

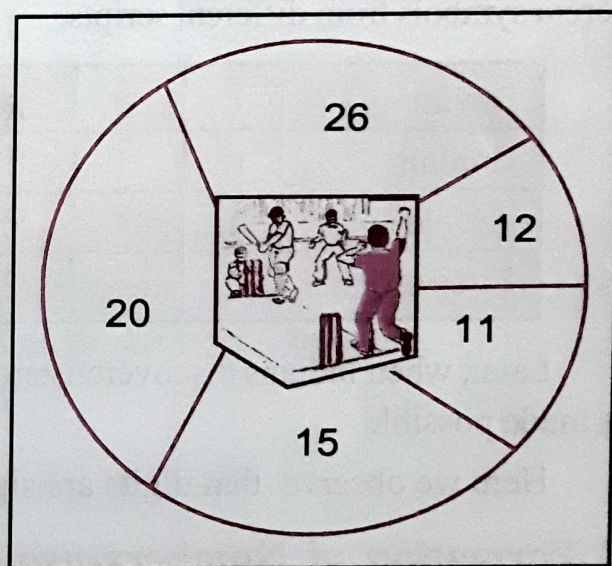


- Differentiate between number and digit
- Use of digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and formation of number by Place value system.
- Natural Numbers
- Knowledge of Number line and representing Natural Number on it.
- Perception of Predecessor and Successor of Numbers.

1.1 Introduction

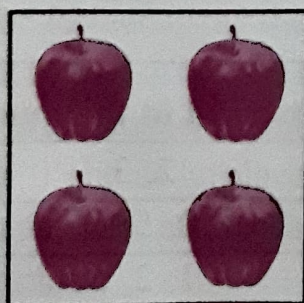
You have learnt to count objects. In our daily life we come across many tasks when we need to count certain things e.g., counting the number of your classmates; in cricket match, counting the number of runs scored by the Indian team; counting the total marks obtained in annual examination etc., thus, there are many other fields of work where we feel the need of counting objects, we use numbers which are known as counting numbers; also known as '**Natural Numbers**'.

We will start this unit, by discussing the symbols used for writing Natural Numbers and after that we will learn about certain characteristics of natural numbers.



1.2 Numbers and Digits

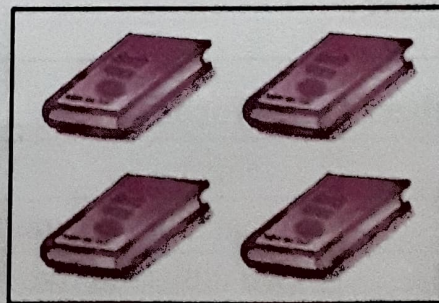
Observe the following pictures



Picture 1



Picture 2



Picture 3

Picture 1 - Tell the number of apples ?

Picture 2 - Tell the number of balls ?

Picture 3 - Tell the number of books ?

We find that in every picture there are four objects. The number four is denoted by symbol '4', that itself is a digit. Similarly the number five is denoted by the digit 5 and the number seven is denoted by the number 7. 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are digits, with the help of these digits other numbers are formed.

Digits or group of digit which are used to express the quantity of an object is called number.

Digits are the symbols which represent a number.

➔ **Facts: from the beginning to different civilizations symbols are developed for numbers from 1 to 9.**

Observe the following table, where Numbers from one to nine are depicted using different symbols from different scripts.

Devanagari	१	२	३	४	५	६	७	८	९
Roman	I	II	III	IV	V	VI	VII	VIII	IX
Arabic	١	٢	٣	٤	٥	٦	٧	٨	٩
International	1	2	3	4	5	6	7	8	9

Later, when Indians discovered zero "0" with its help writing small and large numbers was made possible.

Here we observe that digits are signs to express numbers.

1.3 Formation of Numbers using Place Value System

In the previous classes we have learnt how to read and write the numbers. Observe the following table :

Numbers	In Words	Digits used in the numbers
23	Twenty three	2, 3
705	Seven hundred and five	0, 5, 7
2512	Two thousand five hundred and twelve	1, 2, 5
84096	Eighty four thousand and ninty six	0, 4, 6, 8, 9

We see here that in the formation of different numbers digits 0, 1, 2, 9 are used. Notice, as per need, the digits can be repeated to form a number e.g. shown in the above table, in the given number 2512, the digit 2 is repeated. Identify the digits used multiple times .

863683, 101001, 999999

Activities :

Write three different numbers 2, 3 and 5 on three pieces of paper. Place them in different order to form 3 digit numbers.

You can place them, in the following ways.

2	3	5
2	5	3
3	2	5
3	5	2
5	3	2
5	2	3

Here we can see, that these digits i.e., 2, 3 and 5 can be used to form numbers 235, 253, 325, 352, 532, 523. Can you tell, which one is the greatest or smallest ? Please note, digits are not repeated in any of these numbers.

How many 3 digit numbers can be formed using the digits 4, 0 and 7 ? Is '047' a three digit number ? No, because if in any number, the left most digit is '0', the place value of that digit is zero, as a result it does not have an impact on the number. Therefore,

$$\begin{aligned}
 047 &= 0 \times 100 + 4 \times 10 + 7 \times 1 \\
 &= 0 \times 40 + 7 \\
 &= 47
 \end{aligned}$$

Hence, we can see from above that 047 is actually a two digit number 47.

Similarly, if the greatest three digit number has to be formed using the digits 7, 6 and 0, is 760. But instead of 067 the smallest number will be 607. In the smallest number, the smallest digit leaving '0' should be placed in the 100's place. Zero at ten place and the largest digit will come at ones place.

Pay Attention

Hundreds	Tens	Ones	Digit
4	7	9	Ascending order
9	7	4	Descending order

Conclusion :

- To obtain the smallest number, all the other digits other than zero are written from left to right in ascending order.
- In case of 'zero' it should be written in the second place from left.
- If we write the digits from left in descending order, then we will obtain the largest number.

Example 1. Write the largest and smallest four digit number using the digits 5, 3, 8, 1

Solution : Largest number = 8531 (digits written in descending order)

Smallest number = 1358 (digits written in ascending order)

Example 2. Using the digits 2, 3, and 8, write the largest and smallest four digit number.

Solution : We have three digits but the number of four digits has to be formed. Therefore in the 1000's and 100's place, the largest digit i.e. 8 should be used. So, the largest number is 8832.

Again, in 2, 3 and 8; the smallest digit 2, should be placed in 1000's and 100's position. Hence, the smallest number = 2238.

Example 3. Find the difference of the greatest and smallest numbers of the digits 2, 0, 5, 0.

Solution : Greatest number = 5200

Smallest number = 2005

Difference = $5200 - 2005 = 3195$

1.3.1. The Largest and the Smallest Number

We know that the largest digit is 9.

Therefore, the largest one digit number = 9

The Smallest one digit natural number = 1

The Smallest two digit number = $9+1 = 10$

The Largest two digit number = 99

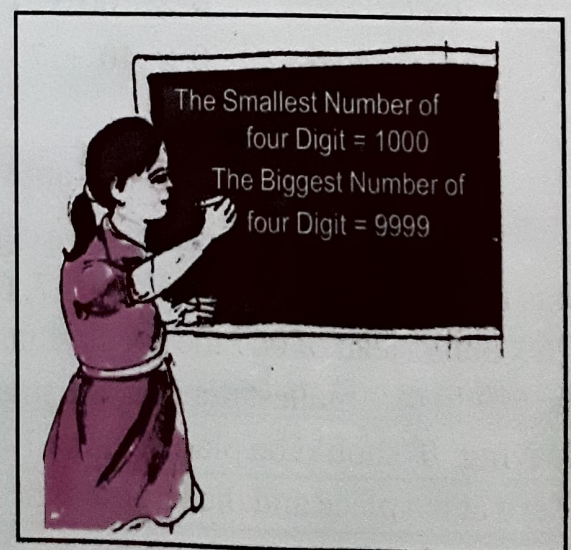
The Smallest three digit number = $99+1 = 100$

The Largest three digit number = 999

Similarly,

The Smallest four digit number = 1000

The Largest four digit number = 9999



1.4 : Place Value

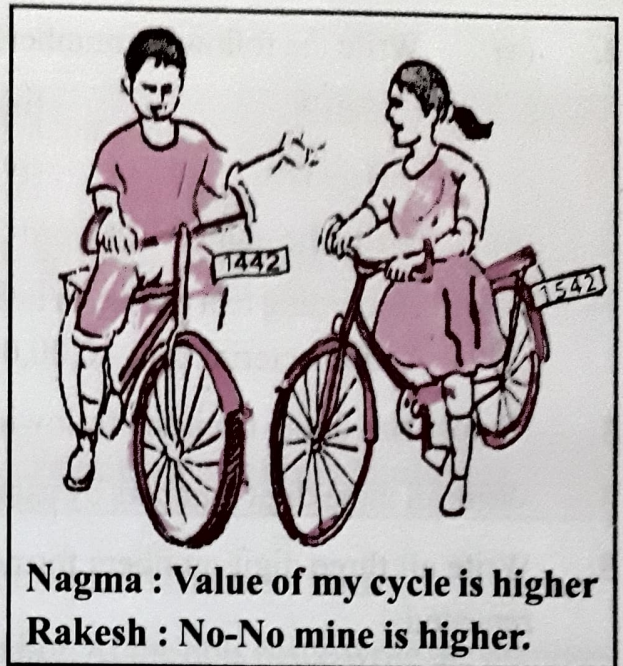
Observe the picture on the right and tell whose statement do you find correct ? Nagma's or Suresh's ?

Let us see, to compare the value, we need to compare the numbers. We know :

$$1442 = 1000 + 400 + 40 + 2$$

$$1542 = 1000 + 500 + 40 + 2$$

In both the numbers, the digits at 1000's place are same but different at 100's place. Now tell the value of whose cycle is greater. Since 500 is greater than 400 therefore the value of Nagma's cycle is more hence her statement is correct.



You have seen previously, that by placing 2, 3 and 5 in different order, we obtain a total of six, three digit numbers.

One of the number formed using 5, 3 and 2 is 523. If we swap the first and third digit in the number, the new number formed is 325.

$$523 = 5 \times 100 + 2 \times 10 + 3 \times 1$$

and $325 = 3 \times 100 + 2 \times 10 + 5 \times 1$

In 523, the value of 5 is $5 \times 100 = 500$

In 325, the value of 5 is $5 \times 1 = 5$

We have seen that by changing the position of digits, the value changes. Therefore :

**In a number, corresponding digit of every place has different value.
This is called place value of a digit.**

Example 4. In the number 3477, find the place value of both the 7.

Solution : $3477 = 3000 + 400 + 70 + 7$

From right hand side, we observe

First 7's place value = 7

and second 7's place value = 70

Exercise 1 (a)

1. Express the following numbers in digits :

- (i) Four Hundred and Twenty Seven
- (ii) Three Thousand Five Hundred and One
- (iii) Hundred and fifteen
- (iv) Eighty nine Thousand and Twenty Nine

2. (a) Write the following numbers in words :
(i) 7019 (ii) 23013
(iii) 69379 (iv) 893059
(b) Write the numbers in words, given in the following sentence :
According to a report, in one gram of human feces, there are 100 bacterial eggs, 1000 bacterial cell, 10,00,000 bacteria and 1,00,00,000 virus are present.
3. Choose the digits from the following numbers, 10, 11, 18, 0, 3
4. Write all three digit numbers by using the digits 1, 2, 3; where the digits are not repeated.
5. Write all three digit numbers formed using the digits 0, 3, 5, where the digits are not repeated.
6. Using 6, 7, 0 and 5 to write the largest and smallest four digit number.
7. Write the biggest and smallest five digit numbers.
8. In the number 5231, find the place value of each digit.
9. In the number 636, find the place value of both the 6's.
10. In the number 3334, find the place value of all the 3's and also find their sum.
11. In the number 22222, find the place value of each 2 and also find their sum.
12. In the number 545, find the place value of both the 5's. Also find their difference.

See the adjacent picture and answer the following :

There are two people.



 Try it :

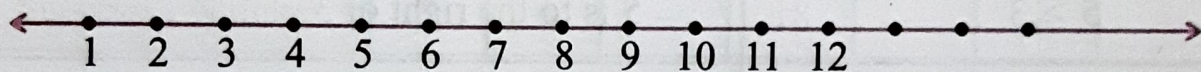
1. Count the number of books in your school bag.
2. Count the number of students present in the class.
3. Count the number of boys and girls present in the class.

 Note it :

Counting numbers 1, 2, 3, 4, 5, 6,..... are known as natural numbers.

1.6 Representation of Natural Numbers on Number Line :

Draw a line : Mark several dots at equal distance. At the dots place write the numbers 1, 2, 3, 4, 5, 6, ...



Counting starts from the number '1', therefore we can say that '1' is the smallest and the first natural number.

1.6 Predecessor and Successor Number

The next natural number after 1 is 2. If we add 1 in 1, we get 2. Similarly, if we add 1 in 2; we get 3 which is the next natural number. Accordingly, $3 + 1 = 4$, $4 + 1 = 5$ etc. In this way, if we add 1 to any natural number, we get the next natural number, which we call the successive of the number. Similarly, if we subtract 1 from any number except 1 then we get the previous natural number, which is known as the predecessor of the number, for example, 10 is 9's successor number and 9 is 10's Predecessor number.

 Note it :

The number next to a natural number, is the successor number of that natural number and the number which come just before is known as the predecessor number.

We have observed that, if we add '1' to any natural number then we get the successor number of that natural number. In this way, every successor number of a natural number is also a natural number.

You may face difficulty to find the largest natural number. Imagine about any large number; it can never be the largest number because by adding '1' to it, we will get the next natural number. Therefore,

Conclusion :

Any natural number can not be the largest natural number because its successor is always larger than the number itself.

Chart Observation : See the following table and fill the space accordingly :

Largest (>)/Smallest (<)	Position on number line left/right
$3 > 2$	3 is to the right of 2
$5 > 3$	5 is to the right of 3
$8 \square 7$	8 is of 7
$1 < 2$	1 is to the left of 2
$3 \square 4$	3 is towards the of 4
$2 < 5$	2 is left of 5
$8 \square 6$	8 is towards the of 6
$10 \square 12$	10 is towards the is 12
$3 \square 5$	3 is towards the of 5
$7 \square 4$	7 is towards of 4

What conclusion we get from this ?

On a number line, every natural number is larger than the natural number to its left and it is smaller than the natural numbers to its right.

1.7. Predecessor and Successor of Numbers :

We are familiar with predecessor and successor of numbers. **Successor number are also known as resultant number.** Fill in the space after analysing the following table.

Natural Number	5	6	13	8	20	40	22	2	1
Predecessor Natural Number	4	5	—	—	—	39	21	—	None

We know that 1 is the first and the smallest natural number. Therefore, we can say :
There is no predecessor of 1.

Fill in the blank after observation the following table :

Natural Number	1	3	5	—	25	19	23	—
Successor Number	2	4	—	18	—	—	—	1

From the above table, we conclude :

1 is not the successor number of any other natural number.

Sequential Number :

Consecutive natural number in sequence are called sequential number. Like 4, 5, 6 108, 109, 110, ... etc.

Example 5 : Write the smallest three digit natural number. Also find its predecessor natural.

Solution : Smallest three digit number = 100

Predecessor number of 100 = $100 - 1 = 99$.

Example 6 : Write the largest four digit number. Find its successor natural number.

Solution : Largest four digit number = 9999

Successor natural number = $9999 + 1 = 10000$.

Example 7 : Find the successor of 3775.

Solution : Successor of 3775 = $3775 + 1 = 3776$

Example 8 : Find the predecessor of 3776.

Solution : The predecessor number of 3776 = $3776 - 1 = 3775$

Example 9 : Write the next three consecutive of 20.

Solution : The next three consecutive are 21, 22 and 23.

Exercise 1(b)

Four option have been given in the following tables but one is correct. Choose the correct option and fill in the blanks.

1.	4	5	6	7	8
	23	24	25		27
	(i) 21	(ii) 22	(iii) 26	(iv) 28	

2.	9	8	7	6	5
	35	34		32	31
	(i) 36	(ii) 33	(iii) 30	(iv) 28	

3. For the following questions, four options are given. Pick the right option.

(a) Write the successor number of 13

(i) 27 (ii) 12 (iii) 14 (iv) 16

(b) Write the predecessor number of 27.

(i) 27 (ii) 26 (iii) 28 (iv) 25

(c) Write the successor natural number of 6

(i) 6 and 7 (ii) Only 8 (iii) 6, 7 and 8 (iv) Only 7

(d) Write the predecessor natural number of 15.

(i) Only 14 (ii) 14 and 15 (iii) 14 and 16 (iv) Only 16

4. Write true or false from the following statements :

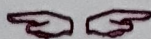
(i) 1 is the smallest natural number

(ii) Numbers on the right hand of a number represented on number line are smaller than it.

- (iii) Consecutive numbers 102, 103, 104 are larger than 101.
 - (iv) 23 is a natural number.
 - (v) There is no largest number in natural numbers.
5. Write successor of 9999.
 6. Find Predecessor of 100001.
 7. Draw a number line and represent natural numbers upto 9.
 8. Write smallest four digit natural numbers. Find its predecessor.
 9. Write largest six digit natural number and also find its successor.

We Learnt in this Unit :

1. Natural number tells the amount of the objects.
2. The symbols which express the numbers are called digit.
3. The value of digits used in a number are different according to their places.
4. The smallest natural number is 1.
5. No natural number is largest because it itself has a successor.
6. There is no predecessor of 1 in natural numbers .
7. Except 1 every natural number, has only one predecessor which is one less than the number.
8. Any natural number has only one successor, which is one more than the number.
9. On number line number on the right hand are larger to that on left hand side.



ANSWERS

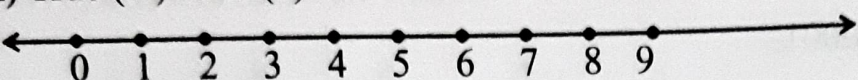
Exercise 1(a)

1. (i) 427 (ii) 3501 (iii) 115 (iv) 79029, 2. (i) (i) Seven thousand Nineteen (ii) Twenty three thousand thirteen (iii) Sixty nine thousand three hundred seventy nine (iv) Eight lakh ninty three thousand fifty nine (b) one hundred; one thousand, ten lakh and one crore 3.. 1, 0, 1, 1, 8, 0,

3, 4. 123, 132, 213, 231, 312, 321, 5. 305, 350, 503, 530, 6. 7650, 5067, 7. 99999; 10000
 8. Place value of 5 is 5000, place value of is 200; place value of 3 is 30 and place value of
 is 1. 9. 600, 6 10. 3330 11. 20000, 2000, 200, 20, 2,22222 12. 495.

Exercise 1(b)

1 (iii) 26 2. (ii) 33 3. (a) (iii) 14 (b) (ii) 26 C (iv) only 7 (d) (i) only 14 4. (i) True (ii) False
 (iii) True (iv) True (v) True 5. 10000 6. 100000

7.  8. 1000, 999 9. 999999, 1000000

(Sridharacharya 991)

Sridharji was born in 991 A.D. in Karnataka. "Ganit Sar" is his most popular work. This work of 300 slokas is famous as Trishatika which has following contents.

Numerology of natural numbers, multiplication, division, zero, square, squareroot, cuberoot, fractions, Interest, mixtures, shares and measurements.

