Graph It Out: Density from Data

Density can be determined not only by calculation, but also by **graphing** mass vs. volume. When plotted correctly, a **mass–volume graph** forms a **straight line**, and the **slope of that line** = **density**.

$$D = \text{slope} = \frac{\Delta m}{\Delta V}$$

Tips for Graphing: Place **mass (g)** on the **y-axis**, **volume (mL)** on the **x-axis**. The slope (rise/run) gives **density**. A **steeper slope** means **greater density**.

1. The following data were collected for an unknown liquid:

Volume (mL)	10	20	30	40	50
Mass (g)	8.0	16.1	24.1	32.2	40.3

a) Plot mass vs. volume (on graph paper).

b) Find the slope of the line. _____

c) What is the density of the liquid? _____

2. A line passes through points (10 mL, 25 g) and (40 mL, 100 g).

Find the slope and interpret its meaning. _____

3. On a mass–volume graph, a line through (0, 0) and (10 mL, 80 g) is drawn.

What is the density? _____

4. Another sample shows (0 mL, 0 g) and (50 mL, 40 g).

Compare its density to that in Problem 3. Which is denser? _____

5. A student's graph gives a line with slope = 7.9 g/cm³.
What substance might it be, given these reference values:
Aluminum - 2.7 | Iron -7.9 | Copper - 8.9 | Silver - 10.5 | Lead - 11.3

Possible identity: _____

6. You have three liquids with the following slopes:
Liquid A - 0.8   Liquid B - 1.2   Liquid C - 1.4

Arrange them from least dense to most dense. _____