Lecture No-1: Integers and Divisibility

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October 4, 2021

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Lecture 1: Integers and Divisibility

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Unit I : Integers & Divisibility
Lecture - 1

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1. The Integers

We know that,

(i) The integers can be added & multiplied within themseleves.
i.e if 2 & 3 are integers then their addition '+' $2+3=5$ is again a integer
Similarly, their multiplication '.' $2 \cdot 3 = 6$ is also a integer.

(ii) 0 and 1 are the identities with respect to addition & multiplication.

(iii) Two integers are always comparable.

i.e. if a & b are any two integers then either $a = b$ or $a < b$ or $a > b$.

This property of integer is called the order property which help us in arranging a given set of integers in the increasing order or decreasing order as per the requirement.

13,000, 12,300, 9,500, 20,000

The division by every non-zero integer is NOT always possible within set of integer.

Lecture 1: Integers and Divisibility

e.g. 2, 5 are in ($\mathbb{Z}$) integers

$2 \neq 0$, but $\frac{5}{2}$ is not an integers.

Important :- Set of Integers is denoted by $\mathbb{Z}$

(iv) The multiplicative inverse of a non-zero integer (other than ± 1) do not exist in $\mathbb{Z}$.

Hence, if $n \neq \pm 1$, then $\frac{1}{n}$ is not in $\mathbb{Z}$.

(v) Between every pair of distinct integers, there need not be an integer.

e.g. between 2 & 3, there is no integer.

This is the concept of being consecutive.

Note that, due to the concept of 'consucutiveness' there are gaps in the set of integers.

We begin with the set of positive integers, also called as Natural Numbers (N).

My Inspiration
Shri. V.G. Patil Saheb
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Thus, we will not be able to find the largest and smallest element for the set of integers $\mathbb{Z}$.

However, since the set of all natural numbers begin after '0', one may be able to find the smallest positive integer.

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Natural Numbers (N)

We know that, given any integer n, $n+1$ is an integer larger than n and $n-1$ is an integer smaller than n.

if $n = 5$

$\Rightarrow n+1 = 5+1 = 6$

$\therefore 6 > 5$ i.e. $n+1 > n$

Illy, $n-1 = 5-1 = 4$

$\therefore 4 < 5$ i.e. $n-1 < n$