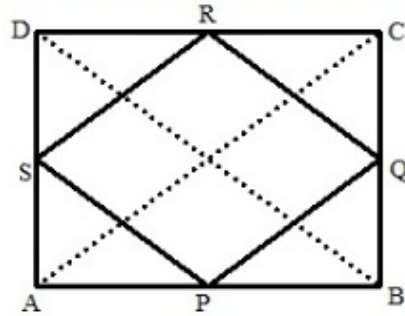




Exercise 9C

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 $\triangle ADC$,

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

$$\Rightarrow PQ \parallel RS \text{ and } PQ = RS = \frac{1}{2} AC \dots\dots(1)$$

Now, in $\triangle BAD$,

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

So by Mid – point Theorem, we have

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

Similarly, from $\triangle BCD$,

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

$$\Rightarrow PS \parallel RQ \text{ and } PS = RQ = \frac{1}{2} DB \dots\dots(2)$$

The diagonals of a rectangle are equal

$$\therefore AC = BD \dots\dots(3)$$

From (1), (2) and (3) we have

$$PQ \parallel RS \text{ and } PS \parallel RQ \text{ and}$$

$$\therefore PQ = QR = RS = SP$$

\therefore PQRS is a rhombus.

***** END *****

