

Construction of Quadrilaterals

- A unique quadrilateral can be constructed, if any five measurements of the quadrilateral are given.
- **Construction of a quadrilateral when four sides and a diagonal are given:**

Example:

Construct a quadrilateral WXYZ, where $WX = 4.5$ cm, $XY = 5$ cm, $YZ = 5.5$ cm, $ZW = 3$ cm, and $WY = 6$ cm.

Solution:

Step 1:

Draw a line WY of length 6 cm. Draw an arc of radius 4.5 cm with W as centre and another arc of length 5 cm with Y as centre. The intersection of the two arcs will be the point, X.

Join WX and XY.

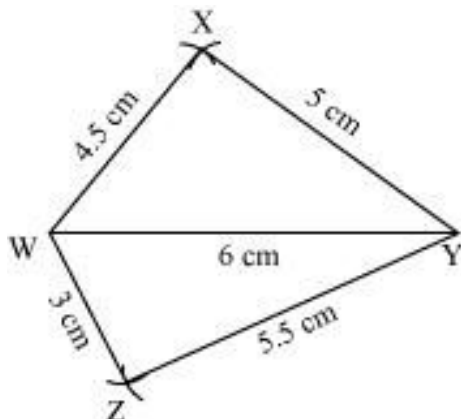
Step 2:

The point, Z, will be on the opposite side of point X with respect to WY.

Draw an arc of length 3 cm taking W as centre and another arc of length 5.5 cm taking Y as centre. The intersection of these arcs will be the point, Z.

Join WZ and YZ.

WXYZ is the required quadrilateral.



- **Construction of a quadrilateral when two diagonals and three sides are given**

Example:

Construct a quadrilateral PQRS, where $PR = 7$ cm, $QS = 8$ cm, $PQ = 5$ cm, $QR = 5$ cm, and $PS = 5.5$ cm.

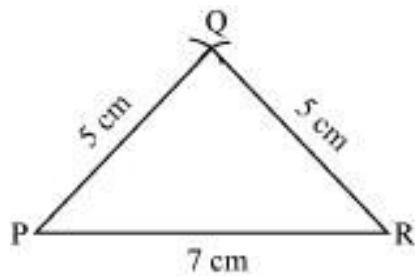
Solution:

The steps of constructing quadrilateral PQRS are as follows:

Step 1:

Draw a line PR of length 7 cm. Draw an arc of radius 5 cm taking P as centre and an arc of radius 5 cm taking R as centre. The point of intersection of these two arcs will be the point, Q.

Join PQ and RQ.

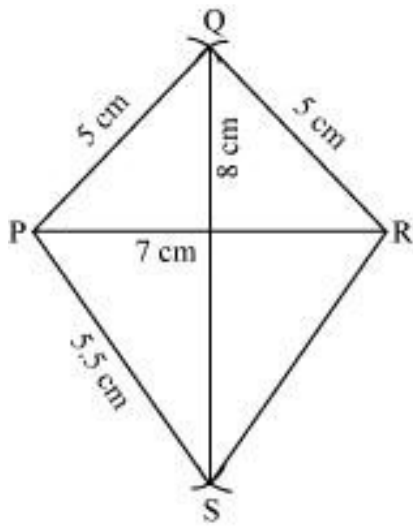


Step 2:

With Q as centre, draw an arc of radius 8 cm. The point, S, will lie on this arc.

Then, taking P as centre, draw an arc of radius 5.5 cm. The intersection point of the two arcs will be the point, S.

Join PS and RS.



PQRS is the required quadrilateral.

- **Construction of a quadrilateral when three sides and two included angles are given**

Example:

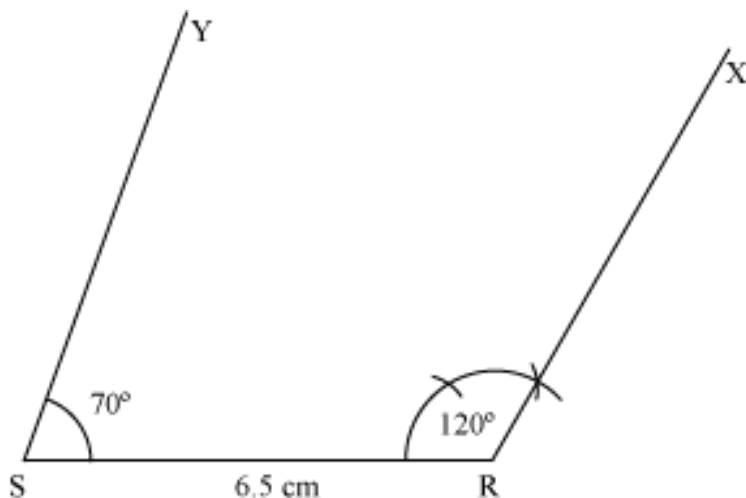
Construct a quadrilateral PQRS with $SR = 6.5$ cm, $PS = 5$ cm, $QR = 3$ cm, $\angle R = 120^\circ$, and $\angle S = 70^\circ$.

Solution:

The steps of construction are as follows:

Step 1:

Draw $SR = 6.5$ cm. Draw $\angle SRX = 120^\circ$ at R and $\angle RSY = 70^\circ$ at S.

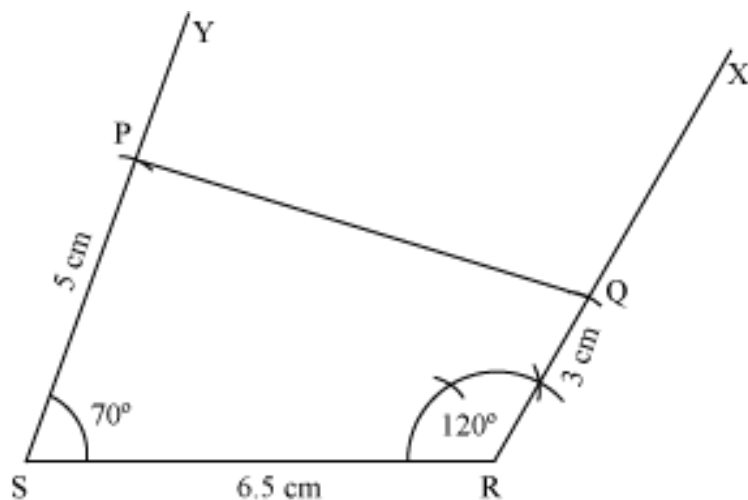


Step 2:

With S as centre, draw an arc of radius 5 cm intersecting SY at P.

With R as centre, draw an arc of radius 3 cm intersecting RX at Q.

Join PQ to obtain the required quadrilateral PQRS.



- **Construction of a quadrilateral when two adjacent sides and three angles are given:**

Example:

Construct a quadrilateral ABCD, where $AB = 6$ cm, $AD = 4$ cm, $\angle A = 90^\circ$, $\angle B = 105^\circ$, and $\angle D = 60^\circ$.

Solution:

Step 1:

Draw a line segment AB of length 6 cm. Make $\angle ABX = 105^\circ$ at B and $\angle BAY = 90^\circ$ at A.

Step 2:

With A as centre, draw an arc of radius 4 cm to cut the ray AY at point D. At D, draw $\angle ADZ = 60^\circ$.

The point of intersection of the rays, BX and DZ, will be the point, C.

ABCD is the required quadrilateral.

