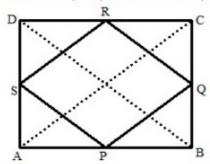


Exercise 9C

Question 9:

Given: ABCD is a rectangle and P, Q, R and S are the mid points of AB, BC, CD and DA respectively.



To prove: PQRS is a rhombus. Construction: Join AC and BD

Proof: In  $\triangle ABC$ ,

P and Q are the mid - points of AB and BC.

Midpoint Theorem: The line segment joining the midpoints of any two sides of a triangle is parallel to the third side and

equal to half of it.

So by Mid - point Theorem,

$$PQ \parallel AC \text{ and } PQ = \frac{1}{2}AC$$

Similarly, from  $\Delta ADC$ ,

$$RS \parallel AC$$
 and  $RS = \frac{1}{2}AC$ 

$$\Rightarrow$$
 PQ || RS and PQ = RS =  $\frac{1}{2}$  AC.....(1)

Now, in ABAD,

P and S are the mid – points of AB and AD.

So by Mid - point Theorem, we have

PS || BD and PS = 
$$\frac{1}{2}$$
DB

Similarly, from ABCD,

$$RQ \parallel BD$$
 and  $RQ = \frac{1}{2}DB$ 

$$\Rightarrow$$
 PS || RQ and PS = RQ =  $\frac{1}{2}$ DB.....(2)

The diagonals of a rectangle are equal

From (1), (2) and (3) we have  $PQ \parallel RS$  and  $PS \parallel RQ$  and

:. PQRS is a rhombus.