



UDAAAN 2024

- FOR CLASS 10th STUDENTS

Lecture No.- 02

- Subject Name- **Mathematics**
- Chapter Name- **Triangles**



By- RITIK SIR

Topic to be Covered



Topic

Proof of converse of BPT

Topic

Important Questions

Recap of Previous Lecture



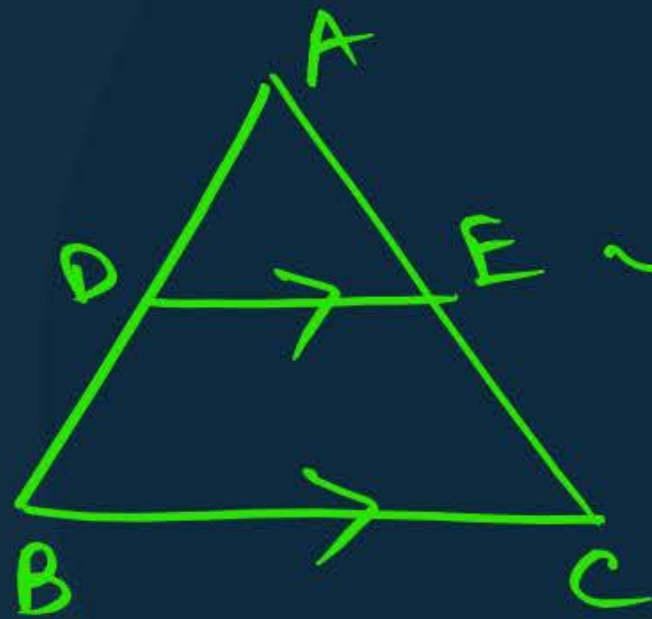
✓ Topic

Basic Proportionality Theorem
(Thales Theorem)

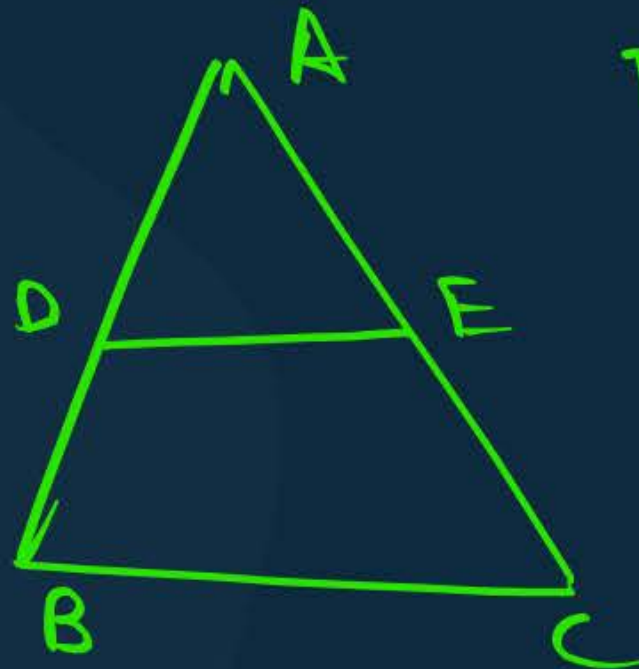
Topic

Converse of Basic Proportionality Theorem





$$\frac{AD}{DB} = \frac{AE}{EC}$$



If (अगर)

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$DE \parallel BC$



Topic : Theorem 2

Parallel

(Converse of Basic Proportionality Theorem)

If a line divides any two sides of a triangle in the same ratio, then the line must be parallel to the third side.

Gi: $\frac{AD}{DB} = \frac{AE}{EC}$ ②

To prove: $DE \parallel BC$

Construction: Let $DF \parallel BC$

Proof: If $DF \parallel BC$

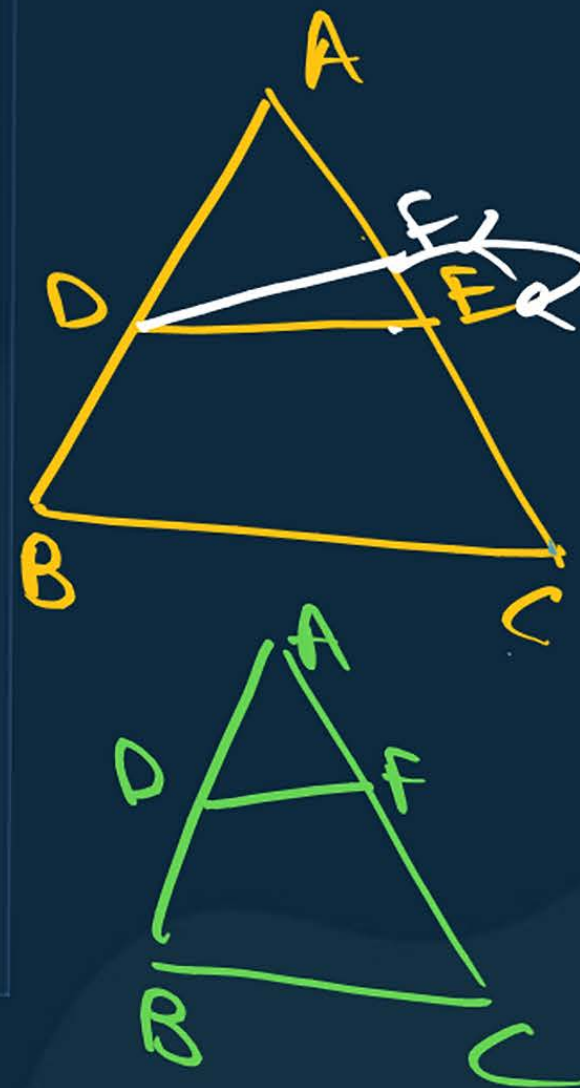
$$\frac{AD}{DB} = \frac{AF}{FC} \quad \text{①}$$

By ① and ②

$$\frac{AE}{EC} = \frac{AF}{FC}$$

add ① to both sides....

$$\frac{AE}{EC} + 1 = \frac{AF}{FC} + 1$$



$$\frac{AE}{EC} + 1 = \frac{AF}{FC} + 1$$

$$\frac{AE + EC}{EC} = \frac{AF + FC}{FC}$$

$$\frac{\cancel{AC}}{EC} = \frac{\cancel{AC}}{FC}$$

$$\frac{1}{EC} = \frac{1}{FC}$$

$$FC = EC$$

This means that 'E' and 'F' coincide.

$$\overset{O}{\underset{OO}{DE \parallel BC}}$$

Hence proved



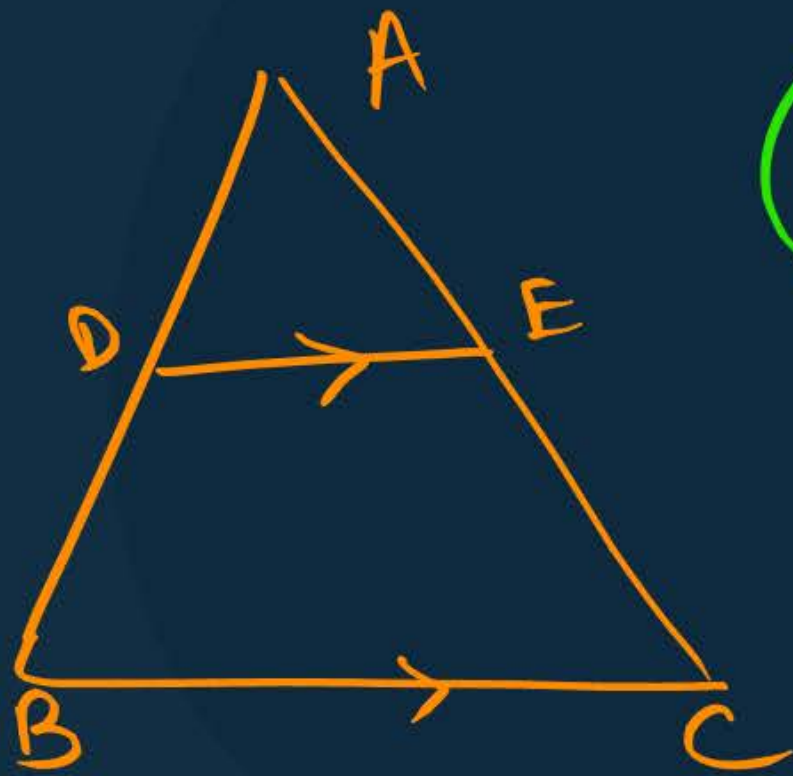
Topic : Corollary

Theorem sey koi cheez nikali hai.

If in a $\triangle ABC$, a line $DE \parallel BC$, intersects AB in D and AC in E , then :

$$(i) \quad \frac{AB}{AD} = \frac{AC}{AE}$$

$$(ii) \quad \frac{AB}{DB} = \frac{AC}{EC}$$



By B.P.T

①

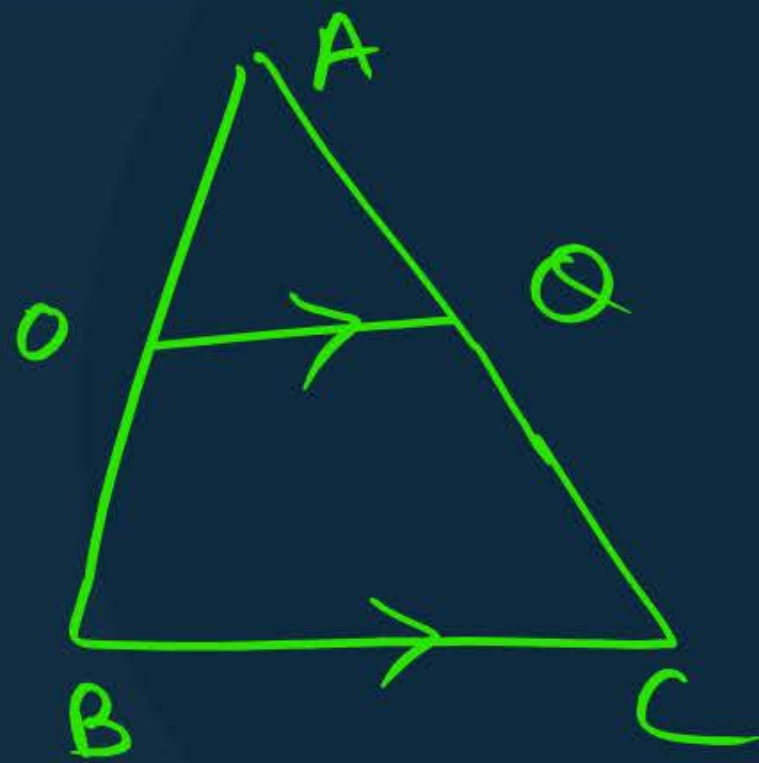
$$\frac{AD}{DB} = \frac{AE}{EC}$$

②

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

③

$$\frac{DB}{AB} = \frac{EC}{AC}$$



By B.P.T

$$\textcircled{1} \quad \frac{AO}{OB} = \frac{AQ}{QC}$$

$$\textcircled{2} \quad \frac{AO}{AB} = \frac{AQ}{AC}$$

$$\textcircled{3} \quad \frac{OB}{AB} = \frac{QC}{AC}$$

$$\frac{AB}{AO} = \frac{AC}{AQ}$$

$$\frac{AB}{OB} = \frac{AC}{QC}$$

#Q. In fig. $PQ \parallel BC$ and $PR \parallel CD$. Prove that

(i) $\frac{AR}{AD} = \frac{AQ}{AB}$

(ii) $\frac{QB}{AQ} = \frac{DR}{AR}$

use 1st wala

$PQ \parallel BC$

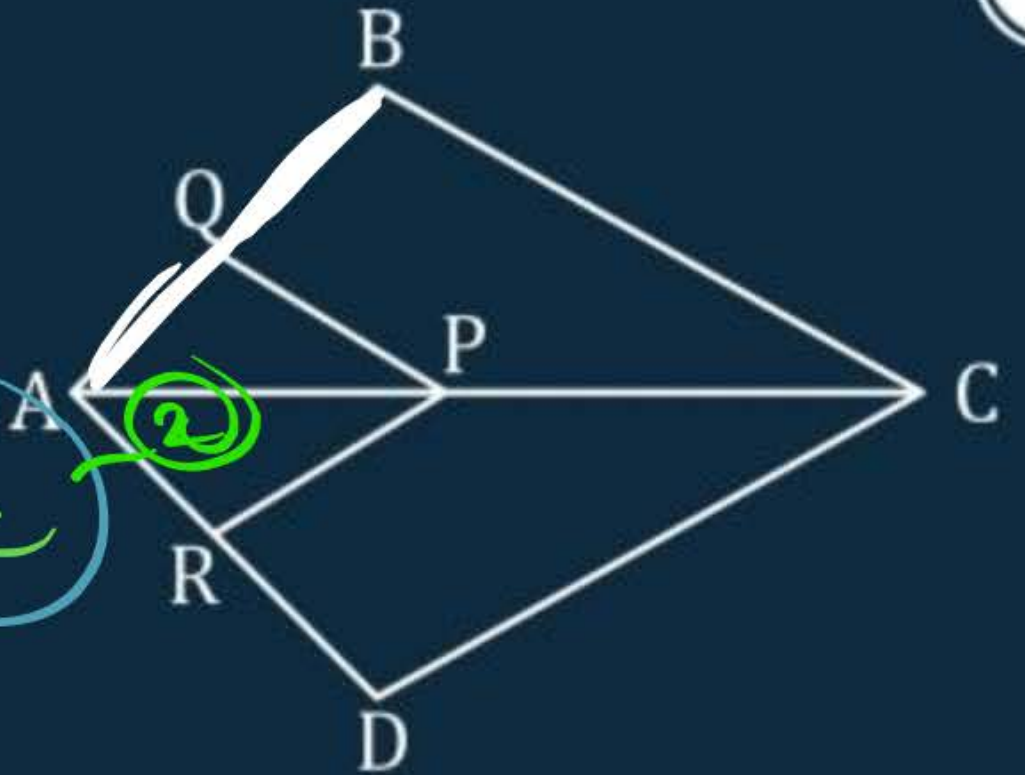
① $\frac{AP}{AC} = \frac{AQ}{AB}$

$\frac{AQ}{AB} = \frac{AR}{AD}$

$PR \parallel CD$

$\frac{AR}{AD} = \frac{AP}{AC}$

H.P



#Q. $DE \parallel AC$ and $DC \parallel AP$, prove that $\frac{BE}{EC} = \frac{BC}{CP}$

$DE \parallel AC$

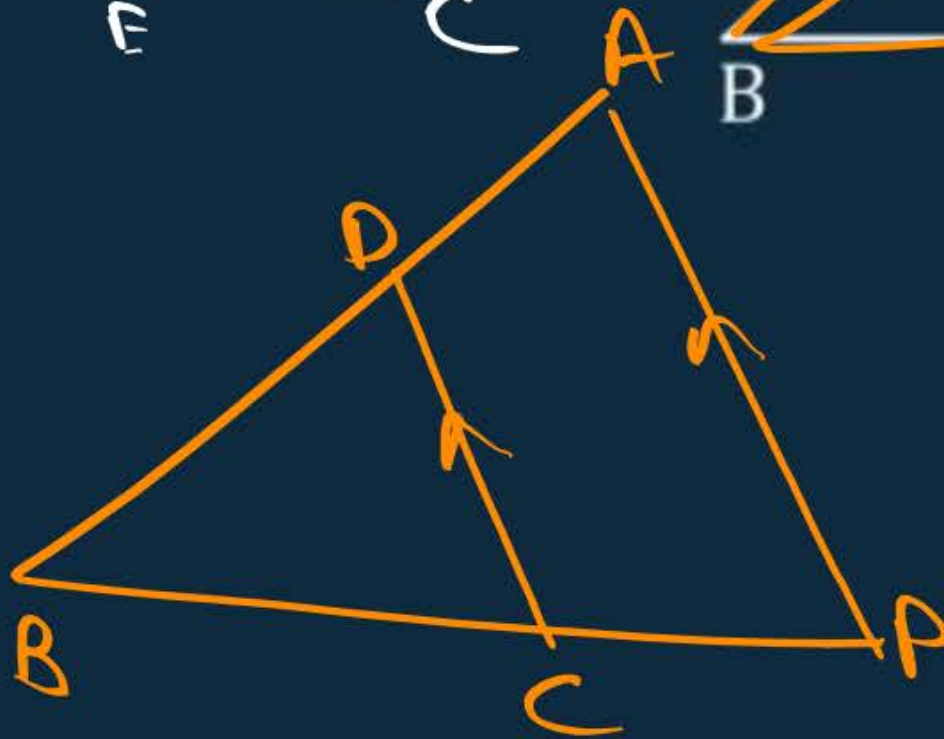
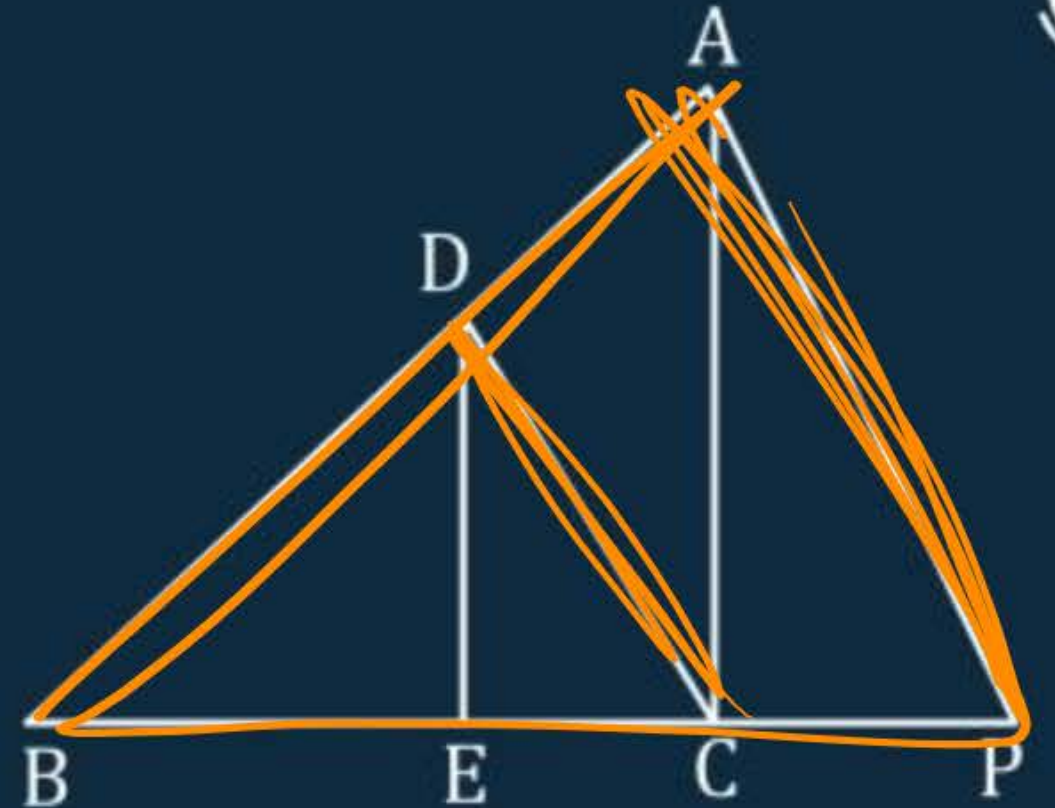
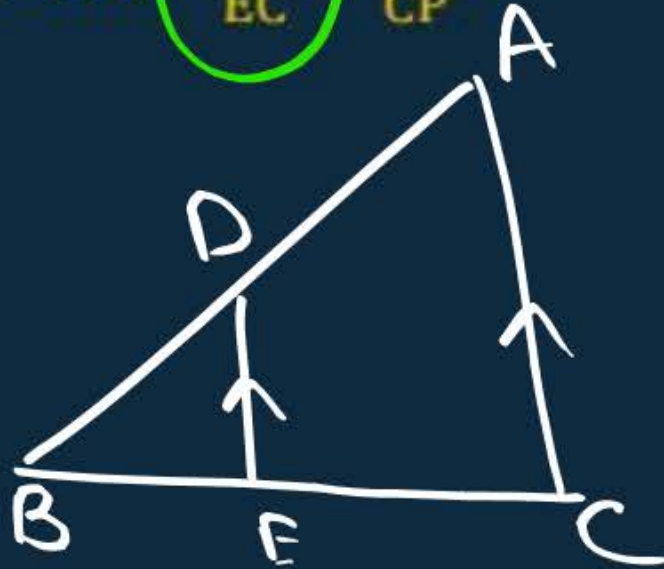
$$\frac{BE}{EC} = \frac{BD}{DA} \quad \text{--- (1)}$$

$DC \parallel AP$

$$\frac{BC}{CP} = \frac{BD}{DA} \quad \text{--- (2)}$$

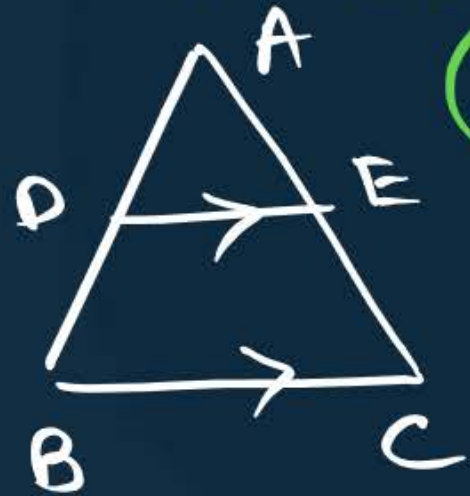
From (1) and (2)

$$\frac{BE}{EC} = \frac{BC}{CP} \quad \text{--- H.P.}$$



#Q. In fig. $DE \parallel BC$ and $CD \parallel EF$. Prove that $AD^2 = AB \times AF$.

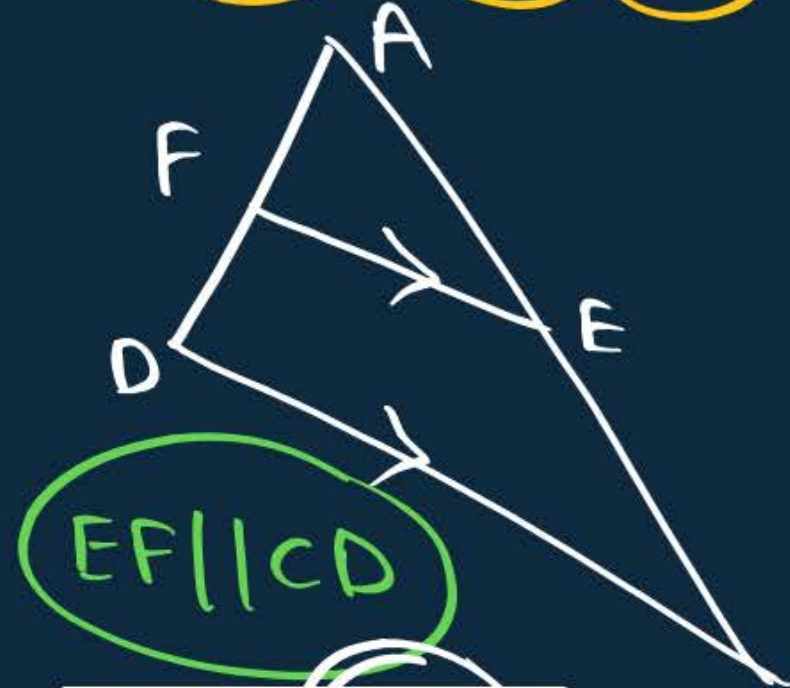
[CBSE 2007]



$DE \parallel BC$

By B.P.T....

$$\frac{AD}{AB} = \frac{AE}{AC} \quad \text{--- (1)}$$



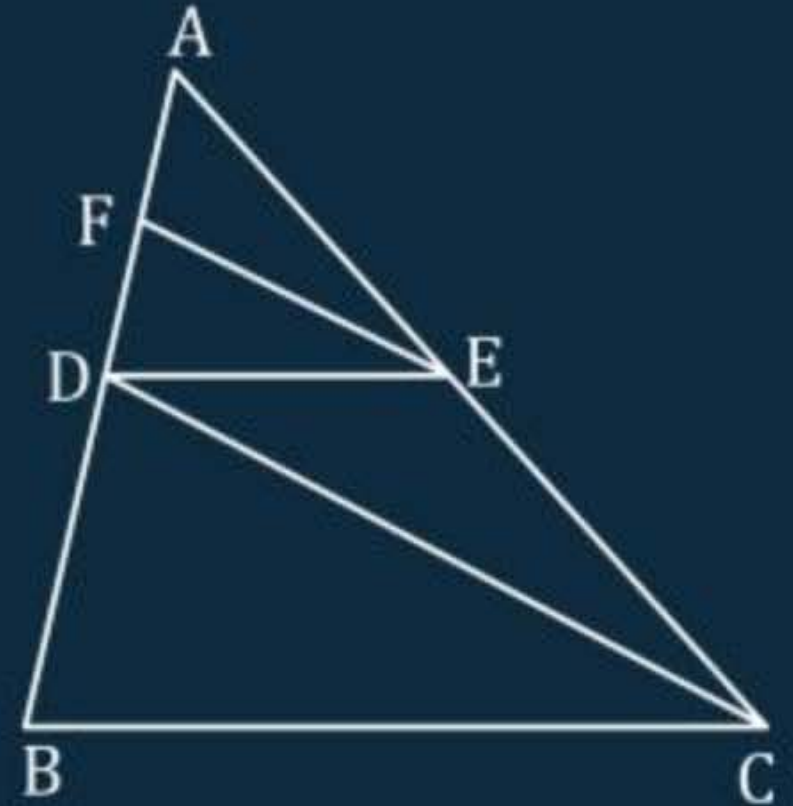
$EF \parallel CD$

$$\frac{AF}{AD} = \frac{AE}{AC} \quad \text{--- (2)}$$

By (1) and (2)

$$\frac{AD}{AB} = \frac{AF}{AD}$$

$$AD^2 = AB \times AF \quad \text{--- H.P}$$



#Q. Let X be any point on the side BC of a triangle ABC . If XM and XN are drawn parallel to BA and CA meeting CA , BA in M , N respectively; MN meets BC produced in T , prove that $TX^2 = TB \times TC$.

Gi: $XM \parallel BA$ & $XN \parallel CA$

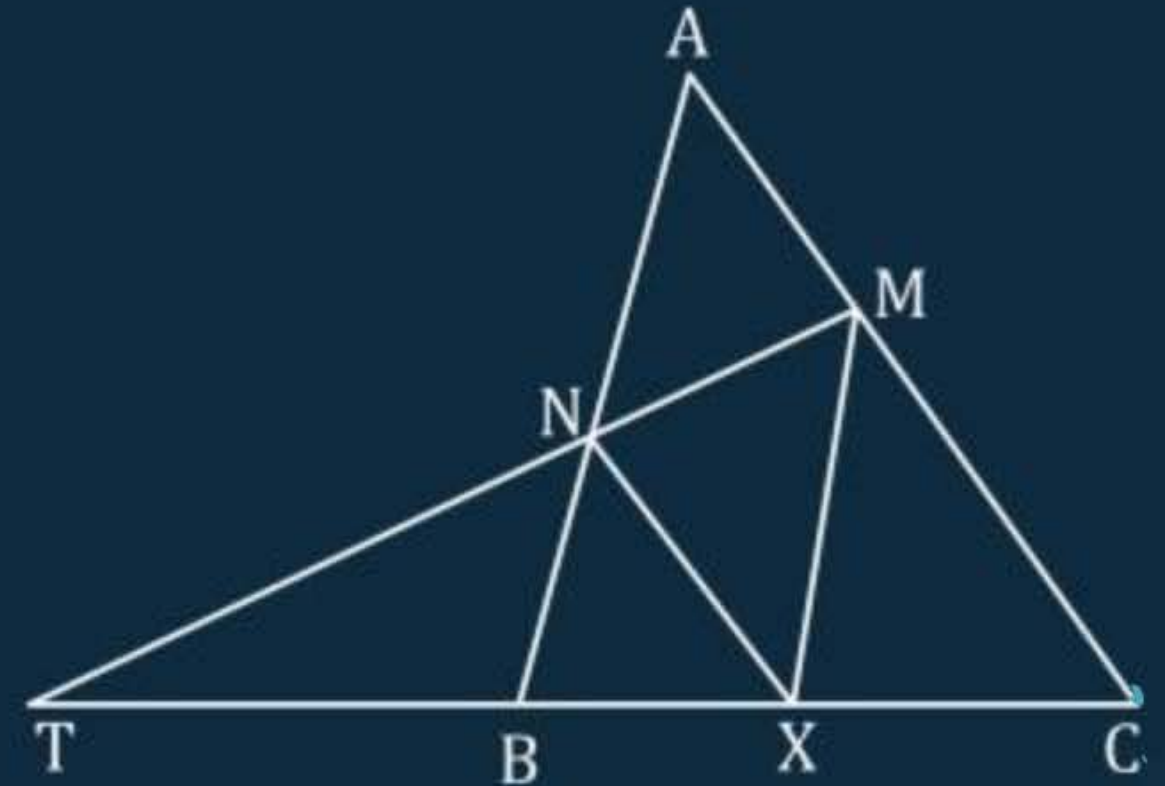
To prove: $TX^2 = TB \times TC$

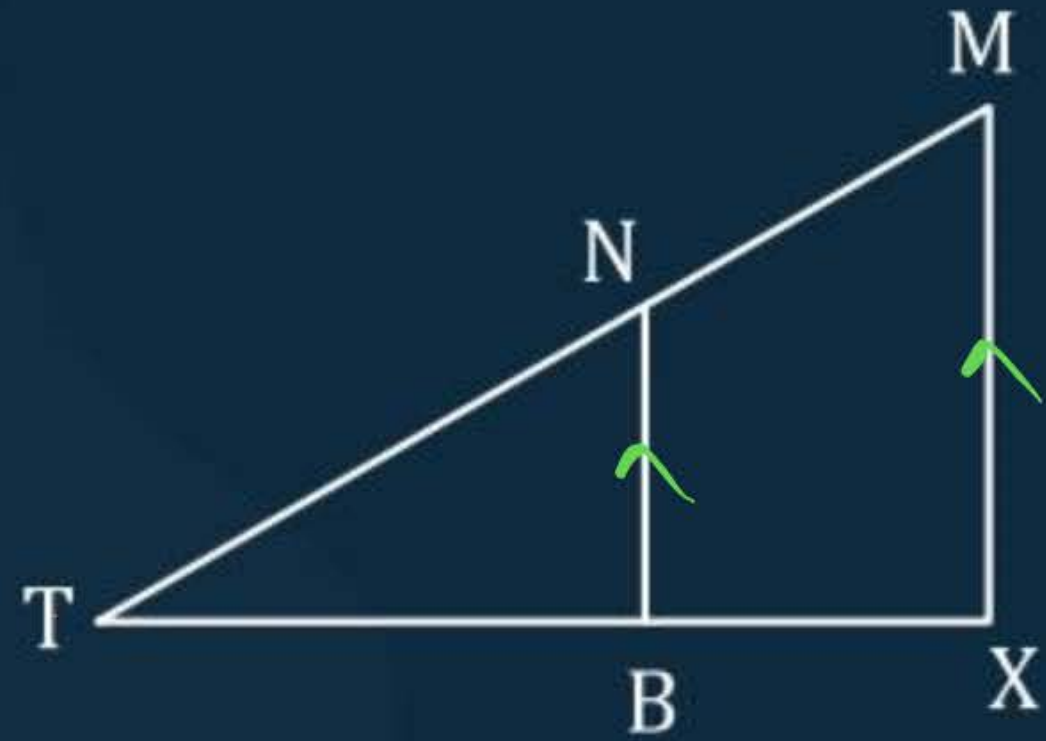
Proof: Since $XM \parallel BA$

$\therefore XM \parallel NB$

Since $XN \parallel CA$

$\therefore XN \parallel CM$





By B.P.T--

$$\frac{TB}{TX} = \frac{TN}{TM}$$



By B.P.T--

$$\frac{TX}{TC} = \frac{TN}{TM}$$

$$\frac{TB}{TX} = \frac{TX}{TC}$$

$$TB \times TC = TX^2$$

H.P

#Q.

prove that the line joining the mid-points of any two sides

of a triangle is parallel - to the third side.

Given: $AD = DB$, $AE = EC$

To prove: $DE \parallel BC$

$$\frac{AD}{DB} = \frac{AE}{EC}$$

Proof

$$AD = DB$$

$$\frac{AD}{DB} = 1$$

①

$$AE = EC$$

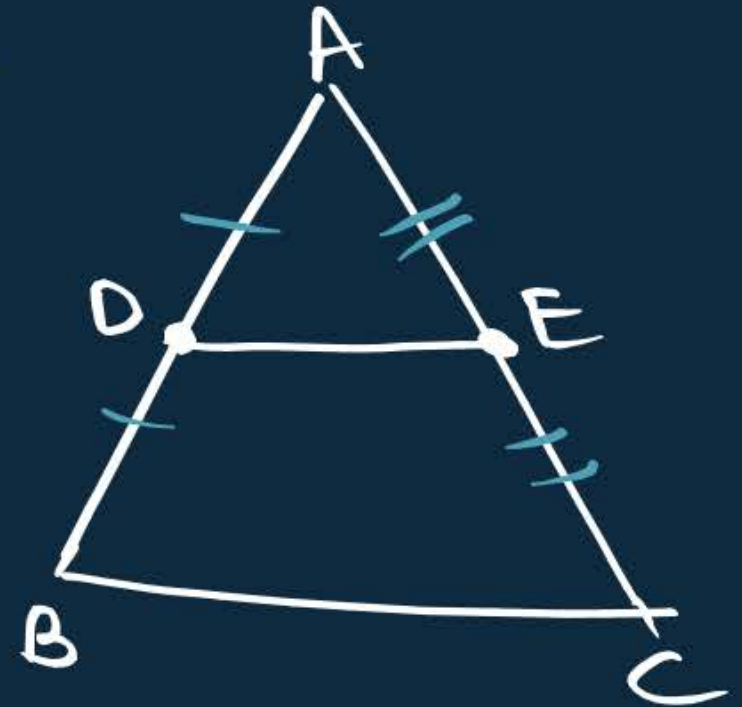
$$\frac{AE}{EC} = 1$$

②

∴

$$\frac{AD}{DB} = \frac{AE}{EC}$$

By c of B.P.T
 $DE \parallel BC$

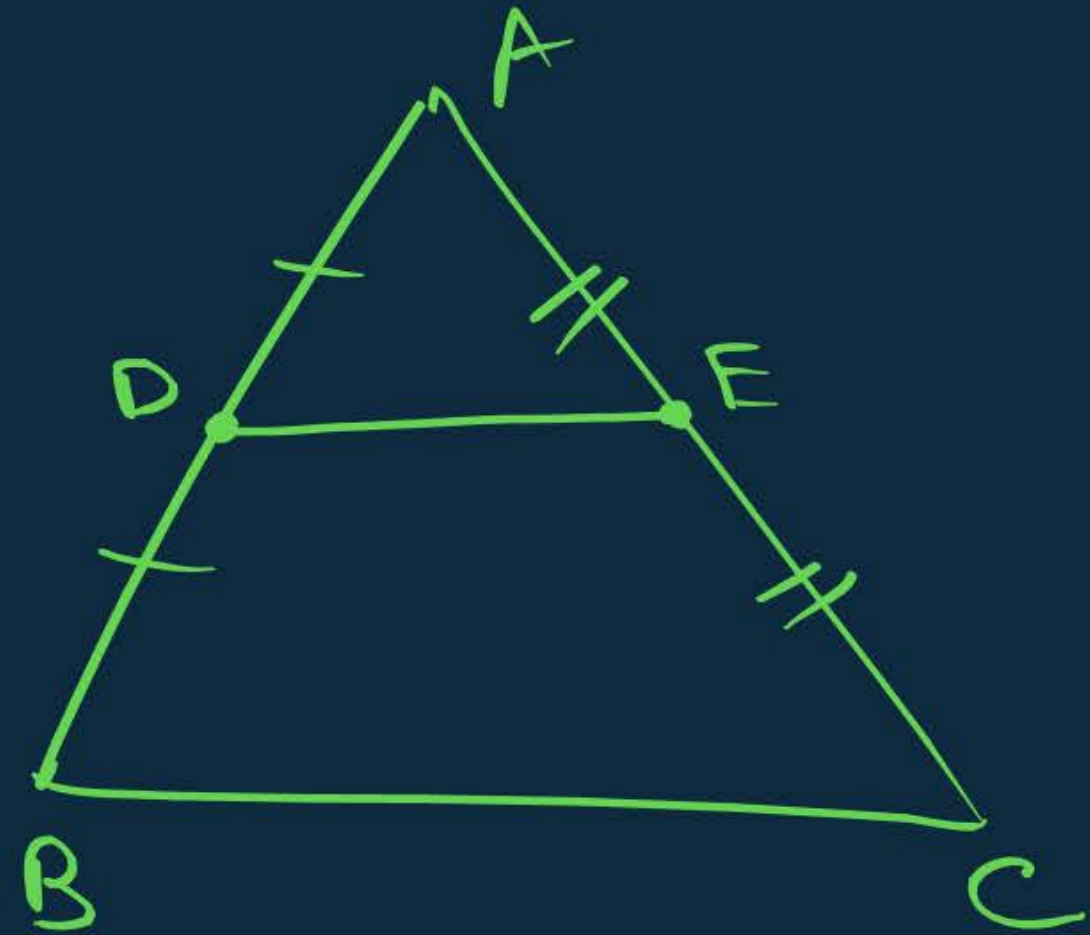




$$\rightarrow \boxed{AD = DB}$$

$$\rightarrow \boxed{\begin{array}{l} \angle ADE = \angle ABE \\ \angle DBE = \angle ABE \end{array}}$$

$$\rightarrow \boxed{\begin{array}{l} \frac{1}{2} AB = AD \\ \frac{1}{2} AB = DB \end{array}}$$



#Q. ABCD is a trapezium in which $AB \parallel DC$ and its diagonal intersect each other at the point O. Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

Given: ABCD is a trapezium
where $AB \parallel CD$ -

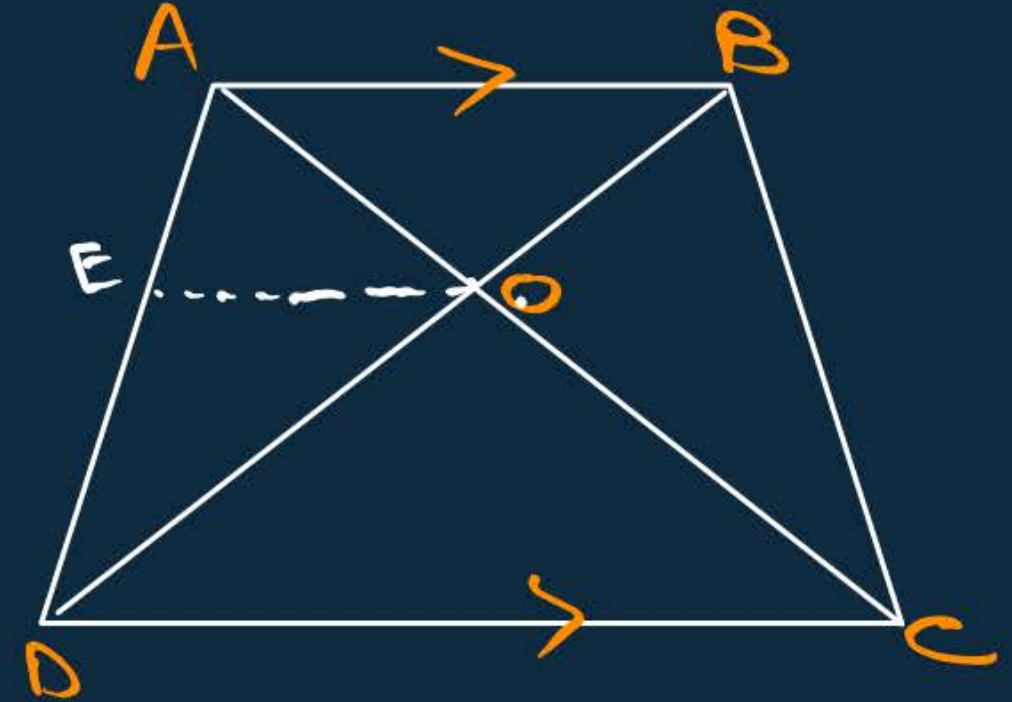
To prove: $\frac{AO}{BO} = \frac{CO}{DO}$

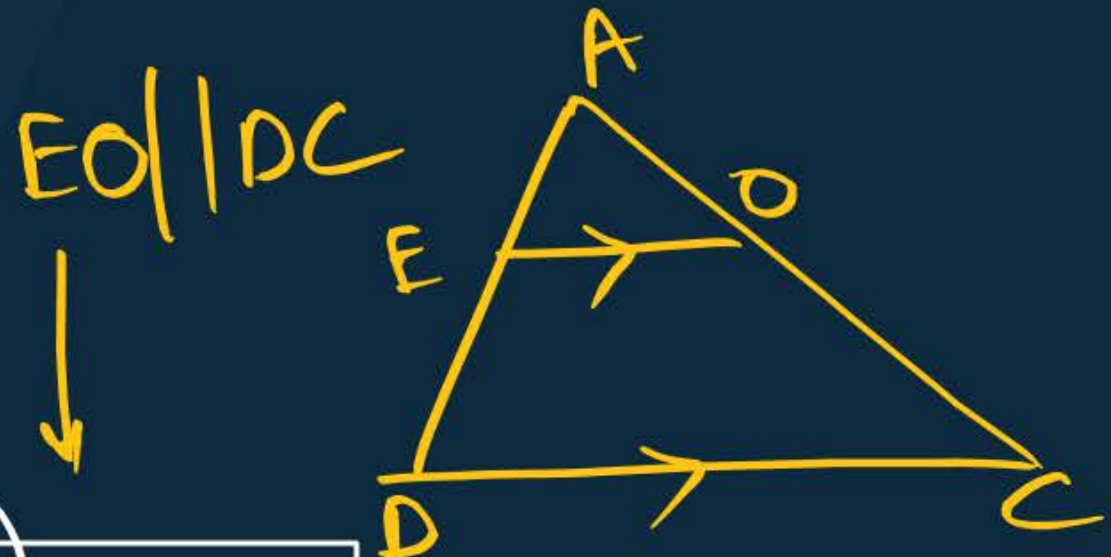
Construction: Draw $EO \parallel DC$ -

Proof: Since $EO \parallel DC$
 $\therefore EO \parallel AB$

$AB \parallel CD$
 $EO \parallel CD$

$AB \parallel EO$

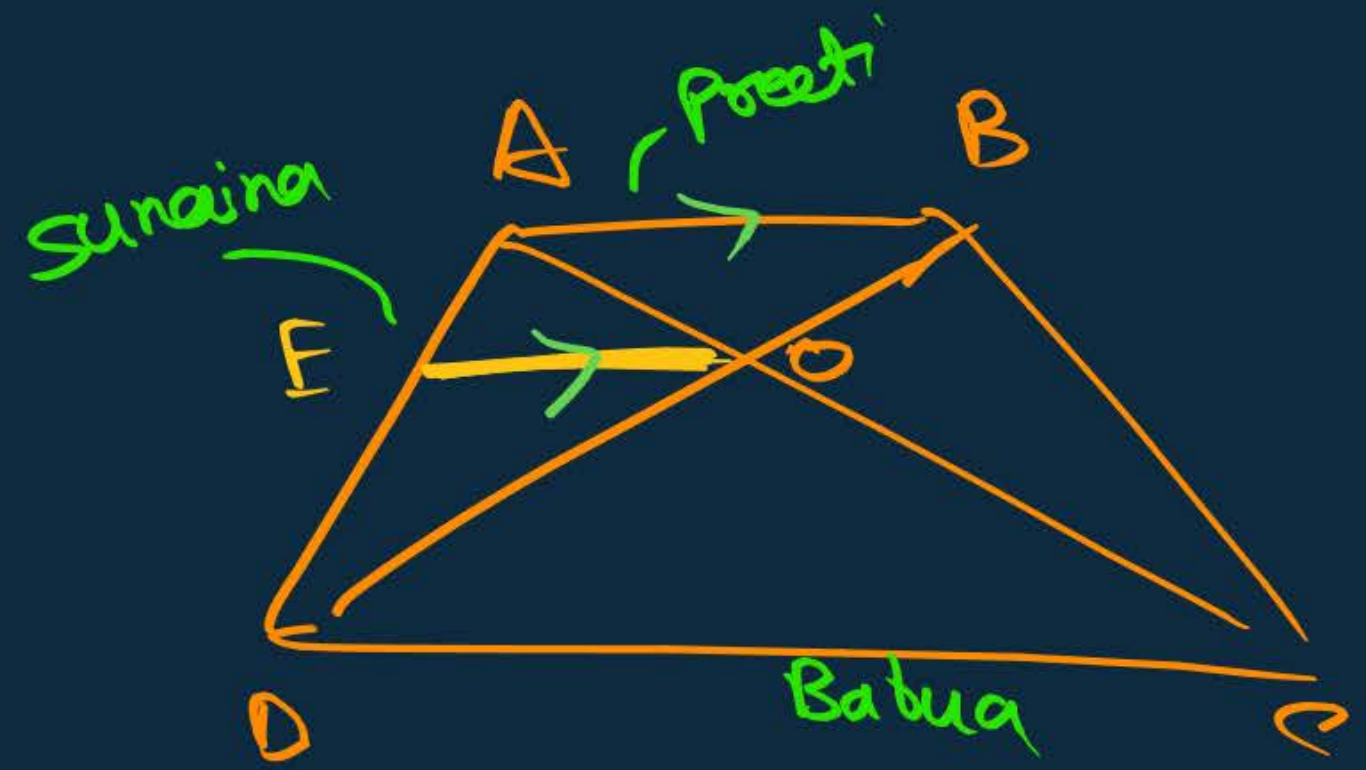
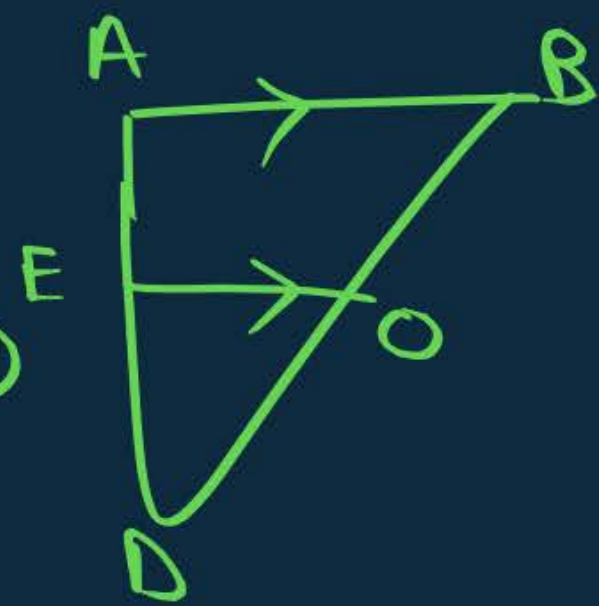




$$\frac{AE}{ED} = \frac{AO}{OC} \quad \text{--- (1)}$$

$EO \parallel AB$

$$\frac{AE}{ED} = \frac{BO}{OD} \quad \text{--- (2)}$$

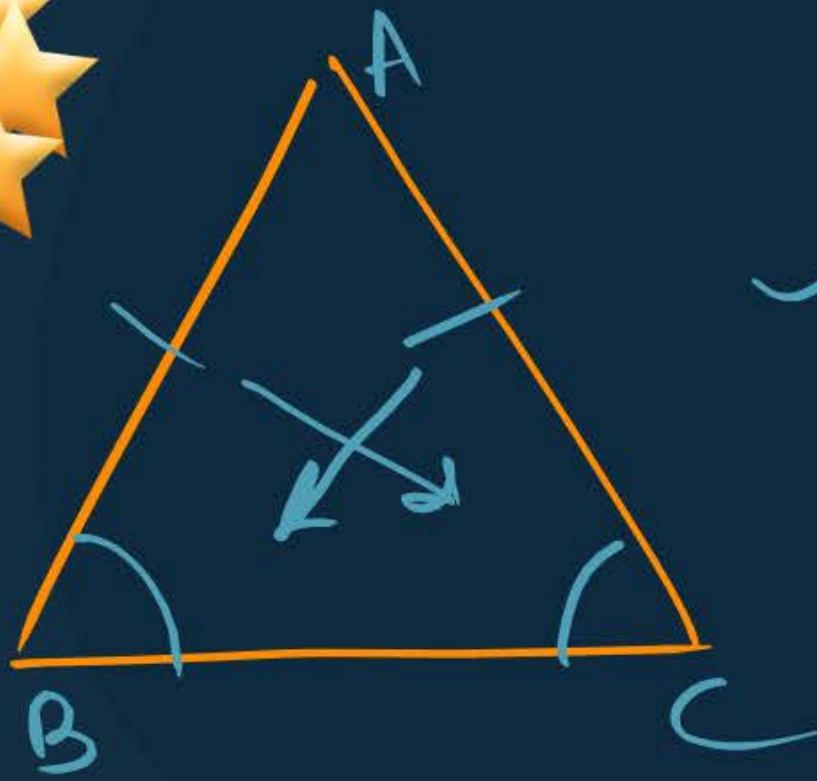


By (1) and (2)

$$\frac{AO}{OC} = \frac{OB}{OD}$$

$$\frac{AO}{OB} = \frac{OC}{OD} \quad \text{--- H.P}$$

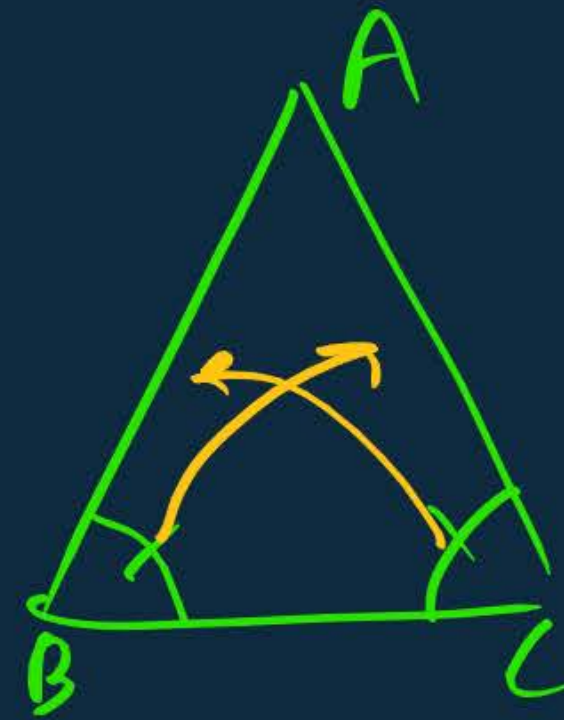
H.P



$$AB = AC$$

$$\angle C = \angle B$$

Angles opposite to equal sides are equal.



If (oqas) $\angle B = \angle C$

$$AB = AC$$

Sides opp. to equal angles are equal.

#Q. $\frac{PS}{SQ} = \frac{PT}{TR}$ and $\angle PST = \angle PRQ$. Prove that ΔPQR is an isosceles. [NCERT]

GI: $\frac{PS}{SQ} = \frac{PT}{TR}$ ①, $\angle PST = \angle PRQ$ ①

To prove: ΔPQR is isosceles.

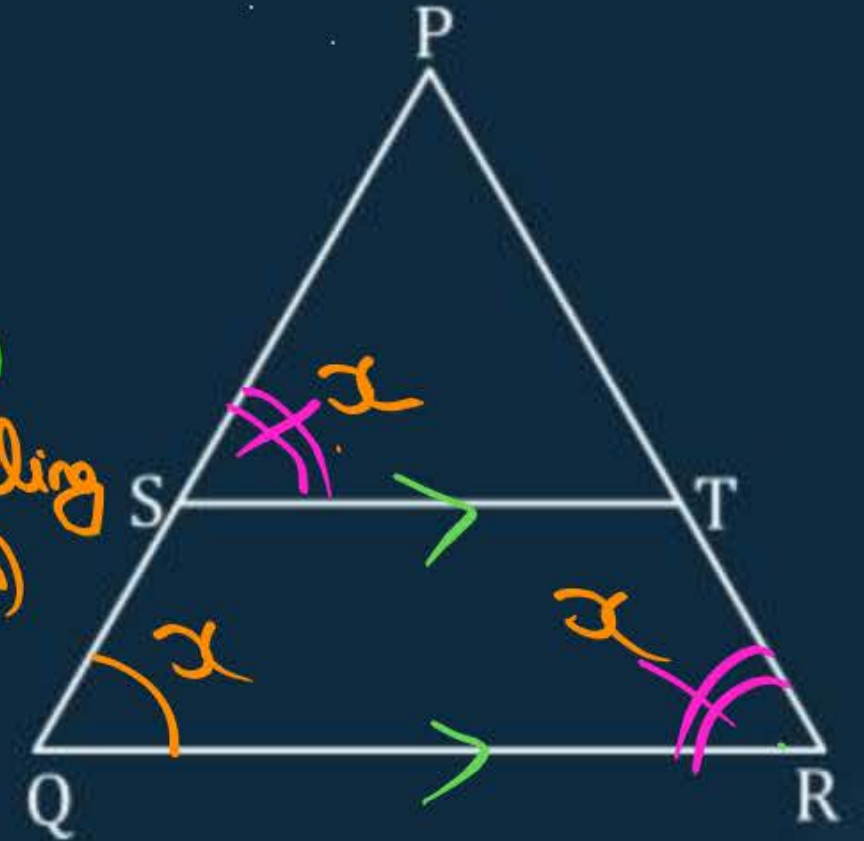
Proof: From eqⁿ ①
 $ST \parallel QR$

(By converse of B.P.T)

Since $ST \parallel QR$
 $\angle PST = \angle PRQ$ ②
(Corresponding angles)

By ① and ②
 $\angle PRQ = \angle PQR$

Hence ΔPQR is isosceles...



At the end of class



@cuteladdi07

Via MemeChat

Kisi ko kuch doubt
ho to puch lo?

me

Sir ye aap konsa
subject padha rahe the!

#Q. ABCD is a parallelogram, P is a point on side BC and DP when produced meets AB produced at L. Prove that $\frac{DP}{PL} = \frac{DC}{BL}$.

To prove: $\frac{DP}{PL} = \frac{DC}{BL}$

Proof: Since $AD \parallel BC$

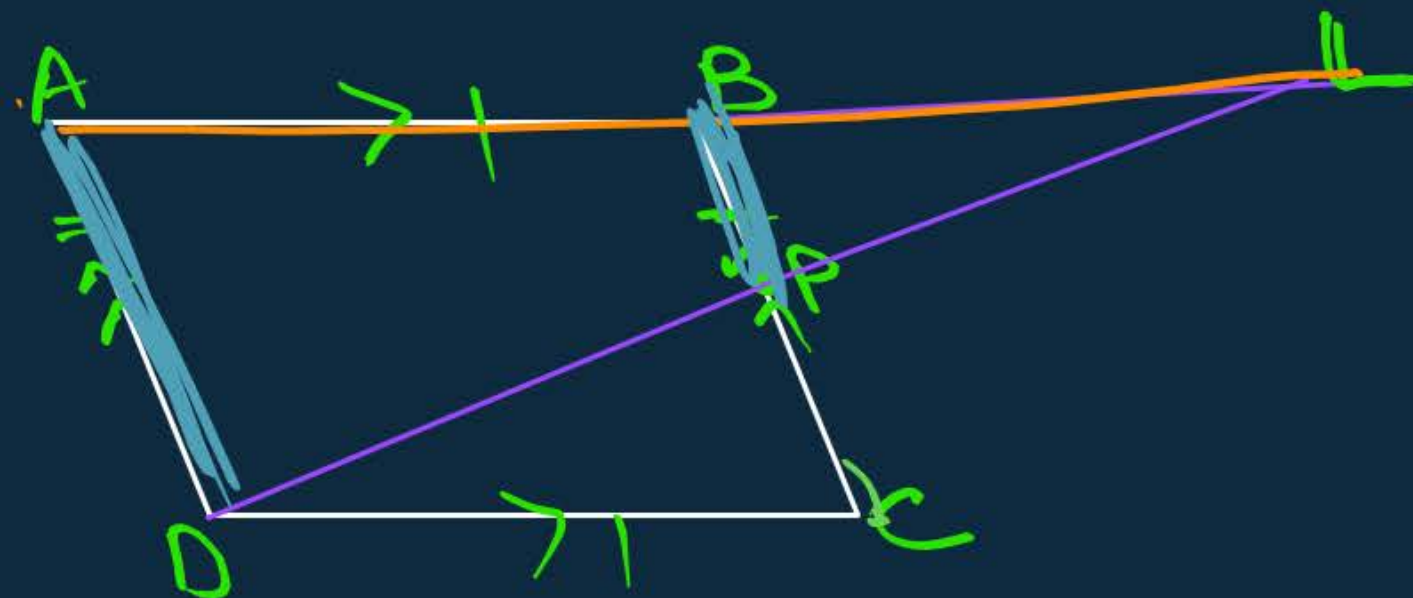
$\therefore AD \parallel BP$

By B.P.T. -

$\frac{DP}{PL} = \frac{AB}{BL}$

$\frac{DP}{PL} = \frac{DC}{BL}$ H.P

$(\because AB = DC)$



#Q. If D and E are points on side AB and AC respectively of a $\triangle ABC$ such that $DE \parallel BC$ and $BD = CE$. Prove that $\triangle ABC$ is isosceles. [CBSE 2007, 2009]

H.W

