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Exs:- 6.3

(1)

(i)

In ΔABC,	In ΔPQR,
$\angle A = 60°$	$\angle P = 60°$
$\angle B = 80°$	$\angle Q = 80°$
$\angle C = 40°$	$\angle R = 40°$

$\angle A = \angle P$
$\angle B = \angle Q$
$\angle C = \angle R$
$\therefore \Delta ABC \sim \Delta PQR$ [By AA].

(ii)

In ΔABC,	In ΔPQR,
$AB = 2$	$QR = 4$
$BC = 2.5$	$RP = 5$
$AC = 3$	$PQ = 6$

$AB = QR$, $BC = RP$, $AC = PQ$
$\therefore \Delta ABC \sim \Delta PQR$ [By SSS]
$\Delta ABC \sim \Delta QRP$

(iii)

In ΔLMP,	In ΔDEF,
$LM = 2.7$	$FE = 5$
$MP = 2$	$DE = 4$
$PL = 3$	$FD = 6$

$\therefore$ Not similar

(iv)

In ΔMNL,	In ΔPQR,
$MN = 2.5$	$PQ = 5$
$\angle M = 70°$	$\angle Q = 70°$
$ML = 5$	$QR = 10$

$\because MN = PQ$
$\angle M = \angle Q$
$ML = QR$

$\therefore \Delta MNL \sim \Delta PQR$ [By SAS].

(v) In ΔABC,

$AB = 2.5$

$\angle A = 80^\circ$

$BC = 3$

In ΔDEF,

$DF = 5$

$\angle F = 80^\circ$

$EF = 6$.

$\because$ Not similar

(vi) In ΔDEF,

$\angle D = 70^\circ$

$\angle E = 80^\circ$

$\angle F = 180^\circ - 150^\circ$

$\angle F = 30^\circ$

In ΔPQR,

$\angle P = \cancel{3}70^\circ$

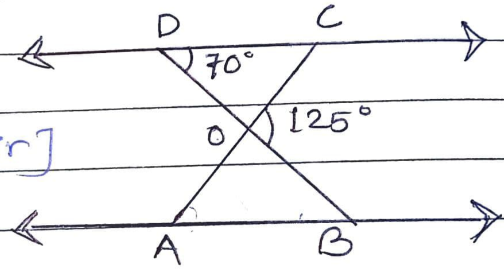
$\angle Q = 80^\circ$

$\angle R = 30^\circ$

$\therefore \Delta DEF \sim \Delta PQR$ [By AA]

(2) Given :- $\angle BOC = 125^\circ$

$\angle CDO = 70^\circ$



$\angle DOC = 180^\circ - 125^\circ$ [Linear pair]

$= 55^\circ$

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

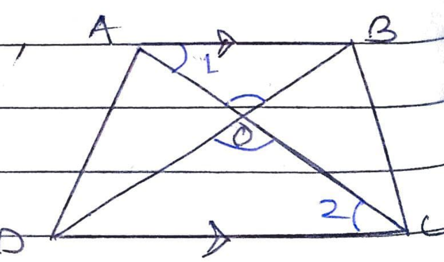
$= 180^\circ - 125^\circ$

$= 55^\circ$

$\angle OAB = \angle DCO^\circ = 55^\circ$ [Alternate interior angles].

(3) Given :- $AB \parallel DC$.

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



Proof :- In ΔAOB & ΔCOD,

$AB \parallel DC$.

$\angle OAB = \angle OCD$ [Alt $\angle$s].

$\angle AOB = \angle COD$ [VOA]

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

$\frac{AO}{OC} = \frac{BO}{OD}$ [Sides of similar Δs].

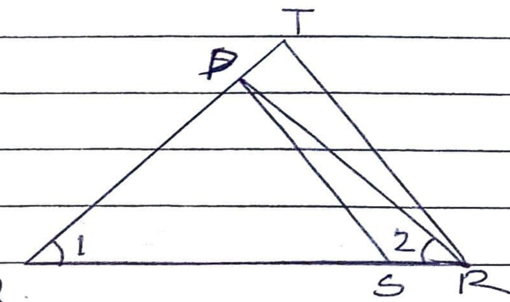
$\therefore \frac{OA}{OC} = \frac{OB}{OD}$ [Hence proved].

~~(3)~~
(4) Given:- $\frac{QR}{QS} = \frac{QT}{PR}$

$\angle 1 = \angle 2$.

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

Proof:- $\frac{QR}{QS} = \frac{QT}{PR}$ — (I)



So, In ΔPQS and ΔTQR,

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

and $\frac{QR}{QS} = \frac{QT}{QP}$ from (I) (Hence proved)

$\therefore \Delta PQS \sim \Delta TQR$ [By SAS].

(5) Given:- $\angle P = \angle RTS$.

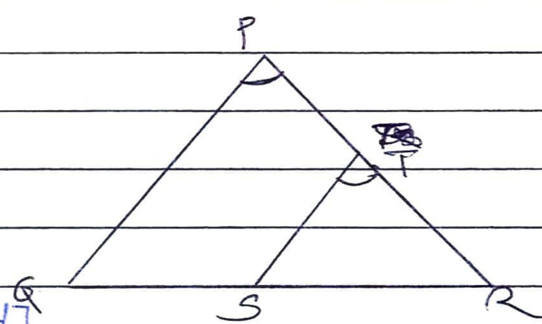
To prove:- $\Delta RPQ \sim \Delta RTS$.

Proof:- In ΔRPQ & ΔRTS,

$\angle P = \angle RTS$ [Given]

$\angle R = \angle SRT$ [common $\angle$].

$\therefore \Delta RPQ \sim \Delta RTS$ [Hence proved]



(6) Given:- $\Delta ABE \cong \Delta ACD$,

To prove:- $\Delta ADE \sim \Delta ABC$,

Proof:- $AB = AC$ and — (I)
$AE = AD$ [By cpct] (II)

Dividing (II) and (I)

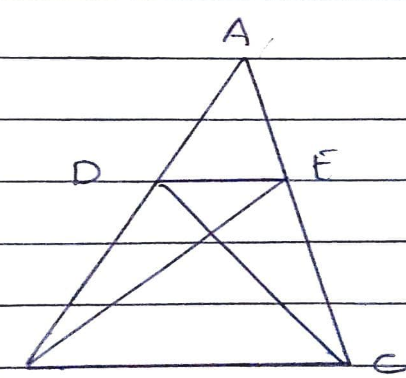
$\frac{AE}{AC} = \frac{AD}{AB}$ — (III)

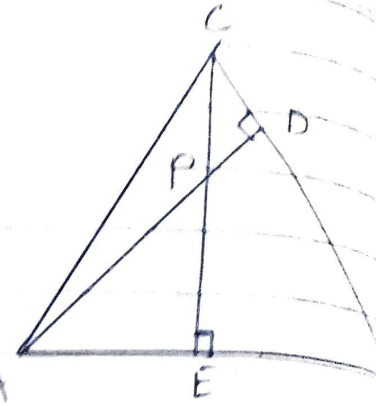
Now, In ΔADE and ΔABC,

$\frac{AE}{AC} = \frac{AD}{AB}$ [from (III)]

and $\angle BAC = \angle DAE$ (common)

$\therefore \Delta ADE \sim \Delta ABC$ [By SAS].





(i) To prove:- ΔAEP and ΔCDP

Proof:- In ΔAEP and ΔCDP,

$\angle APE = \angle CPD$ [VOA]

$\angle CDP = \angle AEC$ [$90°$ each]

$\therefore \Delta AEP \sim \Delta CDP$ [By AA].

[Hence proved]

(ii) To prove:- ΔABD and ΔCBE,

Proof:- In ΔABD and ΔCBE,

~~$\angle B = \angle B$ [common]~~

$\angle BDE = \angle CEB$ [each $= 90°$]

$\angle CBE = \angle ABD$ [common]

$\therefore \Delta ABD$ and ΔCBE [By AA]

[Hence proved]

(iii) To prove:- $\Delta AEP \sim \Delta ADB$,

Proof:- In ΔAEP and ΔADB,

$\angle AEP = \angle ADB$ [each $= 90°$]

$\angle PAE = \angle DAB$ [common]

$\therefore \Delta AEP \sim \Delta ADB$ [By AA]

[Hence proved]

(iv) To prove:- $\Delta PDC \sim \Delta BEC$,

Proof:- In ΔPDC and ΔBEC,

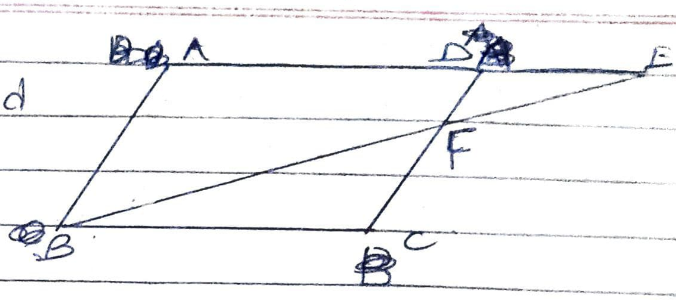
$\angle PCD = \angle BCE$ [common].

$\angle PDC = \angle BEC$ [each $90°$]

$\therefore \Delta PDC \sim \Delta BEC$ [By AA]

[Hence proved]

(8) Given:- ABCD is a ||gm.
E is a point on side DC and
BE intersects CD at F.



To prove:- $\Delta ABE \sim \Delta CFB$.

Proof:- In ΔABE and ΔCFB,

$\angle A = \angle C$ [opposite sides are equal in a ||gm]

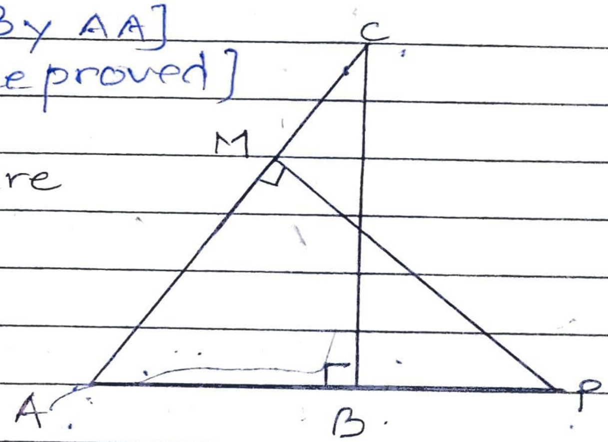
AD || BC.

i.e., AE || BC and BE is the transversal.

$\therefore \angle AEB = \angle CBF$ [Alternate interior $\angle$s].

$\therefore \Delta ABE \sim \Delta CFB$ [By AA]

[$\therefore$ Hence proved]



(9) (i) Given:- ΔABC and ΔAMP are right angled Δs, at B & M.

To prove:- $\Delta ABC \sim \Delta AMP$.

Proof:- ΔABC and ΔAMP

$\angle ABC = \angle AMP$ [given]

$\angle MAP = \angle BAC$ [common].

$\therefore \Delta ABC \sim \Delta AMP$ [By AA].

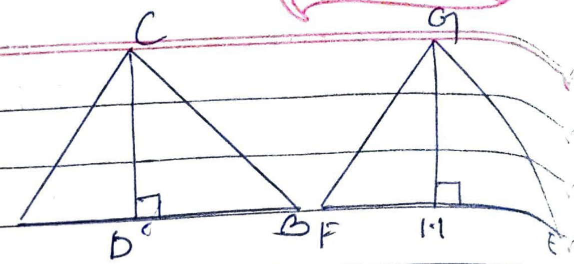
[Hence proved]

(ii) To prove:- $\frac{CA}{PA} = \frac{BC}{MP}$.

Proof:- In (i) we proved $\Delta ABC \sim \Delta AMP$

So, $\frac{CA}{PA} = \frac{BC}{MP} = \frac{BA}{MA}$ [If two Δs are equal, the ratio of their corresponding ~~sides are also equal~~]

(10)(i) Given:- CD and GH are the bisectors of $\angle ACB$ and $\angle EGF$.
D and H lie on sides AB and FE of ΔABC and ΔEFG.
$\Delta ABC \sim \Delta FEG$.



To prove:- $\frac{CD}{GH} = \frac{AC}{FG}$

Proof:- As $\Delta ABC \sim \Delta FEG$,
$\angle A = \angle F$ — (i) [$\angle$s of similar Δs are equal]
and $\angle C = \angle G$ — (ii)

From (ii),
$\angle C = \angle G$
$\frac{1}{2}\angle C = \frac{1}{2}\angle G$.
$\angle ACD = \angle FGH$ — (iii)

In ΔACD and ΔFGH,
$\angle A = \angle F$ [From (i)]
$\angle ACD = \angle FGH$ [From (iii)],

$\therefore \Delta ACD \sim \Delta FGH$ [By AA]

so, $\frac{CD}{GH} = \frac{AC}{FG} = \frac{AD}{FH}$ [ratios of corr. sides of two $\sim$ Δs are proportional].

$\therefore \frac{CD}{GH} = \frac{AC}{FG}$ [Hence proved]

(ii) ~~ADCB.~~

(ii) To prove:— $\triangle DCB \sim \triangle HGE$

Proof:— As $\triangle ABC \sim \triangle EGF$,

$\angle B = \angle E$ — (i) [$\angle$s of $\sim$ $\triangle$s are equal].

$\angle C = \angle G$ — (ii)

From (ii),

$\angle C = \angle G$

$\frac{1}{2}\angle C = \frac{1}{2}\angle G$

$\angle DCB = \angle HGF$ — (iii)

In $\triangle DCB$ and $\triangle HGE$,

$\because \angle B = \angle E$ [From (i)]

$\angle DCB = \angle HGF$ [From iii].

$\therefore \triangle DCB \sim \triangle HGE$ [By AA].

[$\therefore$ Hence proved]

(iii) To prove:— $\triangle DCA \sim \triangle HGF$.

Proof:— As $\triangle ABC \sim \triangle EGF$,

$\angle A = \angle C$ — (i) [,,]

$\angle C = \angle G$ — (ii),

From (ii),

$\angle C = \angle G$

$\frac{1}{2}\angle C = \frac{1}{2}\angle G$.

$\angle ACD = \angle EGH$ — (iii)

Now,

$\angle A = \angle C$ — (i)

$\angle ACD = \angle EGH$ — (iii)

$\therefore \triangle DCA \sim \angle HGF$ [By AA]

(Hence proved)

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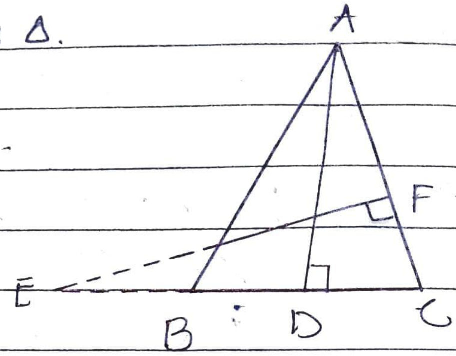
(11) Given:— ΔABC is an isosceles Δ.
Where, $AB = AC$ and
$AD \perp BC$ and $EF \perp AC$.



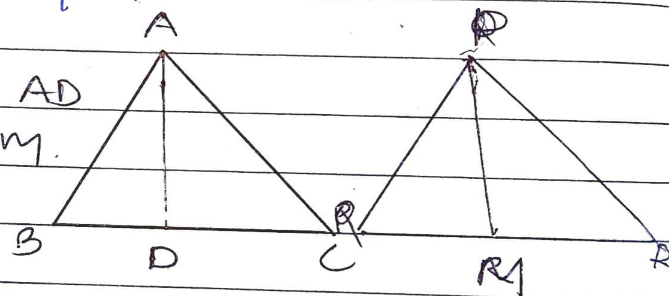
To prove:— $\Delta ABD \sim \Delta ECF$

Proof:— In ΔABD and ΔECF,
$\angle ADB = \angle EFC$ [Given each $90°$]
$\angle ABD = \angle ECF$ [As $AB = AC$, opp $\angle$s of equal sides are equal].

$\therefore \Delta ABD \sim \Delta ECF$ [By AA]
[Hence proved]

(12) Given:— ΔABC's median AD and ΔPQR's median PM.

$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$.



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

Proof:— As AD is the median of ΔABC
$BD = CD = \frac{1}{2}BC$ - (I)
PM is the median of ΔPQR
$QM = RM = \frac{1}{2}QR$ - (II)

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

$\frac{AB}{PQ} = \frac{2BD}{2QM} = \frac{AD}{PM}$ [From (I) and (II)]

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

In ΔABD and ΔPQM, all sides are proportional
so $\Delta ABD \sim \Delta PQM$ [By SSS].

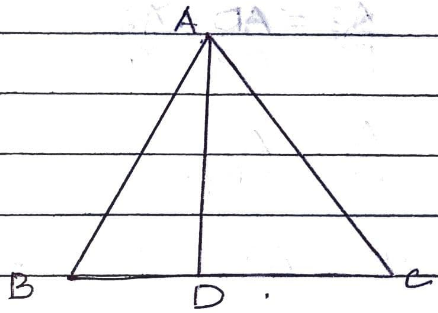
$\because \angle B = \angle Q$ [III].

In ΔABC and ΔPQR,

$\angle B = \angle Q$ [From (III)]

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

$\therefore \Delta ABC \sim \Delta PQR$. [By SAS].



(13) Given:- ΔABC and D is a point on BC.
$\angle ADC = \angle BAC$

To prove:- $CA^2 = CB \cdot CD$.

Proof:- In ΔADC and ΔBAC,

$\angle ADC = \angle BAC$ [Given]

$\angle ACD = \angle ACB$ [common]

$\therefore \Delta ADC \sim \Delta BAC$ [By AA]

also, $\frac{BA}{AD} = \frac{AC}{DC} = \frac{CB}{CA}$.

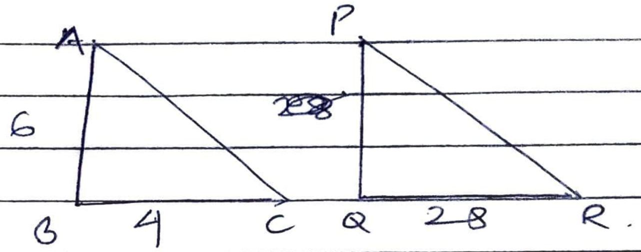
$= \frac{AC}{DC} = \frac{CB}{CA}$

$= CA \times CA = CB \times DC$

$\therefore CA^2 = CB \cdot CD$ [Hence proved].

(15) length of vertical pole = 6 m.
length of shadow it casts = 4 m.
length of shadow of a tower = 28 m.

$AB = 6, BC = 4, PQ = 28$



In ΔABC and ΔPQR,
$\because \angle B = \angle Q$ [Each = 90°]
$\angle C = \angle R$ [
$\therefore \Delta ABC \sim \Delta PQR$ (By AA)

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

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

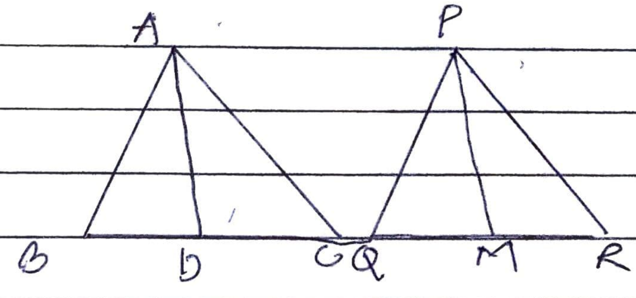
$$\frac{6}{28} = \frac{4}{QR}. \qquad \frac{6}{PQ} = \frac{4}{28}$$

$6QR = 112 \qquad 4PQ = 168$

$QR = \frac{112}{6} \qquad PQ = \frac{168}{4}$

$\boxed{PQ = 42}$

(16) Given:- $\Delta ABC \sim \Delta PQR$.
To prove- $\frac{AB}{PQ} = \frac{AD}{PM}$



Proof:- ~~Δ In ΔABD & ΔPQM~~,

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

$$\frac{AB}{PQ} = \frac{\cancel{2}BD}{\cancel{2}QR}$$

$$\frac{AB}{PQ} = \frac{BD}{QR}.$$

$\angle B = \angle Q$.
$\therefore \Delta ABD \sim \Delta PQM$

so, $\frac{AB}{PQ} = \frac{AD}{PM}$ (by cpct)

(Hence proved)