

## Introduction to Geometrical Constructions

Geometrical constructions involve drawing shapes, angles, and lines accurately using only a compass, ruler (scale), and pencil. This chapter helps develop practical skills for drawing with precision.

### • Basic Tools Used in Constructions

- Ruler: Used to draw straight lines and measure lengths.
- Compass: Used to draw arcs and circles.
- Protractor: Used to measure and draw angles.
- Pencil & Eraser: For accurate drawing and corrections.

### • Drawing a Line Segment of Given Length

Step 1: Place the ruler on the paper.

Step 2: Mark two points A and B such that  $AB =$  given length.

Step 3: Join the points A and B using a ruler.

#### • *Constructing a Circle of Given Radius*

Step 1: Open the compass to the given radius using a ruler.

Step 2: Place the pointed end on the center point O.

Step 3: Rotate the compass to draw the circle.

#### • *Constructing Perpendicular Lines*

**Method 1:** Using a protractor

- Draw a line and mark a point P on it.
- Place the protractor on P and mark  $90^\circ$ .
- Draw the perpendicular.

**Method 2:** Using a compass

- Draw arcs from a point above and below the line.
- Intersect the arcs to find the perpendicular line.

### • Constructing Angles with Compass

#### 1. 60 degree:

- Draw a straight line and mark a point O on it.
- Place the compass on point O and draw an arc to cut the line at point A.

- Without changing compass width, place the compass on A and draw an arc intersecting the first arc. Mark that intersection as **B**.
- Draw a line from O to B.  
✓ Angle AOB =  $60^\circ$

### 2. 120 degree:

- Follow the same steps as for  $60^\circ$  to get point B.
- Now place the compass on B (Not A), and draw another arc intersecting the first arc. Mark this new point as **C**.
- Draw a line from O to C.  
✓ Angle AOC =  $120^\circ$

### 3. 90 degree:

- First construct a  $60^\circ$  and  $120^\circ$  angle (as above).
- Place compass on the intersection points of the two arcs (from  $60^\circ$  and  $120^\circ$ ).
- Draw arcs that intersect each other above point O.
- Join O to this new intersection point.  
✓ Angle =  $90^\circ$  (angle bisector between  $60^\circ$  and  $120^\circ$ )

#### • Real-Life Importance of Constructions

- Used in architecture and engineering drawings.
- Helps design geometrical patterns and crafts.
- Used in making floor plans and technical sketches.