

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.

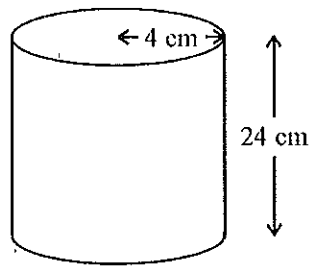


Diagram NOT accurately drawn

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.

$$\begin{aligned}\text{Volume} &= \pi r^2 h \\ &= \pi (4)^2 (24) \\ &= 1206.371579 \\ &= 21 \\ &= 1210 \text{ cm}^3 \quad (3 \text{ s.f.})\end{aligned}$$

.....1210..... cm³
(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.

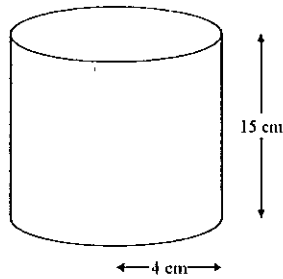


Diagram NOT accurately drawn

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

$$\begin{aligned}
 V &= \pi r^2 h \\
 &= \pi (4)^2 (15) \\
 &= 753.9822369 \\
 &= 754 \text{ (3 s.f.) cm}^3
 \end{aligned}$$

$$\dots 754 \text{ cm}^3 \dots$$

(Total 3 marks)

- 3.

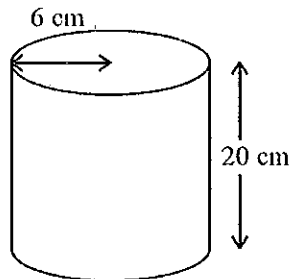


Diagram NOT accurately drawn

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.

$$\begin{aligned}
 V &= \pi r^2 h \\
 &= \pi (6)^2 (20) \\
 &= 720\pi \\
 &= 2261.946711 \\
 &= 2260 \text{ cm}^3 \text{ (3 s.f.)}
 \end{aligned}$$

$$\dots 2260 \text{ cm}^3 \dots$$

(Total 2 marks)

4.

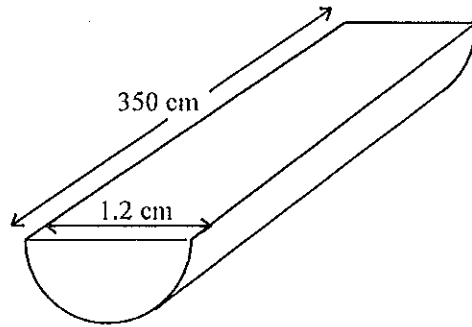


Diagram **NOT** accurately drawn

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.

$$\begin{aligned}V &= \frac{1}{2} \pi r^2 h \\&= \frac{1}{2} \pi (0.6)^2 (350) \\&= 63\pi \\&= 197.9203372 \\&= 198 \text{ cm}^3 \text{ (3sf)}\end{aligned}$$

.....198..... cm³
(Total 4 marks)

5.

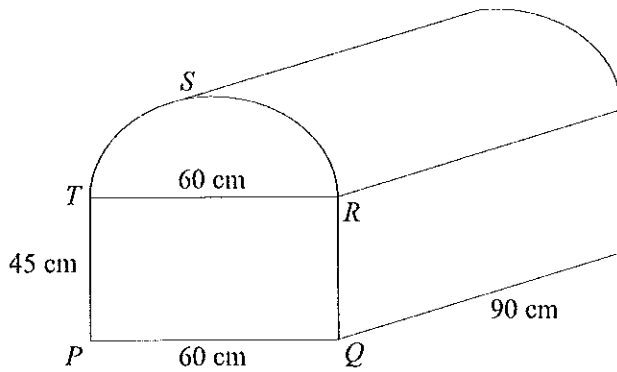


Diagram NOT accurately drawn

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.

$$\begin{aligned} \text{Volume} &= \frac{1}{2} \pi r^2 h + lwh \\ &= \frac{1}{2} \pi (30)^2 (90) + (45)(60)(90) \\ &= 370234.5025 \\ &= 370000 \text{ cm}^3 \end{aligned}$$

$$\underline{\underline{370000 \text{ cm}^3}}$$

(Total 5 marks)

6.

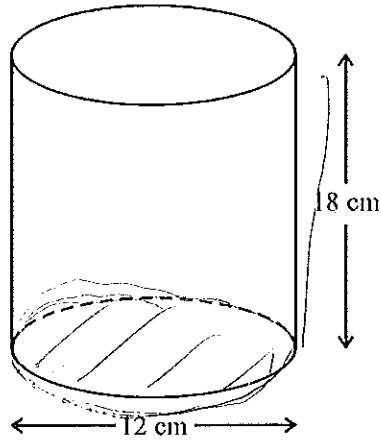


Diagram NOT accurately drawn

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.

$$\begin{aligned} S.A. &= 2\pi r^2 + 2\pi r h \\ &= 2\pi(6)^2 + 2\pi(6)(18) \\ &= 288\pi \\ &= 905 \text{ cm}^2 \text{ (3sf)} \end{aligned}$$

.....9.05..... cm²
(Total 4 marks)

7.

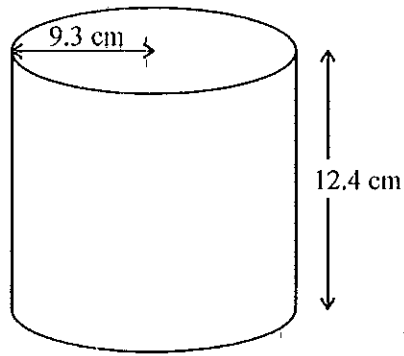


Diagram **NOT** accurately drawn

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.

$$\begin{aligned} \text{s.a.} &= 2\pi r^2 + 2\pi r h \\ &= 2\pi(9.3)^2 + 2\pi(9.3)(12.4) \\ &= 1268.009627 \\ &= 1270 \text{ cm}^2 \text{ (3sf)} \end{aligned}$$

.....1270..... cm²
(Total 4 marks)

8.

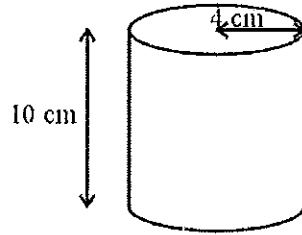


Diagram NOT accurately drawn

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.

$$\begin{aligned}V &= \pi r^2 h \\&= \pi (4)^2 (10) \\&= 502.6548246 \text{ cm}^3\end{aligned}$$

$$\underline{503 \text{ cm}^3} \quad (352) \quad (3)$$

The cylinder is solid.

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

$$\begin{aligned}S.A. &= 2\pi r^2 + 2\pi r h \\&= 2\pi (4)^2 + 2\pi (4)(10) \\&= 351.8583772 \\&= 352 \text{ cm}^2 \quad (351)\end{aligned}$$

$$\underline{352 \text{ cm}^2}$$

(3)
(Total 6 marks)