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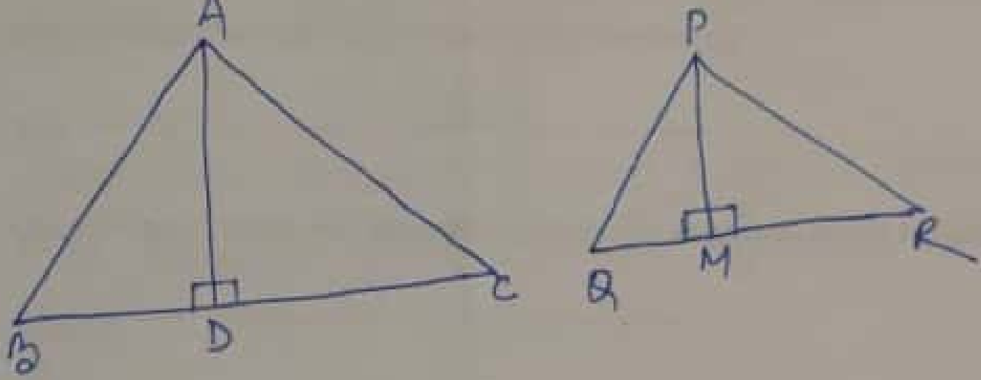
class – X Sub - Maths Date :- 15/09/2020.

## Theorem 6.6

The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.




Given :- $\triangle ABC \sim \triangle PQR$

To Prove :- $\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$

Const :- Draw $AD \perp BC$ and $PM \perp QR$.

Proof $\triangle ABD$ and $\triangle PQM$

$\angle B = \angle Q$ (Given $\triangle ABC \sim \triangle PQR$)

$\angle ADB = \angle PMQ = 90°$

$\triangle ABD \sim \triangle PQM$ (by A-A)

$\frac{AB}{PQ} = \frac{AD}{PM}$ (by C.P.S.T) ——— (1)

$\frac{AB}{PQ} = \frac{BC}{QR}$ ($\triangle ABC \sim \triangle PQR$) ——— (11)

from eqn (1) and (11)

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

$$\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{\cancel{\frac{1}{2}} \times BC \times AD}{\cancel{\frac{1}{2}} \times QR \times PM}$$

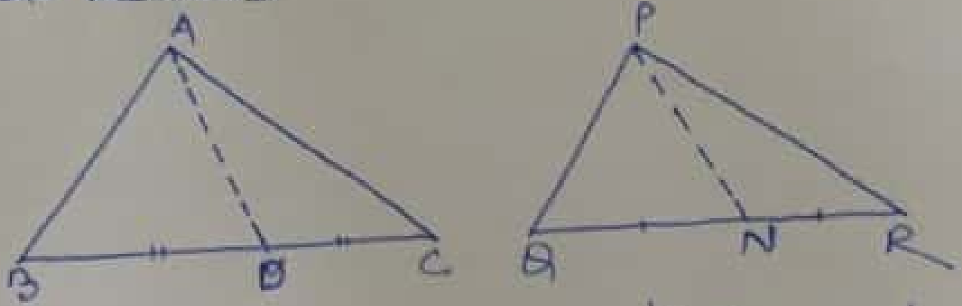
$$= \frac{BC}{QR} \times \frac{AD}{PM}$$

$$= \frac{BC}{QR} \times \frac{BC}{QR} = \frac{BC^2}{QR^2}$$

lly $\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$ Proved.

Corollary

Prove that the areas of two similar triangles is equal to the square of the ratio of their corresponding ~~side~~ medians.




Given :- AD and PM are medians of two similar triangles ABC and PQR.

To Prove $\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{AD^2}{PM^2}$

Proof $\triangle ABD$ and $\triangle PQN$.

$\angle B = \angle Q$ ($\triangle ABC \sim \triangle PQR$)

$\frac{AB}{PQ} = \frac{BC}{QR}$ ( " )

D and N are mid points of BC and QR

$\therefore \frac{AB}{PQ} = \frac{2BD}{2QN}$

$\frac{AB}{PQ} = \frac{BD}{QN}$

$\triangle ABD \sim \triangle PQN$ (by S-A-S)

$\frac{AB}{PQ} = \frac{AD}{PN}$ (by C.P.S.T.)

$\frac{AB^2}{PQ^2} = \frac{AD^2}{PN^2}$ (S.B.S) —— (i)

$\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{AB^2}{PQ^2}$ —— (ii) (Theorem)

(from eq (i) and (ii))

$\frac{ar(\triangle ABC)}{ar(\triangle PQR)} = \frac{AD^2}{PN^2}$

Proved