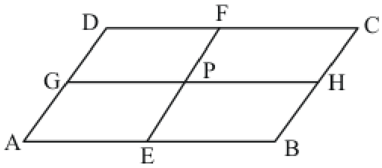
Quadrilaterals Ex 14.4 Q17

Answer :

ABCD is a parallelogram with *E* and *F* as the mid-points of *AB* and *CD* respectively.



We need to prove that $GP = PH$

Since *E* and *F* are the mid-points of *AB* and *CD* respectively.

Therefore,

$BE = \frac{1}{2}AB$, $AE = BE$

And

$DF = \frac{1}{2}CD$, $DF = CF$

Also, *ABCD* is a parallelogram. Therefore, the opposite sides should be equal.

Thus,

$$AB = CD$$
$$\frac{1}{2}AB = \frac{1}{2}CD$$
$$BE = CF$$

Also, $BE \parallel CF$ (Because $AB \parallel CD$)

Therefore, *BEFC* is a parallelogram

Therefore, *BEFC* is a parallelogram

Then, $BC \parallel EF$ and $BE = PH$ ...... (i)

Now, $BC \parallel EF$

Thus, $AD \parallel EF$ (Because $BC \parallel AD$ as *ABCD* is a parallelogram)

We get,

AEFD is a parallelogram

Then, we get:

$AE = GP$ ...... (ii)

But, *E* is the mid-point of *AB*.

Therefore,

$AE = BE$

Using (i) and (ii), we get:

$\boxed{GP = PH}$

Hence proved.

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