

Unit - 1

Number System

Examples:

$$3 + 4 = 7$$

$$3 \times 4 = 12$$

$$-3 + 4 = 1$$

$$-3 \times 4 = -12$$

$$3 - 4 = -1$$

$$3 \times (-4) = -12$$

$$-3 - 4 = -7$$

$$(-3) \times (-4) = 12$$

Binary Operation : (+, -, ×, ÷)

Which Convert a number into data.

Unary Operation :

Which has negative sign or '-' before the number $[-2 \times 2 = -4]$.

Number System :

1. Natural Number (1, 2, 3, 4, 5, ...)

2. Whole Number (0, 1, 2, 3, 4, ...)

3. Integer Number (-1, -2, -3, ...)

1. Natural Numbers.

Which starts with 1 and ends with infinity within sets $\{1, 2, 3, 4, \dots\} \in \mathbb{N}$

$$2 \times 3 = 6 \in \mathbb{N}$$

2. Whole Numbers

Which starts with 0 and ends with $\{0, 1, 2, 3, 4, \dots\}$

3. Integer Numbers

Includes Positive, Negative and zero within sets $\{\dots, -3, -2, -1, 0, 1, 2, 3\}$

Rational Number:

Fractional Number or decimal number.

$$\frac{2}{3} = 0.6, \sqrt{49} = 7, \sqrt{25} = 5,$$

$$\frac{1}{2} = 0.5$$

Irrational Numbers:

Which are not rational number

$$\pi = 3.14, \sqrt{3}, \sqrt{5},$$

Imaginary Numbers:

Imaginary Numbers are the number when squared it gives the negative results. $\sqrt{-2}, \sqrt{-3}$

$$i = \sqrt{-1}$$

$$i^2 = (\sqrt{-1})^2 = (-1)^{\frac{1}{2}} = -1$$

$$i^3 = i^2 \cdot i = (-1) \times i = -i$$

$$i^4 = i^2 \cdot i^2 = (-1) \times (-1) = 1$$

Complex Numbers:

Real parts and Imaginary parts are called as Complex numbers.

$$\begin{array}{c} x + iy \\ \downarrow \quad \downarrow \\ \text{Real} \quad \text{Imaginary} \\ \sqrt{3} + i\sqrt{4} \\ \downarrow \quad \downarrow \\ R \quad I \end{array}$$

Odd Number:

When we divide a number and which gives remainder.

$$5/2 \Rightarrow 2 \overline{) 5} \begin{array}{r} 2 \\ 4 \\ \hline 1 \end{array} \quad \text{Eg: } \{1, 3, 7, 9, 11, \dots\}$$

Even Number:

When we divide a number and the remainder Zero.

$$\text{Eg: } \{2, 4, 6, 8, 10, \dots\}$$

Prime Number:

or (A number should only can divide 1 and itself) is called a prime number.

$$\text{Eg: } \{2, 3, 5, 7, 11, 13, 17, \dots\}$$

Composite Number:

Which are not prime number is called a composite number

Eg: $\{4, 6, 8, 9, 10, 12, \dots\}$