Class VII Mathematics

Congruence Of triangles

In geometry, two figures or objects are congruent if they have the same shape and size

The relation of two objects being congruent is called **congruence.**

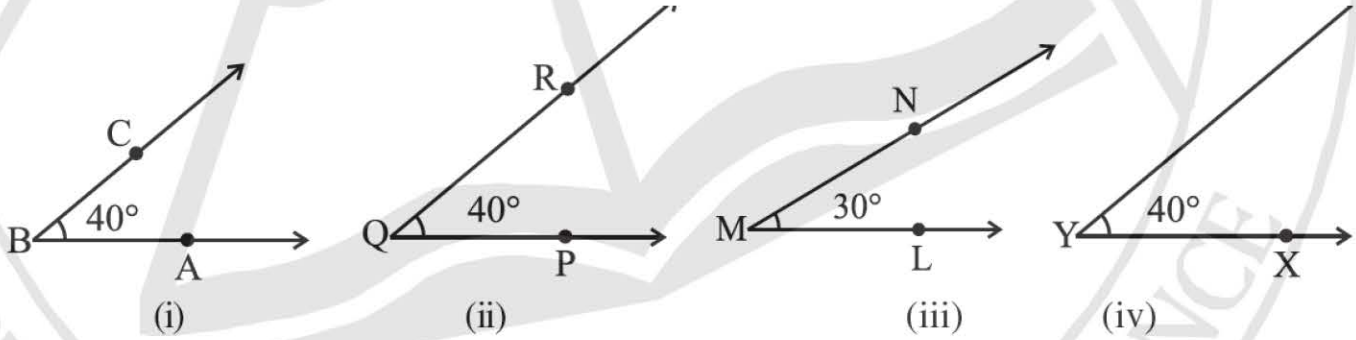
If two line segments have the same (i.e., equal) length, they are congruent. Also, if two line segments are congruent, they have the same length.

If the line segments are congruent. We write AB ≅ CD.

If two angles have the same measure, they are congruent.

Also, if two angles are congruent, their measures are same.

For the figure shown below



We write

∠ABC ≅ ∠XYZ (ii)

or $m\angle ABC = m\angle XYZ$

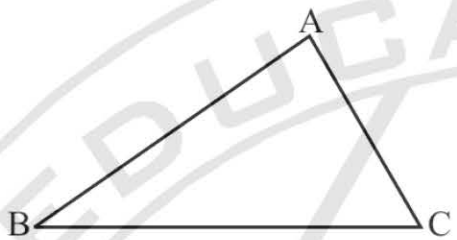
In view of (i) and (ii), we may even write

∠ABC ≅ ∠PQR ≅ ∠XYZ

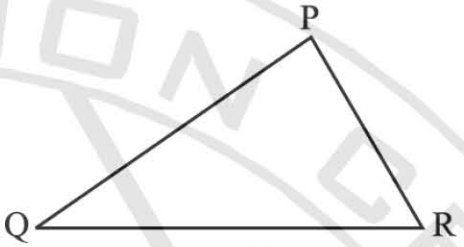
Congruence of triangles

If two triangles ABC and PQR, are of the same shape and size, they are congruent and we express it as

$\Delta ABC \cong \Delta PQR$



(i)



(ii)

This would also imply that

AB = PQ

BC = QR and

AC = PR

Also

Angle A = Angle P;

Angle B = Angle Q;

Angle C = Angle R;

This means

Corresponding vertices : A and P, B and Q, C and R.

Corresponding sides : $\overline{AB}$ and $\overline{PQ}$, $\overline{BC}$ and $\overline{QR}$, $\overline{AC}$ and $\overline{PR}$.

Corresponding angles : $\angle A$ and $\angle P$, $\angle B$ and $\angle Q$, $\angle C$ and $\angle R$.

CRITERIA FOR CONGRUENCE OF TRIANGLES

SSS Congruence criterion:

If under a given correspondence, the three sides of one triangle are equal to the three corresponding sides of another triangle, then the triangles are congruent

Consider triangles ABC and PQR, AB = 3.5 cm, BC = 7.1 cm, AC = 5 cm, PQ = 7.1 cm, QR = 5 cm and PR = 3.5 cm. We examine whether the two triangles are congruent or not.

We find that AB = PR

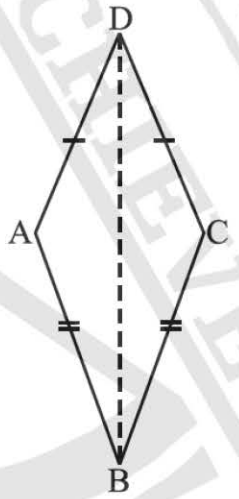
AC = QR

And BC = PQ

We hence conclude that the triangles are congruent

We represent this as $\Delta ABC \cong \Delta RPQ$

Q1) In the given figure, AD = CD and AB = CB.



i) State the three pairs of equal parts in ΔABD and ΔCBD.

ii) Is ΔABD $\cong$ ΔCBD? Why or why not?

iii) Does BD bisect $\angle$ABC? Give reasons