CHAPTER 11

VI-MATHEMATICS-NCERT-2024-25

11. ALGEBRA (Notes)

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1. **Variable**: A variable takes on different values, its value is not fixed.
2. We may use any letter n, l, m, p, x, y, z, etc. to show a variable.
3. A variable allows us to express relations in any practical situation.
4. **Expression**: Using different operations we can form expressions with variables.

   $Ex: x+5,\ 2y-7,\ 5m+\frac{1}{2},\ \frac{n}{3}-15, \ldots$

EXERCISE 11.1

1. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

(a) A pattern of letter T as 

Sol: To make a T , 2 match sticks required.

Rule =2×n=2n (n= number of T)

(b) A pattern of letter Z as 

Sol: : To make a Z , 3 match sticks required.

Rule =3×n=3n (n= number of Z)

(c) A pattern of letter U as 

Sol: : To make a Z , 3 match sticks required.

Rule =3×n=3n (n= number of Z)

(d) A pattern of letter V as 

Sol: : To make a V , 3 match sticks required.

Rule =3×n=3n (n= number of V)

(e) A pattern of letter E as 

Sol: To make a E , 5 match sticks required. 

Rule =5×n=5n (n= number of E)

(f) A pattern of letter S as 

Sol: : To make a S , 5 match sticks required.

Rule =5×n=3n (n= number of S)

(g) A pattern of letter A as

Sol: To make a A , 6 match sticks required.

Rule =6×n=6n (n= number of Z)

2. We already know the rule for the pattern of letters L, C and F. Some of the letters from Q.1 (given above) give us the same rule as that given by L. Which are these? Why does this happen?

Sol: (a) T and (d) V; The number of matchsticks required in each of them is 2

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3. Cadets are marching in a parade. There are 5 cadets in a row. What is the rule which gives the number of cadets, given the number of rows? (Use n for the number of rows.)

Sol: Number of cadets in a row =5

Number of rows=n

Total number of cadets=5×n=5n

4. If there are 50 mangoes in a box, how will you write the total number of mangoes in terms of the number of boxes? (Use b for the number of boxes.)

Sol: Number of mangoes in a box=50

Number of boxes=b

The total number of mangoes=50×b=50b

5. The teacher distributes 5 pencils per student. Can you tell how many pencils are needed, given the number of students? (Use s for the number of students.)

Sol: Number of pencils distributed per student=5

Number of students=s

Total number of pencils needed=5×s=5s

6. A bird flies 1 kilometer in one minute. Can you express the distance covered by the bird in terms of its flying time in minutes? (Use t for flying time in minutes.)

Sol: A bird flies in 1 minute=1 km

The distance covered by the bird in t minutes=t×1 km=t km

7. Radha is drawing a dot Rangoli (a beautiful pattern of lines joining dots) with chalk powder. She has 9 dots in a row. How many dots will her Rangoli have for r rows? How many dots are there if there are 8 rows? If there are 10 rows?

Sol: Number of dots in a row=9

Number of dots in **r** rows =9×r=9r

Number of dots in 8 rows=9×8=72

Number of dots in 10 rows=9×10=90

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8. Leela is Radha's younger sister. Leela is 4 years younger than Radha. Can you write Leela's age in terms of Radha's age? Take Radha's age to be x years.

Sol: Radha's age$=x$ years

Leela's age$=(x-4)$ years

9. Mother has made laddus. She gives some laddus to guests and family members; still 5 laddus remain. If the number of laddus mother gave away is l, how many laddus did she make?

Sol: Number of laddus given to guests and family members $=l$

Number of remaining laddus$=5$

Total number of laddus made by mother$=l+5$

10. Oranges are to be transferred from larger boxes into smaller boxes. When a large box is emptied, the oranges from it fill two smaller boxes and still 10 oranges remain outside. If the number of oranges in a small box are taken to be x, what is the number of oranges in the larger box?

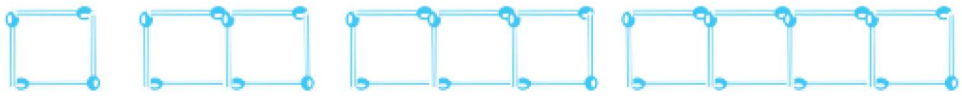
Sol: The number of oranges in the small box$=x$

The number of oranges in two smaller boxes$=2x$

Remaining oranges$=10$

The number of oranges in the larger box$=2x+10$

11. (a) Look at the following matchstick pattern of squares (Fig 11.6). The squares are not separate. Two neighbouring squares have a common matchstick. Observe the patterns and find the rule that gives the number of matchsticks in terms of the number of squares. (Hint : If you remove the vertical stick at the end, you will get a pattern of Cs.)



(a) (b) (c) (d)

Sol: Number of sticks in (a) $=3\times1+1$

Number of sticks in (b)$=3\times2+1$

Number of sticks in (c)$=3\times3+1$

Number of sticks in (d)$=3\times4+1$

If number of squares$=n$

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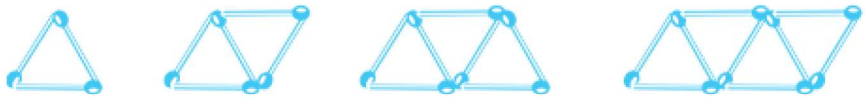
Then the rule for the pattern=3×n+1=3n+1

(b) Fig 11.7 gives a matchstick pattern of triangles. As in Exercise 11 (a) above, find the general rule that gives the number of matchsticks in terms of the number of triangles.



(a) (b) (c) (d)

Sol: Number of sticks in (a) =2×1+1

Number of sticks in (b)=2×2+1

Number of sticks in (c)=2×3+1

Number of sticks in (d)=2×4+1

If number of triangles=n

Then the rule for the pattern=2×n+1=2n+1

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