Natural Numbers : Set of counting numbers is callled natural numbers. It is denoted by N. where,

N = {1, 2, 3, ...∞}

Even Numbers : The set of all natural numbers which are divisible by 2 are called even numbers. It is denoted by E.

Where, E = {2, 4, 6, 8, 10, ...∞}

Odd Numbers : The set of all natural numbers which are not divisible by 2 are called odd numbers. In other words, the natural numbers which are not even numbers, are odd numbers. i.e.,

O = {1, 3, 5, 7, ...∞}

Whole Numbers : When zero is included in the set of natural numbers, then it forms set of whole numbers. It is denoted by W. where,

W = {0, 1, 2, 3, ...∞}

Integers : When in the set of whole numbers, natural numbers with negative sign are included, then it becomes set of integers. It is denoted by I or Z.

I : [– ∞, ... –4, –3, –2, –1, 0, 1, 2, 3, 4, ...∞]

Integers can further be classified into negative or positive Integers. Negative Integers are denoted by Z^- and positive Integers are denoted by Z^+.

Z^- = {– ∞, ... –3, – 2, –1} and

Z^+ = {1, 2, 3, ... ∞}

Further 0 is neither negative nor positive integer.

Prime Numbers: The natural numbers which have no factors other than 1 and itself are called prime numbers.

Note that, (i) In other words they can be divided only by themselves or 1 only. As, 2, 3, 5, 7, 11 etc.

(ii) All prime numbers other than 2 are odd numbers but all odd numbers are not prime numbers.

2 is the only one even Prime number.

Co-Prime Numbers : Two numbers which have no common factor except 1, are called Co–Prime numbers. Such as, 9 and 16, 4 and 17, 80 and 81 etc.

It is not necessary that two co–prime numbers are prime always. They may or may not be prime numbers.

Divisible numbers/composite numbers : The whole numbers which are divisible by numbers other than itself and 1 are called divisible numbers or we can say the numbers which are not prime numbers are composite or divisible numbers. As, 4, 6, 9, 15, ...

Note : 1 is neither Prime number nor composite number. Composite numbers may be even or odd.

Rational Numbers : The numbers which can be expressed in the form of $\dfrac{p}{q}$ where p and q are integers and coprime and $q \neq 0$ are called rational numbers. It is denoted by Q. These may be positive, or negative.

e.g. $\dfrac{4}{5}, \dfrac{5}{1}, -\dfrac{1}{2}$ etc are rational numbers.

Irrational Numbers : The numbers which are not rational numbers, are called irrational numbers. Such as

$$\sqrt{2} = 1.414213562...........$$

$$\pi = 3.141592653 ....$$

Real Numbers: Set of all rational numbers as well as irrational numbers is called Real numbers. The square of all of them is positive.

Cyclic Numbers : Cyclic numbers are those numbers of n digits which when multiplied by any other number upto n gives same digits in a different order. They are in the same line. As 142857

$2 \times 142857 = 285714 : 3 \times 142857 = 428571$

$4 \times 142857 = 571428 : 5 \times 142857 = 714285$

Perfect Numbers : If the sum of all divisors of a number N (except N) is equal to the number N itself then the number is called perfect number. Such as, 6, 28, 496. 8128 etc.

The factor of 6 are 1, 2 and 3

Since, 6 : 1 + 2 + 3 = 6

28 : 1 + 2 + 4 + 7 + 14 = 28

496 : 1 + 2 + 4 + 8 + 16 + 31 + 62 + 124 + 248 = 496

8128 : 1 + 2 + 4 + 8 + 16 + 32 + 64 + 127 + 254 + 508 + 1016 + 2032 + 4064 = 8128. etc.

Note : In a perfect number, the sum of inverse of all of its factors including itself is 2 always.

e.g. Factors of 28 are 1,2,4,7,14 are

$$= \dfrac{1}{1} + \dfrac{1}{2} + \dfrac{1}{4} + \dfrac{1}{7} + \dfrac{1}{14} + \dfrac{1}{28} = \dfrac{56}{28} = 2$$

Complex Numbers : Z = a + ib is called complex number, where a and b are real numbers, $b \neq 0$ and $i = \sqrt{-1}$.

Such as, $\sqrt{-2}$, $\sqrt{-3}$ etc.

So, a + ib or 4 + 5i are complex numbers.