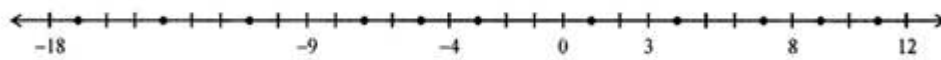# Chapter 1

Integers

Exercise 1.1

Question 1 .

Some integers are marked on the following number line:
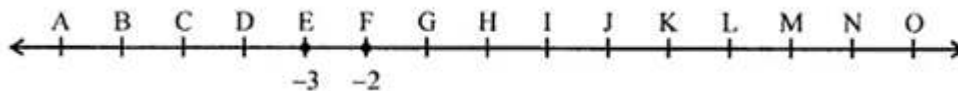

(i) Write these integers in ascending order.

(ii) Write these integers in descending order.

(iii) Few dots have been marked on the above number line. write an appropriate integer at each dot

Solution:

(i) -18, -9, -4, 0, 3, 8, 12,

(ii) 12, 8, 3, 0, -4, -9, -18

(iii) Integer from left to right are -17, -14, -11, -7, -5, -3, 1, 4, 7, 9, 11

Question 2.

A number line representing integers in given below:

The integers -3 and -2 are marked points E and F respectively . which integers are marked by points B,D,H,J,M and O ?
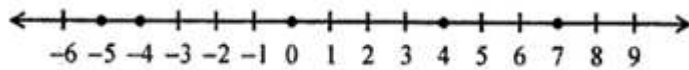
Solution:

The integers which marked by the points B,G,H,J,M and O are respectively -6,-1,0,2,5,7

Question 3.

Arrange 7,-5,4,0,and -4 in ascending order and mark them on a number line to check your answer.

Solution: Arranging the given integers in ascending order,-5,-4,0,7,and marked on the number line is given below:

Question 4.

In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answer. If Rohit scores in five successive rounds were 15,-3,-7,12 and 8, what was his total at the and ?

Solution :

Rohit's scores in 5 successive rounds, were 15,-3,-7,12,8 his total score will be = 15-3-7+12+8 = 15+12+8-3-7 = 35-10 = 25

Question 5.

Ruchi deposited 4370 in her account on Monday and then withdrew 2875 on Tuesday . Next day she deposited 1550 what was her balance on Thursday?
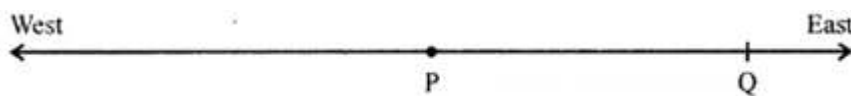
Solution :

Ruchi deposited 4370 on Monday 1550 on Wednesday so, her total deposit = 4370+1550 = 5920

And withdraw = 2875

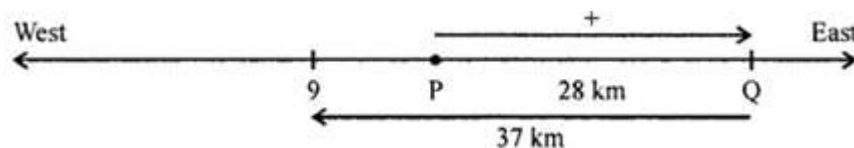Balance on Thursday = 5920-2875 = 3045

Question 6.

Ravi goes 28 km towards east from a point P to the point Q . from he moves 37 km towards the west along the same road. If the distance towards east is represented by a positive integer then, how will you represent the distance travelled towards the west? By which integers will you represent his final position from P ?

Solution:

From point P to Q, Ravi goes 28 km towards East. From Q to the West, he will be

His final position will be -9 km from P.

Question 7 .

Fill in the blank spaces by integers of the given magic square so the sum of the integers in each row, each column and each diagonal is -6

-1		
3	-2	

Solution:

Sum of integers of the magic square is -6 in each row, column and each diagonal as shown here:

-1	-9	4
3	-2	-7
-8	5	-3

Question 8 .

Evaluate the following:

(i) $|-13| - |9|$

(ii) $|13 - 5| - |-9|$

(iii) $|35 - 21| - |8 - 3|$

Solution:

$(i) |-13| - |9|$ = 13-9 = 4

(ii) $|13 - 5| - |-9| = |8| - |-9| = 8 - 9 = -1$

(iii) $|35 - 21| - |8 - 3| = |14| - |5| = 14 - 5$

Question 9.

Arrange the following integers in ascending order:

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

Solution:

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

Arranging in ascending order:

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

Question 10.

Arrange the following integers in descending order:

-31,139,-203,-97,0,4208

Solution:

-31,139,-203,-97,0,4208

4208,139,0,-31,-97,-203

Question 11.

State whether each of the following statement is true or false:

(i) 0 is the successor of -1 in integers

(ii) 0 has no predecessor in integers

(iii) -2 is the predecessor of -1

(iv) 0 is greater than every negative integer.

Solution:

(i) 0 is the successor of -1 integer: true

(ii) 0 has no predecessor in integers : False

    As 0 has -1 as its predecessor.

(iii) -2 is the predecessor. Of -1 : True

(iv) 0 is greater than every negative integer: True

Question 12.

Use the sing>,< or = in the box to make the following statements true:

(i) (-11) +(-7) ....(-11) – (-7)

(ii) 23-41+11......................23-41-11

(iii) 40 – (-39) + (-5) ....40+(-39)-(-5)

(iv) (-3) +13-15................25-(-2) + (-33)

Solution:

(i) (-11) +(-7) ....(-11)-(-7)

⟹ -18 < -11 +7 = -4

(ii) 23 – 41 + 11 ....23 – 41 – 11

⟹ 34 – 41 .... 23 – 52

⟹ -9 > -19

(iii) 40 – (-39) + (-5) ...... 40 + (-39) – (-5)

⟹ 40+39-5........40-39+5

⟹ 79 -5 ....45 – 39

⟹ 74 > 6

(iv) (-3) +13 –(15) ....25-(-2) +(-33)

⟹ -3 +13 - ....25 +2 -33

⟹ 13 -18 .... 27 -33

⟹ -5 > -6

Exercise 1.2

Question 1.

Write a pair of integers whose:

(i) sum is -3

(ii) difference is -5

(iii) difference is 4

Solution :

Pair of integers whose,

(i) sum is -3 = -6, 3 (-6+3 = -3)

(ii) difference is -5 = -2, 3 (-2 -3 = -5)

(iii) difference is 4 = -3 , -7[-3 – (-7) = -3 + 7 = 4]

Question 2.

(i) write a pair of negative integers whose difference is 5 .

(ii) write a negative integer and a positive whose sum is -8

(iii) write a negative integer and a positive integer whose difference is -3 .

Solution:

(i) Let two negative integers whose difference is 5 be -7, -12. Now the difference is -7 +12 = 5

(ii) let two integers one negative and other positive but sum is -8 and -13,5

= -13+5 = -8

(iii) let two integer, one negative and other positive whose difference is -3 be -1 , 2

Difference = -1 –(2) = -1-2 = -3

Question 3.

Write two integers which are smaller than -5 but their difference is greater than -5

Solution:

Let two integer which are smaller than -5 but their difference is greater than -5

= -6, -8 as -6 – (-8)

= -6 +8

= 2 > -5

Question 4.

In a quiz, team A scored -30,20 ,0 and team B scored 20 , 0 , and 30 three successive rounds. Which team scored more? Can we say that we can add integers in any order?

Solution:

In a quiz,

Team A scored -30, 20,0 and

Team B scores 20 ,0,-30 in three rounds

Sum of scores of A team = -30 + 20 +0 = -10

Sum of scores of B team = 20 +0 -30 = -10

The scores of both the team are equal i.e. -10

Yes, by adding the scores in any order, the result will be the same.

Question 5 .

Find the sum of integers -72 , 237, 84, 72, -184, -37.

Solution :

 sum of integers -72, 237, 84, 72, -184, -37

= -72 +237 +84 +72+ -184 +-37

= 237 + 84 + 72 + (-72 – 184 – 37)

= (393) + (-293)

= 393 – 293

= 100

Exercise 1.3

Question 1.

Find the following products:

(i) $7 \times (-35)$

(ii) $(-13) \times (-15)$

(iii) $(-12) \times (-11) \times (-10)$

(iv) $(-13) \times 0 \times (-24)$

(v) $(-1) \times (-2) \times (-3) \times 4$

(vi) $(-3) \times (-6) \times (-2) \times (-1)$

Solution:

(i) $7 \times (-35) = -245$

$\{ (+) \times (-) = -; (-) \times (-) = +; (-) \times (-) = -\}$

(ii) $(-13) \times (-15) = +195$

(iii) $(-12) \times (-11) \times (-10) = 132 \times (-10) = -1320$

(iv) $(-13) \times 0 \times (-24) = -13 \times 0 = 0 \times -24 = 0$

(Multiplication by 0, result is always zero)

(v) $(-1) \times (-2) \times (-3) \times 4 = (2)(-3) \times 4 = -6 \times 4 = -24$

(vi) $(-3) \times (-6) \times (-2) \times (-1) = +18 \times (+2) = 36$

Question 2.

Verify the following:

(i) $37 \times [6 +(-3)]= 37\times6+37\times (-3)$

(ii) $(-21) \times [(-6)+(-4) = (-21) \times (-6) + (-21) \times (-4)$

Solution:

(i) $37 \times [6 +(-3)]= 37\times6+37\times (-3)$

LHS = $37 \times [6-3] = 37 \times 3 = 111$

RHS = $37 \times 6 + 37 (-3) = 222 -111 = 111$

LHS = RHS

(ii) $(-21) \times [(-6)+(-4) = (-21) \times (-6) + (-21) \times (-4)$

LHS = $(-21) \times [(-6) + (-4)] = -21\times [-6-4] = (-21) \times (-10) = +210$

RHS = $(-21) \times (-6) + (-21) \times (-4) = 126+84 = 210$

LHS = RHS

Question 3.

Using suitable properties, evaluate the following :

(i) $8 \times 53 \times (-125)$

(ii) $(-8) \times (-2) \times 3 \times (-5)$

(iii) $(-6) \times 2 \times (-8) \times 5$

(iv) $15 \times (-25) \times (-4) \times (-10)$

(v) $26 \times (-48) +(-48) \times (-36)$

(vi) $724 \times (-56) + (-724) \times 44$

(vii) $(-47) \times 102$

(viii) (-39) × (-97)

Solution :

(i) 8 × 53 × (-125)

Using associative property

= 8 × (-125) × 53 = -1000× 53 = -53000

(ii) (-8) × (-2) × 3 × (-5)

Using associative property

= (-2) × (-5) × (-8) × 3

= +10 × (-8) × 3

= -80 × 3

= -240

(iii) (-6) × 2 × (-8) × 5

Using associative property

= 2 × 5 × (-6) × (-8)

= 10 × (+48)

= -240

(iv) 15 × (-25) × (-4) × (-10)

= (-25) × (-4) × (-10) × 15

= 100 × (-150)

= -15000

(v) 26 × (-48) + (-4) × (-10)

Using distributive law of multiplication

= (-48) [26 + (-36)]

=   (-48) × (-10)

= 480

(vi) 724 × (-56) + (-724) × 44

Using distributive law of multiplication

= 724 × (-56 -44)

= 724 × 100

= 72400

(vii) (-47) × 102

= (-47) × (100+2)

Using distributive law of multiplication

= (-47) × 100 + (-47 × 2)

= -4700 -94

= -4794

(viii) (-39) × (-97)

= -39 × (-100+3)

= (-39) × (-100) +(-39) (3)

= 3900 - 117

= 3783

Question 4.

Fill in the blanks to make the following true statements:

(i) (-4) × ....= 44

(ii) 7 × ....= -42

(iii) .... × (-13) = 143

(iv) (-5) × ....= 0

Solution:

(i) (-4) × ....= 44

$\Longrightarrow$ (-4) × (41) = 44 (44÷(-4) = -11)

(ii) 7 × ....= 42

7 × (-6) = -42 (-42 ÷ 7 = -6)

(iii) .... × (-13) = 143

(-11) × (-13) = 143 (143 ÷ -13 = -11)

(iv) (-5) × .... = 0

 (-5) × 0 = 0 (0 ÷ -5 = 0)

Question 5.

A certain freezing process requires that room temperature be lower from $32°c$ at the rate of 5°C every hour. What will be the room temperature 8 hours after the freezing process begins?

Solution :

Original temperature = $32°C$

Rate of lowering the temperature = 5°C per hour

After 8 hours, the freezing process begins = $32°C - (5° \times 8) = 32$

Question 6 .

In a class test containing 10 question, 5 marks are awarded for every correct answer and 2 marks are deducted for every incorrect answer and 0 for questions not attempted.

(i) Rohit gets four correct and six incorrect answer . what is his score?

(ii) Seema gets 5 correct and 5 incorrect answers. What is her score ?

(iii) Ritu attempted 7 questions and gets only 2 correct answers. What is her score?

Solution:

Total number of questions in a test = 10

Award for a correct

Answer = 5 marks

Deduction for an incorrect

Answer = 2 marks

Answer for not attempting the question = 0 mark

(i) Rohit award for 4 correct answer and 6 incorrect answer 54 – 6 ×2
= 20-12 = 8 marks

(ii) seema's award for 5 correct answers and 5 incorrect

Answers $= 5 \times 5 – 5 \times 2 = 25 – 10 = 15$ marks

(iii) Ritu's award for attempting 7 questions 3 questions not attempted, 2 correct answers

$= (10 – 7) = 3$ not attempted = 0 marks and 5 incorrect answers

$= 2 \times 5 + 3 \times 0 – 5 \times 2$

$= 10 + 0 – 10$

= 0 marks

Question 7 .

(i) find a pair of integers whose product is -15 and whose different is 8.

(ii) find a pair of integers whose product is -36 and whose different is 15 .

Solution:

(i) A pair of integers whose product = -15

And difference = 8

These integers can be -3, 5 as

$-3 \times 5 = -15$

$5 – (-3) = 5+3 = 8$

As -5 , 3 is another pair as

$3 \times (-5) = -15$ and $3 - (-5) = 8$

(ii) A pair of integer whose product is -36 and difference = 15

There integers can be -12 and 3

As $-12 \times 3 = -36$

And $3 - (-12) = 3+12 = -36$ and

$12 - (-3)$

$= 12+3 = 15$

Exercise 1.4

Question 1.

Evaluate the following:

(i) (-36) ÷ (-9)

(ii) 150 ÷ (-25)

(iii) (-270) ÷ 27

(iv) (-59) ÷ 59

(v) 0 ÷ (-17)

(vi) (-784) ÷ (-56)

Solution:

(i) $(\text{-36}) \div (\text{-9}) = \dfrac{-36}{-9} = +4$

(ii) $150 \div (\text{-25}) = \dfrac{150}{-25} = \text{-6}$

(iii) $(\text{-270}) \div 27 = \dfrac{-270}{27} = \text{-10}$

(iv) $(\text{-59}) \div 59 = \dfrac{-59}{59} = \text{-1}$

(v) $0 \div (\text{-17}) = \dfrac{0}{-17} = 0$

(vi) $(-784) \div (-56) = \frac{-784}{-56} = 14$

$$
\begin{array}{r|r|l}
56 & 784 & 14 \\
& \underline{56} & \\
& 224 & \\
& 224 & \\
& \underline{} & \\
& 0 &
\end{array}
$$

Question 2.

Evaluate the following :

(i) $13 \div [(-2) +1]$

(ii) $(-47) \div [(-45)+(-2)]$

(iii) $[(-6)+5] \div [(-2) +1]$

(iv) $[(-48) \div (-6)] \div (-2)$

Solution :

(i) $13 \div [(-2) +1]$

$= 13 \div [-2 +1]$

$= 13 \div (-1)$

$= -13$

(ii) $(-47) \div [\ (-45) + (-2)\ ]$

   $= (-47) \div (-47)$

   $= 1$

(iii) $[\ (-6) + 5\ ] \div [\ (-2) +1\ ]$

   $= [\ -6 +1\ ] + [\ -2 +1\ ]$

   $= (-1) \div (-1)$

   $= 1$

(iv) $[\ (-48) \div (-6)\ ] \div (-2)$

   $= 8 \div (-2)$

   $= -4$

Question 3 .

Verify that $(\ a \div b) \div c \neq a \div (\ b \div c)$ for a $= -225$, b $= 15$ and c $= -3$.

Solution:

LHS $= (\ a \div b)\ \div c\ = \dfrac{a}{b} \div c\ =\ \dfrac{a}{bc}$

RHS $= a \div (\ b \div c) = a \div \dfrac{b}{c}\ =\ a \times \dfrac{c}{b} = \dfrac{ac}{b}$

LHS ≠ RHS

a = -225 , b = 15 , c = -3

LHS = (a +b) +c = $\frac{-225}{25}$ ÷ (-3)

= (-15) ÷ (-3) = $\frac{-15}{-3}$ = 5

RHS = a ÷ (b ÷ c) = -225 ÷ (15 ÷ (-3))

= -225 ÷ $\left[\frac{15}{-3}\right]$ = -225 ÷ (-5)

= 45

LHS ≠ RHS

Question 4.

Verify that   a ÷ (b ÷ c) ≠ (a ÷ b) ÷ (a ÷ c) for

(i) a = -10 , b = 1 and c = 1

(ii) a $= 12$, b $= 1$ and c $= -2$

Solution :

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

LHS $= a \div b + c = \dfrac{a}{b+c}$

RHS $= (a \div b) (a \div c) = \dfrac{a}{b} + \dfrac{a}{c} = \dfrac{ac+ab}{bc}$

LHS $\neq$ RHS

a $= -10$, b $= 1$, c $= 1$

LHS $= a \div b + c = -10 \div (1 \div 1)$

$= (-10) \div 1 = \dfrac{-10}{1} = -10$

RHS $= (a \div b) + (a \div c) = \dfrac{-10}{1} + \dfrac{-10}{1}$

$= (-10) + (-10) = -10 -10 = -20$

LHS $\neq$ RHS

A = 12 , B = 1 and c = -2

LHS = a ÷ (b ÷ c) = 12 ÷ (1 ÷ (-2))

$$= 12 \div \frac{1}{-2} = 12 \times \frac{-2}{1} = -24$$

RHS = (a ÷ b) + (a ÷ b) =

= (12 ÷ 1) + [12 ÷ (-2))

= 12 – 6

= 6

LHS ≠ RHS

Question 5.

Fill in the blanks to make the following statements true:

(i) 239 ÷ .... = 1

(ii) (-85) ÷ ...... = -1

(iii) (-213) ÷ .... = 1

(iv) (-43) ÷ .... = 43

(v) .... ÷ (-21) = 4

(vi) (-66) ÷ .... = -3

Solution :

(i) 239 ÷ .... = 1

$$\frac{239}{1} = 239 \quad ; 239 \div 239 = 1$$

(ii) $(-85) \div \ldots\ldots\ldots = -1$

$-85 \div -1 = \frac{-85}{-1} = 85$

$; (-85) \div (85) = -1$

(iii) $(-213) \div \ldots\ldots = 1$

$$\frac{-213}{-1} = -213$$

$; (-213) \div (-213) = 1$

(iv) $(-43) \div \ldots\ldots = 43$

$$\frac{-43}{43} = (-1) = 43$$

(v) $\ldots\ldots \div (-21) = 4$

$-21 \times 4 = -84$

$; (-84) \div (-21) = 4$

(vi) (-66) ÷ .... = -3

$$\frac{-66}{-3} = 22$$

; (-66) ÷ 22 = -3

Question 6 .

Write five pairs of integers (a , b) such that a ÷ b = -3 one such pair (-6 , 2)

Solution:

Here, a ÷ b = -3

$\Longrightarrow$ a = -3b

Putting some different values to b, we get corresponding values of a such as

(i) b = 1 then

A = -3b = -3 × 1 = -3

(-3 , 1)

(ii) b = 3 , then

a = -3 × 3 = -9

(-9 , 3) is a pair.

(iii) b = 4 , then a = -3 × 4 = -12

Pair is (-12 , 4)

(iv) b = 5 then a = -3 × 5 = -15

Pair is (-15 , 5)

(v) b = 6 , then a = -3 × 6 = -18

 pair is (-18 , 6)

Question 7 .

In a competition 3 marks are given for every correct answer and -2 marks are given for every incorrect answer and no marks for not attempting any question.

(i) sachin scored 24 marks. If he got 14 correct answers, how many questions has he attempted incorrectly?

(ii) Nalini scores (-7) marks in this competition, though she has got 9 correct answers. How many questions she has attempted incorrectly?

Solution:

In a competition,

3 marks for every correct answer and (-2) marks for every incorrect answer.

No marks for non – attempting the question.

Sachin got 14 correct answers, and got 24 marks he attempted 14 correct answer

He would have got $14 \times 3 = 42$ marks

But to get 24 marks $42 - 24 = 18$ marks were deducted due to incorrect answer.

He attempted $\frac{18}{2} = 9$ question incorrect.

(ii) nalini scored (-7) marks, she got 9 correct answers, so she would have $9 \times 3 = 27$

But she got (-7) marks

So , $27 + 7 = 34$ marks were deducted due to incorrect answers.

Number of incorrect answers $= \frac{34}{2}$

$= 17$ question

Question 8 .

An elevator descends into a mine shaft at the rate of 6 m/min. If the descend starts from 10 m above the ground level, how long will it take to reach the shaft 350 m below the ground level?

Solution:

Rate of elevator $= 6$ m/min

And it was started 10m above the ground level

Depth below ground level $= 350$ m

Total depth $= 350 + 10 = 360$

Time taken $= \frac{360}{6}$ minutes

$= 60$ minutes

$= 1$ hour

Exercise 1.5

Question 1.

$7 - 8 \div (-2) + 3 \times (-4)$

Solution:

$7 - 8 \div (-2) + 3 \times (-4)$

$= 7 + \frac{-8}{2} + 3 \times (-4)$

$= 7 + 4 + 3 \times (-4)$ (use of BODMAS)

$= 7 + 4 - 12$

$= 11 - 12$

$= -1$

Question 2 .

$9 - \{ 7 - 24 \div (8 + 6 \times 2 - 16) \}$

Solution :

$9 - \{ 7 - 24 \div (8 + 6 \times 2 - 16) \}$

$= 9 - \{ 7 - 24 \div (8 + 12 - 16) \}$

$= 9 - \{ 7 - 24 \div 4 \}$

$= 9 - (7 - \frac{24}{4})$

$= 9 - [7 - 6]$

$= 9 - 1$

$= 8$

Question 3.

-11 [-6 – { 3 – 5 (8 ÷ 4 – 1) }]

Solution:

-11 [-6 – { 3 – 5 (8 ÷ 4 – 1) }]

= -11 [-6 – { 3 – 5 (2 – 1) }]

= -11 [-6 – { 3 – 5 × 1}]

= -11 [-6 – { 3 – 5 }]

= -11 [-6 – (-2)]

= -11 – (-4)

= -11 +4

= -7

Question 4.

(-3) × (12) ÷ (-4) + 3 × 6

Solution:

(-3) × (12) ÷ (-4) + 3 × 6

= -3 × $\frac{-12}{-4}$ + 3 × 6

= -9 + 18

= 9

Question 5.

$14 \div (3 \text{ of } 2 - 3 + 4) - 9 (5 - 3)$

Solution:

$14 \div (6 - 3 + 4) - 9(2)$

$= 14 \div 7 - 9 \times 2$

$= 2 - 18$

$= -16$

Chapter 1

Objective type question

Question 1 .

Fill in the blanks:

(i) .... is the greatest negative integer.

(ii) ((-10) + 3) + (-12) = (-10) + (3 + ...)

(iii) The product of two negative integers and the product of two positive integers is a .... integer.

(iv) the division of any integer by zero is ....

(v) The integer whose product with (-1) is 22 is ....

(vi) (-15) × .... = 120

(vii) .... ÷ (-6) = -12

(viii) (-10) × ((-15) + 33) = ... × (-15) + (-10) × 33

(ix) .... ÷ (-25) = 0

(x) (-8) × (-13)) × 27 = (-8) × ((........)× 27)

(xi) 13 × (-6) = - (.......... ×...........) = ...

(xii) (-a) + b = b + additive inverse of ....

(xiii) when we divide a negative integer by a positive integer divide them as whole numbers and put a ...... sing before quotient.

(xiv) when -25 is divided by ...... the quotient is 5 .

(xv) there are .... pairs of integers satisfying a ÷ b = -1 .

(xvi) The value of the expression ((-60) ÷ 12) (-5) is ....

(i) -1 is the greatest negative integer.

(ii) ((-10) + 3) + (-12) = (-10) + (3 + ...)

[(-10 + 3] + (-12) = (-10) + [3 + (-12)] (Associative law of addition.)

(iii) The product of two negative integers and the product of two positive integers is a positive integer.

(iv) the division of any integer by zero is meaningless.

(v) The integer whose product with (-1) is 22 is -22 [(-1) × (−22) = 22

(vi) (-15) × -8 = 120

$\frac{120}{-15}$ = -8   ; (-15) × (-8) = 120

(vii) .... ÷ (-6) = -12

-6 × (-12) = 72

72 ÷ (-6) = -12

(viii) (-10) × ((-15) + 33) = ... × (-15) + (-10) × 33

       = (-10) × ((-15) + 33)

        = (-10) × (-15) +(-10) × 33) (Distributive law of multiplication.

(ix) 0 ÷ (-25) = 0 (0 divided by every integer excepted is zero)

(x)   (-8) × (-13)) × 27 = (-8) × ((-13)× 27) (Associative law of multiplication)

(xi) 13 × (-6) = - (13 × 6) = 78

(xii) (-a) + b = b + additive inverse of a .

(xiii) when we divide a negative integer by a positive integer divide them as whole numbers and put a negative sing before quotient.

(xiv) when -25 is divided by (-5) the quotient is 5 .

(xv) there are infinite pairs of integers satisfying a ÷ b = -1 .

(xvi) The value of the expression ((-60) ÷ 12) (-5) is 1 .

$\{ \frac{-60}{12} = \text{-5} \div (\text{-5}) = \frac{-5}{-5} = 1 \}$

Question 2.

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

(i) For every integer a $|a|$ is either positive or zero.

(ii) the difference of two negative integers cannot be a positive integer.

(iii) We can write a pair of integers whose sum is not an integer.

(iv) Going 300 metres towards east first and then 100 m back is the same as going 100 m towards west first and then going 300 back.

(v) If we multiply an integer by (-1) , then the result is the additive inverse of the integer.

(vi) If we divide an integer by (-1) , then the result is the additive inverse of the integer.

(vii) 1 is the additive identity of integers.

(viii) (-17) × 6 is a whole number.

(ix) (-5) × (-8) × is a whole number .

(x) (-237) × 0 is same as 0 × (-89) .

(xi) the product of 5 negative integers is a negative integer.

(xii) Closure property holds for subtraction of integers.

(xiii) commutative property does not hold for subtraction of integers

(xiv) Associative property holds for subtraction of integers.

(xv) Closure property holds for division of integers.

(xvi) Commutative property does not hold for division of integers.

(xvii) (-1) is not a multiplicative identity of integers.

(xviii) Multiplication fact (-8) × (-12) = 96 is same as division fact 96 ÷ (-12) = -8

(xix) [(-32 ÷ 8] ÷ 2 = (-32) ÷ (8 ÷ 2)

(xx) For every integer a , a ÷ a = 1

(xxi) The successor of 0 × (-10) is 1 × (-10).

Solution:

(i) For every integer a $|a|$ is either positive or zero. **(True)**

(ii) the difference of two negative integers cannot be a positive integer.**(False)**

Correct:

Difference of -3 and -5 = -3 – (-5) = -3+5 = 2 which is positive

(iii) We can write a pair of integers whose sum is not an integer.**(False)**

Correct:

As sum of two integers is always an integer .

(iv) Going 300 metres towards east first and then 100 m back is the same as going 100 m towards west first and then going 300 back.**(True)**

(v) If we multiply an integer by (-1) , then the result is the additive inverse of the integer. **(True)**

(vi) If we divide an integer by (-1) , then the result is the additive inverse of the integer. **(True)**

(vii) 1 is the additive identity of integers. **(False)**

Correct:

0 is a additive identity not 1 .

(viii) (-17) × 6 is a whole number. **(False)**

Correct:

(-17) × 6 = -102 is not a whole number as a whole number is zero or positive.

(ix) (-5) × (-8) × is a whole number . **(False)**

(x) (-237) × 0 is same as 0 × (-89) . **(True)**

(xi) the product of 5 negative integers is a negative integer. **(True)**

(xii) Closure property holds for subtraction of integers. **(True)**

(xiii) commutative property does not hold for subtraction of integers.**(True)**

(xiv) Associative property holds for subtraction of integers.**(False)**

Correct:

It does not holds as

= 15 -7 = 8

= 7 -15 = -8

So, 8 ≠ (-8)

(xv) Closure property holds for division of integers. **(False)**

Correct:

As $\frac{15}{3} = 3$ but $\frac{5}{15} = \frac{1}{3}$

So, $3 \neq \frac{1}{3}$

(xvi) Commutative property does not hold for division of integers. **(True)**

(xvii) (-1) is not a multiplicative identity of integers. **(True)**

(xviii) Multiplication fact (-8) × (-12) = 96 is same as division fact 96 ÷ (-12) = -8 .**(True)**

(xix) [(-32 ÷ 8] ÷ 2 = (-32) ÷ (8 ÷ 2) **(False)**

Correct:

[(-32) ÷ 8 } ÷ 2 = -4 ÷ 2 = -2

And (-32) ÷ (8 ÷ 2) = -32 ÷ 4 = -8

So, it is false ,

(xx) For every integer a , a ÷ a = 1 **(False)**

Correct:

As 0 ÷ 0 ≠ 1

(xxi) The successor of 0 × (-10) is 1 × (-10). **(False)**

Correct:

As 0 × (-10) = 0 and successor of 0 is 1 but 1 × (-10) = -10

Question 3.

State whether the following statements are true or false. Justify your answer.

(i) the sum of a positive integer and a negative integer is always a positive integer.

(ii) The sum of two integers is always greater than their difference.

(iii) For any two integers a and b , the inequality –a < b is always true.

(iv) The product of two integers is always greater than the sum of the integers.

Solution :

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

Correct:

As 3 + (-8) = 3 – 8 = -5 which is negative.

(ii) The sum of two integers is always greater than their difference. **(False)**

Correct :

As 3 + (-4) = -1 but 3 – (-4) = 3+4 = 7 and -1 <7

(iii) For any two integers a and b , the inequality –a < b is always true. **(False)**

Correct:

Let a = -5 and b = 2 , then –a = -(-5) 5 and –a > b

(iv) The product of two integers is always greater than the sum of the integers. **(False)**

Correct:

Let two integers be -2 and 3

Then product $= -2 \times 3 = -6$

And sum $= -2 + 3 = 1$

But $-6 < 1$

Their product $<$ Their sum.

Multiple Choice Questions

Choose the correct answer from the given four option (4 to 19) :

Question 4.

If the integers 10, -7, 5, 3, -4, and 0 are marked on the number line, then the integer which lies on the extreme left is

(a) 10

(b) 0

(c) -7

(d) -4

Solution:

Numbers (Integers) 10, -7, 5, 3, -4 and 0 are marked on a number line the integer on the extreme left will be -7 .(c)

Question 5 .

On the number line, the value of $(-3) \times 3$ lies on the right hand side of

(a) -10

(b) -6

(c) o

(d) 9

Solution:

Value of (-3) × 3 = -9 lies on the right side of -10 as (-10) < (-9) (a)

Question 6.

The value of 5 ÷ (-1) does not lie between

(a) 0 and -10

(b) 0 and 10

(c) -3 and -10

(d) -7 and 7

Solution:

5 ÷ (-1) = 5 – 1 = -5

-5 does not lie between 0 and 10 are positive integer.

0 and 10 (b)

Question 7.

The next number in the pattern -62, -37, -12, ...is

(a) 25

(b) 0

(c) 13

(d) -13

Solution :

-62 , -37, -12,.....

Next number is 0. (b)

Question 8 .

Multiplication of integers satisfies the property of

(a) closure

(b) commutative

(c) associativity

(d) all of these

Solution:

Multiplication of integers satisfies the property of closure, commutative, associative i.e. all there properties. (d)

Question 9.

Closure property does not hold in integers for

(a) multiplication

(b) division

(c) addition

(d) subtraction

Solution :

Closure property does not hold in the integers for the division. (b)

Question 10.

The number of integers between -20 and -10 are

(a) 8

(b) 9

(c) 10

(d) 11

Solution:

The number of integers between -20 and -10 are 9

(-19, -18, -17, -16, -15, -14,-13, -12, -11,) (b)

Question 11.

If the sum of two integers is -10 and one of them is 2, then the other is

(a) 8

(b) -8

(c) 12

(d) -12

Solution :

Sum of two integers = -10

One integers = 2

Then Second integer will be = -10 – (2) = -12 (d)

Question 12.

The integer that must be subtracted from -5 to obtain -12 is

(a) 7

(b) -7

(c) 17

(d) -17

Solution:

The integer will -12 if -5 is subtracted from that -5 (.....) = -12

12 – 5 = 7 (a)

Question 13.

Which of the following is not the additive inverse of a ?

(a) –(-a)

(b) –a

(c) a ÷ (-1)

(d) a × (-1)

Solution:

Additive inverse of a is not a i. e - (-a) (a)

Question 14.

0 ÷ (-10) is equal to

(a) 0

(b) -1

(c) -10

(d) none of these

Solution.

0 ÷ (-10) = 0 -10 = 0 (a)

Question 15 .

(-33) × 102 + (-33) × (-2) is equal to

(a) 3300

(b) -3300

(c) 3432

(d) -3432

Solution:

(-33) × 102 + (-33) × (-2) = (-33) (102-2) = -33 × 100 = -3300 (b)

Question 16 .

(-25) (6+4) is not the same as

(a) -250

(b) (-25) × 10

(c) (-25) × 6 × 4

(d) (-25) × 6 + (-25) × 4

Solution:

(-25) (6+4) is not same as (-25) × 6 × 4

6+4 = 10 but 6 × 4 = 24 (c)

Question 17 .

$101 \times (-1) + 0 \div (-1)$ is equal to

(a) -101

(b) 101

(c) -102

(d) 102

Solution:

$101 \times (-1) + 0 \div (-1) = -101 + 0 = -101$ (a)

Question 18 .

If a and b are two integers, then which of the following may not be an integer?

(a) $a + b$

(b) $a - b$

(c) $a \times b$

(d) $a \div b$

Solution:

A and B are two integers, then

By closure proper $a \div b$ is not an integer . (d)

Question 19 .

For a non-zero integer a which is the following is not defined?

(a) a ÷ 0

(b) 0 ÷ a

(c) a = 1

(d) 1 ÷ a

Solution:

A is a non-zero integer, then

A ÷ 0 or a 0 is not defined, (a)

Value Based Questions

Question 1.

In a competitive exam, 3 marks are given for every correct answer and 1 mark is deducted for every incorrect answer . Raju copied some answers from Reema and answered all the questions, he scored 20 marks thought he got 10 correct answers. How many incorrect answer had he attempted? What values are promoted in the question?

Solution:

In competitive exam

3 marks awarded for every correct answer.

1 mark is deducted for an incorrect answer.

Raju copied some answer from Reema.

He scored 20 marks but he got 10 correct answers.

For correct answer, his scores = 10 × 3= 30

But he scored 20 marks

30 -20 = 10 marks were deducted

He attempted 10 ÷ 1 = 10 incorrect answers.

A student should not use unfair mean in the exam. It is a bad habit. He should work hard.

Question 2.

In a quiz, 300 are awarded for every correct answer and a penalty of 75 is put for every incorrect answer. Madhuri answered 15 questions out of which only 6 answers were correct. How much money is earned by madhuri in the quiz?

If she distributes the money earned by her to poor children in the neighbourhood, what values are being promoted?

Solution:

In a quiz,

300 are awarded for every correct answer.

75 is put as the penalty for every incorrect answer.

Madhuri scored 15 questions, but 6 questions were correct answers.

Money earned for correct answer $= 6 \times 300 = 1800$

She scored incorrect $= 15 - 6 = 9$

Penalty $= 75 \times 9 = 675$

Correct amount she got $= 1800 - 675 = 1125$

So, she got 1125

Higher order thinking skills (HOTS)

Question 1.

Write a pair of integers whose product is -12 and there lies seven integers between them.

Solution:

Product of two integers = -12

The pairs can be possible

1×12 , 2×6 , 3×4

But has 7 integers between them the pair can be -2×6 or -6×2

And seven integers between them will be

-1, 0, 1, 2, 3, 4, 5, or -5, -4, -3, -2, -1, 0, 1

Question 2.

A water tank has steps inside it. A monkey is sitting on the first step. The water level is at the ninth step.

(i) he jumps 3 steps down and then jumps back 2 steps up. In how many jumps will he reach the water level?

(ii) after drinking water, he wants to go back. For this, he jumps 5 steps up and then jumps back 3 steps down in every move. In how many jumps will he reach back the top of the tank?

Solution:

In a tank

Monkey is at first step and water level is at 9th step.

(i) monkey jumps 3 steps down jumps back 2 steps

So, he jumps 3-2=1 step in one attempt.

(ii) after drinking water, he jumps up 5 steps and then back 3 steps. So, he covers 2 steps in one jump.

So, 9-5 = 4+1 = 5 jumps, he will come back at the first step of the tank.

Question 3.

A shopkeeper earns a profit of 2 by selling a pen and incurs a loss of 50 praise per pencil and loss of 15 praise per eraser while selling pencils and erasers of old stock. On a particular day, he earns a profit of 10 . if he sold 10 pens and the number of pencils and erasers he sold are in the ratio 7:10, then find the number of pencils and eraser she sold on that day.

Solution:

By selling a pen, gain is 2

And by selling a pencils , he loses 50 praise

And an eraser, he loses 15 praise

On one day, he gains $= 10$

On that day he sold 10 pens and pencils and erasers in the ratio of 7 : 10

On ten pens, his gain $= 10 \times 2 = 20$

Loss on pencils and erasers $= 20 - 10 = 10 = 1000$ praise

Ratio in pencil and erasers $= 7 : 10$

Let number of pencils $= 7x$, then eraser $= 10x$

$7x \times 50 + 10x \times 15 = 1000$

$\implies 350x + 150x = 1000$

$\implies 500x = 1000$

$\implies x = 2$

Number of pencils $= 7 \times 2 = 14$

And number of erasers $= 10 \times 2 = 20$

Chapter 1

Check your progress

Question 1.

Evaluate the following :

(i) $(-7) \times (-9) \times (-11)$

(ii) $(-5) \times 7 \times (-6) \times (-8)$

(iii) $(-1024) \div 32$

(iv) $(-216) \div (-12)$

Solution :

(i) $(-7) \times (-9) \times (-11)$

$= (63) \times (-11)$

$= -693$

(ii) $(-5) \times 7 \times (-6) \times (-8)$

$= -35 \times (48)$

$= -1680$

(iii) $(-1024) \div 32$

$= \dfrac{-1024}{32}$

$= -32$

(iv) (-216) ÷ (-12)

$$= \frac{-216}{-12}$$

$= +18$

$= 18$

Question 2.

What will be the sign of the product if we multiply 39 negative integers and 98 positive integers?

Solution:

39 is odd and 98 is even.

Product of 39 negative and 98 positive integers will negative.

Question 3. Use the sign > , < or = in the box to make the following state true:

(i) (-15) + 38 ....27 + (-50)

(ii) (-13) × 0 × (-5) .... (-7) × (-6) × 14

(iii) (-18) ÷ (-3) .... (-10) + (-15) +31

(iv) (-5) × (-7) × (-10) .... (-1400) ÷ (-4)

Solution:

(i) (-15) + 38 .... 27 + (-50)

LHS = -15 + 38 = 23

RHS = 27 -50 = -23

(23) > (-23)

(ii) (-13) × 0 × (-5) .... (-7) × (-6) × 14

LHS = -13 × 0 × (-5) = 0

And (-7) × (-6) × 14

RHS = 42 × 14 = 588

0 < 588

(iii) (-18) ÷ (-3) .... (-10) + (-15) +31

LHS = -18 ÷ -3 = 6

RHS = (-10) + (-15) + 31 = -25 +31 = 6

6 = 6

Question 4.

Is {(-45) ÷ (-15) } ÷ (-3) = (-45) ÷ [(-15) ÷ (-3)] ?

Solution:

(-45) ÷ (-15) ÷ (-3)

LHS = $\frac{-45}{-15}$ ÷ (-3)

= 3 ÷ -3

= -1

And

RHS = -45 ÷ ($\frac{-15}{-3}$)

= -45 ÷ 5

= -9

(-1) ≠ -9

No, not equal.

Question 5.

A cement company earns a profit of 8 per bag of white cement and a loss of 5 per bag of grey cement sold.

(i) The company sells 3000 bags of white cement and 5000 bags of grey cement in a month. What is its profit or loss?

(ii) what is the number of white cement bags it must sell to have neither profit nor loss, if the number of grey cement bags sold is 6400?

Solution:

Profit on one white cement bag = 8

And loss on one bag grey cement bag = 5

(i) on the sale of 3000 bags of white cement and 5000 bags of grey cement bags.

Sale = 3000 × 8 − 5000 × 5 = 24000 − 25000 = -1000

There will be a loss of 1000

(ii) loss on 6400 bags of grey cement = 6400 × 5 = 32000

In order to get a gain of 32000

The white cement bags be sold = $\frac{32000}{8}$ = 4000 bags

Question 6.

Simplify the following :

(i) (-7) + (-6) ÷ 2 − { (-5) × (-4) − (3-5)}

(ii) 11 − [7 − (5 − 3 (9 -3 − 6) }]

Solution:

(i) (-7) + (-6) ÷ 2 − {(-5) × (-4) − (3 − 5) }

$= (-7) + (-6) \div 2 - [+20 - (-2)]$

$= (-7) + (-6) \div 2 - (20 + 2)$

$= (-7) + \frac{-6}{2} - 22$

$= (-7) + (-3) - 22$

$= -7 - 3 - 22$

$= -32$

(ii) 11 − [7 − { 5 − 3 (9 -3 − 6) }]

$= 11 - [7 - \{ 5 - 3 (9 \text{-}3 + 6) \}]$

$= 11 - [7 - (5 - 3 \times 12\}]$

$= 11 - [7 - (5 - 36) \}]$

$= 11 - [7 - (-31)]$

$= 11 - 38$

$= -27$