Homework #5 Solutions
Due in class Wednesday, February 22

Part 2. Observing (Note: this requires two observations at least 3 days apart)

(a) There are two planets easily visible with the naked eye right now in the early evening. Use your monthly sky chart to identify them and sketch their location in the sky. Reminder: you did something very similar in Homework #2 and the same rules apply here. Draw features on the horizon, record the direction you're facing, the time and date, and sketch in nearby constellations.

(b) Record the height of each planet with your astrolabe. To do this well, you should take two or three measurements independently and average them. Record your individual measurements and show your work in computing the average.

(c) At THE SAME TIME (to within 5 mins) at least three nights later, go out and record the NEW locations of the two planets ON THE SAME DRAWING (leave horizon, nearby constellations the same, but record the NEW location of each planet with a note next to it with time and date of your second observation)

(d) Record the elevations of these planets again with your astrolabe (using the same procedure of multiple measurements averaged together).

(e) Which planet moved more? Use your astrolabe measurements and your sketch to justify your conclusion.

(f) Come up with a hypothesis to explain your answer to part (e) and design an experiment to test it. How could you verify that your reasoning is correct or incorrect (Hint: Could you make similar observations of different planets? If so, how much would you expect them to move over the same time period?)

If you did this correctly, you should have found that Jupiter moved less than Venus in the sky over the same time period. Any well-thought out hypothesis for why this is was given full credit, but now that you know about Kepler's laws, you should actually be able to explain EXACTLY why this occurs. What does Kepler's third law tell you should happen if you watch these planets in the sky over time?