

Please answer the questions below as well as problems marked **P** in Lectures 1 and 2.

1. How massive is the Sun relative to the Earth?
2. How massive is our galaxy relative to the Sun?
3. How large is the Sun relative to the Earth?
4. How old is the Sun? [y]
5. How far away is the Sun?
6. How far away is the second nearest star?
7. How far away is the center of our galaxy?
8. How massive is the most massive star relative to the least?
9. How large is the largest star relative to the smallest?
10. How luminous is the most intrinsically luminous star relative to the least?
11. What is the luminosity of the Sun? [W]
12. How much energy from the Sun falls on the Earth? [W m^{-2}]
13. Is the Sun a variable star? If so, how?
14. What is rate of energy production per gram in the core of the Sun relative to your metabolic rate per gram?
 - a. 10^3 times smaller
 - b. About the same.
 - c. 10^6 times greater.
15. How hot is the Sun at its surface? At its core?
16. Which of the following equations describes hydrostatic equilibrium?
 - a. $\frac{dP}{dr} = -\frac{GM\rho}{r^2}$
 - a. $\frac{dT}{dr} = -\frac{GP\rho}{r^2}$
 - b. $\frac{\partial^2 P}{\partial r^2} = -\frac{GMr}{\rho}$

17. An approximate expression for the mean molecular weight μ of a fully ionized gas composed of hydrogen, helium, and heavier elements with respective mass fractions X , Y , and Z ($X+Y+Z=1$) is
- a. $\mu = X + 2Y + 10Z$
 - b. $\mu = 2X + Y + 0.5Z$
 - c. $\mu^{-1} = 2X + 0.75Y + 0.5Z$

18. What astronomy courses have you taken? [Please include course title and text.]

19. What physics courses have you taken? [Ditto.]