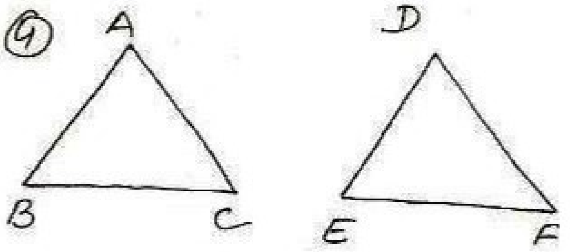
NCERT Sols by Dev Anoop (Bathinda)

Ex 6.4

(4)



given - In fig $\triangle ABC \sim \triangle DEF$

$ar(\triangle ABC) = ar(\triangle DEF)$

To Prove $\triangle ABC \cong \triangle DEF$

Proof $\triangle ABC \sim \triangle DEF$

$$\frac{ar(\triangle ABC)}{ar(\triangle DEF)} = \frac{AB^2}{DE^2}$$

$$\frac{ar(\triangle ABC)}{ar(\triangle ABC)} = \frac{AB^2}{DE^2}$$

[$\because ar(\triangle ABC) = ar(\triangle DEF)$]

$\Rightarrow AB^2 = DE^2$

$\Rightarrow AB = DE$

$\angle A = \angle D$

$\angle B = \angle E$ ($\triangle ABC \sim \triangle DEF$)

In $\triangle ABC$ and $\triangle DEF$

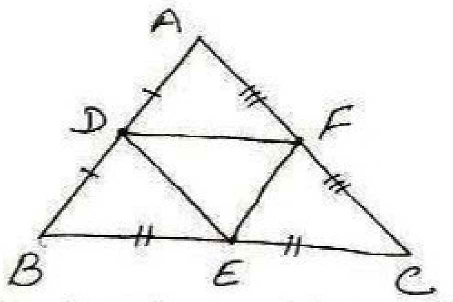
$\angle A = \angle D$

$AB = DE$ (Proved)

$\angle B = \angle E$

$\therefore \triangle ABC \cong \triangle DEF$ by ASA prop.

(5)



to find $\frac{ar(\triangle DEF)}{ar(\triangle ABC)}$

Solution

In $\triangle ABC$, DF joins midpts of sides AB and AC respectively

$DF = \frac{1}{2} BC$ [Midpt. theorem]

$\Rightarrow \frac{DF}{BC} = \frac{1}{2}$ ... (i)

Sim. $\frac{EF}{BA} = \frac{1}{2}$ ... (ii)

$\frac{DE}{AC} = \frac{1}{2}$ ... (iii)

From (i), (ii), (iii)

$$\frac{DF}{BC} = \frac{EF}{BA} = \frac{DE}{AC}$$

$\therefore \triangle EFD \sim \triangle ABC$ by SSS prop

$$\therefore \frac{ar(\triangle EFD)}{ar(\triangle ABC)} = \left(\frac{DF}{BC}\right)^2 = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$\therefore \frac{ar(\triangle DEF)}{ar(\triangle ABC)} = \frac{1}{4}$$