

Sectors and Volume

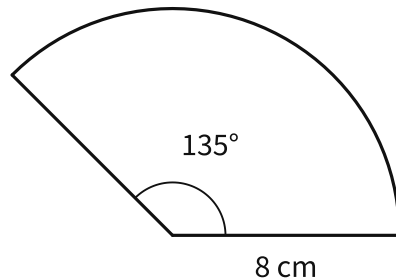
ANSWERS

Calculator | 30 minutes | Total marks: 30

Name _____ Class _____

- 1 The diagram shows a sector of a circle.

Not drawn accurately



- (a) Work out the length of the arc.

Give your answer to 1 decimal place.

$$\frac{135}{360} \times \pi \times 16 \text{ (1)}$$

Answer 18.8 (1) cm [2 marks]

- (b) Work out the area of the sector.

Give your answer to 1 decimal place.

$$\frac{135}{360} \times \pi \times 8^2 \text{ (1)}$$

Answer 75.4 (1) cm² [2 marks]

- 2 A sector of a circle has a radius of 6 cm and an angle of 60°.

- (a) Work out the area of the sector.

Give your answer in terms of π .

$$\frac{60}{360} \times \pi \times 36 \text{ (1)}$$

Answer 6 π (1) cm² [2 marks]

- (b) Work out the perimeter of the sector.

Give your answer in terms of π .

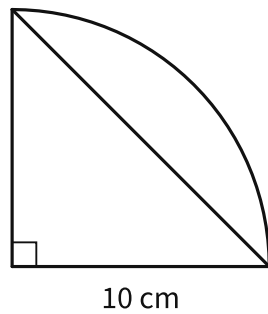
$$\text{arc} = \frac{60}{360} \times \pi \times 12 = 2\pi \text{ (1)}$$

Answer 2 π + 12 (1) cm [2 marks]

3

The diagram shows a sector of a circle with radius 10 cm and angle 90° .

A chord joins the ends of the two radii.



Not drawn accurately

Work out the area of the segment between the chord and the arc.

Give your answer to 1 decimal place.

$$\text{sector} = \frac{1}{4} \times \pi \times 10^2 = 78.53... \text{ (1)}$$

$$\text{triangle} = \frac{1}{2} \times 10 \times 10 = 50 \text{ (1)}$$

Answer 28.5 (1) cm² [3 marks]

4

(a) Change 3 m² into cm²

Answer 30 000 (1) cm² [1 mark]

(b) Change 4 000 000 cm³ into m³

Answer 4 (1) m³ [1 mark]

5

Volume of a cone = $\frac{1}{3}\pi r^2 h$ Curved surface area of a cone = $\pi r l$

A cone has radius 5 cm, vertical height 12 cm and slant height 13 cm.

(a) Work out the volume of the cone.

Give your answer in terms of π .

$$\frac{1}{3} \times \pi \times 5^2 \times 12 \text{ (1)}$$

Answer 100 π (1) cm³ [2 marks]

(b) Work out the total surface area of the cone.

Give your answer in terms of π .

$$\text{curved surface} = \pi \times 5 \times 13 = 65\pi \text{ (1)}$$

$$\text{base} = 25\pi \text{ (1)}$$

Answer 90 π (1) cm² [3 marks]

6

Volume of a sphere = $\frac{4}{3}\pi r^3$ Surface area of a sphere = $4\pi r^2$

- (a) Work out the volume of a sphere with radius 6 cm.

Give your answer to 1 decimal place.

$$\frac{4}{3} \times \pi \times 6^3 \quad (1)$$

Answer 904.8 (1) cm³ [2 marks]

- (b) A solid hemisphere has radius 4 cm.

Work out its total surface area.

Give your answer in terms of π .

$$\text{curved surface} = \frac{1}{2} \times 4 \times \pi \times 4^2 = 32\pi \quad (1)$$

$$\text{flat face} = 16\pi \quad (1)$$

Answer 48 π (1) cm² [3 marks]

7

- A pyramid has a square base of side 6 cm and a vertical height of 10 cm.

Volume of a pyramid = $\frac{1}{3} \times \text{area of base} \times \text{height}$

Work out the volume of the pyramid.

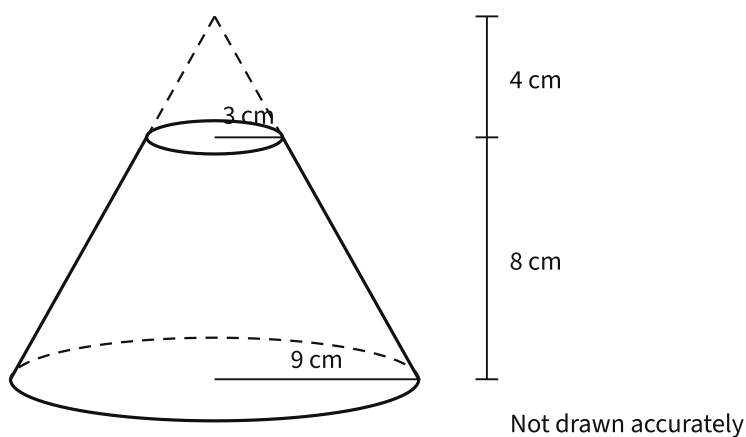
$$\frac{1}{3} \times 36 \times 10 \quad (1)$$

Answer 120 (1) cm³ [2 marks]

8

A cone has radius 9 cm and height 12 cm.

A smaller cone with radius 3 cm and height 4 cm is cut off the top to leave a frustum.



Work out the volume of the frustum.

Give your answer in terms of π .

$$\text{large cone: } \frac{1}{3} \times \pi \times 9^2 \times 12 = 324\pi \text{ (1)}$$

$$\text{small cone: } \frac{1}{3} \times \pi \times 3^2 \times 4 = 12\pi \text{ (1)}$$

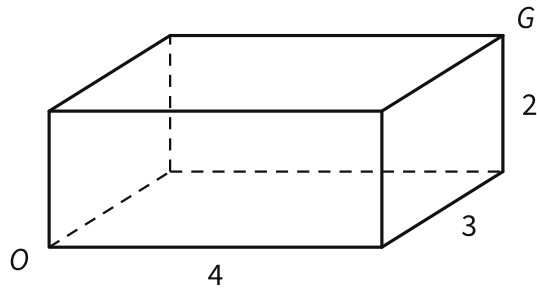
$$324\pi - 12\pi \text{ (1)}$$

Answer 312\pi (1) cm³ [4 marks]

9

The diagram shows a cuboid drawn on 3D axes. O is the point $(0, 0, 0)$.

The cuboid is 4 units long in the x direction, 3 units in the y direction and 2 units in the z direction.



Write down the coordinates of G , the vertex opposite O .

Answer (4, 3, 2) (1) [1 mark]

Question	Topic	RAG
1	I can find an arc length and the area of a sector	
2	I can give sector answers in terms of π	
3	I can find the area of a segment	
4	I can convert units of area and volume	
5	I can find the volume and surface area of a cone	
6	I can find the volume of a sphere and the surface area of a hemisphere	
7	I can find the volume of a pyramid	
8	I can find the volume of a frustum	
9	I can use coordinates in 3D	