

NCERT Solutions for Class 9 Maths Chapter 1 Number Systems Ex 1.2

Question 1.

State whether the following statements are true or false. Justify your answers.

- (i) Every irrational number is a real number.
- (ii) Every point on the number line is of the form $\sqrt{m}$, where m is a natural number.
- (iii) Every real number is an irrational number.

Solution.

(i) True

Because all rational numbers and all irrational numbers form the group (collection) of real numbers.

(ii) False

Because negative numbers cannot be the square root of any natural number.

(iii) False

Because rational numbers are also a part of real numbers.

Question 2.

Are the square roots of all positive integers irrational? If not, give an example of the square root of a number that is a rational number.

Solution.

No, if we take a positive integer, say 9, its square root is 3, which is a rational number.

Question 3.

Show how $\sqrt{5}$ can be represented on the number line.

Solution.

Draw a number line and take point O and A on it such that $OA = 1$ unit. Draw $BA \perp OA$ as $BA = 1$ unit. Join $OB = \sqrt{2}$ units.

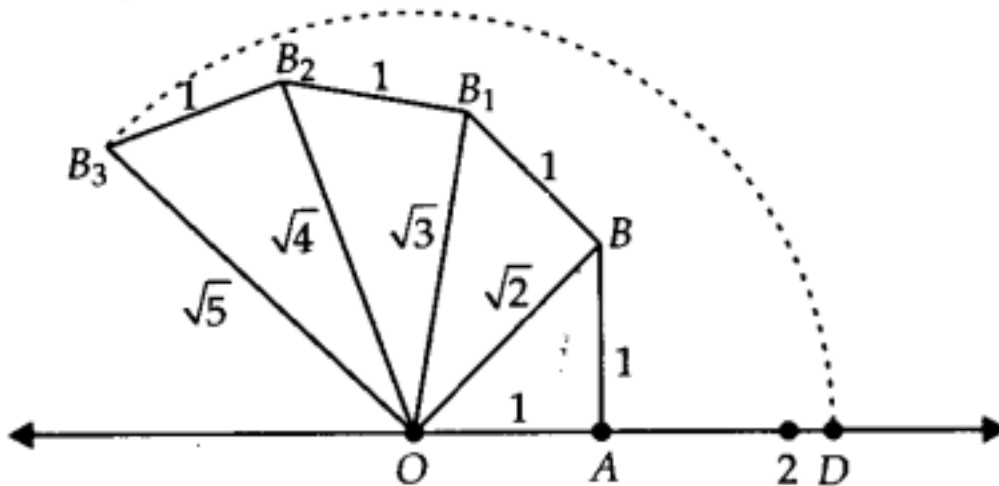
Now draw $BB_1 \perp OB$ such that $BB_1 = 1$ unit. Join $OB_1 = \sqrt{3}$ units.

Next, draw $B_1B_2 \perp OB_1$ such that $B_1B_2 = 1$ unit.

Join $OB_2 = \sqrt{4}$ units.

Again draw $B_2B_3 \perp OB_2$ such that $B_2B_3 = 1$ unit.

Join $OB_3 = \sqrt{5}$ units.



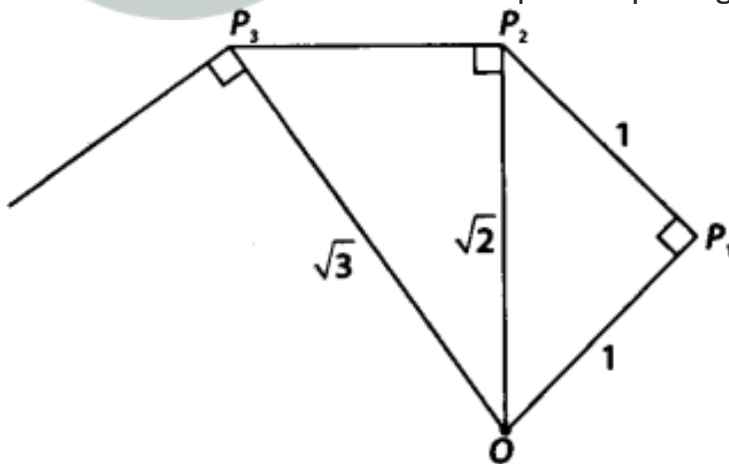
Take O as centre and OB_3 as radius, draw an arc which cuts the number line at D.

Point D

represents $\sqrt{5}$ on the number line.

Question 4.

Take a large sheet of paper and construct the 'square root spiral' in the following fashion. Start with a point O and draw a line segment OP_1 of unit lengths. Draw a line segment P_1P_2 perpendicular to OP_1 of unit length (see figure). Now, draw a line segment P_2P_3 perpendicular to OP_2 . Then draw a line segment P_3P_4 perpendicular to OP_3 . Continuing in this manner, you can get the line segment $P_{n-1}P_n$ by drawing a line segment of unit length perpendicular to OP_{n-1} . In this manner, you will have created the points $P_2, P_3, \dots, P_n, \dots$ and joined them to create a beautiful spiral depicting $\sqrt{2}, \sqrt{3}, \sqrt{4}, \dots$



Solution.

Do it yourself.