

UNIT 13 *Areas*

Introduction to SIM

Learning objectives

The work in this unit is focused on the very important topic of areas. After completing this unit of STUDENT INSTRUCTIONAL MATERIAL (SIM) you should be able to

- use formulae to calculate the areas of *squares*, *rectangles* and *triangles*
- understand and calculate the area and circumference of a *circle*
- use formulae to calculate the areas of *parallelograms*, *trapeziums* and *kites*
- calculate the surface areas of solids including *cuboids*, *cylinders* and *spheres*
- find the arc length and area of a *sector* of a circle.

Key points and principles

- There are formulae for the area of many 2D shapes. You should be familiar with these and able to use the formulae in contexts and with compound shapes.
- The formulae for sector area and arc length can be derived from the formula for circles.
- Always be careful to ensure that units used are consistent throughout.

Glossary of terms

Area of 2D shape

For example, area of circle = πr^2

Surface area of 3D shape

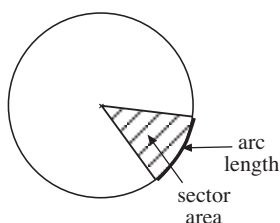
For example, surface area of cuboid = $2(ab + bc + ca)$

surface area of a cylinder = $2\pi r^2 + 2\pi rh$

surface area of a sphere = $4\pi r^2$

Sector area

Arc length



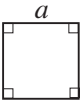
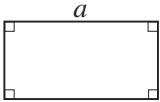
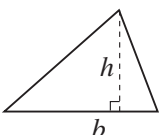
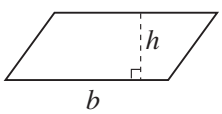
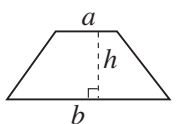
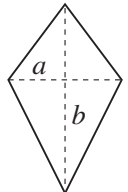
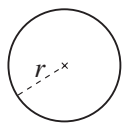
Chord (a straight line joining any two points on a curve)

UNIT 13 Areas

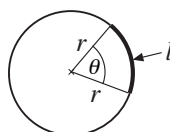
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Facts to remember

Whilst many of the formulae below are given on a fact sheet in your examination, it is much better if you are fully familiar with them and can remember them.

Shape	Sketch	Area
Square		a^2
Rectangle		ab
Triangle		$\frac{1}{2}bh$
Parallelogram		bh
Trapezium		$\frac{1}{2}(a + b)h$
Kite		$\frac{1}{2}ab$
Circle		πr^2 (and circumference = $2\pi r$)

Arc length of sector



$$l = \frac{\theta}{360} \times 2\pi r$$

Area of sector

$$A = \frac{\theta}{360} \times \pi r^2$$