Astronomy 45

Introduction to Astrophysics

Problem Set 4 - Due Friday March 10

1. The radius of the Sun is 7×10^{10} cm, its luminosity is 4×10^{33} erg s^{-1} and its effective temperature is 5770K. Calculate how many watts are emitted by one square centimeter of solar surface in two ways:
   a) start with the luminosity and do not use the temperature
   b) start with the temperature and do not use the luminosity.

2. a) Two stars are at the same distance. They have identical radii. One has a temperature of 5800K and the other a temperature of 2900K. Which is brighter and how much brighter is it in magnitudes?

3. The radiation emitted from Pluto has a wavelength of maximum intensity at 50μ. What is the temperature of Pluto?

4. Assume that the wavelength of maximum light of the Sun is 500nm, that its temperature is 5770K and its bolometric magnitude is 5.0. Another star has a wavelength of maximum light of 10,000nm with an apparent visual magnitude of 15.5, a bolometric correction of 0.5 and a parallax of 0.01 arcsec. What is its radius in terms of the solar radius?