Your notes

GCSE Maths: revision notes

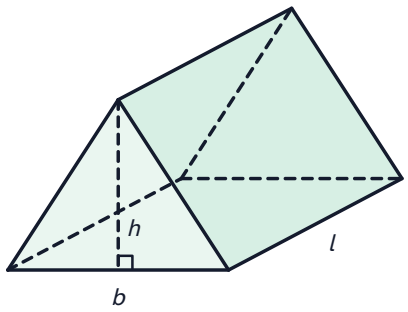
Volume and surface area

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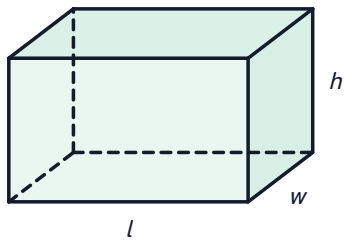
Volume of prisms

- A **prism** has the same **cross-section** all the way through. **Volume** = area of cross-section × length.
- Cuboid: length × width × height. **Cylinder**: $\pi r^2 h$.
- A **cylinder** with radius 3 cm and height 10 cm has a **volume** of $90\pi = 282.7$ cm^3.



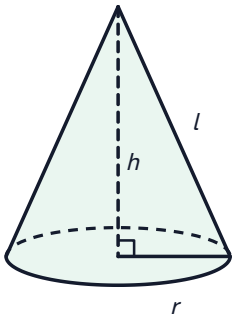
Surface area

- **Surface area** is the total area of all the faces. Sketch the net and add up the area of each face.
- Cuboid: $2(lw + lh + wh)$. **Cylinder**: $2\pi r^2 + 2\pi rh$ (two circles plus the curved surface).
- A 5 cm by 4 cm by 3 cm cuboid has a **surface area** of $2 \times (20 + 15 + 12) = 94$ cm^2.



Pyramids, cones and spheres

- Pyramid **volume** = ⅓ × base area × height. Cone **volume** = ⅓πr²h. Sphere **volume** = 4/3 πr³.
- Sphere **surface area** = 4πr². Curved **surface area** of a cone = πrl, where l is the **slant height**.
- These formulae are given in the exam, but you need to know how to use them.



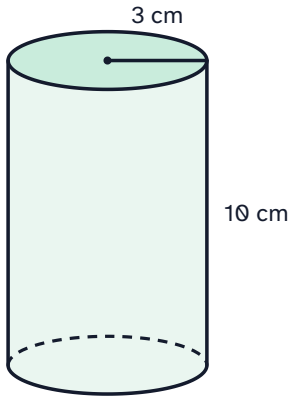
Units and capacity

- **Volume** is measured in cubic units, such as cm³ and m³.
- 1 cm³ = 1 ml, and 1000 cm³ = 1 litre.

Your notes

Worked examples

Find the volume of a cylinder with radius 3 cm and height 10 cm. Leave your answer in terms of π.



Volume of a prism = area of the cross-section × length. For a cylinder that's $\pi r^2 h$. **$V = \pi r^2 h$**

Put the numbers in. **$\pi \times 3^2 \times 10 = \pi \times 9 \times 10$**

Answer: 90π cm^3

Key terms

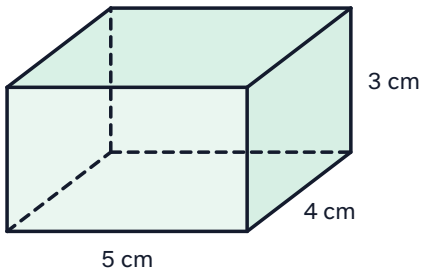
Prism	A 3D shape with the same cross-section all the way through.
Cross-section	The shape you see when you cut straight through a solid.
Volume	The amount of space inside a 3D shape.
Surface area	The total area of all the faces of a 3D shape.
Net	A flat shape that folds up to make a 3D shape.
Cylinder	A prism with a circular cross-section.
Slant height	The distance from the tip of a cone down its sloping side to the edge of the base.

Quick questions

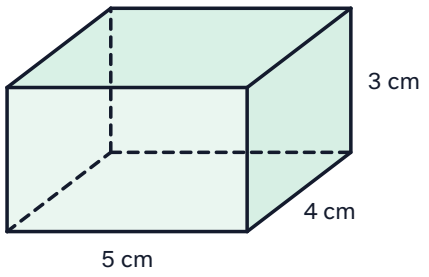
Cover the answers and test yourself: remembering is what makes it stick.

Your notes

1. What is the volume of a cuboid 5 cm by 4 cm by 3 cm?

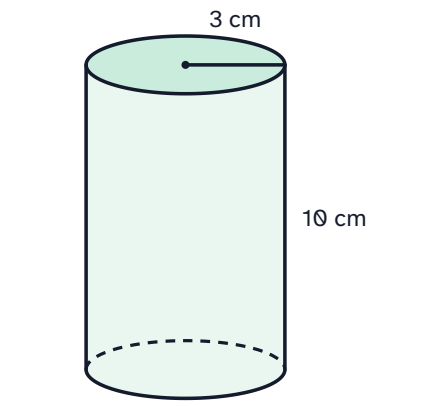


2. What is the surface area of a cuboid 5 cm by 4 cm by 3 cm?



3. How do you find the volume of a prism?

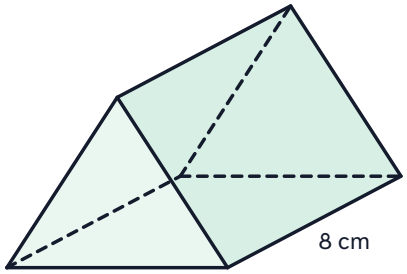
4. What is the volume of a cylinder with radius 3 cm and height 10 cm, to 1 d.p.?



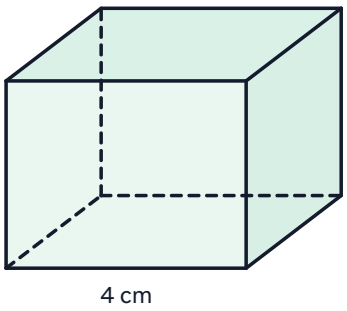
5. How many cm^3 are in 1 litre?

Your notes

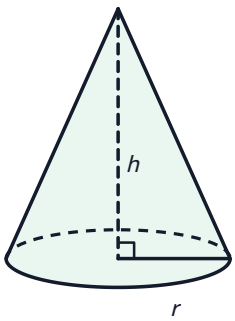
6. A prism has a cross-section with an area of 12 cm^2 and a length of 8 cm. What is its volume?



7. What is the volume of a cube with sides of 4 cm?



8. What is the formula for the volume of a cone?



Answers

1. 60 cm^3
2. 94 cm^2
3. Area of the cross-section multiplied by the length
4. 282.7 cm^3
5. 1000
6. 96 cm^3
7. 64 cm^3
8. $\frac{1}{3}\pi r^2 h$

Your notes

What to do next

Practise 12 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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