Chapter 7
Simple Patterns

PATTERNS IN COUNTING OF UNIT SQUARES

Let the first figure be a unit square. Count the number of unit squares in each figure given below. Discover the pattern and then find the number of unit squares in the figure VII.

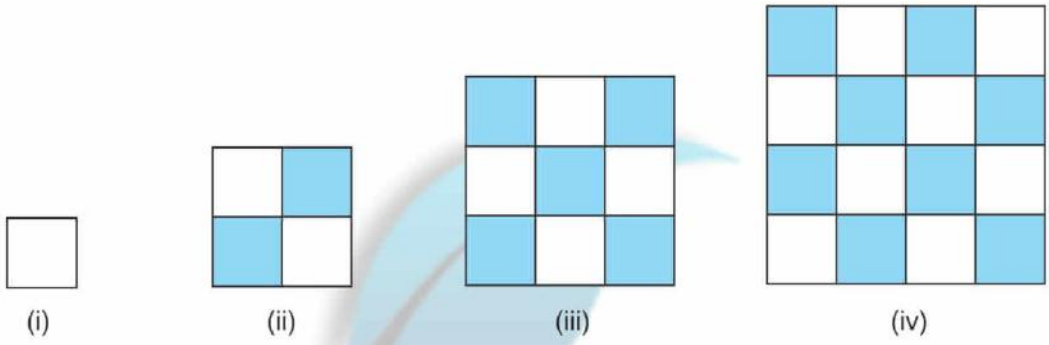

Figure number	Number of unit squares	Pattern
(i)	1	1×1
(ii)	4	2×2
(iii)	9	3×3
(iv)	16	4×4

$\therefore$ The figure VII will have 7×7 or 49 unit squares.

THE PATTERNS IN COUNTING OF RECTANGLES

Look at the following figures. Count the number of rectangles in each figure. Discover the pattern and then find the number of rectangles in the figure VIII.

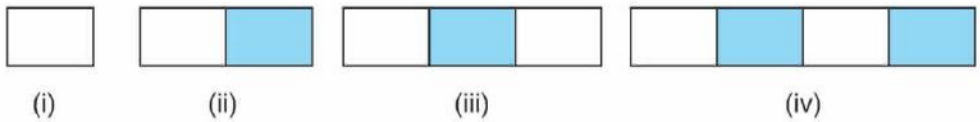

Figure number	Number of rectangles	Pattern
(i)	1	1
(ii)	3	1 + 2
(iii)	6	1 + 2 + 3
(iv)	10	1 + 2 + 3 + 4

∴ The figure VIII will have 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 or 36 rectangles.

PATTERN IN TRIANGULAR NUMBERS

Count the number of dots in each of the following triangles and write the numbers corresponding to each triangle:

The numbers thus obtained are:

1 3 6 10 15 21

These numbers are called triangular numbers.

These triangular numbers can be written as:

1 = 1
3 = 1 + 2
6 = 1 + 2 + 3
10 = 1 + 2 + 3 + 4
15 = 1 + 2 + 3 + 4 + 5
21 = 1 + 2 + 3 + 4 + 5 + 6

Can you form the next two triangular numbers ?

.....

.....

PATTERNS IN SEQUENCE OF NUMBERS

Discover the pattern in each and write next two numbers.

(a) 4, 7, 13, 22, ..., ...

The numbers in the series are increased by multiples of 3, i.e.,

4 + 3 = 7; 7 + 6 = 13; 13 + 9 = 22; 22 + 12 = 34; 34 + 15 = 49

∴ Next two numbers are 34 and 49.

(b) 2, 3, 5, 8, 13, ..., ...

Each number is the sum of the two preceding numbers.

∴ Next two numbers are 21 and 34.

PATTERNS IN MULTIPLES OF NUMBERS ENDING IN 9

Let us perform the following activity.

Activity 1 :

Step 1. Write1.

Step 2. Add 2 and write the sum just below it.

Step 3. Repeat step 2 until you reach at 19.

Step 4. Make sure that the following column of numbers is obtained:

1
3
5
7
9
11
13
15
17
19

Step 5. Write 0 just at the right of 19.

Step 6. Start writing up 1, 2, 3, ..., 9 above 0.

Step 7. Make sure that finally the following column of numbers is obtained:

19
38
57
76
95
114
133
152
171
190

Step 8. Are the above numbers multiples of 19 ?

The next activity is quite similar to **Activity 1**.

Activity 2 :

Step 1. Write 2.

Step 2. Add 3 and write the sum just below it.

Step 3. Repeat Step 2 until we reach at 29.

Step 4. Write 0 just at the right of 29.

Step 5. Perform the Steps 6 and 7 of **Activity 1**.

Step 6. Are the numbers multiples of 29 ?

Observe the activities 1 and 2 carefully and answer the following questions:

1. In what way the starting number of Step 1 and the number added in Step 2 are related ?

   _____

2. If we have to write the multiples of 39, what should be our starting number and what should be our ending number ? _____

3. If we have to write the multiples of 49, what should be our starting number and what should be our ending number ? _____

Activity 3 : Use above method to write the multiples of 9 and answer the following questions:

1. Can you use this method for writing the multiples of numbers not ending in 9?

   _____

2. Can you use this method for writing the multiples of 3-digit numbers ending in 9?

   _____

Activity 4 : Perform similar activities to write the first ten multiples of 49 and 59 and verify that the method really works.

Testing Time 7.1

1. Identify the pattern and fill in the blanks :

(a)
$9 \times 9 + 7 = 88$
$98 \times 9 + 6 = 888$
$987 \times 9 + 5 =$ .....
$9876 \times 9 + 4 =$ .....

(b)
$37 \times 3 = 111$
$37 \times 6 = 222$
$37 \times 9 = 333$
$37 \times 12 = 444$
$37 \times 15 =$ .....
$37 \times 18 =$ .....

2. Look at the pattern in the pair of numbers given below and write the next three number pairs in each:

(a) (5, 10); (10, 15); (15, 20); (20, 25); ....., ..., ...

(b) (1, 4); (2, 6); (3, 8); (4, 10); ....., ..., ...

(c) (1, 2); (2, 5); (3, 8); (4, 11); ....., ..., ...

3. Observe the following pattern and write the next three steps:

(a)
$1 \times 8 + 1 = 9$
$12 \times 8 + 2 = 98$
$123 \times 8 + 3 = 987$
.....
.....
.....

(b)
$(9 \times 1) - 1 = 8$
$(9 \times 21) - 1 = 188$
$(9 \times 321) - 1 = 2888$
.....
.....
.....

(c)
$(9 \times 1) + 1 = 10$
$(9 \times 10) + 10 = 100$
$(9 \times 100) + 100 = 1000$
.....
.....
.....

(d)
$(9 \times 1) + 2 = 11$
$(9 \times 12) + 3 = 111$
$(9 \times 123) + 4 = 1111$
.....
.....
.....

4. Discover the pattern in each and extend it to three more places:

(a) 3, 12, 21, 30, ..., ..., ...

(b) 4, 8, 16, 32, ..., ..., ...

(c) 20, 50, 110, 230, ..., ..., ...

(d) 1, 4, 9, 16, 25, ..., ..., ...

(e) 64, 32, 16, ..., ..., ...