

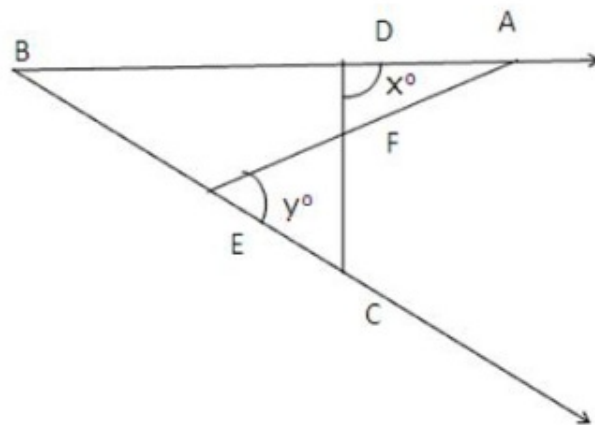


Exercise 5A

Question 17:

Given: $AB = BC$

and, $x^\circ = y^\circ$



To prove: $AE = CD$

Proof: In $\triangle ABE$, we have,

Exterior $\angle AEB = \angle EBA + \angle BAE$

$$\Rightarrow y^\circ = \angle EBA + \angle BAE$$

Again, in $\triangle BCD$ we have

$$x^\circ = \angle CBA + \angle BCD$$

Since, $x = y$ [Given]

$$\text{So, } \angle EBA + \angle BAE = \angle CBA + \angle BCD$$

$$\Rightarrow \angle BAE = \angle BCD$$

Thus in $\triangle BCD$ and $\triangle BAE$, we have

$$\angle B = \angle B \quad [\text{Common}]$$

$$BC = AB \quad [\text{Given}]$$

$$\text{and, } \angle BCD = \angle BAE \quad [\text{Proved above}]$$

Thus by Angle-Side-Angle criterion of congruence, we have

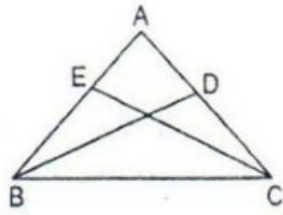
$$\triangle BCD \cong \triangle BAE$$

The corresponding parts of the congruent triangles are equal.

$$\text{So, } CD = AE \quad [\text{Proved}]$$

Question 18:

Given: A $\triangle ABC$ in which $AB = AC$ and
BD and CE are the bisectors of $\angle B$ and $\angle C$ respectively.



To prove: $BD = CE$

Proof: In $\triangle ABD$ and $\triangle ACE$

$$\angle ABD = \frac{1}{2} \angle B$$

and $\angle ACE = \frac{1}{2} \angle C$

But $\angle B = \angle C$ as $AB = AC$ [In Isosceles triangle, base angles are equal]

$$\Rightarrow \angle ABD = \angle ACE$$

$$AB = AC \quad [\text{Given}]$$

$$\angle A = \angle A \quad [\text{Common}]$$

Thus by Angle-Side-Angle criterion of congruence, we have

$$\triangle ABD \cong \triangle ACE \quad [\text{By ASA}]$$

The corresponding parts of the congruent triangles are equal.

$$\therefore BD = CE \quad [\text{C.P.C.T}]$$

***** END *****