

ASTR 121: Homework 2

Due Thursday, September 10th, 2009

For problems of a mathematical nature, show all work for full credit (including multiple choice responses).

1. In modern astronomy, the constellations are
 - a. clusters of stars that are held together by the mutual gravitational attractions of the individual stars in the cluster.
 - b. nearby galaxies to which astronomers have given specific names.
 - c. 12 regions of sky through which the Sun, Moon, and the planets move as seen from Earth.
 - d. 88 regions of sky, covering the entire sky.
2. How would the seasons be affected if the tilt of Earth's rotational axis, currently at 23.5° , changed to (a) 10° ; (b) 45° ? Explain.
3. What percent of the sky is circumpolar at (a) the north pole; (b) the equator?
4. If constellation Y is at the zenith at 4:00am in January, what month will it be at the zenith at 10:00pm?
5. *Ch 2, prob. 40*: Suppose that you live at a latitude of 40° N. What is the elevation (angle) of the Sun above the southern horizon at noon (a) at the time of the vernal equinox; (b) at the time of the winter solstice? Explain your reasoning. Include a drawing as part of your explanation.
6. *Ch 2, prob. 33*: The time exposure photograph that opens this chapter shows the trails made by individual stars as the celestial sphere appears to rotate around the Earth. (a) For approximately what length of time was the camera shutter left open to take this photograph? (b) The stars in this photograph (taken in Hawaii, at roughly 20° north latitude) appear to rotate around one of the celestial poles. Which celestial pole is it? As seen from this location, do the stars move clockwise or counter-clockwise around this celestial pole? (c) If you were at 20° south latitude, which celestial pole could you see? In which direction would you look to see it? As seen from this location, do the stars move clockwise or counterclockwise around the celestial pole?