cw

Ex- 6.4

Q1. let $\Delta ABC \sim \Delta DEF$ & their areas be $64 cm^2$ & $121 cm^2$. If $EF = 15.4$ cm, find BC.

A. $\Delta ABC \sim \Delta DEF$

$\therefore \frac{ar(\Delta ABC)}{ar(\Delta DEF)} = \left(\frac{AB}{DE}\right)^2 = \left(\frac{BC}{EF}\right)^2 = \left(\frac{AC}{DF}\right)^2$

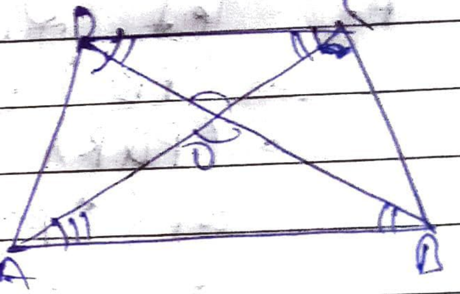
$ar(ABC) = 64 cm^2$

$ar(DEF) = 121 cm^2$

$\frac{ar(ABC)}{ar(DEF)} = \left(\frac{BC}{EF}\right)^2$

$\Rightarrow \left(\frac{64 cm^2}{121 cm^2}\right) = \frac{BC^2}{(15.4 cm)^2} \Rightarrow \frac{BC}{15.4} = \frac{8}{11}$ cm

$\Rightarrow BC = \left(\frac{8 \times 15.4}{11}\right) = 8 \times 1.4 = 11.2$ cm



A2. $AB \parallel CD$,

$\angle OAB = \angle OCD$ & $\angle OBA = \angle ODC$

In ΔAOB & ΔCOD

$\angle AOB = \angle COD$ (VOA)

$\angle OAB = \angle OCD$ (Alternate interior angles)

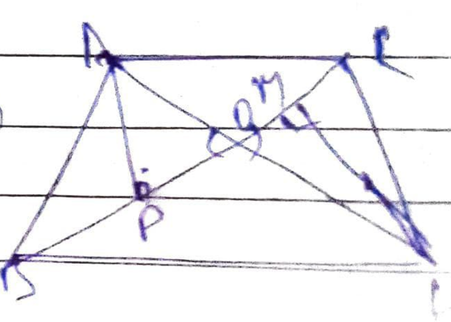
$\angle OBA = \angle ODC$ (" " ")

$\therefore \Delta AOB \sim \Delta COD$ (by AAA)

$\frac{ar(AOB)}{ar(COD)} = \left(\frac{AB}{CD}\right)^2$

$AB = 2CD$

$\frac{ar(AOB)}{ar(COD)} = \left(\frac{2CD}{CD}\right)^2 = \frac{4}{1} = 4:1$



A3. let us draw two $\perp$ AP & DM on line BC

ar of $\Delta = \frac{1}{2} \times b \times h$

$$\frac{ar(ABC)}{ar(DBC)} = \frac{\frac{1}{2} BC \times AP}{\frac{1}{2} BC \times DM}$$

In ΔAPO & ΔDMO

$\angle APO = \angle DMO$ (90°)

$\angle AOP = \angle DOM$ (VOA)

$\therefore \Delta APO \sim \Delta DMO$ (by AA)

$$\frac{AP}{DM} = \frac{AO}{DO}$$

$$\Rightarrow \frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$$

4Q If areas of two similar Δ are equal, prove that they are congruent

A. let two similar Δ as $\Delta ABC \sim \Delta PQR$

$$\frac{ar(ABC)}{ar(PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{AC}{PR}\right)^2 \quad \text{—— (1)}$$

$ar(\Delta ABC) = ar(\Delta ABC)$

$$\Rightarrow \frac{ar(\Delta ABC)}{ar(PQR)} = 1$$

$$1 = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{AC}{PR}\right)^2$$

$\Rightarrow AB = PQ$, $BC = QR$ & $AC = PR$.

$\therefore \Delta ABC \cong \Delta PQR$ (by SSS)