Physics 112
FA – Percent Error, SDs and Rules, Conversions and Equations

Name - _____Key_____

1. A student measured the specific heat of water to be 4.39 J/g°C. The literature value of the specific heat of water is 4.18 J/g°C. What was the student's percent error?
   (The specific heat is the amount of heat per unit mass required to raise the temperature by one degree Celsius.)

$$\text{Percent Error} = \left| \frac{4.39 - 4.18}{4.18} \right| \times 100\% = 5.02\%$$

2. State each answer to the appropriate number of significant digits. (3)

   a) 12.93 g + 17.841 g = ___30.77 g___   30.77|1 g

   b) 4.56 m x 8.2 m = ___37 m²___   37.|392 m²

   c) What rule did you use in (b)? ___Certainty Rule___

3. Perform the following conversions. In (a) and (b), use conversion factors. Show some work for (c).

   a) Convert 7.18 g to Mg. $1 Mg = 10^6 g$

   $$7.18 g \times \frac{1 Mg}{10^6 g} = 7.18 \times 10^{-6} Mg$$

   b) Convert 28.9 hs to ds. $1 hs = 10^2 s, \quad 1 ds = 10^{-1} s$

   $$28.9 hs \times \frac{10^2 s}{1 hs} \times \frac{1 ds}{10^{-1} s} = 2.89 \times 10^4 ds$$

   c) Convert 56.9 m/s to km/h.

   $$56.9 m/s \times 3.6 = 205 km/h$$

   $$56.9 \frac{m}{s} \times \frac{3600 s}{1h} \times \frac{1 km}{10^3 m} = 205 \frac{km}{h}$$

4. Solve for the indicated variable.

a) $E_e = \boxed{\dfrac{1}{2}kx^2}$ [k]

$$\dfrac{\partial E_e}{x^2} = \boxed{\dfrac{kx^2}{x^2}}$$

$$K = \dfrac{2E_e}{x^2}$$

b) $Ft = \boxed{7mv^2} - ds$ [v]

$$\dfrac{Ft + ds}{7m} = \dfrac{\boxed{7mv^2}}{7m}$$

$$\boxed{\sqrt{\dfrac{Ft + ds}{7m}}} = \sqrt{\sqrt{v^2}}$$

$$v = \sqrt{\dfrac{Ft + ds}{7m}}$$

c) $\dfrac{e}{x} = \dfrac{\boxed{y} - r}{f + 2}$ [y]

$$\dfrac{e(f+2)}{x} = \dfrac{\cancel{x}(\boxed{y} - r)}{\cancel{x}}$$

$$\dfrac{e(f+2)}{x} = \boxed{y} - r$$

$$\dfrac{e(f+2)}{x} + r = y$$

$$y = \dfrac{e(f+2)}{x} + r$$