Areas of Parallelograms and Triangles Ex 15.3 Q9

**Answer :**

**Given:**

(1) ABCD is a quadrilateral,

(2) Diagonals AC and BD of quadrilateral ABCD intersect at P.

**To prove:** Area of$\Delta$ APB $\times$Area of $\Delta$CPD = Area of $\Delta$APD $\times$ Area of $\Delta$BPC

**Construction:** Draw AL perpendicular to BD and CM perpendicular to BD

**Proof:**

We know that

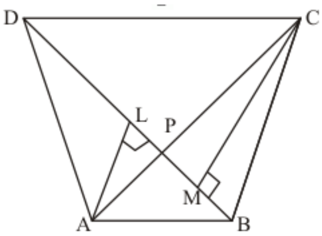
Area of triangle = $\frac{1}{2} \times$ base$\times$ height

Area of $\Delta$APD = $\frac{1}{2} \cdot DP \cdot AL$ ...... (1)

Area of $\Delta$BPC = $\frac{1}{2} \cdot CM \cdot BP$ ...... (2)

Area of $\Delta$APB = $\frac{1}{2} \cdot BP \cdot AL$ ...... (3)

Area of $\Delta$CPD = $\frac{1}{2} \cdot CM \cdot DP$ ...... (4)




Therefore

$$\begin{aligned}\text{Area of } \Delta APD \times \text{Area of } \Delta BPC &= \left(\frac{1}{2} \times DP \times AL\right) \times \left(\frac{1}{2} \times CM \times BP\right)\\ &= \left(\frac{1}{2} \times BP \times AL\right) \times \left(\frac{1}{2} \times CM \times DP\right)\\ &= \text{Area of } \Delta APB \times \text{Area of } \Delta CPD\end{aligned}$$

Hence it is proved that $\boxed{\text{Area of } \Delta APD \times \text{Area of } \Delta BPC = \text{Area of } \Delta APB \times \text{Area of } \Delta CPD}$

Areas of Parallelograms and Triangles Ex 15.3 Q10

**Answer :**

**Given:**

(1) ABC and ABD are two triangles on the same base AB,

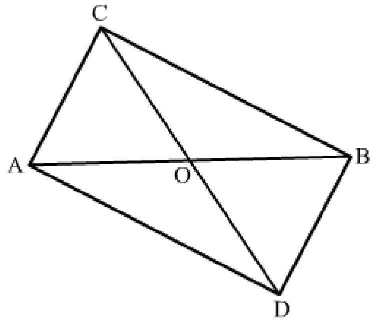
(2) CD bisect AB at O which means AO = OB

**To Prove:** Area of ΔABC = Area of ΔABD

**Proof:**

Here it is given that CD bisected by AB at O which means O is the midpoint of CD.

Therefore AO is the median of triangle ACD.




Since the median divides a triangle in two triangles of equal area

Therefore Area of ΔCAO = Area of ΔAOD ...... (1)

Similarly for Δ CBD, O is the midpoint of CD

Therefore BO is the median of triangle BCD.

Therefore Area of ΔCOB = Area of ΔBOD ...... (2)

Adding equation (1) and (2) we get

Area of ΔCAO + Area of ΔCOB = Area of ΔAOD + Area of ΔBOD

⇒ Area of ΔABC = Area of ΔABD

Hence it is proved that $\boxed{\text{Area of } \Delta ABC = \text{Area of } \Delta ABD}$

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