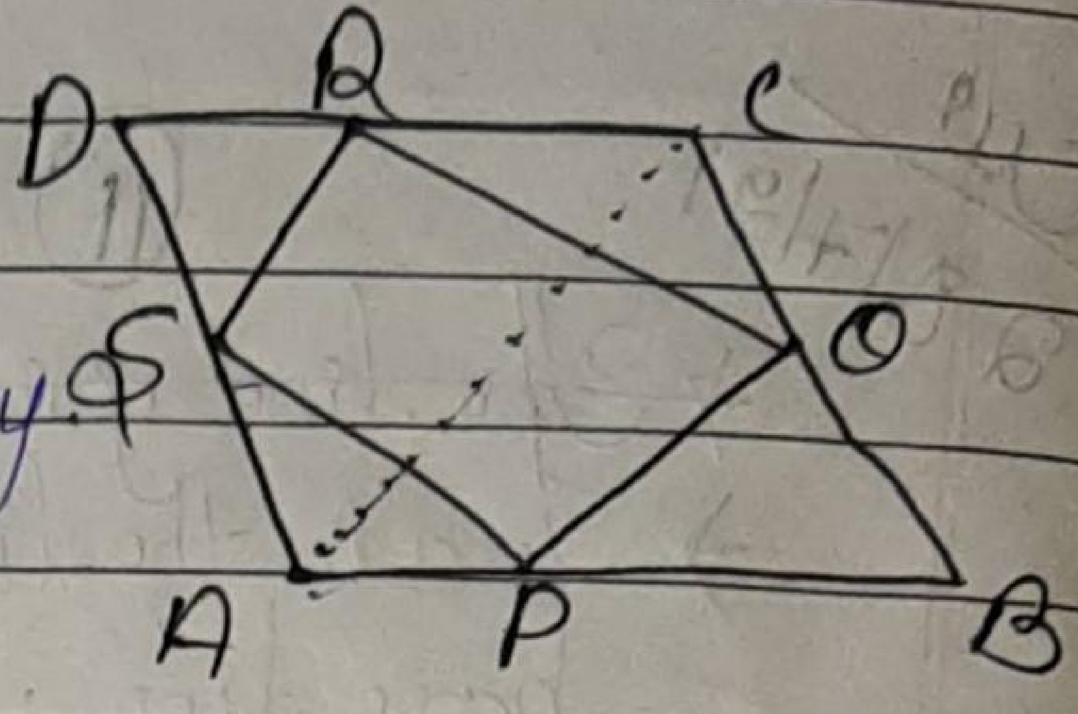
8.2



(1) (i) Given :- P, Q, R, S are midpoint of AB, BC, CD, DA respectively.

To prove :- SR ∥ AC & $SR = \frac{1}{2}AC$

Prove :- In △DAC,
S & R are midpoint of DA & DC respectively.
∵ SR ∥ AC and $SR = \frac{1}{2}AC$ (midpoint theorum)
∴ Hence proved

(ii) Proof: In △BAC,
P and Q are midpoint of BC and BA respectively.
∵ PQ ∥ AC and $PQ = \frac{1}{2}AC$ (midpoint theorum) - (1)

In △ACD,
S and R are midpoint of DA & DC respectively.
∵ SR ∥ AC and $SR = \frac{1}{2}AC$ (midpoint theorum) - (2)

From (1) and (2),
PQ ∥ AC ∥ SR
⇒ PQ ∥ SR

$PQ = AC = SR$

$\Rightarrow PQ = SR$

$PQ \parallel AC \parallel SR$ [proved in part (ii)]

~~and PQ~~ $\Rightarrow PQ = SR$

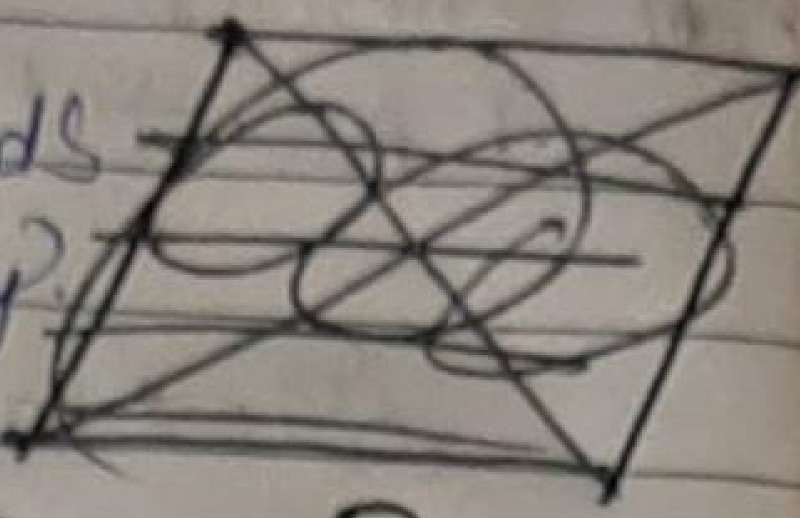
$PQ = SR$ (proved)

$\therefore$ PQRS is a llgm

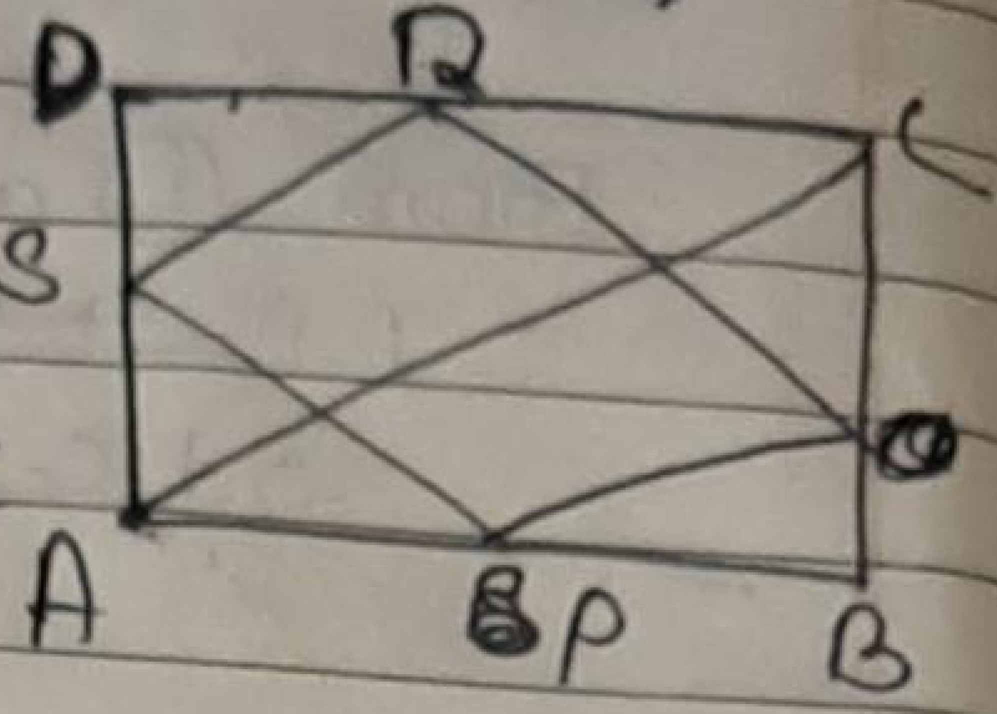
HW

8.2

(2) Given – ABCD is a rectangle. P, Q, R and S are mid-points of AB, BC, CD and DA respectively. PQ, QR, RS and SP are joined.



To prove :-



Proof :- In $\triangle$ABC,

P and Q are the midpoints of AB & BC respectively.

PQ $\parallel$ AC and PQ = $\frac{1}{2}$ AC – (1)

In ADC,

S and R are the midpoint of AD and DC respectively.

SR $\parallel$ AC and SR = $\frac{1}{2}$ AC – (2)

From (1) and (2)

PQ $\parallel$ SR and PQ = SR

$\therefore$ So, PQRS is a llgm – (3)

In ▭ ABCD

AD = BC (opp sides are =)

AS = BQ (Halves of equals are =)

In $\triangle$ APS and BPQ,

AP = BP (P is the midpoint of AB)

AS = BQ (proved above)

$\angle$PAS = $\angle$PBQ (Each 90°)

$\therefore$ $\triangle$APS $\cong$ $\triangle$BPQ (SAS)

$\therefore$ PS = PQ (cpct) – (4)

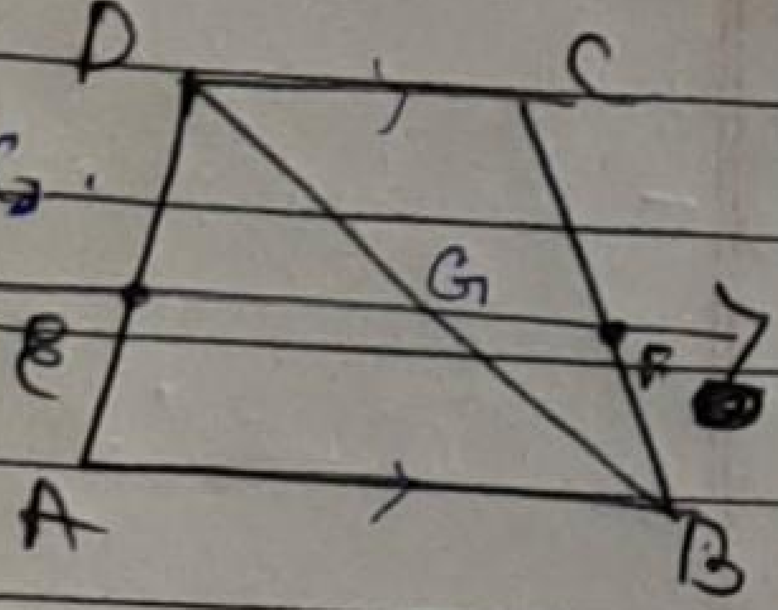
From (3) and (4),

PQRS is a rhombus

$\therefore$ Hence proved

(4)

Given - ABCD is a trapezium and AB || DC. BD is a diagonal & E is the midpoint of AD. A line drawn through E is || AB intersecting BC at F.



To prove - F is the midpoint of BC

Proof - ~~BD intersect EF at G~~

In $\triangle DAB$,

E is the midpoint of DA and

EG || AB

∴ G is the midpoint of DB (converse of mid-point theorem)

In $\triangle BDC$,

G is the midpoint of BD and GF || AB || DC

∴ F is the mid-point of BC (converse of midpoint theorem)

∴ Hence proved.