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Tender Heart High School, Sec-33B, Chandigarh

Class - VI

Date - 23.12.2024

Subject - Mathematics

Teacher - Ms. Sushma

Chapter - 22 "Construction"

We use a ruler and a divider to measure and compare a line segment and we use a protractor to measure an angle.

Tips for Neat and Accurate Construction
Keep the following tips in mind while doing constructions.

- ⇒ The instruments should be in good condition i.e. marking on ruler, protractor, and a set squares should be clearly visible and have fine edges.
- ⇒ Divider and compass should have sharp tips.
- ⇒ The pencil should be sharpened properly and always maintain pointed tips.
- ⇒ Marking of points or drawing of lines should be neat and thin.
- ⇒ Separate pencils should be used for compass and drawing lines.

Construction of a line Segment : →

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Construction of a Line Segment of a Given Length

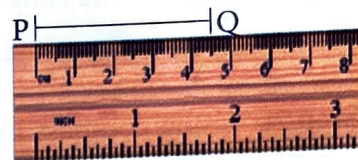
Let us construct a line segment of 4.5 cm length using a ruler and a compass through the following steps.

Using a Ruler

Step 1: Mark a point P on a paper.

Step 2: Place the ruler so that the zero (0) mark of the ruler coincides with the point P. Now, mark another point Q on the paper against the 5 small divisions just after the 4 cm mark.

Step 3: Join points P and Q along the edge of the ruler. Thus, $\overline{PQ} = 4.5$ cm.

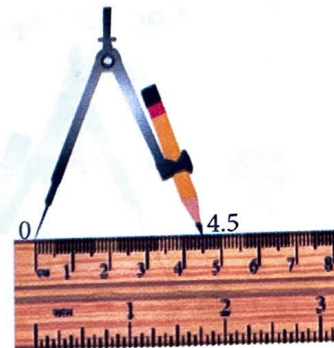


Using a Compass

Step 1: Draw a line l . Mark point A on it.

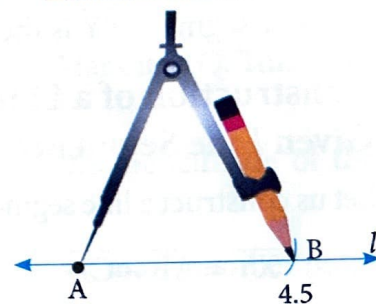


Step 2: Place the pointer of the compass on the zero (0) mark of the ruler. Open the compass so that the tip of the pencil touches the 4.5 cm mark on the ruler.



Step 3: Without changing the measures of the compass, place the pointer of compass at point A on line l and draw an arc of radius 4.5 cm, which cuts line l at B.

Thus, \overline{AB} is the required line segment, i.e., $\overline{AB} = 4.5$ cm.



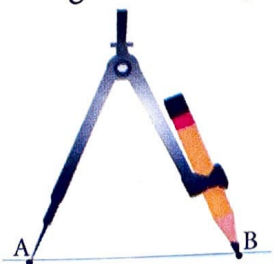
Construction of a Line Segment Equal to the Given Line Segment

Let us draw line segment \overline{PQ} whose length is equal to the given \overline{AB} .

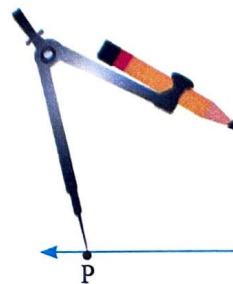
Step 1: Draw a line, say \overline{PL} , longer than \overline{AB} , whose length is not known.



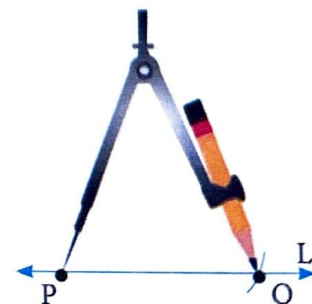
Step 2: Fix the compass pointer on point A of \overline{AB} and stretch its end to point B. The opening of the compass now gives the length of \overline{AB} .



Step 3: Without changing the compass setting, place the pointer on P of line PL.

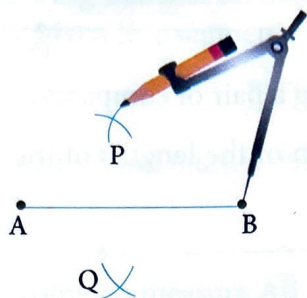


Step 4: Make an arc that cuts the ray at point Q. Now \overline{PQ} is a copy of \overline{AB} .

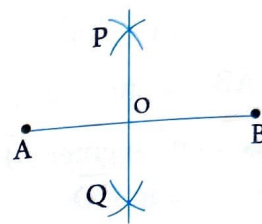


Thus, \overline{PQ} is the required line segment, which is same as line segment AB.

Step 3: Similarly, taking B as the centre and with the same radius draw two arcs which cut the previous arcs at P and Q respectively.



Step 4: Join P and Q and mark this point of intersection with AB as O.



Thus, \overline{PQ} is the required perpendicular bisector of line segment \overline{AB} .

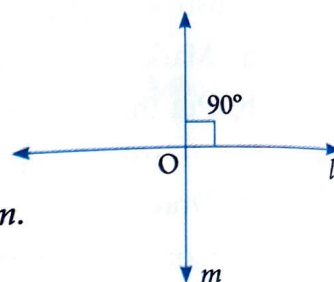
Construction of a Perpendicular Line

We know that two lines (or rays or segments) are said to be perpendicular if they intersect each other at right angles.

In the given figure, lines l and m intersect at O and form a right angle, i.e., $\angle 90^\circ$.

So, lines l and m are perpendicular to each other. They can be represented as $l \perp m$.

Let us now learn to construct perpendicular lines.



Using a Ruler and a Compass

From a point on the line	From a point outside the line
<p>Step 1: Draw a line l and mark a point O anywhere on it.</p>	<p>Step 1: Let l be the given line and O be the point outside it.</p>
<p>Step 2: With O as the centre, draw an arc to cut the line PQ at points A and B.</p>	<p>Step 2: With O as the centre, draw an arc to cut the line l at B and C.</p>
<p>Step 3: With A and B as centres and the radius of more than half AB, draw two arcs to cut at C.</p>	<p>Step 3: With B and C as centres and a radius of more than half BC, draw two arcs to cut at D.</p>
<p>Step 4: Join OC. Ray OC is perpendicular to line PQ at O.</p>	<p>Step 4: Join OD. It is perpendicular to line l.</p>