1) CREATING A TRIANGLE GIVEN LENGTHS OF SIDES:

I. Draw one side, shown as C in the desired position. Draw an arc with its radius equal to side A
II. Draw a second arc with its radius equal to side B
III. Draw sides A and B from the intersection of the arcs, as shown

![Triangle Construction](image)

2) CREATING A RIGHT TRIANGLE WITH THE HYPOTENUSE AND ONE SIDE GIVEN:

**Theorem:** Any triangle inscribed in a semi circle is a right triangle if the hypotenuse coincides with the diameter.

1) Draw a semicircle with a diameter AB equal to the given length S.
2) Using A as the center and the length R as the radius, draw an arc that first semicircle at C.
3) Draw lines AC and CB to complete the right angle.

![Right Triangle Construction](image)

3) CONSTRUCTION OF A PERPENDICULAR AND ANGLE BISECTOR
**Bisector** is a line that divides a given line or angle into two equal segments.

**A) Perpendicular bisector:**
1) From A and B draw equal arcs with radius (constant) greater than half AB on both sides of the line.
2) Connect intersections D and E with a straight line. Line DE will intersect Line AB at the midpoint, shown as C.
3) Line DE is perpendicular through the midpoint of AB.

**B) Angle bisector (see steps in table)**

<table>
<thead>
<tr>
<th>A) Perpendicular Bisector</th>
<th>B) Angle Bisector</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Bisecting a Line or Circular Arc" /></td>
<td><img src="image2" alt="Bisecting an Angle" /></td>
</tr>
</tbody>
</table>

The figure shown at right shows the given angle BAC to be bisected.

1. Create large arc R.
2. Create equal arcs r with their radius slightly larger than half BC, to intersect at D.
3. Create line AD, which bisects the angle.
4) A CIRCLE THROUGH THREE POINTS.

1) Let A, B and C be the three given points not in a straight line. Draw lines AB and BC, which will be the cords of the circle.
2) Create perpendicular bisectors EO and DO intersecting at O.
3) With the center at O and the radius defined as OA, OB, or OC create the required circle through the points.

5) DIVIDING A LINE INTO EQUAL PARTS

---

**Step by Step 4.2**

**Dividing a line into equal parts**

1. Sketch a vertical construction line at one end of the given line.
2. Set zero of scale at the other end of the line.
3. Swing scale up until units for the required number of divisions fall on the vertical line (for example, three units to divide into thirds).
4. Make light marks at each point.
5. Sketch vertical construction lines through each point.

Some practical applications of this method used to sketch (a) screw threads, (b) a framing layout, and (c) stair tread are shown below.