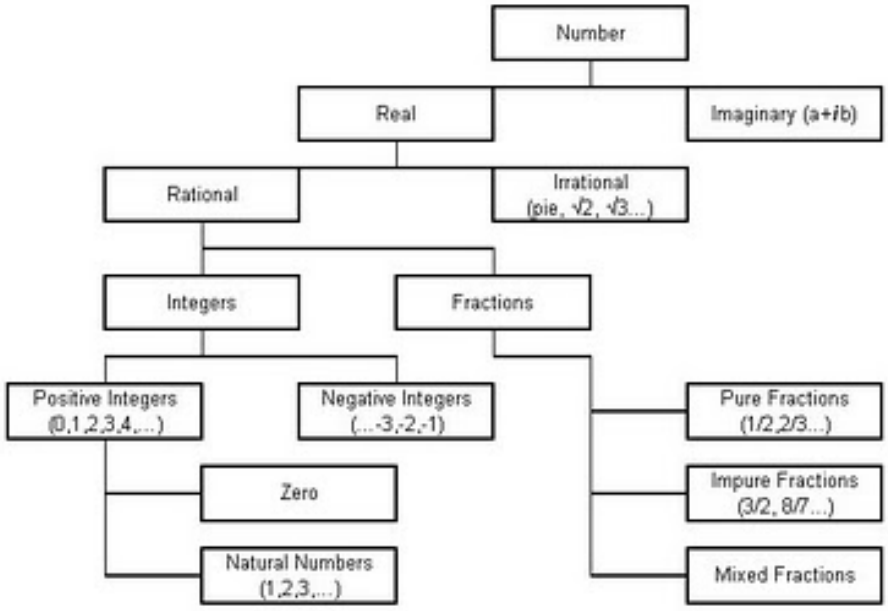
UNIT 4
CHAPTER 2
NUMBER SYSTEM
BASIC CONCEPT BUILDER

Classification of the numbers:

The concept of numbers is made clear from the number tree. The basics of number tree is given below.

- **Number Tree –**



Essential definitions are given below

Real Number: - The real numbers include all of the measuring numbers.All the numbers on a number line starting from -∞ to +∞ are real numbers.

Imaginary Number: - Number with square root of negative number is called imaginary number. These numbers are in the form of a + ***i***b.

Rational Number: - A rational number is a number that can be expressed as a fraction(p/q) with an integer numerator and a non-zero natural number denominator. A number repeated after a decimal is a recurring number. ***All recurring numbers are rational numbers.***

Conversion of Recurring number to p/q form -

Find the number 1.45454545…….in the form of p/q.
Let x=1.454545…..

100x=145.454545….
100x-x = 145.454545….-1.454545….
99x = 144
X = 145/99

Irrational Number: - In mathematics, an **irrational number** is any real number which cannot be expressed as a fraction *m*/*n*, where *m* and *n* are integers, with *n* non-zero and is therefore not a rational number.

Integers: - The **integers** are formed by the natural numbers including 0 (0, 1, 2, 3, ...) together with the negatives of the non-zero natural numbers (−1, −2, −3, ...). Viewed as subset of the real numbers, they are numbers that can be written without a fractional or decimal component, and fall within the set {... −2, −1, 0, 1, 2 ...}.

Fractions: - A **fraction** is a number that can represent part of a whole.

Proper Fraction: Value of the fraction is less than 1. These are in the form of ½, 2/3 , ¾ ..

Improper Fraction: - Value of the fraction is greater than 1. These are in the form of 3/2 , 4/3 …

Mixed Fraction: - When an integer is given before proper fraction then number is called mixed fraction. Numbers of the form 2¾.

Whole Number: All non negative numbers including Zero. W ~ (0,1,2,3,4...)

Natural Numbers: - All the number starting from 1. N ~ (1,2,3,4...)

Natural Numbers = Whole Number - Zero

Prime and Composite Numbers - A number which has two factors 1 and itself is a prime number. 2 is the only even prime number and that prime numbers greater than 3 are of the form 6k±1,or 4k±1 where k is a natural number.. Here the converse is not true.i.e. all those numbers in the above mentioned form are not necessarily the prime number.

Co-Prime Numbers (Relatively Prime Numbers):-

Pair of numbers that do not have any common factor except 1 are known as Co-prime numbers.

Remember:-
1. One is co-prime with any other number. (1,2) , (1,3) …
2. Two Consecutive numbers are always co-prime.
3. A prime number is co-prime with all numbers except its multiple.
4. Two prime numbers are always co-prime.