



Prisms and cylinders

About 55 minutes Calculator allowed 41 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks]

A trapezium has area 77 cm^2 . Its parallel sides are 3 cm and 19 cm. Find the distance between the parallel sides.

A2 From chapter 9 [2 marks]

A circle has circumference 26π cm. Find its area, in terms of π .

Answer

Answer

- A3** Key Stage 3 [2 marks]

A train travels 66 km in 45 minutes. Work out its average speed in km/h.

A4 Key Stage 3 [2 marks]

A length, L cm, is 55 cm correct to the nearest 5. Write down the error interval for L .

Answer

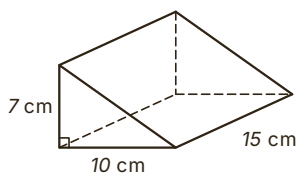
Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

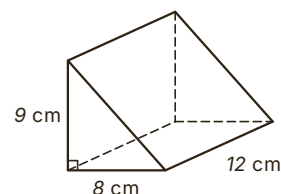
EXAMPLE 1

Work out the volume of the triangular prism.



Hint Volume of a prism = area of cross-section $\times$ length.

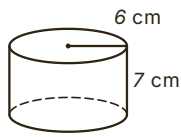
- B1** Work out the volume of the prism. [2 marks]



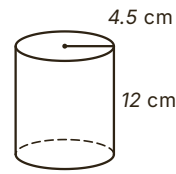
Answer

EXAMPLE 2

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



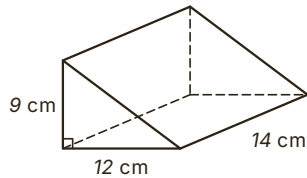
Hint A cylinder is a prism with a circle as its cross-section.

B2 Work out the volume of the cylinder. Give your answer to 3 significant figures. [2 marks]

Answer

c Practice

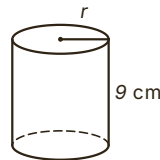
- C1** The cross-section of this prism is a right-angled triangle. Work out its total surface area. [4 marks]



Not drawn accurately

Answer

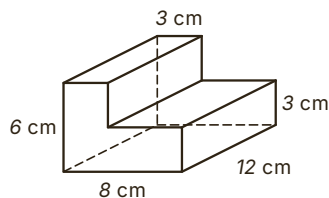
- C2** The cylinder has a volume of 500 cm^3 . Work out its radius, r . Give your answer to 1 decimal place. [3 marks]



Not drawn accurately

Answer

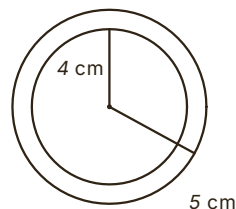
- C3** The prism has an L-shaped cross-section. Work out its volume. [3 marks]



Not drawn accurately

Answer

- C4** A metal pipe is 80 cm long. Its end is the ring shown. Work out the volume of metal. Give your answer to 3 significant figures. [3 marks]



Answer

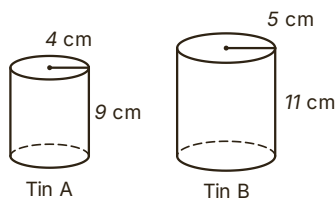
D Exam-style questions

D1

Soup is sold in two sizes of cylindrical tin. Tin A costs 80p and Tin B costs £1.30. Sam says, "Tin A is better value because it is cheaper."

[4 marks]

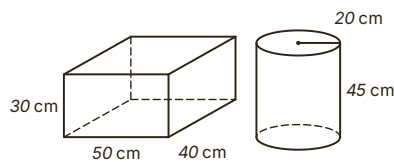
Show that Sam is wrong.



Not drawn accurately

D2

A cuboid tank 50 cm by 40 cm by 30 cm is full of water. All the water is poured into an empty cylindrical tank of radius 20 cm and height 45 cm.



Not drawn accurately

- (a) Show that the water overflows, and work out how much overflows, in litres. Give your answer to 1 decimal place.

[5 marks]

Answer

- (b) The cylindrical tank has a base but no lid. Work out the area of its outside surface. Give your answer to 3 significant figures.

[3 marks]

Answer

Total for D2: 8 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A cylinder fits exactly inside a cube of side 10 cm, touching all six faces. What percentage of the cube is empty space? Give your answer to 3 significant figures. [4 marks]

View from above



Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** The cylinder is as tall as the cube and as wide as the cube. What are its radius and height?
- Hint 2** The radius is 5 cm and the height is 10 cm, so the cylinder holds $\pi \times 5^2 \times 10 = 785.4 \text{ cm}^3$.
- Hint 3** Empty space = $1000 - 785.4 = 214.6 \text{ cm}^3$. Write this as a percentage of 1000.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can work out the volume of a prism and a cylinder. ☐ ☐ ☐
- I can work out surface areas and work back from a volume to a missing length. ☐ ☐ ☐
- I can use these in problems with containers, units and value for money. ☐ ☐ ☐