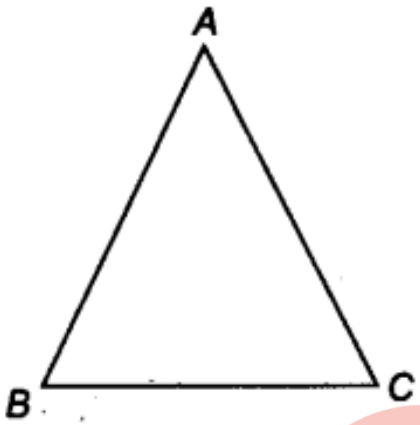
9th Standard-Maths

Triangles

1. **Triangle:** A closed figure formed by three intersecting lines is called a triangle ('Tri' means 'three'). A triangle has three sides, three angles and three vertices.



e.g., In triangle ABC, denoted as ΔABC. AB, BC, CA are the three sides, ∠A, ∠B, ∠C are the three angles and A, B, C are three vertices.

2. **Congruence of Triangles:** Two triangles are congruent if the sides and angles of one triangle are equal to the corresponding sides and angles of the other triangle.

If ΔPQR is congruent to ΔABC, we write ΔPQR = ΔABC.

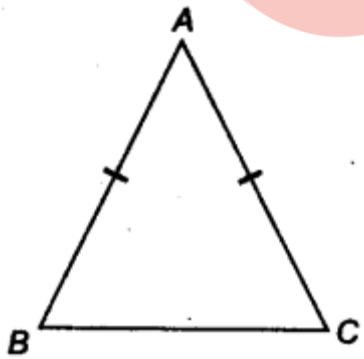
Note: Congruent triangles corresponding parts are equal and we write in short 'CPCT' for Corresponding Parts of Congruent Triangles.

3. Criteria for Congruence of Triangles.

- **SAS congruence rule:** Two triangles are congruent if two sides and the included angle of one triangle are equal to the sides and the included angle of the other triangle.
- **ASA congruence rule:** Two triangles are congruent if two angles and the included sides of one triangle are equal to two angles and the included side of another triangle.
- **AAS congruence rule:** Two triangles are congruent if any two pairs of angles and one pair of corresponding sides are equal.
- **SSS congruence rule:** Two triangles are congruent if three sides of one triangle are equal to the sides of the other triangle.
- **RHS congruence rule:** If in two right triangles, hypotenuse and one side of a triangle are equal to the hypotenuse and one side of other triangles, then the two triangles are congruent.

4. Properties of a Triangle

- **Isosceles triangle:** A triangle in which two sides are equal is called an isosceles triangle. So, ΔABC is an isosceles triangle with AB = AC.



- **Theorem 1:** Angles opposite to equal sides of an isosceles triangle are equal.

  i.e., ∠B = ∠C

- **Theorem 2:** The sides opposite to equal angles of a triangle are equal. i.e., AB = AC

5. Inequalities in a Triangle

- If two sides of a triangle are unequal, the angle opposite to the longer side is larger (or greater).
- In any triangle, the side opposite to the larger (or greater) angle is longer (converse of (i)).
- The sum of any two sides of a triangle is greater than the third side, i.e., AB + BC > CA.