In ΔABD, ΔPQM,

$\angle B = \angle Q$ (proved)

$\angle ADB = \angle PQMQ$ (90°)

$\Delta ABD \sim \Delta PQM$ (AA)

$= \frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM} \Rightarrow \frac{BC}{QR} = \frac{AD}{PM}$ — (ii).

from (i) & (ii),

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

$= \frac{BC^2}{QR^2}$ [Hence proved]

6.4 exercise

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

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

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

$= \frac{64}{121} = \frac{(BC)^2}{(15.4)^2} = \frac{BC^2}{237.16}$

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

$BC^2 = \frac{15178.24}{121} = 125.44$.

$BC = \sqrt{125.44}$

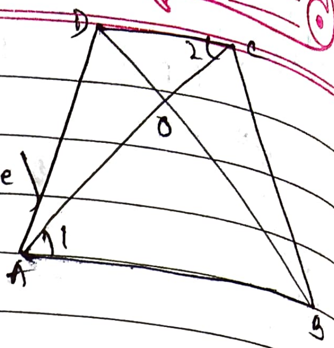
$= 11.2$ cm.

Q2. In $\triangle AOB$ & $\triangle COD$,

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

$\angle 1 = \angle 2$ (Alternate Angle)

$\triangle AOB \sim \triangle COD$ (AA)



$$\frac{ar\,\triangle AOB}{ar\,\triangle COD} = \frac{AB^2}{CD^2}$$

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

$\Rightarrow$ $\triangle AOB : \triangle COD = 4:1$.

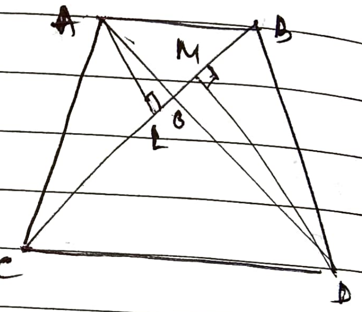
Q3. $AL \perp BC$, $DM \perp BC$

$\triangle ALO$, $\triangle DMO$;

$\angle ALO = \angle DMO$ (90°)

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

$\triangle ALO \sim \triangle DMO$ (AA)



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

$$\frac{ar\,\triangle ABC}{ar\,\triangle DBC} = \frac{\cancel{1/2}\cdot\cancel{BC}\cdot AL}{\cancel{1/2}\cdot\cancel{BC}\cdot DM}$$

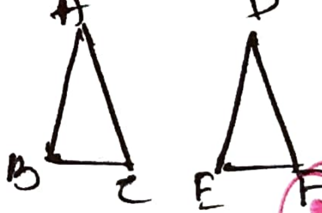
$$= \frac{AL}{DM} = \frac{AO}{DO}$$ (from 1).

(Hence, proved).

Q4. $\triangle ABC \sim \triangle DEF$ (given)

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

TIP $\Rightarrow$ $\triangle ABC \cong \triangle DEF$



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

$$\Rightarrow \frac{AB^2}{DE^2} = \frac{AC^2}{DF^2} = \frac{BC^2}{EF^2} \Rightarrow 1 \qquad (ar\ \Delta ABC = ar\ \Delta DEF)$$

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

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

Hence, $\Delta ABC \cong \Delta DEF$ (SSS).

Q5. ~~D~~ 1:4