AST 301
Homework #3
Due Friday Feb. 11

1. Make a sketch like figure 4-3 in Seeds, but for the Earth and Venus. (Venus is in a smaller orbit than the Earth and moves faster.) From your sketch, figure out where Venus is relative to the Earth when it appears to move in the retrograde direction. At what time of day is Venus highest in the sky when it is moving retrograde? At what time of day is Venus highest in the sky when it is moving most rapidly in the prograde direction? What is its phase in each of these cases?

2. Consider a comet that is 0.5 AU from the Sun when it is closest to the Sun, and is 5 AU from the Sun when it is farthest from the Sun.
a) Use Kepler's 3rd law to figure out the period of its orbit.
b) If its speed is 50 km/s when it is closest to the Sun, what is its speed when it is farthest from the Sun?

3. The Moon is new early next week.
a) What will its phase be a week later, and when and where should you look to see it then?
b) Knowing only that the Moon is new next week, when is the next time there might be a lunar eclipse?
c) Look in your book to find the date of the next lunar eclipse. This should be different from your answer to question b. Why isn't there an eclipse the next time you might expect one?
d) Is the eclipse you found in the book visible from Austin? What time should we go outside to see the next lunar eclipse in Austin?
e) Where in the sky will the Moon be during the next lunar eclipse in Austin? (Rising? Near overhead? Well south of overhead? Setting?)