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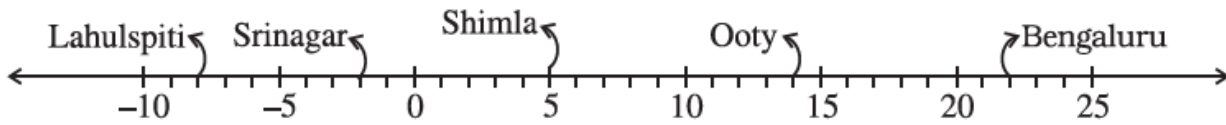
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Chapter-1: Integers

Exercise 1.1 (Page 4)

Q1. Following number line shows the temperature in degree Celsius ($^{\circ}\text{C}$) at different places on a particular day.



- Observe this number line and write the temperature of the places marked on it.
- What is the temperature difference between the hottest and the coldest places among the above?
- What is the temperature difference between Lahulspiti and Srinagar?
- 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?

(a) Difficulty Level: Low

What is given/known?

Temperature in degree Celsius ($^{\circ}\text{C}$) at different places on a particular day marked on the number line.

What is the unknown?

Temperature at different places marked on the number line.

Reasoning:

Identify the integer on the given number line and match it with the place which is written on the top (and connected to the point by an arrow). That integer is the temperature of the place in degree Celsius ($^{\circ}\text{C}$).

Solution:

Place	Temperature
Lahulspiti	-8°C
Srinagar	-2°C
Shimla	5°C
Ooty	14°C
Bengaluru	22°C

(b) Difficulty Level: Medium**What is given/known?**

Different places and their respective temperatures.

What is the unknown?

The temperature difference between the hottest and the coldest places.

Reasoning:

Identify the hottest place – highest temperature (or the highest positive value of the integer) and the coldest place – lowest temperature (or the lowest negative value of the integer). Find the difference between the two values.

Solution:

Hottest place is **Bengaluru** at 22°C .

Coldest place is **Lahulspiti** at -8°C .

The difference between the temperature of the two cities:

$$\begin{aligned} &= 22^{\circ}\text{C} - (-8^{\circ}\text{C}) = 22^{\circ}\text{C} + 8^{\circ}\text{C} \\ &= 30^{\circ}\text{C} \end{aligned}$$

Remember that for subtraction, we add the additive inverse of the integer that is being subtracted, to the other integer. The additive inverse of -8 is 8 and therefore, we added 22 and 8 to get the answer.

(c) Difficulty Level: Low**What is given/known?**

Different places and their respective temperatures.

What is the unknown?

The temperature difference between Lahulspiti and Srinagar.

Reasoning:

Use the table and find the temperature of Lahulspiti and Srinagar. Then subtract the two values. But remember one thing – subtract the lower value from the higher one.

Solution:

Temperature of Srinagar: -2°C

Temperature of Lahulspiti: -8°C

Although the absolute value of the temperature of Lahulspiti is higher than that of Srinagar, it is a negative integer and thus, it is lower.

Therefore, the difference between the temperature is:

$$\begin{aligned} &-2^{\circ}\text{C} - (-8^{\circ}\text{C}) = -2^{\circ}\text{C} + 8^{\circ}\text{C} \\ &= 8^{\circ}\text{C} - 2^{\circ}\text{C} \\ &= 6^{\circ}\text{C} \end{aligned}$$

(d) Difficulty Level: Low

What is the unknown?

The temperature difference between Lahulspiti and Srinagar.

What is given/known?

Different places and their respective temperatures.

Reasoning:

Use the table and find the temperature values for Lahulspiti and Srinagar. Subtract the lower value from the higher values.

Solution:

Temperature of Srinagar: -2°C

Temperature of Shimla: 5°C

$$\begin{aligned}\text{Temperature of Srinagar \& Shimla together} &= -2^{\circ}\text{C} + 5^{\circ}\text{C} \\ &= 3^{\circ}\text{C}\end{aligned}$$

So, we can say that temperature of Srinagar and Shimla, taken together is less than the temperature of Shimla.

$$3^{\circ}\text{C} < 5^{\circ}\text{C}$$

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

$$-2^{\circ}\text{C} < 3^{\circ}\text{C}$$

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

Difficulty Level: Low

What is given/known?

Jack's score in five successive rounds.

What is the unknown?

Jack's total score in five rounds.

Reasoning:

Just add the scores in five rounds to get the total score.

Solution:

Jack's scores in the five successive rounds are 25, -5 , -10 , 10 and 15

$$\begin{aligned}\text{Total marks obtained by jack} &= 25 + (-5) + (-10) + 10 + 15 \\ &= 25 - 5 - 10 + 10 + 15 \\ &= 35\end{aligned}$$

Thus, jack obtained 35 marks in the quiz.

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

Difficulty Level: Low

What is given/known?

Different days and their respective temperatures.

What is the unknown?

The temperature of Srinagar on Tuesday and Wednesday.

Reasoning:

Solution:

Temperature of Srinagar on Monday = -5°C

On Tuesday, it was dropped by 2°C .

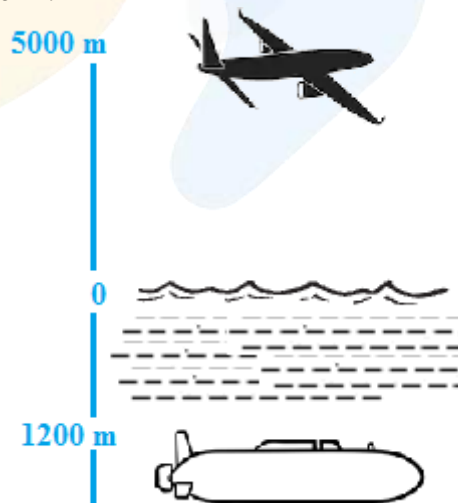
$$\therefore \text{Temperature on Tuesday} = -5^{\circ}\text{C} - 2^{\circ}\text{C} = -7^{\circ}\text{C}$$

On Wednesday, it rose up by 4°C

$$\therefore \text{Temperature on Wednesday} = -7^{\circ}\text{C} + 4^{\circ}\text{C} = -3^{\circ}\text{C}$$

Thus, temperature on Tuesday was -7°C and on Wednesday was -3°C .

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



Difficulty Level: Easy

What is the unknown?

The vertical distance between Plane and Submarine.

What is given/known?

Distance of Plane and Submarine from the sea level.

Solution:

Height of the plane above the sea level = 5000 m

Depth of submarine below the sea level = -1200 m

$$\begin{aligned}\text{Distance between plane and submarine} &= 5000 \text{ m} - (-1200 \text{ m}) \\ &= 5000 + 1200 \\ &= 6200 \text{ m}\end{aligned}$$

Hence, the vertical distance between = 6200m.

Q5. Mohan deposits ₹2000 in his 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?

Difficulty Level: Easy**What is the unknown?**

Balance after the withdrawal.

What is given/known?

The amount deposited and the amount withdrawal.

How can you use this information to arrive at a solution?

To find the balance, you have to subtract the amount deposited and the amount withdrawal.

Solution:

Amount deposited by Mohan = ₹2000 (amount deposited can be represented by a positive integer)

Amount withdrawn by Mohan = ₹1642 (amount deposited can be represented by negative integer)

$$\begin{aligned}\text{Balance in Mohan's account} &= \text{amount deposited} - \text{amount withdrawal} \\ &= ₹ (2000 - 1642) \\ &= ₹ 358\end{aligned}$$

Hence, the balance in Mohan's account after withdrawal is ₹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?



Difficulty Level: Easy

Reasoning:

What is the unknown?

Final position of Rita from A.

What is given/known?

Distances travelled by Rita towards east from point A and towards west from point B.

How can you use this information to arrive at a solution?

Distance travelled toward east from point A (or the highest positive value of the integer) and Distance travelled toward west from point B (or the lowest negative value of the integer). Find the difference between the two values.

Solution:

Distance travelled by Rita towards east = 20km
 (distance travelled towards east is represented by positive integer)

Distance travelled by Rita towards west = -30km
 (distance travelled towards west is represented by negative integer)

$$\begin{aligned} \text{Final position of Rita from A} &= [20 + (-30)] \text{ km} \\ &= (20 - 30) \text{ km} \\ &= -10 \text{ km} \end{aligned}$$

Therefore, we will represent her final position from A by negative integer i.e. -10km.

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

5	-1	-4
-5	-2	7
0	3	-3

1	-10	0
-4	-3	-2
-6	4	-7

Difficulty Level: Easy

Reasoning:

What is the unknown?

To check which row, column and the diagonal have same sum.

What is given/known?

Values of each row, column and the diagonal.

How can you use this information to arrive at a solution?

Use the table and find the sum of the row, column and the diagonal.

Solution:

In square (i)

(a) Taking rows

$$R_1 = 5 + (-1) + (-4) = 0$$

$$R_2 = -5 + (-2) + 7 = 0$$

$$R_3 = 0 + 3 + (-3) = 0$$

(b) Taking columns

$$C_1 = 5 + (-5) + 0 = 0$$

$$C_2 = -1 + (-2) + (-3) = 0$$

$$C_3 = -4 + 7 + (-3) = 0$$

(c) Taking diagonals

$$d_1 = 5 + (-2) + (-3) = 0$$

$$d_2 = -4 + (-2) + 0 = -6$$

This square is not a magic square because the sum of one of its diagonal is not equal to the sum of its other diagonal.

In square (ii)

a) Taking rows

$$R_1 = 1 + (-10) + 0 = -9$$

$$R_2 = -4 + (-3) + (-2) = -9$$

$$R_3 = -6 + 4 + (-7) = -9$$

b) Taking columns

$$C_1 = 1 + (-4) + (-6) = -9$$

$$C_2 = -10 + (-3) + 4 = -9$$

$$C_3 = 0 + (-2) + (-7) = -9$$

(c) Taking diagonals

$$d_1 = 1 + (-3) + (-7) = -9$$

$$d_2 = 0 + (-3) + (-6) = -9$$

This square box is a magic square because the sum of its rows, columns and diagonals are equal. Hence, (ii) is a magic square.

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

i) $a = 21, b = 18$

ii) $a = 118, b = 125$

iii) $a = 75, b = 84$

iv) $a = 28, b = 11$

Difficulty Level: Easy

What is the unknown?

To verify: $a - (-b) = a + b$

What is given/known?

Different value of a and b .

Solution:

Let, $a - (-b) = a + b$ (equation - 1)

i) $a = 21, b = 18$

Put the values of a & b in equation (1):

$$\begin{aligned} a - (-b) &= a + b \\ &= 21 - (-18) = 21 + 18 \\ &= 21 + 18 = 21 + 18 \\ &= 39 = 39 \end{aligned}$$

\therefore LHS = RHS. Hence verified.

ii) $a = 118, b = 125$

Put the values of a & b in equation (1):

$$\begin{aligned} a - (-b) &= a + b \\ &= 118 - (-125) = 118 + 125 \\ &= 118 + 125 = 118 + 125 \\ &= 243 = 243 \end{aligned}$$

\therefore LHS=RHS. Hence verified.

iii) $a = 75, b = 84$

Put the values of a & b in equation (1):

$$\begin{aligned} a - (-b) &= a + b \\ &= 75 - (-84) = 75 + 84 \\ &= 75 + 84 = 75 + 84 \\ &= 159 = 159 \end{aligned}$$

\therefore LHS = RHS. Hence verified.

iv) $a = 28, b = 11$

Put the values of a & b in equation (1):

$$\begin{aligned} a - (-b) &= a + b \\ &= 28 - (-11) = 28 + 11 \\ &= 28 + 11 = 39 \\ &= 39 = 39 \end{aligned}$$

\therefore LHS = RHS. Hence verified.

Q9. Use the sign of $<$, $>$ or $=$ to make the statement true?

- | | | |
|------------------------|--------------------------|----------------------|
| a. $(-8) + (-4)$ | <input type="checkbox"/> | $(-8) - (-4)$ |
| b. $(-3) + 7 - (19)$ | <input type="checkbox"/> | $15 - 8 + (-9)$ |
| c. $23 - 41 + 11$ | <input type="checkbox"/> | $23 - 41 - 11$ |
| d. $39 + (-24) - (15)$ | <input type="checkbox"/> | $36 + (-52) - (-36)$ |
| e. $-231 + 79 + 51$ | <input type="checkbox"/> | $-399 + 159 + 81$ |

Difficulty Level: Easy

What is the unknown?

To find out which is greater than, smaller than or equal to.

What is given/known?

The statement.

How can you use this information to arrive at a solution?

Add or subtract the two values and after checking the statement is $<$, $>$, or $=$.

Solution:

- | | | |
|--------------------|-------------------------------------|-----------------|
| a) $-8 + (-4)$ | <input type="checkbox"/> | $-8 - (-4)$ |
| $-8 - 4$ | <input type="checkbox"/> | $-8 + 4$ |
| -12 | <input checked="" type="checkbox"/> | -4 |
| | | |
| b) $(-3) + 7 - 19$ | <input type="checkbox"/> | $15 - 8 + (-9)$ |
| $-3 + 7 - 19$ | <input type="checkbox"/> | $15 - 8 - 9$ |
| $4 - 19$ | <input type="checkbox"/> | $7 - 9$ |
| -15 | <input checked="" type="checkbox"/> | -2 |

$$\begin{array}{rcl} \text{c) } 23 - 41 + 11 & \square & 23 - 41 - 11 \\ -18 + 11 & \square & -18 - 11 \\ -7 & \square > & -29 \end{array}$$

$$\begin{array}{rcl} \text{d) } 39 + (-24) - 15 & \square & 36 + (-52) - (-36) \\ 39 - 24 - 15 & \square & 36 - 52 + 36 \\ 15 - 15 & \square & -16 + 36 \\ 0 & \square < & 20 \end{array}$$

$$\begin{array}{rcl} \text{e) } -231 + 79 + 51 & \square & -399 + 159 + 81 \\ -152 + 51 & \square & -240 + 81 \\ -101 & \square > & -159 \end{array}$$

Q10. A water tank has steps inside it. A monkey is sitting on the topmost step C (i.e; the first step). The water level is on 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(i) & (ii) by completing the following
 a) $-3 + 2 - \dots = -8$ b) $4 - 2 + \dots = 8$. In (a) the sum (-8) represents going down by 8 steps. So, what will the sum 8 in (b) represent?



Difficulty Level: Easy

What is the unknown?

In how many jumps will he reach the water level and In how many jumps will he reach back the top step?

What is given/known?

Number of steps going up and down.

Solution:

- i) Monkey jumps 3 steps down and then back 2 steps up. The jumps of monkey can be represented as:

$$\text{First jump} = 1+3+4 = 8\text{steps}$$

$$\text{Second jump} = 4-2 = 2 \text{ steps}$$

$$\text{Third jump} = 2+3 = 5\text{steps}$$

$$\text{Fourth jump} = 5-2 = 3\text{steps}$$

$$\text{Fifth jump} = 3+3 = 6\text{steps}$$

$$\text{Sixth jump} = 6-2 = 4 \text{ steps}$$

$$\text{Seventh jump} = 4+3 = 7\text{steps}$$

$$\text{Eighth jump} = 7-2 = 5 \text{ steps}$$

$$\text{Ninth jump} = 5+3 = 8 \text{ steps}$$

$$\text{Tenth jump} = 8-2 = 6\text{steps}$$

$$\text{Eleventh jump} = 6+3 = 9 \text{ steps}$$

Monkey will reach ninth step in 11 jumps.

- ii) Monkey jumps 4 steps up and then jumps back 2 steps down in every move. The jumps of monkey can be represented as follows; –

$$\text{First jump} = 9-4 = 5 \text{ steps}$$

$$\text{Second jump} = 5+2 = 7 \text{ steps}$$

$$\text{Third jump} = 7-4 = 3 \text{ steps}$$

$$\text{Fourth jump} = 3+2 = 5 \text{ steps}$$

$$\text{Fifth jump} = 5-4 = 1 \text{ step}$$

The monkey will reach back the top step after 5 jumps.

- iii) Moves in part (a)

$$-3+2-3+2-3+2-3+2-3+2 = -8 \text{ which represents the monkey goes down by 8 steps.}$$

Moves in part (b)

$$4-2+4-2+4 = 8, \text{ the sum 8 in (b) represents the monkey goes up by 8 steps.}$$

Chapter-1: Integers

Exercise 1.2 (Page 9)

Q1. Write down a pair of integers, whose:

a) Sum is -7

b) Difference is -10

c) Sum is 0

Difficulty Level: Low

What is given/known?

Sum and difference of a pair of integers.

What is the unknown?

The two integers whose sum is given.

Reasoning:

Add or subtract the two values.

Solution:

a) Sum is -7

Let us take a pair of integers -8 and $+1$

$$\therefore -8 + 1 = -7$$

b) Difference is -10

Let us take a pair of integers -12 and -2

$$= -12 - (-2) = -10$$

c) Sum is 0

Let us take a pair of integers -5 and $+5$

$$= 5 + (-5) = 0$$

Q2.

a) Write the pair of negative integers whose difference gives 8 .

b) Write a negative integer and a positive integer whose sum is -5 .

c) Write a negative integer and a positive integer whose difference is -3 .

Difficulty Level: Easy

Reasoning:

What is the unknown?

Sum and difference of a pair of integers.

What is given/known?

The two integers whose sum and difference is given.

How can you use this information to arrive at a solution?

Add or Subtract the two values.

Solution:

a) Let us have -2 and -10

$$\therefore \text{Difference} = (-2) - (-10) = -2 + 10 = 8$$

b) Let us have -10 and 5

$$\therefore \text{Sum} = -10 + 5 = -5$$

c) Let us have -2 and 1

$$\therefore \text{Difference} = -2 - 1 = -3$$

Q3. In a quiz team A scored $-40, 10, 0$, and team B scored $10, 0, -40$ in 3 successive rounds. Which team scored more? Can we say that we can add integers in any order?

Difficulty Level: Moderate**What is the unknown?**

The total score of team A and B.

What is given/known?

Score of team A and B.

How can you use this information to arrive at a solution?

Add the score.

Solution:

Scores of team A = $-40, 10, 0$

$$\text{Total score of team A} = -40 + 10 + 0 = -30$$

Scores of team B = $10, 0, -40$

$$\text{Total scores of team B} = 10 + 0 + (-40) = -30$$

So, the scores of both the teams are equal.

Yes, we can add integers in any order.

We had already observed that scores obtained by both the teams are numerically equal.

But their order is different. So, the scores obtained by both the teams are equal.

Q4. Fill in the blanks to make the statements true:

- i) $(-5) + (-8) = (-8) + (\dots\dots)$
- ii) $-53 + \dots\dots = -53$
- iii) $17 + \dots\dots = 0$
- iv) $[13 + (-12)] + (\dots\dots) = 13 + [(-12) + (-7)]$
- v) $(-4) + [15 + (-3)] = [-4 + 15] + \dots\dots$

i) Difficulty Level: Easy

What is the unknown?

Missing values.

What is given/known?

Different values

How can you use this information to arrive at a solution?

We have to use different laws of addition.

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]

Chapter-1: Integers

Exercise 1.3 (Page 21 of Grade 7 NCERT)

Q1. Find each of the following products:

- | | |
|--|---|
| a) $3 \times (-1)$ | b) $(-1) \times 225$ |
| c) $(-21) \times (-30)$ | d) $(-316) \times (-1)$ |
| e) $(-15) \times 0 \times (-18)$ | f) $(-12) \times (-11) \times 10$ |
| g) $9 \times (-3) \times (-6)$ | h) $(-18) \times (-5) \times (-4)$ |
| i) $(-1) \times (-2) \times (-3 \times 4)$ | j) $(-3) \times (-6) \times (-2) \times -1$ |

Difficulty Level: Medium

Solution:

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

Q2. Verify the following:

- a) $18 \times [7 + (-3)] = [18 \times 7] + [18 \times (-3)]$
b) $(-21) \times [(-4) + (-6)] = [(-21) \times (-4)] + [(-21) \times (-6)]$

Difficulty Level: Medium

Solution:

a)

$$8 \times [7 + (-3)] = [18 \times 7] + [18 \times (-3)]$$

$$\text{L.H.S} = 18 \times [7 + (-3)] \quad (\text{Open brackets})$$

$$= 18 \times 4$$

$$= 72$$

$$\text{R.H.S} = [18 \times 7] + [18 \times (-3)] \quad (\text{Open brackets})$$

$$= [18 \times 7] + [18 \times -3]$$

$$= 126 + (-54)$$

$$= 72$$

$$18 \times [7 + (-3)] = [18 \times 7] + [18 \times (-3)]$$

$$72 = 72$$

L.H.S = R.H.S. Hence verified.

b)

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

$$\begin{aligned} \text{L.H.S} &= (-21) \times [(-4) + (-6)] && \text{(Open brackets)} \\ &= [-21 \times (-4 - 6)] \\ &= -21 \times -10 \\ &= 210 \end{aligned}$$

$$\begin{aligned} \text{R.H.S} &= [(-21) \times (-4)] + [(-21) \times (-6)] \\ &= [-21 \times -4] + [-21 \times -6] \\ &= [84] + [126] = \\ &210 \end{aligned}$$

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

$$210 = 210$$

L.H.S = R.H.S. Hence verified.

Q3. i) For any integer a , what is $(-1) \times a$ equal to?

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

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

Difficulty Level: Medium

Solution:

i)

$$(-1)a = -a \quad (\text{where } a \text{ is any integer})$$

(ii)

a). $? \times (-1) = -22$

Let x be the required integer

$$x \times (-1) = -22 \quad (1)$$

$$-x = -22$$

$$x = 22$$

Putting the value of x in equation (1), we get

$$x \times (-1) = -22$$

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

b) $? \times (-1) = 37$

Let y be the required integer

$$y \times (-1) = 37 \dots\dots(1)$$

$$-y = 37$$

$$y = -37$$

Putting the value of y in equation (1), we get

$$-37 \times (-1) = 37$$

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

Let z be the required integer

$$z \times (-1) = 0 \quad (1)$$

$$-z = 0$$

$$z = 0$$

Putting the value of z in equation (1), we get

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

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

$0 \times (-1) = 0$ (Multiplying any number by 0, we get the product 0)

Hence (c) 0 is the required integer.

Q4. Starting from $(-1) \times 5$, write various products showing some pattern to show $(-1) \times (-1) = 1$.

Difficulty Level: Medium

Solution:

$$(-1) \times 5 = -5$$

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

$$(-1) \times 3 = -3$$

$$(-1) \times 2 = -2$$

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

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

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

Thus, it is clear that when we multiply a negative integer by a positive integer the result is a negative integer whereas if we multiply a negative integer by a negative integer the result is always a positive integer.

Q5. Find the product, using suitable properties: –

- a) $26 \times (-48) + (-48) \times (-36)$
- b) $8 \times 53 \times (-125)$
- c) $15 \times (-25) \times (-4) \times (-10)$
- d) $(-41) \times 102$
- e) $625 \times (-35) \times (-625) \times 65$
- f) $7 \times (50-2)$
- g) $(-17) \times (-29)$
- h) $(-57) \times (-19) + 57$

Difficulty Level: Medium

Solution:

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

Using distributive property, we get

$$\begin{aligned} (a \times b) + (b \times c) &= b \times (a + c) \\ &= (-48) \times [26 + (-36)] \\ &= (-48) \times [26 - 36] \\ &= (-48) \times [(-10)] \\ &= 480 \end{aligned}$$

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

Using associative property, we get

$$\begin{aligned} (a \times b) \times c &= a \times (b \times c) \\ &= 8 \times [53 \times (-125)] \\ &= 8 \times -6625 \\ &= -53000 \end{aligned}$$

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

Using associative property, we get

$$\begin{aligned} &= 15 \times [(-25) \times (-4) \times (-10)] \\ &= 15 \times [100 \times (-10)] \\ &= 15 \times [-1000] \\ &= -15000 \end{aligned}$$

d) $(-41) \times 102$

Using distributive law, we get

$$\begin{aligned} &= (-41) \times (100 + 2) \dots\dots [a \times (b + c)] = (a \times b + a \times c) \\ &= (-41) \times 100 + (-41) \times 2 \\ &= -4100 - 82 \\ &= -4182 \end{aligned}$$

e) $625 \times (-35) + (-625) \times 65$

Using distributive property, we get

$$\begin{aligned} &= 625 \times [(-35) + (-65)] \dots\dots\dots [a \times b + a \times c = a(b + c)] \\ &= 625 \times [-35 - 65] \\ &= 625 \times [-100] \\ &= -62500 \end{aligned}$$

f) $7 \times (50 - 2)$

Using distributive property, we get

$$\begin{aligned} &= 7 \times (50 - 2) \dots\dots\dots [a \times (b - c) = a \times b - a \times c] \\ &= 7 \times 50 - 7 \times 2 \\ &= 350 - 14 \\ &= 336 \end{aligned}$$

g) $(-17) \times (-29)$

Using distributive property, we get

$$\begin{aligned} &= (-17) \times [(-30) + 1] \dots\dots\dots [a \times (b + c) = a \times b + a \times c] \\ &= (-17) \times (-30) + (-17) \times 1 \\ &= 510 + (-17) \\ &= 510 - 17 \\ &= 493 \end{aligned}$$

h) $(-57) \times (-19) + 57$

Using distributive property, we get

$$\begin{aligned} &= (-57) \times (-19) + 57 \times 1 \dots\dots\dots [a \times b + a \times c = a \times (b + c)] \\ &= 57 \times 19 + 57 \times 1 \\ &= 57 \times (19 + 1) \\ &= 57 \times 20 \\ &= 1140 \end{aligned}$$

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 temperature 10 hours after the process begin?

Difficulty Level: Medium

Solution:

Present temperature of room = 40°C

Decrease in temperature after every hour = 5°C

$$\begin{aligned}\text{Temperature of room after 10 hours} &= 40^{\circ}\text{c} + 10 \times (-5)^{\circ}\text{c} \\ &= 40^{\circ}\text{c} - 50^{\circ}\text{c} \\ &= -10^{\circ}\text{c}\end{aligned}$$

Thus, the room temperature after 10 hours is -10°c , after the process begins.

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 question not attempted.

- i) Mohan gets 4 correct and 6 incorrect answers. What is his score?
- ii) Reshma gets 5 correct and 5 incorrect answers. What is her score?
- iii) Heena gets 2 correct and 5 incorrect answers out of 7 questions she attempts. What is her score?

Difficulty Level: Moderate

Solution:

Given: –

Total number of questions = 10

Marks awarded for every correct answer = 5

Marks awarded for every incorrect answer = (-2)

Marks for not attempted question = 0

i) Marks obtained by Mohan by 4 correct answers = $4 \times 5 = 20$ marks

Marks for 6 incorrect answers = $6 \times (-2) = -12$

$$\begin{aligned}\therefore \text{total score of Mohan} &= \text{Marks for correct answers} + \text{marks for incorrect answers} \\ &= 20 + (-12) \\ &= 20 - 12 \\ &= 8 \text{ marks}\end{aligned}$$

Thus, Mohan gets 8 marks in the class test.

ii) Marks obtained by Reshma for 5 correct answers = $5 \times 5 = 25$ marks

Marks for 5 incorrect answers = $5 \times (-2) = -10$ marks

$$\begin{aligned}\therefore \text{Total score of Reshma} &= \text{Marks for correct answers} + \text{marks for incorrect answers} \\ &= 25 + (-10) \\ &= 25 - 10 \\ &= 15 \text{ marks}\end{aligned}$$

iii) Marks obtained by Heena for 2 correct answers = $2 \times 5 = 10$ marks

Marks for 5 incorrect answers = $5 \times (-2) = -10$ marks

Marks for not attempted questions = $3 \times 0 = 0$ marks

$$\begin{aligned}\therefore \text{Total score of Heena} &= \text{Marks for correct answers} + \text{marks for incorrect answers} + \\ &\text{Marks for not attempted questions}\end{aligned}$$

$$= 25 + (-10) + 0$$

$$= 25 - 10 + 0$$

$$= 15 \text{ marks}$$

- Q8.** A cement company earns a profit of Rs 8 per bag of white cement sold and a loss of Rs5 per bag of grey cement sold.
- The company sells 3,000 bags of white cement and sold 5,000 bags of grey cement in a month. What is its profit and loss?
 - 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?

Difficulty Level: Moderate

Solution:

Given:

Profit on one white cement bag = Rs 8

Loss on one grey cement bag = Rs -5

- Profit on 3,000 bags of white cement = $3,000 \times \text{Rs } 8 = \text{Rs } 24,000$
Loss on 5,000 bags of white cement = $5,000 \times \text{Rs } -5 = -\text{Rs } 25,000$

$$\begin{aligned} \text{Total loss} &= -\text{Rs } 25,000 - \text{Rs } 24,000 \\ &= -\text{Rs } 1,000 \\ &\text{i.e. Rs } 1000 \end{aligned}$$

- Selling price of grey bags at a loss of Rs 5 = $\text{Rs } -5 \times 6,400 = -\text{Rs } 32000$

For no profit and no loss, the selling price of white bags = Rs 32000

\therefore Number of white cement bags sold = $\frac{\text{selling price of white cement bags sold}}{\text{rate of selling price of white bags at profit}}$

$$\begin{aligned} &= \frac{32000}{8} \\ &= 4000 \end{aligned}$$

Hence, the required number of bags = 4,000

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

- $(-3) + \dots = 27$
- $-5x \dots = -35$
- $\dots \times (-8) = -56$
- $\dots \times (-12) = 132$

Difficulty Level: Low

Solution:

(a)

$$\begin{aligned}(-3) + \dots &= 27 \\ &= (-3) \times (-9) \\ &= 27\end{aligned}$$

(b)

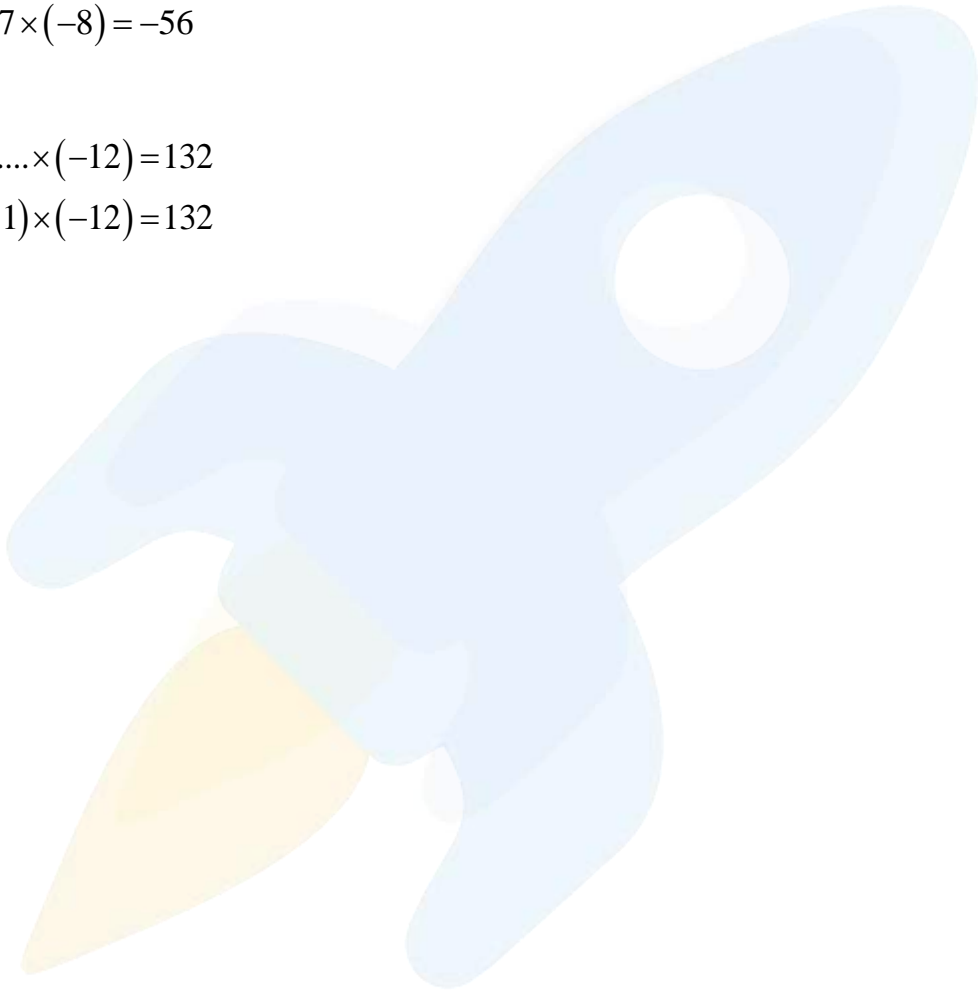
$$\begin{aligned}-5 \times \dots &= -35 \\ -5 \times (-7) &= -35\end{aligned}$$

(c)

$$\begin{aligned}\dots \times (-8) &= -56 \\ 7 \times (-8) &= -56\end{aligned}$$

(d)

$$\begin{aligned}\dots \times (-12) &= 132 \\ (-11) \times (-12) &= 132\end{aligned}$$



Chapter-1: Integers

Exercise 1.4 (Page 26 of Grade 7 NCERT)

Q1. Evaluate each of the following: –

a) $-30 \div 10$

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

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

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

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

b) $50 \div (-5)$

d) $(-49) \div (49)$

f) $0 \div (-12)$

h) $[(-36) \div 12] \div 3$

Difficulty Level: Medium

Solution:

a)
$$\begin{aligned} (-30) \div 10 &= (-30) \times \frac{1}{10} \\ &= \frac{-30}{10} \\ &= -3 \end{aligned}$$

b)
$$\begin{aligned} 50 \div (-5) &= 50 \times \frac{1}{(-5)} \\ &= \frac{50}{-5} \\ &= -10 \end{aligned}$$

c)
$$\begin{aligned} (-36) \div (-9) &= (-36) \times \frac{1}{(-9)} \\ &= \frac{36}{9} \\ &= 4 \end{aligned}$$

d)
$$\begin{aligned} (-49) \div 49 &= (-49) \times \frac{1}{(49)} \\ &= \frac{-49}{49} \\ &= -1 \end{aligned}$$

$$\begin{aligned} \text{e) } 13 \div [(-2) + 1] &= 13 \div [-2 + 1] \\ &= 13 \div [-1] \\ &= 13 \times \frac{1}{(-1)} \\ &= -13 \end{aligned}$$

$$\begin{aligned} \text{f) } 0 \div (-12) &= 0 \times \frac{1}{(-12)} \\ &= \frac{0}{-12} \\ &= 0 [0 \div \text{Number} = 0] \end{aligned}$$

$$\begin{aligned} \text{g) } (-31) \div [(-30) + (-1)] &= (-31) \div [-30 - 1] \\ &= (-31) \div (-31) \\ &= (-31) \times \frac{1}{(-31)} \\ &= \frac{-31}{-31} \\ &= 1 \end{aligned}$$

$$\begin{aligned} \text{h) } [(-36) \div 12] \div 3 &= \left[(-36) \times \frac{1}{12} \right] \div 3 \\ &= \left[\left(\frac{-36}{12} \right) \right] \times \frac{1}{3} \\ &= -1 \end{aligned}$$

$$\begin{aligned} \text{i) } [(-6) + 5] \div [(-2) + 1] &= -1 \div -1 \\ &= \frac{-1}{-1} \\ &= 1 \end{aligned}$$

Q2. Verify that $a \div (b + c) \neq (a \div b) + (a \div c)$ for each of the following values of a , b and c .

$$\text{(a) } a = 12, b = -4, c = 2 \quad \text{(b) } a = (-10), b = 1, c = 1$$

Difficulty Level: Medium

Solution:

(1)

$$\text{Let, } a \div (b + c) \neq (a \div b) + (a \div c)$$

a)

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

Take L.H.S, $a \div (b + c)$ Putting the values of a , b and c , we get

$$\begin{aligned} & a \div (b + c) \\ &= 12 \div (-4 + 2) \\ &= 12 \div (-2) \\ &= 12 \times \frac{1}{(-2)} \\ &= \frac{12}{(-2)} \\ &= -6 \end{aligned}$$

Now take R.H.S, $(a \div b) + (a \div c)$

$$\begin{aligned} &= [12 \div (-4)] + (12 \div 2) \\ &= \left[12 \times \frac{(-1)}{4} \right] + \left(12 \times \frac{1}{2} \right) \\ &= \frac{(-12)}{4} + \left(\frac{12}{2} \right) \\ &= -3 + 6 \\ &= 3 \end{aligned}$$

Putting the values of L.H.S and R.H.S in equation (1), we get

$$\begin{aligned} & a \div (b + c) \neq (a \div b) + (a \div c) \\ & \quad 6 \neq 3 \\ & \text{L.H.S.} \neq \text{R.H.S.} \end{aligned}$$

Hence verified.

b)

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

Take L.H.S, $a \div (b + c)$ Putting the values of a , b and c , we get

$$\begin{aligned} &= (-10) \div (1 + 1) \\ &= (-10) \div (2) \\ &= (-10) \times \frac{1}{2} \\ &= -5 \end{aligned}$$

Take R.H.S, $(a \div b) + (a \div c)$

Putting the values of a , b and c , we get

$$= [(-10) \div 1] + [(-10) \div 1]$$

$$= [(-10) \times \frac{1}{1}] + [(-10) \times \frac{1}{1}]$$

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

$$= -10 - 10$$

$$= -20$$

Putting the values of L.H.S and R.H.S in equation (1), we get

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

$$-5 \neq -20$$

$$\text{L.H.S} \neq \text{R.H.S}$$

Hence verified

Q3. Fill in the blanks: –

a) $369 \div \underline{\hspace{2cm}} = 369$

b) $(-75) \div \underline{\hspace{2cm}} = -1$

c) $(-206) \div \underline{\hspace{2cm}} = 1$

d) $(-87) \div \underline{\hspace{2cm}} = 87$

e) $\underline{\hspace{2cm}} \div 1 = -87$

f) $\underline{\hspace{2cm}} \div 48 = -1$

g) $20 \div \underline{\hspace{2cm}} = -2$

h) $\underline{\hspace{2cm}} \div (4) = -3$

Difficulty Level: Medium

Solution:

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

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

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

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

Q4. Write five pair of integers (a, b) such that $a \div b = -3$. One such pair is (6, -2) because $6 \div (-2) = (-3)$.

Difficulty Level: Medium

Solution:

i) $(-9) \div 3 = (-3)$

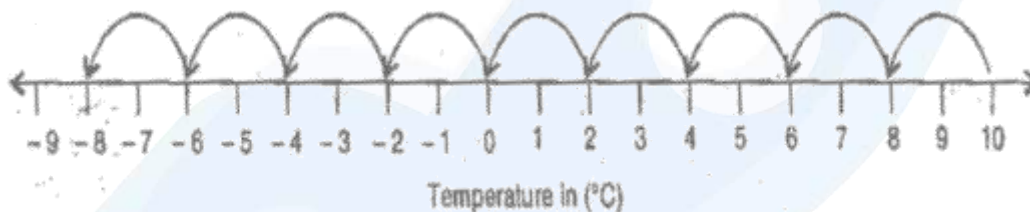
ii) $12 \div (-4) = (-3)$

iii) $(-15) \div 5 = (-3)$

iv) $18 \div (-6) = (-3)$

v) $(-27) \div 9 = (-3)$

Q5. 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?



Difficulty Level: Easy

Solution:

The temperature at 12 noon = 10°C (given)

The temperature decreases $2^{\circ}\text{C} = 1$ hour (given)

The temperature decreases $1^{\circ}\text{C} = \frac{1}{2}$ hour

The temperature decreases $18^{\circ}\text{C} = \frac{1}{2} \times 18$

(From 10°C to 8°C below zero) = 9 hours

Total time = 12 noon + 9 hours

= 21 hours

= 9 pm

Thus, at 9 pm temperature would be 8°C below zero.

ii) The temperature at 12 noon = 10°C

The temperature decreases = 2°C every hour

The temperature decreases in 12 hours = $-2^{\circ}\text{C} \times 12 = -24^{\circ}\text{C}$

At midnight, the temperature will be = $10^{\circ}\text{C} + (-24^{\circ}\text{C}) = -14^{\circ}\text{C}$

Therefore, the temperature at mid night will be 14°C below 0.

Q6. In a class test (+3) marks are given for every correct answer and (-2) marks are given for every incorrect answer and no mark 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?

Difficulty Level: Easy

Solution:

Given: -

Marks given for every correct answer = 3 marks

Marks given for every incorrect answer = -2

Marks for not attempting any question = 0

i) Total score of Radhika = 20 marks

No. of correct answers given by Radhika = 12 answers

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

Marks obtained for incorrect answers = Total score - Marks obtained for 12 correct answers
= $20 - 36$
= -16 marks

Marks obtained for every incorrect answer = -2 marks

Thus, number of incorrect answers = $-16 \div (-2)$
= 8

Therefore, she attempted 8 questions wrongly.

ii) Total score of Mohini = -5

No. of correct answers given by Mohini = 7

Marks obtained for correct answers = $7 \times 3 = 21$ marks

Marks obtained for incorrect answers = Total score - marks obtained for correct answers
= $-5 - 21$
= -26

Marks obtained for every incorrect answer = -2 marks

Thus, number of incorrect answers = $(-26) \div (-2) = 13$

Therefore, she attempted 13 questions wrongly.

Q7. An elevator descends into a mine shaft at the rate of 6m/min. If the descent starts from 10m above the ground level, how long will it take to reach -350m ?

Difficulty Level: Easy

Solution:

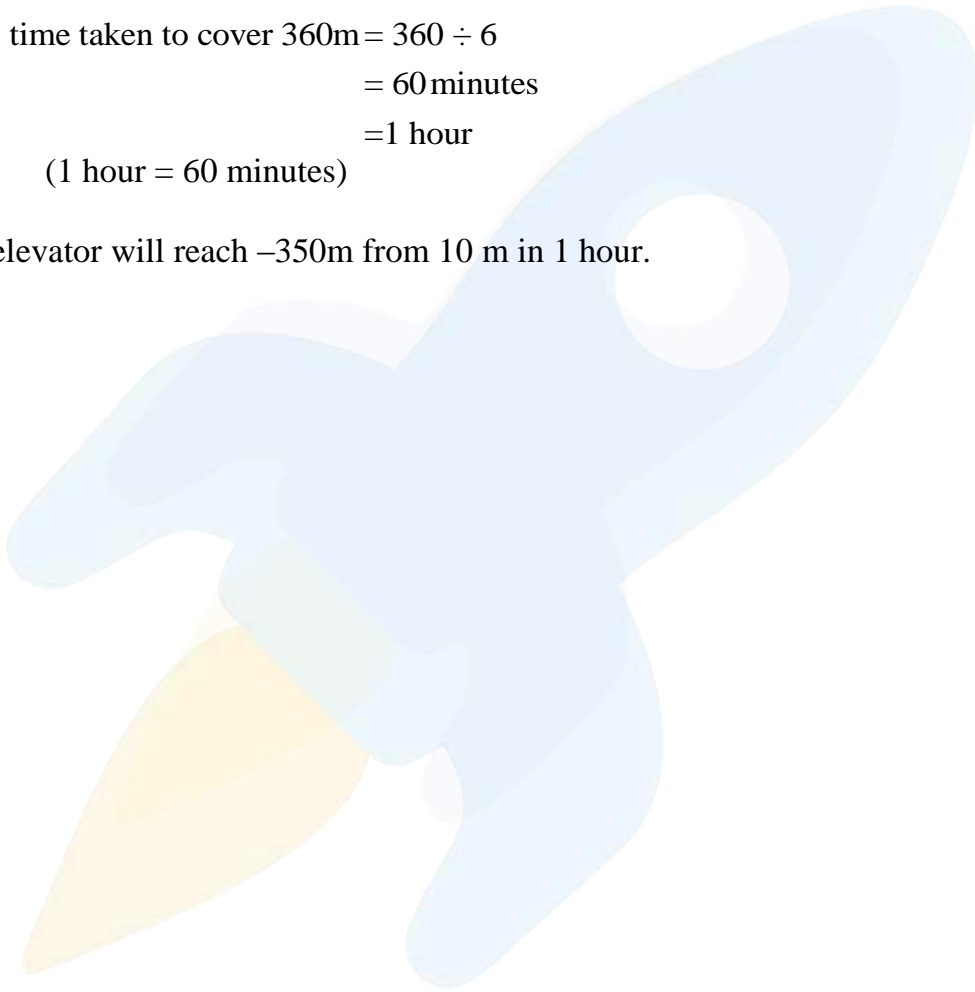
$$\begin{aligned}\text{Total distance covered by an elevator} &= 10 - (-350)\text{m} \\ &= 10 + (350) \\ &= 360\text{m}\end{aligned}$$

So, time taken to cover a distance of 6 m = 1min

$$\begin{aligned}\text{Therefore, time taken to cover } 360\text{m} &= 360 \div 6 \\ &= 60\text{ minutes} \\ &= 1\text{ hour}\end{aligned}$$

(1 hour = 60 minutes)

Thus, the elevator will reach -350m from 10 m in 1 hour.



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