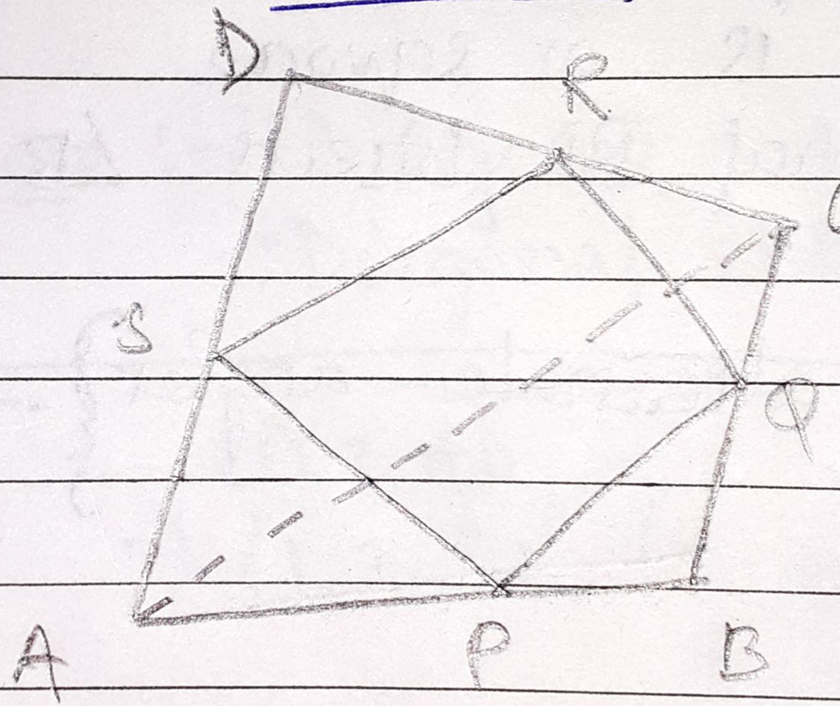
H.W
29.7.21

1.Aru.

Ex. 8.2



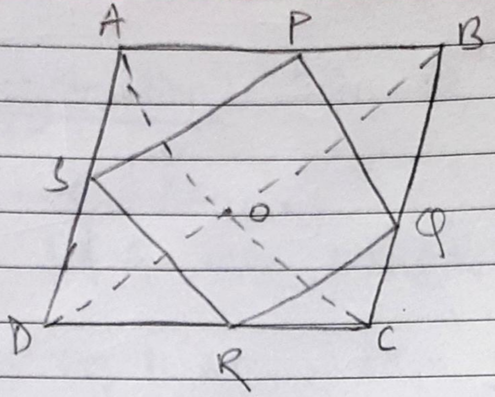
In ΔADC,
S & R are the midpoints of DA & DC.
$SR = \frac{1}{2} AC$, $SR \parallel AC$ ——— (i.) (midpoint Theorem)

In ΔABC
~~RQ &~~ Point Q & P are the midpoints of BA & BC.

$PQ = \frac{1}{2} AC$, $PQ \parallel AC$ ——— (ii.) (midpoint theorem)

From (i.) & (ii.)
$SR = PQ$, $SR \parallel PQ$
$\therefore$ PQRS is a $\parallel$gm.

2. Ans:



In ΔABC, P & Q are mid-points of side AB & BC respectively.
$\therefore$ $PQ \parallel AC$, $PQ = \frac{1}{2} AC$ ——— (i.)

In ΔADC, R & S are mid-points of side CD & AD respectively.
$\therefore$ $RS \parallel AC$, $RS = \frac{1}{2} AC$ ——— (ii.)

From (i.) & (ii.)
$PQ \parallel RS$, $PQ = RS$
Since in quadrilateral PQRS, one pair of opposite sides is equal & parallel to each other.
$\therefore$ PQRS is a $\parallel$gm.

Let the diagonals of rhombus ABCD intersect each other at point O.
In quadrilateral OMQN,
$MQ \parallel ON$ ($\because PQ \parallel AC$)
$QN \parallel OM$ ($\because QR \parallel BD$)

Therefore, OMQN is a $\parallel$gm.
$\therefore$ $\angle MQN = \angle NOM$
$\angle PQR = \angle NOM$

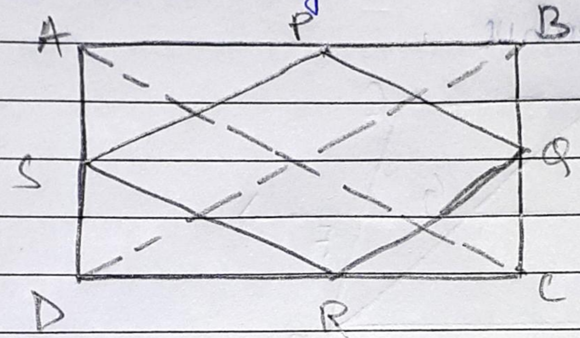
However, $\angle NOM = 90^\circ$ (Diagonals of a rhombus are perpendicular to each other)

$\therefore \angle PQR = 90^\circ$

PQRS is a ||gm having one of its interior angles is 90°.

$\therefore$ PQRS is a rectangle.

3. Ans:



Let us join AC & BD

In ΔABC,

P & Q are the mid-points of AB & BC respectively.

$\therefore PQ \parallel AC$, $PQ = \frac{1}{2}AC$ ——— (i)

In ΔADC,

$SR \parallel AC$, $SR = \frac{1}{2}AC$ ——— (ii)

From (i) & (ii)

$PQ \parallel SR$, $PQ = SR$

Since, in quadrilateral PQRS, one pair of opposite sides is equal & parallel to each other, it is a ||gm.

$\therefore PS \parallel QR$ & $PS = QR$ (opposite sides of ||gm) ——— (iii)

In ΔBCD, Q & R are the mid-point of sides BC & CD respectively.

$\therefore QR \parallel BD$, $QR = \frac{1}{2}BD$ & ——— (iv)

However, the diagonals of a rectangle are equal.

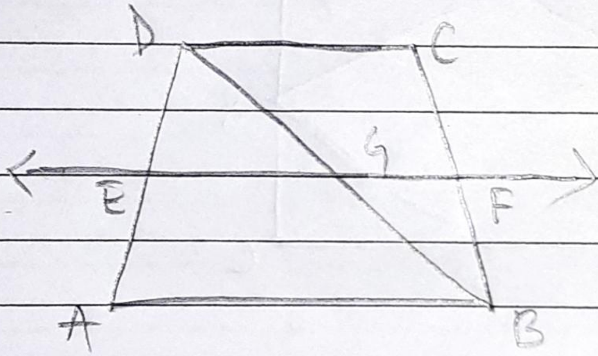
∴ $AC = BD$ ——— (v)

From (ii), (iii), (iii), (iv), (v)

$PQ = QR = SR = PS$

∴ PQRS is a rhombus.

4. Ans



Let EF intersect DB at G.

In $\triangle ABD$

$EF \parallel AB$ & E is the mid-point of AD.

∴ Therefore, G will be mid-point of DB.

As, $EF \parallel AB$ & $AB \parallel CD$

∴ $EF \parallel CD$ (Two parallel to the same line are parallel to each other)

In $\triangle BCD$, $GF \parallel CD$ & G is the mid-point of line BD, Therefore, by using converse of mid-point theorem, F is the mid-point of BC.