STD – 9 MATHS

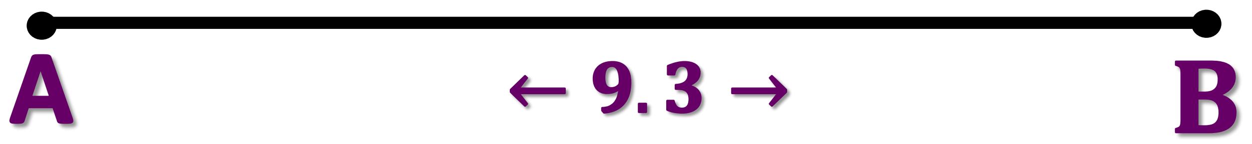
CHAPTER - 1

NUMBER SYSTEM

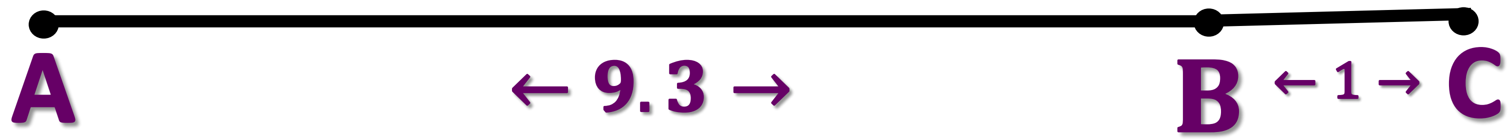
EXERCISE - 1.5 (Q.4 to Q.5)

4. Represent $(\sqrt{9.3})$ on the number line.

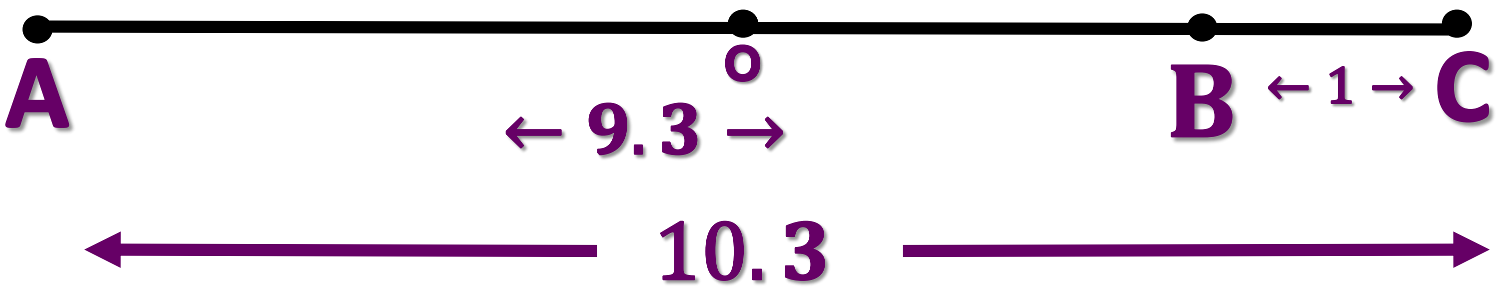
Step 1 : Draw a 9.3 units long line segment, AB.



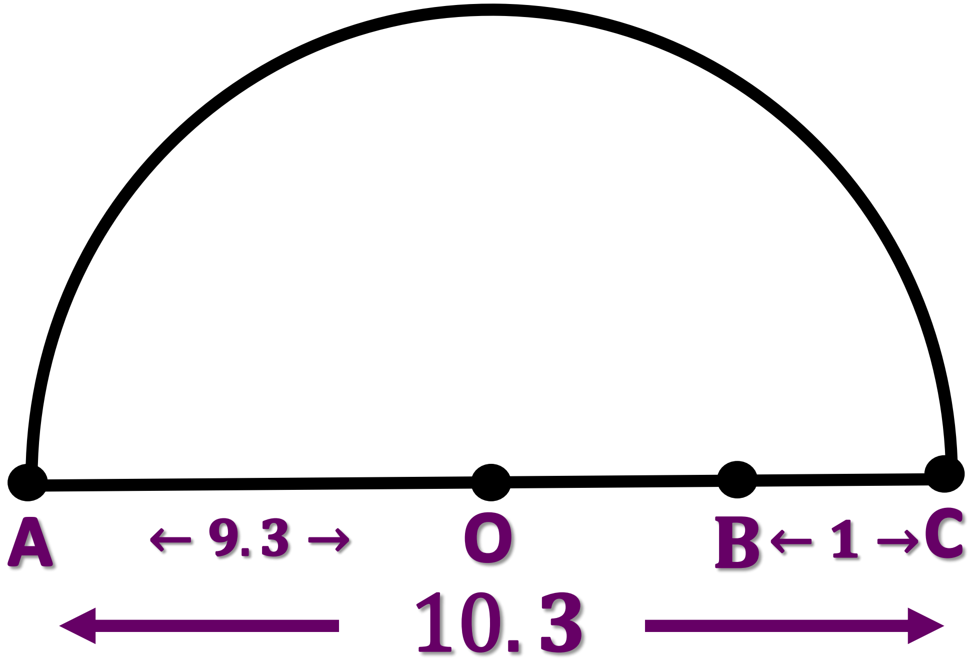
Step 2 : Extend AB to C such that BC = 1 unit.



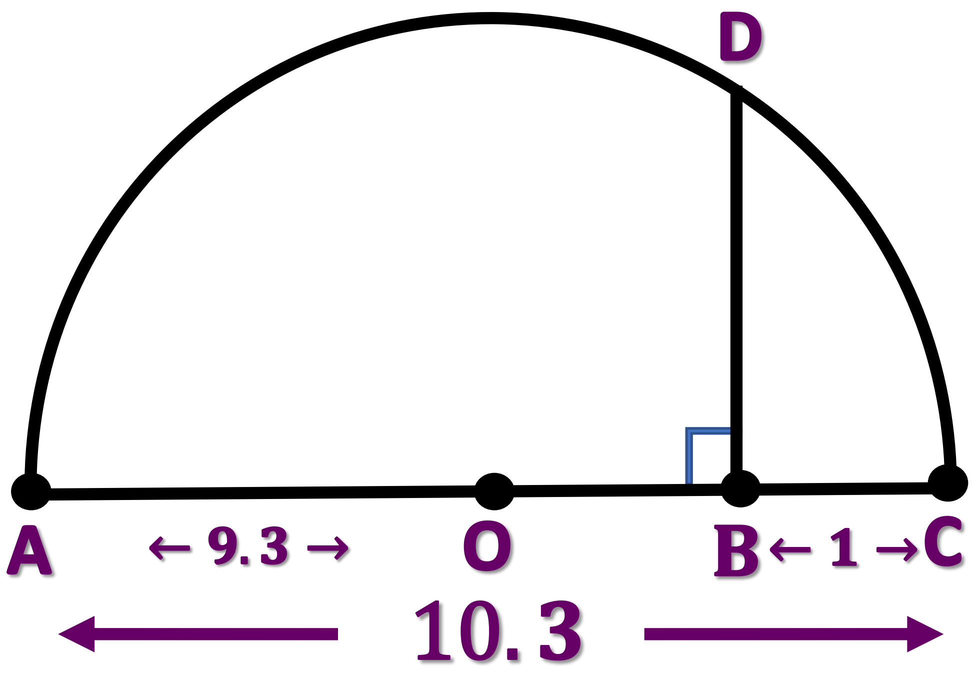
Step 3 : Now, AC = 10.3 units. Let the centre of AC be O.



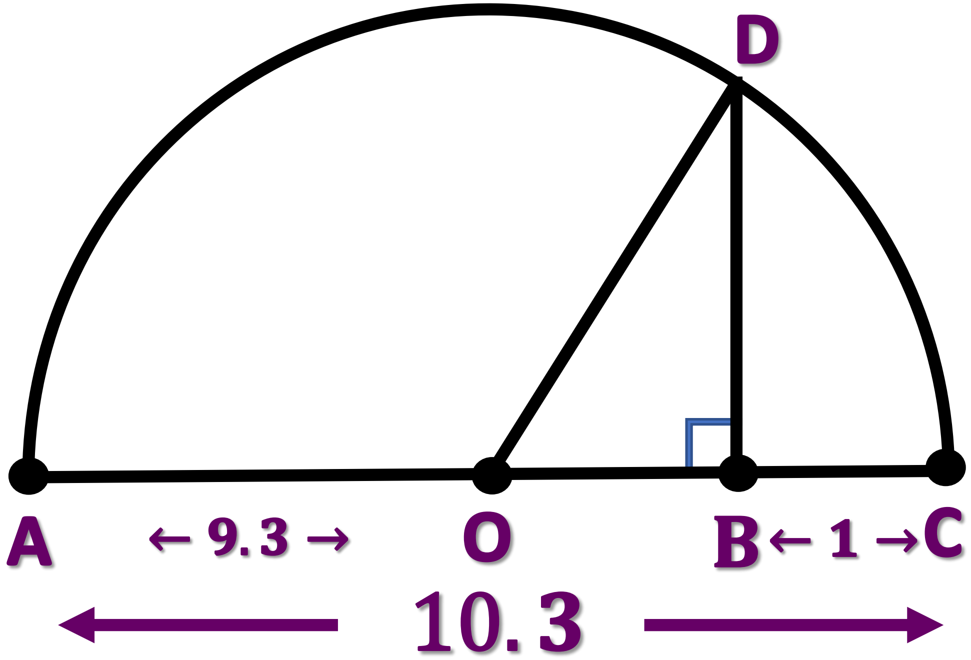
Step 4 : Draw a semi-circle of radius OC with centre O.



Step 5 : **Draw a BD perpendicular to AC at point B intersecting the semicircle at D.**



Step 6 : OBD, obtained, is a right angled triangle.



Here, OD $\frac{10.3}{2}$ (radius of semi-circle),

$$OC = \frac{10.3}{2}, \; BC = 1$$

$$OB = OC - BC$$

$$= \left(\frac{10.3}{2}\right) - 1$$

$$= \frac{8.3}{2}$$

Using Pythagoras theorem,

We get,

$OD^2 = BD^2 + OB^2$

$$\frac{10.3^2}{2} = BD^2 + \frac{8.3^2}{2}$$

$$BD^2 = \frac{10.3^2}{2} - \frac{8.3^2}{2}$$

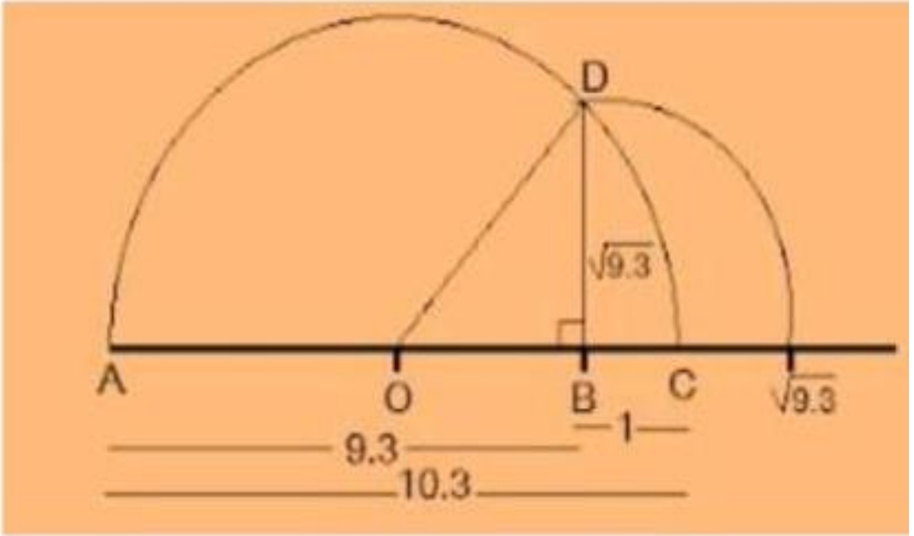
$$(BD^2) = \left[\left(\frac{10.3}{2}\right) - \left(\frac{8.3}{2}\right)\right]\left[\left(\frac{10.3}{2}\right) + \left(\frac{8.3}{2}\right)\right]$$

$$BD^2 = 9.3$$

$$BD = \sqrt{9}.3$$

Thus, the length of BD is $\sqrt{9}.3$ units.

Step 7: Taking BD as radius and B as centre draw an arc which touches the line segment. The point where it touches the line segment is at a distance of $\sqrt{9.3}$ from O as shown in the figure.



Q.5. Rationalise the denominators of the following:

(i) $\frac{1}{\sqrt{7}}$

Multiply and divide $\frac{1}{\sqrt{7}}$ **by** $\sqrt{7}$

$$= \frac{1 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}}$$

$$= \frac{\sqrt{7}}{7}$$

(ii) $\frac{1}{\sqrt{7}-\sqrt{6}}$

Multiply and divide $\frac{1}{(\sqrt{7}-\sqrt{6})}$ by $(\sqrt{7}+\sqrt{6})$

$= [\frac{1}{(\sqrt{7}-\sqrt{6})}] \times \frac{(\sqrt{7}+\sqrt{6})}{(\sqrt{7}+\sqrt{6})}$

$= \frac{(\sqrt{7}+\sqrt{6})}{(\sqrt{7}-\sqrt{6})\ (\sqrt{7}+\sqrt{6})}$

$= \frac{(\sqrt{7}+\sqrt{6})}{(\sqrt{7}^2-\sqrt{6}^2)}$ **[denominator is obtained by the property, (a+b) (a-b) =** $a^2 - b^2$

$= \frac{(\sqrt{7}+\sqrt{6})}{(7-6)}$

$= \frac{(\sqrt{7}+\sqrt{6})}{1}$

$= \sqrt{7} + \sqrt{6}$

(iii) $\frac{1}{\sqrt{5}-\sqrt{2}}$

Multiply and divide $\frac{1}{(\sqrt{5}-\sqrt{2})}$ by $(\sqrt{5}+\sqrt{2})$

$= [\frac{1}{(\sqrt{5}+\sqrt{2})}] \times \frac{(\sqrt{5}-\sqrt{2})}{(\sqrt{5}-\sqrt{2})}$

$= \frac{(\sqrt{5}-\sqrt{2})}{(\sqrt{5}+\sqrt{2})\ (\sqrt{5}-\sqrt{2})}$

$= \frac{(\sqrt{5}-\sqrt{2})}{(\sqrt{5}^2-\sqrt{2}^2)}$ [denominator is obtained by the property, (a+b) (a-b) = [$a^2 - b^2$]

$= \frac{(\sqrt{5}-\sqrt{2})}{(5-2)}$

$= \frac{(\sqrt{5}+\sqrt{2})}{3}$

(iv) $\frac{1}{\sqrt{7}-2}$

Multiply and divide $\frac{1}{(\sqrt{7}-2)}$ $by\ (\sqrt{7}+2)$

$= \frac{1}{(\sqrt{7}-2)} \times \frac{(\sqrt{7}+2)}{(\sqrt{7}+2)}$

$= \frac{(\sqrt{7}+2)}{(\sqrt{7}+2)\,(\sqrt{7}-2)}$

$= \frac{(\sqrt{7}+2)}{(\sqrt{7}^2-2^2)}$ **[denominator is obtained by the property, (a+b) (a-b) = [a^2 - b^2]**

$= \frac{(\sqrt{7}+2)}{(7-4)}$

$= \frac{(\sqrt{7}+2)}{3}$

Thanks

For watching