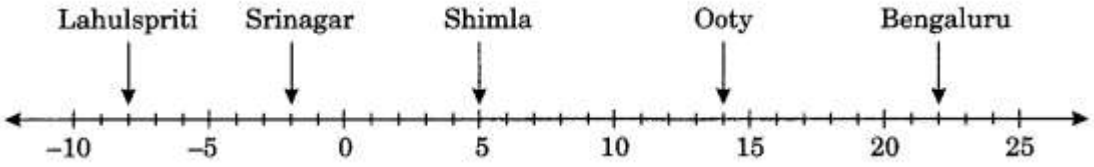
CHAPTER-1

INTEGERS

EX 1.1:-

Question 1

Following number line shows the temperature in degree Celsius (°C) at different places on a particular day.



Cities	Temperature
Lahulspriti	-8°C
Srinagar	-2°C
Shimla	5°C
Ooty	14°C
Bengaluru	22°C

(a) Observe this number line and write the temperature of the places marked on it.
(b) What is the temperature difference between the hottest and the coldest places among the above?
(c) What is the temperature difference between Lahulspriti and Srinagar?
(d) Can we say temperature of Srinagar and Shimla taken together is less than the temperature at Shimla? Is it also less than the temperature at Srinagar?
Solution:
(a) From the given number line, we observe the following temperatures.

(b) The temperature of the hottest place = 22°C
The temperature of the coldest place = -8°C
Difference = 22°C – (-8°C)
= 22°C + 8°C = 30°C
(c) Temperature of Lahulspriti = -8°C
Temperature of Srinagar = -2°C
∴ Difference = -2°C – (-8°C)
= -2°C + 8°C = 6°C
(d) Temperature of Srinagar = -2°C
Temperature of Shimla = 5°C
∴ Temperature of the above cities taken together
= -2°C + 5°C = 3°C
Temperature of Shimla = 5°C
Hence, the temperature of Srinagar and Shimla taken together is less than that of Shimla by 2°C.
i.e., (5°C – 3°C) = 2°C

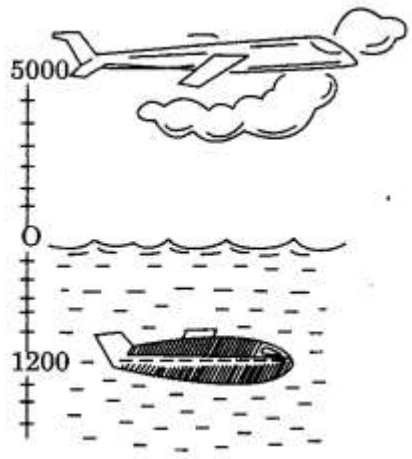
Question 2
In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If Jack's scores in five successive rounds were 25, -5, -10, 15 and 10, what was his total at the end?
Solution:
Given scores are 25, -5, -10, 15, 10
Marks given for correct answers
= 25 + 15 + 10 = 50
Marks given for incorrect answers
= (-5) + (-10) = -15
∴ Total marks given at the end
= 50 + (-15) = 50 – 15 = 35

Question 3
At Srinagar temperature was -5°C on Monday and then it dropped by 2°C on Tuesday. What was the temperature of Srinagar on Tuesday? On Wednesday, it rose by 4°C. What was the temperature on this day?
Solution:
Initial temperature of Srinagar on Monday = -5°C
Temperature on Tuesday = -5°C – 2°C = -7°C
Temperature was increased by 4°C on Wednesday.

∴ Temperature on Wednesday
= -7°C + 4°C = -3°C
Hence, the required temperature on Tuesday = -7°C
and the temperature on Wednesday = -3°C

Question 4

A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine flowing 1200 m below the sea level. What is the vertical distance between them?



Solution:

Height of the flying plane = 5000 m
Depth of the submarine = -1200 m
∴ Distance between them
= + 5000 m – (-1200 m)
= 5000 m + 1200 m = 6200 m
Hence, the vertical distance = 6200 m

Question 5

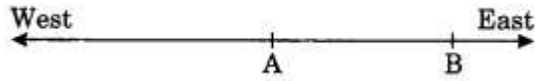
Mohan deposits ₹ 2,000 in a bank account and withdraws ₹ 1,642 from it, the next day. If withdrawal of amount from the account is represented by a negative integer, then how will you represent the amount deposited? Find the balance in Mohan's account after the withdrawal.

Solution:

The deposited amount will be represented by a positive integer i.e., ₹ 2000.
Amount withdrawn = ₹ 1,642
∴ Balance in the account
= ₹ 2,000 – ₹ 1,642 = ₹ 358
Hence, the balance in Mohan's account after the withdrawal
= ₹ 358

Question 6

Rita goes 20 km towards east from a point A to the point B. From B, she moves 30 km towards west along the same road. If the distance towards east is represented by a positive integer, then how will you represent her final position from A?



Solution:

Distances travelled towards east from point A will be represented by positive integer i.e. +20 km.

Distance travelled towards the west from point B will be represented by negative integer, i.e., —30 km.

Final position of Rita from A

= 20 km – 30 km = – 10 km

Hence, the required position of Rita will be presented by a negative number, i.e., -10.

Question 7

In a magic square each row, column and the diagonal have the same sum. Check which of the following is a magic square?

5	–1	–4
–5	–2	7
0	3	–3

(i)

1	–10	0
–4	–3	–2
–6	4	–7

(ii)

Solution:

(i) Row one R_1 = 5 + (-1) + (—4)

=5 – 1 – 4 = 5 – 5 = 0

Row two R_2 = (-5) + (-2) + 7

= -5 – 2 + 7 = -7 + 7 = 0

Row three R_3 = 0 + 3 + (-3)

= 0 + 3- 3 = 0

Column one C_1t = 5 + (-5) + 0

= 5 – 5 + 0 = 0

Column two C_2 = (-1) + (-2) + (3)

=-1 – 2 + 3 = -3 + 3 = 0

Column three C_3 = (-4) + 7 + (-3)

= -4 + 7 – 3 = 7 – 7 = 0

Diagonal d_{12} = 5 + (-2) + (-3)

= 5 – 2- 3 = 5 – 5 = 0

Diagonal d_2 = (-4) + (-2) + 0

= -4 – 2 + 0 = -6 + 0 = -6

Here, the sum of the integers of diagonal d2 is different from the others.

Hence, it is not a magic square.

(ii) Row one R_1 = 1 + (-10) + 0

= 1 – 10 + 0 = -9

Row two R_2 = (-4) + (-3) + (-2)
= -4 – 3 – 2 = -9
Row three R_3 = (-6) + (4) + (-7)
= -6 + 4 – 7 = -9
Column one C_3 = 1 + (-4) + (-6)
= 1 – 4 – 6 = -9
Column two C_2 = (-10) + (-3) + 4
= -10 – 3 + 4 = -9
Column three C_3 = 0 + (-2) + (-7)
= 0 – 2 -7 = -9
Diagonal d_1 = 1 + (-3) + (-7)
= 1 – 3 – 7 = 1 – 10 = -9
Diagonal d_2 = 0 + (-3) + (-6)
= 0 – 3- 6 = -9
Here, sum of the integers column wise, row wise and diagonally is same i.e. -9.
Hence, (ii) is a magic square.

Question 8
Verify a – (-b) = a + b for the following values of a and 6.
(i) a = 21, b = 18
(ii) a = 118, b = 125
(iii) a = 75, b = 84
(iv) a= 28, 6 = 11
Solution:
(i) a – (-b) = a + b
LHS = 21 – (-18) = 21 + 18 = 39
RHS = 21 + 18 = 39
LHS = RHS Hence, verified.

(ii) a – (-b) = a + b
LHS = 118 – (-125) = 118 + 125 = 243
RHS = 118 + 125 = 243
LHS = RHS Hence, verified.

(iii) a – (-b) = a + b
LHS = 75 – (-84) = 75 + 84 = 159
RHS = 75 + 84 = 159
LHS = RHS Hence, verified.

(iv) a – (-b) = a + b
LHS = 28 – (-11) = 28 + 11 = 39
RHS = 28 + 11 = 28 + 11 = 39
LHS = RHS Hence, verified.

Question 9

Use the sign of >, < or = in the box to make the statements true.

(a) (-8) +(-4) □(-8)-(-4)

(b) (-3) + 7 − (19) □ 15 − 8 + (-9)

(c) 23 − 41 + 11 □ 23 − 41 − 11

(d) 39 + (-24) − (15) □ 36 + (-52) − (-36)

(e) -231 + 79 + 51 □ -399 + 159 + 81

Solution:

(a) (-8) + (-4) □ (-8) − (-4)

LHS = (-8) + (-4) = -8 − 4 = − 12

RHS = (-8) − (-4) = -8 + 4 = -4

Here − 12 < -4

Hence, (-8) + (-4) [<] (-8) − (-4)

(b) (-3) + 7 − (19) □ 15 − 8 + (-9)

LHS = (-3) + 7 − (19) =-3 + 7-19

= -3 − 19 + 7

= -22 + 1 = -15

RHS = 15 − 8 + (-9)

= 15-8-9

= 15 − 17 = -2

Here -15 < -2

Hence, (-3) + 7 − (19) [<] 15 − 8 + (-9)

(c) 23 − 41 + 11 □ 23 − 41 − 11

LHS = 23 − 41 + 11 = 23 + 11 − 41 = 34 − 41 = -7

RHS = 23 − 41 − 11 = 23 − 52 = -29 Here, -7 > -29

Hence, 23 − 41 + 11 [>] 23 − 41 − 11

(d) 39 + (-24) − (15) □ 36 + (-52) − (-36)

LHS = 39 + (-24) − (15)

= 39 − 24 − 15

= 39 − 39 = 0

RHS = 36 + (-52) − (-36) = 36 − 52 + 36

= 36 + 36 − 52

= 72 − 52 = 20

Here 0 < 20

Hence, 39 + (-24) − (15) [<] 36 + (-52) − (-36)

(e) -231 + 79 + 51 □ -399 + 159 + 81

LHS = -231 + 79 + 51 = -231 + 130 = -101

RHS = -399 + 159 + 81 = -399 + 240 = -159

Here, -101 > -159

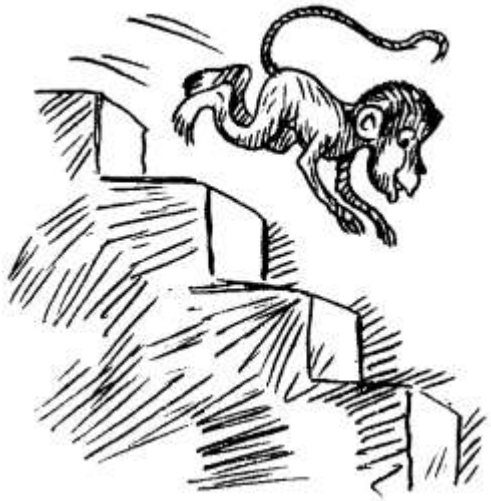
Hence, -231 + 79 + 51 [>] -399 + 159 + 81

Question 10

A water tank has steps inside it. A monkey is sitting on the topmost step (i.e., 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 4 steps up and then jumps back 2 steps down in every move. In how many jumps will he reach back the top step?



(iii) If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers, represent his move in part (t) and (ii) by completing the following:

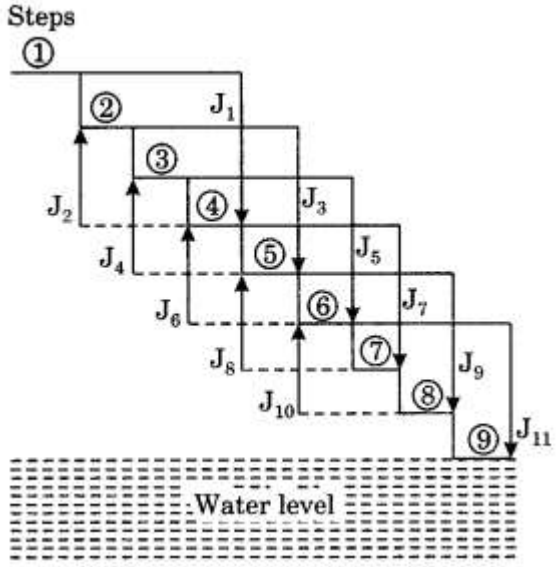
(a) − 3 + 2 − … = -8

(b) 4 − 2 + … = 8. In (a) the sum (-8) represents going down by eight steps. So, what will the sum 8 in

(b) represent?

Solution:

(i) The position of monkey after the



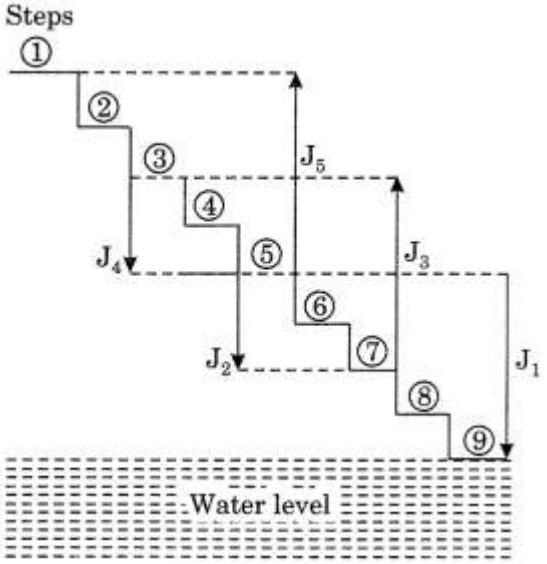
1st jump J_1 is at 4th step ↓

2nd jump J_2 is at 2nd step ↑

3rd jump J_3 is at 5th step ↓

4th jump J_4 is at 3rd step ↑
5th jump J_5 is at 6th step ↓
6th jump J_6 is at 4th step ↑
7th jump J_7 is at 7th step ↓
8th jump J_8 is at 5th step ↑
9th jump J_9 is at 8th step ↓
10th jump J_{10} is at 6th step ↑
11th jump J_{11} is at9th step ↓ (Water level)
Hence the required number of jumps = 11.

(ii) Monkey's position after the



1st jump J_1 is at 5th step ↑
2nd jump J_2 is at 7th step ↓
3rd jump J_3 is at 3rd step ↑
4th jump J_4 is at 5th step ↓
5th jump J_5 is at 1st step ↑
Hence, the required number of jumps = 5.

(iii) According to the given conditions we have the following tables

Jumps	J_1	J_2	J_3	J_4	J_5	J_6	J_7	J_8	J_9	J_{10}	J_{11}
Number of steps	-3	+2	-3	+2	-3	+2	-3	+2	-3	+2	-3

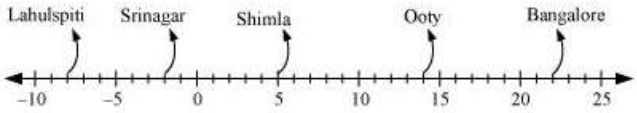
Jumps	J_1	J_2	J_3	J_4	J_5
Number of steps	+ 4	-2	+4	-2	+4

Therefore (a) Total number of steps
=-3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3
= -8 which represents the monkey goes down by 8 steps.
In case (ii), we get

Therefore (b) Total number of steps.
= +4 – 2 + 4 – 2 + 4 = 8
Here, the monkey is going up by 8 steps.

Exercise 1.1 : Solutions of Questions on Page Number : **4**

Q1 : Following number line shows the temperature in degree celsius (°C) at different places on a particular day.



(a) Observe this number line and write the temperature of the places marked on it.

(b) What is the temperature difference between the hottest and the coldest places among the above?

(c) What is the temperature difference between Lahulspiti and Srinagar?

(d) Can we say temperature of Srinagar and Shimla taken together is less than the temperature at Shimla? Is it also less than the temperature at Srinagar?

Answer :

(a) By observing the given data, the temperatures of these cities are as follows.

Lahulspiti	:	-8°C
Srinagar	:	-2°C
Shimla	:	5°C
Ooty	:	14°C
Bangalore	:	22°C

(b) Temperature at the hottest place, i.e., Bangalore = 22°C

Temperature at the coldest place, i.e., Lahulspiti = -8°C

Temperature difference = 22°C - (-8°C)

= 30°C

Therefore, the temperature difference between the hottest and the coldest places is 30°C.

(c) Temperature at Lahulspiti = -8°C

Temperature at Srinagar = -2°C

Temperature difference = -2°C - (-8°C)

= 6°C

Therefore, the temperature difference between Lahulspiti and Srinagar is 6°C.

(d) Temperature at Srinagar = -2°C

Temperature at Shimla = 5°C

Temperature of Srinagar and Shimla taken together = -2°C + 5°C

= 3°C

3°C < 5°C

3°C < Temperature of Shimla

Yes, the temperature of Srinagar and Shimla taken together is less than the temperature of Shimla.

However, 3°C > -2°C

Hence, the temperature of Srinagar and Shimla taken together is not less than the temperature of Srinagar.

Q2 : In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If jack's scores in five successive rounds were 25, - 5, - 10, 15 and 10, what was his total at the end?

Answer :

Jack's scores in five successive rounds are 25, -5, -10, 15, and 10. Total score of Jack at the end will be the sum of these scores.

Therefore, Jack's total score at the end = 25 - 5 - 10 + 15 + 10 = 35

Q3 : At Srinagar temperature was - 5°C on Monday and then it dropped by 2°C on Tuesday. What was the temperature of Srinagar on Tuesday? On Wednesday, it rose by 4°C. What was the temperature on this day?

Answer :

Temperature on Monday = -5°C

Temperature on Tuesday = Temperature on Monday -2°C

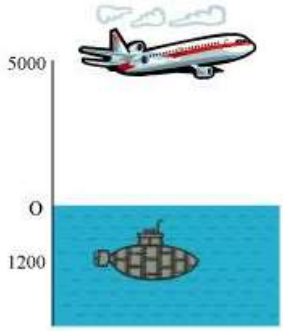
= -5°C - 2°C = -7°C

Temperature on Wednesday = Temperature on Tuesday + 4°C

= -7°C + 4°C = -3°C

Therefore, the temperature on Tuesday and Wednesday was -7°C and -3°C respectively.

Q4 : A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine floating 1200 m below the sea level. What is the vertical distance between them?



Answer :

Height of plane = 5000 m

Depth of submarine = -1200 m

Distance between plane and submarine = 5000 m - (-1200) m

= 5000 m + 1200 m = 6200 m

Q5 : Mohan deposits Rs 2,000 in his bank account and withdraws Rs 1,642 from it, the next day. If withdrawal of amount from the account is represented by a negative integer, then how will you represent the amount deposited? Find the balance in Mohan's account after the withdrawal.

Answer :

Since the amount withdrawn is represented by a negative integer, the amount deposited will be represented by a positive integer.

Amount deposited = Rs 2000

Amount withdrawn = -Rs 1642

Balance in Mohan's account = Money deposited + Money withdrawn

= 2000 + (-1642) = 2000 - 1642 = 358

Therefore, balance in Mohan's account after withdrawal is Rs 358.

Q6 : Rita goes 20 km towards east from a point A to the point B. From B, she moves 30 km towards 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 west? By which integer will you represent her final position from A?

Answer :

Since the distance towards east is represented by a positive integer, the distance travelled towards west will be represented by a negative integer.

Distance travelled in east direction = 20 km

Distance travelled in west direction = -30 km

Distance travelled from A = 20 + (-30) = -10 km

Therefore, we will represent the distance travelled by Rita from point A by a negative integer, i.e., -10 km (i.e., Rita is now in west direction).

Q7 : In a magic square each row, column and diagonal have the same sum. Check which of the following is a magic square.

5	- 1	- 4	1	- 10	0
- 5	- 2	7	- 4	- 3	- 2
0	3	- 3	- 6	4	- 7
	(i)			(ii)	

Answer :

It can be observed that in square (i), every row and column add up to give 0. However, the sum of one of its diagonals is not 0.

As - 4 - 2 = -6 ≠ 0,

Therefore, (i) is not a magic square.

Similarly, in square (ii), each row, column, and diagonal add up to give -9. Therefore, (ii) is a magic square.

Q8 : Verify $a - (-b) = a + b$ for the following values of a and b.

(i) $a = 21, b = 18$

(ii) $a = 118, b = 125$

(iii) $a = 75, b = 84$

(iv) $a = 28, b = 11$

Answer :

(i) $a = 21, b = 18$

$a - (-b) = 21 - (-18) = 21 + 18 = 39$

$a + b = 21 + 18 = 39$

$\therefore a - (-b) = a + b = 39$

(ii) $a = 118, b = 125$

$a - (-b) = 118 - (-125) = 118 + 125 = 243$

$a + b = 118 + 125 = 243$

$\therefore a - (-b) = a + b = 243$

(iii) $a = 75, b = 84$

$a - (-b) = 75 - (-84) = 75 + 84 = 159$

$a + b = 75 + 84 = 159$

$\therefore a - (-b) = a + b = 159$

(iv) $a = 28, b = 11$

$a - (-b) = 28 - (-11) = 28 + 11 = 39$

$a + b = 28 + 11 = 39$

Q9 : Use the sign of >, < or = in the box to make the statements true.

(a) $(-8)+(-4) \square (-8)-(-4)$

(b) $(-3)+7-(19) \square 15-8+(-9)$

(c) $23-41+11 \square 23-41-11$

(d) $39+(-24)-(15) \square 36+(-52)-(-36)$

(e) $-231+79+51 \square -399+159+81$

Answer :

(a)

$(-8)+(-4) \square (-8)-(-4)$

$\Rightarrow -8-4 \square -8+4$

$\Rightarrow -12 < -4$

(b)

$(-3)+7-(19) \square 15-8+(-9)$

$\Rightarrow -3+7-19 \square 15-8-9$

$\Rightarrow -15 < -2$

(c)

$23-41+11 \square 23-41-11$

$\Rightarrow -7 > -29$

(d)

$39+(-24)-(15) \square 36+(-52)-(-36)$

$\Rightarrow 39-24-15 \square 36-52+36$

$\Rightarrow 0 < 20$

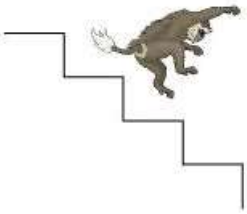
(e) Here, $-231+79+51 = -231+130 = -101$

and, $-399+159+81 = -399+240 = -159$

Since, $-101 > -159$

$\therefore$ $-231+79+51 \boxed{>} -399+159+81$

Q10 : A water tank has steps inside it. A monkey is sitting on the topmost step (i.e., 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 4 steps up and then jumps back 2 steps down in every move. In how many jumps will he reach back the top step?

(iii) If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers, represent his moves in part (i) and (ii) by completing the following; (a) - 3 + 2 - ... = - 8 (b) 4 - 2 + ... = 8. In (a) the sum (- 8) represents going down by eight steps. So, what will the sum 8 in (b) represent?

Answer :

Let the steps moved down be represented by positive integers and the steps moved up be represented by negative integers.

(i) Initially, the monkey was at step = 1

After 1^{st} jump, the monkey will be at step = 1 + 3 = 4

After 2^{nd} jump, the monkey will be at step = 4 + (-2) = 2

After 3^{rd} jump, the monkey will be at step = 2 + 3 = 5

After 4^{th} jump, the monkey will be at step = 5 + (-2) = 3

After 5^{th} jump, the monkey will be at step = 3 + 3 = 6

After 6^{th} jump, the monkey will be at step = 6 + (-2) = 4

After 7^{th} jump, the monkey will be at step = 4 + 3 = 7

After 8^{th} jump, the monkey will be at step = 7 + (-2) = 5

After 9^{th} jump, the monkey will be at step = 5 + 3 = 8

After 10^{th} jump, the monkey will be at step = 8 + (-2) = 6

After 11^{th} jump, the monkey will be at step = 6 + 3 = 9

Clearly, the monkey will be at water level (i.e., 9^{th} step) after 11 jumps.

(ii) Initially, the monkey was at step = 9

After 1^{st} jump, the monkey will be at step = 9 + (-4) = 5

After 2^{nd} jump, the monkey will be at step = 5 + 2 = 7

After 3^{rd} jump, the monkey will be at step = 7 + (- 4) = 3

After 4^{th} jump, the monkey will be at step = 3 + 2 = 5

After 5^{th} jump, the monkey will be at step = 5 + (- 4) = 1

Clearly, the monkey will reach back at the top step after 5 jumps.

(iii) If steps moved down are represented by negative integers and steps moved up are represented by positive integers, then his moves will be as follows.

Moves in part (i)

- 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 = -8

Moves in part (ii)

4 - 2 + 4 - 2 + 4 = 8

Moves in part (ii) represent going up 8 steps.

Ex 1.2:-

Question 1

Write down a pair of integers whose:
(a) sum is -7
(b) difference is -10
(c) sum is 0.

Solution:

(a) Let us take a pair of integers -3 and -4.
∴ (-3) + (-4) = -3 − 4 = -7
(b) Let us take a pair of integers -12 and -2
∴ (-12) − (-2) = -12 + 2 = -10
(c) Let us take a pair of integers -3 and 3
∴ (-3) + (3) = -3 + 3 = 0

Question 2

(a) Write a pair of negative integers whose difference gives 8.
(b) Write a negative integer and positive integer whose sum is -5.
(c) Write a negative integer and a positive integer whose difference is -3.

Solution:

(a) Let us have -2 and -10
∴ Difference = (-2) – (-10) = -2 + 10 = 8
(b) Let us have -7 and 2
∴ (-7) + (2) = -7 + 2 = -5
(c) Let us have -2 and 1
∴ (-2) – (1) = – 2 – 1 = -3

Question 3

In a quiz, team A scored -40, 10, 0 and team B scored 10, 0, -40 in three successive rounds. Which team scored more? Can you say that we can add integers in any order?
table

Solution:

Total score of team
A = (-40) + (10) + (0) – -40 + 10 + 0 = -30
Total score of team
B = 10 + 0 + (-40) = 10 + 0 – 40 – -30
∴ The scores of both the teams are same i.e. -30.
Yes, we can add the integers in any order.

Question 4

Fill in the blanks to make the following statements true:
(i) (-5) + (-8) = (-8) + (…)
(ii) -53 + … = -53
(iii) 17 + … = 0
(iv) [13 + (-12)] + (…) = 13 + [(-12) + (-7)]
(v) (-4) + [15 + (-3)] = [-4 + 15] + …

Solution:

(i) -5 + (-8) – (-8) + (-5) [Commutative law of additions]
(ii) -53 + 0 = -53 [Additive Identity]
[Adding 0 to any integer, it gives the same value]
(iii) 17 + (-17) = 0 [Additive inverse]
(iv) [13 + (-12)] + (-7) – 13 + [(-12) + (-7)] [Associative law of addition]
(v) (-4) + [15 + (-3)] – [-4 + 15] + (-3) [Associative law of addition]

Ex 1.3:-

Question 1

Find each of the following products:
(a) 3 × (-1)
(b) (-1) × 225
(c) (-21) × (-30)
(d) (-316) × (-1)
(e) (-15) × 0 × (-18)
(f) (-12) × (-11) × (10)
(g) 9 × (-3) × (-6)
(h) (-18) × (-5) × (-4)
(i) (-1) ×(-2) × (-3) × 4
(j) (-3) × (-6) × (-2) × (-1)

Solution:

(a) 3 × (-1) = -3 × 1 = -3
(b) (-1) × 225 = -1 × 225 = -225
(c) (-21) × (-30) = (-) × (-) × 21 × 30 = 630
(d) (-316) × (-1) = (-) × (-) × 316 × 1 = 316
(e) (-15) × 0 × (-18) = 0 [∵ a × 0 = a]
(f) (-12) × (-11) × (10)
= (-) × (-) × 12 × 11 × 10 = 1320
(g) 9 × (-3) × (-6) = (-3) × (-6) × 9
= (—) × (-) × 3 × 6 × 9 = 162
(h) (-18) × (-5) × (-4)
= (-) × (-) × (-) × 18 × 5 × 4 = -360
(i) (-1) × (-2) × (-3) × 4
= (-) × (-) × (-) × 1 × 2 × 3 × 4 = -24
(j) (-3) × (-6) × (-2) × (-1)
= (-) × (-) × (-) × (-) × 3 × 6 × 2 × 1 = 36

Question 2

Verify the following:
(a) 18 × [7 + (-3)] = [18 × 7] + [18 × (-3)]
(b) (-21) × [(-4) + (-6)] = [(-21) × (-4)] + [(-21) × (-6)]

Solution:

(a) 18 × [7 + (-3)] = [18 × 7] + [18 × (-3)]
LHS = 18 × [7 + (-3)] = 18 × 4 = 72
RHS = [18 × 7] + [18 × (-3)] = 126 + (-54)
= 126 – 54 = 72
LHS = RHS
Hence, verified.

(b) (-21) × [(-4) + (-6)] = [(-21) × (-4)] + [(-21) × (-6)]
LHS = (-21) × [(-4) + (-6)]
= (-21) × (-10)
= (-) × (-) × 21 × 10 = 210

RHS = [(-21) × (-4)] + [(-21) × (-6)]
= (84) + (126) = 84 + 126 = 210
LHS = RHS
Hence, verified.

Question 3
(i) For any integer a, what is (-1) × a equal to?
(ii) Determine the integer whose product with (-1) is 0.
(a) -22
(b) 37
(c) 0
Solution:
(i) (-1) × a = -a
(ii) (-1) × 0 = 0 [∵ a × 0 = 0]
Hence (c) 0 is the required integer.

Question 4
Starting from (-1) × 5, write various products showing some pattern to show (-1) × (-1) = 1
Solution:
(-1) × 5 = -5
(-1) × 4 = -4 = (-5) + 1
(-1) × 3 = -3 = (-4) + 1
(-1) × 2 = -2 = (-3) + 1
(-1) × (1) = -1 = (-2) + 1
(-1) × 0 = 0 – (-1) + 1
(-1) × (-1) = 1 = 0+1

Question 5
Find the product, using suitable properties:
(a) 26 × (-48) + (-48) × (-36)
(b) 8 × 53 × (-125)
(c) 15 × (-25) × (-4) × (-10)
(d) (-41) × 102
(e) 625 × (-35) + (-625) × 65
(f) 7 × (50 – 2)
(g) (-17) × (-29)
(h) (-57) × (-19) + 57
Solution:
(a) 26 × (-48) + (-48) × (-36)
= -48 × [26 + (-36)] = -48 × [26 – 36] = -48 × -10 = 480 [Distributive property of multiplication over
addition]

(b) 8 × 53 × (-125) = 53 × [8 × (-125)]
[Associative property of multiplication] = 53 × (-1000) = -53000

(c) 15 × (-25) × (-4) × (-10)
= [(-25) × (-4)] × [15 × (-10)]
[Regrouping the terms] = 100 × (-150) = -15000

(d) (-41) × 102 = (-41) × [100 + 2]
= (-41) × 100 + (-41) × 2
[Distributive property of multiplication over addition] = -4100 – 82 = -4182

(e) 625 × (-35) + (-625) × 65
= 625 × [(-35) + (-65)]
[Distributive property of multiplication over addition]
= 625 × (-100) = -62500

(f) 7 × (50 – 2) = 7 × 48 = 336 or
7 × (50 – 2) = 7 × 50 -7 × 2 = 350 – 14 = 336 [Distributive property of multiplication over addition]

(g) (-17) × (-29) = (-17) × [30 + (-1)]
= (-17) × 30 + (-17) × (-1)
= -510 + 17 = -493
[Distributive property of multiplication over addition]

(h) (-57) × (-19) + 57 = 57 × 19 + 57
= 57 × 19 + 57 × 1 [Y (-) × (-) = (+)] [Distributive property of multiplication over addition]
= 57 × (19 + 1) = 57 × 20 = 1140

Question 6
A certain freezing process requires that room temperature be lowered from 40°C at the rate of 5°C every hour. What will be the room temperature 10 hours after the process begins?
Solution:
Temperature of the room in the beginning = 40°C
Temperature after 1 hour
= 40°C – 1 × 5°C = 40°C – 5°C – 35°C
Similarly, temperature of the room after 10 hours
= 40°C – 10 × 5°C = 40°C – 50°C = -10°C

Question 7

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

(i) Mohan gets four correct and si× incorrect answers. What is his score?

(ii) Reshma gets five correct answers and five incorrect answers, what is her score?

(iii) Heena gets two correct and five incorrect answers out of seven questions she attempts. What is her score?

Solution:

(i) Marks awarded to Mohan = 4 × 5

=20 for correct answers Marks awarded to Mohan = 6 × (-2)

= -12 for incorrect answers.

∴ Total marks obtained by Mohan

= 20 + (-12) = 20 – 12 = 8

(ii) Marks awarded to Reshma for correct answers

= 5 × 5 = 25

Marks awarded to Reshma for incorrect answers

= 5 × (-2) = -10

∴ Total marks obtained by Reshma

= 25 + (-10) = 25 – 10 = 15

(iii) Marks awarded to Heena for correct answers

= 2 × 5 = 10

Marks awarded to Heena for incorrect answers

= 5 × (-2) = -10

Number of question not attempted by Heena

= 10 – (2 + 5) = 10 – 7 = 3

Marks awarded to Heena for non-attempted questions

=3×0=0

∴ Total marks obtained by Heena

= 10 + (-10) + 0 = 10-10+ 0 = 0

Question 8

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

(a) The company sells 3,000 bags of white cement and sold 5,000 bags of grey cement in a month. What is its profit or loss?

(b) What is the number of white cement bags it must sell to have neither profit nor loss, if the number of grey bags sold is 6,400 bags.

Solution:

(a) Profit on one white cement bag = ₹ 8

loss on one grey cement bag = ₹ – 5

Profit on 3,000 bags of white cement

= ₹ (8 × 3,000) = ₹ 24,000

Loss on 5,000 bags of grey cement

= ₹ (-5 × 5000) = – ₹ 25,000

Total loss = – ₹ 25,000 + ₹ 24,000
= – ₹ 1000 i.e. ₹ 1000

(b) Selling price of grey bags at a loss of ₹ 5
= ₹ (5 × 6,400) – ₹ 32,000
For no profit and no loss, the selling price of white bags = ₹ 32,000
Rate of selling price of white bags at a profit of ₹ 8 per bag.
∴ Number of white cement bags sold
$=\frac{320008}{}=4000$
Hence, the required number of bags = 4,000

Question 9

Replace the blank with an integer to make it a true statement.
(a) (-3) × __ = 27
(b) 5 × __ = -35
(c) __ × (-8) = -56
(d) __ × (-12) = 132

Solution:
(a) (-3) × __ = 27 = (-3) × (-9) = 27 [∵ (-) × (-) = (+)]
(b) 5 × __ = -35 = 5 × (-7) = -35 [∵ (+) × (-) = (-)]
(c) __ × (-8) = -56 = 7 × (-8) = -56 [∵ (+) × (-) = (-)]
(d) __ × (-12) = 132 = (-11) × (-12) = 132 [∵ (-) × (-) = (+)]

Q1 : Find each of the following products:

(a) 3 x (- 1) (b) (- 1) x 225

(c) (- 21) x (- 30) (d) (- 316) x (- 1)

(e) (- 15) x 0 x (-18) (f) (- 12) x (- 11) x (10)

(g) 9 x (- 3) x (- 6) (h) (- 18) x (- 5) x (- 4)

(i) (- 1) x (-2) x (- 3) x 4

(j) (- 3) x (- 6) x (- 2) x (- 1)

Answer :

(a) 3 x (-1) = -3

(b) (-1) x 225 = -225

(c) (-21) x (-30) = 630

(d) (-316) x (-1) = 316

(e) (-15) x 0 x (-18) = 0

(f) (-12) x (-11) x 10 = 1320

(g) 9 x (-3) x (-6) = 162

(h) (-18) x (-5) x (-4) = -360

(i) (-1) x (-2) x (-3) x 4 = -24

(j) (-3) x (-6) x (-2) x (-1) = 36

Q2 : Verify the following:

(a) $18\times\left[7+(-3)\right]=\left[18\times7\right]+\left[18\times(-3)\right]$

(b) $(-21)\times\left[(-4)+(-6)\right]=\left[(-21)\times(-4)\right]+\left[(-21)\times(-6)\right]$

Answer :

(a) L.H.S. = 18 × [7 + (- 3)] = 18 × [7 - 3] = 18 × 4 = 72

R.H.S. = [18 × 7] + [18 × (- 3)] = 126 + (- 54) = 72

Hence, $18\times\left[7+(-3)\right]=\left[18\times7\right]+\left[18\times(-3)\right]$

(b) L.H.S. = (- 21) × [(- 4) + (- 6)] = (- 21) × [- 4 - 6] = (- 21) × [- 10] = 210

R.H.S. = [(- 21) × (- 4)] + [(- 21) × (- 6)] = 84 + 126 = 210

Hence, $(-21)\times\left[(-4)+(-6)\right]=\left[(-21)\times(-4)\right]+\left[(-21)\times(-6)\right]$

Q3 : (i) For any integer *a*, what is (- 1) x *a* equal to?

(ii) Determine the integer whose product with (- 1) is

(a) - 22 (b) 37 (c) 0

Answer :

(i) As per the question, there will be three cases possible because we can divide number line among negative integers, 0 and positive integers.

So, case 1: When *a* is any negative ineteger, that is, *-a*,
then (- 1) × (*-a*) = *a*
So, case 2: When *a* is 0,
then (- 1) × 0 = 0
So, case 3: When *a* is any positive ineteger, that is, *a*,
then (- 1) × *a* = *-a*
Thus, the possible answers are *a*, 0 and *-a*.

(ii) (a) $22 \times(-1)=-22$

(b) [Math Processing Error]

(c) $0 \times(-1)=0$

Q4 : Starting from (- 1) x 5, write various products showing some pattern to show (- 1) x (- 1) =1.

Answer :

-1 x 5 = -5

-1 x 4 = -4 = - 5 + 1

-1 x 3 = -3 = - 4 + 1

-1 x 2 = -2 = - 3 + 1

-1 x 1 = -1 = - 2 + 1

-1 x 0 = 0 = - 1 + 1

Therefore, -1 x (-1) = 0 + 1 = 1

Q5 : Find the product, using suitable properties:

(a) 26 x (- 48) + (- 48) x (- 36) (b) 8 x 53 x (-125)

(c) 15 x (- 25) x (- 4) x (- 10) (d) (- 41) x 102

(e) 625 x (- 35) + (- 625) x 65 (f) 7 x (50 - 2)

(g) (- 17) x (- 29) (h) (- 57) x (- 19) + 57

Answer :

(a) 26 x (-48) + (-48) x (-36)

= (-48) x 26 + (-48) x (-36) ($b \times a = a \times b$)

= (-48) [26 - 36] ($a \times b + a \times c = a(b + c)$)

= (-48) x (-10) = 480

(b) 8 x 53 x (-125) = 8 x [53 x (-125)]

= 8 x [(-125) x 53] ($b \times a = a \times b$)

= [8 x (-125)] x 53 $a \times (b \times c) = (a \times b) \times c$

= [-1000] x 53 = -53000

(c) 15 x (-25) x (-4) x (-10)

= 15 x [(-25) x (-4)] x (-10)

= 15 x [100] x (-10)

= 15 x (-1000) = -15000

(d) (-41) x 102

= (-41) x (100 + 2)

= (-41) x 100 + (-41) x 2 $a \times (b + c) = (a \times b) + (a \times c)$

= - 4100 - 82 = -4182

(e) 625 x (-35) + (-625) x 65

= 625 x [(-35) + (-65)] $(a \times b) + (a \times c) = a \times (b + c)$

= 625 x [-100] = -62500

(f) 7 x (50 - 2)

= (7 x 50) - (7 x 2) $a \times (b - c) = (a \times b) - (a \times c)$

= 350 - 14

= 336

(g) (-17) x (-29)

= (-17) x [-30 + 1]

= [(-17) x (-30)] + [(-17) x 1] $a \times (b + c) = (a \times b) + (a \times c)$

= [510] + [-17] = 493

(h) (-57) x (-19) + 57

= 57 x 19 + 57 x 1

= 57 [19 + 1] $(a \times b) + (a \times c) = a \times (b + c)$

= 57 x 20 = 1140

Q6 : A certain freezing process requires that room temperature be lowered from 40°C at the rate of 5°C every hour. What will be the room temperature 10 hours after the process begins?

Answer :

Initial temperature = 40°C

Change in temperature per hour = -5°C

Change in temperature after 10 hours = (-5) x 10 = -50°C

Final temperature = 40°C + (-50°C) = -10°C

Q7 : In a class test containing 10 questions, 5 marks are awarded for every correct answer and (- 2) marks are awarded for every incorrect answer and 0 for questions not attempted.

(i) Mohan gets four correct and six incorrect answers. What is his score?

(ii) Reshma gets five correct answers and five incorrect answers, what is her score?

(iii) Heena gets two correct and five incorrect answers out of seven questions she attempts. What is her score?

Answer :

(i) Marks given for 1 correct answer = 5

Marks given for 4 correct answers = 5 x 4 = 20

Marks given for 1 wrong answer = -2

Marks given for 6 wrong answers = -2 x 6 = -12

Score obtained by Mohan = 20 - 12 = 8

(ii) Marks given for 1 correct answer = 5

Marks given for 5 correct answers = 5 x 5 = 25

Marks given for 1 wrong answer = -2

Marks given for 5 wrong answers = -2 x 5 = -10

Score obtained by Reshma = 25 - 10 = 15

(iii) Similarly,

Marks given for 2 correct answers = 5 x 2 = 10

Marks given for 5 wrong answers = -2 x 5 = -10

Score obtained by Heena = 10 - 10 = 0

Q8 : A cement company earns a profit of Rs 8 per bag of white cement sold and a loss of Rs 5 per bag of grey cement sold.

(a) The company sells 3, 000 bags of white cement and 5,000 bags of grey cement in a month. What is its profit or loss?

(b) What is the number of white cement bags it must sell to have neither profit nor loss, if the number of grey bags sold is 6,400 bags.

Answer :

Profit is denoted by a positive integer and loss is denoted by a negative integer.

(a) Profit earned while selling 1 bag of white cement = Rs 8

Profit earned while selling 3000 bags of white cement = 8 x 3000

= 24000

Loss incurred while selling 1 bag of grey cement = -Rs 5

Loss incurred while selling 5000 bags of grey cement = -5 x 5000

= -25000

Total profit/loss earned = Profit + Loss

= 24000 + (-25000) = -1000

Therefore, a loss of Rs 1000 will be incurred by the company.

(b) Loss incurred while selling 1 bag of grey cement = -Rs 5

Loss incurred while selling 6400 bags of grey cement = (-5) x 6400

= -32000

Let the number of bags of white cement to be sold be x.

Profit earned while selling 1 bag of white cement = Rs 8

Profit earned while selling x bags of white cement = x x 8

= $8x$

In condition of no profit no loss,

Profit earned + Loss incurred = 0

$8x + (-32000) = 0$

$8x = 32000$

$x = 4000$

Therefore, 4000 bags of white cement must be sold.

Q9 : Replace the blank with an integer to make it a true statement.

(a) $(-3)\times$ _____ $=27$

(b) $5\times$ _____ $=-35$

(c) _____ $\times(-8)=-56$

(d) _____ $\times(-12)=132$

Answer :

(a) $(-3)\times \underline{(-9)} =27$

(b) $5\times \underline{(-7)} =-35$

(c) $\underline{7} \times(-8)=-56$

(d) $\underline{(-11)} \times(-12)=132$

Ex 1.4:-

Question 1

Evaluate each of the following:

(a) (-30) ÷ 10

(b) 50 ÷ (-5)

(c) (-36) ÷ (-9)

(d) (-49) ÷ (49)

(e) 13 ÷ [(-2) + 1]

(f) 0 ÷ (-12)

(g) (-31) ÷ [(-30) + (-1)]

(h) [(-36) ÷ 12] ÷ 3

(i) [(-6) + 5] ÷ [(-2) + 1]

Solution:

(a) (-30) ÷ 10 = -3010 = -3 50

(b) 50 ÷ (-5) = $50-5$ = -10

(c) (-36) ÷ (-9) = $-36-9$ = 4

(d) (-49) ÷ (49) = -4949 = -1

(e) 13 ÷ [(-2) + 1] = 13 ÷ -1 = $13-1$ = -13

(f) 0 ÷ (-12) = $0-12$ = 0

(g) (-31) ÷ [(-30) + (-1)] = (-31) ÷ (-31) = $-31-31$ = 1

(h) [(-36) + 12] ÷ 3 = $[-3612]$ ÷ 3 = -3 ÷ 3

= -33 =-1

(i) [(-6) + 5] + [(-2) + 1] = (-1) − (-1) = $-1-1$ = 1

Question 2

Verify that: a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c) for each of the following values of a, b and c.

(a) a = 12, b = – 4, c = 2

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

Solution:

(a) a = 12, 6 = – 4, c = 2

a ÷ (b + c) = 12 ÷ [(-4) + 2]

= 12 ÷ (-2) = $12{-}2$ = -6

(a ÷ b) + (a ÷ c) = [12 ÷ (-4)] + [12 ÷ 2]

$=12{-}4+122=-3+6=3$

Since, (-6) + 3

Hence, a ÷ (b + c) + (a ÷ b) + (a ÷ c)

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

a ÷ (b + c) = (-10) ÷ (1 + 1)

=(-10) ÷ 2 = -102 = -5

(a ÷ b) + (a ÷ c)

=[(-10) ÷ 1] + [(-10) ÷ 1]

$=(-10)1+(-10)1$

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

Since (-5) ≠ (-20)

Hence, a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c)

Question 3

Fill in the blanks:

(a) 369 ÷ ___ = 369

(b) (-75) ÷ ___ = -1

(c) (-206) ÷ ___ =1

(d) -87 ÷ ___ = -87

(e) ___ ÷ 1 = -87

(g) 20 ÷ ___ = -2

Solution:

(a) 369 ÷ ___ = 369 = 369 ÷ 1 = 369

(b) (-75) ÷ ___ = -1 = (-75) ÷ 75 = -1

(c) (-206) ÷ ___ = 1 = (-206) ÷ (-206) = 1

(d) 87 ÷ ___ = 87 = -87 ÷ (-1) = 87

(e) ___ ÷ 1 = -87 = -87 ÷ 1 = -87

(f) ___ ÷ 48 = -1 = (-48) ÷ 48 = -1

(g) 20 + ___ = -2 = 20 ÷ (-10) = -2

(h) ___ + (4) = -3 = (-12) ÷ (4) = -3

Question 4

Write five pairs of integers (a, b) such that a ÷ b = -3. One such pair is (6, -2) because 6 + (-2) = -3.

Solution:

(a) (24, -8) because 24 ÷ (-8) = -3

(b) (-12, 4) because (-12) ÷ 4 = -3

(c) (15, -5) because 15 ÷ (-5) = -3

(d) (18, -6) because 18 ÷ (-6) = -3
(e) (60, -20) because 60 ÷ (-20) = -3

Question 5

The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, at what time would the temperature be 8°C below zero? What would be the temperature at midnight?

Solution:

Temperature at 12 noon was 10°C above zero i.e. +10°C
Rate of decrease in temperature per hour = 2°C
Number of hours from 12 noon to midnight = 12
∴ Change in temperature in 12 hours
= 12 × (-2°C) = -24°C
∴ Temperature at midnight
= +10°C + (-24°C) = -14°C
Hence, the required temperature at midnight =-14°C
Difference in temperature between + 10°C and -8°C
= +10°C – (-8°C) = +10°C + 8°C = 18°C
Number of hours required = $18 \circ C 2 \circ C$= 9 hours
∴ Time after 9 hours from 12 noon = 9 pm.

Question 6

In a class test (+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) Radhika scored 20 marks. If she has got 12 correct answers, how many questions has she attempted incorrectly?
(ii) Mohini scores -5 marks in this test, though she has got 7 correct answers. How many questions has she attempted incorrectly?

Solution:

Given that:
+3 marks are given for each correct answer. (-2) marks are given for each incorrect answer. Zero marks for not attempted questions.
(i) Marks obtained by Radhika for 12 correct answers = (+3) × 12 = 36
Marks obtained by Radhika for correct answers = 12 × 3 = 36
Total marks obtained by Radhika = 20
∴ Marks obtained by Radhika for incorrect answers = 20 – 36 = -16
Number of incorrect answers
$=(-16) \div (-2) = (-16)(-2) = 8$
Hence, the required number of incorrect answers = 8
(ii) Marks scored by Mohini = -5
Number of correct answers = 7
∴ Marks obtained by Mohini for 7 correct answers = 7 × (+3) – 21
Marks obtained for incorrect answers
= -5 – 21 = (-26)
∴ Number of incorrect answers
= (-26) ÷ (-2) = 13
Hence, the required number of incorrect answers – 13.

Question 7

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

Solution:

The present position of the elevator is at 10 in above the ground level.

Distance moved by the elevator below the ground level = 350 m

∴ Total distance moved by the elevator = 350 m + 10 m = 360 m

Rate of descent = 6 m/min.

Total time taken by the elevator

$=360\text{m}6\text{m/min}$

= 60 minutes = 1 hour

Hence, the required time = 1 hour.

Question 1:

Evaluate each of the following:

(a) $(-30)\div 10$ (b) $50\div(-5)$

(c) $(-36)\div(-9)$ (d) $(-49)\div(49)$

(e) $13\div[(-2)+1]$ (f) $0\div(-12)$

(g) $(-31)\div[(-30)+(-1)]$

(h) $[(-36)\div 12]\div 3$ (i) $[(-6)+5)]\div[(-2)+1]$

Answer 1:

(a) (−30) ÷ 10 = −3

(b) 50 ÷ (−5) = −10

(c) (−36) ÷ (−9) = 4

(d) (−49) ÷ 49 = −1

(e) 13 ÷ [−2 + 1] = 13 ÷ [−1] = −13

(f) 0 ÷ (−12) = 0

(g) (−31) ÷ [(−30) + (−1)] = (−31) ÷ (−31) = 1

(h) [(−36) ÷ 12] ÷ 3 = [−3] ÷ 3 = −1

(i) [− 6 + 5] ÷ [− 2 + 1] = (−1) ÷ (−1) = 1

Question 2:

Verify that $a \div (b + c) \neq (a \div b) + (a \div c)$ for each of the following values of a, b and c.

(a) $a = 12$, $b = -4$, $c = 2$

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

Answer 2:

(a) $a = 12$, $b = -4$, $c = 2$

$a \div (b + c) = 12 \div (-4 + 2) = 12 \div (-2) = -6$

$(a \div b) + (a \div c) = [12 \div (-4)] + [12 \div 2] = -3 + 6 = 3$

Hence, $a \div (b + c) \neq (a \div b) + (a \div c)$

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

$a \div (b + c) = (-10) \div (1 + 1) = (-10) \div 2 = -5$

$(a \div b) + (a \div c) = [(-10) \div 1] + [(-10) \div 1] = -10 - 10 = -20$

Hence, $a \div (b + c) \neq (a \div b) + (a \div c)$

Question 3:

Fill in the blanks:

(a) $369 \div \_\_\_\_ = 369$ (b) $(-75) \div \_\_\_\_ = -1$

(c) $(-206) \div \_\_\_\_ = 1$ (d) $-87 \div \_\_\_\_ = 87$

(e) $\_\_\_\_ \div 1 = -87$ (f) $\_\_\_\_ \div 48 = -1$

(g) $20 \div \_\_\_\_ = -2$ (h) $\_\_\_\_ \div (4) = -3$

Answer 3:

(a) $369 \div \underline{1} = 369$

(b) $(-75) \div \underline{75} = -1$

(c) $(-206) \div \underline{(-206)} = 1$

(d) $-87 \div \underline{(-1)} = 87$

(e) $\underline{(-87)} \div 1 = -87$

(f) $\underline{(-48)} \div 48 = -1$

(g) $20 \div \underline{(-10)} = -2$

(h) $\underline{(-12)} \div (4) = -3$

Question 4:
Write five pairs of integers (a, b) such $a \div b = -3$. One such pair is $(6, -2)$ because $6 \div (-2) = (-3)$.

Answer 4:

(i) (3, −1)
Because $3 \div (-1) = -3$
(ii) (−3, 1)
Because $(-3) \div 1 = -3$
(iii) (9, −3)
Because $9 \div (-3) = -3$
(iv) (−9, 3)
Because $(-9) \div 3 = -3$
(v) (12, −4)
Because $12 \div (-4) = -3$

Question 5:
The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, at what time would the temperature be 8°C below zero? What would be the temperature at mid-night?

Answer 5:

Initial temperature i.e., at 12 noon = 10°C
Change in temperature per hour = −2°C
Temperature at 1:00 PM = 10°C + (−2°C) = 8°C
Temperature at 2:00 PM = 8°C + (−2°C) = 6°C
Temperature at 3:00 PM = 6°C + (−2°C) = 4°C
Temperature at 4:00 PM = 4°C + (−2°C) = 2°C
Temperature at 5:00 PM = 2°C + (−2°C) = 0°C
Temperature at 6:00 PM = 0°C + (−2°C) = −2°C
Temperature at 7:00 PM = −2°C + (−2°C) = −4°C
Temperature at 8:00 PM = −4°C + (−2°C) = −6°C
Temperature at 9:00 PM = −6°C + (−2°C) = −8°C
Therefore, the temperature will be 8°C below zero at 9:00 PM.
It will take 12 hours to be midnight (i.e., 12:00 AM) after 12:00 noon.
Change in temperature in 12 hours = −2°C × 12 = −24°C
At midnight, the temperature will be = 10 + (−24)
= −14°C
Therefore, the temperature at midnight will be 14°C below 0.

Question 6:

In a class test (+ 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) Radhika scored 20 marks. If she has got 12 correct answers, how many questions has she attempted incorrectly? (ii) Mohini scores − 5 marks in this test, though she has got 7 correct answers. How many questions has she attempted incorrectly? (iii) Rakesh scores 18 marks by attempting 16 questions. How many questions has he attempted correctly and how many has he attempted incorrectly?

Answer 6:

Marks obtained for 1 right answer = +3

Marks obtained for 1 wrong answer = −2

(i) Marks scored by Radhika = 20

Marks obtained for 12 correct answers = 12 × 3 = 36

Marks obtained for incorrect answers = Total score − Marks obtained for 12 correct answers

= 20 − 36 = −16

Marks obtained for 1 wrong answer = −2

Thus, number of incorrect answers = (−16) ÷(−2) = 8

Therefore, she attempted 8 questions wrongly.

(ii) Marks scored by Mohini = −5

Marks obtained for 7 correct answers = 7 × 3 = 21

Marks obtained for incorrect answers = Total score − Marks obtained for 12 correct answers

= − 5 − 21 = −26

Marks obtained for 1 wrong answer = −2

Thus, number of incorrect answers = (−26) ÷(−2) = 13

Therefore, she attempted 13 questions wrongly.

(iii) Total marks scored by Rakesh = 18

Number of questions attempted = 16

(Number of correct answers)(3) + (Number of incorrect answers)(−2) = 18

⇒(Number of correct answers)(3) + (16 − Number of correct answers)(−2) = 18

⇒(Number of correct answers)(3) + −32 + 2(Number of correct answers) = 18

⇒(Number of correct answers)(5) + −32 = 18

⇒(Number of correct answers)(5) = 18 + 32 = 50

⇒ Number of correct answers = 10

∴Number of incorrect answers = 16 − 10 = 6

∴Total number of correct and incorrect answers scored by Rakesh is 10 and 6 respectively.

Question 7:

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

Answer 7:

Distance descended is denoted by a negative integer.

Initial height = +10 m

Final depth = −350 m

Total distance to be descended by the elevator = (−350) − (+10) = −360 m

Time taken by the elevator to descend −6 m = 1 min

Thus, time taken by the elevator to descend −360 m = (−360) ÷ (−6)

= 60 minutes = 1 hour