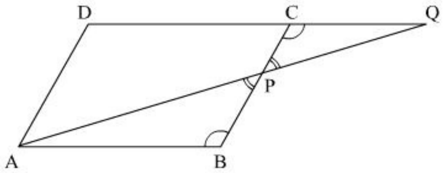
Triangles Ex 4.5 Q15

Answer :

Given:

ABCD is a parallelogram and APQ is a straight line meeting BC at P and DC produced at Q.



To Prove:

The rectangle obtained by BP and DQ is equal to the rectangle contained by AB and BC. We need to prove that $\mathrm{BP} \times \mathrm{DQ} = \mathrm{AB} \times \mathrm{BC}$

Proof:

In ΔABP and ΔQCP, we have

∠ABP = ∠QCP (Alternate angles as AB || DC)

∠BPA = ∠QPC (Vertically opposite angles)

By AA similarity, we get

ΔABP ~ ΔQCP

We know that corresponding sides of similar triangles are proportional.

$$\Rightarrow \frac{\mathrm{AB}}{\mathrm{QC}} = \frac{\mathrm{BP}}{\mathrm{CP}} = \frac{\mathrm{AP}}{\mathrm{QP}}$$

$$\Rightarrow \frac{\mathrm{AB}}{\mathrm{QC}} = \frac{\mathrm{BP}}{\mathrm{CP}}$$

$$\Rightarrow \mathrm{AB} \times \mathrm{CP} = \mathrm{QC} \times \mathrm{BP}$$

Adding $\mathrm{AB} \times \mathrm{BP}$ in both sides, we get

$$\Rightarrow \mathrm{AB} \times \mathrm{CP} + \mathrm{AB} \times \mathrm{BP} = \mathrm{QC} \times \mathrm{BP} + \mathrm{AB} \times \mathrm{BP}$$

$$\Rightarrow \mathrm{AB} \times (\mathrm{CP} + \mathrm{BP}) = (\mathrm{QC} + \mathrm{AB}) \times \mathrm{BP}$$

$$\Rightarrow \mathrm{AB} \times (\mathrm{CP} + \mathrm{BP}) = (\mathrm{QC} + \mathrm{CD}) \times \mathrm{BP}$$

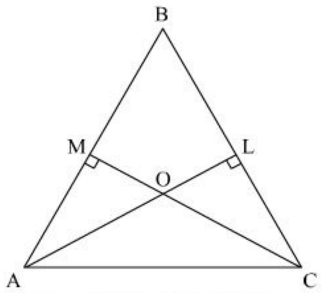
$$(\mathrm{ABCD\ is\ a\ parallelogram},\ \mathrm{AB} = \mathrm{CD})$$

$$\Rightarrow \mathrm{AB} \times \mathrm{BC} = \mathrm{DQ} \times \mathrm{BP}$$

$$\Rightarrow \mathrm{BP} \times \mathrm{DQ} = \mathrm{AB} \times \mathrm{BC}$$

Triangles Ex 4.5 Q16

Answer :



(i). In $\triangle OMA$ and $\triangle OLC$,

$\angle AOM = \angle COL$ [Vertically opposite angles]

$\angle OMA = \angle OLC$ [90° each]

$\Rightarrow \triangle OMA \sim \triangle OLC$ [AA similarity]

(ii). Since $\triangle OMA \sim \triangle OLC$ by AA similarity, then

$\frac{OM}{OL} = \frac{OA}{OC} = \frac{MA}{LC}$ [Corresponding sides of similar triangles are proportional]

$\Rightarrow \frac{OA}{OC} = \frac{OM}{OL}$

*********** END **********