[Aim: 100/100 in Maths]

अभय CLASS 10

TRIANGLES

L - 3

Abhi tak ki kahaani :-

BPT

Conv. of BPT

Similarity

$\triangle ABC \sim \triangle PQR$

$\begin{bmatrix} \angle A = \angle P \\ \angle B = \angle Q \\ \angle C = \angle R \end{bmatrix} \quad \left| \quad \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} \right.$

To prove similar

- AAA
- AA
- SAS
- SSS

$K^3B \Rightarrow$ △ का question देखते ही दिमाग में 2 options आने चाहिए। → BPT → Similarity

 # LP : In the figure given below, E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that △ABE ~ △CFB.

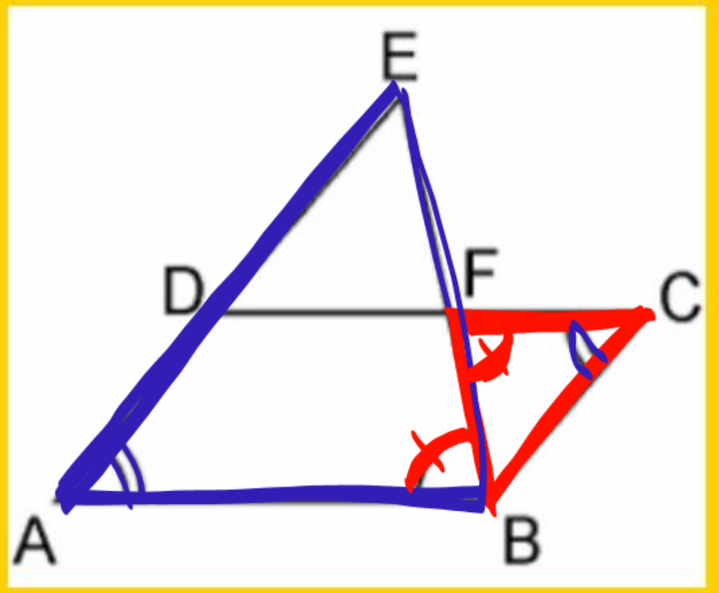
Given :- ABCD is a llgm.

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

Proof :- $\angle CFB = \angle ABF$ (AIA)

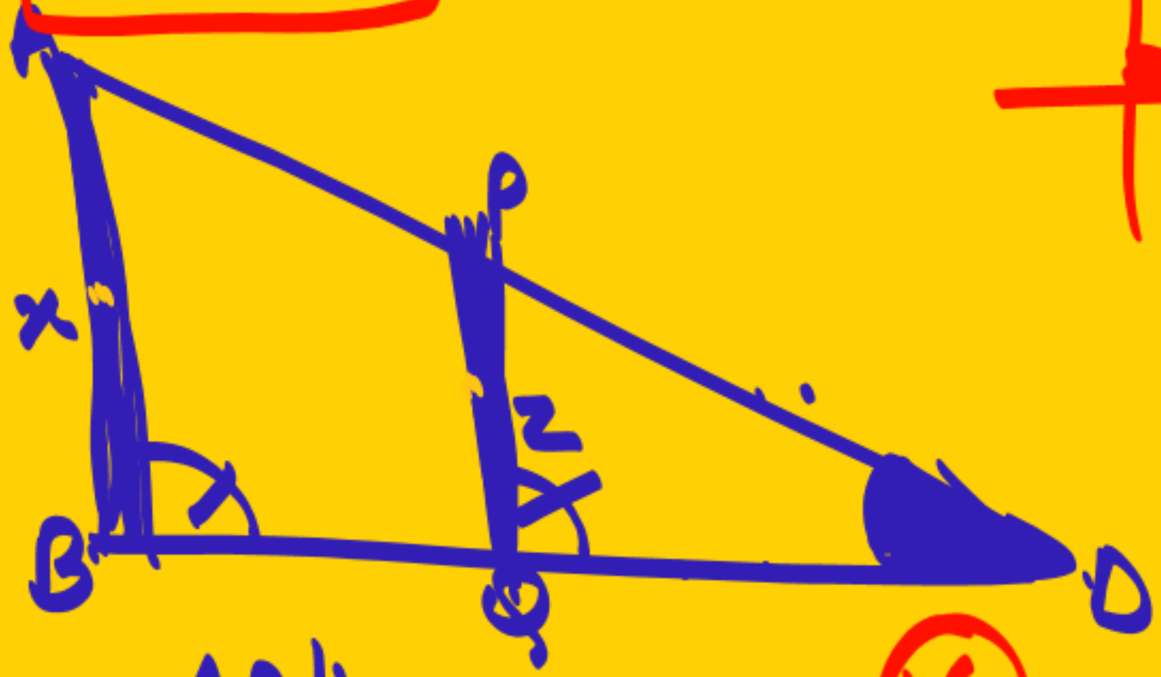
$\angle A = \angle C$ (opp. angles of llgm)

by AA ⇒ $\Delta ABE \sim \Delta CFB$ HP



LP : In the figure AB ll PQ ll CD , AB = x units , CD = y units and PQ = z units . Prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$

→ BPT



AB || PQ → BPT ✗

Similarity ✓

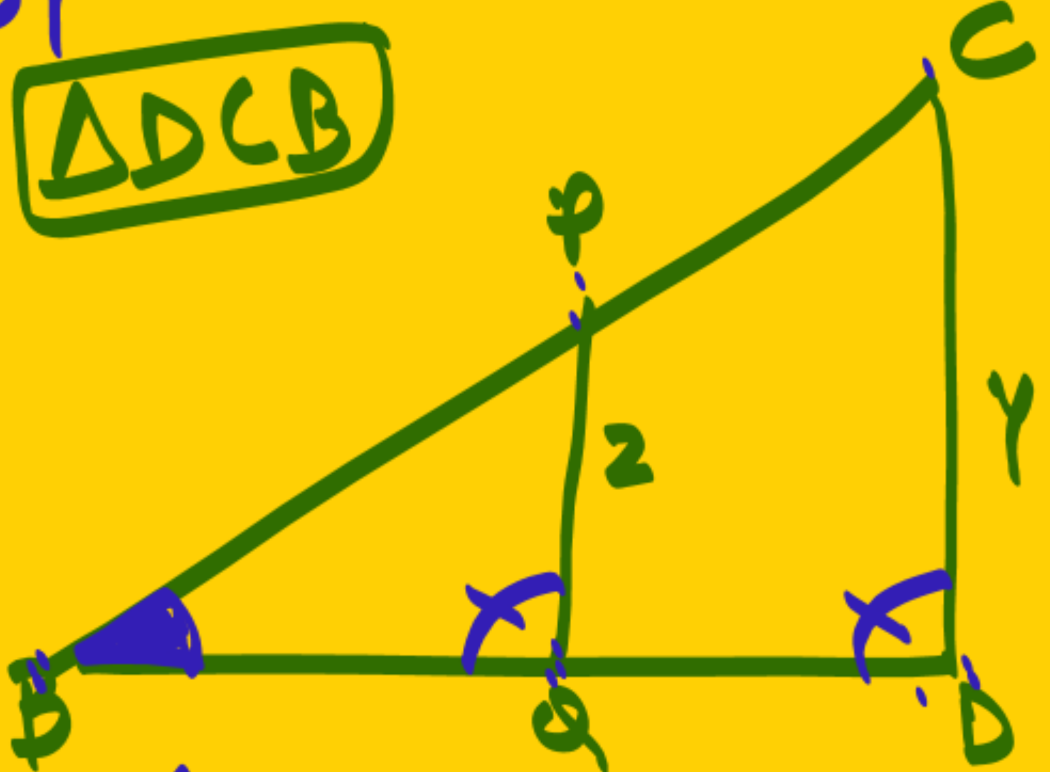
ΔDQP & ΔDBA

∠D = ∠D (common)

∠DQP = ∠DBA (corr. Angles)

∴ ΔDQP ~ ΔDBA

→ CPST → DQ = QP



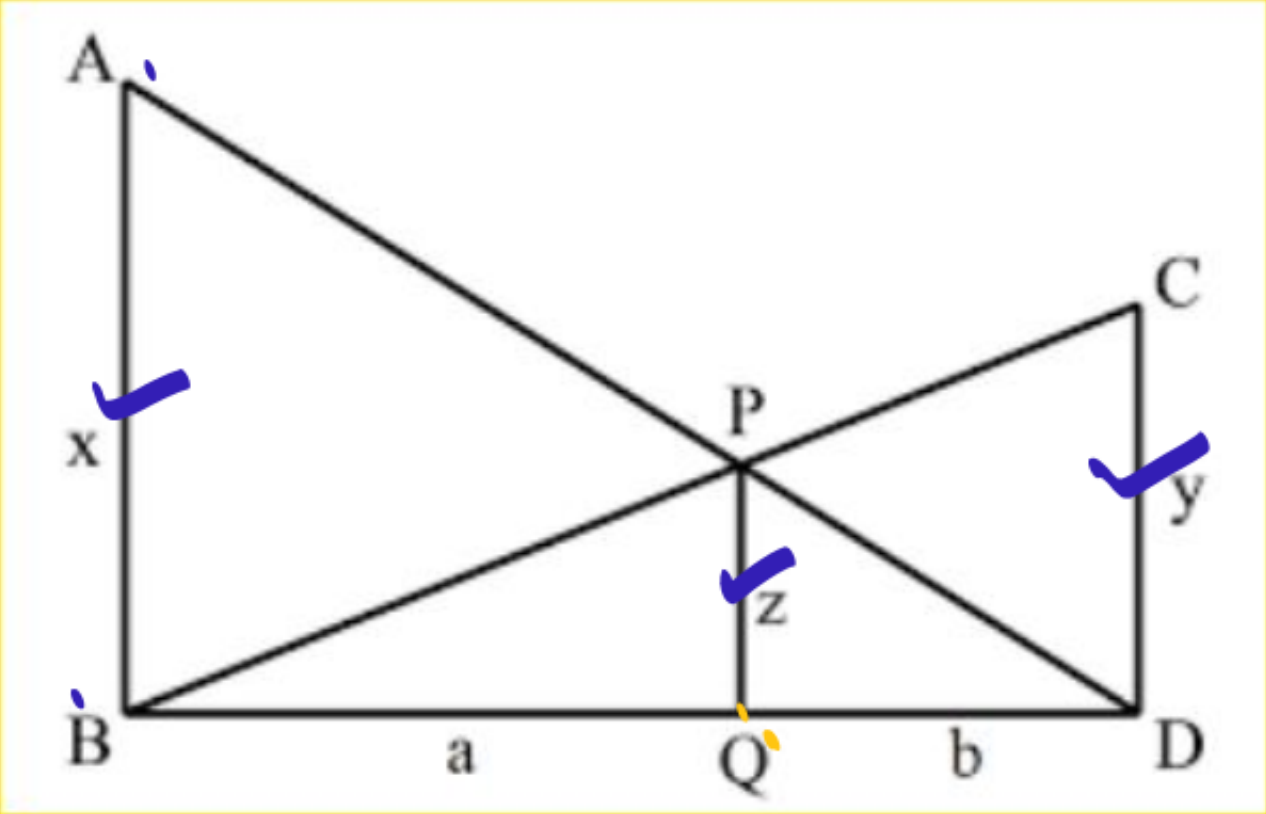
ΔBQP and ΔBDC

∠B = ∠B (common)

∠BQP = ∠BDC (corr. Angles)

∴ AA ⇒ ΔBQP ~ ΔBDC

CPST → $\frac{BQ}{BD} = \frac{QP}{DC} = \frac{BP}{BC}$



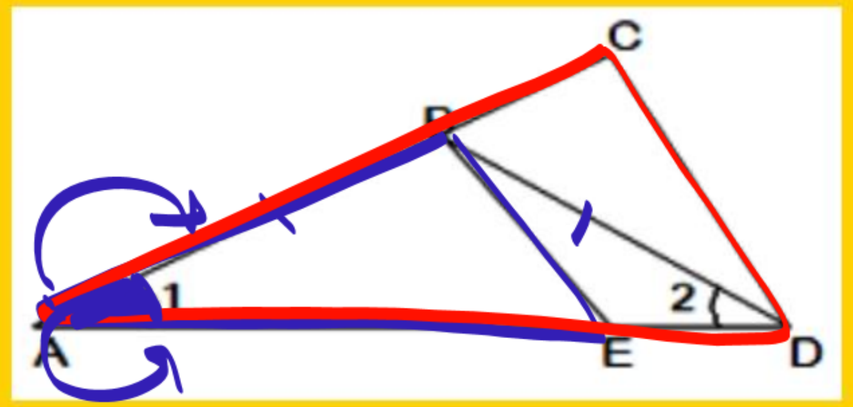
Add (I) & (II)

LP : In the figure below , AD/AE = AC/BD and ∠1 = ∠2 . Show that triangle BAE is similar to triangle CAD .

given: $\frac{AD}{AE} = \frac{AC}{BD}$, $\angle 1 = \angle 2$

$\Downarrow$

$BD = AB$



Since $BD = AB$

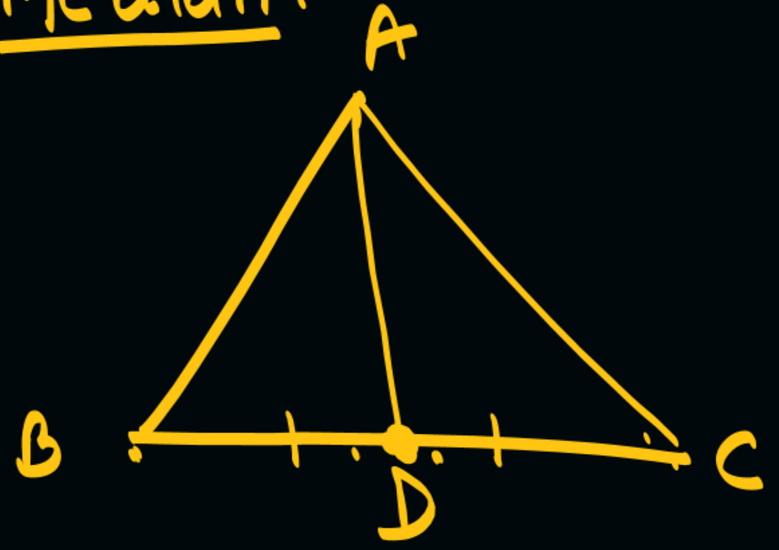
$\therefore \frac{AD}{AE} = \frac{AC}{AB}$

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

$\frac{AD}{AE} = \frac{AC}{AD}$

SAS $\rightarrow$ $\triangle BAC \sim \triangle CAD$

Median :-



AD → Median

BD = DC

or, $BD = \frac{1}{2}BC$

or, $DC = \frac{1}{2}BC$

or, $BC = 2BD$

or, $BC = 2DC$

Same

I <3 B

AD, PM → medians

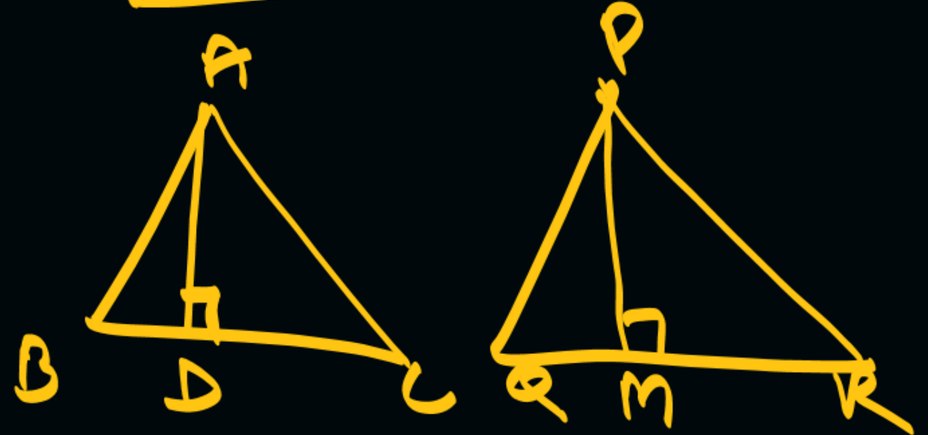
given, $\Delta ABC \sim \Delta PQR$

by cpst →

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

icka proof imp ra!

Altitude :-

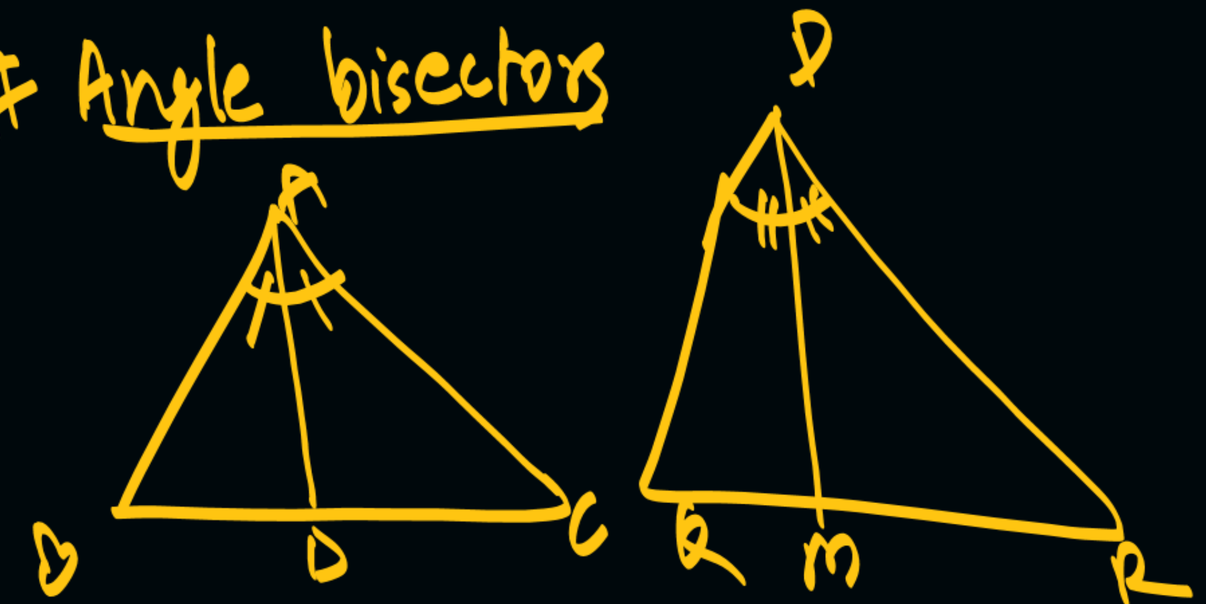


AD → Alt (90°)

If $\Delta ABC \sim \Delta PQR$

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

Angle bisectors



If $\Delta ABC \sim \Delta PQR$

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

Perimeter :-

if $\Delta ABC \sim \Delta PQR$

then $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{Per(\Delta ABC)}{Per(\Delta PQR)}$

LP:

$\Delta ABC \sim \Delta PQR$, if $AB = 4cm$, $PQ = 16cm$, AD & PM are medians, $AD = 8$, find PM.

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

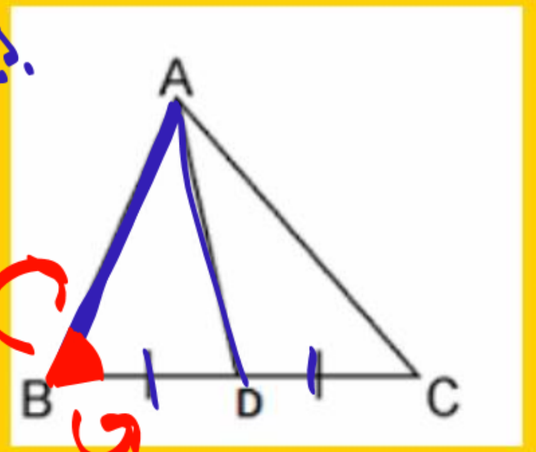
$$\frac{4}{16} = \frac{8}{PM} \Rightarrow PM = 32\,cm$$

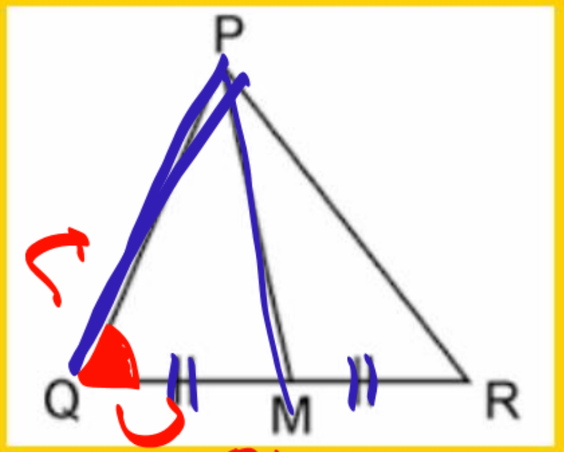
V. IMP

 # LP : If AD and PM are median of triangle ABC and PQR , respectively where triangle ABC is ~~co~~ similar to triangle PQR . Prove that AB/PQ = AD/PM.

Given :- $\Delta ABC \sim \Delta PQR$, AD, PM → medians.

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





Proof :- given $\Delta ABC \sim \Delta PQR$

by cpct :- $\angle A = \angle P$, $\angle B = \angle Q$, $\angle C = \angle R$ (1)

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

$\frac{AB}{PQ} = \frac{2BD}{2QM}$

$\frac{AB}{PQ} = \frac{BD}{QM}$ (II)

$\angle B = \angle Q$ (from I)

$\frac{AB}{PQ} = \frac{BD}{QM}$ (from II)

SAS → $\Delta ABD \sim \Delta PQM$

by cpct :- $\frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$

HP

अभय

LP : The perimeters of two similar triangles are 30cm and 20cm , respectively . If one side of the first triangle is 9cm long , find the length of the corresponding side of the second triangle .

Given $\begin{cases} \text{Per}(\Delta ABC) = 30\text{ cm} \\ \text{Per}(\Delta PQR) = 20\text{ cm} \end{cases}$

given, $AB = 9\text{cm}$

$PQ = ?$

We know, if $\Delta ABC \sim \Delta PQR$

then $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{\text{Per}(\Delta ABC)}{\text{Per}(\Delta PQR)}$

$\frac{9}{PQ} = \frac{30}{20}$

$\frac{x}{PQ} = \frac{3}{2}$

$PQ = 3 \times 2 = 6\text{cm}$


Bye

NCERT

THANK YOU

COODIES