Westminster Kingsway
central London's College

Volume and Surface Area

GCSE MATHS

Name: _____

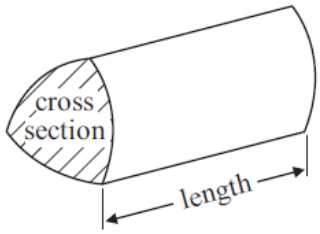
Teacher: _____

Learning objectives

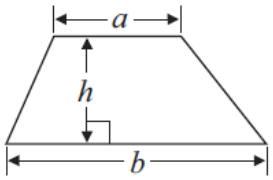
By the end this pack you will be able to:

1. **Find the volume of a prism**
2. **Find the surface area of a Prism**

Volume of prism = area of cross section × length

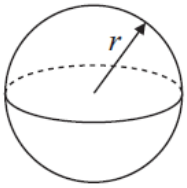


Area of trapezium = $\frac{1}{2}(a+b)h$



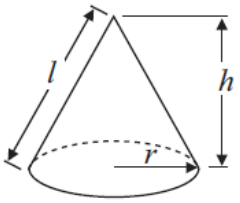
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



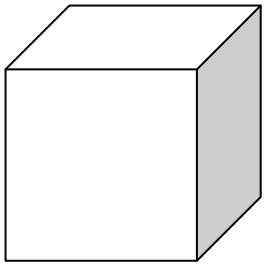
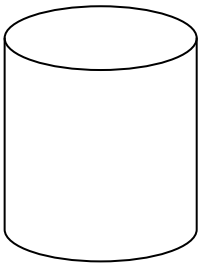
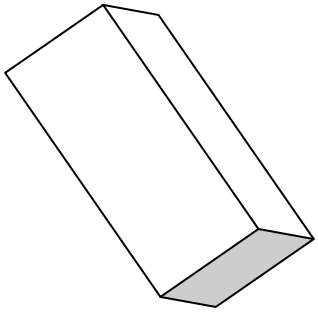
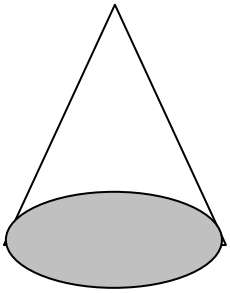
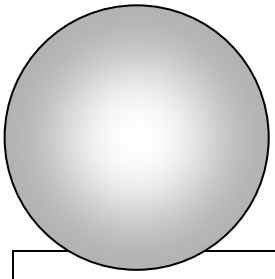
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$



3D Shape Properties

How many?

	Faces	Edges	Corners	What am I?
				
				
				
				
				

Cube Cone Cylinder Sphere Cuboid

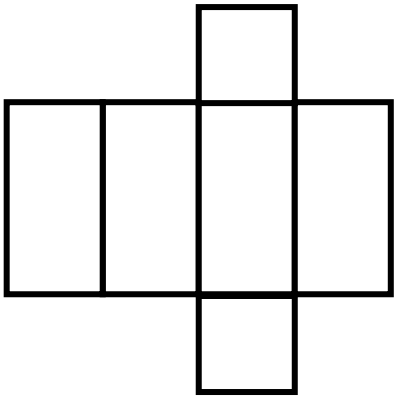
The Faces of 3D Shapes

A. How many faces does a Cube have? _____

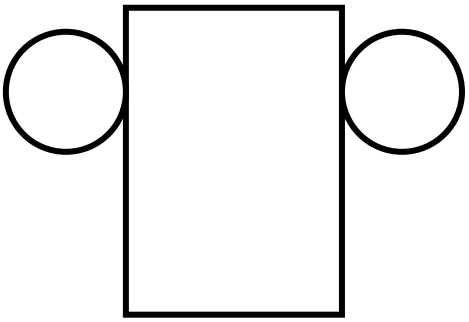
B. What shape are they? _____

C. Draw them below:

D. Name the 3D shapes from these nets:



_____



_____

E. How many faces does a Triangular Prism have? ___

F. What shape are they? _____

G. Draw them below:

Dinky King 8 – Murrio Turns Up The Volume

The aim of the game:

In the latest version of the game, Murrio has gone 3D. Murrio must collect the stars. The number of stars on each level is equal to the level's volume in cubic metres to the nearest whole number.

Each star is worth 30 points.

Dinky King will attempt to stop Murrio but cannot collect stars himself.

Levels are complete when Murrio has collected <u>every</u> star.

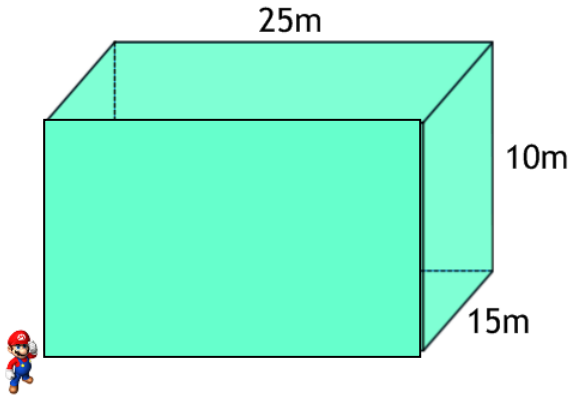
Your task:

What is the maximum number of points from collecting stars that Murrio can win on each level?

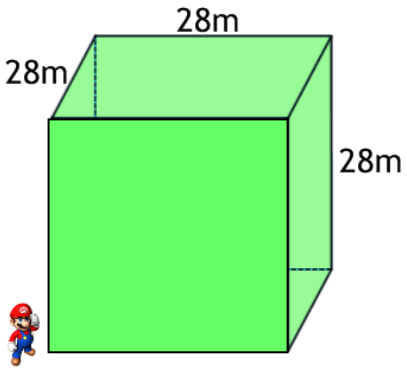
(You are given the dimensions of each level.)

Each star = 30 points

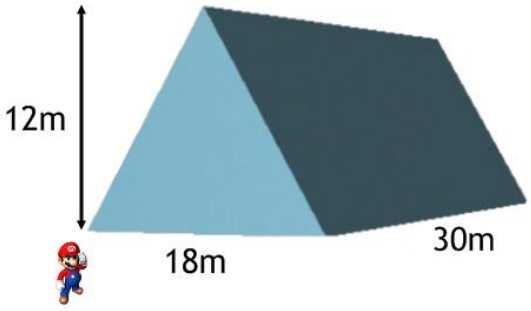
Level 1



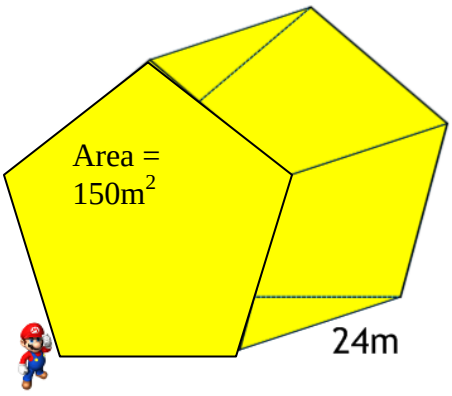
Level 2



Level 3



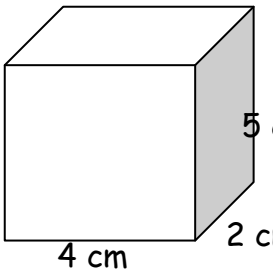
Level 4



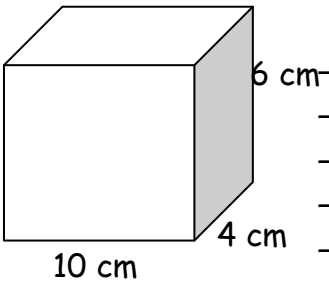
Volume of cuboids

1. Find the volume of the following cuboids

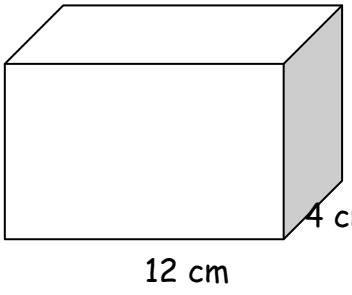
a)



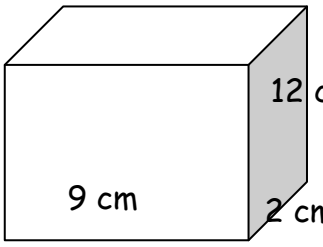
b)



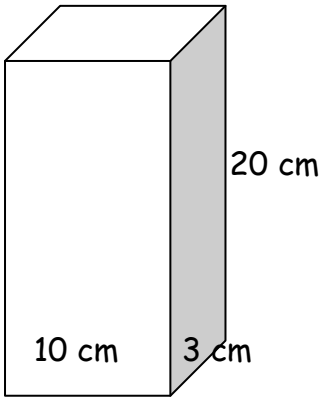
c)



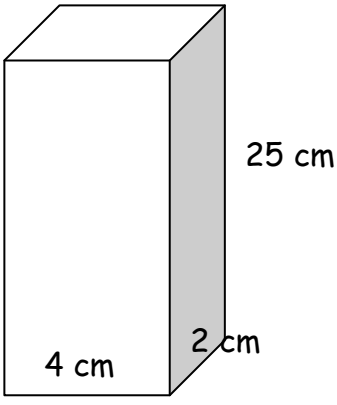
d)



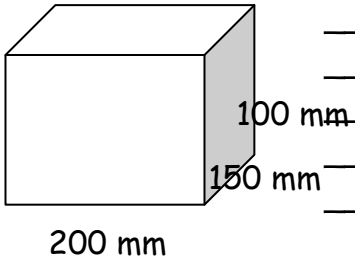
e)



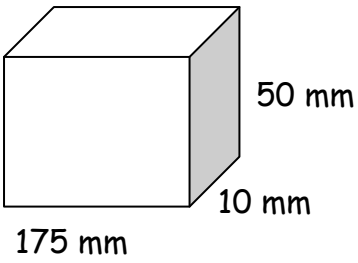
f)



g)



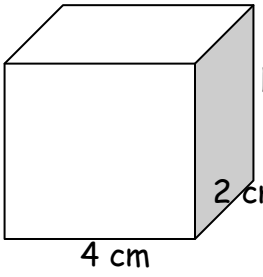
h)



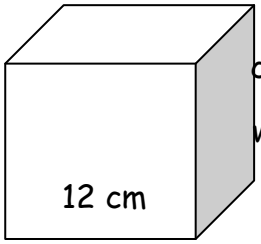
Volume of cuboids

2. Find the lengths marked with a letter for the following cuboids

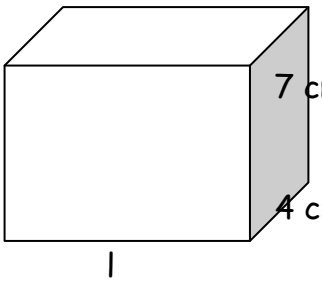
a) Volume = 64 cm^3



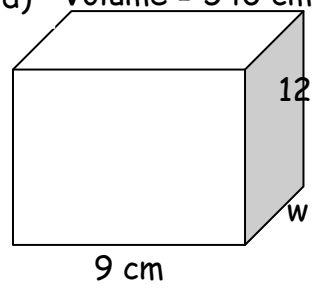
b) Volume = 300 cm^3



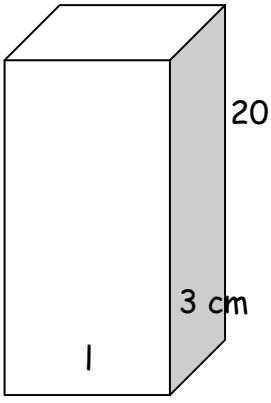
c) Volume = 224 cm^3



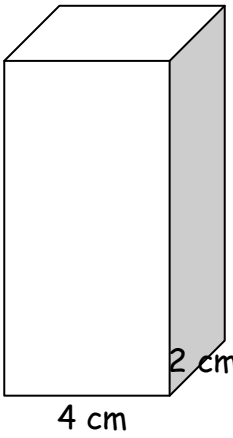
d) Volume = 540 cm^3



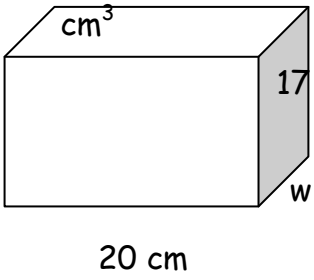
e) Volume = 600 cm^3



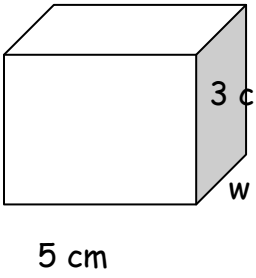
f) Volume = 160 cm^3



g) Volume = 1360 cm^3



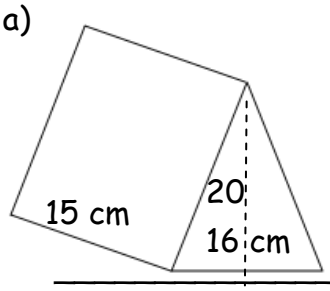
h) Volume = 420 cm^3



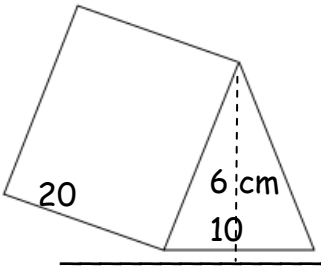
Volume of triangular prisms

3. Work out the volume of each of these prisms

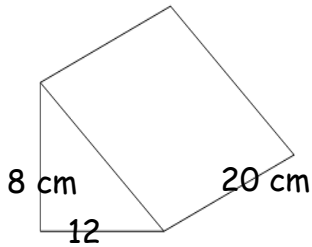
a)



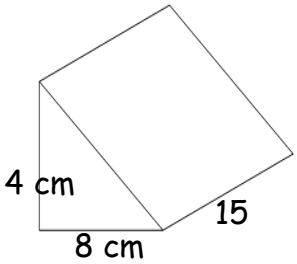
b)



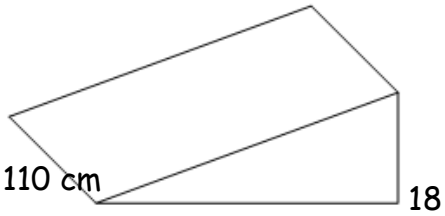
c)



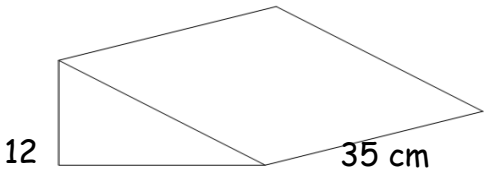
d)



e)

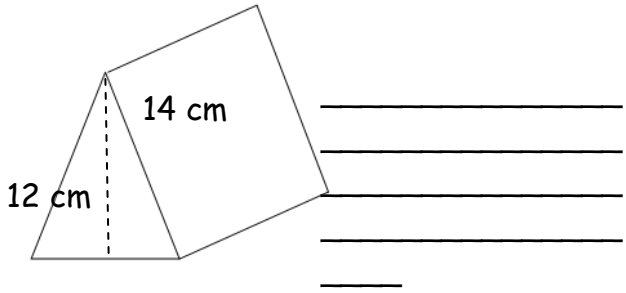


f)

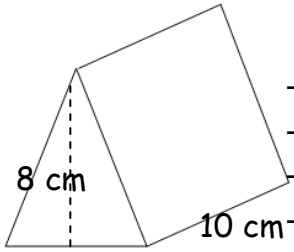


4. Find the lengths marked with a letter.

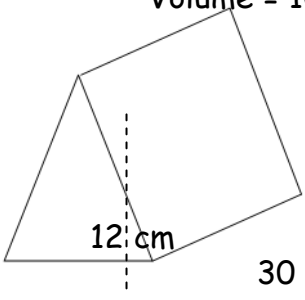
a) Volume = 1176 cm^3



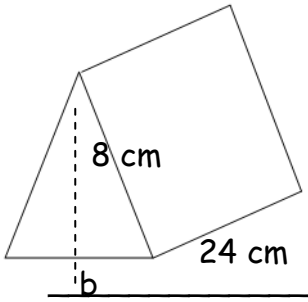
b) Volume = 880 cm^3



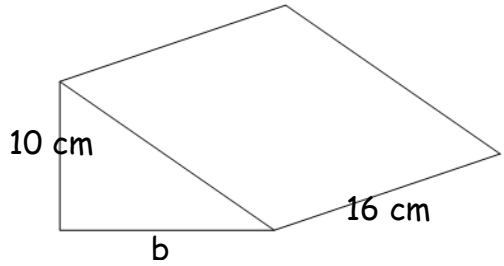
c) Volume = 1080 cm^3



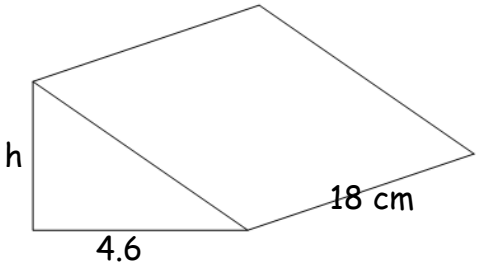
d) Volume = 1440 cm^3



e) Volume = 200 cm^3



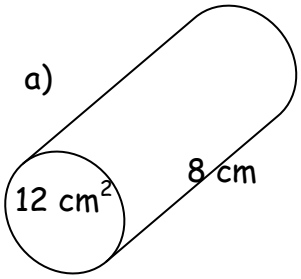
f) Volume = 132.48 cm^3



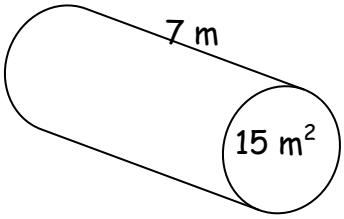
Volume of prisms and cylinders

5. Work out the volumes of these prisms and cylinders

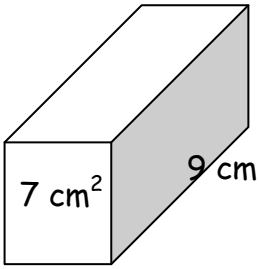
a)



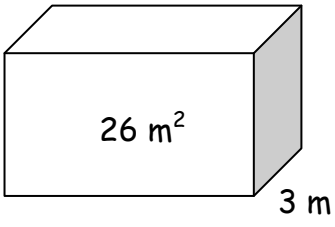
b)



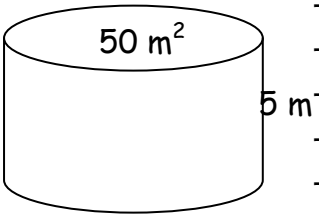
c)



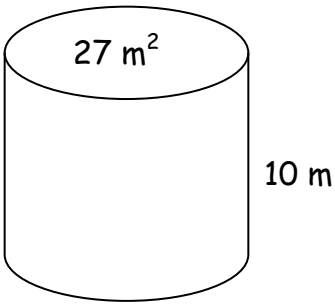
d)



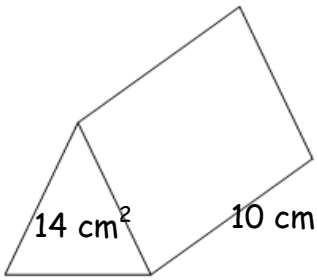
e)



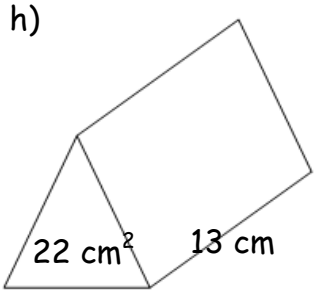
f)



g)

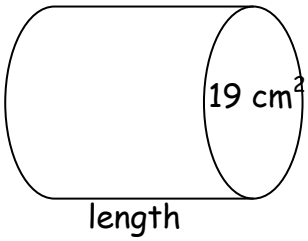


h)

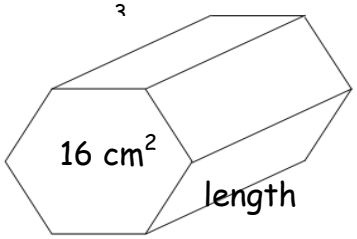


6. Find the length of each of these shapes.

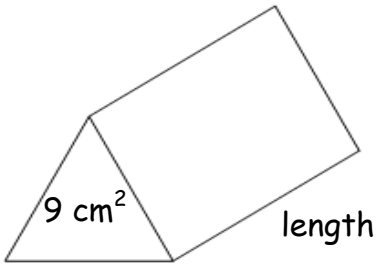
a) Volume = 418 cm^3



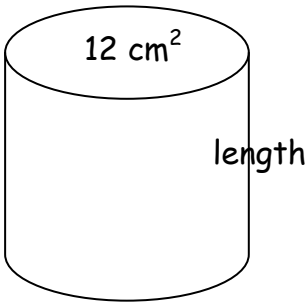
b) Volume = 224 cm^3



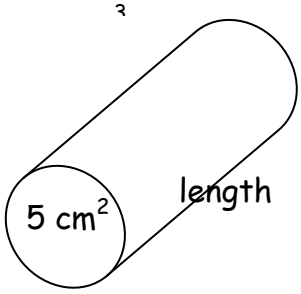
c) Volume = 324 cm^3



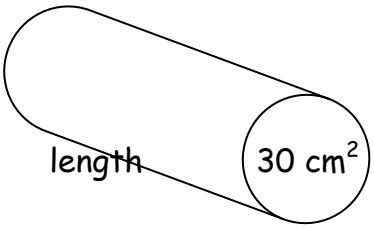
d) Volume = 168 cm^3



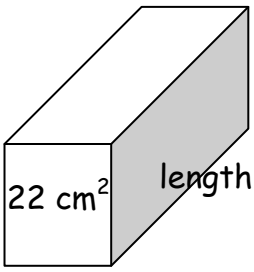
e) Volume = 400 cm^3



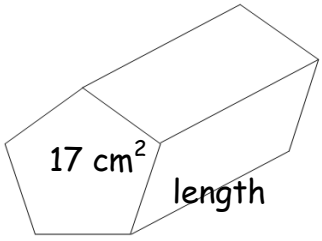
f) Volume = 270 cm^3



g) Volume = 330 cm^3

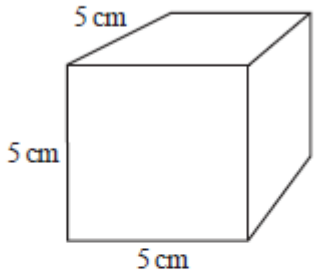


h) Volume = 255 cm^3



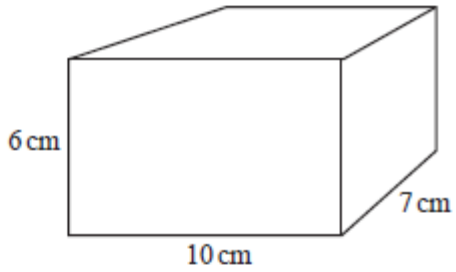
1) A cube has sides of length 5 cm.

Find the total surface area of the cube.



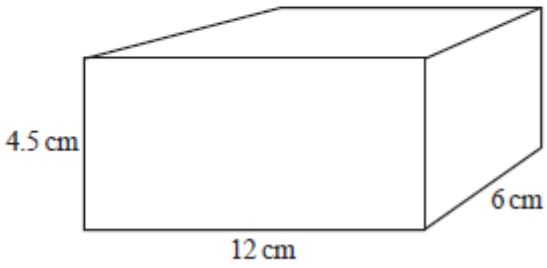
2) A cuboid has sides of length 10 cm, 6cm and 7 cm.

Find the total surface area of the cuboid.

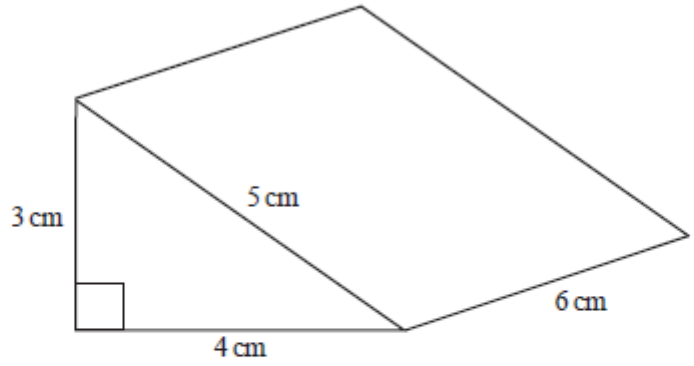


3) A cuboid has sides of length 12 cm, 4.5cm and 6 cm.

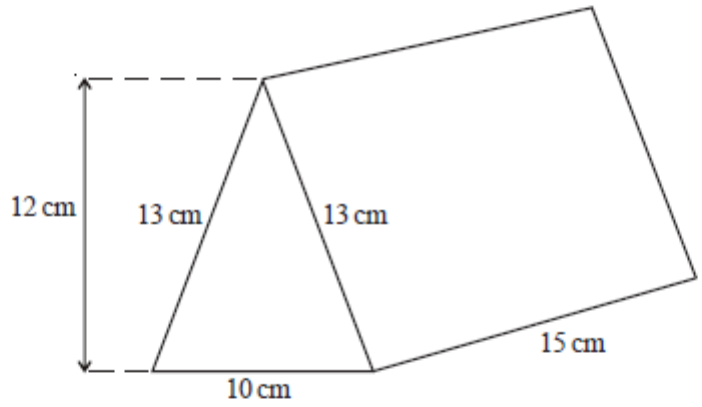
Find the total surface area of the cuboid.



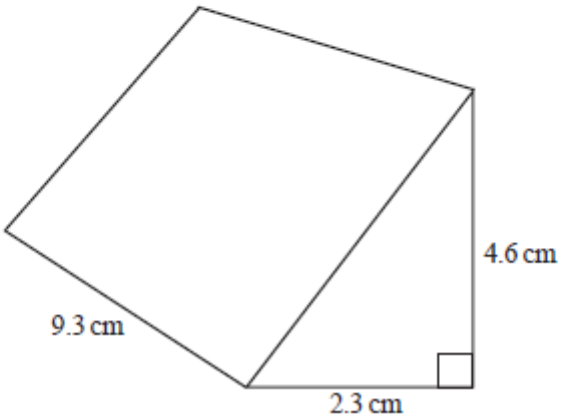
1) Find the surface area of this triangular prism.



2) Find the surface area of this triangular prism.

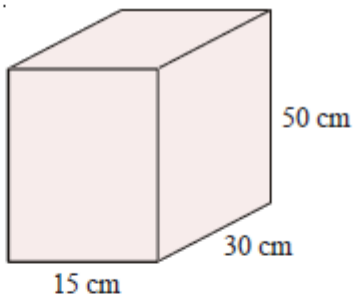


3) With the aid of Pythagoras' Theorem, find the surface area of this triangular prism.
Give your answer correct to 2 significant figures.

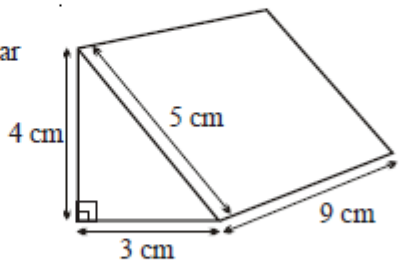


1) The diagram shows a cuboid.

Work out the volume of the cuboid.



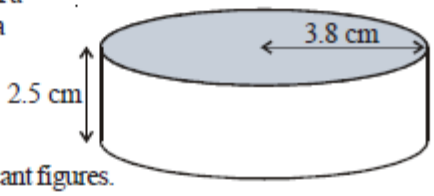
2) Calculate the volume of this triangular prism.



3) An ice hockey puck is in the shape of a cylinder with a radius of 3.8 cm and a thickness of 2.5 cm.

Take π to be 3.142

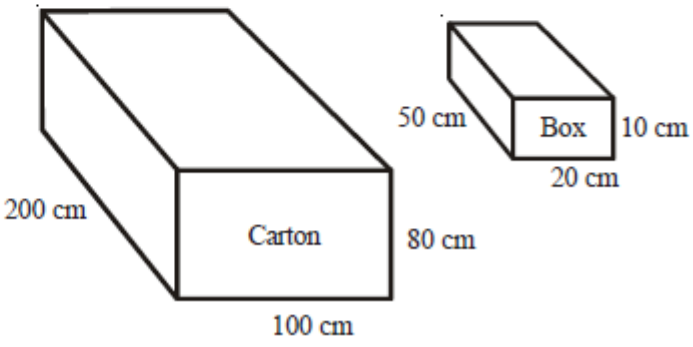
Work out the volume of the puck.
Give your answer correct to 3 significant figures.



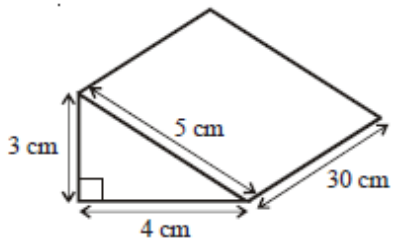
4) A cuboid has: a volume of $80cm^3$
a length of 5 cm
a width of 2 cm

Work out the height of the cuboid.

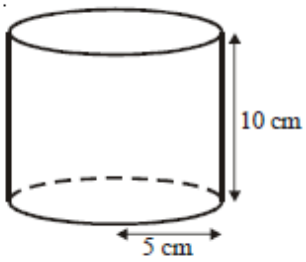
5) Work out the maximum number of boxes which can fit in the carton.



1) Work out the volume of the prism.



2)

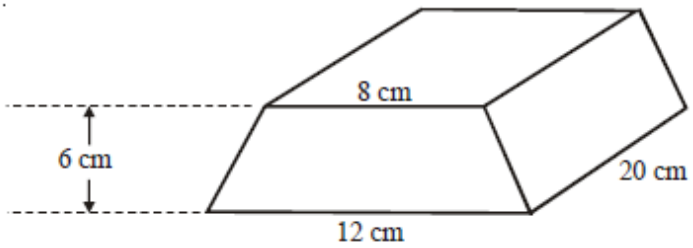


A solid cylinder has a radius of 5 cm and a height of 10 cm.

Work out the volume of the cylinder.

Take π to be 3.142
Give your answer correct to 3 significant figures.

3)



The diagram shows a solid prism made from metal.
The cross-section of the prism is a trapezium.

Find the volume of the prism.
You must state your units.

Edexcel GCSE

Mathematics (Linear) – 1MA0

VOLUME AND SURFACE AREA OF CYLINDER

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.
Keep an eye on the time.
Try to answer every question.
Check your answers if you have time at the end.

1.

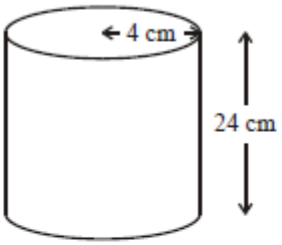


Diagram **NOT** accurately drawn

A cylinder has a height of 24 cm and a radius of 4 cm.
Work out the volume of the cylinder.
Give your answer correct to 3 significant figures.

..... cm^3

(Total 2 marks)

2. A can of drink is in the shape of a cylinder.
The can has a radius of 4 cm and a height of 15 cm.

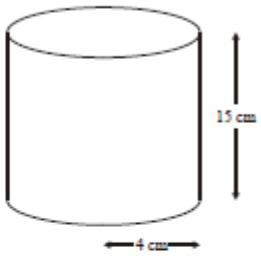


Diagram **NOT** accurately drawn

Calculate the volume of the cylinder.
Give your answer correct to 3 significant figures.

.....

(Total 3 marks)

3.

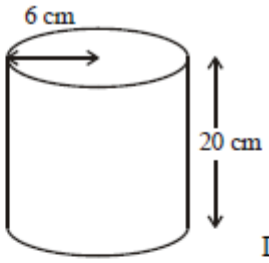


Diagram **NOT** accurately drawn

A solid cylinder has a radius of 6 cm and a height of 20 cm.

Calculate the volume of the cylinder.

Give your answer correct to 3 significant figures.

..... cm^3

(Total 2 marks)

4.

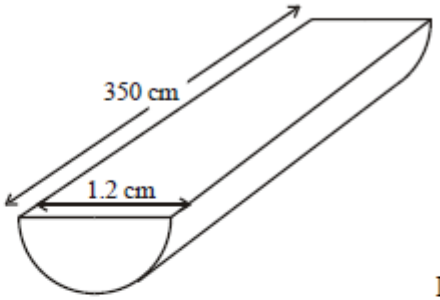


Diagram **NOT** accurately drawn

The diagram shows a piece of wood.
The piece of wood is a prism of length 350 cm.
The cross-section of the prism is a semi-circle with diameter 1.2 cm.

Calculate the volume of the piece of wood.
Give your answer correct to 3 significant figures.

..... cm^3

(Total 4 marks)

5.

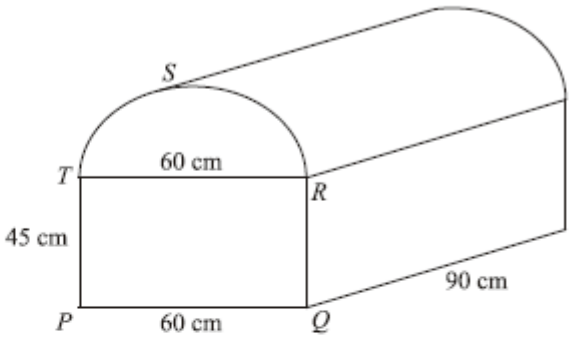


Diagram **NOT** accurately drawn

The diagram shows a prism of length 90 cm.
The cross section, *PQRST*, of the prism is a semi-circle above a rectangle.
PQRT is a rectangle.
RST is a semi-circle with diameter *RT*.
$PQ = RT = 60$ cm.
$PT = QR = 45$ cm.

Calculate the volume of the prism.
Give your answer correct to 3 significant figures.
State the units of your answer.

....

(Total 5 marks)

6.

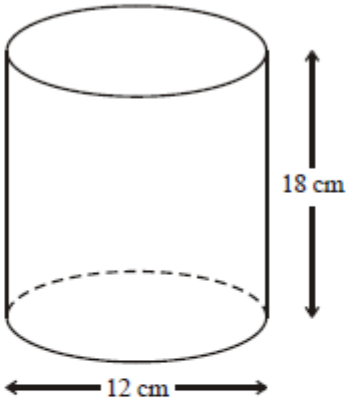


Diagram **NOT** accurately drawn

The diagram shows a solid cylinder.
The cylinder has a diameter of 12 cm and a height of 18 cm.

Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

..... cm^2

(Total 4 marks)

7.

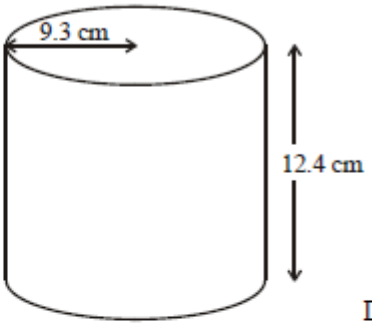


Diagram **NOT** accurately drawn

The diagram shows a solid cylinder.
The radius of the cylinder is 9.3 cm.
Its height is 12.4 cm.

Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

..... cm^2

(Total 4 marks)

8.

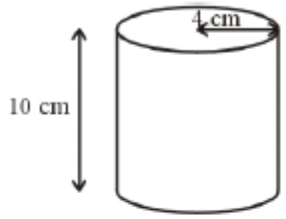


Diagram **NOT** accurately drawn

The diagram shows a cylinder with a height of 10 cm and a radius of 4 cm.

(a) Calculate the volume of the cylinder.
Give your answer correct to 3 significant figures.

.....

(3)

The cylinder is solid.

(b) Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

.....

(3)
(Total 6 marks)