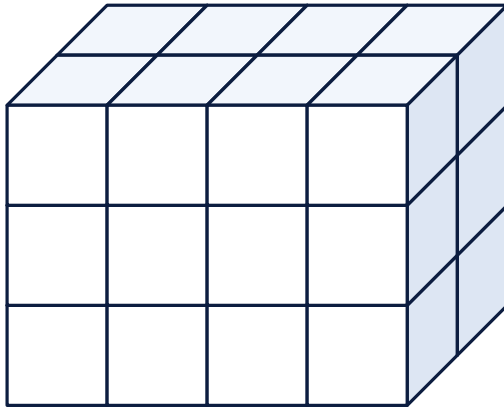




- 1** This cuboid is made from centimetre cubes. There are no gaps inside it.
The cuboid is 4 cubes long, 2 cubes deep and 3 cubes high.
Work out the volume of the cuboid.



(1 mark)

Cubes in one layer

$$4 \times 2 = 8$$

3 layers

$$8 \times 3 = 24$$

$$\boxed{24 \text{ cm}^3}$$

- 2** A cuboid measures 6 cm by 4 cm by 3 cm.
Work out the volume of the cuboid.
State the units of your answer.

(2 marks)

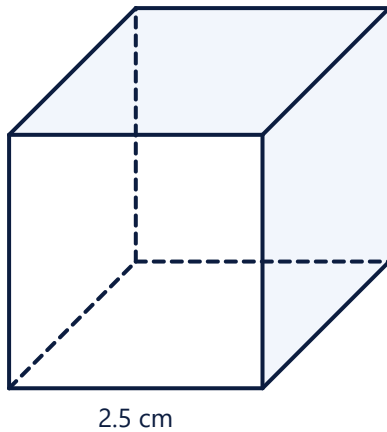
Volume of a cuboid = length $\times$ width $\times$ height

$$\text{Volume} = 6 \times 4 \times 3 = 72 \text{ cm}^3$$

$$\boxed{72 \text{ cm}^3}$$

3

A dice is a cube with edges of length 2.5 cm.
Work out the volume of the dice.



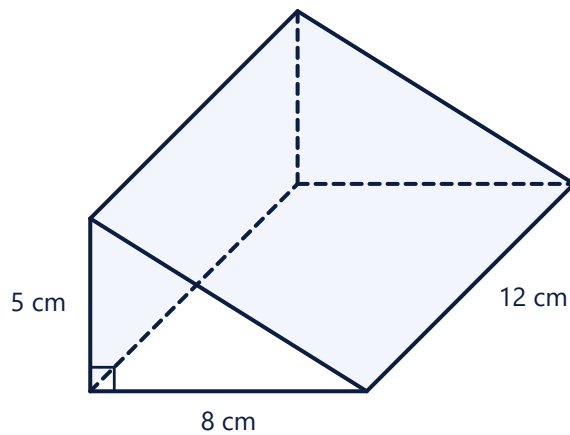
(2 marks)

$$\begin{aligned}\text{Volume} &= 2.5 \times 2.5 \times 2.5 \\ &= 6.25 \times 2.5 \\ &= 15.625\end{aligned}$$

$$15.625 \text{ cm}^3$$

4

The cross-section of a prism is a right-angled triangle with base 8 cm and height 5 cm.
The length of the prism is 12 cm.
Work out the volume of the prism.



(3 marks)

$$\text{Area of the triangular cross-section} = \frac{1}{2} \times 8 \times 5 = 20 \text{ cm}^2$$

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

$$\text{Volume} = 20 \times 12 = 240 \text{ cm}^3$$

A prism has the same cross-section all along its length. Imagine stacking identical thin slices: cross-sectional area $\times$ length gives the volume

$$240 \text{ cm}^3$$

5

A box of chocolates is a triangular prism.

The triangle at the end has a base of 10 cm and a height of 6 cm. The box is 15 cm long.

Work out the volume of the box.

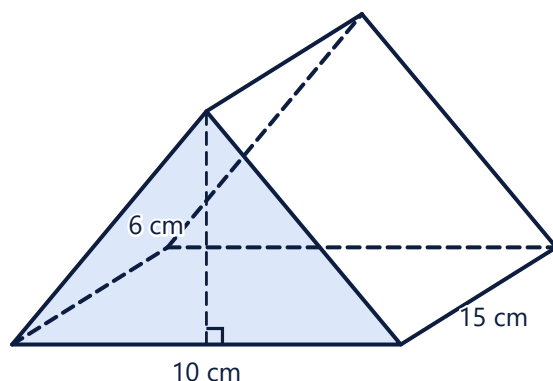


Diagram NOT accurately drawn

(2 marks)

Area of the triangle

$$A = \frac{1}{2} \times 10 \times 6$$

$$= 30 \text{ cm}^2$$

Volume = area $\times$ length

$$V = 30 \times 15$$

$$= 450$$

$$450 \text{ cm}^3$$

6

A cuboid has a volume of 180 cm^3 .

The base of the cuboid measures 6 cm by 5 cm.

Work out the height of the cuboid.

(3 marks)

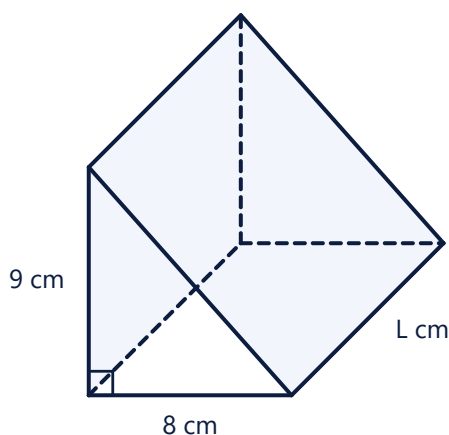
$$\text{Area of the base} = 6 \times 5 = 30 \text{ cm}^2$$

$$\text{Volume} = \text{base area} \times \text{height, so } 30 \times \text{height} = 180$$

$$\text{Height} = 180 \div 30 = 6 \text{ cm}$$

$$6 \text{ cm}$$

- 7 The cross-section of this prism is a right-angled triangle with base 8 cm and height 9 cm.
The volume of the prism is 360 cm^3 .
Work out the length, L , of the prism.



(3 marks)

Area of the triangle

$$A = \frac{1}{2} \times 8 \times 9$$

$$= 36 \text{ cm}^2$$

Volume = area $\times$ length

$$36L = 360$$

$$\div 36 \quad L = 10 \quad \div 36$$

$$L = 10 \text{ cm}$$

- 8 Ayesha has a cube of modelling clay with edges of 6 cm.
She reshapes all of the clay into a cuboid. The cuboid is 8 cm long and 3 cm wide.
Work out the height of the cuboid.

(3 marks)

Volume of the cube

$$V = 6 \times 6 \times 6$$

$$= 216 \text{ cm}^3$$

Same volume for the cuboid

$$8 \times 3 \times h = 216$$

$$24h = 216$$

$$\div 24 \quad h = 9 \quad \div 24$$

$$9 \text{ cm}$$

9

A doorstep is a triangular prism. Its cross-section is a right-angled triangle with shorter sides 6 cm and 4 cm. The doorstep is 15 cm long.

A cuboid has the same volume as the doorstep. The base of the cuboid measures 5 cm by 3 cm.

Work out the height of the cuboid.

(3 marks)

Area of the triangle

$$A = \frac{1}{2} \times 6 \times 4$$

$$= 12 \text{ cm}^2$$

Volume of the doorstep

$$V = 12 \times 15$$

$$= 180 \text{ cm}^3$$

Cuboid has the same volume

$$5 \times 3 \times h = 180$$

$$15h = 180$$

$$\div 15 \quad h = 12 \quad \div 15$$

12 cm

10

A box is a cuboid measuring 60 cm by 40 cm by 30 cm.

Packets of tea are cuboids measuring 10 cm by 8 cm by 6 cm.

The packets are packed into the box so that they fill it completely with no gaps.

Work out the number of packets that fill the box.

(4 marks)

Along the 60 cm edge

$$60 \div 10 = 6 \text{ packets; along the 40 cm edge: } 40 \div 8 = 5$$

$$\text{packets; along the 30 cm edge: } 30 \div 6 = 5 \text{ packets}$$

$$\text{Number of packets} = 6 \times 5 \times 5 = 150$$

Check by volume

$$60 \times 40 \times 30 = 72000 \text{ cm}^3 \text{ and } 10 \times 8 \times 6 = 480 \text{ cm}^3; 72000 \div 480 = 150$$

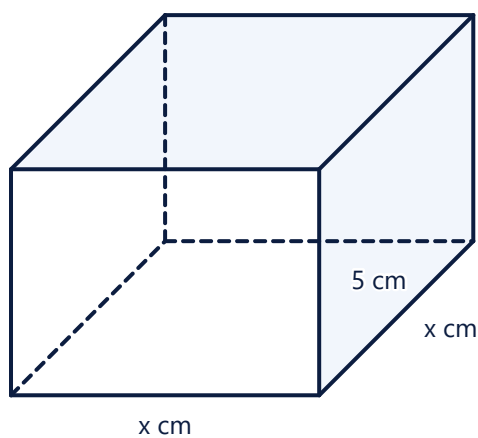
150

11

A cuboid has a square base with sides of x cm. The height of the cuboid is 5 cm.

The volume of the cuboid is 180 cm^3 .

Work out the value of x .



(3 marks)

$$\begin{array}{rcl}
 x \times x \times 5 & = & 180 \\
 5x^2 & = & 180 \\
 \div 5 & & \div 5 \\
 x^2 & = & 36 \\
 \sqrt{} & & \sqrt{} \\
 x & = & 6
 \end{array}$$

$x = 6$