



মণিগোবিন্দোৰ ডেপুটী নক্সাৰাংল (ডেপুটী)

DEPARTMENT OF EDUCATION (S)

Government of Manipur

CHAPTER 1

INTEGERS

NOTES:

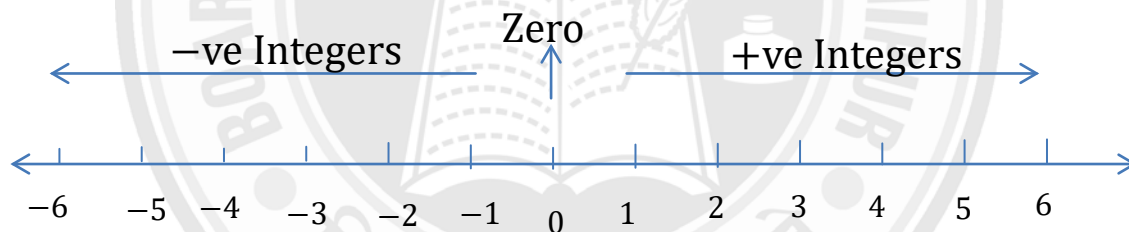
1. **Natural Number:** The numbers 1, 2, 3, 4, 5, are called **natural numbers**.
2. **Whole Number:** The numbers 0, 1, 2, 3, 4, 5, are called **whole numbers**.
 - I. All the natural numbers are positive numbers.
 - II. All the natural numbers are included in the whole number system.
 - III. The numbers obtained on putting minus sign before the natural numbers are called the negative numbers.
 - IV. **Zero** is neither positive nor negative.

INTEGERS

The group of positive and negative numbers with 0 together is called the integers.

e.g : , - 5, - 4, - 3, - 2, - 1, 0, 1, 2, 3, 4, 5,

The number systems of natural numbers, whole numbers and integers can be put on the number line.



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PROPERTIES OF ADDITION AND SUBTRACTION OF INTEGERS:

1. CLOSURE UNDER ADDITION :

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

e.g. $2 + 3 = 5$ is an integer .

2. CLOSURE UNDER SUBTRACTION:

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

e.g. $5 - 3 = 2$ is an integer.

3. COMMUTATIVE PROPERTY:

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

e.g. $2 + 3 = 3 + 2$

4. ASSOCIATIVE PROPERTY:

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

e.g. $2 + (3 + 4) = (2 + 3) + 4$.

5. ADDITIVE IDENTITY:

The sum of an integer and zero is always the number itself.

e.g. $5 + 0 = 5$.

MULTIPLICATION OF INTEGERS

1. Multiplication of two **positive** integers is **positive**.

i.e. $2 \times 3 = 6$.

2. Multiplication of a **positive** and a **negative** integer is always **negative**.

e.g. $2 \times (-3) = -6$.

3. **Multiplication** of two **negative** integers is always **positive**.

e.g. $-5 \times (-4) = 20$.

4. CLOSURE UNDER MULTIPLICATION

For any two integers a and b then $a \times b = ab$ is an integer.

e.g. $2 \times 3 = 6$ is an integer.

5. COMMUTATIVE UNDER MULTIPLICATION:

For any two integers a and b then $a \times b = b \times a$

$$\text{e.g. } 4 \times 5 = 5 \times 4.$$

6. MULTIPLICATION BY ZERO :

The product of an integer and zero is always zero.

$$\text{e.g. } 2 \times 0 = 0.$$

7. MULTIPLICATIVE IDENTITY :

The product of an integer and 1 is always the number itself.

$$\text{e.g. } 5 \times 1 = 5.$$

8. ASSOCIATIVITY OF MULTIPLICATION:

For any three integers a, b and c . The product of three integers does not depend upon the grouping of integers.

$$\text{i.e., } (a \times b) \times c = a \times (b \times c)$$

$$\text{e.g., } (2 \times 3) \times 4 = 2 \times (3 \times 4).$$

9. DISTRIBUTIVE PROPERTY :

For any three integers a, b and c .

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

$$\text{And, } a \times (b - c) = a \times b - a \times c$$



DIVISION OF INTEGERS

Rules of division of integers

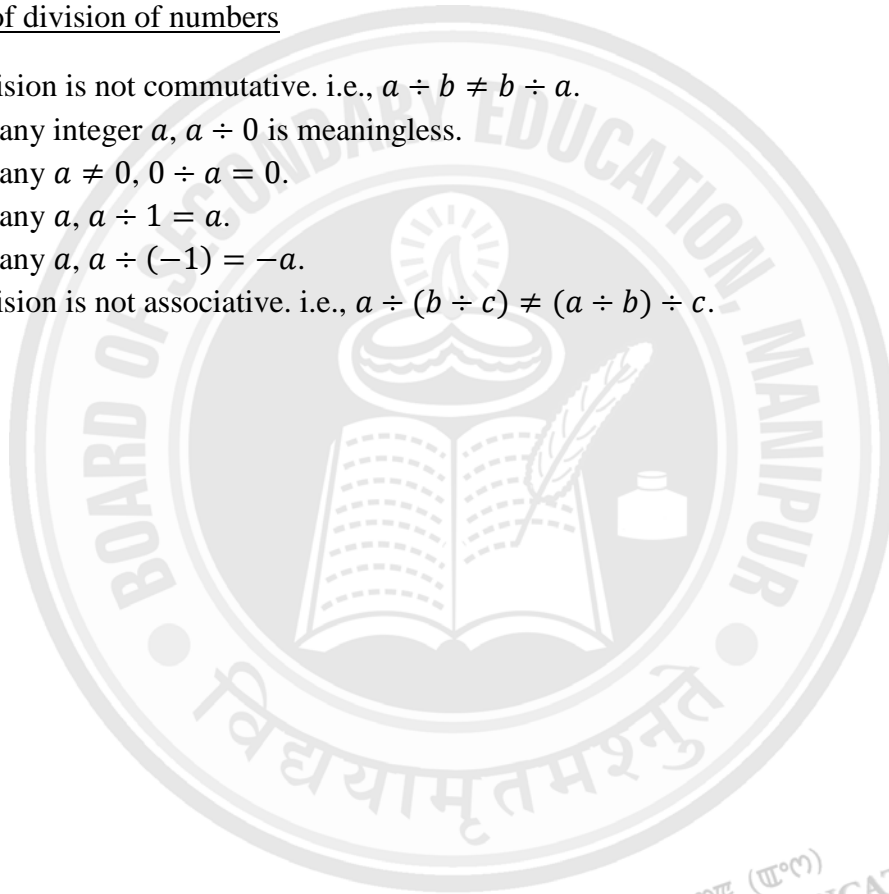
Rule1. When we divide a negative integer by a positive integer, we divide them as whole numbers and put a minus sign (–) before the quotient.

Rule2. When we divide a positive integer by a negative integer, we divide them as whole numbers and put a minus sign (–) before the quotient.

Rule3. When we divide a negative integer by a negative integer, we divide them as whole numbers and put a positive sign (+) before the quotient.

Properties of division of numbers

1. Division is not commutative. i.e., $a \div b \neq b \div a$.
2. For any integer a , $a \div 0$ is meaningless.
3. For any $a \neq 0$, $0 \div a = 0$.
4. For any a , $a \div 1 = a$.
5. For any a , $a \div (-1) = -a$.
6. Division is not associative. i.e., $a \div (b \div c) \neq (a \div b) \div c$.



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