Addition and Subtraction of Integers

The numbers which can be written as non-fractions are called integers. They include all natural numbers, zero and negative numbers.

E.g. -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5 etc.

Integers which carry negative sign are called negative integers like -1, -5, -8 etc.

Integers which do not carry negative sign are called positive integers except for zero. E.g. 2, 8, 21 etc.

Integers extend on both sides of a number line.

Important points:

- Zero is an integer that is neither positive nor negative.
- We cannot determine the greatest and the smallest integers as the number line representing integers can extend infinitely in both directions.
- All positive integers are greater than all negative integers. E.g. 2 is greater than -5.
- Integers represent the set of positive natural numbers, their negative representations and zero (0).
- The sum of any integer and its negative representation is always zero. E.g. Sum of 5 and -5 is 0.
- The absolute value of an integer is its value without considering the sign. Absolute value is the distance of the integer from zero.
- The absolute values of an integer and its negative representation are the same. E.g. The absolute value of 5 and -5 is 5.

Rules for the addition of integers:

1. If both the integers being added are positives, then simply add them.
2. If both the integers being added are negatives, then add the integers considering them as positives and then put the negative sign with the result.
3. If one of the two integers is negative and the other is positive then we calculate the difference of their absolute values and use the sign of the integer having the higher absolute value.

Properties of Addition of Integers:

1) Closure Property: The sum of two integers is always an integer. Thus we can say that integers are closed under addition.

eg 2 + 3 = 5, here 2 and 3 are an integer and 5 is also an integer.

2) Commutative Property: If we add two integers and then we change the order of the numbers but the sum will remain the same. If P and Q are two integers then P + Q = Q + P.

eg: i) 8+9 = 9+8

17 = 17

ii) -7+(-12) = -12+(-7)

-19 = -19

Associative Property: If we change the order of number the sum remains unchanged.

eg: a+(b+c)=(a+b)+c

7+(6+2)=(7+6)+2

7+8=13+2

15=15

4)Additive Identity: When we added 0 to any integer,sum remains same.In this case 0 is the additive Identity.

eg: a+0=a

12+0=12

5)Additive Inverse: When we add the same number with opposite sign,answer comes to zero.

Same number with opposite sign are called Additive Inverse.

Subtraction of Integer:

Subtraction is inverse operation of addition of Integers.

Properties of Subtraction of Integers:

1)Closure Property: Difference of two integer is always an integer.

Eg:12-8=4

All are integer in above example.

2)Commutative Property: This property is not followed in subtraction.

Eg: 5-4 is not equal to 4-5

3)Associative Property: This property is not followed in subtraction.