Exercise 6.4

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

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

So, $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{CA}{FD}$

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

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

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

$BC^2 = \dfrac{15178.24}{121} = 125.44$

$BC = \sqrt{125.44} = 11.2\,cm$

2. In ΔAOB and ΔCOD

$\angle AOB = \angle COD$ [V.O.A]

$\therefore \Delta AOB \sim \Delta COD$ [AA]

$\therefore \dfrac{ar\,\Delta AOB}{ar\,\Delta COD} = \dfrac{AB^2}{CD^2}$

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

$ar\,\Delta AOB : ar\,\Delta COD = 4:1$

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

In ΔALO $\angle ALO = \angle DMO$ [Each of 90°]

$\angle AOL = \angle DOM$ [vertically ~~opp~~ opposite angles]

$\therefore \Delta ALO \sim \Delta DMO$ [By AA ~~s~~ similarity]

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

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

$= \dfrac{AL}{DM} = \dfrac{AO}{DO}$

(From (i))

Hence ~~m~~ proved

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Given : consider $\Delta ABC \sim \Delta DEF$

and $ar\ \Delta ABC = ar\ \Delta DEF$

To prove : $\Delta ABC \cong \Delta DEF$

proof : $\dfrac{ar\ \Delta ABC}{ar\ \Delta DEF} = \dfrac{AB^2}{DE^2} = \dfrac{AC^2}{DF^2} = \dfrac{BC^2}{EF^2}$

$1 = \dfrac{AB^2}{DE^2} = \dfrac{AC^2}{DF^2} = \dfrac{BC^2}{EF^2}$ [$\because ar\ \Delta ABC = ar\ \Delta DEF$]

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

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

$\Delta ABC \cong \Delta DEF$ [By SSS congruence rule]