



Bishops Online Tutoring



Education Consultancy

Edexcel GCSE Mathematics VOLUME & SURFACE AREA OF CYLINDER

Materials Required:

- Pen
- HB Pencil
- Ruler (in centimetres and millimetres)
- Protractor
- Compass

Information:

- The marks allocated for each question are displayed within brackets – utilise this information to gauge the appropriate amount of time to dedicate to each question
- Questions marked with an asterisk (*) will assess your written communication; be careful of spelling, punctuation and grammar with these questions

Instructions:

- Use a black ink pen to answer all questions
- Fill your name in the section below
- Answer the questions in the spaces provided
- Show your working out for all answers

Advice:

- Carefully read the question before attempting to answer it
- Be vary of time and try to answer every question
- If you have enough time in the end, go back and check your answers. A good way to check your answers is to retry the question with the hope of getting the same answer as before without looking at your working out from before

CALCULATOR ALLOWED

NAME:

1.

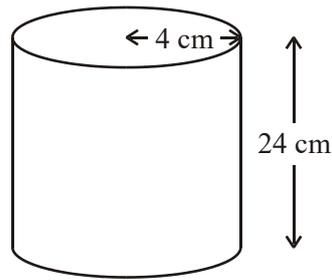


Diagram **NOT** accurately drawn

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.

$$\begin{aligned} \text{Volume} &= \text{Area of circle} \times \text{height} \\ &= \pi r^2 h \end{aligned}$$

$$\begin{aligned} r &= 4 \\ h &= 24 \end{aligned}$$

$$\begin{aligned} \pi \times 4^2 \times 24 \\ = 1206.371579 \end{aligned}$$

→ 3 sig. fig

$$\rightarrow 1210 \text{ cm}^3$$

$$\dots\dots\dots 1210 \text{ cm}^3$$

(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.

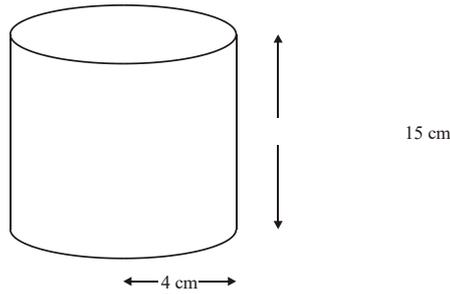


Diagram NOT accurately drawn

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

$$V = \pi r^2 h \quad r = 4 \quad h = 15$$

$$V = \pi \times 4^2 \times 15$$

$$V = 753.9822369$$

↳ 3 sig. fig
= 754

..... 754 cm³

(Total 3 marks)

3.

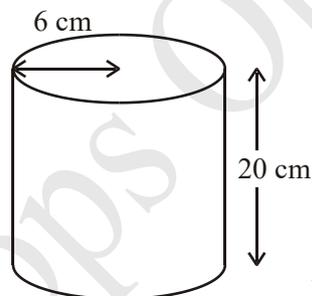


Diagram NOT accurately drawn

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.

$$V = \pi r^2 h \quad r = 6 \quad h = 20$$

$$V = \pi \times 6^2 \times 20$$

$$V = 2261.946711$$

3 sig fig = 2260

..... 2260 cm³

(Total 2 marks)

4.

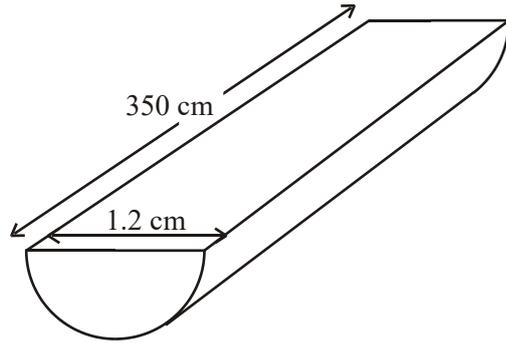


Diagram **NOT** accurately drawn

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.

Volume of Cylinder = $\pi r^2 h$ therefore

Volume of $\frac{1}{2}$ Cylinder = $\frac{1}{2} \times \pi r^2 \times h$

$r = 0.6$
 $h = 350$

$= \frac{1}{2} \times \pi \times 0.6^2 \times 350$
 $= 197.9203372$

3 sig fig = 198

198

..... cm³

(Total 4 marks)

5.

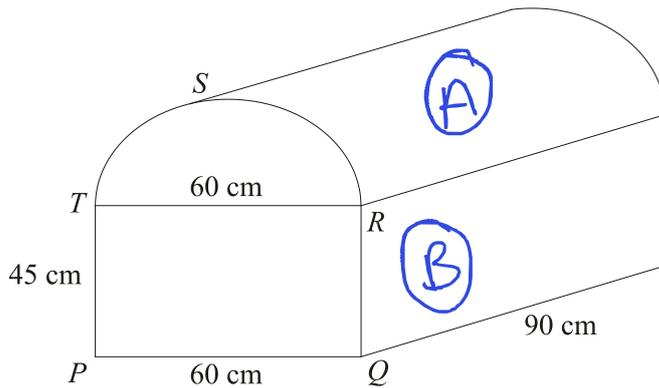


Diagram NOT accurately drawn

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.

(A) Half Cylinder $V = \frac{1}{2} \times \pi \times r^2 \times h$ $r = 30$
 $V = \frac{1}{2} \times \pi \times 30^2 \times 90$ $h = 90$
 $V = 127234.5025 \text{ cm}^3$

(B) Cuboid $V = h \times w \times b$
 $V = 45 \times 60 \times 90$
 $V = 243000 \text{ cm}^3$

(A) + (B)

$$127234.5025 + 243000 = 370234.5025$$

3 sig fig = 370000 $\underline{\underline{370000 \text{ cm}^3}}$

(Total 5 marks)

6.

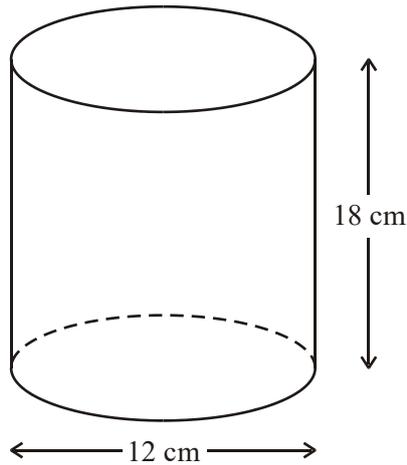


Diagram **NOT** accurately drawn

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.

$$\begin{aligned} \text{Surface area of cylinder} &= 2 \text{ circles} + \text{rectangle} \\ &= 2 \times \pi r^2 + \pi d \times h \\ &= 2 \times \pi \times 6^2 + \pi \times 12 \times 18 \\ &= 226.1946711 + 678.5840132 \\ &= 904.7786842 \\ &\sim 3 \text{ sig fig} = 905 \text{ cm}^2 \end{aligned}$$

$$\dots\dots\dots 905 \dots\dots\dots \text{cm}^2$$

(Total 4 marks)

7.

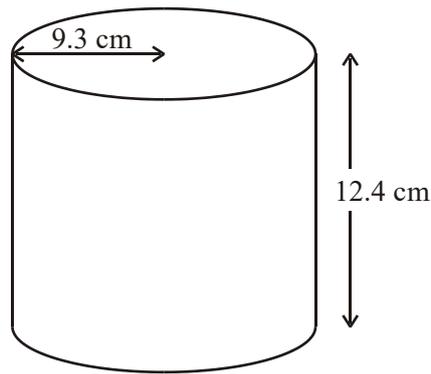


Diagram **NOT** accurately drawn

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.

$$\begin{aligned}\text{Surface area of cylinder} &= 2 \times \text{circle} + \text{rectangle} \\ &= 2 \times \pi r^2 + \pi d \times h \\ &= 2 \times \pi \times 9.3^2 + \pi \times 18.6 \times 12.4 \\ &= 543.4326972 + 724.5769296 \\ &= 1268.009627\end{aligned}$$

3 sig fig = 1270 cm²

$$1270 \text{ cm}^2$$

(Total 4 marks)

8.

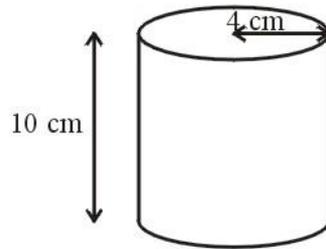


Diagram **NOT** accurately drawn

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.

$$\begin{aligned} \text{Volume} &= \pi r^2 h \\ &= \pi \times 4^2 \times 10 \\ &= 502.6548246 \\ \text{3 sig fig} &= 503 \text{ cm}^3 \end{aligned}$$

503 cm³
(3)

The cylinder is solid.

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

$$\begin{aligned} \text{Surface area of cylinder} &= 2 \times \text{circle} + \text{rectangle} \\ &= 2 \times \pi r^2 + \pi d \times h \\ &= 2 \times \pi \times 4^2 + \pi \times 8 \times 10 \\ &= 100.5309649 + 251.3274123 \\ &= 351.8583772 \\ \text{3 sig fig} &= 352 \text{ cm}^2 \end{aligned}$$

352 cm²
(3)

(Total 6 marks)