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2D Perimeter and Area

IGCSE Mathematics

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Quality Mathematics Education for Students

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1 Introduction

Note

Perimeter and area are two of the most fundamental and frequently tested topics at IGCSE level. They appear not only in pure geometry questions, but also in real-world contexts such as fencing a garden, tiling a floor, or painting a wall.

In this chapter, we will explore:

- The difference between perimeter and area
- Units of measurement and unit conversions
- Perimeter and area of rectangles, triangles, parallelograms, and trapezoids
- Circumference and area of circles
- Sectors and arcs of circles
- Composite shapes (combining multiple shapes)
- Shaded region problems
- Real-world applications

2 Key Definitions

Definition

The **perimeter** of a 2D shape is the **total length of its boundary** — the distance you would travel if you walked all the way around the outside edge of the shape. Perimeter is measured in **units of length**: mm, cm, m, km, etc.

Definition

The **area** of a 2D shape is the **amount of space it covers** (or encloses) in a flat plane.

Area is measured in **square units**: mm^2 , cm^2 , m^2 , km^2 , etc.

Note

A helpful way to remember the difference:

- **Perimeter** = the fence around a garden (it goes around the edge)
- **Area** = the grass inside the garden (it covers the surface)

These are entirely different quantities and must **never be confused**. Always check which one the question is asking for.

3 Units of Measurement and Conversions

Unit Conversions for Length

$$1 \text{ cm} = 10 \text{ mm}$$

$$1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$$

$$1 \text{ km} = 1000 \text{ m}$$

Unit Conversions for Area

Since area involves **two** dimensions, conversions are squared:

$$1 \text{ cm}^2 = 100 \text{ mm}^2 \quad (\text{because } 10 \times 10 = 100)$$

$$1 \text{ m}^2 = 10,000 \text{ cm}^2 \quad (\text{because } 100 \times 100 = 10,000)$$

$$1 \text{ km}^2 = 1,000,000 \text{ m}^2 \quad (\text{because } 1000 \times 1000 = 1,000,000)$$

Warning

Common Mistake: Forgetting that area conversions are squared!

Many students write $1 \text{ m}^2 = 100 \text{ cm}^2$ because $1 \text{ m} = 100 \text{ cm}$. This is **wrong**.

Correct: $1 \text{ m}^2 = 10,000 \text{ cm}^2$

A square that is $1 \text{ m} \times 1 \text{ m}$ is the same as $100 \text{ cm} \times 100 \text{ cm} = 10,000 \text{ cm}^2$.

Preview ends here

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