USE OF CONCISE SIGHT REDUCTION TABLES

1. *Introduction.* The concise sight reduction tables given on pages 286 to 317 are intended for use when neither more extensive tables nor electronic computing aids are available. These "NAO sight reduction tables" provide for the reduction of the local hour angle and declination of a celestial object to azimuth and altitude, referred to an assumed position on the Earth, for use in the intercept method of celestial navigation which is now standard practice.

2. *Form of tables.* Entries in the reduction table are at a fixed interval of one degree for all latitudes and hour angles. A compact arrangement results from division of the navigational triangle into two right spherical triangles, so that the table has to be entered twice. Assumed latitude and local hour angle are the arguments for the first entry. The reduction table responds with the intermediate arguments A, B, and Z_1, where A is used as one of the arguments for the second entry to the table, B has to be incremented by the declination to produce the quantity F, and Z_1 is a component of the azimuth angle. The reduction table is then reentered with A and F and yields H, P, and Z_2 where H is the altitude, P is the complement of the parallactic angle, and Z_2 is the second component of the azimuth angle. It is usually necessary to adjust the tabular altitude for the fractional parts of the intermediate entering arguments to derive computed altitude, and an auxiliary table is provided for the purpose. Rules governing signs of the quantities which must be added or subtracted are given in the instructions and summarized on each tabular page. Azimuth angle is the sum of two components and is converted to true azimuth by familiar rules, repeated at the bottom of the tabular pages.

Tabular altitude and intermediate quantities are given to the nearest minute of arc, although errors of 2′ in computed altitude may accrue during adjustment for the minutes parts of entering arguments. Components of azimuth angle are stated to 0°.1; for derived true azimuth, only whole degrees are warranted. Since objects near the zenith are difficult to observe with a marine sextant, they should be avoided; altitudes greater than about 80° are not suited to reduction by this method.

In many circumstances the accuracy provided by these tables is sufficient. However, to maintain the full accuracy (0′.1) of the ephemeral data in the almanac throughout their reduction to altitude and azimuth, more extensive tables or a calculator should be used.

3. *Use of Tables.*

Step 1. Determine the Greenwich hour angle (*GHA*) and Declination (*Dec*) of the body from the almanac. Select an assumed latitude (*Lat*) of integral degrees nearest to the estimated latitude. Choose an assumed longitude nearest to the estimated longitude such that the local hour angle

$$LHA = GHA \begin{matrix} - \text{ west} \\ + \text{ east} \end{matrix} \text{ longitude}$$

has integral degrees.

Step 2. Enter the reduction table with *Lat* and *LHA* as arguments. Record the quantities A, B and Z_1. Apply the rules for the sign of B and Z_1: B is minus if $90° < LHA < 270°$: Z_1 has the same sign as B. Set $A°$ = nearest whole degree of A and A' = minutes part of A. This step may be repeated for all reductions before leaving the latitude opening of the table.

Step 3. Record the declination *Dec*. Apply the rules for the sign of *Dec*: *Dec* is minus if the name of *Dec* (*i.e.* N or S) is contrary to latitude. Add B and *Dec* algebraically to produce F. If F is negative, the object is below the horizon (in sight reduction, this can occur when the objects are close to the horizon). Regard F as positive until step 7. Set $F°$ = nearest whole degree of F and F' = minutes part of F.

Step 4. Enter the reduction table a second time with $A°$ and $F°$ as arguments and record H, P, and Z_2. Set $P°$ = nearest whole degree of P and $Z_2°$ = nearest whole degree of Z_2.

Step 5. Enter the auxiliary table with F' and $P°$ as arguments to obtain $corr_1$ to H for F'. Apply the rule for the sign of $corr_1$: $corr_1$ is minus if $F < 90°$ and $F' > 29'$ or if $F > 90°$ and $F' < 30'$, otherwise $corr_1$ is plus.

Step 6. Enter the auxiliary table with A' and $Z_2°$ as arguments to obtain $corr_2$ to H for A'. Apply the rule for the sign of $corr_2$: $corr_2$ is minus if $A' < 30'$, otherwise $corr_2$ is plus.

Step 7. Calculate the computed altitude H_C as the sum of H, $corr_1$ and $corr_2$. Apply the rule for the sign of H_C: H_C is minus if F is negative.

Step 8. Apply the rule for the sign of Z_2: Z_2 is minus if $F > 90°$. If F is negative, replace Z_2 by $180° - Z_2$. Set the azimuth angle Z equal to the algebraic sum of Z_1 and Z_2 and ignore the resulting sign. Obtain the true azimuth Z_n from the rules

For N latitude, if	$LHA > 180°$	$Z_n = Z$
if	$LHA < 180°$	$Z_n = 360° - Z$
For S latitude, if	$LHA > 180°$	$Z_n = 180° - Z$
if	$LHA < 180°$	$Z_n = 180° + Z$

Observed altitude H_O is compared with H_C to obtain the altitude difference, which, with Z_n, is used to plot the position line.

4. *Example.* (a) Required the altitude and azimuth of *Schedar* on 2001 February 5 at UT $06^h\ 30^m$ from the estimated position 4° east, 53° north.

1. Assumed latitude	$Lat =$	53° N		
From the almanac	$GHA =$	222° 50′		
Assumed longitude		4° 10′ E		
Local hour angle	$LHA =$	227		
2. Reduction table, 1st entry				
$(Lat, LHA) = (53, 227)$	$A =$	26 07	$A° = 26$, $A' = 7$	
	$B =$	−27 12	$Z_1 = -49{\cdot}4$,	$90° < LHA < 270°$
3. From the almanac	$Dec =$	+56 33		*Lat* and *Dec* same
Sum = $B + Dec$	$F =$	+29 21	$F° = 29$, $F' = 21$	
4. Reduction table, 2nd entry				
$(A°, F°) = (26, 29)$	$H =$	25 50	$P° = 61$	
			$Z_2 = 76{\cdot}3$	
5. Auxiliary table, 1st entry				
$(F', P°) = (21, 61)$	$corr_1 =$	+18		$F < 90°$, $F' < 29'$
Sum		26 08		
6. Auxiliary table, 2nd entry				
$(A', Z_2°) = (7, 76)$	$corr_2 =$	−2		$A' < 30'$
7. Sum = computed altitude	$H_C =$	+26° 06′		$F > 0°$
8. Azimuth, first component	$Z_1 =$	−49·4		same sign as B
second component	$Z_2 =$	+76·3		$F < 90°$, $F > 0°$
Sum = azimuth angle	$Z =$	26·9		
True azimuth	$Z_n =$	027°		N *Lat*, $LHA > 180°$

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USE OF CONCISE SIGHT REDUCTION TABLES (continued)

4. *Example.* (b) Required the altitude and azimuth of *Vega* on 2001 July 29 at UT $04^h\ 50^m$ from the estimated position 152° west, 15° south.

1. Assumed latitude	$Lat =$	15° S		
From the almanac	$GHA =$	100° 10′		
Assumed longitude		152° 10′ W		
Local hour angle	$LHA =$	308		
2. Reduction table, 1st entry				
$(Lat, LHA) = (15, 308)$	$A =$	49 34	$A° = 50$, $A' = 34$	
	$B =$	+66 29	$Z_1 = +71{\cdot}7$,	$LHA > 270°$
3. From the almanac	$Dec =$	−38 47		*Lat* and *Dec* contrary
Sum = $B + Dec$	$F =$	+27 42	$F° = 28$, $F' = 42$	
4. Reduction table, 2nd entry				
$(A°, F°) = (50, 28)$	$H =$	17 34	$P° = 37$	
			$Z_2 = 67{\cdot}8$	
5. Auxiliary table, 1st entry				
$(F', P°) = (42, 37)$	$corr_1 =$	−11		$F < 90°$, $F' > 29'$
Sum		17 23		
6. Auxiliary table, 2nd entry				
$(A', Z_2°) = (34, 68)$	$corr_2 =$	+10		$A' > 30'$
7. Sum = computed altitude	$H_C =$	+17° 33′		$F > 0°$
8. Azimuth, first component	$Z_1 =$	+71·7		same sign as B
second component	$Z_2 =$	+67·8		$F < 90°$, $F > 0°$
Sum = azimuth angle	$Z =$	139·5		
True azimuth	$Z_n =$	041°		S *Lat*, $LHA > 180°$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		0°			1°			2°			3°			4°			5°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	90 00	90.0	0 00	89 00	90.0	0 00	88 00	90.0	0 00	87 00	90.0	0 00	86 00	90.0	0 00	85 00	90.0	180	360
1	179	1 00	90 00	90.0	1 00	89 00	90.0	1 00	88 00	90.0	1 00	87 00	89.9	1 00	86 00	89.9	1 00	85 00	89.9	181	359
2	178	2 00	90 00	90.0	2 00	89 00	90.0	2 00	88 00	89.9	2 00	87 00	89.9	2 00	86 00	89.9	2 00	85 00	89.8	182	358
3	177	3 00	90 00	90.0	3 00	89 00	89.9	3 00	88 00	89.9	3 00	87 00	89.8	3 00	86 00	89.8	2 59	85 00	89.7	183	357
4	176	4 00	90 00	90.0	4 00	89 00	89.9	4 00	88 00	89.9	4 00	87 00	89.8	3 59	85 59	89.7	3 59	84 59	89.7	184	356
5	175	5 00	90 00	90.0	5 00	89 00	89.9	5 00	88 00	89.8	5 00	86 59	89.7	4 59	85 59	89.7	4 59	84 59	89.6	185	355
6	174	6 00	90 00	90.0	6 00	89 00	89.9	6 00	87 59	89.8	6 00	86 59	89.7	5 59	85 59	89.6	5 59	84 58	89.5	186	354
7	173	7 00	90 00	90.0	7 00	89 00	89.9	7 00	87 59	89.8	6 59	86 59	89.6	6 59	85 58	89.5	6 58	84 58	89.4	187	353
8	172	8 00	90 00	90.0	8 00	88 59	89.9	8 00	87 59	89.7	7 59	86 58	89.6	7 59	85 58	89.4	7 58	84 57	89.3	188	352
9	171	9 00	90 00	90.0	9 00	88 59	89.8	9 00	87 59	89.7	8 59	86 58	89.5	8 59	85 57	89.4	8 58	84 56	89.2	189	351
10	170	10 00	90 00	90.0	10 00	88 59	89.8	10 00	87 58	89.6	9 59	86 57	89.5	9 59	85 56	89.3	9 58	84 55	89.1	190	350
11	169	11 00	90 00	90.0	11 00	88 59	89.8	11 00	87 58	89.6	10 59	86 57	89.4	10 58	85 56	89.2	10 57	84 54	89.0	191	349
12	168	12 00	90 00	90.0	12 00	88 59	89.8	12 00	87 57	89.6	11 59	86 56	89.4	11 58	85 55	89.2	11 57	84 53	88.9	192	348
13	167	13 00	90 00	90.0	13 00	88 58	89.8	13 00	87 57	89.5	12 59	86 55	89.3	12 58	85 54	89.1	12 57	84 52	88.8	193	347
14	166	14 00	90 00	90.0	14 00	88 58	89.8	13 59	87 56	89.5	13 59	86 54	89.3	13 58	85 53	89.0	13 57	84 51	88.8	194	346
15	165	15 00	90 00	90.0	15 00	88 58	89.7	14 59	87 56	89.5	14 59	86 54	89.2	14 58	85 52	88.9	14 56	84 49	88.7	195	345
16	164	16 00	90 00	90.0	16 00	88 58	89.7	15 59	87 55	89.4	15 59	86 53	89.1	15 58	85 50	88.9	15 56	84 48	88.6	196	344
17	163	17 00	90 00	90.0	17 00	88 57	89.7	16 59	87 55	89.4	16 59	86 52	89.1	16 57	85 49	88.8	16 56	84 46	88.5	197	343
18	162	18 00	90 00	90.0	18 00	88 57	89.7	17 59	87 54	89.4	17 58	86 51	89.0	17 57	85 48	88.7	17 56	84 45	88.4	198	342
19	161	19 00	90 00	90.0	19 00	88 57	89.7	18 59	87 53	89.3	18 58	86 50	89.0	18 57	85 46	88.6	18 55	84 43	88.3	199	341
20	160	20 00	90 00	90.0	20 00	88 56	89.6	19 59	87 52	89.3	19 58	86 48	88.9	19 57	85 45	88.5	19 55	84 41	88.2	200	340
21	159	21 00	90 00	90.0	21 00	88 56	89.6	20 59	87 51	89.2	20 58	86 47	88.8	20 57	85 43	88.5	20 55	84 39	88.1	201	339
22	158	22 00	90 00	90.0	22 00	88 55	89.6	21 59	87 51	89.2	21 58	86 46	88.8	21 57	85 41	88.4	21 55	84 37	88.0	202	338
23	157	23 00	90 00	90.0	23 00	88 55	89.6	22 59	87 50	89.2	22 58	86 44	88.7	22 56	85 39	88.3	22 54	84 34	87.9	203	337
24	156	24 00	90 00	90.0	24 00	88 54	89.6	23 59	87 49	89.1	23 58	86 43	88.7	23 56	85 37	88.2	23 54	84 32	87.8	204	336
25	155	25 00	90 00	90.0	25 00	88 54	89.5	24 59	87 48	89.1	24 58	86 41	88.6	24 56	85 35	88.1	24 54	84 29	87.7	205	335
26	154	26 00	90 00	90.0	26 00	88 53	89.5	25 59	87 46	89.0	25 58	86 40	88.5	25 56	85 33	88.1	25 54	84 26	87.6	206	334
27	153	27 00	90 00	90.0	27 00	88 53	89.5	26 59	87 45	89.0	26 58	86 38	88.5	26 56	85 31	88.0	26 53	84 24	87.5	207	333
28	152	28 00	90 00	90.0	28 00	88 52	89.5	27 59	87 44	88.9	27 57	86 36	88.4	27 56	85 28	87.9	27 53	84 20	87.3	208	332
29	151	29 00	90 00	90.0	29 00	88 51	89.4	28 59	87 43	88.9	28 57	86 34	88.3	28 55	85 26	87.8	28 53	84 17	87.2	209	331
30	150	30 00	90 00	90.0	30 00	88 51	89.4	29 59	87 41	88.8	29 57	86 32	88.3	29 55	85 23	87.7	29 52	84 14	87.1	210	330
31	149	31 00	90 00	90.0	31 00	88 50	89.4	30 59	87 40	88.8	30 57	86 30	88.2	30 55	85 20	87.6	30 52	84 10	87.0	211	329
32	148	32 00	90 00	90.0	32 00	88 49	89.4	31 59	87 39	88.8	31 57	86 28	88.1	31 55	85 17	87.5	31 52	84 07	86.9	212	328
33	147	33 00	90 00	90.0	33 00	88 48	89.4	32 59	87 37	88.7	32 57	86 25	88.1	32 55	85 14	87.4	32 52	84 03	86.8	213	327
34	146	34 00	90 00	90.0	34 00	88 48	89.3	33 59	87 35	88.7	33 57	86 23	88.0	33 54	85 11	87.3	33 51	83 59	86.6	214	326
35	145	35 00	90 00	90.0	35 00	88 47	89.3	34 59	87 34	88.6	34 57	86 20	87.9	34 54	85 07	87.2	34 51	83 54	86.5	215	325
36	144	36 00	90 00	90.0	36 00	88 46	89.3	35 58	87 32	88.5	35 57	86 18	87.8	35 54	85 04	87.1	35 51	83 50	86.4	216	324
37	143	37 00	90 00	90.0	37 00	88 45	89.2	36 58	87 30	88.5	36 56	86 15	87.7	36 54	85 00	87.0	36 50	83 45	86.2	217	323
38	142	38 00	90 00	90.0	38 00	88 44	89.2	37 58	87 28	88.4	37 56	86 12	87.7	37 53	84 56	86.9	37 50	83 40	86.1	218	322
39	141	39 00	90 00	90.0	39 00	88 43	89.2	38 58	87 26	88.4	38 56	86 09	87.6	38 53	84 52	86.8	38 49	83 35	86.0	219	321
40	140	40 00	90 00	90.0	40 00	88 42	89.2	39 58	87 23	88.3	39 56	86 05	87.5	39 53	84 47	86.7	39 49	83 29	85.8	220	320
41	139	41 00	90 00	90.0	41 00	88 40	89.1	40 58	87 21	88.3	40 56	86 02	87.4	40 53	84 42	86.5	40 49	83 23	85.7	221	319
42	138	42 00	90 00	90.0	42 00	88 39	89.1	41 58	87 19	88.2	41 56	85 58	87.3	41 52	84 37	86.4	41 48	83 17	85.5	222	318
43	137	43 00	90 00	90.0	43 00	88 38	89.1	42 58	87 16	88.1	42 56	85 54	87.2	42 52	84 32	86.3	42 48	83 11	85.4	223	317
44	136	44 00	90 00	90.0	43 59	88 37	89.0	43 58	87 13	88.1	43 55	85 50	87.1	43 52	84 27	86.1	43 47	83 04	85.2	224	316
45	135	45 00	90 00	90.0	44 59	88 35	89.0	44 58	87 10	88.0	44 55	85 46	87.0	44 52	84 21	86.0	44 47	82 57	85.0	225	315

Lat. / A		0°			1°			2°			3°			4°			5°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	45 00	90 00	90.0	44 59	88 35	89.0	44 58	87 10	88.0	44 55	85 46	87.0	44 52	84 21	86.0	44 47	82 57	85.0	225	315
46	134	46 00	90 00	90.0	45 59	88 34	89.0	45 58	87 07	87.9	45 55	85 41	86.9	45 51	84 15	85.9	45 46	82 49	84.8	226	314
47	133	47 00	90 00	90.0	46 59	88 32	88.9	46 58	87 04	87.9	46 55	85 36	86.8	46 51	84 09	85.7	46 46	82 41	84.7	227	313
48	132	48 00	90 00	90.0	47 59	88 30	88.9	47 58	87 01	87.8	47 55	85 31	86.7	47 51	84 02	85.6	47 46	82 33	84.5	228	312
49	131	49 00	90 00	90.0	48 59	88 29	88.8	48 58	86 57	87.7	48 55	85 26	86.6	48 50	83 55	85.4	48 45	82 24	84.3	229	311
50	130	50 00	90 00	90.0	49 59	88 27	88.8	49 58	86 53	87.6	49 54	85 20	86.4	49 50	83 47	85.2	49 44	82 15	84.1	230	310
51	129	51 00	90 00	90.0	50 59	88 25	88.8	50 57	86 49	87.5	50 54	85 14	86.3	50 50	83 40	85.1	50 44	82 05	83.9	231	309
52	128	52 00	90 00	90.0	51 59	88 23	88.7	51 57	86 45	87.4	51 54	85 08	86.2	51 49	83 31	84.9	51 43	81 55	83.6	232	308
53	127	53 00	90 00	90.0	52 59	88 20	88.7	52 57	86 41	87.3	52 54	85 01	86.0	52 49	83 22	84.7	52 43	81 44	83.4	233	307
54	126	54 00	90 00	90.0	53 59	88 18	88.6	53 57	86 36	87.2	53 54	84 54	85.9	53 49	83 13	84.5	53 42	81 32	83.2	234	306
55	125	55 00	90 00	90.0	54 59	88 15	88.6	54 57	86 31	87.1	54 53	84 47	85.7	54 48	83 03	84.3	54 41	81 20	82.9	235	305
56	124	56 00	90 00	90.0	55 59	88 13	88.5	55 57	86 26	87.0	55 53	84 39	85.6	55 48	82 52	84.1	55 41	81 06	82.6	236	304
57	123	57 00	90 00	90.0	56 59	88 10	88.5	56 57	86 20	86.9	56 53	84 30	85.4	56 47	82 41	83.9	56 40	80 52	82.4	237	303
58	122	58 00	90 00	90.0	57 59	88 07	88.4	57 57	86 14	86.8	57 52	84 21	85.2	57 47	82 29	83.6	57 39	80 38	82.1	238	302
59	121	59 00	90 00	90.0	58 59	88 04	88.3	58 57	86 07	86.7	58 52	84 11	85.0	58 46	82 16	83.4	58 38	80 22	81.7	239	301
60	120	60 00	90 00	90.0	59 59	88 00	88.3	59 56	86 00	86.5	59 52	84 01	84.8	59 46	82 02	83.1	59 37	80 04	81.4	240	300
61	119	61 00	90 00	90.0	60 59	87 56	88.2	60 56	85 53	86.4	60 52	83 50	84.6	60 45	81 48	82.8	60 37	79 46	81.1	241	299
62	118	62 00	90 00	90.0	61 59	87 52	88.1	61 56	85 45	86.2	61 51	83 38	84.4	61 44	81 32	82.5	61 36	79 27	80.7	242	298
63	117	63 00	90 00	90.0	62 59	87 48	88.0	62 56	85 36	86.1	62 51	83 25	84.1	62 44	81 15	82.2	62 35	79 06	80.3	243	297
64	116	64 00	90 00	90.0	63 59	87 43	88.0	63 56	85 27	85.9	63 50	83 11	83.9	63 43	80 56	81.9	63 33	78 43	79.9	244	296
65	115	65 00	90 00	90.0	64 59	87 38	87.9	64 56	85 17	85.7	64 50	82 56	83.6	64 42	80 36	81.5	64 32	78 18	79.4	245	295
66	114	66 00	90 00	90.0	65 59	87 33	87.8	65 55	85 06	85.5	65 49	82 39	83.3	65 41	80 15	81.1	65 31	77 52	78.9	246	294
67	113	67 00	90 00	90.0	66 59	87 26	87.6	66 55	84 54	85.3	66 49	82 22	83.0	66 40	79 51	80.7	66 29	77 23	78.4	247	293
68	112	68 00	90 00	90.0	67 59	87 20	87.5	67 55	84 40	85.1	67 48	82 02	82.6	67 39	79 26	80.2	67 28	76 51	77.8	248	292
69	111	69 00	90 00	90.0	68 59	87 13	87.4	68 55	84 26	84.8	68 48	81 41	82.2	68 38	78 57	79.7	68 26	76 17	77.2	249	291
70	110	70 00	90 00	90.0	69 59	87 05	87.3	69 54	84 10	84.5	69 47	81 17	81.8	69 37	78 27	79.2	69 25	75 39	76.5	250	290
71	109	71 00	90 00	90.0	70 58	86 56	87.1	70 54	83 53	84.2	70 46	80 51	81.4	70 36	77 53	78.5	70 23	74 57	75.8	251	289
72	108	72 00	90 00	90.0	71 58	86 46	86.9	71 54	83 33	83.9	71 46	80 22	80.8	71 35	77 15	77.9	71 20	74 12	75.0	252	288
73	107	73 00	90 00	90.0	72 58	86 35	86.7	72 53	83 11	83.5	72 45	79 50	80.3	72 33	76 33	77.1	72 18	73 20	74.1	253	287
74	106	74 00	90 00	90.0	73 58	86 22	86.5	73 53	82 47	83.1	73 44	79 14	79.7	73 31	75 46	76.3	73 15	72 23	73.1	254	286
75	105	75 00	90 00	90.0	74 58	86 08	86.3	74 52	82 19	82.6	74 43	78 33	78.9	74 29	74 53	75.4	74 12	71 19	72.0	255	285
76	104	76 00	90 00	90.0	75 58	85 52	86.0	75 52	81 47	82.0	75 41	77 47	78.1	75 27	73 53	74.4	75 09	70 07	70.7	256	284
77	103	77 00	90 00	90.0	76 58	85 34	85.7	76 51	81 11	81.4	76 40	76 53	77.2	76 25	72 44	73.2	76 05	68 45	69.3	257	283
78	102	78 00	90 00	90.0	77 58	85 12	85.3	77 50	80 28	80.7	77 38	75 51	76.2	77 22	71 25	71.8	77 01	67 11	67.7	258	282
79	101	79 00	90 00	90.0	78 57	84 46	84.9	78 49	79 38	79.8	78 36	74 38	74.9	78 18	69 52	70.3	77 56	65 22	65.8	259	281
80	100	80 00	90 00	90.0	79 57	84 16	84.3	79 48	78 38	78.8	79 34	73 12	73.5	79 14	68 04	68.4	78 50	63 16	63.7	260	280
81	99	81 00	90 00	90.0	80 57	83 38	83.7	80 47	77 25	77.6	80 31	71 29	71.7	80 09	65 55	66.2	79 43	60 47	61.2	261	279
82	98	82 00	90 00	90.0	81 56	82 51	82.9	81 45	75 55	76.1	81 28	69 22	69.6	81 04	63 19	63.6	80 34	57 51	58.2	262	278
83	97	83 00	90 00	90.0	82 56	81 51	81.9	82 43	74 01	74.1	82 23	66 44	66.9	81 57	60 09	60.4	81 24	54 20	54.6	263	277
84	96	84 00	90 00	90.0	83 55	80 31	80.6	83 41	71 32	71.6	83 18	63 22	63.5	82 48	56 13	56.4	82 12	50 04	50.3	264	276
85	95	85 00	90 00	90.0	84 54	78 40	78.7	84 37	68 10	68.3	84 10	58 59	59.1	83 36	51 16	51.4	82 56	44 53	45.1	265	275
86	94	86 00	90 00	90.0	85 53	75 57	76.0	85 32	63 24	63.5	85 00	53 05	53.2	84 21	44 56	45.1	83 36	38 34	38.7	266	274
87	93	87 00	90 00	90.0	86 50	71 33	71.6	86 24	56 17	56.3	85 45	44 58	45.0	85 00	36 49	36.9	84 10	30 53	31.0	267	273
88	92	88 00	90 00	90.0	87 46	63 26	63.4	87 10	44 59	45.0	86 24	33 40	33.7	85 32	26 31	26.6	84 37	21 45	21.8	268	272
89	91	89 00	90 00	90.0	88 35	45 00	45.0	87 46	26 33	26.6	86 50	18 25	18.4	85 53	14 01	14.0	84 54	11 17	11.3	269	271
90	90	90 00	0 00	0.0	89 00	0 00	0.0	88 00	0 00	0.0	87 00	0 00	0.0	86 00	0 00	0.0	85 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (−) for 90°< LHA < 270°
Dec: (−) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (−) for F > 90°

Lat. / A		6°			7°			8°			9°			10°			11°			Lat. / A	
LHA / F		A / H	B / P	Z_1/Z_2	A / H	B / P	Z_1/Z_2	A / H	B / P	Z_1/Z_2	A / H	B / P	Z_1/Z_2	A / H	B / P	Z_1/Z_2	A / H	B / P	Z_1/Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	84 00	90.0	0 00	83 00	90.0	0 00	82 00	90.0	0 00	81 00	90.0	0 00	80 00	90.0	0 00	79 00	90.0	180	360
1	179	1 00	84 00	89.9	1 00	83 00	89.9	0 59	82 00	89.9	0 59	81 00	89.8	0 59	80 00	89.8	0 59	79 00	89.8	181	359
2	178	1 59	84 00	89.8	1 59	83 00	89.8	1 59	82 00	89.7	1 59	81 00	89.7	1 58	80 00	89.7	1 58	79 00	89.6	182	358
3	177	2 59	84 00	89.7	2 59	82 59	89.6	2 58	81 59	89.6	2 58	80 59	89.5	2 57	79 59	89.5	2 57	78 59	89.4	183	357
4	176	3 59	83 59	89.6	3 58	82 59	89.5	3 58	81 59	89.4	3 57	80 59	89.4	3 56	79 59	89.3	3 56	78 58	89.2	184	356
5	175	4 58	83 59	89.5	4 58	82 58	89.4	4 57	81 58	89.3	4 56	80 58	89.2	4 55	79 58	89.1	4 54	78 58	89.0	185	355
6	174	5 58	83 58	89.4	5 57	82 58	89.3	5 56	81 57	89.2	5 56	80 57	89.1	5 55	79 57	89.0	5 53	78 56	88.9	186	354
7	173	6 58	83 57	89.3	6 57	82 57	89.1	6 56	81 56	89.0	6 55	80 56	88.9	6 54	79 56	88.8	6 52	78 55	88.7	187	353
8	172	7 57	83 56	89.2	7 56	82 56	89.0	7 55	81 55	88.9	7 54	80 55	88.7	7 53	79 54	88.6	7 51	78 54	88.5	188	352
9	171	8 57	83 56	89.1	8 56	82 55	88.9	8 55	81 54	88.7	8 53	80 53	88.6	8 52	79 53	88.4	8 50	78 52	88.3	189	351
10	170	9 57	83 54	88.9	9 55	82 54	88.8	9 54	81 53	88.6	9 53	80 52	88.4	9 51	79 51	88.2	9 49	78 50	88.1	190	350
11	169	10 56	83 53	88.8	10 55	82 52	88.6	10 53	81 51	88.5	10 52	80 50	88.3	10 50	79 49	88.1	10 48	78 48	87.9	191	349
12	168	11 56	83 52	88.7	11 55	82 51	88.5	11 53	81 49	88.3	11 51	80 48	88.1	11 49	79 47	87.9	11 47	78 46	87.7	192	348
13	167	12 56	83 51	88.6	12 54	82 49	88.4	12 52	81 48	88.2	12 50	80 46	87.9	12 48	79 45	87.7	12 45	78 43	87.5	193	347
14	166	13 55	83 49	88.5	13 54	82 47	88.3	13 52	81 46	88.0	13 49	80 44	87.8	13 47	79 42	87.5	13 44	78 40	87.3	194	346
15	165	14 55	83 47	88.4	14 53	82 45	88.1	14 51	81 43	87.9	14 49	80 41	87.6	14 46	79 39	87.3	14 43	78 37	87.1	195	345
16	164	15 55	83 46	88.3	15 53	82 43	88.0	15 50	81 41	87.7	15 48	80 39	87.4	15 45	79 36	87.1	15 42	78 34	86.9	196	344
17	163	16 54	83 44	88.2	16 52	82 41	87.9	16 50	81 38	87.6	16 47	80 36	87.3	16 44	79 33	87.0	16 41	78 31	86.7	197	343
18	162	17 54	83 42	88.1	17 52	82 39	87.7	17 49	81 36	87.4	17 46	80 33	87.1	17 43	79 30	86.8	17 39	78 27	86.5	198	342
19	161	18 54	83 39	87.9	18 51	82 36	87.6	18 48	81 33	87.3	18 45	80 29	86.9	18 42	79 26	86.6	18 38	78 23	86.2	199	341
20	160	19 53	83 37	87.8	19 51	82 33	87.5	19 48	81 30	87.1	19 45	80 26	86.7	19 41	79 22	86.4	19 37	78 19	86.0	200	340
21	159	20 53	83 35	87.7	20 50	82 30	87.3	20 47	81 26	86.9	20 44	80 22	86.6	20 40	79 18	86.2	20 36	78 14	85.8	201	339
22	158	21 52	83 32	87.6	21 50	82 27	87.2	21 46	81 23	86.8	21 43	80 18	86.4	21 39	79 14	86.0	21 35	78 10	85.6	202	338
23	157	22 52	83 29	87.5	22 49	82 24	87.0	22 46	81 19	86.6	22 42	80 14	86.2	22 38	79 09	85.8	22 33	78 05	85.4	203	337
24	156	23 52	83 26	87.3	23 49	82 21	86.9	23 45	81 15	86.5	23 41	80 10	86.0	23 37	79 05	85.6	23 32	77 59	85.1	204	336
25	155	24 51	83 23	87.2	24 48	82 17	86.7	24 44	81 11	86.3	24 40	80 05	85.8	24 36	78 59	85.4	24 31	77 54	84.9	205	335
26	154	25 51	83 20	87.1	25 48	82 13	86.6	25 44	81 07	86.1	25 39	80 00	85.6	25 35	78 54	85.2	25 29	77 48	84.7	206	334
27	153	26 50	83 16	87.0	26 47	82 09	86.4	26 43	81 02	85.9	26 38	79 55	85.4	26 33	78 48	84.9	26 28	77 42	84.4	207	333
28	152	27 50	83 13	86.8	27 46	82 05	86.3	27 42	80 57	85.8	27 38	79 50	85.2	27 32	78 42	84.7	27 27	77 35	84.2	208	332
29	151	28 50	83 09	86.7	28 46	82 01	86.1	28 41	80 52	85.6	28 37	79 44	85.0	28 31	78 36	84.5	28 25	77 28	84.0	209	331
30	150	29 49	83 05	86.5	29 45	81 56	86.0	29 41	80 47	85.4	29 36	79 38	84.8	29 30	78 29	84.3	29 24	77 21	83.7	210	330
31	149	30 49	83 01	86.4	30 45	81 51	85.8	30 40	80 41	85.2	30 35	79 32	84.6	30 29	78 23	84.0	30 22	77 13	83.5	211	329
32	148	31 48	82 56	86.3	31 44	81 46	85.6	31 39	80 35	85.0	31 34	79 25	84.4	31 27	78 15	83.8	31 21	77 05	83.2	212	328
33	147	32 48	82 51	86.1	32 43	81 40	85.5	32 38	80 29	84.8	32 33	79 18	84.2	32 26	78 08	83.6	32 19	76 57	82.9	213	327
34	146	33 47	82 46	86.0	33 43	81 35	85.3	33 37	80 23	84.6	33 32	79 11	84.0	33 25	78 00	83.3	33 18	76 48	82.7	214	326
35	145	34 47	82 41	85.8	34 42	81 29	85.1	34 37	80 16	84.4	34 30	79 03	83.7	34 24	77 51	83.1	34 16	76 39	82.4	215	325
36	144	35 46	82 36	85.7	35 41	81 22	84.9	35 36	80 09	84.2	35 29	78 55	83.5	35 22	77 42	82.8	35 14	76 29	82.1	216	324
37	143	36 46	82 30	85.5	36 41	81 16	84.8	36 35	80 01	84.0	36 28	78 47	83.3	36 21	77 33	82.5	36 13	76 19	81.8	217	323
38	142	37 45	82 24	85.3	37 40	81 09	84.6	37 34	79 53	83.8	37 27	78 38	83.0	37 19	77 23	82.3	37 11	76 09	81.5	218	322
39	141	38 45	82 18	85.2	38 39	81 01	84.4	38 33	79 45	83.6	38 26	78 29	82.8	38 18	77 13	82.0	38 09	75 57	81.2	219	321
40	140	39 44	82 11	85.0	39 39	80 54	84.2	39 32	79 36	83.3	39 25	78 19	82.5	39 16	77 02	81.7	39 07	75 46	80.9	220	320
41	139	40 44	82 04	84.8	40 38	80 46	84.0	40 31	79 27	83.1	40 23	78 09	82.3	40 15	76 51	81.4	40 05	75 33	80.6	221	319
42	138	41 43	81 57	84.6	41 37	80 37	83.7	41 30	79 17	82.9	41 22	77 58	82.0	41 13	76 39	81.1	41 04	75 21	80.3	222	318
43	137	42 42	81 49	84.4	42 36	80 28	83.5	42 29	79 07	82.6	42 21	77 47	81.7	42 12	76 27	80.8	42 02	75 07	79.9	223	317
44	136	43 42	81 41	84.2	43 35	80 19	83.3	43 28	78 57	82.3	43 19	77 35	81.4	43 10	76 14	80.5	43 00	74 53	79.6	224	316
45	135	44 41	81 33	84.0	44 34	80 09	83.1	44 27	78 46	82.1	44 18	77 22	81.1	44 08	76 00	80.1	43 57	74 38	79.2	225	315

Lat. / A		6°			7°			8°			9°			10°			11°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	44 41	81 33	84.0	44 34	80 09	83.1	44 27	78 46	82.1	44 18	77 22	81.1	44 08	76 00	80.1	43 57	74 38	79.2	225	315
46	134	45 41	81 24	83.8	45 34	79 59	82.8	45 26	78 34	81.8	45 16	77 09	80.8	45 06	75 45	79.8	44 55	74 22	78.8	226	314
47	133	46 40	81 14	83.6	46 33	79 48	82.6	46 24	78 21	81.5	46 15	76 56	80.5	46 04	75 30	79.5	45 53	74 05	78.4	227	313
48	132	47 39	81 04	83.4	47 32	79 36	82.3	47 23	78 08	81.2	47 13	76 41	80.1	47 03	75 14	79.1	46 51	73 48	78.0	228	312
49	131	48 38	80 54	83.1	48 31	79 24	82.0	48 22	77 55	80.9	48 12	76 26	79.8	48 01	74 57	78.7	47 48	73 30	77.6	229	311
50	130	49 38	80 43	82.9	49 30	79 11	81.7	49 20	77 40	80.6	49 10	76 09	79.4	48 58	74 40	78.3	48 46	73 10	77.2	230	310
51	129	50 37	80 31	82.6	50 29	78 58	81.4	50 19	77 25	80.2	50 08	75 52	79.1	49 56	74 21	77.9	49 43	72 50	76.7	231	309
52	128	51 36	80 19	82.4	51 27	78 43	81.1	51 18	77 08	79.9	51 06	75 34	78.7	50 54	74 01	77.5	50 40	72 29	76.3	232	308
53	127	52 35	80 06	82.1	52 26	78 28	80.8	52 16	76 51	79.5	52 04	75 15	78.3	51 52	73 40	77.0	51 37	72 06	75.8	233	307
54	126	53 34	79 52	81.8	53 25	78 12	80.5	53 14	76 33	79.2	53 02	74 55	77.8	52 49	73 18	76.6	52 35	71 42	75.3	234	306
55	125	54 33	79 37	81.5	54 24	77 55	80.1	54 13	76 14	78.8	54 00	74 34	77.4	53 47	72 55	76.1	53 31	71 17	74.8	235	305
56	124	55 32	79 21	81.2	55 22	77 37	79.8	55 11	75 54	78.3	54 58	74 11	76.9	54 44	72 30	75.6	54 28	70 50	74.2	236	304
57	123	56 31	79 05	80.9	56 21	77 18	79.4	56 09	75 32	77.9	55 56	73 47	76.5	55 41	72 04	75.0	55 25	70 22	73.6	237	303
58	122	57 30	78 47	80.5	57 19	76 57	79.0	57 07	75 09	77.4	56 53	73 22	75.9	56 38	71 36	74.5	56 21	69 51	73.0	238	302
59	121	58 29	78 28	80.1	58 18	76 35	78.5	58 05	74 44	77.0	57 51	72 54	75.4	57 35	71 06	73.9	57 17	69 19	72.4	239	301
60	120	59 28	78 08	79.7	59 16	76 12	78.1	59 03	74 18	76.4	58 48	72 25	74.8	58 32	70 34	73.3	58 13	68 45	71.7	240	300
61	119	60 26	77 46	79.3	60 14	75 47	77.6	60 01	73 50	75.9	59 45	71 54	74.2	59 28	70 01	72.6	59 09	68 09	71.0	241	299
62	118	61 25	77 23	78.9	61 12	75 21	77.1	60 58	73 20	75.3	60 42	71 21	73.6	60 24	69 25	71.9	60 05	67 30	70.3	242	298
63	117	62 23	76 58	78.4	62 10	74 52	76.5	61 56	72 48	74.7	61 39	70 46	72.9	61 20	68 46	71.2	61 00	66 49	69.5	243	297
64	116	63 22	76 31	77.9	63 08	74 21	76.0	62 53	72 13	74.1	62 35	70 08	72.2	62 16	68 05	70.4	61 55	66 05	68.6	244	296
65	115	64 20	76 02	77.4	64 06	73 48	75.4	63 50	71 36	73.4	63 32	69 27	71.5	63 12	67 21	69.6	62 50	65 18	67.7	245	295
66	114	65 18	75 31	76.8	65 03	73 12	74.7	64 47	70 56	72.6	64 28	68 43	70.6	64 07	66 34	68.7	63 44	64 27	66.8	246	294
67	113	66 16	74 57	76.2	66 01	72 33	74.0	65 43	70 13	71.8	65 23	67 56	69.8	65 02	65 43	67.8	64 38	63 33	65.8	247	293
68	112	67 14	74 20	75.5	66 58	71 51	73.2	66 40	69 26	71.0	66 19	67 05	68.8	65 56	64 48	66.7	65 32	62 35	64.7	248	292
69	111	68 12	73 39	74.8	67 55	71 05	72.4	67 36	68 35	70.1	67 14	66 09	67.8	66 50	63 48	65.7	66 25	61 31	63.6	249	291
70	110	69 09	72 55	74.0	68 51	70 15	71.5	68 31	67 40	69.1	68 09	65 09	66.7	67 44	62 44	64.5	67 17	60 23	62.3	250	290
71	109	70 07	72 06	73.1	69 48	69 20	70.5	69 27	66 39	68.0	69 03	64 03	65.6	68 37	61 34	63.2	68 09	59 10	61.0	251	289
72	108	71 03	71 13	72.2	70 44	68 20	69.4	70 21	65 33	66.8	69 57	62 52	64.3	69 29	60 17	61.9	69 00	57 50	59.6	252	288
73	107	72 00	70 14	71.1	71 39	67 13	68.3	71 16	64 20	65.5	70 50	61 33	62.9	70 21	58 54	60.4	69 50	56 23	58.0	253	287
74	106	72 56	69 08	70.0	72 34	65 59	67.0	72 09	62 59	64.1	71 42	60 07	61.4	71 12	57 24	58.8	70 40	54 48	56.4	254	286
75	105	73 52	67 54	68.7	73 29	64 37	65.5	73 03	61 30	62.6	72 34	58 32	59.7	72 02	55 44	57.1	71 28	53 06	54.5	255	285
76	104	74 48	66 31	67.3	74 23	63 05	64.0	73 55	59 51	60.8	73 24	56 47	57.9	72 51	53 55	55.1	72 16	51 13	52.6	256	284
77	103	75 42	64 57	65.6	75 16	61 22	62.2	74 46	58 00	58.9	74 14	54 51	55.9	73 39	51 55	53.1	73 02	49 10	50.4	257	283
78	102	76 36	63 11	63.8	76 08	59 26	60.2	75 37	55 57	56.8	75 02	52 42	53.6	74 26	49 42	50.8	73 47	46 56	48.1	258	282
79	101	77 29	61 09	61.7	76 59	57 14	57.9	76 26	53 38	54.4	75 49	50 18	51.2	75 11	47 16	48.2	74 30	44 28	45.5	259	281
80	100	78 21	58 49	59.3	77 49	54 44	55.3	77 13	51 01	51.7	76 35	47 38	48.4	75 54	44 34	45.4	75 11	41 47	42.7	260	280
81	99	79 12	56 06	56.6	78 37	51 52	52.4	77 59	48 04	48.7	77 18	44 39	45.4	76 35	41 35	42.4	75 49	38 50	39.7	261	279
82	98	80 01	52 56	53.4	79 23	48 35	49.1	78 42	44 43	45.3	77 59	41 18	41.9	77 13	38 17	39.0	76 26	35 36	36.4	262	278
83	97	80 47	49 13	49.6	80 07	44 47	45.2	79 23	40 56	41.4	78 37	37 35	38.1	77 49	34 39	35.3	76 59	32 05	32.8	263	277
84	96	81 31	44 51	45.2	80 47	40 24	40.8	80 01	36 38	37.1	79 12	33 25	33.9	78 21	30 40	31.2	77 29	28 16	28.8	264	276
85	95	82 12	39 40	39.9	81 24	35 22	35.7	80 34	31 48	32.2	79 43	28 49	29.2	78 50	26 18	26.7	77 56	24 09	24.6	265	275
86	94	82 48	33 34	33.8	81 57	29 36	29.8	81 04	26 24	26.7	80 09	23 46	24.1	79 14	21 35	21.9	78 18	19 44	20.1	266	274
87	93	83 18	26 28	26.6	82 23	23 05	23.3	81 28	20 25	20.6	80 31	18 17	18.5	79 34	16 32	16.8	78 36	15 04	15.4	267	273
88	92	83 41	18 22	18.5	82 43	15 52	16.0	81 45	13 57	14.1	80 47	12 26	12.6	79 48	11 12	11.4	78 49	10 11	10.4	268	272
89	91	83 55	9 26	9.5	82 56	8 05	8.2	81 56	7 05	7.1	80 57	6 17	6.4	79 57	5 39	5.7	78 57	5 08	5.2	269	271
90	90	84 00	0 00	0.0	83 00	0 00	0.0	82 00	0 00	0.0	81 00	0 00	0.0	80 00	0 00	0.0	79 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		12°			13°			14°			15°			16°			17°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	78 00	90.0	0 00	77 00	90.0	0 00	76 00	90.0	0 00	75 00	90.0	0 00	74 00	90.0	0 00	73 00	90.0	180	360
1	179	0 59	78 00	89.8	0 58	77 00	89.8	0 58	76 00	89.8	0 58	75 00	89.7	0 58	74 00	89.7	0 57	73 00	89.7	181	359
2	178	1 57	78 00	89.6	1 57	77 00	89.5	1 56	76 00	89.5	1 56	74 59	89.5	1 55	73 59	89.4	1 55	72 59	89.4	182	358
3	177	2 56	77 59	89.4	2 55	76 59	89.3	2 55	75 59	89.3	2 54	74 59	89.2	2 53	73 59	89.2	2 52	72 59	89.1	183	357
4	176	3 55	77 58	89.2	3 54	76 58	89.1	3 53	75 58	89.0	3 52	74 58	89.0	3 51	73 58	88.9	3 49	72 58	88.8	184	356
5	175	4 53	77 57	89.0	4 52	76 57	88.9	4 51	75 57	88.8	4 50	74 57	88.7	4 48	73 57	88.6	4 47	72 56	88.5	185	355
6	174	5 52	77 56	88.7	5 51	76 56	88.6	5 49	75 56	88.5	5 48	74 55	88.4	5 46	73 55	88.3	5 44	72 55	88.2	186	354
7	173	6 51	77 55	88.5	6 49	76 54	88.4	6 47	75 54	88.3	6 46	74 54	88.2	6 44	73 53	88.1	6 42	72 53	87.9	187	353
8	172	7 49	77 53	88.3	7 48	76 53	88.2	7 46	75 52	88.1	7 44	74 52	87.9	7 41	73 51	87.8	7 39	72 51	87.6	188	352
9	171	8 48	77 51	88.1	8 46	76 51	88.0	8 44	75 50	87.8	8 41	74 49	87.7	8 39	73 49	87.5	8 36	72 48	87.3	189	351
10	170	9 47	77 49	87.9	9 44	76 48	87.7	9 42	75 48	87.6	9 39	74 47	87.4	9 37	73 46	87.2	9 34	72 45	87.0	190	350
11	169	10 45	77 47	87.7	10 43	76 46	87.5	10 40	75 45	87.3	10 37	74 44	87.1	10 34	73 43	86.9	10 31	72 42	86.7	191	349
12	168	11 44	77 44	87.5	11 41	76 43	87.3	11 38	75 42	87.1	11 35	74 41	86.9	11 32	73 40	86.6	11 28	72 39	86.4	192	348
13	167	12 43	77 42	87.3	12 40	76 40	87.0	12 36	75 39	86.8	12 33	74 37	86.6	12 29	73 36	86.4	12 25	72 35	86.1	193	347
14	166	13 41	77 39	87.0	13 38	76 37	86.8	13 35	75 35	86.5	13 31	74 34	86.3	13 27	73 32	86.1	13 23	72 31	85.8	194	346
15	165	14 40	77 35	86.8	14 36	76 33	86.6	14 33	75 32	86.3	14 29	74 30	86.0	14 24	73 28	85.8	14 20	72 26	85.5	195	345
16	164	15 38	77 32	86.6	15 35	76 30	86.3	15 31	75 28	86.0	15 26	74 25	85.8	15 22	73 23	85.5	15 17	72 21	85.2	196	344
17	163	16 37	77 28	86.4	16 33	76 26	86.1	16 29	75 23	85.8	16 24	74 21	85.5	16 19	73 19	85.2	16 14	72 16	84.9	197	343
18	162	17 36	77 24	86.1	17 31	76 21	85.8	17 27	75 19	85.5	17 22	74 16	85.2	17 17	73 13	84.9	17 11	72 11	84.6	198	342
19	161	18 34	77 20	85.9	18 30	76 17	85.6	18 25	75 14	85.2	18 20	74 11	84.9	18 14	73 08	84.6	18 08	72 05	84.3	199	341
20	160	19 33	77 15	85.7	19 28	76 12	85.3	19 23	75 08	85.0	19 17	74 05	84.6	19 12	73 02	84.3	19 05	71 59	83.9	200	340
21	159	20 31	77 10	85.4	20 26	76 07	85.1	20 21	75 03	84.7	20 15	73 59	84.3	20 09	72 56	84.0	20 03	71 52	83.6	201	339
22	158	21 30	77 05	85.2	21 24	76 01	84.8	21 19	74 57	84.4	21 13	73 53	84.0	21 06	72 49	83.6	21 00	71 45	83.3	202	338
23	157	22 28	77 00	85.0	22 23	75 55	84.5	22 17	74 51	84.1	22 10	73 46	83.7	22 04	72 42	83.3	21 56	71 38	82.9	203	337
24	156	23 27	76 54	84.7	23 21	75 49	84.3	23 15	74 44	83.9	23 08	73 39	83.4	23 01	72 34	83.0	22 53	71 30	82.6	204	336
25	155	24 25	76 48	84.5	24 19	75 43	84.0	24 13	74 37	83.6	24 06	73 32	83.1	23 58	72 27	82.7	23 50	71 22	82.2	205	335
26	154	25 23	76 42	84.2	25 17	75 36	83.7	25 10	74 30	83.3	25 03	73 24	82.8	24 55	72 18	82.3	24 47	71 13	81.9	206	334
27	153	26 22	76 35	84.0	26 15	75 28	83.5	26 08	74 22	83.0	26 01	73 16	82.5	25 52	72 10	82.0	25 44	71 04	81.5	207	333
28	152	27 20	76 28	83.7	27 13	75 21	83.2	27 06	74 14	82.7	26 58	73 07	82.2	26 50	72 00	81.7	26 41	70 54	81.2	208	332
29	151	28 18	76 20	83.4	28 11	75 13	82.9	28 04	74 05	82.4	27 55	72 58	81.8	27 47	71 51	81.3	27 37	70 44	80.8	209	331
30	150	29 17	76 13	83.2	29 09	75 04	82.6	29 01	73 56	82.0	28 53	72 48	81.5	28 44	71 41	81.0	28 34	70 33	80.4	210	330
31	149	30 15	76 04	82.9	30 07	74 56	82.3	29 59	73 47	81.7	29 50	72 38	81.2	29 41	71 30	80.6	29 30	70 22	80.0	211	329
32	148	31 13	75 56	82.6	31 05	74 46	82.0	30 57	73 37	81.4	30 47	72 28	80.8	30 37	71 19	80.2	30 27	70 11	79.6	212	328
33	147	32 11	75 47	82.3	32 03	74 37	81.7	31 54	73 27	81.1	31 44	72 17	80.5	31 34	71 07	79.9	31 23	69 58	79.2	213	327
34	146	33 10	75 37	82.0	33 01	74 26	81.4	32 52	73 16	80.7	32 42	72 05	80.1	32 31	70 55	79.5	32 20	69 45	78.8	214	326
35	145	34 08	75 27	81.7	33 59	74 16	81.0	33 49	73 04	80.4	33 39	71 53	79.7	33 28	70 42	79.1	33 16	69 32	78.4	215	325
36	144	35 06	75 17	81.4	34 56	74 04	80.7	34 46	72 52	80.0	34 36	71 40	79.4	34 24	70 29	78.7	34 12	69 18	78.0	216	324
37	143	36 04	75 06	81.1	35 54	73 53	80.4	35 44	72 40	79.7	35 33	71 27	79.0	35 21	70 15	78.3	35 08	69 03	77.6	217	323
38	142	37 02	74 54	80.8	36 52	73 40	80.0	36 41	72 27	79.3	36 29	71 13	78.6	36 17	70 00	77.8	36 04	68 48	77.1	218	322
39	141	38 00	74 42	80.4	37 49	73 27	79.7	37 38	72 13	78.9	37 26	70 59	78.2	37 13	69 45	77.4	37 00	68 32	76.7	219	321
40	140	38 57	74 30	80.1	38 47	73 14	79.3	38 35	71 58	78.5	38 23	70 43	77.7	38 10	69 29	77.0	37 56	68 15	76.2	220	320
41	139	39 55	74 16	79.8	39 44	72 59	78.9	39 32	71 43	78.1	39 19	70 27	77.3	39 06	69 12	76.5	38 51	67 57	75.7	221	319
42	138	40 53	74 02	79.4	40 41	72 45	78.5	40 29	71 27	77.7	40 16	70 10	76.9	40 02	68 54	76.1	39 47	67 38	75.3	222	318
43	137	41 51	73 48	79.0	41 39	72 29	78.2	41 26	71 11	77.3	41 12	69 53	76.4	40 58	68 35	75.6	40 42	67 19	74.7	223	317
44	136	42 48	73 32	78.6	42 36	72 12	77.7	42 23	70 53	76.9	42 09	69 34	76.0	41 54	68 16	75.1	41 38	66 58	74.2	224	316
45	135	43 46	73 16	78.3	43 33	71 55	77.3	43 19	70 35	76.4	43 05	69 15	75.5	42 49	67 56	74.6	42 33	66 37	73.7	225	315

Lat. / A		12°			13°			14°			15°			16°			17°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	43 46	73 16	78.3	43 33	71 55	77.3	43 19	70 35	76.4	43 05	69 15	75.5	42 49	67 56	74.6	42 33	66 37	73.7	225	315
46	134	44 43	72 59	77.8	44 30	71 37	76.9	44 16	70 15	75.9	44 01	68 54	75.0	43 45	67 34	74.1	43 28	66 15	73.2	226	314
47	133	45 40	72 41	77.4	45 27	71 18	76.4	45 12	69 55	75.5	44 57	68 33	74.5	44 40	67 12	73.5	44 23	65 51	72.6	227	313
48	132	46 38	72 23	77.0	46 24	70 58	76.0	46 09	69 34	75.0	45 53	68 11	74.0	45 35	66 48	73.0	45 17	65 27	72.0	228	312
49	131	47 35	72 03	76.5	47 20	70 37	75.5	47 05	69 11	74.4	46 48	67 47	73.4	46 30	66 23	72.4	46 12	65 01	71.4	229	311
50	130	48 32	71 42	76.1	48 17	70 15	75.0	48 01	68 48	73.9	47 44	67 22	72.9	47 25	65 58	71.8	47 06	64 34	70.8	230	310
51	129	49 29	71 20	75.6	49 13	69 51	74.5	48 57	68 23	73.4	48 39	66 56	72.3	48 20	65 30	71.2	48 00	64 05	70.1	231	309
52	128	50 25	70 57	75.1	50 09	69 27	73.9	49 52	67 57	72.8	49 34	66 29	71.7	49 15	65 02	70.6	48 54	63 35	69.5	232	308
53	127	51 22	70 33	74.6	51 06	69 01	73.4	50 48	67 30	72.2	50 29	66 00	71.0	50 09	64 31	69.9	49 48	63 04	68.8	233	307
54	126	52 19	70 07	74.0	52 02	68 33	72.8	51 43	67 01	71.6	51 24	65 30	70.4	51 03	64 00	69.2	50 41	62 31	68.1	234	306
55	125	53 15	69 40	73.5	52 57	68 04	72.2	52 38	66 30	70.9	52 18	64 58	69.7	51 57	63 26	68.5	51 34	61 56	67.3	235	305
56	124	54 11	69 11	72.9	53 53	67 34	71.6	53 33	65 58	70.3	53 12	64 24	69.0	52 50	62 51	67.8	52 27	61 20	66.6	236	304
57	123	55 07	68 41	72.2	54 48	67 02	70.9	54 28	65 24	69.6	54 06	63 48	68.3	53 43	62 14	67.0	53 19	60 42	65.8	237	303
58	122	56 03	68 09	71.6	55 43	66 28	70.2	55 22	64 48	68.8	55 00	63 11	67.5	54 36	61 35	66.2	54 12	60 01	64.9	238	302
59	121	56 59	67 34	70.9	56 38	65 51	69.5	56 16	64 10	68.1	55 53	62 31	66.7	55 29	60 54	65.4	55 03	59 18	64.1	239	301
60	120	57 54	66 58	70.2	57 33	65 13	68.7	57 10	63 30	67.3	56 46	61 49	65.9	56 21	60 10	64.5	55 55	58 33	63.1	240	300
61	119	58 49	66 20	69.4	58 27	64 32	67.9	58 04	62 47	66.4	57 39	61 04	65.0	57 13	59 24	63.6	56 46	57 46	62.2	241	299
62	118	59 44	65 38	68.6	59 21	63 49	67.1	58 57	62 02	65.5	58 31	60 17	64.0	58 05	58 35	62.6	57 36	56 56	61.2	242	298
63	117	60 38	64 55	67.8	60 15	63 03	66.2	59 50	61 13	64.6	59 23	59 27	63.1	58 55	57 43	61.6	58 26	56 03	60.2	243	297
64	116	61 32	64 08	66.9	61 08	62 14	65.2	60 42	60 22	63.6	60 15	58 34	62.0	59 46	56 49	60.5	59 16	55 06	59.1	244	296
65	115	62 26	63 18	66.0	62 01	61 21	64.2	61 34	59 28	62.6	61 06	57 37	61.0	60 36	55 51	59.4	60 05	54 07	57.9	245	295
66	114	63 20	62 25	65.0	62 53	60 25	63.2	62 26	58 30	61.5	61 56	56 37	59.8	61 25	54 49	58.2	60 53	53 04	56.7	246	294
67	113	64 13	61 27	63.9	63 45	59 25	62.1	63 16	57 27	60.3	62 46	55 34	58.6	62 14	53 44	57.0	61 41	51 57	55.4	247	293
68	112	65 05	60 26	62.8	64 37	58 21	60.9	64 07	56 21	59.1	63 35	54 25	57.4	63 02	52 34	55.7	62 27	50 47	54.1	248	292
69	111	65 57	59 20	61.6	65 27	57 13	59.6	64 56	55 10	57.8	64 23	53 13	56.0	63 49	51 20	54.3	63 14	49 32	52.7	249	291
70	110	66 48	58 08	60.3	66 18	55 59	58.3	65 45	53 55	56.4	65 11	51 55	54.6	64 36	50 01	52.9	63 59	48 12	51.2	250	290
71	109	67 39	56 52	58.9	67 07	54 40	56.8	66 33	52 33	54.9	65 58	50 33	53.1	65 21	48 38	51.3	64 43	46 48	49.7	251	289
72	108	68 29	55 29	57.4	67 55	53 14	55.3	67 20	51 06	53.3	66 44	49 04	51.5	66 06	47 08	49.7	65 26	45 18	48.0	252	288
73	107	69 18	53 59	55.8	68 43	51 42	53.7	68 07	49 33	51.6	67 29	47 30	49.8	66 49	45 33	48.0	66 08	43 43	46.3	253	287
74	106	70 06	52 22	54.1	69 30	50 03	51.9	68 52	47 52	49.8	68 12	45 49	47.9	67 31	43 52	46.1	66 49	42 02	44.4	254	286
75	105	70 53	50 36	52.2	70 15	48 16	50.0	69 36	46 04	47.9	68 55	44 00	46.0	68 12	42 04	44.2	67 29	40 15	42.5	255	285
76	104	71 38	48 42	50.2	70 59	46 20	47.9	70 18	44 08	45.9	69 36	42 05	43.9	68 52	40 09	42.1	68 07	38 21	40.5	256	284
77	103	72 23	46 37	48.0	71 42	44 15	45.7	70 59	42 03	43.7	70 15	40 01	41.7	69 30	38 07	39.9	68 43	36 21	38.3	257	283
78	102	73 06	44 22	45.6	72 23	42 00	43.4	71 38	39 49	41.3	70 53	37 49	39.4	70 06	35 57	37.6	69 18	34 13	36.0	258	282
79	101	73 47	41 55	43.1	73 02	39 34	40.8	72 16	37 26	38.8	71 28	35 27	36.9	70 40	33 38	35.2	69 50	31 58	33.6	259	281
80	100	74 26	39 15	40.3	73 39	36 57	38.1	72 51	34 51	36.1	72 02	32 57	34.3	71 12	31 12	32.6	70 21	29 36	31.1	260	280
81	99	75 02	36 21	37.3	74 14	34 07	35.1	73 24	32 06	33.2	72 34	30 17	31.5	71 42	28 37	29.9	70 50	27 06	28.4	261	279
82	98	75 37	33 13	34.1	74 46	31 05	32.0	73 55	29 10	30.2	73 03	27 27	28.5	72 09	25 53	27.0	71 16	24 29	25.7	262	278
83	97	76 08	29 50	30.6	75 16	27 50	28.6	74 23	26 03	26.9	73 29	24 27	25.4	72 34	23 02	24.0	71 39	21 44	22.8	263	277
84	96	76 36	26 11	26.8	75 42	24 22	25.0	74 48	22 45	23.5	73 52	21 19	22.1	72 56	20 02	20.9	72 00	18 53	19.8	264	276
85	95	77 01	22 18	22.8	76 05	20 41	21.3	75 09	19 16	19.9	74 12	18 01	18.7	73 15	16 54	17.6	72 18	15 55	16.7	265	275
86	94	77 22	18 10	18.6	76 25	16 49	17.3	75 27	15 38	16.1	74 29	14 36	15.1	73 31	13 40	14.2	72 33	12 51	13.5	266	274
87	93	77 38	13 50	14.1	76 40	12 46	13.1	75 41	11 51	12.2	74 43	11 03	11.4	73 44	10 21	10.8	72 45	9 43	10.2	267	273
88	92	77 50	9 19	9.5	76 51	8 36	8.8	75 52	7 58	8.2	74 52	7 25	7.7	73 53	6 56	7.2	72 53	6 31	6.8	268	272
89	91	77 58	4 42	4.8	76 58	4 19	4.4	75 58	4 00	4.1	74 58	3 44	3.9	73 58	3 29	3.6	72 58	3 16	3.4	269	271
90	90	78 00	0 00	0.0	77 00	0 00	0.0	76 00	0 00	0.0	75 00	0 00	0.0	74 00	0 00	0.0	73 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		18°			19°			20°			21°			22°			23°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	72 00	90.0	0 00	71 00	90.0	0 00	70 00	90.0	0 00	69 00	90.0	0 00	68 00	90.0	0 00	67 00	90.0	180	360
1	179	0 57	72 00	89.7	0 57	71 00	89.7	0 56	70 00	89.7	0 56	69 00	89.6	0 56	68 00	89.6	0 55	67 00	89.6	181	359
2	178	1 54	71 59	89.4	1 53	70 59	89.3	1 53	69 59	89.3	1 52	68 59	89.3	1 51	67 59	89.3	1 50	66 59	89.2	182	358
3	177	2 51	71 59	89.1	2 50	70 59	89.0	2 49	69 58	89.0	2 48	68 58	88.9	2 47	67 58	88.9	2 46	66 58	88.8	183	357
4	176	3 48	71 58	88.8	3 47	70 57	88.7	3 46	69 57	88.6	3 44	68 57	88.6	3 42	67 57	88.5	3 41	66 57	88.4	184	356
5	175	4 45	71 56	88.5	4 44	70 56	88.4	4 42	69 56	88.3	4 40	68 56	88.2	4 38	67 55	88.1	4 36	66 55	88.0	185	355
6	174	5 42	71 54	88.1	5 40	70 54	88.0	5 38	69 54	87.9	5 36	68 54	87.8	5 34	67 53	87.7	5 31	66 53	87.6	186	354
7	173	6 39	71 52	87.8	6 37	70 52	87.7	6 35	69 52	87.6	6 32	68 51	87.5	6 29	67 51	87.4	6 26	66 51	87.3	187	353
8	172	7 36	71 50	87.5	7 34	70 50	87.4	7 31	69 49	87.2	7 28	68 49	87.1	7 25	67 48	87.0	7 22	66 48	86.9	188	352
9	171	8 33	71 47	87.2	8 30	70 47	87.0	8 27	69 46	86.9	8 24	68 46	86.8	8 20	67 45	86.6	8 17	66 45	86.5	189	351
10	170	9 30	71 44	86.9	9 27	70 44	86.7	9 23	69 43	86.5	9 20	68 42	86.4	9 16	67 42	86.2	9 12	66 41	86.1	190	350
11	169	10 27	71 41	86.6	10 24	70 40	86.4	10 20	69 39	86.2	10 16	68 39	86.0	10 11	67 38	85.8	10 07	66 37	85.7	191	349
12	168	11 24	71 37	86.2	11 20	70 36	86.0	11 16	69 35	85.8	11 12	68 34	85.6	11 07	67 33	85.4	11 02	66 32	85.3	192	348
13	167	12 21	71 33	85.9	12 17	70 32	85.7	12 12	69 31	85.5	12 07	68 30	85.3	12 02	67 29	85.1	11 57	66 28	84.8	193	347
14	166	13 18	71 29	85.6	13 13	70 28	85.4	13 08	69 26	85.1	13 03	68 25	84.9	12 58	67 24	84.7	12 52	66 22	84.4	194	346
15	165	14 15	71 24	85.3	14 10	70 23	85.0	14 05	69 21	84.8	13 59	68 20	84.5	13 53	67 18	84.3	13 47	66 17	84.0	195	345
16	164	15 12	71 19	84.9	15 06	70 18	84.7	15 01	69 16	84.4	14 55	68 14	84.1	14 48	67 12	83.9	14 42	66 10	83.6	196	344
17	163	16 09	71 14	84.6	16 03	70 12	84.3	15 57	69 10	84.0	15 50	68 08	83.7	15 44	67 06	83.5	15 37	66 04	83.2	197	343
18	162	17 05	71 08	84.3	16 59	70 06	84.0	16 53	69 03	83.7	16 46	68 01	83.4	16 39	66 59	83.1	16 32	65 57	82.8	198	342
19	161	18 02	71 02	83.9	17 56	69 59	83.6	17 49	68 57	83.3	17 42	67 54	83.0	17 34	66 52	82.7	17 26	65 49	82.3	199	341
20	160	18 59	70 56	83.6	18 52	69 53	83.2	18 45	68 50	82.9	18 37	67 47	82.6	18 29	66 44	82.2	18 21	65 41	81.9	200	340
21	159	19 56	70 49	83.2	19 48	69 45	82.9	19 41	68 42	82.5	19 33	67 39	82.2	19 24	66 36	81.8	19 16	65 33	81.5	201	339
22	158	20 52	70 41	82.9	20 45	69 38	82.5	20 37	68 34	82.1	20 28	67 31	81.8	20 19	66 27	81.4	20 10	65 24	81.0	202	338
23	157	21 49	70 33	82.5	21 41	69 29	82.1	21 32	68 26	81.7	21 24	67 22	81.4	21 14	66 18	81.0	21 05	65 15	80.6	203	337
24	156	22 45	70 25	82.2	22 37	69 21	81.8	22 28	68 17	81.3	22 19	67 12	80.9	22 09	66 09	80.5	21 59	65 05	80.1	204	336
25	155	23 42	70 17	81.8	23 33	69 12	81.4	23 24	68 07	80.9	23 14	67 03	80.5	23 04	65 58	80.1	22 54	64 54	79.7	205	335
26	154	24 38	70 07	81.4	24 29	69 02	81.0	24 20	67 57	80.5	24 09	66 52	80.1	23 59	65 48	79.6	23 48	64 43	79.2	206	334
27	153	25 35	69 58	81.1	25 25	68 52	80.6	25 15	67 47	80.1	25 05	66 42	79.7	24 54	65 36	79.2	24 42	64 32	78.7	207	333
28	152	26 31	69 48	80.7	26 21	68 42	80.2	26 11	67 36	79.7	26 00	66 30	79.2	25 48	65 25	78.7	25 36	64 19	78.3	208	332
29	151	27 27	69 37	80.3	27 17	68 31	79.8	27 06	67 24	79.3	26 55	66 18	78.8	26 43	65 12	78.3	26 30	64 07	77.8	209	331
30	150	28 24	69 26	79.9	28 13	68 19	79.4	28 01	67 12	78.8	27 50	66 06	78.3	27 37	64 59	77.8	27 24	63 53	77.3	210	330
31	149	29 20	69 14	79.5	29 09	68 07	78.9	28 57	67 00	78.4	28 44	65 53	77.8	28 31	64 46	77.3	28 18	63 39	76.8	211	329
32	148	30 16	69 02	79.1	30 04	67 54	78.5	29 52	66 46	77.9	29 39	65 39	77.4	29 26	64 32	76.8	29 12	63 25	76.3	212	328
33	147	31 12	68 49	78.7	31 00	67 41	78.1	30 47	66 32	77.5	30 34	65 24	76.9	30 20	64 17	76.3	30 05	63 09	75.8	213	327
34	146	32 08	68 36	78.2	31 55	67 27	77.6	31 42	66 18	77.0	31 28	65 09	76.4	31 14	64 01	75.8	30 59	62 53	75.2	214	326
35	145	33 04	68 22	77.8	32 51	67 12	77.2	32 37	66 03	76.5	32 23	64 54	75.9	32 08	63 45	75.3	31 52	62 36	74.7	215	325
36	144	33 59	68 07	77.3	33 46	66 57	76.7	33 32	65 47	76.0	33 17	64 37	75.4	33 01	63 28	74.8	32 45	62 19	74.2	216	324
37	143	34 55	67 52	76.9	34 41	66 41	76.2	34 26	65 30	75.5	34 11	64 20	74.9	33 55	63 10	74.2	33 38	62 01	73.6	217	323
38	142	35 50	67 36	76.4	35 36	66 24	75.7	35 21	65 13	75.0	35 05	64 02	74.4	34 48	62 51	73.7	34 31	61 41	73.0	218	322
39	141	36 46	67 19	76.0	36 31	66 06	75.2	36 15	64 54	74.5	35 59	63 43	73.8	35 42	62 32	73.1	35 24	61 21	72.4	219	321
40	140	37 41	67 01	75.5	37 26	65 48	74.7	37 10	64 35	74.0	36 53	63 23	73.3	36 35	62 12	72.6	36 17	61 01	71.8	220	320
41	139	38 36	66 42	75.0	38 20	65 29	74.2	38 04	64 15	73.4	37 46	63 02	72.7	37 28	61 50	72.0	37 09	60 39	71.2	221	319
42	138	39 31	66 23	74.5	39 15	65 08	73.7	38 58	63 54	72.9	38 40	62 41	72.1	38 21	61 28	71.4	38 01	60 16	70.6	222	318
43	137	40 26	66 03	73.9	40 09	64 47	73.1	39 51	63 33	72.3	39 33	62 18	71.5	39 13	61 05	70.7	38 53	59 52	70.0	223	317
44	136	41 21	65 42	73.4	41 03	64 25	72.5	40 45	63 10	71.7	40 26	61 55	70.9	40 06	60 41	70.1	39 45	59 27	69.3	224	316
45	135	42 16	65 19	72.8	41 57	64 02	72.0	41 38	62 46	71.1	41 19	61 30	70.3	40 58	60 15	69.5	40 37	59 01	68.7	225	315

Lat. / A		18°			19°			20°			21°			22°			23°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	42 16	65 19	72.8	41 57	64 02	72.0	41 38	62 46	71.1	41 19	61 30	70.3	40 58	60 15	69.5	40 37	59 01	68.7	225	315
46	134	43 10	64 56	72.3	42 51	63 38	71.4	42 32	62 21	70.5	42 11	61 05	69.6	41 50	59 49	68.8	41 28	58 34	68.0	226	314
47	133	44 04	64 32	71.7	43 45	63 13	70.8	43 25	61 55	69.9	43 04	60 38	69.0	42 42	59 21	68.1	42 19	58 06	67.3	227	313
48	132	44 58	64 06	71.1	44 38	62 46	70.1	44 18	61 27	69.2	43 56	60 09	68.3	43 33	58 53	67.4	43 10	57 37	66.5	228	312
49	131	45 52	63 39	70.4	45 32	62 18	69.5	45 10	60 59	68.5	44 48	59 40	67.6	44 24	58 22	66.7	44 00	57 06	65.8	229	311
50	130	46 46	63 11	69.8	46 25	61 49	68.8	46 03	60 29	67.8	45 39	59 09	66.9	45 15	57 51	65.9	44 50	56 34	65.0	230	310
51	129	47 39	62 42	69.1	47 17	61 19	68.1	46 55	59 57	67.1	46 31	58 37	66.1	46 06	57 18	65.2	45 40	56 00	64.2	231	309
52	128	48 33	62 11	68.4	48 10	60 47	67.4	47 46	59 25	66.4	47 22	58 03	65.4	46 56	56 44	64.4	46 30	55 25	63.4	232	308
53	127	49 25	61 38	67.7	49 02	60 13	66.6	48 38	58 50	65.6	48 13	57 28	64.6	47 46	56 07	63.6	47 19	54 48	62.6	233	307
54	126	50 18	61 04	67.0	49 54	59 38	65.9	49 29	58 14	64.8	49 03	56 51	63.7	48 36	55 30	62.7	48 08	54 10	61.7	234	306
55	125	51 10	60 28	66.2	50 46	59 01	65.1	50 20	57 36	64.0	49 53	56 12	62.9	49 25	54 50	61.9	48 56	53 30	60.8	235	305
56	124	52 03	59 50	65.4	51 37	58 23	64.2	51 10	56 56	63.1	50 43	55 32	62.0	50 14	54 09	61.0	49 44	52 48	59.9	236	304
57	123	52 54	59 11	64.6	52 28	57 42	63.4	52 00	56 15	62.2	51 32	54 49	61.1	51 02	53 26	60.0	50 32	52 04	59.0	237	303
58	122	53 46	58 29	63.7	53 18	56 59	62.5	52 50	55 31	61.3	52 21	54 05	60.2	51 50	52 41	59.1	51 19	51 18	58.0	238	302
59	121	54 37	57 45	62.8	54 08	56 14	61.5	53 39	54 45	60.4	53 09	53 18	59.2	52 38	51 53	58.1	52 06	50 30	57.0	239	301
60	120	55 27	56 59	61.8	54 58	55 27	60.6	54 28	53 57	59.4	53 57	52 29	58.2	53 25	51 04	57.0	52 52	49 40	55.9	240	300
61	119	56 17	56 10	60.9	55 47	54 37	59.6	55 16	53 06	58.3	54 44	51 38	57.1	54 11	50 12	55.9	53 37	48 48	54.8	241	299
62	118	57 07	55 19	59.8	56 36	53 45	58.5	56 04	52 13	57.2	55 31	50 44	56.0	54 57	49 17	54.8	54 22	47 53	53.7	242	298
63	117	57 56	54 25	58.8	57 24	52 49	57.4	56 51	51 17	56.1	56 17	49 47	54.9	55 42	48 20	53.7	55 06	46 55	52.5	243	297
64	116	58 44	53 27	57.6	58 12	51 51	56.3	57 38	50 18	55.0	57 03	48 48	53.7	56 27	47 20	52.5	55 50	45 55	51.3	244	296
65	115	59 32	52 27	56.5	58 58	50 50	55.1	58 23	49 16	53.7	57 47	47 45	52.5	57 10	46 17	51.2	56 32	44 52	50.0	245	295
66	114	60 19	51 23	55.2	59 45	49 45	53.8	59 09	48 11	52.5	58 32	46 39	51.2	57 53	45 11	49.9	57 14	43 47	48.7	246	294
67	113	61 06	50 15	53.9	60 30	48 37	52.5	59 53	47 02	51.1	59 15	45 30	49.8	58 36	44 02	48.6	57 55	42 38	47.4	247	293
68	112	61 52	49 04	52.6	61 15	47 25	51.1	60 36	45 50	49.8	59 57	44 18	48.4	59 17	42 50	47.2	58 36	41 26	46.0	248	292
69	111	62 37	47 48	51.2	61 58	46 09	49.7	61 19	44 33	48.3	60 39	43 02	47.0	59 57	41 34	45.7	59 15	40 10	44.5	249	291
70	110	63 21	46 28	49.7	62 41	44 48	48.2	62 01	43 13	46.8	61 19	41 42	45.4	60 36	40 15	44.2	59 53	38 52	43.0	250	290
71	109	64 04	45 03	48.1	63 23	43 24	46.6	62 41	41 49	45.2	61 58	40 18	43.9	61 15	38 52	42.6	60 30	37 29	41.4	251	289
72	108	64 45	43 34	46.4	64 04	41 54	44.9	63 21	40 20	43.5	62 37	38 50	42.2	61 52	37 25	40.9	61 06	36 03	39.7	252	288
73	107	65 26	41 59	44.7	64 43	40 20	43.2	63 59	38 46	41.8	63 14	37 18	40.5	62 27	35 53	39.2	61 41	34 34	38.0	253	287
74	106	66 06	40 19	42.9	65 21	38 41	41.4	64 36	37 08	40.0	63 49	35 41	38.7	63 02	34 18	37.4	62 14	33 00	36.3	254	286
75	105	66 44	38 32	40.9	65 58	36 56	39.5	65 11	35 25	38.1	64 23	33 59	36.8	63 35	32 39	35.6	62 46	31 22	34.4	255	285
76	104	67 20	36 40	38.9	66 33	35 05	37.4	65 45	33 37	36.1	64 56	32 13	34.8	64 07	30 55	33.6	63 16	29 41	32.5	256	284
77	103	67 55	34 42	36.8	67 07	33 09	35.3	66 18	31 43	34.0	65 27	30 22	32.8	64 37	29 06	31.6	63 45	27 55	30.6	257	283
78	102	68 29	32 37	34.5	67 39	31 07	33.1	66 48	29 44	31.9	65 57	28 26	30.7	65 05	27 14	29.6	64 13	26 06	28.5	258	282
79	101	69 00	30 25	32.2	68 09	29 00	30.8	67 17	27 40	29.6	66 25	26 26	28.5	65 32	25 17	27.4	64 38	24 12	26.4	259	281
80	100	69 29	28 07	29.7	68 37	26 46	28.4	67 44	25 30	27.3	66 50	24 20	26.2	65 56	23 15	25.2	65 02	22 15	24.3	260	280
81	99	69 57	25 43	27.1	69 03	24 26	25.9	68 09	23 15	24.8	67 14	22 10	23.8	66 19	21 10	22.9	65 23	20 14	22.1	261	279
82	98	70 21	23 11	24.5	69 27	22 00	23.3	68 31	20 56	22.3	67 36	19 56	21.4	66 40	19 00	20.6	65 43	18 09	19.8	262	278
83	97	70 44	20 34	21.7	69 48	19 29	20.7	68 51	18 31	19.7	67 55	17 37	18.9	66 58	16 47	18.1	66 01	16 01	17.4	263	277
84	96	71 03	17 50	18.8	70 07	16 53	17.9	69 09	16 01	17.1	68 12	15 14	16.3	67 14	14 30	15.7	66 16	13 50	15.1	264	276
85	95	71 20	15 01	15.8	70 23	14 12	15.0	69 25	13 28	14.3	68 26	12 48	13.7	67 28	12 10	13.1	66 29	11 36	12.6	265	275
86	94	71 35	12 07	12.8	70 36	11 27	12.1	69 37	10 51	11.6	68 38	10 18	11.0	67 39	9 48	10.6	66 40	9 20	10.1	266	274
87	93	71 46	9 09	9.6	70 46	8 39	9.1	69 47	8 11	8.7	68 48	7 46	8.3	67 48	7 23	8.0	66 49	7 02	7.6	267	273
88	92	71 54	6 08	6.4	70 54	5 47	6.1	69 54	5 29	5.8	68 55	5 12	5.6	67 55	4 56	5.3	66 55	4 42	5.1	268	272
89	91	71 58	3 04	3.2	70 58	2 54	3.1	69 59	2 45	2.9	68 59	2 36	2.8	67 59	2 28	2.7	66 59	2 21	2.6	269	271
90	90	72 00	0 00	0.0	71 00	0 00	0.0	70 00	0 00	0.0	69 00	0 00	0.0	68 00	0 00	0.0	67 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		24°			25°			26°			27°			28°			29°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	66 00	90.0	0 00	65 00	90.0	0 00	64 00	90.0	0 00	63 00	90.0	0 00	62 00	90.0	0 00	61 00	90.0	180	360
1	179	0 55	66 00	89.6	0 54	65 00	89.6	0 54	64 00	89.6	0 53	63 00	89.5	0 53	62 00	89.5	0 52	61 00	89.5	181	359
2	178	1 50	65 59	89.2	1 49	64 59	89.2	1 48	63 59	89.1	1 47	62 59	89.1	1 46	61 59	89.1	1 45	60 59	89.0	182	358
3	177	2 44	65 58	88.8	2 43	64 58	88.7	2 42	63 58	88.7	2 40	62 58	88.6	2 39	61 58	88.6	2 37	60 58	88.5	183	357
4	176	3 39	65 57	88.4	3 37	64 57	88.3	3 36	63 57	88.2	3 34	62 57	88.2	3 32	61 57	88.1	3 30	60 56	88.1	184	356
5	175	4 34	65 55	88.0	4 32	64 55	87.9	4 30	63 55	87.8	4 27	62 55	87.7	4 25	61 55	87.6	4 22	60 54	87.6	185	355
6	174	5 29	65 53	87.6	5 26	64 53	87.5	5 23	63 53	87.4	5 21	62 52	87.3	5 18	61 52	87.2	5 15	60 52	87.1	186	354
7	173	6 24	65 50	87.1	6 20	64 50	87.0	6 17	63 50	86.9	6 14	62 50	86.8	6 11	61 49	86.7	6 07	60 49	86.6	187	353
8	172	7 18	65 47	86.7	7 15	64 47	86.6	7 11	63 47	86.5	7 07	62 46	86.3	7 04	61 46	86.2	6 59	60 46	86.1	188	352
9	171	8 13	65 44	86.3	8 09	64 44	86.2	8 05	63 43	86.0	8 01	62 43	85.9	7 56	61 42	85.7	7 52	60 42	85.6	189	351
10	170	9 08	65 40	85.9	9 03	64 40	85.7	8 59	63 39	85.6	8 54	62 39	85.4	8 49	61 38	85.3	8 44	60 38	85.1	190	350
11	169	10 02	65 36	85.5	9 57	64 35	85.3	9 52	63 35	85.1	9 47	62 34	85.0	9 42	61 33	84.8	9 36	60 33	84.6	191	349
12	168	10 57	65 32	85.1	10 52	64 31	84.9	10 46	63 30	84.7	10 41	62 29	84.5	10 35	61 28	84.3	10 29	60 28	84.1	192	348
13	167	11 52	65 27	84.6	11 46	64 26	84.4	11 40	63 25	84.2	11 34	62 24	84.0	11 27	61 23	83.8	11 21	60 22	83.6	193	347
14	166	12 46	65 21	84.2	12 40	64 20	84.0	12 34	63 19	83.8	12 27	62 18	83.5	12 20	61 17	83.3	12 13	60 16	83.1	194	346
15	165	13 41	65 15	83.8	13 34	64 14	83.5	13 27	63 13	83.3	13 20	62 11	83.1	13 13	61 10	82.8	13 05	60 09	82.6	195	345
16	164	14 35	65 09	83.3	14 28	64 07	83.1	14 21	63 06	82.8	14 13	62 04	82.6	14 05	61 03	82.3	13 57	60 02	82.1	196	344
17	163	15 29	65 02	82.9	15 22	64 00	82.6	15 14	62 59	82.4	15 06	61 57	82.1	14 58	60 56	81.8	14 49	59 54	81.6	197	343
18	162	16 24	64 55	82.5	16 16	63 53	82.2	16 08	62 51	81.9	15 59	61 49	81.6	15 50	60 47	81.3	15 41	59 46	81.0	198	342
19	161	17 18	64 47	82.0	17 10	63 45	81.7	17 01	62 43	81.4	16 52	61 41	81.1	16 42	60 39	80.8	16 33	59 37	80.5	199	341
20	160	18 12	64 39	81.6	18 03	63 36	81.3	17 54	62 34	80.9	17 45	61 32	80.6	17 35	60 30	80.3	17 24	59 28	80.0	200	340
21	159	19 07	64 30	81.1	18 57	63 28	80.8	18 47	62 25	80.4	18 37	61 23	80.1	18 27	60 20	79.8	18 16	59 18	79.5	201	339
22	158	20 01	64 21	80.7	19 51	63 18	80.3	19 41	62 15	80.0	19 30	61 13	79.6	19 19	60 10	79.3	19 08	59 08	78.9	202	338
23	157	20 55	64 11	80.2	20 44	63 08	79.8	20 34	62 05	79.5	20 22	61 02	79.1	20 11	59 59	78.7	19 59	58 57	78.4	203	337
24	156	21 49	64 01	79.7	21 38	62 58	79.3	21 27	61 54	79.0	21 15	60 51	78.6	21 03	59 48	78.2	20 50	58 45	77.8	204	336
25	155	22 43	63 50	79.3	22 31	62 46	78.9	22 19	61 43	78.4	22 07	60 39	78.0	21 55	59 36	77.7	21 42	58 33	77.3	205	335
26	154	23 36	63 39	78.8	23 25	62 35	78.4	23 12	61 31	77.9	22 59	60 27	77.5	22 46	59 24	77.1	22 33	58 20	76.7	206	334
27	153	24 30	63 27	78.3	24 18	62 22	77.8	24 05	61 18	77.4	23 52	60 14	77.0	23 38	59 10	76.5	23 24	58 07	76.1	207	333
28	152	25 24	63 14	77.8	25 11	62 10	77.3	24 57	61 05	76.9	24 44	60 01	76.4	24 29	58 57	76.0	24 15	57 53	75.5	208	332
29	151	26 17	63 01	77.3	26 04	61 56	76.8	25 50	60 51	76.3	25 36	59 47	75.9	25 21	58 42	75.4	25 05	57 38	75.0	209	331
30	150	27 11	62 48	76.8	26 57	61 42	76.3	26 42	60 37	75.8	26 27	59 32	75.3	26 12	58 27	74.8	25 56	57 23	74.4	210	330
31	149	28 04	62 33	76.3	27 50	61 27	75.8	27 35	60 22	75.2	27 19	59 16	74.7	27 03	58 11	74.2	26 46	57 07	73.8	211	329
32	148	28 57	62 18	75.7	28 42	61 12	75.2	28 27	60 06	74.7	28 10	59 00	74.2	27 54	57 55	73.7	27 37	56 50	73.1	212	328
33	147	29 50	62 02	75.2	29 35	60 56	74.7	29 19	59 49	74.1	29 02	58 43	73.6	28 45	57 38	73.0	28 27	56 32	72.5	213	327
34	146	30 43	61 46	74.7	30 27	60 39	74.1	30 10	59 32	73.5	29 53	58 26	73.0	29 35	57 20	72.4	29 17	56 14	71.9	214	326
35	145	31 36	61 28	74.1	31 19	60 21	73.5	31 02	59 14	72.9	30 44	58 07	72.4	30 26	57 01	71.8	30 07	55 55	71.2	215	325
36	144	32 29	61 10	73.5	32 11	60 02	72.9	31 53	58 55	72.3	31 35	57 48	71.7	31 16	56 41	71.2	30 56	55 35	70.6	216	324
37	143	33 21	60 52	73.0	33 03	59 43	72.3	32 45	58 35	71.7	32 26	57 28	71.1	32 06	56 21	70.5	31 46	55 14	69.9	217	323
38	142	34 13	60 32	72.4	33 55	59 23	71.7	33 36	58 15	71.1	33 16	57 07	70.5	32 56	55 59	69.9	32 35	54 53	69.3	218	322
39	141	35 06	60 11	71.8	34 47	59 02	71.1	34 27	57 53	70.5	34 06	56 45	69.8	33 45	55 37	69.2	33 24	54 30	68.6	219	321
40	140	35 58	59 50	71.2	35 38	58 40	70.5	35 17	57 31	69.8	34 56	56 22	69.1	34 35	55 14	68.5	34 12	54 07	67.9	220	320
41	139	36 49	59 28	70.5	36 29	58 17	69.8	36 08	57 08	69.1	35 46	55 59	68.5	35 24	54 50	67.8	35 01	53 42	67.1	221	319
42	138	37 41	59 04	69.9	37 20	57 54	69.2	36 58	56 43	68.5	36 36	55 34	67.8	36 13	54 25	67.1	35 49	53 17	66.4	222	318
43	137	38 32	58 40	69.2	38 11	57 29	68.5	37 48	56 18	67.8	37 25	55 08	67.1	37 02	53 59	66.4	36 37	52 50	65.7	223	317
44	136	39 23	58 15	68.6	39 01	57 03	67.8	38 38	55 52	67.1	38 14	54 41	66.3	37 50	53 32	65.6	37 25	52 23	64.9	224	316
45	135	40 14	57 48	67.9	39 51	56 36	67.1	39 28	55 24	66.3	39 03	54 13	65.6	38 38	53 04	64.9	38 12	51 54	64.1	225	315

Lat. / A		24°			25°			26°			27°			28°			29°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	40 14	57 48	67.9	39 51	56 36	67.1	39 28	55 24	66.3	39 03	54 13	65.6	38 38	53 04	64.9	38 12	51 54	64.1	225	315
46	134	41 05	57 21	67.2	40 41	56·08	66.4	40 17	54 56	65.6	39 52	53 44	64.8	39 26	52 34	64.1	38 59	51 25	63.3	226	314
47	133	41 55	56 52	66.4	41 31	55 38	65.6	41 06	54 26	64.8	40 40	53 14	64.0	40 13	52 04	63.3	39 46	50 54	62.5	227	313
48	132	42 45	56 22	65.7	42 20	55 08	64.9	41 54	53 55	64.0	41 28	52 43	63.2	41 00	51 32	62.5	40 32	50 22	61.7	228	312
49	131	43 35	55 50	64.9	43 09	54 36	64.1	42 43	53 22	63.2	42 15	52 10	62.4	41 47	50 59	61.6	41 18	49 48	60.9	229	311
50	130	44 25	55 17	64.1	43 58	54 02	63.3	43 31	52 49	62.4	43 03	51 36	61.6	42 34	50 24	60.8	42 04	49 14	60.0	230	310
51	129	45 14	54 43	63.3	44 47	53 28	62.4	44 18	52 13	61.6	43 49	51 00	60.7	43 20	49 48	59.9	42 49	48 38	59.1	231	309
52	128	46 03	54 08	62.5	45 35	52 52	61.6	45 06	51 37	60.7	44 36	50 23	59.8	44 05	49 11	59.0	43 34	48 00	58.2	232	308
53	127	46 51	53 30	61.6	46 22	52 14	60.7	45 52	50 59	59.8	45 22	49 45	58.9	44 51	48 32	58.1	44 18	47 21	57.2	233	307
54	126	47 39	52 51	60.8	47 09	51 34	59.8	46 39	50 19	58.9	46 07	49 05	58.0	45 35	47 52	57.1	45 02	46 41	56.3	234	306
55	125	48 27	52 11	59.8	47 56	50 53	58.9	47 25	49 37	58.0	46 53	48 23	57.0	46 19	47 10	56.2	45 46	45 59	55.3	235	305
56	124	49 14	51 28	58.9	48 43	50 11	57.9	48 10	48 54	57.0	47 37	47 40	56.1	47 03	46 27	55.2	46 29	45 15	54.3	236	304
57	123	50 01	50 44	57.9	49 28	49 26	56.9	48 55	48 09	56.0	48 21	46 54	55.0	47 46	45 41	54.1	47 11	44 30	53.3	237	303
58	122	50 47	49 58	56.9	50 14	48 39	55.9	49 40	47 22	54.9	49 05	46 07	54.0	48 29	44 54	53.1	47 53	43 43	52.2	238	302
59	121	51 33	49 09	55.9	50 58	47 51	54.9	50 23	46 34	53.9	49 48	45 18	52.9	49 11	44 05	52.0	48 34	42 54	51.1	239	301
60	120	52 18	48 19	54.8	51 43	47 00	53.8	51 07	45 43	52.8	50 30	44 28	51.8	49 53	43 14	50.9	49 14	42 03	50.0	240	300
61	119	53 02	47 26	53.7	52 26	46 07	52.7	51 49	44 50	51.7	51 12	43 35	50.7	50 33	42 22	49.7	49 54	41 10	48.8	241	299
62	118	53 46	46 31	52.6	53 09	45 12	51.5	52 31	43 54	50.5	51 53	42 39	49.5	51 13	41 27	48.6	50 33	40 16	47.6	242	298
63	117	54 29	45 33	51.4	53 51	44 14	50.3	53 13	42 57	49.3	52 33	41 42	48.3	51 53	40 30	47.3	51 12	39 19	46.4	243	297
64	116	55 12	44 33	50.2	54 33	43 14	49.1	53 53	41 57	48.1	53 13	40 42	47.1	52 31	39 30	46.1	51 49	38 20	45.2	244	296
65	115	55 53	43 30	48.9	55 13	42 11	47.8	54 33	40 55	46.8	53 51	39 40	45.8	53 09	38 29	44.8	52 26	37 19	43.9	245	295
66	114	56 34	42 25	47.6	55 53	41 06	46.5	55 12	39 50	45.4	54 29	38 36	44.4	53 46	37 25	43.5	53 02	36 16	42.6	246	294
67	113	57 14	41 16	46.2	56 32	39 58	45.1	55 50	38 42	44.1	55 06	37 29	43.1	54 22	36 19	42.1	53 37	35 11	41.2	247	293
68	112	57 53	40 05	44.8	57 10	38 47	43.7	56 27	37 32	42.7	55 42	36 19	41.7	54 57	35 10	40.7	54 11	34 03	39.8	248	292
69	111	58 32	38 50	43.3	57 47	37 33	42.2	57 03	36 18	41.2	56 17	35 07	40.2	55 31	33 59	39.3	54 44	32 53	38.4	249	291
70	110	59 09	37 32	41.8	58 23	36 16	40.7	57 38	35 02	39.7	56 51	33 52	38.7	56 04	32 45	37.8	55 16	31 41	36.9	250	290
71	109	59 45	36 11	40.2	58 58	34 55	39.2	58 12	33 43	38.1	57 24	32 35	37.2	56 36	31 29	36.3	55 47	30 26	35.4	251	289
72	108	60 19	34 46	38.6	59 32	33 32	37.6	58 44	32 21	36.5	57 56	31 14	35.6	57 07	30 10	34.7	56 17	29 08	33.8	252	288
73	107	60 53	33 18	36.9	60 05	32 05	35.9	59 16	30 56	34.9	58 26	29 51	34.0	57 36	28 48	33.1	56 46	27 49	32.2	253	287
74	106	61 25	31 46	35.2	60 36	30 35	34.2	59 46	29 28	33.2	58 55	28 25	32.3	58 05	27 24	31.4	57 13	26 26	30.6	254	286
75	105	61 56	30 10	33.4	61 06	29 02	32.4	60 15	27 57	31.4	59 23	26 56	30.5	58 31	25 57	29.7	57 39	25 02	28.9	255	285
76	104	62 26	28 31	31.5	61 34	27 25	30.5	60 42	26 23	29.6	59 50	25 24	28.8	58 57	24 28	28.0	58 04	23 35	27.2	256	284
77	103	62 53	26 48	29.6	62 01	25 45	28.6	61 08	24 46	27.8	60 15	23 49	27.0	59 21	22 56	26.2	58 27	22 05	25.5	257	283
78	102	63 20	25 02	27.6	62 26	24 02	26.7	61 32	23 05	25.9	60 38	22 12	25.1	59 44	21 21	24.4	58 49	20 34	23.7	258	282
79	101	63 44	23 12	25.5	62 50	22 15	24.7	61 55	21 22	23.9	61 00	20 32	23.2	60 05	19 44	22.5	59 09	19 00	21.8	259	281
80	100	64 07	21 18	23.4	63 12	20 25	22.6	62 16	19 36	21.9	61 20	18 49	21.2	60 24	18 05	20.6	59 28	17 24	20.0	260	280
81	99	64 28	19 22	21.3	63 32	18 33	20.5	62 35	17 47	19.9	61 39	17 04	19.2	60 42	16 24	18.6	59 45	15 46	18.1	261	279
82	98	64 47	17 22	19.1	63 50	16 37	18.4	62 53	15 56	17.8	61 56	15 17	17.2	60 58	14 40	16.7	60 01	14 06	16.2	262	278
83	97	65 03	15 18	16.8	64 06	14 39	16.2	63 08	14 02	15.6	62 10	13 27	15.1	61 12	12 55	14.7	60 14	12 24	14.2	263	277
84	96	65 18	13 13	14.5	64 20	12 38	14.0	63 22	12 06	13.5	62 23	11 36	13.0	61 25	11 07	12.6	60 26	10 41	12.2	264	276
85	95	65 31	11 05	12.1	64 32	10 35	11.7	63 33	10 08	11.3	62 35	9 42	10.9	61 36	9 19	10.6	60 37	8 56	10.2	265	275
86	94	65 41	8 54	9.8	64 42	8 30	9.4	63 43	8 08	9.1	62 44	7 48	8.8	61 44	7 28	8.5	60 45	7 10	8.2	266	274
87	93	65 49	6 42	7.3	64 50	6 24	7.1	63 50	6 07	6.8	62 51	5 52	6.6	61 51	5 37	6.4	60 52	5 24	6.2	267	273
88	92	65 55	4 29	4.9	64 56	4 17	4.7	63 56	4 06	4.6	62 56	3 55	4.4	61 56	3 45	4.3	60 56	3 36	4.1	268	272
89	91	65 59	2 15	2.5	64 59	2 09	2.4	63 59	2 03	2.3	62 59	1 58	2.2	61 59	1 53	2.1	60 59	1 48	2.1	269	271
90	90	66 00	0 00	0.0	65 00	0 00	0.0	64 00	0 00	0.0	63 00	0 00	0.0	62 00	0 00	0.0	61 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		30°			31°			32°			33°			34°			35°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	60 00	90.0	0 00	59 00	90.0	0 00	58 00	90.0	0 00	57 00	90.0	0 00	56 00	90.0	0 00	55 00	90.0	180	360
1	179	0 52	60 00	89.5	0 51	59 00	89.5	0 51	58 00	89.5	0 50	57 00	89.5	0 50	56 00	89.4	0 49	55 00	89.4	181	359
2	178	1 44	59 59	89.0	1 43	58 59	89.0	1 42	57 59	88.9	1 41	56 59	88.9	1 39	55 59	88.9	1 38	54 59	88.9	182	358
3	177	2 36	59 58	88.5	2 34	58 58	88.5	2 33	57 58	88.4	2 31	56 58	88.4	2 29	55 58	88.3	2 27	54 58	88.3	183	357
4	176	3 28	59 56	88.0	3 26	58 56	87.9	3 23	57 56	87.9	3 21	56 56	87.8	3 19	55 56	87.8	3 17	54 56	87.7	184	356
5	175	4 20	59 54	87.5	4 17	58 54	87.4	4 14	57 54	87.3	4 12	56 54	87.3	4 09	55 54	87.2	4 06	54 54	87.1	185	355
6	174	5 12	59 52	87.0	5 08	58 52	86.9	5 05	57 52	86.8	5 02	56 51	86.7	4 58	55 51	86.6	4 55	54 51	86.6	186	354
7	173	6 04	59 49	86.5	6 00	58 49	86.4	5 56	57 48	86.3	5 52	56 48	86.2	5 48	55 48	86.1	5 44	54 48	86.0	187	353
8	172	6 55	59 45	86.0	6 51	58 45	85.9	6 47	57 45	85.7	6 42	56 45	85.6	6 38	55 44	85.5	6 33	54 44	85.4	188	352
9	171	7 47	59 42	85.5	7 42	58 41	85.3	7 37	57 41	85.2	7 32	56 40	85.1	7 27	55 40	84.9	7 22	54 40	84.8	189	351
10	170	8 39	59 37	85.0	8 34	58 37	84.8	8 28	57 36	84.7	8 22	56 36	84.5	8 17	55 36	84.4	8 11	54 35	84.2	190	350
11	169	9 31	59 32	84.4	9 25	58 32	84.3	9 19	57 31	84.1	9 13	56 31	84.0	9 06	55 30	83.8	9 00	54 30	83.6	191	349
12	168	10 22	59 27	83.9	10 16	58 26	83.8	10 09	57 26	83.6	10 03	56 25	83.4	9 56	55 25	83.2	9 48	54 24	83.0	192	348
13	167	11 14	59 21	83.4	11 07	58 20	83.2	11 00	57 20	83.0	10 52	56 19	82.8	10 45	55 18	82.6	10 37	54 18	82.5	193	347
14	166	12 06	59 15	82.9	11 58	58 14	82.7	11 50	57 13	82.5	11 42	56 12	82.3	11 34	55 12	82.1	11 26	54 11	81.9	194	346
15	165	12 57	59 08	82.4	12 49	58 07	82.1	12 41	57 06	81.9	12 32	56 05	81.7	12 23	55 04	81.5	12 14	54 04	81.3	195	345
16	164	13 49	59 01	81.8	13 40	57 59	81.6	13 31	56 58	81.4	13 22	55 57	81.1	13 13	54 57	80.9	13 03	53 56	80.7	196	344
17	163	14 40	58 53	81.3	14 31	57 51	81.1	14 21	56 50	80.8	14 12	55 49	80.5	14 02	54 48	80.3	13 51	53 47	80.1	197	343
18	162	15 31	58 44	80.8	15 22	57 43	80.5	15 12	56 42	80.2	15 01	55 40	80.0	14 51	54 39	79.7	14 40	53 38	79.4	198	342
19	161	16 23	58 35	80.2	16 12	57 34	79.9	16 02	56 32	79.7	15 51	55 31	79.4	15 40	54 30	79.1	15 28	53 29	78.8	199	341
20	160	17 14	58 26	79.7	17 03	57 24	79.4	16 52	56 23	79.1	16 40	55 21	78.8	16 28	54 20	78.5	16 16	53 19	78.2	200	340
21	159	18 05	58 16	79.1	17 53	57 14	78.8	17 42	56 12	78.5	17 29	55 11	78.2	17 17	54 09	77.9	17 04	53 08	77.6	201	339
22	158	18 56	58 05	78.6	18 44	57 03	78.2	18 31	56 01	77.9	18 19	55 00	77.6	18 06	53 58	77.3	17 52	52 56	77.0	202	338
23	157	19 47	57 54	78.0	19 34	56 52	77.7	19 21	55 50	77.3	19 08	54 48	77.0	18 54	53 46	76.6	18 40	52 44	76.3	203	337
24	156	20 37	57 42	77.4	20 24	56 40	77.1	20 11	55 38	76.7	19 57	54 36	76.4	19 42	53 34	76.0	19 28	52 32	75.7	204	336
25	155	21 28	57 30	76.9	21 14	56 27	76.5	21 00	55 25	76.1	20 46	54 23	75.7	20 31	53 21	75.4	20 15	52 19	75.0	205	335
26	154	22 19	57 17	76.3	22 04	56 14	75.9	21 49	55 12	75.5	21 34	54 09	75.1	21 19	53 07	74.7	21 03	52 05	74.4	206	334
27	153	23 09	57 03	75.7	22 54	56 00	75.3	22 39	54 57	74.9	22 23	53 55	74.5	22 07	52 52	74.1	21 50	51 50	73.7	207	333
28	152	23 59	56 49	75.1	23 44	55 46	74.7	23 28	54 43	74.3	23 11	53 40	73.8	22 54	52 37	73.4	22 37	51 35	73.0	208	332
29	151	24 50	56 34	74.5	24 33	55 31	74.1	24 17	54 27	73.6	23 59	53 24	73.2	23 42	52 22	72.8	23 24	51 19	72.4	209	331
30	150	25 40	56 19	73.9	25 23	55 15	73.4	25 05	54 11	73.0	24 48	53 08	72.5	24 29	52 05	72.1	24 11	51 03	71.7	210	330
31	149	26 29	56 02	73.3	26 12	54 58	72.8	25 54	53 54	72.3	25 35	52 51	71.9	25 17	51 48	71.4	24 57	50 45	71.0	211	329
32	148	27 19	55 45	72.6	27 01	54 41	72.2	26 42	53 37	71.7	26 23	52 33	71.2	26 04	51 30	70.7	25 44	50 27	70.3	212	328
33	147	28 09	55 27	72.0	27 50	54 23	71.5	27 31	53 19	71.0	27 11	52 15	70.5	26 50	51 12	70.0	26 30	50 08	69.6	213	327
34	146	28 58	55 09	71.4	28 38	54 04	70.8	28 19	53 00	70.3	27 58	51 56	69.8	27 37	50 52	69.3	27 16	49 49	68.8	214	326
35	145	29 47	54 49	70.7	29 27	53 44	70.2	29 06	52 40	69.6	28 45	51 36	69.1	28 24	50 32	68.6	28 01	49 29	68.1	215	325
36	144	30 36	54 29	70.0	30 15	53 24	69.5	29 54	52 19	68.9	29 32	51 15	68.4	29 10	50 11	67.9	28 47	49 07	67.4	216	324
37	143	31 25	54 08	69.4	31 03	53 03	68.8	30 41	51 58	68.2	30 19	50 53	67.7	29 56	49 49	67.2	29 32	48 45	66.6	217	323
38	142	32 13	53 46	68.7	31 51	52 40	68.1	31 28	51 35	67.5	31 05	50 30	66.9	30 41	49 26	66.4	30 17	48 23	65.9	218	322
39	141	33 02	53 23	68.0	32 39	52 17	67.4	32 15	51 12	66.8	31 51	50 07	66.2	31 27	49 03	65.6	31 02	47 59	65.1	219	321
40	140	33 50	53 00	67.2	33 26	51 53	66.6	33 02	50 48	66.0	32 37	49 43	65.4	32 12	48 38	64.9	31 46	47 34	64.3	220	320
41	139	34 37	52 35	66.5	34 13	51 29	65.9	33 48	50 23	65.3	33 23	49 17	64.7	32 57	48 13	64.1	32 30	47 09	63.5	221	319
42	138	35 25	52 09	65.8	35 00	51 03	65.1	34 34	49 56	64.5	34 08	48 51	63.9	33 42	47 46	63.3	33 14	46 42	62.7	222	318
43	137	36 12	51 43	65.0	35 46	50 36	64.3	35 20	49 29	63.7	34 53	48 24	63.1	34 26	47 19	62.5	33 58	46 15	61.9	223	317
44	136	36 59	51 15	64.2	36 33	50 08	63.6	36 06	49 01	62.9	35 38	47 55	62.3	35 10	46 51	61.6	34 41	45 46	61.0	224	316
45	135	37 46	50 46	63.4	37 19	49 39	62.7	36 51	48 32	62.1	36 22	47 26	61.4	35 53	46 21	60.8	35 24	45 17	60.2	225	315

Lat. / A		30°			31°			32°			33°			34°			35°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	37 46	50 46	63.4	37 19	49 39	62.7	36 51	48 32	62.1	36 22	47 26	61.4	35 53	46 21	60.8	35 24	45 17	60.2	225	315
46	134	38 32	50 16	62.6	38 04	49 08	61.9	37 36	48 02	61.2	37 06	46 56	60.6	36 37	45 51	59.9	36 06	44 46	59.3	226	314
47	133	39 18	49 45	61.8	38 49	48 37	61.1	38 20	47 30	60.4	37 50	46 24	59.7	37 19	45 19	59.1	36 48	44 15	58.4	227	313
48	132	40 04	49 13	61.0	39 34	48 05	60.2	39 04	46 58	59.5	38 33	45 51	58.8	38 02	44 46	58.2	37 30	43 42	57.5	228	312
49	131	40 49	48 39	60.1	40 19	47 31	59.4	39 48	46 24	58.6	39 16	45 18	57.9	38 44	44 12	57.2	38 11	43 08	56.6	229	311
50	130	41 34	48 04	59.2	41 03	46 56	58.5	40 31	45 49	57.7	39 59	44 42	57.0	39 26	43 37	56.3	38 52	42 33	55.6	230	310
51	129	42 18	47 28	58.3	41 46	46 20	57.5	41 14	45 12	56.8	40 41	44 06	56.1	40 07	43 01	55.4	39 32	41 57	54.7	231	309
52	128	43 02	46 50	57.4	42 29	45 42	56.6	41 56	44 34	55.9	41 22	43 28	55.1	40 47	42 23	54.4	40 12	41 19	53.7	232	308
53	127	43 46	46 11	56.4	43 12	45 03	55.6	42 38	43 55	54.9	42 03	42 49	54.1	41 28	41 44	53.4	40 52	40 41	52.7	233	307
54	126	44 29	45 31	55.5	43 54	44 22	54.7	43 19	43 15	53.9	42 44	42 09	53.1	42 07	41 04	52.4	41 30	40 01	51.7	234	306
55	125	45 11	44 49	54.5	44 36	43 40	53.7	44 00	42 33	52.9	43 24	41 27	52.1	42 46	40 23	51.4	42 09	39 19	50.7	235	305
56	124	45 53	44 05	53.5	45 17	42 57	52.6	44 40	41 50	51.8	44 03	40 44	51.1	43 25	39 40	50.3	42 46	38 37	49.6	236	304
57	123	46 35	43 20	52.4	45 58	42 11	51.6	45 20	41 05	50.8	44 42	39 59	50.0	44 03	38 55	49.3	43 24	37 53	48.5	237	303
58	122	47 16	42 33	51.3	46 38	41 25	50.5	45 59	40 18	49.7	45 20	39 13	48.9	44 40	38 09	48.2	44 00	37 07	47.5	238	302
59	121	47 56	41 44	50.2	47 17	40 36	49.4	46 38	39 30	48.6	45 58	38 25	47.8	45 17	37 22	47.1	44 36	36 20	46.3	239	301
60	120	48 35	40 54	49.1	47 56	39 46	48.3	47 16	38 40	47.5	46 35	37 36	46.7	45 53	36 33	45.9	45 11	35 32	45.2	240	300
61	119	49 14	40 01	47.9	48 34	38 54	47.1	47 53	37 48	46.3	47 11	36 45	45.5	46 29	35 42	44.7	45 46	34 42	44.0	241	299
62	118	49 53	39 07	46.8	49 11	38 00	45.9	48 29	36 55	45.1	47 46	35 52	44.3	47 03	34 50	43.6	46 19	33 50	42.8	242	298
63	117	50 30	38 11	45.5	49 48	37 04	44.7	49 05	36 00	43.9	48 21	34 57	43.1	47 37	33 57	42.3	46 53	32 57	41.6	243	297
64	116	51 07	37 13	44.3	50 23	36 07	43.4	49 40	35 03	42.6	48 55	34 01	41.8	48 10	33 01	41.1	47 25	32 03	40.4	244	296
65	115	51 43	36 12	43.0	50 58	35 07	42.2	50 14	34 04	41.3	49 28	33 03	40.6	48 43	32 04	39.8	47 56	31 07	39.1	245	295
66	114	52 18	35 10	41.7	51 33	34 06	40.8	50 47	33 04	40.0	50 01	32 04	39.3	49 14	31 05	38.5	48 27	30 09	37.8	246	294
67	113	52 52	34 05	40.3	52 06	33 02	39.5	51 19	32 01	38.7	50 32	31 02	37.9	49 44	30 05	37.2	48 56	29 10	36.5	247	293
68	112	53 25	32 59	38.9	52 38	31 56	38.1	51 50	30 57	37.3	51 02	29 59	36.6	50 14	29 03	35.8	49 25	28 09	35.2	248	292
69	111	53 57	31 50	37.5	53 09	30 49	36.7	52 21	29 50	35.9	51 32	28 53	35.2	50 43	27 59	34.5	49 53	27 06	33.8	249	291
70	110	54 28	30 39	36.1	53 39	29 39	35.2	52 50	28 42	34.5	52 00	27 46	33.8	51 10	26 53	33.1	50 20	26 02	32.4	250	290
71	109	54 58	29 25	34.6	54 08	28 27	33.8	53 18	27 31	33.0	52 28	26 38	32.3	51 37	25 46	31.6	50 46	24 56	31.0	251	289
72	108	55 27	28 09	33.0	54 37	27 13	32.2	53 46	26 19	31.5	52 54	25 27	30.8	52 03	24 37	30.2	51 10	23 49	29.5	252	288
73	107	55 55	26 51	31.4	55 03	25 57	30.7	54 12	25 04	30.0	53 19	24 14	29.3	52 27	23 26	28.7	51 34	22 40	28.1	253	287
74	106	56 21	25 31	29.8	55 29	24 39	29.1	54 36	23 48	28.4	53 43	23 00	27.8	52 50	22 14	27.1	51 57	21 29	26.6	254	286
75	105	56 46	24 09	28.2	55 53	23 18	27.5	55 00	22 30	26.8	54 06	21 44	26.2	53 12	21 00	25.6	52 18	20 17	25.0	255	285
76	104	57 10	22 44	26.5	56 16	21 56	25.8	55 22	21 10	25.2	54 28	20 26	24.6	53 33	19 44	24.0	52 38	19 04	23.5	256	284
77	103	57 33	21 17	24.8	56 38	20 31	24.1	55 43	19 48	23.5	54 48	19 06	23.0	53 53	18 27	22.4	52 57	17 49	21.9	257	283
78	102	57 54	19 48	23.0	56 59	19 05	22.4	56 03	18 24	21.9	55 07	17 45	21.3	54 11	17 08	20.8	53 15	16 32	20.3	258	282
79	101	58 13	18 17	21.2	57 17	17 37	20.7	56 21	16 59	20.1	55 25	16 22	19.6	54 28	15 48	19.2	53 31	15 15	18.7	259	281
80	100	58 32	16 44	19.4	57 35	16 07	18.9	56 38	15 32	18.4	55 41	14 58	17.9	54 44	14 26	17.5	53 47	13 56	17.1	260	280
81	99	58 48	15 10	17.6	57 51	14 36	17.1	56 53	14 03	16.6	55 56	13 33	16.2	54 58	13 03	15.8	54 00	12 36	15.4	261	279
82	98	59 03	13 33	15.7	58 05	13 02	15.3	57 07	12 33	14.9	56 09	12 06	14.5	55 11	11 40	14.1	54 13	11 14	13.8	262	278
83	97	59 16	11 55	13.8	58 18	11 28	13.4	57 19	11 02	13.0	56 21	10 38	12.7	55 22	10 14	12.4	54 24	9 52	12.1	263	277
84	96	59 28	10 16	11.9	58 29	9 52	11.5	57 30	9 30	11.2	56 31	9 09	10.9	55 32	8 49	10.6	54 33	8 29	10.4	264	276
85	95	59 37	8 35	9.9	58 38	8 15	9.6	57 39	7 56	9.4	56 40	7 39	9.1	55 41	7 22	8.9	54 41	7 06	8.7	265	275
86	94	59 46	6 53	8.0	58 46	6 37	7.7	57 47	6 22	7.5	56 47	6 08	7.3	55 48	5 54	7.1	54 48	5 41	7.0	266	274
87	93	59 52	5 11	6.0	58 52	4 59	5.8	57 52	4 47	5.6	56 53	4 36	5.5	55 53	4 26	5.4	54 53	4 16	5.2	267	273
88	92	59 56	3 28	4.0	58 57	3 19	3.9	57 57	3 12	3.8	56 57	3 05	3.7	55 57	2 58	3.6	54 57	2 51	3.5	268	272
89	91	59 59	1 44	2.0	58 59	1 40	1.9	57 59	1 36	1.9	56 59	1 32	1.8	55 59	1 29	1.8	54 59	1 26	1.7	269	271
90	90	60 00	0 00	0.0	59 00	0 00	0.0	58 00	0 00	0.0	57 00	0 00	0.0	56 00	0 00	0.0	55 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		36°			37°			38°			39°			40°			41°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	54 00	90.0	0 00	53 00	90.0	0 00	52 00	90.0	0 00	51 00	90.0	0 00	50 00	90.0	0 00	49 00	90.0	180	360
1	179	0 49	54 00	89.4	0 48	53 00	89.4	0 47	52 00	89.4	0 47	51 00	89.4	0 46	50 00	89.4	0 45	49 00	89.3	181	359
2	178	1 37	53 59	88.8	1 36	52 59	88.8	1 35	51 59	88.8	1 33	50 59	88.7	1 32	49 59	88.7	1 31	48 59	88.7	182	358
3	177	2 26	53 58	88.2	2 24	52 58	88.2	2 22	51 58	88.2	2 20	50 58	88.1	2 18	49 58	88.1	2 16	48 58	88.0	183	357
4	176	3 14	53 56	87.6	3 12	52 56	87.6	3 09	51 56	87.5	3 06	50 56	87.5	3 04	49 56	87.4	3 01	48 56	87.4	184	356
5	175	4 03	53 54	87.1	3 59	52 54	87.0	3 56	51 54	86.9	3 53	50 54	86.8	3 50	49 54	86.8	3 46	48 54	86.7	185	355
6	174	4 51	53 51	86.5	4 47	52 51	86.4	4 43	51 51	86.3	4 40	50 51	86.2	4 36	49 51	86.1	4 31	48 51	86.1	186	354
7	173	5 39	53 48	85.9	5 35	52 48	85.8	5 31	51 48	85.7	5 26	50 47	85.6	5 21	49 47	85.5	5 17	48 47	85.4	187	353
8	172	6 28	53 44	85.3	6 23	52 44	85.2	6 18	51 44	85.1	6 13	50 44	84.9	6 07	49 43	84.8	6 02	48 43	84.7	188	352
9	171	7 16	53 40	84.7	7 11	52 39	84.6	7 05	51 39	84.4	6 59	50 39	84.3	6 53	49 39	84.2	6 47	48 39	84.1	189	351
10	170	8 05	53 35	84.1	7 58	52 35	83.9	7 52	51 34	83.8	7 45	50 34	83.7	7 39	49 34	83.5	7 32	48 34	83.4	190	350
11	169	8 53	53 30	83.5	8 46	52 29	83.3	8 39	51 29	83.2	8 32	50 29	83.0	8 24	49 29	82.9	8 17	48 28	82.7	191	349
12	168	9 41	53 24	82.9	9 33	52 23	82.7	9 26	51 23	82.5	9 18	50 23	82.4	9 10	49 23	82.2	9 02	48 22	82.1	192	348
13	167	10 29	53 17	82.3	10 21	52 17	82.1	10 13	51 17	81.9	10 04	50 16	81.7	9 55	49 16	81.6	9 46	48 16	81.4	193	347
14	166	11 17	53 10	81.7	11 08	52 10	81.5	10 59	51 10	81.3	10 50	50 09	81.1	10 41	49 09	80.9	10 31	48 09	80.7	194	346
15	165	12 05	53 03	81.0	11 56	52 02	80.8	11 46	51 02	80.6	11 36	50 02	80.4	11 26	49 01	80.2	11 16	48 01	80.0	195	345
16	164	12 53	52 55	80.4	12 43	51 54	80.2	12 33	50 54	80.0	12 22	49 53	79.8	12 11	48 53	79.6	12 00	47 53	79.3	196	344
17	163	13 41	52 46	79.8	13 30	51 46	79.6	13 19	50 45	79.3	13 08	49 45	79.1	12 57	48 44	78.9	12 45	47 44	78.7	197	343
18	162	14 29	52 37	79.2	14 17	51 37	78.9	14 06	50 36	78.7	13 54	49 35	78.4	13 42	48 35	78.2	13 29	47 34	78.0	198	342
19	161	15 16	52 28	78.6	15 04	51 27	78.3	14 52	50 26	78.0	14 39	49 25	77.8	14 27	48 25	77.5	14 13	47 24	77.3	199	341
20	160	16 04	52 17	77.9	15 51	51 16	77.6	15 38	50 16	77.4	15 25	49 15	77.1	15 11	48 14	76.8	14 58	47 14	76.6	200	340
21	159	16 51	52 07	77.3	16 38	51 05	77.0	16 24	50 05	76.7	16 10	49 04	76.4	15 56	48 03	76.1	15 42	47 03	75.9	201	339
22	158	17 39	51 55	76.6	17 24	50 54	76.3	17 10	49 53	76.0	16 56	48 52	75.7	16 41	47 51	75.4	16 25	46 51	75.2	202	338
23	157	18 26	51 43	76.0	18 11	50 42	75.7	17 56	49 41	75.4	17 41	48 40	75.0	17 25	47 39	74.7	17 09	46 38	74.4	203	337
24	156	19 13	51 30	75.3	18 57	50 29	75.0	18 42	49 28	74.7	18 26	48 27	74.3	18 09	47 26	74.0	17 53	46 25	73.7	204	336
25	155	20 00	51 17	74.7	19 44	50 15	74.3	19 27	49 14	74.0	19 10	48 13	73.6	18 53	47 12	73.3	18 36	46 12	73.0	205	335
26	154	20 46	51 03	74.0	20 30	50 01	73.6	20 13	49 00	73.3	19 55	47 59	72.9	19 37	46 58	72.6	19 19	45 57	72.3	206	334
27	153	21 33	50 48	73.3	21 15	49 47	73.0	20 58	48 45	72.6	20 40	47 44	72.2	20 21	46 43	71.9	20 02	45 42	71.5	207	333
28	152	22 19	50 33	72.6	22 01	49 31	72.3	21 43	48 30	71.9	21 24	47 28	71.5	21 05	46 28	71.1	20 45	45 27	70.8	208	332
29	151	23 06	50 17	72.0	22 47	49 15	71.6	22 28	48 14	71.2	22 08	47 12	70.8	21 48	46 11	70.4	21 28	45 11	70.0	209	331
30	150	23 52	50 00	71.3	23 32	48 58	70.8	23 12	47 57	70.4	22 52	46 55	70.0	22 31	45 54	69.6	22 10	44 54	69.3	210	330
31	149	24 37	49 43	70.5	24 17	48 41	70.1	23 57	47 39	69.7	23 36	46 38	69.3	23 14	45 37	68.9	22 52	44 36	68.5	211	329
32	148	25 23	49 25	69.8	25 02	48 23	69.4	24 41	47 21	69.0	24 19	46 19	68.5	23 57	45 18	68.1	23 34	44 17	67.7	212	328
33	147	26 09	49 06	69.1	25 47	48 04	68.7	25 25	47 02	68.2	25 02	46 00	67.8	24 40	44 59	67.3	24 16	43 58	66.9	213	327
34	146	26 54	48 46	68.4	26 32	47 44	67.9	26 09	46 42	67.4	25 45	45 40	67.0	25 22	44 39	66.6	24 58	43 39	66.1	214	326
35	145	27 39	48 26	67.6	27 16	47 23	67.1	26 52	46 21	66.7	26 28	45 20	66.2	26 04	44 19	65.8	25 39	43 18	65.3	215	325
36	144	28 24	48 04	66.9	28 00	47 02	66.4	27 36	46 00	65.9	27 11	44 58	65.4	26 46	43 57	65.0	26 20	42 57	64.5	216	324
37	143	29 08	47 42	66.1	28 44	46 40	65.6	28 19	45 38	65.1	27 53	44 36	64.6	27 27	43 35	64.2	27 01	42 34	63.7	217	323
38	142	29 52	47 19	65.3	29 27	46 17	64.8	29 01	45 15	64.3	28 35	44 13	63.8	28 08	43 12	63.3	27 41	42 12	62.9	218	322
39	141	30 36	46 56	64.5	30 10	45 53	64.0	29 44	44 51	63.5	29 17	43 49	63.0	28 49	42 48	62.5	28 21	41 48	62.0	219	321
40	140	31 20	46 31	63.7	30 53	45 28	63.2	30 26	44 26	62.7	29 58	43 25	62.2	29 30	42 24	61.7	29 01	41 23	61.2	220	320
41	139	32 03	46 05	62.9	31 36	45 03	62.4	31 08	44 01	61.8	30 39	42 59	61.3	30 10	41 58	60.8	29 41	40 58	60.3	221	319
42	138	32 46	45 39	62.1	32 18	44 36	61.5	31 49	43 34	61.0	31 20	42 33	60.5	30 50	41 32	59.9	30 20	40 32	59.4	222	318
43	137	33 29	45 11	61.3	33 00	44 09	60.7	32 30	43 07	60.1	32 00	42 05	59.6	31 30	41 05	59.1	30 59	40 04	58.5	223	317
44	136	34 12	44 43	60.4	33 42	43 40	59.8	33 11	42 38	59.3	32 40	41 37	58.7	32 09	40 36	58.2	31 37	39 36	57.6	224	316
45	135	34 54	44 13	59.6	34 23	43 11	59.0	33 52	42 09	58.4	33 20	41 08	57.8	32 48	40 07	57.3	32 15	39 08	56.7	225	315

Lat. / A		36°			37°			38°			39°			40°			41°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	34 54	44 13	59.6	34 23	43 11	59.0	33 52	42 09	58.4	33 20	41 08	57.8	32 48	40 07	57.3	32 15	39 08	56.7	225	315
46	134	35 35	43 43	58.7	35 04	42 40	58.1	34 32	41 38	57.5	33 59	40 37	56.9	33 26	39 37	56.4	32 53	38 38	55.8	226	314
47	133	36 17	43 11	57.8	35 44	42 09	57.2	35 12	41 07	56.6	34 38	40 06	56.0	34 04	39 06	55.4	33 30	38 07	54.9	227	313
48	132	36 57	42 39	56.9	36 24	41 36	56.2	35 51	40 35	55.6	35 17	39 34	55.0	34 42	38 34	54.5	34 07	37 35	53.9	228	312
49	131	37 38	42 05	55.9	37 04	41 03	55.3	36 30	40 01	54.7	35 55	39 01	54.1	35 19	38 01	53.5	34 43	37 03	53.0	229	311
50	130	38 18	41 30	55.0	37 43	40 28	54.4	37 08	39 27	53.7	36 32	38 27	53.1	35 56	37 27	52.5	35 19	36 29	52.0	230	310
51	129	38 57	40 54	54.0	38 22	39 52	53.4	37 46	38 51	52.8	37 09	37 51	52.1	36 32	36 52	51.6	35 55	35 54	51.0	231	309
52	128	39 36	40 17	53.0	39 00	39 15	52.4	38 23	38 14	51.8	37 46	37 15	51.1	37 08	36 16	50.6	36 30	35 18	50.0	232	308
53	127	40 15	39 38	52.0	39 38	38 37	51.4	39 00	37 36	50.8	38 22	36 37	50.1	37 43	35 39	49.5	37 04	34 42	49.0	233	307
54	126	40 53	38 58	51.0	40 15	37 57	50.4	39 36	36 57	49.7	38 57	35 58	49.1	38 18	35 01	48.5	37 38	34 04	47.9	234	306
55	125	41 30	38 17	50.0	40 52	37 17	49.3	40 12	36 17	48.7	39 32	35 19	48.1	38 52	34 21	47.4	38 11	33 25	46.9	235	305
56	124	42 07	37 35	48.9	41 28	36 35	48.3	40 47	35 36	47.6	40 07	34 38	47.0	39 26	33 41	46.4	38 44	32 45	45.8	236	304
57	123	42 44	36 51	47.9	42 03	35 51	47.2	41 22	34 53	46.5	40 41	33 55	45.9	39 59	32 59	45.3	39 16	32 04	44.7	237	303
58	122	43 19	36 06	46.8	42 38	35 07	46.1	41 56	34 09	45.4	41 14	33 12	44.8	40 31	32 16	44.2	39 48	31 22	43.6	238	302
59	121	43 54	35 20	45.6	43 12	34 21	45.0	42 29	33 24	44.3	41 46	32 27	43.7	41 03	31 32	43.1	40 19	30 39	42.5	239	301
60	120	44 29	34 32	44.5	43 46	33 34	43.8	43 02	32 37	43.2	42 18	31 42	42.5	41 34	30 47	41.9	40 49	29 54	41.3	240	300
61	119	45 02	33 43	43.3	44 18	32 45	42.6	43 34	31 49	42.0	42 49	30 55	41.4	42 04	30 01	40.8	41 18	29 09	40.2	241	299
62	118	45 35	32 52	42.1	44 51	31 55	41.5	44 05	31 00	40.8	43 20	30 06	40.2	42 34	29 14	39.6	41 47	28 22	39.0	242	298
63	117	46 07	32 00	40.9	45 22	31 04	40.3	44 36	30 10	39.6	43 49	29 17	39.0	43 03	28 25	38.4	42 15	27 35	37.8	243	297
64	116	46 39	31 06	39.7	45 52	30 11	39.0	45 06	29 18	38.4	44 18	28 26	37.8	43 31	27 35	37.2	42 43	26 46	36.6	244	296
65	115	47 09	30 11	38.4	46 22	29 17	37.8	45 35	28 25	37.1	44 47	27 34	36.5	43 58	26 44	36.0	43 09	25 56	35.4	245	295
66	114	47 39	29 14	37.1	46 51	28 21	36.5	46 03	27 30	35.9	45 14	26 40	35.3	44 25	25 52	34.7	43 35	25 04	34.2	246	294
67	113	48 08	28 16	35.8	47 19	27 24	35.2	46 30	26 34	34.6	45 40	25 45	34.0	44 50	24 58	33.4	44 00	24 12	32.9	247	293
68	112	48 36	27 17	34.5	47 46	26 26	33.9	46 56	25 37	33.3	46 06	24 50	32.7	45 15	24 03	32.2	44 24	23 19	31.6	248	292
69	111	49 03	26 15	33.1	48 13	25 26	32.5	47 22	24 38	31.9	46 31	23 52	31.4	45 39	23 08	30.8	44 48	22 24	30.3	249	291
70	110	49 29	25 13	31.8	48 38	24 25	31.2	47 46	23 39	30.6	46 55	22 54	30.0	46 03	22 11	29.5	45 10	21 29	29.0	250	290
71	109	49 54	24 08	30.4	49 02	23 22	29.8	48 10	22 37	29.2	47 17	21 54	28.7	46 25	21 12	28.2	45 32	20 32	27.7	251	289
72	108	50 18	23 02	28.9	49 25	22 18	28.4	48 33	21 35	27.8	47 39	20 53	27.3	46 46	20 13	26.8	45 52	19 34	26.3	252	288
73	107	50 41	21 55	27.5	49 48	21 12	26.9	48 54	20 31	26.4	48 00	19 51	25.9	47 06	19 13	25.4	46 12	18 35	25.0	253	287
74	106	51 03	20 47	26.0	50 09	20 06	25.5	49 15	19 26	25.0	48 20	18 48	24.5	47 25	18 11	24.0	46 30	17 36	23.6	254	286
75	105	51 24	19 36	24.5	50 29	18 57	24.0	49 34	18 20	23.5	48 39	17 43	23.1	47 44	17 09	22.6	46 48	16 35	22.2	255	285
76	104	51 43	18 25	23.0	50 48	17 48	22.5	49 52	17 12	22.0	48 57	16 38	21.6	48 01	16 05	21.2	47 05	15 33	20.8	256	284
77	103	52 02	17 12	21.4	51 06	16 37	21.0	50 09	16 04	20.6	49 13	15 31	20.1	48 17	15 00	19.8	47 20	14 31	19.4	257	283
78	102	52 19	15 58	19.9	51 22	15 25	19.5	50 25	14 54	19.0	49 29	14 24	18.7	48 32	13 55	18.3	47 35	13 27	18.0	258	282
79	101	52 35	14 43	18.3	51 37	14 13	17.9	50 40	13 43	17.5	49 43	13 16	17.2	48 46	12 49	16.8	47 48	12 23	16.5	259	281
80	100	52 49	13 27	16.7	51 52	12 59	16.3	50 54	12 32	16.0	49 56	12 06	15.7	48 58	11 42	15.3	48 01	11 18	15.0	260	280
81	99	53 02	12 09	15.1	52 04	11 44	14.7	51 06	11 19	14.4	50 08	10 56	14.1	49 10	10 34	13.8	48 12	10 12	13.6	261	279
82	98	53 14	10 51	13.4	52 16	10 28	13.1	51 18	10 06	12.9	50 19	9 45	12.6	49 20	9 25	12.3	48 22	9 06	12.1	262	278
83	97	53 25	9 31	11.8	52 26	9 11	11.5	51 27	8 52	11.3	50 29	8 34	11.0	49 30	8 16	10.8	48 31	7 59	10.6	263	277
84	96	53 34	8 11	10.1	52 35	7 54	9.9	51 36	7 37	9.7	50 37	7 21	9.5	49 38	7 06	9.3	48 38	6 51	9.1	264	276
85	95	53 42	6 50	8.5	52 43	6 36	8.3	51 43	6 22	8.1	50 44	6 09	7.9	49 44	5 56	7.8	48 45	5 44	7.6	265	275
86	94	53 49	5 29	6.8	52 49	5 17	6.6	51 49	5 06	6.5	50 50	4 55	6.3	49 50	4 45	6.2	48 50	4 35	6.1	266	274
87	93	53 54	4 07	5.1	52 54	3 58	5.0	51 54	3 50	4.9	50 54	3 42	4.8	49 54	3 34	4.7	48 55	3 27	4.6	267	273
88	92	53 57	2 45	3.4	52 57	2 39	3.3	51 57	2 33	3.2	50 57	2 28	3.2	49 58	2 23	3.1	48 58	2 18	3.0	268	272
89	91	53 59	1 23	1.7	52 59	1 20	1.7	51 59	1 17	1.6	50 59	1 14	1.6	49 59	1 11	1.6	48 59	1 09	1.5	269	271
90	90	54 00	0 00	0.0	53 00	0 00	0.0	52 00	0 00	0.0	51 00	0 00	0.0	50 00	0 00	0.0	49 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		42°			43°			44°			45°			46°			47°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	48 00	90.0	0 00	47 00	90.0	0 00	46 00	90.0	0 00	45 00	90.0	0 00	44 00	90.0	0 00	43 00	90.0	180	360
1	179	0 45	48 00	89.3	0 44	47 00	89.3	0 43	46 00	89.3	0 42	45 00	89.3	0 42	44 00	89.3	0 41	43 00	89.3	181	359
2	178	1 29	47 59	88.7	1 28	46 59	88.6	1 26	45 59	88.6	1 25	44 59	88.6	1 23	43 59	88.6	1 22	42 59	88.5	182	358
3	177	2 14	47 58	88.0	2 12	46 58	88.0	2 09	45 58	87.9	2 07	44 58	87.9	2 05	43 58	87.8	2 03	42 58	87.8	183	357
4	176	2 58	47 56	87.3	2 55	46 56	87.3	2 53	45 56	87.2	2 50	44 56	87.2	2 47	43 56	87.1	2 44	42 56	87.1	184	356
5	175	3 43	47 53	86.6	3 39	46 53	86.6	3 36	45 53	86.5	3 32	44 53	86.5	3 28	43 53	86.4	3 24	42 53	86.3	185	355
6	174	4 27	47 51	86.0	4 23	46 51	85.9	4 19	45 51	85.8	4 14	44 51	85.7	4 10	43 51	85.7	4 05	42 51	85.6	186	354
7	173	5 12	47 47	85.3	5 07	46 47	85.2	5 02	45 47	85.1	4 57	44 47	85.0	4 51	43 47	85.0	4 46	42 47	84.9	187	353
8	172	5 56	47 43	84.6	5 51	46 43	84.5	5 45	45 43	84.4	5 39	44 43	84.3	5 33	43 43	84.2	5 27	42 43	84.1	188	352
9	171	6 41	47 39	84.0	6 34	46 39	83.8	6 28	45 39	83.7	6 21	44 39	83.6	6 14	43 39	83.5	6 07	42 39	83.4	189	351
10	170	7 25	47 34	83.3	7 18	46 34	83.1	7 11	45 34	83.0	7 03	44 34	82.9	6 56	43 34	82.8	6 48	42 34	82.7	190	350
11	169	8 09	47 28	82.6	8 01	46 28	82.4	7 53	45 28	82.3	7 45	44 28	82.2	7 37	43 28	82.0	7 29	42 28	81.9	191	349
12	168	8 53	47 22	81.9	8 45	46 22	81.8	8 36	45 22	81.6	8 27	44 22	81.5	8 18	43 22	81.3	8 09	42 22	81.2	192	348
13	167	9 37	47 16	81.2	9 28	46 15	81.1	9 19	45 15	80.9	9 09	44 15	80.7	8 59	43 15	80.6	8 49	42 16	80.4	193	347
14	166	10 21	47 08	80.5	10 11	46 08	80.3	10 01	45 08	80.2	9 51	44 08	80.0	9 40	43 08	79.8	9 30	42 08	79.7	194	346
15	165	11 05	47 01	79.8	10 55	46 00	79.6	10 44	45 00	79.5	10 33	44 00	79.3	10 21	43 00	79.1	10 10	42 01	78.9	195	345
16	164	11 49	46 52	79.1	11 38	45 52	78.9	11 26	44 52	78.7	11 14	43 52	78.5	11 02	42 52	78.3	10 50	41 52	78.2	196	344
17	163	12 33	46 43	78.4	12 21	45 43	78.2	12 08	44 43	78.0	11 56	43 43	77.8	11 43	42 43	77.6	11 30	41 44	77.4	197	343
18	162	13 17	46 34	77.7	13 04	45 34	77.5	12 51	44 34	77.3	12 37	43 34	77.1	12 24	42 34	76.8	12 10	41 34	76.6	198	342
19	161	14 00	46 24	77.0	13 46	45 24	76.8	13 33	44 24	76.5	13 19	43 24	76.3	13 04	42 24	76.1	12 50	41 24	75.9	199	341
20	160	14 43	46 13	76.3	14 29	45 13	76.1	14 15	44 13	75.8	14 00	43 13	75.6	13 45	42 13	75.3	13 29	41 14	75.1	200	340
21	159	15 27	46 02	75.6	15 12	45 02	75.3	14 56	44 02	75.1	14 41	43 02	74.8	14 25	42 02	74.6	14 09	41 03	74.3	201	339
22	158	16 10	45 50	74.9	15 54	44 50	74.6	15 38	43 50	74.3	15 22	42 50	74.1	15 05	41 50	73.8	14 48	40 51	73.5	202	338
23	157	16 53	45 38	74.1	16 36	44 38	73.9	16 19	43 38	73.6	16 02	42 38	73.3	15 45	41 38	73.0	15 27	40 39	72.8	203	337
24	156	17 36	45 25	73.4	17 18	44 25	73.1	17 01	43 25	72.8	16 43	42 25	72.5	16 25	41 25	72.2	16 06	40 26	72.0	204	336
25	155	18 18	45 11	72.7	18 00	44 11	72.4	17 42	43 11	72.1	17 23	42 11	71.8	17 04	41 12	71.5	16 45	40 12	71.2	205	335
26	154	19 01	44 57	71.9	18 42	43 57	71.6	18 23	42 57	71.3	18 03	41 57	71.0	17 44	40 57	70.7	17 24	39 58	70.4	206	334
27	153	19 43	44 42	71.2	19 24	43 42	70.8	19 04	42 42	70.5	18 43	41 42	70.2	18 23	40 43	69.9	18 02	39 43	69.6	207	333
28	152	20 25	44 26	70.4	20 05	43 26	70.1	19 44	42 26	69.7	19 23	41 27	69.4	19 02	40 27	69.1	18 40	39 28	68.8	208	332
29	151	21 07	44 10	69.6	20 46	43 10	69.3	20 25	42 10	68.9	20 03	41 10	68.6	19 41	40 11	68.3	19 18	39 12	67.9	209	331
30	150	21 49	43 53	68.9	21 27	42 53	68.5	21 05	41 53	68.1	20 42	40 54	67.8	20 19	39 54	67.4	19 56	38 55	67.1	210	330
31	149	22 30	43 35	68.1	22 08	42 35	67.7	21 45	41 36	67.3	21 21	40 36	67.0	20 58	39 37	66.6	20 34	38 38	66.3	211	329
32	148	23 11	43 17	67.3	22 48	42 17	66.9	22 24	41 17	66.5	22 00	40 18	66.2	21 36	39 19	65.8	21 11	38 20	65.4	212	328
33	147	23 53	42 58	66.5	23 28	41 58	66.1	23 04	40 58	65.7	22 39	39 59	65.3	22 14	39 00	65.0	21 48	38 02	64.6	213	327
34	146	24 33	42 38	65.7	24 08	41 38	65.3	23 43	40 39	64.9	23 17	39 40	64.5	22 51	38 41	64.1	22 25	37 42	63.7	214	326
35	145	25 14	42 18	64.9	24 48	41 18	64.5	24 22	40 18	64.1	23 56	39 19	63.7	23 29	38 21	63.3	23 02	37 23	62.9	215	325
36	144	25 54	41 56	64.1	25 28	40 57	63.6	25 01	39 57	63.2	24 34	38 58	62.8	24 06	38 00	62.4	23 38	37 02	62.0	216	324
37	143	26 34	41 34	63.2	26 07	40 35	62.8	25 39	39 35	62.4	25 11	38 37	61.9	24 43	37 38	61.5	24 14	36 41	61.1	217	323
38	142	27 14	41 11	62.4	26 46	40 12	61.9	26 17	39 13	61.5	25 48	38 14	61.1	25 19	37 16	60.7	24 50	36 19	60.3	218	322
39	141	27 53	40 48	61.5	27 24	39 48	61.1	26 55	38 50	60.6	26 25	37 51	60.2	25 55	36 53	59.8	25 25	35 56	59.4	219	321
40	140	28 32	40 23	60.7	28 02	39 24	60.2	27 32	38 25	59.8	27 02	37 27	59.3	26 31	36 30	58.9	26 00	35 32	58.5	220	320
41	139	29 11	39 58	59.8	28 40	38 59	59.3	28 10	38 01	58.9	27 38	37 03	58.4	27 07	36 05	58.0	26 35	35 08	57.6	221	319
42	138	29 49	39 32	58.9	29 18	38 33	58.4	28 46	37 35	58.0	28 14	36 37	57.5	27 42	35 40	57.1	27 09	34 43	56.6	222	318
43	137	30 27	39 05	58.0	29 55	38 06	57.5	29 23	37 08	57.1	28 50	36 11	56.6	28 17	35 14	56.1	27 43	34 18	55.7	223	317
44	136	31 05	38 37	57.1	30 32	37 39	56.6	29 59	36 41	56.1	29 25	35 44	55.7	28 51	34 47	55.2	28 17	33 51	54.8	224	316
45	135	31 42	38 09	56.2	31 08	37 10	55.7	30 34	36 13	55.2	30 00	35 16	54.7	29 25	34 20	54.3	28 50	33 24	53.8	225	315

Lat. / A		42°			43°			44°			45°			46°			47°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	31 42	38 09	56.2	31 08	37 10	55.7	30 34	36 13	55.2	30 00	35 16	54.7	29 25	34 20	54.3	28 50	33 24	53.8	225	315
46	134	32 19	37 39	55.3	31 45	36 41	54.8	31 10	35 44	54.3	30 34	34 47	53.8	29 59	33 51	53.3	29 23	32 56	52.9	226	314
47	133	32 55	37 08	54.3	32 20	36 11	53.8	31 45	35 14	53.3	31 08	34 18	52.8	30 32	33 22	52.4	29 55	32 27	51.9	227	313
48	132	33 31	36 37	53.4	32 55	35 40	52.9	32 19	34 43	52.3	31 42	33 47	51.9	31 05	32 52	51.4	30 27	31 58	50.9	228	312
49	131	34 07	36 05	52.4	33 30	35 08	51.9	32 53	34 11	51.4	32 15	33 16	50.9	31 37	32 21	50.4	30 59	31 27	49.9	229	311
50	130	34 42	35 31	51.4	34 04	34 35	50.9	33 26	33 39	50.4	32 48	32 44	49.9	32 09	31 50	49.4	31 30	30 56	48.9	230	310
51	129	35 17	34 57	50.4	34 38	34 01	49.9	33 59	33 05	49.4	33 20	32 11	48.9	32 40	31 17	48.4	32 00	30 24	47.9	231	309
52	128	35 51	34 22	49.4	35 12	33 26	48.9	34 32	32 31	48.4	33 52	31 37	47.9	33 11	30 44	47.4	32 30	29 52	46.9	232	308
53	127	36 24	33 45	48.4	35 44	32 50	47.9	35 04	31 56	47.3	34 23	31 02	46.8	33 42	30 10	46.3	33 00	29 18	45.9	233	307
54	126	36 57	33 08	47.4	36 17	32 13	46.8	35 35	31 20	46.3	34 54	30 27	45.8	34 12	29 35	45.3	33 29	28 44	44.8	234	306
55	125	37 30	32 30	46.3	36 48	31 36	45.8	36 06	30 43	45.2	35 24	29 50	44.7	34 41	28 59	44.2	33 58	28 08	43.8	235	305
56	124	38 02	31 51	45.2	37 19	30 57	44.7	36 37	30 04	44.2	35 53	29 13	43.6	35 10	28 22	43.2	34 26	27 32	42.7	236	304
57	123	38 33	31 10	44.1	37 50	30 17	43.6	37 06	29 25	43.1	36 22	28 34	42.6	35 38	27 45	42.1	34 53	26 56	41.6	237	303
58	122	39 04	30 29	43.0	38 20	29 36	42.5	37 36	28 45	42.0	36 51	27 55	41.5	36 06	27 06	41.0	35 20	26 18	40.5	238	302
59	121	39 34	29 46	41.9	38 49	28 55	41.4	38 04	28 04	40.9	37 19	27 15	40.4	36 33	26 27	39.9	35 46	25 39	39.4	239	301
60	120	40 04	29 03	40.8	39 18	28 12	40.2	38 32	27 22	39.7	37 46	26 34	39.2	36 59	25 46	38.8	36 12	25 00	38.3	240	300
61	119	40 32	28 18	39.6	39 46	27 28	39.1	38 59	26 39	38.6	38 12	25 52	38.1	37 25	25 05	37.6	36 37	24 20	37.2	241	299
62	118	41 00	27 32	38.5	40 13	26 43	37.9	39 26	25 56	37.4	38 38	25 09	36.9	37 50	24 23	36.5	37 02	23 39	36.0	242	298
63	117	41 28	26 45	37.3	40 40	25 58	36.8	39 52	25 11	36.3	39 03	24 25	35.8	38 14	23 40	35.3	37 25	22 57	34.9	243	297
64	116	41 54	25 58	36.1	41 06	25 11	35.6	40 17	24 25	35.1	39 28	23 40	34.6	38 38	22 57	34.1	37 48	22 14	33.7	244	296
65	115	42 20	25 09	34.9	41 31	24 23	34.4	40 41	23 38	33.9	39 51	22 55	33.4	39 01	22 12	33.0	38 11	21 31	32.5	245	295
66	114	42 45	24 19	33.6	41 55	23 34	33.1	41 05	22 50	32.7	40 14	22 08	32.2	39 23	21 27	31.8	38 32	20 46	31.3	246	294
67	113	43 10	23 28	32.4	42 19	22 44	31.9	41 28	22 02	31.4	40 37	21 21	31.0	39 45	20 40	30.5	38 53	20 01	30.1	247	293
68	112	43 33	22 35	31.1	42 42	21 53	30.6	41 50	21 12	30.2	40 58	20 32	29.7	40 06	19 53	29.3	39 13	19 15	28.9	248	292
69	111	43 56	21 42	29.8	43 04	21 01	29.4	42 11	20 22	28.9	41 19	19 43	28.5	40 26	19 05	28.1	39 33	18 29	27.7	249	291
70	110	44 18	20 48	28.5	43 25	20 08	28.1	42 32	19 30	27.7	41 38	18 53	27.2	40 45	18 17	26.8	39 51	17 41	26.5	250	290
71	109	44 38	19 53	27.2	43 45	19 15	26.8	42 51	18 38	26.4	41 57	18 02	26.0	41 03	17 27	25.6	40 09	16 53	25.2	251	289
72	108	44 58	18 57	25.9	44 04	18 20	25.5	43 10	17 45	25.1	42 16	17 10	24.7	41 21	16 37	24.3	40 26	16 05	24.0	252	288
73	107	45 17	17 59	24.6	44 23	17 24	24.1	43 28	16 51	23.8	42 33	16 18	23.4	41 38	15 46	23.0	40 42	15 15	22.7	253	287
74	106	45 35	17 01	23.2	44 40	16 28	22.8	43 45	15 56	22.4	42 49	15 25	22.1	41 54	14 54	21.7	40 58	14 25	21.4	254	286
75	105	45 53	16 02	21.8	44 57	15 31	21.4	44 01	15 00	21.1	43 05	14 31	20.8	42 09	14 02	20.4	41 12	13 34	20.1	255	285
76	104	46 09	15 02	20.4	45 12	14 33	20.1	44 16	14 04	19.7	43 19	13 36	19.4	42 23	13 09	19.1	41 26	12 43	18.8	256	284
77	103	46 24	14 02	19.0	45 27	13 34	18.7	44 30	13 07	18.4	43 33	12 41	18.1	42 36	12 15	17.8	41 39	11 51	17.5	257	283
78	102	46 38	13 00	17.6	45 40	12 34	17.3	44 43	12 09	17.0	43 46	11 45	16.7	42 48	11 21	16.5	41 51	10 58	16.2	258	282
79	101	46 51	11 58	16.2	45 53	11 34	15.9	44 55	11 11	15.6	43 57	10 48	15.4	43 00	10 26	15.1	42 02	10 05	14.9	259	281
80	100	47 03	10 55	14.8	46 04	10 33	14.5	45 06	10 12	14.2	44 08	9 51	14.0	43 10	9 31	13.8	42 12	9 12	13.6	260	280
81	99	47 13	9 51	13.3	46 15	9 31	13.1	45 16	9 12	12.8	44 18	8 53	12.6	43 19	8 35	12.4	42 21	8 18	12.2	261	279
82	98	47 23	8 47	11.9	46 24	8 29	11.6	45 26	8 12	11.4	44 27	7 55	11.2	43 28	7 39	11.1	42 29	7 24	10.9	262	278
83	97	47 32	7 42	10.4	46 33	7 27	10.2	45 34	7 12	10.0	44 34	6 57	9.9	43 35	6 43	9.7	42 36	6 29	9.5	263	277
84	96	47 39	6 37	8.9	46 40	6 24	8.8	45 41	6 11	8.6	44 41	5 58	8.5	43 42	5 46	8.3	42 42	5 34	8.2	264	276
85	95	47 46	5 32	7.4	46 46	5 20	7.3	45 46	5 09	7.2	44 47	4 59	7.1	43 47	4 49	6.9	42 48	4 39	6.8	265	275
86	94	47 51	4 26	6.0	46 51	4 17	5.9	45 51	4 08	5.7	44 52	3 59	5.6	43 52	3 51	5.6	42 52	3 43	5.5	266	274
87	93	47 55	3 20	4.5	46 55	3 13	4.4	45 55	3 06	4.3	44 55	3 00	4.2	43 55	2 54	4.2	42 56	2 48	4.1	267	273
88	92	47 58	2 13	3.0	46 58	2 09	2.9	45 58	2 04	2.9	44 58	2 00	2.8	43 58	1 56	2.8	42 58	1 52	2.7	268	272
89	91	47 59	1 07	1.5	46 59	1 04	1.5	45 59	1 02	1.4	44 59	1 00	1.4	43 59	0 58	1.4	43 00	0 56	1.4	269	271
90	90	48 00	0 00	0.0	47 00	0 00	0.0	46 00	0 00	0.0	45 00	0 00	0.0	44 00	0 00	0.0	43 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		48°			49°			50°			51°			52°			53°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	42 00	90.0	0 00	41 00	90.0	0 00	40 00	90.0	0 00	39 00	90.0	0 00	38 00	90.0	0 00	37 00	90.0	180	360
1	179	0 40	42 00	89.3	0 39	41 00	89.2	0 39	40 00	89.2	0 38	39 00	89.2	0 37	38 00	89.2	0 36	37 00	89.2	181	359
2	178	1 20	41 59	88.5	1 19	40 59	88.5	1 17	39 59	88.5	1 16	38 59	88.4	1 14	37 59	88.4	1 12	36 59	88.4	182	358
3	177	2 00	41 58	87.8	1 58	40 58	87.7	1 56	39 58	87.7	1 53	38 58	87.7	1 51	37 58	87.6	1 48	36 58	87.6	183	357
4	176	2 41	41 56	87.0	2 37	40 56	87.0	2 34	39 56	86.9	2 31	38 56	86.9	2 28	37 56	86.8	2 24	36 56	86.8	184	356
5	175	3 21	41 53	86.3	3 17	40 54	86.2	3 13	39 54	86.2	3 09	38 54	86.1	3 05	37 54	86.1	3 00	36 54	86.0	185	355
6	174	4 01	41 51	85.5	3 56	40 51	85.5	3 51	39 51	85.4	3 46	38 51	85.3	3 41	37 51	85.3	3 36	36 51	85.2	186	354
7	173	4 41	41 47	84.8	4 35	40 47	84.7	4 30	39 47	84.6	4 24	38 47	84.5	4 18	37 48	84.5	4 12	36 48	84.4	187	353
8	172	5 21	41 43	84.0	5 14	40 43	83.9	5 08	39 43	83.9	5 01	38 44	83.8	4 55	37 44	83.7	4 48	36 44	83.6	188	352
9	171	6 01	41 39	83.3	5 53	40 39	83.2	5 46	39 39	83.1	5 39	38 39	83.0	5 32	37 39	82.9	5 24	36 40	82.8	189	351
10	170	6 40	41 34	82.5	6 32	40 34	82.4	6 25	39 34	82.3	6 16	38 34	82.2	6 08	37 35	82.1	6 00	36 35	82.0	190	350
11	169	7 20	41 28	81.8	7 11	40 28	81.7	7 03	39 29	81.5	6 54	38 29	81.4	6 45	37 29	81.3	6 36	36 29	81.2	191	349
12	168	8 00	41 22	81.0	7 50	40 22	80.9	7 41	39 23	80.8	7 31	38 23	80.6	7 21	37 23	80.5	7 11	36 24	80.4	192	348
13	167	8 39	41 16	80.3	8 29	40 16	80.1	8 19	39 16	80.0	8 08	38 16	79.8	7 58	37 17	79.7	7 47	36 17	79.6	193	347
14	166	9 19	41 09	79.5	9 08	40 09	79.3	8 57	39 09	79.2	8 45	38 09	79.0	8 34	37 10	78.9	8 22	36 10	78.7	194	346
15	165	9 58	41 01	78.7	9 47	40 01	78.6	9 35	39 02	78.4	9 22	38 02	78.2	9 10	37 02	78.1	8 58	36 03	77.9	195	345
16	164	10 38	40 53	78.0	10 25	39 53	77.8	10 12	38 53	77.6	9 59	37 54	77.4	9 46	36 54	77.3	9 33	35 55	77.1	196	344
17	163	11 17	40 44	77.2	11 04	39 44	77.0	10 50	38 45	76.8	10 36	37 45	76.6	10 22	36 46	76.5	10 08	35 47	76.3	197	343
18	162	11 56	40 34	76.4	11 42	39 35	76.2	11 27	38 35	76.0	11 13	37 36	75.8	10 58	36 37	75.6	10 43	35 38	75.5	198	342
19	161	12 35	40 25	75.6	12 20	39 25	75.4	12 05	38 26	75.2	11 49	37 26	75.0	11 34	36 27	74.8	11 18	35 28	74.6	199	341
20	160	13 14	40 14	74.9	12 58	39 15	74.6	12 42	38 15	74.4	12 26	37 16	74.2	12 09	36 17	74.0	11 53	35 18	73.8	200	340
21	159	13 52	40 03	74.1	13 36	39 04	73.8	13 19	38 04	73.6	13 02	37 05	73.4	12 45	36 06	73.2	12 27	35 08	73.0	201	339
22	158	14 31	39 51	73.3	14 14	38 52	73.0	13 56	37 53	72.8	13 38	36 54	72.6	13 20	35 55	72.3	13 02	34 56	72.1	202	338
23	157	15 09	39 39	72.5	14 51	38 40	72.2	14 33	37 41	72.0	14 14	36 42	71.7	13 55	35 43	71.5	13 36	34 45	71.3	203	337
24	156	15 48	39 26	71.7	15 29	38 27	71.4	15 09	37 28	71.2	14 50	36 30	70.9	14 30	35 31	70.7	14 10	34 33	70.4	204	336
25	155	16 26	39 13	70.9	16 06	38 14	70.6	15 46	37 15	70.3	15 25	36 17	70.1	15 05	35 18	69.8	14 44	34 20	69.6	205	335
26	154	17 03	38 59	70.1	16 43	38 00	69.8	16 22	37 01	69.5	16 01	36 03	69.2	15 39	35 05	69.0	15 18	34 07	68.7	206	334
27	153	17 41	38 44	69.3	17 20	37 46	69.0	16 58	36 47	68.7	16 36	35 49	68.4	16 14	34 51	68.1	15 51	33 53	67.9	207	333
28	152	18 19	38 29	68.4	17 56	37 30	68.1	17 34	36 32	67.8	17 11	35 34	67.5	16 48	34 36	67.3	16 25	33 38	67.0	208	332
29	151	18 56	38 13	67.6	18 33	37 15	67.3	18 09	36 16	67.0	17 46	35 18	66.7	17 22	34 21	66.4	16 58	33 23	66.1	209	331
30	150	19 33	37 57	66.8	19 09	36 58	66.5	18 45	36 00	66.1	18 20	35 03	65.8	17 56	34 05	65.5	17 31	33 08	65.2	210	330
31	149	20 10	37 40	65.9	19 45	36 41	65.6	19 20	35 44	65.3	18 55	34 46	65.0	18 29	33 49	64.7	18 03	32 52	64.4	211	329
32	148	20 46	37 22	65.1	20 21	36 24	64.8	19 55	35 26	64.4	19 29	34 29	64.1	19 02	33 32	63.8	18 36	32 35	63.5	212	328
33	147	21 22	37 03	64.2	20 56	36 06	63.9	20 30	35 08	63.6	20 03	34 11	63.2	19 35	33 14	62.9	19 08	32 18	62.6	213	327
34	146	21 58	36 44	63.4	21 31	35 47	63.0	21 04	34 49	62.7	20 36	33 53	62.3	20 08	32 56	62.0	19 40	32 00	61.7	214	326
35	145	22 34	36 25	62.5	22 06	35 27	62.1	21 38	34 30	61.8	21 10	33 33	61.4	20 41	32 37	61.1	20 12	31 41	60.8	215	325
36	144	23 10	36 04	61.6	22 41	35 07	61.3	22 12	34 10	60.9	21 43	33 14	60.5	21 13	32 18	60.2	20 43	31 22	59.9	216	324
37	143	23 45	35 43	60.8	23 15	34 46	60.4	22 45	33 50	60.0	22 15	32 54	59.6	21 45	31 58	59.3	21 14	31 02	59.0	217	323
38	142	24 20	35 21	59.9	23 49	34 25	59.5	23 19	33 28	59.1	22 48	32 33	58.7	22 16	31 37	58.4	21 45	30 42	58.0	218	322
39	141	24 54	34 59	59.0	24 23	34 02	58.6	23 52	33 07	58.2	23 20	32 11	57.8	22 48	31 16	57.5	22 15	30 21	57.1	219	321
40	140	25 28	34 36	58.1	24 57	33 40	57.7	24 24	32 44	57.3	23 52	31 49	56.9	23 19	30 54	56.5	22 45	30 00	56.2	220	320
41	139	26 02	34 12	57.1	25 30	33 16	56.7	24 57	32 21	56.3	24 23	31 26	56.0	23 49	30 32	55.6	23 15	29 38	55.2	221	319
42	138	26 36	33 47	56.2	26 02	32 52	55.8	25 28	31 57	55.4	24 54	31 02	55.0	24 20	30 08	54.6	23 45	29 15	54.3	222	318
43	137	27 09	33 22	55.3	26 35	32 27	54.9	26 00	31 32	54.5	25 25	30 38	54.1	24 50	29 45	53.7	24 14	28 52	53.3	223	317
44	136	27 42	32 56	54.3	27 07	32 01	53.9	26 31	31 07	53.5	25 55	30 13	53.1	25 19	29 20	52.7	24 43	28 28	52.4	224	316
45	135	28 14	32 29	53.4	27 38	31 35	53.0	27 02	30 41	52.5	26 25	29 48	52.1	25 48	28 55	51.8	25 11	28 03	51.4	225	315

Lat. / A		48°			49°			50°			51°			52°			53°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	28 14	32 29	53.4	27 38	31 35	53.0	27 02	30 41	52.5	26 25	29 48	52.1	25 48	28 55	51.8	25 11	28 03	51.4	225	315
46	134	28 46	32 01	52.4	28 10	31 08	52.0	27 32	30 14	51.6	26 55	29 22	51.2	26 17	28 29	50.8	25 39	27 38	50.4	226	314
47	133	29 18	31 33	51.4	28 40	30 40	51.0	28 02	29 47	50.6	27 24	28 55	50.2	26 46	28 03	49.8	26 07	27 12	49.4	227	313
48	132	29 49	31 04	50.5	29 11	30 11	50.0	28 32	29 19	49.6	27 53	28 27	49.2	27 14	27 36	48.8	26 34	26 46	48.4	228	312
49	131	30 20	30 34	49.5	29 41	29 42	49.0	29 01	28 50	48.6	28 21	27 59	48.2	27 41	27 08	47.8	27 01	26 18	47.4	229	311
50	130	30 50	30 04	48.5	30 10	29 12	48.0	29 30	28 20	47.6	28 49	27 30	47.2	28 08	26 40	46.8	27 27	25 51	46.4	230	310
51	129	31 20	29 32	47.5	30 39	28 41	47.0	29 58	27 50	46.6	29 17	27 00	46.2	28 35	26 11	45.8	27 53	25 22	45.4	231	309
52	128	31 49	29 00	46.4	31 08	28 09	46.0	30 26	27 19	45.6	29 44	26 30	45.2	29 01	25 41	44.8	28 19	24 53	44.4	232	308
53	127	32 18	28 27	45.4	31 36	27 37	45.0	30 53	26 48	44.5	30 10	25 59	44.1	29 27	25 11	43.7	28 44	24 24	43.3	233	307
54	126	32 46	27 53	44.4	32 03	27 04	43.9	31 20	26 15	43.5	30 36	25 27	43.1	29 52	24 40	42.7	29 08	23 53	42.3	234	306
55	125	33 14	27 19	43.3	32 30	26 30	42.9	31 46	25 42	42.4	31 02	24 55	42.0	30 17	24 08	41.6	29 32	23 23	41.2	235	305
56	124	33 42	26 44	42.2	32 57	25 55	41.8	32 12	25 08	41.4	31 27	24 22	41.0	30 41	23 36	40.6	29 56	22 51	40.2	236	304
57	123	34 08	26 07	41.1	33 23	25 20	40.7	32 37	24 34	40.3	31 51	23 48	39.9	31 05	23 03	39.5	30 19	22 19	39.1	237	303
58	122	34 34	25 30	40.1	33 48	24 44	39.6	33 02	23 58	39.2	32 15	23 14	38.8	31 28	22 29	38.4	30 41	21 46	38.0	238	302
59	121	35 00	24 53	39.0	34 13	24 07	38.5	33 26	23 22	38.1	32 39	22 38	37.7	31 51	21 55	37.3	31 03	21 13	37.0	239	301
60	120	35 25	24 14	37.8	34 37	23 30	37.4	33 50	22 46	37.0	33 02	22 03	36.6	32 13	21 20	36.2	31 25	20 39	35.9	240	300
61	119	35 49	23 35	36.7	35 01	22 51	36.3	34 12	22 08	35.9	33 24	21 26	35.5	32 35	20 45	35.1	31 46	20 04	34.8	241	299
62	118	36 13	22 55	35.6	35 24	22 12	35.2	34 35	21 30	34.8	33 45	20 49	34.4	32 56	20 09	34.0	32 06	19 29	33.7	242	298
63	117	36 36	22 14	34.4	35 46	21 32	34.0	34 56	20 51	33.6	34 06	20 11	33.3	33 16	19 32	32.9	32 26	18 53	32.5	243	297
64	116	36 58	21 32	33.3	36 08	20 52	32.9	35 17	20 12	32.5	34 27	19 33	32.1	33 36	18 54	31.8	32 45	18 17	31.4	244	296
65	115	37 20	20 50	32.1	36 29	20 10	31.7	35 38	19 32	31.3	34 47	18 54	31.0	33 55	18 16	30.6	33 03	17 40	30.3	245	295
66	114	37 41	20 07	30.9	36 49	19 28	30.5	35 58	18 51	30.2	35 06	18 14	29.8	34 13	17 38	29.5	33 21	17 02	29.1	246	294
67	113	38 01	19 23	29.7	37 09	18 46	29.4	36 17	18 09	29.0	35 24	17 33	28.6	34 31	16 59	28.3	33 38	16 24	28.0	247	293
68	112	38 21	18 38	28.5	37 28	18 02	28.2	36 35	17 27	27.8	35 42	16 53	27.5	34 48	16 19	27.1	33 55	15 46	26.8	248	292
69	111	38 40	17 53	27.3	37 46	17 18	27.0	36 53	16 44	26.6	35 59	16 11	26.3	35 05	15 38	26.0	34 11	15 07	25.7	249	291
70	110	38 58	17 07	26.1	38 04	16 33	25.7	37 10	16 01	25.4	36 15	15 29	25.1	35 21	14 58	24.8	34 26	14 27	24.5	250	290
71	109	39 15	16 20	24.9	38 20	15 48	24.5	37 26	15 17	24.2	36 31	14 46	23.9	35 36	14 16	23.6	34 41	13 47	23.3	251	289
72	108	39 31	15 33	23.6	38 36	15 02	23.3	37 41	14 32	23.0	36 46	14 03	22.7	35 50	13 34	22.4	34 55	13 07	22.1	252	288
73	107	39 47	14 45	22.4	38 51	14 16	22.1	37 56	13 47	21.8	37 00	13 19	21.5	36 04	12 52	21.2	35 08	12 25	20.9	253	287
74	106	40 02	13 56	21.1	39 06	13 28	20.8	38 10	13 01	20.5	37 13	12 35	20.3	36 17	12 09	20.0	35 21	11 44	19.8	254	286
75	105	40 16	13 07	19.8	39 19	12 41	19.5	38 23	12 15	19.3	37 26	11 50	19.0	36 29	11 26	18.8	35 33	11 02	18.5	255	285
76	104	40 29	12 17	18.5	39 32	11 53	18.3	38 35	11 28	18.0	37 38	11 05	17.8	36 41	10 42	17.6	35 44	10 20	17.3	256	284
77	103	40 41	11 27	17.3	39 44	11 04	17.0	38 47	10 41	16.8	37 49	10 19	16.5	36 52	9 58	16.3	35 54	9 37	16.1	257	283
78	102	40 53	10 36	16.0	39 55	10 15	15.7	38 57	9 54	15.5	38 00	9 33	15.3	37 02	9 14	15.1	36 04	8 54	14.9	258	282
79	101	41 04	9 45	14.7	40 05	9 25	14.4	39 07	9 06	14.2	38 09	8 47	14.0	37 11	8 29	13.9	36 13	8 11	13.7	259	281
80	100	41 13	8 53	13.3	40 15	8 35	13.2	39 16	8 17	13.0	38 18	8 00	12.8	37 19	7 44	12.6	36 21	7 27	12.5	260	280
81	99	41 22	8 01	12.0	40 23	7 45	11.9	39 25	7 29	11.7	38 26	7 13	11.5	37 27	6 58	11.4	36 28	6 43	11.2	261	279
82	98	41 30	7 09	10.7	40 31	6 54	10.5	39 32	6 40	10.4	38 33	6 26	10.3	37 34	6 12	10.1	36 35	5 59	10.0	262	278
83	97	41 37	6 16	9.4	40 38	6 03	9.2	39 39	5 50	9.1	38 39	5 38	9.0	37 40	5 26	8.9	36 41	5 15	8.7	263	277
84	96	41 43	5 23	8.1	40 44	5 12	7.9	39 44	5 01	7.8	38 45	4 50	7.7	37 45	4 40	7.6	36 46	4 30	7.5	264	276
85	95	41 48	4 29	6.7	40 49	4 20	6.6	39 49	4 11	6.5	38 49	4 02	6.4	37 50	3 54	6.3	36 50	3 45	6.3	265	275
86	94	41 52	3 36	5.4	40 53	3 28	5.3	39 53	3 21	5.2	38 53	3 14	5.1	37 53	3 07	5.1	36 54	3 01	5.0	266	274
87	93	41 56	2 42	4.0	40 56	2 36	4.0	39 56	2 31	3.9	38 56	2 26	3.9	37 56	2 20	3.8	36 56	2 16	3.8	267	273
88	92	41 58	1 48	2.7	40 58	1 44	2.6	39 58	1 41	2.6	38 58	1 37	2.6	37 58	1 34	2.5	36 58	1 30	2.5	268	272
89	91	42 00	0 54	1.3	41 00	0 52	1.3	40 00	0 50	1.3	39 00	0 49	1.3	38 00	0 47	1.3	37 00	0 45	1.3	269	271
90	90	42 00	0 00	0.0	41 00	0 00	0.0	40 00	0 00	0.0	39 00	0 00	0.0	38 00	0 00	0.0	37 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		54°			55°			56°			57°			58°			59°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	36 00	90.0	0 00	35 00	90.0	0 00	34 00	90.0	0 00	33 00	90.0	0 00	32 00	90.0	0 00	31 00	90.0	180	360
1	179	0 35	36 00	89.2	0 34	35 00	89.2	0 34	34 00	89.2	0 33	33 00	89.2	0 32	32 00	89.2	0 31	31 00	89.1	181	359
2	178	1 11	35 59	88.4	1 09	34 59	88.4	1 07	33 59	88.3	1 05	32 59	88.3	1 04	31 59	88.3	1 02	30 59	88.3	182	358
3	177	1 46	35 58	87.6	1 43	34 58	87.5	1 41	33 58	87.5	1 38	32 58	87.5	1 35	31 58	87.5	1 33	30 58	87.4	183	357
4	176	2 21	35 56	86.8	2 18	34 56	86.7	2 14	33 56	86.7	2 11	32 56	86.6	2 07	31 56	86.6	2 04	30 56	86.6	184	356
5	175	2 56	35 54	86.0	2 52	34 54	85.9	2 48	33 54	85.9	2 43	32 54	85.8	2 39	31 54	85.8	2 34	30 54	85.7	185	355
6	174	3 31	35 51	85.1	3 26	34 51	85.1	3 21	33 51	85.0	3 16	32 51	85.0	3 11	31 52	84.9	3 05	30 52	84.9	186	354
7	173	4 06	35 48	84.3	4 00	34 48	84.3	3 54	33 48	84.2	3 48	32 48	84.1	3 42	31 48	84.1	3 36	30 49	84.0	187	353
8	172	4 42	35 44	83.5	4 35	34 44	83.4	4 28	33 44	83.4	4 21	32 45	83.3	4 14	31 45	83.2	4 07	30 45	83.1	188	352
9	171	5 17	35 40	82.7	5 09	34 40	82.6	5 01	33 40	82.5	4 53	32 41	82.4	4 45	31 41	82.3	4 37	30 41	82.3	189	351
10	170	5 51	35 35	81.9	5 43	34 35	81.8	5 34	33 36	81.7	5 26	32 36	81.6	5 17	31 36	81.5	5 08	30 37	81.4	190	350
11	169	6 26	35 30	81.1	6 17	34 30	81.0	6 08	33 31	80.8	5 58	32 31	80.7	5 48	31 31	80.6	5 38	30 32	80.5	191	349
12	168	7 01	35 24	80.2	6 51	34 24	80.1	6 41	33 25	80.0	6 30	32 25	79.9	6 20	31 26	79.8	6 09	30 27	79.7	192	348
13	167	7 36	35 18	79.4	7 25	34 18	79.3	7 14	33 19	79.2	7 02	32 19	79.0	6 51	31 20	78.9	6 39	30 21	78.8	193	347
14	166	8 11	35 11	78.6	7 59	34 12	78.5	7 46	33 12	78.3	7 34	32 13	78.2	7 22	31 14	78.1	7 09	30 15	77.9	194	346
15	165	8 45	35 04	77.8	8 32	34 04	77.6	8 19	33 05	77.5	8 06	32 06	77.3	7 53	31 07	77.2	7 40	30 08	77.1	195	345
16	164	9 19	34 56	76.9	9 06	33 57	76.8	8 52	32 58	76.6	8 38	31 58	76.5	8 24	31 00	76.3	8 10	30 01	76.2	196	344
17	163	9 54	34 47	76.1	9 39	33 48	75.9	9 25	32 49	75.8	9 10	31 50	75.6	8 55	30 52	75.5	8 40	29 53	75.3	197	343
18	162	10 28	34 39	75.3	10 13	33 40	75.1	9 57	32 41	74.9	9 41	31 42	74.8	9 25	30 43	74.6	9 09	29 45	74.4	198	342
19	161	11 02	34 29	74.4	10 46	33 30	74.2	10 29	32 32	74.1	10 13	31 33	73.9	9 56	30 35	73.7	9 39	29 36	73.6	199	341
20	160	11 36	34 19	73.6	11 19	33 21	73.4	11 02	32 22	73.2	10 44	31 24	73.0	10 27	30 25	72.8	10 09	29 27	72.7	200	340
21	159	12 10	34 09	72.7	11 52	33 10	72.5	11 34	32 12	72.3	11 15	31 14	72.2	10 57	30 15	72.0	10 38	29 17	71.8	201	339
22	158	12 43	33 58	71.9	12 24	33 00	71.7	12 06	32 01	71.5	11 46	31 03	71.3	11 27	30 05	71.1	11 07	29 07	70.9	202	338
23	157	13 17	33 46	71.0	12 57	32 48	70.8	12 37	31 50	70.6	12 17	30 52	70.4	11 57	29 54	70.2	11 37	28 57	70.0	203	337
24	156	13 50	33 34	70.2	13 29	32 36	70.0	13 09	31 38	69.7	12 48	30 41	69.5	12 27	29 43	69.3	12 06	28 46	69.1	204	336
25	155	14 23	33 22	69.3	14 02	32 24	69.1	13 40	31 26	68.9	13 18	30 29	68.6	12 56	29 31	68.4	12 34	28 34	68.2	205	335
26	154	14 56	33 09	68.5	14 34	32 11	68.2	14 11	31 14	68.0	13 49	30 16	67.8	13 26	29 19	67.5	13 03	28 22	67.3	206	334
27	153	15 29	32 55	67.6	15 06	31 58	67.3	14 42	31 00	67.1	14 19	30 03	66.9	13 55	29 06	66.6	13 31	28 10	66.4	207	333
28	152	16 01	32 41	66.7	15 37	31 44	66.5	15 13	30 47	66.2	14 49	29 50	66.0	14 24	28 53	65.7	14 00	27 57	65.5	208	332
29	151	16 33	32 26	65.8	16 09	31 29	65.6	15 44	30 32	65.3	15 19	29 36	65.1	14 53	28 39	64.8	14 28	27 43	64.6	209	331
30	150	17 05	32 11	65.0	16 40	31 14	64.7	16 14	30 17	64.4	15 48	29 21	64.2	15 22	28 25	63.9	14 55	27 29	63.7	210	330
31	149	17 37	31 55	64.1	17 11	30 58	63.8	16 44	30 02	63.5	16 17	29 06	63.3	15 50	28 10	63.0	15 23	27 15	62.7	211	329
32	148	18 09	31 38	63.2	17 42	30 42	62.9	17 14	29 46	62.6	16 47	28 51	62.3	16 19	27 55	62.1	15 50	27 00	61.8	212	328
33	147	18 40	31 21	62.3	18 12	30 25	62.0	17 44	29 30	61.7	17 15	28 34	61.4	16 47	27 39	61.2	16 17	26 45	60.9	213	327
34	146	19 11	31 04	61.4	18 42	30 08	61.1	18 13	29 13	60.8	17 44	28 18	60.5	17 14	27 23	60.2	16 44	26 29	60.0	214	326
35	145	19 42	30 46	60.5	19 12	29 50	60.2	18 42	28 55	59.9	18 12	28 01	59.6	17 42	27 06	59.3	17 11	26 12	59.0	215	325
36	144	20 13	30 27	59.6	19 42	29 32	59.2	19 11	28 37	58.9	18 40	27 43	58.6	18 09	26 49	58.4	17 37	25 55	58.1	216	324
37	143	20 43	30 07	58.6	20 12	29 13	58.3	19 40	28 19	58.0	19 08	27 25	57.7	18 36	26 31	57.4	18 03	25 38	57.1	217	323
38	142	21 13	29 48	57.7	20 41	28 53	57.4	20 08	27 59	57.1	19 35	27 06	56.8	19 02	26 13	56.5	18 29	25 20	56.2	218	322
39	141	21 43	29 27	56.8	21 10	28 33	56.4	20 36	27 40	56.1	20 03	26 47	55.8	19 29	25 54	55.5	18 55	25 02	55.2	219	321
40	140	22 12	29 06	55.8	21 38	28 13	55.5	21 04	27 20	55.2	20 30	26 27	54.9	19 55	25 35	54.6	19 20	24 43	54.3	220	320
41	139	22 41	28 44	54.9	22 06	27 51	54.5	21 31	26 59	54.2	20 56	26 07	53.9	20 21	25 15	53.6	19 45	24 24	53.3	221	319
42	138	23 10	28 22	53.9	22 34	27 29	53.6	21 58	26 37	53.3	21 22	25 46	52.9	20 46	24 55	52.6	20 10	24 04	52.3	222	318
43	137	23 38	27 59	53.0	23 02	27 07	52.6	22 25	26 15	52.3	21 48	25 24	52.0	21 11	24 34	51.7	20 34	23 43	51.4	223	317
44	136	24 06	27 36	52.0	23 29	26 44	51.7	22 51	25 53	51.3	22 14	25 02	51.0	21 36	24 12	50.7	20 58	23 23	50.4	224	316
45	135	24 34	27 11	51.0	23 56	26 20	50.7	23 17	25 30	50.3	22 39	24 40	50.0	22 00	23 50	49.7	21 21	23 01	49.4	225	315

Lat. / A		54°			55°			56°			57°			58°			59°			Lat. / A	
LHA	/ F	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	24 34	27 11	51.0	23 56	26 20	50.7	23 17	25 30	50.3	22 39	24 40	50.0	22 00	23 50	49.7	21 21	23 01	49.4	225	315
46	134	25 01	26 47	50.0	24 22	25 56	49.7	23 43	25 06	49.4	23 04	24 17	49.0	22 24	23 28	48.7	21 45	22 39	48.4	226	314
47	133	25 28	26 22	49.1	24 48	25 32	48.7	24 08	24 42	48.4	23 28	23 53	48.0	22 48	23 05	47.7	22 08	22 17	47.4	227	313
48	132	25 54	25 56	48.1	25 14	25 06	47.7	24 33	24 17	47.4	23 53	23 29	47.0	23 11	22 41	46.7	22 30	21 54	46.4	228	312
49	131	26 20	25 29	47.1	25 39	24 40	46.7	24 58	23 52	46.4	24 16	23 05	46.0	23 34	22 17	45.7	22 52	21 31	45.4	229	311
50	130	26 46	25 02	46.0	26 04	24 14	45.7	25 22	23 26	45.3	24 40	22 39	45.0	23 57	21 53	44.7	23 14	21 07	44.4	230	310
51	129	27 11	24 34	45.0	26 28	23 47	44.7	25 45	23 00	44.3	25 02	22 14	44.0	24 19	21 28	43.7	23 36	20 43	43.4	231	309
52	128	27 36	24 06	44.0	26 52	23 19	43.6	26 09	22 33	43.3	25 25	21 48	43.0	24 41	21 03	42.7	23 57	20 18	42.3	232	308
53	127	28 00	23 37	43.0	27 16	22 51	42.6	26 32	22 06	42.3	25 47	21 21	41.9	25 02	20 37	41.6	24 17	19 53	41.3	233	307
54	126	28 24	23 07	41.9	27 39	22 22	41.6	26 54	21 38	41.2	26 09	20 54	40.9	25 23	20 10	40.6	24 37	19 27	40.3	234	306
55	125	28 47	22 37	40.9	28 01	21 53	40.5	27 16	21 09	40.2	26 30	20 26	39.9	25 44	19 43	39.5	24 57	19 01	39.2	235	305
56	124	29 10	22 07	39.8	28 24	21 23	39.5	27 37	20 40	39.1	26 50	19 57	38.8	26 04	19 16	38.5	25 17	18 34	38.2	236	304
57	123	29 32	21 35	38.8	28 45	20 52	38.4	27 58	20 10	38.1	27 11	19 29	37.8	26 23	18 48	37.4	25 35	18 07	37.1	237	303
58	122	29 54	21 03	37.7	29 06	20 21	37.3	28 19	19 40	37.0	27 31	18 59	36.7	26 42	18 19	36.4	25 54	17 40	36.1	238	302
59	121	30 15	20 31	36.6	29 27	19 50	36.3	28 38	19 09	35.9	27 50	18 30	35.6	27 01	17 50	35.3	26 12	17 12	35.0	239	301
60	120	30 36	19 58	35.5	29 47	19 18	35.2	28 58	18 38	34.9	28 09	17 59	34.5	27 19	17 21	34.2	26 29	16 43	34.0	240	300
61	119	30 56	19 24	34.4	30 07	18 45	34.1	29 17	18 06	33.8	28 27	17 29	33.5	27 37	16 51	33.2	26 46	16 14	32.9	241	299
62	118	31 16	18 50	33.3	30 26	18 12	33.0	29 35	17 34	32.7	28 45	16 57	32.4	27 54	16 21	32.1	27 03	15 45	31.8	242	298
63	117	31 35	18 15	32.2	30 44	17 38	31.9	29 53	17 02	31.6	29 02	16 26	31.3	28 10	15 50	31.0	27 19	15 15	30.7	243	297
64	116	31 53	17 40	31.1	31 02	17 04	30.8	30 10	16 28	30.5	29 19	15 53	30.2	28 27	15 19	29.9	27 35	14 45	29.6	244	296
65	115	32 11	17 04	30.0	31 19	16 29	29.7	30 27	15 55	29.4	29 35	15 21	29.1	28 42	14 48	28.8	27 50	14 15	28.5	245	295
66	114	32 29	16 28	28.8	31 36	15 54	28.5	30 43	15 20	28.2	29 50	14 48	28.0	28 57	14 16	27.7	28 04	13 44	27.4	246	294
67	113	32 45	15 51	27.7	31 52	15 18	27.4	30 59	14 46	27.1	30 05	14 14	26.8	29 12	13 43	26.6	28 18	13 13	26.3	247	293
68	112	33 01	15 14	26.5	32 08	14 42	26.3	31 14	14 11	26.0	30 20	13 40	25.7	29 26	13 10	25.5	28 31	12 41	25.2	248	292
69	111	33 17	14 36	25.4	32 23	14 05	25.1	31 28	13 35	24.8	30 34	13 06	24.6	29 39	12 37	24.4	28 44	12 09	24.1	249	291
70	110	33 32	13 57	24.2	32 37	13 28	24.0	31 42	12 59	23.7	30 47	12 31	23.5	29 52	12 04	23.2	28 57	11 37	23.0	250	290
71	109	33 46	13 18	23.1	32 51	12 51	22.8	31 55	12 23	22.6	31 00	11 56	22.3	30 04	11 30	22.1	29 09	11 04	21.9	251	289
72	108	33 59	12 39	21.9	33 04	12 13	21.6	32 08	11 46	21.4	31 12	11 21	21.2	30 16	10 56	21.0	29 20	10 31	20.8	252	288
73	107	34 12	12 00	20.7	33 16	11 34	20.5	32 20	11 09	20.2	31 23	10 45	20.0	30 27	10 21	19.8	29 30	9 58	19.6	253	287
74	106	34 24	11 19	19.5	33 28	10 55	19.3	32 31	10 32	19.1	31 34	10 09	18.9	30 37	9 46	18.7	29 41	9 24	18.5	254	286
75	105	34 36	10 39	18.3	33 39	10 16	18.1	32 42	9 54	17.9	31 44	9 32	17.7	30 47	9 11	17.5	29 50	8 50	17.4	255	285
76	104	34 46	9 58	17.1	33 49	9 37	16.9	32 52	9 16	16.7	31 54	8 56	16.6	30 57	8 36	16.4	29 59	8 16	16.2	256	284
77	103	34 56	9 17	15.9	33 59	8 57	15.7	33 01	8 38	15.6	32 03	8 19	15.4	31 05	8 00	15.2	30 07	7 42	15.1	257	283
78	102	35 06	8 35	14.7	34 08	8 17	14.5	33 10	7 59	14.4	32 11	7 41	14.2	31 13	7 24	14.1	30 15	7 07	13.9	258	282
79	101	35 14	7 54	13.5	34 16	7 37	13.3	33 18	7 20	13.2	32 19	7 04	13.0	31 21	6 48	12.9	30 22	6 32	12.8	259	281
80	100	35 22	7 11	12.3	34 24	6 56	12.1	33 25	6 41	12.0	32 26	6 26	11.9	31 27	6 12	11.7	30 29	5 57	11.6	260	280
81	99	35 29	6 29	11.1	34 30	6 15	10.9	33 32	6 01	10.8	32 33	5 48	10.7	31 34	5 35	10.6	30 35	5 22	10.5	261	279
82	98	35 36	5 46	9.9	34 37	5 34	9.7	33 37	5 22	9.6	32 38	5 10	9.5	31 39	4 58	9.4	30 40	4 47	9.3	262	278
83	97	35 41	5 04	8.6	34 42	4 53	8.5	33 43	4 42	8.4	32 43	4 32	8.3	31 44	4 21	8.2	30 45	4 11	8.2	263	277
84	96	35 46	4 21	7.4	34 47	4 11	7.3	33 47	4 02	7.2	32 48	3 53	7.1	31 48	3 44	7.1	30 49	3 36	7.0	264	276
85	95	35 51	3 37	6.2	34 51	3 30	6.1	33 51	3 22	6.0	32 52	3 14	6.0	31 52	3 07	5.9	30 52	3 00	5.8	265	275
86	94	35 54	2 54	4.9	34 54	2 48	4.9	33 54	2 42	4.8	32 55	2 36	4.8	31 55	2 30	4.7	30 55	2 24	4.7	266	274
87	93	35 57	2 11	3.7	34 57	2 06	3.7	33 57	2 01	3.6	32 57	1 57	3.6	31 57	1 52	3.5	30 57	1 48	3.5	267	273
88	92	35 58	1 27	2.5	34 59	1 24	2.4	33 59	1 21	2.4	32 59	1 18	2.4	31 59	1 15	2.4	30 59	1 12	2.3	268	272
89	91	36 00	0 44	1.2	35 00	0 42	1.2	34 00	0 40	1.2	33 00	0 39	1.2	32 00	0 37	1.2	31 00	0 36	1.2	269	271
90	90	36 00	0 00	0.0	35 00	0 00	0.0	34 00	0 00	0.0	33 00	0 00	0.0	32 00	0 00	0.0	31 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1 : same sign as B
Z_2 : (–) for F > 90°

Lat. / A		60°			61°			62°			63°			64°			65°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	30 00	90.0	0 00	29 00	90.0	0 00	28 00	90.0	0 00	27 00	90.0	0 00	26 00	90.0	0 00	25 00	90.0	180	360
1	179	0 30	30 00	89.1	0 29	29 00	89.1	0 28	28 00	89.1	0 27	27 00	89.1	0 26	26 00	89.1	0 25	25 00	89.1	181	359
2	178	1 00	29 59	88.3	0 58	28 59	88.3	0 56	27 59	88.2	0 54	26 59	88.2	0 53	25 59	88.2	0 51	24 59	88.2	182	358
3	177	1 30	29 58	87.4	1 27	28 58	87.4	1 24	27 58	87.4	1 22	26 58	87.3	1 19	25 58	87.3	1 16	24 58	87.3	183	357
4	176	2 00	29 56	86.5	1 56	28 56	86.5	1 53	27 57	86.5	1 49	26 57	86.4	1 45	25 57	86.4	1 41	24 57	86.4	184	356
5	175	2 30	29 54	85.7	2 25	28 54	85.6	2 21	27 55	85.6	2 16	26 55	85.5	2 11	25 55	85.5	2 07	24 55	85.5	185	355
6	174	3 00	29 52	84.8	2 54	28 52	84.7	2 49	27 52	84.7	2 43	26 52	84.6	2 38	25 53	84.6	2 32	24 53	84.6	186	354
7	173	3 30	29 49	83.9	3 23	28 49	83.9	3 17	27 49	83.8	3 10	26 50	83.8	3 04	25 50	83.7	2 57	24 50	83.7	187	353
8	172	3 59	29 45	83.1	3 52	28 46	83.0	3 45	27 46	82.9	3 37	26 46	82.9	3 30	25 47	82.8	3 22	24 47	82.7	188	352
9	171	4 29	29 42	82.2	4 21	28 42	82.1	4 13	27 42	82.0	4 04	26 43	82.0	3 56	25 43	81.9	3 47	24 44	81.8	189	351
10	170	4 59	29 37	81.3	4 50	28 38	81.2	4 41	27 38	81.2	4 31	26 39	81.1	4 22	25 39	81.0	4 13	24 40	80.9	190	350
11	169	5 28	29 33	80.4	5 18	28 33	80.4	5 08	27 34	80.3	4 58	26 34	80.2	4 48	25 35	80.1	4 38	24 36	80.0	191	349
12	168	5 58	29 27	79.6	5 47	28 28	79.5	5 36	27 29	79.4	5 25	26 29	79.3	5 14	25 30	79.2	5 02	24 31	79.1	192	348
13	167	6 27	29 22	78.7	6 16	28 22	78.6	6 04	27 23	78.5	5 52	26 24	78.4	5 40	25 25	78.3	5 27	24 26	78.2	193	347
14	166	6 57	29 15	77.8	6 44	28 16	77.7	6 31	27 17	77.6	6 18	26 18	77.5	6 05	25 20	77.4	5 52	24 21	77.3	194	346
15	165	7 26	29 09	76.9	7 13	28 10	76.8	6 59	27 11	76.7	6 45	26 12	76.6	6 31	25 14	76.5	6 17	24 15	76.4	195	345
16	164	7 55	29 02	76.1	7 41	28 03	75.9	7 26	27 04	75.8	7 11	26 06	75.7	6 56	25 07	75.5	6 41	24 09	75.4	196	344
17	163	8 24	28 54	75.2	8 09	27 56	75.0	7 53	26 57	74.9	7 38	25 59	74.8	7 22	25 00	74.6	7 06	24 02	74.5	197	343
18	162	8 53	28 46	74.3	8 37	27 48	74.1	8 20	26 50	74.0	8 04	25 51	73.9	7 47	24 53	73.7	7 30	23 55	73.6	198	342
19	161	9 22	28 38	73.4	9 05	27 40	73.2	8 48	26 41	73.1	8 30	25 43	72.9	8 12	24 45	72.8	7 55	23 48	72.7	199	341
20	160	9 51	28 29	72.5	9 33	27 31	72.3	9 14	26 33	72.2	8 56	25 35	72.0	8 37	24 37	71.9	8 19	23 40	71.7	200	340
21	159	10 19	28 19	71.6	10 00	27 22	71.4	9 41	26 24	71.3	9 22	25 26	71.1	9 02	24 29	71.0	8 43	23 32	70.8	201	339
22	158	10 48	28 10	70.7	10 28	27 12	70.5	10 08	26 15	70.4	9 48	25 17	70.2	9 27	24 20	70.0	9 07	23 23	69.9	202	338
23	157	11 16	27 59	69.8	10 55	27 02	69.6	10 34	26 05	69.5	10 13	25 08	69.3	9 52	24 11	69.1	9 30	23 14	69.0	203	337
24	156	11 44	27 49	68.9	11 22	26 51	68.7	11 00	25 54	68.5	10 38	24 58	68.4	10 16	24 01	68.2	9 54	23 04	68.0	204	336
25	155	12 12	27 37	68.0	11 49	26 40	67.8	11 27	25 44	67.6	11 04	24 47	67.4	10 41	23 51	67.3	10 17	22 55	67.1	205	335
26	154	12 40	27 26	67.1	12 16	26 29	66.9	11 53	25 33	66.7	11 29	24 36	66.5	11 05	23 40	66.3	10 41	22 44	66.2	206	334
27	153	13 07	27 13	66.2	12 43	26 17	66.0	12 18	25 21	65.8	11 54	24 25	65.6	11 29	23 29	65.4	11 04	22 34	65.2	207	333
28	152	13 35	27 01	65.3	13 09	26 05	65.1	12 44	25 09	64.9	12 18	24 13	64.7	11 53	23 18	64.5	11 27	22 23	64.3	208	332
29	151	14 02	26 48	64.4	13 36	25 52	64.1	13 09	24 56	63.9	12 43	24 01	63.7	12 16	23 06	63.5	11 49	22 11	63.3	209	331
30	150	14 29	26 34	63.4	14 02	25 39	63.2	13 35	24 43	63.0	13 07	23 49	62.8	12 40	22 54	62.6	12 12	21 59	62.4	210	330
31	149	14 55	26 20	62.5	14 28	25 25	62.3	14 00	24 30	62.1	13 31	23 36	61.8	13 03	22 41	61.6	12 34	21 47	61.4	211	329
32	148	15 22	26 05	61.6	14 53	25 11	61.3	14 24	24 16	61.1	13 55	23 22	60.9	13 26	22 28	60.7	12 56	21 35	60.5	212	328
33	147	15 48	25 50	60.6	15 19	24 56	60.4	14 49	24 02	60.2	14 19	23 08	59.9	13 49	22 15	59.7	13 18	21 22	59.5	213	327
34	146	16 14	25 35	59.7	15 44	24 41	59.5	15 13	23 47	59.2	14 42	22 54	59.0	14 11	22 01	58.8	13 40	21 08	58.6	214	326
35	145	16 40	25 19	58.8	16 09	24 25	58.5	15 37	23 32	58.3	15 06	22 39	58.0	14 34	21 47	57.8	14 02	20 54	57.6	215	325
36	144	17 05	25 02	57.8	16 33	24 09	57.6	16 01	23 17	57.3	15 29	22 24	57.1	14 56	21 32	56.9	14 23	20 40	56.6	216	324
37	143	17 31	24 45	56.9	16 58	23 53	56.6	16 25	23 00	56.4	15 51	22 09	56.1	15 18	21 17	55.9	14 44	20 26	55.7	217	323
38	142	17 56	24 28	55.9	17 22	23 36	55.7	16 48	22 44	55.4	16 14	21 53	55.2	15 39	21 01	54.9	15 05	20 11	54.7	218	322
39	141	18 20	24 10	55.0	17 46	23 18	54.7	17 11	22 27	54.4	16 36	21 36	54.2	16 01	20 46	54.0	15 25	19 55	53.7	219	321
40	140	18 45	23 52	54.0	18 09	23 00	53.7	17 34	22 10	53.5	16 58	21 19	53.2	16 22	20 29	53.0	15 46	19 39	52.7	220	320
41	139	19 09	23 33	53.0	18 33	22 42	52.8	17 56	21 52	52.5	17 20	21 02	52.2	16 43	20 13	52.0	16 06	19 23	51.8	221	319
42	138	19 33	23 13	52.1	18 56	22 23	51.8	18 19	21 34	51.5	17 41	20 44	51.3	17 03	19 55	51.0	16 26	19 07	50.8	222	318
43	137	19 56	22 54	51.1	19 18	22 04	50.8	18 40	21 15	50.5	18 02	20 26	50.3	17 24	19 38	50.0	16 45	18 50	49.8	223	317
44	136	20 19	22 33	50.1	19 41	21 44	49.8	19 02	20 56	49.5	18 23	20 08	49.3	17 44	19 20	49.0	17 04	18 33	48.8	224	316
45	135	20 42	22 12	49.1	20 03	21 24	48.8	19 23	20 36	48.6	18 43	19 49	48.3	18 03	19 02	48.1	17 23	18 15	47.8	225	315

Lat. / A		60°			61°			62°			63°			64°			65°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	20 42	22 12	49.1	20 03	21 24	48.8	19 23	20 36	48.6	18 43	19 49	48.3	18 03	19 02	48.1	17 23	18 15	47.8	225	315
46	134	21 05	21 51	48.1	20 25	21 04	47.8	19 44	20 16	47.6	19 04	19 29	47.3	18 23	18 43	47.1	17 42	17 57	46.8	226	314
47	133	21 27	21 30	47.1	20 46	20 43	46.8	20 05	19 56	46.6	19 24	19 10	46.3	18 42	18 24	46.1	18 00	17 39	45.8	227	313
48	132	21 49	21 07	46.1	21 07	20 21	45.8	20 25	19 35	45.6	19 43	18 50	45.3	19 01	18 04	45.1	18 18	17 20	44.8	228	312
49	131	22 10	20 45	45.1	21 28	19 59	44.8	20 45	19 14	44.6	20 02	18 29	44.3	19 19	17 45	44.0	18 36	17 01	43.8	229	311
50	130	22 31	20 22	44.1	21 48	19 37	43.8	21 05	18 52	43.5	20 21	18 08	43.3	19 37	17 24	43.0	18 53	16 41	42.8	230	310
51	129	22 52	19 58	43.1	22 08	19 14	42.8	21 24	18 30	42.5	20 40	17 47	42.3	19 55	17 04	42.0	19 10	16 21	41.8	231	309
52	128	23 12	19 34	42.1	22 28	18 51	41.8	21 43	18 08	41.5	20 58	17 25	41.2	20 13	16 43	41.0	19 27	16 01	40.8	232	308
53	127	23 32	19 10	41.0	22 47	18 27	40.7	22 01	17 45	40.5	21 15	17 03	40.2	20 30	16 21	40.0	19 44	15 41	39.7	233	307
54	126	23 52	18 45	40.0	23 06	18 03	39.7	22 19	17 21	39.4	21 33	16 40	39.2	20 46	16 00	39.0	20 00	15 20	38.7	234	306
55	125	24 11	18 19	39.0	23 24	17 38	38.7	22 37	16 58	38.4	21 50	16 17	38.2	21 03	15 38	37.9	20 15	14 58	37.7	235	305
56	124	24 29	17 54	37.9	23 42	17 13	37.6	22 54	16 34	37.4	22 07	15 54	37.1	21 19	15 15	36.9	20 31	14 37	36.7	236	304
57	123	24 48	17 27	36.9	23 59	16 48	36.6	23 11	16 09	36.3	22 23	15 31	36.1	21 34	14 53	35.8	20 46	14 15	35.6	237	303
58	122	25 05	17 01	35.8	24 17	16 22	35.5	23 28	15 44	35.3	22 39	15 07	35.0	21 49	14 29	34.8	21 00	13 53	34.6	238	302
59	121	25 23	16 34	34.8	24 33	15 56	34.5	23 44	15 19	34.2	22 54	14 42	34.0	22 04	14 06	33.8	21 14	13 30	33.5	239	301
60	120	25 40	16 06	33.7	24 50	15 29	33.4	23 59	14 53	33.2	23 09	14 18	32.9	22 19	13 42	32.7	21 28	13 07	32.5	240	300
61	119	25 56	15 38	32.6	25 05	15 03	32.4	24 15	14 27	32.1	23 24	13 53	31.9	22 33	13 18	31.7	21 42	12 44	31.5	241	299
62	118	26 12	15 10	31.5	25 21	14 35	31.3	24 29	14 01	31.1	23 38	13 27	30.8	22 46	12 54	30.6	21 55	12 21	30.4	242	298
63	117	26 27	14 41	30.5	25 36	14 08	30.2	24 44	13 34	30.0	23 52	13 01	29.8	22 59	12 29	29.5	22 07	11 57	29.3	243	297
64	116	26 42	14 12	29.4	25 50	13 39	29.1	24 57	13 07	28.9	24 05	12 35	28.7	23 12	12 04	28.5	22 19	11 33	28.3	244	296
65	115	26 57	13 43	28.3	26 04	13 11	28.1	25 11	12 40	27.8	24 18	12 09	27.6	23 25	11 39	27.4	22 31	11 09	27.2	245	295
66	114	27 11	13 13	27.2	26 17	12 42	27.0	25 24	12 12	26.8	24 30	11 43	26.6	23 36	11 13	26.4	22 43	10 44	26.2	246	294
67	113	27 24	12 43	26.1	26 30	12 13	25.9	25 36	11 44	25.7	24 42	11 16	25.5	23 48	10 47	25.3	22 54	10 20	25.1	247	293
68	112	27 37	12 12	25.0	26 43	11 44	24.8	25 48	11 16	24.6	24 54	10 48	24.4	23 59	10 21	24.2	23 04	9 55	24.0	248	292
69	111	27 50	11 41	23.9	26 55	11 14	23.7	26 00	10 47	23.5	25 05	10 21	23.3	24 09	9 55	23.1	23 14	9 29	23.0	249	291
70	110	28 01	11 10	22.8	27 06	10 44	22.6	26 11	10 18	22.4	25 15	9 53	22.2	24 20	9 28	22.0	23 24	9 04	21.9	250	290
71	109	28 13	10 39	21.7	27 17	10 14	21.5	26 21	9 49	21.3	25 25	9 25	21.1	24 29	9 01	21.0	23 33	8 38	20.8	251	289
72	108	28 24	10 07	20.6	27 27	9 43	20.4	26 31	9 20	20.2	25 35	8 57	20.0	24 38	8 34	19.9	23 42	8 12	19.7	252	288
73	107	28 34	9 35	19.4	27 37	9 12	19.3	26 41	8 50	19.1	25 44	8 28	18.9	24 47	8 07	18.8	23 50	7 46	18.6	253	287
74	106	28 44	9 03	18.3	27 47	8 41	18.2	26 50	8 20	18.0	25 52	8 00	17.8	24 55	7 39	17.7	23 58	7 19	17.6	254	286
75	105	28 53	8 30	17.2	27 55	8 10	17.0	26 58	7 50	16.9	26 01	7 31	16.7	25 03	7 12	16.6	24 06	6 53	16.5	255	285
76	104	29 01	7 57	16.1	28 04	7 38	15.9	27 06	7 20	15.8	26 08	7 02	15.6	25 10	6 44	15.5	24 13	6 26	15.4	256	284
77	103	29 09	7 24	14.9	28 11	7 06	14.8	27 13	6 49	14.7	26 15	6 32	14.5	25 17	6 16	14.4	24 19	5 59	14.3	257	283
78	102	29 17	6 51	13.8	28 18	6 34	13.7	27 20	6 19	13.5	26 22	6 03	13.4	25 23	5 47	13.3	24 25	5 32	13.2	258	282
79	101	29 24	6 17	12.7	28 25	6 02	12 5	27 27	5 48	12.4	26 28	5 33	12.3	25 29	5 19	12.2	24 31	5 05	12.1	259	281
80	100	29 30	5 44	11.5	28 31	5 30	11.4	27 32	5 17	11.3	26 33	5 03	11.2	25 35	4 50	11.1	24 36	4 38	11.0	260	280
81	99	29 36	5 10	10.4	28 37	4 57	10.3	27 38	4 45	10.2	26 38	4 33	10.1	25 39	4 22	10.0	24 40	4 10	9.9	261	279
82	98	29 41	4 36	9.2	28 41	4 25	9.1	27 42	4 14	9.0	26 43	4 03	9.0	25 44	3 53	8.9	24 44	3 43	8.8	262	278
83	97	29 45	4 01	8.1	28 46	3 52	8.0	27 46	3 42	7.9	26 47	3 33	7.8	25 48	3 24	7.8	24 48	3 15	7.7	263	277
84	96	29 49	3 27	6.9	28 50	3 19	6.9	27 50	3 11	6.8	26 50	3 03	6.7	25 51	2 55	6.7	24 51	2 47	6.6	264	276
85	95	29 52	2 53	5.8	28 53	2 46	5.7	27 53	2 39	5.7	26 53	2 33	5.6	25 54	2 26	5.6	24 54	2 20	5.5	265	275
86	94	29 55	2 18	4.6	28 55	2 13	4.6	27 56	2 07	4.5	26 56	2 02	4.5	25 56	1 57	4.4	24 56	1 52	4.4	266	274
87	93	29 57	1 44	3.5	28 57	1 40	3.4	27 57	1 36	3.4	26 58	1 32	3.4	25 58	1 28	3.3	24 58	1 24	3.3	267	273
88	92	29 59	1 09	2.3	28 59	1 06	2.3	27 59	1 04	2.3	26 59	1 01	2.2	25 59	0 59	2.2	24 59	0 56	2.2	268	272
89	91	30 00	0 35	1.2	29 00	0 33	1.1	28 00	0 32	1.1	27 00	0 31	1.1	26 00	0 29	1.1	25 00	0 28	1.1	269	271
90	90	30 00	0 00	0.0	29 00	0 00	0.0	28 00	0 00	0.0	27 00	0 00	0.0	26 00	0 00	0.0	25 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A	66°			67°			68°			69°			70°			71°			Lat. / A
LHA / F	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA
° °	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° °
0 180	0 00	24 00	90.0	0 00	23 00	90.0	0 00	22 00	90.0	0 00	21 00	90.0	0 00	20 00	90.0	0 00	19 00	90.0	180 360
1 179	0 24	24 00	89.1	0 23	23 00	89.1	0 22	22 00	89.1	0 22	21 00	89.1	0 21	20 00	89.1	0 20	19 00	89.1	181 359
2 178	0 49	23 59	88.2	0 47	22 59	88.2	0 45	21 59	88.1	0 43	20 59	88.1	0 41	19 59	88.1	0 39	18 59	88.1	182 358
3 177	1 13	23 58	87.3	1 10	22 58	87.2	1 07	21 58	87.2	1 04	20 58	87.2	1 02	19 58	87.2	0 59	18 59	87.2	183 357
4 176	1 38	23 57	86.3	1 34	22 57	86.3	1 30	21 57	86.3	1 26	20 57	86.3	1 22	19 57	86.2	1 18	18 57	86.2	184 356
5 175	2 02	23 55	85.4	1 57	22 55	85.4	1 52	21 55	85.4	1 47	20 56	85.3	1 42	19 56	85.3	1 38	18 56	85.3	185 355
6 174	2 26	23 53	84.5	2 20	22 53	84.5	2 15	21 53	84.4	2 09	20 54	84.4	2 03	19 54	84.4	1 57	18 54	84.3	186 354
7 173	2 50	23 50	83.6	2 44	22 51	83.6	2 37	21 51	83.5	2 30	20 51	83.5	2 23	19 52	83.4	2 16	18 52	83.4	187 353
8 172	3 15	23 48	82.7	3 07	22 48	82.6	2 59	21 48	82.6	2 52	20 49	82.5	2 44	19 49	82.5	2 36	18 50	82:4	188 352
9 171	3 39	23 44	81.8	3 30	22 45	81.7	3 22	21 45	81.6	3 13	20 46	81.6	3 04	19 46	81.5	2 55	18 47	81.5	189 351
10 170	4 03	23 41	80.8	3 53	22 41	80.8	3 44	21 42	80.7	3 34	20 42	80.7	3 24	19 43	80.6	3 14	18 44	80.5	190 350
11 169	4 27	23 36	79.9	4 17	22 37	79.9	4 06	21 38	79.8	3 55	20 39	79.7	3 45	19 40	79.6	3 34	18 41	79.6	191 349
12 168	4 51	23 32	79.0	4 40	22 33	78.9	4 28	21 34	78.9	4 16	20 35	78.8	4 05	19 36	78.7	3 53	18 37	78.6	192 348
13 167	5 15	23 27	78.1	5 03	22 28	78.0	4 50	21 29	77.9	4 37	20 30	77.8	4 25	19 32	77.8	4 12	18 33	77.7	193 347
14 166	5 39	23 22	77.2	5 25	22 23	77.1	5 12	21 24	77.0	4 58	20 26	76.9	4 45	19 27	76.8	4 31	18 28	76.7	194 346
15 165	6 03	23 16	76.2	5 48	22 18	76.1	5 34	21 19	76.0	5 19	20 21	76.0	5 05	19 22	75.9	4 50	18 24	75.8	195 345
16 164	6 26	23 10	75.3	6 11	22 12	75.2	5 56	21 13	75.1	5 40	20 15	75.0	5 25	19 17	74.9	5 09	18 19	74.8	196 344
17 163	6 50	23 04	74.4	6 34	22 06	74.3	6 17	21 08	74.2	6 01	20 09	74.1	5 44	19 11	74.0	5 28	18 14	73.9	197 343
18 162	7 13	22 57	73.5	6 56	21 59	73.3	6 39	21 01	73.2	6 21	20 03	73.1	6 04	19 06	73.0	5 46	18 08	72.9	198 342
19 161	7 37	22 50	72.5	7 19	21 52	72.4	7 00	20 54	72.3	6 42	19 57	72.2	6 24	18 59	72.1	6 05	18 02	72.0	199 341
20 160	8 00	22 42	71.6	7 41	21 45	71.5	7 22	20 47	71.4	7 02	19 50	71.2	6 43	18 53	71.1	6 24	17 56	71.0	200 340
21 159	8 23	22 34	70.7	8 03	21 37	70.5	7 43	20 40	70.4	7 23	19 43	70.3	7 02	18 46	70.2	6 42	17 49	70.1	201 339
22 158	8 46	22 26	69.7	8 25	21 29	69.6	8 04	20 32	69.5	7 43	19 35	69.3	7 22	18 39	69.2	7 00	17 42	69.1	202 338
23 157	9 09	22 17	68.8	8 47	21 21	68.7	8 25	20 24	68.5	8 03	19 28	68.4	7 41	18 31	68.3	7 19	17 35	68.1	203 337
24 156	9 31	22 08	67.9	9 09	21 12	67.7	8 46	20 16	67.6	8 23	19 19	67.4	8 00	18 24	67.3	7 37	17 28	67.2	204 336
25 155	9 54	21 58	66.9	9 30	21 03	66.8	9 07	20 07	66.6	8 43	19 11	66.5	8 19	18 15	66.3	7 55	17 20	66.2	205 335
26 154	10 16	21 49	66.0	9 52	20 53	65.8	9 27	19 57	65.7	9 02	19 02	65.5	8 37	18 07	65.4	8 12	17 12	65.2	206 334
27 153	10 38	21 38	65.0	10 13	20 43	64.9	9 48	19 48	64.7	9 22	18 53	64.6	8 56	17 58	64.4	8 30	17 03	64.3	207 333
28 152	11 00	21 28	64.1	10 34	20 33	63.9	10 08	19 38	63.8	9 41	18 43	63.6	9 14	17 49	63.5	8 48	16 55	63.3	208 332
29 151	11 22	21 17	63.1	10 55	20 22	63.0	10 28	19 28	62.8	10 00	18 34	62.6	9 33	17 39	62.5	9 05	16 46	62.3	209 331
30 150	11 44	21 05	62.2	11 16	20 11	62.0	10 48	19 17	61.8	10 19	18 23	61.7	9 51	17 30	61.5	9 22	16 36	61.4	210 330
31 149	12 06	20 53	61.2	11 37	20 00	61.1	11 07	19 06	60.9	10 38	18 13	60.7	10 09	17 20	60.5	9 39	16 27	60.4	211 329
32 148	12 27	20 41	60.3	11 57	19 48	60.1	11 27	18 55	59.9	10 57	18 02	59.7	10 27	17 09	59.6	9 56	16 17	59.4	212 328
33 147	12 48	20 29	59.3	12 17	19 36	59.1	11 46	18 43	58.9	11 15	17 51	58.8	10 44	16 58	58.6	10 13	16 06	58.4	213 327
34 146	13 09	20 16	58.4	12 37	19 23	58.2	12 06	18 31	58.0	11 34	17 39	57.8	11 02	16 47	57.6	10 29	15 56	57.5	214 326
35 145	13 29	20 02	57.4	12 57	19 10	57.2	12 24	18 19	57.0	11 52	17 27	56.8	11 19	16 36	56.7	10 46	15 45	56.5	215 325
36 144	13 50	19 49	56.4	13 17	18 57	56.2	12 43	18 06	56.0	12 10	17 15	55.9	11 36	16 24	55.7	11 02	15 34	55.5	216 324
37 143	14 10	19 34	55.5	13 36	18 44	55.3	13 02	17 53	55.1	12 27	17 03	54.9	11 53	16 12	54.7	11 18	15 23	54.5	217 323
38 142	14 30	19 20	54.5	13 55	18 30	54.3	13 20	17 40	54.1	12 45	16 50	53.9	12 09	16 00	53.7	11 34	15 11	53.5	218 322
39 141	14 50	19 05	53.5	14 14	18 15	53.3	13 38	17 26	53.1	13 02	16 37	52.9	12 26	15 48	52.7	11 49	14 59	52.6	219 321
40 140	15 09	18 50	52.5	14 33	18 01	52.3	13 56	17 12	52.1	13 19	16 23	51.9	12 42	15 35	51.7	12 05	14 47	51.6	220 320
41 139	15 29	18 34	51.5	14 51	17 46	51.3	14 14	16 57	51.1	13 36	16 09	50.9	12 58	15 22	50.8	12 20	14 34	50.6	221 319
42 138	15 48	18 18	50.6	15 09	17 30	50.3	14 31	16 43	50.1	13 52	15 55	49.9	13 14	15 08	49.8	12 35	14 21	49.6	222 318
43 137	16 06	18 02	49.6	15 27	17 15	49.4	14 48	16 28	49.2	14 09	15 41	49.0	13 29	14 54	48.8	12 50	14 08	48.6	223 317
44 136	16 25	17 46	48.6	15 45	16 59	48.4	15 05	16 12	48.2	14 25	15 26	48.0	13 45	14 40	47.8	13 04	13 55	47.6	224 316
45 135	16 43	17 29	47.6	16 02	16 42	47.4	15 22	15 57	47.2	14 41	15 11	47.0	14 00	14 26	46.8	13 19	13 41	46.6	225 315

Lat. / A		66°			67°			68°			69°			70°			71°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	16 43	17 29	47.6	16 02	16 42	47.4	15 22	15 57	47.2	14 41	15 11	47.0	14 00	14 26	46.8	13 19	13 41	46.6	225	315
46	134	17 01	17 11	46.6	16 19	16 26	46.4	15 38	15 41	46.2	14 56	14 56	46.0	14 15	14 11	45.8	13 33	13 27	45.6	226	314
47	133	17 18	16 53	45.6	16 36	16 09	45.4	15 54	15 24	45.2	15 12	14 40	45.0	14 29	13 56	44.8	13 46	13 13	44.6	227	313
48	132	17 36	16 35	44.6	16 53	15 51	44.4	16 10	15 08	44.2	15 27	14 24	44.0	14 43	13 41	43.8	14 00	12 58	43.6	228	312
49	131	17 53	16 17	43.6	17 09	15 34	43.4	16 25	14 51	43.2	15 42	14 08	43.0	14 58	13 26	42.8	14 13	12 44	42.6	229	311
50	130	18 09	15 58	42.6	17 25	15 16	42.4	16 41	14 33	42.1	15 56	13 52	41.9	15 11	13 10	41.8	14 27	12 29	41.6	230	310
51	129	18 26	15 39	41.6	17 41	14 57	41.3	16 56	14 16	41.1	16 10	13 35	40.9	15 25	12 54	40.8	14 39	12 14	40.6	231	309
52	128	18 42	15 20	40.5	17 56	14 39	40.3	17 10	13 58	40.1	16 24	13 18	39.9	15 38	12 38	39.7	14 52	11 58	39.6	232	308
53	127	18 57	15 00	39.5	18 11	14 20	39.3	17 24	13 40	39.1	16 38	13 00	38.9	15 51	12 21	38.7	15 04	11 42	38.6	233	307
54	126	19 13	14 40	38.5	18 26	14 01	38.3	17 39	13 22	38.1	16 51	12 43	37.9	16 04	12 05	37.7	15 16	11 26	37.5	234	306
55	125	19 28	14 20	37.5	18 40	13 41	37.3	17 52	13 03	37.1	17 04	12 25	36.9	16 16	11 48	36.7	15 28	11 10	36.5	235	305
56	124	19 42	13 59	36.4	18 54	13 21	36.2	18 06	12 44	36.0	17 17	12 07	35.8	16 28	11 30	35.7	15 40	10 54	35.5	236	304
57	123	19 57	13 38	35.4	19 08	13 01	35.2	18 19	12 25	35.0	17 29	11 49	34.8	16 40	11 13	34.6	15 51	10 37	34.5	237	303
58	122	20 11	13 17	34.4	19 21	12 41	34.2	18 31	12 05	34.0	17 42	11 30	33.8	16 52	10 55	33.6	16 02	10 20	33.5	238	302
59	121	20-24	12 55	33.3	19 34	12 20	33.1	18 44	11 45	32.9	17 53	11 11	32.8	17 03	10 37	32.6	16 12	10 03	32.4	239	301
60	120	20 37	12 33	32.3	19 47	11 59	32.1	18 56	11 25	31.9	18 05	10 52	31.7	17 14	10 19	31.6	16 23	9 46	31.4	240	300
61	119	20 50	12 11	31.2	19 59	11 38	31.1	19 08	11 05	30.9	18 16	10 33	30.7	17 24	10 00	30.5	16 33	9 29	30.4	241	299
62	118	21 03	11 48	30.2	20 11	11 16	30.0	19 19	10 44	29.8	18 27	10 13	29.7	17 35	9 42	29.5	16 42	9 11	29.4	242	298
63	117	21 15	11 26	29.2	20 22	10 54	29.0	19 30	10 24	28.8	18 37	9 53	28.6	17 45	9 23	28.5	16 52	8 53	28.3	243	297
64	116	21 27	11 03	28.1	20 34	10 32	27.9	19 41	10 03	27.7	18 47	9 33	27.6	17 54	9 04	27.4	17 01	8 35	27.3	244	296
65	115	21 38	10 39	27.0	20 44	10 10	26.9	19 51	9 41	26.7	18 57	9 13	26.5	18 03	8 45	26.4	17 10	8 17	26.3	245	295
66	114	21 49	10 16	26.0	20 55	9 48	25.8	20 01	9 20	25.7	19 07	8 52	25.5	18 12	8 25	25.4	17 18	7 58	25.2	246	294
67	113	21 59	9 52	24.9	21 05	9 25	24.8	20 10	8 58	24.6	19 16	8 32	24.5	18 21	8 06	24.3	17 26	7 40	24.2	247	293
68	112	22 09	9 28	23.9	21 14	9 02	23.7	20 19	8 36	23.5	19 24	8 11	23.4	18 29	7 46	23.3	17 34	7 21	23.1	248	292
69	111	22 19	9 04	22.8	21 24	8 39	22.6	20 28	8 14	22.5	19 33	7 50	22.4	18 37	7 26	22.2	17 42	7 02	22.1	249	291
70	110	22 28	8 40	21.7	21 32	8 16	21.6	20 37	7 52	21.4	19 41	7 29	21.3	18 45	7 06	21.2	17 49	6 43	21.1	250	290
71	109	22 37	8 15	20.7	21 41	7 52	20.5	20 45	7 30	20.4	19 48	7 07	20.2	18 52	6 45	20.1	17 56	6 24	20.0	251	289
72	108	22 45	7 50	19.6	21 49	7 28	19.4	20 52	7 07	19.3	19 56	6 46	19.2	18 59	6 25	19.1	18 02	6 04	19.0	252	288
73	107	22 53	7 25	18.5	21 56	7 04	18.4	21 00	6 44	18.2	20 03	6 24	18.1	19 05	6 04	18.0	18 08	5 45	17.9	253	287
74	106	23 01	7 00	17.4	22 04	6 40	17.3	21 06	6 21	17.2	20 09	6 02	17.1	19 12	5 44	17.0	18 14	5 25	16.9	254	286
75	105	23 08	6 34	16.3	22 10	6 16	16.2	21 13	5 58	16.1	20 15	5 40	16.0	19 17	5 23	15.9	18 20	5 06	15.8	255	285
76	104	23 15	6 09	15.3	22 17	5 52	15.2	21 19	5 35	15.1	20 21	5 18	15.0	19 23	5 02	14.9	18 25	4 46	14.8	256	284
77	103	23 21	5 43	14.2	22 23	5 27	14.1	21 24	5 12	14.0	20 26	4 56	13.9	19 28	4 41	13.8	18 30	4 26	13.7	257	283
78	102	23 27	5 17	13.1	22 28	5 03	13.0	21 30	4 48	12.9	20 31	4 34	12.8	19 33	4 20	12.7	18 34	4 06	12.7	258	282
79	101	23 32	4 51	12.0	22 33	4 38	11.9	21 35	4 24	11.8	20 36	4 11	11.8	19 37	3 58	11.7	18 38	3 46	11.6	259	281
80	100	23 37	4 25	10.9	22 38	4 13	10.8	21 39	4 01	10.8	20 40	3 49	10.7	19 41	3 37	10.6	18 42	3 25	10.6	260	280
81	99	23 41	3 59	9.8	22 42	3 48	9.8	21 43	3 37	9.7	20 44	3 26	9.6	19 45	3 16	9.6	18 45	3 05	9.5	261	279
82	98	23 45	3 33	8.7	22 46	3 23	8.7	21 46	3 13	8.6	20 47	3 03	8.6	19 48	2 54	8.5	18 48	2 45	8.5	262	278
83	97	23 49	3 06	7.7	22 49	2 58	7.6	21 50	2 49	7.5	20 50	2 41	7.5	19 51	2 32	7.4	18 51	2 24	7.4	263	277
84	96	23 52	2 40	6.6	22 52	2 32	6.5	21 52	2 25	6.5	20 53	2 18	6.4	19 53	2 11	6.4	18 54	2 04	6.3	264	276
85	95	23 54	2 13	5.5	22 54	2 07	5.4	21 55	2 01	5.4	20 55	1 55	5.4	19 55	1 49	5.3	18 55	1 43	5.3	265	275
86	94	23 56	1 47	4.4	22 56	1 42	4.3	21 57	1 37	4.3	20 57	1 32	4.3	19 57	1 27	4.3	18 57	1 23	4.2	266	274
87	93	23 58	1 20	3.3	22 58	1 16	3.3	21 58	1 13	3.2	20 58	1 09	3.2	19 58	1 05	3.2	18 58	1 02	3.2	267	273
88	92	23 59	0 53	2.2	22 59	0 51	2.2	21 59	0 48	2.2	20 59	0 46	2.1	19 59	0 44	2.1	18 59	0 41	2.1	268	272
89	91	24 00	0 27	1.1	23 00	0 25	1.1	22 00	0 24	1.1	21 00	0 23	1.1	20 00	0 22	1.1	19 00	0 21	1.1	269	271
90	90	24 00	0 00	0.0	23 00	0 00	0.0	22 00	0 00	0.0	21 00	0 00	0.0	20 00	0 00	0.0	19 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		72°			73°			74°			75°			76°			77°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	18 00	90.0	0 00	17 00	90.0	0 00	16 00	90.0	0 00	15 00	90.0	0 00	14 00	90.0	0 00	13 00	90.0	180	360
1	179	0 19	18 00	89.0	0 18	17 00	89.0	0 17	16 00	89.0	0 16	15 00	89.0	0 15	14 00	89.0	0 13	13 00	89.0	181	359
2	178	0 37	17 59	88.1	0 35	16 59	88.1	0 33	15 59	88.1	0 31	14 59	88.1	0 29	14 00	88.1	0 27	13 00	88.1	182	358
3	177	0 56	17 59	87.1	0 53	16 59	87.1	0 50	15 59	87.1	0 47	14 59	87.1	0 44	13 59	87.1	0 40	12 59	87.1	183	357
4	176	1 14	17 58	86.2	1 10	16 58	86.2	1 06	15 58	86.2	1 02	14 58	86.1	0 58	13 58	86.1	0 54	12 58	86.1	184	356
5	175	1 33	17 56	85.2	1 28	16 56	85.2	1 23	15 57	85.2	1 18	14 57	85.2	1 12	13 57	85.1	1 07	12 57	85.1	185	355
6	174	1 51	17 54	84.3	1 45	16 55	84.3	1 39	15 55	84.2	1 33	14 55	84.2	1 27	13 56	84.2	1 21	12 56	84.2	186	354
7	173	2 09	17 52	83.3	2 03	16 53	83.3	1 56	15 53	83.3	1 48	14 54	83.2	1 41	13 54	83.2	1 34	12 54	83.2	187	353
8	172	2 28	17 50	82.4	2 20	16 51	82.3	2 12	15 51	82.3	2 04	14 52	82.3	1 56	13 52	82.2	1 48	12 53	82.2	188	352
9	171	2 46	17 48	81.4	2 37	16 48	81.4	2 28	15 49	81.3	2 19	14 49	81.3	2 10	13 50	81.3	2 01	12 51	81.2	189	351
10	170	3 05	17 45	80.5	2 55	16 45	80.4	2 45	15 46	80.4	2 35	14 47	80.3	2 24	13 48	80.3	2 14	12 49	80.3	190	350
11	169	3 23	17 41	79.5	3 12	16 42	79.5	3 01	15 43	79.4	2 50	14 44	79.4	2 39	13 45	79.3	2 28	12 46	79.3	191	349
12	168	3 41	17 38	78.6	3 29	16 39	78.5	3 17	15 40	78.5	3 05	14 41	78.4	2 53	13 42	78.3	2 41	12 44	78.3	192	348
13	167	3 59	17 34	77.6	3 46	16 35	77.5	3 33	15 37	77.5	3 20	14 38	77.4	3 07	13 39	77.4	2 54	12 41	77.3	193	347
14	166	4 17	17 30	76.7	4 03	16 31	76.6	3 49	15 33	76.5	3 35	14 34	76.5	3 21	13 36	76.4	3 07	12 38	76.3	194	346
15	165	4 35	17 25	75.7	4 20	16 27	75.6	4 05	15 29	75.6	3 50	14 31	75.5	3 35	13 32	75.4	3 20	12 34	75.4	195	345
16	164	4 53	17 21	74.7	4 37	16 23	74.7	4 21	15 25	74.6	4 05	14 27	74.5	3 49	13 29	74.5	3 33	12 31	74.4	196	344
17	163	5 11	17 16	73.8	4 54	16 18	73.7	4 37	15 20	73.6	4 20	14 22	73.5	4 03	13 25	73.5	3 46	12 27	73.4	197	343
18	162	5 29	17 10	72.8	5 11	16 13	72.7	4 53	15 15	72.7	4 35	14 18	72.6	4 17	13 20	72.5	3 59	12 23	72.4	198	342
19	161	5 46	17 05	71.9	5 28	16 07	71.8	5 09	15 10	71.7	4 50	14 13	71.6	4 31	13 16	71.5	4 12	12 19	71.5	199	341
20	160	6 04	16 59	70.9	5 44	16 02	70.8	5 25	15 05	70.7	5 05	14 08	70.6	4 45	13 11	70.5	4 25	12 14	70.5	200	340
21	159	6 21	16 52	69.9	6 01	15 56	69.8	5 40	14 59	69.7	5 19	14 03	69.7	4 58	13 06	69.6	4 37	12 10	69.5	201	339
22	158	6 39	16 46	69.0	6 17	15 50	68.9	5 56	14 53	68.8	5 34	13 57	68.7	5 12	13 01	68.6	4 50	12 05	68.5	202	338
23	157	6 56	16 39	68.0	6 34	15 43	67.9	6 11	14 47	67.8	5 48	13 51	67.7	5 25	12 56	67.6	5 03	12 00	67.5	203	337
24	156	7 13	16 32	67.1	6 50	15 36	66.9	6 26	14 41	66.8	6 03	13 45	66.7	5 39	12 50	66.6	5 15	11 55	66.5	204	336
25	155	7 30	16 25	66.1	7 06	15 29	66.0	6 41	14 34	65.9	6 17	13 39	65.8	5 52	12 44	65.7	5 27	11 49	65.6	205	335
26	154	7 47	16 17	65.1	7 22	15 22	65.0	6 56	14 27	64.9	6 31	13 32	64.8	6 05	12 38	64.7	5 40	11 43	64.6	206	334
27	153	8 04	16 09	64.1	7 38	15 14	64.0	7 11	14 20	63.9	6 45	13 26	63.8	6 18	12 32	63.7	5 52	11 37	63.6	207	333
28	152	8 20	16 00	63.2	7 53	15 06	63.0	7 26	14 12	62.9	6 59	13 19	62.8	6 31	12 25	62.7	6 04	11 31	62.6	208	332
29	151	8 37	15 52	62.2	8 09	14 58	62.1	7 41	14 05	61.9	7 13	13 11	61.8	6 44	12 18	61.7	6 16	11 25	61.6	209	331
30	150	8 53	15 43	61.2	8 24	14 50	61.1	7 55	13 57	61.0	7 26	13 04	60.9	6 57	12 11	60.7	6 27	11 18	60.6	210	330
31	149	9 09	15 34	60.3	8 40	14 41	60.1	8 10	13 49	60.0	7 40	12 56	59.9	7 09	12 04	59.8	6 39	11 12	59.7	211	329
32	148	9 25	15 24	59.3	8 55	14 32	59.1	8 24	13 40	59.0	7 53	12 48	58.9	7 22	11 56	58.8	6 51	11 05	58.7	212	328
33	147	9 41	15 15	58.3	9 10	14 23	58.2	8 38	13 31	58.0	8 06	12 40	57.9	7 34	11 49	57.8	7 02	10 57	57.7	213	327
34	146	9 57	15 05	57.3	9 25	14 13	57.2	8 52	13 22	57.0	8 19	12 31	56.9	7 46	11 41	56.8	7 14	10 50	56.7	214	326
35	145	10 13	14 54	56.3	9 39	14 04	56.2	9 06	13 13	56.1	8 32	12 23	55.9	7 59	11 33	55.8	7 25	10 43	55.7	215	325
36	144	10 28	14 44	55.4	9 54	13 54	55.2	9 19	13 04	55.1	8 45	12 14	54.9	8 11	11 24	54.8	7 36	10 35	54.7	216	324
37	143	10 43	14 33	54.4	10 08	13 43	54.2	9 33	12 54	54.1	8 58	12 05	53.9	8 22	11 16	53.8	7 47	10 27	53.7	217	323
38	142	10 58	14 22	53.4	10 22	13 33	53.2	9 46	12 44	53.1	9 10	11 55	53.0	8 34	11 07	52.8	7 58	10 19	52.7	218	322
39	141	11 13	14 10	52.4	10 36	13 22	52.2	9 59	12 34	52.1	9 22	11 46	52.0	8 45	10 58	51.8	8 08	10 10	51.7	219	321
40	140	11 27	13 59	51.4	10 50	13 11	51.3	10 12	12 23	51.1	9 35	11 36	51.0	8 57	10 49	50.8	8 19	10 02	50.7	220	320
41	139	11 42	13 47	50.4	11 04	13 00	50.3	10 25	12 13	50.1	9 47	11 26	50.0	9 08	10 39	49.9	8 29	9 53	49.7	221	319
42	138	11 56	13 34	49.4	11 17	12 48	49.3	10 38	12 02	49.1	9 58	11 16	49.0	9 19	10 30	48.9	8 39	9 44	48.7	222	318
43	137	12 10	13 22	48.4	11 30	12 36	48.3	10 50	11 51	48.1	10 10	11 05	48.0	9 30	10 20	47.9	8 49	9 35	47.7	223	317
44	136	12 24	13 09	47.4	11 43	12 24	47.3	11 02	11 39	47.1	10 21	10 55	47.0	9 40	10 10	46.9	8 59	9 26	46.7	224	316
45	135	12 37	12 56	46.4	11 56	12 12	46.3	11 14	11 28	46.1	10 33	10 44	46.0	9 51	10 00	45.9	9 09	9 16	45.7	225	315

Lat. / A		72°			73°			74°			75°			76°			77°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	12 37	12 56	46.4	11 56	12 12	46.3	11 14	11 28	46.1	10 33	10 44	46.0	9 51	10 00	45.9	9 09	9 16	45.7	225	315
46	134	12 51	12 43	45.4	12 08	11 59	45.3	11 26	11 16	45.1	10 44	10 33	45.0	10 01	9 50	44.9	9 19	9 07	44.7	226	314
47	133	13 04	12 30	44.4	12 21	11 47	44.3	11 38	11 04	44.1	10 55	10 21	44.0	10 11	9 39	43.9	9 28	8 57	43.7	227	313
48	132	13 17	12 16	43.4	12 33	11 34	43.3	11 49	10 52	43.1	11 05	10 10	43.0	10 21	9 28	42.9	9 37	8 47	42.7	228	312
49	131	13 29	12 02	42.4	12 45	11 21	42.3	12 00	10 39	42.1	11 16	9 58	42.0	10 31	9 17	41.9	9 46	8 37	41.7	229	311
50	130	13 42	11 48	41.4	12 57	11 07	41.3	12 11	10 27	41.1	11 26	9 46	41.0	10 41	9 06	40.9	9 55	8 26	40.7	230	310
51	129	13 54	11 33	40.4	13 08	10 53	40.3	12 22	10 14	40.1	11 36	9 34	40.0	10 50	8 55	39.8	10 04	8 16	39.7	231	309
52	128	14 06	11 19	39.4	13 19	10 40	39.2	12 33	10 01	39.1	11 46	9 22	39.0	10 59	8 44	38.8	10 13	8 05	38.7	232	308
53	127	14 17	11 04	38.4	13 30	10 26	38.2	12 43	9 47	38.1	11 56	9 10	38.0	11 08	8 32	37.8	10 21	7 55	37.7	233	307
54	126	14 29	10 49	37.4	13 41	10 11	37.2	12 53	9 34	37.1	12 05	8 57	36.9	11 17	8 20	36.8	10 29	7 44	36.7	234	306
55	125	14 40	10 33	36.4	13 51	9 57	36.2	13 03	9 20	36.1	12 14	8 44	35.9	11 26	8 08	35.8	10 37	7 33	35.7	235	305
56	124	14 51	10 18	35.3	14 02	9 42	35.2	13 13	9 07	35.1	12 23	8 31	34.9	11 34	7 56	34.8	10 45	7 21	34.7	236	304
57	123	15 01	10 02	34.3	14 12	9 27	34.2	13 22	8 53	34.0	12 32	8 18	33.9	11 42	7 44	33.8	10 52	7 10	33.7	237	303
58	122	15 12	9 46	33.3	14 21	9 12	33.2	13 31	8 38	33.0	12 41	8 05	32.9	11 50	7 32	32.8	11 00	6 59	32.7	238	302
59	121	15 22	9 30	32.3	14 31	8 57	32.1	13 40	8 24	32.0	12 49	7 51	31.9	11 58	7 19	31.8	11 07	6 47	31.7	239	301
60	120	15 31	9 14	31.3	14 40	8 41	31.1	13 49	8 10	31.0	12 57	7 38	30.9	12 06	7 06	30.8	11 14	6 35	30.6	240	300
61	119	15 41	8 57	30.2	14 49	8 26	30.1	13 57	7 55	30.0	13 05	7 24	29.8	12 13	6 54	29.7	11 21	6 23	29.6	241	299
62	118	15 50	8 40	29.2	14 58	8 10	29.1	14 05	7 40	28.9	13 13	7 10	28.8	12 20	6 41	28.7	11 27	6 11	28.6	242	298
63	117	15 59	8 23	28.2	15 06	7 54	28.0	14 13	7 25	27.9	13 20	6 56	27.8	12 27	6 27	27.7	11 34	5 59	27.6	243	297
64	116	16 08	8 06	27.2	15 14	7 38	27.0	14 21	7 10	26.9	13 27	6 42	26.8	12 34	6 14	26.7	11 40	5 47	26.6	244	296
65	115	16 16	7 49	26.1	15 22	7 22	26.0	14 28	6 55	25.9	13 34	6 28	25.8	12 40	6 01	25.7	11 46	5 34	25.6	245	295
66	114	16 24	7 32	25.1	15 29	7 05	25.0	14 35	6 39	24.9	13 41	6 13	24.7	12 46	5 47	24.6	11 52	5 22	24.6	246	294
67	113	16 32	7 14	24.1	15 37	6 49	23.9	14 42	6 24	23.8	13 47	5 59	23.7	12 52	5 34	23.6	11 57	5 09	23.5	247	293
68	112	16 39	6 56	23.0	15 44	6 32	22.9	14 48	6 08	22.8	13 53	5 44	22.7	12 58	5 20	22.6	12 02	4 57	22.5	248	292
69	111	16 46	6 39	22.0	15 50	6 15	21.9	14 55	5 52	21.8	13 59	5 29	21.7	13 03	5 06	21.6	12 07	4 44	21.5	249	291
70	110	16 53	6 20	20.9	15 57	5 58	20.8	15 01	5 36	20.7	14 05	5 14	20.6	13 08	4 52	20.6	12 12	4 31	20.5	250	290
71	109	16 59	6 02	19.9	16 03	5 41	19.8	15 06	5 20	19.7	14 10	4 59	19.6	13 13	4 38	19.5	12 17	4 18	19.5	251	289
72	108	17 05	5 44	18.9	16 09	5 24	18.8	15 12	5 04	18.7	14 15	4 44	18.6	13 18	4 24	18.5	12 21	4 05	18.4	252	288
73	107	17 11	5 26	17.8	16 14	5 06	17.7	15 17	4 48	17.6	14 20	4 29	17.6	13 23	4 10	17.5	12 25	3 52	17.4	253	287
74	106	17 17	5 07	16.8	16 19	4 49	16.7	15 22	4 31	16.6	14 24	4 13	16.5	13 27	3 56	16.5	12 29	3 38	16.4	254	286
75	105	17 22	4 48	15.7	16 24	4 31	15.7	15 26	4 15	15.6	14 29	3 58	15.5	13 31	3 42	15.4	12 33	3 25	15.4	255	285
76	104	17 27	4 30	14.7	16 29	4 14	14.6	15 31	3 58	14.5	14 33	3 43	14.5	13 35	3 27	14.4	12 36	3 12	14.4	256	284
77	103	17 31	4 11	13.6	16 33	3 56	13.6	15 35	3 41	13.5	14 36	3 27	13.4	13 38	3 13	13.4	12 40	2 58	13.3	257	283
78	102	17 36	3 52	12.6	16 37	3 38	12.5	15 38	3 25	12.5	14 40	3 11	12.4	13 41	2 58	12.4	12 43	2 45	12.3	258	282
79	101	17 39	3 33	11.6	16 41	3 20	11.5	15 42	3 08	11.4	14 43	2 56	11.4	13 44	2 43	11.3	12 45	2 31	11.3	259	281
80	100	17 43	3 14	10.5	16 44	3 02	10.4	15 45	2 51	10.4	14 46	2 40	10.3	13 47	2 29	10.3	12 48	2 18	10.3	260	280
81	99	17 46	2 55	9.5	16 47	2 44	9.4	15 48	2 34	9.4	14 49	2 24	9.3	13 49	2 14	9.3	12 50	2 04	9.2	261	279
82	98	17 49	2 35	8.4	16 50	2 26	8.4	15 50	2 17	8.3	14 51	2 08	8.3	13 52	1 59	8.2	12 52	1 50	8.2	262	278
83	97	17 52	2 16	7.4	16 52	2 08	7.3	15 53	2 00	7.3	14 53	1 52	7.2	13 54	1 44	7.2	12 54	1 37	7.2	263	277
84	96	17 54	1 57	6.3	16 54	1 50	6.3	15 55	1 43	6.2	14 55	1 36	6.2	13 55	1 30	6.2	12 56	1 23	6.2	264	276
85	95	17 56	1 37	5.3	16 56	1 32	5.2	15 56	1 26	5.2	14 56	1 20	5.2	13 57	1 15	5.2	12 57	1 09	5.1	265	275
86	94	17 57	1 18	4.2	16 57	1 13	4.2	15 58	1 09	4.2	14 58	1 04	4.1	13 58	1 00	4.1	12 58	0 55	4.1	266	274
87	93	17 58	0 58	3.2	16 59	0 55	3.1	15 59	0 52	3.1	14 59	0 48	3.1	13 59	0 45	3.1	12 59	0 42	3.1	267	273
88	92	17 59	0 39	2.1	16 59	0 37	2.1	15 59	0 34	2.1	14 59	0 32	2.1	13 59	0 30	2.1	13 00	0 28	2.1	268	272
89	91	18 00	0 19	1.1	17 00	0 18	1.0	16 00	0 17	1.0	15 00	0 16	1.0	14 00	0 15	1.0	13 00	0 14	1.0	269	271
90	90	18 00	0 00	0.0	17 00	0 00	0.0	16 00	0 00	0.0	15 00	0 00	0.0	14 00	0 00	0.0	13 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		78°			79°			80°			81°			82°			83°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	12 00	90.0	0 00	11 00	90.0	0 00	10 00	90.0	0 00	9 00	90.0	0 00	8 00	90.0	0 00	7 00	90.0	180	360
1	179	0 12	12 00	89.0	0 11	11 00	89.0	0 10	10 00	89.0	0 09	9 00	89.0	0 08	8 00	89.0	0 07	7 00	89.0	181	359
2	178	0 25	12 00	88.0	0 23	11 00	88.0	0 21	10 00	88.0	0 19	9 00	88.0	0 17	8 00	88.0	0 15	7 00	88.0	182	358
3	177	0 37	11 59	87.1	0 34	10 59	87.1	0 31	9 59	87.0	0 28	8 59	87.0	0 25	7 59	87.0	0 22	6 59	87.0	183	357
4	176	0 50	11 58	86.1	0 46	10 58	86.1	0 42	9 59	86.1	0 38	8 59	86.0	0 33	7 59	86.0	0 29	6 59	86.0	184	356
5	175	1 02	11 57	85.1	0 57	10 58	85.1	0 52	9 58	85.1	0 47	8 58	85.1	0 42	7 58	85.0	0 37	6 58	85.0	185	355
6	174	1 15	11 56	84.1	1 09	10 56	84.1	1 02	9 57	84.1	0 56	8 57	84.1	0 50	7 57	84.1	0 44	6 58	84.0	186	354
7	173	1 27	11 55	83.2	1 20	10 55	83.1	1 13	9 56	83.1	1 06	8 56	83.1	0 58	7 56	83.1	0 51	6 57	83.1	187	353
8	172	1 39	11 53	82.2	1 31	10 54	82.1	1 23	9 54	82.1	1 15	8 55	82.1	1 07	7 55	82.1	0 58	6 56	82.1	188	352
9	171	1 52	11 51	81.2	1 43	10 52	81.2	1 33	9 53	81.1	1 24	8 53	81.1	1 15	7 54	81.1	1 06	6 55	81.1	189	351
10	170	2 04	11 49	80.2	1 54	10 50	80.2	1 44	9 51	80.1	1 33	8 52	80.1	1 23	7 53	80.1	1 13	6 54	80.1	190	350
11	169	2 16	11 47	79.2	2 05	10 48	79.2	1 54	9 49	79.2	1 43	8 50	79.1	1 31	7 51	79.1	1 20	6 52	79.1	191	349
12	168	2 29	11 45	78.3	2 16	10 46	78.2	2 04	9 47	78.2	1 52	8 48	78.1	1 39	7 50	78.1	1 27	6 51	78.1	192	348
13	167	2 41	11 42	77.3	2 28	10 43	77.2	2 14	9 45	77.2	2 01	8 46	77.2	1 48	7 48	77.1	1 34	6 49	77.1	193	347
14	166	2 53	11 39	76.3	2 39	10 41	76.2	2 24	9 43	76.2	2 10	8 44	76.2	1 56	7 46	76.1	1 41	6 48	76.1	194	346
15	165	3 05	11 36	75.3	2 50	10 38	75.3	2 35	9 40	75.2	2 19	8 42	75.2	2 04	7 44	75.1	1 48	6 46	75.1	195	345
16	164	3 17	11 33	74.3	3 01	10 35	74.3	2 45	9 37	74.2	2 28	8 39	74.2	2 12	7 42	74.1	1 56	6 44	74.1	196	344
17	163	3 29	11 29	73.4	3 12	10 32	73.3	2 55	9 34	73.2	2 37	8 37	73.2	2 20	7 39	73.2	2 03	6 42	73.1	197	343
18	162	3 41	11 26	72.4	3 23	10 28	72.3	3 05	9 31	72.3	2 46	8 34	72.2	2 28	7 37	72.2	2 09	6 40	72.1	198	342
19	161	3 53	11 22	71.4	3 34	10 25	71.3	3 14	9 28	71.3	2 55	8 31	71.2	2 36	7 34	71.2	2 16	6 37	71.1	199	341
20	160	4 05	11 18	70.4	3 45	10 21	70.3	3 24	9 24	70.3	3 04	8 28	70.2	2 44	7 31	70.2	2 23	6 35	70.1	200	340
21	159	4 16	11 13	69.4	3 55	10 17	69.4	3 34	9 21	69.3	3 13	8 25	69.2	2 52	7 28	69.2	2 30	6 32	69.1	201	339
22	158	4 28	11 09	68.4	4 06	10 13	68.4	3 44	9 17	68.3	3 22	8 21	68.2	2 59	7 25	68.2	2 37	6 30	68.1	202	338
23	157	4 40	11 04	67.5	4 17	10 09	67.4	3 53	9 13	67.3	3 30	8 18	67.3	3 07	7 22	67.2	2 44	6 27	67.2	203	337
24	156	4 51	10 59	66.5	4 27	10 04	66.4	4 03	9 09	66.3	3 39	8 14	66.3	3 15	7 19	66.2	2 50	6 24	66.2	204	336
25	155	5 02	10 54	65.5	4 38	9 59	65.4	4 13	9 05	65.3	3 47	8 10	65.3	3 22	7 16	65.2	2 57	6 21	65.2	205	335
26	154	5 14	10 49	64.5	4 48	9 55	64.4	4 22	9 00	64.3	3 56	8 06	64.3	3 30	7 12	64.2	3 04	6 18	64.2	206	334
27	153	5 25	10 43	63.5	4 58	9 50	63.4	4 31	8 56	63.4	4 04	8 02	63.3	3 37	7 08	63.2	3 10	6 15	63.2	207	333
28	152	5 36	10 38	62.5	5 08	9 44	62.4	4 41	8 51	62.4	4 13	7 58	62.3	3 45	7 04	62.2	3 17	6 11	62.2	208	332
29	151	5 47	10 32	61.5	5 18	9 39	61.4	4 50	8 46	61.4	4 21	7 53	61.3	3 52	7 00	61.2	3 23	6 08	61.2	209	331
30	150	5 58	10 26	60.5	5 28	9 33	60.5	4 59	8 41	60.4	4 29	7 49	60.3	3 59	6 56	60.2	3 30	6 04	60.2	210	330
31	149	6 09	10 20	59.6	5 38	9 28	59.5	5 08	8 36	59.4	4 37	7 44	59.3	4 07	6 52	59.2	3 36	6 00	59.2	211	329
32	148	6 20	10 13	58.6	5 48	9 22	58.5	5 17	8 30	58.4	4 45	7 39	58.3	4 14	6 48	58.3	3 42	5 57	58.2	212	328
33	147	6 30	10 06	57.6	5 58	9 16	57.5	5 26	8 25	57.4	4 53	7 34	57.3	4 21	6 43	57.3	3 48	5 53	57.2	213	327
34	146	6 41	10 00	56.6	6 08	9 09	56.5	5 34	8 19	56.4	5 01	7 29	56.3	4 28	6 39	56.3	3 54	5 49	56.2	214	326
35	145	6 51	9 53	55.6	6 17	9 03	55.5	5 43	8 13	55.4	5 09	7 24	55.3	4 35	6 34	55.3	4 00	5 45	55.2	215	325
36	144	7 01	9 45	54.6	6 26	8 56	54.5	5 51	8 07	54.4	5 17	7 18	54.3	4 42	6 29	54.3	4 06	5 40	54.2	216	324
37	143	7 11	9 38	53.6	6 36	8 49	53.5	6 00	8 01	53.4	5 24	7 13	53.3	4 48	6 24	53.3	4 12	5 36	53.2	217	323
38	142	7 21	9 31	52.6	6 45	8 43	52.5	6 08	7 55	52.4	5 32	7 07	52.3	4 55	6 19	52.3	4 18	5 32	52.2	218	322
39	141	7 31	9 23	51.6	6 54	8 35	51.5	6 16	7 48	51.4	5 39	7 01	51.3	5 01	6 14	51.3	4 24	5 27	51.2	219	321
40	140	7 41	9 15	50.6	7 03	8 28	50.5	6 25	7 42	50.4	5 46	6 55	50.3	5 08	6 09	50.3	4 30	5 22	50.2	220	320
41	139	7 50	9 07	49.6	7 11	8 21	49.5	6 32	7 35	49.4	5 53	6 49	49.4	5 14	6 03	49.3	4 35	5 18	49.2	221	319
42	138	8 00	8 59	48.6	7 20	8 13	48.5	6 40	7 28	48.4	6 01	6 43	48.4	5 21	5 58	48.3	4 41	5 13	48.2	222	318
43	137	8 09	8 50	47.6	7 29	8 05	47.5	6 48	7 21	47.4	6 07	6 36	47.4	5 27	5 52	47.3	4 46	5 08	47.2	223	317
44	136	8 18	8 42	46.6	7 37	7 58	46.5	6 56	7 14	46.4	6 14	6 30	46.4	5 33	5 46	46.3	4 51	5 03	46.2	224	316
45	135	8 27	8 33	45.6	7 45	7 50	45.5	7 03	7 06	45.4	6 21	6 23	45.4	5 39	5 41	45.3	4 57	4 58	45.2	225	315

Lat. / A		78°			79°			80°			81°			82°			83°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	8 27	8 33	45.6	7 45	7 50	45.5	7 03	7 06	45.4	6 21	6 23	45.4	5 39	5 41	45.3	4 57	4 58	45.2	225	315
46	134	8 36	8 24	44.6	7 53	7 41	44.5	7 11	6 59	44.4	6 28	6 17	44.4	5 45	5 35	44.3	5 02	4 53	44.2	226	314
47	133	8 45	8 15	43.6	8 01	7 33	43.5	7 18	6 51	43.4	6 34	6 10	43.4	5 51	5 29	43.3	5 07	4 47	43.2	227	313
48	132	8 53	8 06	42.6	8 09	7 25	42.5	7 25	6 44	42.4	6 41	6 03	42.4	5 56	5 22	42.3	5 12	4 42	42.2	228	312
49	131	9 02	7 56	41.6	8 17	7 16	41.5	7 32	6 36	41.4	6 47	5 56	41.4	6 02	5 16	41.3	5 17	4 36	41.2	229	311
50	130	9 10	7 47	40.6	8 24	7 07	40.5	7 39	6 28	40.4	6 53	5 49	40.3	6 07	5 10	40.3	5 21	4 31	40.2	230	310
51	129	9 18	7 37	39.6	8 32	6 58	39.5	7 45	6 20	39.4	6 59	5 42	39.3	6 13	5 03	39.3	5 26	4 25	39.2	231	309
52	128	9 26	7 27	38.6	8 39	6 49	38.5	7 52	6 12	38.4	7 05	5 34	38.3	6 18	4 57	38.3	5 31	4 19	38.2	232	308
53	127	9 33	7 17	37.6	8 46	6 40	37.5	7 58	6 03	37.4	7 11	5 27	37.3	6 23	4 50	37.3	5 35	4 14	37.2	233	307
54	126	9 41	7 07	36.6	8 53	6 31	36.5	8 05	5 55	36.4	7 16	5 19	36.3	6 28	4 43	36.3	5 39	4 08	36.2	234	306
55	125	9 48	6 57	35.6	9 00	6 22	35.5	8 11	5 47	35.4	7 22	5 11	35.3	6 33	4 37	35.3	5 44	4 02	35.2	235	305
56	124	9 56	6 47	34.6	9 06	6 12	34.5	8 17	5 38	34.4	7 27	5 04	34.3	6 38	4 30	34.3	5 48	3 56	34.2	236	304
57	123	10 03	6 36	33.6	9 13	6 03	33.5	8 22	5 29	33.4	7 32	4 56	33.3	6 42	4 23	33.3	5 52	3 50	33.2	237	303
58	122	10 09	6 26	32.6	9 19	5 53	32.5	8 28	5 20	32.4	7 37	4 48	32.3	6 47	4 16	32.3	5 56	3 43	32.2	238	302
59	121	10 16	6 15	31.6	9 25	5 43	31.5	8 34	5 11	31.4	7 42	4 40	31.3	6 51	4 08	31.2	6 00	3 37	31.2	239	301
60	120	10 22	6 04	30.6	9 31	5 33	30.5	8 39	5 02	30.4	7 47	4 32	30.3	6 55	4 01	30.2	6 04	3 31	30.2	240	300
61	119	10 29	5 53	29.5	9 36	5 23	29.5	8 44	4 53	29.4	7 52	4 23	29.3	6 59	3 54	29.2	6 07	3 24	29.2	241	299
62	118	10 35	5 42	28.5	9 42	5 13	28.4	8 49	4 44	28.4	7 56	4 15	28.3	7 04	3 46	28.2	6 11	3 18	28.2	242	298
63	117	10 41	5 31	27.5	9 47	5 03	27.4	8 54	4 35	27.4	8 01	4 07	27.3	7 07	3 39	27.2	6 14	3 11	27.2	243	297
64	116	10 46	5 19	26.5	9 52	4 52	26.4	8 59	4 25	26.3	8 05	3 58	26.3	7 11	3 32	26.2	6 17	3 05	26.2	244	296
65	115	10 52	5 08	25.5	9 57	4 42	25.4	9 03	4 16	25.3	8 09	3 50	25.3	7 15	3 24	25.2	6 20	2 58	25.2	245	295
66	114	10 57	4 56	24.5	10 02	4 31	24.4	9 08	4 06	24.3	8 13	3 41	24.3	7 18	3 16	24.2	6 24	2 52	24.2	246	294
67	113	11 02	4 45	23.5	10 07	4 21	23.4	9 12	3 56	23.3	8 17	3 32	23.3	7 22	3 09	23.2	6 26	2 45	23.2	247	293
68	112	11 07	4 33	22.4	10 11	4 10	22.4	9 16	3 47	22.3	8 20	3 24	22.2	7 25	3 01	22.2	6 29	2 38	22.1	248	292
69	111	11 12	4 21	21.4	10 16	3 59	21.4	9 20	3 37	21.3	8 24	3 15	21.2	7 28	2 53	21.2	6 32	2 31	21.1	249	291
70	110	11 16	4 09	20.4	10 20	3 48	20.3	9 23	3 27	20.3	8 27	3 06	20.2	7 31	2 45	20.2	6 35	2 24	20.1	250	290
71	109	11 20	3 58	19.4	10 24	3 37	19.3	9 27	3 17	19.3	8 30	2 57	19.2	7 34	2 37	19.2	6 37	2 17	19.1	251	289
72	108	11 24	3 45	18.4	10 27	3 26	18.3	9 30	3 07	18.3	8 33	2 48	18.2	7 36	2 29	18.2	6 39	2 10	18.1	252	288
73	107	11 28	3 33	17.4	10 31	3 15	17.3	9 34	2 57	17.2	8 36	2 39	17.2	7 39	2 21	17.2	6 42	2 03	17.1	253	287
74	106	11 32	3 21	16.3	10 34	3 04	16.3	9 37	2 47	16.2	8 39	2 30	16.2	7 41	2 13	16.1	6 44	1 56	16.1	254	286
75	105	11 35	3 09	15.3	10 37	2 53	15.3	9 39	2 37	15.2	8 41	2 21	15.2	7 44	2 05	15.1	6 46	1 49	15.1	255	285
76	104	11 38	2 57	14.3	10 40	2 42	14.3	9 42	2 27	14.2	8 44	2 12	14.2	7 46	1 57	14.1	6 47	1 42	14.1	256	284
77	103	11 41	2 44	13.3	10 43	2 30	13.2	9 44	2 16	13.2	8 46	2 02	13.2	7 48	1 49	13.1	6 49	1 35	13.1	257	283
78	102	11 44	2 32	12.3	10 45	2 19	12.2	9 47	2 06	12.2	8 48	1 53	12.1	7 49	1 40	12.1	6 51	1 28	12.1	258	282
79	101	11 47	2 19	11.2	10 48	2 07	11.2	9 49	1 56	11.2	8 50	1 44	11.1	7 51	1 32	11.1	6 52	1 21	11.1	259	281
80	100	11 49	2 07	10.2	10 50	1 56	10.2	9 51	1 45	10.2	8 52	1 35	10.1	7 53	1 24	10.1	6 54	1 13	10.1	260	280
81	99	11 51	1 54	9.2	10 52	1 45	9.2	9 53	1 35	9.1	8 53	1 25	9.1	7 54	1 16	9.1	6 55	1 06	9.1	261	279
82	98	11 53	1 42	8.2	10 53	1 33	8.1	9 54	1 24	8.1	8 55	1 16	8.1	7 55	1 07	8.1	6 56	0 59	8.1	262	278
83	97	11 55	1 29	7.2	10 55	1 21	7.1	9 55	1 14	7.1	8 56	1 06	7.1	7 56	0 59	7.1	6 57	0 51	7.1	263	277
84	96	11 56	1 16	6.1	10 56	1 10	6.1	9 57	1 03	6.1	8 57	0 57	6.1	7 57	0 50	6.1	6 58	0 44	6.0	264	276
85	95	11 57	1 04	5.1	10 57	0 58	5.1	9 58	0 53	5.1	8 58	0 47	5.1	7 58	0 42	5.0	6 58	0 37	5.0	265	275
86	94	11 58	0 51	4.1	10 58	0 47	4.1	9 59	0 42	4.1	8 59	0 38	4.0	7 59	0 34	4.0	6 59	0 29	4.0	266	274
87	93	11 59	0 38	3.1	10 59	0 35	3.1	9 59	0 32	3.0	8 59	0 28	3.0	7 59	0 25	3.0	6 59	0 22	3.0	267	273
88	92	12 00	0 26	2.0	11 00	0 23	2.0	10 00	0 21	2.0	9 00	0 19	2.0	8 00	0 17	2.0	7 00	0 15	2.0	268	272
89	91	12 00	0 13	1.0	11 00	0 12	1.0	10 00	0 11	1.0	9 00	0 10	1.0	8 00	0 08	1.0	7 00	0 07	1.0	269	271
90	90	12 00	0 00	0.0	11 00	0 00	0.0	10 00	0 00	0.0	9 00	0 00	0.0	8 00	0 00	0.0	7 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

B: (–) for 90°< LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

Z_1: same sign as B
Z_2: (–) for F > 90°

Lat. / A		84°			85°			86°			87°			88°			89°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
0	180	0 00	6 00	90.0	0 00	5 00	90.0	0 00	4 00	90.0	0 00	3 00	90.0	0 00	2 00	90.0	0 00	1 00	90.0	180	360
1	179	0 06	6 00	89.0	0 05	5 00	89.0	0 04	4 00	89.0	0 03	3 00	89.0	0 02	2 00	89.0	0 01	1 00	89.0	181	359
2	178	0 13	6 00	88.0	0 10	5 00	88.0	0 08	4 00	88.0	0 06	3 00	88.0	0 04	2 00	88.0	0 02	1 00	88.0	182	358
3	177	0 19	6 00	87.0	0 16	5 00	87.0	0 13	4 00	87.0	0 09	3 00	87.0	0 06	2 00	87.0	0 03	1 00	87.0	183	357
4	176	0 25	5 59	86.0	0 21	4 59	86.0	0 17	3 59	86.0	0 13	3 00	86.0	0 08	2 00	86.0	0 04	1 00	86.0	184	356
5	175	0 31	5 59	85.0	0 26	4 59	85.0	0 21	3 59	85.0	0 16	2 59	85.0	0 10	2 00	85.0	0 05	1 00	85.0	185	355
6	174	0 38	5 58	84.0	0 31	4 58	84.0	0 25	3 59	84.0	0 19	2 59	84.0	0 13	1 59	84.0	0 06	1 00	84.0	186	354
7	173	0 44	5 57	83.0	0 37	4 58	83.0	0 29	3 58	83.0	0 22	2 59	83.0	0 15	1 59	83.0	0 07	1 00	83.0	187	353
8	172	0 50	5 57	82.0	0 42	4 57	82.0	0 33	3 58	82.0	0 25	2 58	82.0	0 17	1 59	82.0	0 08	0 59	82.0	188	352
9	171	0 56	5 56	81.0	0 47	4 56	81.0	0 38	3 57	81.0	0 28	2 58	81.0	0 19	1 59	81.0	0 09	0 59	81.0	189	351
10	170	1 02	5 55	80.1	0 52	4 55	80.0	0 42	3 56	80.0	0 31	2 57	80.0	0 21	1 58	80.0	0 10	0 59	80.0	190	350
11	169	1 09	5 53	79.1	0 57	4 55	79.0	0 46	3 56	79.0	0 34	2 57	79.0	0 23	1 58	79.0	0 11	0 59	79.0	191	349
12	168	1 15	5 52	78.1	1 02	4 53	78.0	0 50	3 55	78.0	0 37	2 56	78.0	0 25	1 57	78.0	0 12	0 59	78.0	192	348
13	167	1 21	5 51	77.1	1 07	4 52	77.0	0 54	3 54	77.0	0 40	2 55	77.0	0 27	1 57	77.0	0 13	0 58	77.0	193	347
14	166	1 27	5 49	76.1	1 12	4 51	76.1	0 58	3 53	76.0	0 44	2 55	76.0	0 29	1 56	76.0	0 15	0 58	76.0	194	346
15	165	1 33	5 48	75.1	1 18	4 50	75.1	1 02	3 52	75.0	0 47	2 54	75.0	0 31	1 56	75.0	0 16	0 58	75.0	195	345
16	164	1 39	5 46	74.1	1 23	4 48	74.1	1 06	3 51	74.0	0 50	2 53	74.0	0 33	1 55	74.0	0 17	0 58	74.0	196	344
17	163	1 45	5 44	73.1	1 28	4 47	73.1	1 10	3 50	73.0	0 53	2 52	73.0	0 35	1 55	73.0	0 18	0 57	73.0	197	343
18	162	1 51	5 43	72.1	1 33	4 45	72.1	1 14	3 48	72.0	0 56	2 51	72.0	0 37	1 54	72.0	0 19	0 57	72.0	198	342
19	161	1 57	5 41	71.1	1 38	4 44	71.1	1 18	3 47	71.0	0 59	2 50	71.0	0 39	1 53	71.0	0 20	0 57	71.0	199	341
20	160	2 03	5 38	70.1	1 42	4 42	70.1	1 22	3 46	70.0	1 02	2 49	70.0	0 41	1 53	70.0	0 21	0 56	70.0	200	340
21	159	2 09	5 36	69.1	1 47	4 40	69.1	1 26	3 44	69.0	1 04	2 48	69.0	0 43	1 52	69.0	0 22	0 56	69.0	201	339
22	158	2 15	5 34	68.1	1 52	4 38	68.1	1 30	3 43	68.0	1 07	2 47	68.0	0 45	1 51	68.0	0 22	0 56	68.0	202	338
23	157	2 20	5 32	67.1	1 57	4 36	67.1	1 34	3 41	67.1	1 10	2 46	67.0	0 47	1 50	67.0	0 23	0 55	67.0	203	337
24	156	2 26	5 29	66.1	2 02	4 34	66.1	1 38	3 39	66.1	1 13	2 44	66.0	0 49	1 50	66.0	0 24	0 55	66.0	204	336
25	155	2 32	5 26	65.1	2 07	4 32	65.1	1 41	3 38	65.1	1 16	2 43	65.0	0 51	1 49	65.0	0 25	0 54	65.0	205	335
26	154	2 38	5 24	64.1	2 11	4 30	64.1	1 45	3 36	64.1	1 19	2 42	64.0	0 53	1 48	64.0	0 26	0 54	64.0	206	334
27	153	2 43	5 21	63.1	2 16	4 27	63.1	1 49	3 34	63.1	1 22	2 40	63.0	0 54	1 47	63.0	0 27	0 53	63.0	207	333
28	152	2 49	5 18	62.1	2 21	4 25	62.1	1 53	3 32	62.1	1 24	2 39	62.0	0 56	1 46	62.0	0 28	0 53	62.0	208	332
29	151	2 54	5 15	61.1	2 25	4 23	61.1	1 56	3 30	61.1	1 27	2 37	61.0	0 58	1 45	61.0	0 29	0 52	61.0	209	331
30	150	3 00	5 12	60.1	2 30	4 20	60.1	2 00	3 28	60.1	1 30	2 36	60.0	1 00	1 44	60.0	0 30	0 52	60.0	210	330
31	149	3 05	5 09	59.1	2 34	4 17	59.1	2 04	3 26	59.1	1 33	2 34	59.0	1 02	1 43	59.0	0 31	0 51	59.0	211	329
32	148	3 11	5 06	58.1	2 39	4 15	58.1	2 07	3 24	58.1	1 35	2 33	58.0	1 04	1 42	58.0	0 32	0 51	58.0	212	328
33	147	3 16	5 02	57.1	2 43	4 12	57.1	2 11	3 21	57.1	1 38	2 31	57.0	1 05	1 41	57.0	0 33	0 50	57.0	213	327
34	146	3 21	4 59	56.1	2 48	4 09	56.1	2 14	3 19	56.1	1 41	2 29	56.0	1 07	1 39	56.0	0 34	0 50	56.0	214	326
35	145	3 26	4 55	55.1	2 52	4 06	55.1	2 18	3 17	55.1	1 43	2 27	55.0	1 09	1 38	55.0	0 34	0 49	55.0	215	325
36	144	3 31	4 52	54.1	2 56	4 03	54.1	2 21	3 14	54.1	1 46	2 26	54.0	1 11	1 37	54.0	0 35	0 49	54.0	216	324
37	143	3 36	4 48	53.2	3 00	4 00	53.1	2 24	3 12	53.1	1 48	2 24	53.0	1 12	1 36	53.0	0 36	0 48	53.0	217	323
38	142	3 41	4 44	52.2	3 05	3 57	52.1	2 28	3 09	52.1	1 51	2 22	52.0	1 14	1 35	52.0	0 37	0 47	52.0	218	322
39	141	3 46	4 40	51.2	3 09	3 53	51.1	2 31	3 07	51.1	1 53	2 20	51.0	1 16	1 33	51.0	0 38	0 47	51.0	219	321
40	140	3 51	4 36	50.2	3 13	3 50	50.1	2 34	3 04	50.1	1 56	2 18	50.0	1 17	1 32	50.0	0 39	0 46	50.0	220	320
41	139	3 56	4 32	49.2	3 17	3 47	49.1	2 37	3 01	49.1	1 58	2 16	49.0	1 19	1 31	49.0	0 39	0 45	49.0	221	319
42	138	4 01	4 28	48.2	3 21	3 43	48.1	2 41	2 58	48.1	2 00	2 14	48.0	1 20	1 29	48.0	0 40	0 45	48.0	222	318
43	137	4 05	4 24	47.2	3 24	3 40	47.1	2 44	2 56	47.1	2 03	2 12	47.0	1 22	1 28	47.0	0 41	0 44	47.0	223	317
44	136	4 10	4 19	46.2	3 28	3 36	46.1	2 47	2 53	46.1	2 05	2 10	46.0	1 23	1 26	46.0	0 42	0 43	46.0	224	316
45	135	4 14	4 15	45.2	3 32	3 32	45.1	2 50	2 50	45.1	2 07	2 07	45.0	1 25	1 25	45.0	0 42	0 42	45.0	225	315

Lat. / A		84°			85°			86°			87°			88°			89°			Lat. / A	
LHA / F		A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	A / H	B / P	Z_1 / Z_2	LHA	
°	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	° ′	° ′	°	°	°
45	135	4 14	4 15	45.2	3 32	3 32	45.1	2 50	2 50	45.1	2 07	2 07	45.0	1 25	1 25	45.0	0 42	0 42	45.0	225	315
46	134	4 19	4 11	44.2	3 36	3 29	44.1	2 53	2 47	44.1	2 09	2 05	44.0	1 26	1 23	44.0	0 43	0 42	44.0	226	314
47	133	4 23	4 06	43.2	3 39	3 25	43.1	2 55	2 44	43.1	2 12	2 03	43.0	1 28	1 22	43.0	0 44	0 41	43.0	227	313
48	132	4 27	4 01	42.2	3 43	3 21	42.1	2 58	2 41	42.1	2 14	2 01	42.0	1 29	1 20	42.0	0 45	0 40	42.0	228	312
49	131	4 31	3 57	41.2	3 46	3 17	41.1	3 01	2 38	41.1	2 16	1 58	41.0	1 31	1 19	41.0	0 45	0 39	41.0	229	311
50	130	4 36	3 52	40.2	3 50	3 13	40.1	3 04	2 34	40.1	2 18	1 56	40.0	1 32	1 17	40.0	0 46	0 39	40.0	230	310
51	129	4 40	3 47	39.2	3 53	3 09	39.1	3 06	2 31	39.1	2 20	1 53	39.0	1 33	1 16	39.0	0 47	0 38	39.0	231	309
52	128	4 43	3 42	38.2	3 56	3 05	38.1	3 09	2 28	38.1	2 22	1 51	38.0	1 35	1 14	38.0	0 47	0 37	38.0	232	308
53	127	4 47	3 37	37.2	3 59	3 01	37.1	3 12	2 25	37.1	2 24	1 48	37.0	1 36	1 12	37.0	0 48	0 36	37.0	233	307
54	126	4 51	3 32	36.1	4 03	2 57	36.1	3 14	2 21	36.1	2 26	1 46	36.0	1 37	1 11	36.0	0 49	0 35	36.0	234	306
55	125	4 55	3 27	35.1	4 06	2 52	35.1	3 17	2 18	35.1	2 27	1 43	35.0	1 38	1 09	35.0	0 49	0 34	35.0	235	305
56	124	4 58	3 22	34.1	4 09	2 48	34.1	3 19	2 14	34.1	2 29	1 41	34.0	1 39	1 07	34.0	0 50	0 34	34.0	236	304
57	123	5 02	3 17	33.1	4 12	2 44	33.1	3 21	2 11	33.1	2 31	1 38	33.0	1 41	1 05	33.0	0 50	0 33	33.0	237	303
58	122	5 05	3 11	32.1	4 14	2 39	32.1	3 23	2 07	32.1	2 33	1 35	32.0	1 42	1 04	32.0	0 51	0 32	32.0	238	302
59	121	5 08	3 06	31.1	4 17	2 35	31.1	3 26	2 04	31.1	2 34	1 33	31.0	1 43	1 02	31.0	0 51	0 31	31.0	239	301
60	120	5 12	3 00	30.1	4 20	2 30	30.1	3 28	2 00	30.1	2 36	1 30	30.0	1 44	1 00	30.0	0 52	0 30	30.0	240	300
61	119	5 15	2 55	29.1	4 22	2 26	29.1	3 30	1 56	29.1	2 37	1 27	29.0	1 45	0 58	29.0	0 52	0 29	29.0	241	299
62	118	5 18	2 49	28.1	4 25	2 21	28.1	3 32	1 53	28.1	2 39	1 25	28.0	1 46	0 56	28.0	0 53	0 28	28.0	242	298
63	117	5 21	2 44	27.1	4 27	2 16	27.1	3 34	1 49	27.1	2 40	1 22	27.0	1 47	0 54	27.0	0 53	0 27	27.0	243	297
64	116	5 23	2 38	26.1	4 30	2 12	26.1	3 36	1 45	26.1	2 42	1 19	26.0	1 48	0 53	26.0	0 54	0 26	26.0	244	296
65	115	5 26	2 33	25.1	4 32	2 07	25.1	3 37	1 42	25.1	2 43	1 16	25.0	1 49	0 51	25.0	0 54	0 25	25.0	245	295
66	114	5 29	2 27	24.1	4 34	2 02	24.1	3 39	1 38	24.1	2 44	1 13	24.0	1 50	0 49	24.0	0 55	0 24	24.0	246	294
67	113	5 31	2 21	23.1	4 36	1 57	23.1	3 41	1 34	23.1	2 46	1 10	23.0	1 50	0 47	23.0	0 55	0 23	23.0	247	293
68	112	5 34	2 15	22.1	4 38	1 53	22.1	3 42	1 30	22.0	2 47	1 07	22.0	1 51	0 45	22.0	0 56	0 22	22.0	248	292
69	111	5 36	2 09	21.1	4 40	1 48	21.1	3 44	1 26	21.0	2 48	1 05	21.0	1 52	0 43	21.0	0 56	0 22	21.0	249	291
70	110	5 38	2 04	20.1	4 42	1 43	20.1	3 46	1 22	20.0	2 49	1 02	20.0	1 53	0 41	20.0	0 56	0 21	20.0	250	290
71	109	5 40	1 58	19.1	4 44	1 38	19.1	3 47	1 18	19.0	2 50	0 59	19.0	1 53	0 39	19.0	0 57	0 20	19.0	251	289
72	108	5 42	1 52	18.1	4 45	1 33	18.1	3 48	1 14	18.0	2 51	0 56	18.0	1 54	0 37	18.0	0 57	0 19	18.0	252	288
73	107	5 44	1 46	17.1	4 47	1 28	17.1	3 49	1 10	17.0	2 52	0 53	17.0	1 55	0 35	17.0	0 57	0 18	17.0	253	287
74	106	5 46	1 40	16.1	4 48	1 23	16.1	3 51	1 06	16.0	2 53	0 50	16.0	1 55	0 33	16.0	0 58	0 17	16.0	254	286
75	105	5 48	1 33	15.1	4 50	1 18	15.1	3 52	1 02	15.0	2 54	0 47	15.0	1 56	0 31	15.0	0 58	0 16	15.0	255	285
76	104	5 49	1 27	14.1	4 51	1 13	14.1	3 53	0 58	14.0	2 55	0 44	14.0	1 56	0 29	14.0	0 58	0 15	14.0	256	284
77	103	5 51	1 21	13.1	4 52	1 08	13.0	3 54	0 54	13.0	2 55	0 41	13.0	1 57	0 27	13.0	0 58	0 13	13.0	257	283
78	102	5 52	1 15	12.1	4 53	1 03	12.0	3 55	0 50	12.0	2 56	0 37	12.0	1 57	0 25	12.0	0 59	0 12	12.0	258	282
79	101	5 53	1 09	11.1	4 54	0 57	11.0	3 56	0 46	11.0	2 57	0 34	11.0	1 58	0 23	11.0	0 59	0 11	11.0	259	281
80	100	5 55	1 03	10.1	4 55	0 52	10.0	3 56	0 42	10.0	2 57	0 31	10.0	1 58	0 21	10.0	0 59	0 10	10.0	260	280
81	99	5 56	0 57	9.0	4 56	0 47	9.0	3 57	0 38	9.0	2 58	0 28	9.0	1 59	0 19	9.0	0 59	0 09	9.0	261	279
82	98	5 56	0 50	8.0	4 57	0 42	8.0	3 58	0 33	8.0	2 58	0 25	8.0	1 59	0 17	8.0	0 59	0 08	8.0	262	278
83	97	5 57	0 44	7.0	4 58	0 37	7.0	3 58	0 29	7.0	2 59	0 22	7.0	1 59	0 15	7.0	1 00	0 07	7.0	263	277
84	96	5 58	0 38	6.0	4 58	0 31	6.0	3 59	0 25	6.0	2 59	0 19	6.0	1 59	0 13	6.0	1 00	0 06	6.0	264	276
85	95	5 59	0 31	5.0	4 59	0 26	5.0	3 59	0 21	5.0	2 59	0 16	5.0	2 00	0 10	5.0	1 00	0 05	5.0	265	275
86	94	5 59	0 25	4.0	4 59	0 21	4.0	3 59	0 17	4.0	3 00	0 13	4.0	2 00	0 08	4.0	1 00	0 04	4.0	266	274
87	93	6 00	0 19	3.0	5 00	0 16	3.0	4 00	0 13	3.0	3 00	0 09	3.0	2 00	0 06	3.0	1 00	0 03	3.0	267	273
88	92	6 00	0 13	2.0	5 00	0 10	2.0	4 00	0 08	2.0	3 00	0 06	2.0	2 00	0 04	2.0	1 00	0 02	2.0	268	272
89	91	6 00	0 06	1.0	5 00	0 05	1.0	4 00	0 04	1.0	3 00	0 03	1.0	2 00	0 02	1.0	1 00	0 01	1.0	269	271
90	90	6 00	0 00	0.0	5 00	0 00	0.0	4 00	0 00	0.0	3 00	0 00	0.0	2 00	0 00	0.0	1 00	0 00	0.0	270	270

N. Lat.: for LHA > 180°... $Z_n = Z$
for LHA < 180°... $Z_n = 360° - Z$

S. Lat.: for LHA > 180°... $Z_n = 180° - Z$
for LHA < 180°... $Z_n = 180° + Z$

AUXILIARY TABLE

Sign of corr 1 for F'. *Reverse sign if F > 90°.*

Sign of corr 2 for A'.

F' + / −	1 / 59	2 / 58	3 / 57	4 / 56	5 / 55	6 / 54	7 / 53	8 / 52	9 / 51	10 / 50	11 / 49	12 / 48	13 / 47	14 / 46	15 / 45	16 / 44	17 / 43	18 / 42	19 / 41	20 / 40	21 / 39	22 / 38	23 / 37	24 / 36	25 / 35	26 / 34	27 / 33	28 / 32	29 / 31	□ / 30	− / + A'
P°	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	Z_2°
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	89
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	88
3	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	87
4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	86
5	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	85
6	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	84
7	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	83
8	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	4	4	4	82
9	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	4	4	4	5	5	81
10	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	80
11	0	0	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	79
12	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	78
13	0	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	6	6	6	6	7	7	77
14	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	76
15	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	8	8	75
16	0	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	7	8	8	8	74
17	0	1	1	1	1	2	2	2	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	8	9	73
18	0	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	72
19	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	7	8	8	8	9	9	10	10	71
20	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	8	8	8	9	9	9	10	10	10	70
21	0	1	1	1	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	8	8	8	9	9	9	10	10	10	11	69
22	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	7	8	8	9	9	9	10	10	10	11	11	68
23	0	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	7	7	7	8	8	9	9	9	10	10	11	11	11	12	67
24	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	7	7	7	8	8	9	9	9	10	10	11	11	11	12	12	66
25	0	1	1	2	2	3	3	3	4	4	5	5	5	6	6	7	7	8	8	8	9	9	10	10	11	11	11	12	12	13	65
26	0	1	1	2	2	3	3	4	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10	11	11	11	12	12	13	13	64
27	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10	10	11	11	12	12	13	13	14	63
28	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	8	9	9	10	10	11	11	12	12	13	13	14	14	62
29	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	61
30	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	60
31	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	59
32	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	10	10	11	11	12	12	13	13	14	14	15	15	16	58
33	1	1	2	2	3	3	4	4	5	5	6	7	7	8	8	9	9	10	10	11	11	12	13	13	14	14	15	15	16	16	57
34	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	10	10	11	11	12	12	13	13	14	15	15	16	16	17	56
35	1	1	2	2	3	3	4	5	5	6	6	7	7	8	9	9	10	10	11	11	12	13	13	14	14	15	15	16	17	17	55
36	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15	16	16	17	18	54
37	1	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	11	12	13	13	14	14	15	16	16	17	17	18	53
38	1	1	2	2	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16	17	17	18	18	52
39	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	13	13	14	14	15	16	16	17	18	18	19	51
40	1	1	2	3	3	4	4	5	6	6	7	8	8	9	10	10	11	12	12	13	13	14	15	15	16	17	17	18	19	19	50

F' + / −	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	0	− A' / +
	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	
P°	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'	Z_2°
41	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	49
42	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17	17	18	19	19	20	48
43	1	1	2	3	3	4	5	5	6	7	8	8	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	47
44	1	1	2	3	3	4	5	6	6	7	8	8	9	10	10	11	12	13	13	14	15	15	16	17	17	18	19	19	20	21	46
45	1	1	2	3	4	4	5	6	6	7	8	8	9	10	11	11	12	13	13	14	15	16	16	17	18	18	19	20	21	21	45
46	1	1	2	3	4	4	5	6	6	7	8	9	9	10	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22	44
47	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	12	13	14	15	15	16	17	18	18	19	20	20	21	22	43
48	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	13	13	14	15	16	16	17	18	19	19	20	21	22	22	42
49	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	14	15	16	17	17	18	19	20	20	21	22	23	41
50	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	15	15	16	17	18	18	19	20	21	21	22	23	40
51	1	2	2	3	4	5	5	6	7	8	9	9	10	11	12	12	13	14	15	16	16	17	18	19	19	20	21	22	23	23	39
52	1	2	2	3	4	5	6	6	7	8	9	9	10	11	12	13	13	14	15	16	17	17	18	19	20	20	21	22	23	24	38
53	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	14	15	16	17	18	18	19	20	21	22	22	23	24	37
54	1	2	2	3	4	5	6	6	7	8	9	10	11	11	12	13	14	15	15	16	17	18	19	19	20	21	22	23	23	24	36
55	1	2	2	3	4	5	6	7	7	8	9	10	11	11	12	13	14	15	16	16	17	18	19	20	20	21	22	23	24	25	35
56	1	2	2	3	4	5	6	7	7	8	9	10	11	12	12	13	14	15	16	17	17	18	19	20	21	22	22	23	24	25	34
57	1	2	3	3	4	5	6	7	8	8	9	10	11	12	13	13	14	15	16	17	18	18	19	20	21	22	23	23	24	25	33
58	1	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	14	15	16	17	18	19	20	20	21	22	23	24	25	25	32
59	1	2	3	3	4	5	6	7	8	9	9	10	11	12	13	14	15	15	16	17	18	19	20	21	21	22	23	24	25	26	31
60	1	2	3	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	23	24	25	26	30
61	1	2	3	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23	24	24	25	26	29
62	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	19	20	21	22	23	24	25	26	26	28
63	1	2	3	4	4	5	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	20	21	22	23	24	25	26	27	27
64	1	2	3	4	4	5	6	7	8	9	10	11	12	13	13	14	15	16	17	18	19	20	21	22	22	23	24	25	26	27	26
65	1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	15	16	17	18	19	20	21	22	23	24	24	25	26	27	25
66	1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	26	27	24
67	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23	24	25	26	27	28	23
68	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	18	19	19	20	21	22	23	24	25	26	27	28	22
69	1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21	22	23	24	25	26	27	28	21
70	1	2	3	4	5	6	7	8	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	23	24	25	26	27	28	20
71	1	2	3	4	5	6	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	26	27	28	19
72	1	2	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	18
73	1	2	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	17
74	1	2	3	4	5	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	16
75	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	15
76	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	14
77	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	19	20	21	22	23	24	25	26	27	28	29	13
78	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	22	23	24	25	26	27	28	29	12
79	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	11
80	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	10

For P > 80°, use 80°.

For Z_2 < 10°, use 10°

11.11 Sight Reduction with the NAO Tables

Starting in 1989, there was a significant change in the available tables for celestial navigation. As we have learned so far, the tables required are an almanac and a set of sight reduction tables. In the past sight reduction (SR) tables were usually chosen from *Pub 249* (most popular with yachtsmen) and *Pub 229* which is required on USCG license exams. The latter have more precision, but this extra precision would rarely affect the final accuracy of a celestial fix. *Pub 229* is much heavier, more expensive, and slightly more difficult to use. These notes use *Pub 249*, up to this point.

As of 1989, the Nautical Almanac Office (NAO) began to include a set of sight reduction tables in the back of the Nautical Almanac. Now when you buy an almanac, you get a set of sight reduction tables with it, even if you don't intent to use these tables. As always, the almanac data must be replaced each new year with a new almanac, but the SR tables they include each year will be the same. Like all standard SR tables, these are not dated and can be used for sights from any year.

The new tables (which I think will come to be called the "NAO Tables") are very short, but they will reduce any sight and provide the same Hc precision as the *Pub 249* tables (0.5′, rounded to nearest 1′) and the same azimuth precision (0.05°, rounded to nearest 0.1′) as the *Pub 229* tables. The price we pay, however, for a "free" set of concise tables is the amount of work necessary to get the numbers out of them.

All SR tables start with Lat, LHA, and dec and end up with Hc and Zn. With *Pub 249*, the answer is obtained in two steps. With *Pub 229*, it takes 3 steps, sometimes 4, and with the new NAO tables it always takes 4 steps with some adding and subtracting between the steps.

At first glance, the new tables are awkward to use and not an attractive alternative to *Pub 249*. There are several reasons, however, to not rule them out too quickly. First, they will always be there. As of 1989, everyone has them, like it or not. Second, celestial itself is a back-up navigation method to most sailors these days. Most rely on GPS, only using celestial to test it or to replace it if it fails. The sailors who rely on celestial daily, on the other hand, usually do not use tables at all, but instead do all the paperwork with a calculator. In short, traditional navigation using tables is becoming less and less common. Since we are not using tables often, it is not so bad that the tables take a bit longer to use.

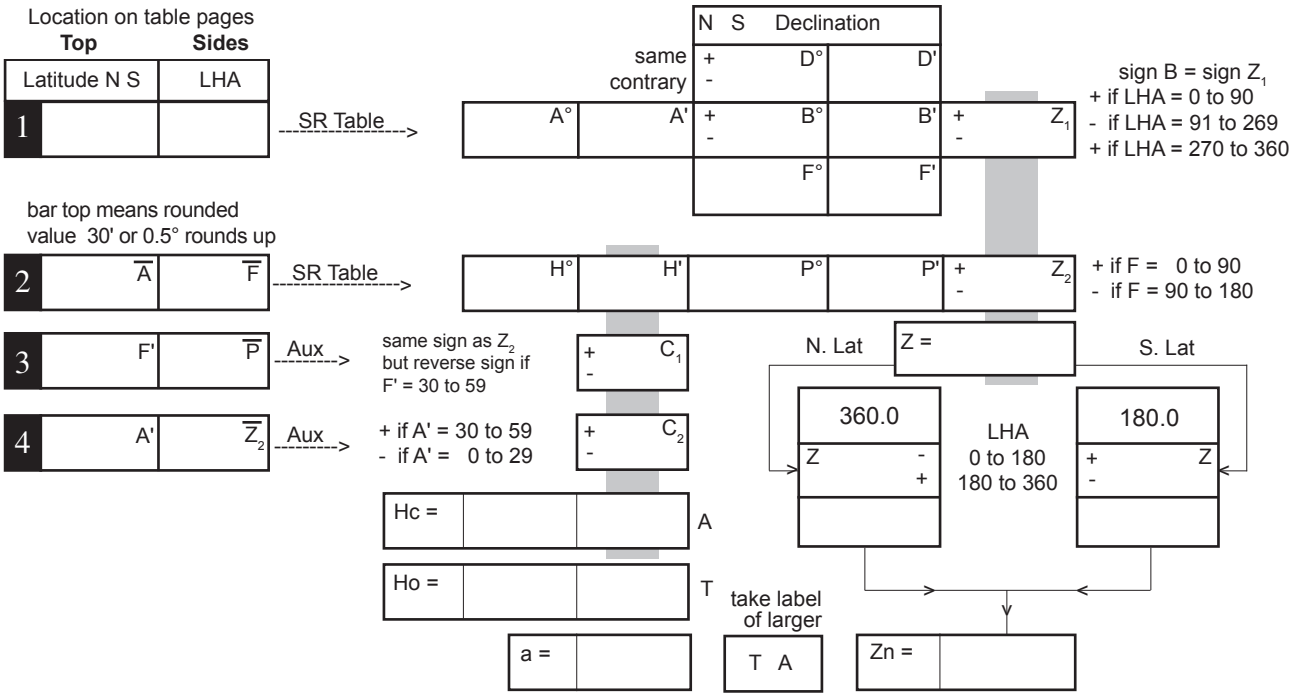
In short, if we take the time to learn these new tables and are comfortable with the knowledge that we can use them if we need to, we can save space money and complexity in the long run by not having to bother with various sources of tables. With this in mind, we have developed a work form that makes the use of these tables *considerably easier* than just following the instructions given in the almanac. With the use of our workform, the NAO tables do not take much longer than *Pub 249* does for this step of the work. Naturally, the first few times go slowly, but after a few examples it becomes automatic and easy. The form guides you through the steps.

We have included here a few of the earlier examples, redone using the new tables. Try a few if you care to see how it goes. As time permits, we will include more examples, with emphasis on unusual cases, such as very low or very high sights.

A Bit of History

The NAO tables were invented by Admiral Davies, and they were originally published as the Concise Tables for Sight Reduction by Cornell Press. We referred to them in our notes as "Davies Tables" and we had a form for their use—now outdated. The original publication of the tables had awkward sign rules and a few minor errors. Forerunners of these tables were the Ageton tables (*Pub 211*) and the Dreisenstock tables (*Pub 208*). The Ageton Tables are included in *Bowditch, Vol 2* (editions prior to 1985) but these were not included in later edtions, perhaps because they are now in the Nautical Almanac. Both Ageton and Dreisenstock are outdated now. The Power Squadron courses on celestial switched to the new NAO tables shortly after they were published.

Workform for NAO Sight Reduction Tables included in the Nautical Almanac



Short Instructions

1 In row 1, record assumed Lat, LHA, and Dec (D). Mark the signs of D, B, and Z_1.

2 In row 1, with Lat and LHA, enter Sight Reduction (SR) Table and record A, B, and Z_1.

3 Add D and B to get F, and record it in row 1.

4 Copy A′ to row 4 and mark the sign of C_2.

5 Round off A to nearest whole degree and record it as A-bar in row 2.

6 Mark the signs of Z_2 and C_1 in rows 2 and 3.

7 Round off F to nearest whole degree and record it as F-bar in row 2.

8 With A-bar and F-bar, enter SR table and record H, P, and Z_2 in row 2.

9 Round off P and Z_2 to nearest whole degrees and record them as as P-bar and Z_2-bar in rows 3 and 4.

10 With F′ and P-bar, enter Auxiliary Table (Aux) and record C_1 in row 3.

11 With A′ and Z_2-bar, enter Aux table and record C_2 in row 4.

12 Add C_1 and C_2 to H to get Hc.

13 Add Z_1 and Z_2 to get Z. Copy Z to space below it, rounding to nearest degree. Drop minus sign if present.

14 Convert Z to Zn by chosing appropriate Z sign next to LHA.

15 Record Ho below Hc; take their difference and record it as "a" with the proper label.

Using the NAO Tables

Notes: (1) This procedure is the same as presented in the Almanac, except for a change in notation explained below (2) In the workform, row numbers are marked with white letters in black boxes. (3) For Hs below 1° or above 87°, see special instructions at the end. (4) the angle notation used in the form is illustrated below:

X = 35° 48' — an angle

X° = 35° — degrees part of X

X′ = 48' — minutes part of X

X = 36° — X rounded to the nearest whole degree.

Step 1. In the top lines of row 1, record assumed Latitude, LHA, and Declination (degrees in D°; minutes in D′). Circle the sign (+ or -) of D according to Same or Contrary name—or mark out the sign that does not apply.

Step 2. From the rules beside the Z1 box, determine the sign of B and Z1 (depends on LHA) and circle these signs in row 1 of the work form. B and Z1 have the same sign.

Step 3. With LAT and LHA, enter the main Sight Reduction (SR) Table and record A, B, and Z1 in the spaces provided in row 1, separating degrees and minutes parts. Lat is found at the top of the SR tables; LHA on either side. Note the reminder of this arrangement at the top left of the form. This applies to all table entries.

Step 4. Copy A′ to row 4 and circle the sign of C2 according to the size of A′.

Step 5. Round off A to the nearest whole degree and record it as A-bar in row 2.

Step 6. Add D and B algebraically to get F, and record it in the space provided in row 1.

Step 7. From the size of F and the notes provided, determine the signs of Z2 and C1 and circle them in rows 2 and 3.

Step 8. Round off F to the nearest whole degree and record it as F-bar in row 2.

Step 9. With A-bar and F-bar, enter SR table and record H, P, and Z2 into the spaces provided in row 2.

Step 10. Round off P and Z2 to nearest whole degrees and record them as as P-bar and Z2-bar in rows 3 and 4.

Step 11. With F′ and P-bar, enter the Auxiliary Table (Aux) and record C1 in row 3. The Aux table is at the end of the SR table.

Step 12. With A′ and Z2-bar, enter the Auxiliary Table and record C2 in row 4.

Step 13. Apply the corrrections C1 and C2 (with their apapropriate signs) to H to get Hc and record it in the space provided.

Step 14. Combine Z1 and Z2 (with their appropriate signs) to get Z and record it in the space provided. The result can be negative or positive (depending on the signs of Z1 and Z2), but this resulting sign is to be ignored—Z is to be treated as a positive number when later converting it to Zn.

Step 15. Record Ho in the space provided below Hc, then take their difference and record it as "a" in the space provided. Mark the proper label of the a-value using the rule if Hc is greater than Ho, then the label is "A," otherwise it is "T."

Step 16. Convert Z to Zn using the traditional rules located below the box for Z, and record the result in the space provided.

Step 17. Plot the LOP using the a-value, its label, and Zn

Low-altitude Sights (Hs below 1° or so)

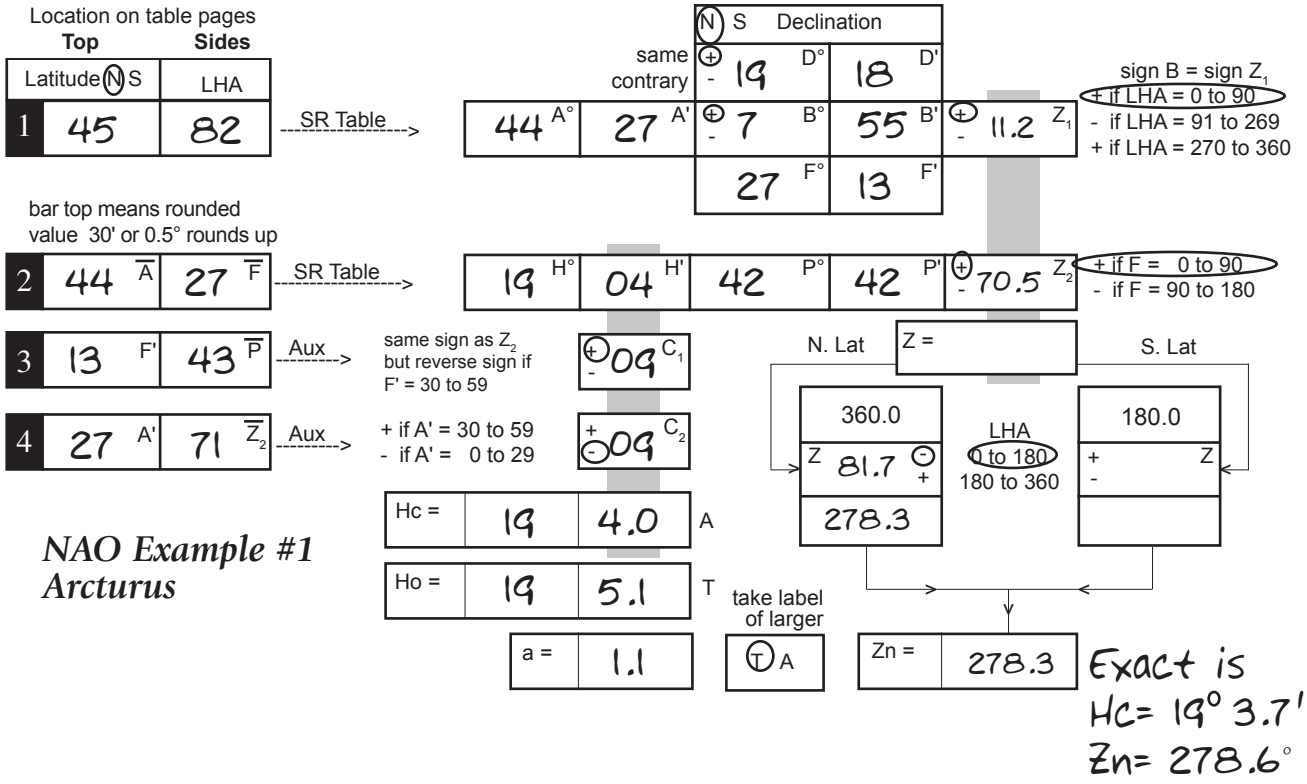
For Hs values below 1° or so (sights that are usually only taken in desperation when other sights are not available), Ho, Hc, or both can be negative. In these cases, the Hs to Ho conversion must be done carefully, as signs can change as corrections are applied. Also, the above procedure must be modified as follows: in Step 6 if F is negative (can only happen for very low sights), treat it as positive until the final Hc is determined in Step 13. And in Step 9, change Z2 to 180° - Z2 (remembering that the original Z2 has a sign). In Step 13, if F was negative, change Hc to negative.

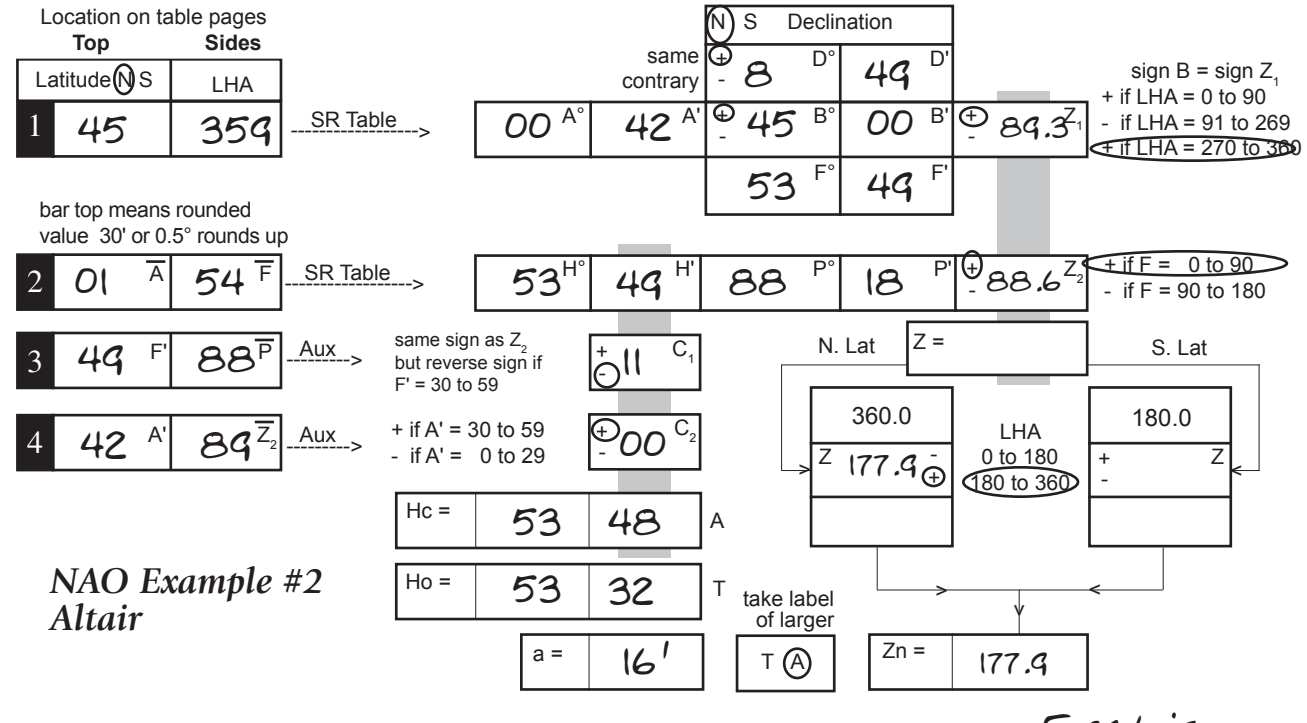
High-altitude Sights (Hs above 87° or so)

For very high sights, the standard plotting procedure of intersecting two straight LOPs does not provide a reliable fix, because these lines are no longer good approximations to the circles of position measured with the sextant. For high sights, it is best to plot the GP and then swing an arc from this point, using a radius equal to the zenith distance (90° - Ho). This arc is then a section of your circle of position.

It is difficult to estimate the errors caused by neglecting this procedure since they depend on the heights of all sights used for the fix. In any event, when a fix is made from data including a high sight, it is best to check this effect. Also, our preliminary study shows that the NAO type of sight reduction table does not provide consistently accurate Zn values for very high sights. We have not analyzed this effect in detail. We have found no Zn problems for heights below 87°.

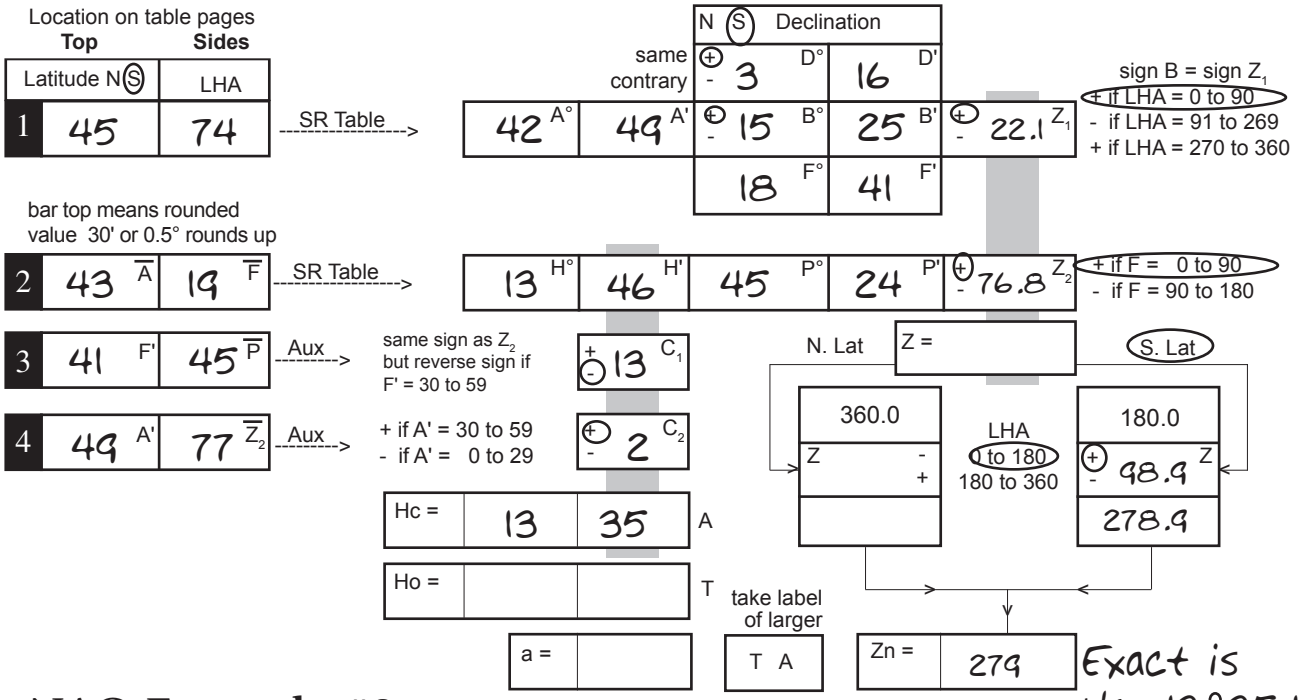
Workform for NAO Sight Reduction Tables included in the *Nautical Almanac*





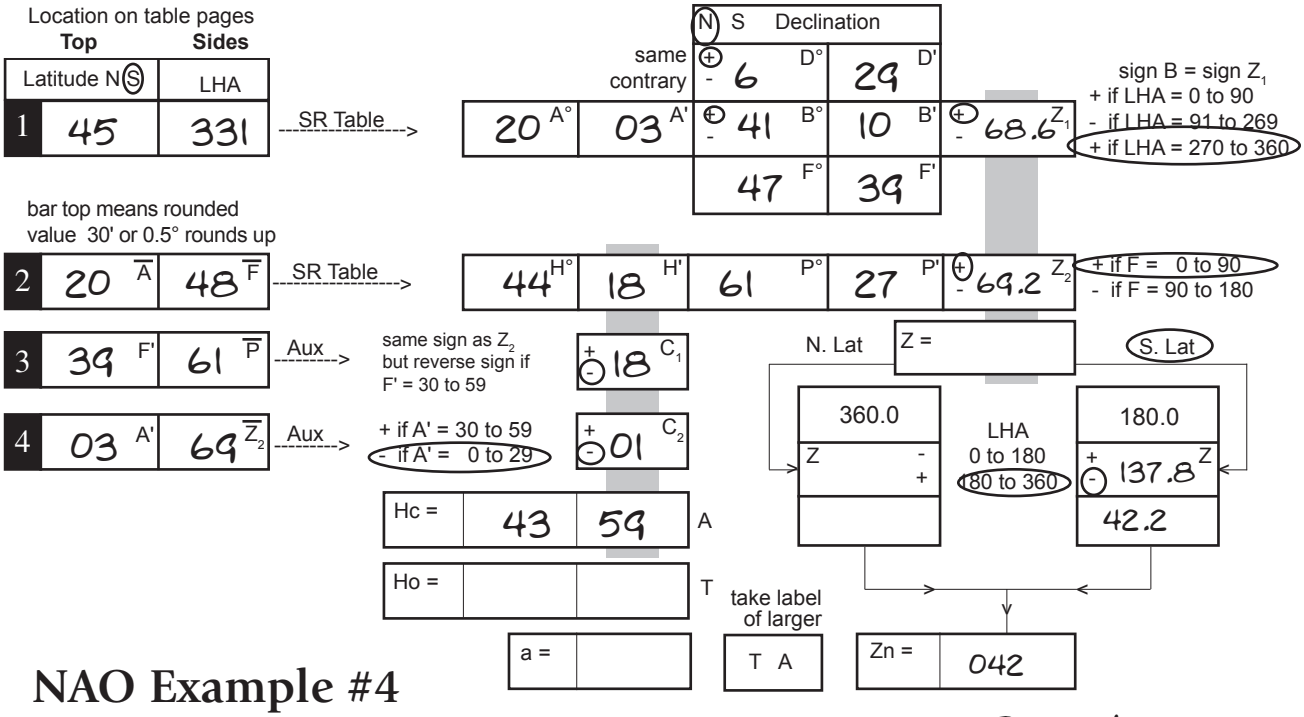
Compare to sample sights in Sec 11.12 using Pub 249

Workform for NAO Sight Reduction Tables included in the *Nautical Almanac*



Exact is
Hc= 13°35.1'
Zn= 279.1°

NAO Example #3



Exact is
Hc= 43° 58.5'
Zn= 042.00°

NAO Example #4

Starpath form 106