*−23.9*•	0.0	88 00.0	*−27.4*•	0.0	89 00.0	*−35.2*•	0.0	90 00.0	−60.0	52.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 75°, 285°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 48.5	−59.6	104.9	1 33.0	−59.7	104.9	1 17.6	−59.8	104.9	1 02.1	−59.9	105.0	0 46.6	−60.0	105.0	0 31.1	−60.0	105.0	0 15.5	−60.0	105.0	0 00.0	+60.0	75.0	0
1	0 48.9	−59.6	105.0	0 33.3	−59.7	105.0	0 17.8	−59.8	105.0	0 02.2	−59.9	105.0	0 13.4	+59.9	75.0	0 28.9	+60.0	75.0	0 44.5	+60.0	75.0	1 00.0	+60.0	75.0	1
2	0 10.7	+59.6	74.9	0 26.4	+59.7	74.9	0 42.0	+59.8	74.9	0 57.7	+59.8	74.9	1 13.3	+59.9	74.9	1 28.9	+59.9	74.9	1 44.5	+59.9	75.0	2 00.0	+60.0	75.0	2
3	1 10.3	+59.6	74.8	1 26.1	+59.7	74.8	1 41.8	+59.8	74.8	1 57.5	+59.9	74.8	2 13.2	+59.9	74.9	2 28.8	+60.0	74.9	2 44.4	+60.0	75.0	3 00.0	+60.0	75.0	3
4	2 09.9	+59.6	74.6	2 25.8	+59.6	74.7	2 41.6	+59.8	74.7	2 57.4	+59.8	74.8	3 13.1	+59.9	74.8	3 28.8	+60.0	74.9	3 44.4	+60.0	74.9	4 00.0	+60.0	75.0	4
5	3 09.5	+59.5	74.5	3 25.4	+59.7	74.6	3 41.4	+59.8	74.6	3 57.2	+59.9	74.7	4 13.0	+60.0	74.8	4 28.8	+59.9	74.8	4 44.4	+60.0	74.9	5 00.0	+60.0	75.0	5
6	4 09.0	+59.6	74.4	4 25.1	+59.7	74.5	4 41.2	+59.8	74.5	4 57.1	+59.9	74.6	5 13.0	+59.9	74.7	5 28.7	+60.0	74.8	5 44.4	+60.0	74.9	6 00.0	+60.0	75.0	6
7	5 08.6	+59.6	74.3	5 24.8	+59.7	74.4	5 41.0	+59.7	74.5	5 57.0	+59.8	74.6	6 12.9	+59.9	74.7	6 28.7	+60.0	74.8	6 44.4	+60.0	74.9	7 00.0	+60.0	75.0	7
8	6 08.2	+59.6	74.2	6 24.5	+59.7	74.3	6 40.7	+59.8	74.4	6 56.8	+59.9	74.5	7 12.8	+59.9	74.6	7 28.7	+59.9	74.7	7 44.4	+60.0	74.9	8 00.0	+60.0	75.0	8
9	7 07.8	+59.6	74.0	7 24.2	+59.7	74.2	7 40.5	+59.8	74.3	7 56.7	+59.9	74.4	8 12.7	+60.0	74.6	8 28.6	+60.0	74.7	8 44.4	+60.0	74.8	9 00.0	+60.0	75.0	9
10	8 07.4	+59.5	73.9	8 23.9	+59.7	74.1	8 40.3	+59.8	74.2	8 56.6	+59.8	74.4	9 12.7	+59.9	74.5	9 28.6	+60.0	74.7	9 44.4	+60.0	74.8	10 00.0	+60.0	75.0	10
11	9 06.9	+59.6	73.8	9 23.6	+59.7	74.0	9 40.1	+59.8	74.1	9 56.4	+59.9	74.3	10 12.6	+59.9	74.5	10 28.6	+59.9	74.6	10 44.4	+60.0	74.8	11 00.0	+60.0	75.0	11
12	10 06.5	+59.6	73.7	10 23.3	+59.7	73.9	10 39.9	+59.7	74.0	10 56.3	+59.8	74.2	11 12.5	+59.9	74.4	11 28.5	+60.0	74.6	11 44.4	+60.0	74.8	12 00.0	+60.0	75.0	12
13	11 06.1	+59.5	73.6	11 23.0	+59.6	73.8	11 39.6	+59.8	73.9	11 56.1	+59.9	74.1	12 12.4	+59.9	74.4	12 28.5	+60.0	74.6	12 44.4	+59.9	74.8	13 00.0	+60.0	75.0	13
14	12 05.6	+59.6	73.4	12 22.6	+59.7	73.6	12 39.4	+59.8	73.9	12 56.0	+59.8	74.1	13 12.3	+60.0	74.3	13 28.5	+59.9	74.5	13 44.3	+60.0	74.8	14 00.0	+60.0	75.0	14
15	13 05.2	+59.6	73.3	13 22.3	+59.7	73.5	13 39.2	+59.8	73.8	13 55.8	+59.9	74.0	14 12.3	+59.9	74.2	14 28.4	+60.0	74.5	14 44.3	+60.0	74.7	15 00.0	+60.0	75.0	15
16	14 04.8	+59.5	73.2	14 22.0	+59.7	73.4	14 39.0	+59.7	73.7	14 55.7	+59.9	73.9	15 12.2	+59.9	74.2	15 28.4	+60.0	74.5	15 44.3	+60.0	74.7	16 00.0	+60.0	75.0	16
17	15 04.3	+59.6	73.1	15 21.7	+59.6	73.3	15 38.7	+59.8	73.6	15 55.6	+59.8	73.9	16 12.1	+59.9	74.1	16 28.4	+59.9	74.4	16 44.3	+60.0	74.7	17 00.0	+60.0	75.0	17
18	16 03.9	+59.5	72.9	16 21.3	+59.7	73.2	16 38.5	+59.8	73.5	16 55.4	+59.9	73.8	17 12.0	+59.9	74.1	17 28.3	+60.0	74.4	17 44.3	+60.0	74.7	18 00.0	+60.0	75.0	18
19	17 03.4	+59.5	72.8	17 21.0	+59.6	73.1	17 38.3	+59.7	73.4	17 55.3	+59.8	73.7	18 11.9	+59.9	74.0	18 28.3	+59.9	74.3	18 44.3	+60.0	74.7	19 00.0	+60.0	75.0	19
20	18 02.9	+59.6	72.7	18 20.6	+59.7	73.0	18 38.0	+59.8	73.3	18 55.1	+59.9	73.6	19 11.8	+60.0	74.0	19 28.2	+60.0	74.3	19 44.3	+60.0	74.7	20 00.0	+60.0	75.0	20
21	19 02.5	+59.5	72.5	19 20.3	+59.7	72.9	19 37.8	+59.8	73.2	19 55.0	+59.8	73.6	20 11.8	+59.9	73.9	20 28.2	+60.0	74.3	20 44.3	+60.0	74.6	21 00.0	+60.0	75.0	21
22	20 02.0	+59.5	72.4	20 20.0	+59.6	72.8	20 37.6	+59.7	73.1	20 54.8	+59.9	73.5	21 11.7	+59.9	73.9	21 28.2	+59.9	74.2	21 44.3	+60.0	74.6	22 00.0	+60.0	75.0	22
23	21 01.5	+59.5	72.3	21 19.6	+59.7	72.7	21 37.3	+59.8	73.0	21 54.6	+59.9	73.4	22 11.6	+59.9	73.8	22 28.1	+60.0	74.2	22 44.3	+60.0	74.6	23 00.0	+60.0	75.0	23
24	22 01.0	+59.6	72.1	22 19.3	+59.6	72.5	22 37.1	+59.7	72.9	22 54.5	+59.8	73.3	23 11.5	+59.9	73.7	23 28.1	+59.9	74.2	23 44.3	+59.9	74.6	24 00.0	+60.0	75.0	24
25	23 00.6	+59.5	72.0	23 18.9	+59.6	72.4	23 36.8	+59.8	72.8	23 54.3	+59.9	73.2	24 11.4	+59.9	73.7	24 28.0	+60.0	74.1	24 44.2	+60.0	74.6	25 00.0	+60.0	75.0	25
26	24 00.1	+59.5	71.9	24 18.5	+59.7	72.3	24 36.6	+59.7	72.7	24 54.2	+59.8	73.2	25 11.3	+59.9	73.6	25 28.0	+60.0	74.1	25 44.2	+60.0	74.5	26 00.0	+60.0	75.0	26
27	24 59.6	+59.4	71.7	25 18.2	+59.6	72.2	25 36.3	+59.7	72.6	25 54.0	+59.8	73.1	26 11.2	+59.9	73.6	26 28.0	+59.9	74.0	26 44.2	+60.0	74.5	27 00.0	+60.0	75.0	27
28	25 59.0	+59.5	71.6	26 17.8	+59.6	72.0	26 36.0	+59.8	72.5	26 53.8	+59.8	73.0	27 11.1	+59.9	73.5	27 27.9	+60.0	74.0	27 44.2	+60.0	74.5	28 00.0	+60.0	75.0	28
29	26 58.5	+59.5	71.4	27 17.4	+59.6	71.9	27 35.8	+59.7	72.4	27 53.6	+59.9	72.9	28 11.0	+59.9	73.4	28 27.9	+59.9	73.9	28 44.2	+60.0	74.5	29 00.0	+60.0	75.0	29
30	27 58.0	+59.5	71.3	28 17.0	+59.6	71.8	28 35.5	+59.7	72.3	28 53.5	+59.8	72.8	29 10.9	+59.9	73.4	29 27.8	+60.0	73.9	29 44.2	+60.0	74.4	30 00.0	+60.0	75.0	30
31	28 57.5	+59.4	71.1	29 16.6	+59.6	71.7	29 35.2	+59.7	72.2	29 53.3	+59.8	72.7	30 10.8	+59.9	73.3	30 27.8	+59.9	73.9	30 44.2	+60.0	74.4	31 00.0	+60.0	75.0	31
32	29 56.9	+59.4	71.0	30 16.2	+59.6	71.5	30 34.9	+59.7	72.1	30 53.1	+59.8	72.7	31 10.7	+59.9	73.2	31 27.7	+60.0	73.8	31 44.2	+60.0	74.4	32 00.0	+60.0	75.0	32
33	30 56.3	+59.5	70.8	31 15.8	+59.6	71.4	31 34.6	+59.7	72.0	31 52.9	+59.8	72.6	32 10.6	+59.9	73.2	32 27.7	+59.9	73.8	32 44.2	+59.9	74.4	33 00.0	+60.0	75.0	33
34	31 55.8	+59.4	70.7	32 15.4	+59.5	71.2	32 34.3	+59.7	71.9	32 52.7	+59.8	72.5	33 10.5	+59.9	73.1	33 27.6	+60.0	73.7	33 44.1	+60.0	74.4	34 00.0	+60.0	75.0	34
35	32 55.2	+59.4	70.5	33 14.9	+59.6	71.1	33 34.0	+59.7	71.7	33 52.5	+59.8	72.4	34 10.4	+59.9	73.0	34 27.6	+59.9	73.7	34 44.1	+60.0	74.3	35 00.0	+60.0	75.0	35
36	33 54.6	+59.4	70.3	34 14.5	+59.5	71.0	34 33.7	+59.7	71.6	34 52.3	+59.8	72.3	35 10.3	+59.9	72.9	35 27.5	+60.0	73.6	35 44.1	+60.0	74.3	36 00.0	+60.0	75.0	36
37	34 54.0	+59.3	70.1	35 14.0	+59.6	70.8	35 33.4	+59.7	71.5	35 52.1	+59.8	72.2	36 10.2	+59.8	72.9	36 27.5	+59.9	73.6	36 44.1	+60.0	74.3	37 00.0	+60.0	75.0	37
38	35 53.3	+59.4	70.0	36 13.6	+59.5	70.7	36 33.1	+59.6	71.4	36 51.9	+59.8	72.1	37 10.0	+59.9	72.8	37 27.4	+60.0	73.5	37 44.1	+60.0	74.3	38 00.0	+60.0	75.0	38
39	36 52.7	+59.3	69.8	37 13.1	+59.5	70.5	37 32.7	+59.7	71.2	37 51.7	+59.8	72.0	38 09.9	+59.9	72.7	38 27.4	+59.9	73.5	38 44.1	+60.0	74.2	39 00.0	+60.0	75.0	39
40	37 52.0	+59.4	69.6	38 12.6	+59.5	70.3	38 32.4	+59.6	71.1	38 51.5	+59.7	71.8	39 09.8	+59.9	72.6	39 27.3	+60.0	73.4	39 44.1	+59.9	74.2	40 00.0	+60.0	75.0	40
41	38 51.4	+59.3	69.4	39 12.1	+59.5	70.2	39 32.0	+59.7	70.9	39 51.2	+59.8	71.7	40 09.7	+59.8	72.5	40 27.3	+59.9	73.3	40 44.0	+60.0	74.2	41 00.0	+60.0	75.0	41
42	39 50.7	+59.2	69.2	40 11.6	+59.4	70.0	40 31.7	+59.6	70.8	40 51.0	+59.8	71.6	41 09.5	+59.9	72.4	41 27.2	+59.9	73.3	41 44.0	+60.0	74.1	42 00.0	+60.0	75.0	42
43	40 49.9	+59.3	69.0	41 11.0	+59.5	69.8	41 31.3	+59.6	70.7	41 50.8	+59.7	71.5	42 09.4	+59.8	72.4	42 27.1	+60.0	73.2	42 44.0	+60.0	74.1	43 00.0	+60.0	75.0	43
44	41 49.2	+59.2	68.8	42 10.5	+59.4	69.6	42 30.9	+59.6	70.5	42 50.5	+59.8	71.4	43 09.2	+59.9	72.3	43 27.1	+59.9	73.2	43 44.0	+60.0	74.1	44 00.0	+60.0	75.0	44
45	42 48.4	+59.2	68.6	43 09.9	+59.4	69.5	43 30.5	+59.6	70.3	43 50.3	+59.7	71.2	44 09.1	+59.8	72.2	44 27.0	+59.9	73.1	44 44.0	+60.0	74.0	45 00.0	+60.0	75.0	45
46	43 47.6	+59.2	68.4	44 09.3	+59.4	69.3	44 30.1	+59.6	70.2	44 50.0	+59.7	71.1	45 08.9	+59.9	72.1	45 26.9	+60.0	73.0	45 44.0	+60.0	74.0	46 00.0	+60.0	75.0	46
47	44 46.8	+59.2	68.1	45 08.7	+59.4	69.1	45 29.7	+59.5	70.0	45 49.7	+59.7	71.0	46 08.8	+59.8	72.0	46 26.9	+59.9	73.0	46 44.0	+59.9	74.0	47 00.0	+60.0	75.0	47
48	45 46.0	+59.1	67.9	46 08.1	+59.3	68.9	46 29.2	+59.6	69.8	46 49.4	+59.7	70.8	47 08.6	+59.9	71.9	47 26.8	+59.9	72.9	47 43.9	+60.0	73.9	48 00.0	+60.0	75.0	48
49	46 45.1	+59.1	67.7	47 07.4	+59.4	68.6	47 28.8	+59.5	69.7	47 49.1	+59.7	70.7	48 08.5	+59.8	71.7	48 26.7	+59.9	72.8	48 43.9	+60.0	73.9	49 00.0	+60.0	75.0	49
50	47 44.2	+59.0	67.4	48 06.8	+59.3	68.4	48 28.3	+59.5	69.5	48 48.8	+59.7	70.5	49 08.3	+59.8	71.6	49 26.6	+60.0	72.7	49 43.9	+60.0	73.9	50 00.0	+60.0	75.0	50
51	48 43.2	+59.1	67.1	49 06.1	+59.2	68.2	49 27.8	+59.5	69.3	49 48.5	+59.7	70.4	50 08.1	+59.8	71.5	50 26.6	+59.9	72.7	50 43.9	+59.9	73.8	51 00.0	+60.0	75.0	51
52	49 42.3	+58.9	66.9	50 05.3	+59.3	68.0	50 27.3	+59.5	69.1	50 48.2	+59.6	70.2	51 07.9	+59.8	71.4	51 26.5	+59.9	72.6	51 43.8	+60.0	73.8	52 00.0	+60.0	75.0	52
53	50 41.2	+59.0	66.6	51 04.6	+59.2	67.7	51 26.8	+59.4	68.9	51 47.8	+59.7	70.0	52 07.7	+59.8	71.2	52 26.4	+59.9	72.5	52 43.8	+60.0	73.7	53 00.0	+60.0	75.0	53
54	51 40.2	+58.9	66.3	52 03.8	+59.1	67.4	52 26.2	+59.4	68.6	52 47.5	+59.6	69.9	53 07.5	+59.8	71.1	53 26.3	+59.9	72.4	53 43.8	+60.0	73.7	54 00.0	+60.0	75.0	54
55	52 39.1	+58.8	66.0	53 02.9	+59.2	67.2	53 25.6	+59.4	68.4	53 47.1	+59.6	69.7	54 07.3	+59.8	71.0	54 26.2	+59.9	72.3	54 43.8	+60.0	73.6	55 00.0	+60.0	75.0	55
56	53 37.9	+58.8	65.6	54 02.1	+59.0	66.9	54 25.0	+59.3	68.2	54 46.7	+59.6	69.5	55 07.1	+59.7	70.8	55 26.1	+59.9	72.2	55 43.8	+59.9	73.6	56 00.0	+60.0	75.0	56
57	54 36.7	+58.7	65.3	55 01.1	+59.1	66.6	55 24.3	+59.4	67.9	55 46.3	+59.5	69.3	56 06.8	+59.8	70.7	56 26.0	+59.9	72.1	56 43.7	+60.0	73.5	57 00.0	+60.0	75.0	57
58	55 35.4	+58.6	64.9	56 00.2	+59.0	66.3	56 23.7	+59.2	67.6	56 45.8	+59.5	69.0	57 06.6	+59.7	70.5	57 25.9	+59.8	72.0	57 43.7	+60.0	73.5	58 00.0	+60.0	75.0	58
59	56 34.0	+58.6	64.5	56 59.2	+58.9	65.9	57 22.9	+59.3	67.4	57 45.3	+59.5	68.8	58 06.3	+59.7	70.3	58 25.7	+59.9	71.8	58 43.7	+59.9	73.4	59 00.0	+60.0	75.0	59
60	57 32.6	+58.5	64.2	57 58.1	+58.9	65.6	58 22.2	+59.2	67.1	58 44.8	+59.5	68.6	59 06.0	+59.7	70.1	59 25.6	+59.9	71.7	59 43.6	+60.0	73.3	60 00.0	+60.0	75.0	60
61	58 31.1	+58.4	63.7	58 57.0	+58.8	65.2	59 21.4	+59.1	66.7	59 44.3	+59.5	68.3	60 05.7	+59.7	69.9	60 25.5	+59.8	71.6	60 43.6	+60.0	73.3	61 00.0	+60.0	75.0	61
62	59 29.5	+58.3	63.3	59 55.8	+58.7	64.8	60 20.5	+59.1	66.4	60 43.8	+59.4	68.0	61 05.4	+59.6	69.7	61 25.3	+59.9	71.4	61 43.6	+59.9	73.2	62 00.0	+60.0	75.0	62
63	60 27.8	+58.2	62.8	60 54.5	+58.7	64.4	61 19.6	+59.1	66.1	61 43.2	+59.3	67.8	62 05.0	+59.7	69.5	62 25.2	+59.8	71.3	62 43.5	+60.0	73.1	63 00.0	+60.0	75.0	63
64	61 26.0	+58.1	62.3	61 53.2	+58.5	64.0	62 18.7	+59.0	65.7	62 42.5	+59.4	67.4	63 04.7	+59.6	69.3	63 25.0	+59.8	71.1	63 43.5	+59.9	73.0	64 00.0	+60.0	75.0	64
65	62 24.1	+58.0	61.8	62 51.7	+58.5	63.5	63 17.7	+58.9	65.3	63 41.9	+59.2	67.1	64 04.3	+59.6	69.0	64 24.8	+59.9	71.0	64 43.4	+60.0	73.0	65 00.0	+60.0	75.0	65
66	63 22.1	+57.8	61.2	63 50.2	+58.3	63.0	64 16.6	+58.8	64.8	64 41.1	+59.3	66.8	65 03.9	+59.5	68.7	65 24.7	+59.7	70.8	65 43.4	+59.9	72.9	66 00.0	+60.0	75.0	66
67	64 19.9	+57.7	60.6	64 48.5	+58.2	62.5	65 15.4	+58.7	64.4	65 40.4	+59.1	66.4	66 03.4	+59.5	68.4	66 24.4	+59.8	70.6	66 43.3	+60.0	72.8	67 00.0	+60.0	75.0	67
68	65 17.6	+57.5	60.0	65 46.7	+58.1	61.9	66 14.1	+58.6	63.9	66 39.5	+59.1	66.0	67 02.9	+59.5	68.1	67 24.2	+59.8	70.3	67 43.3	+59.9	72.6	68 00.0	+60.0	75.0	68
69	66 15.1	+57.2	59.3	66 44.8	+57.9	61.3	67 12.7	+58.5	63.3	67 38.6	+59.0	65.5	68 02.4	+59.4	67.8	68 24.0	+59.7	70.1	68 43.2	+59.9	72.5	69 00.0	+60.0	75.0	69
70	67 12.3	+57.1	58.5	67 42.7	+57.8	60.6	68 11.2	+58.4	62.8	68 37.6	+58.9	65.0	69 01.8	+59.4	67.4	69 23.7	+59.7	69.8	69 43.1	+60.0	72.4	70 00.0	+60.0	75.0	70
71	68 09.4	+56.8	57.7	68 40.5	+57.5	59.9	69 09.6	+58.2	62.1	69 36.5	+58.9	64.5	70 01.2	+59.3	67.0	70 23.4	+59.7	69.6	70 43.1	+59.9	72.2	71 00.0	+60.0	75.0	71
72	69 06.2	+56.4	56.8	69 38.0	+57.3	59.1	70 07.8	+58.0	61.4	70 35.4	+58.6	63.9	71 00.5	+59.2	66.5	71 23.1	+59.7	69.2	71 43.0	+59.9	72.1	72 00.0	+60.0	75.0	72
73	70 02.6	+56.2	55.8	70 35.3	+57.0	58.2	71 05.8	+57.9	60.7	71 34.0	+58.6	63.3	71 59.7	+59.2	66.0	72 22.8	+59.6	68.9	72 42.9	+59.9	71.9	73 00.0	+60.0	75.0	73
74	70 58.8	+55.7	54.8	71 32.3	+56.7	57.2	72 03.7	+57.6	59.8	72 32.6	+58.4	62.6	72 58.9	+59.0	65.5	73 22.4	+59.5	68.5	73 42.8	+59.9	71.7	74 00.0	+60.0	75.0	74
75	71 54.5	+55.3	53.6	72 29.0	+56.4	56.2	73 01.3	+57.3	58.9	73 31.0	+58.2	61.8	73 57.9	+59.0	64.8	74 21.9	+59.5	68.1	74 42.7	+59.8	71.5	75 00.0	+60.0	75.0	75
76	72 49.8	+54.7	52.3	73 25.4	+55.8	55.0	73 58.6	+56.9	57.8	74 29.2	+57.9	60.9	74 56.9	+58.7	64.1	75 21.4	+59.4	67.6	75 42.5	+59.9	71.2	76 00.0	+60.0	75.0	76
77	73 44.5	+54.1	50.9	74 21.2	+55.4	53.7	74 55.5	+56.6	56.7	75 27.1	+57.6	59.9	75 55.6	+58.6	63.3	76 20.8	+59.4	67.0	76 42.4	+59.8	70.9	77 00.0	+60.0	75.0	77
78	74 38.6	+53.4	49.3	75 16.6	+54.7	52.2	75 52.1	+56.0	55.3	76 24.7	+57.3	58.7	76 54.2	+58.4	62.4	77 20.2	+59.2	66.4	77 42.2	+59.8	70.6	78 00.0	+60.0	75.0	78
79	75 32.0	+52.4	47.5	76 11.3	+54.0	50.5	76 48.1	+55.5	53.8	77 22.0	+56.9	57.4	77 52.6	+58.1	61.4	78 19.4	+59.1	65.6	78 42.0	+59.8	70.2	79 00.0	+60.0	75.0	79
80	76 24.4	+51.4	45.5	77 05.3	+53.0	48.6	77 43.6	+54.7	52.1	78 18.9	+56.2	55.9	78 50.7	+57.7	60.1	79 18.5	+58.9	64.7	79 41.8	+59.7	69.7	80 00.0	+60.0	75.0	80
81	77 15.8	+50.0	43.3	77 58.3	+51.9	46.5	78 38.3	+53.7	50.1	79 15.1	+55.6	54.1	79 48.4	+57.2	58.6	80 17.4	+58.6	63.6	80 41.5	+59.6	69.1	81 00.0	+60.0	75.0	81
82	78 05.8	+48.4	40.7	78 50.2	+50.4	44.0	79 32.0	+52.5	47.7	80 10.7	+54.6	52.0	80 45.6	+56.6	56.9	81 16.0	+58.4	62.3	81 41.1	+59.6	68.4	82 00.0	+60.0	75.0	82
83	78 54.2	*+46.4* •	37.7	79 40.6	*+48.6* •	41.1	80 24.5	+50.9	44.9	81 05.3	+53.3	49.5	81 42.2	+55.7	54.7	82 14.4	+57.8	60.7	82 40.7	+59.3	67.5	83 00.0	+60.0	75.0	83
84	79 40.6	*+43.9* •	34.3	80 29.2	*+46.2* •	37.7	81 15.4	*+48.8* •	41.6	81 58.6	*+51.6* •	46.3	82 37.9	+54.4	51.9	83 12.2	+57.1	58.6	83 40.0	+59.2	66.3	84 00.0	+60.0	75.0	84
85	80 24.5	*+40.8* •	30.3	81 15.4	*+43.2* •	33.6	82 04.2	*+46.0* •	37.6	82 50.2	*+49.1* •	42.5	83 32.3	*+52.6* •	48.4	84 09.3	+55.9	55.8	84 39.2	+58.8	64.6	85 00.0	+60.0	75.0	85
86	81 05.3	*+36.9* •	25.8	81 58.6	*+39.3* •	28.9	82 50.2	*+42.1* •	32.7	83 39.3	*+45.6* •	37.6	84 24.9	*+49.5* •	43.8	85 05.2	*+54.0* •	51.9	85 38.0	+58.1	62.2	86 00.0	+60.0	75.0	86
87	81 42.2	*+32.2* •	20.5	82 37.9	*+34.3* •	23.2	83 32.3	*+37.0* •	26.7	84 24.9	*+40.3* •	31.3	85 14.4	*+44.8* •	37.5	85 59.2	*+50.4* •	46.3	86 36.1	*+56.5* •	58.5	87 00.0	+60.0	75.0	87
88	82 14.4	*+26.3* •	14.5	83 12.2	*+27.8* •	16.5	84 09.3	*+29.9* •	19.3	85 05.2	*+32.8* •	23.2	85 59.2	*+36.9* •	28.8	86 49.6	*+43.0* •	37.5	87 32.6	*+52.2* •	51.9	88 00.0	+60.0	75.0	88
89	82 40.7	*+19.3* •	7.6	83 40.0	*+20.0* •	8.8	84 39.2	*+20.8* •	10.4	85 38.0	*+22.0* •	12.8	86 36.1	*+23.9* •	16.5	87 32.6	*+27.4* •	23.2	88 24.8	*+35.2* •	37.5	89 00.0	+60.0	75.0	89
90	83 00.0	*+11.4* •	0.0	84 00.0	*+10.7* •	0.0	85 00.0	*+9.7* •	0.0	86 00.0	*+8.2* •	0.0	87 00.0	*+5.6* •	0.0	88 00.0	*+0.5* •	0.0	89 00.0	*−13.0* •	0.0	90 00.0	−60.0	37.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 105°, 255°

76°, 284° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 41.4	+59.5	103.9	1 26.9	+59.7	103.9	1 12.5	+59.8	103.9	0 58.0	+59.9	104.0	0 43.5	+59.9	104.0	0 29.0	+60.0	104.0	0 14.5	+60.0	104.0	0 00.0	+60.0	104.0	**0**
1	2 40.9	+59.6	103.8	2 26.6	+59.7	103.8	2 12.3	+59.8	103.9	1 57.9	+59.8	103.9	1 43.4	+60.0	103.9	1 29.0	+60.0	104.0	1 14.5	+60.0	104.0	1 00.0	+60.0	104.0	**1**
2	3 40.5	+59.6	103.7	3 26.3	+59.7	103.7	3 12.1	+59.7	103.8	2 57.7	+59.9	103.8	2 43.4	+59.9	103.9	2 29.0	+59.9	103.9	2 14.5	+60.0	104.0	2 00.0	+60.0	104.0	**2**
3	4 40.1	+59.6	103.5	4 26.0	+59.7	103.6	4 11.8	+59.8	103.7	3 57.6	+59.9	103.8	3 43.3	+59.9	103.8	3 28.9	+60.0	103.9	3 14.5	+60.0	103.9	3 00.0	+60.0	104.0	**3**
4	5 39.7	+59.6	103.4	5 25.7	+59.7	103.5	5 11.6	+59.8	103.6	4 57.5	+59.8	103.7	4 43.2	+59.9	103.8	4 28.9	+60.0	103.9	4 14.5	+60.0	103.9	4 00.0	+60.0	104.0	**4**
5	6 39.3	+59.5	103.3	6 25.4	+59.7	103.4	6 11.4	+59.8	103.5	5 57.3	+59.9	103.6	5 43.1	+60.0	103.7	5 28.9	+59.9	103.8	5 14.5	+60.0	103.9	5 00.0	+60.0	104.0	**5**
6	7 38.8	+59.6	103.2	7 25.1	+59.7	103.3	7 11.2	+59.8	103.4	6 57.2	+59.8	103.6	6 43.1	+59.9	103.7	6 28.8	+60.0	103.8	6 14.5	+60.0	103.9	6 00.0	+60.0	104.0	**6**
7	8 38.4	+59.6	103.1	8 24.8	+59.6	103.2	8 11.0	+59.8	103.4	7 57.0	+59.9	103.5	7 43.0	+59.9	103.6	7 28.8	+59.9	103.8	7 14.5	+59.9	103.9	7 00.0	+60.0	104.0	**7**
8	9 38.0	+59.5	102.9	9 24.4	+59.7	103.1	9 10.8	+59.7	103.3	8 56.9	+59.9	103.4	8 42.9	+59.9	103.6	8 28.7	+60.0	103.7	8 14.4	+60.0	103.9	8 00.0	+60.0	104.0	**8**
9	10 37.5	+59.6	102.8	10 24.1	+59.7	103.0	10 10.5	+59.8	103.2	9 56.8	+59.8	103.4	9 42.8	+59.9	103.5	9 28.7	+60.0	103.7	9 14.4	+60.0	103.8	9 00.0	+60.0	104.0	**9**
10	11 37.1	+59.6	102.7	11 23.8	+59.7	102.9	11 10.3	+59.8	103.1	10 56.6	+59.9	103.3	10 42.7	+60.0	103.5	10 28.7	+59.9	103.6	10 14.4	+60.0	103.8	10 00.0	+60.0	104.0	**10**
11	12 36.7	+59.5	102.6	12 23.5	+59.7	102.8	12 10.1	+59.8	103.0	11 56.5	+59.8	103.2	11 42.7	+59.9	103.4	11 28.6	+60.0	103.6	11 14.4	+60.0	103.8	11 00.0	+60.0	104.0	**11**
12	13 36.2	+59.6	102.4	13 23.2	+59.6	102.7	13 09.9	+59.7	102.9	12 56.3	+59.9	103.1	12 42.6	+59.9	103.4	12 28.6	+60.0	103.6	12 14.4	+60.0	103.8	12 00.0	+60.0	104.0	**12**
13	14 35.8	+59.5	102.3	14 22.8	+59.7	102.6	14 09.6	+59.8	102.8	13 56.2	+59.8	103.1	13 42.5	+59.9	103.3	13 28.6	+59.9	103.5	13 14.4	+60.0	103.8	13 00.0	+60.0	104.0	**13**
14	15 35.3	+59.6	102.2	15 22.5	+59.7	102.5	15 09.4	+59.8	102.7	14 56.0	+59.9	103.0	14 42.4	+59.9	103.3	14 28.5	+60.0	103.5	14 14.4	+60.0	103.8	14 00.0	+60.0	104.0	**14**
15	16 34.9	+59.5	102.1	16 22.2	+59.6	102.4	16 09.2	+59.7	102.6	15 55.9	+59.8	102.9	15 42.3	+60.0	103.2	15 28.5	+60.0	103.5	15 14.4	+60.0	103.7	15 00.0	+60.0	104.0	**15**
16	17 34.4	+59.5	101.9	17 21.8	+59.7	102.2	17 08.9	+59.8	102.6	16 55.7	+59.9	102.8	16 42.3	+59.9	103.1	16 28.5	+59.9	103.4	16 14.4	+60.0	103.7	16 00.0	+60.0	104.0	**16**
17	18 33.9	+59.6	101.8	18 21.5	+59.6	102.1	18 08.7	+59.8	102.5	17 55.6	+59.8	102.8	17 42.2	+59.9	103.1	17 28.4	+60.0	103.4	17 14.4	+60.0	103.7	17 00.0	+60.0	104.0	**17**
18	19 33.5	+59.5	101.7	19 21.1	+59.7	102.0	19 08.5	+59.7	102.4	18 55.4	+59.9	102.7	18 42.1	+59.9	103.0	18 28.4	+59.9	103.4	18 14.4	+59.9	103.7	18 00.0	+60.0	104.0	**18**
19	20 33.0	+59.5	101.5	20 20.8	+59.6	101.9	20 08.2	+59.8	102.3	19 55.3	+59.8	102.6	19 42.0	+59.9	103.0	19 28.3	+60.0	103.3	19 14.3	+60.0	103.7	19 00.0	+60.0	104.0	**19**
20	21 32.5	+59.5	101.4	21 20.4	+59.7	101.8	21 08.0	+59.7	102.2	20 55.1	+59.9	102.5	20 41.9	+59.9	102.9	20 28.3	+60.0	103.3	20 14.3	+60.0	103.6	20 00.0	+60.0	104.0	**20**
21	22 32.0	+59.5	101.3	22 20.1	+59.6	101.7	22 07.7	+59.8	102.1	21 55.0	+59.8	102.5	21 41.8	+59.9	102.9	21 28.3	+59.9	103.2	21 14.3	+60.0	103.6	21 00.0	+60.0	104.0	**21**
22	23 31.5	+59.5	101.1	23 19.7	+59.6	101.6	23 07.5	+59.7	102.0	22 54.8	+59.8	102.4	22 41.7	+59.9	102.8	22 28.2	+60.0	103.2	22 14.3	+60.0	103.6	22 00.0	+60.0	104.0	**22**
23	24 31.0	+59.5	101.0	24 19.3	+59.7	101.4	24 07.2	+59.8	101.9	23 54.6	+59.9	102.3	23 41.6	+59.9	102.7	23 28.2	+59.9	103.2	23 14.3	+60.0	103.6	23 00.0	+60.0	104.0	**23**
24	25 30.5	+59.5	100.8	25 19.0	+59.6	101.3	25 07.0	+59.7	101.8	24 54.5	+59.8	102.2	24 41.5	+59.9	102.7	24 28.1	+60.0	103.1	24 14.3	+60.0	103.6	24 00.0	+60.0	104.0	**24**
25	26 30.0	+59.4	100.7	26 18.6	+59.6	101.2	26 06.7	+59.7	101.7	25 54.3	+59.8	102.1	25 41.4	+60.0	102.6	25 28.1	+60.0	103.1	25 14.3	+60.0	103.5	25 00.0	+60.0	104.0	**25**
26	27 29.4	+59.5	100.5	27 18.2	+59.6	101.1	27 06.4	+59.7	101.6	26 54.1	+59.9	102.1	26 41.4	+59.9	102.6	26 28.1	+59.9	103.0	26 14.3	+60.0	103.5	26 00.0	+60.0	104.0	**26**
27	28 28.9	+59.4	100.4	28 17.8	+59.6	100.9	28 06.1	+59.8	101.5	27 54.0	+59.8	102.0	27 41.3	+59.9	102.5	27 28.0	+60.0	103.0	27 14.3	+60.0	103.5	27 00.0	+60.0	104.0	**27**
28	29 28.3	+59.5	100.2	29 17.4	+59.6	100.8	29 05.9	+59.7	101.3	28 53.8	+59.8	101.9	28 41.2	+59.9	102.4	28 28.0	+59.9	103.0	28 14.3	+59.9	103.5	28 00.0	+60.0	104.0	**28**
29	30 27.8	+59.4	100.1	30 17.0	+59.6	100.7	30 05.6	+59.7	101.2	29 53.6	+59.8	101.8	29 41.1	+59.8	102.4	29 27.9	+60.0	102.9	29 14.2	+60.0	103.5	29 00.0	+60.0	104.0	**29**
30	31 27.2	+59.4	99.9	31 16.6	+59.5	100.5	31 05.3	+59.7	101.1	30 53.4	+59.8	101.7	30 40.9	+59.9	102.3	30 27.9	+59.9	102.9	30 14.2	+60.0	103.4	30 00.0	+60.0	104.0	**30**
31	32 26.6	+59.4	99.8	32 16.1	+59.6	100.4	32 05.0	+59.7	101.0	31 53.2	+59.8	101.6	31 40.8	+59.9	102.2	31 27.8	+60.0	102.8	31 14.2	+60.0	103.4	31 00.0	+60.0	104.0	**31**
32	33 26.0	+59.4	99.6	33 15.7	+59.5	100.2	33 04.7	+59.7	100.9	32 53.0	+59.8	101.5	32 40.7	+59.9	102.1	32 27.8	+59.9	102.8	32 14.2	+60.0	103.4	32 00.0	+60.0	104.0	**32**
33	34 25.4	+59.4	99.4	34 15.2	+59.6	100.1	34 04.4	+59.7	100.8	33 52.8	+59.8	101.4	33 40.6	+59.9	102.1	33 27.7	+60.0	102.7	33 14.2	+60.0	103.4	33 00.0	+60.0	104.0	**33**
34	35 24.8	+59.3	99.2	35 14.8	+59.5	99.9	35 04.1	+59.6	100.6	34 52.6	+59.8	101.3	34 40.5	+59.9	102.0	34 27.7	+59.9	102.7	34 14.2	+60.0	103.3	34 00.0	+60.0	104.0	**34**
35	36 24.1	+59.4	99.1	36 14.3	+59.5	99.8	36 03.7	+59.7	100.5	35 52.4	+59.8	101.2	35 40.4	+59.9	101.9	35 27.6	+60.0	102.6	35 14.2	+60.0	103.3	35 00.0	+60.0	104.0	**35**
36	37 23.5	+59.3	98.9	37 13.8	+59.5	99.6	37 03.4	+59.7	100.4	36 52.2	+59.8	101.1	36 40.3	+59.9	101.8	36 27.6	+59.9	102.6	36 14.2	+59.9	103.3	36 00.0	+60.0	104.0	**36**
37	38 22.8	+59.3	98.7	38 13.3	+59.5	99.5	38 03.1	+59.6	100.2	37 52.0	+59.8	101.0	37 40.2	+59.8	101.8	37 27.5	+60.0	102.5	37 14.1	+60.0	103.3	37 00.0	+60.0	104.0	**37**
38	39 22.1	+59.3	98.5	39 12.8	+59.5	99.3	39 02.7	+59.7	100.1	38 51.8	+59.7	100.9	38 40.0	+59.9	101.7	38 27.5	+59.9	102.5	38 14.1	+60.0	103.2	38 00.0	+60.0	104.0	**38**
39	40 21.4	+59.3	98.3	40 12.3	+59.5	99.1	40 02.4	+59.6	100.0	39 51.5	+59.8	100.8	39 39.9	+59.9	101.6	39 27.4	+60.0	102.4	39 14.1	+60.0	103.2	39 00.0	+60.0	104.0	**39**
40	41 20.7	+59.2	98.1	41 11.8	+59.4	99.0	41 02.0	+59.6	99.8	40 51.3	+59.8	100.7	40 39.8	+59.8	101.5	40 27.4	+59.9	102.4	40 14.1	+60.0	103.2	40 00.0	+60.0	104.0	**40**
41	42 19.9	+59.2	97.9	42 11.2	+59.4	98.8	42 01.6	+59.6	99.7	41 51.1	+59.7	100.5	41 39.6	+59.9	101.4	41 27.3	+59.9	102.3	41 14.1	+60.0	103.2	41 00.0	+60.0	104.0	**41**
42	43 19.1	+59.2	97.7	43 10.6	+59.4	98.6	43 01.2	+59.6	99.5	42 50.8	+59.8	100.4	42 39.5	+59.8	101.3	42 27.2	+60.0	102.2	42 14.1	+60.0	103.1	42 00.0	+60.0	104.0	**42**
43	44 18.3	+59.2	97.4	44 10.0	+59.4	98.4	44 00.8	+59.6	99.3	43 50.6	+59.7	100.3	43 39.3	+59.9	101.2	43 27.2	+59.9	102.2	43 14.1	+59.9	103.1	43 00.0	+60.0	104.0	**43**
44	45 17.5	+59.1	97.2	45 09.4	+59.4	98.2	45 00.4	+59.5	99.2	44 50.3	+59.7	100.2	44 39.2	+59.8	101.1	44 27.1	+59.9	102.1	44 14.0	+60.0	103.1	44 00.0	+60.0	104.0	**44**
45	46 16.6	+59.1	96.9	46 08.8	+59.3	98.0	45 59.9	+59.6	99.0	45 50.0	+59.7	100.0	45 39.0	+59.9	101.0	45 27.0	+60.0	102.0	45 14.0	+60.0	103.0	45 00.0	+60.0	104.0	**45**
46	47 15.7	+59.1	96.7	47 08.1	+59.4	97.8	46 59.5	+59.5	98.8	46 49.7	+59.7	99.9	46 38.9	+59.8	100.9	46 27.0	+59.9	102.0	46 14.0	+60.0	103.0	46 00.0	+60.0	104.0	**46**
47	48 14.8	+59.0	96.4	48 07.5	+59.2	97.5	47 59.0	+59.5	98.6	47 49.4	+59.7	99.7	47 38.7	+59.8	100.8	47 26.9	+59.9	101.9	47 14.0	+60.0	103.0	47 00.0	+60.0	104.0	**47**
48	49 13.8	+59.0	96.2	49 06.7	+59.3	97.3	48 58.5	+59.5	98.5	48 49.1	+59.7	99.6	48 38.5	+59.9	100.7	48 26.8	+59.9	101.8	48 14.0	+59.9	102.9	48 00.0	+60.0	104.0	**48**
49	50 12.8	+58.9	95.9	50 06.0	+59.2	97.1	49 58.0	+59.5	98.3	49 48.8	+59.6	99.4	49 38.4	+59.8	100.6	49 26.7	+60.0	101.7	49 13.9	+60.0	102.9	49 00.0	+60.0	104.0	**49**
50	51 11.7	+58.9	95.6	51 05.2	+59.2	96.8	50 57.5	+59.4	98.0	50 48.4	+59.7	99.3	50 38.2	+59.8	100.5	50 26.7	+59.9	101.7	50 13.9	+60.0	102.8	50 00.0	+60.0	104.0	**50**
51	52 10.6	+58.9	95.3	52 04.4	+59.2	96.6	51 56.9	+59.4	97.8	51 48.1	+59.6	99.1	51 38.0	+59.8	100.3	51 26.6	+59.9	101.6	51 13.9	+60.0	102.8	51 00.0	+60.0	104.0	**51**
52	53 09.5	+58.8	95.0	53 03.6	+59.1	96.3	52 56.3	+59.4	97.6	52 47.7	+59.6	98.9	52 37.8	+59.7	100.2	52 26.5	+59.9	101.5	52 13.9	+60.0	102.7	52 00.0	+60.0	104.0	**52**
53	54 08.3	+58.7	94.6	54 02.7	+59.1	96.0	53 55.7	+59.4	97.4	53 47.3	+59.6	98.7	53 37.5	+59.8	100.1	53 26.4	+59.9	101.4	53 13.9	+59.9	102.7	53 00.0	+60.0	104.0	**53**
54	55 07.0	+58.7	94.3	55 01.8	+59.0	95.7	54 55.1	+59.3	97.1	54 46.9	+59.6	98.5	54 37.3	+59.8	99.9	54 26.3	+59.9	101.3	54 13.8	+60.0	102.7	54 00.0	+60.0	104.0	**54**
55	56 05.7	+58.6	93.9	56 00.8	+59.0	95.4	55 54.4	+59.3	96.8	55 46.5	+59.6	98.3	55 37.1	+59.7	99.8	55 26.2	+59.9	101.2	55 13.8	+60.0	102.6	55 00.0	+60.0	104.0	**55**
56	57 04.3	+58.5	93.5	56 59.8	+58.9	95.0	56 53.7	+59.3	96.6	56 46.1	+59.5	98.1	56 36.8	+59.8	99.6	56 26.1	+59.9	101.1	56 13.8	+60.0	102.6	56 00.0	+60.0	104.0	**56**
57	58 02.8	+58.4	93.1	57 58.7	+58.9	94.7	57 53.0	+59.2	96.3	57 45.6	+59.5	97.9	57 36.6	+59.7	99.4	57 26.0	+59.8	101.0	57 13.8	+59.9	102.5	57 00.0	+60.0	104.0	**57**
58	59 01.2	+58.4	92.7	58 57.6	+58.8	94.3	58 52.2	+59.2	96.0	58 45.1	+59.5	97.6	58 36.3	+59.7	99.2	58 25.8	+59.9	100.8	58 13.7	+60.0	102.4	58 00.0	+60.0	104.0	**58**
59	59 59.6	+58.2	92.2	59 56.4	+58.7	93.9	59 51.4	+59.1	95.6	59 44.6	+59.4	97.4	59 36.0	+59.7	99.0	59 25.7	+59.9	100.7	59 13.7	+60.0	102.4	59 00.0	+60.0	104.0	**59**
60	60 57.8	+58.2	91.7	60 55.1	+58.6	93.5	60 50.5	+59.0	95.3	60 44.0	+59.4	97.1	60 35.7	+59.7	98.8	60 25.6	+59.8	100.6	60 13.7	+59.9	102.3	60 00.0	+60.0	104.0	**60**
61	61 56.0	+58.0	91.2	61 53.7	+58.6	93.1	61 49.5	+59.0	94.9	61 43.4	+59.4	96.8	61 35.4	+59.6	98.6	61 25.4	+59.9	100.4	61 13.6	+60.0	102.2	61 00.0	+60.0	104.0	**61**
62	62 54.0	+57.8	90.6	62 52.3	+58.4	92.6	62 48.5	+59.0	94.5	62 42.8	+59.3	96.5	62 35.0	+59.6	98.4	62 25.3	+59.8	100.3	62 13.6	+59.9	102.2	62 00.0	+60.0	104.0	**62**
63	63 51.8	+57.8	90.1	63 50.7	+58.3	92.1	63 47.5	+58.8	94.1	63 42.1	+59.3	96.1	63 34.6	+59.6	98.1	63 25.1	+59.8	100.1	63 13.5	+60.0	102.1	63 00.0	+60.0	104.0	**63**
64	64 49.6	+57.5	89.4	64 49.0	+58.2	91.6	64 46.3	+58.8	93.7	64 41.4	+59.2	95.8	64 34.2	+59.6	97.9	64 24.9	+59.8	100.0	64 13.5	+59.9	102.0	64 00.0	+60.0	104.0	**64**
65	65 47.1	+57.3	88.7	65 47.2	+58.1	91.0	65 45.1	+58.6	93.2	65 40.6	+59.1	95.4	65 33.8	+59.5	97.6	65 24.7	+59.8	99.8	65 13.4	+60.0	101.9	65 00.0	+60.0	104.0	**65**
66	66 44.4	+57.2	88.0	66 45.3	+57.9	90.3	66 43.7	+58.6	92.7	66 39.7	+59.1	95.0	66 33.3	+59.5	97.3	66 24.5	+59.8	99.6	66 13.4	+59.9	101.8	66 00.0	+60.0	104.0	**66**
67	67 41.6	+56.9	87.2	67 43.2	+57.7	89.7	67 42.3	+58.4	92.1	67 38.8	+59.0	94.5	67 32.8	+59.4	97.0	67 24.3	+59.8	99.3	67 13.3	+60.0	101.7	67 00.0	+60.0	104.0	**67**
68	68 38.5	+56.6	86.4	68 40.9	+57.5	88.9	68 40.7	+58.3	91.5	68 37.8	+58.9	94.0	68 32.2	+59.4	96.6	68 24.1	+59.7	99.1	68 13.3	+59.9	101.6	68 00.0	+60.0	104.0	**68**
69	69 35.1	+56.2	85.4	69 38.4	+57.3	88.1	69 39.0	+58.1	90.8	69 36.7	+58.8	93.5	69 31.6	+59.4	96.2	69 23.8	+59.7	98.8	69 13.2	+59.9	101.4	69 00.0	+60.0	104.0	**69**
70	70 31.3	+55.9	84.4	70 35.7	+57.0	87.3	70 37.1	+57.9	90.1	70 35.5	+58.7	92.9	70 31.0	+59.2	95.8	70 23.5	+59.7	98.6	70 13.1	+60.0	101.3	70 00.0	+60.0	104.0	**70**
71	71 27.2	+55.5	83.3	71 32.7	+56.7	86.3	71 35.0	+57.7	89.3	71 34.2	+58.5	92.3	71 30.2	+59.2	95.3	71 23.2	+59.6	98.2	71 13.1	+59.9	101.1	71 00.0	+60.0	104.0	**71**
72	72 22.7	+55.0	82.1	72 29.4	+56.2	85.2	72 32.7	+57.4	88.4	72 32.7	+58.4	91.6	72 29.4	+59.1	94.7	72 22.8	+59.6	97.9	72 13.0	+59.9	101.0	72 00.0	+60.0	104.0	**72**
73	73 17.7	+54.4	80.7	73 25.6	+55.9	84.0	73 30.1	+57.1	87.4	73 31.1	+58.1	90.8	73 28.5	+59.0	94.2	73 22.4	+59.6	97.5	73 12.9	+59.9	100.8	73 00.0	+60.0	104.0	**73**
74	74 12.1	+53.6	79.2	74 21.5	+55.3	82.7	74 27.2	+56.8	86.3	74 29.2	+58.0	89.9	74 27.5	+58.8	93.5	74 22.0	+59.5	97.1	74 12.8	+59.8	100.6	74 00.0	+60.0	104.0	**74**
75	75 05.7	+52.9	77.5	75 16.8	+54.7	81.2	75 24.0	+56.3	85.0	75 27.2	+57.6	88.9	75 26.3	+58.7	92.7	75 21.5	+59.4	96.6	75 12.6	+59.9	100.3	75 00.0	+60.0	104.0	**75**
76	75 58.6	+51.8	75.6	76 11.5	+53.9	79.6	76 20.3	+55.7	83.6	76 24.8	+57.2	87.7	76 25.0	+58.5	91.9	76 20.9	+59.3	96.0	76 12.5	+59.8	100.0	76 00.0	+60.0	104.0	**76**
77	76 50.4	+50.6	73.5	77 05.4	+52.9	77.7	77 16.0	+55.0	82.0	77 22.0	+56.9	86.4	77 23.5	+58.2	90.9	77 20.2	+59.2	95.3	77 12.3	+59.9	99.7	77 00.0	+60.0	104.0	**77**
78	77 41.0	+49.2	71.0	77 58.3	+51.8	75.5	78 11.0	+54.2	80.1	78 18.9	+56.2	84.9	78 21.7	+57.9	89.7	78 19.4	+59.1	94.6	78 12.2	+59.7	99.4	78 00.0	+60.0	104.0	**78**
79	78 30.2	*+47.3*•	68.3	78 50.1	+50.3	73.0	79 05.2	+53.1	77.9	79 15.1	+55.5	83.1	79 19.6	+57.4	88.4	79 18.5	+58.9	93.7	79 11.9	+59.8	98.9	79 00.0	+60.0	104.0	**79**
80	79 17.5	*+45.1*•	65.1	79 40.4	*+48.5*•	70.0	79 58.3	+51.7	75.4	80 10.6	+54.6	81.0	80 17.0	+57.0	86.7	80 17.4	+58.6	92.6	80 11.7	+59.6	98.4	80 00.0	+60.0	104.0	**80**
81	80 02.6	*+42.3*•	61.4	80 28.9	*+46.1*•	66.6	80 50.0	*+49.8*•	72.3	81 05.2	+53.2	78.4	81 14.0	+56.1	84.8	81 16.0	+58.3	91.3	81 11.3	+59.6	97.7	81 00.0	+60.0	104.0	**81**
82	80 44.9	*+38.7*•	57.1	81 15.0	*+43.1*•	62.6	81 39.8	*+47.4*•	68.7	81 58.4	*+51.5*•	75.3	82 10.1	+55.1	82.3	82 14.3	+57.8	89.6	82 10.9	+59.5	96.9	82 00.0	+60.0	104.0	**82**
83	81 23.6	*+34.5*•	52.2	81 58.1	*+39.1*•	57.8	82 27.2	*+44.1*•	64.2	82 49.9	*+49.1*•	71.4	83 05.2	*+53.5*•	79.2	83 12.1	+57.1	87.5	83 10.4	+59.3	95.9	83 00.0	+60.0	104.0	**83**
84	81 58.1	*+29.1*•	46.5	82 37.2	*+34.1*•	52.2	83 11.3	*+39.6*•	58.8	83 39.0	*+45.4*•	66.5	83 58.7	*+51.1*•	75.2	84 09.2	+55.9	84.7	84 09.7	+59.0	94.5	84 00.0	+60.0	104.0	**84**
85	82 27.2	*+22.7*•	40.1	83 11.3	*+27.7*•	45.5	83 50.9	*+33.5*•	52.1	84 24.4	*+40.2*•	60.2	84 49.8	*+47.4*•	69.8	85 05.1	*+54.0*•	80.8	85 08.7	+58.4	92.5	85 00.0	+60.0	104.0	**85**
86	82 49.9	*+15.3*•	32.9	83 39.0	*+19.7*•	37.7	84 24.4	*+25.4*•	44.0	85 04.6	*+32.6*•	52.1	85 37.2	*+41.2*•	62.4	85 59.1	*+50.3*•	75.1	86 07.1	+57.5	89.5	86 00.0	+60.0	104.0	**86**
87	83 05.2	*+6.9*•	25.0	83 58.7	*+10.5*•	29.0	84 49.8	*+15.3*•	34.3	85 37.2	*+21.9*•	41.7	86 18.4	*+31.0*•	52.0	86 49.4	*+42.9*•	66.4	87 04.6	*+54.9*•	84.6	87 00.0	+60.0	104.0	**87**
88	83 12.1	*−1.7*•	16.6	84 09.2	*+0.5*•	19.4	85 05.1	*+3.6*•	23.3	85 59.1	*+8.0*•	28.9	86 49.4	*+15.2*•	37.7	87 32.3	*+27.2*•	52.0	87 59.5	*+46.6*•	75.1	88 00.0	+60.0	104.0	**88**
89	83 10.4	*−10.4*•	8.2	84 09.7	*−9.7*•	9.6	85 08.7	*−8.7*•	11.5	86 07.1	*−7.1*•	14.5	87 04.6	*−4.6*•	19.4	87 59.5	*+0.5*•	28.9	88 46.1	*+13.9*•	52.0	89 00.0	+60.0	104.0	**89**
90	83 00.0	*−18.4*•	0.0	84 00.0	*−19.0*•	0.0	85 00.0	*−19.8*•	0.0	86 00.0	*−21.1*•	0.0	87 00.0	*−23.0*•	0.0	88 00.0	*−26.6*•	0.0	89 00.0	*−34.6*•	0.0	90 00.0	−60.0	52.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 76°, 284°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 41.4	−59.6	103.9	1 26.9	−59.6	103.9	1 12.5	−59.8	103.9	0 58.0	−59.8	104.0	0 43.5	−59.9	104.0	0 29.0	−59.9	104.0	0 14.5	−60.0	104.0	0 00.0	+60.0	76.0	**0**
1	0 41.8	−59.6	104.0	0 27.3	−59.7	104.0	0 12.7	−59.8	104.0	0 01.8	+59.9	76.0	0 16.4	+59.9	76.0	0 30.9	+60.0	76.0	0 45.5	+60.0	76.0	1 00.0	+60.0	76.0	**1**
2	0 17.8	+59.6	75.9	0 32.4	+59.7	75.9	0 47.1	+59.8	75.9	1 01.7	+59.9	75.9	1 16.3	+59.9	75.9	1 30.9	+60.0	75.9	1 45.5	+60.0	76.0	2 00.0	+60.0	76.0	**2**
3	1 17.4	+59.5	75.7	1 32.1	+59.7	75.8	1 46.9	+59.7	75.8	2 01.6	+59.8	75.8	2 16.2	+60.0	75.9	2 30.9	+59.9	75.9	2 45.5	+60.0	76.0	3 00.0	+60.0	76.0	**3**
4	2 16.9	+59.6	75.6	2 31.8	+59.7	75.7	2 46.6	+59.8	75.7	3 01.4	+59.9	75.8	3 16.2	+59.9	75.8	3 30.8	+60.0	75.9	3 45.5	+59.9	75.9	4 00.0	+60.0	76.0	**4**
5	3 16.5	+59.6	75.5	3 31.5	+59.7	75.6	3 46.4	+59.8	75.6	4 01.3	+59.9	75.7	4 16.1	+59.9	75.8	4 30.8	+60.0	75.8	4 45.4	+60.0	75.9	5 00.0	+60.0	76.0	**5**
6	4 16.1	+59.6	75.4	4 31.2	+59.7	75.5	4 46.2	+59.8	75.5	5 01.2	+59.8	75.6	5 16.0	+59.9	75.7	5 30.8	+59.9	75.8	5 45.4	+60.0	75.9	6 00.0	+60.0	76.0	**6**
7	5 15.7	+59.6	75.3	5 30.9	+59.7	75.4	5 46.0	+59.8	75.5	6 01.0	+59.9	75.6	6 15.9	+60.0	75.7	6 30.7	+60.0	75.8	6 45.4	+60.0	75.9	7 00.0	+60.0	76.0	**7**
8	6 15.3	+59.5	75.2	6 30.6	+59.7	75.3	6 45.8	+59.8	75.4	7 00.9	+59.8	75.5	7 15.9	+59.9	75.6	7 30.7	+60.0	75.7	7 45.4	+60.0	75.9	8 00.0	+60.0	76.0	**8**
9	7 14.8	+59.6	75.0	7 30.3	+59.6	75.2	7 45.6	+59.7	75.3	8 00.7	+59.9	75.4	8 15.8	+59.9	75.6	8 30.7	+59.9	75.7	8 45.4	+60.0	75.8	9 00.0	+60.0	76.0	**9**
10	8 14.4	+59.6	74.9	8 29.9	+59.7	75.1	8 45.3	+59.8	75.2	9 00.6	+59.9	75.4	9 15.7	+59.9	75.5	9 30.6	+60.0	75.7	9 45.4	+60.0	75.8	10 00.0	+60.0	76.0	**10**
11	9 14.0	+59.5	74.8	9 29.6	+59.7	74.9	9 45.1	+59.8	75.1	10 00.5	+59.8	75.3	10 15.6	+59.9	75.5	10 30.6	+60.0	75.6	10 45.4	+60.0	75.8	11 00.0	+60.0	76.0	**11**
12	10 13.5	+59.6	74.7	10 29.3	+59.7	74.8	10 44.9	+59.8	75.0	11 00.3	+59.9	75.2	11 15.5	+60.0	75.4	11 30.6	+59.9	75.6	11 45.4	+60.0	75.8	12 00.0	+60.0	76.0	**12**
13	11 13.1	+59.6	74.5	11 29.0	+59.7	74.7	11 44.7	+59.8	74.9	12 00.2	+59.8	75.1	12 15.5	+59.9	75.3	12 30.5	+60.0	75.6	12 45.4	+60.0	75.8	13 00.0	+60.0	76.0	**13**
14	12 12.7	+59.5	74.4	12 28.7	+59.6	74.6	12 44.5	+59.7	74.8	13 00.0	+59.9	75.1	13 15.4	+59.9	75.3	13 30.5	+59.9	75.5	13 45.4	+60.0	75.8	14 00.0	+60.0	76.0	**14**
15	13 12.2	+59.6	74.3	13 28.3	+59.7	74.5	13 44.2	+59.8	74.8	13 59.9	+59.8	75.0	14 15.3	+59.9	75.2	14 30.4	+60.0	75.5	14 45.4	+59.9	75.7	15 00.0	+60.0	76.0	**15**
16	14 11.8	+59.5	74.2	14 28.0	+59.7	74.4	14 44.0	+59.8	74.7	14 59.7	+59.9	74.9	15 15.2	+59.9	75.2	15 30.4	+60.0	75.5	15 45.3	+60.0	75.7	16 00.0	+60.0	76.0	**16**
17	15 11.3	+59.6	74.0	15 27.7	+59.6	74.3	15 43.8	+59.7	74.6	15 59.6	+59.8	74.9	16 15.1	+59.9	75.1	16 30.4	+59.9	75.4	16 45.3	+60.0	75.7	17 00.0	+60.0	76.0	**17**
18	16 10.9	+59.5	73.9	16 27.3	+59.7	74.2	16 43.5	+59.8	74.5	16 59.4	+59.9	74.8	17 15.0	+60.0	75.1	17 30.3	+60.0	75.4	17 45.3	+60.0	75.7	18 00.0	+60.0	76.0	**18**
19	17 10.4	+59.5	73.8	17 27.0	+59.7	74.1	17 43.3	+59.8	74.4	17 59.3	+59.8	74.7	18 15.0	+59.9	75.0	18 30.3	+60.0	75.3	18 45.3	+60.0	75.7	19 00.0	+60.0	76.0	**19**
20	18 09.9	+59.6	73.7	18 26.7	+59.6	74.0	18 43.1	+59.7	74.3	18 59.1	+59.9	74.6	19 14.9	+59.9	75.0	19 30.3	+59.9	75.3	19 45.3	+60.0	75.6	20 00.0	+60.0	76.0	**20**
21	19 09.5	+59.5	73.5	19 26.3	+59.7	73.9	19 42.8	+59.8	74.2	19 59.0	+59.8	74.6	20 14.8	+59.9	74.9	20 30.2	+60.0	75.3	20 45.3	+60.0	75.6	21 00.0	+60.0	76.0	**21**
22	20 09.0	+59.5	73.4	20 26.0	+59.6	73.7	20 42.6	+59.7	74.1	20 58.8	+59.9	74.5	21 14.7	+59.9	74.8	21 30.2	+59.9	75.2	21 45.3	+60.0	75.6	22 00.0	+60.0	76.0	**22**
23	21 08.5	+59.5	73.3	21 25.6	+59.7	73.6	21 42.3	+59.8	74.0	21 58.7	+59.8	74.4	22 14.6	+59.9	74.8	22 30.1	+60.0	75.2	22 45.3	+60.0	75.6	23 00.0	+60.0	76.0	**23**
24	22 08.0	+59.5	73.1	22 25.3	+59.6	73.5	22 42.1	+59.7	73.9	22 58.5	+59.8	74.3	23 14.5	+59.9	74.7	23 30.1	+60.0	75.1	23 45.3	+60.0	75.6	24 00.0	+60.0	76.0	**24**
25	23 07.5	+59.5	73.0	23 24.9	+59.6	73.4	23 41.8	+59.8	73.8	23 58.3	+59.9	74.2	24 14.4	+59.9	74.7	24 30.1	+59.9	75.1	24 45.3	+59.9	75.6	25 00.0	+60.0	76.0	**25**
26	24 07.0	+59.5	72.8	24 24.5	+59.6	73.3	24 41.6	+59.7	73.7	24 58.2	+59.8	74.2	25 14.3	+59.9	74.6	25 30.0	+60.0	75.1	25 45.2	+60.0	75.5	26 00.0	+60.0	76.0	**26**
27	25 06.5	+59.5	72.7	25 24.1	+59.7	73.2	25 41.3	+59.7	73.6	25 58.0	+59.8	74.1	26 14.2	+59.9	74.5	26 30.0	+59.9	75.0	26 45.2	+60.0	75.5	27 00.0	+60.0	76.0	**27**
28	26 06.0	+59.5	72.6	26 23.8	+59.6	73.0	26 41.0	+59.8	73.5	26 57.8	+59.9	74.0	27 14.1	+59.9	74.5	27 29.9	+60.0	75.0	27 45.2	+60.0	75.5	28 00.0	+60.0	76.0	**28**
29	27 05.5	+59.4	72.4	27 23.4	+59.6	72.9	27 40.8	+59.7	73.4	27 57.7	+59.8	73.9	28 14.0	+59.9	74.4	28 29.9	+59.9	74.9	28 45.2	+60.0	75.5	29 00.0	+60.0	76.0	**29**
30	28 04.9	+59.5	72.3	28 23.0	+59.6	72.8	28 40.5	+59.7	73.3	28 57.5	+59.8	73.8	29 13.9	+59.9	74.4	29 29.8	+60.0	74.9	29 45.2	+60.0	75.4	30 00.0	+60.0	76.0	**30**
31	29 04.4	+59.4	72.1	29 22.6	+59.6	72.6	29 40.2	+59.7	73.2	29 57.3	+59.8	73.7	30 13.8	+59.9	74.3	30 29.8	+59.9	74.8	30 45.2	+60.0	75.4	31 00.0	+60.0	76.0	**31**
32	30 03.8	+59.5	71.9	30 22.2	+59.5	72.5	30 39.9	+59.7	73.1	30 57.1	+59.8	73.6	31 13.7	+59.9	74.2	31 29.7	+60.0	74.8	31 45.2	+60.0	75.4	32 00.0	+60.0	76.0	**32**
33	31 03.3	+59.4	71.8	31 21.7	+59.6	72.4	31 39.6	+59.7	72.9	31 56.9	+59.8	73.5	32 13.6	+59.9	74.1	32 29.7	+60.0	74.8	32 45.2	+60.0	75.4	33 00.0	+60.0	76.0	**33**
34	32 02.7	+59.4	71.6	32 21.3	+59.6	72.2	32 39.3	+59.7	72.8	32 56.7	+59.8	73.4	33 13.5	+59.9	74.1	33 29.7	+59.9	74.7	33 45.2	+59.9	75.3	34 00.0	+60.0	76.0	**34**
35	33 02.1	+59.4	71.5	33 20.9	+59.5	72.1	33 39.0	+59.7	72.7	33 56.5	+59.8	73.4	34 13.4	+59.9	74.0	34 29.6	+60.0	74.7	34 45.1	+60.0	75.3	35 00.0	+60.0	76.0	**35**
36	34 01.5	+59.4	71.3	34 20.4	+59.6	71.9	34 38.7	+59.7	72.6	34 56.3	+59.8	73.3	35 13.3	+59.9	73.9	35 29.6	+59.9	74.6	35 45.1	+60.0	75.3	36 00.0	+60.0	76.0	**36**
37	35 00.9	+59.3	71.1	35 20.0	+59.5	71.8	35 38.4	+59.7	72.5	35 56.1	+59.8	73.1	36 13.2	+59.8	73.8	36 29.5	+59.9	74.6	36 45.1	+60.0	75.3	37 00.0	+60.0	76.0	**37**
38	36 00.2	+59.4	70.9	36 19.5	+59.5	71.6	36 38.1	+59.6	72.3	36 55.9	+59.8	73.0	37 13.0	+59.9	73.8	37 29.4	+60.0	74.5	37 45.1	+60.0	75.2	38 00.0	+60.0	76.0	**38**
39	36 59.6	+59.3	70.8	37 19.0	+59.5	71.5	37 37.7	+59.7	72.2	37 55.7	+59.8	72.9	38 12.9	+59.9	73.7	38 29.4	+59.9	74.4	38 45.1	+60.0	75.2	39 00.0	+60.0	76.0	**39**
40	37 58.9	+59.3	70.6	38 18.5	+59.5	71.3	38 37.4	+59.6	72.1	38 55.5	+59.7	72.8	39 12.8	+59.9	73.6	39 29.3	+60.0	74.4	39 45.1	+60.0	75.2	40 00.0	+60.0	76.0	**40**
41	38 58.2	+59.3	70.4	39 18.0	+59.5	71.1	39 37.0	+59.6	71.9	39 55.2	+59.8	72.7	40 12.7	+59.8	73.5	40 29.3	+59.9	74.3	40 45.1	+59.9	75.2	41 00.0	+60.0	76.0	**41**
42	39 57.5	+59.3	70.2	40 17.5	+59.4	71.0	40 36.6	+59.7	71.8	40 55.0	+59.8	72.6	41 12.5	+59.9	73.4	41 29.2	+60.0	74.3	41 45.0	+60.0	75.1	42 00.0	+60.0	76.0	**42**
43	40 56.8	+59.2	70.0	41 16.9	+59.5	70.8	41 36.3	+59.6	71.6	41 54.8	+59.7	72.5	42 12.4	+59.8	73.3	42 29.2	+59.9	74.2	42 45.0	+60.0	75.1	43 00.0	+60.0	76.0	**43**
44	41 56.0	+59.3	69.8	42 16.4	+59.4	70.6	42 35.9	+59.6	71.5	42 54.5	+59.7	72.4	43 12.2	+59.9	73.2	43 29.1	+59.9	74.2	43 45.0	+60.0	75.1	44 00.0	+60.0	76.0	**44**
45	42 55.3	+59.2	69.5	43 15.8	+59.4	70.4	43 35.5	+59.5	71.3	43 54.2	+59.8	72.2	44 12.1	+59.8	73.1	44 29.0	+60.0	74.1	44 45.0	+60.0	75.0	45 00.0	+60.0	76.0	**45**
46	43 54.5	+59.1	69.3	44 15.2	+59.4	70.2	44 35.0	+59.6	71.2	44 54.0	+59.7	72.1	45 11.9	+59.9	73.0	45 29.0	+59.9	74.0	45 45.0	+60.0	75.0	46 00.0	+60.0	76.0	**46**
47	44 53.6	+59.2	69.1	45 14.6	+59.4	70.0	45 34.6	+59.6	71.0	45 53.7	+59.7	72.0	46 11.8	+59.8	72.9	46 28.9	+59.9	73.9	46 45.0	+59.9	75.0	47 00.0	+60.0	76.0	**47**
48	45 52.8	+59.1	68.8	46 14.0	+59.3	69.8	46 34.2	+59.5	70.8	46 53.4	+59.7	71.8	47 11.6	+59.8	72.8	47 28.8	+59.9	73.9	47 44.9	+60.0	74.9	48 00.0	+60.0	76.0	**48**
49	46 51.9	+59.1	68.6	47 13.3	+59.3	69.6	47 33.7	+59.5	70.6	47 53.1	+59.7	71.7	48 11.4	+59.9	72.7	48 28.7	+59.9	73.8	48 44.9	+60.0	74.9	49 00.0	+60.0	76.0	**49**
50	47 51.0	+59.0	68.3	48 12.6	+59.3	69.4	48 33.2	+59.5	70.4	48 52.8	+59.7	71.5	49 11.3	+59.8	72.6	49 28.6	+60.0	73.7	49 44.9	+60.0	74.9	50 00.0	+60.0	76.0	**50**
51	48 50.0	+59.0	68.1	49 11.9	+59.3	69.1	49 32.7	+59.5	70.2	49 52.5	+59.6	71.4	50 11.1	+59.8	72.5	50 28.6	+59.9	73.6	50 44.9	+60.0	74.8	51 00.0	+60.0	76.0	**51**
52	49 49.0	+59.0	67.8	50 11.2	+59.2	68.9	50 32.2	+59.5	70.0	50 52.1	+59.7	71.2	51 10.9	+59.8	72.4	51 28.5	+59.9	73.6	51 44.9	+59.9	74.8	52 00.0	+60.0	76.0	**52**
53	50 48.0	+58.9	67.5	51 10.4	+59.2	68.6	51 31.7	+59.4	69.8	51 51.8	+59.6	71.0	52 10.7	+59.8	72.2	52 28.4	+59.9	73.5	52 44.8	+60.0	74.7	53 00.0	+60.0	76.0	**53**
54	51 46.9	+58.9	67.2	52 09.6	+59.1	68.4	52 31.1	+59.4	69.6	52 51.4	+59.6	70.8	53 10.5	+59.8	72.1	53 28.3	+59.9	73.4	53 44.8	+60.0	74.7	54 00.0	+60.0	76.0	**54**
55	52 45.8	+58.8	66.9	53 08.7	+59.1	68.1	53 30.5	+59.4	69.4	53 51.0	+59.6	70.6	54 10.3	+59.7	71.9	54 28.2	+59.9	73.3	54 44.8	+60.0	74.6	55 00.0	+60.0	76.0	**55**
56	53 44.6	+58.7	66.6	54 07.8	+59.1	67.8	54 29.9	+59.3	69.1	54 50.6	+59.6	70.4	55 10.0	+59.8	71.8	55 28.1	+59.9	73.2	55 44.8	+59.9	74.6	56 00.0	+60.0	76.0	**56**
57	54 43.3	+58.7	66.2	55 06.9	+59.0	67.5	55 29.2	+59.3	68.9	55 50.2	+59.5	70.2	56 09.8	+59.7	71.6	56 28.0	+59.9	73.1	56 44.7	+60.0	74.5	57 00.0	+60.0	76.0	**57**
58	55 42.0	+58.7	65.8	56 05.9	+59.0	67.2	56 28.5	+59.3	68.6	56 49.7	+59.6	70.0	57 09.5	+59.8	71.5	57 27.9	+59.8	72.9	57 44.7	+60.0	74.5	58 00.0	+60.0	76.0	**58**
59	56 40.7	+58.5	65.5	57 04.9	+58.9	66.9	57 27.8	+59.2	68.3	57 49.3	+59.5	69.8	58 09.3	+59.7	71.3	58 27.7	+59.9	72.8	58 44.7	+59.9	74.4	59 00.0	+60.0	76.0	**59**
60	57 39.2	+58.5	65.1	58 03.8	+58.9	66.5	58 27.0	+59.2	68.0	58 48.8	+59.4	69.5	59 09.0	+59.7	71.1	59 27.6	+59.9	72.7	59 44.6	+60.0	74.3	60 00.0	+60.0	76.0	**60**
61	58 37.7	+58.4	64.6	59 02.7	+58.8	66.1	59 26.2	+59.2	67.7	59 48.2	+59.5	69.3	60 08.7	+59.6	70.9	60 27.5	+59.8	72.6	60 44.6	+60.0	74.3	61 00.0	+60.0	76.0	**61**
62	59 36.1	+58.3	64.2	60 01.5	+58.7	65.7	60 25.4	+59.0	67.3	60 47.7	+59.4	69.0	61 08.3	+59.7	70.7	61 27.3	+59.9	72.4	61 44.6	+59.9	74.2	62 00.0	+60.0	76.0	**62**
63	60 34.4	+58.1	63.7	61 00.2	+58.6	65.3	61 24.4	+59.1	67.0	61 47.1	+59.3	68.7	62 08.0	+59.6	70.5	62 27.2	+59.8	72.3	62 44.5	+60.0	74.1	63 00.0	+60.0	76.0	**63**
64	61 32.5	+58.1	63.2	61 58.8	+58.5	64.9	62 23.5	+58.9	66.6	62 46.4	+59.3	68.4	63 07.6	+59.6	70.2	63 27.0	+59.8	72.1	63 44.5	+59.9	74.0	64 00.0	+60.0	76.0	**64**
65	62 30.6	+57.9	62.7	62 57.3	+58.5	64.4	63 22.4	+58.9	66.2	63 45.7	+59.3	68.1	64 07.2	+59.6	70.0	64 26.8	+59.8	71.9	64 44.4	+60.0	73.9	65 00.0	+60.0	76.0	**65**
66	63 28.5	+57.8	62.1	63 55.8	+58.3	63.9	64 21.3	+58.8	65.8	64 45.0	+59.2	67.7	65 06.8	+59.6	69.7	65 26.6	+59.8	71.7	65 44.4	+59.9	73.8	66 00.0	+60.0	76.0	**66**
67	64 26.3	+57.6	61.5	64 54.1	+58.2	63.4	65 20.1	+58.7	65.3	65 44.2	+59.2	67.3	66 06.4	+59.5	69.4	66 26.4	+59.8	71.5	66 44.3	+60.0	73.7	67 00.0	+60.0	76.0	**67**
68	65 23.9	+57.5	60.8	65 52.3	+58.0	62.8	66 18.8	+58.6	64.8	66 43.4	+59.0	66.9	67 05.9	+59.4	69.1	67 26.2	+59.8	71.3	67 44.3	+59.9	73.6	68 00.0	+60.0	76.0	**68**
69	66 21.4	+57.2	60.1	66 50.3	+57.9	62.1	67 17.4	+58.5	64.2	67 42.4	+59.0	66.4	68 05.3	+59.4	68.7	68 26.0	+59.7	71.1	68 44.2	+59.9	73.5	69 00.0	+60.0	76.0	**69**
70	67 18.6	+57.0	59.4	67 48.2	+57.7	61.5	68 15.9	+58.3	63.7	68 41.4	+58.9	66.0	69 04.7	+59.4	68.3	69 25.7	+59.7	70.8	69 44.1	+60.0	73.4	70 00.0	+60.0	76.0	**70**
71	68 15.6	+56.7	58.5	68 45.9	+57.5	60.7	69 14.2	+58.2	63.0	69 40.3	+58.8	65.4	70 04.1	+59.3	67.9	70 25.4	+59.7	70.5	70 44.1	+59.9	73.2	71 00.0	+60.0	76.0	**71**
72	69 12.3	+56.4	57.6	69 43.4	+57.3	59.9	70 12.4	+58.0	62.3	70 39.1	+58.7	64.8	71 03.4	+59.2	67.5	71 25.1	+59.6	70.2	71 44.0	+59.9	73.1	72 00.0	+60.0	76.0	**72**
73	70 08.7	+56.1	56.6	70 40.7	+56.9	59.0	71 10.4	+57.8	61.5	71 37.8	+58.5	64.2	72 02.6	+59.2	67.0	72 24.7	+59.6	69.9	72 43.9	+59.9	72.9	73 00.0	+60.0	76.0	**73**
74	71 04.8	+55.6	55.6	71 37.6	+56.7	58.1	72 08.2	+57.6	60.7	72 36.3	+58.4	63.5	73 01.8	+59.0	66.4	73 24.3	+59.6	69.5	73 43.8	+59.9	72.7	74 00.0	+60.0	76.0	**74**
75	72 00.4	+55.2	54.4	72 34.3	+56.2	57.0	73 05.8	+57.2	59.7	73 34.7	+58.1	62.7	74 00.8	+58.9	65.8	74 23.9	+59.5	69.0	74 43.7	+59.8	72.4	75 00.0	+60.0	76.0	**75**
76	72 55.6	+54.6	53.1	73 30.5	+55.8	55.8	74 03.0	+56.9	58.7	74 32.8	+57.9	61.8	74 59.7	+58.8	65.0	75 23.4	+59.4	68.5	75 43.5	+59.9	72.2	76 00.0	+60.0	76.0	**76**
77	73 50.2	+54.0	51.6	74 26.3	+55.3	54.5	74 59.9	+56.5	57.5	75 30.7	+57.6	60.7	75 58.5	+58.5	64.2	76 22.8	+59.3	68.0	76 43.4	+59.8	71.9	77 00.0	+60.0	76.0	**77**
78	74 44.2	+53.2	50.0	75 21.6	+54.6	53.0	75 56.4	+56.0	56.1	76 28.3	+57.3	59.6	76 57.0	+58.4	63.3	77 22.1	+59.2	67.3	77 43.2	+59.8	71.5	78 00.0	+60.0	76.0	**78**
79	75 37.4	+52.3	48.2	76 16.2	+53.8	51.3	76 52.4	+55.3	54.6	77 25.6	+56.7	58.3	77 55.4	+58.0	62.2	78 21.3	+59.1	66.5	78 43.0	+59.8	71.1	79 00.0	+60.0	76.0	**79**
80	76 29.7	+51.1	46.2	77 10.0	+52.9	49.3	77 47.7	+54.6	52.8	78 22.3	+56.2	56.7	78 53.4	+57.7	61.0	79 20.4	+58.9	65.6	79 42.8	+59.7	70.6	80 00.0	+60.0	76.0	**80**
81	77 20.8	+49.8	43.9	78 02.9	+51.7	47.1	78 42.3	+53.6	50.8	79 18.5	+55.5	54.9	79 51.1	+57.2	59.5	80 19.3	+58.6	64.5	80 42.5	+59.6	70.1	81 00.0	+60.0	76.0	**81**
82	78 10.6	+48.1	41.2	78 54.6	+50.1	44.6	79 35.9	+52.3	48.4	80 14.0	+54.5	52.8	80 48.3	+56.5	57.7	81 17.9	+58.3	63.2	81 42.1	+59.5	69.3	82 00.0	+60.0	76.0	**82**
83	78 58.7	*+46.0* •	38.2	79 44.7	*+48.3* •	41.6	80 28.2	+50.7	45.6	81 08.5	+53.2	50.2	81 44.8	+55.6	55.5	82 16.2	+57.8	61.5	82 41.6	+59.4	68.4	83 00.0	+60.0	76.0	**83**
84	79 44.7	*+43.5* •	34.7	80 33.0	*+45.9* •	38.2	81 18.9	*+48.5* •	42.2	82 01.7	*+51.3* •	47.0	82 40.4	+54.3	52.7	83 14.0	+57.0	59.4	83 41.0	+59.2	67.2	84 00.0	+60.0	76.0	**84**
85	80 28.2	*+40.3* •	30.7	81 18.9	*+42.8* •	34.1	82 07.4	*+45.6* •	38.1	82 53.0	*+48.9* •	43.1	83 34.7	*+52.4* •	49.1	84 11.0	+55.9	56.6	84 40.2	+58.7	65.5	85 00.0	+60.0	76.0	**85**
86	81 08.5	*+36.3* •	26.1	82 01.7	*+38.7* •	29.2	82 53.0	*+41.7* •	33.1	83 41.9	*+45.2* •	38.1	84 27.1	*+49.3* •	44.4	85 06.9	*+53.9* •	52.6	85 38.9	+58.1	63.1	86 00.0	+60.0	76.0	**86**
87	81 44.8	*+31.4* •	20.7	82 40.4	*+33.6* •	23.5	83 34.7	*+36.3* •	27.0	84 27.1	*+39.8* •	31.7	85 16.4	*+44.4* •	38.0	86 00.8	*+50.1* •	46.9	86 37.0	*+56.4* •	59.4	87 00.0	+60.0	76.0	**87**
88	82 16.2	*+25.4* •	14.6	83 14.0	*+27.0* •	16.7	84 11.0	*+29.2* •	19.5	85 06.9	*+32.0* •	23.4	86 00.8	*+36.2* •	29.1	86 50.9	*+42.5* •	38.0	87 33.4	*+52.0* •	52.6	88 00.0	+60.0	76.0	**88**
89	82 41.6	*+18.4* •	7.7	83 41.0	*+19.0* •	8.9	84 40.2	*+19.8* •	10.5	85 38.9	*+21.1* •	12.9	86 37.0	*+23.0* •	16.7	87 33.4	*+26.6* •	23.4	88 25.4	*+34.6* •	38.0	89 00.0	+60.0	76.0	**89**
90	83 00.0	*+10.4* •	0.0	84 00.0	*+9.7* •	0.0	85 00.0	*+8.7* •	0.0	86 00.0	*+7.1* •	0.0	87 00.0	*+4.6* •	0.0	88 00.0	*−0.5* •	0.0	89 00.0	*−13.9* •	0.0	90 00.0	−60.0	38.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 104°, 256°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 34.3	+59.5	102.9	1 20.8	+59.7	102.9	1 07.4	+59.8	103.0	0 53.9	+59.9	103.0	0 40.5	+59.9	103.0	0 27.0	+60.0	103.0	0 13.5	+60.0	103.0	0 00.0	+60.0	103.0	**0**
1	2 33.8	+59.6	102.8	2 20.5	+59.7	102.8	2 07.2	+59.8	102.9	1 53.8	+59.9	102.9	1 40.4	+59.9	102.9	1 27.0	+59.9	103.0	1 13.5	+60.0	103.0	1 00.0	+60.0	103.0	**1**
2	3 33.4	+59.6	102.7	3 20.2	+59.7	102.7	3 07.0	+59.8	102.8	2 53.7	+59.8	102.8	2 40.3	+59.9	102.9	2 26.9	+60.0	102.9	2 13.5	+60.0	103.0	2 00.0	+60.0	103.0	**2**
3	4 33.0	+59.6	102.5	4 19.9	+59.7	102.6	4 06.8	+59.7	102.7	3 53.5	+59.9	102.8	3 40.2	+60.0	102.8	3 26.9	+59.9	102.9	3 13.5	+60.0	102.9	3 00.0	+60.0	103.0	**3**
4	5 32.6	+59.5	102.4	5 19.6	+59.7	102.5	5 06.5	+59.8	102.6	4 53.4	+59.8	102.7	4 40.2	+59.9	102.8	4 26.8	+60.0	102.9	4 13.5	+60.0	102.9	4 00.0	+60.0	103.0	**4**
5	6 32.1	+59.6	102.3	6 19.3	+59.7	102.4	6 06.3	+59.8	102.5	5 53.2	+59.9	102.6	5 40.1	+59.9	102.7	5 26.8	+60.0	102.8	5 13.5	+59.9	102.9	5 00.0	+60.0	103.0	**5**
6	7 31.7	+59.6	102.2	7 19.0	+59.6	102.3	7 06.1	+59.8	102.4	6 53.1	+59.9	102.6	6 40.0	+59.9	102.7	6 26.8	+59.9	102.8	6 13.4	+60.0	102.9	6 00.0	+60.0	103.0	**6**
7	8 31.3	+59.5	102.1	8 18.6	+59.7	102.2	8 05.9	+59.8	102.4	7 53.0	+59.8	102.5	7 39.9	+59.9	102.6	7 26.7	+60.0	102.8	7 13.4	+60.0	102.9	7 00.0	+60.0	103.0	**7**
8	9 30.8	+59.6	101.9	9 18.3	+59.7	102.1	9 05.7	+59.7	102.3	8 52.8	+59.9	102.4	8 39.8	+60.0	102.6	8 26.7	+60.0	102.7	8 13.4	+60.0	102.9	8 00.0	+60.0	103.0	**8**
9	10 30.4	+59.5	101.8	10 18.0	+59.7	102.0	10 05.4	+59.8	102.2	9 52.7	+59.8	102.4	9 39.8	+59.9	102.5	9 26.7	+59.9	102.7	9 13.4	+60.0	102.8	9 00.0	+60.0	103.0	**9**
10	11 29.9	+59.6	101.7	11 17.7	+59.6	101.9	11 05.2	+59.8	102.1	10 52.5	+59.9	102.3	10 39.7	+59.9	102.5	10 26.6	+60.0	102.6	10 13.4	+60.0	102.8	10 00.0	+60.0	103.0	**10**
11	12 29.5	+59.6	101.6	12 17.3	+59.7	101.8	12 05.0	+59.8	102.0	11 52.4	+59.9	102.2	11 39.6	+59.9	102.4	11 26.6	+60.0	102.6	11 13.4	+60.0	102.8	11 00.0	+60.0	103.0	**11**
12	13 29.1	+59.5	101.5	13 17.0	+59.7	101.7	13 04.8	+59.7	101.9	12 52.3	+59.8	102.1	12 39.5	+59.9	102.4	12 26.6	+59.9	102.6	12 13.4	+60.0	102.8	12 00.0	+60.0	103.0	**12**
13	14 28.6	+59.5	101.3	14 16.7	+59.7	101.6	14 04.5	+59.8	101.8	13 52.1	+59.9	102.1	13 39.4	+60.0	102.3	13 26.5	+60.0	102.5	13 13.4	+60.0	102.8	13 00.0	+60.0	103.0	**13**
14	15 28.1	+59.6	101.2	15 16.4	+59.6	101.5	15 04.3	+59.8	101.7	14 52.0	+59.8	102.0	14 39.4	+59.9	102.3	14 26.5	+60.0	102.5	14 13.4	+60.0	102.8	14 00.0	+60.0	103.0	**14**
15	16 27.7	+59.5	101.1	16 16.0	+59.7	101.4	16 04.1	+59.7	101.6	15 51.8	+59.9	101.9	15 39.3	+59.9	102.2	15 26.5	+59.9	102.5	15 13.4	+60.0	102.7	15 00.0	+60.0	103.0	**15**
16	17 27.2	+59.6	100.9	17 15.7	+59.6	101.2	17 03.8	+59.8	101.5	16 51.7	+59.8	101.8	16 39.2	+59.9	102.1	16 26.4	+60.0	102.4	16 13.4	+59.9	102.7	16 00.0	+60.0	103.0	**16**
17	18 26.8	+59.5	100.8	18 15.3	+59.7	101.1	18 03.6	+59.7	101.5	17 51.5	+59.9	101.8	17 39.1	+59.9	102.1	17 26.4	+59.9	102.4	17 13.3	+60.0	102.7	17 00.0	+60.0	103.0	**17**
18	19 26.3	+59.5	100.7	19 15.0	+59.6	101.0	19 03.3	+59.8	101.4	18 51.4	+59.8	101.7	18 39.0	+59.9	102.0	18 26.3	+60.0	102.4	18 13.3	+60.0	102.7	18 00.0	+60.0	103.0	**18**
19	20 25.8	+59.5	100.5	20 14.6	+59.7	100.9	20 03.1	+59.8	101.3	19 51.2	+59.8	101.6	19 38.9	+59.9	102.0	19 26.3	+60.0	102.3	19 13.3	+60.0	102.7	19 00.0	+60.0	103.0	**19**
20	21 25.3	+59.5	100.4	21 14.3	+59.6	100.8	21 02.9	+59.7	101.2	20 51.0	+59.9	101.5	20 38.8	+59.9	101.9	20 26.3	+59.9	102.3	20 13.3	+60.0	102.6	20 00.0	+60.0	103.0	**20**
21	22 24.8	+59.5	100.3	22 13.9	+59.6	100.7	22 02.6	+59.7	101.1	21 50.9	+59.8	101.5	21 38.7	+60.0	101.9	21 26.2	+60.0	102.2	21 13.3	+60.0	102.6	21 00.0	+60.0	103.0	**21**
22	23 24.3	+59.5	100.1	23 13.5	+59.7	100.6	23 02.3	+59.8	101.0	22 50.7	+59.8	101.4	22 38.7	+59.9	101.8	22 26.2	+59.9	102.2	22 13.3	+60.0	102.6	22 00.0	+60.0	103.0	**22**
23	24 23.8	+59.5	100.0	24 13.2	+59.6	100.4	24 02.1	+59.7	100.9	23 50.5	+59.9	101.3	23 38.6	+59.9	101.7	23 26.1	+60.0	102.2	23 13.3	+60.0	102.6	23 00.0	+60.0	103.0	**23**
24	25 23.3	+59.5	99.8	25 12.8	+59.6	100.3	25 01.8	+59.8	100.8	24 50.4	+59.8	101.2	24 38.5	+59.9	101.7	24 26.1	+60.0	102.1	24 13.3	+60.0	102.6	24 00.0	+60.0	103.0	**24**
25	26 22.8	+59.4	99.7	26 12.4	+59.6	100.2	26 01.6	+59.7	100.7	25 50.2	+59.8	101.1	25 38.4	+59.9	101.6	25 26.1	+59.9	102.1	25 13.3	+60.0	102.5	25 00.0	+60.0	103.0	**25**
26	27 22.2	+59.5	99.5	27 12.0	+59.6	100.1	27 01.3	+59.7	100.6	26 50.0	+59.9	101.1	26 38.3	+59.9	101.5	26 26.0	+60.0	102.0	26 13.3	+59.9	102.5	26 00.0	+60.0	103.0	**26**
27	28 21.7	+59.4	99.4	28 11.6	+59.6	99.9	28 01.0	+59.7	100.4	27 49.9	+59.8	101.0	27 38.2	+59.9	101.5	27 26.0	+59.9	102.0	27 13.2	+60.0	102.5	27 00.0	+60.0	103.0	**27**
28	29 21.1	+59.5	99.2	29 11.2	+59.6	99.8	29 00.7	+59.7	100.3	28 49.7	+59.8	100.9	28 38.1	+59.9	101.4	28 25.9	+60.0	102.0	28 13.2	+60.0	102.5	28 00.0	+60.0	103.0	**28**
29	30 20.6	+59.4	99.1	30 10.8	+59.6	99.7	30 00.4	+59.8	100.2	29 49.5	+59.8	100.8	29 38.0	+59.9	101.4	29 25.9	+59.9	101.9	29 13.2	+60.0	102.5	29 00.0	+60.0	103.0	**29**
30	31 20.0	+59.4	98.9	31 10.4	+59.6	99.5	31 00.2	+59.7	100.1	30 49.3	+59.8	100.7	30 37.9	+59.9	101.3	30 25.8	+60.0	101.9	30 13.2	+60.0	102.4	30 00.0	+60.0	103.0	**30**
31	32 19.4	+59.4	98.8	32 10.0	+59.5	99.4	31 59.9	+59.7	100.0	31 49.1	+59.8	100.6	31 37.8	+59.9	101.2	31 25.8	+59.9	101.8	31 13.2	+60.0	102.4	31 00.0	+60.0	103.0	**31**
32	33 18.8	+59.4	98.6	33 09.5	+59.6	99.2	32 59.6	+59.6	99.9	32 48.9	+59.8	100.5	32 37.7	+59.8	101.1	32 25.7	+60.0	101.8	32 13.2	+60.0	102.4	32 00.0	+60.0	103.0	**32**
33	34 18.2	+59.4	98.4	34 09.1	+59.5	99.1	33 59.2	+59.7	99.8	33 48.7	+59.8	100.4	33 37.5	+59.9	101.1	33 25.7	+59.9	101.7	33 13.2	+60.0	102.4	33 00.0	+60.0	103.0	**33**
34	35 17.6	+59.3	98.2	35 08.6	+59.5	98.9	34 58.9	+59.7	99.6	34 48.5	+59.8	100.3	34 37.4	+59.9	101.0	34 25.6	+60.0	101.7	34 13.2	+59.9	102.3	34 00.0	+60.0	103.0	**34**
35	36 16.9	+59.3	98.1	36 08.1	+59.5	98.8	35 58.6	+59.7	99.5	35 48.3	+59.8	100.2	35 37.3	+59.9	100.9	35 25.6	+59.9	101.6	35 13.1	+60.0	102.3	35 00.0	+60.0	103.0	**35**
36	37 16.2	+59.4	97.9	37 07.6	+59.5	98.6	36 58.3	+59.6	99.4	36 48.1	+59.8	100.1	36 37.2	+59.9	100.8	36 25.5	+60.0	101.6	36 13.1	+60.0	102.3	36 00.0	+60.0	103.0	**36**
37	38 15.6	+59.3	97.7	38 07.1	+59.5	98.5	37 57.9	+59.7	99.2	37 47.9	+59.8	100.0	37 37.1	+59.8	100.8	37 25.5	+59.9	101.5	37 13.1	+60.0	102.3	37 00.0	+60.0	103.0	**37**
38	39 14.9	+59.2	97.5	39 06.6	+59.5	98.3	38 57.6	+59.6	99.1	38 47.7	+59.7	99.9	38 36.9	+59.9	100.7	38 25.4	+60.0	101.5	38 13.1	+60.0	102.2	38 00.0	+60.0	103.0	**38**
39	40 14.1	+59.3	97.3	40 06.1	+59.5	98.1	39 57.2	+59.6	99.0	39 47.4	+59.8	99.8	39 36.8	+59.9	100.6	39 25.4	+59.9	101.4	39 13.1	+60.0	102.2	39 00.0	+60.0	103.0	**39**
40	41 13.4	+59.2	97.1	41 05.6	+59.4	97.9	40 56.8	+59.6	98.8	40 47.2	+59.7	99.7	40 36.7	+59.8	100.5	40 25.3	+59.9	101.3	40 13.1	+60.0	102.2	40 00.0	+60.0	103.0	**40**
41	42 12.6	+59.3	96.9	42 05.0	+59.4	97.8	41 56.4	+59.6	98.7	41 46.9	+59.8	99.5	41 36.5	+59.9	100.4	41 25.2	+60.0	101.3	41 13.1	+59.9	102.1	41 00.0	+60.0	103.0	**41**
42	43 11.9	+59.1	96.6	43 04.4	+59.4	97.6	42 56.0	+59.6	98.5	42 46.7	+59.7	99.4	42 36.4	+59.9	100.3	42 25.2	+59.9	101.2	42 13.0	+60.0	102.1	42 00.0	+60.0	103.0	**42**
43	44 11.0	+59.2	96.4	44 03.8	+59.4	97.4	43 55.6	+59.6	98.3	43 46.4	+59.8	99.3	43 36.3	+59.8	100.2	43 25.1	+60.0	101.2	43 13.0	+60.0	102.1	43 00.0	+60.0	103.0	**43**
44	45 10.2	+59.1	96.2	45 03.2	+59.4	97.2	44 55.2	+59.6	98.2	44 46.2	+59.7	99.2	44 36.1	+59.8	100.1	44 25.1	+59.9	101.1	44 13.0	+60.0	102.1	44 00.0	+60.0	103.0	**44**
45	46 09.3	+59.1	95.9	46 02.6	+59.3	97.0	45 54.8	+59.5	98.0	45 45.9	+59.7	99.0	45 35.9	+59.9	100.0	45 25.0	+59.9	101.0	45 13.0	+60.0	102.0	45 00.0	+60.0	103.0	**45**
46	47 08.4	+59.1	95.7	47 01.9	+59.3	96.8	46 54.3	+59.5	97.8	46 45.6	+59.7	98.9	46 35.8	+59.8	99.9	46 24.9	+59.9	101.0	46 13.0	+60.0	102.0	46 00.0	+60.0	103.0	**46**
47	48 07.5	+59.0	95.4	48 01.2	+59.3	96.5	47 53.8	+59.5	97.6	47 45.3	+59.7	98.7	47 35.6	+59.8	99.8	47 24.8	+60.0	100.9	47 13.0	+59.9	101.9	47 00.0	+60.0	103.0	**47**
48	49 06.5	+59.0	95.2	49 00.5	+59.3	96.3	48 53.3	+59.5	97.4	48 45.0	+59.6	98.6	48 35.4	+59.9	99.7	48 24.8	+59.9	100.8	48 12.9	+60.0	101.9	48 00.0	+60.0	103.0	**48**
49	50 05.5	+58.9	94.9	49 59.8	+59.2	96.1	49 52.8	+59.5	97.2	49 44.6	+59.7	98.4	49 35.3	+59.8	99.6	49 24.7	+59.9	100.7	49 12.9	+60.0	101.9	49 00.0	+60.0	103.0	**49**
50	51 04.4	+58.9	94.6	50 59.0	+59.2	95.8	50 52.3	+59.4	97.0	50 44.3	+59.7	98.2	50 35.1	+59.8	99.5	50 24.6	+59.9	100.6	50 12.9	+60.0	101.8	50 00.0	+60.0	103.0	**50**
51	52 03.3	+58.9	94.3	51 58.2	+59.1	95.5	51 51.7	+59.4	96.8	51 44.0	+59.6	98.1	51 34.9	+59.8	99.3	51 24.5	+59.9	100.6	51 12.9	+60.0	101.8	51 00.0	+60.0	103.0	**51**
52	53 02.2	+58.8	94.0	52 57.3	+59.2	95.3	52 51.1	+59.4	96.6	52 43.6	+59.6	97.9	52 34.7	+59.8	99.2	52 24.4	+59.9	100.5	52 12.9	+59.9	101.7	52 00.0	+60.0	103.0	**52**
53	54 01.0	+58.7	93.6	53 56.5	+59.0	95.0	53 50.5	+59.4	96.4	53 43.2	+59.6	97.7	53 34.5	+59.7	99.0	53 24.3	+59.9	100.4	53 12.8	+60.0	101.7	53 00.0	+60.0	103.0	**53**
54	54 59.7	+58.7	93.3	54 55.5	+59.1	94.7	54 49.9	+59.3	96.1	54 42.8	+59.6	97.5	54 34.2	+59.8	98.9	54 24.2	+59.9	100.3	54 12.8	+60.0	101.6	54 00.0	+60.0	103.0	**54**
55	55 58.4	+58.6	92.9	55 54.6	+58.9	94.4	55 49.2	+59.3	95.8	55 42.4	+59.5	97.3	55 34.0	+59.7	98.7	55 24.1	+59.9	100.2	55 12.8	+60.0	101.6	55 00.0	+60.0	103.0	**55**
56	56 57.0	+58.5	92.5	56 53.5	+59.0	94.0	56 48.5	+59.3	95.6	56 41.9	+59.5	97.1	56 33.7	+59.8	98.6	56 24.0	+59.9	100.1	56 12.8	+59.9	101.5	56 00.0	+60.0	103.0	**56**
57	57 55.5	+58.4	92.1	57 52.5	+58.8	93.7	57 47.8	+59.2	95.3	57 41.4	+59.5	96.8	57 33.5	+59.7	98.4	57 23.9	+59.9	100.0	57 12.7	+60.0	101.5	57 00.0	+60.0	103.0	**57**
58	58 53.9	+58.4	91.7	58 51.3	+58.8	93.3	58 47.0	+59.1	95.0	58 40.9	+59.5	96.6	58 33.2	+59.7	98.2	58 23.8	+59.8	99.8	58 12.7	+60.0	101.4	58 00.0	+60.0	103.0	**58**
59	59 52.3	+58.2	91.2	59 50.1	+58.7	92.9	59 46.1	+59.2	94.6	59 40.4	+59.4	96.3	59 32.9	+59.7	98.0	59 23.6	+59.9	99.7	59 12.7	+59.9	101.4	59 00.0	+60.0	103.0	**59**
60	60 50.5	+58.1	90.7	60 48.8	+58.7	92.5	60 45.3	+59.0	94.3	60 39.8	+59.4	96.1	60 32.6	+59.6	97.8	60 23.5	+59.9	99.6	60 12.6	+60.0	101.3	60 00.0	+60.0	103.0	**60**
61	61 48.6	+58.0	90.2	61 47.5	+58.5	92.1	61 44.3	+59.0	93.9	61 39.2	+59.4	95.8	61 32.2	+59.7	97.6	61 23.4	+59.8	99.4	61 12.6	+60.0	101.2	61 00.0	+60.0	103.0	**61**
62	62 46.6	+57.9	89.7	62 46.0	+58.4	91.6	62 43.3	+58.9	93.5	62 38.6	+59.3	95.5	62 31.9	+59.6	97.4	62 23.2	+59.8	99.3	62 12.6	+59.9	101.2	62 00.0	+60.0	103.0	**62**
63	63 44.5	+57.7	89.1	63 44.4	+58.4	91.1	63 42.2	+58.9	93.1	63 37.9	+59.3	95.1	63 31.5	+59.6	97.1	63 23.0	+59.9	99.1	63 12.5	+60.0	101.1	63 00.0	+60.0	103.0	**63**
64	64 42.2	+57.6	88.4	64 42.8	+58.2	90.6	64 41.1	+58.7	92.7	64 37.2	+59.2	94.8	64 31.1	+59.6	96.9	64 22.9	+59.8	98.9	64 12.5	+59.9	101.0	64 00.0	+60.0	103.0	**64**
65	65 39.8	+57.3	87.8	65 41.0	+58.0	90.0	65 39.8	+58.7	92.2	65 36.4	+59.1	94.4	65 30.7	+59.5	96.6	65 22.7	+59.7	98.8	65 12.4	+60.0	100.9	65 00.0	+60.0	103.0	**65**
66	66 37.1	+57.2	87.0	66 39.0	+57.9	89.3	66 38.5	+58.6	91.7	66 35.5	+59.1	94.0	66 30.2	+59.5	96.3	66 22.4	+59.8	98.5	66 12.4	+59.9	100.8	66 00.0	+60.0	103.0	**66**
67	67 34.3	+56.9	86.3	67 36.9	+57.8	88.7	67 37.1	+58.4	91.1	67 34.6	+59.0	93.5	67 29.7	+59.4	95.9	67 22.2	+59.8	98.3	67 12.3	+60.0	100.7	67 00.0	+60.0	103.0	**67**
68	68 31.2	+56.6	85.4	68 34.7	+57.5	87.9	68 35.5	+58.3	90.5	68 33.6	+58.9	93.0	68 29.1	+59.4	95.6	68 22.0	+59.7	98.1	68 12.3	+59.9	100.6	68 00.0	+60.0	103.0	**68**
69	69 27.8	+56.3	84.5	69 32.2	+57.2	87.1	69 33.8	+58.1	89.8	69 32.5	+58.8	92.5	69 28.5	+59.3	95.2	69 21.7	+59.7	97.8	69 12.2	+59.9	100.4	69 00.0	+60.0	103.0	**69**
70	70 24.1	+55.9	83.5	70 29.4	+57.0	86.3	70 31.9	+57.9	89.1	70 31.3	+58.7	91.9	70 27.8	+59.3	94.7	70 21.4	+59.7	97.5	70 12.1	+59.9	100.3	70 00.0	+60.0	103.0	**70**
71	71 20.0	+55.5	82.4	71 26.4	+56.7	85.3	71 29.8	+57.7	88.3	71 30.0	+58.5	91.3	71 27.1	+59.2	94.3	71 21.1	+59.6	97.2	71 12.0	+59.9	100.1	71 00.0	+60.0	103.0	**71**
72	72 15.5	+55.0	81.1	72 23.1	+56.3	84.3	72 27.5	+57.4	87.4	72 28.5	+58.4	90.6	72 26.3	+59.1	93.7	72 20.7	+59.6	96.9	72 11.9	+60.0	100.0	72 00.0	+60.0	103.0	**72**
73	73 10.5	+54.4	79.8	73 19.4	+55.9	83.1	73 24.9	+57.1	86.4	73 26.9	+58.2	89.8	73 25.4	+58.9	93.1	73 20.3	+59.6	96.5	73 11.9	+59.8	99.8	73 00.0	+60.0	103.0	**73**
74	74 04.9	+53.7	78.3	74 15.3	+55.3	81.8	74 22.0	+56.8	85.3	74 25.1	+57.9	88.9	74 24.3	+58.9	92.5	74 19.9	+59.5	96.0	74 11.7	+59.9	99.6	74 00.0	+60.0	103.0	**74**
75	74 58.6	+52.9	76.6	75 10.6	+54.7	80.3	75 18.8	+56.3	84.1	75 23.0	+57.6	87.9	75 23.2	+58.7	91.7	75 19.4	+59.4	95.5	75 11.6	+59.9	99.3	75 00.0	+60.0	103.0	**75**
76	75 51.5	+51.9	74.8	76 05.3	+54.0	78.7	76 15.1	+55.7	82.7	76 20.6	+57.3	86.7	76 21.9	+58.4	90.9	76 18.8	+59.3	95.0	76 11.5	+59.8	99.0	76 00.0	+60.0	103.0	**76**
77	76 43.4	+50.7	72.6	76 59.3	+53.0	76.8	77 10.8	+55.1	81.1	77 17.9	+56.8	85.4	77 20.3	+58.2	89.9	77 18.1	+59.2	94.3	77 11.3	+59.8	98.7	77 00.0	+60.0	103.0	**77**
78	77 34.1	+49.3	70.2	77 52.3	+51.8	74.6	78 05.9	+54.2	79.2	78 14.7	+56.3	83.9	78 18.5	+57.9	88.7	78 17.3	+59.1	93.6	78 11.1	+59.8	98.3	78 00.0	+60.0	103.0	**78**
79	78 23.4	*+47.5* •	67.5	78 44.1	+50.5	72.1	79 00.1	+53.1	77.0	79 11.0	+55.5	82.1	79 16.4	+57.5	87.4	79 16.4	+58.9	92.7	79 10.9	+59.7	97.9	79 00.0	+60.0	103.0	**79**
80	79 10.9	*+45.3* •	64.4	79 34.6	*+48.6* •	69.3	79 53.2	+51.8	74.5	80 06.5	+54.6	80.0	80 13.9	+56.9	85.8	80 15.3	+58.6	91.6	80 10.6	+59.7	97.4	80 00.0	+60.0	103.0	**80**
81	79 56.2	*+42.5* •	60.7	80 23.2	*+46.3* •	65.9	80 45.0	*+50.0* •	71.5	81 01.1	+53.3	77.5	81 10.8	+56.2	83.8	81 13.9	+58.3	90.3	81 10.3	+59.6	96.7	81 00.0	+60.0	103.0	**81**
82	80 38.7	*+39.2* •	56.5	81 09.5	*+43.3* •	61.9	81 35.0	*+47.5* •	67.9	81 54.4	*+51.6* •	74.4	82 07.0	+55.1	81.4	82 12.2	+57.9	88.6	82 09.9	+59.4	95.9	82 00.0	+60.0	103.0	**82**
83	81 17.9	*+34.9* •	51.7	81 52.8	*+39.5* •	57.2	82 22.5	*+44.3* •	63.5	82 46.0	*+49.1* •	70.6	83 02.1	+53.6	78.3	83 10.1	+57.0	86.5	83 09.3	+59.3	94.9	83 00.0	+60.0	103.0	**83**
84	81 52.8	*+29.7* •	46.1	82 32.3	*+34.5* •	51.7	83 06.8	*+40.0* •	58.2	83 35.1	*+45.7* •	65.7	83 55.7	*+51.2* •	74.3	84 07.1	+56.0	83.7	84 08.6	+59.0	93.5	84 00.0	+60.0	103.0	**84**
85	82 22.5	*+23.5* •	39.8	83 06.8	*+28.3* •	45.1	83 46.8	*+34.0* •	51.6	84 20.8	*+40.5* •	59.5	84 46.9	*+47.6* •	69.0	85 03.1	*+54.0* •	79.9	85 07.6	+58.5	91.5	85 00.0	+60.0	103.0	**85**
86	82 46.0	*+16.1* •	32.7	83 35.1	*+20.6* •	37.5	84 20.8	*+26.1* •	43.6	85 01.3	*+33.2* •	51.6	85 34.5	*+41.5* •	61.7	85 57.1	*+50.4* •	74.3	86 06.1	+57.4	88.5	86 00.0	+60.0	103.0	**86**
87	83 02.1	*+8.0* •	24.9	83 55.7	*+11.4* •	28.8	84 46.9	*+16.2* •	34.1	85 34.5	*+22.6* •	41.4	86 16.0	*+31.5* •	51.5	86 47.5	*+43.1* •	65.6	87 03.5	*+55.0* •	83.7	87 00.0	+60.0	103.0	**87**
88	83 10.1	*−0.8* •	16.6	84 07.1	*+1.5* •	19.4	85 03.1	*+4.5* •	23.2	85 57.1	*+9.0* •	28.8	86 47.5	*+16.0* •	37.4	87 30.6	*+27.9* •	51.5	87 58.5	*+46.8* •	74.2	88 00.0	+60.0	103.0	**88**
89	83 09.3	*−9.3* •	8.2	84 08.6	*−8.6* •	9.6	85 07.6	*−7.6* •	11.5	86 06.1	*−6.1* •	14.5	87 03.5	*−3.5* •	19.4	87 58.5	*+1.5* •	28.8	88 45.3	*+14.7* •	51.5	89 00.0	+60.0	103.0	**89**
90	83 00.0	*−17.4* •	0.0	84 00.0	*−18.0* •	0.0	85 00.0	*−18.9* •	0.0	86 00.0	*−20.1* •	0.0	87 00.0	*−22.1* •	0.0	88 00.0	*−25.7* •	0.0	89 00.0	*−33.9* •	0.0	90 00.0	−60.0	51.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 77°, 283°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 34.3	– 59.6	102.9	1 20.8	– 59.6	102.9	1 07.4	– 59.8	103.0	0 53.9	– 59.8	103.0	0 40.5	– 59.9	103.0	0 27.0	– 60.0	103.0	0 13.5	– 60.0	103.0	0 00.0	+ 60.0	77.0	**0**
1	0 34.7	– 59.6	103.0	0 21.2	– 59.7	103.0	0 07.6	– 59.8	103.0	0 05.9	+ 59.9	77.0	0 19.4	+ 60.0	77.0	0 33.0	+ 59.9	77.0	0 46.5	+ 60.0	77.0	1 00.0	+ 60.0	77.0	**1**
2	0 24.9	+ 59.6	76.9	0 38.5	+ 59.7	76.9	0 52.2	+ 59.7	76.9	1 05.8	+ 59.8	76.9	1 19.4	+ 59.9	76.9	1 32.9	+ 60.0	76.9	1 46.5	+ 60.0	77.0	2 00.0	+ 60.0	77.0	**2**
3	1 24.5	+ 59.5	76.7	1 38.2	+ 59.7	76.8	1 51.9	+ 59.8	76.8	2 05.6	+ 59.9	76.8	2 19.3	+ 59.9	76.9	2 32.9	+ 60.0	76.9	2 46.5	+ 60.0	77.0	3 00.0	+ 60.0	77.0	**3**
4	2 24.0	+ 59.6	76.6	2 37.9	+ 59.7	76.7	2 51.7	+ 59.8	76.7	3 05.5	+ 59.9	76.8	3 19.2	+ 59.9	76.8	3 32.9	+ 59.9	76.9	3 46.5	+ 60.0	76.9	4 00.0	+ 60.0	77.0	**4**
5	3 23.6	+ 59.6	76.5	3 37.6	+ 59.7	76.6	3 51.5	+ 59.8	76.6	4 05.4	+ 59.8	76.7	4 19.1	+ 60.0	76.8	4 32.8	+ 60.0	76.8	4 46.5	+ 60.0	76.9	5 00.0	+ 60.0	77.0	**5**
6	4 23.2	+ 59.6	76.4	4 37.3	+ 59.7	76.5	4 51.3	+ 59.8	76.5	5 05.2	+ 59.9	76.6	5 19.1	+ 59.9	76.7	5 32.8	+ 60.0	76.8	5 46.5	+ 59.9	76.9	6 00.0	+ 60.0	77.0	**6**
7	5 22.8	+ 59.5	76.3	5 37.0	+ 59.7	76.4	5 51.1	+ 59.8	76.5	6 05.1	+ 59.8	76.6	6 19.0	+ 59.9	76.7	6 32.8	+ 59.9	76.8	6 46.4	+ 60.0	76.9	7 00.0	+ 60.0	77.0	**7**
8	6 22.3	+ 59.6	76.1	6 36.7	+ 59.6	76.3	6 50.9	+ 59.7	76.4	7 04.9	+ 59.9	76.5	7 18.9	+ 59.9	76.6	7 32.7	+ 60.0	76.7	7 46.4	+ 60.0	76.9	8 00.0	+ 60.0	77.0	**8**
9	7 21.9	+ 59.6	76.0	7 36.3	+ 59.7	76.1	7 50.6	+ 59.8	76.3	8 04.8	+ 59.9	76.4	8 18.8	+ 59.9	76.6	8 32.7	+ 60.0	76.7	8 46.4	+ 60.0	76.8	9 00.0	+ 60.0	77.0	**9**
10	8 21.5	+ 59.5	75.9	8 36.0	+ 59.7	76.0	8 50.4	+ 59.8	76.2	9 04.7	+ 59.8	76.3	9 18.7	+ 60.0	76.5	9 32.7	+ 59.9	76.7	9 46.4	+ 60.0	76.8	10 00.0	+ 60.0	77.0	**10**
11	9 21.0	+ 59.6	75.8	9 35.7	+ 59.7	75.9	9 50.2	+ 59.8	76.1	10 04.5	+ 59.9	76.3	10 18.7	+ 59.9	76.5	10 32.6	+ 60.0	76.6	10 46.4	+ 60.0	76.8	11 00.0	+ 60.0	77.0	**11**
12	10 20.6	+ 59.6	75.7	10 35.4	+ 59.7	75.8	10 50.0	+ 59.7	76.0	11 04.4	+ 59.8	76.2	11 18.6	+ 59.9	76.4	11 32.6	+ 60.0	76.6	11 46.4	+ 60.0	76.8	12 00.0	+ 60.0	77.0	**12**
13	11 20.2	+ 59.5	75.5	11 35.1	+ 59.6	75.7	11 49.7	+ 59.8	75.9	12 04.2	+ 59.9	76.1	12 18.5	+ 59.9	76.3	12 32.6	+ 59.9	76.6	12 46.4	+ 60.0	76.8	13 00.0	+ 60.0	77.0	**13**
14	12 19.7	+ 59.6	75.4	12 34.7	+ 59.7	75.6	12 49.5	+ 59.8	75.8	13 04.1	+ 59.8	76.1	13 18.4	+ 59.9	76.3	13 32.5	+ 60.0	76.5	13 46.4	+ 60.0	76.8	14 00.0	+ 60.0	77.0	**14**
15	13 19.3	+ 59.5	75.3	13 34.4	+ 59.7	75.5	13 49.3	+ 59.8	75.8	14 03.9	+ 59.9	76.0	14 18.3	+ 59.9	76.2	14 32.5	+ 59.9	76.5	14 46.4	+ 60.0	76.7	15 00.0	+ 60.0	77.0	**15**
16	14 18.8	+ 59.6	75.2	14 34.1	+ 59.6	75.4	14 49.1	+ 59.7	75.7	15 03.8	+ 59.8	75.9	15 18.2	+ 60.0	76.2	15 32.4	+ 60.0	76.5	15 46.4	+ 60.0	76.7	16 00.0	+ 60.0	77.0	**16**
17	15 18.4	+ 59.5	75.0	15 33.7	+ 59.7	75.3	15 48.8	+ 59.8	75.6	16 03.6	+ 59.9	75.8	16 18.2	+ 59.9	76.1	16 32.4	+ 60.0	76.4	16 46.4	+ 59.9	76.7	17 00.0	+ 60.0	77.0	**17**
18	16 17.9	+ 59.5	74.9	16 33.4	+ 59.7	75.2	16 48.6	+ 59.7	75.5	17 03.5	+ 59.8	75.8	17 18.1	+ 59.9	76.1	17 32.4	+ 59.9	76.4	17 46.3	+ 60.0	76.7	18 00.0	+ 60.0	77.0	**18**
19	17 17.4	+ 59.6	74.8	17 33.1	+ 59.6	75.1	17 48.3	+ 59.8	75.4	18 03.3	+ 59.9	75.7	18 18.0	+ 59.9	76.0	18 32.3	+ 60.0	76.3	18 46.3	+ 60.0	76.7	19 00.0	+ 60.0	77.0	**19**
20	18 17.0	+ 59.5	74.6	18 32.7	+ 59.7	75.0	18 48.1	+ 59.8	75.3	19 03.2	+ 59.8	75.6	19 17.9	+ 59.9	76.0	19 32.3	+ 60.0	76.3	19 46.3	+ 60.0	76.6	20 00.0	+ 60.0	77.0	**20**
21	19 16.5	+ 59.5	74.5	19 32.4	+ 59.6	74.8	19 47.9	+ 59.7	75.2	20 03.0	+ 59.9	75.5	20 17.8	+ 59.9	75.9	20 32.3	+ 59.9	76.3	20 46.3	+ 60.0	76.6	21 00.0	+ 60.0	77.0	**21**
22	20 16.0	+ 59.5	74.4	20 32.0	+ 59.6	74.7	20 47.6	+ 59.8	75.1	21 02.9	+ 59.8	75.5	21 17.7	+ 59.9	75.8	21 32.2	+ 60.0	76.2	21 46.3	+ 60.0	76.6	22 00.0	+ 60.0	77.0	**22**
23	21 15.5	+ 59.5	74.2	21 31.6	+ 59.7	74.6	21 47.4	+ 59.7	75.0	22 02.7	+ 59.8	75.4	22 17.6	+ 59.9	75.8	22 32.2	+ 59.9	76.2	22 46.3	+ 60.0	76.6	23 00.0	+ 60.0	77.0	**23**
24	22 15.0	+ 59.5	74.1	22 31.3	+ 59.6	74.5	22 47.1	+ 59.8	74.9	23 02.5	+ 59.9	75.3	23 17.5	+ 60.0	75.7	23 32.1	+ 60.0	76.1	23 46.3	+ 60.0	76.6	24 00.0	+ 60.0	77.0	**24**
25	23 14.5	+ 59.5	74.0	23 30.9	+ 59.6	74.4	23 46.9	+ 59.7	74.8	24 02.4	+ 59.8	75.2	24 17.5	+ 59.9	75.7	24 32.1	+ 59.9	76.1	24 46.3	+ 60.0	76.5	25 00.0	+ 60.0	77.0	**25**
26	24 14.0	+ 59.5	73.8	24 30.5	+ 59.7	74.3	24 46.6	+ 59.7	74.7	25 02.2	+ 59.8	75.1	25 17.4	+ 59.9	75.6	25 32.0	+ 60.0	76.1	25 46.3	+ 60.0	76.5	26 00.0	+ 60.0	77.0	**26**
27	25 13.5	+ 59.5	73.7	25 30.2	+ 59.6	74.1	25 46.3	+ 59.8	74.6	26 02.0	+ 59.9	75.1	26 17.3	+ 59.9	75.5	26 32.0	+ 60.0	76.0	26 46.3	+ 59.9	76.5	27 00.0	+ 60.0	77.0	**27**
28	26 13.0	+ 59.5	73.5	26 29.8	+ 59.6	74.0	26 46.1	+ 59.7	74.5	27 01.9	+ 59.8	75.0	27 17.2	+ 59.9	75.5	27 32.0	+ 59.9	76.0	27 46.2	+ 60.0	76.5	28 00.0	+ 60.0	77.0	**28**
29	27 12.5	+ 59.4	73.4	27 29.4	+ 59.6	73.9	27 45.8	+ 59.7	74.4	28 01.7	+ 59.8	74.9	28 17.1	+ 59.9	75.4	28 31.9	+ 60.0	75.9	28 46.2	+ 60.0	76.5	29 00.0	+ 60.0	77.0	**29**
30	28 11.9	+ 59.5	73.2	28 29.0	+ 59.6	73.7	28 45.5	+ 59.7	74.3	29 01.5	+ 59.8	74.8	29 17.0	+ 59.9	75.3	29 31.9	+ 59.9	75.9	29 46.2	+ 60.0	76.4	30 00.0	+ 60.0	77.0	**30**
31	29 11.4	+ 59.4	73.1	29 28.6	+ 59.6	73.6	29 45.2	+ 59.7	74.2	30 01.3	+ 59.8	74.7	30 16.9	+ 59.9	75.3	30 31.8	+ 60.0	75.8	30 46.2	+ 60.0	76.4	31 00.0	+ 60.0	77.0	**31**
32	30 10.8	+ 59.4	72.9	30 28.2	+ 59.5	73.5	30 44.9	+ 59.7	74.0	31 01.1	+ 59.8	74.6	31 16.8	+ 59.8	75.2	31 31.8	+ 59.9	75.8	31 46.2	+ 60.0	76.4	32 00.0	+ 60.0	77.0	**32**
33	31 10.2	+ 59.4	72.8	31 27.7	+ 59.6	73.3	31 44.6	+ 59.7	73.9	32 00.9	+ 59.8	74.5	32 16.6	+ 59.9	75.1	32 31.7	+ 60.0	75.7	32 46.2	+ 60.0	76.4	33 00.0	+ 60.0	77.0	**33**
34	32 09.6	+ 59.4	72.6	32 27.3	+ 59.6	73.2	32 44.3	+ 59.7	73.8	33 00.7	+ 59.8	74.4	33 16.5	+ 59.9	75.1	33 31.7	+ 59.9	75.7	33 46.2	+ 60.0	76.3	34 00.0	+ 60.0	77.0	**34**
35	33 09.0	+ 59.4	72.4	33 26.9	+ 59.5	73.1	33 44.0	+ 59.7	73.7	34 00.5	+ 59.8	74.3	34 16.4	+ 59.9	75.0	34 31.6	+ 60.0	75.7	34 46.2	+ 59.9	76.3	35 00.0	+ 60.0	77.0	**35**
36	34 08.4	+ 59.4	72.3	34 26.4	+ 59.5	72.9	34 43.7	+ 59.7	73.6	35 00.3	+ 59.8	74.2	35 16.3	+ 59.9	74.9	35 31.6	+ 59.9	75.6	35 46.1	+ 60.0	76.3	36 00.0	+ 60.0	77.0	**36**
37	35 07.8	+ 59.4	72.1	35 25.9	+ 59.6	72.8	35 43.4	+ 59.6	73.4	36 00.1	+ 59.8	74.1	36 16.2	+ 59.9	74.8	36 31.5	+ 60.0	75.5	36 46.1	+ 60.0	76.3	37 00.0	+ 60.0	77.0	**37**
38	36 07.2	+ 59.3	71.9	36 25.5	+ 59.5	72.6	36 43.0	+ 59.7	73.3	36 59.9	+ 59.8	74.0	37 16.1	+ 59.8	74.8	37 31.5	+ 59.9	75.5	37 46.1	+ 60.0	76.2	38 00.0	+ 60.0	77.0	**38**
39	37 06.5	+ 59.3	71.7	37 25.0	+ 59.5	72.4	37 42.7	+ 59.7	73.2	37 59.7	+ 59.8	73.9	38 15.9	+ 59.9	74.7	38 31.4	+ 60.0	75.4	38 46.1	+ 60.0	76.2	39 00.0	+ 60.0	77.0	**39**
40	38 05.8	+ 59.3	71.5	38 24.5	+ 59.4	72.3	38 42.4	+ 59.6	73.0	38 59.5	+ 59.7	73.8	39 15.8	+ 59.9	74.6	39 31.4	+ 59.9	75.4	39 46.1	+ 60.0	76.2	40 00.0	+ 60.0	77.0	**40**
41	39 05.1	+ 59.3	71.3	39 23.9	+ 59.5	72.1	39 42.0	+ 59.6	72.9	39 59.2	+ 59.8	73.7	40 15.7	+ 59.8	74.5	40 31.3	+ 59.9	75.3	40 46.1	+ 60.0	76.2	41 00.0	+ 60.0	77.0	**41**
42	40 04.4	+ 59.3	71.1	40 23.4	+ 59.5	71.9	40 41.6	+ 59.6	72.7	40 59.0	+ 59.8	73.6	41 15.5	+ 59.9	74.4	41 31.2	+ 60.0	75.3	41 46.1	+ 59.9	76.1	42 00.0	+ 60.0	77.0	**42**
43	41 03.7	+ 59.2	70.9	41 22.9	+ 59.4	71.8	41 41.2	+ 59.6	72.6	41 58.8	+ 59.7	73.5	42 15.4	+ 59.9	74.3	42 31.2	+ 59.9	75.2	42 46.0	+ 60.0	76.1	43 00.0	+ 60.0	77.0	**43**
44	42 02.9	+ 59.2	70.7	42 22.3	+ 59.4	71.6	42 40.8	+ 59.6	72.4	42 58.5	+ 59.7	73.3	43 15.3	+ 59.8	74.2	43 31.1	+ 59.9	75.1	43 46.0	+ 60.0	76.1	44 00.0	+ 60.0	77.0	**44**
45	43 02.1	+ 59.2	70.5	43 21.7	+ 59.4	71.4	43 40.4	+ 59.6	72.3	43 58.2	+ 59.8	73.2	44 15.1	+ 59.9	74.1	44 31.0	+ 60.0	75.1	44 46.0	+ 60.0	76.0	45 00.0	+ 60.0	77.0	**45**
46	44 01.3	+ 59.2	70.3	44 21.1	+ 59.4	71.2	44 40.0	+ 59.6	72.1	44 58.0	+ 59.7	73.1	45 15.0	+ 59.8	74.0	45 31.0	+ 59.9	75.0	45 46.0	+ 60.0	76.0	46 00.0	+ 60.0	77.0	**46**
47	45 00.5	+ 59.1	70.0	45 20.5	+ 59.4	71.0	45 39.6	+ 59.5	71.9	45 57.7	+ 59.7	72.9	46 14.8	+ 59.8	73.9	46 30.9	+ 59.9	74.9	46 46.0	+ 60.0	76.0	47 00.0	+ 60.0	77.0	**47**
48	45 59.6	+ 59.1	69.8	46 19.9	+ 59.3	70.8	46 39.1	+ 59.6	71.8	46 57.4	+ 59.7	72.8	47 14.6	+ 59.9	73.8	47 30.8	+ 59.9	74.9	47 46.0	+ 59.9	75.9	48 00.0	+ 60.0	77.0	**48**
49	46 58.7	+ 59.1	69.5	47 19.2	+ 59.3	70.6	47 38.7	+ 59.5	71.6	47 57.1	+ 59.7	72.6	48 14.5	+ 59.8	73.7	48 30.7	+ 60.0	74.8	48 45.9	+ 60.0	75.9	49 00.0	+ 60.0	77.0	**49**
50	47 57.8	+ 59.0	69.3	48 18.5	+ 59.3	70.3	48 38.2	+ 59.5	71.4	48 56.8	+ 59.6	72.5	49 14.3	+ 59.8	73.6	49 30.7	+ 59.9	74.7	49 45.9	+ 60.0	75.8	50 00.0	+ 60.0	77.0	**50**
51	48 56.8	+ 59.0	69.0	49 17.8	+ 59.2	70.1	49 37.7	+ 59.4	71.2	49 56.4	+ 59.7	72.3	50 14.1	+ 59.8	73.5	50 30.6	+ 59.9	74.6	50 45.9	+ 60.0	75.8	51 00.0	+ 60.0	77.0	**51**
52	49 55.8	+ 59.0	68.7	50 17.0	+ 59.2	69.9	50 37.1	+ 59.5	71.0	50 56.1	+ 59.6	72.2	51 13.9	+ 59.8	73.3	51 30.5	+ 59.9	74.5	51 45.9	+ 59.9	75.8	52 00.0	+ 60.0	77.0	**52**
53	50 54.8	+ 58.9	68.4	51 16.2	+ 59.2	69.6	51 36.6	+ 59.4	70.8	51 55.7	+ 59.7	72.0	52 13.7	+ 59.8	73.2	52 30.4	+ 59.9	74.5	52 45.8	+ 60.0	75.7	53 00.0	+ 60.0	77.0	**53**
54	51 53.7	+ 58.8	68.1	52 15.4	+ 59.2	69.3	52 36.0	+ 59.4	70.6	52 55.4	+ 59.6	71.8	53 13.5	+ 59.8	73.1	53 30.3	+ 59.9	74.4	53 45.8	+ 60.0	75.7	54 00.0	+ 60.0	77.0	**54**
55	52 52.5	+ 58.8	67.8	53 14.6	+ 59.1	69.1	53 35.4	+ 59.4	70.3	53 55.0	+ 59.6	71.6	54 13.3	+ 59.7	72.9	54 30.2	+ 59.9	74.3	54 45.8	+ 60.0	75.6	55 00.0	+ 60.0	77.0	**55**
56	53 51.3	+ 58.7	67.5	54 13.7	+ 59.0	68.8	54 34.8	+ 59.3	70.1	54 54.6	+ 59.5	71.4	55 13.0	+ 59.8	72.8	55 30.1	+ 59.9	74.2	55 45.8	+ 59.9	75.6	56 00.0	+ 60.0	77.0	**56**
57	54 50.0	+ 58.7	67.1	55 12.7	+ 59.0	68.5	55 34.1	+ 59.3	69.8	55 54.1	+ 59.6	71.2	56 12.8	+ 59.7	72.6	56 30.0	+ 59.9	74.0	56 45.7	+ 60.0	75.5	57 00.0	+ 60.0	77.0	**57**
58	55 48.7	+ 58.6	66.8	56 11.7	+ 59.0	68.1	56 33.4	+ 59.3	69.5	56 53.7	+ 59.5	71.0	57 12.5	+ 59.7	72.4	57 29.9	+ 59.8	73.9	57 45.7	+ 60.0	75.5	58 00.0	+ 60.0	77.0	**58**
59	56 47.3	+ 58.6	66.4	57 10.7	+ 58.9	67.8	57 32.7	+ 59.2	69.3	57 53.2	+ 59.5	70.7	58 12.2	+ 59.7	72.3	58 29.7	+ 59.9	73.8	58 45.7	+ 59.9	75.4	59 00.0	+ 60.0	77.0	**59**
60	57 45.9	+ 58.4	66.0	58 09.6	+ 58.8	67.4	58 31.9	+ 59.2	68.9	58 52.7	+ 59.5	70.5	59 11.9	+ 59.7	72.1	59 29.6	+ 59.9	73.7	59 45.6	+ 60.0	75.3	60 00.0	+ 60.0	77.0	**60**
61	58 44.3	+ 58.4	65.5	59 08.4	+ 58.8	67.1	59 31.1	+ 59.1	68.6	59 52.2	+ 59.4	70.2	60 11.6	+ 59.7	71.9	60 29.5	+ 59.8	73.5	60 45.6	+ 60.0	75.3	61 00.0	+ 60.0	77.0	**61**
62	59 42.7	+ 58.2	65.1	60 07.2	+ 58.7	66.7	60 30.2	+ 59.1	68.3	60 51.6	+ 59.4	70.0	61 11.3	+ 59.7	71.7	61 29.3	+ 59.9	73.4	61 45.6	+ 59.9	75.2	62 00.0	+ 60.0	77.0	**62**
63	60 40.9	+ 58.2	64.6	61 05.9	+ 58.6	66.2	61 29.3	+ 59.0	67.9	61 51.0	+ 59.3	69.7	62 11.0	+ 59.6	71.4	62 29.2	+ 59.8	73.2	62 45.5	+ 60.0	75.1	63 00.0	+ 60.0	77.0	**63**
64	61 39.1	+ 58.0	64.1	62 04.5	+ 58.5	65.8	62 28.3	+ 58.9	67.5	62 50.3	+ 59.3	69.3	63 10.6	+ 59.6	71.2	63 29.0	+ 59.8	73.1	63 45.5	+ 59.9	75.0	64 00.0	+ 60.0	77.0	**64**
65	62 37.1	+ 57.9	63.6	63 03.0	+ 58.4	65.3	63 27.2	+ 58.9	67.1	63 49.6	+ 59.3	69.0	64 10.2	+ 59.6	70.9	64 28.8	+ 59.8	72.9	64 45.4	+ 60.0	74.9	65 00.0	+ 60.0	77.0	**65**
66	63 35.0	+ 57.8	63.0	64 01.4	+ 58.3	64.8	64 26.1	+ 58.8	66.7	64 48.9	+ 59.2	68.6	65 09.8	+ 59.5	70.6	65 28.6	+ 59.8	72.7	65 45.4	+ 59.9	74.8	66 00.0	+ 60.0	77.0	**66**
67	64 32.8	+ 57.5	62.4	64 59.7	+ 58.2	64.3	65 24.9	+ 58.7	66.2	65 48.1	+ 59.1	68.2	66 09.3	+ 59.5	70.3	66 28.4	+ 59.8	72.5	66 45.3	+ 60.0	74.7	67 00.0	+ 60.0	77.0	**67**
68	65 30.3	+ 57.4	61.7	65 57.9	+ 58.0	63.7	66 23.6	+ 58.5	65.7	66 47.2	+ 59.1	67.8	67 08.8	+ 59.5	70.0	67 28.2	+ 59.7	72.3	67 45.3	+ 59.9	74.6	68 00.0	+ 60.0	77.0	**68**
69	66 27.7	+ 57.2	61.0	66 55.9	+ 57.9	63.0	67 22.1	+ 58.5	65.2	67 46.3	+ 59.0	67.4	68 08.3	+ 59.4	69.7	68 27.9	+ 59.8	72.0	68 45.2	+ 60.0	74.5	69 00.0	+ 60.0	77.0	**69**
70	67 24.9	+ 56.9	60.2	67 53.8	+ 57.6	62.3	68 20.6	+ 58.3	64.6	68 45.3	+ 58.9	66.9	69 07.7	+ 59.3	69.3	69 27.7	+ 59.7	71.8	69 45.2	+ 59.9	74.4	70 00.0	+ 60.0	77.0	**70**
71	68 21.8	+ 56.7	59.4	68 51.4	+ 57.5	61.6	69 18.9	+ 58.2	63.9	69 44.2	+ 58.7	66.3	70 07.0	+ 59.3	68.9	70 27.4	+ 59.7	71.5	70 45.1	+ 59.9	74.2	71 00.0	+ 60.0	77.0	**71**
72	69 18.5	+ 56.4	58.4	69 48.9	+ 57.2	60.8	70 17.1	+ 57.9	63.2	70 42.9	+ 58.7	65.7	71 06.3	+ 59.2	68.4	71 27.1	+ 59.6	71.2	71 45.0	+ 59.9	74.0	72 00.0	+ 60.0	77.0	**72**
73	70 14.9	+ 55.9	57.5	70 46.1	+ 56.9	59.9	71 15.0	+ 57.8	62.4	71 41.6	+ 58.5	65.1	72 05.5	+ 59.1	67.9	72 26.7	+ 59.6	70.8	72 44.9	+ 59.9	73.9	73 00.0	+ 60.0	77.0	**73**
74	71 10.8	+ 55.6	56.4	71 43.0	+ 56.5	58.9	72 12.8	+ 57.5	61.5	72 40.1	+ 58.3	64.4	73 04.6	+ 59.1	67.3	73 26.3	+ 59.5	70.4	73 44.8	+ 59.9	73.7	74 00.0	+ 60.0	77.0	**74**
75	72 06.4	+ 55.1	55.2	72 39.5	+ 56.2	57.8	73 10.3	+ 57.2	60.6	73 38.4	+ 58.1	63.6	74 03.7	+ 58.9	66.7	74 25.8	+ 59.5	70.0	74 44.7	+ 59.8	73.4	75 00.0	+ 60.0	77.0	**75**
76	73 01.5	+ 54.5	53.8	73 35.7	+ 55.7	56.6	74 07.5	+ 56.8	59.5	74 36.5	+ 57.9	62.6	75 02.6	+ 58.7	66.0	75 25.3	+ 59.4	69.5	75 44.5	+ 59.9	73.2	76 00.0	+ 60.0	77.0	**76**
77	73 56.0	+ 53.8	52.4	74 31.4	+ 55.2	55.2	75 04.3	+ 56.5	58.3	75 34.4	+ 57.6	61.6	76 01.3	+ 58.5	65.1	76 24.7	+ 59.3	68.9	76 44.4	+ 59.8	72.9	77 00.0	+ 60.0	77.0	**77**
78	74 49.8	+ 53.1	50.7	75 26.6	+ 54.5	53.7	76 00.8	+ 55.9	56.9	76 32.0	+ 57.1	60.4	76 59.8	+ 58.3	64.2	77 24.0	+ 59.2	68.2	77 44.2	+ 59.8	72.5	78 00.0	+ 60.0	77.0	**78**
79	75 42.9	+ 52.1	48.9	76 21.1	+ 53.7	52.0	76 56.7	+ 55.2	55.4	77 29.1	+ 56.8	59.1	77 58.1	+ 58.1	63.1	78 23.2	+ 59.1	67.5	78 44.0	+ 59.8	72.1	79 00.0	+ 60.0	77.0	**79**
80	76 35.0	+ 50.9	46.8	77 14.8	+ 52.7	50.0	77 51.9	+ 54.5	53.6	78 25.9	+ 56.1	57.5	78 56.2	+ 57.6	61.8	79 22.3	+ 58.9	66.5	79 43.8	+ 59.6	71.6	80 00.0	+ 60.0	77.0	**80**
81	77 25.9	+ 49.5	44.5	78 07.5	+ 51.5	47.8	78 46.4	+ 53.4	51.5	79 22.0	+ 55.4	55.7	79 53.8	+ 57.1	60.3	80 21.2	+ 58.6	65.4	80 43.4	+ 59.7	71.0	81 00.0	+ 60.0	77.0	**81**
82	78 15.4	+ 47.8	41.8	78 59.0	+ 49.9	45.2	79 39.8	+ 52.2	49.1	80 17.4	+ 54.3	53.5	80 50.9	+ 56.5	58.5	81 19.8	+ 58.2	64.1	81 43.1	+ 59.5	70.3	82 00.0	+ 60.0	77.0	**82**
83	79 03.2	*+ 45.7* •	38.7	79 48.9	*+ 48.0* •	42.2	80 32.0	+ 50.4	46.2	81 11.7	+ 53.0	50.9	81 47.4	+ 55.5	56.3	82 18.0	+ 57.8	62.4	82 42.6	+ 59.4	69.4	83 00.0	+ 60.0	77.0	**83**
84	79 48.9	*+ 43.1* •	35.2	80 36.9	*+ 45.5* •	38.7	81 22.4	*+ 48.3* •	42.8	82 04.7	*+ 51.2* •	47.7	82 42.9	+ 54.2	53.4	83 15.8	+ 57.0	60.3	83 42.0	+ 59.1	68.1	84 00.0	+ 60.0	77.0	**84**
85	80 32.0	*+ 39.7* •	31.1	81 22.4	*+ 42.3* •	34.5	82 10.7	*+ 45.2* •	38.6	82 55.9	*+ 48.6* •	43.6	83 37.1	*+ 52.2* •	49.8	84 12.8	+ 55.8	57.4	84 41.1	+ 58.8	66.5	85 00.0	+ 60.0	77.0	**85**
86	81 11.7	*+ 35.7* •	26.4	82 04.7	*+ 38.2* •	29.6	82 55.9	*+ 41.2* •	33.5	83 44.5	*+ 44.8* •	38.6	84 29.3	*+ 49.0* •	45.0	85 08.6	*+ 53.7* •	53.4	85 39.9	+ 58.0	64.0	86 00.0	+ 60.0	77.0	**86**
87	81 47.4	*+ 30.6* •	20.9	82 42.9	*+ 32.9* •	23.7	83 37.1	*+ 35.7* •	27.3	84 29.3	*+ 39.3* •	32.1	85 18.3	*+ 44.0* •	38.5	86 02.3	*+ 49.9* •	47.6	86 37.9	*+ 56.4* •	60.2	87 00.0	+ 60.0	77.0	**87**
88	82 18.0	*+ 24.6* •	14.7	83 15.8	*+ 26.2* •	16.9	84 12.8	*+ 28.3* •	19.7	85 08.6	*+ 31.3* •	23.7	86 02.3	*+ 35.6* •	29.5	86 52.2	*+ 42.1* •	38.5	87 34.3	*+ 51.8* •	53.4	88 00.0	+ 60.0	77.0	**88**
89	82 42.6	*+ 17.4* •	7.7	83 42.0	*+ 18.0* •	8.9	84 41.1	*+ 18.9* •	10.6	85 39.9	*+ 20.1* •	13.0	86 37.9	*+ 22.1* •	16.8	87 34.3	*+ 25.7* •	23.7	88 26.1	*+ 33.9* •	38.5	89 00.0	+ 60.0	77.0	**89**
90	83 00.0	*+ 9.3* •	0.0	84 00.0	*+ 8.6* •	0.0	85 00.0	*+ 7.6* •	0.0	86 00.0	*+ 6.1* •	0.0	87 00.0	*+ 3.5* •	0.0	88 00.0	*– 1.5* •	0.0	89 00.0	*– 14.7* •	0.0	90 00.0	– 60.0	38.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
{L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 103°, 257°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	1 27.1	+59.6	101.9	1 14.7	+59.7	101.9	1 02.3	+59.8	102.0	0 49.9	+59.8	102.0	0 37.4	+59.9	102.0	0 24.9	+60.0	102.0	0 12.5	+60.0	102.0	0 00.0	+60.0	102.0	**0**
1	2 26.7	+59.6	101.8	2 14.4	+59.7	101.8	2 02.1	+59.8	101.9	1 49.7	+59.9	101.9	1 37.3	+60.0	101.9	1 24.9	+60.0	102.0	1 12.5	+60.0	102.0	1 00.0	+60.0	102.0	**1**
2	3 26.3	+59.5	101.7	3 14.1	+59.7	101.7	3 01.9	+59.7	101.8	2 49.6	+59.8	101.8	2 37.3	+59.9	101.9	2 24.9	+59.9	101.9	2 12.5	+59.9	102.0	2 00.0	+60.0	102.0	**2**
3	4 25.8	+59.6	101.6	4 13.8	+59.7	101.6	4 01.6	+59.8	101.7	3 49.4	+59.9	101.8	3 37.2	+59.9	101.8	3 24.8	+60.0	101.9	3 12.4	+60.0	101.9	3 00.0	+60.0	102.0	**3**
4	5 25.4	+59.6	101.4	5 13.5	+59.6	101.5	5 01.4	+59.8	101.6	4 49.3	+59.9	101.7	4 37.1	+59.9	101.8	4 24.8	+60.0	101.9	4 12.4	+60.0	101.9	4 00.0	+60.0	102.0	**4**
5	6 25.0	+59.5	101.3	6 13.1	+59.7	101.4	6 01.2	+59.8	101.5	5 49.2	+59.8	101.6	5 37.0	+59.9	101.7	5 24.8	+59.9	101.8	5 12.4	+60.0	101.9	5 00.0	+60.0	102.0	**5**
6	7 24.5	+59.6	101.2	7 12.8	+59.7	101.3	7 01.0	+59.8	101.4	6 49.0	+59.9	101.6	6 36.9	+60.0	101.7	6 24.7	+60.0	101.8	6 12.4	+60.0	101.9	6 00.0	+60.0	102.0	**6**
7	8 24.1	+59.6	101.1	8 12.5	+59.7	101.2	8 00.8	+59.7	101.4	7 48.9	+59.8	101.5	7 36.9	+59.9	101.6	7 24.7	+60.0	101.8	7 12.4	+60.0	101.9	7 00.0	+60.0	102.0	**7**
8	9 23.7	+59.5	100.9	9 12.2	+59.7	101.1	9 00.5	+59.8	101.3	8 48.7	+59.9	101.4	8 36.8	+59.9	101.6	8 24.7	+59.9	101.7	8 12.4	+60.0	101.9	8 00.0	+60.0	102.0	**8**
9	10 23.2	+59.6	100.8	10 11.9	+59.6	101.0	10 00.3	+59.8	101.2	9 48.6	+59.8	101.4	9 36.7	+59.9	101.5	9 24.6	+60.0	101.7	9 12.4	+60.0	101.8	9 00.0	+60.0	102.0	**9**
10	11 22.8	+59.5	100.7	11 11.5	+59.7	100.9	11 00.1	+59.8	101.1	10 48.4	+59.9	101.3	10 36.6	+59.9	101.5	10 24.6	+60.0	101.6	10 12.4	+60.0	101.8	10 00.0	+60.0	102.0	**10**
11	12 22.3	+59.6	100.6	12 11.2	+59.7	100.8	11 59.9	+59.7	101.0	11 48.3	+59.9	101.2	11 36.5	+59.9	101.4	11 24.6	+59.9	101.6	11 12.4	+60.0	101.8	11 00.0	+60.0	102.0	**11**
12	13 21.9	+59.5	100.5	13 10.9	+59.6	100.7	12 59.6	+59.8	100.9	12 48.2	+59.8	101.1	12 36.4	+60.0	101.4	12 24.5	+60.0	101.6	12 12.4	+60.0	101.8	12 00.0	+60.0	102.0	**12**
13	14 21.4	+59.6	100.3	14 10.5	+59.7	100.6	13 59.4	+59.8	100.8	13 48.0	+59.9	101.1	13 36.4	+59.9	101.3	13 24.5	+59.9	101.5	13 12.4	+59.9	101.8	13 00.0	+60.0	102.0	**13**
14	15 21.0	+59.5	100.2	15 10.2	+59.7	100.5	14 59.2	+59.7	100.7	14 47.9	+59.8	101.0	14 36.3	+59.9	101.3	14 24.4	+60.0	101.5	14 12.3	+60.0	101.8	14 00.0	+60.0	102.0	**14**
15	16 20.5	+59.5	100.1	16 09.9	+59.6	100.4	15 58.9	+59.8	100.6	15 47.7	+59.9	100.9	15 36.2	+59.9	101.2	15 24.4	+60.0	101.5	15 12.3	+60.0	101.7	15 00.0	+60.0	102.0	**15**
16	17 20.0	+59.6	99.9	17 09.5	+59.7	100.2	16 58.7	+59.7	100.5	16 47.6	+59.8	100.8	16 36.1	+59.9	101.1	16 24.4	+59.9	101.4	16 12.3	+60.0	101.7	16 00.0	+60.0	102.0	**16**
17	18 19.6	+59.5	99.8	18 09.2	+59.6	100.1	17 58.4	+59.8	100.5	17 47.4	+59.8	100.8	17 36.0	+59.9	101.1	17 24.3	+60.0	101.4	17 12.3	+60.0	101.7	17 00.0	+60.0	102.0	**17**
18	19 19.1	+59.5	99.7	19 08.8	+59.7	100.0	18 58.2	+59.8	100.4	18 47.2	+59.9	100.7	18 35.9	+59.9	101.0	18 24.3	+60.0	101.4	18 12.3	+60.0	101.7	18 00.0	+60.0	102.0	**18**
19	20 18.6	+59.5	99.5	20 08.5	+59.6	99.9	19 58.0	+59.7	100.3	19 47.1	+59.8	100.6	19 35.8	+60.0	101.0	19 24.3	+59.9	101.3	19 12.3	+60.0	101.7	19 00.0	+60.0	102.0	**19**
20	21 18.1	+59.5	99.4	21 08.1	+59.6	99.8	20 57.7	+59.8	100.2	20 46.9	+59.9	100.5	20 35.8	+59.9	100.9	20 24.2	+60.0	101.3	20 12.3	+60.0	101.6	20 00.0	+60.0	102.0	**20**
21	22 17.6	+59.5	99.3	22 07.7	+59.7	99.7	21 57.5	+59.7	100.1	21 46.8	+59.8	100.5	21 35.7	+59.9	100.9	21 24.2	+59.9	101.2	21 12.3	+60.0	101.6	21 00.0	+60.0	102.0	**21**
22	23 17.1	+59.5	99.1	23 07.4	+59.6	99.5	22 57.2	+59.7	100.0	22 46.6	+59.8	100.4	22 35.6	+59.9	100.8	22 24.1	+60.0	101.2	22 12.3	+60.0	101.6	22 00.0	+60.0	102.0	**22**
23	24 16.6	+59.5	99.0	24 07.0	+59.6	99.4	23 56.9	+59.8	99.9	23 46.4	+59.9	100.3	23 35.5	+59.9	100.7	23 24.1	+59.9	101.2	23 12.3	+60.0	101.6	23 00.0	+60.0	102.0	**23**
24	25 16.1	+59.5	98.8	25 06.6	+59.6	99.3	24 56.7	+59.7	99.8	24 46.3	+59.8	100.2	24 35.4	+59.9	100.7	24 24.0	+60.0	101.1	24 12.3	+59.9	101.6	24 00.0	+60.0	102.0	**24**
25	26 15.6	+59.4	98.7	26 06.2	+59.6	99.2	25 56.4	+59.7	99.7	25 46.1	+59.8	100.1	25 35.3	+59.9	100.6	25 24.0	+60.0	101.1	25 12.2	+60.0	101.5	25 00.0	+60.0	102.0	**25**
26	27 15.0	+59.5	98.5	27 05.8	+59.6	99.0	26 56.1	+59.8	99.6	26 45.9	+59.8	100.1	26 35.2	+59.9	100.5	26 24.0	+59.9	101.0	26 12.2	+60.0	101.5	26 00.0	+60.0	102.0	**26**
27	28 14.5	+59.4	98.4	28 05.4	+59.6	98.9	27 55.9	+59.7	99.4	27 45.7	+59.9	100.0	27 35.1	+59.9	100.5	27 23.9	+60.0	101.0	27 12.2	+60.0	101.5	27 00.0	+60.0	102.0	**27**
28	29 13.9	+59.4	98.2	29 05.0	+59.6	98.8	28 55.6	+59.7	99.3	28 45.6	+59.8	99.9	28 35.0	+59.9	100.4	28 23.9	+59.9	100.9	28 12.2	+60.0	101.5	28 00.0	+60.0	102.0	**28**
29	30 13.3	+59.5	98.1	30 04.6	+59.6	98.7	29 55.3	+59.7	99.2	29 45.4	+59.8	99.8	29 34.9	+59.9	100.3	29 23.8	+60.0	100.9	29 12.2	+60.0	101.5	29 00.0	+60.0	102.0	**29**
30	31 12.8	+59.4	97.9	31 04.2	+59.6	98.5	30 55.0	+59.7	99.1	30 45.2	+59.8	99.7	30 34.8	+59.9	100.3	30 23.8	+59.9	100.9	30 12.2	+60.0	101.4	30 00.0	+60.0	102.0	**30**
31	32 12.2	+59.4	97.8	32 03.8	+59.5	98.4	31 54.7	+59.7	99.0	31 45.0	+59.8	99.6	31 34.7	+59.9	100.2	31 23.7	+60.0	100.8	31 12.2	+60.0	101.4	31 00.0	+60.0	102.0	**31**
32	33 11.6	+59.3	97.6	33 03.3	+59.6	98.2	32 54.4	+59.7	98.9	32 44.8	+59.8	99.5	32 34.6	+59.9	100.1	32 23.7	+59.9	100.8	32 12.2	+59.9	101.4	32 00.0	+60.0	102.0	**32**
33	34 10.9	+59.4	97.4	34 02.9	+59.5	98.1	33 54.1	+59.7	98.7	33 44.6	+59.8	99.4	33 34.5	+59.8	100.1	33 23.6	+60.0	100.7	33 12.1	+60.0	101.4	33 00.0	+60.0	102.0	**33**
34	35 10.3	+59.4	97.2	35 02.4	+59.5	97.9	34 53.8	+59.6	98.6	34 44.4	+59.8	99.3	34 34.3	+59.9	100.0	34 23.6	+59.9	100.7	34 12.1	+60.0	101.3	34 00.0	+60.0	102.0	**34**
35	36 09.7	+59.3	97.1	36 01.9	+59.5	97.8	35 53.4	+59.7	98.5	35 44.2	+59.8	99.2	35 34.2	+59.9	99.9	35 23.5	+60.0	100.6	35 12.1	+60.0	101.3	35 00.0	+60.0	102.0	**35**
36	37 09.0	+59.3	96.9	37 01.4	+59.5	97.6	36 53.1	+59.6	98.4	36 44.0	+59.8	99.1	36 34.1	+59.9	99.8	36 23.5	+59.9	100.6	36 12.1	+60.0	101.3	36 00.0	+60.0	102.0	**36**
37	38 08.3	+59.3	96.7	38 00.9	+59.5	97.5	37 52.7	+59.7	98.2	37 43.8	+59.7	99.0	37 34.0	+59.9	99.8	37 23.4	+60.0	100.5	37 12.1	+60.0	101.3	37 00.0	+60.0	102.0	**37**
38	39 07.6	+59.3	96.5	39 00.4	+59.5	97.3	38 52.4	+59.6	98.1	38 43.5	+59.8	98.9	38 33.9	+59.8	99.7	38 23.4	+59.9	100.5	38 12.1	+60.0	101.2	38 00.0	+60.0	102.0	**38**
39	40 06.9	+59.2	96.3	39 59.9	+59.4	97.1	39 52.0	+59.6	97.9	39 43.3	+59.8	98.8	39 33.7	+59.9	99.6	39 23.3	+60.0	100.4	39 12.1	+60.0	101.2	39 00.0	+60.0	102.0	**39**
40	41 06.1	+59.3	96.1	40 59.3	+59.5	96.9	40 51.6	+59.7	97.8	40 43.1	+59.7	98.7	40 33.6	+59.9	99.5	40 23.3	+59.9	100.3	40 12.1	+59.9	101.2	40 00.0	+60.0	102.0	**40**
41	42 05.4	+59.2	95.9	41 58.8	+59.4	96.8	41 51.3	+59.6	97.6	41 42.8	+59.8	98.5	41 33.5	+59.8	99.4	41 23.2	+59.9	100.3	41 12.0	+60.0	101.1	41 00.0	+60.0	102.0	**41**
42	43 04.6	+59.2	95.6	42 58.2	+59.4	96.6	42 50.9	+59.5	97.5	42 42.6	+59.7	98.4	42 33.3	+59.9	99.3	42 23.1	+60.0	100.2	42 12.0	+60.0	101.1	42 00.0	+60.0	102.0	**42**
43	44 03.8	+59.1	95.4	43 57.6	+59.4	96.4	43 50.4	+59.6	97.3	43 42.3	+59.7	98.3	43 33.2	+59.8	99.2	43 23.1	+59.9	100.2	43 12.0	+60.0	101.1	43 00.0	+60.0	102.0	**43**
44	45 02.9	+59.1	95.2	44 57.0	+59.3	96.2	44 50.0	+59.6	97.2	44 42.0	+59.7	98.1	44 33.0	+59.9	99.1	44 23.0	+59.9	100.1	44 12.0	+60.0	101.1	44 00.0	+60.0	102.0	**44**
45	46 02.0	+59.1	94.9	45 56.3	+59.4	96.0	45 49.6	+59.5	97.0	45 41.7	+59.7	98.0	45 32.9	+59.8	99.0	45 22.9	+60.0	100.0	45 12.0	+60.0	101.0	45 00.0	+60.0	102.0	**45**
46	47 01.1	+59.1	94.7	46 55.7	+59.3	95.8	46 49.1	+59.5	96.8	46 41.4	+59.7	97.9	46 32.7	+59.8	98.9	46 22.9	+59.9	100.0	46 12.0	+59.9	101.0	46 00.0	+60.0	102.0	**46**
47	48 00.2	+59.0	94.4	47 55.0	+59.3	95.5	47 48.6	+59.5	96.6	47 41.1	+59.7	97.7	47 32.5	+59.8	98.8	47 22.8	+59.9	99.9	47 11.9	+60.0	100.9	47 00.0	+60.0	102.0	**47**
48	48 59.2	+59.0	94.2	48 54.3	+59.2	95.3	48 48.1	+59.5	96.4	48 40.8	+59.7	97.6	48 32.3	+59.9	98.7	48 22.7	+59.9	99.8	48 11.9	+60.0	100.9	48 00.0	+60.0	102.0	**48**
49	49 58.2	+58.9	93.9	49 53.5	+59.3	95.1	49 47.6	+59.5	96.2	49 40.5	+59.7	97.4	49 32.2	+59.8	98.6	49 22.6	+59.9	99.7	49 11.9	+60.0	100.9	49 00.0	+60.0	102.0	**49**
50	50 57.1	+58.9	93.6	50 52.8	+59.1	94.8	50 47.1	+59.4	96.0	50 40.2	+59.6	97.2	50 32.0	+59.8	98.4	50 22.5	+59.9	99.6	50 11.9	+60.0	100.8	50 00.0	+60.0	102.0	**50**
51	51 56.0	+58.9	93.3	51 51.9	+59.2	94.5	51 46.5	+59.4	95.8	51 39.8	+59.6	97.1	51 31.8	+59.8	98.3	51 22.4	+60.0	99.6	51 11.9	+59.9	100.8	51 00.0	+60.0	102.0	**51**
52	52 54.9	+58.8	92.9	52 51.1	+59.1	94.3	52 45.9	+59.4	95.6	52 39.4	+59.6	96.9	52 31.6	+59.7	98.2	52 22.4	+59.9	99.5	52 11.8	+60.0	100.7	52 00.0	+60.0	102.0	**52**
53	53 53.7	+58.7	92.6	53 50.2	+59.1	94.0	53 45.3	+59.4	95.3	53 39.0	+59.6	96.7	53 31.3	+59.8	98.0	53 22.3	+59.9	99.4	53 11.8	+60.0	100.7	53 00.0	+60.0	102.0	**53**
54	54 52.4	+58.7	92.3	54 49.3	+59.0	93.7	54 44.7	+59.3	95.1	54 38.6	+59.6	96.5	54 31.1	+59.8	97.9	54 22.2	+59.9	99.3	54 11.8	+60.0	100.6	54 00.0	+60.0	102.0	**54**
55	55 51.1	+58.5	91.9	55 48.3	+59.0	93.4	55 44.0	+59.3	94.8	55 38.2	+59.6	96.3	55 30.9	+59.7	97.7	55 22.1	+59.8	99.2	55 11.8	+59.9	100.6	55 00.0	+60.0	102.0	**55**
56	56 49.6	+58.6	91.5	56 47.3	+58.9	93.0	56 43.3	+59.3	94.6	56 37.8	+59.5	96.1	56 30.6	+59.8	97.6	56 21.9	+59.9	99.1	56 11.7	+60.0	100.5	56 00.0	+60.0	102.0	**56**
57	57 48.2	+58.4	91.1	57 46.2	+58.8	92.7	57 42.6	+59.2	94.3	57 37.3	+59.5	95.8	57 30.4	+59.7	97.4	57 21.8	+59.9	98.9	57 11.7	+60.0	100.5	57 00.0	+60.0	102.0	**57**
58	58 46.6	+58.3	90.7	58 45.0	+58.8	92.3	58 41.8	+59.1	94.0	58 36.8	+59.4	95.6	58 30.1	+59.7	97.2	58 21.7	+59.9	98.8	58 11.7	+59.9	100.4	58 00.0	+60.0	102.0	**58**
59	59 44.9	+58.3	90.2	59 43.8	+58.8	91.9	59 40.9	+59.1	93.6	59 36.2	+59.5	95.3	59 29.8	+59.7	97.0	59 21.6	+59.8	98.7	59 11.6	+60.0	100.4	59 00.0	+60.0	102.0	**59**
60	60 43.2	+58.1	89.7	60 42.5	+58.7	91.5	60 40.0	+59.1	93.3	60 35.7	+59.4	95.1	60 29.5	+59.6	96.8	60 21.4	+59.9	98.6	60 11.6	+60.0	100.3	60 00.0	+60.0	102.0	**60**
61	61 41.3	+58.0	89.2	61 41.2	+58.5	91.1	61 39.1	+59.0	92.9	61 35.1	+59.3	94.8	61 29.1	+59.7	96.6	61 21.3	+59.8	98.4	61 11.6	+59.9	100.2	61 00.0	+60.0	102.0	**61**
62	62 39.3	+57.9	88.7	62 39.7	+58.5	90.6	62 38.1	+58.9	92.5	62 34.4	+59.3	94.5	62 28.8	+59.6	96.4	62 21.1	+59.9	98.3	62 11.5	+60.0	100.1	62 00.0	+60.0	102.0	**62**
63	63 37.2	+57.7	88.1	63 38.2	+58.3	90.1	63 37.0	+58.9	92.1	63 33.7	+59.3	94.1	63 28.4	+59.6	96.1	63 21.0	+59.8	98.1	63 11.5	+59.9	100.1	63 00.0	+60.0	102.0	**63**
64	64 34.9	+57.6	87.5	64 36.5	+58.2	89.6	64 35.9	+58.7	91.7	64 33.0	+59.2	93.8	64 28.0	+59.5	95.9	64 20.8	+59.8	97.9	64 11.4	+60.0	100.0	64 00.0	+60.0	102.0	**64**
65	65 32.5	+57.3	86.8	65 34.7	+58.1	89.0	65 34.6	+58.7	91.2	65 32.2	+59.2	93.4	65 27.5	+59.6	95.6	65 20.6	+59.8	97.7	65 11.4	+59.9	99.9	65 00.0	+60.0	102.0	**65**
66	66 29.8	+57.2	86.1	66 32.8	+57.9	88.4	66 33.3	+58.5	90.7	66 31.4	+59.0	93.0	66 27.1	+59.4	95.3	66 20.4	+59.7	97.5	66 11.3	+60.0	99.8	66 00.0	+60.0	102.0	**66**
67	67 27.0	+56.9	85.3	67 30.7	+57.7	87.7	67 31.8	+58.4	90.1	67 30.4	+59.0	92.5	67 26.5	+59.5	94.9	67 20.1	+59.8	97.3	67 11.3	+59.9	99.7	67 00.0	+60.0	102.0	**67**
68	68 23.9	+56.6	84.4	68 28.4	+57.5	87.0	68 30.2	+58.3	89.5	68 29.4	+58.9	92.0	68 26.0	+59.4	94.6	68 19.9	+59.7	97.1	68 11.2	+60.0	99.6	68 00.0	+60.0	102.0	**68**
69	69 20.5	+56.3	83.5	69 25.9	+57.3	86.2	69 28.5	+58.1	88.8	69 28.3	+58.8	91.5	69 25.4	+59.3	94.2	69 19.6	+59.7	96.8	69 11.2	+59.9	99.4	69 00.0	+60.0	102.0	**69**
70	70 16.8	+56.0	82.5	70 23.2	+57.0	85.3	70 26.6	+58.0	88.1	70 27.1	+58.7	90.9	70 24.7	+59.3	93.7	70 19.3	+59.7	96.5	70 11.1	+59.9	99.3	70 00.0	+60.0	102.0	**70**
71	71 12.8	+55.5	81.4	71 20.2	+56.7	84.3	71 24.6	+57.7	87.3	71 25.8	+58.6	90.3	71 24.0	+59.1	93.3	71 19.0	+59.7	96.2	71 11.0	+59.9	99.1	71 00.0	+60.0	102.0	**71**
72	72 08.3	+55.0	80.2	72 16.9	+56.3	83.3	72 22.3	+57.4	86.4	72 24.4	+58.3	89.6	72 23.1	+59.1	92.7	72 18.7	+59.6	95.9	72 10.9	+59.9	99.0	72 00.0	+60.0	102.0	**72**
73	73 03.3	+54.4	78.9	73 13.2	+55.9	82.1	73 19.7	+57.1	85.4	73 22.7	+58.2	88.8	73 22.2	+59.0	92.1	73 18.3	+59.5	95.5	73 10.8	+59.9	98.8	73 00.0	+60.0	102.0	**73**
74	73 57.7	+53.8	77.4	74 09.1	+55.3	80.8	74 16.8	+56.8	84.3	74 20.9	+57.9	87.9	74 21.2	+58.8	91.5	74 17.8	+59.5	95.0	74 10.7	+59.9	98.5	74 00.0	+60.0	102.0	**74**
75	74 51.5	+53.0	75.7	75 04.4	+54.8	79.4	75 13.6	+56.3	83.1	75 18.8	+57.6	86.9	75 20.0	+58.7	90.7	75 17.3	+59.4	94.5	75 10.6	+59.8	98.3	75 00.0	+60.0	102.0	**75**
76	75 44.5	+52.0	73.9	75 59.2	+54.0	77.7	76 09.9	+55.8	81.7	76 16.4	+57.3	85.8	76 18.7	+58.5	89.9	76 16.7	+59.3	94.0	76 10.4	+59.9	98.0	76 00.0	+60.0	102.0	**76**
77	76 36.5	+50.8	71.8	76 53.2	+53.0	75.9	77 05.7	+55.1	80.1	77 13.7	+56.8	84.5	77 17.2	+58.2	88.9	77 16.0	+59.3	93.3	77 10.3	+59.8	97.7	77 00.0	+60.0	102.0	**77**
78	77 27.3	+49.4	69.4	77 46.2	+52.0	73.8	78 00.8	+54.2	78.3	78 10.5	+56.3	83.0	78 15.4	+57.9	87.7	78 15.3	+59.0	92.6	78 10.1	+59.8	97.3	78 00.0	+60.0	102.0	**78**
79	78 16.7	+47.6	66.7	78 38.2	+50.5	71.3	78 55.0	+53.2	76.1	79 06.8	+55.6	81.2	79 13.3	+57.5	86.4	79 14.3	+58.9	91.7	79 09.9	+59.7	96.9	79 00.0	+60.0	102.0	**79**
80	79 04.3	*+45.5* •	63.6	79 28.7	*+48.8* •	68.5	79 48.2	+51.9	73.6	80 02.4	+54.6	79.1	80 10.8	+56.9	84.8	80 13.2	+58.7	90.6	80 09.6	+59.6	96.4	80 00.0	+60.0	102.0	**80**
81	79 49.8	*+42.9* •	60.1	80 17.5	*+46.5* •	65.1	80 40.1	*+50.0* •	70.7	80 57.0	+53.4	76.6	81 07.7	+56.2	82.8	81 11.9	+58.3	89.3	81 09.2	+59.6	95.7	81 00.0	+60.0	102.0	**81**
82	80 32.7	*+39.5* •	56.0	81 04.0	*+43.5* •	61.2	81 30.1	*+47.8* •	67.1	81 50.4	*+51.6* •	73.5	82 03.9	+55.1	80.4	82 10.2	+57.8	87.6	82 08.8	+59.5	94.9	82 00.0	+60.0	102.0	**82**
83	81 12.2	*+35.3* •	51.2	81 47.5	*+39.9* •	56.6	82 17.9	*+44.5* •	62.8	82 42.0	*+49.3* •	69.8	82 59.0	+53.7	77.4	83 08.0	+57.1	85.5	83 08.3	+59.3	93.8	83 00.0	+60.0	102.0	**83**
84	81 47.5	*+30.4* •	45.7	82 27.4	*+35.0* •	51.2	83 02.4	*+40.3* •	57.5	83 31.3	*+45.9* •	65.0	83 52.7	*+51.3* •	73.5	84 05.1	+55.9	82.8	84 07.6	+59.0	92.4	84 00.0	+60.0	102.0	**84**
85	82 17.9	*+24.1* •	39.5	83 02.4	*+28.9* •	44.7	83 42.7	*+34.5* •	51.1	84 17.2	*+40.9* •	58.9	84 44.0	*+47.7* •	68.2	85 01.0	*+54.0* •	78.9	85 06.6	+58.4	90.5	85 00.0	+60.0	102.0	**85**
86	82 42.0	*+17.0* •	32.5	83 31.3	*+21.4* •	37.2	84 17.2	*+26.8* •	43.3	84 58.1	*+33.6* •	51.1	85 31.7	*+41.8* •	61.1	85 55.0	*+50.6* •	73.4	86 05.0	+57.5	87.6	86 00.0	+60.0	102.0	**86**
87	82 59.0	*+9.0* •	24.8	83 52.7	*+12.4* •	28.7	84 44.0	*+17.0* •	33.9	85 31.7	*+23.3* •	41.0	86 13.5	*+32.1* •	51.0	86 45.6	*+43.4* •	64.9	87 02.5	*+55.0* •	82.7	87 00.0	+60.0	102.0	**87**
88	83 08.0	*+0.3* •	16.6	84 05.1	*+2.5* •	19.3	85 01.0	*+5.6* •	23.1	85 55.0	*+10.0* •	28.7	86 45.6	*+16.9* •	37.1	87 29.0	*+28.5* •	51.0	87 57.5	*+47.0* •	73.4	88 00.0	+60.0	102.0	**88**
89	83 08.3	*−8.3* •	8.2	84 07.6	*−7.6* •	9.6	85 06.6	*−6.6* •	11.6	86 05.0	*−5.0* •	14.5	87 02.5	*−2.5* •	19.3	87 57.5	*+2.5* •	28.6	88 44.5	*+15.5* •	51.0	89 00.0	+60.0	102.0	**89**
90	83 00.0	*−16.4* •	0.0	84 00.0	*−17.1* •	0.0	85 00.0	*−17.9* •	0.0	86 00.0	*−19.2* •	0.0	87 00.0	*−21.2* •	0.0	88 00.0	*−24.9* •	0.0	89 00.0	*−33.3* •	0.0	90 00.0	−60.0	51.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 78°, 282°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	1 27.1	–59.6	101.9	1 14.7	–59.7	101.9	1 02.3	–59.8	102.0	0 49.9	–59.9	102.0	0 37.4	–59.9	102.0	0 24.9	–59.9	102.0	0 12.5	–60.0	102.0	0 00.0	+60.0	78.0	**0**
1	0 27.5	–59.5	102.0	0 15.0	–59.7	102.0	0 02.5	–59.8	102.0	0 10.0	+59.9	78.0	0 22.5	+59.9	78.0	0 35.0	+60.0	78.0	0 47.5	+60.0	78.0	1 00.0	+60.0	78.0	**1**
2	0 32.0	+59.6	77.8	0 44.7	+59.6	77.9	0 57.3	+59.7	77.9	1 09.9	+59.8	77.9	1 22.4	+60.0	77.9	1 35.0	+60.0	77.9	1 47.5	+60.0	78.0	2 00.0	+60.0	78.0	**2**
3	1 31.6	+59.6	77.7	1 44.3	+59.7	77.8	1 57.0	+59.8	77.8	2 09.7	+59.9	77.8	2 22.4	+59.9	77.9	2 35.0	+59.9	77.9	2 47.5	+60.0	78.0	3 00.0	+60.0	78.0	**3**
4	2 31.2	+59.5	77.6	2 44.0	+59.7	77.7	2 56.8	+59.8	77.7	3 09.6	+59.8	77.8	3 22.3	+59.9	77.8	3 34.9	+60.0	77.9	3 47.5	+60.0	77.9	4 00.0	+60.0	78.0	**4**
5	3 30.7	+59.6	77.5	3 43.7	+59.7	77.6	3 56.6	+59.8	77.6	4 09.4	+59.9	77.7	4 22.2	+59.9	77.8	4 34.9	+59.9	77.8	4 47.5	+60.0	77.9	5 00.0	+60.0	78.0	**5**
6	4 30.3	+59.6	77.4	4 43.4	+59.7	77.4	4 56.4	+59.8	77.5	5 09.3	+59.9	77.6	5 22.1	+59.9	77.7	5 34.8	+60.0	77.8	5 47.5	+60.0	77.9	6 00.0	+60.0	78.0	**6**
7	5 29.9	+59.6	77.3	5 43.1	+59.7	77.3	5 56.2	+59.7	77.4	6 09.2	+59.8	77.5	6 22.0	+60.0	77.7	6 34.8	+60.0	77.8	6 47.5	+60.0	77.9	7 00.0	+60.0	78.0	**7**
8	6 29.4	+59.6	77.1	6 42.8	+59.6	77.2	6 55.9	+59.8	77.4	7 09.0	+59.9	77.5	7 22.0	+59.9	77.6	7 34.8	+59.9	77.7	7 47.5	+59.9	77.9	8 00.0	+60.0	78.0	**8**
9	7 29.0	+59.6	77.0	7 42.4	+59.7	77.1	7 55.7	+59.8	77.3	8 08.9	+59.8	77.4	8 21.9	+59.9	77.6	8 34.7	+60.0	77.7	8 47.4	+60.0	77.8	9 00.0	+60.0	78.0	**9**
10	8 28.6	+59.5	76.9	8 42.1	+59.7	77.0	8 55.5	+59.8	77.2	9 08.7	+59.9	77.3	9 21.8	+59.9	77.5	9 34.7	+60.0	77.7	9 47.4	+60.0	77.8	10 00.0	+60.0	78.0	**10**
11	9 28.1	+59.6	76.8	9 41.8	+59.7	76.9	9 55.3	+59.8	77.1	10 08.6	+59.8	77.3	10 21.7	+59.9	77.4	10 34.7	+59.9	77.6	10 47.4	+60.0	77.8	11 00.0	+60.0	78.0	**11**
12	10 27.7	+59.6	76.6	10 41.5	+59.6	76.8	10 55.1	+59.7	77.0	11 08.4	+59.9	77.2	11 21.6	+60.0	77.4	11 34.6	+60.0	77.6	11 47.4	+60.0	77.8	12 00.0	+60.0	78.0	**12**
13	11 27.3	+59.5	76.5	11 41.1	+59.7	76.7	11 54.8	+59.8	76.9	12 08.3	+59.8	77.1	12 21.6	+59.9	77.3	12 34.6	+60.0	77.6	12 47.4	+60.0	77.8	13 00.0	+60.0	78.0	**13**
14	12 26.8	+59.6	76.4	12 40.8	+59.7	76.6	12 54.6	+59.8	76.8	13 08.1	+59.9	77.1	13 21.5	+59.9	77.3	13 34.6	+59.9	77.5	13 47.4	+60.0	77.8	14 00.0	+60.0	78.0	**14**
15	13 26.4	+59.5	76.3	13 40.5	+59.6	76.5	13 54.4	+59.7	76.7	14 08.0	+59.9	77.0	14 21.4	+59.9	77.2	14 34.5	+60.0	77.5	14 47.4	+60.0	77.7	15 00.0	+60.0	78.0	**15**
16	14 25.9	+59.5	76.1	14 40.1	+59.7	76.4	14 54.1	+59.8	76.7	15 07.9	+59.8	76.9	15 21.3	+59.9	77.2	15 34.5	+59.9	77.4	15 47.4	+60.0	77.7	16 00.0	+60.0	78.0	**16**
17	15 25.4	+59.6	76.0	15 39.8	+59.7	76.3	15 53.9	+59.8	76.6	16 07.7	+59.8	76.8	16 21.2	+59.9	77.1	16 34.4	+60.0	77.4	16 47.4	+60.0	77.7	17 00.0	+60.0	78.0	**17**
18	16 25.0	+59.5	75.9	16 39.5	+59.6	76.2	16 53.7	+59.7	76.5	17 07.5	+59.9	76.8	17 21.1	+59.9	77.1	17 34.4	+60.0	77.4	17 47.4	+60.0	77.7	18 00.0	+60.0	78.0	**18**
19	17 24.5	+59.5	75.8	17 39.1	+59.7	76.1	17 53.4	+59.8	76.4	18 07.4	+59.8	76.7	18 21.0	+60.0	77.0	18 34.4	+59.9	77.3	18 47.4	+59.9	77.7	19 00.0	+60.0	78.0	**19**
20	18 24.0	+59.6	75.6	18 38.8	+59.6	75.9	18 53.2	+59.7	76.3	19 07.2	+59.9	76.6	19 21.0	+59.9	77.0	19 34.3	+60.0	77.3	19 47.3	+60.0	77.6	20 00.0	+60.0	78.0	**20**
21	19 23.6	+59.5	75.5	19 38.4	+59.7	75.8	19 52.9	+59.8	76.2	20 07.1	+59.8	76.5	20 20.9	+59.9	76.9	20 34.3	+59.9	77.3	20 47.3	+60.0	77.6	21 00.0	+60.0	78.0	**21**
22	20 23.1	+59.5	75.4	20 38.1	+59.6	75.7	20 52.7	+59.7	76.1	21 06.9	+59.9	76.5	21 20.8	+59.9	76.8	21 34.2	+60.0	77.2	21 47.3	+60.0	77.6	22 00.0	+60.0	78.0	**22**
23	21 22.6	+59.5	75.2	21 37.7	+59.6	75.6	21 52.4	+59.8	76.0	22 06.8	+59.8	76.4	22 20.7	+59.9	76.8	22 34.2	+60.0	77.2	22 47.3	+60.0	77.6	23 00.0	+60.0	78.0	**23**
24	22 22.1	+59.5	75.1	22 37.3	+59.7	75.5	22 52.2	+59.7	75.9	23 06.6	+59.8	76.3	23 20.6	+59.9	76.7	23 34.2	+59.9	77.1	23 47.3	+60.0	77.6	24 00.0	+60.0	78.0	**24**
25	23 21.6	+59.5	74.9	23 37.0	+59.6	75.4	23 51.9	+59.8	75.8	24 06.4	+59.9	76.2	24 20.5	+59.9	76.7	24 34.1	+60.0	77.1	24 47.3	+60.0	77.5	25 00.0	+60.0	78.0	**25**
26	24 21.1	+59.5	74.8	24 36.6	+59.6	75.2	24 51.7	+59.7	75.7	25 06.3	+59.8	76.1	25 20.4	+59.9	76.6	25 34.1	+59.9	77.1	25 47.3	+60.0	77.5	26 00.0	+60.0	78.0	**26**
27	25 20.6	+59.4	74.7	25 36.2	+59.6	75.1	25 51.4	+59.7	75.6	26 06.1	+59.8	76.1	26 20.3	+59.9	76.5	26 34.0	+60.0	77.0	26 47.3	+60.0	77.5	27 00.0	+60.0	78.0	**27**
28	26 20.0	+59.5	74.5	26 35.8	+59.6	75.0	26 51.1	+59.7	75.5	27 05.9	+59.8	76.0	27 20.2	+59.9	76.5	27 34.0	+59.9	77.0	27 47.3	+59.9	77.5	28 00.0	+60.0	78.0	**28**
29	27 19.5	+59.4	74.4	27 35.4	+59.6	74.9	27 50.8	+59.8	75.4	28 05.7	+59.9	75.9	28 20.1	+59.9	76.4	28 33.9	+60.0	76.9	28 47.2	+60.0	77.5	29 00.0	+60.0	78.0	**29**
30	28 18.9	+59.5	74.2	28 35.0	+59.6	74.7	28 50.6	+59.7	75.3	29 05.6	+59.8	75.8	29 20.0	+59.9	76.3	29 33.9	+60.0	76.9	29 47.2	+60.0	77.4	30 00.0	+60.0	78.0	**30**
31	29 18.4	+59.4	74.0	29 34.6	+59.6	74.6	29 50.3	+59.7	75.1	30 05.4	+59.8	75.7	30 19.9	+59.9	76.3	30 33.9	+59.9	76.8	30 47.2	+60.0	77.4	31 00.0	+60.0	78.0	**31**
32	30 17.8	+59.4	73.9	30 34.2	+59.6	74.5	30 50.0	+59.7	75.0	31 05.2	+59.8	75.6	31 19.8	+59.9	76.2	31 33.8	+60.0	76.8	31 47.2	+60.0	77.4	32 00.0	+60.0	78.0	**32**
33	31 17.2	+59.4	73.7	31 33.8	+59.5	74.3	31 49.7	+59.7	74.9	32 05.0	+59.8	75.5	32 19.7	+59.9	76.1	32 33.8	+59.9	76.7	32 47.2	+60.0	77.4	33 00.0	+60.0	78.0	**33**
34	32 16.6	+59.4	73.6	32 33.3	+59.6	74.2	32 49.4	+59.7	74.8	33 04.8	+59.8	75.4	33 19.6	+59.9	76.1	33 33.7	+60.0	76.7	33 47.2	+60.0	77.3	34 00.0	+60.0	78.0	**34**
35	33 16.0	+59.4	73.4	33 32.9	+59.5	74.0	33 49.1	+59.6	74.7	34 04.6	+59.8	75.3	34 19.5	+59.8	76.0	34 33.7	+59.9	76.6	34 47.2	+60.0	77.3	35 00.0	+60.0	78.0	**35**
36	34 15.4	+59.4	73.2	34 32.4	+59.5	73.9	34 48.7	+59.7	74.5	35 04.4	+59.8	75.2	35 19.3	+59.9	75.9	35 33.6	+60.0	76.6	35 47.2	+59.9	77.3	36 00.0	+60.0	78.0	**36**
37	35 14.8	+59.3	73.0	35 31.9	+59.6	73.7	35 48.4	+59.7	74.4	36 04.2	+59.8	75.1	36 19.2	+59.9	75.8	36 33.6	+59.9	76.5	36 47.1	+60.0	77.3	37 00.0	+60.0	78.0	**37**
38	36 14.1	+59.4	72.9	36 31.5	+59.5	73.6	36 48.1	+59.6	74.3	37 04.0	+59.7	75.0	37 19.1	+59.9	75.7	37 33.5	+59.9	76.5	37 47.1	+60.0	77.2	38 00.0	+60.0	78.0	**38**
39	37 13.5	+59.3	72.7	37 31.0	+59.5	73.4	37 47.7	+59.7	74.2	38 03.7	+59.8	74.9	38 19.0	+59.8	75.7	38 33.4	+60.0	76.4	38 47.1	+60.0	77.2	39 00.0	+60.0	78.0	**39**
40	38 12.8	+59.3	72.5	38 30.5	+59.4	73.2	38 47.4	+59.6	74.0	39 03.5	+59.8	74.8	39 18.8	+59.9	75.6	39 33.4	+59.9	76.4	39 47.1	+60.0	77.2	40 00.0	+60.0	78.0	**40**
41	39 12.1	+59.2	72.3	39 29.9	+59.5	73.1	39 47.0	+59.6	73.9	40 03.3	+59.7	74.7	40 18.7	+59.9	75.5	40 33.3	+60.0	76.3	40 47.1	+60.0	77.2	41 00.0	+60.0	78.0	**41**
42	40 11.3	+59.3	72.1	40 29.4	+59.4	72.9	40 46.6	+59.6	73.7	41 03.0	+59.8	74.6	41 18.6	+59.8	75.4	41 33.3	+59.9	76.3	41 47.1	+60.0	77.1	42 00.0	+60.0	78.0	**42**
43	41 10.6	+59.2	71.9	41 28.8	+59.5	72.7	41 46.2	+59.6	73.6	42 02.8	+59.7	74.4	42 18.4	+59.9	75.3	42 33.2	+59.9	76.2	42 47.1	+59.9	77.1	43 00.0	+60.0	78.0	**43**
44	42 09.8	+59.2	71.7	42 28.3	+59.4	72.5	42 45.8	+59.6	73.4	43 02.5	+59.7	74.3	43 18.3	+59.8	75.2	43 33.1	+60.0	76.1	43 47.0	+60.0	77.1	44 00.0	+60.0	78.0	**44**
45	43 09.0	+59.2	71.5	43 27.7	+59.4	72.3	43 45.4	+59.6	73.3	44 02.2	+59.8	74.2	44 18.1	+59.9	75.1	44 33.1	+59.9	76.1	44 47.0	+60.0	77.0	45 00.0	+60.0	78.0	**45**
46	44 08.2	+59.2	71.2	44 27.1	+59.3	72.1	44 45.0	+59.6	73.1	45 02.0	+59.7	74.0	45 18.0	+59.8	75.0	45 33.0	+59.9	76.0	45 47.0	+60.0	77.0	46 00.0	+60.0	78.0	**46**
47	45 07.4	+59.1	71.0	45 26.4	+59.4	71.9	45 44.6	+59.5	72.9	46 01.7	+59.7	73.9	46 17.8	+59.8	74.9	46 32.9	+59.9	75.9	46 47.0	+60.0	77.0	47 00.0	+60.0	78.0	**47**
48	46 06.5	+59.1	70.7	46 25.8	+59.3	71.7	46 44.1	+59.5	72.7	47 01.4	+59.7	73.8	47 17.6	+59.9	74.8	47 32.8	+60.0	75.9	47 47.0	+60.0	76.9	48 00.0	+60.0	78.0	**48**
49	47 05.6	+59.0	70.5	47 25.1	+59.3	71.5	47 43.6	+59.5	72.6	48 01.1	+59.7	73.6	48 17.5	+59.8	74.7	48 32.8	+59.9	75.8	48 47.0	+59.9	76.9	49 00.0	+60.0	78.0	**49**
50	48 04.6	+59.1	70.2	48 24.4	+59.3	71.3	48 43.1	+59.5	72.4	49 00.8	+59.6	73.5	49 17.3	+59.8	74.6	49 32.7	+59.9	75.7	49 46.9	+60.0	76.8	50 00.0	+60.0	78.0	**50**
51	49 03.7	+58.9	70.0	49 23.7	+59.2	71.0	49 42.6	+59.5	72.2	50 00.4	+59.7	73.3	50 17.1	+59.8	74.4	50 32.6	+59.9	75.6	50 46.9	+60.0	76.8	51 00.0	+60.0	78.0	**51**
52	50 02.6	+59.0	69.7	50 22.9	+59.2	70.8	50 42.1	+59.4	72.0	51 00.1	+59.6	73.1	51 16.9	+59.8	74.3	51 32.5	+59.9	75.5	51 46.9	+60.0	76.8	52 00.0	+60.0	78.0	**52**
53	51 01.6	+58.9	69.4	51 22.1	+59.2	70.5	51 41.5	+59.4	71.7	51 59.7	+59.6	73.0	52 16.7	+59.8	74.2	52 32.4	+59.9	75.4	52 46.9	+59.9	76.7	53 00.0	+60.0	78.0	**53**
54	52 00.5	+58.8	69.1	52 21.3	+59.1	70.3	52 40.9	+59.4	71.5	52 59.3	+59.7	72.8	53 16.5	+59.8	74.0	53 32.3	+59.9	75.3	53 46.8	+60.0	76.7	54 00.0	+60.0	78.0	**54**
55	52 59.3	+58.8	68.7	53 20.4	+59.1	70.0	53 40.3	+59.4	71.3	53 59.0	+59.5	72.6	54 16.3	+59.7	73.9	54 32.2	+59.9	75.2	54 46.8	+60.0	76.6	55 00.0	+60.0	78.0	**55**
56	53 58.1	+58.7	68.4	54 19.5	+59.1	69.7	54 39.7	+59.3	71.0	54 58.5	+59.6	72.4	55 16.0	+59.8	73.7	55 32.1	+59.9	75.1	55 46.8	+60.0	76.6	56 00.0	+60.0	78.0	**56**
57	54 56.8	+58.7	68.1	55 18.6	+59.0	69.4	55 39.0	+59.3	70.8	55 58.1	+59.5	72.2	56 15.8	+59.7	73.6	56 32.0	+59.9	75.0	56 46.8	+59.9	76.5	57 00.0	+60.0	78.0	**57**
58	55 55.5	+58.6	67.7	56 17.6	+58.9	69.1	56 38.3	+59.3	70.5	56 57.6	+59.6	71.9	57 15.5	+59.7	73.4	57 31.9	+59.9	74.9	57 46.7	+60.0	76.4	58 00.0	+60.0	78.0	**58**
59	56 54.1	+58.5	67.3	57 16.5	+58.9	68.7	57 37.6	+59.2	70.2	57 57.2	+59.4	71.7	58 15.2	+59.7	73.2	58 31.8	+59.8	74.8	58 46.7	+60.0	76.4	59 00.0	+60.0	78.0	**59**
60	57 52.6	+58.4	66.9	58 15.4	+58.8	68.4	58 36.8	+59.2	69.9	58 56.6	+59.5	71.5	59 14.9	+59.7	73.0	59 31.6	+59.9	74.7	59 46.7	+59.9	76.3	60 00.0	+60.0	78.0	**60**
61	58 51.0	+58.3	66.5	59 14.2	+58.8	68.0	59 36.0	+59.1	69.6	59 56.1	+59.4	71.2	60 14.6	+59.7	72.8	60 31.5	+59.8	74.5	60 46.6	+60.0	76.2	61 00.0	+60.0	78.0	**61**
62	59 49.3	+58.3	66.0	60 13.0	+58.7	67.6	60 35.1	+59.0	69.2	60 55.5	+59.4	70.9	61 14.3	+59.7	72.6	61 31.3	+59.9	74.4	61 46.6	+59.9	76.2	62 00.0	+60.0	78.0	**62**
63	60 47.6	+58.1	65.5	61 11.7	+58.5	67.2	61 34.1	+59.0	68.9	61 54.9	+59.4	70.6	62 14.0	+59.6	72.4	62 31.2	+59.8	74.2	62 46.5	+60.0	76.1	63 00.0	+60.0	78.0	**63**
64	61 45.7	+58.0	65.0	62 10.2	+58.5	66.7	62 33.1	+59.0	68.5	62 54.3	+59.3	70.3	63 13.6	+59.6	72.2	63 31.0	+59.8	74.1	63 46.5	+60.0	76.0	64 00.0	+60.0	78.0	**64**
65	62 43.7	+57.9	64.4	63 08.7	+58.4	66.2	63 32.1	+58.8	68.1	63 53.6	+59.2	69.9	64 13.2	+59.5	71.9	64 30.8	+59.8	73.9	64 46.5	+59.9	75.9	65 00.0	+60.0	78.0	**65**
66	63 41.6	+57.7	63.9	64 07.1	+58.3	65.7	64 30.9	+58.8	67.6	64 52.8	+59.2	69.6	65 12.7	+59.6	71.6	65 30.6	+59.8	73.7	65 46.4	+60.0	75.8	66 00.0	+60.0	78.0	**66**
67	64 39.3	+57.5	63.2	65 05.4	+58.1	65.1	65 29.7	+58.6	67.1	65 52.0	+59.1	69.2	66 12.3	+59.5	71.3	66 30.4	+59.8	73.5	66 46.4	+59.9	75.7	67 00.0	+60.0	78.0	**67**
68	65 36.8	+57.4	62.6	66 03.5	+58.0	64.6	66 28.3	+58.6	66.6	66 51.1	+59.1	68.8	67 11.8	+59.4	71.0	67 30.2	+59.7	73.3	67 46.3	+59.9	75.6	68 00.0	+60.0	78.0	**68**
69	66 34.2	+57.1	61.8	67 01.5	+57.8	63.9	67 26.9	+58.4	66.1	67 50.2	+58.9	68.3	68 11.2	+59.4	70.6	68 29.9	+59.8	73.0	68 46.2	+60.0	75.5	69 00.0	+60.0	78.0	**69**
70	67 31.3	+56.9	61.0	67 59.3	+57.7	63.2	68 25.3	+58.3	65.5	68 49.1	+58.9	67.8	69 10.6	+59.4	70.2	69 29.7	+59.7	72.8	69 46.2	+59.9	75.3	70 00.0	+60.0	78.0	**70**
71	68 28.2	+56.6	60.2	68 57.0	+57.4	62.4	69 23.6	+58.2	64.8	69 48.0	+58.8	67.3	70 10.0	+59.2	69.8	70 29.4	+59.6	72.5	70 46.1	+59.9	75.2	71 00.0	+60.0	78.0	**71**
72	69 24.8	+56.2	59.3	69 54.4	+57.1	61.6	70 21.8	+57.9	64.1	70 46.8	+58.6	66.7	71 09.2	+59.2	69.3	71 29.0	+59.7	72.1	71 46.0	+59.9	75.0	72 00.0	+60.0	78.0	**72**
73	70 21.0	+56.0	58.3	70 51.5	+56.9	60.7	71 19.7	+57.7	63.3	71 45.4	+58.5	66.0	72 08.4	+59.2	68.8	72 28.7	+59.6	71.8	72 45.9	+59.9	74.8	73 00.0	+60.0	78.0	**73**
74	71 17.0	+55.4	57.2	71 48.4	+56.5	59.7	72 17.4	+57.5	62.4	72 43.9	+58.3	65.3	73 07.6	+59.0	68.3	73 28.3	+59.5	71.4	73 45.8	+59.9	74.6	74 00.0	+60.0	78.0	**74**
75	72 12.4	+55.0	55.9	72 44.9	+56.1	58.6	73 14.9	+57.1	61.4	73 42.2	+58.1	64.4	74 06.6	+58.8	67.6	74 27.8	+59.5	70.9	74 45.7	+59.8	74.4	75 00.0	+60.0	78.0	**75**
76	73 07.4	+54.4	54.6	73 41.0	+55.6	57.4	74 12.0	+56.8	60.4	74 40.3	+57.8	63.5	75 05.4	+58.7	66.9	75 27.3	+59.4	70.4	75 45.5	+59.9	74.1	76 00.0	+60.0	78.0	**76**
77	74 01.8	+53.7	53.1	74 36.6	+55.1	56.0	75 08.8	+56.4	59.1	75 38.1	+57.5	62.5	76 04.1	+58.6	66.1	76 26.7	+59.3	69.8	76 45.4	+59.8	73.8	77 00.0	+60.0	78.0	**77**
78	74 55.5	+52.9	51.4	75 31.7	+54.4	54.5	76 05.2	+55.8	57.8	76 35.6	+57.1	61.3	77 02.7	+58.3	65.1	77 26.0	+59.2	69.2	77 45.2	+59.8	73.5	78 00.0	+60.0	78.0	**78**
79	75 48.4	+51.9	49.6	76 26.1	+53.5	52.7	77 01.0	+55.1	56.2	77 32.7	+56.7	59.9	78 01.0	+57.9	64.0	78 25.2	+59.0	68.4	78 45.0	+59.7	73.1	79 00.0	+60.0	78.0	**79**
80	76 40.3	+50.8	47.5	77 19.6	+52.6	50.7	77 56.1	+54.4	54.4	78 29.4	+56.1	58.3	78 58.9	+57.6	62.7	79 24.2	+58.9	67.5	79 44.7	+59.7	72.6	80 00.0	+60.0	78.0	**80**
81	77 31.1	+49.2	45.1	78 12.2	+51.3	48.5	78 50.5	+53.3	52.2	79 25.5	+55.2	56.5	79 56.5	+57.1	61.2	80 23.1	+58.6	66.4	80 44.4	+59.7	72.0	81 00.0	+60.0	78.0	**81**
82	78 20.3	+47.5	42.3	79 03.5	+49.7	45.8	79 43.8	+52.0	49.8	80 20.7	+54.3	54.3	80 53.6	+56.4	59.3	81 21.7	+58.2	65.0	81 44.1	+59.5	71.2	82 00.0	+60.0	78.0	**82**
83	79 07.8	*+45.4* •	39.2	79 53.2	*+47.7* •	42.8	80 35.8	*+50.2* •	46.8	81 15.0	+52.9	51.6	81 50.0	+55.5	57.1	82 19.9	+57.7	63.3	82 43.6	+59.3	70.3	83 00.0	+60.0	78.0	**83**
84	79 53.2	*+42.6* •	35.6	80 40.9	*+45.1* •	39.2	81 26.0	*+47.9* •	43.3	82 07.9	*+50.9* •	48.3	82 45.5	+54.0	54.2	83 17.6	+57.0	61.1	83 42.9	+59.2	69.1	84 00.0	+60.0	78.0	**84**
85	80 35.8	*+39.2* •	31.4	81 26.0	*+41.9* •	34.9	82 13.9	*+44.9* •	39.1	82 58.8	*+48.3* •	44.2	83 39.5	*+52.0* •	50.5	84 14.6	+55.7	58.2	84 42.1	+58.7	67.4	85 00.0	+60.0	78.0	**85**
86	81 15.0	*+35.0* •	26.6	82 07.9	*+37.6* •	29.9	82 58.8	*+40.7* •	33.9	83 47.1	*+44.4* •	39.1	84 31.5	*+48.8* •	45.7	85 10.3	*+53.5* •	54.1	85 40.8	+58.0	64.9	86 00.0	+60.0	78.0	**86**
87	81 50.0	*+29.9* •	21.1	82 45.5	*+32.1* •	24.0	83 39.5	*+35.1* •	27.6	84 31.5	*+38.8* •	32.4	85 20.3	*+43.5* •	39.0	86 03.8	*+49.7* •	48.2	86 38.8	*+56.3* •	61.1	87 00.0	+60.0	78.0	**87**
88	82 19.9	*+23.7* •	14.8	83 17.6	*+25.3* •	17.0	84 14.6	*+27.5* •	19.9	85 10.3	*+30.5* •	23.9	86 03.8	*+35.0* •	29.8	86 53.5	*+41.6* •	39.0	87 35.1	*+51.6* •	54.1	88 00.0	+60.0	78.0	**88**
89	82 43.6	*+16.4* •	7.7	83 42.9	*+17.1* •	9.0	84 42.1	*+17.9* •	10.7	85 40.8	*+19.2* •	13.1	86 38.8	*+21.2* •	17.0	87 35.1	*+24.9* •	23.9	88 26.7	*+33.3* •	39.0	89 00.0	+60.0	78.0	**89**
90	83 00.0	*+8.3* •	0.0	84 00.0	*+7.6* •	0.0	85 00.0	*+6.6* •	0.0	86 00.0	*+5.0* •	0.0	87 00.0	*+2.5* •	0.0	88 00.0	*–2.5* •	0.0	89 00.0	*–15.5* •	0.0	90 00.0	–60.0	39.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 102°, 258°

79°, 281° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 19.9	+59.6	100.9	1 08.6	+59.7	100.9	0 57.2	+59.8	101.0	0 45.8	+59.8	101.0	0 34.3	+60.0	101.0	0 22.9	+60.0	101.0	0 11.4	+60.0	101.0	0 00.0	+60.0	101.0	**0**
1	2 19.5	+59.6	100.8	2 08.3	+59.6	100.8	1 57.0	+59.7	100.9	1 45.6	+59.9	100.9	1 34.3	+59.9	100.9	1 22.9	+59.9	101.0	1 11.4	+60.0	101.0	1 00.0	+60.0	101.0	**1**
2	3 19.1	+59.6	100.7	3 07.9	+59.7	100.7	2 56.7	+59.8	100.8	2 45.5	+59.8	100.8	2 34.2	+59.9	100.9	2 22.8	+60.0	100.9	2 11.4	+60.0	101.0	2 00.0	+60.0	101.0	**2**
3	4 18.7	+59.5	100.6	4 07.6	+59.7	100.6	3 56.5	+59.8	100.7	3 45.3	+59.9	100.8	3 34.1	+59.9	100.8	3 22.8	+60.0	100.9	3 11.4	+60.0	100.9	3 00.0	+60.0	101.0	**3**
4	5 18.2	+59.6	100.4	5 07.3	+59.7	100.5	4 56.3	+59.8	100.6	4 45.2	+59.9	100.7	4 34.0	+59.9	100.8	4 22.8	+59.9	100.9	4 11.4	+60.0	100.9	4 00.0	+60.0	101.0	**4**
5	6 17.8	+59.5	100.3	6 07.0	+59.7	100.4	5 56.1	+59.7	100.5	5 45.1	+59.8	100.6	5 33.9	+60.0	100.7	5 22.7	+60.0	100.8	5 11.4	+60.0	100.9	5 00.0	+60.0	101.0	**5**
6	7 17.3	+59.6	100.2	7 06.7	+59.6	100.3	6 55.8	+59.8	100.4	6 44.9	+59.9	100.6	6 33.9	+59.9	100.7	6 22.7	+59.9	100.8	6 11.4	+60.0	100.9	6 00.0	+60.0	101.0	**6**
7	8 16.9	+59.6	100.1	8 06.3	+59.7	100.2	7 55.6	+59.8	100.4	7 44.8	+59.8	100.5	7 33.8	+59.9	100.6	7 22.6	+60.0	100.8	7 11.4	+60.0	100.9	7 00.0	+60.0	101.0	**7**
8	9 16.5	+59.5	100.0	9 06.0	+59.7	100.1	8 55.4	+59.8	100.3	8 44.6	+59.9	100.4	8 33.7	+59.9	100.6	8 22.6	+60.0	100.7	8 11.4	+60.0	100.9	8 00.0	+60.0	101.0	**8**
9	10 16.0	+59.6	99.8	10 05.7	+59.7	100.0	9 55.2	+59.7	100.2	9 44.5	+59.8	100.4	9 33.6	+59.9	100.5	9 22.6	+59.9	100.7	9 11.4	+60.0	100.8	9 00.0	+60.0	101.0	**9**
10	11 15.6	+59.5	99.7	11 05.4	+59.6	99.9	10 54.9	+59.8	100.1	10 44.3	+59.9	100.3	10 33.5	+59.9	100.5	10 22.5	+60.0	100.6	10 11.4	+59.9	100.8	10 00.0	+60.0	101.0	**10**
11	12 15.1	+59.6	99.6	12 05.0	+59.7	99.8	11 54.7	+59.8	100.0	11 44.2	+59.8	100.2	11 33.4	+60.0	100.4	11 22.5	+60.0	100.6	11 11.3	+60.0	100.8	11 00.0	+60.0	101.0	**11**
12	13 14.7	+59.5	99.5	13 04.7	+59.7	99.7	12 54.5	+59.8	99.9	12 44.0	+59.9	100.1	12 33.4	+59.9	100.4	12 22.5	+59.9	100.6	12 11.3	+60.0	100.8	12 00.0	+60.0	101.0	**12**
13	14 14.2	+59.6	99.3	14 04.4	+59.6	99.6	13 54.3	+59.7	99.8	13 43.9	+59.8	100.1	13 33.3	+59.9	100.3	13 22.4	+60.0	100.5	13 11.3	+60.0	100.8	13 00.0	+60.0	101.0	**13**
14	15 13.8	+59.5	99.2	15 04.0	+59.7	99.5	14 54.0	+59.8	99.7	14 43.7	+59.9	100.0	14 33.2	+59.9	100.2	14 22.4	+60.0	100.5	14 11.3	+60.0	100.8	14 00.0	+60.0	101.0	**14**
15	16 13.3	+59.5	99.1	16 03.7	+59.6	99.4	15 53.8	+59.7	99.6	15 43.6	+59.8	99.9	15 33.1	+59.9	100.2	15 22.4	+59.9	100.5	15 11.3	+60.0	100.7	15 00.0	+60.0	101.0	**15**
16	17 12.8	+59.5	98.9	17 03.3	+59.7	99.2	16 53.5	+59.8	99.5	16 43.4	+59.9	99.8	16 33.0	+59.9	100.1	16 22.3	+60.0	100.4	16 11.3	+60.0	100.7	16 00.0	+60.0	101.0	**16**
17	18 12.3	+59.6	98.8	18 03.0	+59.6	99.1	17 53.3	+59.8	99.5	17 43.3	+59.8	99.8	17 32.9	+60.0	100.1	17 22.3	+59.9	100.4	17 11.3	+60.0	100.7	17 00.0	+60.0	101.0	**17**
18	19 11.9	+59.5	98.7	19 02.6	+59.7	99.0	18 53.1	+59.7	99.4	18 43.1	+59.9	99.7	18 32.9	+59.9	100.0	18 22.2	+60.0	100.4	18 11.3	+60.0	100.7	18 00.0	+60.0	101.0	**18**
19	20 11.4	+59.5	98.5	20 02.3	+59.6	98.9	19 52.8	+59.8	99.3	19 43.0	+59.8	99.6	19 32.8	+59.9	100.0	19 22.2	+60.0	100.3	19 11.3	+60.0	100.7	19 00.0	+60.0	101.0	**19**
20	21 10.9	+59.5	98.4	21 01.9	+59.7	98.8	20 52.6	+59.7	99.2	20 42.8	+59.8	99.5	20 32.7	+59.9	99.9	20 22.2	+59.9	100.3	20 11.3	+60.0	100.6	20 00.0	+60.0	101.0	**20**
21	22 10.4	+59.5	98.3	22 01.6	+59.6	98.7	21 52.3	+59.7	99.1	21 42.6	+59.9	99.5	21 32.6	+59.9	99.9	21 22.1	+60.0	100.2	21 11.3	+59.9	100.6	21 00.0	+60.0	101.0	**21**
22	23 09.9	+59.5	98.1	23 01.2	+59.6	98.5	22 52.0	+59.8	99.0	22 42.5	+59.8	99.4	22 32.5	+59.9	99.8	22 22.1	+59.9	100.2	22 11.2	+60.0	100.6	22 00.0	+60.0	101.0	**22**
23	24 09.4	+59.4	98.0	24 00.8	+59.6	98.4	23 51.8	+59.7	98.9	23 42.3	+59.8	99.3	23 32.4	+59.9	99.7	23 22.0	+60.0	100.2	23 11.2	+60.0	100.6	23 00.0	+60.0	101.0	**23**
24	25 08.8	+59.5	97.8	25 00.4	+59.6	98.3	24 51.5	+59.7	98.8	24 42.1	+59.9	99.2	24 32.3	+59.9	99.7	24 22.0	+59.9	100.1	24 11.2	+60.0	100.6	24 00.0	+60.0	101.0	**24**
25	26 08.3	+59.5	97.7	26 00.0	+59.6	98.2	25 51.2	+59.8	98.7	25 42.0	+59.8	99.1	25 32.2	+59.9	99.6	25 21.9	+60.0	100.1	25 11.2	+60.0	100.5	25 00.0	+60.0	101.0	**25**
26	27 07.8	+59.4	97.5	26 59.6	+59.6	98.0	26 51.0	+59.7	98.5	26 41.8	+59.8	99.0	26 32.1	+59.9	99.5	26 21.9	+60.0	100.0	26 11.2	+60.0	100.5	26 00.0	+60.0	101.0	**26**
27	28 07.2	+59.5	97.4	27 59.2	+59.6	97.9	27 50.7	+59.7	98.4	27 41.6	+59.8	99.0	27 32.0	+59.9	99.5	27 21.9	+59.9	100.0	27 11.2	+60.0	100.5	27 00.0	+60.0	101.0	**27**
28	29 06.7	+59.4	97.2	28 58.8	+59.6	97.8	28 50.4	+59.7	98.3	28 41.4	+59.9	98.9	28 31.9	+59.9	99.4	28 21.8	+60.0	99.9	28 11.2	+60.0	100.5	28 00.0	+60.0	101.0	**28**
29	30 06.1	+59.4	97.1	29 58.4	+59.6	97.6	29 50.1	+59.7	98.2	29 41.3	+59.8	98.8	29 31.8	+59.9	99.3	29 21.8	+59.9	99.9	29 11.2	+60.0	100.5	29 00.0	+60.0	101.0	**29**
30	31 05.5	+59.4	96.9	30 58.0	+59.5	97.5	30 49.8	+59.7	98.1	30 41.1	+59.8	98.7	30 31.7	+59.9	99.3	30 21.7	+60.0	99.9	30 11.2	+59.9	100.4	30 00.0	+60.0	101.0	**30**
31	32 04.9	+59.4	96.7	31 57.5	+59.6	97.4	31 49.5	+59.7	98.0	31 40.9	+59.8	98.6	31 31.6	+59.9	99.2	31 21.7	+59.9	99.8	31 11.1	+60.0	100.4	31 00.0	+60.0	101.0	**31**
32	33 04.3	+59.4	96.6	32 57.1	+59.5	97.2	32 49.2	+59.7	97.9	32 40.7	+59.8	98.5	32 31.5	+59.9	99.1	32 21.6	+60.0	99.8	32 11.1	+60.0	100.4	32 00.0	+60.0	101.0	**32**
33	34 03.7	+59.4	96.4	33 56.6	+59.6	97.1	33 48.9	+59.7	97.7	33 40.5	+59.8	98.4	33 31.4	+59.8	99.1	33 21.6	+59.9	99.7	33 11.1	+60.0	100.4	33 00.0	+60.0	101.0	**33**
34	35 03.1	+59.3	96.2	34 56.2	+59.5	96.9	34 48.6	+59.6	97.6	34 40.3	+59.8	98.3	34 31.2	+59.9	99.0	34 21.5	+60.0	99.7	34 11.1	+60.0	100.3	34 00.0	+60.0	101.0	**34**
35	36 02.4	+59.3	96.1	35 55.7	+59.5	96.8	35 48.2	+59.7	97.5	35 40.1	+59.7	98.2	35 31.1	+59.9	98.9	35 21.5	+59.9	99.6	35 11.1	+60.0	100.3	35 00.0	+60.0	101.0	**35**
36	37 01.7	+59.3	95.9	36 55.2	+59.5	96.6	36 47.9	+59.7	97.4	36 39.8	+59.8	98.1	36 31.0	+59.9	98.8	36 21.4	+60.0	99.6	36 11.1	+60.0	100.3	36 00.0	+60.0	101.0	**36**
37	38 01.0	+59.3	95.7	37 54.7	+59.5	96.5	37 47.6	+59.6	97.2	37 39.6	+59.8	98.0	37 30.9	+59.9	98.8	37 21.4	+59.9	99.5	37 11.1	+60.0	100.3	37 00.0	+60.0	101.0	**37**
38	39 00.3	+59.3	95.5	38 54.2	+59.5	96.3	38 47.2	+59.6	97.1	38 39.4	+59.8	97.9	38 30.8	+59.8	98.7	38 21.3	+60.0	99.5	38 11.1	+59.9	100.2	38 00.0	+60.0	101.0	**38**
39	39 59.6	+59.3	95.3	39 53.7	+59.4	96.1	39 46.8	+59.7	96.9	39 39.2	+59.7	97.8	39 30.6	+59.9	98.6	39 21.3	+59.9	99.4	39 11.0	+60.0	100.2	39 00.0	+60.0	101.0	**39**
40	40 58.9	+59.2	95.1	40 53.1	+59.4	95.9	40 46.5	+59.6	96.8	40 38.9	+59.8	97.6	40 30.5	+59.9	98.5	40 21.2	+59.9	99.3	40 11.0	+60.0	100.2	40 00.0	+60.0	101.0	**40**
41	41 58.1	+59.2	94.9	41 52.5	+59.5	95.8	41 46.1	+59.6	96.6	41 38.7	+59.7	97.5	41 30.4	+59.8	98.4	41 21.1	+60.0	99.3	41 11.0	+60.0	100.1	41 00.0	+60.0	101.0	**41**
42	42 57.3	+59.2	94.6	42 52.0	+59.4	95.6	42 45.7	+59.6	96.5	42 38.4	+59.7	97.4	42 30.2	+59.9	98.3	42 21.1	+59.9	99.2	42 11.0	+60.0	100.1	42 00.0	+60.0	101.0	**42**
43	43 56.5	+59.1	94.4	43 51.4	+59.3	95.4	43 45.3	+59.5	96.3	43 38.1	+59.8	97.3	43 30.1	+59.8	98.2	43 21.0	+59.9	99.2	43 11.0	+60.0	100.1	43 00.0	+60.0	101.0	**43**
44	44 55.6	+59.2	94.2	44 50.7	+59.4	95.2	44 44.8	+59.6	96.2	44 37.9	+59.7	97.1	44 29.9	+59.8	98.1	44 20.9	+60.0	99.1	44 11.0	+59.9	100.0	44 00.0	+60.0	101.0	**44**
45	45 54.8	+59.0	93.9	45 50.1	+59.3	95.0	45 44.4	+59.5	96.0	45 37.6	+59.7	97.0	45 29.7	+59.9	98.0	45 20.9	+59.9	99.0	45 10.9	+60.0	100.0	45 00.0	+60.0	101.0	**45**
46	46 53.8	+59.1	93.7	46 49.4	+59.3	94.7	46 43.9	+59.5	95.8	46 37.3	+59.7	96.9	46 29.6	+59.8	97.9	46 20.8	+59.9	98.9	46 10.9	+60.0	100.0	46 00.0	+60.0	101.0	**46**
47	47 52.9	+59.0	93.4	47 48.7	+59.3	94.5	47 43.4	+59.5	95.6	47 37.0	+59.7	96.7	47 29.4	+59.8	97.8	47 20.7	+59.9	98.9	47 10.9	+60.0	99.9	47 00.0	+60.0	101.0	**47**
48	48 51.9	+59.0	93.2	48 48.0	+59.3	94.3	48 42.9	+59.5	95.4	48 36.7	+59.6	96.6	48 29.2	+59.9	97.7	48 20.6	+60.0	98.8	48 10.9	+60.0	99.9	48 00.0	+60.0	101.0	**48**
49	49 50.9	+58.9	92.9	49 47.3	+59.2	94.1	49 42.4	+59.5	95.2	49 36.3	+59.7	96.4	49 29.1	+59.8	97.6	49 20.6	+59.9	98.7	49 10.9	+59.9	99.9	49 00.0	+60.0	101.0	**49**
50	50 49.8	+58.9	92.6	50 46.5	+59.2	93.8	50 41.9	+59.4	95.0	50 36.0	+59.6	96.2	50 28.9	+59.8	97.4	50 20.5	+59.9	98.6	50 10.8	+60.0	99.8	50 00.0	+60.0	101.0	**50**
51	51 48.7	+58.9	92.3	51 45.7	+59.1	93.5	51 41.3	+59.4	94.8	51 35.6	+59.7	96.1	51 28.7	+59.8	97.3	51 20.4	+59.9	98.6	51 10.8	+60.0	99.8	51 00.0	+60.0	101.0	**51**
52	52 47.6	+58.8	91.9	52 44.8	+59.1	93.3	52 40.7	+59.4	94.6	52 35.3	+59.6	95.9	52 28.5	+59.7	97.2	52 20.3	+59.9	98.5	52 10.8	+60.0	99.7	52 00.0	+60.0	101.0	**52**
53	53 46.4	+58.7	91.6	53 43.9	+59.1	93.0	53 40.1	+59.4	94.3	53 34.9	+59.6	95.7	53 28.2	+59.8	97.0	53 20.2	+59.9	98.4	53 10.8	+60.0	99.7	53 00.0	+60.0	101.0	**53**
54	54 45.1	+58.6	91.3	54 43.0	+59.0	92.7	54 39.5	+59.3	94.1	54 34.5	+59.5	95.5	54 28.0	+59.8	96.9	54 20.1	+59.9	98.3	54 10.8	+59.9	99.6	54 00.0	+60.0	101.0	**54**
55	55 43.7	+58.6	90.9	55 42.0	+59.0	92.4	55 38.8	+59.3	93.8	55 34.0	+59.6	95.3	55 27.8	+59.7	96.7	55 20.0	+59.9	98.2	55 10.7	+60.0	99.6	55 00.0	+60.0	101.0	**55**
56	56 42.3	+58.6	90.5	56 41.0	+58.9	92.0	56 38.1	+59.2	93.5	56 33.6	+59.5	95.1	56 27.5	+59.7	96.6	56 19.9	+59.9	98.1	56 10.7	+60.0	99.5	56 00.0	+60.0	101.0	**56**
57	57 40.9	+58.4	90.1	57 39.9	+58.9	91.7	57 37.3	+59.2	93.3	57 33.1	+59.5	94.8	57 27.2	+59.8	96.4	57 19.8	+59.8	97.9	57 10.7	+59.9	99.5	57 00.0	+60.0	101.0	**57**
58	58 39.3	+58.3	89.7	58 38.8	+58.8	91.3	58 36.5	+59.2	93.0	58 32.6	+59.5	94.6	58 27.0	+59.7	96.2	58 19.6	+59.9	97.8	58 10.6	+60.0	99.4	58 00.0	+60.0	101.0	**58**
59	59 37.6	+58.3	89.2	59 37.6	+58.7	90.9	59 35.7	+59.1	92.6	59 32.1	+59.4	94.3	59 26.7	+59.6	96.0	59 19.5	+59.9	97.7	59 10.6	+60.0	99.4	59 00.0	+60.0	101.0	**59**
60	60 35.9	+58.1	88.7	60 36.3	+58.6	90.5	60 34.8	+59.1	92.3	60 31.5	+59.4	94.1	60 26.3	+59.7	95.8	60 19.4	+59.8	97.6	60 10.6	+59.9	99.3	60 00.0	+60.0	101.0	**60**
61	61 34.0	+58.0	88.2	61 34.9	+58.6	90.1	61 33.9	+59.0	91.9	61 30.9	+59.4	93.8	61 26.0	+59.6	95.6	61 19.2	+59.9	97.4	61 10.5	+60.0	99.2	61 00.0	+60.0	101.0	**61**
62	62 32.0	+57.9	87.7	62 33.5	+58.4	89.6	62 32.9	+58.9	91.5	62 30.3	+59.3	93.4	62 25.6	+59.7	95.4	62 19.1	+59.8	97.3	62 10.5	+60.0	99.1	62 00.0	+60.0	101.0	**62**
63	63 29.9	+57.7	87.1	63 31.9	+58.3	89.1	63 31.8	+58.8	91.1	63 29.6	+59.2	93.1	63 25.3	+59.6	95.1	63 18.9	+59.8	97.1	63 10.5	+59.9	99.1	63 00.0	+60.0	101.0	**63**
64	64 27.6	+57.6	86.5	64 30.2	+58.2	88.6	64 30.6	+58.8	90.7	64 28.8	+59.2	92.8	64 24.9	+59.5	94.8	64 18.7	+59.8	96.9	64 10.4	+60.0	99.0	64 00.0	+60.0	101.0	**64**
65	65 25.2	+57.4	85.8	65 28.4	+58.1	88.0	65 29.4	+58.6	90.2	65 28.0	+59.2	92.4	65 24.4	+59.5	94.6	65 18.5	+59.8	96.7	65 10.4	+59.9	98.9	65 00.0	+60.0	101.0	**65**
66	66 22.6	+57.1	85.1	66 26.5	+57.9	87.4	66 28.0	+58.6	89.7	66 27.2	+59.1	92.0	66 23.9	+59.5	94.3	66 18.3	+59.8	96.5	66 10.3	+60.0	98.8	66 00.0	+60.0	101.0	**66**
67	67 19.7	+56.9	84.3	67 24.4	+57.7	86.7	67 26.6	+58.4	89.1	67 26.3	+59.0	91.5	67 23.4	+59.5	93.9	67 18.1	+59.7	96.3	67 10.3	+59.9	98.7	67 00.0	+60.0	101.0	**67**
68	68 16.6	+56.7	83.5	68 22.1	+57.6	86.0	68 25.0	+58.3	88.5	68 25.3	+58.9	91.0	68 22.9	+59.3	93.6	68 17.8	+59.8	96.1	68 10.2	+59.9	98.6	68 00.0	+60.0	101.0	**68**
69	69 13.3	+56.3	82.6	69 19.7	+57.2	85.2	69 23.3	+58.1	87.8	69 24.2	+58.8	90.5	69 22.2	+59.4	93.2	69 17.6	+59.7	95.8	69 10.1	+59.9	98.4	69 00.0	+60.0	101.0	**69**
70	70 09.6	+55.9	81.6	70 16.9	+57.1	84.3	70 21.4	+57.9	87.1	70 23.0	+58.6	89.9	70 21.6	+59.2	92.7	70 17.3	+59.6	95.5	70 10.0	+60.0	98.3	70 00.0	+60.0	101.0	**70**
71	71 05.5	+55.6	80.5	71 14.0	+56.7	83.4	71 19.3	+57.7	86.3	71 21.6	+58.6	89.3	71 20.8	+59.2	92.2	71 16.9	+59.7	95.2	71 10.0	+59.9	98.1	71 00.0	+60.0	101.0	**71**
72	72 01.1	+55.0	79.3	72 10.7	+56.3	82.3	72 17.0	+57.5	85.4	72 20.2	+58.3	88.6	72 20.0	+59.1	91.7	72 16.6	+59.6	94.8	72 09.9	+59.9	97.9	72 00.0	+60.0	101.0	**72**
73	72 56.1	+54.5	78.0	73 07.0	+55.9	81.2	73 14.5	+57.1	84.5	73 18.5	+58.2	87.8	73 19.1	+59.0	91.1	73 16.2	+59.5	94.5	73 09.8	+59.9	97.8	73 00.0	+60.0	101.0	**73**
74	73 50.6	+53.8	76.5	74 02.9	+55.4	79.9	74 11.6	+56.8	83.4	74 16.7	+57.9	86.9	74 18.1	+58.8	90.5	74 15.7	+59.5	94.0	74 09.7	+59.8	97.5	74 00.0	+60.0	101.0	**74**
75	74 44.4	+53.1	74.9	74 58.3	+54.8	78.5	75 08.4	+56.3	82.2	75 14.6	+57.7	85.9	75 16.9	+58.7	89.7	75 15.2	+59.4	93.5	75 09.5	+59.9	97.3	75 00.0	+60.0	101.0	**75**
76	75 37.5	+52.0	73.0	75 53.1	+54.0	76.8	76 04.7	+55.8	80.8	76 12.3	+57.2	84.8	76 15.6	+58.4	88.9	76 14.6	+59.3	93.0	76 09.4	+59.8	97.0	76 00.0	+60.0	101.0	**76**
77	76 29.5	+51.0	71.0	76 47.1	+53.1	75.0	77 00.5	+55.1	79.2	77 09.5	+56.9	83.5	77 14.0	+58.3	87.9	77 13.9	+59.3	92.3	77 09.2	+59.8	96.7	77 00.0	+60.0	101.0	**77**
78	77 20.5	+49.5	68.6	77 40.2	+52.1	72.9	77 55.6	+54.3	77.4	78 06.4	+56.3	82.0	78 12.3	+57.9	86.8	78 13.2	+59.0	91.5	78 09.0	+59.8	96.3	78 00.0	+60.0	101.0	**78**
79	78 10.0	+47.8	66.0	78 32.3	+50.6	70.5	78 49.9	+53.3	75.3	79 02.7	+55.6	80.3	79 10.2	+57.5	85.4	79 12.2	+58.9	90.7	79 08.8	+59.7	95.9	79 00.0	+60.0	101.0	**79**
80	78 57.8	*+45.7*•	62.9	79 22.9	+48.9	67.7	79 43.2	+51.9	72.8	79 58.3	+54.6	78.2	80 07.7	+56.9	83.8	80 11.1	+58.7	89.6	80 08.5	+59.7	95.3	80 00.0	+60.0	101.0	**80**
81	79 43.5	*+43.1*•	59.4	80 11.8	*+46.7*•	64.4	80 35.1	*+50.2*•	69.8	80 52.9	+53.5	75.7	81 04.6	+56.2	81.9	81 09.8	+58.3	88.3	81 08.2	+59.6	94.7	81 00.0	+60.0	101.0	**81**
82	80 26.6	*+39.9*•	55.4	80 58.5	*+43.8*•	60.6	81 25.3	*+47.9*•	66.3	81 46.4	*+51.7*•	72.7	82 00.8	+55.2	79.5	82 08.1	+57.8	86.6	82 07.8	+59.4	93.9	82 00.0	+60.0	101.0	**82**
83	81 06.5	*+35.8*•	50.7	81 42.3	*+40.2*•	56.0	82 13.2	*+44.8*•	62.1	82 38.1	*+49.4*•	69.0	82 56.0	+53.7	76.5	83 05.9	+57.1	84.6	83 07.2	+59.3	92.8	83 00.0	+60.0	101.0	**83**
84	81 42.3	*+30.9*•	45.3	82 22.5	*+35.5*•	50.7	82 58.0	*+40.6*•	56.9	83 27.5	*+46.1*•	64.3	83 49.7	*+51.4*•	72.6	84 03.0	+56.0	81.8	84 06.5	+59.0	91.4	84 00.0	+60.0	101.0	**84**
85	82 13.2	*+24.9*•	39.2	82 58.0	*+29.5*•	44.3	83 38.6	*+35.0*•	50.6	84 13.6	*+41.2*•	58.3	84 41.1	*+47.9*•	67.4	84 59.0	*+54.0*•	78.0	85 05.5	+58.5	89.5	85 00.0	+60.0	101.0	**85**
86	82 38.1	*+17.9*•	32.3	83 27.5	*+22.2*•	36.9	84 13.6	*+27.5*•	42.9	84 54.8	*+34.2*•	50.6	85 29.0	*+42.1*•	60.4	85 53.0	*+50.7*•	72.6	86 04.0	+57.5	86.6	86 00.0	+60.0	101.0	**86**
87	82 56.0	*+9.9*•	24.7	83 49.7	*+13.3*•	28.5	84 41.1	*+17.9*•	33.7	85 29.0	*+24.0*•	40.7	86 11.1	*+32.6*•	50.5	86 43.7	*+43.7*•	64.2	87 01.5	*+55.0*•	81.8	87 00.0	+60.0	101.0	**87**
88	83 05.9	*+1.3*•	16.6	84 03.0	*+3.5*•	19.3	84 59.0	*+6.5*•	23.1	85 53.0	*+11.0*•	28.5	86 43.7	*+17.8*•	36.9	87 27.4	*+29.1*•	50.5	87 56.5	*+47.2*•	72.5	88 00.0	+60.0	101.0	**88**
89	83 07.2	*–7.2*•	8.2	84 06.5	*–6.5*•	9.6	85 05.5	*–5.5*•	11.6	86 04.0	*–4.0*•	14.5	87 01.5	*–1.5*•	19.3	87 56.5	*+3.5*•	28.5	88 43.7	*+16.3*•	50.5	89 00.0	+60.0	101.0	**89**
90	83 00.0	*–15.4*•	0.0	84 00.0	*–16.1*•	0.0	85 00.0	*–17.0*•	0.0	86 00.0	*–18.2*•	0.0	87 00.0	*–20.3*•	0.0	88 00.0	*–24.0*•	0.0	89 00.0	*–32.6*•	0.0	90 00.0	–60.0	50.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 79°, 281°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 19.9	– 59.5	100.9	1 08.6	– 59.7	100.9	0 57.2	– 59.8	101.0	0 45.8	– 59.9	101.0	0 34.3	– 59.9	101.0	0 22.9	– 60.0	101.0	0 11.4	– 59.9	101.0	0 00.0	+ 60.0	79.0	**0**
1	0 20.4	– 59.6	101.0	0 08.9	– 59.7	101.0	0 02.6	+ 59.8	79.0	0 14.1	+ 59.9	79.0	0 25.6	+ 59.9	79.0	0 37.1	+ 59.9	79.0	0 48.5	+ 60.0	79.0	1 00.0	+ 60.0	79.0	**1**
2	0 39.2	+ 59.6	78.8	0 50.8	+ 59.7	78.9	1 02.4	+ 59.8	78.9	1 14.0	+ 59.8	78.9	1 25.5	+ 59.9	78.9	1 37.0	+ 60.0	78.9	1 48.5	+ 60.0	79.0	2 00.0	+ 60.0	79.0	**2**
3	1 38.8	+ 59.5	78.7	1 50.5	+ 59.7	78.8	2 02.2	+ 59.7	78.8	2 13.8	+ 59.9	78.8	2 25.4	+ 60.0	78.9	2 37.0	+ 60.0	78.9	2 48.5	+ 60.0	79.0	3 00.0	+ 60.0	79.0	**3**
4	2 38.3	+ 59.6	78.6	2 50.2	+ 59.6	78.6	3 01.9	+ 59.8	78.7	3 13.7	+ 59.8	78.8	3 25.4	+ 59.9	78.8	3 37.0	+ 59.9	78.9	3 48.5	+ 60.0	78.9	4 00.0	+ 60.0	79.0	**4**
5	3 37.9	+ 59.6	78.5	3 49.8	+ 59.7	78.5	4 01.7	+ 59.8	78.6	4 13.5	+ 59.9	78.7	4 25.3	+ 59.9	78.8	4 36.9	+ 60.0	78.8	4 48.5	+ 60.0	78.9	5 00.0	+ 60.0	79.0	**5**
6	4 37.5	+ 59.5	78.4	4 49.5	+ 59.7	78.4	5 01.5	+ 59.8	78.5	5 13.4	+ 59.9	78.6	5 25.2	+ 59.9	78.7	5 36.9	+ 60.0	78.8	5 48.5	+ 60.0	78.9	6 00.0	+ 60.0	79.0	**6**
7	5 37.0	+ 59.6	78.2	5 49.2	+ 59.7	78.3	6 01.3	+ 59.8	78.4	6 13.3	+ 59.8	78.5	6 25.1	+ 59.9	78.7	6 36.9	+ 59.9	78.8	6 48.5	+ 60.0	78.9	7 00.0	+ 60.0	79.0	**7**
8	6 36.6	+ 59.6	78.1	6 48.9	+ 59.7	78.2	7 01.1	+ 59.7	78.4	7 13.1	+ 59.9	78.5	7 25.0	+ 60.0	78.6	7 36.8	+ 60.0	78.7	7 48.5	+ 60.0	78.9	8 00.0	+ 60.0	79.0	**8**
9	7 36.2	+ 59.5	78.0	7 48.6	+ 59.6	78.1	8 00.8	+ 59.8	78.3	8 13.0	+ 59.8	78.4	8 25.0	+ 59.9	78.5	8 36.8	+ 60.0	78.7	8 48.5	+ 60.0	78.8	9 00.0	+ 60.0	79.0	**9**
10	8 35.7	+ 59.6	77.9	8 48.2	+ 59.7	78.0	9 00.6	+ 59.8	78.2	9 12.8	+ 59.9	78.3	9 24.9	+ 59.9	78.5	9 36.8	+ 59.9	78.7	9 48.5	+ 60.0	78.8	10 00.0	+ 60.0	79.0	**10**
11	9 35.3	+ 59.5	77.8	9 47.9	+ 59.7	77.9	10 00.4	+ 59.8	78.1	10 12.7	+ 59.8	78.3	10 24.8	+ 59.9	78.4	10 36.7	+ 60.0	78.6	10 48.5	+ 59.9	78.8	11 00.0	+ 60.0	79.0	**11**
12	10 34.8	+ 59.6	77.6	10 47.6	+ 59.7	77.8	11 00.2	+ 59.7	78.0	11 12.5	+ 59.9	78.2	11 24.7	+ 59.9	78.4	11 36.7	+ 59.9	78.6	11 48.4	+ 60.0	78.8	12 00.0	+ 60.0	79.0	**12**
13	11 34.4	+ 59.5	77.5	11 47.3	+ 59.6	77.7	11 59.9	+ 59.8	77.9	12 12.4	+ 59.8	78.1	12 24.6	+ 59.9	78.3	12 36.6	+ 60.0	78.6	12 48.4	+ 60.0	78.8	13 00.0	+ 60.0	79.0	**13**
14	12 33.9	+ 59.6	77.4	12 46.9	+ 59.7	77.6	12 59.7	+ 59.8	77.8	13 12.2	+ 59.9	78.1	13 24.5	+ 60.0	78.3	13 36.6	+ 60.0	78.5	13 48.4	+ 60.0	78.8	14 00.0	+ 60.0	79.0	**14**
15	13 33.5	+ 59.5	77.3	13 46.6	+ 59.7	77.5	13 59.5	+ 59.7	77.7	14 12.1	+ 59.8	78.0	14 24.5	+ 59.9	78.2	14 36.6	+ 59.9	78.5	14 48.4	+ 60.0	78.7	15 00.0	+ 60.0	79.0	**15**
16	14 33.0	+ 59.6	77.1	14 46.3	+ 59.6	77.4	14 59.2	+ 59.8	77.6	15 11.9	+ 59.9	77.9	15 24.4	+ 59.9	78.2	15 36.5	+ 60.0	78.4	15 48.4	+ 60.0	78.7	16 00.0	+ 60.0	79.0	**16**
17	15 32.6	+ 59.5	77.0	15 45.9	+ 59.7	77.3	15 59.0	+ 59.8	77.5	16 11.8	+ 59.8	77.8	16 24.3	+ 59.9	78.1	16 36.5	+ 60.0	78.4	16 48.4	+ 60.0	78.7	17 00.0	+ 60.0	79.0	**17**
18	16 32.1	+ 59.5	76.9	16 45.6	+ 59.6	77.2	16 58.8	+ 59.7	77.5	17 11.6	+ 59.9	77.8	17 24.2	+ 59.9	78.1	17 36.5	+ 59.9	78.4	17 48.4	+ 60.0	78.7	18 00.0	+ 60.0	79.0	**18**
19	17 31.6	+ 59.5	76.7	17 45.2	+ 59.7	77.0	17 58.5	+ 59.8	77.4	18 11.5	+ 59.8	77.7	18 24.1	+ 59.9	78.0	18 36.4	+ 60.0	78.3	18 48.4	+ 60.0	78.7	19 00.0	+ 60.0	79.0	**19**
20	18 31.1	+ 59.6	76.6	18 44.9	+ 59.6	76.9	18 58.3	+ 59.7	77.3	19 11.3	+ 59.9	77.6	19 24.0	+ 59.9	77.9	19 36.4	+ 59.9	78.3	19 48.4	+ 60.0	78.6	20 00.0	+ 60.0	79.0	**20**
21	19 30.7	+ 59.5	76.5	19 44.5	+ 59.7	76.8	19 58.0	+ 59.8	77.2	20 11.2	+ 59.8	77.5	20 23.9	+ 59.9	77.9	20 36.3	+ 60.0	78.3	20 48.4	+ 59.9	78.6	21 00.0	+ 60.0	79.0	**21**
22	20 30.2	+ 59.5	76.3	20 44.2	+ 59.6	76.7	20 57.8	+ 59.7	77.1	21 11.0	+ 59.8	77.4	21 23.8	+ 60.0	77.8	21 36.3	+ 60.0	78.2	21 48.3	+ 60.0	78.6	22 00.0	+ 60.0	79.0	**22**
23	21 29.7	+ 59.5	76.2	21 43.8	+ 59.6	76.6	21 57.5	+ 59.8	77.0	22 10.8	+ 59.9	77.4	22 23.8	+ 59.9	77.8	22 36.3	+ 59.9	78.2	22 48.3	+ 60.0	78.6	23 00.0	+ 60.0	79.0	**23**
24	22 29.2	+ 59.5	76.1	22 43.4	+ 59.6	76.5	22 57.3	+ 59.7	76.9	23 10.7	+ 59.8	77.3	23 23.7	+ 59.9	77.7	23 36.2	+ 60.0	78.1	23 48.3	+ 60.0	78.6	24 00.0	+ 60.0	79.0	**24**
25	23 28.7	+ 59.4	75.9	23 43.0	+ 59.7	76.3	23 57.0	+ 59.7	76.8	24 10.5	+ 59.8	77.2	24 23.6	+ 59.9	77.6	24 36.2	+ 59.9	78.1	24 48.3	+ 60.0	78.5	25 00.0	+ 60.0	79.0	**25**
26	24 28.1	+ 59.5	75.8	24 42.7	+ 59.6	76.2	24 56.7	+ 59.8	76.7	25 10.3	+ 59.9	77.1	25 23.5	+ 59.9	77.6	25 36.1	+ 60.0	78.1	25 48.3	+ 60.0	78.5	26 00.0	+ 60.0	79.0	**26**
27	25 27.6	+ 59.5	75.6	25 42.3	+ 59.6	76.1	25 56.5	+ 59.7	76.6	26 10.2	+ 59.8	77.0	26 23.4	+ 59.9	77.5	26 36.1	+ 59.9	78.0	26 48.3	+ 60.0	78.5	27 00.0	+ 60.0	79.0	**27**
28	26 27.1	+ 59.4	75.5	26 41.9	+ 59.6	76.0	26 56.2	+ 59.7	76.5	27 10.0	+ 59.8	77.0	27 23.3	+ 59.9	77.5	27 36.0	+ 60.0	78.0	27 48.3	+ 60.0	78.5	28 00.0	+ 60.0	79.0	**28**
29	27 26.5	+ 59.5	75.3	27 41.5	+ 59.6	75.8	27 55.9	+ 59.7	76.3	28 09.8	+ 59.8	76.9	28 23.2	+ 59.9	77.4	28 36.0	+ 59.9	77.9	28 48.3	+ 60.0	78.5	29 00.0	+ 60.0	79.0	**29**
30	28 26.0	+ 59.4	75.2	28 41.1	+ 59.6	75.7	28 55.6	+ 59.7	76.2	29 09.6	+ 59.8	76.8	29 23.1	+ 59.9	77.3	29 35.9	+ 60.0	77.9	29 48.3	+ 59.9	78.4	30 00.0	+ 60.0	79.0	**30**
31	29 25.4	+ 59.5	75.0	29 40.7	+ 59.5	75.6	29 55.3	+ 59.7	76.1	30 09.4	+ 59.8	76.7	30 23.0	+ 59.9	77.3	30 35.9	+ 60.0	77.8	30 48.2	+ 60.0	78.4	31 00.0	+ 60.0	79.0	**31**
32	30 24.9	+ 59.4	74.9	30 40.2	+ 59.6	75.4	30 55.0	+ 59.7	76.0	31 09.2	+ 59.8	76.6	31 22.9	+ 59.8	77.2	31 35.9	+ 59.9	77.8	31 48.2	+ 60.0	78.4	32 00.0	+ 60.0	79.0	**32**
33	31 24.3	+ 59.4	74.7	31 39.8	+ 59.6	75.3	31 54.7	+ 59.7	75.9	32 09.0	+ 59.8	76.5	32 22.7	+ 59.9	77.1	32 35.8	+ 60.0	77.7	32 48.2	+ 60.0	78.4	33 00.0	+ 60.0	79.0	**33**
34	32 23.7	+ 59.4	74.5	32 39.4	+ 59.5	75.2	32 54.4	+ 59.7	75.8	33 08.8	+ 59.8	76.4	33 22.6	+ 59.9	77.0	33 35.8	+ 59.9	77.7	33 48.2	+ 60.0	78.3	34 00.0	+ 60.0	79.0	**34**
35	33 23.1	+ 59.3	74.4	33 38.9	+ 59.5	75.0	33 54.1	+ 59.7	75.7	34 08.6	+ 59.8	76.3	34 22.5	+ 59.9	77.0	34 35.7	+ 59.9	77.6	34 48.2	+ 60.0	78.3	35 00.0	+ 60.0	79.0	**35**
36	34 22.4	+ 59.4	74.2	34 38.4	+ 59.6	74.9	34 53.8	+ 59.7	75.5	35 08.4	+ 59.8	76.2	35 22.4	+ 59.9	76.9	35 35.6	+ 60.0	77.6	35 48.2	+ 60.0	78.3	36 00.0	+ 60.0	79.0	**36**
37	35 21.8	+ 59.3	74.0	35 38.0	+ 59.5	74.7	35 53.5	+ 59.6	75.4	36 08.2	+ 59.8	76.1	36 22.3	+ 59.9	76.8	36 35.6	+ 59.9	77.5	36 48.2	+ 60.0	78.3	37 00.0	+ 60.0	79.0	**37**
38	36 21.1	+ 59.4	73.8	36 37.5	+ 59.5	74.5	36 53.1	+ 59.7	75.3	37 08.0	+ 59.8	76.0	37 22.2	+ 59.8	76.7	37 35.5	+ 60.0	77.5	37 48.2	+ 59.9	78.2	38 00.0	+ 60.0	79.0	**38**
39	37 20.5	+ 59.3	73.6	37 37.0	+ 59.5	74.4	37 52.8	+ 59.6	75.1	38 07.8	+ 59.8	75.9	38 22.0	+ 59.9	76.7	38 35.5	+ 59.9	77.4	38 48.1	+ 60.0	78.2	39 00.0	+ 60.0	79.0	**39**
40	38 19.8	+ 59.3	73.5	38 36.5	+ 59.4	74.2	38 52.4	+ 59.6	75.0	39 07.6	+ 59.7	75.8	39 21.9	+ 59.9	76.6	39 35.4	+ 60.0	77.4	39 48.1	+ 60.0	78.2	40 00.0	+ 60.0	79.0	**40**
41	39 19.1	+ 59.2	73.3	39 35.9	+ 59.5	74.0	39 52.0	+ 59.7	74.8	40 07.3	+ 59.8	75.7	40 21.8	+ 59.8	76.5	40 35.4	+ 59.9	77.3	40 48.1	+ 60.0	78.2	41 00.0	+ 60.0	79.0	**41**
42	40 18.3	+ 59.3	73.1	40 35.4	+ 59.4	73.9	40 51.7	+ 59.6	74.7	41 07.1	+ 59.7	75.5	41 21.6	+ 59.9	76.4	41 35.3	+ 59.9	77.3	41 48.1	+ 60.0	78.1	42 00.0	+ 60.0	79.0	**42**
43	41 17.6	+ 59.2	72.8	41 34.8	+ 59.5	73.7	41 51.3	+ 59.6	74.5	42 06.8	+ 59.8	75.4	42 21.5	+ 59.8	76.3	42 35.2	+ 60.0	77.2	42 48.1	+ 60.0	78.1	43 00.0	+ 60.0	79.0	**43**
44	42 16.8	+ 59.2	72.6	42 34.3	+ 59.4	73.5	42 50.9	+ 59.5	74.4	43 06.6	+ 59.7	75.3	43 21.3	+ 59.9	76.2	43 35.2	+ 59.9	77.1	43 48.1	+ 59.9	78.1	44 00.0	+ 60.0	79.0	**44**
45	43 16.0	+ 59.2	72.4	43 33.7	+ 59.4	73.3	43 50.4	+ 59.6	74.2	44 06.3	+ 59.7	75.2	44 21.2	+ 59.8	76.1	44 35.1	+ 59.9	77.1	44 48.0	+ 60.0	78.0	45 00.0	+ 60.0	79.0	**45**
46	44 15.2	+ 59.1	72.2	44 33.1	+ 59.3	73.1	44 50.0	+ 59.6	74.1	45 06.0	+ 59.7	75.0	45 21.0	+ 59.9	76.0	45 35.0	+ 60.0	77.0	45 48.0	+ 60.0	78.0	46 00.0	+ 60.0	79.0	**46**
47	45 14.3	+ 59.1	71.9	45 32.4	+ 59.4	72.9	45 49.6	+ 59.5	73.9	46 05.7	+ 59.7	74.9	46 20.9	+ 59.8	75.9	46 35.0	+ 59.9	76.9	46 48.0	+ 60.0	78.0	47 00.0	+ 60.0	79.0	**47**
48	46 13.4	+ 59.1	71.7	46 31.8	+ 59.3	72.7	46 49.1	+ 59.5	73.7	47 05.4	+ 59.7	74.7	47 20.7	+ 59.8	75.8	47 34.9	+ 59.9	76.8	47 48.0	+ 60.0	77.9	48 00.0	+ 60.0	79.0	**48**
49	47 12.5	+ 59.0	71.4	47 31.1	+ 59.3	72.5	47 48.6	+ 59.5	73.5	48 05.1	+ 59.7	74.6	48 20.5	+ 59.8	75.7	48 34.8	+ 59.9	76.8	48 48.0	+ 60.0	77.9	49 00.0	+ 60.0	79.0	**49**
50	48 11.5	+ 59.0	71.2	48 30.4	+ 59.2	72.2	48 48.1	+ 59.5	73.3	49 04.8	+ 59.7	74.4	49 20.3	+ 59.8	75.6	49 34.7	+ 59.9	76.7	49 48.0	+ 59.9	77.8	50 00.0	+ 60.0	79.0	**50**
51	49 10.5	+ 59.0	70.9	49 29.6	+ 59.3	72.0	49 47.6	+ 59.5	73.1	50 04.5	+ 59.6	74.3	50 20.1	+ 59.8	75.4	50 34.6	+ 59.9	76.6	50 47.9	+ 60.0	77.8	51 00.0	+ 60.0	79.0	**51**
52	50 09.5	+ 58.9	70.6	50 28.9	+ 59.2	71.8	50 47.1	+ 59.4	72.9	51 04.1	+ 59.6	74.1	51 19.9	+ 59.8	75.3	51 34.5	+ 60.0	76.5	51 47.9	+ 60.0	77.8	52 00.0	+ 60.0	79.0	**52**
53	51 08.4	+ 58.9	70.3	51 28.1	+ 59.1	71.5	51 46.5	+ 59.4	72.7	52 03.7	+ 59.7	73.9	52 19.7	+ 59.8	75.2	52 34.5	+ 59.9	76.4	52 47.9	+ 60.0	77.7	53 00.0	+ 60.0	79.0	**53**
54	52 07.3	+ 58.8	70.0	52 27.2	+ 59.1	71.2	52 45.9	+ 59.4	72.5	53 03.4	+ 59.6	73.7	53 19.5	+ 59.8	75.0	53 34.4	+ 59.9	76.3	53 47.9	+ 59.9	77.7	54 00.0	+ 60.0	79.0	**54**
55	53 06.1	+ 58.8	69.7	53 26.3	+ 59.1	70.9	53 45.3	+ 59.4	72.2	54 03.0	+ 59.5	73.5	54 19.3	+ 59.7	74.9	54 34.3	+ 59.8	76.2	54 47.8	+ 60.0	77.6	55 00.0	+ 60.0	79.0	**55**
56	54 04.9	+ 58.7	69.3	54 25.4	+ 59.1	70.6	54 44.7	+ 59.3	72.0	55 02.5	+ 59.6	73.3	55 19.0	+ 59.8	74.7	55 34.1	+ 59.9	76.1	55 47.8	+ 60.0	77.6	56 00.0	+ 60.0	79.0	**56**
57	55 03.6	+ 58.7	69.0	55 24.5	+ 59.0	70.3	55 44.0	+ 59.3	71.7	56 02.1	+ 59.5	73.1	56 18.8	+ 59.7	74.6	56 34.0	+ 59.9	76.0	56 47.8	+ 59.9	77.5	57 00.0	+ 60.0	79.0	**57**
58	56 02.3	+ 58.5	68.6	56 23.5	+ 58.9	70.0	56 43.3	+ 59.2	71.4	57 01.6	+ 59.5	72.9	57 18.5	+ 59.8	74.4	57 33.9	+ 59.9	75.9	57 47.7	+ 60.0	77.4	58 00.0	+ 60.0	79.0	**58**
59	57 00.8	+ 58.5	68.2	57 22.4	+ 58.9	69.7	57 42.5	+ 59.2	71.1	58 01.1	+ 59.5	72.7	58 18.3	+ 59.7	74.2	58 33.8	+ 59.9	75.8	58 47.7	+ 60.0	77.4	59 00.0	+ 60.0	79.0	**59**
60	57 59.3	+ 58.4	67.8	58 21.3	+ 58.8	69.3	58 41.7	+ 59.2	70.8	59 00.6	+ 59.5	72.4	59 18.0	+ 59.6	74.0	59 33.7	+ 59.8	75.6	59 47.7	+ 59.9	77.3	60 00.0	+ 60.0	79.0	**60**
61	58 57.7	+ 58.3	67.4	59 20.1	+ 58.7	68.9	59 40.9	+ 59.1	70.5	60 00.1	+ 59.4	72.1	60 17.6	+ 59.7	73.8	60 33.5	+ 59.9	75.5	60 47.6	+ 60.0	77.2	61 00.0	+ 60.0	79.0	**61**
62	59 56.0	+ 58.3	66.9	60 18.8	+ 58.7	68.5	60 40.0	+ 59.0	70.2	60 59.5	+ 59.4	71.9	61 17.3	+ 59.7	73.6	61 33.4	+ 59.8	75.4	61 47.6	+ 60.0	77.2	62 00.0	+ 60.0	79.0	**62**
63	60 54.3	+ 58.1	66.4	61 17.5	+ 58.5	68.1	61 39.0	+ 59.0	69.8	61 58.9	+ 59.3	71.6	62 17.0	+ 59.6	73.4	62 33.2	+ 59.8	75.2	62 47.6	+ 59.9	77.1	63 00.0	+ 60.0	79.0	**63**
64	61 52.4	+ 57.9	65.9	62 16.0	+ 58.5	67.6	62 38.0	+ 58.9	69.4	62 58.2	+ 59.3	71.2	63 16.6	+ 59.6	73.1	63 33.0	+ 59.8	75.0	63 47.5	+ 60.0	77.0	64 00.0	+ 60.0	79.0	**64**
65	62 50.3	+ 57.9	65.3	63 14.5	+ 58.4	67.1	63 36.9	+ 58.9	69.0	63 57.5	+ 59.2	70.9	64 16.2	+ 59.5	72.9	64 32.8	+ 59.8	74.9	64 47.5	+ 59.9	76.9	65 00.0	+ 60.0	79.0	**65**
66	63 48.2	+ 57.6	64.7	64 12.9	+ 58.2	66.6	64 35.8	+ 58.7	68.5	64 56.7	+ 59.2	70.5	65 15.7	+ 59.6	72.6	65 32.6	+ 59.8	74.7	65 47.4	+ 60.0	76.8	66 00.0	+ 60.0	79.0	**66**
67	64 45.8	+ 57.5	64.1	65 11.1	+ 58.1	66.1	65 34.5	+ 58.7	68.1	65 55.9	+ 59.1	70.1	66 15.3	+ 59.4	72.3	66 32.4	+ 59.8	74.5	66 47.4	+ 59.9	76.7	67 00.0	+ 60.0	79.0	**67**
68	65 43.3	+ 57.3	63.4	66 09.2	+ 58.0	65.4	66 33.2	+ 58.5	67.5	66 55.0	+ 59.1	69.7	67 14.7	+ 59.5	71.9	67 32.2	+ 59.7	74.2	67 47.3	+ 59.9	76.6	68 00.0	+ 60.0	79.0	**68**
69	66 40.6	+ 57.1	62.7	67 07.2	+ 57.8	64.8	67 31.7	+ 58.4	67.0	67 54.1	+ 58.9	69.2	68 14.2	+ 59.4	71.6	68 31.9	+ 59.8	74.0	68 47.2	+ 60.0	76.5	69 00.0	+ 60.0	79.0	**69**
70	67 37.7	+ 56.8	61.9	68 05.0	+ 57.5	64.1	68 30.1	+ 58.3	66.4	68 53.0	+ 58.9	68.7	69 13.6	+ 59.3	71.2	69 31.7	+ 59.7	73.7	69 47.2	+ 59.9	76.3	70 00.0	+ 60.0	79.0	**70**
71	68 34.5	+ 56.6	61.0	69 02.5	+ 57.4	63.3	69 28.4	+ 58.1	65.7	69 51.9	+ 58.7	68.2	70 12.9	+ 59.3	70.8	70 31.4	+ 59.6	73.4	70 47.1	+ 59.9	76.2	71 00.0	+ 60.0	79.0	**71**
72	69 31.1	+ 56.2	60.1	69 59.9	+ 57.1	62.5	70 26.5	+ 57.9	65.0	70 50.6	+ 58.6	67.6	71 12.2	+ 59.2	70.3	71 31.0	+ 59.7	73.1	71 47.0	+ 59.9	76.0	72 00.0	+ 60.0	79.0	**72**
73	70 27.3	+ 55.8	59.1	70 57.0	+ 56.8	61.6	71 24.4	+ 57.7	64.2	71 49.2	+ 58.5	66.9	72 11.4	+ 59.1	69.8	72 30.7	+ 59.6	72.7	72 46.9	+ 59.9	75.8	73 00.0	+ 60.0	79.0	**73**
74	71 23.1	+ 55.4	58.0	71 53.8	+ 56.5	60.5	72 22.1	+ 57.4	63.3	72 47.7	+ 58.3	66.2	73 10.5	+ 59.0	69.2	73 30.3	+ 59.5	72.3	73 46.8	+ 59.9	75.6	74 00.0	+ 60.0	79.0	**74**
75	72 18.5	+ 54.9	56.7	72 50.3	+ 56.0	59.4	73 19.5	+ 57.1	62.3	73 46.0	+ 58.0	65.3	74 09.5	+ 58.8	68.5	74 29.8	+ 59.5	71.9	74 46.7	+ 59.9	75.4	75 00.0	+ 60.0	79.0	**75**
76	73 13.4	+ 54.3	55.4	73 46.3	+ 55.5	58.2	74 16.6	+ 56.7	61.2	74 44.0	+ 57.8	64.4	75 08.3	+ 58.7	67.8	75 29.3	+ 59.4	71.4	75 46.6	+ 59.8	75.1	76 00.0	+ 60.0	79.0	**76**
77	74 07.7	+ 53.6	53.8	74 41.8	+ 55.0	56.8	75 13.3	+ 56.3	60.0	75 41.8	+ 57.5	63.4	76 07.0	+ 58.5	67.0	76 28.7	+ 59.3	70.8	76 46.4	+ 59.8	74.8	77 00.0	+ 60.0	79.0	**77**
78	75 01.3	+ 52.7	52.2	75 36.8	+ 54.3	55.2	76 09.6	+ 55.7	58.6	76 39.3	+ 57.1	62.2	77 05.5	+ 58.3	66.0	77 28.0	+ 59.1	70.1	77 46.2	+ 59.8	74.5	78 00.0	+ 60.0	79.0	**78**
79	75 54.0	+ 51.7	50.3	76 31.1	+ 53.4	53.5	77 05.3	+ 55.1	57.0	77 36.4	+ 56.6	60.8	78 03.8	+ 57.9	64.9	78 27.1	+ 59.1	69.3	78 46.0	+ 59.7	74.0	79 00.0	+ 60.0	79.0	**79**
80	76 45.7	+ 50.6	48.1	77 24.5	+ 52.4	51.4	78 00.4	+ 54.2	55.1	78 33.0	+ 56.0	59.2	79 01.7	+ 57.6	63.6	79 26.2	+ 58.8	68.4	79 45.7	+ 59.7	73.6	80 00.0	+ 60.0	79.0	**80**
81	77 36.3	+ 49.0	45.7	78 16.9	+ 51.1	49.1	78 54.6	+ 53.2	53.0	79 29.0	+ 55.2	57.3	79 59.3	+ 57.0	62.0	80 25.0	+ 58.6	67.3	80 45.4	+ 59.7	73.0	81 00.0	+ 60.0	79.0	**81**
82	78 25.3	*+ 47.2* •	42.9	79 08.0	+ 49.4	46.4	79 47.8	+ 51.8	50.5	80 24.2	+ 54.1	55.0	80 56.3	+ 56.4	60.2	81 23.6	+ 58.2	65.9	81 45.1	+ 59.5	72.2	82 00.0	+ 60.0	79.0	**82**
83	79 12.5	*+ 44.9* •	39.7	79 57.4	*+ 47.4* •	43.3	80 39.6	*+ 50.0* •	47.5	81 18.3	+ 52.7	52.3	81 52.7	+ 55.3	57.9	82 21.8	+ 57.7	64.2	82 44.6	+ 59.3	71.3	83 00.0	+ 60.0	79.0	**83**
84	79 57.4	*+ 42.2* •	36.0	80 44.8	*+ 44.8* •	39.7	81 29.6	*+ 47.7* •	43.9	82 11.0	*+ 50.7* •	49.0	82 48.0	+ 53.9	55.0	83 19.5	+ 56.8	62.0	83 43.9	+ 59.1	70.0	84 00.0	+ 60.0	79.0	**84**
85	80 39.6	*+ 38.7* •	31.8	81 29.6	*+ 41.4* •	35.3	82 17.3	*+ 44.4* •	39.6	83 01.7	*+ 48.0* •	44.8	83 41.9	*+ 51.9* •	51.2	84 16.3	+ 55.7	59.0	84 43.0	+ 58.8	68.3	85 00.0	+ 60.0	79.0	**85**
86	81 18.3	*+ 34.4* •	26.9	82 11.0	*+ 37.0* •	30.2	83 01.7	*+ 40.2* •	34.3	83 49.7	*+ 44.1* •	39.6	84 33.8	*+ 48.5* •	46.3	85 12.0	*+ 53.4* •	54.9	85 41.8	+ 57.9	65.8	86 00.0	+ 60.0	79.0	**86**
87	81 52.7	*+ 29.1* •	21.3	82 48.0	*+ 31.5* •	24.2	83 41.9	*+ 34.4* •	27.9	84 33.8	*+ 38.2* •	32.8	85 22.3	*+ 43.1* •	39.5	86 05.4	*+ 49.4* •	48.9	86 39.7	*+ 56.3* •	61.9	87 00.0	+ 60.0	79.0	**87**
88	82 21.8	*+ 22.8* •	14.9	83 19.5	*+ 24.4* •	17.1	84 16.3	*+ 26.7* •	20.1	85 12.0	*+ 29.8* •	24.2	86 05.4	*+ 34.3* •	30.2	86 54.8	*+ 41.2* •	39.5	87 36.0	*+ 51.4* •	54.9	88 00.0	+ 60.0	79.0	**88**
89	82 44.6	*+ 15.4* •	7.8	83 43.9	*+ 16.1* •	9.0	84 43.0	*+ 17.0* •	10.7	85 41.8	*+ 18.2* •	13.2	86 39.7	*+ 20.3* •	17.1	87 36.0	*+ 24.0* •	24.1	88 27.4	*+ 32.6* •	39.5	89 00.0	+ 60.0	79.0	**89**
90	83 00.0	*+ 7.2* •	0.0	84 00.0	*+ 6.5* •	0.0	85 00.0	*+ 5.5* •	0.0	86 00.0	*+ 4.0* •	0.0	87 00.0	*+ 1.5* •	0.0	88 00.0	*– 3.5* •	0.0	89 00.0	*– 16.3* •	0.0	90 00.0	– 60.0	39.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 101°, 259°

80°, 280° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 12.8	+59.5	99.9	1 02.4	+59.7	99.9	0 52.0	+59.8	100.0	0 41.6	+59.9	100.0	0 31.2	+60.0	100.0	0 20.8	+60.0	100.0	0 10.4	+60.0	100.0	0 00.0	+60.0	100.0	**0**
1	2 12.3	+59.6	99.8	2 02.1	+59.7	99.8	1 51.8	+59.8	99.9	1 41.5	+59.9	99.9	1 31.2	+59.9	99.9	1 20.8	+60.0	100.0	1 10.4	+60.0	100.0	1 00.0	+60.0	100.0	**1**
2	3 11.9	+59.6	99.7	3 01.8	+59.6	99.7	2 51.6	+59.8	99.8	2 41.4	+59.8	99.8	2 31.1	+59.9	99.9	2 20.8	+59.9	99.9	2 10.4	+60.0	100.0	2 00.0	+60.0	100.0	**2**
3	4 11.5	+59.5	99.6	4 01.4	+59.7	99.6	3 51.4	+59.7	99.7	3 41.2	+59.9	99.8	3 31.0	+59.9	99.8	3 20.7	+60.0	99.9	3 10.4	+60.0	99.9	3 00.0	+60.0	100.0	**3**
4	5 11.0	+59.6	99.4	5 01.1	+59.7	99.5	4 51.1	+59.8	99.6	4 41.1	+59.8	99.7	4 30.9	+59.9	99.8	4 20.7	+60.0	99.9	4 10.4	+60.0	99.9	4 00.0	+60.0	100.0	**4**
5	6 10.6	+59.5	99.3	6 00.8	+59.7	99.4	5 50.9	+59.8	99.5	5 40.9	+59.9	99.6	5 30.8	+60.0	99.7	5 20.7	+59.9	99.8	5 10.4	+60.0	99.9	5 00.0	+60.0	100.0	**5**
6	7 10.1	+59.6	99.2	7 00.5	+59.7	99.3	6 50.7	+59.8	99.4	6 40.8	+59.8	99.6	6 30.8	+59.9	99.7	6 20.6	+60.0	99.8	6 10.4	+60.0	99.9	6 00.0	+60.0	100.0	**6**
7	8 09.7	+59.6	99.1	8 00.2	+59.6	99.2	7 50.5	+59.7	99.4	7 40.6	+59.9	99.5	7 30.7	+59.9	99.6	7 20.6	+59.9	99.8	7 10.4	+59.9	99.9	7 00.0	+60.0	100.0	**7**
8	9 09.3	+59.5	99.0	8 59.8	+59.7	99.1	8 50.2	+59.8	99.3	8 40.5	+59.9	99.4	8 30.6	+59.9	99.6	8 20.5	+60.0	99.7	8 10.3	+60.0	99.9	8 00.0	+60.0	100.0	**8**
9	10 08.8	+59.6	98.8	9 59.5	+59.7	99.0	9 50.0	+59.8	99.2	9 40.4	+59.8	99.4	9 30.5	+59.9	99.5	9 20.5	+60.0	99.7	9 10.3	+60.0	99.8	9 00.0	+60.0	100.0	**9**
10	11 08.4	+59.5	98.7	10 59.2	+59.6	98.9	10 49.8	+59.8	99.1	10 40.2	+59.9	99.3	10 30.4	+60.0	99.5	10 20.5	+59.9	99.6	10 10.3	+60.0	99.8	10 00.0	+60.0	100.0	**10**
11	12 07.9	+59.5	98.6	11 58.8	+59.7	98.8	11 49.6	+59.7	99.0	11 40.1	+59.8	99.2	11 30.4	+59.9	99.4	11 20.4	+60.0	99.6	11 10.3	+60.0	99.8	11 00.0	+60.0	100.0	**11**
12	13 07.4	+59.6	98.5	12 58.5	+59.7	98.7	12 49.3	+59.8	98.9	12 39.9	+59.9	99.1	12 30.3	+59.9	99.4	12 20.4	+60.0	99.6	12 10.3	+60.0	99.8	12 00.0	+60.0	100.0	**12**
13	14 07.0	+59.5	98.3	13 58.2	+59.6	98.6	13 49.1	+59.8	98.8	13 39.8	+59.8	99.1	13 30.2	+59.9	99.3	13 20.4	+59.9	99.5	13 10.3	+60.0	99.8	13 00.0	+60.0	100.0	**13**
14	15 06.5	+59.6	98.2	14 57.8	+59.7	98.5	14 48.9	+59.7	98.7	14 39.6	+59.9	99.0	14 30.1	+59.9	99.2	14 20.3	+60.0	99.5	14 10.3	+60.0	99.8	14 00.0	+60.0	100.0	**14**
15	16 06.1	+59.5	98.1	15 57.5	+59.6	98.4	15 48.6	+59.8	98.6	15 39.5	+59.8	98.9	15 30.0	+59.9	99.2	15 20.3	+60.0	99.5	15 10.3	+60.0	99.7	15 00.0	+60.0	100.0	**15**
16	17 05.6	+59.5	97.9	16 57.1	+59.7	98.2	16 48.4	+59.7	98.5	16 39.3	+59.9	98.8	16 29.9	+59.9	99.1	16 20.3	+59.9	99.4	16 10.3	+60.0	99.7	16 00.0	+60.0	100.0	**16**
17	18 05.1	+59.5	97.8	17 56.8	+59.6	98.1	17 48.1	+59.8	98.5	17 39.2	+59.8	98.8	17 29.8	+60.0	99.1	17 20.2	+60.0	99.4	17 10.3	+60.0	99.7	17 00.0	+60.0	100.0	**17**
18	19 04.6	+59.5	97.7	18 56.4	+59.7	98.0	18 47.9	+59.7	98.4	18 39.0	+59.8	98.7	18 29.8	+59.9	99.0	18 20.2	+59.9	99.4	18 10.3	+59.9	99.7	18 00.0	+60.0	100.0	**18**
19	20 04.1	+59.5	97.5	19 56.1	+59.6	97.9	19 47.6	+59.8	98.3	19 38.8	+59.9	98.6	19 29.7	+59.9	99.0	19 20.1	+60.0	99.3	19 10.2	+60.0	99.7	19 00.0	+60.0	100.0	**19**
20	21 03.6	+59.5	97.4	20 55.7	+59.6	97.8	20 47.4	+59.7	98.2	20 38.7	+59.8	98.5	20 29.6	+59.9	98.9	20 20.1	+60.0	99.3	20 10.2	+60.0	99.6	20 00.0	+60.0	100.0	**20**
21	22 03.1	+59.5	97.3	21 55.3	+59.7	97.7	21 47.1	+59.8	98.1	21 38.5	+59.8	98.5	21 29.5	+59.9	98.8	21 20.1	+59.9	99.2	21 10.2	+60.0	99.6	21 00.0	+60.0	100.0	**21**
22	23 02.6	+59.5	97.1	22 55.0	+59.6	97.5	22 46.9	+59.7	98.0	22 38.3	+59.9	98.4	22 29.4	+59.9	98.8	22 20.0	+60.0	99.2	22 10.2	+60.0	99.6	22 00.0	+60.0	100.0	**22**
23	24 02.1	+59.5	97.0	23 54.6	+59.6	97.4	23 46.6	+59.7	97.9	23 38.2	+59.8	98.3	23 29.3	+59.9	98.7	23 20.0	+59.9	99.2	23 10.2	+60.0	99.6	23 00.0	+60.0	100.0	**23**
24	25 01.6	+59.5	96.8	24 54.2	+59.6	97.3	24 46.3	+59.8	97.8	24 38.0	+59.8	98.2	24 29.2	+59.9	98.7	24 19.9	+60.0	99.1	24 10.2	+60.0	99.6	24 00.0	+60.0	100.0	**24**
25	26 01.1	+59.4	96.7	25 53.8	+59.6	97.2	25 46.1	+59.7	97.7	25 37.8	+59.9	98.1	25 29.1	+59.9	98.6	25 19.9	+59.9	99.1	25 10.2	+60.0	99.5	25 00.0	+60.0	100.0	**25**
26	27 00.5	+59.5	96.5	26 53.4	+59.6	97.0	26 45.8	+59.7	97.5	26 37.7	+59.8	98.0	26 29.0	+59.9	98.5	26 19.8	+60.0	99.0	26 10.2	+60.0	99.5	26 00.0	+60.0	100.0	**26**
27	28 00.0	+59.4	96.4	27 53.0	+59.6	96.9	27 45.5	+59.7	97.4	27 37.5	+59.8	98.0	27 28.9	+59.9	98.5	27 19.8	+60.0	99.0	27 10.2	+59.9	99.5	27 00.0	+60.0	100.0	**27**
28	28 59.4	+59.4	96.2	28 52.6	+59.6	96.8	28 45.2	+59.7	97.3	28 37.3	+59.8	97.9	28 28.8	+59.9	98.4	28 19.8	+59.9	98.9	28 10.1	+60.0	99.5	28 00.0	+60.0	100.0	**28**
29	29 58.8	+59.4	96.1	29 52.2	+59.6	96.6	29 44.9	+59.7	97.2	29 37.1	+59.8	97.8	29 28.7	+59.9	98.3	29 19.7	+60.0	98.9	29 10.1	+60.0	99.5	29 00.0	+60.0	100.0	**29**
30	30 58.2	+59.4	95.9	30 51.8	+59.5	96.5	30 44.6	+59.7	97.1	30 36.9	+59.8	97.7	30 28.6	+59.9	98.3	30 19.7	+59.9	98.9	30 10.1	+60.0	99.4	30 00.0	+60.0	100.0	**30**
31	31 57.6	+59.4	95.7	31 51.3	+59.6	96.4	31 44.3	+59.7	97.0	31 36.7	+59.8	97.6	31 28.5	+59.9	98.2	31 19.6	+60.0	98.8	31 10.1	+60.0	99.4	31 00.0	+60.0	100.0	**31**
32	32 57.0	+59.4	95.6	32 50.9	+59.5	96.2	32 44.0	+59.7	96.9	32 36.5	+59.8	97.5	32 28.4	+59.9	98.1	32 19.6	+59.9	98.8	32 10.1	+60.0	99.4	32 00.0	+60.0	100.0	**32**
33	33 56.4	+59.4	95.4	33 50.4	+59.5	96.1	33 43.7	+59.7	96.7	33 36.3	+59.8	97.4	33 28.3	+59.8	98.1	33 19.5	+60.0	98.7	33 10.1	+60.0	99.4	33 00.0	+60.0	100.0	**33**
34	34 55.8	+59.3	95.2	34 49.9	+59.6	95.9	34 43.4	+59.7	96.6	34 36.1	+59.8	97.3	34 28.1	+59.9	98.0	34 19.5	+59.9	98.7	34 10.1	+60.0	99.3	34 00.0	+60.0	100.0	**34**
35	35 55.1	+59.3	95.0	35 49.5	+59.5	95.8	35 43.1	+59.6	96.5	35 35.9	+59.8	97.2	35 28.0	+59.9	97.9	35 19.4	+60.0	98.6	35 10.1	+59.9	99.3	35 00.0	+60.0	100.0	**35**
36	36 54.4	+59.4	94.9	36 49.0	+59.5	95.6	36 42.7	+59.7	96.4	36 35.7	+59.8	97.1	36 27.9	+59.9	97.8	36 19.4	+59.9	98.6	36 10.0	+60.0	99.3	36 00.0	+60.0	100.0	**36**
37	37 53.8	+59.3	94.7	37 48.5	+59.4	95.4	37 42.4	+59.6	96.2	37 35.5	+59.7	97.0	37 27.8	+59.8	97.7	37 19.3	+59.9	98.5	37 10.0	+60.0	99.3	37 00.0	+60.0	100.0	**37**
38	38 53.1	+59.2	94.5	38 47.9	+59.5	95.3	38 42.0	+59.6	96.1	38 35.2	+59.8	96.9	38 27.6	+59.9	97.7	38 19.2	+60.0	98.4	38 10.0	+60.0	99.2	38 00.0	+60.0	100.0	**38**
39	39 52.3	+59.3	94.3	39 47.4	+59.5	95.1	39 41.6	+59.7	95.9	39 35.0	+59.8	96.8	39 27.5	+59.9	97.6	39 19.2	+59.9	98.4	39 10.0	+60.0	99.2	39 00.0	+60.0	100.0	**39**
40	40 51.6	+59.2	94.1	40 46.9	+59.4	94.9	40 41.3	+59.6	95.8	40 34.8	+59.7	96.6	40 27.4	+59.8	97.5	40 19.1	+60.0	98.3	40 10.0	+60.0	99.2	40 00.0	+60.0	100.0	**40**
41	41 50.8	+59.2	93.9	41 46.3	+59.4	94.8	41 40.9	+59.6	95.6	41 34.5	+59.8	96.5	41 27.2	+59.9	97.4	41 19.1	+59.9	98.3	41 10.0	+60.0	99.1	41 00.0	+60.0	100.0	**41**
42	42 50.0	+59.2	93.6	42 45.7	+59.4	94.6	42 40.5	+59.5	95.5	42 34.3	+59.7	96.4	42 27.1	+59.8	97.3	42 19.0	+59.9	98.2	42 10.0	+59.9	99.1	42 00.0	+60.0	100.0	**42**
43	43 49.2	+59.1	93.4	43 45.1	+59.4	94.4	43 40.0	+59.6	95.3	43 34.0	+59.7	96.3	43 26.9	+59.9	97.2	43 18.9	+60.0	98.1	43 09.9	+60.0	99.1	43 00.0	+60.0	100.0	**43**
44	44 48.3	+59.2	93.2	44 44.5	+59.3	94.2	44 39.6	+59.6	95.2	44 33.7	+59.7	96.1	44 26.8	+59.8	97.1	44 18.9	+59.9	98.1	44 09.9	+60.0	99.0	44 00.0	+60.0	100.0	**44**
45	45 47.5	+59.0	92.9	45 43.8	+59.4	94.0	45 39.2	+59.5	95.0	45 33.4	+59.7	96.0	45 26.6	+59.9	97.0	45 18.8	+59.9	98.0	45 09.9	+60.0	99.0	45 00.0	+60.0	100.0	**45**
46	46 46.5	+59.1	92.7	46 43.2	+59.3	93.7	46 38.7	+59.5	94.8	46 33.1	+59.7	95.9	46 26.5	+59.8	96.9	46 18.7	+59.9	97.9	46 09.9	+60.0	99.0	46 00.0	+60.0	100.0	**46**
47	47 45.6	+59.0	92.4	47 42.5	+59.3	93.5	47 38.2	+59.5	94.6	47 32.8	+59.7	95.7	47 26.3	+59.8	96.8	47 18.6	+60.0	97.9	47 09.9	+60.0	98.9	47 00.0	+60.0	100.0	**47**
48	48 44.6	+59.0	92.2	48 41.8	+59.2	93.3	48 37.7	+59.5	94.4	48 32.5	+59.7	95.6	48 26.1	+59.8	96.7	48 18.6	+59.9	97.8	48 09.9	+59.9	98.9	48 00.0	+60.0	100.0	**48**
49	49 43.6	+58.9	91.9	49 41.0	+59.2	93.0	49 37.2	+59.5	94.2	49 32.2	+59.6	95.4	49 25.9	+59.8	96.6	49 18.5	+59.9	97.7	49 09.8	+60.0	98.9	49 00.0	+60.0	100.0	**49**
50	50 42.5	+58.9	91.6	50 40.2	+59.2	92.8	50 36.7	+59.4	94.0	50 31.8	+59.7	95.2	50 25.7	+59.8	96.4	50 18.4	+59.9	97.6	50 09.8	+60.0	98.8	50 00.0	+60.0	100.0	**50**
51	51 41.4	+58.9	91.3	51 39.4	+59.2	92.5	51 36.1	+59.4	93.8	51 31.5	+59.6	95.1	51 25.5	+59.8	96.3	51 18.3	+59.9	97.5	51 09.8	+60.0	98.8	51 00.0	+60.0	100.0	**51**
52	52 40.3	+58.7	91.0	52 38.6	+59.1	92.3	52 35.5	+59.4	93.6	52 31.1	+59.6	94.9	52 25.3	+59.8	96.2	52 18.2	+59.9	97.5	52 09.8	+59.9	98.7	52 00.0	+60.0	100.0	**52**
53	53 39.0	+58.8	90.6	53 37.7	+59.0	92.0	53 34.9	+59.4	93.3	53 30.7	+59.6	94.7	53 25.1	+59.8	96.0	53 18.1	+59.9	97.4	53 09.7	+60.0	98.7	53 00.0	+60.0	100.0	**53**
54	54 37.8	+58.6	90.3	54 36.7	+59.1	91.7	54 34.3	+59.3	93.1	54 30.3	+59.6	94.5	54 24.9	+59.7	95.9	54 18.0	+59.9	97.3	54 09.7	+60.0	98.6	54 00.0	+60.0	100.0	**54**
55	55 36.4	+58.6	89.9	55 35.8	+58.9	91.4	55 33.6	+59.3	92.8	55 29.9	+59.5	94.3	55 24.6	+59.8	95.7	55 17.9	+59.9	97.2	55 09.7	+60.0	98.6	55 00.0	+60.0	100.0	**55**
56	56 35.0	+58.5	89.5	56 34.7	+59.0	91.0	56 32.9	+59.2	92.5	56 29.4	+59.5	94.1	56 24.4	+59.7	95.6	56 17.8	+59.9	97.1	56 09.7	+59.9	98.5	56 00.0	+60.0	100.0	**56**
57	57 33.5	+58.5	89.1	57 33.7	+58.8	90.7	57 32.1	+59.2	92.3	57 28.9	+59.5	93.8	57 24.1	+59.7	95.4	57 17.7	+59.9	96.9	57 09.6	+60.0	98.5	57 00.0	+60.0	100.0	**57**
58	58 32.0	+58.3	88.7	58 32.5	+58.8	90.3	58 31.3	+59.2	91.9	58 28.4	+59.5	93.6	58 23.8	+59.7	95.2	58 17.6	+59.8	96.8	58 09.6	+60.0	98.4	58 00.0	+60.0	100.0	**58**
59	59 30.3	+58.3	88.2	59 31.3	+58.7	89.9	59 30.5	+59.1	91.6	59 27.9	+59.4	93.3	59 23.5	+59.7	95.0	59 17.4	+59.9	96.7	59 09.6	+59.9	98.4	59 00.0	+60.0	100.0	**59**
60	60 28.6	+58.1	87.7	60 30.0	+58.6	89.5	60 29.6	+59.0	91.3	60 27.3	+59.4	93.0	60 23.2	+59.7	94.8	60 17.3	+59.8	96.6	60 09.5	+60.0	98.3	60 00.0	+60.0	100.0	**60**
61	61 26.7	+58.0	87.2	61 28.6	+58.6	89.1	61 28.6	+59.0	90.9	61 26.7	+59.4	92.8	61 22.9	+59.6	94.6	61 17.1	+59.9	96.4	61 09.5	+60.0	98.2	61 00.0	+60.0	100.0	**61**
62	62 24.7	+57.9	86.7	62 27.2	+58.4	88.6	62 27.6	+59.0	90.5	62 26.1	+59.3	92.4	62 22.5	+59.6	94.4	62 17.0	+59.8	96.3	62 09.5	+59.9	98.1	62 00.0	+60.0	100.0	**62**
63	63 22.6	+57.7	86.1	63 25.6	+58.4	88.1	63 26.6	+58.8	90.1	63 25.4	+59.3	92.1	63 22.1	+59.6	94.1	63 16.8	+59.8	96.1	63 09.4	+60.0	98.1	63 00.0	+60.0	100.0	**63**
64	64 20.3	+57.6	85.5	64 24.0	+58.2	87.6	64 25.4	+58.8	89.7	64 24.7	+59.2	91.8	64 21.7	+59.6	93.8	64 16.6	+59.8	95.9	64 09.4	+59.9	98.0	64 00.0	+60.0	100.0	**64**
65	65 17.9	+57.4	84.8	65 22.2	+58.0	87.0	65 24.2	+58.6	89.2	65 23.9	+59.1	91.4	65 21.3	+59.5	93.6	65 16.4	+59.8	95.7	65 09.3	+60.0	97.9	65 00.0	+60.0	100.0	**65**
66	66 15.3	+57.1	84.1	66 20.2	+57.9	86.4	66 22.8	+58.6	88.7	66 23.0	+59.1	91.0	66 20.8	+59.5	93.2	66 16.2	+59.8	95.5	66 09.3	+59.9	97.8	66 00.0	+60.0	100.0	**66**
67	67 12.4	+57.0	83.4	67 18.1	+57.8	85.7	67 21.4	+58.4	88.1	67 22.1	+59.0	90.5	67 20.3	+59.4	92.9	67 16.0	+59.7	95.3	67 09.2	+60.0	97.7	67 00.0	+60.0	100.0	**67**
68	68 09.4	+56.6	82.5	68 15.9	+57.5	85.0	68 19.8	+58.3	87.5	68 21.1	+58.9	90.0	68 19.7	+59.4	92.6	68 15.7	+59.8	95.1	68 09.2	+59.9	97.5	68 00.0	+60.0	100.0	**68**
69	69 06.0	+56.4	81.6	69 13.4	+57.3	84.2	69 18.1	+58.1	86.9	69 20.0	+58.8	89.5	69 19.1	+59.3	92.2	69 15.5	+59.7	94.8	69 09.1	+59.9	97.4	69 00.0	+60.0	100.0	**69**
70	70 02.4	+55.9	80.6	70 10.7	+57.0	83.4	70 16.2	+57.9	86.1	70 18.8	+58.7	88.9	70 18.4	+59.3	91.7	70 15.2	+59.6	94.5	70 09.0	+59.9	97.3	70 00.0	+60.0	100.0	**70**
71	70 58.3	+55.6	79.6	71 07.7	+56.7	82.4	71 14.1	+57.7	85.3	71 17.5	+58.5	88.3	71 17.7	+59.2	91.2	71 14.8	+59.7	94.2	71 08.9	+59.9	97.1	71 00.0	+60.0	100.0	**71**
72	71 53.9	+55.1	78.4	72 04.4	+56.4	81.4	72 11.8	+57.5	84.5	72 16.0	+58.3	87.6	72 16.9	+59.1	90.7	72 14.5	+59.6	93.8	72 08.8	+59.9	96.9	72 00.0	+60.0	100.0	**72**
73	72 49.0	+54.5	77.1	73 00.8	+55.9	80.3	73 09.3	+57.1	83.5	73 14.3	+58.2	86.8	73 16.0	+58.9	90.1	73 14.1	+59.5	93.5	73 08.7	+59.9	96.7	73 00.0	+60.0	100.0	**73**
74	73 43.5	+53.9	75.6	73 56.7	+55.4	79.0	74 06.4	+56.8	82.4	74 12.5	+57.9	85.9	74 14.9	+58.9	89.5	74 13.6	+59.5	93.0	74 08.6	+59.9	96.5	74 00.0	+60.0	100.0	**74**
75	74 37.4	+53.1	74.0	74 52.1	+54.9	77.6	75 03.2	+56.4	81.2	75 10.4	+57.7	84.9	75 13.8	+58.6	88.7	75 13.1	+59.4	92.5	75 08.5	+59.9	96.3	75 00.0	+60.0	100.0	**75**
76	75 30.5	+52.1	72.2	75 47.0	+54.1	75.9	75 59.6	+55.8	79.8	76 08.1	+57.3	83.8	76 12.4	+58.5	87.9	76 12.5	+59.4	92.0	76 08.4	+59.8	96.0	76 00.0	+60.0	100.0	**76**
77	76 22.6	+51.1	70.2	76 41.1	+53.2	74.1	76 55.4	+55.1	78.3	77 05.4	+56.8	82.5	77 10.9	+58.2	86.9	77 11.9	+59.2	91.3	77 08.2	+59.8	95.7	77 00.0	+60.0	100.0	**77**
78	77 13.7	+49.6	67.8	77 34.3	+52.1	72.0	77 50.5	+54.4	76.5	78 02.2	+56.4	81.1	78 09.1	+57.9	85.8	78 11.1	+59.0	90.5	78 08.0	+59.8	95.3	78 00.0	+60.0	100.0	**78**
79	78 03.3	+48.0	65.2	78 26.4	+50.7	69.7	78 44.9	+53.3	74.4	78 58.6	+55.6	79.3	79 07.0	+57.5	84.4	79 10.1	+58.9	89.7	79 07.8	+59.7	94.9	79 00.0	+60.0	100.0	**79**
80	78 51.3	*+45.9*•	62.2	79 17.1	+49.1	66.9	79 38.2	+52.0	71.9	79 54.2	+54.7	77.3	80 04.5	+57.0	82.9	80 09.0	+58.7	88.6	80 07.5	+59.7	94.3	80 00.0	+60.0	100.0	**80**
81	79 37.2	*+43.4*•	58.8	80 06.2	*+46.8*•	63.7	80 30.2	*+50.4*•	69.0	80 48.9	+53.5	74.8	81 01.5	+56.2	80.9	81 07.7	+58.3	87.3	81 07.2	+59.5	93.7	81 00.0	+60.0	100.0	**81**
82	80 20.6	*+40.2*•	54.8	80 53.0	*+44.1*•	59.9	81 20.6	*+48.0*•	65.6	81 42.4	+51.8	71.8	81 57.7	+55.2	78.6	82 06.0	+57.8	85.7	82 06.7	+59.5	92.9	82 00.0	+60.0	100.0	**82**
83	81 00.8	*+36.3*•	50.2	81 37.1	*+40.6*•	55.4	82 08.6	*+45.1*•	61.4	82 34.2	*+49.6*•	68.1	82 52.9	+53.8	75.6	83 03.8	+57.1	83.6	83 06.2	+59.3	91.8	83 00.0	+60.0	100.0	**83**
84	81 37.1	*+31.5*•	44.9	82 17.7	*+36.0*•	50.2	82 53.7	*+40.9*•	56.3	83 23.8	*+46.3*•	63.5	83 46.7	*+51.5*•	71.8	84 00.9	+56.0	80.9	84 05.5	+59.0	90.4	84 00.0	+60.0	100.0	**84**
85	82 08.6	*+25.6*•	38.9	82 53.7	*+30.1*•	43.9	83 34.6	*+35.5*•	50.1	84 10.1	*+41.5*•	57.6	84 38.2	*+48.0*•	66.7	84 56.9	*+54.2*•	77.1	85 04.5	+58.4	88.5	85 00.0	+60.0	100.0	**85**
86	82 34.2	*+18.7*•	32.1	83 23.8	*+22.9*•	36.7	84 10.1	*+28.1*•	42.5	84 51.6	*+34.6*•	50.1	85 26.2	*+42.5*•	59.7	85 51.1	*+50.7*•	71.7	86 02.9	+57.5	85.6	86 00.0	+60.0	100.0	**86**
87	82 52.9	*+10.9*•	24.6	83 46.7	*+14.2*•	28.4	84 38.2	*+18.7*•	33.5	85 26.2	*+24.9*•	40.4	86 08.7	*+33.1*•	50.0	86 41.8	*+43.9*•	63.4	87 00.4	*+55.1*•	80.8	87 00.0	+60.0	100.0	**87**
88	83 03.8	*+2.4*•	16.5	84 00.9	*+4.6*•	19.2	84 56.9	*+7.6*•	23.0	85 51.1	*+11.8*•	28.4	86 41.8	*+18.6*•	36.6	87 25.7	*+29.8*•	50.0	87 55.5	*+47.4*•	71.7	88 00.0	+60.0	100.0	**88**
89	83 06.2	*–6.2*•	8.2	84 05.5	*–5.5*•	9.6	85 04.5	*–4.5*•	11.5	86 02.9	*–2.9*•	14.4	87 00.4	*–0.4*•	19.2	87 55.5	*+4.5*•	28.3	88 42.9	*+17.1*•	50.0	89 00.0	+60.0	100.0	**89**
90	83 00.0	*–14.4*•	0.0	84 00.0	*–15.1*•	0.0	85 00.0	*–16.0*•	0.0	86 00.0	*–17.3*•	0.0	87 00.0	*–19.4*•	0.0	88 00.0	*–23.2*•	0.0	89 00.0	*–31.9*•	0.0	90 00.0	–60.0	50.0	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 80°, 280°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 12.8	–59.6	99.9	1 02.4	–59.7	99.9	0 52.0	–59.7	100.0	0 41.6	–59.8	100.0	0 31.2	–59.9	100.0	0 20.8	–59.9	100.0	0 10.4	–60.0	100.0	0 00.0	+60.0	80.0	**0**
1	0 13.2	–59.6	100.0	0 02.7	–59.7	100.0	0 07.7	+59.8	80.0	0 18.2	+59.9	80.0	0 28.7	+59.9	80.0	0 39.1	+60.0	80.0	0 49.6	+60.0	80.0	1 00.0	+60.0	80.0	**1**
2	0 46.4	+59.5	79.8	0 57.0	+59.6	79.8	1 07.5	+59.8	79.9	1 18.1	+59.8	79.9	1 28.6	+59.9	79.9	1 39.1	+60.0	79.9	1 49.6	+60.0	80.0	2 00.0	+60.0	80.0	**2**
3	1 45.9	+59.6	79.7	1 56.6	+59.7	79.7	2 07.3	+59.8	79.8	2 17.9	+59.9	79.8	2 28.5	+59.9	79.9	2 39.1	+59.9	79.9	2 49.6	+59.9	79.9	3 00.0	+60.0	80.0	**3**
4	2 45.5	+59.6	79.6	2 56.3	+59.7	79.6	3 07.1	+59.8	79.7	3 17.8	+59.8	79.7	3 28.4	+60.0	79.8	3 39.0	+60.0	79.9	3 49.5	+60.0	79.9	4 00.0	+60.0	80.0	**4**
5	3 45.1	+59.5	79.5	3 56.0	+59.7	79.5	4 06.9	+59.7	79.6	4 17.6	+59.9	79.7	4 28.4	+59.9	79.8	4 39.0	+60.0	79.8	4 49.5	+60.0	79.9	5 00.0	+60.0	80.0	**5**
6	4 44.6	+59.6	79.4	4 55.7	+59.7	79.4	5 06.6	+59.8	79.5	5 17.5	+59.9	79.6	5 28.3	+59.9	79.7	5 39.0	+59.9	79.8	5 49.5	+60.0	79.9	6 00.0	+60.0	80.0	**6**
7	5 44.2	+59.6	79.2	5 55.4	+59.6	79.3	6 06.4	+59.8	79.4	6 17.4	+59.8	79.5	6 28.2	+59.9	79.7	6 38.9	+60.0	79.8	6 49.5	+60.0	79.9	7 00.0	+60.0	80.0	**7**
8	6 43.8	+59.5	79.1	6 55.0	+59.7	79.2	7 06.2	+59.8	79.3	7 17.2	+59.9	79.5	7 28.1	+59.9	79.6	7 38.9	+59.9	79.7	7 49.5	+60.0	79.9	8 00.0	+60.0	80.0	**8**
9	7 43.3	+59.6	79.0	7 54.7	+59.7	79.1	8 06.0	+59.7	79.3	8 17.1	+59.8	79.4	8 28.0	+60.0	79.5	8 38.8	+60.0	79.7	8 49.5	+60.0	79.8	9 00.0	+60.0	80.0	**9**
10	8 42.9	+59.5	78.9	8 54.4	+59.7	79.0	9 05.7	+59.8	79.2	9 16.9	+59.9	79.3	9 28.0	+59.9	79.5	9 38.8	+60.0	79.7	9 49.5	+60.0	79.8	10 00.0	+60.0	80.0	**10**
11	9 42.4	+59.6	78.7	9 54.1	+59.6	78.9	10 05.5	+59.8	79.1	10 16.8	+59.8	79.3	10 27.9	+59.9	79.4	10 38.8	+59.9	79.6	10 49.5	+60.0	79.8	11 00.0	+60.0	80.0	**11**
12	10 42.0	+59.5	78.6	10 53.7	+59.7	78.8	11 05.3	+59.8	79.0	11 16.6	+59.9	79.2	11 27.8	+59.9	79.4	11 38.7	+60.0	79.6	11 49.5	+60.0	79.8	12 00.0	+60.0	80.0	**12**
13	11 41.5	+59.6	78.5	11 53.4	+59.7	78.7	12 05.1	+59.7	78.9	12 16.5	+59.8	79.1	12 27.7	+59.9	79.3	12 38.7	+60.0	79.6	12 49.5	+60.0	79.8	13 00.0	+60.0	80.0	**13**
14	12 41.1	+59.5	78.4	12 53.1	+59.6	78.6	13 04.8	+59.8	78.8	13 16.3	+59.9	79.0	13 27.6	+59.9	79.3	13 38.7	+59.9	79.5	13 49.5	+59.9	79.8	14 00.0	+60.0	80.0	**14**
15	13 40.6	+59.6	78.2	13 52.7	+59.7	78.5	14 04.6	+59.7	78.7	14 16.2	+59.8	79.0	14 27.5	+60.0	79.2	14 38.6	+60.0	79.5	14 49.4	+60.0	79.7	15 00.0	+60.0	80.0	**15**
16	14 40.2	+59.5	78.1	14 52.4	+59.6	78.4	15 04.3	+59.8	78.6	15 16.0	+59.9	78.9	15 27.5	+59.9	79.2	15 38.6	+59.9	79.4	15 49.4	+60.0	79.7	16 00.0	+60.0	80.0	**16**
17	15 39.7	+59.5	78.0	15 52.0	+59.7	78.3	16 04.1	+59.8	78.5	16 15.9	+59.8	78.8	16 27.4	+59.9	79.1	16 38.5	+60.0	79.4	16 49.4	+60.0	79.7	17 00.0	+60.0	80.0	**17**
18	16 39.2	+59.5	77.9	16 51.7	+59.6	78.1	17 03.9	+59.7	78.4	17 15.7	+59.9	78.8	17 27.3	+59.9	79.1	17 38.5	+60.0	79.4	17 49.4	+60.0	79.7	18 00.0	+60.0	80.0	**18**
19	17 38.7	+59.6	77.7	17 51.3	+59.7	78.0	18 03.6	+59.8	78.4	18 15.6	+59.8	78.7	18 27.2	+59.9	79.0	18 38.5	+59.9	79.3	18 49.4	+60.0	79.7	19 00.0	+60.0	80.0	**19**
20	18 38.3	+59.5	77.6	18 51.0	+59.6	77.9	19 03.4	+59.7	78.3	19 15.4	+59.9	78.6	19 27.1	+59.9	78.9	19 38.4	+60.0	79.3	19 49.4	+60.0	79.6	20 00.0	+60.0	80.0	**20**
21	19 37.8	+59.5	77.5	19 50.6	+59.7	77.8	20 03.1	+59.8	78.2	20 15.3	+59.8	78.5	20 27.0	+59.9	78.9	20 38.4	+59.9	79.3	20 49.4	+60.0	79.6	21 00.0	+60.0	80.0	**21**
22	20 37.3	+59.5	77.3	20 50.3	+59.6	77.7	21 02.9	+59.7	78.1	21 15.1	+59.8	78.4	21 26.9	+59.9	78.8	21 38.3	+60.0	79.2	21 49.4	+60.0	79.6	22 00.0	+60.0	80.0	**22**
23	21 36.8	+59.5	77.2	21 49.9	+59.6	77.6	22 02.6	+59.8	78.0	22 14.9	+59.9	78.4	22 26.8	+59.9	78.8	22 38.3	+60.0	79.2	22 49.4	+60.0	79.6	23 00.0	+60.0	80.0	**23**
24	22 36.3	+59.5	77.0	22 49.5	+59.7	77.4	23 02.4	+59.7	77.9	23 14.8	+59.8	78.3	23 26.7	+59.9	78.7	23 38.3	+59.9	79.1	23 49.4	+59.9	79.6	24 00.0	+60.0	80.0	**24**
25	23 35.8	+59.5	76.9	23 49.2	+59.6	77.3	24 02.1	+59.7	77.8	24 14.6	+59.8	78.2	24 26.6	+59.9	78.6	24 38.2	+60.0	79.1	24 49.3	+60.0	79.5	25 00.0	+60.0	80.0	**25**
26	24 35.3	+59.4	76.8	24 48.8	+59.6	77.2	25 01.8	+59.8	77.7	25 14.4	+59.8	78.1	25 26.5	+59.9	78.6	25 38.2	+59.9	79.0	25 49.3	+60.0	79.5	26 00.0	+60.0	80.0	**26**
27	25 34.7	+59.5	76.6	25 48.4	+59.6	77.1	26 01.6	+59.7	77.6	26 14.2	+59.9	78.0	26 26.4	+59.9	78.5	26 38.1	+60.0	79.0	26 49.3	+60.0	79.5	27 00.0	+60.0	80.0	**27**
28	26 34.2	+59.4	76.5	26 48.0	+59.6	76.9	27 01.3	+59.7	77.4	27 14.1	+59.8	77.9	27 26.3	+59.9	78.5	27 38.1	+59.9	79.0	27 49.3	+60.0	79.5	28 00.0	+60.0	80.0	**28**
29	27 33.6	+59.5	76.3	27 47.6	+59.6	76.8	28 01.0	+59.7	77.3	28 13.9	+59.8	77.9	28 26.2	+59.9	78.4	28 38.0	+60.0	78.9	28 49.3	+60.0	79.5	29 00.0	+60.0	80.0	**29**
30	28 33.1	+59.4	76.2	28 47.2	+59.5	76.7	29 00.7	+59.7	77.2	29 13.7	+59.8	77.8	29 26.1	+59.9	78.3	29 38.0	+60.0	78.9	29 49.3	+60.0	79.4	30 00.0	+60.0	80.0	**30**
31	29 32.5	+59.4	76.0	29 46.7	+59.6	76.6	30 00.4	+59.7	77.1	30 13.5	+59.8	77.7	30 26.0	+59.9	78.2	30 38.0	+59.9	78.8	30 49.3	+60.0	79.4	31 00.0	+60.0	80.0	**31**
32	30 31.9	+59.4	75.8	30 46.3	+59.6	76.4	31 00.1	+59.7	77.0	31 13.3	+59.8	77.6	31 25.9	+59.9	78.2	31 37.9	+60.0	78.8	31 49.3	+60.0	79.4	32 00.0	+60.0	80.0	**32**
33	31 31.3	+59.4	75.7	31 45.9	+59.5	76.3	31 59.8	+59.7	76.9	32 13.1	+59.8	77.5	32 25.8	+59.9	78.1	32 37.9	+59.9	78.7	32 49.3	+59.9	79.4	33 00.0	+60.0	80.0	**33**
34	32 30.7	+59.4	75.5	32 45.4	+59.6	76.1	32 59.5	+59.7	76.8	33 12.9	+59.8	77.4	33 25.7	+59.9	78.0	33 37.8	+60.0	78.7	33 49.2	+60.0	79.3	34 00.0	+60.0	80.0	**34**
35	33 30.1	+59.4	75.3	33 45.0	+59.5	76.0	33 59.2	+59.7	76.6	34 12.7	+59.8	77.3	34 25.6	+59.9	78.0	34 37.8	+59.9	78.6	34 49.2	+60.0	79.3	35 00.0	+60.0	80.0	**35**
36	34 29.5	+59.3	75.2	34 44.5	+59.5	75.8	34 58.9	+59.6	76.5	35 12.5	+59.8	77.2	35 25.5	+59.8	77.9	35 37.7	+59.9	78.6	35 49.2	+60.0	79.3	36 00.0	+60.0	80.0	**36**
37	35 28.8	+59.4	75.0	35 44.0	+59.5	75.7	35 58.5	+59.7	76.4	36 12.3	+59.8	77.1	36 25.3	+59.9	77.8	36 37.6	+60.0	78.5	36 49.2	+60.0	79.3	37 00.0	+60.0	80.0	**37**
38	36 28.2	+59.3	74.8	36 43.5	+59.5	75.5	36 58.2	+59.6	76.2	37 12.1	+59.7	77.0	37 25.2	+59.9	77.7	37 37.6	+59.9	78.5	37 49.2	+60.0	79.2	38 00.0	+60.0	80.0	**38**
39	37 27.5	+59.3	74.6	37 43.0	+59.5	75.4	37 57.8	+59.7	76.1	38 11.8	+59.8	76.9	38 25.1	+59.9	77.6	38 37.5	+60.0	78.4	38 49.2	+60.0	79.2	39 00.0	+60.0	80.0	**39**
40	38 26.8	+59.3	74.4	38 42.5	+59.5	75.2	38 57.5	+59.6	76.0	39 11.6	+59.8	76.8	39 25.0	+59.8	77.6	39 37.5	+59.9	78.4	39 49.2	+59.9	79.2	40 00.0	+60.0	80.0	**40**
41	39 26.1	+59.2	74.2	39 42.0	+59.4	75.0	39 57.1	+59.6	75.8	40 11.4	+59.7	76.6	40 24.8	+59.9	77.5	40 37.4	+59.9	78.3	40 49.1	+60.0	79.1	41 00.0	+60.0	80.0	**41**
42	40 25.3	+59.3	74.0	40 41.4	+59.5	74.8	40 56.7	+59.6	75.7	41 11.1	+59.8	76.5	41 24.7	+59.8	77.4	41 37.3	+60.0	78.2	41 49.1	+60.0	79.1	42 00.0	+60.0	80.0	**42**
43	41 24.6	+59.2	73.8	41 40.9	+59.4	74.7	41 56.3	+59.6	75.5	42 10.9	+59.7	76.4	42 24.5	+59.9	77.3	42 37.3	+59.9	78.2	42 49.1	+60.0	79.1	43 00.0	+60.0	80.0	**43**
44	42 23.8	+59.2	73.6	42 40.3	+59.4	74.5	42 55.9	+59.6	75.4	43 10.6	+59.7	76.3	43 24.4	+59.8	77.2	43 37.2	+59.9	78.1	43 49.1	+60.0	79.1	44 00.0	+60.0	80.0	**44**
45	43 23.0	+59.1	73.4	43 39.7	+59.4	74.3	43 55.5	+59.6	75.2	44 10.3	+59.8	76.1	44 24.2	+59.9	77.1	44 37.1	+60.0	78.0	44 49.1	+60.0	79.0	45 00.0	+60.0	80.0	**45**
46	44 22.1	+59.2	73.1	44 39.1	+59.3	74.1	44 55.1	+59.5	75.0	45 10.1	+59.7	76.0	45 24.1	+59.8	77.0	45 37.1	+59.9	78.0	45 49.1	+59.9	79.0	46 00.0	+60.0	80.0	**46**
47	45 21.3	+59.1	72.9	45 38.4	+59.4	73.9	45 54.6	+59.5	74.9	46 09.8	+59.7	75.9	46 23.9	+59.8	76.9	46 37.0	+59.9	77.9	46 49.0	+60.0	78.9	47 00.0	+60.0	80.0	**47**
48	46 20.4	+59.0	72.6	46 37.8	+59.3	73.7	46 54.1	+59.6	74.7	47 09.5	+59.7	75.7	47 23.7	+59.9	76.8	47 36.9	+59.9	77.8	47 49.0	+60.0	78.9	48 00.0	+60.0	80.0	**48**
49	47 19.4	+59.1	72.4	47 37.1	+59.3	73.4	47 53.7	+59.5	74.5	48 09.2	+59.6	75.6	48 23.6	+59.8	76.7	48 36.8	+60.0	77.8	48 49.0	+60.0	78.9	49 00.0	+60.0	80.0	**49**
50	48 18.5	+59.0	72.1	48 36.4	+59.2	73.2	48 53.2	+59.4	74.3	49 08.8	+59.7	75.4	49 23.4	+59.8	76.5	49 36.8	+59.9	77.7	49 49.0	+60.0	78.8	50 00.0	+60.0	80.0	**50**
51	49 17.5	+58.9	71.8	49 35.6	+59.2	73.0	49 52.6	+59.5	74.1	50 08.5	+59.6	75.2	50 23.2	+59.8	76.4	50 36.7	+59.9	77.6	50 49.0	+59.9	78.8	51 00.0	+60.0	80.0	**51**
52	50 16.4	+58.9	71.6	50 34.8	+59.2	72.7	50 52.1	+59.4	73.9	51 08.1	+59.7	75.1	51 23.0	+59.8	76.3	51 36.6	+59.9	77.5	51 48.9	+60.0	78.7	52 00.0	+60.0	80.0	**52**
53	51 15.3	+58.9	71.3	51 34.0	+59.2	72.5	51 51.5	+59.4	73.7	52 07.8	+59.6	74.9	52 22.8	+59.8	76.1	52 36.5	+59.9	77.4	52 48.9	+60.0	78.7	53 00.0	+60.0	80.0	**53**
54	52 14.2	+58.8	70.9	52 33.2	+59.1	72.2	52 50.9	+59.4	73.4	53 07.4	+59.6	74.7	53 22.6	+59.7	76.0	53 36.4	+59.9	77.3	53 48.9	+60.0	78.7	54 00.0	+60.0	80.0	**54**
55	53 13.0	+58.8	70.6	53 32.3	+59.1	71.9	53 50.3	+59.3	73.2	54 07.0	+59.6	74.5	54 22.3	+59.8	75.9	54 36.3	+59.9	77.2	54 48.9	+59.9	78.6	55 00.0	+60.0	80.0	**55**
56	54 11.8	+58.7	70.3	54 31.4	+59.0	71.6	54 49.6	+59.4	72.9	55 06.6	+59.5	74.3	55 22.1	+59.7	75.7	55 36.2	+59.9	77.1	55 48.8	+60.0	78.5	56 00.0	+60.0	80.0	**56**
57	55 10.5	+58.6	69.9	55 30.4	+59.0	71.3	55 49.0	+59.2	72.7	56 06.1	+59.5	74.1	56 21.8	+59.8	75.5	56 36.1	+59.8	77.0	56 48.8	+60.0	78.5	57 00.0	+60.0	80.0	**57**
58	56 09.1	+58.5	69.5	56 29.4	+58.9	71.0	56 48.2	+59.3	72.4	57 05.6	+59.5	73.9	57 21.6	+59.7	75.4	57 35.9	+59.9	76.9	57 48.8	+59.9	78.4	58 00.0	+60.0	80.0	**58**
59	57 07.6	+58.5	69.1	57 28.3	+58.8	70.6	57 47.5	+59.2	72.1	58 05.1	+59.5	73.6	58 21.3	+59.7	75.2	58 35.8	+59.9	76.8	58 48.7	+60.0	78.4	59 00.0	+60.0	80.0	**59**
60	58 06.1	+58.4	68.7	58 27.1	+58.8	70.2	58 46.7	+59.1	71.8	59 04.6	+59.5	73.4	59 21.0	+59.7	75.0	59 35.7	+59.8	76.6	59 48.7	+60.0	78.3	60 00.0	+60.0	80.0	**60**
61	59 04.5	+58.3	68.3	59 25.9	+58.8	69.9	59 45.8	+59.1	71.5	60 04.1	+59.4	73.1	60 20.7	+59.6	74.8	60 35.5	+59.9	76.5	60 48.7	+59.9	78.2	61 00.0	+60.0	80.0	**61**
62	60 02.8	+58.2	67.8	60 24.7	+58.6	69.4	60 44.9	+59.0	71.1	61 03.5	+59.4	72.8	61 20.3	+59.7	74.6	61 35.4	+59.8	76.3	61 48.6	+60.0	78.2	62 00.0	+60.0	80.0	**62**
63	61 01.0	+58.0	67.3	61 23.3	+58.5	69.0	61 43.9	+59.0	70.7	62 02.9	+59.3	72.5	62 20.0	+59.6	74.3	62 35.2	+59.9	76.2	62 48.6	+59.9	78.1	63 00.0	+60.0	80.0	**63**
64	61 59.0	+58.0	66.8	62 21.8	+58.5	68.5	62 42.9	+58.9	70.3	63 02.2	+59.3	72.2	63 19.6	+59.6	74.1	63 35.1	+59.8	76.0	63 48.5	+60.0	78.0	64 00.0	+60.0	80.0	**64**
65	62 57.0	+57.8	66.2	63 20.3	+58.3	68.1	63 41.8	+58.8	69.9	64 01.5	+59.2	71.9	64 19.2	+59.5	73.8	64 34.9	+59.8	75.8	64 48.5	+59.9	77.9	65 00.0	+60.0	80.0	**65**
66	63 54.8	+57.6	65.6	64 18.6	+58.3	67.5	64 40.6	+58.8	69.5	65 00.7	+59.2	71.5	65 18.7	+59.6	73.5	65 34.7	+59.8	75.7	65 48.4	+60.0	77.8	66 00.0	+60.0	80.0	**66**
67	64 52.4	+57.5	65.0	65 16.9	+58.0	67.0	65 39.4	+58.6	69.0	65 59.9	+59.1	71.1	66 18.3	+59.4	73.2	66 34.5	+59.7	75.4	66 48.4	+59.9	77.7	67 00.0	+60.0	80.0	**67**
68	65 49.9	+57.2	64.3	66 14.9	+58.0	66.3	66 38.0	+58.5	68.5	66 59.0	+59.0	70.6	67 17.7	+59.5	72.9	67 34.2	+59.8	75.2	67 48.3	+60.0	77.6	68 00.0	+60.0	80.0	**68**
69	66 47.1	+57.1	63.6	67 12.9	+57.7	65.7	67 36.5	+58.4	67.9	67 58.0	+58.9	70.2	68 17.2	+59.4	72.5	68 34.0	+59.7	75.0	68 48.3	+59.9	77.5	69 00.0	+60.0	80.0	**69**
70	67 44.2	+56.8	62.8	68 10.6	+57.6	65.0	68 34.9	+58.3	67.3	68 56.9	+58.9	69.7	69 16.6	+59.3	72.1	69 33.7	+59.7	74.7	69 48.2	+59.9	77.3	70 00.0	+60.0	80.0	**70**
71	68 41.0	+56.4	61.9	69 08.2	+57.3	64.2	69 33.2	+58.0	66.6	69 55.8	+58.7	69.1	70 15.9	+59.3	71.7	70 33.4	+59.6	74.4	70 48.1	+59.9	77.2	71 00.0	+60.0	80.0	**71**
72	69 37.4	+56.2	60.9	70 05.5	+57.0	63.3	70 31.2	+57.9	65.9	70 54.5	+58.6	68.5	71 15.2	+59.1	71.2	71 33.0	+59.7	74.1	71 48.0	+59.9	77.0	72 00.0	+60.0	80.0	**72**
73	70 33.6	+55.7	59.9	71 02.5	+56.8	62.4	71 29.1	+57.6	65.1	71 53.1	+58.4	67.8	72 14.3	+59.1	70.7	72 32.7	+59.6	73.7	72 47.9	+59.9	76.8	73 00.0	+60.0	80.0	**73**
74	71 29.3	+55.4	58.8	71 59.3	+56.4	61.4	72 26.7	+57.4	64.2	72 51.5	+58.3	67.1	73 13.4	+59.0	70.1	73 32.3	+59.5	73.3	73 47.8	+59.9	76.6	74 00.0	+60.0	80.0	**74**
75	72 24.7	+54.8	57.5	72 55.7	+55.9	60.3	73 24.1	+57.1	63.2	73 49.8	+58.0	66.2	74 12.4	+58.8	69.5	74 31.8	+59.4	72.9	74 47.7	+59.9	76.4	75 00.0	+60.0	80.0	**75**
76	73 19.5	+54.1	56.1	73 51.6	+55.5	59.0	74 21.2	+56.7	62.0	74 47.8	+57.8	65.3	75 11.2	+58.7	68.7	75 31.2	+59.4	72.3	75 47.6	+59.8	76.1	76 00.0	+60.0	80.0	**76**
77	74 13.6	+53.5	54.6	74 47.1	+54.9	57.6	75 17.9	+56.2	60.8	75 45.6	+57.4	64.2	76 09.9	+58.5	67.9	76 30.6	+59.3	71.8	76 47.4	+59.8	75.8	77 00.0	+60.0	80.0	**77**
78	75 07.1	+52.6	52.9	75 42.0	+54.2	56.0	76 14.1	+55.6	59.4	76 43.0	+57.1	63.0	77 08.4	+58.2	66.9	77 29.9	+59.2	71.1	77 47.2	+59.8	75.4	78 00.0	+60.0	80.0	**78**
79	75 59.7	+51.5	50.9	76 36.2	+53.2	54.2	77 09.7	+55.0	57.8	77 40.1	+56.5	61.6	78 06.6	+58.0	65.8	78 29.1	+59.0	70.3	78 47.0	+59.8	75.0	79 00.0	+60.0	80.0	**79**
80	76 51.2	+50.3	48.8	77 29.4	+52.3	52.1	78 04.7	+54.1	55.9	78 36.6	+55.9	60.0	79 04.6	+57.5	64.5	79 28.1	+58.8	69.3	79 46.8	+59.6	74.5	80 00.0	+60.0	80.0	**80**
81	77 41.5	+48.8	46.3	78 21.7	+50.8	49.8	78 58.8	+53.1	53.7	79 32.5	+55.1	58.1	80 02.1	+57.0	62.9	80 26.9	+58.6	68.2	80 46.4	+59.7	73.9	81 00.0	+60.0	80.0	**81**
82	78 30.3	*+46.9* •	43.5	79 12.5	+49.3	47.1	79 51.9	+51.6	51.2	80 27.6	+54.0	55.8	80 59.1	+56.2	61.0	81 25.5	+58.2	66.8	81 46.1	+59.5	73.2	82 00.0	+60.0	80.0	**82**
83	79 17.2	*+44.6* •	40.2	80 01.8	*+47.1* •	43.9	80 43.5	*+49.8* •	48.1	81 21.6	+52.6	53.0	81 55.3	+55.3	58.7	82 23.7	+57.6	65.1	82 45.6	+59.3	72.2	83 00.0	+60.0	80.0	**83**
84	80 01.8	*+41.7* •	36.5	80 48.9	*+44.4* •	40.2	81 33.3	*+47.3* •	44.5	82 14.2	*+50.5* •	49.6	82 50.6	+53.8	55.7	83 21.3	+56.8	62.8	83 44.9	+59.1	71.0	84 00.0	+60.0	80.0	**84**
85	80 43.5	*+38.1* •	32.2	81 33.3	*+40.9* •	35.8	82 20.6	*+44.1* •	40.1	83 04.7	*+47.7* •	45.4	83 44.4	*+51.6* •	51.9	84 18.1	+55.6	59.8	84 44.0	+58.7	69.3	85 00.0	+60.0	80.0	**85**
86	81 21.6	*+33.7* •	27.2	82 14.2	*+36.4* •	30.6	83 04.7	*+39.7* •	34.8	83 52.4	*+43.6* •	40.1	84 36.0	*+48.3* •	46.9	85 13.7	*+53.3* •	55.7	85 42.7	+57.9	66.7	86 00.0	+60.0	80.0	**86**
87	81 55.3	*+28.4* •	21.5	82 50.6	*+30.7* •	24.4	83 44.4	*+33.7* •	28.2	84 36.0	*+37.7* •	33.2	85 24.3	*+42.7* •	40.0	86 07.0	*+49.2* •	49.6	86 40.6	*+56.2* •	62.8	87 00.0	+60.0	80.0	**87**
88	82 23.7	*+21.9* •	15.1	83 21.3	*+23.6* •	17.3	84 18.1	*+25.9* •	20.3	85 13.7	*+29.0* •	24.4	86 07.0	*+33.6* •	30.5	86 56.2	*+40.6* •	40.0	87 36.8	*+51.3* •	55.6	88 00.0	+60.0	80.0	**88**
89	82 45.6	*+14.4* •	7.8	83 44.9	*+15.1* •	9.1	84 44.0	*+16.0* •	10.8	85 42.7	*+17.3* •	13.3	86 40.6	*+19.4* •	17.2	87 36.8	*+23.2* •	24.4	88 28.1	*+31.9* •	40.0	89 00.0	+60.0	80.0	**89**
90	83 00.0	*+6.2* •	0.0	84 00.0	*+5.5* •	0.0	85 00.0	*+4.5* •	0.0	86 00.0	*+2.9* •	0.0	87 00.0	*+0.4* •	0.0	88 00.0	*–4.5* •	0.0	89 00.0	*–17.1* •	0.0	90 00.0	–60.0	40.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 100°, 260°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 05.5	+59.6	98.9	0 56.2	+59.7	99.0	0 46.9	+59.7	99.0	0 37.5	+59.9	99.0	0 28.1	+60.0	99.0	0 18.8	+59.9	99.0	0 09.4	+60.0	99.0	0 00.0	+60.0	99.0	**0**
1	2 05.1	+59.6	98.8	1 55.9	+59.7	98.8	1 46.6	+59.8	98.9	1 37.4	+59.8	98.9	1 28.1	+59.9	98.9	1 18.7	+60.0	99.0	1 09.4	+60.0	99.0	1 00.0	+60.0	99.0	**1**
2	3 04.7	+59.5	98.7	2 55.6	+59.7	98.7	2 46.4	+59.8	98.8	2 37.2	+59.9	98.8	2 28.0	+59.9	98.9	2 18.7	+60.0	98.9	2 09.4	+60.0	99.0	2 00.0	+60.0	99.0	**2**
3	4 04.2	+59.6	98.6	3 55.3	+59.6	98.6	3 46.2	+59.8	98.7	3 37.1	+59.8	98.8	3 27.9	+59.9	98.8	3 18.7	+59.9	98.9	3 09.4	+59.9	98.9	3 00.0	+60.0	99.0	**3**
4	5 03.8	+59.6	98.5	4 54.9	+59.7	98.5	4 46.0	+59.8	98.6	4 36.9	+59.9	98.7	4 27.8	+59.9	98.8	4 18.6	+60.0	98.9	4 09.3	+60.0	98.9	4 00.0	+60.0	99.0	**4**
5	6 03.4	+59.5	98.3	5 54.6	+59.7	98.4	5 45.8	+59.7	98.5	5 36.8	+59.9	98.6	5 27.7	+60.0	98.7	5 18.6	+60.0	98.8	5 09.3	+60.0	98.9	5 00.0	+60.0	99.0	**5**
6	7 02.9	+59.6	98.2	6 54.3	+59.7	98.3	6 45.5	+59.8	98.4	6 36.7	+59.8	98.6	6 27.7	+59.9	98.7	6 18.6	+59.9	98.8	6 09.3	+60.0	98.9	6 00.0	+60.0	99.0	**6**
7	8 02.5	+59.5	98.1	7 54.0	+59.6	98.2	7 45.3	+59.8	98.4	7 36.5	+59.9	98.5	7 27.6	+59.9	98.6	7 18.5	+60.0	98.8	7 09.3	+60.0	98.9	7 00.0	+60.0	99.0	**7**
8	9 02.0	+59.6	98.0	8 53.6	+59.7	98.1	8 45.1	+59.7	98.3	8 36.4	+59.8	98.4	8 27.5	+59.9	98.6	8 18.5	+59.9	98.7	8 09.3	+60.0	98.9	8 00.0	+60.0	99.0	**8**
9	10 01.6	+59.5	97.8	9 53.3	+59.7	98.0	9 44.8	+59.8	98.2	9 36.2	+59.9	98.4	9 27.4	+59.9	98.5	9 18.4	+60.0	98.7	9 09.3	+60.0	98.8	9 00.0	+60.0	99.0	**9**
10	11 01.1	+59.6	97.7	10 53.0	+59.6	97.9	10 44.6	+59.8	98.1	10 36.1	+59.8	98.3	10 27.3	+60.0	98.5	10 18.4	+60.0	98.6	10 09.3	+60.0	98.8	10 00.0	+60.0	99.0	**10**
11	12 00.7	+59.5	97.6	11 52.6	+59.7	97.8	11 44.4	+59.8	98.0	11 35.9	+59.9	98.2	11 27.3	+59.9	98.4	11 18.4	+59.9	98.6	11 09.3	+60.0	98.8	11 00.0	+60.0	99.0	**11**
12	13 00.2	+59.5	97.5	12 52.3	+59.7	97.7	12 44.2	+59.7	97.9	12 35.8	+59.8	98.1	12 27.2	+59.9	98.4	12 18.3	+60.0	98.6	12 09.3	+60.0	98.8	12 00.0	+60.0	99.0	**12**
13	13 59.7	+59.6	97.3	13 52.0	+59.6	97.6	13 43.9	+59.8	97.8	13 35.6	+59.9	98.1	13 27.1	+59.9	98.3	13 18.3	+60.0	98.5	13 09.3	+60.0	98.8	13 00.0	+60.0	99.0	**13**
14	14 59.3	+59.5	97.2	14 51.6	+59.7	97.5	14 43.7	+59.7	97.7	14 35.5	+59.8	98.0	14 27.0	+59.9	98.2	14 18.3	+59.9	98.5	14 09.3	+59.9	98.8	14 00.0	+60.0	99.0	**14**
15	15 58.8	+59.5	97.1	15 51.3	+59.6	97.4	15 43.4	+59.8	97.6	15 35.3	+59.9	97.9	15 26.9	+59.9	98.2	15 18.2	+60.0	98.5	15 09.2	+60.0	98.7	15 00.0	+60.0	99.0	**15**
16	16 58.3	+59.6	96.9	16 50.9	+59.7	97.2	16 43.2	+59.8	97.5	16 35.2	+59.8	97.8	16 26.8	+59.9	98.1	16 18.2	+59.9	98.4	16 09.2	+60.0	98.7	16 00.0	+60.0	99.0	**16**
17	17 57.9	+59.5	96.8	17 50.6	+59.6	97.1	17 43.0	+59.7	97.5	17 35.0	+59.9	97.8	17 26.7	+59.9	98.1	17 18.1	+60.0	98.4	17 09.2	+60.0	98.7	17 00.0	+60.0	99.0	**17**
18	18 57.4	+59.5	96.7	18 50.2	+59.7	97.0	18 42.7	+59.8	97.4	18 34.9	+59.8	97.7	18 26.6	+60.0	98.0	18 18.1	+60.0	98.4	18 09.2	+60.0	98.7	18 00.0	+60.0	99.0	**18**
19	19 56.9	+59.5	96.5	19 49.9	+59.6	96.9	19 42.5	+59.7	97.3	19 34.7	+59.8	97.6	19 26.6	+59.9	98.0	19 18.1	+59.9	98.3	19 09.2	+60.0	98.7	19 00.0	+60.0	99.0	**19**
20	20 56.4	+59.5	96.4	20 49.5	+59.6	96.8	20 42.2	+59.7	97.2	20 34.5	+59.9	97.5	20 26.5	+59.9	97.9	20 18.0	+60.0	98.3	20 09.2	+60.0	98.6	20 00.0	+60.0	99.0	**20**
21	21 55.9	+59.5	96.3	21 49.1	+59.6	96.7	21 41.9	+59.8	97.1	21 34.4	+59.8	97.5	21 26.4	+59.9	97.8	21 18.0	+59.9	98.2	21 09.2	+60.0	98.6	21 00.0	+60.0	99.0	**21**
22	22 55.4	+59.5	96.1	22 48.7	+59.7	96.5	22 41.7	+59.7	97.0	22 34.2	+59.8	97.4	22 26.3	+59.9	97.8	22 17.9	+60.0	98.2	22 09.2	+60.0	98.6	22 00.0	+60.0	99.0	**22**
23	23 54.9	+59.4	96.0	23 48.4	+59.6	96.4	23 41.4	+59.8	96.9	23 34.0	+59.9	97.3	23 26.2	+59.9	97.7	23 17.9	+60.0	98.2	23 09.2	+60.0	98.6	23 00.0	+60.0	99.0	**23**
24	24 54.3	+59.5	95.8	24 48.0	+59.6	96.3	24 41.2	+59.7	96.8	24 33.9	+59.8	97.2	24 26.1	+59.9	97.7	24 17.9	+59.9	98.1	24 09.2	+59.9	98.6	24 00.0	+60.0	99.0	**24**
25	25 53.8	+59.4	95.7	25 47.6	+59.6	96.2	25 40.9	+59.7	96.7	25 33.7	+59.8	97.1	25 26.0	+59.9	97.6	25 17.8	+60.0	98.1	25 09.1	+60.0	98.5	25 00.0	+60.0	99.0	**25**
26	26 53.2	+59.5	95.5	26 47.2	+59.6	96.0	26 40.6	+59.7	96.5	26 33.5	+59.8	97.0	26 25.9	+59.9	97.5	26 17.8	+59.9	98.0	26 09.1	+60.0	98.5	26 00.0	+60.0	99.0	**26**
27	27 52.7	+59.4	95.4	27 46.8	+59.6	95.9	27 40.3	+59.7	96.4	27 33.3	+59.8	97.0	27 25.8	+59.9	97.5	27 17.7	+60.0	98.0	27 09.1	+60.0	98.5	27 00.0	+60.0	99.0	**27**
28	28 52.1	+59.5	95.2	28 46.4	+59.5	95.8	28 40.0	+59.7	96.3	28 33.1	+59.9	96.9	28 25.7	+59.9	97.4	28 17.7	+59.9	97.9	28 09.1	+60.0	98.5	28 00.0	+60.0	99.0	**28**
29	29 51.6	+59.4	95.1	29 45.9	+59.6	95.6	29 39.7	+59.7	96.2	29 33.0	+59.8	96.8	29 25.6	+59.9	97.3	29 17.6	+60.0	97.9	29 09.1	+60.0	98.5	29 00.0	+60.0	99.0	**29**
30	30 51.0	+59.4	94.9	30 45.5	+59.6	95.5	30 39.4	+59.7	96.1	30 32.8	+59.8	96.7	30 25.5	+59.9	97.3	30 17.6	+59.9	97.9	30 09.1	+60.0	98.4	30 00.0	+60.0	99.0	**30**
31	31 50.4	+59.4	94.7	31 45.1	+59.5	95.4	31 39.1	+59.7	96.0	31 32.6	+59.8	96.6	31 25.4	+59.9	97.2	31 17.5	+60.0	97.8	31 09.1	+60.0	98.4	31 00.0	+60.0	99.0	**31**
32	32 49.8	+59.3	94.6	32 44.6	+59.6	95.2	32 38.8	+59.7	95.9	32 32.4	+59.8	96.5	32 25.3	+59.8	97.1	32 17.5	+59.9	97.8	32 09.1	+60.0	98.4	32 00.0	+60.0	99.0	**32**
33	33 49.1	+59.4	94.4	33 44.2	+59.5	95.1	33 38.5	+59.7	95.7	33 32.2	+59.8	96.4	33 25.1	+59.9	97.1	33 17.4	+60.0	97.7	33 09.1	+59.9	98.4	33 00.0	+60.0	99.0	**33**
34	34 48.5	+59.3	94.2	34 43.7	+59.5	94.9	34 38.2	+59.7	95.6	34 32.0	+59.8	96.3	34 25.0	+59.9	97.0	34 17.4	+59.9	97.7	34 09.0	+60.0	98.3	34 00.0	+60.0	99.0	**34**
35	35 47.8	+59.4	94.1	35 43.2	+59.5	94.8	35 37.9	+59.6	95.5	35 31.8	+59.7	96.2	35 24.9	+59.9	96.9	35 17.3	+60.0	97.6	35 09.0	+60.0	98.3	35 00.0	+60.0	99.0	**35**
36	36 47.2	+59.3	93.9	36 42.7	+59.5	94.6	36 37.5	+59.7	95.4	36 31.5	+59.8	96.1	36 24.8	+59.9	96.8	36 17.3	+59.9	97.6	36 09.0	+60.0	98.3	36 00.0	+60.0	99.0	**36**
37	37 46.5	+59.3	93.7	37 42.2	+59.5	94.4	37 37.2	+59.6	95.2	37 31.3	+59.8	96.0	37 24.7	+59.8	96.7	37 17.2	+60.0	97.5	37 09.0	+60.0	98.3	37 00.0	+60.0	99.0	**37**
38	38 45.8	+59.2	93.5	38 41.7	+59.5	94.3	38 36.8	+59.6	95.1	38 31.1	+59.7	95.9	38 24.5	+59.9	96.7	38 17.2	+59.9	97.4	38 09.0	+60.0	98.2	38 00.0	+60.0	99.0	**38**
39	39 45.0	+59.3	93.3	39 41.2	+59.4	94.1	39 36.4	+59.7	94.9	39 30.8	+59.8	95.8	39 24.4	+59.9	96.6	39 17.1	+59.9	97.4	39 09.0	+60.0	98.2	39 00.0	+60.0	99.0	**39**
40	40 44.3	+59.2	93.1	40 40.6	+59.4	93.9	40 36.1	+59.6	94.8	40 30.6	+59.8	95.6	40 24.3	+59.8	96.5	40 17.0	+60.0	97.3	40 09.0	+59.9	98.2	40 00.0	+60.0	99.0	**40**
41	41 43.5	+59.2	92.9	41 40.0	+59.5	93.7	41 35.7	+59.6	94.6	41 30.4	+59.7	95.5	41 24.1	+59.9	96.4	41 17.0	+59.9	97.3	41 08.9	+60.0	98.1	41 00.0	+60.0	99.0	**41**
42	42 42.7	+59.2	92.6	42 39.5	+59.4	93.6	42 35.3	+59.5	94.5	42 30.1	+59.7	95.4	42 24.0	+59.8	96.3	42 16.9	+60.0	97.2	42 08.9	+60.0	98.1	42 00.0	+60.0	99.0	**42**
43	43 41.9	+59.1	92.4	43 38.9	+59.3	93.4	43 34.8	+59.6	94.3	43 29.8	+59.7	95.3	43 23.8	+59.9	96.2	43 16.9	+59.9	97.1	43 08.9	+60.0	98.1	43 00.0	+60.0	99.0	**43**
44	44 41.0	+59.2	92.2	44 38.2	+59.4	93.2	44 34.4	+59.6	94.2	44 29.5	+59.8	95.1	44 23.7	+59.8	96.1	44 16.8	+59.9	97.1	44 08.9	+60.0	98.0	44 00.0	+60.0	99.0	**44**
45	45 40.2	+59.0	91.9	45 37.6	+59.3	93.0	45 34.0	+59.5	94.0	45 29.3	+59.7	95.0	45 23.5	+59.8	96.0	45 16.7	+59.9	97.0	45 08.9	+60.0	98.0	45 00.0	+60.0	99.0	**45**
46	46 39.2	+59.1	91.7	46 36.9	+59.3	92.7	46 33.5	+59.5	93.8	46 29.0	+59.7	94.9	46 23.3	+59.9	95.9	46 16.6	+60.0	96.9	46 08.9	+59.9	98.0	46 00.0	+60.0	99.0	**46**
47	47 38.3	+59.0	91.4	47 36.2	+59.3	92.5	47 33.0	+59.5	93.6	47 28.7	+59.6	94.7	47 23.2	+59.8	95.8	47 16.6	+59.9	96.9	47 08.8	+60.0	97.9	47 00.0	+60.0	99.0	**47**
48	48 37.3	+59.0	91.2	48 35.5	+59.3	92.3	48 32.5	+59.5	93.4	48 28.3	+59.7	94.5	48 23.0	+59.8	95.7	48 16.5	+59.9	96.8	48 08.8	+60.0	97.9	48 00.0	+60.0	99.0	**48**
49	49 36.3	+58.9	90.9	49 34.8	+59.2	92.0	49 32.0	+59.5	93.2	49 28.0	+59.7	94.4	49 22.8	+59.8	95.6	49 16.4	+59.9	96.7	49 08.8	+60.0	97.9	49 00.0	+60.0	99.0	**49**
50	50 35.2	+58.9	90.6	50 34.0	+59.2	91.8	50 31.5	+59.4	93.0	50 27.7	+59.6	94.2	50 22.6	+59.8	95.4	50 16.3	+59.9	96.6	50 08.8	+60.0	97.8	50 00.0	+60.0	99.0	**50**
51	51 34.1	+58.8	90.3	51 33.2	+59.1	91.5	51 30.9	+59.4	92.8	51 27.3	+59.6	94.0	51 22.4	+59.8	95.3	51 16.2	+59.9	96.5	51 08.8	+59.9	97.8	51 00.0	+60.0	99.0	**51**
52	52 32.9	+58.8	90.0	52 32.3	+59.1	91.3	52 30.3	+59.4	92.6	52 26.9	+59.6	93.9	52 22.2	+59.8	95.2	52 16.1	+59.9	96.5	52 08.7	+60.0	97.7	52 00.0	+60.0	99.0	**52**
53	53 31.7	+58.8	89.6	53 31.4	+59.1	91.0	53 29.7	+59.3	92.3	53 26.5	+59.6	93.7	53 22.0	+59.8	95.0	53 16.0	+59.9	96.4	53 08.7	+60.0	97.7	53 00.0	+60.0	99.0	**53**
54	54 30.5	+58.6	89.3	54 30.5	+59.0	90.7	54 29.0	+59.4	92.1	54 26.1	+59.6	93.5	54 21.8	+59.7	94.9	54 15.9	+59.9	96.3	54 08.7	+60.0	97.6	54 00.0	+60.0	99.0	**54**
55	55 29.1	+58.6	88.9	55 29.5	+59.0	90.4	55 28.4	+59.2	91.8	55 25.7	+59.5	93.3	55 21.5	+59.8	94.7	55 15.8	+59.9	96.2	55 08.7	+59.9	97.6	55 00.0	+60.0	99.0	**55**
56	56 27.7	+58.5	88.5	56 28.5	+58.9	90.0	56 27.6	+59.3	91.5	56 25.2	+59.6	93.1	56 21.3	+59.7	94.6	56 15.7	+59.9	96.0	56 08.6	+60.0	97.5	56 00.0	+60.0	99.0	**56**
57	57 26.2	+58.5	88.1	57 27.4	+58.8	89.7	57 26.9	+59.2	91.3	57 24.8	+59.4	92.8	57 21.0	+59.7	94.4	57 15.6	+59.9	95.9	57 08.6	+60.0	97.5	57 00.0	+60.0	99.0	**57**
58	58 24.7	+58.3	87.7	58 26.2	+58.8	89.3	58 26.1	+59.2	90.9	58 24.2	+59.5	92.6	58 20.7	+59.7	94.2	58 15.5	+59.8	95.8	58 08.6	+59.9	97.4	58 00.0	+60.0	99.0	**58**
59	59 23.0	+58.3	87.2	59 25.0	+58.7	88.9	59 25.3	+59.1	90.6	59 23.7	+59.4	92.3	59 20.4	+59.7	94.0	59 15.3	+59.9	95.7	59 08.5	+60.0	97.3	59 00.0	+60.0	99.0	**59**
60	60 21.3	+58.1	86.8	60 23.7	+58.7	88.5	60 24.4	+59.0	90.3	60 23.1	+59.4	92.0	60 20.1	+59.6	93.8	60 15.2	+59.8	95.5	60 08.5	+60.0	97.3	60 00.0	+60.0	99.0	**60**
61	61 19.4	+58.0	86.3	61 22.4	+58.5	88.1	61 23.4	+59.0	89.9	61 22.5	+59.4	91.8	61 19.7	+59.7	93.6	61 15.0	+59.9	95.4	61 08.5	+59.9	97.2	61 00.0	+60.0	99.0	**61**
62	62 17.4	+57.9	85.7	62 20.9	+58.5	87.6	62 22.4	+58.9	89.5	62 21.9	+59.3	91.4	62 19.4	+59.6	93.3	62 14.9	+59.8	95.2	62 08.4	+60.0	97.1	62 00.0	+60.0	99.0	**62**
63	63 15.3	+57.8	85.1	63 19.4	+58.3	87.1	63 21.3	+58.9	89.1	63 21.2	+59.3	91.1	63 19.0	+59.6	93.1	63 14.7	+59.8	95.1	63 08.4	+59.9	97.1	63 00.0	+60.0	99.0	**63**
64	64 13.1	+57.5	84.5	64 17.7	+58.2	86.6	64 20.2	+58.7	88.7	64 20.5	+59.2	90.8	64 18.6	+59.5	92.8	64 14.5	+59.8	94.9	64 08.3	+60.0	97.0	64 00.0	+60.0	99.0	**64**
65	65 10.6	+57.4	83.9	65 15.9	+58.1	86.0	65 18.9	+58.7	88.2	65 19.7	+59.1	90.4	65 18.1	+59.6	92.5	65 14.3	+59.8	94.7	65 08.3	+59.9	96.9	65 00.0	+60.0	99.0	**65**
66	66 08.0	+57.2	83.2	66 14.0	+57.9	85.4	66 17.6	+58.5	87.7	66 18.8	+59.1	90.0	66 17.7	+59.4	92.2	66 14.1	+59.8	94.5	66 08.2	+60.0	96.8	66 00.0	+60.0	99.0	**66**
67	67 05.2	+56.9	82.4	67 11.9	+57.7	84.8	67 16.1	+58.5	87.1	67 17.9	+59.0	89.5	67 17.1	+59.5	91.9	67 13.9	+59.8	94.3	67 08.2	+59.9	96.7	67 00.0	+60.0	99.0	**67**
68	68 02.1	+56.7	81.6	68 09.6	+57.6	84.0	68 14.6	+58.3	86.5	68 16.9	+58.9	89.0	68 16.6	+59.4	91.5	68 13.7	+59.7	94.1	68 08.1	+59.9	96.5	68 00.0	+60.0	99.0	**68**
69	68 58.8	+56.3	80.7	69 07.2	+57.3	83.3	69 12.9	+58.1	85.9	69 15.8	+58.8	88.5	69 16.0	+59.3	91.2	69 13.4	+59.7	93.8	69 08.0	+60.0	96.4	69 00.0	+60.0	99.0	**69**
70	69 55.1	+56.1	79.7	70 04.5	+57.0	82.4	70 11.0	+57.9	85.2	70 14.6	+58.7	87.9	70 15.3	+59.3	90.7	70 13.1	+59.7	93.5	70 08.0	+59.9	96.3	70 00.0	+60.0	99.0	**70**
71	70 51.2	+55.6	78.6	71 01.5	+56.8	81.5	71 08.9	+57.7	84.4	71 13.3	+58.5	87.3	71 14.6	+59.1	90.2	71 12.8	+59.6	93.2	71 07.9	+59.9	96.1	71 00.0	+60.0	99.0	**71**
72	71 46.8	+55.1	77.5	71 58.3	+56.3	80.5	72 06.6	+57.5	83.5	72 11.8	+58.4	86.6	72 13.7	+59.1	89.7	72 12.4	+59.6	92.8	72 07.8	+59.9	95.9	72 00.0	+60.0	99.0	**72**
73	72 41.9	+54.6	76.2	72 54.6	+56.0	79.3	73 04.1	+57.2	82.5	73 10.2	+58.1	85.8	73 12.8	+59.0	89.1	73 12.0	+59.5	92.4	73 07.7	+59.9	95.7	73 00.0	+60.0	99.0	**73**
74	73 36.5	+53.9	74.7	73 50.6	+55.4	78.1	74 01.3	+56.8	81.5	74 08.3	+58.0	85.0	74 11.8	+58.8	88.5	74 11.5	+59.5	92.0	74 07.6	+59.9	95.5	74 00.0	+60.0	99.0	**74**
75	74 30.4	+53.1	73.1	74 46.0	+54.9	76.6	74 58.1	+56.3	80.3	75 06.3	+57.6	84.0	75 10.6	+58.7	87.7	75 11.0	+59.4	91.5	75 07.5	+59.8	95.3	75 00.0	+60.0	99.0	**75**
76	75 23.5	+52.3	71.3	75 40.9	+54.1	75.1	75 54.4	+55.9	78.9	76 03.9	+57.3	82.9	76 09.3	+58.5	86.9	76 10.4	+59.4	90.9	76 07.3	+59.9	95.0	76 00.0	+60.0	99.0	**76**
77	76 15.8	+51.1	69.3	76 35.0	+53.3	73.3	76 50.3	+55.2	77.4	77 01.2	+56.9	81.6	77 07.8	+58.2	85.9	77 09.8	+59.2	90.3	77 07.2	+59.8	94.7	77 00.0	+60.0	99.0	**77**
78	77 06.9	+49.8	67.1	77 28.3	+52.2	71.2	77 45.5	+54.4	75.6	77 58.1	+56.4	80.1	78 06.0	+57.9	84.8	78 09.0	+59.0	89.5	78 07.0	+59.7	94.3	78 00.0	+60.0	99.0	**78**
79	77 56.7	+48.2	64.5	78 20.5	+50.9	68.8	78 39.9	+53.4	73.5	78 54.5	+55.6	78.4	79 03.9	+57.5	83.5	79 08.0	+58.9	88.7	79 06.7	+59.8	93.9	79 00.0	+60.0	99.0	**79**
80	78 44.9	*+46.1* •	61.5	79 11.4	+49.2	66.1	79 33.3	+52.1	71.1	79 50.1	+54.8	76.4	80 01.4	+57.0	81.9	80 06.9	+58.7	87.6	80 06.5	+59.6	93.3	80 00.0	+60.0	99.0	**80**
81	79 31.0	*+43.7* •	58.1	80 00.6	*+47.0* •	62.9	80 25.4	+50.4	68.2	80 44.9	+53.5	73.9	80 58.4	+56.3	80.0	81 05.6	+58.3	86.3	81 06.1	+59.6	92.7	81 00.0	+60.0	99.0	**81**
82	80 14.7	*+40.5* •	54.2	80 47.6	*+44.4* •	59.2	81 15.8	*+48.2* •	64.8	81 38.4	+52.0	71.0	81 54.7	+55.2	77.7	82 03.9	+57.8	84.7	82 05.7	+59.5	91.9	82 00.0	+60.0	99.0	**82**
83	80 55.2	*+36.8* •	49.7	81 32.0	*+40.9* •	54.8	82 04.0	*+45.3* •	60.7	82 30.4	*+49.6* •	67.4	82 49.9	+53.8	74.7	83 01.7	+57.1	82.6	83 05.2	+59.2	90.8	83 00.0	+60.0	99.0	**83**
84	81 32.0	*+32.0* •	44.5	82 12.9	*+36.4* •	49.7	82 49.3	*+41.3* •	55.7	83 20.0	*+46.5* •	62.8	83 43.7	*+51.6* •	70.9	83 58.8	+56.1	79.9	84 04.4	+59.0	89.4	84 00.0	+60.0	99.0	**84**
85	82 04.0	*+26.4* •	38.6	82 49.3	*+30.7* •	43.5	83 30.6	*+35.9* •	49.6	84 06.5	*+41.9* •	57.0	84 35.3	*+48.2* •	65.9	84 54.9	*+54.2* •	76.2	85 03.4	+58.5	87.5	85 00.0	+60.0	99.0	**85**
86	82 30.4	*+19.5* •	31.9	83 20.0	*+23.7* •	36.4	84 06.5	*+28.8* •	42.2	84 48.4	*+35.1* •	49.6	85 23.5	*+42.8* •	59.1	85 49.1	*+50.8* •	70.9	86 01.9	+57.5	84.6	86 00.0	+60.0	99.0	**86**
87	82 49.9	*+11.8* •	24.5	83 43.7	*+15.1* •	28.2	84 35.3	*+19.6* •	33.2	85 23.5	*+25.6* •	40.1	86 06.3	*+33.6* •	49.5	86 39.9	*+44.3* •	62.7	86 59.4	*+55.1* •	79.9	87 00.0	+60.0	99.0	**87**
88	83 01.7	*+3.5* •	16.5	83 58.8	*+5.6* •	19.2	84 54.9	*+8.5* •	22.9	85 49.1	*+12.8* •	28.2	86 39.9	*+19.5* •	36.3	87 24.2	*+30.3* •	49.5	87 54.5	*+47.6* •	70.8	88 00.0	+60.0	99.0	**88**
89	83 05.2	*–5.2* •	8.2	84 04.4	*–4.4* •	9.6	85 03.4	*–3.4* •	11.5	86 01.9	*–1.9* •	14.4	86 59.4	*+0.6* •	19.2	87 54.5	*+5.5* •	28.2	88 42.1	*+17.9* •	49.5	89 00.0	+60.0	99.0	**89**
90	83 00.0	*–13.4* •	0.0	84 00.0	*–14.1* •	0.0	85 00.0	*–15.0* •	0.0	86 00.0	*–16.3* •	0.0	87 00.0	*–18.4* •	0.0	88 00.0	*–22.3* •	0.0	89 00.0	*–31.2* •	0.0	90 00.0	–60.0	49.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 81°, 279°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 05.5	–59.5	98.9	0 56.2	–59.7	99.0	0 46.9	–59.8	99.0	0 37.5	–59.8	99.0	0 28.1	–59.9	99.0	0 18.8	–60.0	99.0	0 09.4	–60.0	99.0	0 00.0	+60.0	81.0	0
1	0 06.0	–59.6	99.1	0 03.5	+59.6	80.9	0 12.9	+59.8	80.9	0 22.3	+59.9	81.0	0 31.8	+59.9	81.0	0 41.2	+60.0	81.0	0 50.6	+60.0	81.0	1 00.0	+60.0	81.0	1
2	0 53.6	+59.5	80.8	1 03.1	+59.7	80.8	1 12.7	+59.8	80.9	1 22.2	+59.9	80.9	1 31.7	+59.9	80.9	1 41.2	+59.9	80.9	1 50.6	+60.0	81.0	2 00.0	+60.0	81.0	2
3	1 53.1	+59.6	80.7	2 02.8	+59.7	80.7	2 12.5	+59.7	80.8	2 22.1	+59.8	80.8	2 31.6	+59.9	80.9	2 41.1	+60.0	80.9	2 50.6	+60.0	80.9	3 00.0	+60.0	81.0	3
4	2 52.7	+59.6	80.6	3 02.5	+59.7	80.6	3 12.2	+59.8	80.7	3 21.9	+59.9	80.7	3 31.5	+60.0	80.8	3 41.1	+60.0	80.9	3 50.6	+60.0	80.9	4 00.0	+60.0	81.0	4
5	3 52.3	+59.5	80.5	4 02.2	+59.7	80.5	4 12.0	+59.8	80.6	4 21.8	+59.8	80.7	4 31.5	+59.9	80.8	4 41.1	+59.9	80.8	4 50.6	+60.0	80.9	5 00.0	+60.0	81.0	5
6	4 51.8	+59.6	80.3	5 01.9	+59.6	80.4	5 11.8	+59.8	80.5	5 21.6	+59.9	80.6	5 31.4	+59.9	80.7	5 41.0	+60.0	80.8	5 50.6	+60.0	80.9	6 00.0	+60.0	81.0	6
7	5 51.4	+59.6	80.2	6 01.5	+59.7	80.3	6 11.6	+59.7	80.4	6 21.5	+59.8	80.5	6 31.3	+59.9	80.6	6 41.0	+59.9	80.8	6 50.6	+59.9	80.9	7 00.0	+60.0	81.0	7
8	6 51.0	+59.5	80.1	7 01.2	+59.7	80.2	7 11.3	+59.8	80.3	7 21.3	+59.9	80.5	7 31.2	+59.9	80.6	7 40.9	+60.0	80.7	7 50.5	+60.0	80.9	8 00.0	+60.0	81.0	8
9	7 50.5	+59.6	80.0	8 00.9	+59.7	80.1	8 11.1	+59.8	80.3	8 21.2	+59.8	80.4	8 31.1	+59.9	80.5	8 40.9	+60.0	80.7	8 50.5	+60.0	80.8	9 00.0	+60.0	81.0	9
10	8 50.1	+59.5	79.9	9 00.6	+59.6	80.0	9 10.9	+59.8	80.2	9 21.0	+59.9	80.3	9 31.0	+60.0	80.5	9 40.9	+59.9	80.7	9 50.5	+60.0	80.8	10 00.0	+60.0	81.0	10
11	9 49.6	+59.6	79.7	10 00.2	+59.7	79.9	10 10.7	+59.7	80.1	10 20.9	+59.9	80.3	10 31.0	+59.9	80.4	10 40.8	+60.0	80.6	10 50.5	+60.0	80.8	11 00.0	+60.0	81.0	11
12	10 49.2	+59.5	79.6	10 59.9	+59.7	79.8	11 10.4	+59.8	80.0	11 20.8	+59.8	80.2	11 30.9	+59.9	80.4	11 40.8	+60.0	80.6	11 50.5	+60.0	80.8	12 00.0	+60.0	81.0	12
13	11 48.7	+59.6	79.5	11 59.6	+59.6	79.7	12 10.2	+59.8	79.9	12 20.6	+59.9	80.1	12 30.8	+59.9	80.3	12 40.8	+59.9	80.6	12 50.5	+60.0	80.8	13 00.0	+60.0	81.0	13
14	12 48.3	+59.5	79.4	12 59.2	+59.7	79.6	13 10.0	+59.7	79.8	13 20.5	+59.8	80.0	13 30.7	+59.9	80.3	13 40.7	+60.0	80.5	13 50.5	+60.0	80.8	14 00.0	+60.0	81.0	14
15	13 47.8	+59.5	79.2	13 58.9	+59.6	79.5	14 09.7	+59.8	79.7	14 20.3	+59.9	80.0	14 30.6	+59.9	80.2	14 40.7	+59.9	80.5	14 50.5	+60.0	80.7	15 00.0	+60.0	81.0	15
16	14 47.3	+59.6	79.1	14 58.5	+59.7	79.4	15 09.5	+59.7	79.6	15 20.2	+59.8	79.9	15 30.5	+60.0	80.2	15 40.6	+60.0	80.4	15 50.5	+60.0	80.7	16 00.0	+60.0	81.0	16
17	15 46.9	+59.5	79.0	15 58.2	+59.6	79.2	16 09.2	+59.8	79.5	16 20.0	+59.8	79.8	16 30.5	+59.9	80.1	16 40.6	+60.0	80.4	16 50.5	+59.9	80.7	17 00.0	+60.0	81.0	17
18	16 46.4	+59.5	78.8	16 57.8	+59.7	79.1	17 09.0	+59.8	79.4	17 19.8	+59.9	79.7	17 30.4	+59.9	80.1	17 40.6	+59.9	80.4	17 50.4	+60.0	80.7	18 00.0	+60.0	81.0	18
19	17 45.9	+59.5	78.7	17 57.5	+59.6	79.0	18 08.8	+59.7	79.3	18 19.7	+59.8	79.7	18 30.3	+59.9	80.0	18 40.5	+60.0	80.3	18 50.4	+60.0	80.7	19 00.0	+60.0	81.0	19
20	18 45.4	+59.5	78.6	18 57.1	+59.7	78.9	19 08.5	+59.8	79.2	19 19.5	+59.9	79.6	19 30.2	+59.9	79.9	19 40.5	+59.9	80.3	19 50.4	+60.0	80.6	20 00.0	+60.0	81.0	20
21	19 44.9	+59.5	78.4	19 56.8	+59.6	78.8	20 08.3	+59.7	79.2	20 19.4	+59.8	79.5	20 30.1	+59.9	79.9	20 40.4	+60.0	80.2	20 50.4	+60.0	80.6	21 00.0	+60.0	81.0	21
22	20 44.4	+59.5	78.3	20 56.4	+59.6	78.7	21 08.0	+59.7	79.1	21 19.2	+59.8	79.4	21 30.0	+59.9	79.8	21 40.4	+60.0	80.2	21 50.4	+60.0	80.6	22 00.0	+60.0	81.0	22
23	21 43.9	+59.5	78.2	21 56.0	+59.7	78.6	22 07.7	+59.8	79.0	22 19.0	+59.9	79.4	22 29.9	+59.9	79.8	22 40.4	+59.9	80.2	22 50.4	+60.0	80.6	23 00.0	+60.0	81.0	23
24	22 43.4	+59.5	78.0	22 55.7	+59.6	78.4	23 07.5	+59.7	78.9	23 18.9	+59.8	79.3	23 29.8	+59.9	79.7	23 40.3	+60.0	80.1	23 50.4	+60.0	80.6	24 00.0	+60.0	81.0	24
25	23 42.9	+59.5	77.9	23 55.3	+59.6	78.3	24 07.2	+59.7	78.7	24 18.7	+59.8	79.2	24 29.7	+59.9	79.6	24 40.3	+59.9	80.1	24 50.4	+60.0	80.5	25 00.0	+60.0	81.0	25
26	24 42.4	+59.5	77.7	24 54.9	+59.6	78.2	25 06.9	+59.8	78.6	25 18.5	+59.8	79.1	25 29.6	+59.9	79.6	25 40.2	+60.0	80.0	25 50.4	+60.0	80.5	26 00.0	+60.0	81.0	26
27	25 41.9	+59.4	77.6	25 54.5	+59.6	78.1	26 06.7	+59.7	78.5	26 18.3	+59.9	79.0	26 29.5	+59.9	79.5	26 40.2	+59.9	80.0	26 50.4	+59.9	80.5	27 00.0	+60.0	81.0	27
28	26 41.3	+59.5	77.4	26 54.1	+59.6	77.9	27 06.4	+59.7	78.4	27 18.2	+59.8	78.9	27 29.4	+59.9	79.4	27 40.1	+60.0	80.0	27 50.3	+60.0	80.5	28 00.0	+60.0	81.0	28
29	27 40.8	+59.4	77.3	27 53.7	+59.6	77.8	28 06.1	+59.7	78.3	28 18.0	+59.8	78.8	28 29.3	+59.9	79.4	28 40.1	+60.0	79.9	28 50.3	+60.0	80.5	29 00.0	+60.0	81.0	29
30	28 40.2	+59.4	77.1	28 53.3	+59.6	77.7	29 05.8	+59.7	78.2	29 17.8	+59.8	78.8	29 29.2	+59.9	79.3	29 40.1	+59.9	79.9	29 50.3	+60.0	80.4	30 00.0	+60.0	81.0	30
31	29 39.6	+59.4	77.0	29 52.9	+59.5	77.5	30 05.5	+59.7	78.1	30 17.6	+59.8	78.7	30 29.1	+59.9	79.2	30 40.0	+60.0	79.8	30 50.3	+60.0	80.4	31 00.0	+60.0	81.0	31
32	30 39.0	+59.4	76.8	30 52.4	+59.6	77.4	31 05.2	+59.7	78.0	31 17.4	+59.8	78.6	31 29.0	+59.9	79.2	31 40.0	+59.9	79.8	31 50.3	+60.0	80.4	32 00.0	+60.0	81.0	32
33	31 38.4	+59.4	76.6	31 52.0	+59.5	77.3	32 04.9	+59.7	77.9	32 17.2	+59.8	78.5	32 28.9	+59.9	79.1	32 39.9	+60.0	79.7	32 50.3	+60.0	80.4	33 00.0	+60.0	81.0	33
34	32 37.8	+59.4	76.5	32 51.5	+59.6	77.1	33 04.6	+59.7	77.7	33 17.0	+59.8	78.4	33 28.8	+59.9	79.0	33 39.9	+59.9	79.7	33 50.3	+60.0	80.3	34 00.0	+60.0	81.0	34
35	33 37.2	+59.4	76.3	33 51.1	+59.5	77.0	34 04.3	+59.7	77.6	34 16.8	+59.8	78.3	34 28.7	+59.8	79.0	34 39.8	+60.0	79.6	34 50.3	+59.9	80.3	35 00.0	+60.0	81.0	35
36	34 36.6	+59.3	76.1	34 50.6	+59.5	76.8	35 04.0	+59.6	77.5	35 16.6	+59.8	78.2	35 28.5	+59.9	78.9	35 39.8	+59.9	79.6	35 50.2	+60.0	80.3	36 00.0	+60.0	81.0	36
37	35 35.9	+59.3	76.0	35 50.1	+59.5	76.7	36 03.6	+59.7	77.4	36 16.4	+59.8	78.1	36 28.4	+59.9	78.8	36 39.7	+59.9	79.5	36 50.2	+60.0	80.3	37 00.0	+60.0	81.0	37
38	36 35.2	+59.4	75.8	36 49.6	+59.5	76.5	37 03.3	+59.6	77.2	37 16.2	+59.7	78.0	37 28.3	+59.9	78.7	37 39.6	+60.0	79.5	37 50.2	+60.0	80.2	38 00.0	+60.0	81.0	38
39	37 34.6	+59.3	75.6	37 49.1	+59.5	76.3	38 02.9	+59.7	77.1	38 15.9	+59.8	77.9	38 28.2	+59.8	78.6	38 39.6	+59.9	79.4	38 50.2	+60.0	80.2	39 00.0	+60.0	81.0	39
40	38 33.9	+59.2	75.4	38 48.6	+59.5	76.2	39 02.6	+59.6	76.9	39 15.7	+59.8	77.7	39 28.0	+59.9	78.5	39 39.5	+60.0	79.4	39 50.2	+60.0	80.2	40 00.0	+60.0	81.0	40
41	39 33.1	+59.3	75.2	39 48.1	+59.4	76.0	40 02.2	+59.6	76.8	40 15.5	+59.7	77.6	40 27.9	+59.8	78.5	40 39.5	+59.9	79.3	40 50.2	+60.0	80.1	41 00.0	+60.0	81.0	41
42	40 32.4	+59.2	75.0	40 47.5	+59.4	75.8	41 01.8	+59.6	76.7	41 15.2	+59.8	77.5	41 27.7	+59.9	78.4	41 39.4	+59.9	79.2	41 50.2	+59.9	80.1	42 00.0	+60.0	81.0	42
43	41 31.6	+59.2	74.8	41 46.9	+59.5	75.6	42 01.4	+59.6	76.5	42 15.0	+59.7	77.4	42 27.6	+59.9	78.3	42 39.3	+60.0	79.2	42 50.1	+60.0	80.1	43 00.0	+60.0	81.0	43
44	42 30.8	+59.2	74.6	42 46.4	+59.4	75.4	43 01.0	+59.6	76.3	43 14.7	+59.7	77.3	43 27.5	+59.8	78.2	43 39.3	+59.9	79.1	43 50.1	+60.0	80.1	44 00.0	+60.0	81.0	44
45	43 30.0	+59.2	74.3	43 45.8	+59.3	75.2	44 00.6	+59.5	76.2	44 14.4	+59.7	77.1	44 27.3	+59.8	78.1	44 39.2	+59.9	79.0	44 50.1	+60.0	80.0	45 00.0	+60.0	81.0	45
46	44 29.2	+59.1	74.1	44 45.1	+59.4	75.0	45 00.1	+59.6	76.0	45 14.1	+59.7	77.0	45 27.1	+59.9	78.0	45 39.1	+60.0	79.0	45 50.1	+60.0	80.0	46 00.0	+60.0	81.0	46
47	45 28.3	+59.1	73.9	45 44.5	+59.3	74.8	45 59.7	+59.5	75.8	46 13.8	+59.7	76.8	46 27.0	+59.8	77.9	46 39.1	+59.9	78.9	46 50.1	+59.9	79.9	47 00.0	+60.0	81.0	47
48	46 27.4	+59.0	73.6	46 43.8	+59.3	74.6	46 59.2	+59.5	75.7	47 13.5	+59.7	76.7	47 26.8	+59.8	77.8	47 39.0	+59.9	78.8	47 50.0	+60.0	79.9	48 00.0	+60.0	81.0	48
49	47 26.4	+59.1	73.3	47 43.1	+59.3	74.4	47 58.7	+59.5	75.5	48 13.2	+59.7	76.5	48 26.6	+59.8	77.6	48 38.9	+59.9	78.7	48 50.0	+60.0	79.9	49 00.0	+60.0	81.0	49
50	48 25.5	+58.9	73.1	48 42.4	+59.2	74.2	48 58.2	+59.5	75.3	49 12.9	+59.6	76.4	49 26.4	+59.8	77.5	49 38.8	+59.9	78.7	49 50.0	+60.0	79.8	50 00.0	+60.0	81.0	50
51	49 24.4	+59.0	72.8	49 41.6	+59.2	73.9	49 57.7	+59.4	75.1	50 12.5	+59.7	76.2	50 26.2	+59.8	77.4	50 38.7	+59.9	78.6	50 50.0	+60.0	79.8	51 00.0	+60.0	81.0	51
52	50 23.4	+58.9	72.5	50 40.8	+59.2	73.7	50 57.1	+59.4	74.9	51 12.2	+59.6	76.1	51 26.0	+59.8	77.3	51 38.6	+59.9	78.5	51 50.0	+59.9	79.7	52 00.0	+60.0	81.0	52
53	51 22.3	+58.8	72.2	51 40.0	+59.2	73.4	51 56.5	+59.4	74.6	52 11.8	+59.6	75.9	52 25.8	+59.8	77.1	52 38.5	+59.9	78.4	52 49.9	+60.0	79.7	53 00.0	+60.0	81.0	53
54	52 21.1	+58.8	71.9	52 39.2	+59.1	73.1	52 55.9	+59.4	74.4	53 11.4	+59.6	75.7	53 25.6	+59.8	77.0	53 38.4	+59.9	78.3	53 49.9	+60.0	79.6	54 00.0	+60.0	81.0	54
55	53 19.9	+58.8	71.6	53 38.3	+59.0	72.8	53 55.3	+59.4	74.2	54 11.0	+59.6	75.5	54 25.4	+59.7	76.8	54 38.3	+59.9	78.2	54 49.9	+60.0	79.6	55 00.0	+60.0	81.0	55
56	54 18.7	+58.6	71.2	54 37.3	+59.0	72.5	54 54.7	+59.3	73.9	55 10.6	+59.5	75.3	55 25.1	+59.8	76.7	55 38.2	+59.9	78.1	55 49.9	+59.9	79.5	56 00.0	+60.0	81.0	56
57	55 17.3	+58.7	70.9	55 36.3	+59.0	72.2	55 54.0	+59.2	73.6	56 10.1	+59.6	75.1	56 24.9	+59.7	76.5	56 38.1	+59.9	78.0	56 49.8	+60.0	79.5	57 00.0	+60.0	81.0	57
58	56 16.0	+58.5	70.5	56 35.3	+58.9	71.9	56 53.2	+59.3	73.4	57 09.7	+59.5	74.8	57 24.6	+59.7	76.3	57 38.0	+59.9	77.9	57 49.8	+60.0	79.4	58 00.0	+60.0	81.0	58
59	57 14.5	+58.4	70.1	57 34.2	+58.9	71.5	57 52.5	+59.1	73.1	58 09.2	+59.4	74.6	58 24.3	+59.7	76.2	58 37.9	+59.8	77.8	58 49.8	+59.9	79.4	59 00.0	+60.0	81.0	59
60	58 12.9	+58.4	69.6	58 33.1	+58.7	71.2	58 51.6	+59.2	72.7	59 08.6	+59.5	74.3	59 24.0	+59.7	76.0	59 37.7	+59.9	77.6	59 49.7	+60.0	79.3	60 00.0	+60.0	81.0	60
61	59 11.3	+58.3	69.2	59 31.8	+58.7	70.8	59 50.8	+59.1	72.4	60 08.1	+59.4	74.1	60 23.7	+59.7	75.8	60 37.6	+59.8	77.5	60 49.7	+60.0	79.2	61 00.0	+60.0	81.0	61
62	60 09.6	+58.1	68.7	60 30.5	+58.7	70.4	60 49.9	+59.0	72.1	61 07.5	+59.4	73.8	61 23.4	+59.6	75.5	61 37.4	+59.9	77.3	61 49.7	+59.9	79.2	62 00.0	+60.0	81.0	62
63	61 07.7	+58.1	68.2	61 29.2	+58.5	69.9	61 48.9	+59.0	71.7	62 06.9	+59.3	73.5	62 23.0	+59.6	75.3	62 37.3	+59.8	77.2	62 49.6	+60.0	79.1	63 00.0	+60.0	81.0	63
64	62 05.8	+57.9	67.7	62 27.7	+58.4	69.5	62 47.9	+58.8	71.3	63 06.2	+59.3	73.2	63 22.6	+59.6	75.1	63 37.1	+59.8	77.0	63 49.6	+59.9	79.0	64 00.0	+60.0	81.0	64
65	63 03.7	+57.8	67.1	63 26.1	+58.4	69.0	63 46.7	+58.9	70.9	64 05.5	+59.2	72.8	64 22.2	+59.5	74.8	64 36.9	+59.8	76.8	64 49.5	+60.0	78.9	65 00.0	+60.0	81.0	65
66	64 01.5	+57.6	66.5	64 24.5	+58.2	68.4	64 45.6	+58.7	70.4	65 04.7	+59.1	72.4	65 21.7	+59.6	74.5	65 36.7	+59.8	76.6	65 49.5	+59.9	78.8	66 00.0	+60.0	81.0	66
67	64 59.1	+57.4	65.9	65 22.7	+58.0	67.9	65 44.3	+58.6	69.9	66 03.8	+59.1	72.0	66 21.3	+59.4	74.2	66 36.5	+59.8	76.4	66 49.4	+60.0	78.7	67 00.0	+60.0	81.0	67
68	65 56.5	+57.2	65.2	66 20.7	+57.9	67.2	66 42.9	+58.5	69.4	67 02.9	+59.0	71.6	67 20.7	+59.5	73.9	67 36.3	+59.7	76.2	67 49.4	+59.9	78.6	68 00.0	+60.0	81.0	68
69	66 53.7	+57.0	64.4	67 18.6	+57.7	66.6	67 41.4	+58.4	68.8	68 01.9	+59.0	71.1	68 20.2	+59.4	73.5	68 36.0	+59.7	75.9	68 49.3	+59.9	78.4	69 00.0	+60.0	81.0	69
70	67 50.7	+56.7	63.6	68 16.3	+57.5	65.9	68 39.8	+58.2	68.2	69 00.9	+58.8	70.6	69 19.6	+59.3	73.1	69 35.7	+59.7	75.7	69 49.2	+59.9	78.3	70 00.0	+60.0	81.0	70
71	68 47.4	+56.5	62.7	69 13.8	+57.3	65.1	69 38.0	+58.0	67.5	69 59.7	+58.7	70.0	70 18.9	+59.2	72.7	70 35.4	+59.7	75.4	70 49.1	+60.0	78.2	71 00.0	+60.0	81.0	71
72	69 43.9	+56.0	61.8	70 11.1	+57.0	64.2	70 36.0	+57.9	66.8	70 58.4	+58.6	69.4	71 18.1	+59.2	72.2	71 35.1	+59.6	75.0	71 49.1	+59.9	78.0	72 00.0	+60.0	81.0	72
73	70 39.9	+55.7	60.7	71 08.1	+56.7	63.3	71 33.9	+57.6	65.9	71 57.0	+58.4	68.7	72 17.3	+59.1	71.7	72 34.7	+59.6	74.7	72 49.0	+59.9	77.8	73 00.0	+60.0	81.0	73
74	71 35.6	+55.3	59.6	72 04.8	+56.3	62.2	72 31.5	+57.3	65.0	72 55.4	+58.2	68.0	73 16.4	+59.0	71.1	73 34.3	+59.5	74.3	73 48.9	+59.8	77.6	74 00.0	+60.0	81.0	74
75	72 30.9	+54.6	58.3	73 01.1	+55.9	61.1	73 28.8	+57.0	64.0	73 53.6	+58.0	67.1	74 15.4	+58.8	70.4	74 33.8	+59.4	73.8	74 48.7	+59.9	77.4	75 00.0	+60.0	81.0	75
76	73 25.5	+54.1	56.9	73 57.0	+55.4	59.8	74 25.8	+56.6	62.9	74 51.6	+57.8	66.2	75 14.2	+58.6	69.7	75 33.2	+59.4	73.3	75 48.6	+59.8	77.1	76 00.0	+60.0	81.0	76
77	74 19.6	+53.3	55.3	74 52.4	+54.8	58.4	75 22.4	+56.2	61.6	75 49.4	+57.4	65.1	76 12.8	+58.5	68.8	76 32.6	+59.3	72.7	76 48.4	+59.8	76.8	77 00.0	+60.0	81.0	77
78	75 12.9	+52.5	53.6	75 47.2	+54.1	56.8	76 18.6	+55.6	60.2	76 46.8	+56.9	63.9	77 11.3	+58.2	67.8	77 31.9	+59.2	72.0	77 48.2	+59.8	76.4	78 00.0	+60.0	81.0	78
79	76 05.4	+51.3	51.6	76 41.3	+53.1	54.9	77 14.2	+54.9	58.5	77 43.7	+56.5	62.5	78 09.5	+57.9	66.7	78 31.1	+59.0	71.2	78 48.0	+59.8	76.0	79 00.0	+60.0	81.0	79
80	76 56.7	+50.1	49.4	77 34.4	+52.1	52.8	78 09.1	+54.0	56.6	78 40.2	+55.9	60.8	79 07.4	+57.5	65.4	79 30.1	+58.8	70.3	79 47.8	+59.7	75.5	80 00.0	+60.0	81.0	80
81	77 46.8	+48.5	46.9	78 26.5	+50.7	50.5	79 03.1	+52.8	54.4	79 36.1	+55.0	58.9	80 04.9	+56.9	63.8	80 28.9	+58.5	69.1	80 47.5	+59.6	74.9	81 00.0	+60.0	81.0	81
82	78 35.3	*+46.6* •	44.0	79 17.2	+48.9	47.7	79 55.9	+51.5	51.8	80 31.1	+53.9	56.6	81 01.8	+56.2	61.8	81 27.4	+58.2	67.7	81 47.1	+59.5	74.1	82 00.0	+60.0	81.0	82
83	79 21.9	*+44.2* •	40.7	80 06.1	*+46.8* •	44.4	80 47.4	*+49.5* •	48.8	81 25.0	+52.4	53.8	81 58.0	+55.2	59.5	82 25.6	+57.6	66.0	82 46.6	+59.3	73.2	83 00.0	+60.0	81.0	83
84	80 06.1	*+41.3* •	36.9	80 52.9	*+44.0* •	40.7	81 36.9	*+47.1* •	45.1	82 17.4	*+50.3* •	50.3	82 53.2	+53.7	56.5	83 23.2	+56.8	63.7	83 45.9	+59.1	71.9	84 00.0	+60.0	81.0	84
85	80 47.4	*+37.6* •	32.5	81 36.9	*+40.5* •	36.2	82 24.0	*+43.7* •	40.6	83 07.7	*+47.4* •	46.0	83 46.9	*+51.4* •	52.6	84 20.0	+55.4	60.7	84 45.0	+58.7	70.2	85 00.0	+60.0	81.0	85
86	81 25.0	*+33.0* •	27.5	82 17.4	*+35.8* •	30.9	83 07.7	*+39.2* •	35.2	83 55.1	*+43.2* •	40.6	84 38.3	*+48.0* •	47.5	85 15.4	*+53.2* •	56.4	85 43.7	+57.9	67.7	86 00.0	+60.0	81.0	86
87	81 58.0	*+27.6* •	21.7	82 53.2	*+30.0* •	24.7	83 46.9	*+33.1* •	28.5	84 38.3	*+37.1* •	33.6	85 26.3	*+42.3* •	40.5	86 08.6	*+48.9* •	50.2	86 41.6	*+56.1* •	63.6	87 00.0	+60.0	81.0	87
88	82 25.6	*+21.0* •	15.2	83 23.2	*+22.7* •	17.4	84 20.0	*+25.0* •	20.4	85 15.4	*+28.3* •	24.6	86 08.6	*+33.0* •	30.8	86 57.5	*+40.2* •	40.5	87 37.7	*+51.1* •	56.4	88 00.0	+60.0	81.0	88
89	82 46.6	*+13.4* •	7.9	83 45.9	*+14.1* •	9.1	84 45.0	*+15.0* •	10.9	85 43.7	*+16.3* •	13.4	86 41.6	*+18.4* •	17.4	87 37.7	*+22.3* •	24.6	88 28.8	*+31.2* •	40.5	89 00.0	+60.0	81.0	89
90	83 00.0	*+5.2* •	0.0	84 00.0	*+4.4* •	0.0	85 00.0	*+3.4* •	0.0	86 00.0	*+1.9* •	0.0	87 00.0	*–0.6* •	0.0	88 00.0	*–5.5* •	0.0	89 00.0	*–17.9* •	0.0	90 00.0	–60.0	40.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 99°, 261°

82°, 278° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 58.3	+59.6	97.9	0 50.0	+59.7	98.0	0 41.7	+59.8	98.0	0 33.4	+59.8	98.0	0 25.0	+60.0	98.0	0 16.7	+60.0	98.0	0 08.3	+60.0	98.0	0 00.0	+60.0	98.0	0
1	1 57.9	+59.5	97.8	1 49.7	+59.7	97.9	1 41.5	+59.8	97.9	1 33.2	+59.9	97.9	1 25.0	+59.9	97.9	1 16.7	+59.9	98.0	1 08.3	+60.0	98.0	1 00.0	+60.0	98.0	1
2	2 57.4	+59.6	97.7	2 49.4	+59.6	97.7	2 41.3	+59.7	97.8	2 33.1	+59.8	97.8	2 24.9	+59.9	97.9	2 16.6	+60.0	97.9	2 08.3	+60.0	98.0	2 00.0	+60.0	98.0	2
3	3 57.0	+59.6	97.6	3 49.0	+59.7	97.6	3 41.0	+59.8	97.7	3 32.9	+59.9	97.8	3 24.8	+59.9	97.8	3 16.6	+60.0	97.9	3 08.3	+60.0	97.9	3 00.0	+60.0	98.0	3
4	4 56.6	+59.5	97.5	4 48.7	+59.7	97.5	4 40.8	+59.8	97.6	4 32.8	+59.9	97.7	4 24.7	+59.9	97.8	4 16.6	+59.9	97.9	4 08.3	+60.0	97.9	4 00.0	+60.0	98.0	4
5	5 56.1	+59.6	97.3	5 48.4	+59.7	97.4	5 40.6	+59.7	97.5	5 32.7	+59.8	97.6	5 24.6	+60.0	97.7	5 16.5	+60.0	97.8	5 08.3	+60.0	97.9	5 00.0	+60.0	98.0	5
6	6 55.7	+59.5	97.2	6 48.1	+59.6	97.3	6 40.3	+59.8	97.4	6 32.5	+59.9	97.6	6 24.6	+59.9	97.7	6 16.5	+59.9	97.8	6 08.3	+60.0	97.9	6 00.0	+60.0	98.0	6
7	7 55.2	+59.6	97.1	7 47.7	+59.7	97.2	7 40.1	+59.8	97.4	7 32.4	+59.8	97.5	7 24.5	+59.9	97.6	7 16.4	+60.0	97.8	7 08.3	+60.0	97.9	7 00.0	+60.0	98.0	7
8	8 54.8	+59.5	97.0	8 47.4	+59.7	97.1	8 39.9	+59.8	97.3	8 32.2	+59.9	97.4	8 24.4	+59.9	97.6	8 16.4	+60.0	97.7	8 08.3	+60.0	97.9	8 00.0	+60.0	98.0	8
9	9 54.3	+59.6	96.8	9 47.1	+59.6	97.0	9 39.7	+59.7	97.2	9 32.1	+59.8	97.4	9 24.3	+59.9	97.5	9 16.4	+59.9	97.7	9 08.3	+60.0	97.8	9 00.0	+60.0	98.0	9
10	10 53.9	+59.5	96.7	10 46.7	+59.7	96.9	10 39.4	+59.8	97.1	10 31.9	+59.9	97.3	10 24.2	+59.9	97.5	10 16.3	+60.0	97.6	10 08.3	+60.0	97.8	10 00.0	+60.0	98.0	10
11	11 53.4	+59.5	96.6	11 46.4	+59.7	96.8	11 39.2	+59.8	97.0	11 31.8	+59.8	97.2	11 24.1	+60.0	97.4	11 16.3	+60.0	97.6	11 08.3	+59.9	97.8	11 00.0	+60.0	98.0	11
12	12 52.9	+59.6	96.5	12 46.1	+59.6	96.7	12 39.0	+59.7	96.9	12 31.6	+59.9	97.1	12 24.1	+59.9	97.4	12 16.3	+59.9	97.6	12 08.2	+60.0	97.8	12 00.0	+60.0	98.0	12
13	13 52.5	+59.5	96.3	13 45.7	+59.7	96.6	13 38.7	+59.8	96.8	13 31.5	+59.8	97.1	13 24.0	+59.9	97.3	13 16.2	+60.0	97.5	13 08.2	+60.0	97.8	13 00.0	+60.0	98.0	13
14	14 52.0	+59.5	96.2	14 45.4	+59.6	96.5	14 38.5	+59.8	96.7	14 31.3	+59.9	97.0	14 23.9	+59.9	97.2	14 16.2	+59.9	97.5	14 08.2	+60.0	97.8	14 00.0	+60.0	98.0	14
15	15 51.5	+59.6	96.1	15 45.0	+59.7	96.4	15 38.3	+59.7	96.6	15 31.2	+59.8	96.9	15 23.8	+59.9	97.2	15 16.1	+60.0	97.5	15 08.2	+60.0	97.7	15 00.0	+60.0	98.0	15
16	16 51.1	+59.5	95.9	16 44.7	+59.6	96.2	16 38.0	+59.8	96.5	16 31.0	+59.9	96.8	16 23.7	+59.9	97.1	16 16.1	+60.0	97.4	16 08.2	+60.0	97.7	16 00.0	+60.0	98.0	16
17	17 50.6	+59.5	95.8	17 44.3	+59.7	96.1	17 37.8	+59.7	96.5	17 30.9	+59.8	96.8	17 23.6	+59.9	97.1	17 16.1	+59.9	97.4	17 08.2	+60.0	97.7	17 00.0	+60.0	98.0	17
18	18 50.1	+59.5	95.7	18 44.0	+59.6	96.0	18 37.5	+59.8	96.4	18 30.7	+59.8	96.7	18 23.5	+59.9	97.0	18 16.0	+60.0	97.4	18 08.2	+60.0	97.7	18 00.0	+60.0	98.0	18
19	19 49.6	+59.5	95.5	19 43.6	+59.7	95.9	19 37.3	+59.7	96.3	19 30.5	+59.9	96.6	19 23.4	+60.0	97.0	19 16.0	+59.9	97.3	19 08.2	+60.0	97.7	19 00.0	+60.0	98.0	19
20	20 49.1	+59.5	95.4	20 43.3	+59.6	95.8	20 37.0	+59.8	96.2	20 30.4	+59.8	96.5	20 23.4	+59.9	96.9	20 15.9	+60.0	97.3	20 08.2	+60.0	97.6	20 00.0	+60.0	98.0	20
21	21 48.6	+59.5	95.3	21 42.9	+59.6	95.7	21 36.8	+59.7	96.1	21 30.2	+59.8	96.5	21 23.3	+59.9	96.8	21 15.9	+60.0	97.2	21 08.2	+59.9	97.6	21 00.0	+60.0	98.0	21
22	22 48.1	+59.5	95.1	22 42.5	+59.6	95.5	22 36.5	+59.7	96.0	22 30.0	+59.9	96.4	22 23.2	+59.9	96.8	22 15.9	+59.9	97.2	22 08.1	+60.0	97.6	22 00.0	+60.0	98.0	22
23	23 47.6	+59.4	95.0	23 42.1	+59.6	95.4	23 36.2	+59.8	95.9	23 29.9	+59.8	96.3	23 23.1	+59.9	96.7	23 15.8	+60.0	97.2	23 08.1	+60.0	97.6	23 00.0	+60.0	98.0	23
24	24 47.0	+59.5	94.8	24 41.7	+59.6	95.3	24 36.0	+59.7	95.8	24 29.7	+59.8	96.2	24 23.0	+59.9	96.7	24 15.8	+59.9	97.1	24 08.1	+60.0	97.6	24 00.0	+60.0	98.0	24
25	25 46.5	+59.5	94.7	25 41.3	+59.6	95.2	25 35.7	+59.7	95.7	25 29.5	+59.9	96.1	25 22.9	+59.9	96.6	25 15.7	+60.0	97.1	25 08.1	+60.0	97.5	25 00.0	+60.0	98.0	25
26	26 46.0	+59.4	94.5	26 40.9	+59.6	95.0	26 35.4	+59.7	95.5	26 29.4	+59.8	96.0	26 22.8	+59.9	96.5	26 15.7	+59.9	97.0	26 08.1	+60.0	97.5	26 00.0	+60.0	98.0	26
27	27 45.4	+59.4	94.4	27 40.5	+59.6	94.9	27 35.1	+59.7	95.4	27 29.2	+59.8	96.0	27 22.7	+59.9	96.5	27 15.6	+60.0	97.0	27 08.1	+60.0	97.5	27 00.0	+60.0	98.0	27
28	28 44.8	+59.5	94.2	28 40.1	+59.6	94.8	28 34.8	+59.7	95.3	28 29.0	+59.8	95.9	28 22.6	+59.9	96.4	28 15.6	+60.0	96.9	28 08.1	+60.0	97.5	28 00.0	+60.0	98.0	28
29	29 44.3	+59.4	94.1	29 39.7	+59.6	94.6	29 34.5	+59.7	95.2	29 28.8	+59.8	95.8	29 22.5	+59.9	96.3	29 15.6	+59.9	96.9	29 08.1	+60.0	97.4	29 00.0	+60.0	98.0	29
30	30 43.7	+59.4	93.9	30 39.3	+59.5	94.5	30 34.2	+59.7	95.1	30 28.6	+59.8	95.7	30 22.4	+59.9	96.3	30 15.5	+60.0	96.8	30 08.1	+59.9	97.4	30 00.0	+60.0	98.0	30
31	31 43.1	+59.4	93.8	31 38.8	+59.6	94.4	31 33.9	+59.7	95.0	31 28.4	+59.8	95.6	31 22.3	+59.8	96.2	31 15.5	+59.9	96.8	31 08.0	+60.0	97.4	31 00.0	+60.0	98.0	31
32	32 42.5	+59.3	93.6	32 38.4	+59.5	94.2	32 33.6	+59.7	94.9	32 28.2	+59.8	95.5	32 22.1	+59.9	96.1	32 15.4	+60.0	96.8	32 08.0	+60.0	97.4	32 00.0	+60.0	98.0	32
33	33 41.8	+59.4	93.4	33 37.9	+59.5	94.1	33 33.3	+59.7	94.7	33 28.0	+59.8	95.4	33 22.0	+59.9	96.1	33 15.4	+59.9	96.7	33 08.0	+60.0	97.4	33 00.0	+60.0	98.0	33
34	34 41.2	+59.3	93.2	34 37.4	+59.6	93.9	34 33.0	+59.6	94.6	34 27.8	+59.8	95.3	34 21.9	+59.9	96.0	34 15.3	+60.0	96.7	34 08.0	+60.0	97.3	34 00.0	+60.0	98.0	34
35	35 40.5	+59.4	93.1	35 37.0	+59.5	93.8	35 32.6	+59.7	94.5	35 27.6	+59.8	95.2	35 21.8	+59.9	95.9	35 15.3	+59.9	96.6	35 08.0	+60.0	97.3	35 00.0	+60.0	98.0	35
36	36 39.9	+59.3	92.9	36 36.5	+59.5	93.6	36 32.3	+59.7	94.3	36 27.4	+59.7	95.1	36 21.7	+59.8	95.8	36 15.2	+59.9	96.6	36 08.0	+60.0	97.3	36 00.0	+60.0	98.0	36
37	37 39.2	+59.3	92.7	37 36.0	+59.4	93.4	37 32.0	+59.6	94.2	37 27.1	+59.8	95.0	37 21.5	+59.9	95.7	37 15.1	+60.0	96.5	37 08.0	+59.9	97.3	37 00.0	+60.0	98.0	37
38	38 38.5	+59.2	92.5	38 35.4	+59.5	93.3	38 31.6	+59.6	94.1	38 26.9	+59.8	94.9	38 21.4	+59.9	95.7	38 15.1	+59.9	96.4	38 07.9	+60.0	97.2	38 00.0	+60.0	98.0	38
39	39 37.7	+59.3	92.3	39 34.9	+59.5	93.1	39 31.2	+59.6	93.9	39 26.7	+59.7	94.8	39 21.3	+59.8	95.6	39 15.0	+60.0	96.4	39 07.9	+60.0	97.2	39 00.0	+60.0	98.0	39
40	40 37.0	+59.2	92.1	40 34.4	+59.4	92.9	40 30.8	+59.6	93.8	40 26.4	+59.8	94.6	40 21.1	+59.9	95.5	40 15.0	+59.9	96.3	40 07.9	+60.0	97.2	40 00.0	+60.0	98.0	40
41	41 36.2	+59.2	91.9	41 33.8	+59.4	92.7	41 30.4	+59.6	93.6	41 26.2	+59.7	94.5	41 21.0	+59.9	95.4	41 14.9	+59.9	96.3	41 07.9	+60.0	97.1	41 00.0	+60.0	98.0	41
42	42 35.4	+59.2	91.6	42 33.2	+59.4	92.6	42 30.0	+59.6	93.5	42 25.9	+59.8	94.4	42 20.9	+59.8	95.3	42 14.8	+60.0	96.2	42 07.9	+60.0	97.1	42 00.0	+60.0	98.0	42
43	43 34.6	+59.1	91.4	43 32.6	+59.4	92.4	43 29.6	+59.6	93.3	43 25.7	+59.7	94.3	43 20.7	+59.8	95.2	43 14.8	+59.9	96.1	43 07.9	+60.0	97.1	43 00.0	+60.0	98.0	43
44	44 33.7	+59.1	91.2	44 32.0	+59.3	92.2	44 29.2	+59.5	93.1	44 25.4	+59.7	94.1	44 20.5	+59.9	95.1	44 14.7	+59.9	96.1	44 07.9	+59.9	97.0	44 00.0	+60.0	98.0	44
45	45 32.8	+59.1	90.9	45 31.3	+59.4	92.0	45 28.7	+59.6	93.0	45 25.1	+59.7	94.0	45 20.4	+59.8	95.0	45 14.6	+60.0	96.0	45 07.8	+60.0	97.0	45 00.0	+60.0	98.0	45
46	46 31.9	+59.1	90.7	46 30.7	+59.3	91.7	46 28.3	+59.5	92.8	46 24.8	+59.7	93.8	46 20.2	+59.9	94.9	46 14.6	+59.9	95.9	46 07.8	+60.0	97.0	46 00.0	+60.0	98.0	46
47	47 31.0	+59.0	90.4	47 30.0	+59.2	91.5	47 27.8	+59.5	92.6	47 24.5	+59.7	93.7	47 20.1	+59.8	94.8	47 14.5	+59.9	95.9	47 07.8	+60.0	96.9	47 00.0	+60.0	98.0	47
48	48 30.0	+59.0	90.2	48 29.2	+59.3	91.3	48 27.3	+59.5	92.4	48 24.2	+59.6	93.5	48 19.9	+59.8	94.7	48 14.4	+59.9	95.8	48 07.8	+60.0	96.9	48 00.0	+60.0	98.0	48
49	49 29.0	+58.9	89.9	49 28.5	+59.2	91.1	49 26.8	+59.4	92.2	49 23.8	+59.7	93.4	49 19.7	+59.8	94.5	49 14.3	+59.9	95.7	49 07.8	+59.9	96.9	49 00.0	+60.0	98.0	49
50	50 27.9	+58.9	89.6	50 27.7	+59.2	90.8	50 26.2	+59.5	92.0	50 23.5	+59.6	93.2	50 19.5	+59.8	94.4	50 14.2	+59.9	95.6	50 07.7	+60.0	96.8	50 00.0	+60.0	98.0	50
51	51 26.8	+58.8	89.3	51 26.9	+59.1	90.5	51 25.7	+59.4	91.8	51 23.1	+59.7	93.0	51 19.3	+59.8	94.3	51 14.1	+60.0	95.5	51 07.7	+60.0	96.8	51 00.0	+60.0	98.0	51
52	52 25.6	+58.8	89.0	52 26.0	+59.1	90.3	52 25.1	+59.4	91.6	52 22.8	+59.6	92.9	52 19.1	+59.8	94.2	52 14.1	+59.9	95.4	52 07.7	+60.0	96.7	52 00.0	+60.0	98.0	52
53	53 24.4	+58.7	88.6	53 25.1	+59.1	90.0	53 24.5	+59.3	91.3	53 22.4	+59.5	92.7	53 18.9	+59.7	94.0	53 14.0	+59.9	95.4	53 07.7	+59.9	96.7	53 00.0	+60.0	98.0	53
54	54 23.1	+58.7	88.3	54 24.2	+59.0	89.7	54 23.8	+59.3	91.1	54 21.9	+59.6	92.5	54 18.6	+59.8	93.9	54 13.9	+59.8	95.3	54 07.6	+60.0	96.6	54 00.0	+60.0	98.0	54
55	55 21.8	+58.6	87.9	55 23.2	+59.0	89.4	55 23.1	+59.3	90.8	55 21.5	+59.6	92.3	55 18.4	+59.7	93.7	55 13.7	+59.9	95.1	55 07.6	+60.0	96.6	55 00.0	+60.0	98.0	55
56	56 20.4	+58.5	87.5	56 22.2	+58.9	89.0	56 22.4	+59.3	90.5	56 21.1	+59.5	92.0	56 18.1	+59.8	93.5	56 13.6	+59.9	95.0	56 07.6	+60.0	96.5	56 00.0	+60.0	98.0	56
57	57 18.9	+58.5	87.1	57 21.1	+58.9	88.7	57 21.7	+59.2	90.3	57 20.6	+59.5	91.8	57 17.9	+59.7	93.4	57 13.5	+59.9	94.9	57 07.6	+59.9	96.5	57 00.0	+60.0	98.0	57
58	58 17.4	+58.3	86.7	58 20.0	+58.8	88.3	58 20.9	+59.1	90.0	58 20.1	+59.4	91.6	58 17.6	+59.7	93.2	58 13.4	+59.9	94.8	58 07.5	+60.0	96.4	58 00.0	+60.0	98.0	58
59	59 15.7	+58.3	86.3	59 18.8	+58.7	87.9	59 20.0	+59.1	89.6	59 19.5	+59.5	91.3	59 17.3	+59.7	93.0	59 13.3	+59.8	94.7	59 07.5	+60.0	96.3	59 00.0	+60.0	98.0	59
60	60 14.0	+58.1	85.8	60 17.5	+58.6	87.5	60 19.1	+59.1	89.3	60 19.0	+59.4	91.0	60 17.0	+59.6	92.8	60 13.1	+59.9	94.5	60 07.5	+59.9	96.3	60 00.0	+60.0	98.0	60
61	61 12.1	+58.0	85.3	61 16.1	+58.6	87.1	61 18.2	+59.0	88.9	61 18.4	+59.3	90.8	61 16.6	+59.7	92.6	61 13.0	+59.8	94.4	61 07.4	+60.0	96.2	61 00.0	+60.0	98.0	61
62	62 10.1	+57.9	84.7	62 14.7	+58.4	86.6	62 17.2	+58.9	88.5	62 17.7	+59.3	90.4	62 16.3	+59.6	92.3	62 12.8	+59.8	94.2	62 07.4	+59.9	96.1	62 00.0	+60.0	98.0	62
63	63 08.0	+57.8	84.2	63 13.1	+58.3	86.1	63 16.1	+58.8	88.1	63 17.0	+59.3	90.1	63 15.9	+59.6	92.1	63 12.6	+59.9	94.1	63 07.3	+60.0	96.0	63 00.0	+60.0	98.0	63
64	64 05.8	+57.6	83.6	64 11.4	+58.3	85.6	64 14.9	+58.8	87.7	64 16.3	+59.2	89.8	64 15.5	+59.5	91.8	64 12.5	+59.8	93.9	64 07.3	+59.9	96.0	64 00.0	+60.0	98.0	64
65	65 03.4	+57.4	82.9	65 09.7	+58.0	85.1	65 13.7	+58.7	87.2	65 15.5	+59.1	89.4	65 15.0	+59.5	91.5	65 12.3	+59.7	93.7	65 07.2	+60.0	95.9	65 00.0	+60.0	98.0	65
66	66 00.8	+57.1	82.2	66 07.7	+58.0	84.4	66 12.4	+58.5	86.7	66 14.6	+59.1	89.0	66 14.5	+59.5	91.2	66 12.0	+59.8	93.5	66 07.2	+59.9	95.8	66 00.0	+60.0	98.0	66
67	66 57.9	+57.0	81.4	67 05.7	+57.7	83.8	67 10.9	+58.5	86.1	67 13.7	+59.0	88.5	67 14.0	+59.4	90.9	67 11.8	+59.8	93.3	67 07.1	+60.0	95.7	67 00.0	+60.0	98.0	67
68	67 54.9	+56.7	80.6	68 03.4	+57.6	83.1	68 09.4	+58.2	85.5	68 12.7	+58.9	88.0	68 13.4	+59.4	90.5	68 11.6	+59.7	93.0	68 07.1	+59.9	95.5	68 00.0	+60.0	98.0	68
69	68 51.6	+56.4	79.7	69 01.0	+57.3	82.3	69 07.6	+58.2	84.9	69 11.6	+58.8	87.5	69 12.8	+59.4	90.2	69 11.3	+59.7	92.8	69 07.0	+59.9	95.4	69 00.0	+60.0	98.0	69
70	69 48.0	+56.0	78.8	69 58.3	+57.0	81.5	70 05.8	+57.9	84.2	70 10.4	+58.7	86.9	70 12.2	+59.2	89.7	70 11.0	+59.7	92.5	70 06.9	+59.9	95.3	70 00.0	+60.0	98.0	70
71	70 44.0	+55.6	77.7	70 55.3	+56.8	80.5	71 03.7	+57.7	83.4	71 09.1	+58.5	86.3	71 11.4	+59.2	89.2	71 10.7	+59.6	92.2	71 06.8	+60.0	95.1	71 00.0	+60.0	98.0	71
72	71 39.6	+55.2	76.5	71 52.1	+56.4	79.5	72 01.4	+57.5	82.5	72 07.6	+58.4	85.6	72 10.6	+59.1	88.7	72 10.3	+59.6	91.8	72 06.8	+59.9	94.9	72 00.0	+60.0	98.0	72
73	72 34.8	+54.6	75.3	72 48.5	+56.0	78.4	72 58.9	+57.2	81.6	73 06.0	+58.2	84.8	73 09.7	+58.9	88.1	73 09.9	+59.5	91.4	73 06.7	+59.8	94.7	73 00.0	+60.0	98.0	73
74	73 29.4	+54.0	73.8	73 44.5	+55.4	77.1	73 56.1	+56.8	80.5	74 04.2	+57.9	84.0	74 08.6	+58.9	87.5	74 09.4	+59.5	91.0	74 06.5	+59.9	94.5	74 00.0	+60.0	98.0	74
75	74 23.4	+53.2	72.3	74 39.9	+54.9	75.7	74 52.9	+56.4	79.3	75 02.1	+57.7	83.0	75 07.5	+58.7	86.7	75 08.9	+59.4	90.5	75 06.4	+59.9	94.3	75 00.0	+60.0	98.0	75
76	75 16.6	+52.4	70.5	75 34.8	+54.2	74.2	75 49.3	+55.9	78.0	75 59.8	+57.3	81.9	76 06.2	+58.4	85.9	76 08.3	+59.4	89.9	76 06.3	+59.8	94.0	76 00.0	+60.0	98.0	76
77	76 09.0	+51.2	68.5	76 29.0	+53.4	72.4	76 45.2	+55.2	76.4	76 57.1	+56.9	80.6	77 04.6	+58.3	84.9	77 07.7	+59.2	89.3	77 06.1	+59.8	93.7	77 00.0	+60.0	98.0	77
78	77 00.2	+49.9	66.3	77 22.4	+52.3	70.4	77 40.4	+54.5	74.7	77 54.0	+56.4	79.2	78 02.9	+57.9	83.8	78 06.9	+59.1	88.5	78 05.9	+59.8	93.3	78 00.0	+60.0	98.0	78
79	77 50.1	+48.4	63.7	78 14.7	+50.9	68.0	78 34.9	+53.4	72.6	78 50.4	+55.6	77.5	79 00.8	+57.5	82.5	79 06.0	+58.8	87.7	79 05.7	+59.7	92.9	79 00.0	+60.0	98.0	79
80	78 38.5	*+46.3*•	60.8	79 05.6	+49.4	65.4	79 28.3	+52.2	70.2	79 46.0	+54.8	75.5	79 58.3	+57.0	80.9	80 04.8	+58.7	86.6	80 05.4	+59.7	92.3	80 00.0	+60.0	98.0	80
81	79 24.8	*+44.0*•	57.5	79 55.0	*+47.3*•	62.2	80 20.5	+50.6	67.4	80 40.8	+53.7	73.1	80 55.3	+56.3	79.1	81 03.5	+58.3	85.3	81 05.1	+59.5	91.7	81 00.0	+60.0	98.0	81
82	80 08.8	*+40.9*•	53.6	80 42.3	*+44.6*•	58.6	81 11.1	*+48.4*•	64.1	81 34.5	+52.0	70.1	81 51.6	+55.3	76.7	82 01.8	+57.8	83.7	82 04.6	+59.5	90.9	82 00.0	+60.0	98.0	82
83	80 49.7	*+37.2*•	49.2	81 26.9	*+41.2*•	54.2	81 59.5	*+45.5*•	60.0	82 26.5	*+49.8*•	66.6	82 46.9	+53.8	73.8	82 59.6	+57.2	81.7	83 04.1	+59.3	89.8	83 00.0	+60.0	98.0	83
84	81 26.9	*+32.6*•	44.1	82 08.1	*+36.9*•	49.2	82 45.0	*+41.6*•	55.1	83 16.3	*+46.7*•	62.1	83 40.7	*+51.8*•	70.1	83 56.8	+56.0	79.0	84 03.4	+59.0	88.4	84 00.0	+60.0	98.0	84
85	81 59.5	*+27.0*•	38.3	82 45.0	*+31.3*•	43.2	83 26.6	*+36.4*•	49.1	84 03.0	*+42.2*•	56.4	84 32.5	*+48.4*•	65.1	84 52.8	*+54.3*•	75.3	85 02.4	+58.5	86.5	85 00.0	+60.0	98.0	85
86	82 26.5	*+20.4*•	31.7	83 16.3	*+24.4*•	36.1	84 03.0	*+29.5*•	41.8	84 45.2	*+35.7*•	49.1	85 20.9	*+43.0*•	58.4	85 47.1	*+51.0*•	70.0	86 00.9	+57.5	83.6	86 00.0	+60.0	98.0	86
87	82 46.9	*+12.7*•	24.4	83 40.7	*+16.1*•	28.1	84 32.5	*+20.3*•	33.0	85 20.9	*+26.2*•	39.7	86 03.9	*+34.2*•	49.0	86 38.1	*+44.5*•	62.0	86 58.4	*+55.1*•	78.9	87 00.0	+60.0	98.0	87
88	82 59.6	*+4.5*•	16.5	83 56.8	*+6.6*•	19.1	84 52.8	*+9.6*•	22.8	85 47.1	*+13.8*•	28.0	86 38.1	*+20.3*•	36.1	87 22.6	*+30.9*•	49.0	87 53.5	*+47.8*•	70.0	88 00.0	+60.0	98.0	88
89	83 04.1	*−4.1*•	8.2	84 03.4	*−3.4*•	9.6	85 02.4	*−2.4*•	11.5	86 00.9	*−0.9*•	14.4	86 58.4	*+1.6*•	19.1	87 53.5	*+6.5*•	28.0	88 41.3	*+18.7*•	49.0	89 00.0	+60.0	98.0	89
90	83 00.0	*−12.4*•	0.0	84 00.0	*−13.1*•	0.0	85 00.0	*−14.0*•	0.0	86 00.0	*−15.3*•	0.0	87 00.0	*−17.5*•	0.0	88 00.0	*−21.4*•	0.0	89 00.0	*−30.6*•	0.0	90 00.0	−60.0	49.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 82°, 278°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 58.3	–59.6	97.9	0 50.0	–59.7	98.0	0 41.7	–59.8	98.0	0 33.4	–59.9	98.0	0 25.0	–59.9	98.0	0 16.7	–60.0	98.0	0 08.3	–59.9	98.0	0 00.0	+60.0	82.0	**0**
1	0 01.3	+59.5	81.9	0 09.7	+59.6	81.9	0 18.1	+59.8	81.9	0 26.5	+59.8	82.0	0 34.9	+59.9	82.0	0 43.3	+59.9	82.0	0 51.6	+60.0	82.0	1 00.0	+60.0	82.0	**1**
2	1 00.8	+59.6	81.8	1 09.3	+59.7	81.8	1 17.9	+59.7	81.9	1 26.3	+59.9	81.9	1 34.8	+59.9	81.9	1 43.2	+60.0	81.9	1 51.6	+60.0	82.0	2 00.0	+60.0	82.0	**2**
3	2 00.4	+59.5	81.7	2 09.0	+59.7	81.7	2 17.6	+59.8	81.8	2 26.2	+59.9	81.8	2 34.7	+59.9	81.9	2 43.2	+60.0	81.9	2 51.6	+60.0	81.9	3 00.0	+60.0	82.0	**3**
4	2 59.9	+59.6	81.6	3 08.7	+59.7	81.6	3 17.4	+59.8	81.7	3 26.1	+59.8	81.7	3 34.6	+60.0	81.8	3 43.2	+59.9	81.9	3 51.6	+60.0	81.9	4 00.0	+60.0	82.0	**4**
5	3 59.5	+59.6	81.5	4 08.4	+59.6	81.5	4 17.2	+59.8	81.6	4 25.9	+59.9	81.7	4 34.6	+59.9	81.8	4 43.1	+60.0	81.8	4 51.6	+60.0	81.9	5 00.0	+60.0	82.0	**5**
6	4 59.1	+59.5	81.3	5 08.0	+59.7	81.4	5 17.0	+59.7	81.5	5 25.8	+59.8	81.6	5 34.5	+59.9	81.7	5 43.1	+60.0	81.8	5 51.6	+60.0	81.9	6 00.0	+60.0	82.0	**6**
7	5 58.6	+59.6	81.2	6 07.7	+59.7	81.3	6 16.7	+59.8	81.4	6 25.6	+59.9	81.5	6 34.4	+59.9	81.6	6 43.1	+59.9	81.8	6 51.6	+60.0	81.9	7 00.0	+60.0	82.0	**7**
8	6 58.2	+59.5	81.1	7 07.4	+59.7	81.2	7 16.5	+59.8	81.3	7 25.5	+59.8	81.5	7 34.3	+59.9	81.6	7 43.0	+60.0	81.7	7 51.6	+60.0	81.9	8 00.0	+60.0	82.0	**8**
9	7 57.7	+59.6	81.0	8 07.1	+59.6	81.1	8 16.3	+59.7	81.2	8 25.3	+59.9	81.4	8 34.2	+59.9	81.5	8 43.0	+59.9	81.7	8 51.6	+60.0	81.8	9 00.0	+60.0	82.0	**9**
10	8 57.3	+59.5	80.8	9 06.7	+59.7	81.0	9 16.0	+59.8	81.2	9 25.2	+59.8	81.3	9 34.1	+60.0	81.5	9 42.9	+60.0	81.7	9 51.6	+60.0	81.8	10 00.0	+60.0	82.0	**10**
11	9 56.8	+59.6	80.7	10 06.4	+59.7	80.9	10 15.8	+59.8	81.1	10 25.0	+59.9	81.3	10 34.1	+59.9	81.4	10 42.9	+60.0	81.6	10 51.6	+59.9	81.8	11 00.0	+60.0	82.0	**11**
12	10 56.4	+59.5	80.6	11 06.1	+59.6	80.8	11 15.6	+59.7	81.0	11 24.9	+59.8	81.2	11 34.0	+59.9	81.4	11 42.9	+59.9	81.6	11 51.5	+60.0	81.8	12 00.0	+60.0	82.0	**12**
13	11 55.9	+59.6	80.5	12 05.7	+59.7	80.7	12 15.3	+59.8	80.9	12 24.7	+59.9	81.1	12 33.9	+59.9	81.3	12 42.8	+60.0	81.5	12 51.5	+60.0	81.8	13 00.0	+60.0	82.0	**13**
14	12 55.5	+59.5	80.3	13 05.4	+59.7	80.6	13 15.1	+59.8	80.8	13 24.6	+59.8	81.0	13 33.8	+59.9	81.3	13 42.8	+60.0	81.5	13 51.5	+60.0	81.8	14 00.0	+60.0	82.0	**14**
15	13 55.0	+59.5	80.2	14 05.1	+59.6	80.5	14 14.9	+59.7	80.7	14 24.4	+59.9	81.0	14 33.7	+59.9	81.2	14 42.8	+59.9	81.5	14 51.5	+60.0	81.7	15 00.0	+60.0	82.0	**15**
16	14 54.5	+59.5	80.1	15 04.7	+59.7	80.3	15 14.6	+59.8	80.6	15 24.3	+59.8	80.9	15 33.6	+60.0	81.2	15 42.7	+60.0	81.4	15 51.5	+60.0	81.7	16 00.0	+60.0	82.0	**16**
17	15 54.0	+59.6	80.0	16 04.4	+59.6	80.2	16 14.4	+59.7	80.5	16 24.1	+59.9	80.8	16 33.6	+59.9	81.1	16 42.7	+59.9	81.4	16 51.5	+60.0	81.7	17 00.0	+60.0	82.0	**17**
18	16 53.6	+59.5	79.8	17 04.0	+59.7	80.1	17 14.1	+59.8	80.4	17 24.0	+59.8	80.7	17 33.5	+59.9	81.0	17 42.6	+60.0	81.4	17 51.5	+60.0	81.7	18 00.0	+60.0	82.0	**18**
19	17 53.1	+59.5	79.7	18 03.7	+59.6	80.0	18 13.9	+59.8	80.3	18 23.8	+59.8	80.7	18 33.4	+59.9	81.0	18 42.6	+60.0	81.3	18 51.5	+60.0	81.7	19 00.0	+60.0	82.0	**19**
20	18 52.6	+59.5	79.6	19 03.3	+59.6	79.9	19 13.7	+59.7	80.2	19 23.6	+59.9	80.6	19 33.3	+59.9	80.9	19 42.6	+59.9	81.3	19 51.5	+60.0	81.6	20 00.0	+60.0	82.0	**20**
21	19 52.1	+59.5	79.4	20 02.9	+59.7	79.8	20 13.4	+59.7	80.1	20 23.5	+59.8	80.5	20 33.2	+59.9	80.9	20 42.5	+60.0	81.2	20 51.5	+59.9	81.6	21 00.0	+60.0	82.0	**21**
22	20 51.6	+59.5	79.3	21 02.6	+59.6	79.7	21 13.1	+59.8	80.0	21 23.3	+59.9	80.4	21 33.1	+59.9	80.8	21 42.5	+59.9	81.2	21 51.4	+60.0	81.6	22 00.0	+60.0	82.0	**22**
23	21 51.1	+59.5	79.1	22 02.2	+59.6	79.5	22 12.9	+59.7	79.9	22 23.2	+59.8	80.3	22 33.0	+59.9	80.8	22 42.4	+60.0	81.2	22 51.4	+60.0	81.6	23 00.0	+60.0	82.0	**23**
24	22 50.6	+59.5	79.0	23 01.8	+59.6	79.4	23 12.6	+59.8	79.8	23 23.0	+59.8	80.3	23 32.9	+59.9	80.7	23 42.4	+59.9	81.1	23 51.4	+60.0	81.6	24 00.0	+60.0	82.0	**24**
25	23 50.1	+59.4	78.9	24 01.4	+59.6	79.3	24 12.4	+59.7	79.7	24 22.8	+59.8	80.2	24 32.8	+59.9	80.6	24 42.3	+60.0	81.1	24 51.4	+60.0	81.5	25 00.0	+60.0	82.0	**25**
26	24 49.5	+59.5	78.7	25 01.0	+59.7	79.2	25 12.1	+59.7	79.6	25 22.6	+59.9	80.1	25 32.7	+59.9	80.6	25 42.3	+60.0	81.0	25 51.4	+60.0	81.5	26 00.0	+60.0	82.0	**26**
27	25 49.0	+59.5	78.6	26 00.7	+59.5	79.0	26 11.8	+59.7	79.5	26 22.5	+59.8	80.0	26 32.6	+59.9	80.5	26 42.3	+59.9	81.0	26 51.4	+60.0	81.5	27 00.0	+60.0	82.0	**27**
28	26 48.5	+59.4	78.4	27 00.2	+59.6	78.9	27 11.5	+59.7	79.4	27 22.3	+59.8	79.9	27 32.5	+59.9	80.4	27 42.2	+60.0	81.0	27 51.4	+60.0	81.5	28 00.0	+60.0	82.0	**28**
29	27 47.9	+59.4	78.3	27 59.8	+59.6	78.8	28 11.2	+59.7	79.3	28 22.1	+59.8	79.8	28 32.4	+59.9	80.4	28 42.2	+59.9	80.9	28 51.4	+60.0	81.5	29 00.0	+60.0	82.0	**29**
30	28 47.3	+59.5	78.1	28 59.4	+59.6	78.7	29 10.9	+59.8	79.2	29 21.9	+59.8	79.7	29 32.3	+59.9	80.3	29 42.1	+60.0	80.9	29 51.4	+59.9	81.4	30 00.0	+60.0	82.0	**30**
31	29 46.8	+59.4	78.0	29 59.0	+59.6	78.5	30 10.7	+59.6	79.1	30 21.7	+59.8	79.7	30 32.2	+59.9	80.2	30 42.1	+59.9	80.8	30 51.3	+60.0	81.4	31 00.0	+60.0	82.0	**31**
32	30 46.2	+59.4	77.8	30 58.6	+59.5	78.4	31 10.3	+59.7	79.0	31 21.5	+59.8	79.6	31 32.1	+59.9	80.2	31 42.0	+60.0	80.8	31 51.3	+60.0	81.4	32 00.0	+60.0	82.0	**32**
33	31 45.6	+59.4	77.6	31 58.1	+59.6	78.2	32 10.0	+59.7	78.8	32 21.3	+59.8	79.5	32 32.0	+59.9	80.1	32 42.0	+59.9	80.7	32 51.3	+60.0	81.4	33 00.0	+60.0	82.0	**33**
34	32 45.0	+59.3	77.5	32 57.7	+59.5	78.1	33 09.7	+59.7	78.7	33 21.1	+59.8	79.4	33 31.9	+59.8	80.0	33 41.9	+60.0	80.7	33 51.3	+60.0	81.3	34 00.0	+60.0	82.0	**34**
35	33 44.3	+59.4	77.3	33 57.2	+59.5	77.9	34 09.4	+59.7	78.6	34 20.9	+59.8	79.3	34 31.7	+59.9	79.9	34 41.9	+59.9	80.6	34 51.3	+60.0	81.3	35 00.0	+60.0	82.0	**35**
36	34 43.7	+59.3	77.1	34 56.7	+59.5	77.8	35 09.1	+59.6	78.5	35 20.7	+59.8	79.2	35 31.6	+59.9	79.9	35 41.8	+60.0	80.6	35 51.3	+60.0	81.3	36 00.0	+60.0	82.0	**36**
37	35 43.0	+59.4	76.9	35 56.2	+59.5	77.6	36 08.7	+59.7	78.3	36 20.5	+59.8	79.1	36 31.5	+59.9	79.8	36 41.8	+59.9	80.5	36 51.3	+59.9	81.3	37 00.0	+60.0	82.0	**37**
38	36 42.4	+59.3	76.7	36 55.7	+59.5	77.5	37 08.4	+59.6	78.2	37 20.3	+59.7	79.0	37 31.4	+59.8	79.7	37 41.7	+59.9	80.5	37 51.2	+60.0	81.2	38 00.0	+60.0	82.0	**38**
39	37 41.7	+59.2	76.6	37 55.2	+59.5	77.3	38 08.0	+59.7	78.1	38 20.0	+59.8	78.8	38 31.2	+59.9	79.6	38 41.6	+60.0	80.4	38 51.2	+60.0	81.2	39 00.0	+60.0	82.0	**39**
40	38 40.9	+59.3	76.4	38 54.7	+59.5	77.1	39 07.7	+59.6	77.9	39 19.8	+59.8	78.7	39 31.1	+59.9	79.5	39 41.6	+59.9	80.4	39 51.2	+60.0	81.2	40 00.0	+60.0	82.0	**40**
41	39 40.2	+59.3	76.2	39 54.2	+59.4	77.0	40 07.3	+59.6	77.8	40 19.6	+59.7	78.6	40 31.0	+59.8	79.4	40 41.5	+60.0	80.3	40 51.2	+60.0	81.1	41 00.0	+60.0	82.0	**41**
42	40 39.5	+59.2	75.9	40 53.6	+59.4	76.8	41 06.9	+59.6	77.6	41 19.3	+59.7	78.5	41 30.8	+59.9	79.4	41 41.5	+59.9	80.2	41 51.2	+60.0	81.1	42 00.0	+60.0	82.0	**42**
43	41 38.7	+59.2	75.7	41 53.0	+59.4	76.6	42 06.5	+59.6	77.5	42 19.0	+59.8	78.4	42 30.7	+59.8	79.3	42 41.4	+59.9	80.2	42 51.2	+60.0	81.1	43 00.0	+60.0	82.0	**43**
44	42 37.9	+59.2	75.5	42 52.4	+59.4	76.4	43 06.1	+59.5	77.3	43 18.8	+59.7	78.2	43 30.5	+59.9	79.2	43 41.3	+60.0	80.1	43 51.2	+59.9	81.0	44 00.0	+60.0	82.0	**44**
45	43 37.1	+59.1	75.3	43 51.8	+59.4	76.2	44 05.6	+59.6	77.2	44 18.5	+59.7	78.1	44 30.4	+59.8	79.1	44 41.3	+59.9	80.0	44 51.1	+60.0	81.0	45 00.0	+60.0	82.0	**45**
46	44 36.2	+59.1	75.1	44 51.2	+59.3	76.0	45 05.2	+59.5	77.0	45 18.2	+59.7	78.0	45 30.2	+59.8	79.0	45 41.2	+59.9	80.0	45 51.1	+60.0	81.0	46 00.0	+60.0	82.0	**46**
47	45 35.3	+59.1	74.8	45 50.5	+59.4	75.8	46 04.7	+59.6	76.8	46 17.9	+59.7	77.8	46 30.0	+59.9	78.9	46 41.1	+59.9	79.9	46 51.1	+60.0	80.9	47 00.0	+60.0	82.0	**47**
48	46 34.4	+59.1	74.6	46 49.9	+59.3	75.6	47 04.3	+59.5	76.6	47 17.6	+59.7	77.7	47 29.9	+59.8	78.7	47 41.0	+60.0	79.8	47 51.1	+60.0	80.9	48 00.0	+60.0	82.0	**48**
49	47 33.5	+59.0	74.3	47 49.2	+59.2	75.4	48 03.8	+59.5	76.4	48 17.3	+59.7	77.5	48 29.7	+59.8	78.6	48 41.0	+59.9	79.7	48 51.1	+59.9	80.9	49 00.0	+60.0	82.0	**49**
50	48 32.5	+58.9	74.0	48 48.4	+59.3	75.1	49 03.3	+59.4	76.2	49 17.0	+59.6	77.4	49 29.5	+59.8	78.5	49 40.9	+59.9	79.7	49 51.0	+60.0	80.8	50 00.0	+60.0	82.0	**50**
51	49 31.4	+59.0	73.8	49 47.7	+59.2	74.9	50 02.7	+59.5	76.0	50 16.6	+59.7	77.2	50 29.3	+59.8	78.4	50 40.8	+59.9	79.6	50 51.0	+60.0	80.8	51 00.0	+60.0	82.0	**51**
52	50 30.4	+58.9	73.5	50 46.9	+59.1	74.6	51 02.2	+59.4	75.8	51 16.3	+59.6	77.0	51 29.1	+59.8	78.3	51 40.7	+59.9	79.5	51 51.0	+60.0	80.7	52 00.0	+60.0	82.0	**52**
53	51 29.3	+58.8	73.2	51 46.0	+59.2	74.4	52 01.6	+59.4	75.6	52 15.9	+59.6	76.8	52 28.9	+59.8	78.1	52 40.6	+59.9	79.4	52 51.0	+59.9	80.7	53 00.0	+60.0	82.0	**53**
54	52 28.1	+58.8	72.8	52 45.2	+59.1	74.1	53 01.0	+59.4	75.4	53 15.5	+59.6	76.7	53 28.7	+59.7	78.0	53 40.5	+59.9	79.3	53 50.9	+60.0	80.6	54 00.0	+60.0	82.0	**54**
55	53 26.9	+58.7	72.5	53 44.3	+59.0	73.8	54 00.4	+59.3	75.1	54 15.1	+59.6	76.5	54 28.4	+59.8	77.8	54 40.4	+59.9	79.2	54 50.9	+60.0	80.6	55 00.0	+60.0	82.0	**55**
56	54 25.6	+58.7	72.2	54 43.3	+59.0	73.5	54 59.7	+59.3	74.9	55 14.7	+59.5	76.3	55 28.2	+59.7	77.7	55 40.3	+59.9	79.1	55 50.9	+60.0	80.5	56 00.0	+60.0	82.0	**56**
57	55 24.3	+58.6	71.8	55 42.3	+59.0	73.2	55 59.0	+59.3	74.6	56 14.2	+59.5	76.0	56 27.9	+59.8	77.5	56 40.2	+59.8	79.0	56 50.9	+59.9	80.5	57 00.0	+60.0	82.0	**57**
58	56 22.9	+58.5	71.4	56 41.3	+58.9	72.8	56 58.3	+59.2	74.3	57 13.7	+59.5	75.8	57 27.7	+59.7	77.3	57 40.0	+59.9	78.9	57 50.8	+60.0	80.4	58 00.0	+60.0	82.0	**58**
59	57 21.4	+58.4	71.0	57 40.2	+58.8	72.5	57 57.5	+59.2	74.0	58 13.2	+59.5	75.6	58 27.4	+59.7	77.1	58 39.9	+59.9	78.7	58 50.8	+60.0	80.4	59 00.0	+60.0	82.0	**59**
60	58 19.8	+58.4	70.6	58 39.0	+58.8	72.1	58 56.7	+59.1	73.7	59 12.7	+59.4	75.3	59 27.1	+59.7	76.9	59 39.8	+59.8	78.6	59 50.8	+59.9	80.3	60 00.0	+60.0	82.0	**60**
61	59 18.2	+58.2	70.1	59 37.8	+58.7	71.7	59 55.8	+59.1	73.4	60 12.1	+59.4	75.0	60 26.8	+59.6	76.7	60 39.6	+59.9	78.5	60 50.7	+60.0	80.2	61 00.0	+60.0	82.0	**61**
62	60 16.4	+58.2	69.6	60 36.5	+58.6	71.3	60 54.9	+59.0	73.0	61 11.5	+59.4	74.7	61 26.4	+59.6	76.5	61 39.5	+59.8	78.3	61 50.7	+59.9	80.1	62 00.0	+60.0	82.0	**62**
63	61 14.6	+58.0	69.1	61 35.1	+58.5	70.9	61 53.9	+58.9	72.6	62 10.9	+59.3	74.4	62 26.0	+59.7	76.3	62 39.3	+59.8	78.2	62 50.6	+60.0	80.1	63 00.0	+60.0	82.0	**63**
64	62 12.6	+57.9	68.6	62 33.6	+58.4	70.4	62 52.8	+58.9	72.2	63 10.2	+59.3	74.1	63 25.7	+59.5	76.0	63 39.1	+59.8	78.0	63 50.6	+60.0	80.0	64 00.0	+60.0	82.0	**64**
65	63 10.5	+57.7	68.0	63 32.0	+58.3	69.9	63 51.7	+58.8	71.8	64 09.5	+59.2	73.8	64 25.2	+59.6	75.8	64 38.9	+59.8	77.8	64 50.6	+59.9	79.9	65 00.0	+60.0	82.0	**65**
66	64 08.2	+57.6	67.4	64 30.3	+58.2	69.4	64 50.5	+58.7	71.3	65 08.7	+59.1	73.4	65 24.8	+59.5	75.5	65 38.7	+59.8	77.6	65 50.5	+59.9	79.8	66 00.0	+60.0	82.0	**66**
67	65 05.8	+57.4	66.8	65 28.5	+58.0	68.8	65 49.2	+58.6	70.8	66 07.8	+59.1	73.0	66 24.3	+59.5	75.2	66 38.5	+59.8	77.4	66 50.4	+60.0	79.7	67 00.0	+60.0	82.0	**67**
68	66 03.2	+57.1	66.1	66 26.5	+57.9	68.1	66 47.8	+58.5	70.3	67 06.9	+59.0	72.5	67 23.8	+59.4	74.8	67 38.3	+59.7	77.2	67 50.4	+59.9	79.6	68 00.0	+60.0	82.0	**68**
69	67 00.3	+57.0	65.3	67 24.4	+57.7	67.5	67 46.3	+58.3	69.7	68 05.9	+58.9	72.1	68 23.2	+59.4	74.5	68 38.0	+59.7	76.9	68 50.3	+59.9	79.4	69 00.0	+60.0	82.0	**69**
70	67 57.3	+56.7	64.5	68 22.1	+57.4	66.7	68 44.6	+58.2	69.1	69 04.8	+58.8	71.5	69 22.6	+59.3	74.1	69 37.7	+59.7	76.7	69 50.2	+60.0	79.3	70 00.0	+60.0	82.0	**70**
71	68 54.0	+56.3	63.6	69 19.5	+57.3	65.9	69 42.8	+58.0	68.4	70 03.6	+58.7	71.0	70 21.9	+59.2	73.6	70 37.4	+59.7	76.4	70 50.2	+59.9	79.1	71 00.0	+60.0	82.0	**71**
72	69 50.3	+56.0	62.6	70 16.8	+56.9	65.1	70 40.8	+57.9	67.7	71 02.3	+58.6	70.4	71 21.1	+59.2	73.1	71 37.1	+59.6	76.0	71 50.1	+59.9	79.0	72 00.0	+60.0	82.0	**72**
73	70 46.3	+55.7	61.5	71 13.7	+56.7	64.1	71 38.7	+57.5	66.8	72 00.9	+58.4	69.7	72 20.3	+59.1	72.6	72 36.7	+59.6	75.7	72 50.0	+59.9	78.8	73 00.0	+60.0	82.0	**73**
74	71 42.0	+55.1	60.4	72 10.4	+56.3	63.1	72 36.2	+57.3	65.9	72 59.3	+58.2	68.9	73 19.4	+58.9	72.0	73 36.3	+59.5	75.2	73 49.9	+59.9	78.6	74 00.0	+60.0	82.0	**74**
75	72 37.1	+54.6	59.1	73 06.7	+55.8	61.9	73 33.5	+57.0	64.9	73 57.5	+58.0	68.0	74 18.3	+58.8	71.3	74 35.8	+59.5	74.8	74 49.8	+59.8	78.3	75 00.0	+60.0	82.0	**75**
76	73 31.7	+54.0	57.7	74 02.5	+55.3	60.6	74 30.5	+56.6	63.8	74 55.5	+57.7	67.1	75 17.1	+58.7	70.6	75 35.3	+59.3	74.3	75 49.6	+59.9	78.1	76 00.0	+60.0	82.0	**76**
77	74 25.7	+53.1	56.1	74 57.8	+54.7	59.2	75 27.1	+56.1	62.5	75 53.2	+57.3	66.0	76 15.8	+58.4	69.7	76 34.6	+59.3	73.7	76 49.5	+59.8	77.8	77 00.0	+60.0	82.0	**77**
78	75 18.8	+52.3	54.3	75 52.5	+53.9	57.5	76 23.2	+55.5	61.0	76 50.5	+57.0	64.8	77 14.2	+58.2	68.7	77 33.9	+59.2	73.0	77 49.3	+59.7	77.4	78 00.0	+60.0	82.0	**78**
79	76 11.1	+51.2	52.3	76 46.4	+53.0	55.7	77 18.7	+54.8	59.3	77 47.5	+56.4	63.3	78 12.4	+57.9	67.6	78 33.1	+59.0	72.2	78 49.0	+59.8	77.0	79 00.0	+60.0	82.0	**79**
80	77 02.3	+49.9	50.1	77 39.4	+51.9	53.6	78 13.5	+53.8	57.4	78 43.9	+55.8	61.6	79 10.3	+57.4	66.2	79 32.1	+58.8	71.2	79 48.8	+59.7	76.5	80 00.0	+60.0	82.0	**80**
81	77 52.2	+48.3	47.5	78 31.3	+50.5	51.1	79 07.3	+52.8	55.2	79 39.7	+54.9	59.7	80 07.7	+56.9	64.6	80 30.9	+58.5	70.1	80 48.5	+59.6	75.9	81 00.0	+60.0	82.0	**81**
82	78 40.5	+46.2 •	44.6	79 21.8	+48.7 •	48.3	80 00.1	+51.2	52.5	80 34.6	+53.8	57.3	81 04.6	+56.1	62.7	81 29.4	+58.1	68.6	81 48.1	+59.5	75.1	82 00.0	+60.0	82.0	**82**
83	79 26.7	+43.8 •	41.2	80 10.5	+46.5 •	45.0	80 51.3	+49.4 •	49.4	81 28.4	+52.2	54.5	82 00.7	+55.1	60.3	82 27.5	+57.6	66.9	82 47.6	+59.3	74.1	83 00.0	+60.0	82.0	**83**
84	80 10.5	+40.8 •	37.3	80 57.0	+43.7 •	41.2	81 40.7	+46.7 •	45.7	82 20.6	+50.1 •	51.0	82 55.8	+53.6	57.3	83 25.1	+56.7	64.6	83 46.9	+59.1	72.9	84 00.0	+60.0	82.0	**84**
85	80 51.3	+37.1 •	32.9	81 40.7	+39.9 •	36.6	82 27.4	+43.3 •	41.1	83 10.7	+47.2 •	46.6	83 49.4	+51.3 •	53.3	84 21.8	+55.4	61.5	84 46.0	+58.7	71.1	85 00.0	+60.0	82.0	**85**
86	81 28.4	+32.3 •	27.8	82 20.6	+35.2 •	31.2	83 10.7	+38.7 •	35.6	83 57.9	+42.8 •	41.1	84 40.7	+47.7 •	48.1	85 17.2	+53.0 •	57.2	85 44.7	+57.8	68.6	86 00.0	+60.0	82.0	**86**
87	82 00.7	+26.8 •	21.9	82 55.8	+29.3 •	24.9	83 49.4	+32.4 •	28.8	84 40.7	+36.5 •	34.0	85 28.4	+41.8 •	41.0	86 10.2	+48.7 •	50.9	86 42.5	+56.1 •	64.5	87 00.0	+60.0	82.0	**87**
88	82 27.5	+20.1 •	15.3	83 25.1	+21.8 •	17.5	84 21.8	+24.2 •	20.6	85 17.2	+27.5 •	24.9	86 10.2	+32.3 •	31.2	86 58.9	+39.7 •	41.0	87 38.6	+50.8 •	57.2	88 00.0	+60.0	82.0	**88**
89	82 47.6	+12.4 •	7.9	83 46.9	+13.1 •	9.2	84 46.0	+14.0 •	10.9	85 44.7	+15.3 •	13.5	86 42.5	+17.5 •	17.5	87 38.6	+21.4 •	24.8	88 29.4	+30.6 •	41.0	89 00.0	+60.0	82.0	**89**
90	83 00.0	+4.1 •	0.0	84 00.0	+3.4 •	0.0	85 00.0	+2.4 •	0.0	86 00.0	+0.9 •	0.0	87 00.0	–1.6 •	0.0	88 00.0	–6.5 •	0.0	89 00.0	–18.7 •	0.0	90 00.0	–60.0	41.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. 98°, 262°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 51.1	+59.5	96.9	0 43.8	+59.7	97.0	0 36.5	+59.8	97.0	0 29.2	+59.9	97.0	0 21.9	+59.9	97.0	0 14.6	+60.0	97.0	0 07.3	+60.0	97.0	0 00.0	+60.0	97.0	**0**
1	1 50.6	+59.6	96.8	1 43.5	+59.6	96.9	1 36.3	+59.8	96.9	1 29.1	+59.8	96.9	1 21.8	+60.0	96.9	1 14.6	+59.9	97.0	1 07.3	+60.0	97.0	1 00.0	+60.0	97.0	**1**
2	2 50.2	+59.5	96.7	2 43.1	+59.7	96.8	2 36.1	+59.7	96.8	2 28.9	+59.9	96.8	2 21.8	+59.9	96.9	2 14.5	+60.0	96.9	2 07.3	+60.0	97.0	2 00.0	+60.0	97.0	**2**
3	3 49.7	+59.6	96.6	3 42.8	+59.7	96.7	3 35.8	+59.8	96.7	3 28.8	+59.8	96.8	3 21.7	+59.9	96.8	3 14.5	+60.0	96.9	3 07.3	+60.0	96.9	3 00.0	+60.0	97.0	**3**
4	4 49.3	+59.5	96.5	4 42.5	+59.7	96.5	4 35.6	+59.8	96.6	4 28.6	+59.9	96.7	4 21.6	+59.9	96.8	4 14.5	+59.9	96.9	4 07.3	+60.0	96.9	4 00.0	+60.0	97.0	**4**
5	5 48.8	+59.6	96.3	5 42.2	+59.6	96.4	5 35.4	+59.8	96.5	5 28.5	+59.9	96.6	5 21.5	+59.9	96.7	5 14.4	+60.0	96.8	5 07.3	+60.0	96.9	5 00.0	+60.0	97.0	**5**
6	6 48.4	+59.6	96.2	6 41.8	+59.7	96.3	6 35.2	+59.7	96.5	6 28.4	+59.8	96.6	6 21.4	+60.0	96.7	6 14.4	+60.0	96.8	6 07.3	+59.9	96.9	6 00.0	+60.0	97.0	**6**
7	7 48.0	+59.5	96.1	7 41.5	+59.7	96.2	7 34.9	+59.8	96.4	7 28.2	+59.9	96.5	7 21.4	+59.9	96.6	7 14.4	+59.9	96.8	7 07.2	+60.0	96.9	7 00.0	+60.0	97.0	**7**
8	8 47.5	+59.6	96.0	8 41.2	+59.6	96.1	8 34.7	+59.8	96.3	8 28.1	+59.8	96.4	8 21.3	+59.9	96.6	8 14.3	+60.0	96.7	8 07.2	+60.0	96.9	8 00.0	+60.0	97.0	**8**
9	9 47.1	+59.5	95.8	9 40.8	+59.7	96.0	9 34.5	+59.7	96.2	9 27.9	+59.9	96.4	9 21.2	+59.9	96.5	9 14.3	+60.0	96.7	9 07.2	+60.0	96.8	9 00.0	+60.0	97.0	**9**
10	10 46.6	+59.5	95.7	10 40.5	+59.7	95.9	10 34.2	+59.8	96.1	10 27.8	+59.8	96.3	10 21.1	+59.9	96.5	10 14.3	+59.9	96.6	10 07.2	+60.0	96.8	10 00.0	+60.0	97.0	**10**
11	11 46.1	+59.6	95.6	11 40.2	+59.6	95.8	11 34.0	+59.8	96.0	11 27.6	+59.9	96.2	11 21.0	+59.9	96.4	11 14.2	+60.0	96.6	11 07.2	+60.0	96.8	11 00.0	+60.0	97.0	**11**
12	12 45.7	+59.5	95.5	12 39.8	+59.7	95.7	12 33.8	+59.7	95.9	12 27.5	+59.8	96.1	12 20.9	+60.0	96.4	12 14.2	+59.9	96.6	12 07.2	+60.0	96.8	12 00.0	+60.0	97.0	**12**
13	13 45.2	+59.5	95.3	13 39.5	+59.7	95.6	13 33.5	+59.8	95.8	13 27.3	+59.9	96.1	13 20.9	+59.9	96.3	13 14.1	+60.0	96.5	13 07.2	+60.0	96.8	13 00.0	+60.0	97.0	**13**
14	14 44.7	+59.6	95.2	14 39.2	+59.6	95.5	14 33.3	+59.8	95.7	14 27.2	+59.8	96.0	14 20.8	+59.9	96.2	14 14.1	+60.0	96.5	14 07.2	+60.0	96.8	14 00.0	+60.0	97.0	**14**
15	15 44.3	+59.5	95.1	15 38.8	+59.7	95.4	15 33.1	+59.7	95.6	15 27.0	+59.9	95.9	15 20.7	+59.9	96.2	15 14.1	+59.9	96.5	15 07.2	+60.0	96.7	15 00.0	+60.0	97.0	**15**
16	16 43.8	+59.5	95.0	16 38.5	+59.6	95.3	16 32.8	+59.8	95.5	16 26.9	+59.8	95.8	16 20.6	+59.9	96.1	16 14.0	+60.0	96.4	16 07.2	+60.0	96.7	16 00.0	+60.0	97.0	**16**
17	17 43.3	+59.5	94.8	17 38.1	+59.6	95.1	17 32.6	+59.7	95.5	17 26.7	+59.8	95.8	17 20.5	+59.9	96.1	17 14.0	+60.0	96.4	17 07.2	+59.9	96.7	17 00.0	+60.0	97.0	**17**
18	18 42.8	+59.5	94.7	18 37.7	+59.7	95.0	18 32.3	+59.8	95.4	18 26.5	+59.9	95.7	18 20.4	+59.9	96.0	18 14.0	+59.9	96.4	18 07.1	+60.0	96.7	18 00.0	+60.0	97.0	**18**
19	19 42.3	+59.5	94.6	19 37.4	+59.6	94.9	19 32.1	+59.7	95.3	19 26.4	+59.8	95.6	19 20.3	+59.9	96.0	19 13.9	+60.0	96.3	19 07.1	+60.0	96.7	19 00.0	+60.0	97.0	**19**
20	20 41.8	+59.5	94.4	20 37.0	+59.6	94.8	20 31.8	+59.7	95.2	20 26.2	+59.8	95.5	20 20.2	+59.9	95.9	20 13.9	+59.9	96.3	20 07.1	+60.0	96.6	20 00.0	+60.0	97.0	**20**
21	21 41.3	+59.5	94.3	21 36.6	+59.7	94.7	21 31.5	+59.8	95.1	21 26.0	+59.9	95.5	21 20.1	+59.9	95.8	21 13.8	+60.0	96.2	21 07.1	+60.0	96.6	21 00.0	+60.0	97.0	**21**
22	22 40.8	+59.5	94.1	22 36.3	+59.6	94.5	22 31.3	+59.7	95.0	22 25.9	+59.8	95.4	22 20.0	+60.0	95.8	22 13.8	+59.9	96.2	22 07.1	+60.0	96.6	22 00.0	+60.0	97.0	**22**
23	23 40.3	+59.5	94.0	23 35.9	+59.6	94.4	23 31.0	+59.8	94.9	23 25.7	+59.8	95.3	23 20.0	+59.9	95.7	23 13.7	+60.0	96.2	23 07.1	+60.0	96.6	23 00.0	+60.0	97.0	**23**
24	24 39.8	+59.4	93.8	24 35.5	+59.6	94.3	24 30.8	+59.7	94.8	24 25.5	+59.9	95.2	24 19.9	+59.9	95.7	24 13.7	+60.0	96.1	24 07.1	+60.0	96.6	24 00.0	+60.0	97.0	**24**
25	25 39.2	+59.5	93.7	25 35.1	+59.6	94.2	25 30.5	+59.7	94.7	25 25.4	+59.8	95.1	25 19.8	+59.9	95.6	25 13.7	+59.9	96.1	25 07.1	+60.0	96.5	25 00.0	+60.0	97.0	**25**
26	26 38.7	+59.4	93.5	26 34.7	+59.6	94.0	26 30.2	+59.7	94.5	26 25.2	+59.8	95.0	26 19.7	+59.9	95.5	26 13.6	+60.0	96.0	26 07.1	+59.9	96.5	26 00.0	+60.0	97.0	**26**
27	27 38.1	+59.4	93.4	27 34.3	+59.6	93.9	27 29.9	+59.7	94.4	27 25.0	+59.8	95.0	27 19.6	+59.9	95.5	27 13.6	+59.9	96.0	27 07.0	+60.0	96.5	27 00.0	+60.0	97.0	**27**
28	28 37.5	+59.5	93.2	28 33.9	+59.5	93.8	28 29.6	+59.7	94.3	28 24.8	+59.8	94.9	28 19.5	+59.8	95.4	28 13.5	+60.0	95.9	28 07.0	+60.0	96.5	28 00.0	+60.0	97.0	**28**
29	29 37.0	+59.4	93.1	29 33.4	+59.6	93.6	29 29.3	+59.7	94.2	29 24.6	+59.8	94.8	29 19.3	+59.9	95.3	29 13.5	+59.9	95.9	29 07.0	+60.0	96.4	29 00.0	+60.0	97.0	**29**
30	30 36.4	+59.4	92.9	30 33.0	+59.6	93.5	30 29.0	+59.7	94.1	30 24.4	+59.8	94.7	30 19.2	+59.9	95.3	30 13.4	+60.0	95.8	30 07.0	+60.0	96.4	30 00.0	+60.0	97.0	**30**
31	31 35.8	+59.4	92.8	31 32.6	+59.5	93.4	31 28.7	+59.7	94.0	31 24.2	+59.8	94.6	31 19.1	+59.9	95.2	31 13.4	+59.9	95.8	31 07.0	+60.0	96.4	31 00.0	+60.0	97.0	**31**
32	32 35.2	+59.3	92.6	32 32.1	+59.6	93.2	32 28.4	+59.7	93.9	32 24.0	+59.8	94.5	32 19.0	+59.9	95.1	32 13.3	+60.0	95.8	32 07.0	+60.0	96.4	32 00.0	+60.0	97.0	**32**
33	33 34.5	+59.4	92.4	33 31.7	+59.5	93.1	33 28.1	+59.7	93.7	33 23.8	+59.8	94.4	33 18.9	+59.9	95.1	33 13.3	+59.9	95.7	33 07.0	+60.0	96.4	33 00.0	+60.0	97.0	**33**
34	34 33.9	+59.3	92.2	34 31.2	+59.5	92.9	34 27.8	+59.6	93.6	34 23.6	+59.8	94.3	34 18.8	+59.9	95.0	34 13.2	+60.0	95.7	34 07.0	+60.0	96.3	34 00.0	+60.0	97.0	**34**
35	35 33.2	+59.4	92.1	35 30.7	+59.5	92.8	35 27.4	+59.7	93.5	35 23.4	+59.8	94.2	35 18.7	+59.8	94.9	35 13.2	+59.9	95.6	35 07.0	+59.9	96.3	35 00.0	+60.0	97.0	**35**
36	36 32.6	+59.3	91.9	36 30.2	+59.5	92.6	36 27.1	+59.6	93.3	36 23.2	+59.8	94.1	36 18.5	+59.9	94.8	36 13.1	+60.0	95.5	36 06.9	+60.0	96.3	36 00.0	+60.0	97.0	**36**
37	37 31.9	+59.2	91.7	37 29.7	+59.5	92.4	37 26.7	+59.7	93.2	37 23.0	+59.7	94.0	37 18.4	+59.9	94.7	37 13.1	+59.9	95.5	37 06.9	+60.0	96.2	37 00.0	+60.0	97.0	**37**
38	38 31.1	+59.3	91.5	38 29.2	+59.4	92.3	38 26.4	+59.6	93.1	38 22.7	+59.8	93.9	38 18.3	+59.9	94.7	38 13.0	+59.9	95.4	38 06.9	+60.0	96.2	38 00.0	+60.0	97.0	**38**
39	39 30.4	+59.3	91.3	39 28.6	+59.5	92.1	39 26.0	+59.6	92.9	39 22.5	+59.8	93.8	39 18.2	+59.8	94.6	39 12.9	+60.0	95.4	39 06.9	+60.0	96.2	39 00.0	+60.0	97.0	**39**
40	40 29.7	+59.2	91.1	40 28.1	+59.4	91.9	40 25.6	+59.6	92.8	40 22.3	+59.7	93.6	40 18.0	+59.9	94.5	40 12.9	+59.9	95.3	40 06.9	+60.0	96.2	40 00.0	+60.0	97.0	**40**
41	41 28.9	+59.2	90.9	41 27.5	+59.4	91.8	41 25.2	+59.6	92.6	41 22.0	+59.7	93.5	41 17.9	+59.8	94.4	41 12.8	+60.0	95.3	41 06.9	+59.9	96.1	41 00.0	+60.0	97.0	**41**
42	42 28.1	+59.2	90.6	42 26.9	+59.4	91.6	42 24.8	+59.6	92.5	42 21.7	+59.8	93.4	42 17.7	+59.9	94.3	42 12.8	+59.9	95.2	42 06.8	+60.0	96.1	42 00.0	+60.0	97.0	**42**
43	43 27.3	+59.1	90.4	43 26.3	+59.4	91.4	43 24.4	+59.6	92.3	43 21.5	+59.7	93.3	43 17.6	+59.8	94.2	43 12.7	+59.9	95.1	43 06.8	+60.0	96.1	43 00.0	+60.0	97.0	**43**
44	44 26.4	+59.1	90.2	44 25.7	+59.4	91.2	44 24.0	+59.5	92.1	44 21.2	+59.7	93.1	44 17.4	+59.9	94.1	44 12.6	+60.0	95.1	44 06.8	+60.0	96.0	44 00.0	+60.0	97.0	**44**
45	45 25.5	+59.1	89.9	45 25.1	+59.3	91.0	45 23.5	+59.5	92.0	45 20.9	+59.7	93.0	45 17.3	+59.8	94.0	45 12.6	+59.9	95.0	45 06.8	+60.0	96.0	45 00.0	+60.0	97.0	**45**
46	46 24.6	+59.1	89.7	46 24.4	+59.3	90.7	46 23.0	+59.6	91.8	46 20.6	+59.7	92.8	46 17.1	+59.8	93.9	46 12.5	+59.9	94.9	46 06.8	+60.0	96.0	46 00.0	+60.0	97.0	**46**
47	47 23.7	+59.0	89.4	47 23.7	+59.3	90.5	47 22.6	+59.5	91.6	47 20.3	+59.7	92.7	47 16.9	+59.8	93.8	47 12.4	+59.9	94.9	47 06.8	+59.9	95.9	47 00.0	+60.0	97.0	**47**
48	48 22.7	+59.0	89.2	48 23.0	+59.2	90.3	48 22.1	+59.4	91.4	48 20.0	+59.7	92.5	48 16.7	+59.9	93.7	48 12.3	+59.9	94.8	48 06.7	+60.0	95.9	48 00.0	+60.0	97.0	**48**
49	49 21.7	+58.9	88.9	49 22.2	+59.2	90.1	49 21.5	+59.5	91.2	49 19.7	+59.6	92.4	49 16.6	+59.8	93.5	49 12.2	+60.0	94.7	49 06.7	+60.0	95.9	49 00.0	+60.0	97.0	**49**
50	50 20.6	+58.9	88.6	50 21.4	+59.2	89.8	50 21.0	+59.4	91.0	50 19.3	+59.6	92.2	50 16.4	+59.8	93.4	50 12.2	+59.9	94.6	50 06.7	+60.0	95.8	50 00.0	+60.0	97.0	**50**
51	51 19.5	+58.8	88.3	51 20.6	+59.2	89.5	51 20.4	+59.4	90.8	51 18.9	+59.7	92.0	51 16.2	+59.7	93.3	51 12.1	+59.9	94.5	51 06.7	+59.9	95.8	51 00.0	+60.0	97.0	**51**
52	52 18.3	+58.8	88.0	52 19.8	+59.1	89.3	52 19.8	+59.4	90.6	52 18.6	+59.6	91.9	52 15.9	+59.8	93.2	52 12.0	+59.9	94.4	52 06.6	+60.0	95.7	52 00.0	+60.0	97.0	**52**
53	53 17.1	+58.7	87.6	53 18.9	+59.0	89.0	53 19.2	+59.4	90.3	53 18.2	+59.6	91.7	53 15.7	+59.8	93.0	53 11.9	+59.9	94.3	53 06.6	+60.0	95.7	53 00.0	+60.0	97.0	**53**
54	54 15.8	+58.7	87.3	54 17.9	+59.1	88.7	54 18.6	+59.3	90.1	54 17.8	+59.5	91.5	54 15.5	+59.7	92.9	54 11.8	+59.9	94.3	54 06.6	+60.0	95.6	54 00.0	+60.0	97.0	**54**
55	55 14.5	+58.6	86.9	55 17.0	+58.9	88.4	55 17.9	+59.3	89.8	55 17.3	+59.6	91.3	55 15.2	+59.8	92.7	55 11.7	+59.8	94.1	55 06.6	+59.9	95.6	55 00.0	+60.0	97.0	**55**
56	56 13.1	+58.5	86.6	56 15.9	+58.9	88.1	56 17.2	+59.2	89.5	56 16.9	+59.5	91.0	56 15.0	+59.7	92.5	56 11.5	+59.9	94.0	56 06.5	+60.0	95.5	56 00.0	+60.0	97.0	**56**
57	57 11.6	+58.5	86.2	57 14.8	+58.9	87.7	57 16.4	+59.2	89.3	57 16.4	+59.5	90.8	57 14.7	+59.7	92.4	57 11.4	+59.9	93.9	57 06.5	+60.0	95.5	57 00.0	+60.0	97.0	**57**
58	58 10.1	+58.3	85.7	58 13.7	+58.8	87.3	58 15.6	+59.2	89.0	58 15.9	+59.4	90.6	58 14.4	+59.7	92.2	58 11.3	+59.9	93.8	58 06.5	+60.0	95.4	58 00.0	+60.0	97.0	**58**
59	59 08.4	+58.3	85.3	59 12.5	+58.7	87.0	59 14.8	+59.1	88.6	59 15.3	+59.5	90.3	59 14.1	+59.7	92.0	59 11.2	+59.8	93.7	59 06.5	+59.9	95.3	59 00.0	+60.0	97.0	**59**
60	60 06.7	+58.1	84.8	60 11.2	+58.6	86.5	60 13.9	+59.1	88.3	60 14.8	+59.4	90.0	60 13.8	+59.7	91.8	60 11.0	+59.9	93.5	60 06.4	+60.0	95.3	60 00.0	+60.0	97.0	**60**
61	61 04.8	+58.1	84.3	61 09.8	+58.6	86.1	61 13.0	+59.0	87.9	61 14.2	+59.3	89.8	61 13.5	+59.6	91.6	61 10.9	+59.8	93.4	61 06.4	+59.9	95.2	61 00.0	+60.0	97.0	**61**
62	62 02.9	+57.9	83.8	62 08.4	+58.4	85.7	62 12.0	+58.9	87.5	62 13.5	+59.3	89.4	62 13.1	+59.6	91.3	62 10.7	+59.8	93.2	62 06.3	+60.0	95.1	62 00.0	+60.0	97.0	**62**
63	63 00.8	+57.7	83.2	63 06.8	+58.4	85.2	63 10.9	+58.8	87.1	63 12.8	+59.3	89.1	63 12.7	+59.6	91.1	63 10.5	+59.9	93.1	63 06.3	+60.0	95.0	63 00.0	+60.0	97.0	**63**
64	63 58.5	+57.6	82.6	64 05.2	+58.2	84.6	64 09.7	+58.8	86.7	64 12.1	+59.2	88.8	64 12.3	+59.6	90.8	64 10.4	+59.8	92.9	64 06.3	+59.9	95.0	64 00.0	+60.0	97.0	**64**
65	64 56.1	+57.4	81.9	65 03.4	+58.1	84.1	65 08.5	+58.6	86.2	65 11.3	+59.2	88.4	65 11.9	+59.5	90.5	65 10.2	+59.7	92.7	65 06.2	+59.9	94.9	65 00.0	+60.0	97.0	**65**
66	65 53.5	+57.2	81.3	66 01.5	+57.9	83.5	66 07.1	+58.6	85.7	66 10.5	+59.0	88.0	66 11.4	+59.5	90.2	66 09.9	+59.8	92.5	66 06.1	+60.0	94.8	66 00.0	+60.0	97.0	**66**
67	66 50.7	+57.0	80.5	66 59.4	+57.8	82.8	67 05.7	+58.4	85.2	67 09.5	+59.0	87.5	67 10.9	+59.4	89.9	67 09.7	+59.8	92.3	67 06.1	+59.9	94.7	67 00.0	+60.0	97.0	**67**
68	67 47.7	+56.7	79.7	67 57.2	+57.5	82.1	68 04.1	+58.3	84.6	68 08.5	+58.9	87.1	68 10.3	+59.4	89.5	68 09.5	+59.7	92.0	68 06.0	+60.0	94.5	68 00.0	+60.0	97.0	**68**
69	68 44.4	+56.4	78.8	68 54.7	+57.4	81.3	69 02.4	+58.2	83.9	69 07.4	+58.8	86.5	69 09.7	+59.3	89.2	69 09.2	+59.7	91.8	69 06.0	+59.9	94.4	69 00.0	+60.0	97.0	**69**
70	69 40.8	+56.1	77.8	69 52.1	+57.0	80.5	70 00.6	+57.9	83.2	70 06.2	+58.7	86.0	70 09.0	+59.3	88.7	70 08.9	+59.7	91.5	70 05.9	+59.9	94.3	70 00.0	+60.0	97.0	**70**
71	70 36.9	+55.6	76.8	70 49.1	+56.8	79.6	70 58.5	+57.8	82.4	71 04.9	+58.6	85.3	71 08.3	+59.2	88.3	71 08.6	+59.6	91.2	71 05.8	+59.9	94.1	71 00.0	+60.0	97.0	**71**
72	71 32.5	+55.2	75.6	71 45.9	+56.4	78.6	71 56.3	+57.4	81.6	72 03.5	+58.3	84.6	72 07.5	+59.0	87.7	72 08.2	+59.6	90.8	72 05.7	+59.9	93.9	72 00.0	+60.0	97.0	**72**
73	72 27.7	+54.7	74.4	72 42.3	+56.1	77.5	72 53.7	+57.2	80.6	73 01.8	+58.2	83.9	73 06.5	+59.0	87.1	73 07.8	+59.5	90.4	73 05.6	+59.9	93.7	73 00.0	+60.0	97.0	**73**
74	73 22.4	+54.1	73.0	73 38.4	+55.5	76.2	73 50.9	+56.9	79.6	74 00.0	+58.0	83.0	74 05.5	+58.9	86.5	74 07.3	+59.5	90.0	74 05.5	+59.9	93.5	74 00.0	+60.0	97.0	**74**
75	74 16.5	+53.3	71.4	74 33.9	+54.9	74.8	74 47.8	+56.4	78.4	74 58.0	+57.6	82.0	75 04.4	+58.6	85.8	75 06.8	+59.4	89.5	75 05.4	+59.8	93.3	75 00.0	+60.0	97.0	**75**
76	75 09.8	+52.4	69.7	75 28.8	+54.3	73.3	75 44.2	+55.9	77.1	75 55.6	+57.4	80.9	76 03.0	+58.5	84.9	76 06.2	+59.4	89.0	76 05.2	+59.9	93.0	76 00.0	+60.0	97.0	**76**
77	76 02.2	+51.3	67.7	76 23.1	+53.4	71.5	76 40.1	+55.3	75.5	76 53.0	+56.9	79.7	77 01.5	+58.3	84.0	77 05.6	+59.2	88.3	77 05.1	+59.8	92.7	77 00.0	+60.0	97.0	**77**
78	76 53.5	+50.1	65.5	77 16.5	+52.4	69.5	77 35.4	+54.5	73.8	77 49.9	+56.4	78.2	77 59.8	+57.9	82.8	78 04.8	+59.1	87.6	78 04.9	+59.7	92.3	78 00.0	+60.0	97.0	**78**
79	77 43.6	+48.5	63.0	78 08.9	+51.1	67.2	78 29.9	+53.5	71.8	78 46.3	+55.7	76.6	78 57.7	+57.5	81.5	79 03.9	+58.9	86.7	79 04.6	+59.8	91.9	79 00.0	+60.0	97.0	**79**
80	78 32.1	*+46.6* •	60.1	79 00.0	+49.5	64.6	79 23.4	+52.3	69.4	79 42.0	+54.8	74.6	79 55.2	+57.0	80.0	80 02.8	+58.6	85.6	80 04.4	+59.6	91.3	80 00.0	+60.0	97.0	**80**
81	79 18.7	*+44.2* •	56.8	79 49.5	*+47.4* •	61.5	80 15.7	+50.7	66.6	80 36.8	+53.7	72.2	80 52.2	+56.3	78.1	81 01.4	+58.3	84.3	81 04.0	+59.6	90.7	81 00.0	+60.0	97.0	**81**
82	80 02.9	*+41.3* •	53.1	80 36.9	*+44.9* •	57.9	81 06.4	*+48.6* •	63.3	81 30.5	+52.2	69.3	81 48.5	+55.4	75.8	81 59.7	+57.9	82.7	82 03.6	+59.5	89.9	82 00.0	+60.0	97.0	**82**
83	80 44.2	*+37.6* •	48.7	81 21.8	*+41.6* •	53.7	81 55.0	*+45.7* •	59.3	82 22.7	*+50.0* •	65.8	82 43.9	+53.9	72.9	82 57.6	+57.1	80.7	83 03.1	+59.2	88.8	83 00.0	+60.0	97.0	**83**
84	81 21.8	*+33.2* •	43.7	82 03.4	*+37.3* •	48.7	82 40.7	*+42.0* •	54.5	83 12.7	*+46.9* •	61.4	83 37.8	*+51.8* •	69.2	83 54.7	+56.1	78.0	84 02.3	+59.0	87.5	84 00.0	+60.0	97.0	**84**
85	81 55.0	*+27.7* •	38.0	82 40.7	*+32.0* •	42.8	83 22.7	*+36.9* •	48.6	83 59.6	*+42.5* •	55.8	84 29.6	*+48.6* •	64.4	84 50.8	*+54.3* •	74.4	85 01.3	+58.5	85.5	85 00.0	+60.0	97.0	**85**
86	82 22.7	*+21.2* •	31.5	83 12.7	*+25.1* •	35.9	83 59.6	*+30.0* •	41.4	84 42.1	*+36.1* •	48.6	85 18.2	*+43.3* •	57.7	85 45.1	*+51.1* •	69.2	85 59.8	+57.5	82.7	86 00.0	+60.0	97.0	**86**
87	82 43.9	*+13.7* •	24.2	83 37.8	*+16.9* •	27.9	84 29.6	*+21.2* •	32.8	85 18.2	*+26.9* •	39.4	86 01.5	*+34.7* •	48.5	86 36.2	*+44.8* •	61.3	86 57.3	*+55.2* •	78.0	87 00.0	+60.0	97.0	**87**
88	82 57.6	*+5.5* •	16.4	83 54.7	*+7.6* •	19.1	84 50.8	*+10.5* •	22.7	85 45.1	*+14.7* •	27.9	86 36.2	*+21.1* •	35.8	87 21.0	*+31.5* •	48.5	87 52.5	*+48.0* •	69.2	88 00.0	+60.0	97.0	**88**
89	83 03.1	*−3.1* •	8.2	84 02.3	*−2.3* •	9.6	85 01.3	*−1.3* •	11.5	85 59.8	*+0.2* •	14.4	86 57.3	*+2.7* •	19.0	87 52.5	*+7.5* •	27.9	88 40.5	*+19.5* •	48.5	89 00.0	+60.0	97.0	**89**
90	83 00.0	*−11.4* •	0.0	84 00.0	*−12.1* •	0.0	85 00.0	*−13.0* •	0.0	86 00.0	*−14.4* •	0.0	87 00.0	*−16.5* •	0.0	88 00.0	*−20.5* •	0.0	89 00.0	*−29.9* •	0.0	90 00.0	−60.0	48.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 83°, 277°

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 51.1	– 59.6	96.9	0 43.8	– 59.7	97.0	0 36.5	– 59.8	97.0	0 29.2	– 59.8	97.0	0 21.9	– 59.9	97.0	0 14.6	– 59.9	97.0	0 07.3	– 60.0	97.0	0 00.0	+ 60.0	83.0	0
1	0 08.5	+ 59.6	82.9	0 15.9	+ 59.7	82.9	0 23.3	+ 59.7	82.9	0 30.6	+ 59.9	82.9	0 38.0	+ 59.9	83.0	0 45.3	+ 60.0	83.0	0 52.7	+ 60.0	83.0	1 00.0	+ 60.0	83.0	1
2	1 08.1	+ 59.5	82.8	1 15.6	+ 59.6	82.8	1 23.0	+ 59.8	82.9	1 30.5	+ 59.8	82.9	1 37.9	+ 59.9	82.9	1 45.3	+ 60.0	82.9	1 52.7	+ 60.0	83.0	2 00.0	+ 60.0	83.0	2
3	2 07.6	+ 59.6	82.7	2 15.2	+ 59.7	82.7	2 22.8	+ 59.8	82.8	2 30.3	+ 59.9	82.8	2 37.8	+ 59.9	82.9	2 45.3	+ 59.9	82.9	2 52.7	+ 60.0	82.9	3 00.0	+ 60.0	83.0	3
4	3 07.2	+ 59.5	82.6	3 14.9	+ 59.7	82.6	3 22.6	+ 59.8	82.7	3 30.2	+ 59.9	82.7	3 37.7	+ 60.0	82.8	3 45.2	+ 60.0	82.9	3 52.7	+ 59.9	82.9	4 00.0	+ 60.0	83.0	4
5	4 06.7	+ 59.6	82.4	4 14.6	+ 59.7	82.5	4 22.4	+ 59.7	82.6	4 30.1	+ 59.8	82.7	4 37.7	+ 59.9	82.7	4 45.2	+ 60.0	82.8	4 52.6	+ 60.0	82.9	5 00.0	+ 60.0	83.0	5
6	5 06.3	+ 59.5	82.3	5 14.3	+ 59.6	82.4	5 22.1	+ 59.8	82.5	5 29.9	+ 59.9	82.6	5 37.6	+ 59.9	82.7	5 45.2	+ 59.9	82.8	5 52.6	+ 60.0	82.9	6 00.0	+ 60.0	83.0	6
7	6 05.8	+ 59.6	82.2	6 13.9	+ 59.7	82.3	6 21.9	+ 59.8	82.4	6 29.8	+ 59.8	82.5	6 37.5	+ 59.9	82.6	6 45.1	+ 60.0	82.8	6 52.6	+ 60.0	82.9	7 00.0	+ 60.0	83.0	7
8	7 05.4	+ 59.6	82.1	7 13.6	+ 59.7	82.2	7 21.7	+ 59.7	82.3	7 29.6	+ 59.9	82.5	7 37.4	+ 59.9	82.6	7 45.1	+ 60.0	82.7	7 52.6	+ 60.0	82.9	8 00.0	+ 60.0	83.0	8
9	8 05.0	+ 59.5	82.0	8 13.3	+ 59.6	82.1	8 21.4	+ 59.8	82.2	8 29.5	+ 59.8	82.4	8 37.3	+ 60.0	82.5	8 45.1	+ 59.9	82.7	8 52.6	+ 60.0	82.8	9 00.0	+ 60.0	83.0	9
10	9 04.5	+ 59.5	81.8	9 12.9	+ 59.7	82.0	9 21.2	+ 59.8	82.2	9 29.3	+ 59.9	82.3	9 37.3	+ 59.9	82.5	9 45.0	+ 60.0	82.7	9 52.6	+ 60.0	82.8	10 00.0	+ 60.0	83.0	10
11	10 04.0	+ 59.6	81.7	10 12.6	+ 59.7	81.9	10 21.0	+ 59.8	82.1	10 29.2	+ 59.8	82.2	10 37.2	+ 59.9	82.4	10 45.0	+ 59.9	82.6	10 52.6	+ 60.0	82.8	11 00.0	+ 60.0	83.0	11
12	11 03.6	+ 59.5	81.6	11 12.3	+ 59.6	81.8	11 20.8	+ 59.7	82.0	11 29.0	+ 59.9	82.2	11 37.1	+ 59.9	82.4	11 44.9	+ 60.0	82.6	11 52.6	+ 60.0	82.8	12 00.0	+ 60.0	83.0	12
13	12 03.1	+ 59.6	81.5	12 11.9	+ 59.7	81.7	12 20.5	+ 59.8	81.9	12 28.9	+ 59.8	82.1	12 37.0	+ 59.9	82.3	12 44.9	+ 60.0	82.5	12 52.6	+ 60.0	82.8	13 00.0	+ 60.0	83.0	13
14	13 02.7	+ 59.5	81.3	13 11.6	+ 59.7	81.6	13 20.3	+ 59.7	81.8	13 28.7	+ 59.9	82.0	13 36.9	+ 59.9	82.3	13 44.9	+ 59.9	82.5	13 52.6	+ 60.0	82.8	14 00.0	+ 60.0	83.0	14
15	14 02.2	+ 59.5	81.2	14 11.3	+ 59.6	81.5	14 20.0	+ 59.8	81.7	14 28.6	+ 59.8	82.0	14 36.8	+ 59.9	82.2	14 44.8	+ 60.0	82.5	14 52.6	+ 59.9	82.7	15 00.0	+ 60.0	83.0	15
16	15 01.7	+ 59.6	81.1	15 10.9	+ 59.7	81.3	15 19.8	+ 59.8	81.6	15 28.4	+ 59.9	81.9	15 36.7	+ 60.0	82.2	15 44.8	+ 59.9	82.4	15 52.5	+ 60.0	82.7	16 00.0	+ 60.0	83.0	16
17	16 01.3	+ 59.5	80.9	16 10.6	+ 59.6	81.2	16 19.6	+ 59.7	81.5	16 28.3	+ 59.8	81.8	16 36.7	+ 59.9	82.1	16 44.7	+ 60.0	82.4	16 52.5	+ 60.0	82.7	17 00.0	+ 60.0	83.0	17
18	17 00.8	+ 59.5	80.8	17 10.2	+ 59.6	81.1	17 19.3	+ 59.8	81.4	17 28.1	+ 59.8	81.7	17 36.6	+ 59.9	82.0	17 44.7	+ 60.0	82.4	17 52.5	+ 60.0	82.7	18 00.0	+ 60.0	83.0	18
19	18 00.3	+ 59.5	80.7	18 09.8	+ 59.7	81.0	18 19.1	+ 59.7	81.3	18 27.9	+ 59.9	81.7	18 36.5	+ 59.9	82.0	18 44.7	+ 59.9	82.3	18 52.5	+ 60.0	82.7	19 00.0	+ 60.0	83.0	19
20	18 59.8	+ 59.5	80.5	19 09.5	+ 59.6	80.9	19 18.8	+ 59.8	81.2	19 27.8	+ 59.8	81.6	19 36.4	+ 59.9	81.9	19 44.6	+ 60.0	82.3	19 52.5	+ 60.0	82.6	20 00.0	+ 60.0	83.0	20
21	19 59.3	+ 59.5	80.4	20 09.1	+ 59.7	80.8	20 18.6	+ 59.7	81.1	20 27.6	+ 59.9	81.5	20 36.3	+ 59.9	81.9	20 44.6	+ 59.9	82.2	20 52.5	+ 60.0	82.6	21 00.0	+ 60.0	83.0	21
22	20 58.8	+ 59.5	80.3	21 08.8	+ 59.6	80.6	21 18.3	+ 59.7	81.0	21 27.5	+ 59.8	81.4	21 36.2	+ 59.9	81.8	21 44.5	+ 60.0	82.2	21 52.5	+ 60.0	82.6	22 00.0	+ 60.0	83.0	22
23	21 58.3	+ 59.5	80.1	22 08.4	+ 59.6	80.5	22 18.0	+ 59.8	80.9	22 27.3	+ 59.8	81.3	22 36.1	+ 59.9	81.7	22 44.5	+ 60.0	82.2	22 52.5	+ 60.0	82.6	23 00.0	+ 60.0	83.0	23
24	22 57.8	+ 59.5	80.0	23 08.0	+ 59.6	80.4	23 17.8	+ 59.7	80.8	23 27.1	+ 59.8	81.3	23 36.0	+ 59.9	81.7	23 44.5	+ 59.9	82.1	23 52.5	+ 59.9	82.6	24 00.0	+ 60.0	83.0	24
25	23 57.3	+ 59.4	79.8	24 07.6	+ 59.6	80.3	24 17.5	+ 59.7	80.7	24 26.9	+ 59.9	81.2	24 35.9	+ 59.9	81.6	24 44.4	+ 60.0	82.1	24 52.4	+ 60.0	82.5	25 00.0	+ 60.0	83.0	25
26	24 56.7	+ 59.5	79.7	25 07.2	+ 59.6	80.2	25 17.2	+ 59.8	80.6	25 26.8	+ 59.8	81.1	25 35.8	+ 59.9	81.6	25 44.4	+ 59.9	82.0	25 52.4	+ 60.0	82.5	26 00.0	+ 60.0	83.0	26
27	25 56.2	+ 59.4	79.6	26 06.8	+ 59.6	80.0	26 17.0	+ 59.7	80.5	26 26.6	+ 59.8	81.0	26 35.7	+ 59.9	81.5	26 44.3	+ 60.0	82.0	26 52.4	+ 60.0	82.5	27 00.0	+ 60.0	83.0	27
28	26 55.6	+ 59.5	79.4	27 06.4	+ 59.6	79.9	27 16.7	+ 59.7	80.4	27 26.4	+ 59.8	80.9	27 35.6	+ 59.9	81.4	27 44.3	+ 59.9	82.0	27 52.4	+ 60.0	82.5	28 00.0	+ 60.0	83.0	28
29	27 55.1	+ 59.4	79.2	28 06.0	+ 59.6	79.8	28 16.4	+ 59.7	80.3	28 26.2	+ 59.8	80.8	28 35.5	+ 59.9	81.4	28 44.2	+ 60.0	81.9	28 52.4	+ 60.0	82.5	29 00.0	+ 60.0	83.0	29
30	28 54.5	+ 59.4	79.1	29 05.6	+ 59.6	79.6	29 16.1	+ 59.7	80.2	29 26.0	+ 59.8	80.7	29 35.4	+ 59.9	81.3	29 44.2	+ 59.9	81.9	29 52.4	+ 60.0	82.4	30 00.0	+ 60.0	83.0	30
31	29 53.9	+ 59.4	78.9	30 05.2	+ 59.5	79.5	30 15.8	+ 59.7	80.1	30 25.8	+ 59.8	80.6	30 35.3	+ 59.9	81.2	30 44.1	+ 60.0	81.8	30 52.4	+ 60.0	82.4	31 00.0	+ 60.0	83.0	31
32	30 53.3	+ 59.4	78.8	31 04.7	+ 59.6	79.4	31 15.5	+ 59.7	80.0	31 25.6	+ 59.8	80.6	31 35.2	+ 59.9	81.2	31 44.1	+ 59.9	81.8	31 52.4	+ 60.0	82.4	32 00.0	+ 60.0	83.0	32
33	31 52.7	+ 59.4	78.6	32 04.3	+ 59.5	79.2	32 15.2	+ 59.7	79.8	32 25.4	+ 59.8	80.5	32 35.1	+ 59.9	81.1	32 44.0	+ 60.0	81.7	32 52.4	+ 59.9	82.4	33 00.0	+ 60.0	83.0	33
34	32 52.1	+ 59.4	78.4	33 03.8	+ 59.5	79.1	33 14.9	+ 59.6	79.7	33 25.2	+ 59.8	80.4	33 35.0	+ 59.8	81.0	33 44.0	+ 59.9	81.7	33 52.3	+ 60.0	82.3	34 00.0	+ 60.0	83.0	34
35	33 51.5	+ 59.3	78.3	34 03.3	+ 59.6	78.9	34 14.5	+ 59.7	79.6	34 25.0	+ 59.8	80.3	34 34.8	+ 59.9	80.9	34 43.9	+ 60.0	81.6	34 52.3	+ 60.0	82.3	35 00.0	+ 60.0	83.0	35
36	34 50.8	+ 59.4	78.1	35 02.9	+ 59.5	78.8	35 14.2	+ 59.7	79.5	35 24.8	+ 59.8	80.2	35 34.7	+ 59.9	80.9	35 43.9	+ 59.9	81.6	35 52.3	+ 60.0	82.3	36 00.0	+ 60.0	83.0	36
37	35 50.2	+ 59.3	77.9	36 02.4	+ 59.5	78.6	36 13.9	+ 59.6	79.3	36 24.6	+ 59.8	80.0	36 34.6	+ 59.9	80.8	36 43.8	+ 60.0	81.5	36 52.3	+ 60.0	82.3	37 00.0	+ 60.0	83.0	37
38	36 49.5	+ 59.3	77.7	37 01.9	+ 59.5	78.4	37 13.5	+ 59.6	79.2	37 24.4	+ 59.7	79.9	37 34.5	+ 59.8	80.7	37 43.8	+ 59.9	81.5	37 52.3	+ 60.0	82.2	38 00.0	+ 60.0	83.0	38
39	37 48.8	+ 59.3	77.5	38 01.4	+ 59.4	78.3	38 13.1	+ 59.7	79.1	38 24.1	+ 59.8	79.8	38 34.3	+ 59.9	80.6	38 43.7	+ 60.0	81.4	38 52.3	+ 60.0	82.2	39 00.0	+ 60.0	83.0	39
40	38 48.1	+ 59.2	77.3	39 00.8	+ 59.5	78.1	39 12.8	+ 59.6	78.9	39 23.9	+ 59.8	79.7	39 34.2	+ 59.9	80.5	39 43.7	+ 59.9	81.3	39 52.3	+ 59.9	82.2	40 00.0	+ 60.0	83.0	40
41	39 47.3	+ 59.3	77.1	40 00.3	+ 59.4	77.9	40 12.4	+ 59.6	78.8	40 23.7	+ 59.7	79.6	40 34.1	+ 59.8	80.4	40 43.6	+ 59.9	81.3	40 52.2	+ 60.0	82.1	41 00.0	+ 60.0	83.0	41
42	40 46.6	+ 59.2	76.9	40 59.7	+ 59.4	77.8	41 12.0	+ 59.6	78.6	41 23.4	+ 59.7	79.5	41 33.9	+ 59.9	80.3	41 43.5	+ 60.0	81.2	41 52.2	+ 60.0	82.1	42 00.0	+ 60.0	83.0	42
43	41 45.8	+ 59.2	76.7	41 59.1	+ 59.4	77.6	42 11.6	+ 59.6	78.5	42 23.1	+ 59.8	79.4	42 33.8	+ 59.8	80.3	42 43.5	+ 59.9	81.2	42 52.2	+ 60.0	82.1	43 00.0	+ 60.0	83.0	43
44	42 45.0	+ 59.1	76.5	42 58.5	+ 59.4	77.4	43 11.2	+ 59.6	78.3	43 22.9	+ 59.7	79.2	43 33.6	+ 59.9	80.2	43 43.4	+ 59.9	81.1	43 52.2	+ 60.0	82.0	44 00.0	+ 60.0	83.0	44
45	43 44.1	+ 59.2	76.3	43 57.9	+ 59.4	77.2	44 10.8	+ 59.5	78.1	44 22.6	+ 59.7	79.1	44 33.5	+ 59.8	80.1	44 43.3	+ 60.0	81.0	44 52.2	+ 60.0	82.0	45 00.0	+ 60.0	83.0	45
46	44 43.3	+ 59.1	76.0	44 57.3	+ 59.3	77.0	45 10.3	+ 59.5	78.0	45 22.3	+ 59.7	79.0	45 33.3	+ 59.8	80.0	45 43.3	+ 59.9	81.0	45 52.2	+ 59.9	82.0	46 00.0	+ 60.0	83.0	46
47	45 42.4	+ 59.1	75.8	45 56.6	+ 59.4	76.8	46 09.8	+ 59.6	77.8	46 22.0	+ 59.7	78.8	46 33.1	+ 59.9	79.8	46 43.2	+ 59.9	80.9	46 52.1	+ 60.0	81.9	47 00.0	+ 60.0	83.0	47
48	46 41.5	+ 59.0	75.5	46 56.0	+ 59.2	76.6	47 09.4	+ 59.5	77.6	47 21.7	+ 59.7	78.7	47 33.0	+ 59.8	79.7	47 43.1	+ 59.9	80.8	47 52.1	+ 60.0	81.9	48 00.0	+ 60.0	83.0	48
49	47 40.5	+ 59.0	75.3	47 55.2	+ 59.3	76.3	48 08.9	+ 59.5	77.4	48 21.4	+ 59.7	78.5	48 32.8	+ 59.8	79.6	48 43.0	+ 59.9	80.7	48 52.1	+ 60.0	81.9	49 00.0	+ 60.0	83.0	49
50	48 39.5	+ 59.0	75.0	48 54.5	+ 59.2	76.1	49 08.4	+ 59.4	77.2	49 21.1	+ 59.6	78.3	49 32.6	+ 59.8	79.5	49 42.9	+ 59.9	80.7	49 52.1	+ 60.0	81.8	50 00.0	+ 60.0	83.0	50
51	49 38.5	+ 58.9	74.7	49 53.7	+ 59.2	75.8	50 07.8	+ 59.5	77.0	50 20.7	+ 59.6	78.2	50 32.4	+ 59.8	79.4	50 42.8	+ 60.0	80.6	50 52.1	+ 59.9	81.8	51 00.0	+ 60.0	83.0	51
52	50 37.4	+ 58.9	74.4	50 52.9	+ 59.2	75.6	51 07.3	+ 59.4	76.8	51 20.3	+ 59.7	78.0	51 32.2	+ 59.8	79.2	51 42.8	+ 59.9	80.5	51 52.0	+ 60.0	81.7	52 00.0	+ 60.0	83.0	52
53	51 36.3	+ 58.8	74.1	51 52.1	+ 59.1	75.3	52 06.7	+ 59.4	76.6	52 20.0	+ 59.6	77.8	52 32.0	+ 59.7	79.1	52 42.7	+ 59.9	80.4	52 52.0	+ 60.0	81.7	53 00.0	+ 60.0	83.0	53
54	52 35.1	+ 58.8	73.8	52 51.2	+ 59.1	75.0	53 06.1	+ 59.3	76.3	53 19.6	+ 59.6	77.6	53 31.7	+ 59.8	79.0	53 42.6	+ 59.9	80.3	53 52.0	+ 60.0	81.6	54 00.0	+ 60.0	83.0	54
55	53 33.9	+ 58.7	73.4	53 50.3	+ 59.1	74.8	54 05.4	+ 59.3	76.1	54 19.2	+ 59.5	77.4	54 31.5	+ 59.8	78.8	54 42.5	+ 59.8	80.2	54 52.0	+ 59.9	81.6	55 00.0	+ 60.0	83.0	55
56	54 32.6	+ 58.6	73.1	54 49.4	+ 59.0	74.5	55 04.7	+ 59.3	75.8	55 18.7	+ 59.6	77.2	55 31.3	+ 59.7	78.6	55 42.3	+ 59.9	80.1	55 51.9	+ 60.0	81.5	56 00.0	+ 60.0	83.0	56
57	55 31.2	+ 58.6	72.7	55 48.4	+ 58.9	74.1	56 04.0	+ 59.3	75.6	56 18.3	+ 59.5	77.0	56 31.0	+ 59.7	78.5	56 42.2	+ 59.9	80.0	56 51.9	+ 60.0	81.5	57 00.0	+ 60.0	83.0	57
58	56 29.8	+ 58.5	72.3	56 47.3	+ 58.9	73.8	57 03.3	+ 59.2	75.3	57 17.8	+ 59.5	76.8	57 30.7	+ 59.7	78.3	57 42.1	+ 59.9	79.9	57 51.9	+ 59.9	81.4	58 00.0	+ 60.0	83.0	58
59	57 28.3	+ 58.4	71.9	57 46.2	+ 58.8	73.4	58 02.5	+ 59.2	75.0	58 17.3	+ 59.4	76.5	58 30.4	+ 59.7	78.1	58 42.0	+ 59.8	79.7	58 51.8	+ 60.0	81.4	59 00.0	+ 60.0	83.0	59
60	58 26.7	+ 58.4	71.5	58 45.0	+ 58.8	73.1	59 01.7	+ 59.1	74.7	59 16.7	+ 59.5	76.3	59 30.1	+ 59.7	77.9	59 41.8	+ 59.9	79.6	59 51.8	+ 60.0	81.3	60 00.0	+ 60.0	83.0	60
61	59 25.1	+ 58.2	71.0	59 43.8	+ 58.6	72.7	60 00.8	+ 59.1	74.3	60 16.2	+ 59.4	76.0	60 29.8	+ 59.7	77.7	60 41.7	+ 59.8	79.5	60 51.8	+ 59.9	81.2	61 00.0	+ 60.0	83.0	61
62	60 23.3	+ 58.1	70.6	60 42.4	+ 58.6	72.2	60 59.9	+ 59.0	74.0	61 15.6	+ 59.3	75.7	61 29.5	+ 59.6	77.5	61 41.5	+ 59.9	79.3	61 51.7	+ 60.0	81.1	62 00.0	+ 60.0	83.0	62
63	61 21.4	+ 58.0	70.1	61 41.0	+ 58.5	71.8	61 58.9	+ 58.9	73.6	62 14.9	+ 59.3	75.4	62 29.1	+ 59.6	77.3	62 41.4	+ 59.8	79.1	62 51.7	+ 59.9	81.1	63 00.0	+ 60.0	83.0	63
64	62 19.4	+ 57.9	69.5	62 39.5	+ 58.4	71.3	62 57.8	+ 58.9	73.2	63 14.2	+ 59.3	75.1	63 28.7	+ 59.6	77.0	63 41.2	+ 59.8	79.0	63 51.6	+ 60.0	81.0	64 00.0	+ 60.0	83.0	64
65	63 17.3	+ 57.7	68.9	63 37.9	+ 58.3	70.8	63 56.7	+ 58.8	72.7	64 13.5	+ 59.2	74.7	64 28.3	+ 59.5	76.7	64 41.0	+ 59.8	78.8	64 51.6	+ 59.9	80.9	65 00.0	+ 60.0	83.0	65
66	64 15.0	+ 57.5	68.3	64 36.2	+ 58.1	70.3	64 55.5	+ 58.6	72.3	65 12.7	+ 59.1	74.3	65 27.8	+ 59.5	76.4	65 40.8	+ 59.8	78.6	65 51.5	+ 60.0	80.8	66 00.0	+ 60.0	83.0	66
67	65 12.5	+ 57.4	67.7	65 34.3	+ 58.1	69.7	65 54.1	+ 58.6	71.8	66 11.8	+ 59.1	73.9	66 27.3	+ 59.5	76.1	66 40.6	+ 59.7	78.4	66 51.5	+ 59.9	80.7	67 00.0	+ 60.0	83.0	67
68	66 09.9	+ 57.1	66.9	66 32.4	+ 57.8	69.1	66 52.7	+ 58.5	71.2	67 10.9	+ 59.0	73.5	67 26.8	+ 59.4	75.8	67 40.3	+ 59.8	78.2	67 51.4	+ 60.0	80.6	68 00.0	+ 60.0	83.0	68
69	67 07.0	+ 56.9	66.2	67 30.2	+ 57.6	68.4	67 51.2	+ 58.3	70.7	68 09.9	+ 58.9	73.0	68 26.2	+ 59.4	75.4	68 40.1	+ 59.7	77.9	68 51.4	+ 59.9	80.4	69 00.0	+ 60.0	83.0	69
70	68 03.9	+ 56.6	65.3	68 27.8	+ 57.5	67.6	68 49.5	+ 58.2	70.0	69 08.8	+ 58.8	72.5	69 25.6	+ 59.3	75.0	69 39.8	+ 59.7	77.6	69 51.3	+ 59.9	80.3	70 00.0	+ 60.0	83.0	70
71	69 00.5	+ 56.3	64.4	69 25.3	+ 57.2	66.8	69 47.7	+ 58.0	69.3	70 07.6	+ 58.7	71.9	70 24.9	+ 59.2	74.6	70 39.5	+ 59.6	77.3	70 51.2	+ 59.9	80.1	71 00.0	+ 60.0	83.0	71
72	69 56.8	+ 56.0	63.4	70 22.5	+ 56.9	66.0	70 45.7	+ 57.8	68.6	71 06.3	+ 58.5	71.3	71 24.1	+ 59.2	74.1	71 39.1	+ 59.6	77.0	71 51.1	+ 59.9	80.0	72 00.0	+ 60.0	83.0	72
73	70 52.8	+ 55.5	62.4	71 19.4	+ 56.6	65.0	71 43.5	+ 57.5	67.7	72 04.8	+ 58.4	70.6	72 23.3	+ 59.1	73.6	72 38.7	+ 59.6	76.6	72 51.0	+ 59.9	79.8	73 00.0	+ 60.0	83.0	73
74	71 48.3	+ 55.1	61.2	72 16.0	+ 56.2	63.9	72 41.0	+ 57.3	66.8	73 03.2	+ 58.2	69.8	73 22.4	+ 58.9	73.0	73 38.3	+ 59.5	76.2	73 50.9	+ 59.9	79.6	74 00.0	+ 60.0	83.0	74
75	72 43.4	+ 54.5	59.9	73 12.2	+ 55.8	62.7	73 38.3	+ 56.9	65.8	74 01.4	+ 57.9	69.0	74 21.3	+ 58.8	72.3	74 37.8	+ 59.5	75.8	74 50.8	+ 59.8	79.3	75 00.0	+ 60.0	83.0	75
76	73 37.9	+ 53.8	58.4	74 08.0	+ 55.2	61.4	74 35.2	+ 56.5	64.6	74 59.3	+ 57.7	68.0	75 20.1	+ 58.6	71.5	75 37.3	+ 59.4	75.2	75 50.6	+ 59.9	79.1	76 00.0	+ 60.0	83.0	76
77	74 31.7	+ 53.1	56.8	75 03.2	+ 54.6	60.0	75 31.7	+ 56.1	63.3	75 57.0	+ 57.3	66.9	76 18.7	+ 58.5	70.7	76 36.7	+ 59.2	74.6	76 50.5	+ 59.8	78.7	77 00.0	+ 60.0	83.0	77
78	75 24.8	+ 52.1	55.0	75 57.8	+ 53.8	58.3	76 27.8	+ 55.4	61.8	76 54.3	+ 56.9	65.6	77 17.2	+ 58.1	69.7	77 35.9	+ 59.2	73.9	77 50.3	+ 59.8	78.4	78 00.0	+ 60.0	83.0	78
79	76 16.9	+ 51.1	53.0	76 51.6	+ 52.9	56.4	77 23.2	+ 54.7	60.1	77 51.2	+ 56.4	64.2	78 15.3	+ 57.9	68.5	78 35.1	+ 59.0	73.1	78 50.1	+ 59.7	78.0	79 00.0	+ 60.0	83.0	79
80	77 08.0	+ 49.6	50.7	77 44.5	+ 51.7	54.3	78 17.9	+ 53.8	58.2	78 47.6	+ 55.7	62.5	79 13.2	+ 57.4	67.1	79 34.1	+ 58.7	72.1	79 49.8	+ 59.7	77.5	80 00.0	+ 60.0	83.0	80
81	77 57.6	+ 48.0	48.1	78 36.2	+ 50.3	51.8	79 11.7	+ 52.5	55.9	79 43.3	+ 54.8	60.5	80 10.6	+ 56.8	65.5	80 32.8	+ 58.5	71.0	80 49.5	+ 59.6	76.8	81 00.0	+ 60.0	83.0	81
82	78 45.6	*+ 46.0* •	45.1	79 26.5	*+ 48.5* •	48.9	80 04.2	+ 51.1	53.2	80 38.1	+ 53.7	58.1	81 07.4	+ 56.1	63.5	81 31.3	+ 58.1	69.5	81 49.1	+ 59.5	76.1	82 00.0	+ 60.0	83.0	82
83	79 31.6	*+ 43.4* •	41.7	80 15.0	*+ 46.2* •	45.6	80 55.3	*+ 49.1* •	50.1	81 31.8	+ 52.1	55.2	82 03.5	+ 55.0	61.1	82 29.4	+ 57.6	67.8	82 48.6	+ 59.3	75.1	83 00.0	+ 60.0	83.0	83
84	80 15.0	*+ 40.3* •	37.8	81 01.2	*+ 43.2* •	41.7	81 44.4	*+ 46.5* •	46.2	82 23.9	*+ 49.9* •	51.7	82 58.5	+ 53.4	58.0	83 27.0	+ 56.6	65.4	83 47.9	+ 59.1	73.8	84 00.0	+ 60.0	83.0	84
85	80 55.3	*+ 36.5* •	33.2	81 44.4	*+ 39.5* •	37.0	82 30.9	*+ 42.9* •	41.6	83 13.8	*+ 46.8* •	47.2	83 51.9	*+ 51.1* •	54.0	84 23.6	+ 55.3	62.3	84 47.0	+ 58.6	72.1	85 00.0	+ 60.0	83.0	85
86	81 31.8	*+ 31.7* •	28.0	82 23.9	*+ 34.6* •	31.6	83 13.8	*+ 38.1* •	36.0	84 00.6	*+ 42.4* •	41.6	84 43.0	*+ 47.4* •	48.8	85 18.9	*+ 53.0* •	58.0	85 45.6	+ 57.9	69.5	86 00.0	+ 60.0	83.0	86
87	82 03.5	*+ 25.9* •	22.1	82 58.5	*+ 28.5* •	25.1	83 51.9	*+ 31.7* •	29.1	84 43.0	*+ 35.9* •	34.3	85 30.4	*+ 41.5* •	41.5	86 11.9	*+ 48.4* •	51.6	86 43.5	*+ 56.0* •	65.4	87 00.0	+ 60.0	83.0	87
88	82 29.4	*+ 19.2* •	15.4	83 27.0	*+ 20.9* •	17.7	84 23.6	*+ 23.4* •	20.8	85 18.9	*+ 26.7* •	25.1	86 11.9	*+ 31.6* •	31.5	87 00.3	*+ 39.2* •	41.5	87 39.5	*+ 50.6* •	57.9	88 00.0	+ 60.0	83.0	88
89	82 48.6	*+ 11.4* •	8.0	83 47.9	*+ 12.1* •	9.2	84 47.0	*+ 13.0* •	11.0	85 45.6	*+ 14.4* •	13.6	86 43.5	*+ 16.5* •	17.6	87 39.5	*+ 20.5* •	25.1	88 30.1	*+ 29.9* •	41.5	89 00.0	+ 60.0	83.0	89
90	83 00.0	*+ 3.1* •	0.0	84 00.0	*+ 2.3* •	0.0	85 00.0	*+ 1.3* •	0.0	86 00.0	*– 0.2* •	0.0	87 00.0	*– 2.7* •	0.0	88 00.0	*– 7.5* •	0.0	89 00.0	*– 19.5* •	0.0	90 00.0	– 60.0	41.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 97°, 263°

84°, 276° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 43.8	+59.6	96.0	0 37.6	+59.6	96.0	0 31.3	+59.8	96.0	0 25.1	+59.8	96.0	0 18.8	+59.9	96.0	0 12.5	+60.0	96.0	0 06.3	+60.0	96.0	0 00.0	+60.0	96.0	0
1	1 43.4	+59.5	95.8	1 37.2	+59.7	95.9	1 31.1	+59.8	95.9	1 24.9	+59.9	95.9	1 18.7	+59.9	95.9	1 12.5	+60.0	96.0	1 06.3	+60.0	96.0	1 00.0	+60.0	96.0	1
2	2 42.9	+59.6	95.7	2 36.9	+59.7	95.8	2 30.9	+59.7	95.8	2 24.8	+59.8	95.8	2 18.6	+60.0	95.9	2 12.5	+59.9	95.9	2 06.3	+59.9	96.0	2 00.0	+60.0	96.0	2
3	3 42.5	+59.5	95.6	3 36.6	+59.7	95.7	3 30.6	+59.8	95.7	3 24.6	+59.9	95.8	3 18.6	+59.9	95.8	3 12.4	+60.0	95.9	3 06.2	+60.0	95.9	3 00.0	+60.0	96.0	3
4	4 42.0	+59.6	95.5	4 36.3	+59.6	95.6	4 30.4	+59.8	95.6	4 24.5	+59.8	95.7	4 18.5	+59.9	95.8	4 12.4	+60.0	95.9	4 06.2	+60.0	95.9	4 00.0	+60.0	96.0	4
5	5 41.6	+59.5	95.3	5 35.9	+59.7	95.4	5 30.2	+59.8	95.5	5 24.3	+59.9	95.6	5 18.4	+59.9	95.7	5 12.4	+59.9	95.8	5 06.2	+60.0	95.9	5 00.0	+60.0	96.0	5
6	6 41.1	+59.6	95.2	6 35.6	+59.7	95.3	6 30.0	+59.7	95.5	6 24.2	+59.8	95.6	6 18.3	+59.9	95.7	6 12.3	+60.0	95.8	6 06.2	+60.0	95.9	6 00.0	+60.0	96.0	6
7	7 40.7	+59.5	95.1	7 35.3	+59.6	95.2	7 29.7	+59.8	95.4	7 24.0	+59.9	95.5	7 18.2	+60.0	95.6	7 12.3	+59.9	95.8	7 06.2	+60.0	95.9	7 00.0	+60.0	96.0	7
8	8 40.2	+59.6	95.0	8 34.9	+59.7	95.1	8 29.5	+59.8	95.3	8 23.9	+59.9	95.4	8 18.2	+59.9	95.6	8 12.2	+60.0	95.7	8 06.2	+60.0	95.9	8 00.0	+60.0	96.0	8
9	9 39.8	+59.5	94.9	9 34.6	+59.7	95.0	9 29.3	+59.7	95.2	9 23.8	+59.8	95.4	9 18.1	+59.9	95.5	9 12.2	+60.0	95.7	9 06.2	+60.0	95.8	9 00.0	+60.0	96.0	9
10	10 39.3	+59.6	94.7	10 34.3	+59.6	94.9	10 29.0	+59.8	95.1	10 23.6	+59.9	95.3	10 18.0	+59.9	95.5	10 12.2	+59.9	95.6	10 06.2	+60.0	95.8	10 00.0	+60.0	96.0	10
11	11 38.9	+59.5	94.6	11 33.9	+59.7	94.8	11 28.8	+59.8	95.0	11 23.5	+59.8	95.2	11 17.9	+59.9	95.4	11 12.1	+60.0	95.6	11 06.2	+60.0	95.8	11 00.0	+60.0	96.0	11
12	12 38.4	+59.5	94.5	12 33.6	+59.7	94.7	12 28.6	+59.7	94.9	12 23.3	+59.9	95.1	12 17.8	+59.9	95.4	12 12.1	+60.0	95.6	12 06.2	+60.0	95.8	12 00.0	+60.0	96.0	12
13	13 37.9	+59.6	94.3	13 33.3	+59.6	94.6	13 28.3	+59.8	94.8	13 23.2	+59.8	95.1	13 17.7	+59.9	95.3	13 12.1	+59.9	95.5	13 06.2	+59.9	95.8	13 00.0	+60.0	96.0	13
14	14 37.5	+59.5	94.2	14 32.9	+59.7	94.5	14 28.1	+59.7	94.7	14 23.0	+59.8	95.0	14 17.6	+60.0	95.2	14 12.0	+60.0	95.5	14 06.1	+60.0	95.8	14 00.0	+60.0	96.0	14
15	15 37.0	+59.5	94.1	15 32.6	+59.6	94.4	15 27.8	+59.8	94.6	15 22.8	+59.9	94.9	15 17.6	+59.9	95.2	15 12.0	+59.9	95.5	15 06.1	+60.0	95.7	15 00.0	+60.0	96.0	15
16	16 36.5	+59.5	94.0	16 32.2	+59.6	94.3	16 27.6	+59.8	94.5	16 22.7	+59.8	94.8	16 17.5	+59.9	95.1	16 11.9	+60.0	95.4	16 06.1	+60.0	95.7	16 00.0	+60.0	96.0	16
17	17 36.0	+59.5	93.8	17 31.8	+59.7	94.1	17 27.4	+59.7	94.5	17 22.5	+59.9	94.8	17 17.4	+59.9	95.1	17 11.9	+60.0	95.4	17 06.1	+60.0	95.7	17 00.0	+60.0	96.0	17
18	18 35.5	+59.5	93.7	18 31.5	+59.6	94.0	18 27.1	+59.8	94.4	18 22.4	+59.8	94.7	18 17.3	+59.9	95.0	18 11.9	+59.9	95.3	18 06.1	+60.0	95.7	18 00.0	+60.0	96.0	18
19	19 35.0	+59.5	93.6	19 31.1	+59.7	93.9	19 26.9	+59.7	94.3	19 22.2	+59.8	94.6	19 17.2	+59.9	95.0	19 11.8	+60.0	95.3	19 06.1	+60.0	95.7	19 00.0	+60.0	96.0	19
20	20 34.5	+59.5	93.4	20 30.8	+59.6	93.8	20 26.6	+59.7	94.2	20 22.0	+59.9	94.5	20 17.1	+59.9	94.9	20 11.8	+59.9	95.3	20 06.1	+60.0	95.6	20 00.0	+60.0	96.0	20
21	21 34.0	+59.5	93.3	21 30.4	+59.6	93.7	21 26.3	+59.8	94.1	21 21.9	+59.8	94.5	21 17.0	+59.9	94.8	21 11.7	+60.0	95.2	21 06.1	+60.0	95.6	21 00.0	+60.0	96.0	21
22	22 33.5	+59.5	93.1	22 30.0	+59.6	93.6	22 26.1	+59.7	94.0	22 21.7	+59.8	94.4	22 16.9	+59.9	94.8	22 11.7	+60.0	95.2	22 06.1	+60.0	95.6	22 00.0	+60.0	96.0	22
23	23 33.0	+59.5	93.0	23 29.6	+59.6	93.4	23 25.8	+59.7	93.9	23 21.5	+59.9	94.3	23 16.8	+59.9	94.7	23 11.7	+59.9	95.2	23 06.1	+59.9	95.6	23 00.0	+60.0	96.0	23
24	24 32.5	+59.4	92.8	24 29.2	+59.6	93.3	24 25.5	+59.8	93.8	24 21.4	+59.8	94.2	24 16.7	+59.9	94.7	24 11.6	+60.0	95.1	24 06.0	+60.0	95.6	24 00.0	+60.0	96.0	24
25	25 31.9	+59.5	92.7	25 28.8	+59.6	93.2	25 25.3	+59.7	93.7	25 21.2	+59.8	94.1	25 16.6	+59.9	94.6	25 11.6	+59.9	95.1	25 06.0	+60.0	95.5	25 00.0	+60.0	96.0	25
26	26 31.4	+59.4	92.6	26 28.4	+59.6	93.0	26 25.0	+59.7	93.5	26 21.0	+59.8	94.0	26 16.5	+59.9	94.5	26 11.5	+60.0	95.0	26 06.0	+60.0	95.5	26 00.0	+60.0	96.0	26
27	27 30.8	+59.4	92.4	27 28.0	+59.6	92.9	27 24.7	+59.7	93.4	27 20.8	+59.8	94.0	27 16.4	+59.9	94.5	27 11.5	+59.9	95.0	27 06.0	+60.0	95.5	27 00.0	+60.0	96.0	27
28	28 30.2	+59.5	92.2	28 27.6	+59.6	92.8	28 24.4	+59.7	93.3	28 20.6	+59.9	93.9	28 16.3	+59.9	94.4	28 11.4	+60.0	94.9	28 06.0	+60.0	95.5	28 00.0	+60.0	96.0	28
29	29 29.7	+59.4	92.1	29 27.2	+59.5	92.6	29 24.1	+59.7	93.2	29 20.5	+59.8	93.8	29 16.2	+59.9	94.3	29 11.4	+59.9	94.9	29 06.0	+60.0	95.4	29 00.0	+60.0	96.0	29
30	30 29.1	+59.4	91.9	30 26.7	+59.6	92.5	30 23.8	+59.7	93.1	30 20.3	+59.8	93.7	30 16.1	+59.9	94.3	30 11.3	+60.0	94.8	30 06.0	+60.0	95.4	30 00.0	+60.0	96.0	30
31	31 28.5	+59.4	91.8	31 26.3	+59.6	92.4	31 23.5	+59.7	93.0	31 20.1	+59.8	93.6	31 16.0	+59.9	94.2	31 11.3	+59.9	94.8	31 06.0	+59.9	95.4	31 00.0	+60.0	96.0	31
32	32 27.9	+59.3	91.6	32 25.9	+59.5	92.2	32 23.2	+59.7	92.9	32 19.9	+59.8	93.5	32 15.9	+59.9	94.1	32 11.2	+60.0	94.8	32 05.9	+60.0	95.4	32 00.0	+60.0	96.0	32
33	33 27.2	+59.4	91.4	33 25.4	+59.5	92.1	33 22.9	+59.6	92.7	33 19.7	+59.8	93.4	33 15.8	+59.9	94.0	33 11.2	+59.9	94.7	33 05.9	+60.0	95.4	33 00.0	+60.0	96.0	33
34	34 26.6	+59.3	91.2	34 24.9	+59.5	91.9	34 22.5	+59.7	92.6	34 19.5	+59.7	93.3	34 15.7	+59.8	94.0	34 11.1	+60.0	94.7	34 05.9	+60.0	95.3	34 00.0	+60.0	96.0	34
35	35 25.9	+59.3	91.1	35 24.4	+59.5	91.8	35 22.2	+59.7	92.5	35 19.2	+59.8	93.2	35 15.5	+59.9	93.9	35 11.1	+59.9	94.6	35 05.9	+60.0	95.3	35 00.0	+60.0	96.0	35
36	36 25.2	+59.3	90.9	36 23.9	+59.5	91.6	36 21.9	+59.6	92.3	36 19.0	+59.8	93.1	36 15.4	+59.9	93.8	36 11.0	+60.0	94.5	36 05.9	+60.0	95.3	36 00.0	+60.0	96.0	36
37	37 24.5	+59.3	90.7	37 23.4	+59.5	91.5	37 21.5	+59.6	92.2	37 18.8	+59.8	93.0	37 15.3	+59.9	93.7	37 11.0	+59.9	94.5	37 05.9	+60.0	95.2	37 00.0	+60.0	96.0	37
38	38 23.8	+59.3	90.5	38 22.9	+59.5	91.3	38 21.1	+59.7	92.1	38 18.6	+59.7	92.9	38 15.2	+59.8	93.7	38 10.9	+60.0	94.4	38 05.9	+60.0	95.2	38 00.0	+60.0	96.0	38
39	39 23.1	+59.3	90.3	39 22.4	+59.4	91.1	39 20.8	+59.6	91.9	39 18.3	+59.8	92.8	39 15.0	+59.9	93.6	39 10.9	+59.9	94.4	39 05.9	+59.9	95.2	39 00.0	+60.0	96.0	39
40	40 22.4	+59.2	90.1	40 21.8	+59.4	90.9	40 20.4	+59.6	91.8	40 18.1	+59.7	92.6	40 14.9	+59.8	93.5	40 10.8	+59.9	94.3	40 05.8	+60.0	95.2	40 00.0	+60.0	96.0	40
41	41 21.6	+59.2	89.9	41 21.2	+59.5	90.8	41 20.0	+59.6	91.6	41 17.8	+59.8	92.5	41 14.7	+59.9	93.4	41 10.7	+60.0	94.3	41 05.8	+60.0	95.1	41 00.0	+60.0	96.0	41
42	42 20.8	+59.2	89.7	42 20.7	+59.4	90.6	42 19.6	+59.6	91.5	42 17.6	+59.7	92.4	42 14.6	+59.8	93.3	42 10.7	+59.9	94.2	42 05.8	+60.0	95.1	42 00.0	+60.0	96.0	42
43	43 20.0	+59.1	89.4	43 20.1	+59.3	90.4	43 19.2	+59.5	91.3	43 17.3	+59.7	92.3	43 14.4	+59.9	93.2	43 10.6	+59.9	94.1	43 05.8	+60.0	95.1	43 00.0	+60.0	96.0	43
44	44 19.1	+59.1	89.2	44 19.4	+59.4	90.2	44 18.7	+59.6	91.2	44 17.0	+59.7	92.1	44 14.3	+59.8	93.1	44 10.5	+60.0	94.1	44 05.8	+60.0	95.0	44 00.0	+60.0	96.0	44
45	45 18.2	+59.1	89.0	45 18.8	+59.3	90.0	45 18.3	+59.5	91.0	45 16.7	+59.7	92.0	45 14.1	+59.9	93.0	45 10.5	+59.9	94.0	45 05.8	+59.9	95.0	45 00.0	+60.0	96.0	45
46	46 17.3	+59.1	88.7	46 18.1	+59.3	89.8	46 17.8	+59.5	90.8	46 16.4	+59.7	91.8	46 14.0	+59.8	92.9	46 10.4	+59.9	93.9	46 05.7	+60.0	95.0	46 00.0	+60.0	96.0	46
47	47 16.4	+59.0	88.4	47 17.4	+59.3	89.5	47 17.3	+59.5	90.6	47 16.1	+59.7	91.7	47 13.8	+59.8	92.8	47 10.3	+59.9	93.9	47 05.7	+60.0	94.9	47 00.0	+60.0	96.0	47
48	48 15.4	+58.9	88.2	48 16.7	+59.2	89.3	48 16.8	+59.5	90.4	48 15.8	+59.7	91.5	48 13.6	+59.8	92.7	48 10.2	+59.9	93.8	48 05.7	+60.0	94.9	48 00.0	+60.0	96.0	48
49	49 14.3	+59.0	87.9	49 15.9	+59.3	89.1	49 16.3	+59.5	90.2	49 15.5	+59.6	91.4	49 13.4	+59.8	92.5	49 10.1	+60.0	93.7	49 05.7	+60.0	94.9	49 00.0	+60.0	96.0	49
50	50 13.3	+58.9	87.6	50 15.2	+59.1	88.8	50 15.8	+59.4	90.0	50 15.1	+59.7	91.2	50 13.2	+59.8	92.4	50 10.1	+59.9	93.6	50 05.7	+59.9	94.8	50 00.0	+60.0	96.0	50
51	51 12.2	+58.8	87.3	51 14.3	+59.2	88.6	51 15.2	+59.4	89.8	51 14.8	+59.6	91.0	51 13.0	+59.8	92.3	51 10.0	+59.9	93.5	51 05.6	+60.0	94.8	51 00.0	+60.0	96.0	51
52	52 11.0	+58.8	87.0	52 13.5	+59.1	88.3	52 14.6	+59.4	89.6	52 14.4	+59.6	90.9	52 12.8	+59.8	92.2	52 09.9	+59.9	93.4	52 05.6	+60.0	94.7	52 00.0	+60.0	96.0	52
53	53 09.8	+58.7	86.7	53 12.6	+59.1	88.0	53 14.0	+59.3	89.3	53 14.0	+59.6	90.7	53 12.6	+59.8	92.0	53 09.8	+59.9	93.3	53 05.6	+60.0	94.7	53 00.0	+60.0	96.0	53
54	54 08.5	+58.7	86.3	54 11.7	+59.0	87.7	54 13.3	+59.4	89.1	54 13.6	+59.5	90.5	54 12.4	+59.7	91.9	54 09.7	+59.9	93.2	54 05.6	+59.9	94.6	54 00.0	+60.0	96.0	54
55	55 07.2	+58.6	86.0	55 10.7	+59.0	87.4	55 12.7	+59.3	88.8	55 13.1	+59.6	90.3	55 12.1	+59.8	91.7	55 09.6	+59.9	93.1	55 05.5	+60.0	94.6	55 00.0	+60.0	96.0	55
56	56 05.8	+58.5	85.6	56 09.7	+58.9	87.1	56 12.0	+59.2	88.6	56 12.7	+59.5	90.0	56 11.9	+59.7	91.5	56 09.5	+59.8	93.0	56 05.5	+60.0	94.5	56 00.0	+60.0	96.0	56
57	57 04.3	+58.5	85.2	57 08.6	+58.8	86.7	57 11.2	+59.2	88.3	57 12.2	+59.5	89.8	57 11.6	+59.7	91.4	57 09.3	+59.9	92.9	57 05.5	+59.9	94.5	57 00.0	+60.0	96.0	57
58	58 02.8	+58.3	84.8	58 07.4	+58.8	86.4	58 10.4	+59.2	88.0	58 11.7	+59.5	89.6	58 11.3	+59.7	91.2	58 09.2	+59.9	92.8	58 05.4	+60.0	94.4	58 00.0	+60.0	96.0	58
59	59 01.1	+58.3	84.3	59 06.2	+58.7	86.0	59 09.6	+59.1	87.6	59 11.2	+59.4	89.3	59 11.0	+59.7	91.0	59 09.1	+59.8	92.7	59 05.4	+60.0	94.3	59 00.0	+60.0	96.0	59
60	59 59.4	+58.2	83.8	60 04.9	+58.7	85.6	60 08.7	+59.0	87.3	60 10.6	+59.4	89.0	60 10.7	+59.6	90.8	60 08.9	+59.9	92.5	60 05.4	+59.9	94.3	60 00.0	+60.0	96.0	60
61	60 57.6	+58.0	83.3	61 03.6	+58.5	85.1	61 07.7	+59.0	86.9	61 10.0	+59.3	88.8	61 10.3	+59.7	90.6	61 08.8	+59.8	92.4	61 05.3	+60.0	94.2	61 00.0	+60.0	96.0	61
62	61 55.6	+57.9	82.8	62 02.1	+58.5	84.7	62 06.7	+59.0	86.6	62 09.3	+59.4	88.4	62 10.0	+59.6	90.3	62 08.6	+59.9	92.2	62 05.3	+60.0	94.1	62 00.0	+60.0	96.0	62
63	62 53.5	+57.8	82.2	63 00.6	+58.3	84.2	63 05.7	+58.8	86.2	63 08.7	+59.2	88.1	63 09.6	+59.6	90.1	63 08.5	+59.8	92.1	63 05.3	+59.9	94.0	63 00.0	+60.0	96.0	63
64	63 51.3	+57.6	81.6	63 58.9	+58.3	83.7	64 04.5	+58.8	85.7	64 07.9	+59.2	87.8	64 09.2	+59.5	89.8	64 08.3	+59.8	91.9	64 05.2	+60.0	94.0	64 00.0	+60.0	96.0	64
65	64 48.9	+57.4	81.0	64 57.2	+58.1	83.1	65 03.3	+58.6	85.2	65 07.1	+59.2	87.4	65 08.7	+59.5	89.5	65 08.1	+59.8	91.7	65 05.2	+59.9	93.9	65 00.0	+60.0	96.0	65
66	65 46.3	+57.2	80.3	65 55.3	+57.9	82.5	66 01.9	+58.6	84.7	66 06.3	+59.0	87.0	66 08.2	+59.5	89.2	66 07.9	+59.7	91.5	66 05.1	+59.9	93.8	66 00.0	+60.0	96.0	66
67	66 43.5	+57.0	79.6	66 53.2	+57.8	81.9	67 00.5	+58.4	84.2	67 05.3	+59.0	86.5	67 07.7	+59.5	88.9	67 07.6	+59.8	91.3	67 05.0	+60.0	93.6	67 00.0	+60.0	96.0	67
68	67 40.5	+56.7	78.7	67 51.0	+57.6	81.2	67 58.9	+58.3	83.6	68 04.3	+59.0	86.1	68 07.2	+59.3	88.6	68 07.4	+59.7	91.0	68 05.0	+59.9	93.5	68 00.0	+60.0	96.0	68
69	68 37.2	+56.5	77.9	68 48.6	+57.3	80.4	68 57.2	+58.2	83.0	69 03.3	+58.8	85.5	69 06.5	+59.4	88.2	69 07.1	+59.7	90.8	69 04.9	+59.9	93.4	69 00.0	+60.0	96.0	69
70	69 33.7	+56.1	76.9	69 45.9	+57.1	79.6	69 55.4	+57.9	82.3	70 02.1	+58.6	85.0	70 05.9	+59.2	87.7	70 06.8	+59.7	90.5	70 04.8	+60.0	93.3	70 00.0	+60.0	96.0	70
71	70 29.8	+55.7	75.9	70 43.0	+56.8	78.7	70 53.3	+57.8	81.5	71 00.7	+58.6	84.4	71 05.1	+59.2	87.3	71 06.5	+59.6	90.2	71 04.8	+59.9	93.1	71 00.0	+60.0	96.0	71
72	71 25.5	+55.2	74.7	71 39.8	+56.4	77.7	71 51.1	+57.5	80.6	71 59.3	+58.4	83.7	72 04.3	+59.1	86.7	72 06.1	+59.6	89.8	72 04.7	+59.9	92.9	72 00.0	+60.0	96.0	72
73	72 20.7	+54.7	73.5	72 36.2	+56.1	76.5	72 48.6	+57.2	79.7	72 57.7	+58.2	82.9	73 03.4	+59.0	86.2	73 05.7	+59.6	89.4	73 04.6	+59.9	92.7	73 00.0	+60.0	96.0	73
74	73 15.4	+54.1	72.1	73 32.3	+55.5	75.3	73 45.8	+56.9	78.6	73 55.9	+57.9	82.0	74 02.4	+58.8	85.5	74 05.3	+59.4	89.0	74 04.5	+59.8	92.5	74 00.0	+60.0	96.0	74
75	74 09.5	+53.4	70.6	74 27.8	+55.0	73.9	74 42.7	+56.4	77.5	74 53.8	+57.7	81.1	75 01.2	+58.7	84.8	75 04.7	+59.5	88.5	75 04.3	+59.9	92.3	75 00.0	+60.0	96.0	75
76	75 02.9	+52.5	68.8	75 22.8	+54.3	72.4	75 39.1	+55.9	76.1	75 51.5	+57.4	80.0	75 59.9	+58.5	83.9	76 04.2	+59.3	88.0	76 04.2	+59.8	92.0	76 00.0	+60.0	96.0	76
77	75 55.4	+51.5	66.9	76 17.1	+53.5	70.7	76 35.0	+55.4	74.6	76 48.9	+56.9	78.7	76 58.4	+58.2	83.0	77 03.5	+59.2	87.3	77 04.0	+59.8	91.7	77 00.0	+60.0	96.0	77
78	76 46.9	+50.2	64.7	77 10.6	+52.5	68.7	77 30.4	+54.5	72.9	77 45.8	+56.4	77.3	77 56.6	+58.0	81.9	78 02.7	+59.1	86.6	78 03.8	+59.8	91.3	78 00.0	+60.0	96.0	78
79	77 37.1	+48.7	62.3	78 03.1	+51.2	66.4	78 24.9	+53.6	70.9	78 42.2	+55.8	75.6	78 54.6	+57.5	80.6	79 01.8	+58.9	85.7	79 03.6	+59.7	90.8	79 00.0	+60.0	96.0	79
80	78 25.8	+46.8•	59.4	78 54.3	+49.7	63.8	79 18.5	+52.4	68.6	79 38.0	+54.9	73.7	79 52.1	+57.1	79.0	80 00.7	+58.6	84.6	80 03.3	+59.7	90.3	80 00.0	+60.0	96.0	80
81	79 12.6	+44.5•	56.2	79 44.0	+47.6•	60.8	80 10.9	+50.8	65.8	80 32.9	+53.7	71.3	80 49.2	+56.3	77.2	80 59.3	+58.3	83.4	81 03.0	+59.6	89.7	81 00.0	+60.0	96.0	81
82	79 57.1	+41.6•	52.5	80 31.6	+45.2•	57.2	81 01.7	+48.8•	62.6	81 26.6	+52.3	68.5	81 45.5	+55.4	74.9	81 57.6	+57.9	81.8	82 02.6	+59.4	88.9	82 00.0	+60.0	96.0	82
83	80 38.7	+38.1•	48.2	81 16.8	+41.9•	53.1	81 50.5	+46.0•	58.7	82 18.9	+50.1•	65.0	82 40.9	+54.0	72.1	82 55.5	+57.2	79.8	83 02.0	+59.3	87.8	83 00.0	+60.0	96.0	83
84	81 16.8	+33.7•	43.3	81 58.7	+37.8•	48.2	82 36.5	+42.3•	53.9	83 09.0	+47.1•	60.6	83 34.9	+51.9•	68.4	83 52.7	+56.1	77.1	84 01.3	+59.0	86.5	84 00.0	+60.0	96.0	84
85	81 50.5	+28.4•	37.6	82 36.5	+32.5•	42.4	83 18.8	+37.3•	48.1	83 56.1	+42.9•	55.1	84 26.8	+48.7•	63.6	84 48.8	+54.4•	73.5	85 00.3	+58.5	84.5	85 00.0	+60.0	96.0	85
86	82 18.9	+22.0•	31.2	83 09.0	+25.9•	35.6	83 56.1	+30.7•	41.0	84 39.0	+36.5•	48.1	85 15.5	+43.7•	57.1	85 43.2	+51.2•	68.4	85 58.8	+57.5	81.7	86 00.0	+60.0	96.0	86
87	82 40.9	+14.6•	24.1	83 34.9	+17.8•	27.7	84 26.8	+22.0•	32.5	85 15.5	+27.7•	39.0	85 59.2	+35.2•	48.0	86 34.4	+45.0•	60.6	86 56.3	+55.3•	77.1	87 00.0	+60.0	96.0	87
88	82 55.5	+6.5•	16.4	83 52.7	+8.6•	19.0	84 48.8	+11.5•	22.6	85 43.2	+15.6•	27.7	86 34.4	+21.9•	35.5	87 19.4	+32.2•	48.0	87 51.6	+48.1•	68.3	88 00.0	+60.0	96.0	88
89	83 02.0	−2.0•	8.2	84 01.3	−1.3•	9.6	85 00.3	−0.3•	11.5	85 58.8	+1.2•	14.3	86 56.3	+3.7•	19.0	87 51.6	+8.4•	27.7	88 39.7	+20.3•	48.0	89 00.0	+60.0	96.0	89
90	83 00.0	−10.4•	0.0	84 00.0	−11.1•	0.0	85 00.0	−12.0•	0.0	86 00.0	−13.4•	0.0	87 00.0	−15.6•	0.0	88 00.0	−19.7•	0.0	89 00.0	−29.2•	0.0	90 00.0	−60.0	48.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 84°, 276°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 43.8	–59.6	96.0	0 37.6	–59.7	96.0	0 31.3	–59.8	96.0	0 25.1	–59.9	96.0	0 18.8	–59.9	96.0	0 12.5	–59.9	96.0	0 06.3	–60.0	96.0	0 00.0	+60.0	84.0	0
1	0 15.8	+59.5	83.9	0 22.1	+59.7	83.9	0 28.5	+59.7	83.9	0 34.8	+59.8	83.9	0 41.1	+59.9	84.0	0 47.4	+60.0	84.0	0 53.7	+60.0	84.0	1 00.0	+60.0	84.0	1
2	1 15.3	+59.6	83.8	1 21.8	+59.7	83.8	1 28.2	+59.8	83.8	1 34.6	+59.9	83.8	1 41.0	+59.9	83.9	1 47.4	+60.0	83.9	1 53.7	+60.0	84.0	2 00.0	+60.0	84.0	2
3	2 14.9	+59.5	83.7	2 21.5	+59.6	83.7	2 28.0	+59.8	83.8	2 34.5	+59.9	83.8	2 40.9	+60.0	83.9	2 47.4	+59.9	83.9	2 53.7	+60.0	83.9	3 00.0	+60.0	84.0	3
4	3 14.4	+59.6	83.6	3 21.1	+59.7	83.6	3 27.8	+59.7	83.7	3 34.4	+59.8	83.7	3 40.9	+59.9	83.8	3 47.3	+60.0	83.9	3 53.7	+60.0	83.9	4 00.0	+60.0	84.0	4
5	4 14.0	+59.5	83.4	4 20.8	+59.7	83.5	4 27.5	+59.8	83.6	4 34.2	+59.9	83.7	4 40.8	+59.9	83.7	4 47.3	+59.9	83.8	4 53.7	+60.0	83.9	5 00.0	+60.0	84.0	5
6	5 13.5	+59.6	83.3	5 20.5	+59.7	83.4	5 27.3	+59.8	83.5	5 34.1	+59.8	83.6	5 40.7	+59.9	83.7	5 47.2	+60.0	83.8	5 53.7	+60.0	83.9	6 00.0	+60.0	84.0	6
7	6 13.1	+59.6	83.2	6 20.2	+59.6	83.3	6 27.1	+59.8	83.4	6 33.9	+59.9	83.5	6 40.6	+59.9	83.6	6 47.2	+60.0	83.8	6 53.7	+60.0	83.9	7 00.0	+60.0	84.0	7
8	7 12.7	+59.5	83.1	7 19.8	+59.7	83.2	7 26.9	+59.7	83.3	7 33.8	+59.8	83.5	7 40.5	+60.0	83.6	7 47.2	+59.9	83.7	7 53.7	+59.9	83.9	8 00.0	+60.0	84.0	8
9	8 12.2	+59.5	82.9	8 19.5	+59.7	83.1	8 26.6	+59.8	83.2	8 33.6	+59.9	83.4	8 40.5	+59.9	83.5	8 47.1	+60.0	83.7	8 53.6	+60.0	83.8	9 00.0	+60.0	84.0	9
10	9 11.7	+59.6	82.8	9 19.2	+59.6	83.0	9 26.4	+59.8	83.1	9 33.5	+59.8	83.3	9 40.4	+59.9	83.5	9 47.1	+60.0	83.7	9 53.6	+60.0	83.8	10 00.0	+60.0	84.0	10
11	10 11.3	+59.5	82.7	10 18.8	+59.7	82.9	10 26.2	+59.7	83.1	10 33.3	+59.9	83.2	10 40.3	+59.9	83.4	10 47.1	+59.9	83.6	10 53.6	+60.0	83.8	11 00.0	+60.0	84.0	11
12	11 10.8	+59.6	82.6	11 18.5	+59.6	82.8	11 25.9	+59.8	83.0	11 33.2	+59.8	83.2	11 40.2	+59.9	83.4	11 47.0	+60.0	83.6	11 53.6	+60.0	83.8	12 00.0	+60.0	84.0	12
13	12 10.4	+59.5	82.4	12 18.1	+59.7	82.7	12 25.7	+59.8	82.9	12 33.0	+59.9	83.1	12 40.1	+59.9	83.3	12 47.0	+59.9	83.5	12 53.6	+60.0	83.8	13 00.0	+60.0	84.0	13
14	13 09.9	+59.5	82.3	13 17.8	+59.7	82.6	13 25.5	+59.7	82.8	13 32.9	+59.8	83.0	13 40.0	+59.9	83.3	13 46.9	+60.0	83.5	13 53.6	+60.0	83.8	14 00.0	+60.0	84.0	14
15	14 09.4	+59.6	82.2	14 17.5	+59.6	82.4	14 25.2	+59.8	82.7	14 32.7	+59.9	83.0	14 39.9	+60.0	83.2	14 46.9	+60.0	83.5	14 53.6	+60.0	83.7	15 00.0	+60.0	84.0	15
16	15 09.0	+59.5	82.1	15 17.1	+59.7	82.3	15 25.0	+59.7	82.6	15 32.6	+59.8	82.9	15 39.9	+59.9	83.2	15 46.9	+59.9	83.4	15 53.6	+60.0	83.7	16 00.0	+60.0	84.0	16
17	16 08.5	+59.5	81.9	16 16.8	+59.6	82.2	16 24.7	+59.8	82.5	16 32.4	+59.8	82.8	16 39.8	+59.9	83.1	16 46.8	+60.0	83.4	16 53.6	+60.0	83.7	17 00.0	+60.0	84.0	17
18	17 08.0	+59.5	81.8	17 16.4	+59.6	82.1	17 24.5	+59.7	82.4	17 32.2	+59.9	82.7	17 39.7	+59.9	83.0	17 46.8	+59.9	83.4	17 53.6	+60.0	83.7	18 00.0	+60.0	84.0	18
19	18 07.5	+59.5	81.7	18 16.0	+59.7	82.0	18 24.2	+59.8	82.3	18 32.1	+59.8	82.6	18 39.6	+59.9	83.0	18 46.7	+60.0	83.3	18 53.6	+59.9	83.7	19 00.0	+60.0	84.0	19
20	19 07.0	+59.5	81.5	19 15.7	+59.6	81.9	19 24.0	+59.7	82.2	19 31.9	+59.9	82.6	19 39.5	+59.9	82.9	19 46.7	+60.0	83.3	19 53.5	+60.0	83.6	20 00.0	+60.0	84.0	20
21	20 06.5	+59.5	81.4	20 15.3	+59.6	81.8	20 23.7	+59.8	82.1	20 31.8	+59.8	82.5	20 39.4	+59.9	82.9	20 46.7	+59.9	83.2	20 53.5	+60.0	83.6	21 00.0	+60.0	84.0	21
22	21 06.0	+59.5	81.3	21 14.9	+59.7	81.6	21 23.5	+59.7	82.0	21 31.6	+59.8	82.4	21 39.3	+59.9	82.8	21 46.6	+60.0	83.2	21 53.5	+60.0	83.6	22 00.0	+60.0	84.0	22
23	22 05.5	+59.5	81.1	22 14.6	+59.6	81.5	22 23.2	+59.7	81.9	22 31.4	+59.9	82.3	22 39.2	+59.9	82.7	22 46.6	+59.9	83.2	22 53.5	+60.0	83.6	23 00.0	+60.0	84.0	23
24	23 05.0	+59.5	81.0	23 14.2	+59.6	81.4	23 22.9	+59.8	81.8	23 31.3	+59.8	82.3	23 39.1	+59.9	82.7	23 46.5	+60.0	83.1	23 53.5	+60.0	83.6	24 00.0	+60.0	84.0	24
25	24 04.5	+59.4	80.8	24 13.8	+59.6	81.3	24 22.7	+59.7	81.7	24 31.1	+59.8	82.2	24 39.0	+59.9	82.6	24 46.5	+60.0	83.1	24 53.5	+60.0	83.5	25 00.0	+60.0	84.0	25
26	25 03.9	+59.5	80.7	25 13.4	+59.6	81.1	25 22.4	+59.7	81.6	25 30.9	+59.8	82.1	25 38.9	+59.9	82.6	25 46.5	+59.9	83.0	25 53.5	+60.0	83.5	26 00.0	+60.0	84.0	26
27	26 03.4	+59.4	80.5	26 13.0	+59.6	81.0	26 22.1	+59.7	81.5	26 30.7	+59.8	82.0	26 38.8	+59.9	82.5	26 46.4	+60.0	83.0	26 53.5	+60.0	83.5	27 00.0	+60.0	84.0	27
28	27 02.8	+59.5	80.4	27 12.6	+59.6	80.9	27 21.8	+59.7	81.4	27 30.5	+59.9	81.9	27 38.7	+59.9	82.4	27 46.4	+59.9	82.9	27 53.5	+59.9	83.5	28 00.0	+60.0	84.0	28
29	28 02.3	+59.4	80.2	28 12.2	+59.6	80.8	28 21.5	+59.8	81.3	28 30.4	+59.8	81.8	28 38.6	+59.9	82.4	28 46.3	+60.0	82.9	28 53.4	+60.0	83.5	29 00.0	+60.0	84.0	29
30	29 01.7	+59.4	80.1	29 11.8	+59.5	80.6	29 21.3	+59.7	81.2	29 30.2	+59.8	81.7	29 38.5	+59.9	82.3	29 46.3	+59.9	82.9	29 53.4	+60.0	83.4	30 00.0	+60.0	84.0	30
31	30 01.1	+59.4	79.9	30 11.3	+59.6	80.5	30 21.0	+59.6	81.1	30 30.0	+59.8	81.6	30 38.4	+59.9	82.2	30 46.2	+60.0	82.8	30 53.4	+60.0	83.4	31 00.0	+60.0	84.0	31
32	31 00.5	+59.4	79.7	31 10.9	+59.5	80.3	31 20.6	+59.7	80.9	31 29.8	+59.8	81.5	31 38.3	+59.9	82.2	31 46.2	+59.9	82.8	31 53.4	+60.0	83.4	32 00.0	+60.0	84.0	32
33	31 59.9	+59.4	79.6	32 10.4	+59.6	80.2	32 20.3	+59.7	80.8	32 29.6	+59.8	81.4	32 38.2	+59.9	82.1	32 46.1	+60.0	82.7	32 53.4	+60.0	83.4	33 00.0	+60.0	84.0	33
34	32 59.3	+59.3	79.4	33 10.0	+59.5	80.1	33 20.0	+59.7	80.7	33 29.4	+59.8	81.3	33 38.1	+59.8	82.0	33 46.1	+59.9	82.7	33 53.4	+60.0	83.3	34 00.0	+60.0	84.0	34
35	33 58.6	+59.4	79.2	34 09.5	+59.5	79.9	34 19.7	+59.7	80.6	34 29.2	+59.8	81.2	34 37.9	+59.9	81.9	34 46.0	+60.0	82.6	34 53.4	+60.0	83.3	35 00.0	+60.0	84.0	35
36	34 58.0	+59.3	79.1	35 09.0	+59.5	79.7	35 19.4	+59.6	80.4	35 29.0	+59.7	81.1	35 37.8	+59.9	81.9	35 46.0	+59.9	82.6	35 53.4	+59.9	83.3	36 00.0	+60.0	84.0	36
37	35 57.3	+59.3	78.9	36 08.5	+59.5	79.6	36 19.0	+59.7	80.3	36 28.7	+59.8	81.0	36 37.7	+59.9	81.8	36 45.9	+59.9	82.5	36 53.3	+60.0	83.3	37 00.0	+60.0	84.0	37
38	36 56.6	+59.3	78.7	37 08.0	+59.5	79.4	37 18.7	+59.6	80.2	37 28.5	+59.8	80.9	37 37.6	+59.8	81.7	37 45.8	+60.0	82.5	37 53.3	+60.0	83.2	38 00.0	+60.0	84.0	38
39	37 55.9	+59.3	78.5	38 07.5	+59.5	79.3	38 18.3	+59.6	80.0	38 28.3	+59.7	80.8	38 37.4	+59.9	81.6	38 45.8	+59.9	82.4	38 53.3	+60.0	83.2	39 00.0	+60.0	84.0	39
40	38 55.2	+59.3	78.3	39 07.0	+59.4	79.1	39 17.9	+59.6	79.9	39 28.0	+59.8	80.7	39 37.3	+59.9	81.5	39 45.7	+60.0	82.3	39 53.3	+60.0	83.2	40 00.0	+60.0	84.0	40
41	39 54.5	+59.2	78.1	40 06.4	+59.5	78.9	40 17.5	+59.6	79.7	40 27.8	+59.7	80.6	40 37.2	+59.8	81.4	40 45.7	+59.9	82.3	40 53.3	+60.0	83.1	41 00.0	+60.0	84.0	41
42	40 53.7	+59.2	77.9	41 05.9	+59.4	78.7	41 17.1	+59.6	79.6	41 27.5	+59.8	80.5	41 37.0	+59.9	81.3	41 45.6	+59.9	82.2	41 53.3	+59.9	83.1	42 00.0	+60.0	84.0	42
43	41 52.9	+59.2	77.7	42 05.3	+59.4	78.6	42 16.7	+59.6	79.4	42 27.3	+59.7	80.3	42 36.9	+59.8	81.2	42 45.5	+60.0	82.2	42 53.2	+60.0	83.1	43 00.0	+60.0	84.0	43
44	42 52.1	+59.2	77.4	43 04.7	+59.4	78.4	43 16.3	+59.6	79.3	43 27.0	+59.7	80.2	43 36.7	+59.9	81.1	43 45.5	+59.9	82.1	43 53.2	+60.0	83.0	44 00.0	+60.0	84.0	44
45	43 51.3	+59.1	77.2	44 04.1	+59.3	78.2	44 15.9	+59.5	79.1	44 26.7	+59.7	80.1	44 36.6	+59.8	81.0	44 45.4	+59.9	82.0	44 53.2	+60.0	83.0	45 00.0	+60.0	84.0	45
46	44 50.4	+59.1	77.0	45 03.4	+59.4	78.0	45 15.4	+59.6	78.9	45 26.4	+59.7	79.9	45 36.4	+59.8	80.9	45 45.3	+59.9	82.0	45 53.2	+60.0	83.0	46 00.0	+60.0	84.0	46
47	45 49.5	+59.1	76.7	46 02.8	+59.3	77.7	46 15.0	+59.5	78.8	46 26.1	+59.7	79.8	46 36.2	+59.9	80.8	46 45.2	+60.0	81.9	46 53.2	+60.0	82.9	47 00.0	+60.0	84.0	47
48	46 48.6	+59.0	76.5	47 02.1	+59.2	77.5	47 14.5	+59.5	78.6	47 25.8	+59.7	79.6	47 36.1	+59.8	80.7	47 45.2	+59.9	81.8	47 53.2	+59.9	82.9	48 00.0	+60.0	84.0	48
49	47 47.6	+59.0	76.2	48 01.3	+59.3	77.3	48 14.0	+59.5	78.4	48 25.5	+59.7	79.5	48 35.9	+59.8	80.6	48 45.1	+59.9	81.7	48 53.1	+60.0	82.9	49 00.0	+60.0	84.0	49
50	48 46.6	+59.0	75.9	49 00.6	+59.2	77.1	49 13.5	+59.4	78.2	49 25.2	+59.6	79.3	49 35.7	+59.8	80.5	49 45.0	+59.9	81.6	49 53.1	+60.0	82.8	50 00.0	+60.0	84.0	50
51	49 45.6	+58.9	75.7	49 59.8	+59.2	76.8	50 12.9	+59.5	78.0	50 24.8	+59.6	79.2	50 35.5	+59.8	80.4	50 44.9	+59.9	81.6	50 53.1	+60.0	82.8	51 00.0	+60.0	84.0	51
52	50 44.5	+58.8	75.4	50 59.0	+59.2	76.6	51 12.4	+59.4	77.8	51 24.4	+59.7	79.0	51 35.3	+59.8	80.2	51 44.8	+59.9	81.5	51 53.1	+59.9	82.7	52 00.0	+60.0	84.0	52
53	51 43.3	+58.8	75.1	51 58.2	+59.1	76.3	52 11.8	+59.4	77.5	52 24.1	+59.6	78.8	52 35.1	+59.7	80.1	52 44.7	+59.9	81.4	52 53.0	+60.0	82.7	53 00.0	+60.0	84.0	53
54	52 42.1	+58.8	74.7	52 57.3	+59.1	76.0	53 11.2	+59.3	77.3	53 23.7	+59.6	78.6	53 34.8	+59.8	79.9	53 44.6	+59.9	81.3	53 53.0	+60.0	82.6	54 00.0	+60.0	84.0	54
55	53 40.9	+58.7	74.4	53 56.4	+59.0	75.7	54 10.5	+59.3	77.1	54 23.3	+59.5	78.4	54 34.6	+59.8	79.8	54 44.5	+59.9	81.2	54 53.0	+60.0	82.6	55 00.0	+60.0	84.0	55
56	54 39.6	+58.6	74.0	54 55.4	+59.0	75.4	55 09.8	+59.3	76.8	55 22.8	+59.6	78.2	55 34.4	+59.7	79.6	55 44.4	+59.9	81.1	55 53.0	+59.9	82.5	56 00.0	+60.0	84.0	56
57	55 38.2	+58.6	73.7	55 54.4	+58.9	75.1	56 09.1	+59.3	76.5	56 22.4	+59.5	78.0	56 34.1	+59.7	79.5	56 44.3	+59.9	81.0	56 52.9	+60.0	82.5	57 00.0	+60.0	84.0	57
58	56 36.8	+58.5	73.3	56 53.3	+58.9	74.7	57 08.4	+59.2	76.2	57 21.9	+59.5	77.8	57 33.8	+59.7	79.3	57 44.2	+59.8	80.8	57 52.9	+60.0	82.4	58 00.0	+60.0	84.0	58
59	57 35.3	+58.4	72.9	57 52.2	+58.8	74.4	58 07.6	+59.1	75.9	58 21.4	+59.4	77.5	58 33.5	+59.7	79.1	58 44.0	+59.9	80.7	58 52.9	+59.9	82.4	59 00.0	+60.0	84.0	59
60	58 33.7	+58.3	72.4	58 51.0	+58.8	74.0	59 06.7	+59.1	75.6	59 20.8	+59.4	77.2	59 33.2	+59.7	78.9	59 43.9	+59.9	80.6	59 52.8	+60.0	82.3	60 00.0	+60.0	84.0	60
61	59 32.0	+58.2	72.0	59 49.8	+58.6	73.6	60 05.8	+59.1	75.3	60 20.2	+59.4	77.0	60 32.9	+59.6	78.7	60 43.8	+59.8	80.4	60 52.8	+60.0	82.2	61 00.0	+60.0	84.0	61
62	60 30.2	+58.1	71.5	60 48.4	+58.6	73.2	61 04.9	+59.0	74.9	61 19.6	+59.4	76.7	61 32.5	+59.7	78.5	61 43.6	+59.8	80.3	61 52.8	+59.9	82.1	62 00.0	+60.0	84.0	62
63	61 28.3	+58.0	71.0	61 47.0	+58.5	72.7	62 03.9	+58.9	74.5	62 19.0	+59.3	76.4	62 32.2	+59.6	78.2	62 43.4	+59.8	80.1	62 52.7	+60.0	82.1	63 00.0	+60.0	84.0	63
64	62 26.3	+57.8	70.4	62 45.5	+58.4	72.3	63 02.8	+58.9	74.1	63 18.3	+59.2	76.0	63 31.8	+59.5	78.0	63 43.2	+59.9	80.0	63 52.7	+59.9	82.0	64 00.0	+60.0	84.0	64
65	63 24.1	+57.7	69.8	63 43.9	+58.2	71.7	64 01.7	+58.8	73.7	64 17.5	+59.2	75.7	64 31.3	+59.6	77.7	64 43.1	+59.8	79.8	64 52.6	+60.0	81.9	65 00.0	+60.0	84.0	65
66	64 21.8	+57.5	69.2	64 42.1	+58.1	71.2	65 00.5	+58.6	73.2	65 16.7	+59.2	75.3	65 30.9	+59.5	77.4	65 42.9	+59.7	79.6	65 52.6	+59.9	81.8	66 00.0	+60.0	84.0	66
67	65 19.3	+57.3	68.5	65 40.2	+58.0	70.6	65 59.1	+58.6	72.7	66 15.9	+59.0	74.9	66 30.4	+59.5	77.1	66 42.6	+59.8	79.4	66 52.5	+60.0	81.7	67 00.0	+60.0	84.0	67
68	66 16.6	+57.1	67.8	66 38.2	+57.8	70.0	66 57.7	+58.4	72.2	67 14.9	+59.0	74.4	67 29.9	+59.4	76.8	67 42.4	+59.7	79.1	67 52.5	+59.9	81.6	68 00.0	+60.0	84.0	68
69	67 13.7	+56.9	67.0	67 36.0	+57.7	69.3	67 56.1	+58.4	71.6	68 13.9	+58.9	74.0	68 29.3	+59.3	76.4	68 42.1	+59.7	78.9	68 52.4	+59.9	81.4	69 00.0	+60.0	84.0	69
70	68 10.6	+56.5	66.2	68 33.7	+57.4	68.5	68 54.5	+58.1	70.9	69 12.8	+58.8	73.4	69 28.6	+59.3	76.0	69 41.8	+59.7	78.6	69 52.3	+59.9	81.3	70 00.0	+60.0	84.0	70
71	69 07.1	+56.3	65.3	69 31.1	+57.1	67.7	69 52.6	+58.0	70.2	70 11.6	+58.7	72.9	70 27.9	+59.3	75.5	70 41.5	+59.7	78.3	70 52.2	+59.9	81.1	71 00.0	+60.0	84.0	71
72	70 03.4	+55.9	64.3	70 28.2	+56.9	66.8	70 50.6	+57.7	69.5	71 10.3	+58.5	72.2	71 27.2	+59.1	75.1	71 41.2	+59.6	78.0	71 52.1	+59.9	81.0	72 00.0	+60.0	84.0	72
73	70 59.3	+55.5	63.2	71 25.1	+56.6	65.9	71 48.3	+57.5	68.6	72 08.8	+58.3	71.5	72 26.3	+59.1	74.5	72 40.8	+59.6	77.6	72 52.0	+59.9	80.8	73 00.0	+60.0	84.0	73
74	71 54.8	+55.0	62.0	72 21.7	+56.1	64.8	72 45.8	+57.3	67.7	73 07.1	+58.2	70.7	73 25.4	+58.9	73.9	73 40.4	+59.5	77.2	73 51.9	+59.9	80.6	74 00.0	+60.0	84.0	74
75	72 49.8	+54.4	60.7	73 17.8	+55.7	63.6	73 43.1	+56.8	66.6	74 05.3	+57.9	69.9	74 24.3	+58.8	73.2	74 39.9	+59.4	76.7	74 51.8	+59.9	80.3	75 00.0	+60.0	84.0	75
76	73 44.2	+53.7	59.2	74 13.5	+55.2	62.3	74 39.9	+56.5	65.5	75 03.2	+57.7	68.9	75 23.1	+58.6	72.5	75 39.3	+59.4	76.2	75 51.7	+59.8	80.0	76 00.0	+60.0	84.0	76
77	74 37.9	+52.9	57.6	75 08.7	+54.5	60.8	75 36.4	+56.0	64.2	76 00.9	+57.3	67.8	76 21.7	+58.4	71.6	76 38.7	+59.2	75.6	76 51.5	+59.8	79.7	77 00.0	+60.0	84.0	77
78	75 30.8	+52.0	55.8	76 03.2	+53.7	59.1	76 32.4	+55.3	62.7	76 58.2	+56.8	66.5	77 20.1	+58.2	70.6	77 37.9	+59.2	74.9	77 51.3	+59.8	79.4	78 00.0	+60.0	84.0	78
79	76 22.8	+50.8	53.7	76 56.9	+52.7	57.2	77 27.7	+54.6	60.9	77 55.0	+56.3	65.0	78 18.3	+57.8	69.4	78 37.1	+59.0	74.1	78 51.1	+59.7	78.9	79 00.0	+60.0	84.0	79
80	77 13.6	+49.5	51.4	77 49.6	+51.6	55.0	78 22.3	+53.7	59.0	78 51.3	+55.7	63.3	79 16.1	+57.3	68.0	79 36.1	+58.7	73.1	79 50.8	+59.7	78.4	80 00.0	+60.0	84.0	80
81	78 03.1	+47.7	48.7	78 41.2	+50.1	52.5	79 16.0	+52.5	56.7	79 47.0	+54.7	61.3	80 13.4	+56.8	66.4	80 34.8	+58.5	71.9	80 50.5	+59.6	77.8	81 00.0	+60.0	84.0	81
82	78 50.8	*+45.7*•	45.7	79 31.3	*+48.2*•	49.6	80 08.5	+50.9	53.9	80 41.7	+53.5	58.9	81 10.2	+56.0	64.4	81 33.3	+58.1	70.5	81 50.1	+59.5	77.0	82 00.0	+60.0	84.0	82
83	79 36.5	*+43.0*•	42.2	80 19.5	*+45.9*•	46.2	80 59.4	*+48.8*•	50.7	81 35.2	+52.0	55.9	82 06.2	+55.0	61.9	82 31.4	+57.5	68.7	82 49.6	+59.3	76.1	83 00.0	+60.0	84.0	83
84	80 19.5	*+39.9*•	38.2	81 05.4	*+42.8*•	42.2	81 48.2	*+46.2*•	46.8	82 27.2	*+49.7*•	52.3	83 01.2	*+53.3*•	58.8	83 28.9	+56.6	66.3	83 48.9	+59.1	74.8	84 00.0	+60.0	84.0	84
85	80 59.4	*+35.8*•	33.6	81 48.2	*+39.0*•	37.4	82 34.4	*+42.5*•	42.1	83 16.9	*+46.5*•	47.8	83 54.5	*+50.9*•	54.8	84 25.5	+55.2	63.2	84 48.0	+58.6	73.0	85 00.0	+60.0	84.0	85
86	81 35.2	*+31.0*•	28.3	82 27.2	*+34.0*•	31.9	83 16.9	*+37.6*•	36.4	84 03.4	*+42.0*•	42.1	84 45.4	*+47.1*•	49.4	85 20.7	*+52.8*•	58.7	85 46.6	+57.8	70.4	86 00.0	+60.0	84.0	86
87	82 06.2	*+25.2*•	22.3	83 01.2	*+27.7*•	25.4	83 54.5	*+31.0*•	29.4	84 45.4	*+35.3*•	34.7	85 32.5	*+41.0*•	42.0	86 13.5	*+48.2*•	52.2	86 44.4	*+55.9*•	66.3	87 00.0	+60.0	84.0	87
88	82 31.4	*+18.2*•	15.5	83 28.9	*+20.0*•	17.8	84 25.5	*+22.5*•	20.9	85 20.7	*+25.9*•	25.3	86 13.5	*+30.9*•	31.8	87 01.7	*+38.6*•	42.0	87 40.3	*+50.5*•	58.7	88 00.0	+60.0	84.0	88
89	82 49.6	*+10.4*•	8.0	83 48.9	*+11.1*•	9.3	84 48.0	*+12.0*•	11.0	85 46.6	*+13.4*•	13.6	86 44.4	*+15.6*•	17.8	87 40.3	*+19.7*•	25.3	88 30.8	*+29.2*•	42.0	89 00.0	+60.0	84.0	89
90	83 00.0	*+2.0*•	0.0	84 00.0	*+1.3*•	0.0	85 00.0	*+0.3*•	0.0	86 00.0	*–1.2*•	0.0	87 00.0	*–3.7*•	0.0	88 00.0	*–8.4*•	0.0	89 00.0	*–20.3*•	0.0	90 00.0	–60.0	42.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 96°, 264°

85°, 275° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 36.5	+59.6	95.0	0 31.3	+59.7	95.0	0 26.1	+59.8	95.0	0 20.9	+59.9	95.0	0 15.7	+59.9	95.0	0 10.5	+59.9	95.0	0 05.2	+60.0	95.0	0 00.0	+60.0	95.0	**0**
1	1 36.1	+59.5	94.8	1 31.0	+59.7	94.9	1 25.9	+59.8	94.9	1 20.8	+59.8	94.9	1 15.6	+59.9	94.9	1 10.4	+60.0	95.0	1 05.2	+60.0	95.0	1 00.0	+60.0	95.0	**1**
2	2 35.6	+59.6	94.7	2 30.7	+59.6	94.8	2 25.7	+59.7	94.8	2 20.6	+59.9	94.8	2 15.5	+59.9	94.9	2 10.4	+59.9	94.9	2 05.2	+60.0	95.0	2 00.0	+60.0	95.0	**2**
3	3 35.2	+59.5	94.6	3 30.3	+59.7	94.7	3 25.4	+59.8	94.7	3 20.5	+59.8	94.8	3 15.4	+60.0	94.8	3 10.3	+60.0	94.9	3 05.2	+60.0	94.9	3 00.0	+60.0	95.0	**3**
4	4 34.7	+59.6	94.5	4 30.0	+59.7	94.6	4 25.2	+59.8	94.6	4 20.3	+59.9	94.7	4 15.4	+59.9	94.8	4 10.3	+60.0	94.9	4 05.2	+60.0	94.9	4 00.0	+60.0	95.0	**4**
5	5 34.3	+59.5	94.4	5 29.7	+59.7	94.5	5 25.0	+59.7	94.5	5 20.2	+59.8	94.6	5 15.3	+59.9	94.7	5 10.3	+59.9	94.8	5 05.2	+60.0	94.9	5 00.0	+60.0	95.0	**5**
6	6 33.8	+59.6	94.2	6 29.4	+59.6	94.3	6 24.7	+59.8	94.5	6 20.0	+59.9	94.6	6 15.2	+59.9	94.7	6 10.2	+60.0	94.8	6 05.2	+60.0	94.9	6 00.0	+60.0	95.0	**6**
7	7 33.4	+59.5	94.1	7 29.0	+59.7	94.2	7 24.5	+59.8	94.4	7 19.9	+59.8	94.5	7 15.1	+59.9	94.6	7 10.2	+60.0	94.8	7 05.2	+60.0	94.9	7 00.0	+60.0	95.0	**7**
8	8 32.9	+59.6	94.0	8 28.7	+59.7	94.1	8 24.3	+59.8	94.3	8 19.7	+59.9	94.4	8 15.0	+59.9	94.6	8 10.2	+59.9	94.7	8 05.2	+59.9	94.9	8 00.0	+60.0	95.0	**8**
9	9 32.5	+59.5	93.9	9 28.4	+59.6	94.0	9 24.1	+59.7	94.2	9 19.6	+59.8	94.4	9 14.9	+60.0	94.5	9 10.1	+60.0	94.7	9 05.1	+60.0	94.8	9 00.0	+60.0	95.0	**9**
10	10 32.0	+59.6	93.7	10 28.0	+59.7	93.9	10 23.8	+59.8	94.1	10 19.4	+59.9	94.3	10 14.9	+59.9	94.5	10 10.1	+60.0	94.6	10 05.1	+60.0	94.8	10 00.0	+60.0	95.0	**10**
11	11 31.6	+59.5	93.6	11 27.7	+59.6	93.8	11 23.6	+59.8	94.0	11 19.3	+59.8	94.2	11 14.8	+59.9	94.4	11 10.1	+59.9	94.6	11 05.1	+60.0	94.8	11 00.0	+60.0	95.0	**11**
12	12 31.1	+59.5	93.5	12 27.3	+59.7	93.7	12 23.3	+59.8	93.9	12 19.1	+59.9	94.1	12 14.7	+59.9	94.4	12 10.0	+60.0	94.6	12 05.1	+60.0	94.8	12 00.0	+60.0	95.0	**12**
13	13 30.6	+59.6	93.4	13 27.0	+59.6	93.6	13 23.1	+59.8	93.8	13 19.0	+59.8	94.1	13 14.6	+59.9	94.3	13 10.0	+59.9	94.5	13 05.1	+60.0	94.8	13 00.0	+60.0	95.0	**13**
14	14 30.2	+59.5	93.2	14 26.6	+59.7	93.5	14 22.9	+59.7	93.7	14 18.8	+59.9	94.0	14 14.5	+59.9	94.2	14 09.9	+60.0	94.5	14 05.1	+60.0	94.8	14 00.0	+60.0	95.0	**14**
15	15 29.7	+59.5	93.1	15 26.3	+59.6	93.4	15 22.6	+59.8	93.6	15 18.7	+59.8	93.9	15 14.4	+59.9	94.2	15 09.9	+60.0	94.5	15 05.1	+60.0	94.7	15 00.0	+60.0	95.0	**15**
16	16 29.2	+59.5	93.0	16 25.9	+59.7	93.3	16 22.4	+59.7	93.6	16 18.5	+59.9	93.8	16 14.3	+59.9	94.1	16 09.9	+59.9	94.4	16 05.1	+60.0	94.7	16 00.0	+60.0	95.0	**16**
17	17 28.7	+59.5	92.8	17 25.6	+59.6	93.1	17 22.1	+59.8	93.5	17 18.4	+59.8	93.8	17 14.2	+60.0	94.1	17 09.8	+60.0	94.4	17 05.1	+60.0	94.7	17 00.0	+60.0	95.0	**17**
18	18 28.2	+59.5	92.7	18 25.2	+59.7	93.0	18 21.9	+59.7	93.4	18 18.2	+59.8	93.7	18 14.2	+59.9	94.0	18 09.8	+59.9	94.3	18 05.1	+60.0	94.7	18 00.0	+60.0	95.0	**18**
19	19 27.7	+59.5	92.6	19 24.9	+59.6	92.9	19 21.6	+59.8	93.3	19 18.0	+59.9	93.6	19 14.1	+59.9	94.0	19 09.7	+60.0	94.3	19 05.1	+59.9	94.7	19 00.0	+60.0	95.0	**19**
20	20 27.2	+59.5	92.4	20 24.5	+59.6	92.8	20 21.4	+59.7	93.2	20 17.9	+59.8	93.5	20 14.0	+59.9	93.9	20 09.7	+60.0	94.3	20 05.0	+60.0	94.6	20 00.0	+60.0	95.0	**20**
21	21 26.7	+59.5	92.3	21 24.1	+59.6	92.7	21 21.1	+59.8	93.1	21 17.7	+59.8	93.5	21 13.9	+59.9	93.8	21 09.7	+59.9	94.2	21 05.0	+60.0	94.6	21 00.0	+60.0	95.0	**21**
22	22 26.2	+59.5	92.1	22 23.7	+59.7	92.6	22 20.9	+59.7	93.0	22 17.5	+59.9	93.4	22 13.8	+59.9	93.8	22 09.6	+60.0	94.2	22 05.0	+60.0	94.6	22 00.0	+60.0	95.0	**22**
23	23 25.7	+59.4	92.0	23 23.4	+59.6	92.4	23 20.6	+59.7	92.9	23 17.4	+59.8	93.3	23 13.7	+59.9	93.7	23 09.6	+59.9	94.2	23 05.0	+60.0	94.6	23 00.0	+60.0	95.0	**23**
24	24 25.1	+59.5	91.9	24 23.0	+59.6	92.3	24 20.3	+59.7	92.8	24 17.2	+59.8	93.2	24 13.6	+59.9	93.7	24 09.5	+60.0	94.1	24 05.0	+60.0	94.6	24 00.0	+60.0	95.0	**24**
25	25 24.6	+59.5	91.7	25 22.6	+59.6	92.2	25 20.0	+59.8	92.7	25 17.0	+59.8	93.1	25 13.5	+59.9	93.6	25 09.5	+59.9	94.1	25 05.0	+60.0	94.5	25 00.0	+60.0	95.0	**25**
26	26 24.1	+59.4	91.6	26 22.2	+59.6	92.1	26 19.8	+59.7	92.5	26 16.8	+59.9	93.0	26 13.4	+59.9	93.5	26 09.4	+60.0	94.0	26 05.0	+60.0	94.5	26 00.0	+60.0	95.0	**26**
27	27 23.5	+59.4	91.4	27 21.8	+59.5	91.9	27 19.5	+59.7	92.4	27 16.7	+59.8	93.0	27 13.3	+59.9	93.5	27 09.4	+59.9	94.0	27 05.0	+60.0	94.5	27 00.0	+60.0	95.0	**27**
28	28 22.9	+59.5	91.2	28 21.3	+59.6	91.8	28 19.2	+59.7	92.3	28 16.5	+59.8	92.9	28 13.2	+59.9	93.4	28 09.3	+60.0	93.9	28 05.0	+59.9	94.5	28 00.0	+60.0	95.0	**28**
29	29 22.4	+59.4	91.1	29 20.9	+59.6	91.7	29 18.9	+59.7	92.2	29 16.3	+59.8	92.8	29 13.1	+59.9	93.3	29 09.3	+60.0	93.9	29 04.9	+60.0	94.4	29 00.0	+60.0	95.0	**29**
30	30 21.8	+59.4	90.9	30 20.5	+59.5	91.5	30 18.6	+59.7	92.1	30 16.1	+59.8	92.7	30 13.0	+59.9	93.3	30 09.3	+59.9	93.8	30 04.9	+60.0	94.4	30 00.0	+60.0	95.0	**30**
31	31 21.2	+59.3	90.8	31 20.0	+59.6	91.4	31 18.3	+59.7	92.0	31 15.9	+59.8	92.6	31 12.9	+59.9	93.2	31 09.2	+60.0	93.8	31 04.9	+60.0	94.4	31 00.0	+60.0	95.0	**31**
32	32 20.5	+59.4	90.6	32 19.6	+59.5	91.2	32 18.0	+59.6	91.9	32 15.7	+59.8	92.5	32 12.8	+59.8	93.1	32 09.2	+59.9	93.8	32 04.9	+60.0	94.4	32 00.0	+60.0	95.0	**32**
33	33 19.9	+59.4	90.4	33 19.1	+59.6	91.1	33 17.6	+59.7	91.7	33 15.5	+59.8	92.4	33 12.6	+59.9	93.0	33 09.1	+60.0	93.7	33 04.9	+60.0	94.4	33 00.0	+60.0	95.0	**33**
34	34 19.3	+59.3	90.2	34 18.7	+59.5	90.9	34 17.3	+59.7	91.6	34 15.3	+59.8	92.3	34 12.5	+59.9	93.0	34 09.1	+59.9	93.7	34 04.9	+60.0	94.3	34 00.0	+60.0	95.0	**34**
35	35 18.6	+59.3	90.1	35 18.2	+59.5	90.8	35 17.0	+59.6	91.5	35 15.1	+59.7	92.2	35 12.4	+59.9	92.9	35 09.0	+59.9	93.6	35 04.9	+60.0	94.3	35 00.0	+60.0	95.0	**35**
36	36 17.9	+59.3	89.9	36 17.7	+59.5	90.6	36 16.6	+59.7	91.4	36 14.8	+59.8	92.1	36 12.3	+59.8	92.8	36 08.9	+60.0	93.5	36 04.9	+59.9	94.3	36 00.0	+60.0	95.0	**36**
37	37 17.2	+59.3	89.7	37 17.2	+59.4	90.5	37 16.3	+59.6	91.2	37 14.6	+59.8	92.0	37 12.1	+59.9	92.7	37 08.9	+59.9	93.5	37 04.8	+60.0	94.2	37 00.0	+60.0	95.0	**37**
38	38 16.5	+59.3	89.5	38 16.6	+59.5	90.3	38 15.9	+59.6	91.1	38 14.4	+59.7	91.9	38 12.0	+59.9	92.7	38 08.8	+60.0	93.4	38 04.8	+60.0	94.2	38 00.0	+60.0	95.0	**38**
39	39 15.8	+59.2	89.3	39 16.1	+59.4	90.1	39 15.5	+59.7	90.9	39 14.1	+59.8	91.8	39 11.9	+59.8	92.6	39 08.8	+59.9	93.4	39 04.8	+60.0	94.2	39 00.0	+60.0	95.0	**39**
40	40 15.0	+59.3	89.1	40 15.5	+59.5	89.9	40 15.2	+59.6	90.8	40 13.9	+59.7	91.6	40 11.7	+59.9	92.5	40 08.7	+59.9	93.3	40 04.8	+60.0	94.2	40 00.0	+60.0	95.0	**40**
41	41 14.3	+59.2	88.9	41 15.0	+59.4	89.8	41 14.8	+59.6	90.6	41 13.6	+59.8	91.5	41 11.6	+59.9	92.4	41 08.6	+60.0	93.3	41 04.8	+60.0	94.1	41 00.0	+60.0	95.0	**41**
42	42 13.5	+59.1	88.7	42 14.4	+59.4	89.6	42 14.4	+59.5	90.5	42 13.4	+59.7	91.4	42 11.5	+59.8	92.3	42 08.6	+59.9	93.2	42 04.8	+59.9	94.1	42 00.0	+60.0	95.0	**42**
43	43 12.6	+59.2	88.4	43 13.8	+59.4	89.4	43 13.9	+59.6	90.3	43 13.1	+59.7	91.3	43 11.3	+59.8	92.2	43 08.5	+59.9	93.1	43 04.7	+60.0	94.1	43 00.0	+60.0	95.0	**43**
44	44 11.8	+59.1	88.2	44 13.2	+59.3	89.2	44 13.5	+59.6	90.2	44 12.8	+59.7	91.1	44 11.1	+59.9	92.1	44 08.4	+60.0	93.1	44 04.7	+60.0	94.0	44 00.0	+60.0	95.0	**44**
45	45 10.9	+59.1	88.0	45 12.5	+59.3	89.0	45 13.1	+59.5	90.0	45 12.5	+59.8	91.0	45 11.0	+59.8	92.0	45 08.4	+59.9	93.0	45 04.7	+60.0	94.0	45 00.0	+60.0	95.0	**45**
46	46 10.0	+59.0	87.7	46 11.8	+59.3	88.8	46 12.6	+59.5	89.8	46 12.3	+59.6	90.8	46 10.8	+59.8	91.9	46 08.3	+59.9	92.9	46 04.7	+60.0	94.0	46 00.0	+60.0	95.0	**46**
47	47 09.0	+59.1	87.5	47 11.1	+59.3	88.5	47 12.1	+59.5	89.6	47 11.9	+59.7	90.7	47 10.6	+59.9	91.8	47 08.2	+59.9	92.9	47 04.7	+60.0	93.9	47 00.0	+60.0	95.0	**47**
48	48 08.1	+58.9	87.2	48 10.4	+59.3	88.3	48 11.6	+59.5	89.4	48 11.6	+59.7	90.5	48 10.5	+59.8	91.7	48 08.1	+60.0	92.8	48 04.7	+59.9	93.9	48 00.0	+60.0	95.0	**48**
49	49 07.0	+59.0	86.9	49 09.7	+59.2	88.1	49 11.1	+59.4	89.2	49 11.3	+59.6	90.4	49 10.3	+59.8	91.5	49 08.1	+59.9	92.7	49 04.6	+60.0	93.9	49 00.0	+60.0	95.0	**49**
50	50 06.0	+58.9	86.6	50 08.9	+59.2	87.8	50 10.5	+59.5	89.0	50 10.9	+59.7	90.2	50 10.1	+59.8	91.4	50 08.0	+59.9	92.6	50 04.6	+60.0	93.8	50 00.0	+60.0	95.0	**50**
51	51 04.9	+58.8	86.3	51 08.1	+59.1	87.6	51 10.0	+59.4	88.8	51 10.6	+59.6	90.0	51 09.9	+59.8	91.3	51 07.9	+59.9	92.5	51 04.6	+60.0	93.8	51 00.0	+60.0	95.0	**51**
52	52 03.7	+58.8	86.0	52 07.2	+59.1	87.3	52 09.4	+59.4	88.6	52 10.2	+59.6	89.9	52 09.7	+59.7	91.2	52 07.8	+59.9	92.4	52 04.6	+59.9	93.7	52 00.0	+60.0	95.0	**52**
53	53 02.5	+58.7	85.7	53 06.3	+59.1	87.0	53 08.8	+59.3	88.3	53 09.8	+59.6	89.7	53 09.4	+59.8	91.0	53 07.7	+59.9	92.3	53 04.5	+60.0	93.7	53 00.0	+60.0	95.0	**53**
54	54 01.2	+58.7	85.3	54 05.4	+59.0	86.7	54 08.1	+59.3	88.1	54 09.4	+59.6	89.5	54 09.2	+59.8	90.9	54 07.6	+59.9	92.2	54 04.5	+60.0	93.6	54 00.0	+60.0	95.0	**54**
55	54 59.9	+58.6	85.0	55 04.4	+59.0	86.4	55 07.4	+59.3	87.8	55 09.0	+59.5	89.3	55 09.0	+59.7	90.7	55 07.5	+59.9	92.1	55 04.5	+60.0	93.6	55 00.0	+60.0	95.0	**55**
56	55 58.5	+58.6	84.6	56 03.4	+58.9	86.1	56 06.7	+59.3	87.6	56 08.5	+59.5	89.1	56 08.7	+59.7	90.5	56 07.4	+59.8	92.0	56 04.5	+59.9	93.5	56 00.0	+60.0	95.0	**56**
57	56 57.1	+58.4	84.2	57 02.3	+58.9	85.7	57 06.0	+59.2	87.3	57 08.0	+59.5	88.8	57 08.4	+59.8	90.4	57 07.2	+59.9	91.9	57 04.4	+60.0	93.5	57 00.0	+60.0	95.0	**57**
58	57 55.5	+58.4	83.8	58 01.2	+58.8	85.4	58 05.2	+59.1	87.0	58 07.5	+59.5	88.6	58 08.2	+59.7	90.2	58 07.1	+59.9	91.8	58 04.4	+60.0	93.4	58 00.0	+60.0	95.0	**58**
59	58 53.9	+58.2	83.3	59 00.0	+58.7	85.0	59 04.3	+59.2	86.7	59 07.0	+59.4	88.3	59 07.9	+59.6	90.0	59 07.0	+59.8	91.7	59 04.4	+59.9	93.3	59 00.0	+60.0	95.0	**59**
60	59 52.1	+58.2	82.9	59 58.7	+58.6	84.6	60 03.5	+59.0	86.3	60 06.4	+59.4	88.1	60 07.5	+59.7	89.8	60 06.8	+59.9	91.5	60 04.3	+60.0	93.3	60 00.0	+60.0	95.0	**60**
61	60 50.3	+58.1	82.4	60 57.3	+58.6	84.2	61 02.5	+59.0	86.0	61 05.8	+59.4	87.8	61 07.2	+59.6	89.6	61 06.7	+59.8	91.4	61 04.3	+59.9	93.2	61 00.0	+60.0	95.0	**61**
62	61 48.4	+57.9	81.8	61 55.9	+58.5	83.7	62 01.5	+58.9	85.6	62 05.2	+59.3	87.5	62 06.8	+59.6	89.3	62 06.5	+59.9	91.2	62 04.2	+60.0	93.1	62 00.0	+60.0	95.0	**62**
63	62 46.3	+57.8	81.3	62 54.4	+58.3	83.2	63 00.4	+58.9	85.2	63 04.5	+59.2	87.1	63 06.4	+59.6	89.1	63 06.4	+59.8	91.1	63 04.2	+60.0	93.0	63 00.0	+60.0	95.0	**63**
64	63 44.1	+57.6	80.7	63 52.7	+58.3	82.7	63 59.3	+58.8	84.7	64 03.7	+59.2	86.8	64 06.0	+59.6	88.8	64 06.2	+59.8	90.9	64 04.2	+59.9	93.0	64 00.0	+60.0	95.0	**64**
65	64 41.7	+57.4	80.0	64 51.0	+58.1	82.1	64 58.1	+58.6	84.3	65 02.9	+59.2	86.4	65 05.6	+59.5	88.6	65 06.0	+59.8	90.7	65 04.1	+60.0	92.9	65 00.0	+60.0	95.0	**65**
66	65 39.1	+57.2	79.4	65 49.1	+57.9	81.5	65 56.7	+58.6	83.8	66 02.1	+59.1	86.0	66 05.1	+59.5	88.2	66 05.8	+59.7	90.5	66 04.1	+59.9	92.8	66 00.0	+60.0	95.0	**66**
67	66 36.3	+57.0	78.6	66 47.0	+57.8	80.9	66 55.3	+58.4	83.2	67 01.2	+59.0	85.6	67 04.6	+59.4	87.9	67 05.5	+59.8	90.3	67 04.0	+59.9	92.6	67 00.0	+60.0	95.0	**67**
68	67 33.3	+56.8	77.8	67 44.8	+57.6	80.2	67 53.7	+58.4	82.6	68 00.2	+58.9	85.1	68 04.0	+59.4	87.6	68 05.3	+59.7	90.0	68 03.9	+60.0	92.5	68 00.0	+60.0	95.0	**68**
69	68 30.1	+56.5	76.9	68 42.4	+57.3	79.4	68 52.1	+58.1	82.0	68 59.1	+58.8	84.6	69 03.4	+59.3	87.2	69 05.0	+59.7	89.8	69 03.9	+59.9	92.4	69 00.0	+60.0	95.0	**69**
70	69 26.6	+56.1	76.0	69 39.7	+57.2	78.6	69 50.2	+58.0	81.3	69 57.9	+58.7	84.0	70 02.7	+59.3	86.7	70 04.7	+59.7	89.5	70 03.8	+59.9	92.3	70 00.0	+60.0	95.0	**70**
71	70 22.7	+55.7	75.0	70 36.9	+56.8	77.7	70 48.2	+57.7	80.5	70 56.6	+58.5	83.4	71 02.0	+59.2	86.3	71 04.4	+59.6	89.2	71 03.7	+59.9	92.1	71 00.0	+60.0	95.0	**71**
72	71 18.4	+55.3	73.8	71 33.7	+56.4	76.7	71 45.9	+57.6	79.7	71 55.1	+58.4	82.7	72 01.2	+59.1	85.7	72 04.0	+59.6	88.8	72 03.6	+59.9	91.9	72 00.0	+60.0	95.0	**72**
73	72 13.7	+54.8	72.6	72 30.1	+56.1	75.6	72 43.5	+57.2	78.7	72 53.5	+58.2	81.9	73 00.3	+59.0	85.2	73 03.6	+59.6	88.4	73 03.5	+59.9	91.7	73 00.0	+60.0	95.0	**73**
74	73 08.5	+54.2	71.2	73 26.2	+55.6	74.4	73 40.7	+56.9	77.7	73 51.7	+58.0	81.1	73 59.3	+58.8	84.5	74 03.2	+59.4	88.0	74 03.4	+59.9	91.5	74 00.0	+60.0	95.0	**74**
75	74 02.7	+53.4	69.7	74 21.8	+55.1	73.1	74 37.6	+56.4	76.5	74 49.7	+57.7	80.1	74 58.1	+58.7	83.8	75 02.6	+59.5	87.5	75 03.3	+59.8	91.3	75 00.0	+60.0	95.0	**75**
76	74 56.1	+52.6	68.0	75 16.9	+54.3	71.5	75 34.0	+56.0	75.2	75 47.4	+57.4	79.0	75 56.8	+58.5	83.0	76 02.1	+59.3	87.0	76 03.1	+59.9	91.0	76 00.0	+60.0	95.0	**76**
77	75 48.7	+51.6	66.1	76 11.2	+53.6	69.8	76 30.0	+55.4	73.7	76 44.8	+56.9	77.8	76 55.3	+58.2	82.0	77 01.4	+59.2	86.3	77 03.0	+59.8	90.7	77 00.0	+60.0	95.0	**77**
78	76 40.3	+50.4	64.0	77 04.8	+52.6	67.9	77 25.4	+54.6	72.0	77 41.7	+56.5	76.4	77 53.5	+58.0	80.9	78 00.6	+59.1	85.6	78 02.8	+59.7	90.3	78 00.0	+60.0	95.0	**78**
79	77 30.7	+48.8	61.5	77 57.4	+51.3	65.6	78 20.0	+53.7	70.1	78 38.2	+55.8	74.7	78 51.5	+57.6	79.6	78 59.7	+58.9	84.7	79 02.5	+59.8	89.8	79 00.0	+60.0	95.0	**79**
80	78 19.5	*+47.0*•	58.7	78 48.7	+49.8	63.1	79 13.7	+52.5	67.8	79 34.0	+54.9	72.8	79 49.1	+57.0	78.1	79 58.6	+58.6	83.7	80 02.3	+59.6	89.3	80 00.0	+60.0	95.0	**80**
81	79 06.5	*+44.8*•	55.6	79 38.5	*+47.9*•	60.1	80 06.2	+50.9	65.1	80 28.9	+53.9	70.5	80 46.1	+56.4	76.3	80 57.2	+58.4	82.4	81 01.9	+59.6	88.7	81 00.0	+60.0	95.0	**81**
82	79 51.3	*+42.0*•	51.9	80 26.4	*+45.4*•	56.6	80 57.1	*+48.9*•	61.8	81 22.8	+52.3	67.7	81 42.5	+55.4	74.0	81 55.6	+57.9	80.8	82 01.5	+59.5	87.9	82 00.0	+60.0	95.0	**82**
83	80 33.3	*+38.5*•	47.7	81 11.8	*+42.3*•	52.5	81 46.0	*+46.3*•	58.0	82 15.1	*+50.3*•	64.2	82 37.9	+54.0	71.2	82 53.5	+57.2	78.8	83 01.0	+59.2	86.8	83 00.0	+60.0	95.0	**83**
84	81 11.8	*+34.2*•	42.9	81 54.1	*+38.2*•	47.7	82 32.3	*+42.6*•	53.3	83 05.4	*+47.3*•	59.9	83 31.9	*+52.1*•	67.6	83 50.7	+56.1	76.2	84 00.2	+59.0	85.5	84 00.0	+60.0	95.0	**84**
85	81 46.0	*+29.1*•	37.3	82 32.3	*+33.1*•	42.0	83 14.9	*+37.8*•	47.6	83 52.7	*+43.2*•	54.5	84 24.0	*+48.9*•	62.8	84 46.8	*+54.4*•	72.6	84 59.2	+58.6	83.6	85 00.0	+60.0	95.0	**85**
86	82 15.1	*+22.8*•	31.0	83 05.4	*+26.5*•	35.3	83 52.7	*+31.3*•	40.7	84 35.9	*+37.0*•	47.6	85 12.9	*+43.9*•	56.4	85 41.2	*+51.4*•	67.5	85 57.8	+57.5	80.7	86 00.0	+60.0	95.0	**86**
87	82 37.9	*+15.6*•	24.0	83 31.9	*+18.8*•	27.6	84 24.0	*+22.8*•	32.3	85 12.9	*+28.3*•	38.7	85 56.8	*+35.8*•	47.5	86 32.6	*+45.3*•	59.8	86 55.3	*+55.3*•	76.1	87 00.0	+60.0	95.0	**87**
88	82 53.5	*+7.5*•	16.3	83 50.7	*+9.5*•	18.9	84 46.8	*+12.4*•	22.5	85 41.2	*+16.6*•	27.5	86 32.6	*+22.7*•	35.2	87 17.9	*+32.7*•	47.5	87 50.6	*+48.3*•	67.5	88 00.0	+60.0	95.0	**88**
89	83 01.0	*–1.0*•	8.2	84 00.2	*–0.2*•	9.6	84 59.2	*+0.8*•	11.5	85 57.8	*+2.2*•	14.3	86 55.3	*+4.7*•	18.9	87 50.6	*+9.4*•	27.5	88 38.9	*+21.1*•	47.5	89 00.0	+60.0	95.0	**89**
90	83 00.0	*–9.4*•	0.0	84 00.0	*–10.1*•	0.0	85 00.0	*–11.0*•	0.0	86 00.0	*–12.4*•	0.0	87 00.0	*–14.6*•	0.0	88 00.0	*–18.8*•	0.0	89 00.0	*–28.5*•	0.0	90 00.0	–60.0	47.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 85°, 275°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 36.5	–59.5	95.0	0 31.3	–59.7	95.0	0 26.1	–59.8	95.0	0 20.9	–59.9	95.0	0 15.7	–59.9	95.0	0 10.5	–60.0	95.0	0 05.2	–60.0	95.0	0 00.0	+60.0	85.0	0
1	0 23.0	+59.6	84.9	0 28.4	+59.6	84.9	0 33.7	+59.7	84.9	0 39.0	+59.8	84.9	0 44.2	+60.0	85.0	0 49.5	+60.0	85.0	0 54.8	+60.0	85.0	1 00.0	+60.0	85.0	1
2	1 22.6	+59.6	84.8	1 28.0	+59.7	84.8	1 33.4	+59.8	84.8	1 38.8	+59.9	84.9	1 44.2	+59.9	84.9	1 49.5	+59.9	84.9	1 54.8	+59.9	85.0	2 00.0	+60.0	85.0	2
3	2 22.2	+59.5	84.7	2 27.7	+59.7	84.7	2 33.2	+59.8	84.8	2 38.7	+59.8	84.8	2 44.1	+59.9	84.9	2 49.4	+60.0	84.9	2 54.7	+60.0	84.9	3 00.0	+60.0	85.0	3
4	3 21.7	+59.6	84.6	3 27.4	+59.6	84.6	3 33.0	+59.8	84.7	3 38.5	+59.9	84.7	3 44.0	+59.9	84.8	3 49.4	+60.0	84.9	3 54.7	+60.0	84.9	4 00.0	+60.0	85.0	4
5	4 21.3	+59.5	84.4	4 27.0	+59.7	84.5	4 32.8	+59.7	84.6	4 38.4	+59.8	84.7	4 43.9	+59.9	84.7	4 49.4	+59.9	84.8	4 54.7	+60.0	84.9	5 00.0	+60.0	85.0	5
6	5 20.8	+59.6	84.3	5 26.7	+59.7	84.4	5 32.5	+59.8	84.5	5 38.2	+59.9	84.6	5 43.8	+59.9	84.7	5 49.3	+60.0	84.8	5 54.7	+60.0	84.9	6 00.0	+60.0	85.0	6
7	6 20.4	+59.5	84.2	6 26.4	+59.7	84.3	6 32.3	+59.8	84.4	6 38.1	+59.8	84.5	6 43.7	+60.0	84.6	6 49.3	+60.0	84.8	6 54.7	+60.0	84.9	7 00.0	+60.0	85.0	7
8	7 19.9	+59.6	84.1	7 26.1	+59.6	84.2	7 32.1	+59.7	84.3	7 37.9	+59.9	84.5	7 43.7	+59.9	84.6	7 49.3	+59.9	84.7	7 54.7	+60.0	84.9	8 00.0	+60.0	85.0	8
9	8 19.5	+59.5	83.9	8 25.7	+59.7	84.1	8 31.8	+59.8	84.2	8 37.8	+59.8	84.4	8 43.6	+59.9	84.5	8 49.2	+60.0	84.7	8 54.7	+60.0	84.8	9 00.0	+60.0	85.0	9
10	9 19.0	+59.6	83.8	9 25.4	+59.7	84.0	9 31.6	+59.8	84.1	9 37.6	+59.9	84.3	9 43.5	+59.9	84.5	9 49.2	+59.9	84.7	9 54.7	+60.0	84.8	10 00.0	+60.0	85.0	10
11	10 18.6	+59.5	83.7	10 25.1	+59.6	83.9	10 31.4	+59.7	84.1	10 37.5	+59.8	84.2	10 43.4	+59.9	84.4	10 49.1	+60.0	84.6	10 54.7	+60.0	84.8	11 00.0	+60.0	85.0	11
12	11 18.1	+59.5	83.6	11 24.7	+59.7	83.8	11 31.1	+59.8	84.0	11 37.3	+59.9	84.2	11 43.3	+59.9	84.4	11 49.1	+60.0	84.6	11 54.7	+60.0	84.8	12 00.0	+60.0	85.0	12
13	12 17.6	+59.6	83.4	12 24.4	+59.6	83.7	12 30.9	+59.8	83.9	12 37.2	+59.8	84.1	12 43.2	+60.0	84.3	12 49.1	+59.9	84.5	12 54.7	+59.9	84.8	13 00.0	+60.0	85.0	13
14	13 17.2	+59.5	83.3	13 24.0	+59.7	83.5	13 30.7	+59.7	83.8	13 37.0	+59.9	84.0	13 43.2	+59.9	84.3	13 49.0	+60.0	84.5	13 54.6	+60.0	84.8	14 00.0	+60.0	85.0	14
15	14 16.7	+59.5	83.2	14 23.7	+59.6	83.4	14 30.4	+59.8	83.7	14 36.9	+59.8	83.9	14 43.1	+59.9	84.2	14 49.0	+59.9	84.5	14 54.6	+60.0	84.7	15 00.0	+60.0	85.0	15
16	15 16.2	+59.5	83.0	15 23.3	+59.7	83.3	15 30.2	+59.7	83.6	15 36.7	+59.9	83.9	15 43.0	+59.9	84.2	15 48.9	+60.0	84.4	15 54.6	+60.0	84.7	16 00.0	+60.0	85.0	16
17	16 15.7	+59.6	82.9	16 23.0	+59.6	83.2	16 29.9	+59.8	83.5	16 36.6	+59.8	83.8	16 42.9	+59.9	84.1	16 48.9	+60.0	84.4	16 54.6	+60.0	84.7	17 00.0	+60.0	85.0	17
18	17 15.3	+59.5	82.8	17 22.6	+59.7	83.1	17 29.7	+59.7	83.4	17 36.4	+59.8	83.7	17 42.8	+59.9	84.0	17 48.9	+59.9	84.4	17 54.6	+60.0	84.7	18 00.0	+60.0	85.0	18
19	18 14.8	+59.5	82.7	18 22.3	+59.6	83.0	18 29.4	+59.8	83.3	18 36.2	+59.9	83.6	18 42.7	+59.9	84.0	18 48.8	+60.0	84.3	18 54.6	+60.0	84.7	19 00.0	+60.0	85.0	19
20	19 14.3	+59.5	82.5	19 21.9	+59.6	82.9	19 29.2	+59.7	83.2	19 36.1	+59.8	83.6	19 42.6	+59.9	83.9	19 48.8	+59.9	84.3	19 54.6	+60.0	84.6	20 00.0	+60.0	85.0	20
21	20 13.8	+59.5	82.4	20 21.5	+59.7	82.7	20 28.9	+59.8	83.1	20 35.9	+59.9	83.5	20 42.5	+59.9	83.9	20 48.7	+60.0	84.2	20 54.6	+60.0	84.6	21 00.0	+60.0	85.0	21
22	21 13.3	+59.4	82.2	21 21.2	+59.6	82.6	21 28.7	+59.7	83.0	21 35.8	+59.8	83.4	21 42.4	+59.9	83.8	21 48.7	+60.0	84.2	21 54.6	+60.0	84.6	22 00.0	+60.0	85.0	22
23	22 12.7	+59.5	82.1	22 20.8	+59.6	82.5	22 28.4	+59.7	82.9	22 35.6	+59.8	83.3	22 42.3	+59.9	83.7	22 48.7	+59.9	84.2	22 54.6	+59.9	84.6	23 00.0	+60.0	85.0	23
24	23 12.2	+59.5	82.0	23 20.4	+59.6	82.4	23 28.1	+59.8	82.8	23 35.4	+59.8	83.2	23 42.2	+59.9	83.7	23 48.6	+60.0	84.1	23 54.5	+60.0	84.6	24 00.0	+60.0	85.0	24
25	24 11.7	+59.5	81.8	24 20.0	+59.6	82.3	24 27.9	+59.7	82.7	24 35.2	+59.9	83.2	24 42.1	+59.9	83.6	24 48.6	+59.9	84.1	24 54.5	+60.0	84.5	25 00.0	+60.0	85.0	25
26	25 11.2	+59.4	81.7	25 19.6	+59.6	82.1	25 27.6	+59.7	82.6	25 35.1	+59.8	83.1	25 42.0	+59.9	83.6	25 48.5	+60.0	84.0	25 54.5	+60.0	84.5	26 00.0	+60.0	85.0	26
27	26 10.6	+59.5	81.5	26 19.2	+59.6	82.0	26 27.3	+59.7	82.5	26 34.9	+59.8	83.0	26 41.9	+59.9	83.5	26 48.5	+59.9	84.0	26 54.5	+60.0	84.5	27 00.0	+60.0	85.0	27
28	27 10.1	+59.4	81.4	27 18.8	+59.6	81.9	27 27.0	+59.7	82.4	27 34.7	+59.8	82.9	27 41.8	+59.9	83.4	27 48.4	+60.0	83.9	27 54.5	+60.0	84.5	28 00.0	+60.0	85.0	28
29	28 09.5	+59.4	81.2	28 18.4	+59.6	81.7	28 26.7	+59.7	82.3	28 34.5	+59.8	82.8	28 41.7	+59.9	83.4	28 48.4	+59.9	83.9	28 54.5	+60.0	84.4	29 00.0	+60.0	85.0	29
30	29 08.9	+59.4	81.1	29 18.0	+59.5	81.6	29 26.4	+59.7	82.2	29 34.3	+59.8	82.7	29 41.6	+59.9	83.3	29 48.3	+60.0	83.9	29 54.5	+60.0	84.4	30 00.0	+60.0	85.0	30
31	30 08.3	+59.4	80.9	30 17.5	+59.6	81.5	30 26.1	+59.7	82.0	30 34.1	+59.8	82.6	30 41.5	+59.9	83.2	30 48.3	+59.9	83.8	30 54.5	+59.9	84.4	31 00.0	+60.0	85.0	31
32	31 07.7	+59.4	80.7	31 17.1	+59.5	81.3	31 25.8	+59.7	81.9	31 33.9	+59.8	82.5	31 41.4	+59.9	83.1	31 48.2	+60.0	83.8	31 54.4	+60.0	84.4	32 00.0	+60.0	85.0	32
33	32 07.1	+59.4	80.6	32 16.6	+59.6	81.2	32 25.5	+59.7	81.8	32 33.7	+59.8	82.4	32 41.3	+59.9	83.1	32 48.2	+59.9	83.7	32 54.4	+60.0	84.4	33 00.0	+60.0	85.0	33
34	33 06.5	+59.3	80.4	33 16.2	+59.5	81.0	33 25.2	+59.7	81.7	33 33.5	+59.8	82.3	33 41.2	+59.9	83.0	33 48.1	+60.0	83.7	33 54.4	+60.0	84.3	34 00.0	+60.0	85.0	34
35	34 05.8	+59.4	80.2	34 15.7	+59.5	80.9	34 24.9	+59.6	81.6	34 33.3	+59.8	82.2	34 41.1	+59.8	82.9	34 48.1	+59.9	83.6	34 54.4	+60.0	84.3	35 00.0	+60.0	85.0	35
36	35 05.2	+59.3	80.0	35 15.2	+59.5	80.7	35 24.5	+59.7	81.4	35 33.1	+59.8	82.1	35 40.9	+59.9	82.8	35 48.0	+60.0	83.6	35 54.4	+60.0	84.3	36 00.0	+60.0	85.0	36
37	36 04.5	+59.3	79.9	36 14.7	+59.5	80.6	36 24.2	+59.6	81.3	36 32.9	+59.7	82.0	36 40.8	+59.9	82.8	36 48.0	+59.9	83.5	36 54.4	+60.0	84.3	37 00.0	+60.0	85.0	37
38	37 03.8	+59.3	79.7	37 14.2	+59.5	80.4	37 23.8	+59.6	81.2	37 32.6	+59.8	81.9	37 40.7	+59.8	82.7	37 47.9	+60.0	83.5	37 54.4	+60.0	84.2	38 00.0	+60.0	85.0	38
39	38 03.1	+59.3	79.5	38 13.7	+59.4	80.2	38 23.4	+59.7	81.0	38 32.4	+59.8	81.8	38 40.5	+59.9	82.6	38 47.9	+59.9	83.4	38 54.4	+59.9	84.2	39 00.0	+60.0	85.0	39
40	39 02.4	+59.2	79.3	39 13.1	+59.5	80.1	39 23.1	+59.6	80.9	39 32.2	+59.7	81.7	39 40.4	+59.9	82.5	39 47.8	+59.9	83.3	39 54.3	+60.0	84.2	40 00.0	+60.0	85.0	40
41	40 01.6	+59.3	79.1	40 12.6	+59.4	79.9	40 22.7	+59.6	80.7	40 31.9	+59.8	81.6	40 40.3	+59.8	82.4	40 47.7	+60.0	83.3	40 54.3	+60.0	84.1	41 00.0	+60.0	85.0	41
42	41 00.9	+59.2	78.9	41 12.0	+59.4	79.7	41 22.3	+59.6	80.6	41 31.7	+59.7	81.5	41 40.1	+59.9	82.3	41 47.7	+59.9	83.2	41 54.3	+60.0	84.1	42 00.0	+60.0	85.0	42
43	42 00.1	+59.2	78.6	42 11.4	+59.4	79.5	42 21.9	+59.6	80.4	42 31.4	+59.7	81.3	42 40.0	+59.8	82.2	42 47.6	+59.9	83.2	42 54.3	+60.0	84.1	43 00.0	+60.0	85.0	43
44	42 59.3	+59.1	78.4	43 10.8	+59.4	79.3	43 21.5	+59.5	80.3	43 31.1	+59.7	81.2	43 39.8	+59.9	82.1	43 47.5	+60.0	83.1	43 54.3	+60.0	84.0	44 00.0	+60.0	85.0	44
45	43 58.4	+59.1	78.2	44 10.2	+59.4	79.1	44 21.0	+59.6	80.1	44 30.8	+59.8	81.1	44 39.7	+59.8	82.0	44 47.5	+59.9	83.0	44 54.3	+59.9	84.0	45 00.0	+60.0	85.0	45
46	44 57.5	+59.1	77.9	45 09.6	+59.3	78.9	45 20.6	+59.5	79.9	45 30.6	+59.7	80.9	45 39.5	+59.8	81.9	45 47.4	+59.9	82.9	45 54.2	+60.0	84.0	46 00.0	+60.0	85.0	46
47	45 56.6	+59.1	77.7	46 08.9	+59.3	78.7	46 20.1	+59.5	79.7	46 30.3	+59.6	80.8	46 39.3	+59.9	81.8	46 47.3	+59.9	82.9	46 54.2	+60.0	83.9	47 00.0	+60.0	85.0	47
48	46 55.7	+59.0	77.4	47 08.2	+59.3	78.5	47 19.6	+59.5	79.6	47 29.9	+59.7	80.6	47 39.2	+59.8	81.7	47 47.2	+60.0	82.8	47 54.2	+60.0	83.9	48 00.0	+60.0	85.0	48
49	47 54.7	+59.0	77.2	48 07.5	+59.2	78.3	48 19.1	+59.5	79.4	48 29.6	+59.7	80.5	48 39.0	+59.8	81.6	48 47.2	+59.9	82.7	48 54.2	+60.0	83.9	49 00.0	+60.0	85.0	49
50	48 53.7	+59.0	76.9	49 06.7	+59.2	78.0	49 18.6	+59.4	79.2	49 29.3	+59.6	80.3	49 38.8	+59.8	81.5	49 47.1	+59.9	82.6	49 54.2	+59.9	83.8	50 00.0	+60.0	85.0	50
51	49 52.7	+58.9	76.6	50 05.9	+59.2	77.8	50 18.0	+59.5	79.0	50 28.9	+59.7	80.1	50 38.6	+59.8	81.3	50 47.0	+59.9	82.6	50 54.1	+60.0	83.8	51 00.0	+60.0	85.0	51
52	50 51.6	+58.8	76.3	51 05.1	+59.2	77.5	51 17.5	+59.4	78.7	51 28.6	+59.6	80.0	51 38.4	+59.8	81.2	51 46.9	+59.9	82.5	51 54.1	+60.0	83.7	52 00.0	+60.0	85.0	52
53	51 50.4	+58.8	76.0	52 04.3	+59.1	77.3	52 16.9	+59.4	78.5	52 28.2	+59.6	79.8	52 38.2	+59.7	81.1	52 46.8	+59.9	82.4	52 54.1	+60.0	83.7	53 00.0	+60.0	85.0	53
54	52 49.2	+58.8	75.7	53 03.4	+59.1	77.0	53 16.3	+59.3	78.3	53 27.8	+59.6	79.6	53 37.9	+59.8	80.9	53 46.7	+59.9	82.3	53 54.1	+59.9	83.6	54 00.0	+60.0	85.0	54
55	53 48.0	+58.7	75.3	54 02.5	+59.0	76.7	54 15.6	+59.3	78.0	54 27.4	+59.5	79.4	54 37.7	+59.7	80.8	54 46.6	+59.9	82.2	54 54.0	+60.0	83.6	55 00.0	+60.0	85.0	55
56	54 46.7	+58.6	75.0	55 01.5	+59.0	76.4	55 14.9	+59.3	77.8	55 26.9	+59.6	79.2	55 37.4	+59.8	80.6	55 46.5	+59.9	82.1	55 54.0	+60.0	83.5	56 00.0	+60.0	85.0	56
57	55 45.3	+58.5	74.6	56 00.5	+58.9	76.0	56 14.2	+59.3	77.5	56 26.5	+59.5	79.0	56 37.2	+59.7	80.4	56 46.4	+59.8	82.0	56 54.0	+59.9	83.5	57 00.0	+60.0	85.0	57
58	56 43.8	+58.5	74.2	56 59.4	+58.9	75.7	57 13.5	+59.2	77.2	57 26.0	+59.5	78.7	57 36.9	+59.7	80.3	57 46.2	+59.9	81.8	57 53.9	+60.0	83.4	58 00.0	+60.0	85.0	58
59	57 42.3	+58.4	73.8	57 58.3	+58.8	75.3	58 12.7	+59.1	76.9	58 25.5	+59.4	78.5	58 36.6	+59.7	80.1	58 46.1	+59.9	81.7	58 53.9	+60.0	83.3	59 00.0	+60.0	85.0	59
60	58 40.7	+58.3	73.4	58 57.1	+58.7	75.0	59 11.8	+59.1	76.6	59 24.9	+59.4	78.2	59 36.3	+59.7	79.9	59 46.0	+59.8	81.6	59 53.9	+59.9	83.3	60 00.0	+60.0	85.0	60
61	59 39.0	+58.2	72.9	59 55.8	+58.6	74.6	60 10.9	+59.1	76.2	60 24.3	+59.4	77.9	60 36.0	+59.6	79.7	60 45.8	+59.9	81.4	60 53.8	+60.0	83.2	61 00.0	+60.0	85.0	61
62	60 37.2	+58.0	72.4	60 54.4	+58.6	74.1	61 10.0	+59.0	75.9	61 23.7	+59.4	77.6	61 35.6	+59.6	79.5	61 45.7	+59.8	81.3	61 53.8	+60.0	83.1	62 00.0	+60.0	85.0	62
63	61 35.2	+58.0	71.9	61 53.0	+58.5	73.7	62 09.0	+58.9	75.5	62 23.1	+59.3	77.3	62 35.2	+59.6	79.2	62 45.5	+59.8	81.1	62 53.8	+59.9	83.1	63 00.0	+60.0	85.0	63
64	62 33.2	+57.8	71.3	62 51.5	+58.3	73.2	63 07.9	+58.8	75.1	63 22.4	+59.2	77.0	63 34.8	+59.6	79.0	63 45.3	+59.8	81.0	63 53.7	+60.0	83.0	64 00.0	+60.0	85.0	64
65	63 31.0	+57.6	70.8	63 49.8	+58.3	72.7	64 06.7	+58.8	74.6	64 21.6	+59.2	76.6	64 34.4	+59.6	78.7	64 45.1	+59.8	80.8	64 53.7	+59.9	82.9	65 00.0	+60.0	85.0	65
66	64 28.6	+57.5	70.1	64 48.1	+58.1	72.1	65 05.5	+58.6	74.2	65 20.8	+59.1	76.3	65 34.0	+59.5	78.4	65 44.9	+59.8	80.6	65 53.6	+60.0	82.8	66 00.0	+60.0	85.0	66
67	65 26.1	+57.3	69.4	65 46.2	+57.9	71.5	66 04.1	+58.6	73.7	66 19.9	+59.1	75.8	66 33.5	+59.4	78.1	66 44.7	+59.7	80.4	66 53.6	+59.9	82.7	67 00.0	+60.0	85.0	67
68	66 23.4	+57.1	68.7	66 44.1	+57.8	70.9	67 02.7	+58.4	73.1	67 19.0	+59.0	75.4	67 32.9	+59.4	77.7	67 44.4	+59.8	80.1	67 53.5	+59.9	82.5	68 00.0	+60.0	85.0	68
69	67 20.5	+56.8	67.9	67 41.9	+57.6	70.2	68 01.1	+58.3	72.5	68 18.0	+58.8	74.9	68 32.3	+59.4	77.4	68 44.2	+59.7	79.9	68 53.4	+59.9	82.4	69 00.0	+60.0	85.0	69
70	68 17.3	+56.5	67.1	68 39.5	+57.4	69.4	68 59.4	+58.1	71.9	69 16.8	+58.8	74.4	69 31.7	+59.3	77.0	69 43.9	+59.7	79.6	69 53.3	+60.0	82.3	70 00.0	+60.0	85.0	70
71	69 13.8	+56.2	66.1	69 36.9	+57.1	68.6	69 57.5	+58.0	71.2	70 15.6	+58.7	73.8	70 31.0	+59.2	76.5	70 43.6	+59.6	79.3	70 53.3	+59.9	82.1	71 00.0	+60.0	85.0	71
72	70 10.0	+55.8	65.1	70 34.0	+56.9	67.7	70 55.5	+57.7	70.4	71 14.3	+58.5	73.2	71 30.2	+59.2	76.0	71 43.2	+59.6	79.0	71 53.2	+59.9	82.0	72 00.0	+60.0	85.0	72
73	71 05.8	+55.5	64.0	71 30.9	+56.4	66.7	71 53.2	+57.5	69.5	72 12.8	+58.3	72.4	72 29.4	+59.0	75.5	72 42.8	+59.6	78.6	72 53.1	+59.9	81.8	73 00.0	+60.0	85.0	73
74	72 01.3	+54.9	62.8	72 27.3	+56.1	65.6	72 50.7	+57.2	68.6	73 11.1	+58.1	71.7	73 28.4	+58.9	74.9	73 42.4	+59.5	78.2	73 53.0	+59.8	81.5	74 00.0	+60.0	85.0	74
75	72 56.2	+54.3	61.5	73 23.4	+55.7	64.4	73 47.9	+56.8	67.5	74 09.2	+57.9	70.8	74 27.3	+58.8	74.2	74 41.9	+59.4	77.7	74 52.8	+59.9	81.3	75 00.0	+60.0	85.0	75
76	73 50.5	+53.6	60.0	74 19.1	+55.1	63.1	74 44.7	+56.4	66.3	75 07.1	+57.6	69.8	75 26.1	+58.6	73.4	75 41.3	+59.4	77.2	75 52.7	+59.8	81.0	76 00.0	+60.0	85.0	76
77	74 44.1	+52.8	58.3	75 14.2	+54.4	61.6	75 41.1	+55.9	65.0	76 04.7	+57.3	68.7	76 24.7	+58.4	72.5	76 40.7	+59.3	76.5	76 52.5	+59.8	80.7	77 00.0	+60.0	85.0	77
78	75 36.9	+51.8	56.5	76 08.6	+53.6	59.9	76 37.0	+55.3	63.5	77 02.0	+56.8	67.4	77 23.1	+58.1	71.5	77 40.0	+59.1	75.8	77 52.3	+59.8	80.4	78 00.0	+60.0	85.0	78
79	76 28.7	+50.7	54.4	77 02.2	+52.6	57.9	77 32.3	+54.5	61.8	77 58.8	+56.3	65.9	78 21.2	+57.8	70.3	78 39.1	+59.0	75.0	78 52.1	+59.8	79.9	79 00.0	+60.0	85.0	79
80	77 19.4	+49.2	52.0	77 54.8	+51.4	55.7	78 26.8	+53.6	59.7	78 55.1	+55.5	64.2	79 19.0	+57.3	68.9	79 38.1	+58.7	74.0	79 51.9	+59.6	79.4	80 00.0	+60.0	85.0	80
81	78 08.6	+47.5	49.3	78 46.2	+49.9	53.1	79 20.4	+52.3	57.4	79 50.6	+54.7	62.1	80 16.3	+56.8	67.3	80 36.8	+58.5	72.8	80 51.5	+59.6	78.8	81 00.0	+60.0	85.0	81
82	78 56.1	+45.3 •	46.2	79 36.1	+48.0 •	50.2	80 12.7	+50.7	54.6	80 45.3	+53.4	59.7	81 13.1	+55.9	65.2	81 35.3	+58.0	71.4	81 51.1	+59.5	78.0	82 00.0	+60.0	85.0	82
83	79 41.4	+42.7 •	42.7	80 24.1	+45.5 •	46.7	81 03.4	+48.6 •	51.4	81 38.7	+51.8	56.7	82 09.0	+54.9	62.7	82 33.3	+57.5	69.6	82 50.6	+59.3	77.0	83 00.0	+60.0	85.0	83
84	80 24.1	+39.3 •	38.6	81 09.6	+42.4 •	42.7	81 52.0	+45.9 •	47.4	82 30.5	+49.5 •	53.0	83 03.9	+53.2 •	59.6	83 30.8	+56.6	67.2	83 49.9	+59.1	75.7	84 00.0	+60.0	85.0	84
85	81 03.4	+35.3 •	34.0	81 52.0	+38.5 •	37.9	82 37.9	+42.1 •	42.6	83 20.0	+46.2 •	48.4	83 57.1	+50.7 •	55.5	84 27.4	+55.1	64.0	84 49.0	+58.6	73.9	85 00.0	+60.0	85.0	85
86	81 38.7	+30.3 •	28.6	82 30.5	+33.4 •	32.2	83 20.0	+37.1 •	36.8	84 06.2	+41.6 •	42.6	84 47.8	+46.8 •	50.0	85 22.5	+52.7 •	59.5	85 47.6	+57.8	71.3	86 00.0	+60.0	85.0	86
87	82 09.0	+24.3 •	22.4	83 03.9	+26.9 •	25.6	83 57.1	+30.3 •	29.7	84 47.8	+34.7 •	35.1	85 34.6	+40.6 •	42.5	86 15.2	+47.9 •	52.9	86 45.4	+55.8 •	67.1	87 00.0	+60.0	85.0	87
88	82 33.3	+17.3 •	15.6	83 30.8	+19.1 •	17.9	84 27.4	+21.6 •	21.1	85 22.5	+25.1 •	25.5	86 15.2	+30.2 •	32.1	87 03.1	+38.1 •	42.5	87 41.2	+50.3 •	59.5	88 00.0	+60.0	85.0	88
89	82 50.6	+9.4 •	8.0	83 49.9	+10.1 •	9.3	84 49.0	+11.0 •	11.1	85 47.6	+12.4 •	13.7	86 45.4	+14.6 •	17.9	87 41.2	+18.8 •	25.5	88 31.5	+28.5 •	42.5	89 00.0	+60.0	85.0	89
90	83 00.0	+1.0 •	0.0	84 00.0	+0.2 •	0.0	85 00.0	–0.8 •	0.0	86 00.0	–2.2 •	0.0	87 00.0	–4.7 •	0.0	88 00.0	–9.4 •	0.0	89 00.0	–21.1 •	0.0	90 00.0	–60.0	42.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 95°, 265°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 29.2	+59.6	94.0	0 25.1	+59.6	94.0	0 20.9	+59.8	94.0	0 16.7	+59.9	94.0	0 12.6	+59.9	94.0	0 08.4	+59.9	94.0	0 04.2	+60.0	94.0	0 00.0	+60.0	94.0	**0**
1	1 28.8	+59.5	93.8	1 24.7	+59.7	93.9	1 20.7	+59.7	93.9	1 16.6	+59.8	93.9	1 12.5	+59.9	93.9	1 08.3	+60.0	94.0	1 04.2	+60.0	94.0	1 00.0	+60.0	94.0	**1**
2	2 28.3	+59.6	93.7	2 24.4	+59.7	93.8	2 20.4	+59.8	93.8	2 16.4	+59.9	93.9	2 12.4	+59.9	93.9	2 08.3	+60.0	93.9	2 04.2	+60.0	94.0	2 00.0	+60.0	94.0	**2**
3	3 27.9	+59.5	93.6	3 24.1	+59.7	93.7	3 20.2	+59.8	93.7	3 16.3	+59.8	93.8	3 12.3	+59.9	93.8	3 08.3	+59.9	93.9	3 04.2	+59.9	93.9	3 00.0	+60.0	94.0	**3**
4	4 27.4	+59.6	93.5	4 23.8	+59.6	93.6	4 20.0	+59.8	93.6	4 16.1	+59.9	93.7	4 12.2	+59.9	93.8	4 08.2	+60.0	93.9	4 04.1	+60.0	93.9	4 00.0	+60.0	94.0	**4**
5	5 27.0	+59.5	93.4	5 23.4	+59.7	93.5	5 19.8	+59.7	93.5	5 16.0	+59.9	93.6	5 12.1	+60.0	93.7	5 08.2	+60.0	93.8	5 04.1	+60.0	93.9	5 00.0	+60.0	94.0	**5**
6	6 26.5	+59.6	93.2	6 23.1	+59.7	93.3	6 19.5	+59.8	93.5	6 15.9	+59.8	93.6	6 12.1	+59.9	93.7	6 08.2	+59.9	93.8	6 04.1	+60.0	93.9	6 00.0	+60.0	94.0	**6**
7	7 26.1	+59.5	93.1	7 22.8	+59.6	93.2	7 19.3	+59.8	93.4	7 15.7	+59.9	93.5	7 12.0	+59.9	93.6	7 08.1	+60.0	93.8	7 04.1	+60.0	93.9	7 00.0	+60.0	94.0	**7**
8	8 25.6	+59.6	93.0	8 22.4	+59.7	93.1	8 19.1	+59.7	93.3	8 15.6	+59.8	93.4	8 11.9	+59.9	93.6	8 08.1	+59.9	93.7	8 04.1	+60.0	93.9	8 00.0	+60.0	94.0	**8**
9	9 25.2	+59.5	92.9	9 22.1	+59.7	93.0	9 18.8	+59.8	93.2	9 15.4	+59.9	93.4	9 11.8	+59.9	93.5	9 08.0	+60.0	93.7	9 04.1	+60.0	93.8	9 00.0	+60.0	94.0	**9**
10	10 24.7	+59.6	92.7	10 21.8	+59.6	92.9	10 18.6	+59.8	93.1	10 15.3	+59.8	93.3	10 11.7	+59.9	93.5	10 08.0	+60.0	93.6	10 04.1	+60.0	93.8	10 00.0	+60.0	94.0	**10**
11	11 24.3	+59.5	92.6	11 21.4	+59.7	92.8	11 18.4	+59.7	93.0	11 15.1	+59.9	93.2	11 11.6	+60.0	93.4	11 08.0	+59.9	93.6	11 04.1	+60.0	93.8	11 00.0	+60.0	94.0	**11**
12	12 23.8	+59.5	92.5	12 21.1	+59.6	92.7	12 18.1	+59.8	92.9	12 15.0	+59.8	93.1	12 11.6	+59.9	93.4	12 07.9	+60.0	93.6	12 04.1	+60.0	93.8	12 00.0	+60.0	94.0	**12**
13	13 23.3	+59.6	92.4	13 20.7	+59.7	92.6	13 17.9	+59.8	92.8	13 14.8	+59.8	93.1	13 11.5	+59.9	93.3	13 07.9	+59.9	93.5	13 04.1	+60.0	93.8	13 00.0	+60.0	94.0	**13**
14	14 22.9	+59.5	92.2	14 20.4	+59.6	92.5	14 17.7	+59.7	92.7	14 14.6	+59.9	93.0	14 11.4	+59.9	93.2	14 07.8	+60.0	93.5	14 04.1	+59.9	93.8	14 00.0	+60.0	94.0	**14**
15	15 22.4	+59.5	92.1	15 20.0	+59.7	92.4	15 17.4	+59.8	92.6	15 14.5	+59.8	92.9	15 11.3	+59.9	93.2	15 07.8	+60.0	93.5	15 04.0	+60.0	93.7	15 00.0	+60.0	94.0	**15**
16	16 21.9	+59.5	92.0	16 19.7	+59.6	92.3	16 17.2	+59.7	92.6	16 14.3	+59.9	92.8	16 11.2	+59.9	93.1	16 07.8	+59.9	93.4	16 04.0	+60.0	93.7	16 00.0	+60.0	94.0	**16**
17	17 21.4	+59.5	91.8	17 19.3	+59.7	92.1	17 16.9	+59.8	92.5	17 14.2	+59.8	92.8	17 11.1	+59.9	93.1	17 07.7	+60.0	93.4	17 04.0	+60.0	93.7	17 00.0	+60.0	94.0	**17**
18	18 20.9	+59.5	91.7	18 19.0	+59.6	92.0	18 16.7	+59.7	92.4	18 14.0	+59.9	92.7	18 11.0	+59.9	93.0	18 07.7	+60.0	93.3	18 04.0	+60.0	93.7	18 00.0	+60.0	94.0	**18**
19	19 20.4	+59.5	91.6	19 18.6	+59.6	91.9	19 16.4	+59.8	92.3	19 13.9	+59.8	92.6	19 10.9	+59.9	93.0	19 07.7	+59.9	93.3	19 04.0	+60.0	93.7	19 00.0	+60.0	94.0	**19**
20	20 19.9	+59.5	91.4	20 18.2	+59.7	91.8	20 16.2	+59.7	92.2	20 13.7	+59.8	92.5	20 10.8	+59.9	92.9	20 07.6	+60.0	93.3	20 04.0	+60.0	93.6	20 00.0	+60.0	94.0	**20**
21	21 19.4	+59.5	91.3	21 17.9	+59.6	91.7	21 15.9	+59.7	92.1	21 13.5	+59.9	92.5	21 10.7	+60.0	92.8	21 07.6	+59.9	93.2	21 04.0	+60.0	93.6	21 00.0	+60.0	94.0	**21**
22	22 18.9	+59.5	91.1	22 17.5	+59.6	91.6	22 15.6	+59.8	92.0	22 13.4	+59.8	92.4	22 10.7	+59.9	92.8	22 07.5	+60.0	93.2	22 04.0	+60.0	93.6	22 00.0	+60.0	94.0	**22**
23	23 18.4	+59.4	91.0	23 17.1	+59.6	91.4	23 15.4	+59.7	91.9	23 13.2	+59.8	92.3	23 10.6	+59.9	92.7	23 07.5	+59.9	93.2	23 04.0	+60.0	93.6	23 00.0	+60.0	94.0	**23**
24	24 17.8	+59.5	90.9	24 16.7	+59.6	91.3	24 15.1	+59.7	91.8	24 13.0	+59.8	92.2	24 10.5	+59.9	92.7	24 07.4	+60.0	93.1	24 04.0	+59.9	93.6	24 00.0	+60.0	94.0	**24**
25	25 17.3	+59.4	90.7	25 16.3	+59.6	91.2	25 14.8	+59.7	91.7	25 12.8	+59.9	92.1	25 10.4	+59.9	92.6	25 07.4	+60.0	93.1	25 03.9	+60.0	93.5	25 00.0	+60.0	94.0	**25**
26	26 16.7	+59.5	90.6	26 15.9	+59.6	91.1	26 14.5	+59.8	91.5	26 12.7	+59.8	92.0	26 10.3	+59.9	92.5	26 07.4	+59.9	93.0	26 03.9	+60.0	93.5	26 00.0	+60.0	94.0	**26**
27	27 16.2	+59.4	90.4	27 15.5	+59.6	90.9	27 14.3	+59.7	91.4	27 12.5	+59.8	92.0	27 10.2	+59.9	92.5	27 07.3	+60.0	93.0	27 03.9	+60.0	93.5	27 00.0	+60.0	94.0	**27**
28	28 15.6	+59.4	90.3	28 15.1	+59.5	90.8	28 14.0	+59.7	91.3	28 12.3	+59.8	91.9	28 10.1	+59.8	92.4	28 07.3	+59.9	92.9	28 03.9	+60.0	93.5	28 00.0	+60.0	94.0	**28**
29	29 15.0	+59.4	90.1	29 14.6	+59.6	90.7	29 13.7	+59.7	91.2	29 12.1	+59.8	91.8	29 09.9	+59.9	92.3	29 07.2	+60.0	92.9	29 03.9	+60.0	93.4	29 00.0	+60.0	94.0	**29**
30	30 14.4	+59.4	89.9	30 14.2	+59.6	90.5	30 13.4	+59.7	91.1	30 11.9	+59.8	91.7	30 09.8	+59.9	92.3	30 07.2	+59.9	92.8	30 03.9	+60.0	93.4	30 00.0	+60.0	94.0	**30**
31	31 13.8	+59.4	89.8	31 13.8	+59.5	90.4	31 13.1	+59.6	91.0	31 11.7	+59.8	91.6	31 09.7	+59.9	92.2	31 07.1	+60.0	92.8	31 03.9	+60.0	93.4	31 00.0	+60.0	94.0	**31**
32	32 13.2	+59.4	89.6	32 13.3	+59.6	90.2	32 12.7	+59.7	90.9	32 11.5	+59.8	91.5	32 09.6	+59.9	92.1	32 07.1	+59.9	92.7	32 03.9	+59.9	93.4	32 00.0	+60.0	94.0	**32**
33	33 12.6	+59.4	89.4	33 12.9	+59.5	90.1	33 12.4	+59.7	90.7	33 11.3	+59.8	91.4	33 09.5	+59.9	92.0	33 07.0	+60.0	92.7	33 03.8	+60.0	93.4	33 00.0	+60.0	94.0	**33**
34	34 12.0	+59.3	89.3	34 12.4	+59.5	89.9	34 12.1	+59.7	90.6	34 11.1	+59.8	91.3	34 09.4	+59.9	92.0	34 07.0	+59.9	92.7	34 03.8	+60.0	93.3	34 00.0	+60.0	94.0	**34**
35	35 11.3	+59.3	89.1	35 11.9	+59.5	89.8	35 11.8	+59.6	90.5	35 10.9	+59.8	91.2	35 09.3	+59.8	91.9	35 06.9	+60.0	92.6	35 03.8	+60.0	93.3	35 00.0	+60.0	94.0	**35**
36	36 10.6	+59.3	88.9	36 11.4	+59.5	89.6	36 11.4	+59.7	90.4	36 10.7	+59.7	91.1	36 09.1	+59.9	91.8	36 06.9	+59.9	92.5	36 03.8	+60.0	93.3	36 00.0	+60.0	94.0	**36**
37	37 09.9	+59.3	88.7	37 10.9	+59.5	89.5	37 11.1	+59.6	90.2	37 10.4	+59.8	91.0	37 09.0	+59.9	91.7	37 06.8	+59.9	92.5	37 03.8	+60.0	93.2	37 00.0	+60.0	94.0	**37**
38	38 09.2	+59.3	88.5	38 10.4	+59.4	89.3	38 10.7	+59.6	90.1	38 10.2	+59.8	90.9	38 08.9	+59.8	91.7	38 06.7	+60.0	92.4	38 03.8	+60.0	93.2	38 00.0	+60.0	94.0	**38**
39	39 08.5	+59.2	88.3	39 09.8	+59.5	89.1	39 10.3	+59.6	89.9	39 10.0	+59.7	90.8	39 08.7	+59.9	91.6	39 06.7	+59.9	92.4	39 03.8	+59.9	93.2	39 00.0	+60.0	94.0	**39**
40	40 07.7	+59.3	88.1	40 09.3	+59.4	88.9	40 09.9	+59.6	89.8	40 09.7	+59.8	90.6	40 08.6	+59.9	91.5	40 06.6	+60.0	92.3	40 03.7	+60.0	93.2	40 00.0	+60.0	94.0	**40**
41	41 07.0	+59.2	87.9	41 08.7	+59.4	88.8	41 09.5	+59.6	89.6	41 09.5	+59.7	90.5	41 08.5	+59.8	91.4	41 06.6	+59.9	92.3	41 03.7	+60.0	93.1	41 00.0	+60.0	94.0	**41**
42	42 06.2	+59.1	87.7	42 08.1	+59.4	88.6	42 09.1	+59.6	89.5	42 09.2	+59.7	90.4	42 08.3	+59.9	91.3	42 06.5	+59.9	92.2	42 03.7	+60.0	93.1	42 00.0	+60.0	94.0	**42**
43	43 05.3	+59.2	87.5	43 07.5	+59.4	88.4	43 08.7	+59.6	89.3	43 08.9	+59.8	90.3	43 08.2	+59.8	91.2	43 06.4	+60.0	92.1	43 03.7	+60.0	93.1	43 00.0	+60.0	94.0	**43**
44	44 04.5	+59.1	87.2	44 06.9	+59.3	88.2	44 08.3	+59.5	89.2	44 08.7	+59.7	90.1	44 08.0	+59.8	91.1	44 06.4	+59.9	92.1	44 03.7	+60.0	93.0	44 00.0	+60.0	94.0	**44**
45	45 03.6	+59.1	87.0	45 06.2	+59.4	88.0	45 07.8	+59.6	89.0	45 08.4	+59.7	90.0	45 07.8	+59.9	91.0	45 06.3	+59.9	92.0	45 03.7	+59.9	93.0	45 00.0	+60.0	94.0	**45**
46	46 02.7	+59.0	86.7	46 05.6	+59.3	87.8	46 07.4	+59.5	88.8	46 08.1	+59.7	89.8	46 07.7	+59.8	90.9	46 06.2	+59.9	91.9	46 03.6	+60.0	93.0	46 00.0	+60.0	94.0	**46**
47	47 01.7	+59.1	86.5	47 04.9	+59.3	87.5	47 06.9	+59.5	88.6	47 07.8	+59.6	89.7	47 07.5	+59.8	90.8	47 06.1	+59.9	91.9	47 03.6	+60.0	92.9	47 00.0	+60.0	94.0	**47**
48	48 00.8	+58.9	86.2	48 04.2	+59.2	87.3	48 06.4	+59.5	88.4	48 07.4	+59.7	89.5	48 07.3	+59.8	90.7	48 06.0	+60.0	91.8	48 03.6	+60.0	92.9	48 00.0	+60.0	94.0	**48**
49	48 59.7	+59.0	85.9	49 03.4	+59.2	87.1	49 05.9	+59.4	88.2	49 07.1	+59.7	89.4	49 07.1	+59.8	90.5	49 06.0	+59.9	91.7	49 03.6	+60.0	92.9	49 00.0	+60.0	94.0	**49**
50	49 58.7	+58.9	85.6	50 02.6	+59.2	86.8	50 05.3	+59.5	88.0	50 06.8	+59.6	89.2	50 06.9	+59.8	90.4	50 05.9	+59.9	91.6	50 03.6	+59.9	92.8	50 00.0	+60.0	94.0	**50**
51	50 57.6	+58.8	85.3	51 01.8	+59.2	86.6	51 04.8	+59.4	87.8	51 06.4	+59.6	89.0	51 06.7	+59.8	90.3	51 05.8	+59.9	91.5	51 03.5	+60.0	92.8	51 00.0	+60.0	94.0	**51**
52	51 56.4	+58.8	85.0	52 01.0	+59.1	86.3	52 04.2	+59.3	87.6	52 06.0	+59.6	88.9	52 06.5	+59.8	90.2	52 05.7	+59.9	91.4	52 03.5	+60.0	92.7	52 00.0	+60.0	94.0	**52**
53	52 55.2	+58.8	84.7	53 00.1	+59.0	86.0	53 03.5	+59.4	87.4	53 05.6	+59.6	88.7	53 06.3	+59.8	90.0	53 05.6	+59.9	91.3	53 03.5	+60.0	92.7	53 00.0	+60.0	94.0	**53**
54	53 54.0	+58.6	84.4	53 59.1	+59.1	85.7	54 02.9	+59.3	87.1	54 05.2	+59.6	88.5	54 06.1	+59.7	89.9	54 05.5	+59.9	91.2	54 03.5	+59.9	92.6	54 00.0	+60.0	94.0	**54**
55	54 52.6	+58.7	84.0	54 58.2	+58.9	85.4	55 02.2	+59.3	86.8	55 04.8	+59.5	88.3	55 05.8	+59.8	89.7	55 05.4	+59.9	91.1	55 03.4	+60.0	92.6	55 00.0	+60.0	94.0	**55**
56	55 51.3	+58.5	83.6	55 57.1	+59.0	85.1	56 01.5	+59.3	86.6	56 04.3	+59.5	88.1	56 05.6	+59.7	89.5	56 05.3	+59.9	91.0	56 03.4	+60.0	92.5	56 00.0	+60.0	94.0	**56**
57	56 49.8	+58.4	83.2	56 56.1	+58.8	84.8	57 00.8	+59.2	86.3	57 03.8	+59.5	87.8	57 05.3	+59.7	89.4	57 05.2	+59.8	90.9	57 03.4	+59.9	92.5	57 00.0	+60.0	94.0	**57**
58	57 48.2	+58.4	82.8	57 54.9	+58.8	84.4	58 00.0	+59.1	86.0	58 03.3	+59.5	87.6	58 05.0	+59.7	89.2	58 05.0	+59.9	90.8	58 03.3	+60.0	92.4	58 00.0	+60.0	94.0	**58**
59	58 46.6	+58.3	82.4	58 53.7	+58.8	84.0	58 59.1	+59.1	85.7	59 02.8	+59.4	87.3	59 04.7	+59.7	89.0	59 04.9	+59.8	90.7	59 03.3	+60.0	92.3	59 00.0	+60.0	94.0	**59**
60	59 44.9	+58.2	81.9	59 52.5	+58.6	83.6	59 58.2	+59.1	85.3	60 02.2	+59.4	87.1	60 04.4	+59.7	88.8	60 04.7	+59.9	90.5	60 03.3	+59.9	92.3	60 00.0	+60.0	94.0	**60**
61	60 43.1	+58.0	81.4	60 51.1	+58.6	83.2	60 57.3	+59.0	85.0	61 01.6	+59.4	86.8	61 04.1	+59.6	88.6	61 04.6	+59.8	90.4	61 03.2	+60.0	92.2	61 00.0	+60.0	94.0	**61**
62	61 41.1	+58.0	80.9	61 49.7	+58.4	82.7	61 56.3	+58.9	84.6	62 01.0	+59.3	86.5	62 03.7	+59.6	88.3	62 04.4	+59.9	90.2	62 03.2	+60.0	92.1	62 00.0	+60.0	94.0	**62**
63	62 39.1	+57.7	80.3	62 48.1	+58.4	82.2	62 55.2	+58.9	84.2	63 00.3	+59.3	86.1	63 03.3	+59.6	88.1	63 04.3	+59.8	90.1	63 03.2	+59.9	92.0	63 00.0	+60.0	94.0	**63**
64	63 36.8	+57.7	79.7	63 46.5	+58.3	81.7	63 54.1	+58.8	83.8	63 59.6	+59.2	85.8	64 02.9	+59.5	87.8	64 04.1	+59.8	89.9	64 03.1	+60.0	91.9	64 00.0	+60.0	94.0	**64**
65	64 34.5	+57.4	79.1	64 44.8	+58.1	81.2	64 52.9	+58.6	83.3	64 58.8	+59.1	85.4	65 02.4	+59.6	87.6	65 03.9	+59.8	89.7	65 03.1	+59.9	91.9	65 00.0	+60.0	94.0	**65**
66	65 31.9	+57.3	78.4	65 42.9	+57.9	80.6	65 51.5	+58.6	82.8	65 57.9	+59.1	85.0	66 02.0	+59.5	87.3	66 03.7	+59.7	89.5	66 03.0	+60.0	91.8	66 00.0	+60.0	94.0	**66**
67	66 29.2	+57.0	77.7	66 40.8	+57.8	79.9	66 50.1	+58.5	82.2	66 57.0	+59.0	84.6	67 01.5	+59.4	86.9	67 03.4	+59.8	89.3	67 03.0	+59.9	91.6	67 00.0	+60.0	94.0	**67**
68	67 26.2	+56.8	76.9	67 38.6	+57.6	79.3	67 48.6	+58.3	81.7	67 56.0	+58.9	84.1	68 00.9	+59.4	86.6	68 03.2	+59.7	89.0	68 02.9	+59.9	91.5	68 00.0	+60.0	94.0	**68**
69	68 23.0	+56.5	76.0	68 36.2	+57.4	78.5	68 46.9	+58.1	81.0	68 54.9	+58.8	83.6	69 00.3	+59.3	86.2	69 02.9	+59.7	88.8	69 02.8	+59.9	91.4	69 00.0	+60.0	94.0	**69**
70	69 19.5	+56.1	75.1	69 33.6	+57.1	77.7	69 45.0	+58.0	80.3	69 53.7	+58.7	83.0	69 59.6	+59.3	85.8	70 02.6	+59.7	88.5	70 02.7	+60.0	91.3	70 00.0	+60.0	94.0	**70**
71	70 15.6	+55.8	74.1	70 30.7	+56.9	76.8	70 43.0	+57.8	79.6	70 52.4	+58.6	82.4	70 58.9	+59.2	85.3	71 02.3	+59.6	88.2	71 02.7	+59.9	91.1	71 00.0	+60.0	94.0	**71**
72	71 11.4	+55.4	73.0	71 27.6	+56.5	75.8	71 40.8	+57.5	78.7	71 51.0	+58.4	81.7	71 58.1	+59.0	84.8	72 01.9	+59.6	87.8	72 02.6	+59.9	90.9	72 00.0	+60.0	94.0	**72**
73	72 06.8	+54.8	71.7	72 24.1	+56.1	74.7	72 38.3	+57.3	77.8	72 49.4	+58.2	81.0	72 57.1	+59.0	84.2	73 01.5	+59.6	87.4	73 02.5	+59.9	90.7	73 00.0	+60.0	94.0	**73**
74	73 01.6	+54.2	70.4	73 20.2	+55.6	73.5	73 35.6	+56.9	76.8	73 47.6	+58.0	80.1	73 56.1	+58.9	83.5	74 01.1	+59.5	87.0	74 02.4	+59.8	90.5	74 00.0	+60.0	94.0	**74**
75	73 55.8	+53.6	68.9	74 15.8	+55.1	72.2	74 32.5	+56.5	75.6	74 45.6	+57.7	79.2	74 55.0	+58.7	82.8	75 00.6	+59.4	86.5	75 02.2	+59.9	90.3	75 00.0	+60.0	94.0	**75**
76	74 49.4	+52.7	67.2	75 10.9	+54.5	70.7	75 29.0	+56.0	74.3	75 43.3	+57.4	78.1	75 53.7	+58.5	82.0	76 00.0	+59.3	86.0	76 02.1	+59.8	90.0	76 00.0	+60.0	94.0	**76**
77	75 42.1	+51.7	65.3	76 05.4	+53.6	69.0	76 25.0	+55.4	72.8	76 40.7	+57.0	76.9	76 52.2	+58.2	81.1	76 59.3	+59.2	85.3	77 01.9	+59.8	89.7	77 00.0	+60.0	94.0	**77**
78	76 33.8	+50.4	63.2	76 59.0	+52.7	67.1	77 20.4	+54.7	71.2	77 37.7	+56.4	75.5	77 50.4	+58.0	80.0	77 58.5	+59.1	84.6	78 01.7	+59.8	89.3	78 00.0	+60.0	94.0	**78**
79	77 24.2	+49.1	60.8	77 51.7	+51.4	64.8	78 15.1	+53.8	69.2	78 34.1	+55.9	73.8	78 48.4	+57.6	78.7	78 57.6	+58.9	83.7	79 01.5	+59.7	88.8	79 00.0	+60.0	94.0	**79**
80	78 13.3	*+47.2*•	58.1	78 43.1	+50.0	62.3	79 08.9	+52.6	66.9	79 30.0	+55.0	71.9	79 46.0	+57.1	77.2	79 56.5	+58.7	82.7	80 01.2	+59.7	88.3	80 00.0	+60.0	94.0	**80**
81	79 00.5	*+45.1*•	54.9	79 33.1	*+48.1*•	59.4	80 01.5	+51.0	64.3	80 25.0	+53.9	69.6	80 43.1	+56.4	75.4	80 55.2	+58.3	81.4	81 00.9	+59.6	87.7	81 00.0	+60.0	94.0	**81**
82	79 45.6	*+42.3*•	51.3	80 21.2	*+45.6*•	55.9	80 52.5	*+49.1*•	61.1	81 18.9	+52.4	66.8	81 39.5	+55.4	73.1	81 53.5	+57.9	79.8	82 00.5	+59.4	86.9	82 00.0	+60.0	94.0	**82**
83	80 27.9	*+38.9*•	47.2	81 06.8	*+42.6*•	51.9	81 41.6	*+46.5*•	57.3	82 11.3	*+50.4*•	63.4	82 34.9	+54.2	70.3	82 51.4	+57.2	77.9	82 59.9	+59.3	85.8	83 00.0	+60.0	94.0	**83**
84	81 06.8	*+34.8*•	42.5	81 49.4	*+38.7*•	47.2	82 28.1	*+43.0*•	52.7	83 01.7	*+47.6*•	59.2	83 29.1	*+52.1*•	66.8	83 48.6	+56.2	75.3	83 59.2	+59.0	84.5	84 00.0	+60.0	94.0	**84**
85	81 41.6	*+29.7*•	37.0	82 28.1	*+33.6*•	41.6	83 11.1	*+38.2*•	47.1	83 49.3	*+43.5*•	53.9	84 21.2	*+49.1*•	62.1	84 44.8	*+54.5*•	71.7	84 58.2	+58.5	82.6	85 00.0	+60.0	94.0	**85**
86	82 11.3	*+23.6*•	30.8	83 01.7	*+27.4*•	35.0	83 49.3	*+31.9*•	40.3	84 32.8	*+37.5*•	47.1	85 10.3	*+44.2*•	55.8	85 39.3	*+51.5*•	66.7	85 56.7	+57.6	79.8	86 00.0	+60.0	94.0	**86**
87	82 34.9	*+16.5*•	23.9	83 29.1	*+19.5*•	27.4	84 21.2	*+23.6*•	32.0	85 10.3	*+29.0*•	38.3	85 54.5	*+36.3*•	47.0	86 30.8	*+45.5*•	59.1	86 54.3	*+55.3*•	75.2	87 00.0	+60.0	94.0	**87**
88	82 51.4	*+8.5*•	16.3	83 48.6	*+10.6*•	18.8	84 44.8	*+13.4*•	22.3	85 39.3	*+17.4*•	27.4	86 30.8	*+23.5*•	34.9	87 16.3	*+33.3*•	47.0	87 49.6	*+48.6*•	66.7	88 00.0	+60.0	94.0	**88**
89	82 59.9	*+0.1*•	8.2	83 59.2	*+0.8*•	9.6	84 58.2	*+1.8*•	11.5	85 56.7	*+3.3*•	14.3	86 54.3	*+5.7*•	18.8	87 49.6	*+10.4*•	27.3	88 38.2	*+21.8*•	47.0	89 00.0	+60.0	94.0	**89**
90	83 00.0	*−8.4*•	0.0	84 00.0	*−9.1*•	0.0	85 00.0	*−10.0*•	0.0	86 00.0	*−11.4*•	0.0	87 00.0	*−13.7*•	0.0	88 00.0	*−17.9*•	0.0	89 00.0	*−27.8*•	0.0	90 00.0	−60.0	47.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 86°, 274°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 29.2	−59.5	94.0	0 25.1	−59.7	94.0	0 20.9	−59.8	94.0	0 16.7	−59.8	94.0	0 12.6	−60.0	94.0	0 08.4	−60.0	94.0	0 04.2	−60.0	94.0	0 00.0	+60.0	86.0	**0**
1	0 30.3	+59.6	85.9	0 34.6	+59.7	85.9	0 38.9	+59.7	85.9	0 43.1	+59.9	85.9	0 47.4	+59.9	86.0	0 51.6	+60.0	86.0	0 55.8	+60.0	86.0	1 00.0	+60.0	86.0	**1**
2	1 29.9	+59.5	85.8	1 34.3	+59.7	85.8	1 38.6	+59.8	85.8	1 43.0	+59.8	85.9	1 47.3	+59.9	85.9	1 51.6	+59.9	85.9	1 55.8	+60.0	86.0	2 00.0	+60.0	86.0	**2**
3	2 29.4	+59.6	85.7	2 34.0	+59.6	85.7	2 38.4	+59.8	85.8	2 42.8	+59.9	85.8	2 47.2	+59.9	85.8	2 51.5	+60.0	85.9	2 55.8	+60.0	85.9	3 00.0	+60.0	86.0	**3**
4	3 29.0	+59.5	85.5	3 33.6	+59.7	85.6	3 38.2	+59.8	85.7	3 42.7	+59.8	85.7	3 47.1	+59.9	85.8	3 51.5	+59.9	85.9	3 55.8	+60.0	85.9	4 00.0	+60.0	86.0	**4**
5	4 28.5	+59.6	85.4	4 33.3	+59.7	85.5	4 38.0	+59.7	85.6	4 42.5	+59.9	85.7	4 47.0	+60.0	85.7	4 51.4	+60.0	85.8	4 55.8	+60.0	85.9	5 00.0	+60.0	86.0	**5**
6	5 28.1	+59.5	85.3	5 33.0	+59.6	85.4	5 37.7	+59.8	85.5	5 42.4	+59.8	85.6	5 47.0	+59.9	85.7	5 51.4	+60.0	85.8	5 55.8	+60.0	85.9	6 00.0	+60.0	86.0	**6**
7	6 27.6	+59.6	85.2	6 32.6	+59.7	85.3	6 37.5	+59.8	85.4	6 42.2	+59.9	85.5	6 46.9	+59.9	85.6	6 51.4	+59.9	85.8	6 55.8	+59.9	85.9	7 00.0	+60.0	86.0	**7**
8	7 27.2	+59.5	85.1	7 32.3	+59.7	85.2	7 37.3	+59.7	85.3	7 42.1	+59.9	85.4	7 46.8	+59.9	85.6	7 51.3	+60.0	85.7	7 55.7	+60.0	85.9	8 00.0	+60.0	86.0	**8**
9	8 26.7	+59.6	84.9	8 32.0	+59.6	85.1	8 37.0	+59.8	85.2	8 42.0	+59.8	85.4	8 46.7	+59.9	85.5	8 51.3	+60.0	85.7	8 55.7	+60.0	85.8	9 00.0	+60.0	86.0	**9**
10	9 26.3	+59.5	84.8	9 31.6	+59.7	85.0	9 36.8	+59.8	85.1	9 41.8	+59.9	85.3	9 46.6	+59.9	85.5	9 51.3	+59.9	85.7	9 55.7	+60.0	85.8	10 00.0	+60.0	86.0	**10**
11	10 25.8	+59.6	84.7	10 31.3	+59.7	84.9	10 36.6	+59.7	85.0	10 41.7	+59.8	85.2	10 46.5	+60.0	85.4	10 51.2	+60.0	85.6	10 55.7	+60.0	85.8	11 00.0	+60.0	86.0	**11**
12	11 25.4	+59.5	84.6	11 31.0	+59.6	84.8	11 36.3	+59.8	85.0	11 41.5	+59.9	85.2	11 46.5	+59.9	85.4	11 51.2	+60.0	85.6	11 55.7	+60.0	85.8	12 00.0	+60.0	86.0	**12**
13	12 24.9	+59.5	84.4	12 30.6	+59.7	84.6	12 36.1	+59.8	84.9	12 41.4	+59.8	85.1	12 46.4	+59.9	85.3	12 51.2	+59.9	85.5	12 55.7	+60.0	85.8	13 00.0	+60.0	86.0	**13**
14	13 24.4	+59.6	84.3	13 30.3	+59.6	84.5	13 35.9	+59.7	84.8	13 41.2	+59.8	85.0	13 46.3	+59.9	85.3	13 51.1	+60.0	85.5	13 55.7	+60.0	85.8	14 00.0	+60.0	86.0	**14**
15	14 24.0	+59.5	84.2	14 29.9	+59.7	84.4	14 35.6	+59.8	84.7	14 41.0	+59.9	84.9	14 46.2	+59.9	85.2	14 51.1	+59.9	85.5	14 55.7	+60.0	85.7	15 00.0	+60.0	86.0	**15**
16	15 23.5	+59.5	84.0	15 29.6	+59.6	84.3	15 35.4	+59.7	84.6	15 40.9	+59.8	84.9	15 46.1	+59.9	85.1	15 51.0	+60.0	85.4	15 55.7	+60.0	85.7	16 00.0	+60.0	86.0	**16**
17	16 23.0	+59.5	83.9	16 29.2	+59.7	84.2	16 35.1	+59.8	84.5	16 40.7	+59.9	84.8	16 46.0	+59.9	85.1	16 51.0	+60.0	85.4	16 55.7	+59.9	85.7	17 00.0	+60.0	86.0	**17**
18	17 22.5	+59.5	83.8	17 28.9	+59.6	84.1	17 34.9	+59.7	84.4	17 40.6	+59.8	84.7	17 45.9	+59.9	85.0	17 51.0	+59.9	85.4	17 55.6	+60.0	85.7	18 00.0	+60.0	86.0	**18**
19	18 22.0	+59.5	83.6	18 28.5	+59.6	84.0	18 34.6	+59.8	84.3	18 40.4	+59.8	84.6	18 45.8	+59.9	85.0	18 50.9	+60.0	85.3	18 55.6	+60.0	85.7	19 00.0	+60.0	86.0	**19**
20	19 21.5	+59.5	83.5	19 28.1	+59.7	83.9	19 34.4	+59.7	84.2	19 40.2	+59.9	84.6	19 45.7	+60.0	84.9	19 50.9	+59.9	85.3	19 55.6	+60.0	85.6	20 00.0	+60.0	86.0	**20**
21	20 21.0	+59.5	83.4	20 27.8	+59.6	83.7	20 34.1	+59.8	84.1	20 40.1	+59.8	84.5	20 45.7	+59.9	84.9	20 50.8	+60.0	85.2	20 55.6	+60.0	85.6	21 00.0	+60.0	86.0	**21**
22	21 20.5	+59.5	83.2	21 27.4	+59.6	83.6	21 33.9	+59.7	84.0	21 39.9	+59.8	84.4	21 45.6	+59.9	84.8	21 50.8	+59.9	85.2	21 55.6	+60.0	85.6	22 00.0	+60.0	86.0	**22**
23	22 20.0	+59.5	83.1	22 27.0	+59.6	83.5	22 33.6	+59.7	83.9	22 39.7	+59.9	84.3	22 45.5	+59.9	84.7	22 50.7	+60.0	85.2	22 55.6	+60.0	85.6	23 00.0	+60.0	86.0	**23**
24	23 19.5	+59.4	82.9	23 26.6	+59.6	83.4	23 33.3	+59.7	83.8	23 39.6	+59.8	84.2	23 45.4	+59.9	84.7	23 50.7	+60.0	85.1	23 55.6	+60.0	85.6	24 00.0	+60.0	86.0	**24**
25	24 18.9	+59.5	82.8	24 26.2	+59.6	83.2	24 33.0	+59.8	83.7	24 39.4	+59.8	84.2	24 45.3	+59.9	84.6	24 50.7	+59.9	85.1	24 55.6	+60.0	85.5	25 00.0	+60.0	86.0	**25**
26	25 18.4	+59.4	82.6	25 25.8	+59.6	83.1	25 32.8	+59.7	83.6	25 39.2	+59.8	84.1	25 45.2	+59.9	84.5	25 50.6	+60.0	85.0	25 55.6	+59.9	85.5	26 00.0	+60.0	86.0	**26**
27	26 17.8	+59.5	82.5	26 25.4	+59.6	83.0	26 32.5	+59.7	83.5	26 39.0	+59.9	84.0	26 45.1	+59.9	84.5	26 50.6	+59.9	85.0	26 55.5	+60.0	85.5	27 00.0	+60.0	86.0	**27**
28	27 17.3	+59.4	82.3	27 25.0	+59.6	82.9	27 32.2	+59.7	83.4	27 38.9	+59.8	83.9	27 45.0	+59.9	84.4	27 50.5	+60.0	84.9	27 55.5	+60.0	85.5	28 00.0	+60.0	86.0	**28**
29	28 16.7	+59.4	82.2	28 24.6	+59.6	82.7	28 31.9	+59.7	83.3	28 38.7	+59.8	83.8	28 44.9	+59.8	84.4	28 50.5	+59.9	84.9	28 55.5	+60.0	85.4	29 00.0	+60.0	86.0	**29**
30	29 16.1	+59.4	82.0	29 24.2	+59.5	82.6	29 31.6	+59.7	83.2	29 38.5	+59.8	83.7	29 44.7	+59.9	84.3	29 50.4	+60.0	84.9	29 55.5	+60.0	85.4	30 00.0	+60.0	86.0	**30**
31	30 15.5	+59.4	81.9	30 23.7	+59.6	82.5	30 31.3	+59.7	83.0	30 38.3	+59.8	83.6	30 44.6	+59.9	84.2	30 50.4	+59.9	84.8	30 55.5	+60.0	85.4	31 00.0	+60.0	86.0	**31**
32	31 14.9	+59.4	81.7	31 23.3	+59.5	82.3	31 31.0	+59.7	82.9	31 38.1	+59.8	83.5	31 44.5	+59.9	84.1	31 50.3	+60.0	84.8	31 55.5	+60.0	85.4	32 00.0	+60.0	86.0	**32**
33	32 14.3	+59.4	81.5	32 22.8	+59.6	82.2	32 30.7	+59.7	82.8	32 37.9	+59.8	83.4	32 44.4	+59.9	84.1	32 50.3	+59.9	84.7	32 55.5	+60.0	85.4	33 00.0	+60.0	86.0	**33**
34	33 13.7	+59.4	81.4	33 22.4	+59.5	82.0	33 30.4	+59.6	82.7	33 37.7	+59.8	83.3	33 44.3	+59.9	84.0	33 50.2	+60.0	84.7	33 55.5	+60.0	85.3	34 00.0	+60.0	86.0	**34**
35	34 13.1	+59.3	81.2	34 21.9	+59.5	81.9	34 30.0	+59.7	82.5	34 37.5	+59.7	83.2	34 44.2	+59.9	83.9	34 50.2	+59.9	84.6	34 55.5	+59.9	85.3	35 00.0	+60.0	86.0	**35**
36	35 12.4	+59.3	81.0	35 21.4	+59.5	81.7	35 29.7	+59.6	82.4	35 37.2	+59.8	83.1	35 44.1	+59.8	83.8	35 50.1	+60.0	84.6	35 55.4	+60.0	85.3	36 00.0	+60.0	86.0	**36**
37	36 11.7	+59.3	80.8	36 20.9	+59.5	81.6	36 29.3	+59.7	82.3	36 37.0	+59.8	83.0	36 43.9	+59.9	83.8	36 50.1	+59.9	84.5	36 55.4	+60.0	85.2	37 00.0	+60.0	86.0	**37**
38	37 11.0	+59.3	80.6	37 20.4	+59.5	81.4	37 29.0	+59.6	82.1	37 36.8	+59.8	82.9	37 43.8	+59.9	83.7	37 50.0	+59.9	84.4	37 55.4	+60.0	85.2	38 00.0	+60.0	86.0	**38**
39	38 10.3	+59.3	80.4	38 19.9	+59.4	81.2	38 28.6	+59.6	82.0	38 36.6	+59.7	82.8	38 43.7	+59.8	83.6	38 49.9	+60.0	84.4	38 55.4	+60.0	85.2	39 00.0	+60.0	86.0	**39**
40	39 09.6	+59.2	80.2	39 19.3	+59.5	81.1	39 28.2	+59.7	81.9	39 36.3	+59.8	82.7	39 43.5	+59.9	83.5	39 49.9	+59.9	84.3	39 55.4	+60.0	85.2	40 00.0	+60.0	86.0	**40**
41	40 08.8	+59.3	80.0	40 18.8	+59.4	80.9	40 27.9	+59.6	81.7	40 36.1	+59.7	82.6	40 43.4	+59.8	83.4	40 49.8	+60.0	84.3	40 55.4	+59.9	85.1	41 00.0	+60.0	86.0	**41**
42	41 08.1	+59.2	79.8	41 18.2	+59.4	80.7	41 27.5	+59.5	81.6	41 35.8	+59.7	82.4	41 43.2	+59.9	83.3	41 49.8	+59.9	84.2	41 55.3	+60.0	85.1	42 00.0	+60.0	86.0	**42**
43	42 07.3	+59.1	79.6	42 17.6	+59.4	80.5	42 27.0	+59.6	81.4	42 35.5	+59.8	82.3	42 43.1	+59.8	83.2	42 49.7	+59.9	84.1	42 55.3	+60.0	85.1	43 00.0	+60.0	86.0	**43**
44	43 06.4	+59.2	79.4	43 17.0	+59.4	80.3	43 26.6	+59.6	81.2	43 35.3	+59.7	82.2	43 42.9	+59.9	83.1	43 49.6	+60.0	84.1	43 55.3	+60.0	85.0	44 00.0	+60.0	86.0	**44**
45	44 05.6	+59.1	79.2	44 16.4	+59.3	80.1	44 26.2	+59.5	81.1	44 35.0	+59.7	82.0	44 42.8	+59.8	83.0	44 49.6	+59.9	84.0	44 55.3	+60.0	85.0	45 00.0	+60.0	86.0	**45**
46	45 04.7	+59.1	78.9	45 15.7	+59.4	79.9	45 25.7	+59.6	80.9	45 34.7	+59.7	81.9	45 42.6	+59.8	82.9	45 49.5	+59.9	83.9	45 55.3	+60.0	85.0	46 00.0	+60.0	86.0	**46**
47	46 03.8	+59.0	78.7	46 15.1	+59.3	79.7	46 25.3	+59.5	80.7	46 34.4	+59.7	81.8	46 42.4	+59.9	82.8	46 49.4	+59.9	83.9	46 55.3	+59.9	84.9	47 00.0	+60.0	86.0	**47**
48	47 02.8	+59.1	78.4	47 14.4	+59.2	79.5	47 24.8	+59.5	80.5	47 34.1	+59.7	81.6	47 42.3	+59.8	82.7	47 49.3	+59.9	83.8	47 55.2	+60.0	84.9	48 00.0	+60.0	86.0	**48**
49	48 01.9	+58.9	78.1	48 13.6	+59.3	79.2	48 24.3	+59.4	80.3	48 33.8	+59.6	81.5	48 42.1	+59.8	82.6	48 49.2	+60.0	83.7	48 55.2	+60.0	84.9	49 00.0	+60.0	86.0	**49**
50	49 00.8	+59.0	77.9	49 12.9	+59.2	79.0	49 23.7	+59.5	80.1	49 33.4	+59.7	81.3	49 41.9	+59.8	82.5	49 49.2	+59.9	83.6	49 55.2	+60.0	84.8	50 00.0	+60.0	86.0	**50**
51	49 59.8	+58.9	77.6	50 12.1	+59.2	78.7	50 23.2	+59.4	79.9	50 33.1	+59.6	81.1	50 41.7	+59.8	82.3	50 49.1	+59.9	83.5	50 55.2	+59.9	84.8	51 00.0	+60.0	86.0	**51**
52	50 58.7	+58.8	77.3	51 11.3	+59.1	78.5	51 22.6	+59.4	79.7	51 32.7	+59.6	81.0	51 41.5	+59.8	82.2	51 49.0	+59.9	83.5	51 55.1	+60.0	84.7	52 00.0	+60.0	86.0	**52**
53	51 57.5	+58.8	77.0	52 10.4	+59.1	78.2	52 22.0	+59.4	79.5	52 32.3	+59.6	80.8	52 41.3	+59.7	82.1	52 48.9	+59.9	83.4	52 55.1	+60.0	84.7	53 00.0	+60.0	86.0	**53**
54	52 56.3	+58.8	76.6	53 09.5	+59.1	77.9	53 21.4	+59.3	79.2	53 31.9	+59.6	80.6	53 41.0	+59.8	81.9	53 48.8	+59.9	83.3	53 55.1	+60.0	84.6	54 00.0	+60.0	86.0	**54**
55	53 55.1	+58.6	76.3	54 08.6	+59.0	77.6	54 20.7	+59.3	79.0	54 31.5	+59.5	80.4	54 40.8	+59.7	81.8	54 48.7	+59.9	83.2	54 55.1	+59.9	84.6	55 00.0	+60.0	86.0	**55**
56	54 53.7	+58.6	75.9	55 07.6	+59.0	77.3	55 20.0	+59.3	78.7	55 31.0	+59.6	80.2	55 40.5	+59.8	81.6	55 48.6	+59.8	83.1	55 55.0	+60.0	84.5	56 00.0	+60.0	86.0	**56**
57	55 52.3	+58.6	75.6	56 06.6	+58.9	77.0	56 19.3	+59.3	78.5	56 30.6	+59.5	79.9	56 40.3	+59.7	81.4	56 48.4	+59.9	82.9	56 55.0	+60.0	84.5	57 00.0	+60.0	86.0	**57**
58	56 50.9	+58.4	75.2	57 05.5	+58.8	76.7	57 18.6	+59.2	78.2	57 30.1	+59.5	79.7	57 40.0	+59.7	81.3	57 48.3	+59.9	82.8	57 55.0	+59.9	84.4	58 00.0	+60.0	86.0	**58**
59	57 49.3	+58.4	74.7	58 04.3	+58.8	76.3	58 17.8	+59.1	77.9	58 29.6	+59.4	79.5	58 39.7	+59.7	81.1	58 48.2	+59.8	82.7	58 54.9	+60.0	84.3	59 00.0	+60.0	86.0	**59**
60	58 47.7	+58.3	74.3	59 03.1	+58.7	75.9	59 16.9	+59.1	77.5	59 29.0	+59.4	79.2	59 39.4	+59.7	80.9	59 48.0	+59.9	82.6	59 54.9	+60.0	84.3	60 00.0	+60.0	86.0	**60**
61	59 46.0	+58.1	73.8	60 01.8	+58.7	75.5	60 16.0	+59.0	77.2	60 28.4	+59.4	78.9	60 39.1	+59.6	80.7	60 47.9	+59.8	82.4	60 54.9	+59.9	84.2	61 00.0	+60.0	86.0	**61**
62	60 44.1	+58.1	73.3	61 00.5	+58.5	75.1	61 15.0	+59.0	76.8	61 27.8	+59.3	78.6	61 38.7	+59.6	80.4	61 47.7	+59.9	82.3	61 54.8	+60.0	84.1	62 00.0	+60.0	86.0	**62**
63	61 42.2	+57.9	72.8	61 59.0	+58.5	74.6	62 14.0	+58.9	76.4	62 27.1	+59.3	78.3	62 38.3	+59.6	80.2	62 47.6	+59.8	82.1	62 54.8	+59.9	84.0	63 00.0	+60.0	86.0	**63**
64	62 40.1	+57.8	72.3	62 57.5	+58.3	74.1	63 12.9	+58.9	76.0	63 26.4	+59.3	78.0	63 37.9	+59.6	79.9	63 47.4	+59.8	81.9	63 54.7	+60.0	84.0	64 00.0	+60.0	86.0	**64**
65	63 37.9	+57.6	71.7	63 55.8	+58.3	73.6	64 11.8	+58.7	75.6	64 25.7	+59.2	77.6	64 37.5	+59.5	79.7	64 47.2	+59.8	81.8	64 54.7	+59.9	83.9	65 00.0	+60.0	86.0	**65**
66	64 35.5	+57.5	71.0	64 54.1	+58.0	73.0	65 10.5	+58.7	75.1	65 24.9	+59.1	77.2	65 37.0	+59.5	79.4	65 47.0	+59.8	81.6	65 54.6	+60.0	83.8	66 00.0	+60.0	86.0	**66**
67	65 33.0	+57.2	70.3	65 52.1	+58.0	72.4	66 09.2	+58.5	74.6	66 24.0	+59.0	76.8	66 36.5	+59.5	79.1	66 46.8	+59.7	81.3	66 54.6	+59.9	83.7	67 00.0	+60.0	86.0	**67**
68	66 30.2	+57.1	69.6	66 50.1	+57.7	71.8	67 07.7	+58.4	74.0	67 23.0	+59.0	76.4	67 36.0	+59.4	78.7	67 46.5	+59.7	81.1	67 54.5	+60.0	83.5	68 00.0	+60.0	86.0	**68**
69	67 27.3	+56.7	68.8	67 47.8	+57.6	71.1	68 06.1	+58.3	73.4	68 22.0	+58.9	75.9	68 35.4	+59.4	78.3	68 46.2	+59.8	80.9	68 54.5	+59.9	83.4	69 00.0	+60.0	86.0	**69**
70	68 24.0	+56.5	67.9	68 45.4	+57.4	70.3	69 04.4	+58.1	72.8	69 20.9	+58.7	75.3	69 34.8	+59.3	77.9	69 46.0	+59.6	80.6	69 54.4	+59.9	83.3	70 00.0	+60.0	86.0	**70**
71	69 20.5	+56.2	67.0	69 42.8	+57.0	69.5	70 02.5	+57.9	72.1	70 19.6	+58.7	74.7	70 34.1	+59.2	77.5	70 45.6	+59.7	80.3	70 54.3	+59.9	83.1	71 00.0	+60.0	86.0	**71**
72	70 16.7	+55.7	66.0	70 39.8	+56.8	68.6	71 00.4	+57.7	71.3	71 18.3	+58.5	74.1	71 33.3	+59.1	77.0	71 45.3	+59.6	79.9	71 54.2	+59.9	82.9	72 00.0	+60.0	86.0	**72**
73	71 12.4	+55.4	64.9	71 36.6	+56.5	67.6	71 58.1	+57.5	70.4	72 16.8	+58.3	73.4	72 32.4	+59.0	76.4	72 44.9	+59.6	79.6	72 54.1	+59.9	82.8	73 00.0	+60.0	86.0	**73**
74	72 07.8	+54.8	63.6	72 33.1	+56.0	66.5	72 55.6	+57.1	69.5	73 15.1	+58.1	72.6	73 31.4	+58.9	75.8	73 44.5	+59.5	79.1	73 54.0	+59.9	82.5	74 00.0	+60.0	86.0	**74**
75	73 02.6	+54.2	62.3	73 29.1	+55.6	65.3	73 52.7	+56.8	68.4	74 13.2	+57.9	71.7	74 30.3	+58.8	75.1	74 44.0	+59.4	78.7	74 53.9	+59.8	82.3	75 00.0	+60.0	86.0	**75**
76	73 56.8	+53.5	60.8	74 24.7	+55.0	63.9	74 49.5	+56.4	67.2	75 11.1	+57.6	70.7	75 29.1	+58.6	74.3	75 43.4	+59.3	78.1	75 53.7	+59.9	82.0	76 00.0	+60.0	86.0	**76**
77	74 50.3	+52.7	59.1	75 19.7	+54.3	62.4	75 45.9	+55.8	65.9	76 08.7	+57.2	69.6	76 27.7	+58.4	73.5	76 42.7	+59.3	77.5	76 53.6	+59.8	81.7	77 00.0	+60.0	86.0	**77**
78	75 43.0	+51.7	57.2	76 14.0	+53.5	60.6	76 41.7	+55.3	64.3	77 05.9	+56.7	68.3	77 26.1	+58.1	72.4	77 42.0	+59.1	76.8	77 53.4	+59.8	81.3	78 00.0	+60.0	86.0	**78**
79	76 34.7	+50.5	55.1	77 07.5	+52.5	58.7	77 37.0	+54.4	62.6	78 02.6	+56.3	66.8	78 24.2	+57.7	71.2	78 41.1	+59.0	76.0	78 53.2	+59.7	80.9	79 00.0	+60.0	86.0	**79**
80	77 25.2	+49.0	52.7	78 00.0	+51.2	56.4	78 31.4	+53.4	60.5	78 58.9	+55.5	65.0	79 21.9	+57.3	69.8	79 40.1	+58.7	75.0	79 52.9	+59.7	80.4	80 00.0	+60.0	86.0	**80**
81	78 14.2	*+47.2* •	49.9	78 51.2	+49.7	53.8	79 24.8	+52.2	58.1	79 54.4	+54.5	62.9	80 19.2	+56.7	68.1	80 38.8	+58.5	73.8	80 52.6	+59.6	79.8	81 00.0	+60.0	86.0	**81**
82	79 01.4	*+45.0* •	46.8	79 40.9	*+47.7* •	50.8	80 17.0	+50.5	55.3	80 48.9	+53.3	60.4	81 15.9	+55.9	66.1	81 37.3	+58.0	72.3	81 52.2	+59.4	79.0	82 00.0	+60.0	86.0	**82**
83	79 46.4	*+42.2* •	43.2	80 28.6	*+45.3* •	47.3	81 07.5	*+48.4* •	52.0	81 42.2	*+51.7* •	57.4	82 11.8	+54.8	63.6	82 35.3	+57.4	70.5	82 51.6	+59.3	78.0	83 00.0	+60.0	86.0	**83**
84	80 28.6	*+38.9* •	39.1	81 13.9	*+42.0* •	43.2	81 55.9	*+45.5* •	48.0	82 33.9	*+49.2* •	53.7	83 06.6	*+53.1* •	60.4	83 32.7	+56.6	68.1	83 50.9	+59.1	76.7	84 00.0	+60.0	86.0	**84**
85	81 07.5	*+34.7* •	34.3	81 55.9	*+38.0* •	38.3	82 41.4	*+41.7* •	43.1	83 23.1	*+46.0* •	49.0	83 59.7	*+50.5* •	56.2	84 29.3	*+55.0* •	64.8	84 50.0	+58.6	74.9	85 00.0	+60.0	86.0	**85**
86	81 42.2	*+29.6* •	28.8	82 33.9	*+32.7* •	32.5	83 23.1	*+36.6* •	37.2	84 09.1	*+41.1* •	43.1	84 50.2	*+46.6* •	50.6	85 24.3	*+52.5* •	60.3	85 48.6	+57.7	72.2	86 00.0	+60.0	86.0	**86**
87	82 11.8	*+23.5* •	22.6	83 06.6	*+26.1* •	25.8	83 59.7	*+29.6* •	29.9	84 50.2	*+34.1* •	35.5	85 36.8	*+40.0* •	43.0	86 16.8	*+47.7* •	53.6	86 46.3	*+55.8* •	68.0	87 00.0	+60.0	86.0	**87**
88	82 35.3	*+16.3* •	15.7	83 32.7	*+18.2* •	18.0	84 29.3	*+20.7* •	21.2	85 24.3	*+24.3* •	25.8	86 16.8	*+29.5* •	32.5	87 04.5	*+37.6* •	43.0	87 42.1	*+50.1* •	60.3	88 00.0	+60.0	86.0	**88**
89	82 51.6	*+8.4* •	8.1	83 50.9	*+9.1* •	9.4	84 50.0	*+10.0* •	11.1	85 48.6	*+11.4* •	13.8	86 46.3	*+13.7* •	18.0	87 42.1	*+17.9* •	25.7	88 32.2	*+27.8* •	43.0	89 00.0	+60.0	86.0	**89**
90	83 00.0	*−0.1* •	0.0	84 00.0	*−0.8* •	0.0	85 00.0	*−1.8* •	0.0	86 00.0	*−3.3* •	0.0	87 00.0	*−5.7* •	0.0	88 00.0	*−10.4* •	0.0	89 00.0	*−21.8* •	0.0	90 00.0	−60.0	43.0	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 94°, 266°

LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 21.9	+59.6	93.0	0 18.8	+59.7	93.0	0 15.7	+59.8	93.0	0 12.6	+59.8	93.0	0 09.4	+59.9	93.0	0 06.3	+59.9	93.0	0 03.1	+60.0	93.0	0 00.0	+60.0	93.0	**0**
1	1 21.5	+59.5	92.9	1 18.5	+59.7	92.9	1 15.5	+59.7	92.9	1 12.4	+59.9	92.9	1 09.3	+60.0	92.9	1 06.2	+60.0	93.0	1 03.1	+60.0	93.0	1 00.0	+60.0	93.0	**1**
2	2 21.0	+59.6	92.7	2 18.2	+59.6	92.8	2 15.2	+59.8	92.8	2 12.3	+59.8	92.9	2 09.3	+59.9	92.9	2 06.2	+60.0	92.9	2 03.1	+60.0	93.0	2 00.0	+60.0	93.0	**2**
3	3 20.6	+59.5	92.6	3 17.8	+59.7	92.7	3 15.0	+59.8	92.7	3 12.1	+59.9	92.8	3 09.2	+59.9	92.8	3 06.2	+59.9	92.9	3 03.1	+60.0	92.9	3 00.0	+60.0	93.0	**3**
4	4 20.1	+59.6	92.5	4 17.5	+59.7	92.6	4 14.8	+59.7	92.6	4 12.0	+59.8	92.7	4 09.1	+59.9	92.8	4 06.1	+60.0	92.9	4 03.1	+60.0	92.9	4 00.0	+60.0	93.0	**4**
5	5 19.7	+59.5	92.4	5 17.2	+59.6	92.5	5 14.5	+59.8	92.6	5 11.8	+59.9	92.6	5 09.0	+59.9	92.7	5 06.1	+60.0	92.8	5 03.1	+60.0	92.9	5 00.0	+60.0	93.0	**5**
6	6 19.2	+59.6	92.2	6 16.8	+59.7	92.4	6 14.3	+59.8	92.5	6 11.7	+59.8	92.6	6 08.9	+59.9	92.7	6 06.1	+59.9	92.8	6 03.1	+60.0	92.9	6 00.0	+60.0	93.0	**6**
7	7 18.8	+59.5	92.1	7 16.5	+59.7	92.2	7 14.1	+59.7	92.4	7 11.5	+59.9	92.5	7 08.8	+60.0	92.6	7 06.0	+60.0	92.8	7 03.1	+60.0	92.9	7 00.0	+60.0	93.0	**7**
8	8 18.3	+59.6	92.0	8 16.2	+59.6	92.1	8 13.8	+59.8	92.3	8 11.4	+59.8	92.4	8 08.8	+59.9	92.6	8 06.0	+59.9	92.7	8 03.1	+60.0	92.9	8 00.0	+60.0	93.0	**8**
9	9 17.9	+59.5	91.9	9 15.8	+59.7	92.0	9 13.6	+59.8	92.2	9 11.2	+59.9	92.4	9 08.7	+59.9	92.5	9 05.9	+60.0	92.7	9 03.1	+59.9	92.8	9 00.0	+60.0	93.0	**9**
10	10 17.4	+59.6	91.7	10 15.5	+59.7	91.9	10 13.4	+59.7	92.1	10 11.1	+59.8	92.3	10 08.6	+59.9	92.5	10 05.9	+60.0	92.6	10 03.0	+60.0	92.8	10 00.0	+60.0	93.0	**10**
11	11 17.0	+59.5	91.6	11 15.2	+59.6	91.8	11 13.1	+59.8	92.0	11 10.9	+59.9	92.2	11 08.5	+59.9	92.4	11 05.9	+59.9	92.6	11 03.0	+60.0	92.8	11 00.0	+60.0	93.0	**11**
12	12 16.5	+59.5	91.5	12 14.8	+59.7	91.7	12 12.9	+59.8	91.9	12 10.8	+59.8	92.1	12 08.4	+59.9	92.4	12 05.8	+60.0	92.6	12 03.0	+60.0	92.8	12 00.0	+60.0	93.0	**12**
13	13 16.0	+59.5	91.4	13 14.5	+59.6	91.6	13 12.7	+59.7	91.8	13 10.6	+59.9	92.1	13 08.3	+59.9	92.3	13 05.8	+60.0	92.5	13 03.0	+60.0	92.8	13 00.0	+60.0	93.0	**13**
14	14 15.5	+59.6	91.2	14 14.1	+59.7	91.5	14 12.4	+59.8	91.7	14 10.5	+59.8	92.0	14 08.2	+60.0	92.2	14 05.8	+59.9	92.5	14 03.0	+60.0	92.8	14 00.0	+60.0	93.0	**14**
15	15 15.1	+59.5	91.1	15 13.8	+59.6	91.4	15 12.2	+59.7	91.7	15 10.3	+59.9	91.9	15 08.2	+59.9	92.2	15 05.7	+60.0	92.5	15 03.0	+60.0	92.7	15 00.0	+60.0	93.0	**15**
16	16 14.6	+59.5	91.0	16 13.4	+59.7	91.3	16 11.9	+59.8	91.6	16 10.2	+59.8	91.8	16 08.1	+59.9	92.1	16 05.7	+59.9	92.4	16 03.0	+60.0	92.7	16 00.0	+60.0	93.0	**16**
17	17 14.1	+59.5	90.8	17 13.1	+59.6	91.2	17 11.7	+59.7	91.5	17 10.0	+59.8	91.8	17 08.0	+59.9	92.1	17 05.6	+60.0	92.4	17 03.0	+60.0	92.7	17 00.0	+60.0	93.0	**17**
18	18 13.6	+59.5	90.7	18 12.7	+59.6	91.0	18 11.4	+59.8	91.4	18 09.8	+59.9	91.7	18 07.9	+59.9	92.0	18 05.6	+60.0	92.3	18 03.0	+60.0	92.7	18 00.0	+60.0	93.0	**18**
19	19 13.1	+59.5	90.6	19 12.3	+59.7	90.9	19 11.2	+59.7	91.3	19 09.7	+59.8	91.6	19 07.8	+59.9	92.0	19 05.6	+59.9	92.3	19 03.0	+59.9	92.7	19 00.0	+60.0	93.0	**19**
20	20 12.6	+59.5	90.4	20 12.0	+59.6	90.8	20 10.9	+59.8	91.2	20 09.5	+59.8	91.5	20 07.7	+59.9	91.9	20 05.5	+60.0	92.3	20 02.9	+60.0	92.6	20 00.0	+60.0	93.0	**20**
21	21 12.1	+59.5	90.3	21 11.6	+59.6	90.7	21 10.7	+59.7	91.1	21 09.3	+59.9	91.5	21 07.6	+59.9	91.8	21 05.5	+59.9	92.2	21 02.9	+60.0	92.6	21 00.0	+60.0	93.0	**21**
22	22 11.6	+59.5	90.2	22 11.2	+59.6	90.6	22 10.4	+59.7	91.0	22 09.2	+59.8	91.4	22 07.5	+59.9	91.8	22 05.4	+60.0	92.2	22 02.9	+60.0	92.6	22 00.0	+60.0	93.0	**22**
23	23 11.1	+59.4	90.0	23 10.8	+59.6	90.4	23 10.1	+59.8	90.9	23 09.0	+59.8	91.3	23 07.4	+59.9	91.7	23 05.4	+59.9	92.1	23 02.9	+60.0	92.6	23 00.0	+60.0	93.0	**23**
24	24 10.5	+59.5	89.9	24 10.4	+59.6	90.3	24 09.9	+59.7	90.8	24 08.8	+59.9	91.2	24 07.3	+59.9	91.7	24 05.3	+60.0	92.1	24 02.9	+60.0	92.6	24 00.0	+60.0	93.0	**24**
25	25 10.0	+59.4	89.7	25 10.0	+59.6	90.2	25 09.6	+59.7	90.7	25 08.7	+59.8	91.1	25 07.2	+59.9	91.6	25 05.3	+60.0	92.1	25 02.9	+60.0	92.5	25 00.0	+60.0	93.0	**25**
26	26 09.4	+59.5	89.6	26 09.6	+59.6	90.1	26 09.3	+59.7	90.6	26 08.5	+59.8	91.0	26 07.1	+59.9	91.5	26 05.3	+59.9	92.0	26 02.9	+60.0	92.5	26 00.0	+60.0	93.0	**26**
27	27 08.9	+59.4	89.4	27 09.2	+59.6	89.9	27 09.0	+59.7	90.4	27 08.3	+59.8	91.0	27 07.0	+59.9	91.5	27 05.2	+60.0	92.0	27 02.9	+60.0	92.5	27 00.0	+60.0	93.0	**27**
28	28 08.3	+59.4	89.3	28 08.8	+59.6	89.8	28 08.7	+59.7	90.3	28 08.1	+59.8	90.9	28 06.9	+59.9	91.4	28 05.2	+59.9	91.9	28 02.9	+60.0	92.5	28 00.0	+60.0	93.0	**28**
29	29 07.7	+59.4	89.1	29 08.4	+59.5	89.7	29 08.4	+59.7	90.2	29 07.9	+59.8	90.8	29 06.8	+59.9	91.3	29 05.1	+60.0	91.9	29 02.9	+59.9	92.4	29 00.0	+60.0	93.0	**29**
30	30 07.1	+59.4	88.9	30 07.9	+59.6	89.5	30 08.1	+59.7	90.1	30 07.7	+59.8	90.7	30 06.7	+59.9	91.3	30 05.1	+59.9	91.8	30 02.8	+60.0	92.4	30 00.0	+60.0	93.0	**30**
31	31 06.5	+59.4	88.8	31 07.5	+59.5	89.4	31 07.8	+59.7	90.0	31 07.5	+59.8	90.6	31 06.6	+59.9	91.2	31 05.0	+60.0	91.8	31 02.8	+60.0	92.4	31 00.0	+60.0	93.0	**31**
32	32 05.9	+59.4	88.6	32 07.0	+59.6	89.2	32 07.5	+59.7	89.9	32 07.3	+59.8	90.5	32 06.5	+59.9	91.1	32 05.0	+59.9	91.7	32 02.8	+60.0	92.4	32 00.0	+60.0	93.0	**32**
33	33 05.3	+59.3	88.4	33 06.6	+59.5	89.1	33 07.2	+59.7	89.7	33 07.1	+59.8	90.4	33 06.4	+59.8	91.0	33 04.9	+60.0	91.7	33 02.8	+60.0	92.4	33 00.0	+60.0	93.0	**33**
34	34 04.6	+59.4	88.3	34 06.1	+59.5	88.9	34 06.9	+59.6	89.6	34 06.9	+59.8	90.3	34 06.2	+59.9	91.0	34 04.9	+59.9	91.6	34 02.8	+60.0	92.3	34 00.0	+60.0	93.0	**34**
35	35 04.0	+59.3	88.1	35 05.6	+59.5	88.8	35 06.5	+59.7	89.5	35 06.7	+59.8	90.2	35 06.1	+59.9	90.9	35 04.8	+60.0	91.6	35 02.8	+60.0	92.3	35 00.0	+60.0	93.0	**35**
36	36 03.3	+59.3	87.9	36 05.1	+59.5	88.6	36 06.2	+59.6	89.4	36 06.5	+59.7	90.1	36 06.0	+59.9	90.8	36 04.8	+59.9	91.5	36 02.8	+59.9	92.3	36 00.0	+60.0	93.0	**36**
37	37 02.6	+59.3	87.7	37 04.6	+59.5	88.5	37 05.8	+59.7	89.2	37 06.2	+59.8	90.0	37 05.9	+59.8	90.7	37 04.7	+59.9	91.5	37 02.7	+60.0	92.2	37 00.0	+60.0	93.0	**37**
38	38 01.9	+59.3	87.5	38 04.1	+59.5	88.3	38 05.5	+59.6	89.1	38 06.0	+59.8	89.9	38 05.7	+59.9	90.7	38 04.6	+60.0	91.4	38 02.7	+60.0	92.2	38 00.0	+60.0	93.0	**38**
39	39 01.2	+59.2	87.3	39 03.6	+59.4	88.1	39 05.1	+59.6	88.9	39 05.8	+59.7	89.8	39 05.6	+59.9	90.6	39 04.6	+59.9	91.4	39 02.7	+60.0	92.2	39 00.0	+60.0	93.0	**39**
40	40 00.4	+59.3	87.1	40 03.0	+59.4	88.0	40 04.7	+59.6	88.8	40 05.5	+59.8	89.6	40 05.5	+59.8	90.5	40 04.5	+60.0	91.3	40 02.7	+60.0	92.2	40 00.0	+60.0	93.0	**40**
41	40 59.7	+59.2	86.9	41 02.4	+59.5	87.8	41 04.3	+59.6	88.6	41 05.3	+59.7	89.5	41 05.3	+59.9	90.4	41 04.5	+59.9	91.3	41 02.7	+60.0	92.1	41 00.0	+60.0	93.0	**41**
42	41 58.9	+59.1	86.7	42 01.9	+59.3	87.6	42 03.9	+59.6	88.5	42 05.0	+59.7	89.4	42 05.2	+59.8	90.3	42 04.4	+59.9	91.2	42 02.7	+60.0	92.1	42 00.0	+60.0	93.0	**42**
43	42 58.0	+59.2	86.5	43 01.2	+59.4	87.4	43 03.5	+59.5	88.3	43 04.7	+59.8	89.3	43 05.0	+59.9	90.2	43 04.3	+60.0	91.1	43 02.7	+59.9	92.1	43 00.0	+60.0	93.0	**43**
44	43 57.2	+59.1	86.2	44 00.6	+59.4	87.2	44 03.0	+59.6	88.2	44 04.5	+59.7	89.1	44 04.9	+59.8	90.1	44 04.3	+59.9	91.1	44 02.6	+60.0	92.0	44 00.0	+60.0	93.0	**44**
45	44 56.3	+59.1	86.0	45 00.0	+59.3	87.0	45 02.6	+59.5	88.0	45 04.2	+59.7	89.0	45 04.7	+59.8	90.0	45 04.2	+59.9	91.0	45 02.6	+60.0	92.0	45 00.0	+60.0	93.0	**45**
46	45 55.4	+59.1	85.7	45 59.3	+59.3	86.8	46 02.1	+59.6	87.8	46 03.9	+59.7	88.9	46 04.5	+59.9	89.9	46 04.1	+59.9	90.9	46 02.6	+60.0	92.0	46 00.0	+60.0	93.0	**46**
47	46 54.5	+59.0	85.5	46 58.6	+59.3	86.6	47 01.7	+59.5	87.6	47 03.6	+59.7	88.7	47 04.4	+59.8	89.8	47 04.0	+60.0	90.9	47 02.6	+60.0	91.9	47 00.0	+60.0	93.0	**47**
48	47 53.5	+59.0	85.2	47 57.9	+59.2	86.3	48 01.2	+59.4	87.4	48 03.3	+59.6	88.6	48 04.2	+59.8	89.7	48 04.0	+59.9	90.8	48 02.6	+59.9	91.9	48 00.0	+60.0	93.0	**48**
49	48 52.5	+58.9	84.9	48 57.1	+59.3	86.1	49 00.6	+59.5	87.2	49 02.9	+59.7	88.4	49 04.0	+59.8	89.5	49 03.9	+59.9	90.7	49 02.5	+60.0	91.8	49 00.0	+60.0	93.0	**49**
50	49 51.4	+58.9	84.7	49 56.4	+59.2	85.8	50 00.1	+59.4	87.0	50 02.6	+59.6	88.2	50 03.8	+59.8	89.4	50 03.8	+59.9	90.6	50 02.5	+60.0	91.8	50 00.0	+60.0	93.0	**50**
51	50 50.3	+58.9	84.4	50 55.6	+59.1	85.6	50 59.5	+59.4	86.8	51 02.2	+59.6	88.1	51 03.6	+59.8	89.3	51 03.7	+59.9	90.5	51 02.5	+60.0	91.8	51 00.0	+60.0	93.0	**51**
52	51 49.2	+58.7	84.1	51 54.7	+59.1	85.3	51 58.9	+59.4	86.6	52 01.8	+59.6	87.9	52 03.4	+59.8	89.2	52 03.6	+59.9	90.4	52 02.5	+59.9	91.7	52 00.0	+60.0	93.0	**52**
53	52 47.9	+58.8	83.7	52 53.8	+59.1	85.0	52 58.3	+59.4	86.4	53 01.4	+59.6	87.7	53 03.2	+59.7	89.0	53 03.5	+59.9	90.3	53 02.4	+60.0	91.7	53 00.0	+60.0	93.0	**53**
54	53 46.7	+58.7	83.4	53 52.9	+59.0	84.7	53 57.7	+59.3	86.1	54 01.0	+59.6	87.5	54 02.9	+59.8	88.9	54 03.4	+59.9	90.2	54 02.4	+60.0	91.6	54 00.0	+60.0	93.0	**54**
55	54 45.4	+58.6	83.0	54 51.9	+59.0	84.4	54 57.0	+59.3	85.9	55 00.6	+59.5	87.3	55 02.7	+59.7	88.7	55 03.3	+59.9	90.1	55 02.4	+60.0	91.6	55 00.0	+60.0	93.0	**55**
56	55 44.0	+58.5	82.7	55 50.9	+58.9	84.1	55 56.3	+59.2	85.6	56 00.1	+59.6	87.1	56 02.4	+59.8	88.5	56 03.2	+59.9	90.0	56 02.4	+59.9	91.5	56 00.0	+60.0	93.0	**56**
57	56 42.5	+58.5	82.3	56 49.8	+58.9	83.8	56 55.5	+59.3	85.3	56 59.7	+59.4	86.8	57 02.2	+59.7	88.4	57 03.1	+59.8	89.9	57 02.3	+60.0	91.5	57 00.0	+60.0	93.0	**57**
58	57 41.0	+58.4	81.8	57 48.7	+58.8	83.4	57 54.8	+59.1	85.0	57 59.1	+59.5	86.6	58 01.9	+59.7	88.2	58 02.9	+59.9	89.8	58 02.3	+60.0	91.4	58 00.0	+60.0	93.0	**58**
59	58 39.4	+58.3	81.4	58 47.5	+58.7	83.0	58 53.9	+59.1	84.7	58 58.6	+59.4	86.3	59 01.6	+59.7	88.0	59 02.8	+59.9	89.7	59 02.3	+59.9	91.3	59 00.0	+60.0	93.0	**59**
60	59 37.7	+58.2	80.9	59 46.2	+58.7	82.6	59 53.0	+59.1	84.3	59 58.0	+59.4	86.1	60 01.3	+59.6	87.8	60 02.7	+59.8	89.5	60 02.2	+60.0	91.3	60 00.0	+60.0	93.0	**60**
61	60 35.9	+58.0	80.5	60 44.9	+58.6	82.2	60 52.1	+59.0	84.0	60 57.4	+59.4	85.8	61 00.9	+59.7	87.6	61 02.5	+59.8	89.4	61 02.2	+60.0	91.2	61 00.0	+60.0	93.0	**61**
62	61 33.9	+58.0	79.9	61 43.5	+58.4	81.8	61 51.1	+58.9	83.6	61 56.8	+59.3	85.5	62 00.6	+59.6	87.4	62 02.3	+59.9	89.2	62 02.2	+59.9	91.1	62 00.0	+60.0	93.0	**62**
63	62 31.9	+57.8	79.4	62 41.9	+58.4	81.3	62 50.0	+58.9	83.2	62 56.1	+59.3	85.2	63 00.2	+59.6	87.1	63 02.2	+59.8	89.1	63 02.1	+60.0	91.0	63 00.0	+60.0	93.0	**63**
64	63 29.7	+57.6	78.8	63 40.3	+58.3	80.8	63 48.9	+58.8	82.8	63 55.4	+59.2	84.8	63 59.8	+59.5	86.8	64 02.0	+59.8	88.9	64 02.1	+59.9	90.9	64 00.0	+60.0	93.0	**64**
65	64 27.3	+57.5	78.2	64 38.6	+58.1	80.2	64 47.7	+58.7	82.3	64 54.6	+59.2	84.4	64 59.3	+59.5	86.6	65 01.8	+59.8	88.7	65 02.0	+60.0	90.9	65 00.0	+60.0	93.0	**65**
66	65 24.8	+57.3	77.5	65 36.7	+58.0	79.6	65 46.4	+58.5	81.8	65 53.8	+59.0	84.0	65 58.8	+59.5	86.3	66 01.6	+59.7	88.5	66 02.0	+59.9	90.8	66 00.0	+60.0	93.0	**66**
67	66 22.1	+57.0	76.7	66 34.7	+57.8	79.0	66 44.9	+58.5	81.3	66 52.8	+59.0	83.6	66 58.3	+59.5	85.9	67 01.3	+59.8	88.3	67 01.9	+59.9	90.6	67 00.0	+60.0	93.0	**67**
68	67 19.1	+56.8	76.0	67 32.5	+57.6	78.3	67 43.4	+58.3	80.7	67 51.8	+59.0	83.1	67 57.8	+59.3	85.6	68 01.1	+59.7	88.0	68 01.8	+60.0	90.5	68 00.0	+60.0	93.0	**68**
69	68 15.9	+56.5	75.1	68 30.1	+57.4	77.6	68 41.7	+58.2	80.1	68 50.8	+58.8	82.6	68 57.1	+59.4	85.2	69 00.8	+59.7	87.8	69 01.8	+59.9	90.4	69 00.0	+60.0	93.0	**69**
70	69 12.4	+56.2	74.2	69 27.5	+57.1	76.8	69 39.9	+58.0	79.4	69 49.6	+58.7	82.1	69 56.5	+59.2	84.8	70 00.5	+59.7	87.5	70 01.7	+59.9	90.3	70 00.0	+60.0	93.0	**70**
71	70 08.6	+55.8	73.2	70 24.6	+56.9	75.9	70 37.9	+57.8	78.6	70 48.3	+58.6	81.4	70 55.7	+59.2	84.3	71 00.2	+59.6	87.2	71 01.6	+59.9	90.1	71 00.0	+60.0	93.0	**71**
72	71 04.4	+55.4	72.1	71 21.5	+56.5	74.9	71 35.7	+57.5	77.8	71 46.9	+58.4	80.8	71 54.9	+59.1	83.8	71 59.8	+59.6	86.8	72 01.5	+59.9	89.9	72 00.0	+60.0	93.0	**72**
73	71 59.8	+54.9	70.9	72 18.0	+56.2	73.8	72 33.2	+57.3	76.9	72 45.3	+58.2	80.0	72 54.0	+59.0	83.2	72 59.4	+59.6	86.5	73 01.4	+59.9	89.7	73 00.0	+60.0	93.0	**73**
74	72 54.7	+54.3	69.5	73 14.2	+55.7	72.6	73 30.5	+56.9	75.8	73 43.5	+58.0	79.2	73 53.0	+58.9	82.6	73 59.0	+59.5	86.0	74 01.3	+59.9	89.5	74 00.0	+60.0	93.0	**74**
75	73 49.0	+53.6	68.0	74 09.9	+55.1	71.3	74 27.4	+56.6	74.7	74 41.5	+57.7	78.2	74 51.9	+58.7	81.8	74 58.5	+59.4	85.5	75 01.2	+59.8	89.3	75 00.0	+60.0	93.0	**75**
76	74 42.6	+52.8	66.4	75 05.0	+54.5	69.8	75 24.0	+56.0	73.4	75 39.2	+57.4	77.2	75 50.6	+58.5	81.0	75 57.9	+59.3	85.0	76 01.0	+59.9	89.0	76 00.0	+60.0	93.0	**76**
77	75 35.4	+51.8	64.5	75 59.5	+53.8	68.1	76 20.0	+55.5	72.0	76 36.6	+57.0	75.9	76 49.1	+58.3	80.1	76 57.2	+59.2	84.3	77 00.9	+59.8	88.7	77 00.0	+60.0	93.0	**77**
78	76 27.2	+50.7	62.4	76 53.3	+52.7	66.2	77 15.5	+54.7	70.3	77 33.6	+56.5	74.6	77 47.4	+57.9	79.0	77 56.4	+59.1	83.6	78 00.7	+59.7	88.3	78 00.0	+60.0	93.0	**78**
79	77 17.9	+49.2	60.1	77 46.0	+51.6	64.1	78 10.2	+53.9	68.4	78 30.1	+55.9	72.9	78 45.3	+57.6	77.7	78 55.5	+58.9	82.7	79 00.4	+59.8	87.9	79 00.0	+60.0	93.0	**79**
80	78 07.1	+47.5	57.4	78 37.6	+50.1	61.6	79 04.1	+52.7	66.1	79 26.0	+55.1	71.0	79 42.9	+57.1	76.2	79 54.4	+58.7	81.7	80 00.2	+59.6	87.3	80 00.0	+60.0	93.0	**80**
81	78 54.6	*+45.3* •	54.3	79 27.7	*+48.3* •	58.7	79 56.8	+51.2	63.5	80 21.1	+54.0	68.8	80 40.0	+56.5	74.4	80 53.1	+58.4	80.4	80 59.8	+59.6	86.7	81 00.0	+60.0	93.0	**81**
82	79 39.9	*+42.6* •	50.8	80 16.0	*+45.9* •	55.3	80 48.0	*+49.2* •	60.4	81 15.1	+52.5	66.0	81 36.5	+55.5	72.2	81 51.5	+57.9	78.9	81 59.4	+59.5	85.9	82 00.0	+60.0	93.0	**82**
83	80 22.5	*+39.4* •	46.7	81 01.9	*+43.0* •	51.3	81 37.2	*+46.8* •	56.6	82 07.6	*+50.6* •	62.7	82 32.0	+54.2	69.5	82 49.4	+57.2	76.9	82 58.9	+59.3	84.9	83 00.0	+60.0	93.0	**83**
84	81 01.9	*+35.3* •	42.0	81 44.9	*+39.1* •	46.7	82 24.0	*+43.3* •	52.1	82 58.2	*+47.7* •	58.5	83 26.2	*+52.2* •	65.9	83 46.6	+56.2	74.4	83 58.2	+59.0	83.5	84 00.0	+60.0	93.0	**84**
85	81 37.2	*+30.4* •	36.7	82 24.0	*+34.2* •	41.2	83 07.3	*+38.6* •	46.6	83 45.9	*+43.8* •	53.3	84 18.4	*+49.3* •	61.3	84 42.8	*+54.6* •	70.9	84 57.2	+58.5	81.6	85 00.0	+60.0	93.0	**85**
86	82 07.6	*+24.4* •	30.6	82 58.2	*+28.0* •	34.7	83 45.9	*+32.5* •	39.9	84 29.7	*+38.0* •	46.6	85 07.7	*+44.6* •	55.1	85 37.4	*+51.6* •	65.9	85 55.7	+57.6	78.8	86 00.0	+60.0	93.0	**86**
87	82 32.0	*+17.4* •	23.7	83 26.2	*+20.4* •	27.2	84 18.4	*+24.4* •	31.8	85 07.7	*+29.7* •	38.0	85 52.3	*+36.7* •	46.5	86 29.0	*+45.8* •	58.4	86 53.3	*+55.4* •	74.3	87 00.0	+60.0	93.0	**87**
88	82 49.4	*+9.5* •	16.2	83 46.6	*+11.6* •	18.8	84 42.8	*+14.4* •	22.2	85 37.4	*+18.3* •	27.2	86 29.0	*+24.3* •	34.6	87 14.8	*+33.9* •	46.5	87 48.7	*+48.7* •	65.9	88 00.0	+60.0	93.0	**88**
89	82 58.9	*+1.1* •	8.2	83 58.2	*+1.8* •	9.5	84 57.2	*+2.8* •	11.4	85 55.7	*+4.3* •	14.2	86 53.3	*+6.7* •	18.7	87 48.7	*+11.3* •	27.2	88 37.4	*+22.6* •	46.5	89 00.0	+60.0	93.0	**89**
90	83 00.0	*–7.3* •	0.0	84 00.0	*–8.0* •	0.0	85 00.0	*–9.0* •	0.0	86 00.0	*–10.4* •	0.0	87 00.0	*–12.7* •	0.0	88 00.0	*–16.9* •	0.0	89 00.0	*–27.0* •	0.0	90 00.0	–60.0	46.5	**90**
	83°			**84°**			**85°**			**86°**			**87°**			**88°**			**89°**			**90°**			

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 21.9	−59.5	93.0	0 18.8	−59.7	93.0	0 15.7	−59.8	93.0	0 12.6	−59.9	93.0	0 09.4	−59.9	93.0	0 06.3	−60.0	93.0	0 03.1	−60.0	93.0	0 00.0	+60.0	87.0	0
1	0 37.6	+59.6	86.9	0 40.9	+59.6	86.9	0 44.1	+59.8	86.9	0 47.3	+59.9	86.9	0 50.5	+59.9	87.0	0 53.7	+59.9	87.0	0 56.9	+59.9	87.0	1 00.0	+60.0	87.0	1
2	1 37.2	+59.5	86.8	1 40.5	+59.7	86.8	1 43.9	+59.7	86.8	1 47.2	+59.8	86.9	1 50.4	+59.9	86.9	1 53.6	+60.0	86.9	1 56.8	+60.0	87.0	2 00.0	+60.0	87.0	2
3	2 36.7	+59.6	86.7	2 40.2	+59.7	86.7	2 43.6	+59.8	86.8	2 47.0	+59.9	86.8	2 50.3	+60.0	86.8	2 53.6	+60.0	86.9	2 56.8	+60.0	86.9	3 00.0	+60.0	87.0	3
4	3 36.3	+59.5	86.5	3 39.9	+59.7	86.6	3 43.4	+59.8	86.7	3 46.9	+59.8	86.7	3 50.3	+59.9	86.8	3 53.6	+59.9	86.9	3 56.8	+60.0	86.9	4 00.0	+60.0	87.0	4
5	4 35.8	+59.6	86.4	4 39.6	+59.6	86.5	4 43.2	+59.7	86.6	4 46.7	+59.9	86.7	4 50.2	+59.9	86.7	4 53.5	+60.0	86.8	4 56.8	+60.0	86.9	5 00.0	+60.0	87.0	5
6	5 35.4	+59.5	86.3	5 39.2	+59.7	86.4	5 42.9	+59.8	86.5	5 46.6	+59.8	86.6	5 50.1	+59.9	86.7	5 53.5	+60.0	86.8	5 56.8	+60.0	86.9	6 00.0	+60.0	87.0	6
7	6 34.9	+59.6	86.2	6 38.9	+59.7	86.3	6 42.7	+59.8	86.4	6 46.4	+59.9	86.5	6 50.0	+59.9	86.6	6 53.5	+59.9	86.8	6 56.8	+60.0	86.9	7 00.0	+60.0	87.0	7
8	7 34.5	+59.5	86.0	7 38.6	+59.6	86.2	7 42.5	+59.8	86.3	7 46.3	+59.8	86.4	7 49.9	+59.9	86.6	7 53.4	+60.0	86.7	7 56.8	+60.0	86.9	8 00.0	+60.0	87.0	8
9	8 34.0	+59.6	85.9	8 38.2	+59.7	86.1	8 42.3	+59.7	86.2	8 46.1	+59.9	86.4	8 49.8	+60.0	86.5	8 53.4	+60.0	86.7	8 56.8	+60.0	86.8	9 00.0	+60.0	87.0	9
10	9 33.6	+59.5	85.8	9 37.9	+59.6	86.0	9 42.0	+59.8	86.1	9 46.0	+59.8	86.3	9 49.8	+59.9	86.5	9 53.4	+59.9	86.6	9 56.8	+60.0	86.8	10 00.0	+60.0	87.0	10
11	10 33.1	+59.5	85.7	10 37.5	+59.7	85.9	10 41.8	+59.7	86.0	10 45.8	+59.9	86.2	10 49.7	+59.9	86.4	10 53.3	+60.0	86.6	10 56.8	+59.9	86.8	11 00.0	+60.0	87.0	11
12	11 32.6	+59.6	85.5	11 37.2	+59.7	85.7	11 41.5	+59.8	86.0	11 45.7	+59.8	86.2	11 49.6	+59.9	86.4	11 53.3	+59.9	86.6	11 56.7	+60.0	86.8	12 00.0	+60.0	87.0	12
13	12 32.2	+59.5	85.4	12 36.9	+59.6	85.6	12 41.3	+59.8	85.9	12 45.5	+59.9	86.1	12 49.5	+59.9	86.3	12 53.2	+60.0	86.5	12 56.7	+60.0	86.8	13 00.0	+60.0	87.0	13
14	13 31.7	+59.5	85.3	13 36.5	+59.7	85.5	13 41.1	+59.7	85.8	13 45.4	+59.8	86.0	13 49.4	+59.9	86.3	13 53.2	+60.0	86.5	13 56.7	+60.0	86.8	14 00.0	+60.0	87.0	14
15	14 31.2	+59.6	85.2	14 36.2	+59.6	85.4	14 40.8	+59.8	85.7	14 45.2	+59.9	85.9	14 49.3	+59.9	86.2	14 53.2	+59.9	86.5	14 56.7	+60.0	86.7	15 00.0	+60.0	87.0	15
16	15 30.8	+59.5	85.0	15 35.8	+59.7	85.3	15 40.6	+59.7	85.6	15 45.1	+59.8	85.9	15 49.2	+59.9	86.1	15 53.1	+60.0	86.4	15 56.7	+60.0	86.7	16 00.0	+60.0	87.0	16
17	16 30.3	+59.5	84.9	16 35.5	+59.6	85.2	16 40.3	+59.8	85.5	16 44.9	+59.8	85.8	16 49.1	+60.0	86.1	16 53.1	+59.9	86.4	16 56.7	+60.0	86.7	17 00.0	+60.0	87.0	17
18	17 29.8	+59.5	84.8	17 35.1	+59.6	85.1	17 40.1	+59.7	85.4	17 44.7	+59.9	85.7	17 49.1	+59.9	86.0	17 53.0	+60.0	86.4	17 56.7	+60.0	86.7	18 00.0	+60.0	87.0	18
19	18 29.3	+59.5	84.6	18 34.7	+59.7	85.0	18 39.8	+59.8	85.3	18 44.6	+59.8	85.6	18 49.0	+59.9	86.0	18 53.0	+60.0	86.3	18 56.7	+60.0	86.7	19 00.0	+60.0	87.0	19
20	19 28.8	+59.5	84.5	19 34.4	+59.6	84.8	19 39.6	+59.7	85.2	19 44.4	+59.8	85.6	19 48.9	+59.9	85.9	19 53.0	+59.9	86.3	19 56.7	+60.0	86.6	20 00.0	+60.0	87.0	20
21	20 28.3	+59.5	84.4	20 34.0	+59.6	84.7	20 39.3	+59.8	85.1	20 44.2	+59.9	85.5	20 48.8	+59.9	85.9	20 52.9	+60.0	86.2	20 56.7	+59.9	86.6	21 00.0	+60.0	87.0	21
22	21 27.8	+59.5	84.2	21 33.6	+59.6	84.6	21 39.1	+59.7	85.0	21 44.1	+59.8	85.4	21 48.7	+59.9	85.8	21 52.9	+59.9	86.2	21 56.6	+60.0	86.6	22 00.0	+60.0	87.0	22
23	22 27.3	+59.4	84.1	22 33.2	+59.7	84.5	22 38.8	+59.7	84.9	22 43.9	+59.8	85.3	22 48.6	+59.9	85.7	22 52.8	+60.0	86.2	22 56.6	+60.0	86.6	23 00.0	+60.0	87.0	23
24	23 26.7	+59.5	83.9	23 32.9	+59.6	84.4	23 38.5	+59.8	84.8	23 43.7	+59.9	85.2	23 48.5	+59.9	85.7	23 52.8	+59.9	86.1	23 56.6	+60.0	86.6	24 00.0	+60.0	87.0	24
25	24 26.2	+59.5	83.8	24 32.5	+59.6	84.2	24 38.3	+59.7	84.7	24 43.6	+59.8	85.1	24 48.4	+59.9	85.6	24 52.7	+60.0	86.1	24 56.6	+60.0	86.5	25 00.0	+60.0	87.0	25
26	25 25.7	+59.4	83.6	25 32.1	+59.6	84.1	25 38.0	+59.7	84.6	25 43.4	+59.8	85.1	25 48.3	+59.9	85.5	25 52.7	+60.0	86.0	25 56.6	+60.0	86.5	26 00.0	+60.0	87.0	26
27	26 25.1	+59.4	83.5	26 31.7	+59.5	84.0	26 37.7	+59.7	84.5	26 43.2	+59.8	85.0	26 48.2	+59.9	85.5	26 52.7	+59.9	86.0	26 56.6	+60.0	86.5	27 00.0	+60.0	87.0	27
28	27 24.5	+59.5	83.3	27 31.2	+59.6	83.8	27 37.4	+59.7	84.4	27 43.0	+59.8	84.9	27 48.1	+59.9	85.4	27 52.6	+60.0	85.9	27 56.6	+60.0	86.5	28 00.0	+60.0	87.0	28
29	28 24.0	+59.4	83.2	28 30.8	+59.6	83.7	28 37.1	+59.7	84.3	28 42.8	+59.8	84.8	28 48.0	+59.9	85.3	28 52.6	+59.9	85.9	28 56.6	+60.0	86.4	29 00.0	+60.0	87.0	29
30	29 23.4	+59.4	83.0	29 30.4	+59.6	83.6	29 36.8	+59.7	84.1	29 42.6	+59.8	84.7	29 47.9	+59.9	85.3	29 52.5	+60.0	85.9	29 56.6	+59.9	86.4	30 00.0	+60.0	87.0	30
31	30 22.8	+59.4	82.9	30 30.0	+59.5	83.4	30 36.5	+59.7	84.0	30 42.4	+59.8	84.6	30 47.8	+59.9	85.2	30 52.5	+59.9	85.8	30 56.5	+60.0	86.4	31 00.0	+60.0	87.0	31
32	31 22.2	+59.4	82.7	31 29.5	+59.6	83.3	31 36.2	+59.7	83.9	31 42.2	+59.8	84.5	31 47.7	+59.8	85.1	31 52.4	+60.0	85.8	31 56.5	+60.0	86.4	32 00.0	+60.0	87.0	32
33	32 21.6	+59.3	82.5	32 29.1	+59.5	83.2	32 35.9	+59.7	83.8	32 42.0	+59.8	84.4	32 47.5	+59.9	85.1	32 52.4	+59.9	85.7	32 56.5	+60.0	86.4	33 00.0	+60.0	87.0	33
34	33 20.9	+59.4	82.3	33 28.6	+59.5	83.0	33 35.6	+59.6	83.7	33 41.8	+59.8	84.3	33 47.4	+59.9	85.0	33 52.3	+60.0	85.7	33 56.5	+60.0	86.3	34 00.0	+60.0	87.0	34
35	34 20.3	+59.3	82.2	34 28.1	+59.5	82.9	34 35.2	+59.7	83.5	34 41.6	+59.8	84.2	34 47.3	+59.9	84.9	34 52.3	+59.9	85.6	34 56.5	+60.0	86.3	35 00.0	+60.0	87.0	35
36	35 19.6	+59.3	82.0	35 27.6	+59.5	82.7	35 34.9	+59.6	83.4	35 41.4	+59.8	84.1	35 47.2	+59.9	84.8	35 52.2	+59.9	85.6	35 56.5	+60.0	86.3	36 00.0	+60.0	87.0	36
37	36 18.9	+59.4	81.8	36 27.1	+59.5	82.5	36 34.5	+59.7	83.3	36 41.2	+59.7	84.0	36 47.1	+59.8	84.8	36 52.1	+60.0	85.5	36 56.5	+60.0	86.2	37 00.0	+60.0	87.0	37
38	37 18.3	+59.2	81.6	37 26.6	+59.5	82.4	37 34.2	+59.6	83.1	37 40.9	+59.8	83.9	37 46.9	+59.9	84.7	37 52.1	+59.9	85.4	37 56.5	+59.9	86.2	38 00.0	+60.0	87.0	38
39	38 17.5	+59.3	81.4	38 26.1	+59.4	82.2	38 33.8	+59.6	83.0	38 40.7	+59.8	83.8	38 46.8	+59.9	84.6	38 52.0	+60.0	85.4	38 56.4	+60.0	86.2	39 00.0	+60.0	87.0	39
40	39 16.8	+59.2	81.2	39 25.5	+59.5	82.0	39 33.4	+59.6	82.9	39 40.5	+59.7	83.7	39 46.7	+59.8	84.5	39 52.0	+59.9	85.3	39 56.4	+60.0	86.2	40 00.0	+60.0	87.0	40
41	40 16.0	+59.3	81.0	40 25.0	+59.4	81.9	40 33.0	+59.6	82.7	40 40.2	+59.8	83.6	40 46.5	+59.9	84.4	40 51.9	+59.9	85.3	40 56.4	+60.0	86.1	41 00.0	+60.0	87.0	41
42	41 15.3	+59.2	80.8	41 24.4	+59.4	81.7	41 32.6	+59.6	82.5	41 40.0	+59.7	83.4	41 46.4	+59.8	84.3	41 51.8	+60.0	85.2	41 56.4	+60.0	86.1	42 00.0	+60.0	87.0	42
43	42 14.5	+59.1	80.6	42 23.8	+59.4	81.5	42 32.2	+59.6	82.4	42 39.7	+59.7	83.3	42 46.2	+59.9	84.2	42 51.8	+59.9	85.1	42 56.4	+60.0	86.1	43 00.0	+60.0	87.0	43
44	43 13.6	+59.2	80.4	43 23.2	+59.4	81.3	43 31.8	+59.6	82.2	43 39.4	+59.7	83.2	43 46.1	+59.8	84.1	43 51.7	+59.9	85.1	43 56.4	+59.9	86.0	44 00.0	+60.0	87.0	44
45	44 12.8	+59.1	80.1	44 22.6	+59.3	81.1	44 31.4	+59.5	82.1	44 39.1	+59.7	83.0	44 45.9	+59.8	84.0	44 51.6	+60.0	85.0	44 56.3	+60.0	86.0	45 00.0	+60.0	87.0	45
46	45 11.9	+59.1	79.9	45 21.9	+59.3	80.9	45 30.9	+59.5	81.9	45 38.8	+59.7	82.9	45 45.7	+59.9	83.9	45 51.6	+59.9	84.9	45 56.3	+60.0	86.0	46 00.0	+60.0	87.0	46
47	46 11.0	+59.0	79.6	46 21.2	+59.3	80.7	46 30.4	+59.5	81.7	46 38.5	+59.7	82.8	46 45.6	+59.8	83.8	46 51.5	+59.9	84.9	46 56.3	+60.0	85.9	47 00.0	+60.0	87.0	47
48	47 10.0	+59.0	79.4	47 20.5	+59.3	80.4	47 29.9	+59.5	81.5	47 38.2	+59.7	82.6	47 45.4	+59.8	83.7	47 51.4	+59.9	84.8	47 56.3	+60.0	85.9	48 00.0	+60.0	87.0	48
49	48 09.0	+59.0	79.1	48 19.8	+59.2	80.2	48 29.4	+59.5	81.3	48 37.9	+59.7	82.4	48 45.2	+59.8	83.6	48 51.3	+59.9	84.7	48 56.3	+59.9	85.9	49 00.0	+60.0	87.0	49
50	49 08.0	+58.9	78.8	49 19.0	+59.2	80.0	49 28.9	+59.4	81.1	49 37.6	+59.6	82.3	49 45.0	+59.8	83.5	49 51.2	+59.9	84.6	49 56.2	+60.0	85.8	50 00.0	+60.0	87.0	50
51	50 06.9	+58.9	78.5	50 18.2	+59.2	79.7	50 28.3	+59.5	80.9	50 37.2	+59.6	82.1	50 44.8	+59.8	83.3	50 51.1	+60.0	84.5	50 56.2	+60.0	85.8	51 00.0	+60.0	87.0	51
52	51 05.8	+58.9	78.2	51 17.4	+59.2	79.5	51 27.8	+59.4	80.7	51 36.8	+59.6	81.9	51 44.6	+59.8	83.2	51 51.1	+59.9	84.5	51 56.2	+60.0	85.7	52 00.0	+60.0	87.0	52
53	52 04.7	+58.7	77.9	52 16.6	+59.1	79.2	52 27.2	+59.3	80.5	52 36.4	+59.6	81.8	52 44.4	+59.7	83.1	52 51.0	+59.9	84.4	52 56.2	+59.9	85.7	53 00.0	+60.0	87.0	53
54	53 03.4	+58.8	77.6	53 15.7	+59.0	78.9	53 26.5	+59.4	80.2	53 36.0	+59.6	81.6	53 44.1	+59.8	82.9	53 50.9	+59.8	84.3	53 56.1	+60.0	85.6	54 00.0	+60.0	87.0	54
55	54 02.2	+58.6	77.2	54 14.7	+59.0	78.6	54 25.9	+59.3	80.0	54 35.6	+59.6	81.4	54 43.9	+59.8	82.8	54 50.7	+59.9	84.2	54 56.1	+60.0	85.6	55 00.0	+60.0	87.0	55
56	55 00.8	+58.6	76.9	55 13.7	+59.0	78.3	55 25.2	+59.3	79.7	55 35.2	+59.5	81.1	55 43.7	+59.7	82.6	55 50.6	+59.9	84.1	55 56.1	+60.0	85.5	56 00.0	+60.0	87.0	56
57	55 59.4	+58.6	76.5	56 12.7	+58.9	78.0	56 24.5	+59.2	79.4	56 34.7	+59.5	80.9	56 43.4	+59.7	82.4	56 50.5	+59.9	83.9	56 56.1	+59.9	85.5	57 00.0	+60.0	87.0	57
58	56 58.0	+58.4	76.1	57 11.6	+58.8	77.6	57 23.7	+59.2	79.1	57 34.2	+59.5	80.7	57 43.1	+59.7	82.2	57 50.4	+59.9	83.8	57 56.0	+60.0	85.4	58 00.0	+60.0	87.0	58
59	57 56.4	+58.4	75.7	58 10.4	+58.8	77.2	58 22.9	+59.1	78.8	58 33.7	+59.4	80.4	58 42.8	+59.7	82.1	58 50.3	+59.8	83.7	58 56.0	+60.0	85.3	59 00.0	+60.0	87.0	59
60	58 54.8	+58.2	75.2	59 09.2	+58.7	76.9	59 22.0	+59.1	78.5	59 33.1	+59.4	80.2	59 42.5	+59.7	81.9	59 50.1	+59.9	83.6	59 56.0	+59.9	85.3	60 00.0	+60.0	87.0	60
61	59 53.0	+58.2	74.8	60 07.9	+58.7	76.5	60 21.1	+59.0	78.2	60 32.5	+59.4	79.9	60 42.2	+59.6	81.6	60 50.0	+59.8	83.4	60 55.9	+60.0	85.2	61 00.0	+60.0	87.0	61
62	60 51.2	+58.0	74.3	61 06.6	+58.5	76.0	61 20.1	+59.0	77.8	61 31.9	+59.3	79.6	61 41.8	+59.6	81.4	61 49.8	+59.8	83.3	61 55.9	+59.9	85.1	62 00.0	+60.0	87.0	62
63	61 49.2	+57.9	73.7	62 05.1	+58.4	75.6	62 19.1	+58.9	77.4	62 31.2	+59.3	79.3	62 41.4	+59.6	81.2	62 49.6	+59.9	83.1	62 55.8	+60.0	85.0	63 00.0	+60.0	87.0	63
64	62 47.1	+57.8	73.2	63 03.5	+58.4	75.1	63 18.0	+58.8	77.0	63 30.5	+59.3	78.9	63 41.0	+59.6	80.9	63 49.5	+59.8	82.9	63 55.8	+59.9	85.0	64 00.0	+60.0	87.0	64
65	63 44.9	+57.6	72.6	64 01.9	+58.2	74.5	64 16.8	+58.8	76.5	64 29.8	+59.2	78.6	64 40.6	+59.5	80.6	64 49.3	+59.8	82.7	64 55.7	+60.0	84.9	65 00.0	+60.0	87.0	65
66	64 42.5	+57.4	71.9	65 00.1	+58.0	74.0	65 15.6	+58.6	76.1	65 29.0	+59.1	78.2	65 40.1	+59.5	80.3	65 49.1	+59.7	82.5	65 55.7	+59.9	84.8	66 00.0	+60.0	87.0	66
67	65 39.9	+57.2	71.2	65 58.1	+58.0	73.4	66 14.2	+58.5	75.5	66 28.1	+59.0	77.8	66 39.6	+59.5	80.0	66 48.8	+59.8	82.3	66 55.6	+60.0	84.7	67 00.0	+60.0	87.0	67
68	66 37.1	+57.0	70.5	66 56.1	+57.7	72.7	67 12.7	+58.4	75.0	67 27.1	+59.0	77.3	67 39.1	+59.4	79.7	67 48.6	+59.7	82.1	67 55.6	+59.9	84.5	68 00.0	+60.0	87.0	68
69	67 34.1	+56.7	69.7	67 53.8	+57.5	72.0	68 11.1	+58.3	74.4	68 26.1	+58.8	76.8	68 38.5	+59.3	79.3	68 48.3	+59.7	81.8	68 55.5	+59.9	84.4	69 00.0	+60.0	87.0	69
70	68 30.8	+56.5	68.8	68 51.3	+57.3	71.2	69 09.4	+58.1	73.7	69 24.9	+58.8	76.3	69 37.8	+59.3	78.9	69 48.0	+59.7	81.6	69 55.4	+59.9	84.3	70 00.0	+60.0	87.0	70
71	69 27.3	+56.1	67.9	69 48.6	+57.1	70.4	70 07.5	+57.9	73.0	70 23.7	+58.6	75.7	70 37.1	+59.2	78.4	70 47.7	+59.6	81.3	70 55.3	+60.0	84.1	71 00.0	+60.0	87.0	71
72	70 23.4	+55.7	66.8	70 45.7	+56.7	69.5	71 05.4	+57.7	72.2	71 22.3	+58.5	75.0	71 36.3	+59.2	77.9	71 47.3	+59.7	80.9	71 55.3	+59.9	83.9	72 00.0	+60.0	87.0	72
73	71 19.1	+55.3	65.7	71 42.4	+56.4	68.5	72 03.1	+57.4	71.3	72 20.8	+58.3	74.3	72 35.5	+59.0	77.4	72 47.0	+59.5	80.5	72 55.2	+59.8	83.7	73 00.0	+60.0	87.0	73
74	72 14.4	+54.7	64.5	72 38.8	+56.0	67.4	73 00.5	+57.1	70.4	73 19.1	+58.1	73.5	73 34.5	+58.9	76.8	73 46.5	+59.5	80.1	73 55.0	+59.9	83.5	74 00.0	+60.0	87.0	74
75	73 09.1	+54.1	63.1	73 34.8	+55.5	66.1	73 57.6	+56.8	69.3	74 17.2	+57.8	72.6	74 33.4	+58.7	76.1	74 46.0	+59.4	79.6	74 54.9	+59.9	83.3	75 00.0	+60.0	87.0	75
76	74 03.2	+53.4	61.6	74 30.3	+55.0	64.7	74 54.4	+56.3	68.1	75 15.0	+57.6	71.6	75 32.1	+58.6	75.3	75 45.4	+59.4	79.1	75 54.8	+59.8	83.0	76 00.0	+60.0	87.0	76
77	74 56.6	+52.6	59.9	75 25.3	+54.2	63.2	75 50.7	+55.8	66.7	76 12.6	+57.2	70.5	76 30.7	+58.4	74.4	76 44.8	+59.2	78.5	76 54.6	+59.8	82.7	77 00.0	+60.0	87.0	77
78	75 49.2	+51.5	57.9	76 19.5	+53.4	61.4	76 46.5	+55.1	65.2	77 09.8	+56.7	69.1	77 29.1	+58.1	73.4	77 44.0	+59.2	77.8	77 54.4	+59.8	82.3	78 00.0	+60.0	87.0	78
79	76 40.7	+50.3	55.8	77 12.9	+52.3	59.4	77 41.6	+54.3	63.4	78 06.5	+56.2	67.6	78 27.2	+57.7	72.2	78 43.2	+58.9	76.9	78 54.2	+59.7	81.9	79 00.0	+60.0	87.0	79
80	77 31.0	+48.8	53.3	78 05.2	+51.1	57.1	78 35.9	+53.4	61.3	79 02.7	+55.4	65.8	79 24.9	+57.3	70.7	79 42.1	+58.7	75.9	79 53.9	+59.7	81.4	80 00.0	+60.0	87.0	80
81	78 19.8	*+46.9* •	50.6	78 56.3	+49.5	54.5	79 29.3	+52.0	58.9	79 58.1	+54.5	63.7	80 22.2	+56.6	69.0	80 40.8	+58.5	74.7	80 53.6	+59.6	80.8	81 00.0	+60.0	87.0	81
82	79 06.7	*+44.7* •	47.4	79 45.8	*+47.5* •	51.4	80 21.3	+50.4	56.1	80 52.6	+53.2	61.2	81 18.8	+55.8	67.0	81 39.3	+58.0	73.2	81 53.2	+59.5	80.0	82 00.0	+60.0	87.0	82
83	79 51.4	*+41.9* •	43.7	80 33.3	*+44.9* •	47.9	81 11.7	*+48.1* •	52.7	81 45.8	*+51.4* •	58.2	82 14.6	+54.7	64.4	82 37.3	+57.4	71.4	82 52.7	+59.3	79.0	83 00.0	+60.0	87.0	83
84	80 33.3	*+38.4* •	39.5	81 18.2	*+41.6* •	43.7	81 59.8	*+45.2* •	48.6	82 37.2	*+49.1* •	54.4	83 09.3	*+53.0* •	61.1	83 34.7	+56.5	68.9	83 52.0	+59.0	77.7	84 00.0	+60.0	87.0	84
85	81 11.7	*+34.1* •	34.6	81 59.8	*+37.4* •	38.7	82 45.0	*+41.3* •	43.6	83 26.3	*+45.7* •	49.6	84 02.3	*+50.3* •	56.9	84 31.2	*+55.0* •	65.7	84 51.0	+58.6	75.8	85 00.0	+60.0	87.0	85
86	81 45.8	*+28.8* •	29.1	82 37.2	*+32.1* •	32.8	83 26.3	*+36.0* •	37.6	84 12.0	*+40.6* •	43.6	84 52.6	*+46.3* •	51.3	85 26.2	*+52.3* •	61.1	85 49.6	+57.7	73.2	86 00.0	+60.0	87.0	86
87	82 14.6	*+22.7* •	22.8	83 09.3	*+25.4* •	26.0	84 02.3	*+28.9* •	30.2	84 52.6	*+33.6* •	35.8	85 38.9	*+39.6* •	43.5	86 18.5	*+47.4* •	54.3	86 47.3	*+55.8* •	68.9	87 00.0	+60.0	87.0	87
88	82 37.3	*+15.4* •	15.7	83 34.7	*+17.3* •	18.2	84 31.2	*+19.8* •	21.4	85 26.2	*+23.4* •	26.0	86 18.5	*+28.8* •	32.8	87 05.9	*+37.2* •	43.5	87 43.1	*+49.9* •	61.1	88 00.0	+60.0	87.0	88
89	82 52.7	*+7.3* •	8.1	83 52.0	*+8.0* •	9.4	84 51.0	*+9.0* •	11.2	85 49.6	*+10.4* •	13.9	86 47.3	*+12.7* •	18.1	87 43.1	*+16.9* •	26.0	88 33.0	*+27.0* •	43.5	89 00.0	+60.0	87.0	89
90	83 00.0	*−1.1* •	0.0	84 00.0	*−1.8* •	0.0	85 00.0	*−2.8* •	0.0	86 00.0	*−4.3* •	0.0	87 00.0	*−6.7* •	0.0	88 00.0	*−11.3* •	0.0	89 00.0	*−22.6* •	0.0	90 00.0	−60.0	43.5	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
L.H.A. less than 180°............Zn=180°+Z

88°, 272° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 14.6	+59.6	92.0	0 12.5	+59.7	92.0	0 10.5	+59.7	92.0	0 08.4	+59.8	92.0	0 06.3	+59.9	92.0	0 04.2	+60.0	92.0	0 02.1	+60.0	92.0	0 00.0	+60.0	92.0	0
1	1 14.2	+59.5	91.9	1 12.2	+59.7	91.9	1 10.2	+59.8	91.9	1 08.2	+59.9	91.9	1 06.2	+59.9	91.9	1 04.2	+59.9	92.0	1 02.1	+60.0	92.0	1 00.0	+60.0	92.0	1
2	2 13.7	+59.6	91.7	2 11.9	+59.7	91.8	2 10.0	+59.8	91.8	2 08.1	+59.8	91.9	2 06.1	+59.9	91.9	2 04.1	+60.0	91.9	2 02.1	+60.0	92.0	2 00.0	+60.0	92.0	2
3	3 13.3	+59.5	91.6	3 11.6	+59.6	91.7	3 09.8	+59.7	91.7	3 07.9	+59.9	91.8	3 06.0	+59.9	91.8	3 04.1	+59.9	91.9	3 02.1	+60.0	91.9	3 00.0	+60.0	92.0	3
4	4 12.8	+59.6	91.5	4 11.2	+59.7	91.6	4 09.5	+59.8	91.6	4 07.8	+59.8	91.7	4 05.9	+60.0	91.8	4 04.0	+60.0	91.9	4 02.1	+59.9	91.9	4 00.0	+60.0	92.0	4
5	5 12.4	+59.5	91.4	5 10.9	+59.7	91.5	5 09.3	+59.8	91.6	5 07.6	+59.9	91.6	5 05.9	+59.9	91.7	5 04.0	+60.0	91.8	5 02.0	+60.0	91.9	5 00.0	+60.0	92.0	5
6	6 11.9	+59.6	91.3	6 10.6	+59.6	91.4	6 09.1	+59.8	91.5	6 07.5	+59.8	91.6	6 05.8	+59.9	91.7	6 04.0	+59.9	91.8	6 02.0	+60.0	91.9	6 00.0	+60.0	92.0	6
7	7 11.5	+59.5	91.1	7 10.2	+59.7	91.3	7 08.9	+59.7	91.4	7 07.3	+59.9	91.5	7 05.7	+59.9	91.6	7 03.9	+60.0	91.8	7 02.0	+60.0	91.9	7 00.0	+60.0	92.0	7
8	8 11.0	+59.6	91.0	8 09.9	+59.7	91.1	8 08.6	+59.8	91.3	8 07.2	+59.8	91.4	8 05.6	+59.9	91.6	8 03.9	+60.0	91.7	8 02.0	+60.0	91.9	8 00.0	+60.0	92.0	8
9	9 10.6	+59.5	90.9	9 09.6	+59.6	91.0	9 08.4	+59.8	91.2	9 07.0	+59.9	91.4	9 05.5	+59.9	91.5	9 03.9	+59.9	91.7	9 02.0	+60.0	91.8	9 00.0	+60.0	92.0	9
10	10 10.1	+59.5	90.8	10 09.2	+59.7	90.9	10 08.2	+59.7	91.1	10 06.9	+59.8	91.3	10 05.4	+60.0	91.5	10 03.8	+60.0	91.6	10 02.0	+60.0	91.8	10 00.0	+60.0	92.0	10
11	11 09.6	+59.6	90.6	11 08.9	+59.6	90.8	11 07.9	+59.8	91.0	11 06.7	+59.9	91.2	11 05.4	+59.9	91.4	11 03.8	+59.9	91.6	11 02.0	+60.0	91.8	11 00.0	+60.0	92.0	11
12	12 09.2	+59.5	90.5	12 08.5	+59.7	90.7	12 07.7	+59.7	90.9	12 06.6	+59.8	91.1	12 05.3	+59.9	91.4	12 03.7	+60.0	91.6	12 02.0	+60.0	91.8	12 00.0	+60.0	92.0	12
13	13 08.7	+59.5	90.4	13 08.2	+59.6	90.6	13 07.4	+59.8	90.8	13 06.4	+59.9	91.1	13 05.2	+59.9	91.3	13 03.7	+60.0	91.5	13 02.0	+60.0	91.8	13 00.0	+60.0	92.0	13
14	14 08.2	+59.6	90.2	14 07.8	+59.7	90.5	14 07.2	+59.8	90.7	14 06.3	+59.8	91.0	14 05.1	+59.9	91.2	14 03.7	+59.9	91.5	14 02.0	+60.0	91.8	14 00.0	+60.0	92.0	14
15	15 07.8	+59.5	90.1	15 07.5	+59.6	90.4	15 07.0	+59.7	90.7	15 06.1	+59.9	90.9	15 05.0	+59.9	91.2	15 03.6	+60.0	91.5	15 02.0	+59.9	91.7	15 00.0	+60.0	92.0	15
16	16 07.3	+59.5	90.0	16 07.1	+59.7	90.3	16 06.7	+59.8	90.6	16 06.0	+59.8	90.8	16 04.9	+59.9	91.1	16 03.6	+59.9	91.4	16 01.9	+60.0	91.7	16 00.0	+60.0	92.0	16
17	17 06.8	+59.5	89.8	17 06.8	+59.6	90.2	17 06.5	+59.7	90.5	17 05.8	+59.8	90.8	17 04.8	+59.9	91.1	17 03.5	+60.0	91.4	17 01.9	+60.0	91.7	17 00.0	+60.0	92.0	17
18	18 06.3	+59.5	89.7	18 06.4	+59.7	90.0	18 06.2	+59.8	90.4	18 05.6	+59.9	90.7	18 04.7	+60.0	91.0	18 03.5	+60.0	91.3	18 01.9	+60.0	91.7	18 00.0	+60.0	92.0	18
19	19 05.8	+59.5	89.6	19 06.1	+59.6	89.9	19 06.0	+59.7	90.3	19 05.5	+59.8	90.6	19 04.7	+59.9	91.0	19 03.5	+59.9	91.3	19 01.9	+60.0	91.7	19 00.0	+60.0	92.0	19
20	20 05.3	+59.5	89.4	20 05.7	+59.6	89.8	20 05.7	+59.7	90.2	20 05.3	+59.9	90.5	20 04.6	+59.9	90.9	20 03.4	+60.0	91.3	20 01.9	+60.0	91.6	20 00.0	+60.0	92.0	20
21	21 04.8	+59.5	89.3	21 05.3	+59.6	89.7	21 05.4	+59.8	90.1	21 05.2	+59.8	90.5	21 04.5	+59.9	90.8	21 03.4	+59.9	91.2	21 01.9	+60.0	91.6	21 00.0	+60.0	92.0	21
22	22 04.3	+59.4	89.2	22 04.9	+59.6	89.6	22 05.2	+59.7	90.0	22 05.0	+59.8	90.4	22 04.4	+59.9	90.8	22 03.3	+60.0	91.2	22 01.9	+60.0	91.6	22 00.0	+60.0	92.0	22
23	23 03.7	+59.5	89.0	23 04.5	+59.7	89.4	23 04.9	+59.7	89.9	23 04.8	+59.8	90.3	23 04.3	+59.9	90.7	23 03.3	+60.0	91.2	23 01.9	+60.0	91.6	23 00.0	+60.0	92.0	23
24	24 03.2	+59.5	88.9	24 04.2	+59.6	89.3	24 04.6	+59.8	89.8	24 04.6	+59.9	90.2	24 04.2	+59.9	90.7	24 03.3	+59.9	91.1	24 01.9	+59.9	91.6	24 00.0	+60.0	92.0	24
25	25 02.7	+59.4	88.7	25 03.8	+59.6	89.2	25 04.4	+59.7	89.7	25 04.5	+59.8	90.1	25 04.1	+59.9	90.6	25 03.2	+60.0	91.1	25 01.8	+60.0	91.5	25 00.0	+60.0	92.0	25
26	26 02.1	+59.5	88.6	26 03.4	+59.5	89.1	26 04.1	+59.7	89.6	26 04.3	+59.8	90.0	26 04.0	+59.9	90.5	26 03.2	+59.9	91.0	26 01.8	+60.0	91.5	26 00.0	+60.0	92.0	26
27	27 01.6	+59.4	88.4	27 02.9	+59.6	88.9	27 03.8	+59.7	89.4	27 04.1	+59.8	90.0	27 03.9	+59.9	90.5	27 03.1	+60.0	91.0	27 01.8	+60.0	91.5	27 00.0	+60.0	92.0	27
28	28 01.0	+59.4	88.3	28 02.5	+59.6	88.8	28 03.5	+59.7	89.3	28 03.9	+59.8	89.9	28 03.8	+59.9	90.4	28 03.1	+59.9	90.9	28 01.8	+60.0	91.5	28 00.0	+60.0	92.0	28
29	29 00.4	+59.4	88.1	29 02.1	+59.6	88.7	29 03.2	+59.7	89.2	29 03.7	+59.8	89.8	29 03.7	+59.9	90.3	29 03.0	+60.0	90.9	29 01.8	+60.0	91.4	29 00.0	+60.0	92.0	29
30	29 59.8	+59.4	88.0	30 01.7	+59.5	88.5	30 02.9	+59.7	89.1	30 03.5	+59.8	89.7	30 03.6	+59.8	90.3	30 03.0	+59.9	90.8	30 01.8	+60.0	91.4	30 00.0	+60.0	92.0	30
31	30 59.2	+59.4	87.8	31 01.2	+59.6	88.4	31 02.6	+59.7	89.0	31 03.3	+59.8	89.6	31 03.4	+59.9	90.2	31 02.9	+60.0	90.8	31 01.8	+60.0	91.4	31 00.0	+60.0	92.0	31
32	31 58.6	+59.4	87.6	32 00.8	+59.5	88.2	32 02.3	+59.7	88.9	32 03.1	+59.8	89.5	32 03.3	+59.9	90.1	32 02.9	+59.9	90.7	32 01.8	+60.0	91.4	32 00.0	+60.0	92.0	32
33	32 58.0	+59.3	87.5	33 00.3	+59.5	88.1	33 02.0	+59.6	88.7	33 02.9	+59.8	89.4	33 03.2	+59.9	90.0	33 02.8	+60.0	90.7	33 01.8	+59.9	91.4	33 00.0	+60.0	92.0	33
34	33 57.3	+59.4	87.3	33 59.8	+59.6	87.9	34 01.6	+59.7	88.6	34 02.7	+59.8	89.3	34 03.1	+59.9	90.0	34 02.8	+59.9	90.6	34 01.7	+60.0	91.3	34 00.0	+60.0	92.0	34
35	34 56.7	+59.3	87.1	34 59.4	+59.5	87.8	35 01.3	+59.7	88.5	35 02.5	+59.8	89.2	35 03.0	+59.9	89.9	35 02.7	+60.0	90.6	35 01.7	+60.0	91.3	35 00.0	+60.0	92.0	35
36	35 56.0	+59.3	86.9	35 58.9	+59.5	87.6	36 01.0	+59.6	88.4	36 02.3	+59.8	89.1	36 02.9	+59.8	89.8	36 02.7	+59.9	90.5	36 01.7	+60.0	91.3	36 00.0	+60.0	92.0	36
37	36 55.3	+59.3	86.7	36 58.4	+59.4	87.5	37 00.6	+59.6	88.2	37 02.1	+59.7	89.0	37 02.7	+59.9	89.7	37 02.6	+60.0	90.5	37 01.7	+60.0	91.2	37 00.0	+60.0	92.0	37
38	37 54.6	+59.3	86.5	37 57.8	+59.5	87.3	38 00.2	+59.7	88.1	38 01.8	+59.8	88.9	38 02.6	+59.9	89.7	38 02.6	+59.9	90.4	38 01.7	+60.0	91.2	38 00.0	+60.0	92.0	38
39	38 53.9	+59.2	86.3	38 57.3	+59.4	87.1	38 59.9	+59.6	87.9	39 01.6	+59.7	88.8	39 02.5	+59.8	89.6	39 02.5	+59.9	90.4	39 01.7	+60.0	91.2	39 00.0	+60.0	92.0	39
40	39 53.1	+59.3	86.1	39 56.7	+59.5	87.0	39 59.5	+59.6	87.8	40 01.3	+59.8	88.6	40 02.3	+59.9	89.5	40 02.4	+60.0	90.3	40 01.7	+59.9	91.2	40 00.0	+60.0	92.0	40
41	40 52.4	+59.2	85.9	40 56.2	+59.4	86.8	40 59.1	+59.6	87.7	41 01.1	+59.7	88.5	41 02.2	+59.8	89.4	41 02.4	+59.9	90.3	41 01.6	+60.0	91.1	41 00.0	+60.0	92.0	41
42	41 51.6	+59.1	85.7	41 55.6	+59.4	86.6	41 58.7	+59.6	87.5	42 00.8	+59.8	88.4	42 02.0	+59.9	89.3	42 02.3	+59.9	90.2	42 01.6	+60.0	91.1	42 00.0	+60.0	92.0	42
43	42 50.7	+59.2	85.5	42 55.0	+59.4	86.4	42 58.3	+59.5	87.3	43 00.6	+59.7	88.3	43 01.9	+59.8	89.2	43 02.2	+60.0	90.1	43 01.6	+60.0	91.1	43 00.0	+60.0	92.0	43
44	43 49.9	+59.1	85.2	43 54.4	+59.3	86.2	43 57.8	+59.6	87.2	44 00.3	+59.7	88.1	44 01.7	+59.9	89.1	44 02.2	+59.9	90.1	44 01.6	+60.0	91.0	44 00.0	+60.0	92.0	44
45	44 49.0	+59.1	85.0	44 53.7	+59.3	86.0	44 57.4	+59.5	87.0	45 00.0	+59.7	88.0	45 01.6	+59.8	89.0	45 02.1	+59.9	90.0	45 01.6	+60.0	91.0	45 00.0	+60.0	92.0	45
46	45 48.1	+59.1	84.8	45 53.0	+59.4	85.8	45 56.9	+59.5	86.8	45 59.7	+59.7	87.9	46 01.4	+59.8	88.9	46 02.0	+59.9	89.9	46 01.6	+59.9	91.0	46 00.0	+60.0	92.0	46
47	46 47.2	+59.0	84.5	46 52.4	+59.2	85.6	46 56.4	+59.5	86.6	46 59.4	+59.7	87.7	47 01.2	+59.8	88.8	47 01.9	+60.0	89.9	47 01.5	+60.0	90.9	47 00.0	+60.0	92.0	47
48	47 46.2	+59.0	84.2	47 51.6	+59.3	85.3	47 55.9	+59.5	86.4	47 59.1	+59.6	87.6	48 01.0	+59.9	88.7	48 01.9	+59.9	89.8	48 01.5	+60.0	90.9	48 00.0	+60.0	92.0	48
49	48 45.2	+58.9	84.0	48 50.9	+59.2	85.1	48 55.4	+59.5	86.3	48 58.7	+59.7	87.4	49 00.9	+59.8	88.5	49 01.8	+59.9	89.7	49 01.5	+60.0	90.8	49 00.0	+60.0	92.0	49
50	49 44.1	+58.9	83.7	49 50.1	+59.2	84.9	49 54.9	+59.4	86.0	49 58.4	+59.6	87.2	50 00.7	+59.8	88.4	50 01.7	+59.9	89.6	50 01.5	+59.9	90.8	50 00.0	+60.0	92.0	50
51	50 43.0	+58.9	83.4	50 49.3	+59.2	84.6	50 54.3	+59.4	85.8	50 58.0	+59.7	87.1	51 00.5	+59.7	88.3	51 01.6	+59.9	89.5	51 01.4	+60.0	90.8	51 00.0	+60.0	92.0	51
52	51 41.9	+58.8	83.1	51 48.5	+59.1	84.3	51 53.7	+59.4	85.6	51 57.7	+59.6	86.9	52 00.2	+59.8	88.2	52 01.5	+59.9	89.4	52 01.4	+60.0	90.7	52 00.0	+60.0	92.0	52
53	52 40.7	+58.7	82.8	52 47.6	+59.1	84.1	52 53.1	+59.4	85.4	52 57.3	+59.5	86.7	53 00.0	+59.8	88.0	53 01.4	+59.9	89.3	53 01.4	+60.0	90.7	53 00.0	+60.0	92.0	53
54	53 39.4	+58.7	82.4	53 46.7	+59.0	83.8	53 52.5	+59.3	85.1	53 56.8	+59.6	86.5	53 59.8	+59.8	87.9	54 01.3	+59.9	89.2	54 01.4	+59.9	90.6	54 00.0	+60.0	92.0	54
55	54 38.1	+58.6	82.1	54 45.7	+59.0	83.5	54 51.8	+59.3	84.9	54 56.4	+59.6	86.3	54 59.6	+59.7	87.7	55 01.2	+59.9	89.1	55 01.3	+60.0	90.6	55 00.0	+60.0	92.0	55
56	55 36.7	+58.6	81.7	55 44.7	+58.9	83.1	55 51.1	+59.2	84.6	55 56.0	+59.5	86.1	55 59.3	+59.7	87.6	56 01.1	+59.9	89.0	56 01.3	+60.0	90.5	56 00.0	+60.0	92.0	56
57	56 35.3	+58.5	81.3	56 43.6	+58.9	82.8	56 50.3	+59.2	84.3	56 55.5	+59.5	85.8	56 59.0	+59.7	87.4	57 01.0	+59.8	88.9	57 01.3	+60.0	90.5	57 00.0	+60.0	92.0	57
58	57 33.8	+58.4	80.9	57 42.5	+58.8	82.4	57 49.5	+59.2	84.0	57 55.0	+59.4	85.6	57 58.7	+59.7	87.2	58 00.8	+59.9	88.8	58 01.3	+59.9	90.4	58 00.0	+60.0	92.0	58
59	58 32.2	+58.3	80.4	58 41.3	+58.7	82.1	58 48.7	+59.1	83.7	58 54.4	+59.5	85.4	58 58.4	+59.7	87.0	59 00.7	+59.9	88.7	59 01.2	+60.0	90.3	59 00.0	+60.0	92.0	59
60	59 30.5	+58.2	80.0	59 40.0	+58.7	81.7	59 47.8	+59.1	83.4	59 53.9	+59.4	85.1	59 58.1	+59.7	86.8	60 00.6	+59.8	88.5	60 01.2	+59.9	90.3	60 00.0	+60.0	92.0	60
61	60 28.7	+58.0	79.5	60 38.7	+58.6	81.2	60 46.9	+59.0	83.0	60 53.3	+59.3	84.8	60 57.8	+59.6	86.6	61 00.4	+59.8	88.4	61 01.1	+60.0	90.2	61 00.0	+60.0	92.0	61
62	61 26.7	+58.0	79.0	61 37.3	+58.4	80.8	61 45.9	+58.9	82.6	61 52.6	+59.4	84.5	61 57.4	+59.6	86.4	62 00.2	+59.9	88.2	62 01.1	+60.0	90.1	62 00.0	+60.0	92.0	62
63	62 24.7	+57.8	78.4	62 35.7	+58.4	80.3	62 44.8	+58.9	82.2	62 52.0	+59.2	84.2	62 57.0	+59.6	86.1	63 00.1	+59.8	88.1	63 01.1	+59.9	90.0	63 00.0	+60.0	92.0	63
64	63 22.5	+57.7	77.8	63 34.1	+58.3	79.8	63 43.7	+58.8	81.8	63 51.2	+59.2	83.8	63 56.6	+59.6	85.9	63 59.9	+59.8	87.9	64 01.0	+60.0	89.9	64 00.0	+60.0	92.0	64
65	64 20.2	+57.5	77.2	64 32.4	+58.1	79.3	64 42.5	+58.7	81.3	64 50.4	+59.2	83.4	64 56.2	+59.5	85.6	64 59.7	+59.8	87.7	65 01.0	+59.9	89.9	65 00.0	+60.0	92.0	65
66	65 17.7	+57.2	76.5	65 30.5	+58.0	78.7	65 41.2	+58.6	80.8	65 49.6	+59.1	83.0	65 55.7	+59.5	85.3	65 59.5	+59.8	87.5	66 00.9	+60.0	89.8	66 00.0	+60.0	92.0	66
67	66 14.9	+57.1	75.8	66 28.5	+57.8	78.0	66 39.8	+58.4	80.3	66 48.7	+59.0	82.6	66 55.2	+59.4	84.9	66 59.3	+59.7	87.3	67 00.9	+59.9	89.6	67 00.0	+60.0	92.0	67
68	67 12.0	+56.9	75.0	67 26.3	+57.7	77.4	67 38.2	+58.4	79.7	67 47.7	+58.9	82.1	67 54.6	+59.4	84.6	67 59.0	+59.7	87.1	68 00.8	+59.9	89.5	68 00.0	+60.0	92.0	68
69	68 08.9	+56.5	74.2	68 24.0	+57.4	76.6	68 36.6	+58.2	79.1	68 46.6	+58.8	81.6	68 54.0	+59.4	84.2	68 58.7	+59.7	86.8	69 00.7	+60.0	89.4	69 00.0	+60.0	92.0	69
70	69 05.4	+56.2	73.3	69 21.4	+57.2	75.8	69 34.8	+58.0	78.4	69 45.4	+58.8	81.1	69 53.4	+59.2	83.8	69 58.4	+59.7	86.5	70 00.7	+59.9	89.3	70 00.0	+60.0	92.0	70
71	70 01.6	+55.9	72.3	70 18.6	+56.9	74.9	70 32.8	+57.8	77.7	70 44.2	+58.5	80.5	70 52.6	+59.2	83.3	70 58.1	+59.6	86.2	71 00.6	+59.9	89.1	71 00.0	+60.0	92.0	71
72	70 57.5	+55.4	71.2	71 15.5	+56.5	74.0	71 30.6	+57.6	76.9	71 42.7	+58.4	79.8	71 51.8	+59.1	82.8	71 57.7	+59.6	85.8	72 00.5	+59.9	88.9	72 00.0	+60.0	92.0	72
73	71 52.9	+55.0	70.0	72 12.0	+56.2	72.9	72 28.2	+57.2	75.9	72 41.1	+58.3	79.1	72 50.9	+59.0	82.2	72 57.3	+59.6	85.5	73 00.4	+59.9	88.7	73 00.0	+60.0	92.0	73
74	72 47.9	+54.4	68.7	73 08.2	+55.8	71.7	73 25.4	+57.0	74.9	73 39.4	+58.0	78.2	73 49.9	+58.9	81.6	73 56.9	+59.5	85.0	74 00.3	+59.8	88.5	74 00.0	+60.0	92.0	74
75	73 42.3	+53.7	67.2	74 04.0	+55.2	70.4	74 22.4	+56.6	73.8	74 37.4	+57.7	77.3	74 48.8	+58.7	80.9	74 56.4	+59.4	84.5	75 00.1	+59.9	88.3	75 00.0	+60.0	92.0	75
76	74 36.0	+52.9	65.6	74 59.2	+54.5	69.0	75 19.0	+56.1	72.5	75 35.1	+57.5	76.2	75 47.5	+58.5	80.1	75 55.8	+59.3	84.0	76 00.0	+59.8	88.0	76 00.0	+60.0	92.0	76
77	75 28.9	+51.9	63.7	75 53.7	+53.8	67.3	76 15.1	+55.5	71.1	76 32.6	+57.0	75.0	76 46.0	+58.3	79.1	76 55.1	+59.3	83.4	76 59.8	+59.8	87.7	77 00.0	+60.0	92.0	77
78	76 20.8	+50.8	61.7	76 47.5	+52.9	65.4	77 10.6	+54.8	69.4	77 29.6	+56.5	73.6	77 44.3	+58.0	78.1	77 54.4	+59.0	82.6	77 59.6	+59.8	87.3	78 00.0	+60.0	92.0	78
79	77 11.6	+49.4	59.3	77 40.4	+51.7	63.3	78 05.4	+53.9	67.5	78 26.1	+56.0	72.0	78 42.3	+57.6	76.8	78 53.4	+59.0	81.8	78 59.4	+59.7	86.9	79 00.0	+60.0	92.0	79
80	78 01.0	+47.6	56.7	78 32.1	+50.3	60.8	78 59.3	+52.8	65.3	79 22.1	+55.1	70.1	79 39.9	+57.1	75.3	79 52.4	+58.6	80.7	79 59.1	+59.7	86.3	80 00.0	+60.0	92.0	80
81	78 48.6	+45.6•	53.7	79 22.4	+48.5•	58.0	79 52.1	+51.3	62.7	80 17.2	+54.0	67.9	80 37.0	+56.5	73.5	80 51.0	+58.4	79.5	80 58.8	+59.6	85.7	81 00.0	+60.0	92.0	81
82	79 34.2	+43.0•	50.2	80 10.9	+46.1•	54.6	80 43.4	+49.5•	59.6	81 11.2	+52.7	65.2	81 33.5	+55.5	71.3	81 49.4	+57.9	77.9	81 58.4	+59.4	84.9	82 00.0	+60.0	92.0	82
83	80 17.2	+39.8•	46.2	80 57.0	+43.3•	50.7	81 32.9	+47.0•	56.0	82 03.9	+50.7•	61.9	82 29.0	+54.3	68.6	82 47.3	+57.3	76.0	82 57.8	+59.3	83.9	83 00.0	+60.0	92.0	83
84	80 57.0	+35.9•	41.6	81 40.3	+39.6•	46.2	82 19.9	+43.6•	51.5	82 54.6	+48.0•	57.8	83 23.3	+52.4•	65.1	83 44.6	+56.3	73.4	83 57.1	+59.0	82.5	84 00.0	+60.0	92.0	84
85	81 32.9	+31.0•	36.3	82 19.9	+34.7•	40.7	83 03.5	+39.1•	46.1	83 42.6	+44.1•	52.7	84 15.7	+49.5•	60.6	84 40.9	+54.6•	70.0	84 56.1	+58.6	80.6	85 00.0	+60.0	92.0	85
86	82 03.9	+25.1•	30.3	82 54.6	+28.7•	34.4	83 42.6	+33.1•	39.5	84 26.7	+38.5•	46.1	85 05.2	+44.8•	54.5	85 35.5	+51.7•	65.1	85 54.7	+57.6	77.9	86 00.0	+60.0	92.0	86
87	82 29.0	+18.3•	23.6	83 23.3	+21.3•	27.0	84 15.7	+25.2•	31.5	85 05.2	+30.3•	37.6	85 50.0	+37.2•	46.0	86 27.2	+46.1•	57.7	86 52.3	+55.4•	73.4	87 00.0	+60.0	92.0	87
88	82 47.3	+10.5•	16.1	83 44.6	+12.5•	18.7	84 40.9	+15.2•	22.1	85 35.5	+19.2•	27.0	86 27.2	+25.1•	34.3	87 13.3	+34.4•	46.0	87 47.7	+48.9•	65.1	88 00.0	+60.0	92.0	88
89	82 57.8	+2.2•	8.2	83 57.1	+2.9•	9.5	84 56.1	+3.9•	11.4	85 54.7	+5.3•	14.2	86 52.3	+7.7•	18.6	87 47.7	+12.3•	27.0	88 36.6	+23.4•	46.0	89 00.0	+60.0	92.0	89
90	83 00.0	−6.3•	0.0	84 00.0	−7.0•	0.0	85 00.0	−8.0•	0.0	86 00.0	−9.4•	0.0	87 00.0	−11.7•	0.0	88 00.0	−16.0•	0.0	89 00.0	−26.3•	0.0	90 00.0	−60.0	46.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 88°, 272°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
°	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	Hc ° ′	d ′	Z °	°
0	0 14.6	– 59.5	92.0	0 12.5	– 59.6	92.0	0 10.5	– 59.8	92.0	0 08.4	– 59.9	92.0	0 06.3	– 59.9	92.0	0 04.2	– 60.0	92.0	0 02.1	– 60.0	92.0	0 00.0	+ 60.0	88.0	0
1	0 44.9	+ 59.6	87.9	0 47.1	+ 59.7	87.9	0 49.3	+ 59.8	87.9	0 51.5	+ 59.8	87.9	0 53.6	+ 60.0	88.0	0 55.8	+ 59.9	88.0	0 57.9	+ 60.0	88.0	1 00.0	+ 60.0	88.0	1
2	1 44.5	+ 59.5	87.8	1 46.8	+ 59.7	87.8	1 49.1	+ 59.8	87.8	1 51.3	+ 59.9	87.9	1 53.6	+ 59.9	87.9	1 55.7	+ 60.0	87.9	1 57.9	+ 60.0	88.0	2 00.0	+ 60.0	88.0	2
3	2 44.0	+ 59.6	87.6	2 46.5	+ 59.6	87.7	2 48.9	+ 59.7	87.7	2 51.2	+ 59.8	87.8	2 53.5	+ 59.9	87.8	2 55.7	+ 60.0	87.9	2 57.9	+ 60.0	87.9	3 00.0	+ 60.0	88.0	3
4	3 43.6	+ 59.5	87.5	3 46.1	+ 59.7	87.6	3 48.6	+ 59.8	87.7	3 51.0	+ 59.9	87.7	3 53.4	+ 59.9	87.8	3 55.7	+ 59.9	87.9	3 57.9	+ 60.0	87.9	4 00.0	+ 60.0	88.0	4
5	4 43.1	+ 59.6	87.4	4 45.8	+ 59.7	87.5	4 48.4	+ 59.8	87.6	4 50.9	+ 59.9	87.7	4 53.3	+ 59.9	87.7	4 55.6	+ 60.0	87.8	4 57.9	+ 60.0	87.9	5 00.0	+ 60.0	88.0	5
6	5 42.7	+ 59.5	87.3	5 45.5	+ 59.7	87.4	5 48.2	+ 59.7	87.5	5 50.8	+ 59.8	87.6	5 53.2	+ 59.9	87.7	5 55.6	+ 60.0	87.8	5 57.9	+ 59.9	87.9	6 00.0	+ 60.0	88.0	6
7	6 42.2	+ 59.6	87.2	6 45.2	+ 59.6	87.3	6 47.9	+ 59.8	87.4	6 50.6	+ 59.9	87.5	6 53.1	+ 60.0	87.6	6 55.6	+ 59.9	87.8	6 57.8	+ 60.0	87.9	7 00.0	+ 60.0	88.0	7
8	7 41.8	+ 59.5	87.0	7 44.8	+ 59.7	87.2	7 47.7	+ 59.8	87.3	7 50.5	+ 59.8	87.4	7 53.1	+ 59.9	87.6	7 55.5	+ 60.0	87.7	7 57.8	+ 60.0	87.9	8 00.0	+ 60.0	88.0	8
9	8 41.3	+ 59.6	86.9	8 44.5	+ 59.6	87.1	8 47.5	+ 59.7	87.2	8 50.3	+ 59.9	87.4	8 53.0	+ 59.9	87.5	8 55.5	+ 59.9	87.7	8 57.8	+ 60.0	87.8	9 00.0	+ 60.0	88.0	9
10	9 40.9	+ 59.5	86.8	9 44.1	+ 59.7	87.0	9 47.2	+ 59.8	87.1	9 50.2	+ 59.8	87.3	9 52.9	+ 59.9	87.5	9 55.4	+ 60.0	87.6	9 57.8	+ 60.0	87.8	10 00.0	+ 60.0	88.0	10
11	10 40.4	+ 59.5	86.7	10 43.8	+ 59.7	86.8	10 47.0	+ 59.8	87.0	10 50.0	+ 59.9	87.2	10 52.8	+ 59.9	87.4	10 55.4	+ 60.0	87.6	10 57.8	+ 60.0	87.8	11 00.0	+ 60.0	88.0	11
12	11 39.9	+ 59.6	86.5	11 43.5	+ 59.6	86.7	11 46.8	+ 59.7	86.9	11 49.9	+ 59.8	87.2	11 52.7	+ 59.9	87.4	11 55.4	+ 59.9	87.6	11 57.8	+ 60.0	87.8	12 00.0	+ 60.0	88.0	12
13	12 39.5	+ 59.5	86.4	12 43.1	+ 59.7	86.6	12 46.5	+ 59.8	86.9	12 49.7	+ 59.8	87.1	12 52.6	+ 59.9	87.3	12 55.3	+ 60.0	87.5	12 57.8	+ 60.0	87.8	13 00.0	+ 60.0	88.0	13
14	13 39.0	+ 59.5	86.3	13 42.8	+ 59.6	86.5	13 46.3	+ 59.7	86.8	13 49.5	+ 59.9	87.0	13 52.5	+ 60.0	87.3	13 55.3	+ 60.0	87.5	13 57.8	+ 60.0	87.8	14 00.0	+ 60.0	88.0	14
15	14 38.5	+ 59.6	86.1	14 42.4	+ 59.7	86.4	14 46.0	+ 59.8	86.7	14 49.4	+ 59.8	86.9	14 52.5	+ 59.9	87.2	14 55.3	+ 59.9	87.5	14 57.8	+ 60.0	87.7	15 00.0	+ 60.0	88.0	15
16	15 38.1	+ 59.5	86.0	15 42.1	+ 59.6	86.3	15 45.8	+ 59.8	86.6	15 49.2	+ 59.9	86.9	15 52.4	+ 59.9	87.1	15 55.2	+ 60.0	87.4	15 57.8	+ 59.9	87.7	16 00.0	+ 60.0	88.0	16
17	16 37.6	+ 59.5	85.9	16 41.7	+ 59.7	86.2	16 45.6	+ 59.7	86.5	16 49.1	+ 59.8	86.8	16 52.3	+ 59.9	87.1	16 55.2	+ 59.9	87.4	16 57.7	+ 60.0	87.7	17 00.0	+ 60.0	88.0	17
18	17 37.1	+ 59.5	85.8	17 41.4	+ 59.6	86.1	17 45.3	+ 59.8	86.4	17 48.9	+ 59.9	86.7	17 52.2	+ 59.9	87.0	17 55.1	+ 60.0	87.4	17 57.7	+ 60.0	87.7	18 00.0	+ 60.0	88.0	18
19	18 36.6	+ 59.5	85.6	18 41.0	+ 59.6	86.0	18 45.1	+ 59.7	86.3	18 48.8	+ 59.8	86.6	18 52.1	+ 59.9	87.0	18 55.1	+ 60.0	87.3	18 57.7	+ 60.0	87.7	19 00.0	+ 60.0	88.0	19
20	19 36.1	+ 59.5	85.5	19 40.6	+ 59.7	85.8	19 44.8	+ 59.7	86.2	19 48.6	+ 59.8	86.6	19 52.0	+ 59.9	86.9	19 55.1	+ 59.9	87.3	19 57.7	+ 60.0	87.6	20 00.0	+ 60.0	88.0	20
21	20 35.6	+ 59.5	85.3	20 40.3	+ 59.6	85.7	20 44.5	+ 59.8	86.1	20 48.4	+ 59.9	86.5	20 51.9	+ 59.9	86.9	20 55.0	+ 60.0	87.2	20 57.7	+ 60.0	87.6	21 00.0	+ 60.0	88.0	21
22	21 35.1	+ 59.4	85.2	21 39.9	+ 59.6	85.6	21 44.3	+ 59.7	86.0	21 48.3	+ 59.8	86.4	21 51.8	+ 59.9	86.8	21 55.0	+ 59.9	87.2	21 57.7	+ 60.0	87.6	22 00.0	+ 60.0	88.0	22
23	22 34.5	+ 59.5	85.1	22 39.5	+ 59.6	85.5	22 44.0	+ 59.7	85.9	22 48.1	+ 59.8	86.3	22 51.7	+ 59.9	86.7	22 54.9	+ 60.0	87.2	22 57.7	+ 60.0	87.6	23 00.0	+ 60.0	88.0	23
24	23 34.0	+ 59.5	84.9	23 39.1	+ 59.6	85.4	23 43.7	+ 59.8	85.8	23 47.9	+ 59.8	86.2	23 51.6	+ 59.9	86.7	23 54.9	+ 59.9	87.1	23 57.7	+ 60.0	87.6	24 00.0	+ 60.0	88.0	24
25	24 33.5	+ 59.4	84.8	24 38.7	+ 59.6	85.2	24 43.5	+ 59.7	85.7	24 47.7	+ 59.9	86.1	24 51.5	+ 59.9	86.6	24 54.8	+ 60.0	87.1	24 57.7	+ 60.0	87.5	25 00.0	+ 60.0	88.0	25
26	25 32.9	+ 59.5	84.6	25 38.3	+ 59.6	85.1	25 43.2	+ 59.7	85.6	25 47.6	+ 59.8	86.1	25 51.4	+ 59.9	86.5	25 54.8	+ 59.9	87.0	25 57.7	+ 59.9	87.5	26 00.0	+ 60.0	88.0	26
27	26 32.4	+ 59.4	84.5	26 37.9	+ 59.6	85.0	26 42.9	+ 59.7	85.5	26 47.4	+ 59.8	86.0	26 51.3	+ 59.9	86.5	26 54.7	+ 60.0	87.0	26 57.6	+ 60.0	87.5	27 00.0	+ 60.0	88.0	27
28	27 31.8	+ 59.4	84.3	27 37.5	+ 59.6	84.8	27 42.6	+ 59.7	85.4	27 47.2	+ 59.8	85.9	27 51.2	+ 59.9	86.4	27 54.7	+ 60.0	86.9	27 57.6	+ 60.0	87.5	28 00.0	+ 60.0	88.0	28
29	28 31.2	+ 59.5	84.2	28 37.1	+ 59.5	84.7	28 42.3	+ 59.7	85.2	28 47.0	+ 59.8	85.8	28 51.1	+ 59.9	86.3	28 54.7	+ 59.9	86.9	28 57.6	+ 60.0	87.4	29 00.0	+ 60.0	88.0	29
30	29 30.7	+ 59.4	84.0	29 36.6	+ 59.6	84.6	29 42.0	+ 59.7	85.1	29 46.8	+ 59.8	85.7	29 51.0	+ 59.9	86.3	29 54.6	+ 60.0	86.8	29 57.6	+ 60.0	87.4	30 00.0	+ 60.0	88.0	30
31	30 30.1	+ 59.4	83.8	30 36.2	+ 59.5	84.4	30 41.7	+ 59.7	85.0	30 46.6	+ 59.8	85.6	30 50.9	+ 59.9	86.2	30 54.6	+ 59.9	86.8	30 57.6	+ 60.0	87.4	31 00.0	+ 60.0	88.0	31
32	31 29.5	+ 59.3	83.7	31 35.7	+ 59.6	84.3	31 41.4	+ 59.7	84.9	31 46.4	+ 59.8	85.5	31 50.8	+ 59.9	86.1	31 54.5	+ 60.0	86.8	31 57.6	+ 60.0	87.4	32 00.0	+ 60.0	88.0	32
33	32 28.8	+ 59.4	83.5	32 35.3	+ 59.5	84.1	32 41.1	+ 59.7	84.8	32 46.2	+ 59.8	85.4	32 50.7	+ 59.9	86.1	32 54.5	+ 59.9	86.7	32 57.6	+ 60.0	87.4	33 00.0	+ 60.0	88.0	33
34	33 28.2	+ 59.3	83.3	33 34.8	+ 59.5	84.0	33 40.8	+ 59.6	84.7	33 46.0	+ 59.8	85.3	33 50.6	+ 59.8	86.0	33 54.4	+ 59.9	86.7	33 57.6	+ 59.9	87.3	34 00.0	+ 60.0	88.0	34
35	34 27.5	+ 59.4	83.2	34 34.3	+ 59.5	83.8	34 40.4	+ 59.7	84.5	34 45.8	+ 59.8	85.2	34 50.4	+ 59.9	85.9	34 54.3	+ 60.0	86.6	34 57.5	+ 60.0	87.3	35 00.0	+ 60.0	88.0	35
36	35 26.9	+ 59.3	83.0	35 33.8	+ 59.5	83.7	35 40.1	+ 59.6	84.4	35 45.6	+ 59.7	85.1	35 50.3	+ 59.9	85.8	35 54.3	+ 59.9	86.6	35 57.5	+ 60.0	87.3	36 00.0	+ 60.0	88.0	36
37	36 26.2	+ 59.3	82.8	36 33.3	+ 59.5	83.5	36 39.7	+ 59.7	84.3	36 45.3	+ 59.8	85.0	36 50.2	+ 59.9	85.7	36 54.2	+ 60.0	86.5	36 57.5	+ 60.0	87.2	37 00.0	+ 60.0	88.0	37
38	37 25.5	+ 59.3	82.6	37 32.8	+ 59.5	83.4	37 39.4	+ 59.6	84.1	37 45.1	+ 59.8	84.9	37 50.1	+ 59.8	85.7	37 54.2	+ 59.9	86.4	37 57.5	+ 60.0	87.2	38 00.0	+ 60.0	88.0	38
39	38 24.8	+ 59.2	82.4	38 32.3	+ 59.5	83.2	38 39.0	+ 59.6	84.0	38 44.9	+ 59.7	84.8	38 49.9	+ 59.9	85.6	38 54.1	+ 60.0	86.4	38 57.5	+ 60.0	87.2	39 00.0	+ 60.0	88.0	39
40	39 24.0	+ 59.3	82.2	39 31.8	+ 59.4	83.0	39 38.6	+ 59.6	83.8	39 44.6	+ 59.8	84.7	39 49.8	+ 59.8	85.5	39 54.1	+ 59.9	86.3	39 57.5	+ 60.0	87.2	40 00.0	+ 60.0	88.0	40
41	40 23.3	+ 59.2	82.0	40 31.2	+ 59.4	82.8	40 38.2	+ 59.6	83.7	40 44.4	+ 59.7	84.5	40 49.6	+ 59.9	85.4	40 54.0	+ 59.9	86.3	40 57.5	+ 59.9	87.1	41 00.0	+ 60.0	88.0	41
42	41 22.5	+ 59.2	81.8	41 30.6	+ 59.4	82.7	41 37.8	+ 59.6	83.5	41 44.1	+ 59.8	84.4	41 49.5	+ 59.8	85.3	41 53.9	+ 60.0	86.2	41 57.4	+ 60.0	87.1	42 00.0	+ 60.0	88.0	42
43	42 21.7	+ 59.1	81.6	42 30.0	+ 59.4	82.5	42 37.4	+ 59.6	83.4	42 43.9	+ 59.7	84.3	42 49.3	+ 59.9	85.2	42 53.9	+ 59.9	86.1	42 57.4	+ 60.0	87.1	43 00.0	+ 60.0	88.0	43
44	43 20.8	+ 59.2	81.3	43 29.4	+ 59.4	82.3	43 37.0	+ 59.5	83.2	43 43.6	+ 59.7	84.2	43 49.2	+ 59.8	85.1	43 53.8	+ 59.9	86.1	43 57.4	+ 60.0	87.0	44 00.0	+ 60.0	88.0	44
45	44 20.0	+ 59.1	81.1	44 28.8	+ 59.3	82.1	44 36.5	+ 59.6	83.0	44 43.3	+ 59.7	84.0	44 49.0	+ 59.9	85.0	44 53.7	+ 60.0	86.0	44 57.4	+ 60.0	87.0	45 00.0	+ 60.0	88.0	45
46	45 19.1	+ 59.1	80.9	45 28.1	+ 59.3	81.9	45 36.1	+ 59.5	82.9	45 43.0	+ 59.7	83.9	45 48.9	+ 59.8	84.9	45 53.7	+ 59.9	85.9	45 57.4	+ 59.9	87.0	46 00.0	+ 60.0	88.0	46
47	46 18.2	+ 59.0	80.6	46 27.4	+ 59.3	81.6	46 35.6	+ 59.5	82.7	46 42.7	+ 59.7	83.7	46 48.7	+ 59.8	84.8	46 53.6	+ 59.9	85.9	46 57.3	+ 60.0	86.9	47 00.0	+ 60.0	88.0	47
48	47 17.2	+ 59.0	80.3	47 26.7	+ 59.3	81.4	47 35.1	+ 59.5	82.5	47 42.4	+ 59.7	83.6	47 48.5	+ 59.8	84.7	47 53.5	+ 59.9	85.8	47 57.3	+ 60.0	86.9	48 00.0	+ 60.0	88.0	48
49	48 16.2	+ 59.0	80.1	48 26.0	+ 59.2	81.2	48 34.6	+ 59.5	82.3	48 42.1	+ 59.6	83.4	48 48.3	+ 59.8	84.6	48 53.4	+ 59.9	85.7	48 57.3	+ 60.0	86.9	49 00.0	+ 60.0	88.0	49
50	49 15.2	+ 58.9	79.8	49 25.2	+ 59.2	80.9	49 34.1	+ 59.4	82.1	49 41.7	+ 59.7	83.3	49 48.1	+ 59.8	84.4	49 53.3	+ 59.9	85.6	49 57.3	+ 60.0	86.8	50 00.0	+ 60.0	88.0	50
51	50 14.1	+ 58.9	79.5	50 24.4	+ 59.2	80.7	50 33.5	+ 59.4	81.9	50 41.4	+ 59.6	83.1	50 47.9	+ 59.8	84.3	50 53.2	+ 59.9	85.5	50 57.3	+ 59.9	86.8	51 00.0	+ 60.0	88.0	51
52	51 13.0	+ 58.8	79.2	51 23.6	+ 59.1	80.4	51 32.9	+ 59.4	81.7	51 41.0	+ 59.6	82.9	51 47.7	+ 59.8	84.2	51 53.1	+ 59.9	85.4	51 57.2	+ 60.0	86.7	52 00.0	+ 60.0	88.0	52
53	52 11.8	+ 58.8	78.9	52 22.7	+ 59.1	80.2	52 32.3	+ 59.4	81.4	52 40.6	+ 59.6	82.7	52 47.5	+ 59.8	84.0	52 53.0	+ 59.9	85.4	52 57.2	+ 60.0	86.7	53 00.0	+ 60.0	88.0	53
54	53 10.6	+ 58.7	78.6	53 21.8	+ 59.1	79.9	53 31.7	+ 59.3	81.2	53 40.2	+ 59.6	82.5	53 47.3	+ 59.7	83.9	53 52.9	+ 59.9	85.3	53 57.2	+ 60.0	86.6	54 00.0	+ 60.0	88.0	54
55	54 09.3	+ 58.7	78.2	54 20.9	+ 59.0	79.6	54 31.0	+ 59.3	80.9	54 39.8	+ 59.5	82.3	54 47.0	+ 59.8	83.7	54 52.8	+ 59.9	85.2	54 57.2	+ 59.9	86.6	55 00.0	+ 60.0	88.0	55
56	55 08.0	+ 58.6	77.8	55 19.9	+ 58.9	79.3	55 30.3	+ 59.3	80.7	55 39.3	+ 59.5	82.1	55 46.8	+ 59.7	83.6	55 52.7	+ 59.9	85.0	55 57.1	+ 60.0	86.5	56 00.0	+ 60.0	88.0	56
57	56 06.6	+ 58.5	77.5	56 18.8	+ 58.9	78.9	56 29.6	+ 59.2	80.4	56 38.8	+ 59.5	81.9	56 46.5	+ 59.7	83.4	56 52.6	+ 59.9	84.9	56 57.1	+ 60.0	86.5	57 00.0	+ 60.0	88.0	57
58	57 05.1	+ 58.4	77.1	57 17.7	+ 58.9	78.6	57 28.8	+ 59.2	80.1	57 38.3	+ 59.5	81.7	57 46.2	+ 59.7	83.2	57 52.5	+ 59.8	84.8	57 57.1	+ 59.9	86.4	58 00.0	+ 60.0	88.0	58
59	58 03.5	+ 58.3	76.6	58 16.6	+ 58.7	78.2	58 28.0	+ 59.2	79.8	58 37.8	+ 59.5	81.4	58 45.9	+ 59.7	83.0	58 52.3	+ 59.9	84.7	58 57.0	+ 60.0	86.3	59 00.0	+ 60.0	88.0	59
60	59 01.8	+ 58.3	76.2	59 15.3	+ 58.7	77.8	59 27.2	+ 59.0	79.5	59 37.3	+ 59.4	81.1	59 45.6	+ 59.7	82.8	59 52.2	+ 59.9	84.6	59 57.0	+ 60.0	86.3	60 00.0	+ 60.0	88.0	60
61	60 00.1	+ 58.1	75.7	60 14.0	+ 58.7	77.4	60 26.2	+ 59.1	79.1	60 36.7	+ 59.3	80.9	60 45.3	+ 59.6	82.6	60 52.1	+ 59.8	84.4	60 57.0	+ 59.9	86.2	61 00.0	+ 60.0	88.0	61
62	60 58.2	+ 58.0	75.2	61 12.7	+ 58.5	77.0	61 25.3	+ 58.9	78.8	61 36.0	+ 59.4	80.6	61 44.9	+ 59.6	82.4	61 51.9	+ 59.8	84.3	61 56.9	+ 60.0	86.1	62 00.0	+ 60.0	88.0	62
63	61 56.2	+ 57.9	74.7	62 11.2	+ 58.4	76.5	62 24.2	+ 58.9	78.4	62 35.4	+ 59.3	80.3	62 44.5	+ 59.6	82.2	62 51.7	+ 59.8	84.1	62 56.9	+ 59.9	86.0	63 00.0	+ 60.0	88.0	63
64	62 54.1	+ 57.8	74.1	63 09.6	+ 58.3	76.0	63 23.1	+ 58.8	77.9	63 34.7	+ 59.2	79.9	63 44.1	+ 59.6	81.9	63 51.5	+ 59.8	83.9	63 56.8	+ 60.0	86.0	64 00.0	+ 60.0	88.0	64
65	63 51.9	+ 57.5	73.5	64 07.9	+ 58.2	75.5	64 21.9	+ 58.8	77.5	64 33.9	+ 59.2	79.5	64 43.7	+ 59.5	81.6	64 51.3	+ 59.8	83.7	64 56.8	+ 59.9	85.9	65 00.0	+ 60.0	88.0	65
66	64 49.4	+ 57.4	72.9	65 06.1	+ 58.1	74.9	65 20.7	+ 58.6	77.0	65 33.1	+ 59.1	79.2	65 43.2	+ 59.5	81.3	65 51.1	+ 59.8	83.5	65 56.7	+ 60.0	85.8	66 00.0	+ 60.0	88.0	66
67	65 46.8	+ 57.2	72.2	66 04.2	+ 57.9	74.3	66 19.3	+ 58.5	76.5	66 32.2	+ 59.0	78.7	66 42.7	+ 59.5	81.0	66 50.9	+ 59.8	83.3	66 56.7	+ 59.9	85.7	67 00.0	+ 60.0	88.0	67
68	66 44.0	+ 57.0	71.4	67 02.1	+ 57.7	73.6	67 17.8	+ 58.4	75.9	67 31.2	+ 59.0	78.3	67 42.2	+ 59.4	80.7	67 50.7	+ 59.7	83.1	67 56.6	+ 59.9	85.5	68 00.0	+ 60.0	88.0	68
69	67 41.0	+ 56.7	70.6	67 59.8	+ 57.5	72.9	68 16.2	+ 58.2	75.3	68 30.2	+ 58.8	77.8	68 41.6	+ 59.3	80.3	68 50.4	+ 59.7	82.8	68 56.5	+ 60.0	85.4	69 00.0	+ 60.0	88.0	69
70	68 37.7	+ 56.4	69.7	68 57.3	+ 57.3	72.1	69 14.4	+ 58.1	74.7	69 29.0	+ 58.7	77.2	69 40.9	+ 59.3	79.9	69 50.1	+ 59.7	82.5	69 56.5	+ 59.9	85.3	70 00.0	+ 60.0	88.0	70
71	69 34.1	+ 56.0	68.8	69 54.6	+ 57.0	71.3	70 12.5	+ 57.9	73.9	70 27.7	+ 58.7	76.6	70 40.2	+ 59.2	79.4	70 49.8	+ 59.6	82.2	70 56.4	+ 59.9	85.1	71 00.0	+ 60.0	88.0	71
72	70 30.1	+ 55.7	67.7	70 51.6	+ 56.7	70.4	71 10.4	+ 57.6	73.1	71 26.4	+ 58.4	76.0	71 39.4	+ 59.1	78.9	71 49.4	+ 59.6	81.9	71 56.3	+ 59.9	84.9	72 00.0	+ 60.0	88.0	72
73	71 25.8	+ 55.2	66.6	71 48.3	+ 56.4	69.4	72 08.0	+ 57.4	72.3	72 24.8	+ 58.3	75.3	72 38.5	+ 59.0	78.4	72 49.0	+ 59.6	81.5	72 56.2	+ 59.9	84.7	73 00.0	+ 60.0	88.0	73
74	72 21.0	+ 54.6	65.3	72 44.7	+ 55.9	68.2	73 05.4	+ 57.1	71.3	73 23.1	+ 58.1	74.5	73 37.5	+ 58.9	77.7	73 48.6	+ 59.5	81.1	73 56.1	+ 59.9	84.5	74 00.0	+ 60.0	88.0	74
75	73 15.6	+ 54.1	63.9	73 40.6	+ 55.4	67.0	74 02.5	+ 56.7	70.2	74 21.2	+ 57.8	73.5	74 36.4	+ 58.8	77.0	74 48.1	+ 59.4	80.6	74 56.0	+ 59.8	84.3	75 00.0	+ 60.0	88.0	75
76	74 09.7	+ 53.3	62.4	74 36.0	+ 54.9	65.6	74 59.2	+ 56.3	69.0	75 19.0	+ 57.5	72.5	75 35.2	+ 58.5	76.2	75 47.5	+ 59.4	80.1	75 55.8	+ 59.9	84.0	76 00.0	+ 60.0	88.0	76
77	75 03.0	+ 52.4	60.6	75 30.9	+ 54.1	64.0	75 55.5	+ 55.7	67.6	76 16.5	+ 57.2	71.4	76 33.7	+ 58.4	75.3	76 46.9	+ 59.2	79.5	76 55.7	+ 59.8	83.7	77 00.0	+ 60.0	88.0	77
78	75 55.4	+ 51.4	58.7	76 25.0	+ 53.3	62.2	76 51.2	+ 55.1	66.0	77 13.7	+ 56.7	70.0	77 32.1	+ 58.0	74.3	77 46.1	+ 59.1	78.7	77 55.5	+ 59.7	83.3	78 00.0	+ 60.0	88.0	78
79	76 46.8	+ 50.1	56.5	77 18.3	+ 52.2	60.2	77 46.3	+ 54.3	64.2	78 10.4	+ 56.1	68.5	78 30.1	+ 57.8	73.1	78 45.2	+ 58.9	77.9	78 55.2	+ 59.8	82.9	79 00.0	+ 60.0	88.0	79
80	77 36.9	+ 48.6	54.0	78 10.5	+ 50.9	57.9	78 40.6	+ 53.2	62.1	79 06.5	+ 55.4	66.7	79 27.9	+ 57.2	71.6	79 44.1	+ 58.8	76.9	79 55.0	+ 59.6	82.4	80 00.0	+ 60.0	88.0	80
81	78 25.5	*+ 46.6* •	51.2	79 01.4	+ 49.3	55.2	79 33.8	+ 51.9	59.7	80 01.9	+ 54.3	64.6	80 25.1	+ 56.6	69.9	80 42.9	+ 58.4	75.7	80 54.6	+ 59.6	81.7	81 00.0	+ 60.0	88.0	81
82	79 12.1	*+ 44.4* •	47.9	79 50.7	*+ 47.2* •	52.1	80 25.7	+ 50.1	56.8	80 56.2	+ 53.1	62.0	81 21.7	+ 55.8	67.8	81 41.3	+ 58.0	74.2	81 54.2	+ 59.5	81.0	82 00.0	+ 60.0	88.0	82
83	79 56.5	*+ 41.4* •	44.2	80 37.9	*+ 44.6* •	48.4	81 15.8	*+ 48.0* •	53.3	81 49.3	*+ 51.4* •	58.9	82 17.5	+ 54.6	65.2	82 39.3	+ 57.3	72.3	82 53.7	+ 59.3	80.0	83 00.0	+ 60.0	88.0	83
84	80 37.9	*+ 37.9* •	39.9	81 22.5	*+ 41.3* •	44.2	82 03.8	*+ 44.9* •	49.2	82 40.7	*+ 48.8* •	55.0	83 12.1	*+ 52.8* •	61.9	83 36.6	+ 56.5	69.8	83 53.0	+ 59.0	78.6	84 00.0	+ 60.0	88.0	84
85	81 15.8	*+ 33.5* •	35.0	82 03.8	*+ 36.9* •	39.1	82 48.7	*+ 40.8* •	44.1	83 29.5	*+ 45.4* •	50.2	84 04.9	*+ 50.2* •	57.6	84 33.1	*+ 54.9* •	66.5	84 52.0	+ 58.6	76.8	85 00.0	+ 60.0	88.0	85
86	81 49.3	*+ 28.2* •	29.3	82 40.7	*+ 31.4* •	33.2	83 29.5	*+ 35.4* •	38.0	84 14.9	*+ 40.2* •	44.1	84 55.1	*+ 46.0* •	51.9	85 28.0	*+ 52.2* •	61.9	85 50.6	+ 57.7	74.1	86 00.0	+ 60.0	88.0	86
87	82 17.5	*+ 21.8* •	23.0	83 12.1	*+ 24.5* •	26.2	84 04.9	*+ 28.2* •	30.5	84 55.1	*+ 32.9* •	36.2	85 41.1	*+ 39.1* •	44.0	86 20.2	*+ 47.2* •	55.0	86 48.3	*+ 55.7* •	69.8	87 00.0	+ 60.0	88.0	87
88	82 39.3	*+ 14.4* •	15.8	83 36.6	*+ 16.4* •	18.3	84 33.1	*+ 18.9* •	21.6	85 28.0	*+ 22.6* •	26.2	86 20.2	*+ 28.1* •	33.1	87 07.4	*+ 36.6* •	44.0	87 44.0	*+ 49.7* •	61.9	88 00.0	+ 60.0	88.0	88
89	82 53.7	*+ 6.3* •	8.1	83 53.0	*+ 7.0* •	9.4	84 52.0	*+ 8.0* •	11.2	85 50.6	*+ 9.4* •	13.9	86 48.3	*+ 11.7* •	18.2	87 44.0	*+ 16.0* •	26.2	88 33.7	*+ 26.3* •	44.0	89 00.0	+ 60.0	88.0	89
90	83 00.0	*– 2.2* •	0.0	84 00.0	*– 2.9* •	0.0	85 00.0	*– 3.9* •	0.0	86 00.0	*– 5.3* •	0.0	87 00.0	*– 7.7* •	0.0	88 00.0	*– 12.3* •	0.0	89 00.0	*– 23.4* •	0.0	90 00.0	– 60.0	44.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 92°, 268°

89°, 271° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

	83°			84°			85°			86°			87°			88°			89°			90°			
Dec.	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Hc**	**d**	**Z**	**Dec.**
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 07.3	+59.6	91.0	0 06.3	+59.6	91.0	0 05.2	+59.8	91.0	0 04.2	+59.8	91.0	0 03.1	+60.0	91.0	0 02.1	+60.0	91.0	0 01.0	+60.0	91.0	0 00.0	+60.0	91.0	**0**
1	1 06.9	+59.5	90.9	1 05.9	+59.7	90.9	1 05.0	+59.8	90.9	1 04.0	+59.9	90.9	1 03.1	+59.9	90.9	1 02.1	+59.9	91.0	1 01.0	+60.0	91.0	1 00.0	+60.0	91.0	**1**
2	2 06.4	+59.6	90.7	2 05.6	+59.7	90.8	2 04.8	+59.7	90.8	2 03.9	+59.8	90.9	2 03.0	+59.9	90.9	2 02.0	+60.0	90.9	2 01.0	+60.0	91.0	2 00.0	+60.0	91.0	**2**
3	3 06.0	+59.5	90.6	3 05.3	+59.7	90.7	3 04.5	+59.8	90.7	3 03.7	+59.9	90.8	3 02.9	+59.9	90.8	3 02.0	+59.9	90.9	3 01.0	+60.0	90.9	3 00.0	+60.0	91.0	**3**
4	4 05.5	+59.6	90.5	4 05.0	+59.6	90.6	4 04.3	+59.8	90.6	4 03.6	+59.9	90.7	4 02.8	+59.9	90.8	4 01.9	+60.0	90.9	4 01.0	+60.0	90.9	4 00.0	+60.0	91.0	**4**
5	5 05.1	+59.5	90.4	5 04.6	+59.7	90.5	5 04.1	+59.8	90.6	5 03.5	+59.8	90.6	5 02.7	+59.9	90.7	5 01.9	+60.0	90.8	5 01.0	+60.0	90.9	5 00.0	+60.0	91.0	**5**
6	6 04.6	+59.6	90.3	6 04.3	+59.7	90.4	6 03.9	+59.7	90.5	6 03.3	+59.9	90.6	6 02.6	+60.0	90.7	6 01.9	+59.9	90.8	6 01.0	+60.0	90.9	6 00.0	+60.0	91.0	**6**
7	7 04.2	+59.5	90.1	7 04.0	+59.6	90.3	7 03.6	+59.8	90.4	7 03.2	+59.8	90.5	7 02.6	+59.9	90.6	7 01.8	+60.0	90.8	7 01.0	+60.0	90.9	7 00.0	+60.0	91.0	**7**
8	8 03.7	+59.6	90.0	8 03.6	+59.7	90.2	8 03.4	+59.8	90.3	8 03.0	+59.9	90.4	8 02.5	+59.9	90.6	8 01.8	+60.0	90.7	8 01.0	+60.0	90.9	8 00.0	+60.0	91.0	**8**
9	9 03.3	+59.5	89.9	9 03.3	+59.7	90.0	9 03.2	+59.7	90.2	9 02.9	+59.8	90.4	9 02.4	+59.9	90.5	9 01.8	+59.9	90.7	9 01.0	+60.0	90.8	9 00.0	+60.0	91.0	**9**
10	10 02.8	+59.5	89.8	10 03.0	+59.6	89.9	10 02.9	+59.8	90.1	10 02.7	+59.9	90.3	10 02.3	+59.9	90.5	10 01.7	+60.0	90.6	10 01.0	+59.9	90.8	10 00.0	+60.0	91.0	**10**
11	11 02.3	+59.6	89.6	11 02.6	+59.7	89.8	11 02.7	+59.7	90.0	11 02.6	+59.8	90.2	11 02.2	+59.9	90.4	11 01.7	+59.9	90.6	11 00.9	+60.0	90.8	11 00.0	+60.0	91.0	**11**
12	12 01.9	+59.5	89.5	12 02.3	+59.6	89.7	12 02.4	+59.8	89.9	12 02.4	+59.9	90.1	12 02.1	+60.0	90.4	12 01.6	+60.0	90.6	12 00.9	+60.0	90.8	12 00.0	+60.0	91.0	**12**
13	13 01.4	+59.5	89.4	13 01.9	+59.7	89.6	13 02.2	+59.8	89.8	13 02.3	+59.8	90.1	13 02.1	+59.9	90.3	13 01.6	+60.0	90.5	13 00.9	+60.0	90.8	13 00.0	+60.0	91.0	**13**
14	14 00.9	+59.5	89.3	14 01.6	+59.6	89.5	14 02.0	+59.7	89.8	14 02.1	+59.8	90.0	14 02.0	+59.9	90.3	14 01.6	+59.9	90.5	14 00.9	+60.0	90.8	14 00.0	+60.0	91.0	**14**
15	15 00.4	+59.6	89.1	15 01.2	+59.7	89.4	15 01.7	+59.8	89.7	15 01.9	+59.9	89.9	15 01.9	+59.9	90.2	15 01.5	+60.0	90.5	15 00.9	+60.0	90.7	15 00.0	+60.0	91.0	**15**
16	16 00.0	+59.5	89.0	16 00.9	+59.6	89.3	16 01.5	+59.7	89.6	16 01.8	+59.8	89.9	16 01.8	+59.9	90.1	16 01.5	+60.0	90.4	16 00.9	+60.0	90.7	16 00.0	+60.0	91.0	**16**
17	16 59.5	+59.5	88.9	17 00.5	+59.7	89.2	17 01.2	+59.8	89.5	17 01.6	+59.9	89.8	17 01.7	+59.9	90.1	17 01.5	+59.9	90.4	17 00.9	+60.0	90.7	17 00.0	+60.0	91.0	**17**
18	17 59.0	+59.5	88.7	18 00.2	+59.6	89.0	18 01.0	+59.7	89.4	18 01.5	+59.8	89.7	18 01.6	+59.9	90.0	18 01.4	+60.0	90.3	18 00.9	+60.0	90.7	18 00.0	+60.0	91.0	**18**
19	18 58.5	+59.5	88.6	18 59.8	+59.6	88.9	19 00.7	+59.8	89.3	19 01.3	+59.8	89.6	19 01.5	+59.9	90.0	19 01.4	+59.9	90.3	19 00.9	+60.0	90.7	19 00.0	+60.0	91.0	**19**
20	19 58.0	+59.5	88.5	19 59.4	+59.6	88.8	20 00.5	+59.7	89.2	20 01.1	+59.9	89.5	20 01.4	+59.9	89.9	20 01.3	+60.0	90.3	20 00.9	+59.9	90.6	20 00.0	+60.0	91.0	**20**
21	20 57.5	+59.5	88.3	20 59.0	+59.7	88.7	21 00.2	+59.7	89.1	21 01.0	+59.8	89.5	21 01.3	+59.9	89.8	21 01.3	+59.9	90.2	21 00.8	+60.0	90.6	21 00.0	+60.0	91.0	**21**
22	21 57.0	+59.4	88.2	21 58.7	+59.6	88.6	21 59.9	+59.8	89.0	22 00.8	+59.8	89.4	22 01.2	+59.9	89.8	22 01.2	+60.0	90.2	22 00.8	+60.0	90.6	22 00.0	+60.0	91.0	**22**
23	22 56.4	+59.5	88.0	22 58.3	+59.6	88.5	22 59.7	+59.7	88.9	23 00.6	+59.9	89.3	23 01.1	+59.9	89.7	23 01.2	+60.0	90.2	23 00.8	+60.0	90.6	23 00.0	+60.0	91.0	**23**
24	23 55.9	+59.5	87.9	23 57.9	+59.6	88.3	23 59.4	+59.7	88.8	24 00.5	+59.8	89.2	24 01.0	+59.9	89.7	24 01.2	+59.9	90.1	24 00.8	+60.0	90.6	24 00.0	+60.0	91.0	**24**
25	24 55.4	+59.4	87.7	24 57.5	+59.6	88.2	24 59.1	+59.7	88.7	25 00.3	+59.8	89.1	25 00.9	+59.9	89.6	25 01.1	+60.0	90.1	25 00.8	+60.0	90.5	25 00.0	+60.0	91.0	**25**
26	25 54.8	+59.5	87.6	25 57.1	+59.6	88.1	25 58.8	+59.8	88.6	26 00.1	+59.8	89.0	26 00.8	+59.9	89.5	26 01.1	+59.9	90.0	26 00.8	+60.0	90.5	26 00.0	+60.0	91.0	**26**
27	26 54.3	+59.4	87.4	26 56.7	+59.6	87.9	26 58.6	+59.7	88.5	26 59.9	+59.8	89.0	27 00.7	+59.9	89.5	27 01.0	+60.0	90.0	27 00.8	+60.0	90.5	27 00.0	+60.0	91.0	**27**
28	27 53.7	+59.4	87.3	27 56.3	+59.5	87.8	27 58.3	+59.7	88.3	27 59.7	+59.8	88.9	28 00.6	+59.9	89.4	28 01.0	+59.9	89.9	28 00.8	+60.0	90.5	28 00.0	+60.0	91.0	**28**
29	28 53.1	+59.4	87.1	28 55.8	+59.6	87.7	28 58.0	+59.7	88.2	28 59.5	+59.9	88.8	29 00.5	+59.9	89.3	29 00.9	+60.0	89.9	29 00.8	+59.9	90.4	29 00.0	+60.0	91.0	**29**
30	29 52.5	+59.4	87.0	29 55.4	+59.6	87.5	29 57.7	+59.7	88.1	29 59.4	+59.8	88.7	30 00.4	+59.9	89.3	30 00.9	+59.9	89.8	30 00.7	+60.0	90.4	30 00.0	+60.0	91.0	**30**
31	30 51.9	+59.4	86.8	30 55.0	+59.5	87.4	30 57.4	+59.7	88.0	30 59.2	+59.8	88.6	31 00.3	+59.9	89.2	31 00.8	+60.0	89.8	31 00.7	+60.0	90.4	31 00.0	+60.0	91.0	**31**
32	31 51.3	+59.4	86.6	31 54.5	+59.5	87.3	31 57.1	+59.6	87.9	31 59.0	+59.7	88.5	32 00.2	+59.9	89.1	32 00.8	+59.9	89.7	32 00.7	+60.0	90.4	32 00.0	+60.0	91.0	**32**
33	32 50.7	+59.3	86.5	32 54.0	+59.6	87.1	32 56.7	+59.7	87.8	32 58.7	+59.8	88.4	33 00.1	+59.9	89.1	33 00.7	+60.0	89.7	33 00.7	+60.0	90.4	33 00.0	+60.0	91.0	**33**
34	33 50.0	+59.4	86.3	33 53.6	+59.5	87.0	33 56.4	+59.7	87.6	33 58.5	+59.8	88.3	34 00.0	+59.8	89.0	34 00.7	+59.9	89.7	34 00.7	+60.0	90.3	34 00.0	+60.0	91.0	**34**
35	34 49.4	+59.3	86.1	34 53.1	+59.5	86.8	34 56.1	+59.6	87.5	34 58.3	+59.8	88.2	34 59.8	+59.9	88.9	35 00.6	+60.0	89.6	35 00.7	+60.0	90.3	35 00.0	+60.0	91.0	**35**
36	35 48.7	+59.3	85.9	35 52.6	+59.5	86.6	35 55.7	+59.7	87.4	35 58.1	+59.8	88.1	35 59.7	+59.9	88.8	36 00.6	+59.9	89.5	36 00.7	+60.0	90.3	36 00.0	+60.0	91.0	**36**
37	36 48.0	+59.3	85.7	36 52.1	+59.5	86.5	36 55.4	+59.6	87.2	36 57.9	+59.7	88.0	36 59.6	+59.9	88.7	37 00.5	+60.0	89.5	37 00.7	+59.9	90.2	37 00.0	+60.0	91.0	**37**
38	37 47.3	+59.3	85.5	37 51.6	+59.4	86.3	37 55.0	+59.6	87.1	37 57.6	+59.8	87.9	37 59.5	+59.8	88.7	38 00.5	+59.9	89.4	38 00.6	+60.0	90.2	38 00.0	+60.0	91.0	**38**
39	38 46.6	+59.2	85.3	38 51.0	+59.5	86.1	38 54.6	+59.7	87.0	38 57.4	+59.8	87.8	38 59.3	+59.9	88.6	39 00.4	+59.9	89.4	39 00.6	+60.0	90.2	39 00.0	+60.0	91.0	**39**
40	39 45.8	+59.3	85.1	39 50.5	+59.4	86.0	39 54.3	+59.6	86.8	39 57.2	+59.7	87.6	39 59.2	+59.8	88.5	40 00.3	+60.0	89.3	40 00.6	+60.0	90.2	40 00.0	+60.0	91.0	**40**
41	40 45.1	+59.2	84.9	40 49.9	+59.4	85.8	40 53.9	+59.6	86.7	40 56.9	+59.7	87.5	40 59.0	+59.9	88.4	41 00.3	+59.9	89.3	41 00.6	+60.0	90.1	41 00.0	+60.0	91.0	**41**
42	41 44.3	+59.2	84.7	41 49.3	+59.4	85.6	41 53.5	+59.5	86.5	41 56.6	+59.8	87.4	41 58.9	+59.8	88.3	42 00.2	+59.9	89.2	42 00.6	+60.0	90.1	42 00.0	+60.0	91.0	**42**
43	42 43.5	+59.1	84.5	42 48.7	+59.4	85.4	42 53.0	+59.6	86.3	42 56.4	+59.7	87.3	42 58.7	+59.9	88.2	43 00.1	+60.0	89.1	43 00.6	+59.9	90.1	43 00.0	+60.0	91.0	**43**
44	43 42.6	+59.1	84.3	43 48.1	+59.4	85.2	43 52.6	+59.6	86.2	43 56.1	+59.7	87.1	43 58.6	+59.8	88.1	44 00.1	+59.9	89.1	44 00.5	+60.0	90.0	44 00.0	+60.0	91.0	**44**
45	44 41.7	+59.1	84.0	44 47.5	+59.3	85.0	44 52.2	+59.5	86.0	44 55.8	+59.7	87.0	44 58.4	+59.9	88.0	45 00.0	+59.9	89.0	45 00.5	+60.0	90.0	45 00.0	+60.0	91.0	**45**
46	45 40.8	+59.1	83.8	45 46.8	+59.3	84.8	45 51.7	+59.5	85.8	45 55.5	+59.7	86.9	45 58.3	+59.8	87.9	45 59.9	+59.9	88.9	46 00.5	+60.0	90.0	46 00.0	+60.0	91.0	**46**
47	46 39.9	+59.0	83.5	46 46.1	+59.3	84.6	46 51.2	+59.5	85.6	46 55.2	+59.7	86.7	46 58.1	+59.8	87.8	46 59.8	+60.0	88.9	47 00.5	+60.0	89.9	47 00.0	+60.0	91.0	**47**
48	47 38.9	+59.0	83.3	47 45.4	+59.2	84.4	47 50.7	+59.5	85.5	47 54.9	+59.7	86.6	47 57.9	+59.8	87.7	47 59.8	+59.9	88.8	48 00.5	+59.9	89.9	48 00.0	+60.0	91.0	**48**
49	48 37.9	+59.0	83.0	48 44.6	+59.3	84.1	48 50.2	+59.5	85.3	48 54.6	+59.6	86.4	48 57.7	+59.8	87.6	48 59.7	+59.9	88.7	49 00.4	+60.0	89.8	49 00.0	+60.0	91.0	**49**
50	49 36.9	+58.9	82.7	49 43.9	+59.2	83.9	49 49.7	+59.4	85.1	49 54.2	+59.7	86.2	49 57.5	+59.8	87.4	49 59.6	+59.9	88.6	50 00.4	+60.0	89.8	50 00.0	+60.0	91.0	**50**
51	50 35.8	+58.8	82.4	50 43.1	+59.1	83.6	50 49.1	+59.4	84.8	50 53.9	+59.6	86.1	50 57.3	+59.8	87.3	50 59.5	+59.9	88.5	51 00.4	+60.0	89.8	51 00.0	+60.0	91.0	**51**
52	51 34.6	+58.8	82.1	51 42.2	+59.1	83.4	51 48.5	+59.4	84.6	51 53.5	+59.6	85.9	51 57.1	+59.8	87.2	51 59.4	+59.9	88.4	52 00.4	+60.0	89.7	52 00.0	+60.0	91.0	**52**
53	52 33.4	+58.8	81.8	52 41.3	+59.1	83.1	52 47.9	+59.4	84.4	52 53.1	+59.6	85.7	52 56.9	+59.8	87.0	52 59.3	+59.9	88.3	53 00.4	+59.9	89.7	53 00.0	+60.0	91.0	**53**
54	53 32.2	+58.7	81.4	53 40.4	+59.1	82.8	53 47.3	+59.3	84.1	53 52.7	+59.5	85.5	53 56.7	+59.7	86.9	53 59.2	+59.9	88.2	54 00.3	+60.0	89.6	54 00.0	+60.0	91.0	**54**
55	54 30.9	+58.6	81.1	54 39.5	+59.0	82.5	54 46.6	+59.3	83.9	54 52.2	+59.6	85.3	54 56.4	+59.8	86.7	54 59.1	+59.9	88.1	55 00.3	+60.0	89.6	55 00.0	+60.0	91.0	**55**
56	55 29.5	+58.6	80.7	55 38.5	+58.9	82.2	55 45.9	+59.2	83.6	55 51.8	+59.5	85.1	55 56.2	+59.7	86.6	55 59.0	+59.9	88.0	56 00.3	+59.9	89.5	56 00.0	+60.0	91.0	**56**
57	56 28.1	+58.5	80.3	56 37.4	+58.9	81.8	56 45.1	+59.3	83.3	56 51.3	+59.5	84.9	56 55.9	+59.7	86.4	56 58.9	+59.8	87.9	57 00.2	+60.0	89.5	57 00.0	+60.0	91.0	**57**
58	57 26.6	+58.4	79.9	57 36.3	+58.8	81.5	57 44.4	+59.1	83.0	57 50.8	+59.5	84.6	57 55.6	+59.7	86.2	57 58.7	+59.9	87.8	58 00.2	+60.0	89.4	58 00.0	+60.0	91.0	**58**
59	58 25.0	+58.3	79.5	58 35.1	+58.7	81.1	58 43.5	+59.1	82.7	58 50.3	+59.4	84.4	58 55.3	+59.7	86.0	58 58.6	+59.9	87.7	59 00.2	+59.9	89.3	59 00.0	+60.0	91.0	**59**
60	59 23.3	+58.2	79.0	59 33.8	+58.7	80.7	59 42.6	+59.1	82.4	59 49.7	+59.4	84.1	59 55.0	+59.6	85.8	59 58.5	+59.8	87.5	60 00.1	+60.0	89.3	60 00.0	+60.0	91.0	**60**
61	60 21.5	+58.1	78.5	60 32.5	+58.6	80.3	60 41.7	+59.0	82.0	60 49.1	+59.4	83.8	60 54.6	+59.7	85.6	60 58.3	+59.9	87.4	61 00.1	+60.0	89.2	61 00.0	+60.0	91.0	**61**
62	61 19.6	+57.9	78.0	61 31.1	+58.5	79.8	61 40.7	+59.0	81.7	61 48.5	+59.3	83.5	61 54.3	+59.6	85.4	61 58.2	+59.8	87.2	62 00.1	+59.9	89.1	62 00.0	+60.0	91.0	**62**
63	62 17.5	+57.9	77.5	62 29.6	+58.4	79.4	62 39.7	+58.8	81.3	62 47.8	+59.3	83.2	62 53.9	+59.6	85.1	62 58.0	+59.8	87.1	63 00.0	+60.0	89.0	63 00.0	+60.0	91.0	**63**
64	63 15.4	+57.6	76.9	63 28.0	+58.2	78.9	63 38.5	+58.8	80.8	63 47.1	+59.2	82.8	63 53.5	+59.6	84.9	63 57.8	+59.8	86.9	64 00.0	+59.9	88.9	64 00.0	+60.0	91.0	**64**
65	64 13.0	+57.6	76.3	64 26.2	+58.2	78.3	64 37.3	+58.7	80.4	64 46.3	+59.1	82.5	64 53.1	+59.5	84.6	64 57.6	+59.8	86.7	64 59.9	+60.0	88.9	65 00.0	+60.0	91.0	**65**
66	65 10.6	+57.3	75.6	65 24.4	+58.0	77.7	65 36.0	+58.6	79.9	65 45.4	+59.1	82.1	65 52.6	+59.5	84.3	65 57.4	+59.8	86.5	65 59.9	+59.9	88.8	66 00.0	+60.0	91.0	**66**
67	66 07.9	+57.1	74.9	66 22.4	+57.8	77.1	66 34.6	+58.5	79.4	66 44.5	+59.1	81.6	66 52.1	+59.4	84.0	66 57.2	+59.7	86.3	66 59.8	+60.0	88.6	67 00.0	+60.0	91.0	**67**
68	67 05.0	+56.8	74.1	67 20.2	+57.7	76.4	67 33.1	+58.4	78.8	67 43.6	+58.9	81.2	67 51.5	+59.4	83.6	67 56.9	+59.7	86.1	67 59.8	+59.9	88.5	68 00.0	+60.0	91.0	**68**
69	68 01.8	+56.6	73.3	68 17.9	+57.4	75.7	68 31.5	+58.2	78.2	68 42.5	+58.8	80.7	68 50.9	+59.3	83.2	68 56.6	+59.7	85.8	68 59.7	+59.9	88.4	69 00.0	+60.0	91.0	**69**
70	68 58.4	+56.3	72.4	69 15.3	+57.2	74.9	69 29.7	+58.0	77.5	69 41.3	+58.7	80.1	69 50.2	+59.3	82.8	69 56.3	+59.7	85.5	69 59.6	+59.9	88.3	70 00.0	+60.0	91.0	**70**
71	69 54.7	+55.9	71.4	70 12.5	+57.0	74.0	70 27.7	+57.8	76.7	70 40.0	+58.6	79.5	70 49.5	+59.2	82.3	70 56.0	+59.7	85.2	70 59.5	+59.9	88.1	71 00.0	+60.0	91.0	**71**
72	70 50.6	+55.5	70.3	71 09.5	+56.6	73.1	71 25.5	+57.6	75.9	71 38.6	+58.4	78.8	71 48.7	+59.1	81.8	71 55.7	+59.6	84.9	71 59.4	+59.9	87.9	72 00.0	+60.0	91.0	**72**
73	71 46.1	+55.0	69.1	72 06.1	+56.2	72.0	72 23.1	+57.3	75.0	72 37.0	+58.3	78.1	72 47.8	+59.0	81.3	72 55.3	+59.5	84.5	72 59.3	+59.9	87.7	73 00.0	+60.0	91.0	**73**
74	72 41.1	+54.4	67.8	73 02.3	+55.8	70.9	73 20.4	+57.0	74.0	73 35.3	+58.0	77.3	73 46.8	+58.9	80.6	73 54.8	+59.5	84.0	73 59.2	+59.9	87.5	74 00.0	+60.0	91.0	**74**
75	73 35.5	+53.8	66.4	73 58.1	+55.2	69.6	74 17.4	+56.6	72.9	74 33.3	+57.8	76.3	74 45.7	+58.7	79.9	74 54.3	+59.4	83.6	74 59.1	+59.8	87.3	75 00.0	+60.0	91.0	**75**
76	74 29.3	+53.0	64.8	74 53.3	+54.7	68.1	75 14.0	+56.1	71.6	75 31.1	+57.4	75.3	75 44.4	+58.5	79.1	75 53.7	+59.4	83.0	75 58.9	+59.9	87.0	76 00.0	+60.0	91.0	**76**
77	75 22.3	+52.1	62.9	75 48.0	+53.8	66.5	76 10.1	+55.6	70.2	76 28.5	+57.1	74.1	76 42.9	+58.3	78.2	76 53.1	+59.2	82.4	76 58.8	+59.8	86.7	77 00.0	+60.0	91.0	**77**
78	76 14.4	+50.9	60.9	76 41.8	+53.0	64.6	77 05.7	+54.9	68.6	77 25.6	+56.6	72.7	77 41.2	+58.0	77.1	77 52.3	+59.1	81.7	77 58.6	+59.8	86.3	78 00.0	+60.0	91.0	**78**
79	77 05.3	+49.6	58.6	77 34.8	+51.8	62.5	78 00.6	+54.0	66.7	78 22.2	+55.9	71.1	78 39.2	+57.7	75.9	78 51.4	+58.9	80.8	78 58.4	+59.7	85.9	79 00.0	+60.0	91.0	**79**
80	77 54.9	+47.9	56.0	78 26.6	+50.5	60.1	78 54.6	+52.9	64.5	79 18.1	+55.2	69.3	79 36.9	+57.1	74.4	79 50.3	+58.7	79.8	79 58.1	+59.6	85.3	80 00.0	+60.0	91.0	**80**
81	78 42.8	*+45.8*•	53.0	79 17.1	*+48.7*•	57.3	79 47.5	+51.4	61.9	80 13.3	+54.2	67.1	80 34.0	+56.5	72.6	80 49.0	+58.4	78.5	80 57.7	+59.6	84.7	81 00.0	+60.0	91.0	**81**
82	79 28.6	*+43.4*•	49.6	80 05.8	*+46.4*•	54.0	80 38.9	*+49.7*•	58.9	81 07.5	+52.7	64.4	81 30.5	+55.6	70.5	81 47.4	+57.9	77.0	81 57.3	+59.5	83.9	82 00.0	+60.0	91.0	**82**
83	80 12.0	*+40.2*•	45.7	80 52.2	*+43.6*•	50.2	81 28.6	*+47.2*•	55.3	82 00.2	*+50.9*•	61.2	82 26.1	+54.4	67.8	82 45.3	+57.3	75.1	82 56.8	+59.3	82.9	83 00.0	+60.0	91.0	**83**
84	80 52.2	*+36.4*•	41.2	81 35.8	*+40.0*•	45.7	82 15.8	*+43.9*•	50.9	82 51.1	*+48.2*•	57.1	83 20.5	*+52.5*•	64.3	83 42.6	+56.3	72.5	83 56.1	+59.0	81.5	84 00.0	+60.0	91.0	**84**
85	81 28.6	*+31.6*•	36.0	82 15.8	*+35.3*•	40.3	82 59.7	*+39.6*•	45.6	83 39.3	*+44.4*•	52.0	84 13.0	*+49.6*•	59.8	84 38.9	*+54.7*•	69.1	84 55.1	+58.5	79.7	85 00.0	+60.0	91.0	**85**
86	82 00.2	*+25.9*•	30.1	82 51.1	*+29.4*•	34.1	83 39.3	*+33.7*•	39.1	84 23.7	*+38.9*•	45.6	85 02.6	*+45.1*•	53.8	85 33.6	*+51.8*•	64.3	85 53.6	+57.7	76.9	86 00.0	+60.0	91.0	**86**
87	82 26.1	*+19.2*•	23.4	83 20.5	*+22.1*•	26.8	84 13.0	*+25.9*•	31.3	85 02.6	*+31.0*•	37.3	85 47.7	*+37.7*•	45.5	86 25.4	*+46.4*•	57.0	86 51.3	*+55.5*•	72.5	87 00.0	+60.0	91.0	**87**
88	82 45.3	*+11.5*•	16.1	83 42.6	*+13.5*•	18.6	84 38.9	*+16.2*•	22.0	85 33.6	*+20.0*•	26.8	86 25.4	*+25.9*•	34.0	87 11.8	*+35.0*•	45.5	87 46.8	*+49.1*•	64.2	88 00.0	+60.0	91.0	**88**
89	82 56.8	*+3.2*•	8.2	83 56.1	*+3.9*•	9.5	84 55.1	*+4.9*•	11.4	85 53.6	*+6.4*•	14.1	86 51.3	*+8.7*•	18.5	87 46.8	*+13.2*•	26.8	88 35.9	*+24.1*•	45.5	89 00.0	+60.0	91.0	**89**
90	83 00.0	*–5.3*•	0.0	84 00.0	*–6.0*•	0.0	85 00.0	*–7.0*•	0.0	86 00.0	*–8.4*•	0.0	87 00.0	*–10.7*•	0.0	88 00.0	*–15.1*•	0.0	89 00.0	*–25.6*•	0.0	90 00.0	–60.0	45.5	**90**
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 89°, 271°

Dec.	83°			84°			85°			86°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	0 07.3	–59.5	91.0	0 06.3	–59.7	91.0	0 05.2	–59.7	91.0	0 04.2	–59.9	91.0
1	0 52.2	+59.6	88.9	0 53.4	+59.7	88.9	0 54.5	+59.8	88.9	0 55.7	+59.8	88.9
2	1 51.8	+59.5	88.8	1 53.1	+59.6	88.8	1 54.3	+59.8	88.8	1 55.5	+59.9	88.9
3	2 51.3	+59.6	88.6	2 52.7	+59.7	88.7	2 54.1	+59.8	88.7	2 55.4	+59.8	88.8
4	3 50.9	+59.5	88.5	3 52.4	+59.7	88.6	3 53.9	+59.7	88.7	3 55.2	+59.9	88.7
5	4 50.4	+59.6	88.4	4 52.1	+59.7	88.5	4 53.6	+59.8	88.6	4 55.1	+59.8	88.7
6	5 50.0	+59.5	88.3	5 51.8	+59.6	88.4	5 53.4	+59.8	88.5	5 54.9	+59.9	88.6
7	6 49.5	+59.6	88.2	6 51.4	+59.7	88.3	6 53.2	+59.7	88.4	6 54.8	+59.8	88.5
8	7 49.1	+59.5	88.0	7 51.1	+59.6	88.2	7 52.9	+59.8	88.3	7 54.6	+59.9	88.4
9	8 48.6	+59.6	87.9	8 50.7	+59.7	88.1	8 52.7	+59.8	88.2	8 54.5	+59.8	88.4
10	9 48.2	+59.5	87.8	9 50.4	+59.7	88.0	9 52.5	+59.7	88.1	9 54.3	+59.9	88.3
11	10 47.7	+59.5	87.7	10 50.1	+59.6	87.8	10 52.2	+59.8	88.0	10 54.2	+59.8	88.2
12	11 47.2	+59.6	87.5	11 49.7	+59.7	87.7	11 52.0	+59.8	87.9	11 54.0	+59.9	88.2
13	12 46.8	+59.5	87.4	12 49.4	+59.6	87.6	12 51.8	+59.7	87.9	12 53.9	+59.8	88.1
14	13 46.3	+59.5	87.3	13 49.0	+59.7	87.5	13 51.5	+59.8	87.8	13 53.7	+59.9	88.0
15	14 45.8	+59.5	87.1	14 48.7	+59.6	87.4	14 51.3	+59.7	87.7	14 53.6	+59.8	87.9
16	15 45.3	+59.6	87.0	15 48.3	+59.7	87.3	15 51.0	+59.8	87.6	15 53.4	+59.9	87.9
17	16 44.9	+59.5	86.9	16 48.0	+59.6	87.2	16 50.8	+59.7	87.5	16 53.3	+59.8	87.8
18	17 44.4	+59.5	86.7	17 47.6	+59.7	87.1	17 50.5	+59.8	87.4	17 53.1	+59.8	87.7
19	18 43.9	+59.5	86.6	18 47.3	+59.6	86.9	18 50.3	+59.7	87.3	18 52.9	+59.9	87.6
20	19 43.4	+59.5	86.5	19 46.9	+59.6	86.8	19 50.0	+59.8	87.2	19 52.8	+59.8	87.5
21	20 42.9	+59.5	86.3	20 46.5	+59.6	86.7	20 49.8	+59.7	87.1	20 52.6	+59.8	87.5
22	21 42.4	+59.4	86.2	21 46.1	+59.6	86.6	21 49.5	+59.7	87.0	21 52.4	+59.9	87.4
23	22 41.8	+59.5	86.0	22 45.7	+59.7	86.5	22 49.2	+59.8	86.9	22 52.3	+59.8	87.3
24	23 41.3	+59.5	85.9	23 45.4	+59.6	86.3	23 49.0	+59.7	86.8	23 52.1	+59.8	87.2
25	24 40.8	+59.4	85.8	24 45.0	+59.6	86.2	24 48.7	+59.7	86.7	24 51.9	+59.8	87.1
26	25 40.2	+59.5	85.6	25 44.6	+59.6	86.1	25 48.4	+59.7	86.6	25 51.7	+59.9	87.1
27	26 39.7	+59.4	85.5	26 44.2	+59.5	86.0	26 48.1	+59.7	86.5	26 51.6	+59.8	87.0
28	27 39.1	+59.4	85.3	27 43.7	+59.6	85.8	27 47.8	+59.7	86.4	27 51.4	+59.8	86.9
29	28 38.5	+59.4	85.1	28 43.3	+59.6	85.7	28 47.5	+59.7	86.2	28 51.2	+59.8	86.8
30	29 37.9	+59.4	85.0	29 42.9	+59.5	85.6	29 47.2	+59.7	86.1	29 51.0	+59.8	86.7
31	30 37.3	+59.4	84.8	30 42.4	+59.6	85.4	30 46.9	+59.7	86.0	30 50.8	+59.8	86.6
32	31 36.7	+59.4	84.7	31 42.0	+59.5	85.3	31 46.6	+59.7	85.9	31 50.6	+59.8	86.5
33	32 36.1	+59.4	84.5	32 41.5	+59.6	85.1	32 46.3	+59.7	85.8	32 50.4	+59.8	86.4
34	33 35.5	+59.3	84.3	33 41.1	+59.5	85.0	33 46.0	+59.6	85.6	33 50.2	+59.8	86.3
35	34 34.8	+59.3	84.1	34 40.6	+59.5	84.8	34 45.6	+59.7	85.5	34 50.0	+59.7	86.2
36	35 34.1	+59.4	84.0	35 40.1	+59.5	84.7	35 45.3	+59.6	85.4	35 49.7	+59.8	86.1
37	36 33.5	+59.3	83.8	36 39.6	+59.5	84.5	36 44.9	+59.7	85.3	36 49.5	+59.8	86.0
38	37 32.8	+59.2	83.6	37 39.1	+59.4	84.3	37 44.6	+59.6	85.1	37 49.3	+59.7	85.9
39	38 32.0	+59.3	83.4	38 38.5	+59.5	84.2	38 44.2	+59.6	85.0	38 49.0	+59.8	85.8
40	39 31.3	+59.2	83.2	39 38.0	+59.4	84.0	39 43.8	+59.6	84.8	39 48.8	+59.8	85.7
41	40 30.5	+59.2	83.0	40 37.4	+59.4	83.8	40 43.4	+59.6	84.7	40 48.6	+59.7	85.5
42	41 29.7	+59.2	82.8	41 36.8	+59.4	83.6	41 43.0	+59.6	84.5	41 48.3	+59.7	85.4
43	42 28.9	+59.2	82.5	42 36.2	+59.4	83.4	42 42.6	+59.6	84.4	42 48.0	+59.7	85.3
44	43 28.1	+59.1	82.3	43 35.6	+59.4	83.3	43 42.2	+59.5	84.2	43 47.7	+59.8	85.2
45	44 27.2	+59.1	82.1	44 35.0	+59.3	83.0	44 41.7	+59.6	84.0	44 47.5	+59.7	85.0
46	45 26.3	+59.1	81.8	45 34.3	+59.3	82.8	45 41.3	+59.5	83.9	45 47.2	+59.7	84.9
47	46 25.4	+59.0	81.6	46 33.6	+59.3	82.6	46 40.8	+59.5	83.7	46 46.9	+59.6	84.7
48	47 24.4	+59.0	81.3	47 32.9	+59.3	82.4	47 40.3	+59.5	83.5	47 46.5	+59.7	84.6
49	48 23.4	+59.0	81.0	48 32.2	+59.2	82.2	48 39.8	+59.5	83.3	48 46.2	+59.7	84.4
50	49 22.4	+58.9	80.8	49 31.4	+59.2	81.9	49 39.3	+59.4	83.1	49 45.9	+59.6	84.3
51	50 21.3	+58.9	80.5	50 30.6	+59.2	81.7	50 38.7	+59.4	82.9	50 45.5	+59.6	84.1
52	51 20.2	+58.8	80.2	51 29.8	+59.1	81.4	51 38.1	+59.4	82.7	51 45.1	+59.6	83.9
53	52 19.0	+58.8	79.8	52 28.9	+59.1	81.1	52 37.5	+59.4	82.4	52 44.7	+59.6	83.7
54	53 17.8	+58.7	79.5	53 28.0	+59.1	80.8	53 36.9	+59.3	82.2	53 44.3	+59.6	83.5
55	54 16.5	+58.6	79.2	54 27.1	+59.0	80.5	54 36.2	+59.3	81.9	54 43.9	+59.6	83.3
56	55 15.1	+58.6	78.8	55 26.1	+58.9	80.2	55 35.5	+59.3	81.7	55 43.5	+59.5	83.1
57	56 13.7	+58.5	78.4	56 25.0	+58.9	79.9	56 34.8	+59.2	81.4	56 43.0	+59.5	82.9
58	57 12.2	+58.4	78.0	57 23.9	+58.8	79.5	57 34.0	+59.2	81.1	57 42.5	+59.5	82.6
59	58 10.6	+58.4	77.6	58 22.7	+58.8	79.2	58 33.2	+59.1	80.8	58 42.0	+59.4	82.4
60	59 09.0	+58.2	77.1	59 21.5	+58.7	78.8	59 32.3	+59.1	80.4	59 41.4	+59.4	82.1
61	60 07.2	+58.1	76.7	60 20.2	+58.6	78.4	60 31.4	+59.0	80.1	60 40.8	+59.4	81.8
62	61 05.3	+58.0	76.1	61 18.8	+58.5	77.9	61 30.4	+59.0	79.7	61 40.2	+59.3	81.5
63	62 03.3	+57.9	75.6	62 17.3	+58.4	77.5	62 29.4	+58.8	79.3	62 39.5	+59.3	81.2
64	63 01.2	+57.7	75.0	63 15.7	+58.3	77.0	63 28.2	+58.9	78.9	63 38.8	+59.2	80.9
65	63 58.9	+57.6	74.4	64 14.0	+58.2	76.4	64 27.1	+58.7	78.5	64 38.0	+59.2	80.5
66	64 56.5	+57.3	73.8	65 12.2	+58.0	75.8	65 25.8	+58.6	78.0	65 37.2	+59.1	80.1
67	65 53.8	+57.2	73.1	66 10.2	+57.9	75.2	66 24.4	+58.5	77.4	66 36.3	+59.0	79.7
68	66 51.0	+56.9	72.3	67 08.1	+57.7	74.6	67 22.9	+58.4	76.9	67 35.3	+59.0	79.2
69	67 47.9	+56.7	71.5	68 05.8	+57.5	73.8	68 21.3	+58.2	76.3	68 34.3	+58.8	78.7
70	68 44.6	+56.3	70.6	69 03.3	+57.2	73.1	69 19.5	+58.0	75.6	69 33.1	+58.7	78.2
71	69 40.9	+56.0	69.6	70 00.5	+57.0	72.2	70 17.5	+57.9	74.9	70 31.8	+58.6	77.6
72	70 36.9	+55.6	68.6	70 57.5	+56.7	71.3	71 15.4	+57.6	74.1	71 30.4	+58.5	76.9
73	71 32.5	+55.1	67.4	71 54.2	+56.3	70.2	72 13.0	+57.4	73.2	72 28.9	+58.3	76.2
74	72 27.6	+54.6	66.1	72 50.5	+55.9	69.1	73 10.4	+57.0	72.2	73 27.2	+58.0	75.4
75	73 22.2	+54.0	64.7	73 46.4	+55.4	67.8	74 07.4	+56.7	71.1	74 25.2	+57.8	74.5
76	74 16.2	+53.2	63.2	74 41.8	+54.7	66.4	75 04.1	+56.2	69.8	75 23.0	+57.5	73.4
77	75 09.4	+52.3	61.4	75 36.5	+54.1	64.8	76 00.3	+55.7	68.4	76 20.5	+57.1	72.3
78	76 01.7	+51.2	59.4	76 30.6	+53.2	63.0	76 56.0	+55.0	66.9	77 17.6	+56.7	70.9
79	76 52.9	+49.9	57.2	77 23.8	+52.1	61.0	77 51.0	+54.2	65.0	78 14.3	+56.1	69.4
80	77 42.8	+48.4	54.7	78 15.9	+50.7	58.6	78 45.2	+53.1	62.9	79 10.4	+55.3	67.6
81	78 31.2	*+46.4* •	51.8	79 06.6	+49.1	55.9	79 38.3	+51.8	60.4	80 05.7	+54.3	65.4
82	79 17.6	*+44.0* •	48.5	79 55.7	*+47.0* •	52.7	80 30.1	*+49.9* •	57.5	81 00.0	+52.9	62.8
83	80 01.6	*+41.1* •	44.7	80 42.7	*+44.2* •	49.0	81 20.0	*+47.7* •	54.0	81 52.9	*+51.2* •	59.6
84	80 42.7	*+37.3* •	40.4	81 26.9	*+40.8* •	44.7	82 07.7	*+44.6* •	49.7	82 44.1	*+48.6* •	55.7
85	81 20.0	*+32.9* •	35.3	82 07.7	*+36.4* •	39.5	82 52.3	*+40.4* •	44.6	83 32.7	*+45.1* •	50.8
86	81 52.9	*+27.5* •	29.6	82 44.1	*+30.8* •	33.5	83 32.7	*+34.9* •	38.3	84 17.8	*+39.8* •	44.6
87	82 20.4	*+20.9* •	23.1	83 14.9	*+23.7* •	26.4	84 07.6	*+27.4* •	30.8	84 57.6	*+32.2* •	36.6
88	82 41.3	*+13.4* •	15.9	83 38.6	*+15.4* •	18.4	84 35.0	*+18.0* •	21.7	85 29.8	*+21.8* •	26.4
89	82 54.7	*+5.3* •	8.1	83 54.0	*+6.0* •	9.5	84 53.0	*+7.0* •	11.3	85 51.6	*+8.4* •	14.0
90	83 00.0	*–3.2* •	0.0	84 00.0	*–3.9* •	0.0	85 00.0	*–4.9* •	0.0	86 00.0	*–6.4* •	0.0
	83°			84°			85°			86°		

87°			88°			89°			90°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0 03.1	–59.9	91.0	0 02.1	–60.0	91.0	0 01.0	–59.9	91.0	0 00.0	+60.0	89.0	0
0 56.8	+59.9	88.9	0 57.9	+59.9	89.0	0 58.9	+60.0	89.0	1 00.0	+60.0	89.0	1
1 56.7	+59.9	88.9	1 57.8	+60.0	88.9	1 58.9	+60.0	89.0	2 00.0	+60.0	89.0	2
2 56.6	+59.9	88.8	2 57.8	+60.0	88.9	2 58.9	+60.0	88.9	3 00.0	+60.0	89.0	3
3 56.5	+59.9	88.8	3 57.8	+59.9	88.9	3 58.9	+60.0	88.9	4 00.0	+60.0	89.0	4
4 56.4	+60.0	88.7	4 57.7	+60.0	88.8	4 58.9	+60.0	88.9	5 00.0	+60.0	89.0	5
5 56.4	+59.9	88.7	5 57.7	+59.9	88.8	5 58.9	+60.0	88.9	6 00.0	+60.0	89.0	6
6 56.3	+59.9	88.6	6 57.6	+60.0	88.8	6 58.9	+60.0	88.9	7 00.0	+60.0	89.0	7
7 56.2	+59.9	88.6	7 57.6	+60.0	88.7	7 58.9	+60.0	88.9	8 00.0	+60.0	89.0	8
8 56.1	+59.9	88.5	8 57.6	+59.9	88.7	8 58.9	+60.0	88.8	9 00.0	+60.0	89.0	9
9 56.0	+59.9	88.5	9 57.5	+60.0	88.6	9 58.9	+60.0	88.8	10 00.0	+60.0	89.0	10
10 55.9	+60.0	88.4	10 57.5	+60.0	88.6	10 58.9	+59.9	88.8	11 00.0	+60.0	89.0	11
11 55.9	+59.9	88.4	11 57.5	+59.9	88.6	11 58.8	+60.0	88.8	12 00.0	+60.0	89.0	12
12 55.8	+59.9	88.3	12 57.4	+60.0	88.5	12 58.8	+60.0	88.8	13 00.0	+60.0	89.0	13
13 55.7	+59.9	88.3	13 57.4	+59.9	88.5	13 58.8	+60.0	88.8	14 00.0	+60.0	89.0	14
14 55.6	+59.9	88.2	14 57.3	+60.0	88.5	14 58.8	+60.0	88.7	15 00.0	+60.0	89.0	15
15 55.5	+59.9	88.1	15 57.3	+60.0	88.4	15 58.8	+60.0	88.7	16 00.0	+60.0	89.0	16
16 55.4	+59.9	88.1	16 57.3	+59.9	88.4	16 58.8	+60.0	88.7	17 00.0	+60.0	89.0	17
17 55.3	+59.9	88.0	17 57.2	+60.0	88.4	17 58.8	+60.0	88.7	18 00.0	+60.0	89.0	18
18 55.2	+59.9	88.0	18 57.2	+59.9	88.3	18 58.8	+60.0	88.7	19 00.0	+60.0	89.0	19
19 55.1	+60.0	87.9	19 57.1	+60.0	88.3	19 58.8	+60.0	88.6	20 00.0	+60.0	89.0	20
20 55.1	+59.9	87.9	20 57.1	+60.0	88.2	20 58.8	+59.9	88.6	21 00.0	+60.0	89.0	21
21 55.0	+59.9	87.8	21 57.1	+59.9	88.2	21 58.7	+60.0	88.6	22 00.0	+60.0	89.0	22
22 54.9	+59.9	87.7	22 57.0	+60.0	88.2	22 58.7	+60.0	88.6	23 00.0	+60.0	89.0	23
23 54.8	+59.9	87.7	23 57.0	+59.9	88.1	23 58.7	+60.0	88.6	24 00.0	+60.0	89.0	24
24 54.7	+59.9	87.6	24 56.9	+60.0	88.1	24 58.7	+60.0	88.5	25 00.0	+60.0	89.0	25
25 54.6	+59.9	87.5	25 56.9	+59.9	88.0	25 58.7	+60.0	88.5	26 00.0	+60.0	89.0	26
26 54.5	+59.9	87.5	26 56.8	+60.0	88.0	26 58.7	+60.0	88.5	27 00.0	+60.0	89.0	27
27 54.4	+59.9	87.4	27 56.8	+59.9	87.9	27 58.7	+60.0	88.5	28 00.0	+60.0	89.0	28
28 54.3	+59.8	87.3	28 56.7	+60.0	87.9	28 58.7	+60.0	88.4	29 00.0	+60.0	89.0	29
29 54.1	+59.9	87.3	29 56.7	+59.9	87.8	29 58.7	+59.9	88.4	30 00.0	+60.0	89.0	30
30 54.0	+59.9	87.2	30 56.6	+60.0	87.8	30 58.6	+60.0	88.4	31 00.0	+60.0	89.0	31
31 53.9	+59.9	87.1	31 56.6	+59.9	87.8	31 58.6	+60.0	88.4	32 00.0	+60.0	89.0	32
32 53.8	+59.9	87.1	32 56.5	+60.0	87.7	32 58.6	+60.0	88.4	33 00.0	+60.0	89.0	33
33 53.7	+59.9	87.0	33 56.5	+59.9	87.7	33 58.6	+60.0	88.3	34 00.0	+60.0	89.0	34
34 53.6	+59.8	86.9	34 56.4	+60.0	87.6	34 58.6	+60.0	88.3	35 00.0	+60.0	89.0	35
35 53.4	+59.9	86.8	35 56.4	+59.9	87.5	35 58.6	+60.0	88.3	36 00.0	+60.0	89.0	36
36 53.3	+59.9	86.7	36 56.3	+60.0	87.5	36 58.6	+59.9	88.2	37 00.0	+60.0	89.0	37
37 53.2	+59.9	86.7	37 56.3	+59.9	87.4	37 58.5	+60.0	88.2	38 00.0	+60.0	89.0	38
38 53.1	+59.8	86.6	38 56.2	+60.0	87.4	38 58.5	+60.0	88.2	39 00.0	+60.0	89.0	39
39 52.9	+59.9	86.5	39 56.2	+59.9	87.3	39 58.5	+60.0	88.2	40 00.0	+60.0	89.0	40
40 52.8	+59.8	86.4	40 56.1	+59.9	87.3	40 58.5	+60.0	88.1	41 00.0	+60.0	89.0	41
41 52.6	+59.9	86.3	41 56.0	+60.0	87.2	41 58.5	+60.0	88.1	42 00.0	+60.0	89.0	42
42 52.5	+59.8	86.2	42 56.0	+59.9	87.1	42 58.5	+59.9	88.1	43 00.0	+60.0	89.0	43
43 52.3	+59.9	86.1	43 55.9	+59.9	87.1	43 58.4	+60.0	88.0	44 00.0	+60.0	89.0	44
44 52.2	+59.8	86.0	44 55.8	+59.9	87.0	44 58.4	+60.0	88.0	45 00.0	+60.0	89.0	45
45 52.0	+59.8	85.9	45 55.7	+60.0	86.9	45 58.4	+60.0	88.0	46 00.0	+60.0	89.0	46
46 51.8	+59.8	85.8	46 55.7	+59.9	86.9	46 58.4	+60.0	87.9	47 00.0	+60.0	89.0	47
47 51.6	+59.9	85.7	47 55.6	+59.9	86.8	47 58.4	+60.0	87.9	48 00.0	+60.0	89.0	48
48 51.5	+59.8	85.6	48 55.5	+59.9	86.7	48 58.4	+59.9	87.9	49 00.0	+60.0	89.0	49
49 51.3	+59.8	85.4	49 55.4	+59.9	86.6	49 58.3	+60.0	87.8	50 00.0	+60.0	89.0	50
50 51.1	+59.7	85.3	50 55.3	+59.9	86.5	50 58.3	+60.0	87.8	51 00.0	+60.0	89.0	51
51 50.8	+59.8	85.2	51 55.2	+59.9	86.4	51 58.3	+60.0	87.7	52 00.0	+60.0	89.0	52
52 50.6	+59.8	85.0	52 55.1	+59.9	86.4	52 58.3	+59.9	87.7	53 00.0	+60.0	89.0	53
53 50.4	+59.8	84.9	53 55.0	+59.9	86.3	53 58.2	+60.0	87.6	54 00.0	+60.0	89.0	54
54 50.2	+59.7	84.7	54 54.9	+59.9	86.2	54 58.2	+60.0	87.6	55 00.0	+60.0	89.0	55
55 49.9	+59.7	84.6	55 54.8	+59.9	86.0	55 58.2	+59.9	87.5	56 00.0	+60.0	89.0	56
56 49.6	+59.7	84.4	56 54.7	+59.9	85.9	56 58.1	+60.0	87.5	57 00.0	+60.0	89.0	57
57 49.3	+59.7	84.2	57 54.6	+59.8	85.8	57 58.1	+60.0	87.4	58 00.0	+60.0	89.0	58
58 49.0	+59.7	84.0	58 54.4	+59.9	85.7	58 58.1	+59.9	87.3	59 00.0	+60.0	89.0	59
59 48.7	+59.7	83.8	59 54.3	+59.8	85.5	59 58.0	+60.0	87.3	60 00.0	+60.0	89.0	60
60 48.4	+59.6	83.6	60 54.1	+59.9	85.4	60 58.0	+60.0	87.2	61 00.0	+60.0	89.0	61
61 48.0	+59.7	83.4	61 54.0	+59.8	85.3	61 58.0	+59.9	87.1	62 00.0	+60.0	89.0	62
62 47.7	+59.5	83.1	62 53.8	+59.8	85.1	62 57.9	+60.0	87.0	63 00.0	+60.0	89.0	63
63 47.2	+59.6	82.9	63 53.6	+59.8	84.9	63 57.9	+59.9	87.0	64 00.0	+60.0	89.0	64
64 46.8	+59.5	82.6	64 53.4	+59.8	84.7	64 57.8	+60.0	86.9	65 00.0	+60.0	89.0	65
65 46.3	+59.5	82.3	65 53.2	+59.8	84.5	65 57.8	+59.9	86.8	66 00.0	+60.0	89.0	66
66 45.8	+59.5	82.0	66 53.0	+59.7	84.3	66 57.7	+60.0	86.6	67 00.0	+60.0	89.0	67
67 45.3	+59.4	81.6	67 52.7	+59.8	84.1	67 57.7	+59.9	86.5	68 00.0	+60.0	89.0	68
68 44.7	+59.3	81.3	68 52.5	+59.7	83.8	68 57.6	+59.9	86.4	69 00.0	+60.0	89.0	69
69 44.0	+59.3	80.8	69 52.2	+59.7	83.5	69 57.5	+59.9	86.3	70 00.0	+60.0	89.0	70
70 43.3	+59.2	80.4	70 51.9	+59.6	83.2	70 57.4	+59.9	86.1	71 00.0	+60.0	89.0	71
71 42.5	+59.1	79.9	71 51.5	+59.6	82.9	71 57.3	+59.9	85.9	72 00.0	+60.0	89.0	72
72 41.6	+59.0	79.3	72 51.1	+59.5	82.5	72 57.2	+59.9	85.7	73 00.0	+60.0	89.0	73
73 40.6	+58.9	78.7	73 50.6	+59.5	82.1	73 57.1	+59.9	85.5	74 00.0	+60.0	89.0	74
74 39.5	+58.7	78.0	74 50.1	+59.5	81.6	74 57.0	+59.9	85.3	75 00.0	+60.0	89.0	75
75 38.2	+58.6	77.2	75 49.6	+59.3	81.1	75 56.9	+59.8	85.0	76 00.0	+60.0	89.0	76
76 36.8	+58.3	76.3	76 48.9	+59.3	80.4	76 56.7	+59.8	84.7	77 00.0	+60.0	89.0	77
77 35.1	+58.1	75.2	77 48.2	+59.1	79.7	77 56.5	+59.8	84.3	78 00.0	+60.0	89.0	78
78 33.2	+57.6	74.0	78 47.3	+58.9	78.9	78 56.3	+59.7	83.9	79 00.0	+60.0	89.0	79
79 30.8	+57.3	72.6	79 46.2	+58.7	77.8	79 56.0	+59.7	83.4	80 00.0	+60.0	89.0	80
80 28.1	+56.5	70.8	80 44.9	+58.4	76.6	80 55.7	+59.6	82.7	81 00.0	+60.0	89.0	81
81 24.6	+55.8	68.7	81 43.3	+58.0	75.1	81 55.3	+59.4	81.9	82 00.0	+60.0	89.0	82
82 20.4	+54.5	66.1	82 41.3	+57.3	73.2	82 54.7	+59.3	80.9	83 00.0	+60.0	89.0	83
83 14.9	*+52.7* •	62.7	83 38.6	+56.4	70.7	83 54.0	+59.0	79.6	84 00.0	+60.0	89.0	84
84 07.6	*+50.0* •	58.4	84 35.0	*+54.8* •	67.4	84 53.0	+58.6	77.8	85 00.0	+60.0	89.0	85
84 57.6	*+45.7* •	52.5	85 29.8	*+52.2* •	62.7	85 51.6	+57.7	75.0	86 00.0	+60.0	89.0	86
85 43.3	*+38.7* •	44.5	86 22.0	*+46.8* •	55.6	86 49.3	*+55.6* •	70.7	87 00.0	+60.0	89.0	87
86 22.0	*+27.3* •	33.4	87 08.8	*+36.1* •	44.5	87 44.9	*+49.5* •	62.6	88 00.0	+60.0	89.0	88
86 49.3	*+10.7* •	18.3	87 44.9	*+15.1* •	26.4	88 34.4	*+25.6* •	44.5	89 00.0	+60.0	89.0	89
87 00.0	*–8.7* •	0.0	88 00.0	*–13.2* •	0.0	89 00.0	*–24.1* •	0.0	90 00.0	–60.0	44.5	90
87°			88°			89°			90°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 91°, 269°

90°, 270° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 00.0	+59.6	90.0	0 00.0	+59.7	90.0	0 00.0	+59.8	90.0	0 00.0	+59.9	90.0	0 00.0	+59.9	90.0	0 00.0	+60.0	90.0	0 00.0	+60.0	90.0	0 00.0	+60.0	90.0	0
1	0 59.6	+59.5	89.9	0 59.7	+59.6	89.9	0 59.8	+59.7	89.9	0 59.9	+59.8	89.9	0 59.9	+59.9	89.9	1 00.0	+59.9	90.0	1 00.0	+60.0	90.0	1 00.0	+60.0	90.0	1
2	1 59.1	+59.6	89.8	1 59.3	+59.7	89.8	1 59.5	+59.8	89.8	1 59.7	+59.9	89.9	1 59.8	+60.0	89.9	1 59.9	+60.0	89.9	2 00.0	+60.0	90.0	2 00.0	+60.0	90.0	2
3	2 58.7	+59.5	89.6	2 59.0	+59.7	89.7	2 59.3	+59.8	89.7	2 59.6	+59.8	89.8	2 59.8	+59.9	89.8	2 59.9	+60.0	89.9	3 00.0	+60.0	89.9	3 00.0	+60.0	90.0	3
4	3 58.2	+59.6	89.5	3 58.7	+59.7	89.6	3 59.1	+59.8	89.7	3 59.4	+59.9	89.7	3 59.7	+59.9	89.8	3 59.9	+59.9	89.9	4 00.0	+60.0	89.9	4 00.0	+60.0	90.0	4
5	4 57.8	+59.5	89.4	4 58.4	+59.6	89.5	4 58.9	+59.7	89.6	4 59.3	+59.8	89.7	4 59.6	+59.9	89.7	4 59.8	+60.0	89.8	5 00.0	+59.9	89.9	5 00.0	+60.0	90.0	5
6	5 57.3	+59.6	89.3	5 58.0	+59.7	89.4	5 58.6	+59.8	89.5	5 59.1	+59.9	89.6	5 59.5	+59.9	89.7	5 59.8	+59.9	89.8	5 59.9	+60.0	89.9	6 00.0	+60.0	90.0	6
7	6 56.9	+59.5	89.1	6 57.7	+59.7	89.3	6 58.4	+59.8	89.4	6 59.0	+59.8	89.5	6 59.4	+59.9	89.6	6 59.7	+60.0	89.8	6 59.9	+60.0	89.9	7 00.0	+60.0	90.0	7
8	7 56.4	+59.5	89.0	7 57.4	+59.6	89.2	7 58.2	+59.7	89.3	7 58.8	+59.9	89.4	7 59.3	+60.0	89.6	7 59.7	+60.0	89.7	7 59.9	+60.0	89.9	8 00.0	+60.0	90.0	8
9	8 55.9	+59.6	88.9	8 57.0	+59.7	89.1	8 57.9	+59.8	89.2	8 58.7	+59.8	89.4	8 59.3	+59.9	89.5	8 59.7	+59.9	89.7	8 59.9	+60.0	89.8	9 00.0	+60.0	90.0	9
10	9 55.5	+59.5	88.8	9 56.7	+59.6	88.9	9 57.7	+59.8	89.1	9 58.5	+59.9	89.3	9 59.2	+59.9	89.5	9 59.6	+60.0	89.6	9 59.9	+60.0	89.8	10 00.0	+60.0	90.0	10
11	10 55.0	+59.6	88.6	10 56.3	+59.7	88.8	10 57.5	+59.7	89.0	10 58.4	+59.8	89.2	10 59.1	+59.9	89.4	10 59.6	+60.0	89.6	10 59.9	+60.0	89.8	11 00.0	+60.0	90.0	11
12	11 54.6	+59.5	88.5	11 56.0	+59.7	88.7	11 57.2	+59.8	88.9	11 58.2	+59.9	89.2	11 59.0	+59.9	89.4	11 59.6	+59.9	89.6	11 59.9	+60.0	89.8	12 00.0	+60.0	90.0	12
13	12 54.1	+59.5	88.4	12 55.7	+59.6	88.6	12 57.0	+59.7	88.8	12 58.1	+59.8	89.1	12 58.9	+59.9	89.3	12 59.5	+60.0	89.5	12 59.9	+60.0	89.8	13 00.0	+60.0	90.0	13
14	13 53.6	+59.5	88.3	13 55.3	+59.7	88.5	13 56.7	+59.8	88.8	13 57.9	+59.9	89.0	13 58.8	+59.9	89.3	13 59.5	+59.9	89.5	13 59.9	+60.0	89.8	14 00.0	+60.0	90.0	14
15	14 53.1	+59.6	88.1	14 55.0	+59.6	88.4	14 56.5	+59.7	88.7	14 57.8	+59.8	88.9	14 58.7	+59.9	89.2	14 59.4	+60.0	89.5	14 59.9	+59.9	89.7	15 00.0	+60.0	90.0	15
16	15 52.7	+59.5	88.0	15 54.6	+59.6	88.3	15 56.2	+59.8	88.6	15 57.6	+59.8	88.9	15 58.6	+60.0	89.1	15 59.4	+60.0	89.4	15 59.8	+60.0	89.7	16 00.0	+60.0	90.0	16
17	16 52.2	+59.5	87.9	16 54.2	+59.7	88.2	16 56.0	+59.8	88.5	16 57.4	+59.9	88.8	16 58.6	+59.9	89.1	16 59.4	+59.9	89.4	16 59.8	+60.0	89.7	17 00.0	+60.0	90.0	17
18	17 51.7	+59.5	87.7	17 53.9	+59.6	88.1	17 55.8	+59.7	88.4	17 57.3	+59.8	88.7	17 58.5	+59.9	89.0	17 59.3	+60.0	89.4	17 59.8	+60.0	89.7	18 00.0	+60.0	90.0	18
19	18 51.2	+59.5	87.6	18 53.5	+59.6	87.9	18 55.5	+59.7	88.3	18 57.1	+59.9	88.6	18 58.4	+59.9	89.0	18 59.3	+59.9	89.3	18 59.8	+60.0	89.7	19 00.0	+60.0	90.0	19
20	19 50.7	+59.5	87.5	19 53.1	+59.7	87.8	19 55.2	+59.8	88.2	19 57.0	+59.8	88.5	19 58.3	+59.9	88.9	19 59.2	+60.0	89.3	19 59.8	+60.0	89.6	20 00.0	+60.0	90.0	20
21	20 50.2	+59.5	87.3	20 52.8	+59.6	87.7	20 55.0	+59.7	88.1	20 56.8	+59.8	88.5	20 58.2	+59.9	88.8	20 59.2	+60.0	89.2	20 59.8	+60.0	89.6	21 00.0	+60.0	90.0	21
22	21 49.7	+59.4	87.2	21 52.4	+59.6	87.6	21 54.7	+59.7	88.0	21 56.6	+59.8	88.4	21 58.1	+59.9	88.8	21 59.2	+59.9	89.2	21 59.8	+60.0	89.6	22 00.0	+60.0	90.0	22
23	22 49.1	+59.5	87.0	22 52.0	+59.6	87.5	22 54.4	+59.8	87.9	22 56.4	+59.9	88.3	22 58.0	+59.9	88.7	22 59.1	+60.0	89.2	22 59.8	+60.0	89.6	23 00.0	+60.0	90.0	23
24	23 48.6	+59.5	86.9	23 51.6	+59.6	87.3	23 54.2	+59.7	87.8	23 56.3	+59.8	88.2	23 57.9	+59.9	88.7	23 59.1	+59.9	89.1	23 59.8	+60.0	89.6	24 00.0	+60.0	90.0	24
25	24 48.1	+59.4	86.7	24 51.2	+59.6	87.2	24 53.9	+59.7	87.7	24 56.1	+59.8	88.1	24 57.8	+59.9	88.6	24 59.0	+60.0	89.1	24 59.8	+59.9	89.5	25 00.0	+60.0	90.0	25
26	25 47.5	+59.5	86.6	25 50.8	+59.6	87.1	25 53.6	+59.7	87.6	25 55.9	+59.8	88.1	25 57.7	+59.9	88.5	25 59.0	+59.9	89.0	25 59.7	+60.0	89.5	26 00.0	+60.0	90.0	26
27	26 47.0	+59.4	86.4	26 50.4	+59.6	87.0	26 53.3	+59.7	87.5	26 55.7	+59.8	88.0	26 57.6	+59.9	88.5	26 58.9	+60.0	89.0	26 59.7	+60.0	89.5	27 00.0	+60.0	90.0	27
28	27 46.4	+59.4	86.3	27 50.0	+59.6	86.8	27 53.0	+59.8	87.3	27 55.5	+59.9	87.9	27 57.5	+59.9	88.4	27 58.9	+59.9	88.9	27 59.7	+60.0	89.5	28 00.0	+60.0	90.0	28
29	28 45.8	+59.4	86.1	28 49.6	+59.5	86.7	28 52.8	+59.7	87.2	28 55.4	+59.8	87.8	28 57.4	+59.9	88.3	28 58.8	+60.0	88.9	28 59.7	+60.0	89.4	29 00.0	+60.0	90.0	29
30	29 45.2	+59.4	86.0	29 49.1	+59.6	86.5	29 52.5	+59.6	87.1	29 55.2	+59.8	87.7	29 57.3	+59.9	88.3	29 58.8	+59.9	88.8	29 59.7	+60.0	89.4	30 00.0	+60.0	90.0	30
31	30 44.6	+59.4	85.8	30 48.7	+59.5	86.4	30 52.1	+59.7	87.0	30 55.0	+59.8	87.6	30 57.2	+59.9	88.2	30 58.7	+60.0	88.8	30 59.7	+60.0	89.4	31 00.0	+60.0	90.0	31
32	31 44.0	+59.4	85.6	31 48.2	+59.6	86.3	31 51.8	+59.7	86.9	31 54.8	+59.8	87.5	31 57.1	+59.8	88.1	31 58.7	+59.9	88.8	31 59.7	+60.0	89.4	32 00.0	+60.0	90.0	32
33	32 43.4	+59.3	85.5	32 47.8	+59.5	86.1	32 51.5	+59.7	86.8	32 54.6	+59.8	87.4	32 56.9	+59.9	88.1	32 58.6	+60.0	88.7	32 59.7	+59.9	89.4	33 00.0	+60.0	90.0	33
34	33 42.7	+59.4	85.3	33 47.3	+59.5	86.0	33 51.2	+59.6	86.6	33 54.4	+59.7	87.3	33 56.8	+59.9	88.0	33 58.6	+59.9	88.7	33 59.6	+60.0	89.3	34 00.0	+60.0	90.0	34
35	34 42.1	+59.3	85.1	34 46.8	+59.5	85.8	34 50.8	+59.7	86.5	34 54.1	+59.8	87.2	34 56.7	+59.9	87.9	34 58.5	+60.0	88.6	34 59.6	+60.0	89.3	35 00.0	+60.0	90.0	35
36	35 41.4	+59.3	84.9	35 46.3	+59.5	85.7	35 50.5	+59.7	86.4	35 53.9	+59.8	87.1	35 56.6	+59.9	87.8	35 58.5	+59.9	88.5	35 59.6	+60.0	89.3	36 00.0	+60.0	90.0	36
37	36 40.7	+59.3	84.8	36 45.8	+59.5	85.5	36 50.2	+59.6	86.2	36 53.7	+59.8	87.0	36 56.5	+59.8	87.7	36 58.4	+60.0	88.5	36 59.6	+60.0	89.2	37 00.0	+60.0	90.0	37
38	37 40.0	+59.3	84.6	37 45.3	+59.5	85.3	37 49.8	+59.6	86.1	37 53.5	+59.7	86.9	37 56.3	+59.9	87.7	37 58.4	+59.9	88.4	37 59.6	+60.0	89.2	38 00.0	+60.0	90.0	38
39	38 39.3	+59.3	84.4	38 44.8	+59.4	85.2	38 49.4	+59.6	86.0	38 53.2	+59.8	86.8	38 56.2	+59.8	87.6	38 58.3	+59.9	88.4	38 59.6	+60.0	89.2	39 00.0	+60.0	90.0	39
40	39 38.6	+59.2	84.2	39 44.2	+59.5	85.0	39 49.0	+59.6	85.8	39 53.0	+59.7	86.7	39 56.0	+59.9	87.5	39 58.2	+60.0	88.3	39 59.6	+59.9	89.2	40 00.0	+60.0	90.0	40
41	40 37.8	+59.2	84.0	40 43.7	+59.4	84.8	40 48.6	+59.6	85.7	40 52.7	+59.8	86.5	40 55.9	+59.9	87.4	40 58.2	+59.9	88.3	40 59.5	+60.0	89.1	41 00.0	+60.0	90.0	41
42	41 37.0	+59.2	83.7	41 43.1	+59.4	84.6	41 48.2	+59.6	85.5	41 52.5	+59.7	86.4	41 55.8	+59.8	87.3	41 58.1	+59.9	88.2	41 59.5	+60.0	89.1	42 00.0	+60.0	90.0	42
43	42 36.2	+59.1	83.5	42 42.5	+59.4	84.4	42 47.8	+59.6	85.4	42 52.2	+59.7	86.3	42 55.6	+59.9	87.2	42 58.0	+60.0	88.1	42 59.5	+60.0	89.1	43 00.0	+60.0	90.0	43
44	43 35.3	+59.2	83.3	43 41.9	+59.3	84.2	43 47.4	+59.5	85.2	43 51.9	+59.7	86.1	43 55.5	+59.8	87.1	43 58.0	+59.9	88.1	43 59.5	+60.0	89.0	44 00.0	+60.0	90.0	44
45	44 34.5	+59.1	83.1	44 41.2	+59.4	84.0	44 46.9	+59.6	85.0	44 51.6	+59.7	86.0	44 55.3	+59.8	87.0	44 57.9	+59.9	88.0	44 59.5	+60.0	89.0	45 00.0	+60.0	90.0	45
46	45 33.6	+59.0	82.8	45 40.6	+59.3	83.8	45 46.5	+59.5	84.8	45 51.3	+59.7	85.9	45 55.1	+59.9	86.9	45 57.8	+60.0	87.9	45 59.5	+59.9	89.0	46 00.0	+60.0	90.0	46
47	46 32.6	+59.1	82.6	46 39.9	+59.3	83.6	46 46.0	+59.5	84.7	46 51.0	+59.7	85.7	46 55.0	+59.8	86.8	46 57.8	+59.9	87.9	46 59.4	+60.0	88.9	47 00.0	+60.0	90.0	47
48	47 31.7	+59.0	82.3	47 39.2	+59.2	83.4	47 45.5	+59.5	84.5	47 50.7	+59.7	85.6	47 54.8	+59.8	86.7	47 57.7	+59.9	87.8	47 59.4	+60.0	88.9	48 00.0	+60.0	90.0	48
49	48 30.7	+58.9	82.0	48 38.4	+59.2	83.1	48 45.0	+59.5	84.3	48 50.4	+59.6	85.4	48 54.6	+59.8	86.6	48 57.6	+59.9	87.7	48 59.4	+60.0	88.8	49 00.0	+60.0	90.0	49
50	49 29.6	+58.9	81.7	49 37.6	+59.2	82.9	49 44.5	+59.4	84.1	49 50.0	+59.7	85.2	49 54.4	+59.8	86.4	49 57.5	+59.9	87.6	49 59.4	+60.0	88.8	50 00.0	+60.0	90.0	50
51	50 28.5	+58.9	81.4	50 36.8	+59.2	82.6	50 43.9	+59.4	83.9	50 49.7	+59.6	85.1	50 54.2	+59.8	86.3	50 57.4	+59.9	87.5	50 59.4	+59.9	88.8	51 00.0	+60.0	90.0	51
52	51 27.4	+58.8	81.1	51 36.0	+59.1	82.4	51 43.3	+59.4	83.6	51 49.3	+59.6	84.9	51 54.0	+59.8	86.2	51 57.3	+59.9	87.4	51 59.3	+60.0	88.7	52 00.0	+60.0	90.0	52
53	52 26.2	+58.8	80.8	52 35.1	+59.1	82.1	52 42.7	+59.4	83.4	52 48.9	+59.6	84.7	52 53.8	+59.7	86.0	52 57.2	+59.9	87.3	52 59.3	+60.0	88.7	53 00.0	+60.0	90.0	53
54	53 25.0	+58.7	80.5	53 34.2	+59.1	81.8	53 42.1	+59.3	83.2	53 48.5	+59.6	84.5	53 53.5	+59.8	85.9	53 57.1	+59.9	87.2	53 59.3	+60.0	88.6	54 00.0	+60.0	90.0	54
55	54 23.7	+58.6	80.1	54 33.3	+58.9	81.5	54 41.4	+59.3	82.9	54 48.1	+59.5	84.3	54 53.3	+59.7	85.7	54 57.0	+59.9	87.1	54 59.3	+59.9	88.6	55 00.0	+60.0	90.0	55
56	55 22.3	+58.6	79.8	55 32.2	+59.0	81.2	55 40.7	+59.2	82.6	55 47.6	+59.5	84.1	55 53.0	+59.8	85.6	55 56.9	+59.9	87.0	55 59.2	+60.0	88.5	56 00.0	+60.0	90.0	56
57	56 20.9	+58.5	79.4	56 31.2	+58.9	80.9	56 39.9	+59.3	82.4	56 47.1	+59.5	83.9	56 52.8	+59.7	85.4	56 56.8	+59.9	86.9	56 59.2	+60.0	88.5	57 00.0	+60.0	90.0	57
58	57 19.4	+58.4	79.0	57 30.1	+58.8	80.5	57 39.2	+59.1	82.1	57 46.6	+59.5	83.6	57 52.5	+59.7	85.2	57 56.7	+59.8	86.8	57 59.2	+59.9	88.4	58 00.0	+60.0	90.0	58
59	58 17.8	+58.3	78.5	58 28.9	+58.7	80.1	58 38.3	+59.2	81.7	58 46.1	+59.4	83.4	58 52.2	+59.7	85.0	58 56.5	+59.9	86.7	58 59.1	+60.0	88.3	59 00.0	+60.0	90.0	59
60	59 16.1	+58.2	78.1	59 27.6	+58.7	79.7	59 37.5	+59.0	81.4	59 45.5	+59.5	83.1	59 51.9	+59.6	84.8	59 56.4	+59.8	86.5	59 59.1	+60.0	88.3	60 00.0	+60.0	90.0	60
61	60 14.3	+58.1	77.6	60 26.3	+58.6	79.3	60 36.5	+59.1	81.1	60 45.0	+59.3	82.8	60 51.5	+59.7	84.6	60 56.2	+59.9	86.4	60 59.1	+59.9	88.2	61 00.0	+60.0	90.0	61
62	61 12.4	+58.0	77.1	61 24.9	+58.5	78.9	61 35.6	+58.9	80.7	61 44.3	+59.3	82.5	61 51.2	+59.6	84.4	61 56.1	+59.8	86.2	61 59.0	+60.0	88.1	62 00.0	+60.0	90.0	62
63	62 10.4	+57.9	76.5	62 23.4	+58.4	78.4	62 34.5	+58.9	80.3	62 43.6	+59.3	82.2	62 50.8	+59.6	84.1	62 55.9	+59.8	86.1	62 59.0	+59.9	88.0	63 00.0	+60.0	90.0	63
64	63 08.3	+57.7	76.0	63 21.8	+58.3	77.9	63 33.4	+58.8	79.9	63 42.9	+59.2	81.9	63 50.4	+59.5	83.9	63 55.7	+59.8	85.9	63 58.9	+60.0	88.0	64 00.0	+60.0	90.0	64
65	64 06.0	+57.5	75.4	64 20.1	+58.2	77.4	64 32.2	+58.7	79.4	64 42.1	+59.2	81.5	64 49.9	+59.6	83.6	64 55.5	+59.8	85.7	64 58.9	+59.9	87.9	65 00.0	+60.0	90.0	65
66	65 03.5	+57.3	74.7	65 18.3	+58.0	76.8	65 30.9	+58.6	78.9	65 41.3	+59.1	81.1	65 49.5	+59.4	83.3	65 55.3	+59.8	85.5	65 58.8	+60.0	87.8	66 00.0	+60.0	90.0	66
67	66 00.8	+57.2	74.0	66 16.3	+57.8	76.2	66 29.5	+58.5	78.4	66 40.4	+59.0	80.7	66 48.9	+59.5	83.0	66 55.1	+59.7	85.3	66 58.8	+59.9	87.6	67 00.0	+60.0	90.0	67
68	66 58.0	+56.9	73.2	67 14.1	+57.7	75.5	67 28.0	+58.3	77.8	67 39.4	+59.0	80.2	67 48.4	+59.4	82.6	67 54.8	+59.8	85.1	67 58.7	+59.9	87.5	68 00.0	+60.0	90.0	68
69	67 54.9	+56.6	72.4	68 11.8	+57.5	74.8	68 26.3	+58.3	77.2	68 38.4	+58.8	79.7	68 47.8	+59.3	82.2	68 54.6	+59.7	84.8	68 58.6	+60.0	87.4	69 00.0	+60.0	90.0	69
70	68 51.5	+56.3	71.5	69 09.3	+57.2	74.0	69 24.6	+58.0	76.5	69 37.2	+58.7	79.2	69 47.1	+59.3	81.8	69 54.3	+59.6	84.5	69 58.6	+59.9	87.3	70 00.0	+60.0	90.0	70
71	69 47.8	+55.9	70.5	70 06.5	+57.0	73.1	70 22.6	+57.8	75.8	70 35.9	+58.6	78.5	70 46.4	+59.2	81.4	70 53.9	+59.7	84.2	70 58.5	+59.9	87.1	71 00.0	+60.0	90.0	71
72	70 43.7	+55.6	69.4	71 03.5	+56.6	72.2	71 20.4	+57.6	75.0	71 34.5	+58.5	77.9	71 45.6	+59.1	80.8	71 53.6	+59.6	83.9	71 58.4	+59.9	86.9	72 00.0	+60.0	90.0	72
73	71 39.3	+55.0	68.3	72 00.1	+56.3	71.1	72 18.0	+57.4	74.1	72 33.0	+58.2	77.1	72 44.7	+59.0	80.3	72 53.2	+59.5	83.5	72 58.3	+59.9	86.7	73 00.0	+60.0	90.0	73
74	72 34.3	+54.6	67.0	72 56.4	+55.8	70.0	73 15.4	+57.0	73.1	73 31.2	+58.1	76.3	73 43.7	+58.9	79.7	73 52.7	+59.5	83.1	73 58.2	+59.8	86.5	74 00.0	+60.0	90.0	74
75	73 28.9	+53.8	65.5	73 52.2	+55.3	68.7	74 12.4	+56.6	72.0	74 29.3	+57.7	75.4	74 42.6	+58.7	78.9	74 52.2	+59.4	82.6	74 58.0	+59.9	86.3	75 00.0	+60.0	90.0	75
76	74 22.7	+53.1	64.0	74 47.5	+54.7	67.3	75 09.0	+56.2	70.7	75 27.0	+57.5	74.4	75 41.3	+58.5	78.1	75 51.6	+59.4	82.0	75 57.9	+59.8	86.0	76 00.0	+60.0	90.0	76
77	75 15.8	+52.2	62.2	75 42.2	+54.0	65.6	76 05.2	+55.6	69.3	76 24.5	+57.1	73.2	76 39.8	+58.4	77.2	76 51.0	+59.2	81.4	76 57.7	+59.8	85.7	77 00.0	+60.0	90.0	77
78	76 08.0	+51.1	60.2	76 36.2	+53.1	63.8	77 00.8	+55.0	67.7	77 21.6	+56.6	71.8	77 38.2	+58.0	76.2	77 50.2	+59.1	80.7	77 57.5	+59.8	85.3	78 00.0	+60.0	90.0	78
79	76 59.1	+49.7	57.9	77 29.3	+51.9	61.7	77 55.8	+54.1	65.8	78 18.2	+56.0	70.3	78 36.2	+57.6	74.9	78 49.3	+58.9	79.8	78 57.3	+59.7	84.9	79 00.0	+60.0	90.0	79
80	77 48.8	+48.2	55.3	78 21.2	+50.6	59.3	78 49.9	+53.0	63.7	79 14.2	+55.3	68.4	79 33.8	+57.2	73.5	79 48.2	+58.7	78.8	79 57.0	+59.7	84.3	80 00.0	+60.0	90.0	80
81	78 37.0	*+46.1* •	52.4	79 11.8	+48.9	56.6	79 42.9	+51.6	61.2	80 09.5	+54.2	66.2	80 31.0	+56.6	71.7	80 46.9	+58.4	77.6	80 56.7	+59.6	83.7	81 00.0	+60.0	90.0	81
82	79 23.1	*+43.7* •	49.1	80 00.7	*+46.7* •	53.4	80 34.5	*+49.8* •	58.2	81 03.7	+52.9	63.6	81 27.6	+55.6	69.6	81 45.3	+58.0	76.1	81 56.3	+59.5	82.9	82 00.0	+60.0	90.0	82
83	80 06.8	*+40.6* •	45.2	80 47.4	*+43.9* •	49.6	81 24.3	*+47.4* •	54.6	81 56.6	*+51.0* •	60.4	82 23.2	+54.5	66.9	82 43.3	+57.3	74.1	82 55.8	+59.3	81.9	83 00.0	+60.0	90.0	83
84	80 47.4	*+36.9* •	40.8	81 31.3	*+40.4* •	45.2	82 11.7	*+44.3* •	50.3	82 47.6	*+48.4* •	56.4	83 17.7	*+52.6* •	63.5	83 40.6	+56.3	71.6	83 55.1	+59.0	80.6	84 00.0	+60.0	90.0	84
85	81 24.3	*+32.3* •	35.7	82 11.7	*+35.9* •	39.9	82 56.0	*+40.0* •	45.1	83 36.0	*+44.7* •	51.4	84 10.3	*+49.8* •	59.1	84 36.9	*+54.8* •	68.3	84 54.1	+58.5	78.7	85 00.0	+60.0	90.0	85
86	81 56.6	*+26.6* •	29.8	82 47.6	*+30.1* •	33.8	83 36.0	*+34.3* •	38.7	84 20.7	*+39.4* •	45.1	85 00.1	*+45.4* •	53.2	85 31.7	*+52.0* •	63.5	85 52.6	+57.7	76.0	86 00.0	+60.0	90.0	86
87	82 23.2	*+20.1* •	23.3	83 17.7	*+22.9* •	26.6	84 10.3	*+26.6* •	31.0	85 00.1	*+31.6* •	36.9	85 45.5	*+38.2* •	45.0	86 23.7	*+46.6* •	56.3	86 50.3	*+55.5* •	71.6	87 00.0	+60.0	90.0	87
88	82 43.3	*+12.5* •	16.0	83 40.6	*+14.5* •	18.5	84 36.9	*+17.2* •	21.8	85 31.7	*+20.9* •	26.6	86 23.7	*+26.6* •	33.7	87 10.3	*+35.5* •	45.0	87 45.8	*+49.3* •	63.4	88 00.0	+60.0	90.0	88
89	82 55.8	*+4.2* •	8.2	83 55.1	*+4.9* •	9.5	84 54.1	*+5.9* •	11.3	85 52.6	*+7.4* •	14.0	86 50.3	*+9.7* •	18.4	87 45.8	*+14.2* •	26.6	88 35.1	*+24.9* •	45.0	89 00.0	+60.0	90.0	89
90	83 00.0	*−4.2* •	0.0	84 00.0	*−4.9* •	0.0	85 00.0	*−5.9* •	0.0	86 00.0	*−7.4* •	0.0	87 00.0	*−9.7* •	0.0	88 00.0	*−14.2* •	0.0	89 00.0	*−24.9* •	0.0	90 00.0	−60.0	45.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

LATITUDE *CONTRARY NAME TO DECLINATION L.H.A. 90°, 270°

Dec.	83°			84°			85°			86°			87°			88°			89°			90°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	0 00.0	+59.6	90.0	0 00.0	+59.7	90.0	0 00.0	+59.8	90.0	0 00.0	+59.9	90.0	0 00.0	+59.9	90.0	0 00.0	+60.0	90.0	0 00.0	+60.0	90.0	0 00.0	+60.0	90.0	0
1	0 59.6	+59.5	89.9	0 59.7	+59.6	89.9	0 59.8	+59.7	89.9	0 59.9	+59.8	89.9	0 59.9	+59.9	89.9	1 00.0	+59.9	90.0	1 00.0	+60.0	90.0	1 00.0	+60.0	90.0	1
2	1 59.1	+59.6	89.8	1 59.3	+59.7	89.8	1 59.5	+59.8	89.8	1 59.7	+59.9	89.9	1 59.8	+60.0	89.9	1 59.9	+60.0	89.9	2 00.0	+60.0	90.0	2 00.0	+60.0	90.0	2
3	2 58.7	+59.5	89.6	2 59.0	+59.7	89.7	2 59.3	+59.8	89.7	2 59.6	+59.8	89.8	2 59.8	+59.9	89.8	2 59.9	+60.0	89.9	3 00.0	+60.0	89.9	3 00.0	+60.0	90.0	3
4	3 58.2	+59.6	89.5	3 58.7	+59.7	89.6	3 59.1	+59.8	89.7	3 59.4	+59.9	89.7	3 59.7	+59.9	89.8	3 59.9	+59.9	89.9	4 00.0	+60.0	89.9	4 00.0	+60.0	90.0	4
5	4 57.8	+59.5	89.4	4 58.4	+59.6	89.5	4 58.9	+59.7	89.6	4 59.3	+59.8	89.7	4 59.6	+59.9	89.7	4 59.8	+60.0	89.8	5 00.0	+59.9	89.9	5 00.0	+60.0	90.0	5
6	5 57.3	+59.6	89.3	5 58.0	+59.7	89.4	5 58.6	+59.8	89.5	5 59.1	+59.9	89.6	5 59.5	+59.9	89.7	5 59.8	+59.9	89.8	5 59.9	+60.0	89.9	6 00.0	+60.0	90.0	6
7	6 56.9	+59.5	89.1	6 57.7	+59.7	89.3	6 58.4	+59.8	89.4	6 59.0	+59.8	89.5	6 59.4	+59.9	89.6	6 59.7	+60.0	89.8	6 59.9	+60.0	89.9	7 00.0	+60.0	90.0	7
8	7 56.4	+59.5	89.0	7 57.4	+59.6	89.2	7 58.2	+59.7	89.3	7 58.8	+59.9	89.4	7 59.3	+60.0	89.6	7 59.7	+60.0	89.7	7 59.9	+60.0	89.9	8 00.0	+60.0	90.0	8
9	8 55.9	+59.6	88.9	8 57.0	+59.7	89.1	8 57.9	+59.8	89.2	8 58.7	+59.8	89.4	8 59.3	+59.9	89.5	8 59.7	+59.9	89.7	8 59.9	+60.0	89.8	9 00.0	+60.0	90.0	9
10	9 55.5	+59.5	88.8	9 56.7	+59.6	88.9	9 57.7	+59.8	89.1	9 58.5	+59.9	89.3	9 59.2	+59.9	89.5	9 59.6	+60.0	89.6	9 59.9	+60.0	89.8	10 00.0	+60.0	90.0	10
11	10 55.0	+59.6	88.6	10 56.3	+59.7	88.8	10 57.5	+59.7	89.0	10 58.4	+59.8	89.2	10 59.1	+59.9	89.4	10 59.6	+60.0	89.6	10 59.9	+60.0	89.8	11 00.0	+60.0	90.0	11
12	11 54.6	+59.5	88.5	11 56.0	+59.7	88.7	11 57.2	+59.8	88.9	11 58.2	+59.9	89.2	11 59.0	+59.9	89.4	11 59.6	+59.9	89.6	11 59.9	+60.0	89.8	12 00.0	+60.0	90.0	12
13	12 54.1	+59.5	88.4	12 55.7	+59.6	88.6	12 57.0	+59.7	88.8	12 58.1	+59.8	89.1	12 58.9	+59.9	89.3	12 59.5	+60.0	89.5	12 59.9	+60.0	89.8	13 00.0	+60.0	90.0	13
14	13 53.6	+59.5	88.3	13 55.3	+59.7	88.5	13 56.7	+59.8	88.8	13 57.9	+59.9	89.0	13 58.8	+59.9	89.3	13 59.5	+59.9	89.5	13 59.9	+60.0	89.8	14 00.0	+60.0	90.0	14
15	14 53.1	+59.6	88.1	14 55.0	+59.6	88.4	14 56.5	+59.7	88.7	14 57.8	+59.8	88.9	14 58.7	+59.9	89.2	14 59.4	+60.0	89.5	14 59.9	+59.9	89.7	15 00.0	+60.0	90.0	15
16	15 52.7	+59.5	88.0	15 54.6	+59.6	88.3	15 56.2	+59.8	88.6	15 57.6	+59.8	88.9	15 58.6	+60.0	89.1	15 59.4	+60.0	89.4	15 59.8	+60.0	89.7	16 00.0	+60.0	90.0	16
17	16 52.2	+59.5	87.9	16 54.2	+59.7	88.2	16 56.0	+59.8	88.5	16 57.4	+59.9	88.8	16 58.6	+59.9	89.1	16 59.4	+59.9	89.4	16 59.8	+60.0	89.7	17 00.0	+60.0	90.0	17
18	17 51.7	+59.5	87.7	17 53.9	+59.6	88.1	17 55.8	+59.7	88.4	17 57.3	+59.8	88.7	17 58.5	+59.9	89.0	17 59.3	+60.0	89.4	17 59.8	+60.0	89.7	18 00.0	+60.0	90.0	18
19	18 51.2	+59.5	87.6	18 53.5	+59.6	87.9	18 55.5	+59.7	88.3	18 57.1	+59.9	88.6	18 58.4	+59.9	89.0	18 59.3	+59.9	89.3	18 59.8	+60.0	89.7	19 00.0	+60.0	90.0	19
20	19 50.7	+59.5	87.5	19 53.1	+59.7	87.8	19 55.2	+59.8	88.2	19 57.0	+59.8	88.5	19 58.3	+59.9	88.9	19 59.2	+60.0	89.3	19 59.8	+60.0	89.6	20 00.0	+60.0	90.0	20
21	20 50.2	+59.5	87.3	20 52.8	+59.6	87.7	20 55.0	+59.7	88.1	20 56.8	+59.8	88.5	20 58.2	+59.9	88.8	20 59.2	+60.0	89.2	20 59.8	+60.0	89.6	21 00.0	+60.0	90.0	21
22	21 49.7	+59.4	87.2	21 52.4	+59.6	87.6	21 54.7	+59.7	88.0	21 56.6	+59.8	88.4	21 58.1	+59.9	88.8	21 59.2	+59.9	89.2	21 59.8	+60.0	89.6	22 00.0	+60.0	90.0	22
23	22 49.1	+59.5	87.0	22 52.0	+59.6	87.5	22 54.4	+59.8	87.9	22 56.4	+59.9	88.3	22 58.0	+59.9	88.7	22 59.1	+60.0	89.2	22 59.8	+60.0	89.6	23 00.0	+60.0	90.0	23
24	23 48.6	+59.5	86.9	23 51.6	+59.6	87.3	23 54.2	+59.7	87.8	23 56.3	+59.8	88.2	23 57.9	+59.9	88.7	23 59.1	+59.9	89.1	23 59.8	+60.0	89.6	24 00.0	+60.0	90.0	24
25	24 48.1	+59.4	86.7	24 51.2	+59.6	87.2	24 53.9	+59.7	87.7	24 56.1	+59.8	88.1	24 57.8	+59.9	88.6	24 59.0	+60.0	89.1	24 59.8	+59.9	89.5	25 00.0	+60.0	90.0	25
26	25 47.5	+59.5	86.6	25 50.8	+59.6	87.1	25 53.6	+59.7	87.6	25 55.9	+59.8	88.1	25 57.7	+59.9	88.5	25 59.0	+59.9	89.0	25 59.7	+60.0	89.5	26 00.0	+60.0	90.0	26
27	26 47.0	+59.4	86.4	26 50.4	+59.6	87.0	26 53.3	+59.7	87.5	26 55.7	+59.8	88.0	26 57.6	+59.9	88.5	26 58.9	+60.0	89.0	26 59.7	+60.0	89.5	27 00.0	+60.0	90.0	27
28	27 46.4	+59.4	86.3	27 50.0	+59.6	86.8	27 53.0	+59.8	87.3	27 55.5	+59.9	87.9	27 57.5	+59.9	88.4	27 58.9	+59.9	88.9	27 59.7	+60.0	89.5	28 00.0	+60.0	90.0	28
29	28 45.8	+59.4	86.1	28 49.6	+59.5	86.7	28 52.8	+59.7	87.2	28 55.4	+59.8	87.8	28 57.4	+59.9	88.3	28 58.8	+60.0	88.9	28 59.7	+60.0	89.4	29 00.0	+60.0	90.0	29
30	29 45.2	+59.4	86.0	29 49.1	+59.6	86.5	29 52.5	+59.6	87.1	29 55.2	+59.8	87.7	29 57.3	+59.9	88.3	29 58.8	+59.9	88.8	29 59.7	+60.0	89.4	30 00.0	+60.0	90.0	30
31	30 44.6	+59.4	85.8	30 48.7	+59.5	86.4	30 52.1	+59.7	87.0	30 55.0	+59.8	87.6	30 57.2	+59.9	88.2	30 58.7	+60.0	88.8	30 59.7	+60.0	89.4	31 00.0	+60.0	90.0	31
32	31 44.0	+59.4	85.6	31 48.2	+59.6	86.3	31 51.8	+59.7	86.9	31 54.8	+59.8	87.5	31 57.1	+59.8	88.1	31 58.7	+59.9	88.8	31 59.7	+60.0	89.4	32 00.0	+60.0	90.0	32
33	32 43.4	+59.3	85.5	32 47.8	+59.5	86.1	32 51.5	+59.7	86.8	32 54.6	+59.8	87.4	32 56.9	+59.9	88.1	32 58.6	+60.0	88.7	32 59.7	+59.9	89.4	33 00.0	+60.0	90.0	33
34	33 42.7	+59.4	85.3	33 47.3	+59.5	86.0	33 51.2	+59.6	86.6	33 54.4	+59.7	87.3	33 56.8	+59.9	88.0	33 58.6	+59.9	88.7	33 59.6	+60.0	89.3	34 00.0	+60.0	90.0	34
35	34 42.1	+59.3	85.1	34 46.8	+59.5	85.8	34 50.8	+59.7	86.5	34 54.1	+59.8	87.2	34 56.7	+59.9	87.9	34 58.5	+60.0	88.6	34 59.6	+60.0	89.3	35 00.0	+60.0	90.0	35
36	35 41.4	+59.3	84.9	35 46.3	+59.5	85.7	35 50.5	+59.7	86.4	35 53.9	+59.8	87.1	35 56.6	+59.9	87.8	35 58.5	+59.9	88.5	35 59.6	+60.0	89.3	36 00.0	+60.0	90.0	36
37	36 40.7	+59.3	84.8	36 45.8	+59.5	85.5	36 50.2	+59.6	86.2	36 53.7	+59.8	87.0	36 56.5	+59.8	87.7	36 58.4	+60.0	88.5	36 59.6	+60.0	89.2	37 00.0	+60.0	90.0	37
38	37 40.0	+59.3	84.6	37 45.3	+59.5	85.3	37 49.8	+59.6	86.1	37 53.5	+59.7	86.9	37 56.3	+59.9	87.7	37 58.4	+59.9	88.4	37 59.6	+60.0	89.2	38 00.0	+60.0	90.0	38
39	38 39.3	+59.3	84.4	38 44.8	+59.4	85.2	38 49.4	+59.6	86.0	38 53.2	+59.8	86.8	38 56.2	+59.8	87.6	38 58.3	+59.9	88.4	38 59.6	+60.0	89.2	39 00.0	+60.0	90.0	39
40	39 38.6	+59.2	84.2	39 44.2	+59.5	85.0	39 49.0	+59.6	85.8	39 53.0	+59.7	86.7	39 56.0	+59.9	87.5	39 58.2	+60.0	88.3	39 59.6	+59.9	89.2	40 00.0	+60.0	90.0	40
41	40 37.8	+59.2	84.0	40 43.7	+59.4	84.8	40 48.6	+59.6	85.7	40 52.7	+59.8	86.5	40 55.9	+59.9	87.4	40 58.2	+59.9	88.3	40 59.5	+60.0	89.1	41 00.0	+60.0	90.0	41
42	41 37.0	+59.2	83.7	41 43.1	+59.4	84.6	41 48.2	+59.6	85.5	41 52.5	+59.7	86.4	41 55.8	+59.8	87.3	41 58.1	+59.9	88.2	41 59.5	+60.0	89.1	42 00.0	+60.0	90.0	42
43	42 36.2	+59.1	83.5	42 42.5	+59.4	84.4	42 47.8	+59.6	85.4	42 52.2	+59.7	86.3	42 55.6	+59.9	87.2	42 58.0	+60.0	88.1	42 59.5	+60.0	89.1	43 00.0	+60.0	90.0	43
44	43 35.3	+59.2	83.3	43 41.9	+59.3	84.2	43 47.4	+59.5	85.2	43 51.9	+59.7	86.1	43 55.5	+59.8	87.1	43 58.0	+59.9	88.1	43 59.5	+60.0	89.0	44 00.0	+60.0	90.0	44
45	44 34.5	+59.1	83.1	44 41.2	+59.4	84.0	44 46.9	+59.6	85.0	44 51.6	+59.7	86.0	44 55.3	+59.8	87.0	44 57.9	+59.9	88.0	44 59.5	+60.0	89.0	45 00.0	+60.0	90.0	45
46	45 33.6	+59.0	82.8	45 40.6	+59.3	83.8	45 46.5	+59.5	84.8	45 51.3	+59.7	85.9	45 55.1	+59.9	86.9	45 57.8	+60.0	87.9	45 59.5	+59.9	89.0	46 00.0	+60.0	90.0	46
47	46 32.6	+59.1	82.6	46 39.9	+59.3	83.6	46 46.0	+59.5	84.7	46 51.0	+59.7	85.7	46 55.0	+59.8	86.8	46 57.8	+59.9	87.9	46 59.4	+60.0	88.9	47 00.0	+60.0	90.0	47
48	47 31.7	+59.0	82.3	47 39.2	+59.2	83.4	47 45.5	+59.5	84.5	47 50.7	+59.7	85.6	47 54.8	+59.8	86.7	47 57.7	+59.9	87.8	47 59.4	+60.0	88.9	48 00.0	+60.0	90.0	48
49	48 30.7	+58.9	82.0	48 38.4	+59.2	83.1	48 45.0	+59.5	84.3	48 50.4	+59.6	85.4	48 54.6	+59.8	86.6	48 57.6	+59.9	87.7	48 59.4	+60.0	88.8	49 00.0	+60.0	90.0	49
50	49 29.6	+58.9	81.7	49 37.6	+59.2	82.9	49 44.5	+59.4	84.1	49 50.0	+59.7	85.2	49 54.4	+59.8	86.4	49 57.5	+59.9	87.6	49 59.4	+60.0	88.8	50 00.0	+60.0	90.0	50
51	50 28.5	+58.9	81.4	50 36.8	+59.2	82.6	50 43.9	+59.4	83.9	50 49.7	+59.6	85.1	50 54.2	+59.8	86.3	50 57.4	+59.9	87.5	50 59.4	+59.9	88.8	51 00.0	+60.0	90.0	51
52	51 27.4	+58.8	81.1	51 36.0	+59.1	82.4	51 43.3	+59.4	83.6	51 49.3	+59.6	84.9	51 54.0	+59.8	86.2	51 57.3	+59.9	87.4	51 59.3	+60.0	88.7	52 00.0	+60.0	90.0	52
53	52 26.2	+58.8	80.8	52 35.1	+59.1	82.1	52 42.7	+59.4	83.4	52 48.9	+59.6	84.7	52 53.8	+59.7	86.0	52 57.2	+59.9	87.3	52 59.3	+60.0	88.7	53 00.0	+60.0	90.0	53
54	53 25.0	+58.7	80.5	53 34.2	+59.1	81.8	53 42.1	+59.3	83.2	53 48.5	+59.6	84.5	53 53.5	+59.8	85.9	53 57.1	+59.9	87.2	53 59.3	+60.0	88.6	54 00.0	+60.0	90.0	54
55	54 23.7	+58.6	80.1	54 33.3	+58.9	81.5	54 41.4	+59.3	82.9	54 48.1	+59.5	84.3	54 53.3	+59.7	85.7	54 57.0	+59.9	87.1	54 59.3	+59.9	88.6	55 00.0	+60.0	90.0	55
56	55 22.3	+58.6	79.8	55 32.2	+59.0	81.2	55 40.7	+59.2	82.6	55 47.6	+59.5	84.1	55 53.0	+59.8	85.6	55 56.9	+59.9	87.0	55 59.2	+60.0	88.5	56 00.0	+60.0	90.0	56
57	56 20.9	+58.5	79.4	56 31.2	+58.9	80.9	56 39.9	+59.3	82.4	56 47.1	+59.5	83.9	56 52.8	+59.7	85.4	56 56.8	+59.9	86.9	56 59.2	+60.0	88.5	57 00.0	+60.0	90.0	57
58	57 19.4	+58.4	79.0	57 30.1	+58.8	80.5	57 39.2	+59.1	82.1	57 46.6	+59.5	83.6	57 52.5	+59.7	85.2	57 56.7	+59.8	86.8	57 59.2	+59.9	88.4	58 00.0	+60.0	90.0	58
59	58 17.8	+58.3	78.5	58 28.9	+58.7	80.1	58 38.3	+59.2	81.7	58 46.1	+59.4	83.4	58 52.2	+59.7	85.0	58 56.5	+59.9	86.7	58 59.1	+60.0	88.3	59 00.0	+60.0	90.0	59
60	59 16.1	+58.2	78.1	59 27.6	+58.7	79.7	59 37.5	+59.0	81.4	59 45.5	+59.5	83.1	59 51.9	+59.6	84.8	59 56.4	+59.8	86.5	59 59.1	+60.0	88.3	60 00.0	+60.0	90.0	60
61	60 14.3	+58.1	77.6	60 26.3	+58.6	79.3	60 36.5	+59.1	81.1	60 45.0	+59.3	82.8	60 51.5	+59.7	84.6	60 56.2	+59.9	86.4	60 59.1	+59.9	88.2	61 00.0	+60.0	90.0	61
62	61 12.4	+58.0	77.1	61 24.9	+58.5	78.9	61 35.6	+58.9	80.7	61 44.3	+59.3	82.5	61 51.2	+59.6	84.4	61 56.1	+59.8	86.2	61 59.0	+60.0	88.1	62 00.0	+60.0	90.0	62
63	62 10.4	+57.9	76.5	62 23.4	+58.4	78.4	62 34.5	+58.9	80.3	62 43.6	+59.3	82.2	62 50.8	+59.6	84.1	62 55.9	+59.8	86.1	62 59.0	+59.9	88.0	63 00.0	+60.0	90.0	63
64	63 08.3	+57.7	76.0	63 21.8	+58.3	77.9	63 33.4	+58.8	79.9	63 42.9	+59.2	81.9	63 50.4	+59.5	83.9	63 55.7	+59.8	85.9	63 58.9	+60.0	88.0	64 00.0	+60.0	90.0	64
65	64 06.0	+57.5	75.4	64 20.1	+58.2	77.4	64 32.2	+58.7	79.4	64 42.1	+59.2	81.5	64 49.9	+59.6	83.6	64 55.5	+59.8	85.7	64 58.9	+59.9	87.9	65 00.0	+60.0	90.0	65
66	65 03.5	+57.3	74.7	65 18.3	+58.0	76.8	65 30.9	+58.6	78.9	65 41.3	+59.1	81.1	65 49.5	+59.4	83.3	65 55.3	+59.8	85.5	65 58.8	+60.0	87.8	66 00.0	+60.0	90.0	66
67	66 00.8	+57.2	74.0	66 16.3	+57.8	76.2	66 29.5	+58.5	78.4	66 40.4	+59.0	80.7	66 48.9	+59.5	83.0	66 55.1	+59.7	85.3	66 58.8	+59.9	87.6	67 00.0	+60.0	90.0	67
68	66 58.0	+56.9	73.2	67 14.1	+57.7	75.5	67 28.0	+58.3	77.8	67 39.4	+59.0	80.2	67 48.4	+59.4	82.6	67 54.8	+59.8	85.1	67 58.7	+59.9	87.5	68 00.0	+60.0	90.0	68
69	67 54.9	+56.6	72.4	68 11.8	+57.5	74.8	68 26.3	+58.3	77.2	68 38.4	+58.8	79.7	68 47.8	+59.3	82.2	68 54.6	+59.7	84.8	68 58.6	+60.0	87.4	69 00.0	+60.0	90.0	69
70	68 51.5	+56.3	71.5	69 09.3	+57.2	74.0	69 24.6	+58.0	76.5	69 37.2	+58.7	79.2	69 47.1	+59.3	81.8	69 54.3	+59.6	84.5	69 58.6	+59.9	87.3	70 00.0	+60.0	90.0	70
71	69 47.8	+55.9	70.5	70 06.5	+57.0	73.1	70 22.6	+57.8	75.8	70 35.9	+58.6	78.5	70 46.4	+59.2	81.4	70 53.9	+59.7	84.2	70 58.5	+59.9	87.1	71 00.0	+60.0	90.0	71
72	70 43.7	+55.6	69.4	71 03.5	+56.6	72.2	71 20.4	+57.6	75.0	71 34.5	+58.5	77.9	71 45.6	+59.1	80.8	71 53.6	+59.6	83.9	71 58.4	+59.9	86.9	72 00.0	+60.0	90.0	72
73	71 39.3	+55.0	68.3	72 00.1	+56.3	71.1	72 18.0	+57.4	74.1	72 33.0	+58.2	77.1	72 44.7	+59.0	80.3	72 53.2	+59.5	83.5	72 58.3	+59.9	86.7	73 00.0	+60.0	90.0	73
74	72 34.3	+54.6	67.0	72 56.4	+55.8	70.0	73 15.4	+57.0	73.1	73 31.2	+58.1	76.3	73 43.7	+58.9	79.7	73 52.7	+59.5	83.1	73 58.2	+59.8	86.5	74 00.0	+60.0	90.0	74
75	73 28.9	+53.8	65.5	73 52.2	+55.3	68.7	74 12.4	+56.6	72.0	74 29.3	+57.7	75.4	74 42.6	+58.7	78.9	74 52.2	+59.4	82.6	74 58.0	+59.9	86.3	75 00.0	+60.0	90.0	75
76	74 22.7	+53.1	64.0	74 47.5	+54.7	67.3	75 09.0	+56.2	70.7	75 27.0	+57.5	74.4	75 41.3	+58.5	78.1	75 51.6	+59.4	82.0	75 57.9	+59.8	86.0	76 00.0	+60.0	90.0	76
77	75 15.8	+52.2	62.2	75 42.2	+54.0	65.6	76 05.2	+55.6	69.3	76 24.5	+57.1	73.2	76 39.8	+58.4	77.2	76 51.0	+59.2	81.4	76 57.7	+59.8	85.7	77 00.0	+60.0	90.0	77
78	76 08.0	+51.1	60.2	76 36.2	+53.1	63.8	77 00.8	+55.0	67.7	77 21.6	+56.6	71.8	77 38.2	+58.0	76.2	77 50.2	+59.1	80.7	77 57.5	+59.8	85.3	78 00.0	+60.0	90.0	78
79	76 59.1	+49.7	57.9	77 29.3	+51.9	61.7	77 55.8	+54.1	65.8	78 18.2	+56.0	70.3	78 36.2	+57.6	74.9	78 49.3	+58.9	79.8	78 57.3	+59.7	84.9	79 00.0	+60.0	90.0	79
80	77 48.8	+48.2	55.3	78 21.2	+50.6	59.3	78 49.9	+53.0	63.7	79 14.2	+55.3	68.4	79 33.8	+57.2	73.5	79 48.2	+58.7	78.8	79 57.0	+59.7	84.3	80 00.0	+60.0	90.0	80
81	78 37.0	+46.1 •	52.4	79 11.8	+48.9	56.6	79 42.9	+51.6	61.2	80 09.5	+54.2	66.2	80 31.0	+56.6	71.7	80 46.9	+58.4	77.6	80 56.7	+59.6	83.7	81 00.0	+60.0	90.0	81
82	79 23.1	+43.7 •	49.1	80 00.7	+46.7 •	53.4	80 34.5	+49.8 •	58.2	81 03.7	+52.9	63.6	81 27.6	+55.6	69.6	81 45.3	+58.0	76.1	81 56.3	+59.5	82.9	82 00.0	+60.0	90.0	82
83	80 06.8	+40.6 •	45.2	80 47.4	+43.9 •	49.6	81 24.3	+47.4 •	54.6	81 56.6	+51.0 •	60.4	82 23.2	+54.5	66.9	82 43.3	+57.3	74.1	82 55.8	+59.3	81.9	83 00.0	+60.0	90.0	83
84	80 47.4	+36.9 •	40.8	81 31.3	+40.4 •	45.2	82 11.7	+44.3 •	50.3	82 47.6	+48.4 •	56.4	83 17.7	+52.6 •	63.5	83 40.6	+56.3	71.6	83 55.1	+59.0	80.6	84 00.0	+60.0	90.0	84
85	81 24.3	+32.3 •	35.7	82 11.7	+35.9 •	39.9	82 56.0	+40.0 •	45.1	83 36.0	+44.7 •	51.4	84 10.3	+49.8 •	59.1	84 36.9	+54.8 •	68.3	84 54.1	+58.5	78.7	85 00.0	+60.0	90.0	85
86	81 56.6	+26.6 •	29.8	82 47.6	+30.1 •	33.8	83 36.0	+34.3 •	38.7	84 20.7	+39.4 •	45.1	85 00.1	+45.4 •	53.2	85 31.7	+52.0 •	63.5	85 52.6	+57.7	76.0	86 00.0	+60.0	90.0	86
87	82 23.2	+20.1 •	23.3	83 17.7	+22.9 •	26.6	84 10.3	+26.6 •	31.0	85 00.1	+31.6 •	36.9	85 45.5	+38.2 •	45.0	86 23.7	+46.6 •	56.3	86 50.3	+55.5 •	71.6	87 00.0	+60.0	90.0	87
88	82 43.3	+12.5 •	16.0	83 40.6	+14.5 •	18.5	84 36.9	+17.2 •	21.8	85 31.7	+20.9 •	26.6	86 23.7	+26.6 •	33.7	87 10.3	+35.5 •	45.0	87 45.8	+49.3 •	63.4	88 00.0	+60.0	90.0	88
89	82 55.8	+4.2 •	8.2	83 55.1	+4.9 •	9.5	84 54.1	+5.9 •	11.3	85 52.6	+7.4 •	14.0	86 50.3	+9.7 •	18.4	87 45.8	+14.2 •	26.6	88 35.1	+24.9 •	45.0	89 00.0	+60.0	90.0	89
90	83 00.0	–4.2 •	0.0	84 00.0	–4.9 •	0.0	85 00.0	–5.9 •	0.0	86 00.0	–7.4 •	0.0	87 00.0	–9.7 •	0.0	88 00.0	–14.2 •	0.0	89 00.0	–24.9 •	0.0	90 00.0	–60.0	45.0	90
	83°			84°			85°			86°			87°			88°			89°			90°			

S. Lat. {L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 90°, 270°

*No entries for contrary name appear on this page.