

Observational Astronomy - Spring 2014

Homework 1 - Coordinates and Angles

1. Why do we use angles to determine the position of objects in the sky?
2. You are looking at the Statue of Liberty from a distance. If you extend your arm out your thumb is just the right size to cover the height of the statue. Are you in Flag Plaza, Governor Island Picnic Park, Battery Park? (Show your calculation, measure the length of your arm and your thumb beforehand, and google the size of the Statue of Liberty, if you do not know it. Eventually, you can help yourself with, for example, Google Maps).
3. Why do multiple coordinate systems exist in astronomy? What are they? Describe in which context each one is useful.
4. Convert the following decimal coordinates RA: 83.63, DEC: 22.014 into sexagesimal coordinates (hour, minutes, seconds for RA and degrees, minutes, seconds for Dec). Show your calculation. These are the coordinates of a famous astronomical object. Please look up what this object is, and describe it.
5. What is the equivalent of the Equator on earth called on the Celestial Sphere?
6. You are at the Palomar observatory at the Hale telescope, a 5 meter optical telescope in California. The coordinates of Palomar on earth are 33.36°N , 116.86°W . What is the declination of the Zenith where you are?
7. How many sidereal days are there in a solar year? Explain your answer.
8. We said that you can only see one half of the sky at any one time on the surface of the Earth. However, because you are above the ground and the Earth is curved, you can actually see slightly below the theoretical horizon. If your eyes are 2 meters off the ground, and the Earth is a perfect sphere with a radius of 6400 km, how far below the theoretical horizon can you see? How about if you are at the top of the One World Trade Center, 1776 feet (541 meters) off the ground? Give both answers in minutes of arc.