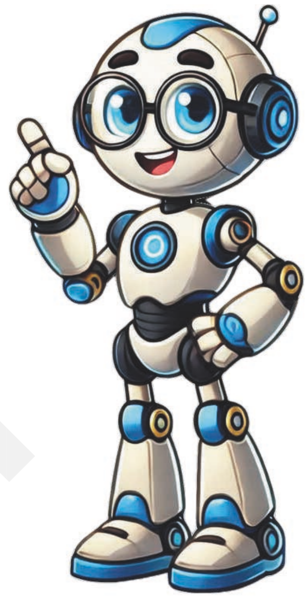
Chapter 1

Integers

We'll cover the following key points:

- → Integers
- → Addition and subtraction of integers
- → Multiplication of integers
- → Division of integers
- → Properties of integers



Hi, I'm EeeBee

Do you Remember fundamental concept in previous class.

In class 5th we learnt

- → Multiplication of Large Numbers
- → Division of Large Numbers

In class 4th we learnt

- → Properties of Addition
- → Properties of Subtraction

Still curious? Talk to me by scanning the QR code.

Learning Outcomes

By the end of this chapter, students will be able to:

- Define and identify integers and distinguish them from other types of numbers, such as whole numbers and natural numbers.
- Represent integers on a number line and identify their relative positions in relation to zero.
- Perform addition and subtraction of integers, including understanding and applying the rules for adding and subtracting positive and negative integers.
- Perform multiplication and division of integers, applying the rules for the multiplication and division of positive and negative integers.
- Understand and apply the properties of integers, including the closure property, where the sum, difference, product, and quotient of integers (except division by zero) is always an integer.
- Understand the commutative property of addition and multiplication, where changing the order of integers does not affect the result.
- Understand the associative property of addition and multiplication, where changing the grouping of integers does not affect the result.

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Mind Map

INTEGERS

Properties of addition of Integers

i. Closure property for any two integers a and b, a + b is an integer.

ii.Commutative property

a + b = b + a

iii. Associative property

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

iv. Additive Identity

a + 0 = 0 + a = a

Properties of subtraction of Integers

i. Closure property for any two integers a and b, a - b is an integer.

ii.Commutative property

a - b ≠ b - a

iii. Associative property

a - (b - c) ≠ (a - b) - c

iv. Subtraction of zero

a - 0 = a

Multiplication of integers

i. Positive integers × Negative integer = negative integer

e.g., (+4) × (-3) = -12

ii. Negative integers × negative integers = positive integers

e.g., ⇒(-4) × (-3) = + 12

Properties of multiplication of Integers

i. Closure property a × b = c

a × b is an integer for all integers a and b.

ii. Commutative property

a × b = b × a

iii. Multiplication by zero

a × 0 = 0

iv. Multiplicative identity

a × 1 = 1 × a = a

v. Associative property

a × (b × c) = (a × b) × c

vi. Distributive property

a × (b + c) = a × b + a × c

a × (b - c) = a × b – a × c

Division of integers

Division is the inverse operation of multiplication

3 × 5 = 15

15 ÷ 3 = 5 or 15 ÷ 5 = 3

a ÷ (-b) = (-a) ÷ b

(-a) ÷ (-b) = a ÷ b

Where b ≠ 0

Properties of Division of Integers

i. Division by zero

a ÷ 0 = not defined

ii. Division of zero

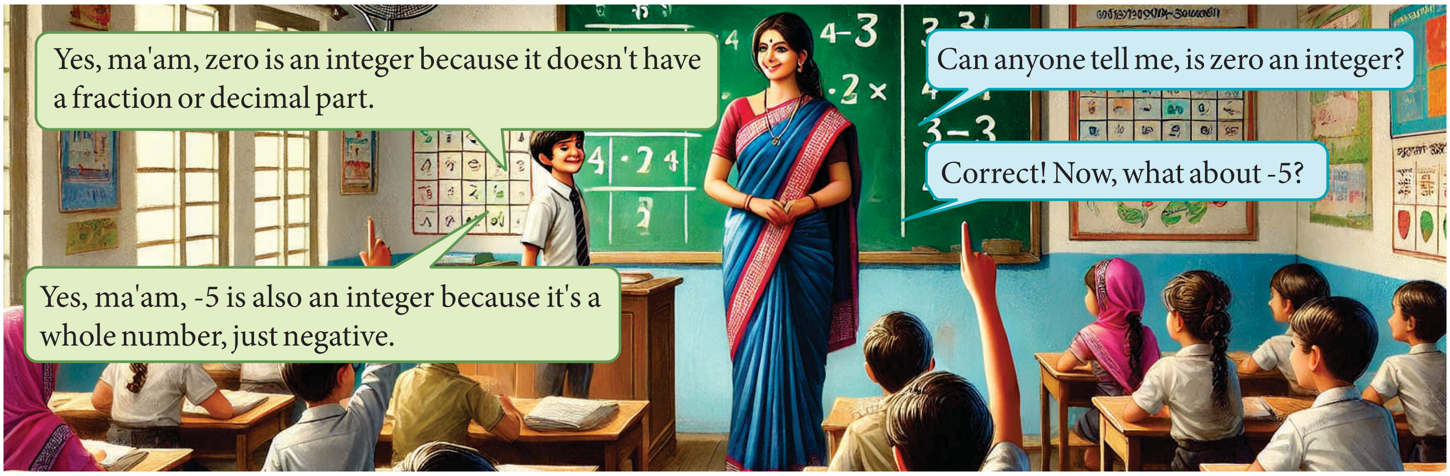
0 ÷ a = 0, a ≠ 0

iii. Division by 1

a ÷ 1 = a

Based on NCERT*

Introduction



Integers

A combined set of negative numbers, zero and whole numbers is called integers, i.e., $\{-4, -3, -2, -1, 0, 1, 2, 3, 4, \ldots\}$

Absolute value of an integer: The absolute value of an integer is the numerical value (magnitude) of an integer regardless of its sign (direction). It is denoted by the symbol $|\,|$. The absolute value of an integer is either zero or positive.

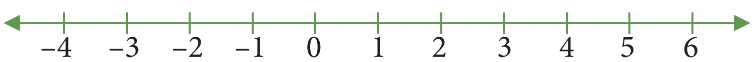
Examples: $|-5| = 5, |7-8| = |-1| = 1,$
$|3-3| = |0| = 0$

REMEMBER
The numbers 1, 2, 3, 4, ... are natural numbers.
The numbers 0, 1, 2, 3, 4, 5, ... are whole numbers.

Also, the corresponding positive and negative integers have the same absolute value.

Examples: $|9| = 9$ and $|-9| = 9$

Ordering of integers: Integers and whole numbers obey the same rule in their ordering when they are represented on a number line. The integer represented to the right of any integer is greater than that of integer to the left and vice versa.



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Examples: $5 > 4, 7 > 6, -1 > -2, -3 > -4$

From the above figure, it is clear that:

(*i*) For every positive integer to the right of zero, there is a negative integer to the left of zero placed at the same distance from zero.

(*ii*) Zero is greater than every negative integer and it is less than every positive integer.

(*iii*) Every positive integer is greater than every negative integer.

Addition and Subtraction of Integers

1. When two integers having the same sign (either positive or negative) are added, we add their absolute values and assign a common sign to their sum.

$$(32)+(12)=44$$

Generally, the '+' sign with positive integers is not written.

$$(-31)+(-4)=-35$$

2. While adding integers with different signs, we first find the difference of their absolute values and assign it the sign of the integer having greater absolute value.

$$(4)+(-9)=-5,\ (-8)+(9)=1,\ (5)+(-3)=2$$

3. While subtracting two integers, we change the integer to be subtracted into its corresponding negative integer and then simply add the two integers.

$$(7)-(3)=(7)+(-3)=4$$
$$(3)-(7)=(3)+(-7)=-4$$
$$(7)-(-3)=(7)+(3)=10$$
$$(3)-(-7)=(3)+(7)=10$$
$$(-7)-(-3)=(-7)+(3)=-4$$
$$(-3)-(-7)=(-3)+(7)=4$$
$$(-7)-(3)=(-7)+(-3)=-10$$
$$(-3)-(7)=(-3)+(-7)=-10$$

Addition of integers on the number line

Working Rules

Step 1 : Draw a number line and mark points as negative integers i.e., (–1, –2, –3, ...), zero and positive integers i.e., (1, 2, 3, ...).

Step 2 : For a positive integer move forward and for a negative integer move background.

Step 3 : The end is the result.

Examples 1 : Add the following number on number line :

(*i*) 5 and 3 (*ii*) –3 and –4 (*iii*) 5 and –3

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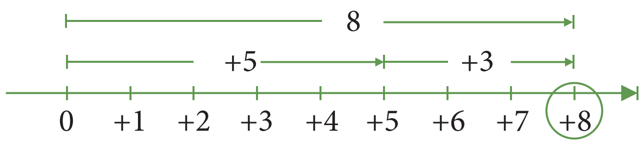
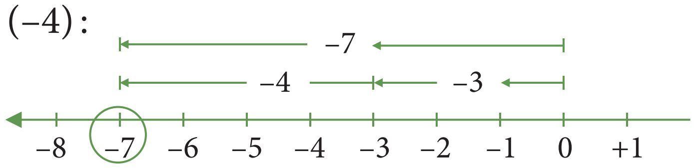
Solution : (*i*) $5 + 3$



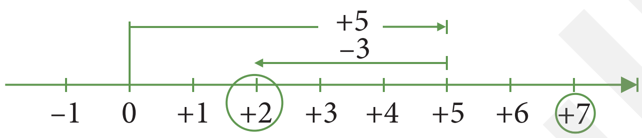
Hence, $5 + 3 = 8$.

(*ii*) $(-3) + (-4)$:



Hence, $(-3) + (-4) = -7$

(*iii*) $5 + (-3)$:



Hence, $5\,(-3) = 2$

Exercise 1.1

1. Tick (✓) the correct option:

(*i*) The integer, 5 less than –4, is:

(*a*) 1 ☐ (*b*) 9 ☐ (*c*) –9 ☐ (*d*) –1 ☐

(*ii*) The additive inverse of –9 is:

(*a*) $\frac{1}{9}$ ☐ (*b*) $-\frac{1}{9}$ ☐ (*c*) 9 ☐ (*d*) –9 ☐

(*iii*) $|18| + |-17|$ is equal to:

(*a*) –1 ☐ (*b*) 1 ☐ (*c*) 35 ☐ (*d*) –35 ☐

2. Arrange the following integers in ascending order:

(*i*) 18, – 6, 8, –13, 10, 26, –13 (*ii*) – 35, 17, 15, – 10, 12, – 21

3. Arrange the following integers in descending order:

(*i*) –20, – 25, 17, 23, – 19, 14 (*ii*) 10, – 9, – 15, 8, – 7, 23, 6, 5

4. Write the absolute value of the following:

(*i*) $|-3-3|$ (*ii*) $|0-8|$ (*iii*) $|-31+13|$ (*iv*) $|-22-17|$

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5. **Which temperature is higher?**

(*I*) −18°C or 18°C (*ii*) −25°C or 19°C

(*iii*) 0°C or −30°C (*iv*) −14°C or 22°C

6. **Add the following:**

(*i*) 9 + (−4) (*ii*) −14 + (−13) (*iii*) −19 + (−6) (*iv*) 12 + (−19)

7. **Subtract the following:**

(*i*) 5 − (−7) (*ii*) 8 −(14) (*iii*) −29 − (−7) (*iv*) −15 − (39)

Multiplication of Integers

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We have learnt that multiplication is nothing but repeated addition. So, we can find the product of any two integers using the repeated addition method.

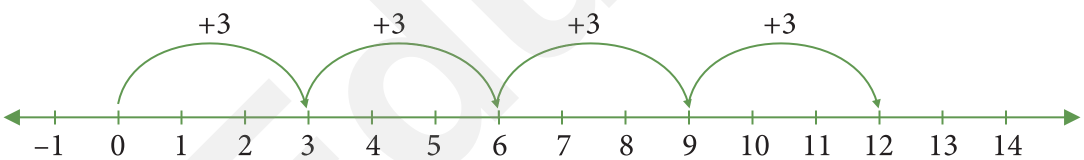
Examples 2 : Find the value of (3) × (4).

Solution :

$= (3) \times 4$

$= (3) + (3) + (3) + (3) = (12)$

On the number line, (3) × (4) means moving to the right of zero 4 times in steps of 3.



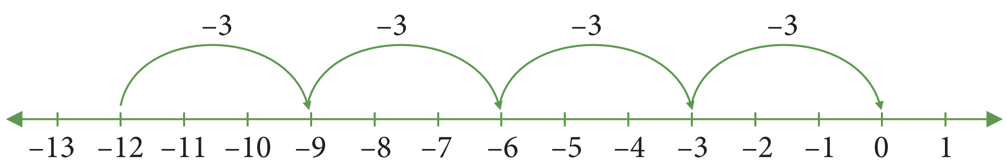
Examples 3 : Find (−3) × 4.

Solution :

$= (-3) \times 4$

$= (-3) + (-3) + (-3) + (-3) = -12$

(−3) × 4 means moving to the left of zero 4 times in steps of 3.



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Multiplication of two negative numbers

Let us observe the following pattern:

$(-4) \times 4 = -16$

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

Division of Integers

We know that for whole numbers, every multiplication fact gives two division facts, for example,

$9 \times 7 = 63$ (multiplication fact)

$63 \div 7 = 9$ and $63 \div 9 = 7$ (division facts)

This rule is true for integers also.

Examples: (*i*) $(-12) \times 4 = -48$ gives

$(-48) \div 4 = -12$ and

$(-48) \div (-12) = 4$

(*ii*) $7 \times (-3) = -21$ gives

$(-21) \div 7 = -3$ and

$(-21) \div (-3) = 7$

(*iii*) $(-12) \times (-10) = 120$ gives

$(120) \div (-12) = -10$ and

$120 \div (-10) = -12$

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From the above, we can conclude:

(*i*) The division of two positive integers or two negative integers gives a positive quotient, i.e., $(+) \div (+) = (+)$ and $(-) \div (-) = (+)$

(*ii*) The division of a positive integer by a negative integer or the division of a negative integer by a positive integer gives a negative quotient, i.e.,

$(+) \div (-) = (-)$ and $(-) \div (+) = (-)$

Thus, for the division of two integers, the rule is as follows:

First, find the quotient of the absolute values of the integers, and

(*i*) assign a positive sign (+) to the quotient if both the divisor and dividend have the same sign (positive or negative)

(*ii*) assign a negative sign to the quotient if the divisor and dividend have opposite signs.

Let us see an example:

$(-4) \times 2 = (-8)$

$(-4) \times 1 = (-4)$

$(-4) \times 0 = 0$

What do you observe in the above pattern?

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When the multiplier decreases by 1, the product increases by 4. Using this fact, we can proceed like this:

$$(-4) \times (-1) = 4$$
$$(-4) \times (-2) = 8$$
$$(-4) \times (-3) = 12$$
$$(-4) \times (-4) = 16$$

From the above examples, we can conclude that the product of two integers is the product of their absolute values and their signs are as follows:

(*i*) The product of two positive integers has a positive sign.

$(5) \times (6) = 30$

$(7) \times (4) = 28$

(*ii*) The product of two negative integers has a positive sign.

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

$(-9) \times (-7) = 63$

(*iii*) The product of two integers with opposite signs have a negative sign.

$(8) \times (-5) = -40$

$(-6) \times (7) = -42$

Example 4: Find the products of the following:

(*i*) $(-3) \times 4$ (*ii*) 6×9

(*iii*) $(-12) \times (-12)$ (*iv*) $5 \times (-12)$

Solution: (*i*) $(-3) \times 4 = -12$ (minus × plus = minus)

(*ii*) $6 \times 9 = 54$ (plus × plus = plus)

(*iii*) $(-12) \times (-12) = 144$ (minus × minus = plus)

(*iv*) $5 \times (-12) = -60$ (plus × minus = minus)

Example 5: Determine the quotient for each of the following:

(*i*) $72 \div (-8)$ (*ii*) $-22 \div (-11)$ (*iii*) $(-80) \div 10$ (*iv*) $42 \div (-6)$

Solution: (*i*) $72 \div (-8) = \frac{72}{-8} = -9$

(*ii*) $-22 \div (-11) = \frac{-22}{-11} = 2$

(*iii*) $(-80) \div 10 = \frac{-80}{10}$

$= -8$

(*iv*) $42 \div (-6) = \frac{42}{-6}$

$= -7$

Exercise 1.2

1. Multiply the following:

(*i*) 0 and 20 (*ii*) (–75) and 0 (*iii*) 6 and (–5)

(*iv*) (–25) and 8 (*v*) 18 and (–4) (*vi*) (–15) and (–7)

2. Find the product of the following:

(*i*) $(-9) \times 3$ (*ii*) $0 \times (-125)$ (*iii*) $4 \times (-42)$

(*iv*) $(-17) \times (-5)$ (*v*) $(-7) \times (-49)$ (*vi*) $(-18) \times (-12)$

(*vii*) $(-1) \times (-3) \times (6)$ (*viii*) $(-6) \times (-6) \times (-6)$ (*ix*) $(-10) \times 0 \times (-18)$

3. Fill in the blanks:

(*i*) $(-23) \times 0 \times 188 =$ ______ (*ii*) $(-1) \times (-1) \times 1 =$ ______

(*iii*) $144 \div (-12) =$ ______ (*iv*) ______ $\div (-13) = 13$

(*v*) ______ $\div 349 = 0$ (*vi*) $(-12) \div (-12) =$ ______

4. Determine the quotient for each of the following:

(*i*) $0 \div 8$ (*ii*) $15 \div (-3)$ (*iii*) $0 \div 32$

(*iv*) $(-27) \div (-9)$ (*v*) $(-60) \div 4$ (*vi*) $36 \div (-36)$

(*vii*) $(-49) \div (-7)$ (*viii*) $88 \div 11$

5. Simplify and find the absolute value of the following:

(*i*) $|20 \div (-5)|$ (*ii*) $|6 \times (-3)|$

(*iii*) $|(-10) - (-15) \div 5 - (-2)|$ (*iv*) $|6 \times (-5) - (-3)|$

Mental Maths

1. State true or false:

(*i*) $0 \div (-7) = 0$ (*ii*) $12 \div 0 = 0$ (*iii*) $1 \div 1 = 1$

(*iv*) $0 \div 4 = 0$ (*v*) $2 \times (-3) = 6$ (*vi*) $(-3) \times (-1) = 3$

2. An integer when divided by (–2) gives 42. Find the integer.

Properties of Integers

Properties of addition

Closure Property: Let a and b be any two integers, then $a + b$ will always be an integer. This is called the closure property of addition of integers.

Examples: $8 + 5 = 13, (-12) + 6 = -6, 9 + (-15) = -6$

Commutative Property: If a and b are two integers, then $a + b = b + a$, i.e., on changing the order of integers, we get the same result. This is called the commutative property of addition of integers.

Examples: $4 + 6 = 6 + 4 = 10, (-3) + (12) = (12) + (-3) = 9, (-8) + (-4) = (-4) + (-8) = -12$

Associative Property: If a, b, and c are three integers, then $a + (b + c) = (a + b) + c$, i.e., in the addition of integers, we get the same result, even if the grouping is changed. This is called the associative property of addition of integers.

Examples: $[(-3) + (-4)] + (8) = (-3) + [(-4) + 8]$

Or $(-7) + 8 = (-3) + 4$

Or $1 = 1$

Additive Identity: If zero is added to any integer, the value of the integer does not change. If a is an integer, then

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

Hence, zero is called the **additive identity of integers**.

Examples: $12 + 0 = 12 = 0 + 12$

$(-3) + 0 = (-3) = 0 + (-3)$

Additive Inverse: When an integer is added to its opposite, we get the result as zero (additive identity). If a is an integer, then $(-a)$ is its opposite (or vice versa) such that

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

Thus, an integer and its opposite are called the **additive inverse** of each other.

Examples:

$9 + (-9) = 0 = (-9) + 9, 15 + (-15) = 0 = (-15) + 15$

In the above examples, the integers of each pair, i.e., (9, –9) or (15, –15) are the additive inverse of each other.

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Property of 1: Addition of 1 to any integer gives its successor.

Examples: $12 + 1 = 13$. Hence, 13 is the successor of 12.

$-5 + 1 = (-4)$. Hence, (-4) is the successor of (-5).

Properties of subtraction

Closure Property : If a and b be any two integers, then $a - b$ will always be an integer. This is called the closure property of subtraction of integers.

Examples: $9 - 13 = -4, 6 - 19 = -13, (-8) - (3) = -11$

Commutative Property: If a and b are two integers, then $a - b \neq b - a$, *i.e.*, commutative property does not hold good for the subtraction of integers.

Examples: $7 - (-8) = 15$ but $(-8) - 7 = -15$

$3 - 4 = -1$ but $4 - 3 = 1$

Hence, subtraction of integers is not commutative.

Associative Property: If a, b, and c are three integers, then

$$(a - b) - c \neq a - (b - c)$$

i.e., the associative property does not hold good for the subtraction of integers.

Example: $(8 - 4) - 2 \neq 8 - (4 - 2)$

Or $4 - 2 \neq 8 - 2$

Or $2 \neq 6$

Hence, subtraction of integers is not associative.

Property of Zero: When zero is subtracted from an integer, we get the same integer, *i.e.*, $a - 0 = a$, where a is an integer.

Examples: $12 - 0 = 12, (-12) - 0 = (-12), (-23) - 0 = -23$

Property of 1 : Subtraction of 1 from any integer gives its predecessor.

Examples: $15 - 1 = 14$ (14 is the predecessor of 15.)

$(-3) - 1 = -4$ [(-4) is the predecessor of (-3).]

$19 - 1 = 18$ (18 is the predecessor of 19.)

Properties of multiplication

Closure Property: If a and b are two integers, then $a \times b$ will also be an integer. This is called the closure property of multiplication of integers.

Examples: $7 \times (-5) = -35$

$(-9) \times (-2) = 18$

$(-5) \times 3 = -15$

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Commutative Property: If a and b are two integers, then $a \times b = b \times a$, *i.e.*, on changing the order of integers, we get the same result. This is called the commutative property of multiplication of integers.

Examples: $6 \times 9 = 9 \times 6 = 54, (-3) \times (-7) = (-7) \times (-3) = 21$

Thus, the commutative property holds good for the multiplication of integers.

Associative Property: If a, b and c are three integers, then $a \times (b \times c) = (a \times b) \times c$. This is called the associative property of multiplication of integers.

Examples: $[(-5) \times 2] \times (-3) = (-5) \times [2 \times (-3)]$

Or $(-10) \times (-3) = (-5) \times (-6)$

Or $30 = 30$

Thus, associative property holds good for the multiplication of integers.

Multiplicative Identity: The product of any integer and 1 gives the same integer. If a is an integer, then $a \times 1 = a = 1 \times a$. Hence, 1 is called the multiplicative identity.

Examples: $19 \times 1 = 1 \times 19 = 19, (-8) \times 1 = 1 \times (-8) = (-8)$

Multiplicative Inverse: The product of any integer and its reciprocal gives the result as 1 (multiplicative identity). If a is an integer, then $a \times \frac{1}{a} = 1 = \frac{1}{a} \times a$. Thus, an integer and its reciprocal are called the multiplicative inverse of each other.

Examples: $9 \times \frac{1}{9} = 1 = \frac{1}{9} \times 9$, $(-5) \times \frac{1}{(-5)} = 1 = \frac{1}{(-5)} \times (-5)$

Property of Zero: The product of any integer and zero gives the result as zero. If a is an integer, then $a \times 0 = 0 \times a = 0$.

Examples: $9 \times 0 = 0 \times 9 = 0, (-25) \times 0 = 0 \times (-25) = 0$

Distributive Property: Multiplication distributes over addition. If a, b, and c are three integers, then $a \times (b + c) = ab + ac$.

This is called the distributive property of multiplication of integers.

Examples:

$(-7) \times [3 + (-4)] = (-7) \times (3) + (-7) \times (-4)$

Or $(-7) \times (-1) = (-21) + 28$

Or $7 = 7$

Hence, integers possess the distributive property of multiplication.

Properties of division

Closure Property: The closure property does not hold good for the division of integers.

Examples: (*i*) $15 \div 5 = 3$ (3 is an integer.)

(*ii*) $(-30) \div 6 = -5$ (–5 is an integer.)

(*iii*) $9 \div 4 = \frac{9}{4}$ $\left(\frac{9}{4} \text{ is not an integer.}\right)$

(*iv*) $1 \div 2 = \frac{1}{2}$ $\left(\frac{1}{2} \text{ is not an integer.}\right)$

In examples (*i*) and (*ii*), the quotients of the two integers are also integers, but in (*iii*) and (*iv*), the results are not integers. Hence, the closure property does not hold good for the division of integers.

Commutative Property: If a and b are two integers, then $a \div b \neq b \div a$.

Examples: $4 \div 2 = 2$ but $2 \div 4 = \frac{2}{4}$ or $\frac{1}{2}$

$(-3) \div 1 = -3$ but $1 \div (-3) = \frac{1}{-3}$

Here, we see that when the order of integers is changed, the result does not remain the same. Hence, integers do not possess commutative property of division.

Associative Property: If a, b, c are three integers, then $(a \div b) \div c \neq a \div (b \div c)$

Examples: $(24 \div 4) \div (-2) \neq 24 \div [4 \div (-2)]$

Or $6 \div (-2) \neq 24 \div (-2)$

Or $(-3) \neq (-12)$

Take a Task

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Thus, the associative property does not hold good for division of integers.

Property of 1: Any integer divided by 1 gives the same integer as the quotient. If a is an integer, then $a \div 1 = a$.

Examples: $5 \div 1 = 5$, $(-28) \div 1 = -28$

Property of Zero: When zero is divided by any integer, the result is always zero. If a is an integer, then $0 \div a = 0$.

Examples: $0 \div 9 = 0, 0 \div 21 = 0, 0 \div (-18) = 0$

REMEMBER

Division of integers by zero is not defined.

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Example 6: Find $(-6050) \times 25 \times 4$ by two methods. Which way is easier?

Solution:

First Method: $(-6050) \times (25 \times 4) = (-6050) \times 100 = -605000$

Second Method: $[(-6050) \times 25] \times 4 = (-151250) \times 4 = -605000$

It is clear that the first method is easier.

Example 7: Simplify: $125 \times 12 + 125 \times 16 + 125 \times 2$

Solution: $125 \times 12 + 125 \times 16 + 125 \times 2$

$= 125 \times (12 + 16 + 2) = 125 \times 30 = 3750$

Example 8: Multiply (-326) by 105 using the distributive property.

Solution: $(-326) \times 105 = (-326) \times (100 + 5) = (-326) \times 100 + (-326) \times 5$

$= (-32600) + (-1630) = -34230$

Exercise 1.3

1. **Fill in the blanks:**

   (*i*) $(-35) \div 35 = \square$ (*ii*) $\square \div (-18) = -1$

   (*iii*) $\square \div 115 = 0$ (*iv*) $(-28) - \square = 0$

   (*v*) $(-29) \times 0 = \square = 0 \times (-29)$ (*vi*) $[7 \times (-3)] \times (-6) = 7 \times [(-3) \times \square]$

2. **State true or false:**

   (*i*) $0 \times (-9) = 0$ (*ii*) $(-6) - 1 = (-7)$ (*iii*) $(-35) - 0 = 0$

   (*iv*) $(-75) + 75 = 0$ (*v*) $(-16) \div 4 = -4$ (*vi*) $(-18) \times (-1) = (-18)$

3. An integer divided by (-7) gives 9. Find the integer.
4. Give one example of the distributive property of multiplication over subtraction.
5. Find the integer which when multiplied with (-1) gives (-25).
6. Determine the integer which when divided by (-1) gives (-47).
7. **Calculate the following using suitable arrangements:**

   (*i*) $(-142) + (-58) + 200$ (*ii*) $195 \times 7 + 195 \times 3$ (*iii*) $(-50) \times 125 \times (-6) \times 8$

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Chapter-end Exercise

Gap Analyzer™

A. Tick (✓) the correct option:

1. Every natural number is also ____________ .
   (*a*) an integer (*b*) a whole number
   (*c*) (*a*) and (*b*) both (*d*) none
2. On subtracting (-15) from 0 we get ____________ .
   (*a*) 15 (*b*) -15 (*c*) 18 (*d*) none of these
3. $-15-(-7)=$ ____________ .
   (*a*) -22 (*b*) 25 (*c*) -8 (*d*) 18
4. The additive inverse of -37 is ____________ .
   (*a*) -37 (*b*) 0 (*c*) -73 (*d*) 37
5. $(-68)\div 0=$ ____________ .
   (*a*) 24 (*b*) 0 (*c*) -24 (*d*) not defined

B. Represent the following on number lines:

1. $(-4)\times 3$ 2. 2×3 3. $8+5$ 4. $(-3)+(-2)$

C. Find the product:

1. $(-12)\times(-6)$ 2. $(13)\times(-3)$ 3. $(-4)\times(15)$ 4. $(-9)\times(-9)$

D. Find the quotient:

1. $(-128)\div(-8)$ 2. $0\div(115)$ 3. $(21)\div(-21)$ 4. $(68)\div(-1)$

E. Simplify:

1. $4-24\div 4\times 3$
2. $(-3)\times(-4)\div(-2)+(-1)$
3. $(-20)+(-8)\div(-2)-3$
4. $[14\div(-7)]\times(-6)]$

F. Find the additive inverse of the following:

1. -6 2. 17 3. -19 4. 299 5. -199

G. Find the multiplicative inverse of the following:

1. -10 2. 12 3. 25 4. -118 5. 318

H. Answer the following questions:

1. What will be the sign of the product if we multiply together 15 negative integers and 4 positive integers?
2. Does the associative property hold good for the subtraction of integers? Give an example to support your answer.

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3. Are two integers commutative under division? Justify by giving an example.
4. A rock climber started from 700 m and came down to a distance of 250 m. How far above the sea level did he travel?
5. The product of two numbers is 105. One of the numbers (–21). What is the other number?

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Mental Maths

1. Verify the property $a \times (b + c) = a \times b + a \times c$
   (*a*) $a = (-3),\ b = 7, c = (-9)$ (*b*) $a = 4, b = 5, c = 7$
2. Verify the property $(a \times b) \times c = a \times (b \times c)$, if:
   (*a*) $a = 2,\ b = 3, c = 4$ (*b*) $a = 5,\ b = -8, c = -7$

HOTS (Higher Order Thinking Skills)

Experiential Learning

1. What will be the sign of the resultant integer if we multiply 5 negative integers and 2 positive integers?
2. The temperature inside a freezer is –10°C. To defrost it, the temperature was allowed to rise by 14°C. What will be the temperature after this rise?

Assertion and Reason

In each of the following questions, an Assertion (A) and a corresponding Reason (R) supporting it is given.
Study both the statements and state which of the following is correct:
(*a*) Both A and R are true and R is the correct explanation of A.
(*b*) Both A and R are true but R is not the correct explanation of A.
(*c*) A is true but R is false.
(*d*) A is false but R is true.

1. **Assertion (A) :** Additive inverse of a positive integer is a negative integer.
   Reason (R) : Additive inverse of zero is zero itself.
2. **Assertion (A) :** The product of any integer and zero is always zero.
   Reason (R) : $(-8) \times (-1) \times (-2)$ is equal to 16.
3. **Assertion (A) :** $(-12) \times [(-15) + (-8)]$ is equal to –276.
   Reason (R) : For any integers a, b and c, $a(b + c) = ab + bc$.
4. **Assertion (A) :** $(-3)^4$ is a negative integer.
   Reason (R) : If the exponent of a negative integer is even, then the value is positive.
5. **Assertion (A) :** The additive inverse of the greatest negative integer is +1.
   Reason (R) : Every positive integer is less than 0 and every negative integer is greater than 0.