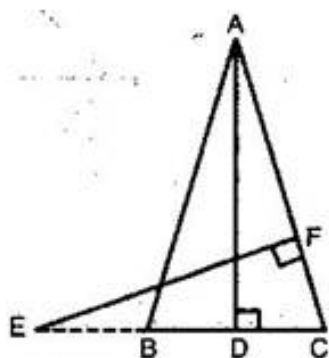




Exercise 6.3

11. In figure, E is a point on side CB produced of an isosceles triangle ABC with $AB = AC$. If $AD \perp BC$ and $EF \perp AC$, prove that $\triangle ABD \sim \triangle ECF$.



Ans. Here $\triangle ABC$ is isosceles with $AB = AC$

$$\therefore \angle B = \angle C$$

In $\triangle s$ ABD and ECF, we have

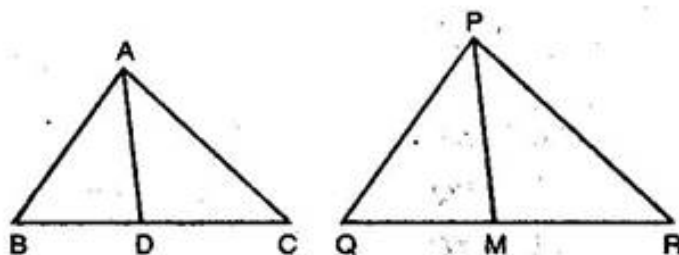
$$\angle ABD = \angle ECF [\because \angle B = \angle C]$$

$$\angle ABD = \angle ECF = 90^\circ [\because AD \perp BC \text{ and } EF \perp AC]$$

\therefore By AA-criterion of similarity, we have

$$\triangle ABD \sim \triangle ECF$$

12. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of a $\triangle PQR$ (see figure). Show that $\triangle ABC \sim \triangle PQR$.



Ans. Given: AD is the median of $\triangle ABC$ and PM is the median of $\triangle PQR$ such that

$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$$

To prove: $\triangle ABC \sim \triangle PQR$

Proof: $BD = \frac{1}{2} BC$ [Given]

And $QM = \frac{1}{2} QR$ [Given]

Also $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$ [Given]

$$\Rightarrow \frac{AB}{PQ} = \frac{2BD}{2QM} = \frac{AD}{PM}$$

$$\Rightarrow \frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$$

$\therefore \triangle ABD \sim \triangle PQM$ [By SSS-criterion of similarity]

$\Rightarrow \angle B = \angle Q$ [Similar triangles have corresponding angles equal]

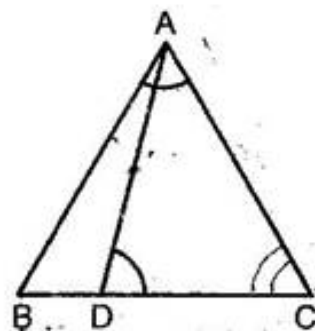
And $\frac{AB}{PQ} = \frac{BC}{QR}$ [Given]

\therefore By SAS-criterion of similarity, we have

$$\triangle ABC \sim \triangle PQR$$

13. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.CD$.

ANS. In triangles ABC and DAC,



$$\angle ADC = \angle BAC \text{ [Given]}$$

$$\text{and } \angle C = \angle C \text{ [Common]}$$

\therefore By AA-similarity criterion,

$$\triangle ABC \sim \triangle DAC$$

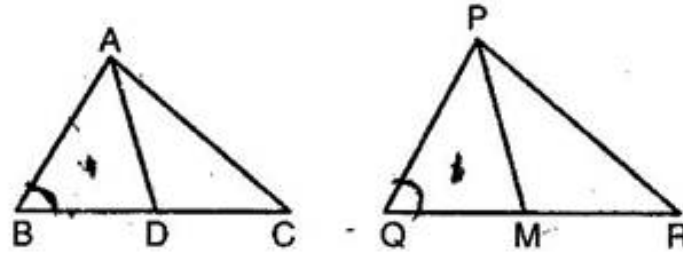
$$\Rightarrow \frac{AB}{DA} = \frac{BC}{AC} = \frac{AC}{DC}$$

$$\Rightarrow \frac{CB}{CA} = \frac{CA}{CD}$$

$$\Rightarrow CA^2 = CB.CD$$

14. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\triangle ABC \sim \triangle PQR$.

ANS. Given: AD is the median of $\triangle ABC$ and PM is the median of $\triangle PQR$ such that



$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$$

To prove: $\triangle ABC \sim \triangle PQR$

Proof: $BD = \frac{1}{2} BC$ [Given]

And $QM = \frac{1}{2} QR$ and $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$ [Given]

$$\Rightarrow \frac{AB}{PQ} = \frac{2BD}{2QM} = \frac{AD}{PM}$$

$$\Rightarrow \frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$$

$\therefore \triangle ABD \sim \triangle PQM$ [By SSS-criterion of similarity]

$\Rightarrow \angle B = \angle Q$ [Similar triangles have corresponding angles equal]

$$\text{And } \frac{AB}{PQ} = \frac{BC}{QR} \text{ [Given]}$$

\therefore By SAS-criterion of similarity, we have

$$\triangle ABC \sim \triangle PQR$$

***** END *****