

EXERCISE 8.1

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1. Write the following using numbers, literals and signs of basic operations. State what each letter represents:

- (i) The diameter of a circle is twice its radius.
- (ii) The area of a rectangle is the product of its length and breadth.
- (iii) The selling price equals the sum of the cost price and the profit.
- (iv) The total amount equals the sum of the principal and the interest.
- (v) The perimeter of a rectangle is two times the sum of its length and breadth.
- (vi) The perimeter of a square is four times its side.

Solution:

(i) Consider d as the diameter and r as the radius of the circle
Hence, we get $d = 2r$.

(ii) Consider A as the area, l as the length and b as the breadth of a rectangle
Hence, we get $A = l \times b$.

(iii) Consider $S.P$ as the selling price, $C.P$ as the cost price and P as the profit
Hence, we get $S.P = C.P + P$

(iv) Consider A as the amount, P as the principal and I as the interest
Hence, we get $A = P + I$

(v) Consider P as the perimeter, l as the length and b as the breadth of a rectangle
Hence, $P = 2(l + b)$

(vi) Consider P as the perimeter and a as the side of a square
Hence, $P = 4a$

2. Write the following using numbers, literals and signs of basic operations:

- (i) The sum of 6 and x .
- (ii) 3 more than a number y .
- (iii) One-third of a number x .
- (iv) One-half of the sum of number x and y .
- (v) Number y less than a number 7.
- (vi) 7 taken away from x .
- (vii) 2 less than the quotient of x and y .
- (viii) 4 times x taken away from one-third of y .
- (ix) Quotient of x by 3 is multiplied by y .

Solution:

(i) The sum of 6 and x can be written as $6 + x$.

(ii) 3 more than a number y can be written as $y + 3$.

(iii) One-third of a number x can be written as $x/3$.

(iv) One-half of the sum of number x and y can be written as $(x + y)/ 2$.

- (v) Number y less than a number 7 can be written as $7 - y$.
- (vi) 7 taken away from x can be written as $x - 7$.
- (vii) 2 less than the quotient of x and y can be written as $x/y - 2$.
- (viii) 4 times x taken away from one-third of y can be written as $y/3 - 4x$.
- (ix) Quotient of x by 3 is multiplied by y can be written as $xy/3$.

3. Think of a number. Multiply by 5. Add 6 to the result. Subtract y from this result. What is the result?

Solution:

Consider x as the number.

Multiplying the number by $5 = 5x$

Again add 6 to the number $= 5x + 6$

By subtracting y from the above equation $= 5x + 6 - y$.

Hence, the result is $5x + 6 - y$.

4. The number of rooms on the ground floor of a building is 12 less than the twice of the number of rooms on first floor. If the first floor has x rooms, how many rooms does the ground floor has?

Solution:

Consider y as the number of rooms on the ground floor

We know that

The number of rooms on the first floor $= x$

It is given that number of rooms on the ground floor of a building is 12 less than the twice of the number of rooms on first floor

So we get

$$y = 2x - 12$$

Hence, the rooms on the ground floor is $y = 2x - 12$.

5. Binny spend Rs a daily and saves Rs b per week. What is her income for two weeks?

Solution:

Amount spent by Binny $=$ Rs a

Amount saved by Binny $=$ Rs b

Amount spent by Binny in one week $= 7a$

So the total income for one week $=$ Amount spent by Binny in one week $+$ Amount saved by Binny

Substituting the values

Total income for one week $= 7a + b$

We get Binny's income for 2 weeks $= 2(7a + b) =$ Rs $14a + 2b$

Hence, the income of Binny for two weeks is Rs $14a + 2b$.

6. Rahul scores 80 marks in English and x marks in Hindi. What is his total score in the two subjects?

Solution:

Marks scored by Rahul in English = 80
Marks scored by Rahul in Hindi = x
So the total scores in the two subjects = $x + 80$

Hence, the total score of Rahul in two subjects is $x + 80$.

7. Rohit covers x centimetres in one step. How much distance does he cover in y steps?

Solution:

Distance covered by Rohit in one step = x cm
So the distance covered by Rohit in y steps = xy cm

Hence, Rohit covers xy cm in y steps.

8. One apple weighs 75 grams and one orange weighs 40 grams. Determine the weight of x apples and y oranges.

Solution:

Weight of one apple = 75 g
Weight of one orange = 40 g
So the weight of x apples = $75x$ g
So the weight of y oranges = $40y$ g
We get the weight of x apples and y oranges = $(75x + 40y)$ g

Hence, the weight of x apples and y oranges is $(75x + 40y)$ g.

9. One pencil costs Rs 2 and one fountain pen costs Rs 15. What is the cost of x pencils and y fountain pens?

Solution:

Cost of one pencil = Rs 2
Cost of one fountain pen = Rs 15
Cost of x pencils = $2x$
Cost of y fountain pens = $15y$
So the cost of x pencils and y fountain pens = Rs $(2x + 15y)$

Hence, the cost of x pencils and y fountain pens is Rs $(2x + 15y)$.

EXERCISE 8.2

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1. Write each of the following products in exponential form:

- (i) $a \times a \times a \times a \times \dots \times a$ 15 times
- (ii) $8 \times b \times b \times b \times a \times a \times a \times a$
- (iii) $5 \times a \times a \times a \times b \times b \times c \times c \times c$
- (iv) $7 \times a \times a \times a \dots \times a$ 8 times $\times b \times b \times b \times \dots \times b$ 5 times
- (v) $4 \times a \times a \times a \dots \times a$ 5 times $\times b \times b \times b \dots \times b$ 12 times $\times c \times c \dots \times c$ 15 times

Solution:

- (i) $a \times a \times a \times a \times \dots \times a$ 15 times is written in exponential form as a^{15} .
- (ii) $8 \times b \times b \times b \times a \times a \times a \times a$ is written in exponential form as $8a^4b^3$.
- (iii) $5 \times a \times a \times a \times b \times b \times c \times c \times c$ is written in exponential form as $5a^3b^2c^3$.
- (iv) $7 \times a \times a \times a \dots \times a$ 8 times $\times b \times b \times b \times \dots \times b$ 5 times is written in exponential form as $7a^8b^5$.
- (v) $4 \times a \times a \times a \dots \times a$ 5 times $\times b \times b \times b \dots \times b$ 12 times $\times c \times c \dots \times c$ 15 times is written in exponential form as $4a^5b^{12}c^{15}$.

2. Write each of the following in the product form:

- (i) $a^2 b^5$
- (ii) $8x^3$
- (iii) $7a^3b^4$
- (iv) $15 a^9 b^8 c^6$
- (v) $30x^4y^4z^5$
- (vi) $43p^{10}q^5r^{15}$
- (vii) $17p^{12}q^{20}$

Solution:

- (i) $a^2 b^5$ is written in the product form as $a \times a \times b \times b \times b \times b \times b$.
- (ii) $8x^3$ is written in the product form as $8 \times x \times x \times x$.
- (iii) $7a^3b^4$ is written in the product form as $7 \times a \times a \times a \times b \times b \times b \times b$.
- (iv) $15 a^9 b^8 c^6$ is written in the product form as $15 \times a \times a \dots \times a$ 9 times $\times b \times b \times \dots \times b$ 8 times $\times c \times c \times \dots \times c$ 6 times.
- (v) $30x^4y^4z^5$ is written in the product form as $30 \times x \times x \times x \times x \times y \times y \times y \times y \times z \times z \times z \times z \times z$.
- (vi) $43p^{10}q^5r^{15}$ is written in the product form as $43 \times p \times p \dots \times p$ 10 times $\times q \times q \dots \times q$ 5 times $\times r \times r \times \dots \times r$ 15 times.
- (vii) $17p^{12}q^{20}$ is written in the product form as $17 \times p \times p \dots \times p$ 12 times $\times q \times q \times \dots \times q$ 20 times.

3. Write down each of the following in exponential form:

- (i) $4a^3 \times 6ab^2 \times c^2$
- (ii) $5xy \times 3x^2y \times 7y^2$
- (iii) $a^3 \times 3ab^2 \times 2a^2b^2$

Solution:

(i) $4a^3 \times 6ab^2 \times c^2$ is written in exponential form as $24a^4b^2c^2$.

(ii) $5xy \times 3x^2y \times 7y^2$ is written in exponential form as $105x^3y^4$.

(iii) $a^3 \times 3ab^2 \times 2a^2b^2$ is written in exponential form as $6a^6b^4$.

4. The number of bacteria in a culture is x now. It becomes square of itself after one week. What will be its number after two weeks?

Solution:

Number of bacteria in a culture = x

It is given that

Number of bacteria becomes square of itself in one week = x^2

So the number of bacteria after two weeks = $(x^2)^2 = x^4$

Hence, the number of bacteria after two weeks is x^4 .

5. The area of a rectangle is given by the product of its length and breadth. The length of a rectangle is two-third of its breadth. Find its area if its breadth is x cm.

Solution:

It is given that

Area of rectangle = $l \times b$

Breadth = x cm

Length = $(2/3)x$ cm

So the area of the rectangle = $(2/3)x \times x = 2/3 x^2 \text{ cm}^2$

Hence, the area of rectangle is $(2/3)x^2 \text{ cm}^2$.

6. If there are x rows of chairs and each row contains x^2 chairs. Determine the total number of chairs.

Solution:

Number of rows of chairs = x

Each row contains = x^2 chairs

So the total number of chairs = number of rows of chairs \times chairs in each row

We get

Total number of chairs = $x \times x^2 = x^3$

Hence, the total number of chairs is x^3 .

OBJECTIVE TYPE QUESTIONS

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Mark the correct alternative in each of the following:

1. 5 more than twice a number x is written as

- (a) $5 + x + 2$
- (b) $2x + 5$
- (c) $2x - 5$
- (d) $5x + 2$

Solution:

The option (b) is correct answer.

5 more than twice a number x is written as $2x + 5$.**2. The quotient of x by 2 is added to 5 is written as**

- (a) $x/2 + 5$
- (b) $2/x+5$
- (c) $(x+2)/ 5$
- (d) $x/ (2+5)$

Solution:

The option (a) is correct answer.

The quotient of x by 2 is added to 5 is written as $x/2 + 5$.**3. The quotient of x by 3 is multiplied by y is written as**

- (a) $x/3y$
- (b) $3x/y$
- (c) $3y/x$
- (d) $xy/3$

Solution:

The option (d) is correct answer.

It can be written as

$$x/3 \times y = xy/3$$

4. 9 taken away from the sum of x and y is

- (a) $x + y - 9$
- (b) $9 - (x+y)$
- (c) $x+y/ 9$
- (d) $9/ x+y$

Solution:

The option (a) is correct answer.

9 taken away from the sum of x and y is $x + y - 9$.**5. The quotient of x by y added to the product of x and y is written as**

- (a) $x/y + xy$
- (b) $y/x + xy$
- (c) $xy+x/ y$
- (d) $xy+y/ x$

Solution:

The option (a) is correct answer.

The quotient of x by y added to the product of x and y is written as $x/y + xy$.

6. $a^2b^3 \times 2ab^2$ is equal to

(a) $2a^3b^4$

(b) $2a^3b^5$

(c) $2ab$

(d) a^3b^5

Solution:

The option (b) is correct answer.

It can be written as

$$a^2b^3 \times 2ab^2 = 2a^2 \times a \times b^3 \times b^2 = 2a^3b^5.$$

7. $4a^2b^3 \times 3ab^2 \times 5a^3b$ is equal to

(a) $60a^3b^5$

(b) $60a^6b^5$

(c) $60a^6b^6$

(d) a^6b^6

Solution:

The option (c) is correct answer.

It can be written as

$$4a^2b^3 \times 3ab^2 \times 5a^3b = 4 \times 3 \times 5 \times a^2 \times a \times a^3 \times b^3 \times b^2 \times b = 60a^6b^6$$

8. If $2x^2y$ and $3xy^2$ denote the length and breadth of a rectangle, then its area is

(a) $6xy$

(b) $6x^2y^2$

(c) $6x^3y^3$

(d) x^3y^3

Solution:

The option (c) is correct answer.

We know that area of a rectangle = length \times breadth

By substituting the values

$$\text{Area} = 2x^2y \times 3xy^2 = 6x^3y^3$$

9. In a room there are x^2 rows of chairs and each row contains $2x^2$ chairs. The total number of chairs in the room is

(a) $2x^3$

(b) $2x^4$

(c) x^4

(d) $x^4/2$

Solution:

The option (b) is correct answer.

We know that

Total number of chairs in the room = Number of rows \times Number of chairs

By substituting the values

Total number of chairs in the room = $x^2 \times 2x^2 = 2x^4$

10. $a^3 \times 2a^2b \times 3ab^5$ is equal to

(a) a^6b^6

(b) $23a^6b^6$

(c) $6a^6b^6$

(d) None of these

Solution:

The option (c) is correct answer.

It can be written as

$$a^3 \times 2a^2b \times 3ab^5 = 2 \times 3a^3 \times a^2 \times a \times b \times b^5 = 6a^6b^6$$

