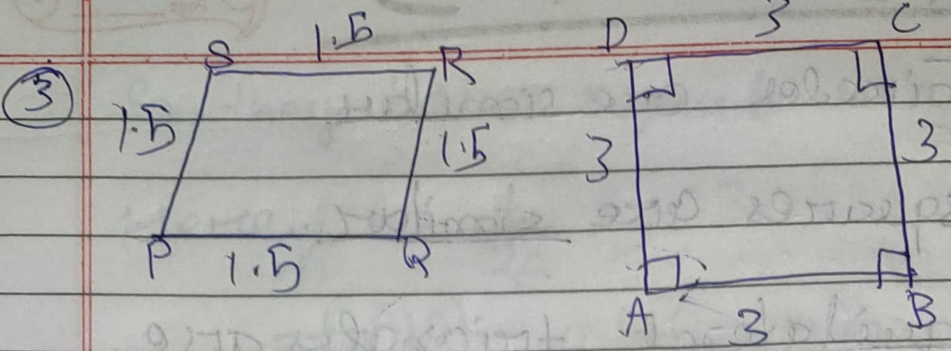
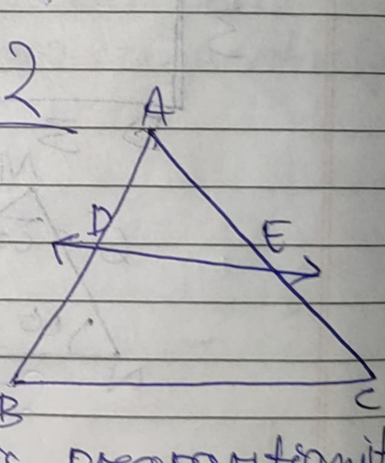
(3)



Here, the two ~~polynomial~~ polygons of the same number of sides are similar.

(i) Their corresponding sides are in the same proportion 1:2 but their corresponding angles are not equal.

EXERCISE - 6.2



Ex 1 → In $\triangle ABC$

Given - $DE \parallel BC$

So, we can say that,

$$\frac{AD}{DB} = \frac{AE}{EC}$$ (By basic proportionality theorem)

Adding 1 to both the ~~equa~~ sides

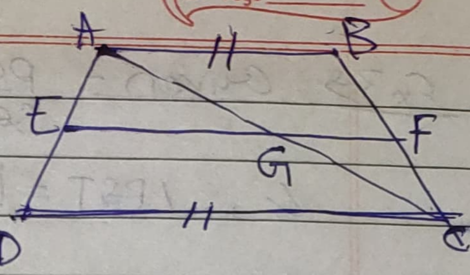
$$\cancel{\frac{AD}{DB} + \frac{AE}{EC}} \quad \frac{AD}{DB} + 1 = \frac{AE}{EC} + 1$$

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

Therefore, $\dfrac{AB}{DB} = \dfrac{AC}{DB}$

Ex 2.y

Given - AB ∥ DC



To show that - $\frac{AE}{ED} = \frac{BF}{FC}$

Let us join AC to intersect EF at G

AB ∥ DC, and
EF ∥ AB (Given)

As, AB ∥ DC ∥ EF
So, EF also parallel to DC (Lines ∥ to the same line are ∥ to each other)

Now in △ADC,
EG ∥ DC (As EF ∥ DC)

So, EG ∥ DC (As EF ∥ DC)

So, $\frac{AE}{ED} = \frac{AG}{GC}$ (basic proportionality theorem) —— (1)

Similarly, from △CAB

$$\frac{CG}{AG} = \frac{CF}{BF}$$

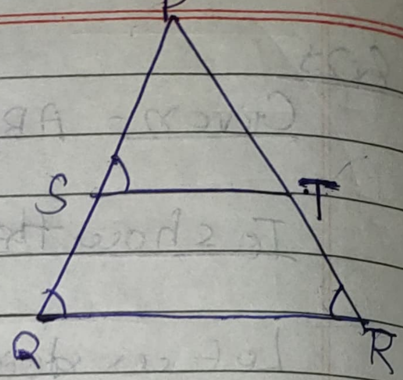
By reversing, $\frac{AG}{GC} = \frac{BF}{CF}$ —— (2)

Therefore, from (1) and (2)

$$\frac{AE}{ED} = \frac{BF}{FC}$$

Ex 3 → Given - $\frac{PS}{SQ} = \frac{PT}{TR}$

& , $\angle PST = \angle PRQ$



To prove that ΔPQR is isosceles.

$ST \parallel QR$ (By converse of basic proportionality theorem)

$\angle PST = \angle PQR$ (corresponding angle) —— (1)

Also, it is given that

$\angle PST = \angle PRQ$ —— (2)

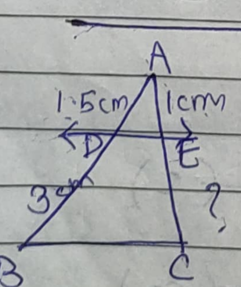
So, $\angle PRQ = \angle PQR$ [From (1) and (2)]

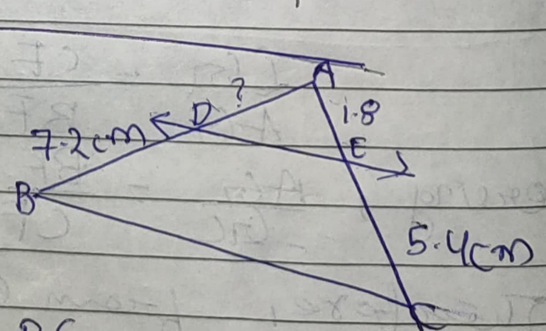
Therefore, $PQ = PR$ (sides opposite the equal angles)

That is, PQR is an isosceles triangle.

EXERCISE - 6.2

(1)





(i) Given - $DE \parallel BC$.

So, ~~$\frac{DE}{BC}$~~ $\frac{AD}{DB} = \frac{AE}{EC}$ (basic proportionality theorem)

Here $AD = 1.5\,cm$, $DB = 3\,cm$, $AE = 1\,cm$, $EC = ?$

$$\frac{1.5}{3} = \frac{1}{EC}$$

$$1.5(EC) = 3$$

$$EC = \frac{3}{1.5} = ?$$

$$\therefore \boxed{EC = 2\,cm}$$

CASE-II - Given $DE \parallel BC$

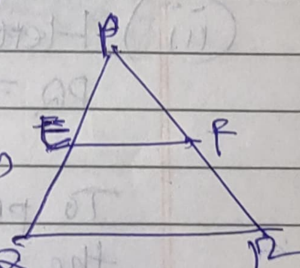
$$\frac{AD}{AB} = \frac{AE}{EC} \text{ (basic proportionality theorem)}$$

$$\frac{AD}{7.2} = \frac{\cancel{1.8}^{\,1}}{\cancel{5.4}_{\,3}}$$

$$3(AD) = 7.2$$

$$AD = \frac{7.2}{3} = 2.4\,cm$$

(2) (i) Here,



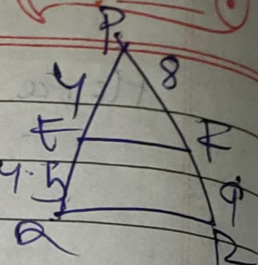
$PE = 3.9\,cm$, $EQ = 3\,cm$, $PF = 3.6\,cm$ and, $FR = 2.4\,cm$

$$\frac{PE}{PQ} = \frac{PF}{FR} \text{ (Given)}$$

$$\frac{3.9}{3} = \frac{3.6}{2.4}$$

$$\frac{1.3}{1} \neq \frac{3}{2}$$

As, The sides are not proportional, Thus, ER is not $\parallel$ to QR.



(ii) Here,

PE = 4 cm, QE = 4.5, PF 8 cm.

and RF = 9 cm.

To prove EF || QR, the sides of the Δ must be proportional,

$$\frac{PE}{EQ} = \frac{PF}{FR}$$

$$\frac{4}{4.5} = \frac{8}{9}$$

$$\frac{40}{45} = \frac{8}{9} \quad \therefore \frac{8}{9} = \frac{8}{9}$$

As the sides are proportional

Hence, EF || QR

(iii) Here,

PQ = 1.28 cm, PR = 2.56 cm, PE = 0.18 cm & PF = 0.36 cm

To prove that EF || QR, the sides of the triangle must be proportional

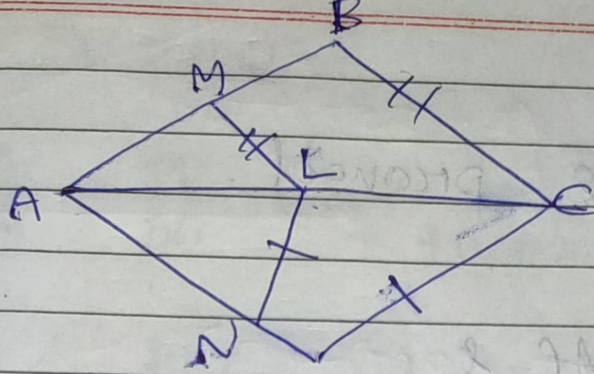
$$\frac{PE}{EQ} = \frac{PF}{FR}$$

$$\frac{1.28}{2.56} = \frac{0.18}{0.36}, \text{ which is}$$

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

As, the sides are proportional. Hence, EF || QR

3



~~If~~ $LM \parallel CB$, &
$LN \parallel CD$

Given - $LM \parallel CB$
$LN \parallel CD$

To prove that -

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

Here, In $\triangle ABC$ we can say that

$$\cancel{\frac{AM}{MB} = \frac{AL}{LC}} \text{ ~~(By basic proportionality theorem)~~}$$

$$\frac{AM}{BM} = \frac{AL}{LC} \text{ (By basic proportionality theorem)}$$

Adding 1,

$$\frac{AM}{BM} + 1 = \frac{AL}{LC} + 1$$

$$\frac{AB}{BM} = \frac{AC}{LC} \quad \text{—— (i)}$$

Here, In $\triangle ADC$

$$\frac{AN}{ND} = \frac{AL}{LC}$$

$$\frac{AD}{AN} = \frac{AL}{LC} \quad \text{—— (ii)}$$

From eq. (i) and (ii)

$$\frac{AB}{BM} = \frac{AD}{AN}, \text{ by reversing.}$$

Hence,

$$\frac{BM}{AB} = \frac{AN}{AD}$$

Hence proved.