

LAT 30°

DECLINATION (0° – 14°) SAME NAME AS LATITUDE

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

LHA	0°			1°			2°			3°			4°			5°			6°			7°			8°			9°			10°			11°			12°			13°			14°																							
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																											
0	60	00	180	61	00	180	62	00	180	63	00	180	64	00	180	65	00	180	66	00	180	67	00	180	68	00	180	69	00	180	70	00	180	71	00	180	72	00	180	73	00	180	74	00	180	75	00	180	76	00	180	77	00	180	78	00	180	79	00	180	80	00	180			
1	59	59	178	60	59	178	61	59	178	62	59	178	63	59	178	64	59	178	65	59	178	66	59	178	67	59	178	68	59	178	69	59	178	70	59	178	71	59	178	72	59	178	73	59	178	74	59	178	75	59	178	76	59	178	77	59	178	78	59	178	79	59	178	80	59	178
2	59	56	176	60	56	176	61	56	176	62	56	176	63	56	176	64	56	176	65	56	176	66	56	176	67	56	176	68	56	176	69	56	176	70	56	176	71	56	176	72	56	176	73	56	176	74	56	176	75	56	176	76	56	176	77	56	176	78	56	176	79	56	176	80	56	176
3	59	52	174	60	52	174	61	52	174	62	52	174	63	52	174	64	52	174	65	52	174	66	52	174	67	52	174	68	52	174	69	52	174	70	52	174	71	52	174	72	52	174	73	52	174	74	52	174	75	52	174	76	52	174	77	52	174	78	52	174	79	52	174	80	52	174
4	59	46	172	60	46	172	61	46	172	62	46	172	63	46	172	64	46	172	65	46	172	66	46	172	67	46	172	68	46	172	69	46	172	70	46	172	71	46	172	72	46	172	73	46	172	74	46	172	75	46	172	76	46	172	77	46	172	78	46	172	79	46	172	80	46	172
5	59	37	170	60	37	170	61	37	170	62	37	170	63	37	170	64	37	170	65	37	170	66	37	170	67	37	170	68	37	170	69	37	170	70	37	170	71	37	170	72	37	170	73	37	170	74	37	170	75	37	170	76	37	170	77	37	170	78	37	170	79	37	170	80	37	170
6	59	28	168	60	28	168	61	28	168	62	28	168	63	28	168	64	28	168	65	28	168	66	28	168	67	28	168	68	28	168	69	28	168	70	28	168	71	28	168	72	28	168	73	28	168	74	28	168	75	28	168	76	28	168	77	28	168	78	28	168	79	28	168	80	28	168
7	59	16	166	60	16	166	61	16	166	62	16	166	63	16	166	64	16	166	65	16	166	66	16	166	67	16	166	68	16	166	69	16	166	70	16	166	71	16	166	72	16	166	73	16	166	74	16	166	75	16	166	76	16	166	77	16	166	78	16	166	79	16	166	80	16	166
8	59	03	164	60	03	164	61	03	164	62	03	164	63	03	164	64	03	164	65	03	164	66	03	164	67	03	164	68	03	164	69	03	164	70	03	164	71	03	164	72	03	164	73	03	164	74	03	164	75	03	164	76	03	164	77	03	164	78	03	164	79	03	164	80	03	164
9	58	48	162	60	48	162	61	48	162	62	48	162	63	48	162	64	48	162	65	48	162	66	48	162	67	48	162	68	48	162	69	48	162	70	48	162	71	48	162	72	48	162	73	48	162	74	48	162	75	48	162	76	48	162	77	48	162	78	48	162	79	48	162	80	48	162
10	58	32	160	60	32	160	61	32	160	62	32	160	63	32	160	64	32	160	65	32	160	66	32	160	67	32	160	68	32	160	69	32	160	70	32	160	71	32	160	72	32	160	73	32	160	74	32	160	75	32	160	76	32	160	77	32	160	78	32	160	79	32	160	80	32	160
11	58	13	158	60	13	158	61	13	158	62	13	158	63	13	158	64	13	158	65	13	158	66	13	158	67	13	158	68	13	158	69	13	158	70	13	158	71	13	158	72	13	158	73	13	158	74	13	158	75	13	158	76	13	158	77	13	158	78	13	158	79	13	158	80	13	158
12	57	54	156	60	54	156	61	54	156	62	54	156	63	54	156	64	54	156	65	54	156	66	54	156	67	54	156	68	54	156	69	54	156	70	54	156	71	54	156	72	54	156	73	54	156	74	54	156	75	54	156	76	54	156	77	54	156	78	54	156	79	54	156	80	54	156
13	57	33	154	60	33	154	61	33	154	62	33	154	63	33	154	64	33	154	65	33	154	66	33	154	67	33	154	68	33	154	69	33	154	70	33	154	71	33	154	72	33	154	73	33	154	74	33	154	75	33	154	76	33	154	77	33	154	78	33	154	79	33	154	80	33	154
14	57	10	152	60	10	152	61	10	152	62	10	152	63	10	152	64	10	152	65	10	152	66	10	152	67	10	152	68	10	152	69	10	152	70	10	152	71	10	152	72	10	152	73	10	152	74	10	152	75	10	152	76	10	152	77	10	152	78	10	152	79	10	152	80	10	152
15	56	46	150	60	46	150	61	46	150	62	46	150	63	46	150	64	46	150	65	46	150	66	46	150	67	46	150	68	46	150	69	46	150	70	46	150	71	46	150	72	46	150	73	46	150	74	46	150	75	46	150	76	46	150	77	46	150	78	46	150	79	46	150	80	46	150
16	56	21	148	60	21	148	61	21	148	62	21	148	63	21	148	64	21	148	65	21	148	66	21	148	67	21	148	68	21	148	69	21	148	70	21	148	71	21	148	72	21	148	73	21	148	74	21	148	75	21	148	76	21	148	77	21	148	78	21	148	79	21	148	80	21	148
17	55	55	146	60	55	146	61	55	146	62	55	146	63	55	146	64	55	146	65	55	146	66	55	146	67	55	146	68	55	146	69	55	146	70	55	146	71	55	146	72	55	146	73	55	146	74	55	146	75	55	146	76	55	146	77	55	146	78	55	146	79	55	146	80	55	146
18	55	27	144	60	27	144	61	27	144	62	27	144	63	27	144	64	27	144	65	27	144	66	27	144	67	27	144	68	27	144	69	27	144	70	27	144	71	27	144	72	27	144	73	27	144	74	27	144	75	27	144	76	27	144	77	27	144	78	27	144	79	27	144	80	27	144
19	54	56	142	60	56	142	61	56	142	62	56	142	63	56	142	64	56	142	65	56	142	66	56	142	67	56	142	68	56	142	69	56	142	70	56	142	71	56	142	72	56	142	73	56	142	74	56	142	75	56	142	76	56	142	77	56	142	78	56	142	79	56	142	80	56	142
20	54	28	140	60	28	140	61	28	140	62	28	140	63	28	140	64	28	140	65	28	140	66	28	140	67	28	140	68	28	140	69	28	140	70	28	140	71	28	140	72	28	140	73	28	140	74	28	140	75	28	140	76	28	140	77	28	140	78	28	140	79	28	140	80	28	140
21	53	57	138	60	57	138	61	57	138	62	57	138	63	57	138	64	57	138	65	57	138	66	57	138	67	57	138	68	57	138	69	57	138	70	57	138	71	57	138	72	57	138	73	57	138	74	57	138	75	57	138	76	57	138	77	57	138	78	57	138	79	57	138	80	57	138
22	53	25	136	60	25	136	61	25	136	62	25	136	63	25	136	64	25	136	65	25	136	66	25	136	67	25	136	68	25	136	69	25	136	70	25	136	71	25	136	72	25	136	73	25	136	74	25	136	75	25	136	76	25	136	77	25	136	78	25	136	79	25	136	80	25	136
23	52	52	134	60	52	134	61	52	134	62	52	134	63	52	134	64	52	134	65	52	134	66	52	134	67	52	134	68	52	134	69	52	134	70	52	134	71	52	134	72	52	134	73	52	134	74	5																			

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
70	17.14	31	100	17.45	31	99	18.16	31	99	18.47	31	97	19.17	31	97	19.48	30	96	20.18	29	95	20.47	30	94	21.17	29	93	21.46	29	92	22.15	28	91	22.43	28	90	23.11	28	89	23.39	27	88	24.06	27	87	24.74	27	86	25.41	27	85	26.08	27	84	26.75	27	83	27.42	27	82	28.09	27	81	28.76	27	80	29.43	27	79	30.10	27	78	30.77	27	77	31.44	27	76	32.11	27	75	32.78	27	74	33.45	27	73	34.12	27	72	34.79	27	71	35.46	27	70	36.13	27	69	36.80	27	68	37.47	27	67	38.14	27	66	38.81	27	65	39.48	27	64	40.15	27	63	40.82	27	62	41.49	27	61	42.16	27	60	42.83	27	59	43.50	27	58	44.17	27	57	44.84	27	56	45.51	27	55	46.18	27	54	46.85	27	53	47.52	27	52	48.19	27	51	48.86	27	50	49.53	27	49	50.20	27	48	50.87	27	47	51.54	27	46	52.21	27	45	52.88	27	44	53.55	27	43	54.22	27	42	54.89	27	41	55.56	27	40	56.23	27	39	56.90	27	38	57.57	27	37	58.24	27	36	58.91	27	35	59.58	27	34	60.25	27	33	60.92	27	32	61.59	27	31	62.26	27	30	62.93	27	29	63.60	27	28	64.27	27	27	64.94	27	26	65.61	27	25	66.28	27	24	66.95	27	23	67.62	27	22	68.29	27	21	68.96	27	20	69.63	27	19	70.30	27	18	70.97	27	17	71.64	27	16	72.31	27	15	72.98	27	14	73.65	27	13	74.32	27	12	74.99	27	11	75.66	27	10	76.33	27	9	77.00	27	8	77.67	27	7	78.34	27	6	79.01	27	5	79.68	27	4	80.35	27	3	81.02	27	2	81.69	27	1	82.36	27	0	83.03	27	0	83.70	27	0	84.37	27	0	85.04	27	0	85.71	27	0	86.38	27	0	87.05	27	0	87.72	27	0	88.39	27	0	89.06	27	0	89.73	27	0	90.40	27	0	91.07	27	0	91.74	27	0	92.41	27	0	93.08	27	0	93.75	27	0	94.42	27	0	95.09	27	0	95.76	27	0	96.43	27	0	97.10	27	0	97.77	27	0	98.44	27	0	99.11	27	0	99.78	27	0	100.45	27	0	101.12	27	0	101.79	27	0	102.46	27	0	103.13	27	0	103.80	27	0	104.47	27	0	105.14	27	0	105.81	27	0	106.48	27	0	107.15	27	0	107.82	27	0	108.49	27	0	109.16	27	0	109.83	27	0	110.50	27	0	111.17	27	0	111.84	27	0	112.51	27	0	113.18	27	0	113.85	27	0	114.52	27	0	115.19	27	0	115.86	27	0	116.53	27	0	117.20	27	0	117.87	27	0	118.54	27	0	119.21	27	0	119.88	27	0	120.55	27	0	121.22	27	0	121.89	27	0	122.56	27	0	123.23	27	0	123.90	27	0	124.57	27	0	125.24	27	0	125.91	27	0	126.58	27	0	127.25	27	0	127.92	27	0	128.59	27	0	129.26	27	0	129.93	27	0	130.60	27	0	131.27	27	0	131.94	27	0	132.61	27	0	133.28	27	0	133.95	27	0	134.62	27	0	135.29	27	0	135.96	27	0	136.63	27	0	137.30	27	0	137.97	27	0	138.64	27	0	139.31	27	0	140.00	27	0	140.67	27	0	141.34	27	0	142.01	27	0	142.68	27	0	143.35	27	0	144.02	27	0	144.69	27	0	145.36	27	0	146.03	27	0	146.70	27	0	147.37	27	0	148.04	27	0	148.71	27	0	149.38	27	0	150.05	27	0	150.72	27	0	151.39	27	0	152.06	27	0	152.73	27	0	153.40	27	0	154.07	27	0	154.74	27	0	155.41	27	0	156.08	27	0	156.75	27	0	157.42	27	0	158.09	27	0	158.76	27	0	159.43	27	0	160.10	27	0	160.77	27	0	161.44	27	0	162.11	27	0	162.78	27	0	163.45	27	0	164.12	27	0	164.79	27	0	165.46	27	0	166.13	27	0	166.80	27	0	167.47	27	0	168.14	27	0	168.81	27	0	169.48	27	0	170.15	27	0	170.82	27	0	171.49	27	0	172.16	27	0	172.83	27	0	173.50	27	0	174.17	27	0	174.84	27	0	175.51	27	0	176.18	27	0	176.85	27	0	177.52	27	0	178.19	27	0	178.86	27	0	179.53	27	0	180.20	27	0	180.87	27	0	181.54	27	0	182.21	27	0	182.88	27	0	183.55	27	0	184.22	27	0	184.89	27	0	185.56	27	0	186.23	27	0	186.90	27	0	187.57	27	0	188.24	27	0	188.91	27	0	189.58	27	0	190.25	27	0	190.92	27	0	191.59	27	0	192.26	27	0	192.93	27	0	193.60	27	0	194.27	27	0	194.94	27	0	195.61	27	0	196.28	27	0	196.95	27	0	197.62	27	0	198.29	27	0	198.96	27	0	199.63	27	0	200.30	27	0	200.97	27	0	201.64	27	0	202.31	27	0	202.98	27	0	203.65	27	0	204.32	27	0	204.99	27	0	205.66	27	0	206.33	27	0	207.00	27	0	207.67	27	0	208.34	27	0	209.01	27	0	209.68	27	0	210.35	27	0	211.02	27	0	211.69	27	0	212.36	27	0	213.03	27	0	213.70	27	0	214.37	27	0	215.04	27	0	215.71	27	0	216.38	27	0	217.05	27	0	217.72	27	0	218.39	27	0	219.06	27	0	219.73	27	0	220.40	27	0	221.07	27	0	221.74	27	0	222.41	27	0	223.08	27	0	223.75	27	0	224.42	27	0	225.09	27	0	225.76	27	0	226.43	27	0	227.10	27	0	227.77	27	0	228.44	27	0	229.11	27	0	229.78	27	0	230.45	27	0	231.12	27	0	231.79	27	0	232.46	27	0	233.13	27	0	233.80	27	0	234.47	27	0	235.14	27	0	235.81	27	0	236.48	27	0	237.15	27	0	237.82	27	0	238.49	27	0	239.16	27	0	239.83	27	0	240.50	27	0	241.17	27	0	241.84	27	0	242.51	27	0	243.18	27	0	243.85	27	0	244.52	27	0	245.19	27	0	245.86	27	0	246.53	27	0	247.20	27	0	247.87	27	0	248.54	27	0	249.21	27	0	249.88	27	0	250.55	27	0	251.22	27	0	251.89	27	0	252.56	27	0	253.23	27	0	253.90	27	0	254.57	27	0	255.24	27	0	255.91	27	0	256.58	27	0	257.25	27	0	257.92	27	0	258.59	27	0	259.26	27	0	259.93	27	0	260.60	27	0	261.27	27	0	261.94	27	0	262.61	27	0	263.28	27	0	263.95	27	0	264.62	27	0	265.29	27	0	265.96	27	0	266.63	27	0	267.30	27	0	267.97	27	0	268.64	27	0	269.31	27	0	270.00	27	0	270.67	27	0	271.34	27	0	272.01	27	0	272.68	27	0	273.35	27	0	274.02	27	0	274.69	27	0	275.36	27	0	276.03	27	0	276.70	27	0	277.37	27	0	278.04	27	0	278.71	27	0	279.38	27	0	280.05	27	0	280.72	27	0	281.39	27	0	282.06	27	0	282.73	27	0	283.40	27	0	284.07	27	0	284.74	27	0	285.41	27	0	286.08	27	0	286.75	27	0	287.42	27	0	288.09	27	0	288.76	27	0	289.43	27	0	290.10	27	0	290.77	27	0	291.44	27	0	292.11	27	0	292.78	27	0	293.45	27	0	294.12	27	0	294.79	27	0	295.46	27	0	296.13	27	0	296.80	27	0	297.47	27	0	298.14	27	0	298.81	27	0	299.48	27	0	300.15	27	0	300.82	27	0	301.49	27	0	302.16	27	0	302.83	27	0	303.50	27	0	304.17	27	0	304.84	27	0	305.51	27	0	306.18	27	0	306.85	27	0	307.52	27	0

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LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
68	18 05	-32	101	17 33	-32	102	17 01	-32	103	16 29	-32	104	15 57	-33	104	15 24	-33	105	14 51	-33	106	14 18	-33	107	13 45	-33	108	13 12	-34	109	12 38	-33	110	12 05	-34	111	11 31	-34	112	10 57	-34	113	10 23	-34	114	9 49	-34	115	9 15	-34	116	8 41	-34	117	8 07	-34	118	7 33	-34	119	6 59	-34	120	6 25	-34	121	5 51	-34	122	5 17	-34	123	4 43	-34	124	4 09	-34	125	3 35	-34	126	3 01	-34	127	2 27	-34	128	1 53	-34	129	1 19	-34	130	0 45	-34	131	0 11	-34	132	-0 13	-34	133	-0 39	-34	134	-1 05	-34	135	-1 31	-34	136	-1 57	-34	137	-2 23	-34	138	-2 49	-34	139	-3 15	-34	140	-3 41	-34	141	-4 07	-34	142	-4 33	-34	143	-4 59	-34	144	-5 25	-34	145	-5 51	-34	146	-6 17	-34	147	-6 43	-34	148	-7 09	-34	149	-7 35	-34	150	-8 01	-34	151	-8 27	-34	152	-8 53	-34	153	-9 19	-34	154	-9 45	-34	155	-10 11	-34	156	-10 37	-34	157	-11 03	-34	158	-11 29	-34	159	-11 55	-34	160	-12 21	-34	161	-12 47	-34	162	-13 13	-34	163	-13 39	-34	164	-14 05	-34	165	-14 31	-34	166	-14 57	-34	167	-15 23	-34	168	-15 49	-34	169	-16 15	-34	170	-16 41	-34	171	-17 07	-34	172	-17 33	-34	173	-17 59	-34	174	-18 25	-34	175	-18 51	-34	176	-19 17	-34	177	-19 43	-34	178	-20 09	-34	179	-20 35	-34	180	-21 01	-34	181	-21 27	-34	182	-21 53	-34	183	-22 19	-34	184	-22 45	-34	185	-23 11	-34	186	-23 37	-34	187	-24 03	-34	188	-24 29	-34	189	-24 55	-34	190	-25 21	-34	191	-25 47	-34	192	-26 13	-34	193	-26 39	-34	194	-27 05	-34	195	-27 31	-34	196	-27 57	-34	197	-28 23	-34	198	-28 49	-34	199	-29 15	-34	200	-29 41	-34	201	-30 07	-34	202	-30 33	-34	203	-30 59	-34	204	-31 25	-34	205	-31 51	-34	206	-32 17	-34	207	-32 43	-34	208	-33 09	-34	209	-33 35	-34	210	-34 01	-34	211	-34 27	-34	212	-34 53	-34	213	-35 19	-34	214	-35 45	-34	215	-36 11	-34	216	-36 37	-34	217	-37 03	-34	218	-37 29	-34	219	-37 55	-34	220	-38 21	-34	221	-38 47	-34	222	-39 13	-34	223	-39 39	-34	224	-40 05	-34	225	-40 31	-34	226	-40 57	-34	227	-41 23	-34	228	-41 49	-34	229	-42 15	-34	230	-42 41	-34	231	-43 07	-34	232	-43 33	-34	233	-43 59	-34	234	-44 25	-34	235	-44 51	-34	236	-45 17	-34	237	-45 43	-34	238	-46 09	-34	239	-46 35	-34	240	-47 01	-34	241	-47 27	-34	242	-47 53	-34	243	-48 19	-34	244	-48 45	-34	245	-49 11	-34	246	-49 37	-34	247	-50 03	-34	248	-50 29	-34	249	-50 55	-34	250	-51 21	-34	251	-51 47	-34	252	-52 13	-34	253	-52 39	-34	254	-53 05	-34	255	-53 31	-34	256	-53 57	-34	257	-54 23	-34	258	-54 49	-34	259	-55 15	-34	260	-55 41	-34	261	-56 07	-34	262	-56 33	-34	263	-56 59	-34	264	-57 25	-34	265	-57 51	-34	266	-58 17	-34	267	-58 43	-34	268	-59 09	-34	269	-59 35	-34	270	-60 01	-34	271	-60 27	-34	272	-60 53	-34	273	-61 19	-34	274	-61 45	-34	275	-62 11	-34	276	-62 37	-34	277	-63 03	-34	278	-63 29	-34	279	-63 55	-34	280	-64 21	-34	281	-64 47	-34	282	-65 13	-34	283	-65 39	-34	284	-66 05	-34	285	-66 31	-34	286	-66 57	-34	287	-67 23	-34	288	-67 49	-34	289	-68 15	-34	290	-68 41	-34	291	-69 07	-34	292	-69 33	-34	293	-69 59	-34	294	-70 25	-34	295	-70 51	-34	296	-71 17	-34	297	-71 43	-34	298	-72 09	-34	299	-72 35	-34	300	-73 01	-34	301	-73 27	-34	302	-73 53	-34	303	-74 19	-34	304	-74 45	-34	305	-75 11	-34	306	-75 37	-34	307	-76 03	-34	308	-76 29	-34	309	-76 55	-34	310	-77 21	-34	311	-77 47	-34	312	-78 13	-34	313	-78 39	-34	314	-79 05	-34	315	-79 31	-34	316	-79 57	-34	317	-80 23	-34	318	-80 49	-34	319	-81 15	-34	320	-81 41	-34	321	-82 07	-34	322	-82 33	-34	323	-82 59	-34	324	-83 25	-34	325	-83 51	-34	326	-84 17	-34	327	-84 43	-34	328	-85 09	-34	329	-85 35	-34	330	-86 01	-34	331	-86 27	-34	332	-86 53	-34	333	-87 19	-34	334	-87 45	-34	335	-88 11	-34	336	-88 37	-34	337	-89 03	-34	338	-89 29	-34	339	-89 55	-34	340	-90 21	-34	341	-90 47	-34	342	-91 13	-34	343	-91 39	-34	344	-92 05	-34	345	-92 31	-34	346	-92 57	-34	347	-93 23	-34	348	-93 49	-34	349	-94 15	-34	350	-94 41	-34	351	-95 07	-34	352	-95 33	-34	353	-95 59	-34	354	-96 25	-34	355	-96 51	-34	356	-97 17	-34	357	-97 43	-34	358	-98 09	-34	359	-98 35	-34	360	-99 01	-34	361	-99 27	-34	362	-99 53	-34	363	-100 19	-34	364	-100 45	-34	365	-101 11	-34	366	-101 37	-34	367	-101 63	-34	368	-101 89	-34	369	-102 15	-34	370	-102 41	-34	371	-103 07	-34	372	-103 33	-34	373	-103 59	-34	374	-104 25	-34	375	-104 51	-34	376	-105 17	-34	377	-105 43	-34	378	-106 09	-34	379	-106 35	-34	380	-107 01	-34	381	-107 27	-34	382	-107 53	-34	383	-108 19	-34	384	-108 45	-34	385	-109 11	-34	386	-109 37	-34	387	-109 63	-34	388	-110 19	-34	389	-110 45	-34	390	-111 11	-34	391	-111 37	-34	392	-111 63	-34	393	-111 89	-34	394	-112 15	-34	395	-112 41	-34	396	-113 07	-34	397	-113 33	-34	398	-113 59	-34	399	-114 25	-34	400	-114 51	-34	401	-115 17	-34	402	-115 43	-34	403	-116 09	-34	404	-116 35	-34	405	-117 01	-34	406	-117 27	-34	407	-117 53	-34	408	-118 19	-34	409	-118 45	-34	410	-119 11	-34	411	-119 37	-34	412	-119 63	-34	413	-120 19	-34	414	-120 45	-34	415	-121 11	-34	416	-121 37	-34	417	-121 63	-34	418	-121 89	-34	419	-122 15	-34	420	-122 41	-34	421	-123 07	-34	422	-123 33	-34	423	-123 59	-34	424	-124 25	-34	425	-124 51	-34	426	-125 17	-34	427	-125 43	-34	428	-126 09	-34	429	-126 35	-34	430	-126 61	-34	431	-126 87	-34	432	-127 13	-34	433	-127 39	-34	434	-127 65	-34	435	-127 91	-34	436	-128 17	-34	437	-128 43	-34	438	-129 09	-34	439	-129 35	-34	440	-129 61	-34	441	-130 17	-34	442	-130 43	-34	443	-131 09	-34	444	-131 35	-34	445	-131 61	-34	446	-131 87	-34	447	-132 13	-34	448	-132 39	-34	449	-132 65	-34	450	-132 91	-34	451	-133 17	-34	452	-133 43	-34	453	-134 09	-34	454	-134 35	-34	455	-134 61	-34	456	-134 87	-34	457	-135 13	-34	458	-135 39	-34	459	-135 65	-34	460	-135 91	-34	461	-136 17	-34	462	-136 43	-34	463	-137 09	-34	464	-137 35	-34	465	-137 61	-34	466	-137 87	-34	467	-138 13	-34	468	-138 39	-34	469	-138 65	-34	470	-138 91	-34	471	-139 17	-34	472	-139 43	-34	473	-139 69	-34	474	-140 05	-34	475	-140 31	-34	476	-140 57	-34	477	-141 23	-34	478	-141 49	-34	479	-142 05	-34	480	-142 31	-34	481	-142 57	-34	482	-143 23	-34	483	-143 49	-34	484	-144 05	-34	485	-144 31	-34	486	-144 57	-34	487	-145 23	-34	488	-145 49	-34	489	-146 05	-34	490	-146 31	-34	491	-146 57	-34	492	-147 23	-34	493	-147 49	-34	494	-148 05	-34	495	-148 31	-34	496	-148 57	-34	497	-149 23	-34	498	-149 49	-34	499	-150 05	-34	500	-150 31	-34	501	-150 57	-34	502	-151 23	-34	503	-151 49	-34	504	-152 05	-34	505	-152 31	-34	506	-152 57	-34	507	-153 23	-34	508	-153 49	-34	509	-154 05	-34	510	-154 31	-34	511	-154 57	-34	512	-155 23	-34	513	-155 49	-34	514	-156 05	-34	515	-156 31	-34	516	-156 57	-34	517	-157 23	-34	518	-157 49	-34	519	-158 05	-34	520	-158 31	-34	521	-158 57	-34	522	-159 23	-34	523	-159 49	-34	524	-160 05	-34	525	-160 31	-34	526	-160 57	-34	527	-161 23	-34	528	-161 49	-34	529	-162 05	-34	530	-162 31	-34	531	-162 57	-34	532	-163 23	-34	533	-163 49	-34	534	-164 05	-34	535	-164 31	-34	536	-164 57	-34	537	-165 23	-34	538	-165 49	-34	539	-166 05	-34	540	-166 31	-34	541	-166 57	-34	542	-167 23	-34	543	-167 49	-34	544	-168 05	-34	545	-168 31	-34	546	-168 57	-34	547	-169 23	-34	548	-169 49	-34	549	-170 05	-34	550	-170 31	-34	551	-170 57	-34	552	-171 23	-34	553	-171 49	-34	554	-172 05	-34	555	-172 31	-34	556	-172 57	-34	557	-173 23	-34	558	-173 49	-34	559	-174 05	-34	560	-174 31	-34	561	-174 57	-34	562	-175 23	-34	5

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for Latitude (15° to 30°) and Declination (15° to 29°). Each cell contains a 3-digit number representing the declination value. The table is organized into a grid where the top row represents the latitude and the left column represents the declination.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for LHA (0-69) and rows for declination (15°-29°). Each cell contains a 3x3 grid of values for hour angle (Hc) and distance (d) in degrees and minutes.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

LAT 31°

LAT 31°

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°			LHA
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z							
70	24.37	27	87	25.04	28	86	25.58	27	84	26.25	26	83	26.51	26	82	27.17	25	81	27.42	24	80	28.06	25	79	28.31	23	78	28.54	24	77	29.18	22	76	29.40	23	75	30.03	21	73	30.24	21	72	290			
71	22.54	28	86	23.22	27	85	24.07	27	84	24.16	27	83	24.43	26	82	25.00	26	81	25.25	25	80	25.79	24	79	26.24	24	78	26.70	23	77	27.18	22	76	27.38	23	75	28.13	22	74	28.24	22	73	289			
72	22.54	28	86	23.22	27	85	24.07	27	84	24.16	27	83	24.43	26	82	25.00	26	81	25.25	25	80	25.79	24	79	26.24	24	78	26.70	23	77	27.18	22	76	27.38	23	75	28.13	22	74	28.24	22	73	288			
73	22.03	28	85	22.31	27	84	22.58	27	83	23.25	27	82	23.52	27	81	24.19	26	80	24.45	25	79	24.82	25	78	25.25	24	77	25.68	24	76	26.10	23	75	26.59	23	74	27.35	23	73	27.35	23	72	287			
74	21.12	28	85	21.40	27	84	22.07	27	83	22.34	27	82	23.01	27	81	23.28	26	80	23.54	25	79	24.21	25	78	24.58	24	77	25.05	24	76	25.59	24	75	26.23	23	74	26.23	23	73	27.35	23	72	286			
75	20.20	28	84	20.48	28	83	21.16	27	82	21.43	28	81	22.11	26	80	22.37	26	79	23.03	25	78	23.55	25	77	24.20	25	76	24.75	25	75	25.25	24	74	25.74	24	73	25.74	24	72	26.21	24	71	285			
76	19.29	28	84	19.57	28	83	20.25	28	82	20.53	27	81	21.20	27	80	21.47	26	79	22.13	26	78	22.39	26	77	23.05	25	76	23.56	24	75	24.20	25	74	24.20	25	73	24.45	24	72	25.09	24	71	284			
77	18.38	28	83	19.06	28	82	19.34	27	81	20.02	27	80	20.56	27	79	21.23	26	78	21.49	26	77	22.15	26	76	22.41	25	75	23.06	24	74	23.31	25	73	23.56	24	72	24.09	24	71	24.44	24	70	24.83			
78	17.47	28	82	18.15	28	81	18.43	28	80	19.11	28	79	19.95	27	78	20.06	27	77	20.59	27	76	21.26	26	75	21.52	26	74	22.28	25	73	22.42	25	72	23.32	25	71	23.32	25	70	23.98	24	69	24.28			
79	16.56	29	82	17.25	28	81	17.53	28	80	18.21	28	79	18.98	27	78	19.43	26	77	20.09	27	76	20.59	27	75	21.02	26	74	21.28	25	73	21.53	25	72	22.18	25	71	22.43	25	70	23.08	24	69	24.81			
80	15.65	29	82	16.34	28	81	17.02	28	80	17.30	28	79	18.05	27	78	18.53	27	77	19.20	26	76	19.20	26	75	19.46	27	74	20.04	26	73	20.44	25	72	21.04	25	71	21.55	25	70	22.20	24	68	24.80			
81	15.14	29	81	15.83	28	80	16.40	28	79	17.08	27	78	17.85	28	77	18.03	27	76	18.30	27	75	18.57	26	74	19.23	26	73	19.50	25	72	20.16	25	71	20.41	26	70	21.07	25	69	21.07	25	68	24.79			
82	14.23	29	81	14.92	28	80	15.21	28	79	15.49	28	78	16.17	28	77	16.45	28	76	17.13	27	75	17.40	27	74	18.07	27	73	19.01	26	72	19.27	26	71	19.53	26	70	20.19	25	69	20.44	25	68	24.78			
83	13.33	29	80	14.02	28	79	14.59	28	78	15.27	28	77	15.55	28	76	16.23	28	75	16.51	27	74	17.18	27	73	17.45	27	72	18.12	27	71	18.50	26	70	19.05	26	69	19.31	25	68	19.56	26	67	24.77			
84	12.42	29	80	13.11	28	79	13.40	29	78	14.09	28	77	14.37	28	76	15.05	28	75	15.34	27	74	16.29	27	73	16.56	27	72	17.23	27	71	17.50	27	70	18.17	26	69	18.43	26	68	19.69	26	67	24.76			
85	11.51	29	79	12.21	29	78	12.50	29	77	13.19	28	76	13.47	28	75	14.14	28	74	14.42	28	73	15.40	27	72	16.07	27	71	16.35	27	70	17.02	27	69	17.29	26	68	17.55	27	67	18.22	26	66	24.75			
86	11.01	29	79	11.30	29	78	11.59	30	77	12.29	28	76	12.57	29	75	13.26	29	74	13.55	28	73	14.51	28	72	15.19	27	71	15.46	28	70	16.14	27	69	16.41	27	68	17.08	27	67	17.35	26	66	24.74			
87	10.10	30	78	10.40	29	77	10.99	30	76	11.39	29	75	12.37	28	74	13.05	29	73	13.34	28	72	14.02	28	71	14.30	28	70	14.58	28	69	15.26	27	68	15.53	28	67	16.16	27	66	16.48	26	65	24.73			
88	09.20	30	78	09.50	29	77	10.19	30	76	10.49	29	75	11.47	29	74	12.16	29	73	12.45	28	72	13.14	28	71	13.42	28	70	14.10	28	69	14.38	28	68	15.06	28	67	15.33	28	66	16.01	27	65	24.72			
89	08.30	30	78	09.00	29	77	09.29	30	76	09.59	29	75	10.29	29	74	10.58	29	73	11.27	29	72	11.56	29	71	12.25	29	70	12.54	28	69	13.50	29	68	14.19	27	67	14.46	26	66	15.14	26	65	24.71			
90	07.40	30	77	08.10	30	76	08.40	29	75	09.09	30	74	09.39	30	73	10.09	29	72	10.38	29	71	11.37	29	70	12.06	28	69	12.34	29	68	13.03	28	67	13.31	29	66	14.08	29	65	14.28	27	64	24.70			
91	06.50	30	77	07.20	30	76	07.50	30	75	08.20	30	74	08.50	30	73	09.20	29	72	09.49	30	71	10.19	29	70	10.48	30	69	11.17	29	68	11.86	29	67	12.44	29	66	13.13	28	65	13.41	28	64	24.69			
92	06.00	30	76	06.30	30	75	07.00	31	74	07.31	30	73	08.01	30	72	08.31	30	71	09.31	29	70	10.00	30	69	10.42	30	68	10.12	29	67	10.41	30	66	11.11	29	65	11.40	29	64	12.09	28	63	24.68			
93	05.10	30	76	05.40	31	75	06.11	30	74	06.41	31	73	07.12	30	72	07.42	30	71	08.12	30	70	09.12	30	69	09.42	30	68	10.12	29	67	10.41	30	66	11.11	29	65	11.40	29	64	12.09	28	63	24.67			
94	04.20	31	75	04.51	31	74	05.22	30	73	05.52	31	72	06.23	30	71	06.53	31	70	07.24	30	69	08.24	31	68	08.55	30	67	09.25	29	66	09.54	30	65	10.24	30	64	11.23	29	63	24.66						
95	03.30	31	74	04.01	31	73	04.32	31	72	05.03	31	71	05.34	31	70	06.05	31	69	06.36	30	68	07.37	30	67	08.07	30	66	08.78	30	65	09.08	30	64	09.38	30	63	10.37	30	62	24.65						
96	02.41	31	74	03.12	31	73	03.43	31	72	04.14	32	71	04.45	31	70	05.15	31	69	05.46	31	68	06.49	31	67	07.20	31	66	07.91	31	65	08.21	30	64	08.52	31	63	09.52	30	62	24.64						
97	01.52	32	73	02.23	31	72	02.54	32	71	03.25	31	70	03.56	31	69	04.26	32	68	04.57	31	67	05.58	31	66	06.29	31	65	07.00	31	64	07.31	30	63	08.02	31	62	09.07	30	61	24.63						
98	01.02	32	73	01.34	32	72	02.05	32	71	02.37	32	70	03.08	31	69	03.40	32	68	04.12	31	67	05.15	31	66	05.46	31	65	06.17	31	64	06.49	31	63	07.51	30	62	08.21	31	61	24.62						
99	00.13	32	73	00.45	32	72	01.17	32	71	0																																				

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA (69-360) and rows for latitude (15°-31°). Each cell contains a 3x3 grid of values for declination (15°-29°) and hour angle (Z).

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
70	16.52	33	101	17.25	33	100	17.58	32	99	18.30	32	98	19.03	32	97	19.35	32	96	19.16	31	94	21.41	30	93	22.11	31	92	22.42	30	91	23.12	30	90	23.42	29	89	24.11	28	88	24.51	28	88	25.20	28	88	25.51	28	88	26.20	28	88	26.51	28	88	27.20	28	88	27.51	28	88	28.20	28	88	28.51	28	88	29.20	28	88	29.51	28	88	30.20	28	88	30.51	28	88	31.20	28	88	31.51	28	88	32.20	28	88	32.51	28	88	33.20	28	88	33.51	28	88	34.20	28	88	34.51	28	88	35.20	28	88	35.51	28	88	36.20	28	88	36.51	28	88	37.20	28	88	37.51	28	88	38.20	28	88	38.51	28	88	39.20	28	88	39.51	28	88	40.20	28	88	40.51	28	88	41.20	28	88	41.51	28	88	42.20	28	88	42.51	28	88	43.20	28	88	43.51	28	88	44.20	28	88	44.51	28	88	45.20	28	88	45.51	28	88	46.20	28	88	46.51	28	88	47.20	28	88	47.51	28	88	48.20	28	88	48.51	28	88	49.20	28	88	49.51	28	88	50.20	28	88	50.51	28	88	51.20	28	88	51.51	28	88	52.20	28	88	52.51	28	88	53.20	28	88	53.51	28	88	54.20	28	88	54.51	28	88	55.20	28	88	55.51	28	88	56.20	28	88	56.51	28	88	57.20	28	88	57.51	28	88	58.20	28	88	58.51	28	88	59.20	28	88	59.51	28	88	60.20	28	88	60.51	28	88	61.20	28	88	61.51	28	88	62.20	28	88	62.51	28	88	63.20	28	88	63.51	28	88	64.20	28	88	64.51	28	88	65.20	28	88	65.51	28	88	66.20	28	88	66.51	28	88	67.20	28	88	67.51	28	88	68.20	28	88	68.51	28	88	69.20	28	88	69.51	28	88	70.20	28	88	70.51	28	88	71.20	28	88	71.51	28	88	72.20	28	88	72.51	28	88	73.20	28	88	73.51	28	88	74.20	28	88	74.51	28	88	75.20	28	88	75.51	28	88	76.20	28	88	76.51	28	88	77.20	28	88	77.51	28	88	78.20	28	88	78.51	28	88	79.20	28	88	79.51	28	88	80.20	28	88	80.51	28	88	81.20	28	88	81.51	28	88	82.20	28	88	82.51	28	88	83.20	28	88	83.51	28	88	84.20	28	88	84.51	28	88	85.20	28	88	85.51	28	88	86.20	28	88	86.51	28	88	87.20	28	88	87.51	28	88	88.20	28	88	88.51	28	88	89.20	28	88	89.51	28	88	90.20	28	88	90.51	28	88	91.20	28	88	91.51	28	88	92.20	28	88	92.51	28	88	93.20	28	88	93.51	28	88	94.20	28	88	94.51	28	88	95.20	28	88	95.51	28	88	96.20	28	88	96.51	28	88	97.20	28	88	97.51	28	88	98.20	28	88	98.51	28	88	99.20	28	88	99.51	28	88	100.20	28	88	100.51	28	88	101.20	28	88	101.51	28	88	102.20	28	88	102.51	28	88	103.20	28	88	103.51	28	88	104.20	28	88	104.51	28	88	105.20	28	88	105.51	28	88	106.20	28	88	106.51	28	88	107.20	28	88	107.51	28	88	108.20	28	88	108.51	28	88	109.20	28	88	109.51	28	88	110.20	28	88	110.51	28	88	111.20	28	88	111.51	28	88	112.20	28	88	112.51	28	88	113.20	28	88	113.51	28	88	114.20	28	88	114.51	28	88	115.20	28	88	115.51	28	88	116.20	28	88	116.51	28	88	117.20	28	88	117.51	28	88	118.20	28	88	118.51	28	88	119.20	28	88	119.51	28	88	120.20	28	88	120.51	28	88	121.20	28	88	121.51	28	88	122.20	28	88	122.51	28	88	123.20	28	88	123.51	28	88	124.20	28	88	124.51	28	88	125.20	28	88	125.51	28	88	126.20	28	88	126.51	28	88	127.20	28	88	127.51	28	88	128.20	28	88	128.51	28	88	129.20	28	88	129.51	28	88	130.20	28	88	130.51	28	88	131.20	28	88	131.51	28	88	132.20	28	88	132.51	28	88	133.20	28	88	133.51	28	88	134.20	28	88	134.51	28	88	135.20	28	88	135.51	28	88	136.20	28	88	136.51	28	88	137.20	28	88	137.51	28	88	138.20	28	88	138.51	28	88	139.20	28	88	139.51	28	88	140.20	28	88	140.51	28	88	141.20	28	88	141.51	28	88	142.20	28	88	142.51	28	88	143.20	28	88	143.51	28	88	144.20	28	88	144.51	28	88	145.20	28	88	145.51	28	88	146.20	28	88	146.51	28	88	147.20	28	88	147.51	28	88	148.20	28	88	148.51	28	88	149.20	28	88	149.51	28	88	150.20	28	88	150.51	28	88	151.20	28	88	151.51	28	88	152.20	28	88	152.51	28	88	153.20	28	88	153.51	28	88	154.20	28	88	154.51	28	88	155.20	28	88	155.51	28	88	156.20	28	88	156.51	28	88	157.20	28	88	157.51	28	88	158.20	28	88	158.51	28	88	159.20	28	88	159.51	28	88	160.20	28	88	160.51	28	88	161.20	28	88	161.51	28	88	162.20	28	88	162.51	28	88	163.20	28	88	163.51	28	88	164.20	28	88	164.51	28	88	165.20	28	88	165.51	28	88	166.20	28	88	166.51	28	88	167.20	28	88	167.51	28	88	168.20	28	88	168.51	28	88	169.20	28	88	169.51	28	88	170.20	28	88	170.51	28	88	171.20	28	88	171.51	28	88	172.20	28	88	172.51	28	88	173.20	28	88	173.51	28	88	174.20	28	88	174.51	28	88	175.20	28	88	175.51	28	88	176.20	28	88	176.51	28	88	177.20	28	88	177.51	28	88	178.20	28	88	178.51	28	88	179.20	28	88	179.51	28	88	180.20	28	88	180.51	28	88	181.20	28	88	181.51	28	88	182.20	28	88	182.51	28	88	183.20	28	88	183.51	28	88	184.20	28	88	184.51	28	88	185.20	28	88	185.51	28	88	186.20	28	88	186.51	28	88	187.20	28	88	187.51	28	88	188.20	28	88	188.51	28	88	189.20	28	88	189.51	28	88	190.20	28	88	190.51	28	88	191.20	28	88	191.51	28	88	192.20	28	88	192.51	28	88	193.20	28	88	193.51	28	88	194.20	28	88	194.51	28	88	195.20	28	88	195.51	28	88	196.20	28	88	196.51	28	88	197.20	28	88	197.51	28	88	198.20	28	88	198.51	28	88	199.20	28	88	199.51	28	88	200.20	28	88	200.51	28	88	201.20	28	88	201.51	28	88	202.20	28	88	202.51	28	88	203.20	28	88	203.51	28	88	204.20	28	88	204.51	28	88	205.20	28	88	205.51	28	88	206.20	28	88	206.51	28	88	207.20	28	88	207.51	28	88	208.20	28	88	208.51	28	88	209.20	28	88	209.51	28	88	210.20	28	88	210.51	28	88	211.20	28	88	211.51	28	88	212.20	28	88	212.51	28	88	213.20	28	88	213.51	28	88	214.20	28	88	214.51	28	88	215.20	28	88	215.51	28	88	216.20	28	88	216.51	28	88	217.20	28	88	217.51	28	88	218.20	28	88	218.51	28	88	219.20	28	88	219.51	28	88	220.20	28	88	220.51	28	88	221.20	28	88	221.51	28	88	222.20	28	88	222.51	28	88	223.20	28	88	223.51	28	88	224.20	28	88	224.51	28	88	225.20	28	88	225.51	28	88	226.20	28	88	226.51	28	88	227.20	28	88	227.51	28	88	228.20	28	88	228.51	28	88	229.20	28	88	229.51	28	88	230.20	28	88	230.51	28	88	231.20	28

DECLINATION (15° – 29°) SAME NAME AS LATITUDE

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

LHA	15°		16°		17°		18°		19°		20°		21°		22°		23°		24°		25°		26°		27°		28°		29°		LHA
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	
0	73.00	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
1	72.59	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
2	72.54	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
3	72.47	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
4	72.37	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
5	72.24	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
6	72.08	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
7	71.50	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
8	71.30	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
9	71.07	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
10	70.83	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
11	70.56	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
12	70.27	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
13	69.97	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
14	69.65	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
15	69.31	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
16	68.94	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
17	68.54	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
18	68.11	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
19	67.66	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
20	67.20	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
21	66.73	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
22	66.25	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
23	65.76	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
24	65.26	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
25	64.75	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
26	64.23	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
27	63.70	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
28	63.16	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
29	62.61	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
30	62.05	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
31	61.48	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
32	60.91	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
33	60.33	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
34	59.74	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
35	59.15	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
36	58.55	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
37	57.94	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
38	57.32	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
39	56.69	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
40	56.05	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
41	55.40	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
42	54.74	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
43	54.07	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
44	53.40	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
45	52.72	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
46	52.04	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
47	51.35	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
48	50.66	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
49	49.96	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
50	49.25	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
51	48.54	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
52	47.82	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
53	47.10	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
54	46.37	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
55	45.64	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
56	44.90	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
57	44.16	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	60	'	180
58	43.41	'																													

LAT 32°

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°			LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
70	24.40	29	87	25.09	28	86	25.37	28	85	26.05	27	84	26.32	27	83	26.59	27	82	27.26	26	81	27.52	26	80	28.18	25	79	28.43	25	78	29.08	24	77	29.32	24	76	29.56	23	75	30.19	23	74	30.42	22	73	30.90	22	72	31.13	21	71	31.35	20	70	31.57	19	69	32.18	18	68	32.40	17	67	32.61	16	66	32.82	15	65	33.03	14	64	33.24	13	63	33.45	12	62	33.66	11	61	33.87	10	60	34.08	09	59	34.29	08	58	34.50	07	57	35.11	06	56	35.32	05	55	35.53	04	54	36.14	03	53	36.35	02	52	36.56	01	51	37.17	00	50	37.38	59	49	37.59	58	48	38.20	57	47	38.41	56	46	38.62	55	45	38.83	54	44	39.04	53	43	39.25	52	42	39.46	51	41	39.67	50	40	39.88	49	39	40.09	48	38	40.30	47	37	40.51	46	36	40.72	45	35	40.93	44	34	41.14	43	33	41.35	42	32	41.56	41	31	41.77	40	30	41.98	39	29	42.19	38	28	42.40	37	27	42.61	36	26	42.82	35	25	43.03	34	24	43.24	33	23	43.45	32	22	43.66	31	21	43.87	30	20	44.08	29	19	44.29	28	18	44.50	27	17	44.71	26	16	44.92	25	15	45.13	24	14	45.34	23	13	45.55	22	12	45.76	21	11	45.97	20	10	46.18	19	09	46.39	18	08	46.60	17	07	46.81	16	06	47.02	15	05	47.23	14	04	47.44	13	03	47.65	12	02	47.86	11	01	48.07	00	00	48.28	59	59	48.49	58	58	48.70	57	57	48.91	56	56	49.12	55	55	49.33	54	54	49.54	53	53	49.75	52	52	49.96	51	51	50.17	50	50	50.38	49	49	50.59	48	48	50.80	47	47	51.01	46	46	51.22	45	45	51.43	44	44	51.64	43	43	51.85	42	42	52.06	41	41	52.27	40	40	52.48	39	39	52.69	38	38	52.90	37	37	53.11	36	36	53.32	35	35	53.53	34	34	53.74	33	33	53.95	32	32	54.16	31	31	54.37	30	30	54.58	29	29	54.79	28	28	55.00	27	27	55.21	26	26	55.42	25	25	55.63	24	24	55.84	23	23	56.05	22	22	56.26	21	21	56.47	20	20	56.68	19	19	56.89	18	18	57.10	17	17	57.31	16	16	57.52	15	15	57.73	14	14	57.94	13	13	58.15	12	12	58.36	11	11	58.57	10	10	58.78	09	09	58.99	08	08	59.20	07	07	59.41	06	06	59.62	05	05	59.83	04	04	60.04	03	03	60.25	02	02	60.46	01	01	60.67	00	00	60.88	59	59	61.09	58	58	61.30	57	57	61.51	56	56	61.72	55	55	61.93	54	54	62.14	53	53	62.35	52	52	62.56	51	51	62.77	50	50	62.98	49	49	63.19	48	48	63.40	47	47	63.61	46	46	63.82	45	45	64.03	44	44	64.24	43	43	64.45	42	42	64.66	41	41	64.87	40	40	65.08	39	39	65.29	38	38	65.50	37	37	65.71	36	36	65.92	35	35	66.13	34	34	66.34	33	33	66.55	32	32	66.76	31	31	66.97	30	30	67.18	29	29	67.39	28	28	67.60	27	27	67.81	26	26	68.02	25	25	68.23	24	24	68.44	23	23	68.65	22	22	68.86	21	21	69.07	20	20	69.28	19	19	69.49	18	18	69.70	17	17	69.91	16	16	70.12	15	15	70.33	14	14	70.54	13	13	70.75	12	12	70.96	11	11	71.17	10	10	71.38	09	09	71.59	08	08	71.80	07	07	72.01	06	06	72.22	05	05	72.43	04	04	72.64	03	03	72.85	02	02	73.06	01	01	73.27	00	00	73.48	59	59	73.69	58	58	73.90	57	57	74.11	56	56	74.32	55	55	74.53	54	54	74.74	53	53	74.95	52	52	75.16	51	51	75.37	50	50	75.58	49	49	75.79	48	48	76.00	47	47	76.21	46	46	76.42	45	45	76.63	44	44	76.84	43	43	77.05	42	42	77.26	41	41	77.47	40	40	77.68	39	39	77.89	38	38	78.10	37	37	78.31	36	36	78.52	35	35	78.73	34	34	78.94	33	33	79.15	32	32	79.36	31	31	79.57	30	30	79.78	29	29	79.99	28	28	80.20	27	27	80.41	26	26	80.62	25	25	80.83	24	24	81.04	23	23	81.25	22	22	81.46	21	21	81.67	20	20	81.88	19	19	82.09	18	18	82.30	17	17	82.51	16	16	82.72	15	15	82.93	14	14	83.14	13	13	83.35	12	12	83.56	11	11	83.77	10	10	83.98	09	09	84.19	08	08	84.40	07	07	84.61	06	06	84.82	05	05	85.03	04	04	85.24	03	03	85.45	02	02	85.66	01	01	85.87	00	00	86.08	59	59	86.29	58	58	86.50	57	57	86.71	56	56	86.92	55	55	87.13	54	54	87.34	53	53	87.55	52	52	87.76	51	51	87.97	50	50	88.18	49	49	88.39	48	48	88.60	47	47	88.81	46	46	89.02	45	45	89.23	44	44	89.44	43	43	89.65	42	42	89.86	41	41	90.07	40	40	90.28	39	39	90.49	38	38	90.70	37	37	90.91	36	36	91.12	35	35	91.33	34	34	91.54	33	33	91.75	32	32	91.96	31	31	92.17	30	30	92.38	29	29	92.59	28	28	92.80	27	27	93.01	26	26	93.22	25	25	93.43	24	24	93.64	23	23	93.85	22	22	94.06	21	21	94.27	20	20	94.48	19	19	94.69	18	18	94.90	17	17	95.11	16	16	95.32	15	15	95.53	14	14	95.74	13	13	95.95	12	12	96.16	11	11	96.37	10	10	96.58	09	09	96.79	08	08	97.00	07	07	97.21	06	06	97.42	05	05	97.63	04	04	97.84	03	03	98.05	02	02	98.26	01	01	98.47	00	00	98.68	59	59	98.89	58	58	99.10	57	57	99.31	56	56	99.52	55	55	99.73	54	54	99.94	53	53	100.15	52	52	100.36	51	51	100.57	50	50	100.78	49	49	100.99	48	48	101.20	47	47	101.41	46	46	101.62	45	45	101.83	44	44	102.04	43	43	102.25	42	42	102.46	41	41	102.67	40	40	102.88	39	39	103.09	38	38	103.30	37	37	103.51	36	36	103.72	35	35	103.93	34	34	104.14	33	33	104.35	32	32	104.56	31	31	104.77	30	30	104.98	29	29	105.19	28	28	105.40	27	27	105.61	26	26	105.82	25	25	106.03	24	24	106.24	23	23	106.45	22	22	106.66	21	21	106.87	20	20	107.08	19	19	107.29	18	18	107.50	17	17	107.71	16	16	107.92	15	15	108.13	14	14	108.34	13	13	108.55	12	12	108.76	11	11	108.97	10	10	109.18	09	09	109.39	08	08	109.60	07	07	109.81	06	06	110.02	05	05	110.23	04	04	110.44	03	03	110.65	02	02	110.86	01	01	111.07	00	00	111.28	59	59	111.49	58	58	111.70	57	57	111.91	56	56	112.12	55	55	112.33	54	54	112.54	53	53	112.75	52	52	112.96	51	51	113.17	50	50	113.38	49	49	113.59	48	48	113.80	47	47	114.01	46	46	114.22	45	45	114.43	44	44	114.64	43	43	114.85	42	42	115.06	41	41	115.27	40	40	115.48	39	39	115.69	38	38	115.90	37	37	116.11	36	36	116.32	35	35	116.53	34	34	116.74	33	33	116.95	32	32	117.16	31	31	117.37	30	30	117.58	29	29	117.79	28	28	118.00	27	27	118.21	26	26	118.42	25	25	118.63	24	24	118.84	23	23	119.05	22	22	119.26	21	21	119.47	20	20	119.68	19	19	119.89	18	18	120.10	17	17	120.31	16	16	120.52	15	15	120.73	14	14	120.94	13	13	121.15	12	12	121.36	11	11	121.57	10	10	121.78	09	09	121.99	08	08	122.20	07	07	122.41	06	06	122.62	05	05	122.83	04	04	123.04	03	03	123.25	02	02	123.46	01	01	123.67	00	00	123.88	59	59	124.09	58	58	124.30	57	57	124.51	56	56	124.72	55	55	124.93	54	54	125.14	53	53	125.35	52	52	125.56	51	51	125.77	50	50	125.98	49	49	126.19	48	48	126.40	47	47	126.61	46	46	126.82	45	45	127.03	44	44	127.24	43	43	127.45	42	42	127.66	41	41	127.87	40	40	128.08	39	39	128.29	38	38	128.50	37	37	128.71	36	36	128.92	35	35	129.13	34	34	129.34	33	33	129.55	32	32	129.76	31	31	129.97	30	30	130.18	29	29	130.39	28	28	130.60	27	27	130

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA (69-360) and rows for latitude (15°-32°). Each cell contains a 4x4 grid of values for declination (15°-29°) and hour angle (Z).

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

LHA	0°			1°			2°			3°			4°			5°			6°			7°			8°			9°			10°			11°			12°			13°			14°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z						
0	57.00	60	180	58.00	60	180	59.00	60	180	60.00	60	180	61.00	60	180	62.00	60	180	63.00	60	180	64.00	60	180	65.00	60	180	66.00	60	180	67.00	60	180	68.00	60	180	69.00	60	180	70.00	60	180			
1	56.59	60	178	57.59	60	176	58.59	60	174	59.59	60	172	60.59	60	170	61.59	60	168	62.59	60	166	63.59	60	164	64.59	60	162	65.59	60	160	66.59	60	158	67.59	60	156	68.59	60	154	69.59	60	152	70.59	60	150
2	56.57	60	176	57.57	60	174	58.57	60	172	59.57	60	170	60.57	60	168	61.57	60	166	62.57	60	164	63.57	60	162	64.57	60	160	65.57	60	158	66.57	60	156	67.57	60	154	68.57	60	152	69.57	60	150	70.57	60	148
3	56.53	60	175	57.53	60	173	58.53	60	171	59.53	60	169	60.53	60	167	61.53	60	165	62.53	60	163	63.53	60	161	64.53	60	159	65.53	60	157	66.53	60	155	67.53	60	153	68.53	60	151	69.53	60	149	70.53	60	147
4	56.47	60	173	57.47	60	171	58.47	60	169	59.47	60	167	60.47	60	165	61.47	60	163	62.47	60	161	63.47	60	159	64.47	60	157	65.47	60	155	66.47	60	153	67.47	60	151	68.47	60	149	69.47	60	147	70.47	60	145
5	56.40	59	171	57.39	60	169	58.39	60	167	59.39	60	165	60.39	60	163	61.39	60	161	62.39	60	159	63.39	60	157	64.39	60	155	65.39	60	153	66.39	60	151	67.39	60	149	68.39	60	147	69.39	60	145	70.39	60	143
6	56.31	59	169	57.29	60	167	58.29	60	165	59.29	60	163	60.29	60	161	61.29	60	159	62.29	60	157	63.29	60	155	64.29	60	153	65.29	60	151	66.29	60	149	67.29	60	147	68.29	60	145	69.29	60	143	70.29	60	141
7	56.21	59	167	57.19	60	165	58.19	60	163	59.19	60	161	60.19	60	159	61.19	60	157	62.19	60	155	63.19	60	153	64.19	60	151	65.19	60	149	66.19	60	147	67.19	60	145	68.19	60	143	69.19	60	141	70.19	60	139
8	56.09	59	166	57.06	60	164	58.06	60	162	59.06	60	160	60.06	60	158	61.06	60	156	62.06	60	154	63.06	60	152	64.06	60	150	65.06	60	148	66.06	60	146	67.06	60	144	68.06	60	142	69.06	60	140	70.06	60	138
9	55.95	59	165	56.92	60	163	57.92	60	161	58.92	60	159	59.92	60	157	60.92	60	155	61.92	60	153	62.92	60	151	63.92	60	149	64.92	60	147	65.92	60	145	66.92	60	143	67.92	60	141	68.92	60	139	69.92	60	137
10	55.81	59	162	56.78	60	160	57.78	60	158	58.78	60	156	59.78	60	154	60.78	60	152	61.78	60	150	62.78	60	148	63.78	60	146	64.78	60	144	65.78	60	142	66.78	60	140	67.78	60	138	68.78	60	136	69.78	60	134
11	55.65	59	160	56.62	60	158	57.62	60	156	58.62	60	154	59.62	60	152	60.62	60	150	61.62	60	148	62.62	60	146	63.62	60	144	64.62	60	142	65.62	60	140	66.62	60	138	67.62	60	136	68.62	60	134	69.62	60	132
12	55.07	57	159	56.04	57	157	57.04	57	155	58.04	57	153	59.04	57	151	60.04	57	149	61.04	57	147	62.04	57	145	63.04	57	143	64.04	57	141	65.04	57	139	66.04	57	137	67.04	57	135	68.04	57	133	69.04	57	131
13	54.48	57	157	55.45	56	156	56.45	56	154	57.45	56	152	58.45	56	150	59.45	56	148	60.45	56	146	61.45	56	144	62.45	56	142	63.45	56	140	64.45	56	138	65.45	56	136	66.45	56	134	67.45	56	132	68.45	56	130
14	54.28	56	155	55.24	56	154	56.24	56	152	57.24	56	150	58.24	56	148	59.24	56	146	60.24	56	144	61.24	56	142	62.24	56	140	63.24	56	138	64.24	56	136	65.24	56	134	66.24	56	132	67.24	56	130	68.24	56	128
15	54.03	56	154	55.02	55	153	56.02	55	151	57.02	55	149	58.02	55	147	59.02	55	145	60.02	55	143	61.02	55	141	62.02	55	139	63.02	55	137	64.02	55	135	65.02	55	133	66.02	55	131	67.02	55	129	68.02	55	127
16	53.03	56	152	54.03	55	151	55.03	55	149	56.03	55	147	57.03	55	145	58.03	55	143	59.03	55	141	60.03	55	139	61.03	55	137	62.03	55	135	63.03	55	133	64.03	55	131	65.03	55	129	66.03	55	127	67.03	55	125
17	52.54	55	151	53.54	54	150	54.54	54	148	55.54	54	146	56.54	54	144	57.54	54	142	58.54	54	140	59.54	54	138	60.54	54	136	61.54	54	134	62.54	54	132	63.54	54	130	64.54	54	128	65.54	54	126	66.54	54	124
18	52.54	54	149	53.48	54	148	54.42	54	146	55.36	54	144	56.29	54	142	57.22	54	140	58.15	54	138	59.08	54	136	60.01	54	134	60.94	54	132	61.87	54	130	62.80	54	128	63.73	54	126	64.66	54	124	65.59	54	122
19	52.28	53	148	53.21	54	147	54.14	54	145	55.07	54	143	56.00	54	141	56.93	54	139	57.86	54	137	58.79	54	135	59.72	54	133	60.65	54	131	61.58	54	129	62.51	54	127	63.44	54	125	64.37	54	123	65.30	54	121
20	52.00	53	146	52.93	53	145	53.86	53	143	54.79	53	141	55.72	53	139	56.65	53	137	57.58	53	135	58.51	53	133	59.44	53	131	60.37	53	129	61.30	53	127	62.23	53	125	63.16	53	123	64.09	53	121	65.02	53	119
21	51.32	52	145	52.24	52	144	53.16	52	142	54.08	52	140	55.00	52	138	55.92	52	136	56.84	52	134	57.76	52	132	58.68	52	130	59.60	52	128	60.52	52	126	61.44	52	124	62.36	52	122	63.28	52	120	64.20	52	118
22	51.02	52	143	51.94	52	142	52.86	52	140	53.78	52	138	54.70	52	136	55.62	52	134	56.54	52	132	57.46	52	130	58.38	52	128	59.30	52	126	60.22	52	124	61.14	52	122	62.06	52	120	62.98	52	118	63.90	52	116
23	50.32	51	142	51.23	51	141	52.14	51	139	53.06	51	137	53.98	51	135	54.90	51	133	55.82	51	131	56.74	51	129	57.66	51	127	58.58	51	125	59.50	51	123	60.42	51	121	61.34	51	119	62.26	51	117	63.18	51	115
24	50.01	50	141	50.51	51	140	51.42	49	139	52.31	50	138	53.21	49	137	54.10	49	136	55.00	49	135	55.89	49	134	56.78	49	133	57.67	49	132	58.56	49	131	59.45	49	130	60.34	49	129	61.23	49	128	62.12	49	127
25	49.28	50	139	49.45	50	138	50.62	49	137	51.79	49	136	52.96	49	135	54.13	49	134	55.30	49	133	56.47	49	132	57.64	49	131	58.81	49	130	59.98	49	129	61.15	49	128	62.32	49	127	63.49	49	126	64.66	49	125
26	48.55	50	138	48.72	49	137	49.89	49	136	51.06	49	135	52.23	49	134	53.40	49	133	54.57	49	132	55.74	49	131	56.91	49	130	58.08	49	129	59.25	49	128	60.42	49	127	61.59	49	126	62.76	49	125	63.93	49	124
27	48.21	49	137	48.38	49	136	49.55	49	135	50.72	49	134	51.89	49	133	53.06	49	132	54.23	49	131	55.40	49	130	56.57	49	129	57.74	49	128	58.91	49	127	60.08	49	126	61.25	49	125	62.42	49	124	63.59	49	123
28	47.46	49	136	47.63	48	135	48.80	48	134	49.97	48	133	51.14	48	132	52.31	48	131	53.48	48	130	54.65	48	129	55.82	48	128	56.99	48	127	58.16	48	126	59.33	48	125	60.50	48	124	61.67	48	123	62.84	48	122
29	47.11	48	134	47.59	47	133	48.46	47	132	49.33	47	131	50.20	47	130	51.07	47	129	51.94	47	128	52.81	47	127	53.68	47	126	54.55	47	125	55.42	47	124	56.29	47	123	57.16	47	122	58.03	47	121	58.90	47	120
30	46.35	47	133	47.22	47	132	48.09	46	131	48.96	46	130	49.83	46	129	50.70	46																												

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

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
70	16.40	34	101	17.14	34	100	17.48	33	99	18.21	34	99	18.55	33	98	19.28	33	97	20.01	32	96	20.33	32	95	21.05	32	94	21.37	32	93	22.09	31	92	22.40	32	91	23.12	30	90	23.42	31	90	24.13	30	89	24.43	30	88	25.14	30	88	25.45	30	87	26.15	30	86	26.46	30	86	27.16	30	85	27.47	30	85	28.18	30	84	28.49	30	84	29.20	30	83	29.51	30	83	30.22	30	82	30.53	30	82	31.24	30	81	31.55	30	81	32.26	30	80	32.57	30	80	33.28	30	79	34.00	30	79	34.31	30	78	35.02	30	78	35.33	30	77	36.04	30	77	36.35	30	76	37.06	30	76	37.37	30	75	38.08	30	75	38.39	30	74	39.10	30	74	39.41	30	73	40.12	30	73	40.43	30	72	41.14	30	72	41.45	30	71	42.16	30	71	42.47	30	70	43.18	30	70	43.49	30	69	44.20	30	69	44.51	30	68	45.52	30	68	46.23	30	67	47.04	30	67	47.35	30	66	48.36	30	66	48.67	30	65	49.68	30	65	50.00	30	64	50.31	30	64	51.02	30	63	51.63	30	63	51.94	30	62	52.65	30	62	52.96	30	61	53.97	30	61	54.28	30	60	55.00	30	60	55.31	30	59	56.32	30	59	56.63	30	58	57.64	30	58	57.95	30	57	58.97	30	57	59.28	30	56	60.30	30	56	60.61	30	55	61.62	30	55	61.93	30	54	62.94	30	54	63.25	30	53	64.26	30	53	64.57	30	52	65.58	30	52	65.89	30	51	67.00	30	51	67.31	30	50	68.62	30	50	68.93	30	49	70.04	30	49	70.35	30	48	71.66	30	48	71.97	30	47	73.08	30	47	73.39	30	46	74.70	30	46	75.01	30	45	76.32	30	45	76.63	30	44	77.94	30	44	78.25	30	43	79.66	30	43	79.97	30	42	81.38	30	42	81.69	30	41	83.00	30	41	83.31	30	40	84.72	30	40	85.03	30	39	86.44	30	39	86.75	30	38	88.36	30	38	88.67	30	37	90.08	30	37	90.39	30	36	92.00	30	36	92.31	30	35	94.02	30	35	94.33	30	34	96.04	30	34	96.35	30	33	98.16	30	33	98.47	30	32	100.08	30	32	100.39	30	31	102.00	30	31	102.31	30	30	104.12	30	30	104.43	30	29	106.34	30	29	106.65	30	28	108.46	30	28	108.77	30	27	110.88	30	27	111.19	30	26	113.00	30	26	113.31	30	25	115.42	30	25	115.73	30	24	117.84	30	24	118.15	30	23	120.36	30	23	120.67	30	22	122.88	30	22	123.19	30	21	125.70	30	21	126.01	30	20	128.42	30	20	128.73	30	19	131.34	30	19	131.65	30	18	134.06	30	18	134.37	30	17	136.88	30	17	137.19	30	16	140.00	30	16	140.31	30	15	143.42	30	15	143.73	30	14	146.84	30	14	147.15	30	13	150.46	30	13	150.77	30	12	154.08	30	12	154.39	30	11	157.80	30	11	158.11	30	10	161.62	30	10	161.93	30	9	165.44	30	9	165.75	30	8	169.66	30	8	169.97	30	7	173.88	30	7	174.19	30	6	178.40	30	6	178.71	30	5	183.92	30	5	184.23	30	4	189.64	30	4	189.95	30	3	196.06	30	3	196.37	30	2	202.78	30	2	203.09	30	1	210.40	30	1	210.71	30	0	218.42	30	0	218.73	30	0	226.84	30	0	227.15	30	0	236.46	30	0	236.77	30	0	246.88	30	0	247.19	30	0	258.40	30	0	258.71	30	0	270.82	30	0	271.13	30	0	283.84	30	0	284.15	30	0	297.46	30	0	297.77	30	0	312.08	30	0	312.39	30	0	327.00	30	0	327.31	30	0	342.42	30	0	342.73	30	0	358.84	30	0	359.15	30	0	376.06	30	0	376.37	30	0	393.48	30	0	393.79	30	0	411.50	30	0	411.81	30	0	430.42	30	0	430.73	30	0	449.84	30	0	450.15	30	0	470.36	30	0	470.67	30	0	491.48	30	0	491.79	30	0	513.40	30	0	513.71	30	0	536.02	30	0	536.33	30	0	559.64	30	0	559.95	30	0	584.76	30	0	585.07	30	0	611.48	30	0	611.79	30	0	640.00	30	0	640.31	30	0	669.42	30	0	669.73	30	0	700.04	30	0	700.35	30	0	731.66	30	0	731.97	30	0	764.38	30	0	764.69	30	0	808.00	30	0	808.31	30	0	852.42	30	0	852.73	30	0	897.84	30	0	898.15	30	0	954.46	30	0	954.77	30	0	1012.88	30	0	1013.19	30	0	1073.00	30	0	1073.31	30	0	1134.42	30	0	1134.73	30	0	1196.84	30	0	1197.15	30	0	1261.46	30	0	1261.77	30	0	1328.48	30	0	1328.79	30	0	1407.00	30	0	1407.31	30	0	1487.42	30	0	1487.73	30	0	1569.44	30	0	1569.75	30	0	1654.06	30	0	1654.37	30	0	1740.48	30	0	1740.79	30	0	1829.00	30	0	1829.31	30	0	1919.62	30	0	1920.13	30	0	2023.44	30	0	2023.95	30	0	2130.46	30	0	2130.97	30	0	2241.08	30	0	2241.59	30	0	2355.40	30	0	2355.91	30	0	2473.42	30	0	2473.93	30	0	2595.04	30	0	2595.55	30	0	2820.46	30	0	2820.97	30	0	3050.08	30	0	3050.59	30	0	3284.40	30	0	3284.91	30	0	3523.42	30	0	3523.93	30	0	3766.04	30	0	3766.55	30	0	4018.46	30	0	4018.97	30	0	4270.08	30	0	4270.59	30	0	4530.40	30	0	4530.91	30	0	4790.02	30	0	4790.53	30	0	5059.44	30	0	5059.95	30	0	5338.46	30	0	5338.97	30	0	5627.08	30	0	5627.59	30	0	5925.40	30	0	5925.91	30	0	6233.42	30	0	6233.93	30	0	6541.04	30	0	6541.55	30	0	6859.46	30	0	6859.97	30	0	7188.08	30	0	7188.59	30	0	7527.40	30	0	7527.91	30	0	7877.02	30	0	7877.53	30	0	8237.44	30	0	8237.95	30	0	8608.46	30	0	8608.97	30	0	8990.08	30	0	8990.59	30	0	9383.40	30	0	9383.91	30	0	9787.42	30	0	9787.93	30	0	10203.04	30	0	10203.55	30	0	10629.46	30	0	10629.97	30	0	11067.08	30	0	11067.59	30	0	11516.40	30	0	11516.91	30	0	12077.42	30	0	12077.93	30	0	12650.04	30	0	12650.55	30	0	13244.46	30	0	13244.97	30	0	13850.08	30	0	13850.59	30	0	14467.40	30	0	14467.91	30	0	15096.42	30	0	15096.93	30	0	15737.04	30	0	15737.55	30	0	16389.46	30	0	16389.97	30	0	17053.08	30	0	17053.59	30	0	17728.40	30	0	17728.91	30	0	18415.42	30	0	18415.93	30	0	19114.04	30	0	19114.55	30	0	19825.46	30	0	19825.97	30	0	20549.08	30	0	20549.59	30	0	21285.40	30	0	21285.91	30	0	22034.42	30	0	22034.93	30	0	22796.04	30	0	22796.55	30	0	23570.46	30	0	23570.97	30	0	24367.08	30	0	24367.59	30	0	25177.40	30	0	25177.91	30	0	26000.42	30	0	26000.93	30	0	26836.04	30	0	26836.55	30	0	27685.46	30	0	27685.97	30	0	28548.08	30	0	28548.59	30	0	29425.40	30	0	29425.91	30	0	30317.42	30	0	30317.93	30	0	31224.04	30	0	31224.55	30	0	32145.46	30	0	32145.97	30	0	33081.08	30	0	33081.59	30	0	34032.40	30	0	34032.91	30	0	35000.42	30	0	35000.93	30	0	35984.04	30	0	35984.55	30	0	36993.46	30	0	36993.97	30	0	38018.08	30	0	38018.59	30	0	39059.40	30	0	39059.91	30	0	40117.42	30	0	40117.93	30	0	41192.04	30	0	41192.55	30	0	42283.46	30	0	42283.97	30	0	43391.08	30	0	43391.59	30	0	44506.40	30	0	44506.91	30	0	45639.42	30	0	45639.93	30	0	46789.04	30	0	46789.55	30	0	47956.46	30	0	47956.97	30	0	49141.08	30	0	49141.59	30	0	50343.40	30	0	50343.91	30	0	51563.42	30	0	51563.93	30	0	52801.04	30	0	52801.55	30	0	54057.46	30	0	54057.97	30	0	55332.08	30	0	55332.59	30	0	56627.40	30	0	56627.91	30	0	57937.42	30	0	57937.93	30	0	59262.04	30	0	59262.55	30	0	60602.46	30	0	60602.97	30	0	61958.08	30	0	61958.59	30	0	63329.40	30	0	63329.91	30	0	64716.42	30	0	64716.93	30	0	66119.04	30	0	66119.55	30	0	67537.46	30	0	67537.97	30	0	68961.08	30	0	68961.59	30	0	70401.40	30	0	70401.91	30	0	71858.42	30	0	71858.93	30	0	73331.04	30	0	73331.55	30

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

DECLINATION (0° - 14°) CONTRARY NAME TO LATITUDE

LAT 33°

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
68	17	29	34	102	16	55	35	103	16	20	34	104	15	46	35	104	15	11	35	105	14	36	38	106	14	06	38	106	13	37	110	11	01	36	111	10	25	37	112	09	48	36	113	09	12	37	113	08	58	36	114	08	30	36	115	07	58	35	116	07	23	35	117	06	50	34	118	06	13	33	119	05	44	32	120	05	00	31	121	04	11	30	122	03	14	29	123	02	11	28	124	01	00	27	125	00	00	26	126	00	00	25	127	00	00	24	128	00	00	23	129	00	00	22	130	00	00	21	131	00	00	20	132	00	00	19	133	00	00	18	134	00	00	17	135	00	00	16	136	00	00	15	137	00	00	14	138	00	00	13	139	00	00	12	140	00	00	11	141	00	00	10	142	00	00	09	143	00	00	08	144	00	00	07	145	00	00	06	146	00	00	05	147	00	00	04	148	00	00	03	149	00	00	02	150	00	00	01	151	00	00	00	152	00	00	00	153	00	00	00	154	00	00	00	155	00	00	00	156	00	00	00	157	00	00	00	158	00	00	00	159	00	00	00	160	00	00	00	161	00	00	00	162	00	00	00	163	00	00	00	164	00	00	00	165	00	00	00	166	00	00	00	167	00	00	00	168	00	00	00	169	00	00	00	170	00	00	00	171	00	00	00	172	00	00	00	173	00	00	00	174	00	00	00	175	00	00	00	176	00	00	00	177	00	00	00	178	00	00	00	179	00	00	00	180	00	00	00	181	00	00	00	182	00	00	00	183	00	00	00	184	00	00	00	185	00	00	00	186	00	00	00	187	00	00	00	188	00	00	00	189	00	00	00	190	00	00	00	191	00	00	00	192	00	00	00	193	00	00	00	194	00	00	00	195	00	00	00	196	00	00	00	197	00	00	00	198	00	00	00	199	00	00	00	200	00	00	00	201	00	00	00	202	00	00	00	203	00	00	00	204	00	00	00	205	00	00	00	206	00	00	00	207	00	00	00	208	00	00	00	209	00	00	00	210	00	00	00	211	00	00	00	212	00	00	00	213	00	00	00	214	00	00	00	215	00	00	00	216	00	00	00	217	00	00	00	218	00	00	00	219	00	00	00	220	00	00	00	221	00	00	00	222	00	00	00	223	00	00	00	224	00	00	00	225	00	00	00	226	00	00	00	227	00	00	00	228	00	00	00	229	00	00	00	230	00	00	00	231	00	00	00	232	00	00	00	233	00	00	00	234	00	00	00	235	00	00	00	236	00	00	00	237	00	00	00	238	00	00	00	239	00	00	00	240	00	00	00	241	00	00	00	242	00	00	00	243	00	00	00	244	00	00	00	245	00	00	00	246	00	00	00	247	00	00	00	248	00	00	00	249	00	00	00	250	00	00	00	251	00	00	00	252	00	00	00	253	00	00	00	254	00	00	00	255	00	00	00	256	00	00	00	257	00	00	00	258	00	00	00	259	00	00	00	260	00	00	00	261	00	00	00	262	00	00	00	263	00	00	00	264	00	00	00	265	00	00	00	266	00	00	00	267	00	00	00	268	00	00	00	269	00	00	00	270	00	00	00	271	00	00	00	272	00	00	00	273	00	00	00	274	00	00	00	275	00	00	00	276	00	00	00	277	00	00	00	278	00	00	00	279	00	00	00	280	00	00	00	281	00	00	00	282	00	00	00	283	00	00	00	284	00	00	00	285	00	00	00	286	00	00	00	287	00	00	00	288	00	00	00	289	00	00	00	290	00	00	00	291	00	00	00	292	00	00	00	293	00	00	00	294	00	00	00	295	00	00	00	296	00	00	00	297	00	00	00	298	00	00	00	299	00	00	00	300	00	00	00	301	00	00	00	302	00	00	00	303	00	00	00	304	00	00	00	305	00	00	00	306	00	00	00	307	00	00	00	308	00	00	00	309	00	00	00	310	00	00	00	311	00	00	00	312	00	00	00	313	00	00	00	314	00	00	00	315	00	00	00	316	00	00	00	317	00	00	00	318	00	00	00	319	00	00	00	320	00	00	00	321	00	00	00	322	00	00	00	323	00	00	00	324	00	00	00	325	00	00	00	326	00	00	00	327	00	00	00	328	00	00	00	329	00	00	00	330	00	00	00	331	00	00	00	332	00	00	00	333	00	00	00	334	00	00	00	335	00	00	00	336	00	00	00	337	00	00	00	338	00	00	00	339	00	00	00	340	00	00	00	341	00	00	00	342	00	00	00	343	00	00	00	344	00	00	00	345	00	00	00	346	00	00	00	347	00	00	00	348	00	00	00	349	00	00	00	350	00	00	00	351	00	00	00	352	00	00	00	353	00	00	00	354	00	00	00	355	00	00	00	356	00	00	00	357	00	00	00	358	00	00	00	359	00	00	00	360	00	00	00	361	00	00	00	362	00	00	00	363	00	00	00	364	00	00	00	365	00	00	00	366	00	00	00	367	00	00	00	368	00	00	00	369	00	00	00	370	00	00	00	371	00	00	00	372	00	00	00	373	00	00	00	374	00	00	00	375	00	00	00	376	00	00	00	377	00	00	00	378	00	00	00	379	00	00	00	380	00	00	00	381	00	00	00	382	00	00	00	383	00	00	00	384	00	00	00	385	00	00	00	386	00	00	00	387	00	00	00	388	00	00	00	389	00	00	00	390	00	00	00	391	00	00	00	392	00	00	00	393	00	00	00	394	00	00	00	395	00	00	00	396	00	00	00	397	00	00	00	398	00	00	00	399	00	00	00	400	00	00	00	401	00	00	00	402	00	00	00	403	00	00	00	404	00	00	00	405	00	00	00	406	00	00	00	407	00	00	00	408	00	00	00	409	00	00	00	410	00	00	00	411	00	00	00	412	00	00	00	413	00	00	00	414	00	00	00	415	00	00	00	416	00	00	00	417	00	00	00	418	00	00	00	419	00	00	00	420	00	00	00	421	00	00	00	422	00	00	00	423	00	00	00	424	00	00	00	425	00	00	00	426	00	00	00	427	00	00	00	428	00	00	00	429	00	00	00	430	00	00	00	431	00	00	00	432	00	00	00	433	00	00	00	434	00	00	00	435	00	00	00	436	00	00	00	437	00	00	00	438	00	00	00	439	00	00	00	440	00	00	00	441	00	00	00	442	00	00	00	443	00	00	00	444	00	00	00	445	00	00	00	446	00	00	00	447	00	00	00	448	00	00	00	449	00	00	00	450	00	00	00	451	00	00	00	452	00	00	00	453	00	00	00	454	00	00	00	455	00	00	00	456	00	00	00	457	00	00	00	458	00	00	00	459	00	00	00	460	00	00	00	461	00	00	00	462	00	00	00	463	00	00	00	464	00	00	00	465	00	00	00	466	00	00	00	467	00	00	00	468	00	00	00	469	00	00	00	470	00	00	00	471	00	00	00	472	00	00	00	473	00	00	00	474	00	00	00	475	00	00	00	476	00	00	00	477	00	00	00	478	00	00	00	479	00	00	00	480	00	00	00	481	00	00	00	482	00	00	00	483	00	00	00	484	00	00	00	485	00	00	00	486	00	00	00	487	00	00	00	488	00	00	00	489	00	00	00	490	00	00	00	491	00	00	00	492	00	00	00	493	00	00	00	494	00	00	00	495	00	00	00	496	00	00	00	497	00	00	00	498	00	00	00	499	00	00	00	500	00	00	00	501	00	00	00	502	00	00	00	503	00	00	00	504	00	00	00	505	00	00	00	506	00	00	

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for LHA (0-69) and rows for declination (15°-29°). Each cell contains a 3x3 grid of values for Hc, d, and Z.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

LAT 33°

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°			
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z				
70	24.43	29	88	25.12	30	87	25.42	28	86	26.10	29	85	26.39	28	84	27.07	28	83	27.35	27	82	28.02	27	81	28.29	26	80	28.55	26	79	29.21	25	78	29.46	25	77	30.11	25	76	30.36	24	75	31.00	23	73	290
71	23.52	30	87	24.22	29	86	24.51	29	85	25.20	29	84	25.49	28	83	26.17	28	82	26.45	27	81	27.12	27	80	27.39	27	79	28.06	27	78	28.32	26	77	28.59	26	76	29.26	25	75	29.53	24	74	30.21	24	73	288
72	23.02	30	86	22.42	29	85	23.11	29	84	23.40	29	83	24.09	28	82	24.38	28	81	25.06	27	80	25.34	27	79	26.01	26	78	26.27	26	77	26.54	26	76	27.20	25	75	27.45	24	74	28.11	24	73	28.95	24	72	287
73	22.12	30	86	21.52	29	85	22.21	29	84	22.50	29	83	23.19	28	82	23.48	28	81	24.16	27	80	24.44	27	79	25.11	26	78	25.38	27	77	26.05	26	76	26.31	26	75	26.57	25	74	27.22	25	73	27.47	24	72	286
74	21.22	30	86	20.02	29	84	20.31	30	83	21.01	30	82	21.70	29	81	22.39	29	80	23.07	28	79	23.75	28	78	24.42	27	77	25.10	27	76	25.78	27	75	26.45	26	74	27.09	25	73	28.34	26	72	27.00	24	71	285
75	19.41	30	84	18.21	30	83	18.51	30	82	19.20	30	81	19.89	29	80	20.58	29	79	21.26	28	78	21.94	28	77	22.62	27	76	23.30	27	75	24.07	26	74	24.84	26	73	25.61	25	72	26.12	25	71	26.84	24	70	281
76	18.51	30	84	17.01	30	83	17.71	30	82	18.40	30	81	19.09	29	80	20.77	29	79	21.45	28	78	22.13	28	77	22.81	27	76	23.49	27	75	24.16	26	74	24.93	26	73	26.46	26	72	27.24	25	71	283			
77	18.01	31	83	16.12	30	82	16.81	30	81	17.50	30	80	18.19	29	79	19.87	29	78	20.55	28	77	21.21	28	76	21.88	27	75	22.54	27	74	23.20	26	73	24.67	26	72	26.94	26	71	282						
78	17.11	31	83	14.92	30	82	15.61	30	81	16.30	30	80	17.00	29	79	19.67	29	78	20.43	28	77	21.09	28	76	21.75	27	75	22.48	27	74	23.13	26	73	24.60	26	72	27.24	26	71	280						
79	16.21	31	83	13.72	30	82	14.41	30	81	15.10	30	80	15.79	29	79	19.00	29	78	19.89	28	77	20.58	28	76	21.26	27	75	22.02	27	74	23.30	26	73	24.57	26	72	27.34	26	71	281						
80	15.32	31	82	12.52	30	81	13.21	30	80	13.90	30	79	14.59	29	78	18.81	29	77	19.70	28	76	20.49	28	75	21.28	27	74	22.06	27	73	23.29	26	72	24.56	26	71	27.49	27	70	280						
81	14.42	30	81	11.32	30	80	12.01	30	79	12.70	30	78	13.39	29	77	18.31	29	76	19.10	28	75	19.98	28	74	20.87	27	73	21.75	27	72	22.92	26	71	24.41	26	70	22.03	26	69	279						
82	13.52	31	81	10.12	30	80	10.81	30	79	11.50	30	78	12.19	29	77	17.42	29	76	18.12	28	75	19.09	28	74	19.98	28	73	20.86	27	72	21.93	26	71	24.50	26	70	21.29	27	69	278						
83	12.62	31	81	8.92	30	80	9.61	30	79	10.30	30	78	11.00	29	77	16.54	29	76	17.23	28	75	18.10	28	74	19.09	28	73	19.87	27	72	20.86	26	71	24.92	26	70	20.68	27	68	277						
84	11.72	31	81	7.72	30	80	8.41	30	79	9.10	30	78	9.80	29	77	15.38	29	76	16.07	28	75	17.23	28	74	18.21	27	73	19.09	27	72	20.14	26	71	24.92	26	70	20.50	27	68	277						
85	10.82	31	81	6.52	30	80	7.21	30	79	7.90	30	78	8.60	29	77	14.35	29	76	15.04	28	75	16.38	28	74	17.72	27	73	18.50	27	72	20.14	26	71	24.92	26	70	20.86	27	68	277						
86	9.92	31	81	5.32	30	80	6.01	30	79	6.70	30	78	7.40	29	77	13.21	29	76	14.00	28	75	15.19	28	74	16.54	27	73	17.37	27	72	19.09	26	71	24.92	26	70	20.86	27	68	277						
87	9.02	31	81	4.12	30	80	4.81	30	79	5.50	30	78	6.20	29	77	12.01	29	76	12.80	28	75	13.99	28	74	15.48	27	73	16.65	27	72	18.41	26	71	24.92	26	70	20.86	27	68	277						
88	8.12	31	81	2.92	30	80	3.61	30	79	4.30	30	78	5.00	29	77	10.81	29	76	11.60	28	75	12.79	28	74	14.81	27	73	17.50	27	72	19.87	26	71	24.92	26	70	20.86	27	68	277						
89	7.22	31	81	1.72	30	80	2.41	30	79	3.10	30	78	3.80	29	77	9.61	29	76	10.40	28	75	11.59	28	74	14.22	27	73	17.09	27	72	18.81	26	71	24.92	26	70	20.86	27	68	277						
90	6.32	31	81	0.52	30	80	1.21	30	79	1.90	30	78	2.60	29	77	8.41	29	76	9.20	28	75	10.39	28	74	13.30	27	73	16.21	27	72	17.72	26	71	24.92	26	70	20.86	27	68	277						
91	5.42	31	81	-0.68	30	80	-0.01	30	79	0.68	30	78	1.37	29	77	7.21	29	76	8.00	28	75	9.19	28	74	12.41	27	73	15.30	27	72	16.81	26	71	24.92	26	70	20.86	27	68	277						
92	4.52	31	81	-1.48	30	80	-0.81	30	79	-0.14	30	78	0.57	29	77	6.01	29	76	6.80	28	75	7.99	28	74	11.50	27	73	14.41	27	72	15.72	26	71	24.92	26	70	20.86	27	68	277						
93	3.62	31	81	-2.28	30	80	-1.61	30	79	-0.94	30	78	-0.27	29	77	4.81	29	76	5.60	28	75	6.79	28	74	10.60	27	73	13.50	27	72	14.81	26	71	24.92	26	70	20.86	27	68	277						
94	2.72	31	81	-3.08	30	80	-2.41	30	79	-1.74	30	78	-1.07	29	77	3.61	29	76	4.40	28	75	5.59	28	74	9.70	27	73	12.60	27	72	13.92	26	71	24.92	26	70	20.86	27	68	277						
95	1.82	31	81	-3.88	30	80	-3.21	30	79	-2.54	30	78	-1.87	29	77	2.41	29	76	3.20	28	75	4.39	28	74	8.80	27	73	11.70	27	72	13.03	26	71	24.92	26	70	20.86	27	68	277						
96	0.92	31	81	-4.68	30	80	-4.01	30	79	-3.34	30	78	-2.67	29	77	1.21	29	76	2.00	28	75	3.28	28	74	7.90	27	73	10.80	27	72	12.14	26	71	24.92	26	70	20.86	27	68	277						
97	0.02	31	81	-5.48	30	80	-4.81	30	79	-4.14	30	78	-3.47	29	77	0.01	29	76	0.80	28	75	2.22	28	74	7.00	27	73	9.90	27	72	11.24	26	71	24.92	26	70	20.86	27	68	277						
98	-0.88	31	81	-6.28	30	80	-5.61	30	79	-4.94	30	78	-4.27	29	77	-1.19	29	76	-0.40	28	75	1.42	28	74	6.10	27	73	9.00	27	72	10.34	26	71	24.92	26	70	20.86	27	68	277						
99	-1.78	31	81	-7.08	30	80	-6.41	30	79	-5.74	30	78	-5.07	29	77	-2.00	29	76	-1.20	28	75	0.62	28	74	5.20	27	73	8.10	27	72	9.44	26	71	24.92	26	70	20.86	27	68	277						
100	-2.68	31	81	-7.88	30	80	-7.21	30	79	-6.54	30	78	-5.87	29	77	-2.80	29	76	-2.00	28	75	-0.20	28	74	4.30	27	73	7.20	27	72	8.54	26	71	24.92	26	70	20.86	27	68	277						
101	-3.58	31	81	-8.68	30	80	-8.01	30	79	-7.34	30	78	-6.67	29	77	-3.60	29	76	-2.80	28	75	-1.00	28	74	3.40	27	73	6.30	27	72	7.64	26	71	24.92	26	70	20.86	27	68	277						
102	-4.48	31	81	-9.48	30	80	-8.81	30	79	-8.14	30	78	-7.47	29	77	-4.40	29	76	-3.60	28	75	-1.80	28	74	2.50	27	73	5.40	27	72	6.74	26	71	24.92	26	70	20.86	27	68	277						
103	-5.38	31	81	-10.28	30	80	-9.61	30	79	-8.94	30	78	-8.27	29	77	-5.20	29	76	-4.40	28	75	-2.60	28	74	1.60	27	73	4.50	27	72	5.84	26	71	24.92	26	70	20.86	27	68	277						
104	-6.28	31	81	-11.08	30	80	-10.41	30	79	-9.74	30	78	-9.07	29	77	-6.00	29	76	-5.20	28	75	-3.40	28	74	0.70	27	73	3.60	27	72	4.94	26														

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for Latitude (15° to 30°) and Declination (15° to 29°). Each cell contains a 4-digit number representing the declination value.

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for Latitude (15° to 34°) and Declination (15° to 29°). Each cell contains a 3-digit number representing the declination value.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

N. Lat. { L.H.A. greater than 180°Zn-Z
L.H.A. less than 180°Zn+Z

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

LAT 34°

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°						
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z										
70	24.45	30	88	25.15	31	87	25.46	30	86	26.16	29	85	26.45	28	84	27.14	29	83	27.43	28	82	28.11	28	81	28.39	28	80	29.07	28	79	29.33	27	78	30.00	28	77	30.26	25	76	30.51	25	75	31.16	25	74	290			
71	23.05	31	87	23.36	30	86	24.07	30	85	24.78	29	84	25.49	29	83	26.20	29	82	26.91	28	81	27.62	28	80	28.33	28	79	29.04	28	78	29.75	28	77	30.46	28	76	31.17	28	75	31.88	28	74	30.29	24	73	288			
72	21.65	32	86	22.37	30	85	23.08	30	84	23.79	29	83	24.50	29	82	25.21	29	81	25.92	28	80	26.63	28	79	27.34	28	78	28.05	28	77	28.76	28	76	29.47	28	75	30.18	28	74	30.89	28	73	28.03	28	72	28.74	28	71	284
73	20.25	33	85	20.97	31	84	21.68	31	83	22.39	30	82	23.10	30	81	23.81	30	80	24.52	29	79	25.23	29	78	25.94	29	77	26.65	29	76	27.36	29	75	28.07	29	74	28.78	29	73	29.49	29	72	30.20	29	71	282			
74	18.85	34	84	19.56	32	83	20.27	32	82	20.98	31	81	21.69	31	80	22.40	31	79	23.11	31	78	23.82	31	77	24.53	31	76	25.24	31	75	25.95	31	74	26.66	31	73	27.37	31	72	28.08	31	71	28.79	31	70	281			
75	17.45	35	83	18.16	33	82	18.87	33	81	19.58	33	80	20.29	33	79	21.00	33	78	21.71	33	77	22.42	33	76	23.13	33	75	23.84	33	74	24.55	33	73	25.26	33	72	25.97	33	71	26.68	33	70	27.39	33	69	280			
76	16.05	36	82	16.77	34	81	17.48	34	80	18.19	34	79	18.90	34	78	19.61	34	77	20.32	34	76	21.03	34	75	21.74	34	74	22.45	34	73	23.16	34	72	23.87	34	71	24.58	34	70	25.29	34	69	279						
77	14.65	37	81	15.29	35	80	16.00	35	79	16.71	35	78	17.42	35	77	18.13	35	76	18.84	35	75	19.55	35	74	20.26	35	73	20.97	35	72	21.68	35	71	22.39	35	70	23.10	35	69	278									
78	13.25	38	80	13.91	36	79	14.62	36	78	15.33	36	77	16.04	36	76	16.75	36	75	17.46	36	74	18.27	36	73	19.08	36	72	19.79	36	71	20.60	36	70	21.31	36	69	22.42	36	68	22.77	36	67	23.84	36	66	277			
79	11.85	39	79	12.52	37	78	13.23	37	77	13.94	37	76	14.65	37	75	15.36	37	74	16.07	37	73	16.78	37	72	17.59	37	71	18.30	37	70	19.01	37	69	19.62	37	68	20.23	37	67	21.05	37	66	22.22	37	65	281			
80	10.45	40	78	11.13	38	77	11.84	38	76	12.55	38	75	13.26	38	74	14.07	38	73	14.88	38	72	15.69	38	71	16.50	38	70	17.31	38	69	18.12	38	68	18.93	38	67	19.74	38	66	20.35	38	65	270						
81	9.05	41	77	9.81	39	76	10.52	39	75	11.23	39	74	11.94	39	73	12.65	39	72	13.46	39	71	14.27	39	70	15.08	39	69	15.69	39	68	16.50	39	67	17.11	39	66	17.72	39	65	18.53	39	64	268						
82	7.65	42	76	8.41	40	75	9.12	40	74	9.83	40	73	10.54	40	72	11.35	40	71	12.16	40	70	12.97	40	69	13.78	40	68	14.39	40	67	15.20	40	66	15.81	40	65	16.62	40	64	17.43	40	63	266						
83	6.25	43	75	7.01	41	74	7.72	41	73	8.43	41	72	9.14	41	71	9.85	41	70	10.56	41	69	11.37	41	68	12.18	41	67	12.99	41	66	13.80	41	65	14.41	41	64	15.22	41	63	16.03	41	62	261						
84	4.85	44	74	5.61	42	73	6.32	42	72	7.03	42	71	7.74	42	70	8.45	42	69	9.16	42	68	9.87	42	67	10.58	42	66	11.39	42	65	12.00	42	64	12.61	42	63	13.42	42	62	14.83	42	61	261						
85	3.45	45	73	4.21	43	72	4.92	43	71	5.63	43	70	6.34	43	69	7.05	43	68	7.76	43	67	8.47	43	66	9.18	43	65	9.89	43	64	10.50	43	63	11.31	43	62	12.12	43	61	14.24	43	60	265						
86	2.05	46	72	2.81	44	71	3.52	44	70	4.23	44	69	4.94	44	68	5.65	44	67	6.36	44	66	7.07	44	65	7.78	44	64	8.49	44	63	9.20	44	62	9.91	44	61	10.52	44	60	13.17	44	59	257						
87	0.65	47	71	1.41	45	70	2.12	45	69	2.83	45	68	3.54	45	67	4.25	45	66	4.96	45	65	5.67	45	64	6.38	45	63	7.09	45	62	7.80	45	61	8.51	45	60	9.32	45	59	12.16	45	58	256						
88	0.25	48	70	1.01	46	69	1.72	46	68	2.43	46	67	3.14	46	66	3.85	46	65	4.56	46	64	5.27	46	63	5.98	46	62	6.69	46	61	7.40	46	60	8.01	46	59	9.42	46	58	11.29	46	57	255						
89	0.15	49	69	0.91	47	68	1.62	47	67	2.33	47	66	3.04	47	65	3.75	47	64	4.46	47	63	5.17	47	62	5.88	47	61	6.59	47	60	7.30	47	59	8.01	47	58	9.42	47	57	11.30	47	56	254						
90	0.05	50	68	0.81	48	67	1.52	48	66	2.23	48	65	2.94	48	64	3.65	48	63	4.36	48	62	5.07	48	61	5.78	48	60	6.49	48	59	7.21	48	58	7.82	48	57	9.23	48	56	11.31	48	55	250						
91	0.00	51	67	0.76	49	66	1.47	49	65	2.18	49	64	2.89	49	63	3.60	49	62	4.31	49	61	5.02	49	60	5.73	49	59	6.44	49	58	7.05	49	57	7.66	49	56	9.07	49	55	11.31	49	54	248						
92	0.00	52	66	0.71	50	65	1.42	50	64	2.13	50	63	2.84	50	62	3.55	50	61	4.26	50	60	4.97	50	59	5.68	50	58	6.39	50	57	7.00	50	56	7.61	50	55	9.02	50	54	11.31	50	53	247						
93	0.00	53	65	0.66	51	64	1.37	51	63	2.08	51	62	2.79	51	61	3.50	51	60	4.21	51	59	4.92	51	58	5.63	51	57	6.34	51	56	6.95	51	55	7.56	51	54	8.97	51	53	11.31	51	52	246						
94	0.00	54	64	0.61	52	63	1.32	52	62	2.03	52	61	2.74	52	60	3.45	52	59	4.16	52	58	4.87	52	57	5.58	52	56	6.29	52	55	6.90	52	54	7.51	52	53	8.92	52	52	11.31	52	51	245						
95	0.00	55	63	0.56	53	62	1.27	53	61	1.98	53	60	2.69	53	59	3.40	53	58	4.11	53	57	4.82	53	56	5.53	53	55	6.24	53	54	6.85	53	53	7.46	53	52	8.87	53	51	11.31	53	50	244						
96	0.00	56	62	0.51	54	61	1.22	54	60	1.93	54	59	2.64	54	58	3.35	54	57	4.06	54	56	4.77	54	55	5.48	54	54	6.19	54	53	6.80	54	52	7.41	54	51	8.82	54	50	11.31	54	49	243						
97	0.00	57	61	0.46	55	60	1.17	55	59	1.88	55	58	2.59	55	57	3.30	55	56	4.01	55	55	4.72	55	54	5.43	55	53	6.14	55	52	6.75	55	51	7.36	55	50	8.79	55	49	11.31	55	48	242						
98	0.00	58	60	0.41	56	59	1.12	56	58	1.83	56	57	2.54	56	56	3.25	56	55	3.96	56	54	4.67	56	53	5.38	56	52	6.09	56	51	6.70	56	50	7.31	56	49	8.74	56	48	11.31	56	47	241						
99	0.00	59	59	0.36</																																													

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA (69-360) and rows for latitude (15°-30°). Each cell contains a 3x3 grid of values for declination (15°-29°).

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
70	16.16	36	102	16.52	36	101	17.28	35	100	18.03	35	99	18.38	35	98	19.13	34	98	19.47	35	97	20.22	34	96	20.56	34	96	21.30	33	94	22.37	33	92	23.10	32	91	23.42	33	90	24.15	32	90	24.50	32	89	25.25	32	88	25.99	32	88	26.74	32	87	27.49	32	86	28.24	32	86	28.99	32	85	29.74	32	85	30.49	32	84	31.24	32	84	31.99	32	83	32.74	32	83	33.49	32	82	34.24	32	82	34.99	32	81	35.74	32	81	36.49	32	80	37.24	32	80	37.99	32	79	38.74	32	79	39.49	32	78	40.24	32	78	40.99	32	77	41.74	32	77	42.49	32	76	43.24	32	76	43.99	32	75	44.74	32	75	45.49	32	74	46.24	32	74	46.99	32	73	47.74	32	73	48.49	32	72	49.24	32	72	49.99	32	71	50.74	32	71	51.49	32	70	52.24	32	70	52.99	32	69	53.74	32	69	54.49	32	68	55.24	32	68	55.99	32	67	56.74	32	67	57.49	32	66	58.24	32	66	58.99	32	65	59.74	32	65	60.49	32	64	61.24	32	64	61.99	32	63	62.74	32	63	63.49	32	62	64.24	32	62	64.99	32	61	65.74	32	61	66.49	32	60	67.24	32	60	67.99	32	59	68.74	32	59	69.49	32	58	70.24	32	58	70.99	32	57	71.74	32	57	72.49	32	56	73.24	32	56	73.99	32	55	74.74	32	55	75.49	32	54	76.24	32	54	76.99	32	53	77.74	32	53	78.49	32	52	79.24	32	52	79.99	32	51	80.74	32	51	81.49	32	50	82.24	32	50	82.99	32	49	83.74	32	49	84.49	32	48	85.24	32	48	85.99	32	47	86.74	32	47	87.49	32	46	88.24	32	46	88.99	32	45	89.74	32	45	90.49	32	44	91.24	32	44	91.99	32	43	92.74	32	43	93.49	32	42	94.24	32	42	94.99	32	41	95.74	32	41	96.49	32	40	97.24	32	40	97.99	32	39	98.74	32	39	99.49	32	38	100.24	32	38	100.99	32	37	101.74	32	37	102.49	32	36	103.24	32	36	103.99	32	35	104.74	32	35	105.49	32	34	106.24	32	34	106.99	32	33	107.74	32	33	108.49	32	32	109.24	32	32	109.99	32	31	110.74	32	31	111.49	32	30	112.24	32	30	112.99	32	29	113.74	32	29	114.49	32	28	115.24	32	28	115.99	32	27	116.74	32	27	117.49	32	26	118.24	32	26	118.99	32	25	119.74	32	25	120.49	32	24	121.24	32	24	121.99	32	23	122.74	32	23	123.49	32	22	124.24	32	22	124.99	32	21	125.74	32	21	126.49	32	20	127.24	32	20	127.99	32	19	128.74	32	19	129.49	32	18	130.24	32	18	130.99	32	17	131.74	32	17	132.49	32	16	133.24	32	16	133.99	32	15	134.74	32	15	135.49	32	14	136.24	32	14	136.99	32	13	137.74	32	13	138.49	32	12	139.24	32	12	139.99	32	11	140.74	32	11	141.49	32	10	142.24	32	10	142.99	32	9	143.74	32	9	144.49	32	8	145.24	32	8	145.99	32	7	146.74	32	7	147.49	32	6	148.24	32	6	148.99	32	5	149.74	32	5	150.49	32	4	151.24	32	4	151.99	32	3	152.74	32	3	153.49	32	2	154.24	32	2	154.99	32	1	155.74	32	1	156.49	32	0	157.24	32	0	157.99	32	0	158.74	32	0	159.49	32	0	160.24	32	0	160.99	32	0	161.74	32	0	162.49	32	0	163.24	32	0	163.99	32	0	164.74	32	0	165.49	32	0	166.24	32	0	166.99	32	0	167.74	32	0	168.49	32	0	169.24	32	0	169.99	32	0	170.74	32	0	171.49	32	0	172.24	32	0	172.99	32	0	173.74	32	0	174.49	32	0	175.24	32	0	175.99	32	0	176.74	32	0	177.49	32	0	178.24	32	0	178.99	32	0	179.74	32	0	180.49	32	0	181.24	32	0	181.99	32	0	182.74	32	0	183.49	32	0	184.24	32	0	184.99	32	0	185.74	32	0	186.49	32	0	187.24	32	0	187.99	32	0	188.74	32	0	189.49	32	0	190.24	32	0	190.99	32	0	191.74	32	0	192.49	32	0	193.24	32	0	193.99	32	0	194.74	32	0	195.49	32	0	196.24	32	0	196.99	32	0	197.74	32	0	198.49	32	0	199.24	32	0	199.99	32	0	200.74	32	0	201.49	32	0	202.24	32	0	202.99	32	0	203.74	32	0	204.49	32	0	205.24	32	0	205.99	32	0	206.74	32	0	207.49	32	0	208.24	32	0	208.99	32	0	209.74	32	0	210.49	32	0	211.24	32	0	211.99	32	0	212.74	32	0	213.49	32	0	214.24	32	0	214.99	32	0	215.74	32	0	216.49	32	0	217.24	32	0	217.99	32	0	218.74	32	0	219.49	32	0	220.24	32	0	220.99	32	0	221.74	32	0	222.49	32	0	223.24	32	0	223.99	32	0	224.74	32	0	225.49	32	0	226.24	32	0	226.99	32	0	227.74	32	0	228.49	32	0	229.24	32	0	229.99	32	0	230.74	32	0	231.49	32	0	232.24	32	0	232.99	32	0	233.74	32	0	234.49	32	0	235.24	32	0	235.99	32	0	236.74	32	0	237.49	32	0	238.24	32	0	238.99	32	0	239.74	32	0	240.49	32	0	241.24	32	0	241.99	32	0	242.74	32	0	243.49	32	0	244.24	32	0	244.99	32	0	245.74	32	0	246.49	32	0	247.24	32	0	247.99	32	0	248.74	32	0	249.49	32	0	250.24	32	0	250.99	32	0	251.74	32	0	252.49	32	0	253.24	32	0	253.99	32	0	254.74	32	0	255.49	32	0	256.24	32	0	256.99	32	0	257.74	32	0	258.49	32	0	259.24	32	0	259.99	32	0	260.74	32	0	261.49	32	0	262.24	32	0	262.99	32	0	263.74	32	0	264.49	32	0	265.24	32	0	265.99	32	0	266.74	32	0	267.49	32	0	268.24	32	0	268.99	32	0	269.74	32	0	270.49	32	0	271.24	32	0	271.99	32	0	272.74	32	0	273.49	32	0	274.24	32	0	274.99	32	0	275.74	32	0	276.49	32	0	277.24	32	0	277.99	32	0	278.74	32	0	279.49	32	0	280.24	32	0	280.99	32	0	281.74	32	0	282.49	32	0	283.24	32	0	283.99	32	0	284.74	32	0	285.49	32	0	286.24	32	0	286.99	32	0	287.74	32	0	288.49	32	0	289.24	32	0	289.99	32	0	290.74	32	0	291.49	32	0	292.24	32	0	292.99	32	0	293.74	32	0	294.49	32	0	295.24	32	0	295.99	32	0	296.74	32	0	297.49	32	0	298.24	32	0	298.99	32	0	299.74	32	0	300.49	32	0	301.24	32	0	301.99	32	0	302.74	32	0	303.49	32	0	304.24	32	0	304.99	32	0	305.74	32	0	306.49	32	0	307.24	32	0	307.99	32	0	308.74	32	0	309.49	32	0	310.24	32	0	310.99	32	0	311.74	32	0	312.49	32	0	313.24	32	0	313.99	32	0	314.74	32	0	315.49	32	0	316.24	32	0	316.99	32	0	317.74	32	0	318.49	32	0	319.24	32	0	319.99	32	0	320.74	32	0	321.49	32	0	322.24	32	0	322.99	32	0	323.74	32	0	324.49	32	0	325.24	32	0	325.99	32	0	326.74	32	0	327.49	32	0	328.24	32	0	328.99	32	0	329.74	32	0	330.49	32	0	331.24	32	0	331.99	32	0	332.74	32	0	333.49	32	0	334.24	32	0	334.99	32	0	335.74	32	0	336.49	32	0	337.24	32	0	337.99	32	0	338.74	32	0	339.49	32	0	340.24	32	0	340.99	32	0	341.74	32	0	342.49	32	0	343.24	32	0	343.99	32	0	344.74	32	0	345.49	32	0	346.24	32	0	346.99	32	0	347.74	32	0	348.49	32	0	349.24	32	0	349.99	32	0	350.74	32	0	351.49	32	0	352.24	32	0	352.99	32	0	353.74	32	0	354.49	32	0	355.24	32	0	355.99	32	0	356.74	32	0	357.49	32	0	358.24	32	0	358.99	32	0	359.74	32	0	360.49	32	0	361.24	32	0	361.99	32	0	362.74	32	0	363.49	32	0	364.24	32	0	364.99	32	0	365.74	32	0	366.49	32	0	367.24	32	0	367.99	32	0	368.74	32	0	369.49	32	0	370.24	32	0	370.99	32	0	371.74	32	0	372.49	32	0	373.24	32	0	373.99	32	0	374.74	32	0	375.49	32	0	376.24	32	0	376.99	32	0	377.74	32	0	378.49	32	0	379.24	32	0	379.99

LAT 35°

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z						
70	24.47	31	88	25.49	31	88	26.20	31	88	27.21	30	84	27.51	29	83	28.20	29	82	28.49	28	81	29.17	28	80	29.45	28	79	30.13	27	78	30.59	26	77	31.06	26	76	31.32	26	75	290					
71	23.08	32	87	24.11	31	87	25.00	31	86	25.82	30	84	26.52	30	82	27.32	29	81	28.01	29	80	28.29	28	79	28.57	28	78	29.25	27	77	29.52	27	76	30.19	27	75	30.46	27	74	288					
72	21.30	32	86	22.32	31	86	23.04	31	85	23.68	30	83	24.38	29	81	25.04	28	80	25.64	28	79	26.03	28	78	26.31	28	77	26.59	27	76	27.17	27	75	27.44	27	74	27.71	27	73	287					
73	19.52	32	85	20.43	31	85	21.06	31	84	21.61	30	82	22.26	29	80	22.82	28	79	23.29	28	78	23.67	28	77	23.95	28	76	24.23	27	75	24.51	27	74	24.79	27	73	25.07	27	72	286					
74	18.14	32	84	18.46	32	83	19.01	32	81	19.50	31	80	20.32	30	79	20.82	29	78	21.13	29	77	21.41	29	76	21.69	29	75	21.97	28	74	22.25	28	73	22.53	28	72	22.81	28	71	281					
75	16.37	32	83	16.20	32	82	16.52	32	81	17.24	32	80	17.56	31	79	18.27	31	78	18.59	31	77	19.30	31	76	19.61	31	75	19.92	30	74	20.23	30	73	20.54	30	72	20.85	30	71	280					
76	14.59	32	82	14.32	32	81	14.57	32	80	15.21	32	79	15.45	31	78	15.69	31	77	15.93	31	76	16.17	31	75	16.41	31	74	16.65	30	73	16.89	30	72	17.13	30	71	17.37	30	70	279					
77	12.82	32	81	12.55	32	80	13.08	32	79	13.21	32	78	13.34	31	77	13.47	31	76	13.60	31	75	13.73	31	74	13.86	31	73	13.99	30	72	14.12	30	71	14.25	30	70	14.38	30	69	277					
78	11.08	34	79	11.02	33	78	11.05	33	77	11.08	33	76	11.11	33	75	11.14	33	74	11.17	33	73	11.20	33	72	11.23	33	71	11.26	32	70	11.29	32	69	11.32	32	68	11.35	32	67	272					
79	9.29	34	78	9.23	33	77	9.26	33	76	9.29	33	75	9.32	33	74	9.35	33	73	9.38	33	72	9.41	33	71	9.44	33	70	9.47	32	69	9.50	32	68	9.53	32	67	9.56	32	66	271					
80	7.44	34	77	7.38	33	76	7.41	33	75	7.44	33	74	7.47	33	73	7.50	33	72	7.53	33	71	7.56	33	70	7.59	33	69	7.62	32	68	7.65	32	67	7.68	32	66	7.71	32	65	270					
81	5.63	34	76	5.57	33	75	5.60	33	74	5.63	33	73	5.66	33	72	5.69	33	71	5.72	33	70	5.75	33	69	5.78	33	68	5.81	32	67	5.84	32	66	5.87	32	65	5.90	32	64	268					
82	3.82	34	75	3.76	33	74	3.79	33	73	3.82	33	72	3.85	33	71	3.88	33	70	3.91	33	69	3.94	33	68	3.97	33	67	4.00	32	66	4.03	32	65	4.06	32	64	4.09	32	63	266					
83	2.01	34	74	1.95	33	73	1.98	33	72	2.01	33	71	2.04	33	70	2.07	33	69	2.10	33	68	2.13	33	67	2.16	33	66	2.19	32	65	2.22	32	64	2.25	32	63	2.28	32	62	262					
84	0.20	34	73	0.14	33	72	0.17	33	71	0.20	33	70	0.23	33	69	0.26	33	68	0.29	33	67	0.32	33	66	0.35	33	65	0.38	32	64	0.41	32	63	0.44	32	62	0.47	32	61	261					
85	0.00	34	72	0.00	33	71	0.00	33	70	0.00	33	69	0.00	33	68	0.00	33	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	32	63	0.00	32	62	0.00	32	61	0.00	32	60	260					
86	0.00	34	71	0.00	33	70	0.00	33	69	0.00	33	68	0.00	33	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	32	62	0.00	32	61	0.00	32	60	0.00	32	59	259					
87	0.00	34	70	0.00	33	69	0.00	33	68	0.00	33	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	32	61	0.00	32	60	0.00	32	59	0.00	32	58	258					
88	0.00	34	69	0.00	33	68	0.00	33	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	32	60	0.00	32	59	0.00	32	58	0.00	32	57	257					
89	0.00	34	68	0.00	33	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	32	59	0.00	32	58	0.00	32	57	0.00	32	56	256					
90	0.00	34	67	0.00	33	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	32	58	0.00	32	57	0.00	32	56	0.00	32	55	255					
91	0.00	34	66	0.00	33	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	32	57	0.00	32	56	0.00	32	55	0.00	32	54	254					
92	0.00	34	65	0.00	33	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	32	56	0.00	32	55	0.00	32	54	0.00	32	53	253					
93	0.00	34	64	0.00	33	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	32	55	0.00	32	54	0.00	32	53	0.00	32	52	252					
94	0.00	34	63	0.00	33	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	32	54	0.00	32	53	0.00	32	52	0.00	32	51	251					
95	0.00	34	62	0.00	33	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	32	53	0.00	32	52	0.00	32	51	0.00	32	50	250					
96	0.00	34	61	0.00	33	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	32	52	0.00	32	51	0.00	32	50	0.00	32	49	249					
97	0.00	34	60	0.00	33	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	33	52	0.00	32	51	0.00	32	50	0.00	32	49	0.00	32	48	248					
98	0.00	34	59	0.00	33	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	33	52	0.00	33	51	0.00	32	50	0.00	32	49	0.00	32	48	0.00	32	47	247					
99	0.00	34	58	0.00	33	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	33	52	0.00	33	51	0.00	33	50	0.00	32	49	0.00	32	48	0.00	32	47	0.00	32	46	246					
100	0.00	34	57	0.00	33	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	33	52	0.00	33	51	0.00	33	50	0.00	33	49	0.00	32	48	0.00	32	47	0.00	32	46	0.00	32	45	245					
101	0.00	34	56	0.00	33	55	0.00	33	54	0.00	33	53	0.00	33	52	0.00	33	51	0.00	33	50	0.00	33	49	0.00	33	48	0.00	32	47	0.00	32	46	0.00	32	45	0.00	32	44	244					
102																																													

Table with columns for Latitude (0° to 69°) and Declination (0° to 14°). Each cell contains a 3x3 grid of values (Hc, d, Z) for various astronomical calculations.

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA			
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z		
70	16.04	36	102	16.40	37	101	17.17	36	100	18.29	36	99	19.05	35	98	19.40	34	95	21.25	35	94	22.00	34	93	23.08	34	92	23.42	33	91	24.15	33	90	250
71	15.16	37	101	15.53	36	101	16.29	36	100	17.05	36	98	18.17	35	97	18.52	35	95	20.37	34	94	21.11	35	93	22.19	34	91	22.53	33	90	23.26	33	89	289
72	14.29	36	100	14.05	36	100	14.41	36	99	15.17	36	97	16.04	35	96	16.89	35	94	19.48	35	93	20.23	34	92	21.16	33	90	21.94	33	89	22.38	33	88	287
73	13.41	36	100	13.17	36	99	13.53	36	98	14.29	36	96	15.15	35	95	16.00	35	93	18.12	34	92	18.87	34	90	19.54	33	89	20.31	33	88	20.11	33	87	285
74	12.53	36	99	12.29	36	98	13.04	36	97	13.39	36	95	14.25	35	94	15.10	35	92	17.34	34	91	18.09	34	89	18.17	33	88	18.50	33	87	19.24	33	86	284
75	11.77	36	98	11.53	36	98	12.29	36	97	12.64	36	95	13.50	35	94	14.35	35	92	16.34	34	91	17.13	34	89	17.28	33	88	18.02	33	87	18.55	33	86	283
76	11.29	36	98	11.05	36	97	11.41	36	96	12.16	36	94	13.02	35	93	13.87	35	91	15.46	34	90	16.20	34	88	16.40	33	87	17.13	33	86	17.47	33	85	282
77	09.41	36	97	09.28	36	96	10.04	36	95	10.39	36	93	11.25	35	92	12.10	35	90	14.23	34	89	15.00	34	87	15.51	33	86	16.25	33	85	16.59	33	84	281
78	08.53	35	97	08.28	36	96	10.04	36	95	10.39	36	93	11.25	35	92	12.10	35	90	14.23	34	89	15.00	34	87	15.51	33	86	16.25	33	85	16.59	33	84	280
79	07.16	36	95	07.52	35	94	08.27	35	94	09.02	35	92	10.13	35	91	10.48	35	89	12.32	34	88	13.06	34	86	13.40	34	85	14.48	34	84	15.22	33	83	279
80	06.28	35	95	07.03	35	94	07.39	35	94	08.14	35	92	09.24	35	91	09.59	35	89	11.09	34	88	11.83	34	86	12.52	34	85	14.00	34	84	14.34	33	83	278
81	05.39	36	94	06.15	35	93	06.50	35	93	07.25	35	91	08.35	35	90	09.11	34	88	10.20	35	88	10.55	34	87	11.29	35	86	12.04	34	85	13.46	33	83	277
82	04.51	35	94	05.26	35	93	06.02	35	92	06.37	35	90	07.47	35	89	08.22	35	88	09.32	34	87	10.06	35	86	10.41	34	85	12.24	34	84	13.56	33	82	276
83	03.63	35	93	04.38	35	92	05.13	35	91	05.48	35	89	06.58	35	88	07.33	35	87	08.43	35	86	09.34	35	85	10.15	34	84	11.01	34	83	12.56	33	82	275
84	02.75	35	92	03.50	35	91	04.25	35	90	04.60	35	88	05.70	35	87	06.45	35	86	07.55	35	85	08.30	34	84	09.39	34	83	10.47	35	82	12.12	34	81	274
85	01.87	35	91	03.12	35	90	03.47	35	89	03.82	35	87	04.92	35	86	05.67	35	85	06.77	35	84	07.52	35	83	08.61	34	83	09.25	35	81	10.34	34	80	273
86	00.99	35	90	02.24	35	89	02.59	35	88	03.34	35	86	04.44	35	85	05.19	35	84	06.28	34	83	07.28	34	82	08.02	35	82	08.37	34	81	09.46	34	80	272
87	00.11	35	89	01.36	35	88	01.71	35	87	02.06	35	85	03.16	35	84	03.91	35	83	05.00	34	82	05.90	34	81	06.59	35	81	07.49	35	80	08.58	35	79	271
88	00.23	35	88	00.51	35	87	01.18	35	86	01.45	35	84	02.55	35	83	03.30	35	82	04.19	35	81	05.08	35	80	05.97	35	80	06.37	34	79	07.23	35	78	269
89	00.35	35	87	00.13	35	86	00.40	35	85	00.67	35	83	01.77	35	82	02.52	35	81	03.36	35	80	04.25	35	79	05.14	35	79	05.48	35	78	06.48	35	77	268
90	00.47	35	86	00.01	35	85	00.28	35	84	00.55	35	82	01.65	35	81	02.40	35	80	03.29	35	79	04.18	35	78	05.06	35	78	05.40	35	77	06.74	35	76	267
91	00.59	35	85	00.00	35	84	00.27	35	83	00.54	35	81	01.92	35	80	02.67	35	79	03.56	35	78	04.35	35	77	05.13	35	77	05.47	35	76	07.01	35	75	266
92	01.11	35	84	00.00	35	83	00.27	35	82	00.54	35	80	01.62	35	79	02.37	35	78	03.26	35	77	04.05	35	76	04.82	35	76	05.19	35	75	07.01	35	74	265
93	01.23	35	83	00.00	35	82	00.27	35	81	00.54	35	79	01.62	35	78	02.37	35	77	03.26	35	76	04.05	35	75	04.82	35	75	05.19	35	74	07.01	35	73	264
94	01.35	35	82	00.00	35	81	00.27	35	80	00.54	35	78	01.62	35	77	02.37	35	76	03.26	35	75	04.05	35	74	04.82	35	74	05.19	35	73	07.01	35	72	263
95	01.47	35	81	00.00	35	80	00.27	35	79	00.54	35	77	01.62	35	76	02.37	35	75	03.26	35	74	04.05	35	73	04.82	35	73	05.19	35	72	07.01	35	71	262
96	01.59	35	80	00.00	35	79	00.27	35	78	00.54	35	76	01.62	35	75	02.37	35	74	03.26	35	73	04.05	35	72	04.82	35	72	05.19	35	71	07.01	35	70	261
97	02.11	35	79	00.00	35	78	00.27	35	77	00.54	35	75	01.62	35	74	02.37	35	73	03.26	35	72	04.05	35	71	04.82	35	71	05.19	35	70	07.01	35	69	260
98	02.23	35	78	00.00	35	77	00.27	35	76	00.54	35	74	01.62	35	73	02.37	35	72	03.26	35	71	04.05	35	70	04.82	35	70	05.19	35	69	07.01	35	68	259
99	02.35	35	77	00.00	35	76	00.27	35	75	00.54	35	73	01.62	35	72	02.37	35	71	03.26	35	70	04.05	35	69	04.82	35	69	05.19	35	68	07.01	35	67	258
100	02.47	35	76	00.00	35	75	00.27	35	74	00.54	35	72	01.62	35	71	02.37	35	70	03.26	35	69	04.05	35	68	04.82	35	68	05.19	35	67	07.01	35	66	257

LAT 36°

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA		
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d		Z	
96	6.28	35	85	262	6.15	35	87	6.02	35	88	5.48	36	89	6.24	35	90	265	5.00	35	90	4.25	35	88	4.25	35	89	3.40	35	88	3.40	35	87	273
97	5.39	36	86	261	5.26	36	87	5.13	36	88	4.59	36	89	5.35	36	90	264	3.53	36	90	2.78	36	88	2.78	36	89	1.93	36	88	1.93	36	87	272
98	4.51	35	87	260	4.38	35	88	4.25	35	89	4.11	35	90	4.46	35	91	263	2.66	36	90	2.10	36	88	2.10	36	89	1.25	36	88	1.25	36	87	271
99	3.63	36	88	259	3.50	36	89	3.37	36	90	3.23	36	91	3.48	36	92	262	1.99	36	90	1.43	36	88	1.43	36	89	0.58	36	88	0.58	36	87	270
100	2.75	36	89	258	2.62	36	90	2.49	36	91	2.35	36	92	2.60																			

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for Latitude (15° to 36°) and Declination (15° to 29°). Each cell contains a 3-digit number representing the declination value.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

DECLINATION (15° – 29°) SAME NAME AS LATITUDE

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
70	24.48	32	89	25.20	33	88	25.53	32	87	26.25	31	85	27.27	31	84	27.58	30	83	28.28	30	82	28.58	29	80	29.57	28	79	30.55	28	78	31.52	27	77	32.48	26	76	33.44	25	75	34.39	24	74	35.34	23	73	36.28	22	72	37.21	21	71	38.13	20	70	38.94	19	69	39.74	18	68	40.53	17	67	41.31	16	66	42.08	15	65	42.64	14	64	43.39	13	63	44.14	12	62	44.93	11	61	45.66	10	60	46.33	9	59	47.04	8	58	47.39	7	57	47.68	6	56	47.91	5	55	48.08	4	54	48.19	3	53	48.24	2	52	48.23	1	51	48.16	0	50	48.03	359	49	47.84	358	48	47.61	357	47	47.34	356	46	47.03	355	45	46.68	354	44	46.30	353	43	45.88	352	42	45.43	351	41	44.95	350	40	44.53	349	39	44.14	348	38	43.77	347	37	43.42	346	36	43.09	345	35	42.78	344	34	42.49	343	33	42.12	342	32	41.78	341	31	41.46	340	30	41.16	339	29	40.88	338	28	40.61	337	27	40.36	336	26	40.12	335	25	39.89	334	24	39.64	333	23	39.41	332	22	39.19	331	21	38.98	330	20	38.77	329	19	38.57	328	18	38.37	327	17	38.17	326	16	37.98	325	15	37.78	324	14	37.59	323	13	37.40	322	12	37.21	321	11	37.02	320	10	36.83	319	9	36.64	318	8	36.45	317	7	36.26	316	6	36.07	315	5	35.88	314	4	35.69	313	3	35.50	312	2	35.31	311	1	35.12	310	0	34.93	309	359	34	34.74	308	358	33	34.55	307	357	32	34.36	306	356	31	34.17	305	355	30	33.98	304	354	29	33.79	303	353	28	33.60	302	352	27	33.41	301	351	26	33.22	300	350	25	33.03	299	349	24	32.84	298	348	23	32.65	297	347	22	32.46	296	346	21	32.27	295	345	20	32.08	294	344	19	31.89	293	343	18	31.70	292	342	17	31.51	291	341	16	31.32	290	340	15	31.13	289	339	14	30.94	288	338	13	30.75	287	337	12	30.56	286	336	11	30.37	285	335	10	30.18	284	334	9	29.99	283	333	8	29.80	282	332	7	29.61	281	331	6	29.42	280	330	5	29.23	279	329	4	29.04	278	328	3	28.85	277	327	2	28.66	276	326	1	28.47	275	325	0	28.28	274	324	359	34	28.09	273	358	33	27.90	272	357	32	27.71	271	356	31	27.52	270	355	30	27.33	269	354	29	27.14	268	353	28	26.95	267	352	27	26.76	266	351	26	26.57	265	350	25	26.38	264	349	24	26.19	263	348	23	26.00	262	347	22	25.81	261	346	21	25.62	260	345	20	25.43	259	344	19	25.24	258	343	18	25.05	257	342	17	24.86	256	341	16	24.67	255	340	15	24.48	254	339	14	24.29	253	338	13	24.10	252	337	12	23.91	251	336	11	23.72	250	335	10	23.53	249	334	9	23.34	248	333	8	23.15	247	332	7	22.96	246	331	6	22.77	245	330	5	22.58	244	329	4	22.39	243	328	3	22.20	242	327	2	22.01	241	326	1	21.82	240	325	0	21.63	239	324	359	34	21.44	238	358	33	21.25	237	357	32	21.06	236	356	31	20.87	235	355	30	20.68	234	354	29	20.49	233	353	28	20.30	232	352	27	20.11	231	351	26	19.92	230	350	25	19.73	229	349	24	19.54	228	348	23	19.35	227	347	22	19.16	226	346	21	18.97	225	345	20	18.78	224	344	19	18.59	223	343	18	18.40	222	342	17	18.21	221	341	16	18.02	220	340	15	17.83	219	339	14	17.64	218	338	13	17.45	217	337	12	17.26	216	336	11	17.07	215	335	10	16.88	214	334	9	16.69	213	333	8	16.50	212	332	7	16.31	211	331	6	16.12	210	330	5	15.93	209	329	4	15.74	208	328	3	15.55	207	327	2	15.36	206	326	1	15.17	205	325	0	14.98	204	324	359	34	14.79	203	358	33	14.60	202	357	32	14.41	201	356	31	14.22	200	355	30	14.03	199	354	29	13.84	198	353	28	13.65	197	352	27	13.46	196	351	26	13.27	195	350	25	13.08	194	349	24	12.89	193	348	23	12.70	192	347	22	12.51	191	346	21	12.32	190	345	20	12.13	189	344	19	11.94	188	343	18	11.75	187	342	17	11.56	186	341	16	11.37	185	340	15	11.18	184	339	14	10.99	183	338	13	10.80	182	337	12	10.61	181	336	11	10.42	180	335	10	10.23	179	334	9	10.04	178	333	8	9.85	177	332	7	9.66	176	331	6	9.47	175	330	5	9.28	174	329	4	9.09	173	328	3	8.90	172	327	2	8.71	171	326	1	8.52	170	325	0	8.33	169	324	359	34	8.14	168	358	33	7.95	167	357	32	7.76	166	356	31	7.57	165	355	30	7.38	164	354	29	7.19	163	353	28	7.00	162	352	27	6.81	161	351	26	6.62	160	350	25	6.43	159	349	24	6.24	158	348	23	6.05	157	347	22	5.86	156	346	21	5.67	155	345	20	5.48	154	344	19	5.29	153	343	18	5.10	152	342	17	4.91	151	341	16	4.72	150	340	15	4.53	149	339	14	4.34	148	338	13	4.15	147	337	12	3.96	146	336	11	3.77	145	335	10	3.58	144	334	9	3.39	143	333	8	3.20	142	332	7	3.01	141	331	6	2.82	140	330	5	2.63	139	329	4	2.44	138	328	3	2.25	137	327	2	2.06	136	326	1	1.87	135	325	0	1.68	134	324	359	34	1.49	133	358	33	1.30	132	357	32	1.11	131	356	31	0.92	130	355	30	0.73	129	354	29	0.54	128	353	28	0.35	127	352	27	0.16	126	351	26	-0.03	125	350	25	-0.22	124	349	24	-0.41	123	348	23	-0.60	122	347	22	-0.79	121	346	21	-0.98	120	345	20	-1.17	119	344	19	-1.36	118	343	18	-1.55	117	342	17	-1.74	116	341	16	-1.93	115	340	15	-2.12	114	339	14	-2.31	113	338	13	-2.50	112	337	12	-2.69	111	336	11	-2.88	110	335	10	-3.07	109	334	9	-3.26	108	333	8	-3.45	107	332	7	-3.64	106	331	6	-3.83	105	330	5	-4.02	104	329	4	-4.21	103	328	3	-4.40	102	327	2	-4.59	101	326	1	-4.78	100	325	0	-4.97	99	324	359	34	-5.16	98	358	33	-5.35	97	357	32	-5.54	96	356	31	-5.73	95	355	30	-5.92	94	354	29	-6.11	93	353	28	-6.30	92	352	27	-6.49	91	351	26	-6.68	90	350	25	-6.87	89	349	24	-7.06	88	348	23	-7.25	87	347	22	-7.44	86	346	21	-7.63	85	345	20	-7.82	84	344	19	-8.01	83	343	18	-8.20	82	342	17	-8.39	81	341	16	-8.58	80	340	15	-8.77	79	339	14	-8.96	78	338	13	-9.15	77	337	12	-9.34	76	336	11	-9.53	75	335	10	-9.72	74	334	9	-9.91	73	333	8	-10.10	72	332	7	-10.29	71	331	6	-10.48	70	330	5	-10.67	69	329	4	-10.86	68	328	3	-11.05	67	327	2	-11.24	66	326	1	-11.43	65	325	0	-11.62	64	324	359	34	-11.81	63	358	33	-12.00	62	357	32	-12.19	61	356	31	-12.38	60	355	30	-12.57	59	354	29	-12.76	58	353	28	-12.95	57	352	27	-13.14	56	351	26	-13.33	55	350	25	-13.52	54	349	24	-13.71	53	348	23	-13.90	52	347	22	-14.09	51	346	21	-14.28	50	345	20	-14.47	49	344	19	-14.66	48	343	18	-14.85	47	342	17	-15.04	46	341	16	-15.23	45	340	15	-15.42	44	339	14	-15.61	43	338	13	-15.80	42	337	12	-16.00	41	336	11	-16.19	40	335	10	-16.38	39	334	9	-16.57	38	333	8	-16.76	37	332	7	-16.95	36	331	6	-17.14	35	330	5	-17.33	34	329	4	-17.52	33	328	3	-17.71	32	327	2	-17.90	31	326	1	-18.09	30	325	0	-18.28	29	324	359	34	-18.47	28	358	33	-18.66	27	357	32	-18.85	26	356	31	-19.04	25	355	30	-19.23	24	354	29	-19.42	23	353	28	-19.61	22	352	27	-19.80	21	351	26	-19.99	20	350	25	-20.18	19	349	24	-20.37	18	348	23	-20.56	17	347	22	-20.75	16	346	21	-20.94	15	345	20	-21.13	14	344	19	-21.32	13	343	18	-2

LAT 37°

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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

LHA	0°			1°			2°			3°			4°			5°			6°			7°			8°			9°			10°			11°			12°			13°			14°																																																																													
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																																																																																	
0	53.00	0	180	54.00	0	180	55.00	0	180	56.00	0	180	57.00	0	180	58.00	0	180	59.00	0	180	60.00	0	180	61.00	0	180	62.00	0	180	63.00	0	180	64.00	0	180	65.00	0	180	66.00	0	180	67.00	0	180	68.00	0	180	69.00	0	180	70.00	0	180	71.00	0	180	72.00	0	180	73.00	0	180	74.00	0	180	75.00	0	180	76.00	0	180	77.00	0	180	78.00	0	180	79.00	0	180	80.00	0	180	81.00	0	180	82.00	0	180	83.00	0	180	84.00	0	180	85.00	0	180	86.00	0	180	87.00	0	180	88.00	0	180	89.00	0	180	90.00	0	180						
1	52.59	0	178	53.59	0	178	54.59	0	178	55.59	0	178	56.59	0	178	57.59	0	178	58.59	0	178	59.59	0	178	60.59	0	178	61.59	0	178	62.59	0	178	63.59	0	178	64.59	0	178	65.59	0	178	66.59	0	178	67.59	0	178	68.59	0	178	69.59	0	178	70.59	0	178	71.59	0	178	72.59	0	178	73.59	0	178	74.59	0	178	75.59	0	178	76.59	0	178	77.59	0	178	78.59	0	178	79.59	0	178	80.59	0	178	81.59	0	178	82.59	0	178	83.59	0	178	84.59	0	178	85.59	0	178	86.59	0	178	87.59	0	178	88.59	0	178	89.59	0	178	90.59	0	178			
2	52.54	0	175	53.54	0	175	54.54	0	175	55.54	0	175	56.54	0	175	57.54	0	175	58.54	0	175	59.54	0	175	60.54	0	175	61.54	0	175	62.54	0	175	63.54	0	175	64.54	0	175	65.54	0	175	66.54	0	175	67.54	0	175	68.54	0	175	69.54	0	175	70.54	0	175	71.54	0	175	72.54	0	175	73.54	0	175	74.54	0	175	75.54	0	175	76.54	0	175	77.54	0	175	78.54	0	175	79.54	0	175	80.54	0	175	81.54	0	175	82.54	0	175	83.54	0	175	84.54	0	175	85.54	0	175	86.54	0	175	87.54	0	175	88.54	0	175	89.54	0	175	90.54	0	175			
3	52.49	0	173	53.49	0	173	54.49	0	173	55.49	0	173	56.49	0	173	57.49	0	173	58.49	0	173	59.49	0	173	60.49	0	173	61.49	0	173	62.49	0	173	63.49	0	173	64.49	0	173	65.49	0	173	66.49	0	173	67.49	0	173	68.49	0	173	69.49	0	173	70.49	0	173	71.49	0	173	72.49	0	173	73.49	0	173	74.49	0	173	75.49	0	173	76.49	0	173	77.49	0	173	78.49	0	173	79.49	0	173	80.49	0	173	81.49	0	173	82.49	0	173	83.49	0	173	84.49	0	173	85.49	0	173	86.49	0	173	87.49	0	173	88.49	0	173	89.49	0	173	90.49	0	173			
4	52.43	0	172	53.43	0	172	54.43	0	172	55.43	0	172	56.43	0	172	57.43	0	172	58.43	0	172	59.43	0	172	60.43	0	172	61.43	0	172	62.43	0	172	63.43	0	172	64.43	0	172	65.43	0	172	66.43	0	172	67.43	0	172	68.43	0	172	69.43	0	172	70.43	0	172	71.43	0	172	72.43	0	172	73.43	0	172	74.43	0	172	75.43	0	172	76.43	0	172	77.43	0	172	78.43	0	172	79.43	0	172	80.43	0	172	81.43	0	172	82.43	0	172	83.43	0	172	84.43	0	172	85.43	0	172	86.43	0	172	87.43	0	172	88.43	0	172	89.43	0	172	90.43	0	172			
5	52.35	0	170	53.35	0	170	54.35	0	170	55.35	0	170	56.35	0	170	57.35	0	170	58.35	0	170	59.35	0	170	60.35	0	170	61.35	0	170	62.35	0	170	63.35	0	170	64.35	0	170	65.35	0	170	66.35	0	170	67.35	0	170	68.35	0	170	69.35	0	170	70.35	0	170	71.35	0	170	72.35	0	170	73.35	0	170	74.35	0	170	75.35	0	170	76.35	0	170	77.35	0	170	78.35	0	170	79.35	0	170	80.35	0	170	81.35	0	170	82.35	0	170	83.35	0	170	84.35	0	170	85.35	0	170	86.35	0	170	87.35	0	170	88.35	0	170	89.35	0	170	90.35	0	170			
6	52.26	0	168	53.26	0	168	54.26	0	168	55.26	0	168	56.26	0	168	57.26	0	168	58.26	0	168	59.26	0	168	60.26	0	168	61.26	0	168	62.26	0	168	63.26	0	168	64.26	0	168	65.26	0	168	66.26	0	168	67.26	0	168	68.26	0	168	69.26	0	168	70.26	0	168	71.26	0	168	72.26	0	168	73.26	0	168	74.26	0	168	75.26	0	168	76.26	0	168	77.26	0	168	78.26	0	168	79.26	0	168	80.26	0	168	81.26	0	168	82.26	0	168	83.26	0	168	84.26	0	168	85.26	0	168	86.26	0	168	87.26	0	168	88.26	0	168	89.26	0	168	90.26	0	168			
7	52.16	0	166	53.16	0	166	54.16	0	166	55.16	0	166	56.16	0	166	57.16	0	166	58.16	0	166	59.16	0	166	60.16	0	166	61.16	0	166	62.16	0	166	63.16	0	166	64.16	0	166	65.16	0	166	66.16	0	166	67.16	0	166	68.16	0	166	69.16	0	166	70.16	0	166	71.16	0	166	72.16	0	166	73.16	0	166	74.16	0	166	75.16	0	166	76.16	0	166	77.16	0	166	78.16	0	166	79.16	0	166	80.16	0	166	81.16	0	166	82.16	0	166	83.16	0	166	84.16	0	166	85.16	0	166	86.16	0	166	87.16	0	166	88.16	0	166	89.16	0	166	90.16	0	166			
8	52.04	0	165	53.04	0	165	54.04	0	165	55.04	0	165	56.04	0	165	57.04	0	165	58.04	0	165	59.04	0	165	60.04	0	165	61.04	0	165	62.04	0	165	63.04	0	165	64.04	0	165	65.04	0	165	66.04	0	165	67.04	0	165	68.04	0	165	69.04	0	165	70.04	0	165	71.04	0	165	72.04	0	165	73.04	0	165	74.04	0	165	75.04	0	165	76.04	0	165	77.04	0	165	78.04	0	165	79.04	0	165	80.04	0	165	81.04	0	165	82.04	0	165	83.04	0	165	84.04	0	165	85.04	0	165	86.04	0	165	87.04	0	165	88.04	0	165	89.04	0	165	90.04	0	165			
9	51.52	0	164	52.52	0	164	53.52	0	164	54.52	0	164	55.52	0	164	56.52	0	164	57.52	0	164	58.52	0	164	59.52	0	164	60.52	0	164	61.52	0	164	62.52	0	164	63.52	0	164	64.52	0	164	65.52	0	164	66.52	0	164	67.52	0	164	68.52	0	164	69.52	0	164	70.52	0	164	71.52	0	164	72.52	0	164	73.52	0	164	74.52	0	164	75.52	0	164	76.52	0	164	77.52	0	164	78.52	0	164	79.52	0	164	80.52	0	164	81.52	0	164	82.52	0	164	83.52	0	164	84.52	0	164	85.52	0	164	86.52	0	164	87.52	0	164	88.52	0	164	89.52	0	164	90.52	0	164
10	51.37	0	163	52.37	0	163	53.37	0	163	54.37	0	163	55.37	0	163	56.37	0	163	57.37	0	163	58.37	0	163	59.37	0	163	60.37	0	163	61.37	0	163	62.37	0	163	63.37	0	163	64.37	0	163	65.37	0	163	66.37	0	163	67.37	0	163	68.37	0	163	69.37	0	163	70.37	0	163	71.37	0	163	72.37	0	163	73.37	0	163	74.37	0	163	75.37	0	163	76.37	0	163	77.37	0	163	78.37	0	163	79.37	0	163	80.37	0	163	81.37	0	163	82.37	0	163	83.37	0	163	84.37	0	163	85.37	0	163	86.37	0	163	87.37	0	163	88.37	0	163	89.37	0	163	90.37	0	163
11	51.21	0	162	52.21	0	162	53.21	0	162	54.21	0	162	55.21	0	162	56.21	0	162	57.21	0	162	58.21	0	162	59.21	0	162	60.21	0	162	61.21	0	162	62.21	0	162	63.21	0	162	64.21	0	162	65.21	0	162	66.21	0	162	67.21	0	162	68.21	0	162	69.21	0	162	70.21	0	162	71.21	0	162	72.21	0	162	73.21	0	162	74.21	0	162	75.21	0	162	76.21	0	162	77.21	0	162	78.21	0	162	79.21	0	162	80.21	0	162	81.21	0	162	82.21	0	162	83.21	0	162	84.21	0	162	85.21	0	162	86.21	0	162	87.21	0	162	88.21	0	162	89.21	0	162	90.21	0	162
12	51.06	0	161	52.06	0	161	53.06	0	161	54.06	0	161	55.06	0	161	56.06	0	161	57.06	0	161	58.06	0	161	59.06	0	161	60.06	0	161	61.06	0	161	62.06	0	161	63.06	0</																																																																																		

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

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

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z		Hc	d	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
70	15.51	38	102	16.29	37	102	17.06	37	101	17.43	37	100	18.20	36	99	18.56	37	98	19.33	36	97	20.09	36	97	20.45	36	96	21.21	35	95	21.56	35	94	22.31	35	93	23.06	34	92	23.40	35	91	24.15	34	90	24.51	34	90	25.29	34	89	25.99	34	88	26.63	34	87	27.22	34	86	27.80	34	85	28.33	34	84	28.81	34	83	29.29	34	82	29.71	34	81	30.08	34	80	30.41	34	79	30.69	34	78	31.02	34	77	31.29	34	76	31.51	34	75	31.67	34	74	31.78	34	73	31.84	34	72	31.85	34	71	31.81	34	70	31.73	34	69	31.61	34	68	31.45	34	67	31.15	34	66	30.76	34	65	29.94	34	64	29.11	34	63	28.24	34	62	26.66	34	61	25.27	34	60	24.07	34	59	22.27	34	58	20.28	34	57	18.31	34	56	16.28	34	55	14.14	34	54	11.93	34	53	9.57	34	52	7.09	34	51	4.61	34	50	2.18	34	49	-0.37	34	48	-2.91	34	47	-5.42	34	46	-7.90	34	45	-10.35	34	44	-12.77	34	43	-15.16	34	42	-17.52	34	41	-19.84	34	40	-22.12	34	39	-24.27	34	38	-26.19	34	37	-28.00	34	36	-29.58	34	35	-31.04	34	34	-32.47	34	33	-33.80	34	32	-35.07	34	31	-36.29	34	30	-37.54	34	29	-38.73	34	28	-39.66	34	27	-40.94	34	26	-42.38	34	25	-43.97	34	24	-45.70	34	23	-47.58	34	22	-49.51	34	21	-51.38	34	20	-53.30	34	19	-55.27	34	18	-57.30	34	17	-61.29	34	16	-65.24	34	15	-69.15	34	14	-73.02	34	13	-76.75	34	12	-80.44	34	11	-84.17	34	10	-87.85	34	9	-91.48	34	8	-95.13	34	7	-98.82	34	6	-102.56	34	5	-105.97	34	4	-109.36	34	3	-112.73	34	2	-116.08	34	1	-119.41	34	0	-122.72	34	0	-126.27	34	0	-129.78	34	0	-133.35	34	0	-136.98	34	0	-140.17	34	0	-143.02	34	0	-145.93	34	0	-148.80	34	0	-151.73	34	0	-154.56	34	0	-157.32	34	0	-160.03	34	0	-162.68	34	0	-165.27	34	0	-167.81	34	0	-170.30	34	0	-172.73	34	0	-175.11	34	0	-177.44	34	0	-179.72	34	0	-181.95	34	0	-184.33	34	0	-186.66	34	0	-188.94	34	0	-191.17	34	0	-193.35	34	0	-195.48	34	0	-197.56	34	0	-199.59	34	0	-201.57	34	0	-203.51	34	0	-205.40	34	0	-207.24	34	0	-209.02	34	0	-210.75	34	0	-212.43	34	0	-214.06	34	0	-215.64	34	0	-217.26	34	0	-218.83	34	0	-220.35	34	0	-222.39	34	0	-224.38	34	0	-226.32	34	0	-228.21	34	0	-230.04	34	0	-231.71	34	0	-233.33	34	0	-234.90	34	0	-236.42	34	0	-237.89	34	0	-238.82	34	0	-239.71	34	0	-240.56	34	0	-241.36	34	0	-242.11	34	0	-242.82	34	0	-243.29	34	0	-243.72	34	0	-244.11	34	0	-244.34	34	0	-244.52	34	0	-244.65	34	0	-244.73	34	0	-244.76	34	0	-244.74	34	0	-244.67	34	0	-244.55	34	0	-244.38	34	0	-244.16	34	0	-243.89	34	0	-243.57	34	0	-243.20	34	0	-242.78	34	0	-242.31	34	0	-241.79	34	0	-241.22	34	0	-240.60	34	0	-239.93	34	0	-239.21	34	0	-238.44	34	0	-237.62	34	0	-236.75	34	0	-235.83	34	0	-234.86	34	0	-233.84	34	0	-232.77	34	0	-231.65	34	0	-230.48	34	0	-229.26	34	0	-228.00	34	0	-226.69	34	0	-225.34	34	0	-223.94	34	0	-222.50	34	0	-221.02	34	0	-219.50	34	0	-217.94	34	0	-216.34	34	0	-214.70	34	0	-213.02	34	0	-211.30	34	0	-209.54	34	0	-207.74	34	0	-205.90	34	0	-204.02	34	0	-202.10	34	0	-200.14	34	0	-198.14	34	0	-196.10	34	0	-194.02	34	0	-191.90	34	0	-189.74	34	0	-187.54	34	0	-185.30	34	0	-183.02	34	0	-180.70	34	0	-178.34	34	0	-175.94	34	0	-173.50	34	0	-171.02	34	0	-168.50	34	0	-165.94	34	0	-163.34	34	0	-160.70	34	0	-158.02	34	0	-155.30	34	0	-152.54	34	0	-149.74	34	0	-147.10	34	0	-144.42	34	0	-141.70	34	0	-138.94	34	0	-136.14	34	0	-133.30	34	0	-130.42	34	0	-127.50	34	0	-124.54	34	0	-121.54	34	0	-118.50	34	0	-115.42	34	0	-112.30	34	0	-109.14	34	0	-105.92	34	0	-102.66	34	0	-99.36	34	0	-96.02	34	0	-92.64	34	0	-89.22	34	0	-85.76	34	0	-82.26	34	0	-78.72	34	0	-75.14	34	0	-71.52	34	0	-67.86	34	0	-64.16	34	0	-60.42	34	0	-56.64	34	0	-52.82	34	0	-48.96	34	0	-45.06	34	0	-41.12	34	0	-37.14	34	0	-33.12	34	0	-29.06	34	0	-24.96	34	0	-20.82	34	0	-16.64	34	0	-12.42	34	0	-8.16	34	0	-3.86	34	0	0.48	34	0	4.77	34	0	9.02	34	0	13.23	34	0	17.40	34	0	21.53	34	0	25.62	34	0	29.67	34	0	33.68	34	0	37.65	34	0	41.58	34	0	45.47	34	0	49.32	34	0	53.13	34	0	56.90	34	0	60.63	34	0	64.32	34	0	67.97	34	0	71.58	34	0	75.15	34	0	78.68	34	0	82.17	34	0	85.62	34	0	89.03	34	0	92.40	34	0	95.73	34	0	99.02	34	0	102.27	34	0	105.58	34	0	108.85	34	0	112.08	34	0	115.27	34	0	118.42	34	0	121.53	34	0	124.60	34	0	127.63	34	0	130.72	34	0	133.77	34	0	136.78	34	0	139.75	34	0	142.68	34	0	145.55	34	0	148.38	34	0	151.17	34	0	153.92	34	0	156.63	34	0	159.30	34	0	161.93	34	0	164.52	34	0	167.07	34	0	169.58	34	0	172.05	34	0	174.49	34	0	176.89	34	0	179.25	34	0	181.57	34	0	183.85	34	0	186.09	34	0	188.29	34	0	190.45	34	0	192.57	34	0	194.65	34	0	196.69	34	0	198.69	34	0	200.65	34	0	202.57	34	0	204.45	34	0	206.29	34	0	208.08	34	0	209.83	34	0	211.54	34	0	213.01	34	0	214.44	34	0	215.83	34	0	217.18	34	0	218.49	34	0	219.66	34	0	220.79	34	0	221.87	34	0	222.91	34	0	223.91	34	0	224.87	34	0	225.79	34	0	226.67	34	0	227.51	34	0	228.31	34	0	228.97	34	0	229.59	34	0	230.17	34	0	230.71	34	0	231.21	34	0	231.67	34	0	232.09	34	0	232.47	34	0	232.81	34	0	233.11	34	0	233.37	34	0	233.59	34	0	233.77	34	0	233.91	34	0	234.01	34	0	234.07	34	0	234.09	34	0	234.07	34	0	234.01	34	0	233.91	34	0	233.77	34	0	233.59	34	0	233.37	34	0	233.11	34	0	232.81	34	0	232.47	34	0	232.09	34	0	231.67	34	0	231.21	34	0	230.71	34	0	230.17	34	0	229.59	34	0	228.97	34	0	228.31	34	0	227.51	34	0	226.67	34	0	225.79	34	0	224.87	34	0	223.91	34	0	222.91	34	0	221.87	34	0	220.79	34	0	219.66	34	0	218.49	34	0	217.18	34	0	215.83	34	0	214.44	34	0	212.91	34	0	211.34	34	0	209.73	34	0	208.08	34	0	206.39	34	0	204.65	34	0	202.87	34	0	201.01	34	0	199.07	34	0	197.05	34	0	194.96	34	0	192.81	34	0	190.61	34	0	188.36	34	0	186.06	34	0	183.71	34	0	181.32	34	0	178.88	34	0	176.40	34	0	173.87	34	0	171.30	34	0	168.69	34	0	166.04	34	0	163.35	34	0	160.62	34	0	157.85	34	0	155.04	34	0	152.19	34	0	149.30	34	0	146.37	34	0	143.40	34	0	140.39	34	0	137.34	34	0	134.25	34	0	131.12	34	0	127.95	34	0	124.74	34	0	121.49	34	0	118.20	34	0	114.87	34	0	111.50	34	0	108.09	34	0	104.64	34	0	101.15	34	0	97.62	34	0	94.05	34	0	90.44	34	0	86.79	34	0	83.10	34	0	79.37	34	0	75.60	34	0	71.79	34	0	67.94	34	0	64.06	34	0	60.14	34	0	56.18	34	0	52.18	34	0	48.14	34	0	44.06	34	0	39.94	34	0	35.78	34	0	31.58	34	0	27.34	34	0	23.06	34	0	18.74	34	0	14.38	34	0	9.98	34	0	5.54	34	0	1.06	34	0	-3.46	34	0	-8.93	34	0	-14.36	34	0	-19.74	34	0	-25.07	34	0	-30.35	34	0	-35.58	34	0	-40.76	34	0	-46.09	34	0	-51.37	34	0	-56.60	34	0	-61.78	34	0	-67.11	34	0	-72.39	34	0	-77.46	34	0	-82.39	34	0

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

DECLINATION (0° - 14°) CONTRARY NAME TO LATITUDE

LAT 37°

LHA	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°		11°		12°		13°		14°		LHA																						
	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d	Hc	d																							
68	16	38	-38	103	16	00	-38	104	14	44	-38	105	14	06	-38	106	13	27	-38	107	12	49	-38	108	11	31	-38	109	10	52	-38	110	10	13	-38	111	09	34	-40	112	08	54	-39	112	08	15	-40	113	07	35	-39	114	281
67	17	24	-37	104	16	47	-38	104	14	32	-38	107	14	59	-38	108	14	13	-38	108	13	34	-38	109	12	16	-38	110	11	37	-39	111	10	58	-40	112	10	38	-40	113	09	59	-40	114	08	39	-40	115	282				
66	18	11	-37	104	17	33	-38	105	15	30	-38	106	15	37	-38	107	15	04	-38	108	14	20	-38	109	13	06	-38	110	12	22	-39	111	11	42	-40	112	10	18	-40	113	09	43	-40	114	08	44	-40	115	283				
65	18	57	-38	105	18	19	-38	106	16	16	-38	107	16	23	-38	108	15	44	-38	109	15	05	-40	110	13	06	-40	111	12	28	-40	112	12	26	-40	113	11	46	-40	114	11	06	-40	115	284								
64	19	44	-38	106	19	05	-38	106	17	48	-40	107	17	08	-38	109	16	29	-38	110	15	50	-40	111	13	50	-40	112	13	50	-40	113	13	10	-40	114	12	30	-40	115	285												
63	20	30	-39	106	19	51	-39	107	17	14	-39	110	17	14	-39	110	17	14	-39	110	17	19	-40	111	14	34	-40	112	13	50	-40	113	13	54	-40	114	13	14	-41	115	286												
62	21	15	-39	107	20	37	-39	108	18	39	-39	109	18	39	-40	110	17	59	-40	111	17	19	-40	112	15	18	-40	113	14	34	-40	114	14	38	-41	115	287																
61	22	01	-39	108	21	22	-39	109	20	43	-40	110	18	44	-41	112	18	03	-41	113	16	02	-41	114	16	02	-41	115	15	21	-41	116	15	21	-41	117	14	40	-41	118	288												
60	22	47	-40	109	22	07	-40	110	20	48	-40	111	20	08	-41	112	19	28	-41	113	17	25	-41	114	16	45	-41	115	16	04	-41	116	16	04	-41	117	15	41	-41	118	289												
59	23	32	-39	109	22	53	-40	110	22	13	-40	111	22	13	-40	111	19	32	-40	112	19	32	-40	113	17	48	-41	114	17	25	-41	115	17	25	-41	116	17	41	-41	117	16	42	-41	118	290								
58	24	17	-39	110	23	38	-40	111	22	58	-41	112	22	17	-41	113	20	56	-41	114	20	15	-41	115	18	41	-41	116	18	04	-41	117	18	04	-41	118	18	04	-41	119	17	42	-41	120	291								
57	25	02	-40	111	24	22	-40	112	23	02	-40	113	23	02	-40	113	21	40	-41	114	21	40	-41	115	19	58	-42	116	18	54	-42	117	18	54	-42	118	19	16	-42	119	18	47	-42	120	292								
56	25	47	-40	111	25	07	-41	113	23	45	-41	114	23	45	-41	114	22	23	-41	115	21	42	-42	116	20	36	-42	117	19	36	-42	118	19	36	-42	119	19	36	-42	120	293												
55	26	32	-41	112	25	51	-41	114	24	29	-41	115	23	48	-42	115	22	06	-42	116	21	42	-42	117	20	18	-42	118	20	18	-42	119	19	35	-42	120	18	53	-42	121	18	53	-42	122	294								
54	27	16	-41	113	26	35	-41	114	25	14	-42	115	24	31	-42	116	23	49	-42	117	22	25	-42	118	21	08	-42	119	20	43	-42	120	20	43	-42	121	19	34	-42	122	18	50	-42	123	295								
53	28	00	-41	114	27	19	-42	114	25	56	-42	115	25	16	-42	116	23	49	-42	117	22	54	-42	118	21	41	-42	119	21	00	-42	120	20	58	-42	121	20	14	-42	122	18	47	-42	123	296								
52	28	44	-42	114	28	02	-41	115	27	21	-42	116	25	42	-42	117	25	14	-42	118	24	32	-42	119	22	41	-42	120	21	43	-42	121	21	43	-42	122	20	11	-44	123	18	47	-44	124	18	43	-44	125	300				
51	29	27	-42	115	28	45	-41	116	28	04	-43	117	26	30	-43	118	25	56	-43	119	25	13	-43	120	23	04	-43	121	22	44	-43	122	22	44	-43	123	22	44	-43	124	20	11	-44	124	19	27	-44	125	301				
50	30	10	-42	116	29	28	-42	118	28	04	-43	118	27	21	-43	119	26	38	-43	120	25	55	-43	121	24	03	-43	122	23	04	-43	123	22	59	-44	124	21	35	-44	125	20	46	-44	126	19	22	-45	126	302				
49	30	53	-42	117	30	11	-43	119	28	46	-43	119	28	04	-43	119	26	38	-43	120	25	55	-44	121	23	03	-44	122	23	03	-44	123	22	59	-44	124	21	35	-44	125	20	46	-44	126	19	22	-45	127	303				
48	31	36	-43	118	30	53	-43	119	28	46	-43	119	28	04	-43	119	26	38	-43	120	25	55	-44	121	23	03	-44	122	23	03	-44	123	22	59	-44	124	21	35	-44	125	20	46	-44	126	19	22	-45	128	304				
47	32	20	-43	119	31	36	-43	120	29	28	-43	120	28	04	-44	120	27	19	-43	121	26	36	-44	122	23	03	-44	123	23	03	-44	124	23	39	-45	125	22	54	-45	126	21	24	-46	127	20	38	-45	127	310				
46	33	04	-44	120	32	18	-44	121	30	50	-44	122	30	01	-45	123	29	21	-45	124	28	16	-45	125	27	06	-45	126	26	59	-46	127	26	59	-46	128	26	59	-46	129	24	41	-46	129	23	54	-47	130	314				
45	34	23	-44	121	33	39	-44	122	32	10	-45	123	31	25	-45	124	30	40	-45	125	29	25	-45	126	28	03	-46	128	27	37	-46	129	27	37	-46	130	26	51	-47	129	26	04	-46	129	25	18	-47	130	315				
44	35	04	-44	122	34	20	-45	124	33	35	-45	124	32	05	-46	125	31	19	-45	126	30	14	-46	127	28	03	-46	128	28	10	-46	129	28	10	-46	130	27	48	-46	130	26	41	-46	131	24	44	-48	131	315				
43	35	44	-44	123	35	00	-45	124	34	15	-46	124	33	29	-46	125	31	19	-45	126	30	14	-46	127	28	03	-46	128	28	10	-46	129	28	10	-46	130	27	48	-46	130	26	41	-46	131	24	44	-48	132	316				
42	36	24	-45	124	35	39	-45	125	34	54	-46	125	34	08	-46	126	32	16	-46	127	31	03	-47	128	30	16	-47	129	29	51	-47	130	28	52	-47	131	27	49	-47	132	25	42	-48	132	24	54	-48	133	317				
41	37	04	-45	125	36	19	-46	126	35	34	-46	126	34	54	-46	127	33	16	-46	128	32	16	-47	129	30	16	-47	130	29	48	-47	131	28	41	-48	131	28	41	-48	132	27	05	-48	132	26	17	-48	133	318				
40	37	43	-46	126	36	57	-46	126	36	11	-46	127	35	25	-46	128	34	06	-46	129	33	04	-47	130	30	52	-47	131	29	48	-47	132	29	48	-47	133	27	40	-48	133	27	40	-48	134	26	15	-48	134	319				
39	38	22	-46	127	37	36	-47	127	36	49	-47	128	36	02	-47	129	35	15	-47	130	33	04	-48	130	31	28	-48	131	30	05	-48	132	29	52	-48	133	28	52	-48	134	26	15	-48	134	26	15	-48	135	320				
38	39	00	-46	128	38	13	-47	128	37	26	-47	129	36	50	-47	130	34	28	-48	131	33	04	-48	131	32	04	-48	132	30	48	-48	133	29	48	-48	134	27	40	-48	135	27	40	-48	136	25	42	-48	136	321				
37	39	38	-47	129	38	03	-47	129	38	03	-47	130	37	16	-48	131	35	04	-48	132	34	16	-48	132	33	29	-48	133	31	58	-48	134	30	52	-48	135	28	52	-48	136	25	42	-48	137	25	42	-48	138	322				
36	40	15	-48	130	39	27	-47	130	38	40	-47	131	37	52	-48	132	35	16	-48	133	35	16	-48	133	34	43	-48	134	31	58	-48	135	28	52	-48	136	25	42	-48	137	25	42	-48	138	25	42	-48	139	323				
35	40	52	-48	131	40	04	-49	131	39	15	-48	132	38	27	-49	133	36	49	-49	134	36	00	-50</																														

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for LHA (0-69) and rows for declination (15°-29°). Each cell contains a 3x3 grid of values for hour angle (Hc) and distance (d) in minutes.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

DECLINATION (15° – 29°) SAME NAME AS LATITUDE

LAT 37°

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
70	24	49	33	89	25	22	33	88	26	28	33	87	27	01	32	86	27	33	85	27	33	84	28	05	31	83	28	07	30	82	28	37	81	28	37	80	29	08	79	29	03	78	31	06	29	77	31	06	28	76	32	03	28	75	32	03	28	74	33	17	27	73	33	17	27	72	34	02	28	71	34	02	28	70	35	17	27	69	35	17	27	68	36	02	28	67	36	02	28	66	37	17	27	65	37	17	27	64	38	02	28	63	38	02	28	62	39	02	28	61	39	02	28	60	40	17	27	59	40	17	27	58	41	02	28	57	41	02	28	56	42	17	27	55	42	17	27	54	43	02	28	53	43	02	28	52	44	17	27	51	44	17	27	50	45	02	28	49	45	02	28	48	46	17	27	47	46	17	27	46	47	02	28	45	47	02	28	44	48	17	27	43	48	17	27	42	49	02	28	41	49	02	28	40	50	17	27	39	50	17	27	38	51	02	28	37	51	02	28	36	52	17	27	35	52	17	27	34	53	02	28	33	53	02	28	32	54	17	27	31	54	17	27	30	55	02	28	29	55	02	28	28	56	17	27	27	56	17	27	26	57	02	28	25	57	02	28	24	58	17	27	23	58	17	27	22	59	02	28	21	59	02	28	20	60	17	27	19	60	17	27	18	61	02	28	17	61	02	28	16	62	17	27	15	62	17	27	14	63	02	28	13	63	02	28	12	64	17	27	11	64	17	27	10	65	02	28	09	65	02	28	08	66	17	27	07	66	17	27	06	67	02	28	05	67	02	28	04	68	17	27	03	68	17	27	02	69	02	28	01	69	02	28	00	70	17	27	70	70	17	27	69	71	02	28	68	71	02	28	67	72	17	27	66	72	17	27	65	73	02	28	64	73	02	28	63	74	17	27	62	74	17	27	61	75	02	28	60	75	02	28	59	76	17	27	58	76	17	27	57	77	02	28	56	77	02	28	55	78	17	27	54	78	17	27	53	79	02	28	52	79	02	28	51	80	17	27	50	80	17	27	49	81	02	28	48	81	02	28	47	82	17	27	46	82	17	27	45	83	02	28	44	83	02	28	43	84	17	27	42	84	17	27	41	85	02	28	40	85	02	28	39	86	17	27	38	86	17	27	37	87	02	28	36	87	02	28	35	88	17	27	34	88	17	27	33	89	02	28	32	89	02	28	31	90	17	27	30	90	17	27	29	91	02	28	28	91	02	28	27	92	17	27	26	92	17	27	25	93	02	28	24	93	02	28	23	94	17	27	22	94	17	27	21	95	02	28	20	95	02	28	19	96	17	27	18	96	17	27	17	97	02	28	16	97	02	28	15	98	17	27	14	98	17	27	13	99	02	28	12	99	02	28	11	100	17	27	10	100	17	27	09	101	02	28	08	101	02	28	07	102	17	27	06	102	17	27	05	103	02	28	04	103	02	28	03	104	17	27	02	104	17	27	01	105	02	28	00	105	02	28	99	106	17	27	98	106	17	27	97	107	02	28	96	107	02	28	95	108	17	27	94	108	17	27	93	109	02	28	92	109	02	28	91	110	17	27	90	110	17	27	89	111	02	28	88	111	02	28	87	112	17	27	86	112	17	27	85	113	02	28	84	113	02	28	83	114	17	27	82	114	17	27	81	115	02	28	80	115	02	28	79	116	17	27	78	116	17	27	77	117	02	28	76	117	02	28	75	118	17	27	74	118	17	27	73	119	02	28	72	119	02	28	71	120	17	27	70	120	17	27	69	121	02	28	68	121	02	28	67	122	17	27	66	122	17	27	65	123	02	28	64	123	02	28	63	124	17	27	62	124	17	27	61	125	02	28	60	125	02	28	59	126	17	27	58	126	17	27	57	127	02	28	56	127	02	28	55	128	17	27	54	128	17	27	53	129	02	28	52	129	02	28	51	130	17	27	50	130	17	27	49	131	02	28	48	131	02	28	47	132	17	27	46	132	17	27	45	133	02	28	44	133	02	28	43	134	17	27	42	134	17	27	41	135	02	28	40	135	02	28	39	136	17	27	38	136	17	27	37	137	02	28	36	137	02	28	35	138	17	27	34	138	17	27	33	139	02	28	32	139	02	28	31	140	17	27	30	140	17	27	29	141	02	28	28	141	02	28	27	142	17	27	26	142	17	27	25	143	02	28	24	143	02	28	23	144	17	27	22	144	17	27	21	145	02	28	20	145	02	28	19	146	17	27	18	146	17	27	17	147	02	28	16	147	02	28	15	148	17	27	14	148	17	27	13	149	02	28	12	149	02	28	11	150	17	27	10	150	17	27	09	151	02	28	08	151	02	28	07	152	17	27	06	152	17	27	05	153	02	28	04	153	02	28	03	154	17	27	02	154	17	27	01	155	02	28	00	155	02	28	99	156	17	27	98	156	17	27	97	157	02	28	96	157	02	28	95	158	17	27	94	158	17	27	93	159	02	28	92	159	02	28	91	160	17	27	90	160	17	27	89	161	02	28	88	161	02	28	87	162	17	27	86	162	17	27	85	163	02	28	84	163	02	28	83	164	17	27	82	164	17	27	81	165	02	28	80	165	02	28	79	166	17	27	78	166	17	27	77	167	02	28	76	167	02	28	75	168	17	27	74	168	17	27	73	169	02	28	72	169	02	28	71	170	17	27	70	170	17	27	69	171	02	28	68	171	02	28	67	172	17	27	66	172	17	27	65	173	02	28	64	173	02	28	63	174	17	27	62	174	17	27	61	175	02	28	60	175	02	28	59	176	17	27	58	176	17	27	57	177	02	28	56	177	02	28	55	178	17	27	54	178	17	27	53	179	02	28	52	179	02	28	51	180	17	27	50	180	17	27	49	181	02	28	48	181	02	28	47	182	17	27	46	182	17	27	45	183	02	28	44	183	02	28	43	184	17	27	42	184	17	27	41	185	02	28	40	185	02	28	39	186	17	27	38	186	17	27	37	187	02	28	36	187	02	28	35	188	17	27	34	188	17	27	33	189	02	28	32	189	02	28	31	190	17	27	30	190	17	27	29	191	02	28	28	191	02	28	27	192	17	27	26	192	17	27	25	193	02	28	24	193	02	28	23	194	17	27	22	194	17	27	21	195	02	28	20	195	02	28	19	196	17	27	18	196	17	27	17	197	02	28	16	197	02	28	15	198	17	27	14	198	17	27	13	199	02	28	12	199	02	28	11	200	17	27	10	200	17	27	09	201	02	28	08	201	02	28	07	202	17	27	06	202	17	27	05	203	02	28	04	203	02	28	03	204	17	27	02	204	17	27	01	205	02	28	00	205	02	28	99	206	17	27	98	206	17	27	97	207	02	28	96	207	02	28	95	208	17	27	94	208	17	27	93	209	02	28	92	209	02	28	91	210	17	27	90	210	17	27	89	211	02	28	88	211	02	28	87	212	17	27	86	212	17	27	85	213	02	28	84	213	02	28	83	214	17	27	82	214	17	27	81	215	02	28	80	215	02	28	79	216	17	27	78	216	17	27	77	217	02	28	76	217	02	28	75	218	17	27	74	218	17	27	73	219	02	28	72	219	02	28	71	220	17	27	70	220	17	27	69	221	02	28	68	221	02	28	67	222	17	27	66	222	17	27	65	223	02	28	64	223	02	28	63	224	17	27	62	224	17	27	61	225	02	28	60	225	02	28	59	226	17	27	58	226	17	27	57	227	02	28	56	227	02	28	55	228	17	27	54	228	17	27	53	229	02	28	52	229	02	28</

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA, 15° to 29° (Hc, d, Z), and 29° to 15° (Hc, d, Z). Each degree column contains three sub-columns for Hc, d, and Z values.

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA (0-69) and rows for declination (0°-14°). Each cell contains a 3x3 grid of values (Hc, d, Z) for each degree of latitude. The table is organized into 14 sections, one for each declination degree from 0° to 14°.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

Table with columns for LHA (0-69) and rows for declination (15°-29°). Each cell contains a 3x3 grid of values for Hc, d, and Z.

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

LAT 38°

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
70	24.49	34	80	25.23	35	88	25.88	33	86	27.38	33	85	28.11	32	84	28.43	32	83	29.15	32	82	29.47	31	82	30.18	30	81	30.48	31	80	30.90	31	79	31.19	29	79	31.48	29	77	32.17	28	76	32.86	28	76	33.17	27	75	33.86	27	75	34.17	26	74	34.86	26	74	35.17	25	73	35.86	25	73	36.17	24	72	36.86	24	72	37.17	23	71	37.86	23	71	38.17	22	70	38.86	22	70	39.17	21	69	39.86	21	69	40.17	20	68	40.86	20	68	41.17	19	67	41.86	19	67	42.17	18	66	42.86	18	66	43.17	17	65	43.86	17	65	44.17	16	64	44.86	16	64	45.17	15	63	45.86	15	63	46.17	14	62	46.86	14	62	47.17	13	61	47.86	13	61	48.17	12	60	48.86	12	60	49.17	11	59	49.86	11	59	50.17	10	58	50.86	10	58	51.17	9	57	51.86	9	57	52.17	8	56	52.86	8	56	53.17	7	55	53.86	7	55	54.17	6	54	54.86	6	54	55.17	5	53	55.86	5	53	56.17	4	52	56.86	4	52	57.17	3	51	57.86	3	51	58.17	2	50	58.86	2	50	59.17	1	49	59.86	1	49	60.17	0	48	60.86	0	48	61.17	0	47	61.86	0	47	62.17	0	46	62.86	0	46	63.17	0	45	63.86	0	45	64.17	0	44	64.86	0	44	65.17	0	43	65.86	0	43	66.17	0	42	66.86	0	42	67.17	0	41	67.86	0	41	68.17	0	40	68.86	0	40	69.17	0	39	69.86	0	39	70.17	0	38	70.86	0	38	71.17	0	37	71.86	0	37	72.17	0	36	72.86	0	36	73.17	0	35	73.86	0	35	74.17	0	34	74.86	0	34	75.17	0	33	75.86	0	33	76.17	0	32	76.86	0	32	77.17	0	31	77.86	0	31	78.17	0	30	78.86	0	30	79.17	0	29	79.86	0	29	80.17	0	28	80.86	0	28	81.17	0	27	81.86	0	27	82.17	0	26	82.86	0	26	83.17	0	25	83.86	0	25	84.17	0	24	84.86	0	24	85.17	0	23	85.86	0	23	86.17	0	22	86.86	0	22	87.17	0	21	87.86	0	21	88.17	0	20	88.86	0	20	89.17	0	19	89.86	0	19	90.17	0	18	90.86	0	18	91.17	0	17	91.86	0	17	92.17	0	16	92.86	0	16	93.17	0	15	93.86	0	15	94.17	0	14	94.86	0	14	95.17	0	13	95.86	0	13	96.17	0	12	96.86	0	12	97.17	0	11	97.86	0	11	98.17	0	10	98.86	0	10	99.17	0	9	99.86	0	9	100.17	0	8	100.86	0	8	101.17	0	7	101.86	0	7	102.17	0	6	102.86	0	6	103.17	0	5	103.86	0	5	104.17	0	4	104.86	0	4	105.17	0	3	105.86	0	3	106.17	0	2	106.86	0	2	107.17	0	1	107.86	0	1	108.17	0	0	108.86	0	0	109.17	0	0	109.86	0	0	110.17	0	0	110.86	0	0	111.17	0	0	111.86	0	0	112.17	0	0	112.86	0	0	113.17	0	0	113.86	0	0	114.17	0	0	114.86	0	0	115.17	0	0	115.86	0	0	116.17	0	0	116.86	0	0	117.17	0	0	117.86	0	0	118.17	0	0	118.86	0	0	119.17	0	0	119.86	0	0	120.17	0	0	120.86	0	0	121.17	0	0	121.86	0	0	122.17	0	0	122.86	0	0	123.17	0	0	123.86	0	0	124.17	0	0	124.86	0	0	125.17	0	0	125.86	0	0	126.17	0	0	126.86	0	0	127.17	0	0	127.86	0	0	128.17	0	0	128.86	0	0	129.17	0	0	129.86	0	0	130.17	0	0	130.86	0	0	131.17	0	0	131.86	0	0	132.17	0	0	132.86	0	0	133.17	0	0	133.86	0	0	134.17	0	0	134.86	0	0	135.17	0	0	135.86	0	0	136.17	0	0	136.86	0	0	137.17	0	0	137.86	0	0	138.17	0	0	138.86	0	0	139.17	0	0	139.86	0	0	140.17	0	0	140.86	0	0	141.17	0	0	141.86	0	0	142.17	0	0	142.86	0	0	143.17	0	0	143.86	0	0	144.17	0	0	144.86	0	0	145.17	0	0	145.86	0	0	146.17	0	0	146.86	0	0	147.17	0	0	147.86	0	0	148.17	0	0	148.86	0	0	149.17	0	0	149.86	0	0	150.17	0	0	150.86	0	0	151.17	0	0	151.86	0	0	152.17	0	0	152.86	0	0	153.17	0	0	153.86	0	0	154.17	0	0	154.86	0	0	155.17	0	0	155.86	0	0	156.17	0	0	156.86	0	0	157.17	0	0	157.86	0	0	158.17	0	0	158.86	0	0	159.17	0	0	159.86	0	0	160.17	0	0	160.86	0	0	161.17	0	0	161.86	0	0	162.17	0	0	162.86	0	0	163.17	0	0	163.86	0	0	164.17	0	0	164.86	0	0	165.17	0	0	165.86	0	0	166.17	0	0	166.86	0	0	167.17	0	0	167.86	0	0	168.17	0	0	168.86	0	0	169.17	0	0	169.86	0	0	170.17	0	0	170.86	0	0	171.17	0	0	171.86	0	0	172.17	0	0	172.86	0	0	173.17	0	0	173.86	0	0	174.17	0	0	174.86	0	0	175.17	0	0	175.86	0	0	176.17	0	0	176.86	0	0	177.17	0	0	177.86	0	0	178.17	0	0	178.86	0	0	179.17	0	0	179.86	0	0	180.17	0	0	180.86	0	0	181.17	0	0	181.86	0	0	182.17	0	0	182.86	0	0	183.17	0	0	183.86	0	0	184.17	0	0	184.86	0	0	185.17	0	0	185.86	0	0	186.17	0	0	186.86	0	0	187.17	0	0	187.86	0	0	188.17	0	0	188.86	0	0	189.17	0	0	189.86	0	0	190.17	0	0	190.86	0	0	191.17	0	0	191.86	0	0	192.17	0	0	192.86	0	0	193.17	0	0	193.86	0	0	194.17	0	0	194.86	0	0	195.17	0	0	195.86	0	0	196.17	0	0	196.86	0	0	197.17	0	0	197.86	0	0	198.17	0	0	198.86	0	0	199.17	0	0	199.86	0	0	200.17	0	0	200.86	0	0	201.17	0	0	201.86	0	0	202.17	0	0	202.86	0	0	203.17	0	0	203.86	0	0	204.17	0	0	204.86	0	0	205.17	0	0	205.86	0	0	206.17	0	0	206.86	0	0	207.17	0	0	207.86	0	0	208.17	0	0	208.86	0	0	209.17	0	0	209.86	0	0	210.17	0	0	210.86	0	0	211.17	0	0	211.86	0	0	212.17	0	0	212.86	0	0	213.17	0	0	213.86	0	0	214.17	0	0	214.86	0	0	215.17	0	0	215.86	0	0	216.17	0	0	216.86	0	0	217.17	0	0	217.86	0	0	218.17	0	0	218.86	0	0	219.17	0	0	219.86	0	0	220.17	0	0	220.86	0	0	221.17	0	0	221.86	0	0	222.17	0	0	222.86	0	0	223.17	0	0	223.86	0	0	224.17	0	0	224.86	0	0	225.17	0	0	225.86	0	0	226.17	0	0	226.86	0	0	227.17	0	0	227.86	0	0	228.17	0	0	228.86	0	0	229.17	0	0	229.86	0	0	230.17	0	0	230.86	0	0	231.17	0	0	231.86	0	0	232.17	0	0	232.86	0	0	233.17	0	0	233.86	0	0	234.17	0	0	234.86	0	0	235.17	0	0	235.86	0	0	236.17	0	0	236.86	0	0	237.17	0	0	237.86	0	0	238.17	0	0	238.86	0	0	239.17	0	0	239.86	0	0	240.17	0	0	240.86	0	0	241.17	0	0	241.86	0	0	242.17	0	0	242.86	0	0	243.17	0	0	243.86	0	0	244.17	0	0	244.86	0	0	245.17	0	0	245.86	0	0	246.17	0	0	246.86	0	0	247.17	0	0	247.86	0	0	248.17	0	0	248.86	0	0	249.17	0	0	249.

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for Latitude (15° to 38°) and Declination (15° to 29°). Each cell contains a 3-digit number representing the declination value. The table is organized in a grid where the top row represents the latitude and the left column represents the declination.

DECLINATION (15° - 29°) CONTRARY NAME TO LATITUDE

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

Table with columns for LHA (0-69) and declination (1°-14°). Each cell contains a 3x3 grid of values (Hc, d, Z) for various LHA values.

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

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

LHA	15°		16°		17°		18°		19°		20°		21°		22°		23°		24°		25°		26°		27°		28°		29°		LHA		
	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z	Hc	d Z			
0	66	00	60	180	68	00	60	180	70	00	60	180	72	00	60	180	74	00	60	180	76	00	60	180	78	00	60	180	80	00	60	180	360
1	66	59	60	178	67	59	60	177	69	59	60	177	71	59	60	177	73	59	60	177	75	59	60	177	77	59	60	177	79	59	60	177	359
2	66	58	60	176	67	58	60	175	69	58	60	175	71	58	60	175	73	58	60	175	75	58	60	175	77	58	60	175	79	58	60	175	358
3	66	57	60	175	67	57	60	174	69	57	60	174	71	57	60	174	73	57	60	174	75	57	60	174	77	57	60	174	79	57	60	174	357
4	66	56	59	173	67	56	59	172	69	56	59	172	71	56	59	172	73	56	59	172	75	56	59	172	77	56	59	172	79	56	59	172	356
5	66	55	59	171	67	55	59	170	69	55	59	170	71	55	59	170	73	55	59	170	75	55	59	170	77	55	59	170	79	55	59	170	355
6	66	54	59	169	67	54	59	168	69	54	59	168	71	54	59	168	73	54	59	168	75	54	59	168	77	54	59	168	79	54	59	168	354
7	66	53	59	167	67	53	59	166	69	53	59	166	71	53	59	166	73	53	59	166	75	53	59	166	77	53	59	166	79	53	59	166	353
8	66	52	59	165	67	52	59	164	69	52	59	164	71	52	59	164	73	52	59	164	75	52	59	164	77	52	59	164	79	52	59	164	352
9	66	51	59	163	67	51	59	162	69	51	59	162	71	51	59	162	73	51	59	162	75	51	59	162	77	51	59	162	79	51	59	162	351
10	66	50	59	161	67	50	59	160	69	50	59	160	71	50	59	160	73	50	59	160	75	50	59	160	77	50	59	160	79	50	59	160	350
11	66	49	59	159	67	49	59	158	69	49	59	158	71	49	59	158	73	49	59	158	75	49	59	158	77	49	59	158	79	49	59	158	349
12	66	48	59	157	67	48	59	156	69	48	59	156	71	48	59	156	73	48	59	156	75	48	59	156	77	48	59	156	79	48	59	156	348
13	66	47	59	155	67	47	59	154	69	47	59	154	71	47	59	154	73	47	59	154	75	47	59	154	77	47	59	154	79	47	59	154	347
14	66	46	59	153	67	46	59	152	69	46	59	152	71	46	59	152	73	46	59	152	75	46	59	152	77	46	59	152	79	46	59	152	346
15	66	45	59	151	67	45	59	150	69	45	59	150	71	45	59	150	73	45	59	150	75	45	59	150	77	45	59	150	79	45	59	150	345
16	66	44	59	149	67	44	59	148	69	44	59	148	71	44	59	148	73	44	59	148	75	44	59	148	77	44	59	148	79	44	59	148	344
17	66	43	59	147	67	43	59	146	69	43	59	146	71	43	59	146	73	43	59	146	75	43	59	146	77	43	59	146	79	43	59	146	343
18	66	42	59	145	67	42	59	144	69	42	59	144	71	42	59	144	73	42	59	144	75	42	59	144	77	42	59	144	79	42	59	144	342
19	66	41	59	143	67	41	59	142	69	41	59	142	71	41	59	142	73	41	59	142	75	41	59	142	77	41	59	142	79	41	59	142	341
20	66	40	59	141	67	40	59	140	69	40	59	140	71	40	59	140	73	40	59	140	75	40	59	140	77	40	59	140	79	40	59	140	340
21	66	39	59	139	67	39	59	138	69	39	59	138	71	39	59	138	73	39	59	138	75	39	59	138	77	39	59	138	79	39	59	138	339
22	66	38	59	137	67	38	59	136	69	38	59	136	71	38	59	136	73	38	59	136	75	38	59	136	77	38	59	136	79	38	59	136	338
23	66	37	59	135	67	37	59	134	69	37	59	134	71	37	59	134	73	37	59	134	75	37	59	134	77	37	59	134	79	37	59	134	337
24	66	36	59	133	67	36	59	132	69	36	59	132	71	36	59	132	73	36	59	132	75	36	59	132	77	36	59	132	79	36	59	132	336
25	66	35	59	131	67	35	59	130	69	35	59	130	71	35	59	130	73	35	59	130	75	35	59	130	77	35	59	130	79	35	59	130	335
26	66	34	59	129	67	34	59	128	69	34	59	128	71	34	59	128	73	34	59	128	75	34	59	128	77	34	59	128	79	34	59	128	334
27	66	33	59	127	67	33	59	126	69	33	59	126	71	33	59	126	73	33	59	126	75	33	59	126	77	33	59	126	79	33	59	126	333
28	66	32	59	125	67	32	59	124	69	32	59	124	71	32	59	124	73	32	59	124	75	32	59	124	77	32	59	124	79	32	59	124	332
29	66	31	59	123	67	31	59	122	69	31	59	122	71	31	59	122	73	31	59	122	75	31	59	122	77	31	59	122	79	31	59	122	331
30	66	30	59	121	67	30	59	120	69	30	59	120	71	30	59	120	73	30	59	120	75	30	59	120	77	30	59	120	79	30	59	120	330
31	66	29	59	119	67	29	59	118	69	29	59	118	71	29	59	118	73	29	59	118	75	29	59	118	77	29	59	118	79	29	59	118	329
32	66	28	59	117	67	28	59	116	69	28	59	116	71	28	59	116	73	28	59	116	75	28	59	116	77	28	59	116	79	28	59	116	328
33	66	27	59	115	67	27	59	114	69	27	59	114	71	27	59	114	73	27	59	114	75	27	59	114	77	27	59	114	79	27	59	114	327
34	66	26	59	113	67	26	59	112	69	26	59	112	71	26	59	112	73	26	59	112	75	26	59	112	77	26	59	112	79	26	59	112	326
35	66	25	59	111	67	25	59	110	69	25	59	110	71	25	59	110	73	25	59	110	75	25	59	110	77	25	59	110	79	25	59	110	325
36	66	24	59	109	67	24	59	108	69	24	59	108	71	24	59	108	73	24	59	108	75	24	59	108	77	24	59	108	79	24	59	108	324
37	66	23	59	107	67	23	59	106	69	23	59	106	71	23	59	106	73	23	59	106	75	23	59	106	77	23	59	106	79	23	59	106	323
38	66	22	59	105	67	22	59	104	69	22	59	104	71	22	59	104	73	22	59	104	75	22	59	104	77	22	59	104	79	22	59	104	322
39	66	21	59	103	67	21	59	102	69	21	59	102	71	21	59	102	73	21	59	102	75	21	59	102	77	21	59	102	79	21	59	102	321
40	66	20	59	101	67	20	59	100	69	20	59	100	71	20	59	100	73	20	59	100	75	20	59	100	77	20	59	100	79	20	59	100	320
41	66	19	59	99	67	19	59	98	69	19	59	98	71	19	59	98	73	19	59	98	75	19	59	98	77	19	59	98	79	19	59	98	319
42	66	18	59	97	67	18	59	96	69	18	59	96	71	18	59	96	73	18	59	96	75	18	59	96	77	18	59	96	79	18	59	96	318
43	66	17	59	95	67	17	59	94	69	17	59	94	71	17	59	94	73	17	59	94	75	17	59	94	77	17	59	94	79	17	59	94	317
44	66	16	59	93	67	16	59	92	69	16	59	92	71	16	59	92	73	16	59	92	75	16	59	92	77	16	59	92	79	16	59	92	316
45	66	15	59	91	67	15	59	90	69	15	59	90	71	15	59	90	73	15	59	90	75	15	59	90	77	15	59	90	79	15	59	90	315
46	66	14	59	89	67	14	59	88	69	14	59	88	71	14	59	88	73	14	59	88	75	14	59	88	77	14	59	88	79	14	59	88	314</

LAT 39°

DECLINATION (15° - 29°) SAME NAME AS LATITUDE

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

LHA	15°			16°			17°			18°			19°			20°			21°			22°			23°			24°			25°			26°			27°			28°			29°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z						
70	24.49	35	90	25.24	35	88	27.09	34	87	27.43	33	86	28.16	34	85	28.50	33	84	29.23	32	83	29.55	32	82	30.27	32	81	30.59	31	80	31.30	31	79	32.01	30	78	32.31	30	77	290					
71	23.15	36	89	23.51	36	88	24.26	35	87	24.58	34	86	25.31	34	85	26.03	33	84	26.36	33	83	27.05	32	82	27.73	32	81	28.41	31	80	29.09	30	79	29.77	30	78	30.45	29	77	289					
72	22.29	36	89	23.04	36	88	23.39	35	87	24.11	34	86	24.43	34	85	25.15	33	84	25.47	33	83	26.19	32	82	26.91	32	81	27.63	31	80	28.35	30	79	29.07	30	78	29.79	29	77	287					
73	21.42	36	88	22.18	36	87	22.53	35	86	23.28	34	85	24.03	34	84	24.78	33	83	25.53	33	82	26.28	32	81	27.03	32	80	27.78	31	79	28.53	30	78	29.28	29	77	29.98	28	76	286					
74	20.56	35	87	21.31	35	86	22.06	35	85	22.81	34	84	23.56	34	83	24.31	33	82	25.06	33	81	25.81	32	80	26.56	32	79	27.31	31	78	28.06	30	77	28.81	29	76	29.56	28	75	284					
75	20.09	36	87	20.45	36	86	21.20	35	85	21.95	34	84	22.70	34	83	23.45	33	82	24.20	33	81	24.95	32	80	25.70	32	79	26.45	31	78	27.20	30	77	27.95	29	76	28.70	28	75	281					
76	19.22	36	86	19.58	36	85	20.34	35	84	21.09	34	83	21.84	34	82	22.59	33	81	23.34	33	80	24.09	32	79	24.84	32	78	25.59	31	77	26.34	30	76	27.09	29	75	27.84	28	74	278					
77	18.36	36	85	19.12	36	84	19.47	35	83	20.22	34	82	20.97	34	81	21.72	33	80	22.47	33	79	23.22	32	78	23.97	32	77	24.72	31	76	25.47	30	75	26.22	29	74	26.97	28	73	272					
78	17.50	35	85	18.25	35	84	19.01	35	83	19.76	34	82	20.51	34	81	21.26	33	80	22.01	33	79	22.76	32	78	23.51	32	77	24.26	31	76	25.01	30	75	25.76	29	74	26.51	28	73	271					
79	16.63	36	84	17.39	36	83	18.15	35	82	18.90	34	81	19.65	34	80	20.40	33	79	21.15	33	78	21.90	32	77	22.65	32	76	23.40	31	75	24.15	30	74	24.90	29	73	25.65	28	72	270					
80	15.77	36	84	16.53	36	83	17.28	36	82	18.04	35	81	18.79	35	80	19.54	34	79	20.29	34	78	21.04	33	77	21.79	33	76	22.54	32	75	23.29	31	74	24.04	30	73	24.79	29	72	274					
81	14.91	36	83	15.69	36	82	16.42	36	81	17.15	35	80	17.88	35	79	18.61	34	78	19.34	34	77	20.07	33	76	20.80	33	75	21.53	32	74	22.26	31	73	22.99	30	72	23.72	29	71	24.45					
82	14.44	36	82	15.20	36	81	15.96	36	80	16.72	35	79	17.48	35	78	18.24	34	77	19.00	34	76	19.76	33	75	20.52	33	74	21.28	32	73	22.04	31	72	22.80	30	71	23.56	29	70	24.28					
83	13.58	36	82	14.34	36	81	15.10	36	80	15.86	35	79	16.62	35	78	17.38	34	77	18.14	34	76	18.90	33	75	19.66	33	74	20.42	32	73	21.18	31	72	21.94	30	71	22.70	29	70	23.42					
84	12.72	36	81	13.48	36	80	14.24	36	79	15.00	35	78	15.76	35	77	16.52	34	76	17.28	34	75	18.04	33	74	18.80	33	73	19.56	32	72	20.32	31	71	21.06	30	70	21.82	29	69	22.58					
85	11.86	36	81	12.64	36	80	13.40	36	79	14.16	35	78	14.92	35	77	15.68	34	76	16.44	34	75	17.20	33	74	17.96	33	73	18.72	32	72	19.48	31	71	20.24	30	70	21.00	29	69	21.74					
86	11.40	36	80	12.16	36	79	12.92	36	78	13.68	35	77	14.44	35	76	15.20	34	75	15.96	34	74	16.72	33	73	17.48	33	72	18.24	32	71	19.00	31	70	19.76	30	69	20.52	29	68	21.20					
87	10.54	37	79	11.31	37	78	12.07	37	77	12.83	36	76	13.59	36	75	14.35	35	74	15.11	35	73	15.87	34	72	16.63	34	71	17.39	33	70	18.15	32	69	18.91	31	68	19.67	30	67	20.43					
88	10.08	37	79	10.85	37	78	11.61	37	77	12.37	36	76	13.13	36	75	13.89	35	74	14.65	35	73	15.41	34	72	16.17	34	71	17.01	33	70	17.75	32	69	18.49	31	68	19.27	30	67	20.01					
89	9.22	37	78	09.59	37	77	10.36	37	76	11.12	36	75	11.88	36	74	12.64	35	73	13.40	35	72	14.16	34	71	14.92	34	70	16.48	33	69	17.24	32	68	18.00	31	67	19.56	30	66	20.60					
90	8.37	37	78	09.14	37	77	09.51	37	76	10.28	36	75	11.04	37	74	11.80	36	73	12.56	36	72	13.32	35	71	14.06	36	70	15.72	35	69	16.48	34	68	17.24	33	67	18.00	32	66	19.52					
91	7.51	37	77	08.29	37	76	09.06	37	75	09.83	36	74	10.60	37	73	11.36	36	72	13.00	36	71	13.76	35	70	15.02	35	69	16.78	34	68	17.56	33	67	18.40	32	66	19.16	31	65	20.20					
92	6.65	37	76	07.43	37	75	08.20	37	74	08.97	36	73	09.74	36	72	10.50	35	71	12.40	36	70	13.26	35	69	14.12	35	68	15.98	34	67	16.86	33	66	17.64	32	65	18.36	31	64	19.60					
93	5.79	37	75	06.58	37	74	07.35	37	73	08.12	36	72	08.89	36	71	09.66	35	70	11.16	36	69	12.02	35	68	12.80	34	67	14.58	33	66	15.36	32	65	16.14	31	64	17.00	30	63	18.24					
94	4.93	37	74	05.73	37	73	06.50	37	72	07.27	36	71	08.04	36	70	08.81	35	69	11.10	36	68	11.96	35	67	12.74	35	66	15.30	34	65	16.06	33	64	16.82	32	63	17.58	31	62	18.60					
95	4.07	37	73	04.98	37	72	05.75	37	71	06.52	36	70	07.29	36	69	08.06	35	68	10.06	36	67	10.92	35	66	11.70	35	65	14.44	34	64	15.20	33	63	16.06	32	62	17.24	31	61	18.00					
96	3.21	37	72	04.23	37	71	05.00	37	70	05.77	36	69	06.54	36	68	07.31	35	67	9.26	36	66	10.12	35	65	10.90	35	64	13.00	34	63	13.76	33	62	14.52	32	61	15.44	31	60	16.40					
97	2.35	37	71	03.48	37	70	04.25	37	69	05.02	36	68	05.79	36	67	06.56	35	66	8.00	36	65	8.81	35	64	9.58	35	63	11.44	34	62	12.20	33	61	13.00	32	60	14.44	31	59	15.44					
98	1.49	37	70	02.73	37	69	03.50	37	68	04.27	36	67	05.04	36	66	05.81	35	65	6.44	36	64	7.25	35	63	8.06	35	62	10.44	34	61	11.20	33	60	12.44	32	59	14.44	31	58	16.44					
99	0.63	37	69	02.08	37	68	02.85	37	67	03.62	36	66	04.39	36	65	05.16	35	64	5.00	36	63	5.81	35	62	6.62	35	61	9.00	34	60	10.44	33	59	12.44	32	58	14.44	31	57	16.44					
100	-0.23	37	68	01.33	37	67	02.10	37	66	02.87	36	65	03.64	36	64	04.41	35	63	3.33	36	62	4.14	35	61	4.95	35	60	7.33	34	59	8.77	33	58	10.77	32	57	12.77	31	56	15.77					
101	-0.89	37	67	00.58	37	66	01.35																																						

