Number System

The number system is among the most important topics in the whole of mathematics.
This topic is the backbone of mathematics. They are advised to go through this topic,
understanding each and every aspect of the topic with utmost care.
In this document, basic definitions of different types of number systems are given. Not only
definitions but various questions with solved examples are given for a better understanding on
the basis of theory.

Natural Numbers
Any positive counting integers are called natural numbers.
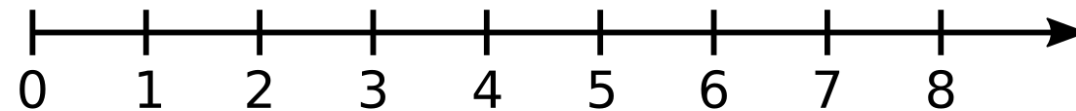The natural numbers can be represented by N = (1, 2, 3, 4, 5, 6, 7……)
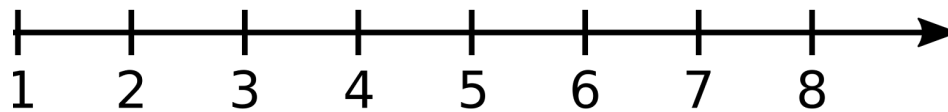
Whole Numbers
When we include zero (0) among the natural numbers, then these numbers 0, 1, 2, 3, 4, 5, 6,
7….. etc are known as whole numbers.
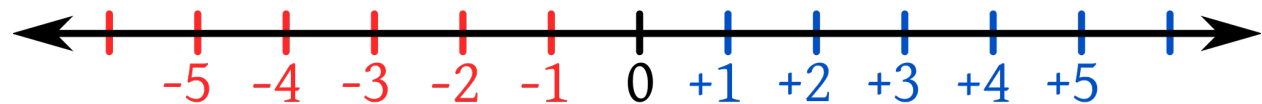Whole number (W) = 0, 1, 2, 3, 4, 5, 6,7…..
We can clearly say that every natural number is a whole number while zero (0) is a whole
number but not a natural number.

Integers
All the counting numbers positive and their negatives including zero are called integers.
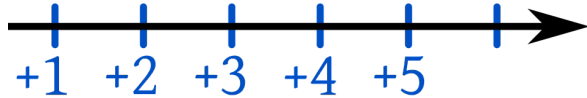The set of integers: n = (…. -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5….)

Positive Integers

The set of all positive numbers (1, 2, 3, 4, 5, 6, 7…..) are positive integers.
In this way, it can understood that positive Integers and natural numbers are synonyms for each other.

+1   +2   +3   +4   +5

Negative Integers

The set of all negative numbers (-1, -2, -3, -4, -5) are negative integers.
Zero (0) is neither a negative nor a positive integer.

−5   −4   −3   −2   −1

Rational Numbers

If the numbers are in the p/q form and q is not equal to zero (0) or q ≠ 0, where p and q are integers are called rational numbers.
Example: ¾, ⅞, -⅗, 3/5

Irrational Numbers

The numbers when expressed in decimal form and are neither terminating nor repeating decimals, then those numbers are known as irrational numbers.
Examples: √2, √3, √5, √7, π (because the exact value π is not 22/7 while 22/7 is a rational number), etc.

Real Numbers

It is a combination of rational and irrational numbers.
Example: √7, 5+√2, 3+√5, etc…
The real numbers are denoted by R.

Complex Numbers

Complex numbers are represented as a +ib, where a and b are real numbers and i=√-1.
eg: 3i, 6+2i, i, 2+7i etc are Complex numbers.

Even Numbers

The numbers which are exactly divisible by 2 are known as even numbers.
eg: 8, 6, 16, 8, 12, 24, etc.

Odd Numbers

If the numbers are not exactly divisible by 2 are known as odd numbers.
Eg: 3, 5, 1, 7, 11,23, etc.

Prime Numbers

All those numbers that are divisible by 1 and itself and not divisible by any other number are called prime numbers.
e.g.: 2, 5, 7, 3, 13, etc.
Note: 2 is the only prime number that is also an even number.
Rest all other are odd prime numbers.

Composite Numbers

Natural numbers greater than 1 and not prime numbers are composite numbers.
Examples: 4, 8, 9, 14, etc

Co Prime Numbers

Two numbers that have only 1 as the common factor are known as Co Primes or relatively prime numbers to each other.
eg: (3, 5) (8, 9) (36, 25) etc.
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