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

∵ If any integer is multiplied by zero, 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 the 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 the 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 the 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 the 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

When we multiply any integer a with -1, then we get the additive inverse of that integer.

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

(a) –22

Solution:-

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

= -22 × (-1)

= 22

When we multiply integer -22 with -1, then we get the additive inverse of that integer.

(b) 37

Solution:-

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

= 37 × (-1)

= -37

When we multiply integer 37 with -1, then we get the additive inverse of that integer.

(c) 0

Solution:-

Now, multiply 0 by (-1), and we get

= 0 × (-1)

= 0

Because the product of negative integers and zero gives 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 a 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 the 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 the 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 the 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 the 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 the 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 the 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 the 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 the 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,

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 a positive integer and loss in a negative integer,

From the question,

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

Then,

The 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 a positive integer and loss in a negative integer,

From the question,

The 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,

The 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 the 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 the 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 the blank.

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