similar.)

Exercise 6.2

In $\triangle ABC$, $DE \parallel BC$.

$$\frac{AD}{BD} = \frac{AE}{CE} \quad \text{(by bpt)}$$

$$\frac{1.5}{3} = \frac{1}{CE}.$$

$$EC = \frac{1.5 \times 1}{3} = \frac{3}{1.5} = 2 \text{ cm}.$$

In $\triangle ABC$, $DE \parallel BC$

$$\frac{AD}{BD} = \frac{AE}{EC}$$

$$\frac{AD}{7.2} = \frac{1.8}{5.4}$$

$$AD = \frac{1.8 \times 7.2}{5.4} = 2.4 \text{ cm}.$$

ii) $$\frac{PE}{EQ} = \frac{PF}{FR} \quad \text{(by bpt)}$$

$$= \frac{3.9}{3} = 1.3 \neq \frac{3.6}{2.4} = 1.5$$

(Not possible)

ii) $\frac{PE}{EQ} = \frac{4}{4.5} = \frac{40}{45} = \frac{8}{9} = \frac{PF}{FR} = \frac{8}{9}$.

(Possible)

iii) $\frac{PE}{EQ} = \frac{0.18}{1.28 - 0.18} = \frac{0.18}{1.10} = \frac{9}{55}$.

$\frac{PF}{EQ} \neq \frac{PF}{FR}$ (Possible)

Q3. In $\triangle ABC$,

$\frac{AM}{AB} = \frac{AL}{AC}$ [by bpt — (i)]

In $\triangle ADC$,

$\frac{AL}{AC} = \frac{AN}{AD}$ [by bpt — (ii)]

from (i) & (ii),

$\frac{AM}{AB} = \frac{AL}{A} = \frac{AN}{AD}$

$= \frac{AM}{AB} = \frac{AN}{AD}$.

Q4. In $\triangle ABCA$, $DE \parallel AC$.

$\Rightarrow \frac{BD}{DA} = \frac{BE}{EC}$ [by bpt — (i)]

In $\triangle BEA$, $DF \parallel AE$

$\Rightarrow \frac{BD}{DA} = \frac{BF}{FE}$ [by bpt, (ii)]

from i, ii,

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

$\Rightarrow \frac{BE}{EC} = \frac{BF}{FE}$. [proved].

Q5 In $\triangle POQ$,

$\frac{PE}{EQ} = \frac{PD}{DO}$ — (i) [by bpt]

In $\triangle POR$,

$\Rightarrow \frac{PF}{FR} = \frac{PD}{DO}$ — (ii) [by bpt].

from i, ii,

$\Rightarrow \frac{PE}{EQ} = \frac{PD}{DO} = \frac{PF}{FR} = \frac{PD}{DO} \Rightarrow \frac{PE}{EQ} = \frac{PE}{FR} \Rightarrow EF \parallel QR$

Q6. In ΔOPQ, $AB \parallel PQ$,

$\Rightarrow \frac{OA}{AP} = \frac{OB}{BQ}$ — (I) [by bpt].

In ΔOPR, $AC \parallel PR$,

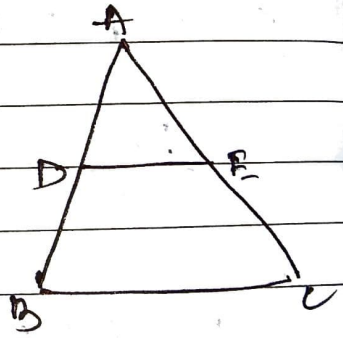
$\Rightarrow \frac{OA}{AP} = \frac{OC}{CR}$ — (II) [by bpt].

from I & II,

$\Rightarrow \frac{OA}{AP} = \frac{OB}{BQ} = \frac{OA}{AR} = \frac{OC}{CQ} \Rightarrow \frac{OB}{BQ} = \frac{OC}{CR}$

$\therefore \frac{OB}{BQ} = \frac{OC}{CR}$, $BC \parallel QR$. (by converse of bpt).

Q7. ΔABC & D is mid point of AB.



$\Rightarrow$ DE $\parallel$ BC.

$\Rightarrow$ In ΔABC, $DE \parallel BC$;

$= \frac{AD}{DB} = \frac{AE}{EC}$

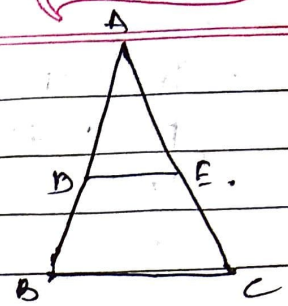
$\Rightarrow AD = DB = 1$.

$\Rightarrow 1 = \frac{AE}{EC}$

$= AE = EC$ [proved].

$=$ DE bisects BC.

Q8. $\frac{AD}{DB} = 1$, $\frac{AE}{EC} = 1$.



$\Rightarrow AD = DB$, $AE = EC$

$\Rightarrow \frac{AD}{DB} = \frac{AE}{EC}$. (converse of bpt).

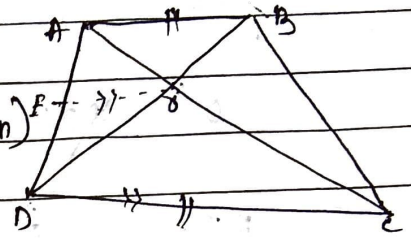
$\Rightarrow DE \parallel BC$.

In $\triangle ABC$,

Q9. $EO \parallel DC$ (by construction)

$AB \parallel DC$ (given)

$\Rightarrow EO \parallel AB$



$\Rightarrow \frac{AE}{ED} = \frac{BO}{DO}$ (bpt) — (I).

In $\triangle ADC$,

$EO \parallel DC$

$\Rightarrow \frac{AE}{ED} = \frac{AO}{CO}$ (bpt) — (II).

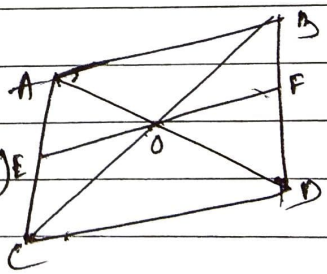
from (I), (II),

$\Rightarrow \frac{AE}{ED} = \frac{BO}{DO}$, $\frac{AE}{ED} = \frac{AO}{CO}$

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

$= \frac{AO}{BO} = \frac{CO}{DO}$ (proved)

Q10. Draw $EF \parallel AB$.



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

$\Rightarrow \frac{BO}{CO} = \frac{AO}{DO}$ (given) — (I).

$\Rightarrow$ In $\triangle ADB$,

$\Rightarrow FO \parallel AB$

$\Rightarrow \frac{BF}{DF} = \frac{AO}{DO}$ — (I) (bpt)

In $\triangle ADC$,

$EO \parallel AB$.

$\therefore \frac{AE}{CE} = \frac{AO}{CO}$ ——— (ii) (bpt)

from (i), (ii),

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

$$\therefore \frac{BO}{CO} = \frac{BF}{DF}$$

$\Rightarrow FO \parallel CD$ (converse of bpt).

$\because FO \parallel AB$.

$\Rightarrow AB \parallel CD$.

$\therefore ABCD$ is a Trapezium.