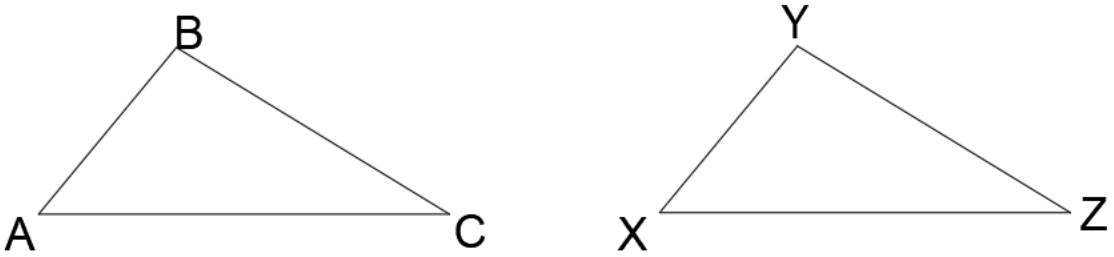
Congruent Triangles

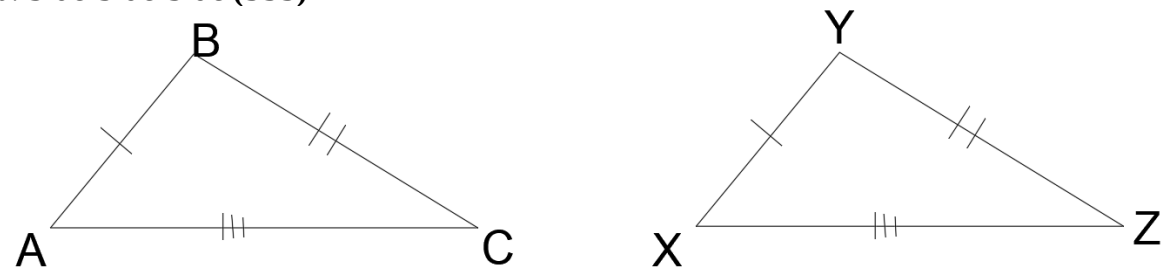


Congruent triangles are similar triangles. Here, the corresponding sides are also equal
AB = XY, BC = YZ, AC = XZ

Corresponding **P**arts (sides and angles) of **C**ongruent **T**riangles are also **C**ongruent
This is shortened to **CPCTC**

Conditions for congruency of triangles

a. **Side-Side-Side (SSS)**

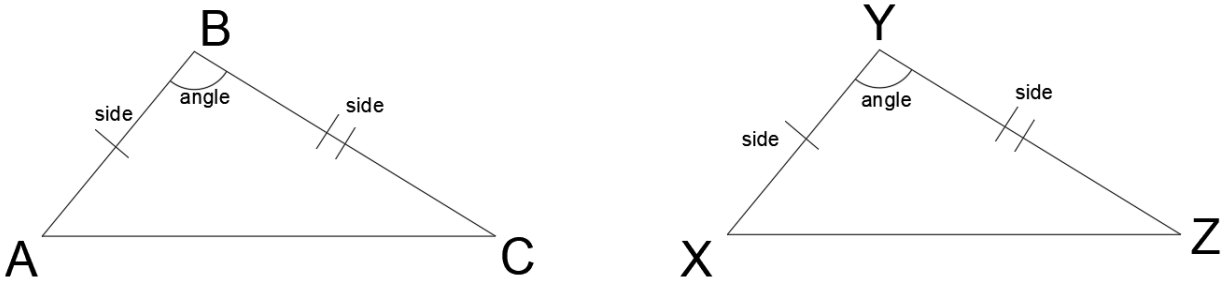


Two triangles are congruent if their corresponding sides are equal.
If AB = XY, BC = YZ, AC = XZ, then $\Delta ABC \text{ is congruent to } \Delta XYZ$

$$\Delta ABC \cong \Delta XYZ$$

b. **Side-Angle-Side (SAS)**

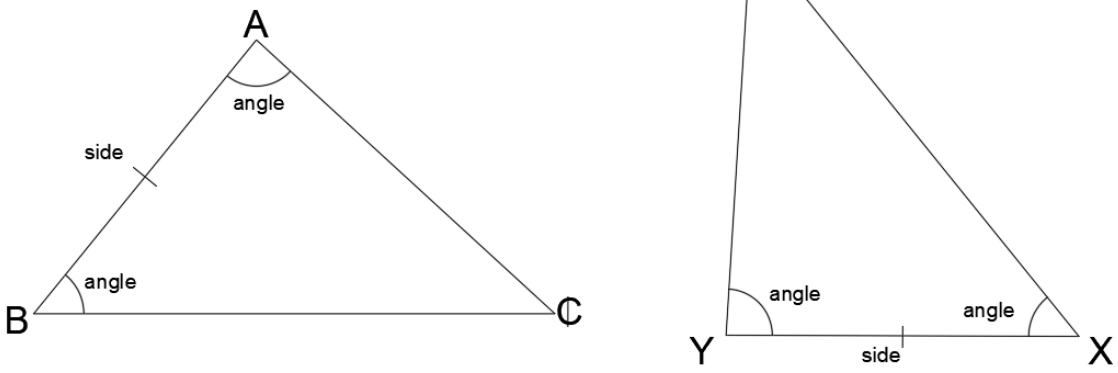
If the side, included angle, side of one triangle are equal to the side, included angle, side of another, both triangles are congruent.



Two triangles are congruent if -
- two corresponding sides are equal, AB = XY, BC = YZ
- the *included* angles are equal, $\angle ABC = \angle XYZ$

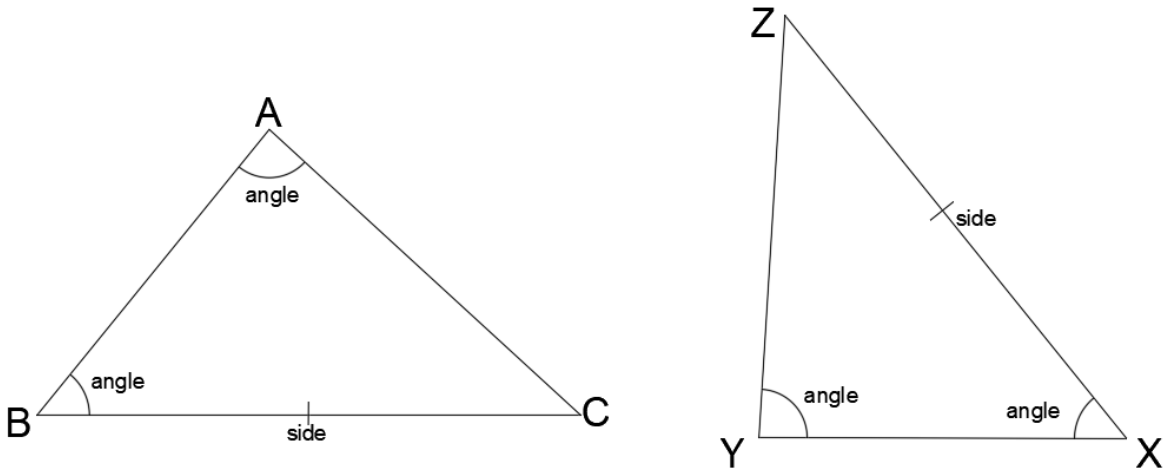
c. **Angle-Side-Angle (ASA)**

If the angle, included side, angle of one triangle are equal to the angle, included side, angle of another, both triangles are congruent.



Two triangles are congruent if -
- two corresponding angles are equal, $\angle CAB = \angle ZYX, \angle ABC = \angle YXZ$
- the *included* side is equal, AB = YX

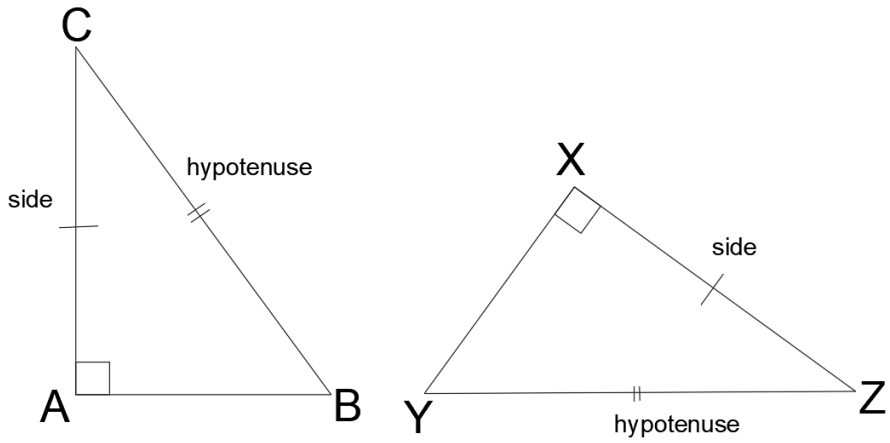
d. **Angle-Angle-Side (AAS)**
If two angles, and one of the sides of one triangle are equal to the two corresponding angles, and corresponding side of another, the triangles are congruent.



Two triangles are congruent if –
- two corresponding angles are equal, $\angle CAB = \angle ZYX, \angle ABC = \angle YXZ$
- one of the other sides of ABC is equal to one of the other sides of YXZ, BC = XZ

Difference between ASA and AAS:
In ASA, the side is *common* to both angles.
In AAS, the side touches *only one* of the two angles.

e. **Right-angle-Hypotenuse-Side (RHS)**
Two right angled triangles are congruent, if the hypotenuse and one side are equal to the hypotenuse and corresponding side of another are equal.



Note:
A triangle has six parameters – three angles and three sides
For congruency between two triangles, three parameters must match.