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Ex- 6.4

1. We have $\Delta ABC \sim \Delta DEF$

so, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

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

$\Rightarrow \frac{64}{121} = \frac{BC^2}{(15.4)^2}$

$\Rightarrow \frac{64}{121} = \frac{BC^2}{237.16}$

$\Rightarrow 121 BC^2 = 237.16 \times 64$

$\Rightarrow BC^2 = \frac{237.16 \times 64}{121}$

$\Rightarrow BC^2 = 125.44$

$\Rightarrow BC = \sqrt{125.44}$

$\Rightarrow BC = 11.2cm$

2. Given

ABCD is a trapezium with $AB \parallel DC$

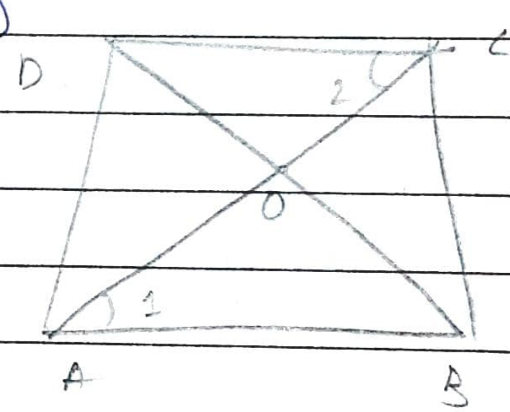
$AB = 2CD$

In ΔAOB and ΔCOD,

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

$\angle 1 = \angle 2$ (alternate angles)

$\therefore \Delta AOB \sim \Delta COD$ (AA)



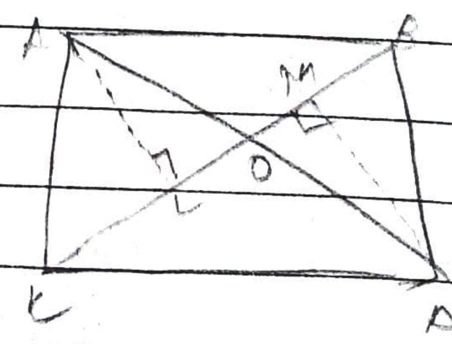
$$\frac{ar.\ \Delta AOB}{ar.\ \Delta COD} = \frac{AB^2}{CD^2}$$

$$= \frac{(2CD)^2}{CD^2} = \frac{4CD^2}{CD^2} = \frac{4}{1}$$

$\therefore$ ar. ΔAOB : ar. ΔCOD = 4 : 1

3. Constructⁿ

Draw $AL \perp BC$ and $DM \perp BC$



In ΔALO & ~~Δ~~ ΔDMO

$\angle ALO = \angle DMO$ (each $90°$)

$\angle AOL = \angle DOM$ (V.O.A)

$\therefore \Delta ALO \sim \Delta DMO$ (AA)

$\Rightarrow \dfrac{AL}{DM} = \dfrac{AO}{DO}$ —— (1)

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Now, $\frac{ar.(\Delta ABC)}{ar.(\Delta DBC)} = \frac{\frac{1}{2} \times BC \times AL}{\frac{1}{2} \times BC \times DM}$

$= \frac{AL}{DM} = \frac{AO}{DO}$ (from ①)

∴ Proved

4. Given

$\Delta ABC \sim \Delta DEF$

ar. ΔABC = ar. ΔDEF

To prove

$\Delta ABC \cong \Delta DEF$

Proof

$\frac{ar.\ \Delta ABC}{ar.\ \Delta DEF} = \frac{AB^2}{DE^2} = \frac{AC^2}{DF^2} = \frac{BC^2}{EF^2}$

$1 = \frac{AB^2}{DE^2} = \frac{AC^2}{DF^2} = \frac{BC^2}{EF}$ ($\because$ ar. ΔABC = ar. ΔDEF)

$\Rightarrow AB^2 = DE^2,\ AC^2 = DF^2,\ BC^2 = EF^2$

$AB = DE$, $AC = DF$, $BC = EF$

$\therefore \triangle ABC \cong \triangle DEF$ (SSS)