

Name: \_\_\_\_\_

Exam Style Questions

# Density



Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

## Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

[www.corbettmaths.com/contents](http://www.corbettmaths.com/contents)

# Video 384



1. A piece of wood has a mass of 8g and a volume of 10cm<sup>3</sup>.  
Work out the density of the wood.



$$\rho = \frac{m}{v} \quad \frac{8}{10}$$

.....0.8 g/cm<sup>3</sup>  
(2)

2. What is the volume of a piece of metal that has a mass of 300g and density of 6g/cm<sup>3</sup>?



$$v = \frac{m}{\rho} \quad \frac{300}{6}$$

.....50 cm<sup>3</sup>  
(2)

3. A piece of plastic has a density of 1.3g/cm<sup>3</sup> and a volume of 100cm<sup>3</sup>.  
Work out the mass of the piece of plastic.



$$m = \rho \times v$$
$$1.3 \times 100$$

.....130 g  
(2)

4. Iron has a density of 7.8g/cm<sup>3</sup>.  
A solid iron statue has a mass of 877.5g.  
Work out the volume of the statue.



$$v = \frac{m}{\rho} \quad \frac{877.5}{7.8}$$

.....112.5 cm<sup>3</sup>  
(2)

5. A solid silver spoon has a mass of 65.1g.  
 The volume of the spoon is 6.2cm<sup>3</sup>.  
 Calculate the density of silver.



$$\frac{M}{V} \quad \frac{65.1}{6.2}$$

$$\frac{10.5}{\dots\dots\dots} \text{g/cm}^3$$

(2)

6. A glass cube of side length 5cm has a mass of 306.25g.  
 Calculate the density of the glass.



$$V = 125 \quad 5 \times 5 \times 5$$

$$\frac{M}{V} \quad \frac{306.25}{125}$$

$$\frac{2.45}{\dots\dots\dots} \text{g/cm}^3$$

(3)

7. A liquid has mass of 10kg and a density of 1.18g/cm<sup>3</sup>.  
 Calculate the volume of the liquid.  
 Include suitable units.



$$M = 10000g$$

$$d = 1.18 \text{g/cm}^3$$

$$\frac{M}{d} = \frac{10000}{1.18} = 8474.576 \text{cm}^3$$

$$\frac{8474.6 \text{cm}^3}{\dots\dots\dots}$$

(3)

8. A garden ornament has a volume of 0.05m<sup>3</sup>.  
 The ornament is made from a stone that has a density of 6.4g/cm<sup>3</sup>.  
 Calculate the mass of the ornament.  
 Include suitable units.



$$D \times V$$

$$6.4 \times 50000 = 320000g$$

$$1 \text{m}^3 = 1,000,000 \text{cm}^3$$

$$\frac{320kg}{\dots\dots\dots}$$

(3)

9. The mass of  $3\text{m}^3$  of tin is  $21840\text{kg}$ .



(a) Work out the density of tin.

$$\frac{m}{v} = \frac{21840 \text{ kg}}{3 \text{ m}^3}$$

$$\dots\dots\dots 7280 \text{ kg/m}^3$$

(2)

The density of aluminium is  $2712\text{kg/m}^3$ .  $\times 5 = 13560 \text{ kg}$

(b) Work out the difference in mass between  $5\text{m}^3$  of tin and  $5\text{m}^3$  of aluminium.

$$\begin{aligned} \text{tin} &= 21840 \text{ kg} \\ \text{Aluminium} &= 13560 \text{ kg} \end{aligned}$$

$$\dots\dots\dots 8280 \text{ kg}$$

(3)

10. Mr. Dixon is building a toy boat for his son.



He has three different planks of wood to choose from.

Plank A	Plank B	Plank C
Volume = $750\text{cm}^3$ Mass = $900\text{g}$	Volume = $0.0152\text{m}^3$ Mass = $7.6\text{kg}$	Volume = $1000\text{cm}^3$ Mass = $1.02\text{kg}$

If wood has a density under  $1\text{g/cm}^3$ , it will float.

Which plank of wood is the most suitable?  
Explain your answer.

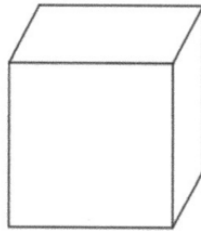
$$D = \frac{m}{v}$$

$$\frac{900}{750} = 1.2\text{g/cm}^3 \quad \frac{7600}{15200} = 0.5\text{g/cm}^3 \quad \frac{1020}{1000} = 1.02\text{g/cm}^3$$

Plank B.....

(4)

11. The diagram below shows a solid block of ice.



81cm

$$81^3 = 531441 \text{ cm}^3$$

$$= 0.531441 \text{ m}^3$$

A block of ice weighs  $\frac{1}{2}$  tonne.  $500 \text{ kg}$   
 The block is a cube with side length 81cm.

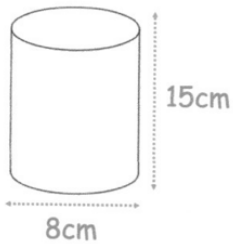
Find the density of the ice.  
 Give your answer in kilograms per cubic metre.

$$\frac{500}{0.531441}$$

$$\dots\dots\dots 940.8 \text{ kg/m}^3$$

(3)

12. The diagram shows a solid cylinder.



$$V = \pi r^2 h$$

$$= \pi \times 4^2 \times 15$$

$$= 753.98 \dots \text{ cm}^3$$

The cylinder is made from titanium.  
 The density of titanium is  $4.43 \text{ g/cm}^3$

Calculate the mass of the cylinder.

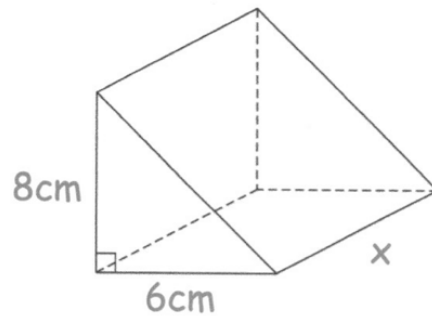
$$m = D \times V$$

$$4.43 \times 753 \dots$$

$$\dots\dots\dots 3340 \text{ g}$$

(3)

13. The diagram shows a solid triangular prism.



The prism is made from wood and has a mass of 643.8g  
The density of wood is 1.85g/cm<sup>3</sup>

Calculate the length of the prism.

$$\frac{M}{D} = \frac{643.8}{1.85} = 348 \text{ cm}^3$$

$$24 \times x = 348$$

$$\dots\dots\dots 14.5 \text{ cm}$$

(4)

14. Material A has a density of 5.8g/cm<sup>3</sup>. 65 cm<sup>3</sup>  
Material B has a density of 4.1g/cm<sup>3</sup>. 400 cm<sup>3</sup>



377g of Material A and 1.64kg of Material B form Material C.

Work out the density of Material C.

Volume of A	Volume of B
$\frac{377}{5.8} = 65 \text{ cm}^3$	$\frac{1640}{4.1} = 400 \text{ cm}^3$

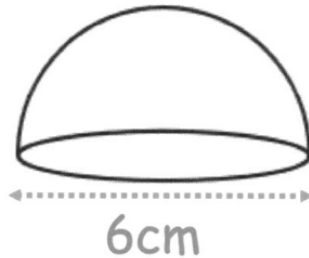
$$D = \frac{m}{v}$$

$$\frac{(377 + 1640)}{(65 + 400)}$$

$$\dots\dots\dots 4.3376 \text{ g/cm}^3$$

(4)

15. The diagram shows a solid glass paperweight.



The paperweight is a hemisphere with diameter 6cm.  
The glass has a density of 3g/cm<sup>3</sup>.

Calculate the mass of the paperweight.

$$\begin{aligned}
 m &= D \times V \\
 &= 3 \times 56.548 \dots \\
 &= 169.646
 \end{aligned}$$

$$\begin{aligned}
 V &= \frac{1}{2} \left( \frac{4}{3} \pi r^3 \right) \\
 &= \frac{1}{2} \left( \frac{4}{3} \times \pi \times 3^3 \right) \\
 &= 56.548 \dots \text{cm}^3
 \end{aligned}$$

$$\begin{aligned}
 &169.646 \dots \text{g} \\
 &\quad (4)
 \end{aligned}$$

16. A solid metal sphere has a radius of 4cm, correct to the nearest centimetre.



Mass of the sphere is 720g, correct to two significant figures.

Work out the greatest possible density of the metal.  
Give your answer to three significant figures.

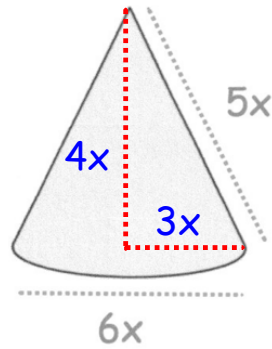
$$D = \frac{m}{V} \quad \begin{matrix} \swarrow \uparrow \\ \nwarrow \downarrow \end{matrix} \quad \begin{array}{r} 725 \\ \hline 179.59438 \end{array}$$

$$V = \frac{4}{3} \times \pi \times 3.5^3$$

$$\frac{4}{3} \times \pi \times 3.5^3 = 179.594 \dots \text{cm}^3$$

$$\begin{aligned}
 &4.04 \dots \text{g/cm}^3 \\
 &\quad (4)
 \end{aligned}$$

17. The diagram below shows a solid cone.



The cone is made from a material with density  $5\text{g/cm}^3$ .

Write an expression for the mass of the cone, in terms of  $x$ .

$$m = D \times V$$

$$m = 5 \times 12\pi x^3$$
$$= 60\pi x^3$$

$$V = \frac{1}{3} \pi r^2 h$$

$$V = \frac{1}{3} \times \pi \times (3x)^2 \times 4x$$

$$V = \frac{1}{3} \times \pi \times 9x^2 \times 4x$$

$$= \frac{1}{3} \times \pi \times 36x^3$$

$$= 12\pi x^3$$

$$\dots 60\pi x^3 \text{ cm}^3$$

(4)