

**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)  $4 \times a \times a \times \dots \times a$  5 times  $\times b \times b \times \dots \times b$  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)  $4 \times a \times a \times \dots \times a$  5 times  $\times b \times b \times \dots \times b$  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)  $15 a^9b^8c^6$   
 (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)  $15 a^9b^8c^6$  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 =  $\frac{2}{3}x$  cm

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

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

**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 numbers 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, the 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 two 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

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

