

Exercise 1.5

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Question 1: Complete the following sentences:

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

Solution:

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

Question 2: Represent $\sqrt{6}$, $\sqrt{7}$, $\sqrt{8}$ on the number line.

Solution:

Find the equivalent values of $\sqrt{6}$, $\sqrt{7}$, $\sqrt{8}$

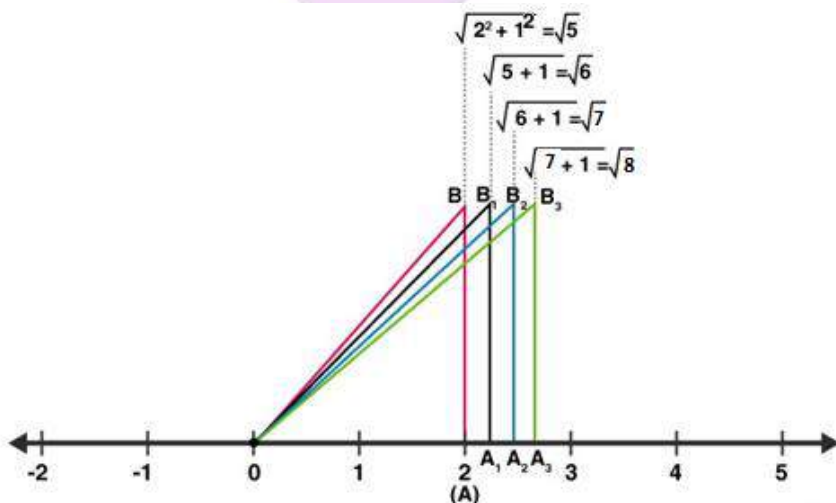
$$\sqrt{6} = 2.449$$

$$\sqrt{7} = 2.645$$

$$\sqrt{8} = 2.828$$

We can see that, all the given numbers lie between 2 and 3.

Draw on number line:



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Question 3: Represent $\sqrt{3.5}$, $\sqrt{9.4}$, $\sqrt{10.5}$ and on the real number line.

Solution:

Represent $\sqrt{3.5}$ on number line

Step 1: Draw a line segment $AB = 3.5$ units

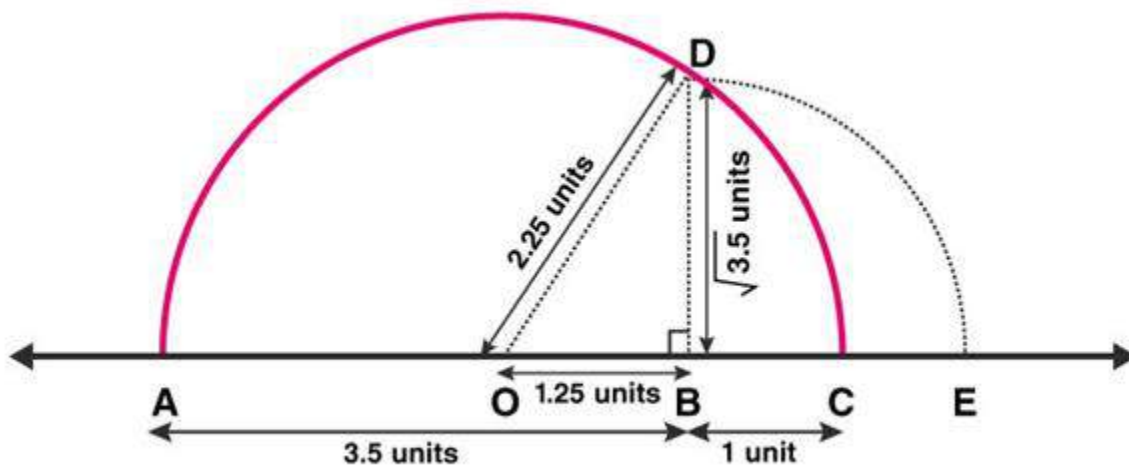
Step 2: Produce B till point C, such that $BC = 1$ unit

Step 3: Find the mid-point of AC, say O.

Step 4: Taking O as the centre draw a semi circle, passing through A and C.

Step 5: Draw a line passing through B perpendicular to OB, and cut semicircle at D.

Step 6: Consider B as a centre and BD as radius draw an arc cutting OC produced at E.



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Now, from right triangle OBD,

$$BD^2 = OD^2 - OB^2$$

$$= OC^2 - (OC - BC)^2$$

(As, $OD = OC$)

$$BD^2 = 2OC \times BC - (BC)^2$$

$$= 2 \times 2.25 \times 1 - 1$$

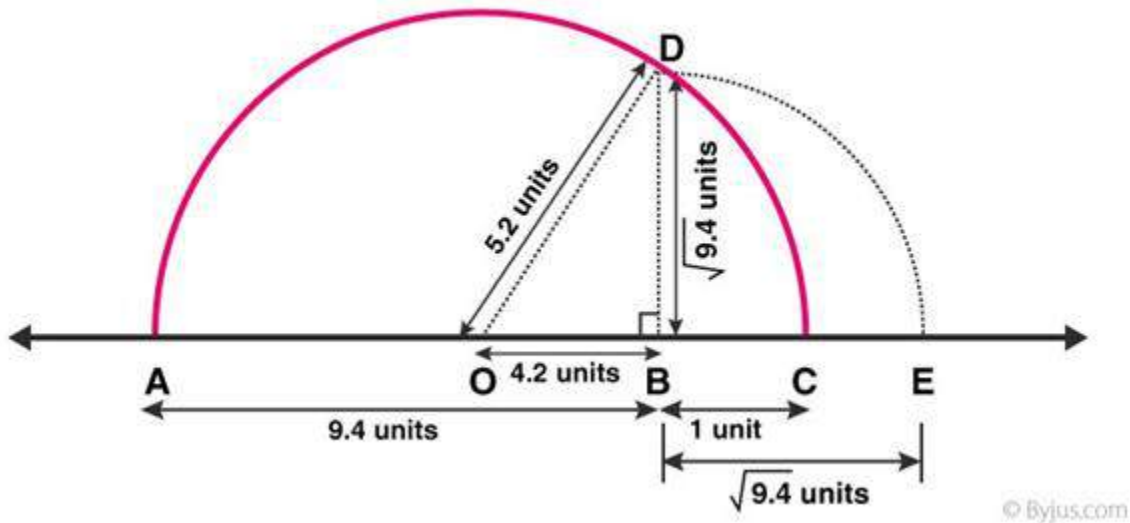
$$= 3.5$$

$$\Rightarrow BD = \sqrt{3.5}$$

Represent $\sqrt{9.4}$ on number line

Step 1: Draw a line segment AB = 9.4 units

Follow step 2 to Step 6 mentioned above.



$$BD^2 = 2OC \times BC - (BC)^2$$

$$= 2 \times 5.2 \times 1 - 1$$

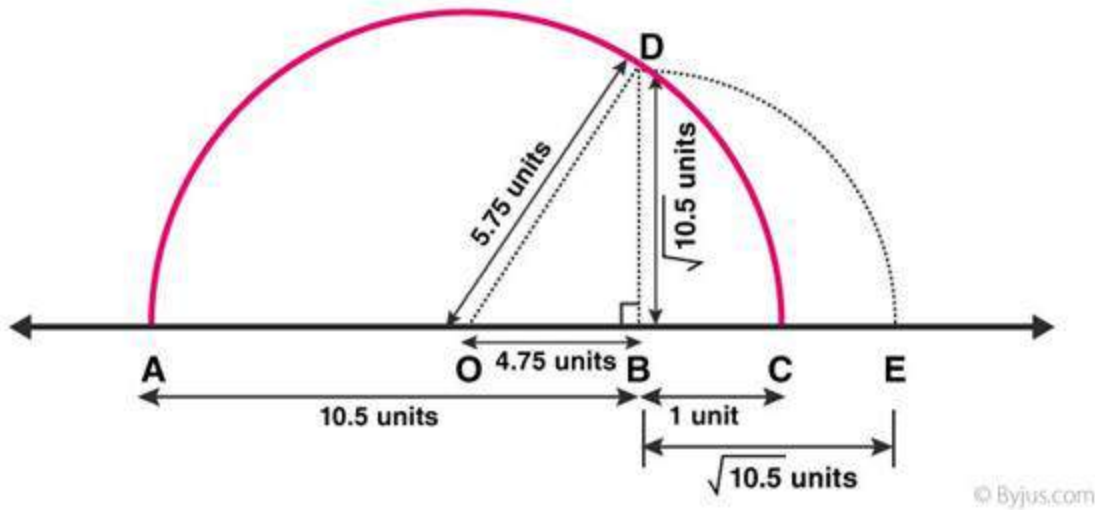
$$= 9.4$$

$$\Rightarrow BD = \sqrt{9.4}$$

Represent $\sqrt{10.5}$ on number line

Step 1: Draw a line segment AB = 10.5 units

Follow step 2 to Step 6 mentioned above, we get



$$BD^2 = 2OC \times BC - (BC)^2$$

$$= 2 \times 5.75 \times 1 - 1$$

$$= 10.5$$

$$\Rightarrow BD = \sqrt{10.5}$$

Question 4: Find whether the following statements are true or false:

(i) Every real number is either rational or irrational.

(ii) π is an irrational number.

(iii) Irrational numbers cannot be represented by points on the number line.

Solution:

(i) True.

(ii) True.

(iii) False.