Properties of Whole Numbers

☞ **A. Closure Property:** The sum and product of any two whole number is a whole number.

 Let's understand with some examples

 (i) 6 + 7 = 13(**a whole number**)

(ii) 7 × 6 = 42 (**a whole number**)

Note: Subtraction and Division of any two whole number are not closed.

Let's understand with some examples

(i) 6 – 7 = -1 (**Not a whole number**)

(ii) 7/0 = **Not defined**

☞ **B. Commutative Property:** Two whole numbers can be added and multiply in any order. Hence, Addition and multiplication are commutative for whole numbers. If a and b are any Whole numbers, then a + b = b + a also a × b = b × a
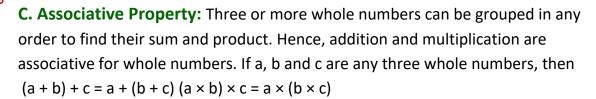
Let's understand with some examples

(i) 9 + 11 = **20** and 11 + 9 = **20**

(ii) 8 × 6 = **48** and 6 × 8 = **48**

Note: Subtraction and Division of any two whole number are not commutative.

Let's understand with some examples

(i) 7 – 5 = 2 and 5 – 7 = -2 **which is not same**

(ii) 8/2 = 4 and 2/8 = $\frac{1}{4}$ **which is not same**

☞ **C. Associative Property:** Three or more whole numbers can be grouped in any order to find their sum and product. Hence, addition and multiplication are associative for whole numbers. If a, b and c are any three whole numbers, then
 (a + b) + c = a + (b + c) (a × b) × c = a × (b × c)

Let's see some examples:-

(i) (752 + 807) + 947 = 1559 + 947 = 2506

   752 + (807 + 947) = 752 + 1754 = 2506

(ii) 2 × (3 × 4) = 2 × 12 = 24

   (2 × 3) × 4 = 6 × 4 = 24

Note: Subtraction and Division is not associative.

Properties of Whole Numbers

☞ **D. Distributive Property:-** The multiplication of a whole number is distributed over the total or difference of the whole numbers.
Consider three whole numbers, 9, 11, and 6.
9 × (11 + 6) = 9 × 17 = 153
(9 × 11) + (9 × 6) = 99 + 54 = 153
Thus, 9 × (11 + 6) = (9 × 11) + (9 × 6)

☞ **E. Property of Zero:-** When a whole number is multiplied to 0, the result is always 0, i.e., $x.0 = 0.x = 0$
Let's understand with an Example:
$0 × 6 = 0$
$6 × 0 = 0$
Here, $0 × 6 = 6 × 0 = 0$

☞ **F. Additive identity:-** When a whole number is added to 0, its value remains unchanged, i.e., if x is a whole number then $x + 0 = 0 + x = x$
Let's us understand with an Example:
Consider two whole numbers 0 and 16.
$0 + 16 = 11$
$16 + 0 = 11$
Here, $0 + 16 = 16 + 0 = 16$
Therefore, 0 is called the additive identity of whole numbers.

☞ **G. Multiplicative identity:-** When a whole number is multiplied by 1, its value remains unchanged, i.e., if x is a whole number then $x.1 = x = 1.x$
Let's us understand with an Example:
Consider two whole numbers 1 and 24.
$1 × 24 = 24$
$24 × 1 = 24$
Here, $1 × 24 = 24 = 24 × 1$
Therefore, 1 is the multiplicative identity of whole numbers.