

# Summary of Chapter: Congruence of Triangles

## Introduction

- **Congruence** means two objects have the same shape and size.
- Examples: Two identical photographs, two ₹5 coins, or two toy models made from the same mold.

## Congruence in Geometry

### 1. Congruence of Line Segments

- Two line segments are congruent if they have the same length.

### 2. Congruence of Angles

- Two angles are congruent if they have the same measurement.

### 3. Congruence of Circles

- Two circles are congruent if they have the same radius.

### 4. Congruence of Squares and Rectangles

- Two squares are congruent if their sides are equal.
- Two rectangles are congruent if their lengths and breadths are equal.

## Congruence of Triangles

- **Definition:** Two triangles are congruent if their corresponding sides and angles are equal.
- **Notation:** If  $\triangle ABC \cong \triangle PQR$ , then:
  - **Sides:**  $AB = PQ$ ,  $BC = QR$ ,  $CA = RP$
  - **Angles:**  $\angle A = \angle P$ ,  $\angle B = \angle Q$ ,  $\angle C = \angle R$
- **CPCT (Corresponding Parts of Congruent Triangles):** When two triangles are congruent, all their corresponding parts are equal.

## Criteria for Congruence of Triangles

To prove two triangles are congruent, we don't need to compare all six elements (three sides and three angles). The following conditions are sufficient:

### 1. SSS (Side-Side-Side) Criterion

- If three sides of one triangle are equal to three sides of another, the triangles are congruent.

### 2. SAS (Side-Angle-Side) Criterion

- If two sides and the included angle of one triangle are equal to two sides and the included angle of another, the triangles are congruent.

### 3. ASA (Angle-Side-Angle) Criterion

- If two angles and the included side of one triangle are equal to two angles and the included side of another, the triangles are congruent.

### 4. AAS (Angle-Angle-Side) Criterion

- If two angles and a non-included side of one triangle are equal to the corresponding angles and side of another, the triangles are congruent.

### 5. RHS (Right Angle-Hypotenuse-Side) Criterion

- If the hypotenuse and one side of a right-angled triangle are equal to the hypotenuse and one side of another right-angled triangle, they are congruent.

### Key Points

- Congruent triangles are identical in shape and size.
- The order of corresponding vertices matters in congruence.
- AAA (Angle-Angle-Angle) **does not** guarantee congruence, as triangles may have the same angles but different sizes.
- CPCT can be used to prove additional properties once two triangles are proved congruent.

This summary provides a **quick revision** of all important concepts, helping you recall them faster! 🚀