29:50 Stars, Galaxies, and the Universe
Instructor: Spangler
Homework Assignment # 1
August 31, 2010

1. What is the azimuth angle of the Sun when it sets these days?
   (a) 40 - 70 degrees
   (b) 100-130 degrees
   (c) 150 - 180 degrees
   (d) 230 - 250 degrees
   (e) 270 - 310 degrees

2. If a star is at the *zenith*, what is its altitude angle?
   (a) 0 degrees
   (b) 15 degrees
   (c) 35 degrees
   (d) 90 degrees
   (e) 117 degrees

3. An observer is at the north pole (together with Santa Claus). What fraction of the celestial sphere does he or she see at one time or another?
   (a) 100 %
   (b) 0 %
   (c) 50 %
   (d) 67 %

4. Use the star charts under "Star Charts with Coordinate Grids" on the course homepage to answer this question. In the constellation of Lyra (the Lyre) is the bright star Vega. It very close to the zenith these nights as soon as it gets dark. What are its coordinates in the celestial coordinate system, or equatorial coordinate system as it is called in your textbook? In what follows, "RA" stands for right ascension, and "dec" means declination.
   (a) RA = 5h32m, dec= +5d
   (b) RA = 7h42m, dec= -5d
   (c) RA = 18h50m, dec= +39d
   (d) RA = 13h25m, dec= +17d
   (e) RA = 27h42m, dec= +73d

5. The constellations Aquila (the Eagle) and Canis Minor (the little dog) are close to the celestial equator. The middle of Aquila has a right ascension of

20 hours, and Canis Minor has a right ascension of about 8 hours. Now, at 10PM on November 5, Aquila is setting in the west. What time of year will Canis Minor be setting?
(a) January 5
(b) March 1
(c) May 5
(d) August 15
(e) November 5

6. An observer is on the beach at the equator. What fraction of the celestial sphere does he or she see at one time or another?
(a) 100 %
(b) 0 %
(c) 50 %
(d) 67 %

7. What if the obliquity of the ecliptic were 70 degrees rather than the 23.5 degrees that it really is? Would seasonal variations be stronger or weaker than they are?
(a) stronger seasons
(b) less pronounced seasons
(c) the obliquity has no effect on seasons; they would be the same.

8. You see a solar eclipse, in which the Moon passes in front of the Sun and blocks out its light, in December. When this happens, you can see the stars around the Sun. Which constellation would you see surrounding the eclipsed Sun?
(a) Scorpius
(b) Capricornus
(c) Leo
(d) Gemini
(e) Aquila