Astronomy 301 – Fall 2019

Homework 3

Due Date: Wednesday, September 25, 2019, 9:00 AM

You must turn in your homework answers electronically via Canvas. A .pdf or .docx file would be best, but if you can get a good image of your hand-written homework, a .jpg or .png file would okay also. Make sure your name and eid appear at the beginning of your homework.

We encourage you to work together on the homework but you are not allowed to copy from each other. You must write out the answers in your own words.

1. A periodic comet is one that has an orbital period short enough so that it has been seen to approach the sun more than once. Describe the life history of a typical periodic comet, from its origin in the Oort cloud to its demise as a meteor shower.

2. The star 61 Cygni has a parallax of 0.285 arcseconds.
   (a) How far away is 61 Cygni in parsecs? What is its distance in light years? kilometers?
   (b) Suppose you travel to the star at 10 km per second (roughly the speed of a rocket in orbit around the Earth). How many years will it take you to get to the star?

3. Suppose two stars are identical in every respect but one is 9 times brighter than the other. How much further away is the fainter star than the brighter star?

4. An electromagnetic wave traveling through space has a frequency of 5.0×10^{17} Hz. What is the wavelength of the radiation in centimeters? In Ångstroms? What is the name given to radiation with this wavelength? Where would you have to put a telescope to observe radiation with this wavelength from a star?