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# The Nautical Almanac 2022

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# The Nautical Almanac

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*fair winds, clear skies & following seas*

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## **Acknowledgment and Credits**

### **Dr. Enno Rodegerdts**

The Nautical Almanac *Daily Pages* and Sun Almanacs found on our site were originally created from PyAlmanac written by the great Norwegian sailor Enno Rodegerdts. PyAlmanac used PyEphem to generate the almanacs and LaTeX provided the final formatting. Visit Dr. Rodegerdts site and learn of his voyages at <https://sv-inua.net/>

Without his work TheNauticalAlmanac.com wouldn't exist.

### **Andrew Bauer**

Mr. Bauer has taken the initial work of Dr. Rodegerdts and improved it to the excellence found in the following Daily Pages. Attending foremost to the accuracy of data and then formatting Mr. Bauer created SkyAlmanac which draws from Brandon Rhodes work *Ephem* and *Skyfield* and provides a clear arrangement of figures required for celestial navigation. To that end his work was determined, tireless and efficient. In our mutual writing across many lines of longitude he has always been pleasant, friendly and most affable.

As he has said, *"The art of celestial navigation should be promoted, not discouraged, even in the modern day"*.

*To both of these men we all owe a large debt of gratitude and thanks*

## **Disclaimer and Warning**

Prior to use verify the accuracy of The Nautical Almanac or data you download from our site. They SHOULD NOT and MUST NOT be relied upon for celestial navigation work of any sorts or any purpose whatsoever. You use them at your own risk or peril.

## **Errors & Corrections**

Contact us if you find any significant errors and describe the correction that should be made.



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# 2022

## January

wk	Su	M	Tu	W	Th	F	Sa
52							1
1	2	3	4	5	6	7	8
2	9	10	11	12	13	14	15
3	16	17	18	19	20	21	22
4	23	24	25	26	27	28	29
5	30	31					

## February

wk	Su	M	Tu	W	Th	F	Sa
5			1	2	3	4	5
6	6	7	8	9	10	11	12
7	13	14	15	16	17	18	19
8	20	21	22	23	24	25	26
9	27	28					

## March

wk	Su	M	Tu	W	Th	F	Sa
9			1	2	3	4	5
10	6	7	8	9	10	11	12
11	13	14	15	16	17	18	19
12	20	21	22	23	24	25	26
13	27	28	29	30	31		

## April

wk	Su	M	Tu	W	Th	F	Sa
13						1	2
14	3	4	5	6	7	8	9
15	10	11	12	13	14	15	16
16	17	18	19	20	21	22	23
17	24	25	26	27	28	29	30

## May

wk	Su	M	Tu	W	Th	F	Sa
18	1	2	3	4	5	6	7
19	8	9	10	11	12	13	14
20	15	16	17	18	19	20	21
21	22	23	24	25	26	27	28
22	29	30	31				

## June

wk	Su	M	Tu	W	Th	F	Sa
22				1	2	3	4
23	5	6	7	8	9	10	11
24	12	13	14	15	16	17	18
25	19	20	21	22	23	24	25
26	26	27	28	29	30		

## July

wk	Su	M	Tu	W	Th	F	Sa
26						1	2
27	3	4	5	6	7	8	9
28	10	11	12	13	14	15	16
29	17	18	19	20	21	22	23
30	24	25	26	27	28	29	30
31	31						

## August

wk	Su	M	Tu	W	Th	F	Sa
31		1	2	3	4	5	6
32	7	8	9	10	11	12	13
33	14	15	16	17	18	19	20
34	21	22	23	24	25	26	27
35	28	29	30	31			

## September

wk	Su	M	Tu	W	Th	F	Sa
35					1	2	3
36	4	5	6	7	8	9	10
37	11	12	13	14	15	16	17
38	18	19	20	21	22	23	24
39	25	26	27	28	29	30	

## October

wk	Su	M	Tu	W	Th	F	Sa
39						1	
40	2	3	4	5	6	7	8
41	9	10	11	12	13	14	15
42	16	17	18	19	20	21	22
43	23	24	25	26	27	28	29
44	30	31					

## November

wk	Su	M	Tu	W	Th	F	Sa
44			1	2	3	4	5
45	6	7	8	9	10	11	12
46	13	14	15	16	17	18	19
47	20	21	22	23	24	25	26
48	27	28	29	30			

## December

wk	Su	M	Tu	W	Th	F	Sa
48					1	2	3
49	4	5	6	7	8	9	10
50	11	12	13	14	15	16	17
51	18	19	20	21	22	23	24
52	25	26	27	28	29	30	31



## Useful Information

### Time Signals- by telephone

**WWV** 303-499-7111      **WWVH** 808-335-4363

**CHU English:** 613-745-1576 (CHU provides only Eastern time announcements)

**French:** 613-745-9426

### Time signals- by Radio

**WWV** (Fort Collins, Colorado)      2.5, 5, 10, 15, 20 MHz (male voice)

**WWVH** (Kauai, Hawaii)      2.5, 5, 10, 15 MHz (female voice)

**CHU** (Ottawa, Canada)      3330, 7850, and 14,670 kHz (USB)

**Bowditch**      2019- *The American Practical Navigator*

[https://TheNauticalAlmanac.com/2019\\_Bowditch-American\\_Practical\\_Navigator.html](https://TheNauticalAlmanac.com/2019_Bowditch-American_Practical_Navigator.html)

Organized in a convenient and useful manner. Download the Chapters, Parts or Tables you want or the entire work.

**The Terrestrial Almanac** Annual calendar and day planner for the entire year.

<https://TheNauticalAlmanac.com/TerrestrialAlmanac.html>

**Pub. No. 249** Download individual Latitudes or Volumes

*Epoch 2020*      [https://www.thenauticalalmanac.com/Pub\\_No\\_249\\_Epoch\\_2020.html](https://www.thenauticalalmanac.com/Pub_No_249_Epoch_2020.html)

*Epoch 2025*      [https://www.thenauticalalmanac.com/Pub\\_No\\_249\\_Epoch\\_2025.html](https://www.thenauticalalmanac.com/Pub_No_249_Epoch_2025.html)

**Pub. No. 229** Download individual Volumes covering a range of Latitudes

<https://TheNauticalAlmanac.com/Pub.No.229.html>

### Sight Reduction Forms & Methods

<https://www.TheNauticalAlmanac.com/Methods.html>

# Celestial Navigation

## useful Formulas

### About Calculators

The Casio *fx-300ES Plus* is an inexpensive calculator at about 11 USD. It features *natural input* so you enter a formula just as it would be written on paper. Entering degrees, minutes and seconds is very simple. The Casio *fx-300ES Plus* has 9 memory locations and you can review many of the previous entries you make using a special key on the calculator.

### Determine Hc using a calculator

#### The formula

$$Hc = \text{asin}[\sin(\text{Declination}) * \sin(\text{Latitude}) + \cos(\text{Latitude}) * \cos(\text{Declination}) * \cos(\text{LHA})]$$

As it would be entered into the Casio calculator Note-  $\text{Sin}^{-1}$  is the arc-sin key

$$\text{Sin}^{-1}(\text{Sin}(\text{Ap Latitude}) \times \text{Sin}(\text{Declination}) + \text{Cos}(\text{Ap Latitude}) \times \text{Cos}(\text{Declination}) \times \text{Cos}(\text{LHA}))$$

**Declination** is the declination of the Celestial body you're observing. When the heavenly body's declination is *Contrary name* to your Ap Latitude enter a negative sign before it.

**Latitude** "The AP latitude is chosen to be the nearest whole degree in latitude to the DR latitude." *from Bowditch 2019 Vol. 1 Chapter 19 section 1902 p. 310* Consider this to be where you are, think you are or where you would like to determine Hc for. Typically, you'll be using an *Assumed position Latitude* or *Ap Latitude* as it's called. *See Bowditch 2019 Vol. 1 Chapter 19 section 1902 p. 310*

### About LHA determination

**Assumed Position longitude ( $\alpha \lambda$ )** "The AP longitude is that nearest the DR longitude resulting in a whole degree of LHA for the observed body." *From Bowditch 2019 Vol. 1 Chapter 19 section 1902 p. 310*

**In Western Longitudes** *see Bowditch 2019 Vol. 1 Chapter 19 section 1905 p. 313*

**LHA** is the Local Hour Angle derived by subtracting your Assumed Longitude ( $\alpha \lambda$ ) whole degree value from the whole degree **GHA** (Greenwich Hour Angle) value. If GHA is less than the  $\alpha \lambda$  then the add 360° to it then subtract the  $\alpha \lambda$ . *Ignore the arc minutes of GHA and  $\alpha \lambda$ .*

**Example** when GHA is less than  $\alpha \lambda$     **GHA**= 43° 25.2'     $\alpha \lambda$ = W 55° 15.1'

$$360^\circ + 43^\circ = 403^\circ \quad \text{Then....} 403^\circ - 55^\circ = 348^\circ \text{ (LHA)}$$

**In Eastern Longitudes** *see Bowditch 2019 Vol. 1 Chapter 19 section 1905 p. 313*

**LHA, in Eastern Longitudes**, is determined by adding the entire GHA figure (degrees and minutes) to the whole degree figure of the Assumed longitude ( $\alpha \lambda$ ) *plus* the amount of arc minutes required to get to the next degree of the GHA. If the resulting LHA figure is greater than 360° then subtract 360° from the figure to obtain the LHA.

**Example-**    **GHA**= 58° 01.2'     $\alpha \lambda$ = E 9° 10.1' (ignore the 10.1')

**Step 1-** *get GHA degree difference;*    59° - 58° 01.2' = 0° 58.8'

**Step 2-** *add  $\alpha \lambda$  degrees to difference found in step 1;*    9° + 0°58.8' = 9° 58.8'  $\alpha \lambda$

**Step 3-** *get LHA;*    58° 01.2 + 9° 58.8' = 68° (LHA)

### Why would you want to determine Hc using a calculator?

It's faster than looking up in Pub. No. 249 and Pub. No. 229, highly accurate and you don't need a lot of printed out pages of Latitudes from Pub. No. 249 and Pub. No. 229. Pub. No. 249 Vol. 2 & 3 don't cover any declination greater than 29 degrees so you'd have to use Pub. No. 229 which is extremely large.

## Celestial Navigation

### Determine Z

$$Z = \text{acos}[(\sin(\text{Declination}) - \sin(\text{Ap Latitude}) \times \sin(\text{Hc})) \div (\cos(\text{Ap Latitude}) \times \cos(\text{Hc}))]$$

**As it would be entered into the Casio calculator...** Note-  $\text{Cos}^{-1}$  is the arc-cosine key

$$\text{Cos}^{-1}((\sin(\text{Declination}) - \sin(\text{AP Latitude}) \times \sin(\text{Hc})) \div (\cos(\text{AP Latitude}) \times \cos(\text{Hc}))$$

If the heavenly body's declination is *Contrary name* to the Ap Latitude enter a negative sign before it.

**To obtain Zn see the rules below for Northern and Southern latitudes.**

### Determine Z independent of Hc

$$Z = \tan^{-1}\left(\frac{\sin \text{LHA}}{(\cos L \tan d) - (\sin L \cos \text{LHA})}\right)$$

"L" is latitude and "d" is declination. When the heavenly body's declination is *Contrary name* to your Ap Latitude enter a negative sign before it.

**As it would be entered into the Casio calculator...** Note-  $\tan^{-1}$  is the arc-tangent key

$$Z = \tan^{-1} ((\sin (\text{LHA}) \div (\cos(\text{AP latitude}) \times \tan(\text{declination}) - (\sin(\text{AP latitude}) \times \cos(\text{LHA})))$$

The sign convention used in the calculation of this azimuth formula is as follows:

from Bowditch Chapter 22 CALCULATIONS AND CONVERSIONS, page 331

- 1) If latitude and declination are of contrary name, declination is treated as a negative quantity;
- 2) If the local hour angle is greater than  $180^\circ$ , it is treated as a negative quantity. If the azimuth angle as calculated is negative, add  $180^\circ$  to obtain the desired value.

### **To obtain Zn apply the following rules**

<b><u>In Northern Latitudes</u></b>	<b><u>In Southern Latitudes</u></b>
LHA greater than $180^\circ$ ....Zn=Z	LHA greater than $180^\circ$ ....Zn= $180^\circ - Z$
LHA less than $180^\circ$ .....Zn= $360^\circ - Z$	LHA less than $180^\circ$ .....Zn= $180^\circ + Z$

**Determine Refraction**  $0.96 \div \text{Tan of } (H_a)$

Gives good results down to about  $8^\circ$  from the horizon but not less.

**Refraction** (good overall formula from  $90^\circ$  to below  $8^\circ$  from the horizon)

$$R_0 = \cot \left( H_a + \frac{7.31}{H_a + 4.4} \right)$$



## As it would be entered into the Casio calculator...

$$1 \div \tan((H_a + (7.31 \div (H_a + 4.4)))$$

Both refraction formulas use the standard pressure and temperature of;

1010 mb    10° C  
29.83 in    53° F

### Determine Dip using feet

0.97 x (Square Root of  $H_e$  (Height of Eye) in feet)

### Determine Dip using meters

1.76 x (Square Root of  $H_e$  (Height of eye) in meters)

## Rules to Calculate Latitude using the Sun- Noon-Sight

1- Latitude and declination *Same name* but latitude is greater than declination:

$$\text{Latitude} = (90^\circ - H_o) + \text{declination}$$

2- Latitude and declination *Same name* but declination greater than latitude:

$$\text{Latitude} = \text{Declination} - (90^\circ - H_o)$$

3- Latitude and declination *Contrary name*:

$$\text{Latitude} = (90^\circ - H_o) - \text{Declination}$$

## To get AP longitude (needed for plotting the LOP)

### In Western longitudes

Combine the DR Longitude figure with only the minutes (of arc) of the total GHA figure. The  $A_p \lambda$  figure will be used when plotting the LOP on the UPS.

### In Eastern longitudes

In Eastern longitudes the  $A_p \lambda$  is determined as follows;

DR longitude + (0°60' *minus* GHA minutes of arc)

Example- E 075° + (0°60' - 0° 02')= 75° 58'  $A_p$  longitude



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## Explanation of The Nautical Almanac Daily Pages

1	Date and Time based on GMT/UT												
2	<b>Mer. pass-</b> meridian passage of Aries at the Prime Meridian- Greenwich- 0°. Time figure is GMT/UT.												
3	<p>Planet or Moon GHA <b>v</b> value and planet or Moon declination <b>d</b> value.</p> <p><b>v-</b> "The change in hour angle arising from <b>v</b> of the body at the time of the sight observation is accounted for with the <i>v correction</i>." <i>Source- Bowditch 2017, Chapter 19- Sight Reduction p. 313.</i> The planet's <b>v</b> is positive unless preceded by a minus sign which is sometimes the case with Venus. The sign of the Moon's <b>v</b> is positive.</p> <p><b>d-</b> "The change in declination of the body at the time of the sight observation is accounted for with the <i>d correction</i>." <i>Source- Bowditch 2017, Chapter 19- Sight Reduction p. 313.</i> The sign of the Moon or planet's <b>d</b> correction is determined by the declination trend- positive if successive declination values increase and negative if they decrease.</p> <p>Corrections for both <b>v</b> and <b>d</b> are found in the Increments and Corrections pages of The Nautical Almanac.</p> <p>To find the correction for either <b>v</b> or <b>d</b> enter the Increments and Corrections pages for the minutes in time of the observation and find the value in the <b>v and d corr.</b> columns Find the <b>v</b>, or <b>d</b>, value in the left side of one of the three columns. To the right of that value is the <b>v</b>, or <b>d</b>, correction. Be sure to add or subtract the values depending upon the <i>sign</i> of the value as mentioned above.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 35%;"><b>Example for v &amp; d correction-</b></td> <td style="width: 20%;">June 10, 2020</td> <td style="width: 20%;">GMT- 21:19:10</td> <td style="width: 25%;">Body- Moon</td> </tr> <tr> <td style="padding: 5px;">                     GHA= 247° 20.6' <b>v</b> = 12.1'                      GHA increment 4° 34.4'  <b>v-</b> correction for 12.1' + 0° 03.9'                      GHA= 251° 58.9'                 </td> <td colspan="3" style="padding: 5px;">                     Dec= S 17° 43.8' <b>d</b>= 8.9'  <b>d-</b> correction for 8.9' - 0° 02.9'                      dec= S 17° 40.9'                 </td> </tr> <tr> <td colspan="4" style="padding: 5px; text-align: center;"><i>declination trend is decreasing so the sign of d correction is negative</i></td> </tr> </table>	<b>Example for v &amp; d correction-</b>	June 10, 2020	GMT- 21:19:10	Body- Moon	GHA= 247° 20.6' <b>v</b> = 12.1' GHA increment 4° 34.4' <b>v-</b> correction for 12.1' + 0° 03.9' GHA= 251° 58.9'	Dec= S 17° 43.8' <b>d</b> = 8.9' <b>d-</b> correction for 8.9' - 0° 02.9' dec= S 17° 40.9'			<i>declination trend is decreasing so the sign of d correction is negative</i>			
<b>Example for v &amp; d correction-</b>	June 10, 2020	GMT- 21:19:10	Body- Moon										
GHA= 247° 20.6' <b>v</b> = 12.1' GHA increment 4° 34.4' <b>v-</b> correction for 12.1' + 0° 03.9' GHA= 251° 58.9'	Dec= S 17° 43.8' <b>d</b> = 8.9' <b>d-</b> correction for 8.9' - 0° 02.9' dec= S 17° 40.9'												
<i>declination trend is decreasing so the sign of d correction is negative</i>													
4	<p><b>m-</b> is the <i>magnitude</i> or brightness of the planet.</p> <p>A bright planet will have a <i>minus</i> sign beside the figure. A fainter planet will have no sign beside its magnitude figure.</p>												
5	<p><b>Stars- SHA, Sidereal Hour Angle, and Declination.</b> 59 stars are listed.</p> <p>Typically, only 57 stars are used for navigational purposes in both Northern and Southern Hemispheres. Here you'll also find Polaris and Scheat. In the Northern Hemisphere Polaris is often used for determination of latitude.</p>												
6	<b>Mer. pass-</b> planet meridian passage time at the Prime Meridian- Greenwich- 0°. Time figure is GMT/UT.												
7	<p><b>SHA-</b> planet SHA.</p> <p>Planet SHA is calculated by subtracting Aries GHA from planet GHA. If planet GHA figure is less than Aries GHA, add 360° to planet GHA and then subtract Aries GHA.</p>												
8	<p><b>Horizontal parallax-</b> for Venus and Mars.</p> <p>Horizontal parallax is the angle subtended by half the Earth's diameter as viewed from the planet in minutes of arc.</p>												
9	<p><b>SD-</b> Semi-diameter of the Sun in minutes of arc.</p> <p>One half of the angular width of the Sun as observed on earth.</p>												
10	<b>d-</b> the daily average change, per hour, in the Sun's declination in minutes of arc.												

11	<b>SD-</b> Semi-diameter of the Moon in minutes of arc. Semi-diameter is one half of the angular width of the Moon, as observed on earth.
12	<b>HP-</b> the angle between two lines, one from the center of the Moon to the center of the Earth, the other from the center of the Moon to the edge of the Earth. This angle is about 56', but it changes slightly from day to day as the distance to the Moon changes along its elliptical path around the Earth. <i>Source- starpath.com</i>
13	<b>Sun- Eqn. of Time-</b> Basically the Equation of Time (EoT) is the difference between clock time and time seen on a sundial. This is comparing "clock time", as a mechanical measurement of time, and the sundial being time determined by the position of the Sun at any given moment. The figures listed are for 00 <sup>h</sup> and 12 <sup>h</sup> . Using the EoT you can get fairly accurate determination of when Meridian Passage (Local Apparent Noon) occurs at your position. Unshaded EoT values are subtracted from 12:00 to get Meridian Passage. Shaded EoT values are added to 12:00 to get Meridian Passage. An Equation of Time chart (as a curve) is provided in each almanac on TheNauticalAlmanac.com <b>Example-</b> Meridian Passage on May 30, 2020 equals 12:00 – EoT of 2 minutes 21 seconds MP= 11:57:39 <i>Local Apparent Noon</i> <b>Example-</b> Meridian Passage on August 25, 2020 equals 12:00 + EoT of 1 minute 59 seconds MP= 12:01:59 <i>Local Apparent Noon</i>
14	<b>Sun- Mer. Pass</b> just to the right of the <b>Eqn. of Time</b> is the approximate GMT/UT when the Sun crosses The Prime Meridian (at Greenwich) for that specific date.
15	<b>Moon- Mer. Pass-</b> is the approximate GMT/UT when the Moon crosses The Prime Meridian (at Greenwich) or the 180° line of longitude. <b>Upper</b> means the GMT/UT when the Moon crosses The Prime Meridian (Greenwich). <b>Lower</b> means the GMT/UT when the Moon crosses the 180° line of longitude.
16	<b>Moon- Age-</b> this is the number of days past a new Moon. Typically, there are 29 days in a lunar month. <b>Moon- %-</b> the amount of the Moon's illumination. 100% would be a full moon. 49% would be about ½ of the Moon is illuminated. A 3 day range percentage is provided but only one graphic for the phase.
17* see notes at bottom	<b>(morning) Twilight- Naut.-</b> the approximate GMT/UT when morning Nautical Twilight begins. Nautical twilight is the time when the center of the sun is 12° below the horizon and the horizon is visible enough to be used for marine sextant observations. First locate your approximate Latitude in the <b>Lat.</b> column and then follow across horizontally to the right to find the time.
17* see notes at bottom	<b>(morning) Twilight- Civil-</b> the approximate GMT/UT of morning civil twilight starts when the geometric center of the sun is 6° below the horizon. First locate your approximate Latitude in the <b>Lat.</b> column and then follow across horizontally to the right to find the time.
17* see notes at bottom	<b>Sunrise-</b> the approximate GMT/UT when the Sun is 0° 50' (semi-diameter plus refraction) below the horizon. First locate your approximate Latitude in the <b>Lat.</b> column and then follow across horizontally to the right to find the time.

17* see notes at bottom	<b>Sunset-</b> the approximate GMT/UT when the Sun is 0° 50' (semi-diameter plus refraction) below the horizon. First locate your approximate Latitude in the Lat. column and then follow across horizontally to the right to find the time.
17* see notes at bottom	<b>(evening) Twilight- Civil-</b> the approximate GMT/UT of evening civil twilight that ends when the geometric center of the sun is 6° below the horizon. First locate your approximate Latitude in the <b>Lat.</b> column and then follow across horizontally to the right to find the time.
17* see notes at bottom	<b>(evening) Twilight- Naut.-</b> the approximate GMT/UT of when evening Nautical Twilight ends. Nautical twilight is the time when the center of the sun is 12° below the horizon and the horizon is no longer visible enough to be used for sextant observations. First locate your approximate Latitude in the Lat. column and then follow across horizontally to the right to find the time.
18* see notes at bottom	<b>Moonrise-</b> the approximate GMT/UT when the Moon is about 0° 05' to 0° 10' below the horizon. First locate your approximate Latitude in the Lat. column and then follow across horizontally to the right to find the time under the specific day.
18* see notes at bottom	<b>Moonset-</b> the approximate GMT/UT when the Moon is about 0° 05' to 0° 10' below the horizon. First locate your approximate Latitude in the Lat. column and then follow across horizontally to the right to find the time under the specific day.

\* Note-

☐ means the Sun or Moon remains continuously above the horizon on that day.

–:– can also mean twilight lasts all night

■ means the Sun or Moon remains continuously below the horizon on that day.

–:– means Moon does not rise or set on that day but may have risen or set the previous day or following day.

\* **Note-** Time of Sunrise, Sunset, Moonrise, Moonset and twilight is based on GMT/UT of the event at 0° (Greenwich) and can be considered as approximate LMT (Local Mean Time) with a tolerance of +/- 30 minutes depending on where you are within a time zone.

Wednesday, February 24, 2021

Explanation\_of\_The\_Nautical\_Almanac\_Daily\_Pages.odt

January 01, 02 ,03 (Fri., Sat., Sun.)

Table with columns for Aries, Venus, Mars, Jupiter, Saturn and Stars. Includes GHA, Dec, SHA, Dec for each planet and star. Includes 'Mer.pass.:17:14' at the bottom.

Table for Saturday (Sat) with columns for Aries, Venus, Mars, Jupiter, Saturn and Stars. Includes GHA, Dec, SHA, Dec for each planet and star. Includes 'Mer.pass.:17:11' at the bottom.

Table for Sunday (Sun) with columns for Aries, Venus, Mars, Jupiter, Saturn and Stars. Includes GHA, Dec, SHA, Dec for each planet and star. Includes 'Mer.pass.:17:07' at the bottom.

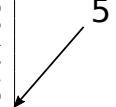
Table of Stars with columns for SHA and Dec. Lists various stars like Alpheratz, Ankaa, Schedar, etc.

Table for Jan 01 Fri with columns for SHA and Mer.pass. Lists Venus, Mars, Jupiter, Saturn.

Table for Jan 02 Sat with columns for SHA and Mer.pass. Lists Venus, Mars, Jupiter, Saturn.

Table for Jan 03 Sun with columns for SHA and Mer.pass. Lists Venus, Mars, Jupiter, Saturn.

Table for Horizontal parallax with columns for Venus and Mars.





## Information in the data page footers

Information pertaining to the IERS EOP data has been added to the odd data page footers if using MiKTeX or TeX Live (2020 or later). The International Earth Rotation Service (IERS) provides accurate data (updated weekly) on the Earth Orientation Parameters (EOP).

Earth's speed of rotation is not constant, i.e. the day length fluctuates.<sup>1</sup> This is due to *internal torques* caused by relative movements and mass redistribution of Earth's core, mantle, oceans, atmosphere, and cryosphere. This has an immediate impact on the GHA values of all celestial objects.

The IERS monitors and measures several parameters taking the actual speed of Earth's rotation into account. Their measured data begins on 2nd January 1973. Predictive data begins following the last day of (obtained) data and extends about 360 days into the future. (The IERS results are published with a delay of about 18-hours between the date of publication and the last available date with measured EOP.<sup>2</sup>) These Nautical Almanac daily pages take the (measured or predicted) UT1-UTC values into account providing highly accurate navigational data especially if the predictions are fairly recent.

As long as either measured or predicted data is available the footer will show:

[IERS Earth Orientation data as of dd-mmm-yyyy](#)

This indicates that IERS EOP data is in use - older dates are measured; newer dates are predictions.

If the final date of IERS prediction data is on the current data page, the footer shows:

[IERS Earth Orientation predictions end dd-mmm-yyyy](#)

Pages with dates beyond the final date of IERS prediction data have the following footer:

**No IERS EOP prediction data available**

Skyfield then defaults to using the  $\Delta T$  and leap second files that ship with Skyfield internally.

The footers mentioned are only displayed as long as `'uselERS = True'` is set in `config.py` to enable use of IERS EOP data.

## Brief historical overview

The story begins with the XEphem astronomical library, which is declared 'end of life' by its author, Elwood Charles Downey, as no further updates are planned. He generously gave permission for use of XEphem code in Ephem (also known as Pyephem), an astronomical library authored by Brandon Rhodes. Enno Rodegerdts (<https://sv-inua.net/>) created the original Nautical Almanac 'daily pages' in Pyalmanac using Python 2 and LaTeX. After contacting him I obtained permission for its future enhancement and maintenance. Pyalmanac uses Ephem.

Meanwhile Brandon Rhodes was working on a far more sophisticated astronomical library, Skyfield. This was 'state of the art' and clearly surpassed the 'Jean Meeus'-based Pyephem/Ephem. Skyfield uses NASA's NAIF (Navigation and Ancillary Information Facility) SPICE algorithms. The results agree with those from the HORIZONS System (*operated by NASA JPL (Jet Propulsion Laboratory) SSD (Solar System Dynamics) group, not by NAIF*). This in turn implies that celestial positions calculated by Skyfield agree with those generated by the United States Naval Observatory and their *Astronomical Almanac* to within 0.0005 arcseconds (half a milliarcsecond).

Pyephem was then in 'maintenance mode'. Clearly Pyalmanac needed adaptation to use Skyfield, and thus SFalmanac was born. However its performance was poor regarding the calculation of 'events' such as: sunrise, sunset, moonrise, moonset, civil twilight start/end and nautical twilight start/end. An interim (faster) solution was required.

A hybrid application, originally named Skyalmanac, was developed using Ephem to calculate 'events' and Skyfield for the rest. This was indeed much faster at the cost of poorer 'event time' data. It took a while to find a better solution: multiprocessing, which was built into SFalmanac. This now could compare to the execution times in Pyalmanac but with improved data.

New functionality was added to SFalmanac, e.g. lunar phase as a graphic; Lunar Distance tables and charts. The original Skyalmanac is deprecated and has now been replaced with the latest SFalmanac code, so Skyalmanac and SFalmanac are now identical apart from the name. Since April 2019 <http://thenauticalalmanac.com> has been publishing Celestial Navigation related material with software provided here.

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<sup>1</sup>[https://en.wikipedia.org/wiki/Day\\_length\\_fluctuations](https://en.wikipedia.org/wiki/Day_length_fluctuations)

<sup>2</sup><https://hpiers.obspm.fr/eoppc/bul/bul/explanatory.html>

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Mon, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for various latitudes.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Sat, Moon), and Moonset (Sat, Sun, Moon) for various latitudes.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Mer. Pass. Upper/Lower, and Age 28-1/5-0%.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include GHA, Dec, and magnitude (m).

Table for Stars with columns: SHA, Dec, magnitude (m).

Table for Sun and Moon with columns: GHA, Dec, ν, d, HP.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, magnitude (m).

Table for Sun and Moon with columns: GHA, Dec, ν, d, HP.

Table for Moonset with columns: Lat., Moonrise (Tue, Wed, Thu), Moonset (Tue, Wed, Thu).

Table with columns: Thu, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Mer. pass, SHA, Mer. pass.

Table for Sun and Moon with columns: GHA, Dec, ν, d, HP.

Table for Day with columns: Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age.

Table with columns for Venus, Mars, Jupiter, Saturn, and Mer. pass. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table for Stars with columns for SHA and Dec. Lists stars like Alphertz, Anka, Schedar, Diphda, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes data for the Sun and Moon over the period.

Table for Twilight, Sunrise, and Sunset with columns for Lat., Naat., Civil, Sunrise, Sunset, Civil, Naat. Includes a moon phase icon.

Table with columns for GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Continuation of celestial data.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Gienah, Gacrux, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Continuation of Sun and Moon data.

Table for Moonset with columns for Lat., Moonrise, Sun, Moonset, Sat, Sun. Includes moon phase icons.

Table with columns for Sun, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Continuation of Sun data.

Table for Stars with columns for SHA, Mer-pass, SHA, Mer-pass. Lists stars like Jan 07 Fri, Jan 08 Sat, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Continuation of Sun and Moon data.

Table for Day with columns for Eqn of Time, Mer. Pass, Upper, Lower, Age. Includes moon phase icons.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include Mon, GHA, Dec, and various magnitude/size indicators.

Table for Stars with columns: SHA, Dec. Lists stars like Alpharatz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: h, Mon, GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Twilight with columns: Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught. Shows twilight times for various latitudes.

Table with columns: Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Continuation of planetary data.

Table for Stars with columns: SHA, Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns: Tue, GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Moonrise with columns: Lat., Mon, Tue, Wed, Mon, Tue, Wed. Shows moonrise times for various latitudes.

Table with columns: Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Continuation of planetary data.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars like Jan 10 Mon, Jan 11 Tue, etc.

Table for Sun and Moon with columns: Wed, GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Moonset with columns: Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age. Includes a moon phase icon.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec, Horizontal parallax. Lists stars like Alphertz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, HP). Includes SD and d values.

Table for Twilight with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Fri, GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec, Horizontal parallax. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns: Fri, Sun (GHA, Dec), Moon (GHA, Dec, HP). Includes SD and d values.

Table for Moonset with columns: Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat).

Table with columns: Sat, GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars for Jan 13, 14, and 15.

Table for Sun and Moon with columns: Sat, Sun (GHA, Dec), Moon (GHA, Dec, HP). Includes SD and d values.

Table for Day with columns: Day, Eqn. of Time, Mer. Pass, Moon (Upper, Lower), Age. Includes a moon phase icon.

Table with columns for Sun, Venus, Mars, Jupiter, Saturn, and Mer. pass. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table with columns for Moon, GHA, Dec, and magnitude. Data includes GHA, Dec, and magnitude for the Moon and other celestial bodies.

Table with columns for Tue, GHA, Dec, and magnitude. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table with columns for Stars, SHA, Dec, and magnitude. Lists stars like Alphertax, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec, and magnitude. Lists stars like Denebola, Gienah, Acrux, etc.

Table with columns for Stars, SHA, Dec, and magnitude. Lists stars like Jan 16 Sun, Jan 17 Mon, Jan 18 Tue, and Horizontal parallax.

Table with columns for Sun, Moon, GHA, Dec, d, and HP. Data includes GHA, Dec, d, and HP for the Sun and Moon.

Table with columns for Sun, Moon, GHA, Dec, d, and HP. Data includes GHA, Dec, d, and HP for the Sun and Moon.

Table with columns for Sun, Moon, GHA, Dec, d, and HP. Data includes GHA, Dec, d, and HP for the Sun and Moon.

Table with columns for Lat., Twilight, Sunrise, Sunset, and Twilight. Data includes twilight times and sunrise/sunset for various latitudes.

Table with columns for Lat., Moonrise, Moonset, and Twilight. Data includes moonrise/moonset times and twilight for various latitudes.

Table with columns for Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age. Data includes equation of time and meridian passage.

Planetary data table for Venus, Mars, Jupiter, and Saturn, including columns for GHA, Dec, and magnitude (m).

Stars data table listing stars like Alpharatz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, Acamar, Menkar, Mirfak, Aldebaran, Rigel, Capella, Bellatrix, Elnath, Anilam, Betelgeuse, Canopus, Sirius, Adhara, Procyon, Pollux, Avior, Suhail, Miaplacidus, Alhaph, Regulus, Dubhe, Denebola, Gienah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkent, Arcturus, Rigel, Kochab, Zuben'ubi, Alphecca, Antares, Atria, Sabik, Rasalhaga, Eitanun, Kaus Aust., Vega, Nunki, Altair, Peacock, Deneb, Enif, Al Na'ir, Fomalhaut, Scheat, Markab.

Sun and Moon data table with columns for GHA, Dec, distance (d), and horizontal parallax (HP).

Twilight data table showing sunrise and sunset times for various latitudes (N 70° to S 60°).

Planetary data table for Venus, Mars, Jupiter, and Saturn, including columns for GHA, Dec, and magnitude (m).

Stars data table listing stars like Jan 19 Wed, Jan 20 Thu, Jan 21 Fri, and Horizontal parallax for Venus and Mars.

Sun and Moon data table with columns for GHA, Dec, distance (d), and horizontal parallax (HP).

Twilight data table showing sunrise and sunset times for various latitudes (N 70° to S 60°).

Planetary data table for Venus, Mars, Jupiter, and Saturn, including columns for GHA, Dec, and magnitude (m).

Stars data table listing stars like Jan 19 Wed, Jan 20 Thu, Jan 21 Fri, and Horizontal parallax for Venus and Mars.

Sun and Moon data table with columns for GHA, Dec, distance (d), and horizontal parallax (HP).

Twilight data table showing sunrise and sunset times for various latitudes (N 70° to S 60°).



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Includes GHA, Dec, and Mer. pass. data.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught.

Table with columns for Sun, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec, listing star names like Denebola, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Moonrise and Moonset with columns for Lat., Sat, Moonrise, Mon, Sat, Moonset, Mon.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for Stars with columns for SHA, Mer. pass., Venus, Mars, Jupiter, Saturn. Includes Horizontal parallax data.

Table for Sun and Moon with columns for GHA, Dec, GHA, ν, Dec, d, HP. Includes SD and d values.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper, Lower, Age. Includes a moon phase icon.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Includes GHA, Dec, and Mer.pass. values.

Table with columns for planets (Wed, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and Mer.pass. values.

Table with columns for planets (Thu, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and Mer.pass. values.

Table for Stars (SHA, Dec) and Horizontal parallax (Venus, Mars) with rows for various star names like Alpheratz, Antek, Schedar, etc.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) with rows for dates (0-23). Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) with rows for dates (0-23). Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) with rows for dates (0-23). Includes SD and d values.

Table for Twilight (Lat., Naught, Civil, Sunrise, Sunset, Civil, Twilight, Naught) with rows for various latitudes (N 72°, N 70°, etc.).

Table for Moonrise (Lat., Tue, Moonrise, Thu, Tue, Moonset, Thu) with rows for various latitudes (N 72°, N 70°, etc.).

Table for Day (Day, Eqn. of Time, Mer. Pass, Mer. Pass., Age) with rows for dates (25, 26, 27).



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include date (Fri, Sat, Sun), GHA, Dec, and magnitude (GHA, Dec, GHA, Dec).

Table for Stars with columns: SHA, Dec, and magnitude (SHA, Dec, SHA, Dec).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Sat, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, and magnitude (SHA, Dec, SHA, Dec).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Moonrise and Moonset with columns: Lat., Moonrise (Fri, Sat, Sun), Moonset (Fri, Sat, Sun).

Table with columns: Sun, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, Mer-pass, and magnitude (SHA, Dec, Mer-pass, SHA, Dec, Mer-pass).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Day with columns: Day, Sun (Eqn. of Time, 12h), Mer. Pass (Upper, Lower), Moon (Mer. Pass, Lower), Age (26-28, 24-7%).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table with columns for planets (Tue, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table with columns for planets (Wed, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) and rows for dates (0-23).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Tue, Wed), and Moonset (Tue, Wed) and rows for dates (0-23).

Table for Day with columns for Day, Sun (Eqn. of Time, 12h, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass), and Moon (Age 2-1%) and rows for dates (0-23).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat).

Table for Stars (SHA, Dec) listing various stars like Alphertz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing stars like Denebola, Gienah, Acrux, etc.

Table for Stars (SHA, Dec) listing stars like Venus, Mars, Jupiter, Saturn for specific dates.

Table for Sun and Moon (h, GHA, Dec, ν, d, HP) for each day (Thu, Fri, Sat).

Table for Sun and Moon (h, GHA, Dec, ν, d, HP) for each day (Fri, Sat).

Table for Sun and Moon (Sat, GHA, Dec, ν, d, HP) for each day (Sat).

Table for Twilight (Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught) for various latitudes.

Table for Moonrise (Lat., Thu, Moonrise, Sat, Thu, Moonset, Fri, Sat) for various latitudes.

Table for Day (Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age) for various days.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Sun, Mon, Tue).

Table with columns for planets (Mercury, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Mon, Tue).

Table with columns for planets (Mercury, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Tue, Wed, Thu, Fri, Sat, Sun).

Table for Stars (SHA, Dec) listing various stars like Alpharatz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing various stars like Denebola, Gienah, Acrux, etc.

Table for Stars (SHA, Dec) listing various stars like Feb 06 Sun, Feb 07 Mon, Feb 08 Tue, and Horizontal parallax.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (Sun, Mon, Tue).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (Mon, Tue).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (Tue, Wed, Thu, Fri, Sat, Sun).

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Twilight) for each day (Sun, Mon, Tue).

Table for Moonrise (Lat., Sun, Moonrise, Moonset) for each day (Sun, Mon, Tue).

Table for Day (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for each day (Sun, Mon, Tue).

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars like Alpharatz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table for Thursday (Thu) with columns: GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars (continued) with columns: SHA, Dec, Mer. pass. Lists stars like Denebola, Cienah, Acruz, etc.

Table for Sun and Moon (continued) with columns: Thu, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Moonset with columns: Lat., Moonset (Thu, Fri), Moonset (Thu, Fri). Includes checkboxes for visibility.

Table for Friday (Fri) with columns: GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars (continued) with columns: SHA, Dec, Mer. pass. Lists stars like Feb 09 Wed, Feb 10 Thu, Feb 11 Fri.

Table for Sun and Moon (continued) with columns: Fri, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Day with columns: Day, Eqn. of Time (0h, 12h), Mer. Pass (Upper, Lower), Age (8-10, 54-72%).

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Each planet has columns for GHA, Dec, and magnitude (S16).

Table for Stars with columns for SHA and Dec. Lists stars like Alpharatz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, and magnitude (S16). Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns for Lat., Naat., Civil, Sunrise, Sunset, Civil, Naat.

Table with columns for Sun, GHA, Dec, and magnitude (S16). Includes Mer. pass. information.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, and magnitude (S16). Includes SD and d values.

Table for Moonrise and Moonset with columns for Lat., Sat, Moonrise, Mon, Sat, Moonset, Mon.

Table with columns for Mon, GHA, Dec, and magnitude (S16). Includes Mer. pass. information.

Table for Stars with columns for SHA, Mer. pass., and Dec. Lists stars like Feb 12 Sat, Venus, Mars, etc.

Table for Sun and Moon with columns for GHA, Dec, and magnitude (S16). Includes SD and d values.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Alphertz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught.

Table with columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD and d values.

Table for Moonset with columns for Lat., Tue, Moonrise, Thu, Tue, Moonset, Thu. Includes visual icons for moon phases.

Table with columns for Thu, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for Stars with columns for SHA, Mer. pass, SHA, Mer. pass. Lists stars like Feb 15 Tue, Feb 16 Wed, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD and d values.

Table for Sun and Moon with columns for Day, Egn. of Time, Mer. Pass, Mer. Pass., Age. Includes visual icons for moon phases.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and other astronomical data.

Table for Stars with columns: SHA, Dec, and other astronomical data.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Sat, GHA, Dec, and other astronomical data.

Table for Stars with columns: SHA, Dec, and other astronomical data.

Table for Sun and Moon with columns: Sat, Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Moonset and Moonrise with columns: Lat., Moonrise (Sat, Sun), Moonset (Fri, Sat, Sun).

Table with columns: Sun, GHA, Dec, and other astronomical data.

Table for Stars with columns: SHA, Dec, and other astronomical data.

Table for Sun and Moon with columns: Sun, Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Day with columns: Day, Eqn of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age 17-19 98-88%.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Mon, Tue, Wed).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Tue, Wed, Thu, Fri, Sat, Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Wed, Thu, Fri, Sat, Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Stars (SHA, Dec) listing various stars like Alpharatz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing various stars like Denebola, Gienah, Acrux, etc.

Table for Stars (SHA, Dec) listing various stars like Feb 21 Mon, Feb 22 Tue, Feb 23 Wed.

Table for Sun and Moon (h, Sun, Moon) listing positions (GHA, Dec, d, HP) for each day (Mon, Tue, Wed, Thu, Fri, Sat, Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Sun and Moon (h, Sun, Moon) listing positions (GHA, Dec, d, HP) for each day (Tue, Wed, Thu, Fri, Sat, Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Sun and Moon (h, Sun, Moon) listing positions (GHA, Dec, d, HP) for each day (Wed, Thu, Fri, Sat, Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Twilight, Sunrise, Sunset, and Moonset (Lat., Twilight, Sunrise, Sunset, Moonset) listing times for various latitudes.

Table for Moonrise, Moonset, and Moon (Lat., Moonrise, Moonset, Moon) listing times and moon phases for various latitudes.

Table for Day, Sun, and Moon (Day, Sun, Moon) listing times (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for various days.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (Thu, Fri, Sat).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (Thu, Fri, Sat).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (Thu, Fri, Sat).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), and Moonset (Thu, Fri, Sat).

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), Mer. Pass (Upper, Lower), and Age (23-25, 49-27%).

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn, and Dec. Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for Stars, SHA, Dec. Rows for various stars like Alpharatz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec, Mer. pass. Rows for stars like Feb 27 Sun, Feb 28 Mon, Mar 01 Tue.

Table with columns for Stars, SHA, Mer. pass. Rows for stars like Feb 27 Sun, Feb 28 Mon, Mar 01 Tue.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, d, HP. Rows 0-23 showing Sun and Moon positions.

Table with columns for Mon, GHA, Dec, GHA, Dec, d, HP. Rows 0-23 showing Moon positions.

Table with columns for Tue, GHA, Dec, GHA, Dec, d, HP. Rows 0-23 showing Sun and Moon positions.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight. Rows for various latitudes (N 72° to S 60°).

Table with columns for Lat., Moonrise, Moonset. Rows for various latitudes (N 72° to S 60°).

Table with columns for Day, Sun, Mer. Pass., Moon, Age. Rows 27-01 showing twilight and moon data.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Wed, Thu, Fri).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Twilight and Moonset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, Moonset (Civil, Naut.) for each day.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Wed, Thu, Fri), Moonset (Wed, Thu, Fri) for each day.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri).

Table for Stars with columns for Star name, SHA, Mer. pass, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age for each day.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Alpheratz, Acemra, Schekar, etc.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns for Sun, GHA, Dec, and magnitude. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Sat, Sun, Mon), Moonset (Sat, Sun, Mon).

Table with columns for Mon, GHA, Dec, and magnitude. Includes Mer. pass. data.

Table for Stars with columns for SHA, Mer. pass., and magnitude. Lists stars like Mar 05 Sat, Mar 06 Sun, Mar 07 Mon.

Table for Sun and Moon with columns for Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Lower, Age).

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (m).

Table for Stars with columns for SHA and Dec.

Table for Sun and Moon with columns for GHA, Dec, and HP.

Table for Twilight and Sunrise/Sunset with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (m).

Table for Stars with columns for SHA and Dec.

Table for Sun and Moon with columns for GHA, Dec, and HP.

Table for Moonrise and Moonset with columns for Lat., Tue, Moonrise, Thu, Tue, Moonset, Thu.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (m).

Table for Stars with columns for SHA and Mer.pass.

Table for Sun and Moon with columns for GHA, Dec, and HP.

Table for Sun and Moon with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (Fri, Sat, Sun) with GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names like Alphertz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, HP) for dates Fri, Sat, Sun.

Table for twilight and sunrise/sunset data with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for Sun, GHA, Dec, and rows for dates (Sat, Sun) with GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for Sat, Sun (GHA, Dec), and Moon (GHA, Dec, HP) for dates Sat, Sun.

Table for Moonrise and moonset data with columns for Lat., Moonrise (Fri, Sat, Sun), and Moonset (Fri, Sat, Sun).

Table with columns for Sun, GHA, Dec, and rows for dates (Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun) with GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Mer-pass, listing various star names like Mar 11 Fri, Mar 12 Sat, Mar 13 Sun.

Table for Sun and Moon with columns for Sun, GHA, Dec, and Moon (GHA, Dec, HP) for dates Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun.

Table for Day with columns for Eqn. of Time, Mer. Pass, Mer. Pass. Upper/Lower, and Age 9-11 55-73%.

Table with columns for planets: Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Dec. Lists stars like Alpheratz, Aekaa, Schedar, etc.

Table for Sun and Moon. Sub-columns for GHA, Dec, and magnitude. Includes SD and d values.

Table for Twilight and Sunrise/Sunset. Columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught.

Table with columns for planets: Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Genah, Acrux, etc.

Table for Sun and Moon. Sub-columns for GHA, Dec, and magnitude. Includes SD and d values.

Table for Moonrise and Moonset. Columns for Lat., Mon, Tue, Wed, Mon, Tue, Wed.

Table with columns for planets: Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Mer. pass. Lists stars like Mar 14 Mon, Mar 15 Tue, etc.

Table for Sun and Moon. Sub-columns for GHA, Dec, and magnitude. Includes SD and d values.

Table for Day and Sun/Moon. Columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (m).

Table for Stars with columns: SHA, Dec, and magnitude (m).

Table for Sun and Moon with columns: h, GHA, Dec, ν, Dec, d, HP.

Table for Twilight with columns: Lat., Naught, Civil, Sunrise, Sunset, Civil, Twilight, Naught.

Table with columns: Fri, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, and magnitude (m).

Table for Sun and Moon with columns: Fri, GHA, Dec, GHA, ν, Dec, d, HP.

Table for Moonset with columns: Lat., Thu, Moonrise, Sat, Thu, Moonset, Fri, Sat.

Table with columns: Sat, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Mer-pass, and magnitude (m).

Table for Sun and Moon with columns: Sat, GHA, Dec, GHA, ν, Dec, d, HP.

Table for Moon with columns: Day, Eqn. of Time, Mer. Pass, Mer. Pass, Lower, Age, 15-17, 98-99%.

Table with columns for Sun, Venus, Mars, Jupiter, Saturn and sub-columns for GHA, Dec. Rows 0-23 showing celestial coordinates.

Mer.pass. 12:08 v -0.1' d 0.4' m -4.47 v 0.5' d 0.5' m 1.14 v 1.9' d 0.2' m -2.04 v 2.2' d 0.1' m 0.83

Table with columns for Mon, GHA, Dec. Rows 0-23 showing celestial coordinates for Monday.

Mer.pass. 12:04 v -0.1' d 0.5' m -4.46 v 0.6' d 0.5' m 1.14 v 1.9' d 0.2' m -2.04 v 2.2' d 0.1' m 0.83

Table with columns for Tue, GHA, Dec. Rows 0-23 showing celestial coordinates for Tuesday.

Mer.pass. 12:00 v -0.1' d 0.5' m -4.45 v 0.6' d 0.5' m 1.13 v 1.9' d 0.2' m -2.04 v 2.2' d 0.1' m 0.83

Table with columns for Stars (SHA, Dec), Sun (GHA, Dec), Moon (GHA, v, Dec, d, HP) and Horizontal parallax (Venus, Mars).

Main table with columns for Sun (GHA, Dec), Moon (GHA, v, Dec, d, HP) and Moon (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age).

Table with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.). Rows 0-45 showing twilight times for various latitudes.

Table with columns for Lat., Moonrise, Moonset, Moonset (Sun, Tue), Moonset (Sun, Tue). Rows 0-45 showing moonrise and moonset times.

Table with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age. Includes a moon phase diagram.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for twilight and sunset times (Lat., Twilight, Sunrise, Sunset, Twilight) for various latitudes.

Table with columns for moon phases (Lat., Moonrise, Moonset) for various latitudes.

Table with columns for day and time (Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for various days.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for Sun and Moon positions (GHA, Dec, d) for each day (0-23).

Table with columns for Moon phases (Mer. Pass, GHA, Dec, d) for each day (0-23).

Table with columns for Stars (SHA, Dec) for each day (0-23).

Table with columns for Stars (SHA, Dec, Mer. Pass) for each day (0-23).

Table with columns for Stars (SHA, Dec, Mer. Pass) for each day (0-23).

Table with columns for Sun and Moon positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Twilight (Lat., Naup., Civil, Sunrise, Sunset, Twilight, Naup.) for each day (0-23).

Table with columns for Moon phases (Lat., Sat, Moonrise, Moonset) for each day (0-23).

Table with columns for Day (Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for each day (26-28).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Tue, Wed, Thu) and Moonset (Tue, Wed, Thu).

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, Mer. pass, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri, Sat, Sun).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Fri, Sat, Sun).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat, Sun).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Sat, Sun).

Table for Moonset with columns for Lat., Moonrise (Fri, Sat, Sun), and Moonset (Fri, Sat, Sun).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Moonset with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age.

Table with columns for Venus, Mars, Jupiter, Saturn, and Mer. pass. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table with columns for Venus, Mars, Jupiter, Saturn, and Mer. pass. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table with columns for Venus, Mars, Jupiter, Saturn, and Mer. pass. Data includes GHA, Dec, and magnitude for various celestial bodies.

Table with columns for Stars, SHA, Dec, and Mer. pass. Lists stars like Alpheratz, Akaa, and others with their coordinates.

Table with columns for Stars, SHA, Dec, and Mer. pass. Lists stars like Denebola, Gienah, and others with their coordinates.

Table with columns for Stars, SHA, Dec, and Mer. pass. Lists stars like Al Na'ir, Fomalhaut, and others with their coordinates.

Table with columns for Sun, Moon, GHA, Dec, and HP. Provides data for the Sun and Moon's positions.

Table with columns for Sun, Moon, GHA, Dec, and HP. Provides data for the Sun and Moon's positions.

Table with columns for Sun, Moon, GHA, Dec, and HP. Provides data for the Sun and Moon's positions.

Table with columns for Lat., Twilight, Sunrise, Sunset, and Twilight. Shows twilight and sunrise/sunset times for various latitudes.

Table with columns for Lat., Moonrise, Moonset, and Moonset. Shows moonrise and moonset times for various latitudes.

Table with columns for Day, Sun, Moon, and Age. Shows sun and moon data and moon age for specific days.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include GHA, Dec, and magnitude (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Stars with columns: SHA, Dec, and magnitude (SHA, Dec, SHA, Dec, SHA, Dec, SHA, Dec).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Fri, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, and magnitude (SHA, Dec, SHA, Dec, SHA, Dec, SHA, Dec).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Moonset with columns: Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat).

Table with columns: Sat, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec.

Table for Stars with columns: SHA, Dec, and magnitude (SHA, Dec, SHA, Dec, SHA, Dec, SHA, Dec).

Table for Sun and Moon with columns: Sun (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec) and Moon (GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec).

Table for Day with columns: Day, Eqn. of Time, Mer. Pass, Mer. Pass, Age.



Table with columns for Sun, Venus, Mars, Jupiter, Saturn and sub-columns for GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23 showing planetary coordinates.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23 showing planetary coordinates.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23 showing planetary coordinates.

Table with columns for Stars, SHA, Dec. Rows listing stars like Alpheratz, Schedar, Achena, etc.

Table with columns for Stars, SHA, Dec. Rows listing stars like Denebola, Gienah, Acrux, etc.

Table with columns for Stars, SHA, Mer.pass. Rows listing stars like Apr 10 Sun, Apr 11 Mon, Apr 12 Tue.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23 showing Sun and Moon coordinates.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23 showing Sun and Moon coordinates.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23 showing Sun and Moon coordinates.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight. Rows showing twilight and sunrise/sunset times for various latitudes.

Table with columns for Lat., Moonrise, Moonset. Rows showing moonrise and moonset times for various latitudes.

Table with columns for Day, Sun, Mer. Pass, Moon, Age. Rows showing sun and moon data for days 10, 11, 12.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Columns include GHA, Dec, and other astronomical data.

Table with columns for planets (Thu, GHA, Dec) and rows for dates (0-23). Columns include GHA, Dec, and other astronomical data.

Table with columns for planets (Fri, GHA, Dec) and rows for dates (0-23). Columns include GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Wed, Thu, Fri), and Moonset (Wed, Thu, Fri).

Table for Day with columns for Day, Sun (Eqn. of Time, 12h, Mer. Pass), Moon (Mer. Pass, Lower), and Age (12-14, 83-96%).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23) and times (Mer.pass. 10:22). Includes GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing stars like Alpheratz, Schedar, and others.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for both celestial bodies.

Table for Twilight and Sunrise/Sunset with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, and Naught.

Table with columns for Sun, GHA, Dec, and other astronomical data for dates 0-23.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, and others.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for both celestial bodies.

Table for Moonrise and Moonset with columns for Lat., Sat, Moonrise, Mon, Sat, Moonset, Mon.

Table with columns for Mon, GHA, Dec, and other astronomical data for dates 0-23.

Table for Stars with columns for SHA, Mer.pass, and other astronomical data.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for both celestial bodies.

Table for Day with columns for Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars (SHA, Dec) listing various star names and their coordinates for days 0-23.

Table for Stars (SHA, Dec) listing various star names and their coordinates for days 0-23.

Table for Stars (SHA, Dec) listing various star names and their coordinates for days 0-23.

Table for Sun and Moon (GHA, Dec, HP) listing positions and parameters for days 0-23.

Table for Sun and Moon (GHA, Dec, HP) listing positions and parameters for days 0-23.

Table for Sun and Moon (GHA, Dec, HP) listing positions and parameters for days 0-23.

Table for Twilight (Lat., Naat., Civil, Sunrise, Sunset, Twilight) listing times for various latitudes.

Table for Moonrise (Lat., Tue, Wed, Thu) listing moonrise and moonset times for various latitudes.

Table for Day (Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) listing astronomical data for days 19-21.



Table with columns for Venus, Mars, Jupiter, Saturn, Stars (SHA, Dec), and Mer. pass. Data includes celestial coordinates and magnitude for various stars and planets.

Table with columns for Sun, GHA, Dec, and Mer. pass. Data includes celestial coordinates and magnitude for the Sun and other celestial bodies.

Table with columns for Sun, GHA, Dec, and Mer. pass. Data includes celestial coordinates and magnitude for the Sun and other celestial bodies.

Table with columns for Stars (SHA, Dec) and Mer. pass. Data includes celestial coordinates and magnitude for various stars.

Table with columns for Stars (SHA, Dec) and Mer. pass. Data includes celestial coordinates and magnitude for various stars.

Table with columns for Stars (SHA, Dec) and Mer. pass. Data includes celestial coordinates and magnitude for various stars.

Table with columns for Sun, Moon (GHA, Dec, HP), and Mer. pass. Data includes celestial coordinates and magnitude for the Sun and Moon.

Table with columns for Sun, Moon (GHA, Dec, HP), and Mer. pass. Data includes celestial coordinates and magnitude for the Sun and Moon.

Table with columns for Sun, Moon (GHA, Dec, HP), and Mer. pass. Data includes celestial coordinates and magnitude for the Sun and Moon.

Table with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.). Data includes twilight and sunrise/sunset times for various latitudes.

Table with columns for Lat., Moonrise, Moonset, and Moonset. Data includes moonrise and moonset times for various latitudes.

Table with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age. Data includes time and age information for various days.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table with columns for planets (Tue, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table with columns for planets (Wed, GHA, Dec) and rows for dates (0-23). Includes GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) and rows for dates (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonset with columns for Lat., Moonrise (Mon, Tue, Wed), Moonset (Mon, Tue, Wed), and Moonset (Mon, Tue, Wed).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Mer. Pass., and Age, including a moon phase icon.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Fri, Sat) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Sat) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table for Stars with columns for SHA and Dec, listing stars like Alpharatz, Ankaa, Schedar, etc.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, Acrux, etc.

Table for Stars with columns for SHA and Dec, listing stars like Apr 28 Thu, Apr 29 Fri, Apr 30 Sat.

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Thu, Fri, Sat).

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Thu, Fri, Sat).

Table for Sun and Moon with columns for GHA, Dec, and HP for each day (Thu, Fri, Sat).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Sat), and Moonset (Thu, Fri, Sat).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Mer. Pass. Upper/Lower, and Age 8-1%.

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer.pass. data at the bottom.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer.pass. data at the bottom.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer.pass. data at the bottom.

Table with columns for Stars, SHA, Dec, Mer.pass. and rows for various stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table with columns for May 01 Sun, SHA, Mer.pass. and rows for Venus, Mars, Jupiter, Saturn.

Table with columns for Horizontal parallax, Venus, Mars.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, d, HP and rows for various celestial objects.

Table with columns for Mon, GHA, Dec, GHA, Dec, d, HP and rows for various celestial objects.

Table with columns for Tue, GHA, Dec, GHA, Dec, d, HP and rows for various celestial objects.

Table with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.) and rows for various latitudes.

Table with columns for Lat., Moonrise, Moonset and rows for various latitudes.

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Lower) and Age.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for SHA and Dec, listing stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, and HP for days 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, and HP for days 0-23.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Wed, Thu, Fri), and Moonset (Wed, Thu, Fri).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for SHA and Mer. pass, listing stars like May 04 Wed, May 05 Thu, May 06 Fri.

Table for Sun and Moon with columns for GHA, Dec, and HP for days 0-23.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age 4-6.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Sun, GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec. Lists stars like Denebola, Geniah, Acrux, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Moonrise and Moonset with columns: Lat., Moonrise (Sun, Mon), Moonset (Sat, Sun, Mon). Includes phase diagrams.

Table with columns: Mon, GHA, Dec, Mer. pass. Data rows for days 0-23.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars like May 07 Sat, May 08 Sun, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Day with columns: Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Lower, Upper, Age). Includes phase diagrams.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP) for days 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for days 0-23.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Sun and Moon with columns for Wed, Sun (GHA, Dec), Moon (GHA, Dec, d, HP) for days 0-23.

Table for Moonset with columns for Lat., Moonrise (Tue, Wed, Thu), Moonset (Tue, Wed, Thu) for days 0-23.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Mer-pass, and magnitude.

Table for Sun and Moon with columns for Thu, Sun (GHA, Dec), Moon (GHA, Dec, d, HP) for days 0-23.

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Lower, Age) for days 10-12.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri to Sun).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Fri to Sun).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (Fri to Sun).

Table for Stars with columns for SHA and Dec, listing stars like Alpharatz, Ankaa, Schedar, etc.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Cienah, Acruz, etc.

Table for Stars with columns for SHA and Dec, listing stars like May 13 Fri, May 14 Sat, May 15 Sun, and Horizontal parallax.

Table for Sun and Moon with columns for GHA, Dec, and other parameters (h, d, HP) for each day (Fri to Sun).

Table for Sun and Moon with columns for GHA, Dec, and other parameters (h, d, HP) for each day (Fri to Sun).

Table for Sun and Moon with columns for GHA, Dec, and other parameters (h, d, HP) for each day (Fri to Sun).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonset with columns for Lat., Moonrise (Sat, Sun), Moonset (Fri, Sat, Sun).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for days 0-50.

Table with columns for planets (Tue, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for Tue, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Moonset with columns for Lat., Moonrise (Mon, Tue, Wed), and Moonset (Mon, Tue, Wed) for days 0-50.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Mer.pass, and Dec.

Table for Sun and Moon with columns for Wed, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Sun and Moon with columns for Day, Sun (Eqn of Time, Mer. Pass), and Moon (Mer. Pass, Age) for days 16-18.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Includes rows for dates and planetary data.

Table for Stars with columns: SHA, Dec. Lists various stars like Alpharatz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Fri, GHA, Dec. Lists planetary data for Friday.

Table for Stars with columns: SHA, Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Moonrise and Moonset with columns: Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat).

Table with columns: Sat, GHA, Dec. Lists planetary data for Saturday.

Table for Stars with columns: SHA, Dec. Lists stars like May 19 Thu, Venus, Mars, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD values.

Table for Sunrise and Sunset with columns: Day, Eqn.of Time, Mer. Pass, Upper/Lower Mer. Pass, Age.

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and sub-columns for GHA, Dec, and Mer.pass.

Table with columns for Mon, GHA, Dec, Mer.pass and sub-columns for GHA, Dec, Mer.pass.

Table with columns for Tue, GHA, Dec, Mer.pass and sub-columns for GHA, Dec, Mer.pass.

Table with columns for Stars, SHA, Dec, Mer.pass and sub-columns for SHA, Dec, Mer.pass.

Table with columns for Stars, SHA, Dec, Mer.pass and sub-columns for SHA, Dec, Mer.pass.

Table with columns for Stars, SHA, Dec, Mer.pass and sub-columns for SHA, Dec, Mer.pass.

Table with columns for Sun, Moon, GHA, Dec, Mer.pass and sub-columns for GHA, Dec, Mer.pass.

Table with columns for Sun, Moon, GHA, Dec, Mer.pass and sub-columns for GHA, Dec, Mer.pass.

Table with columns for Sun, Moon, GHA, Dec, Mer.pass and sub-columns for GHA, Dec, Mer.pass.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and sub-columns for Naut., Civil, Mer., Upper, Lower, Age.

Table with columns for Lat., Moonrise, Moonset and sub-columns for Sun, Moon, Mer., Upper, Lower, Age.

Table with columns for Day, Eqn. of Time, Mer. Pass, Mer. Pass, Mer. Pass, Age and sub-columns for 00h, 12h, Upper, Lower, Age.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) for days 0-23.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for days 0-23.

Table with columns for Moonrise (Wed, Thu, Fri) and Moonset (Wed, Thu, Fri) for days 0-23.

Table with columns for Day, Eqn. of Time, Mer. Pass, Upper/Mer. Pass, Lower/Mer. Pass, and Age for days 25-27.



Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for GHA, Dec, and Mer. pass. values.

Table with columns for Sun, GHA, Dec, Mer. pass. values for various celestial bodies.

Table with columns for Mon, GHA, Dec, Mer. pass. values for various celestial bodies.

Table with columns for Stars (SHA, Dec, Mer. pass.) and Horizontal parallax (Venus, Mars).

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) values.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) values.

Table with columns for Mon (GHA, Dec) and Moon (GHA, Dec, d, HP) values.

Table with columns for Twilight (Civil, Naut.), Sunrise, Sunset, and Twilight (Civil, Naut.) values.

Table with columns for Moonrise, Moonset, and Moon phase (Sun, Moon) values.

Table with columns for Sun (Eqn. of Time, Mer. Pass) and Moon (Mer. Pass, Age) values.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for dates 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and Mer.pass.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for dates 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for various latitudes.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for dates 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and Mer.pass.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for dates 0-23.

Table for Moonset with columns for Lat., Moonrise, Moonset, and Moonset (Wed, Thu) for various latitudes.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for dates 0-23.

Table for Stars with columns for Star Name, SHA, Mer.pass, and Horizontal parallax.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for dates 0-23.

Table for Day with columns for Day, Sun (Eqn of Time, Mer. Pass), and Age (1-3, 0-6%) for dates 01-02.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their GHA, Dec, and magnitude data.

Table with columns for planets (Sat, GHA, Dec) and their GHA, Dec, and magnitude data.

Table with columns for planets (Sun, GHA, Dec) and their GHA, Dec, and magnitude data.

Table for Stars with columns for SHA and Dec.

Table for Stars with columns for SHA and Dec.

Table for Stars with columns for SHA and Dec.

Table for Sun and Moon with columns for GHA, Dec, ν, Dec, d, HP.

Table for Sun and Moon with columns for GHA, Dec, ν, Dec, d, HP.

Table for Sun and Moon with columns for GHA, Dec, ν, Dec, d, HP.

Table for Twilight with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Twilight, Naught.

Table for Moonset with columns for Lat., Fri, Moonrise, Sat, Sun, Fri, Moonset, Sat, Sun.

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Age).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes meridian passage times.

Table with columns for planets (Tue, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes meridian passage times.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes meridian passage times.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc. Includes horizontal parallax for Venus and Mars.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-5. Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 6-23. Includes SD and d values.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for days 0-23. Includes twilight times and moon phases.

Table for Moonrise (Mon, Tue, Wed) and Moonset (Mon, Tue, Wed) for days 0-23. Includes moon phases.

Table for Day (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age 7-9 34-54%) for days 06-08. Includes moon phase icons.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for various latitudes.

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat), and Moonset (Fri, Sat) for various latitudes.

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, Mer. pass, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Day with columns for Day, Sun (Eqn of Time, Mer. Pass), Moon (Mer. Pass, Age), and a moon phase icon.



Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Moon, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Stars, SHA, Dec and rows for stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec and rows for stars like Denebola, Geniah, Acrux, etc.

Table with columns for Stars, SHA, Dec and rows for stars like Jun 12 Sun, Jun 13 Mon, Jun 14 Tue, and Horizontal parallax.

Table with columns for Sun, Moon, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Moon, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Moon, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for dates 0-23. Includes twilight and sunrise/sunset times.

Table with columns for Lat., Moonrise, Moonset and rows for dates 0-23. Includes moonrise and moonset times.

Table with columns for Day, Sun, Mer., Moon, Age and rows for dates 12-14. Includes sun and moon data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their GHA, Dec, and Mer. pass. data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their GHA, Dec, and Mer. pass. data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their GHA, Dec, and Mer. pass. data.

Table for Stars with columns for Star name, SHA, Dec, and Mer. pass.

Table for Stars with columns for Star name, SHA, Dec, and Mer. pass.

Table for Stars with columns for Star name, SHA, Dec, and Mer. pass.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP), and SD.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP), and SD.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP), and SD.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonset with columns for Lat., Moonrise (Wed, Thu, Fri), Moonset (Wed, Thu, Fri).

Table for Day with columns for Day, Sun (Eqn of Time, Mer. Pass), Moon (Mer. Pass, Age), and HP.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Mon, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table with columns for stars (SHA, Dec) listing various stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for stars (SHA, Dec) listing various stars like Denebola, Geniah, Acrux, etc.

Table with columns for stars (SHA, Dec) listing various stars like Jun 18 Sat, Jun 19 Sun, Jun 20 Mon, and Horizontal parallax.

Table with columns for Sun and Moon (GHA, Dec, HP) for days 0-23.

Table with columns for Sun and Moon (GHA, Dec, HP) for days 0-23.

Table with columns for Sun and Moon (GHA, Dec, HP) for days 0-23.

Table with columns for twilight (Naut., Civil, Sunrise, Sunset, Civil, Twilight) for various latitudes.

Table with columns for Moonrise and Moonset (Sat, Sun, Mon) for various latitudes.

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age) for days 18-20.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. times.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. times.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. times.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table for Stars (SHA, Dec) listing stars like Denebola, Gienah, Acrux, Gacrux, Althio, Spica, Alkaid, etc.

Table for Stars (SHA, Dec) listing stars like Jun 21 Tue, Jun 22 Wed, Jun 23 Thu, and Horizontal parallax.

Table for Sun and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD and d values.

Table for Sun and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD and d values.

Table for Sun and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD and d values.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for days 0-23.

Table for Moonrise (Tue, Wed, Thu) and Moonset (Tue, Wed, Thu) for days 0-23.

Table for Day (Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age) for days 21-23.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Alpharatz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD values.

Table for twilight and sunrise/sunset times. Columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns for planets: Sat, GHA, Dec, ν, d, HP. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Cienah, Acruz, etc.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD values.

Table for twilight and sunrise/sunset times. Columns: Lat., Moonrise (Fri, Sat, Sun), Moonset (Fri, Sat, Sun).

Table with columns for planets: Sun, GHA, Dec, ν, d, HP. Includes Mer. pass. data.

Table for Stars with columns for SHA and Dec. Lists stars like Jun 24 Fri, Jun 25 Sat, Jun 26 Sun.

Table for Sun and Moon with columns for GHA, Dec, ν, d, HP. Includes SD values.

Table for twilight and sunrise/sunset times. Columns: Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass, Lower, Upper), Age.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table with columns for planets (Tue, GHA, Dec) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table for Stars (SHA, Dec) listing stars like Denebola, Geniah, Acrux, Gacrux, Alioth, Spica, Alkaid, etc.

Table for Stars (SHA, Dec) listing stars like Jun 27 Mon, Jun 28 Tue, Jun 29 Wed, and Horizontal parallax data.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values.

Table for Twilight (Lat., Naat., Civil, Sunrise, Sunset, Civil, Naat.) for various latitudes (N 72° to S 60°).

Table for Moonrise (Lat., Mon, Tue, Wed, Mon, Tue, Wed) for various latitudes (N 72° to S 60°).

Table for Day (Day, Eqn of Time, Mer. Pass, Upper, Lower, Age) for days 27, 28, 29.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23) showing GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec, listing various star names like Alpheratz, Schedar, and others.

Table for Sun and Moon with columns for GHA, Dec, d, and HP, providing data for both celestial bodies.

Table for twilight and sunrise/sunset times, including columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for Fri, GHA, Dec, and rows for dates (0-23) showing astronomical data for Friday.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, and others.

Table for Sun and Moon with columns for GHA, Dec, d, and HP, providing data for Friday.

Table for Moonrise and Moonset times, including columns for Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat), and other data.

Table with columns for Sat, GHA, Dec, and rows for dates (0-23) showing astronomical data for Saturday.

Table for Stars with columns for SHA and Dec, listing stars like Jun 30 Thu, Jul 01 Fri, and others.

Table for Sun and Moon with columns for GHA, Dec, d, and HP, providing data for Saturday.

Table for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age) data.



Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Mon, GHA, Dec and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Stars, SHA, Dec and rows for stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec and rows for stars like Denebola, Genah, Acrux, etc.

Table with columns for Stars, SHA, Dec and rows for stars like Jul 03 Sun, Venus, Mars, etc.

Table with columns for Sun, Moon, GHA, Dec, HP and rows for dates 0-23. Columns include GHA, Dec, HP, and other astronomical data.

Table with columns for Mon, GHA, Dec, HP and rows for dates 0-23. Columns include GHA, Dec, HP, and other astronomical data.

Table with columns for Tue, GHA, Dec, HP and rows for dates 0-23. Columns include GHA, Dec, HP, and other astronomical data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for dates 0-23. Columns include Twilight, Sunrise, Sunset, Twilight, and other astronomical data.

Table with columns for Lat., Moonrise, Moonset and rows for dates 0-23. Columns include Moonrise, Moonset, and other astronomical data.

Table with columns for Day, Sun, Mer., Moon, Age and rows for dates 03-05. Columns include Sun, Mer., Moon, Age, and other astronomical data.

Tables for planets Aries, Venus, Mars, Jupiter, Saturn. Columns: Wed, GHA, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for stars Stars. Columns: Thu, GHA, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for stars Stars. Columns: Fri, GHA, GHA, Dec, GHA, Dec, GHA, Dec. Includes Mer. pass. data.

Table for stars Stars. Columns: SHA, Dec. Includes Mer. pass. data.

Table for stars Stars. Columns: SHA, Dec. Includes Mer. pass. data.

Table for stars Stars. Columns: SHA, Dec. Includes Mer. pass. data.

Tables for Sun and Moon. Columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD data.

Table for Sun and Moon. Columns: Thu, GHA, Dec, GHA, Dec, d, HP. Includes SD data.

Table for Sun and Moon. Columns: Fri, GHA, Dec, GHA, Dec, d, HP. Includes SD data.

Table for twilight and sunrise/sunset. Columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table for moonrise and moonset. Columns: Lat., Moonrise (Wed, Thu, Fri), Moonset (Wed, Thu, Fri).

Table for sun and moon. Columns: Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass., Age).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their coordinates (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun/Moon coordinates (GHA, Dec, d) and HP.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for Sun and Dec coordinates (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sun/Moon coordinates (GHA, Dec, d) and HP.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Sun, Mon), Moonset (Sun, Mon).

Table with columns for Moon and Dec coordinates (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, Mer.pass, and Dec.

Table for Sun and Moon with columns for Sun/Moon coordinates (GHA, Dec, d) and HP.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Stars with columns for Star Name, SHA, Dec, and magnitude.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonrise/Moonset with columns for Lat., Moonrise (Wed, Thu), Moonset (Wed, Thu).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age.

Aries				Venus				Mars				Jupiter				Saturn			
Fri	GHA	GHA	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec
0	292°49.7	206°49.6	N22°34.9	257°48.9	N12°05.0	284°34.4	N02°04.9	326°04.2	S14°41.1										
1	307°52.2	221°48.9	35.1	272°49.7	05.5	299°36.7	05.0	341°06.8	41.2										
2	322°54.6	236°48.1	35.3	287°50.5	06.1	314°39.1	05.0	356°09.4	41.3										
3	337°57.1	251°47.3	35.5	302°51.3	06.6	329°41.4	05.0	371°12.0	41.3										
4	352°59.6	266°46.5	35.6	317°52.1	07.2	344°43.8	05.1	386°14.6	41.4										
5	8°02.0	281°45.7	35.8	332°52.9	07.8	359°46.1	05.1	41°17.2	41.4										
6	23°04.5	296°44.9	N22°36.0	347°53.8	N12°08.4	14°48.5	N02°05.1	56°19.8	S14°41.5										
7	38°06.9	311°44.1	36.2	2°54.6	08.9	29°50.9	05.2	71°22.4	41.5										
8	53°09.4	326°43.3	36.4	17°55.4	09.5	44°53.2	05.2	86°25.0	41.6										
9	68°11.9	341°42.5	36.6	32°56.2	10.1	59°55.6	05.2	101°27.6	41.6										
10	83°14.3	356°41.7	36.8	47°57.0	10.6	74°57.9	05.3	116°30.2	41.7										
11	98°16.8	11°40.9	36.9	62°57.8	11.2	90°00.3	05.3	131°32.8	41.7										
12	113°19.3	26°40.1	N22°37.1	77°58.7	N12°11.7	105°02.7	N02°05.3	146°35.4	S14°41.8										
13	128°21.7	41°39.3	37.3	92°59.5	12.3	120°05.0	05.3	161°38.0	41.9										
14	143°24.2	56°38.5	37.5	108°00.3	12.9	135°07.4	05.4	176°40.6	41.9										
15	158°26.7	71°37.8	37.8	123°01.1	13.4	150°09.7	05.4	191°43.2	42.0										
16	173°29.1	86°37.0	37.6	138°01.9	14.0	165°12.1	05.4	206°45.8	42.0										
17	188°31.6	101°36.2	38.0	153°02.7	14.6	180°14.5	05.5	221°48.4	42.1										
18	203°34.1	116°35.4	N22°38.2	168°03.6	N12°15.1	195°16.8	N02°05.5	236°51.0	S14°42.1										
19	218°36.5	131°34.6	38.3	183°04.4	15.7	210°19.2	05.6	251°53.6	42.2										
20	233°39.0	146°33.8	38.5	198°05.2	16.2	225°21.5	05.6	266°56.2	42.2										
21	248°41.4	161°33.0	38.7	213°06.0	16.8	240°23.9	05.6	281°58.8	42.3										
22	263°43.9	176°32.2	38.8	228°06.8	17.4	255°26.3	05.6	297°01.4	42.3										
23	278°46.4	191°31.4	39.0	243°07.6	17.9	270°28.6	05.7	312°04.0	42.4										

Mer.pass. 04:28  $\nu$ -0.8' d 0.2' m -3.90  $\nu$  0.8' d 0.6' m 0.29  $\nu$  2.4' d 0.0' m -2.52  $\nu$  2.6' d -0.1' m 0.48

Sat	GHA	GHA	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec				
0	293°48.8	206°30.6	N22°39.2	258°08.5	N12°18.5	285°31.0	N02°05.7	327°06.6	S14°42.5										
1	308°51.3	221°29.8	39.3	273°09.3	19.1	300°33.4	05.7	342°09.2	42.5										
2	323°53.8	236°29.0	39.5	288°10.1	19.6	315°35.7	05.7	357°11.9	42.6										
3	338°56.2	251°28.2	39.7	303°10.9	20.2	330°38.1	05.8	372°14.5	42.6										
4	353°58.7	266°27.4	39.8	318°11.7	20.7	345°40.4	05.8	387°17.1	42.7										
5	9°01.2	281°26.6	40.0	333°12.5	21.3	40°42.8	05.8	42°19.7	42.7										
6	24°03.6	296°25.8	N22°40.2	348°13.4	N12°21.9	15°45.2	N02°05.9	57°22.3	S14°42.8										
7	39°06.1	311°25.0	40.3	3°14.2	22.4	30°47.5	05.9	72°24.9	42.8										
8	54°08.6	326°24.2	40.5	18°15.0	23.0	45°49.9	05.9	87°27.5	42.9										
9	69°11.0	341°23.4	40.6	33°15.8	23.5	60°52.3	05.9	102°30.1	42.9										
10	84°13.5	356°22.6	40.8	48°16.6	24.1	75°54.6	06.0	117°32.7	43.0										
11	99°15.9	11°21.8	40.9	63°17.5	24.6	90°57.0	06.0	132°35.3	43.1										
12	114°18.4	26°21.0	N22°41.1	78°18.3	N12°25.2	105°59.4	N02°06.0	147°37.9	S14°43.1										
13	129°20.9	41°20.2	41.2	93°19.1	25.8	121°01.7	06.1	162°40.5	43.2										
14	144°23.3	56°19.4	41.4	108°19.9	26.6	136°04.1	06.1	177°43.1	43.2										
15	159°25.8	71°18.6	41.5	123°20.7	26.9	151°06.5	06.1	192°45.7	43.3										
16	174°28.3	86°17.8	41.7	138°21.5	27.4	166°08.8	06.1	207°48.3	43.3										
17	189°30.7	101°17.0	41.8	153°22.4	28.0	181°11.2	06.2	222°50.9	43.4										
18	204°33.2	116°16.2	N22°42.0	168°23.2	N12°28.5	196°13.6	N02°06.2	237°53.5	S14°43.4										
19	219°35.7	131°15.4	42.1	183°24.0	29.1	211°15.9	06.2	252°56.2	43.5										
20	234°38.1	146°14.6	42.3	198°24.8	29.7	226°18.3	06.3	267°58.8	43.5										
21	249°40.6	161°13.8	42.4	213°25.6	30.2	241°20.7	06.3	283°01.4	43.6										
22	264°43.0	176°13.0	42.6	228°26.5	30.8	256°23.1	06.3	298°04.0	43.7										
23	279°45.5	191°12.2	42.7	243°27.3	31.3	271°25.4	06.3	313°06.6	43.7										

Mer.pass. 04:24  $\nu$ -0.8' d 0.2' m -3.90  $\nu$  0.8' d 0.6' m 0.28  $\nu$  2.4' d 0.0' m -2.53  $\nu$  2.6' d -0.1' m 0.48

Sun	GHA	GHA	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec	GHA	GHA	Dec	Dec				
0	294°48.0	206°11.4	N22°42.8	258°28.1	N12°31.9	286°27.8	N02°06.4	328°09.2	S14°43.8										
1	309°50.4	221°10.6	43.0	273°28.9	32.4	301°30.2	06.4	343°11.8	43.8										
2	324°52.9	236°09.8	43.1	288°29.7	33.0	316°32.5	06.4	358°14.4	43.9										
3	339°55.4	251°09.0	43.3	303°30.5	33.5	331°34.9	06.4	373°17.0	43.9										
4	354°57.8	266°08.2	43.4	318°31.4	34.1	346°37.3	06.5	388°19.6	44.0										
5	10°00.3	281°07.4	43.5	333°32.2	34.7	1°39.7	06.5	43°22.2	44.0										
6	25°02.8	296°06.6	N22°43.7	348°33.0	N12°35.2	16°42.0	N02°06.5	58°24.8	S14°44.1										
7	40°05.2	311°05.8	43.8	3°33.8	35.8	31°44.4	06.5	73°27.4	44.2										
8	55°07.7	326°05.0	43.9	18°34.6	36.3	46°46.8	06.6	88°30.1	44.2										
9	70°10.2	341°04.2	44.0	33°35.5	36.9	61°49.1	06.6	103°32.7	44.3										
10	85°12.6	356°03.4	44.2	48°36.3	37.4	76°51.5	06.6	118°35.3	44.3										
11	100°15.1	11°02.6	44.3	63°37.1	38.0	91°53.9	06.6	133°37.9	44.4										
12	115°17.5	26°01.8	N22°44.6	78°37.9	N12°38.5	106°56.3	N02°06.7	148°40.5	S14°44.4										
13	130°20.0	41°01.0	44.6	93°38.7	39.1	121°58.6	06.7	163°43.1	44.5										
14	145°22.5	56°00.2	44.7	108°39.6	39.6	137°01.0	06.7	178°45.7	44.5										
15	160°24.9	70°59.4	44.8	123°40.4	40.2	152°03.4	06.7	193°48.3	44.6										
16	175°27.4	85°58.6	44.9	138°41.2	40.7	167°05.8	06.8	208°50.9	44.7										
17	190°29.9	100°57.8	45.0	153°42.0	41.3	182°08.1	06.8	223°53.5	44.7										
18	205°32.3	115°57.0	N22°45.2	168°42.8	N12°41.8	197°10.5	N02°06.8	238°56.1	S14°44.8										
19	220°34.8	130°56.2	45.3	183°43.7	42.4	212°12.9	06.8	253°58.8	44.8										
20	235°37.3	145°55.4	45.4	198°44.5	42.9	227°15.3	06.9	269°01.4	44.9										
21	250°39.7	160°54.6	45.5	213°45.3	43.5	242°17.6	06.9	284°04.0	44.9										
22	265°42.2	175°53.8	45.6	228°46.1	44.0	257°20.0	06.9	299°06.6	45.0										
23	280°44.7	190°52.9	45.8	243°46.9	44.6	272°22.4	06.9	314°09.2	45.1										

Mer.pass. 04:20  $\nu$ -0.8' d 0.1' m -3.90  $\nu$  0.8' d 0.6' m 0.27  $\nu$  2.4' d 0.0' m -2.54  $\nu$  2.6' d -0.1' m 0.47

Stars		SHA	Dec
Alpheratz	357°36.7	29°12.7	
Ankaa	353°09.1	-42°10.8	
Schedar	349°33.2	56°39.3	
D			

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Tue, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table for Stars (SHA, Dec) listing stars like Denebola, Genah, Acrux, Gacrux, Alioth, Spica, Alkaid, etc.

Table for Stars (SHA, Dec) listing stars like Al Na'ir, Fomalhaut, Scheat, Markab, and other constellations.

Table for Horizontal parallax (Ven, Mars) with values 0.1.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23. Includes SD values.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Twilight) for days 0-23.

Table for Moonrise (Mon, Tue, Wed) and Moonset (Mon, Tue, Wed) for days 0-23.

Table for Sun (Eqn. of Time, Mer. Pass) and Moon (Mer. Pass., Lower, Age) for days 18-20.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Fri) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sat) and their positions (GHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) for each day (0-23).

Table with columns for twilight (Lat., Naught, Civil, Sunrise, Sunset, Civil, Naught) for each day (0-23).

Table with columns for moonrise (Lat., Thu, Fri, Sat, Thu, Fri, Sat) for each day (0-23).

Table with columns for day (Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age) for each day (21-23).

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and sub-columns for GHA, Dec, SHA, Dec. Rows 0-23.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Stars, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table with columns for Stars, SHA, Mer-pass, Venus, Mars. Lists stars like Jul 24 Sun, Jul 25 Mon, Jul 26 Tue.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, d, HP. Rows 0-23.

Table with columns for Mon, Moon, GHA, Dec, GHA, Dec, d, HP. Rows 0-23.

Table with columns for Tue, Moon, GHA, Dec, GHA, Dec, d, HP. Rows 0-23.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight. Rows 0-23.

Table with columns for Lat., Moonrise, Moonset. Rows 0-23.

Table with columns for Day, Sun, Moon, Mer. Pass, Upper, Lower, Age. Rows 24-26.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Thu) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Fri) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for stars (SHA, Dec) and names (Alpheratz, Ankaa, Schedar, etc.) for days 0-23.

Table with columns for stars (SHA, Dec) and names (Denebola, Geniah, Acrux, etc.) for days 0-23.

Table with columns for stars (SHA, Mer. pass) and names (Jul 27 Wed, Jul 28 Thu, Jul 29 Fri) for days 0-23.

Table with columns for Sun and Moon (h, Sun, Moon) and their positions (GHA, Dec, ν, d, HP) for days 0-23. Includes SD values.

Table with columns for Sun and Moon (Thu) and their positions (GHA, Dec, ν, d, HP) for days 0-23. Includes SD values.

Table with columns for Sun and Moon (Fri) and their positions (GHA, Dec, ν, d, HP) for days 0-23. Includes SD values.

Table with columns for twilight (Lat., Twilight, Sunrise, Sunset, Twilight) for days 0-23.

Table with columns for moonrise (Lat., Moonrise, Moonset) for days 0-23.

Table with columns for day (Day, Eqn of Time, Mer. Pass, Moon) for days 27-29.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, SHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for planets: Sun, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for planets: Mon, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns: Stars, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns: Stars, SHA, Dec. Lists stars like Denebola, Genah, Acrux, etc.

Table with columns: Stars, SHA, Mer-pass. Lists stars like Jul 30 Sat, Jul 31 Sun, Aug 01 Mon.

Table with columns: Sun, Moon. Sub-columns for GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23.

Table with columns: Sun, Moon. Sub-columns for GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23.

Table with columns: Sun, Moon. Sub-columns for GHA, Dec, GHA, Dec, GHA, Dec, HP. Rows 0-23.

Table with columns: Lat., Twilight, Sunrise, Sunset, Twilight. Rows for various latitudes.

Table with columns: Lat., Moonrise, Moonset. Rows for various latitudes.

Table with columns: Day, Sun, Moon. Sub-columns for Eqn. of Time, Mer. Pass, Mer. Pass, Age.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and Mer. pass. Rows 0-23.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.). Rows 0-23.

Table with columns: Wed, GHA, Dec, Mer. pass. Rows 0-23.

Table for Stars with columns: SHA, Dec, Mer. pass. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns: Wed, GHA, Dec, Moon (GHA, Dec, d, HP). Rows 0-23.

Table for Moonset with columns: Lat., Moonrise (Tue, Wed, Thu), Moonset (Tue, Wed, Thu). Rows 0-23.

Table with columns: Thu, GHA, Dec, Mer. pass. Rows 0-23.

Table for Stars with columns: SHA, Mer. pass. Lists stars like Aug 02 Tue, Venus, Mars, etc.

Table for Sun and Moon with columns: Thu, GHA, Dec, Moon (GHA, Dec, d, HP). Rows 0-23.

Table for Moonset with columns: Day, Sun (Eqn. of Time, Mer. Pass), Moon (Mer. Pass., Lower, Age). Rows 0-23.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include GHA, Dec, and other astronomical data.

Table for Stars with columns: SHA, Dec. Lists various stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Sat, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Lists satellite data.

Table for Stars with columns: SHA, Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Moonrise and Moonset with columns: Lat., Moonrise (Sat, Sun), Moonset (Sat, Sun). Includes a moon phase icon.

Table with columns: Sun, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Lists solar data.

Table for Stars with columns: SHA, Mer. pass. Lists stars like Aug 05 Fri, Aug 06 Sat, Aug 07 Sun.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Includes SD and d values.

Table for Day with columns: Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, Age. Includes a moon phase icon.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and Dec. Rows 0-23 showing celestial coordinates.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, Dec. Rows Tue 0-23 showing celestial coordinates.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, Dec. Rows Wed 0-23 showing celestial coordinates.

Table with columns for Stars: SHA, Dec. Rows listing stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars: SHA, Dec, Mer.pass. Rows listing stars like Denebola, Genah, Acrux, etc.

Table with columns for Stars: SHA, Mer.pass. Rows listing stars like Aug 08 Mon, Aug 09 Tue, Aug 10 Wed.

Table with columns for Sun and Moon: GHA, Dec, GHA, Dec, d, HP. Rows 0-23 showing positions.

Table with columns for Sun and Moon: GHA, Dec, GHA, Dec, d, HP. Rows Tue 0-23 showing positions.

Table with columns for Sun and Moon: GHA, Dec, GHA, Dec, d, HP. Rows Wed 0-23 showing positions.

Table with columns for Twilight: Lat, Naat., Civil, Sunrise, Sunset, Civil, Twilight, Naat. Rows 72°N to 60°S.

Table with columns for Moonrise: Lat, Mon, Tue, Wed, Mon, Tue, Wed. Rows 72°N to 60°S.

Table with columns for Sun: Day, Eqn. of Time, Mer. Pass, Mer. Pass, Lower, Age. Rows 08-10.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (Fri, Sat).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), and Moonset (Thu, Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat).

Table for Stars with columns for Star Name, SHA, Mer.pass, and Dec.

Table for Sun and Moon with columns for Sat, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP).

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age).

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (GHA, Dec, GHA, Dec, GHA, Dec). Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (GHA, Dec, GHA, Dec, GHA, Dec). Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude (GHA, Dec, GHA, Dec, GHA, Dec). Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for Stars: SHA, Dec, Mer-pass. Lists stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table with columns for Stars: SHA, Dec, Mer-pass. Lists stars like Denebola, Genah, Acrux, Gacrux, Althio, Spica, Alkaid, Hadar, Menkent, etc.

Table with columns for Stars: SHA, Dec, Mer-pass. Lists stars like Aug 14 Sun, Aug 15 Mon, Aug 16 Tue, and Horizontal parallax.

Table with columns for Sun and Moon: Sun (GHA, Dec, GHA, Dec, GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table with columns for Sun and Moon: Sun (GHA, Dec, GHA, Dec, GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table with columns for Sun and Moon: Sun (GHA, Dec, GHA, Dec, GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table with columns for Twilight: Lat., Naut., Civil, Sunrise, Sunset, Civil, Twilight, Naut. Rows 0-23 showing twilight times for various latitudes.

Table with columns for Moonrise: Lat., Sun, Moonrise (Mon, Tue), Moonset (Mon, Tue). Rows 0-23 showing moonrise and moonset times.

Table with columns for Day: Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age. Includes a moon phase icon.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Rows 0-23 showing celestial coordinates and magnitudes.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, and magnitude. Rows 0-23 showing celestial coordinates and magnitudes.

Table of Stars with columns: Stars, SHA, Dec, Mer.pass. Lists stars like Alpheratz, Ankaa, Schedar, etc. with their coordinates and magnitudes.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Rows 0-23 showing positions and magnitudes.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.). Rows 0-23 showing times for various latitudes.

Table for Moonrise and Moonset with columns: Lat., Moonrise (Wed, Thu, Fri), Moonset (Wed, Thu, Fri). Rows 0-23 showing times for various latitudes.

Table for Day with columns: Day, Sun (Eqn. of Time, 12h, Mer. Pass), Moon (Mer. Pass., Lower, Age). Rows 17-23 showing solar and lunar data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions in GHA, Dec, and other parameters.

Table with columns for planets (Sun, GHA, Dec) and their positions in GHA, Dec, and other parameters.

Table with columns for planets (Mon, GHA, Dec) and their positions in GHA, Dec, and other parameters.

Table with columns for Stars (SHA, Dec, Mer.pass) and their positions in SHA, Dec, and other parameters.

Table with columns for Sun and Moon (GHA, Dec, GHA, Dec, d, HP) and their positions in GHA, Dec, and other parameters.

Table with columns for Sun and Moon (GHA, Dec, GHA, Dec, d, HP) and their positions in GHA, Dec, and other parameters.

Table with columns for Sun and Moon (GHA, Dec, GHA, Dec, d, HP) and their positions in GHA, Dec, and other parameters.

Table with columns for twilight and sunrise/sunset (Lat., Twilight, Sunrise, Sunset, Twilight) and their times.

Table with columns for moonrise and moonset (Lat., Moonrise, Moonset) and their times.

Table with columns for day, sun, and moon (Day, Eqn of Time, Mer. Pass, Mer. Pass, Age) and their parameters.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table with columns for Sun and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for twilight and sunrise/sunset times (Lat., Naup., Civil, Sunrise, Sunset, Civil, Twiilight, Naup.) for days 0-23.

Table with columns for planets (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec, Mer.pass) for days 0-23.

Table with columns for Sun and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for moonrise and moonset times (Lat., Tue, Moonrise, Thu, Tue, Moonset, Thu) for days 0-23.

Table with columns for planets (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Mer.pass, Horizontal parallax) for days 0-23.

Table with columns for Sun and Moon (GHA, Dec, d, HP) for days 0-23.

Table with columns for Day, Sun (Eqn of Time, Mer. Pass), and Moon (Mer. Pass, Age 26-28, 17-5%) for days 23-25.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri, Sat, Sun).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP).

Table for twilight and sunrise/sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat, Sun).

Table for Stars with columns for Star name, SHA, and Dec.

Table for Sun and Moon with columns for Sat, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP).

Table for Moonset and Moonrise with columns for Lat., Moonset (Sat, Sun), and Moonrise (Sat, Sun).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Stars with columns for Star name, SHA, Mer. pass, and Horizontal parallax.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age.

Planetary positions for Aries, Venus, Mars, Jupiter, and Saturn. Columns include Mon, GHA, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows list dates from 0 to 23.

Mer.pass. 01:31 v -0.6' d -0.9' m -3.89 v 1.0' d 0.3' m -0.15 v 2.7' d -0.1' m -2.86 v 2.6' d -0.1' m 0.39

Planetary positions for TUE. Columns include Tue, GHA, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows list dates from 0 to 23.

Mer.pass. 01:27 v -0.6' d -0.9' m -3.89 v 1.0' d 0.3' m -0.17 v 2.7' d -0.1' m -2.86 v 2.6' d -0.1' m 0.40

Planetary positions for Wed. Columns include Wed, GHA, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows list dates from 0 to 23.

Mer.pass. 01:23 v -0.6' d -1.0' m -3.89 v 1.1' d 0.3' m -0.18 v 2.7' d -0.1' m -2.87 v 2.6' d -0.1' m 0.40

Stars and Sun/Moon data. Columns include Stars (SHA, Dec), Sun (GHA, Dec), Moon (GHA, Dec, d, HP). Rows list star names and dates from 0 to 23.

SD = 15.8' d = -0.9' SD = 15.2'

Stars and Sun/Moon data. Columns include Tue, GHA, Dec, GHA, Dec, d, HP. Rows list dates from 0 to 23.

SD = 15.8' d = -0.9' SD = 15.4'

Stars and Sun/Moon data. Columns include Wed, GHA, Dec, GHA, Dec, d, HP. Rows list dates from 0 to 23.

SD = 15.8' d = -0.9' SD = 15.5'

Twilight and Sunrise/Sunset data. Columns include Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.). Rows list latitudes from N 72° to S 60°.

Moonrise and Moonset data. Columns include Lat., Moonrise (Mon, Tue, Wed), Moonset (Mon, Tue, Wed). Rows list latitudes from N 72° to S 60°.

Equation of Time and Meridian Passage data. Columns include Day, Eqn. of Time, Mer. Pass, Mer. Pass., Lower, Age. Rows list days from 29 to 31.

Equation of Time and Meridian Passage data. Columns include Day, Eqn. of Time, Mer. Pass, Mer. Pass., Lower, Age. Rows list days from 29 to 31.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), and Moonset (Thu, Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for Sat, Sun (GHA, Dec), and Moon (GHA, Dec, d, HP) for each day.

Table for Day with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age).



Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Mon, GHA, Dec and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Stars, SHA, Dec and rows for star names like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec and rows for star names like Denebola, Gienah, Acrux, etc.

Table with columns for Stars, SHA, Dec and rows for star names like Sep 04 Sun, Sep 05 Mon, Sep 06 Tue, and Horizontal parallax.

Table with columns for Sun, Moon, GHA, Dec, ν, d, HP and rows for dates 0-23. Columns include GHA, Dec, ν, d, HP.

Table with columns for Mon, GHA, Dec, ν, d, HP and rows for dates 0-23. Columns include GHA, Dec, ν, d, HP.

Table with columns for Tue, GHA, Dec, ν, d, HP and rows for dates 0-23. Columns include GHA, Dec, ν, d, HP.

Table with columns for Lat., Twilight, Sunrise, Sunset, and rows for latitudes 72°N to 60°S. Columns include Twilight, Sunrise, Sunset.

Table with columns for Lat., Moonrise, Moonset and rows for latitudes 72°N to 60°S. Columns include Moonrise, Moonset.

Table with columns for Day, Sun, Moon and rows for dates 04-06. Columns include Sun, Moon.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for stars (SHA, Dec), Sun (GHA, Dec), and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table with columns for stars (SHA, Dec), Sun (GHA, Dec), and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table with columns for stars (SHA, Dec), Sun (GHA, Dec), and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table with columns for twilight (Naut., Civil), sunrise, sunset, and twilight (Civil, Naut.) for days 0-23.

Table with columns for moonrise, moonset, and moon phase (00h, 12h, Mer. Pass, Upper, Lower) for days 0-23.

Table with columns for day, eqn. of time, mer. pass, moon phase, and age for days 07-09.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (SHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Sun, GHA, Dec) and their positions (SHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Mon, GHA, Dec) and their positions (SHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table listing star names and their positions (SHA, Dec). Includes sections for 'Mer. pass.', 'Sep 10 Sat', 'Sep 11 Sun', 'Sep 12 Mon', and 'Horizontal parallax'.

Table for Sun and Moon positions (GHA, Dec, SHA, Dec, d, HP) for days 0-23. Includes SD and d values at the bottom.

Table for Sun and Moon positions (GHA, Dec, SHA, Dec, d, HP) for days 0-23. Includes SD and d values at the bottom.

Table for Sun and Moon positions (GHA, Dec, SHA, Dec, d, HP) for days 0-23. Includes SD and d values at the bottom.

Table showing twilight and sunrise/sunset times (Lat., Naat., Civil, Sunrise, Sunset, Civil, Twilight, Naat.) for various latitudes from 70°N to 60°S.

Table showing moonrise and moonset times (Lat., Sat, Moonrise, Mon, Sat, Moonset, Mon) for various latitudes from 70°N to 60°S.

Table showing equation of time (Eqn. of Time, Mer. Pass, Upper, Lower) and age (Age) for various times of day.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for stars (Deneb, Gienah, Acrux, etc.) and their positions (SHA, Dec) for each day (0-23).

Table with columns for stars (Sep 13 Tue, Sep 14 Wed, Sep 15 Thu) and their positions (SHA, Mer. pass) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (Wed, GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (Thu, GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for twilight (Lat, Naut., Civil, Sunrise, Sunset, Civil, Twilight, Naut.) for various latitudes (N 72° to S 60°).

Table with columns for moonrise (Lat, Tue, Moonrise, Thu, Tue, Moonset, Thu) for various latitudes (N 72° to S 60°).

Table with columns for day (Day, Eqn. of Time, Mer. Pass, Upper, Lower, Age) for various latitudes (13, 14, 15).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day from 0 to 23.

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day from 0 to 23.

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day from 0 to 23.

Table for Stars with columns for Star name, SHA, Dec, and magnitude.

Table for Stars with columns for Star name, SHA, Dec, and magnitude.

Table for Stars with columns for Star name, SHA, Dec, and magnitude.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day from 0 to 23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day from 0 to 23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day from 0 to 23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) for each day from 0 to 23.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Fri, Sat, Sun), and Moonset (Fri, Sat, Sun) for each day from 0 to 23.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age for each day from 16 to 18.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for GHA, Dec, SHA, Dec. Rows 0-23.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Sub-columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table for Stars with columns: Stars, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table for Stars with columns: Stars, SHA, Dec. Lists stars like Denebola, Gienah, Acrux, etc.

Table for Stars with columns: Stars, SHA, Mer.pass. Lists stars for Sep 19, 20, 21 and horizontal parallax.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, HP). Rows 0-23.

Table for Sun and Moon with columns: Sun (Tue, GHA, Dec), Moon (Tue, GHA, Dec, HP). Rows 0-23.

Table for Sun and Moon with columns: Sun (Wed, GHA, Dec), Moon (Wed, GHA, Dec, HP). Rows 0-23.

Table for Twilight and Sunrise/Sunset with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.). Rows 0-60.

Table for Moonrise and Moonset with columns: Lat., Moonrise (Mon, Tue, Wed), Moonset (Mon, Tue, Wed). Rows 0-60.

Table for Day with columns: Day, Eqn. of Time, Mer. Pass, Mer. Pass, Age. Includes a moon phase icon.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Dec, listing stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, d, HP for days 0-23. Includes SD and d values.

Table for Twilight and Moonset with columns for Lat., Time, and Moonset details for various latitudes.

Table with columns for Fri and Dec for planets (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, d, HP for days 0-23. Includes SD and d values.

Table for Moonset with columns for Lat., Time, and Moonset details for various latitudes.

Table with columns for Sat and Dec for planets (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars with columns for SHA and Mer. pass, listing stars like Sep 22 Thu, Sep 23 Fri, etc.

Table for Sun and Moon with columns for GHA, Dec, d, HP for days 0-23. Includes SD and d values.

Table for Moonset with columns for Day, Time, and Moonset details for various latitudes.

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and other astronomical data.

Table with columns for Mon, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and other astronomical data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and other astronomical data.

Table with columns for SHA, Dec, Mer.pass and rows for various stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Sun, Moon and rows for dates 0-23. Includes GHA, Dec, ν, d, HP and other astronomical data.

Table with columns for Mon, Moon and rows for dates 0-23. Includes GHA, Dec, ν, d, HP and other astronomical data.

Table with columns for Tue, Moon and rows for dates 0-23. Includes GHA, Dec, ν, d, HP and other astronomical data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for various latitudes from N 72° to S 60°.

Table with columns for Lat., Moonrise, Moonset and rows for various latitudes from N 72° to S 60°.

Table with columns for Day, Sun, Mer., Moon and rows for dates 25-27. Includes Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age and a moon phase icon.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (SHA, Dec) for each day (Wed, Thu, Fri).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri).

Table for Stars (SHA, Dec) and Horizontal parallax (Venus, Mars) for each day (Wed, Thu, Fri).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (Wed, Thu, Fri).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (Thu, Fri).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (Fri).

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for each day (Wed, Thu, Fri).

Table for Moonrise (Moonset, Moonset) for each day (Wed, Thu, Fri).

Table for Sun (Eqn. of Time, Mer. Pass) and Moon (Mer. Pass, Lower, Age) for each day (Wed, Thu, Fri).



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (SHA, Dec) for each day (0-23).

Table with columns for planets (Sun, GHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for planets (Mon, GHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) listing various stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for stars (SHA, Dec) listing various stars like Denebola, Genah, Acrux, etc.

Table with columns for stars (SHA, Dec) listing various stars like Oct 01 Sat, Oct 02 Sun, Oct 03 Mon, and Horizontal parallax.

Table with columns for Sun and Moon (GHA, Dec, SHA, Dec, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, SHA, Dec, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, SHA, Dec, HP) for each day (0-23).

Table with columns for twilight (Naut., Civil, Sunrise, Sunset, Civil, Twilight, Naut.) for various latitudes (N 72° to S 60°).

Table with columns for Moonrise and Moonset (Sat, Sunrise, Mon, Sat, Sun, Mon) for various latitudes (N 70° to S 60°).

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass), and Moon (Age 6-8, 28-50%) for various latitudes (01 to 03).

Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for GHA, Dec, and Mer. pass. Data includes celestial coordinates and transit times.

Table with columns for Wed, GHA, Dec, and Mer. pass. Data includes celestial coordinates and transit times.

Table with columns for Thu, GHA, Dec, and Mer. pass. Data includes celestial coordinates and transit times.

Table with columns for Stars, SHA, Dec, and Mer. pass. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec, and Mer. pass. Lists stars like Denebola, Gienah, Acrux, etc.

Table with columns for Stars, SHA, Mer. pass, and Horizontal parallax. Lists stars like Oct 04 Tue, Oct 05 Wed, etc.

Table with columns for Sun, Moon, GHA, Dec, d, HP. Data includes solar and lunar coordinates.

Table with columns for Wed, GHA, Dec, d, HP. Data includes solar and lunar coordinates.

Table with columns for Thu, GHA, Dec, d, HP. Data includes solar and lunar coordinates.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight. Data includes twilight and sunrise/sunset times.

Table with columns for Lat., Moonrise, Moonset. Data includes moonrise and moonset times.

Table with columns for Day, Eqn. of Time, Mer. Pass, Moon, Age. Data includes equation of time and moon phase information.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Columns include day, GHA, Dec, and magnitude.

Table for Stars with columns: SHA, Dec, magnitude.

Table for Sun and Moon with columns: h, Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Twilight with columns: Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.).

Table with columns: Sat, GHA, Dec, magnitude.

Table for Stars with columns: SHA, Dec, magnitude.

Table for Sun and Moon with columns: Sat, Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Moonset with columns: Lat., Moonrise (Fri, Sat, Sun), Moonset (Fri, Sat, Sun).

Table with columns: Sun, GHA, Dec, magnitude.

Table for Stars with columns: SHA, Dec, magnitude.

Table for Sun and Moon with columns: Sun (GHA, Dec), Moon (GHA, Dec, d, HP).

Table for Moon with columns: Day, Sun (Eqn of Time, Mer. Pass), Moon (Mer. Pass, Lower, Upper, Age).



Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for TUE, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec and rows for dates 0-23. Includes Mer. pass. data.

Table with columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec and rows for dates 0-23. Includes Mer. pass. data.

Table with columns for Stars, SHA, Dec and rows for various star names like Alpheratz, Ankaa, Schekar, etc.

Table with columns for Oct 10 Mon, SHA, Mer. pass and rows for Venus, Mars, Jupiter, Saturn.

Table with columns for Oct 12 Wed, SHA, Mer. pass and rows for Venus, Mars, Jupiter, Saturn.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for TUE, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for various latitudes and times.

Table with columns for Lat., Moonrise, Moonset and rows for various latitudes and moon phases.

Table with columns for Day, Sun, Moon and rows for specific dates and times.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star name, SHA, Dec, and Mer. pass.

Table for Stars with columns for Star name, SHA, Mer. pass.

Table for Stars with columns for Star name, SHA, Mer. pass.

Table for Stars with columns for Star name, SHA, Mer. pass.

Table for Stars with columns for Star name, SHA, Mer. pass.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, Twilight (Civil, Naut.) for various latitudes.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat) for various latitudes.

Table for Day with columns for Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, Age 18-20/90-75% for various days.

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, SHA, Dec, and Mer. pass. data.

Table with columns for Mon, GHA, Dec, SHA, Dec, GHA, Dec, GHA, Dec and rows for dates 0-23. Includes Mer. pass. data.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec and rows for dates 0-23. Includes Mer. pass. data.

Table with columns for Stars, SHA, Dec and rows for stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars, SHA, Dec, Mer. pass. and rows for stars like Denebola, Genah, Acrux, etc.

Table with columns for Stars, SHA, Mer. pass. and rows for monthly star lists for Oct 16, 17, 18.

Table with columns for Sun, Moon, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Mon, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Tue, GHA, Dec, GHA, Dec, GHA, Dec, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for latitudes N 72° to S 60°.

Table with columns for Lat., Moonrise, Moonset and rows for latitudes N 72° to S 60°.

Table with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age and rows for days 16, 17, 18.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Thu) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table with columns for planets (Fri) and their positions (GHA, Dec) for days 0-23. Includes Mer. pass. data at the bottom.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, etc.

Table for Stars (SHA, Dec) listing stars like Dubhe, Denebola, Gienah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkent, Antares, Rigel, etc.

Table for Stars (SHA, Dec) listing stars like Oct 19 Wed, Oct 20 Thu, Oct 21 Fri, and Horizontal parallax for Venus and Mars.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for days 0-23. Includes SD and d values.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for various latitudes (N 72°, N 70°, N 68°, etc.).

Table for Moonrise (Moonset) for various latitudes (N 72°, N 70°, N 68°, etc.).

Table for Day (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for days 19-21.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table with columns for planets (Mon, GHA, Dec) and their positions (GHA, Dec) for each day (0-23). Includes Mer. pass. data at the bottom.

Table for Stars (SHA, Dec) and Moon (h, Sun, Moon) with columns for names, SHA, Dec, h, Sun, Moon, and HP. Includes horizontal parallax data at the bottom.

Table for Sun and Moon positions (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values at the bottom.

Table for Sun and Moon positions (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values at the bottom.

Table for Sun and Moon positions (GHA, Dec, ν, d, HP) for each day (0-23). Includes SD and d values at the bottom.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for each day (0-23). Includes twilight times and durations.

Table for Moonrise and Moonset (Sat, Sun, Mon, Sat, Sun, Mon) for each day (0-23). Includes moon phase and timing data.

Table for Day (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for each day (22-24). Includes a moon phase icon.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars (SHA, Dec) and Horizontal parallax (Venus, Mars) for each day (0-23).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (0-23).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (Wed, 0-23).

Table for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for each day (Thu, 0-23).

Table for Twilight (Lat., Naught, Civil, Sunrise, Sunset, Civil, Twilight) for various latitudes (N 72° to S 60°).

Table for Moonset (Lat., Tue, Moonset, Thu, Tue, Moonset, Thu) for various latitudes (N 72° to S 60°).

Table for Day (Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age 0-2, 0-3%) for days 25-27.



Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Includes columns for GHA, Dec, and other astronomical data.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Includes columns for GHA, Dec, and other astronomical data.

Table with columns for planets: Aries, Venus, Mars, Jupiter, Saturn. Includes columns for GHA, Dec, and other astronomical data.

Table for Stars with columns for SHA and Dec. Lists stars like Alpharatz, Ankaa, Schedar, etc.

Table for Stars with columns for SHA and Dec. Lists stars like Denebola, Cienah, Acruz, etc.

Table for Stars with columns for SHA and Dec. Lists stars like Oct 28 Fri, Oct 29 Sat, Oct 30 Sun.

Table for Sun and Moon with columns for GHA, Dec, and other astronomical data.

Table for Sun and Moon with columns for GHA, Dec, and other astronomical data.

Table for Sun and Moon with columns for GHA, Dec, and other astronomical data.

Table for Twilight, Sunrise, and Sunset with columns for Lat., Nautil., Civil, Sunrise, Sunset, Civil, Twilight, Nautil.

Table for Moonrise and Moonset with columns for Lat., Fri, Moonrise, Sun, Fri, Moonset, Sun.

Table for Day with columns for Day, Eqn of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Tue, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars with columns for Star Name, SHA, Dec, and Mer-pass.

Table for Stars with columns for Star Name, SHA, Dec, and Mer-pass.

Table for Stars with columns for Star Name, SHA, Dec, and Mer-pass.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) for days 0-23.

Table for Twilight with columns for Lat., Naught, Civil, Sunrise, Sunset, Civil, Twilight for days 0-50.

Table for Moonrise with columns for Lat., Moonrise (Mon, Tue, Wed), Moonset (Mon, Tue, Wed) for days 0-50.

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age for days 01-02.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, and Dec.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Moonset and Moonrise with columns for Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars with columns for Star Name, SHA, Mer-pass, and Horizontal parallax.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day (0-23).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, and Age.



Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Mon, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Stars, SHA, Dec, Mer. pass. and rows for various stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Nov 06 Sun, Nov 07 Mon, Nov 08 Tue, SHA, Mer. pass. and rows for Venus, Mars, Jupiter, Saturn.

Table with columns for Horizontal parallax, Venus, Mars and rows for Venus, Mars.

Table with columns for Sun, Moon, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Mon, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Tue, GHA, Dec, HP and rows for dates 0-23. Includes GHA, Dec, HP, and SD data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for dates 0-23. Includes Twilight, Sunrise, Sunset, Twilight data.

Table with columns for Lat., Moonrise, Moonset and rows for dates 0-23. Includes Moonrise, Moonset data.

Table with columns for Day, Eqn. of Time, Mer. Pass, Moon and rows for dates 06, 07, 08. Includes Eqn. of Time, Mer. Pass, Moon data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) for days 0-23, listing stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table with columns for twilight and sunrise/sunset times (Lat., Naat., Civil, Sunrise, Sunset, Civil, Twilight, Naat.) for days 0-23.

Table with columns for planets (Thu) and their positions (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Dec) for days 0-23, listing stars like Denebola, Genah, Acru, etc.

Table with columns for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table with columns for Moonset times (Lat., Wed, Moonrise, Fri, Wed, Moonset, Thu, Fri) for days 0-23.

Table with columns for planets (Fri) and their positions (GHA, Dec) for days 0-23.

Table with columns for Stars (SHA, Mer-pass) for days 0-23, listing stars like Nov 09 Ven, Nov 10 Thu, Nov 11 Fri.

Table with columns for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Lower, Age) for days 0-11.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Mon, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for stars (SHA, Dec) and their positions (SHA, Dec) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for Sun and Moon (GHA, Dec, HP) and their positions (GHA, Dec, d, HP) for each day (0-23).

Table with columns for twilight (Lat., Naut., Civil, Sunrise, Sunset, Twilight) and their positions for each day (0-23).

Table with columns for moonset (Lat., Sat, Moonrise, Mon, Sat, Moonset, Mon) and their positions for each day (0-23).

Table with columns for day (Day, Eqn. of Time, Mer. Pass, Mer. Pass, Age) and their positions for each day (12-14).



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, Acamar, Menkar, Mirafak, Aldebaran, Rigil, Capella, Bellatrix, Elmath, Alnilam, Betelgeuse, Canopus, Sirius, Adhara, Procyon, Pollux, Avior, Suhail, Miaplacidus, Alpherat, Regulus, Dubhe, Denebola, Genah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkent, Arcturus, Rigil Kent, Kochab, Zuben el Lieben, Alphecca, Antares, Atria, Sabik, Shaula, Rasalhague, Eltanin, Kaus Aug, Vega, Nunki, Altair, Peacock, Deneb, Enif, Al Na'ir, Fomalhaut, Scheat, Markab.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for days 0-23.

Table with columns for planets (Wed, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars (SHA, Dec, Mer-pass) listing stars like Denebola, Genah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkent, Arcturus, Rigil Kent, Kochab, Zuben el Lieben, Alphecca, Antares, Atria, Sabik, Shaula, Rasalhague, Eltanin, Kaus Aug, Vega, Nunki, Altair, Peacock, Deneb, Enif, Al Na'ir, Fomalhaut, Scheat, Markab.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Moonset (Moonrise, Moonset, Moonset) for days 0-23.

Table with columns for planets (Thu, GHA, Dec) and their positions (GHA, Dec) for days 0-23.

Table for Stars (SHA, Mer-pass) listing stars like Nov 15 Tue, Nov 16 Wed, Nov 17 Thu.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Moonset (Sun, Moon) for days 0-23.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for Fri, Sat, Sun.

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for Fri, Sat, Sun.

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for Fri, Sat, Sun.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for GHA, Dec, and HP for both celestial bodies.

Table for Sun and Moon with columns for GHA, Dec, and HP for both celestial bodies.

Table for Sun and Moon with columns for GHA, Dec, and HP for both celestial bodies.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Sat, Sun), and Moonset (Fri, Sat, Sun).

Table for Day with columns for Day, Sun (Eqn of Time, 12h, Mer. Pass), Moon (Mer. Pass, Upper/Lower), and Age (24-26, 36-18%).

Table with columns for Aries, Venus, Mars, Jupiter, Saturn and sub-columns for GHA, Dec, SHA, Dec. Rows 0-23.

Table with columns for TUE, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Stars, SHA, Dec, Mer-pass. Lists stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Sun, Moon, GHA, Dec, SHA, Dec, HP. Rows 0-23.

Table with columns for TUE, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Wed, GHA, Dec, GHA, Dec, GHA, Dec, GHA, Dec. Rows 0-23.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight. Rows 0-45.

Table with columns for Lat., Moonrise, Moonset. Rows 0-45.

Table with columns for Day, Sun, Mer., Moon, Age. Rows 21-23.



Table with columns for Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and magnitude data.

Table for Stars with columns for SHA and Dec, listing stars like Alpheratz, Ankaa, Schedar, etc.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for hours 0-23.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for Fri, GHA, Dec, and rows for dates 0-23. Includes magnitude and position data.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Gienah, Acrux, etc.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for Friday.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Thu, Fri, Sat), Moonset (Thu, Fri, Sat).

Table with columns for Sat, GHA, Dec, and rows for dates 0-23. Includes magnitude and position data.

Table for Stars with columns for SHA and Mer-pass, listing stars like Nov 24 Thu, Nov 25 Fri, Nov 26 Sat.

Table for Sun and Moon with columns for GHA, Dec, and HP, listing data for Saturday.

Table for Moon and Day with columns for Day, Sun (Eqn of Time, Mer. Pass), Moon (Mer. Pass, Lower), and Age (1-3, 0-6%).

Table with columns for Sun, Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Moon, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Tue, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer. pass. data.

Table with columns for Stars, SHA, Dec and rows for stars like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Nov 27 Sun, Nov 28 Mon, Nov 29 Tue and rows for Sun, Venus, Mars, Jupiter, Saturn.

Table with columns for Horizontal parallax, Venus, Mars and rows for Venus, Mars.

Table with columns for Sun, Moon, GHA, Dec, d, HP and rows for dates 0-23. Includes GHA, Dec, d, HP, and SD data.

Table with columns for Mon, GHA, Dec, GHA, Dec, d, HP and rows for dates 0-23. Includes GHA, Dec, d, HP, and SD data.

Table with columns for Tue, GHA, Dec, GHA, Dec, d, HP and rows for dates 0-23. Includes GHA, Dec, d, HP, and SD data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight and rows for various latitudes (N 72°, N 70°, etc.).

Table with columns for Lat., Moonrise, Moonset and rows for various latitudes (N 72°, N 70°, etc.).

Table with columns for Day, Eqn of Time, Mer. Pass, Upper/Lower Mer. Pass, Age and rows for dates 27-29.

Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Thursday (Thu) and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Friday (Fri) and rows for dates 0-23. Columns include GHA, Dec, and other astronomical data.

Table with columns for Stars (SHA, Dec) and rows for various star names like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Stars (SHA, Dec) and rows for various star names like Dubhe, Denebola, Geniah, etc.

Table with columns for Stars (SHA, Dec) and rows for various star names like Nov 03 Wed, Dec 01 Thu, Dec 02 Fri, and Horizontal parallax.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23.

Table with columns for Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) and rows for dates 0-23.

Table with columns for Moonrise (Wed, Thu, Fri) and Moonset (Wed, Thu, Fri) and rows for dates 0-23.

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age) and rows for dates 30, 01, 02.



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Mon, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars (SHA, Dec) listing various stars like Alpheratz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing various stars like Denebola, Genah, Acrux, etc.

Table for Stars (SHA, Dec) listing various stars like Dec 03 Sat, Dec 04 Sun, Dec 05 Mon, and Horizontal parallax.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Twilight (Naut., Civil, Sunrise, Sunset, Civil, Naut.) for each day (0-23).

Table for Moonrise and Moonset (Sat, Moonrise, Mon, Sat, Moonset, Mon) for each day (0-23).

Table for Day (Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, Age) for each day (03-05).

Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Columns include GHA, Dec, and Mer.pass. values.

Table with columns for Stars (SHA, Dec) and rows for stars like Alpheratz, Ankaa, Schedar, Diphda, Achernar, Hamal, Polaris, Acamar, Menkar, Miraf, Aldebaran, Rigel, Capella, Bellatrix, Elmath, Alnilam, Betelgeuse, Canopus, Sirius, Adhara, Procyon, Pollux, Avior, Suhail, Miaplacidus, Alphan, Regulus, Dubhe, Denebola, Gienah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkar, Antares, Rigel Kent., Kochab, Kueben'ubi, Alphecca, Antares, Atria, Sabik, Shaula, Rasalhague, Eltanin, Kaus Aest., Vega, Nunki, Altair, Peacock, Deneb, Enif, Al Na'ir, Fomalhaut, Scheat, Markab.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23. Includes SD values.

Table with columns for Lat., Twilight (Civil, Sun), Sunrise, Sunset, and rows for dates 0-23. Includes SD values.

Table with columns for Wed, GHA, Dec and rows for dates 0-23. Includes Mer.pass. values.

Table with columns for Stars (SHA, Dec) and rows for stars like Dubhe, Denebola, Gienah, Acrux, Gacrux, Alioth, Spica, Alkaid, Hadar, Menkar, Antares, Rigel Kent., Kochab, Kueben'ubi, Alphecca, Antares, Atria, Sabik, Shaula, Rasalhague, Eltanin, Kaus Aest., Vega, Nunki, Altair, Peacock, Deneb, Enif, Al Na'ir, Fomalhaut, Scheat, Markab.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23. Includes SD values.

Table with columns for Lat., Moonrise, Moonset, and rows for dates 0-23. Includes SD values.

Table with columns for Thu, GHA, Dec and rows for dates 0-23. Includes Mer.pass. values.

Table with columns for Stars (SHA, Dec, Mer.pass) and rows for Dec 06, Dec 07, Dec 08, and Horizontal parallax.

Table with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates 0-23. Includes SD values.

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age) and rows for dates 06, 07, 08.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Fri, Sat, Sun).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for h, Sun (GHA, Dec), and Moon (GHA, Dec, HP) for each day.

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat, Sun).

Table for Stars with columns for SHA and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sat, Sun (GHA, Dec), and Moon (GHA, Dec, HP) for each day.

Table for Moonrise and Moonset with columns for Lat., Moonrise (Fri, Sat, Sun), and Moonset (Fri, Sat, Sun).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun).

Table for Stars with columns for SHA, Mer. pass, and Dec, listing various star names and their coordinates.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, HP) for each day.

Table for Day with columns for Day, Sun (Eqn. of Time, 00h, 12h, mm:ss), Mer. Pass (hh:mm), Mer. Pass. (Upper, Lower), and Age (16-18, 99-93%).



Table with columns for Aries, Venus, Mars, Jupiter, Saturn and rows for GHA, Dec, and Mer. pass. data.

Table with columns for Tue, GHA, Dec, Mer. pass. data.

Table with columns for Wed, GHA, Dec, Mer. pass. data.

Table with columns for Stars, SHA, Dec, Mer. pass. data.

Table with columns for Stars, SHA, Dec, Mer. pass. data.

Table with columns for Stars, SHA, Dec, Mer. pass. data.

Table with columns for Sun, Moon, GHA, Dec, ν, d, HP data.

Table with columns for Sun, Moon, GHA, Dec, ν, d, HP data.

Table with columns for Sun, Moon, GHA, Dec, ν, d, HP data.

Table with columns for Lat., Twilight, Sunrise, Sunset, Twilight data.

Table with columns for Moonrise, Moonset, Moonrise, Moonset data.

Table with columns for Day, Eqn. of Time, Mer. Pass, Moon, Age data.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for planets (Fri, GHA, Dec) and their positions (GHA, Dec) for each day (Fri, Sat).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (Sat).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (Thu, Fri, Sat).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (Fri, Sat).

Table with columns for Stars (SHA, Dec) and their positions (SHA, Dec) for each day (Sat).

Table with columns for Sun and Moon (GHA, Dec, d, HP) and their positions (GHA, Dec, d, HP) for each day (Thu, Fri, Sat).

Table with columns for Sun and Moon (GHA, Dec, d, HP) and their positions (GHA, Dec, d, HP) for each day (Fri, Sat).

Table with columns for Sun and Moon (GHA, Dec, d, HP) and their positions (GHA, Dec, d, HP) for each day (Sat).

Table with columns for Twilight (Naut, Civil), Sunrise, Sunset, and Twilight (Civil, Naut) for each day (Thu, Fri, Sat).

Table with columns for Moonrise, Moonset, and Moon (GHA, Dec, d, HP) for each day (Thu, Fri, Sat).

Table with columns for Day, Sun (Eqn. of Time, Mer. Pass), and Moon (Mer. Pass, Age) for each day (Thu, Fri, Sat).

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Mercury, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table with columns for planets (Mercury, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for days 0-23.

Table for Stars (SHA, Dec) listing various stars like Alpheratz, Ankaa, Schedar, etc.

Table for Dec 18 Sun, Dec 19 Mon, Dec 20 Tue (SHA, Mer.pass).

Table for Horizontal parallax (Mercury, Venus, Mars).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for days 0-23.

Table for Twilight (Civil, Naut.), Sunrise, Sunset, and Moonset for days 0-23.

Table for Moonrise, Moonset, and Moon phase (Age) for days 0-23.

Table for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Moon phase (Age).



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for Wed, Thu, Fri.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for Thu, Fri, Sat.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for Fri, Sat, Sun.

Table for Stars (SHA, Dec) listing stars like Alpheratz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing stars like Denebola, Genah, Acrux, etc.

Table for Stars (SHA, Dec) listing stars like Dec 21 Wed, Dec 22 Thu, Dec 23 Fri.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for Wed, Thu, Fri.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for Thu, Fri, Sat.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for Fri, Sat, Sun.

Table for Twilight and Sunrise/Sunset (Lat., Naup., Civil, Sunrise, Sunset, Civil, Twilight, Naup.) for various latitudes.

Table for Moonrise and Moonset (Lat., Wed, Moonrise, Fri, Wed, Moonset, Fri) for various latitudes.

Table for Day (Day, Eqn. of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age) for various latitudes.

Table with columns for Venus, Mars, Jupiter, Saturn and rows for dates 0-23. Includes GHA, Dec, and Mer.pass. values.

Table with columns for Sun, Dec, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer.pass. values.

Table with columns for Mon, Dec, GHA, Dec and rows for dates 0-23. Includes GHA, Dec, and Mer.pass. values.

Table with columns for Stars (SHA, Dec, Mer.pass) and rows for various star names like Alpheratz, Ankaa, Schedar, etc.

Table with columns for Sun and Moon (GHA, Dec, d, HP) and rows for dates 0-23. Includes SD and d values.

Table with columns for Sun and Moon (GHA, Dec, d, HP) and rows for dates 0-23. Includes SD and d values.

Table with columns for Mon, Dec, GHA, Dec, d, HP and rows for dates 0-23. Includes SD and d values.

Table with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) and rows for dates 0-23.

Table with columns for Lat., Moonrise, Moonset and rows for dates 0-23. Includes moon phase icons.

Table with columns for Day, Sun (Eqn, Time, Mer. Pass), Moon (Mer. Pass, Lower, Age) and rows for dates 24-26.

Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and rows for dates (0-23). Includes sub-headers for GHA, Dec, and Mer. pass.

Table with columns for planets (Wed, GHA, Dec) and rows for dates (0-23). Includes sub-headers for GHA, Dec, and Mer. pass.

Table with columns for planets (Thu, GHA, Dec) and rows for dates (0-23). Includes sub-headers for GHA, Dec, and Mer. pass.

Table for Stars with columns for SHA and Dec, listing stars like Alpheratz, Ankaa, Schedar, etc.

Table for Stars with columns for SHA and Dec, listing stars like Denebola, Genah, Acrux, etc.

Table for Stars with columns for SHA and Dec, listing stars like Dec 27 Tue, Dec 28 Wed, Dec 29 Thu, and Horizontal parallax.

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Sun and Moon with columns for Sun (GHA, Dec) and Moon (GHA, Dec, d, HP) and rows for dates (0-23).

Table for Twilight and Sunrise/Sunset with columns for Lat., Twilight (Naut., Civil), Sunrise, Sunset, and Twilight (Civil, Naut.) and rows for latitudes (N 72° to S 60°).

Table for Moonrise and Moonset with columns for Lat., Moonrise (Tue, Wed, Thu), and Moonset (Tue, Wed, Thu) and rows for latitudes (N 72° to S 60°).

Table for Day with columns for Day, Eqn. of Time, Mer. Pass, Upper/Lower Mer. Pass, and Age (4-6, 18-39%) and rows for dates (27-29).



Table with columns for planets (Aries, Venus, Mars, Jupiter, Saturn) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sat, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table with columns for planets (Sun, GHA, Dec) and their positions (GHA, Dec) for each day (0-23).

Table for Stars (SHA, Dec) listing various stars like Alphertz, Ankaa, Schedar, etc.

Table for Stars (SHA, Dec) listing various stars like Denebola, Gienah, Acrux, etc.

Table for Stars (SHA, Dec) listing various stars like Dec 30 Fri, Dec 31 Sat, Jan 01 Sun, and Horizontal parallax.

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Sun and Moon (GHA, Dec, ν, d, HP) for each day (0-23).

Table for Twilight (Lat., Naup., Civil, Sunrise, Sunset, Civil, Naup.) for various latitudes (N 72° to S 60°).

Table for Moonset (Lat., Fri, Moonrise, Sun, Fri, Moonset, Sun) for various latitudes (N 72° to S 60°).

Table for Day (Day, Eqn of Time, Mer. Pass, Upper Mer. Pass, Lower Mer. Pass, Age 7-9 49-70%) for days 30 and 01.

### Conversion of Arc to Time

0° - 59°			60° - 119°			120° - 179°			180° - 239°			240° - 299°			300° - 360°			0' - 59'			0" - 59"	
°	h	m	°	h	m	°	h	m	°	h	m	°	h	m	°	h	m	'	m	s	"	s
0	0	00	60	4	00	120	8	00	180	12	00	240	16	00	300	20	00	0	0	00	0	0.00
1	0	04	61	4	04	121	8	04	181	12	04	241	16	04	301	20	04	1	0	04	1	0.07
2	0	08	62	4	08	122	8	08	182	12	08	242	16	08	302	20	08	2	0	08	2	0.13
3	0	12	63	4	12	123	8	12	183	12	12	243	16	12	303	20	12	3	0	12	3	0.20
4	0	16	64	4	16	124	8	16	184	12	16	244	16	16	304	20	16	4	0	16	4	0.27
5	0	20	65	4	20	125	8	20	185	12	20	245	16	20	305	20	20	5	0	20	5	0.33
6	0	24	66	4	24	126	8	24	186	12	24	246	16	24	306	20	24	6	0	24	6	0.40
7	0	28	67	4	28	127	8	28	187	12	28	247	16	28	307	20	28	7	0	28	7	0.47
8	0	32	68	4	32	128	8	32	188	12	32	248	16	32	308	20	32	8	0	32	8	0.53
9	0	36	69	4	36	129	8	36	189	12	36	249	16	36	309	20	36	9	0	36	9	0.60
10	0	40	70	4	40	130	8	40	190	12	40	250	16	40	310	20	40	10	0	40	10	0.67
11	0	44	71	4	44	131	8	44	191	12	44	251	16	44	311	20	44	11	0	44	11	0.73
12	0	48	72	4	48	132	8	48	192	12	48	252	16	48	312	20	48	12	0	48	12	0.80
13	0	52	73	4	52	133	8	52	193	12	52	253	16	52	313	20	52	13	0	52	13	0.87
14	0	56	74	4	56	134	8	56	194	12	56	254	16	56	314	20	56	14	0	56	14	0.93
15	1	00	75	5	00	135	9	00	195	13	00	255	17	00	315	21	00	15	1	00	15	1.00
16	1	04	76	5	04	136	9	04	196	13	04	256	17	04	316	21	04	16	1	04	16	1.07
17	1	08	77	5	08	137	9	08	197	13	08	257	17	08	317	21	08	17	1	08	17	1.13
18	1	12	78	5	12	138	9	12	198	13	12	258	17	12	318	21	12	18	1	12	18	1.20
19	1	16	79	5	16	139	9	16	199	13	16	259	17	16	319	21	16	19	1	16	19	1.27
20	1	20	80	5	20	140	9	20	200	13	20	260	17	20	320	21	20	20	1	20	20	1.33
21	1	24	81	5	24	141	9	24	201	13	24	261	17	24	321	21	24	21	1	24	21	1.40
22	1	28	82	5	28	142	9	28	202	13	28	262	17	28	322	21	28	22	1	28	22	1.47
23	1	32	83	5	32	143	9	32	203	13	32	263	17	32	323	21	32	23	1	32	23	1.53
24	1	36	84	5	36	144	9	36	204	13	36	264	17	36	324	21	36	24	1	36	24	1.60
25	1	40	85	5	40	145	9	40	205	13	40	265	17	40	325	21	40	25	1	40	25	1.67
26	1	44	86	5	44	146	9	44	206	13	44	266	17	44	326	21	44	26	1	44	26	1.73
27	1	48	87	5	48	147	9	48	207	13	48	267	17	48	327	21	48	27	1	48	27	1.80
28	1	52	88	5	52	148	9	52	208	13	52	268	17	52	328	21	52	28	1	52	28	1.87
29	1	56	89	5	56	149	9	56	209	13	56	269	17	56	329	21	56	29	1	56	29	1.93
30	2	00	90	6	00	150	10	00	210	14	00	270	18	00	330	22	00	30	2	00	30	2.00
31	2	04	91	6	04	151	10	04	211	14	04	271	18	04	331	22	04	31	2	04	31	2.07
32	2	08	92	6	08	152	10	08	212	14	08	272	18	08	332	22	08	32	2	08	32	2.13
33	2	12	93	6	12	153	10	12	213	14	12	273	18	12	333	22	12	33	2	12	33	2.20
34	2	16	94	6	16	154	10	16	214	14	16	274	18	16	334	22	16	34	2	16	34	2.27
35	2	20	95	6	20	155	10	20	215	14	20	275	18	20	335	22	20	35	2	20	35	2.33
36	2	24	96	6	24	156	10	24	216	14	24	276	18	24	336	22	24	36	2	24	36	2.40
37	2	28	97	6	28	157	10	28	217	14	28	277	18	28	337	22	28	37	2	28	37	2.47
38	2	32	98	6	32	158	10	32	218	14	32	278	18	32	338	22	32	38	2	32	38	2.53
39	2	36	99	6	36	159	10	36	219	14	36	279	18	36	339	22	36	39	2	36	39	2.60
40	2	40	100	6	40	160	10	40	220	14	40	280	18	40	340	22	40	40	2	40	40	2.67
41	2	44	101	6	44	161	10	44	221	14	44	281	18	44	341	22	44	41	2	44	41	2.73
42	2	48	102	6	48	162	10	48	222	14	48	282	18	48	342	22	48	42	2	48	42	2.80
43	2	52	103	6	52	163	10	52	223	14	52	283	18	52	343	22	52	43	2	52	43	2.87
44	2	56	104	6	56	164	10	56	224	14	56	284	18	56	344	22	56	44	2	56	44	2.93
45	3	00	105	7	00	165	11	00	225	15	00	285	19	00	345	23	00	45	3	00	45	3.00
46	3	04	106	7	04	166	11	04	226	15	04	286	19	04	346	23	04	46	3	04	46	3.07
47	3	08	107	7	08	167	11	08	227	15	08	287	19	08	347	23	08	47	3	08	47	3.13
48	3	12	108	7	12	168	11	12	228	15	12	288	19	12	348	23	12	48	3	12	48	3.20
49	3	16	109	7	16	169	11	16	229	15	16	289	19	16	349	23	16	49	3	16	49	3.27
50	3	20	110	7	20	170	11	20	230	15	20	290	19	20	350	23	20	50	3	20	50	3.33
51	3	24	111	7	24	171	11	24	231	15	24	291	19	24	351	23	24	51	3	24	51	3.40
52	3	28	112	7	28	172	11	28	232	15	28	292	19	28	352	23	28	52	3	28	52	3.47
53	3	32	113	7	32	173	11	32	233	15	32	293	19	32	353	23	32	53	3	32	53	3.53
54	3	36	114	7	36	174	11	36	234	15	36	294	19	36	354	23	36	54	3	36	54	3.60
55	3	40	115	7	40	175	11	40	235	15	40	295	19	40	355	23	40	55	3	40	55	3.67
56	3	44	116	7	44	176	11	44	236	15	44	296	19	44	356	23	44	56	3	44	56	3.73
57	3	48	117	7	48	177	11	48	237	15	48	297	19	48	357	23	48	57	3	48	57	3.80
58	3	52	118	7	52	178	11	52	238	15	52	298	19	52	358	23	52	58	3	52	58	3.87
59	3	56	119	7	56	179	11	56	239	15	56	299	19	56	359	23	56	59	3	56	59	3.93
60	4	00	120	8	00	180	12	00	240	16	00	300	20	00	360	24	00	60	4	00	60	4.00

h= hours of time    m= minutes of time    s = seconds of time    ' = minutes of arc    " = seconds of arc

## Increments and Corrections

m 0	Sun Plan.	Aries	Moon	v and d corr			m 1	Sun Plan.	Aries	Moon	v and d corr			m 2	Sun Plan.	Aries	Moon	v and d corr		
0	0°00.0	0°00.0	0°00.0	0.0 - 0.0	6.0 - 0.1	12.0 - 0.1	0	0°15.0	0°15.0	0°14.3	0.0 - 0.0	6.0 - 0.2	12.0 - 0.3	0	0°30.0	0°30.1	0°28.6	0.0 - 0.0	6.0 - 0.3	12.0 - 0.5
1	0°00.3	0°00.3	0°00.2	0.1 - 0.0	6.1 - 0.1	12.1 - 0.1	1	0°15.3	0°15.3	0°14.6	0.1 - 0.0	6.1 - 0.2	12.1 - 0.3	1	0°30.3	0°30.3	0°28.9	0.1 - 0.0	6.1 - 0.3	12.1 - 0.5
2	0°00.5	0°00.5	0°00.5	0.2 - 0.0	6.2 - 0.1	12.2 - 0.1	2	0°15.5	0°15.5	0°14.8	0.2 - 0.0	6.2 - 0.2	12.2 - 0.3	2	0°30.5	0°30.6	0°29.1	0.2 - 0.0	6.2 - 0.3	12.2 - 0.5
3	0°00.8	0°00.8	0°00.7	0.3 - 0.0	6.3 - 0.1	12.3 - 0.1	3	0°15.8	0°15.8	0°15.0	0.3 - 0.0	6.3 - 0.2	12.3 - 0.3	3	0°30.7	0°30.8	0°29.3	0.3 - 0.0	6.3 - 0.3	12.3 - 0.5
4	0°01.0	0°01.0	0°01.0	0.4 - 0.0	6.4 - 0.1	12.4 - 0.1	4	0°16.0	0°16.0	0°15.3	0.4 - 0.0	6.4 - 0.2	12.4 - 0.3	4	0°31.0	0°31.1	0°29.6	0.4 - 0.0	6.4 - 0.3	12.4 - 0.5
5	0°01.3	0°01.3	0°01.2	0.5 - 0.0	6.5 - 0.1	12.5 - 0.1	5	0°16.3	0°16.3	0°15.5	0.5 - 0.0	6.5 - 0.2	12.5 - 0.3	5	0°31.3	0°31.3	0°29.8	0.5 - 0.0	6.5 - 0.3	12.5 - 0.5
6	0°01.5	0°01.5	0°01.4	0.6 - 0.0	6.6 - 0.1	12.6 - 0.1	6	0°16.5	0°16.5	0°15.7	0.6 - 0.0	6.6 - 0.2	12.6 - 0.3	6	0°31.5	0°31.6	0°30.1	0.6 - 0.0	6.6 - 0.3	12.6 - 0.5
7	0°01.8	0°01.8	0°01.7	0.7 - 0.0	6.7 - 0.1	12.7 - 0.1	7	0°16.8	0°16.8	0°16.0	0.7 - 0.0	6.7 - 0.2	12.7 - 0.3	7	0°31.8	0°31.8	0°30.3	0.7 - 0.0	6.7 - 0.3	12.7 - 0.5
8	0°02.0	0°02.0	0°01.9	0.8 - 0.0	6.8 - 0.1	12.8 - 0.1	8	0°17.0	0°17.0	0°16.2	0.8 - 0.0	6.8 - 0.2	12.8 - 0.3	8	0°32.0	0°32.1	0°30.5	0.8 - 0.0	6.8 - 0.3	12.8 - 0.5
9	0°02.3	0°02.3	0°02.1	0.9 - 0.0	6.9 - 0.1	12.9 - 0.1	9	0°17.3	0°17.3	0°16.5	0.9 - 0.0	6.9 - 0.2	12.9 - 0.3	9	0°32.3	0°32.3	0°30.8	0.9 - 0.0	6.9 - 0.3	12.9 - 0.5
10	0°02.5	0°02.5	0°02.4	1.0 - 0.0	7.0 - 0.1	13.0 - 0.1	10	0°17.5	0°17.5	0°16.7	1.0 - 0.0	7.0 - 0.2	13.0 - 0.3	10	0°32.5	0°32.6	0°31.0	1.0 - 0.0	7.0 - 0.3	13.0 - 0.5
11	0°02.8	0°02.8	0°02.6	1.1 - 0.0	7.1 - 0.1	13.1 - 0.1	11	0°17.8	0°17.8	0°16.9	1.1 - 0.0	7.1 - 0.2	13.1 - 0.3	11	0°32.8	0°32.8	0°31.3	1.1 - 0.0	7.1 - 0.3	13.1 - 0.5
12	0°03.0	0°03.0	0°02.9	1.2 - 0.0	7.2 - 0.1	13.2 - 0.1	12	0°18.0	0°18.0	0°17.2	1.2 - 0.0	7.2 - 0.2	13.2 - 0.3	12	0°33.0	0°33.1	0°31.5	1.2 - 0.1	7.2 - 0.3	13.2 - 0.5
13	0°03.3	0°03.3	0°03.1	1.3 - 0.0	7.3 - 0.1	13.3 - 0.1	13	0°18.3	0°18.3	0°17.4	1.3 - 0.0	7.3 - 0.2	13.3 - 0.3	13	0°33.3	0°33.3	0°31.7	1.3 - 0.1	7.3 - 0.3	13.3 - 0.6
14	0°03.5	0°03.5	0°03.3	1.4 - 0.0	7.4 - 0.1	13.4 - 0.1	14	0°18.5	0°18.6	0°17.7	1.4 - 0.0	7.4 - 0.2	13.4 - 0.3	14	0°33.5	0°33.6	0°32.0	1.4 - 0.1	7.4 - 0.3	13.4 - 0.6
15	0°03.8	0°03.8	0°03.6	1.5 - 0.0	7.5 - 0.1	13.5 - 0.1	15	0°18.8	0°18.8	0°17.9	1.5 - 0.0	7.5 - 0.2	13.5 - 0.3	15	0°33.8	0°33.8	0°32.2	1.5 - 0.1	7.5 - 0.3	13.5 - 0.6
16	0°04.0	0°04.0	0°03.8	1.6 - 0.0	7.6 - 0.1	13.6 - 0.1	16	0°19.0	0°19.1	0°18.1	1.6 - 0.0	7.6 - 0.2	13.6 - 0.3	16	0°34.0	0°34.1	0°32.5	1.6 - 0.1	7.6 - 0.3	13.6 - 0.6
17	0°04.3	0°04.3	0°04.1	1.7 - 0.0	7.7 - 0.1	13.7 - 0.1	17	0°19.3	0°19.3	0°18.4	1.7 - 0.0	7.7 - 0.2	13.7 - 0.3	17	0°34.3	0°34.3	0°32.7	1.7 - 0.1	7.7 - 0.3	13.7 - 0.6
18	0°04.5	0°04.5	0°04.3	1.8 - 0.0	7.8 - 0.1	13.8 - 0.1	18	0°19.5	0°19.6	0°18.6	1.8 - 0.0	7.8 - 0.2	13.8 - 0.3	18	0°34.5	0°34.6	0°32.9	1.8 - 0.1	7.8 - 0.3	13.8 - 0.6
19	0°04.8	0°04.8	0°04.5	1.9 - 0.0	7.9 - 0.1	13.9 - 0.1	19	0°19.8	0°19.8	0°18.9	1.9 - 0.0	7.9 - 0.2	13.9 - 0.3	19	0°34.8	0°34.8	0°33.2	1.9 - 0.1	7.9 - 0.3	13.9 - 0.6
20	0°05.0	0°05.0	0°04.8	2.0 - 0.0	8.0 - 0.1	14.0 - 0.1	20	0°20.0	0°20.1	0°19.1	2.0 - 0.1	8.0 - 0.2	14.0 - 0.4	20	0°35.0	0°35.1	0°33.4	2.0 - 0.1	8.0 - 0.3	14.0 - 0.6
21	0°05.3	0°05.3	0°05.0	2.1 - 0.0	8.1 - 0.1	14.1 - 0.1	21	0°20.3	0°20.3	0°19.3	2.1 - 0.1	8.1 - 0.2	14.1 - 0.4	21	0°35.3	0°35.3	0°33.6	2.1 - 0.1	8.1 - 0.3	14.1 - 0.6
22	0°05.5	0°05.5	0°05.2	2.2 - 0.0	8.2 - 0.1	14.2 - 0.1	22	0°20.5	0°20.6	0°19.6	2.2 - 0.1	8.2 - 0.2	14.2 - 0.4	22	0°35.5	0°35.6	0°33.9	2.2 - 0.1	8.2 - 0.3	14.2 - 0.6
23	0°05.8	0°05.8	0°05.5	2.3 - 0.0	8.3 - 0.1	14.3 - 0.1	23	0°20.8	0°20.8	0°19.8	2.3 - 0.1	8.3 - 0.2	14.3 - 0.4	23	0°35.8	0°35.8	0°34.1	2.3 - 0.1	8.3 - 0.3	14.3 - 0.6
24	0°06.0	0°06.0	0°05.7	2.4 - 0.0	8.4 - 0.1	14.4 - 0.1	24	0°21.0	0°21.1	0°20.0	2.4 - 0.1	8.4 - 0.2	14.4 - 0.4	24	0°36.0	0°36.1	0°34.4	2.4 - 0.1	8.4 - 0.3	14.4 - 0.6
25	0°06.3	0°06.3	0°06.0	2.5 - 0.0	8.5 - 0.1	14.5 - 0.1	25	0°21.3	0°21.3	0°20.3	2.5 - 0.1	8.5 - 0.2	14.5 - 0.4	25	0°36.3	0°36.3	0°34.6	2.5 - 0.1	8.5 - 0.4	14.5 - 0.6
26	0°06.5	0°06.5	0°06.2	2.6 - 0.0	8.6 - 0.1	14.6 - 0.1	26	0°21.5	0°21.6	0°20.5	2.6 - 0.1	8.6 - 0.2	14.6 - 0.4	26	0°36.5	0°36.6	0°34.8	2.6 - 0.1	8.6 - 0.4	14.6 - 0.6
27	0°06.8	0°06.8	0°06.4	2.7 - 0.0	8.7 - 0.1	14.7 - 0.1	27	0°21.8	0°21.8	0°20.8	2.7 - 0.1	8.7 - 0.2	14.7 - 0.4	27	0°36.8	0°36.9	0°35.1	2.7 - 0.1	8.7 - 0.4	14.7 - 0.6
28	0°07.0	0°07.0	0°06.7	2.8 - 0.0	8.8 - 0.1	14.8 - 0.1	28	0°22.0	0°22.1	0°21.0	2.8 - 0.1	8.8 - 0.2	14.8 - 0.4	28	0°37.0	0°37.1	0°35.3	2.8 - 0.1	8.8 - 0.4	14.8 - 0.6
29	0°07.3	0°07.3	0°06.9	2.9 - 0.0	8.9 - 0.1	14.9 - 0.1	29	0°22.3	0°22.3	0°21.2	2.9 - 0.1	8.9 - 0.2	14.9 - 0.4	29	0°37.3	0°37.4	0°35.6	2.9 - 0.1	8.9 - 0.4	14.9 - 0.6
30	0°07.5	0°07.5	0°07.2	3.0 - 0.0	9.0 - 0.1	15.0 - 0.1	30	0°22.5	0°22.6	0°21.5	3.0 - 0.1	9.0 - 0.2	15.0 - 0.4	30	0°37.5	0°37.6	0°35.8	3.0 - 0.1	9.0 - 0.4	15.0 - 0.6
31	0°07.8	0°07.8	0°07.4	3.1 - 0.0	9.1 - 0.1	15.1 - 0.1	31	0°22.8	0°22.8	0°21.7	3.1 - 0.1	9.1 - 0.2	15.1 - 0.4	31	0°37.8	0°37.9	0°36.0	3.1 - 0.1	9.1 - 0.4	15.1 - 0.6
32	0°08.0	0°08.0	0°07.6	3.2 - 0.0	9.2 - 0.1	15.2 - 0.1	32	0°23.0	0°23.1	0°22.0	3.2 - 0.1	9.2 - 0.2	15.2 - 0.4	32	0°38.0	0°38.1	0°36.3	3.2 - 0.1	9.2 - 0.4	15.2 - 0.6
33	0°08.3	0°08.3	0°07.9	3.3 - 0.0	9.3 - 0.1	15.3 - 0.1	33	0°23.3	0°23.3	0°22.2	3.3 - 0.1	9.3 - 0.2	15.3 - 0.4	33	0°38.3	0°38.4	0°36.5	3.3 - 0.1	9.3 - 0.4	15.3 - 0.6
34	0°08.5	0°08.5	0°08.1	3.4 - 0.0	9.4 - 0.1	15.4 - 0.1	34	0°23.5	0°23.6	0°22.4	3.4 - 0.1	9.4 - 0.2	15.4 - 0.4	34	0°38.5	0°38.6	0°36.7	3.4 - 0.1	9.4 - 0.4	15.4 - 0.6
35	0°08.8	0°08.8	0°08.4	3.5 - 0.0	9.5 - 0.1	15.5 - 0.1	35	0°23.8	0°23.8	0°22.7	3.5 - 0.1	9.5 - 0.2	15.5 - 0.4	35	0°38.8	0°38.9	0°37.0	3.5 - 0.1	9.5 - 0.4	15.5 - 0.6
36	0°09.0	0°09.0	0°08.6	3.6 - 0.0	9.6 - 0.1	15.6 - 0.1	36	0°24.0	0°24.1	0°22.9	3.6 - 0.1	9.6 - 0.2	15.6 - 0.4	36	0°39.0	0°39.1	0°37.2	3.6 - 0.1	9.6 - 0.4	15.6 - 0.6
37	0°09.3	0°09.3	0°08.8	3.7 - 0.0	9.7 - 0.1	15.7 - 0.1	37	0°24.3	0°24.3	0°23.1	3.7 - 0.1	9.7 - 0.2	15.7 - 0.4	37	0°39.3	0°39.4	0°37.5	3.7 - 0.2	9.7 - 0.4	15.7 - 0.7
38	0°09.5	0°09.5	0°09.1	3.8 - 0.0	9.8 - 0.1	15.8 - 0.1	38	0°24.5	0°24.6	0°23.4	3.8 - 0.1	9.8 - 0.2	15.8 - 0.4	38	0°39.5	0°39.6	0°37.7	3.8 - 0.2	9.8 - 0.4	15.8 - 0.7
39	0°09.8	0°09.8	0°09.3	3.9 - 0.0	9.9 - 0.1	15.9 - 0.1	39	0°24.8	0°24.8	0°23.6	3.9 - 0.1	9.9 - 0.2	15.9 - 0.4	39	0°39.8	0°39.9	0°37.9	3.9 - 0.2	9.9 - 0.4	15.9 - 0.7
40	0°10.0	0°10.0	0°09.5	4.0 - 0.0	10.0 - 0.1	16.0 - 0.1	40	0°25.0	0°25.1	0°23.9	4.0 - 0.1	10.0 - 0.3	16.0 - 0.4	40	0°40.0	0°40.1	0°38.2	4.0 - 0.2	10.0 - 0.4	16.0 - 0.7
41	0°10.3	0°10.3	0°09.8	4.1 - 0.0	10.1 - 0.1	16.1 - 0.1	41	0°25.3	0°25.3	0°24.1	4.1 - 0.1	10.1 - 0.3	16.1 - 0.4	41	0°40.3	0°40.4	0°38.4	4.1 - 0.2	10.1 - 0.4	16.1 - 0.7
42	0°10.5	0°10.5	0°10.0	4.2 - 0.0	10.2 - 0.1	16.2 - 0.1	42	0°25.5	0°25.6	0°24.3	4.2 - 0.1	10.2 - 0.3	16.2 - 0.4	42	0°40.5	0°40.6	0°38.7	4.2 - 0.2	10.2 - 0.4	16.2 - 0.7
43	0°10.8	0°10.8	0°10.3	4.3 - 0.0	10.3 - 0.1	16.3 - 0.1	43	0°25.8	0°25.8	0°24.6	4.3 - 0.1	10.3 - 0.3	16.3 - 0.4	43	0°40.8	0°40.9	0°38.9	4.3 - 0.2	10.3 - 0.4	16.3 - 0.7
44	0°11.0	0°11.0	0°10.5	4.4 - 0.0	10.4 - 0.1	16.4 - 0.1	44	0°26.0	0°26.1	0°24.8	4.4 - 0.1	10.4 - 0.3	16.4 - 0.4	44	0°41.0	0°41.1	0°39.1	4.4 - 0.2	10.4 - 0.4	16.4 - 0.7
45	0°11.3	0°11.3	0°10.7	4.5 - 0.0	10.5 - 0.1	16.5 - 0.1	45	0°26.3	0°26.3	0°25.1	4.5 - 0.1	10.5 - 0.3	16.5 - 0.4	45	0°41.3	0°41.4	0°39.4	4.5 - 0.2	10.5 - 0.4	16.5 - 0.7
46	0°11.5	0°11.5	0°11.0	4.6 - 0.0	10.6 - 0.1	16.6 - 0.1	46	0°26.5	0°26.6	0°25.3	4.6 - 0.1	10.6 - 0.3	16.6 - 0.4	46	0°41.5	0°41.6	0°39.6	4.6 - 0.2	10.6 - 0.4	16.6 - 0.7
47	0°11.8	0°11.8	0°11.2	4.7 - 0.0	10.7 - 0.1	16.7 - 0.1	47	0°26.8	0°26.8	0°25.5	4.7 - 0.1	10.7 - 0.3	16.7 - 0.4	47	0°41.8	0°41.9	0°39.8	4.7 - 0.2	10.7 - 0.4	16.7 - 0.7
48	0°12.0	0°12.0	0°11.5	4.8 - 0.0	10.8 - 0.1	16.8 - 0.1	48	0°27.0	0°27.1	0°25.8	4.8 - 0.1	10.8 - 0.3	16.8 - 0.4	48	0°42.0	0°42.1	0°40.1	4.8 - 0.2	10.8 - 0.5	16.8 - 0.7
49	0°																			



## Increments and Corrections

m 3	Sun Plan.	Aries	Moon	v and d corr			m 4	Sun Plan.	Aries	Moon	v and d corr			m 5	Sun Plan.	Aries	Moon	v and d corr		
0	0°45.0	0°45.1	0°43.0	0.0 - 0.0	6.0 - 0.3	12.0 - 0.7	0	1°00.0	1°00.2	0°57.3	0.0 - 0.0	6.0 - 0.4	12.0 - 0.9	0	1°15.0	1°15.2	1°11.6	0.0 - 0.0	6.0 - 0.5	12.0 - 1.1
1	0°45.3	0°45.4	0°43.2	0.1 - 0.0	6.1 - 0.4	12.1 - 0.7	1	1°00.2	1°00.4	0°57.5	0.1 - 0.0	6.1 - 0.5	12.1 - 0.9	1	1°15.3	1°15.5	1°11.8	0.1 - 0.0	6.1 - 0.6	12.1 - 1.1
2	0°45.5	0°45.6	0°43.4	0.2 - 0.0	6.2 - 0.4	12.2 - 0.7	2	1°00.5	1°00.7	0°57.7	0.2 - 0.0	6.2 - 0.5	12.2 - 0.9	2	1°15.5	1°15.7	1°12.1	0.2 - 0.0	6.2 - 0.6	12.2 - 1.1
3	0°45.8	0°45.9	0°43.7	0.3 - 0.0	6.3 - 0.4	12.3 - 0.7	3	1°00.7	1°00.9	0°58.0	0.3 - 0.0	6.3 - 0.5	12.3 - 0.9	3	1°15.7	1°16.0	1°12.3	0.3 - 0.0	6.3 - 0.6	12.3 - 1.1
4	0°46.0	0°46.1	0°43.9	0.4 - 0.0	6.4 - 0.4	12.4 - 0.7	4	1°01.0	1°01.2	0°58.2	0.4 - 0.0	6.4 - 0.5	12.4 - 0.9	4	1°16.0	1°16.2	1°12.5	0.4 - 0.0	6.4 - 0.6	12.4 - 1.1
5	0°46.3	0°46.4	0°44.1	0.5 - 0.0	6.5 - 0.4	12.5 - 0.7	5	1°01.2	1°01.4	0°58.5	0.5 - 0.0	6.5 - 0.5	12.5 - 0.9	5	1°16.2	1°16.5	1°12.8	0.5 - 0.0	6.5 - 0.6	12.5 - 1.1
6	0°46.5	0°46.6	0°44.4	0.6 - 0.0	6.6 - 0.4	12.6 - 0.7	6	1°01.5	1°01.7	0°58.7	0.6 - 0.0	6.6 - 0.5	12.6 - 0.9	6	1°16.5	1°16.7	1°13.0	0.6 - 0.1	6.6 - 0.6	12.6 - 1.2
7	0°46.8	0°46.9	0°44.6	0.7 - 0.0	6.7 - 0.4	12.7 - 0.7	7	1°01.7	1°01.9	0°58.9	0.7 - 0.1	6.7 - 0.5	12.7 - 1.0	7	1°16.7	1°17.0	1°13.3	0.7 - 0.1	6.7 - 0.6	12.7 - 1.2
8	0°47.0	0°47.1	0°44.9	0.8 - 0.0	6.8 - 0.4	12.8 - 0.7	8	1°02.0	1°02.2	0°59.2	0.8 - 0.1	6.8 - 0.5	12.8 - 1.0	8	1°17.0	1°17.2	1°13.5	0.8 - 0.1	6.8 - 0.6	12.8 - 1.2
9	0°47.3	0°47.4	0°45.1	0.9 - 0.1	6.9 - 0.4	12.9 - 0.8	9	1°02.3	1°02.4	0°59.4	0.9 - 0.1	6.9 - 0.5	12.9 - 1.0	9	1°17.3	1°17.5	1°13.7	0.9 - 0.1	6.9 - 0.6	12.9 - 1.2
10	0°47.5	0°47.6	0°45.3	1.0 - 0.1	7.0 - 0.4	13.0 - 0.8	10	1°02.5	1°02.7	0°59.7	1.0 - 0.1	7.0 - 0.5	13.0 - 1.0	10	1°17.5	1°17.7	1°14.0	1.0 - 0.1	7.0 - 0.6	13.0 - 1.2
11	0°47.8	0°47.9	0°45.6	1.1 - 0.1	7.1 - 0.4	13.1 - 0.8	11	1°02.8	1°02.9	0°59.9	1.1 - 0.1	7.1 - 0.5	13.1 - 1.0	11	1°17.8	1°18.0	1°14.2	1.1 - 0.1	7.1 - 0.7	13.1 - 1.2
12	0°48.0	0°48.1	0°45.8	1.2 - 0.1	7.2 - 0.4	13.2 - 0.8	12	1°03.0	1°03.2	1°00.1	1.2 - 0.1	7.2 - 0.5	13.2 - 1.0	12	1°18.0	1°18.2	1°14.4	1.2 - 0.1	7.2 - 0.7	13.2 - 1.2
13	0°48.3	0°48.4	0°46.1	1.3 - 0.1	7.3 - 0.4	13.3 - 0.8	13	1°03.3	1°03.4	1°00.4	1.3 - 0.1	7.3 - 0.5	13.3 - 1.0	13	1°18.3	1°18.5	1°14.7	1.3 - 0.1	7.3 - 0.7	13.3 - 1.2
14	0°48.5	0°48.6	0°46.3	1.4 - 0.1	7.4 - 0.4	13.4 - 0.8	14	1°03.5	1°03.7	1°00.6	1.4 - 0.1	7.4 - 0.6	13.4 - 1.0	14	1°18.5	1°18.7	1°14.9	1.4 - 0.1	7.4 - 0.7	13.4 - 1.2
15	0°48.8	0°48.9	0°46.5	1.5 - 0.1	7.5 - 0.4	13.5 - 0.8	15	1°03.8	1°03.9	1°00.8	1.5 - 0.1	7.5 - 0.6	13.5 - 1.0	15	1°18.8	1°19.0	1°15.2	1.5 - 0.1	7.5 - 0.7	13.5 - 1.2
16	0°49.0	0°49.1	0°46.8	1.6 - 0.1	7.6 - 0.4	13.6 - 0.8	16	1°04.0	1°04.2	1°01.1	1.6 - 0.1	7.6 - 0.6	13.6 - 1.0	16	1°19.0	1°19.2	1°15.4	1.6 - 0.1	7.6 - 0.7	13.6 - 1.2
17	0°49.3	0°49.4	0°47.0	1.7 - 0.1	7.7 - 0.4	13.7 - 0.8	17	1°04.2	1°04.4	1°01.3	1.7 - 0.1	7.7 - 0.6	13.7 - 1.0	17	1°19.3	1°19.5	1°15.6	1.7 - 0.2	7.7 - 0.7	13.7 - 1.3
18	0°49.5	0°49.6	0°47.2	1.8 - 0.1	7.8 - 0.5	13.8 - 0.8	18	1°04.5	1°04.7	1°01.6	1.8 - 0.1	7.8 - 0.6	13.8 - 1.0	18	1°19.5	1°19.7	1°15.9	1.8 - 0.2	7.8 - 0.7	13.8 - 1.3
19	0°49.8	0°49.9	0°47.5	1.9 - 0.1	7.9 - 0.5	13.9 - 0.8	19	1°04.7	1°04.9	1°01.8	1.9 - 0.1	7.9 - 0.6	13.9 - 1.0	19	1°19.7	1°20.0	1°16.1	1.9 - 0.2	7.9 - 0.7	13.9 - 1.3
20	0°50.0	0°50.1	0°47.7	2.0 - 0.1	8.0 - 0.5	14.0 - 0.8	20	1°05.0	1°05.2	1°02.0	2.0 - 0.1	8.0 - 0.6	14.0 - 1.1	20	1°20.0	1°20.2	1°16.4	2.0 - 0.2	8.0 - 0.7	14.0 - 1.3
21	0°50.3	0°50.4	0°48.0	2.1 - 0.1	8.1 - 0.5	14.1 - 0.8	21	1°05.2	1°05.4	1°02.3	2.1 - 0.2	8.1 - 0.6	14.1 - 1.1	21	1°20.2	1°20.5	1°16.6	2.1 - 0.2	8.1 - 0.7	14.1 - 1.3
22	0°50.5	0°50.6	0°48.2	2.2 - 0.1	8.2 - 0.5	14.2 - 0.8	22	1°05.5	1°05.7	1°02.5	2.2 - 0.2	8.2 - 0.6	14.2 - 1.1	22	1°20.5	1°20.7	1°16.8	2.2 - 0.2	8.2 - 0.8	14.2 - 1.3
23	0°50.8	0°50.9	0°48.4	2.3 - 0.1	8.3 - 0.5	14.3 - 0.8	23	1°05.8	1°05.9	1°02.8	2.3 - 0.2	8.3 - 0.6	14.3 - 1.1	23	1°20.8	1°21.0	1°17.1	2.3 - 0.2	8.3 - 0.8	14.3 - 1.3
24	0°51.0	0°51.1	0°48.7	2.4 - 0.1	8.4 - 0.5	14.4 - 0.8	24	1°06.0	1°06.2	1°03.0	2.4 - 0.2	8.4 - 0.6	14.4 - 1.1	24	1°21.0	1°21.2	1°17.3	2.4 - 0.2	8.4 - 0.8	14.4 - 1.3
25	0°51.3	0°51.4	0°48.9	2.5 - 0.1	8.5 - 0.5	14.5 - 0.8	25	1°06.3	1°06.4	1°03.2	2.5 - 0.2	8.5 - 0.6	14.5 - 1.1	25	1°21.3	1°21.5	1°17.5	2.5 - 0.2	8.5 - 0.8	14.5 - 1.3
26	0°51.5	0°51.6	0°49.2	2.6 - 0.2	8.6 - 0.5	14.6 - 0.9	26	1°06.5	1°06.7	1°03.5	2.6 - 0.2	8.6 - 0.6	14.6 - 1.1	26	1°21.5	1°21.7	1°17.8	2.6 - 0.2	8.6 - 0.8	14.6 - 1.3
27	0°51.8	0°51.9	0°49.4	2.7 - 0.2	8.7 - 0.5	14.7 - 0.9	27	1°06.8	1°06.9	1°03.7	2.7 - 0.2	8.7 - 0.7	14.7 - 1.1	27	1°21.8	1°22.0	1°18.0	2.7 - 0.2	8.7 - 0.8	14.7 - 1.3
28	0°52.0	0°52.1	0°49.6	2.8 - 0.2	8.8 - 0.5	14.8 - 0.9	28	1°07.0	1°07.2	1°03.9	2.8 - 0.2	8.8 - 0.7	14.8 - 1.1	28	1°22.0	1°22.2	1°18.3	2.8 - 0.3	8.8 - 0.8	14.8 - 1.4
29	0°52.3	0°52.4	0°49.9	2.9 - 0.2	8.9 - 0.5	14.9 - 0.9	29	1°07.3	1°07.4	1°04.2	2.9 - 0.2	8.9 - 0.7	14.9 - 1.1	29	1°22.3	1°22.5	1°18.5	2.9 - 0.3	8.9 - 0.8	14.9 - 1.4
30	0°52.5	0°52.6	0°50.1	3.0 - 0.2	9.0 - 0.5	15.0 - 0.9	30	1°07.5	1°07.7	1°04.4	3.0 - 0.2	9.0 - 0.7	15.0 - 1.1	30	1°22.5	1°22.7	1°18.7	3.0 - 0.3	9.0 - 0.8	15.0 - 1.4
31	0°52.8	0°52.9	0°50.3	3.1 - 0.2	9.1 - 0.5	15.1 - 0.9	31	1°07.7	1°07.9	1°04.7	3.1 - 0.2	9.1 - 0.7	15.1 - 1.1	31	1°22.8	1°23.0	1°19.0	3.1 - 0.3	9.1 - 0.8	15.1 - 1.4
32	0°53.0	0°53.1	0°50.6	3.2 - 0.2	9.2 - 0.5	15.2 - 0.9	32	1°08.0	1°08.2	1°04.9	3.2 - 0.2	9.2 - 0.7	15.2 - 1.1	32	1°23.0	1°23.2	1°19.2	3.2 - 0.3	9.2 - 0.8	15.2 - 1.4
33	0°53.3	0°53.4	0°50.8	3.3 - 0.2	9.3 - 0.5	15.3 - 0.9	33	1°08.2	1°08.4	1°05.1	3.3 - 0.2	9.3 - 0.7	15.3 - 1.1	33	1°23.2	1°23.5	1°19.5	3.3 - 0.3	9.3 - 0.9	15.3 - 1.4
34	0°53.5	0°53.6	0°51.1	3.4 - 0.2	9.4 - 0.5	15.4 - 0.9	34	1°08.5	1°08.7	1°05.4	3.4 - 0.3	9.4 - 0.7	15.4 - 1.2	34	1°23.5	1°23.7	1°19.7	3.4 - 0.3	9.4 - 0.9	15.4 - 1.4
35	0°53.8	0°53.9	0°51.3	3.5 - 0.2	9.5 - 0.6	15.5 - 0.9	35	1°08.7	1°08.9	1°05.6	3.5 - 0.3	9.5 - 0.7	15.5 - 1.2	35	1°23.7	1°24.0	1°19.9	3.5 - 0.3	9.5 - 0.9	15.5 - 1.4
36	0°54.0	0°54.1	0°51.5	3.6 - 0.2	9.6 - 0.6	15.6 - 0.9	36	1°09.0	1°09.2	1°05.9	3.6 - 0.3	9.6 - 0.7	15.6 - 1.2	36	1°24.0	1°24.2	1°20.2	3.6 - 0.3	9.6 - 0.9	15.6 - 1.4
37	0°54.3	0°54.4	0°51.8	3.7 - 0.2	9.7 - 0.6	15.7 - 0.9	37	1°09.3	1°09.4	1°06.1	3.7 - 0.3	9.7 - 0.7	15.7 - 1.2	37	1°24.3	1°24.5	1°20.4	3.7 - 0.3	9.7 - 0.9	15.7 - 1.4
38	0°54.5	0°54.6	0°52.0	3.8 - 0.2	9.8 - 0.6	15.8 - 0.9	38	1°09.5	1°09.7	1°06.3	3.8 - 0.3	9.8 - 0.7	15.8 - 1.2	38	1°24.5	1°24.7	1°20.7	3.8 - 0.3	9.8 - 0.9	15.8 - 1.4
39	0°54.8	0°54.9	0°52.3	3.9 - 0.2	9.9 - 0.6	15.9 - 0.9	39	1°09.8	1°09.9	1°06.6	3.9 - 0.3	9.9 - 0.7	15.9 - 1.2	39	1°24.8	1°25.0	1°20.9	3.9 - 0.4	9.9 - 0.9	15.9 - 1.5
40	0°55.0	0°55.2	0°52.5	4.0 - 0.2	10.0 - 0.6	16.0 - 0.9	40	1°10.0	1°10.2	1°06.8	4.0 - 0.3	10.0 - 0.8	16.0 - 1.2	40	1°25.0	1°25.2	1°21.1	4.0 - 0.4	10.0 - 0.9	16.0 - 1.5
41	0°55.3	0°55.4	0°52.7	4.1 - 0.2	10.1 - 0.6	16.1 - 0.9	41	1°10.3	1°10.4	1°07.0	4.1 - 0.3	10.1 - 0.8	16.1 - 1.2	41	1°25.3	1°25.5	1°21.4	4.1 - 0.4	10.1 - 0.9	16.1 - 1.5
42	0°55.5	0°55.7	0°53.0	4.2 - 0.2	10.2 - 0.6	16.2 - 0.9	42	1°10.5	1°10.7	1°07.3	4.2 - 0.3	10.2 - 0.8	16.2 - 1.2	42	1°25.5	1°25.7	1°21.6	4.2 - 0.4	10.2 - 0.9	16.2 - 1.5
43	0°55.8	0°55.9	0°53.2	4.3 - 0.3	10.3 - 0.6	16.3 - 1.0	43	1°10.8	1°10.9	1°07.5	4.3 - 0.3	10.3 - 0.8	16.3 - 1.2	43	1°25.8	1°26.0	1°21.8	4.3 - 0.4	10.3 - 0.9	16.3 - 1.5
44	0°56.0	0°56.2	0°53.4	4.4 - 0.3	10.4 - 0.6	16.4 - 1.0	44	1°11.0	1°11.2	1°07.8	4.4 - 0.3	10.4 - 0.8	16.4 - 1.2	44	1°26.0	1°26.2	1°22.1	4.4 - 0.4	10.4 - 1.0	16.4 - 1.5
45	0°56.3	0°56.4	0°53.7	4.5 - 0.3	10.5 - 0.6	16.5 - 1.0	45	1°11.3	1°11.4	1°08.0	4.5 - 0.3	10.5 - 0.8	16.5 - 1.2	45	1°26.3	1°26.5	1°22.3	4.5 - 0.4	10.5 - 1.0	16.5 - 1.5
46	0°56.5	0°56.7	0°53.9	4.6 - 0.3	10.6 - 0.6	16.6 - 1.0	46	1°11.5	1°11.7	1°08.2	4.6 - 0.3	10.6 - 0.8	16.6 - 1.2	46	1°26.5	1°26.7	1°22.6	4.6 - 0.4	10.6 - 1.0	16.6 - 1.5
47	0°56.8	0°56.9	0°54.2	4.7 - 0.3	10.7 - 0.6	16.7 - 1.0	47	1°11.7	1°11.9	1°08.5	4.7 - 0.4	10.7 - 0.8	16.7 - 1.3	47	1°26.8	1°27.0	1°22.8	4.7 - 0.4	10.7 - 1.0	16.7 - 1.5
48	0°57.0	0°57.2	0°54.4	4.8 - 0.3	10.8 - 0.6	16.8 - 1.0	48	1°12.0	1°12.2	1°08.7	4.8 - 0.4	10.8 - 0.8	16.8 - 1.3	48	1°27.0	1°27.2	1°23.0	4.8 - 0.4	10.8 - 1.0	16.8 - 1.5
49	0°57.3	0°57.4																		

## Increments and Corrections

m 6	Sun Plan.	Aries	Moon	v and d corr			m 7	Sun Plan.	Aries	Moon	v and d corr			m 8	Sun Plan.	Aries	Moon	v and d corr		
0	1°30.0	1°30.2	1°25.9	0.0 - 0.0	6.0 - 0.7	12.0 - 1.3	0	1°45.0	1°45.3	1°40.2	0.0 - 0.0	6.0 - 0.8	12.0 - 1.5	0	2°00.0	2°00.3	1°54.5	0.0 - 0.0	6.0 - 0.8	12.0 - 1.7
1	1°30.3	1°30.5	1°26.1	0.1 - 0.0	6.1 - 0.7	12.1 - 1.3	1	1°45.3	1°45.5	1°40.5	0.1 - 0.0	6.1 - 0.8	12.1 - 1.5	1	2°00.3	2°00.6	1°54.8	0.1 - 0.0	6.1 - 0.9	12.1 - 1.7
2	1°30.5	1°30.7	1°26.4	0.2 - 0.0	6.2 - 0.7	12.2 - 1.3	2	1°45.5	1°45.8	1°40.7	0.2 - 0.0	6.2 - 0.8	12.2 - 1.5	2	2°00.5	2°00.8	1°55.0	0.2 - 0.0	6.2 - 0.9	12.2 - 1.7
3	1°30.7	1°31.0	1°26.6	0.3 - 0.0	6.3 - 0.7	12.3 - 1.3	3	1°45.8	1°46.0	1°40.9	0.3 - 0.0	6.3 - 0.8	12.3 - 1.5	3	2°00.8	2°01.1	1°55.2	0.3 - 0.0	6.3 - 0.9	12.3 - 1.7
4	1°31.0	1°31.2	1°26.9	0.4 - 0.0	6.4 - 0.7	12.4 - 1.3	4	1°46.0	1°46.3	1°41.2	0.4 - 0.1	6.4 - 0.8	12.4 - 1.6	4	2°01.0	2°01.3	1°55.5	0.4 - 0.1	6.4 - 0.9	12.4 - 1.8
5	1°31.2	1°31.5	1°27.1	0.5 - 0.1	6.5 - 0.7	12.5 - 1.4	5	1°46.2	1°46.5	1°41.4	0.5 - 0.1	6.5 - 0.8	12.5 - 1.6	5	2°01.3	2°01.6	1°55.7	0.5 - 0.1	6.5 - 0.9	12.5 - 1.8
6	1°31.5	1°31.8	1°27.3	0.6 - 0.1	6.6 - 0.7	12.6 - 1.4	6	1°46.5	1°46.8	1°41.6	0.6 - 0.1	6.6 - 0.8	12.6 - 1.6	6	2°01.5	2°01.8	1°56.0	0.6 - 0.1	6.6 - 0.9	12.6 - 1.8
7	1°31.7	1°32.0	1°27.6	0.7 - 0.1	6.7 - 0.7	12.7 - 1.4	7	1°46.7	1°47.0	1°41.9	0.7 - 0.1	6.7 - 0.8	12.7 - 1.6	7	2°01.8	2°02.1	1°56.2	0.7 - 0.1	6.7 - 0.9	12.7 - 1.8
8	1°32.0	1°32.3	1°27.8	0.8 - 0.1	6.8 - 0.7	12.8 - 1.4	8	1°47.0	1°47.3	1°42.1	0.8 - 0.1	6.8 - 0.8	12.8 - 1.6	8	2°02.0	2°02.3	1°56.4	0.8 - 0.1	6.8 - 1.0	12.8 - 1.8
9	1°32.3	1°32.5	1°28.0	0.9 - 0.1	6.9 - 0.7	12.9 - 1.4	9	1°47.3	1°47.5	1°42.4	0.9 - 0.1	6.9 - 0.9	12.9 - 1.6	9	2°02.3	2°02.6	1°56.7	0.9 - 0.1	6.9 - 1.0	12.9 - 1.8
10	1°32.5	1°32.8	1°28.3	1.0 - 0.1	7.0 - 0.8	13.0 - 1.4	10	1°47.5	1°47.8	1°42.6	1.0 - 0.1	7.0 - 0.9	13.0 - 1.6	10	2°02.5	2°02.8	1°56.9	1.0 - 0.1	7.0 - 1.0	13.0 - 1.8
11	1°32.8	1°33.0	1°28.5	1.1 - 0.1	7.1 - 0.8	13.1 - 1.4	11	1°47.8	1°48.0	1°42.8	1.1 - 0.1	7.1 - 0.9	13.1 - 1.6	11	2°02.8	2°03.1	1°57.2	1.1 - 0.2	7.1 - 1.0	13.1 - 1.9
12	1°33.0	1°33.3	1°28.8	1.2 - 0.1	7.2 - 0.8	13.2 - 1.4	12	1°48.0	1°48.3	1°43.1	1.2 - 0.2	7.2 - 0.9	13.2 - 1.6	12	2°03.0	2°03.3	1°57.4	1.2 - 0.2	7.2 - 1.0	13.2 - 1.9
13	1°33.3	1°33.5	1°29.0	1.3 - 0.1	7.3 - 0.8	13.3 - 1.4	13	1°48.3	1°48.5	1°43.3	1.3 - 0.2	7.3 - 0.9	13.3 - 1.7	13	2°03.3	2°03.6	1°57.6	1.3 - 0.2	7.3 - 1.0	13.3 - 1.9
14	1°33.5	1°33.8	1°29.2	1.4 - 0.2	7.4 - 0.8	13.4 - 1.5	14	1°48.5	1°48.8	1°43.6	1.4 - 0.2	7.4 - 0.9	13.4 - 1.7	14	2°03.5	2°03.8	1°57.9	1.4 - 0.2	7.4 - 1.0	13.4 - 1.9
15	1°33.8	1°34.0	1°29.5	1.5 - 0.2	7.5 - 0.8	13.5 - 1.5	15	1°48.8	1°49.0	1°43.8	1.5 - 0.2	7.5 - 0.9	13.5 - 1.7	15	2°03.8	2°04.1	1°58.1	1.5 - 0.2	7.5 - 1.1	13.5 - 1.9
16	1°34.0	1°34.3	1°29.7	1.6 - 0.2	7.6 - 0.8	13.6 - 1.5	16	1°49.0	1°49.3	1°44.0	1.6 - 0.2	7.6 - 0.9	13.6 - 1.7	16	2°04.0	2°04.3	1°58.4	1.6 - 0.2	7.6 - 1.1	13.6 - 1.9
17	1°34.3	1°34.5	1°30.0	1.7 - 0.2	7.7 - 0.8	13.7 - 1.5	17	1°49.3	1°49.5	1°44.3	1.7 - 0.2	7.7 - 1.0	13.7 - 1.7	17	2°04.2	2°04.6	1°58.6	1.7 - 0.2	7.7 - 1.1	13.7 - 1.9
18	1°34.5	1°34.8	1°30.2	1.8 - 0.2	7.8 - 0.8	13.8 - 1.5	18	1°49.5	1°49.8	1°44.5	1.8 - 0.2	7.8 - 1.0	13.8 - 1.7	18	2°04.5	2°04.8	1°58.8	1.8 - 0.3	7.8 - 1.1	13.8 - 2.0
19	1°34.8	1°35.0	1°30.4	1.9 - 0.2	7.9 - 0.9	13.9 - 1.5	19	1°49.8	1°50.0	1°44.8	1.9 - 0.2	7.9 - 1.0	13.9 - 1.7	19	2°04.7	2°05.1	1°59.1	1.9 - 0.3	7.9 - 1.1	13.9 - 2.0
20	1°35.0	1°35.3	1°30.7	2.0 - 0.2	8.0 - 0.9	14.0 - 1.5	20	1°50.0	1°50.3	1°45.0	2.0 - 0.3	8.0 - 1.0	14.0 - 1.8	20	2°05.0	2°05.3	1°59.3	2.0 - 0.3	8.0 - 1.1	14.0 - 2.0
21	1°35.2	1°35.5	1°30.9	2.1 - 0.2	8.1 - 0.9	14.1 - 1.5	21	1°50.2	1°50.6	1°45.2	2.1 - 0.3	8.1 - 1.0	14.1 - 1.8	21	2°05.2	2°05.6	1°59.5	2.1 - 0.3	8.1 - 1.1	14.1 - 2.0
22	1°35.5	1°35.8	1°31.1	2.2 - 0.2	8.2 - 0.9	14.2 - 1.5	22	1°50.5	1°50.8	1°45.5	2.2 - 0.3	8.2 - 1.0	14.2 - 1.8	22	2°05.5	2°05.8	1°59.8	2.2 - 0.3	8.2 - 1.2	14.2 - 2.0
23	1°35.8	1°36.0	1°31.4	2.3 - 0.2	8.3 - 0.9	14.3 - 1.5	23	1°50.8	1°51.1	1°45.7	2.3 - 0.3	8.3 - 1.0	14.3 - 1.8	23	2°05.7	2°06.1	2°00.0	2.3 - 0.3	8.3 - 1.2	14.3 - 2.0
24	1°36.0	1°36.3	1°31.6	2.4 - 0.3	8.4 - 0.9	14.4 - 1.6	24	1°51.0	1°51.3	1°45.9	2.4 - 0.3	8.4 - 1.1	14.4 - 1.8	24	2°06.0	2°06.3	2°00.3	2.4 - 0.3	8.4 - 1.2	14.4 - 2.0
25	1°36.3	1°36.5	1°31.9	2.5 - 0.3	8.5 - 0.9	14.5 - 1.6	25	1°51.3	1°51.6	1°46.2	2.5 - 0.3	8.5 - 1.1	14.5 - 1.8	25	2°06.2	2°06.6	2°00.5	2.5 - 0.4	8.5 - 1.2	14.5 - 2.1
26	1°36.5	1°36.8	1°32.1	2.6 - 0.3	8.6 - 0.9	14.6 - 1.6	26	1°51.5	1°51.8	1°46.4	2.6 - 0.3	8.6 - 1.1	14.6 - 1.8	26	2°06.5	2°06.8	2°00.7	2.6 - 0.4	8.6 - 1.2	14.6 - 2.1
27	1°36.8	1°37.0	1°32.3	2.7 - 0.3	8.7 - 0.9	14.7 - 1.6	27	1°51.8	1°52.1	1°46.7	2.7 - 0.3	8.7 - 1.1	14.7 - 1.8	27	2°06.7	2°07.1	2°01.0	2.7 - 0.4	8.7 - 1.2	14.7 - 2.1
28	1°37.0	1°37.3	1°32.6	2.8 - 0.3	8.8 - 1.0	14.8 - 1.6	28	1°52.0	1°52.3	1°46.9	2.8 - 0.4	8.8 - 1.1	14.8 - 1.9	28	2°07.0	2°07.3	2°01.2	2.8 - 0.4	8.8 - 1.2	14.8 - 2.1
29	1°37.3	1°37.5	1°32.8	2.9 - 0.3	8.9 - 1.0	14.9 - 1.6	29	1°52.3	1°52.6	1°47.1	2.9 - 0.4	8.9 - 1.1	14.9 - 1.9	29	2°07.2	2°07.6	2°01.5	2.9 - 0.4	8.9 - 1.3	14.9 - 2.1
30	1°37.5	1°37.8	1°33.1	3.0 - 0.3	9.0 - 1.0	15.0 - 1.6	30	1°52.5	1°52.8	1°47.4	3.0 - 0.4	9.0 - 1.1	15.0 - 1.9	30	2°07.5	2°07.8	2°01.7	3.0 - 0.4	9.0 - 1.3	15.0 - 2.1
31	1°37.8	1°38.0	1°33.3	3.1 - 0.3	9.1 - 1.0	15.1 - 1.6	31	1°52.7	1°53.1	1°47.6	3.1 - 0.4	9.1 - 1.1	15.1 - 1.9	31	2°07.8	2°08.1	2°01.9	3.1 - 0.4	9.1 - 1.3	15.1 - 2.1
32	1°38.0	1°38.3	1°33.5	3.2 - 0.3	9.2 - 1.0	15.2 - 1.6	32	1°53.0	1°53.3	1°47.9	3.2 - 0.4	9.2 - 1.1	15.2 - 1.9	32	2°08.0	2°08.3	2°02.2	3.2 - 0.5	9.2 - 1.3	15.2 - 2.2
33	1°38.3	1°38.5	1°33.8	3.3 - 0.4	9.3 - 1.0	15.3 - 1.7	33	1°53.3	1°53.6	1°48.1	3.3 - 0.4	9.3 - 1.2	15.3 - 1.9	33	2°08.3	2°08.6	2°02.4	3.3 - 0.5	9.3 - 1.3	15.3 - 2.2
34	1°38.5	1°38.8	1°34.0	3.4 - 0.4	9.4 - 1.0	15.4 - 1.7	34	1°53.5	1°53.8	1°48.3	3.4 - 0.4	9.4 - 1.2	15.4 - 1.9	34	2°08.5	2°08.9	2°02.6	3.4 - 0.5	9.4 - 1.3	15.4 - 2.2
35	1°38.7	1°39.0	1°34.3	3.5 - 0.4	9.5 - 1.0	15.5 - 1.7	35	1°53.7	1°54.1	1°48.6	3.5 - 0.4	9.5 - 1.2	15.5 - 1.9	35	2°08.8	2°09.1	2°02.9	3.5 - 0.5	9.5 - 1.3	15.5 - 2.2
36	1°39.0	1°39.3	1°34.5	3.6 - 0.4	9.6 - 1.0	15.6 - 1.7	36	1°54.0	1°54.3	1°48.8	3.6 - 0.5	9.6 - 1.2	15.6 - 1.9	36	2°09.0	2°09.4	2°03.1	3.6 - 0.5	9.6 - 1.4	15.6 - 2.2
37	1°39.3	1°39.5	1°34.7	3.7 - 0.4	9.7 - 1.1	15.7 - 1.7	37	1°54.2	1°54.6	1°49.0	3.7 - 0.5	9.7 - 1.2	15.7 - 2.0	37	2°09.3	2°09.6	2°03.4	3.7 - 0.5	9.7 - 1.4	15.7 - 2.2
38	1°39.5	1°39.8	1°35.0	3.8 - 0.4	9.8 - 1.1	15.8 - 1.7	38	1°54.5	1°54.8	1°49.3	3.8 - 0.5	9.8 - 1.2	15.8 - 2.0	38	2°09.5	2°09.9	2°03.6	3.8 - 0.5	9.8 - 1.4	15.8 - 2.2
39	1°39.8	1°40.0	1°35.2	3.9 - 0.4	9.9 - 1.1	15.9 - 1.7	39	1°54.8	1°55.1	1°49.5	3.9 - 0.5	9.9 - 1.2	15.9 - 2.0	39	2°09.8	2°10.1	2°03.8	3.9 - 0.6	9.9 - 1.4	15.9 - 2.3
40	1°40.0	1°40.3	1°35.4	4.0 - 0.4	10.0 - 1.1	16.0 - 1.7	40	1°55.0	1°55.3	1°49.8	4.0 - 0.5	10.0 - 1.3	16.0 - 2.0	40	2°10.0	2°10.4	2°04.1	4.0 - 0.6	10.0 - 1.4	16.0 - 2.3
41	1°40.3	1°40.5	1°35.7	4.1 - 0.4	10.1 - 1.1	16.1 - 1.7	41	1°55.3	1°55.6	1°50.0	4.1 - 0.5	10.1 - 1.3	16.1 - 2.0	41	2°10.3	2°10.6	2°04.3	4.1 - 0.6	10.1 - 1.4	16.1 - 2.3
42	1°40.5	1°40.8	1°35.9	4.2 - 0.5	10.2 - 1.1	16.2 - 1.8	42	1°55.5	1°55.8	1°50.2	4.2 - 0.5	10.2 - 1.3	16.2 - 2.0	42	2°10.5	2°10.9	2°04.6	4.2 - 0.6	10.2 - 1.4	16.2 - 2.3
43	1°40.8	1°41.0	1°36.2	4.3 - 0.5	10.3 - 1.1	16.3 - 1.8	43	1°55.8	1°56.1	1°50.5	4.3 - 0.5	10.3 - 1.3	16.3 - 2.0	43	2°10.8	2°11.1	2°04.8	4.3 - 0.6	10.3 - 1.5	16.3 - 2.3
44	1°41.0	1°41.3	1°36.4	4.4 - 0.5	10.4 - 1.1	16.4 - 1.8	44	1°56.0	1°56.3	1°50.7	4.4 - 0.6	10.4 - 1.3	16.4 - 2.0	44	2°11.0	2°11.4	2°05.0	4.4 - 0.6	10.4 - 1.5	16.4 - 2.3
45	1°41.3	1°41.5	1°36.6	4.5 - 0.5	10.5 - 1.1	16.5 - 1.8	45	1°56.3	1°56.6	1°51.0	4.5 - 0.6	10.5 - 1.3	16.5 - 2.1	45	2°11.3	2°11.6	2°05.3	4.5 - 0.6	10.5 - 1.5	16.5 - 2.3
46	1°41.5	1°41.8	1°36.9	4.6 - 0.5	10.6 - 1.1	16.6 - 1.8	46	1°56.5	1°56.8	1°51.2	4.6 - 0.6	10.6 - 1.3	16.6 - 2.1	46	2°11.5	2°11.9	2°05.5	4.6 - 0.7	10.6 - 1.5	16.6 - 2.4
47	1°41.8	1°42.0	1°37.1	4.7 - 0.5	10.7 - 1.2	16.7 - 1.8	47	1°56.7	1°57.1	1°51.4	4.7 - 0.6	10.7 - 1.3	16.7 - 2.1	47	2°11.7	2°12.1	2°05.7	4.7 - 0.7	10.7 - 1.5	16.7 - 2.4
48	1°42.0	1°42.3	1°37.4	4.8 - 0.5	10.8 - 1.2	16.8 - 1.8	48	1°57.0	1°57.3	1°51.7	4.8 - 0.6	10.8 - 1.4	16.8 - 2.1	48	2°12.0	2°12.4	2°06.0	4.8 - 0.7	10.8 - 1.5	16.8 - 2.4
49	1°42.3	1°42.5																		

## Increments and Corrections

m 9	Sun Plan.	Aries	Moon	v and d corr			m 10	Sun Plan.	Aries	Moon	v and d corr			m 11	Sun Plan.	Aries	Moon	v and d corr		
0	2°15.0	2°15.4	2°08.8	0.0 - 0.0	6.0 - 0.9	12.0 - 1.9	0	2°30.0	2°30.4	2°23.2	0.0 - 0.0	6.0 - 1.0	12.0 - 2.1	0	2°45.0	2°45.5	2°37.5	0.0 - 0.0	6.0 - 1.2	12.0 - 2.3
1	2°15.3	2°15.6	2°09.1	0.1 - 0.0	6.1 - 1.0	12.1 - 1.9	1	2°30.3	2°30.7	2°23.4	0.1 - 0.0	6.1 - 1.1	12.1 - 2.1	1	2°45.3	2°45.7	2°37.7	0.1 - 0.0	6.1 - 1.2	12.1 - 2.3
2	2°15.5	2°15.9	2°09.3	0.2 - 0.0	6.2 - 1.0	12.2 - 1.9	2	2°30.5	2°30.9	2°23.6	0.2 - 0.0	6.2 - 1.1	12.2 - 2.1	2	2°45.5	2°46.0	2°38.0	0.2 - 0.0	6.2 - 1.2	12.2 - 2.3
3	2°15.8	2°16.1	2°09.6	0.3 - 0.0	6.3 - 1.0	12.3 - 1.9	3	2°30.8	2°31.2	2°23.9	0.3 - 0.1	6.3 - 1.1	12.3 - 2.2	3	2°45.8	2°46.2	2°38.2	0.3 - 0.1	6.3 - 1.2	12.3 - 2.4
4	2°16.0	2°16.4	2°09.8	0.4 - 0.1	6.4 - 1.0	12.4 - 2.0	4	2°31.0	2°31.4	2°24.1	0.4 - 0.1	6.4 - 1.1	12.4 - 2.2	4	2°46.0	2°46.5	2°38.4	0.4 - 0.1	6.4 - 1.2	12.4 - 2.4
5	2°16.3	2°16.6	2°10.0	0.5 - 0.1	6.5 - 1.0	12.5 - 2.0	5	2°31.3	2°31.7	2°24.4	0.5 - 0.1	6.5 - 1.1	12.5 - 2.2	5	2°46.3	2°46.7	2°38.7	0.5 - 0.1	6.5 - 1.2	12.5 - 2.4
6	2°16.5	2°16.9	2°10.3	0.6 - 0.1	6.6 - 1.0	12.6 - 2.0	6	2°31.5	2°31.9	2°24.6	0.6 - 0.1	6.6 - 1.2	12.6 - 2.2	6	2°46.5	2°47.0	2°38.9	0.6 - 0.1	6.6 - 1.3	12.6 - 2.4
7	2°16.8	2°17.1	2°10.5	0.7 - 0.1	6.7 - 1.1	12.7 - 2.0	7	2°31.8	2°32.2	2°24.8	0.7 - 0.1	6.7 - 1.2	12.7 - 2.2	7	2°46.8	2°47.2	2°39.2	0.7 - 0.1	6.7 - 1.3	12.7 - 2.4
8	2°17.0	2°17.4	2°10.8	0.8 - 0.1	6.8 - 1.1	12.8 - 2.0	8	2°32.0	2°32.4	2°25.1	0.8 - 0.1	6.8 - 1.2	12.8 - 2.2	8	2°47.0	2°47.5	2°39.4	0.8 - 0.2	6.8 - 1.3	12.8 - 2.5
9	2°17.3	2°17.6	2°11.0	0.9 - 0.1	6.9 - 1.1	12.9 - 2.0	9	2°32.3	2°32.7	2°25.3	0.9 - 0.2	6.9 - 1.2	12.9 - 2.3	9	2°47.3	2°47.7	2°39.6	0.9 - 0.2	6.9 - 1.3	12.9 - 2.5
10	2°17.5	2°17.9	2°11.2	1.0 - 0.2	7.0 - 1.1	13.0 - 2.1	10	2°32.5	2°32.9	2°25.6	1.0 - 0.2	7.0 - 1.2	13.0 - 2.3	10	2°47.5	2°48.0	2°39.9	1.0 - 0.2	7.0 - 1.3	13.0 - 2.5
11	2°17.8	2°18.1	2°11.5	1.1 - 0.2	7.1 - 1.1	13.1 - 2.1	11	2°32.8	2°33.2	2°25.8	1.1 - 0.2	7.1 - 1.2	13.1 - 2.3	11	2°47.8	2°48.2	2°40.1	1.1 - 0.2	7.1 - 1.4	13.1 - 2.5
12	2°18.0	2°18.4	2°11.7	1.2 - 0.2	7.2 - 1.1	13.2 - 2.1	12	2°33.0	2°33.4	2°26.0	1.2 - 0.2	7.2 - 1.3	13.2 - 2.3	12	2°48.0	2°48.5	2°40.3	1.2 - 0.2	7.2 - 1.4	13.2 - 2.5
13	2°18.3	2°18.6	2°12.0	1.3 - 0.2	7.3 - 1.2	13.3 - 2.1	13	2°33.3	2°33.7	2°26.3	1.3 - 0.2	7.3 - 1.3	13.3 - 2.3	13	2°48.3	2°48.7	2°40.6	1.3 - 0.2	7.3 - 1.4	13.3 - 2.5
14	2°18.5	2°18.9	2°12.2	1.4 - 0.2	7.4 - 1.2	13.4 - 2.1	14	2°33.5	2°33.9	2°26.5	1.4 - 0.2	7.4 - 1.3	13.4 - 2.3	14	2°48.5	2°49.0	2°40.8	1.4 - 0.3	7.4 - 1.4	13.4 - 2.6
15	2°18.8	2°19.1	2°12.4	1.5 - 0.2	7.5 - 1.2	13.5 - 2.1	15	2°33.8	2°34.2	2°26.7	1.5 - 0.3	7.5 - 1.3	13.5 - 2.4	15	2°48.8	2°49.2	2°41.1	1.5 - 0.3	7.5 - 1.4	13.5 - 2.6
16	2°19.0	2°19.4	2°12.7	1.6 - 0.3	7.6 - 1.2	13.6 - 2.2	16	2°34.0	2°34.4	2°27.0	1.6 - 0.3	7.6 - 1.3	13.6 - 2.4	16	2°49.0	2°49.5	2°41.3	1.6 - 0.3	7.6 - 1.5	13.6 - 2.6
17	2°19.3	2°19.6	2°12.9	1.7 - 0.3	7.7 - 1.2	13.7 - 2.2	17	2°34.3	2°34.7	2°27.2	1.7 - 0.3	7.7 - 1.3	13.7 - 2.4	17	2°49.3	2°49.7	2°41.5	1.7 - 0.3	7.7 - 1.5	13.7 - 2.6
18	2°19.5	2°19.9	2°13.1	1.8 - 0.3	7.8 - 1.2	13.8 - 2.2	18	2°34.5	2°34.9	2°27.5	1.8 - 0.3	7.8 - 1.4	13.8 - 2.4	18	2°49.5	2°50.0	2°41.8	1.8 - 0.3	7.8 - 1.5	13.8 - 2.6
19	2°19.7	2°20.1	2°13.4	1.9 - 0.3	7.9 - 1.3	13.9 - 2.2	19	2°34.8	2°35.2	2°27.7	1.9 - 0.3	7.9 - 1.4	13.9 - 2.4	19	2°49.8	2°50.2	2°42.0	1.9 - 0.4	7.9 - 1.5	13.9 - 2.7
20	2°20.0	2°20.4	2°13.6	2.0 - 0.3	8.0 - 1.3	14.0 - 2.2	20	2°35.0	2°35.4	2°27.9	2.0 - 0.3	8.0 - 1.4	14.0 - 2.4	20	2°50.0	2°50.5	2°42.3	2.0 - 0.4	8.0 - 1.5	14.0 - 2.7
21	2°20.2	2°20.6	2°13.9	2.1 - 0.3	8.1 - 1.3	14.1 - 2.2	21	2°35.2	2°35.6	2°28.2	2.1 - 0.4	8.1 - 1.4	14.1 - 2.5	21	2°50.2	2°50.7	2°42.5	2.1 - 0.4	8.1 - 1.6	14.1 - 2.7
22	2°20.5	2°20.9	2°14.1	2.2 - 0.3	8.2 - 1.3	14.2 - 2.2	22	2°35.5	2°35.9	2°28.4	2.2 - 0.4	8.2 - 1.4	14.2 - 2.5	22	2°50.5	2°51.0	2°42.7	2.2 - 0.4	8.2 - 1.6	14.2 - 2.7
23	2°20.7	2°21.1	2°14.3	2.3 - 0.4	8.3 - 1.3	14.3 - 2.3	23	2°35.7	2°36.2	2°28.7	2.3 - 0.4	8.3 - 1.5	14.3 - 2.5	23	2°50.7	2°51.2	2°43.0	2.3 - 0.4	8.3 - 1.6	14.3 - 2.7
24	2°21.0	2°21.4	2°14.6	2.4 - 0.4	8.4 - 1.3	14.4 - 2.3	24	2°36.0	2°36.4	2°28.9	2.4 - 0.4	8.4 - 1.5	14.4 - 2.5	24	2°51.0	2°51.5	2°43.2	2.4 - 0.5	8.4 - 1.6	14.4 - 2.8
25	2°21.2	2°21.6	2°14.8	2.5 - 0.4	8.5 - 1.3	14.5 - 2.3	25	2°36.2	2°36.7	2°29.1	2.5 - 0.4	8.5 - 1.5	14.5 - 2.5	25	2°51.2	2°51.7	2°43.4	2.5 - 0.5	8.5 - 1.6	14.5 - 2.8
26	2°21.5	2°21.9	2°15.1	2.6 - 0.4	8.6 - 1.4	14.6 - 2.3	26	2°36.5	2°36.9	2°29.4	2.6 - 0.5	8.6 - 1.5	14.6 - 2.6	26	2°51.5	2°52.0	2°43.7	2.6 - 0.5	8.6 - 1.6	14.6 - 2.8
27	2°21.7	2°22.1	2°15.3	2.7 - 0.4	8.7 - 1.4	14.7 - 2.3	27	2°36.7	2°37.2	2°29.6	2.7 - 0.5	8.7 - 1.5	14.7 - 2.6	27	2°51.7	2°52.2	2°43.9	2.7 - 0.5	8.7 - 1.7	14.7 - 2.8
28	2°22.0	2°22.4	2°15.5	2.8 - 0.4	8.8 - 1.4	14.8 - 2.3	28	2°37.0	2°37.4	2°29.8	2.8 - 0.5	8.8 - 1.5	14.8 - 2.6	28	2°52.0	2°52.5	2°44.2	2.8 - 0.5	8.8 - 1.7	14.8 - 2.8
29	2°22.2	2°22.6	2°15.8	2.9 - 0.5	8.9 - 1.4	14.9 - 2.4	29	2°37.2	2°37.7	2°30.1	2.9 - 0.5	8.9 - 1.6	14.9 - 2.6	29	2°52.2	2°52.7	2°44.4	2.9 - 0.6	8.9 - 1.7	14.9 - 2.9
30	2°22.5	2°22.9	2°16.0	3.0 - 0.5	9.0 - 1.4	15.0 - 2.4	30	2°37.5	2°37.9	2°30.3	3.0 - 0.5	9.0 - 1.6	15.0 - 2.6	30	2°52.5	2°53.0	2°44.6	3.0 - 0.6	9.0 - 1.7	15.0 - 2.9
31	2°22.8	2°23.1	2°16.2	3.1 - 0.5	9.1 - 1.4	15.1 - 2.4	31	2°37.8	2°38.2	2°30.6	3.1 - 0.5	9.1 - 1.6	15.1 - 2.6	31	2°52.8	2°53.2	2°44.9	3.1 - 0.6	9.1 - 1.7	15.1 - 2.9
32	2°23.0	2°23.4	2°16.5	3.2 - 0.5	9.2 - 1.5	15.2 - 2.4	32	2°38.0	2°38.4	2°30.8	3.2 - 0.6	9.2 - 1.6	15.2 - 2.7	32	2°53.0	2°53.5	2°45.1	3.2 - 0.6	9.2 - 1.8	15.2 - 2.9
33	2°23.3	2°23.6	2°16.7	3.3 - 0.5	9.3 - 1.5	15.3 - 2.4	33	2°38.3	2°38.7	2°31.0	3.3 - 0.6	9.3 - 1.6	15.3 - 2.7	33	2°53.3	2°53.7	2°45.4	3.3 - 0.6	9.3 - 1.8	15.3 - 2.9
34	2°23.5	2°23.9	2°17.0	3.4 - 0.5	9.4 - 1.5	15.4 - 2.4	34	2°38.5	2°38.9	2°31.3	3.4 - 0.6	9.4 - 1.6	15.4 - 2.7	34	2°53.5	2°54.0	2°45.6	3.4 - 0.7	9.4 - 1.8	15.4 - 3.0
35	2°23.8	2°24.1	2°17.2	3.5 - 0.6	9.5 - 1.5	15.5 - 2.5	35	2°38.8	2°39.2	2°31.5	3.5 - 0.6	9.5 - 1.7	15.5 - 2.7	35	2°53.8	2°54.2	2°45.8	3.5 - 0.7	9.5 - 1.8	15.5 - 3.0
36	2°24.0	2°24.4	2°17.4	3.6 - 0.6	9.6 - 1.5	15.6 - 2.5	36	2°39.0	2°39.4	2°31.8	3.6 - 0.6	9.6 - 1.7	15.6 - 2.7	36	2°54.0	2°54.5	2°46.1	3.6 - 0.7	9.6 - 1.8	15.6 - 3.0
37	2°24.3	2°24.6	2°17.7	3.7 - 0.6	9.7 - 1.5	15.7 - 2.5	37	2°39.3	2°39.7	2°32.0	3.7 - 0.6	9.7 - 1.7	15.7 - 2.7	37	2°54.3	2°54.7	2°46.3	3.7 - 0.7	9.7 - 1.9	15.7 - 3.0
38	2°24.5	2°24.9	2°17.9	3.8 - 0.6	9.8 - 1.6	15.8 - 2.5	38	2°39.5	2°39.9	2°32.2	3.8 - 0.7	9.8 - 1.7	15.8 - 2.8	38	2°54.5	2°55.0	2°46.6	3.8 - 0.7	9.8 - 1.9	15.8 - 3.0
39	2°24.8	2°25.1	2°18.2	3.9 - 0.6	9.9 - 1.6	15.9 - 2.5	39	2°39.8	2°40.2	2°32.5	3.9 - 0.7	9.9 - 1.7	15.9 - 2.8	39	2°54.8	2°55.2	2°46.8	3.9 - 0.7	9.9 - 1.9	15.9 - 3.0
40	2°25.0	2°25.4	2°18.4	4.0 - 0.6	10.0 - 1.6	16.0 - 2.5	40	2°40.0	2°40.4	2°32.7	4.0 - 0.7	10.0 - 1.8	16.0 - 2.8	40	2°55.0	2°55.5	2°47.0	4.0 - 0.8	10.0 - 1.9	16.0 - 3.1
41	2°25.3	2°25.6	2°18.6	4.1 - 0.6	10.1 - 1.6	16.1 - 2.5	41	2°40.3	2°40.7	2°32.9	4.1 - 0.7	10.1 - 1.8	16.1 - 2.8	41	2°55.3	2°55.7	2°47.3	4.1 - 0.8	10.1 - 1.9	16.1 - 3.1
42	2°25.5	2°25.9	2°18.9	4.2 - 0.7	10.2 - 1.6	16.2 - 2.6	42	2°40.5	2°40.9	2°33.2	4.2 - 0.7	10.2 - 1.8	16.2 - 2.8	42	2°55.5	2°56.0	2°47.5	4.2 - 0.8	10.2 - 2.0	16.2 - 3.1
43	2°25.8	2°26.1	2°19.1	4.3 - 0.7	10.3 - 1.6	16.3 - 2.6	43	2°40.8	2°41.2	2°33.4	4.3 - 0.8	10.3 - 1.8	16.3 - 2.9	43	2°55.8	2°56.2	2°47.7	4.3 - 0.8	10.3 - 2.0	16.3 - 3.1
44	2°26.0	2°26.4	2°19.3	4.4 - 0.7	10.4 - 1.6	16.4 - 2.6	44	2°41.0	2°41.4	2°33.7	4.4 - 0.8	10.4 - 1.8	16.4 - 2.9	44	2°56.0	2°56.5	2°48.0	4.4 - 0.8	10.4 - 2.0	16.4 - 3.1
45	2°26.3	2°26.6	2°19.6	4.5 - 0.7	10.5 - 1.7	16.5 - 2.6	45	2°41.3	2°41.7	2°33.9	4.5 - 0.8	10.5 - 1.8	16.5 - 2.9	45	2°56.3	2°56.7	2°48.2	4.5 - 0.9	10.5 - 2.0	16.5 - 3.2
46	2°26.5	2°26.9	2°19.8	4.6 - 0.7	10.6 - 1.7	16.6 - 2.6	46	2°41.5	2°41.9	2°34.1	4.6 - 0.8	10.6 - 1.9	16.6 - 2.9	46	2°56.5	2°57.0	2°48.5	4.6 - 0.9	10.6 - 2.0	16.6 - 3.2
47	2°26.8	2°27.2	2°20.1	4.7 - 0.7	10.7 - 1.7	16.7 - 2.6	47	2°41.8	2°42.2	2°34.4	4.7 - 0.8	10.7 - 1.9	16.7 - 2.9	47	2°56.8	2°57.2	2°48.7	4.7 - 0.9	10.7 - 2.1	16.7 - 3.2
48	2°27.0	2°27.4	2°20.3	4.8 - 0.8	10.8 - 1.7	16.8 - 2.7	48	2°42.0	2°42.4	2°34.6	4.8 - 0.8	10.8 - 1.9	16.8 - 2.9	48	2°57.0	2°57.5	2°48.9	4.8 - 0.9	10.8 - 2.1	16.8 - 3.2
49	2°27.2	2°27.7																		



## Increments and Corrections

m 12	Sun Plan.	Aries	Moon	v and d corr			m 13	Sun Plan.	Aries	Moon	v and d corr			m 14	Sun Plan.	Aries	Moon	v and d corr		
0	3°00.0	3°00.5	2°51.8	0.0 - 0.0	6.0 - 1.3	12.0 - 2.5	0	3°15.0	3°15.5	3°06.1	0.0 - 0.0	6.0 - 1.4	12.0 - 2.7	0	3°30.0	3°30.6	3°20.4	0.0 - 0.0	6.0 - 1.4	12.0 - 2.9
1	3°00.3	3°00.7	2°52.0	0.1 - 0.0	6.1 - 1.3	12.1 - 2.5	1	3°15.3	3°15.8	3°06.4	0.1 - 0.0	6.1 - 1.4	12.1 - 2.7	1	3°30.3	3°30.8	3°20.7	0.1 - 0.0	6.1 - 1.5	12.1 - 2.9
2	3°00.5	3°01.0	2°52.3	0.2 - 0.0	6.2 - 1.3	12.2 - 2.5	2	3°15.5	3°16.0	3°06.6	0.2 - 0.0	6.2 - 1.4	12.2 - 2.7	2	3°30.5	3°31.1	3°20.9	0.2 - 0.0	6.2 - 1.5	12.2 - 2.9
3	3°00.8	3°01.2	2°52.5	0.3 - 0.1	6.3 - 1.3	12.3 - 2.6	3	3°15.8	3°16.3	3°06.8	0.3 - 0.1	6.3 - 1.4	12.3 - 2.8	3	3°30.8	3°31.3	3°21.1	0.3 - 0.1	6.3 - 1.5	12.3 - 3.0
4	3°01.0	3°01.5	2°52.8	0.4 - 0.1	6.4 - 1.3	12.4 - 2.6	4	3°16.0	3°16.5	3°07.1	0.4 - 0.1	6.4 - 1.4	12.4 - 2.8	4	3°31.0	3°31.6	3°21.4	0.4 - 0.1	6.4 - 1.5	12.4 - 3.0
5	3°01.3	3°01.7	2°53.0	0.5 - 0.1	6.5 - 1.4	12.5 - 2.6	5	3°16.3	3°16.8	3°07.3	0.5 - 0.1	6.5 - 1.5	12.5 - 2.8	5	3°31.3	3°31.8	3°21.6	0.5 - 0.1	6.5 - 1.6	12.5 - 3.0
6	3°01.5	3°02.0	2°53.2	0.6 - 0.1	6.6 - 1.4	12.6 - 2.6	6	3°16.5	3°17.0	3°07.5	0.6 - 0.1	6.6 - 1.5	12.6 - 2.8	6	3°31.5	3°32.1	3°21.9	0.6 - 0.1	6.6 - 1.6	12.6 - 3.0
7	3°01.8	3°02.2	2°53.5	0.7 - 0.1	6.7 - 1.4	12.7 - 2.6	7	3°16.8	3°17.3	3°07.8	0.7 - 0.2	6.7 - 1.5	12.7 - 2.9	7	3°31.8	3°32.3	3°22.1	0.7 - 0.2	6.7 - 1.6	12.7 - 3.1
8	3°02.0	3°02.5	2°53.7	0.8 - 0.2	6.8 - 1.4	12.8 - 2.7	8	3°17.0	3°17.5	3°08.0	0.8 - 0.2	6.8 - 1.5	12.8 - 2.9	8	3°32.0	3°32.6	3°22.3	0.8 - 0.2	6.8 - 1.6	12.8 - 3.1
9	3°02.3	3°02.7	2°53.9	0.9 - 0.2	6.9 - 1.4	12.9 - 2.7	9	3°17.3	3°17.8	3°08.3	0.9 - 0.2	6.9 - 1.6	12.9 - 2.9	9	3°32.3	3°32.8	3°22.6	0.9 - 0.2	6.9 - 1.7	12.9 - 3.1
10	3°02.5	3°03.0	2°54.2	1.0 - 0.2	7.0 - 1.5	13.0 - 2.7	10	3°17.5	3°18.0	3°08.5	1.0 - 0.2	7.0 - 1.6	13.0 - 2.9	10	3°32.5	3°33.1	3°22.8	1.0 - 0.2	7.0 - 1.7	13.0 - 3.1
11	3°02.8	3°03.2	2°54.4	1.1 - 0.2	7.1 - 1.5	13.1 - 2.7	11	3°17.8	3°18.3	3°08.7	1.1 - 0.2	7.1 - 1.6	13.1 - 2.9	11	3°32.8	3°33.3	3°23.1	1.1 - 0.3	7.1 - 1.7	13.1 - 3.2
12	3°03.0	3°03.5	2°54.7	1.2 - 0.3	7.2 - 1.5	13.2 - 2.8	12	3°18.0	3°18.5	3°09.0	1.2 - 0.3	7.2 - 1.6	13.2 - 3.0	12	3°33.0	3°33.6	3°23.3	1.2 - 0.3	7.2 - 1.7	13.2 - 3.2
13	3°03.3	3°03.8	2°54.9	1.3 - 0.3	7.3 - 1.5	13.3 - 2.8	13	3°18.3	3°18.8	3°09.2	1.3 - 0.3	7.3 - 1.6	13.3 - 3.0	13	3°33.3	3°33.8	3°23.5	1.3 - 0.3	7.3 - 1.8	13.3 - 3.2
14	3°03.5	3°04.0	2°55.1	1.4 - 0.3	7.4 - 1.5	13.4 - 2.8	14	3°18.5	3°19.0	3°09.5	1.4 - 0.3	7.4 - 1.7	13.4 - 3.0	14	3°33.5	3°34.1	3°23.8	1.4 - 0.3	7.4 - 1.8	13.4 - 3.2
15	3°03.8	3°04.3	2°55.4	1.5 - 0.3	7.5 - 1.6	13.5 - 2.8	15	3°18.8	3°19.3	3°09.7	1.5 - 0.3	7.5 - 1.7	13.5 - 3.0	15	3°33.8	3°34.3	3°24.0	1.5 - 0.4	7.5 - 1.8	13.5 - 3.3
16	3°04.0	3°04.5	2°55.6	1.6 - 0.3	7.6 - 1.6	13.6 - 2.8	16	3°19.0	3°19.5	3°09.9	1.6 - 0.4	7.6 - 1.7	13.6 - 3.1	16	3°34.0	3°34.6	3°24.3	1.6 - 0.4	7.6 - 1.8	13.6 - 3.3
17	3°04.2	3°04.8	2°55.9	1.7 - 0.4	7.7 - 1.6	13.7 - 2.9	17	3°19.3	3°19.8	3°10.2	1.7 - 0.4	7.7 - 1.7	13.7 - 3.1	17	3°34.3	3°34.8	3°24.5	1.7 - 0.4	7.7 - 1.9	13.7 - 3.3
18	3°04.5	3°05.0	2°56.1	1.8 - 0.4	7.8 - 1.6	13.8 - 2.9	18	3°19.5	3°20.0	3°10.4	1.8 - 0.4	7.8 - 1.8	13.8 - 3.1	18	3°34.5	3°35.1	3°24.7	1.8 - 0.4	7.8 - 1.9	13.8 - 3.3
19	3°04.7	3°05.3	2°56.3	1.9 - 0.4	7.9 - 1.6	13.9 - 2.9	19	3°19.7	3°20.3	3°10.7	1.9 - 0.4	7.9 - 1.8	13.9 - 3.1	19	3°34.8	3°35.3	3°25.0	1.9 - 0.5	7.9 - 1.9	13.9 - 3.4
20	3°05.0	3°05.5	2°56.6	2.0 - 0.4	8.0 - 1.7	14.0 - 2.9	20	3°20.0	3°20.5	3°10.9	2.0 - 0.5	8.0 - 1.8	14.0 - 3.1	20	3°35.0	3°35.6	3°25.2	2.0 - 0.5	8.0 - 1.9	14.0 - 3.4
21	3°05.2	3°05.8	2°56.8	2.1 - 0.4	8.1 - 1.7	14.1 - 2.9	21	3°20.2	3°20.8	3°11.1	2.1 - 0.5	8.1 - 1.8	14.1 - 3.2	21	3°35.2	3°35.8	3°25.4	2.1 - 0.5	8.1 - 2.0	14.1 - 3.4
22	3°05.5	3°06.0	2°57.0	2.2 - 0.5	8.2 - 1.7	14.2 - 3.0	22	3°20.5	3°21.0	3°11.4	2.2 - 0.5	8.2 - 1.8	14.2 - 3.2	22	3°35.5	3°36.1	3°25.7	2.2 - 0.5	8.2 - 2.0	14.2 - 3.4
23	3°05.7	3°06.3	2°57.3	2.3 - 0.5	8.3 - 1.7	14.3 - 3.0	23	3°20.7	3°21.3	3°11.6	2.3 - 0.5	8.3 - 1.9	14.3 - 3.2	23	3°35.7	3°36.3	3°25.9	2.3 - 0.6	8.3 - 2.0	14.3 - 3.5
24	3°06.0	3°06.5	2°57.5	2.4 - 0.5	8.4 - 1.8	14.4 - 3.0	24	3°21.0	3°21.5	3°11.8	2.4 - 0.5	8.4 - 1.9	14.4 - 3.2	24	3°36.0	3°36.6	3°26.2	2.4 - 0.6	8.4 - 2.0	14.4 - 3.5
25	3°06.2	3°06.8	2°57.8	2.5 - 0.5	8.5 - 1.8	14.5 - 3.0	25	3°21.2	3°21.8	3°12.1	2.5 - 0.6	8.5 - 1.9	14.5 - 3.3	25	3°36.2	3°36.8	3°26.4	2.5 - 0.6	8.5 - 2.1	14.5 - 3.5
26	3°06.5	3°07.0	2°58.0	2.6 - 0.5	8.6 - 1.8	14.6 - 3.0	26	3°21.5	3°22.1	3°12.3	2.6 - 0.6	8.6 - 1.9	14.6 - 3.3	26	3°36.5	3°37.1	3°26.6	2.6 - 0.6	8.6 - 2.1	14.6 - 3.5
27	3°06.7	3°07.3	2°58.2	2.7 - 0.6	8.7 - 1.8	14.7 - 3.1	27	3°21.7	3°22.3	3°12.6	2.7 - 0.6	8.7 - 2.0	14.7 - 3.3	27	3°36.7	3°37.3	3°26.9	2.7 - 0.7	8.7 - 2.1	14.7 - 3.6
28	3°07.0	3°07.5	2°58.5	2.8 - 0.6	8.8 - 1.8	14.8 - 3.1	28	3°22.0	3°22.6	3°12.8	2.8 - 0.6	8.8 - 2.0	14.8 - 3.3	28	3°37.0	3°37.6	3°27.1	2.8 - 0.7	8.8 - 2.1	14.8 - 3.6
29	3°07.2	3°07.8	2°58.7	2.9 - 0.6	8.9 - 1.9	14.9 - 3.1	29	3°22.2	3°22.8	3°13.0	2.9 - 0.7	8.9 - 2.0	14.9 - 3.4	29	3°37.2	3°37.8	3°27.4	2.9 - 0.7	8.9 - 2.2	14.9 - 3.6
30	3°07.5	3°08.0	2°59.0	3.0 - 0.6	9.0 - 1.9	15.0 - 3.1	30	3°22.5	3°23.1	3°13.3	3.0 - 0.7	9.0 - 2.0	15.0 - 3.4	30	3°37.5	3°38.1	3°27.6	3.0 - 0.7	9.0 - 2.2	15.0 - 3.6
31	3°07.8	3°08.3	2°59.2	3.1 - 0.6	9.1 - 1.9	15.1 - 3.1	31	3°22.8	3°23.3	3°13.5	3.1 - 0.7	9.1 - 2.0	15.1 - 3.4	31	3°37.8	3°38.3	3°27.8	3.1 - 0.7	9.1 - 2.2	15.1 - 3.6
32	3°08.0	3°08.5	2°59.4	3.2 - 0.7	9.2 - 1.9	15.2 - 3.2	32	3°23.0	3°23.6	3°13.8	3.2 - 0.7	9.2 - 2.1	15.2 - 3.4	32	3°38.0	3°38.6	3°28.1	3.2 - 0.8	9.2 - 2.2	15.2 - 3.7
33	3°08.3	3°08.8	2°59.7	3.3 - 0.7	9.3 - 1.9	15.3 - 3.2	33	3°23.3	3°23.8	3°14.0	3.3 - 0.7	9.3 - 2.1	15.3 - 3.4	33	3°38.3	3°38.8	3°28.3	3.3 - 0.8	9.3 - 2.2	15.3 - 3.7
34	3°08.5	3°09.0	2°59.9	3.4 - 0.7	9.4 - 2.0	15.4 - 3.2	34	3°23.5	3°24.1	3°14.2	3.4 - 0.8	9.4 - 2.1	15.4 - 3.5	34	3°38.5	3°39.1	3°28.5	3.4 - 0.8	9.4 - 2.3	15.4 - 3.7
35	3°08.8	3°09.3	3°00.2	3.5 - 0.7	9.5 - 2.0	15.5 - 3.2	35	3°23.8	3°24.3	3°14.5	3.5 - 0.8	9.5 - 2.1	15.5 - 3.5	35	3°38.8	3°39.3	3°28.8	3.5 - 0.8	9.5 - 2.3	15.5 - 3.7
36	3°09.0	3°09.5	3°00.4	3.6 - 0.8	9.6 - 2.0	15.6 - 3.3	36	3°24.0	3°24.6	3°14.7	3.6 - 0.8	9.6 - 2.2	15.6 - 3.5	36	3°39.0	3°39.6	3°29.0	3.6 - 0.9	9.6 - 2.3	15.6 - 3.8
37	3°09.3	3°09.8	3°00.6	3.7 - 0.8	9.7 - 2.0	15.7 - 3.3	37	3°24.3	3°24.8	3°14.9	3.7 - 0.8	9.7 - 2.2	15.7 - 3.5	37	3°39.3	3°39.8	3°29.3	3.7 - 0.9	9.7 - 2.3	15.7 - 3.8
38	3°09.5	3°10.0	3°00.9	3.8 - 0.8	9.8 - 2.0	15.8 - 3.3	38	3°24.5	3°25.1	3°15.2	3.8 - 0.9	9.8 - 2.2	15.8 - 3.6	38	3°39.5	3°40.1	3°29.5	3.8 - 0.9	9.8 - 2.4	15.8 - 3.8
39	3°09.8	3°10.3	3°01.1	3.9 - 0.8	9.9 - 2.1	15.9 - 3.3	39	3°24.8	3°25.3	3°15.4	3.9 - 0.9	9.9 - 2.2	15.9 - 3.6	39	3°39.8	3°40.4	3°29.7	3.9 - 0.9	9.9 - 2.4	15.9 - 3.8
40	3°10.0	3°10.5	3°01.3	4.0 - 0.8	10.0 - 2.1	16.0 - 3.3	40	3°25.0	3°25.6	3°15.7	4.0 - 0.9	10.0 - 2.3	16.0 - 3.6	40	3°40.0	3°40.6	3°30.0	4.0 - 1.0	10.0 - 2.4	16.0 - 3.9
41	3°10.3	3°10.8	3°01.6	4.1 - 0.9	10.1 - 2.1	16.1 - 3.4	41	3°25.3	3°25.8	3°15.9	4.1 - 0.9	10.1 - 2.3	16.1 - 3.6	41	3°40.3	3°40.9	3°30.2	4.1 - 1.0	10.1 - 2.4	16.1 - 3.9
42	3°10.5	3°11.0	3°01.8	4.2 - 0.9	10.2 - 2.1	16.2 - 3.4	42	3°25.5	3°26.1	3°16.1	4.2 - 0.9	10.2 - 2.3	16.2 - 3.6	42	3°40.5	3°41.1	3°30.5	4.2 - 1.0	10.2 - 2.5	16.2 - 3.9
43	3°10.8	3°11.3	3°02.1	4.3 - 0.9	10.3 - 2.1	16.3 - 3.4	43	3°25.8	3°26.3	3°16.4	4.3 - 1.0	10.3 - 2.3	16.3 - 3.7	43	3°40.8	3°41.4	3°30.7	4.3 - 1.0	10.3 - 2.5	16.3 - 3.9
44	3°11.0	3°11.5	3°02.3	4.4 - 0.9	10.4 - 2.2	16.4 - 3.4	44	3°26.0	3°26.6	3°16.6	4.4 - 1.0	10.4 - 2.3	16.4 - 3.7	44	3°41.0	3°41.6	3°30.9	4.4 - 1.1	10.4 - 2.5	16.4 - 4.0
45	3°11.3	3°11.8	3°02.5	4.5 - 0.9	10.5 - 2.2	16.5 - 3.4	45	3°26.3	3°26.8	3°16.9	4.5 - 1.0	10.5 - 2.4	16.5 - 3.7	45	3°41.3	3°41.9	3°31.2	4.5 - 1.1	10.5 - 2.5	16.5 - 4.0
46	3°11.5	3°12.0	3°02.8	4.6 - 1.0	10.6 - 2.2	16.6 - 3.5	46	3°26.5	3°27.1	3°17.1	4.6 - 1.0	10.6 - 2.4	16.6 - 3.7	46	3°41.5	3°42.1	3°31.4	4.6 - 1.1	10.6 - 2.6	16.6 - 4.0
47	3°11.7	3°12.3	3°03.0	4.7 - 1.0	10.7 - 2.2	16.7 - 3.5	47	3°26.8	3°27.3	3°17.3	4.7 - 1.1	10.7 - 2.4	16.7 - 3.8	47	3°41.8	3°42.4	3°31.6	4.7 - 1.1	10.7 - 2.6	16.7 - 4.0
48	3°12.0	3°12.5	3°03.3	4.8 - 1.0	10.8 - 2.3	16.8 - 3.5	48	3°27.0	3°27.6	3°17.6	4.8 - 1.1	10.8 - 2.4	16.8 - 3.8	48	3°42.0	3°42.6	3°31.9	4.8 - 1.2	10.8 - 2.6	16.8 - 4.1
49																				

## Increments and Corrections

m 15	Sun Plan.	Aries	Moon	v and d corr			m 16	Sun Plan.	Aries	Moon	v and d corr			m 17	Sun Plan.	Aries	Moon	v and d corr		
0	3°45.0	3°45.6	3°34.8	0.0 - 0.0	6.0 - 1.6	12.0 - 3.1	0	4°00.0	4°00.7	3°49.1	0.0 - 0.0	6.0 - 1.7	12.0 - 3.3	0	4°15.0	4°15.7	4°03.4	0.0 - 0.0	6.0 - 1.8	12.0 - 3.5
1	3°45.2	3°45.9	3°35.0	0.1 - 0.0	6.1 - 1.6	12.1 - 3.1	1	4°00.2	4°00.9	3°49.3	0.1 - 0.0	6.1 - 1.7	12.1 - 3.3	1	4°15.2	4°15.9	4°03.6	0.1 - 0.0	6.1 - 1.8	12.1 - 3.5
2	3°45.5	3°46.1	3°35.2	0.2 - 0.1	6.2 - 1.6	12.2 - 3.2	2	4°00.5	4°01.2	3°49.5	0.2 - 0.1	6.2 - 1.7	12.2 - 3.4	2	4°15.5	4°16.2	4°03.9	0.2 - 0.1	6.2 - 1.8	12.2 - 3.6
3	3°45.8	3°46.4	3°35.5	0.3 - 0.1	6.3 - 1.6	12.3 - 3.2	3	4°00.8	4°01.4	3°49.8	0.3 - 0.1	6.3 - 1.7	12.3 - 3.4	3	4°15.8	4°16.4	4°04.1	0.3 - 0.1	6.3 - 1.8	12.3 - 3.6
4	3°46.0	3°46.6	3°35.7	0.4 - 0.1	6.4 - 1.7	12.4 - 3.2	4	4°01.0	4°01.7	3°50.0	0.4 - 0.1	6.4 - 1.8	12.4 - 3.4	4	4°16.0	4°16.7	4°04.3	0.4 - 0.1	6.4 - 1.9	12.4 - 3.6
5	3°46.2	3°46.9	3°35.9	0.5 - 0.1	6.5 - 1.7	12.5 - 3.2	5	4°01.2	4°01.9	3°50.3	0.5 - 0.1	6.5 - 1.8	12.5 - 3.4	5	4°16.2	4°17.0	4°04.6	0.5 - 0.1	6.5 - 1.9	12.5 - 3.6
6	3°46.5	3°47.1	3°36.2	0.6 - 0.2	6.6 - 1.7	12.6 - 3.3	6	4°01.5	4°02.2	3°50.5	0.6 - 0.2	6.6 - 1.8	12.6 - 3.5	6	4°16.5	4°17.2	4°04.8	0.6 - 0.2	6.6 - 1.9	12.6 - 3.7
7	3°46.8	3°47.4	3°36.4	0.7 - 0.2	6.7 - 1.7	12.7 - 3.3	7	4°01.8	4°02.4	3°50.7	0.7 - 0.2	6.7 - 1.8	12.7 - 3.5	7	4°16.8	4°17.5	4°05.1	0.7 - 0.2	6.7 - 2.0	12.7 - 3.7
8	3°47.0	3°47.6	3°36.7	0.8 - 0.2	6.8 - 1.8	12.8 - 3.3	8	4°02.0	4°02.7	3°51.0	0.8 - 0.2	6.8 - 1.9	12.8 - 3.5	8	4°17.0	4°17.7	4°05.3	0.8 - 0.2	6.8 - 2.0	12.8 - 3.7
9	3°47.3	3°47.9	3°36.9	0.9 - 0.2	6.9 - 1.8	12.9 - 3.3	9	4°02.2	4°02.9	3°51.2	0.9 - 0.2	6.9 - 1.9	12.9 - 3.5	9	4°17.2	4°18.0	4°05.5	0.9 - 0.3	6.9 - 2.0	12.9 - 3.8
10	3°47.5	3°48.1	3°37.1	1.0 - 0.3	7.0 - 1.8	13.0 - 3.4	10	4°02.5	4°03.2	3°51.5	1.0 - 0.3	7.0 - 1.9	13.0 - 3.6	10	4°17.5	4°18.2	4°05.8	1.0 - 0.3	7.0 - 2.0	13.0 - 3.8
11	3°47.7	3°48.4	3°37.4	1.1 - 0.3	7.1 - 1.8	13.1 - 3.4	11	4°02.8	4°03.4	3°51.7	1.1 - 0.3	7.1 - 2.0	13.1 - 3.6	11	4°17.8	4°18.5	4°06.0	1.1 - 0.3	7.1 - 2.1	13.1 - 3.8
12	3°48.0	3°48.6	3°37.6	1.2 - 0.3	7.2 - 1.9	13.2 - 3.4	12	4°03.0	4°03.7	3°51.9	1.2 - 0.3	7.2 - 2.0	13.2 - 3.6	12	4°18.0	4°18.7	4°06.2	1.2 - 0.4	7.2 - 2.1	13.2 - 3.9
13	3°48.3	3°48.9	3°37.9	1.3 - 0.3	7.3 - 1.9	13.3 - 3.4	13	4°03.2	4°03.9	3°52.2	1.3 - 0.4	7.3 - 2.0	13.3 - 3.7	13	4°18.2	4°19.0	4°06.5	1.3 - 0.4	7.3 - 2.1	13.3 - 3.9
14	3°48.5	3°49.1	3°38.1	1.4 - 0.4	7.4 - 1.9	13.4 - 3.5	14	4°03.5	4°04.2	3°52.4	1.4 - 0.4	7.4 - 2.0	13.4 - 3.7	14	4°18.5	4°19.2	4°06.7	1.4 - 0.4	7.4 - 2.2	13.4 - 3.9
15	3°48.8	3°49.4	3°38.3	1.5 - 0.4	7.5 - 1.9	13.5 - 3.5	15	4°03.8	4°04.4	3°52.6	1.5 - 0.4	7.5 - 2.1	13.5 - 3.7	15	4°18.8	4°19.5	4°07.0	1.5 - 0.4	7.5 - 2.2	13.5 - 3.9
16	3°49.0	3°49.6	3°38.6	1.6 - 0.4	7.6 - 2.0	13.6 - 3.5	16	4°04.0	4°04.7	3°52.9	1.6 - 0.4	7.6 - 2.1	13.6 - 3.7	16	4°19.0	4°19.7	4°07.2	1.6 - 0.5	7.6 - 2.2	13.6 - 4.0
17	3°49.3	3°49.9	3°38.8	1.7 - 0.4	7.7 - 2.0	13.7 - 3.5	17	4°04.3	4°04.9	3°53.1	1.7 - 0.5	7.7 - 2.1	13.7 - 3.8	17	4°19.3	4°20.0	4°07.4	1.7 - 0.5	7.7 - 2.2	13.7 - 4.0
18	3°49.5	3°50.1	3°39.0	1.8 - 0.5	7.8 - 2.0	13.8 - 3.6	18	4°04.5	4°05.2	3°53.4	1.8 - 0.5	7.8 - 2.1	13.8 - 3.8	18	4°19.5	4°20.2	4°07.7	1.8 - 0.5	7.8 - 2.3	13.8 - 4.0
19	3°49.8	3°50.4	3°39.3	1.9 - 0.5	7.9 - 2.0	13.9 - 3.6	19	4°04.7	4°05.4	3°53.6	1.9 - 0.5	7.9 - 2.2	13.9 - 3.8	19	4°19.7	4°20.5	4°07.9	1.9 - 0.6	7.9 - 2.3	13.9 - 4.1
20	3°50.0	3°50.6	3°39.5	2.0 - 0.5	8.0 - 2.1	14.0 - 3.6	20	4°05.0	4°05.7	3°53.8	2.0 - 0.6	8.0 - 2.2	14.0 - 3.9	20	4°20.0	4°20.7	4°08.2	2.0 - 0.6	8.0 - 2.3	14.0 - 4.1
21	3°50.2	3°50.9	3°39.8	2.1 - 0.5	8.1 - 2.1	14.1 - 3.6	21	4°05.3	4°05.9	3°54.1	2.1 - 0.6	8.1 - 2.2	14.1 - 3.9	21	4°20.3	4°21.0	4°08.4	2.1 - 0.6	8.1 - 2.4	14.1 - 4.1
22	3°50.5	3°51.1	3°40.0	2.2 - 0.6	8.2 - 2.1	14.2 - 3.7	22	4°05.5	4°06.2	3°54.3	2.2 - 0.6	8.2 - 2.2	14.2 - 3.9	22	4°20.5	4°21.2	4°08.6	2.2 - 0.6	8.2 - 2.4	14.2 - 4.1
23	3°50.7	3°51.4	3°40.2	2.3 - 0.6	8.3 - 2.1	14.3 - 3.7	23	4°05.7	4°06.4	3°54.6	2.3 - 0.6	8.3 - 2.3	14.3 - 3.9	23	4°20.7	4°21.5	4°08.9	2.3 - 0.7	8.3 - 2.4	14.3 - 4.2
24	3°51.0	3°51.6	3°40.5	2.4 - 0.6	8.4 - 2.2	14.4 - 3.7	24	4°06.0	4°06.7	3°54.8	2.4 - 0.7	8.4 - 2.3	14.4 - 4.0	24	4°21.0	4°21.7	4°09.1	2.4 - 0.7	8.4 - 2.5	14.4 - 4.2
25	3°51.2	3°51.9	3°40.7	2.5 - 0.6	8.5 - 2.2	14.5 - 3.7	25	4°06.3	4°06.9	3°55.0	2.5 - 0.7	8.5 - 2.3	14.5 - 4.0	25	4°21.3	4°22.0	4°09.3	2.5 - 0.7	8.5 - 2.5	14.5 - 4.2
26	3°51.5	3°52.1	3°41.0	2.6 - 0.7	8.6 - 2.2	14.6 - 3.8	26	4°06.5	4°07.2	3°55.3	2.6 - 0.7	8.6 - 2.4	14.6 - 4.0	26	4°21.5	4°22.2	4°09.6	2.6 - 0.8	8.6 - 2.5	14.6 - 4.3
27	3°51.8	3°52.4	3°41.2	2.7 - 0.7	8.7 - 2.2	14.7 - 3.8	27	4°06.7	4°07.4	3°55.5	2.7 - 0.7	8.7 - 2.4	14.7 - 4.0	27	4°21.7	4°22.5	4°09.8	2.7 - 0.8	8.7 - 2.5	14.7 - 4.3
28	3°52.0	3°52.6	3°41.4	2.8 - 0.7	8.8 - 2.3	14.8 - 3.8	28	4°07.0	4°07.7	3°55.7	2.8 - 0.8	8.8 - 2.4	14.8 - 4.1	28	4°22.0	4°22.7	4°10.1	2.8 - 0.8	8.8 - 2.6	14.8 - 4.3
29	3°52.2	3°52.9	3°41.7	2.9 - 0.7	8.9 - 2.3	14.9 - 3.8	29	4°07.3	4°07.9	3°56.0	2.9 - 0.8	8.9 - 2.4	14.9 - 4.1	29	4°22.3	4°23.0	4°10.3	2.9 - 0.8	8.9 - 2.6	14.9 - 4.3
30	3°52.5	3°53.1	3°41.9	3.0 - 0.8	9.0 - 2.3	15.0 - 3.9	30	4°07.5	4°08.2	3°56.2	3.0 - 0.8	9.0 - 2.5	15.0 - 4.1	30	4°22.5	4°23.2	4°10.5	3.0 - 0.9	9.0 - 2.6	15.0 - 4.4
31	3°52.8	3°53.4	3°42.1	3.1 - 0.8	9.1 - 2.4	15.1 - 3.9	31	4°07.7	4°08.4	3°56.5	3.1 - 0.9	9.1 - 2.5	15.1 - 4.2	31	4°22.7	4°23.5	4°10.8	3.1 - 0.9	9.1 - 2.7	15.1 - 4.4
32	3°53.0	3°53.6	3°42.4	3.2 - 0.8	9.2 - 2.4	15.2 - 3.9	32	4°08.0	4°08.7	3°56.7	3.2 - 0.9	9.2 - 2.5	15.2 - 4.2	32	4°23.0	4°23.7	4°11.0	3.2 - 0.9	9.2 - 2.7	15.2 - 4.4
33	3°53.2	3°53.9	3°42.6	3.3 - 0.9	9.3 - 2.4	15.3 - 4.0	33	4°08.3	4°08.9	3°56.9	3.3 - 0.9	9.3 - 2.6	15.3 - 4.2	33	4°23.3	4°24.0	4°11.3	3.3 - 1.0	9.3 - 2.7	15.3 - 4.5
34	3°53.5	3°54.1	3°42.9	3.4 - 0.9	9.4 - 2.4	15.4 - 4.0	34	4°08.5	4°09.2	3°57.2	3.4 - 0.9	9.4 - 2.6	15.4 - 4.2	34	4°23.5	4°24.2	4°11.5	3.4 - 1.0	9.4 - 2.7	15.4 - 4.5
35	3°53.8	3°54.4	3°43.1	3.5 - 0.9	9.5 - 2.5	15.5 - 4.0	35	4°08.7	4°09.4	3°57.4	3.5 - 1.0	9.5 - 2.6	15.5 - 4.3	35	4°23.7	4°24.5	4°11.7	3.5 - 1.0	9.5 - 2.8	15.5 - 4.5
36	3°54.0	3°54.6	3°43.3	3.6 - 0.9	9.6 - 2.5	15.6 - 4.0	36	4°09.0	4°09.7	3°57.7	3.6 - 1.0	9.6 - 2.6	15.6 - 4.3	36	4°24.0	4°24.7	4°12.0	3.6 - 1.1	9.6 - 2.8	15.6 - 4.5
37	3°54.3	3°54.9	3°43.6	3.7 - 1.0	9.7 - 2.5	15.7 - 4.1	37	4°09.3	4°09.9	3°57.9	3.7 - 1.0	9.7 - 2.7	15.7 - 4.3	37	4°24.3	4°25.0	4°12.2	3.7 - 1.1	9.7 - 2.8	15.7 - 4.6
38	3°54.5	3°55.1	3°43.8	3.8 - 1.0	9.8 - 2.5	15.8 - 4.1	38	4°09.5	4°10.2	3°58.1	3.8 - 1.0	9.8 - 2.7	15.8 - 4.3	38	4°24.5	4°25.2	4°12.5	3.8 - 1.1	9.8 - 2.9	15.8 - 4.6
39	3°54.8	3°55.4	3°44.1	3.9 - 1.0	9.9 - 2.6	15.9 - 4.1	39	4°09.7	4°10.4	3°58.4	3.9 - 1.1	9.9 - 2.7	15.9 - 4.4	39	4°24.7	4°25.5	4°12.7	3.9 - 1.1	9.9 - 2.9	15.9 - 4.6
40	3°55.0	3°55.6	3°44.3	4.0 - 1.0	10.0 - 2.6	16.0 - 4.1	40	4°10.0	4°10.7	3°58.6	4.0 - 1.1	10.0 - 2.8	16.0 - 4.4	40	4°25.0	4°25.7	4°12.9	4.0 - 1.2	10.0 - 2.9	16.0 - 4.7
41	3°55.3	3°55.9	3°44.5	4.1 - 1.1	10.1 - 2.6	16.1 - 4.2	41	4°10.3	4°10.9	3°58.8	4.1 - 1.1	10.1 - 2.8	16.1 - 4.4	41	4°25.3	4°26.0	4°13.2	4.1 - 1.2	10.1 - 2.9	16.1 - 4.7
42	3°55.5	3°56.1	3°44.8	4.2 - 1.1	10.2 - 2.6	16.2 - 4.2	42	4°10.5	4°11.2	3°59.1	4.2 - 1.2	10.2 - 2.8	16.2 - 4.5	42	4°25.5	4°26.2	4°13.4	4.2 - 1.2	10.2 - 3.0	16.2 - 4.7
43	3°55.7	3°56.4	3°45.0	4.3 - 1.1	10.3 - 2.7	16.3 - 4.2	43	4°10.7	4°11.4	3°59.3	4.3 - 1.2	10.3 - 2.8	16.3 - 4.5	43	4°25.7	4°26.5	4°13.6	4.3 - 1.3	10.3 - 3.0	16.3 - 4.8
44	3°56.0	3°56.6	3°45.2	4.4 - 1.1	10.4 - 2.7	16.4 - 4.2	44	4°11.0	4°11.7	3°59.6	4.4 - 1.2	10.4 - 2.9	16.4 - 4.5	44	4°26.0	4°26.7	4°13.9	4.4 - 1.3	10.4 - 3.0	16.4 - 4.8
45	3°56.3	3°56.9	3°45.5	4.5 - 1.2	10.5 - 2.7	16.5 - 4.3	45	4°11.3	4°11.9	3°59.8	4.5 - 1.2	10.5 - 2.9	16.5 - 4.5	45	4°26.3	4°27.0	4°14.1	4.5 - 1.3	10.5 - 3.1	16.5 - 4.8
46	3°56.5	3°57.1	3°45.7	4.6 - 1.2	10.6 - 2.7	16.6 - 4.3	46	4°11.5	4°12.2	4°00.0	4.6 - 1.3	10.6 - 2.9	16.6 - 4.6	46	4°26.5	4°27.2	4°14.4	4.6 - 1.3	10.6 - 3.1	16.6 - 4.8
47	3°56.8	3°57.4	3°46.0	4.7 - 1.2	10.7 - 2.8	16.7 - 4.3	47	4°11.8	4°12.4	4°00.3	4.7 - 1.3	10.7 - 2.9	16.7 - 4.6	47	4°26.8	4°27.5	4°14.6	4.7 - 1.4	10.7 - 3.1	16.7 - 4.9
48	3°57.0	3°57.6	3°46.2	4.8 - 1.2	10.8 - 2.8	16.8 - 4.3	48	4°12.0	4°12.7	4°00.5	4.8 - 1.3	10.8 - 3.0	16.8 - 4.6	48	4°27.0	4°27.7	4°14.8	4.8 - 1.4	10.8 - 3.2	16.8 - 4.9
49	3°57.3	3°57.																		

## Increments and Corrections

m 18	Sun Plan.	Aries	Moon	v and d corr			m 19	Sun Plan.	Aries	Moon	v and d corr			m 20	Sun Plan.	Aries	Moon	v and d corr		
0	4°30.0	4°30.7	4°17.7	0.0 - 0.0	6.0 - 1.9	12.0 - 3.7	0	4°45.0	4°45.8	4°32.0	0.0 - 0.0	6.0 - 2.0	12.0 - 3.9	0	5°00.0	5°00.8	4°46.3	0.0 - 0.0	6.0 - 2.0	12.0 - 4.1
1	4°30.2	4°31.0	4°17.9	0.1 - 0.0	6.1 - 1.9	12.1 - 3.7	1	4°45.2	4°46.0	4°32.3	0.1 - 0.0	6.1 - 2.0	12.1 - 3.9	1	5°00.2	5°01.1	4°46.6	0.1 - 0.0	6.1 - 2.1	12.1 - 4.1
2	4°30.5	4°31.2	4°18.2	0.2 - 0.1	6.2 - 1.9	12.2 - 3.8	2	4°45.5	4°46.3	4°32.5	0.2 - 0.1	6.2 - 2.0	12.2 - 4.0	2	5°00.5	5°01.3	4°46.8	0.2 - 0.1	6.2 - 2.1	12.2 - 4.2
3	4°30.8	4°31.5	4°18.4	0.3 - 0.1	6.3 - 1.9	12.3 - 3.8	3	4°45.8	4°46.5	4°32.7	0.3 - 0.1	6.3 - 2.0	12.3 - 4.0	3	5°00.8	5°01.6	4°47.0	0.3 - 0.1	6.3 - 2.2	12.3 - 4.2
4	4°31.0	4°31.7	4°18.7	0.4 - 0.1	6.4 - 2.0	12.4 - 3.8	4	4°46.0	4°46.8	4°33.0	0.4 - 0.1	6.4 - 2.1	12.4 - 4.0	4	5°01.0	5°01.8	4°47.3	0.4 - 0.1	6.4 - 2.2	12.4 - 4.2
5	4°31.2	4°32.0	4°18.9	0.5 - 0.2	6.5 - 2.0	12.5 - 3.9	5	4°46.2	4°47.0	4°33.2	0.5 - 0.2	6.5 - 2.1	12.5 - 4.1	5	5°01.2	5°02.1	4°47.5	0.5 - 0.2	6.5 - 2.2	12.5 - 4.3
6	4°31.5	4°32.2	4°19.1	0.6 - 0.2	6.6 - 2.0	12.6 - 3.9	6	4°46.5	4°47.3	4°33.4	0.6 - 0.2	6.6 - 2.1	12.6 - 4.1	6	5°01.5	5°02.3	4°47.8	0.6 - 0.2	6.6 - 2.3	12.6 - 4.3
7	4°31.8	4°32.5	4°19.4	0.7 - 0.2	6.7 - 2.1	12.7 - 3.9	7	4°46.8	4°47.5	4°33.7	0.7 - 0.2	6.7 - 2.2	12.7 - 4.1	7	5°01.8	5°02.6	4°48.0	0.7 - 0.2	6.7 - 2.3	12.7 - 4.3
8	4°32.0	4°32.7	4°19.6	0.8 - 0.2	6.8 - 2.1	12.8 - 3.9	8	4°47.0	4°47.8	4°33.9	0.8 - 0.3	6.8 - 2.2	12.8 - 4.2	8	5°02.0	5°02.8	4°48.2	0.8 - 0.3	6.8 - 2.3	12.8 - 4.4
9	4°32.2	4°33.0	4°19.8	0.9 - 0.3	6.9 - 2.1	12.9 - 4.0	9	4°47.2	4°48.0	4°34.2	0.9 - 0.3	6.9 - 2.2	12.9 - 4.2	9	5°02.2	5°03.1	4°48.5	0.9 - 0.3	6.9 - 2.4	12.9 - 4.4
10	4°32.5	4°33.2	4°20.1	1.0 - 0.3	7.0 - 2.2	13.0 - 4.0	10	4°47.5	4°48.3	4°34.4	1.0 - 0.3	7.0 - 2.3	13.0 - 4.2	10	5°02.5	5°03.3	4°48.7	1.0 - 0.3	7.0 - 2.4	13.0 - 4.4
11	4°32.8	4°33.5	4°20.3	1.1 - 0.3	7.1 - 2.2	13.1 - 4.0	11	4°47.8	4°48.5	4°34.6	1.1 - 0.4	7.1 - 2.3	13.1 - 4.3	11	5°02.8	5°03.6	4°49.0	1.1 - 0.4	7.1 - 2.4	13.1 - 4.5
12	4°33.0	4°33.7	4°20.6	1.2 - 0.4	7.2 - 2.2	13.2 - 4.1	12	4°48.0	4°48.8	4°34.9	1.2 - 0.4	7.2 - 2.3	13.2 - 4.3	12	5°03.0	5°03.8	4°49.2	1.2 - 0.4	7.2 - 2.5	13.2 - 4.5
13	4°33.2	4°34.0	4°20.8	1.3 - 0.4	7.3 - 2.3	13.3 - 4.1	13	4°48.2	4°49.0	4°35.1	1.3 - 0.4	7.3 - 2.4	13.3 - 4.3	13	5°03.2	5°04.1	4°49.4	1.3 - 0.4	7.3 - 2.5	13.3 - 4.5
14	4°33.5	4°34.2	4°21.0	1.4 - 0.4	7.4 - 2.3	13.4 - 4.1	14	4°48.5	4°49.3	4°35.4	1.4 - 0.5	7.4 - 2.4	13.4 - 4.4	14	5°03.5	5°04.3	4°49.7	1.4 - 0.5	7.4 - 2.5	13.4 - 4.6
15	4°33.8	4°34.5	4°21.3	1.5 - 0.5	7.5 - 2.3	13.5 - 4.2	15	4°48.8	4°49.5	4°35.6	1.5 - 0.5	7.5 - 2.4	13.5 - 4.4	15	5°03.8	5°04.6	4°49.9	1.5 - 0.5	7.5 - 2.6	13.5 - 4.6
16	4°34.0	4°34.7	4°21.5	1.6 - 0.5	7.6 - 2.3	13.6 - 4.2	16	4°49.0	4°49.8	4°35.8	1.6 - 0.5	7.6 - 2.5	13.6 - 4.4	16	5°04.0	5°04.8	4°50.2	1.6 - 0.5	7.6 - 2.6	13.6 - 4.6
17	4°34.3	4°35.0	4°21.8	1.7 - 0.5	7.7 - 2.4	13.7 - 4.2	17	4°49.3	4°50.0	4°36.1	1.7 - 0.6	7.7 - 2.5	13.7 - 4.5	17	5°04.3	5°05.1	4°50.4	1.7 - 0.6	7.7 - 2.6	13.7 - 4.7
18	4°34.5	4°35.3	4°22.0	1.8 - 0.6	7.8 - 2.4	13.8 - 4.3	18	4°49.5	4°50.3	4°36.3	1.8 - 0.6	7.8 - 2.5	13.8 - 4.5	18	5°04.5	5°05.3	4°50.6	1.8 - 0.6	7.8 - 2.7	13.8 - 4.7
19	4°34.8	4°35.5	4°22.2	1.9 - 0.6	7.9 - 2.4	13.9 - 4.3	19	4°49.8	4°50.5	4°36.6	1.9 - 0.6	7.9 - 2.6	13.9 - 4.5	19	5°04.7	5°05.6	4°50.9	1.9 - 0.6	7.9 - 2.7	13.9 - 4.7
20	4°35.0	4°35.8	4°22.5	2.0 - 0.6	8.0 - 2.5	14.0 - 4.3	20	4°50.0	4°50.8	4°36.8	2.0 - 0.7	8.0 - 2.6	14.0 - 4.5	20	5°05.0	5°05.8	4°51.1	2.0 - 0.7	8.0 - 2.7	14.0 - 4.8
21	4°35.3	4°36.0	4°22.7	2.1 - 0.6	8.1 - 2.5	14.1 - 4.3	21	4°50.3	4°51.0	4°37.0	2.1 - 0.7	8.1 - 2.6	14.1 - 4.6	21	5°05.3	5°06.1	4°51.3	2.1 - 0.7	8.1 - 2.8	14.1 - 4.8
22	4°35.5	4°36.3	4°22.9	2.2 - 0.7	8.2 - 2.5	14.2 - 4.4	22	4°50.5	4°51.3	4°37.3	2.2 - 0.7	8.2 - 2.7	14.2 - 4.6	22	5°05.5	5°06.3	4°51.6	2.2 - 0.8	8.2 - 2.8	14.2 - 4.9
23	4°35.7	4°36.5	4°23.2	2.3 - 0.7	8.3 - 2.6	14.3 - 4.4	23	4°50.7	4°51.5	4°37.5	2.3 - 0.7	8.3 - 2.7	14.3 - 4.6	23	5°05.7	5°06.6	4°51.8	2.3 - 0.8	8.3 - 2.8	14.3 - 4.9
24	4°36.0	4°36.8	4°23.4	2.4 - 0.7	8.4 - 2.6	14.4 - 4.4	24	4°51.0	4°51.8	4°37.7	2.4 - 0.8	8.4 - 2.7	14.4 - 4.7	24	5°06.0	5°06.8	4°52.1	2.4 - 0.8	8.4 - 2.9	14.4 - 4.9
25	4°36.3	4°37.0	4°23.7	2.5 - 0.8	8.5 - 2.6	14.5 - 4.5	25	4°51.3	4°52.0	4°38.0	2.5 - 0.8	8.5 - 2.8	14.5 - 4.7	25	5°06.3	5°07.1	4°52.3	2.5 - 0.9	8.5 - 2.9	14.5 - 5.0
26	4°36.5	4°37.3	4°23.9	2.6 - 0.8	8.6 - 2.7	14.6 - 4.5	26	4°51.5	4°52.3	4°38.2	2.6 - 0.8	8.6 - 2.8	14.6 - 4.7	26	5°06.5	5°07.3	4°52.5	2.6 - 0.9	8.6 - 2.9	14.6 - 5.0
27	4°36.7	4°37.5	4°24.1	2.7 - 0.8	8.7 - 2.7	14.7 - 4.5	27	4°51.7	4°52.5	4°38.5	2.7 - 0.9	8.7 - 2.8	14.7 - 4.8	27	5°06.7	5°07.6	4°52.8	2.7 - 0.9	8.7 - 3.0	14.7 - 5.0
28	4°37.0	4°37.8	4°24.4	2.8 - 0.9	8.8 - 2.7	14.8 - 4.6	28	4°52.0	4°52.8	4°38.7	2.8 - 0.9	8.8 - 2.9	14.8 - 4.8	28	5°07.0	5°07.8	4°53.0	2.8 - 1.0	8.8 - 3.0	14.8 - 5.1
29	4°37.3	4°38.0	4°24.6	2.9 - 0.9	8.9 - 2.7	14.9 - 4.6	29	4°52.3	4°53.0	4°38.9	2.9 - 0.9	8.9 - 2.9	14.9 - 4.8	29	5°07.3	5°08.1	4°53.3	2.9 - 1.0	8.9 - 3.0	14.9 - 5.1
30	4°37.5	4°38.3	4°24.9	3.0 - 0.9	9.0 - 2.8	15.0 - 4.6	30	4°52.5	4°53.3	4°39.2	3.0 - 1.0	9.0 - 2.9	15.0 - 4.9	30	5°07.5	5°08.3	4°53.5	3.0 - 1.0	9.0 - 3.1	15.0 - 5.1
31	4°37.7	4°38.5	4°25.1	3.1 - 1.0	9.1 - 2.8	15.1 - 4.7	31	4°52.7	4°53.6	4°39.4	3.1 - 1.0	9.1 - 3.0	15.1 - 4.9	31	5°07.7	5°08.6	4°53.7	3.1 - 1.1	9.1 - 3.1	15.1 - 5.2
32	4°38.0	4°38.8	4°25.3	3.2 - 1.0	9.2 - 2.8	15.2 - 4.7	32	4°53.0	4°53.8	4°39.7	3.2 - 1.0	9.2 - 3.0	15.2 - 4.9	32	5°08.0	5°08.8	4°54.0	3.2 - 1.1	9.2 - 3.1	15.2 - 5.2
33	4°38.3	4°39.0	4°25.6	3.3 - 1.0	9.3 - 2.9	15.3 - 4.7	33	4°53.3	4°54.1	4°39.9	3.3 - 1.1	9.3 - 3.0	15.3 - 5.0	33	5°08.3	5°09.1	4°54.2	3.3 - 1.1	9.3 - 3.2	15.3 - 5.2
34	4°38.5	4°39.3	4°25.8	3.4 - 1.0	9.4 - 2.9	15.4 - 4.7	34	4°53.5	4°54.3	4°40.1	3.4 - 1.1	9.4 - 3.1	15.4 - 5.0	34	5°08.5	5°09.3	4°54.4	3.4 - 1.2	9.4 - 3.2	15.4 - 5.3
35	4°38.7	4°39.5	4°26.1	3.5 - 1.1	9.5 - 2.9	15.5 - 4.8	35	4°53.7	4°54.6	4°40.4	3.5 - 1.1	9.5 - 3.1	15.5 - 5.0	35	5°08.7	5°09.6	4°54.7	3.5 - 1.2	9.5 - 3.2	15.5 - 5.3
36	4°39.0	4°39.8	4°26.3	3.6 - 1.1	9.6 - 3.0	15.6 - 4.8	36	4°54.0	4°54.8	4°40.6	3.6 - 1.2	9.6 - 3.1	15.6 - 5.1	36	5°09.0	5°09.8	4°54.9	3.6 - 1.2	9.6 - 3.3	15.6 - 5.3
37	4°39.3	4°40.0	4°26.5	3.7 - 1.1	9.7 - 3.0	15.7 - 4.8	37	4°54.3	4°55.1	4°40.8	3.7 - 1.2	9.7 - 3.2	15.7 - 5.1	37	5°09.3	5°10.1	4°55.2	3.7 - 1.3	9.7 - 3.3	15.7 - 5.4
38	4°39.5	4°40.3	4°26.8	3.8 - 1.2	9.8 - 3.0	15.8 - 4.9	38	4°54.5	4°55.3	4°41.1	3.8 - 1.2	9.8 - 3.2	15.8 - 5.1	38	5°09.5	5°10.3	4°55.4	3.8 - 1.3	9.8 - 3.3	15.8 - 5.4
39	4°39.7	4°40.5	4°27.0	3.9 - 1.2	9.9 - 3.1	15.9 - 4.9	39	4°54.7	4°55.6	4°41.3	3.9 - 1.3	9.9 - 3.2	15.9 - 5.2	39	5°09.7	5°10.6	4°55.6	3.9 - 1.3	9.9 - 3.4	15.9 - 5.4
40	4°40.0	4°40.8	4°27.2	4.0 - 1.2	10.0 - 3.1	16.0 - 4.9	40	4°55.0	4°55.8	4°41.6	4.0 - 1.3	10.0 - 3.3	16.0 - 5.2	40	5°10.0	5°10.8	4°55.9	4.0 - 1.4	10.0 - 3.4	16.0 - 5.5
41	4°40.3	4°41.0	4°27.5	4.1 - 1.3	10.1 - 3.1	16.1 - 5.0	41	4°55.3	4°56.1	4°41.8	4.1 - 1.3	10.1 - 3.3	16.1 - 5.2	41	5°10.3	5°11.1	4°56.1	4.1 - 1.4	10.1 - 3.5	16.1 - 5.5
42	4°40.5	4°41.3	4°27.7	4.2 - 1.3	10.2 - 3.1	16.2 - 5.0	42	4°55.5	4°56.3	4°42.0	4.2 - 1.4	10.2 - 3.3	16.2 - 5.3	42	5°10.5	5°11.3	4°56.4	4.2 - 1.4	10.2 - 3.5	16.2 - 5.5
43	4°40.7	4°41.5	4°28.0	4.3 - 1.3	10.3 - 3.2	16.3 - 5.0	43	4°55.7	4°56.6	4°42.3	4.3 - 1.4	10.3 - 3.3	16.3 - 5.3	43	5°10.7	5°11.6	4°56.6	4.3 - 1.5	10.3 - 3.5	16.3 - 5.6
44	4°41.0	4°41.8	4°28.2	4.4 - 1.4	10.4 - 3.2	16.4 - 5.1	44	4°56.0	4°56.8	4°42.5	4.4 - 1.4	10.4 - 3.4	16.4 - 5.3	44	5°11.0	5°11.9	4°56.8	4.4 - 1.5	10.4 - 3.6	16.4 - 5.6
45	4°41.3	4°42.0	4°28.4	4.5 - 1.4	10.5 - 3.2	16.5 - 5.1	45	4°56.3	4°57.1	4°42.8	4.5 - 1.5	10.5 - 3.4	16.5 - 5.4	45	5°11.3	5°12.1	4°57.1	4.5 - 1.5	10.5 - 3.6	16.5 - 5.6
46	4°41.5	4°42.3	4°28.7	4.6 - 1.4	10.6 - 3.3	16.6 - 5.1	46	4°56.5	4°57.3	4°43.0	4.6 - 1.5	10.6 - 3.4	16.6 - 5.4	46	5°11.5	5°12.4	4°57.3	4.6 - 1.6	10.6 - 3.6	16.6 - 5.7
47	4°41.8	4°42.5	4°28.9	4.7 - 1.4	10.7 - 3.3	16.7 - 5.1	47	4°56.8	4°57.6	4°43.2	4.7 - 1.5	10.7 - 3.5	16.7 - 5.4	47	5°11.8	5°12.6	4°57.5	4.7 - 1.6	10.7 - 3.7	16.7 - 5.7
48	4°42.0	4°42.8	4°29.2	4.8 - 1.5	10.8 - 3.3	16.8 - 5.2	48	4°57.0	4°57.8	4°43.5	4.8 - 1.6	10.8 - 3.5	16.8 - 5.5	48	5°12.0	5°12.9	4°57.8	4.8 - 1.6	10.8 - 3.7	16.8 - 5.7
49	4°42.3	4°43.																		



## Increments and Corrections

m 21	Sun Plan.	Aries	Moon	v and d corr			m 22	Sun Plan.	Aries	Moon	v and d corr			m 23	Sun Plan.	Aries	Moon	v and d corr		
0	5°15.0	5°15.9	5°00.6	0.0 - 0.0	6.0 - 2.1	12.0 - 4.3	0	5°30.0	5°30.9	5°15.0	0.0 - 0.0	6.0 - 2.3	12.0 - 4.5	0	5°45.0	5°45.9	5°29.3	0.0 - 0.0	6.0 - 2.4	12.0 - 4.7
1	5°15.2	5°16.1	5°00.9	0.1 - 0.0	6.1 - 2.2	12.1 - 4.3	1	5°30.2	5°31.2	5°15.2	0.1 - 0.0	6.1 - 2.3	12.1 - 4.5	1	5°45.2	5°46.2	5°29.5	0.1 - 0.0	6.1 - 2.4	12.1 - 4.7
2	5°15.5	5°16.4	5°01.1	0.2 - 0.1	6.2 - 2.2	12.2 - 4.4	2	5°30.5	5°31.4	5°15.4	0.2 - 0.1	6.2 - 2.3	12.2 - 4.6	2	5°45.5	5°46.4	5°29.8	0.2 - 0.1	6.2 - 2.4	12.2 - 4.8
3	5°15.8	5°16.6	5°01.4	0.3 - 0.1	6.3 - 2.3	12.3 - 4.4	3	5°30.8	5°31.7	5°15.7	0.3 - 0.1	6.3 - 2.4	12.3 - 4.6	3	5°45.8	5°46.7	5°30.0	0.3 - 0.1	6.3 - 2.5	12.3 - 4.8
4	5°16.0	5°16.9	5°01.6	0.4 - 0.1	6.4 - 2.3	12.4 - 4.4	4	5°31.0	5°31.9	5°15.9	0.4 - 0.2	6.4 - 2.4	12.4 - 4.7	4	5°46.0	5°46.9	5°30.2	0.4 - 0.2	6.4 - 2.5	12.4 - 4.9
5	5°16.2	5°17.1	5°01.8	0.5 - 0.2	6.5 - 2.3	12.5 - 4.5	5	5°31.2	5°32.2	5°16.2	0.5 - 0.2	6.5 - 2.4	12.5 - 4.7	5	5°46.2	5°47.2	5°30.5	0.5 - 0.2	6.5 - 2.5	12.5 - 4.9
6	5°16.5	5°17.4	5°02.1	0.6 - 0.2	6.6 - 2.4	12.6 - 4.5	6	5°31.5	5°32.4	5°16.4	0.6 - 0.2	6.6 - 2.5	12.6 - 4.7	6	5°46.5	5°47.4	5°30.7	0.6 - 0.2	6.6 - 2.6	12.6 - 4.9
7	5°16.8	5°17.6	5°02.3	0.7 - 0.3	6.7 - 2.4	12.7 - 4.6	7	5°31.8	5°32.7	5°16.6	0.7 - 0.3	6.7 - 2.5	12.7 - 4.8	7	5°46.8	5°47.7	5°31.0	0.7 - 0.3	6.7 - 2.6	12.7 - 5.0
8	5°17.0	5°17.9	5°02.6	0.8 - 0.3	6.8 - 2.4	12.8 - 4.6	8	5°32.0	5°32.9	5°16.9	0.8 - 0.3	6.8 - 2.5	12.8 - 4.8	8	5°47.0	5°47.9	5°31.2	0.8 - 0.3	6.8 - 2.7	12.8 - 5.0
9	5°17.2	5°18.1	5°02.8	0.9 - 0.3	6.9 - 2.5	12.9 - 4.6	9	5°32.2	5°33.2	5°17.1	0.9 - 0.3	6.9 - 2.6	12.9 - 4.8	9	5°47.2	5°48.2	5°31.4	0.9 - 0.4	6.9 - 2.7	12.9 - 5.1
10	5°17.5	5°18.4	5°03.0	1.0 - 0.4	7.0 - 2.5	13.0 - 4.7	10	5°32.5	5°33.4	5°17.4	1.0 - 0.4	7.0 - 2.6	13.0 - 4.9	10	5°47.5	5°48.4	5°31.7	1.0 - 0.4	7.0 - 2.7	13.0 - 5.1
11	5°17.8	5°18.6	5°03.3	1.1 - 0.4	7.1 - 2.5	13.1 - 4.7	11	5°32.8	5°33.7	5°17.6	1.1 - 0.4	7.1 - 2.7	13.1 - 4.9	11	5°47.8	5°48.7	5°31.9	1.1 - 0.4	7.1 - 2.8	13.1 - 5.1
12	5°18.0	5°18.9	5°03.5	1.2 - 0.4	7.2 - 2.6	13.2 - 4.7	12	5°33.0	5°33.9	5°17.8	1.2 - 0.5	7.2 - 2.7	13.2 - 4.9	12	5°48.0	5°49.0	5°32.1	1.2 - 0.5	7.2 - 2.8	13.2 - 5.2
13	5°18.2	5°19.1	5°03.8	1.3 - 0.5	7.3 - 2.6	13.3 - 4.8	13	5°33.2	5°34.2	5°18.1	1.3 - 0.5	7.3 - 2.7	13.3 - 5.0	13	5°48.2	5°49.2	5°32.4	1.3 - 0.5	7.3 - 2.9	13.3 - 5.2
14	5°18.5	5°19.4	5°04.0	1.4 - 0.5	7.4 - 2.7	13.4 - 4.8	14	5°33.5	5°34.4	5°18.3	1.4 - 0.5	7.4 - 2.8	13.4 - 5.0	14	5°48.5	5°49.5	5°32.6	1.4 - 0.5	7.4 - 2.9	13.4 - 5.2
15	5°18.8	5°19.6	5°04.2	1.5 - 0.5	7.5 - 2.7	13.5 - 4.8	15	5°33.8	5°34.7	5°18.5	1.5 - 0.6	7.5 - 2.8	13.5 - 5.1	15	5°48.8	5°49.7	5°32.9	1.5 - 0.6	7.5 - 2.9	13.5 - 5.3
16	5°19.0	5°19.9	5°04.5	1.6 - 0.6	7.6 - 2.7	13.6 - 4.9	16	5°34.0	5°34.9	5°18.8	1.6 - 0.6	7.6 - 2.8	13.6 - 5.1	16	5°49.0	5°50.0	5°33.1	1.6 - 0.6	7.6 - 3.0	13.6 - 5.3
17	5°19.3	5°20.1	5°04.7	1.7 - 0.6	7.7 - 2.8	13.7 - 4.9	17	5°34.3	5°35.2	5°19.0	1.7 - 0.6	7.7 - 2.9	13.7 - 5.1	17	5°49.3	5°50.2	5°33.3	1.7 - 0.7	7.7 - 3.0	13.7 - 5.4
18	5°19.5	5°20.4	5°04.9	1.8 - 0.6	7.8 - 2.8	13.8 - 4.9	18	5°34.5	5°35.4	5°19.3	1.8 - 0.7	7.8 - 2.9	13.8 - 5.2	18	5°49.5	5°50.5	5°33.6	1.8 - 0.7	7.8 - 3.1	13.8 - 5.4
19	5°19.7	5°20.6	5°05.2	1.9 - 0.7	7.9 - 2.8	13.9 - 5.0	19	5°34.8	5°35.7	5°19.5	1.9 - 0.7	7.9 - 3.0	13.9 - 5.2	19	5°49.8	5°50.7	5°33.8	1.9 - 0.7	7.9 - 3.1	13.9 - 5.4
20	5°20.0	5°20.9	5°05.4	2.0 - 0.7	8.0 - 2.9	14.0 - 5.0	20	5°35.0	5°35.9	5°19.7	2.0 - 0.8	8.0 - 3.0	14.0 - 5.3	20	5°50.0	5°51.0	5°34.1	2.0 - 0.8	8.0 - 3.1	14.0 - 5.5
21	5°20.3	5°21.1	5°05.7	2.1 - 0.8	8.1 - 2.9	14.1 - 5.1	21	5°35.3	5°36.2	5°20.0	2.1 - 0.8	8.1 - 3.0	14.1 - 5.3	21	5°50.3	5°51.2	5°34.3	2.1 - 0.8	8.1 - 3.2	14.1 - 5.5
22	5°20.5	5°21.4	5°05.9	2.2 - 0.8	8.2 - 2.9	14.2 - 5.1	22	5°35.5	5°36.4	5°20.2	2.2 - 0.8	8.2 - 3.1	14.2 - 5.3	22	5°50.5	5°51.5	5°34.5	2.2 - 0.9	8.2 - 3.2	14.2 - 5.6
23	5°20.7	5°21.6	5°06.1	2.3 - 0.8	8.3 - 3.0	14.3 - 5.1	23	5°35.7	5°36.7	5°20.5	2.3 - 0.9	8.3 - 3.1	14.3 - 5.4	23	5°50.7	5°51.7	5°34.8	2.3 - 0.9	8.3 - 3.3	14.3 - 5.6
24	5°21.0	5°21.9	5°06.4	2.4 - 0.9	8.4 - 3.0	14.4 - 5.2	24	5°36.0	5°36.9	5°20.7	2.4 - 0.9	8.4 - 3.2	14.4 - 5.4	24	5°51.0	5°52.0	5°35.0	2.4 - 0.9	8.4 - 3.3	14.4 - 5.6
25	5°21.3	5°22.1	5°06.6	2.5 - 0.9	8.5 - 3.0	14.5 - 5.2	25	5°36.3	5°37.2	5°20.9	2.5 - 0.9	8.5 - 3.2	14.5 - 5.4	25	5°51.3	5°52.2	5°35.2	2.5 - 1.0	8.5 - 3.3	14.5 - 5.7
26	5°21.5	5°22.4	5°06.9	2.6 - 0.9	8.6 - 3.1	14.6 - 5.2	26	5°36.5	5°37.4	5°21.2	2.6 - 1.0	8.6 - 3.2	14.6 - 5.5	26	5°51.5	5°52.5	5°35.5	2.6 - 1.0	8.6 - 3.4	14.6 - 5.7
27	5°21.7	5°22.6	5°07.1	2.7 - 1.0	8.7 - 3.1	14.7 - 5.3	27	5°36.7	5°37.7	5°21.4	2.7 - 1.0	8.7 - 3.3	14.7 - 5.5	27	5°51.7	5°52.7	5°35.7	2.7 - 1.1	8.7 - 3.4	14.7 - 5.8
28	5°22.0	5°22.9	5°07.3	2.8 - 1.0	8.8 - 3.2	14.8 - 5.3	28	5°37.0	5°37.9	5°21.6	2.8 - 1.1	8.8 - 3.3	14.8 - 5.6	28	5°52.0	5°53.0	5°36.0	2.8 - 1.1	8.8 - 3.4	14.8 - 5.8
29	5°22.3	5°23.1	5°07.6	2.9 - 1.0	8.9 - 3.2	14.9 - 5.3	29	5°37.3	5°38.2	5°21.9	2.9 - 1.1	8.9 - 3.3	14.9 - 5.6	29	5°52.3	5°53.2	5°36.2	2.9 - 1.1	8.9 - 3.5	14.9 - 5.8
30	5°22.5	5°23.4	5°07.8	3.0 - 1.1	9.0 - 3.2	15.0 - 5.4	30	5°37.5	5°38.4	5°22.1	3.0 - 1.1	9.0 - 3.4	15.0 - 5.6	30	5°52.5	5°53.5	5°36.4	3.0 - 1.2	9.0 - 3.5	15.0 - 5.9
31	5°22.7	5°23.6	5°08.0	3.1 - 1.1	9.1 - 3.3	15.1 - 5.4	31	5°37.7	5°38.7	5°22.4	3.1 - 1.2	9.1 - 3.4	15.1 - 5.7	31	5°52.7	5°53.7	5°36.7	3.1 - 1.2	9.1 - 3.6	15.1 - 5.9
32	5°23.0	5°23.9	5°08.3	3.2 - 1.1	9.2 - 3.3	15.2 - 5.4	32	5°38.0	5°38.9	5°22.6	3.2 - 1.2	9.2 - 3.4	15.2 - 5.7	32	5°53.0	5°54.0	5°36.9	3.2 - 1.3	9.2 - 3.6	15.2 - 6.0
33	5°23.3	5°24.1	5°08.5	3.3 - 1.2	9.3 - 3.3	15.3 - 5.5	33	5°38.3	5°39.2	5°22.8	3.3 - 1.2	9.3 - 3.5	15.3 - 5.7	33	5°53.3	5°54.2	5°37.2	3.3 - 1.3	9.3 - 3.6	15.3 - 6.0
34	5°23.5	5°24.4	5°08.8	3.4 - 1.2	9.4 - 3.4	15.4 - 5.5	34	5°38.5	5°39.4	5°23.1	3.4 - 1.3	9.4 - 3.5	15.4 - 5.8	34	5°53.5	5°54.5	5°37.4	3.4 - 1.3	9.4 - 3.7	15.4 - 6.0
35	5°23.7	5°24.6	5°09.0	3.5 - 1.3	9.5 - 3.4	15.5 - 5.6	35	5°38.7	5°39.7	5°23.3	3.5 - 1.3	9.5 - 3.6	15.5 - 5.8	35	5°53.7	5°54.7	5°37.6	3.5 - 1.4	9.5 - 3.7	15.5 - 6.1
36	5°24.0	5°24.9	5°09.2	3.6 - 1.3	9.6 - 3.4	15.6 - 5.6	36	5°39.0	5°39.9	5°23.6	3.6 - 1.4	9.6 - 3.6	15.6 - 5.8	36	5°54.0	5°55.0	5°37.9	3.6 - 1.4	9.6 - 3.8	15.6 - 6.1
37	5°24.3	5°25.1	5°09.5	3.7 - 1.3	9.7 - 3.5	15.7 - 5.6	37	5°39.3	5°40.2	5°23.8	3.7 - 1.4	9.7 - 3.6	15.7 - 5.9	37	5°54.3	5°55.2	5°38.1	3.7 - 1.4	9.7 - 3.8	15.7 - 6.1
38	5°24.5	5°25.4	5°09.7	3.8 - 1.4	9.8 - 3.5	15.8 - 5.7	38	5°39.5	5°40.4	5°24.0	3.8 - 1.4	9.8 - 3.7	15.8 - 5.9	38	5°54.5	5°55.5	5°38.4	3.8 - 1.5	9.8 - 3.8	15.8 - 6.2
39	5°24.7	5°25.6	5°10.0	3.9 - 1.4	9.9 - 3.5	15.9 - 5.7	39	5°39.7	5°40.7	5°24.3	3.9 - 1.5	9.9 - 3.7	15.9 - 6.0	39	5°54.7	5°55.7	5°38.6	3.9 - 1.5	9.9 - 3.9	15.9 - 6.2
40	5°25.0	5°25.9	5°10.2	4.0 - 1.4	10.0 - 3.6	16.0 - 5.7	40	5°40.0	5°40.9	5°24.5	4.0 - 1.5	10.0 - 3.8	16.0 - 6.0	40	5°55.0	5°56.0	5°38.8	4.0 - 1.6	10.0 - 3.9	16.0 - 6.3
41	5°25.3	5°26.1	5°10.4	4.1 - 1.5	10.1 - 3.6	16.1 - 5.8	41	5°40.3	5°41.2	5°24.7	4.1 - 1.5	10.1 - 3.8	16.1 - 6.0	41	5°55.3	5°56.2	5°39.1	4.1 - 1.6	10.1 - 4.0	16.1 - 6.3
42	5°25.5	5°26.4	5°10.7	4.2 - 1.5	10.2 - 3.7	16.2 - 5.8	42	5°40.5	5°41.4	5°25.0	4.2 - 1.6	10.2 - 3.8	16.2 - 6.1	42	5°55.5	5°56.5	5°39.3	4.2 - 1.6	10.2 - 4.0	16.2 - 6.3
43	5°25.7	5°26.6	5°10.9	4.3 - 1.5	10.3 - 3.7	16.3 - 5.8	43	5°40.7	5°41.7	5°25.2	4.3 - 1.6	10.3 - 3.9	16.3 - 6.1	43	5°55.7	5°56.7	5°39.5	4.3 - 1.7	10.3 - 4.0	16.3 - 6.4
44	5°26.0	5°26.9	5°11.1	4.4 - 1.6	10.4 - 3.7	16.4 - 5.9	44	5°41.0	5°41.9	5°25.5	4.4 - 1.7	10.4 - 3.9	16.4 - 6.1	44	5°56.0	5°57.0	5°39.8	4.4 - 1.7	10.4 - 4.1	16.4 - 6.4
45	5°26.3	5°27.1	5°11.4	4.5 - 1.6	10.5 - 3.8	16.5 - 5.9	45	5°41.3	5°42.2	5°25.7	4.5 - 1.7	10.5 - 3.9	16.5 - 6.2	45	5°56.3	5°57.2	5°40.0	4.5 - 1.8	10.5 - 4.1	16.5 - 6.5
46	5°26.5	5°27.4	5°11.6	4.6 - 1.6	10.6 - 3.8	16.6 - 5.9	46	5°41.5	5°42.4	5°25.9	4.6 - 1.7	10.6 - 4.0	16.6 - 6.2	46	5°56.5	5°57.5	5°40.3	4.6 - 1.8	10.6 - 4.2	16.6 - 6.5
47	5°26.8	5°27.6	5°11.9	4.7 - 1.7	10.7 - 3.8	16.7 - 6.0	47	5°41.8	5°42.7	5°26.2	4.7 - 1.8	10.7 - 4.0	16.7 - 6.3	47	5°56.8	5°57.7	5°40.5	4.7 - 1.8	10.7 - 4.2	16.7 - 6.5
48	5°27.0	5°27.9	5°12.1	4.8 - 1.7	10.8 - 3.9	16.8 - 6.0	48	5°42.0	5°42.9	5°26.4	4.8 - 1.8	10.8 - 4.1	16.8 - 6.3	48	5°57.0	5°58.0	5°40.7	4.8 - 1.9	10.8 - 4.2	16.8 - 6.6
49	5°27.2	5°28.																		

## Increments and Corrections

m 24	Sun Plan.	Aries	Moon	v and d corr			m 25	Sun Plan.	Aries	Moon	v and d corr			m 26	Sun Plan.	Aries	Moon	v and d corr		
0	6°00.0	6°01.0	5°43.6	0.0 - 0.0	6.0 - 2.5	12.0 - 4.9	0	6°15.0	6°16.0	5°57.9	0.0 - 0.0	6.0 - 2.5	12.0 - 5.1	0	6°30.0	6°31.1	6°12.2	0.0 - 0.0	6.0 - 2.6	12.0 - 5.3
1	6°00.2	6°01.2	5°43.8	0.1 - 0.0	6.1 - 2.5	12.1 - 4.9	1	6°15.2	6°16.3	5°58.2	0.1 - 0.0	6.1 - 2.6	12.1 - 5.1	1	6°30.2	6°31.3	6°12.5	0.1 - 0.0	6.1 - 2.7	12.1 - 5.3
2	6°00.5	6°01.5	5°44.1	0.2 - 0.1	6.2 - 2.5	12.2 - 5.0	2	6°15.5	6°16.5	5°58.4	0.2 - 0.1	6.2 - 2.6	12.2 - 5.2	2	6°30.5	6°31.6	6°12.7	0.2 - 0.1	6.2 - 2.7	12.2 - 5.4
3	6°00.8	6°01.7	5°44.3	0.3 - 0.1	6.3 - 2.6	12.3 - 5.0	3	6°15.8	6°16.8	5°58.6	0.3 - 0.1	6.3 - 2.7	12.3 - 5.2	3	6°30.8	6°31.8	6°12.9	0.3 - 0.1	6.3 - 2.8	12.3 - 5.4
4	6°01.0	6°02.0	5°44.6	0.4 - 0.2	6.4 - 2.6	12.4 - 5.1	4	6°16.0	6°17.0	5°58.9	0.4 - 0.2	6.4 - 2.7	12.4 - 5.3	4	6°31.0	6°32.1	6°13.2	0.4 - 0.2	6.4 - 2.8	12.4 - 5.5
5	6°01.2	6°02.2	5°44.8	0.5 - 0.2	6.5 - 2.7	12.5 - 5.1	5	6°16.2	6°17.3	5°59.1	0.5 - 0.2	6.5 - 2.8	12.5 - 5.3	5	6°31.2	6°32.3	6°13.4	0.5 - 0.2	6.5 - 2.9	12.5 - 5.5
6	6°01.5	6°02.5	5°45.0	0.6 - 0.2	6.6 - 2.7	12.6 - 5.1	6	6°16.5	6°17.5	5°59.3	0.6 - 0.3	6.6 - 2.8	12.6 - 5.4	6	6°31.5	6°32.6	6°13.7	0.6 - 0.3	6.6 - 2.9	12.6 - 5.6
7	6°01.8	6°02.7	5°45.3	0.7 - 0.3	6.7 - 2.7	12.7 - 5.2	7	6°16.8	6°17.8	5°59.6	0.7 - 0.3	6.7 - 2.8	12.7 - 5.4	7	6°31.8	6°32.8	6°13.9	0.7 - 0.3	6.7 - 3.0	12.7 - 5.6
8	6°02.0	6°03.0	5°45.5	0.8 - 0.3	6.8 - 2.8	12.8 - 5.2	8	6°17.0	6°18.0	5°59.8	0.8 - 0.3	6.8 - 2.9	12.8 - 5.4	8	6°32.0	6°33.1	6°14.1	0.8 - 0.4	6.8 - 3.0	12.8 - 5.7
9	6°02.2	6°03.2	5°45.7	0.9 - 0.4	6.9 - 2.8	12.9 - 5.3	9	6°17.2	6°18.3	6°00.1	0.9 - 0.4	6.9 - 2.9	12.9 - 5.5	9	6°32.2	6°33.3	6°14.4	0.9 - 0.4	6.9 - 3.0	12.9 - 5.7
10	6°02.5	6°03.5	5°46.0	1.0 - 0.4	7.0 - 2.9	13.0 - 5.3	10	6°17.5	6°18.5	6°00.3	1.0 - 0.4	7.0 - 3.0	13.0 - 5.5	10	6°32.5	6°33.6	6°14.6	1.0 - 0.4	7.0 - 3.1	13.0 - 5.7
11	6°02.8	6°03.7	5°46.2	1.1 - 0.4	7.1 - 2.9	13.1 - 5.3	11	6°17.8	6°18.8	6°00.5	1.1 - 0.5	7.1 - 3.0	13.1 - 5.6	11	6°32.8	6°33.8	6°14.9	1.1 - 0.5	7.1 - 3.1	13.1 - 5.8
12	6°03.0	6°04.0	5°46.5	1.2 - 0.5	7.2 - 2.9	13.2 - 5.4	12	6°18.0	6°19.0	6°00.8	1.2 - 0.5	7.2 - 3.1	13.2 - 5.6	12	6°33.0	6°34.1	6°15.1	1.2 - 0.5	7.2 - 3.2	13.2 - 5.8
13	6°03.2	6°04.2	5°46.7	1.3 - 0.5	7.3 - 3.0	13.3 - 5.4	13	6°18.2	6°19.3	6°01.0	1.3 - 0.6	7.3 - 3.1	13.3 - 5.7	13	6°33.2	6°34.3	6°15.3	1.3 - 0.6	7.3 - 3.2	13.3 - 5.9
14	6°03.5	6°04.5	5°46.9	1.4 - 0.6	7.4 - 3.0	13.4 - 5.5	14	6°18.5	6°19.5	6°01.3	1.4 - 0.6	7.4 - 3.1	13.4 - 5.7	14	6°33.5	6°34.6	6°15.6	1.4 - 0.6	7.4 - 3.3	13.4 - 5.9
15	6°03.8	6°04.7	5°47.2	1.5 - 0.6	7.5 - 3.1	13.5 - 5.5	15	6°18.8	6°19.8	6°01.5	1.5 - 0.6	7.5 - 3.2	13.5 - 5.7	15	6°33.8	6°34.8	6°15.8	1.5 - 0.7	7.5 - 3.3	13.5 - 6.0
16	6°04.0	6°05.0	5°47.4	1.6 - 0.7	7.6 - 3.1	13.6 - 5.6	16	6°19.0	6°20.0	6°01.7	1.6 - 0.7	7.6 - 3.2	13.6 - 5.8	16	6°34.0	6°35.1	6°16.1	1.6 - 0.7	7.6 - 3.4	13.6 - 6.0
17	6°04.3	6°05.2	5°47.7	1.7 - 0.7	7.7 - 3.1	13.7 - 5.6	17	6°19.3	6°20.3	6°02.0	1.7 - 0.7	7.7 - 3.3	13.7 - 5.8	17	6°34.3	6°35.3	6°16.3	1.7 - 0.8	7.7 - 3.4	13.7 - 6.1
18	6°04.5	6°05.5	5°47.9	1.8 - 0.7	7.8 - 3.2	13.8 - 5.6	18	6°19.5	6°20.5	6°02.2	1.8 - 0.8	7.8 - 3.3	13.8 - 5.9	18	6°34.5	6°35.6	6°16.5	1.8 - 0.8	7.8 - 3.4	13.8 - 6.1
19	6°04.7	6°05.7	5°48.1	1.9 - 0.8	7.9 - 3.2	13.9 - 5.7	19	6°19.7	6°20.8	6°02.5	1.9 - 0.8	7.9 - 3.4	13.9 - 5.9	19	6°34.8	6°35.8	6°16.8	1.9 - 0.8	7.9 - 3.5	13.9 - 6.1
20	6°05.0	6°06.0	5°48.4	2.0 - 0.8	8.0 - 3.3	14.0 - 5.7	20	6°20.0	6°21.0	6°02.7	2.0 - 0.8	8.0 - 3.4	14.0 - 6.0	20	6°35.0	6°36.1	6°17.0	2.0 - 0.9	8.0 - 3.5	14.0 - 6.2
21	6°05.3	6°06.2	5°48.6	2.1 - 0.9	8.1 - 3.3	14.1 - 5.8	21	6°20.3	6°21.3	6°02.9	2.1 - 0.9	8.1 - 3.4	14.1 - 6.0	21	6°35.3	6°36.3	6°17.2	2.1 - 0.9	8.1 - 3.6	14.1 - 6.2
22	6°05.5	6°06.5	5°48.8	2.2 - 0.9	8.2 - 3.3	14.2 - 5.8	22	6°20.5	6°21.5	6°03.2	2.2 - 0.9	8.2 - 3.5	14.2 - 6.0	22	6°35.5	6°36.6	6°17.5	2.2 - 1.0	8.2 - 3.6	14.2 - 6.3
23	6°05.7	6°06.7	5°49.1	2.3 - 0.9	8.3 - 3.4	14.3 - 5.8	23	6°20.7	6°21.8	6°03.4	2.3 - 1.0	8.3 - 3.5	14.3 - 6.1	23	6°35.7	6°36.8	6°17.7	2.3 - 1.0	8.3 - 3.7	14.3 - 6.3
24	6°06.0	6°07.0	5°49.3	2.4 - 1.0	8.4 - 3.4	14.4 - 5.9	24	6°21.0	6°22.0	6°03.6	2.4 - 1.0	8.4 - 3.6	14.4 - 6.1	24	6°36.0	6°37.1	6°18.0	2.4 - 1.1	8.4 - 3.7	14.4 - 6.4
25	6°06.3	6°07.3	5°49.6	2.5 - 1.0	8.5 - 3.5	14.5 - 5.9	25	6°21.3	6°22.3	6°03.9	2.5 - 1.1	8.5 - 3.6	14.5 - 6.2	25	6°36.3	6°37.3	6°18.2	2.5 - 1.1	8.5 - 3.8	14.5 - 6.4
26	6°06.5	6°07.5	5°49.8	2.6 - 1.1	8.6 - 3.5	14.6 - 6.0	26	6°21.5	6°22.5	6°04.1	2.6 - 1.1	8.6 - 3.7	14.6 - 6.2	26	6°36.5	6°37.6	6°18.4	2.6 - 1.1	8.6 - 3.8	14.6 - 6.4
27	6°06.7	6°07.8	5°50.0	2.7 - 1.1	8.7 - 3.6	14.7 - 6.0	27	6°21.7	6°22.8	6°04.4	2.7 - 1.1	8.7 - 3.7	14.7 - 6.2	27	6°36.7	6°37.8	6°18.7	2.7 - 1.2	8.7 - 3.8	14.7 - 6.5
28	6°07.0	6°08.0	5°50.3	2.8 - 1.1	8.8 - 3.6	14.8 - 6.0	28	6°22.0	6°23.0	6°04.6	2.8 - 1.2	8.8 - 3.7	14.8 - 6.3	28	6°37.0	6°38.1	6°18.9	2.8 - 1.2	8.8 - 3.9	14.8 - 6.5
29	6°07.3	6°08.3	5°50.5	2.9 - 1.2	8.9 - 3.6	14.9 - 6.1	29	6°22.3	6°23.3	6°04.8	2.9 - 1.2	8.9 - 3.8	14.9 - 6.3	29	6°37.3	6°38.3	6°19.2	2.9 - 1.3	8.9 - 3.9	14.9 - 6.6
30	6°07.5	6°08.5	5°50.8	3.0 - 1.2	9.0 - 3.7	15.0 - 6.1	30	6°22.5	6°23.5	6°05.1	3.0 - 1.3	9.0 - 3.8	15.0 - 6.4	30	6°37.5	6°38.6	6°19.4	3.0 - 1.3	9.0 - 4.0	15.0 - 6.6
31	6°07.7	6°08.8	5°51.0	3.1 - 1.3	9.1 - 3.7	15.1 - 6.2	31	6°22.7	6°23.8	6°05.3	3.1 - 1.3	9.1 - 3.9	15.1 - 6.4	31	6°37.7	6°38.8	6°19.6	3.1 - 1.4	9.1 - 4.0	15.1 - 6.7
32	6°08.0	6°09.0	5°51.2	3.2 - 1.3	9.2 - 3.8	15.2 - 6.2	32	6°23.0	6°24.0	6°05.6	3.2 - 1.4	9.2 - 3.9	15.2 - 6.5	32	6°38.0	6°39.1	6°19.9	3.2 - 1.4	9.2 - 4.1	15.2 - 6.7
33	6°08.3	6°09.3	5°51.5	3.3 - 1.3	9.3 - 3.8	15.3 - 6.2	33	6°23.3	6°24.3	6°05.8	3.3 - 1.4	9.3 - 4.0	15.3 - 6.5	33	6°38.3	6°39.3	6°20.1	3.3 - 1.5	9.3 - 4.1	15.3 - 6.8
34	6°08.5	6°09.5	5°51.7	3.4 - 1.4	9.4 - 3.8	15.4 - 6.3	34	6°23.5	6°24.5	6°06.0	3.4 - 1.4	9.4 - 4.0	15.4 - 6.5	34	6°38.5	6°39.6	6°20.3	3.4 - 1.5	9.4 - 4.2	15.4 - 6.8
35	6°08.7	6°09.8	5°52.0	3.5 - 1.4	9.5 - 3.9	15.5 - 6.3	35	6°23.7	6°24.8	6°06.3	3.5 - 1.5	9.5 - 4.0	15.5 - 6.6	35	6°38.7	6°39.8	6°20.6	3.5 - 1.5	9.5 - 4.2	15.5 - 6.8
36	6°09.0	6°10.0	5°52.2	3.6 - 1.5	9.6 - 3.9	15.6 - 6.4	36	6°24.0	6°25.0	6°06.5	3.6 - 1.5	9.6 - 4.1	15.6 - 6.6	36	6°39.0	6°40.1	6°20.8	3.6 - 1.6	9.6 - 4.2	15.6 - 6.9
37	6°09.3	6°10.3	5°52.4	3.7 - 1.5	9.7 - 4.0	15.7 - 6.4	37	6°24.3	6°25.3	6°06.7	3.7 - 1.6	9.7 - 4.1	15.7 - 6.7	37	6°39.3	6°40.3	6°21.1	3.7 - 1.6	9.7 - 4.3	15.7 - 6.9
38	6°09.5	6°10.5	5°52.7	3.8 - 1.6	9.8 - 4.0	15.8 - 6.5	38	6°24.5	6°25.6	6°07.0	3.8 - 1.6	9.8 - 4.2	15.8 - 6.7	38	6°39.5	6°40.6	6°21.3	3.8 - 1.7	9.8 - 4.3	15.8 - 7.0
39	6°09.7	6°10.8	5°52.9	3.9 - 1.6	9.9 - 4.0	15.9 - 6.5	39	6°24.7	6°25.8	6°07.2	3.9 - 1.7	9.9 - 4.2	15.9 - 6.8	39	6°39.7	6°40.8	6°21.5	3.9 - 1.7	9.9 - 4.4	15.9 - 7.0
40	6°10.0	6°11.0	5°53.1	4.0 - 1.6	10.0 - 4.1	16.0 - 6.5	40	6°25.0	6°26.1	6°07.5	4.0 - 1.7	10.0 - 4.3	16.0 - 6.8	40	6°40.0	6°41.1	6°21.8	4.0 - 1.8	10.0 - 4.4	16.0 - 7.1
41	6°10.3	6°11.3	5°53.4	4.1 - 1.7	10.1 - 4.1	16.1 - 6.6	41	6°25.3	6°26.3	6°07.7	4.1 - 1.7	10.1 - 4.3	16.1 - 6.8	41	6°40.3	6°41.3	6°22.0	4.1 - 1.8	10.1 - 4.5	16.1 - 7.1
42	6°10.5	6°11.5	5°53.6	4.2 - 1.7	10.2 - 4.2	16.2 - 6.6	42	6°25.5	6°26.6	6°07.9	4.2 - 1.8	10.2 - 4.3	16.2 - 6.9	42	6°40.5	6°41.6	6°22.3	4.2 - 1.9	10.2 - 4.5	16.2 - 7.2
43	6°10.7	6°11.8	5°53.9	4.3 - 1.8	10.3 - 4.2	16.3 - 6.7	43	6°25.7	6°26.8	6°08.2	4.3 - 1.8	10.3 - 4.4	16.3 - 6.9	43	6°40.7	6°41.8	6°22.5	4.3 - 1.9	10.3 - 4.5	16.3 - 7.2
44	6°11.0	6°12.0	5°54.1	4.4 - 1.8	10.4 - 4.2	16.4 - 6.7	44	6°26.0	6°27.1	6°08.4	4.4 - 1.9	10.4 - 4.4	16.4 - 7.0	44	6°41.0	6°42.1	6°22.7	4.4 - 1.9	10.4 - 4.6	16.4 - 7.2
45	6°11.3	6°12.3	5°54.3	4.5 - 1.8	10.5 - 4.3	16.5 - 6.7	45	6°26.3	6°27.3	6°08.7	4.5 - 1.9	10.5 - 4.5	16.5 - 7.0	45	6°41.3	6°42.3	6°23.0	4.5 - 2.0	10.5 - 4.6	16.5 - 7.3
46	6°11.5	6°12.5	5°54.6	4.6 - 1.9	10.6 - 4.3	16.6 - 6.8	46	6°26.5	6°27.6	6°08.9	4.6 - 2.0	10.6 - 4.5	16.6 - 7.1	46	6°41.5	6°42.6	6°23.2	4.6 - 2.0	10.6 - 4.7	16.6 - 7.3
47	6°11.8	6°12.8	5°54.8	4.7 - 1.9	10.7 - 4.4	16.7 - 6.8	47	6°26.8	6°27.8	6°09.1	4.7 - 2.0	10.7 - 4.5	16.7 - 7.1	47	6°41.8	6°42.8	6°23.4	4.7 - 2.1	10.7 - 4.7	16.7 - 7.4
48	6°12.0	6°13.0	5°55.1	4.8 - 2.0	10.8 - 4.4	16.8 - 6.9	48	6°27.0	6°28.1	6°09.4	4.8 - 2.0	10.8 - 4.6	16.8 - 7.1	48	6°42.0	6°43.1	6°23.7	4.8 - 2.1	10.8 - 4.8	16.8 - 7.4
49	6°12.2	6°13.																		

## Increments and Corrections

m 27	Sun Plan.	Aries	Moon	v and d corr			m 28	Sun Plan.	Aries	Moon	v and d corr			m 29	Sun Plan.	Aries	Moon	v and d corr		
0	6°45.0	6°46.1	6°26.5	0.0 - 0.0	6.0 - 2.8	12.0 - 5.5	0	7°00.0	7°01.1	6°40.9	0.0 - 0.0	6.0 - 2.8	12.0 - 5.7	0	7°15.0	7°16.2	6°55.2	0.0 - 0.0	6.0 - 2.9	12.0 - 5.9
1	6°45.2	6°46.4	6°26.8	0.1 - 0.0	6.1 - 2.8	12.1 - 5.5	1	7°00.2	7°01.4	6°41.1	0.1 - 0.0	6.1 - 2.9	12.1 - 5.7	1	7°15.2	7°16.4	6°55.4	0.1 - 0.0	6.1 - 3.0	12.1 - 5.9
2	6°45.5	6°46.6	6°27.0	0.2 - 0.1	6.2 - 2.8	12.2 - 5.6	2	7°00.5	7°01.6	6°41.3	0.2 - 0.1	6.2 - 2.9	12.2 - 5.8	2	7°15.5	7°16.7	6°55.7	0.2 - 0.1	6.2 - 3.0	12.2 - 6.0
3	6°45.8	6°46.9	6°27.3	0.3 - 0.1	6.3 - 2.9	12.3 - 5.6	3	7°00.8	7°01.9	6°41.6	0.3 - 0.1	6.3 - 3.0	12.3 - 5.8	3	7°15.8	7°16.9	6°55.9	0.3 - 0.1	6.3 - 3.1	12.3 - 6.0
4	6°46.0	6°47.1	6°27.5	0.4 - 0.2	6.4 - 2.9	12.4 - 5.7	4	7°01.0	7°02.2	6°41.8	0.4 - 0.2	6.4 - 3.0	12.4 - 5.9	4	7°16.0	7°17.2	6°56.1	0.4 - 0.2	6.4 - 3.1	12.4 - 6.1
5	6°46.2	6°47.4	6°27.7	0.5 - 0.2	6.5 - 3.0	12.5 - 5.7	5	7°01.2	7°02.4	6°42.1	0.5 - 0.2	6.5 - 3.1	12.5 - 5.9	5	7°16.2	7°17.4	6°56.4	0.5 - 0.2	6.5 - 3.2	12.5 - 6.1
6	6°46.5	6°47.6	6°28.0	0.6 - 0.3	6.6 - 3.0	12.6 - 5.8	6	7°01.5	7°02.7	6°42.3	0.6 - 0.3	6.6 - 3.1	12.6 - 6.0	6	7°16.5	7°17.7	6°56.6	0.6 - 0.3	6.6 - 3.2	12.6 - 6.2
7	6°46.8	6°47.9	6°28.2	0.7 - 0.3	6.7 - 3.1	12.7 - 5.8	7	7°01.8	7°02.9	6°42.5	0.7 - 0.3	6.7 - 3.2	12.7 - 6.0	7	7°16.8	7°17.9	6°56.9	0.7 - 0.3	6.7 - 3.3	12.7 - 6.2
8	6°47.0	6°48.1	6°28.5	0.8 - 0.4	6.8 - 3.1	12.8 - 5.9	8	7°02.0	7°03.2	6°42.8	0.8 - 0.4	6.8 - 3.2	12.8 - 6.1	8	7°17.0	7°18.2	6°57.1	0.8 - 0.4	6.8 - 3.3	12.8 - 6.3
9	6°47.2	6°48.4	6°28.7	0.9 - 0.4	6.9 - 3.2	12.9 - 5.9	9	7°02.2	7°03.4	6°43.0	0.9 - 0.4	6.9 - 3.3	12.9 - 6.1	9	7°17.2	7°18.4	6°57.3	0.9 - 0.4	6.9 - 3.4	12.9 - 6.3
10	6°47.5	6°48.6	6°28.9	1.0 - 0.5	7.0 - 3.2	13.0 - 6.0	10	7°02.5	7°03.7	6°43.3	1.0 - 0.5	7.0 - 3.3	13.0 - 6.2	10	7°17.5	7°18.7	6°57.6	1.0 - 0.5	7.0 - 3.4	13.0 - 6.4
11	6°47.8	6°48.9	6°29.2	1.1 - 0.5	7.1 - 3.3	13.1 - 6.0	11	7°02.8	7°03.9	6°43.5	1.1 - 0.5	7.1 - 3.4	13.1 - 6.2	11	7°17.8	7°18.9	6°57.8	1.1 - 0.5	7.1 - 3.5	13.1 - 6.4
12	6°48.0	6°49.1	6°29.4	1.2 - 0.6	7.2 - 3.3	13.2 - 6.0	12	7°03.0	7°04.2	6°43.7	1.2 - 0.6	7.2 - 3.4	13.2 - 6.3	12	7°18.0	7°19.2	6°58.0	1.2 - 0.6	7.2 - 3.5	13.2 - 6.5
13	6°48.2	6°49.4	6°29.7	1.3 - 0.6	7.3 - 3.3	13.3 - 6.1	13	7°03.2	7°04.4	6°44.0	1.3 - 0.6	7.3 - 3.5	13.3 - 6.3	13	7°18.2	7°19.4	6°58.3	1.3 - 0.6	7.3 - 3.6	13.3 - 6.5
14	6°48.5	6°49.6	6°29.9	1.4 - 0.6	7.4 - 3.4	13.4 - 6.1	14	7°03.5	7°04.7	6°44.2	1.4 - 0.7	7.4 - 3.5	13.4 - 6.4	14	7°18.5	7°19.7	6°58.5	1.4 - 0.7	7.4 - 3.6	13.4 - 6.6
15	6°48.8	6°49.9	6°30.1	1.5 - 0.7	7.5 - 3.4	13.5 - 6.2	15	7°03.8	7°04.9	6°44.4	1.5 - 0.7	7.5 - 3.6	13.5 - 6.4	15	7°18.8	7°19.9	6°58.8	1.5 - 0.7	7.5 - 3.7	13.5 - 6.6
16	6°49.0	6°50.1	6°30.4	1.6 - 0.7	7.6 - 3.5	13.6 - 6.2	16	7°04.0	7°05.2	6°44.7	1.6 - 0.8	7.6 - 3.6	13.6 - 6.5	16	7°19.0	7°20.2	6°59.0	1.6 - 0.8	7.6 - 3.7	13.6 - 6.7
17	6°49.3	6°50.4	6°30.6	1.7 - 0.8	7.7 - 3.5	13.7 - 6.3	17	7°04.3	7°05.4	6°44.9	1.7 - 0.8	7.7 - 3.7	13.7 - 6.5	17	7°19.3	7°20.5	6°59.2	1.7 - 0.8	7.7 - 3.8	13.7 - 6.7
18	6°49.5	6°50.6	6°30.8	1.8 - 0.8	7.8 - 3.6	13.8 - 6.3	18	7°04.5	7°05.7	6°45.2	1.8 - 0.9	7.8 - 3.7	13.8 - 6.6	18	7°19.5	7°20.7	6°59.5	1.8 - 0.9	7.8 - 3.8	13.8 - 6.8
19	6°49.8	6°50.9	6°31.1	1.9 - 0.9	7.9 - 3.6	13.9 - 6.4	19	7°04.7	7°05.9	6°45.4	1.9 - 0.9	7.9 - 3.8	13.9 - 6.6	19	7°19.7	7°21.0	6°59.7	1.9 - 0.9	7.9 - 3.9	13.9 - 6.8
20	6°50.0	6°51.1	6°31.3	2.0 - 0.9	8.0 - 3.7	14.0 - 6.4	20	7°05.0	7°06.2	6°45.6	2.0 - 0.9	8.0 - 3.8	14.0 - 6.6	20	7°20.0	7°21.2	7°00.0	2.0 - 1.0	8.0 - 3.9	14.0 - 6.9
21	6°50.3	6°51.4	6°31.6	2.1 - 1.0	8.1 - 3.7	14.1 - 6.5	21	7°05.3	7°06.4	6°45.9	2.1 - 1.0	8.1 - 3.8	14.1 - 6.7	21	7°20.3	7°21.5	7°00.2	2.1 - 1.0	8.1 - 4.0	14.1 - 6.9
22	6°50.5	6°51.6	6°31.8	2.2 - 1.0	8.2 - 3.8	14.2 - 6.5	22	7°05.5	7°06.7	6°46.1	2.2 - 1.0	8.2 - 3.9	14.2 - 6.7	22	7°20.5	7°21.7	7°00.4	2.2 - 1.1	8.2 - 4.0	14.2 - 7.0
23	6°50.7	6°51.9	6°32.0	2.3 - 1.1	8.3 - 3.8	14.3 - 6.6	23	7°05.7	7°06.9	6°46.4	2.3 - 1.1	8.3 - 3.9	14.3 - 6.8	23	7°20.7	7°22.0	7°00.7	2.3 - 1.1	8.3 - 4.1	14.3 - 7.0
24	6°51.0	6°52.1	6°32.3	2.4 - 1.1	8.4 - 3.9	14.4 - 6.6	24	7°06.0	7°07.2	6°46.6	2.4 - 1.1	8.4 - 4.0	14.4 - 6.8	24	7°21.0	7°22.2	7°00.9	2.4 - 1.2	8.4 - 4.1	14.4 - 7.1
25	6°51.3	6°52.4	6°32.5	2.5 - 1.1	8.5 - 3.9	14.5 - 6.6	25	7°06.3	7°07.4	6°46.8	2.5 - 1.2	8.5 - 4.0	14.5 - 6.9	25	7°21.3	7°22.5	7°01.1	2.5 - 1.2	8.5 - 4.2	14.5 - 7.1
26	6°51.5	6°52.6	6°32.8	2.6 - 1.2	8.6 - 3.9	14.6 - 6.7	26	7°06.5	7°07.7	6°47.1	2.6 - 1.2	8.6 - 4.1	14.6 - 6.9	26	7°21.5	7°22.7	7°01.4	2.6 - 1.3	8.6 - 4.2	14.6 - 7.2
27	6°51.7	6°52.9	6°33.0	2.7 - 1.2	8.7 - 4.0	14.7 - 6.7	27	7°06.7	7°07.9	6°47.3	2.7 - 1.3	8.7 - 4.1	14.7 - 7.0	27	7°21.7	7°23.0	7°01.6	2.7 - 1.3	8.7 - 4.3	14.7 - 7.2
28	6°52.0	6°53.1	6°33.2	2.8 - 1.3	8.8 - 4.0	14.8 - 6.8	28	7°07.0	7°08.2	6°47.5	2.8 - 1.3	8.8 - 4.2	14.8 - 7.0	28	7°22.0	7°23.2	7°01.9	2.8 - 1.4	8.8 - 4.3	14.8 - 7.3
29	6°52.3	6°53.4	6°33.5	2.9 - 1.3	8.9 - 4.1	14.9 - 6.8	29	7°07.3	7°08.4	6°47.8	2.9 - 1.4	8.9 - 4.2	14.9 - 7.1	29	7°22.3	7°23.5	7°02.1	2.9 - 1.4	8.9 - 4.4	14.9 - 7.3
30	6°52.5	6°53.6	6°33.7	3.0 - 1.4	9.0 - 4.1	15.0 - 6.9	30	7°07.5	7°08.7	6°48.0	3.0 - 1.4	9.0 - 4.3	15.0 - 7.1	30	7°22.5	7°23.7	7°02.3	3.0 - 1.5	9.0 - 4.4	15.0 - 7.4
31	6°52.7	6°53.9	6°33.9	3.1 - 1.4	9.1 - 4.2	15.1 - 6.9	31	7°07.7	7°08.9	6°48.3	3.1 - 1.5	9.1 - 4.3	15.1 - 7.2	31	7°22.7	7°24.0	7°02.6	3.1 - 1.5	9.1 - 4.5	15.1 - 7.4
32	6°53.0	6°54.1	6°34.2	3.2 - 1.5	9.2 - 4.2	15.2 - 7.0	32	7°08.0	7°09.2	6°48.5	3.2 - 1.5	9.2 - 4.4	15.2 - 7.2	32	7°23.0	7°24.2	7°02.8	3.2 - 1.6	9.2 - 4.5	15.2 - 7.5
33	6°53.3	6°54.4	6°34.4	3.3 - 1.5	9.3 - 4.3	15.3 - 7.0	33	7°08.3	7°09.4	6°48.7	3.3 - 1.6	9.3 - 4.4	15.3 - 7.3	33	7°23.3	7°24.5	7°03.1	3.3 - 1.6	9.3 - 4.6	15.3 - 7.5
34	6°53.5	6°54.6	6°34.7	3.4 - 1.6	9.4 - 4.3	15.4 - 7.1	34	7°08.5	7°09.7	6°49.0	3.4 - 1.6	9.4 - 4.5	15.4 - 7.3	34	7°23.5	7°24.7	7°03.3	3.4 - 1.7	9.4 - 4.6	15.4 - 7.6
35	6°53.7	6°54.9	6°34.9	3.5 - 1.6	9.5 - 4.4	15.5 - 7.1	35	7°08.7	7°09.9	6°49.2	3.5 - 1.7	9.5 - 4.5	15.5 - 7.4	35	7°23.7	7°25.0	7°03.5	3.5 - 1.7	9.5 - 4.7	15.5 - 7.6
36	6°54.0	6°55.1	6°35.1	3.6 - 1.6	9.6 - 4.4	15.6 - 7.1	36	7°09.0	7°10.2	6°49.5	3.6 - 1.7	9.6 - 4.6	15.6 - 7.4	36	7°24.0	7°25.2	7°03.8	3.6 - 1.8	9.6 - 4.7	15.6 - 7.7
37	6°54.3	6°55.4	6°35.4	3.7 - 1.7	9.7 - 4.4	15.7 - 7.2	37	7°09.3	7°10.4	6°49.7	3.7 - 1.8	9.7 - 4.6	15.7 - 7.5	37	7°24.3	7°25.5	7°04.0	3.7 - 1.8	9.7 - 4.8	15.7 - 7.7
38	6°54.5	6°55.6	6°35.6	3.8 - 1.7	9.8 - 4.5	15.8 - 7.2	38	7°09.5	7°10.7	6°49.9	3.8 - 1.8	9.8 - 4.7	15.8 - 7.5	38	7°24.5	7°25.7	7°04.3	3.8 - 1.9	9.8 - 4.8	15.8 - 7.8
39	6°54.7	6°55.9	6°35.9	3.9 - 1.8	9.9 - 4.5	15.9 - 7.3	39	7°09.7	7°10.9	6°50.2	3.9 - 1.9	9.9 - 4.7	15.9 - 7.6	39	7°24.7	7°26.0	7°04.5	3.9 - 1.9	9.9 - 4.9	15.9 - 7.9
40	6°55.0	6°56.1	6°36.1	4.0 - 1.8	10.0 - 4.6	16.0 - 7.3	40	7°10.0	7°11.2	6°50.4	4.0 - 1.9	10.0 - 4.8	16.0 - 7.6	40	7°25.0	7°26.2	7°04.7	4.0 - 2.0	10.0 - 4.9	16.0 - 7.8
41	6°55.3	6°56.4	6°36.3	4.1 - 1.9	10.1 - 4.6	16.1 - 7.4	41	7°10.3	7°11.4	6°50.6	4.1 - 1.9	10.1 - 4.8	16.1 - 7.6	41	7°25.3	7°26.5	7°05.0	4.1 - 2.0	10.1 - 5.0	16.1 - 7.9
42	6°55.5	6°56.6	6°36.6	4.2 - 1.9	10.2 - 4.7	16.2 - 7.4	42	7°10.5	7°11.7	6°50.9	4.2 - 2.0	10.2 - 4.8	16.2 - 7.7	42	7°25.5	7°26.7	7°05.2	4.2 - 2.1	10.2 - 5.0	16.2 - 8.0
43	6°55.7	6°56.9	6°36.8	4.3 - 2.0	10.3 - 4.7	16.3 - 7.5	43	7°10.7	7°11.9	6°51.1	4.3 - 2.0	10.3 - 4.9	16.3 - 7.7	43	7°25.7	7°27.0	7°05.4	4.3 - 2.1	10.3 - 5.1	16.3 - 8.0
44	6°56.0	6°57.1	6°37.0	4.4 - 2.0	10.4 - 4.8	16.4 - 7.5	44	7°11.0	7°12.2	6°51.4	4.4 - 2.1	10.4 - 4.9	16.4 - 7.8	44	7°26.0	7°27.2	7°05.7	4.4 - 2.2	10.4 - 5.1	16.4 - 8.1
45	6°56.3	6°57.4	6°37.3	4.5 - 2.1	10.5 - 4.8	16.5 - 7.6	45	7°11.3	7°12.4	6°51.6	4.5 - 2.1	10.5 - 5.0	16.5 - 7.8	45	7°26.3	7°27.5	7°05.9	4.5 - 2.2	10.5 - 5.2	16.5 - 8.1
46	6°56.5	6°57.6	6°37.5	4.6 - 2.1	10.6 - 4.9	16.6 - 7.6	46	7°11.5	7°12.7	6°51.8	4.6 - 2.2	10.6 - 5.0	16.6 - 7.9	46	7°26.5	7°27.7	7°06.2	4.6 - 2.3	10.6 - 5.2	16.6 - 8.2
47	6°56.8	6°57.9	6°37.8	4.7 - 2.2	10.7 - 4.9	16.7 - 7.7	47	7°11.8	7°12.9	6°52.1	4.7 - 2.2	10.7 - 5.1	16.7 - 7.9	47	7°26.8	7°28.0	7°06.4	4.7 - 2.3	10.7 - 5.3	16.7 - 8.2
48	6°57.0	6°58.1	6°38.0	4.8 - 2.2	10.8 - 5.0	16.8 - 7.7	48	7°12.0	7°13.2	6°52.3	4.8 - 2.3	10.8 - 5.1	16.8 - 8.0	48	7°27.0	7°28.2	7°06.6	4.8 - 2.4	10.8 - 5.3	16.8 - 8.3
49	6°57.3	6°58.																		



## Increments and Corrections

m 30	Sun Plan.	Aries	Moon	v and d corr			m 31	Sun Plan.	Aries	Moon	v and d corr			m 32	Sun Plan.	Aries	Moon	v and d corr		
0	7°30.0	7°31.2	7°09.5	0.0 - 0.0	6.0 - 3.0	12.0 - 6.1	0	7°45.0	7°46.3	7°23.8	0.0 - 0.0	6.0 - 3.2	12.0 - 6.3	0	8°00.0	8°01.3	7°38.1	0.0 - 0.0	6.0 - 3.3	12.0 - 6.5
1	7°30.2	7°31.5	7°09.7	0.1 - 0.1	6.1 - 3.1	12.1 - 6.2	1	7°45.2	7°46.5	7°24.1	0.1 - 0.1	6.1 - 3.2	12.1 - 6.4	1	8°00.2	8°01.6	7°38.4	0.1 - 0.1	6.1 - 3.3	12.1 - 6.6
2	7°30.5	7°31.7	7°10.0	0.2 - 0.1	6.2 - 3.2	12.2 - 6.2	2	7°45.5	7°46.8	7°24.3	0.2 - 0.1	6.2 - 3.3	12.2 - 6.4	2	8°00.5	8°01.8	7°38.6	0.2 - 0.1	6.2 - 3.4	12.2 - 6.6
3	7°30.8	7°32.0	7°10.2	0.3 - 0.2	6.3 - 3.2	12.3 - 6.3	3	7°45.7	7°47.0	7°24.5	0.3 - 0.2	6.3 - 3.3	12.3 - 6.5	3	8°00.7	8°02.1	7°38.8	0.3 - 0.2	6.3 - 3.4	12.3 - 6.7
4	7°31.0	7°32.2	7°10.5	0.4 - 0.2	6.4 - 3.3	12.4 - 6.3	4	7°46.0	7°47.3	7°24.8	0.4 - 0.2	6.4 - 3.4	12.4 - 6.5	4	8°01.0	8°02.3	7°39.1	0.4 - 0.2	6.4 - 3.5	12.4 - 6.7
5	7°31.2	7°32.5	7°10.7	0.5 - 0.3	6.5 - 3.3	12.5 - 6.4	5	7°46.2	7°47.5	7°25.0	0.5 - 0.3	6.5 - 3.4	12.5 - 6.6	5	8°01.3	8°02.6	7°39.3	0.5 - 0.3	6.5 - 3.5	12.5 - 6.8
6	7°31.5	7°32.7	7°10.9	0.6 - 0.3	6.6 - 3.4	12.6 - 6.4	6	7°46.5	7°47.8	7°25.2	0.6 - 0.3	6.6 - 3.5	12.6 - 6.6	6	8°01.5	8°02.8	7°39.6	0.6 - 0.3	6.6 - 3.6	12.6 - 6.8
7	7°31.7	7°33.0	7°11.2	0.7 - 0.4	6.7 - 3.4	12.7 - 6.5	7	7°46.8	7°48.0	7°25.5	0.7 - 0.4	6.7 - 3.5	12.7 - 6.7	7	8°01.8	8°03.1	7°39.8	0.7 - 0.4	6.7 - 3.6	12.7 - 6.9
8	7°32.0	7°33.2	7°11.4	0.8 - 0.4	6.8 - 3.5	12.8 - 6.5	8	7°47.0	7°48.3	7°25.7	0.8 - 0.4	6.8 - 3.6	12.8 - 6.7	8	8°02.0	8°03.3	7°40.0	0.8 - 0.4	6.8 - 3.7	12.8 - 6.9
9	7°32.2	7°33.5	7°11.6	0.9 - 0.5	6.9 - 3.5	12.9 - 6.6	9	7°47.2	7°48.5	7°26.0	0.9 - 0.5	6.9 - 3.6	12.9 - 6.8	9	8°02.2	8°03.6	7°40.3	0.9 - 0.5	6.9 - 3.7	12.9 - 7.0
10	7°32.5	7°33.7	7°11.9	1.0 - 0.5	7.0 - 3.6	13.0 - 6.6	10	7°47.5	7°48.8	7°26.2	1.0 - 0.5	7.0 - 3.7	13.0 - 6.8	10	8°02.5	8°03.8	7°40.5	1.0 - 0.5	7.0 - 3.8	13.0 - 7.0
11	7°32.8	7°34.0	7°12.1	1.1 - 0.6	7.1 - 3.6	13.1 - 6.7	11	7°47.7	7°49.0	7°26.4	1.1 - 0.6	7.1 - 3.7	13.1 - 6.9	11	8°02.7	8°04.1	7°40.8	1.1 - 0.6	7.1 - 3.8	13.1 - 7.1
12	7°33.0	7°34.2	7°12.4	1.2 - 0.6	7.2 - 3.7	13.2 - 6.7	12	7°48.0	7°49.3	7°26.7	1.2 - 0.6	7.2 - 3.8	13.2 - 6.9	12	8°03.0	8°04.3	7°41.0	1.2 - 0.7	7.2 - 3.9	13.2 - 7.1
13	7°33.3	7°34.5	7°12.6	1.3 - 0.7	7.3 - 3.7	13.3 - 6.8	13	7°48.2	7°49.5	7°26.9	1.3 - 0.7	7.3 - 3.8	13.3 - 7.0	13	8°03.3	8°04.6	7°41.2	1.3 - 0.7	7.3 - 4.0	13.3 - 7.2
14	7°33.5	7°34.7	7°12.8	1.4 - 0.7	7.4 - 3.8	13.4 - 6.8	14	7°48.5	7°49.8	7°27.2	1.4 - 0.7	7.4 - 3.9	13.4 - 7.0	14	8°03.5	8°04.8	7°41.5	1.4 - 0.8	7.4 - 4.0	13.4 - 7.3
15	7°33.8	7°35.0	7°13.1	1.5 - 0.8	7.5 - 3.8	13.5 - 6.9	15	7°48.8	7°50.0	7°27.4	1.5 - 0.8	7.5 - 3.9	13.5 - 7.1	15	8°03.8	8°05.1	7°41.7	1.5 - 0.8	7.5 - 4.1	13.5 - 7.3
16	7°34.0	7°35.2	7°13.3	1.6 - 0.8	7.6 - 3.9	13.6 - 6.9	16	7°49.0	7°50.3	7°27.6	1.6 - 0.8	7.6 - 4.0	13.6 - 7.1	16	8°04.0	8°05.3	7°42.0	1.6 - 0.9	7.6 - 4.1	13.6 - 7.4
17	7°34.3	7°35.5	7°13.6	1.7 - 0.9	7.7 - 3.9	13.7 - 7.0	17	7°49.3	7°50.5	7°27.9	1.7 - 0.9	7.7 - 4.0	13.7 - 7.2	17	8°04.2	8°05.6	7°42.2	1.7 - 0.9	7.7 - 4.2	13.7 - 7.4
18	7°34.5	7°35.7	7°13.8	1.8 - 0.9	7.8 - 4.0	13.8 - 7.0	18	7°49.5	7°50.8	7°28.1	1.8 - 0.9	7.8 - 4.1	13.8 - 7.2	18	8°04.5	8°05.8	7°42.4	1.8 - 1.0	7.8 - 4.2	13.8 - 7.5
19	7°34.8	7°36.0	7°14.0	1.9 - 1.0	7.9 - 4.0	13.9 - 7.1	19	7°49.8	7°51.0	7°28.4	1.9 - 1.0	7.9 - 4.1	13.9 - 7.3	19	8°04.8	8°06.1	7°42.7	1.9 - 1.0	7.9 - 4.3	13.9 - 7.5
20	7°35.0	7°36.2	7°14.3	2.0 - 1.0	8.0 - 4.1	14.0 - 7.1	20	7°50.0	7°51.3	7°28.6	2.0 - 1.1	8.0 - 4.2	14.0 - 7.4	20	8°05.0	8°06.3	7°42.9	2.0 - 1.1	8.0 - 4.3	14.0 - 7.6
21	7°35.3	7°36.5	7°14.5	2.1 - 1.1	8.1 - 4.1	14.1 - 7.2	21	7°50.3	7°51.5	7°28.8	2.1 - 1.1	8.1 - 4.3	14.1 - 7.4	21	8°05.3	8°06.6	7°43.1	2.1 - 1.1	8.1 - 4.4	14.1 - 7.6
22	7°35.5	7°36.7	7°14.7	2.2 - 1.1	8.2 - 4.2	14.2 - 7.2	22	7°50.5	7°51.8	7°29.1	2.2 - 1.2	8.2 - 4.3	14.2 - 7.5	22	8°05.5	8°06.8	7°43.4	2.2 - 1.2	8.2 - 4.4	14.2 - 7.7
23	7°35.7	7°37.0	7°15.0	2.3 - 1.2	8.3 - 4.2	14.3 - 7.3	23	7°50.7	7°52.0	7°29.3	2.3 - 1.2	8.3 - 4.4	14.3 - 7.5	23	8°05.7	8°07.1	7°43.6	2.3 - 1.2	8.3 - 4.5	14.3 - 7.7
24	7°36.0	7°37.2	7°15.2	2.4 - 1.2	8.4 - 4.3	14.4 - 7.3	24	7°51.0	7°52.3	7°29.5	2.4 - 1.3	8.4 - 4.4	14.4 - 7.6	24	8°06.0	8°07.3	7°43.9	2.4 - 1.3	8.4 - 4.5	14.4 - 7.8
25	7°36.2	7°37.5	7°15.5	2.5 - 1.3	8.5 - 4.3	14.5 - 7.4	25	7°51.3	7°52.5	7°29.8	2.5 - 1.3	8.5 - 4.5	14.5 - 7.6	25	8°06.2	8°07.6	7°44.1	2.5 - 1.4	8.5 - 4.6	14.5 - 7.9
26	7°36.5	7°37.7	7°15.7	2.6 - 1.3	8.6 - 4.4	14.6 - 7.4	26	7°51.5	7°52.8	7°30.0	2.6 - 1.4	8.6 - 4.5	14.6 - 7.7	26	8°06.5	8°07.8	7°44.3	2.6 - 1.4	8.6 - 4.7	14.6 - 7.9
27	7°36.7	7°38.0	7°15.9	2.7 - 1.4	8.7 - 4.4	14.7 - 7.5	27	7°51.7	7°53.0	7°30.3	2.7 - 1.4	8.7 - 4.6	14.7 - 7.7	27	8°06.8	8°08.1	7°44.6	2.7 - 1.5	8.7 - 4.7	14.7 - 8.0
28	7°37.0	7°38.2	7°16.2	2.8 - 1.4	8.8 - 4.5	14.8 - 7.5	28	7°52.0	7°53.3	7°30.5	2.8 - 1.5	8.8 - 4.6	14.8 - 7.8	28	8°07.0	8°08.3	7°44.8	2.8 - 1.5	8.8 - 4.8	14.8 - 8.0
29	7°37.3	7°38.5	7°16.4	2.9 - 1.5	8.9 - 4.5	14.9 - 7.6	29	7°52.2	7°53.5	7°30.7	2.9 - 1.5	8.9 - 4.7	14.9 - 7.8	29	8°07.3	8°08.6	7°45.1	2.9 - 1.6	8.9 - 4.8	14.9 - 8.1
30	7°37.5	7°38.8	7°16.7	3.0 - 1.5	9.0 - 4.6	15.0 - 7.6	30	7°52.5	7°53.8	7°31.0	3.0 - 1.6	9.0 - 4.7	15.0 - 7.9	30	8°07.5	8°08.8	7°45.3	3.0 - 1.6	9.0 - 4.9	15.0 - 8.1
31	7°37.7	7°39.0	7°16.9	3.1 - 1.6	9.1 - 4.6	15.1 - 7.7	31	7°52.7	7°54.0	7°31.2	3.1 - 1.6	9.1 - 4.8	15.1 - 7.9	31	8°07.7	8°09.1	7°45.5	3.1 - 1.7	9.1 - 4.9	15.1 - 8.2
32	7°38.0	7°39.3	7°17.1	3.2 - 1.6	9.2 - 4.7	15.2 - 7.7	32	7°53.0	7°54.3	7°31.5	3.2 - 1.7	9.2 - 4.8	15.2 - 8.0	32	8°08.0	8°09.3	7°45.8	3.2 - 1.7	9.2 - 5.0	15.2 - 8.2
33	7°38.3	7°39.5	7°17.4	3.3 - 1.7	9.3 - 4.7	15.3 - 7.8	33	7°53.3	7°54.5	7°31.7	3.3 - 1.7	9.3 - 4.9	15.3 - 8.0	33	8°08.2	8°09.6	7°46.0	3.3 - 1.8	9.3 - 5.0	15.3 - 8.3
34	7°38.5	7°39.8	7°17.6	3.4 - 1.7	9.4 - 4.8	15.4 - 7.8	34	7°53.5	7°54.8	7°31.9	3.4 - 1.8	9.4 - 4.9	15.4 - 8.1	34	8°08.5	8°09.8	7°46.2	3.4 - 1.8	9.4 - 5.1	15.4 - 8.3
35	7°38.7	7°40.0	7°17.9	3.5 - 1.8	9.5 - 4.8	15.5 - 7.9	35	7°53.8	7°55.0	7°32.2	3.5 - 1.8	9.5 - 5.0	15.5 - 8.1	35	8°08.8	8°10.1	7°46.5	3.5 - 1.9	9.5 - 5.1	15.5 - 8.4
36	7°39.0	7°40.3	7°18.1	3.6 - 1.8	9.6 - 4.9	15.6 - 7.9	36	7°54.0	7°55.3	7°32.4	3.6 - 1.9	9.6 - 5.0	15.6 - 8.2	36	8°09.0	8°10.3	7°46.7	3.6 - 1.9	9.6 - 5.2	15.6 - 8.4
37	7°39.3	7°40.5	7°18.3	3.7 - 1.9	9.7 - 4.9	15.7 - 8.0	37	7°54.3	7°55.5	7°32.6	3.7 - 1.9	9.7 - 5.1	15.7 - 8.2	37	8°09.3	8°10.6	7°47.0	3.7 - 2.0	9.7 - 5.3	15.7 - 8.5
38	7°39.5	7°40.8	7°18.6	3.8 - 1.9	9.8 - 5.0	15.8 - 8.0	38	7°54.5	7°55.8	7°32.9	3.8 - 2.0	9.8 - 5.1	15.8 - 8.3	38	8°09.5	8°10.8	7°47.2	3.8 - 2.1	9.8 - 5.3	15.8 - 8.6
39	7°39.8	7°41.0	7°18.8	3.9 - 2.0	9.9 - 5.0	15.9 - 8.1	39	7°54.7	7°56.0	7°33.1	3.9 - 2.0	9.9 - 5.2	15.9 - 8.3	39	8°09.7	8°11.1	7°47.4	3.9 - 2.1	9.9 - 5.4	15.9 - 8.6
40	7°40.0	7°41.3	7°19.0	4.0 - 2.0	10.0 - 5.1	16.0 - 8.1	40	7°55.0	7°56.3	7°33.4	4.0 - 2.1	10.0 - 5.3	16.0 - 8.4	40	8°10.0	8°11.3	7°47.7	4.0 - 2.2	10.0 - 5.4	16.0 - 8.7
41	7°40.3	7°41.5	7°19.3	4.1 - 2.1	10.1 - 5.1	16.1 - 8.2	41	7°55.3	7°56.5	7°33.6	4.1 - 2.2	10.1 - 5.3	16.1 - 8.5	41	8°10.2	8°11.6	7°47.9	4.1 - 2.2	10.1 - 5.5	16.1 - 8.7
42	7°40.5	7°41.8	7°19.5	4.2 - 2.1	10.2 - 5.2	16.2 - 8.2	42	7°55.5	7°56.8	7°33.8	4.2 - 2.2	10.2 - 5.4	16.2 - 8.5	42	8°10.5	8°11.8	7°48.2	4.2 - 2.3	10.2 - 5.5	16.2 - 8.8
43	7°40.7	7°42.0	7°19.8	4.3 - 2.2	10.3 - 5.2	16.3 - 8.3	43	7°55.7	7°57.1	7°34.1	4.3 - 2.3	10.3 - 5.4	16.3 - 8.6	43	8°10.8	8°12.1	7°48.4	4.3 - 2.3	10.3 - 5.6	16.3 - 8.8
44	7°41.0	7°42.3	7°20.0	4.4 - 2.2	10.4 - 5.3	16.4 - 8.3	44	7°56.0	7°57.3	7°34.3	4.4 - 2.3	10.4 - 5.5	16.4 - 8.6	44	8°11.0	8°12.3	7°48.6	4.4 - 2.4	10.4 - 5.6	16.4 - 8.9
45	7°41.2	7°42.5	7°20.2	4.5 - 2.3	10.5 - 5.3	16.5 - 8.4	45	7°56.3	7°57.6	7°34.6	4.5 - 2.4	10.5 - 5.5	16.5 - 8.7	45	8°11.3	8°12.6	7°48.9	4.5 - 2.4	10.5 - 5.7	16.5 - 8.9
46	7°41.5	7°42.8	7°20.5	4.6 - 2.3	10.6 - 5.4	16.6 - 8.4	46	7°56.5	7°57.8	7°34.8	4.6 - 2.4	10.6 - 5.6	16.6 - 8.7	46	8°11.5	8°12.8	7°49.1	4.6 - 2.5	10.6 - 5.7	16.6 - 9.0
47	7°41.8	7°43.0	7°20.7	4.7 - 2.4	10.7 - 5.4	16.7 - 8.5	47	7°56.7	7°58.1	7°35.0	4.7 - 2.5	10.7 - 5.6	16.7 - 8.8	47	8°11.7	8°13.1	7°49.3	4.7 - 2.5	10.7 - 5.8	16.7 - 9.0
48	7°42.0	7°43.3	7°21.0	4.8 - 2.4	10.8 - 5.5	16.8 - 8.5	48	7°57.0	7°58.3	7°35.3	4.8 - 2.5	10.8 - 5.7	16.8 - 8.8	48	8°12.0	8°13.3	7°49.6	4.8 - 2.6	10.8 - 5.8	16.8 - 9.1
49	7°42.3	7°43.																		

## Increments and Corrections

m 33	Sun Plan.	Aries	Moon	v and d corr			m 34	Sun Plan.	Aries	Moon	v and d corr			m 35	Sun Plan.	Aries	Moon	v and d corr		
0	8°15.0	8°16.4	7°52.5	0.0 - 0.0	6.0 - 3.4	12.0 - 6.7	0	8°30.0	8°31.4	8°06.8	0.0 - 0.0	6.0 - 3.4	12.0 - 6.9	0	8°45.0	8°46.4	8°21.1	0.0 - 0.0	6.0 - 3.5	12.0 - 7.1
1	8°15.2	8°16.6	7°52.7	0.1 - 0.1	6.1 - 3.4	12.1 - 6.8	1	8°30.2	8°31.6	8°07.0	0.1 - 0.1	6.1 - 3.5	12.1 - 7.0	1	8°45.2	8°46.7	8°21.3	0.1 - 0.1	6.1 - 3.6	12.1 - 7.2
2	8°15.5	8°16.9	7°52.9	0.2 - 0.1	6.2 - 3.5	12.2 - 6.8	2	8°30.5	8°31.9	8°07.2	0.2 - 0.1	6.2 - 3.6	12.2 - 7.0	2	8°45.5	8°46.9	8°21.6	0.2 - 0.1	6.2 - 3.7	12.2 - 7.2
3	8°15.7	8°17.1	7°53.2	0.3 - 0.2	6.3 - 3.5	12.3 - 6.9	3	8°30.7	8°32.1	8°07.5	0.3 - 0.2	6.3 - 3.6	12.3 - 7.1	3	8°45.7	8°47.2	8°21.8	0.3 - 0.2	6.3 - 3.7	12.3 - 7.3
4	8°16.0	8°17.4	7°53.4	0.4 - 0.2	6.4 - 3.6	12.4 - 6.9	4	8°31.0	8°32.4	8°07.7	0.4 - 0.2	6.4 - 3.7	12.4 - 7.1	4	8°46.0	8°47.4	8°22.0	0.4 - 0.2	6.4 - 3.8	12.4 - 7.3
5	8°16.3	8°17.6	7°53.6	0.5 - 0.3	6.5 - 3.6	12.5 - 7.0	5	8°31.3	8°32.6	8°08.0	0.5 - 0.3	6.5 - 3.7	12.5 - 7.2	5	8°46.3	8°47.7	8°22.3	0.5 - 0.3	6.5 - 3.8	12.5 - 7.4
6	8°16.5	8°17.9	7°53.9	0.6 - 0.3	6.6 - 3.7	12.6 - 7.0	6	8°31.5	8°32.9	8°08.2	0.6 - 0.3	6.6 - 3.8	12.6 - 7.2	6	8°46.5	8°47.9	8°22.5	0.6 - 0.4	6.6 - 3.9	12.6 - 7.5
7	8°16.8	8°18.1	7°54.1	0.7 - 0.4	6.7 - 3.7	12.7 - 7.1	7	8°31.8	8°33.1	8°08.4	0.7 - 0.4	6.7 - 3.9	12.7 - 7.3	7	8°46.8	8°48.2	8°22.8	0.7 - 0.4	6.7 - 4.0	12.7 - 7.5
8	8°17.0	8°18.4	7°54.4	0.8 - 0.4	6.8 - 3.8	12.8 - 7.1	8	8°32.0	8°33.4	8°08.7	0.8 - 0.5	6.8 - 3.9	12.8 - 7.4	8	8°47.0	8°48.4	8°23.0	0.8 - 0.5	6.8 - 4.0	12.8 - 7.6
9	8°17.2	8°18.6	7°54.6	0.9 - 0.5	6.9 - 3.9	12.9 - 7.2	9	8°32.2	8°33.7	8°08.9	0.9 - 0.5	6.9 - 4.0	12.9 - 7.4	9	8°47.2	8°48.7	8°23.2	0.9 - 0.5	6.9 - 4.1	12.9 - 7.6
10	8°17.5	8°18.9	7°54.8	1.0 - 0.6	7.0 - 3.9	13.0 - 7.3	10	8°32.5	8°33.9	8°09.2	1.0 - 0.6	7.0 - 4.0	13.0 - 7.5	10	8°47.5	8°48.9	8°23.5	1.0 - 0.6	7.0 - 4.1	13.0 - 7.7
11	8°17.7	8°19.1	7°55.1	1.1 - 0.6	7.1 - 4.0	13.1 - 7.3	11	8°32.7	8°34.2	8°09.4	1.1 - 0.6	7.1 - 4.1	13.1 - 7.5	11	8°47.7	8°49.2	8°23.7	1.1 - 0.7	7.1 - 4.2	13.1 - 7.8
12	8°18.0	8°19.4	7°55.3	1.2 - 0.7	7.2 - 4.0	13.2 - 7.4	12	8°33.0	8°34.4	8°09.6	1.2 - 0.7	7.2 - 4.1	13.2 - 7.6	12	8°48.0	8°49.4	8°23.9	1.2 - 0.7	7.2 - 4.3	13.2 - 7.8
13	8°18.3	8°19.6	7°55.6	1.3 - 0.7	7.3 - 4.1	13.3 - 7.4	13	8°33.3	8°34.7	8°09.9	1.3 - 0.7	7.3 - 4.2	13.3 - 7.6	13	8°48.3	8°49.7	8°24.2	1.3 - 0.8	7.3 - 4.3	13.3 - 7.9
14	8°18.5	8°19.9	7°55.8	1.4 - 0.8	7.4 - 4.1	13.4 - 7.5	14	8°33.5	8°34.9	8°10.1	1.4 - 0.8	7.4 - 4.3	13.4 - 7.7	14	8°48.5	8°49.9	8°24.4	1.4 - 0.8	7.4 - 4.4	13.4 - 7.9
15	8°18.8	8°20.1	7°56.0	1.5 - 0.8	7.5 - 4.2	13.5 - 7.5	15	8°33.8	8°35.2	8°10.3	1.5 - 0.9	7.5 - 4.3	13.5 - 7.8	15	8°48.8	8°50.2	8°24.7	1.5 - 0.9	7.5 - 4.4	13.5 - 8.0
16	8°19.0	8°20.4	7°56.3	1.6 - 0.9	7.6 - 4.2	13.6 - 7.6	16	8°34.0	8°35.4	8°10.6	1.6 - 0.9	7.6 - 4.4	13.6 - 7.8	16	8°49.0	8°50.4	8°24.9	1.6 - 0.9	7.6 - 4.5	13.6 - 8.0
17	8°19.2	8°20.6	7°56.5	1.7 - 0.9	7.7 - 4.3	13.7 - 7.6	17	8°34.2	8°35.7	8°10.8	1.7 - 1.0	7.7 - 4.4	13.7 - 7.9	17	8°49.2	8°50.7	8°25.1	1.7 - 1.0	7.7 - 4.6	13.7 - 8.1
18	8°19.5	8°20.9	7°56.7	1.8 - 1.0	7.8 - 4.4	13.8 - 7.7	18	8°34.5	8°35.9	8°11.1	1.8 - 1.0	7.8 - 4.5	13.8 - 7.9	18	8°49.5	8°50.9	8°25.4	1.8 - 1.1	7.8 - 4.6	13.8 - 8.2
19	8°19.8	8°21.1	7°57.0	1.9 - 1.1	7.9 - 4.4	13.9 - 7.8	19	8°34.8	8°36.2	8°11.3	1.9 - 1.1	7.9 - 4.5	13.9 - 8.0	19	8°49.8	8°51.2	8°25.6	1.9 - 1.1	7.9 - 4.7	13.9 - 8.2
20	8°20.0	8°21.4	7°57.2	2.0 - 1.1	8.0 - 4.5	14.0 - 7.8	20	8°35.0	8°36.4	8°11.5	2.0 - 1.1	8.0 - 4.6	14.0 - 8.0	20	8°50.0	8°51.4	8°25.9	2.0 - 1.2	8.0 - 4.7	14.0 - 8.3
21	8°20.3	8°21.6	7°57.5	2.1 - 1.2	8.1 - 4.5	14.1 - 7.9	21	8°35.3	8°36.7	8°11.8	2.1 - 1.2	8.1 - 4.7	14.1 - 8.1	21	8°50.3	8°51.7	8°26.1	2.1 - 1.2	8.1 - 4.8	14.1 - 8.3
22	8°20.5	8°21.9	7°57.7	2.2 - 1.2	8.2 - 4.6	14.2 - 7.9	22	8°35.5	8°36.9	8°12.0	2.2 - 1.3	8.2 - 4.7	14.2 - 8.2	22	8°50.5	8°52.0	8°26.3	2.2 - 1.3	8.2 - 4.9	14.2 - 8.4
23	8°20.7	8°22.1	7°57.9	2.3 - 1.3	8.3 - 4.6	14.3 - 8.0	23	8°35.7	8°37.2	8°12.3	2.3 - 1.3	8.3 - 4.8	14.3 - 8.2	23	8°50.7	8°52.2	8°26.6	2.3 - 1.4	8.3 - 4.9	14.3 - 8.5
24	8°21.0	8°22.4	7°58.2	2.4 - 1.3	8.4 - 4.7	14.4 - 8.0	24	8°36.0	8°37.4	8°12.5	2.4 - 1.4	8.4 - 4.8	14.4 - 8.3	24	8°51.0	8°52.5	8°26.8	2.4 - 1.4	8.4 - 5.0	14.4 - 8.5
25	8°21.2	8°22.6	7°58.4	2.5 - 1.4	8.5 - 4.7	14.5 - 8.1	25	8°36.2	8°37.7	8°12.7	2.5 - 1.4	8.5 - 4.9	14.5 - 8.3	25	8°51.2	8°52.7	8°27.0	2.5 - 1.5	8.5 - 5.0	14.5 - 8.6
26	8°21.5	8°22.9	7°58.7	2.6 - 1.5	8.6 - 4.8	14.6 - 8.2	26	8°36.5	8°37.9	8°13.0	2.6 - 1.5	8.6 - 4.9	14.6 - 8.4	26	8°51.5	8°53.0	8°27.3	2.6 - 1.5	8.6 - 5.1	14.6 - 8.6
27	8°21.8	8°23.1	7°58.9	2.7 - 1.5	8.7 - 4.9	14.7 - 8.2	27	8°36.8	8°38.2	8°13.2	2.7 - 1.6	8.7 - 5.0	14.7 - 8.5	27	8°51.8	8°53.2	8°27.5	2.7 - 1.6	8.7 - 5.1	14.7 - 8.7
28	8°22.0	8°23.4	7°59.1	2.8 - 1.6	8.8 - 4.9	14.8 - 8.3	28	8°37.0	8°38.4	8°13.4	2.8 - 1.6	8.8 - 5.1	14.8 - 8.5	28	8°52.0	8°53.5	8°27.8	2.8 - 1.7	8.8 - 5.2	14.8 - 8.8
29	8°22.3	8°23.6	7°59.4	2.9 - 1.6	8.9 - 5.0	14.9 - 8.3	29	8°37.3	8°38.7	8°13.7	2.9 - 1.7	8.9 - 5.1	14.9 - 8.6	29	8°52.3	8°53.7	8°28.0	2.9 - 1.7	8.9 - 5.3	14.9 - 8.8
30	8°22.5	8°23.9	7°59.6	3.0 - 1.7	9.0 - 5.0	15.0 - 8.4	30	8°37.5	8°38.9	8°13.9	3.0 - 1.7	9.0 - 5.2	15.0 - 8.6	30	8°52.5	8°54.0	8°28.2	3.0 - 1.8	9.0 - 5.3	15.0 - 8.9
31	8°22.7	8°24.1	7°59.8	3.1 - 1.7	9.1 - 5.1	15.1 - 8.4	31	8°37.7	8°39.2	8°14.2	3.1 - 1.8	9.1 - 5.2	15.1 - 8.7	31	8°52.7	8°54.2	8°28.5	3.1 - 1.8	9.1 - 5.4	15.1 - 8.9
32	8°23.0	8°24.4	8°00.1	3.2 - 1.8	9.2 - 5.1	15.2 - 8.5	32	8°38.0	8°39.4	8°14.4	3.2 - 1.8	9.2 - 5.3	15.2 - 8.7	32	8°53.0	8°54.5	8°28.7	3.2 - 1.9	9.2 - 5.4	15.2 - 9.0
33	8°23.2	8°24.6	8°00.3	3.3 - 1.8	9.3 - 5.2	15.3 - 8.5	33	8°38.2	8°39.7	8°14.6	3.3 - 1.9	9.3 - 5.3	15.3 - 8.8	33	8°53.2	8°54.7	8°29.0	3.3 - 2.0	9.3 - 5.5	15.3 - 9.1
34	8°23.5	8°24.9	8°00.6	3.4 - 1.9	9.4 - 5.2	15.4 - 8.6	34	8°38.5	8°39.9	8°14.9	3.4 - 2.0	9.4 - 5.4	15.4 - 8.9	34	8°53.5	8°55.0	8°29.2	3.4 - 2.0	9.4 - 5.6	15.4 - 9.1
35	8°23.8	8°25.1	8°00.8	3.5 - 2.0	9.5 - 5.3	15.5 - 8.7	35	8°38.8	8°40.2	8°15.1	3.5 - 2.0	9.5 - 5.5	15.5 - 8.9	35	8°53.8	8°55.2	8°29.4	3.5 - 2.1	9.5 - 5.6	15.5 - 9.2
36	8°24.0	8°25.4	8°01.0	3.6 - 2.0	9.6 - 5.4	15.6 - 8.7	36	8°39.0	8°40.4	8°15.4	3.6 - 2.1	9.6 - 5.5	15.6 - 9.0	36	8°54.0	8°55.5	8°29.7	3.6 - 2.1	9.6 - 5.7	15.6 - 9.2
37	8°24.3	8°25.6	8°01.3	3.7 - 2.1	9.7 - 5.4	15.7 - 8.8	37	8°39.3	8°40.7	8°15.6	3.7 - 2.1	9.7 - 5.6	15.7 - 9.0	37	8°54.3	8°55.7	8°29.9	3.7 - 2.2	9.7 - 5.7	15.7 - 9.3
38	8°24.5	8°25.9	8°01.5	3.8 - 2.1	9.8 - 5.5	15.8 - 8.8	38	8°39.5	8°40.9	8°15.8	3.8 - 2.2	9.8 - 5.6	15.8 - 9.1	38	8°54.5	8°56.0	8°30.2	3.8 - 2.2	9.8 - 5.8	15.8 - 9.3
39	8°24.7	8°26.1	8°01.8	3.9 - 2.2	9.9 - 5.5	15.9 - 8.9	39	8°39.7	8°41.2	8°16.1	3.9 - 2.2	9.9 - 5.7	15.9 - 9.1	39	8°54.7	8°56.2	8°30.4	3.9 - 2.3	9.9 - 5.9	15.9 - 9.4
40	8°25.0	8°26.4	8°02.0	4.0 - 2.2	10.0 - 5.6	16.0 - 8.9	40	8°40.0	8°41.4	8°16.3	4.0 - 2.3	10.0 - 5.8	16.0 - 9.2	40	8°55.0	8°56.5	8°30.6	4.0 - 2.4	10.0 - 5.9	16.0 - 9.5
41	8°25.2	8°26.6	8°02.2	4.1 - 2.3	10.1 - 5.6	16.1 - 9.0	41	8°40.2	8°41.7	8°16.5	4.1 - 2.4	10.1 - 5.8	16.1 - 9.3	41	8°55.2	8°56.7	8°30.9	4.1 - 2.4	10.1 - 6.0	16.1 - 9.5
42	8°25.5	8°26.9	8°02.5	4.2 - 2.3	10.2 - 5.7	16.2 - 9.0	42	8°40.5	8°41.9	8°16.8	4.2 - 2.4	10.2 - 5.9	16.2 - 9.3	42	8°55.5	8°57.0	8°31.1	4.2 - 2.5	10.2 - 6.0	16.2 - 9.6
43	8°25.8	8°27.1	8°02.7	4.3 - 2.4	10.3 - 5.8	16.3 - 9.1	43	8°40.8	8°42.2	8°17.0	4.3 - 2.5	10.3 - 5.9	16.3 - 9.4	43	8°55.8	8°57.2	8°31.3	4.3 - 2.5	10.3 - 6.1	16.3 - 9.6
44	8°26.0	8°27.4	8°02.9	4.4 - 2.5	10.4 - 5.8	16.4 - 9.2	44	8°41.0	8°42.4	8°17.3	4.4 - 2.5	10.4 - 6.0	16.4 - 9.4	44	8°56.0	8°57.5	8°31.6	4.4 - 2.6	10.4 - 6.2	16.4 - 9.7
45	8°26.3	8°27.6	8°03.2	4.5 - 2.5	10.5 - 5.9	16.5 - 9.2	45	8°41.3	8°42.7	8°17.5	4.5 - 2.6	10.5 - 6.0	16.5 - 9.5	45	8°56.3	8°57.7	8°31.8	4.5 - 2.7	10.5 - 6.2	16.5 - 9.8
46	8°26.5	8°27.9	8°03.4	4.6 - 2.6	10.6 - 5.9	16.6 - 9.3	46	8°41.5	8°42.9	8°17.7	4.6 - 2.6	10.6 - 6.1	16.6 - 9.5	46	8°56.5	8°58.0	8°32.1	4.6 - 2.7	10.6 - 6.3	16.6 - 9.8
47	8°26.7	8°28.1	8°03.7	4.7 - 2.6	10.7 - 6.0	16.7 - 9.3	47	8°41.7	8°43.2	8°18.0	4.7 - 2.7	10.7 - 6.2	16.7 - 9.6	47	8°56.7	8°58.2	8°32.3	4.7 - 2.8	10.7 - 6.3	16.7 - 9.9
48	8°27.0	8°28.4	8°03.9	4.8 - 2.7	10.8 - 6.0	16.8 - 9.4	48	8°42.0	8°43.4	8°18.2	4.8 - 2.8	10.8 - 6.2	16.8 - 9.7	48	8°57.0	8°58.5	8°32.5	4.8 - 2.8	10.8 - 6.4	16.8 - 9.9
49	8°27.3	8°28.																		

## Increments and Corrections

m 36	Sun Plan.	Aries	Moon	v and d corr			m 37	Sun Plan.	Aries	Moon	v and d corr			m 38	Sun Plan.	Aries	Moon	v and d corr		
0	9°00.0	9°01.5	8°35.4	0.0 - 0.0	6.0 - 3.6	12.0 - 7.3	0	9°15.0	9°16.5	8°49.7	0.0 - 0.0	6.0 - 3.8	12.0 - 7.5	0	9°30.0	9°31.6	9°04.0	0.0 - 0.0	6.0 - 3.9	12.0 - 7.7
1	9°00.2	9°01.7	8°35.6	0.1 - 0.1	6.1 - 3.7	12.1 - 7.4	1	9°15.2	9°16.8	8°50.0	0.1 - 0.1	6.1 - 3.8	12.1 - 7.6	1	9°30.2	9°31.8	9°04.3	0.1 - 0.1	6.1 - 3.9	12.1 - 7.8
2	9°00.5	9°02.0	8°35.9	0.2 - 0.1	6.2 - 3.8	12.2 - 7.4	2	9°15.5	9°17.0	8°50.2	0.2 - 0.1	6.2 - 3.9	12.2 - 7.6	2	9°30.5	9°32.1	9°04.5	0.2 - 0.1	6.2 - 4.0	12.2 - 7.8
3	9°00.7	9°02.2	8°36.1	0.3 - 0.2	6.3 - 3.8	12.3 - 7.5	3	9°15.7	9°17.3	8°50.4	0.3 - 0.2	6.3 - 3.9	12.3 - 7.7	3	9°30.7	9°32.3	9°04.7	0.3 - 0.2	6.3 - 4.0	12.3 - 7.9
4	9°01.0	9°02.5	8°36.4	0.4 - 0.2	6.4 - 3.9	12.4 - 7.5	4	9°16.0	9°17.5	8°50.7	0.4 - 0.3	6.4 - 4.0	12.4 - 7.8	4	9°31.0	9°32.6	9°05.0	0.4 - 0.3	6.4 - 4.1	12.4 - 8.0
5	9°01.3	9°02.7	8°36.6	0.5 - 0.3	6.5 - 4.0	12.5 - 7.6	5	9°16.3	9°17.8	8°50.9	0.5 - 0.3	6.5 - 4.1	12.5 - 7.8	5	9°31.3	9°32.8	9°05.2	0.5 - 0.3	6.5 - 4.2	12.5 - 8.0
6	9°01.5	9°03.0	8°36.8	0.6 - 0.4	6.6 - 4.0	12.6 - 7.7	6	9°16.5	9°18.0	8°51.1	0.6 - 0.4	6.6 - 4.1	12.6 - 7.9	6	9°31.5	9°33.1	9°05.5	0.6 - 0.4	6.6 - 4.2	12.6 - 8.1
7	9°01.8	9°03.2	8°37.1	0.7 - 0.4	6.7 - 4.1	12.7 - 7.7	7	9°16.8	9°18.3	8°51.4	0.7 - 0.4	6.7 - 4.2	12.7 - 7.9	7	9°31.8	9°33.3	9°05.7	0.7 - 0.4	6.7 - 4.3	12.7 - 8.1
8	9°02.0	9°03.5	8°37.3	0.8 - 0.5	6.8 - 4.1	12.8 - 7.8	8	9°17.0	9°18.5	8°51.6	0.8 - 0.5	6.8 - 4.3	12.8 - 8.0	8	9°32.0	9°33.6	9°05.9	0.8 - 0.5	6.8 - 4.4	12.8 - 8.2
9	9°02.2	9°03.7	8°37.5	0.9 - 0.5	6.9 - 4.2	12.9 - 7.8	9	9°17.2	9°18.8	8°51.9	0.9 - 0.6	6.9 - 4.3	12.9 - 8.1	9	9°32.2	9°33.8	9°06.2	0.9 - 0.6	6.9 - 4.4	12.9 - 8.3
10	9°02.5	9°04.0	8°37.8	1.0 - 0.6	7.0 - 4.3	13.0 - 7.9	10	9°17.5	9°19.0	8°52.1	1.0 - 0.6	7.0 - 4.4	13.0 - 8.1	10	9°32.5	9°34.1	9°06.4	1.0 - 0.6	7.0 - 4.5	13.0 - 8.3
11	9°02.7	9°04.2	8°38.0	1.1 - 0.7	7.1 - 4.3	13.1 - 8.0	11	9°17.7	9°19.3	8°52.3	1.1 - 0.7	7.1 - 4.4	13.1 - 8.2	11	9°32.7	9°34.3	9°06.7	1.1 - 0.7	7.1 - 4.6	13.1 - 8.4
12	9°03.0	9°04.5	8°38.3	1.2 - 0.7	7.2 - 4.4	13.2 - 8.0	12	9°18.0	9°19.5	8°52.6	1.2 - 0.8	7.2 - 4.5	13.2 - 8.3	12	9°33.0	9°34.6	9°06.9	1.2 - 0.8	7.2 - 4.6	13.2 - 8.5
13	9°03.3	9°04.7	8°38.5	1.3 - 0.8	7.3 - 4.4	13.3 - 8.1	13	9°18.3	9°19.8	8°52.8	1.3 - 0.8	7.3 - 4.6	13.3 - 8.3	13	9°33.3	9°34.8	9°07.1	1.3 - 0.8	7.3 - 4.7	13.3 - 8.5
14	9°03.5	9°05.0	8°38.7	1.4 - 0.9	7.4 - 4.5	13.4 - 8.2	14	9°18.5	9°20.0	8°53.1	1.4 - 0.9	7.4 - 4.6	13.4 - 8.4	14	9°33.5	9°35.1	9°07.4	1.4 - 0.9	7.4 - 4.7	13.4 - 8.6
15	9°03.8	9°05.2	8°39.0	1.5 - 0.9	7.5 - 4.6	13.5 - 8.2	15	9°18.8	9°20.3	8°53.3	1.5 - 0.9	7.5 - 4.7	13.5 - 8.4	15	9°33.8	9°35.3	9°07.6	1.5 - 1.0	7.5 - 4.8	13.5 - 8.7
16	9°04.0	9°05.5	8°39.2	1.6 - 1.0	7.6 - 4.6	13.6 - 8.3	16	9°19.0	9°20.5	8°53.5	1.6 - 1.0	7.6 - 4.8	13.6 - 8.5	16	9°34.0	9°35.6	9°07.9	1.6 - 1.0	7.6 - 4.9	13.6 - 8.7
17	9°04.2	9°05.7	8°39.5	1.7 - 1.0	7.7 - 4.7	13.7 - 8.3	17	9°19.2	9°20.8	8°53.8	1.7 - 1.1	7.7 - 4.8	13.7 - 8.6	17	9°34.2	9°35.8	9°08.1	1.7 - 1.1	7.7 - 4.9	13.7 - 8.8
18	9°04.5	9°06.0	8°39.7	1.8 - 1.1	7.8 - 4.7	13.8 - 8.4	18	9°19.5	9°21.0	8°54.0	1.8 - 1.1	7.8 - 4.9	13.8 - 8.6	18	9°34.5	9°36.1	9°08.3	1.8 - 1.2	7.8 - 5.0	13.8 - 8.9
19	9°04.8	9°06.2	8°39.9	1.9 - 1.2	7.9 - 4.8	13.9 - 8.5	19	9°19.8	9°21.3	8°54.3	1.9 - 1.2	7.9 - 4.9	13.9 - 8.7	19	9°34.8	9°36.3	9°08.6	1.9 - 1.2	7.9 - 5.1	13.9 - 8.9
20	9°05.0	9°06.5	8°40.2	2.0 - 1.2	8.0 - 4.9	14.0 - 8.5	20	9°20.0	9°21.5	8°54.5	2.0 - 1.3	8.0 - 5.0	14.0 - 8.8	20	9°35.0	9°36.6	9°08.8	2.0 - 1.3	8.0 - 5.1	14.0 - 9.0
21	9°05.3	9°06.7	8°40.4	2.1 - 1.3	8.1 - 4.9	14.1 - 8.6	21	9°20.3	9°21.8	8°54.7	2.1 - 1.3	8.1 - 5.1	14.1 - 8.8	21	9°35.3	9°36.8	9°09.0	2.1 - 1.3	8.1 - 5.2	14.1 - 9.1
22	9°05.5	9°07.0	8°40.6	2.2 - 1.3	8.2 - 5.0	14.2 - 8.6	22	9°20.5	9°22.0	8°55.0	2.2 - 1.4	8.2 - 5.1	14.2 - 8.9	22	9°35.5	9°37.1	9°09.3	2.2 - 1.4	8.2 - 5.3	14.2 - 9.0
23	9°05.7	9°07.2	8°40.9	2.3 - 1.4	8.3 - 5.0	14.3 - 8.7	23	9°20.7	9°22.3	8°55.2	2.3 - 1.4	8.3 - 5.2	14.3 - 8.9	23	9°35.7	9°37.3	9°09.5	2.3 - 1.5	8.3 - 5.3	14.3 - 9.2
24	9°06.0	9°07.5	8°41.1	2.4 - 1.5	8.4 - 5.1	14.4 - 8.8	24	9°21.0	9°22.5	8°55.4	2.4 - 1.5	8.4 - 5.3	14.4 - 9.0	24	9°36.0	9°37.6	9°09.8	2.4 - 1.5	8.4 - 5.4	14.4 - 9.2
25	9°06.2	9°07.7	8°41.4	2.5 - 1.5	8.5 - 5.2	14.5 - 8.8	25	9°21.2	9°22.8	8°55.7	2.5 - 1.6	8.5 - 5.3	14.5 - 9.1	25	9°36.2	9°37.8	9°10.0	2.5 - 1.6	8.5 - 5.5	14.5 - 9.3
26	9°06.5	9°08.0	8°41.6	2.6 - 1.6	8.6 - 5.2	14.6 - 8.9	26	9°21.5	9°23.0	8°55.9	2.6 - 1.6	8.6 - 5.4	14.6 - 9.1	26	9°36.5	9°38.1	9°10.2	2.6 - 1.7	8.6 - 5.5	14.6 - 9.4
27	9°06.8	9°08.2	8°41.8	2.7 - 1.6	8.7 - 5.3	14.7 - 8.9	27	9°21.8	9°23.3	8°56.2	2.7 - 1.7	8.7 - 5.4	14.7 - 9.2	27	9°36.8	9°38.3	9°10.5	2.7 - 1.7	8.7 - 5.6	14.7 - 9.4
28	9°07.0	9°08.5	8°42.1	2.8 - 1.7	8.8 - 5.4	14.8 - 9.0	28	9°22.0	9°23.5	8°56.4	2.8 - 1.8	8.8 - 5.5	14.8 - 9.3	28	9°37.0	9°38.6	9°10.7	2.8 - 1.8	8.8 - 5.6	14.8 - 9.5
29	9°07.3	9°08.7	8°42.3	2.9 - 1.8	8.9 - 5.4	14.9 - 9.1	29	9°22.3	9°23.8	8°56.6	2.9 - 1.8	8.9 - 5.6	14.9 - 9.3	29	9°37.3	9°38.8	9°11.0	2.9 - 1.9	8.9 - 5.7	14.9 - 9.6
30	9°07.5	9°09.0	8°42.6	3.0 - 1.8	9.0 - 5.5	15.0 - 9.1	30	9°22.5	9°24.0	8°56.9	3.0 - 1.9	9.0 - 5.6	15.0 - 9.4	30	9°37.5	9°39.1	9°11.2	3.0 - 1.9	9.0 - 5.8	15.0 - 9.6
31	9°07.7	9°09.2	8°42.8	3.1 - 1.9	9.1 - 5.5	15.1 - 9.2	31	9°22.7	9°24.3	8°57.1	3.1 - 1.9	9.1 - 5.7	15.1 - 9.4	31	9°37.7	9°39.3	9°11.4	3.1 - 2.0	9.1 - 5.8	15.1 - 9.7
32	9°08.0	9°09.5	8°43.0	3.2 - 1.9	9.2 - 5.6	15.2 - 9.2	32	9°23.0	9°24.5	8°57.4	3.2 - 2.0	9.2 - 5.8	15.2 - 9.5	32	9°38.0	9°39.6	9°11.7	3.2 - 2.1	9.2 - 5.9	15.2 - 9.8
33	9°08.2	9°09.7	8°43.3	3.3 - 2.0	9.3 - 5.7	15.3 - 9.3	33	9°23.2	9°24.8	8°57.6	3.3 - 2.1	9.3 - 5.8	15.3 - 9.6	33	9°38.2	9°39.8	9°11.9	3.3 - 2.1	9.3 - 6.0	15.3 - 9.8
34	9°08.5	9°10.0	8°43.5	3.4 - 2.1	9.4 - 5.7	15.4 - 9.4	34	9°23.5	9°25.0	8°57.8	3.4 - 2.1	9.4 - 5.9	15.4 - 9.6	34	9°38.5	9°40.1	9°12.1	3.4 - 2.2	9.4 - 6.0	15.4 - 9.9
35	9°08.8	9°10.2	8°43.8	3.5 - 2.1	9.5 - 5.8	15.5 - 9.4	35	9°23.8	9°25.3	8°58.1	3.5 - 2.2	9.5 - 5.9	15.5 - 9.7	35	9°38.8	9°40.3	9°12.4	3.5 - 2.2	9.5 - 6.1	15.5 - 9.9
36	9°09.0	9°10.5	8°44.0	3.6 - 2.2	9.6 - 5.8	15.6 - 9.5	36	9°24.0	9°25.5	8°58.3	3.6 - 2.3	9.6 - 6.0	15.6 - 9.8	36	9°39.0	9°40.6	9°12.6	3.6 - 2.3	9.6 - 6.2	15.6 - 10.0
37	9°09.3	9°10.8	8°44.2	3.7 - 2.3	9.7 - 5.9	15.7 - 9.6	37	9°24.3	9°25.8	8°58.5	3.7 - 2.3	9.7 - 6.1	15.7 - 9.8	37	9°39.3	9°40.8	9°12.9	3.7 - 2.4	9.7 - 6.2	15.7 - 10.1
38	9°09.5	9°11.0	8°44.5	3.8 - 2.3	9.8 - 6.0	15.8 - 9.6	38	9°24.5	9°26.0	8°58.8	3.8 - 2.4	9.8 - 6.1	15.8 - 9.9	38	9°39.5	9°41.1	9°13.1	3.8 - 2.4	9.8 - 6.3	15.8 - 10.1
39	9°09.7	9°11.3	8°44.7	3.9 - 2.4	9.9 - 6.0	15.9 - 9.7	39	9°24.7	9°26.3	8°59.0	3.9 - 2.4	9.9 - 6.2	15.9 - 9.9	39	9°39.7	9°41.3	9°13.3	3.9 - 2.5	9.9 - 6.4	15.9 - 10.2
40	9°10.0	9°11.5	8°44.9	4.0 - 2.4	10.0 - 6.1	16.0 - 9.7	40	9°25.0	9°26.5	8°59.3	4.0 - 2.5	10.0 - 6.3	16.0 - 10.0	40	9°40.0	9°41.6	9°13.6	4.0 - 2.6	10.0 - 6.4	16.0 - 10.3
41	9°10.2	9°11.8	8°45.2	4.1 - 2.5	10.1 - 6.1	16.1 - 9.8	41	9°25.2	9°26.8	8°59.5	4.1 - 2.6	10.1 - 6.3	16.1 - 10.1	41	9°40.2	9°41.8	9°13.8	4.1 - 2.6	10.1 - 6.5	16.1 - 10.3
42	9°10.5	9°12.0	8°45.4	4.2 - 2.6	10.2 - 6.2	16.2 - 9.9	42	9°25.5	9°27.0	8°59.7	4.2 - 2.6	10.2 - 6.4	16.2 - 10.1	42	9°40.5	9°42.1	9°14.1	4.2 - 2.7	10.2 - 6.5	16.2 - 10.4
43	9°10.8	9°12.3	8°45.7	4.3 - 2.6	10.3 - 6.3	16.3 - 9.9	43	9°25.8	9°27.3	9°00.0	4.3 - 2.7	10.3 - 6.4	16.3 - 10.2	43	9°40.8	9°42.3	9°14.3	4.3 - 2.8	10.3 - 6.6	16.3 - 10.5
44	9°11.0	9°12.5	8°45.9	4.4 - 2.7	10.4 - 6.3	16.4 - 10.0	44	9°26.0	9°27.5	9°00.2	4.4 - 2.8	10.4 - 6.5	16.4 - 10.3	44	9°41.0	9°42.6	9°14.5	4.4 - 2.8	10.4 - 6.7	16.4 - 10.5
45	9°11.3	9°12.8	8°46.1	4.5 - 2.7	10.5 - 6.4	16.5 - 10.0	45	9°26.3	9°27.8	9°00.5	4.5 - 2.8	10.5 - 6.6	16.5 - 10.3	45	9°41.3	9°42.8	9°14.8	4.5 - 2.9	10.5 - 6.7	16.5 - 10.6
46	9°11.5	9°13.0	8°46.4	4.6 - 2.8	10.6 - 6.4	16.6 - 10.1	46	9°26.5	9°28.0	9°00.7	4.6 - 2.9	10.6 - 6.6	16.6 - 10.4	46	9°41.5	9°43.1	9°15.0	4.6 - 3.0	10.6 - 6.8	16.6 - 10.7
47	9°11.7	9°13.3	8°46.6	4.7 - 2.9	10.7 - 6.5	16.7 - 10.2	47	9°26.7	9°28.3	9°00.9	4.7 - 2.9	10.7 - 6.7	16.7 - 10.4	47	9°41.7	9°43.3	9°15.2	4.7 - 3.0	10.7 - 6.9	16.7 - 10.7
48	9°12.0	9°13.5	8°46.9	4.8 - 2.9	10.8 - 6.6	16.8 - 10.2	48	9°27.0	9°28.5	9°01.2	4.8 - 3.0	10.8 - 6.8	16.8 - 10.5	48	9°42.0	9°43.6	9°15.5	4.8 - 3.1	10.8 - 6.9	16.8 - 10.8



## Increments and Corrections

m 39	Sun Plan.	Aries	Moon	v and d corr			m 40	Sun Plan.	Aries	Moon	v and d corr			m 41	Sun Plan.	Aries	Moon	v and d corr		
0	9°45.0	9°46.6	9°18.4	0.0 - 0.0	6.0 - 4.0	12.0 - 7.9	0	10°00.0	10°01.6	9°32.7	0.0 - 0.0	6.0 - 4.1	12.0 - 8.1	0	10°15.0	10°16.7	9°47.0	0.0 - 0.0	6.0 - 4.2	12.0 - 8.3
1	9°45.2	9°46.8	9°18.6	0.1 - 0.1	6.1 - 4.0	12.1 - 8.0	1	10°00.2	10°01.9	9°32.9	0.1 - 0.1	6.1 - 4.1	12.1 - 8.2	1	10°15.2	10°16.9	9°47.2	0.1 - 0.1	6.1 - 4.2	12.1 - 8.4
2	9°45.5	9°47.1	9°18.8	0.2 - 0.1	6.2 - 4.1	12.2 - 8.0	2	10°00.5	10°02.1	9°33.1	0.2 - 0.1	6.2 - 4.2	12.2 - 8.2	2	10°15.5	10°17.2	9°47.5	0.2 - 0.1	6.2 - 4.3	12.2 - 8.4
3	9°45.7	9°47.4	9°19.1	0.3 - 0.2	6.3 - 4.1	12.3 - 8.1	3	10°00.7	10°02.4	9°33.4	0.3 - 0.2	6.3 - 4.3	12.3 - 8.3	3	10°15.7	10°17.4	9°47.7	0.3 - 0.2	6.3 - 4.4	12.3 - 8.5
4	9°46.0	9°47.6	9°19.3	0.4 - 0.3	6.4 - 4.2	12.4 - 8.2	4	10°01.0	10°02.6	9°33.6	0.4 - 0.3	6.4 - 4.3	12.4 - 8.4	4	10°16.0	10°17.7	9°47.9	0.4 - 0.3	6.4 - 4.4	12.4 - 8.6
5	9°46.3	9°47.9	9°19.5	0.5 - 0.3	6.5 - 4.3	12.5 - 8.2	5	10°01.3	10°02.9	9°33.9	0.5 - 0.3	6.5 - 4.4	12.5 - 8.4	5	10°16.3	10°17.9	9°48.2	0.5 - 0.3	6.5 - 4.5	12.5 - 8.6
6	9°46.5	9°48.1	9°19.8	0.6 - 0.4	6.6 - 4.3	12.6 - 8.3	6	10°01.5	10°03.1	9°34.1	0.6 - 0.4	6.6 - 4.5	12.6 - 8.5	6	10°16.5	10°18.2	9°48.4	0.6 - 0.4	6.6 - 4.6	12.6 - 8.7
7	9°46.8	9°48.4	9°20.0	0.7 - 0.5	6.7 - 4.4	12.7 - 8.4	7	10°01.8	10°03.4	9°34.3	0.7 - 0.5	6.7 - 4.5	12.7 - 8.6	7	10°16.8	10°18.4	9°48.7	0.7 - 0.5	6.7 - 4.6	12.7 - 8.8
8	9°47.0	9°48.6	9°20.3	0.8 - 0.5	6.8 - 4.5	12.8 - 8.4	8	10°02.0	10°03.6	9°34.6	0.8 - 0.5	6.8 - 4.6	12.8 - 8.6	8	10°17.0	10°18.7	9°48.9	0.8 - 0.6	6.8 - 4.7	12.8 - 8.9
9	9°47.2	9°48.9	9°20.5	0.9 - 0.6	6.9 - 4.5	12.9 - 8.5	9	10°02.2	10°03.9	9°34.8	0.9 - 0.6	6.9 - 4.7	12.9 - 8.7	9	10°17.2	10°18.9	9°49.1	0.9 - 0.6	6.9 - 4.8	12.9 - 8.9
10	9°47.5	9°49.1	9°20.7	1.0 - 0.7	7.0 - 4.6	13.0 - 8.6	10	10°02.5	10°04.1	9°35.1	1.0 - 0.7	7.0 - 4.7	13.0 - 8.8	10	10°17.5	10°19.2	9°49.4	1.0 - 0.7	7.0 - 4.8	13.0 - 9.0
11	9°47.7	9°49.4	9°21.0	1.1 - 0.7	7.1 - 4.7	13.1 - 8.6	11	10°02.7	10°04.4	9°35.3	1.1 - 0.7	7.1 - 4.8	13.1 - 8.8	11	10°17.7	10°19.4	9°49.6	1.1 - 0.8	7.1 - 4.9	13.1 - 9.1
12	9°48.0	9°49.6	9°21.2	1.2 - 0.8	7.2 - 4.7	13.2 - 8.7	12	10°03.0	10°04.6	9°35.5	1.2 - 0.8	7.2 - 4.9	13.2 - 8.9	12	10°18.0	10°19.7	9°49.8	1.2 - 0.8	7.2 - 5.0	13.2 - 9.1
13	9°48.3	9°49.9	9°21.5	1.3 - 0.9	7.3 - 4.8	13.3 - 8.8	13	10°03.3	10°04.9	9°35.8	1.3 - 0.9	7.3 - 4.9	13.3 - 9.0	13	10°18.3	10°19.9	9°50.1	1.3 - 0.9	7.3 - 5.0	13.3 - 9.2
14	9°48.5	9°50.1	9°21.7	1.4 - 0.9	7.4 - 4.9	13.4 - 8.8	14	10°03.5	10°05.1	9°36.0	1.4 - 0.9	7.4 - 5.0	13.4 - 9.0	14	10°18.5	10°20.2	9°50.3	1.4 - 1.0	7.4 - 5.1	13.4 - 9.3
15	9°48.8	9°50.4	9°21.9	1.5 - 1.0	7.5 - 4.9	13.5 - 8.9	15	10°03.8	10°05.4	9°36.2	1.5 - 1.0	7.5 - 5.1	13.5 - 9.1	15	10°18.8	10°20.4	9°50.6	1.5 - 1.0	7.5 - 5.2	13.5 - 9.3
16	9°49.0	9°50.6	9°22.2	1.6 - 1.1	7.6 - 5.0	13.6 - 9.0	16	10°04.0	10°05.7	9°36.5	1.6 - 1.1	7.6 - 5.1	13.6 - 9.2	16	10°19.0	10°20.7	9°50.8	1.6 - 1.1	7.6 - 5.3	13.6 - 9.4
17	9°49.2	9°50.9	9°22.4	1.7 - 1.1	7.7 - 5.1	13.7 - 9.0	17	10°04.2	10°05.9	9°36.7	1.7 - 1.1	7.7 - 5.2	13.7 - 9.2	17	10°19.2	10°20.9	9°51.0	1.7 - 1.2	7.7 - 5.3	13.7 - 9.5
18	9°49.5	9°51.1	9°22.6	1.8 - 1.2	7.8 - 5.1	13.8 - 9.1	18	10°04.5	10°06.2	9°37.0	1.8 - 1.2	7.8 - 5.3	13.8 - 9.3	18	10°19.5	10°21.2	9°51.3	1.8 - 1.2	7.8 - 5.4	13.8 - 9.5
19	9°49.8	9°51.4	9°22.9	1.9 - 1.3	7.9 - 5.2	13.9 - 9.2	19	10°04.8	10°06.4	9°37.2	1.9 - 1.3	7.9 - 5.3	13.9 - 9.4	19	10°19.8	10°21.4	9°51.5	1.9 - 1.3	7.9 - 5.5	13.9 - 9.6
20	9°50.0	9°51.6	9°23.1	2.0 - 1.3	8.0 - 5.3	14.0 - 9.2	20	10°05.0	10°06.7	9°37.4	2.0 - 1.4	8.0 - 5.4	14.0 - 9.5	20	10°20.0	10°21.7	9°51.8	2.0 - 1.4	8.0 - 5.5	14.0 - 9.7
21	9°50.3	9°51.9	9°23.4	2.1 - 1.4	8.1 - 5.3	14.1 - 9.3	21	10°05.3	10°06.9	9°37.7	2.1 - 1.4	8.1 - 5.5	14.1 - 9.5	21	10°20.3	10°21.9	9°52.0	2.1 - 1.5	8.1 - 5.6	14.1 - 9.8
22	9°50.5	9°52.1	9°23.6	2.2 - 1.4	8.2 - 5.4	14.2 - 9.3	22	10°05.5	10°07.2	9°37.9	2.2 - 1.5	8.2 - 5.5	14.2 - 9.6	22	10°20.5	10°22.2	9°52.2	2.2 - 1.5	8.2 - 5.7	14.2 - 9.8
23	9°50.7	9°52.4	9°23.8	2.3 - 1.5	8.3 - 5.5	14.3 - 9.4	23	10°05.7	10°07.4	9°38.2	2.3 - 1.6	8.3 - 5.6	14.3 - 9.7	23	10°20.7	10°22.4	9°52.5	2.3 - 1.6	8.3 - 5.7	14.3 - 9.9
24	9°51.0	9°52.6	9°24.1	2.4 - 1.6	8.4 - 5.5	14.4 - 9.5	24	10°06.0	10°07.7	9°38.4	2.4 - 1.6	8.4 - 5.7	14.4 - 9.7	24	10°21.0	10°22.7	9°52.7	2.4 - 1.7	8.4 - 5.8	14.4 - 10.0
25	9°51.2	9°52.9	9°24.3	2.5 - 1.6	8.5 - 5.6	14.5 - 9.5	25	10°06.2	10°07.9	9°38.6	2.5 - 1.7	8.5 - 5.7	14.5 - 9.8	25	10°21.2	10°22.9	9°52.9	2.5 - 1.7	8.5 - 5.9	14.5 - 10.0
26	9°51.5	9°53.1	9°24.6	2.6 - 1.7	8.6 - 5.7	14.6 - 9.6	26	10°06.5	10°08.2	9°38.9	2.6 - 1.8	8.6 - 5.8	14.6 - 9.9	26	10°21.5	10°23.2	9°53.2	2.6 - 1.8	8.6 - 5.9	14.6 - 10.1
27	9°51.8	9°53.4	9°24.8	2.7 - 1.8	8.7 - 5.7	14.7 - 9.7	27	10°06.8	10°08.4	9°39.1	2.7 - 1.8	8.7 - 5.9	14.7 - 9.9	27	10°21.8	10°23.4	9°53.4	2.7 - 1.9	8.7 - 6.0	14.7 - 10.2
28	9°52.0	9°53.6	9°25.0	2.8 - 1.8	8.8 - 5.8	14.8 - 9.7	28	10°07.0	10°08.7	9°39.3	2.8 - 1.9	8.8 - 5.9	14.8 - 10.0	28	10°22.0	10°23.7	9°53.7	2.8 - 1.9	8.8 - 6.1	14.8 - 10.2
29	9°52.3	9°53.9	9°25.3	2.9 - 1.9	8.9 - 5.9	14.9 - 9.8	29	10°07.3	10°08.9	9°39.6	2.9 - 2.0	8.9 - 6.0	14.9 - 10.1	29	10°22.3	10°24.0	9°53.9	2.9 - 2.0	8.9 - 6.2	14.9 - 10.3
30	9°52.5	9°54.1	9°25.5	3.0 - 2.0	9.0 - 5.9	15.0 - 9.9	30	10°07.5	10°09.2	9°39.8	3.0 - 2.0	9.0 - 6.1	15.0 - 10.1	30	10°22.5	10°24.2	9°54.1	3.0 - 2.1	9.0 - 6.2	15.0 - 10.4
31	9°52.7	9°54.4	9°25.7	3.1 - 2.0	9.1 - 6.0	15.1 - 9.9	31	10°07.7	10°09.4	9°40.1	3.1 - 2.1	9.1 - 6.1	15.1 - 10.2	31	10°22.7	10°24.5	9°54.4	3.1 - 2.1	9.1 - 6.3	15.1 - 10.4
32	9°53.0	9°54.6	9°26.0	3.2 - 2.1	9.2 - 6.1	15.2 - 10.0	32	10°08.0	10°09.7	9°40.3	3.2 - 2.2	9.2 - 6.2	15.2 - 10.3	32	10°23.0	10°24.7	9°54.6	3.2 - 2.2	9.2 - 6.4	15.2 - 10.5
33	9°53.2	9°54.9	9°26.2	3.3 - 2.2	9.3 - 6.1	15.3 - 10.1	33	10°08.2	10°09.9	9°40.5	3.3 - 2.2	9.3 - 6.3	15.3 - 10.3	33	10°23.2	10°25.0	9°54.9	3.3 - 2.3	9.3 - 6.4	15.3 - 10.6
34	9°53.5	9°55.1	9°26.5	3.4 - 2.2	9.4 - 6.2	15.4 - 10.1	34	10°08.5	10°10.2	9°40.8	3.4 - 2.3	9.4 - 6.3	15.4 - 10.4	34	10°23.5	10°25.2	9°55.1	3.4 - 2.4	9.4 - 6.5	15.4 - 10.7
35	9°53.8	9°55.4	9°26.7	3.5 - 2.3	9.5 - 6.3	15.5 - 10.2	35	10°08.8	10°10.4	9°41.0	3.5 - 2.4	9.5 - 6.4	15.5 - 10.5	35	10°23.8	10°25.5	9°55.3	3.5 - 2.4	9.5 - 6.6	15.5 - 10.7
36	9°54.0	9°55.6	9°26.9	3.6 - 2.4	9.6 - 6.3	15.6 - 10.3	36	10°09.0	10°10.7	9°41.3	3.6 - 2.4	9.6 - 6.5	15.6 - 10.5	36	10°24.0	10°25.7	9°55.6	3.6 - 2.5	9.6 - 6.6	15.6 - 10.8
37	9°54.3	9°55.9	9°27.2	3.7 - 2.4	9.7 - 6.4	15.7 - 10.3	37	10°09.3	10°10.9	9°41.5	3.7 - 2.5	9.7 - 6.5	15.7 - 10.6	37	10°24.3	10°26.0	9°55.8	3.7 - 2.6	9.7 - 6.7	15.7 - 10.9
38	9°54.5	9°56.1	9°27.4	3.8 - 2.5	9.8 - 6.5	15.8 - 10.4	38	10°09.5	10°11.2	9°41.7	3.8 - 2.6	9.8 - 6.6	15.8 - 10.7	38	10°24.5	10°26.2	9°56.1	3.8 - 2.6	9.8 - 6.8	15.8 - 10.9
39	9°54.7	9°56.4	9°27.7	3.9 - 2.6	9.9 - 6.5	15.9 - 10.5	39	10°09.7	10°11.4	9°42.0	3.9 - 2.6	9.9 - 6.7	15.9 - 10.7	39	10°24.7	10°26.5	9°56.3	3.9 - 2.7	9.9 - 6.8	15.9 - 11.0
40	9°55.0	9°56.6	9°27.9	4.0 - 2.6	10.0 - 6.6	16.0 - 10.5	40	10°10.0	10°11.7	9°42.2	4.0 - 2.7	10.0 - 6.8	16.0 - 10.8	40	10°25.0	10°26.7	9°56.5	4.0 - 2.8	10.0 - 6.9	16.0 - 11.1
41	9°55.2	9°56.9	9°28.1	4.1 - 2.7	10.1 - 6.6	16.1 - 10.6	41	10°10.2	10°11.9	9°42.4	4.1 - 2.8	10.1 - 6.8	16.1 - 10.9	41	10°25.2	10°27.0	9°56.8	4.1 - 2.8	10.1 - 7.0	16.1 - 11.1
42	9°55.5	9°57.1	9°28.4	4.2 - 2.8	10.2 - 6.7	16.2 - 10.7	42	10°10.5	10°12.2	9°42.7	4.2 - 2.8	10.2 - 6.9	16.2 - 10.9	42	10°25.5	10°27.2	9°57.0	4.2 - 2.9	10.2 - 7.1	16.2 - 11.2
43	9°55.8	9°57.4	9°28.6	4.3 - 2.8	10.3 - 6.8	16.3 - 10.7	43	10°10.8	10°12.4	9°42.9	4.3 - 2.9	10.3 - 7.0	16.3 - 11.0	43	10°25.8	10°27.5	9°57.2	4.3 - 3.0	10.3 - 7.1	16.3 - 11.3
44	9°56.0	9°57.6	9°28.8	4.4 - 2.9	10.4 - 6.8	16.4 - 10.8	44	10°11.0	10°12.7	9°43.2	4.4 - 3.0	10.4 - 7.0	16.4 - 11.1	44	10°26.0	10°27.7	9°57.5	4.4 - 3.0	10.4 - 7.2	16.4 - 11.3
45	9°56.3	9°57.9	9°29.1	4.5 - 3.0	10.5 - 6.9	16.5 - 10.9	45	10°11.3	10°12.9	9°43.4	4.5 - 3.0	10.5 - 7.1	16.5 - 11.1	45	10°26.3	10°28.0	9°57.7	4.5 - 3.1	10.5 - 7.3	16.5 - 11.4
46	9°56.5	9°58.1	9°29.3	4.6 - 3.0	10.6 - 7.0	16.6 - 10.9	46	10°11.5	10°13.2	9°43.6	4.6 - 3.1	10.6 - 7.2	16.6 - 11.2	46	10°26.5	10°28.2	9°58.0	4.6 - 3.2	10.6 - 7.3	16.6 - 11.5
47	9°56.7	9°58.4	9°29.6	4.7 - 3.1	10.7 - 7.0	16.7 - 11.0	47	10°11.7	10°13.4	9°43.9	4.7 - 3.2	10.7 - 7.2	16.7 - 11.3	47	10°26.7	10°28.5	9°58.2	4.7 - 3.3	10.7 - 7.4	16.7 - 11.6
48	9°57.0	9																		

## Increments and Corrections

m	Sun	Aries	Moon	v and d corr			m	Sun	Aries	Moon	v and d corr			m	Sun	Aries	Moon	v and d corr		
42	Plan.						43	Plan.					44	Plan.						
0	10°30.0	10°31.7	10°01.3	0.0 - 0.0	6.0 - 4.3	12.0 - 8.5	0	10°45.0	10°46.8	10°15.6	0.0 - 0.0	6.0 - 4.3	12.0 - 8.7	0	11°00.0	11°01.8	10°29.9	0.0 - 0.0	6.0 - 4.5	12.0 - 8.9
1	10°30.2	10°32.0	10°01.5	0.1 - 0.1	6.1 - 4.3	12.1 - 8.6	1	10°45.2	10°47.0	10°15.9	0.1 - 0.1	6.1 - 4.4	12.1 - 8.8	1	11°00.2	11°02.1	10°30.2	0.1 - 0.1	6.1 - 4.5	12.1 - 9.0
2	10°30.5	10°32.2	10°01.8	0.2 - 0.1	6.2 - 4.4	12.2 - 8.6	2	10°45.5	10°47.3	10°16.1	0.2 - 0.1	6.2 - 4.5	12.2 - 8.8	2	11°00.5	11°02.3	10°30.4	0.2 - 0.1	6.2 - 4.6	12.2 - 9.0
3	10°30.7	10°32.5	10°02.0	0.3 - 0.2	6.3 - 4.5	12.3 - 8.7	3	10°45.7	10°47.5	10°16.3	0.3 - 0.2	6.3 - 4.6	12.3 - 8.9	3	11°00.7	11°02.6	10°30.6	0.3 - 0.2	6.3 - 4.7	12.3 - 9.1
4	10°31.0	10°32.7	10°02.3	0.4 - 0.3	6.4 - 4.5	12.4 - 8.8	4	10°46.0	10°47.8	10°16.6	0.4 - 0.3	6.4 - 4.6	12.4 - 9.0	4	11°01.0	11°02.8	10°30.9	0.4 - 0.3	6.4 - 4.7	12.4 - 9.2
5	10°31.3	10°33.0	10°02.5	0.5 - 0.4	6.5 - 4.6	12.5 - 8.9	5	10°46.3	10°48.0	10°16.8	0.5 - 0.4	6.5 - 4.7	12.5 - 9.1	5	11°01.3	11°03.1	10°31.1	0.5 - 0.4	6.5 - 4.8	12.5 - 9.3
6	10°31.5	10°33.2	10°02.7	0.6 - 0.4	6.6 - 4.7	12.6 - 8.9	6	10°46.5	10°48.3	10°17.0	0.6 - 0.4	6.6 - 4.8	12.6 - 9.1	6	11°01.5	11°03.3	10°31.4	0.6 - 0.4	6.6 - 4.9	12.6 - 9.3
7	10°31.8	10°33.5	10°03.0	0.7 - 0.5	6.7 - 4.7	12.7 - 9.0	7	10°46.8	10°48.5	10°17.3	0.7 - 0.5	6.7 - 4.9	12.7 - 9.2	7	11°01.8	11°03.6	10°31.6	0.7 - 0.5	6.7 - 5.0	12.7 - 9.4
8	10°32.0	10°33.7	10°03.2	0.8 - 0.6	6.8 - 4.8	12.8 - 9.1	8	10°47.0	10°48.8	10°17.5	0.8 - 0.6	6.8 - 4.9	12.8 - 9.3	8	11°02.0	11°03.8	10°31.8	0.8 - 0.6	6.8 - 5.0	12.8 - 9.5
9	10°32.2	10°34.0	10°03.4	0.9 - 0.6	6.9 - 4.9	12.9 - 9.1	9	10°47.2	10°49.0	10°17.8	0.9 - 0.7	6.9 - 5.0	12.9 - 9.4	9	11°02.2	11°04.1	10°32.1	0.9 - 0.7	6.9 - 5.1	12.9 - 9.6
10	10°32.5	10°34.2	10°03.7	1.0 - 0.7	7.0 - 5.0	13.0 - 9.2	10	10°47.5	10°49.3	10°18.0	1.0 - 0.7	7.0 - 5.1	13.0 - 9.4	10	11°02.5	11°04.3	10°32.3	1.0 - 0.7	7.0 - 5.2	13.0 - 9.6
11	10°32.7	10°34.5	10°03.9	1.1 - 0.8	7.1 - 5.0	13.1 - 9.3	11	10°47.7	10°49.5	10°18.2	1.1 - 0.8	7.1 - 5.1	13.1 - 9.5	11	11°02.7	11°04.6	10°32.6	1.1 - 0.8	7.1 - 5.3	13.1 - 9.7
12	10°33.0	10°34.7	10°04.2	1.2 - 0.9	7.2 - 5.1	13.2 - 9.3	12	10°48.0	10°49.8	10°18.5	1.2 - 0.9	7.2 - 5.2	13.2 - 9.6	12	11°03.0	11°04.8	10°32.8	1.2 - 0.9	7.2 - 5.3	13.2 - 9.8
13	10°33.3	10°35.0	10°04.4	1.3 - 0.9	7.3 - 5.2	13.3 - 9.4	13	10°48.3	10°50.0	10°18.7	1.3 - 0.9	7.3 - 5.3	13.3 - 9.6	13	11°03.3	11°05.1	10°33.0	1.3 - 1.0	7.3 - 5.4	13.3 - 9.9
14	10°33.5	10°35.2	10°04.6	1.4 - 1.0	7.4 - 5.2	13.4 - 9.5	14	10°48.5	10°50.3	10°19.0	1.4 - 1.0	7.4 - 5.4	13.4 - 9.7	14	11°03.5	11°05.3	10°33.3	1.4 - 1.0	7.4 - 5.5	13.4 - 9.9
15	10°33.8	10°35.5	10°04.9	1.5 - 1.1	7.5 - 5.3	13.5 - 9.6	15	10°48.8	10°50.5	10°19.2	1.5 - 1.1	7.5 - 5.4	13.5 - 9.8	15	11°03.8	11°05.6	10°33.5	1.5 - 1.1	7.5 - 5.6	13.5 - 10.0
16	10°34.0	10°35.7	10°05.1	1.6 - 1.1	7.6 - 5.4	13.6 - 9.6	16	10°49.0	10°50.8	10°19.4	1.6 - 1.2	7.6 - 5.5	13.6 - 9.9	16	11°04.0	11°05.8	10°33.8	1.6 - 1.2	7.6 - 5.6	13.6 - 10.1
17	10°34.2	10°36.0	10°05.4	1.7 - 1.2	7.7 - 5.5	13.7 - 9.7	17	10°49.2	10°51.0	10°19.7	1.7 - 1.2	7.7 - 5.6	13.7 - 9.9	17	11°04.2	11°06.1	10°34.0	1.7 - 1.3	7.7 - 5.7	13.7 - 10.2
18	10°34.5	10°36.2	10°05.6	1.8 - 1.3	7.8 - 5.5	13.8 - 9.8	18	10°49.5	10°51.3	10°19.9	1.8 - 1.3	7.8 - 5.7	13.8 - 10.0	18	11°04.5	11°06.3	10°34.2	1.8 - 1.3	7.8 - 5.8	13.8 - 10.2
19	10°34.8	10°36.5	10°05.8	1.9 - 1.3	7.9 - 5.6	13.9 - 9.8	19	10°49.8	10°51.5	10°20.2	1.9 - 1.4	7.9 - 5.7	13.9 - 10.1	19	11°04.8	11°06.6	10°34.5	1.9 - 1.4	7.9 - 5.9	13.9 - 10.3
20	10°35.0	10°36.7	10°06.1	2.0 - 1.4	8.0 - 5.7	14.0 - 9.9	20	10°50.0	10°51.8	10°20.4	2.0 - 1.4	8.0 - 5.8	14.0 - 10.2	20	11°05.0	11°06.8	10°34.7	2.0 - 1.5	8.0 - 5.9	14.0 - 10.4
21	10°35.3	10°37.0	10°06.3	2.1 - 1.5	8.1 - 5.7	14.1 - 10.0	21	10°50.3	10°52.0	10°20.6	2.1 - 1.5	8.1 - 5.9	14.1 - 10.2	21	11°05.3	11°07.1	10°34.9	2.1 - 1.6	8.1 - 6.0	14.1 - 10.5
22	10°35.5	10°37.2	10°06.5	2.2 - 1.6	8.2 - 5.8	14.2 - 10.1	22	10°50.5	10°52.3	10°20.9	2.2 - 1.6	8.2 - 5.9	14.2 - 10.3	22	11°05.5	11°07.3	10°35.2	2.2 - 1.6	8.2 - 6.1	14.2 - 10.5
23	10°35.7	10°37.5	10°06.8	2.3 - 1.6	8.3 - 5.9	14.3 - 10.1	23	10°50.7	10°52.5	10°21.1	2.3 - 1.7	8.3 - 6.0	14.3 - 10.4	23	11°05.7	11°07.6	10°35.4	2.3 - 1.7	8.3 - 6.2	14.3 - 10.6
24	10°36.0	10°37.7	10°07.0	2.4 - 1.7	8.4 - 6.0	14.4 - 10.2	24	10°51.0	10°52.8	10°21.3	2.4 - 1.7	8.4 - 6.1	14.4 - 10.4	24	11°06.0	11°07.8	10°35.7	2.4 - 1.8	8.4 - 6.2	14.4 - 10.7
25	10°36.2	10°38.0	10°07.3	2.5 - 1.8	8.5 - 6.0	14.5 - 10.3	25	10°51.2	10°53.0	10°21.6	2.5 - 1.8	8.5 - 6.2	14.5 - 10.5	25	11°06.2	11°08.1	10°35.9	2.5 - 1.9	8.5 - 6.3	14.5 - 10.8
26	10°36.5	10°38.2	10°07.5	2.6 - 1.8	8.6 - 6.1	14.6 - 10.3	26	10°51.5	10°53.3	10°21.8	2.6 - 1.9	8.6 - 6.2	14.6 - 10.6	26	11°06.5	11°08.3	10°36.1	2.6 - 1.9	8.6 - 6.4	14.6 - 10.8
27	10°36.8	10°38.5	10°07.7	2.7 - 1.9	8.7 - 6.2	14.7 - 10.4	27	10°51.8	10°53.5	10°22.1	2.7 - 2.0	8.7 - 6.3	14.7 - 10.7	27	11°06.8	11°08.6	10°36.4	2.7 - 2.0	8.7 - 6.5	14.7 - 10.9
28	10°37.0	10°38.7	10°08.0	2.8 - 2.0	8.8 - 6.2	14.8 - 10.5	28	10°52.0	10°53.8	10°22.3	2.8 - 2.0	8.8 - 6.4	14.8 - 10.7	28	11°07.0	11°08.8	10°36.6	2.8 - 2.1	8.8 - 6.5	14.8 - 11.0
29	10°37.3	10°39.0	10°08.2	2.9 - 2.1	8.9 - 6.3	14.9 - 10.6	29	10°52.3	10°54.0	10°22.5	2.9 - 2.1	8.9 - 6.5	14.9 - 10.8	29	11°07.3	11°09.1	10°36.9	2.9 - 2.2	8.9 - 6.6	14.9 - 11.1
30	10°37.5	10°39.2	10°08.5	3.0 - 2.1	9.0 - 6.4	15.0 - 10.6	30	10°52.5	10°54.3	10°22.8	3.0 - 2.2	9.0 - 6.5	15.0 - 10.9	30	11°07.5	11°09.3	10°37.1	3.0 - 2.2	9.0 - 6.7	15.0 - 11.1
31	10°37.7	10°39.5	10°08.7	3.1 - 2.2	9.1 - 6.4	15.1 - 10.7	31	10°52.7	10°54.5	10°23.0	3.1 - 2.2	9.1 - 6.6	15.1 - 10.9	31	11°07.7	11°09.6	10°37.3	3.1 - 2.3	9.1 - 6.7	15.1 - 11.2
32	10°38.0	10°39.7	10°08.9	3.2 - 2.3	9.2 - 6.5	15.2 - 10.8	32	10°53.0	10°54.8	10°23.3	3.2 - 2.3	9.2 - 6.7	15.2 - 11.0	32	11°08.0	11°09.8	10°37.6	3.2 - 2.4	9.2 - 6.8	15.2 - 11.3
33	10°38.2	10°40.0	10°09.2	3.3 - 2.3	9.3 - 6.6	15.3 - 10.8	33	10°53.2	10°55.0	10°23.5	3.3 - 2.4	9.3 - 6.7	15.3 - 11.1	33	11°08.2	11°10.1	10°37.8	3.3 - 2.4	9.3 - 6.9	15.3 - 11.3
34	10°38.5	10°40.2	10°09.4	3.4 - 2.4	9.4 - 6.7	15.4 - 10.9	34	10°53.5	10°55.3	10°23.7	3.4 - 2.5	9.4 - 6.8	15.4 - 11.2	34	11°08.5	11°10.3	10°38.0	3.4 - 2.5	9.4 - 7.0	15.4 - 11.4
35	10°38.8	10°40.5	10°09.7	3.5 - 2.5	9.5 - 6.7	15.5 - 11.0	35	10°53.8	10°55.5	10°24.0	3.5 - 2.5	9.5 - 6.9	15.5 - 11.2	35	11°08.8	11°10.6	10°38.3	3.5 - 2.6	9.5 - 7.0	15.5 - 11.5
36	10°39.0	10°40.7	10°09.9	3.6 - 2.6	9.6 - 6.8	15.6 - 11.1	36	10°54.0	10°55.8	10°24.2	3.6 - 2.6	9.6 - 7.0	15.6 - 11.3	36	11°09.0	11°10.8	10°38.5	3.6 - 2.7	9.6 - 7.1	15.6 - 11.6
37	10°39.3	10°41.0	10°10.1	3.7 - 2.6	9.7 - 6.9	15.7 - 11.1	37	10°54.3	10°56.0	10°24.4	3.7 - 2.7	9.7 - 7.0	15.7 - 11.4	37	11°09.3	11°11.1	10°38.8	3.7 - 2.7	9.7 - 7.2	15.7 - 11.6
38	10°39.5	10°41.2	10°10.4	3.8 - 2.7	9.8 - 6.9	15.8 - 11.2	38	10°54.5	10°56.3	10°24.7	3.8 - 2.8	9.8 - 7.1	15.8 - 11.5	38	11°09.5	11°11.3	10°39.0	3.8 - 2.8	9.8 - 7.3	15.8 - 11.7
39	10°39.7	10°41.5	10°10.6	3.9 - 2.8	9.9 - 7.0	15.9 - 11.3	39	10°54.7	10°56.5	10°24.9	3.9 - 2.8	9.9 - 7.2	15.9 - 11.5	39	11°09.7	11°11.6	10°39.2	3.9 - 2.9	9.9 - 7.3	15.9 - 11.8
40	10°40.0	10°41.7	10°10.8	4.0 - 2.8	10.0 - 7.1	16.0 - 11.3	40	10°55.0	10°56.8	10°25.2	4.0 - 2.9	10.0 - 7.3	16.0 - 11.6	40	11°10.0	11°11.8	10°39.5	4.0 - 3.0	10.0 - 7.4	16.0 - 11.9
41	10°40.2	10°42.0	10°11.1	4.1 - 2.9	10.1 - 7.2	16.1 - 11.4	41	10°55.2	10°57.0	10°25.4	4.1 - 3.0	10.1 - 7.3	16.1 - 11.7	41	11°10.2	11°12.1	10°39.7	4.1 - 3.0	10.1 - 7.5	16.1 - 11.9
42	10°40.5	10°42.3	10°11.3	4.2 - 3.0	10.2 - 7.2	16.2 - 11.5	42	10°55.5	10°57.3	10°25.6	4.2 - 3.0	10.2 - 7.4	16.2 - 11.7	42	11°10.5	11°12.3	10°40.0	4.2 - 3.1	10.2 - 7.6	16.2 - 12.0
43	10°40.8	10°42.5	10°11.6	4.3 - 3.0	10.3 - 7.3	16.3 - 11.5	43	10°55.8	10°57.5	10°25.9	4.3 - 3.1	10.3 - 7.5	16.3 - 11.8	43	11°10.8	11°12.6	10°40.2	4.3 - 3.2	10.3 - 7.6	16.3 - 12.1
44	10°41.0	10°42.8	10°11.8	4.4 - 3.1	10.4 - 7.4	16.4 - 11.6	44	10°56.0	10°57.8	10°26.1	4.4 - 3.2	10.4 - 7.5	16.4 - 11.9	44	11°11.0	11°12.8	10°40.4	4.4 - 3.3	10.4 - 7.7	16.4 - 12.2
45	10°41.3	10°43.0	10°12.0	4.5 - 3.2	10.5 - 7.4	16.5 - 11.7	45	10°56.3	10°58.0	10°26.4	4.5 - 3.3	10.5 - 7.6	16.5 - 12.0	45	11°11.3	11°13.1	10°40.7	4.5 - 3.3	10.5 - 7.8	16.5 - 12.2
46	10°41.5	10°43.3	10°12.3	4.6 - 3.3	10.6 - 7.5	16.6 - 11.8	46	10°56.5	10°58.3	10°26.6	4.6 - 3.3	10.6 - 7.7	16.6 - 12.0	46	11°11.5	11°13.3	10°40.9	4.6 - 3.4	10.6 - 7.9	16.6 - 12.3
47	10°41.7	10°43.5	10°12.5	4.7 - 3.3																

## Increments and Corrections

m 45	Sun Plan.	Aries	Moon	v and d corr			m 46	Sun Plan.	Aries	Moon	v and d corr			m 47	Sun Plan.	Aries	Moon	v and d corr		
0	11°15.0	11°16.8	10°44.3	0.0 - 0.0	6.0 - 4.5	12.0 - 9.1	0	11°30.0	11°31.9	10°58.6	0.0 - 0.0	6.0 - 4.7	12.0 - 9.3	0	11°45.0	11°46.9	11°12.9	0.0 - 0.0	6.0 - 4.8	12.0 - 9.5
1	11°15.2	11°17.1	10°44.5	0.1 - 0.1	6.1 - 4.6	12.1 - 9.2	1	11°30.2	11°32.1	10°58.8	0.1 - 0.1	6.1 - 4.7	12.1 - 9.4	1	11°45.2	11°47.2	11°13.1	0.1 - 0.1	6.1 - 4.8	12.1 - 9.6
2	11°15.5	11°17.3	10°44.7	0.2 - 0.2	6.2 - 4.7	12.2 - 9.3	2	11°30.5	11°32.4	10°59.0	0.2 - 0.2	6.2 - 4.8	12.2 - 9.5	2	11°45.5	11°47.4	11°13.4	0.2 - 0.2	6.2 - 4.9	12.2 - 9.7
3	11°15.7	11°17.6	10°45.0	0.3 - 0.2	6.3 - 4.8	12.3 - 9.3	3	11°30.7	11°32.6	10°59.3	0.3 - 0.2	6.3 - 4.9	12.3 - 9.5	3	11°45.7	11°47.7	11°13.6	0.3 - 0.2	6.3 - 5.0	12.3 - 9.7
4	11°16.0	11°17.8	10°45.2	0.4 - 0.3	6.4 - 4.9	12.4 - 9.4	4	11°31.0	11°32.9	10°59.5	0.4 - 0.3	6.4 - 5.0	12.4 - 9.6	4	11°46.0	11°47.9	11°13.8	0.4 - 0.3	6.4 - 5.1	12.4 - 9.8
5	11°16.3	11°18.1	10°45.4	0.5 - 0.4	6.5 - 4.9	12.5 - 9.5	5	11°31.3	11°33.1	10°59.8	0.5 - 0.4	6.5 - 5.0	12.5 - 9.7	5	11°46.3	11°48.2	11°14.1	0.5 - 0.4	6.5 - 5.1	12.5 - 9.9
6	11°16.5	11°18.3	10°45.7	0.6 - 0.5	6.6 - 5.0	12.6 - 9.6	6	11°31.5	11°33.4	11°00.0	0.6 - 0.5	6.6 - 5.1	12.6 - 9.8	6	11°46.5	11°48.4	11°14.3	0.6 - 0.5	6.6 - 5.2	12.6 - 10.0
7	11°16.8	11°18.6	10°45.9	0.7 - 0.5	6.7 - 5.1	12.7 - 9.6	7	11°31.8	11°33.6	11°00.2	0.7 - 0.5	6.7 - 5.2	12.7 - 9.8	7	11°46.8	11°48.7	11°14.6	0.7 - 0.6	6.7 - 5.3	12.7 - 10.1
8	11°17.0	11°18.9	10°46.2	0.8 - 0.6	6.8 - 5.2	12.8 - 9.7	8	11°32.0	11°33.9	11°00.5	0.8 - 0.6	6.8 - 5.3	12.8 - 9.9	8	11°47.0	11°48.9	11°14.8	0.8 - 0.6	6.8 - 5.4	12.8 - 10.1
9	11°17.2	11°19.1	10°46.4	0.9 - 0.7	6.9 - 5.2	12.9 - 9.8	9	11°32.2	11°34.1	11°00.7	0.9 - 0.7	6.9 - 5.3	12.9 - 10.0	9	11°47.2	11°49.2	11°15.0	0.9 - 0.7	6.9 - 5.5	12.9 - 10.2
10	11°17.5	11°19.4	10°46.6	1.0 - 0.8	7.0 - 5.3	13.0 - 9.9	10	11°32.5	11°34.4	11°01.0	1.0 - 0.8	7.0 - 5.4	13.0 - 10.1	10	11°47.5	11°49.4	11°15.3	1.0 - 0.8	7.0 - 5.5	13.0 - 10.3
11	11°17.7	11°19.6	10°46.9	1.1 - 0.8	7.1 - 5.4	13.1 - 9.9	11	11°32.7	11°34.6	11°01.2	1.1 - 0.9	7.1 - 5.5	13.1 - 10.2	11	11°47.7	11°49.7	11°15.5	1.1 - 0.9	7.1 - 5.6	13.1 - 10.4
12	11°18.0	11°19.9	10°47.1	1.2 - 0.9	7.2 - 5.5	13.2 - 10.0	12	11°33.0	11°34.9	11°01.4	1.2 - 0.9	7.2 - 5.6	13.2 - 10.2	12	11°48.0	11°49.9	11°15.7	1.2 - 1.0	7.2 - 5.7	13.2 - 10.4
13	11°18.3	11°20.1	10°47.4	1.3 - 1.0	7.3 - 5.5	13.3 - 10.1	13	11°33.3	11°35.1	11°01.7	1.3 - 1.0	7.3 - 5.7	13.3 - 10.3	13	11°48.3	11°50.2	11°16.0	1.3 - 1.0	7.3 - 5.8	13.3 - 10.5
14	11°18.5	11°20.4	10°47.6	1.4 - 1.1	7.4 - 5.6	13.4 - 10.2	14	11°33.5	11°35.4	11°01.9	1.4 - 1.1	7.4 - 5.7	13.4 - 10.4	14	11°48.5	11°50.4	11°16.2	1.4 - 1.1	7.4 - 5.9	13.4 - 10.6
15	11°18.8	11°20.6	10°47.8	1.5 - 1.1	7.5 - 5.7	13.5 - 10.2	15	11°33.8	11°35.6	11°02.1	1.5 - 1.2	7.5 - 5.8	13.5 - 10.5	15	11°48.8	11°50.7	11°16.5	1.5 - 1.2	7.5 - 5.9	13.5 - 10.7
16	11°19.0	11°20.9	10°48.1	1.6 - 1.2	7.6 - 5.8	13.6 - 10.3	16	11°34.0	11°35.9	11°02.4	1.6 - 1.2	7.6 - 5.9	13.6 - 10.5	16	11°49.0	11°50.9	11°16.7	1.6 - 1.3	7.6 - 6.0	13.6 - 10.8
17	11°19.2	11°21.1	10°48.3	1.7 - 1.3	7.7 - 5.8	13.7 - 10.4	17	11°34.2	11°36.1	11°02.6	1.7 - 1.3	7.7 - 6.0	13.7 - 10.6	17	11°49.2	11°51.2	11°16.9	1.7 - 1.3	7.7 - 6.1	13.7 - 10.8
18	11°19.5	11°21.4	10°48.5	1.8 - 1.4	7.8 - 5.9	13.8 - 10.5	18	11°34.5	11°36.4	11°02.9	1.8 - 1.4	7.8 - 6.0	13.8 - 10.7	18	11°49.5	11°51.4	11°17.2	1.8 - 1.4	7.8 - 6.2	13.8 - 10.9
19	11°19.8	11°21.6	10°48.8	1.9 - 1.4	7.9 - 6.0	13.9 - 10.5	19	11°34.8	11°36.6	11°03.1	1.9 - 1.5	7.9 - 6.1	13.9 - 10.8	19	11°49.8	11°51.7	11°17.4	1.9 - 1.5	7.9 - 6.3	13.9 - 11.0
20	11°20.0	11°21.9	10°49.0	2.0 - 1.5	8.0 - 6.1	14.0 - 10.6	20	11°35.0	11°36.9	11°03.3	2.0 - 1.6	8.0 - 6.2	14.0 - 10.8	20	11°50.0	11°51.9	11°17.7	2.0 - 1.6	8.0 - 6.3	14.0 - 11.1
21	11°20.3	11°22.1	10°49.3	2.1 - 1.6	8.1 - 6.1	14.1 - 10.7	21	11°35.3	11°37.2	11°03.6	2.1 - 1.6	8.1 - 6.3	14.1 - 10.9	21	11°50.3	11°52.2	11°17.9	2.1 - 1.7	8.1 - 6.4	14.1 - 11.2
22	11°20.5	11°22.4	10°49.5	2.2 - 1.7	8.2 - 6.2	14.2 - 10.8	22	11°35.5	11°37.4	11°03.8	2.2 - 1.7	8.2 - 6.4	14.2 - 11.0	22	11°50.5	11°52.4	11°18.1	2.2 - 1.7	8.2 - 6.5	14.2 - 11.2
23	11°20.7	11°22.6	10°49.7	2.3 - 1.7	8.3 - 6.3	14.3 - 10.8	23	11°35.7	11°37.7	11°04.1	2.3 - 1.8	8.3 - 6.4	14.3 - 11.1	23	11°50.7	11°52.7	11°18.4	2.3 - 1.8	8.3 - 6.6	14.3 - 11.3
24	11°21.0	11°22.9	10°50.0	2.4 - 1.8	8.4 - 6.4	14.4 - 10.9	24	11°36.0	11°37.9	11°04.3	2.4 - 1.9	8.4 - 6.5	14.4 - 11.2	24	11°51.0	11°52.9	11°18.6	2.4 - 1.9	8.4 - 6.7	14.4 - 11.4
25	11°21.2	11°23.1	10°50.2	2.5 - 1.9	8.5 - 6.4	14.5 - 11.0	25	11°36.2	11°38.2	11°04.5	2.5 - 1.9	8.5 - 6.6	14.5 - 11.2	25	11°51.2	11°53.2	11°18.8	2.5 - 2.0	8.5 - 6.7	14.5 - 11.5
26	11°21.5	11°23.4	10°50.5	2.6 - 2.0	8.6 - 6.5	14.6 - 11.1	26	11°36.5	11°38.4	11°04.8	2.6 - 2.0	8.6 - 6.7	14.6 - 11.3	26	11°51.5	11°53.4	11°19.1	2.6 - 2.1	8.6 - 6.8	14.6 - 11.6
27	11°21.8	11°23.6	10°50.7	2.7 - 2.0	8.7 - 6.6	14.7 - 11.1	27	11°36.8	11°38.7	11°05.0	2.7 - 2.1	8.7 - 6.7	14.7 - 11.4	27	11°51.8	11°53.7	11°19.3	2.7 - 2.1	8.7 - 6.9	14.7 - 11.6
28	11°22.0	11°23.9	10°50.9	2.8 - 2.1	8.8 - 6.7	14.8 - 11.2	28	11°37.0	11°38.9	11°05.2	2.8 - 2.2	8.8 - 6.8	14.8 - 11.5	28	11°52.0	11°53.9	11°19.6	2.8 - 2.2	8.8 - 7.0	14.8 - 11.7
29	11°22.3	11°24.1	10°51.2	2.9 - 2.2	8.9 - 6.7	14.9 - 11.3	29	11°37.3	11°39.2	11°05.5	2.9 - 2.2	8.9 - 6.9	14.9 - 11.5	29	11°52.3	11°54.2	11°19.8	2.9 - 2.3	8.9 - 7.0	14.9 - 11.8
30	11°22.5	11°24.4	10°51.4	3.0 - 2.3	9.0 - 6.8	15.0 - 11.4	30	11°37.5	11°39.4	11°05.7	3.0 - 2.3	9.0 - 7.0	15.0 - 11.6	30	11°52.5	11°54.4	11°20.0	3.0 - 2.4	9.0 - 7.1	15.0 - 11.9
31	11°22.7	11°24.6	10°51.6	3.1 - 2.4	9.1 - 6.9	15.1 - 11.5	31	11°37.7	11°39.7	11°06.0	3.1 - 2.4	9.1 - 7.1	15.1 - 11.7	31	11°52.7	11°54.7	11°20.3	3.1 - 2.5	9.1 - 7.2	15.1 - 12.0
32	11°23.0	11°24.9	10°51.9	3.2 - 2.4	9.2 - 7.0	15.2 - 11.5	32	11°38.0	11°39.9	11°06.2	3.2 - 2.5	9.2 - 7.1	15.2 - 11.8	32	11°53.0	11°54.9	11°20.5	3.2 - 2.5	9.2 - 7.3	15.2 - 12.0
33	11°23.2	11°25.1	10°52.1	3.3 - 2.5	9.3 - 7.1	15.3 - 11.6	33	11°38.2	11°40.2	11°06.4	3.3 - 2.6	9.3 - 7.2	15.3 - 11.9	33	11°53.2	11°55.2	11°20.8	3.3 - 2.6	9.3 - 7.4	15.3 - 12.1
34	11°23.5	11°25.4	10°52.4	3.4 - 2.6	9.4 - 7.1	15.4 - 11.7	34	11°38.5	11°40.4	11°06.7	3.4 - 2.6	9.4 - 7.3	15.4 - 11.9	34	11°53.5	11°55.5	11°21.0	3.4 - 2.7	9.4 - 7.4	15.4 - 12.2
35	11°23.8	11°25.6	10°52.6	3.5 - 2.7	9.5 - 7.2	15.5 - 11.8	35	11°38.8	11°40.7	11°06.9	3.5 - 2.7	9.5 - 7.4	15.5 - 12.0	35	11°53.8	11°55.7	11°21.2	3.5 - 2.8	9.5 - 7.5	15.5 - 12.3
36	11°24.0	11°25.9	10°52.8	3.6 - 2.7	9.6 - 7.3	15.6 - 11.8	36	11°39.0	11°40.9	11°07.2	3.6 - 2.8	9.6 - 7.4	15.6 - 12.1	36	11°54.0	11°56.0	11°21.5	3.6 - 2.9	9.6 - 7.6	15.6 - 12.3
37	11°24.3	11°26.1	10°53.1	3.7 - 2.8	9.7 - 7.4	15.7 - 11.9	37	11°39.3	11°41.2	11°07.4	3.7 - 2.9	9.7 - 7.5	15.7 - 12.2	37	11°54.3	11°56.2	11°21.7	3.7 - 2.9	9.7 - 7.7	15.7 - 12.4
38	11°24.5	11°26.4	10°53.3	3.8 - 2.9	9.8 - 7.4	15.8 - 12.0	38	11°39.5	11°41.4	11°07.6	3.8 - 2.9	9.8 - 7.6	15.8 - 12.2	38	11°54.5	11°56.5	11°22.0	3.8 - 3.0	9.8 - 7.8	15.8 - 12.5
39	11°24.7	11°26.6	10°53.6	3.9 - 3.0	9.9 - 7.5	15.9 - 12.1	39	11°39.7	11°41.7	11°07.9	3.9 - 3.0	9.9 - 7.7	15.9 - 12.3	39	11°54.7	11°56.7	11°22.2	3.9 - 3.1	9.9 - 7.8	15.9 - 12.6
40	11°25.0	11°26.9	10°53.8	4.0 - 3.0	10.0 - 7.6	16.0 - 12.1	40	11°40.0	11°41.9	11°08.1	4.0 - 3.1	10.0 - 7.8	16.0 - 12.4	40	11°55.0	11°57.0	11°22.4	4.0 - 3.2	10.0 - 7.9	16.0 - 12.7
41	11°25.2	11°27.1	10°54.0	4.1 - 3.1	10.1 - 7.7	16.1 - 12.2	41	11°40.2	11°42.2	11°08.3	4.1 - 3.2	10.1 - 7.8	16.1 - 12.5	41	11°55.2	11°57.2	11°22.7	4.1 - 3.2	10.1 - 8.0	16.1 - 12.7
42	11°25.5	11°27.4	10°54.3	4.2 - 3.2	10.2 - 7.7	16.2 - 12.3	42	11°40.5	11°42.4	11°08.6	4.2 - 3.3	10.2 - 7.9	16.2 - 12.6	42	11°55.5	11°57.5	11°22.9	4.2 - 3.3	10.2 - 8.1	16.2 - 12.8
43	11°25.8	11°27.6	10°54.5	4.3 - 3.3	10.3 - 7.8	16.3 - 12.4	43	11°40.8	11°42.7	11°08.8	4.3 - 3.3	10.3 - 8.0	16.3 - 12.6	43	11°55.8	11°57.7	11°23.1	4.3 - 3.4	10.3 - 8.2	16.3 - 12.9
44	11°26.0	11°27.9	10°54.7	4.4 - 3.3	10.4 - 7.9	16.4 - 12.4	44	11°41.0	11°42.9	11°09.1	4.4 - 3.4	10.4 - 8.1	16.4 - 12.7	44	11°56.0	11°58.0	11°23.4	4.4 - 3.5	10.4 - 8.2	16.4 - 13.0
45	11°26.3	11°28.1	10°55.0	4.5 - 3.4	10.5 - 8.0	16.5 - 12.5	45	11°41.3	11°43.2	11°09.3	4.5 - 3.5	10.5 - 8.1	16.5 - 12.8	45	11°56.3	11°58.2	11°23.6	4.5 - 3.6	10.5 - 8.3	16.5 - 13.1
46	11°26.5	11°28.4	10°55.2	4.6 - 3.5	10.6 - 8.0	16.6 - 12.6	46	11°41.5	11°43.4	11°09.5	4.6 - 3.6	10.6 - 8.2	16.6 - 12.9	46	11°56.5	11°58.5	11°23.9	4.6 - 3.6	10.6 - 8.4	16



## Increments and Corrections

m 48	Sun Plan.	Aries	Moon	v and d corr			m 49	Sun Plan.	Aries	Moon	v and d corr			m 50	Sun Plan.	Aries	Moon	v and d corr		
0	12°00.0	12°02.0	11°27.2	0.0 - 0.0	6.0 - 4.8	12.0 - 9.7	0	12°15.0	12°17.0	11°41.5	0.0 - 0.0	6.0 - 4.9	12.0 - 9.9	0	12°30.0	12°32.1	11°55.8	0.0 - 0.0	6.0 - 5.0	12.0 - 10.1
1	12°00.2	12°02.2	11°27.4	0.1 - 0.1	6.1 - 4.9	12.1 - 9.8	1	12°15.2	12°17.3	11°41.8	0.1 - 0.1	6.1 - 5.0	12.1 - 10.0	1	12°30.2	12°32.3	11°56.1	0.1 - 0.1	6.1 - 5.1	12.1 - 10.2
2	12°00.5	12°02.5	11°27.7	0.2 - 0.2	6.2 - 5.0	12.2 - 9.9	2	12°15.5	12°17.5	11°42.0	0.2 - 0.2	6.2 - 5.1	12.2 - 10.1	2	12°30.5	12°32.6	11°56.3	0.2 - 0.2	6.2 - 5.2	12.2 - 10.3
3	12°00.7	12°02.7	11°27.9	0.3 - 0.2	6.3 - 5.1	12.3 - 9.9	3	12°15.7	12°17.8	11°42.2	0.3 - 0.2	6.3 - 5.2	12.3 - 10.1	3	12°30.7	12°32.8	11°56.5	0.3 - 0.3	6.3 - 5.3	12.3 - 10.4
4	12°01.0	12°03.0	11°28.2	0.4 - 0.3	6.4 - 5.2	12.4 - 10.0	4	12°16.0	12°18.0	11°42.5	0.4 - 0.3	6.4 - 5.3	12.4 - 10.2	4	12°31.0	12°33.1	11°56.8	0.4 - 0.3	6.4 - 5.4	12.4 - 10.4
5	12°01.3	12°03.2	11°28.4	0.5 - 0.4	6.5 - 5.3	12.5 - 10.1	5	12°16.3	12°18.3	11°42.7	0.5 - 0.4	6.5 - 5.4	12.5 - 10.3	5	12°31.3	12°33.3	11°57.0	0.5 - 0.4	6.5 - 5.5	12.5 - 10.5
6	12°01.5	12°03.5	11°28.6	0.6 - 0.5	6.6 - 5.3	12.6 - 10.2	6	12°16.5	12°18.5	11°42.9	0.6 - 0.5	6.6 - 5.4	12.6 - 10.4	6	12°31.5	12°33.6	11°57.3	0.6 - 0.5	6.6 - 5.6	12.6 - 10.6
7	12°01.8	12°03.7	11°28.9	0.7 - 0.6	6.7 - 5.4	12.7 - 10.3	7	12°16.8	12°18.8	11°43.2	0.7 - 0.6	6.7 - 5.5	12.7 - 10.5	7	12°31.8	12°33.8	11°57.5	0.7 - 0.6	6.7 - 5.6	12.7 - 10.7
8	12°02.0	12°04.0	11°29.1	0.8 - 0.6	6.8 - 5.5	12.8 - 10.3	8	12°17.0	12°19.0	11°43.4	0.8 - 0.7	6.8 - 5.6	12.8 - 10.6	8	12°32.0	12°34.1	11°57.7	0.8 - 0.7	6.8 - 5.7	12.8 - 10.8
9	12°02.2	12°04.2	11°29.3	0.9 - 0.7	6.9 - 5.6	12.9 - 10.4	9	12°17.2	12°19.3	11°43.7	0.9 - 0.7	6.9 - 5.7	12.9 - 10.6	9	12°32.2	12°34.3	11°58.0	0.9 - 0.8	6.9 - 5.8	12.9 - 10.9
10	12°02.5	12°04.5	11°29.6	1.0 - 0.8	7.0 - 5.7	13.0 - 10.5	10	12°17.5	12°19.5	11°43.9	1.0 - 0.8	7.0 - 5.8	13.0 - 10.7	10	12°32.5	12°34.6	11°58.2	1.0 - 0.8	7.0 - 5.9	13.0 - 10.9
11	12°02.7	12°04.7	11°29.8	1.1 - 0.9	7.1 - 5.7	13.1 - 10.6	11	12°17.7	12°19.8	11°44.1	1.1 - 0.9	7.1 - 5.9	13.1 - 10.8	11	12°32.7	12°34.8	11°58.5	1.1 - 0.9	7.1 - 6.0	13.1 - 11.0
12	12°03.0	12°05.0	11°30.1	1.2 - 1.0	7.2 - 5.8	13.2 - 10.7	12	12°18.0	12°20.0	11°44.4	1.2 - 1.0	7.2 - 5.9	13.2 - 10.9	12	12°33.0	12°35.1	11°58.7	1.2 - 1.0	7.2 - 6.1	13.2 - 11.1
13	12°03.3	12°05.2	11°30.3	1.3 - 1.1	7.3 - 5.9	13.3 - 10.8	13	12°18.3	12°20.3	11°44.6	1.3 - 1.1	7.3 - 6.0	13.3 - 11.0	13	12°33.3	12°35.3	11°58.9	1.3 - 1.1	7.3 - 6.1	13.3 - 11.2
14	12°03.5	12°05.5	11°30.5	1.4 - 1.1	7.4 - 6.0	13.4 - 10.8	14	12°18.5	12°20.5	11°44.9	1.4 - 1.2	7.4 - 6.1	13.4 - 11.1	14	12°33.5	12°35.6	11°59.2	1.4 - 1.2	7.4 - 6.2	13.4 - 11.3
15	12°03.8	12°05.7	11°30.8	1.5 - 1.2	7.5 - 6.1	13.5 - 10.9	15	12°18.8	12°20.8	11°45.1	1.5 - 1.2	7.5 - 6.2	13.5 - 11.1	15	12°33.8	12°35.8	11°59.4	1.5 - 1.3	7.5 - 6.3	13.5 - 11.4
16	12°04.0	12°06.0	11°31.0	1.6 - 1.3	7.6 - 6.1	13.6 - 11.0	16	12°19.0	12°21.0	11°45.3	1.6 - 1.3	7.6 - 6.3	13.6 - 11.2	16	12°34.0	12°36.1	11°59.7	1.6 - 1.3	7.6 - 6.4	13.6 - 11.4
17	12°04.2	12°06.2	11°31.3	1.7 - 1.4	7.7 - 6.2	13.7 - 11.1	17	12°19.2	12°21.3	11°45.6	1.7 - 1.4	7.7 - 6.4	13.7 - 11.3	17	12°34.2	12°36.3	11°59.9	1.7 - 1.4	7.7 - 6.5	13.7 - 11.5
18	12°04.5	12°06.5	11°31.5	1.8 - 1.5	7.8 - 6.3	13.8 - 11.2	18	12°19.5	12°21.5	11°45.8	1.8 - 1.5	7.8 - 6.4	13.8 - 11.4	18	12°34.5	12°36.6	12°00.1	1.8 - 1.5	7.8 - 6.6	13.8 - 11.6
19	12°04.8	12°06.7	11°31.7	1.9 - 1.5	7.9 - 6.4	13.9 - 11.2	19	12°19.8	12°21.8	11°46.1	1.9 - 1.6	7.9 - 6.5	13.9 - 11.5	19	12°34.8	12°36.8	12°00.4	1.9 - 1.6	7.9 - 6.6	13.9 - 11.7
20	12°05.0	12°07.0	11°32.0	2.0 - 1.6	8.0 - 6.5	14.0 - 11.3	20	12°20.0	12°22.0	11°46.3	2.0 - 1.6	8.0 - 6.6	14.0 - 11.5	20	12°35.0	12°37.1	12°00.6	2.0 - 1.7	8.0 - 6.7	14.0 - 11.8
21	12°05.3	12°07.2	11°32.2	2.1 - 1.7	8.1 - 6.5	14.1 - 11.4	21	12°20.3	12°22.3	11°46.5	2.1 - 1.7	8.1 - 6.7	14.1 - 11.6	21	12°35.3	12°37.3	12°00.8	2.1 - 1.8	8.1 - 6.8	14.1 - 11.9
22	12°05.5	12°07.5	11°32.4	2.2 - 1.8	8.2 - 6.6	14.2 - 11.5	22	12°20.5	12°22.5	11°46.8	2.2 - 1.8	8.2 - 6.8	14.2 - 11.7	22	12°35.5	12°37.6	12°01.1	2.2 - 1.9	8.2 - 6.9	14.2 - 12.0
23	12°05.7	12°07.7	11°32.7	2.3 - 1.9	8.3 - 6.7	14.3 - 11.6	23	12°20.7	12°22.8	11°47.0	2.3 - 1.9	8.3 - 6.8	14.3 - 11.8	23	12°35.7	12°37.8	12°01.3	2.3 - 1.9	8.3 - 7.0	14.3 - 12.0
24	12°06.0	12°08.0	11°32.9	2.4 - 1.9	8.4 - 6.8	14.4 - 11.6	24	12°21.0	12°23.0	11°47.2	2.4 - 2.0	8.4 - 6.9	14.4 - 11.9	24	12°36.0	12°38.1	12°01.6	2.4 - 2.0	8.4 - 7.1	14.4 - 12.1
25	12°06.2	12°08.2	11°33.2	2.5 - 2.0	8.5 - 6.9	14.5 - 11.7	25	12°21.2	12°23.3	11°47.5	2.5 - 2.1	8.5 - 7.0	14.5 - 12.0	25	12°36.2	12°38.3	12°01.8	2.5 - 2.1	8.5 - 7.2	14.5 - 12.2
26	12°06.5	12°08.5	11°33.4	2.6 - 2.1	8.6 - 7.0	14.6 - 11.8	26	12°21.5	12°23.5	11°47.7	2.6 - 2.1	8.6 - 7.1	14.6 - 12.0	26	12°36.5	12°38.6	12°02.0	2.6 - 2.2	8.6 - 7.2	14.6 - 12.3
27	12°06.8	12°08.7	11°33.6	2.7 - 2.2	8.7 - 7.0	14.7 - 11.9	27	12°21.8	12°23.8	11°48.0	2.7 - 2.2	8.7 - 7.2	14.7 - 12.1	27	12°36.8	12°38.8	12°02.3	2.7 - 2.3	8.7 - 7.3	14.7 - 12.4
28	12°07.0	12°09.0	11°33.9	2.8 - 2.3	8.8 - 7.1	14.8 - 12.0	28	12°22.0	12°24.0	11°48.2	2.8 - 2.3	8.8 - 7.3	14.8 - 12.2	28	12°37.0	12°39.1	12°02.5	2.8 - 2.4	8.8 - 7.4	14.8 - 12.5
29	12°07.3	12°09.2	11°34.1	2.9 - 2.3	8.9 - 7.2	14.9 - 12.0	29	12°22.3	12°24.3	11°48.4	2.9 - 2.4	8.9 - 7.3	14.9 - 12.3	29	12°37.3	12°39.3	12°02.8	2.9 - 2.4	8.9 - 7.5	14.9 - 12.5
30	12°07.5	12°09.5	11°34.4	3.0 - 2.4	9.0 - 7.3	15.0 - 12.1	30	12°22.5	12°24.5	11°48.7	3.0 - 2.5	9.0 - 7.4	15.0 - 12.4	30	12°37.5	12°39.6	12°03.0	3.0 - 2.5	9.0 - 7.6	15.0 - 12.6
31	12°07.7	12°09.7	11°34.6	3.1 - 2.5	9.1 - 7.4	15.1 - 12.2	31	12°22.7	12°24.8	11°48.9	3.1 - 2.6	9.1 - 7.5	15.1 - 12.5	31	12°37.7	12°39.8	12°03.2	3.1 - 2.6	9.1 - 7.7	15.1 - 12.7
32	12°08.0	12°10.0	11°34.8	3.2 - 2.6	9.2 - 7.4	15.2 - 12.3	32	12°23.0	12°25.0	11°49.2	3.2 - 2.6	9.2 - 7.6	15.2 - 12.5	32	12°38.0	12°40.1	12°03.5	3.2 - 2.7	9.2 - 7.7	15.2 - 12.8
33	12°08.2	12°10.2	11°35.1	3.3 - 2.7	9.3 - 7.5	15.3 - 12.4	33	12°23.2	12°25.3	11°49.4	3.3 - 2.7	9.3 - 7.7	15.3 - 12.6	33	12°38.2	12°40.3	12°03.7	3.3 - 2.8	9.3 - 7.8	15.3 - 12.9
34	12°08.5	12°10.5	11°35.3	3.4 - 2.7	9.4 - 7.6	15.4 - 12.4	34	12°23.5	12°25.5	11°49.6	3.4 - 2.8	9.4 - 7.8	15.4 - 12.7	34	12°38.5	12°40.6	12°03.9	3.4 - 2.9	9.4 - 7.9	15.4 - 13.0
35	12°08.8	12°10.7	11°35.6	3.5 - 2.8	9.5 - 7.7	15.5 - 12.5	35	12°23.8	12°25.8	11°49.9	3.5 - 2.9	9.5 - 7.8	15.5 - 12.8	35	12°38.8	12°40.8	12°04.2	3.5 - 2.9	9.5 - 8.0	15.5 - 13.0
36	12°09.0	12°11.0	11°35.8	3.6 - 2.9	9.6 - 7.8	15.6 - 12.6	36	12°24.0	12°26.0	11°50.1	3.6 - 3.0	9.6 - 7.9	15.6 - 12.9	36	12°39.0	12°41.1	12°04.4	3.6 - 3.0	9.6 - 8.1	15.6 - 13.1
37	12°09.3	12°11.2	11°36.0	3.7 - 3.0	9.7 - 7.8	15.7 - 12.7	37	12°24.3	12°26.3	11°50.3	3.7 - 3.1	9.7 - 8.0	15.7 - 13.0	37	12°39.3	12°41.3	12°04.7	3.7 - 3.1	9.7 - 8.2	15.7 - 13.2
38	12°09.5	12°11.5	11°36.3	3.8 - 3.1	9.8 - 7.9	15.8 - 12.8	38	12°24.5	12°26.5	11°50.6	3.8 - 3.1	9.8 - 8.1	15.8 - 13.0	38	12°39.5	12°41.6	12°04.9	3.8 - 3.2	9.8 - 8.2	15.8 - 13.3
39	12°09.7	12°11.7	11°36.5	3.9 - 3.2	9.9 - 8.0	15.9 - 12.9	39	12°24.7	12°26.8	11°50.8	3.9 - 3.2	9.9 - 8.2	15.9 - 13.1	39	12°39.7	12°41.8	12°05.1	3.9 - 3.3	9.9 - 8.3	15.9 - 13.4
40	12°10.0	12°12.0	11°36.7	4.0 - 3.2	10.0 - 8.1	16.0 - 12.9	40	12°25.0	12°27.0	11°51.1	4.0 - 3.3	10.0 - 8.3	16.0 - 13.2	40	12°40.0	12°42.1	12°05.4	4.0 - 3.4	10.0 - 8.4	16.0 - 13.5
41	12°10.2	12°12.2	11°37.0	4.1 - 3.3	10.1 - 8.2	16.1 - 13.0	41	12°25.2	12°27.3	11°51.3	4.1 - 3.4	10.1 - 8.3	16.1 - 13.3	41	12°40.2	12°42.3	12°05.6	4.1 - 3.5	10.1 - 8.5	16.1 - 13.6
42	12°10.5	12°12.5	11°37.2	4.2 - 3.4	10.2 - 8.2	16.2 - 13.1	42	12°25.5	12°27.5	11°51.5	4.2 - 3.5	10.2 - 8.4	16.2 - 13.4	42	12°40.5	12°42.6	12°05.9	4.2 - 3.5	10.2 - 8.6	16.2 - 13.6
43	12°10.8	12°12.7	11°37.5	4.3 - 3.5	10.3 - 8.3	16.3 - 13.2	43	12°25.8	12°27.8	11°51.8	4.3 - 3.5	10.3 - 8.5	16.3 - 13.4	43	12°40.8	12°42.8	12°06.1	4.3 - 3.6	10.3 - 8.7	16.3 - 13.7
44	12°11.0	12°13.0	11°37.7	4.4 - 3.6	10.4 - 8.4	16.4 - 13.3	44	12°26.0	12°28.0	11°52.0	4.4 - 3.6	10.4 - 8.6	16.4 - 13.5	44	12°41.0	12°43.1	12°06.3	4.4 - 3.7	10.4 - 8.8	16.4 - 13.8
45	12°11.3	12°13.2	11°37.9	4.5 - 3.6	10.5 - 8.5	16.5 - 13.3	45	12°26.3	12°28.3	11°52.3	4.5 - 3.7	10.5 - 8.7	16.5 - 13.6	45	12°41.3	12°43.3	12°06.6	4.5 - 3.8	10.5 - 8.8	16.5 - 13.9
46	12°11.5	12°13.5	11°38.2	4.6 - 3.7	10.6 - 8.6	16.6 - 13.4	46	12°26.5	12°28.5	11°52.5	4.6 - 3.8	10.6 - 8.7	16.6 - 13.7	46	12°41.5	12°43.6	12°06.8	4.6 - 3.		

## Increments and Corrections

m 51	Sun Plan.	Aries	Moon	v and d corr			m 52	Sun Plan.	Aries	Moon	v and d corr			m 53	Sun Plan.	Aries	Moon	v and d corr		
0	12°45.0	12°47.1	12°10.1	0.0 - 0.0	6.0 - 5.1	12.0 - 10.3	0	13°00.0	13°02.1	12°24.5	0.0 - 0.0	6.0 - 5.3	12.0 - 10.5	0	13°15.0	13°17.2	12°38.8	0.0 - 0.0	6.0 - 5.4	12.0 - 10.7
1	12°45.2	12°47.3	12°10.4	0.1 - 0.1	6.1 - 5.2	12.1 - 10.4	1	13°00.2	13°02.4	12°24.7	0.1 - 0.1	6.1 - 5.3	12.1 - 10.6	1	13°15.2	13°17.4	12°39.0	0.1 - 0.1	6.1 - 5.4	12.1 - 10.8
2	12°45.5	12°47.6	12°10.6	0.2 - 0.2	6.2 - 5.3	12.2 - 10.5	2	13°00.5	13°02.6	12°24.9	0.2 - 0.2	6.2 - 5.4	12.2 - 10.7	2	13°15.5	13°17.7	12°39.3	0.2 - 0.2	6.2 - 5.5	12.2 - 10.9
3	12°45.7	12°47.8	12°10.9	0.3 - 0.3	6.3 - 5.4	12.3 - 10.6	3	13°00.7	13°02.9	12°25.2	0.3 - 0.3	6.3 - 5.5	12.3 - 10.8	3	13°15.7	13°17.9	12°39.5	0.3 - 0.3	6.3 - 5.6	12.3 - 11.0
4	12°46.0	12°48.1	12°11.1	0.4 - 0.3	6.4 - 5.5	12.4 - 10.6	4	13°01.0	13°03.1	12°25.4	0.4 - 0.4	6.4 - 5.6	12.4 - 10.8	4	13°16.0	13°18.2	12°39.7	0.4 - 0.4	6.4 - 5.7	12.4 - 11.1
5	12°46.3	12°48.3	12°11.3	0.5 - 0.4	6.5 - 5.6	12.5 - 10.7	5	13°01.3	13°03.4	12°25.7	0.5 - 0.4	6.5 - 5.7	12.5 - 10.9	5	13°16.3	13°18.4	12°40.0	0.5 - 0.4	6.5 - 5.8	12.5 - 11.1
6	12°46.5	12°48.6	12°11.6	0.6 - 0.5	6.6 - 5.7	12.6 - 10.8	6	13°01.5	13°03.6	12°25.9	0.6 - 0.5	6.6 - 5.8	12.6 - 11.0	6	13°16.5	13°18.7	12°40.2	0.6 - 0.5	6.6 - 5.9	12.6 - 11.2
7	12°46.8	12°48.8	12°11.8	0.7 - 0.6	6.7 - 5.8	12.7 - 10.9	7	13°01.8	13°03.9	12°26.1	0.7 - 0.6	6.7 - 5.9	12.7 - 11.1	7	13°16.8	13°18.9	12°40.5	0.7 - 0.6	6.7 - 6.0	12.7 - 11.3
8	12°47.0	12°49.1	12°12.1	0.8 - 0.7	6.8 - 5.8	12.8 - 11.0	8	13°02.0	13°04.1	12°26.4	0.8 - 0.7	6.8 - 6.0	12.8 - 11.2	8	13°17.0	13°19.2	12°40.7	0.8 - 0.7	6.8 - 6.1	12.8 - 11.4
9	12°47.2	12°49.3	12°12.3	0.9 - 0.8	6.9 - 5.9	12.9 - 11.1	9	13°02.2	13°04.4	12°26.6	0.9 - 0.8	6.9 - 6.0	12.9 - 11.3	9	13°17.2	13°19.4	12°40.9	0.9 - 0.8	6.9 - 6.2	12.9 - 11.5
10	12°47.5	12°49.6	12°12.5	1.0 - 0.9	7.0 - 6.0	13.0 - 11.2	10	13°02.5	13°04.6	12°26.9	1.0 - 0.9	7.0 - 6.1	13.0 - 11.4	10	13°17.5	13°19.7	12°41.2	1.0 - 0.9	7.0 - 6.2	13.0 - 11.6
11	12°47.7	12°49.8	12°12.8	1.1 - 0.9	7.1 - 6.1	13.1 - 11.2	11	13°02.7	13°04.9	12°27.1	1.1 - 1.0	7.1 - 6.2	13.1 - 11.5	11	13°17.7	13°19.9	12°41.4	1.1 - 1.0	7.1 - 6.3	13.1 - 11.7
12	12°48.0	12°50.1	12°13.0	1.2 - 1.0	7.2 - 6.2	13.2 - 11.3	12	13°03.0	13°05.1	12°27.3	1.2 - 1.1	7.2 - 6.3	13.2 - 11.5	12	13°18.0	13°20.2	12°41.6	1.2 - 1.1	7.2 - 6.4	13.2 - 11.8
13	12°48.3	12°50.3	12°13.3	1.3 - 1.1	7.3 - 6.3	13.3 - 11.4	13	13°03.3	13°05.4	12°27.6	1.3 - 1.1	7.3 - 6.4	13.3 - 11.6	13	13°18.3	13°20.4	12°41.9	1.3 - 1.2	7.3 - 6.5	13.3 - 11.9
14	12°48.5	12°50.6	12°13.5	1.4 - 1.2	7.4 - 6.4	13.4 - 11.5	14	13°03.5	13°05.6	12°27.8	1.4 - 1.2	7.4 - 6.5	13.4 - 11.7	14	13°18.5	13°20.7	12°42.1	1.4 - 1.2	7.4 - 6.6	13.4 - 11.9
15	12°48.8	12°50.9	12°13.7	1.5 - 1.3	7.5 - 6.4	13.5 - 11.6	15	13°03.8	13°05.9	12°28.0	1.5 - 1.3	7.5 - 6.6	13.5 - 11.8	15	13°18.8	13°20.9	12°42.4	1.5 - 1.3	7.5 - 6.7	13.5 - 12.0
16	12°49.0	12°51.1	12°14.0	1.6 - 1.4	7.6 - 6.5	13.6 - 11.7	16	13°04.0	13°06.1	12°28.3	1.6 - 1.4	7.6 - 6.6	13.6 - 11.9	16	13°19.0	13°21.2	12°42.6	1.6 - 1.4	7.6 - 6.8	13.6 - 12.1
17	12°49.2	12°51.4	12°14.2	1.7 - 1.5	7.7 - 6.6	13.7 - 11.8	17	13°04.2	13°06.4	12°28.5	1.7 - 1.5	7.7 - 6.7	13.7 - 12.0	17	13°19.2	13°21.4	12°42.8	1.7 - 1.5	7.7 - 6.9	13.7 - 12.2
18	12°49.5	12°51.6	12°14.4	1.8 - 1.5	7.8 - 6.7	13.8 - 11.8	18	13°04.5	13°06.6	12°28.8	1.8 - 1.6	7.8 - 6.8	13.8 - 12.1	18	13°19.5	13°21.7	12°43.1	1.8 - 1.6	7.8 - 7.0	13.8 - 12.3
19	12°49.8	12°51.9	12°14.7	1.9 - 1.6	7.9 - 6.8	13.9 - 11.9	19	13°04.8	13°06.9	12°29.0	1.9 - 1.7	7.9 - 6.9	13.9 - 12.2	19	13°19.8	13°21.9	12°43.3	1.9 - 1.7	7.9 - 7.0	13.9 - 12.4
20	12°50.0	12°52.1	12°14.9	2.0 - 1.7	8.0 - 6.9	14.0 - 12.0	20	13°05.0	13°07.1	12°29.2	2.0 - 1.8	8.0 - 7.0	14.0 - 12.3	20	13°20.0	13°22.2	12°43.6	2.0 - 1.8	8.0 - 7.1	14.0 - 12.5
21	12°50.3	12°52.4	12°15.2	2.1 - 1.8	8.1 - 7.0	14.1 - 12.1	21	13°05.3	13°07.4	12°29.5	2.1 - 1.8	8.1 - 7.1	14.1 - 12.3	21	13°20.3	13°22.4	12°43.8	2.1 - 1.9	8.1 - 7.2	14.1 - 12.6
22	12°50.5	12°52.6	12°15.4	2.2 - 1.9	8.2 - 7.0	14.2 - 12.2	22	13°05.5	13°07.6	12°29.7	2.2 - 1.9	8.2 - 7.2	14.2 - 12.4	22	13°20.5	13°22.7	12°44.0	2.2 - 2.0	8.2 - 7.3	14.2 - 12.7
23	12°50.7	12°52.9	12°15.6	2.3 - 2.0	8.3 - 7.1	14.3 - 12.3	23	13°05.7	13°07.9	12°30.0	2.3 - 2.0	8.3 - 7.3	14.3 - 12.5	23	13°20.7	13°22.9	12°44.3	2.3 - 2.1	8.3 - 7.4	14.3 - 12.8
24	12°51.0	12°53.1	12°15.9	2.4 - 2.1	8.4 - 7.2	14.4 - 12.4	24	13°06.0	13°08.1	12°30.2	2.4 - 2.1	8.4 - 7.4	14.4 - 12.6	24	13°21.0	13°23.2	12°44.5	2.4 - 2.1	8.4 - 7.5	14.4 - 12.8
25	12°51.2	12°53.4	12°16.1	2.5 - 2.1	8.5 - 7.3	14.5 - 12.4	25	13°06.2	13°08.4	12°30.4	2.5 - 2.2	8.5 - 7.4	14.5 - 12.7	25	13°21.2	13°23.4	12°44.7	2.5 - 2.2	8.5 - 7.6	14.5 - 12.9
26	12°51.5	12°53.6	12°16.4	2.6 - 2.2	8.6 - 7.4	14.6 - 12.5	26	13°06.5	13°08.6	12°30.7	2.6 - 2.3	8.6 - 7.5	14.6 - 12.8	26	13°21.5	13°23.7	12°45.0	2.6 - 2.3	8.6 - 7.7	14.6 - 13.0
27	12°51.8	12°53.9	12°16.6	2.7 - 2.3	8.7 - 7.5	14.7 - 12.6	27	13°06.8	13°08.9	12°30.9	2.7 - 2.4	8.7 - 7.6	14.7 - 12.9	27	13°21.8	13°23.9	12°45.2	2.7 - 2.4	8.7 - 7.8	14.7 - 13.1
28	12°52.0	12°54.1	12°16.8	2.8 - 2.4	8.8 - 7.6	14.8 - 12.7	28	13°07.0	13°09.2	12°31.1	2.8 - 2.5	8.8 - 7.7	14.8 - 13.0	28	13°22.0	13°24.2	12°45.5	2.8 - 2.5	8.8 - 7.8	14.8 - 13.2
29	12°52.3	12°54.4	12°17.1	2.9 - 2.5	8.9 - 7.6	14.9 - 12.8	29	13°07.3	13°09.4	12°31.4	2.9 - 2.5	8.9 - 7.8	14.9 - 13.0	29	13°22.3	13°24.4	12°45.7	2.9 - 2.6	8.9 - 7.9	14.9 - 13.3
30	12°52.5	12°54.6	12°17.3	3.0 - 2.6	9.0 - 7.7	15.0 - 12.9	30	13°07.5	13°09.7	12°31.6	3.0 - 2.6	9.0 - 7.9	15.0 - 13.1	30	13°22.5	13°24.7	12°45.9	3.0 - 2.7	9.0 - 8.0	15.0 - 13.4
31	12°52.7	12°54.9	12°17.5	3.1 - 2.7	9.1 - 7.8	15.1 - 13.0	31	13°07.7	13°09.9	12°31.9	3.1 - 2.7	9.1 - 8.0	15.1 - 13.2	31	13°22.7	13°24.9	12°46.2	3.1 - 2.8	9.1 - 8.1	15.1 - 13.5
32	12°53.0	12°55.1	12°17.8	3.2 - 2.7	9.2 - 7.9	15.2 - 13.0	32	13°08.0	13°10.2	12°32.1	3.2 - 2.8	9.2 - 8.0	15.2 - 13.3	32	13°23.0	13°25.2	12°46.4	3.2 - 2.9	9.2 - 8.2	15.2 - 13.6
33	12°53.2	12°55.4	12°18.0	3.3 - 2.8	9.3 - 8.0	15.3 - 13.1	33	13°08.2	13°10.4	12°32.3	3.3 - 2.9	9.3 - 8.1	15.3 - 13.4	33	13°23.2	13°25.4	12°46.7	3.3 - 2.9	9.3 - 8.3	15.3 - 13.6
34	12°53.5	12°55.6	12°18.3	3.4 - 2.9	9.4 - 8.1	15.4 - 13.2	34	13°08.5	13°10.7	12°32.6	3.4 - 3.0	9.4 - 8.2	15.4 - 13.5	34	13°23.5	13°25.7	12°46.9	3.4 - 3.0	9.4 - 8.4	15.4 - 13.7
35	12°53.8	12°55.9	12°18.5	3.5 - 3.0	9.5 - 8.2	15.5 - 13.3	35	13°08.8	13°10.9	12°32.8	3.5 - 3.1	9.5 - 8.3	15.5 - 13.6	35	13°23.8	13°25.9	12°47.1	3.5 - 3.1	9.5 - 8.5	15.5 - 13.8
36	12°54.0	12°56.1	12°18.7	3.6 - 3.1	9.6 - 8.2	15.6 - 13.4	36	13°09.0	13°11.2	12°33.1	3.6 - 3.1	9.6 - 8.4	15.6 - 13.7	36	13°24.0	13°26.2	12°47.4	3.6 - 3.2	9.6 - 8.6	15.6 - 13.9
37	12°54.3	12°56.4	12°19.0	3.7 - 3.2	9.7 - 8.3	15.7 - 13.5	37	13°09.3	13°11.4	12°33.3	3.7 - 3.2	9.7 - 8.5	15.7 - 13.7	37	13°24.3	13°26.4	12°47.6	3.7 - 3.3	9.7 - 8.6	15.7 - 14.0
38	12°54.5	12°56.6	12°19.2	3.8 - 3.3	9.8 - 8.4	15.8 - 13.6	38	13°09.5	13°11.7	12°33.5	3.8 - 3.3	9.8 - 8.6	15.8 - 13.8	38	13°24.5	13°26.7	12°47.9	3.8 - 3.4	9.8 - 8.7	15.8 - 14.1
39	12°54.7	12°56.9	12°19.5	3.9 - 3.3	9.9 - 8.5	15.9 - 13.6	39	13°09.7	13°11.9	12°33.8	3.9 - 3.4	9.9 - 8.7	15.9 - 13.9	39	13°24.7	13°26.9	12°48.1	3.9 - 3.5	9.9 - 8.8	15.9 - 14.2
40	12°55.0	12°57.1	12°19.7	4.0 - 3.4	10.0 - 8.6	16.0 - 13.7	40	13°10.0	13°12.2	12°34.0	4.0 - 3.5	10.0 - 8.8	16.0 - 14.0	40	13°25.0	13°27.2	12°48.3	4.0 - 3.6	10.0 - 8.9	16.0 - 14.3
41	12°55.2	12°57.4	12°19.9	4.1 - 3.5	10.1 - 8.7	16.1 - 13.8	41	13°10.2	13°12.4	12°34.2	4.1 - 3.6	10.1 - 8.8	16.1 - 14.1	41	13°25.2	13°27.5	12°48.6	4.1 - 3.7	10.1 - 9.0	16.1 - 14.4
42	12°55.5	12°57.6	12°20.2	4.2 - 3.6	10.2 - 8.8	16.2 - 13.9	42	13°10.5	13°12.7	12°34.5	4.2 - 3.7	10.2 - 8.9	16.2 - 14.2	42	13°25.5	13°27.7	12°48.8	4.2 - 3.7	10.2 - 9.1	16.2 - 14.4
43	12°55.8	12°57.9	12°20.4	4.3 - 3.7	10.3 - 8.8	16.3 - 14.0	43	13°10.8	13°12.9	12°34.7	4.3 - 3.8	10.3 - 9.0	16.3 - 14.3	43	13°25.8	13°28.0	12°49.0	4.3 - 3.8	10.3 - 9.2	16.3 - 14.5
44	12°56.0	12°58.1	12°20.6	4.4 - 3.8	10.4 - 8.9	16.4 - 14.1	44	13°11.0	13°13.2	12°35.0	4.4 - 3.9	10.4 - 9.1	16.4 - 14.3	44	13°26.0	13°28.2	12°49.3	4.4 - 3.9	10.4 - 9.3	16.4 - 14.6
45	12°56.3	12°58.4	12°20.9	4.5 - 3.9	10.5 - 9.0	16.5 - 14.2	45	13°11.3	13°13.4	12°35.2	4.5 - 3.9	10.5 - 9.2	16.5 - 14.4	45	13°26.3	13°28.5	12°49.5	4.5 - 4.0	10.5 - 9.4	16.5 - 14.7
46	12°56.5	12°58.6	12°21.1	4.6 - 3.9	10.6 - 9.1	16.6 - 14.2	46	13°11.5	13°13.7	12°35.4	4.6 - 4.0	10.6 - 9.3	16.6 - 14.5	46	13°26.5	13°28.7	12°49.8	4.		

## Increments and Corrections

m	Sun	Aries	Moon	v and d corr			m	Sun	Aries	Moon	v and d corr			m	Sun	Aries	Moon	v and d corr		
54	Plan.						55	Plan.					56	Plan.						
0	13°30.0	13°32.2	12°53.1	0.0 - 0.0	6.0 - 5.5	12.0 - 10.9	0	13°45.0	13°47.3	13°07.4	0.0 - 0.0	6.0 - 5.6	12.0 - 11.1	0	14°00.0	14°02.3	13°21.7	0.0 - 0.0	6.0 - 5.7	12.0 - 11.3
1	13°30.2	13°32.5	12°53.3	0.1 - 0.1	6.1 - 5.5	12.1 - 11.0	1	13°45.2	13°47.5	13°07.7	0.1 - 0.1	6.1 - 5.6	12.1 - 11.2	1	14°00.2	14°02.5	13°22.0	0.1 - 0.1	6.1 - 5.7	12.1 - 11.4
2	13°30.5	13°32.7	12°53.6	0.2 - 0.2	6.2 - 5.6	12.2 - 11.1	2	13°45.5	13°47.8	13°07.9	0.2 - 0.2	6.2 - 5.7	12.2 - 11.3	2	14°00.5	14°02.8	13°22.2	0.2 - 0.2	6.2 - 5.8	12.2 - 11.5
3	13°30.7	13°33.0	12°53.8	0.3 - 0.3	6.3 - 5.7	12.3 - 11.2	3	13°45.7	13°48.0	13°08.1	0.3 - 0.3	6.3 - 5.8	12.3 - 11.4	3	14°00.7	14°03.0	13°22.4	0.3 - 0.3	6.3 - 5.9	12.3 - 11.6
4	13°31.0	13°33.2	12°54.1	0.4 - 0.4	6.4 - 5.8	12.4 - 11.3	4	13°46.0	13°48.3	13°08.4	0.4 - 0.4	6.4 - 5.9	12.4 - 11.5	4	14°01.0	14°03.3	13°22.7	0.4 - 0.4	6.4 - 6.0	12.4 - 11.7
5	13°31.3	13°33.5	12°54.3	0.5 - 0.5	6.5 - 5.9	12.5 - 11.4	5	13°46.3	13°48.5	13°08.6	0.5 - 0.5	6.5 - 6.0	12.5 - 11.6	5	14°01.3	14°03.5	13°22.9	0.5 - 0.5	6.5 - 6.1	12.5 - 11.8
6	13°31.5	13°33.7	12°54.5	0.6 - 0.5	6.6 - 6.0	12.6 - 11.4	6	13°46.5	13°48.8	13°08.8	0.6 - 0.6	6.6 - 6.1	12.6 - 11.7	6	14°01.5	14°03.8	13°23.2	0.6 - 0.6	6.6 - 6.2	12.6 - 11.9
7	13°31.8	13°34.0	12°54.8	0.7 - 0.6	6.7 - 6.1	12.7 - 11.5	7	13°46.8	13°49.0	13°09.1	0.7 - 0.6	6.7 - 6.2	12.7 - 11.7	7	14°01.8	14°04.1	13°23.4	0.7 - 0.7	6.7 - 6.3	12.7 - 12.0
8	13°32.0	13°34.2	12°55.0	0.8 - 0.7	6.8 - 6.2	12.8 - 11.6	8	13°47.0	13°49.3	13°09.3	0.8 - 0.7	6.8 - 6.3	12.8 - 11.8	8	14°02.0	14°04.3	13°23.6	0.8 - 0.8	6.8 - 6.4	12.8 - 12.1
9	13°32.2	13°34.5	12°55.2	0.9 - 0.8	6.9 - 6.3	12.9 - 11.7	9	13°47.2	13°49.5	13°09.6	0.9 - 0.8	6.9 - 6.4	12.9 - 11.9	9	14°02.2	14°04.6	13°23.9	0.9 - 0.8	6.9 - 6.5	12.9 - 12.1
10	13°32.5	13°34.7	12°55.5	1.0 - 0.9	7.0 - 6.4	13.0 - 11.8	10	13°47.5	13°49.8	13°09.8	1.0 - 0.9	7.0 - 6.5	13.0 - 12.0	10	14°02.5	14°04.8	13°24.1	1.0 - 0.9	7.0 - 6.6	13.0 - 12.2
11	13°32.7	13°35.0	12°55.7	1.1 - 1.0	7.1 - 6.4	13.1 - 11.9	11	13°47.7	13°50.0	13°10.0	1.1 - 1.0	7.1 - 6.6	13.1 - 12.1	11	14°02.7	14°05.1	13°24.4	1.1 - 1.0	7.1 - 6.7	13.1 - 12.3
12	13°33.0	13°35.2	12°56.0	1.2 - 1.1	7.2 - 6.5	13.2 - 12.0	12	13°48.0	13°50.3	13°10.3	1.2 - 1.1	7.2 - 6.7	13.2 - 12.2	12	14°03.0	14°05.3	13°24.6	1.2 - 1.1	7.2 - 6.8	13.2 - 12.4
13	13°33.3	13°35.5	12°56.2	1.3 - 1.2	7.3 - 6.6	13.3 - 12.1	13	13°48.3	13°50.5	13°10.5	1.3 - 1.2	7.3 - 6.8	13.3 - 12.3	13	14°03.3	14°05.6	13°24.8	1.3 - 1.2	7.3 - 6.9	13.3 - 12.5
14	13°33.5	13°35.7	12°56.4	1.4 - 1.3	7.4 - 6.7	13.4 - 12.2	14	13°48.5	13°50.8	13°10.8	1.4 - 1.3	7.4 - 6.8	13.4 - 12.4	14	14°03.5	14°05.8	13°25.1	1.4 - 1.3	7.4 - 7.0	13.4 - 12.6
15	13°33.8	13°36.0	12°56.7	1.5 - 1.4	7.5 - 6.8	13.5 - 12.3	15	13°48.8	13°51.0	13°11.0	1.5 - 1.4	7.5 - 6.9	13.5 - 12.5	15	14°03.8	14°06.1	13°25.3	1.5 - 1.4	7.5 - 7.1	13.5 - 12.7
16	13°34.0	13°36.2	12°56.9	1.6 - 1.5	7.6 - 6.9	13.6 - 12.4	16	13°49.0	13°51.3	13°11.2	1.6 - 1.5	7.6 - 7.0	13.6 - 12.6	16	14°04.0	14°06.3	13°25.6	1.6 - 1.5	7.6 - 7.2	13.6 - 12.8
17	13°34.2	13°36.5	12°57.2	1.7 - 1.5	7.7 - 7.0	13.7 - 12.4	17	13°49.2	13°51.5	13°11.5	1.7 - 1.6	7.7 - 7.1	13.7 - 12.7	17	14°04.2	14°06.6	13°25.8	1.7 - 1.6	7.7 - 7.3	13.7 - 12.9
18	13°34.5	13°36.7	12°57.4	1.8 - 1.6	7.8 - 7.1	13.8 - 12.5	18	13°49.5	13°51.8	13°11.7	1.8 - 1.7	7.8 - 7.2	13.8 - 12.8	18	14°04.5	14°06.8	13°26.0	1.8 - 1.7	7.8 - 7.3	13.8 - 13.0
19	13°34.8	13°37.0	12°57.6	1.9 - 1.7	7.9 - 7.2	13.9 - 12.6	19	13°49.8	13°52.0	13°12.0	1.9 - 1.8	7.9 - 7.3	13.9 - 12.9	19	14°04.8	14°07.1	13°26.3	1.9 - 1.8	7.9 - 7.4	13.9 - 13.1
20	13°35.0	13°37.2	12°57.9	2.0 - 1.8	8.0 - 7.3	14.0 - 12.7	20	13°50.0	13°52.3	13°12.2	2.0 - 1.9	8.0 - 7.4	14.0 - 13.0	20	14°05.0	14°07.3	13°26.5	2.0 - 1.9	8.0 - 7.5	14.0 - 13.2
21	13°35.3	13°37.5	12°58.1	2.1 - 1.9	8.1 - 7.4	14.1 - 12.8	21	13°50.3	13°52.5	13°12.4	2.1 - 1.9	8.1 - 7.5	14.1 - 13.0	21	14°05.3	14°07.6	13°26.7	2.1 - 2.0	8.1 - 7.6	14.1 - 13.3
22	13°35.5	13°37.7	12°58.3	2.2 - 2.0	8.2 - 7.4	14.2 - 12.9	22	13°50.5	13°52.8	13°12.7	2.2 - 2.0	8.2 - 7.6	14.2 - 13.1	22	14°05.5	14°07.8	13°27.0	2.2 - 2.1	8.2 - 7.7	14.2 - 13.4
23	13°35.7	13°38.0	12°58.6	2.3 - 2.1	8.3 - 7.5	14.3 - 13.0	23	13°50.7	13°53.0	13°12.9	2.3 - 2.1	8.3 - 7.7	14.3 - 13.2	23	14°05.7	14°08.1	13°27.2	2.3 - 2.2	8.3 - 7.8	14.3 - 13.5
24	13°36.0	13°38.2	12°58.8	2.4 - 2.2	8.4 - 7.6	14.4 - 13.1	24	13°51.0	13°53.3	13°13.1	2.4 - 2.2	8.4 - 7.8	14.4 - 13.3	24	14°06.0	14°08.3	13°27.5	2.4 - 2.3	8.4 - 7.9	14.4 - 13.6
25	13°36.2	13°38.5	12°59.1	2.5 - 2.3	8.5 - 7.7	14.5 - 13.2	25	13°51.2	13°53.5	13°13.4	2.5 - 2.3	8.5 - 7.9	14.5 - 13.4	25	14°06.2	14°08.6	13°27.7	2.5 - 2.4	8.5 - 8.0	14.5 - 13.7
26	13°36.5	13°38.7	12°59.3	2.6 - 2.4	8.6 - 7.8	14.6 - 13.3	26	13°51.5	13°53.8	13°13.6	2.6 - 2.4	8.6 - 8.0	14.6 - 13.5	26	14°06.5	14°08.8	13°27.9	2.6 - 2.4	8.6 - 8.1	14.6 - 13.7
27	13°36.8	13°39.0	12°59.5	2.7 - 2.5	8.7 - 7.9	14.7 - 13.4	27	13°51.8	13°54.0	13°13.9	2.7 - 2.5	8.7 - 8.0	14.7 - 13.6	27	14°06.8	14°09.1	13°28.2	2.7 - 2.5	8.7 - 8.2	14.7 - 13.8
28	13°37.0	13°39.2	12°59.8	2.8 - 2.5	8.8 - 8.0	14.8 - 13.4	28	13°52.0	13°54.3	13°14.1	2.8 - 2.6	8.8 - 8.1	14.8 - 13.7	28	14°07.0	14°09.3	13°28.4	2.8 - 2.6	8.8 - 8.3	14.8 - 13.9
29	13°37.3	13°39.5	13°00.0	2.9 - 2.6	8.9 - 8.1	14.9 - 13.5	29	13°52.3	13°54.5	13°14.3	2.9 - 2.7	8.9 - 8.2	14.9 - 13.8	29	14°07.3	14°09.6	13°28.7	2.9 - 2.7	8.9 - 8.4	14.9 - 14.0
30	13°37.5	13°39.7	13°00.3	3.0 - 2.7	9.0 - 8.2	15.0 - 13.6	30	13°52.5	13°54.8	13°14.6	3.0 - 2.8	9.0 - 8.3	15.0 - 13.9	30	14°07.5	14°09.8	13°28.9	3.0 - 2.8	9.0 - 8.5	15.0 - 14.1
31	13°37.7	13°40.0	13°00.5	3.1 - 2.8	9.1 - 8.3	15.1 - 13.7	31	13°52.7	13°55.0	13°14.8	3.1 - 2.9	9.1 - 8.4	15.1 - 14.0	31	14°07.7	14°10.1	13°29.1	3.1 - 2.9	9.1 - 8.6	15.1 - 14.2
32	13°38.0	13°40.2	13°00.7	3.2 - 2.9	9.2 - 8.4	15.2 - 13.8	32	13°53.0	13°55.3	13°15.1	3.2 - 3.0	9.2 - 8.5	15.2 - 14.1	32	14°08.0	14°10.3	13°29.4	3.2 - 3.0	9.2 - 8.7	15.2 - 14.3
33	13°38.2	13°40.5	13°01.0	3.3 - 3.0	9.3 - 8.4	15.3 - 13.9	33	13°53.2	13°55.5	13°15.3	3.3 - 3.1	9.3 - 8.6	15.3 - 14.2	33	14°08.2	14°10.6	13°29.6	3.3 - 3.1	9.3 - 8.8	15.3 - 14.4
34	13°38.5	13°40.7	13°01.2	3.4 - 3.1	9.4 - 8.5	15.4 - 14.0	34	13°53.5	13°55.8	13°15.5	3.4 - 3.1	9.4 - 8.7	15.4 - 14.2	34	14°08.5	14°10.8	13°29.8	3.4 - 3.2	9.4 - 8.9	15.4 - 14.5
35	13°38.8	13°41.0	13°01.5	3.5 - 3.2	9.5 - 8.6	15.5 - 14.1	35	13°53.8	13°56.0	13°15.8	3.5 - 3.2	9.5 - 8.8	15.5 - 14.3	35	14°08.8	14°11.1	13°30.1	3.5 - 3.3	9.5 - 8.9	15.5 - 14.6
36	13°39.0	13°41.2	13°01.7	3.6 - 3.3	9.6 - 8.7	15.6 - 14.2	36	13°54.0	13°56.3	13°16.0	3.6 - 3.3	9.6 - 8.9	15.6 - 14.4	36	14°09.0	14°11.3	13°30.3	3.6 - 3.4	9.6 - 9.0	15.6 - 14.7
37	13°39.3	13°41.5	13°01.9	3.7 - 3.4	9.7 - 8.8	15.7 - 14.3	37	13°54.3	13°56.5	13°16.2	3.7 - 3.4	9.7 - 9.0	15.7 - 14.5	37	14°09.3	14°11.6	13°30.6	3.7 - 3.5	9.7 - 9.1	15.7 - 14.8
38	13°39.5	13°41.7	13°02.2	3.8 - 3.5	9.8 - 8.9	15.8 - 14.4	38	13°54.5	13°56.8	13°16.5	3.8 - 3.5	9.8 - 9.1	15.8 - 14.6	38	14°09.5	14°11.8	13°30.8	3.8 - 3.6	9.8 - 9.2	15.8 - 14.9
39	13°39.7	13°42.0	13°02.4	3.9 - 3.5	9.9 - 9.0	15.9 - 14.4	39	13°54.7	13°57.0	13°16.7	3.9 - 3.6	9.9 - 9.2	15.9 - 14.7	39	14°09.7	14°12.1	13°31.0	3.9 - 3.7	9.9 - 9.3	15.9 - 15.0
40	13°40.0	13°42.2	13°02.6	4.0 - 3.6	10.0 - 9.1	16.0 - 14.5	40	13°55.0	13°57.3	13°17.0	4.0 - 3.7	10.0 - 9.3	16.0 - 14.8	40	14°10.0	14°12.3	13°31.3	4.0 - 3.8	10.0 - 9.4	16.0 - 15.1
41	13°40.2	13°42.5	13°02.9	4.1 - 3.7	10.1 - 9.2	16.1 - 14.6	41	13°55.2	13°57.5	13°17.2	4.1 - 3.8	10.1 - 9.3	16.1 - 14.9	41	14°10.2	14°12.6	13°31.5	4.1 - 3.9	10.1 - 9.5	16.1 - 15.2
42	13°40.5	13°42.7	13°03.1	4.2 - 3.8	10.2 - 9.3	16.2 - 14.7	42	13°55.5	13°57.8	13°17.4	4.2 - 3.9	10.2 - 9.4	16.2 - 15.0	42	14°10.5	14°12.8	13°31.8	4.2 - 4.0	10.2 - 9.6	16.2 - 15.3
43	13°40.8	13°43.0	13°03.4	4.3 - 3.9	10.3 - 9.4	16.3 - 14.8	43	13°55.8	13°58.0	13°17.7	4.3 - 4.0	10.3 - 9.5	16.3 - 15.1	43	14°10.8	14°13.1	13°32.0	4.3 - 4.0	10.3 - 9.7	16.3 - 15.3
44	13°41.0	13°43.2	13°03.6	4.4 - 4.0	10.4 - 9.4	16.4 - 14.9	44	13°56.0	13°58.3	13°17.9	4.4 - 4.1	10.4 - 9.6	16.4 - 15.2	44	14°11.0	14°13.3	13°32.2	4.4 - 4.1	10.4 - 9.8	16.4 - 15.4
45	13°41.3	13°43.5	13°03.8	4.5 - 4.1	10.5 - 9.5	16.5 - 15.0	45	13°56.3	13°58.5	13°18.2	4.5 - 4.2	10.5 - 9.7	16.5 - 15.3	45	14°11.3	14°13.6	13°32.5	4.5 - 4.2	10.5 - 9.9	16.5 - 15.5
46	13°41.5	13°43.7	13°04.1	4.6 - 4.2	10.6 - 9.6	16.6 - 15.1	46	13°56.5	13°58.8	13°18.4	4.6 - 4.3	10.6 - 9.8	16.6 - 15.4	46	14°11.5	14°13.8	13°32.7	4.6 - 4.3	10.6 - 10.0	16.6 -



## Increments and Corrections

m 57	Sun Plan.	Aries	Moon	v and d corr			m 58	Sun Plan.	Aries	Moon	v and d corr			m 59	Sun Plan.	Aries	Moon	v and d corr		
0	14°15.0	14°17.3	13°36.0	0.0 - 0.0	6.0 - 5.8	12.0 - 11.5	0	14°30.0	14°32.4	13°50.4	0.0 - 0.0	6.0 - 5.8	12.0 - 11.7	0	14°45.0	14°47.4	14°04.7	0.0 - 0.0	6.0 - 6.0	12.0 - 11.9
1	14°15.2	14°17.6	13°36.3	0.1 - 0.1	6.1 - 5.8	12.1 - 11.6	1	14°30.2	14°32.6	13°50.6	0.1 - 0.1	6.1 - 5.9	12.1 - 11.8	1	14°45.2	14°47.7	14°04.9	0.1 - 0.1	6.1 - 6.0	12.1 - 12.0
2	14°15.5	14°17.8	13°36.5	0.2 - 0.2	6.2 - 5.9	12.2 - 11.7	2	14°30.5	14°32.9	13°50.8	0.2 - 0.2	6.2 - 6.0	12.2 - 11.9	2	14°45.5	14°47.9	14°05.2	0.2 - 0.2	6.2 - 6.1	12.2 - 12.1
3	14°15.7	14°18.1	13°36.8	0.3 - 0.3	6.3 - 6.0	12.3 - 11.8	3	14°30.7	14°33.1	13°51.1	0.3 - 0.3	6.3 - 6.1	12.3 - 12.0	3	14°45.7	14°48.2	14°05.4	0.3 - 0.3	6.3 - 6.2	12.3 - 12.2
4	14°16.0	14°18.3	13°37.0	0.4 - 0.4	6.4 - 6.1	12.4 - 11.9	4	14°31.0	14°33.4	13°51.3	0.4 - 0.4	6.4 - 6.2	12.4 - 12.1	4	14°46.0	14°48.4	14°05.6	0.4 - 0.4	6.4 - 6.3	12.4 - 12.3
5	14°16.3	14°18.6	13°37.2	0.5 - 0.5	6.5 - 6.2	12.5 - 12.0	5	14°31.3	14°33.6	13°51.6	0.5 - 0.5	6.5 - 6.3	12.5 - 12.2	5	14°46.3	14°48.7	14°05.9	0.5 - 0.5	6.5 - 6.4	12.5 - 12.4
6	14°16.5	14°18.8	13°37.5	0.6 - 0.6	6.6 - 6.3	12.6 - 12.1	6	14°31.5	14°33.9	13°51.8	0.6 - 0.6	6.6 - 6.4	12.6 - 12.3	6	14°46.5	14°48.9	14°06.1	0.6 - 0.6	6.6 - 6.5	12.6 - 12.5
7	14°16.8	14°19.1	13°37.7	0.7 - 0.7	6.7 - 6.4	12.7 - 12.2	7	14°31.8	14°34.1	13°52.0	0.7 - 0.7	6.7 - 6.5	12.7 - 12.4	7	14°46.8	14°49.2	14°06.4	0.7 - 0.7	6.7 - 6.6	12.7 - 12.6
8	14°17.0	14°19.3	13°38.0	0.8 - 0.8	6.8 - 6.5	12.8 - 12.3	8	14°32.0	14°34.4	13°52.3	0.8 - 0.8	6.8 - 6.6	12.8 - 12.5	8	14°47.0	14°49.4	14°06.6	0.8 - 0.8	6.8 - 6.7	12.8 - 12.7
9	14°17.2	14°19.6	13°38.2	0.9 - 0.9	6.9 - 6.6	12.9 - 12.4	9	14°32.2	14°34.6	13°52.5	0.9 - 0.9	6.9 - 6.7	12.9 - 12.6	9	14°47.2	14°49.7	14°06.8	0.9 - 0.9	6.9 - 6.8	12.9 - 12.8
10	14°17.5	14°19.8	13°38.4	1.0 - 1.0	7.0 - 6.7	13.0 - 12.5	10	14°32.5	14°34.9	13°52.8	1.0 - 1.0	7.0 - 6.8	13.0 - 12.7	10	14°47.5	14°49.9	14°07.1	1.0 - 1.0	7.0 - 6.9	13.0 - 12.9
11	14°17.7	14°20.1	13°38.7	1.1 - 1.1	7.1 - 6.8	13.1 - 12.6	11	14°32.7	14°35.1	13°53.0	1.1 - 1.1	7.1 - 6.9	13.1 - 12.8	11	14°47.7	14°50.2	14°07.3	1.1 - 1.1	7.1 - 7.0	13.1 - 13.0
12	14°18.0	14°20.3	13°38.9	1.2 - 1.2	7.2 - 6.9	13.2 - 12.7	12	14°33.0	14°35.4	13°53.2	1.2 - 1.2	7.2 - 7.0	13.2 - 12.9	12	14°48.0	14°50.4	14°07.5	1.2 - 1.2	7.2 - 7.1	13.2 - 13.1
13	14°18.3	14°20.6	13°39.2	1.3 - 1.2	7.3 - 7.0	13.3 - 12.7	13	14°33.3	14°35.6	13°53.5	1.3 - 1.3	7.3 - 7.1	13.3 - 13.0	13	14°48.3	14°50.7	14°07.8	1.3 - 1.3	7.3 - 7.2	13.3 - 13.2
14	14°18.5	14°20.8	13°39.4	1.4 - 1.3	7.4 - 7.1	13.4 - 12.8	14	14°33.5	14°35.9	13°53.7	1.4 - 1.4	7.4 - 7.2	13.4 - 13.1	14	14°48.5	14°50.9	14°08.0	1.4 - 1.4	7.4 - 7.3	13.4 - 13.3
15	14°18.8	14°21.1	13°39.6	1.5 - 1.4	7.5 - 7.2	13.5 - 12.9	15	14°33.8	14°36.1	13°53.9	1.5 - 1.5	7.5 - 7.3	13.5 - 13.2	15	14°48.8	14°51.2	14°08.3	1.5 - 1.5	7.5 - 7.4	13.5 - 13.4
16	14°19.0	14°21.3	13°39.9	1.6 - 1.5	7.6 - 7.3	13.6 - 13.0	16	14°34.0	14°36.4	13°54.2	1.6 - 1.6	7.6 - 7.4	13.6 - 13.3	16	14°49.0	14°51.4	14°08.5	1.6 - 1.6	7.6 - 7.5	13.6 - 13.5
17	14°19.2	14°21.6	13°40.1	1.7 - 1.6	7.7 - 7.4	13.7 - 13.1	17	14°34.2	14°36.6	13°54.4	1.7 - 1.7	7.7 - 7.5	13.7 - 13.4	17	14°49.2	14°51.7	14°08.7	1.7 - 1.7	7.7 - 7.6	13.7 - 13.6
18	14°19.5	14°21.8	13°40.3	1.8 - 1.7	7.8 - 7.5	13.8 - 13.2	18	14°34.5	14°36.9	13°54.7	1.8 - 1.8	7.8 - 7.6	13.8 - 13.5	18	14°49.5	14°51.9	14°09.0	1.8 - 1.8	7.8 - 7.7	13.8 - 13.7
19	14°19.8	14°22.1	13°40.6	1.9 - 1.8	7.9 - 7.6	13.9 - 13.3	19	14°34.8	14°37.1	13°54.9	1.9 - 1.9	7.9 - 7.7	13.9 - 13.6	19	14°49.8	14°52.2	14°09.2	1.9 - 1.9	7.9 - 7.8	13.9 - 13.8
20	14°20.0	14°22.4	13°40.8	2.0 - 1.9	8.0 - 7.7	14.0 - 13.4	20	14°35.0	14°37.4	13°55.1	2.0 - 1.9	8.0 - 7.8	14.0 - 13.7	20	14°50.0	14°52.4	14°09.5	2.0 - 2.0	8.0 - 7.9	14.0 - 13.9
21	14°20.3	14°22.6	13°41.1	2.1 - 2.0	8.1 - 7.8	14.1 - 13.5	21	14°35.3	14°37.6	13°55.4	2.1 - 2.0	8.1 - 7.9	14.1 - 13.7	21	14°50.3	14°52.7	14°09.7	2.1 - 2.1	8.1 - 8.0	14.1 - 14.0
22	14°20.5	14°22.9	13°41.3	2.2 - 2.1	8.2 - 7.9	14.2 - 13.6	22	14°35.5	14°37.9	13°55.6	2.2 - 2.1	8.2 - 8.0	14.2 - 13.8	22	14°50.5	14°52.9	14°09.9	2.2 - 2.2	8.2 - 8.1	14.2 - 14.1
23	14°20.7	14°23.1	13°41.5	2.3 - 2.2	8.3 - 8.0	14.3 - 13.7	23	14°35.7	14°38.1	13°55.9	2.3 - 2.2	8.3 - 8.1	14.3 - 13.9	23	14°50.7	14°53.2	14°10.2	2.3 - 2.3	8.3 - 8.2	14.3 - 14.2
24	14°21.0	14°23.4	13°41.8	2.4 - 2.3	8.4 - 8.1	14.4 - 13.8	24	14°36.0	14°38.4	13°56.1	2.4 - 2.3	8.4 - 8.2	14.4 - 14.0	24	14°51.0	14°53.4	14°10.4	2.4 - 2.4	8.4 - 8.3	14.4 - 14.3
25	14°21.2	14°23.6	13°42.0	2.5 - 2.4	8.5 - 8.1	14.5 - 13.9	25	14°36.2	14°38.6	13°56.3	2.5 - 2.4	8.5 - 8.3	14.5 - 14.1	25	14°51.2	14°53.7	14°10.6	2.5 - 2.5	8.5 - 8.4	14.5 - 14.4
26	14°21.5	14°23.9	13°42.3	2.6 - 2.5	8.6 - 8.2	14.6 - 14.0	26	14°36.5	14°38.9	13°56.6	2.6 - 2.5	8.6 - 8.4	14.6 - 14.2	26	14°51.5	14°53.9	14°10.9	2.6 - 2.6	8.6 - 8.5	14.6 - 14.5
27	14°21.8	14°24.1	13°42.5	2.7 - 2.6	8.7 - 8.3	14.7 - 14.1	27	14°36.8	14°39.1	13°56.8	2.7 - 2.6	8.7 - 8.5	14.7 - 14.3	27	14°51.8	14°54.2	14°11.1	2.7 - 2.7	8.7 - 8.6	14.7 - 14.6
28	14°22.0	14°24.4	13°42.7	2.8 - 2.7	8.8 - 8.4	14.8 - 14.2	28	14°37.0	14°39.4	13°57.0	2.8 - 2.7	8.8 - 8.6	14.8 - 14.4	28	14°52.0	14°54.4	14°11.4	2.8 - 2.8	8.8 - 8.7	14.8 - 14.7
29	14°22.3	14°24.6	13°43.0	2.9 - 2.8	8.9 - 8.5	14.9 - 14.3	29	14°37.3	14°39.6	13°57.3	2.9 - 2.8	8.9 - 8.7	14.9 - 14.5	29	14°52.3	14°54.7	14°11.6	2.9 - 2.9	8.9 - 8.8	14.9 - 14.8
30	14°22.5	14°24.9	13°43.2	3.0 - 2.9	9.0 - 8.6	15.0 - 14.4	30	14°37.5	14°39.9	13°57.5	3.0 - 2.9	9.0 - 8.8	15.0 - 14.6	30	14°52.5	14°54.9	14°11.8	3.0 - 3.0	9.0 - 8.9	15.0 - 14.9
31	14°22.7	14°25.1	13°43.4	3.1 - 3.0	9.1 - 8.7	15.1 - 14.5	31	14°37.7	14°40.1	13°57.8	3.1 - 3.0	9.1 - 8.9	15.1 - 14.7	31	14°52.7	14°55.2	14°12.1	3.1 - 3.1	9.1 - 9.0	15.1 - 15.0
32	14°23.0	14°25.4	13°43.7	3.2 - 3.1	9.2 - 8.8	15.2 - 14.6	32	14°38.0	14°40.4	13°58.0	3.2 - 3.1	9.2 - 9.0	15.2 - 14.8	32	14°53.0	14°55.4	14°12.3	3.2 - 3.2	9.2 - 9.1	15.2 - 15.1
33	14°23.2	14°25.6	13°43.9	3.3 - 3.2	9.3 - 8.9	15.3 - 14.7	33	14°38.2	14°40.7	13°58.2	3.3 - 3.2	9.3 - 9.1	15.3 - 14.9	33	14°53.2	14°55.7	14°12.6	3.3 - 3.3	9.3 - 9.2	15.3 - 15.2
34	14°23.5	14°25.9	13°44.2	3.4 - 3.3	9.4 - 9.0	15.4 - 14.8	34	14°38.5	14°40.9	13°58.5	3.4 - 3.3	9.4 - 9.2	15.4 - 15.0	34	14°53.5	14°55.9	14°12.8	3.4 - 3.4	9.4 - 9.3	15.4 - 15.3
35	14°23.8	14°26.1	13°44.4	3.5 - 3.4	9.5 - 9.1	15.5 - 14.9	35	14°38.8	14°41.2	13°58.7	3.5 - 3.4	9.5 - 9.3	15.5 - 15.1	35	14°53.8	14°56.2	14°13.0	3.5 - 3.5	9.5 - 9.4	15.5 - 15.4
36	14°24.0	14°26.4	13°44.6	3.6 - 3.5	9.6 - 9.2	15.6 - 15.0	36	14°39.0	14°41.4	13°59.0	3.6 - 3.5	9.6 - 9.4	15.6 - 15.2	36	14°54.0	14°56.4	14°13.3	3.6 - 3.6	9.6 - 9.5	15.6 - 15.5
37	14°24.3	14°26.6	13°44.9	3.7 - 3.5	9.7 - 9.3	15.7 - 15.0	37	14°39.3	14°41.7	13°59.2	3.7 - 3.6	9.7 - 9.5	15.7 - 15.3	37	14°54.3	14°56.7	14°13.5	3.7 - 3.7	9.7 - 9.6	15.7 - 15.6
38	14°24.5	14°26.9	13°45.1	3.8 - 3.6	9.8 - 9.4	15.8 - 15.1	38	14°39.5	14°41.9	13°59.4	3.8 - 3.7	9.8 - 9.6	15.8 - 15.4	38	14°54.5	14°56.9	14°13.8	3.8 - 3.8	9.8 - 9.7	15.8 - 15.7
39	14°24.7	14°27.1	13°45.4	3.9 - 3.7	9.9 - 9.5	15.9 - 15.2	39	14°39.7	14°42.2	13°59.7	3.9 - 3.8	9.9 - 9.7	15.9 - 15.5	39	14°54.7	14°57.2	14°14.0	3.9 - 3.9	9.9 - 9.8	15.9 - 15.8
40	14°25.0	14°27.4	13°45.6	4.0 - 3.8	10.0 - 9.6	16.0 - 15.3	40	14°40.0	14°42.4	13°59.9	4.0 - 3.9	10.0 - 9.8	16.0 - 15.6	40	14°55.0	14°57.4	14°14.2	4.0 - 4.0	10.0 - 9.9	16.0 - 15.9
41	14°25.2	14°27.6	13°45.8	4.1 - 3.9	10.1 - 9.7	16.1 - 15.4	41	14°40.2	14°42.7	14°00.1	4.1 - 4.0	10.1 - 9.8	16.1 - 15.7	41	14°55.2	14°57.7	14°14.5	4.1 - 4.1	10.1 - 10.0	16.1 - 16.0
42	14°25.5	14°27.9	13°46.1	4.2 - 4.0	10.2 - 9.8	16.2 - 15.5	42	14°40.5	14°42.9	14°00.4	4.2 - 4.1	10.2 - 9.9	16.2 - 15.8	42	14°55.5	14°57.9	14°14.7	4.2 - 4.2	10.2 - 10.1	16.2 - 16.1
43	14°25.8	14°28.1	13°46.3	4.3 - 4.1	10.3 - 9.9	16.3 - 15.6	43	14°40.8	14°43.2	14°00.6	4.3 - 4.2	10.3 - 10.0	16.3 - 15.9	43	14°55.8	14°58.2	14°14.9	4.3 - 4.3	10.3 - 10.2	16.3 - 16.2
44	14°26.0	14°28.4	13°46.5	4.4 - 4.2	10.4 - 10.0	16.4 - 15.7	44	14°41.0	14°43.4	14°00.9	4.4 - 4.3	10.4 - 10.1	16.4 - 16.0	44	14°56.0	14°58.4	14°15.2	4.4 - 4.4	10.4 - 10.3	16.4 - 16.3
45	14°26.3	14°28.6	13°46.8	4.5 - 4.3	10.5 - 10.1	16.5 - 15.8	45	14°41.3	14°43.7	14°01.1	4.5 - 4.4	10.5 - 10.2	16.5 - 16.1	45	14°56.3	14°58.7	14°15.4	4.5 - 4.5	10.5 - 10.4	16.5 - 16.4
46	14°26.5	14°28.9	13°47.0	4.6 - 4.4	10.6 - 10.2	16.6 - 15.9	46	14°41.5	14°43.9	14°01.3	4.6 - 4.5	10.6 - 10.3	16.6 - 16.2	46	14°56.5	14°59.0	14			

Altitude Correction Tables for 10° to 90° — Sun, Stars, Planets

SUN October – March			SUN April – September			Stars & Planets		Additional Altitude Correction for Mars & Venus	Refraction		DIP <i>always subtracted from Hs</i>				
App. Alt.	Lower Limb	Upper Limb	App. Alt.	Lower Limb	Upper Limb	App. Alt.	Corr		App. Alt.	Corr	Ht. of Eye	Corr	Ht. of Eye	Ht. of Eye	Corr
9 33	+10.8	- 21.5	9 39	+10.6	- 21.2	9 55	-5.3	5.5	-9.1	2.4		8.0	1.0	-1.8	
9 45	+10.9	-21.4	9 50	+10.7	-21.1	10 07	-5.2	6.0	-8.5	2.6	-2.8	8.6	1.5	-2.2	
9 56	+11.0	-21.3	10 02	+10.8	-21.0	10 20	-5.1	6.5	-7.9	2.8	-2.9	9.2	2.0	-2.5	
10 08	+11.1	-21.2	10 14	+10.9	-20.9	10 32	-5.0	7.0	-7.5	3.0	-3.0	9.8	2.5	-2.8	
10 20	+11.2	-21.1	10 27	+11.0	-20.8	10 46	-4.9	7.5	-7.0	3.2	-3.1	10.5	3.0	-3.0	
10 33	+11.3	-21.0	10 40	+11.1	-20.7	10 59	-4.8	8.0	-6.6	3.4	-3.2	11.2			
10 46	+11.4	-20.9	10 53	+11.2	-20.6	11 14	-4.7	8.5	-6.3	3.6	-3.3	11.9		See table	
11 00	+11.5	-20.8	11 07	+11.3	-20.5	11 29	-4.6	9.0	-5.9	3.8	-3.4	12.6		←	
11 15	+11.6	-20.7	11 22	+11.4	-20.4	11 44	-4.6	9.5	-5.7	4.0	-3.5	13.3		meters	
11 30	+11.7	-20.6	11 37	+11.5	-20.3	12 00	-4.5	10.0	-5.4	4.3	-3.6	14.1	20	-7.9	
11 45	+11.8	-20.5	11 53	+11.6	-20.2	12 17	-4.4	10.5	-5.1	4.5	-3.7	14.9	22	-8.3	
12 01	+11.9	-20.4	12 10	+11.7	-20.1	12 35	-4.3	11.0	-4.9	4.7	-3.8	15.7	24	-8.6	
12 18	+12.0	-20.3	12 27	+11.8	-20.0	12 53	-4.2	11.5	-4.7	5.0	-3.9	16.5	26	-9.0	
12 36	+12.1	-20.2	14 45	+11.9	-19.9	13 12	-4.1	12.0	-4.5	5.2	-4.0	17.4	28	-9.3	
12 54	+12.2	-20.1	13 04	+12.0	-19.8	13 32	-4.0	12.5	-4.4	5.5	-4.1	18.3			
13 14	+12.3	-20.0	13 24	+12.1	-19.7	13 53	-3.9	13.0	-4.2	5.8	-4.2	19.1	30	-9.6	
13 34	+12.4	-19.9	13 44	+12.2	-19.6	14 16	-3.8	13.5	-4.0	6.1	-4.3	20.1	32	-10.0	
13 55	+12.5	-19.8	14 06	+12.3	-19.5	14 39	-3.7	14.0	-3.9	6.3	-4.4	21.0	34	-10.3	
14 17	+12.6	-19.7	14 29	+12.4	-19.4	15 03	-3.6	14.5	-3.8	6.6	-4.5	22.0	36	-10.6	
14 41	+12.7	-19.6	14 53	+12.5	-19.3	15 29	-3.5	15.0	-3.6	6.9	-4.6	22.9	38	-10.8	
15 05	+12.8	-19.5	15 18	+12.6	-19.2	15 56	-3.4	15.5	-3.5	7.2	-4.7	23.9			
15 31	+12.9	-19.4	15 45	+12.7	-19.1	16 25	-3.3	16.0	-3.4	7.5	-4.8	24.9	40	-11.1	
15 59	+13.0	-19.3	16 13	+12.8	-19.0	16 55	-3.2	16.5	-3.3	7.9	-4.9	26.0	42	-11.4	
16 27	+13.1	-19.2	16 43	+12.9	-18.9	17 27	-3.1	17.0	-3.2	8.2	-5.0	27.1	44	-11.7	
16 58	+13.2	-19.1	17 14	+13.0	-18.8	18 01	-3.0	17.5	-3.1	8.5	-5.1	28.1	46	-11.9	
17 30	+13.3	-19.0	17 47	+13.1	-18.7	18 37	-2.9	18.0	-3.0	8.8	-5.2	29.2	48	-12.2	
18 05	+13.4	-18.9	18 23	+13.2	-18.6	19 16	-2.8	18.5	-2.9	9.2	-5.3	30.4		feet	
18 41	+13.5	-18.8	19 00	+13.3	-18.5	19 56	-2.7	19.0	-2.9	9.5	-5.4	31.5	2	-1.4	
19 20	+13.6	-18.7	19 41	+13.4	-18.4	20 40	-2.6	19.5	-2.8	9.9	-5.5	32.7	4	-1.9	
20 02	+13.7	-18.6	20 24	+13.5	-18.3	21 27	-2.5	20.0	-2.7	10.3	-5.6	33.9	6	-2.4	
20 46	+13.8	-18.5	21 10	+13.6	-18.2	22 17	-2.4	21.0	-2.6	10.6	-5.7	35.1	8	-2.7	
21 34	+13.9	-18.4	21 59	+13.7	-18.1	23 11	-2.3	22.0	-2.4	11.0	-5.8	36.3	10	-3.1	
22 25	+14.0	-18.3	22 52	+13.8	-18.0	24 09	-2.2	23.0	-2.3	11.4	-5.9	37.6		See table	
23 20	+14.1	-18.2	23 49	+13.9	-17.9	25 12	-2.1	24.0	-2.2	11.8	-6.0	38.9		←	
24 20	+14.2	-18.1	24 51	+14.0	-17.8	26 20	-2.0	25.0	-2.1	12.2	-6.1	40.1		feet	
25 24	+14.3	-18.0	25 58	+14.1	-17.7	27 34	-1.9	26.0	-2.0	12.6	-6.2	41.5	70	-8.1	
26 34	+14.4	-17.9	27 11	+14.2	-17.6	28 54	-1.8	27.0	-1.9	13.0	-6.3	42.8	75	-8.4	
27 50	+14.5	-17.8	28 31	+14.3	-17.5	30 22	-1.7	28.0	-1.9	13.4	-6.4	44.2	80	-8.7	
29 13	+14.6	-17.7	29 58	+14.4	-17.4	31 58	-1.6	29.0	-1.8	13.8	-6.5	45.5	85	-8.9	
30 44	+14.7	-17.6	31 33	+14.5	-17.3	33 43	-1.5	30.0	-1.7	14.2	-6.6	46.9	90	-9.2	
32 24	+14.8	-17.5	33 18	+14.6	-17.2	35 38	-1.4	31.0	-1.7	14.7	-6.7	48.4	95	9.5	
34 15	+14.9	-17.4	35 15	+14.7	-17.1	37 45	-1.3	32.0	-1.6	15.1	-6.8	49.8	100	-9.7	
36 17	+15.0	-17.3	37 24	+14.8	-17.0	40 06	-1.2	33.0	-1.5	15.5	-6.9	51.3	105	-9.9	
38 34	+15.1	-17.2	39 48	+14.9	-16.9	42 42	-1.1	34.0	-1.5	16.0	-7.0	52.8	110	-10.2	
41 06	+15.2	-17.1	42 28	+15.0	-16.8	45 34	-1.0	35.0	-1.4	16.5	-7.1	54.3	115	-10.4	
43 56	+15.3	-17.0	45 29	+15.1	-16.7	48 45	-0.9	36.0	-1.4	16.9	-7.2	55.8	120	-10.6	
47 07	+15.4	-16.9	48 52	+15.2	-16.6	52 16	-0.8	37.0	-1.3	17.4	-7.3	57.4	125	-10.8	
50 43	+15.5	-16.8	51 41	+15.3	-16.5	56 09	-0.7	38.0	-1.3	17.9	-7.4	58.9			
54 46	+15.6	-16.7	56 59	+15.4	-16.4	60 26	-0.6	39.0	-1.2	18.4	-7.5	60.5	130	-11.1	
59 21	+15.7	-16.6	61 50	+15.5	-16.3	65 06	-0.5	40.0	-1.2	18.8	-7.6	62.1	135	-11.3	
64 28	+15.8	-16.5	67 15	+15.6	-16.2	70 09	-0.4	45.0	-1.0	19.3	-7.7	63.8	140	-11.5	
70 10	+15.9	-16.4	73 14	+15.7	-16.1	75 32	-0.3	50.0	-0.8	19.8	-7.8	65.4	145	-11.7	
76 24	+16.0	-16.3	79 42	+15.8	-16.0	81 12	-0.2	55.0	-0.7	20.4	-7.9	67.1	150	-11.9	
83 05	+16.1	-16.2	86 21	+15.9	-15.9	87 03	0.0	60.0	-0.6	20.9	-8.0	68.8	155	-12.1	
90 00			90 00			90 00		65.0	-0.5	21.4	-8.1	70.5			
								70.0	-0.4						
								75.0	-0.3						
								80.0	-0.2						
								85.0	-0.1						

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

**Altitude Correction Tables for 0° to 10° — Sun, Stars, Planets**

App. Alt.	Sun		Sun		Stars & Planets	App. Alt.	Sun		Sun		Stars & Planets
	October - March		April - September				October - March		April - September		
	Lower Limb	Upper Limb	Lower Limb	Upper Limb			Lower Limb	Upper Limb	Lower Limb	Upper Limb	
0 00	-17.5	-49.8	-17.8	-49.6	-33.8	3 30	+ 3.4	-28.9	+ 3.1	-28.7	-12.9
0 03	16.9	49.2	17.2	49.0	33.2	3 35	3.6	28.7	3.3	28.5	12.7
0 06	16.3	48.6	16.6	48.4	32.6	3 40	3.8	28.5	3.6	28.2	12.5
0 09	15.7	48.0	16.0	47.8	32.0	3 45	4.0	28.3	3.8	28.0	12.3
0 12	15.2	47.5	15.4	47.2	31.5	3 50	4.2	28.1	4.0	27.8	12.1
0 15	14.6	46.9	14.8	46.6	30.9	3 55	4.4	27.9	4.1	27.7	11.9
0 18	-14.1	-46.4	-14.3	-46.1	-30.4	4 00	+ 4.6	-27.7	+ 4.3	-27.5	-11.7
0 21	13.5	45.8	13.8	45.6	29.8	4 05	4.8	27.5	4.5	27.3	11.5
0 24	13.0	45.3	13.3	45.1	29.3	4 10	4.9	27.4	4.7	27.1	11.4
0 27	12.5	44.8	12.8	44.6	28.8	4 15	5.1	27.2	4.9	26.9	11.2
0 30	12.0	44.3	12.3	44.1	28.3	4 20	5.3	27.0	5.0	26.8	11.0
0 33	11.6	43.9	11.8	43.6	27.9	4 25	5.4	26.9	5.2	26.6	10.9
0 36	-11.1	-10.0	-11.3	-43.1	-27.4	4 30	+ 5.6	-26.7	+ 5.3	-26.5	-10.7
0 39	10.6	42.9	10.9	42.7	26.9	4 35	5.7	26.6	5.5	26.3	10.6
0 42	10.2	42.5	10.5	42.3	26.5	4 40	5.9	26.4	5.6	26.2	10.4
0 45	9.8	42.1	10.0	41.8	26.1	4 45	6.0	26.3	5.8	26.0	10.3
0 48	9.4	41.7	9.6	41.4	25.7	4 50	6.2	26.1	5.9	25.9	10.1
0 51	9.0	41.3	9.2	41.0	25.3	4 55	6.3	26.0	6.1	25.7	10.0
0 54	-8.6	-40.9	-8.8	-40.6	-24.9	5 00	+ 6.4	-25.9	+ 6.2	-25.6	-9.9
0 57	8.2	40.5	8.4	40.2	24.5	5 05	6.6	25.7	6.3	25.5	9.7
1 00	7.8	40.1	8.0	39.8	24.1	5 10	6.7	25.6	6.5	25.3	9.6
1 03	7.4	39.7	7.7	39.5	23.7	5 15	6.8	25.5	6.6	25.2	9.5
1 06	7.1	39.4	7.3	39.1	23.4	5 20	7.0	25.3	6.7	25.1	9.3
1 09	6.7	39.0	7.0	38.8	23.0	5 25	7.1	25.2	6.8	25.0	9.2
1 12	-6.4	-38.7	-6.6	-38.4	-22.7	5 30	+ 7.2	-25.1	+ 6.9	-24.9	-9.1
1 15	6.0	38.3	6.3	38.1	22.3	5 35	7.3	25.0	7.1	24.7	9.0
1 18	5.7	38.0	6.0	37.8	22.0	5 40	7.4	24.9	7.2	24.6	8.9
1 21	5.4	37.7	5.7	37.5	21.7	5 45	7.5	24.8	7.3	24.5	8.8
1 24	5.1	37.4	5.3	37.1	21.4	5 50	7.6	24.7	7.4	24.4	8.7
1 27	4.8	37.1	5.0	36.8	21.1	5 55	7.7	24.6	7.5	24.3	8.6
1 30	-4.5	-36.8	-4.7	-36.5	-20.8	6 00	+ 7.8	-24.5	+ 7.6	-24.2	-8.5
1 35	4.0	36.3	4.3	36.1	20.3	6 10	8.0	24.3	7.8	24.0	8.3
1 40	3.6	35.9	3.8	35.6	19.9	6 20	8.2	24.1	8.0	23.8	8.1
1 45	3.1	35.4	3.4	35.2	19.4	6 30	8.4	23.9	8.2	23.6	7.9
1 50	2.7	35.0	2.9	34.7	19.0	6 40	8.6	23.7	8.3	23.5	7.7
1 55	2.3	34.6	2.5	34.3	18.6	6 50	8.7	23.6	8.5	23.3	7.6
2 00	-1.9	-34.2	-2.1	-33.9	-18.2	7 00	+ 8.9	-23.4	+ 8.7	-23.1	-7.4
2 05	1.5	33.8	1.7	33.5	17.8	7 10	9.1	23.2	8.8	23.0	7.2
2 10	1.1	33.4	1.4	33.2	17.4	7 20	9.2	23.1	9.0	22.8	7.1
2 15	0.8	33.1	1.0	32.8	17.1	7 30	9.3	23.0	9.1	22.7	6.9
2 20	0.4	32.7	0.7	32.5	16.7	7 40	9.5	22.8	9.2	22.6	6.8
2 25	-0.1	32.4	-0.3	32.1	16.4	7 50	9.6	22.7	9.4	22.4	6.7
2 30	+ 0.2	-32.1	0.0	-31.8	-16.1	8 00	+ 9.7	-22.6	+ 9.5	-22.3	-6.6
2 35	0.5	31.8	+ 0.3	31.5	15.8	8 10	9.9	22.4	9.6	22.2	6.4
2 40	0.8	31.5	0.6	31.2	15.4	8 20	10.0	22.3	9.7	22.1	6.3
2 45	1.1	31.2	0.9	30.9	15.2	8 30	10.1	22.2	9.9	21.9	6.2
2 50	1.4	30.9	1.2	30.6	14.9	8 40	10.2	22.1	10.0	21.8	6.1
2 55	1.7	30.6	1.4	30.4	14.9	8 50	10.3	22.0	10.1	21.7	6.0
3 00	+ 2.0	-30.3	+ 1.7	-30.1	-14.3	9 00	+ 10.4	-21.9	+ 10.2	-21.6	-5.9
3 05	2.2	30.1	2.0	29.8	14.1	9 10	10.5	21.8	10.3	21.5	5.8
3 10	2.5	29.8	2.2	29.6	13.8	9 20	10.6	21.7	10.4	21.4	5.7
3 15	2.7	29.6	2.5	29.3	13.6	9 30	10.7	21.6	10.5	21.3	5.6
3 20	2.9	29.4	2.7	29.1	13.4	9 40	10.8	21.5	10.6	21.2	5.5
3 25	3.2	29.1	2.9	28.9	13.4	9 50	10.9	21.4	10.6	21.2	5.4
3 30	3.4	-28.9	+ 3.1	-28.7	-12.9	10 00	+ 11.0	-21.3	+ 10.7	-21.1	-5.3

For bubble sextant observations- ignore dip and use star corrections for the Sun, planets and stars.



# ALTITUDE CORRECTION TABLES 0° – 35° — MOON

App. Alt.	0° – 4°		5° – 9°		10° – 14°		15° – 19°		20° – 24°		25° – 29°		30° – 34°		App. Alt.				
	Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>						
	0°	5°	10°	15°	20°	25°	30°	00	10	20	30	40	50	00	10	20	30	40	50
00	34.5	58.2	62.1	62.8	62.2	60.8	58.9	00						00					
10	36.5	58.5	62.2	62.8	62.2	60.8	58.8	10						10					
20	38.3	58.7	62.2	62.8	62.1	60.7	58.8	20						20					
30	40.0	58.9	62.3	62.8	62.1	60.7	58.7	30						30					
40	41.5	59.1	62.3	62.8	62.0	60.6	58.6	40						40					
50	42.9	59.3	62.4	62.7	62.0	60.6	58.5	50						50					
00	44.2	59.5	62.4	62.7	61.9	60.5	58.5	00						00					
10	45.4	59.7	62.4	62.7	61.9	60.4	58.4	10						10					
20	46.5	59.9	62.5	62.7	61.9	60.4	58.3	20						20					
30	47.5	60.0	62.5	62.7	61.9	60.3	58.2	30						30					
40	48.4	60.2	62.5	62.7	61.8	60.3	58.2	40						40					
50	49.3	60.3	62.6	62.7	61.8	60.2	58.1	50						50					
00	50.1	60.5	62.6	62.7	61.7	60.1	58.0	00						00					
10	50.8	60.6	62.6	62.6	61.7	60.1	57.9	10						10					
20	51.5	60.7	62.6	62.6	61.6	60.0	57.8	20						20					
30	52.2	60.9	62.7	62.6	61.6	59.9	57.8	30						30					
40	52.8	61.0	62.7	62.6	61.6	59.9	57.7	40						40					
50	53.4	61.1	62.7	62.6	61.5	59.8	57.6	50						50					
00	53.9	61.2	62.7	62.5	61.5	59.7	57.5	00						00					
10	54.4	61.3	62.7	62.5	61.4	59.7	57.4	10						10					
20	54.9	61.4	62.7	62.5	61.4	59.6	57.4	20						20					
30	55.3	61.5	62.8	62.5	61.3	59.5	57.3	30						30					
40	55.7	61.6	62.8	62.4	61.3	59.5	57.2	40						40					
50	56.1	61.6	62.8	62.4	61.2	59.4	57.1	50						50					
00	56.4	61.7	62.8	62.4	61.2	59.3	57.0	00						00					
10	56.8	61.8	62.8	62.4	61.1	59.3	56.9	10						10					
20	57.1	61.9	62.8	62.3	61.1	59.2	56.9	20						20					
30	57.4	61.9	62.8	62.3	61.0	59.1	56.8	30						30					
40	57.7	62.0	62.8	62.3	61.0	59.1	56.7	40						40					
50	58.0	62.1	62.8	62.2	60.9	59.0	56.6	50						50					
HP	L	U	L	U	L	U	L	U	L	U	L	U	L	U	HP				
54.0	0.3	0.9	0.3	0.9	0.4	1.0	0.5	1.1	0.6	1.2	0.7	1.3	0.9	1.5	54.0				
54.3	0.7	1.1	0.7	1.2	0.8	1.2	0.8	1.3	0.9	1.4	1.1	1.5	1.2	1.7	54.3				
54.6	1.1	1.4	1.1	1.4	1.1	1.4	1.2	1.5	1.3	1.6	1.4	1.7	1.5	1.8	54.6				
54.9	1.4	1.6	1.4	1.6	1.5	1.6	1.6	1.7	1.6	1.8	1.8	1.9	1.9	2.0	54.9				
55.2	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	55.2				
55.5	2.2	2.0	2.2	2.0	2.3	2.1	2.3	2.1	2.4	2.2	2.4	2.3	2.5	2.4	55.5				
55.8	2.6	2.2	2.6	2.2	2.6	2.3	2.7	2.3	2.7	2.4	2.8	2.4	2.9	2.5	55.8				
56.1	3.0	2.4	3.0	2.5	3.0	2.5	3.0	2.5	3.1	2.6	3.1	2.6	3.2	2.7	56.1				
56.4	3.3	2.7	3.3	2.7	3.4	2.7	3.4	2.7	3.4	2.8	3.5	2.8	3.5	2.9	56.4				
56.7	3.7	2.9	3.7	2.9	3.8	2.9	3.8	2.9	3.8	3.0	3.8	3.0	3.9	3.0	56.7				
57.0	4.1	3.1	4.1	3.1	4.1	3.1	4.1	3.1	4.2	3.2	4.2	3.2	4.2	3.2	57.0				
57.3	4.5	3.3	4.5	3.3	4.5	3.3	4.5	3.3	4.5	3.3	4.5	3.4	4.6	3.4	57.3				
57.6	4.9	3.5	4.9	3.5	4.9	3.5	4.9	3.5	4.9	3.5	4.9	3.5	4.9	3.6	57.6				
57.9	5.3	3.8	5.3	3.8	5.2	3.8	5.2	3.7	5.2	3.7	5.2	3.7	5.2	3.7	57.9				
58.2	5.6	4.0	5.6	4.0	5.6	4.0	5.6	4.0	5.6	3.9	5.6	3.9	5.6	3.9	58.2				
58.5	6.0	4.2	6.0	4.2	6.0	4.2	6.0	4.2	6.0	4.1	5.9	4.1	5.9	4.1	58.5				
58.8	6.4	4.4	6.4	4.4	6.4	4.4	6.3	4.4	6.3	4.3	6.3	4.3	6.2	4.2	58.8				
59.1	6.8	4.6	6.8	4.6	6.7	4.6	6.7	4.6	6.7	4.5	6.6	4.5	6.6	4.4	59.1				
59.4	7.2	4.8	7.1	4.8	7.1	4.8	7.1	4.8	7.0	4.7	7.0	4.7	6.9	4.6	59.4				
59.7	7.5	5.1	7.5	5.0	7.5	5.0	7.5	5.0	7.4	4.9	7.3	4.8	7.2	4.8	59.7				
60.0	7.9	5.3	7.9	5.3	7.9	5.2	7.8	5.2	7.8	5.1	7.7	5.0	7.6	4.9	60.0				
60.3	8.3	5.5	8.3	5.5	8.2	5.4	8.2	5.4	8.1	5.3	8.0	5.2	7.9	5.1	60.3				
60.6	8.7	5.7	8.7	5.7	8.6	5.7	8.6	5.6	8.5	5.5	8.4	5.4	8.2	5.3	60.6				
60.9	9.1	5.9	9.0	5.9	9.0	5.9	8.9	5.8	8.8	5.7	8.7	5.6	8.6	5.4	60.9				
61.2	9.5	6.2	9.4	6.1	9.4	6.1	9.3	6.0	9.2	5.9	9.1	5.8	8.9	5.6	61.2				
61.5	9.8	6.4	9.8	6.3	9.7	6.3	9.7	6.2	9.5	6.1	9.4	5.9	9.2	5.8	61.5				

DIP					
Ht. of Eye	Corr <sup>n</sup>	Ht. of Eye	Ht. of Eye	Corr <sup>n</sup>	Ht. of Eye
m		ft	m		ft
2.4	-2.8	7.9	9.5	-5.5	31.2
2.6	-2.9	8.5	9.9	-5.6	32.5
2.8	-3.0	9.2	10.3	-5.7	33.8
3.0	-3.1	9.8	10.6	-5.8	34.8
3.2	-3.2	10.5	11.0	-5.9	36.1
3.4	-3.3	11.2	11.4	-6.0	37.4
3.6	-3.4	11.8	11.8	-6.1	38.7
3.8	-3.5	12.5	12.2	-6.2	40.0
4.0	-3.6	13.1	12.6	-6.3	41.3
4.3	-3.7	14.1	13.0	-6.4	42.7
4.5	-3.8	14.8	13.4	-6.5	44.0
4.7	-3.9	15.4	13.8	-6.6	45.3
5.0	-4.0	16.4	14.2	-6.7	46.6
5.2	-4.1	17.1	14.7	-6.8	48.2
5.5	-4.2	18.0	15.1	-6.9	49.5
5.8	-4.3	19.0	15.5	-7.0	50.9
6.1	-4.4	20.0	16.0	-7.1	52.5
6.3	-4.5	20.7	16.5	-7.2	54.1
6.6	-4.6	21.7	16.9	-7.3	55.4
6.9	-4.7	22.6	17.4	-7.4	57.1
7.2	-4.8	23.6	17.9	-7.5	58.7
7.5	-4.9	24.6	18.4	-7.6	60.4
7.9	-5.0	25.9	18.8	-7.7	61.7
8.2	-5.1	26.9	19.3	-7.8	63.3
8.5	-5.2	27.9	19.8	-7.9	65.0
8.8	-5.3	28.9	20.4	-8.0	66.9
9.2	-5.4	30.2	20.9	-8.1	68.6
9.5		31.2	21.4		70.2

## MOON CORRECTION TABLE

The correction is in two parts; the first correction is taken from the upper part of the table with argument apparent altitude, and the second from the lower part, with argument HP, in the same column as that from which the first correction was taken. Separate corrections are given in the lower part for lower (L) and upper (U) limbs. All corrections are to be **added** to apparent altitude, *but 30' is to be subtracted from the altitude of the upper limb.*

For corrections for pressure and temperature see page A4.

For bubble sextant observations ignore dip, take the mean of upper and lower limb corrections and subtract 15' from the altitude.

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

# ALTITUDE CORRECTION TABLES 35° – 90° — MOON

App. Alt.	35°-39°		40°-44°		45°-49°		50°-54°		55°-59°		60°-64°		65°-69°		70°-74°		75°-79°		80°-84°		85°-89°		App. Alt.
	Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		Corr <sup>n</sup>		
'	35°	'	40°	'	45°	'	50°	'	55°	'	60°	'	65°	'	70°	'	75°	'	80°	'	85°	'	
<b>00</b>	56.5		53.7		50.5		46.9		43.1		38.9		34.6		30.0		25.3		20.5		15.6		<b>00</b>
<b>10</b>	56.4		53.6		50.4		46.8		42.9		38.8		34.4		29.9		25.2		20.4		15.5		<b>10</b>
<b>20</b>	56.3		53.5		50.2		46.7		42.8		38.7		34.3		29.7		25.0		20.2		15.3		<b>20</b>
<b>30</b>	56.2		53.4		50.1		46.5		42.7		38.5		34.1		29.6		24.9		20.0		15.1		<b>30</b>
<b>40</b>	56.2		53.3		50.0		46.4		42.5		38.4		34.0		29.4		24.7		19.9		15.0		<b>40</b>
<b>50</b>	56.1		53.2		49.9		46.3		42.4		38.2		33.8		29.3		24.5		19.7		14.8		<b>50</b>
<b>00</b>	<b>36°</b>		<b>41°</b>		<b>46°</b>		<b>51°</b>		<b>56°</b>		<b>61°</b>		<b>66°</b>		<b>71°</b>		<b>76°</b>		<b>81°</b>		<b>86°</b>		<b>00</b>
	56.0		53.1		49.8		46.2		42.3		38.1		33.7		29.1		24.4		19.6		14.6		<b>00</b>
<b>10</b>	55.9		53.0		49.7		46.0		42.1		37.9		33.5		29.0		24.2		19.4		14.5		<b>10</b>
<b>20</b>	55.8		52.9		49.5		45.9		42.0		37.8		33.4		28.8		24.1		19.2		14.3		<b>20</b>
<b>30</b>	55.7		52.8		49.4		45.8		41.9		37.7		33.2		28.7		23.9		19.1		14.2		<b>30</b>
<b>40</b>	55.6		52.6		49.3		45.7		41.7		37.5		33.1		28.5		23.8		18.9		14.0		<b>40</b>
<b>50</b>	55.5		52.5		49.2		45.5		41.6		37.4		32.9		28.3		23.6		18.7		13.8		<b>50</b>
<b>00</b>	<b>37°</b>		<b>42°</b>		<b>47°</b>		<b>52°</b>		<b>57°</b>		<b>62°</b>		<b>67°</b>		<b>72°</b>		<b>77°</b>		<b>82°</b>		<b>87°</b>		<b>00</b>
	55.4		52.4		49.1		45.4		41.4		37.2		32.8		28.2		23.4		18.6		13.7		<b>00</b>
<b>10</b>	55.3		52.3		49.0		45.3		41.3		37.1		32.6		28.0		23.3		18.4		13.5		<b>10</b>
<b>20</b>	55.2		52.2		48.8		45.2		41.2		36.9		32.5		27.9		23.1		18.2		13.3		<b>20</b>
<b>30</b>	55.1		52.1		48.7		45.0		41.0		36.8		32.3		27.7		22.9		18.1		13.2		<b>30</b>
<b>40</b>	55.0		52.0		48.6		44.9		40.9		36.6		32.2		27.6		22.8		17.9		13.0		<b>40</b>
<b>50</b>	55.0		51.9		48.5		44.8		40.8		36.5		32.0		27.4		22.6		17.8		12.8		<b>50</b>
<b>00</b>	<b>38°</b>		<b>43°</b>		<b>48°</b>		<b>53°</b>		<b>58°</b>		<b>63°</b>		<b>68°</b>		<b>73°</b>		<b>78°</b>		<b>83°</b>		<b>88°</b>		<b>00</b>
	54.9		51.8		48.4		44.6		40.6		36.4		31.9		27.2		22.5		17.6		12.7		<b>00</b>
<b>10</b>	54.8		51.7		48.3		44.5		40.5		36.2		31.7		27.1		22.3		17.4		12.5		<b>10</b>
<b>20</b>	54.7		51.6		48.1		44.4		40.3		36.1		31.6		26.9		22.1		17.3		12.3		<b>20</b>
<b>30</b>	54.6		51.5		48.0		44.2		40.2		35.9		31.4		26.8		22.0		17.1		12.2		<b>30</b>
<b>40</b>	54.5		51.4		47.9		44.1		40.1		35.8		31.3		26.6		21.8		16.9		12.0		<b>40</b>
<b>50</b>	54.4		51.2		47.8		44.0		39.9		35.6		31.1		26.5		21.7		16.8		11.8		<b>50</b>
<b>00</b>	<b>39°</b>		<b>44°</b>		<b>49°</b>		<b>54°</b>		<b>59°</b>		<b>64°</b>		<b>69°</b>		<b>74°</b>		<b>79°</b>		<b>84°</b>		<b>89°</b>		<b>00</b>
	54.3		51.1		47.7		43.9		39.8		35.5		31.0		26.3		21.5		16.6		11.7		<b>00</b>
<b>10</b>	54.2		51.0		47.5		43.7		39.6		35.3		30.8		26.1		21.3		16.4		11.5		<b>10</b>
<b>20</b>	54.1		50.9		47.4		43.6		39.5		35.2		30.7		26.0		21.2		16.3		11.4		<b>20</b>
<b>30</b>	54.0		50.8		47.3		43.5		39.4		35.0		30.5		25.8		21.0		16.1		11.2		<b>30</b>
<b>40</b>	53.9		50.7		47.2		43.3		39.2		34.9		30.4		25.7		20.9		16.0		11.0		<b>40</b>
<b>50</b>	53.8		50.6		47.0		43.2		39.1		34.7		30.2		25.5		20.7		15.8		10.9		<b>50</b>
HP	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	HP
<b>54.0</b>	1.1	1.7	1.3	1.9	1.5	2.1	1.7	2.4	2.0	2.6	2.3	2.9	2.6	3.2	2.9	3.5	3.2	3.8	3.5	4.1	3.8	4.5	<b>54.0</b>
<b>54.3</b>	1.4	1.8	1.6	2.0	1.8	2.2	2.0	2.5	2.2	2.7	2.5	3.0	2.8	3.2	3.1	3.5	3.3	3.8	3.6	4.1	3.9	4.4	<b>54.3</b>
<b>54.6</b>	1.7	2.0	1.9	2.2	2.1	2.4	2.3	2.6	2.5	2.8	2.7	3.0	3.0	3.3	3.2	3.5	3.5	3.8	3.8	4.0	4.0	4.3	<b>54.6</b>
<b>54.9</b>	2.0	2.2	2.2	2.3	2.4	2.5	2.5	2.7	2.7	2.9	2.9	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.0	4.1	4.3	<b>54.9</b>
<b>55.2</b>	2.3	2.3	2.5	2.4	2.6	2.6	2.8	2.8	3.0	2.9	3.2	3.1	3.4	3.3	3.6	3.5	3.8	3.7	4.0	4.0	4.2	4.2	<b>55.2</b>
<b>55.5</b>	2.7	2.5	2.8	2.6	2.9	2.7	3.1	2.9	3.2	3.0	3.4	3.2	3.6	3.4	3.7	3.5	3.9	3.7	4.1	3.9	4.3	4.1	<b>55.5</b>
<b>55.8</b>	3.0	2.6	3.1	2.7	3.2	2.8	3.3	3.0	3.5	3.1	3.6	3.3	3.8	3.4	3.9	3.6	4.1	3.7	4.2	3.9	4.4	4.0	<b>55.8</b>
<b>56.1</b>	3.3	2.8	3.4	2.9	3.5	3.0	3.6	3.1	3.7	3.2	3.8	3.3	4.0	3.4	4.1	3.6	4.2	3.7	4.4	3.8	4.5	4.0	<b>56.1</b>
<b>56.4</b>	3.6	2.9	3.7	3.0	3.8	3.1	3.9	3.2	3.9	3.3	4.0	3.4	4.1	3.5	4.3	3.6	4.4	3.7	4.5	3.8	4.6	3.9	<b>56.4</b>
<b>56.7</b>	3.9	3.1	4.0	3.1	4.1	3.2	4.1	3.3	4.2	3.3	4.3	3.4	4.3	3.5	4.4	3.6	4.5	3.7	4.6	3.8	4.7	3.8	<b>56.7</b>
<b>57.0</b>	4.3	3.2	4.3	3.3	4.3	3.3	4.4	3.4	4.4	3.4	4.5	3.5	4.5	3.5	4.6	3.6	4.7	3.6	4.7	3.7	4.8	3.8	<b>57.0</b>
<b>57.3</b>	4.6	3.4	4.6	3.4	4.6	3.4	4.6	3.5	4.7	3.5	4.7	3.5	4.7	3.6	4.8	3.6	4.8	3.6	4.8	3.7	4.9	3.7	<b>57.3</b>
<b>57.6</b>	4.9	3.6	4.9	3.6	4.9	3.6	4.9	3.6	4.9	3.6	4.9	3.6	4.9	3.6	4.9	3.6	5.0	3.6	5.0	3.6	5.0	3.6	<b>57.6</b>
<b>57.9</b>	5.2	3.7	5.2	3.7	5.2	3.7	5.2	3.7	5.2	3.7	5.1	3.6	5.1	3.6	5.1	3.6	5.1	3.6	5.1	3.6	5.1	3.6	<b>57.9</b>
<b>58.2</b>	5.5	3.9	5.5	3.8	5.5	3.8	5.4	3.8	5.4	3.7	5.4	3.7	5.3	3.7	5.3	3.6	5.2	3.6	5.2	3.5	5.2	3.5	<b>58.2</b>
<b>58.5</b>	5.9	4.0	5.8	4.0	5.8	3.9	5.7	3.9	5.6	3.8	5.6	3.8	5.5	3.7	5.5	3.6	5.4	3.6	5.3	3.5	5.3	3.4	<b>58.5</b>
<b>58.8</b>	6.2	4.2	6.1	4.1	6.0	4.1	6.0	4.0	5.9	3.9	5.8	3.8	5.7	3.7	5.6	3.6	5.5	3.5	5.4	3.5	5.3	3.4	<b>58.8</b>
<b>59.1</b>	6.5	4.3	6.4	4.3	6.3	4.2	6.2	4.1	6.1	4.0	6.0	3.9	5.9	3.8	5.8	3.6	5.7	3.5	5.6	3.4	5.4	3.3	<b>59.1</b>
<b>59.4</b>	6.8	4.5	6.7	4.4	6.6	4.3	6.5	4.2	6.4	4.1	6.2	3.9	6.1	3.8	6.0	3.7	5.8	3.5	5.7	3.4	5.5	3.2	<b>59.4</b>
<b>59.7</b>	7.1	4.7	7.0	4.5	6.9	4.4	6.8	4.3	6.6	4.1	6.5	4.0	6.3	3.8	6.1	3.7	6.0	3.5	5.8	3.3	5.6	3.2	<b>59.7</b>
<b>60.0</b>	7.5	4.8	7.3	4.7	7.2	4.5	7.0	4.4	6.9	4.2	6.7	4.0	6.5	3.9	6.3	3.7	6.1	3.5	5.9	3.3	5.7	3.1	<b>60.0</b>
<b>60.3</b>	7.8	5.0	7.6	4.8	7.5	4.7	7.3	4.5	7.1	4.3	6.9	4.1	6.7	3.9	6.5	3.7	6.3	3.5	6.0	3.2	5.8	3.0	<b>60.3</b>
<b>60.6</b>	8.1	5.1	7.9	5.0	7.7	4.8	7.6	4.6	7.3	4.4	7.1	4.2	6.9	3.9	6.7	3.7	6.4	3.4	6.2	3.2	5.9	2.9	<b>60.6</b>
<b>60.9</b>	8.4	5.3	8.2	5.1	8.0	4.9	7.8	4.7	7.6	4.5	7.3	4.2	7.1	4.0	6.8	3.7	6.6	3.4	6.3	3.2	6.0	2.9	<b>60.9</b>
<b>61.2</b>	8.7	5.4	8.5	5.2	8.3	5.0	8.1	4.8	7.8	4.5	7.6	4.3	7.3	4.0	7.0	3.7	6.7	3.4	6.4	3.1	6.1	2.8	<b>61.2</b>
<b>61.5</b>	9.1	5.6	8.8	5.4	8.6	5.1	8.3	4.9	8.1	4.6	7.8	4.3	7.5	4.0	7.2	3.7	6.9	3.4	6.5	3.1	6.2	2.7	<b>61.5</b>

# Total Lunar Eclipse of 2022 May 16

Ecliptic Conjunction = 04:15:18.8 TD (= 04:14:06.0 UT)

Greatest Eclipse = 04:12:41.6 TD (= 04:11:28.8 UT)

Penumbral Magnitude = 2.3726

P. Radius = 1.2854°

Gamma = -0.2532

Umbral Magnitude = 1.4137

U. Radius = 0.7580°

Axis = 0.2555°

Saros Series = 131

Member = 34 of 72

## Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 03h31m49.5s

Dec. = +19°05'13.4"

S.D. = 00°15'49.2"

H.P. = 00°00'08.7"

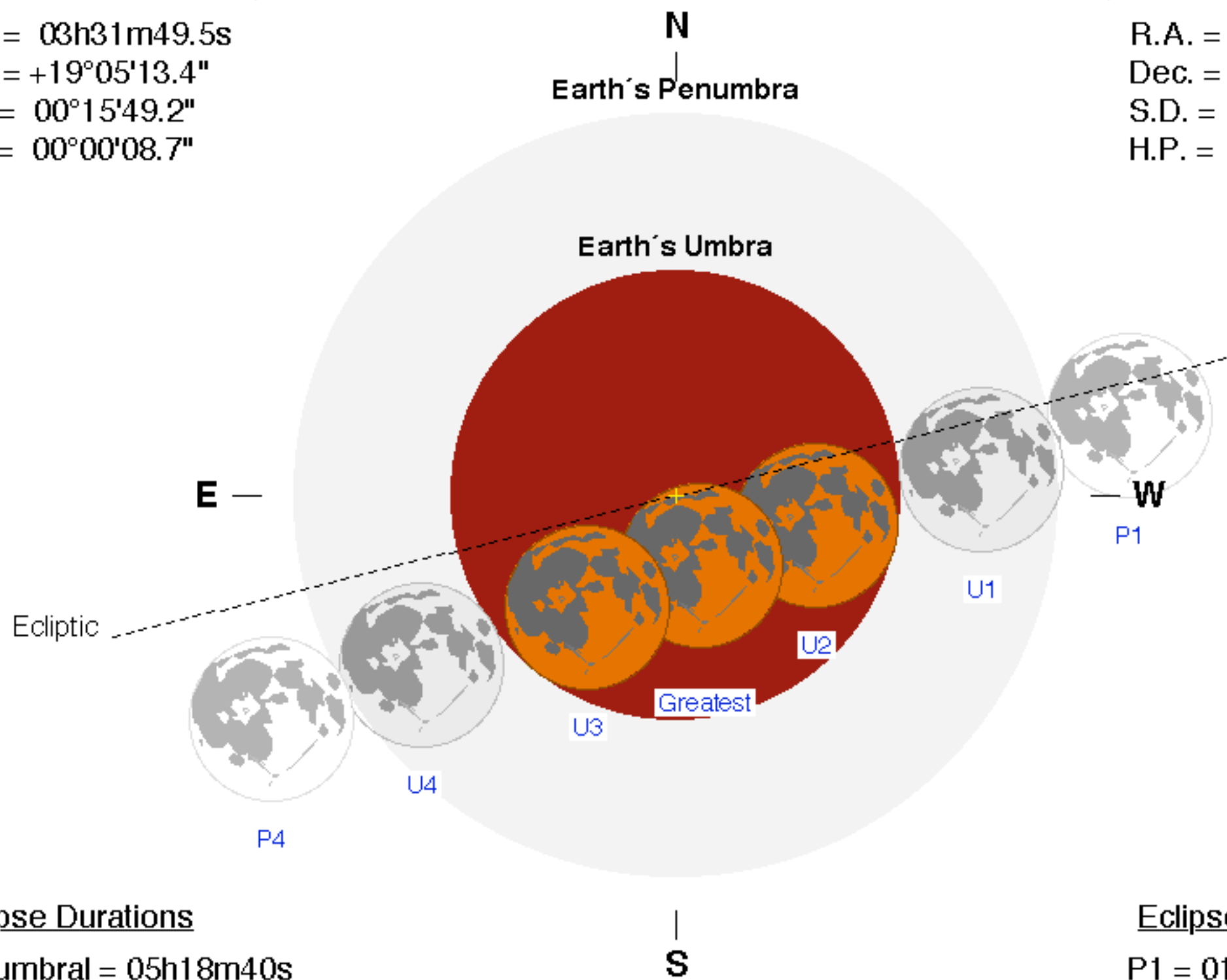
## Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 15h31m27.8s

Dec. = -19°19'40.4"

S.D. = 00°16'29.9"

H.P. = 01°00'33.1"



## Eclipse Durations

Penumbral = 05h18m40s

Umbral = 03h27m14s

Total = 01h24m53s

$\Delta T = 73$  s

Rule = CdT (Danjon)

Eph. = VSOP87/ELP2000-85

## Eclipse Contacts

P1 = 01:32:07 UT

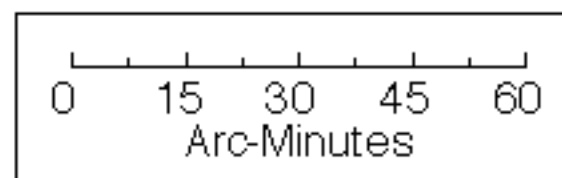
U1 = 02:27:53 UT

U2 = 03:29:03 UT

U3 = 04:53:56 UT

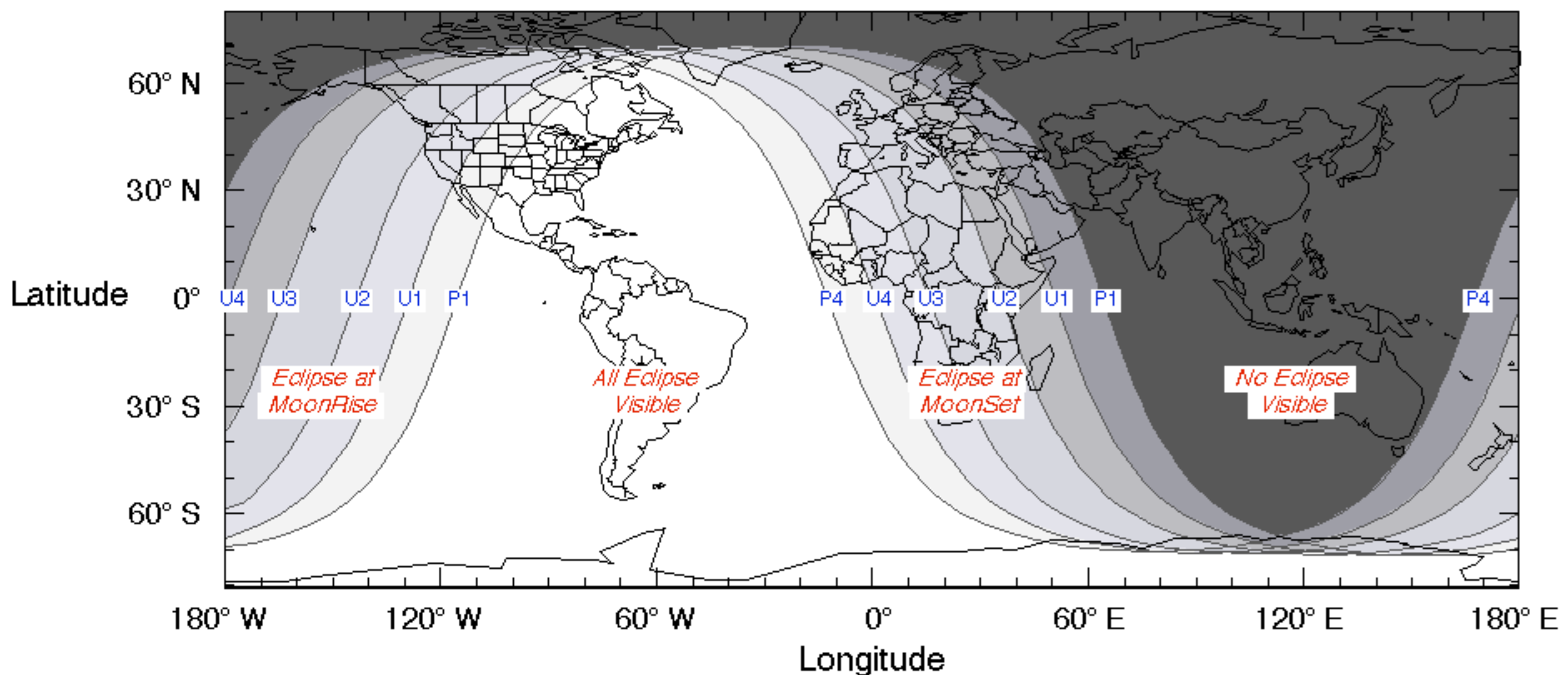
U4 = 05:55:07 UT

P4 = 06:50:48 UT



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[eclipse.gsfc.nasa.gov/eclipse.html](http://eclipse.gsfc.nasa.gov/eclipse.html)





# Total Lunar Eclipse of 2022 Nov 08

Ecliptic Conjunction = 11:03:18.4 TD (= 11:02:05.3 UT)

Greatest Eclipse = 11:00:22.0 TD (= 10:59:08.8 UT)

Penumbral Magnitude = 2.4143

P. Radius = 1.2164°

Gamma = 0.2570

Umbral Magnitude = 1.3589

U. Radius = 0.6783°

Axis = 0.2404°

Saros Series = 136

Member = 20 of 72

## Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 14h54m11.2s

Dec. = -16°37'47.0"

S.D. = 00°16'08.5"

H.P. = 00°00'08.9"

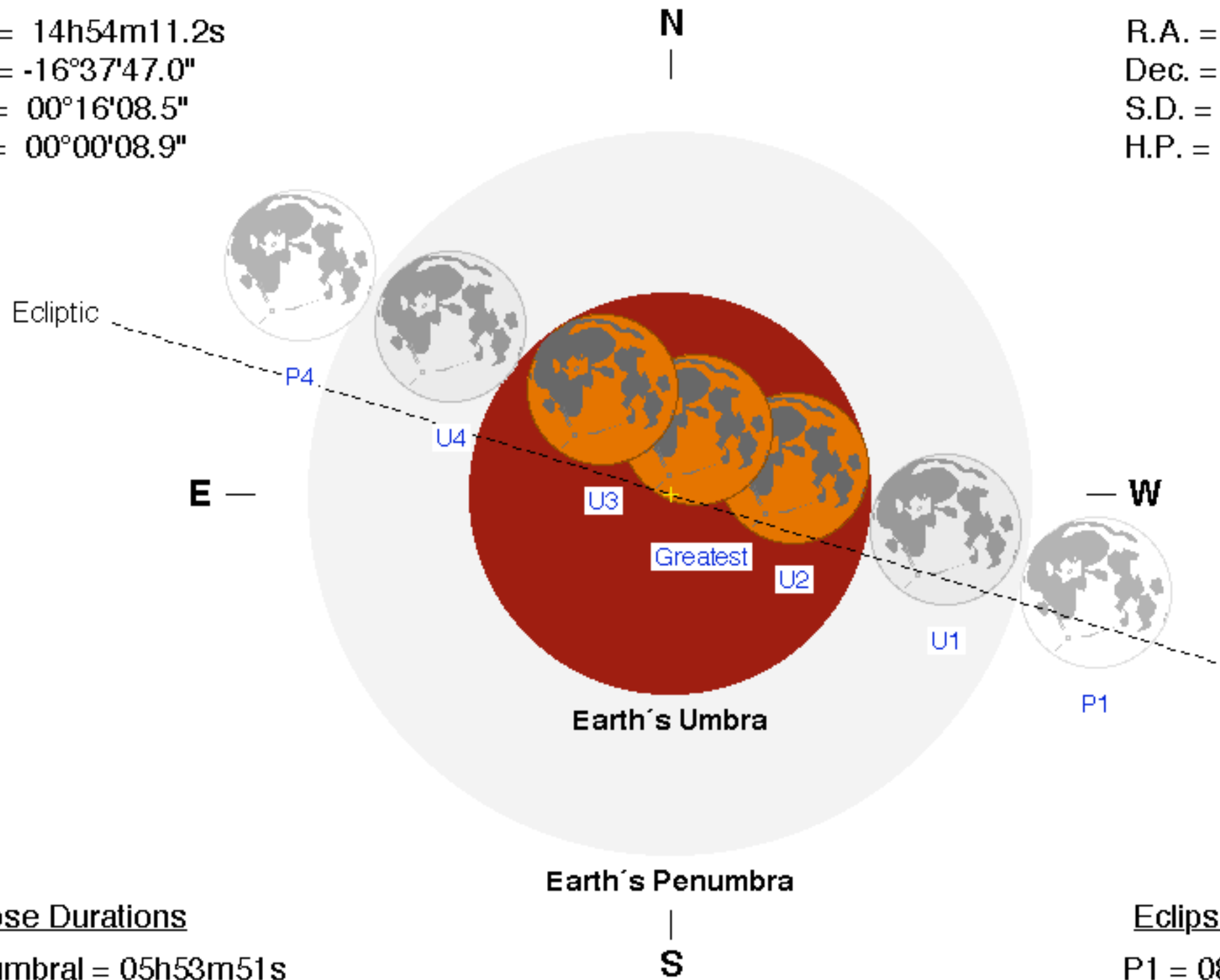
## Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 02h53m48.1s

Dec. = +16°51'06.7"

S.D. = 00°15'17.7"

H.P. = 00°56'07.8"



## Eclipse Durations

Penumbral = 05h53m51s

Umbral = 03h39m50s

Total = 01h24m58s

$\Delta T = 73$  s

Rule = CdT (Danjon)

Eph. = VSOP87/ELP2000-85

## Eclipse Contacts

P1 = 08:02:17 UT

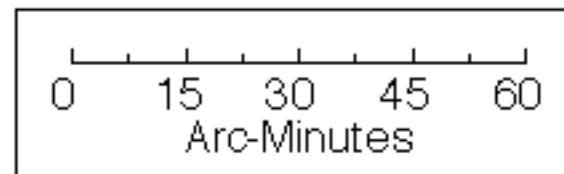
U1 = 09:09:12 UT

U2 = 10:16:39 UT

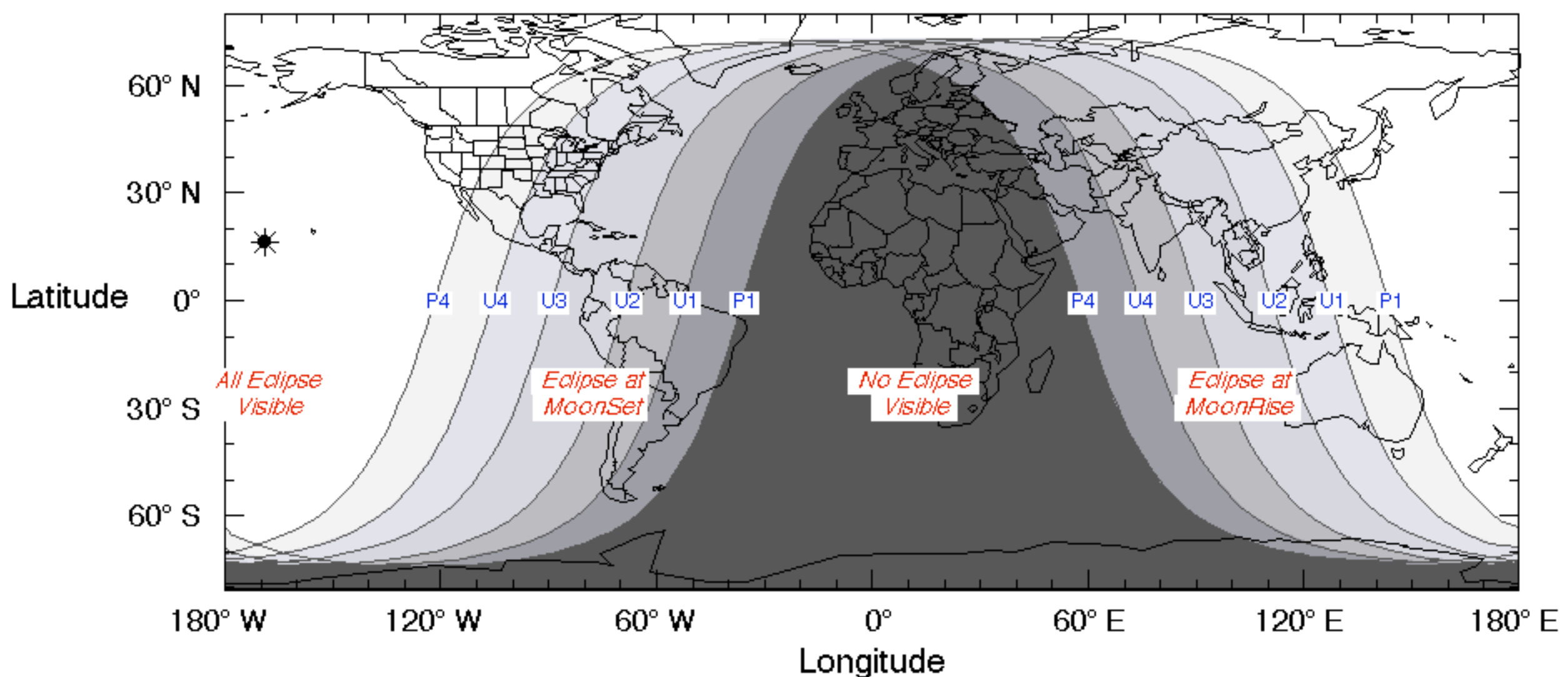
U3 = 11:41:37 UT

U4 = 12:49:03 UT

P4 = 13:56:08 UT



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eclipse.gsfc.nasa.gov/eclipse.html



## Partial Solar Eclipse of 2022 Apr 30

Geocentric Conjunction = 19:40:42.5 UT    J.D. = 2459700.319937  
 Greatest Eclipse = 20:41:20.2 UT    J.D. = 2459700.362039

Eclipse Magnitude = 0.6389    Gamma = -1.1900

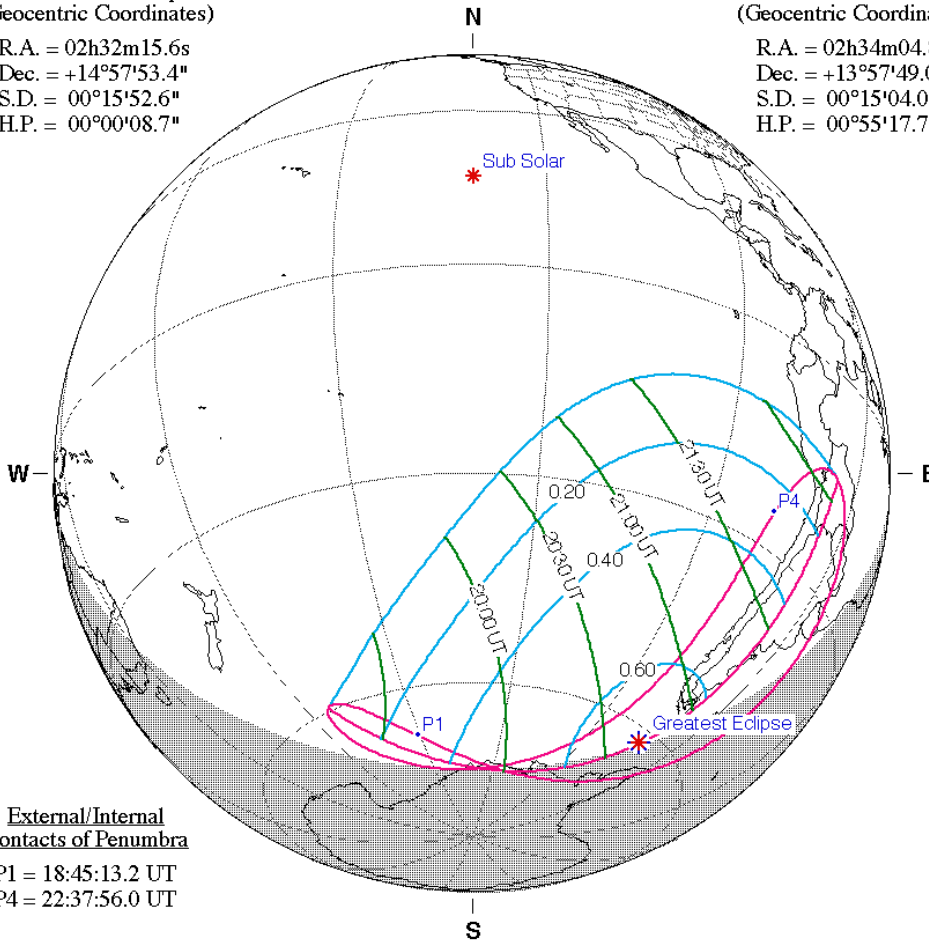
Saros Series = 119    Member = 66 of 71

Sun at Greatest Eclipse  
(Geocentric Coordinates)

R.A. = 02h32m15.6s  
 Dec. = +14°57'53.4"  
 S.D. = 00°15'52.6"  
 H.P. = 00°00'08.7"

Moon at Greatest Eclipse  
(Geocentric Coordinates)

R.A. = 02h34m04.8s  
 Dec. = +13°57'49.0"  
 S.D. = 00°15'04.0"  
 H.P. = 00°55'17.7"



External/Internal  
Contacts of Penumbra

P1 = 18:45:13.2 UT  
 P4 = 22:37:56.0 UT

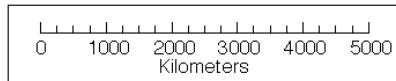
Ephemeris & Constants

Eph. = Newcomb/ILE  
 $\Delta T = 79.2$  s  
 $k1 = 0.2724880$   
 $k2 = 0.2722810$   
 $\Delta b = 0.0''$      $\Delta l = 0.0''$

Geocentric Libration  
(Optical + Physical)

$l = 4.01^\circ$   
 $b = 1.40^\circ$   
 $c = -16.62^\circ$

Brown Lun. No. = 1229



F. Espenak, NASA's GSFC - Fri, Jul 2,  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)

## Partial Solar Eclipse of 2022 Oct 25

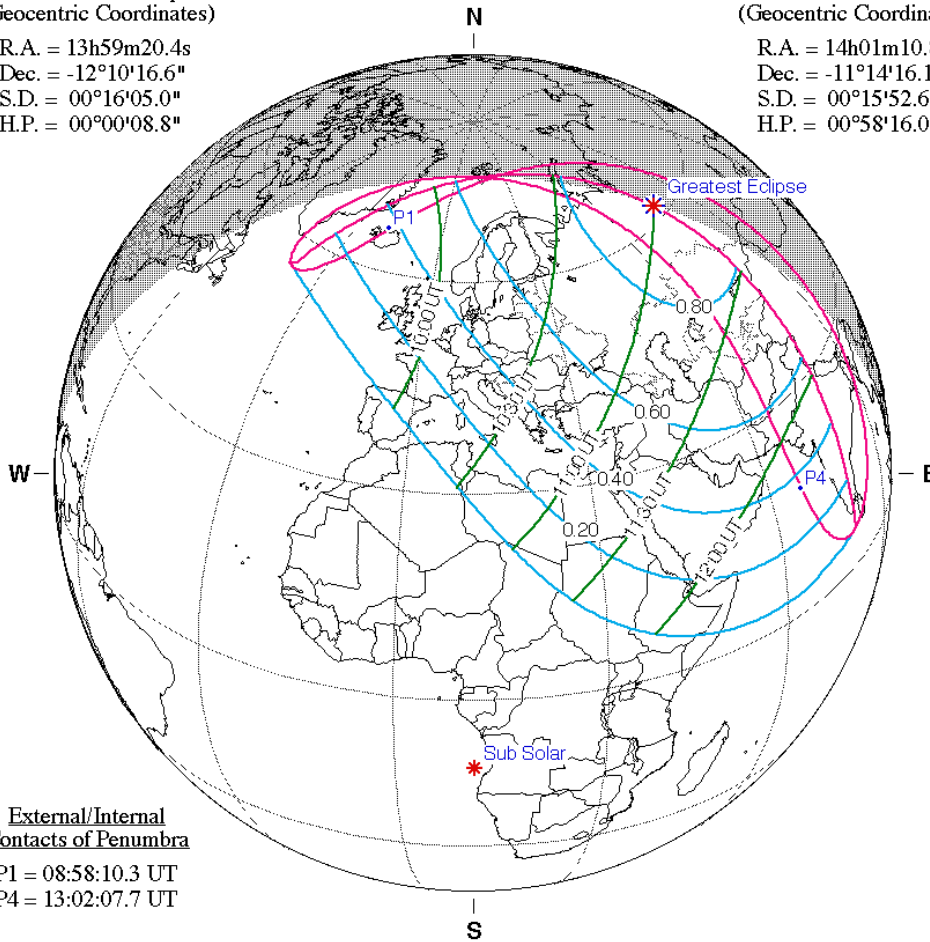
Geocentric Conjunction = 10:03:36.7 UT    J.D. = 2459877.919175  
 Greatest Eclipse = 11:00:00.4 UT    J.D. = 2459877.958338  
 Eclipse Magnitude = 0.8611    Gamma = 1.0700  
 Saros Series = 124    Member = 55 of 73

Sun at Greatest Eclipse  
(Geocentric Coordinates)

R.A. = 13h59m20.4s  
 Dec. = -12°10'16.6"  
 S.D. = 00°16'05.0"  
 H.P. = 00°00'08.8"

Moon at Greatest Eclipse  
(Geocentric Coordinates)

R.A. = 14h01m10.8s  
 Dec. = -11°14'16.1"  
 S.D. = 00°15'52.6"  
 H.P. = 00°58'16.0"



External/Internal  
Contacts of Penumbra

P1 = 08:58:10.3 UT  
 P4 = 13:02:07.7 UT

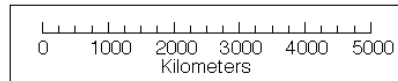
Ephemeris & Constants

Eph. = Newcomb/ILE  
 $\Delta T = 79.7 \text{ s}$   
 $k1 = 0.2724880$   
 $k2 = 0.2722810$   
 $\Delta b = 0.0''$      $\Delta l = 0.0''$

Geocentric Libration  
(Optical + Physical)

$l = -4.55^\circ$   
 $b = -1.38^\circ$   
 $c = 18.60^\circ$

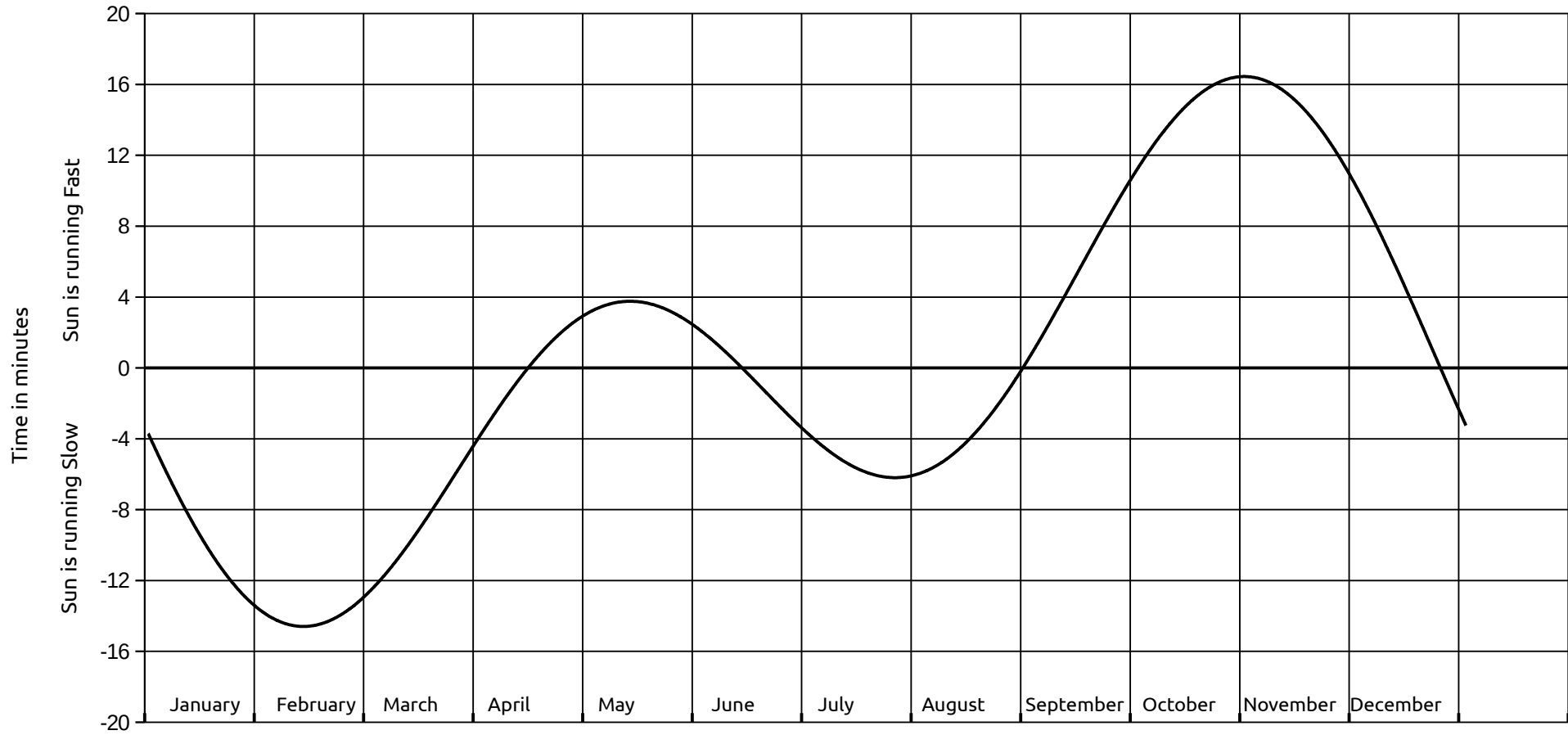
Brown Lun. No. = 1235



*F. Espenak, NASA's GSFC - Fri, Jul 2,*  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)



# Equation of Time *for the Sun*



## 2022 Moon Phases

### Date and Time (GMT/Universal Time)

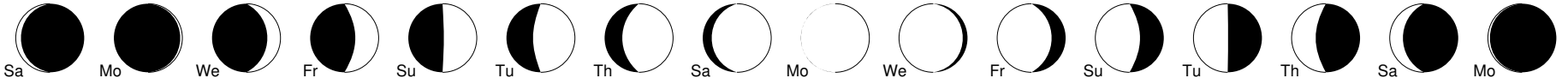
<b>New Moon</b>	<b>First Quarter</b>	<b>Full Moon</b>	<b>Last Quarter</b>
January 02 18:33	January 09 18:11	January 17 23:48	January 25 13:41
February 01 05:46	February 08 13:50	February 16 16:56	February 23 22:32
March 02 17:35	March 10 10:45	March 18 07:17	March 25 05:37
April 01 06:24	April 09 06:48	April 16 18:55	April 23 11:56
April 30 20:28	May 09 00:21	May 16 04:14	May 22 18:43
May 30 11:30	June 07 14:48	June 14 11:52	June 21 03:11
June 29 02:52	July 07 02:14	July 13 18:38	July 20 14:19
July 28 17:55	August 05 11:06	August 12 01:36	August 19 04:36
August 27 08:17	September 03 18:08	September 10 09:59	September 17 21:52
September 25 21:54	October 03 00:14	October 09 20:55	October 17 17:15
October 25 10:49	November 01 06:37	November 08 11:02	November 16 13:27
November 23 22:57	November 30 14:36	December 08 04:08	December 16 08:56
December 23 10:17	December 30 01:20	--	--

Add or subtract your time difference from Greenwich to determine local time and date of Moon phase.

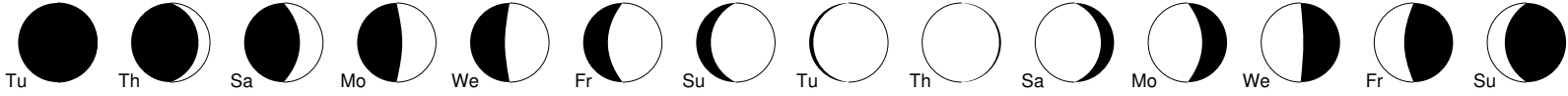
2022

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31

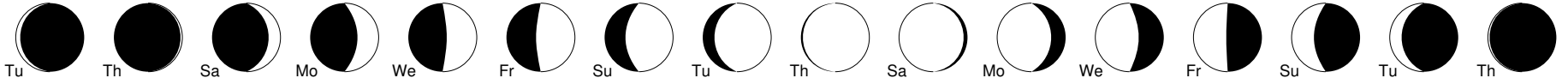
Jan



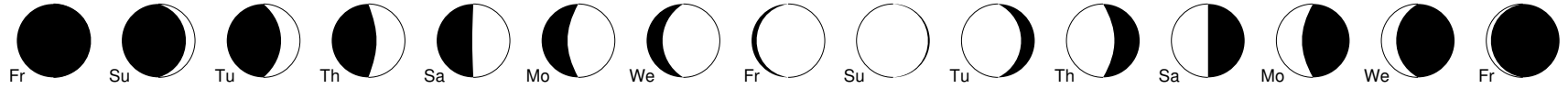
Feb



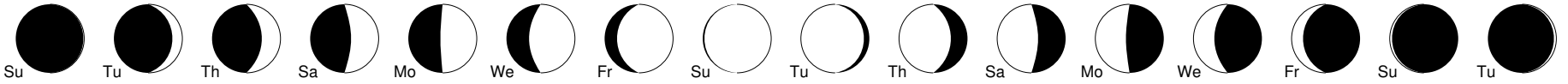
Mar



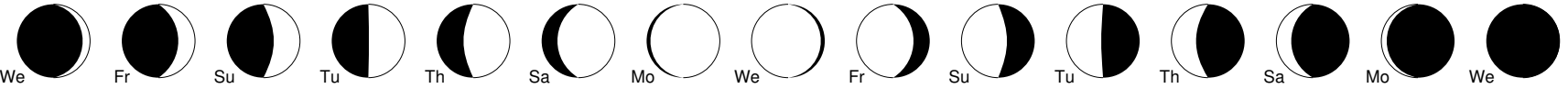
Apr



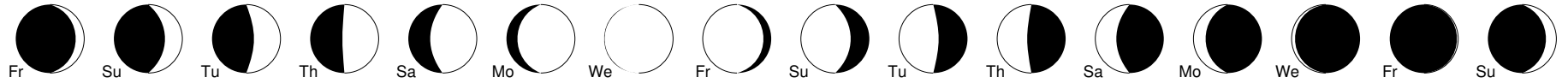
May



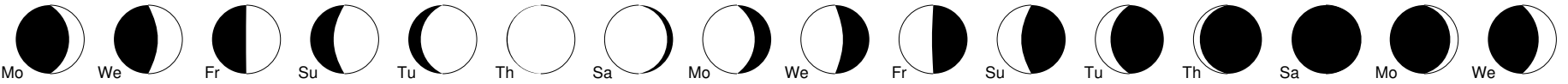
Jun



Jul



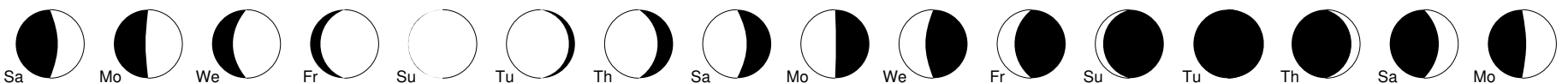
Aug



Sep



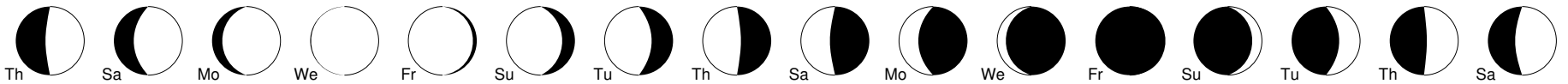
Oct



Nov

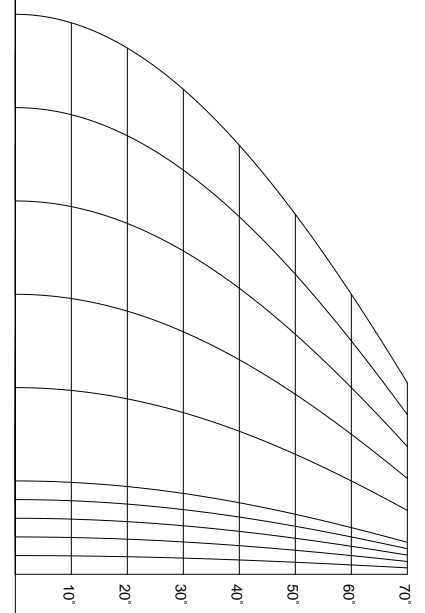
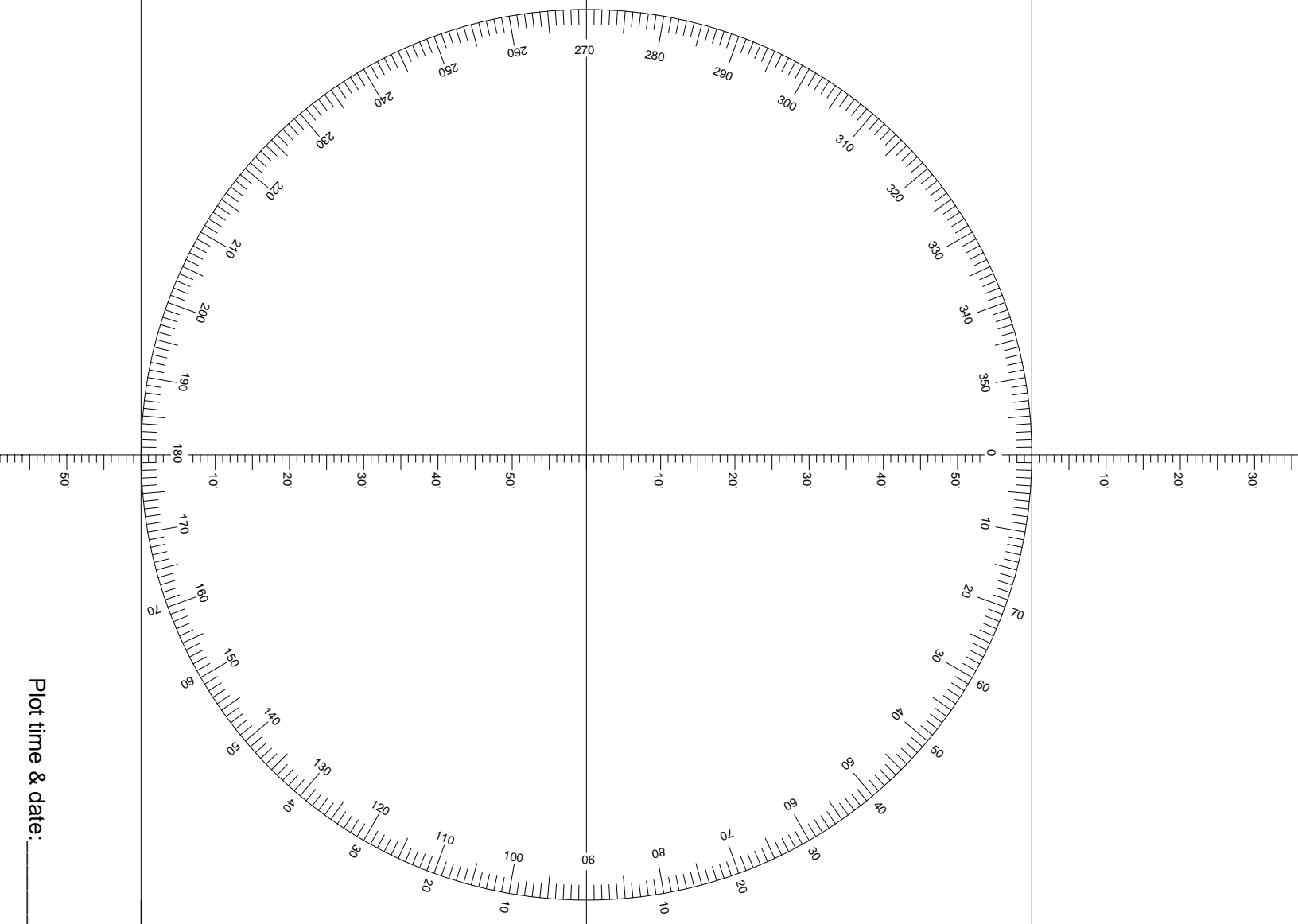


Dec



1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31



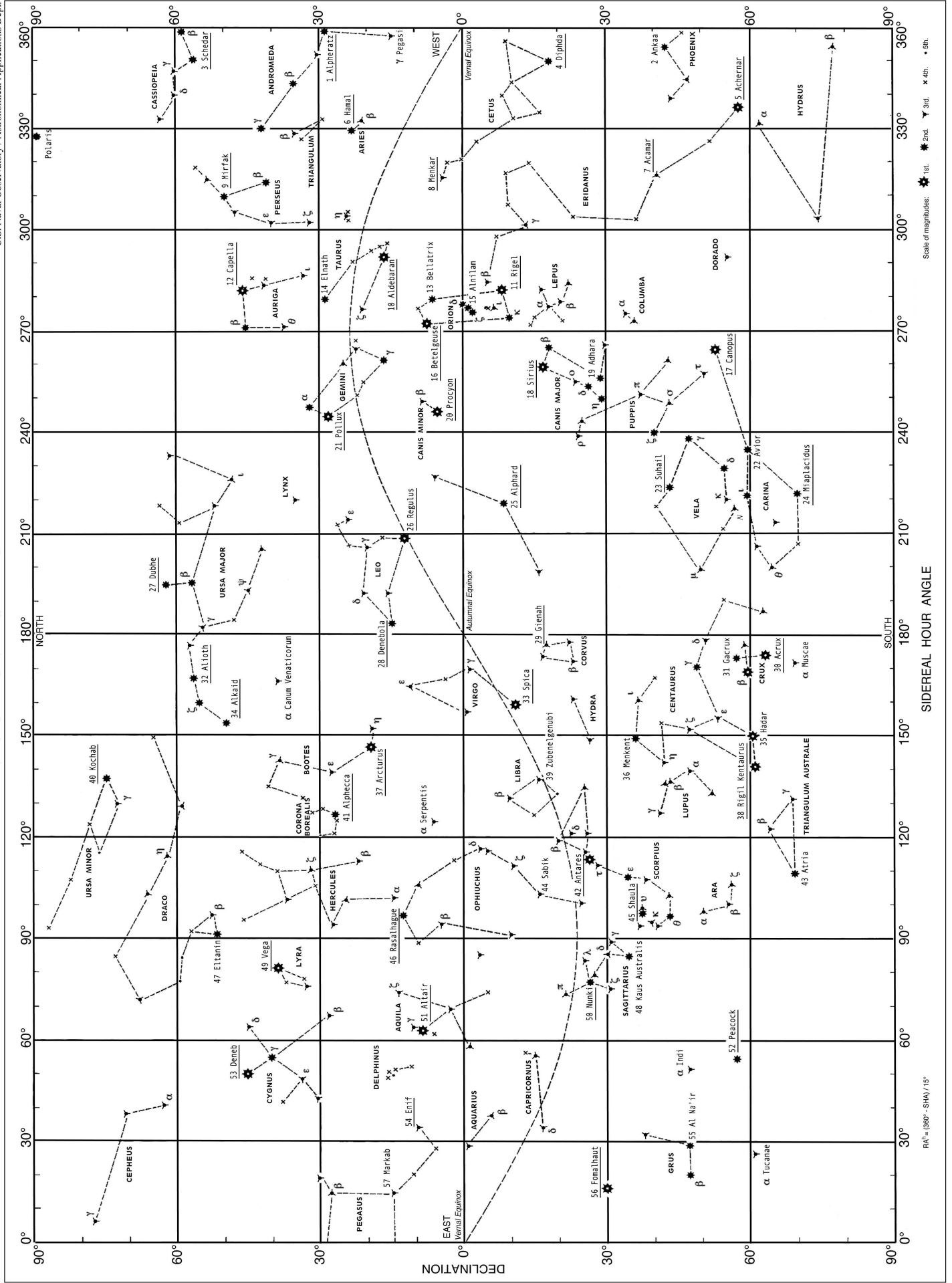


Plot time & date: \_\_\_\_\_

Page: \_\_\_\_\_

# NAVIGATIONAL STAR CHART

U.S. Naval Observatory / Astronomical Applications Dept.



RA<sup>0</sup> = (GHA - SHA) / 15°