DENSITY, MASS AND VOLUME – PRACTICE QUESTIONS
CALCULATOR ALLOWED

metatutor

1.
A marble has a mass of 5 grams and a volume of 2 cm^3.

Work out the density of the marble, in g/cm^3.

D M V

density = mass ÷ volume
= 5 ÷ 2
= 2.5 g/cm^3

2.
A block of wood has a density of 0.75 g/cm^3 and a volume of 120 cm^3.

Work out the mass of the block of wood, in grams.

0.75 × 120 = 90 grams

3.
A brick has a density of 500 kg/m^3 and a mass of 10.5 kilograms.

Work out the volume of the brick, in m^3.

10.5 ÷ 500 = 0.021 m^3

4.
A metal rod has a mass of 150 grams and a volume of 25 cm^3.

Work out the density of the rod, in g/m^3.

150 ÷ 25 = 6 g/m^3

5.
A gold bar has a density of 19 g/cm^3 and a mass of 9,500 grams.

Work out the volume of the gold bar, in cm^3.

$9500 \div 19 = 500 \text{ cm}^3$

6.
A piece of aluminium has a density of 2.6 g/cm^3 and a volume of 15 cm^3.

Work out the mass of the aluminium, in grams.

$2.6 \times 15 = 39$ grams

7.
A cricket ball has a density of 0.8 g/cm^3 and a mass of 165 grams.

Work out the volume of the cricket ball, in cm^3.

$165 \div 0.8 = 206.25 \text{ cm}^3$

8.
A piece of carbon has a density of 2.2 g/cm^3 and a volume of 70 cm^3.

Work out the mass of the piece of carbon, in grams.

$2.2 \times 70 = 154$ grams

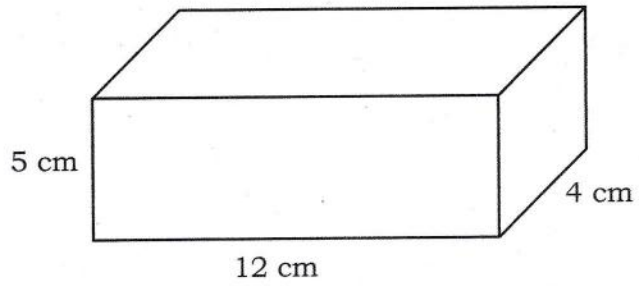
9.
A cube has side length 8 cm and has a mass of 960 grams.

Work out the density of the cube, in g/cm^3.

Volume $= 8^3 = 512 \text{ cm}^3$

$960 \div 512 = 1.875 \text{ g/cm}^3$

10.
Pictured below is a block of wood.



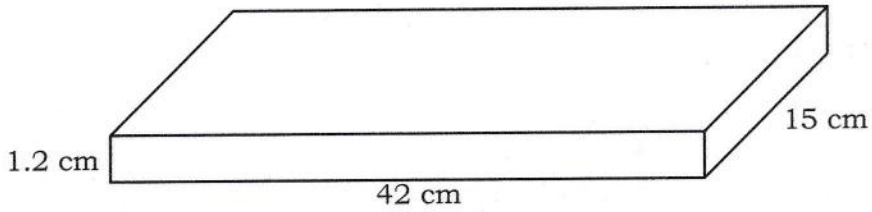
The block has a mass of 288 grams.

Work out the density of the block of wood, in g/cm^3.

Volume = $5 \times 12 \times 4 = 240\ cm^3$

$288 \div 240 = 1.2\ g/cm^3$

11.
Pictured below is a metal sheet.



The density of the metal sheet is 5.5 g/cm^3.

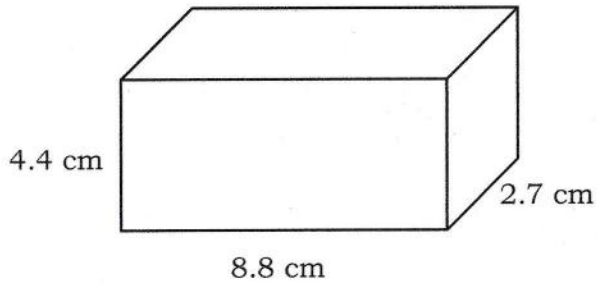
Work out the mass of the metal sheet, in grams.

Volume = $1.2 \times 42 \times 15 = 756\ cm^3$

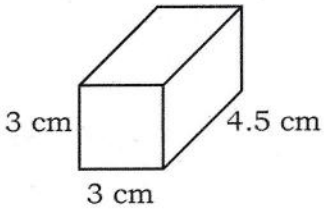
$756 \times 5.5 = 4{,}158$ grams

12.
Pictured below are two blocks – Block A and Block B.

Block A



Block B



Block A is made from tin and Block B is made from tungsten.
Tin has a density of 7.3 g/cm^3.
Tungsten has a density of 19.3 g/cm^3.

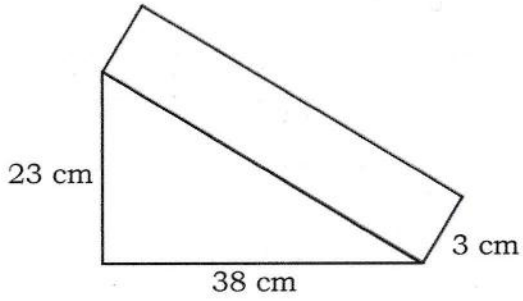
Which block has the largest mass – Block A or Block B?

A : Volume = $4.4 \times 8.8 \times 2.7 = 104.544$ cm^3
Mass = $104.544 \times 7.3 = 763.1712$ grams

B : Volume = $3 \times 3 \times 4.5 = 40.5$ cm^3
Mass = $40.5 \times 19.3 = 781.65$ grams

Block B has the largest mass.

13.
Pictured below is a block of wood.



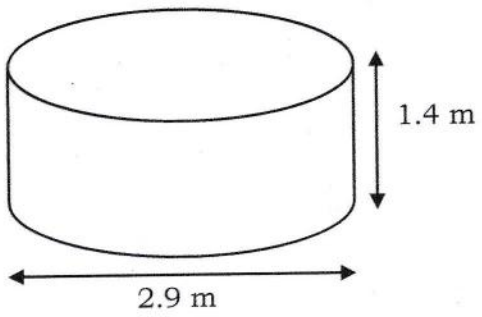
The block of wood has a mass of 980 grams.

Work out the density of the block of wood, to 2 decimal places.

Volume = $\frac{23 \times 38}{2} \times 3 = 1311$ cm^3

$980 \div 1311 = 0.74752\ldots$
$= 0.75$ g/cm^3

14.
Pictured below is a metal cylinder.



The cylinder has a mass of 21,000 kilograms.

Work out the density of the cylinder, in kg/m^3.
Give your answer to 4 significant figures.

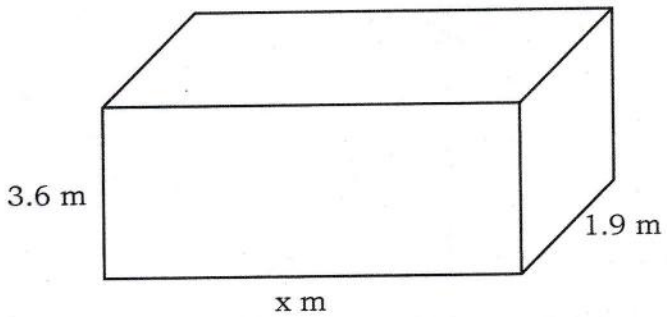
Radius = 2.9 ÷ 2 = 1.45 m

Volume = $\pi \times 1.45^2 \times 1.4 = 9.247\ldots$ m^3

21,000 ÷ 9.247... = 2270.938...

= 2,271 kg/m^3

15.
Pictured below is a block of wood.



The density of the wood is 540 kg/m^3.
The block has a mass of 28,000 kg.

Find x, to 2 significant figures.

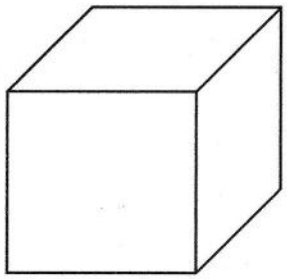
Volume = 28,000 ÷ 540 = 51.851 m^3

x = 51.851 ÷ 3.6 ÷ 1.9

= 7.58068...

= 7.6 m

16.
Pictured below is a cube.



The cube has a mass of 6.5 kilograms and a density of 15.4 g/cm^3.

Find the side length of the cube, to 2 significant figures.

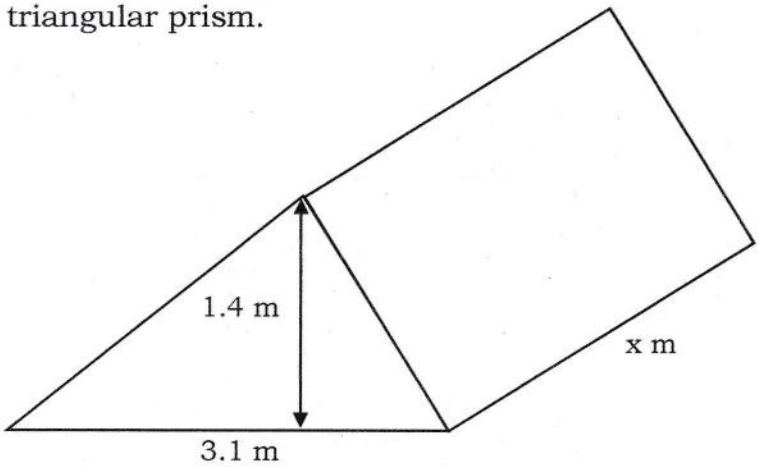
Volume = 6,500 ÷ 15.4 = 422.0779... cm^3

side length = $\sqrt[3]{422.0779...}$

= 7.5012...

= 7.5 cm

17.
Pictured below is a triangular prism.



The triangular prism has a mass of 320 kilograms and a density of 4 g/cm^3.

Find x, to 2 significant figures.

Volume = 320,000 ÷ 4

= 80,000 cm^3

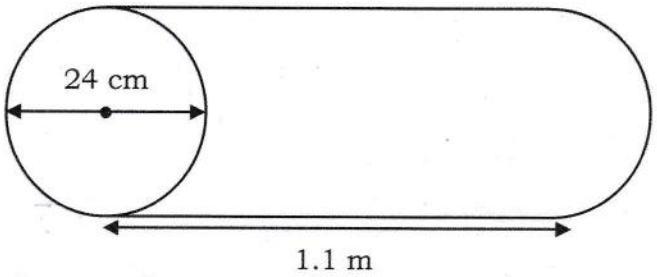
Area of triangle = $\frac{140 \times 310}{2}$ = 21,700 cm^2

x = 80,000 ÷ 21,700

= 3.6866...

= 3.7 m

18.
Pictured below is a cylinder.



Nicola is trying to work out whether the cylinder is made of silicon or carbon.
The density of silicon is 2.33 g/cm^3 and the density of carbon is 2.26 g/cm^3.
The cylinder has a mass of 112 kilograms.

Which material do you think the cylinder is made of?

Radius = $24 \div 2 = 12$ cm

Volume = $\pi \times 12^2 \times 110 = 49{,}762.82763$ cm^3

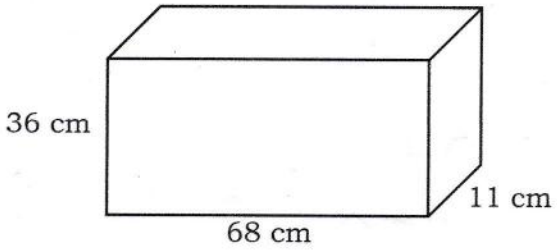
Density = $112{,}000 \div 49{,}762.82763$

$= 2.25067...$ g/cm^3

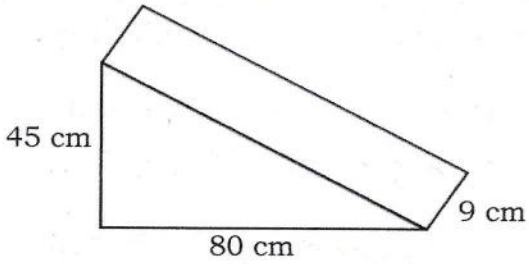
Carbon, because its density is closer to 2.26g/cm^3

19.
Pictured below are two solids – Solid A and Solid B.

Solid A



Solid B



Solid A has a density of 1.7 g/cm^3.
Solid B has a density of 2,750 kg/m^3.

Which solid has the largest mass – Solid A or Solid B?

A: Volume = $36 \times 68 \times 11 = 26{,}928$ cm^3

Mass = $26{,}928 \times 1.7 = 45{,}777.6$ grams

B: Volume = $\frac{0.45 \times 0.8}{2} \times 0.09 = 0.0162$ m^3

Mass = $2{,}750 \times 0.0162 = 44.55$ kg

$= 44{,}550$ grams

Solid A has the largest mass.

20.
Material A has a density of 2.64 g/cm^3.
Material B has a density of 1.91 g/cm^3.

2 kilograms of Material A and 950 grams of Material B form Material C.

Work out the density of Material C, to 2 decimal places.

A : Volume $= 2{,}000 \div 2.64 = 757.\dot{5}\dot{7}$ cm^3

B : Volume $= 950 \div 1.91 = 497.382199$ cm^3

C : Volume $= 757.\dot{5}\dot{7} + 497.382199$
$= 1{,}254.957957$ cm^3

Mass $= 2{,}000 + 950 = 2{,}950$ grams

Density $= 2{,}950 \div 1{,}254.957957$
$= 2.35067\ldots$
$= \underline{2.35 \text{ g/cm}^3}$

21.
Liquid A has a density of 1.08 g/cm^3.
Liquid B has a density of x g/cm^3.

750 cm^3 of Liquid A is mixed with 990 cm^3 of Liquid B to form Liquid C.
The mass of Liquid C is 1.7 kilograms.

Find the density of Liquid B, to 2 decimal places.

A : Mass $= 750 \times 1.08 = 810$ g

C : Volume $= 750 + 990 = 1{,}740$ cm^3

B : Mass $= 1{,}700 - 810 = 890$ g

Density $= 890 \div 990$
$= 0.8\dot{9}$
$= \underline{0.90 \text{ g/cm}^3}$