

Calculation and density		
Density is the mass of 1 cm ³ substance		$\rho = \frac{m}{V}$ $m = V \times \rho$ $V = \frac{m}{\rho}$
Density	ρ in g/cm ³ Gram per cubic centimeter	
mass	m in g Gram	
Volume	V in cm ³ Cubic centimeter	
Example:		
<p><u>Mass</u> On the chessboard is a queen of copper with a volume of 3cm³. Calculate the mass of the Queen?</p> <p>$m = ?$ $V = 3 \text{ cm}^3$ $\rho = 8,96 \text{ g/cm}^3$</p> <p>$m = V \times \rho$ $m = 3 \text{ cm}^3 \times 8,96 \text{ g/cm}^3$ $m = 27 \text{ g}$</p>	<p><u>Volume</u> On the chessboard is a pawn of 10g copper. Calculate the volume of the pawn.</p> <p>$m = 20 \text{ g}$ $V = ?$ $\rho = 8,96 \text{ g/cm}^3$</p> <p>$V = m : \rho$ $V = 20 \text{ g} : 8,96 \text{ g/cm}^3$ $V = 2,2 \text{ cm}^3$</p>	<p><u>Density</u> On the chessboard is also a tower of a different colour. The tower weighs 21,2g and has a volume of 2.5 cm³. From what material is the tower made?</p> <p>$m = 21,2 \text{ g}$ $V = 2,5 \text{ cm}^3$ $\rho = ?$</p> <p>$\rho = m : V$ $\rho = 21,2 \text{ g} / 2,5 \text{ cm}^3$ $\rho = 8,5 \text{ g/cm}^3$</p> <p>The tower is made from Brass</p>

Exercise

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|--|---|---|
| a) A porcelain dish ($\rho = 2.4 \text{ g / cm}^3$) has a volume of 8.5cm ³ . Calculate the mass of the dish. | c) A porcelain dish ($\rho = 2.4 \text{ g / cm}^3$) has a mass of 375g. Calculate the volume of the dish. | e) A dish has a mass of 375g and a volume of 42 cm ³ . What material the dish is made ?. |
| b) An Oak image ($\rho = 0.78 \text{ g / cm}^3$) has a volume of 145 cm ³ . Calculate the mass of the image. | d) An Oak image ($\rho = 0.78 \text{ g / cm}^3$) has a mass of 2.5 kg. Calculate the volume of the image. | f) An statue has a volume of 145 cm ³ and a mass of 2.8 kg. From what material is the statue made? |

Answers

Exercise

a) $m = ?$
 $V = 8.5 \text{ cm}^3$
 $\rho = 2.4 \text{ g/cm}^3$

$$m = V \times \rho$$
$$m = 8.5 \text{ cm}^3 \times 2.4 \text{ g/cm}^3$$
$$m = 20,4 \text{ g}$$

b) $m = ?$
 $V = 145 \text{ cm}^3$
 $\rho = 0.78 \text{ g/cm}^3$

$$m = V \times \rho$$
$$m = 145 \text{ cm}^3 \times 0,78 \text{ g/cm}^3$$
$$m = 113 \text{ g}$$

c) $m = 375 \text{ g}$
 $V = ?$
 $\rho = 2.4 \text{ g/cm}^3$

$$V = m : \rho$$
$$V = 375 \text{ g} : 2.4 \text{ g/cm}^3$$
$$V = 156 \text{ cm}^3$$

d) $m = 2,5 \text{ kg} = 2500 \text{ g}$
 $V = ?$
 $\rho = 0,78 \text{ g/cm}^3$

$$V = m : \rho$$
$$V = 2500 \text{ g} : 0,78 \text{ g/cm}^3$$
$$V = 3205 \text{ cm}^3$$

e) $m = 375 \text{ g}$
 $V = 42 \text{ cm}^3$
 $\rho = ?$

$$\rho = m : V$$
$$\rho = 375 \text{ g} / 42 \text{ cm}^3$$
$$\rho = 8,9 \text{ g/cm}^3$$

The dish is made of bronze.

f) $m = 2,8 \text{ kg} = 2800 \text{ g}$
 $V = 145 \text{ cm}^3$
 $\rho = ?$

$$\rho = m : V$$
$$\rho = 2800 \text{ g} / 145 \text{ cm}^3$$
$$\rho = 19,3 \text{ g/cm}^3$$

The statue is made of gold.