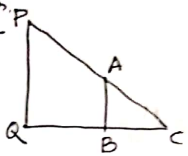
EX-18'3

Cl-X (Maths).

Similarity

S.N-3

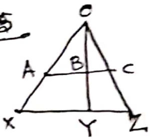
Sol^n:



ΔPQC and ΔABC are similar triangles.

$\therefore \frac{PQ}{AB} = \frac{QC}{BC}$ or $\frac{PQ}{6} = \frac{28}{4}$ or $PQ = 42$ m.

SN-5



R.T.P. $AB:BC = XY:YZ$.

Proof. In ΔOXY, $XY \parallel AB$.

$\therefore \angle OAB = \angle OXY$, $\angle OBA = \angle OYX$.

$\therefore \Delta OAB$ and ΔOXY are similar triangles.

$\therefore \frac{OA}{OX} = \frac{OB}{OY} = \frac{AB}{XY}$. --(i)

Similarly ΔOBC and ΔOYZ are similar triangles.

$\therefore \frac{OB}{OY} = \frac{OC}{OZ} = \frac{BC}{YZ}$ --(ii)

From (i) and (ii) we get, $\frac{OA}{OX} = \frac{OB}{OY} = \frac{OC}{OZ} = \frac{AB}{XY} = \frac{BC}{YZ}$

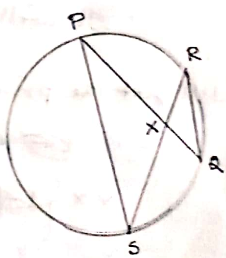
$\therefore \frac{AB}{XY} = \frac{BC}{YZ}$ or $\frac{AB}{BC} = \frac{XY}{YZ}$.

$AB:BC = XY:YZ$.

S.N-9

R.T.P. ΔPXS and ΔRSQ are similar. From this prove that $PX:XQ = RX:XS$.

Proof:-



ΔPXS and ΔRXQ are similar.

$\because \angle SPQ = \angle SRQ$ [lies on the same arc]

$\therefore \angle SPX = \angle XRQ$

Again $\angle PSR = \angle RQX$ [lies on the same arc]

$\therefore \angle PSX = \angle RQX$

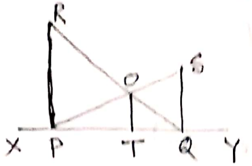
and $\angle PXS$ = vertically opposite $\angle RXQ$.

$\therefore \frac{PX}{RX} = \frac{XS}{XQ} = \frac{PS}{RQ}$ $\therefore$ $PX \cdot XQ = RX \cdot XS$.

proved.

EX-18.3
Cl-X (Maths).
Similarity

SN-10



R.T.P $\frac{1}{OT} = \frac{1}{PR} + \frac{1}{QS}$.

Proof: In $\triangle PQR$, $PR \parallel OT$

$\therefore \frac{OT}{PR} = \frac{TQ}{PQ}$ or $PQ = \frac{PR \cdot TQ}{OT}$ ---(i)

Again $\triangle PQS$, $SQ \parallel OT$

$\frac{OT}{QS} = \frac{PT}{PQ}$ $\therefore PQ = \frac{PT \cdot QS}{OT}$ ---(ii)

$\therefore$ From (i) and (ii) we get,

$$\frac{PR \cdot TQ}{OT} = \frac{PT \cdot QS}{OT}$$

$\therefore PR \cdot TQ = PT \cdot QS$

or $PR \cdot TQ = (PQ - TQ) QS$

or $PQ \cdot QS = PR \cdot TQ + TQ \cdot QS$

or $PQ = \frac{TQ \cdot QS + PR \cdot TQ}{QS}$ ---(iii)

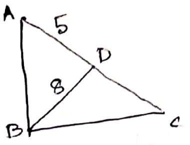
From (i) and (iii) we get $\frac{PR \cdot TQ}{OT} = \frac{TQ \cdot QS + PR \cdot TQ}{QS}$

or $\frac{1}{OT} = \frac{TQ \cdot QS + PR \cdot TQ}{QS \cdot PR \cdot TQ}$

$= \frac{1}{PR} + \frac{1}{QS}$.

EX-18.4

SN-1



$\therefore AB^2 = AD^2 + BD^2$

or $AB^2 = 5^2 + 8^2 = 89$

$\therefore AB = \sqrt{89}$

Again $\triangle ABC$ and $\triangle ABD$ are similar.

$\therefore \frac{AB}{AC} = \frac{AD}{AB}$ or $AB^2 = AD \times AC$

or $89 = 5 \times AC$ or $AC = \frac{89}{5}$

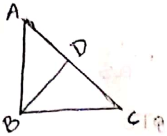
$\therefore CD = AC - AD = \frac{89}{5} - 5 = \frac{64}{5} = 12.8$ cm.

EX- 18.4.

Cl - X (Maths)

Similarity

SN-2



ΔABD and ΔBDC are similar.

$\therefore BD^2 = AD \cdot CD.$

or $BD^2 = 4 \times 16$ or $BD = 8$

Again ΔABC and ΔABD are similar.

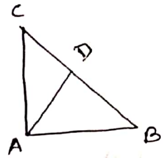
$\therefore \frac{AD}{AB} = \frac{AB}{AC}$ or $AB^2 = AD \cdot AC$

$= AD(AD + DC)$

$= 4(4+16) = 80$

$\therefore AB = \sqrt{80} = 4\sqrt{5}$ cm.

SN-5



R.T.P. $\frac{\Delta ABC}{\Delta ACD} = \frac{BC^2}{AC^2}$

proof. Now ΔACD and ΔABC are similar.

$\therefore \frac{AC}{BC} = \frac{CD}{AC}$ or $AC^2 = BC \cdot CD.$

or $CD = \frac{AC^2}{BC}$ --(1)

Again

$\frac{\Delta ABC}{\Delta ACD} = \frac{\frac{1}{2} BC \cdot AD}{\frac{1}{2} CD \cdot AD} = \frac{BC}{CD}$

$= \frac{BC \times BC}{AC^2} = \frac{BC^2}{AC^2}$ [by using (1)]

$\therefore$

S.N-7 (V.S.A)

Q(A) (iii) $AB : ED = AC : EF$

$\angle B = \angle D.$

$\therefore \angle C = \angle F$ and $\angle B = \angle D.$

$\therefore \angle B = 180° - (\angle A + \angle C)$

$= 180° - (40° + 65°) = 75°.$

S.N-8, (SA)

Q (ii)

$\Delta ABC \sim \Delta ABD$ $\therefore \frac{BD}{BC} = \frac{AD}{AB}$

or $\frac{24}{BC} = \frac{18}{30}$

or $BC = \frac{\cancel{24}^{4} \times \cancel{30}^{10}}{\cancel{18}_{3}} = 40$ cm.