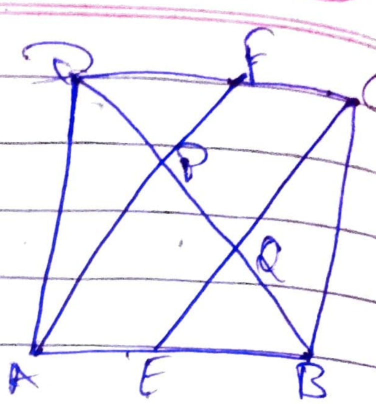
30.08.21

Ch-8 Quadrilateral



5Ans Given,

ABCD is a ||gm.
~~EO~~ & F are mid-points
of AB and CD respectively.

To prove :- The

Proof :- In ABCD ||gm

~~AB || DC~~ AB = DC

$= \frac{1}{2} AB = \frac{1}{2} DC$

AE = CF [E & F are mid-points of AB & CD Given].

In AECF Quadrilateral

~~FC~~
FC = AE

and CF || AE [~~opp~~ Though AB || DC]

AB || CD [It is a parallegram]

So,

~~AD ||~~ AF || CE

In DQC Δ

F is the mid-point of DC

FP // CQ

So,

DP = PQ

[Mid-point theorem] - (1)

Similarly,

In Δ BAP

E is the mid-point of AB

EQ // AP

So,

BQ = PQ

[By mid-point theorem]

From (1) & (2)

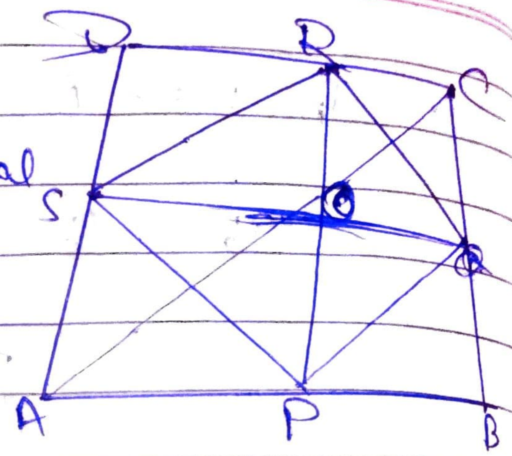
DP = PQ = BQ

So,

the line segments AF & EC trisect the diagonal BD.

SAns, Given,

Let ABCD is a quadrilateral P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively.



To prove:- PR & SQ bisect each other i.e. OP = OR & OQ = OS

Construction :- I joined A & C

Proof:-

In ΔADC,

S is the mid-point of AD.

&

R is the mid-point of CD

[Line segment joining the mid-points of two sides of a triangle is parallel to the third side and is half of it]

$\therefore$ SR // AC and SR = $\frac{1}{2}$ AC ⟶ ①

In ΔABC,

P is mid-point of AB

&

Q is the mid-point of BC

[Line segment joining the mid-points of two sides of a triangle is parallel to the third side and is half of it]

$\therefore$ PQ // AC and PQ = $\frac{1}{2}$ AC ⟶ ②

From ① & ②

$\Rightarrow PQ = SR$ & $PQ \parallel SR$

So, In PQRS quadrilateral.

one pair of opposite sides is parallel and equal.

Hence, PQRS is a ||gm

PR & SQ are diagonals of parallelogram PQRS

So,

So, $OP = OR$ & $OQ = OS$ [Diagonals of a parallelogram bisect each other].

Hence, Proved.

7 Ans,

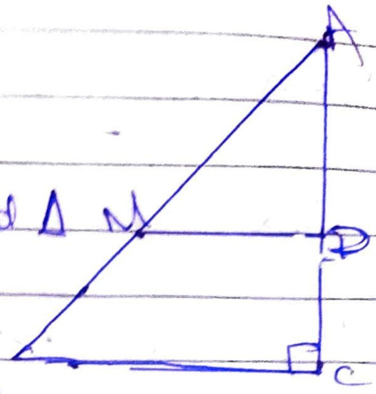
Given;

ΔABC is a right angled Δ

$\angle C = 90°$,

M is the mid-point of AB,

$MD \parallel BC$.



To prove !- D is the mid-point of AC, i.e., AD = CD

Proof :- (i) In ΔABC,

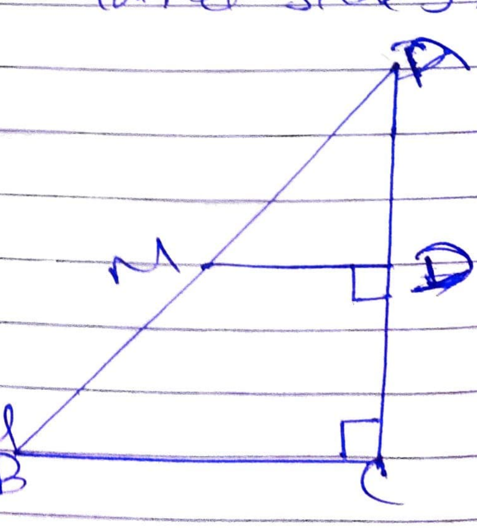
M is the mid-point of AB

~~and~~

$MD \parallel BC$

$\therefore$ D is the mid-point of AC. [line drawn through mid-point of one side of a triangle, parallel to another side, bisects the third side].

(ii) $MD \parallel BC$ & AC is the transversal



$\therefore \angle MDC + \angle BCD = 180°$

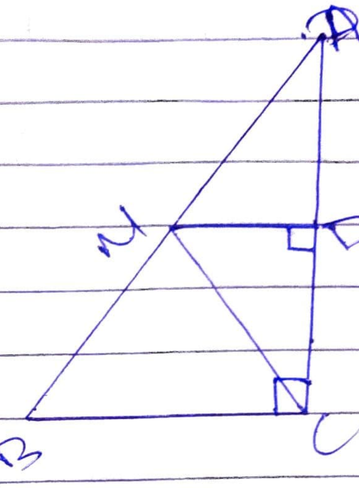
[Interior angles on the same side of transversal are supplementary].

$\angle MDC + 90° = 180°$

$\angle MDC = 90°$

$\therefore MD \perp AC$

Hence, proved



(iii) $CM = MA = \frac{1}{2} AB$

→ I joined MC

In $\triangle AMD$ & $\triangle CMD$,

$AD = CD$ [D is the mid-point of AC].

$\angle ADM = \angle CDM$ - [Both $90°$ as $MD \perp AC$

$DM = DM$ [common]

$\therefore \triangle AMD \cong \triangle CMD$ [SAS]

$\therefore AM = CM$ [CPCT] ...... (1)

However,

$AM = \frac{1}{2} AB$ [Given that M is Mid-point AB] -- (2)

From,

(1) & (2)

$\therefore CM = AM = \frac{1}{2} AB$