Astr 1010
Problem Set #2
(Turn in!–9/10/02)

1. Write in scientific notation:
   a) $9,169,540,000$
   b) 0.00007376

2. Do the following calculations on your (scientific) pocket calculator.
   a) $\dfrac{(3.36 \times 10^6)(6.85 \times 10^{-14})}{(4.60 \times 10^{-8})}$
   b) $(8.99 \times 10^9)\dfrac{(1.609 \times 10^{-19})^2}{(4.66 \times 10^{-10})^2}$

3. Unit conversion. Express:
   a) 7.17×10^{13} seconds in years
   b) 4.2 light–years in miles

4. The radius of the earth's orbit around the sun is 1.50×10^{11} m.

   a) Find the length of the earth's path around the sun (the circumference of its orbit); remember that the circumference is given by $2\pi r$).

   b) The earth travels this distance in one year. (What is one year, in seconds?) Find the speed of the earth in its orbit in units of $\frac{\text{m}}{\text{s}}$. (Use the formula $d = vt$.)

5. The planet Jupiter has a large moon called Europa which has a mass of 4.80×10^{22} kg and a radius of 1569 km. Find the (average) density of Titan in units of $\frac{\text{g}}{\text{cm}^3}$. (Recall that for a sphere $V = \frac{4}{3}\pi R^3$ and Density=$\frac{M}{V}$.) How does the answer compare with the density of the earth and of Saturn?

On all problem sets you need to *show the steps* **that gave your answer.**

$$1\,\text{kg} = 1000\,\text{g} \qquad 1\,\text{m} = 100\,\text{cm} \qquad 1\,\text{mile} = 1.609\,\text{km} = 5280\,\text{ft}$$

$$1\,\text{km} = 1000\,\text{m} \qquad 1\,\text{ly} = 9.46 \times 10^{12}\,\text{km} \qquad 1\,\text{yr} = 3.156 \times 10^7\,\text{s}$$