Homework 1

Due: In class on Wednesday 9/16/09

Homework Policy: **No late homework. Don't just write down the answers – show how you obtained them.**

0. Write a one-page summary of this week's reading (Chapter 7 of Kolb) and pose three questions.

1. Comet *Deep Impact* orbits the Sun with a perihelion distance of 1.5 AU and an aphelion distance of 16.5 AU. Sketch the orbit of this comet around the Sun. Label the point at which the comet travels fastest and the point at which the comet travels slowest.

2. Using the information in problem 1, calculate the semi-major axis and orbital period of *Deep Impact*. (*You don't need a calculator!*)

3. The bright star Rigel emits a hydrogen line which appears to have a wavelength of 640.032 nanometers (nm) when observed by detectors on the Earth. Hydrogen gas in our laboratory emits the same hydrogen line at a wavelength of 640.000 nm. Is Rigel approaching or receding from Earth? At what speed? (*Again, the math is so simple that you don't need a calculator!*)

4. You saw a crazy driver running a red light after you walked out of an exciting Astro 3 class. A police officer stopped the driver but could not determine the car's speed because it was way off the scale of the instrument. "But officer," the driver said, "the light looked *green* to me!" You impressed the bewildered crowd by explaining what you just learned in class and calculating the driver's speed for the officer. How fast was the driver going? (Use red=750nm, green=500nm.) The speed limit is 15 m/s (about 35 mph). By what numerical factor was the driver exceeding the speed limit? (How much should the speeding ticket be?)