Large Numbers

Learning Objectives

At the end of this lesson, students will be able to:

- extend the place-value system to beyond 8 digits, in the Indian and the international systems.
- round numbers to the nearest ten, hundred, thousand and lakh.
- read and write Roman numbers up to 1000.

Warm Up

◆ Recall—Large numbers

The largest 6-digit number is _____.

1 more than 9,99,999 = 10,00,000. This is read as 10 lakhs. It is a 7-digit number.
The largest 7-digit number is _____.

1 more than 99,99,999 is 1,00,00,000. This is equal to 100 lakhs and read as 1 crore.
It is an 8-digit number.

Look at the 8-digit number 3,61,58,632 in a place-value chart.

CRORES	LAKHS		THOUSANDS		ONES		
Crores	Ten lakhs	Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones
3	6	1	5	8	6	3	2

It is read as:

three crore sixty-one lakh fifty-eight thousand six hundred thirty-two.

This number in the international place-vlaue chart is:

MILLIONS		THOUSANDS			ONES		
Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
3	6	1	5	8	6	3	2

It is read as:

thirty-six million one hundred fifty-eight thousand six hundred thirty-two.

Recall Exercise

A. Write the number names: 1) 54357   2) 524152   3) 7600309   4) 56126021

B. Write the number for the number names.

1) Twenty-eight thousand one hundred fourteen

2) Ninety thousand nine hundred ninety

3) Nine lakh fifty-four thousand six hundred one

4) Three lakh three

5) Five crore sixteen lakh twenty thousand five hundred thirty-one

6) Eighty-four million three hundred forty-nine thousand one hundred thirty-two.

C. How many:

1) tens make a lakh?   2) hundreds make a crore?   3) lakhs make a million?
    1000   100000

✦ Extension of the number system

Shown below is the place-value chart for the first nine places in the Indian number system. The table also shows the different periods. They are the ones period, the thousands period, the lakhs period and the crores period. The digits in the same period are read together.

CRORES		LAKHS		THOUSANDS		ONES		
Ten crores	Crores	Ten lakhs	Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones
7	0	3	4	5	6	7	1	0

The number in the place-value chart is read as:

Seventy crore thirty-four lakh fifty-six thousand seven hundred ten

Exercise 1.1

A. Write the place-value of the digit in blue.

1) 78,36,00,342 __6 lakhs__

2) 38,49,32,101 __40 Lakh__

3) 49,19,26,008 __6 Thousand__

4) 56,23,19,300 __20 Lakhs__

B. Write the following numbers in a place-value chart. Read them and write their number names.

1) 362412250

2) 70012020

3) 92400035

4) 274650132

5) 724999

6) 850402100

C. Write the numbers for the following number names.

1) Eight crore thirty-two lakh nineteen thousand three hundred five.
2) Seventeen crore twenty-six lakh nineteen thousand.
3) Sixty-four crore ninety-nine thousand nine hundred three.
4) Seventy-nine crore eighty thousand twelve.
5) Ninety-nine crore ninety-nine lakh ninety-nine thousand nine.

D. Fill in the missing numbers to continue the pattern.

1) 67,21,057 , 67,22,058 , _____ , _____ , _____

2) 3,40,51,278 , 3,41,51,278 , _____ , _____ , _____

3) 70,21,761 , 70,21,861 , _____ , _____ , _____

4) 6,72,26,021 , 6,82,26,021 , _____ , _____ , _____

5) 48,62,36,506 , 58,62,36,507 , _____ , _____ , _____

✦ Expanded form/order relation

You already know how to write a number in its expanded form. Here is an example.

$$54,734 = 50,000 + 4000 + 700 + 30 + 4$$

Larger numbers are written in the expanded form in the same way.

$$43,59,06,246 = 40,00,00,000 + 3,00,00,000 + 50,00,000 + 9,00,000 + 6000 + 200 + 40 + 6$$

Exercise 1.2

A. Write the following numbers in the expanded form. In each case write the place value of 3.

1) 385696
2) 4896593
3) 896753214
4) 302056709
5) 20803050
6) 64300060
7) 987654321
8) 340042119

B. Write the following in the standard form.

1) 6000000 + 500000 + 40000 + 3000 + 200 + 10 + 1
2) 800000000 + 90000000 + 3000000 + 800000 + 30000 + 20 + 2
3) 500000000 + 5000000 + 50000 + 500 + 5
4) 100000000 + 100 + 9
5) 6000000000 + 5000000 + 400000 + 70000 + 8000 + 90 + 1

✦ Comparing numbers

You already know how to compare two numbers. The same method is followed for comparing larger numbers.

- The number with greater number of digits is greater.
- If the number of digits is the same, compare the leftmost digits first. If these are the same, compare the next digits on the right. Continue until you find two digits that are different the number with the greater digit is greater.

Example 1: Compare 56934978 and 3856646.

56934978 is an 8-digit number; 3856646 is a 7-digit number.
Therefore 56934978 > 3856646

Example 2: Compare 464396789 and 463989789.

4 6 4 3 9 6 7 8 9

4 6 3 9 8 9 7 8 9

Both are 9-digit numbers.

The ten-crores and crores digits are the same.

Compare the 10 lakhs digits. Since 4 > 3, therefore 464396789 > 463989789

Exercise 1.3

A. Fill in the blank with > or <.

1) 38649586 **<** 48649586

2) 10040004 **>** 10030003

3) 123456789 **<** 987654321

4) 123456780 **<** 123456789

5) 878787878 **>** 87878787

6) 606060606 **>** 600606060

B. Arrange in ascending order.

1) 38547986, 385479860, 3854798, 385479850

2) 18653496, 338534896, 438534896, 99999999

3) 634398, 6664398, 66664398, 43986666

4) 5896349, 6896349, 5896348, 6896348

5) 22262222, 22622222, 26222222, 22226222

C. Arrange in descending order.

1) 3329567, 3426799, 3415999, 3025859

2) 123456789, 234567891, 345678912, 345678901

3) 5783421, 57834210, 578342100, 478342100

4) 78943025, 78940325, 78904325, 78094325

5) 921467352, 86345943, 73546265, 289453207

D. Write down the following.

1) largest 7-digit number
2) largest 8-digit number
3) smallest 8-digit number
4) smallest 9-digit number

E. Use the following digits to write the smallest and the greatest number you can form. Use each digit only once. The number should not start with 0.

1) 3, 4, 6, 0, 9, 8
2) 9, 8, 6, 0, 5, 4, 1
3) 7, 4, 3, 2, 1, 0, 6, 9
4) 2, 1, 0, 7, 9, 8, 6, 4, 3

F. Find the smallest and the greatest number in each group.

1) 567345, 5673045, 36734500, 39425060
2) 7654986, 5673205, 999999, 10000000
3) 683495670, 68349567, 58400906, 321111460
4) 123321123, 132231132, 213312213, 321123321

✦ International place-value chart

Place-value charts are not the same everywhere. Other than the Indian Place-Value System there is also an International Place-Value System, shown below.

MILLIONS			THOUSANDS			ONES		
Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
3	4	6	5	3	2	0	1	8

In this table there are 3 periods—the ones period, the thousands period and the millions period.

The number in the table is read as:

Three hundred forty-six million **five hundred thirty-two thousand** **eighteen**

In the International Place-Value System we use **hundred thousands** and **millions** instead of lakhs and crores.

1 lakh = 1 hundred thousand or 100,000	10 lakhs = 1 million
1 crore = 10 millions	10 crores = 100 millions

Read the numbers in this table.

MILLIONS			THOUSANDS			ONES		
Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
2	6	7	8	1	3	3	1	0
3	4	5	9	7	0	8	9	2

Exercise 1.4

A. Write the place value of the digit in blue in the International Place-Value System

1) 403,342,600
2) 18,319,203
3) 246,432,000
4) 25,036,018

B. Write the numbers in the International Place-Value System, and write them in an International Place-Value Chart.

1) Three hundred fifteen million six thousand four hundred sixty-five.
2) Six hundred five million two hundred eighty-five thousand two hundred fifty.
3) Nine hundred million eighty-nine thousand three hundred twenty-nine.
4) Sixty-two million four hundred thirty-two thousand six hundred ten.
5) Eight hundred six million eight thousand seventy-five.

✦ Rounding numbers

Let us recall the rules of rounding numbers.

Examples

- To round a number to the **nearest ten**, we round it to the multiple of ten nearest to it.
- A number which is midway is always rounded up.

26 → 30
132 → 130
825 → 830

- To round a number to the **nearest hundred**, we round it to the multiple of hundred nearest to it.
- A number which is midway is always rounded up.

826 → 800
1259 → 130
850 → 900

- To round a number to the **nearest thousand**, we round it to the multiple of thousand nearest to it.
- A number which is midway is always rounded up.

4826 → 500
1259 → 100
2500 → 300

We can now extend the rule of rounding, to the nearest ten thousand, lakh, ten lakh and so on.

Rounding to the nearest ten thousand

3 | 8, 2 4 9

Digit in the thousands place is 8.

Since 8 > 5, the number 38,249 is closer to 40,000 than 30,0

Thus the number is rounded to 40,000

5 | 1, 3 2 4

Digit in the thousands place is 1.

Since 1 < 5, the number 51,324 is closer to 50,000 than 60,

Number is rounded to _____

| 4 | 5,0 0 0 | The number is rounded to 50,000 |

Rounding to the nearest lakh

| 2 |, 5 6, 2 9 3 | Digit in the ten thousands place is 5 |

So change | 2 | to _____

Number is rounded to _____

| 5 |, 4 3, 1 0 2 | Digit in the ten thousands place is 4; 4 < 5 |

So | 5 | will remain as it is. The number is rounded to _____

| 8 |, 5 0, 0 0 0 | Number is rounded to _____

Exercise 1.5

A. Round the numbers to the nearest ten: 1) 28   2) 188   3) 250   4) 101

B. Round the numbers to the nearest hundred: 1) 252   2) 5389   3) 4500   4) 909

C. Round the numbers to the nearest thousand.

1) 4595   2) 64322   3) 999   4) 1500   5) 1495

D. Round the numbers to the nearest ten thousand.

1) 43,150   2) 53,109   3) 60,349   4) 79,432   5) 85,000

E. Round the numbers to the nearest lakh.

1) 1,56,932   2) 2,09,321   3) 4,18,399   4) 5,93,299   5) 8,50,000

F. Round the numbers to the nearest ten lakh.

1) 34,75,678   2) 49,80,031   3) 50,93,987   4) 85,00,000   5) 15,55,555

G. 1) 56,798 people saw a cricket match between India and Australia. Round the number to the nearest ten thousand for a newspaper headline.

2) The price of an apartment is ₹45,32,568. Round the price to the nearest ten lakh.

✦ Roman numbers

You already know that the Romans used a different system of writing numbers. They used the following seven letters of the alphabet to write all numbers.

Symbol (numeral)	I	V	X	L	C	D	M
Value	1	5	10	50	100	500	1000

There is no zero in the Roman system. An important difference between the Hindu-Arabic system and the Roman system is that the Roman system does not use place value.

Rule 1: Numerals I, X, C and M can be repeated to represent a number. Repetition of these numerals means addition.

e.g. II = 2, XXX = 30, CCC = 300, MM = 2000

The numerals I, X and C cannot be repeated more than 3 times in a number.

e.g. 4 is written as IV, not IIII.

Numerals V, L and D are not repeated.

Rule 2: A smaller numeral written to the right of a numeral of greater value is always added to the greater numeral.

e.g. VII = 5 + 2 = 7   XI = 10 + 1 = 11   LX = 50 + 10 = 60   MC = 1100

Rule 3: A smaller numeral written to the left of a numeral of greater value is always subtracted from the greater numeral.

e.g. IV = 5 – 1 = 4   XC = 100 – 10 = 90

CD = 500 – 100 = 400   CM = 1000 – 100 = 900

Rule 4: When a smaller numeral is placed between two numerals of greater value, it is always subtracted from the numeral immediately following it.

e.g. XXIX = 10 + 10 + (10 – 1) = 29   DIX = 500 + (10 – 1) = 509

The numeral I can be subtracted from V and X.

The numeral X can be subtracted from L and C.

The numeral C can be subtracted from D and M.

Numerals V, L and D are never subtracted.

Example 1: Write 3249 in the Roman number system.

3249 = 3000 + 200 + 40 + 9

= MMM + CC + XL + IX

= MMMCCXLIX

Example 2: Write MDCLXVII in the Hindu-Arabic system.

MDCLXVII = M + DC + LX + VII

= 1000 + 600 + 60 + 7

= 1667

Exercise 1.6

A. Write the following numbers in the Roman system.

1) 36
2) 39
3) 506
4) 791
5) 312
6) 979
7) 999
8) 731
9) 2800
10) 1347
11) 1526
12) 2350

B. Write the following numbers in the Hindu-Arabic system.

1) XXVII
2) XXXIX
3) DXC
4) LIX
5) DCCLXXVI
6) CMLXIX
7) CCXVII
8) CDIV
9) CMLXXI
10) MXXXIV
11) MCXI
12) MCCXLVII

MATHLETICS A
for concepts and calculation skills

1. What is the place value of 4 in 874569036 in the:

   a) Indian system? _____   b) International system? _____

2. Write the numbers:

   a) Ninety crore nine lakh eighty-eight thousand ten: _____

   b) Seven hundred seven million one hundred eighty-eight thousand six hundred one: _____

3. How many:

   a) millions in a crore? _____   b) lakhs in a million? _____

4. a) Arrange in ascending order: 3,27,27,345; 33,27,27,345; 2,72,72,745; 72,72,789

   _____

   b) Arrange in descending order: 11,296,311; 112,296,311; 13,296,311; 23,296,311

   _____

5. Use the digits 2, 4, 8, 1, 3, 5, 0, 9 to make the smallest and greatest 8-digit numbers without repeating any digit.

   Smallest: _____   Greatest: _____

6. **Mental Maths**

   a) What is 1 less than 5,00,00,000? _____

   b) What is 45,200 rounded to the nearest ten thousand? _____

   c) What is the sum of the place values of 5 in 5,78,215? _____

   d) Which number comes after the greatest 7-digit number? _____

   e) What is MCX in the Hindu-Arabic system? _____

MATHLETICS B
for higher skills

MCQs

1. One crore two hundred two is equal to:

   a) 1000220   b) 10000202   c) 1000000202   d) 100000202

2. 85,606 is rounded to 85,600. It is rounded to the nearest:

   a) 10   b) 100   c) 1000   d) Both a and b

3. 3,22,34,678 is bigger than which of the following?

   a) 3,34,678   b) 3,31,34,678   c) 34,500,000   d) 3,22,34,679

4. Which of these is a valid Roman number?

   a) IIII   b) XLL   c) VVV   d) LXXX

Higher order thinking

5. Find:
   a) 1 added to the largest 7-digit number: _____
   b) 1 subtracted from the smallest 8-digit number: _____
   c) 1 added to the largest 8-digit number: _____
   d) 1 subtracted from the smallest 9-digit number: _____

6. Ring the numbers that can be rounded to 6000 to the nearest 1000?
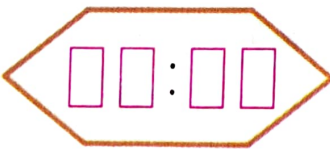
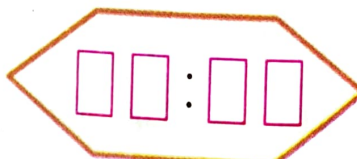   6213   5500   6500   6789   6666   5845

Cross-curricular

7. The distance from the earth to the moon is 3,84,400 km. What is the distance rounded off to the nearest lakh km? _____

Fun activity

8. These are 12-hour digital clocks.
   Fill in the digits on the clocks so that the digits have the smallest and greatest sums

   a) ⬡ □□ : □□ ⬡ = □   smallest sum

   b) ⬡ □□ : □□ ⬡ = □   greates

9. Place five Ys in the given grid so that there is not more than one Y in each row, column or diagonal.

   Hint – you can do it in 2 ways