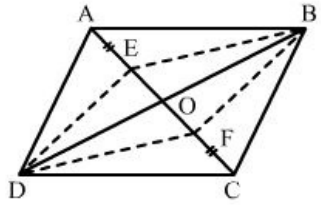
Understanding shapes-III special types of quadrilaterals Ex 17.1 Q28

Answer :



In the II^{gm} ABCD :

$\text{AO} = \text{OC}$..... (i) (diagonals of a parallelogram bisect each other)

$\text{AE} = \text{CF}$..... (ii) (given)

Subtracting (ii) from (i) :

$\text{AO} - \text{AE} = \text{OC} - \text{CF}$

$\text{EO} = \text{OF}$..... (iii)

In $\triangle\text{DOE}$ and $\triangle\text{BOF}$:

$\text{EO} = \text{OF}$ (proved above)

$\text{DO} = \text{OB}$ (diagonals of a parallelogram bisect each other)

$\angle\text{DOE} = \angle\text{BOF}$ (vertically opposite angles)

By SAS congruence :

$\triangle\text{DOE} \cong \triangle\text{BOF}$

$\therefore \text{DE} = \text{BF}$ (c.p.c.t)

In $\triangle\text{BOE}$ and $\triangle\text{DOF}$:

$\text{EO} = \text{OF}$ (proved above)

$\text{DO} = \text{OB}$ (diagonals of a parallelogram bisect each other)

$\angle\text{DOF} = \angle\text{BOE}$ (vertically opposite angles)

By SAS congruence :

$\triangle\text{DOE} \cong \triangle\text{BOF}$

$\therefore \text{DF} = \text{BE}$ (c.p.c.t)

Hence, the pair of opposite sides are equal. Thus, DEBF is a parallelogram.

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