ICSE Class 8 Maths Selina Solutions Chapter 18: In ICSE Class 8 Maths Selina Solutions Chapter 18, "Constructions," students learn important techniques for constructing geometric figures using basic tools like a ruler, compass, and protractor.

This chapter focuses on practical skills such as bisecting angles, constructing perpendicular and parallel lines, drawing triangles based on given measurements, and constructing various types of quadrilaterals.

Through step-by-step instructions and clear illustrations, students gain hands-on experience in creating accurate geometric shapes, reinforcing their understanding of geometric concepts and preparing them for more advanced topics in mathematics.

This chapter not only builds technical proficiency but also cultivates problem-solving abilities by applying precise construction methods to solve practical geometry problems.

ICSE Class 8 Maths Selina Solutions Chapter 18 Constructions Overview

The solutions for ICSE Class 8 Maths Selina Solutions Chapter 18, "Constructions," are created by subject experts of Physics Wallah.

The solutions give clear, step-by-step instructions on how to do tasks like dividing angles in half, drawing lines that are perpendicular or parallel, and making triangles and quadrilaterals based on specific measurements.

By using these solutions, students can practice and improve their skills in geometry, understand how to solve construction problems, and feel more prepared for their exams.

Constructions

In the context of geometry, "Constructions" refer to the methodical creation of geometric figures using basic tools such as a ruler, compass, and protractor. These tools allow mathematicians and students to accurately reproduce shapes and angles based on specific instructions or conditions. Here is a detailed overview of some common constructions:

Bisecting a Line Segment:

- To find the midpoint of a line segment, use a compass to draw arcs from both endpoints. Where the arcs intersect marks the midpoint.

Bisecting an Angle:

- To divide an angle into two equal parts, use a compass to draw arcs from each side of the angle. Where the arcs intersect inside the angle marks the bisector.

Constructing Perpendicular Lines:

- To draw a line perpendicular to another at a specific point, use a compass to draw arcs of equal radius from that point on both sides of the line. Connect the intersections of the arcs to create the perpendicular line.

Constructing Parallel Lines:

- To create a line parallel to another through a specific point, use a compass to measure equal distances on the original line from the point. Draw arcs with these distances and connect corresponding points on the arcs.

Constructing Triangles:

- Given specific measurements (such as side lengths and angles), use compass and ruler constructions to accurately draw triangles of different types (equilateral, isosceles, scalene).

Constructing Quadrilaterals:

- Depending on the given conditions (like side lengths and angles), use construction methods to draw quadrilaterals such as parallelograms, rectangles, squares, rhombuses, and trapeziums.

These constructions not only reinforce geometric principles but also enhance problem-solving skills by requiring students to apply precise techniques to achieve desired shapes and angles.

They are fundamental in geometry for understanding properties of figures, spatial reasoning, and practical applications in fields like architecture and engineering.

Mastering these constructions helps students develop a deeper understanding of geometry and prepares them for advanced mathematical concepts.

ICSE Class 8 Maths Selina Solutions Chapter 18 Constructions PDF

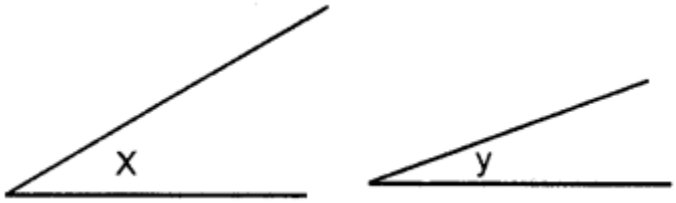
You can find the PDF link for ICSE Class 8 Maths Selina Solutions Chapter 18 "Constructions" below. This PDF provides detailed solutions and explanations on how to perform geometric constructions using basic tools like rulers, compasses, and protractors.

It is a valuable resource for students looking to practice and master construction techniques in geometry, helping them to understand and apply these skills effectively.

ICSE Class 8 Maths Selina Solutions Chapter 18 Constructions

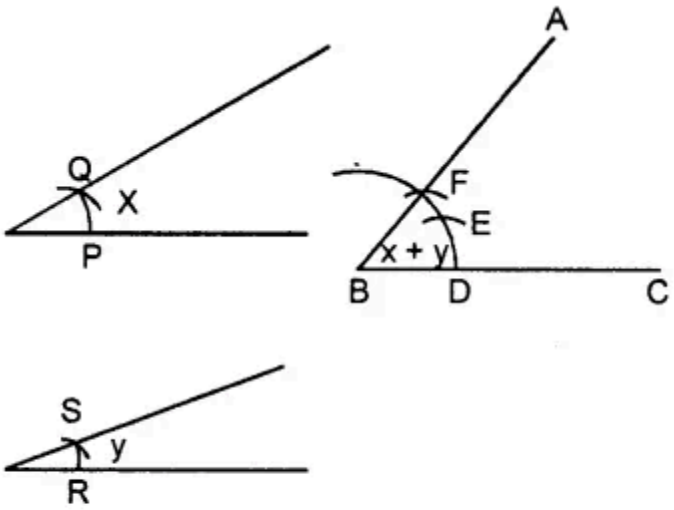
Question 1.

Given below are the angles x and y.



Without measuring these angles, construct :
(i) ∠ABC = x + y
(ii) ∠ABC = 2x + y
(iii) ∠ABC = x + 2y

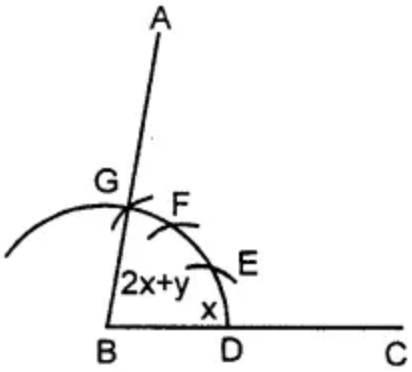
Solution:



(i) Steps of Construction :

1. Draw a line segment BC of any suitable length.
2. With B as centre, draw an arc of any suitable radius. With the same radius, draw arcs with the vertices of given angles as centres.
   Let these arcs cut arms of the arc x at points P and Q
   and arms of angle y at points R and S.
3. From the arc, with centre B, cut DE = PQ arc of x and EF = RS arc of y
4. Join BF and produce upto point A.
   Thus $\angle ABC = x + y$

(ii) Steps of Construction :



Proceed in exactly the same way as in part(i)

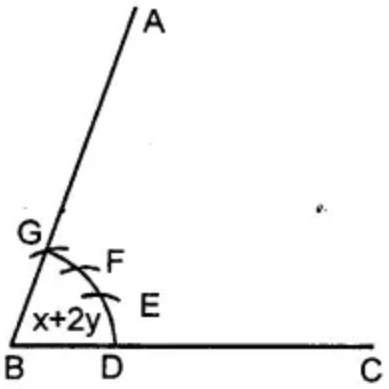
takes DE = PQ = arc of x.

EF = PQ = arc of x and FG = RS = arc of y.

Join BG and produce it upto A.

Thus ∠ABC = x + x+ y = 2x + y

(iii) Steps of Construction :



Proceed in exactly the same way as in (ii)

taking DE = PQ = arc of x. and EF = RS = arc of y and FG = RS = arc of y.

4. Join BF and produce upto point A.

Thus ∠ABC = x + y + y = x + 2y

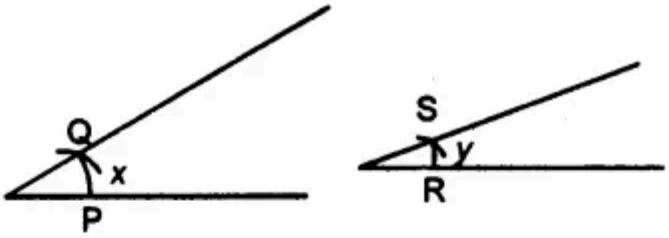
Question 2.

Given below are the angles x, y and z.
Without measuring these angles construct :
(i) ∠ABC = x + y + z

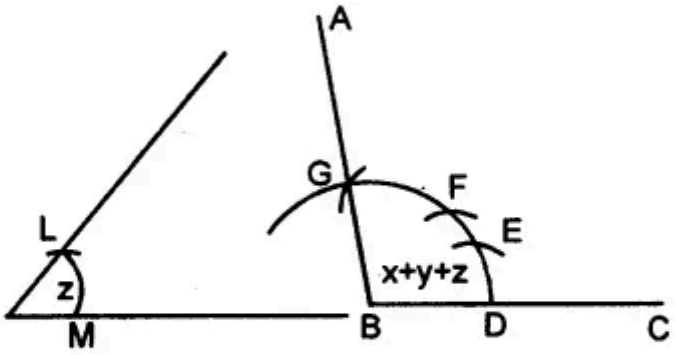
(ii) ∠ABC = 2x + y + z
(iii) ∠ABC = x + 2y + z

Solution:

(i) Steps of Construction :



1. Draw line segment BC of any suitable length.



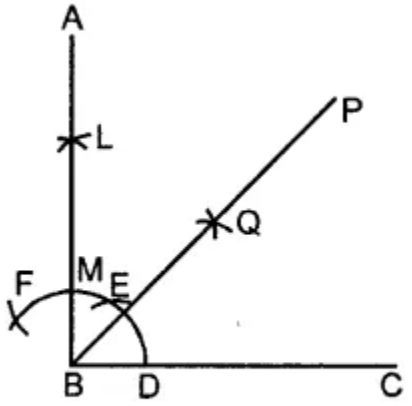
2. With B as centre, draw an arc of any suitable radius. With the same radius, draw arcs with the vertices of given angles as centres.
   Let these arcs cut arms of the anlge x at the points P and Q
   and arms of the angle y at points R and S and
   arms of the angle z at the points L and M.
3. From the arc, with centre B, cut
   DE = PQ = arc of x, EF = RS = arc of y and FG = LM = arc of z.
4. Join BG and produce it upto A.
   Then ∠ABC = x + y + z

Question 3.

Construct angle ABC = 90°. Draw BP, the bisector of angle ABC. State the measure of angle PBC.

Solution:

1. Draw ∠ABC = 90° (as in Ques. 4)



2. Draw bisector of ∠ABC

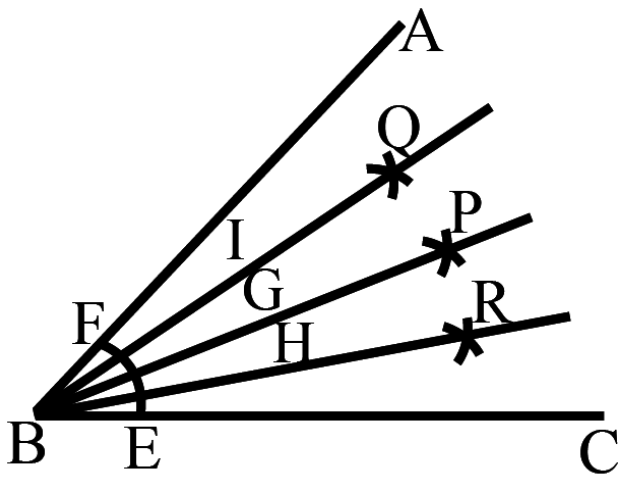
   Then ∠PBC = $\frac{1}{2}$ (90°) = 45°

Question 4.

Draw angle ABC of any suitable measure.
(i) Draw BP, the bisector of angle ABC.
(ii) Draw BR, the bisector of angle PBC and draw BQ, the bisector of angle ABP.
(iii) Are the angles ABQ, QBP, PBR and RBC equal?
(iv) Are the angles ABR and QBC equal ?

Solution:

Steps of Construction :



1. Construct any angle ABC

2. With B as centre, draw an arc EF meeting BC at E and AB at F.

3. With E, F as centres draw two arc of equal radii meeting each other at the point P.

4. Join BP. Then BP is the bisector of ∠ABC

∴ ∠ABP=∠PBC=12∠ABC

5. Similarly draw BR, the bisector of ∠PBC and draw BQ as the bisector of ∠ABP

[With the same method as in steps 2, 3]

6. Then ∠ABQ=∠QBP=∠PBR=∠RBC

7. ∠ABR=34∠ABC and ∠QBC=34∠ABC

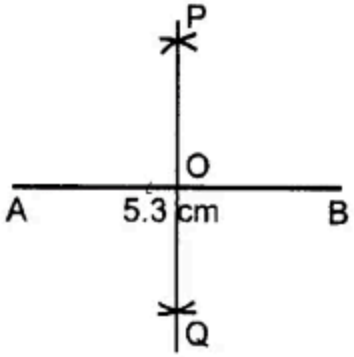
∴∠ABR=∠QBC.

Question 5.

Draw a line segment AB of length 5.3 cm. Using two different methods bisect AB.

Solution:

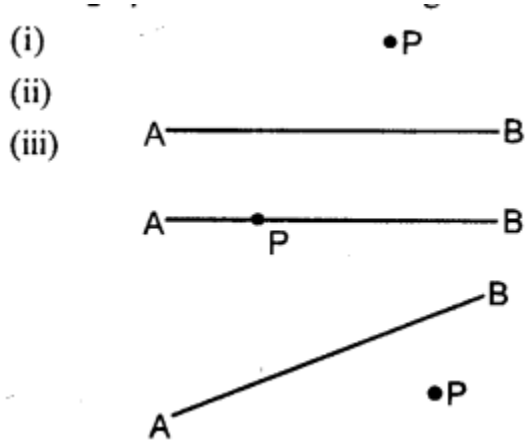
Steps of Construction :



1. Draw a line segment AB = 5.3 cm
2. With A as centre and radius equal to more than half of AB, draw arcs on both sides of AB.
3. With B as centre and with the same radius as taken in step 2, draw arcs on both the sides of AB.
4. Let the arcs intersect each other at points P and Q.
5. Join P and Q.
6. The line PQ cuts the given line segment AB at the point O. Thus, PQ is a bisector of AB such that
   $OA = OB = \frac{1}{2} AB$

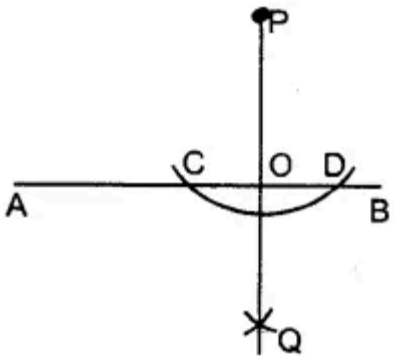
Question 6.

In each of the following, draw perpendicular through point P to the line segment AB :



Solution:

(i) Steps of Construction :



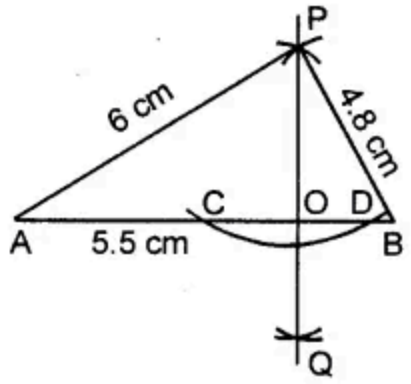
1. With P as centre, draw an arc of a suitable radius which cuts AB at points C and D.
2. With C and D as centres, draw arcs of equal radii and let these arcs intersect each other at the point Q.
   [The radius of these arcs must be more than half of CD and both the arcs must be drawn on the other side]
3. Join P and Q
4. Let PQ cut AB at the point O.
   Thus, OP is the required perpendicular clearly,
   $\angle AOP = \angle BOP = 90°$

Question 7.

Draw a line segment AB = 5.5 cm. Mark a point P, such that PA = 6 cm and PB = 4.8 cm. From the point P, draw a perpendicular to AB.

Solution:

Step of Construction :



1. Draw a line segment AB = 5.5 cm
2. With A as centre and radius = 6 cm, draw an arc.
3. With B as centre and radius = 4.8 cm draw another arc.
4. Let these arcs meet each other at the point P.
   PA = 6 cm, PB = 4.8
5. With P as centre and some suitable radius
   draw an arc meeting AB at the points C and D.
6. With C as centre and radius more than half of CD, draw an arc.
7. With D as centre and same radius as in step 6, draw an arc.
8. Let these arcs meet each other at the point Q.
9. Join PQ.
10. The PQ meet AB at point O.
    Then PO ⊥ AB i.e; ∠AOP = 90° = ∠POB.

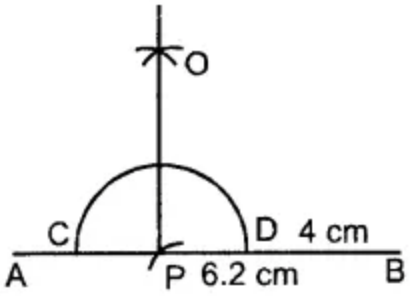
Question 8.

Draw a line segment AB = 6.2 cm. Mark a point P in AB such that BP = 4 cm. Through point P draw perpendicular to AB.

Solution:

Steps of Construction :

1. Draw a line segment AB = 6.2 cm
2. Cut off BP = 4 cm
3. With P as centre and some radius draw arc meeting AB at the points C, D.
4. With C, D as centres and equal radii [each is more than half of CD] draw two arcs, meeting each other at the point O.
5. Join OP. Then OP is perpendicular for AB.

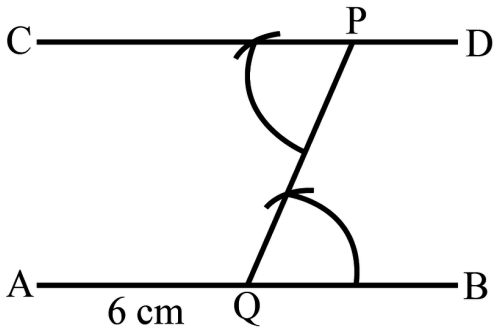


Question 9.

Draw a line AB = 6 cm. Mark a point P any where outside the line AB. Through the point P, construct a line parallel to AB.

Solution:

Steps of construction :



1. Draw a line AB = 6 cm

2. Take any point Q on the line AB and join it with the given point P.

3. At point P, construct ∠CPQ = ∠PQB

4. Produce CP upto any point D.

Thus, CPD is the required parallel line.

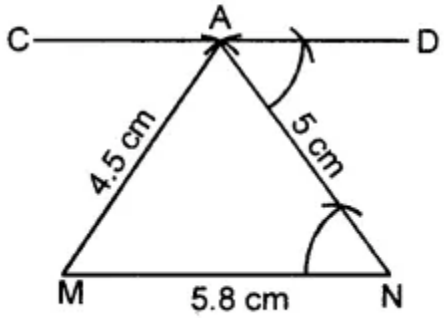
Question 10.

Draw a line MN = 5.8 cm. Locate a point A which is 4.5 cm from M and 5 cm from N. Through A draw a line parallel to line MN.

Solution:

Steps of construction :

1. Draw a line MN = 5.8 cm
2. With M as centre and radius = 4.5 cm, draw an arc.



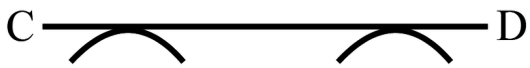
3. With N as centre draw another arc of radius 5 cm.
   These arcs intersect each other at A.
4. Join AM and AN.
5. At point A, draw ∠DAN = ∠ANM
6. Produce DA to any point C.
   Thus CAD is the required parallel line.

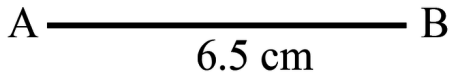
Question 11.

Draw a straight line AB = 6.5 cm. Draw another line which is parallel to AB at a distance of 2.8 cm from it.

Solution:

Steps of construction :





1. Draw a straight line AB = 6.5 cm

2. Taking point A as centre, draw an arc of radius 2.8 cm.

3. Taking B as centre, drawn another arc of radius 2.8 cm.

4. Draw a line CD which touches the two arcs drawn.

Thus CD is the required parallel line.

Question 12.

Construct an angle PQR = 80°. Draw a line parallel to PQ at a distance of 3 cm from it and another line parallel to QR at a distance of 3.5 cm from it. Mark the point of intersection of these parallel lines as A.

Solution:

Steps of construction:
1. Construct $\angle PQR$=80o
2. Taking P as center construct an arc of radius 2cm.
3. Again with Q as center, Construct another arc of radius 2cm. Then BM is a line which touches the two arcs. Then BM is a line parallel to PQ.
4. Taking Q as center, construct an arc of radius 3.5cm. Taking R as center construct another arc of radius 3.5. Construct a line HC which touches these two arcs. Let these two parallel lines intersect at A.

Question 13.

Draw an angle ABC = 60°. Draw the bisector of it. Also draw a line parallel to BC a distance of 2.5 cm from it.
Let this parallel line meet AB at point P and angle bisector at point Q. Measure the length of BP and PQ. Is BP = PQ?

Solution:

Steps of construction : 1. Draw ∠ ABC = 60 ◦

2. Draw BD, the bisector of ∠ ABC.

3. Taking B as centre, draw an arc of radius 2.5 cm.

4. Taking C as centre, draw another arc of radius 2.5 cm.

5. Draw a line MN which touches these two arcs drawn. Then MN is the required line parallel to BC.

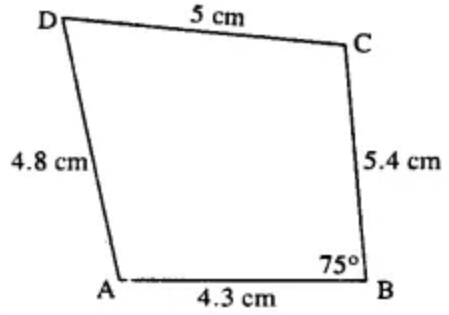
6. Let this line MN meets AB at P and bisector BD at Q. 7. Measure BP and PQ. By measurement we see BP = PQ.

Question 14.

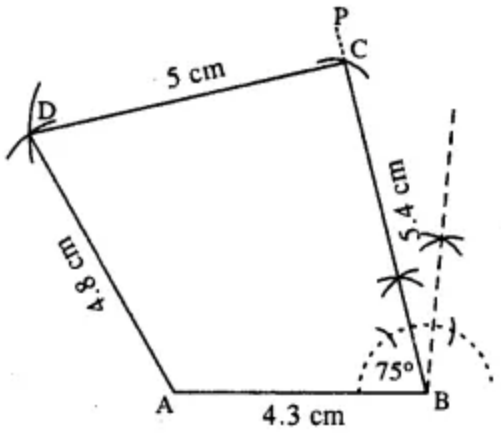
Construct a quadrilateral ABCD; if:
(i) AB = 4.3 cm, BC = 5.4, CD = 5 cm, DA = 4.8 cm and angle ABC = 75°.
(ii) AB = 6 cm, CD = 4.5 cm, BC = AD = 5 cm and ∠BCD = 60°.
(iii) AB = 8 cm, BC = 5.4 cm, AD = 6 cm, ∠A = 60° and ∠B = 75°.
(iv) AB = 5 cm, BC = 6.5 cm, CD =4.8 cm, ∠B = 75° and ∠C = 120°.
(v) AB = 6 cm = AC, BC = 4 cm, CD = 5 cm and AD = 4.5 cm.
(vi) AB = AD = 5cm, BD = 7 cm and BC = DC = 5.5 cm

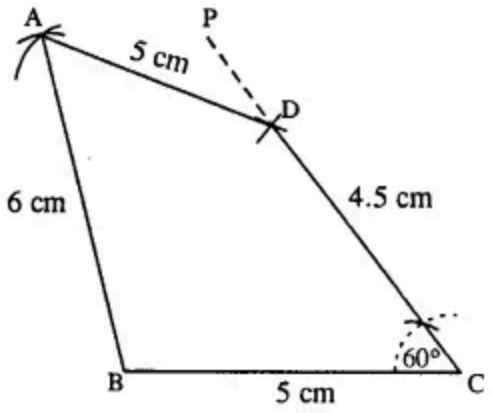
Solution:

(i) Rough figure is as follow :



Actual figure is constructed as follow :



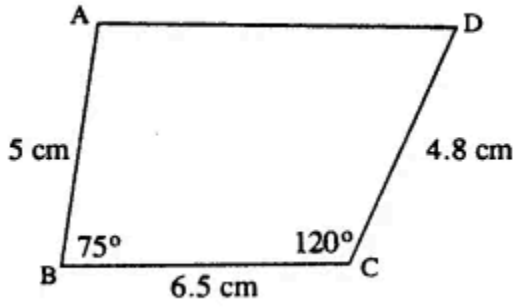


Steps :

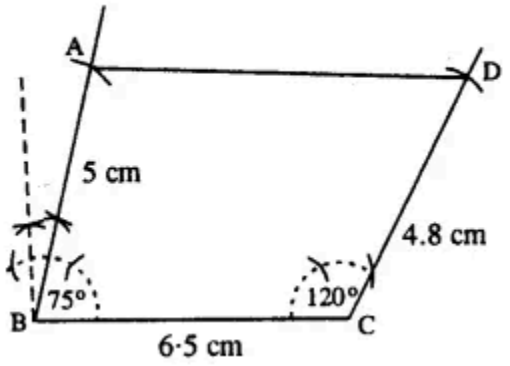
1. Draw BC = 5 cm.
2. Draw ∠PCB = 60° and cut CD = 4.5 cm.
3. From B and D, draw arcs of radii 6 cm and 5 cm respectively which intersect at A.
4. Join AB and AD.
   Thus ABCD is the required quadrilateral.

(iii) Rough figure is as follow :

(iv) Rough figure is as shown below.



Actual construction is as follow (using rough fig.)

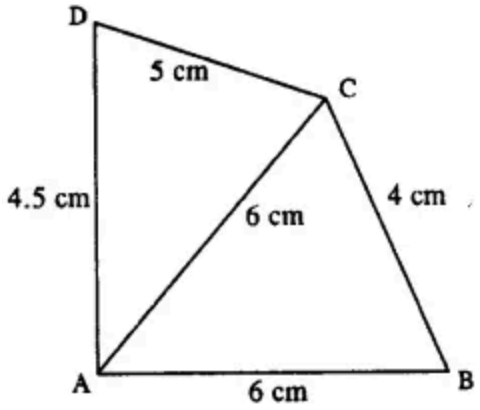


Steps :

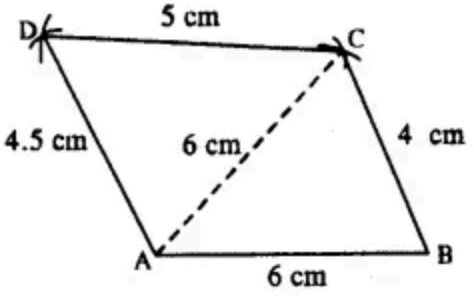
1. Draw BC = 6-5 cm.
2. Draw ∠B = 75° and cut BA = 5 cm.
3. Draw ∠C = 120° and cut CD = 4.8 cm.
4. Join AD.

   Thus ABCD is the required quadrilateral.

(v) Rough figure is as shown below.



Actual quadrilateral is constructed as follow with the help of above rough figure.



Steps :

1. Draw AB = 6 cm.
2. From A and B, draw arcs of radii 6 cm and 4 cm which cut at C.
3. From A and C, draw arcs of radii 4.5 cm and 5 cm respectively which intersect at D.
4. Join BC, CD and DA. Thus ABCD is the required quadrilateral.

Steps :

1. Draw AB = 5 cm.
2. From A & B draw arcs of radii 5 cm and 7cm which intersect at D.
3. From B & D draw arcs of radii 5.5 cm each which intersect at C.
4. Join AD, BD, DC and BC.
   Thus ABCD is the required quadrilateral.

Benefits of ICSE Class 8 Maths Selina Solutions Chapter 18 Constructions

- **Understanding Geometry**: By practicing constructions, students gain a deeper understanding of geometric principles such as angles, symmetry, and properties of shapes like triangles and quadrilaterals.
- **Problem-Solving Skills**: Constructing geometric figures requires logical thinking and problem-solving skills, helping students develop analytical abilities.
- **Visualizing Concepts**: It enhances students ability to visualize and manipulate geometric shapes, which is crucial for spatial reasoning and understanding complex geometric relationships.
- **Preparation for Advanced Topics**: Mastering constructions lays a strong foundation for more advanced topics in geometry and mathematics, preparing students for higher-level studies.
- **Exam Preparation**: The solutions provide step-by-step guidance on how to perform constructions, helping students prepare effectively for exams by practicing construction-based problems.