Areas of Parallelograms and Triangles Ex 15.3 Q26

Answer :

Given: ABCD and AEFD are two parallelograms

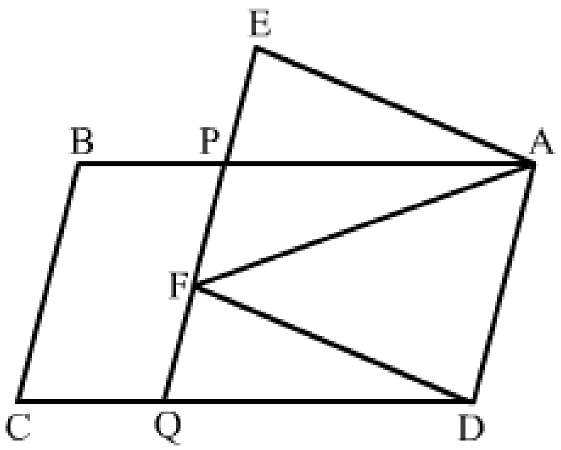
To prove:

(i) $PE = FQ$

(ii) $ar(\Delta APE) : ar(\Delta PFA) = ar(\Delta QFD) : ar(\Delta PFD$

(iii) $ar(\Delta PEA) = ar(\Delta QFD)$

Proof: (i) and (iii)



In ΔAPE and ΔDQF

$\angle APE = \angle DQF$

$AE = DF$

$\angle AEP = \angle DFQ$

$\Rightarrow APE \cong \Delta DQF$ (A.S.A congruence condition)

Therefore

$\boxed{PE = QF}$, and

$\boxed{ar(\Delta APE) = ar(\Delta DQF)}$ ......(1)

(ii) ΔPFA and ΔPFD are on the same base PF and between the same parallels PQ and AD.

$ar(\Delta PFA) = ar(\Delta PFD)$ ...... (2)

From (1) and (2) we get

$\boxed{\frac{ar(\Delta APE)}{ar(\Delta PFA)} = \frac{ar(\Delta DQF)}{ar(\Delta PFD)}}$

Areas of Parallelograms and Triangles Ex 15.3 Q27

Answer :

Given:

(1) ABCD is a parallelogram

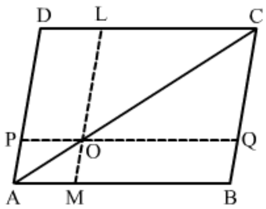
(2) O is any point of AC.

(3) PQ||AB and LM||AD

To prove: $ar(||^{gm}\ DLOP) = ar(||^{gm}\ BMOQ)$

Calculation:

We know that the diagonal of a parallelogram divides it into two triangles of equal area



Therefore we have

$$ar(\Delta ADC) = ar(\Delta ABC)$$

$$\Rightarrow ar(\Delta AOP) + ar(||^{gm}\ DLOP) + ar(\Delta OLC)$$

$$= ar(\Delta AOM) + ar(||^{gm}\ BMOQ) + ar(\Delta OQC) \quad ...... (1)$$

Since OC and AO are diagonals of parallelogram OQCL and AMOP respectively. Therefore

$$ar(\Delta APO) = ar(\Delta AMO) \quad ...... (2)$$

$$ar(\Delta OLC) = ar(\Delta OQC) \quad ...... (3)$$

Subtracting (2) and (3) from (1) we get

$$ar(||^{gm}\ DLOP) = ar(||^{gm}\ BMOQ)$$

Hence we get the result $\boxed{ar(||^{gm}\ DLOP) = ar(||^{gm}\ BMOQ)}$

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