IGCSE · Cambridge (CIE) · Maths

1 hour 19 questions

Non-Calculator Questions

Volume & Surface Area

Volume / Problem Solving with Volumes / Surface Area

Easy (4 questions)	/10
Medium (9 questions)	/23
Hard (3 questions)	/17
Very Hard (3 questions)	/14
Total Marks	**/64**

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Easy Questions

1 The diagram shows a prism.

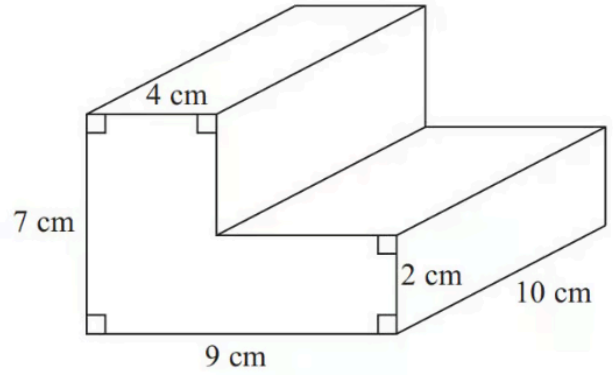


Diagram **NOT** accurately drawn

Work out the volume of the prism.

(3 marks)

2 Here is a triangular prism.

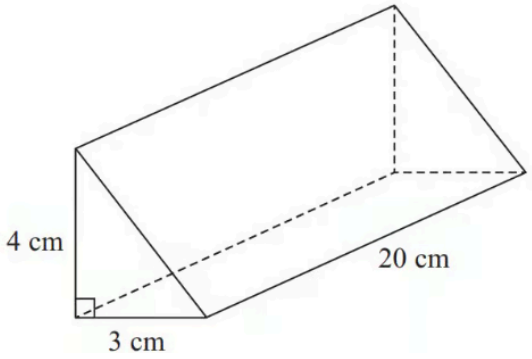
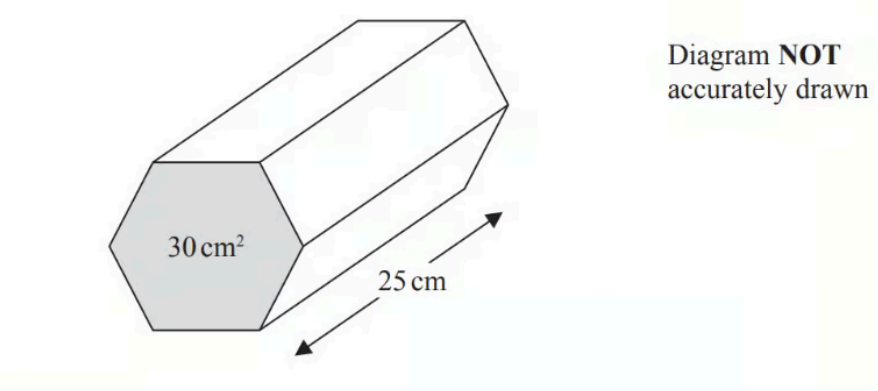


Diagram **NOT** accurately drawn

Work out the volume of this triangular prism.

(3 marks)

3 The diagram shows a prism.

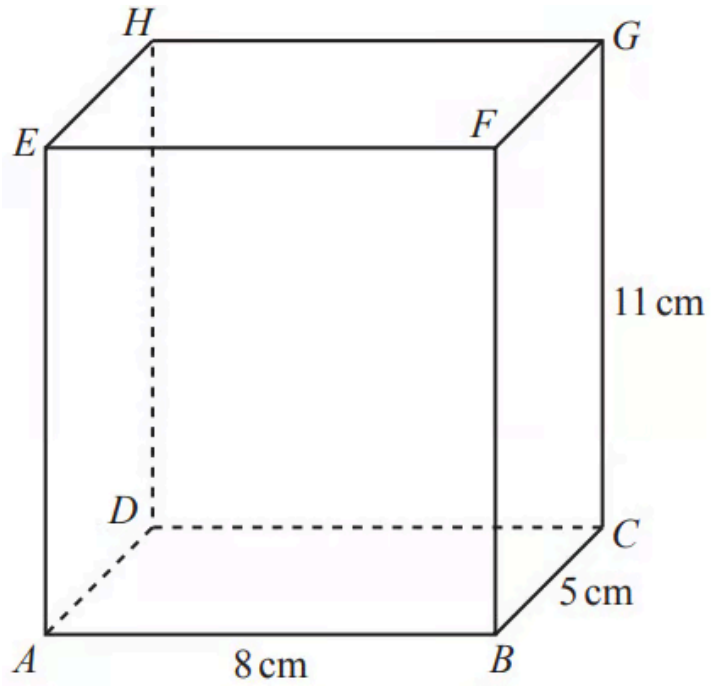


The area of the cross section of the prism is 30 cm^2. The length of the prism is 25 cm.

Work out the volume of the prism.

(2 marks)

4



NOT TO SCALE

ABCDEFGH is a cuboid.
AB = 8 cm, *BC* = 5 cm and *CG* = 11 cm.

Work out the volume of the cuboid.

..... cm^3

(2 marks)

Medium Questions

1 A solid cylinder has radius 3 cm and height 4.5 cm.

Calculate the total surface area of the cylinder.
Give your answer in terms of π.

..... cm^2

(4 marks)

2 The volume of a cuboid is 180 cm^3.
The base is a square of side length 6 cm.

Calculate the height of this cuboid.

..... cm

(2 marks)

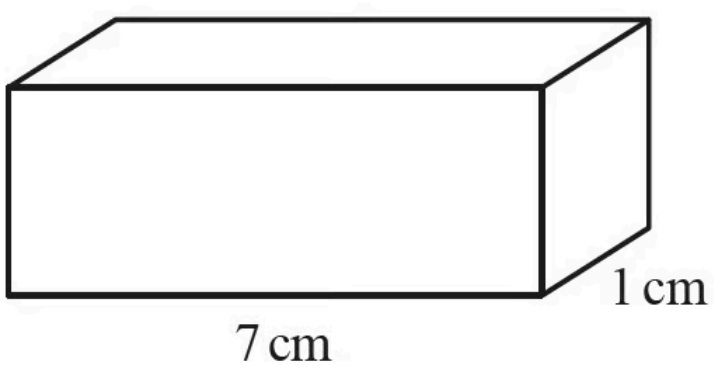
3 A water tank in the shape of a cuboid has length 1.5 metres and width 1 metre.
The water in the tank is 60 centimetres deep.

Calculate the number of litres of water in the tank.

..... litres

(3 marks)

4



NOT TO SCALE

The diagram shows a solid cuboid with base area 7 cm^2.
The volume of this cuboid is 21 cm^3.

Work out the total surface area.

..... cm^2

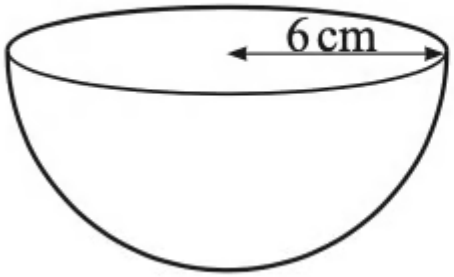
(3 marks)

5 Find the volume of a cylinder of radius 5 cm and height 8 cm.
Give your answer in terms of π.
Give the units of your answer.

(3 marks)

6

NOT TO SCALE



The diagram shows a hemisphere with radius 6 cm.

Calculate the volume.
Give your answer in terms of π.
Give the units of your answer.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

(3 marks)

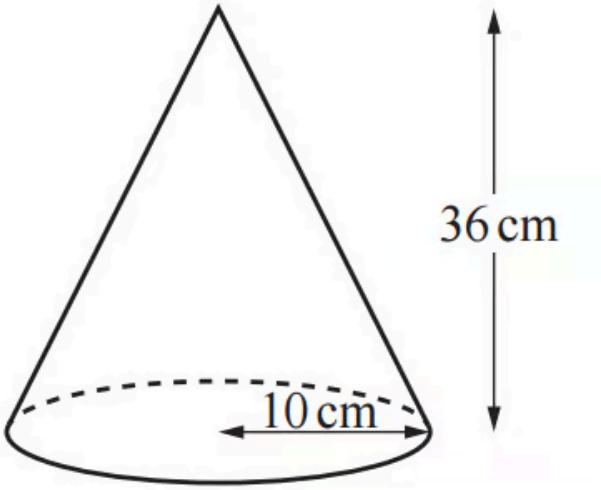
7 A cube has side length x cm. The volume of the cube is 1000 cm^3.

Calculate the value of x.

x = ...

(1 mark)

8



NOT TO SCALE

A solid metal cone has radius 10 cm and height 36 cm.

Calculate the volume of this cone.
Give your answer in terms of π.

[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

..... cm^3

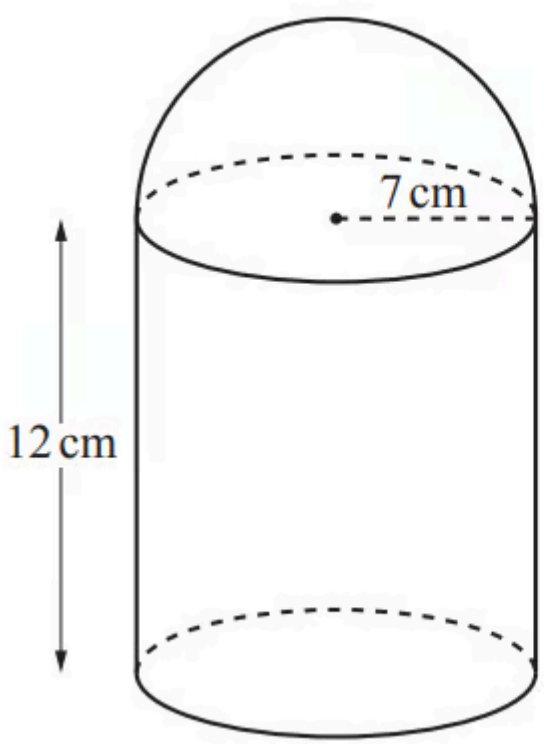
(2 marks)

9 Calculate the exact volume of a sphere with diameter 10 cm. Give your answer in the form $\frac{a}{b}\pi$ where a and b are positive integers.

(2 marks)

Hard Questions

1



NOT TO SCALE

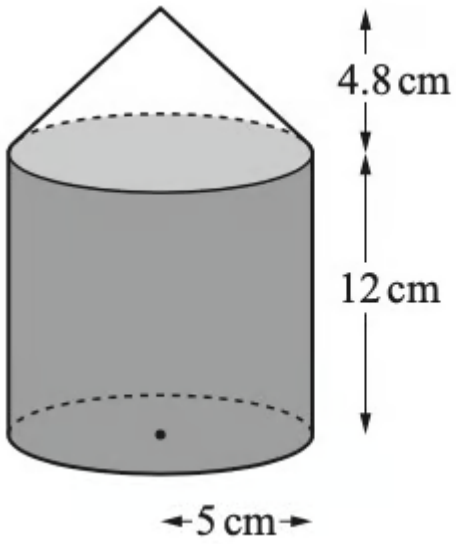
The diagram shows a solid made from a cylinder and a hemisphere, both of radius 7cm.
The cylinder has length 12 cm.

Work out the total surface area of the solid.
Give your answer in terms of π.
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$]

..... cm^2

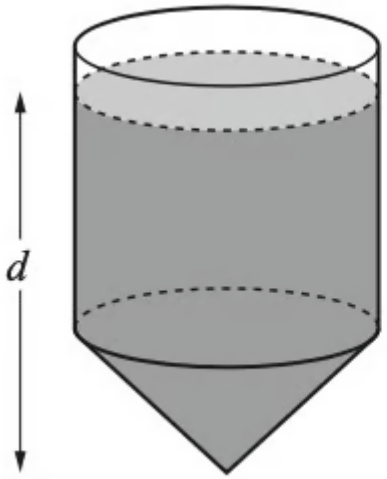
(4 marks)

2 A container is made from a cylinder and a cone, each of radius 5 cm.
The height of the cylinder is 12 cm and the height of the cone is 4.8 cm.



NOT TO SCALE

The cylinder is filled completely with water.
The container is turned upside down as shown below.



NOT TO SCALE

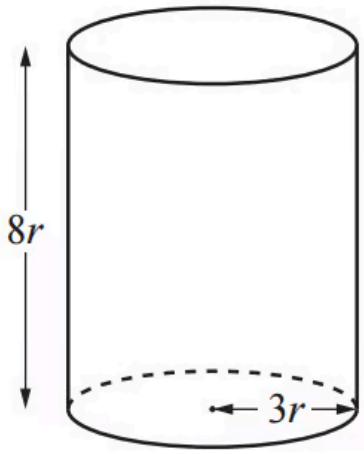
Calculate the depth, d, of the water.

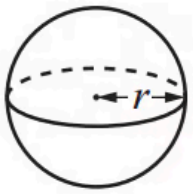
[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

d = ... cm

(5 marks)

3 (a)





NOT TO SCALE

The diagram shows a solid cylinder and a solid sphere.
The cylinder has radius $3r$ and height $8r$.
The sphere has radius r.

Find the volume of the sphere as a fraction of the volume of the cylinder.
Give your answer in its lowest terms.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

(4 marks)

(b) The surface area of the sphere is 81π cm^2.

Find the **curved** surface area of the cylinder.

Give your answer in terms of π.

[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

..... cm^2

(4 marks)

Very Hard Questions

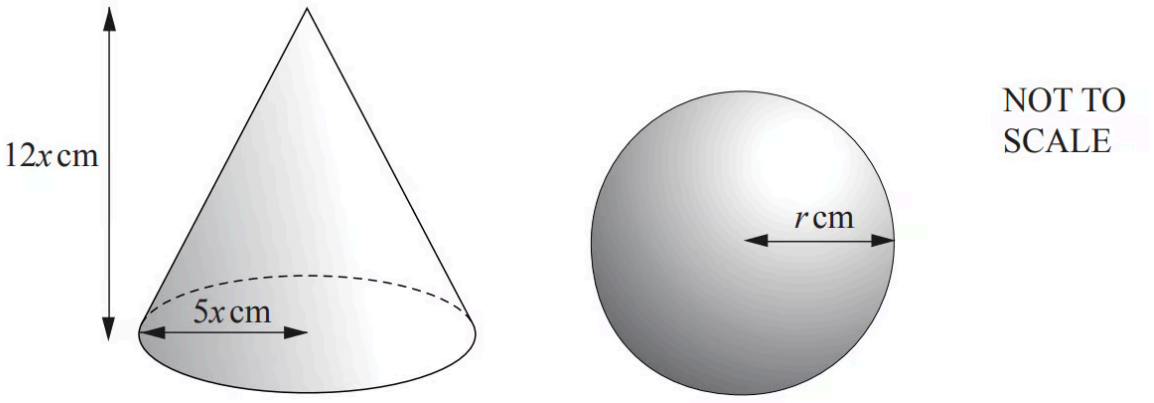
1 A solid cylinder has radius x cm and height $\frac{7x}{2}$ cm. The surface area of a sphere with radius R cm is equal to the total surface area of the cylinder.

Find an expression for R in terms of x.
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$R =$ .....

(3 marks)

2 The diagram below shows a solid circular cone and a solid sphere.



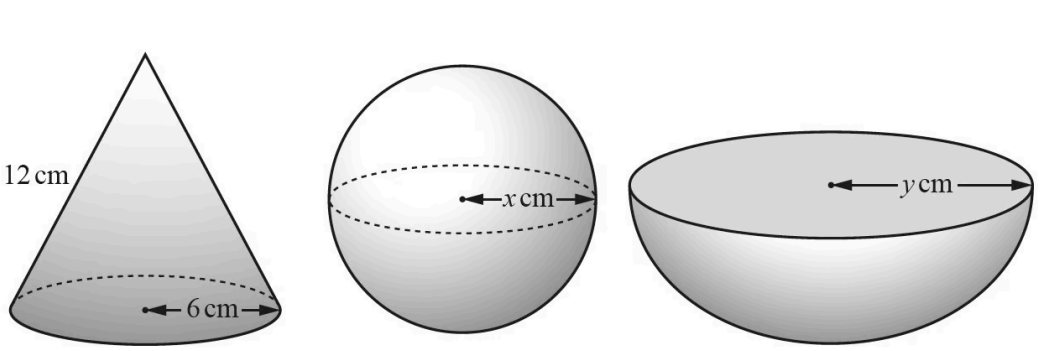
The cone has radius $5x$ cm and height $12x$ cm.
The sphere has radius r cm.
The cone has the same **total** surface area as the sphere.

Show that $r^2 = \frac{45}{2}x^2$.

[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi rl$.]
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

(5 marks)

3 (a)



The diagram shows three solids.
The base radius of the cone is 6 cm and the slant height is 12 cm.

Show that the total surface area of the cone is 108π cm^2.
[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi rl$.]

(2 marks)

(b) The radius of the sphere is x cm and the radius of the hemisphere is y cm.
The **total** surface area of each solid is the same.

Find the value of x and the value of y.
Give the value of x as a simplified surd.
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$x =$ .....

$y =$ .....

(4 marks)