



- 1 A cube has sides of length 5 cm.
Work out the volume of the cube.

(1 mark)

$$V = 5 \times 5 \times 5$$

$$V = 125 \text{ cm}^3$$

- 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)

$$\text{Volume of a cuboid} = \text{length} \times \text{width} \times \text{height}$$

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

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

- 3 A shipping container is a cuboid.
It is 2.5 m long, 1.2 m wide and 0.8 m high.
Work out the volume of the container. State the units of your answer.

(2 marks)

$$V = 2.5 \times 1.2 \times 0.8$$

$$2.5 \times 1.2 = 3$$

$$3 \times 0.8 = 2.4$$

$$V = 2.4 \text{ m}^3$$

- 4 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)

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

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

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

$$6 \text{ cm}$$

5

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

6

A crate is a cuboid measuring 1.2 m by 0.8 m by 0.75 m.

Boxes are cuboids measuring 30 cm by 20 cm by 25 cm.

The boxes fit into the crate exactly, with no gaps.

Work out how many boxes fill the crate.

(4 marks)

Same units: 1.2 m = 120 cm, 0.8 m = 80 cm, 0.75 m = 75 cm

$$\text{Crate} = 120 \times 80 \times 75 = 720\,000 \text{ cm}^3$$

$$\text{Box} = 30 \times 20 \times 25 = 15\,000 \text{ cm}^3$$

$$720\,000 \div 15\,000 = 48$$

48 boxes

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A fish tank is a cuboid with a base measuring 40 cm by 25 cm and a height of 20 cm.

The tank is filled with water to a depth of 15 cm.

All of the water is poured into cups. Each cup holds 250 ml.

Work out the number of cups that can be completely filled.

$$1 \text{ ml} = 1 \text{ cm}^3$$

(4 marks)

$$\text{Volume of water} = 40 \times 25 \times 15 = 15000 \text{ cm}^3$$

$$15000 \text{ cm}^3 = 15000 \text{ ml}$$

$$\text{Number of cups} = 15000 \div 250 = 60$$

60

8

A swimming pool is a cuboid 10 m long, 5 m wide and 1.5 m deep.

The empty pool is filled with water at a rate of 2.5 m^3 every minute.

Work out how many minutes it takes to fill the pool completely.

(3 marks)

$$V = 10 \times 5 \times 1.5 = 75 \text{ m}^3$$

$$\text{Time} = 75 \div 2.5$$

30 minutes

9

Three faces of a cuboid that meet at a vertex have areas 12 cm^2 , 8 cm^2 and 6 cm^2 .

Work out the volume of the cuboid.

(4 marks)

Let the edges be a , b and c , so $ab = 12$, $ac = 8$ and $bc = 6$

Multiplying

$$(ab)(ac)(bc) = (abc)^2 = 12 \times 8 \times 6 = 576$$

$$\text{Volume} = abc = \sqrt{576} = 24 \text{ cm}^3$$

Check

$a = 4$, $b = 3$, $c = 2$ gives face areas 12, 8 and 6 and volume 24
cm³

24 cm³

10

A water tank is a cuboid measuring 1.5 m by 0.8 m by 0.6 m.

The tank is empty. Dev fills the tank completely with water.

Water costs £1.25 for every 100 litres.

Work out the cost of the water needed to fill the tank.

$1 \text{ m}^3 = 1000 \text{ litres}$

(5 marks)

$$\text{Volume of the tank} = 1.5 \times 0.8 \times 0.6 = 0.72 \text{ m}^3$$

$$0.72 \text{ m}^3 = 0.72 \times 1000 = 720 \text{ litres}$$

$$720 \div 100 = 7.2 \text{ lots of } 100 \text{ litres}$$

$$\text{Cost} = 7.2 \times £1.25 = £9.00$$

£9.00

11

A cuboid has a base measuring 8 cm by 5 cm.

The volume of the cuboid is 320 cm^3 .

Work out the total surface area of the cuboid.

(5 marks)

Base area = $8 \times 5 = 40 \text{ cm}^2$, so the height = $320 \div 40 = 8 \text{ cm}$

The three different faces have areas $8 \times 5 = 40 \text{ cm}^2$, $8 \times 8 = 64 \text{ cm}^2$ and $5 \times 8 = 40 \text{ cm}^2$

Total surface area = $2 \times (40 + 64 + 40) = 2 \times 144 = 288 \text{ cm}^2$

288 cm^2