ODM EDUCATIONAL GROUP
Changing your Tomorrow

PERIOD-3

MATHEMATICS

CHAPTER NUMBER :~ 1
CHAPTER NAME :~ NUMBER SYSTEMS
SUB TOPIC :~ REAL NUMBERS

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PREVIOUS KNOWLEDGE TEST

1. Find five rational numbers between 35 and 45.

2. Represent $\sqrt{3}$ on the number line.

LEARNING OUTCOME:-

Students will learn

a) Real Numbers and their Decimal Expansions

b) Representing Real Numbers(Decimals) on the Number line

c) Rational form of decimal numbers and irrationals in between rational numbers

Exercise-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 √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 ⊥ OA as BA = 1 unit. Join OB = √2 units.

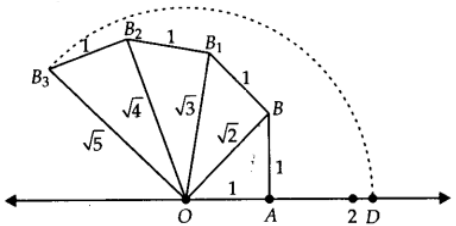
Now draw BB1 ⊥ OB such that BB1 =1 unit. Join OB1 = √3 units.

Next, draw B1B2⊥ OB1such that B1B2 = 1 unit.

Join OB2 = units.

Again draw B2B3 ⊥OB2 such that B2B3 = 1 unit.

Join OB3 = √5 units.



Take O as centre and OB3 as radius, draw an arc which cuts the number line at D.

Point D

represents √5 on the number line.

https://www.youtube.com/watch?v=J-mrAZbOvQ8

"Numbers Are Intellectual Witness That Belong Only To Mankind…"

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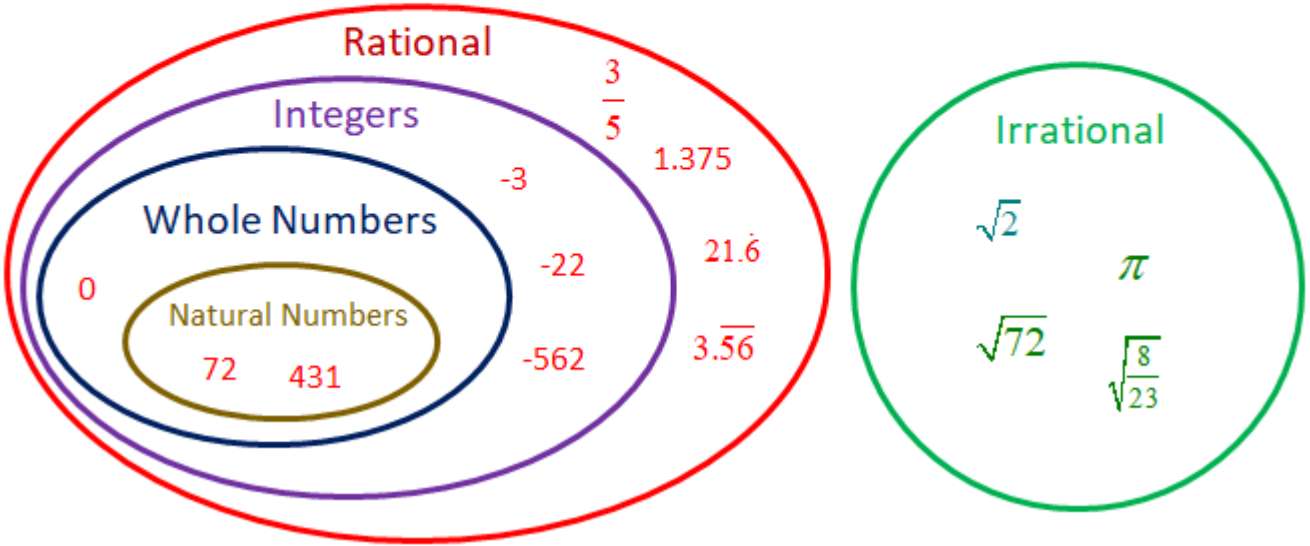
Real Number System

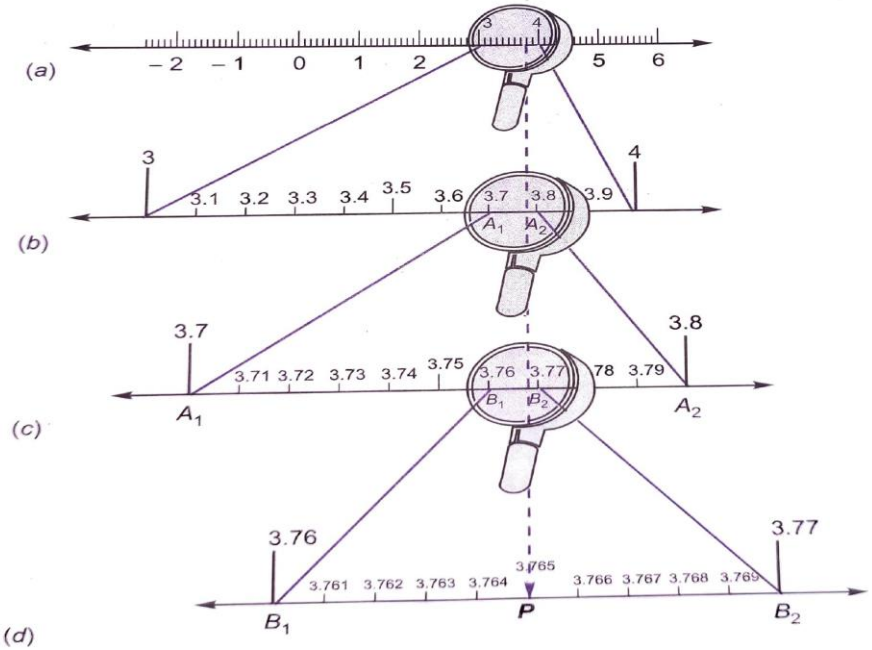
Examples of rational numbers, integers, whole numbers, natural numbers, and irrational numbers



Visualise 3.765 on the number line, using successive magnifications. [NCERT]

Solution. Visual representation of a terminal decimal expansion on a number line. We wish to locate 3.765 on the number line.

1. As the number 3.765 lies between 3 and 4, we look closely at this portion of the number line. We divide this portion into 10 equal parts as shown in Fig. 1.13(*a*). The first mark towards the right of 3 represents 3.1, the second 3.2, and so on. It may be difficult to observe these points of division with the naked eyes.
2. To have a clear view, we use a magnifying glass and look at the portion between 3 and 4. It appears as shown in Fig. 1.13(*b*). Clearly, 3.765 lies between 3.7 and 3.8.
3. To see more clearly, we further magnify the portion between 3.7 and 3.8. We again divide this interval into 10 equal parts. As shown in Fig. 1.13(*c*), the first mark will represent 3.71, the next 3.72 and so on. Clearly 3.765 lies between 3.76 and 3.77.



Find the three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.

Solution. By long division, we can write

$$\frac{5}{7} = 0.\overline{714285}$$

$$\frac{9}{11} = 0.\overline{818}$$

Three irrational numbers between $\frac{5}{7}$ and $\frac{9}{11}$, which should have non-terminating non-recurring decimal expansion, can be easily written as follows :

0.72020020002000002… , 07232332333233333… , 08010010001000001...

Evaluation:

Represent 4.236on the number line by successive magnification.

Homework :

Exercise 1.3 and Exercise 1.4.

AHA:~

1. Show 6.262626…on the number line.
2. Find sum:~ 1.232323…+0.323232….

THANKING YOU

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