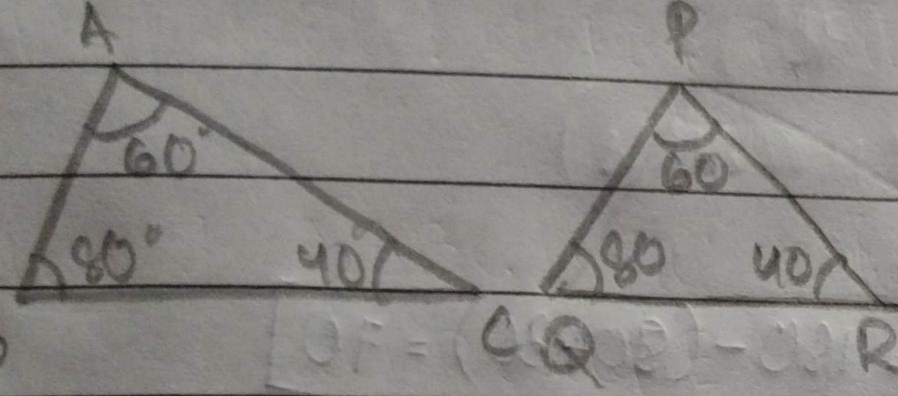
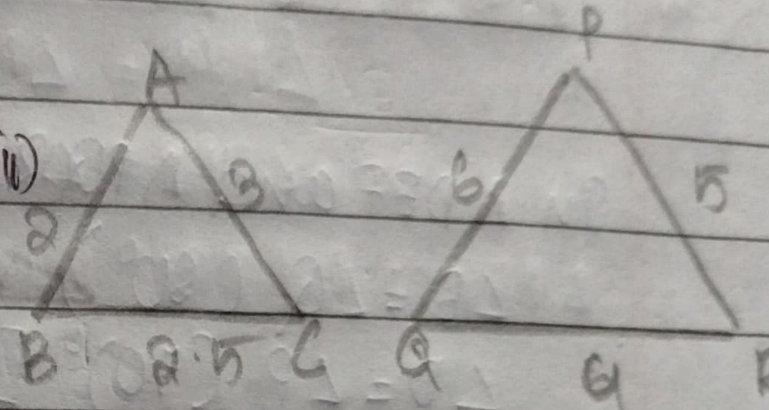
Ex 6.3

(i)



(ii)



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

$\angle A = \angle P \ (60^\circ)$

$\angle B = \angle Q \ (80^\circ)$

$\angle C = \angle R \ (40^\circ)$

$\therefore \triangle ABC \sim \triangle PQR$ (by AAA)

In $\triangle ABC$ and $\triangle QRP$

~~AB = QR~~

~~BC = BR~~

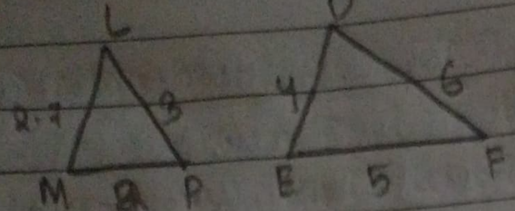
~~AC = BQ~~

$\frac{AB}{QR} = \frac{2}{4} = \frac{1}{2}$

$\frac{BC}{PR} = \frac{2.5}{5} = \frac{1}{2}$

$\frac{AC}{PQ} = \frac{3}{6} = \frac{1}{2}$

$\therefore \triangle ABC \sim \triangle QRP$ (by SSS)

(iv) 

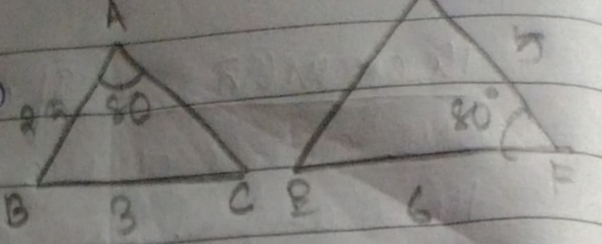
In ΔMPL and ΔEDF

$\frac{LM}{EF} = \frac{2.7}{5}$

$\frac{MP}{ED} = \frac{2}{4} = \frac{1}{2}$

$\frac{LP}{DF} = \frac{3}{6} = \frac{1}{2}$

$\therefore$ ΔMPL is not similar to ΔEDF

(v) 

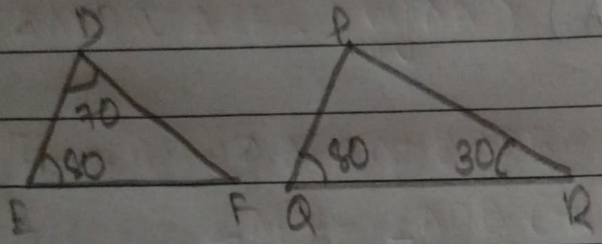
In ΔABC and ΔDEF

$\frac{AB}{DF} = \frac{2.5}{5} = \frac{1}{2}$

$\frac{BC}{EF} = \frac{3}{6} = \frac{1}{2}$

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

ΔABC is not similar to ΔDEF as angle btw two sides are not sa

(vi) 

In ΔDEF and ΔPQR

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

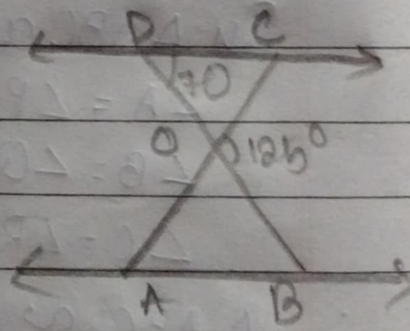
$\angle D = \angle P \ (70)^\circ \ [P = 180 - (80+30) = 70]$

$\therefore$ $\Delta DEF \sim \Delta PQR$ (AA)

2. $\angle DOC = 180 - 125 = 55^\circ$

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

$= 180 - 125 = 55^\circ$



$\Delta ODC \sim \Delta OBA$ (given)

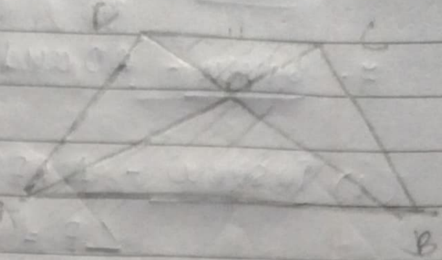
$\angle DCO = \angle OAB = 55^\circ$

Hence, $\angle DOC = 55^\circ$

$\angle DCO = 55^\circ$

$\angle OAB = 55^\circ$

3. Given - Diagonal AC and BD $AB \parallel DC$



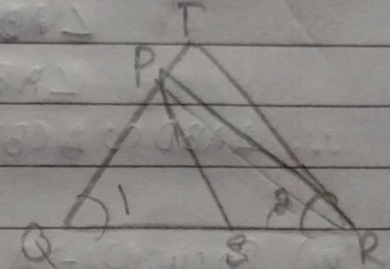
To prove - $\frac{OA}{OC} = \frac{OB}{OD}$

Proof : In ΔAOB and ΔCOD

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

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

$\frac{OA}{OC} = \frac{OB}{OD}$ (CPCT)



4. Given = $\angle 1 = \angle 2$

$\frac{QR}{QS} = \frac{QT}{PR}$

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

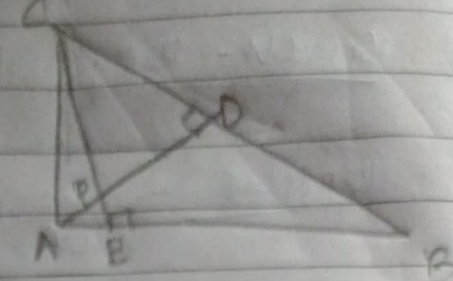
Proof - In ΔPQS and ΔTQR

$\angle PQS = \angle TQR$ ($\angle 1$)

$\frac{QR}{QS} = \frac{QT}{PR}$

$PQ = PR$ (sides opposite to equal angles are equal)

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



~~ΔAEP~~

7. Given - AD and CE are altitudes

(i) To show - $\Delta AEP \sim \Delta CDP$

$\angle E = \angle D$ (90°)

$\angle APE = \angle CPD$ (vertically opposite angle)

$\therefore$ $\Delta AEP \sim \Delta CDP$ (by AA)

(ii) To show - $\Delta ABD \sim \Delta CBE$

$\angle ADB = \angle CEB$ (90°)

$\angle ABD = \angle CBE$ (common angle)

$\therefore$ $\Delta ABD \sim \Delta CBE$ (by AA)

(iii) To show - $\Delta AEP \sim \Delta ADB$

$\angle AEP = \angle ADB$ (90°)

$\angle EAP = \angle DAB$ (common)

$\therefore$ $\Delta AEP \sim \Delta ADB$ (by AA)

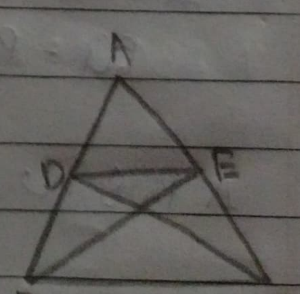
(iv) To show - $\Delta PDC \sim \Delta BEC$

$\angle PDC = \angle BEC$ (90°)

$\angle PCD = \angle BCE$ (common)

$\therefore$ $\Delta PDC \sim \Delta BEC$ (by AA)

6. Given - $\Delta ABE \cong \Delta ACD$



To prove - $\Delta ADE \sim \Delta ABE$

Proof - $AD = AE$ (by CPCT)

$AB = AC$ (by CPCT) $\frac{AB}{AD} = \frac{AC}{AE}$

$\angle A = \angle A$ (common)

$\therefore$ $\Delta ABE \sim \Delta ACD$ (by SAS)

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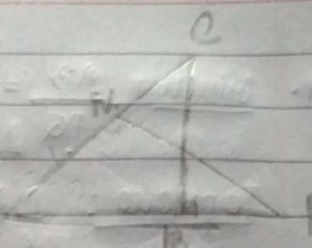


Q. Given : In ABC and ΔAMP are right angle

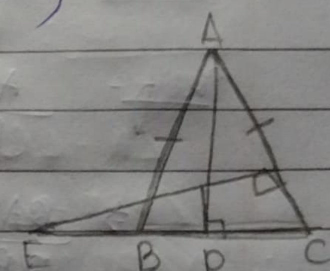
To prove – $\Delta ABC \sim \Delta AMP$

$\angle B = \angle M$ (90°)

$\angle A = \angle A$ (common)

(i) $\Delta ABC \sim \Delta AMP$ by AA

(ii) $\frac{CA}{PA} = \frac{CB}{PM}$ (ratio of corresponding sides of similar triangles)



11. Given - In ΔABC, $AB = AC$

$AD \perp BC$

$EF \perp AC$

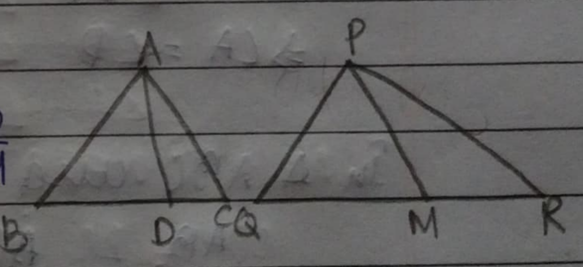
To prove : $\Delta ABD \sim \Delta ECF$

Proof - In ΔABD and ΔECF

$\angle ADB = \angle EFC$ (90°)

$\angle B = \angle C$ (angles opposite to equal sides of an isosceles Δ)

$\therefore$ $\Delta ABD \sim \Delta ECF$ by AA



12. Given- ~~AD is median~~ $\frac{AB}{PQ} = \frac{BC}{QR}, \frac{AD}{PM}$

To prove - $\Delta ABC \sim \Delta PQR$

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

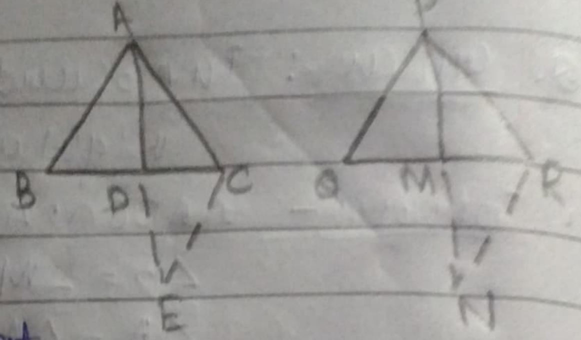
$\frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$

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

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

$\therefore$ $\Delta ABC \sim \Delta PQR$ by SAS.

14. Given: $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{AD}{PM}$



To prove: $\Delta ABC \sim \Delta PQR$

Construction: produce AD to E so that
$AD = DE$
produce PM to N so that
$PM = MN$

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

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

$\Delta ADE \sim \Delta PMS$ (by SSS)

$\angle 1 = \angle 3$
$\angle 2 = \angle 4$
$\angle 1 + \angle 2 = \angle 3 + \angle 4$
$\Rightarrow \angle A = \angle P$

In ΔABC and ΔPQR

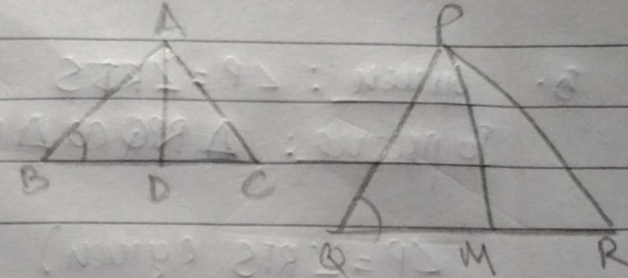
$\frac{AB}{PQ} = \frac{AC}{PR}$

$\angle A = \angle P$

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

16. Given - $\Delta ABC \sim \Delta PQR$

To prove - $\frac{AB}{PQ} = \frac{AD}{PM}$



Proof - In $\Delta ABC \sim \Delta PQR$

$\angle B = \angle Q$ $\quad\quad \frac{AB}{PQ} = \frac{BC}{QR}$

$\angle A = \angle P$

$\angle C = \angle R$

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

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

In ΔABD and ΔPQM

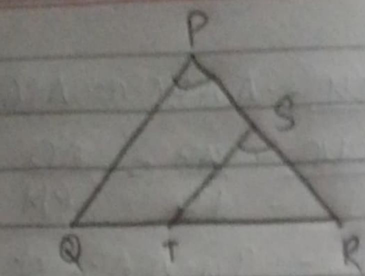
$\angle B = \angle Q$

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

$\therefore \Delta ABD \sim \Delta PQM$ by SAS

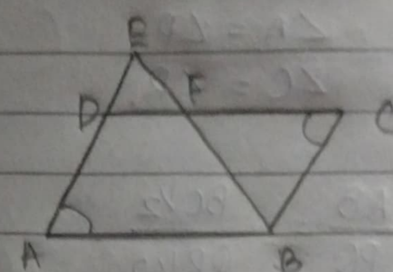
$\Rightarrow \frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$

5. <u>Given</u> : $\angle P = \angle RTS$
<u>To prove</u>: $\Delta RPQ \sim \Delta RTS$



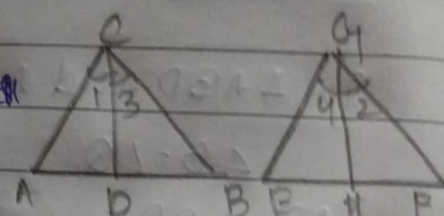
$\angle P = \angle RTS$ (given)
$\angle R = \angle R$ (common)
$\therefore$ $\Delta RPQ \sim \Delta RTS$ by AA

8. <u>Given</u>: BE bisects CD at F
<u>To prove</u> : $\Delta ABE \sim \Delta CFB$



$\angle A = \angle C$ (opposite angle same)
$\angle ABE = \angle$ ~~BEF~~ $\angle BFC$ (alternate angle)
$\therefore$ $\Delta ABE \sim \Delta CFB$ by AA

10 (i) <u>Given</u> : $\angle ACB$ and $\angle EGF$ are bisector
<u>To prove</u> - $\frac{CD}{GH} = \frac{AC}{FG}$



proof - $\Delta ABC \sim \Delta FEG$ (given)
$\angle A = \angle F$
~~$\angle B = \angle E$~~ $\angle 1 = \angle 2$
~~$\angle C = \angle G$~~
$\Delta ABC \sim \Delta FEG$ by AA
$\frac{CD}{GH} = \frac{AC}{FG}$ (corresponding sides of similar triangle)

(ii) $\frac{CD}{GH} = \frac{AC}{FG}$ but $\frac{AC}{FG} = \frac{BC}{EG}$
$\therefore$ $\frac{CD}{GH} = \frac{BC}{EG}$

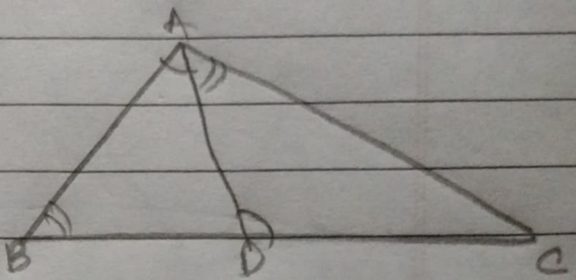
In ΔDCB and ΔHGE
$\frac{CD}{GH} = \frac{DC}{EG}$ $\angle 3 = \angle 4$
$\Delta DCB \sim \Delta HGE$ by SAS

(ii) In $\triangle DCA$ and $\triangle HGF$

$$\angle 1 = \angle 2$$

$$\frac{CD}{GH} = \frac{AC}{FG}$$

$\triangle DCA \sim \triangle HGF$ by SAS



13. Given : $\angle ADC = \angle BAC$

To show : $CA^2 = CB \times CD$

In $\triangle ABC$ and $\triangle DAC$

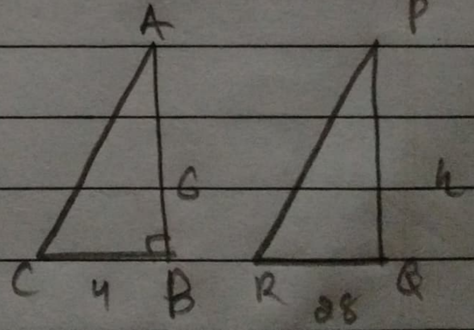
$$\angle C = \angle C$$

$$\angle BAC = \angle ADC$$

$\therefore$ $\triangle ABC \sim \triangle DAC$ by AA

$$\frac{CA}{CD} = \frac{CB}{CA}$$

$CA^2 = CD \times CB$ (proved)



15. $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$

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

$\Rightarrow$ $4h = 168$

$h = 42$

So, the height of the tower is 42m