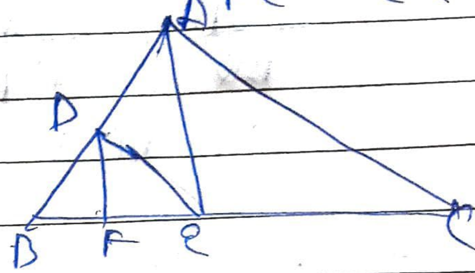
4. DE || AC & DF || AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



A. In Δ ABC, DE || AC

$\frac{BD}{DA} = \frac{BE}{EC}$ —— ①

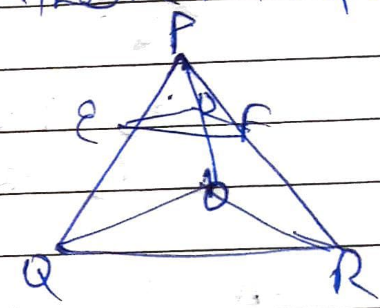
In Δ BAE, DF || AE

$\therefore \frac{BD}{DA} = \frac{BF}{FE}$ —— ②

From ① & ②

$\frac{BE}{EC} = \frac{BF}{FE}$

5. DE || OQ & DF || OR, show that EF || QR



A. In Δ POQ, DE || OQ

$\therefore \frac{PE}{EQ} = \frac{PD}{DO}$ —— ①

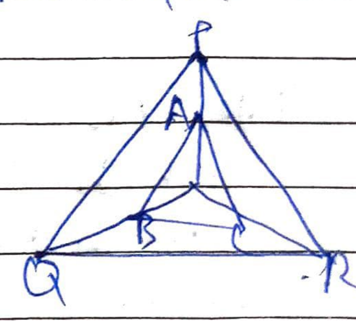
In Δ POR, DF || OR

$\frac{PF}{FR} = \frac{PD}{DO}$ —— ①

From ① & ②

$\frac{PE}{EQ} = \frac{PF}{FR}$ $\therefore$ EF || QR

6. A, B, C are points on OP, OQ & OR such that AB || PQ & AC || PR. Show that BC || QR



A. In Δ POQ, AB || PQ

$\therefore \frac{OA}{AP} = \frac{OB}{BQ}$ —— ①

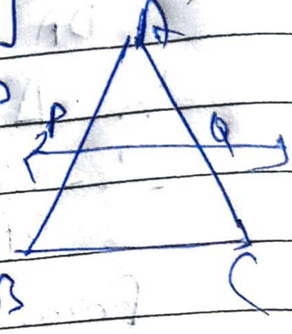
In Δ POR, AC || PR

$\frac{OA}{AP} = \frac{OC}{CR}$ —— (ii)

From (1) & (2)

$\frac{OB}{BQ} = \frac{OC}{CR}$

$\therefore$ BC $\parallel$ QR (by converse of BPT)



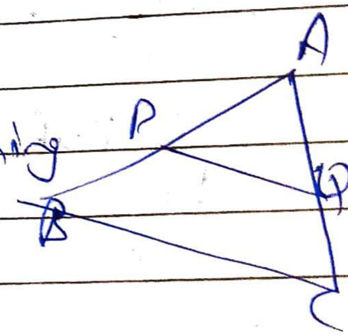
7. A. l is drawn through midpoint P of line segment AB meeting AC at Q & PQ $\parallel$ BC

$\frac{AQ}{QC} = \frac{AP}{PB}$

$\frac{AQ}{QC} = \frac{1}{1}$ (∵ P is midpoint of AB, AP = PB)

$\Rightarrow$ AQ = QC.

Q is midpoint of AC.



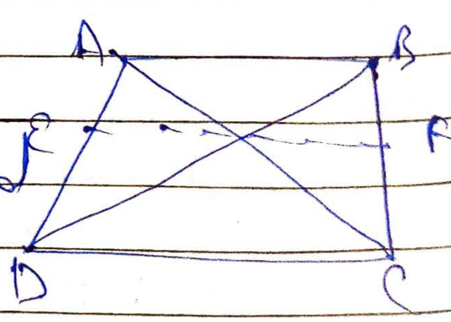
8. A PQ is a line segment joining midpoint P & Q of line AB & AC.

AP = PB & AQ = QC

$\frac{AP}{PB} = \frac{1}{1}$ & $\frac{AQ}{QC} = \frac{1}{1}$

$\therefore \frac{AP}{PB} = \frac{AQ}{QC}$

So, PQ $\parallel$ BC.



9. A. ABCD is a trapezium in which AB $\parallel$ DC & the diagonal intersect each other at point O. Show that

$\frac{AO}{BO} = \frac{CO}{DO}$

A. Draw line EF through point O, such that $EF \parallel CD$

In $\triangle ADC$, $EO \parallel CD$

$\frac{AE}{ED} = \frac{AO}{OC}$ —— (1) (By BPT)

In $\triangle ABD$, $OE \parallel AB$

$\frac{ED}{AE} = \frac{OD}{BO}$

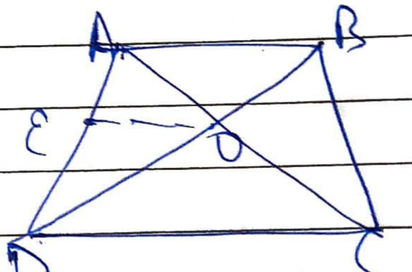
$\Rightarrow \frac{AE}{ED} = \frac{BO}{OD}$ —— (2)

From (1) & (2)

$\frac{AO}{OC} = \frac{BO}{OD}$

$\therefore \Rightarrow \frac{AO}{BO} = \frac{OC}{OD}$

10. The diagonals of a quadrilateral ABCD intersect each other at point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.



A. Draw a line $OE \parallel AB$

In $\triangle ABD$, $OE \parallel AB$

$\frac{AE}{ED} = \frac{BO}{OD}$ —— (1)

$\frac{AO}{OC} = \frac{OB}{OD}$ —— (2)

from eq (1) & (2)

$\frac{AE}{ED} = \frac{AO}{OC}$

$\Rightarrow EO \parallel DC$ (by converse of BPT)

$\Rightarrow AB \parallel OE \parallel DC$

$\Rightarrow AB \parallel CD$

$\therefore$ ABCD is a trapezium