

During Class Invention

Name(s) with Lab section in Group

Significant Figure Practice

1. Indicate the number of significant digits in each of the following measurements.

a) **23.500** grams **5 sig figs**

b) **100.35** mLs **5 sig figs**

c) **1.004** x 10⁻⁷ m **4 sig figs**

d) 0.00**230** kg **3 sig figs**

2. Round off the following numbers to the indicated number of sig figs.

a) 0.0089346 (3 sig figs) **0.00893**

b) 96515 (3 sig figs) **9.65 x 10⁴**

c) 3.50492 (3 sig figs) **3.50**

3. Determine the result to the correct number of significant figures.

a) $\left(\frac{3.2 \text{ cm} * 1.23 \text{ cm} * 0.5 \text{ cm}}{8.32 \text{ cm} * 1.000 \text{ cm} * 0.500 \text{ cm}} \right) \text{ L} = \mathbf{0.5}$

b) $\left(\frac{2.420 \text{ g} + 15.6}{5.31 \text{ g}} \right) = \left(\frac{\mathbf{18.020} \text{ g}}{5.31 \text{ g}} \right) = \mathbf{3.39} \text{ g}$

c) $\left(\frac{6.00 \text{ g}}{16.1 \text{ mL} - 8.440 \text{ mL}} \right) = \left(\frac{6.00 \text{ g}}{\mathbf{7.660} \text{ mL}} \right) = \mathbf{0.78} \frac{\text{g}}{\text{mL}}$

4. Perform the following conversions; (1 lb = 453.59 g : 1 L = 1.0567 qt : 1 inch = 2.54 cm)

a) 100. km to miles (use at least 3 conversion factors)

$$100. \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{100 \text{ cm}}{1 \text{ m}} \right) \left(\frac{1 \text{ in}}{2.54 \text{ cm}} \right) \left(\frac{1 \text{ ft}}{12 \text{ inches}} \right) \left(\frac{1 \text{ mile}}{5280 \text{ ft}} \right) = \mathbf{62.1} \text{ miles}$$

- b) a liquid has a critical temperature of 154.4 K, calculate the temperature in °F and °C.

$$\begin{aligned} \text{Kelvins} &= ^\circ\text{C} + 273.15 \\ ^\circ\text{C} &= \text{Kelvins} - 273.15 = 154.4 - 273.15 = -118.8 ^\circ\text{C} \\ T_{\text{F}} &= \frac{9}{5} T_{\text{C}} + 32 = T_{\text{F}} = \frac{9}{5} (-118.8 ^\circ\text{C}) + 32 = -181.8 ^\circ\text{F} \end{aligned}$$

- c) a human hair is approximately 70,000 nm, calculate the thickness in millimeters.

$$7 \times 10^4 \text{ nm} \left(\frac{1 \times 10^{-1} \text{ m}}{1 \text{ nm}} \right) \left(\frac{1 \times 10^3 \text{ mm}}{1 \text{ m}} \right) = 7 \times 10^{-2} \text{ mm}$$

- d) a typical soft drink container is 355 mL, determine the number of quarts of the soft drink container.

$$355 \text{ mL} \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) \left(\frac{1.0567 \text{ qt}}{1 \text{ L}} \right) = 375 \text{ quarts}$$

4. Perform the following conversions;

- a) the density of water is $1.00 \frac{\text{g}}{\text{cm}^3}$. Convert to $\frac{\text{pounds}}{\text{foot}^3}$.

$$1.00 \frac{\text{g}}{\text{cm}^3} \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right)^3 \left(\frac{12 \text{ inches}}{1 \text{ ft}} \right)^3 \left(\frac{1 \text{ pound}}{454 \text{ g}} \right) = 62.4 \frac{\text{lbs}}{\text{ft}^3}$$