

18. Practical Geometry (Constructions)

Exercise 18.1

1. Question

Construct a quadrilateral $ABCD$ in which $AB = 4.4$ cm, $BC = 4$ cm, $CD = 6.4$ cm, $DA = 3.8$ cm and $BD = 6.6$ cm.

Answer

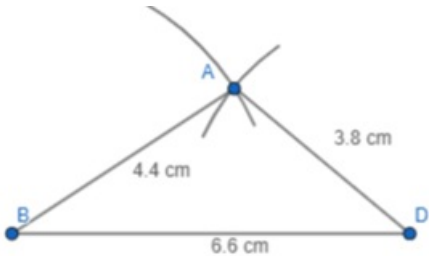
As four sides and diagonal of the quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ABD$. Draw line BD of length 6.6 cm.

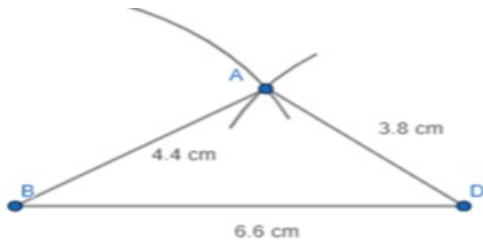


Step 2- Then using compass take a length of 4.4 cm and draw an arc by taking B as the centre. Do the same by taking D as centre and length of 3.8 cm.

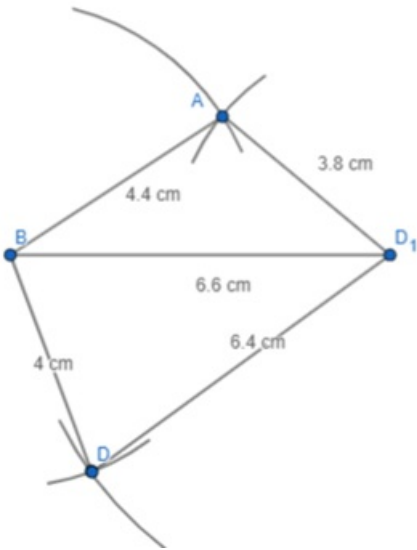
Step 3-Now join the intersection point to B and D and label it as A.



Step 4- Now for vertex C, using compass take a length of 4 cm and draw an arc by taking B as the centre. Do the same by taking D as centre and length of 6.4 cm.



Step 5-Join the intersection point to B and D and label it as C.



2. Question

Construct a quadrilateral $ABCD$ in which $AB = BC = 5.5$ cm, $CD = 4$ cm, $DA = 6.3$ cm, $AC = 9.4$ cm Measure BD .

Answer

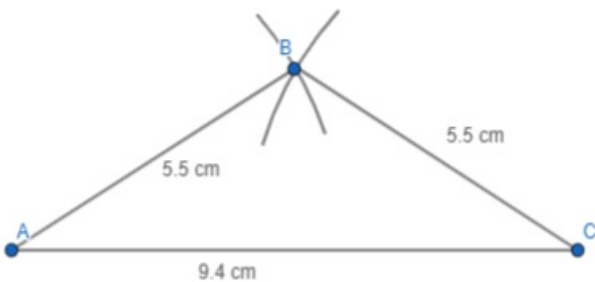
As four sides and diagonal of the quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ABC$. Draw line AC of length 9.4 cm.

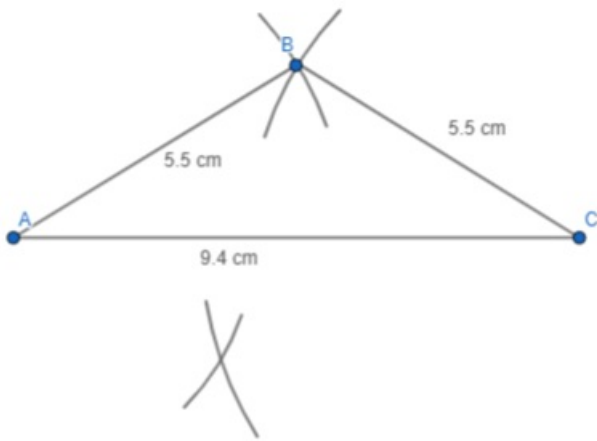


Step 2- Then using compass take a length of 5.5 cm and draw an arc by taking A as the centre. Do the same by taking C as centre and length of 5.5 cm.

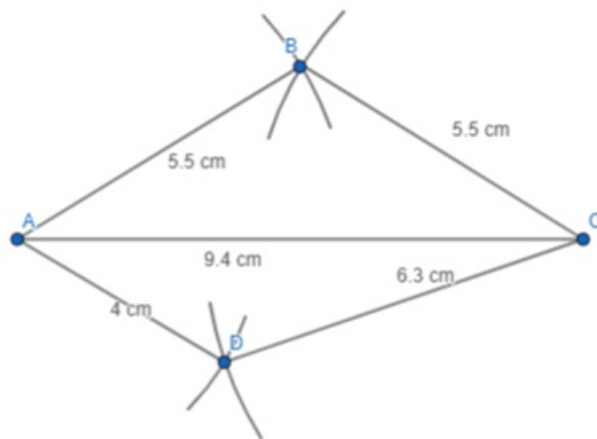
Step 3-Now join the intersection point to A and C and label it as B.



Step 4- Now for vertex B, using compass take a length of 4 cm and draw an arc by taking A as the centre. Do the same by taking C as the centre and length of 6.3 cm.



Step 5-Join the intersection point to A and C and label it as D.



Join BD and measure length of BD.

BD = 5.1 cm

3. Question

Construct a quadrilateral $XYZW$ in which $XY = 5$ cm, $YZ = 6$ cm, $ZW = 7$ cm, $WX = 3$ cm and $XZ = 9$ cm.

Answer

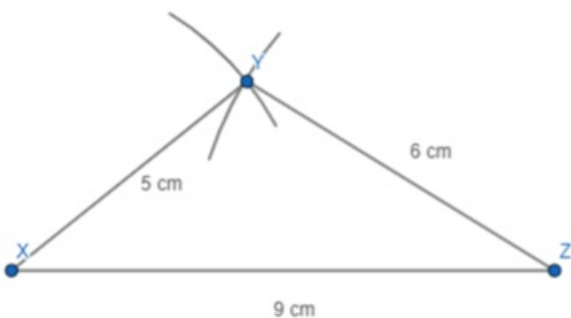
As four sides and diagonal of the quadrilateral is given.

Step 1-Using SSS construction condition first we will construct $\triangle XYZ$. Draw line XZ of length 9 cm.

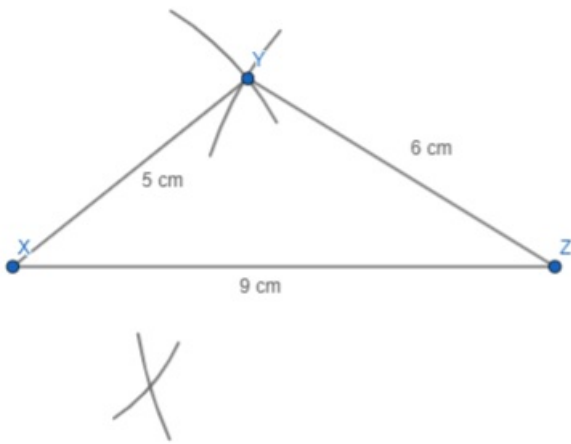


Step 2- Then using compass take a length of 5 cm and draw an arc by taking X as the centre. Do the same by taking Z as centre and length of 6 cm.

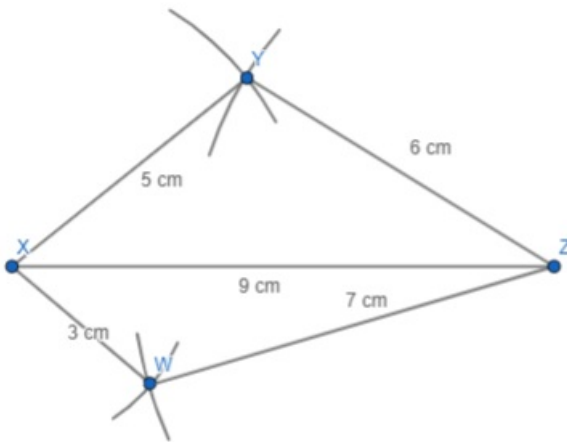
Step 3-Now join the intersection point to X and Z and label it as Y.



Step 4- For vertex W, using compass take a length of 3 cm and draw an arc by taking X as the centre. Similarly, taking Z as the centre and length of 7 cm.



Step 5-Join the intersection point to X and Z and label it as W.



4. Question

Construct a parallelogram $PQRS$ such that $PQ = 5.2$ cm, $PR = 6.8$ cm, and $QS = 8.2$ cm.

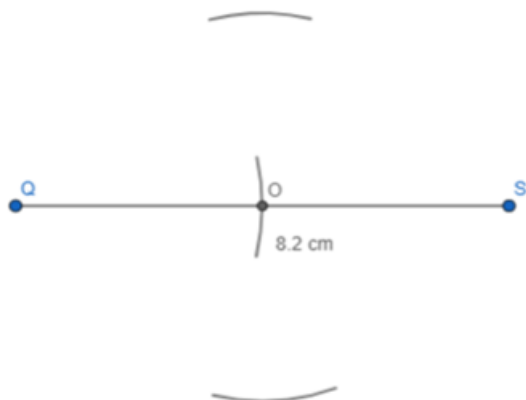
Answer

As two diagonals and one side are given. Now for parallelogram opposite sides are equal.

Step 1- Step 1-Using SSS construction condition first we will construct $\triangle PQS$. Draw line QS of length 8.2 cm.

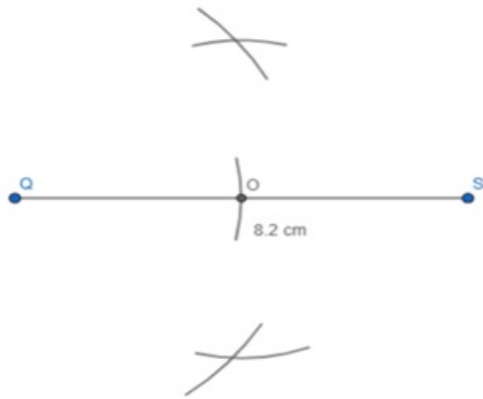


Step 2- Then using compass take a length of half of diagonal QS , 4.1 cm and draw an arc by taking Q as a centre and label it as O . Now the same by taking O as centre and length half of diagonal PR , 3.4 cm draw an arc on both the sides of QS .

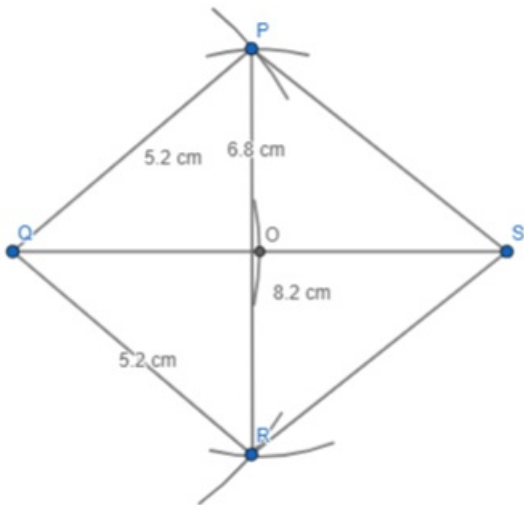


Step 3-Using compass take a length of 5.2 cm and draw an arc by taking Q as a centre on both the sides of

QS.



Step 4- Join sides PQ, PS, QR, RS.



5. Question

Construct a rhombus with side 6 cm and one diagonal 8 cm. Measure the other diagonal.

Answer

As all the sides of a rhombus are equal and diagonals bisect each other.

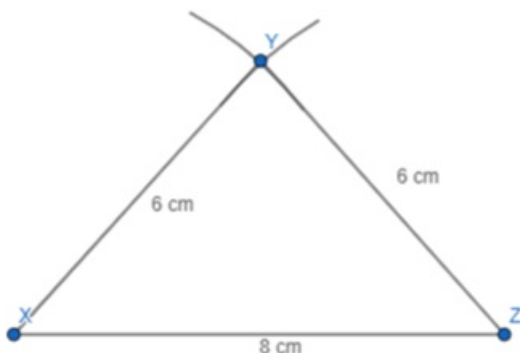
$XY = YZ = ZW = WX = 6$ cm and $XZ = 8$ cm

Step 1-Using SSS construction condition first we will construct $\triangle XYZ$. Draw line XZ of length 8 cm.

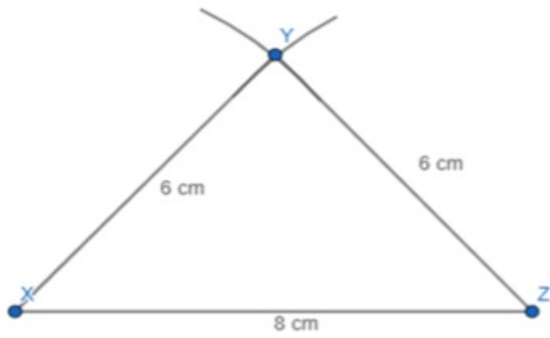


Step 2- Then using compass take a length of 6 cm and draw an arc by taking X as the centre. Do the same by taking Z as centre and length of 6 cm.

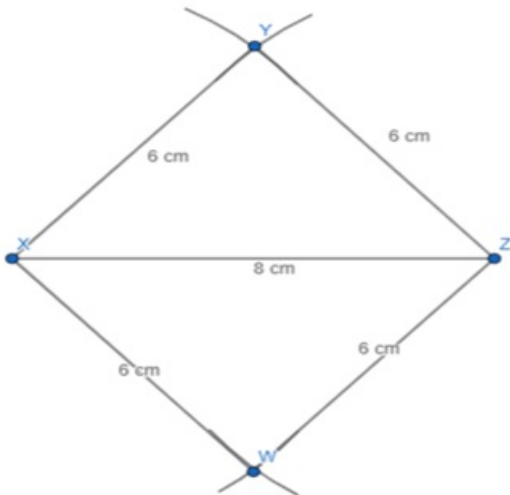
Step 3-Now join the intersection point to X and Z and label it as Y.



Step 4- Now for vertex W, using compass take a length of 6 cm and draw an arc by taking X as the centre. Do the same by taking Z as centre and length of 6 cm.



Step 5-Join the intersection point to X and Z and label it as W.



6. Question

Construct a kite $ABCD$ in which $AB = 4$ cm, $BC = 4.9$ cm, $AC = 7.2$ cm.

Answer

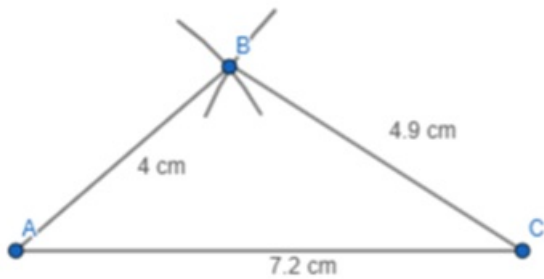
For a kite $ABCD$ $AB=AD$ and $AC=BC$.

Step 1-Using SSS construction condition first we will construct $\triangle ABC$. Draw line AC of length 7.2 cm.

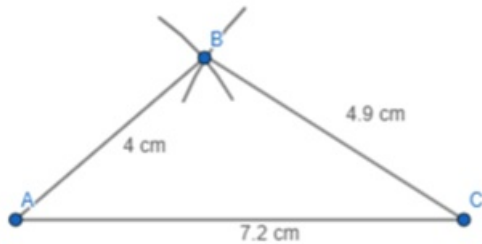


Step 2- Then using compass take a length of 4 cm and draw an arc by taking A as the centre. Do the same by taking C as centre and length of 4.9 cm.

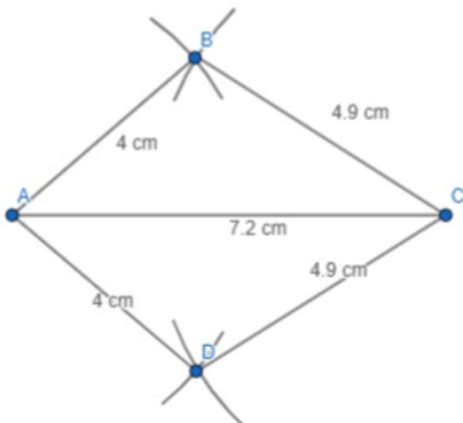
Step 3-Now join the intersection point to A and C and label it as B.



Step 4- Now for vertex D, using compass take a length of 4 cm and draw an arc by taking A as the centre. Do the same by taking C as centre and length of 4.9 cm.



Step 5-Join the intersection point to A and C and label it as D.



7. Question

Construct, if possible, a quadrilateral $ABCD$ given $AB = 6$ cm, $BC = 3.7$ cm, $CD = 5.7$ cm, $AD = 5.5$ cm and $BD = 6.1$ cm. Give reasons for not being able to construct it, if you cannot.

Answer

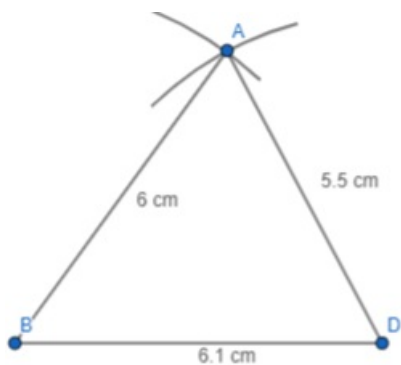
As four sides and diagonal of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ABD$. Draw line BD of length 6.1 cm.

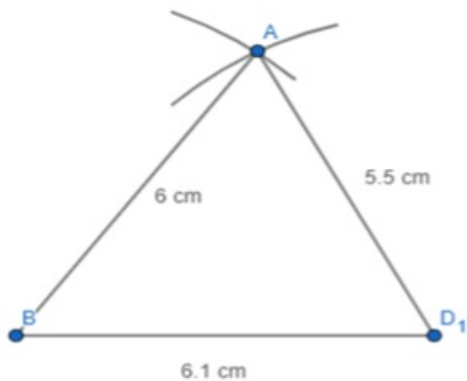


Step 2- Then using compass take a length of 6 cm and draw an arc by taking B as centre. Do the same by taking D as centre and length of 5.5 cm.

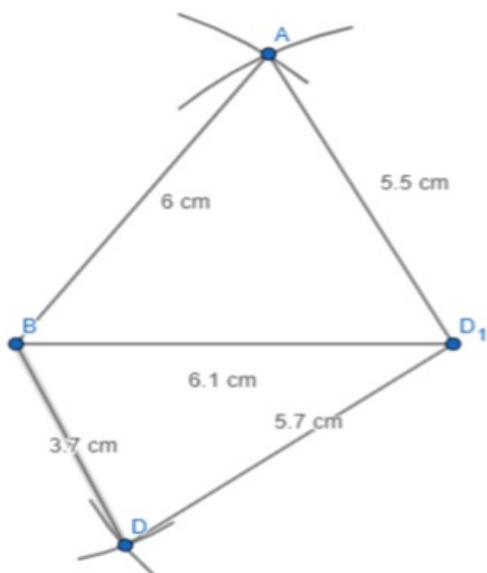
Step 3-Now join the intersection point to B and D and label it as A.



Step 4- Now for vertex C, using compass take a length of 3.7 cm and draw an arc by taking B as centre. Do the same by taking D as centre and length of 5.7 cm.



Step 5-Join the intersection point to B and D and label it as C.



8. Question

Construct, if possible, a quadrilateral $ABCD$ in which $AB = 6$ cm, $BC = 7$ cm, $CD = 3$ cm, $AD = 5.5$ cm and $AC = 11$ cm. Give reasons for not being able to construct, if you cannot. (Not possible, because in triangle ACD , $AD + CD < AC$).

Answer

In a triangle, the sum of the length of its two sides must be greater than that of the third side.

In triangle ACD ,

$$AD + CD = 5.5 + 3 = 8.5 \text{ cm}$$

$$\text{and } AC = 11 \text{ cm}$$

$\Rightarrow AD + CD < AC$ which is not possible.

So, the construction is not possible.

Exercise 18.2

1. Question

Construct a quadrilateral $ABCD$ in which $AB = 3.8 \text{ cm}$, $BC = 3.0 \text{ cm}$, $AD = 2.3 \text{ cm}$, $AC = 4.5 \text{ cm}$ and $BD = 3.8 \text{ cm}$.

Answer

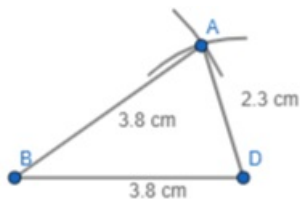
As three sides and two diagonals of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ABD$. Draw line BD of length 3.8 cm .

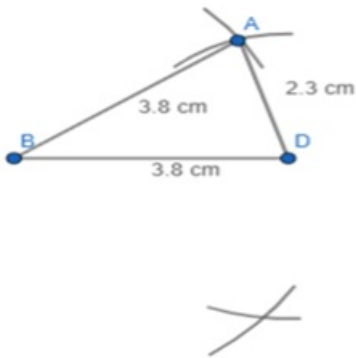


Step 2- Then using compass take a length of 3.8 cm and draw an arc by taking B as centre. Do the same by taking D as centre and length of 2.3 cm .

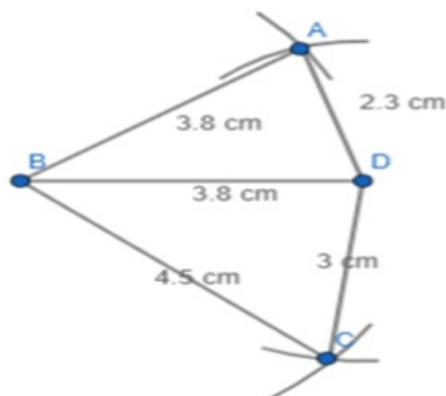
Step 3-Now join the intersection point to B and D and label it as A .



Step 4- Now for vertex C , using compass take a length of 4.5 cm and draw an arc by taking A as centre. Do the same by taking B as centre and length of 3 cm .



Step 5-Join the intersection point to B and D and label it as C .



2. Question

Construct a quadrilateral $ABCD$ in which $BC = 7.5$ cm, $AC = AD = 6$ cm, $CD = 5$ cm and $BD = 10$ cm.

Answer

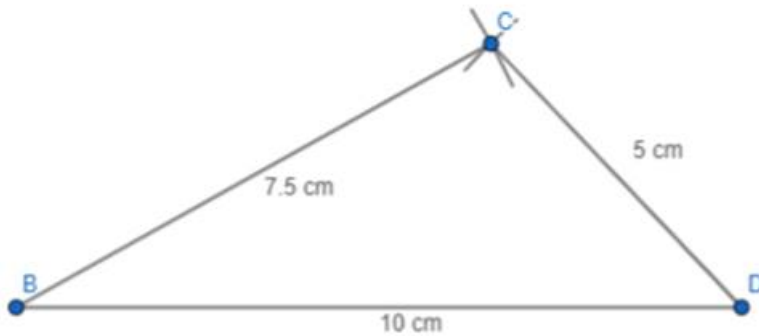
As three sides and two diagonals of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle BCD$. Draw line BD of length 10 cm.

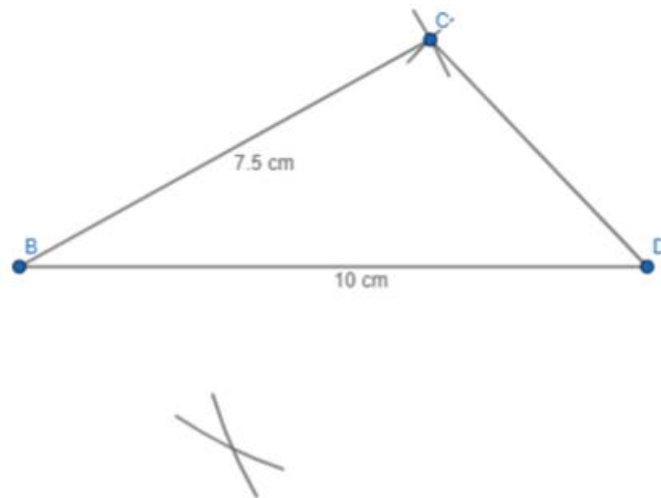


Step 2- Then using compass take a length of 7.5 cm and draw an arc by taking B as centre. Do the same by taking D as centre and length of 5 cm.

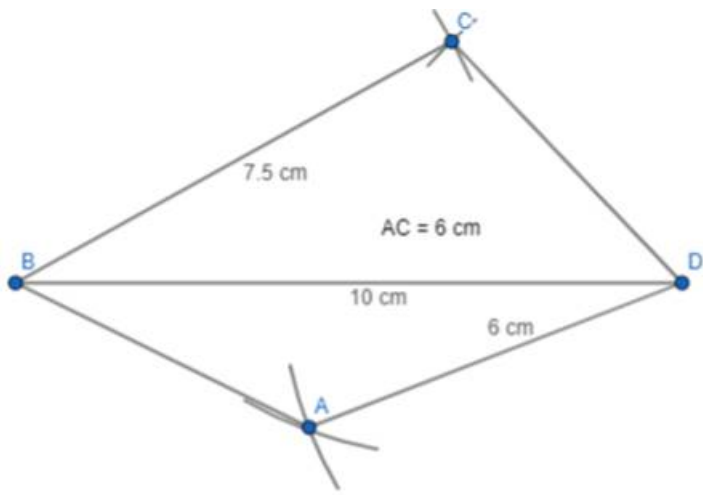
Step 3-Now join the intersection point to B and D and label it as C.



Step 4- Now for vertex A, using compass take a length of 6 cm and draw an arc by taking C as centre. Do the same by taking D as centre and length of 6 cm.



Step 5-Join the intersection point to B and D and label it as A.



3. Question

Construct a quadrilateral $ABCD$ when $AB = 3$ cm, $CD = 3$ cm, $DA = 7.5$ cm, $AC = 8$ cm and $BD = 4$ cm.

Answer

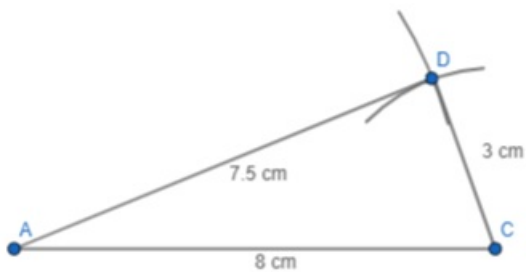
As three sides and two diagonals of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ACD$. Draw line AC of length 8 cm.

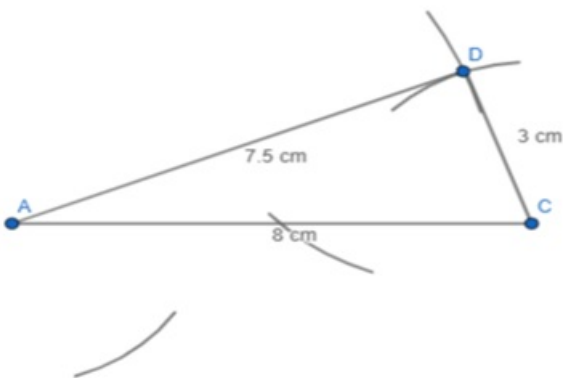


Step 2- Then using compass take a length of 7.5 cm and draw an arc by taking A as centre. Do the same by taking C as centre and length of 3 cm.

Step 3-Now join the intersection point to A and C and label it as D.



Step 4- Now for vertex B, using compass take a length of 4 cm and draw an arc by taking D as centre. Do the same by taking A as centre and length of 3 cm.



Step 5-As arcs drawn are not intersecting it is not possible to construct quadrilateral $ABCD$ (as in $\triangle ABD$, $BD + AB < AD$).

4. Question

Construct a quadrilateral $ABCD$ given $AD = 3.5$ cm, $BC = 2.5$ cm, $CD = 4.1$ cm, $AC = 7.3$ cm and $BD = 3.2$ cm.

Answer

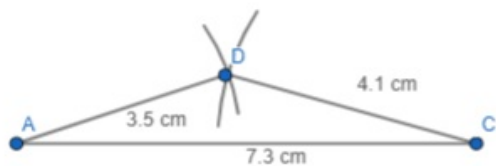
As three sides and two diagonals of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ACD$. Draw line AC of length 7.3 cm.

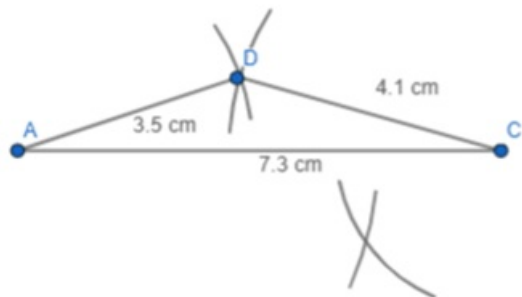


Step 2- Then using compass take a length of 3.5 cm and draw an arc by taking A as centre. Do the same by taking C as centre and length of 4.1 cm.

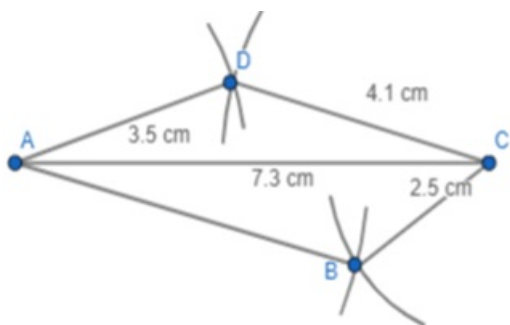
Step 3-Now join the intersection point to A and C and label it as D.



Step 4- Now for vertex B, using compass take a length of 3.2 cm and draw an arc by taking D as centre. Do the same by taking C as centre and length of 2.5 cm.



Step 5-Join the intersection point to A and C and label it as B.



5. Question

Construct a quadrilateral $ABCD$ given $AD = 5$ cm, $AB = 5.5$ cm, $BC = 2.5$ cm, $AC = 7.1$ cm and $BD = 8$ cm.

Answer

As three sides and two diagonals of quadrilateral is given.

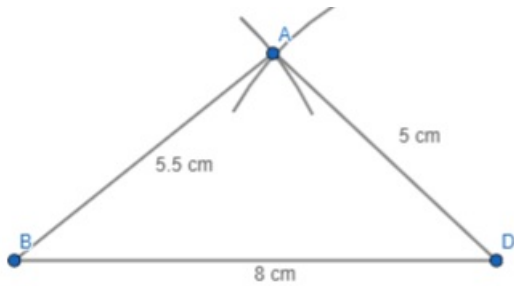
Step 1-Using SSS construction condition first we will draw $\triangle ABD$. Draw line BD of length 8 cm.



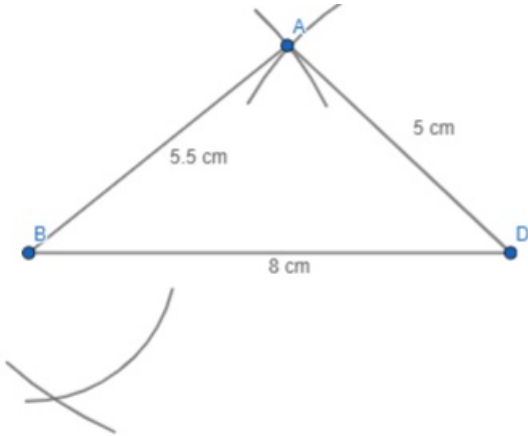
Step 2- Then using compass take a length of 5.5 cm and draw an arc by taking B as centre. Do the same by

taking D as centre and length of 5 cm.

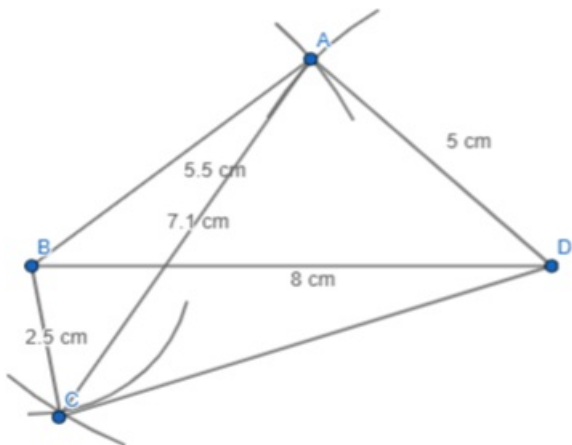
Step 3-Now join the intersection point to B and D and label it as A.



Step 4- Now for vertex D, using compass take a length of 7.1 cm and draw an arc by taking A as centre. Do the same by taking B as centre and length of 2.5 cm.



Step 5-Join the intersection point to A and C and label it as B.



6. Question

Construct a quadrilateral $ABCD$ in which $BC = 4$ cm, $CA = 5.6$ cm, $AD = 4.5$ cm, $CD = 5$ cm and $BD = 6.5$ cm.

Answer

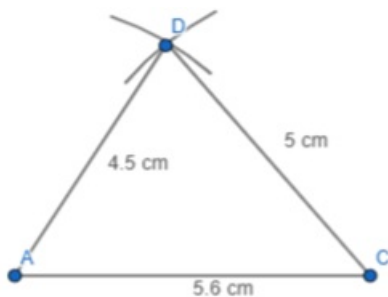
As three sides and two diagonals of quadrilateral is given.

Step 1-Using SSS construction condition first we will draw $\triangle ACD$. Draw line CA of length 5.6 cm.

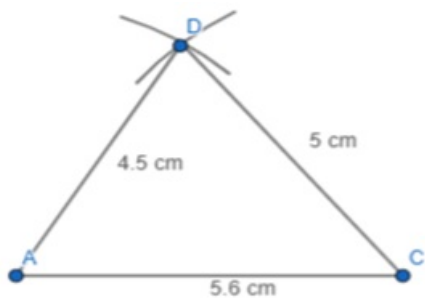


Step 2- Then using compass take a length of 4.5 cm and draw an arc by taking A as centre. Do the same by taking C as centre and length of 5 cm.

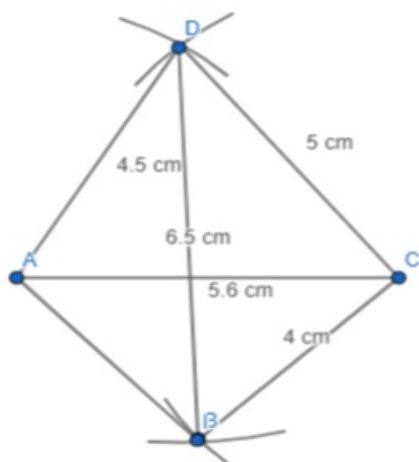
Step 3-Now join the intersection point to A and C and label it as D.



Step 4- Now for vertex B, using compass take a length of 6.5 cm and draw an arc by taking D as centre. Do the same by taking C as centre and length of 4 cm.



Step 5-Join the intersection point to A and C and label it as B.



Exercise 18.3

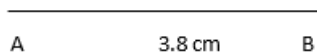
1. Question

Construct a quadrilateral $ABCD$ in which $AB = 3.8$ cm, $BC = 3.4$ cm, $CD = 4.5$ cm, $AD = 5$ cm and $\angle B = 80^\circ$.

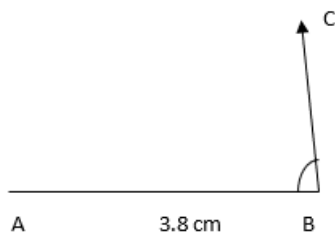
Answer

Steps of construction:

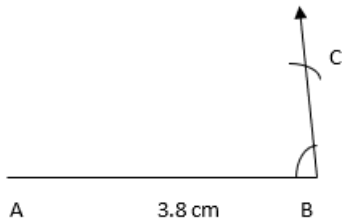
Step I: Draw $AB = 3.8$ cm.



Step II: Draw $\angle ABC = 80^\circ$.

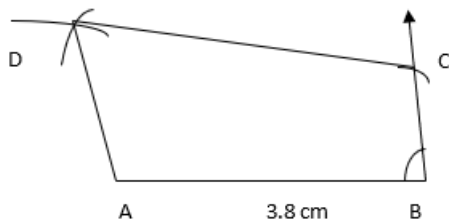


Step III: With B as the center and radius 3.4 cm, cut off $BC = 3.4$ cm.



Step IV: With C as the center and radius 4.5 cm, draw an arc.

Step V: With A as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step IV at D.



Step VI: Join AD, BC and CD to obtain the required quadrilateral.

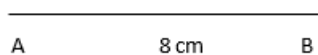
2. Question

Construct a quadrilateral $ABCD$ given that $AB = 8$ cm, $BC = 8$ cm, $CD = 10$ cm, $AD = 10$ cm and $\angle A = 45^\circ$.

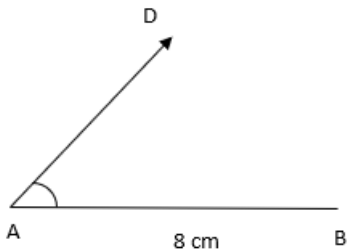
Answer

Steps of construction:

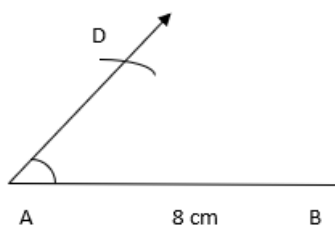
Step I: Draw $AB = 8$ cm.



Step II: Construct $\angle BAD = 45^\circ$.



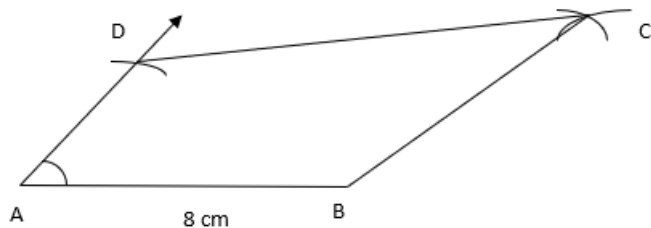
Step III: With A as the centre and radius 10 cm, cut off $AD = 10$ cm.



Step IV: With D as the centre and radius 10 cm, draw an arc.

Step V: With B as the centre and radius 8 cm, draw an arc to intersect the arc drawn in Step IV at C.

Step VI: Join BC and CD to obtain the required quadrilateral.



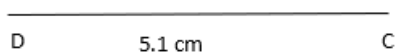
3. Question

Construct a quadrilateral $ABCD$ in which $AB = 7.7$ cm, $BC = 6.8$ cm, $CD = 5.1$ cm, $AD = 3.6$ cm and $\angle C = 120^\circ$.

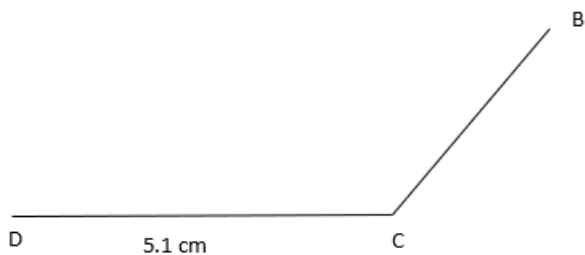
Answer

Steps of construction:

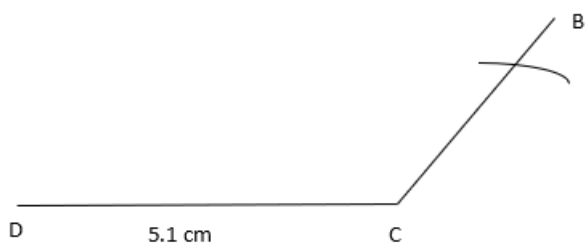
Step I: Draw $DC = 5.1$ cm.



Step II: Construct $\angle DCB = 120^\circ$.



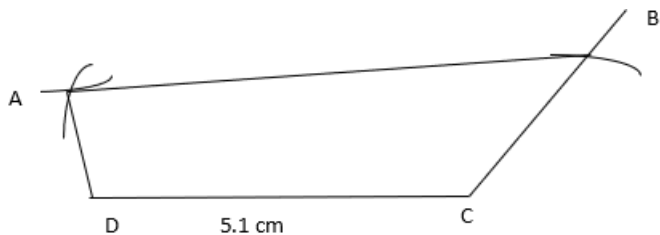
Step III: With C as the center and radius 6.8 cm, cut off $BC = 6.8$ cm.



Step IV: With B as the center and radius 7.7 cm, draw an arc.

Step V: With D as the center and radius 3.6 cm, draw an arc to intersect the arc drawn in Step IV at A.

Step VI: Join AB and AD to obtain the required quadrilateral.



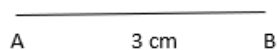
4. Question

Construct a quadrilateral $ABCD$ in which $AB = BC = 3$ cm, $AD = CD = 5$ cm and $\angle B = 120^\circ$.

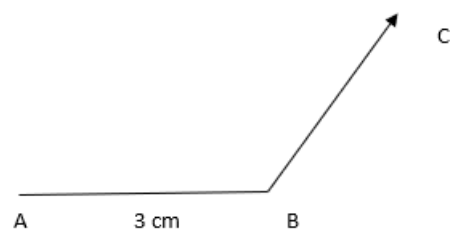
Answer

Steps of construction:

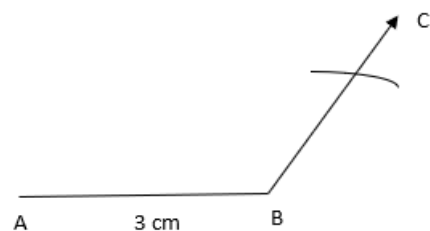
Step I: Draw $AB = 3$ cm.



Step II: Construct $\angle ABC = 120^\circ$.



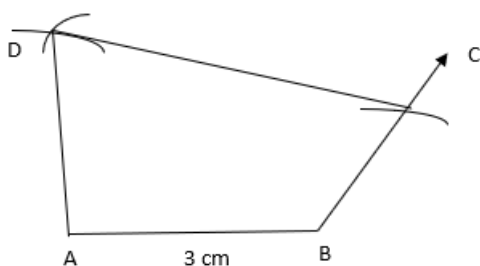
Step III: With B as the center and radius 3 cm, cut off $BC = 3$ cm.



Step IV: With C as the center and radius 5 cm, draw an arc.

Step V: With A as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step IV at D.

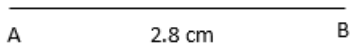
Step VI: Join AD and CD to obtain the required quadrilateral.

**5. Question**

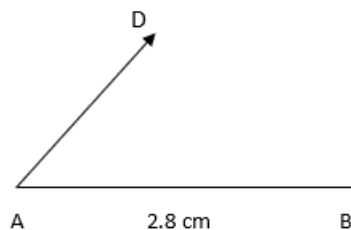
Construct a quadrilateral $ABCD$ in which $AB = 2.8$ cm, $BC = 3.1$ cm, $CD = 2.6$ cm and $DA = 3.3$ cm and $\angle A = 60^\circ$.

Answer**Steps of construction:**

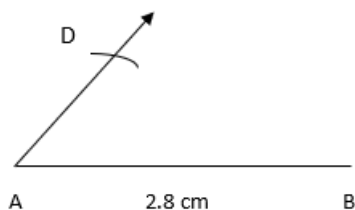
Step I: Draw $AB = 2.8$ cm.



Step II: Draw $\angle BAD = 60^\circ$.



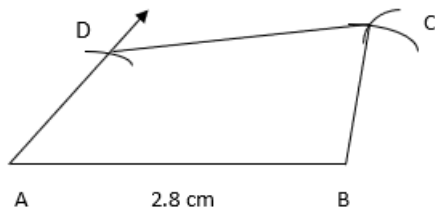
Step III: With A as the center and radius 3.3 cm, cut off $AD = 3.3$ cm.



Step IV: With D as the center and radius 2.6 cm, draw an arc.

Step V: With B as the center and radius 3.1 cm, draw an arc to intersect the arc drawn in Step IV at C.

Step VI: Join BC and CD to obtain the required quadrilateral.



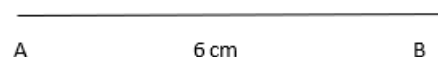
6. Question

Construct a quadrilateral $ABCD$ in which $AB = BC = 6$ cm, $AD = DC = 4.5$ cm and $\angle B = 120^\circ$.

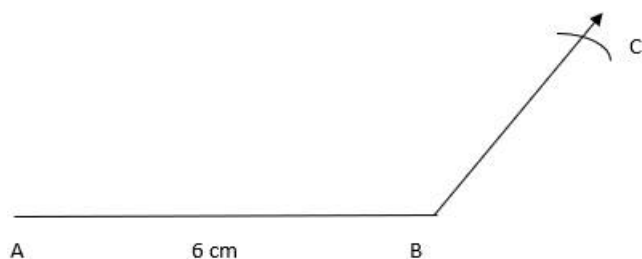
Answer

Steps of construction:

Step I: Draw $AB = 6$ cm.



Step II: Construct $\angle ABC = 120^\circ$.



Step III: With B as the centre and radius 6 cm, cut off $BC = 6$ cm. Now, we can see that AC is about 10.3 cm which is greater than $AD + CD = 4.5 + 4.5 = 9$ cm.

We know that sum of the lengths of two sides of the triangle is always greater than the third side but here, the sum of AD and CD is less than AC .

So, construction of the given quadrilateral is not possible.

Exercise 18.4

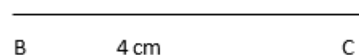
1. Question

Construct a quadrilateral $ABCD$ in which $AB = 6$ cm, $BC = 4$ cm, $CD = 4$ cm, $\angle B = 95^\circ$ and $\angle C = 150^\circ$.

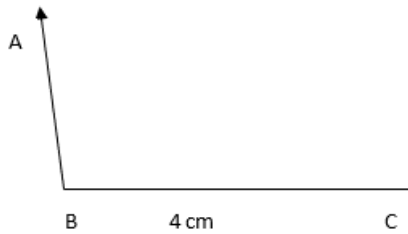
Answer

Steps of construction:

Step I: Draw $BC = 4$ cm.

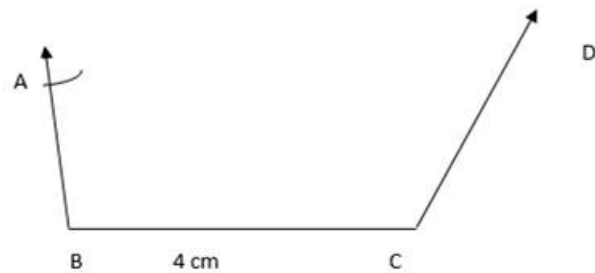


Step II: Construct $\angle ABC = 95^\circ$.

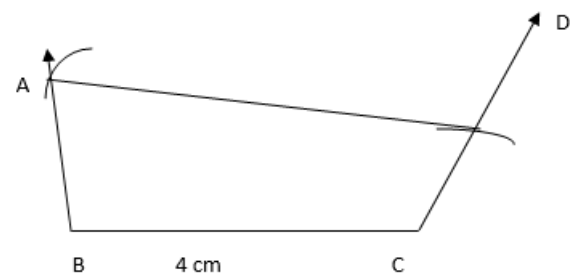


Step III: With B as the center and radius 6 cm, cut off $BA = 6$ cm.

Step IV: Construct $\angle BCD = 150^\circ$.



Step V: With C as the center and radius 4 cm, cut off $CD = 4$ cm.



Step VI: Join DA.

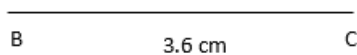
2. Question

Construct a quadrilateral $ABCD$ where $AB = 4.2$ cm, $BC = 3.6$ cm, $CD = 4.8$ cm, $\angle B = 30^\circ$ and $\angle C = 150^\circ$.

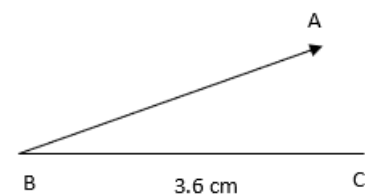
Answer

Steps of construction:

Step I: Draw $BC = 3.6$ cm.

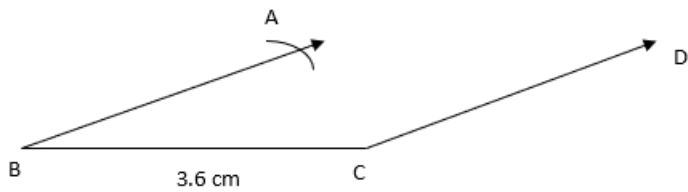


Step II: Construct $\angle ABC = 30^\circ$.



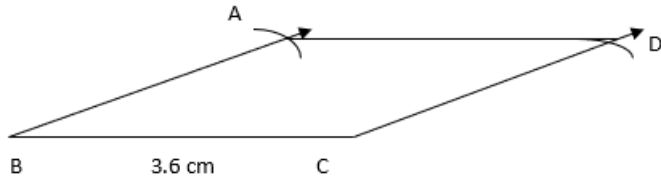
Step III: With B as the center and radius 4.2 cm, cut off $BA = 4.2$ cm.

Step IV: Construct $\angle BCD = 150^\circ$.



Step V: With C as the center and radius 4.8 cm, cut off $CD = 4.8$ cm.

Step VI: Join AD.



The quadrilateral so obtained is the required quadrilateral.

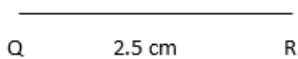
3. Question

Construct a quadrilateral $PQRS$ in which $PQ = 3.5$ cm, $QR = 2.5$ cm, $RS = 4.1$ cm, $\angle Q = 75^\circ$ and $\angle R = 120^\circ$.

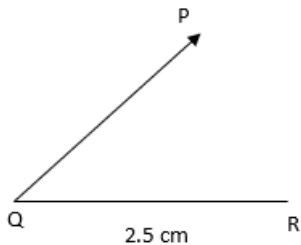
Answer

Steps of construction:

Step I: Draw $QR = 2.5$ cm.

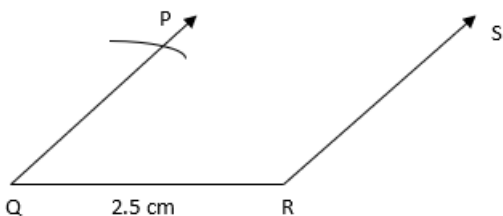


Step II: Construct $\angle PQR = 75^\circ$.



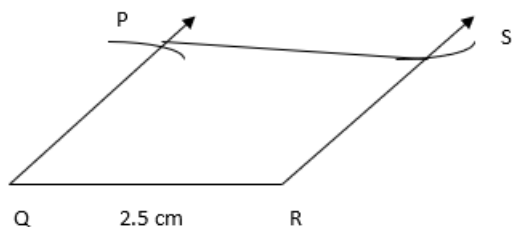
Step III: With Q as the center and radius 3.5 cm, cut off $QP = 3.5$ cm.

Step IV: Construct $\angle QRS = 120^\circ$.



Step V: With R as the center and radius 4.1 cm, cut off $RS = 4.1$ cm.

Step VI: Join PS.



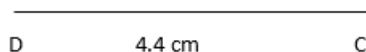
4. Question

Construct a quadrilateral $ABCD$ given $BC = 6.6$ cm, $CD = 4.4$ cm, $AD = 5.6$ cm $\angle D = 100^\circ$ and $\angle C = 95^\circ$.

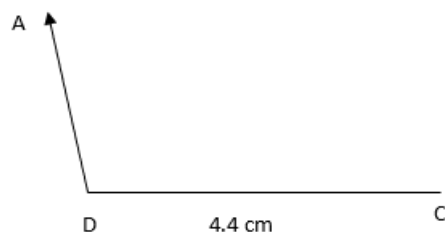
Answer

Steps of construction:

Step I: Draw $DC = 4.4$ cm.

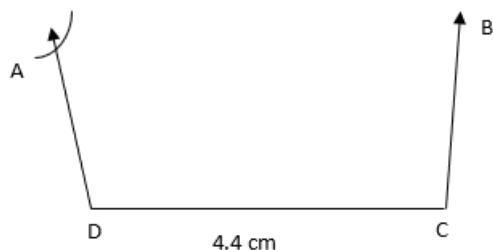


Step II: Construct $\angle ADC = 100^\circ$.



Step III: With D as the center and radius 5.6 cm, cut off $DA = 5.6$ cm.

Step IV: Construct $\angle BCD = 95^\circ$.



Step V: With C as the center and radius 6.6 cm, cut off $CB = 6.6$ cm.

Step VI: Join AB.



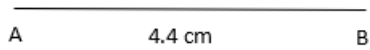
5. Question

Construct a quadrilateral $ABCD$ in which $AD = 3.5$ cm, $AB = 4.4$ cm, $BC = 4.7$ cm, $\angle A = 125^\circ$ and $\angle B = 120^\circ$.

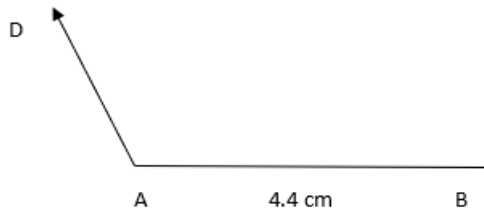
Answer

Steps of construction:

Step I: Draw $AB = 4.4$ cm.

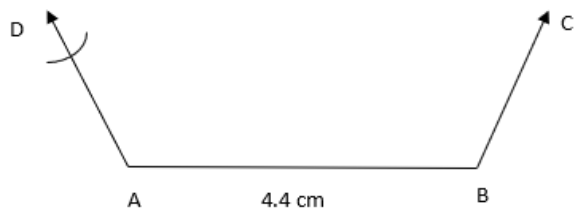


Step II: Construct $\angle BAD = 125^\circ$.



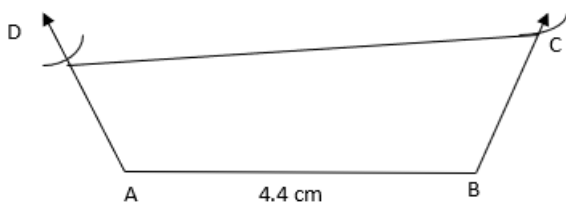
Step III: With A as the centre and radius 3.5 cm, cut off $AD = 3.5$ cm.

Step IV: Construct $\angle ABC = 125^\circ$.



Step V: With B as the centre and radius 4.7 cm, cut off $BC = 4.7$ cm.

Step VI: Join CD.



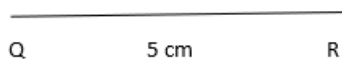
6. Question

Construct a quadrilateral $PQRS$ in which $\angle Q = 45^\circ$ and $\angle R = 90^\circ$, $QR = 5$ cm, $PQ = 9$ cm and $RS = 7$ cm.

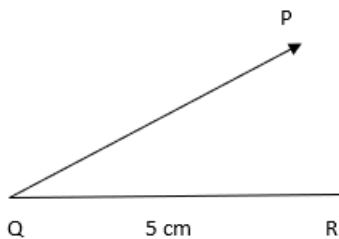
Answer

Steps of construction:

Step I: Draw $QR = 5$ cm.

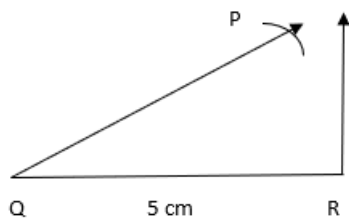


Step II: Construct $\angle PQR = 45^\circ$.



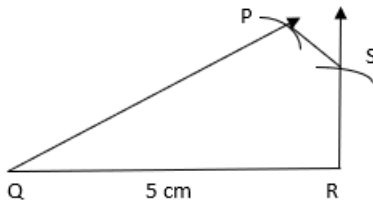
Step III: With Q as the center and radius 9 cm, cut off $QP = 9$ cm.

Step IV: Construct $\angle QRS = 90^\circ$.



Step V: With R as the center and radius 7 cm, cut off $RS = 7$ cm.

Step VI: Join PS.



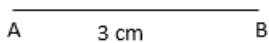
7. Question

Construct a quadrilateral $ABCD$ in which $AB = BC = 3$ cm, $AD = 5$ cm, $\angle A = 90^\circ$ and $\angle B = 105^\circ$.

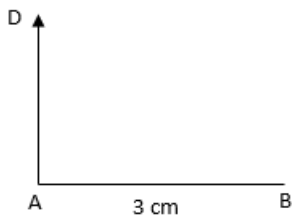
Answer

Steps of construction:

Step I: Draw $AB = 3$ cm.

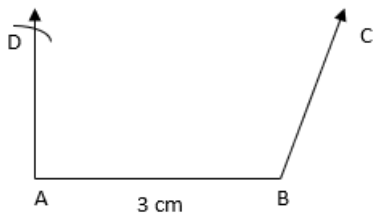


Step II: Construct $\angle DAB = 90^\circ$.



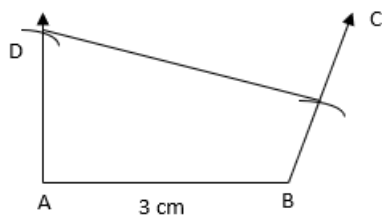
Step III: With A as the center and radius 5 cm, cut off $AD = 5$ cm.

Step IV: Construct $\angle ABC = 105^\circ$.



Step V: With B as the center and radius 3 cm, cut off $BC = 3$ cm.

Step VI: Join CD.



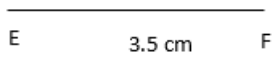
8. Question

Construct a quadrilateral $BDEF$, where $DE = 4.5$ cm, $EF = 3.5$ cm, $FB = 6.5$ cm, $\angle F = 50^\circ$ and $\angle E = 100^\circ$.

Answer

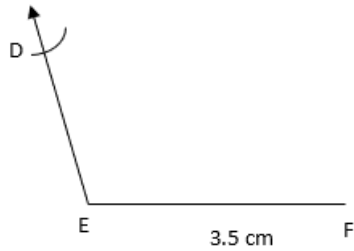
Steps of construction:

Step I: Draw $EF = 3.5$ cm.



Step II: Construct $\angle DEF = 100^\circ$.

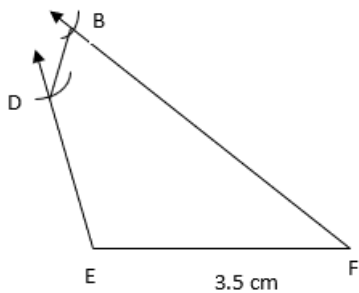
Step III: With E as the center and radius 4.5 cm, cut off $DE = 4.5$ cm.



Step IV: Construct $\angle EFB = 50^\circ$.

Step V: With F as the center and radius 6.5 cm, cut off $FB = 6.5$ cm.

Step VI: Join BD.



Exercise 18.5

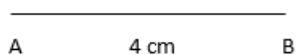
1. Question

Construct a quadrilateral $ABCD$ given that $AB = 4$ cm, $BC = 3$ cm, $\angle A = 75^\circ$, $\angle B = 80^\circ$ and $\angle C = 120^\circ$.

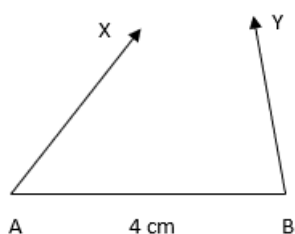
Answer

Steps of construction:

Step I: Draw $AB = 4$ cm.

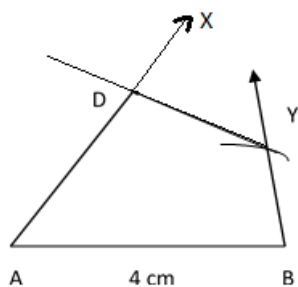


Step II: Construct $\angle XAB = 75^\circ$ at A and $\angle ABY = 80^\circ$ at B.



Step III: With B as the center and radius 3 cm, cut off $BC = 3$ cm.

Step IV: At C, draw $\angle BCD = 120^\circ$ such that it meets AX at D.



2. Question

Construct a quadrilateral $ABCD$ where $AB = 5.5$ cm, $BC = 3.7$ cm, $\angle A = 60^\circ$, $\angle B = 105^\circ$ and $\angle D = 90^\circ$.

Answer

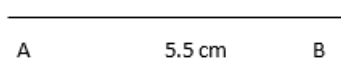
We know that the sum of all the angles in a quadrilateral is 360.

$$\text{i.e. } \angle A + \angle B + \angle C + \angle D = 360^\circ$$

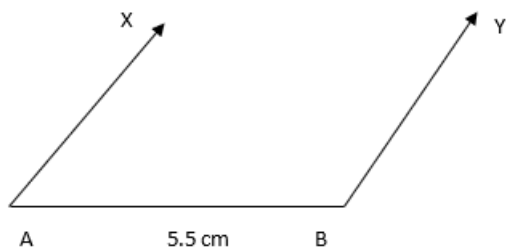
$$\angle C = 105^\circ$$

Steps of construction:

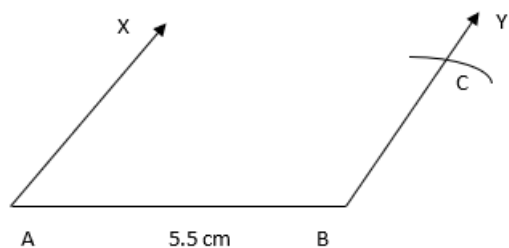
Step I: Draw $AB = 5.5$ cm.



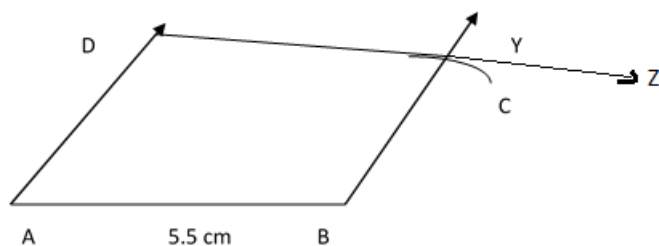
Step II: Construct $\angle XAB = 60^\circ$ at A and $\angle ABY = 105^\circ$.



Step III: With B as the center and radius 3.7 cm, cut off $BC = 3.7$ cm.



Step IV: At C, draw $\angle BCZ = 105^\circ$ such that it meets AX at D.



3. Question

Construct a quadrilateral $PQRS$ where $PQ = 3.5$ cm, $QR = 6.5$ cm, $\angle P = \angle R = 105^\circ$ and $\angle S = 75^\circ$.

Answer

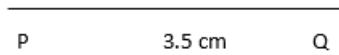
We know that the sum of all the angles in a quadrilateral is 360.

$$\text{i.e., } \angle P + \angle Q + \angle R + \angle S = 360^\circ$$

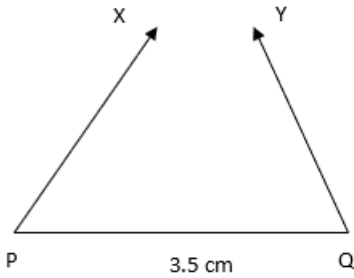
$$\angle Q = 75^\circ$$

Steps of construction:

Step I: Draw $PQ = 3.5$ cm.

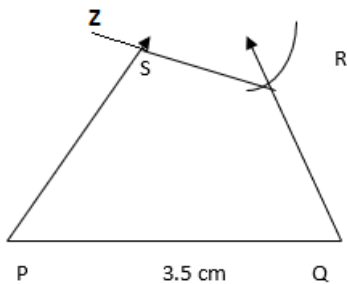


Step II: Construct $\angle XPQ = 75^\circ$ and $\angle PQY = 75^\circ$.



Step III: With Q as the center and radius 6.5 cm, cut off $QR = 6.5$

Step IV: At R, draw $\angle QRZ = 105^\circ$ such that it meets PX at S.



4. Question

Construct a quadrilateral $ABCD$ when $BC = 5.5$ cm, $CD = 4.1$ cm, $\angle A = 70^\circ$, $\angle B = 110^\circ$ and $\angle D = 85^\circ$.

Answer

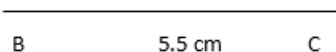
We know that the sum of all the angles in a quadrilateral is 360.

$$\text{i.e., } \angle A + \angle B + \angle C + \angle D = 360^\circ$$

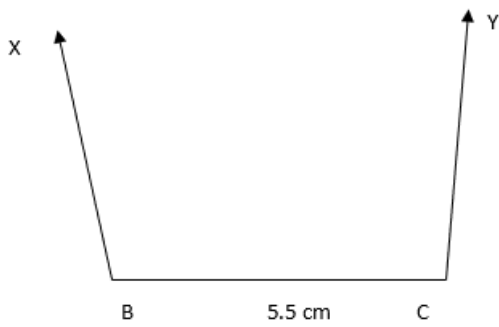
$$\angle C = 95^\circ$$

Steps of construction:

Step I: Draw $BC = 5.5$ cm.

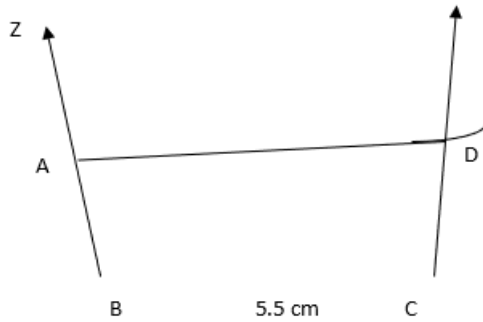


Step II: Construct $\angle XBC = 110^\circ$ at A and $\angle BCY = 95^\circ$.



Step III: With C as the center and radius 4.1 cm, cut off $CD = 4.1$ cm.

Step IV: At D, draw $\angle CDZ = 85^\circ$ such that it meets BY at A.



5. Question

Construct a quadrilateral $ABCD$ $\angle A = 65^\circ$, $\angle B = 105^\circ$, $\angle C = 75^\circ$, $BC = 5.7$ cm and $CD = 6.8$ cm.

Answer

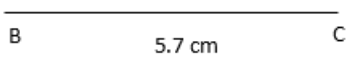
We know that the sum of all the angles in a quadrilateral is 360

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

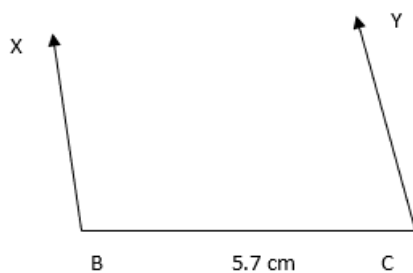
$\angle D = 115^\circ$

Steps of Construction:

Step I: Draw $BC = 5.7$ cm.

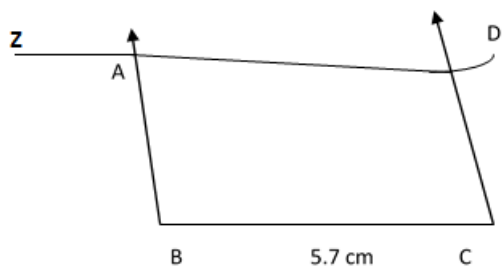


Step II: Construct $\angle XBC = 105^\circ$ and $\angle BCY = 75^\circ$.



Step III: With C as the center and radius 6.8 cm, cut off $CD = 6.8$ cm.

Step IV: At D, draw $\angle CDZ = 115^\circ$ such that it meets BY at A.



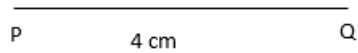
6. Question

Construct a quadrilateral $PQRS$ in which $PQ = 4$ cm, $QR = 5$ cm $\angle P = 50^\circ$, $\angle Q = 110^\circ$ and $\angle R = 70^\circ$.

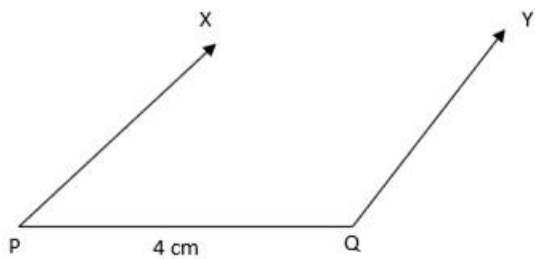
Answer

Steps of construction:

Step I: Draw $PQ = 4$ cm.



Step II: Construct $\angle XPQ = 50^\circ$ and $\angle PQY = 110^\circ$.



Step III: With Q as the center and radius 5 cm, cut off $QR = 5$ cm.

Step IV: At R, draw $\angle QRZ = 70^\circ$ such that it meets PX at S.

