Chapter 3

Integers

Exercise 3.1

Question 1.

Write the opposite of the following :

(i) Loss of ₹5000

(ii) 30 km East of Delhi

(iii) 200m above sea level

(iv) 324 BC

(v) Spending ₹2700

(vi) 25℃ above freezing point.

Solution :

(i) Profit of ₹5000

(ii) 30 km West of Delhi

(iii) 200m below sea level

(iv) 325 AD

(v) Earning ₹2700

(vi) 25℃ below freezing point.

Question 2.

Write each of the following using appropriate sign '+' or '-':

(i) Gain of 3 kg Weight

(ii) Earning ₹1340

(iii) 20℃ below freezing point

(iv) Loss of ₹470

(v) Depositing ₹2500 in a bank

(vi) 240m below sea level

(vii) A jet planeflying at a height of 9329 m.

(viii) 6m down in the basement of a building.

Solution :

(i) +3kg weight

(ii) + ₹ 1340

(iii) -20℃

(iv) -₹470

(v) +₹2500

(vi) -240m

(vii) +9320m

(viii) -6

Question 3.

In each of the following pairs, which number is to the right of the other on the number line ?

(i) 3, 5

(ii) 0, -2

(iii) -3, -5

(iv) 2, -7

Solution:

(i) 5
(ii) 0
(iii) -3
(iv) 2

Question 4.

In each of the following pairs, which number is to the left of the other on the number lines ?

(i) -3, 0

(ii) 2, -5

(iii) -4, -7

(iv) -10, -16

Solution:

(i) -3

(ii) -5

(iii) -7

(iv) -16

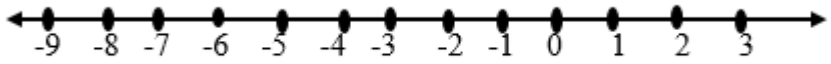
Question 5.

Draw a number line and answer the following questions :

(i) which integers line between -9 and -2 ?

(ii) which is the largest among them ?

(iii) Which is the smallest among them ?



(i) -7, -7, -6, -5, -4, -3

(ii) -3

(iii) -8

Question 6.

Write four consecutinve integers just greater than -9.

Solution:

The foure consecutive integers just greater than -9.

First consecutive = -9 + 1 = -8

Second consecutive = -8 + 1 = -7

Third consecutive = -7 + 1 = -6

Fourth consecutive = -6 + 1 = -5

These are = -8, -7, -6, -5

Question 7.

Write four consecutinve integers just before -2.

Solution:

The four consecutive integers just before -2 are

First consecutive = -2 -1 = -3

Second consecutive = -3 -1 = -4

Third consecutive = - 4 -1 = -5

Fourth consecutive = -5 -1 = -6

∴ These are = -6, -5, -4, -3

Question 8.

Draw a number line and answer the following questions:

(i) Which number will we reach if we move 6 units to the right of -1 ?

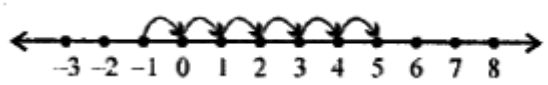
(ii) Which number will we reach it we move 7 units to the left to 2 ?

(iii) in Which direction should we move to reach 3 from -3 ?

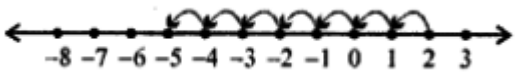
(iv) In which direction should we move to reach -8 from -3 ?

Solution:

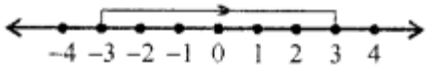
(i)



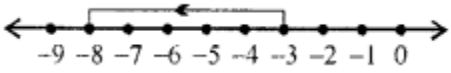
After moving 6 units to the right -1, we reach at 5.

(ii) 

After moving 7 units to the left of 2, we reach at -5.

(iii) 

To reach 3 from -3, we have to move in right direction.

(iv) 

To reach -8 from -3, we have to move in left direction.

Question 9.

Using the number line, write the integer which is :

(i) 5 more than -1

(ii) 5 less than -1

(iii) 7 less than 2

(iv) 3 more than -7

Solution :

(i) 5 more than -1

Question 10

Evaluate the following :

(i) $|13 - 5|$

(ii) $|5 - 13|$

(iii) $|-11| + |9|$

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

(v) $|7| - |-3|$

(vi) $|-19| - |-13|$

Solution:

(i) $|13 - 5|$

$\therefore |13 - 5| = 13 - 5 = 8$

(ii) $|5 - 13|$

$\therefore |5 - 13| = |-8|$

since $|-8| = 8$

(iii) $|-11| + |9|$

Since $|-11| = 11$ *and* $|9| = 9$

$\therefore 11 + 9 = 20$

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

Since $|-8| = 8$ and $|-6| = 6$

$\therefore 8 + 6 = 14$

(v) $|7| - |-3|$

Since $|7| = 7$ and $|-3| = 3$

$\therefore$ 7 - 3 = 4

(vi) $|-19| - |-13|$

Since $|-19| = 19$ and $|-13| = 13$

$\therefore$ 19 - 13 = 6

Question 11.

Use the appropriate symbol < or > to fill in the following blanks :

(i) -3 ……7

(ii) 0 ……..-2

(iii) -10 ……-11

(iv) -6……-2

(v) -5……-13

(vi) -30…….-19

Question 12

Arrange the following integers in ascending order.

(i) -5, 3, 0, -9, 2

(ii) -28, -33, 9, -4, -31, -2, -35

Solution:

(i) -9, -5, 0, 2, 3

(ii) -33, -31, -28, -4, -2 9, 35

Question 13.

Arrange the following integers in descending order.

(i) -31, 25, -37, 43, 0,-5

(ii) -101, 95, -3, -8, 36, -7, -84

Solution:

(i) 4, 3, 25, 0, -5, -31, -37

(ii) 95, 36, -3, -7, -8, -84, -101

Question 14.

State whether the following statements are True (T) or False (F):

(i) 0 is the smallest integer .

(ii) Every negative integer is less than every natural nuumber.

(iii) -7 is to the right of -6 on the number line,

(iv) The absolute value of an integer is always greater than the integer

Solution:

(i) False

(ii) True

(iii) False

(iv) False

Exercise 3.2

Question 1.

Evaluate the following, using the numbers line

(i) 4 + (-5)

(ii) (-4) + 5

(iii) 7 + (-3)

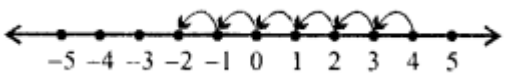
(iv) -6 + (-2)

Solution:

(i) Start from 4 on the number line.

Move 5 units to the left, we reach at -14

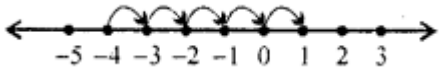
∴ + (-5) = 4 – 5 = -1



(ii) Start from -4 on the number line.

Move 5 units to the left, we reach at 1

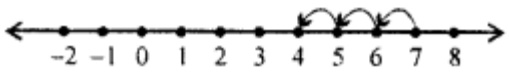
∴ (-4) + 5 = - 4 + 5 = 1



(iii) Start from 7 on the number line.

Move 3 units to the left, we reach at 4

$\therefore$ 7 + (-3) = 7 – 3 = 4



Question 2.

Evaluate the following :

(i) (-8) + (-14)

(ii) -35 + (-47)

(iii) 91 + (-48)

(iv) (-203) + 501

(v) (-36) + 29

(vi) (-131) + 97

Solution:

(i) (-8) + (-14)

= -8 - 14 = -22

(ii) -35 + (-47)

= -35 – 47 = -82

(iii) 91 + (-48)

= 91 – 48 = 43

(iv) (-203) + 501

= -203 +501 = 298

(v) (-36) + 29

= -36 + 29 = -7

(vi) (-131) + 97

= -131 + 97 = -34

Question 3.

Evaluate the following :

(i) -1083 + (-3974)

(ii) 706 + (-394)

(iii) 1309 + (-2811)

Solution:

(i) -1083 + (-3974)

= -1083 - 3974

= - (1083 + 3974)

= - 5057

(ii) 706 + (-394)

= 706 – 394

= 312

(iii) 1309 + (-2811)

= 1309 -2811

= -2811 + 1309

= - 1502

Question 4.

Fill in the following blanks:

(i) –(-5) = ……

(ii) – (-30) = ……

(iii) – (-539) = ……..

Solution:

(i) – (-5) = 5

(ii) – (-30) = 30

(iii) –(-539) = 539

Question 5.

Write down the additive inverses of :

(i) 9

(ii) -11

(iii) -237

(iv) 567

Solution:

(i) Additive inverse of 9 = (-9) = -9

(ii) Additive inverse of -11 = - (-11) = 11

(iii) Additive inverse of -237 = -(-237) = 237

(iv) Additive inverse of 567 = - (567) = -567

Exercise 3.3

Question 1.

Evaluate the following, using the number line :

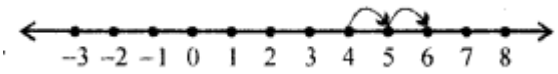
(i) 4 – (-2)
(ii) -4 – (-2)
(iii) 3 – 6
(iv) -3 – (-5)

Solution:

(i) Start from 4 on the number line.

Move 2 units to the digits we reach at 6

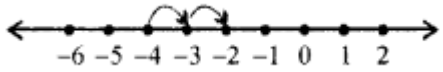
∴ 4 – (-2) = 4 + 2 = 6



(ii) Start from -4 on the number line.

Move 2 units to the digits we reach at -2.

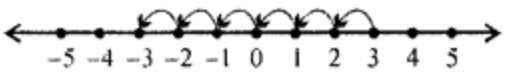
∴ -4 – (-2) = -4 + 2 = -2



(iii) Start from 3 on the number line.

Move 6 unit to the left, we reach at -3.

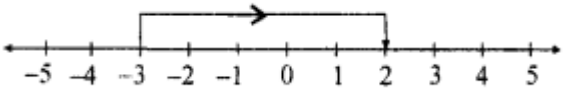
$3 - 6 = -3$



(iv) Start from -3 on the number line.

Move 5 units to the right, we reach at 2

-3 – (-5) = -3 + 5 = 2



Question 2.

Subtract :

(i) -6 from 9

(ii) 6 from -9

(iii) -6 from -9

(iv) -725 from -63

(v) -376 from 10

(vi) 92 from -620

Solution:

(i) 9 – (-6) = 9 + 6 = 15

(ii) -9 - 6 = -15

(iii) -9 – (-6) = -9 + 6 = -3

(iv) -63 – (-725) = -63 + 725 = +662

(v) 10 – (-376) = 10 + 376 = 386

(vi) - 620 – 92 = -712

Question 3.

Evaluate the following:

(i) -237 - (+ 1884)

(ii) -346 - (-1275)

(iii) -190 – (-3512)

(iv) -2718 – (+ 6827)

Solution:

(i) -237 – (+ 1884)

= -237 – 1884

= -(237 + 1884) = -2121

(ii) -346 – (-1275)

= - 346 + 1275

= 1275 – 346 = 929

(iii) -190 – (-3512)

= -190 + 3512

= 3512 – 190 = 3322

(iv) 2718 – (+ 6827)

= -2718 – 6827

= -9545

Question 4.

The sum of two integers is 17. If one of them is -35, find the other.

Solution:

One number = -35

Sum of two integers = 17

Second number = Sum of integers – (The given number)

= 17 – (-35)

= 17 + 35 = 52

Question 5.

What must be added to -23 to get -9 ?

Solution:

Let the number to be added = x

∴ -23 + x = -9

∴ The required number = -9 – (-23)

= -9 + 23 = 14

Question 6.

Find the Predecessor of 0.

Solution:

Predecessor of 0 = 0 – 1 = -1

Question 7.

Find the successor and the predecessor of the following integers :

(i) -31
(ii) -735
(iii) -240

Solution :

(i) Successor of -31 = -31 + 1 = -30
Predecessor of -31 = -31 – 1 = -32

(ii) Successor of -735 = -735 + 1 = -734
Predecessor of -735 = -735 – 1 = -736

(iii) Successor of -240 = -240 + 1 = -239

Predecessor of -240 – 1 = - 241

Exercise 3.4

Question 1.

Find the value of:

(i) 6 – 9 + 4

(ii) – 5 – (-3) + 2

(iii) 7 + (-5) + (-6)

(iv) 6 – 3 – (-5)

Solution:

(i) 6 – 9 + 4

= (6 + 4) – 9

= 10 – 9 = 1

(ii) -5 – (-3) + 2

= -5 + 3 + 2 = -5 + 5 = 0

(iii) 7 + (-5) + (-6)

= 7 – 5 – 6

= 2 – 6 = -4

(iv) 6 – 3 – (-5)

= 6 – 3 + 5 = 8

Question 2.

Evaluate the following :

(i) -77 + (-84) + 318

(ii) 54 + (-218) – (-76)

(iii) -121 – (-78) + (-193) + 576

(iv) -65 + (-76) – (-28) + 32

Solution:

(i) - 77 + (-84) + 318

= -77 - 84 + 318

= - (161) + 318

= 318 – 161 = 157

(ii) 54 + (-218) – (-76)

= 54 – 218 + 76

= (54 + 76) – 218

= 130 – 218

= -88

(iii) -121 - (-78) + (-193) + 576

= -121 + 78 – 193 + 576

= - (121 + 193) + 78 + 576

= - (314) + 654

= 654 – 314 = 340

(iv) -65 + (-76) – (-28) + 32

= -65 – 76 + 28 + 32

= - (65 + 76) + 60

= -141 + 60 = -81

Question 3.

Find the value of :

(i) 8 – 6 + (-2) – (-3) + 1

(ii) 31 + (-23) – 35 + 18 – 4 – (-3)

Solution:

(i) 8 – 6 + (-2) – (-3) + 1

= 8 – 6 – 2 + 3 + 1

= -6 – 2 + 8 + 3 + 1

= - 8 + 12 = 4

(ii) 31 + (-23) – 35 + 18 – 4 – (-3)

= 31 -23 – 35 + 18 – 4 – (-3)

= -23 – 35 – 4 + 31 + 18 + 3

= -23 – 35 – 4 + 52

= -62 + 52 = -10

Question 4.

Rashmi deposited ₹ 4370 in her accound on Monday and then withdrew ₹ 2875 on Tuesday. Next day she deposited ₹ 1550. What was her balancee on Thursday ?

Solution:

Rashmi deposited in her accound on Monday = ₹ 4370

Less withdrawl on Tuesday = ₹ 2875

So the Balance on Tuesday

= ₹ 4370 - ₹ 2875

= ₹1495

Again she deposited on Wednesday = ₹ 1550

Balance on Thursday

= ₹1495 + ₹1550

= ₹3045

Objective Types Questions

Mental maths

Question 1.

Fill in the blanks :

(i) The absolute value of 0 is …….

(ii) The sum of two negative integers is always a ……integer.

(iii) The smallest positive integer is…….

(iv) The largest negative integer is ……

(v) 17 + …… = 0

(vi) …….. – 15 = -10

(vii) The predecessor of -99 is …….

Solution:

(i) The absolute value of 0 is 0.

(ii) The sum of two negative integers is always a negative integer.

(iii) The smallest positive integer is 1.

(iv) The largest negative integer is -1.

(v) 17 + -17 = 0

(vi) 5 – 15 = -10

(vii) The Predecessor of -99 is -100.

Question 2.

State whether the following statements are true (T) or False (F) :

(i) The sum of a positive integer and a negative integer is always a negative integer.
(ii) Zero is an integer.
(iii) The sum of an integer and its negative is always zero.
(iv) The sum of three integers can never be zero.
(v) $|-7| < |-3|$.

(vi) -20 is to the left of -21 on the number line.

(vii) The successor of -29 is -30.

(viii) 0 is greater than every negative integer.

(ix) The difference of two integers is always an integer.

(x) Additive inverse of a negative integer is always a positive integer.

Solution:

(i) The sum of a positive integer and a negative integer is always a negative integer. **False**

(ii) Zero is an integer. **True**

(iii) The sum of an integer and its negative is always zero. **True**

(iv) The sum of three integers can never be zero. **False**
(v) $|-7| < |-3|$. **False**

(vi) -20 is to the left of -21 on the number line. **False**

(vii) The successor of -29 is -30. **False**

(viii) 0 is greater than every negative integer. **True**

(ix) The difference of two integers is always an integer. **True**

(x) Additive inverse of a negative integer is always a positive integer.
True

Question 3.

State whether the following statements are true or false. If a statement is false, write the corresponding correct statement.

(i) -8 is to the right of -10 on the number line.

(ii) -100 is to the right of -50 on the number line.

(iii) Smallest negative integer is -1.

(iv) -26 is greater than -25.

(v) -187 is the predecessor of -188.

Solution :

(i) -8 is to the right of -10 on the number line. **True**

(ii) -100 is to the right of -50 on the number line. **False**

Correct :

-100 is to the left of -50 on the number line.

(iii) Smallest negative integer is -1. False

Correct :

Greatest negative integer is -1.

(iv) -26 is greater than -25. False

Correct :

-26 is smaller than -25.

(v) -187 is the predecessor of -188. False

Correct:

-187 is the successor of -188.

Multiple Choice Questions

Choose the correct answer from the given four options (4 to 17):

Question 4.

The integer which is 5 more than -2 is

(a) -7

(b) -3

(c) 3

(d) 7

Solution:

3 (c)

Integer 3 is 5 more than -2

Question 5.

The number of integers between -1 and 1 is

(a) 0

(b) 1

(c) 2

(d) 3

Solution:

‘0’ lies between -1 and 1

∴ -1, 0, 1 = 1 number(b)

Question 6.

The number of integers between -3 and 2 are

(a) 2
(b) 3
(c) 4
(d) 5
Solution:

-2, -1, 0, 1 lies between -3 and 2

-3, -2, -1, 0, 1, 2 = 4 numbers (c)

Question 7.

The number of whole numbers between -6 and 6 is

(a) 11

(b) 10

(c) 6

(d) 5

Solution:

Number -5, -4, -3, -2, -1, 0, 1, 2, 3 ,4 ,5 lies between -6 and 6.

Among them 0, 1, 2 ,3, 4, 5 are whole numbers.

∴ 6 whole numbers lies between -6 and 6 (c).

Question 8.

The greatest integer lying -10 and -15 is

(a) -10

(b) -11

(c) -14

(d) -15

Solution:

-11(b)

Question 9.

The smallest integer lying between -10 and -15 is

(a) -10

(b) -11

(c) -14

(d) -15

Solution:

-14 (c)

Question 10.

Which of the following statement is true ?

(a) $| 10 – 4 | = | 10| + |-4|$

(b) Additive inverse of -5 is 5

(c) -1 lies on the right of 0 on the number line

(d) -7 is greater than -3

Solution:

Additive inverse of -5 is 5(b)

Question 11.

Which of the following statement is false ?

(a) $-20 – (-5) = -15$

(b) $|-18| > | -13|$

(c) $23 + (-31) = 8$

(d) Every negative integer is less than 5

Solution:

$23 + (- 31) = 8$

The correct answer will be

$23 + (-31) = -8$(c)

The correct answer will be

$23 + (-31) = -8$ (c)

Question 12.

Which of the following statements is false ?

(a) (-3) + (-11) is an integer

(b) (-19) + 13 = 13 + (-19)

(c) (-15) + 0 = -15 = 0 + (-15)

(d) Negative of -7 does not exist

Solution:

Negative of -7 does not exist, is false statement.

Negative of -7 is –(-7) = 7(d)

Question 13.

If the sum of two integers is -17 and one of them is -9, then the other is

(a) 8

(b) -8

(c) 26

(d) -26

Solution:

-17 – (9)

= -17 + 9 = -8(b)

Question 14.

On subtracting -7 from -4, we get

(a) 3

(b) -3

(c) -11

(d) none of these

Solution:

-4 – (-7)

= -4 + 7 = 3(a)

Question 15.

(-12) + 17 – (-10) is equal to

(a) -5

(b) 5

(c) 15

(d) -15

Solution:

(-12) + 17 – (-10)

= -12 + 27 = 15(c)

Question 16.

Which of the following statements is true?

(a) $-13 > -8 - (-6)$

(b) $-5 - 4 > -12 + 2$

(c) $(-8) - 3 = (-3) - (-8)$

(d) $(-15) - (-22) < (-22) - (-15)$

Solution:

$-5 - 4 > -12 + 2$

$-5 -4 > -12 + 2$

$= 9 > -10$

$\therefore$ -9 is always greater than -10(b)

Question 17.

The statement "when an integer is added to itself, the sum is less than the integer" is

(a) always true

(b) never true

(c) true only when the integer is negative

(d) true when the integer is zero or positive

Solution:

true only when the integer is negative (c)

Higher Order Thinking Skills (HOTS)

Question 1.

Can the sum of successor and predecessor of an integer be an odd integer ?

Solution:

No, the sum of successor and predecessor of an integer cannot be an odd integer.

Question 2.

What is the sum of all integers from -500 to 500 ?

Solution:

The sum of all integer from -500 to 500 = -500 + 500 = 0

Question 3.

Find two positive integers such that their product is 1,00,000 and none of them containes 0 an a digit.

Solution:

We shall findthefactors of 1,00,000 to find the two positive integers such that their product is 1,00,000.

2	100000
2	50000
2	25000
2	12500
2	6250
5	3125
5	625
5	125
5	25
5	5
	1

The factors of 100000 = $2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5 \times 5$

∴ The positive integers which have the product 100000 are

(i) $2 \times 2 \times 2 \times 2 \times 2 = 32$

(ii) and $5 \times 5 \times 5 \times 5 \times 5 = 3125$

∴ The positive integers which have the product 100000 are
(i) $2 \times 2 \times 2 \times 2 \times 2 = 32$
(ii) and $5 \times 5 \times 5 \times 5 \times 5 = 3125$

Check Your Progress

Question 1.

Use the appropriate symbol < or > to fill in the following blanks:

(i) (-3 + …….. (-6) (-3) – (-6)

(ii) (-21) – (-10) ….(-31) + (-11)

(iii) 45 – (-11) ……(57) +(-4)

(iv) (-25) – (-42) ……(-42) – (-25)

Question 2.

Find the value of:

(i) 12 + (-3) + 5 – (-2)

(ii) 39 – 35 + 7 – (-4) + 21

(iii) -15 – (-2) – 71 – 8 + 6

Solution:

(i) 12 + (-3) + 5 – (-2)

= 12 – 3 + 5 + 2

= 9 + 7 = 16

(ii) 39 – 35 + 7 – (-4) + 21

= 39 – 35 + 7 + 4 + 21

= 4 + 11 + 21

= 15 + 21 = 36

(iii) -15 – (-2) – 71 – 8 + 6

= - 15 + 2 – 71 – 8 + 6

= - 13 – 79 + 6

= 92 + 6 = -86

Question 3.

Evaluate :

(i) |-13| - | -15|

(ii) |35 – 41| - | 7 – (-2)|

Solution:

(i) |-13| - | -15|

= + 13 – 15 = -2

(ii) | 35 – 41 | - | 7 – (-2)|

= 6 – 9 = -3

Question 4.

Arrange the following integers in ascending order :

-39, 35, -102, 0, -51, -5, -6, 7

Solution:

-102, -51, -39, -6, -5, 0, 7, 35

Question 5.

Find the successor and the predecessor of -199.

Solution:

Successor = -199 – 1 = -198

Predecessor = -199 – 1 = -200

Question 6.

Subtract the sum of -235 and 137 from -152.

Solution:

Sum of (-235 and 137)

= -235 + 137

= 137 – 235 = -98

Now, subtract the sum of (-235 and 137) from -152.

= 152 – (-98)

= -152 + 98 = -54

Question 7.

What must be added to -176 to get -95 ?

Solution:

Let the number to be added = x

$\therefore$ - 176 + x = -95

x = -95 + 176 = 81

Question 8.

What is the difference in height between a point 270m above sea level and 80m below sea level?

Solution :

Height above sea level = + 270m

Height below sea level = -80m

Difference = +270 – (-80)

= 270 + 80 = 350m