CHAPTER - 1

Knowing our Numbers

1.1 Introduction

Latha and Uma have admitted in class VI. On the first day of the school, their maths teacher discussed the population of India, according to the recent population census. Uma couldn't understand the figures. While coming back home, Uma asked Latha about the population.

Uma : Do you know the population of our village?

Latha : Yes, I know

Uma : How?

Latha : I have seen it on the wall of the panchayat office.

Uma : What particulars are written on the wall?

Latha : All information regarding our village especially population of our village, number of men, women and children, number of houses, pucca, kuccha etc.

Uma : Can we visit the place now?

Latha : Sure.

Both of them visited the panchayat office on their way back home and observed the particulars on the wall

Name of the Gram Panchayat	:	Gummadidala
District	:	Sangareddy (Erstwhile medak district)
Population of the village	:	8,032
No. of male	:	4,065
No. of female	:	3,967
No. of children	:	967
No. of house holds	:	2017
Pucca	:	1,947
Kuccha	:	76

Uma read the particulars on the wall and understood the figures. She also asked Latha about lakhs and crores, as the teacher had discussed the population in lakhs and crores in the class. Why? Discuss with your friends.

We have discussed numbers upto thousands in earlier classes. We use numbers in many ways. We compare them, arrange them in increasing and decreasing orders, add and subtract them.

Can you give any five situations where we use numbers in thousands?

For example a television costs ₹12,500.

Let us revise the numbers learned in previous classes to understand and enjoy about larger numbers.

1.2 Estimating and Comparing Numbers

Identify the greatest and smallest among the following numbers.

S.No.	Numbers	Greatest Number	Smallest Number
1.	3845, 485, 34, 13845	13845	34
2.	856, 1459, 35851, 23	.....	.....
3.	585, 9535, 678, 44	.....	.....
4.	39, 748, 19651, 7850	.....	.....

We can identify them easily by simply counting the digits in the numbers. The numbers having five digits are greater than numbers having two digits.

Now ask your friend to compare 51845 and 41964. which is greater? This is also easy as the digit in ten thousands place is 5 in 51845 and 4 in 41964. So $\underline{5}1845 > \underline{4}1964$

Now try to say which is greater, 58672 or 57875? As 5 is in ten thousands place in both numbers, we compare the next place i.e. thousands. As 8 > 7. So 58672 is bigger.
i.e $5\underline{8}672 > 5\underline{7}875$.

If the digits in the thousands place is also the same, what will you do? Move to the hundreds place to compare and then tens place and finally units place.

Exercise - 1.1

1. Which is the greatest and the smallest among the group of numbers:
   i. 15432, 15892, 15370, 15524 ii. 25073, 25289, 25800, 25623
   iii. 44687, 44645, 44670, 44602 iv. 75671, 75635, 75641, 75610
   v. 34895, 34891, 34899, 34893
2. Write the numbers in ascending (increasing) order:
   i. 375, 1475, 15951, 4713 ii. 9347, 19035, 22570, 12300
3. Write the numbers in descending (decreasing) order:
   i. 1876, 89715, 45321, 89254 ii. 3000, 8700, 3900, 18500
4. Put appropriate symbol (< or >) in the space given:
   i. 3854 ..... 15200 ii. 4895 4864
   iii. 99454 ..... 99445 iv. 14500 14499

5. Write the numbers in words:

i. 72642 = ...

ii. 55345 = ...

iii. 66600 = ...

iv. 30301 = ...

6. Write the numbers in figures:

i. Forty thousand two hundred seventy .....

ii. Fourteen thousand sixty four .....

iii. Nine thousand seven hundred .....

iv. Sixty thousand .....

7. Form four digit numbers with the digits 4, 0, 3, 7 and find which is the greatest and the smallest among them?

8. Write i. the smallest four digit number?

ii. the greatest four digit number?

iii. the smallest five digit number?

iv. the greatest five digit number?

1.3 Estimation and rounding off numbers

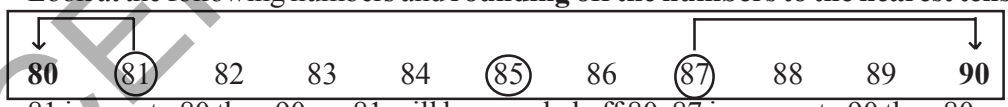
We come across many situations in our daily life such as:

- 25,000 people nearly visited Salarjung museum in the month of November.
- 9 lakh students approximately will appear the S.S.C board examination this year in our state.
- 43,500 tonnes roughly of iron is loaded in the ships in Vizag port every year.

The words 'nearly', 'approximately', 'roughly' do not show the exact number of people or material. Infact 25,000 may be 24,975 or 25,045. i.e. it may be a little less or more, but not exact.

Estimation is also a good way of checking answers. We usually round off the numbers to the nearest 10's (Tens), 100's (Hundreds), 1000's (Thousands), 10000's (Ten Thousands)... etc.

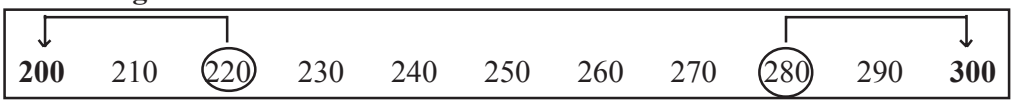
Look at the following numbers and **rounding off the numbers to the nearest tens.**



81 is near to 80 than 90, so 81 will be rounded off 80. 87 is nearer to 90 than 80, so 87 will be rounded off to 90.

85 is at equal distance from 80 and 90 but by convention it is rounded off to 90.

Rounding off the numbers to nearest hundreds:



220 is nearer to 200 than 300, so 220 is rounded off to 200. 280 is nearer to 300 than 200, so it is rounded off to 300.

What is the rounding off number for 250? Why?

Do This

Round off these numbers as directed:

1. 48, 62, 81, 94, 27 to their nearest tens
2. 128, 275, 312, 695, 199 to their nearest hundreds.
3. 7452, 8115, 3066, 7119, 9600 to their nearest thousands.

Think, Discuss and Write

Discuss with your friends about rounding off numbers for ten thousands place.

1.4 Revision of Place Value

You have already learnt how to expand a number using place value. Recall how you expand a two digit, three digit, four digit and five digit number:

1. Expand 64

Tens	Ones
6	4

$= (6 \times 10) + (4 \times 1)$

$= 60 + 4$

2. Expand 325

Hundreds	Tens	Ones
3	2	5

$= (3 \times 100) + (2 \times 10) + (5 \times 1)$

$= 300 + 20 + 5$

3. Expand 5078

Thousands	Hundreds	Tens	Ones
5	0	7	8

$= (5 \times 1000) + (0 \times 100) + (7 \times 10) + (8 \times 1) = 5000 + 0 + 70 + 8$

$= 5000 + 70 + 8$

4. Expand 29500

Ten Thousands	Thousands	Hundreds	Tens	Ones
2	9	5	0	0

$= (2 \times 10000) + (9 \times 1000) + (5 \times 100) + (0 \times 10) + (0 \times 1)$

$= 20000 + 9000 + 500 + 0 + 0$

$= 20000 + 9000 + 500$

Do This

Now expand the numbers as given in the example:

Number	Expansion	Expanded form
21504	(2 × 10000) + (1 × 1000) + (5 × 100) + (0 × 10) + (4 × 1)	20000 + 1000 + 500 + 4
38400		
77888		
20050		
41501		

Exercise - 1.2

1. Round off the following numbers to the nearest tens:
   i. 89 ii. 415 iii. 3951 iv. 4409
2. Round off the following numbers to the nearest hundreds:
   i. 695 ii. 36152 iii. 13648 iv. 93618
3. Round off the following numbers to the nearest thousands:
   i. 3415 ii. 70124 iii. 8765 iv. 4001
4. Write the numbers in short form:
   i. 3000 + 400 + 7 ii. 10000 + 2000 + 300 + 50 + 1
   iii. 30000 + 500 + 20 + 5 iv. 90000 + 9000 + 900 + 90 + 9
5. Write the expanded form of the numbers:
   i. 4348 ii. 30214 iii. 22222 iv. 75025

1.5 Introduction of Large Numbers

The greatest five digit number is 99,999. Now, we add 1 to it.

99,999 + 1 = 1,00,000

This number is **one lakh**. One lakh comes after 99,999.

Now can you say how many tens are there in one lakh?

how many hundreds are there in one lakh?

how many thousands are there in one lakh?

Now, let us take the number 3, 15, 645. Its expanded form is :

3, 15, 645 = (3 × 100000) + (1 × 10000) + (5 × 1000) + (6 × 100) + (4 × 10) + (5 × 1)

= 300000 + 10000 + 5000 + 600 + 40 + 5

Observe,

3	1	5	6	4	5
Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones

This number has 5 in ones place, 4 in tens place, 6 in hundreds place, 5 in thousands place, 1 in ten thousands place and 3 at lakhs place. Now we read the number as three lakh fifteen thousand six hundred and forty five.

NOTE: British English takes 'and' between 'hundred and ...' American English omits 'and'.

Read and expand the numbers as shown below:

Number	**Expanded form**	**Read as**
5,00,000	5 × 100000	Five lakh
4,50,000	4 × 100000 + 5 × 10000	Four lakh fifty thousand
4,57,000	.....	.....
3,05,400	.....	.....
3,09,390	.....	.....
2,00,035	.....	.....

Write five more 6 digit numbers and ask your friend to read and expand them.

What number would you get if all digits are 9s in a 6-digit number?

Can you call it the greatest 6-digit number? Why?

Now if we add one to this number, what would we get?

9,99,999 + 1 = 10,00,000

It is called **ten lakh.**

Is it the smallest 7-digit number?

So now observe the following pattern and complete it.

9 + 1 = 10

99 + 1 = 100

999 + 1 = 1000

9999 + 1 = ...

99999 + 1 = ...

999999 + 1 = ...

9999999 + 1 = 1,00,00,000

Add one more to the greatest 7-digit number. You get the smallest 8-digit number which is called **one crore.**

How will you get the greatest 8 digit number?

We come across large numbers in many different situations. For example, area of our country is 32, 87, 263 square km., population of our state 8,46,65,533, cost of school building,

agricultural production, distance between the planets, multiplication of 3 digited numbers with 3 or more digits are also in large numbers.

By learning these large numbers, do you think Uma can understand the numbers taught by her teacher in the classroom?

TRY THESE

1. Give any five examples using daily life situations where the number of things counted would be more than 6-digits.
2. Write the smallest and greatest of all two digit, three digit, four digit, five digit, six digit, seven digit, eight digit numbers.

1.5.1 Place value of larger numbers

Read the following numbers:

a) 25240 b) 130407 c) 4504155 d) 12200320

Was it difficult to read? Did you find it difficult to read the number in crores, lakhs and thousands? Now read the following nubmers.

25,240 1,30,407 45,04,155 1,22,00,320

Is it comparitively easier, than above numbers ?

Use of 'comma' helps us in reading and writing of large numbers.

There are some indicators useful in writing the expansion of numbers. For example, Radha is expanding number. She identifies the digits in ones place, tens place and hundreds place in 367 by writing them under O, T and H as shown the table.

H	T	O
3	6	7

Expansion

$3 \times 100 + 6 \times 10 + 7 \times 1$

Similarly for 1,729,

Th	H	T	O
1	7	2	9

Expansion

$1 \times 1000 + 7 \times 100 + 2 \times 10 + 9 \times 1$

One can extend this idea to numbers upto lakhs and crores as seen in the following table:

Places	Crores		Lakhs		Thousands				
	Ten Crores (T. Cr)	Crores (Cr)	Ten Lakhs (T. La)	Lakhs (La)	Ten Thou-sands (T.Th.)	Thou-sands (Th.)	Hund-reds (H)	Tens (T)	Ones (O)
Number	10,00,00,000	1,00,00,000	10,00,000	1,00,000	10,000	1,000	100	10	1
No. of Digits	9	8	7	6	5	4	3	2	1

1 crore = 100 lakhs = 10,000 thousands

1 lakh = 100 thousands = 1000 hundreds

Now let us write the large numbers using the place value chart and read the number as given below:

Number	T.Cr.	Cr.	T.La	La	T.Th.	Th.	H	T	O	Read as
41430495	-	4	1	4	3	0	4	9	5	Four crore fourteen lakh thirty thousand four hundred ninety five
304512031										
241800240										
69697100										
100091409										

Think of five more large numbers and write them. Can you write the expanded form of these numbers as shown below?

Expansion of 12735045

1,27,35,045 = 1 × 10000000 + 2 × 1000000 + 7 × 100000 + 3 × 10000 + 5 × 1000 + 0 × 100 + 4 × 10 + 5 × 1

Do This

Expand the numbers using commas.

i. 999999999 ii. 34530678

iii. 510010051

1.5.2 Usage of commas

In our Indian system of numeration we use ones, tens, hundreds, thousands, lakhs and crores. Commas are used to mark thousands, lakhs and crores. The first comma comes after hundred place (i.e. three digits from the right) and marks thousands 74517,500. The second comma comes two digits later (i.e. five digits from the right) 745,17,500. It comes after ten thousands place and marks lakh. The third comma comes after another two digits. (i.e. seven digits from the right) 7,45,17,500. It comes after ten lakhs place and marks crore. Commas help us in reading and writing large numbers easily.For example,

Seven crore forty five lakh seventeen thousand and five hundred can be written as,

7, 45, 17, 500.

Similarly we can easily read this number which is separated by commas as 45,30,14,252 (Forty five crore thirty lakh fourteen thousand two hundred fifty two).

Do This

Read these numbers and write in words;

i) 5,06,45,075 ii) 12,36,99,140 iii) 2,50,00,350

Exercise - 1.3

1. Write the numbers using commas according to place values.
   - i. 11245670 ii. 22402151
   - iii. 30608712 iv. 190308020
2. Write the numbers in words
   - i. 34,025 ii. 7,09,115
   - iii. 47,60,00,317 iv. 6,18,07,000
3. Write the number in figures.
   - i. Four lakh fifty seven thousand four hundred.
   - ii. Sixty lakh two thousand and seven hundred seventy five.
   - iii. Two crore fifty lakh forty thousand three hundred and three.
   - iv. Sixty crore sixty lakh sixty thousand six hundred.
4. Write the numbers in expanded form:
   - i. 6,40,156 ii. 63,20,500
   - iii. 1,25,30,275 iv. 75,80,19,202
5. Write the following numbers in short form (standard notation):
   - i. 50,00,000 + 4,00,000 + 20,000 + 8,000 + 500 + 20 + 4
   - ii. 6,00,00,000 + 40,00,000 + 3,00,000 + 20,000 + 500 + 1
   - iii. 3,00,00,000 + 3,00,000 + 7,000 + 800 + 80 + 1
   - iv. 7,00,00,000 + 70,00,000 + 7000 + 70.
6. Which is larger between each of these two? Use greater than symbol (>) and write:
   - i. 4,67,612 or 18,71,964 ii. 14,35,10,300 or 14,25,10,300
7. Which is smaller between each of these two? Use less than symbol (<) and write:
   - i. 2,00,015 or 99,999 ii. 13,50,050 or 13,49,785
8. Write any ten numbers with digits 5 in crores place, 2 in lakhs place, 1 in ten thousands place, 6 in tens place and 3 in ones place. (keep any digits in the remaining places)

1.6 International System of Numeration

The numbers in which we read and write in our country are different from that of many other countries. We use lakhs for 6-digit number, ten lakhs for 7-digit numbers and then crores and

ten crores etc. In the International system of numeration, we use ones, tens, hundreds, thousands and then millions. One million is a thousand thousands or ten lakhs. Commas are used to mark thousands and millions. Comma comes after every three digits from the right.

Suppose the number is 45690255

Indian system of numeration	International system of numeration
4,56,90,255	45,690,255
Four crore fifty six lakhs ninety thousand two hundred and fifty five.	Forty five million six hundred ninety thousand two hundred fifty five.

Have you noticed that there is no change of numeration upto hundreds place?

What else have you observed?

Let us compare the places in both the systems for better understanding:

Indian System	H.Cr.	T.Cr.	Cr.	T.La	La	Ten Th.	Thou-sand	Hund.	Tens	Ones
International System	Billion	Hund. Million	Ten Million	Million	Hun. Th.	Ten Th.	Thous.	Hund	Tens	Ones

From the above table, the relation between these systems can be understood as follows:

10 lakhs = 1 million

1 crore = 10 million

10 crore = 100 million

100 crore = 1 billion

EXERCISE - 1.4

1. Write the numbers using commas according to International system of numeration.
   i. 97645315 ii. 20048421
   iii. 476356 iv. 9490026834
2. Collect the mobile numbers of your friends and other family members. Write them using commas and read them in International system.
3. Write the numbers in words in both Indian and International system:
   i. 123115027 ii. 89643092
4. Read the number carefully and answer the following:
   302,179,468
   i. The digit at millions place
   ii. The digit at hundreds place
   iii. The digit in ten millions place
   iv. How many millions are there in the number?

1.7 Large Numbers used in Daily Life Situations

We know that we use meter (m) as unit of length, kilogram (kg) as a unit of weight and litre (*l*) as a unit of volume and second (s) as a unit of time.

For example, in the case of length or distance, we use centimeter for measuring the length of a pencil as it is small, meter for measuring length of a saree and kilometer(*km*) for measuring distance between two places. But for measuing the thickness of a paper, even centimeter is too big. So we use millimeter (mm) in this case.

Since there is a relationship between all of them we need to know about this conversion and convenient usage.

10 millimeters	=	1 centimeter
100 centimeters	=	1 meter
1000 meters	=	1 kilometer

How would you calculate the number of millimeters in 1 kilometer?

1 km = 1000m

= 1000 × 100 cm

= 1000 × 100 × 10 mm

= 10,00,000 mm

In the same way we buy rice or wheat in kilograms. But items like spices, chillipowder, haldi etc. which we do not need in large quantities, are bought in grams (g).

1000 g. = 1 kg

Can you calculate the number of milli grams. in 1 kg?

A bucket normally holds 20 litres of water. But some times we need a smaller unit, the milliliters. A bottle of hairoil, painting colour lables in milli liters (*ml*) and oil tankers, water in reserviours are marked with kiloliteres (*kl*)

1000 litres = 1 kilolitre

How many milli litres will make 1 killo litre?

Try These

1. Name four important towns in your district. Note the distance between them in km. Express these in centimeters and millimeters.
2. Can you tell where we use milligrams?
3. A box contains 1,00,000 tablets (medicine) each weighing 20 *mg*. What is the weight of all the tablets in the box in both grams and kilograms?
4. A petrol tanker contains 20,000 litres of petrol. Express the quantity of petrol in kilolitres and millilitres.

Let us understand some examples using large numbers in daily life.

Example-1. Tendulkar is a famous cricket player. He has so far scored 15,030 runs in test matches and 18,111 runs in one day cricket. What is the total number of runs scored by him in both Formats?

***Solution*:** Runs scored in Test matches by Tendulkar = 15,030

Runs scored in One day matches = 18,111

Total number of runs = 33,141

Example-2. A newspaper is published everyday. It contains 16 pages. Every day 15,020 copies are printed. How many pages are printed every day?

***Solution*:** Number of copies printed every day = 15,020

Each copy has 16 pages

Hence, 15,020 copies will have 15,020 × 16 pages.

Try to estimate the total number of pages. It must be more than 2,00,000 pages.

Total number of pages printed = 15,020 × 16 = 2,40,320

So, every day 2,40,320 pages are printed.

Example-3. A hotel has 15 litres milk. 25ml of milk is required to prepare a cup of tea. How many cups of tea can be made with the milk.

Solution: Quantity of milk in the hotel = 15 litres

= 15 × 1000

= 15000 ml.

Since 25ml. of milk is required for each cup of tea

number of cups of tea that can be made = 15000 ÷ 25

= 600 cups.

EXERCISE - 1.5

1. The number of people who visited during common wealth games in New Delhi for the first four days was recorded as 15,290; 14,181; 14,235 and 10,578. Find the total number of people visited in these four days?
2. In Lok Sabha election, the elected candidate got 5,87,500 votes and defeated candidate got 3,52,768. By how many votes did the winner win the election?
3. Write the greatest and smallest 5-digit number formed by the digits 5, 3, 4, 0 and 7 and find their difference?
4. A bicycle industry makes 3,125 bicycles each day. Find the total number of bicycles manufactured for the month of July?
5. A helicopter covers 600 km. in 1 hour. How much distance will it cover in 4 hours?

   Express your answer in meters.

6. The total weight of a box of 5 biscuit packets of same size is 8kg 400 grams. What is the weight of each packet?

7. The distance between the school and the bus stop is 1 km 875 m. Everyday Gayatri walks both the ways to attend the school. Find the total distance she walked in 6 days?

8. The cloth required to make a shirt of school uniform for each boy is 1 m 80 cm. How many shirts can tailor stich using 40m. of cloth? How much cloth will be left?

9. The cost of petrol is ₹60 per litre. A petrol bunk sells 750 litres of petrol on a day. How much money do they get at the end of the day?

THINK, DISCUSS AND WRITE

1. You live in Ahmedabad and you travelled 400 m by bus to reach the nearest station. Then you take a train to reach Gandhi Nagar which is 15 km. away. Then you take a cab to reach your aunt's house which is 18 km. away.
   i. How much distance did you travel to reach your aunt's house?
   ii. If you travel for 7 days like this how much distance would you travel?

2. Every child in your school bring a water bottle containing 2 litres of water. If all the water is poured into a container which has 2 kilo litre capacity of water it was found that it needed 600 litre more to be filled. How many children poured water bottles in the container?

WHAT HAVE WE DISCUSSED?

1. Given two numbers, one with more digits is the greater number. If the number of digits in two given numbers is the same, that number is greater, which has a greater leftmost digit. If this digit also happens to be the same, we look at the next digit on the left and so on.

2. In forming numbers from given digits, we should be careful to see if the conditions under which the numbers are to be formed are satisfied. Thus, to form the greatest four digit number from 7, 8, 3, 5 without repeating a single digit, we need to use all four digits, the greatest number can have only 8 as the leftmost digit.

3. The smallest four digit number is 1000 (one thousand). It follows the largest three digit number 999. Similarly, the smallest five digit number is 10,000. It is ten thousand and follows the largest four digit number 9999.

   Further, the smallest six digit number is 1,00,000. It is one lakh and follows the largest five digit number 99,999. This carries on for higher digit numbers in a similar manner.

4. Use of commas helps in reading and writing large numbers. In the Indian system of numeration we have commas after 3 digits starting from the right and thereafter every 2 digits. The commas after 3^{rd} , 5^{th} and 7^{th} digits to separate thousand, lakh and crore respectively. In the International system of numeration commas are placed after every 3 digits starting from the right. The commas after 3^{rd} and 6^{th} digits to separate thousand and million respectively.

5. Large numbers are needed in many ways in daily life. For example, for counting number of students in a district, number of people in a village or town, money paid or received in large transaction (paying and selling), in measuring large distances say between various cities in a country or in the world and so on.

6. Remember that kilo means1000, Centi means 100^{th} part and milli means 1000 part. Thus, 1 kilometre = 1000 metres, 1 metre = 100 centimetres or 1000 millimetres etc.

7. There are a number of situations in which we do not need the exact quantity but need only a reasonable guess or an estimate. For example, while stating how many spectators watched a particular International hockey match, we state the approximate number, say 51,000, we do not need to state the exact number.

8. Estimation involves approximating a quantity to an accuracy required. Thus, 4,117 may be approximated to 4,100 or to 4,000, i.e. to the nearest hundred or to the nearest thousand depending on our need.

9. In number of situations, we have to estimate the outcome of number operations. This is done by rounding off the numbers involved and getting a quick, rough answer.

10. Use of numbers in Indo-Arabic system and International system.

Srinivasa Ramanujan (India)
1887 - 1920
He worked on the number. He is the first Indian elected to the fellow of Royal Society (England). 1729 is the Ramanujan's Number.
Mathematics Day is celebrated on 22nd December every year on his birth day.

A Postal Stamp was released by the Government of India in memory of Ramanujan in 2011. Govt. of India Declared 2012 as Maths year.