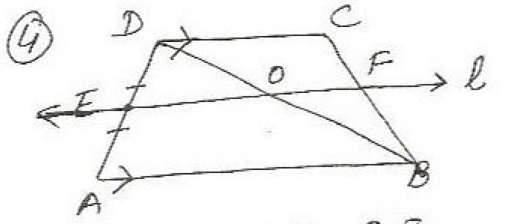
(4)



To show - $CF = BF$

Proof - In $\triangle DAB$, E is midpoint of AD and

$EO \parallel AB$

$\therefore DO = OB$ [converse of midpoint theorem]

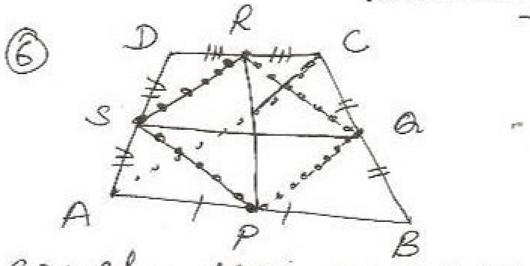
In $\triangle BDC$

$DO = OB$

and $OF \parallel AB$ [$AB \parallel DC$, $l \parallel AB$ $\Rightarrow AB \parallel DC \parallel l$]

$\therefore CF = BF$ [converse of midpoint theorem]

(6)



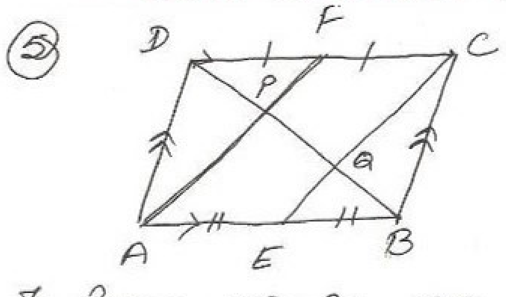
Const - join PQ, QR, RS, SP, AC

To Prove - PR and QS bisect each other

Proof - ▭PQRS is a ||gm [Same as Q1]

$\therefore$ PR and QS bisect each other [$\because$ diagonals of a ||gm bisect each other]

(5)



To Prove - $DP = PQ = QB$

Proof - $DC \parallel AB$ [opp. sides of ||gm]

$\Rightarrow FC \parallel AE$

$DC = AB$ $\therefore$ (do)

$2FC = 2AE$ [F is midpt of DC, E is midpt of AB]

$\Rightarrow FC = AE$

▭AECF is a ||gm [$FC \parallel AE$, $FC = AE$]

$AF \parallel EC$ (opp. sides of ||gm)

F is midpt. of side DC of $\triangle DCQ$ and $PF \parallel QC$

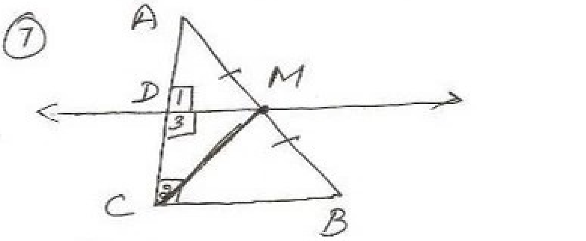
$\therefore DP = PQ$ ...(i) (converse of midpt. theorem)

Similarly $PQ = QB$ ...(ii)

From (i) and (ii)

$DP = PQ = QB$

(7)



To show - $AD = DC$

$MD \perp AC$

$CM = MA = \frac{1}{2} AB$

Proof - In $\triangle ACB$, M is midpt of AB, $MD \parallel BC$

$\therefore AD = DC$ [converse of midpt. theorem]

$DM \parallel CB$

$\therefore \angle 1 = \angle 2 = 90°$ [corresp. angles]

$\Rightarrow MD \perp AC$

In $\triangle ADM$ and $\triangle CDM$

$AD = DC$

$\angle 1 = \angle 3 = 90°$ [$MD \perp AC$]

$DM = DM$ [common]

$\therefore \triangle ADM \cong \triangle CDM$ by SAS p

$\therefore AM = MC$ (cpct)

But $AM = \frac{1}{2} AB$ [$\because$ M is midpt of AB]

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