

HOMEWORK #5 (due start of class January 29) (copyright D. McCarthy)

LEARNING GOALS:

1. Continue recording observations in your journal.
2. Understand terms associated with viewing planets at different locations in their orbits around the Sun.
3. Put the above terms into practice with some practical examples of the Moon and Venus.

TO RECEIVE FULL CREDIT:

1. If you submit multiple pages, staple them together.
 2. To receive any credit on these problems, you must **show how** you derived your answer by writing all the logical steps that led you to it.
 3. All sentence responses must be **typewritten and in complete sentences**. You may handwrite any arithmetic. Use good English grammar.
 4. **If you work more than three hours on this assignment, you should stop, record your work here, and contact Dr. McCarthy.**
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1. Read about planetary orbits as seen from Earth.

<http://astro.unl.edu/naap/ssm/modeling2.html>

2. Continue observing phenomena the sky (night and day) and recording in your journal.

Use your journal to describe your observations. In each case, do your best to measure and record the AZ/EL coordinates of each object and the time of observation. Make a sketch and/or add photos.

- a. Satellite passes. Consult the recommended Web site for what's in the sky that night.
- b. Sunset location and time. Sunrise, too?
- c. The Moon – Continue drawing how it moves with respect from night to night at the same time.
- d. Venus
- e. The star Sirius
- f. Anything unusual you notice. Be sure to record the time and location so we can figure out the likely cause afterwards.

3. The view from the Moon

From Earth, both the Sun and Moon have an angular diameter about ~0.5 degrees. Of course, all three objects have much different diameters in physical units like miles or kilometers. For example, the respective diameters of the Moon, Earth, and Sun are ~2,000, ~8,000, and 864,000 miles. Pretend you are standing on the Moon's surface.

- a. What would the angular diameters be of the Earth and Sun? Show your work.
- b. Would you be able to see a sunrise, a sunset, an Earth-rise? Why or why not?
- c. Would the Earth appear to rotate? Why or why not?
- d. Would the Earth show "phases"? Why or why not?

4. Synodic and sidereal periods

The planet Venus can reach a greatest elongation of ~45 degrees and appear spectacularly bright in the morning or evening sky, as it will in the evening sky on March 24. (FYI, Venus will be at its brightest on April 28.) How often do these events occur? Use the formula (below) from the reading, where "S" is the synodic period you want and "SV" and "SE" are the evolution periods of Venus (224.70 days) and Earth (365.25 days), respectively.

$$\frac{1}{S} = \frac{1}{SV} - \frac{1}{SE}$$