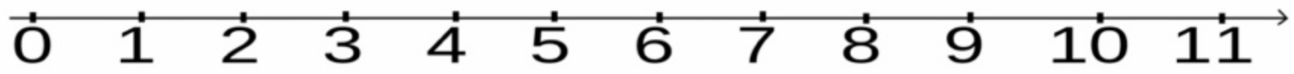
Natural Numbers



Natural numbers are the counting numbers. These are the numbers which start with 1. So the numbers 1, 2, 3… in which do our counting are called as natural numbers. It is denoted by $N = \{1, 2, 3, 4, 5,\ldots\}$. We denote the set of natural numbers with **N** only.

Whole Numbers

The set of natural numbers and a 0 in it makes it a whole number. Whole numbers have all the elements of natural numbers and zero. It is denoted by $W = \{0, 1, 2, 3, 4, 5,\ldots\}$. Every natural number is a whole number but every whole number is not a natural number. Note: 0 is a whole number but not a natural number.

Learn the Properties of Whole Numbers here.

Properties of Natural & Whole Numbers

Closure property

1) Addition: When two natural numbers or whole numbers are added, the result is always a natural number or a whole number. For example, take any two natural numbers, say 3 and 9. Now, $3 + 9 = 12$. 12 is a natural/whole number. Therefore, the system is closed under addition.

2) Subtraction: Subtraction of two whole or natural numbers does not always result in a whole number or natural number. For example, take any two natural numbers, say 3 and 9. Now, $3 - 9 = -6$. -6 is not a natural/whole number. Therefore, the system is not closed under addition.

3) Multiplication: Multiplication of two whole or natural numbers always results in a whole or natural number. For example, $3 \times 9 = 27$, 27 is the natural number. Therefore, the system is closed under multiplication.

4) Division: Division of two whole or natural numbers does not always result in whole or natural numbers. For example, $3 \div 9 = \frac{1}{3}$. $\frac{1}{3}$ is not a natural number. Therefore, the system is not closed under division.

Commutative Property

It is a property that associates with binary operations or functions like addition, multiplication. Take any two numbers a and b and subtract them. That is a – b, say 5 – (-3). Now subtract a from b. That is b – a, or -3 – 5. Are they same? No, they are not equal. So, the commutative property does not hold for **subtraction**. Similarly, it does not hold for **division** too.

Again take any two numbers a and b and add a and b them which comes to a + b. Now add b and a which comes to be b + a. Aren't the same? Yes, they are equal because of commutative property which says that we can swap the numbers and still we get the same answer.

Associative Property

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1) For Addition

$$a + (b + c) = (a + b) + c$$

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For example, if we take 2 , 5 , 11

$2 + (5 + 11) = 18$ and $(2 + 5) + 11 = 18$

2) For Multiplication

$$a \times (b \times c) = (a \times b) \times c$$

For example, $2 \times (5 \times 11) = 110$ and $(2 \times 5) \times 11 = 110$.

Hence associative property is true for addition and multiplication.

3) For Subtraction

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Associative property does not hold for subtraction

$a - (b - c) != (a - b) - c$

For example, if we take 4, 6, 12

$4 - (6 - 12)$ and $(4 - 6) - 12$

$= 4 + 6 = 10$ and $-2 -=12 = - 14$

Therefore associative property is not true for subtraction.

4) **For Division**

Associative property does not hold for division

$a \div (b \div c) != (a \div b) \div c$

For example, again if we take 4, 6, 12

$4 \div (6 \div 12)$ and $(4 \div 6) \div 12$

$= 4 \div \frac{6}{12}$ and $\frac{4}{6} \div 12$

we get,

$= 4 \times 2 = 8$ and $\frac{1}{3 \times 6} = \frac{1}{18}$

Therefore associative property is not true for division.

Multiplicative Identity for Natural & Whole numbers

The multiplicative identity for natural/whole numbers a is a number b which when multiplied with a, leaves it unchanged, i.e. b is called as the multiplicative identity of any integer a if $a \times b = a$. When we multiply 1 with a natural/whole number a we get

$$a \times 1 = a = 1 \times a$$

So, 1 is the multiplicative identity for natural/whole numbers.

Additive Identity for Natural & Whole numbers

The additive identity for natural/whole numbers a is a number b which when added with a, leaves it unchanged, i.e. b is called as the additive identity of any integer a if $a + b = a$. Now, when we add 0 with any natural/whole number a we get

$$a + 0 = a = 0 + a$$

So, 0 is the additive identity for natural/whole numbers.

Solved Examples for You

Question: Which of the following satisfies commutative property?

A. $12 + 18 = 18 + 12$

B. $12 - 18 \neq 18 - 12$

C. $5 - 6 \neq 6 - 5$

D. None of these

Solution: A. Commutative property means A+B = B+A. Since addition satisfies commutative property, A is the correct option.

Question- What is the whole number, give an example?

Answer- Whole numbers refer to the basic counting numbers like 0, 1, 2, 3, 4, 5 and so on and so forth. Thus, 1000, 999999999 and more are examples of this. They also consist of natural numbers beginning from 1. Moreover, these also include positive integers as well as 0.

Question- What are Natural numbers?

Answer- Counting numbers are referred to as Natural numbers. They start with 1 and thus go on like 2, 3, 4, 5, and more. These are ones in which we do counting and we use N to denote them. The set of natural numbers are denoted by only N.

Question- Is the number 0 a natural number?

Answer- As we know that 0 is neither positive nor negative, it is however considered a whole number despite not being positive. Thus, it comes under a natural number as well. It is present on the number line to identify numbers in a set but we don't use to count anything.

Question- What is the difference between a whole number and an integer?

Answer- The difference is that whole numbers are all natural numbers which include 0 like 0, 1, 2, 3, and 4 and so on. On the other hand, integers comprise of all whole numbers plus their negative counterpart like -4, -3, -2, -1, 0, 1, 2, 3, and 4.