

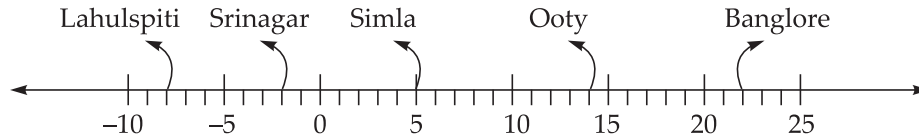
INTEGERS

NCERT Textbook Questions

EXERCISE 1.1

Q.1 Following number line shows the temperature in degree Celsius ($^{\circ}\text{C}$) 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?



Sol. (a)

Places	Lahulspiti	Sri nagar	Shimla	Ooty	Bangalore
Temperature	-8°C	-2°C	-5°C	-14°C	-22°C

- (b) Here, the hottest place is Bangalore (22°C) and the coldest place is Lahulspiti (-8°C)
 \therefore Temperature difference between the hottest and coldest places
 $= 22^{\circ}\text{C} - (-8^{\circ}\text{C}) = 22^{\circ}\text{C} + 8^{\circ}\text{C} = 30^{\circ}\text{C}$
- (c) \therefore Temperature at Lahulspiti = -8°C and temperature at Srinagar = -2°C
 \therefore Required difference
 $= -2^{\circ}\text{C} - (-8^{\circ}\text{C}) \quad [\because (-2) > (-8)]$
 $= -2^{\circ}\text{C} + 8^{\circ}\text{C} = 6^{\circ}\text{C}$
- (d) \therefore The sum of the temperatures of Srinagar and Shimla = $(-2^{\circ}\text{C}) + 5^{\circ}\text{C} = 3^{\circ}\text{C}$ and $3^{\circ}\text{C} < 5^{\circ}\text{C}$

So we can say

Yes, sum of temperatures at Srinagar and Shimla is less than the temperature at Shimla.

Temperature of Srinagar = -2°C . Also, $3^{\circ}\text{C} > -2^{\circ}\text{C}$

No, sum of temperatures at Srinagar and Shimla is not less than the temperature at Srinagar.

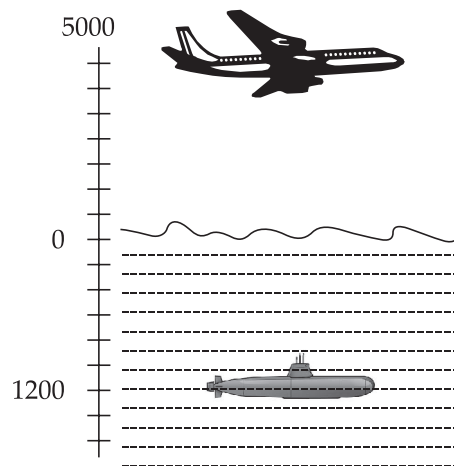
Q.2. In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If Jack's scores in five successive rounds were 25, - 5, - 10, 15 and 10, what was his total at the end?

Sol. Total at the end $= 25 + (-5) + (-10) + 15 + 10$
 $= \{25 + 15 + 10\} + \{(-5) + (-10)\} = 50 + (-15) = 35$

Q.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?

Sol. At Srinagar, temperature on Monday $= -5^{\circ}\text{C}$
 As the temperature falls by 2°C
 \therefore Temperature on Tuesday $= -5^{\circ}\text{C} + (-2^{\circ}\text{C}) = -7^{\circ}\text{C}$
 The temperature increased by 4°C on Wednesday
 \therefore Temperature on Wednesday $= -7^{\circ}\text{C} + 4^{\circ}\text{C} = -3^{\circ}\text{C}$

Q.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 floating 1200 m below the sea level. What is the vertical distance between them?

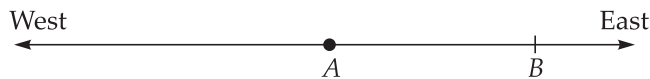


Sol. Vertical distance between the plane and submarine.
 $= 5000\text{m} - (-1200\text{m})$
 $= 5000\text{m} + 1200\text{m} = 6200\text{m}$

Q.5. Mohan deposits ₹2,000 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.

Sol. Since, withdrawing money from the bank is opposite to depositing money to bank. Therefore, the amount deposited is represented by a positive integer. Now, amount deposited = + ₹2000
 Amount withdrawn = - ₹1642.
 Balance, after withdrawal = ₹(2000 - 1642) = ₹358

Q.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 the distance travelled towards west? By which integer will you represent her final position from A?



Sol. The distance towards west = - 30 km.
 Her final position from A = +20 km + (-30) km = - (30 - 20) km = - 10 km

Q.7. 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
-5	-2	7
0	3	-3

(i)

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

(ii)

Sol. (i) Magic square: Sum of digits along:
 1st row = 5 + (-1) + (-4) = 5 + (-5) = 0
 2nd row = (-5) + (-2) + 7 = -7 + 7 = 0
 3rd row = 0 + 3 + (-3) = 3 + (-3) = 0
 1st column = 5 + (-5) + 0 = 5 + (-5) = 0
 2nd column = -1 + (-2) + 3 = (-3) + 3 = 0
 3rd column = (-4) + 7 + (-3) = (-7) + 7 = 0
 One diagonal = 5 + (-2) + (-3) = 5 - 5 = 0
 Other diagonal = 0 + (-2) + (-4) = 0 + (-6) = -6
 $\therefore -6 \neq 0$
 \therefore Square (i) is not a magic square.
 (ii) Magic square: Sum of digits along:
 1st row = 1 + (-10) + 0 = 1 - 10 = -9
 2nd row = (-4) + (-3) + (-2) = (-7) + (-2) = -9
 3rd row = (-6) + 4 + (-7) = (-13) + 4 = -9
 1st column = 1 + (-4) + (-6) = 1 - 10 = -9

$$\text{2nd column} = (-10) + (-3) + 4 = (-13) + 4 = -9$$

$$\text{3rd column} = (0) + (-2) + (-7) = 0 + (-9) = -9$$

$$\text{One diagonal} = 1 + (-3) + (-7) = 1 + (-10) = -9$$

$$\text{Second diagonal} = (-6) + (-3) + 0 = (-9) + 0 = -9$$

Since each row, column and diagonal have the same sum.

\therefore Square (ii) is the magic square.

Q.8. 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) $a = 28, b = 11$

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

$$\text{L.H.S.} = a - (-b) = 21 - (-18) = 21 + 18 = 39 \quad \dots(1)$$

$$\text{R.H.S.} = a + b = 21 + 18 = 39 \quad \dots(2)$$

From (1) and (2), we get, $a - (-b) = a + b$

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

$$\text{L.H.S.} = a - (-b) = 118 - (-125) = 118 + 125 = 243 \quad \dots(1)$$

$$\text{R.H.S.} = a + b = 118 + 125 = 243 \quad \dots(2)$$

From (1) and (2), we get, $a - (-b) = a + b$

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

$$\text{L.H.S.} = a - (-b) = 75 - (-84) = 75 + 84 = 159 \quad \dots(1)$$

$$\text{R.H.S.} = a + b = 75 + 84 = 159 \quad \dots(2)$$

From (1) and (2), we get, $a - (-b) = a + b$

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

$$\text{L.H.S.} = a - (-b) = 28 - (-11) = 28 + 11 = 39 \quad \dots(1)$$

$$\text{R.H.S.} = a + b = 28 + 11 = 39 \quad \dots(2)$$

From (1) and (2), we get, $a - (-b) = a + b$

Q.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) $-231 + 79 + 51$ $-399 + 159 + 81$

Sol. (a) $(-8) + (-4) = -12$

$$(-8) - (-4) = -8 + 4 = -4; (-12) < (-4)$$

$$\therefore (-8) + (-4) \boxed{<} (-8) - (-4)$$

$$(b) \quad (-3) + 7 - 19 = -22 + 7 = -15$$

$$15 - 8 + (-9) = 15 - 17 = -2; (-15) < (-2)$$

$$\therefore (-3) + 7 - 19 \boxed{<} 15 - 8 + (-9)$$

$$(c) \quad 23 - 41 + 11 = 34 - 41 = -7$$

$$23 - 41 - 11 = 23 - 52 = -29; (-7) > (-29)$$

$$\therefore 23 - 41 + 11 \boxed{>} 23 - 41 - 11$$

$$(d) \quad 39 + (-24) - (15) = 39 + (-39) = 0$$

$$36 + (-52) - (-36) = 72 + (-52) = 20; 0 < 20$$

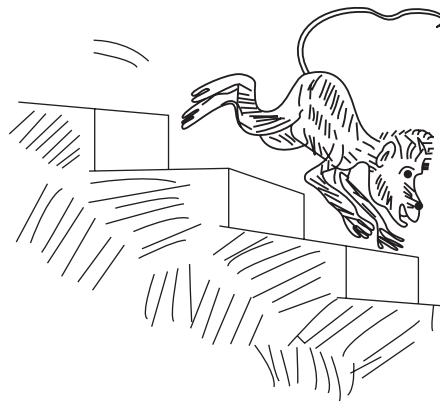
$$\therefore 39 + (-24) - 15 \boxed{<} 36 + (-52) - (-36)$$

$$(e) \quad -231 + 79 + 51 = -231 + 130 = -101$$

$$-399 + 159 + 81 = -399 + 240 = -159; (-101) > (-159)$$

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

Q.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 moves in part (i) and (ii) by completing the following;

(a) $-3 + 2 - \dots = -8$

(b) $4 - 2 + \dots = 8$. In (a) the sum (-8) represents going down by eight steps. So, what will the sum 8 in (b) represent?

Sol. (i) If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers, then we have:

$$(-3 + 2) + (-3 + 2) + (-3 + 2) + (-3 + 2) + (-3 + 2) - 3 = -8$$

After these many jumps, he will reach back the top step.

Since the number of terms in above expression is 11, therefore, he will reach the water level in 11 jumps.

(i) Similarly, to reach back the top step,

$$(4 - 2) + (4 - 2) + 4 = 8.$$

After these many jumps, he will reach the water level.

Since the number of terms in above expression is 5, therefore, he will reach the water level in 5 jumps.

(iii) (a) $-3 + 2 + (-3) + 2 + (-3) + 2 + (-3) + 2 + (-3) + 2 + (-3) + 2 + (-3) + 2 + (-3) + 2 = -8$

(b) $4 - 2 + 4 - 2 + 4 = 8$ and the sum 8 in (b) will represent going up.

EXERCISE 1.2

Q.1. Write down a pair of integers whose:

(a) sum is -7 (b) difference is -10 (c) sum is 0

Sol. (a) (-15) and 8 (b) 15 and 25 (c) (-49) and 49

Q.2. (a) Write a 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 .

Sol. (a) Since, $(-2) - (-10) = -2 + 10 = 8$.

So, (-2) and (-10) is a pair of negative integers such that their difference is 8.

(b) Since, $(-6) + 1 = -5$

Therefore, -6 and 1 is a pair of integers such that their sum is -5 and one of the integers is a negative integer.

(c) Since $(-1) - (2) = -1 - 2 = -3$

Therefore, -1 and 2 is a pair of integers such that their difference is -3 and one of them is positive and other is negative.

Q.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 we say that we can add integers in any order?

Sol. Total score of team A = $(-40) + 10 + 0 = (-40) + 10 = -(40 - 10) = -30$

Total score of team B = $10 + 0 + (-40) = 10 + (-40) = -(40 - 10) = -30$

So, both the teams scored equally. Yes, we can say that we can add integers in any order.

Q.4. Fill in the blanks to make the following statements true:

(i) $(-5) + (\dots\dots\dots) = (-8) + (\dots\dots\dots)$

(ii) $-53 + \dots\dots\dots = -53$

(iii) $17 + \dots\dots\dots = 0$

(iv) $[13 + (-12)] + (\dots\dots\dots) = \dots\dots\dots + [(-12) + (-7)]$

(v) $(-4) + [\dots\dots\dots + (-3)] = [\dots\dots\dots + 15] + \dots\dots\dots$

Sol. (i) Since, integers can be added in any order,

$$\therefore (-5) + (-8) = (-8) + (-5)$$

(ii) If we add zero to any integer, we get the same integer.

$$\therefore -53 + 0 = -53$$

(iii) We know that the sum of an integer and its additive inverse is zero

$$\therefore 17 + (-17) = 0$$

(iv) Since, the addition of integers is associative.

Therefore, for three integers a , b and c ,

we have: $(a + b) + c = a + (b + c)$.

Thus, $[13 + (-12)] + (-7) = 13 + [(-12) + (-7)]$

(v) $(-4) + [15 + (-3)] = [(-4) + 15] + (-3)$

EXERCISE 1.3

Q.1. 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) $(-3) \times (-6) \times (-2) \times (-1)$

Sol. (a) $3 \times (-1) = -(3 \times 1) = -3$

(b) $(-1) \times 225 = -(1 \times 225) = -225$

(c) $(-21) \times (-30) = 21 \times 30 = 630$

(d) $(-316) \times (-1) = 316 \times 1 = 316$

(e) $(-15) \times 0 \times (-18) = \{(-15) \times 0\} \times (-18) = 0 \times (-18) = 0$

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

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

$$(g) \quad 9 \times (-3) \times (-6) = 9 \times [(-3) \times (-6)] = 9 \times 3 \times 6 = 9 \times 18 = 162$$

$$(h) \quad (-18) \times (-5) \times (-4) = [(-18) \times (-5)] \times (-4) = (18 \times 5) \times (-4) \\ = -(90 \times 4) = -360$$

$$(i) \quad (-1) \times (-2) \times (-3) \times 4 = [(-1) \times (-2)] \times [(-3) \times 4] = (1 \times 2) \times [-(3 \times 4)] \\ = 2 \times [-(12)] = 2 \times (-12) = -(2 \times 12) = -24$$

$$(j) \quad (-3) \times (-6) \times (-2) \times (-1) = [(-3) \times (-6)] \times [(-2) \times (-1)] = (3 \times 6) \times (2 \times 1) \\ = 18 \times 2 = 36$$

Q.2. Verify the following:

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

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

Sol. (a) L.H.S. = $18 \times [7 + (-3)] = 18 \times [4] = 72$

$$\text{R.H.S.} = (18 \times 7) + [18 \times (-3)] = 126 + [-54] = 126 - 54 = 72$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

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

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

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

$$= 84 + 126 = 210$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

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

Q.3. (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

Sol. (i) $(-1) \times a = -a$

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

Q.4. Starting from $(-1) \times 5$, write various products showing some pattern to show $(-1) \times (-1) = 1$.

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

$$(-1) \times 4 = -4 = (-5) + 1$$

$$(-1) \times 3 = -3 = (-4) + 1$$

$$(-1) \times 2 = -2 = (-3) + 1$$

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

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

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

Q.5. 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) $625 \times (-35) + (-625) \times 65$

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

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

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

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

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

$$[a \times (-b) = -(a \times b); (-a) \times (-b) = a \times b]$$

$$= (-1248) + 1728 = 480$$

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

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

$$= 424 \times (-125) = -(424 \times 125) \quad [a \times (-b) = -(a \times b)]$$

$$= -[424 \times (100 + 25)] = -[424 \times 100 + 424 \times 25]$$

$$\quad \text{[distributivity of multiplication over addition]}$$

$$= -[42400 + 10600] = -53000$$

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

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

$$\quad \text{[Commutativity of multiplication]}$$

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

$$\quad \text{[Commutativity of multiplication]}$$

$$= [(15) \times (-10)] \times [(-25) \times (-4)]$$

$$= [- (15 \times 10)] \times [25 \times 4]$$

$$\quad [a \times (-b) = -(a \times b); (-a) \times (-b) = a \times b]$$

$$= (-150) \times 100 = -(150 \times 100) = -15000$$

(d) $(-41) \times 102$

$$(-41) \times 102 = -(41 \times 102)$$

$$\quad [(-a) \times b = -(a \times b)]$$

$$= -[41 \times (100 + 2)]$$

$$= -[41 \times 100 + 41 \times 2]$$

$$\quad \text{[distributivity of multiplication over addition]}$$

$$= -[4100 + 82] = -4182$$

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

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

$$\quad [(-a) \times b = a \times (-b)]$$

$$= 625 \times [(-35) + (-65)]$$

$$\quad \text{[distributivity of multiplication over addition]}$$

$$= 625 \times (-100) = -(625 \times 100)$$

$$\quad [a \times (-b) = -(a \times b)]$$

$$= -62500$$

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

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

[distributivity of multiplication over subtraction]

$$= 350 - 14 = 336$$

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

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

[$(-a) \times (-b) = a \times b$]

$$= 17 \times (30 - 1) = 17 \times 30 - 17 \times 1$$

[distributivity of multiplication over subtraction]

$$= 510 - 17 = 493$$

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

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

[$(-a) \times (-b) = a \times b$]

$$= 57 \times 19 + 57 \times 1$$

[$a \times 1 = a$]

$$= 57 \times (19 + 1)$$

[distributivity of multiplication over addition]

$$= 57 \times 20 = 1140$$

Q.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?

Sol. Room temperature = 40°C ; Change in temperature per hour = -5°C
 Change in temperature in 10 hours = $10 \times (-5^{\circ}\text{C}) = -50^{\circ}\text{C}$
 \therefore Room temperature after 10 hours = $40^{\circ}\text{C} + (-50^{\circ}\text{C}) = -10^{\circ}\text{C}$

Q.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 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?

Sol. (i) Mohan gets for four correct answers: $4 \times 5 = 20$ marks
 He also gets for six incorrect answers: $6 \times (-2) = -12$ marks
 Therefore, Mohan score: $20 + (-12) = 20 - 12 = 8$ marks

(ii) Reshma gets for five correct answers: $5 \times 5 = 25$ marks
 She also gets for five incorrect answers: $5 \times (-2) = -10$ marks
 Therefore, Reshma score: $25 + (-10) = 25 - 10 = 15$ marks

(iii) Heena gets two correct answers: $2 \times 5 = 10$ marks
 She also gets for five incorrect answers: $5 \times (-2) = -10$ marks
 She didn't attempted three questions. For these, she gets: $3 \times 0 = 0$ marks
 Therefore, Heena score $10 + (-10) + 0 = 10 - 10 + 0 = 0$ marks

Q.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 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.

Sol. (a) Since profit of ₹8 is earned on a bag of white cement and a loss of ₹5 on a bag of grey cement and

number of white cement bags sold = 3000

number of grey cement bags sold = 5000

∴ Profit = $3000 \times ₹8 = ₹24000$; Loss = $5000 \times ₹5 = ₹25000$

Here, Loss > Profit

∴ Loss = ₹(25000 – 24000) = ₹1000

(b) Number of grey cement bags sold = 6400

∴ Total loss = ₹5 × 6400 = ₹32000

For no profit and no loss, there should be a profit of ₹32000.

∴ Number of white cement bags sold to earn a profit of ₹32000
 $= 32000 \div 8 = 4000$ bags

Q.9. Replace the blank with an integer to make it a true statement.

(a) $(-3) \times \underline{\hspace{2cm}} = 27$

(b) $5 \times \underline{\hspace{2cm}} = -35$

(c) $\underline{\hspace{2cm}} \times (-8) = -56$

(d) $\underline{\hspace{2cm}} \times (-12) = 132$

Sol. (a) $(-3) \times \underline{\hspace{2cm}} = 27 \Rightarrow (-3) \times (-9) = 27$

[Since $3 \times 9 = 27$]

(b) $5 \times \underline{\hspace{2cm}} = -35 \Rightarrow 5 \times (-7) = -35$

[Since $5 \times 7 = 35$]

(c) $\underline{\hspace{2cm}} \times (-8) = -56 \Rightarrow 7 \times (-8) = -56$

[Since $7 \times 8 = 56$]

(d) $\underline{\hspace{2cm}} \times (-12) = 132 \Rightarrow (-11) \times (-12) = 132$

[Since $11 \times 12 = 132$]

EXERCISE 1.4

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

Sol. (a) $(-30) \div 10 = \frac{(-30)}{10} = -3$ (b) $50 \div (-5) = \frac{50}{(-5)} = -10$

(c) $(-36) \div (-9) = \frac{(-36)}{(-9)} = 4$ (d) $(-49) \div (49) = \frac{(-49)}{49} = -1$

(e) $13 \div [(-2) + 1] = 13 \div [-1] = \frac{13}{(-1)} = -13$

(f) $0 \div (-12) = 0$

(g) $(-31) \div [(-30) + (-1)] = (-31) \div [(-31)] = \frac{(-31)}{(-31)} = 1$

(h) $[(-36) \div 12] \div 3 = \left[\frac{(-36)}{12} \right] \div 3 = [-3] \div 3 = -1$

(i) $[(-6) + 5] \div [(-2) + 1] = [-1] \div [-1] = \frac{(-1)}{(-1)} = 1$

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

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

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

(b) $a \div (b + c) = (-10) \div [1 + 1] = (-10) \div 2 = -5$
 $(a \div b) + (a \div c) = [(-10) \div 1] + [(-10) \div 1] = (-10) + (-10) = -20$

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

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

Sol. (a) Since $a \div 1 = a$ therefore, $369 \div 1 = 369$

(b) Since $(-a) \div a = -1$ therefore, $(-75) \div 75 = -1$

(c) Since $(-a) \div (-a) = 1$ therefore, $(-206) \div (-206) = 1$

(d) Since $(-a) \div (-1) = a$ therefore, $-87 \div (-1) = 87$

(e) Since $(-a) \div 1 = -a$ therefore, $(-87) \div 1 = -87$

(f) Since $(-a) \div a = -1$ therefore, $(-48) \div 48 = -1$

(g) Since $20 \div 10 = 2$ therefore, $20 \div (-10) = -2$

(h) Since $12 \div 4 = 3$ therefore, $(-12) \div (4) = -3$

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

Sol. Five pairs of integers (a, b) , such that $a \div b = -3$

1. $[9, (-3)]$ 2. $[12, (-4)]$, 3. $[15, (-5)]$

4. $[-9, 3]$ 5. $[-12, 4]$

Q.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?

Sol. Temperature at 12 noon = $+10^\circ\text{C}$

Rate of change in temperature = -2°C per hour

Number of hours from 12 noon to mid-night = 12

So change in temperature in 12 hours = $12^\circ \times (-2) = -24^\circ\text{C}$

Therefore, temperature at mid-night (i.e. 12 hours after 12 noon)

$$= +10^\circ\text{C} + (-24^\circ\text{C}) = -14^\circ\text{C}$$

Thus, temperature at mid-night = -14°C

Now, temperature difference between $+10^\circ\text{C} - (-8^\circ\text{C}) = 18^\circ\text{C}$

Since $\frac{18}{2} = 9$

Therefore, temperature change of 18°C will take place in 9 hours from 12 noon.

Time after 9 hours from 12 noon = 9p.m.

Thus, the temperature 8°C below 0° (-8°C) would be at 9 p.m.

Q.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?

Sol. (i) Let x be the number of questions attempted incorrectly by Radhika.

According to the question, we get

$$(+3) \times 12 + x \times (-2) = 20 \Rightarrow 36 - 2x = 20 \Rightarrow 2x = 36 - 20 \Rightarrow x = 16/2 = 8$$

Therefore, Radhika attempted 8 questions incorrectly.

(ii) Let x be the number of questions attempted incorrectly by Mohini

According to the question, we get

$$(+3) \times 7 + x \times (-2) = -5 \Rightarrow 21 - 2x = -5 \Rightarrow 2x = 21 + 5 \Rightarrow x = 26/2 = 13$$

Therefore, Mohini attempted 13 question incorrectly.

(iii) Let x be the number of questions attempted correctly by Rakesh.

So $(16 - x)$ will be the number of question attempted incorrectly by him.

According to the question, we get

$$(+3) \times x + (16 - x) \times (-2) = 18 \Rightarrow 3x - 32 + 2x = 18$$

$$\Rightarrow 5x = 18 + 32$$

$$\Rightarrow x = 50/5 = 10$$

Therefore, Rakesh attempted 10 questions correctly and 6 questions incorrectly.

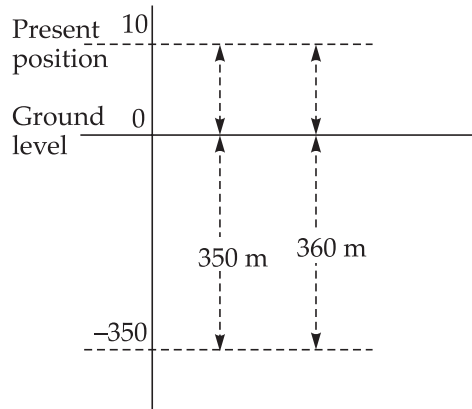
Q.7. An elevator descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach - 350 m.

Sol. Present position of the elevator is at 10 m above the ground level.

Distance to be moved by the elevator below the ground level = 350 m.

\therefore Total distance to be moved by the elevator = 350 m + 10 m = 360 m

The rate of descent = 6 m/min



$$\text{Time taken} = \frac{\text{Total distance}}{\text{Rate of descent}} = \frac{360 \text{ m}}{6 \text{ m/min}} = 60 \text{ min}$$

Therefore, required time = 60 minutes (or one hour)