Number System Ex 1.5 Q1

Answer :

(i) Every point on the number line corresponds to a real number which may be either rational or an irrational number.
(ii) The decimal form of an irrational number is neither terminating nor repeating.
(iii) The decimal representation of rational number is either terminating, recurring.
(iv) Every real number is either rational number or an irrational number because rational or an irrational number is a family of real number.

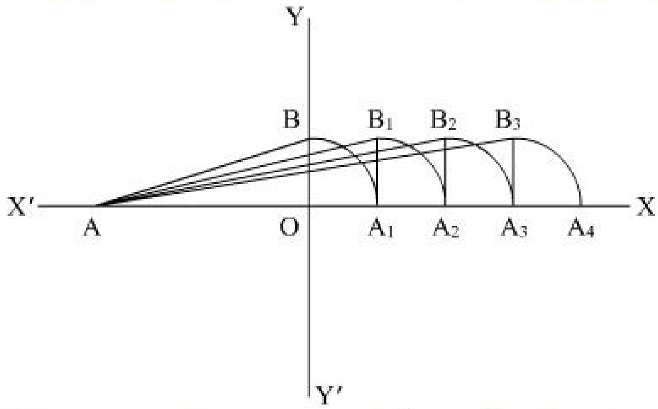
Number System Ex 1.5 Q2

Answer :

We are asked to represent $\sqrt{6}, \sqrt{7}$ and $\sqrt{8}$ on the number line

We will follow certain algorithm to represent these numbers on real line

We will consider point A as reference point to measure the distance



(1) First of all draw a line AX and YY' perpendicular to AX

(2) Consider $AO = 2$ unit and $OB = 1$ unit, so

$$AB = \sqrt{2^2 + 1^2}$$
$$= \sqrt{5}$$

(3) Take A as center and AB as radius, draw an arc which cuts line AX at A_1
(4) Draw a perpendicular line A_1B_1 to AX such that $A_1B_1 = 1$ unit and
(5) Take A as center and AB_1 as radius and draw an arc which cuts the line AX at A_2.
Here

$$AB_1 = AA_2$$
$$= \sqrt{AA_1^2 + A_1B_1^2}$$
$$= \sqrt{\left(\sqrt{5}\right)^2 + 1}$$
$$= \sqrt{6} \text{ unit}$$

So $AA_2 = \sqrt{6}$ unit

So A_2 is the representation for $\sqrt{6}$

(1) Draw line A_2B_2 perpendicular to AX
(2) Take A center and AB_2 as radius and draw an arc which cuts the horizontal line at A_3 such that

$$AB_2 = AA_3$$
$$= \sqrt{AA_2^2 + A_2B_2^2}$$
$$= \sqrt{\left(\sqrt{6}\right)^2 + 1}$$
$$= \sqrt{7} \text{ unit}$$

So point A_3 is the representation of $\sqrt{7}$

(3) Again draw the perpendicular line A_3B_3 to AX

(4) Take A as center and $AB3$ as radius and draw an arc which cuts the horizontal line at $A4$

Here;

$$\begin{aligned} AB_3 &= AA_4 \\ &= \sqrt{AA_3^{\ 2} + A_3B_3^{\ 2}} \\ &= \sqrt{\left(\sqrt{7}\right)^2 + 1^2} \\ &= \sqrt{8} \text{ unit} \end{aligned}$$

$A4$ is basically the representation of $\sqrt{8}$

*********** END **********