

Physics 174
Homework 1 - Due 15 September

30 August, 2006

This homework will help you gain a familiarity with the night skies. You will need one clear night to complete this assignment, with at least two clear periods an hour or two apart. As many of you are well aware, Ithaca is not famous for its clear skies, so don't pass up the first good night you get. It might be the only one before the assignment is due.

1. Pick out the five brightest celestial objects in the sky (besides the Sun and Moon).
 - a. Record the date and time.
 - b. For each object, record their position in the sky as an altitude (in degrees above the horizon) and an azimuth (direction, e.g. NE). You will need to estimate the altitude. Remember that something at the zenith (directly overhead) is at 90 degrees altitude, and something halfway from the horizon to the zenith is at 45 degrees.
 - c. Identify each object using the star charts in the back of your book. If the object is not on the charts, it's probably a planet. Can you tell which one? Mars is in Leo, Jupiter is in Libra, and Saturn is crossing from Cancer to Leo. Venus is barely visible ahead of the Sun in the morning, but will soon be lost in the Sun's glare.
2. Make a drawing of the circumpolar stars in the north on a blank piece of 8 1/2 x 11" paper. Your drawing should include the horizon, the Big Dipper, the Little Dipper, and Cassiopeia, among any other bright stars visible.
 - a. Record the date and time of your observation.
 - b. The best way to make your drawing is to use a ruler, held at arm's length, to measure the distance between the stars, the horizon, and landmarks on the horizon. Make sure that your drawing will fit on a page by scaling it (by 1/4 or 1/5 or so). Start by sketching in the horizon, then add the stars.
3. Repeat step 2 after an hour or two have passed. Be sure to record the time of your second observation as well. If it clouds up for the night, you'll have to try on a different night and start at step 2 again.

Using a protractor, measure the rotation of the sky around the North Celestial Pole (at the tip of the handle of the Little Dipper) of several stars between steps 2 and 3.

- a. What is the average rotation angle between the observations (in degrees)?
- b. How much time passed (in hours)?
- c. At what rate is the sky rotating (degrees per hour)?