Construction of Quadrilaterals
Exercise 17A

Quadrilateral Family

Quadrilateral

Trapezoid

Kite

Parallelogram

Isosceles Trapezoid

Rhombus

Square

Rectangle

Type	Properties
Parallelogram	• Opposite sides are equal and parallel • Opposite angles are equal
Rectangle	• Opposite sides are equal and parallel • All angles are right angles (90°)
Square	• Opposite sides are parallel • All sides are equal • All angles are right angles (90°)
Rhombus	• Opposite sides are parallel • All sides are equal • Opposite angles are equal • Diagonals bisect each other at right angles (90°)
Trapezoid	• One pair of opposite sides is parallel
Kite	• 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°)

Construction of Quadrilaterals RS Aggarwal Class 8 Maths Solutions Exercise 17A Q1

Answer:

Steps of construction:
Step 1: Draw $AB = 4.2$ 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.
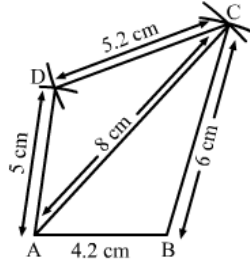Step 4: Join BC.
Step 5: With A as the centre and radius equal to 5 cm, draw an arc.
Step 6: With C as the centre and radius equal to 5.2 cm, draw another arc, cutting the previous arc at D.
Step 7: Join AD and CD.

Thus, ABCD is the required quadrilateral.

Q2

Answer:

Steps of construction:
Step 1: Draw $PQ = 5.4$ 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.
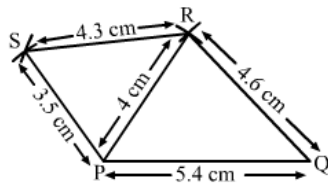Step 4: Join QR.
Step 5: With P as the centre and radius equal to 3.5 cm, draw an arc.
Step 6: With R as the centre and radius equal to 4.3 cm, draw another arc, cutting the previous arc at S.
Step 7: Join PS and RS.

Thus, PQRS is the required quadrilateral.

Q3

Answer:

Steps of construction:
Step 1: Draw $AB = 3.5$ 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 $AB = 3.6$ cm.

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

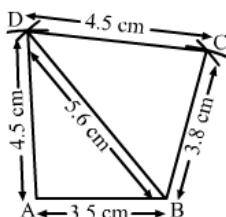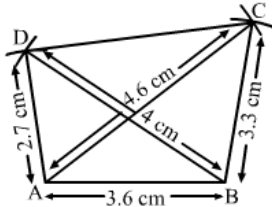Step 3: With A as the centre and radius equal to 2.7 cm, draw another arc, cutting the previous arc at D.

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 $QR = 7.5$ 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.
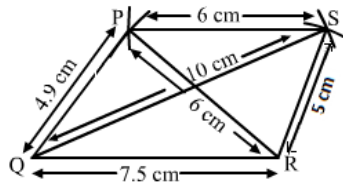
Step 4: Join QS and RS.

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 cm

Thus, PQRS is the required quadrilateral.

Q6

Answer :

Steps of construction:

Step 1: Draw $AB = 3.4$ 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.
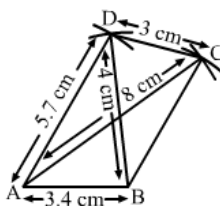
Step 4: Join BD and AD.

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:
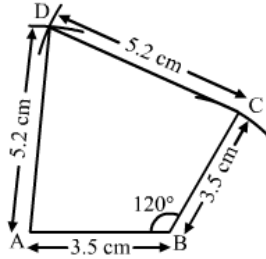Step 1: Draw AB= 3.5 cm.
Step 2: Make $\angle ABC = 120°$.
Step 3: With B as the centre, draw an arc 3.5 cm and name that point C.
Step 4: With C as the centre, draw an arc 5.2 cm.
Step 5: With A as the centre, draw another arc 5.2 cm, cutting the previous arc at D.
Step 6: Join CD and AD.
Thus, $ABCD$ is the required quadrilateral.

Q8
Answer :

Steps of construction:
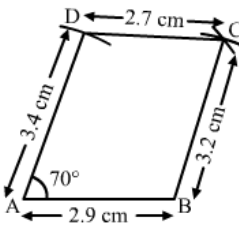Step 1: Draw AB= $2.9cm$
Step 2: Make $\angle A = 70°$
Step 3: With A as the centre, draw an arc of $3.4cm$. Name that point as D.
Step 4: With D as the centre, draw an arc of $2.7cm$.
Step 5: With B as the centre, draw an arc of 3.2 cm, cutting the previous arc at C.
Step 6: Join CD and BC.
Then, $ABCD$ is the required quadrilateral.

Q9
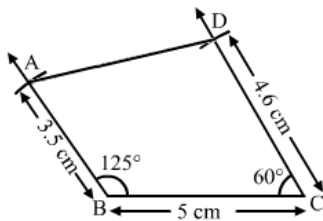**Answer :**

Steps of construction:
Step 1: Draw BC= $5cm$
Step 2: Make $\angle B = 125°$ and $\angle C = 60°$
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 :

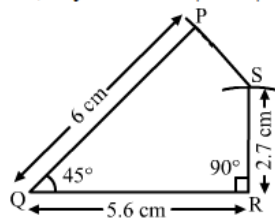Steps of construction:

Step 1: Draw $QR = 5.6\ cm$

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

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 $2.7cm$. 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 $AB = 5.6\ cm$

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

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

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

$\angle A + \angle B + \angle C + \angle D = 360°$

$50° + 105° + \angle C + 80° = 360°$

$235° + \angle C = 360°$
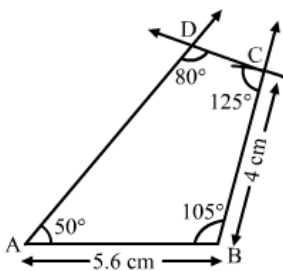
$\angle C = 360° - 235°$

$\angle C = 125°$

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

Step 6: Join C and D.

Step 7: Measure $\angle D = 80°$

Then, $ABCD$ is the required quadrilateral.

Q12

Steps of construction:

Step 1: Draw $PQ = 5cm$

Step 2:

$\angle P + \angle Q + \angle R + \angle S = 360°$

$100° + \angle Q + 100° + 75° = 360°$

$275° + \angle Q = 360°$

$\angle Q = 360° - 275°$

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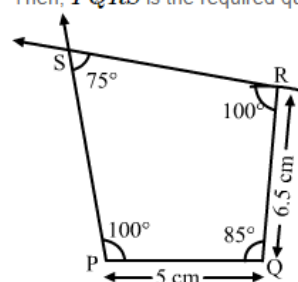
Step 3: Make $\angle P = 100°$ and $\angle Q = 85°$

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

Step 4: Make $\angle R = 100°$

Step 6: Join R and S.

Step 7: Measure $\angle S = 75°$

Then, $PQRS$ is the required quadrilateral.

Q13

Answer :

Steps of construction:

Step 1: Draw $AB = 4cm$

Step 2: $Make \angle B = 90°$

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

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

$\quad\quad 25 - 16 = BC^2$

$\quad\quad BC = 3cm$
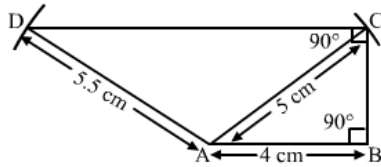
With B as the centre, draw an arc equal to 3 cm.
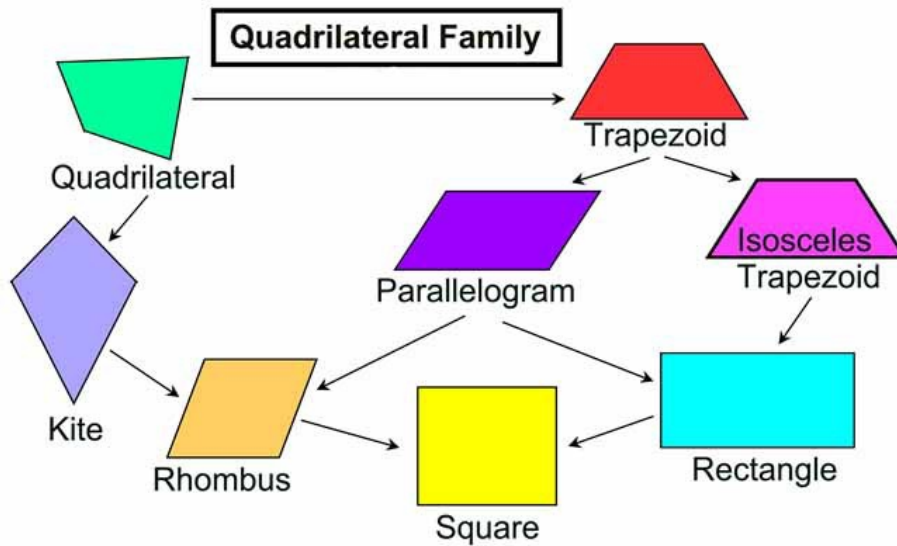
Step 4: Make $\angle C = 90°$

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.

Quadrilateral Family

Quadrilateral

Trapezoid

Kite

Parallelogram

Isosceles Trapezoid

Rhombus

Square

Rectangle

Type	Properties
Parallelogram	• Opposite sides are equal and parallel • Opposite angles are equal
Rectangle	• Opposite sides are equal and parallel • All angles are right angles (90°)
Square	• Opposite sides are parallel • All sides are equal • All angles are right angles (90°)
Rhombus	• Opposite sides are parallel • All sides are equal • Opposite angles are equal • Diagonals bisect each other at right angles (90°)
Trapezoid	• One pair of opposite sides is parallel
Kite	• 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°)

Q1

Answer :

Steps of construction:

Step 1: Draw $AB = 5.2cm$

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.
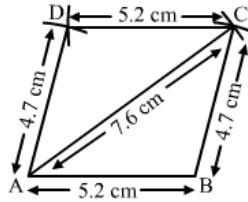
Step 4: Join A and C.

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

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= $4.3cm$

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 $4cm$, 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 $4.3cm$.

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
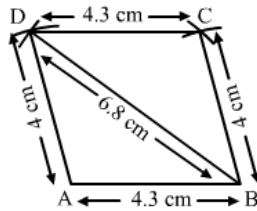
Answer :

Steps of construction:

Step 1: Draw PQ= 4 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= $5cm$.
Step 2: Make an $\angle BCD = 120°$
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.
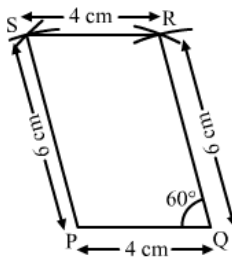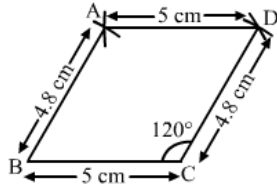

Q5

Answer :

We know that the diagonals of a parallelogram bisect each other.
Steps of construction:
Step 1: Draw $AB= 4.4cm$
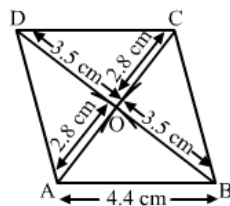Step 2: With A as the centre and radius $2.8cm$, draw an arc.
Step 3: With B as the centre and radius $3.5cm$, draw another arc, cutting the previous arc at point O.
Step 4: Join OA and OB.
Step 5: Produce OA to C, such that $OC= AO$. Produce OB to D, such that $OB=OD$.
Step 5: Join AD, BC, and CD.
Thus, $ABCD$ is the required parallelogram. The other side is 4.5 cm in length.

Q6

Answer :

Steps of construction:
Step 1: Draw AB= 6.5cm
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.
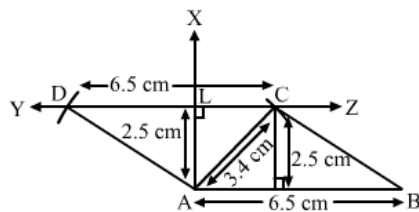
The altitude from C measures 2.5 cm in length.

Q7

Answer :

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

Steps of construction:
Step 1: Draw $AC = 3.8$ cm
Step 2: Bisect AC at O.
Step 3: Make $\angle COX = 60^\circ$
Produce XO to Y.
Step 4:

$$OB = \tfrac{1}{2}\left(4.6\right)\ \text{cm}$$
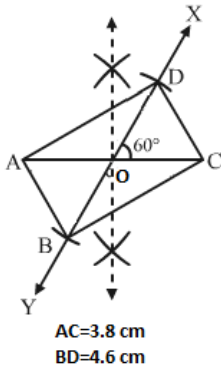
$$OB = 2.3\ \text{cm}$$

$$\text{and } OD = \tfrac{1}{2}\left(4.6\right)\ \text{cm}$$

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

Step 5: Join AB, BC, CD and AD.
Thus, $ABCD$ is the required parallelogram.

AC=3.8 cm
BD=4.6 cm

Q8

Answer :

Steps of construction:
Step 1: Draw $AB = 11cm$
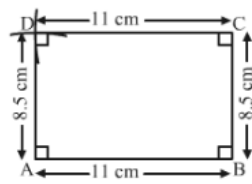Step 2: Make $\angle A = 90^\circ$
$\qquad\qquad \angle B = 90^\circ$
Step 3: Draw an arc of 8.5 cm from point A and name that point as D.
Step 4: Draw an arc of 8.5 cm from point B and name that point as C.
Step 5: Join C and D.
Thus, $ABCD$ is the required rectangle.

Q9

Answer :

All the sides of a square are equal.
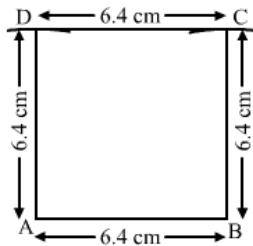
Steps of construction:

Step 1: Draw $AB = 6.4cm$

Step 2: Make $\angle A = 90°$
$\angle B = 90°$

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 $AC = 5.8$ cm

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

Step 3:

$: From\ O :$

$$OB = \tfrac{1}{2}\left(5.8\right)\ \text{cm}\ =\ 2.9\ \text{cm}$$

$$OD = \tfrac{1}{2}\left(5.8\right)\ \text{cm} =\ 2.9\ \text{cm}$$

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

$ABCD$ is the required square.

Q11

Answer :

Steps of construction:

Step 1: Draw $QR = 3.6cm$

Step 2: Make $\angle Q = 90°$
$\angle R = 90°$

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.

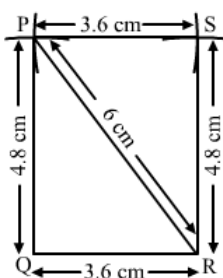Step 4: Draw an arc of length 6 cm from point R, cutting the previous arc at P.

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:

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

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

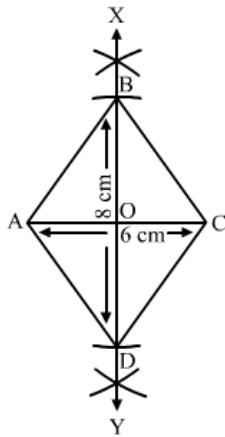$$\text{and } OD = \frac{1}{2}\left(8\right) \text{ cm}$$

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

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*.
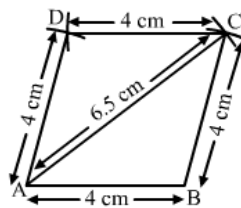
Step 4: Join *AC* and *BC*.

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 $AB = 7.2$ cm

Step2: Draw $\angle ABY = 60°$
$\angle BAX = 120°$

Sum of the adjacent angles is 180°.

$\angle BAX + \angle ABY = 180°$
$=> \angle BAX = 180° - 60° = 120°$
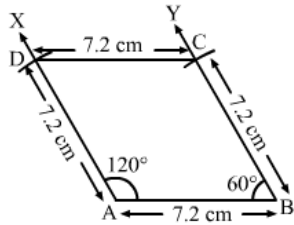
Step 3:

Set off AD (7.2 cm) along AX and BC (7.2 cm) along BY.

Step 4: Join C and D.

Then, $ABCD$ is the required rhombus.

Q15

Answer :

Steps of construction:

Step 1: Draw $AB = 6$ cm

Step 2: Make $\angle ABX = 75°$

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

Step 4: $AB \parallel CD$
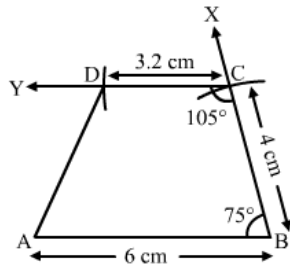
$\therefore \angle ABX + \angle BCY = 180°$
$\Rightarrow \angle BCY = 180° - 75° = 105°$
Make $\angle BCY = 105°$

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:

$AB \parallel DC$

$\therefore \angle ABX + \angle BCY = 180°$

$\Rightarrow \angle BCY = 180° - 60° = 120°$

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.