

Tender Heart High School ; Sec- 33B ; Chd.

Class - VI

Date - 13.05.24

Subject - MATHEMATICS

Teacher - Ms. SUSHMA

Ch-3 INTEGERS

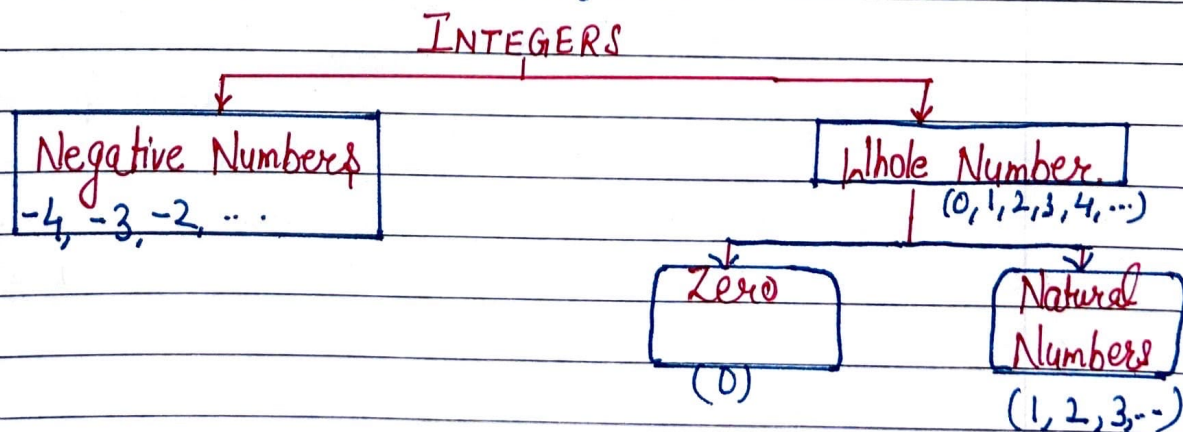
Integers include positive numbers, negative numbers, and zero. 'Integer' is a latin word which means 'whole' or 'intact'.

Integers include all whole numbers and negative numbers. An integer is a number with no decimal or fractional part and it includes negative and positive numbers, including zero.

eg:- $\dots -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, \dots$

A set of integers, which is represented as 'Z' includes:-

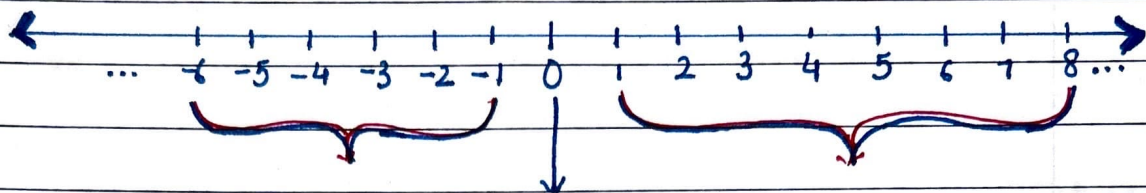
- Positive Numbers: $\rightarrow$ A number is positive if it is greater than zero. eg:- $1, 2, 3, \dots$
- Negative Numbers: A number is negative if it is less than zero. eg:- $-1, -2, -3, \dots$
- Zero is defined as neither a negative number nor a positive number. It is a whole number.



Integers on a Number Line.

A number line is a visual representation of numbers on a straight line.

Graphing Integers on a Number line:-



Negative
Integers

0 is neither
positive nor
negative

Positive integers

Absolute value of An Integer:

The absolute value of an integer is its numerical value regardless of its sign.

eg:- $|-6| = 6$
 $|6| = 6$

Exercise 3.1

Q1. Write the opposite of each of the following statements:-

1. Gain of ₹ 90
Loss of ₹ 90

3. 25% increase
25% decrease

2. 200m due west
200m due east

4. 10°C below freezing point
10°C above freezing point

Q2. Indicate the following using negative sign:-

i) An increase of 8
A decrease of -8

ii) Loss of ₹ 300
Gain of $-₹ 300$

iii) Spending ₹ 725
Saving $-₹ 725$

iv) 53 m below sea-level
 -53 m above sea-level

v) 20°C below freezing point.
 -20°C above freezing point

vi) 4 above average.
 -4 below average.

Q3. Write all integers between:-

(i) 3 and 10
 $\rightarrow 4, 5, 6, 7, 8, 9$

(ii) -3 and 6
 $-2, -1, 0, 1, 2, 3, 4, 5$

iii) -7 and 0
 $-6, -5, -4, -3, -2, -1, -$

iv) -12 and -8
 $-11, -10, -9,$

Q4. Write seven integers, each greater than -6.

→ -5, -4, -3, -2, -1, 0, 1

Q5. Fill in the blanks by using $>$ or $<$ or $=$.

(i) $-5 \dots \leq 3$

(ii) $0 \dots > -4$

(iii) $-8 \dots > -14$

(iv) $-23 \dots \leq -16$

Q6. Evaluate each of the following:-

(i) $| -17 | - | 8 |$

$= 17 - 8$

$= 9$

(ii) $| -14 | + | 5 |$

$= 14 + 5$

$= 19$

(iii) $| -9 | + | -6 |$

$= 9 + 6$

$= 15$

(iv) $| -8 | + | -6 | - | -10 |$

$= 8 + 6 - 10$

$= 14 - 10$

$= 4$

Q7. Write the following integers in ascending order:-

(i) 14, -7, -13, 0, 6, -2, 30

→ -13, -7, -2, 0, 6, 14, 30

(ii) -18, 14, -25, 32, -5, 2

→ -25, -18, -5, 2, 14, 32

Q8. Write the following integers in descending order:-

(i) -16, -21, 8, 0, -7, 14

14, 8, 0, -7, -16, -21

(ii) $-10, -43, -2, 1, -14, 6, 22$

$22, 6, 1, -2, -10, -14, -43$

Q 9. Represent each of the following on the number line:-

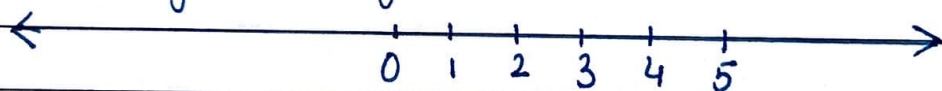
(i) All integers from -5 to $3 \rightarrow -4, -3, -2, -1, 0, 1, 2$



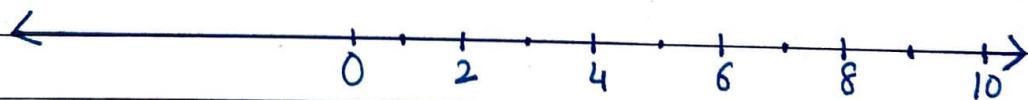
(ii) All negative integers greater than -6 .



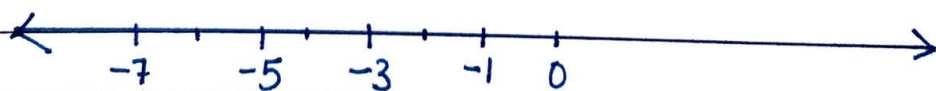
(iii) All non-negative integers less than 6 .



(iv) All even positive integers less than 12 .



(v) All odd negative integers greater than -8 .



Operations on Integers.

Addition of Integers - Adding integers is the process of finding the sum of two or more integers where the values might increase or decrease depending on the integer being positive or negative.

Rules of Integers in Addition

- When both integers have the same sign: Add the absolute values of integers, and give the same sign as that of the given integers to the result. eg:- $2+3=5$
- When one integer is positive and the other is negative:- Find the difference of the absolute values of the numbers and then give the sign of the larger of these numbers to the result.

eg:- $2+(-5) = -3$

Properties of addition of Integers.

1. Closure Property :- The sum of two integers is always an integer.
2. Commutative Law:- For all integers a and b ,
$$(a+b) = (b+a)$$
3. Associative Law:- For all integers a , b and c , we have
$$(a+b)+c = a+(b+c)$$
4. Existence of Additive Identity:- '0' is the additive identity in integers, as.
$$a+0=0+a=a$$

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Existence of Additive Inverse:-

For every integer $+a$, there exists an integer $(-a)$ such that

$$a + (-a) = (-a) + (+a) = 0$$

Here, $(+a)$ and $(-a)$ are called the additive inverses of each other.

Subtraction of Integers:-

$$a - b = a + (-b) = a + (\text{additive inverse of } b)$$

Exercise 3B

1. Find the sum:

(i) $16 + 21 = 37$

(ii) $(-16) + 21 = 5$

(iii) $16 + (-21) = -5$

(iv) $(-25) + (-18) = -43$

Q2. Write the additive inverse of

(i) $34 \rightarrow -34$

(ii) $-58 \rightarrow 58$

(iii) $0 \rightarrow 0$

(iv) $-1 \rightarrow +1$

Q3. Write the successor of

(i) $101 \rightarrow 102$

(ii) $-1 \rightarrow 0$

(ii) $-47 \rightarrow -46$

(iv) $-80 \rightarrow -79$

Q4. Write the predecessor of:-

(i) $40 \rightarrow 39$

(ii) $-32 \rightarrow -33$

Q5. Find the difference :-

$$(i) 15 - (21) = -6$$

$$(iii) 70 - \underbrace{(-8)}_{+} = 70 + 8 = 78$$

$$(ii) -29 - (9) = -38$$

$$(iv) -80 - (-20) = -80 + 20 = -60$$

Q6 Subtract:-

$$(i) -180 \text{ from } 180$$

$$= 180 - (-180)$$

$$= 180 + 180 = 360$$

$$(ii) -16 \text{ from } -25$$

$$= -25 - (-16)$$

$$= -25 + 16$$

$$= -9$$

Q7 What should be added to 15 to get (-15)?

Soln:- Let the required no to be added be 'x'

$$x + 15 = -15$$

$$x = -15 - 15$$

$$x = -30$$

$\therefore$ The required number is -30

Q8 What should be subtracted from (-3) to get 18?

Soln:- Let the required no. be x

A/Q.

$$-3 - x = 18$$

$$-x = 18 + 3$$

$$-x = 21$$

$$\boxed{x = -21}$$

$\therefore$ -21 is the required no.

Q12. The sum of two integers is -23 . If one of them is 12 , find the other.

Soln:-
Sum of two integers $= -23$
one integer $= 12$
Let another integer $= x$

A/Q.

$$12 + x = -23$$

$$x = -23 - 12$$

$$x = -35$$

$\therefore$ The other integer is ' -35 '.

Q13. While playing - - - - - loss or gain?

Soln:-
Amit's points in the first game $= -70$ (as Amit lost)
" " " " 2nd game $= -50$
" " " " 3rd " $= -35$
" " " " 4th game $= +60$ (He gained)
" " " " 5th " $= +80$

$$\text{Total points} = -70 + (-50) + (-35) + 60 + 80$$

$$= -155 + 140$$

$$= -15$$

So, Net loss $= 15$ Ans.