

## Density Practice Problems Worksheet #2

### Answer Key

1. You have a rock with a volume of  $15\text{cm}^3$  and a mass of 45 g. What is its density?

$$\text{Density} = m/v$$

$$\text{Density} = 45\text{g}/15\text{cm}^3$$

$$\text{Density} = 3.0\text{g}/\text{cm}^3$$

2. You have a different rock with a volume of  $30\text{cm}^3$  and a mass of 60g. What is its density?

$$\text{Density} = m/v$$

$$\text{Density} = 60\text{g}/30\text{cm}^3$$

$$\text{Density} = 2.0\text{g}/\text{cm}^3$$

3. In the above two examples which rock is more dense? Why?

Rock sample #1, because it has a density of  $3.0\text{g}/\text{cm}^3$ , which is greater than rock sample #2's density of  $2.0\text{g}/\text{cm}^3$

4. Calculate the mass of a liquid with a density of 3.2 g/mL and a volume of 25 mL.

$$\text{Mass} = D \times V$$

$$\text{Mass} = 3.2\text{g}/\text{ml} \times 25 \text{ ml}$$

$$\text{Mass} = 80.0 \text{ g}$$

5. Calculate the density of a 500g rectangular block with the following dimensions: length=8 cm, width=6 cm, height=5 cm.

$$\text{Density} = m/v$$

$$\text{Density} = 500\text{g}/240\text{cm}^3 (8\text{cm} \times 6\text{cm} \times 5\text{cm})$$

$$\text{Density} = 2.083, \text{ rounded to nearest tenth} = 2.1 \text{ g}/\text{cm}^3$$

6. Calculate the mass of a solid metal block with a density of  $2.6 \text{ g}/\text{cm}^3$ , a width of 1.8 cm, a length of 4 cm, and a height of 2.3 cm.

$$\text{Mass} = D \times V$$

$$\text{Mass} = 2.6\text{g}/\text{cm}^3 \times (1.8\text{cm} \times 4\text{cm} \times 2.3 \text{ cm})$$

$$\text{Mass} = 2.6\text{g}/\text{cm}^3 \times 16.56\text{cm}^3$$

$$\text{Mass} = 43.056\text{g} - \text{rounded to nearest tenth} = 43.1 \text{ g}$$

7. An irregular object with a mass of 180 g displaces 2.5 L of water when placed in a large overflow container. Calculate the density of the object.

$$\text{Density} = m/v$$

$$\text{Density} = 180\text{g}/2.5\text{L (One Liter} = 1000 \text{ ml, thus 2.5 Liters} = 2500 \text{ ml)}$$

$$\text{Density} = 180\text{g}/2500\text{ml}$$

$$\text{Density} = 0.072\text{g/ml}$$

8. A graduated cylinder has a mass of 80 g when empty. When 20 mL of water is added, the graduated cylinder has a mass of 100 g. If a stone is added to the graduated cylinder, the water level rises to 45 mL and the total mass is now 156 g. What is the density of the stone?

$$\text{Density} = m/v$$

$$\text{Mass of stone} = 156\text{g} - 100\text{g (mass of graduated cylinder and water)} = 56\text{g}$$

$$\text{Volume of stone} = 45\text{ml} - 20\text{ml} = 25\text{ml (displaced)}$$

$$\text{Density} = 56\text{g}/25\text{ml}$$

$$\text{Density of stone} = 2.24, \text{ rounded to nearest tenth} = 2.2\text{g/ml}$$

9. What is the density of a board whose dimensions are 5.54 cm x 10.6 cm X 199 cm and whose mass is 28,600 g?

$$\text{Density} = m/v$$

$$\text{Volume of board} = 5.54\text{cm} \times 10.6\text{cm} \times 199\text{cm} = 11,686.076\text{cm}^3$$

$$\text{Density} = 28,600\text{g}/11,686.076\text{cm}^3$$

$$\text{Density} = 2.447357\text{g/cm}^3, \text{ rounded to nearest tenth} = 2.4\text{g/cm}^3$$

10. What is the volume of a tank that can hold 18,754 g of methanol whose density is 0.788g/cm<sup>3</sup>?

$$V = m/D$$

$$V = 18,754\text{g}/0.788\text{g/cm}^3$$

$$V = 23,799.492 \text{ cm}^3, \text{ rounded to nearest tenth} = 23,799.5\text{cm}^3$$