Solutions by
Kenneth Stafford
MATHS TUTOR
ken@kennethstafford.co.uk

GCSE (9-1) Grade 4
Volume and Surface Area of Cylinder

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
- there may be more space than you need.

Show all your working out

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

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1.

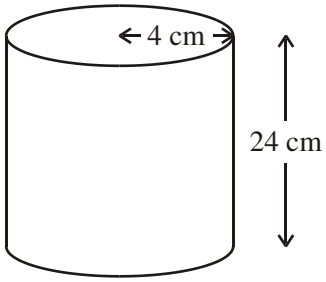


Diagram **NOT** accurately drawn

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.

Volume $= \pi \times 4^2 \times 24$

$= 384\pi$

$= 1206.37$

1210 ..... 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.

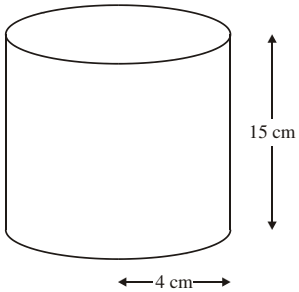


Diagram **NOT** accurately drawn

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

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

$= 240\pi$

$= 753.98$

754 cm^3

(Total 3 marks)

3.

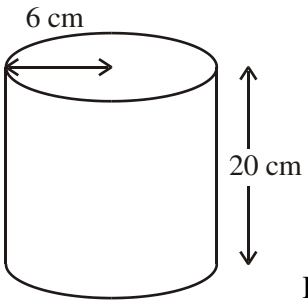


Diagram **NOT** accurately drawn

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.

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

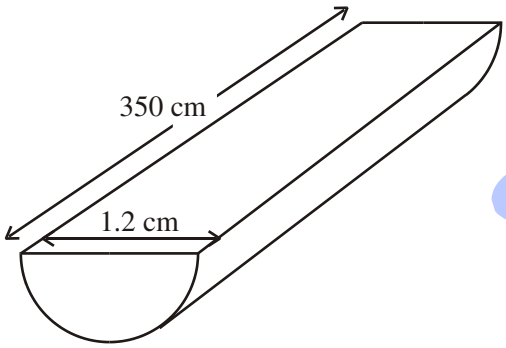
$= 720\pi$

$= 2261.94$

2260 ..... cm^3

(Total 2 marks)

4.



radius = 0.6cm

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

$= 63\pi$

$= 197.92$

198 ..... cm^3

(Total 4 marks)

5.

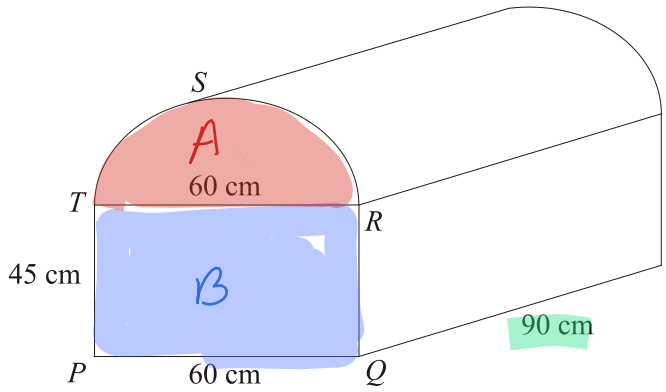


Diagram **NOT** accurately drawn

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
30cm

Area of semi-circle $= \frac{\pi \times 30^2}{2} = 450\pi \text{ cm}^2$

40 B 60

Area of rectangle $= 40 \times 60 = 2400 \text{ cm}^2$

Area of cross-section $= 450\pi + 2400 = 3813.72 \text{ cm}^2$

Volume $= 3813.72 \times 90 = 343234.5$

343,000 cm^3

(Total 5 marks)

6.

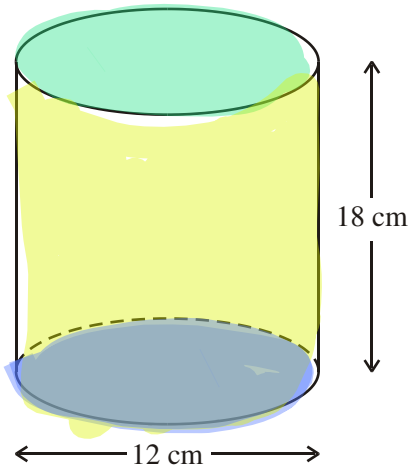
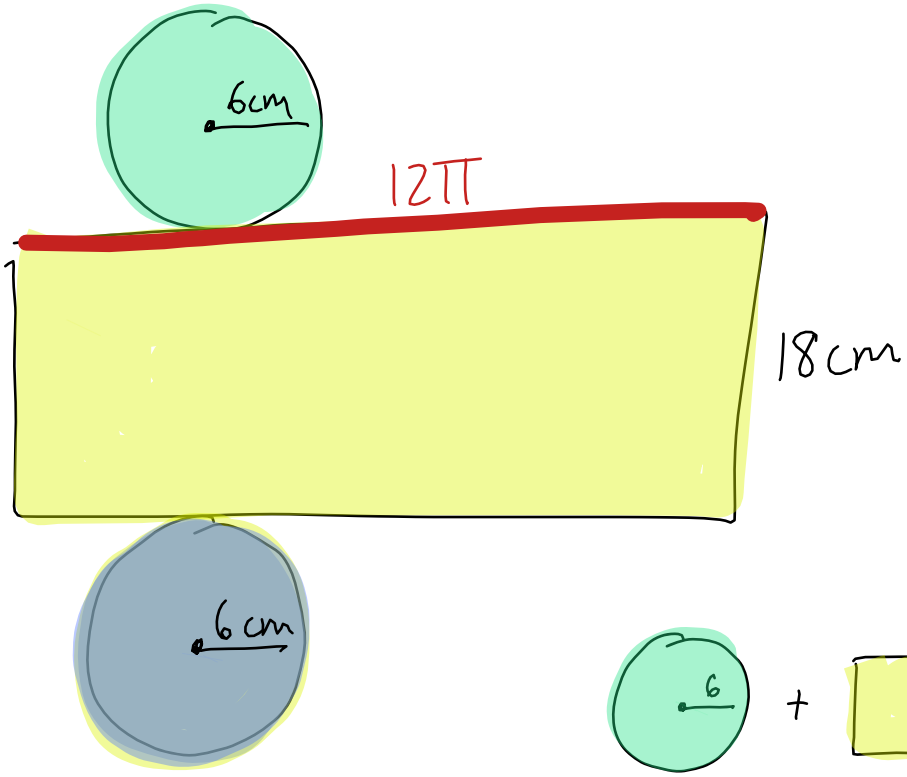


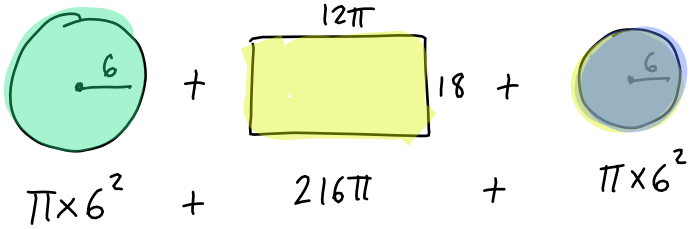
Diagram **NOT** accurately drawn

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.

Circumference = 12π





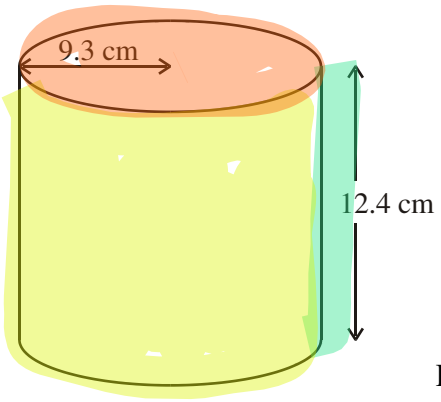
$\pi \times 6^2 + 216\pi + \pi \times 6^2$

$= 288\pi = 905$

..... cm^2

(Total 4 marks)

7.

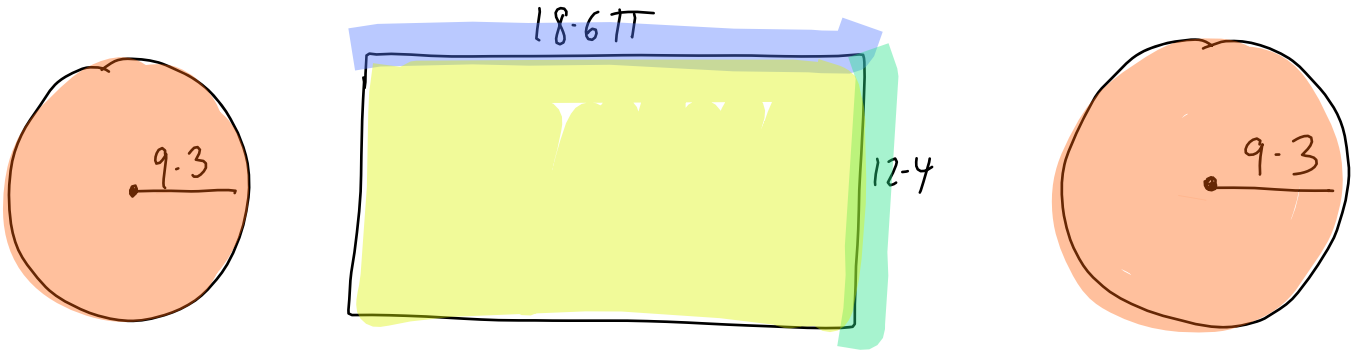


$C = 2 \times 9.3 \times \pi = 18.6\pi$

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.



$(9.3)^2 \times \pi + 12.4 \times 18.6\pi + (9.3)^2 \times \pi$

$271.72 + 724.58 + 271.72$

$= 1268.$

1270 ..... cm^2

(Total 4 marks)

8.

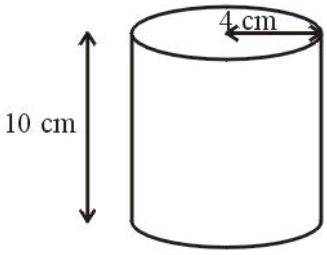


Diagram **NOT** accurately drawn

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.

$\pi \times 4^2 \times 10 = 160\pi$

$= 503 \text{ cm}^3$

(3)

The cylinder is solid.

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

$16\pi + [8\pi \times 10] + 16\pi$

$= 112\pi$

$= 351.9$

352 cm^2

(3)
(Total 6 marks)