

Density Prelab Answer Key

1. A block of aluminum occupies a volume of 15.0 cm^3 and has a mass of 40.5 g . What is its density?

$$D = \frac{m}{V} = \frac{40.5 \text{ g}}{15.0 \text{ cm}^3} = 2.70 \text{ g/cm}^3$$

2. Mercury metal (a liquid) is poured into a graduated cylinder to a volume of 22.5 mL . The mercury used to fill the cylinder has a mass of 306.0 g . From this information, calculate the density of mercury.

$$D = \frac{m}{V} = \frac{306.0 \text{ g}}{22.5 \text{ mL}} = 13.6 \text{ g/mL} = 13.6 \text{ g/cm}^3$$

3. A rectangular block of copper metal has a mass of 1896 g . The volume of the block is 212.52 cm^3 . From this data, determine the density of copper.

$$D = \frac{m}{V} = \frac{1896 \text{ g}}{212.52 \text{ cm}^3} = 8.922 \text{ g/cm}^3$$

4. 28.5 g of iron shot is added to a graduated cylinder containing 45.50 mL of water. The water level rises to the 49.10 mL mark. From this information, calculate the density of iron.

$$V = V_{\text{final}} - V_{\text{initial}} = (49.10 \text{ mL} - 45.50 \text{ mL}) = 3.60 \text{ mL}$$

$$D = \frac{28.5 \text{ g}}{3.60 \text{ mL}} = 7.92 \text{ g/mL} = 7.92 \text{ g/cm}^3$$

5. Calculate the volume of a substance that has a mass of 54.5 g and a density of 2.5 g/mL .

$$D = \frac{m}{V} \Rightarrow V = \frac{m}{D} = \frac{54.5 \cancel{\text{ g}}}{2.5 \cancel{\text{ g}}/\text{mL}} = 22 \text{ mL}$$

OR use density as conversion between mass & volume:

$$? \text{ mL} = 54.5 \cancel{\text{ g}} \times \frac{1 \text{ mL}}{2.5 \cancel{\text{ g}}} = 22 \text{ mL}$$