1 A block of wood has a mass of 3.5 kg.
The wood has density 0.65 kg/m^3

(a) Work out the volume of the block of wood.
Give your answer correct to 3 significant figures.

m^3

(Total for Question 1 is 3 marks)

2 The density of gold is 19.3 g/cm^3
A gold bar has volume 150 cm^3

Work out the mass of the gold bar.

..... g

(Total for Question 2 is 2 marks)

3 A gold bar has a mass of 12.5 kg.

The density of gold is 19.3 g/cm^3

Work out the volume of the gold bar.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 3 is 3 marks)

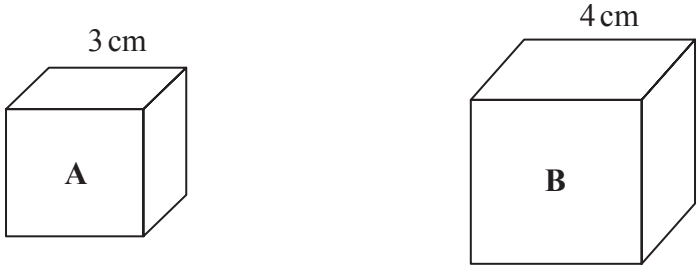
4 A solid metal sphere has radius 1.5 cm.
The mass of the sphere is 109.6 grams.

Work out the density of the sphere.
Give your answer correct to 3 significant figures.

..... g / cm^3

(Total for Question 4 is 3 marks)

5 Here are two cubes, **A** and **B**.



Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.

.....

(Total for Question 5 is 3 marks)

6 Liquid **A** has a density of 1.8 g/cm^3
Liquid **B** has a density of 1.2 g/cm^3

80 cm^3 of liquid **A** is mixed with 40 cm^3 of liquid **B** to make 120 cm^3 of liquid **C**.

Work out the density of liquid **C**.

..... g/cm^3

(Total for Question 6 is 3 marks)

7 Liquid **A** and liquid **B** are mixed to make liquid **C**.

Liquid **A** has a density of 70 kg/m^3
Liquid **A** has a mass of 1400 kg

Liquid **B** has a density of 280 kg/m^3
Liquid **B** has a volume of 30 m^3

Work out the density of liquid **C**.

..... kg/m^3

(Total for Question 7 is 3 marks)

8 Liquid A has a density of 0.7 g/cm^3.
Liquid B has a density of 1.6 g/cm^3.

140 g of liquid A and 128 g of liquid B are mixed to make liquid C.

Work out the density of liquid C.

..... g/cm^3

(Total for Question 8 is 4 marks)

9 Liquid **A** has a density of 1.2 g/cm^3

150 cm^3 of Liquid **A** is mixed with some of Liquid **B** to make Liquid **C**.

Liquid **C** has a mass of 210 g and a density of 1.12 g/cm^3

Find the density of Liquid **B**.

..... g/cm^3

(Total for Question 9 is 4 marks)

10 100ml of liquid A and 200ml of liquid B are mixed together to make liquid C.

Liquid A has a density of 0.7g/ml.
Liquid B has a density of 1.1 g/ml.

Work the density of liquid C.

..... g/ml

(Total for Question 10 is 4 marks)

11 The density of apple juice is 1.05 grams per cm^3.

The density of fruit syrup is 1.4 grams per cm^3.

The density of carbonated water is 0.99 grams per cm^3.

25 cm^3 of apple juice are mixed with 15 cm^3 of fruit syrup and
280 cm^3 of carbonated water to make a drink with a volume of 320 cm^3.

Work out the density of the drink.
Give your answer correct to 2 decimal places.

..... g/cm^3

(Total for Question 11 is 4 marks)

12 The density of ethanol is 1.09 g/cm^3
The density of propylene is 0.97 g/cm^3

60 litres of ethanol are mixed with 128 litres of propylene to make 188 litres of antifreeze.

Work out the density of the antifreeze.
Give your answer correct to 2 decimal places.

..... g/cm^3

(Total for Question 12 is 4 marks)

13 Liquid A and liquid B are mixed together in the ratio 2 : 13 by volume to make liquid C.

Liquid A has density 1.21 g/cm^3
Liquid B has density 1.02 g/cm^3

A cylindrical container is filled completely with liquid C.
The cylinder has radius 3 cm and height 25 cm.

Work out the mass of the liquid in the container.
Give your answer correct to 3 significant figures.
You must show all your working.

..... g

(Total for Question 13 is 4 marks)

14 The diagram shows a solid cylinder made from iron.

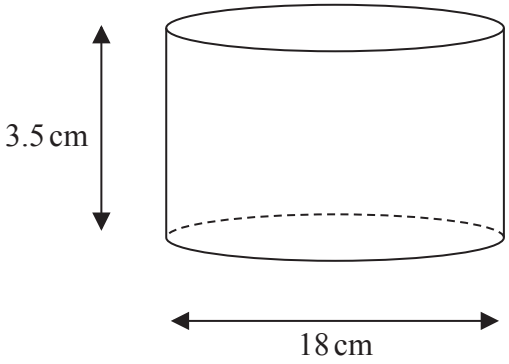


Diagram **NOT** accurately drawn

The cylinder has diameter 18 cm and height 3.5 cm
The mass of the cylinder is 7.04 kg

Work out the density of the iron.
Give your answer in g/cm^3 correct to 2 significant figures.

..... g/cm^3

(Total for Question 14 is 3 marks)

15 The diagram shows a solid cuboid made from wood.

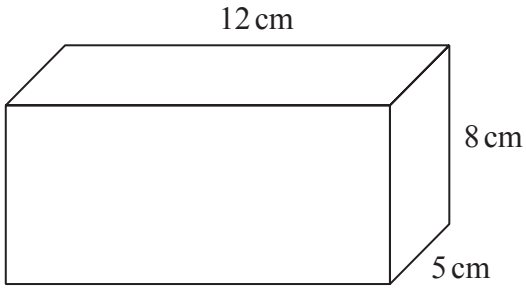


Diagram **NOT** accurately drawn

The wood has density 0.7 g/cm^3

Work out the mass of the cuboid.

..... grams

(Total for Question 15 is 3 marks)

16 The diagram shows a solid triangular prism.

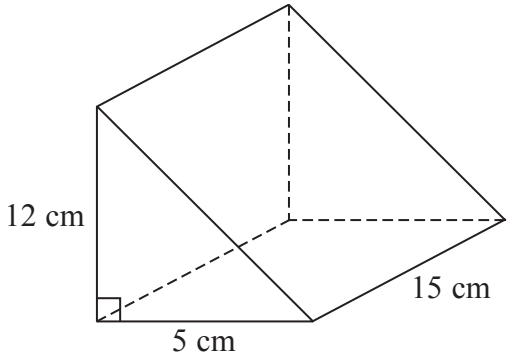


Diagram **NOT** accurately drawn

The prism is made from metal.
The density of the metal is 6.6 grams per cm^3.

Calculate the mass of the prism.

..... grams

(Total for Question 16 is 3 marks)

17 Platinum nuggets are in the shape of a solid cylinder.

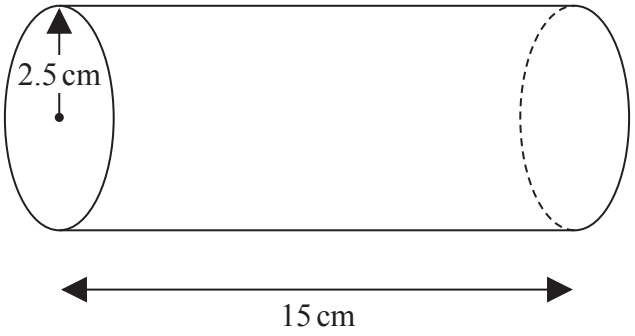


Diagram **NOT** accurately drawn

The radius of each cylinder is 2.5 cm.
The length of each cylinder is 15 cm.

The density of platinum is 21.5 g/cm^3

The greatest mass that Jacques can carry is 30 kg.

Can Jacques carry 5 platinum nuggets at the same time?
You must show all your working.

(Total for Question 17 is 5 marks)

18

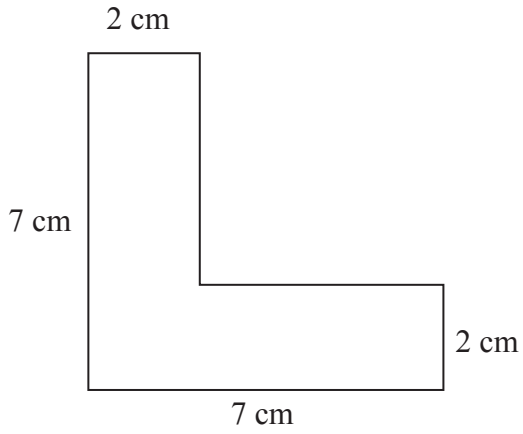


Diagram **NOT** accurately drawn

The diagram shows the cross-section of a solid prism.
The length of the prism is 2 m.

The prism is made from metal.
The density of the metal is 8 grams per cm^3.

Work out the mass of the prism.

.....

(Total for Question 18 is 5 marks)

19 The diagram shows a metal bar in the shape of a prism.

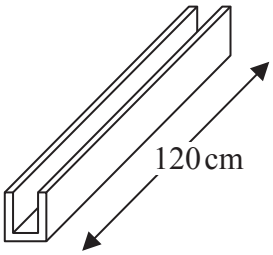


Diagram **NOT** accurately drawn

The length of the metal bar is 120 cm.
The cross section of the metal bar is shown below.

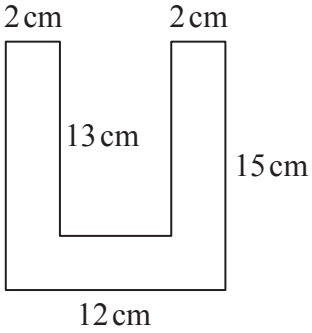


Diagram **NOT** accurately drawn

All corners are right angles.

The metal bar is made from steel with density 8 g/cm^3.

Sean has a trolley.
The trolley can carry a maximum mass of 250 kg.

How many metal bars can the trolley carry at the same time?
You must show your working.

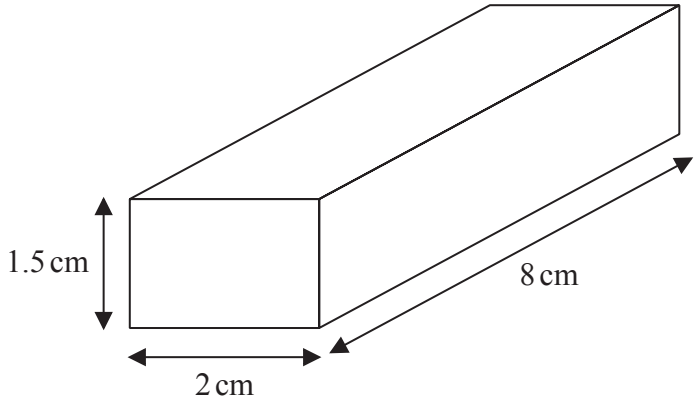
.....

(Total for Question 19 is 5 marks)

20 Pablo made a solid gold statue.

He melted down some gold blocks and used the gold to make the statue.
Each block of gold was a cuboid, as shown below.

Diagram **NOT** accurately drawn



The mass of the statue is 5.73 kg.
The density of gold is 19.32 g/cm^3

Work out the least number of gold blocks Pablo melted down in order to make the statue.
Show your working clearly.

.....

(Total for Question 20 is 5 marks)

21 A solid aluminium cylinder has radius 10 cm and height h cm.

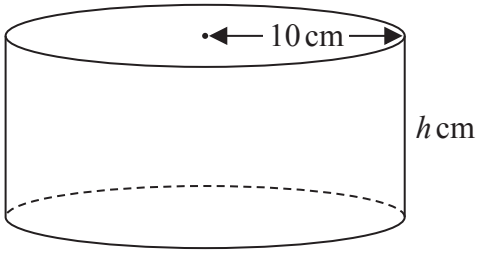


Diagram **NOT** accurately drawn

The mass of the cylinder is 5.4 kg.
The density of aluminium is 0.0027 kg/cm^3

Calculate the value of h.
Give your answer correct to one decimal place.

h = ...

(Total for Question 21 is 5 marks)

22 The diagram shows a solid made from a cylinder and a hemisphere.
The cylinder and the hemisphere are both made from the same metal.

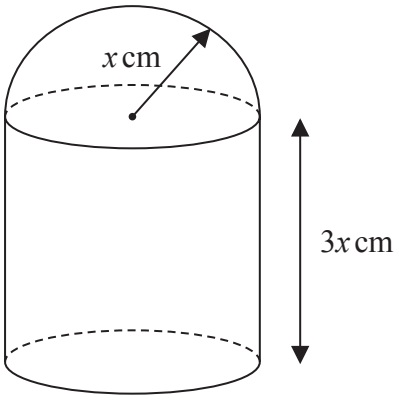


Diagram **NOT** accurately drawn

The plane face of the hemisphere coincides with the upper plane face of the cylinder.

The radius of the cylinder and the radius of the hemisphere are both x cm.
The height of the cylinder is $3x$ cm.

The total surface area of the solid is 81π cm^2
The mass of the solid is 840 grams.

The following table gives the density of each of four metals.

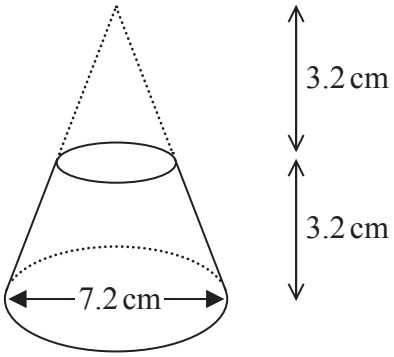
Metal	**Density (g/cm^3)**
Aluminium	2.7
Nickel	8.9
Gold	19.3
Silver	10.5

The metal used to make the solid is one of the metals in the table.

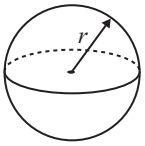
Determine the metal used to make the solid.
Show your working clearly.

(Total for Question 22 is 6 marks)

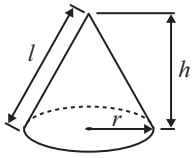
23 Here is a frustum of a cone.



Volume of sphere = $\frac{4}{3}\pi r^3$



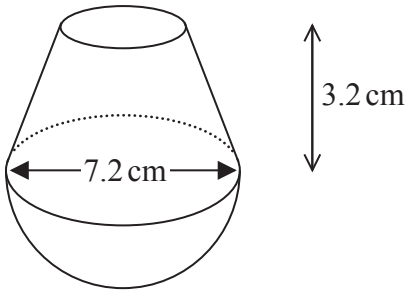
Volume of cone = $\frac{1}{3}\pi r^2 h$



The diagram shows that the frustum is made by removing a cone with height 3.2 cm from a solid cone with height 6.4 cm and base diameter 7.2 cm.

The frustum is joined to a solid hemisphere of diameter 7.2 cm to form the solid **S** shown below.

Solid **S**



The density of the frustum is 2.4 g/cm^3
The density of the hemisphere is 4.8 g/cm^3

Calculate the average density of solid **S**.

.....g/cm^3

(Total for Question 23 is 5 marks)

24 A 3-D shape consists of a hollow sphere made of metal.

The diagram shows a cross section drawn through the centre, O, of the sphere.

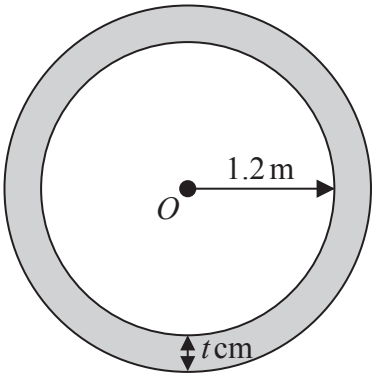


Diagram **NOT** accurately drawn

The internal radius of the sphere is 1.2 m.
The thickness of the metal is t cm.

The density of the metal is 2700 kg per m^3

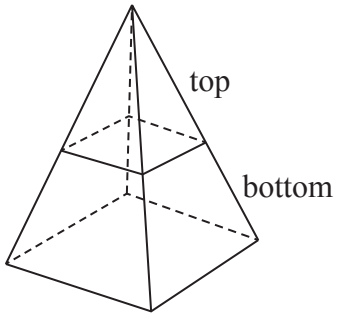
The mass of the 3-D shape is 1980 kg.

Work out the value of t.
Give your answer correct to 2 significant figures.

$t =$ .....

(Total for Question 24 is 5 marks)

25 The pyramid **P** is formed from two parts made of different materials.



The top part of **P** has a mass of 92.8 g and is made from material with a density of 2.9 g/cm^3
The bottom part of **P** has a mass of 972.8 g
The average density of **P** is 4.7 g/cm^3

Calculate the volume of the top part of **P** as a percentage of the total volume of **P**.
Give your answer correct to 1 decimal place.
You must show all your working.

.....%

(Total for Question 25 is 5 marks)