



## Wednesday, July 1

Date in July when Sun & planets are "in" a constellation							
Date	Sun	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
1 Midnight	Gemini	Taurus	Taurus	Aries	Capricornus	Leo	Pisces
2				Taurus			
3		Gemini					
16		Cancer					
20	Cancer						
26		Leo					
29			Orion				
31 11:59:59 P.M.							

12 a.m. (Midnight)  
Julian day = 2,455,013.71

### Saturn

<http://en.wikipedia.org/wiki/Saturn>

- **Local Horizontal (Horizon) Coordinate System location:**

[http://en.wikipedia.org/wiki/Horizon\\_coordinate\\_system](http://en.wikipedia.org/wiki/Horizon_coordinate_system)

Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the "fist" method to measure angles and find the planet Saturn

one-half horizontal fist (one fist =  $10^\circ$ ) right of west

Azimuth point =  $275^\circ$  (west)

one-half vertical fist above the horizon at the azimuth point

Altitude =  $+05^\circ$

- **Ecliptic (Celestial) Coordinate System location:**

[http://en.wikipedia.org/wiki/Ecliptic\\_coordinate\\_system](http://en.wikipedia.org/wiki/Ecliptic_coordinate_system)

Longitude =  $166.60^\circ$

Latitude =  $+02.05^\circ$

- **Equatorial Coordinate System location:**

[http://en.wikipedia.org/wiki/Equatorial\\_coordinate\\_system](http://en.wikipedia.org/wiki/Equatorial_coordinate_system)

Right ascension ( $\alpha$ ) = 11h 13.39m

Declination ( $d$ ) =  $+07^{\circ} 13.60'$

- **Distance of Saturn from Earth:**  
908.09 million miles  
1.46 billion kilometers  
9.77 astronomical units  
[http://en.wikipedia.org/wiki/Astronomical\\_unit](http://en.wikipedia.org/wiki/Astronomical_unit)
- **Light-travel time from Saturn to Earth:**  
[http://en.wikipedia.org/wiki/Speed\\_of\\_light](http://en.wikipedia.org/wiki/Speed_of_light)  
one hour,  $21\frac{1}{4}$  minutes
- **Visual magnitude:**  
[http://en.wikipedia.org/wiki/Apparent\\_magnitude](http://en.wikipedia.org/wiki/Apparent_magnitude)  
+1.04
- **Angular size:**  
17" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Leo until 3:05 p.m. on September 2  
[http://en.wikipedia.org/wiki/Leo\\_\(astronomy\)](http://en.wikipedia.org/wiki/Leo_(astronomy))  
when it then 'enters' Virgo  
[http://en.wikipedia.org/wiki/Virgo\\_\(constellation\)](http://en.wikipedia.org/wiki/Virgo_(constellation))
- **Setting time:**  
On the western horizon at 12:28 a.m.

## Moon

<http://en.wikipedia.org/wiki/Moon>

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the western sky (compass direction =  $270^{\circ}$ ) and use the "fist" method to measure angles and find the Moon  
3  $\frac{1}{2}$  horizontal fists left of west  
Azimuth point =  $233^{\circ}$  (southwest by west)  
two vertical fists above the horizon at the azimuth point  
Altitude =  $+21^{\circ}$
- **Current status and 'age':**  
Waxing gibbous  
[http://en.wikipedia.org/wiki/Lunar\\_phase](http://en.wikipedia.org/wiki/Lunar_phase)  
nine-plus days old (previous new moon was June 22)
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $210.00^{\circ}$   
Latitude =  $-06.05^{\circ}$
- **Equatorial Coordinate System location:**  
Right ascension ( $a$ ) = 13h 42.26m  
Declination ( $d$ ) =  $-17^{\circ} 04.49'$
- **Distance of the Moon from Earth:**  
241,395 miles  
388,488 kilometers  
61.01 Earth radii
- **Light-travel time from the Moon to Earth:**  
 $1\frac{1}{4}$  seconds

- **Visual magnitude:**  
-12.25
- **Angular size:**  
31' arc minutes
- **Disk illumination:**  
68%
- **Constellation:**  
Now 'in' Virgo until 4:20 p.m. when it 'enters' Libra  
[http://en.wikipedia.org/wiki/Libra\\_%28constellation%29](http://en.wikipedia.org/wiki/Libra_%28constellation%29)
- **Setting time:**  
On the western horizon at 2 a.m.

## Jupiter

<http://en.wikipedia.org/wiki/Jupiter>

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern (E) sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Jupiter  
two horizontal fists right of east  
Azimuth point =  $111^\circ$  (east-southeast)  
one-half vertical fist above the horizon at the azimuth point  
Altitude =  $+07^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $326.61^\circ$   
Latitude =  $-00.93^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 21h 56.13m  
Declination ( $\delta$ ) =  $-13^\circ 34.08'$
- **Distance of Jupiter from Earth:**  
400.34 million miles  
644.29 million kilometers  
4.31 Astronomical Units
- **Light-travel time from Jupiter to Earth:**  
 $35\frac{3}{4}$  minutes
- **Visual magnitude:**  
-2.66
- **Angular size:**  
46" arc seconds
- **Disk illumination:**  
99%
- **Constellation:**  
Now 'in' Capricornus until 7:19 a.m., January 5, 2010  
<http://en.wikipedia.org/wiki/Capricornus>  
  
when it 'enters' Aquarius  
[http://en.wikipedia.org/wiki/Aquarius\\_%28constellation%29](http://en.wikipedia.org/wiki/Aquarius_%28constellation%29)
- **Setting time:**  
On the western horizon at 12:28 a.m.

## Uranus

<http://en.wikipedia.org/wiki/Uranus>

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-10^\circ$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 12:45 a.m.

## Mars

<http://en.wikipedia.org/wiki/Mars>

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-35^\circ$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 3:26 a.m.

## Venus

<http://en.wikipedia.org/wiki/Venus>

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-37^\circ$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 3:45 a.m.

## Mercury

[http://en.wikipedia.org/wiki/Mercury\\_\(planet\)](http://en.wikipedia.org/wiki/Mercury_(planet))

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-36^\circ$  below the western horizon
- **Rising time:**  
On the western horizon at 5:31 a.m.

## Sun

<http://en.wikipedia.org/wiki/Sun>

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-31^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 6:31 a.m.

12:45 a.m.

Julian day = 2,455,013.74

## Uranus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Uranus  
0 horizontal fists right of east  
Azimuth point =  $092^\circ$  (east)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $356.62^\circ$   
Latitude =  $-00.77^\circ$
- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 23h 48.32m

Declination ( $\delta$ ) =  $-02^{\circ} 06.31'$

- **Distance of Uranus from Earth:**
  - 1.84 billion miles
  - 2.97 billion kilometers
  - 19.85 astronomical units
- **Light-travel time from Uranus to Earth:**
  - two hours, 45 minutes
- **Visual magnitude:**
  - +5.82
- **Angular size:**
  - 03.6" arc seconds
- **Disk illumination:**
  - 100%
- **Constellation:**
  - Now 'in' Pisces until 2:22 a.m. on October 13
  - [http://en.wikipedia.org/wiki/Pisces\\_\(constellation\)](http://en.wikipedia.org/wiki/Pisces_(constellation))
  - when it 'enters' Aquarius
- **Transiting and Setting times:**
  - Due south at 6:41 a.m.
  - On the western horizon at 12:38 p.m.

**3:26 a.m.**

**Julian day = 2,455,013.85**

## Mars

- **Local Horizontal Coordinate System location:**
  - Start on the horizon at the eastern sky (compass direction =  $090^{\circ}$ ) and use the "fist" method to measure angles and find the planet Mars
  - two horizontal fists left of east
  - Azimuth point =  $069^{\circ}$  (east-northeast)
  - 0 vertical fists above the horizon at the azimuth point
  - Altitude =  $+00^{\circ}$
- **Ecliptic (Celestial) Coordinate System location:**
  - Longitude =  $052.35^{\circ}$
  - Latitude =  $-00.68^{\circ}$
- **Equatorial Coordinate System location:**
  - Right ascension ( $\alpha$ ) = 03h 19.93m
  - Declination ( $\delta$ ) =  $+17^{\circ} 40.11'$
- **Distance of Mars from Earth:**
  - 175.85 million miles
  - 283.01 million kilometers
  - 1.89 astronomical units
- **Light-travel time from Mars to Earth:**
  - 15 $\frac{3}{4}$  minutes
- **Visual magnitude:**
  - +1.12
- **Angular size:**
  - 05" arc seconds

- **Disk illumination:**  
92%
- **Constellation:**  
Now 'in' Aries until 1:54 p.m. on July 2  
[http://en.wikipedia.org/wiki/Aries\\_\(constellation\)](http://en.wikipedia.org/wiki/Aries_(constellation))  
when it 'enters' Taurus  
[http://en.wikipedia.org/wiki/Taurus\\_\(constellation\)](http://en.wikipedia.org/wiki/Taurus_(constellation))
- **Transiting and Setting times:**  
Due south at 10:13 a.m.  
On the western horizon at 5:01 p.m.

**3:45 a.m.**

**Julian day = 2,455,013.86**

## Venus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Venus  
two horizontal fists left of east  
Azimuth point =  $070^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $055.68^\circ$   
Latitude =  $-02.71^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 03h 35.55m  
Declination ( $\delta$ ) =  $+16^\circ 30.70'$
- **Distance of Venus from Earth:**  
83.99 million miles  
135.18 million kilometers  
0.90 astronomical units
- **Light-travel time from Venus to Earth:**  
7½ minutes
- **Visual magnitude:**  
-4.14
- **Angular size:**  
18" arc seconds
- **Disk illumination:**  
62%
- **Constellation:**  
Now 'in' Taurus until 8:20 p.m. on July 29  
when it 'enters' Orion  
[http://en.wikipedia.org/wiki/Orion\\_\(constellation\)](http://en.wikipedia.org/wiki/Orion_(constellation))
- **Transiting and Setting times:**  
Due south at 10:29 a.m.  
On the western horizon at 5:14 p.m.

**6:20 a.m.**

**Julian day = 2,455,023.97**

## Mercury

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Mercury  
2½ horizontal fists left of east  
Azimuth point =  $062^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $106.14^\circ$   
Latitude =  $+01.21^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 07h 10.08m  
Declination ( $\delta$ ) =  $+23^\circ 40.49'$
- **Distance of Mercury from Earth:**  
122.64 million miles  
197.36 million kilometers  
1.32 astronomical units
- **Light-travel time from Mars to Earth:**  
11 minutes
- **Visual magnitude:**  
-1.96
- **Angular size:**  
05.1" arc seconds
- **Disk illumination:**  
99%
- **Constellation:**  
Now 'in' Gemini until 4:55 p.m. on July 16  
[http://en.wikipedia.org/wiki/Gemini\\_%28constellation%29](http://en.wikipedia.org/wiki/Gemini_%28constellation%29)  
when it 'enters' Cancer  
[http://en.wikipedia.org/wiki/Cancer\\_\(astronomy\)](http://en.wikipedia.org/wiki/Cancer_(astronomy))
- **Transiting and Setting times:**  
Due south at 12:36 p.m.  
On the western horizon at 7:38 p.m.

6:31 a.m.

Julian day = 2,455,013.98

## Sun

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Sun  
2½ horizontal fists left of east  
Azimuth point =  $062^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $099.77^\circ$
- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 06h 41.95m

Declination ( $\delta$ ) = +23° 05.18'

- **Distance of the Sun from Earth:**

94.51 million miles

152.10 million kilometers

1.01 astronomical units

- **Light-travel time from the Sun to Earth:**

8½ minutes

- **Visual magnitude:**

-26.86

- **Angular size:**

31' arc minutes

- **Constellation:**

Now 'in' Gemini until 12:21 p.m. on July 20 when it 'enters' Cancer

- **Transiting and Setting times:**

Due south at 1:35 p.m.

On the western horizon at 8:39 p.m.

## Thursday, July 2

1:54 p.m.

Julian day = 2,455,015.29

### Mars

- **Event:**

'Leaves' the constellation Aries

'Enters' the constellation Taurus until 10:43 p.m. on August 25 when it then 'enters' Gemini

- **Local Horizontal Coordinate System location:**

Start on the horizon at the western sky (compass direction = 270°) and use the "fist" method to measure angles and find the planet Mars

0 horizontal fists left of west

Azimuth point = 269° (west)

four vertical fists above the horizon at the azimuth point

Altitude = +38°

- **Ecliptic (Celestial) Coordinate System location:**

Longitude = 053.37°

Latitude = -00.66°

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 03h 24.09m

Declination ( $\delta$ ) = +17° 56.66'

- **Distance of Mars from Earth:**

175.34 million miles

282.19 million kilometers

1.89 astronomical units

- **Light-travel time from Mars to Earth:**

15¾ minutes

- **Visual magnitude:**

+1.12

- **Angular size:**

5.0" arc seconds

- **Disk illumination:**  
92%
- **Setting time:**  
On the western horizon at 5 p.m.

## Friday, July 3

5:36 p.m.

Julian day = 2,455,016.44

### Mercury

- **Event:**  
'Leaves' the constellation Taurus  
'Enters' the constellation Gemini until 4:55 p.m. on July 16 when it then 'enters' Cancer
- **Local Horizontal Coordinate System location:**  
Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the "fist" method to measure angles and find the planet Mercury  
1½ horizontal fists right of west  
Azimuth point =  $283^\circ$  (west by north)  
2½ vertical fists above the horizon at the azimuth point  
Altitude =  $+26^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $090.27^\circ$   
Latitude =  $+00.01^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 06h 00.62m  
Declination ( $\delta$ ) =  $+23^\circ 26.65'$
- **Distance of Mercury from Earth:**  
114.33 million miles  
183.99 million kilometers  
1.23 astronomical units
- **Light-travel time from Mercury to Earth:**  
10¼ minutes
- **Visual magnitude:**  
-1.23
- **Angular size:**  
05.5" arc seconds
- **Disk illumination:**  
87%
- **Setting time:**  
On the western horizon at 7:48 p.m.

9 p.m.

Julian day = 2,455,016.58

### Sun

- **Event**  
**Aphelion** – Farthest distance to the Sun from Earth  
<http://en.wikipedia.org/wiki/Aphelion>

- **Distance of the Sun from Earth:**  
94.51 million miles  
152.09 million kilometers  
1.01668 astronomical units
- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-05^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 6:32 a.m. on July 4

## Tuesday, July 7

4:21 a.m.

Julian day = 2,455,019.89

### Moon

- **Event**  
Full Moon – seventh of 13 in 2009 (next full moon is August 5)  
[http://en.wikipedia.org/wiki/Full\\_moon](http://en.wikipedia.org/wiki/Full_moon)  
Changes from a waxing gibbous to a waning gibbous
- **Local Horizontal Coordinate System location:**  
Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the “fist” method to measure angles and find the Moon  
five horizontal fists left of west  
Azimuth point =  $220^\circ$  (southwest)  
two vertical fists above the horizon at the azimuth point  
Altitude =  $+21^\circ$
- **Current ‘age’:**  
14-plus days old (previous new moon was June 22)
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $284.81^\circ$   
Latitude =  $-01.95^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 19h 04.68m  
Declination ( $\delta$ ) =  $-24^\circ 33.89'$
- **Distance of the Moon from Earth:**  
250,871 miles  
403,737 kilometers  
63.41 Earth radii
- **Light-travel time from the Moon to Earth:**  
 $1\frac{1}{4}$  seconds
- **Visual magnitude:**  
-12.59
- **Angular size:**  
30' arc minutes
- **Disk illumination:**  
100%
- **Constellation:**  
Now ‘in’ Sagittarius until 10:57 a.m. on July 8  
[http://en.wikipedia.org/wiki/Sagittarius\\_%28constellation%29](http://en.wikipedia.org/wiki/Sagittarius_%28constellation%29)  
when it ‘enters’ Capricornus

- **Setting time:**  
On the western horizon at 6:40 a.m.

**4:40 p.m.**  
**Julian day = 2,455,020.40**

## Moon

- **Event**  
Apogee – seventh of 13 in 2009 (next apogee will be August 3)  
<http://en.wikipedia.org/wiki/Apogee>
- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-54^\circ$  below the eastern horizon
- **Distance of the Moon from Earth:**  
252,421 miles  
406,232 kilometers  
63.80 Earth radii
- **Rising time:**  
On the eastern horizon at 9:06 p.m.

## Wednesday, July 8

**10:24 a.m.**  
**Julian day = 2,455,021.14**

## Moon

- **Event**  
Ascending node – seventh of 13 in 2009 (next ascending node will be August 4)  
[http://en.wikipedia.org/wiki/Lunar\\_node](http://en.wikipedia.org/wiki/Lunar_node)
- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-34^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 9:41 p.m.

## Thursday, July 11

**12 a.m. (Midnight)**  
**Julian day = 2,455,023.71**

## Jupiter

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the “fist” method to measure angles and find the planet Jupiter  
2½ horizontal fists right of east  
Azimuth point =  $117^\circ$  (east-southeast)  
1½ vertical fists above the horizon at the azimuth point  
Altitude =  $+15^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $325.96^\circ$   
Latitude =  $-00.97^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 21h 53.67m  
Declination ( $\delta$ ) =  $-13^\circ 49.70'$
- **Distance of Jupiter from Earth:**

390.53 million miles  
628.49 million kilometers  
4.20 astronomical units

- **Light-travel time from Jupiter to Earth:**  
35 minutes
- **Visual magnitude:**  
-2.73
- **Angular size:**  
47" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Capricornus
- **Transiting and Setting times:**  
Due south at 4:08 a.m.  
On the western horizon at 9:35 a.m.

## Moon

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Moon  
two horizontal fists right of east  
Azimuth point =  $111^\circ$  (east-southeast)  
 $1\frac{1}{2}$  vertical fists above the horizon at the azimuth point  
Altitude =  $+15^\circ$
- **Current status and 'age':**  
Waning gibbous  
18-plus days old
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $331.12^\circ$   
Latitude =  $+01.96^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 22h 09.32m  
Declination ( $\delta$ ) =  $-09^\circ 17.58'$
- **Distance of the Moon from Earth:**  
248,915 miles  
400,590 kilometers  
62.91 Earth radii
- **Light-travel time from the Moon to Earth:**  
 $1\frac{1}{4}$  seconds
- **Visual magnitude:**  
-12.46
- **Angular size:**  
30' arc minutes
- **Disk illumination:**  
87%
- **Constellation:**  
Now 'in' Aquarius until 3:00 a.m. on July 12 when it 'enters' Pisces
- **Transiting and Setting times:**

Due south at 4:31 a.m.  
On the western horizon at 10:22 a.m.

## Uranus

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-02^{\circ}$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 12:05 a.m.

## Mars

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-32^{\circ}$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 3:11 a.m.

## Venus

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-36^{\circ}$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 3:44 a.m.

## Mercury

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-32^{\circ}$  below the western horizon
- **Rising time:**  
On the western horizon at 6:20 a.m.

## Sun

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-32^{\circ}$  below the western horizon
- **Rising time:**  
On the eastern horizon at 6:36 a.m.

## Saturn

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-03^{\circ}$  below the western horizon
- **Rising time:**  
On the eastern horizon at 11:14 a.m.

12:05 a.m.

Julian day = 2,455,023.71

## Uranus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^{\circ}$ ) and use the "fist" method to measure angles and find the planet Uranus  
0 horizontal fists right of east  
Azimuth point =  $092^{\circ}$  (east)  
0 vertical fists above the horizon at the azimuth point

- Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $356.58^\circ$   
Latitude =  $-00.78^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 23h 48.18m  
Declination ( $\delta$ ) =  $-02^\circ 07.60'$
- **Distance of Uranus from Earth:**  
1.83 billion miles  
2.95 billion kilometers  
19.69 astronomical units
- **Light-travel time from Uranus to Earth:**  
two hours,  $43\frac{3}{4}$  minutes
- **Visual magnitude:**  
+5.80
- **Angular size:**  
03.6" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Pisces until 2:22 a.m. on October 13 when it 'enters' Aquarius
- **Transiting and Setting times:**  
Due south at 6:02 a.m.  
On the western horizon at 11:59 a.m.

3:11 a.m.

Julian day = 2,455,023.84

## Mars

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Mars  
 $2\frac{1}{2}$  horizontal fists left of East  
Azimuth point =  $067^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $059.45^\circ$   
Latitude =  $-00.56^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 03h 48.95m  
Declination ( $\delta$ ) =  $+19^\circ 27.36'$
- **Distance of Mars from Earth:**  
172.25 million miles  
277.21 million kilometers  
1.85 astronomical units
- **Light-travel time from Mars to Earth:**  
 $15\frac{1}{2}$  minutes
- **Visual magnitude:**

+1.11

- **Angular size:**  
05.1" arc seconds
- **Disk illumination:**  
92%
- **Constellation:**  
Now 'in' Taurus until 10:43 p.m. on August 25 when it 'enters' Gemini
- **Transiting and Setting times:**  
Due south at 10:03 a.m.  
On the western horizon at 4:55 p.m.

3:44 a.m.

Julian day = 2,455,023.86

## Venus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Venus  
2½ horizontal fists left of east  
Azimuth point =  $067^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $066.61^\circ$   
Latitude =  $-02.49^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 04h 20.27m  
Declination ( $\delta$ ) =  $+18^\circ 56.08'$
- **Distance of Venus from Earth:**  
91.14 million miles  
146.68 million kilometers  
0.98 astronomical units
- **Light-travel time from Venus to Earth:**  
8¼ minutes
- **Visual magnitude:**  
-4.09
- **Angular size:**  
17" arc seconds
- **Disk illumination:**  
66%
- **Constellation:**  
Now 'in' Taurus until 8:20 p.m. on July 29 when it 'enters' Orion
- **Transiting and Setting times:**  
Due south at 10:35 a.m.  
On the western horizon at 5:26 p.m.

6:20 a.m.

Julian day = 2,455,023.97

## Mercury

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ )  
use the "fist" method to measure angles and find the planet Mercury  
2½ horizontal fists left of east  
Azimuth point =  $062^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $106.14^\circ$   
Latitude =  $+01.21^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 07h 10.08m  
Declination ( $\delta$ ) =  $+23^\circ 40.49'$
- **Distance of Mercury from Earth:**  
122.64 million miles  
197.36 million kilometers  
1.32 astronomical units
- **Light-travel time from Mercury to Earth:**  
11 minutes
- **Visual magnitude:**  
-1.96
- **Angular size:**  
05.1" arc seconds
- **Disk illumination:**  
99%
- **Constellation:**  
Now 'in' Gemini until 4:55 p.m. on July 16 when it 'enters' Cancer
- **Transiting and Setting times:**  
Due south at 1:26 p.m.  
On the western horizon at 8:31 p.m.

6:36 a.m.

Julian day = 2,455,023.98

## Sun

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Sun  
2½ horizontal fists left of east  
Azimuth point =  $063^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $109.31^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 07h 23.03m  
Declination ( $\delta$ ) =  $+22^\circ 03.96'$
- **Distance of the Sun from Earth:**  
94.50 million miles

152.08 million kilometers

1.02 astronomical units

- **Light-travel time from the Sun to Earth:**  
8½ minutes
- **Visual magnitude:**  
-26.86
- **Angular size:**  
31' arc minutes
- **Constellation:**  
Now 'in' Gemini until 12:21 p.m. on July 20 when it 'enters' Cancer
- **Transiting and Setting times:**  
Due South at 1:37 p.m.  
On the western horizon at 8:38 p.m.

11:10 a.m.

Julian day = 2,455,024.17

## Saturn

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern (E) sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Saturn  
one horizontal fist left of east  
Azimuth point =  $082^\circ$  (east by north)  
0 vertical fist above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $167.42^\circ$   
Latitude =  $+02.03^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 11h 16.42m  
Declination ( $\delta$ ) =  $+06^\circ 53.28'$
- **Distance of Saturn from Earth:**  
922.43 million miles  
1.48 billion kilometers  
9.92 astronomical units
- **Light-travel time from Saturn to Earth:**  
one hour, 22½ minutes
- **Visual magnitude:**  
+1.07
- **Angular size:**  
17" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Leo until 3:05 p.m. on September 2 when it 'enters' Virgo
- **Transiting and Setting times:**  
Due south at 5:28 p.m.  
On the western horizon at 11:47 p.m.

## July 15, Wednesday

4:53 a.m.

Julian day = 2,455,027.91

### Moon

- **Event**

Third (last) quarter – seventh of 12 third quarter moons in 2009 (next third quarter moon will be August 13)

Changes from a waning gibbous to a waning crescent moon

- **Local Horizontal Coordinate System location:**

Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the “fist” method to measure angles and find the Moon

two horizontal fists right of east

Azimuth point =  $110^\circ$  (east-southeast)

five vertical fists above the horizon at the azimuth point

Altitude =  $+52^\circ$

- **Current ‘age’:**

22-plus days old

- **Ecliptic (Celestial) Coordinate System location:**

Longitude =  $023.37^\circ$

Latitude =  $+04.78^\circ$

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 01h 18.75m

Declination ( $\delta$ ) =  $+13^\circ 27.60'$

- **Distance of the Moon from Earth:**

235,937 miles

379,703 kilometers

59.63 Earth radii

- **Light-travel time from the Moon to Earth:**

$1\frac{1}{4}$  seconds

- **Visual magnitude:**

-11.97

- **Angular size:**

31' arc minutes

- **Disk illumination:**

50%

- **Constellation:**

Now ‘in’ Pisces until 7:16 p.m. when it ‘enters’ Aries

- **Transiting and Setting times:**

Due south at 7:21 a.m.

On the western horizon at 2:12 p.m.

## Thursday, July 16

4:55 p.m.

Julian day = 2,455,029.41

### Mercury

- **Event:**

‘Leaves’ the constellation Gemini

‘Enters’ the constellation Cancer until 4:53 p.m. on July 26 when it ‘enters’ Leo

- **Local Horizontal Coordinate System location:**

Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the "fist" method to measure angles and find the planet Mercury

0 horizontal fists left of west

Azimuth point =  $269^\circ$  (west)

five vertical fists above the horizon at the azimuth point

Altitude =  $+48^\circ$

- **Ecliptic (Celestial) Coordinate System location:**

Longitude =  $117.80^\circ$

Latitude =  $+01.69^\circ$

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 08h 00.41m

Declination ( $\delta$ ) =  $+22^\circ 16.95'$

- **Distance of Mercury from Earth:**

124.14 million miles

199.79 million kilometers

1.34 astronomical units

- **Light-travel time from Mercury to Earth:**

11 minutes

- **Visual magnitude:**

-1.80

- **Angular size:**

05.0" arc seconds

- **Disk illumination:**

99%

- **Setting time:**

On the western horizon at 8:54 p.m.

## Monday, July 20

12:21 p.m.

Julian day = 2,455,033.22

### Sun

- **Event:**

'Leaves' the constellation Gemini

'Enters' the constellation Cancer until 11:24 a.m. on August 10 when it 'enters' Leo

- **Local Horizontal Coordinate System location:**

Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Sun

three horizontal fists right of east

Azimuth point =  $117^\circ$  (southeast by east)

seven vertical fists above the horizon at the azimuth point

Altitude =  $+69^\circ$

- **Ecliptic (Celestial) Coordinate System location:**

Longitude =  $118.12^\circ$

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 08h 00.33m

Declination ( $\delta$ ) =  $+20^\circ 33.76'$

- **Distance of the Sun from Earth:**

94.45 million miles  
152.01 million kilometers  
1.02 astronomical units

- **Light-travel time from Mercury to Earth:**  
8½ minutes
- **Visual magnitude:**  
-26.86
- **Angular size:**  
31' arc minutes
- **Transiting and Setting times:**  
Due south at 1:38 p.m.  
On the western horizon at 8:34 p.m.

## Tuesday, July 21

12 a.m. (Midnight)  
Julian day = 2,455,033.71

### Jupiter

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Jupiter  
3½ horizontal fists right of east  
Azimuth point =  $125^\circ$  (southeast by east)  
2½ vertical fists above the horizon at the azimuth point  
Altitude =  $+23^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $325.04^\circ$   
Latitude =  $-01.01^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 21h 50.16m  
Declination ( $\delta$ ) =  $-14^\circ 10.42'$
- **Distance of Jupiter from Earth:**  
382.78 million miles  
616.03 million kilometers  
4.12 astronomical units
- **Light-travel time from Jupiter to Earth:**  
34¼ minutes
- **Visual magnitude:**  
-2.78
- **Angular size:**  
48" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Capricornus until 7:19 a.m. on January 5, 2010, when it 'enters' Aquarius
- **Transiting and Setting times:**  
Due south at 3:25 a.m.  
On the western horizon at 8:52 a.m.

## Uranus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Uranus  
one-half horizontal fist right of east  
Azimuth point =  $097^\circ$  (east by south)  
one-half vertical fist above the horizon at the azimuth point  
Altitude =  $+07^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $356.46^\circ$   
Latitude =  $-00.78^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 23h 48.26m  
Declination ( $\delta$ ) =  $-02^\circ 07.44'$
- **Distance of Uranus from Earth:**  
1.82 billion miles  
2.92 billion kilometers  
19.54 astronomical units
- **Light-travel time from Uranus to Earth:**  
two hours, 42½ minutes
- **Visual magnitude:**  
+5.78
- **Angular size:**  
03.6" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Pisces until 2:22 a.m. on October 13 when it 'enters' Aquarius
- **Transiting and Setting times:**  
Due south at 5:22 a.m.  
On the western horizon at 11:19 a.m.

## Mars

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-30^\circ$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 2:57 a.m.

## Venus

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-35^\circ$  below the eastern horizon
- **Rising time:**  
On the eastern horizon at 3:46 A.M.

## Moon

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-35^\circ$  below the western horizon
- **Rising time:**

On the eastern horizon at 6:01 a.m.

## Sun

- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-33^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 6:41 a.m.

## Mercury

- **Local Horizontal Coordinate System location:**  
At this time it is not visible it is  $-29^\circ$  below the western horizon
- **Rising time:**  
On the western horizon at 7:20 a.m.

## Saturn

- **Local Horizontal Coordinate System location:**  
At this time it is not visible it is  $-10^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 10:35 a.m.

2:57 a.m.

Julian day = 2,455,033.83

## Mars

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Mars  
2½ horizontal fists left of east  
Azimuth point =  $065^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $066.43^\circ$   
Latitude =  $-00.44^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 04h 18.04m  
Declination ( $\delta$ ) =  $+20^\circ 55.79'$
- **Distance of Mars from Earth:**  
168.39 million miles  
271.00 million kilometers  
1.81 astronomical units
- **Light-travel time from Mars to Earth:**  
15 minutes
- **Visual magnitude:**  
+1.10
- **Angular size:**  
05.2" arc seconds
- **Disk illumination:**  
91%

- **Constellation:**  
Now 'in' Taurus until 10:43 p.m. on August 25 when it 'enters' Gemini
- **Transiting and Setting times:**  
Due south at 9:53 a.m.  
On the western horizon at 4:49 p.m.

**3:46 a.m.**

**Julian day = 2,455,033.87**

## Venus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Venus  
2½ horizontal fists left of east  
Azimuth point =  $065^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $077.80^\circ$   
Latitude =  $-02.13^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 05h 07.24m  
Declination ( $\delta$ ) =  $+20^\circ 44.73'$
- **Distance of Venus from Earth:**  
98.06 million miles  
157.81 million kilometers  
1.05 astronomical units
- **Light-travel time from Venus to Earth:**  
8¾ minutes
- **Visual magnitude:**  
-4.05
- **Angular size:**  
16" arc seconds
- **Disk illumination:**  
70%
- **Constellation:**  
Now 'in' Taurus until 8:20 p.m. on July 29 when it 'enters' Orion
- **Transiting and Setting times:**  
Due south at 10:42 a.m.  
On the western horizon at 5:39 p.m.

**6:01 a.m.**

**Julian day = 2,455,033.96**

## Moon

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Moon  
2½ horizontal fists left of east  
Azimuth point =  $063^\circ$  (east-northeast)

0 vertical fists above the horizon at the azimuth point

Altitude =  $+00^\circ$

- **Current status and 'age':**

Waning crescent

28-plus days old (previous new moon was June 22)

- **Ecliptic (Celestial) Coordinate System location:**

Longitude =  $110.52^\circ$

Latitude =  $+00.54^\circ$

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 07h 28.55m

Declination ( $\delta$ ) =  $+22^\circ 25.33'$

- **Distance of the Moon from Earth:**

222,235 miles

357,653 kilometers

61.17 Earth radii

- **Light-travel time from the Moon to Earth:**

1¼ seconds

- **Visual magnitude:**

-08.62

- **Angular size:**

33' arc minutes

- **Disk illumination:**

01%

- **Transiting time:**

Due south at 1:17 p.m.

6:42 a.m.

Julian day = 2,455,033.99

## Sun

- **Local Horizontal Coordinate System location:**

Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Sun

2½ horizontal fists left of east

Azimuth point =  $065^\circ$  (east-northeast)

0 vertical fists above the horizon at the azimuth point

Altitude =  $+00^\circ$

- **Ecliptic (Celestial) Coordinate System location:**

Longitude =  $118.85^\circ$

- **Equatorial Coordinate System location:**

Right ascension ( $\alpha$ ) = 08h 03.39m

Declination ( $\delta$ ) =  $+20^\circ 24.88'$

- **Distance of the Sun from Earth:**

94.45 million miles

152.01 million kilometers

1.02 astronomical units

- **Light-travel time from the Sun to Earth:**

8½ minutes

- **Visual magnitude:**

-26.86

- **Angular size:**  
31' arc minutes
- **Constellation:**  
Now 'in' Cancer until 11:24 a.m. on August 10 when it 'enters' Leo
- **Transiting and Setting times:**  
Due south at 1:38 p.m.  
On the western horizon at 8:33 p.m.

7:20 a.m.

Julian day = 2,455,034.01

## Mercury

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Mercury  
2½ horizontal fists left of east  
Azimuth point =  $066^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $127.27^\circ$   
Latitude =  $+01.81^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 08h 40.08m  
Declination ( $\delta$ ) =  $+20^\circ 14.23'$
- **Distance of Mercury from Earth:**  
122.87 million miles  
197.74 million kilometers  
1.32 astronomical units
- **Light-travel time from Mercury to Earth:**  
11 minutes
- **Visual magnitude:**  
-1.25
- **Angular size:**  
05.1" arc seconds
- **Disk illumination:**  
95%
- **Constellation:**  
Now 'in' Cancer until 4:53 p.m. on July 26 when it 'enters' Leo
- **Transiting and Setting times:**  
Due south at 2:15 p.m.  
On the western horizon at 9:10 p.m.

10:35 a.m.

Julian day = 2,455,034.15

## Saturn

- **Local Horizontal Coordinate System location:**

Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Saturn  
one horizontal fist left of east  
Azimuth point =  $082^\circ$  (east by north)  
0 vertical fist above the horizon at the azimuth point  
Altitude =  $+00^\circ$

- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $168.32^\circ$   
Latitude =  $+02.01^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 11h 19.71m  
Declination ( $\delta$ ) =  $+06^\circ 31.14'$
- **Distance of Saturn from Earth:**  
934.86 million miles  
1.50 billion kilometers  
10.06 astronomical units
- **Light-travel time from Saturn to Earth:**  
one hour,  $23\frac{3}{4}$  minutes
- **Visual magnitude:**  
+1.10
- **Angular size:**  
17" arc seconds
- **Disk illumination:**  
100%
- **Constellation:**  
Now 'in' Leo until 3:05 p.m. on September 2 when it 'enters' Virgo
- **Transiting and Setting times:**  
Due south at 4:52 p.m.  
On the western horizon at 11:10 p.m.

3:17 p.m.

Julian day = 2,455,034.35

## Moon

- **Event**  
Perigee – eighth of 13 perigees in 2009 (next perigee will be August 18)  
This is the closest perigee this year  
<http://en.wikipedia.org/wiki/Perigee>
- **Local Horizontal Coordinate System location:**  
Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the "fist" method to measure angles and find the Moon  
 $1\frac{1}{2}$  horizontal fists left of west  
Azimuth point =  $256^\circ$  (west by south)  
six vertical fists above the horizon at the azimuth point  
Altitude =  $+61^\circ$
- **Current status and 'age':**  
Waning crescent  
29-plus days old
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $115.08^\circ$

Latitude = +00.15°

- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 07h 47.66m  
Declination ( $\delta$ ) = +21° 17.50'
- **Distance of the Moon from Earth:**  
222,118 miles  
357,464 kilometers  
56.14 Earth radii
- **Light-travel time from the Moon to Earth:**  
1¼ seconds
- **Visual magnitude:**  
-08.65
- **Angular size:**  
34' arc minutes
- **Disk illumination:**  
01%
- **Constellation:**  
Now 'in' Gemini until 8:47 p.m. when it 'enters' Cancer
- **Setting time:**  
On the western horizon at 8:26 p.m.

9:35 p.m.

Julian day = 2,455,034.61

## Moon

- **Event**  
New Moon – seventh of 12 in 2009 (next new moon will be August 20)  
[http://en.wikipedia.org/wiki/New\\_moon](http://en.wikipedia.org/wiki/New_moon)  
Changes from a waning crescent to a waxing crescent moon  
Best (darkest moon) period of the month for viewing the evening night sky  
Beginning of Lunation 1071  
[http://en.wikipedia.org/wiki/Lunation\\_Number](http://en.wikipedia.org/wiki/Lunation_Number)
- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is -13° below the western horizon

10:49 p.m.

Julian day = 2,455,034.66

## Moon

- **Event**  
Descending node – eighth of 13 in 2009 (next descending node will be August 18)
- **Local Horizontal Coordinate System location:**  
At this time it is not visible it is -25° below the western horizon
- **Rising time:**  
On the eastern horizon at 7:15 a.m. on July 22

## Wednesday, July 22

7:15 a.m.

Julian day = 2,455,035.01

## Moon

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the Moon  
two horizontal fists left of east  
Azimuth point =  $068^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$
- **Current 'age':**  
00.5+ days old
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $126.52^\circ$   
Latitude =  $-00.82^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 08h 34.22m  
Declination ( $\delta$ ) =  $+17^\circ 52.79'$
- **Distance of the Moon from Earth:**  
222,421 miles  
357,952 kilometers  
56.20 Earth radii
- **Light-travel time from the Moon to Earth:**  
 $1\frac{1}{4}$  seconds
- **Visual magnitude:**  
-8.61
- **Angular size:**  
33' arc minutes
- **Disk illumination:**  
01%
- **Constellation:**  
Now 'in' Cancer until 3:48 a.m. on July 23 when it 'enters' Leo
- **Transiting and Setting times:**  
Due south at 2:16 p.m.  
Sets on the western horizon at 9:10 p.m.

## Saturday, July 25

9 p.m.

Julian day = 2,455,038.58

### Equation of Time

- **Event:**  
The Equation of Time reaches the shallow minimum of the year  
-06.53 minutes  
It will reach 00.00 minutes on September 1  
[http://en.wikipedia.org/wiki/Equation\\_of\\_time](http://en.wikipedia.org/wiki/Equation_of_time)

## Sunday, July 26

4:53 p.m.

Julian day = 2,455,039.41

Mercury

- **Event:**  
 `Leaves` the constellation Cancer (kǎn' sě̄r), (Cnc) the Crab  
 `Enters` the constellation Leo (lē' ō), (Leo) the Lion  
 until 8:02 A.M. on August 20  
 When it then `enters` Virgo (vûr' gō), (Vir) the Maiden or Virgin
- **Local Horizontal Coordinate System location:**  
 Start on the horizon at the western sky (compass direction =  $270^\circ$ ) and use the "fist" method to measure angles and find the planet Mercury  
 1½ horizontal fists left of west  
 Azimuth point =  $254^\circ$  (west by south)  
 5½ vertical fists above the horizon at the azimuth point  
 Altitude =  $+55^\circ$
- **Ecliptic (Celestial) Coordinate System location:**  
 Longitude =  $137.66^\circ$   
 Latitude =  $+01.64^\circ$
- **Equatorial Coordinate System location:**  
 Right ascension ( $_a$ ) = 09h 21.97m  
 Declination ( $_d$ ) =  $+17^\circ 08.68'$
- **Distance of Mercury from Earth:**  
 119.35 million miles  
 192.07 million kilometers  
 1.28 astronomical units
- **Light-travel time from Mercury to Earth:**  
 10¾ minutes
- **Visual magnitude:**  
 -0.77
- **Angular size:**  
 05.2" arc seconds
- **Disk illumination:**  
 89%
- **Setting time:**  
 On the western horizon at 9:21 p.m.

## Tuesday, July 28

4:59 p.m.

Julian day = 2,455,041.42

### Moon

- **Event**  
 First Quarter – eighth of 13 in 2009 (next first quarter moon will be August 27)  
 Changes from a waxing crescent to a waxing gibbous moon
- **Local Horizontal Coordinate System location:**  
 Start on the horizon at the southern sky (compass direction =  $180^\circ$ ) and use the "fist" method to measure angles and find the Moon  
 3½ horizontal fists left of south  
 Azimuth point =  $143^\circ$  (southeast by south)  
 three vertical fists above the horizon at the azimuth point  
 Altitude =  $+30^\circ$
- **Current 'age':**

- seven-plus days old
- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $216.59^\circ$   
Latitude =  $-05.75^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 14h 08.52m  
Declination ( $\delta$ ) =  $-19^\circ 05.70'$
- **Distance of the Moon from Earth:**  
239,888 miles  
386,062 kilometers  
60.63 Earth radii
- **Light-travel time from the Moon to Earth:**  
1¼ seconds
- **Visual magnitude:**  
-11.96
- **Angular size:**  
30' arc minutes
- **Disk illumination:**  
50%
- **Constellation:**  
Now 'in' Virgo until 1:49 a.m. on July 29 when it 'enters' Libra
- **Transiting and Setting times:**  
Due south at 7:13 p.m.  
Sets on the western horizon at 12:36 a.m. on July 29

## Wednesday, July 29

8:20 p.m.  
Julian day = 2,455,042.55

### Venus

- **Event**  
'Leaves' the constellation Taurus  
'Enters' the constellation Orion until 1:44 a.m. on August 1 when it 'enters' Gemini
- **Local Horizontal Coordinate System location:**  
At this time it is not visible since it is  $-26^\circ$  below the western horizon
- **Rising time:**  
On the eastern horizon at 3:52 a.m. on July 30

## Thursday, July 30

3:52 a.m.  
Julian day = 2,455,042.87

### Venus

- **Local Horizontal Coordinate System location:**  
Start on the horizon at the eastern sky (compass direction =  $090^\circ$ ) and use the "fist" method to measure angles and find the planet Venus  
2½ horizontal fists left of east  
Azimuth point =  $064^\circ$  (east-northeast)  
0 vertical fists above the horizon at the azimuth point  
Altitude =  $+00^\circ$

- **Ecliptic (Celestial) Coordinate System location:**  
Longitude =  $088.06^\circ$   
Latitude =  $-01.72^\circ$
- **Equatorial Coordinate System location:**  
Right ascension ( $\alpha$ ) = 05h 51.07m  
Declination ( $\delta$ ) =  $+21^\circ 42.27'$
- **Distance of Venus from Earth:**  
104.05 million miles  
167.45 million kilometers  
1.12 astronomical units
- **Light-travel time from Venus to Earth:**  
9¼ minutes
- **Visual magnitude:**  
-4.02
- **Angular size:**  
15" arc seconds
- **Disk illumination:**  
73%
- **Constellation:**  
Now 'in' Orion
- **Transiting and Setting times:**  
Due south at 10:51 a.m.  
On the western horizon at 5:50 p.m.