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Triangles

IGCSE Mathematics

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1 Introduction to Triangles

Note

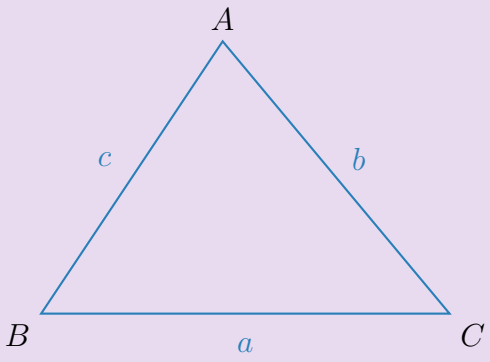
Triangles are one of the most fundamental shapes in geometry. They appear throughout mathematics, engineering, architecture, and nature. A solid understanding of triangle properties is essential for success in IGCSE examinations and provides the foundation for trigonometry and more advanced geometry.
In this chapter, we will explore:

- What defines a triangle
- Types of triangles (classified by sides and by angles)
- Angle properties of triangles
- Exterior angle theorem
- Area of triangles
- Pythagoras' Theorem
- Triangle inequality
- Real-world applications

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Definition

A **triangle** is a closed two-dimensional shape with three straight sides and three angles.
We label a triangle using its three vertices (corners). For example, triangle ABC is written as $\triangle ABC$.



Convention: The side opposite vertex A is labelled a, the side opposite vertex B is labelled b, and the side opposite vertex C is labelled c.

Note

Key Properties of All Triangles:

- Every triangle has exactly 3 sides, 3 vertices, and 3 interior angles
- The sum of the interior angles is always 180
- The sum of any two sides must be greater than the third side (Triangle Inequality)
- The longest side is always opposite the largest angle

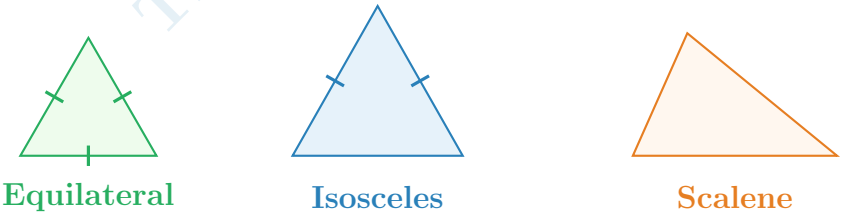
2 Types of Triangles by Sides

Definition

Triangles can be classified by the lengths of their sides:

- **Equilateral triangle:** All three sides are equal in length. All three angles are 60.
- **Isosceles triangle:** Exactly two sides are equal in length. The angles opposite the equal sides (called **base angles**) are also equal.
- **Scalene triangle:** All three sides are different lengths. All three angles are different.

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Properties of Isosceles Triangles

In an isosceles triangle:

- The two base angles are equal
- The line from the apex (top vertex) perpendicular to the base bisects both the base and the apex angle
- This perpendicular line is a line of symmetry

Preview ends here

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