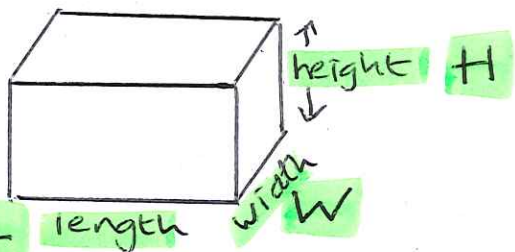


MATHSDIY

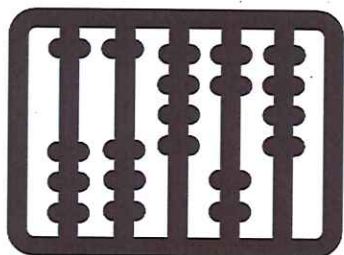
GCSE TOPIC BOOKLET VOLUME: THE BASICS

SOLUTIONS

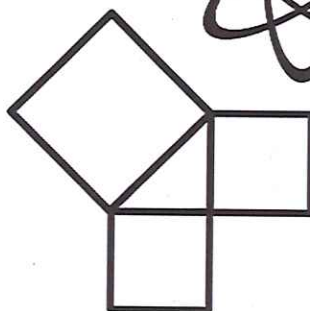
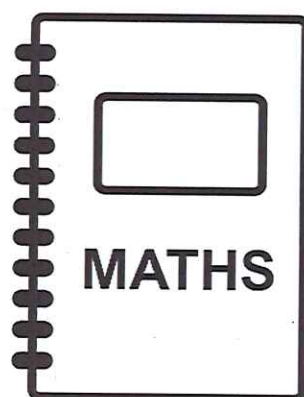
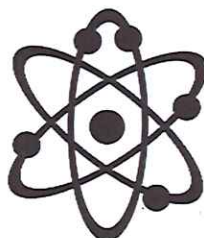
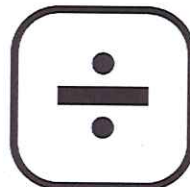
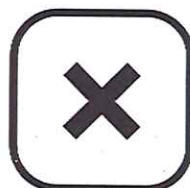
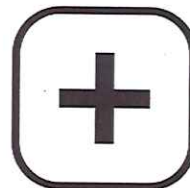
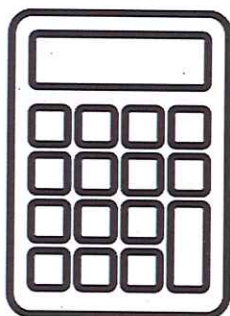
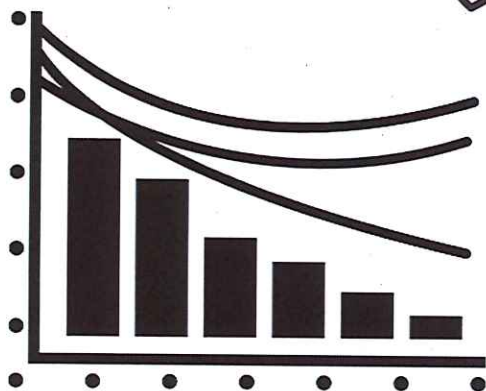


Volume of cuboid/cube = $L \times W \times H$

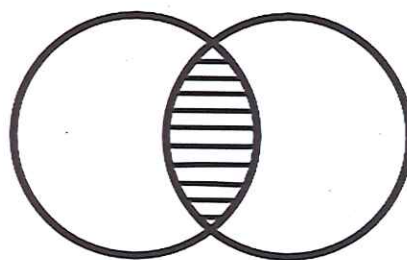
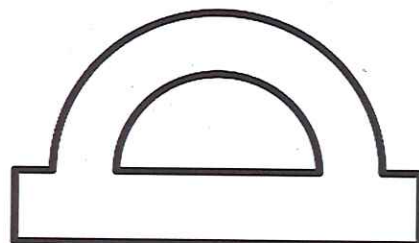
1 litre = 1000cm^3



π

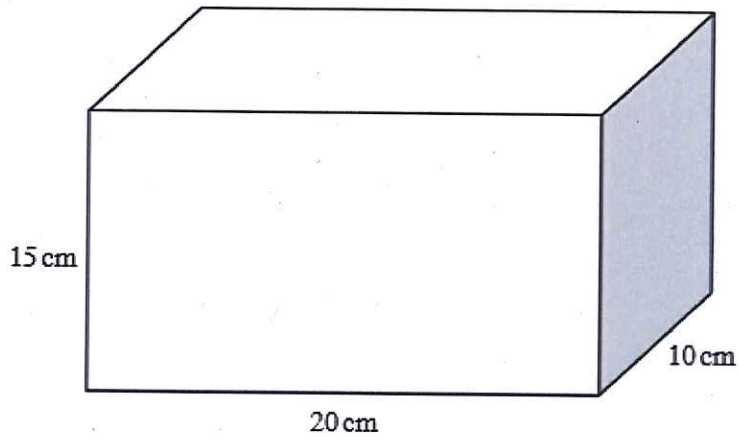


$$a^2 = b^2 + c^2$$



1.

(a)



A rectangular container, full of water, measures 20 cm by 15 cm by 10 cm.
Calculate the volume of water in the container.

$$V = L \times W \times H$$

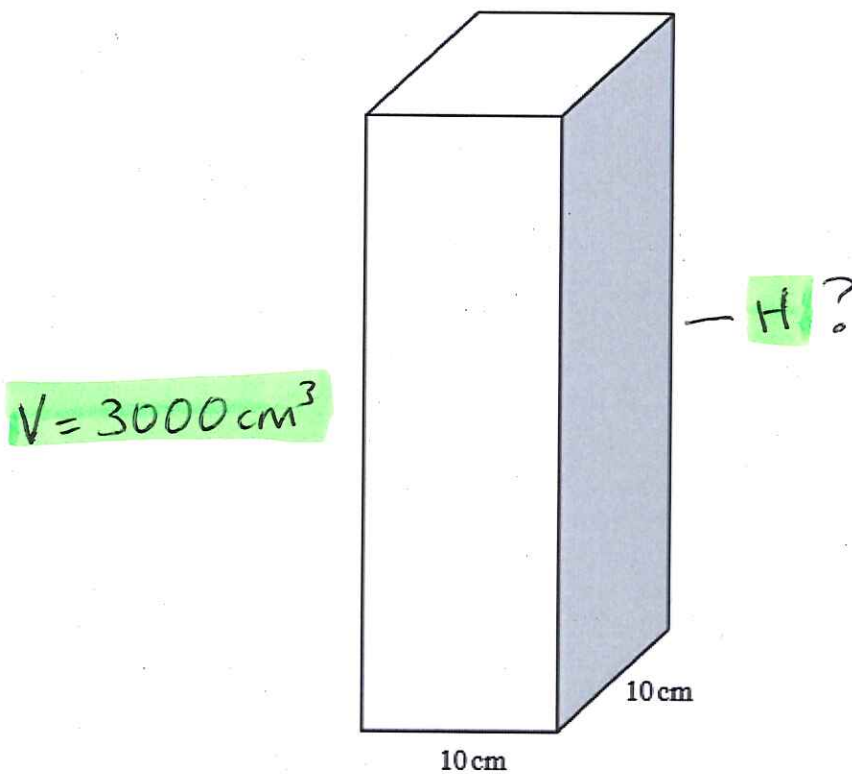
$$V = 20 \times 10 \times 15$$

$$V = 200 \times 15$$

$$V = 3000 \text{ cm}^3$$

[2]

- (b) All of the water is poured into a second container with a square base of side 10 cm.



Calculate the depth of the water in this container.

$$V = L \times W \times H$$

$$3000 = 10 \times 10 \times H$$

$$3000 = 100 \times H \quad (\div 100)$$

$$\frac{3000}{100} = H$$

[2]

$$\underline{\underline{H = 30 \text{ cm}^3}}$$

2. The diagram shows a number of cubes of side 1 cm forming a solid shape.

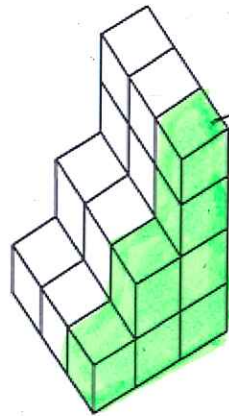


Diagram not drawn to scale

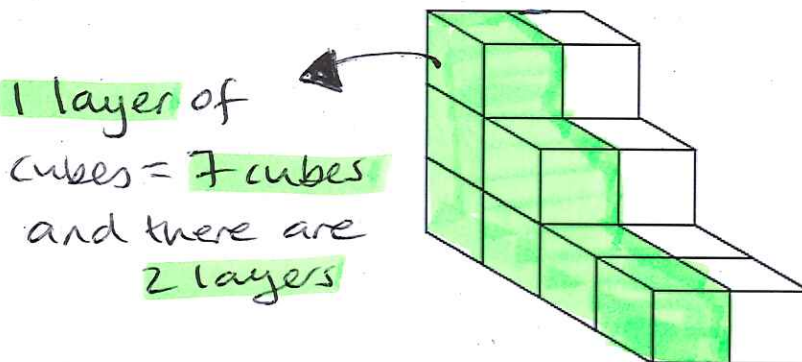
Find, by counting the cubes, the volume of the shape and state the units of your answer.

$$7 \times 3 = 21$$

Volume of the shape = 21 cm³

[2]

3. The diagram shows a number of cubes of side 1 cm forming a solid shape.



Find, by counting the cubes, the volume of the shape and state the units of your answer.

$$7 \times 2 = 14$$

Volume of the shape = 14 cm³

[2]

4.

A rectangular tank has a length of 20 cm, a width of 15 cm and a height of 10 cm. Water is poured into the tank until it is half full. Calculate the volume of the water in **litres**.

[4]

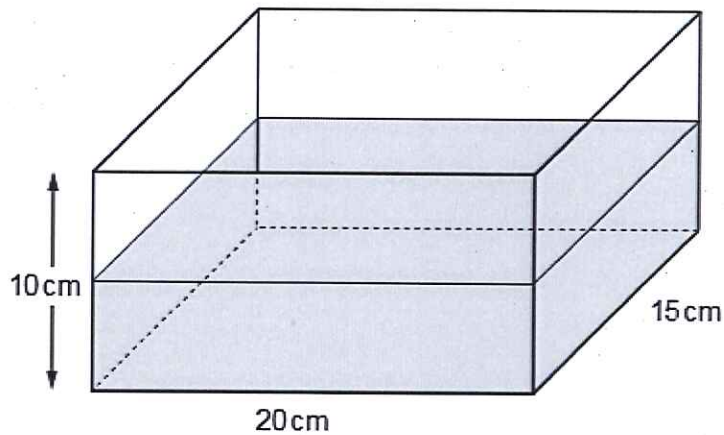


Diagram not drawn to scale

$$V = L \times W \times H$$

$$V = 20 \times 15 \times 10$$

$$V = 300 \times 10$$

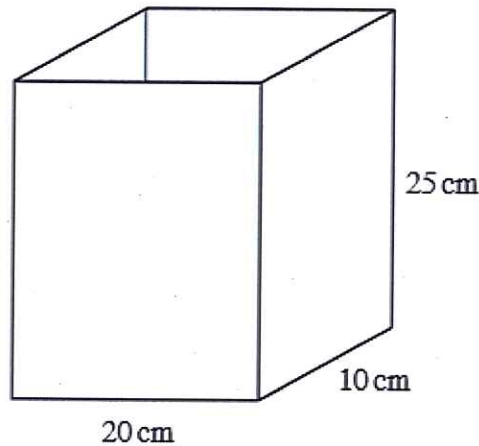
$$V = 3000 \text{ cm}^3$$

now, $1 \text{ litre} = 1000 \text{ cm}^3$

$$V = 3000 \text{ cm}^3 \div 1000$$

$$\underline{V = 3 \text{ litres}}$$

5.



- (a) A storage container, in the shape of a cuboid, measures 20 cm by 10 cm by 25 cm. Calculate the volume of the container, clearly indicating the units of your answer.

$$V = L \times W \times H$$

$$V = 20 \times 10 \times 25$$

$$V = 200 \times 25$$

$$V = \underline{\underline{5000 \text{ cm}^3}}$$

[3]

- (b) The container is used to store 4 litres of cooking oil. Calculate the distance of the surface of the cooking oil below the top of the container.

$$1 \text{ litre} = 1000 \text{ cm}^3$$

$$4 \text{ litres} = 4000 \text{ cm}^3$$

Need to calculate a 'new height' to get 4000 cm^3 as volume

$$V = L \times W \times H$$

$$4000 = 20 \times 10 \times H$$

$$4000 = 200 \times H$$

$$\frac{4000}{200} = H, \quad \underline{\underline{H = 20 \text{ cm}}}$$

[4]

6.

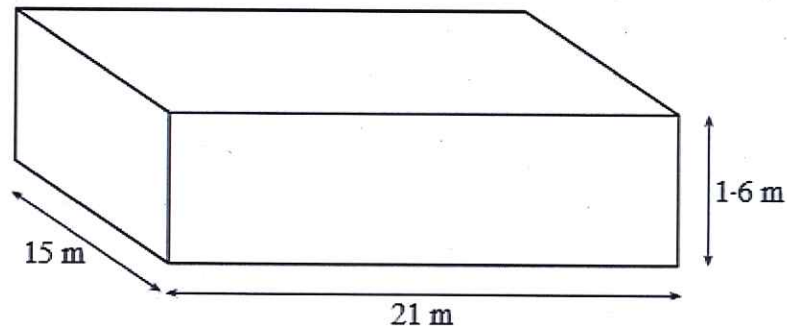


Diagram not drawn to scale.

A swimming pool in the shape of a cuboid has a base measuring 21 m by 15 m and a depth of 1.6 m.

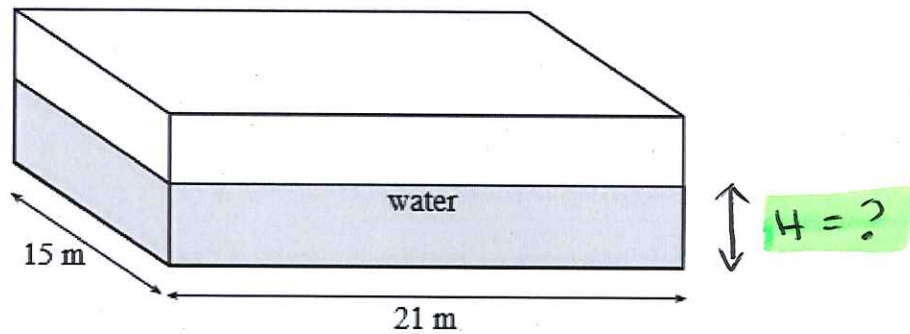
(a) Calculate the volume of the swimming pool.

$$V = L \times W \times H$$

$$V = 21 \times 15 \times 1.6 = 504 \text{ m}^3$$

[2]

(b)



When the volume of the water in the swimming pool is 377 m^3 , calculate the depth of the water, giving your answer to an appropriate degree of accuracy.

$$V = L \times W \times H$$

$$377 = 21 \times 15 \times H$$

$$377 = 315 \times H$$

$$377 \div 315 = H$$

$$H = 1.1968 \dots \text{ m}$$

$$H = 1.2 \text{ m (1dp)}$$

[2]

7.

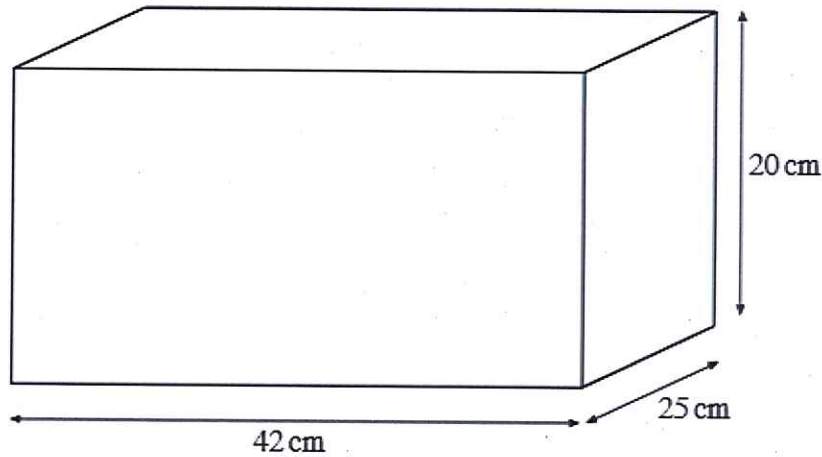


Diagram not drawn to scale.

A tank in the shape of a cuboid has a base measuring 42 cm by 25 cm and a height of 20 cm.

- (a) Calculate the volume of the tank.

$$V = L \times W \times H$$

$$V = 42 \times 25 \times 20 = 21,000 \text{ cm}^3$$

[2]

- (b) Water is poured into the tank.
The volume of the water is 8400 cm^3 .
Calculate the depth of the water in the tank.

$$V = L \times W \times H$$

$$8400 = 42 \times 25 \times H$$

$$8400 = 1050 \times H$$

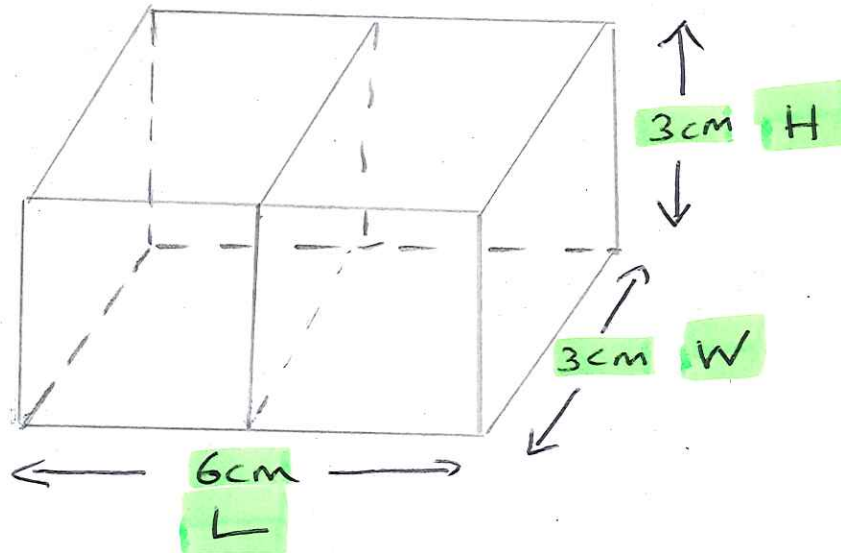
$$8400 \div 1050 = H$$

$$H = 8 \text{ cm}$$

[2]

8. (a) Two cubes, each with sides 3 cm, are stuck together by matching up two complete faces to form a cuboid.
Draw a sketch of the cuboid.

[2]



- (b) Find the volume of the cuboid.

$$V = L \times W \times H$$

$$V = 6 \times 3 \times 3$$

$$V = 18 \times 3$$

$$V = 54 \text{ cm}^3$$

[2]

9.

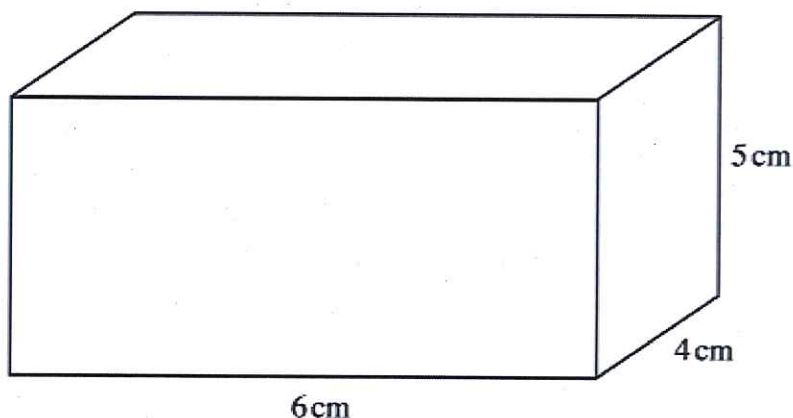


Diagram not drawn to scale.

Calculate the volume of the cuboid shown above, clearly stating the units of your answer.

$$V = L \times W \times H$$

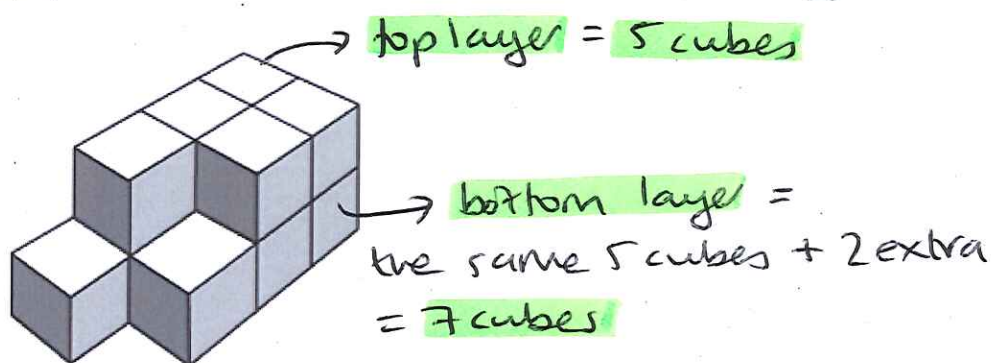
$$V = 6 \times 4 \times 5$$

$$V = 24 \times 5 = 120 \text{ cm}^3$$

[3]

10. The following solid shape is made up of cubes with sides of 1 cm.
What is the volume of the shape?
Give the units of your answer.
(There are no hidden gaps.)

[2]



$$5 + 7 = 12$$

$$\text{Volume} = 12 \text{ cm}^3$$

11.

- (a) Calculate the volume of a metal cuboid measuring 12 cm by 7 cm by 11 cm.

$$V = L \times W \times H$$

$$V = 12 \times 7 \times 11$$

$$V = 924 \text{ cm}^3$$

[2]

- (b) The above metal cuboid is melted down and made into a different cuboid, as shown below, with a base measuring 6 cm by 13 cm. Calculate the height h cm, of this cuboid, correct to 1 decimal place.

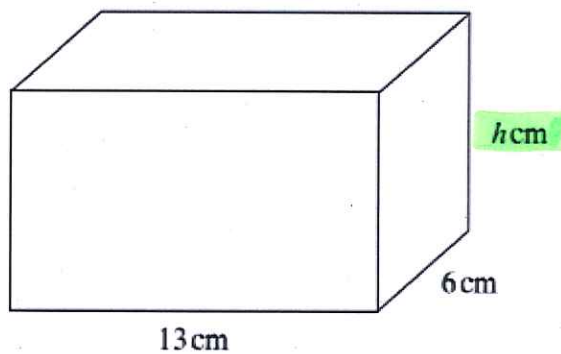


Diagram not drawn to scale

$$V = L \times W \times H$$

$$924 = 13 \times 6 \times H$$

$$924 = 78 \times H$$

$$924 \div 78 = H$$

$$H = 11.84615 \dots$$

[2]

$$\underline{\underline{\text{height} = 11.8 \text{ cm (1dp)}}}$$