

4. Practical Geometry

Exercise 4.1

1. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 5 cm, BC = 6 cm, CD = 4 cm, DA = 5.5 cm and AC = 7 cm.

Answer

Given. ABCD is a quadrilateral.

AB = 5 cm, BC = 6 cm, CD = 4 cm, DA = 5.5 cm, AC = 7 cm

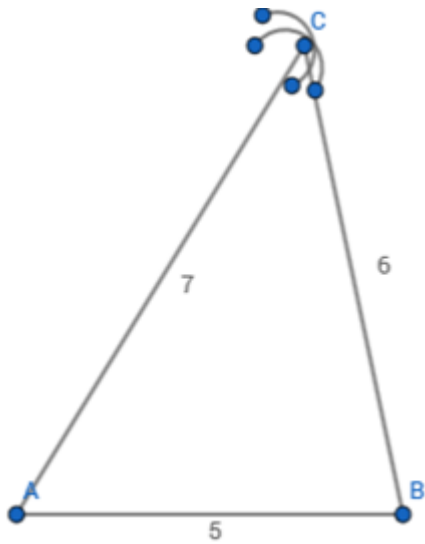
Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

Steps for construction.

Step 1 : Draw a line AB of 5cm

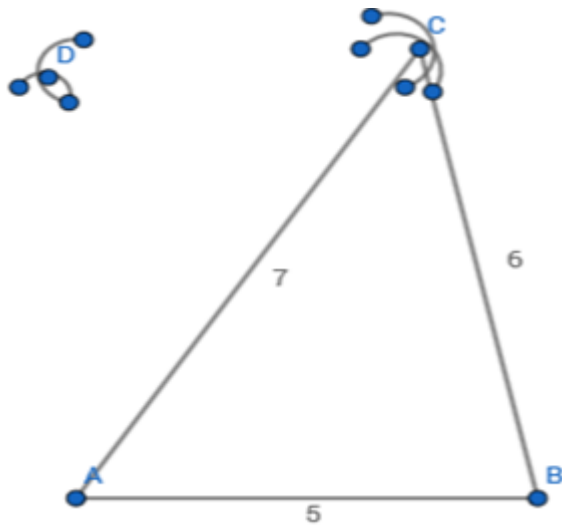


Step 2 : Draw an arc of 7 cm from point A and 6 cm from point B

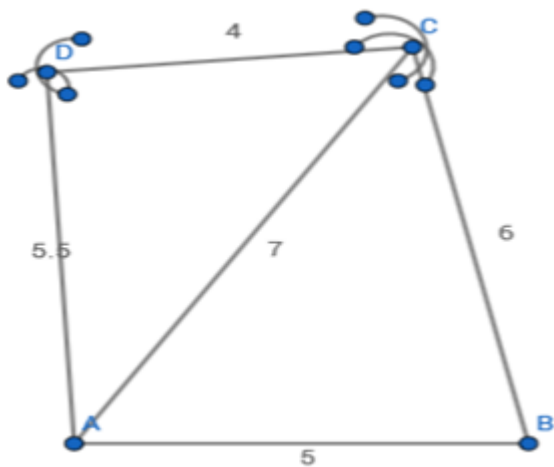


Step 3 : Make the intersection point C and join AC and BC

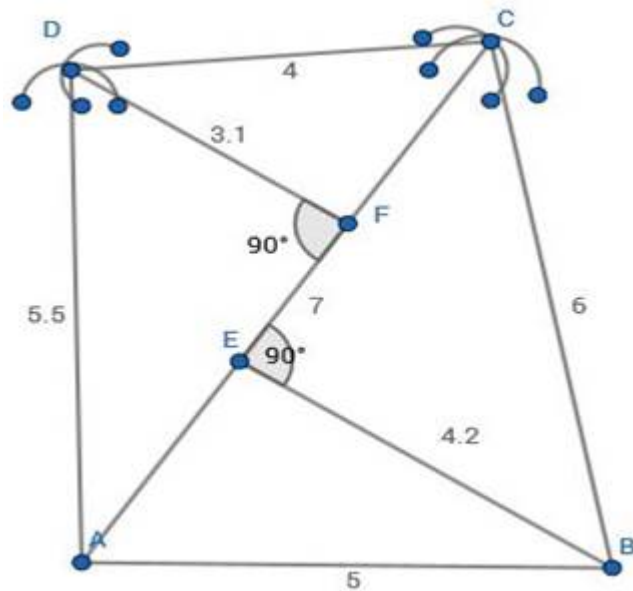
Step 4 : Draw an arc of 4cm from point C and 5.5cm from point A



Step 5 : Mark the intersection point D and join AD and DC



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 7\text{cm} \times (4.2\text{cm} + 3.1\text{cm})$$

$$= 25.55\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$25.55\text{cm}^2$$

2. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 7 cm, BC = 6.5 cm, AC = 8 cm, CD = 6 cm and DA = 4.5 cm.

Answer

Given. ABCD is a quadrilateral.

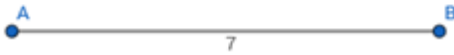
AB = 7 cm, BC = 6.5 cm, CD = 6 cm and DA = 4.5 cm, AC = 8 cm

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

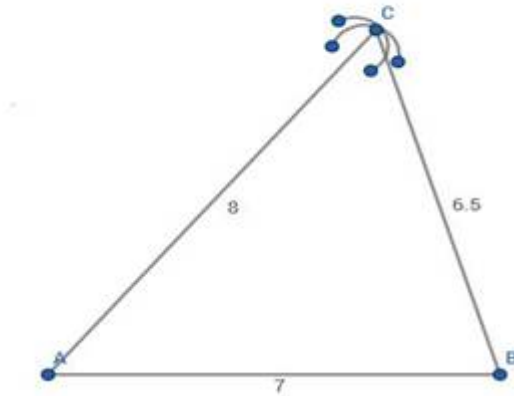
Steps for construction.

Step 1 : Draw a line AB of 7cm

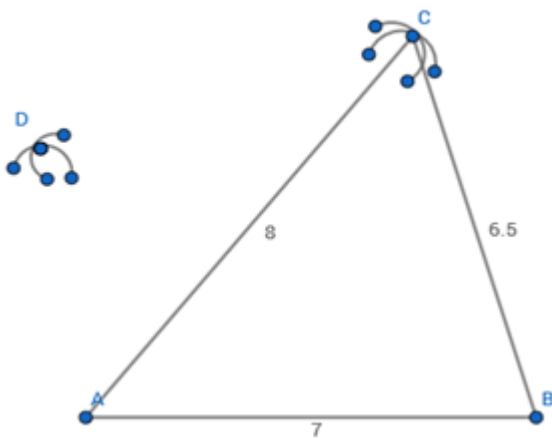
Step 2 : Draw an arc of 8cm from point A and 6.5cm from point B



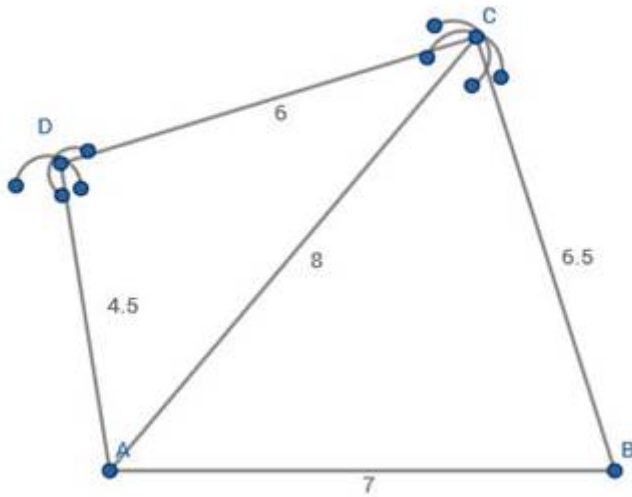
Step 3 : Make the intersection point C and join AC and BC



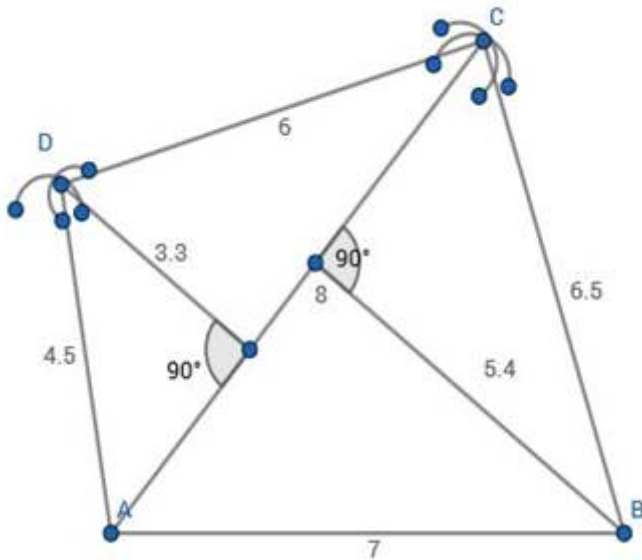
Step 4 : Draw an arc of 6cm from point C and 4.5cm from point A



Step 5 : Mark the intersection point D and join AD and DC



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 8\text{cm} \times (3.3\text{cm} + 5.4\text{cm})$$

$$= 34.8\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$34.8\text{cm}^2$$

3. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 8 cm, BC = 6.8 cm, CD = 6 cm, AD = 6.4 cm and $\angle B = 50^\circ$.

Answer

Given. ABCD is a quadrilateral.

AB = 8 cm, BC = 6.8 cm, CD = 6 cm, AD = 6.4 cm, $\angle B = 50^\circ$.

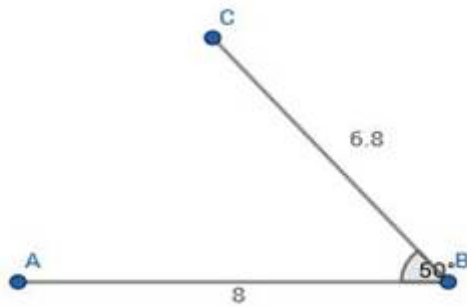
Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

Steps for construction.

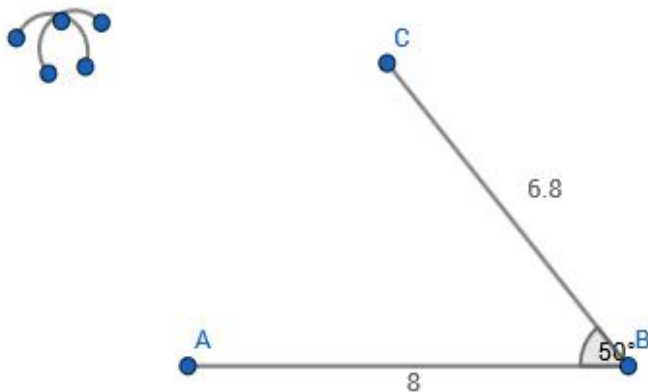
Step 1 : Draw a line AB of 8cm

Step 2 : Draw an angle of 50° on point B and extend the line 6.8cm

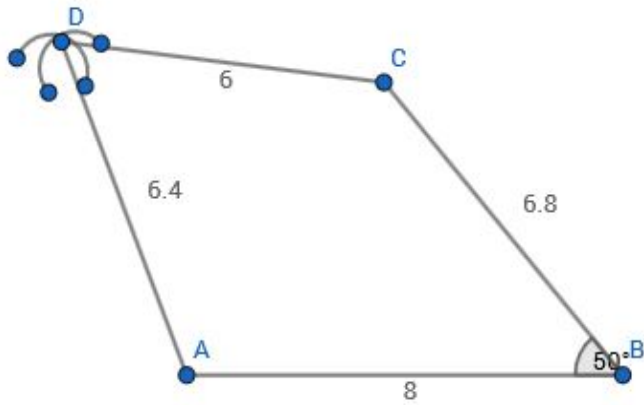
And make the end point as C



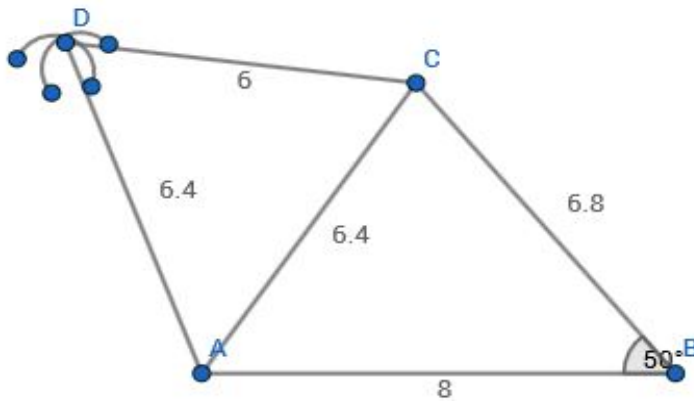
Step 3 : Draw an arc of 6cm from point C and 6.4cm from point A



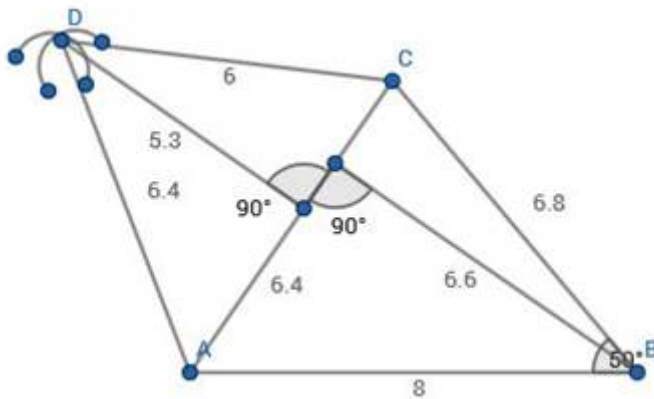
Step 4 : Mark the intersection point D and join AD and DC



Step 5 : Join A and C to divide quadrilateral in two triangles



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 6.4 \times (6.6\text{cm} + 5.3\text{cm})$$

$$= 38.08\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

38.08cm^2

4. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 6 cm, BC = 7 cm, AD = 6 cm, CD = 5 cm, and $\angle BAC = 45^\circ$.

Answer

Given. ABCD is a quadrilateral.

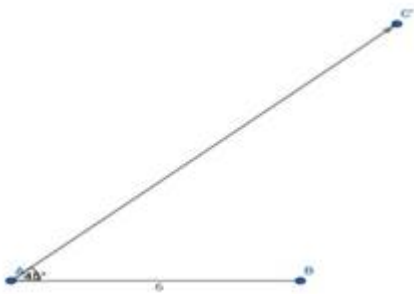
AB = 6 cm, BC = 7 cm, AD = 6 cm, CD = 5 cm, $\angle BAC = 45^\circ$

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

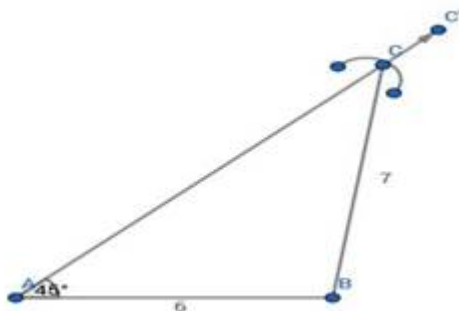
Steps for construction.

Step 1 : Draw a line AB of 6cm

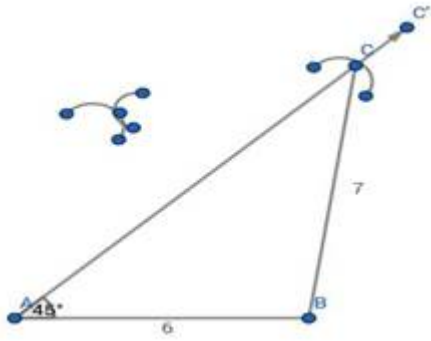
Step 2 : Draw an angle on point A of 45° and extend the ray to AC'



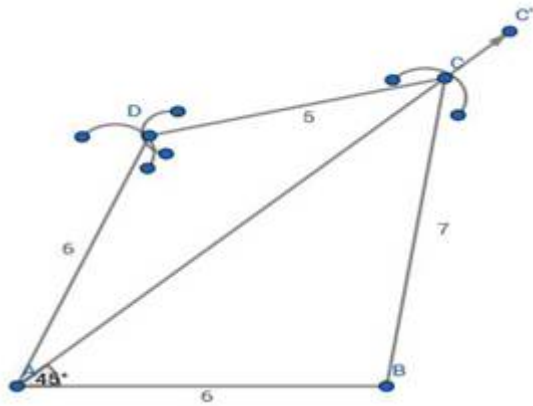
Step 3 : Make an arc of 7cm from point B and mark the point of intersection of arc and ray AC' as point C.



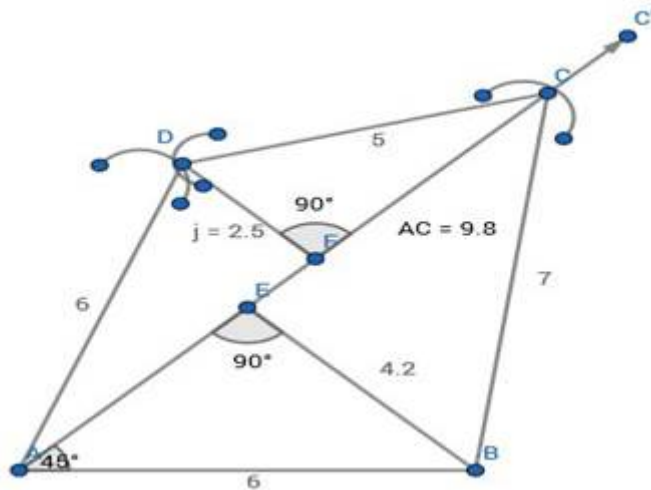
Step 4 : Draw an arc of 5cm from point C and 6cm from point A



Step 5 : Mark the intersection point D and join AD and DC



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 9.8 \times (2.5\text{cm} + 4.2\text{cm})$$

$$= 32.83\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$32.83\text{cm}^2$$

5. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 5.5 cm, BC = 6.5 cm, BD = 7 cm, AD = 5 cm and $\angle BAC = 50^\circ$.

Answer

Given. ABCD is a quadrilateral.

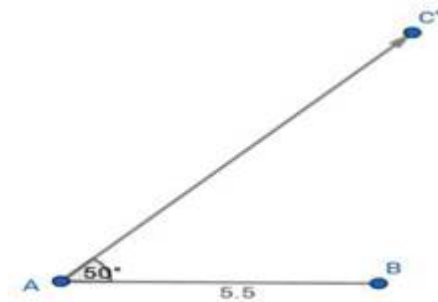
AB = 5.5 cm, BC = 6.5 cm, BD = 7 cm, AD = 5 cm, $\angle BAC = 50^\circ$.

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

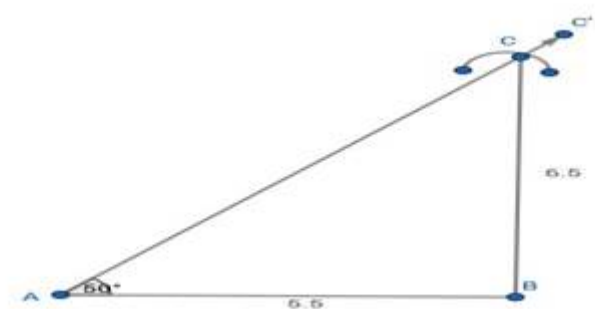
Steps for construction.

Step 1 : Draw a line AB of 5.5cm

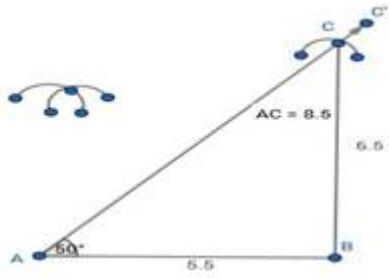
Step 2 : Make an angle of 50° on point A and extend the ray to AC'



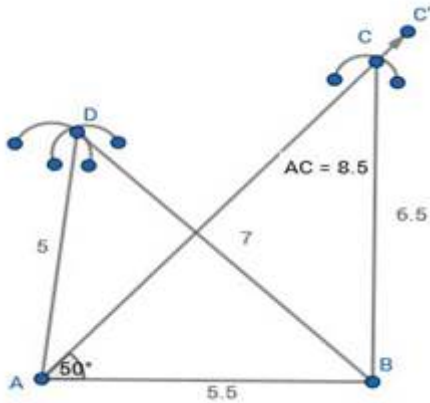
Step 3 : Make an arc of 6.5cm from point B and mark the point of intersection of arc and ray AC' as point C.



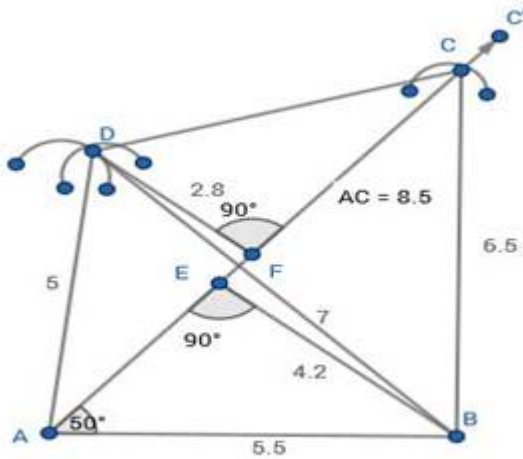
Step 4 : Draw an arc of 7cm from point B and 5cm from point A



Step 5 : Mark the intersection point D and join AD and BD



Step 6 : Join C and D to form quadrilateral ABCD



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively

Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 8.5\text{cm} \times (2.8\text{cm} + 4.2\text{cm})$$

$$= 29.75\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$29.75\text{cm}^2$$

6. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

AB = 7 cm, BC = 5 cm, AC = 6 cm, CD = 4 cm, and $\angle ACD = 45^\circ$.

Answer

Given. ABCD is a quadrilateral.

AB = 7 cm, BC = 5 cm, CD = 4 cm, $\angle ACD = 45^\circ$, AC = 6 cm

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

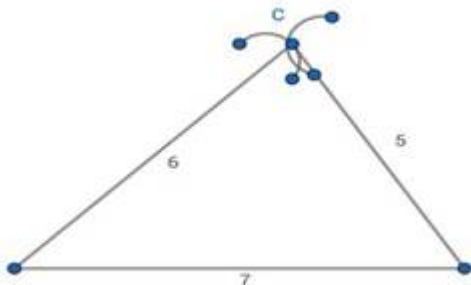
Steps for construction.

Step 1 : Draw a line AB of 7cm

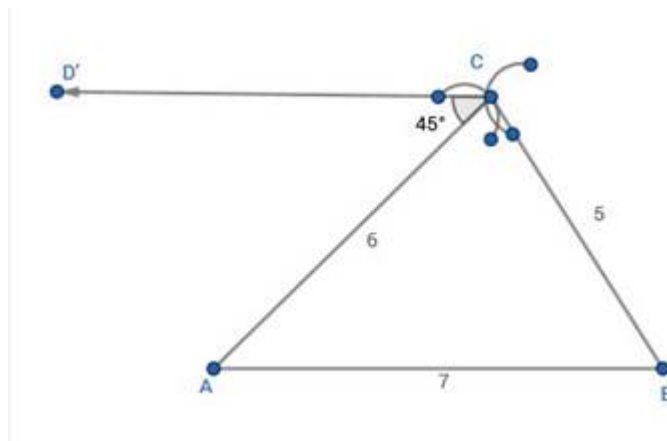
Step 2 : Draw an arc of 6cm from point A and 5 cm from point B



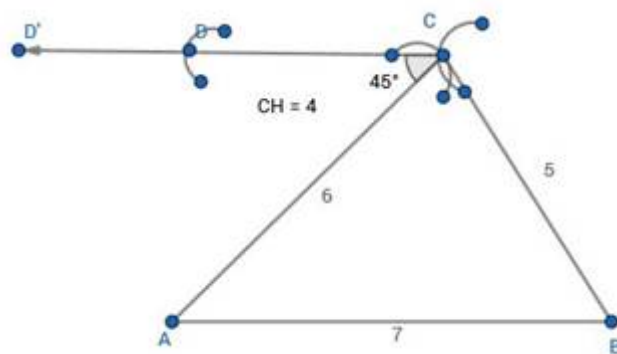
Step 3 : Make the intersection point C and join AC and BC



Step 4 : Draw an angle of 45° on point C on AC

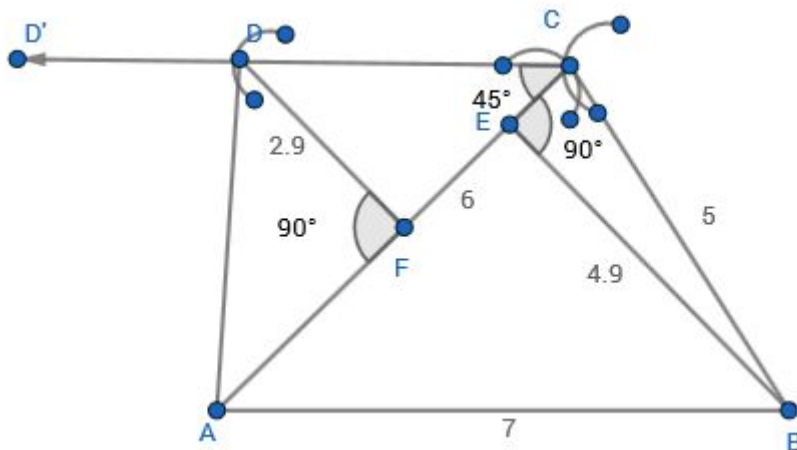


Step 5 : Make an arc of 4cm on ray CD' and mark the intersection point as D



Step 6 : Join A and D to form quadrilateral ABCD

Step 7 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 6\text{cm} \times (4.9\text{cm} + 2.9\text{cm})$$

$$= 23.4\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$23.4\text{cm}^2$$

7. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

$AB = 5.5\text{ cm}$, $BC = 4.5\text{cm}$, $AC = 6.5\text{ cm}$, $\angle CAD = 80^\circ$, $\angle ACD = 40^\circ$

Answer

Given. ABCD is a quadrilateral.

$AB = 5.5\text{ cm}$, $BC = 4.5\text{cm}$, $AC = 6.5\text{ cm}$

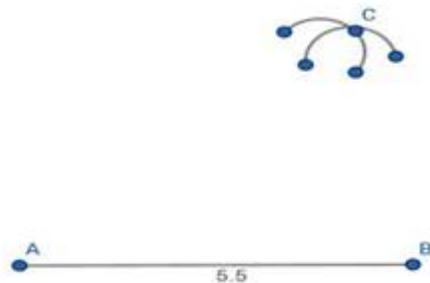
$\angle CAD = 80^\circ$ and $\angle ACD = 40^\circ$

Formula used. Area of triangle $= \frac{1}{2} \times \text{Base} \times \text{Height}$

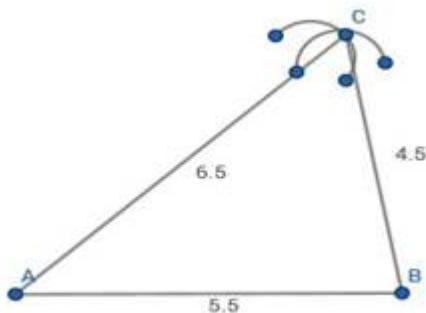
Steps for construction.

Step 1 : Draw a line AB of 5.5cm

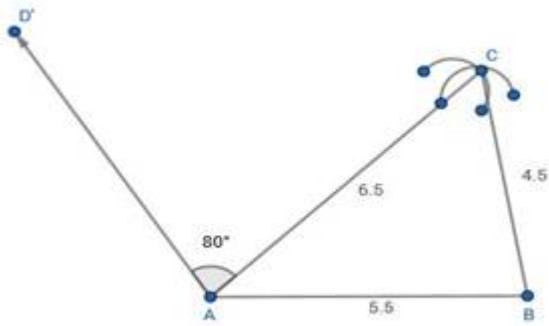
Step 2 : Draw an arc of 6.5 cm from point A and 4.5cm from point B



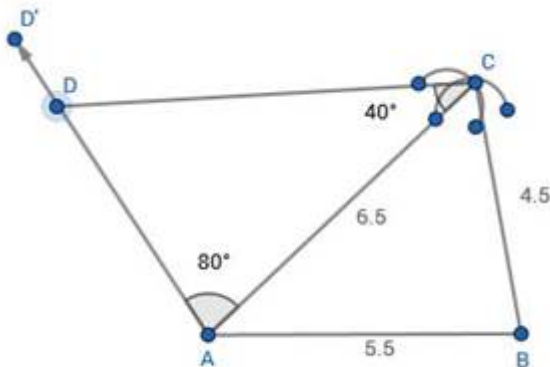
Step 3 : Mark the intersection point C and join AC and BC



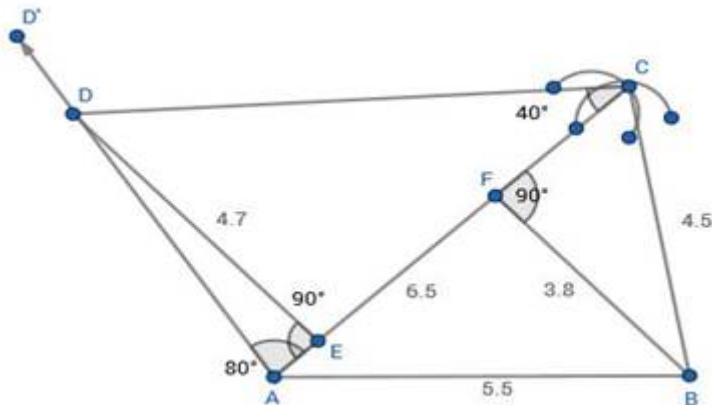
Step 4 : Make an angle of 80° on point A on AC and extend ray AD'



Step 5 : Make an angle of 40° on point C on AC and extend to intersect at ray AD' and mark the intersection point as D



Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 6.5\text{cm} \times (4.7\text{cm} + 3.8\text{cm})$$

$$= 27.625\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$27.625\text{cm}^2$$

8. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

$AB = 5\text{ cm}$, $BD = 7\text{ cm}$, $BC = 4\text{ cm}$, $\angle BAD = 100^\circ$ and $\angle DBC = 60^\circ$.

Answer

Given. ABCD is a quadrilateral.

$\angle BAD = 100^\circ$ and $\angle DBC = 60^\circ$.

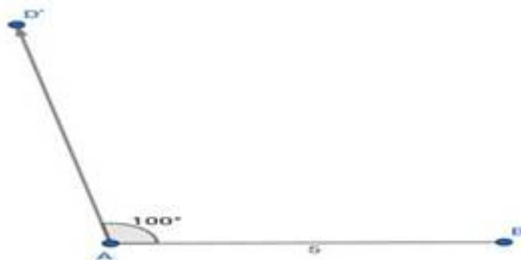
$AB = 5\text{ cm}$, $BC = 4\text{ cm}$, $BD = 7\text{ cm}$

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

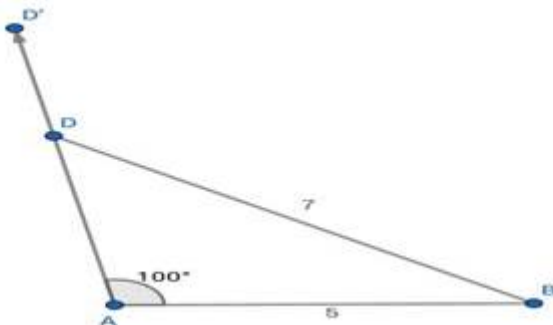
Steps for construction.

Step 1 : Draw a line AB of 5cm

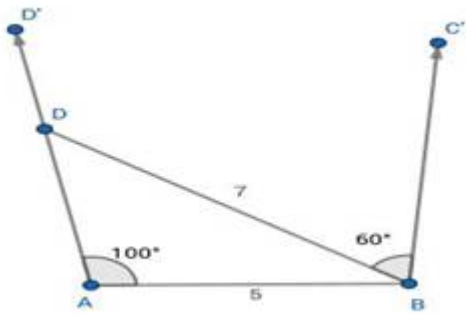
Step 2 : Make an angle of 100° on point A and extend the ray to AD'



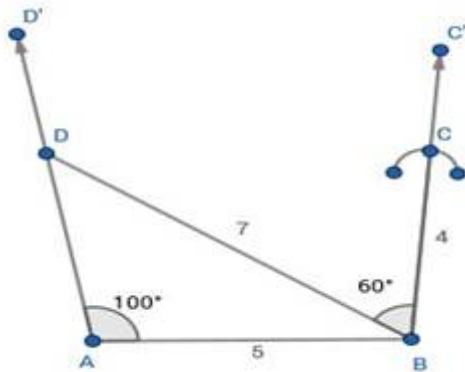
Step 3 : Make an arc on AD' of 7cm from point B and mark the intersection point as D



Step 4 : Make an angle of 60° on point B on BD and extend ray BC'

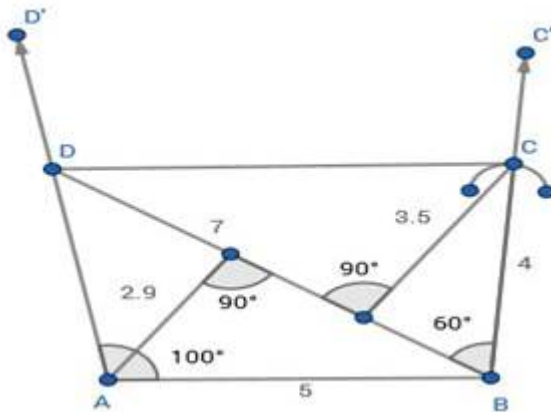


Step 5 : Mark an arc of 4cm from point B on BC' and name the intersection point as C.



Step 6 : Join C and D to form Quadrilateral ABCD

Step 6 : Draw perpendicular from A and C on BD and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ABD$ + Area of $\triangle CBD$

$$= \frac{1}{2} \times AE \times BD + \frac{1}{2} \times CF \times BD$$

$$= \frac{1}{2} \times BD \times (AE + CF)$$

$$= \frac{1}{2} \times 7\text{cm} \times (3.5\text{cm} + 2.9\text{cm})$$

$$= 22.4\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

22.4cm^2

9. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

$AB = 4\text{ cm}$, $AC = 8\text{ cm}$, $\angle ABC = 100^\circ$, $\angle ABD = 50^\circ$, $\angle CAD = 40^\circ$

Answer

Given. ABCD is a quadrilateral.

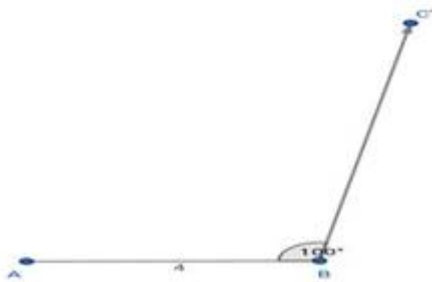
$\angle ABC = 100^\circ$, $\angle ABD = 50^\circ$ and $\angle CAD = 40^\circ$, $AB = 4\text{ cm}$, $AC = 8\text{ cm}$

Formula used. Area of triangle $= \frac{1}{2} \times \text{Base} \times \text{Height}$

Steps for construction.

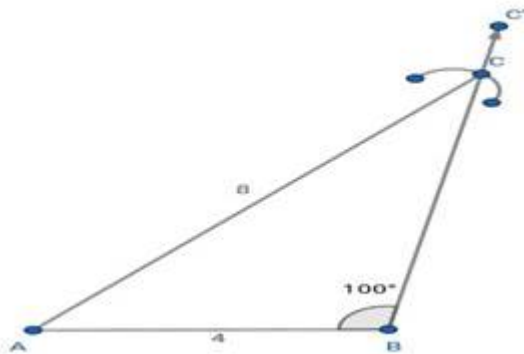
Step 1 : Draw a line AB of 4cm

Step 2 : Draw an angle of 100° on point B and extend ray BC'

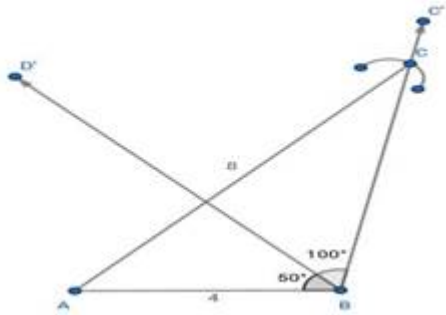


Step 3 : Make an arc of 8cm from point A and intersect it on BC'

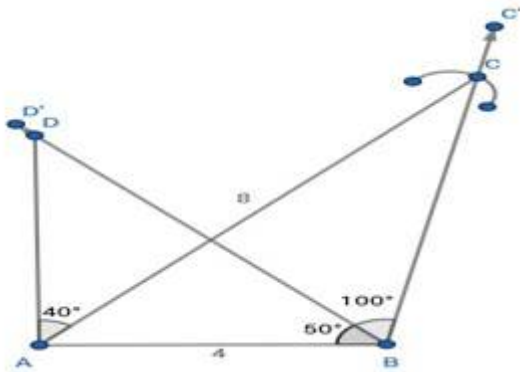
Mark intersection point of arc and ray BC' as point C



Step 4 : Draw an another angle of 50° on point B on AB and extend ray to BD'

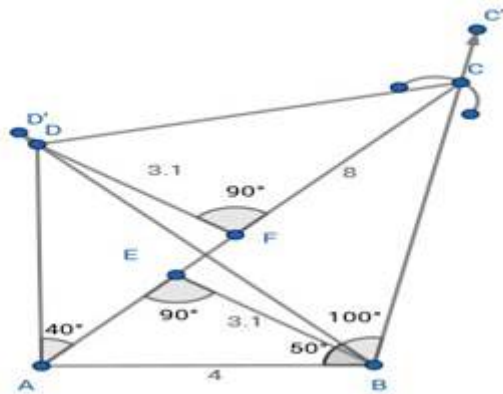


Step 5 : Make an angle of 40° on point A on AC and extend ray to intersect ray BD' mark the intersection point as D



Step 6 : Join D and C to form quadrilateral ABCD

Step 6 : Draw perpendicular from B and D on AC and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times BE \times AC + \frac{1}{2} \times DF \times AC$$

$$= \frac{1}{2} \times AC \times (BE + DF)$$

$$= \frac{1}{2} \times 8\text{cm} \times (3.1\text{cm} + 3.1\text{cm})$$

$$= 24.8\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

24.8cm^2

10. Question

Draw quadrilateral ABCD with the following measurements. Find also its area.

$AB = 6\text{ cm}$, $BC = 6\text{ cm}$, $\angle BAC = 50^\circ$, $\angle ACD = 30^\circ$, $\angle CAD = 100^\circ$

Answer

Given. ABCD is a quadrilateral.

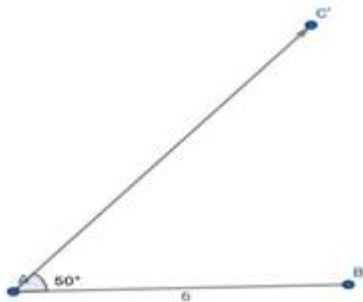
$AB = 6\text{ cm}$, $BC = 6\text{ cm}$, $\angle BAC = 50^\circ$, $\angle ACD = 30^\circ$ and $\angle CAD = 100^\circ$

Formula used. Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

Steps for construction.

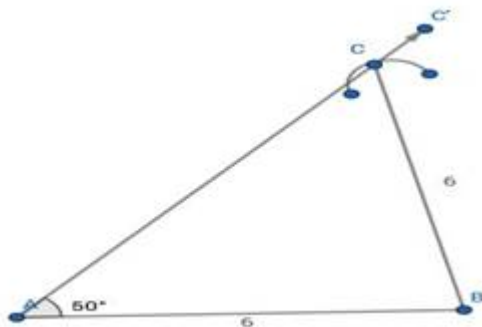
Step 1 : Draw a line AB of 6cm

Step 2 : Draw an angle of 50° on point A and extend ray AC'

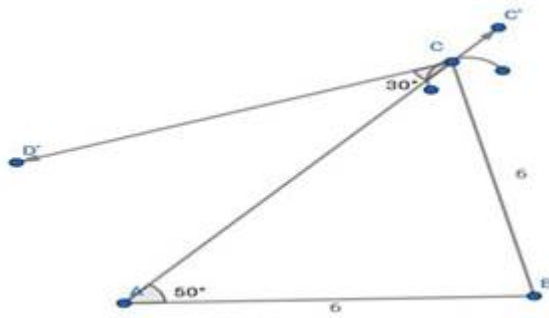


Step 3 : Make an arc of 6cm from point B and intersect it on AC'

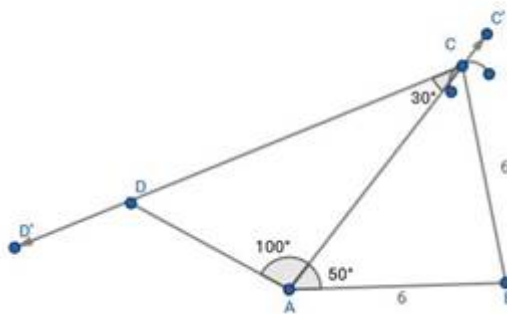
Mark intersection point of arc and ray AC' as point C



Step 4 : Draw an angle of 30° on point C on AC and extend ray to CD'

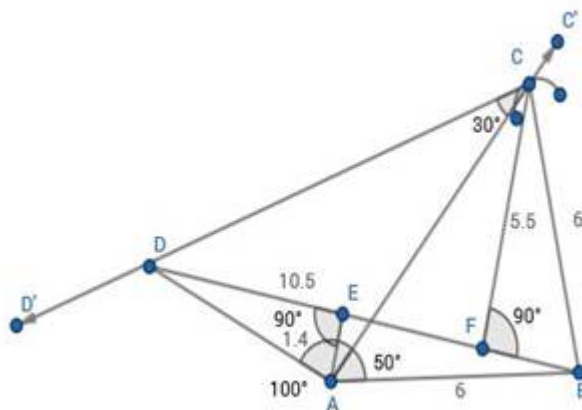


Step 5 : Make an angle of 100° on point A on AC and extend ray to intersect ray CD' mark the intersection point as D



Step 6 : Join BD

Step 6 : Draw perpendicular from A and C on BD and name the intersecting point as E and F respectively



Area of quadrilateral = Area of $\triangle ACB$ + Area of $\triangle ACD$

$$= \frac{1}{2} \times AE \times BD + \frac{1}{2} \times CF \times BD$$

$$= \frac{1}{2} \times BD \times (AE + CF)$$

$$= \frac{1}{2} \times 10.5\text{cm} \times (1.4\text{cm} + 5.5\text{cm})$$

$$= 36.225\text{cm}^2$$

Conclusion. Hence quadrilateral ABCD is constructed and its Area is

$$36.225\text{cm}^2$$

Exercise 4.2

1 A. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $PQ = 6.8$ cm, $QR = 7.2$ cm, $PR = 8.4$ cm and $RS = 8$ cm.

Answer

Given. PQRS is a trapezium.

$PQ = 6.8$ cm, $RS = 8$ cm, $QR = 7.2$ cm, $PR = 8.4$ cm

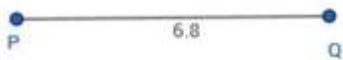
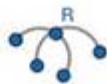
Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (PQ + SR)$

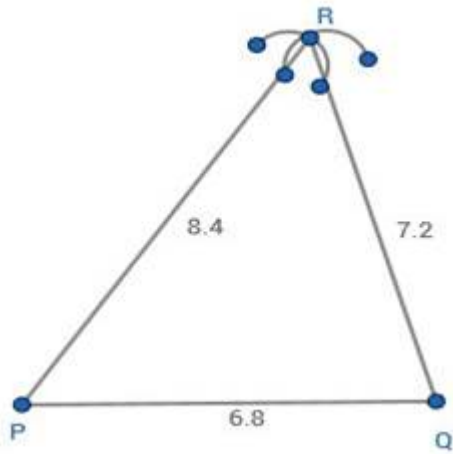
Steps of Construction

Step 1 : Draw a line PQ of 6.8cm

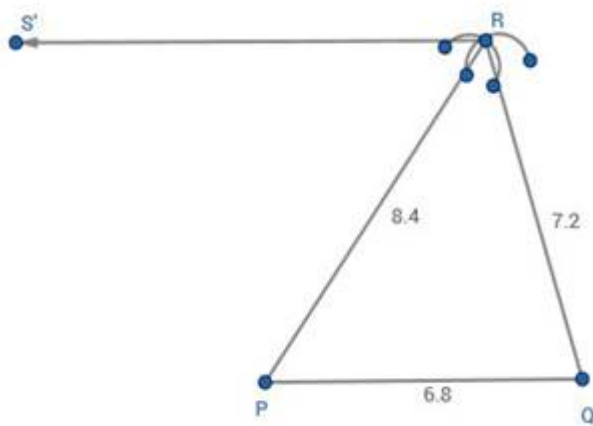
Step 2 : Make an arc of 8.4cm from point P and 7.2cm from point Q



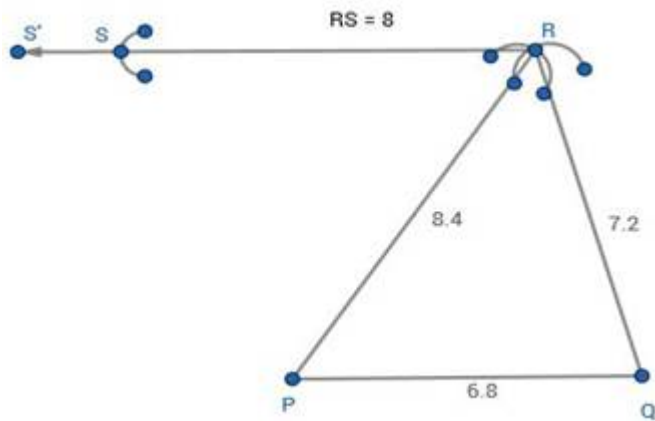
Step 3 : Mark the intersection point as R and join PR and QR



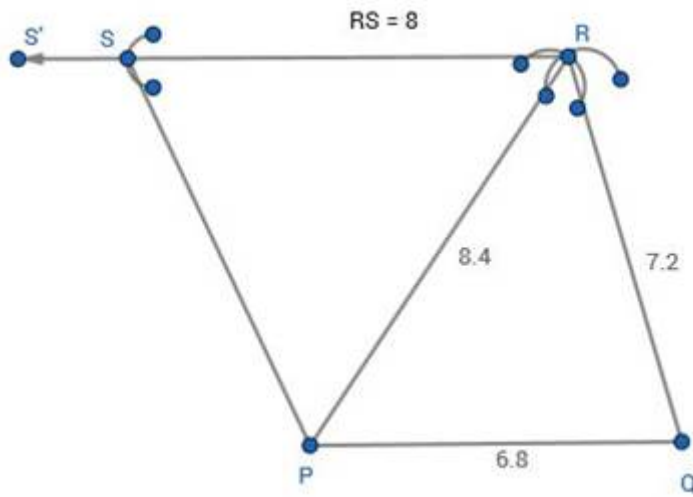
Step 4 : Draw a ray RS' parallel to PQ from point R



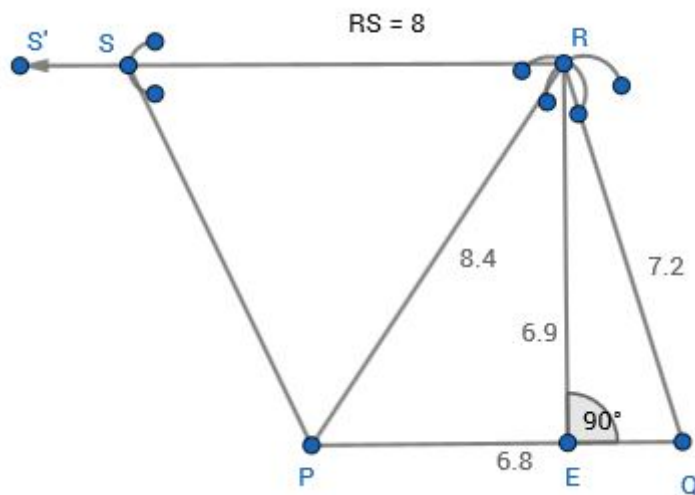
Step 5 : Make arc of 8cm on ray RS' from point R and name intersection point S



Step 6 : Join point S and P to form trapezium PQRS



Step 7 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RE} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 6.9\text{cm} \times (6.8\text{cm} + 8\text{cm})$$

$$= 51.06\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$51.06\text{cm}^2$$

1 B. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $\text{PQ} = 8\text{ cm}$, $\text{QR} = 5\text{ cm}$, $\text{PR} = 6\text{ cm}$, $\text{RS} = 4.5\text{ cm}$

Answer

Given. PQRS is a trapezium.

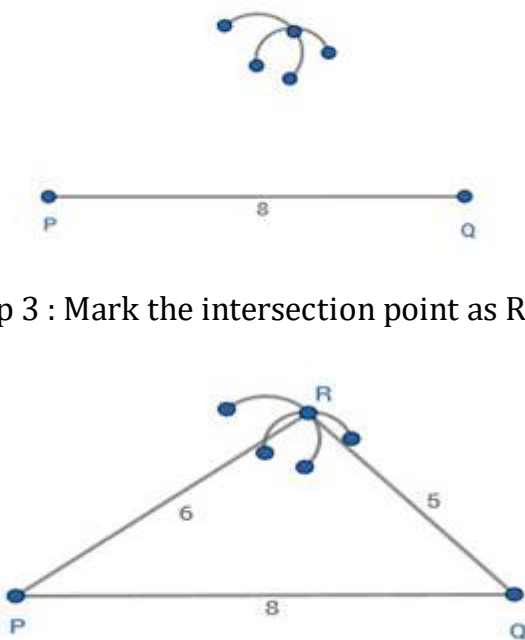
PQ = 8 cm, RS = 4.5 cm, QR = 5 cm, PR = 6 cm

Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$
Area of trapezium = $\frac{1}{2} \times \text{height} \times (PQ + SR)$

Steps of Construction

Step 1 : Draw a line PQ of 8cm

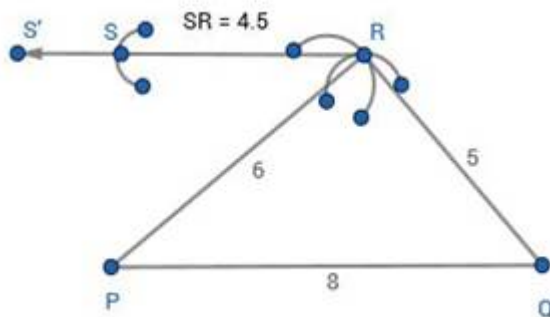
Step 2 : Make an arc of 6cm from point P and 5cm from point Q



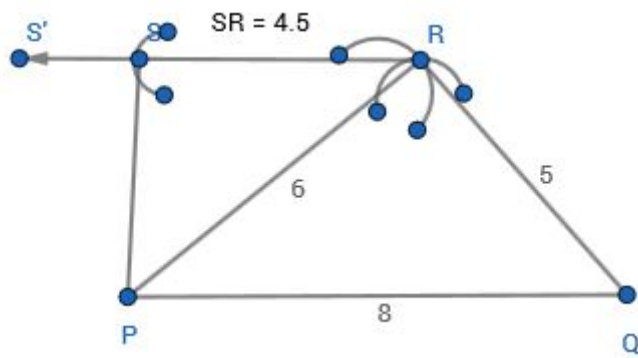
Step 3 : Mark the intersection point as R and join PR and QR

Step 4 : Draw a ray RS' parallel to PQ from point R

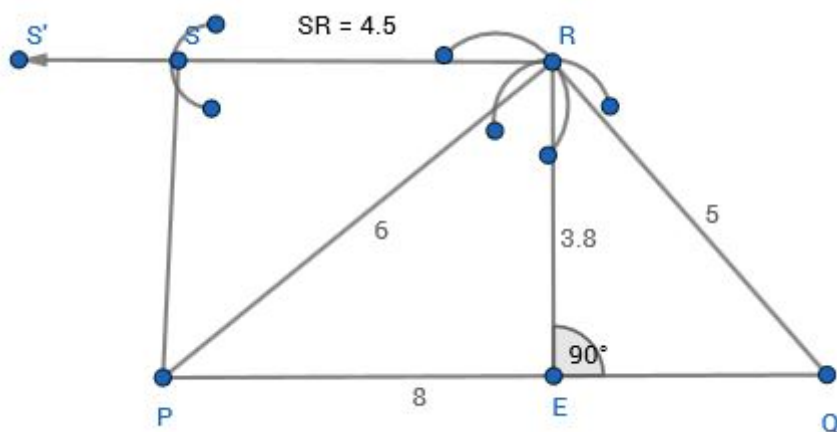
Step 5 : Make an arc of 4.5cm on ray RS' from point R and name intersection point as S



Step 6 : Join point S and P to form trapezium PQRS



Step 7 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RE} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 3.8\text{cm} \times (4.5\text{cm} + 8\text{cm})$$

$$= 23.75\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is 23.75cm^2

1 C. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $\text{PQ} = 7\text{ cm}$, $\angle Q = 60^\circ$, $\text{QR} = 5\text{ cm}$ $\text{RS} = 4\text{ cm}$.

Answer

Given. PQRS is a trapezium.

$\text{PQ} = 7\text{ cm}$, $\text{QR} = 5\text{ cm}$ and $\text{RS} = 4\text{ cm}$, $\angle Q = 60^\circ$

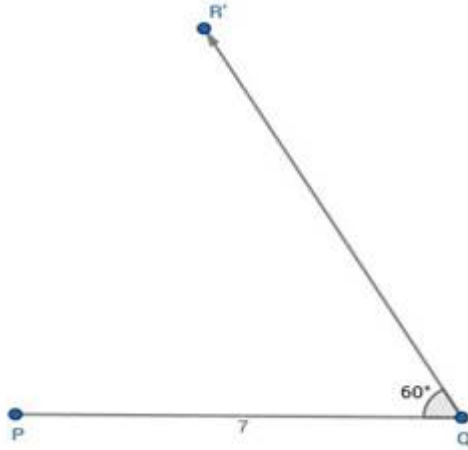
Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$

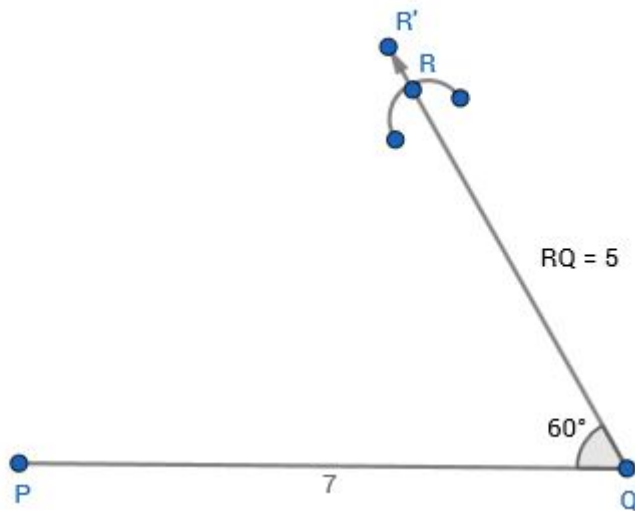
Steps of Construction

Step 1 : Draw a line PQ of 7cm

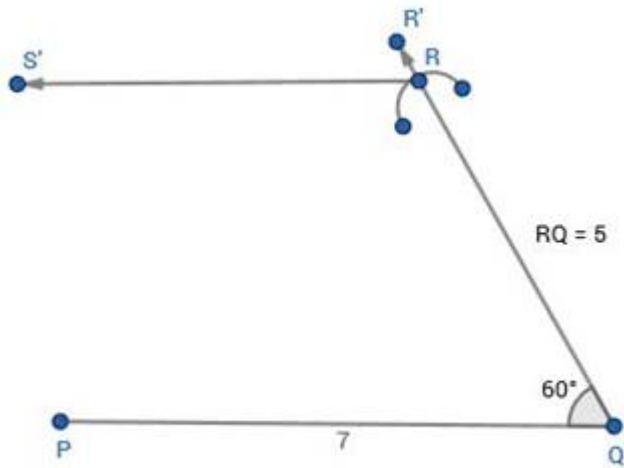
Step 2 : Make an angle of 60° from point Q and extend ray to QR'



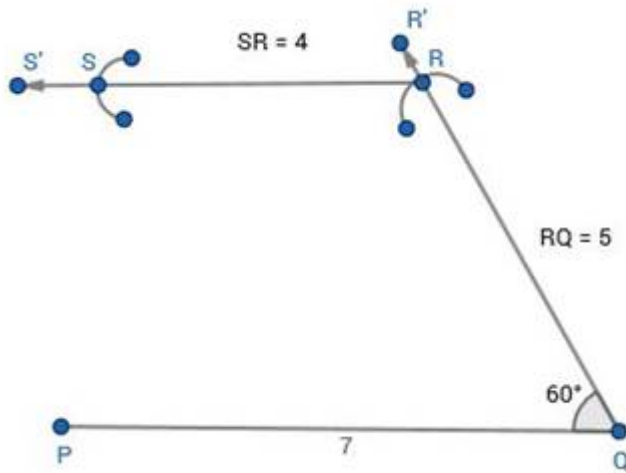
Step 3 : Mark an arc of 5cm from Q on ray QR' and name intersection point as R



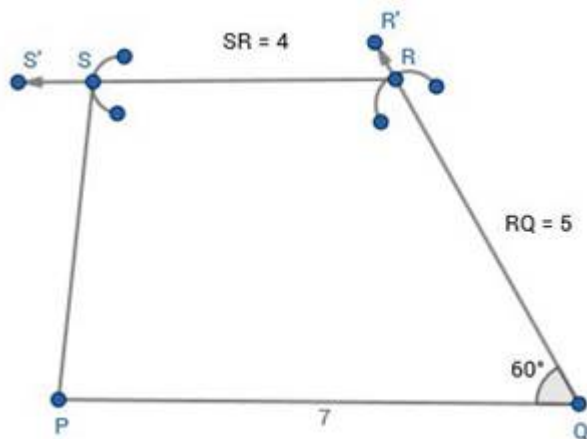
Step 4 : Draw a ray RS' parallel to PQ from point R



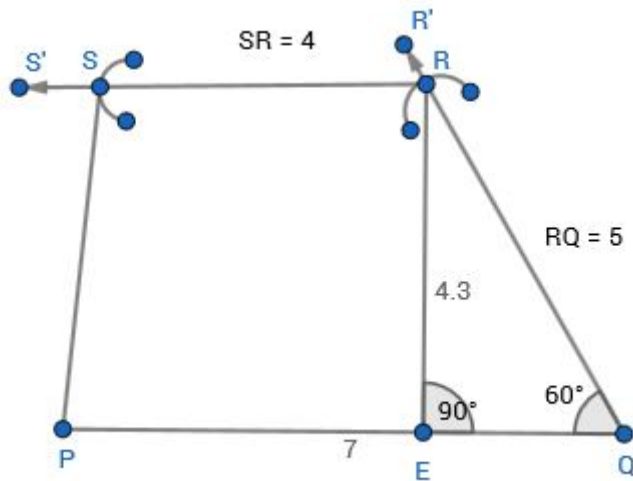
Step 5 : Make arc of 4cm on ray RS' from point R and name intersection point S



Step 6 : Join point S and P to form trapezium PQRS



Step 7 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RE} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 4.3\text{cm} \times (7\text{cm} + 4\text{cm})$$

$$= 23.65\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$23.65\text{cm}^2$$

1 D. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{\text{PQ}}$ is parallel to $\overline{\text{SR}}$, $\text{PQ} = 6.5 \text{ cm}$, $\text{QR} = 7 \text{ cm}$, $\angle \text{PQR} = 85^\circ$, $\text{PS} = 9\text{cm}$

Answer

Given. PQRS is a trapezium.

$\text{PQ} = 6.5 \text{ cm}$, $\text{QR} = 7 \text{ cm}$, $\text{PS} = 9 \text{ cm}$, $\angle \text{PQR} = 85^\circ$

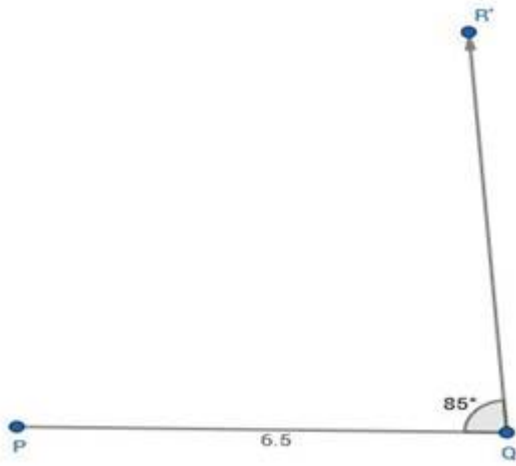
Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

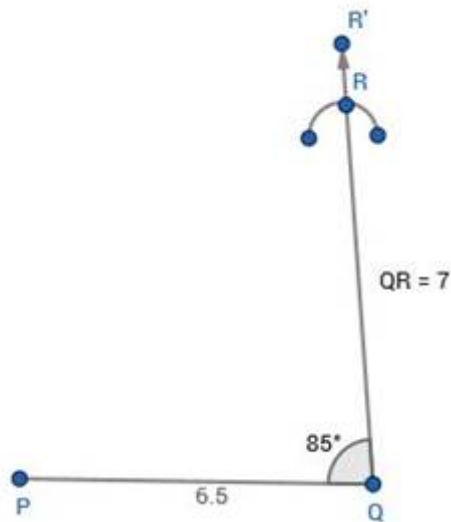
Steps of Construction

Step 1 : Draw a line PQ of 6.5cm

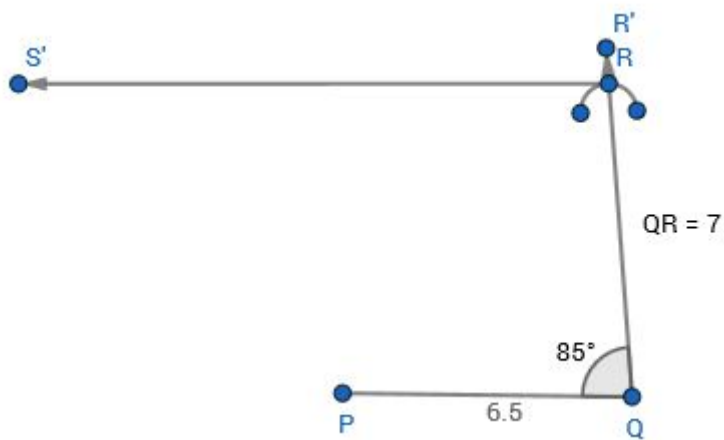
Step 2 : Make an angle of 85° from point Q and extend ray to QR'



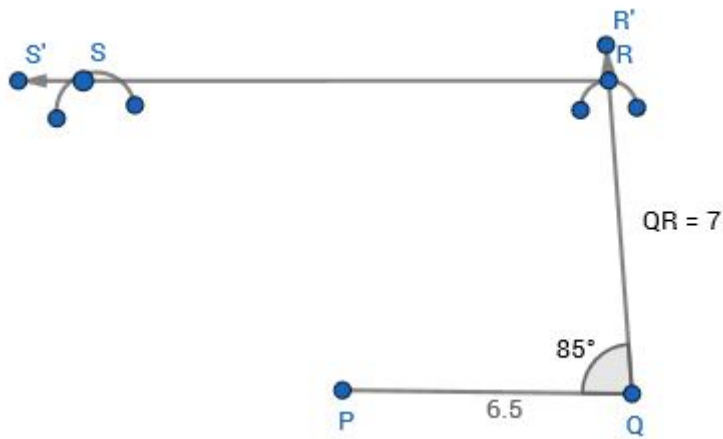
Step 3 : Mark an arc of 7cm from Q on ray QR' and name intersection point as R



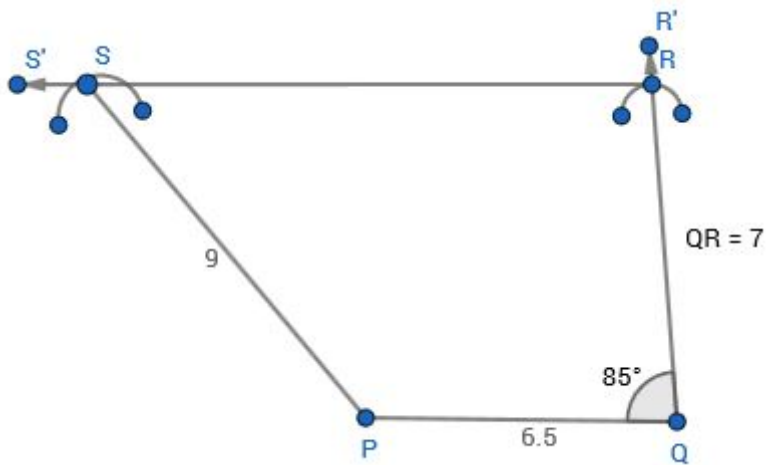
Step 4 : Draw a ray RS' parallel to PQ from point R



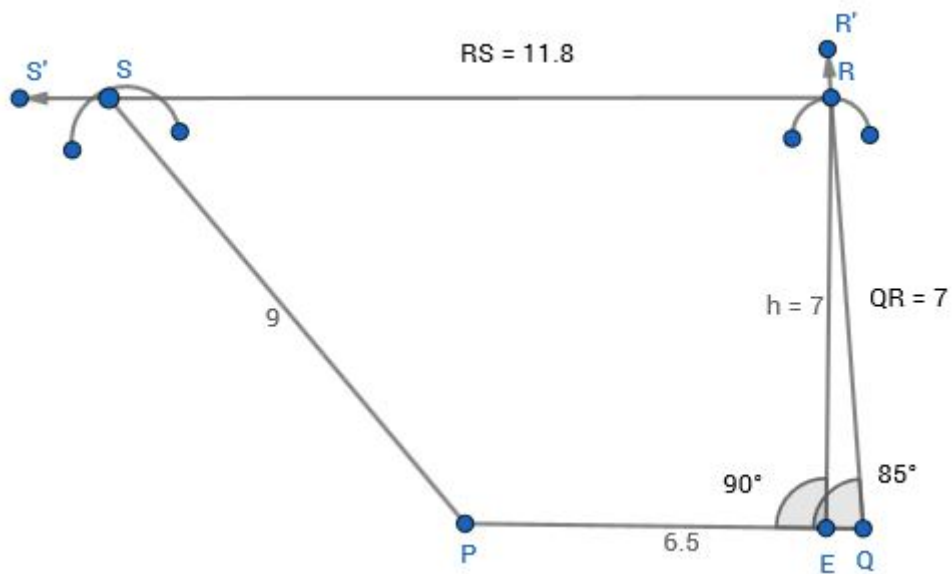
Step 5 : Make arc of 9cm on ray RS' from point P and name intersection point as S



Step 6 : Join point S and P to form trapezium PQRS



Step 7 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RE} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 7\text{cm} \times (6.5\text{cm} + 11.8\text{cm})$$

$$64.05\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is 64.05cm^2

1 E. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $PQ = 7.5\text{ cm}$, $PS = 6.5\text{ cm}$, $\angle QPS = 100^\circ$ and $\angle PQR = 45^\circ$.

Answer

Given. PQRS is a trapezium.

$PQ = 7.5\text{ cm}$, $PS = 6.5\text{ cm}$, $\angle QPS = 100^\circ$ and $\angle PQR = 45^\circ$.

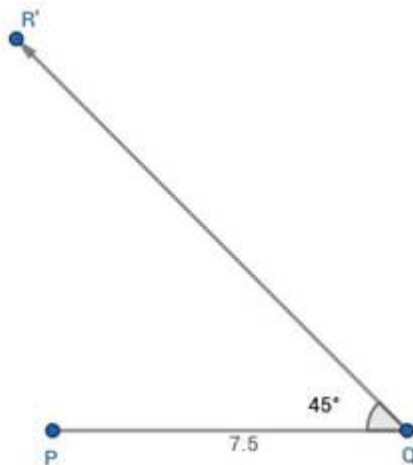
Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (PQ + SR)$

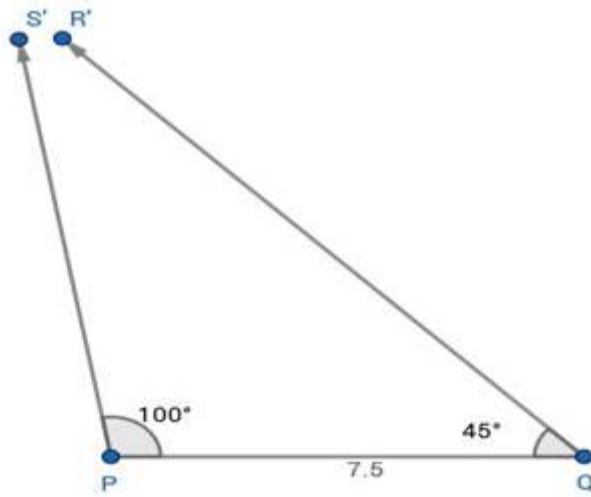
Steps of Construction

Step 1 : Draw a line PQ of 7.5cm

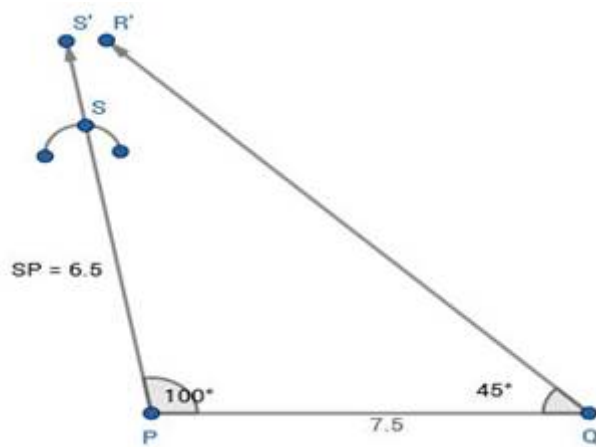
Step 2 : Make an angle of 45° from point Q and extend ray to QR'



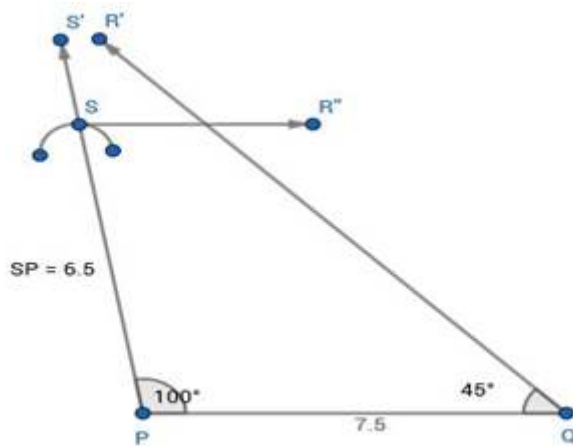
Step 3 : Make an angle of 100° from point P and extend ray to PS'



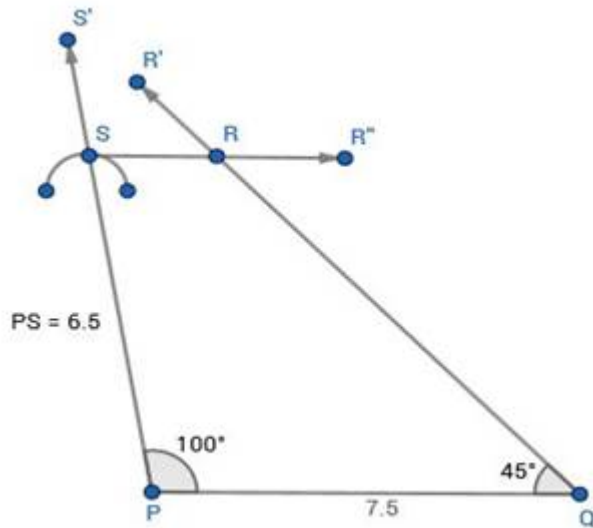
Step 3 : Mark an arc of 6.5cm from P on ray PS' and name intersection point as S



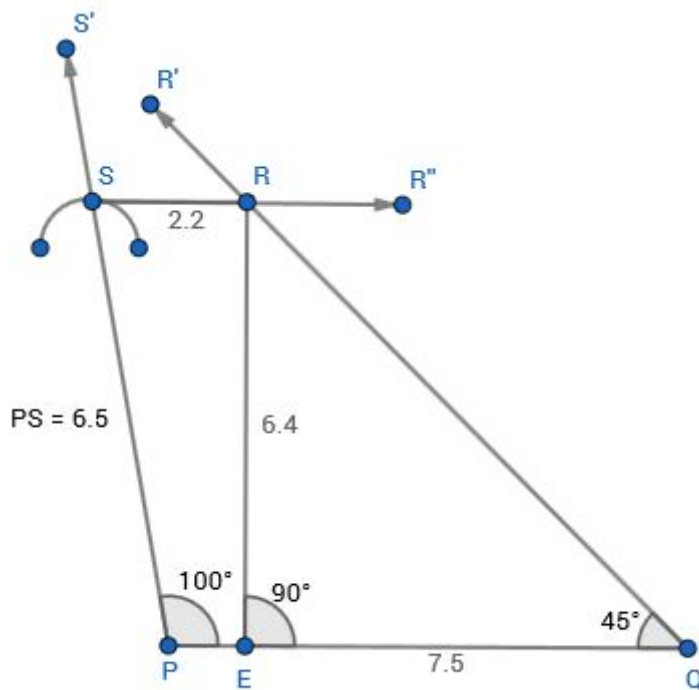
Step 4 : Draw a ray SR'' parallel to PQ from point S



Step 5 : Mark the intersection point of SR'' and QR' as R



Step 6 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (PQ + SR)$$

$$= \frac{1}{2} \times RE \times (PQ + SR)$$

$$= \frac{1}{2} \times 6.4\text{cm} \times (7.5\text{cm} + 2.2\text{cm})$$

$$= 31.04\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$31.04\text{cm}^2$$

1 F. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $PQ = 6$ cm, $PS = 5$ cm, $\angle QPS = 60^\circ$ and $\angle PQR = 100^\circ$.

Answer

Given. PQRS is a trapezium.

$PQ = 6$ cm, $PS = 5$ cm, $\angle QPS = 60^\circ$ and $\angle PQR = 100^\circ$

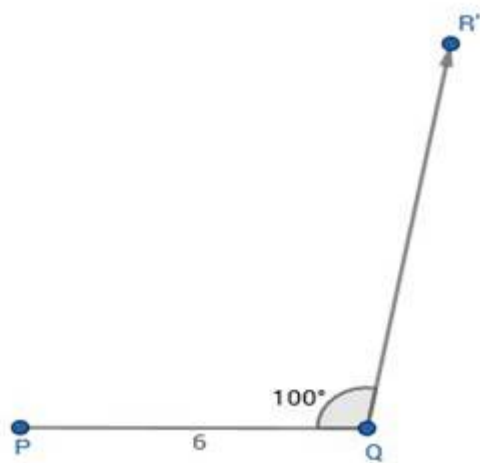
Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (PQ + SR)$

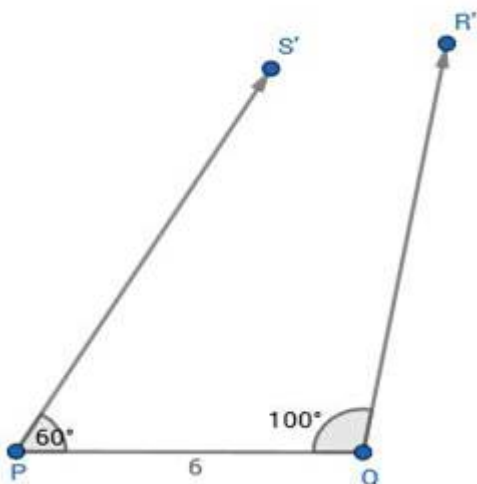
Steps of Construction

Step 1 : Draw a line PQ of 6cm

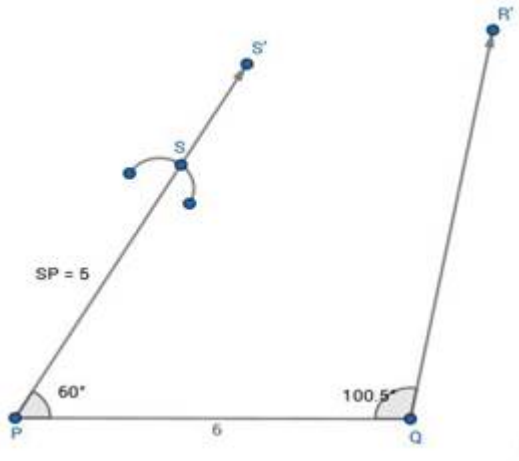
Step 2 : Make an angle of 100° from point Q and extend ray to QR'



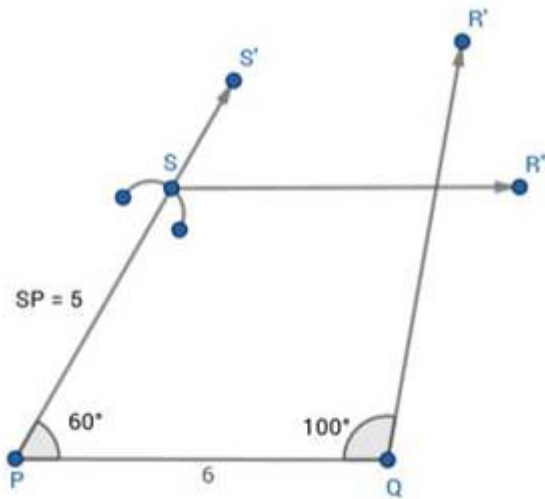
Step 3 : Make an angle of 60° from point P and extend ray to PS'



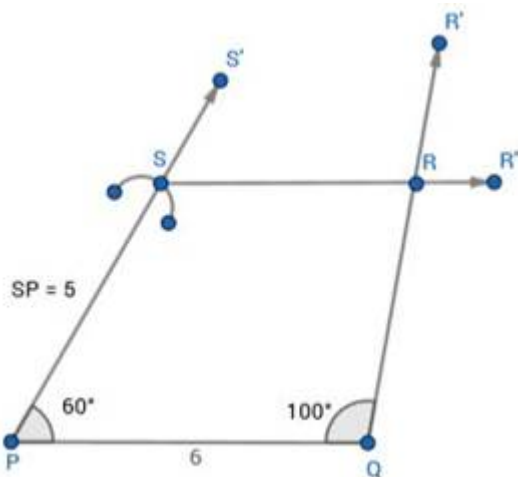
Step 4 : Mark an arc of 5cm from P on ray PS' and name intersection point as S



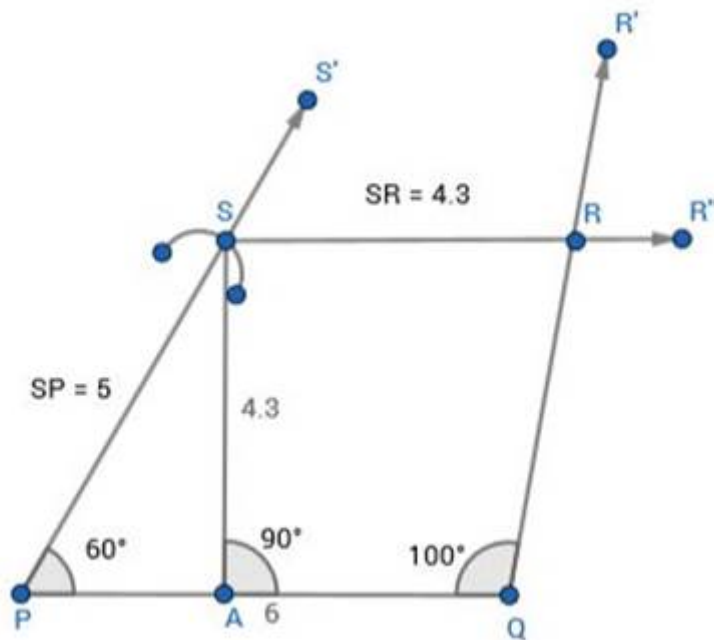
Step 5 : Draw a ray SR'' parallel to PQ from point S



Step 6 : Mark the intersection point of SR'' and QR' as R



Step 7 : Draw a perpendicular on PQ from point S and name the intersection point as A



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{SA} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 4.3\text{cm} \times (6\text{cm} + 4.3\text{cm})$$

$$= 22.145\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$22.145\text{cm}^2$$

1 G. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{PQ}$ is parallel to $\overline{SR}$, $\text{PQ} = 8\text{ cm}$, $\text{QR} = 5\text{ cm}$, $\text{RS} = 6\text{ cm}$, $\text{SP} = 4\text{ cm}$

Answer

Given. PQRS is a trapezium.

$\text{PQ} = 8\text{ cm}$, $\text{QR} = 5\text{ cm}$, $\text{RS} = 6\text{ cm}$ and $\text{SP} = 4\text{ cm}$

Formula used. Area of trapezium $= \frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

Steps of Construction

Step 1 : Draw a line PQ of 8cm

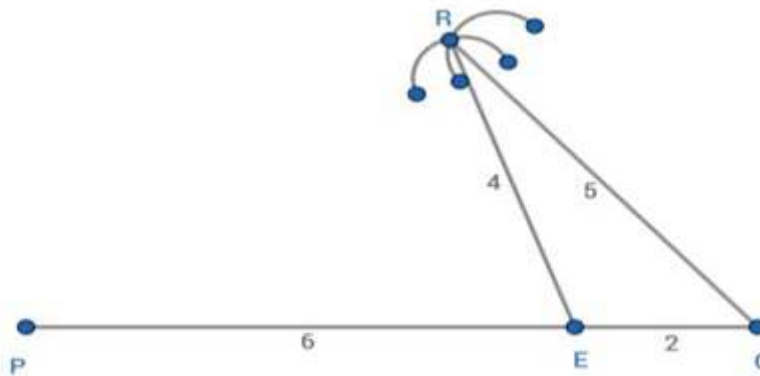
Step 2 : Mark a point E on PQ such that $PE = 6\text{cm}$ and $EQ = 2\text{cm}$



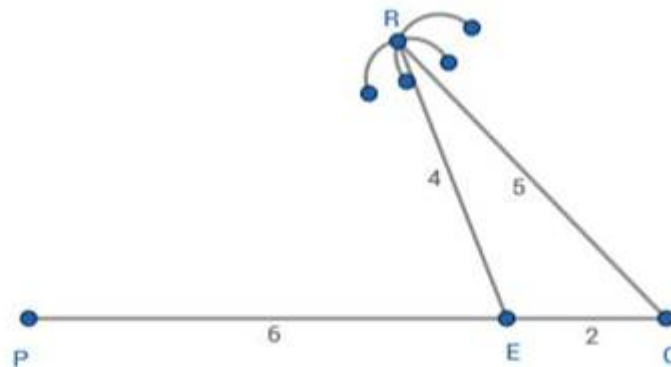
Step 3 : Make arc of 5cm from point Q and 4cm from point E



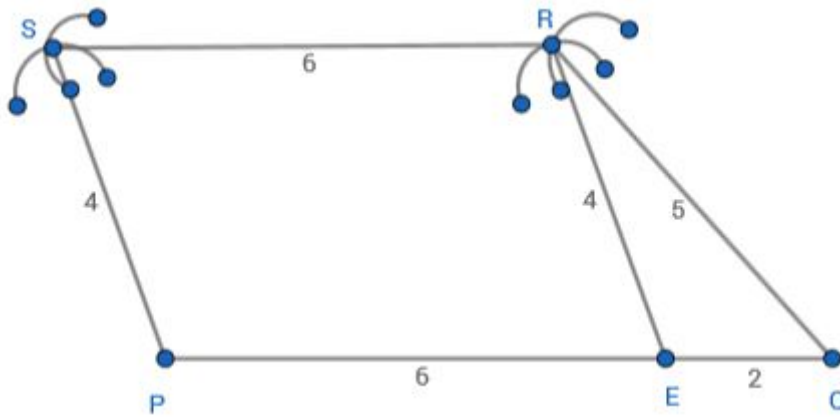
Step 4 : Mark the intersecting point of both arcs to be R and join ER and RQ



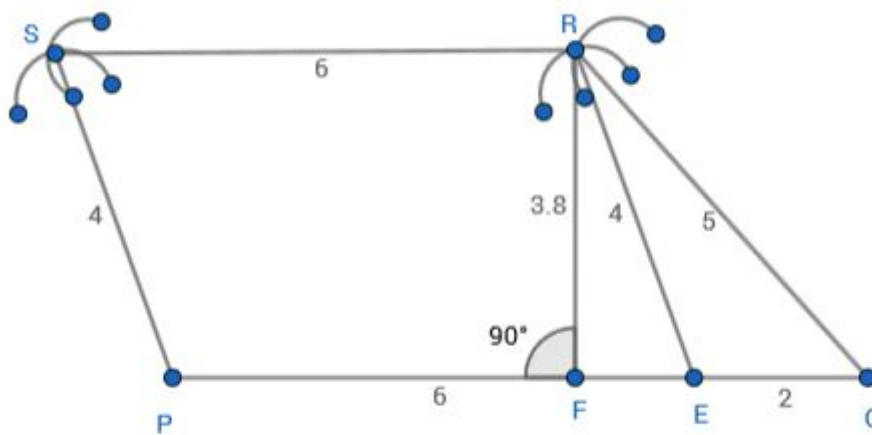
Step 5 : Draw arcs of 6cm and 4cm from point R and P respectively



Step 6 : Mark the intersection point of both arcs as S join SP and RS



Step 8 : Draw a perpendicular on PQ from point R and name the intersection point as F



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RF} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 3.8\text{cm} \times (8\text{cm} + 6\text{cm})$$

$$= 26.6\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$26.6\text{cm}^2$$

1 H. Question

Construct trapezium PQRS with the following measurements. Find also its area.

$\overline{\text{PQ}}$ is parallel to $\overline{\text{SR}}$, $\text{PQ} = 4.5\text{ cm}$, $\text{QR} = 2.5\text{ cm}$, $\text{RS} = 3\text{ cm}$ and $\text{SP} = 2\text{ cm}$.

Answer

Given. PQRS is a trapezium.

PQ = 4.5 cm, QR = 2.5 cm, RS = 3 cm and SP = 2 cm

Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$

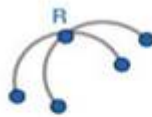
Steps of Construction

Step 1 : Draw a line PQ of 4.5cm

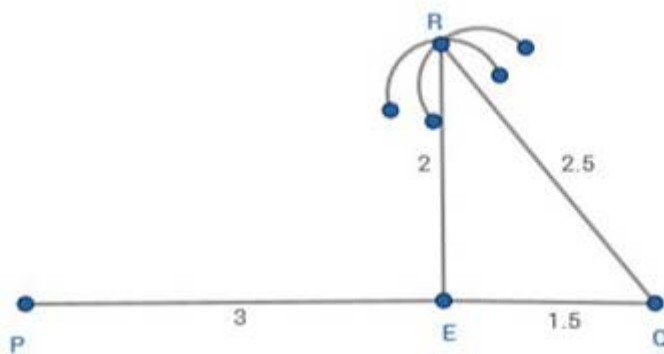
Step 2 : Mark a point E on PQ such that PE = 3cm and EQ = 1.5cm



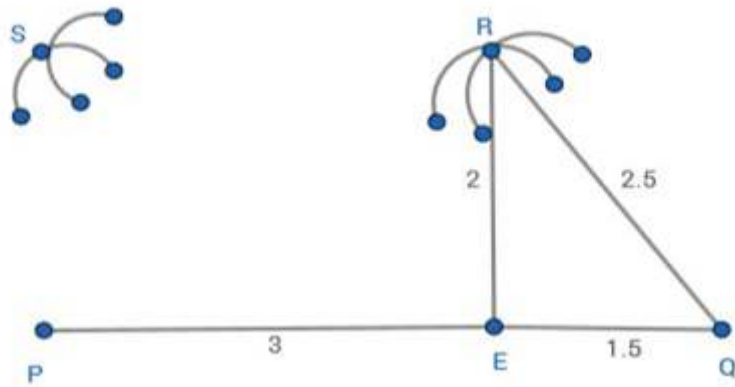
Step 3 : Make arc of 2.5cm from point Q and 2cm from point E



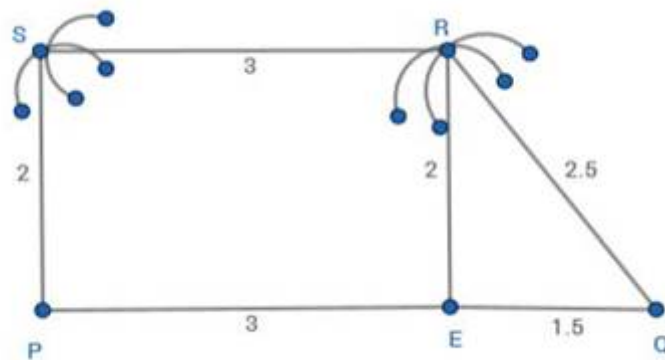
Step 4 : Mark the intersecting point of both arcs to be R and join RE and EQ.



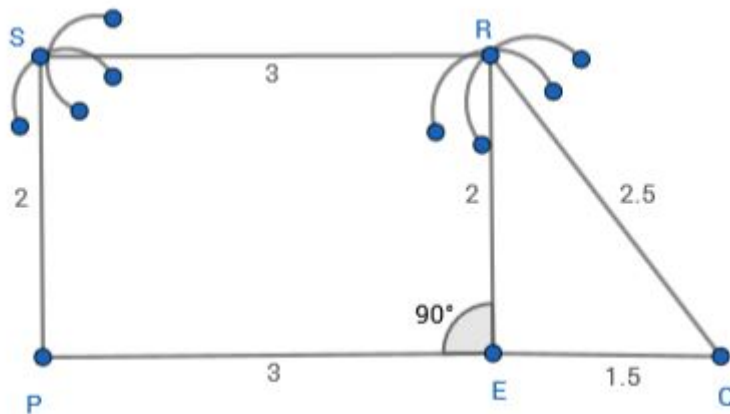
Step 5 : Draw arcs of 3cm and 2cm from point R and P respectively



Step 6 : Mark the intersection point of both arcs as S, join SP and RS



Step 8 : Draw a perpendicular on PQ from point R and name the intersection point as E



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times \text{RE} \times (\text{PQ} + \text{SR})$$

$$= \frac{1}{2} \times 2\text{cm} \times (4.5\text{cm} + 3\text{cm})$$

$$= 7.5\text{cm}^2$$

Conclusion. Hence; Trapezium PQRS is constructed and its area is

$$7.5\text{cm}^2$$

2 A. Question

Construct isosceles trapezium ABCD with the following measurements and find its area.

$\overline{AB}$ is parallel to $\overline{DC}$, $AB = 9\text{ cm}$, $DC = 6\text{ cm}$ and $AD = BC = 5\text{ cm}$.

Answer

Given. ABCD is a isosceles trapezium.

$AB = 9\text{ cm}$, $DC = 6\text{ cm}$ and $AD = BC = 5\text{ cm}$.

Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

Area of trapezium = $\frac{1}{2} \times \text{height} \times (AB + CD)$

Steps of Construction

Step 1 : Draw a line AB of 9cm

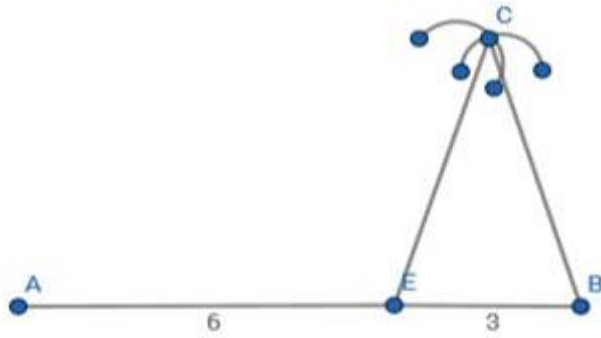
Step 2 : Mark a point E on AB such that $AE = 6\text{cm}$ and $EB = 3\text{cm}$



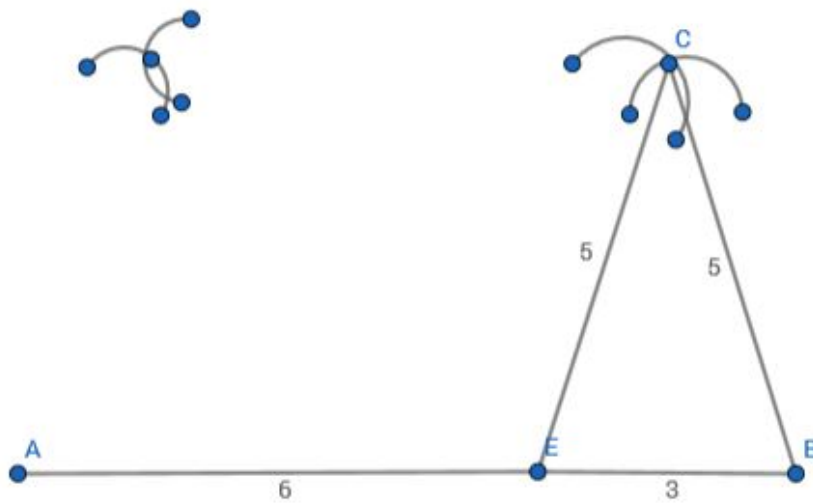
Step 3 : Make arc of 5cm from both point E and B



Step 4 : Mark the intersecting point of both arcs to be C and join EC and BC.

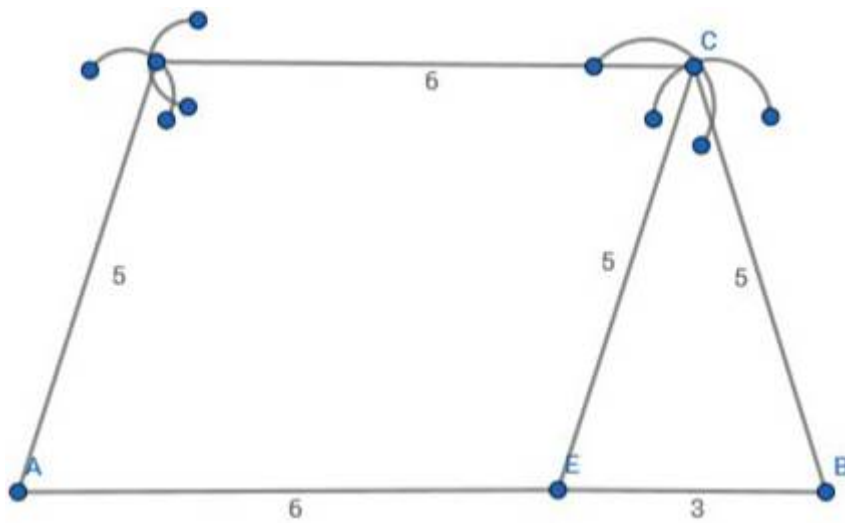


Step 5 : Draw arcs of 6cm and 5cm from point C and A respectively

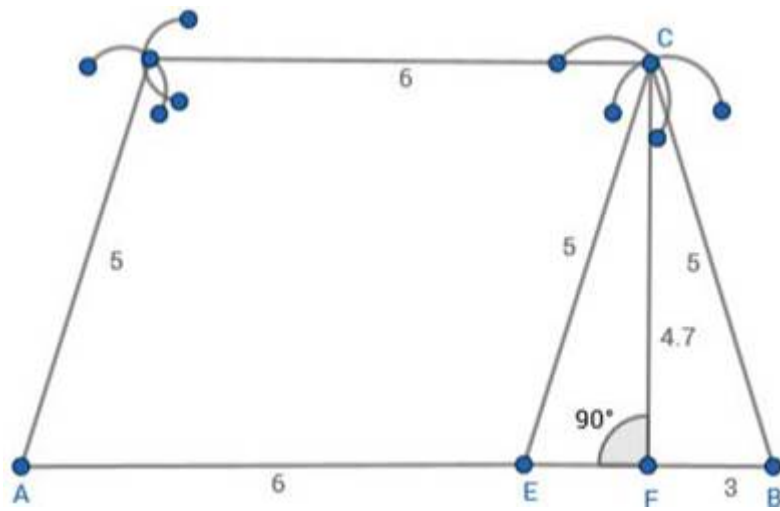


Step 6 : Mark the intersection point of both arcs as D

Step 7 : Join AD and CD to form trapezium ABCD



Step 8 : Draw a perpendicular on AB from point C and name then intersection point as F



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (AB + CD)$$

$$= \frac{1}{2} \times CF \times (AB + CD)$$

$$= \frac{1}{2} \times 4.7\text{cm} \times (9\text{cm} + 6\text{cm})$$

$$= 35.25\text{cm}^2$$

Conclusion. Hence; Trapezium ABCD is constructed and its area is

$$35.25\text{cm}^2$$

2 B. Question

Construct isosceles trapezium ABCD with the following measurements and find its area.

$\overline{AB}$ is parallel to $\overline{DC}$, $AB = 10\text{ cm}$, $DC = 6\text{ cm}$ and $AD = BC = 7\text{ cm}$.

Answer

Given. ABCD is a isosceles trapezium.

$AB = 10\text{ cm}$, $DC = 6\text{ cm}$ and $AD = BC = 7\text{ cm}$

Formula used. Area of trapezium = $\frac{1}{2} \times \text{height} \times \text{sum of parallel sides}$

$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (PQ + SR)$$

Steps of Construction

Step 1 : Draw a line AB of 10cm

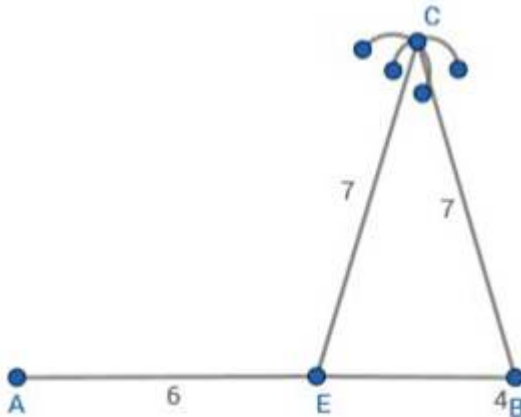
Step 2 : Mark a point E on AB such that $AE = 6\text{cm}$ and $EB = 4\text{cm}$



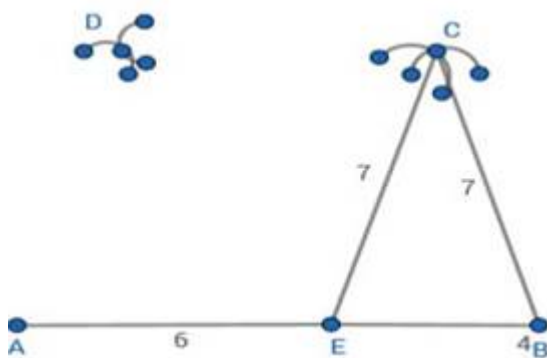
Step 3 : Make arc of 7cm from both point E and B



Step 4 : Mark the intersecting point of both arcs to be C and join EC and EB

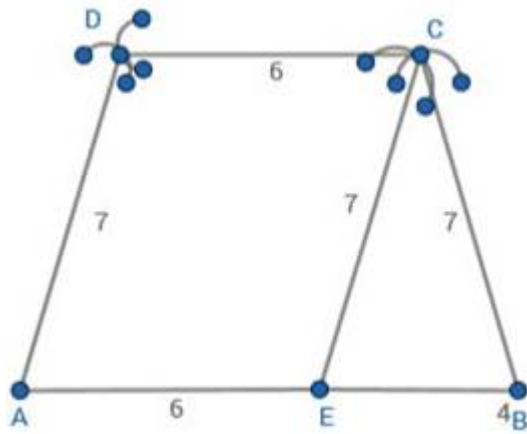


Step 5 : Draw arcs of 6cm and 7cm from point C and A respectively

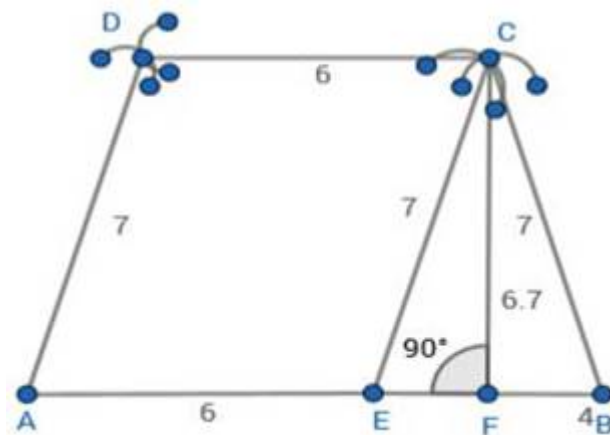


Step 6 : Mark the intersection point of both arcs as D

Step 7 : Join AD and CD to form trapezium ABCD



Step 8 : Draw a perpendicular on AB from point C and name the intersection point as F



$$\text{Area of trapezium} = \frac{1}{2} \times \text{height} \times (AB + CD)$$

$$= \frac{1}{2} \times RF \times (AB + CD)$$

$$= \frac{1}{2} \times 6.7\text{cm} \times (10\text{cm} + 6\text{cm})$$

$$= 53.6\text{cm}^2$$

Conclusion. Hence; Trapezium ABCD is constructed and its area is

$$53.6\text{cm}^2$$

Exercise 4.3

1. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

AB = 7 cm, BC = 5 cm and $\angle ABC = 60^\circ$.

Answer

Given. ABCD is a parallelogram.

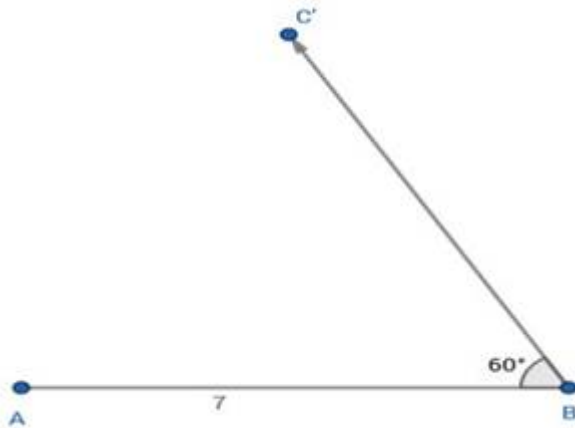
$AB = CD$; $BC = AD$, $AB = 7\text{ cm}$, $BC = 5\text{ cm}$, $\angle ABC = 60^\circ$

Formula used. Area of parallelogram = base $\times$ height

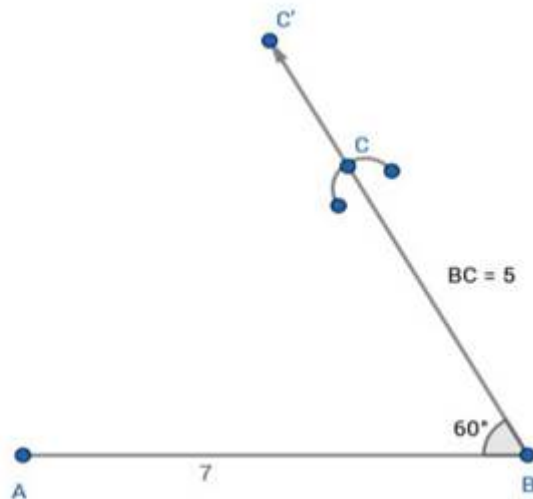
Steps of construction

Step 1 : Draw a line AB of 7cm

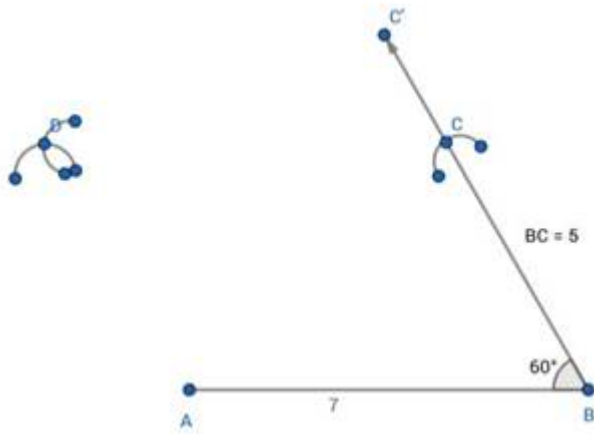
Step 2 : Make an angle of 60° on point B and extend ray to BC'



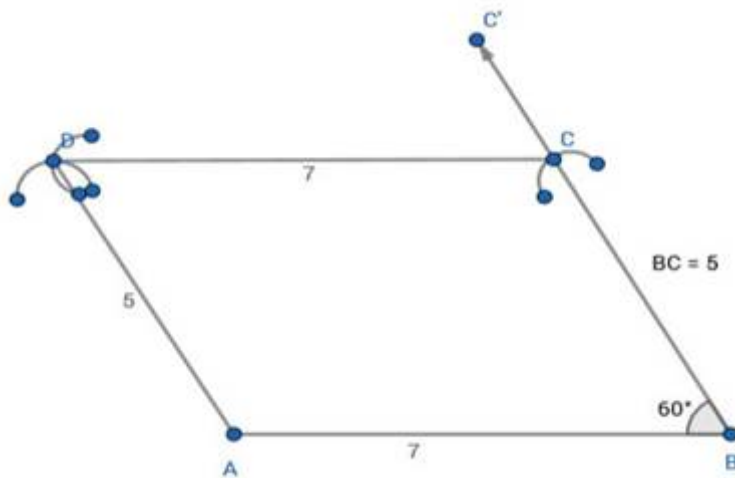
Step 3 : Make an arc of 5cm on ray BC' from point B and name the intersection point as C



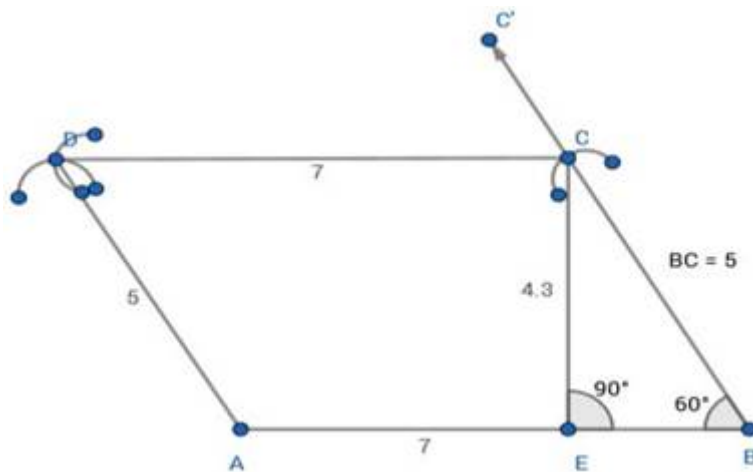
Step 4 : Draw arc of 5cm and 7cm from point A and C respectively



Step 5 : Mark the intersection point as D and join AD and CD



Step 6 : Draw a perpendicular on AB from point C and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times CE$$

$$= 7\text{cm} \times 4.3\text{cm}$$

$$= 30.1\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 30.1cm^2

2. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

$AB = 8.5\text{ cm}$, $AD = 6.5\text{ cm}$ and $\angle DAB = 100^\circ$.

Answer

Given. ABCD is a parallelogram.

$AB = CD$; $BC = AD$

$AB = 8.5\text{ cm}$, $AD = 6.5\text{ cm}$

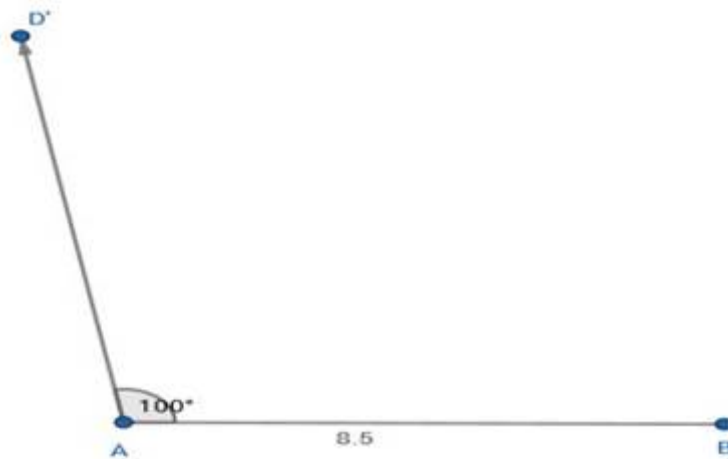
$\angle DAB = 100^\circ$

Formula used. Area of parallelogram = base $\times$ height

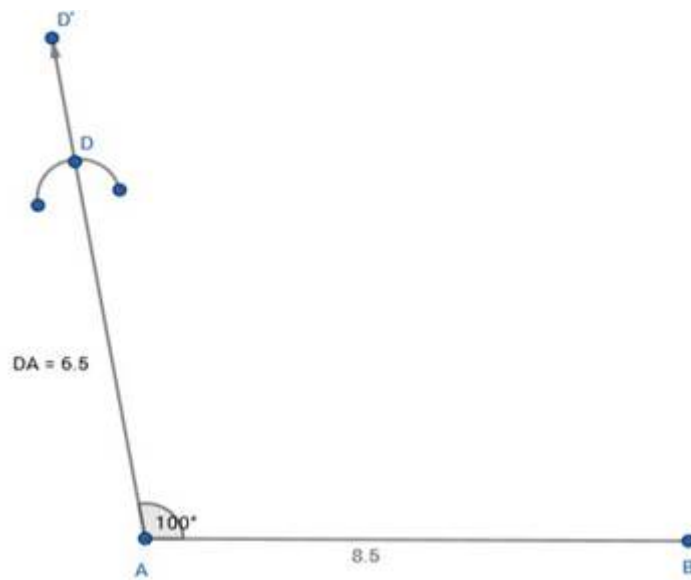
Steps of construction

Step 1 : Draw a line AB of 8.5cm

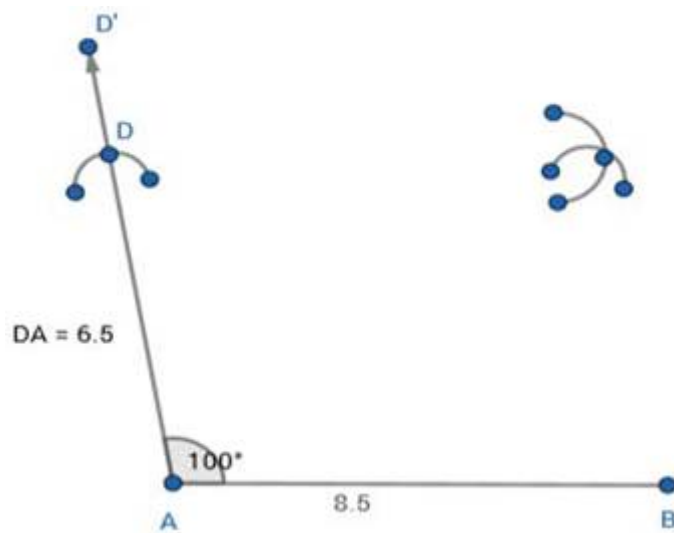
Step 2 : Make an angle of 100° on point A and extend ray to AD'



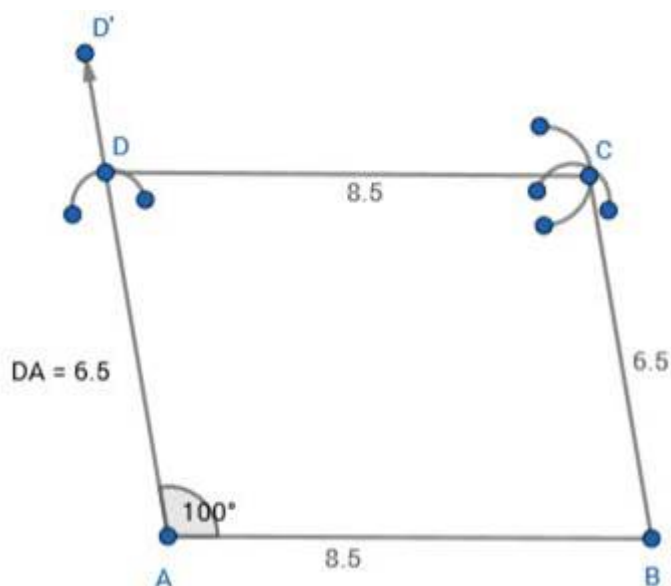
Step 3 : Make an arc of 6.5cm on ray AD' through point A and name the intersection point as D



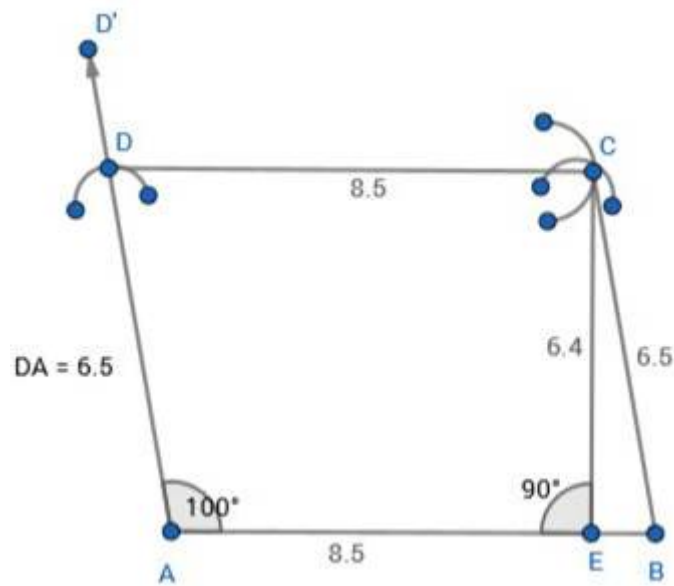
Step 4 : Draw arc of 6.5cm and 8.5cm from point D and B Respectively



Step 5 : Mark the intersection point as C and join DC and BC



Step 6 : Draw a perpendicular on AB from point C and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times CE$$

$$= 8.5\text{cm} \times 6.4\text{cm}$$

$$= 54.4\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 54.4cm^2

3. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

AB = 6 cm, BD = 8 cm and AD = 5 cm.

Answer

Given. ABCD is a parallelogram.

$$AB = CD ; BC = AD$$

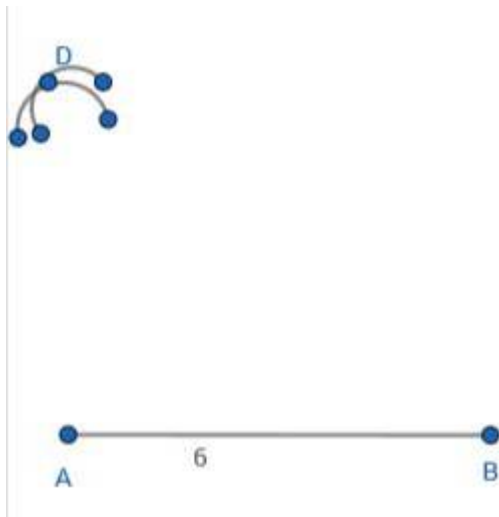
AB = 6 cm, BD = 8 cm and AD = 5 cm

Formula used. Area of parallelogram = base $\times$ height

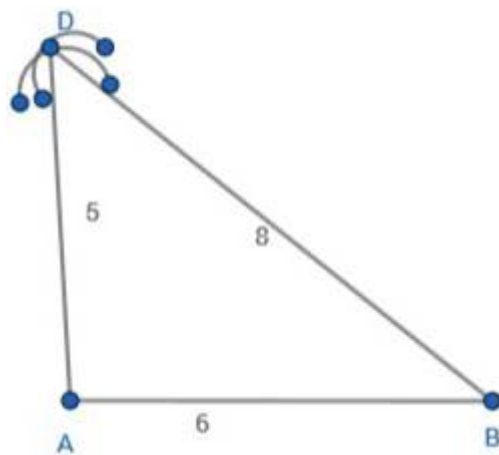
Steps of construction

Step 1 : Draw a line AB of 6cm

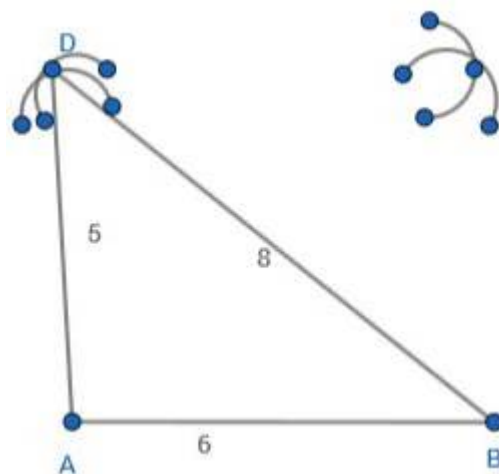
Step 2 : Make an arc of 8cm from point B and 5cm from point A



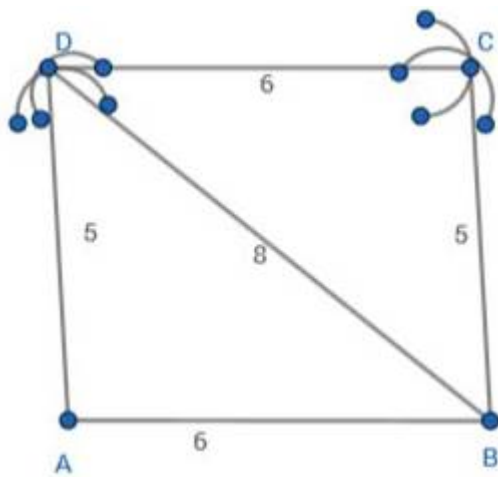
Step 3 : Intersection of Both the arcs gives point D and join AD , AB



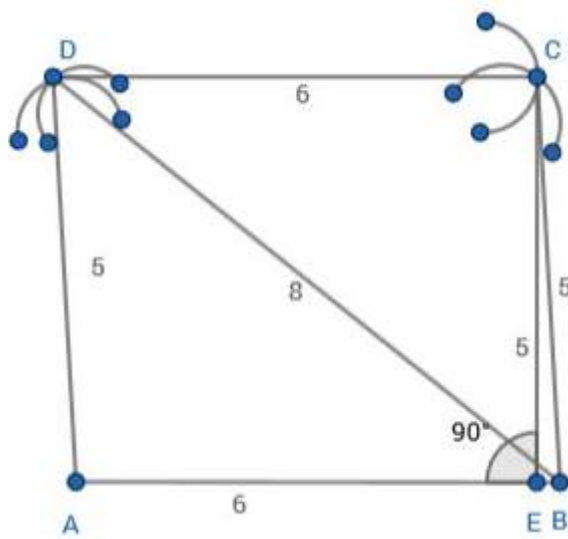
Step 4 : Draw arc of 6cm and 5cm from point D and B respectively



Step 5 : Mark the intersection point as C then join DC and BC



Step 6 : Draw a perpendicular on AB from point C and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times CE$$

$$= 6\text{cm} \times 5\text{cm}$$

$$= 30\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 30cm^2

4. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

AB = 5 cm, BC = 4 cm, AC = 7 cm.

Answer

Given. ABCD is a parallelogram.

$$AB = CD ; BC = AD$$

$AB = 5 \text{ cm}$, $BC = 4 \text{ cm}$, $AC = 7 \text{ cm}$

Formula used. Area of parallelogram = base $\times$ height

Steps of construction

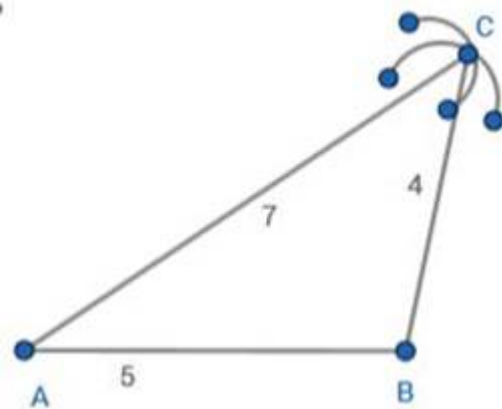
Step 1 : Draw a line AB of 5cm

Step 2 : Make an arc of 7cm from point A and 4cm from point B

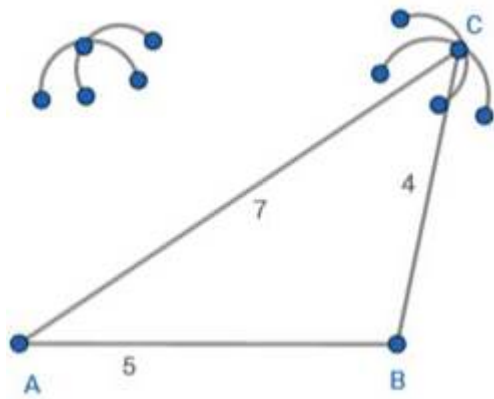


Step 3 : Intersection of Both the arcs gives point C then join

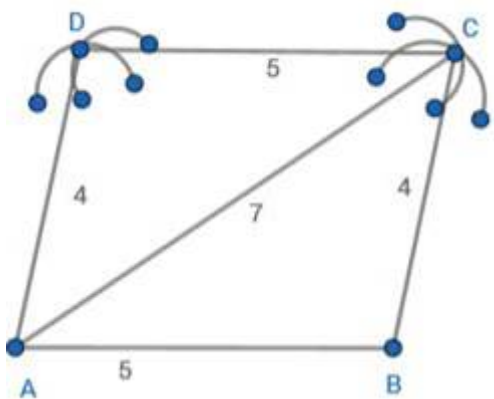
AB and AC



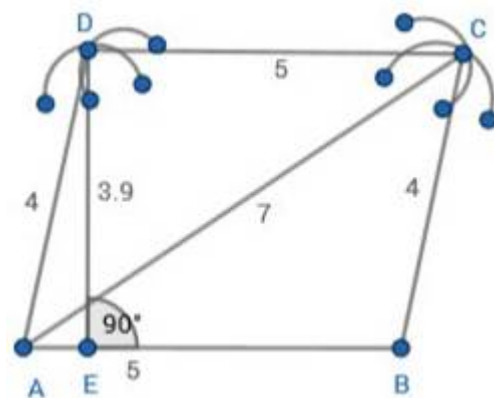
Step 4 : Draw arc of 4cm and 5cm from point A and C respectively



Step 5 : Mark the intersection point as D and join DC and DA



Step 6 : Draw a perpendicular on AB from point D and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times DE$$

$$= 5\text{cm} \times 3.9\text{cm}$$

$$= 19.5\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 19.5cm^2

5. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

$AC = 10$ cm, $BD = 8$ cm and $\angle AOB = 100^\circ$ where $\overline{AC}$ and $\overline{BD}$ intersect at 'O'.

Answer

Given. ABCD is a parallelogram.

$AC = 10$ cm, $BD = 8$ cm

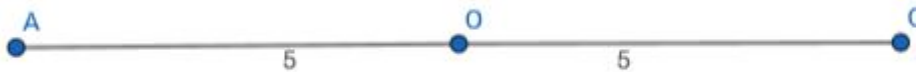
$\angle AOB = 100^\circ$

Formula used. Area of parallelogram = base $\times$ height

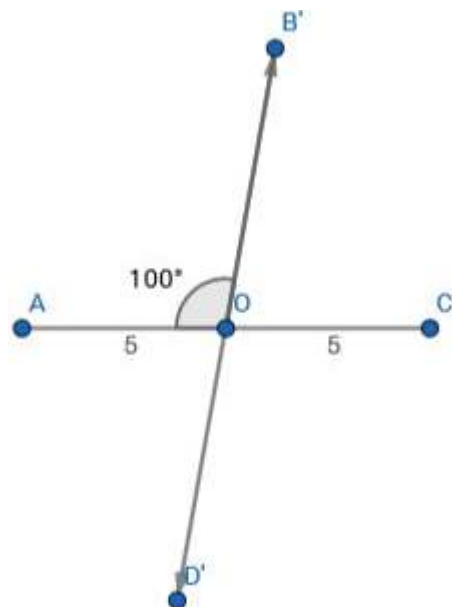
Steps of construction

Step 1 : Draw line segment AC of 10cm

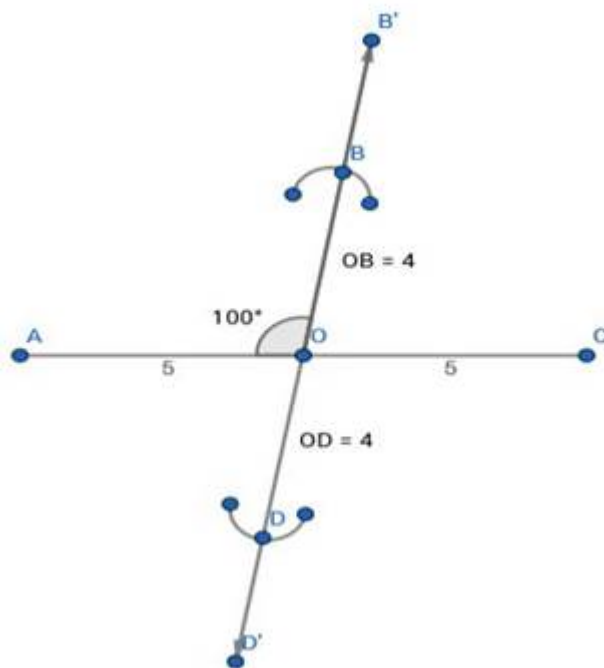
Step 2 : Mark O as midpoint of AC



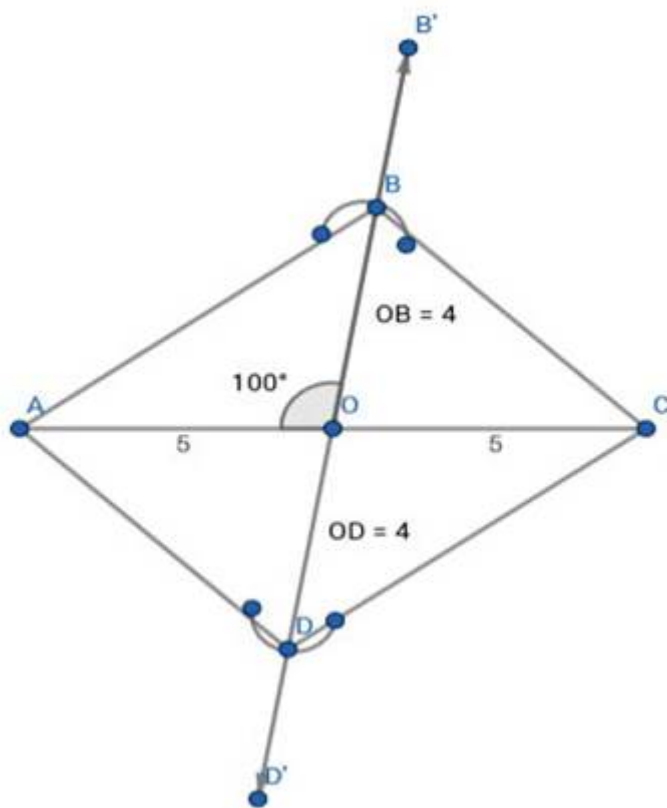
Step 3 : Draw line B'D' through O which makes $\angle AOB' = 120^\circ$



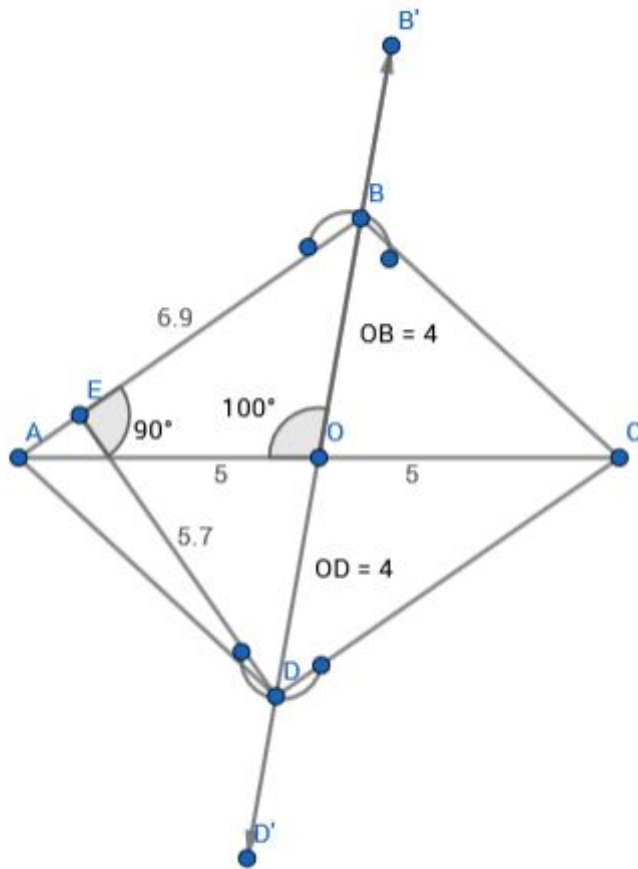
Step 4 : Make Arcs of 4cm from O on both sides of B'D'



Step 5 : Join AB;BC;CD;DA



Step 6 : Draw a perpendicular on AB from point D and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times DE$$

$$= 5.7\text{cm} \times 6.9\text{cm}$$

$$= 39.33\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 39.33cm^2

6. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

AC = 8 cm, BD = 6 cm and $\angle COD = 90^\circ$ where $\overline{AC}$ and $\overline{BD}$ intersect at 'O'.

Answer

Given. ABCD is a parallelogram.

AC = 8 cm, BD = 6 cm

$\angle COD = 90^\circ$

Formula used. Area of parallelogram = base $\times$ height

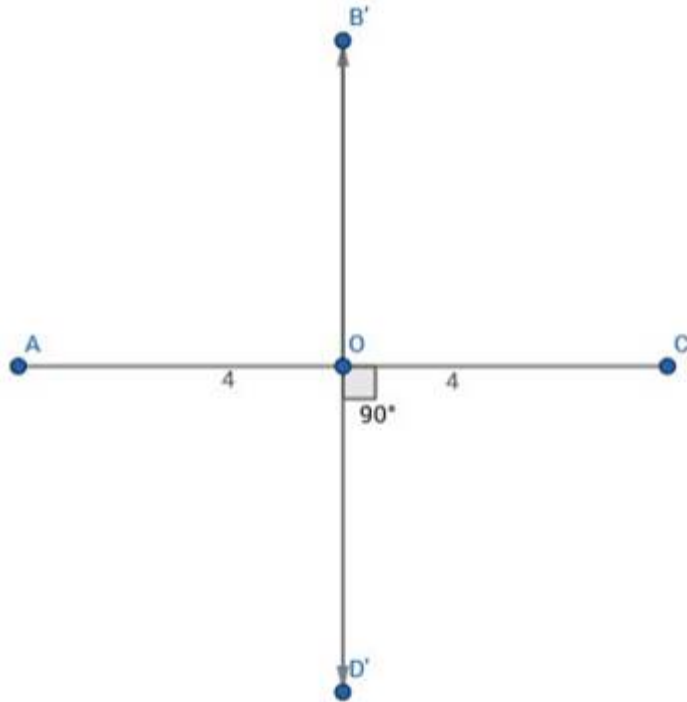
Steps of construction

Step 1 : Draw line segment AC of 8cm

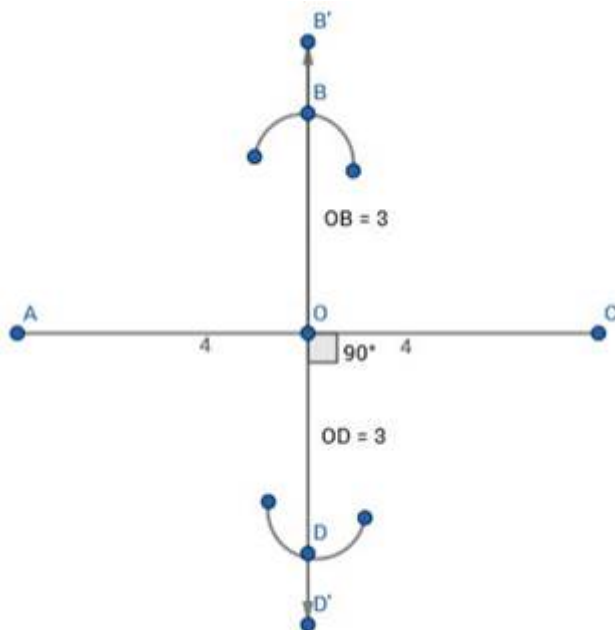
Step 2 : Mark O as midpoint of AC



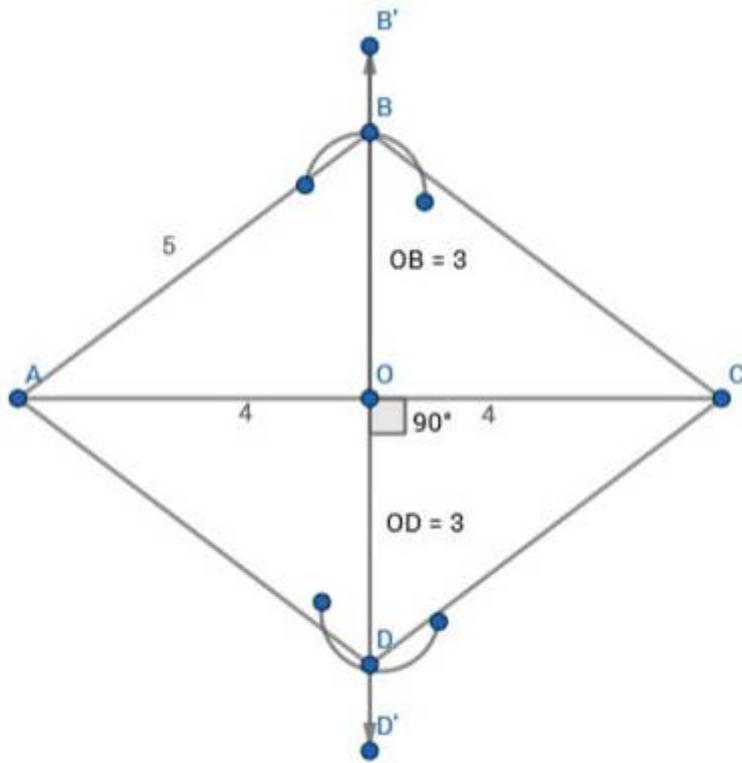
Step 3 : Draw line B'D' through O which makes $\angle COD' = 120^\circ$



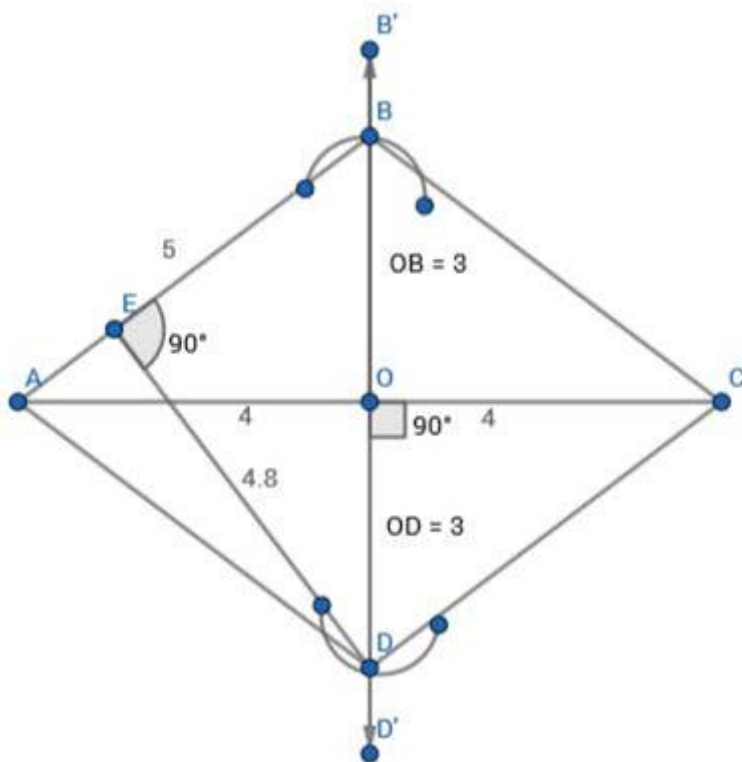
Step 4 : Make Arcs of 3cm form O on both sides of B'D'



Step 5 : Join AB;BC;CD;DA



Step 6 : Draw a perpendicular on AB from point D and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times DE$$

$$= 5\text{cm} \times 4.8\text{cm}$$

$$= 24\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area

is 24cm^2

7. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

$AB = 8\text{ cm}$, $AC = 10\text{ cm}$ and $\angle ABC = 100^\circ$.

Answer

Given. ABCD is a parallelogram.

$AB = CD$; $BC = AD$

$AB = 8\text{ cm}$, $AC = 10\text{ cm}$

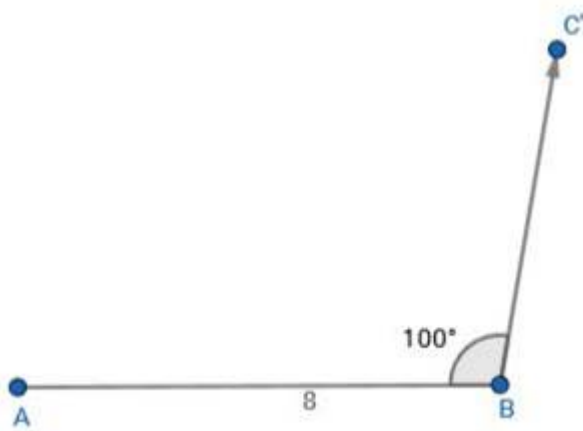
$\angle ABC = 100^\circ$

Formula used. Area of parallelogram = base $\times$ height

Steps of Construction

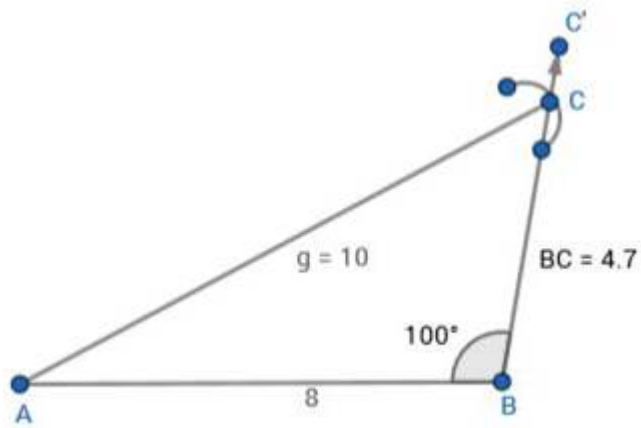
Step 1 : Draw AB of length 8cm

Step 2 : Make an angle of 100° on point B and extend the ray BC'

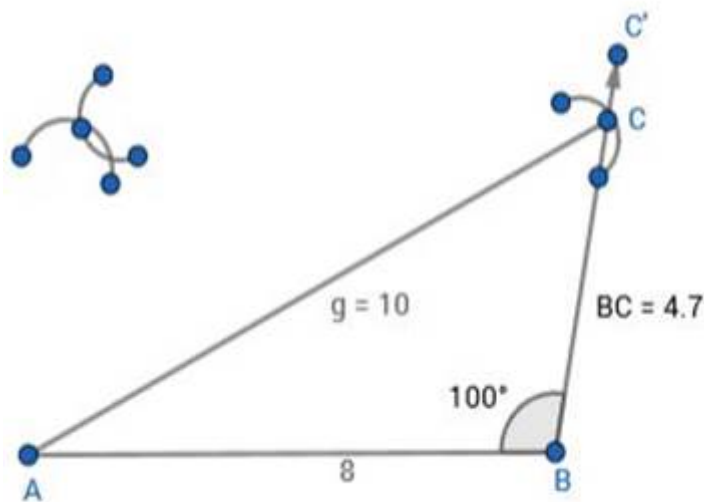


Step 3 : Make an arc of 10cm from point A on ray BC' and note the

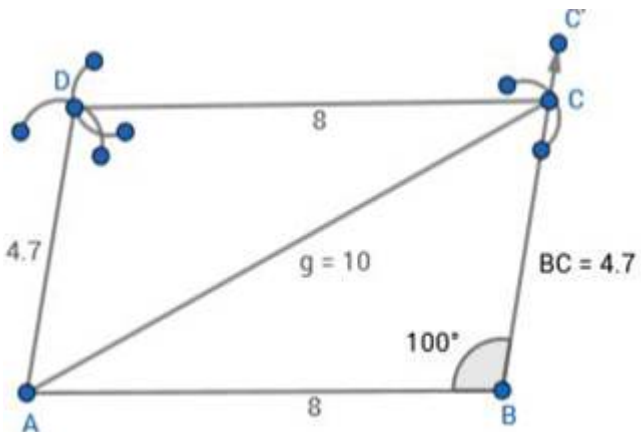
Length of BC



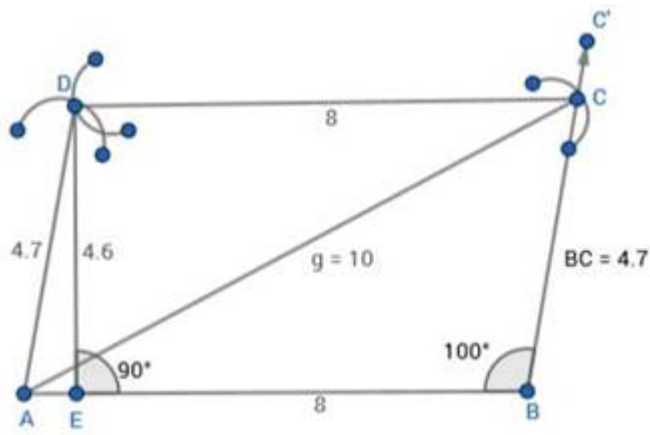
Step 4 : Make an arc of 8cm from point C and another arc of same length of BC from point A



Step 5 : Mark the intersection point as D and join AD and CD



Step 6 : Draw a perpendicular on AB from point D and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times DE$$

$$= 8\text{cm} \times 4.6\text{cm}$$

$$= 36.8\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 36.8cm^2

8. Question

Draw parallelogram ABCD with the following measurements and calculate its area.

$AB = 5.5\text{ cm}$, $\angle DAB = 50^\circ$ and $BD = 7\text{ cm}$.

Answer

Given. ABCD is a parallelogram.

$AB = CD$; $BC = AD$, $AB = 5.5\text{ cm}$, $BD = 7\text{ cm}$

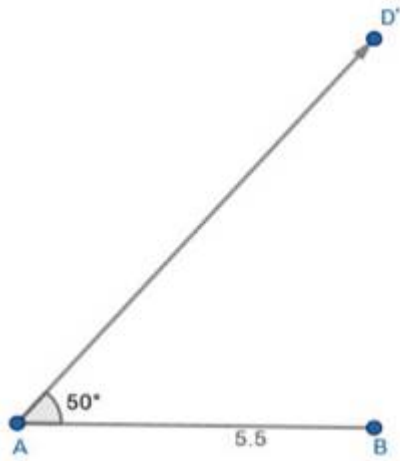
$\angle DAB = 50^\circ$

Formula used. Area of parallelogram = base $\times$ height

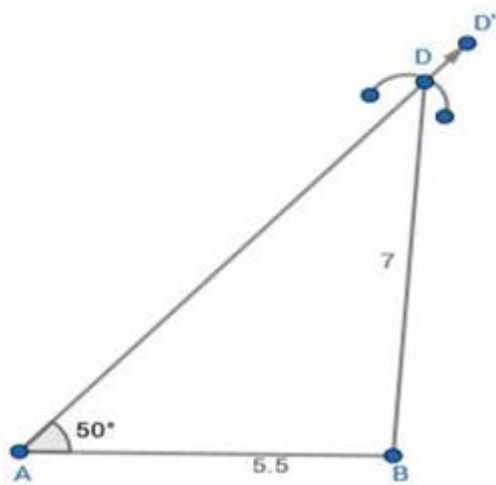
Steps of Construction

Step 1 : Draw AB of length 5.5cm

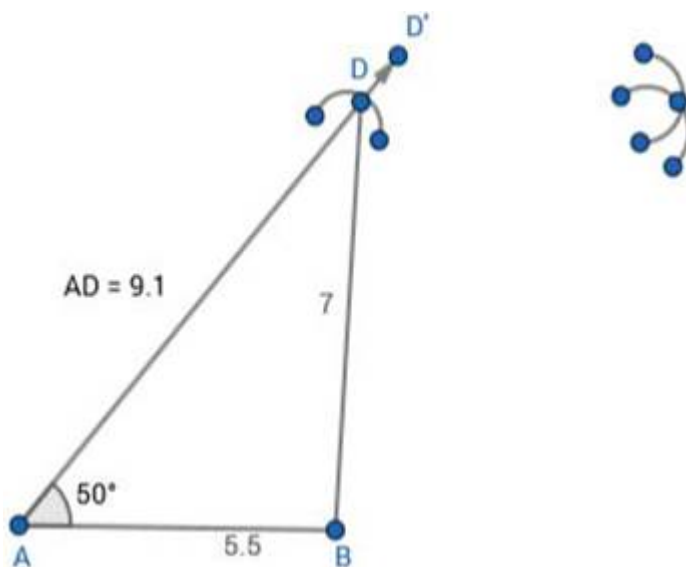
Step 2 : Make an angle of 50° on point A and extend the ray AD'



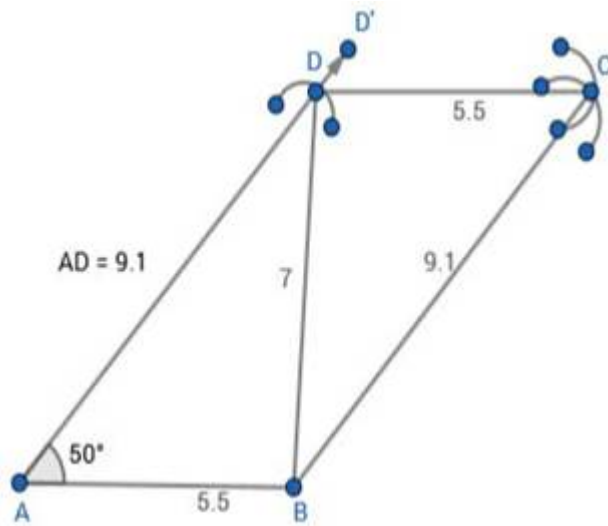
Step 3 : Make an arc of 7cm from point B on ray AD' and also note Down the length of AD



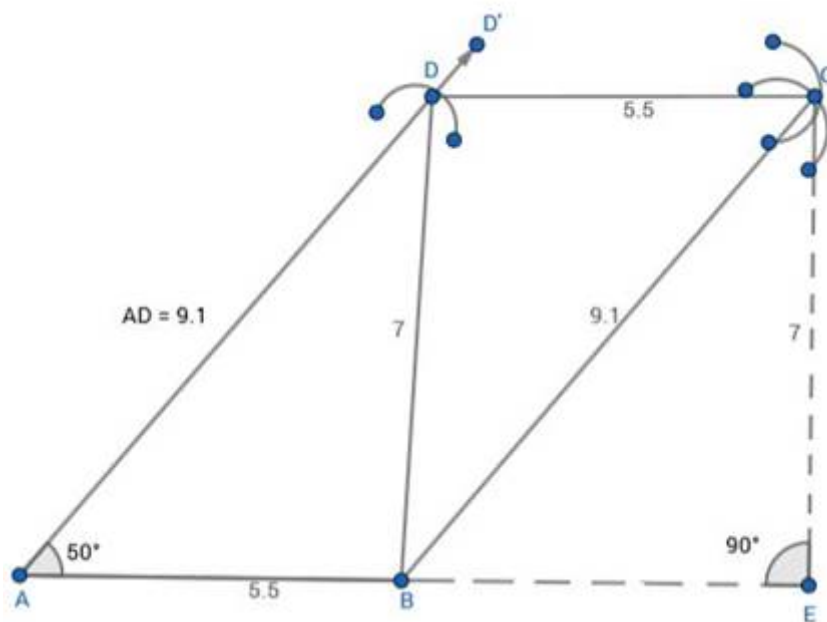
Step 4 : Make an arc of 5.5cm from point D and another arc of same length of AD from point B



Step 5 : Mark the intersection point as C and join AC and CD



Step 6 : Draw a perpendicular on AB from point C and name the intersection point as E



Area of parallelogram = base $\times$ height

$$= AB \times CE$$

$$= 5.5\text{cm} \times 7\text{cm}$$

$$= 38.5\text{cm}^2$$

Conclusion. Hence; parallelogram ABCD is constructed and its area is 38.5cm^2