Chapter 08 Playing with Constructions

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Mindmap

- Introduction to Constructions
  • Drawing lines, shapes using ruler and compass
  • Importance of accuracy
- Tools Used
  • Ruler – for straight lines and measuring
  • Compass – for drawing circles/arcs
  • Pencil – for clear, light markings
  • Eraser – for corrections
- Drawing a Line Segment
  • Use ruler to mark two points
  • Join points with straight line
  • Example: Draw AB = 5 cm
- Constructing a Copy of a Line Segment
  • Use compass to measure length of given segment
  • Without changing compass width, draw same length elsewhere
- Constructing a Perpendicular
  • Perpendicular to a line through a point on it
  • Perpendicular to a line from a point outside it
  • Use compass and ruler
- Constructing an Angle
  • Use protractor to draw angles (e.g., 60°, 90°)
  • Basic angles: 30°, 45°, 60°, 90°
- Copying an Angle
  • Use compass to replicate angle measure
  • Steps: draw arc on original → same radius on new ray → adjust compass to chord length → draw intersecting arc
- Constructing Angle Bisector
  • Draw arcs from vertex → draw arcs from intersection points → join vertex to new intersection

Notes with Relevant Examples

1. Drawing a Line Segment of Given Length
   Example: Draw a line segment PQ of length 6 cm.
   Steps:
   - Place ruler on paper
   - Mark point P at 0 cm
   - Mark point Q at 6 cm
   - Join P and Q with a straight line
2. Copying a Line Segment
   Example: Copy line segment AB = 4 cm to another location.
   Steps:
   - Open compass to length AB
   - Draw a ray from point C

   - With same opening, mark point D on ray so CD = AB
3. Drawing a Perpendicular to a Line Through a Point on It
   Example: Draw perpendicular to line XY at point O on it.
   Steps:
   - With O as centre, draw arc intersecting XY at P and Q
   - With P and Q as centres, draw arcs above XY intersecting at R
   - Join O and R → OR ⊥ XY
4. Copying an Angle
   Example: Copy ∠ABC = 50°
   Steps:
   - Draw ray DE
   - With B as centre, draw arc cutting BA and BC at F, G
   - With D as centre, draw similar arc cutting DE at H
   - Set compass to FG, draw arc from H intersecting first arc at I
   - Join D to I → ∠EDI = ∠ABC
5. Bisecting an Angle
   Example: Bisect ∠PQR = 80°
   Steps:
   - With Q as centre, draw arc cutting QP and QR at S and T
   - With S and T as centres, draw arcs intersecting at U
   - Join Q to U → QU bisects ∠PQR

Unit Test

A. Fill in the blanks (1 mark each)

1. A _____ is used to draw straight lines.
2. To copy a line segment, we use a _____.
3. A perpendicular makes an angle of _____ with the line.
4. The tool used to measure angles is called a _____.
5. The line that divides an angle into two equal parts is called an _____.

B. Short Answer Questions (2 marks each)
6. How will you draw a line segment of 7 cm?
7. What is the first step to construct a perpendicular from a point on a line?
8. Why do we use a sharp pencil in constructions?

C. Long Answer Questions (3 marks each)
9. Explain with steps how to copy an angle of 60°.
10. Construct a perpendicular to a line AB from a point P outside it. Describe the steps.

Worksheets

Worksheet 1: Drawing Line Segments

1. Draw a line segment of length 3 cm.
2. Draw a line segment XY = 8 cm.
3. Copy a line segment of length 5.5 cm to a new location.

Worksheet 2: Perpendiculars and Angles
4. Draw a line AB. Mark a point M on it. Draw a perpendicular at M.
5. Draw an angle of 45° using a protractor.
6. Bisect an angle of 90°.

Worksheet 3: Mixed Practice
7. Copy an angle of 70° without using a protractor.
8. Draw a line segment PQ = 6 cm. Construct its perpendicular bisector.
9. Draw two parallel lines using set squares.
10. Construct an angle of 120° and bisect it.

Solutions to Unit Test

A. Fill in the blanks

1. ruler
2. compass
3. 90°
4. protractor
5. angle bisector

B. Short Answer Questions
6. Place the ruler on paper. Mark a point at 0 cm as one end. Mark another point at 7 cm. Join both points with a straight line.
7. With the point as centre, draw an arc intersecting the line at two points.
8. A sharp pencil gives clear and accurate markings which are essential for precise constructions.

C. Long Answer Questions
9. Steps to copy 60° angle:

- Draw ray DE.
- With vertex of original angle as centre, draw arc cutting both arms.
- With same radius, draw arc from D cutting DE at F.
- Set compass to distance between arc intersections on original angle.
- From F, draw arc intersecting previous arc at G.
- Join D to G. ∠EDG = 60°.

10. Steps:

- From point P, draw arc cutting line AB at C and D.
- With C and D as centres, draw arcs below AB intersecting at Q.
- Join P to Q. PQ is perpendicular to AB.

Solutions to Worksheets

Worksheet 1
1–3. (Construction-based – answers are student drawings following taught steps)

Worksheet 2
4–6. (Construction-based – follow standard construction steps for perpendicular, angle drawing, and bisection)

Worksheet 3
7. Use compass method to copy 70° angle (as in notes).
8. Draw PQ = 6 cm. With P and Q as centres, draw arcs above and below PQ with radius >3 cm. Join intersections → perpendicular bisector.
9. Place one edge of set square along a line. Align second set square against it. Slide to draw parallel line.
10. Draw 120° using protractor or by adding 90° + 30°. To bisect: draw arc from vertex, then arcs from intersections, join vertex to new intersection. Each part = 60°.