Under CSR Support by ipca | Foundation

missiongyan
LET'S LEARN TOGETHER

CLASS – 10

MATHEMATICS

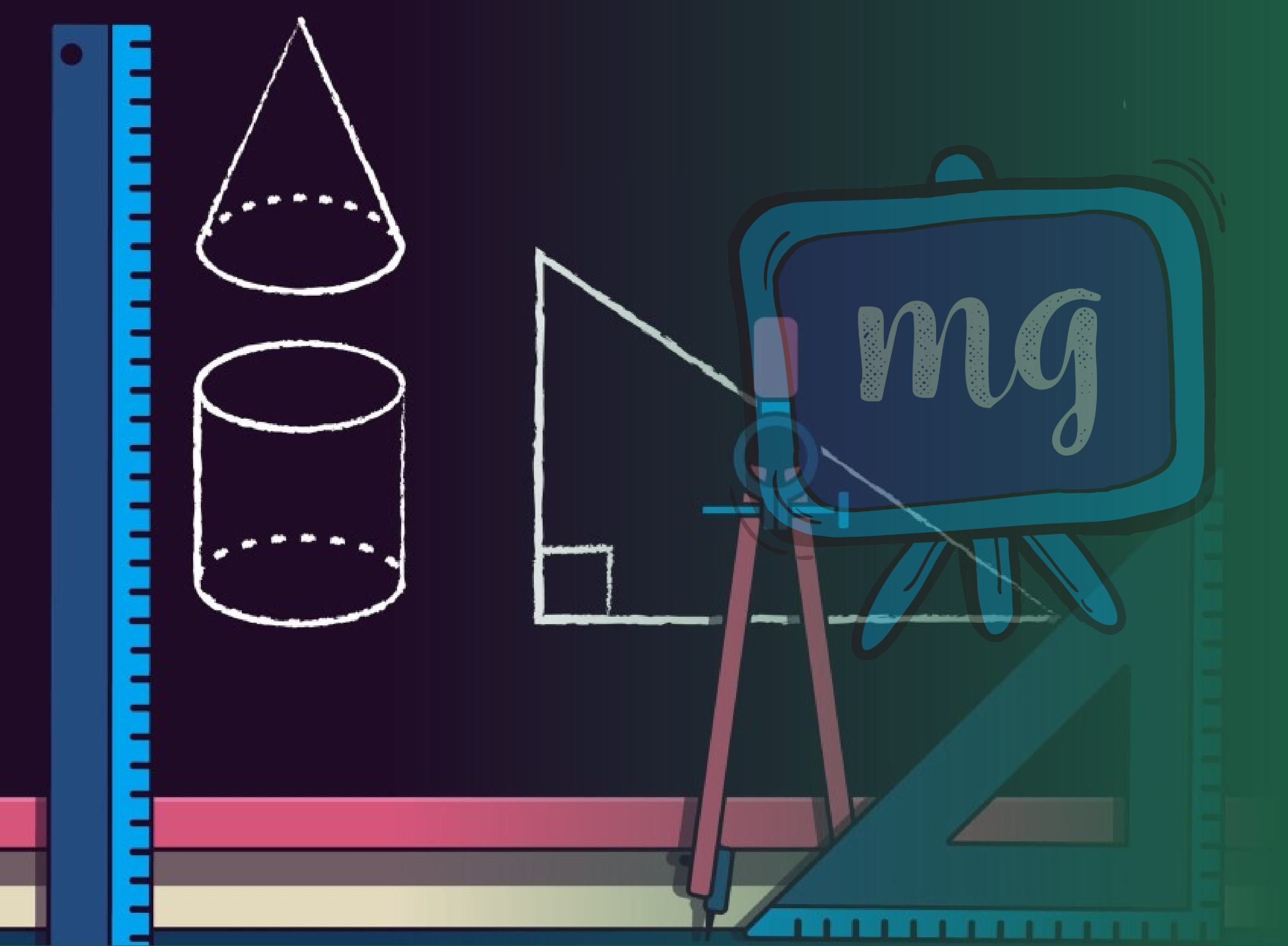
Chapter – 6

Triangles

Part – 12

Exercise 6.3 (Question 14 – 16)

Shubham Tiwari



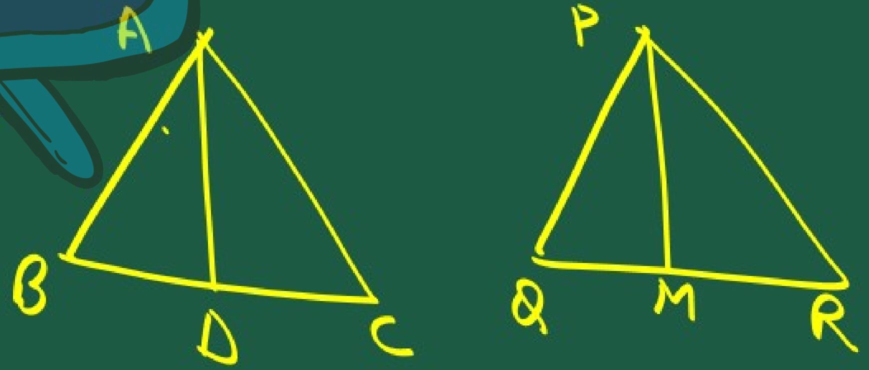
EXERCISE 6.3

Under CSR Support by ipca | Foundation

missiongyan LET'S LEARN TOGETHER

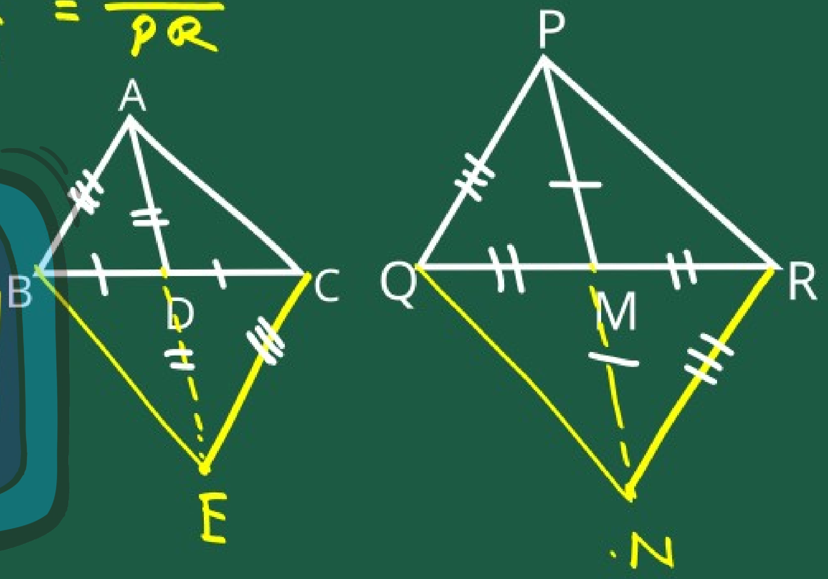
14. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that ΔABC ~ ΔPQR.

Sol:



<u>Given:</u> $\frac{AB}{PQ} = \frac{AD}{PM} = \frac{AC}{PR}$

<u>To Prove:</u> $\Delta ABC \sim \Delta PQR$



<u>Const:</u>- Construct $DE = AD$, $MN = PM$

Join BE, CE and QN, NR

<u>Soln</u>

$BD = DC$ {D is the mid-point as AD is median}

$QM = MR$ {PM is median}

$AD = DE$ } → <u>construction.</u>
$PM = MN$

in $\triangle ABEC$ and $\square PQNR$ are ∥gm, because their diagonal bisects at a common point.

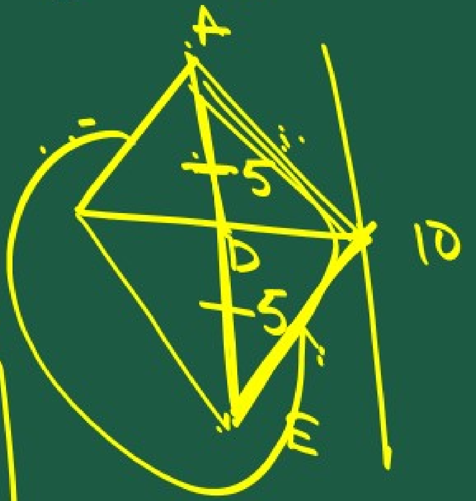
also. $AB = CE$ and
$PQ = NR$ { opp. sides of ∥gm }

in $\triangle ACE$ and $\triangle PNR$

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

$$\frac{AC}{PR} = \frac{2AD}{2PM} = \frac{CE}{NR}$$

$$\boxed{\frac{AC}{PR} = \frac{AE}{PN} = \frac{CE}{NR}}$$



Hence by SSS Similarity Rule $\triangle ACE \sim \triangle PRN$

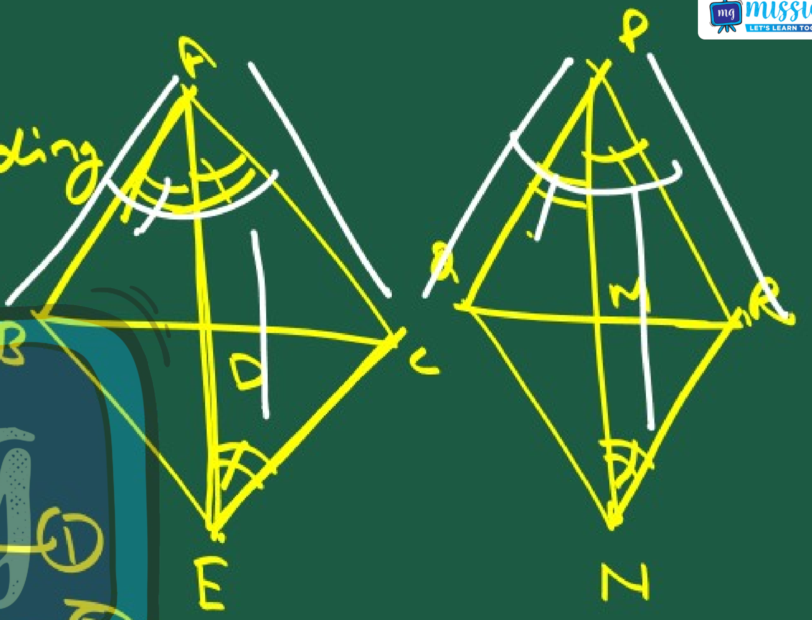
By the corresponding Parts of similar

D.

$\boxed{\angle EAC = \angle NPR}$ — (1)

$\angle CEA = \angle RNP$ — (2)

$\left.\begin{array}{l} \boxed{\angle CEA} = \boxed{\angle BAE} \\ \underline{\angle RNP} = \underline{\angle QPN} \end{array}\right\} \rightarrow$ AIA.



Let's Rewrite (2)

$\boxed{\angle BAE = \angle QPN}$ — (3)

eq ① + eq ③

$$\angle EAC + \angle BAE = \angle NPR + \angle QPN$$

$$\underline{\angle A = \angle P}$$

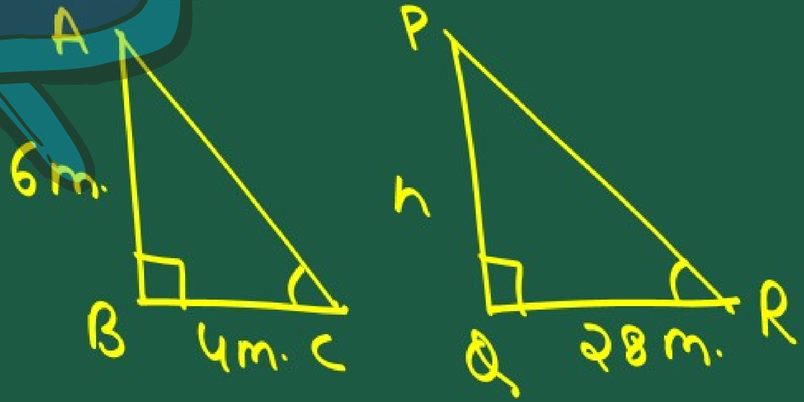
$$\frac{AB}{PQ} = \frac{AC}{PR} \ \{\text{Given}\}$$

Hence By SAS Similarity Rule

$$\triangle ABC \sim \triangle PQR$$

15. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

Solu.



in $\triangle ABC$ & $\triangle PQR$

$\angle ABC = \angle PQR = 90^\circ$ {Given}

$\angle ACB = \angle PRQ =$ {Elevation angle at the same time}

By A-A similarity Rule

$\triangle ABC \sim \triangle PQR$

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

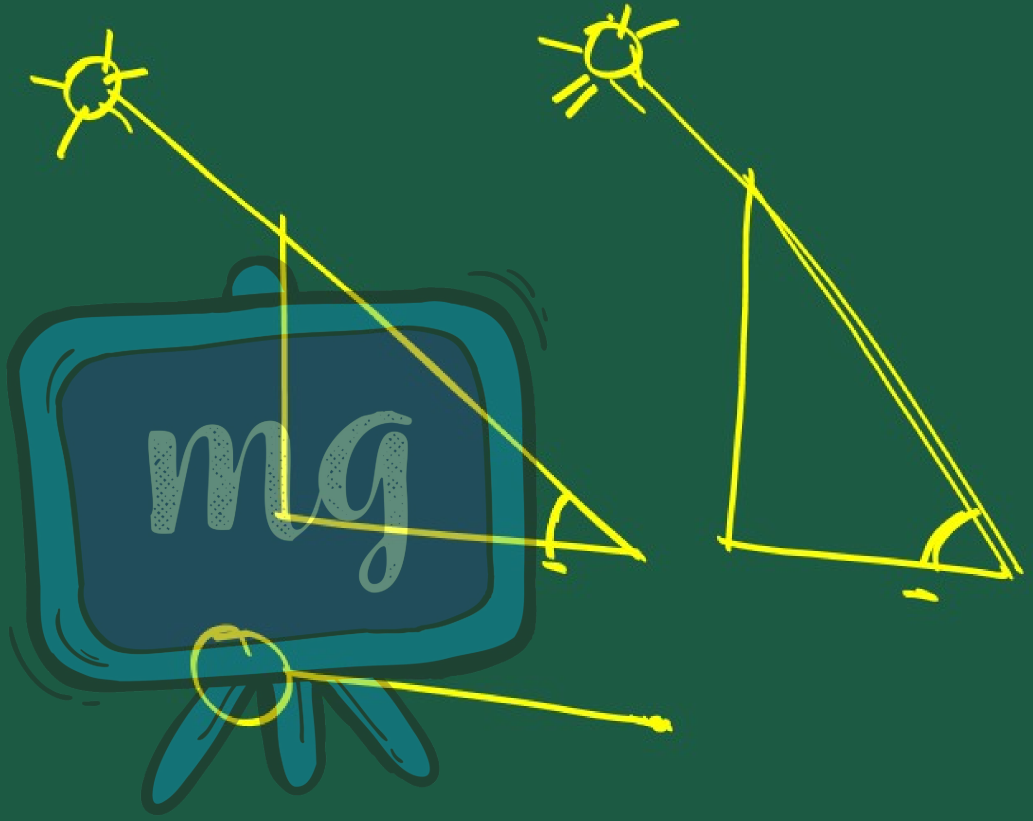
$\frac{6}{4} = \frac{h}{28}$

$$\frac{6}{\cancel{4}\,1} = \frac{h}{\cancel{28}\,7}$$

$$6 \times 7 = h$$

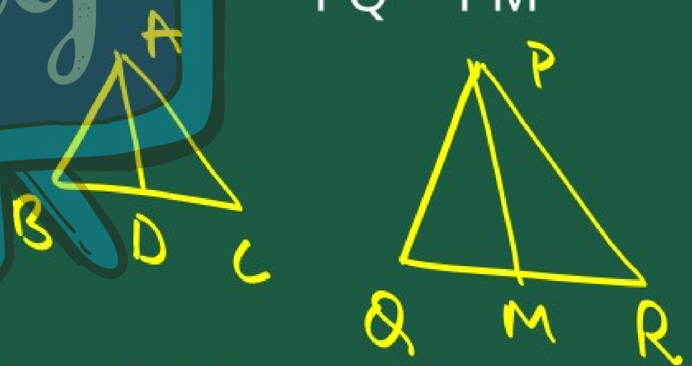
$$42 = h$$

Hence the hieght of the tower is 42 m.



16. If AD and PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

Soln.



Given: $\Delta ABC \sim \Delta PQR$

To Prove: $AB/PQ = \frac{AD}{PM}$

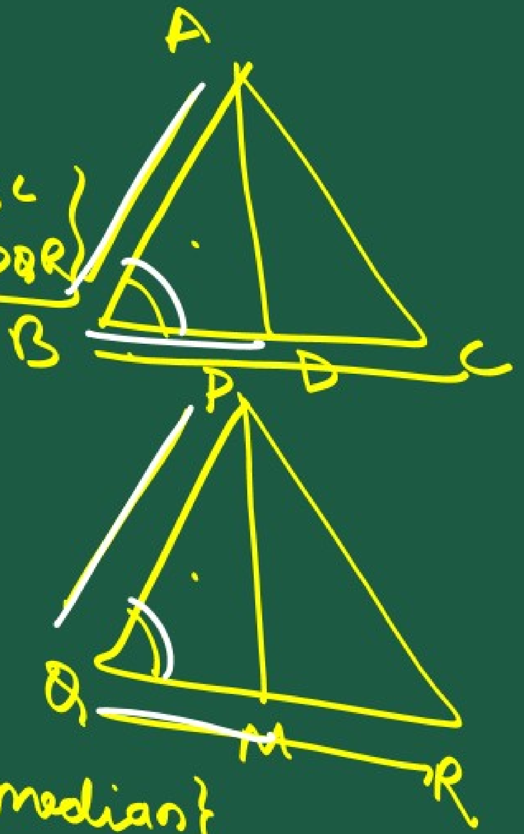
Soln.

$$\frac{AB}{PQ} = \frac{BC}{QR} \quad \{\Delta ABC \sim \Delta PQR\}$$

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

$$\frac{AB}{PQ} = \frac{BD}{QM} \quad \{AD \text{ and } PM \text{ are median}\}$$

$$\angle ABD = \angle PQM \quad \{\Delta ABC \sim \Delta PQR\}$$



By SAS Similarity Rule

$\triangle ABD \sim \triangle PQM$.

$$\boxed{\frac{AB}{PQ} = \frac{AD}{PM}}$$

H.P.