

Chapter – 7

Congruence of Triangles

- **Congruence:** The relation of two objects being congruent is called congruence. Congruent objects are exact copies of one another.
- **Congruence of Plane Figures:** The method of superposition examines the congruence of plane figures. Two plane figures say F_1 and F_2 are said to be congruent, if the trace-copy of F_1 fits exactly on that of F_2 .
- **Congruence of Line Segments:** Two line segments, say \overline{AB} and \overline{CD} , are congruent, if they have equal lengths. We write this as $\overline{AB} = \overline{CD}$. However, it is common to write it as $\overline{AB} \cong \overline{CD}$.
- **Congruence of Angles:** Two angles, say $\angle ABC$ and $\angle PQR$, are congruent, if their measures are equal. We write this as $\angle ABC \cong \angle PQR$ or as $\angle ABC = m\angle PQ$ or simply as $\angle ABC = \angle PQR$.
- **Congruence of Triangles:** Two triangles are congruent if they are copies of each other and when superposed, they cover each other exactly.
- Congruent objects are exact copies of one another.
- The method of superposition examines the congruence of plane figures.
- Two plane figures, say, F_1 and F_2 are congruent if the trace-copy of F_1 fits exactly on that of F_2 . We write this as $F_1 \cong F_2$.
- Two line segments, say, \overline{AB} and \overline{CD} , are congruent if they have equal lengths. We write this as $\overline{AB} \cong \overline{CD}$. However, it is common to write it as $\overline{AB} = \overline{CD}$.
- Two angles, say, $\angle ABC$ and $\angle PQR$, are congruent if their measures are equal. We write this as $\angle ABC \cong \angle PQR$ or as $m\angle ABC = m\angle PQR$. However, in practice, it is common to write it as $\angle ABC = \angle PQR$.
- **SSS Congruence of two triangles:** Under a given correspondence, two triangles are congruent if the three sides of the one are equal to the three corresponding sides of the other.
- **SAS Congruence of two triangles:** Under a given correspondence, two triangles are congruent if two sides and the angle included between them in one of the triangles are equal to the corresponding sides and the angle included between them of the other triangle.

Key Notes

- **ASA Congruence of two triangles:** Under a given correspondence, two triangles are congruent if two angles and the side included between them in one of the triangles are equal to the corresponding angles and the side included between them of the other triangle.
- **RHS Congruence of two right-angled triangles:** Under a given correspondence, two right-angled triangles are congruent if the hypotenuse and a leg of one of the triangles are equal to the hypotenuse and the corresponding leg of the other triangle.
- **There is no such thing as AAA Congruence of two triangles:** Two triangles with equal corresponding angles need not be congruent. In such a correspondence, one of them can be an enlarged copy of the other. (They would be congruent only if they are exact copies of one another).