

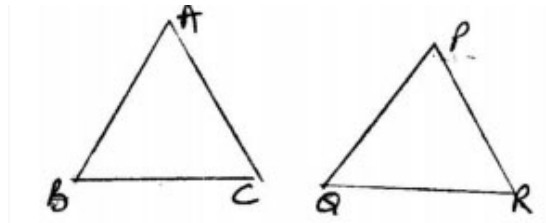
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NCERT Class 9 Solutions: Triangles (Chapter 7) Exercise 7.3 – Part 1

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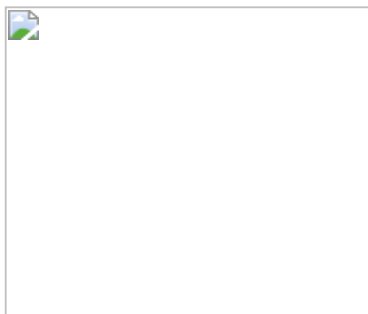
Corresponding Parts of Congruent Triangle (CPCT)



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

Q-1 $\triangle ABC$ and $\triangle DBC$ 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. $\triangle ABD \cong \triangle ACD$
2. $\triangle ABP \cong \triangle ACP$
3. AP bisects $\angle A$ as well as $\angle D$.
4. AP is the perpendicular bisector of BC.



Solution:

Given, $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles.

1. In $\triangle ABD \cong \triangle ACD$ $AD = AD$ (Common line) $AB = AC$ ($\triangle ABC$ is isosceles) $BD = CD$ ($\triangle DBC$ is isosceles)

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

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

also, In $\triangle BPD$ and $\triangle CPD$, $PD = PD$ (Common line) $BD = CD$ ($\triangle DBC$ is isosceles.) $BP = CP$ ($\triangle ABP \cong \triangle ACP$ so by Corresponding Parts of Congruent Triangle (CPCT)).

Therefore, $\triangle BPD \cong \triangle CPD$ 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 $\triangle BPD \cong \triangle CPD$) and $BP = CP$... equation (3) also,
 $\angle BPD + \angle CPD = 180^\circ$ (BC is a straight line.)
 $\Rightarrow 2\angle BPD = 180^\circ$
 $\Rightarrow \angle BPD = 90^\circ$... equation (3)

From (1) and (2),

AP is the perpendicular bisector of BC.