## * EX-6.3:-

1.i) $\angle A = \angle P$
$\angle B = \angle Q$
$\angle C = \angle R$

$\therefore \Delta ABC \sim \Delta PQR$ (AAA Criteria)

ii) In $\Delta ABC$ and $\Delta PQR$
$\frac{BC}{PR} = \frac{\cancel{2.5}}{\cancel{5}} = \frac{1}{2}$, $\frac{AB}{QR} = \frac{\cancel{2}}{\cancel{4}} = \frac{1}{2}$, $\frac{AC}{PQ} = \frac{\cancel{3}}{\cancel{6}} = \frac{1}{2}$

$\therefore \Delta ABC \sim \Delta QRP$ (SSS Criteria)

iii) In $\Delta LMP$ and $\Delta EFD$.
$\frac{LM}{EF} = \frac{2.7}{5}$, $\frac{LP}{DF} = \frac{\cancel{3}}{\cancel{6}} = \frac{1}{2}$, $\frac{MP}{ED} = \frac{\cancel{2}}{\cancel{4}} = \frac{1}{2}$

$\therefore \Delta LMP$ is not similar to $\Delta EFD$.

iv) In $\Delta MNL$ and $\Delta PQR$
$\frac{MN}{PQ} = \frac{2.5}{5} = \frac{1}{2}$, $\frac{ML}{QR} = \frac{\cancel{5}}{\cancel{10}} = \frac{1}{2}$
$\because \angle M = \angle Q = 70°$
$\therefore \Delta NML \sim \Delta PQR$ (SAS)

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v) In $\triangle ABC$ and $\triangle DEF$

$\frac{AB}{DF} = \frac{2.5}{5} = \frac{1}{2}$ , $\frac{BC}{EF} = \frac{3}{6} = \frac{1}{2}$

$\angle A = \angle F = 80^\circ$

$\therefore$ $\triangle ABC$ is not similar to $\triangle DEF$.

vi) In $\triangle DEF$ and $\triangle PQR$.

$\angle E = \angle Q = 80^\circ$

$\angle F = \angle R = 30^\circ$

$\therefore$ $\triangle DEF \sim \triangle PQR$. (AA)

2. $\angle DOC + \angle BOC = 180^\circ$

$\angle DOC + 125^\circ = 180^\circ$

$\therefore$ $\angle DOC = 180^\circ - 125^\circ = 55^\circ$

In $\triangle DOC$,

$\angle DOC + \angle ODC + \angle DCO = 180^\circ$

$55^\circ + 70^\circ + \angle DCO = 180^\circ$

$\therefore$ $\angle DCO = 180^\circ - (55^\circ + 70^\circ) = 55^\circ$

$\therefore$ $\triangle ODC \sim \triangle OBA$

$\angle OAB = \angle DCO = 55^\circ$

$\angle DOC = \angle OAB = 55^\circ$

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3. Given :- diagonals AC and BD intersect at O.
$AB \parallel DC$.

To prove :- $\frac{OA}{OC} = \frac{OB}{OD}$

Proof :- In $\Delta AOB$ and $\Delta COD$,

$\angle 1 = \angle 2$

$\angle 3 = \angle 4$ (Alternate Angles)

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

$\therefore$ $\frac{OA}{OC} = \frac{OB}{OD}$ (corresponding sides of similar triangles).

4. Given :- $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$.

To prove :- $\Delta PQS \sim \Delta TQR$.

Proof :- In $\Delta PQR$,

$\angle 1 = \angle 2$ (Given)

$PQ = PR$ (sides opp. to equal angles)

$\frac{QR}{QS} = \frac{QT}{PR}$ or $\frac{QR}{QS} = \frac{QT}{PQ}$ ($PQ = PR$)

In $\Delta PQS$ and $\Delta TQR$,

$\frac{QR}{QS} = \frac{QT}{PQ}$.

$\therefore \frac{QR}{QT} = \frac{QS}{QP}$

$\because$ $\angle 1 = \angle 1$ (common)

$\therefore$ $\Delta PQS \sim \Delta TQR$ (SAS)

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5. In $\Delta RPQ$ and $\Delta RTS$
$\angle P = \angle RTS$ (Given)
$\angle R = \angle R$ (Common)
$\therefore \Delta RPQ \sim \Delta RTS$ (AA)

6. Given :- $\Delta ABE \cong \Delta ACD$
To prove :- $\Delta ADE \sim \Delta ABC$.
Proof :- $\Delta ABE \cong \Delta ACD$
$AB = AC$ and $AE = AD$
$\frac{BA}{AC} = 1$, $\frac{AD}{AE} = 1$
In $\Delta ADE$ and $\Delta ABC$,
$\frac{AD}{AE} = \frac{AB}{AC}$ (Proved above)
$\angle A = \angle A$ (Common)
$\therefore \Delta ADE \sim \Delta ABC$ (SAS)

7. Given :- AD and CE are altitudes of $\Delta ABC$.

i) To prove :- $\Delta AEP \sim \Delta CDP$
Proof :- In $\Delta AEP$ and $\Delta CDP$
$\angle AEP = \angle CDP$ (Each $90°$)
$\angle APE = \angle CPD$ (VOA)
$\Delta AEP \sim \Delta CDP$ (AA)

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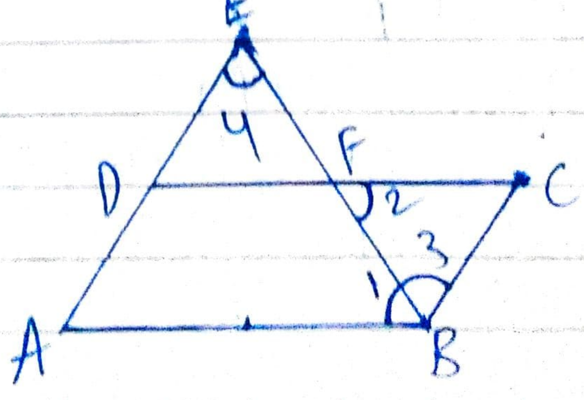
ii) In $\triangle ABD$ and $\triangle CBE$
$\angle ADB = \angle CEB$ (Each $90°$)
$\angle ABD = \angle CBE$ (Common)
$\triangle ABD \sim \triangle CBE$ (AA)

iii) In $\triangle AEP$ and $\triangle ADB$,
$\angle AEP = \angle ADB$ (Each $90°$)
$\angle A = \angle A$ (Common)
$\triangle AEP \sim \triangle ADB$ (AA)

iv) In $\triangle PDC$ and $\triangle BEC$
$\angle PDC = \angle BEC$ (Each $90°$)
$\angle PCD = \angle BCE$ (Common)
$\triangle PDC \sim \triangle BEC$ (AA)

8. In $\triangle ABE$ and $\triangle CFB$,
$\angle 1 = \angle 2$ (Alternate Angles)
$\angle 4 = \angle 3$
$\triangle ABE \sim \triangle CFB$ (AA)



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9. i) In $\Delta ABC$ and $\Delta AMP$,
$\angle B = \angle AMP$ (Each $90°$)
$\angle A = \angle A$ (Common)
$\Delta ABC \sim \Delta AMP$ (AA)

ii) $\Delta ABC \sim \Delta AMP$ (Proved above)
$\frac{CA}{PA} = \frac{CB}{PM}$ (Ratio of the corresponding sides of similar $\Delta$s)

10. $\angle A = \angle F$
$\angle B = \angle E$
$\angle C = \angle C$
$\frac{AB}{FE} = \frac{BC}{EG} = \frac{AC}{FG}$

i) In $\Delta ACD$ and $\Delta FGH$
$\angle A = \angle F$ (Given)
$\angle 1 = \angle 2$ ($1/2 \angle C = 1/2 \angle G$)
$\Delta ACD \sim \Delta FGH$ (AA)
$\therefore \frac{CD}{GH} = \frac{AC}{FG}$ (Corresponding sides of similar triangles).

ii) $\frac{CD}{GH} = \frac{AC}{FG}$ But, $\frac{AC}{FG} = \frac{BC}{EG}$

$\because \frac{CD}{GH} = \frac{BC}{EG}$

In $\Delta DCB$ and $\Delta HGE$,

$\angle 3 = \angle 4$ $(1/2 \angle C = 1/2 \angle G)$

$\frac{CD}{GH} = \frac{BC}{EG}$ (Proved above)

$\Delta DCB \sim \Delta HGE$ (SAS)

iii) In $\Delta DCA$ and $\Delta HGF$,

$\angle 1 = \angle 2$ (Bisectors)

$\frac{CD}{GH} = \frac{AC}{EG}$ (As proved)

$\Delta DCA \sim \Delta HGF$ (SAS)

11. In $\Delta ABD$ and $\Delta ECF$,

$\angle ADB = \angle EFC$ (Each $90^\circ$)

$\angle B = \angle C$ (angles opp. to equal sides are equal)

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

12. In $\Delta ABC$ and $\Delta PQR$

$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$ (Given)

OR

$\frac{AB}{PQ} = \frac{1/2\ BC}{1/2\ QR} = \frac{AD}{PM}$

$\frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$

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

$\angle B = \angle Q$ (corresponding angles of similar triangles) $\therefore \Delta ABD \sim \Delta PQM$ (SAS)

In $\Delta ABC$ and $\Delta PQR$,

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

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

$\Delta ABC \sim \Delta PQR$ (SAS)

13. In $\Delta ACB$ and $\Delta DCA$,

$\angle BAC = \angle ADC$ (Given)

$\angle C = \angle C$ (Common)

$\Delta ACB \sim \Delta DCA$

$\therefore \frac{CB}{CA} = \frac{CA}{CD}$ (corresponding sides of similar triangles)

$\therefore CA^2 = CB \times CD.$

14. E is the mid-point of AB.

$DE = \frac{1}{2} AC$.

$SM = \frac{1}{2} PR$

$\frac{AB}{PQ} = \frac{AC}{PR} = \frac{AD}{PM}$

$\frac{2AE}{2PS} = \frac{2DE}{2SM} = \frac{AD}{PM}$

$\therefore \frac{AE}{PS} = \frac{DE}{SM} = \frac{AD}{PM}$

$\therefore \triangle ADE \sim \triangle PMS$ (SSS)

$\angle 1 = \angle 3$

$\angle 2 = \angle 4$

$\angle 1 + \angle 2 = \angle 3 + \angle 4$

$\therefore \angle A = \angle P$

In $\triangle ABC$ and $\triangle PQR$,

$\frac{AB}{PQ} = \frac{AC}{PR}$ (Given)

$\angle A = \angle P$ (Proved above)

$\therefore \triangle ABC \sim \triangle PQR$ (SAS)

15. In $\Delta ABC$ and $\Delta DEC$,

$\angle ABC = \angle DEC$ (Each $90°$)

$\angle C = \angle C$ (Common)

$\Delta ABC \sim \Delta DEC$ (AA)

$\frac{AB}{DE} = \frac{BC}{EC}$

$\frac{h}{6} = \frac{28}{4}$

$\therefore h = \frac{\cancel{28} \times 6}{\cancel{4}} = \underline{\underline{42m}}$.

16. When $\Delta ABC \sim \Delta PQR$,

$\angle ABC = \angle PQR$

$\frac{AB}{PQ} = \frac{BC}{QR}$

$\frac{AB}{PQ} = \frac{1/2\, BC}{1/2\, QR}$

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

In $\Delta ABD$ and $\Delta PQM$,

$AB/PQ = BD/QM$ (As proved above)

$\angle B = \angle Q$

$\therefore \Delta ABD \sim \Delta PQM$

$AB/PQ = AD/PM$ (Corresponding sides of similar triangles)