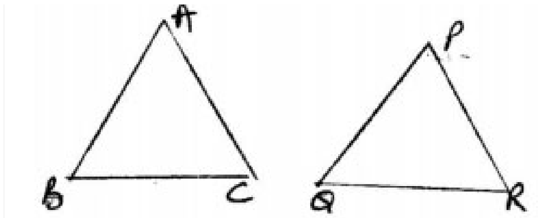
NCERT Class 9 Solutions: Triangles (Chapter 7) Exercise 7.3 – Part 1

Corresponding Parts of Congruent Triangle (CPCT)



CPCT means that the corresponding sides are equal and the corresponding angles are equal.

Q-1 ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (see Fig) . If AD is extended to intersect BC at P, show that

1. $\Delta ABD \cong \Delta ACD$
2. $\Delta ABP \cong \Delta ACP$
3. AP bisects $\angle A$ as well as $\angle D.$
4. AP is the perpendicular bisector of BC.

Solution:

Given, ΔABC and ΔDBC are two isosceles triangles.

1. In $\Delta ABD \cong \Delta ACD$ $AD = AD$ (Common line) $AB = AC$ (ΔABC is isosceles) $BD = CD$ (ΔDBC is isosceles)

Therefore, $\Delta ABD \cong \Delta ACD$ by SSS congruence condition

1. In $\Delta ABP \cong \Delta ACP$ $AP = AP$ (Common line) $\angle PAB = \angle PAC$ ($\Delta ABD \cong \Delta ACD$ so by CPCT) $AB = AC$ (ΔABC is isosceles) Therefore, $\Delta ABP \cong \Delta ACP$ by SAS congruence condition.
2. $\angle PAB = \angle PAC$ by Corresponding Parts of Congruent Triangles as $\Delta ABD \cong \Delta ACD$. AP bisects $\angle A$ … equation (1)

also, In ΔBPD and ΔCPD , $PD = PD$ (Common line) $BD = CD$ (ΔDBC is isosceles.) $BP = CP$ ($\Delta ABP \cong \Delta ACP$ so by Corresponding Parts of Congruent Triangle (CPCT)) .

Therefore, $\Delta BPD \cong \Delta CPD$ by SSS congruence condition.

Thus, $\angle BDP = \angle CDP$ by CPCT … equation (2) By (1) and (2) we can say that AP bisects $\angle A$ as well as $\angle D$.

1. $\angle BPD = \angle CPD$ (by CPCT as $\Delta BPD \cong \Delta CPD$) and $BP = CP$ … equation (3) also, $\angle BPD + \angle CPD = 180°$ (BC is a straight line.)

$$\Rightarrow 2\angle BPD = 180°$$

$\Rightarrow \angle BPD = 90°$ … equation (3)

From (1) and (2) ,

AP is the perpendicular bisector of BC.