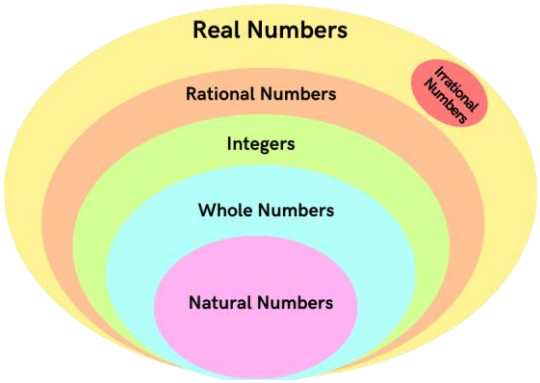
Number Systems

We know that a number is a mathematical value that helps to count or measure objects and helps in performing various mathematical calculation. Types of numbers are, Whole Numbers, Integers, Rational Numbers, Irrational Numbers and Real Numbers etc.



Natural Numbers

Natural Numbers (N) are positive numbers i.e. 1, 2, 3..and so on.

Whole Numbers (W) are 0, 1, 2...and so on. Whole numbers are all Natural Numbers including '0'. Whole numbers do not include any fractions, negative numbers or decimals.

Integers Integers are just like whole numbers, but they also include negative numbers. They are denoted by Z. Examples: …-3, -2, -1, 0, 1, 2…

Rational Numbers A number 'r' is called a rational number if it can be written in the form, where p and q are integers and q ≠ 0. (**Repeating and terminating. For ex 2, 4/7, 5/9, 0/1 etc.**)

Irrational Numbers Any number that cannot be expressed in the form of, where p and q are integers and q ≠ 0, is an irrational number. Examples: √2, 1.010024563…, e, π. **(Non-Repeating and Non-Terminating For ex 2.01001000100001…, 4.020020002…)**

Real Numbers p / q Number Systems any number which can be represented on the number line is a Real Number(R). It includes both rational and irrational numbers. Every point on the number line represents a unique real number.

Real Numbers = Rational + Irrational Numbers

Irrational Numbers

Representation of Irrational numbers on the Number line

I. Let √x be an irrational number. To represent it on the number line we will follow the following steps: Take any point A. Draw a line AB = x units.

II. Extend AB to point C such that BC = 1 unit.

III. Find out the mid-point of AC and name it 'O'. With 'O' as the center draw a semi-circle with radius OC.

IV. Draw a straight line from B which is perpendicular to AC, such that it intersects the semi-circle at point D. Length of BD = √x.