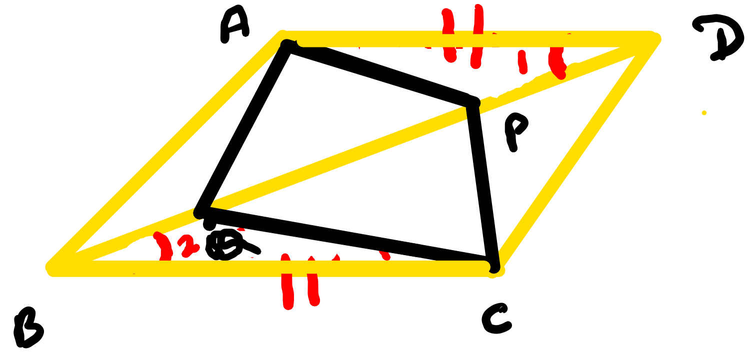
Q9)

Ex: 8·1



(i) $\Delta APD \cong \Delta CQB$.

$AD = BC$ [Opp sides of ||gm]

$\angle 1 = \angle 2$ [A.I.A]

$DP = BQ$ [given]

Given

ABCD is a parallelogram

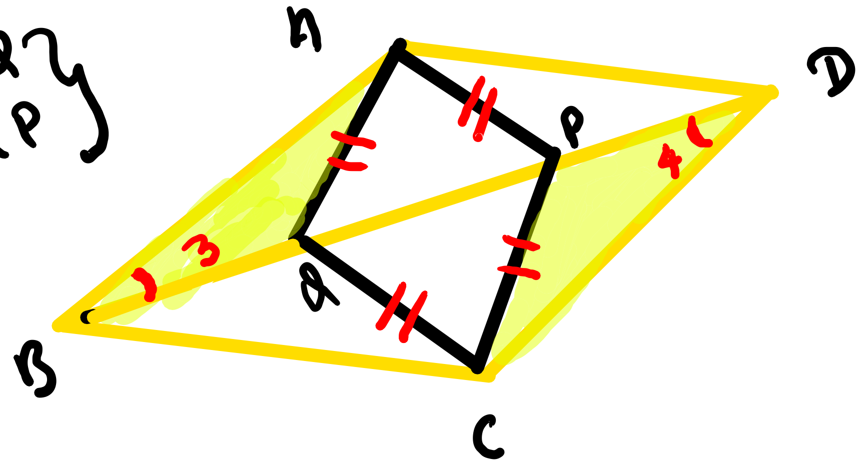
(i) Opp sides of ||gm are equal and parallel.

(ii) $AP = CQ$ [CPCT].

$\Delta APD \cong \Delta CQB$ [By SAS Congruent rule]

(ii) $AP = CQ$ [CPCT] $\longrightarrow$ (1)

$AP = CQ$ ✓
$AQ = CP$



(iii) $\triangle AQB \cong \triangle CPD$

$AB = CD$ [Opp sides of llgm] (S)

$DP = BQ$ [given] (S)

$\angle 3 = \angle 4$ [A.I.A] (A)

$\triangle AQB \cong \triangle CPD$

[By SAS congruent rule]

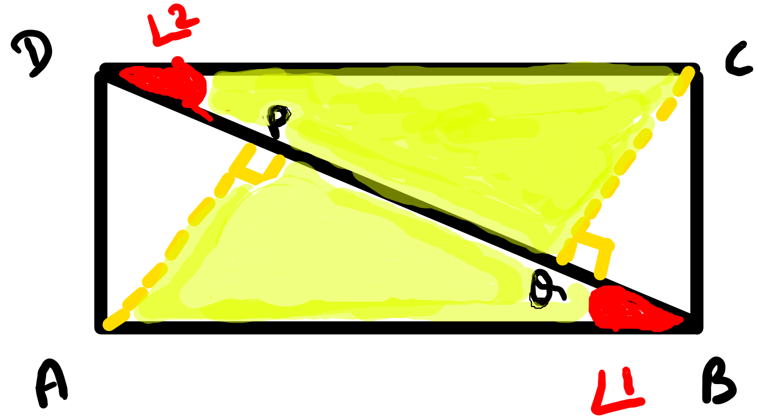
(iv) $AQ = CP$ [CPCT]. → ②

(v) from ① & ②

APCQ is a parallelogram.

Q.10)

Ex: 8.1



Gn:- (i) opp sides of ||gm are equal and parallel

(ii) DP = BQ

(i) $\Delta APB \cong \Delta CQD$

$\angle 1 = \angle 2$ [A.I.A] (A)

AB = CD [Opp sides of ||gm] (S)

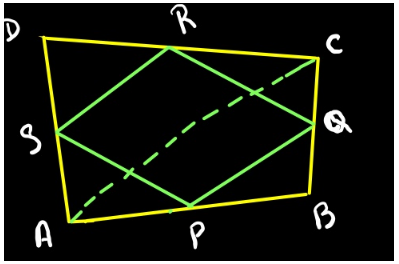
$\angle APB = \angle CQB$ [each 90°] (A)

$\Delta APB \cong \Delta CQD$ [By AAS congruent rule]

(ii) AP = CQ [CPCT]

EX:8.2

Q1)ABCD is a quadrilateral in which P, Q, R, and S are mid-points of the sides AB, BC, CD, and AC is the diagonal. show that



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

By Midpoint theorem: "In a triangle the line segment joining the mid points of any two sides of a triangel is parallel to third side and is half of it."

In ΔACD, By the above condition,

$SR \parallel AC$ and $SR = \frac{1}{2} AC$ — ①

(ii) $PQ = SR$,

In ΔABC, By condition,

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

Now, $SR = \frac{1}{2} AC$
$PQ = \frac{1}{2} AC$ } from ① & ②

$\boxed{PQ = SR}$ → ③

(iii) PQRS is a llgm.

From ① & ② & ③

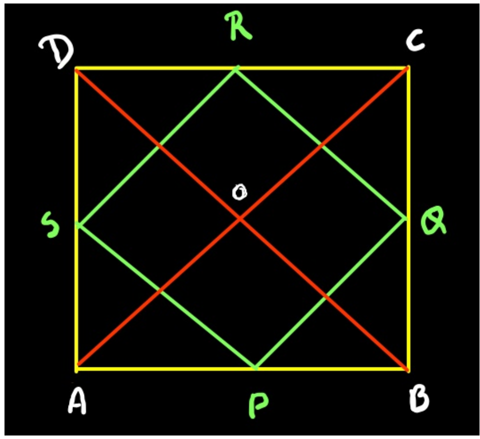
$SR \parallel AC$
$PQ \parallel AC$ } $PQ \parallel SR$

$PQ = SR$ } from ③

Opp sides are equal and ll.

∴ PQRS is a llgm.

Q2)ABCD is a rhombus and P,Q,R,S are the mid-points of AB,BC,CD, and DA respectively. Prove that Quadrilateral PQRS is a rectangle.



Let us join the diagonals of Rhombus ABCD.

T.P: PQRS is a rectangle.

Const: Join AC and BD.

Proof: In ΔACD,

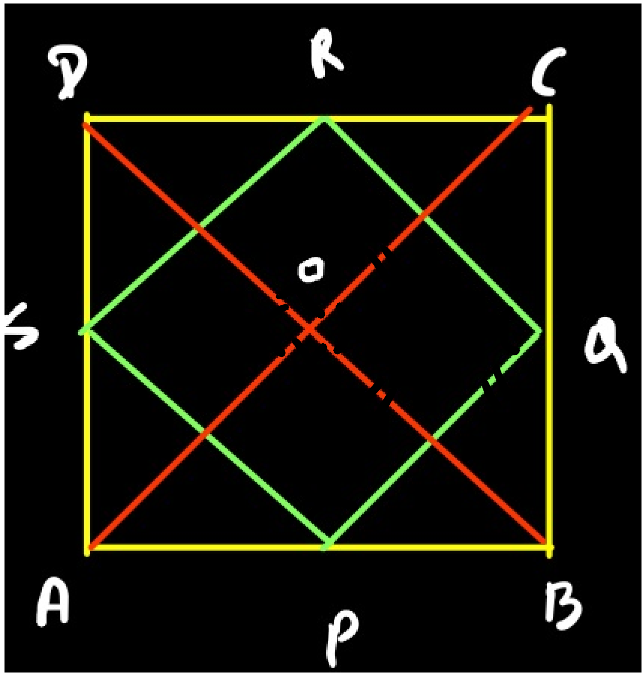
$SR \parallel AC$ and $SR = \frac{1}{2} AC$ [By mid point] —— (1)

In ΔABC,

$PQ \parallel AC$ and $PQ = \frac{1}{2} AC$ [By mid point] —— (2)

$\therefore$ $SR \parallel PQ$ and $SR = PQ$ [from (1) & (2)]

$\therefore$ PQRS is a ||gm [Opp sides are equal and parallel].

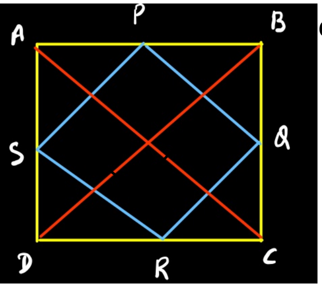


$\left.\begin{array}{l} OM \parallel NQ \\ ON \parallel MQ \end{array}\right\}$ ONQM is a ||gm.

$\angle MON = 90^\circ = \angle PQR = \angle PSR$

[Opp angles in a ||gm are equal]

$\therefore$ PQRS is a rectangle.



Q3)ABCD is a rectangle and P,Q,R,S are mid-points of the sides AB, BC, CD, DA respectively. show that the quadrilateral PQRS is a rhombus.

T.P PQRS is a Rhombus

Cnst: join AC and BD

Proof: In ΔABD

$PS \parallel BD$ and $PS = \frac{1}{2} BD$ —— (1)

(By M.P.T)

In ΔCBD

$RQ \parallel BD$ and $RQ = \frac{1}{2} BD$ —— (2)

From (1) & (2)

$PS \parallel RQ$ and $PS = RQ$ —— (5)

$\therefore$ PQRS is a $\parallel$gm

W.K.T $AC = BD$

In ΔACD, $SR \parallel AC$ and $SR = \frac{1}{2} AC$ —— (3)

In ΔCDB, $RQ \parallel BD$ and $RQ = \frac{1}{2} BD$ —— (4)

[By M.P.T]

From (3) & (4)

$SR = RQ$ —— (6)

From (5) & (6)

$PS = RQ = SR = PQ$

$\therefore$ PQRS is a Rhombus.