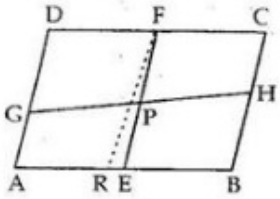
Exercise 9C

Question 2:

Given : A parallelogram ABCD in which E and F are the mid points of AB and CD. A line segment GH cuts EF at P.



To prove : GP = PH

Proof : AD, EF and BC are three line segments and DC and AB are two transversal.

The intercepts made by the line on transversal AB and CD are equal because,

$AE = EB$

and $DF = FC$

We need to prove that FE is parallel to AD.

Let us prove by the method of contradiction.

Let us assume that FE is not parallel to AD.

Now, draw FR parallel to AD.

Intercept Theorem: If there are three parallel lines and the intercepts made by them on one transversal are equal then the intercept on any other transversal are also equal.

Thus, by Intercept Theorem, AR = RB because

$DF = FC$

But $AE = EB$ [Given]

There cannot be two mid points R and E of AB.

Hence our assumption is wrong.

So, $AD \parallel EF \parallel BC$

Now, again by Intercept Theorem, we have

$GP = PH$

because GH is transversal and intecept made by AD, EF and BC on GH are equal as DF = FC.

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