Introductory Astronomy (Ast 180)  
Homework Assignment #2  
Due February 9, 2006 (At the Start of Class)

You will find the equatorial star chart of help in completing questions 1-7. You will find the pages of celestial spheres useful for questions 9-11. Have fun!

1. In which constellation does the Sun appear on the Summer Solstice (June 21)? 
2. About how many months does it take the Sun to move along the ecliptic from B to A? 
3. On the Vernal Equinox (March 21), which zodiacal constellation lies in the opposite direction of the Sun and is visible most of the night? 
4. Which point (letter) on the ecliptic is the winter solstice? 
5. Which constellation will be rising in the east as the Sun sets in the west on the first day of autumn (September 21)? 
6. On the Summer Solstice (June 21), a comet is in the constellation Taurus, at what time of day is it possible to view the comet? The comet is not bright enough to see during the day time. Hint: Notice from the star chart that Taurus and the comet are west of the Sun. 
7. Which number is in the summer night sky? 
8. Where on the Earth can you simultaneously see Polaris and objects near the south celestial pole (e.g. the Clouds of Magellan)? 
9. On the Vernal Equinox (March 21), what is the maximum altitude of the Sun above the horizon in Flagstaff in units of degrees? 
10. How long each year is the Sun below the horizon at the North Pole? 
11. What is the Sun's maximum altitude above the horizon at the North Pole? 
12. You see different constellations at different times of the year because of the Earth's  
   a. tides  
   b. rotation on its axis  
   c. revolution about the Sun  
   d. oblateness 
13. Polaris is important because:  
   a. it is the brightest star in the night sky  
   b. it sits over the rotation axis of the the Earth 
   c. it is the star closest to the Sun  
   d. all of the above 
14. The celestial equator is:  
   a. the line around the sky directly above the Earth's equator  
   b. the dividing line between north and south celestial hemispheres  
   c. the projection of the Earth's equator on the sky  
   d. all of the above 
15. The star 47 UMa is 40 ly from the Earth. The star has a planet orbiting about it. The planet is on a circular orbit 2.1 AU from the star. Assume the circular orbit lies in the plane of the sky. Using the Small Angle Formula, calculate the angular distance between the star and the planet in arc sec. \( 1 \text{ly} = 9.46 \times 10^{12} \text{km} \)
FIG. 7-5 Altitude and azimuth.

FIG. 7-6 Zenith

North celestial pole; zenith

Diurnal circle

Observer

Horizon; celestial equator

FIG. 7-7 Sky from the North Pole.

FIG. 7-8 Sky from the equator.

FIG. 7-9 Sky from latitude 34° N.