CLASS NOTES

Properties of Addition and Subtraction of Integers

Closure under Addition

Integers are closed under addition since, addition of two integers gives an integer.

For any two integers a and b, a + b is an integer.

Example: (-10) + 3 = -7, is an integer

Closure under Subtraction

Integers are closed under subtraction.

For any two integers a and b, a - b is an integer.

Example: (-10) - 3 = -13, is an integer

Commutative Property

Addition is commutative for integers.

Example: Consider the integers 5 and (-3)

5 + (-3) = 2 and (-3) + 5 = 2

For any two integers a and b, a + b = b + a.

i.e., 5 + (-3) = (-3) + 5

Subtraction is not commutative for integers.

For any two integers a and b,
a - b ≠ b - a.

Example: Consider the integers 5 and (-3)

5 - (-3) = 8 and (-3) - 5 = -8

i.e., 5 + (-3) ≠ (-3) + 5

Associative Property

For any integers a, b and c,
a + (b + c) = (a + b) + c

Example: Consider the integers -3, 5 and -4

(-3) + [5 + (-4)] = (-3) + 1 = -2

[(-3) + 5] + (-4) = 2 + (-4) = -2

∴   (-3) + [5 + (-4)] = [(-3) + 5] + (-4)

Additive Identity

For any integer a,
a + 0 = a = 0 + a

Example: Consider the integer (-5)

$$(-5) + 0 = -5 = 0 + (-5)$$

Additive Inverse

For any integer a,
a + (-a) = 0

Example: Consider the integer (-5)

$$5 + (-5) = 0$$

The additive inverse of 5 is -5.