

Mensuration

Cambridge IGCSE Maths (0580) · Knowledge organiser

KEY DEFINITIONS

Perimeter

The total distance around the outside of a shape.

Area

The amount of flat space a shape covers, in square units.

Volume

The amount of space a solid takes up, in cubic units.

Sector

The part of a circle between two radii and an arc.

YOU SHOULD BE ABLE TO...

- Convert between metric units of length, area, volume and capacity, such as m^2 to cm^2 and cm^3 to litres.
- Calculate the circumference and area of a circle, giving answers to a set accuracy or in terms of π , and find a radius from an area.
- Calculate the surface area and volume of cuboids, prisms and cylinders, including problems such as filling a container.
- Find perimeters and areas of compound shapes and parts of shapes, such as a segment or a shape with a semicircle removed.
- Find arc lengths and areas of major and minor sectors, and work backwards to find the angle or the radius from a given arc or area.
- Practise giving exact answers without a calculator, using exact trigonometric values and leaving answers in terms of π .

COMMON MISTAKES

- ✗ Mixing units in area and volume
- ✗ Map scales: not converting centimetres to kilometres
- ✗ Area of a trapezium: the formula is not on the formula list

KEY FORMULAS

B = given in the exam (formula booklet or list); learn the rest.

Triangle **B** $A = \frac{1}{2}bh$

Parallelogram; trapezium $A = bh; A = \frac{1}{2}(a+b)h$

Circle **B** $A = \pi r^2, C = 2\pi r$

Arc; sector (angle θ) $\text{arc} = \frac{\theta}{360} \times 2\pi r, \text{sector} = \frac{\theta}{360} \times \pi r^2$

Curved surface: cylinder; cone (slant l) **B** $A = 2\pi rh; A = \pi rl$

Sphere, surface area **B** $A = 4\pi r^2$

Prism; pyramid **B** $V = Al; V = \frac{1}{3}Ah$

Cylinder; cone **B** $V = \pi r^2 h; V = \frac{1}{3}\pi r^2 h$

Sphere, volume **B** $V = \frac{4}{3}\pi r^3$

WORKED EXAMPLE

A cylinder has radius 3 cm and height 10 cm. Find its volume, leaving your answer in terms of π .

1. $V = \pi r^2 h$

2. $V = \pi \times 9 \times 10$

Answer: $90\pi \text{ cm}^3$ (about 283 cm^3)