NCERT Solutions for Class 7 Maths Chapter 1 Integers
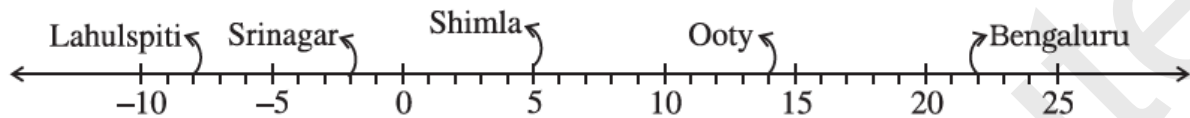
Exercise 1.1 Page: 4

1. 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.

Solution:-

By observing the number line, we can find the temperature of the cities as follows,

Temperature at the Lahulspiti is -8°C

Temperature at the Srinagar is -2°C

Temperature at the Shimla is 5°C

Temperature at the Ooty is 14°C

Temperature at the Bengaluru is 22°C

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

Solution:-

From the number line we observe that,

The temperature at the hottest place i.e., Bengaluru is 22°C

The temperature at the coldest place i.e., Lahulspiti is -8°C

Temperature difference between hottest and coldest place is = 22°C – (-8°C)

= 22°C + 8°C

= 30°C

Hence, the temperature difference between the hottest and the coldest place is 30°C.

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

Solution:-

From the given number line,

The temperature at the Lahulspiti is -8°C

The temperature at the Srinagar is -2°C

∴The temperature difference between Lahulspiti and Srinagar is = -2°C – (8°C)

= – 2°C + 8°C

= 6°C

(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:-

From the given number line,

The temperature at Srinagar =-2°C

The temperature at Shimla = 5°C

The temperature of Srinagar and Shimla taken together is = – 2°C + 5°C

= 3°C

∴ 5°C > 3°C

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

Then,

3° > -2°

No, the temperature of Srinagar and Shimla taken together is not less than the temperature of Srinagar.

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:-

From the question,

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

The total score of Jack at the end will be = 25 + (-5) + (-10) + 15 + 10

= 25 – 5 – 10 + 15 + 10

= 50 – 15

= 35

∴Jack's total score at the end is 35.

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:-

From the question,

Temperature on Monday at Srinagar = -5°C

Temperature on Tuesday at Srinagar is dropped by 2°C = Temperature on Monday – 2°C
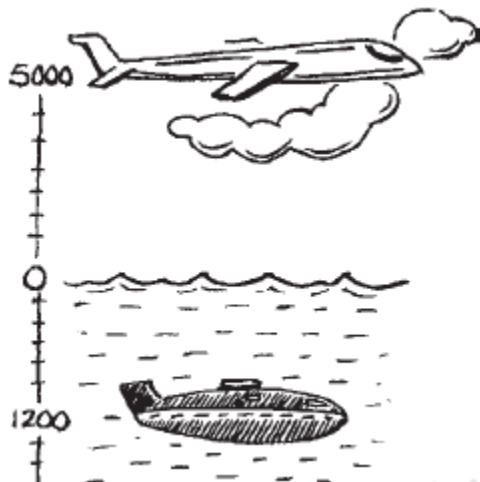
= -5°C – 2°C

= -7°C

Temperature on Wednesday at Srinagar is rose by 4°C = Temperature on Tuesday + 4°C

= -7°C + 4°C

= -3°C

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

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?

Solution:-

From the question,

Plane is flying at the height = 5000 m

Depth of Submarine = -1200 m

The vertical distance between plane and submarine = 5000 m – (- 1200) m

= 5000 m + 1200 m

= 6200 m

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.

Solution:-

Withdrawal of amount from the account is represented by a negative integer.

Then, deposit of amount to the account is represented by a positive integer.

From the question,

Total amount deposited in bank account by the Mohan = ₹ 2000

Total amount withdrawn from the bank account by the Mohan = – ₹ 1642

Balance in Mohan's account after the withdrawal = amount deposited + amount withdrawn

= ₹ 2000 + (-₹ 1642)

= ₹ 2000 – ₹ 1642

= ₹ 358

Hence, the balance in Mohan's account after the withdrawal is ₹ 358

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?

West ⟵———————————————————————— B ——— East →
                                    A

Solution:-

From the question, it is given that

A positive integer represents the distance towards the east.

Then, distance travelled towards the west will be represented by a negative integer.

Rita travels a distance in east direction = 20 km

Rita travels a distance in west direction = – 30 km

∴Distance travelled from A = 20 + (- 30)

= 20 – 30

= -10 km

Hence, we will represent the distance travelled by Rita from point A by a negative integer, i.e. – 10 km

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)

Solution:-

First we consider the square (i)

By adding the numbers in each rows we get,

= 5 + (- 1) + (- 4) = 5 – 1 – 4 = 5 – 5 = 0

= -5 + (-2) + 7 = – 5 – 2 + 7 = -7 + 7 = 0

= 0 + 3 + (-3) = 3 – 3 = 0

By adding the numbers in each columns we get,

= 5 + (- 5) + 0 = 5 – 5 = 0

= (-1) + (-2) + 3 = -1 – 2 + 3 = -3 + 3 = 0

= -4 + 7 + (-3) = -4 + 7 – 3 = -7 + 7 = 0

By adding the numbers in diagonals we get,

= 5 + (-2) + (-3) = 5 – 2 – 3 = 5 – 5 = 0

= -4 + (-2) + 0 = – 4 – 2 = -6

Because sum of one diagonal is not equal to zero,

So, (i) is not a magic square

Now, we consider the square (ii)

By adding the numbers in each rows we get,

= 1 + (-10) + 0 = 1 – 10 + 0 = -9

= (-4) + (-3) + (-2) = -4 – 3 – 2 = -9

= (-6) + 4 + (-7) = -6 + 4 – 7 = -13 + 4 = -9

By adding the numbers in each columns we get,

= 1 + (-4) + (-6) = 1 – 4 – 6 = 1 – 10 = -9

= (-10) + (-3) + 4 = -10 – 3 + 4 = -13 + 4

= 0 + (-2) + (-7) = 0 – 2 – 7 = -9

By adding the numbers in diagonals we get,

= 1 + (-3) + (-7) = 1 – 3 – 7 = 1 – 10 = -9

= 0 + (-3) + (-6) = 0 – 3 – 6 = -9

This (ii) square is a magic square, because sum of each row, each column and diagonal is equal to -9.

8. Verify a – (– b) = a + b for the following values of a and b.

(i) a = 21, b = 18

Solution:-

From the question,

a = 21 and b = 18

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 21 – (- 18)

= 21 + 18

= 39

Now, Right Hand Side (RHS) = a + b

= 21 + 18

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

(ii) a = 118, b = 125

Solution:-

From the question,

a = 118 and b = 125

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 118 – (- 125)

= 118 + 125

= 243

Now, Right Hand Side (RHS) = a + b

= 118 + 125

= 243

By comparing LHS and RHS

LHS = RHS

243 = 243

Hence, the value of a and b is verified.

(iii) a = 75, b = 84

Solution:-

From the question,

a = 75 and b = 84

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 75 – (- 84)

= 75 + 84

= 159

Now, Right Hand Side (RHS) = a + b

= 75 + 84

= 159

By comparing LHS and RHS

LHS = RHS

159 = 159

Hence, the value of a and b is verified.

(iv) a = 28, b = 11

Solution:-

From the question,

a = 28 and b = 11

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 28 – (- 11)

= 28 + 11

= 39

Now, Right Hand Side (RHS) = a + b

= 28 + 11

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

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

(a) (-8) + (-4) [ ] (-8) – (-4)

Solution:-

Let us take Left Hand Side (LHS) = (-8) + (-4)

= -8 – 4

= -12

Now, Right Hand Side (RHS) = (-8) – (-4)

= -8 + 4

= -4

By comparing LHS and RHS

LHS < RHS

-12 < -4

∴ (-8) + (-4) [<] (-8) – (-4)

(b) (-3) + 7 – (19) [ ] 15 – 8 + (-9)

Solution:-

Let us take Left Hand Side (LHS) = (-3) + 7 – 19

= -3 + 7 – 19

= -22 + 7

= -15

Now, Right Hand Side (RHS) = 15 – 8 + (-9)

= 15 – 8 – 9

= 15 – 17

= -2

By comparing LHS and RHS

LHS < RHS

-15 < -2

∴ (-3) + 7 – (19) [<] 15 – 8 + (-9)

(c) 23 – 41 + 11 [ ] 23 – 41 – 11

Solution:-

Let us take Left Hand Side (LHS) = 23 – 41 + 11

= 34 – 41

= – 7

Now, Right Hand Side (RHS) = 23 – 41 – 11

= 23 – 52

= – 29

By comparing LHS and RHS

LHS > RHS

– 7 > -29

∴ 23 – 41 + 11 [>] 23 – 41 – 11

(d) 39 + (-24) – (15) [ ] 36 + (-52) – (- 36)

Solution:-

Let us take Left Hand Side (LHS) = 39 + (-24) – 15

= 39 – 24 – 15

= 39 – 39

= 0

Now, Right Hand Side (RHS) = 36 + (-52) – (- 36)

= 36 – 52 + 36

= 72 – 52

= 20

By comparing LHS and RHS

LHS < RHS

0 < 20

∴ 39 + (-24) – (15) [<] 36 + (-52) – (- 36)

(e) – 231 + 79 + 51 [ ] -399 + 159 + 81

Solution:-

Let us take Left Hand Side (LHS) = – 231 + 79 + 51

= – 231 + 130

= -101

Now, Right Hand Side (RHS) = – 399 + 159 + 81

= – 399 + 240

= – 159

By comparing LHS and RHS

LHS > RHS

-101 > -159

∴ – 231 + 79 + 51 [>] -399 + 159 + 81

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?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the top most step i.e., first step

In 1st jump monkey will be at step = 1 + 3 = 4 steps

In 2nd jump monkey will be at step = 4 + (-2) = 4 – 2 = 2 steps

In 3rd jump monkey will be at step = 2 + 3 = 5 steps

In 4th jump monkey will be at step = 5 + (-2) = 5 – 2 = 3 steps

In 5th jump monkey will be at step = 3 + 3 = 6 steps

In 6th jump monkey will be at step = 6 + (-2) = 6 – 2 = 4 steps

In 7th jump monkey will be at step = 4 + 3 = 7 steps

In 8th jump monkey will be at step = 7 + (-2) = 7 – 2 = 5 steps

In 9th jump monkey will be at step = 5 + 3 = 8 steps

In 10th jump monkey will be at step = 8 + (-2) = 8 – 2 = 6 steps

In 11th jump monkey will be at step = 6 + 3 = 9 steps

∴Monkey took 11 jumps (i.e., 9th step) to 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?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the ninth step i.e., at the water level

In 1ˢᵗ jump monkey will be at step = 9 + (-4) = 9 – 4 = 5 steps

In 2ⁿᵈ jump monkey will be at step = 5 + 2 = 7 steps

In 3ʳᵈ jump monkey will be at step = 7 + (-4) = 7 – 4 = 3 steps

In 4ᵗʰ jump monkey will be at step = 3 + 2 = 5 steps

In 5ᵗʰ jump monkey will be at step = 5 + (-4) = 5 – 4 = 1 step

∴Monkey took 5 jumps to reach back the top step i.e., first 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?

Solution:-

From the question, it is given that

If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers.

Monkey moves in part (i)

= – 3 + 2 – ……….. = – 8

Then LHS = – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3

= – 18 + 10

= – 8

RHS = -8

∴Moves in part (i) represents monkey is going down 8 steps. Because negative integer.

Now,

Monkey moves in part (ii)

= 4 – 2 + ……….. = 8

Then LHS = 4 – 2 + 4 – 2 + 4

= 12 – 4

= 8

RHS = 8

∴Moves in part (ii) represents monkey is going up 8 steps. Because positive integer.

Exercise 1.2 Page: 9

1. Write down a pair of integers whose:

(a) sum is -7

Solution:-

= – 4 + (-3)

= – 4 – 3 … [∵ (+ × – = -)]

= – 7

(b) difference is – 10

Solution:-

= -25 – (-15)

= – 25 + 15 … [∵ (- × – = +)]

= -10

(c) sum is 0

Solution:-

= 4 + (-4)

= 4 – 4

= 0

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

Solution:-

= (-5) – (- 13)

= -5 + 13 … [∵ (- × – = +)]

= 8

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

Solution:-

= -25 + 20

= -5

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

Solution:-

= – 6 – (-3)

= – 6 + 3 … [∵ (- × – = +)]

= – 3

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?

Solution:-

From the question, it is given that

Score of team A = -40, 10, 0

Total score obtained by team A = – 40 + 10 + 0

= – 30

Score of team B = 10, 0, -40

Total score obtained by team B = 10 + 0 + (-40)

= 10 + 0 – 40

= – 30

Thus, the score of the both A team and B team is same.

Yes, we can say that we can add integers in any order.

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

(i) (–5) + (– 8) = (– 8) + (…………)

Solution:-

Let us assume the missing integer be x,

Then,

= (–5) + (– 8) = (– 8) + (x)

= – 5 – 8 = – 8 + x

= – 13 = – 8 + x

By sending – 8 from RHS to LHS it becomes 8,

= – 13 + 8 = x

= x = – 5

Now substitute the x value in the blank place,

(–5) + (– 8) = (– 8) + (- 5) … [This equation is in the form of Commutative law of Addition]

(ii) –53 + ………… = –53

Solution:-

Let us assume the missing integer be x,

Then,

= –53 + x = –53

By sending – 53 from LHS to RHS it becomes 53,

= x = -53 + 53

= x = 0

Now substitute the x value in the blank place,

= –53 + 0 = –53 … [This equation is in the form of Closure property of Addition]

(iii) 17 + ………… = 0

Solution:-

Let us assume the missing integer be x,

Then,

= 17 + x = 0

By sending 17 from LHS to RHS it becomes -17,

= x = 0 – 17

= x = – 17

Now substitute the x value in the blank place,

= 17 + (-17) = 0 … [This equation is in the form of Closure property of Addition]

= 17 – 17 = 0

(iv) [13 + (– 12)] + (…………) = 13 + [(–12) + (–7)]

Solution:-

Let us assume the missing integer be x,

Then,

= [13 + (– 12)] + (x) = 13 + [(–12) + (–7)]

= [13 – 12] + (x) = 13 + [–12 –7]

= [1] + (x) = 13 + [-19]

= 1 + (x) = 13 – 19

= 1 + (x) = -6

By sending 1 from LHS to RHS it becomes -1,

= x = -6 – 1

= x = -7

Now substitute the x value in the blank place,

= [13 + (– 12)] + (-7) = 13 + [(–12) + (–7)] … [This equation is in the form of Associative property of Addition]

(v) (– 4) + [15 + (–3)] = [– 4 + 15] +…………

Solution:-

Let us assume the missing integer be x,

Then,

= (– 4) + [15 + (–3)] = [– 4 + 15] + x

= (– 4) + [15 – 3)] = [– 4 + 15] + x

= (-4) + [12] = [11] + x

= 8 = 11 + x

By sending 11 from RHS to LHS it becomes -11,

= 8 – 11 = x

= x = -3

Now substitute the x value in the blank place,

= (– 4) + [15 + (–3)] = [– 4 + 15] + -3 … [This equation is in the form of Associative property of Addition]

Exercise 1.3 Page: 21

1. Find each of the following products:

(a) 3 × (–1)

Solution:-

By the rule of Multiplication of integers,

= 3 × (-1)

= -3 … [∵ (+ × – = -)]

(b) (–1) × 225

Solution:-

By the rule of Multiplication of integers,

= (-1) × 225

= -225 … [∵ (- × + = -)]

(c) (–21) × (–30)

Solution:-

By the rule of Multiplication of integers,

= (-21) × (-30)

= 630 … [∵ (- × – = +)]

(d) (–316) × (–1)

Solution:-

By the rule of Multiplication of integers,

= (-316) × (-1)

= 316 … [∵ (- × – = +)]

(e) (–15) × 0 × (–18)

Solution:-

By the rule of Multiplication of integers,

= (–15) × 0 × (–18)

= 0

∵Any integer is multiplied with zero and the answer is zero itself.

(f) (–12) × (–11) × (10)

Solution:-

By the rule of Multiplication of integers,

= (–12) × (-11) × (10)

First multiply the two numbers having same sign,

= 132 × 10 … [∵ (- × – = +)]

= 1320

(g) 9 × (–3) × (– 6)

Solution:-

By the rule of Multiplication of integers,

= 9 × (-3) × (-6)

First multiply the two numbers having same sign,

= 9 × 18 … [∵ (- × – = +)]

= 162

(h) (–18) × (–5) × (– 4)

Solution:-

By the rule of Multiplication of integers,

= (-18) × (-5) × (-4)

First multiply the two numbers having same sign,

= 90 × -4 … [∵ (- × – = +)]

= – 360 … [∵ (+ × – = -)]

(i) (–1) × (–2) × (–3) × 4

Solution:-

By the rule of Multiplication of integers,

= [(–1) × (–2)] × [(–3) × 4]

= 2 × (-12) … [∵ (- × – = +), (- × + = -)]

= – 24

(j) (–3) × (–6) × (–2) × (–1)

Solution:-

By the rule of Multiplication of integers,

= [(–3) × (–6)] × [(–2) × (–1)]

First multiply the two numbers having same sign,

= 18 × 2 … [∵ (- × – = +)

= 36

2. Verify the following:

(a) 18 × [7 + (–3)] = [18 × 7] + [18 × (–3)]

Solution:-

From the given equation,

Let us consider the Left Hand Side (LHS) first = 18 × [7 + (–3)]

= 18 × [7 – 3]

= 18 × 4

= 72

Now, consider the Right Hand Side (RHS) = [18 × 7] + [18 × (–3)]

= [126] + [-54]

= 126 – 54

= 72

By comparing LHS and RHS,

72 = 72

LHS = RHS

Hence, the given equation is verified.

(b) (–21) × [(– 4) + (– 6)] = [(–21) × (– 4)] + [(–21) × (– 6)]

Solution:-

From the given equation,

Let us consider the Left Hand Side (LHS) first = (–21) × [(– 4) + (– 6)]

= (-21) × [-4 – 6]

= (-21) × [-10]

= 210

Now, consider the Right Hand Side (RHS) = [(–21) × (– 4)] + [(–21) × (– 6)]

= [84] + [126]

= 210

By comparing LHS and RHS,

210 = 210

LHS = RHS

Hence, the given equation is verified.

3. (i) For any integer a, what is (–1) × a equal to?

Solution:-

= (-1) × a = -a

Because, when we multiplied any integer a with -1, then we get additive inverse of that integer.

(ii). Determine the integer whose product with (–1) is

(a) –22

Solution:-

Now, multiply -22 with (-1), we get

= -22 × (-1)

= 22

Because, when we multiplied integer -22 with -1, then we get additive inverse of that integer.

(b) 37

Solution:-

Now, multiply 37 with (-1), we get

= 37 × (-1)

= -37

Because, when we multiplied integer 37 with -1, then we get additive inverse of that integer.

(c) 0

Solution:-

Now, multiply 0 with (-1), we get

= 0 × (-1)

= 0

Because, the product of negative integers and zero give zero only.

4. Starting from (–1) × 5, write various products showing some pattern to show

(–1) × (–1) = 1.

Solution:-

The various products are,

= -1 × 5 = -5

= -1 × 4 = -4

= -1 × 3 = -3

= -1 × 2 = -2

= -1 × 1 = -1

= -1 × 0 = 0

= -1 × -1 = 1

We concluded that the product of one negative integer and one positive integer is negative integer. Then, the product of two negative integers is a positive integer.

5. Find the product, using suitable properties:

(a) 26 × (– 48) + (– 48) × (–36)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

Let, a = -48, b = 26, c = -36

Now,

= 26 × (– 48) + (– 48) × (–36)

= -48 × (26 + (-36)

= -48 × (26 – 36)

= -48 × (-10)

= 480 … [∵ (- × – = +)

(b) 8 × 53 × (–125)

Solution:-

The given equation is in the form of Commutative law of Multiplication.

= a × b = b × a

Then,

= 8 × [53 × (-125)]

= 8 × [(-125) × 53]

= [8 × (-125)] × 53

= [-1000] × 53

= – 53000

(c) 15 × (–25) × (– 4) × (–10)

Solution:-

The given equation is in the form of Commutative law of Multiplication.

= a × b = b × a

Then,

= 15 × [(–25) × (– 4)] × (–10)

= 15 × [100] × (–10)

= 15 × [-1000]

= – 15000

(d) (– 41) × 102

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

= (-41) × (100 + 2)

= (-41) × 100 + (-41) × 2

= – 4100 – 82

= – 4182

(e) 625 × (–35) + (– 625) × 65

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

= 625 × [(-35) + (-65)]

= 625 × [-100]

= – 62500

(f) 7 × (50 – 2)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Subtraction.

= a × (b – c) = (a × b) – (a × c)

= (7 × 50) – (7 × 2)

= 350 – 14

= 336

(g) (–17) × (–29)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

= (-17) × [-30 + 1]

= [(-17) × (-30)] + [(-17) × 1]

= [510] + [-17]

= 493

(h) (–57) × (–19) + 57

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

= (57 × 19) + (57 × 1)

= 57 [19 + 1]

= 57 × 20

= 1140

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:-

From the question, it is given that

Let us take the lowered temperature as negative,

Initial temperature = 40°C

Change in temperature per hour = -5°C

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

∴The final room temperature after 10 hours of freezing process = 40°C + (-50°C)

= -10°C

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?

Solution:-

From the question,

Marks awarded for 1 correct answer = 5

Then,

Total marks awarded for 4 correct answer = 4 × 5 = 20

Marks awarded for 1 wrong answer = -2

Then,

Total marks awarded for 6 wrong answer = 6 × -2 = -12

∴Total score obtained by Mohan = 20 + (-12)

= 20 – 12

= 8

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

Solution:-

From the question,

Marks awarded for 1 correct answer = 5

Then,

Total marks awarded for 5 correct answer = 5 × 5 = 25

Marks awarded for 1 wrong answer = -2

Then,

Total marks awarded for 5 wrong answer = 5 × -2 = -10

∴Total score obtained by Reshma = 25 + (-10)

= 25 – 10

= 15

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

Solution:-

From the question,

Marks awarded for 1 correct answer = 5

Then,

Total marks awarded for 2 correct answer = 2 × 5 = 10

Marks awarded for 1 wrong answer = -2

Then,

Total marks awarded for 5 wrong answer = 5 × -2 = -10

Marks awarded for questions not attempted is = 0

∴Total score obtained by Heena = 10 + (-10)

= 10 – 10

= 0

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?

Solution:-

We denote profit in positive integer and loss in negative integer,

From the question,

Cement company earns a profit on selling 1 bag of white cement = ₹ 8 per bag

Then,

Cement company earns a profit on selling 3000 bags of white cement = 3000 × ₹ 8

= ₹ 24000

Loss on selling 1 bag of grey cement = – ₹ 5 per bag

Then,

Loss on selling 5000 bags of grey cement = 5000 × – ₹ 5

= – ₹ 25000

Total loss or profit earned by the cement company = profit + loss

= 24000 + (-25000)

= – ₹1000

Thus, a loss of ₹ 1000 will be incurred by the company.

(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:-

We denote profit in positive integer and loss in negative integer,

From the question,

Cement company earns a profit on selling 1 bag of white cement = ₹ 8 per bag

Let the number of white cement bags be x.

Then,

Cement company earns a profit on selling x bags of white cement = (x) × ₹ 8

= ₹ 8x

Loss on selling 1 bag of grey cement = – ₹ 5 per bag

Then,

Loss on selling 6400 bags of grey cement = 6400 × – ₹ 5

= – ₹ 32000

According to the question,

Company must sell to have neither profit nor loss.

= Profit + loss = 0

= 8x + (-32000) =0

By sending -32000 from LHS to RHS it becomes 32000

= 8x = 32000

= x = 32000/8

= x = 4000

Hence, the 4000 bags of white cement have neither profit nor loss.

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

(a) (–3) × _____ = 27

Solution:-

Let us assume the missing integer be x,

Then,

= (–3) × (x) = 27

= x = – (27/3)

= x = -9

Let us substitute the value of x in the place of blank,

= (–3) × (-9) = 27 … [∵ (- × – = +)]

(b) 5 × _____ = –35

Solution:-

Let us assume the missing integer be x,

Then,

= (5) × (x) = -35

= x = – (-35/5)

= x = -7

Let us substitute the value of x in the place of blank,

= (5) × (-7) = -35 … [∵ (+ × – = -)]

(c) _____ × (– 8) = –56

Solution:-

Let us assume the missing integer be x,

Then,

= (x) × (-8) = -56

= x = (-56/-8)

= x = 7

Let us substitute the value of x in the place of blank,

= (7) × (-8) = -56 … [∵ (+ × – = -)]

(d) _____ × (–12) = 132

Solution:-

Let us assume the missing integer be x,

Then,

= (x) × (-12) = 132

= x = – (132/12)

= x = – 11

Let us substitute the value of x in the place of blank,

= (–11) × (-12) = 132 … [∵ (- × – = +)]

Exercise 1.4 Page: 26

1. Evaluate each of the following:

(a) (–30) ÷ 10

Solution:-

= (–30) ÷ 10

= – 3

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(b) 50 ÷ (–5)

Solution:-

= (50) ÷ (-5)

= – 10

When we divide a positive integer by a negative integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(c) (–36) ÷ (–9)

Solution:-

= (-36) ÷ (-9)

= 4

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

(d) (– 49) ÷ (49)

Solution:-

= (–49) ÷ 49

= – 1

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(e) 13 ÷ [(–2) + 1]

Solution:-

= 13 ÷ [(–2) + 1]

= 13 ÷ (-1)

= – 13

When we divide a positive integer by a negative integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(f) 0 ÷ (–12)

Solution:-

= 0 ÷ (-12)

= 0

When we divide zero by a negative integer gives zero.

(g) (–31) ÷ [(–30) + (–1)]

Solution:-

= (–31) ÷ [(–30) + (–1)]

= (-31) ÷ [-30 – 1]

= (-31) ÷ (-31)

= 1

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

(h) [(–36) ÷ 12] ÷ 3

Solution:-

First we have to solve the integers with in the bracket,

= [(–36) ÷ 12]

= (–36) ÷ 12

= – 3

Then,

= (-3) ÷ 3

= -1

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(i) [(– 6) + 5)] ÷ [(–2) + 1]

Solution:-

The given question can be written as,

= [-1] ÷ [-1]

= 1

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

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

Solution:-

From the question, a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c)

Given, a = 12, b = – 4, c = 2

Now, consider LHS = a ÷ (b + c)

= 12 ÷ (-4 + 2)

= 12 ÷ (-2)

= -6

When we divide a positive integer by a negative integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

Then, consider RHS = (a ÷ b) + (a ÷ c)

= (12 ÷ (-4)) + (12 ÷ 2)

= (-3) + (6)

= 3

By comparing LHS and RHS

= -6 ≠ 3

= LHS ≠ RHS

Hence, the given values are verified.

(b) a = (–10), b = 1, c = 1

Solution:-

From the question, a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c)

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

Now, consider LHS = a ÷ (b + c)

= (-10) ÷ (1 + 1)

= (-10) ÷ (2)

= -5

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

Then, consider RHS = (a ÷ b) + (a ÷ c)

= ((-10) ÷ (1)) + ((-10) ÷ 1)

= (-10) + (-10)

= -10 – 10

= -20

By comparing LHS and RHS

= -5 ≠ -20

= LHS ≠ RHS

Hence, the given values are verified.

3. Fill in the blanks:

(a) 369 ÷ _____ = 369

Solution:-

Let us assume the missing integer be x,

Then,

= 369 ÷ x = 369

= x = (369/369)

= x = 1

Now, put the valve of x in the blank.

= 369 ÷ 1 = 369

(b) (–75) ÷ _____ = –1

Solution:-

Let us assume the missing integer be x,

Then,

= (-75) ÷ x = -1

= x = (-75/-1)

= x = 75

Now, put the valve of x in the blank.

= (-75) ÷ 75 = -1

(c) (–206) ÷ _____ = 1

Solution:-

Let us assume the missing integer be x,

Then,

= (-206) ÷ x = 1

= x = (-206/1)

= x = -206

Now, put the valve of x in the blank.

= (-206) ÷ (-206) = 1

(d) – 87 ÷ _____ = 87

Solution:-

Let us assume the missing integer be x,

Then,

= (-87) ÷ x = 87

= x = (-87)/87

= x = -1

Now, put the valve of x in the blank.

= (-87) ÷ (-1) = 87

(e) _____ ÷ 1 = – 87

Solution:-

Let us assume the missing integer be x,

Then,

= (x) ÷ 1 = -87

= x = (-87) × 1

= x = -87

Now, put the valve of x in the blank.

= (-87) ÷ 1 = -87

(f) _____ ÷ 48 = –1

Solution:-

Let us assume the missing integer be x,

Then,

= (x) ÷ 48 = -1

= x = (-1) × 48

= x = -48

Now, put the valve of x in the blank.

= (-48) ÷ 48 = -1

(g) 20 ÷ _____ = –2

Solution:-

Let us assume the missing integer be x,

Then,

= 20 ÷ x = -2

= x = (20)/ (-2)

= x = -10

Now, put the valve of x in the blank.

= (20) ÷ (-10) = -2

(h) _____ ÷ (4) = –3

Solution:-

Let us assume the missing integer be x,

Then,

= (x) ÷ 4 = -3

= x = (-3) × 4

= x = -12

Now, put the valve of x in the blank.

= (-12) ÷ 4 = -3

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

Solution:-

(i) (15, -5)

Because, 15 ÷ (–5) = (–3)

(ii) (-15, 5)

Because, (-15) ÷ (5) = (–3)

(iii) (18, -6)

Because, 18 ÷ (–6) = (–3)

(iv) (-18, 6)

Because, (-18) ÷ 6 = (–3)

(v) (21, -7)

Because, 21 ÷ (–7) = (–3)

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?

Solution:-

From the question is given that,

Temperature at the beginning i.e., at 12 noon = 10°C

Rate of change of temperature = – 2°C per hour

Then,

Temperature at 1 PM = 10 + (-2) = 10 – 2 = 8°C

Temperature at 2 PM = 8 + (-2) = 8 – 2 = 6°C

Temperature at 3 PM = 6 + (-2) = 6 – 2 = 4°C

Temperature at 4 PM = 4 + (-2) = 4 – 2 = 2°C

Temperature at 5 PM = 2 + (-2) = 2 – 2 = 0°C

Temperature at 6 PM = 0 + (-2) = 0 – 2 = -2°C

Temperature at 7 PM = -2 + (-2) = -2 -2 = -4°C

Temperature at 8 PM = -4 + (-2) = -4 – 2 = -6°C

Temperature at 9 PM = -6 + (-2) = -6 – 2 = -8°C

∴At 9 PM the temperature will be 8°C below zero

Then,

The temperature at mid-night i.e., at 12 AM

Change in temperature in 12 hours = -2°C × 12 = – 24°C

So, at midnight temperature will be = 10 + (-24)

= – 14°C

So, at midnight temperature will be 14°C below 0.

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:-

From the question,

Marks awarded for 1 correct answer = + 3

Marks awarded for 1 wrong answer = -2

(i) Radhika scored 20 marks

Then,

Total marks awarded for 12 correct answers = 12 × 3 = 36

Marks awarded for incorrect answers = Total score – Total marks awarded for 12 correct

Answers

= 20 – 36

= – 16

So, the number of incorrect answers made by Radhika = (-16) ÷ (-2)

= 8

(ii) Mohini scored -5 marks

Then,

Total marks awarded for 7 correct answers = 7 × 3 = 21

Marks awarded for incorrect answers = Total score – Total marks awarded for 12 correct

Answers

= – 5 – 21

= – 26

So, the number of incorrect answers made by Mohini = (-26) ÷ (-2)

= 13

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.

Solution:-

From the question,

The initial height of the elevator = 10 m

Final depth of elevator = – 350 m … [∵distance descended is denoted by a negative

integer]

The total distance to descended by the elevator = (-350) – (10)

= – 360 m

Then,

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

So, time taken by the elevator to descend – 360 m = (-360) ÷ (-60)

= 60 minutes

= 1 hour