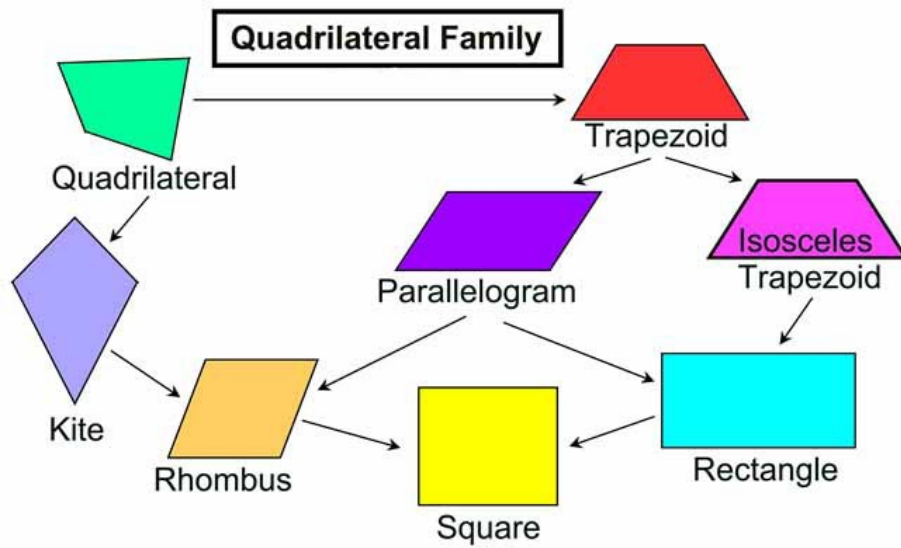


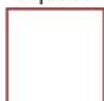





Construction of Quadrilaterals

Exercise 17A



Type	Properties
Parallelogram 	<ul style="list-style-type: none"> • Opposite sides are equal and parallel • Opposite angles are equal
Rectangle 	<ul style="list-style-type: none"> • Opposite sides are equal and parallel • All angles are right angles (90°)
Square 	<ul style="list-style-type: none"> • Opposite sides are parallel • All sides are equal • All angles are right angles (90°)
Rhombus 	<ul style="list-style-type: none"> • Opposite sides are parallel • All sides are equal • Opposite angles are equal • Diagonals bisect each other at right angles (90°)
Trapezoid 	<ul style="list-style-type: none"> • One pair of opposite sides is parallel
Kite 	<ul style="list-style-type: none"> • Two pairs of adjacent sides are equal • One pair of opposite sides are equal • One diagonal bisects the other • Diagonals intersect at right angle (90°)

Answer :

Steps of construction:

Step 1: Draw $AB = 4.2 \text{ cm}$.

Step 2: With A as the centre and radius equal to 8 cm , draw an arc.

Step 3: With B as the centre and radius equal to 6 cm , draw another arc, cutting the previous arc at C.

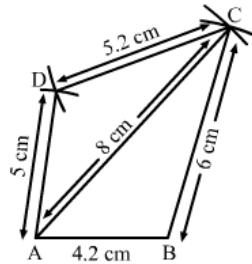
Step 4: Join BC.

Step 5: With A as the centre and radius equal to 5 cm , draw an arc.

Step 6: With C as the centre and radius equal to 5.2 cm , draw another arc, cutting the previous arc at D.

Step 7: Join AD and CD.

Thus, ABCD is the required quadrilateral.



Q2

Answer :

Steps of construction:

Step 1: Draw $PQ = 5.4 \text{ cm}$.

Step 2: With P as the centre and radius equal to 4 cm , draw an arc.

Step 3: With Q as the centre and radius equal to 4.6 cm , draw another arc, cutting the previous arc at R.

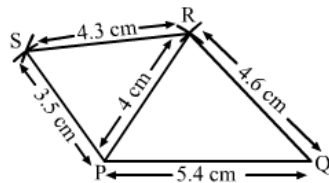
Step 4: Join QR.

Step 5: With P as the centre and radius equal to 3.5 cm , draw an arc.

Step 6: With R as the centre and radius equal to 4.3 cm , draw another arc, cutting the previous arc at S.

Step 7: Join PS and RS.

Thus, PQRS is the required quadrilateral.



Q3

Answer :

Steps of construction:

Step 1: Draw $AB = 3.5 \text{ cm}$.

Step 2: With B as the centre and radius equal to 5.6 cm , draw an arc.

Step 3: With A as the centre and radius equal to 4.5 cm , draw another arc, cutting the previous arc at D.

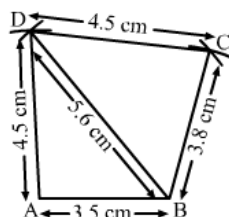
Step 4: Join BD and AD.

Step 5: With D as the centre and radius equal to 4.5 cm , draw an arc.

Step 6: With B as the centre and radius equal to 3.8 cm , draw another arc, cutting the previous arc at C.

Step 7: Join BC and CD.

Thus, ABCD is the required quadrilateral.



Q4

Answer :

Steps of construction:

Step 1: Draw $AB = 3.6 \text{ cm}$.

Step 2: With B as the centre and radius equal to 4 cm , draw an arc.

Step 3: With A as the centre and radius equal to 2.7 cm , draw another arc, cutting the previous arc at D.

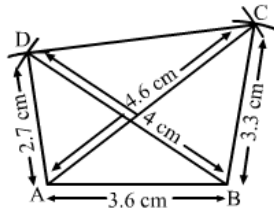
Step 4: Join BD and AD.

Step 5: With A as the centre and radius equal to 4.6 cm , draw an arc.

Step 6: With B as the centre and radius equal to 3.3 cm , draw another arc, cutting the previous arc at C.

Step 7: Join AC, BC and CD.

Thus, ABCD is the required quadrilateral.



Q5

Answer :

Steps of construction:

Step 1: Draw $QR = 7.5 \text{ cm}$.

Step 2: With Q as the centre and radius equal to 10 cm , draw an arc.

Step 3: With R as the centre and radius equal to 5 cm , draw another arc, cutting the previous arc at S.

Step 4: Join QS and RS.

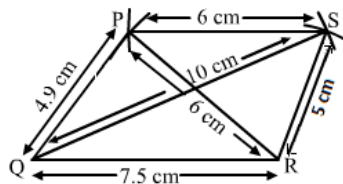
Step 5: With S as the centre and radius equal to 6 cm , draw an arc.

Step 6: With R as the centre and radius equal to 6 cm , draw another arc, cutting the previous arc at P.

Step 7: Join PS and PR.

Step 8: $PQ = 4.9 \text{ cm}$

Thus, PQRS is the required quadrilateral.



Q6

Answer :

Steps of construction:

Step 1: Draw $AB = 3.4 \text{ cm}$.

Step 2: With B as the centre and radius equal to 4 cm , draw an arc.

Step 3: With A as the centre and radius equal to 5.7 cm , draw another arc, cutting the previous arc at D.

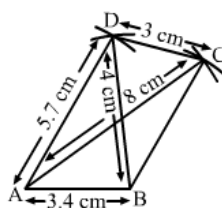
Step 4: Join BD and AD.

Step 5: With A as the centre and radius equal to 8 cm , draw an arc.

Step 6: With D as the centre and radius equal to 3 cm , draw another arc, cutting the previous arc at C.

Step 7: Join AC, CD and BC.

Thus, ABCD is the required quadrilateral.



Q7

Answer :

Steps of construction:

Step 1: Draw $AB = 3.5 \text{ cm}$.

Step 2: Make $\angle ABC = 120^\circ$.

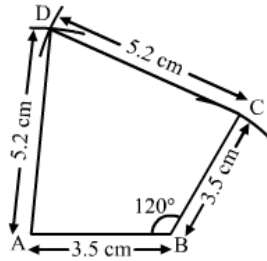
Step 3: With B as the centre, draw an arc 3.5 cm and name that point C.

Step 4: With C as the centre, draw an arc 5.2 cm .

Step 5: With A as the centre, draw another arc 5.2 cm , cutting the previous arc at D.

Step 6: Join CD and AD.

Thus, $ABCD$ is the required quadrilateral.



Q8

Answer :

Steps of construction:

Step 1: Draw $AB = 2.9 \text{ cm}$

Step 2: Make $\angle A = 70^\circ$

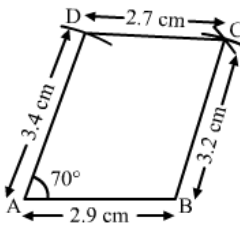
Step 3: With A as the centre, draw an arc of 3.4 cm . Name that point as D.

Step 4: With D as the centre, draw an arc of 2.7 cm .

Step 5: With B as the centre, draw an arc of 3.2 cm , cutting the previous arc at C.

Step 6: Join CD and BC.

Then, $ABCD$ is the required quadrilateral.



Q9

Answer :

Steps of construction:

Step 1: Draw $BC = 5 \text{ cm}$

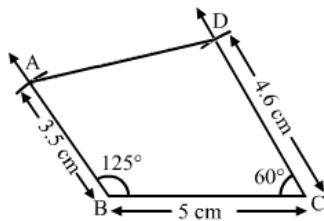
Step 2: Make $\angle B = 125^\circ$ and $\angle C = 60^\circ$

Step 3: With B as the centre, draw an arc of 3.5 cm . Name that point as A.

Step 4: With C as the centre, draw an arc of 4.6 cm . Name that point as D.

Step 5: Join A and D.

Then, $ABCD$ is the required quadrilateral.



Q10

Answer :

Steps of construction:

Step 1: Draw $QR = 5.6 \text{ cm}$

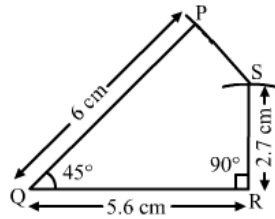
Step 2: Make $\angle Q = 45^\circ$ and $\angle R = 90^\circ$

Step 3: With Q as the centre, draw an arc of 6 cm . Name that point as P .

Step 4: With R as the centre, draw an arc of 2.7 cm . Name that point as S .

Step 6: Join P and S .

Then, $PQRS$ is the required quadrilateral.



Q11

Answer :

Steps of construction:

Step 1: Draw $AB = 5.6 \text{ cm}$

Step 2: Make $\angle A = 50^\circ$ and $\angle B = 105^\circ$

Step 3: With B as the centre, draw an arc of 4 cm .

Step 3: Sum of all the angles of the quadrilateral is 360° .

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$50^\circ + 105^\circ + \angle C + 80^\circ = 360^\circ$$

$$235^\circ + \angle C = 360^\circ$$

$$\angle C = 360^\circ - 235^\circ$$

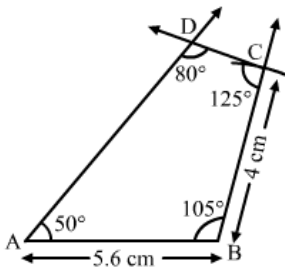
$$\angle C = 125^\circ$$

Step 5: With C as the centre, make $\angle C$ equal to 125° .

Step 6: Join C and D .

Step 7: Measure $\angle D = 80^\circ$

Then, $ABCD$ is the required quadrilateral.



Q12

Steps of construction:

Step 1: Draw $PQ = 5 \text{ cm}$

Step 2:

$$\angle P + \angle Q + \angle R + \angle S = 360^\circ$$

$$100^\circ + \angle Q + 100^\circ + 75^\circ = 360^\circ$$

$$275^\circ + \angle Q = 360^\circ$$

$$\angle Q = 360^\circ - 275^\circ$$

$$\angle Q = 85^\circ$$

Step 3: Make $\angle P = 100^\circ$ and $\angle Q = 85^\circ$

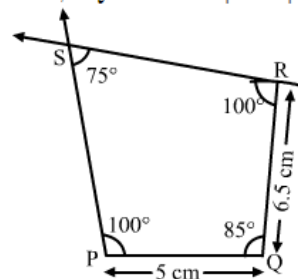
Step 3: With Q as the centre, draw an arc of 6.5 cm .

Step 4: Make $\angle R = 100^\circ$

Step 6: Join R and S .

Step 7: Measure $\angle S = 75^\circ$

Then, $PQRS$ is the required quadrilateral.



Q13

Answer :

Steps of construction:

Step 1: Draw $AB = 4\text{ cm}$

Step 2: **Make** $\angle B = 90^\circ$

Step 3: $AC^2 = AB^2 + BC^2$

$$5^2 = 4^2 + BC^2$$

$$25 - 16 = BC^2$$

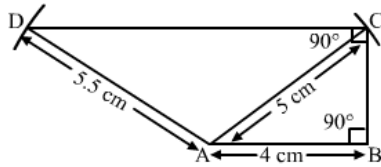
$$BC = 3\text{ cm}$$

With B as the centre, draw an arc equal to 3 cm.

Step 4: Make $\angle C = 90^\circ$

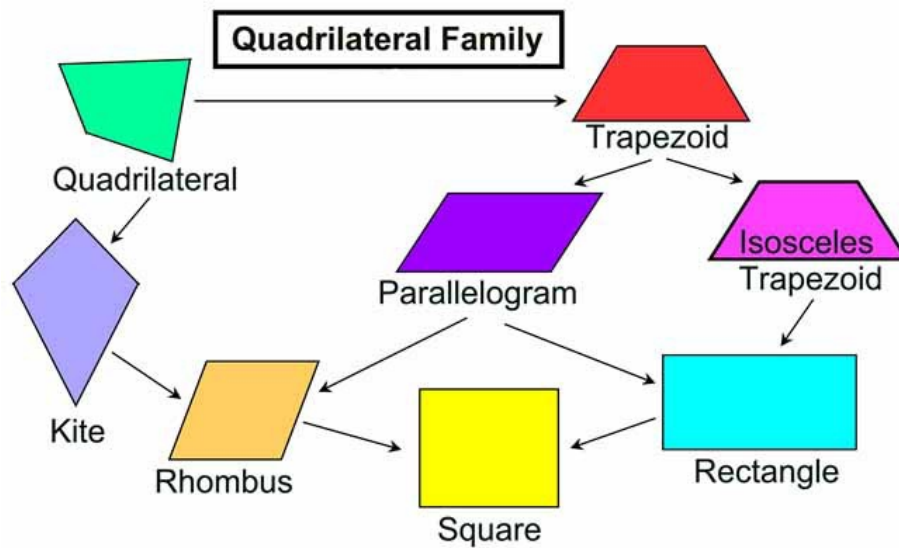
Step 5: With A as the centre and radius equal to 5.5 cm, draw an arc and name that point as D .







Then, $ABCD$ is the required quadrilateral.



Construction of Quadrilaterals

Ex 17B



Type	Properties
Parallelogram 	<ul style="list-style-type: none"> • Opposite sides are equal and parallel • Opposite angles are equal
Rectangle 	<ul style="list-style-type: none"> • Opposite sides are equal and parallel • All angles are right angles (90°)
Square 	<ul style="list-style-type: none"> • Opposite sides are parallel • All sides are equal • All angles are right angles (90°)
Rhombus 	<ul style="list-style-type: none"> • Opposite sides are parallel • All sides are equal • Opposite angles are equal • Diagonals bisect each other at right angles (90°)
Trapezoid 	<ul style="list-style-type: none"> • One pair of opposite sides is parallel
Kite 	<ul style="list-style-type: none"> • Two pairs of adjacent sides are equal • One pair of opposite sides are equal • One diagonal bisects the other • Diagonals intersect at right angle (90°)

Answer :

Steps of construction:

Step 1: Draw $AB = 5.2\text{ cm}$

Step 2: With B as the centre, draw an arc of 4.7 cm .

Step 3: With A as the centre, draw another arc of 7.6 cm , cutting the previous arc at C .

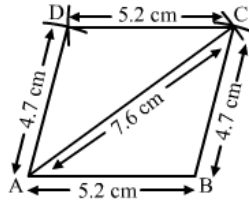
Step 4: Join A and C .

Step 5: We know that the opposite sides of a parallelogram are equal. Thus, with C as the centre, draw an arc of 5.2 cm .

Step 6: With A as the centre, draw another arc of 4.7 cm , cutting the previous arc at D .

Step 7: Join CD and AD .

Then, $ABCD$ is the required parallelogram.



Q2

Answer :

Steps of construction:

Step 1: Draw $AB = 4.3\text{ cm}$

Step 2: With B as the centre, draw an arc of 6.8 cm .

Step 3: With A as the centre, draw another arc of 4 cm , cutting the previous arc at D .

Step 4: Join BD and AD .

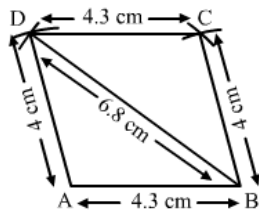
Step 5: We know that the opposite sides of a parallelogram are equal.

Thus, with D as the centre, draw an arc of 4.3 cm .

Step 6: With B as the centre, draw another arc of 4 cm , cutting the previous arc at C .

Step 7: Join CD and BC .

then, $ABCD$ is the required parallelogram.



Q3

Answer :

Steps of construction:

Step 1: Draw $PQ = 4\text{ cm}$

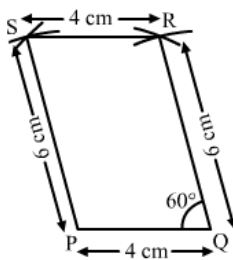
Step 2: Make $\angle PQR = 60^\circ$

Step 2: With Q as the centre, draw an arc of 6 cm and name that point as R .

Step 3: With R as the centre, draw an arc of 4 cm and name that point as S .

Step 4: Join SR and PS .

Then, $PQRS$ is the required parallelogram.



Q4

Answer :

Steps of construction:

Step 1: Draw $BC = 5\text{ cm}$

Step 2: Make an $\angle BCD = 120^\circ$

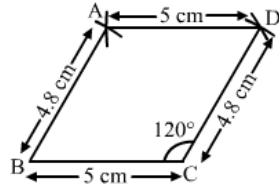
Step 2: With C as centre draw an arc of 4.8 cm , name that point as D

Step 3: With D as centre draw an arc 5 cm , name that point as A

Step 4: With B as centre draw another arc 4.8 cm cutting the previous arc at A .

Step 5: Join AD and AB

then, $ABCD$ is a required parallelogram.



Q5

Answer :

We know that the diagonals of a parallelogram bisect each other.

Steps of construction:

Step 1: Draw $AB = 4.4\text{ cm}$

Step 2: With A as the centre and radius 2.8 cm , draw an arc.

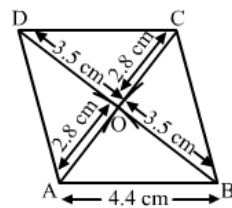
Step 3: With B as the centre and radius 3.5 cm , draw another arc, cutting the previous arc at point O .

Step 4: Join OA and OB .

Step 5: Produce OA to C , such that $OC = AO$. Produce OB to D , such that $OD = OB$.

Step 5: Join AD , BC , and CD .

Thus, $ABCD$ is the required parallelogram. The other side is 4.5 cm in length.



Q6

Answer :

Steps of construction:

Step 1: Draw $AB = 6.5\text{ cm}$

Step 2: Draw a perpendicular at point A . Name that ray as AX . From point A , draw an arc of length 2.5 cm on the ray AX and name that point as L .

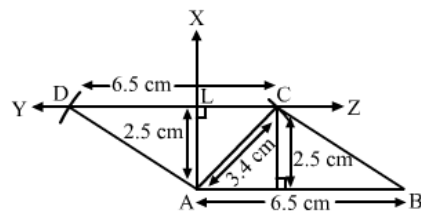
Step 3: On point L , make a perpendicular. Draw a straight line YZ passing through L , which is perpendicular to the ray AX .

Step 4: Cut an arc of length 3.4 cm on the line YZ and name it as C .

Step 5: From point C , cut an arc of length 6.5 cm on the line YZ . Name that point as D .

Step 6: Join BC and AD .

Therefore, quadrilateral $ABCD$ is a parallelogram.



The altitude from C measures 2.5 cm in length.

Q7

Answer :

We know that the diagonals of a parallelogram bisect each other.

Steps of construction:

Step 1: Draw $AC = 3.8 \text{ cm}$

Step 2: Bisect AC at O .

Step 3: Make $\angle COX = 60^\circ$

Produce XO to Y .

Step 4:

$$OB = \frac{1}{2} (4.6) \text{ cm}$$

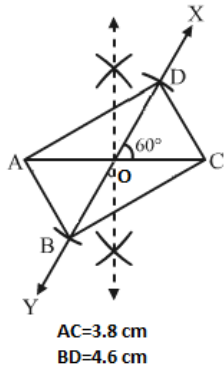
$$OB = 2.3 \text{ cm}$$

$$\text{and } OD = \frac{1}{2} (4.6) \text{ cm}$$

$$OD = 2.3 \text{ cm}$$

Step 5: Join AB , BC , CD and AD .

Thus, $ABCD$ is the required parallelogram.



Q8

Answer :

Steps of construction:

Step 1: Draw $AB = 11 \text{ cm}$

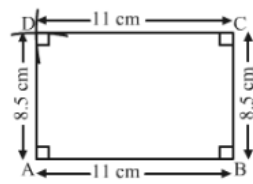
Step 2: Make $\angle A = 90^\circ$
 $\angle B = 90^\circ$

Step 3: Draw an arc of 8.5 cm from point A and name that point as D .

Step 4: Draw an arc of 8.5 cm from point B and name that point as C .

Step 5: Join C and D .

Thus, $ABCD$ is the required rectangle.



Q9

Answer :

All the sides of a square are equal.

Steps of construction:

Step 1: Draw $AB = 6.4\text{ cm}$

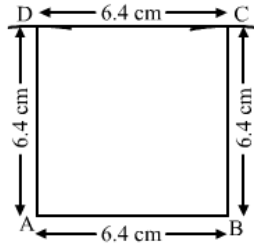
Step 2: Make $\angle A = 90^\circ$
 $\angle B = 90^\circ$

Step 3: Draw an arc of length 6.4 cm from point A and name that point as D.

Step 4: Draw an arc of length 6.4 cm from point B and name that point as C.

Step 5: Join C and D.

Thus, ABCD is a required square.



Q10

Answer :

We know that the diagonals of a square bisect each other at right angles.

Steps of construction:

Step 1: Draw $AC = 5.8\text{ cm}$

Step 2: Draw the perpendicular bisector XY of AC, meeting it at O.

Step 3:

: From O :

$$OB = \frac{1}{2} (5.8) \text{ cm} = 2.9 \text{ cm}$$

$$OD = \frac{1}{2} (5.8) \text{ cm} = 2.9 \text{ cm}$$

Step 4: Join AB, BC, CD and DA.

ABCD is the required square.

Q11

Answer :

Steps of construction:

Step 1: Draw $QR = 3.6\text{ cm}$

Step 2: Make $\angle Q = 90^\circ$
 $\angle R = 90^\circ$

Step 3:

$$PR^2 = PQ^2 + QR^2$$

$$6^2 = PQ^2 + 3.6^2$$

$$PQ^2 = 36 - 12.96$$

$$PQ^2 = 23.04$$

$$PQ = 4.8 \text{ cm}$$

Step 3: Draw an arc of length 4.8 cm from point Q and name that point as P.

Step 4: Draw an arc of length 6 cm from point R, cutting the previous arc at P.

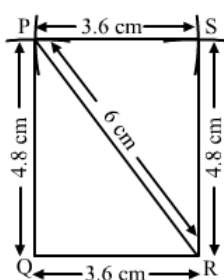
Step 5: Join PQ

Step 6: Draw an arc of length 4.8 cm from point R.

From point P, draw an arc of length 3.6 cm, cutting the previous arc. Name that point as S.

Step 7: Join P and S.

Thus, PQRS is the required rectangle. The other side is 4.8 cm in length.



Q12

Answer :

We know that the diagonals of a rhombus bisect each other.

.Steps of construction:

Step 1: Draw AC= **6cm**

Step 2: Draw a perpendicular bisector(XY) of AC, which bisects AC at O.

Step 3:

$$OB = \frac{1}{2} (8) \text{ cm}$$

$$OB = 4 \text{ cm}$$

$$\text{and } OD = \frac{1}{2} (8) \text{ cm}$$

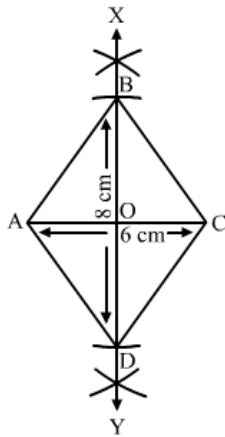
$$OD = 4 \text{ cm}$$

Draw an arc of length 4 cm on OX and name that point as B.

Draw an arc of length 4 cm on OY and name that point as D.

Step 4 : Join AB, BC, CD and AD.

Thus, ABCD is the required rhombus, as shown in the figure.



Q13

Answer :

Steps of construction:

Step 1: Draw AB = **4cm**

Step 2: With B as the centre, draw an arc of **4 cm**.

Step 3: With A as the centre, draw another arc of **6.5 cm**, cutting the previous arc at C.

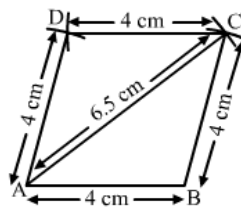
Step 4: Join AC and BC.

Step 5: With C as the centre, draw an arc of 4 cm.

Step 6: With A as the centre, draw another arc of **4 cm**, cutting the previous arc at D.

Step 7: Join AD and CD.

ABCD is the required rhombus.



Q14

Answer :

Steps of construction:

Step1: Draw $AB = 7.2 \text{ cm}$

Step2: Draw $\angle ABY = 60^\circ$
 $\angle BAX = 120^\circ$

Sum of the adjacent angles is 180° .

$\angle BAX + \angle ABY = 180^\circ$

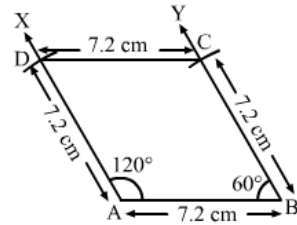
$\Rightarrow \angle BAX = 180^\circ - 60^\circ = 120^\circ$

Step 3:

Set off $AD (7.2 \text{ cm})$ along AX and $BC (7.2 \text{ cm})$ along BY .

Step 4: Join C and D .

Then, $ABCD$ is the required rhombus.



Q15

Answer :

Steps of construction:

Step 1: Draw $AB = 6 \text{ cm}$

Step 2: Make $\angle ABX = 75^\circ$

Step 3: With B as the centre, draw an arc at 4 cm . Name that point as C .

Step 4: $AB \parallel CD$

$\therefore \angle ABX + \angle BCY = 180^\circ$

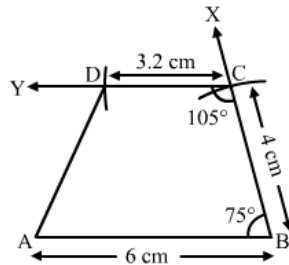
$\Rightarrow \angle BCY = 180^\circ - 75^\circ = 105^\circ$

Make $\angle BCY = 105^\circ$

At C , draw an arc of length 3.2 cm .

Step 5: Join A and D .

Thus, $ABCD$ is the required trapezium.



Q16

Steps of construction :

Step1: Draw AB equal to 7 cm.

Step2: Make an angle, $\angle ABX$, equal to 60° .

Step3: With B as the centre, draw an arc of 5 cm. Name that point as C . Join B and C .

Step4:

$$AB \parallel DC$$

$$\therefore \angle ABX + \angle BCY = 180^\circ$$

$$\Rightarrow \angle BCY = 180^\circ - 60^\circ = 120^\circ$$

Draw an angle, $\angle BCY$, equal to 120° .

Step4: With A as the centre, draw an arc of length 6.5 cm, which cuts CY . Mark that point as D .

Step5: Join A and D .

Thus, $ABCD$ is the required trapezium.

