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MATHEMATICS

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FOREWORD

The Colourful world of children is full of excitement and spectacular thoughts! Their imaginative power can even attract the wild creatures to accompany them in a friendly manner. Their enthusiasum and innovative prescription can even trigger the non-living entities and enchant the poetic Tamil. It is nothing but a bundle of joy blended with emotions when you travel into their creative world.

We have tried our level best to achieve the following objectives through the new Text Books by gently holding the tender hands of those little lads.

- To tune their mind away from rote-learning and guide them into the world of creativity.
- To make the children be proud of their ancient history, culture, art and rich Tamil literature.
- To march triumphantly with confidence into the modern world with the help of Science and Technology.
- To facilitate them to extend their journey of learning beyond the text book into the world of wisdom.

These new Text Books are studded with innovative design, richer content blended with appropriate psychological approach meant for children. We firmly believe that these newly designed text books will certainly create a sparkle in your mind and make you explore the world afresh.

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Chapter 1

NUMBERS

9YQVCL

Learning Objectives

- To understand large numbers and the terms used to represent them.
- To compare large numbers and order them.
- To employ estimation for large numbers.
- To solve word problems involving four fundamental operations.
- To understand and use the properties of Whole Numbers.

1.1 Introduction

Read the following conversation between two classmates.

Mani : (Reading Newspaper Headlines) "Ten thousand people visited the trade fair yesterday".

Mallika : Wow! That's a lot of people.

Mani : Thank goodness, I went to the trade fair exactly yesterday!

Mallika : Why… what is so important about it?

Mani : Don't you see? If I had not gone, they would have written "Nine thousand nine hundred and ninety-nine people only visited the trade fair yesterday". It would have been difficult to read and understand!

What do you think about this conversation? Was Mani right?

No! it would still be "Ten thousand people visited!". Newspapers give (and readers want) a sense of the size, NOT exact values when numbers are large.

You have probably heard names like "lakhs" and "crores" used by elders.

We often come across situations that involve large numbers in real life, like the number of people living in a district, the budget of the Government, the distance of stars or the number of bicycles sold in a year and so on. In all these situations, we look for names that convey the "size" of these numbers.

MATHEMATICS ALIVE - LARGE NUMBERS IN REAL LIFE

Tamil Nadu has about 26,345 square kilometre of forest land.

The number of stars in the Milky way galaxy is about 20,000 crore

Let us understand the large numbers in detail, and the way they are connected to the numbers learnt earlier.

1.2 Recap of Successor and Predecessor

- When 1 is added to a number we get its Successor.
- When 1 is subtracted from a number we get its Predecessor.

Try these

- The Successor of 4576 is _____.
- The Predecessor of 8970 is _____.
- 999 + 1 equals _____.
- 10000 – 1 equals _____.
- The predecessor of the smallest 5 digit number is _____.

1.3 Formation of large numbers

Now, we learn the formation of large numbers. Let us build and complete the number tower by observing the pattern of numbers.

Table: 1.1

Greatest number	Add	Equals	Smallest number	Number Name
Greatest 1 digit number 9	+ 1	=	Smallest 2 digit number 10	Ten
Greatest 2 digit number 99	+ 1	=	Smallest 3 digit number 100	Hundred
Greatest 3 digit number 999	+ 1	=	Smallest 4 digit number	Thousand
Greatest 4 digit number	+ 1	=	Smallest 5 digit number 10000	Ten Thousand
Greatest 5 digit number	+ 1	=	Smallest 6 digit number	Lakh
Greatest 6 digit number	+ 1	=	Smallest 7 digit number	Ten Lakh
Greatest 7 digit number 9999999	+ 1	=	Smallest 8 digit number 10000000	Crore

We can observe that in every row the smallest number column has an additional zero compared to the previous row. You have read in lower classes about place value system. In this system (which was invented in India and spread to other countries!), the number 10 plays a very important role.

It is shown in the following table.

1 × 10	=	10	(Ten)
10 × 10	=	100	(Hundred)
100 × 10	=	1000	(Thousand)
1000 × 10	=	10000	(Ten Thousand)
10000 × 10	=	100000	(Lakh)
100000 × 10	=	1000000	(Ten Lakh)

Note

As the numbers get large, it is difficult to keep track of the number of digits and the place value for each digit. Wherever possible, we use names like lakh and crore instead of writing so many zeros. However, we can write exact values of large numbers too, if needed.

While each new row gives a number 10 times bigger, what happens if we skip and go 2 rows below. Numbers would be 100 times bigger.

For example, 1000 = 100 times 10, or One Thousand has "hundred tens" in it.

Try these

1. Give 3 examples where the number of things counted by you would be a 5 digit number or more.
2. How many hundreds are there in 10 lakh?
3. There are ten lakh people in a district. What would be the population of 10 such districts?
4. The Government spends rupees 2 crores for education in a particular district every month. What would be its expenditure over 10 months?
5. 10 lakh candidates write the Public Exam this year. If each exam centre is allotted with 1000 candidates. How many exam centres would be needed?

1.4 Place Value Chart

Table: 1.2

TC	C	TL	L	T Th	Th	H	T	O
Ten Crores	Crores	Ten Lakh	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones

As in the table:1.2, when writing large numbers we make use of place value chart to ensure that we do not miss any digit in between, while writing it. The ones place can be represented by the letter 'O', tens place by 'T', hundreds place by 'H', thousands place by 'Th', ten thousands place by 'T Th', lakhs place by 'L' , ten lakhs place by 'T L', crores place by 'C' and ten crores by 'T C'.

Try to read the number 359468421. Is it difficult? Yes. It is not easy. But by using the indicators or the periods, it is easy to read and write 359468421 as under.

Periods	Crores		Lakhs		Thousands		Ones		
Place Value	TC	C	TL	L	TTh	Th	H	T	O
Number	3	5	9	4	6	8	4	2	1
Number Name	Thirty five crore ninety four lakh sixty eight thousand four hundred twenty one.								

Try these

Complete the table

Table: 1.3

Number	TC	C	TL	L	T Th	Th	H	T	O	Number name
1670										
47684										
120001										
7800500			7	8	0	0	5	0	0	Seventy Eight Lakh Five Hundred
53409098										
198765912										

Note : When we write numbers, the place value increases from right to left .

Example 1.1

How many thousands are there in 1 lakh?

Solution

Place Value	L	T Th	Th	H	T	O	
1 lakh	1	0	0	0	0	0	$\frac{1\text{lakh}}{1\text{thousand}} = \frac{100000}{1000} = 100$
1 thousand			1	0	0	0	

Lakh is 2 places to the left of thousand. So, it is 10 × 10 = 100 times thousand.

Hence, 1 lakh = 100 thousand.

Example 1.2

Read and expand the number 50000

NUMBER : 50,000

Expanded form : 5 × 10000

Read as : Fifty Thousand

Read and expand the number 676097

NUMBER : 676097

Expanded form : 6 × 100000 + 7 × 10000 + 6 × 1000 + 0 × 100 + 9 × 10 + 7 × 1

Read as : Six Lakh Seventy Six Thousand Ninety Seven

Try these

Read and expand the following numbers:

1. 2304567
2. 4509888
3. 9553556

1.5 Place Value of digits in Large Numbers

Every digit of a number has a place value which gives the value of the digit.

Finding the place value of all the digits in 9847056

The Place value of 6 is 6 × 1	=	6	(Six)
The Place value of 5 is 5 × 10	=	50	(Fifty)
The Place value of 0 is 0 × 100	=	0	(Zero)
The Place value of 7 is 7 × 1000	=	7000	(Seven Thousand)
The Place value of 4 is 4 × 10000	=	40000	(Forty Thousand)

The Place value of 8 is 8 × 100000 = 800000 (Eight Lakh)

The Place value of 9 is 9 × 1000000 = 9000000 (Ninety Lakh)

Hence, the number 9847056 is read as Ninety Eight Lakh Forty Seven Thousand Fifty Six.

Try these

1. Find the place value of underlined digits.

   (i) 3<u>8</u>, 41, 567

   (ii) 94, <u>4</u>3, 810

2. Write down the numerals and place value of 5 in the numbers represented by the following number names.

   (i) Forty Seven Lakh Thirty Eight Thousand Five Hundred Sixty One.

   (ii) Nine Crore Eighty Two Lakh Fifty Thousand Two Hundred Forty One.

   (iii) Nineteen Crore Fifty Seven Lakh Sixty Thousand Three Hundred Seventy.

1.6 Use of commas and Comparison of Number Systems

In our Indian System of Numeration, we use commas from the right. The first comma comes before Hundreds place (3 digits from the right). The second comma comes before Ten Thousands place (5 digits from the right). The third comma comes before Ten Lakh place (7 digits from the right) and represents Crore.

In the International System of Numeration, we use Ones, Tens, Hundreds, Thousands, Ten Thousands, Hundred Thousands, Millions and Billions. Commas are used to mark Thousands, Millions and Billions.

We can easily understand both the Indian and the International Number Systems from the following table.

Table: 1.4

Indian Number System			International Number System		
Period	Name	Numeral	Name	Numeral	Period
Ones	One	1	One	1	Ones
	Ten	10	Ten	10	
	Hundred	100	Hundred	100	
Thousands	Thousand	1,000	Thousand	1,000	Thousands
	Ten thousand	10,000	Ten thousand	10,000	
Lakhs	Lakh	1,00,000	Hundred thousand	100,000	
	Ten Lakh	10,00,000	Million	1,000,000	Millions
Crores	Crore	1,00,00,000	Ten Million	10,000,000	
	Ten crore	10,00,00,000	Hundred Million	100,000,000	
	Hundred crore	100,00,00,000	Billion	1,000,000,000	Billions
	Thousand crore	1000,00,00,000	Ten Billion	10,000,000,000	

With the help of the above table, we can read the number 57340000 as 5,73,40,000 (five crore seventy three lakh forty thousand) in the Indian System and as 57,340,000 (fifty seven million, three hundred forty thousand) in the International System.

Now let us discuss simple problems with examples.

Example 1.3

The distance between the Sun and the Earth is about 92900000 miles. Read and write the number in the Indian and the International System by using commas.

Solution

Indian System

Crores	Ten lakhs	Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones
9	2	9	0	0	0	0	0

i.e., 9,29,00,000

This is read as Nine Crore Twenty Nine Lakh.

International System

Ten Millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
9	2	9	0	0	0	0	0

i.e., 92,900,000

This is read as Ninety Two Million Nine Hundred Thousand.

Try these

Identify the incorrect places of comma and rewrite correctly.

Indian System : 56,12,34,0,1,5

9,90,03,2245

International System : 7,5613,4534

30,30,304,040

Activity

Take a white chart and cut into 9 equal pieces. Write different numbers on each piece. Arrange the pieces, as many times, horizontally which form different numbers. Write any five different numbers and express them in the Indian and the International System.