CHAPTER: Practical Geometry

Grade: **8**
Board: **CBSE**
Book: **NCERT**

1.

Chapter Summary and Placement

<Read through the following to understand how this chapter is connected with the previous and next grades and also the important concepts covered in it.>

1. The chapter is based on concepts related with constructing of line segments, angles, bisectors of angles in previous grades
2. It connects to the chapters related to construction in future grades

2.

LEARNING OUTCOMES

<On completion of the chapter, students will be able to:>

1. Construct a quadrilateral when four sides and one diagonal are given.
2. Construct a quadrilateral when two diagonals and three sides are given.
3. Construct a quadrilateral when two adjacent sides and three angles are given.
4. Construct a quadrilateral when three sides and two included angles are given.
5. Construct a quadrilateral when other special properties are known.

4. TEACHING PLAN

Follow this section for getting ideas on teaching the content covered in the chapter. The subtopic given in the first column with the matching learning outcome can be explained using instructions and resources listed subsequently

Subtopic and Learning Objective #1

Subtopic: Quadrilateral construction
LO:
Constructs a quadrilateral when four sides and one diagonal are given.
1.To make the student construct a quadrilateral with the given measurements

Teacher Activity

Introduce method of construction step by step

Check for understanding:

a) Construct the given quadrilateral[measures can be of teachers choice-Four sides and one diagonal must be given]

Resources Suggested

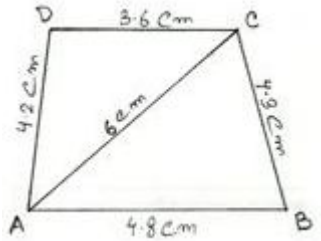
Blackboard, pen, geometry box and paper
Resource 1 for reference

Resource 1

Construction of a quadrilateral when four sides and one diagonal are given.

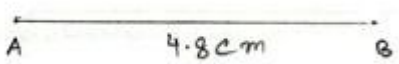
Construct a quadrilateral ABCD in which AB= 4.8 cm, BC=4.3 cm, CD= 3.6 cm, AD= 4.2 cm and diagonal AC= 6 cm

Rough figure



Steps of Construction:

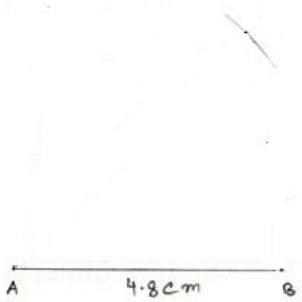
Step 1: Draw AB = 4.8 cm

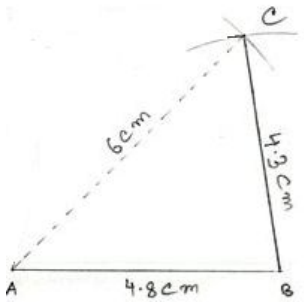


Resource 1

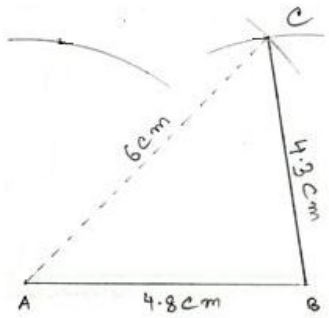
Step 2: With A as center and 6cm as radius, draw an arc

Step 3: With B as center and 4.3cm as radius, draw another arc to cut above arc at C. Join BC



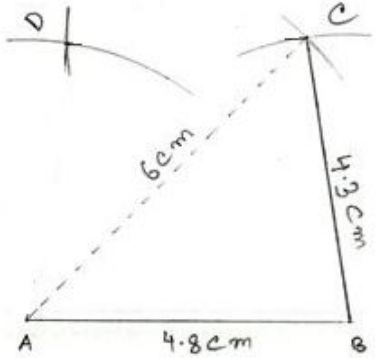


Step 4: With A as center and 4.2cm as radius, draw an arc

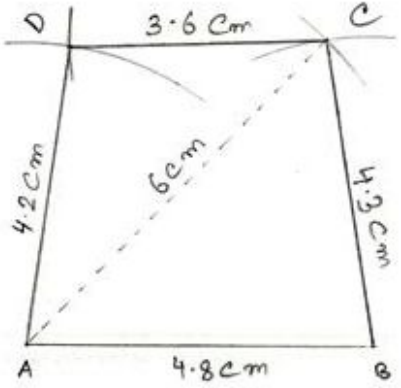


Resource 1

Step 5: With C as center and 3.6 cm as radius, draw another arc to cut above arc at D.



Step 6: Join AD and CD, ABCD is the required quadrilateral



Subtopic and Learning Objective #2

Subtopic: Quadrilateral construction
LO:
Constructs a quadrilateral when two diagonals and three sides are given.
1.To make the students construct a quadrilateral with the given measurements

Teacher Activity

Introduce method of construction step by step

Check for understanding:

b) Construct the given quadrilateral[measures can be of teachers choice-Two diagonals and three sides must be given]

Resources Suggested

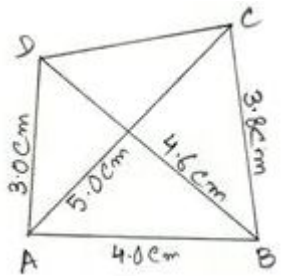
Blackboard, pen, paper, teachers geometry instrument box.
Resource 2 can be used for explanation step by step

Resource 2

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

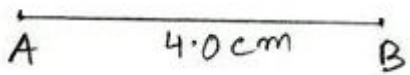
Construct a quadrilateral ABCD in which AB= 4 cm, BC=3.8 cm, AD= 3 cm and diagonals AC= 5 cm , BD= 4.6 cm

Rough Figure



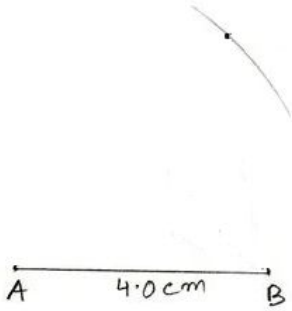
Steps of Construction:

Step 1: Draw AB = 4 cm

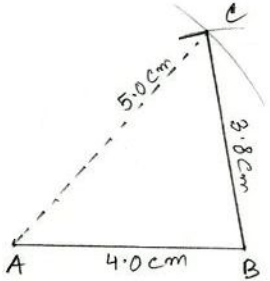


Resource 2

Step 2: With A as center and 5 cm as radius, draw an arc

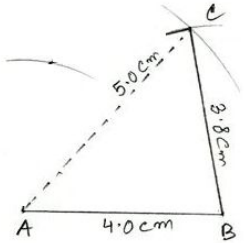


Step 3: With B as center and 3. 8 cm as radius, draw another arc to cut above arc at C. Join BC and AC.

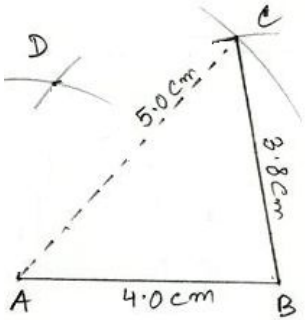


Resource 2

Step 4: With A as center and 3 cm as radius, draw an arc

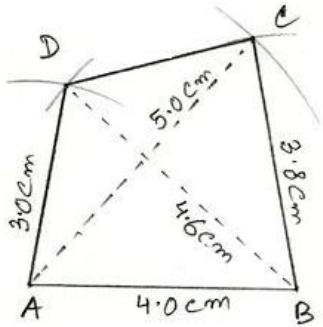


Step 5: With B as center and 4.6 cm as radius, draw another arc to cut above arc at D.



Resource 2

Step 6: Join AD, CD and BD, ABCD is the required quadrilateral



Subtopic and Learning Objective #3

Subtopic: Quadrilateral construction
LO:
Constructs a quadrilateral when two adjacent sides and three angles are given.
1.To make the students construct a quadrilateral with the given measurements

Teacher Activity

Introduce method of construction step by step

Check for understanding:

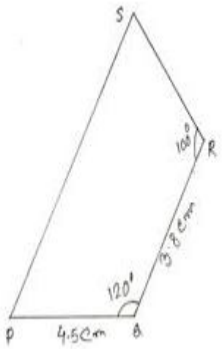
a) Construct the given quadrilateral[measures can be of teachers choice-Two adjacent sides and three angles must be given]

Resources Suggested

Blackboard, pen, paper, teachers geometry instrument box.
Resource 3 can be used for explanation step by step

Resource 3

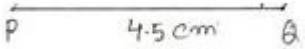
Construction of a quadrilateral when two adjacent sides and three angles are given.



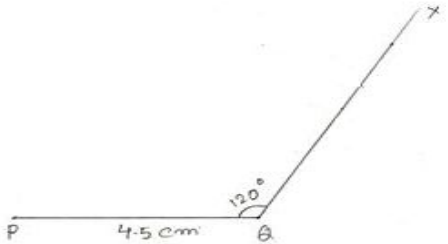
Construct a quadrilateral PQRS in which PQ = 4.5 cm, $\angle PQR = 120^0$, QR = 3.8 cm, $\angle QRS = 100^0$, $\angle QPS = 60^0$.

Steps of Construction:

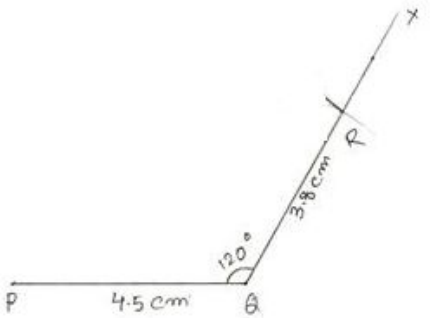
Step 1: Draw PQ = 4.5 cm



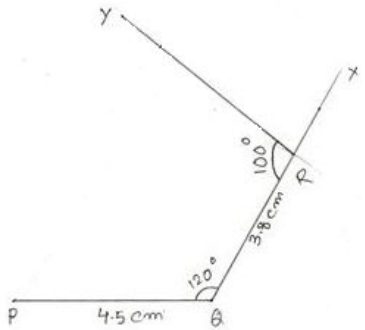
Step 2: With Q as center draw a ray QX which makes an angle of 120 degrees with PQ



Resource 3

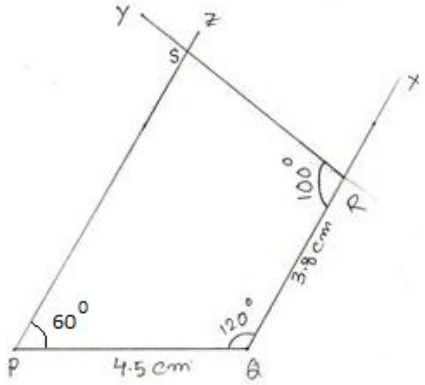


Step 4: With R as center draw a ray RY which makes an angle of 100 degrees with QR



Step 5: With P as center draw a ray PZ which makes an angle of 60 degrees with PQ and cuts the above ray at S. PQRS is the required quadrilateral.

Resource 3



Subtopic and Learning Objective #4

Subtopic: Quadrilateral construction
LO:
Constructs a quadrilateral when three sides and two included angles are given.
1.To make the student construct a quadrilateral with the given measurements

Teacher Activity

Check for understanding:

a) Construct the given quadrilateral[measures can be of teachers choice - Three sides and two included angles must be given]

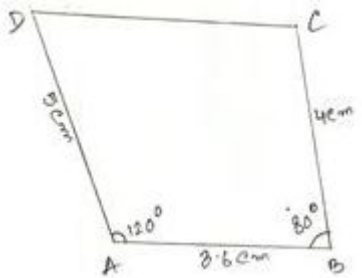
Resources Suggested

Blackboard, pen, paper, teachers geometry instrument box.
Resource 4 can be used for explanation step by step

Resource 4

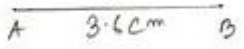
Construction of a quadrilateral when three sides and two included angles are given.

Construct a quadrilateral ABCD in which AB = 3.6 cm, ∠ABC = 80 degrees, BC = 4 cm, ∠BAD= 120 degrees and AD = 5 cm



Steps of construction:

Step 1: Draw AB= 8.6 cm

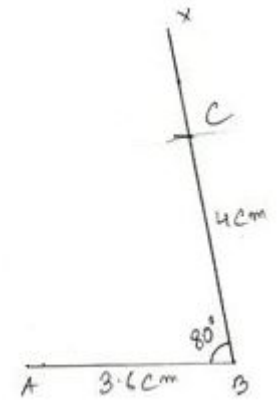


Step 2: With B as center draw a ray BX which makes an angle 80 degrees with AB



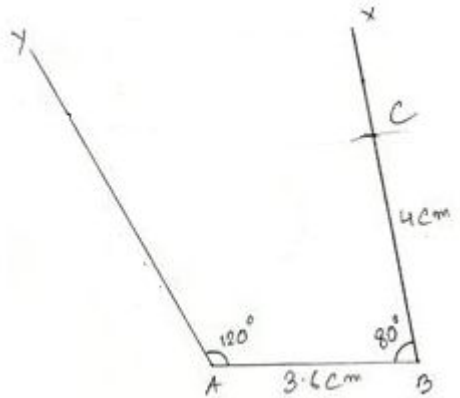
Resource 4

Step 3: WIth B as center and with radius 4 cm draw an arc which cuts previous ray at c

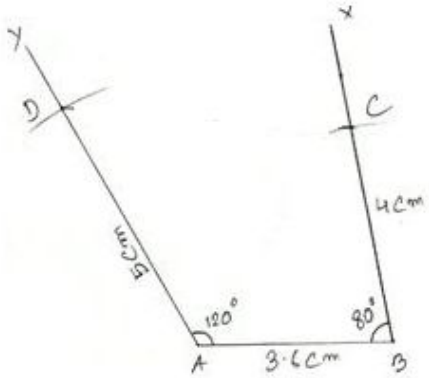


Step 4: With A as center draw a ray AY which makes an angle 120 degrees with AB

Resource 4

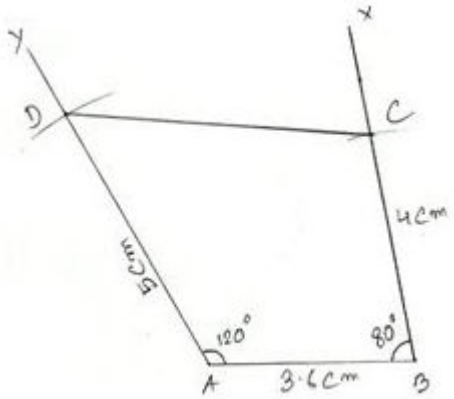


Step 5: With A as center and with radius 5m draw an arc which cuts the previous ray at D



Resource 4

Step 6: Join CD. ABCD is the required quadrilateral



Subtopic and Learning Objective #5

Subtopic: Quadrilateral construction
LO:
Constructs a quadrilateral when other special properties are known.
1.To make the students construct a quadrilateral with the given measurements

Teacher Activity

Introduce method of construction of square, parallelogram and rhombus by using their properties step by step

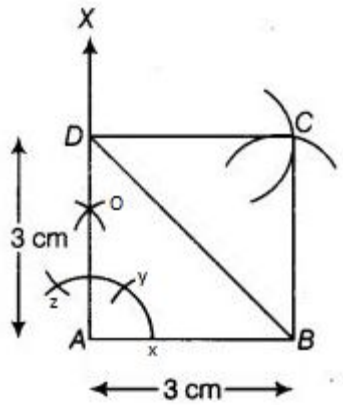
Check for understanding:

a) Construct the given quadrilateral[measures can be of teachers choice - Three sides and two included angles must be given]

Resources Suggested

Blackboard, pen, paper, teachers geometry instrument box.
Resource 5 can be used for explanation step by step

Resource 5



Construction of a quadrilateral when other special properties are known.

Construct a square of side 3 cm

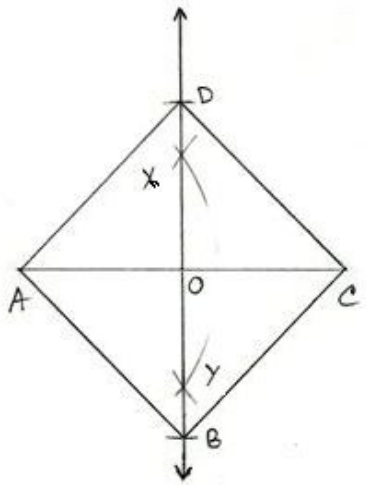
Steps of construction:

1. Draw AB = 3cm
2. With A as center and with some radius draw an arc which cuts AB at x
3. With x as center and with same radius draw an arc which cuts previous arc at y
4. With y as center and with same radius draw an arc which cuts arc of step 2 at Z
5. With Y and Z as centers and with radius whose measure is half of yz draw two arcs to cut each other at o
6. Draw a ray AX which passes through o and it makes 90 degrees angle with AB
7. With A as center and with radius 3 cm draw an arc which cuts ray AX at D
8. With D as center and with radius 3 cm draw an arc
9. With B as center and with radius 3 cm draw another arc to cut the previous arc at C
10. BC and CD are joined, ABCD is the required square

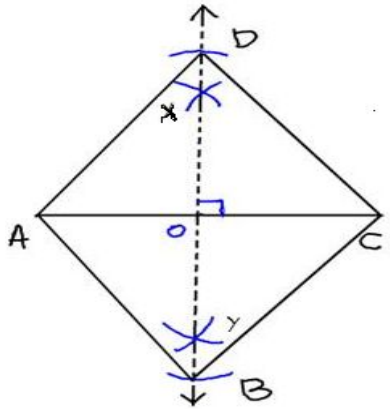
Resource 5

Construct a square whose diagonal is 4.8 cm

1. Draw a line segment AC = 4.8 cm length
2. With A and C as centers and with radius half the length of AC four arcs were drawn to cut each other at X and Y
3. Now join XY which is perpendicular bisector of AC, intersects AC at point O.
4. With O as center and radius equal to half of the length of the diagonal (2.4 cm) draw two arcs on either side of AC on the perpendicular bisector.
5. Mark the point of intersections of the arcs and perpendicular bisectors as B and D
6. Join points A, B; points B, C; points C, D; points A, D.



Resource 5



Construct a rhombus whose diagonals are 5.2 cm and 6.4 cm

1. Draw a line segment AC = 5.2 cm
2. With A and C as centers and with radius half the length of AC four arcs were drawn to cut each other at X and Y
3. Now join XY which is perpendicular bisector of AC, intersects AC at point O
4. With O as center and radius equal to half of BD(3.2 cm) draw arcs on either side of AC on the perpendicular bisector. Let them intersect at B and D as shown.
5. Join points A, B; points B, C; points C, D and points A, D
6. ABCD is the required rhombus

5. WORKSHEETS

Print or copy the worksheet questions on the blackboard and ask the students to attempt them. They can be given as homework or a class test as well.

Worksheet 1

Use it like: test after the chapter is complete, homework

Answer the following:

1. Construct a parallelogram DIPU with DI = 5 cm, IP = 6 cm, ∠I = 75°
2. Construct a quadrilateral PIKU with PI = 6 cm, IK = 4.5 cm, ∠P = 60° , ∠I = 105° and ∠K = 105°
3. Construct a quadrilateral ABCD with AB = 3.5 cm, BC = 3 cm, CD = 4 cm, ∠B = 75° , ∠C = 120°
4. Construct a parallelogram HOME with HO=6cm, HE=4cm and OE=3cm
5. Construct a quadrilateral BEAR in which BE=6cm, EA=7 cm, RB=RE=5 cm and BA=9 cm.

Worksheet 2

Use it like: test after the chapter is complete, homework

Answer the following:

1. Construct a rhombus LMNO with LN = 7 cm, MO = 6 cm
2. Construct a rectangle DEFG with DE = 8 cm, EF = 6 cm
3. Construct a square of side 4cm
4. Draw a circle of radius 3 cm and draw it's diameter and label it as AC. Construct its perpendicular bisector and let it intersect the circle at B and D. What type of quadrilateral is ABCD? Justify your answer.

6. EXTRA RESOURCES

Carry out the following suggested activities/ tasks if you have the time and resources to do them

1. https://www.youtube.com/watch?v=K-p3psoe9PY - Construction when four sides and one angle are given
2. https://www.youtube.com/watch?v=cwhFdXL2Wb4 - Construction when three sides and two diagonals are given
3. https://www.youtube.com/watch?v=0R76vZlcobY - Construction of quadrilaterals when three sides and two included angles are given
4. https://www.youtube.com/watch?v=jxGGM60cBlc - Construct a Quadrilateral when its two adjacent sides and three angles are given
5. https://www.youtube.com/watch?v=ljrL2Iac9EU - Construction of square when one side is given
6. https://www.youtube.com/watch?v=2xHEfFcVg_E - Construction of square when one diagonal is given
7. https://www.youtube.com/watch?v=8iVp6BRrF70 - Construction of rhombus when two diagonals are given