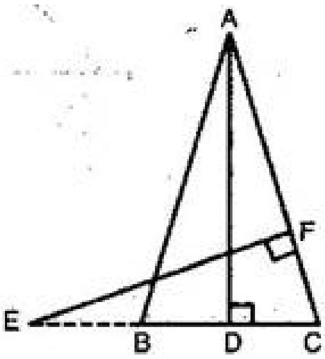
Exercise 6.3

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 ΔABD ~ ΔECF.



Ans. Here ΔABC is isosceles with AB = AC

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

In Δs ABD and ECF, we have

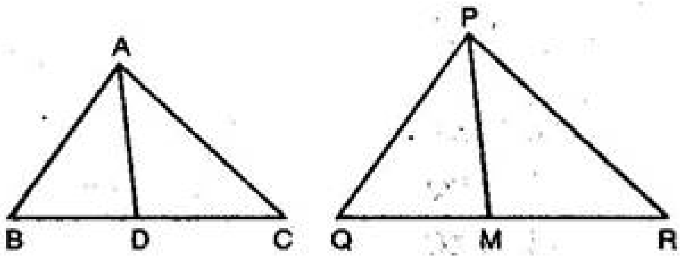
$\angle$ABD = $\angle$ECF[$\because$ $\angle$B = $\angle$C]

$\angle$ABD = $\angle$ECF = 90° [$\because$ AD $\perp$ BC and EF $\perp$ AC]

$\therefore$ By AA-criterion of similarity, we have

ΔABD ~ ΔECF

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 ΔPQR (see figure). Show that ΔABC ~ ΔPQR.



Ans. Given: AD is the median of Δ ABC and PM is the median of Δ PQR such that

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

To prove: Δ ABC ~ Δ 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]

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

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

$\therefore$ Δ ABD ~ Δ PQM[By SSS-criterion of similarity]

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

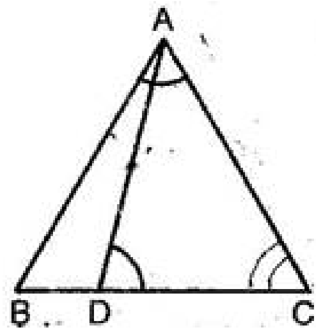
And $\frac{AB}{PQ} = \frac{BC}{QR}$ [Given]

$\therefore$ By SAS-criterion of similarity, we have

Δ ABC ~ Δ 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,



$\angle ADC = \angle BAC$ [Given]

and $\angle C = \angle C$[Common]

$\therefore$ By AA-similarity criterion,

$\Delta ABC \sim \Delta DAC$

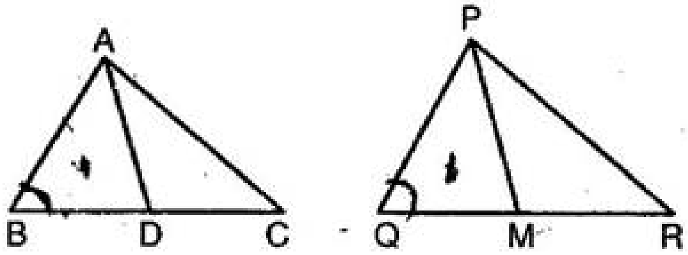
$$\Rightarrow \frac{AB}{DA} = \frac{BC}{AC} = \frac{AC}{DC}$$

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

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

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 $\Delta ABC \sim \Delta PQR$.

ANS. Given: AD is the median of Δ ABC and PM is the median of Δ PQR such that



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

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

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

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

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

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

$\therefore \Delta ABD \sim \Delta PQM$ [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

$\Delta ABC \sim \Delta PQR$

*********** END *********