1. Carry out the following metric to metric conversions: (3 pts)

   a. 48.5 mL to Liters   0.0485 L

   b. 0.00712 g to mg 7.12 mg

   c. 1.47 kg to grams 1470 g

2. Carry out the following English to metric conversions using the conversion factors below: (3 pts)

   a. 14.9 oz to grams (453.6 g = 1.00 lb)

   $14.9 oz \times \dfrac{1 lb}{16 oz} \times 453.6 g/lb = 422g$

   b. 5 ft 6.5 inches to meters (2.54 cm = 1.00 inch)

   $66.5 in \times 2.54 cm/in \times 1 m/100cm = 1.69m$

   c. 42.0 feet to meters (2.54 cm = 1.00 inch)

   $42.0 ft \times 12 in/ft \times 2.54 cm/in \times 1 m/100cm = 12.8 m$

3. Carry out the following metric to English conversions using the conversion factors below: (6 pts)

   a. 709 cm to feet (2.54 cm = 1.00 inch)

   $709 cm \times 1 in/2.54cm \times 1 ft/12 in = 23.3 ft$

   b. 65 cm³ to fluid ounces (8oz = 1cup, 4cups = 1quart and 1.06 qt = 1.00 L)

   $65 cm^3 \times 1 mL/1 cm^3 \times 1 L/1000 mL \times 1.06 qt/L \times 4 cups/qt \times 8 oz/1 cup = 2.2 oz$

   c. 989 g to ounces (16 oz = 1 lb, 2.205 lb = 1.000 kg)

   $989 g \times 1 kg/1000 g \times 2.205 lb/kg \times \dfrac{16 oz}{lb} = 34.9 oz$

4. Solve the following density problems: (6 pts)

   a. Mercury has a density of 13.5 g/mL. What volume in liters would be occupied by 5.00 lbs of mercury (453.6 g = 1.00 lb)

   $5.00 lbs \times 453.6 g/lb \times 1 mL/13.5 g = 168 mL = 0.168 L$

   b. The density of air is 1.2 kg/m³. What is the mass in kg of the air in a room that is 3.0 meters from floor to ceiling and 4.0 meters wide and 5.0 meters long?

   $3.0 m \times 4.0 m \times 5.0 m = 60. m^3 \times 1.2 kg/m^3 = 72 kg$

   c. An empty graduated cylinder has a mass of 31.856 grams. 24.7 mL of an unknown liquid are placed into the graduated cylinder giving the container with the liquid a mass of 50.035 grams. Calculate the density of the unknown liquid.

   $\begin{array}{r} 50.035 g \\ - 31.856 g \\ \hline 18.179 g \end{array}$

   $18.179 g/24.7 mL = 0.736 g/mL$

5. Perform the temperature conversions indicated: (2 pts)

   a. 56.7 °F to °C $\dfrac{56.7 - 32}{1.8} = 13.7°C$

   b. -35 °C to °F $1.8(-35) + 32 = -31°F$

Temperature conversions use the relationship °C = (°F – 32.0)/1.8 and its inverse.