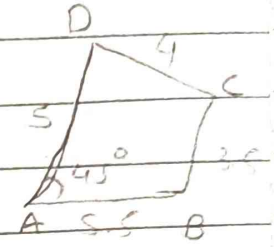
3 Construction Of Quadrilaterals

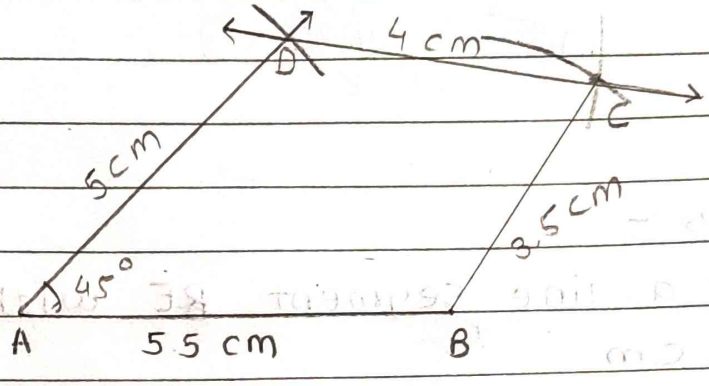
Excercise : 3.1

Construct the qudrilaterals with given measurements & write steps of construction

a) Quadrilateral ABCD with AB = 5.5 cm, BC = 3.5 cm, CD = 4 cm, AD = 5 cm & $\angle A = 45°$

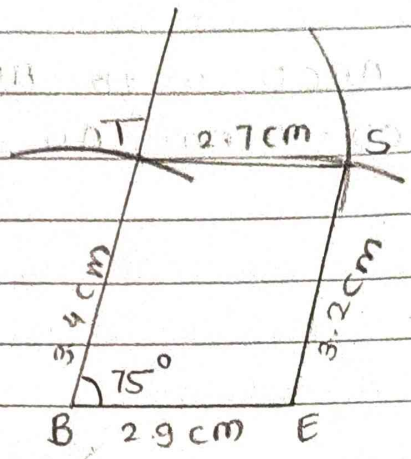


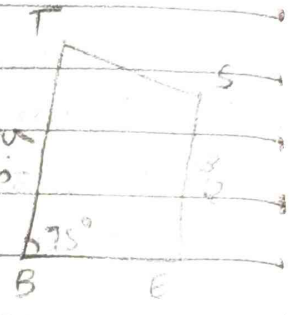
Rough



Steps :
1. Draw a line segment AB with radius 5.5 cm
2. From centre A draw a ray & an arc which are equal to 45° cm & 5 cm.
3. Intersecting point is keep as 'D'
4. With centres D draw arc equal to radius 4 cm
5. From B draw radius 3.5 cm.
6. Interestecting point of these two arcs is keep as 'C'
7. Join DC & BC
8. Quadrilateral ABCD is Formed.

Q) Quadrilateral BEST with BE = 2.9 cm, ES = 3.2 cm, ST = 2.7 cm, BT = 3.4 cm & ∠B = 75°.





Rough

Steps :-

1. Draw a line segment BE with radius 2.9 cm

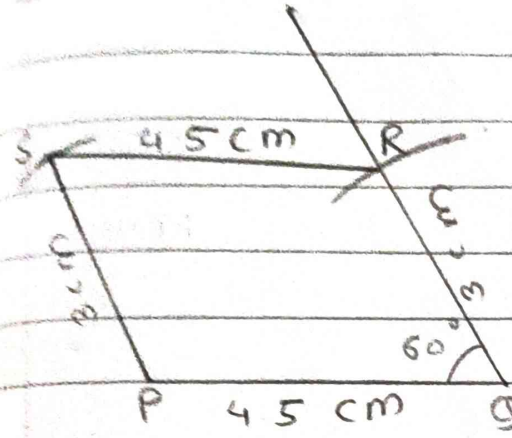
2. From centre B, draw a ray of 75° c & draw arc with radius 3.4 cm & name the point T.

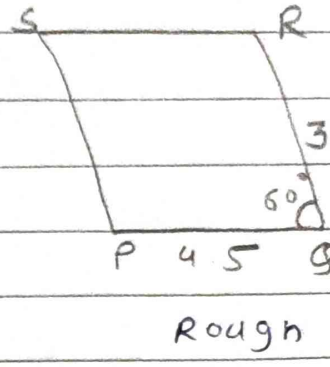
3. From centres T, E draw arcs with radius 2.7 cm, 3.2 cm respectively & name the point S.

4. Join T, S & E, S

5. Quadrilateral BEST is Formed.

Parallelogram PQRS with PQ = 4·5 cm, QR = 3 cm & ∠PQR = 60°





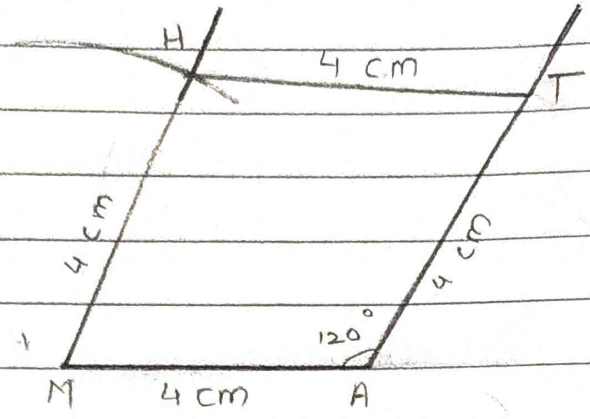
Rough

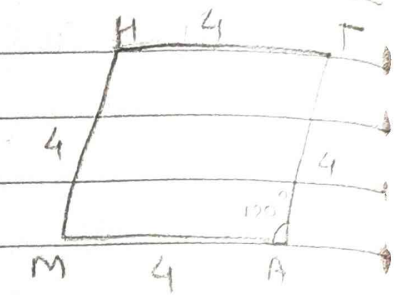
QR = PS = 3 cm
PQ = RS = 4·5 cm
} ∵ opposite sides of a parallelogram are equal.

Steps :-

1. Draw a line segment PQ with radius 4.5 cm
2. With centre Q draw a ray & an arce equal to 60° & 3 cm
3. Intersecting point of these two is point R.
4. From centres R, P draw arcs with 4.5 cm, 3 cm respectively & name int point S.
5. Join P,S & R,S
6. Parallelogram PQRS is formed.

d) Rhombus MATH with AT = 4cm, $\angle MAT = 120^\circ$



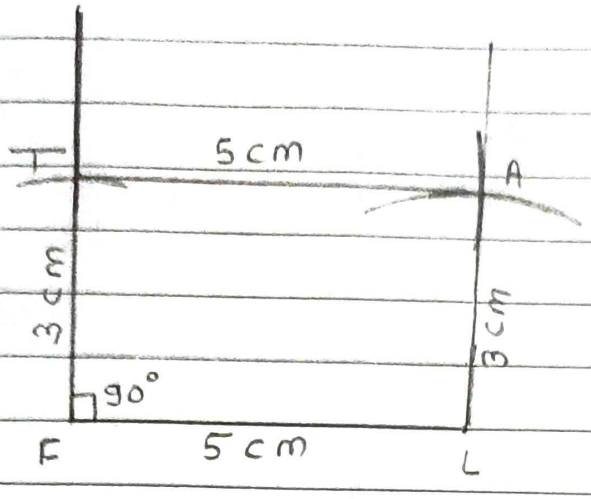


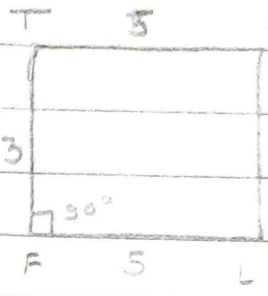
Rough

Steps :-

1. Draw a line segment MA with radius 4 cm.
2. From centre A draw a ray & an arc equal to 120° & 4 cm.
3. These intersecting point be keep as point T.
4. From centres M, T draw arcs equal to 4 cms.
5. These two arcs intersected at point H.
6. Rhombus MATH is formed.

e) Rectangle FLAT with FL = 5 cm, LA = 3 cm





Rough

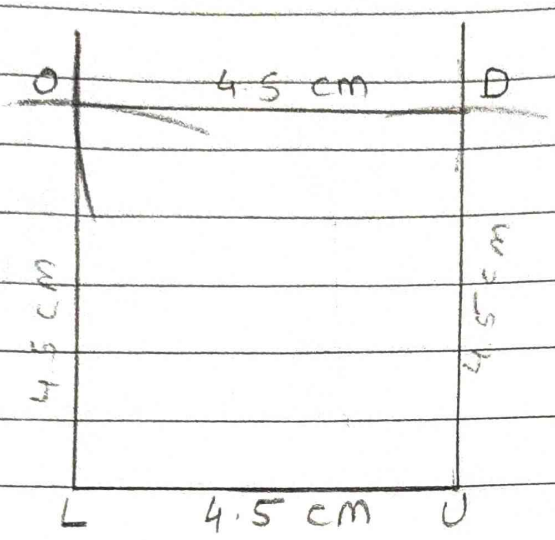
FL = AT = 5 cm } ∵ opposite sides of rectangle
LA = TF = 3 cm

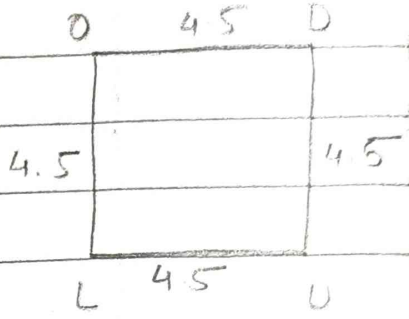
LF = LL = LA = LT = 90° (∵ angles of rectangle)

Steps :-

1. Draw a line segment FL with radius 5 cm.
2. From centre F draw a ray & an arc equal to 90°c & 3 cm
3. These arc meet at point T.
4. From centres T, L draw arcs equal to 5 cm, 3 cm respectively.
5. These two arcs meet at point 'A'.
6. Join T, A & L, A
7. Rectangle FLAT is formed.

f) Square LUDO with LU = 4.5 cm





LU = DU = DO = OL = 4.5 cm (sides of square)

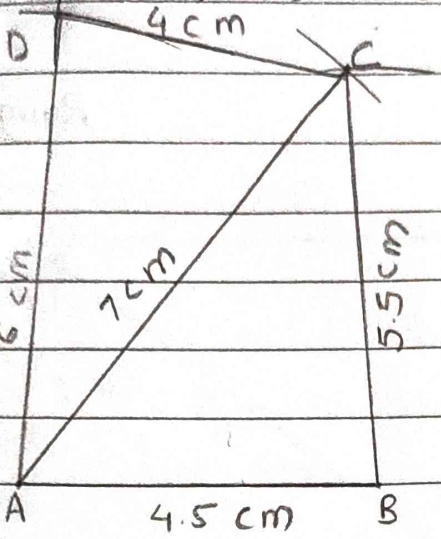
$\angle L = \angle U = \angle D = \angle O = 90^\circ$

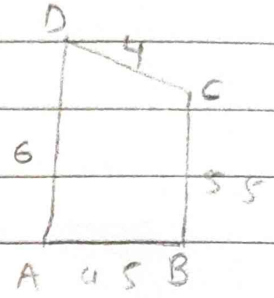
Steps :-

1. Draw a line segment LU with radius 4.5 cm
2. From centre L, draw a ray of 90° & an arc with radius 4.5 cm. These two meet at point 'O'.
3. From centre U, draw a ray of 90° & an arc with radius 4.5 cm. These two meet at point 'D'.
4. Join O, D
5. Required square LUDO is formed.

Exercise 3.2

1. Quadrilateral ABCD with AB = 4.5 cm, BC = 5.5 cm, CD = 4 cm, AD = 6 cm & AC = 7 cm





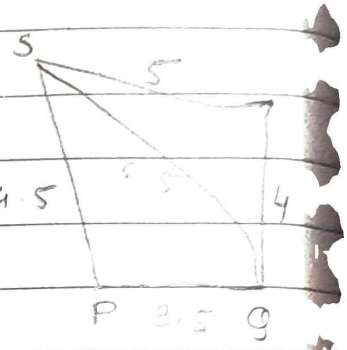
Rough

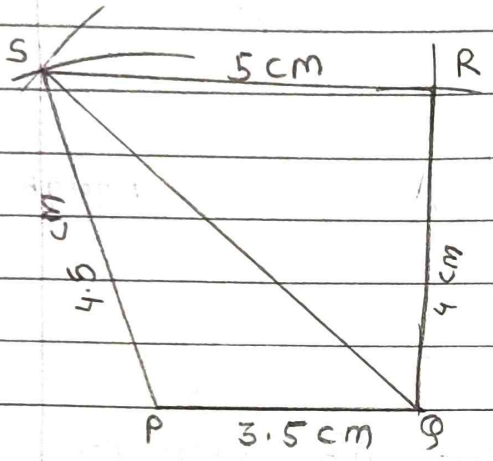
Steps :-

1. Draw a line segment $\overline{AB}$ with radius 4.5 cm.
2. From centres A, B draw arcs equal to 7 cm & 5.5 cm respectively & name intersection point C.
3. Join A, C & B, C
4. From centres C, A draw arcs equal to 4 cm, 6 cm respectively & the ~~pei~~ intersecting point is named as point D.
5. Join D, C & A, D
6. Quadrilateral ABCD is formed.

b) Quadrilateral PQRS with PQ = 3.5 cm, QR = 4cm ; RS = 5 cm , PS = 4.5 cm & QS = 6.5 cm.

Rough diagram





Steps :

1. Draw a line segment PQ with radius 3.5 cm
2. With the centres P, Q draw arcs equal to 4.5 cm & 6.5 cm respectively
3. These two arcs meet at point 'S'
4. With the centres S, Q draw arcs with radius 5 cm , 4 cm. respectively
5. Name these intersected arcs as Point R.
6. Join P, S ; Q, S ; S, R & Q. R
7. Quadrilateral PQRS is formed.

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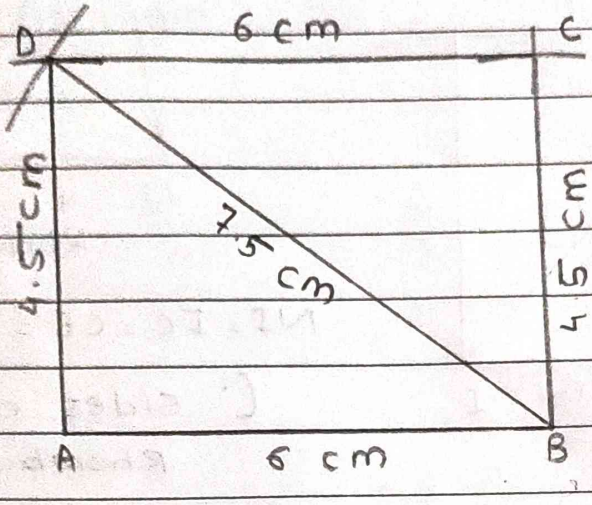
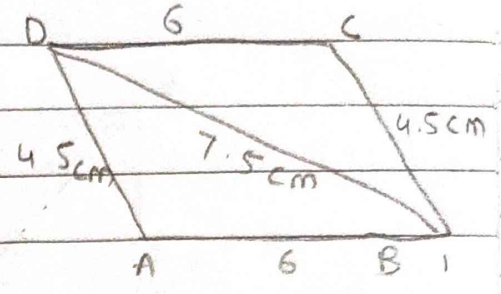
2) Parallelogram ABCD with AB = 6cm, CD = 4.5 cm & BD = 7.5 cm





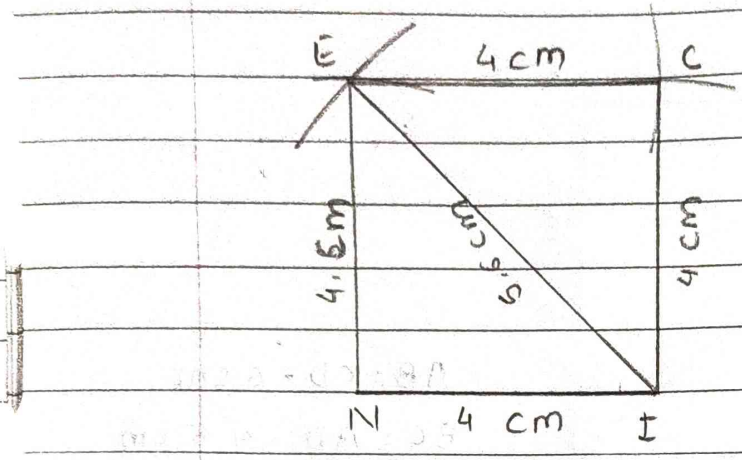
AB = CD = 6 cm

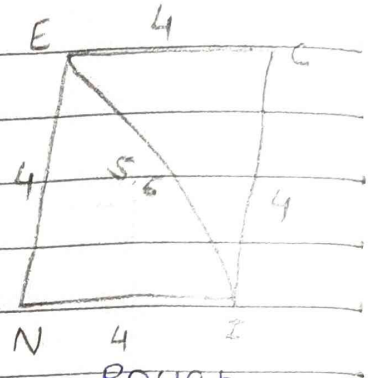
BC = AD = 4.5 cm (∵ opposite sides of parallelogram)

Steps :-

1. Draw a line segment AB with radius 6cm
2. From centres A, B draw arcs with radius 4.5 cm, 7.5 cm respectively. These two arcs intersecting at point D.
3. From centres D, B draw arcs with radius 6 cm, 4.5 cm respectively. These two arcs intersecting arcs meet at point C.
4. Join A, D & B, C & C, D & B, D.
5. Parallelogram ABCD is formed.

d) Rhombus NICE with NI = 4 cm & IE = 5.6 cm





Rough

NI = IC = CE = NE = 4cm

(∵ sides of Rhombus)

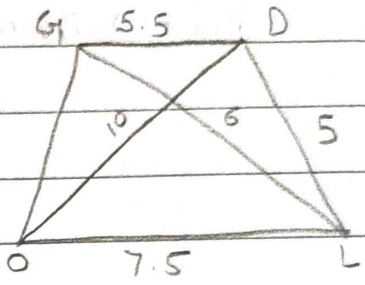
Steps :-

1. Draw a line segment NI with radius 4 cm.
2. From centres N, I draw two arcs with radius 4 cm, 5.6 cm respectively. These two arcs intersect at point E.
3. From centres E, I draw arcs with radius 4 cm. These two arcs meet at point C.
4. Join N, E & I, E, and E, C & I, C.
5. Rhombus NICE is formed

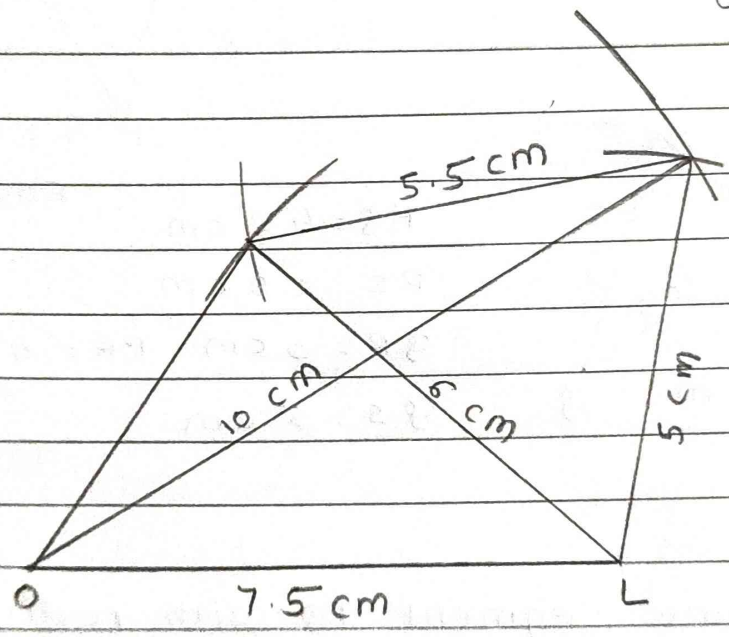
Exercise 3:3

Construct the quadrilateral with measurements given below.

1) Quadrilateral GOLD : OL = 7.5 cm, GL = 6 cm, LD = 5 cm, DG = 5.5 cm & OD = 10 cm



Rough

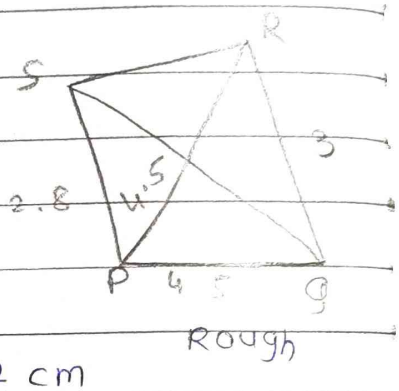


Steps :-

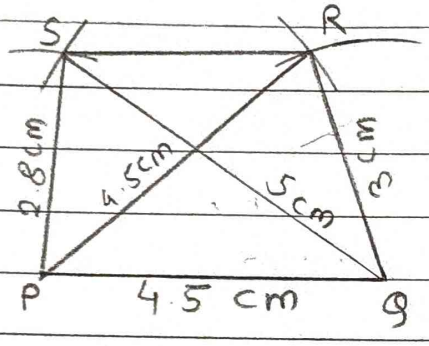
1. Draw a line segment OL equal to radius 7.5 cm
2. From centres O, L draw arcs with radius 10 cm & 5 cm respectively
3. These two arcs meet at point D.
4. From centres L, D draw arcs equal to 6 cm & 5.5 cm respectively.
5. These two arcs meet at point 'G'.

6. Join O, G & L, G. And join O, D & L, D & G, D
7. Quadrilateral GOLD is formed.

b) Quadrilateral PQRS : PQ = 4.2 cm, QR = 3 cm, PS = 2.8 cm, PR = 4.5 cm & QS = 5 cm



Rough



PQ = 4.2 cm
PS = 2.8 cm
QR = 3 cm PR = 4.5 cm
QS = 5 cm

Steps :-

1. Draw a line segment PQ with radius 4.2 cm
2. From centres P, Q draw arcs equal to radius 4.5 cm, 3 cm respectively.
3. These two arcs meet at point R.
4. Join P, R, & Q, R
5. From centres Q, P draw arcs equal to radii 5 cm & 2.8 cm respectively.
6. These two arcs meet at point 'S'.
7. Join P, S & Q, S & S, R.
8. PQRS quadrilateral is formed

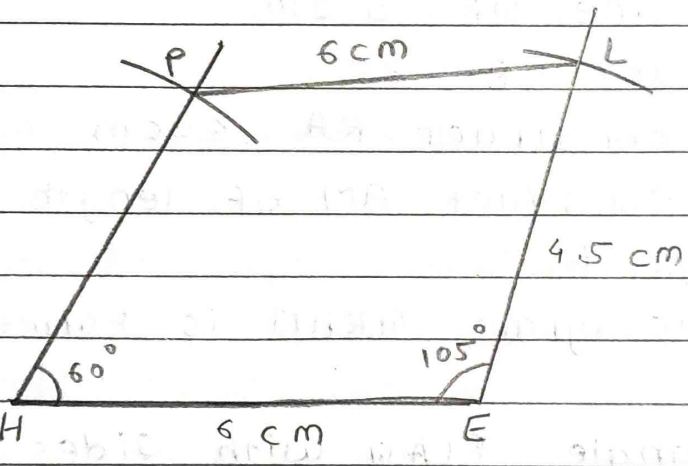
Exercise 3:4

Construct quadrilateral with the measurements given below.

a) Quadrilateral HELP with HE = 6 cm, EL = 4.5 cm, $\angle H = 60^\circ$, $\angle E = 105^\circ$, $\angle P = 120^\circ$

Given:- HE = 6 cm, EL = 4.5,
$\angle H = 60^\circ$, $\angle E = 105^\circ$, $\angle P = 120^\circ$
$\angle L = ?$

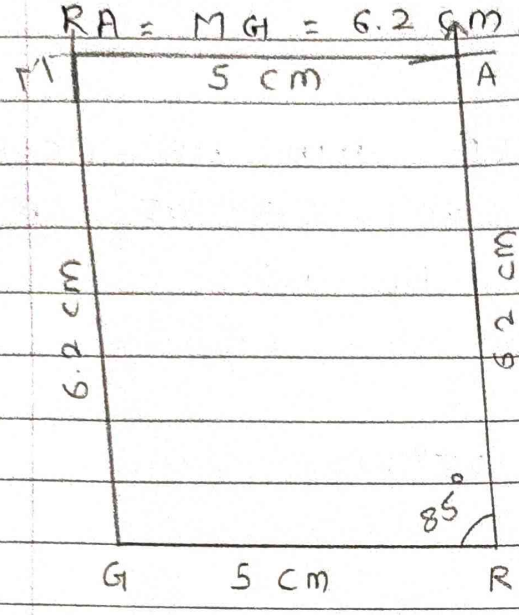
$\angle L = 360^\circ - (60^\circ + 105^\circ + 120^\circ)$
$= 360^\circ - 285^\circ$
$= 75^\circ$



Steps :-

1. Draw HE = 6 cm
2. Construct $\angle H = 60^\circ$
3. Construct $\angle E = 105^\circ$
4. On this line of LE cut an arc at 4.5 cm
5. Construct $\angle L = 75^\circ$

b) Parallelogram GRAM with GR = AM = 5 cm
RA = MG = 6.2 cm & LR = 85°



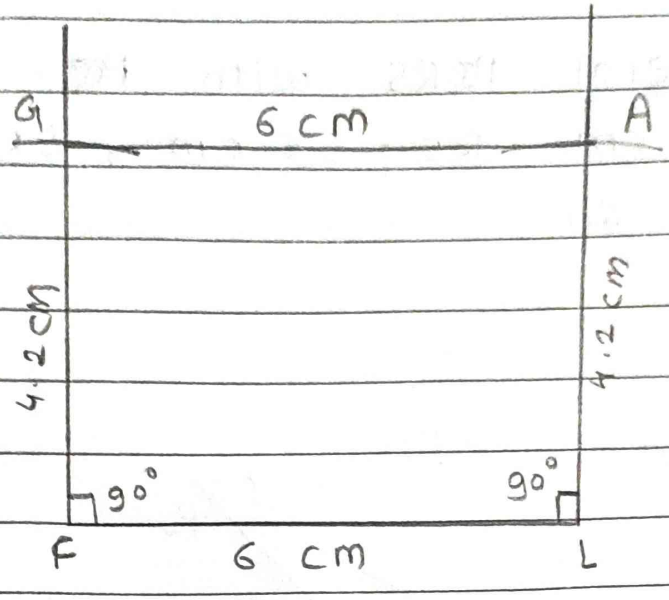
Steps :-

1. Draw line GR = 5 cm
2. Construct LR = 85°.
3. Then construct RA = 6.2 cm
4. Then construct AM of length 5 cm through A.
5. Parallelogram GRAM is formed.

c) Rectangle FLAG with sides FL = 6cm & LA = 4.2 cm

FL ≅ AG = 6 cm

AL = GF = 4.2 cm



Steps :- 1. Draw a line segment FL = 6 cm

2. From F & L draw an angle of 90°.

3. Draw line GF & AG is of 4.2 cm

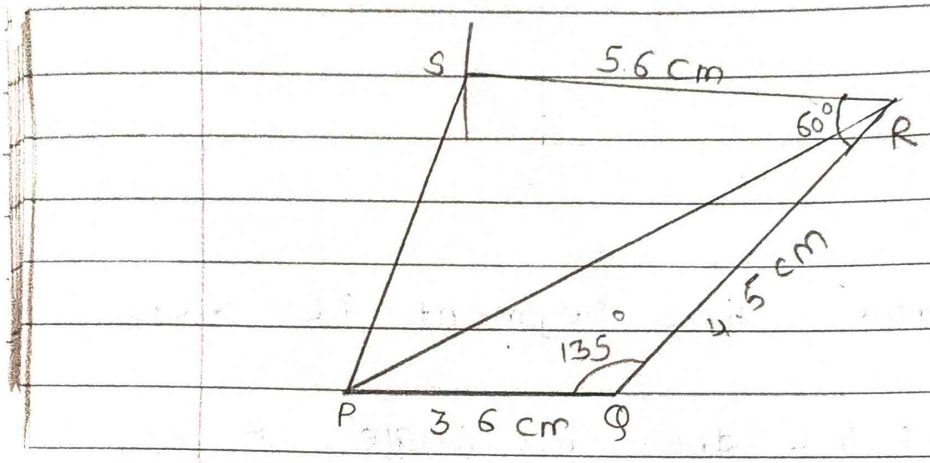
4. Join AG with length 6 cm

5. Quadrilateral FLAG is formed

Exercise : 3.5

Construct following quadrilaterals

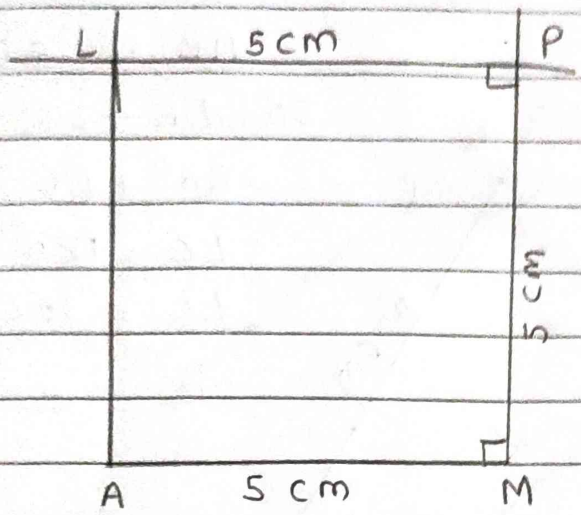
a) Quadrilateral PQRS with PQ = 3.6 cm, QR = 4.5 cm, RS = 5.6 cm, ∠RQP = 135° & ∠SRQ = 60°



Steps :

1) Draw line PQ of 3.6 cm
2) Construct ∠Q = 135°
3) From point Q draw a line of 4.5 cm, & name the point R
4) From point R, construct ∠R = 60°. & Join the line P, R.
5) From R draw a line of 5.6 cm and
6) Name the point S
7) Join P, S.
8) Quadrilateral PQRS is formed

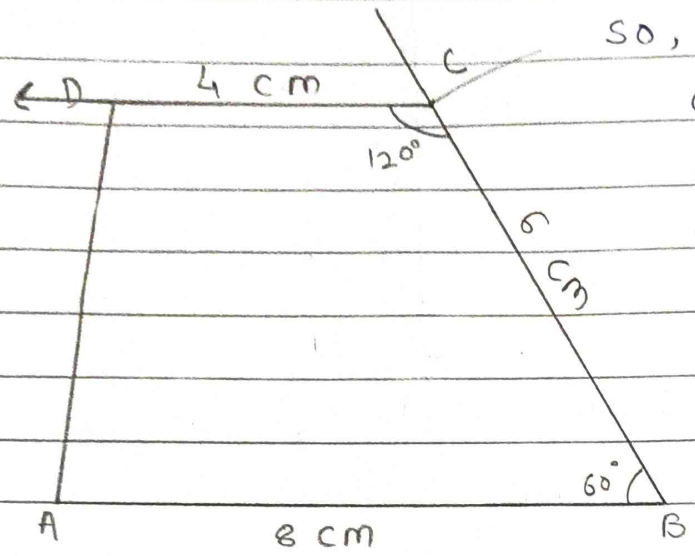
⇒ Quadrilateral LAMP with AM = MP = PL = 5 cm, LM = 90°, LP = 60°



Steps :-

1) Draw line AM of 5 cm
2) From point M, construct LM = 90°
3) Draw line MP of 5 cm
4) From point P, construct LP = 90°
5) Draw line PL of 5 cm
6) Join A, L
7) Quadrilateral LAMP is formed

c) Trapezium ABCD in which AB || CD, AB = 8 cm, BC = 6 cm, CD = 4 cm, $\angle B = 60°$.



AB || CD

So, $\angle B + \angle C = 180°$

$60° + \angle C = 180°$

$\angle C = 180° - 60°$

$\angle C = 120°$

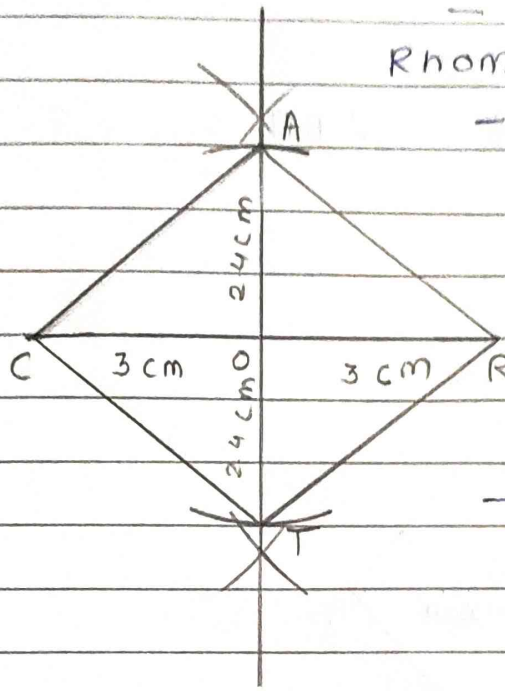
Steps :-

1) Draw a line AB of 8 cm
2) From point B, Construct $\angle B = 60°$
3) Draw a line BC of 6 cm
4) From point C, construct $\angle C = 120°$
5) From point C, draw line CD of 4 cm
6) Join A, D
7) Trapezium ABCD is Formed

Exercise : 3.6

Construct quadrilateral for measurements given below :

a) A rhombus CART with CR = 6cm, AT = 4.8cm



- The diagonals of Rhombus bisect each other

- $CR = OC + OR$

$6cm = 2OC$ $(AT \perp CR)$

$OC = \frac{6}{2}$

$OC = 3$

- $AT = AO + OT$

$4.8 = 2AO$ $(CR \perp AT)$

$AO = \frac{4.8}{2} = 2.4$

Steps :-

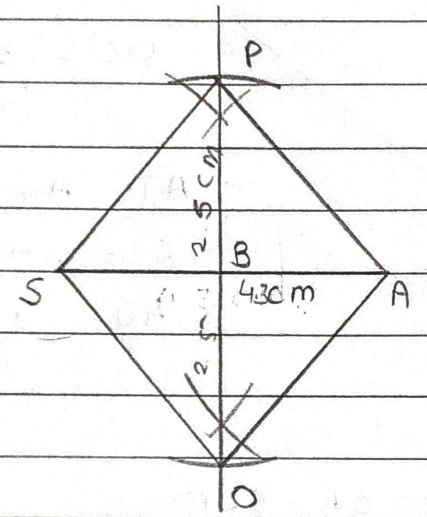
1) Draw a line CR of 6cm
2) Draw perpendicular bisector of CR & name the meeting point as O.
3) From center O with radius 2.4cm, draw a line above & below on perpendicular & name the points A & T.
4) Join AC, AR, TC, RT
5) Rhombus CART is formed

b) A rhombus SOAP with SA = 4.3, OP = 5 cm

- The diagonals of rhombus bisect each other perpendicular

- OA = BP + BO

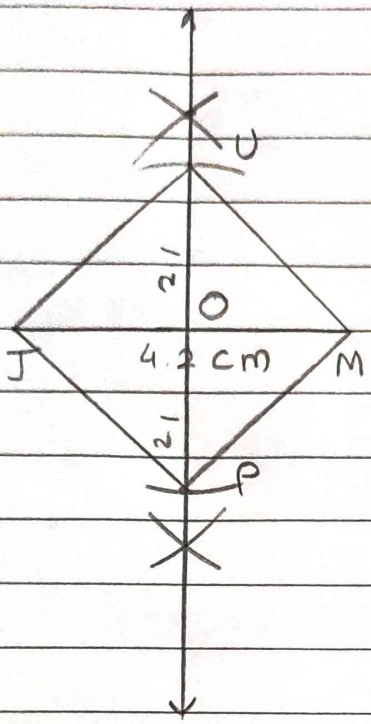
  5 = 2 BP $\therefore BP = \frac{5}{2} = 2.5$



Steps :-

1) Draw a line SA of 4.3 cm
2) Draw perpendicular bisector of SA & name the intersection point as B.
3) OP is perpendicular to SA, so, BP = OB = 2.5 cm.
4) Draw a line BP & OB of 2.5 cm
5) Join SO, OA, AP, SP
6) Rhombus SOAP is formed

c) A Square JUMP with diagonal 4.2 cm



- Diagonal is 4.2 cm means JM = MP = 4.2 cm

- JM & UP are digonals of square which bisect each other at point O.

$OU = UP = \frac{JM}{2} = \frac{4.2}{2} = 2.1$

Steps :-

1) Draw a line JM of 4.2 cm
2) JM & UP bisects each other at point O, so UP = OU = 2.1 cm
3) From point O, draw a line above below of 2.1 cm & name it point U & P
4) Join JU, UM, JP, MP
5) Square JUMP is formed