CHM 090 Density Problems   Names: _____

Always show all your work, each step, with units.

1. A student weighs a coffee cup and observes that it weighs 453.2589 grams. Then the student pours coffee in the cup and weighs it again and observes that now the weight is 498.1103 grams. How much does the coffee weigh?

2. If the coffee in problem 1 has a volume of 43.23 mL, calculate the density of the coffee using the mass you found in problem 1.

3. A rectangular piece of metal is 8.3 cm long, 1.2 cm wide and 2.4 cm tall. What is the volume of the metal piece? Watch your units. If the metal piece weighs 360 grams, also calculate the density in g/cm^3.

4. At a weight loss clinic 14.2 pounds of fat were collected from a liposuction surgery. (Convert pounds to grams first) If that fat is 6570 mL, calculate the density of fat in g/mL. (Ugh ☺)

5. Calculate the density of a piece of solid gold if the gold weighs 82.5 g and has a volume of 4.30 mL.

6. Calculate the density of lotion if a bottle of 650 mL weighs 1170 grams.

7. Calculate the density of carbon dioxide if the gas inside a balloon filled with it masses 0.04246 grams and the volume of the balloon is 27.8 mL.

Density Conversion Problems – when you are given density

Density may be used as a conversion factor between mass (or weight) and volume, as long as you are using the same substance. If a liquid has a density of 1.2 g/mL, then 1.2 g = 1 mL is the equality for this liquid. This equality provides two conversion factors: (1.2 g / 1 mL) and (1 mL / 1.2 g)

Example: The density of a liquid is 1.2 g/mL. (The density is GIVEN, you are not calculating it)

a) Calculate the mass of 3.0 mL of this liquid.

$$3.0 \text{ mL } \left(\frac{1.2 \text{ g}}{1 \text{ mL}}\right) = 3.6 \text{ grams}$$

b) What is the volume in mL of 25 grams of this liquid?

$$25 \text{ g } \left(\frac{1 \text{ mL}}{1.2 \text{ g}}\right) = 21 \text{ mL}$$

1. The density of magnesium metal is 1.74 g/mL. Find the mass of 255 mL of magnesium.

2. The density of lead is 11.31 g/mL. Find the mass of 250.0 mL of lead.

3. Calculate the volume of 50.0 grams of lead. The density of lead is 11.31 g/mL.

4. The density of ethanol is 0.978 g/mL. How much will 1.25 liters of ethanol weigh? *(Hint convert liters to mL first, then finish the problem)*

5. The density of mercury is 13.6 g/mL. How many mL of mercury are in 72 grams?

6. The density of silver is 16.8 g/mL. If a pure silver coin has a volume of 45.3 mL, what is its mass?