(I)

Date : 25/04/20
Page :

Terminating Decimals If the decimal expression of a/b terminates i.e. Comes to end, then the decimal So obtained is called terminating decimals. [or non repeating decimals]

Example = $\frac{1}{4} = 0.25$

Repeating Decimal :- A decimal in which a digit or a set of digits repeats repeatedly Periodically is Called a repeating decimal.

Example = $\frac{2}{3} = 0.666\ldots$

Some Special Characteristics of Rational Numbers -

- Every rational Number is expressible either as a terminating decimal or as a Repeating decimal.
- Every Terminating decimal is a Rational Number.
- Every Repeating decimal is a Rational Number.

Irrational Numbers :- (I) The non terminating, non repeating decimals are called irrational Numbers.

Examples = 0.01001211200 ......

(II) Similarly, If m is a Positive number which is not a Perfect Square, then $\sqrt{m}$ is also irrational.

Example = $\sqrt{3}$, $\sqrt{5}$, $\sqrt{7}$ etc.

(III) If m is a Positive Integer which is not a Perfect Cube, then $\sqrt[3]{m}$ is irrational.

Example - $\sqrt[3]{2}$

Properties of Irrational Numbers :-

(I) These satisfy the Commutative, associative and distributive laws for addition and multiplication.

(II) Sum of two irrationals need not be irrational.

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

(III) Product of two irrationals need not be irrational.

Example = $\sqrt{3} \times \sqrt{3} = 3$

(IV) The quotient of two irrationals need not be irrational.

Example = $\frac{2\sqrt{3}}{\sqrt{3}} = 2$

(V) Sum of rational and irrational is irrational.

Example = $(2+\sqrt{3})$

(VI) The difference of a rational number and an irrational number is irrational.

Example : $(8-\sqrt{8})$ is an irrational.

(VII) Product of rational and irrational is irrational.

Example = $3 \times \sqrt{2}$ is an irrational.

(VIII) Quotient of Rational and irrational is irrational.

Example = $\frac{3}{\sqrt{3}}$ is an irrational.

RATIONALISATION If we have an irrational number, then the Process of Converting the denominator to a rational number by multiplying the numerator and denominator by a suitable Number, is called rationalization.

Example - $\frac{3}{\sqrt{2}} = \frac{3 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{3\sqrt{2}}{2}$

Date: 25/04/20

Laws of Radicals -

let $a > 0$ be a real number, and let p and q be rational numbers, then we have

(I) $a^p \times a^q = a^{(p+q)}$

(II) $(a^p)^q = a^{pq}$

(III) $a^p / a^q = a^{(p-q)}$

(IV) $a^p \times b^p = (ab)^p$

Now $\boxed{\text{Exercise} \cdot 1.2}$

Que (1) State wheather the fallowing statements are true or false. Jastify also your answer

(I) Every irrational number is a real number.

Yes, Every irrational number is a real number because Real Numbers are Collection of irrational and rational Number.

(II) Every Point on the number line is of the form $\sqrt{m}$, where m is a natural number.

No, because every Point on the number line is not form of $\sqrt{m}$ where m is natural Number.

let $m = 1$, then Square root of $m = 1$

$m = 2$ " " " " $m = 1.414$ ---

$m = 3$ " " " " $m = 1.732$ ---

and So on —

but what about zero, 1.111, 1.8384, 3.0, etc. which are not been Place in number line by Square root of m method.

while Number line Consitsts Infinite No. b/w two distinct digits, which are impossible to find out any function.

No Underroot function Can't takes the Places of number line.

Hence Statement is false

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Date: 25/04/20
Page:

(III) Every Real Number is an irrational number (F)

No, because Real Number has both Rational and Irrational Number. So Real Number would be rational or Irrational. not only irrational.

Que-(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.

<u>Solution</u> = Square root of every Positive Integer will not yield an Integer. which are Called Irrational Number.

But $\sqrt{4}$ is 2, which is an Integer

There fore, we Conclude the Square root of every Positive Integer is not an irrational number.

<u>Que-3</u> = Show how $\sqrt{5}$ Can be represented on the number line.

<u>Solution</u> = At first you need to draw a line Segment AB of 2 Unit on the number line. Then draw a Perpendicular line Segment BC at B of 1 Units Then Join the Points C and A. to form a line Segment AC. According to Pythagorean ~~triplet~~ theorem

$$AC^2 = AB^2 + BC^2$$

$$AC^2 = 2^2 + 1^2 = 5$$

$AC = \sqrt{5}$, Then draw the arc ACD, to get the number $\sqrt{5}$ on the number line.