

# 3-D Shapes and Volume

## Question Paper 2

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Topic	Shape, Space and Measures
Sub Topic	3-D Shapes and volume
Booklet	Question Paper 2

**Time Allowed:** 57 minutes

**Score:** /47

**Percentage:** /100

**Grade Boundaries:**

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

1

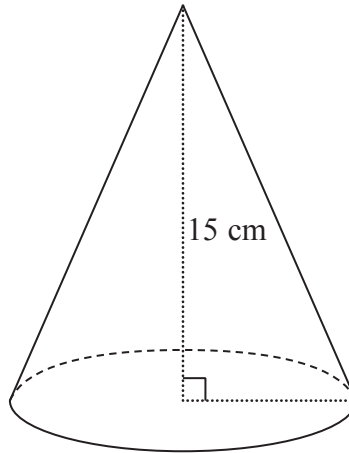


Diagram **NOT** accurately drawn

A solid cone has a height of 15 cm.  
The volume of the cone is  $320\pi \text{ cm}^3$

Work out the curved surface area of the cone.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$

**(Total for Question 1 is 5 marks)**

2 The diagram shows a solid cylinder.

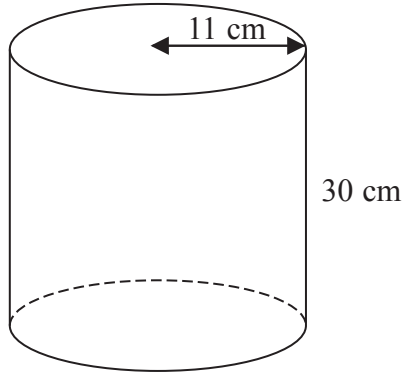


Diagram **NOT** accurately drawn

The cylinder has a height of 30 cm and a radius 11 cm.

- (a) Work out the **total** surface area of the cylinder.  
Give your answer correct to 2 significant figures.

..... cm<sup>2</sup>  
(4)

- (b) The height of the cylinder is 30 cm, correct to the nearest centimetre.

- (i) Write down the lower bound of the height of the cylinder.

..... cm

- (ii) Write down the upper bound of the height of the cylinder.

..... cm  
(2)

**(Total for Question 2 is 6 marks)**

3

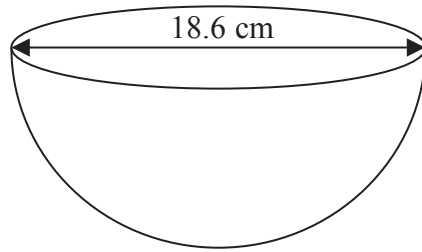


Diagram **NOT** accurately drawn

The diagram shows a hemisphere with a diameter of 18.6 cm.

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

.....cm<sup>3</sup>

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**(Total for Question 3 is 3 marks)**

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4 The diagram shows a cylinder and a sphere.

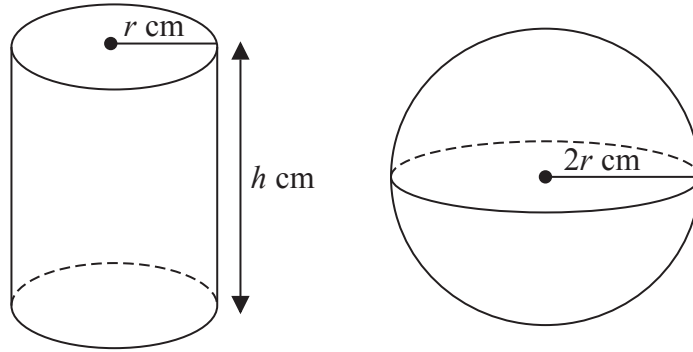


Diagram **NOT** accurately drawn

The cylinder has radius  $r \text{ cm}$  and height  $h \text{ cm}$ .  
The sphere has radius  $2r \text{ cm}$ .

The volume of the cylinder is equal to the volume of the sphere.  
Find an expression for  $h$  in terms of  $r$ .  
Give your answer in its simplest form.

.....  
(Total for Question 4 is 3 marks)

5 Here is a prism.

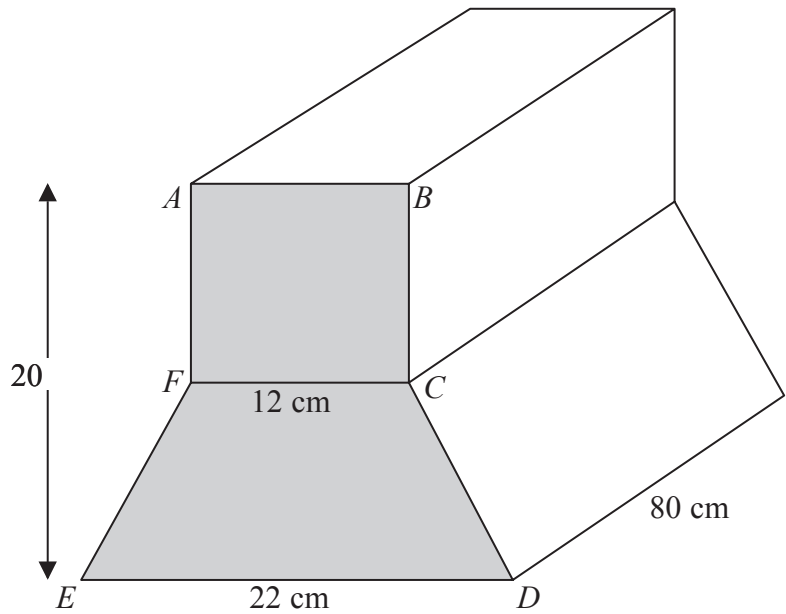


Diagram NOT accurately drawn

*ABCDEF* is a cross section of the prism.

*ABCF* is a square of side 12 cm.

*FCDE* is a trapezium.

*ED* = 22 cm.

The height of the prism is 20 cm.

The length of the prism is 80 cm.

Work out the total volume of the prism.

..... cm<sup>3</sup>

(Total for Question 5 is 5 marks)

6

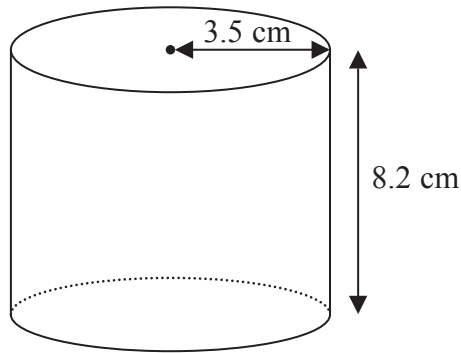


Diagram **NOT** accurately drawn

A solid cylinder has radius 3.5 cm and height 8.2 cm.

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

..... cm<sup>2</sup>

(Total for Question 6 is 3 marks)

7

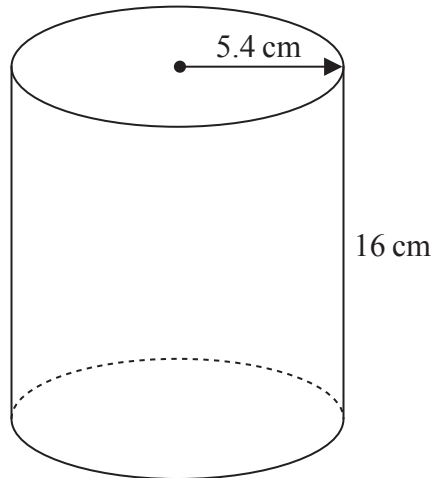


Diagram **NOT** accurately drawn

A cylinder has radius 5.4 cm and height 16 cm.

- (a) Work out the volume of the cylinder.  
Give your answer correct to the nearest whole number.

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

The radius 5.4 cm is correct to 2 significant figures.

- (b) (i) Write down the upper bound of the radius.

..... cm

- (ii) Write down the lower bound of the radius.

..... cm  
(2)

**(Total for Question 7 is 4 marks)**



8 The diagram shows a sphere and a cone.

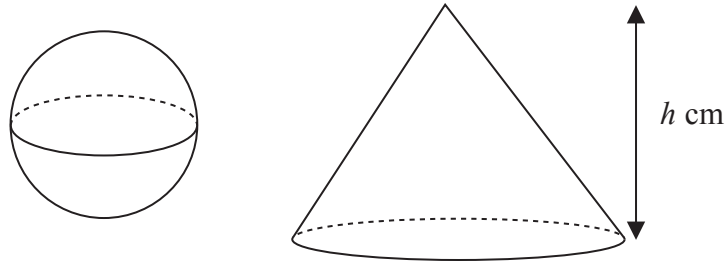


Diagram **NOT** accurately drawn

The cone has height  $h$  cm.

The radius of the base of the cone is 3 times the radius of the sphere.

Given that the volume of the sphere is equal to the volume of the cone, find an expression for the radius of the sphere in terms of  $h$ .

Give your expression in its simplest form.

.....  
**(Total for Question 8 is 3 marks)**

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- 9 The diagram shows a cylinder inside a cone on a horizontal base.  
The cone and the cylinder have the same vertical axis.  
The base of the cylinder lies on the base of the cone.  
The circumference of the top face of the cylinder touches the curved surface of the cone.

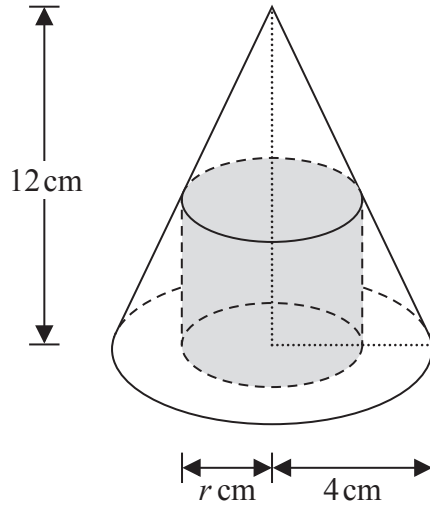


Diagram **NOT** accurately drawn

The height of the cone is 12 cm and the radius of the base of the cone is 4 cm.

- (a) Work out the curved surface area of the cone.  
Give your answer correct to 3 significant figures.

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

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The cylinder has radius  $r$  cm and volume  $V$  cm<sup>3</sup>

(b) Show that  $V = 12\pi r^2 - 3\pi r^3$

(3)

(c)  $V = 12\pi r^2 - 3\pi r^3$

Find the value of  $r$  for which  $V$  is a maximum.

$r = \dots\dots\dots$

(4)

**(Total for Question 9 is 10 marks)**

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**10** The diagram shows a solid cylinder.

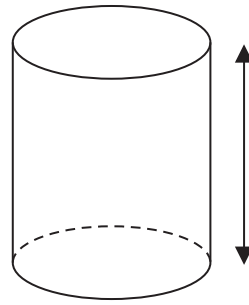


Diagram **NOT** accurately drawn

The cylinder has radius  $4\sqrt{3}$  cm and height  $h$  cm.  
The total surface area of the cylinder is  $56\pi\sqrt{6}$  cm<sup>2</sup>

Find the exact value of  $h$ .  
Give your answer in the form  $a\sqrt{2} + b\sqrt{3}$ , where  $a$  and  $b$  are integers.  
Show your working clearly.

$h = \dots\dots\dots$

**(Total for Question 10 is 5 marks)**