

1 Large Numbers



Get Going

- Write the number names for the following.
 - 12345
 - 789654
 - 99999
 - 100000
- Write in expanded form.
 - 45678
 - 345678
 - 157162
 - 59002
- Write the ascending and descending orders of the following numbers.
 - 278569, 589562, 36790, 24678
 - 978564, 89370, 79875, 56726
 - 46752, 754761, 24687, 956781
 - 675346, 55555, 777777, 999999
- Write the face value and the place value of the circled digits.
 - 3⑨6781
 - 47⑤62
 - ⑨87527
 - 7②727
- Insert commas according to the International system of numerals.
 - 234567
 - 35892
 - 789654
 - 67890
- Insert commas according to the Indian system of numerals.
 - 12345
 - 123456
 - 64761
 - 975643
- Write the following numbers in Hindu-Arabic numerals.
 - XVI
 - LX
 - XC
 - XXIX
- Round off.
 - 84 to the nearest 10
 - 296 to the nearest 100
 - 1797 to the nearest 1000
 - 1291 to the nearest 1000

7-digit numbers

7-digit numbers begin at 1000000. If we place 1000000 in the Indian place value chart, we get,

Lakhs		Thousands		Ones		
TL	L	TTh	Th	H	T	O
1	0	0	0	0	0	0

We get the digit 1 in ten lakhs place, so we can say the number is **ten lakhs** in words and **10,00,000** in figures.

Thus, in the Indian system of numeration,

1000000 in words → ten lakhs 1000000 in figures → 10,00,000

When we write the same number 1000000 in the International place value chart we get,

Millions	Thousands			Ones		
M	HTh	TTh	Th	H	T	O
1	0	0	0	0	0	0

The digit 1 comes in the millions place, so we can express the number in words as **one million**. Using the rules for writing the number in figures and putting commas in appropriate positions we get → 1,000,000.

Thus, in the International system of numeration,

1000000 in words → One million 1000000 in figures → 1,000,000

The largest 7-digit number is → 9999999

We can express this number:

1. In words, in the Indian system of numeration → ninety-nine lakhs ninety-nine thousand nine hundred ninety-nine.
2. In figures, in the Indian system of numeration using commas in appropriate places → 99,99,999
3. In words, in the International system of numeration → nine million nine hundred ninety-nine thousand nine hundred ninety-nine.
4. In figures, in the International system of numeration using commas in appropriate places → 9,999,999

8-digit numbers

The smallest 8-digit number is 10000000. If we put in the Indian place value system and we move one place further to the left, that place is called the crore place.

Crores	Lakhs		Thousands		Ones		
C	TL	L	TTh	Th	H	T	O
1	0	0	0	0	0	0	0

The digit 1 comes in the crores place.

Thus, in the Indian system of numeration,

10000000 in words → one crore

10000000 in figures → 1,00,00,000

In the International place value chart we can write the number 10000000 as

Millions			Thousands			Ones		
HM	TM	M	HTh	TTh	Th	H	T	O
	1	0	0	0	0	0	0	0

The digit 1 comes in the ten millions place.

Therefore, in the International system of numeration,

10000000 in words → ten million

10000000 in figures → 10,000,000

The largest 8-digit number is → 99999999

The number can be expressed as:

1. In words, in the Indian system → nine crore ninety-nine lakh ninety-nine thousand nine hundred ninety-nine.
2. In figures, after putting commas in appropriate places for the Indian system → 9,99,99,999
3. In words, in the International system → ninety-nine million nine hundred ninety-nine thousand nine hundred ninety-nine.
4. In figures, after putting commas in appropriate places we write as → 99,999,999

We understand a number when we write it in a place value chart.

Example: 1234567 is a 7-digit number. To understand the number we draw a place value chart of the number as follows.

Lakhs		Thousands		Ones		
TL	L	TTh	Th	H	T	O
1	2	3	4	5	6	7

$\frac{12 \text{ lakhs}}{12,00,000}$	$\frac{34 \text{ thousands}}{34,000}$	$\frac{5 \text{ hundreds}}{500}$	$\frac{6 \text{ tens}}{60}$	$\frac{7 \text{ ones}}{7}$
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Expanded notation $\rightarrow 12,00,000 + 34,000 + 500 + 60 + 7$

In words \rightarrow twelve lakh thirty-four thousand five hundred sixty-seven

Example: 12345678 is an 8-digit number. Let us understand it by the place value chart.

Draw the place value chart:

Crores		Lakhs		Thousands		Ones		
TC	C	TL	L	TTh	Th	H	T	O
	1	2	3	4	5	6	7	8

1 crore	23 lakhs	45 thousands	6 hundreds	7 tens	8 ones
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Expanded notation $\rightarrow 1,00,00,000 + 23,00,000 + 45,000 + 600 + 70 + 8$

In words \rightarrow one crore twenty-three lakh forty-five thousand six hundred seventy-eight

Example: Represent 12345678 in the International system of numeration.

Solution: 12345678 is an 8-digit number.

In the International system of numeration the place value chart looks like as follows.

Millions		Thousands			Ones		
TM	M	HTh	TTh	Th	H	T	O
1	2	3	4	5	6	7	8

Number →

12 millions 345 thousands 6 hundreds 7 tens 8 ones

Expanded notation

In figures → $12,000,000 + 345,000 + 600 + 70 + 8$

In words → twelve million three hundred forty-five thousand six hundred seventy-eight

We can express any number by placing the number in a place value chart of either Indian or International systems of numeration. The numbers can be written in figures and expressed in words according to the position of the digit in the place value chart.

Successor and predecessor of a number

Successor: To get the successor of a number, add 1 to it.

Successor of any number = number + 1

Example: Find out the successor of 24531786.

Add 1 to 24531786 → $24531786 + 1 = 24531787$

So, 24531787 is the successor of 24531786.

Predecessor: To get the predecessor of a number, subtract 1 from it.

Predecessor of any number = number - 1

Example: Find out the predecessor of 76512348.

Subtract 1 from 76512348 → $76512348 - 1 = 76512347$

So, 76512347 is the predecessor of 76512348.

Comparing numbers

1. When the number of digits are different, the number with more digits is always greater.

Example: Compare 7890564 and 62537984

7890564 \rightarrow It is a 7-digit number.

62537984 \rightarrow It is an 8-digit number.

Therefore, $62537984 > 7890564$

Or $7890564 < 62537984$

2. When the number of digits are same, compare each digit starting from the left. Stop when the digits are different.

Example: Compare 24680975 and 24681476.

Compare digit to digit of the numbers. Start from the left.

$2 = 2 \rightarrow$ Same

$4 = 4 \rightarrow$ Same

$6 = 6 \rightarrow$ Same

$8 = 8 \rightarrow$ Same

$0 < 1 \rightarrow$ Different

C	TL	L	TTh	Th	H	T	O
2	4	6	8	0	9	7	5
2	4	6	8	1	4	7	6

So, $24681476 > 24680975$

Or $24680975 < 24681476$.

Project

EXPERIENTIAL LEARNING

Use the Internet to find the following.

- a) Find the population of the biggest state in India.
- b) Find the population of the smallest state in India.
- c) Find the population of the smallest country in the world.

Forming numbers

Greatest and smallest numbers

You can write the greatest and the smallest numbers by arranging the digits as given.

Greatest number → arrange the digits from the greatest to the smallest

Smallest number → arrange the digits from the smallest to the greatest

Example: Form the greatest and the smallest numbers with digits 9, 5, 7, 4, 6, 2, 0 and 8.

Greatest number — Arrange the digits from the greatest to the smallest.
→ 98765420.

Smallest number — Arrange the digits from the smallest to the greatest.
Here, 0 is the smallest digit. But Number starting with 0 has no meaning. Write the next smallest digit first. Place 0 after this digit. Arrange the next digits from the smallest to greatest.
→ 20456789.

Maths Tip

While forming the smallest number from the digits where 0 is one of the digit, remember that we can not start the number from 0 because 0 at the beginning has no meaning. Begin the number with the next smallest digit and write 0 in the second place. Keep arranging from the smallest to the greatest digits.

Ascending and descending order

Ascending order → arranging the numbers from the smallest to the greatest

Descending order → arranging the numbers from the greatest to the smallest

Example: Arrange the following numbers in ascending and descending orders.

24762587 52672456 19072478 75298643

Ascending order → smallest to greatest

All the numbers are 8-digit numbers. Start comparing from the extreme left.

The number 19072478 has digit 1 on the extreme left. So, it is the smallest.

The number 24762587 has digit 2 on the extreme left. So, it is in the second place.

The number 52672456 has digit 5 on extreme left. So, it is in the third place.

The number 75298643 has digit 7 on the extreme left. So, it is the largest.

Therefore, ascending order of the given numbers is:

19072478, 24762587, 52672456, 75298643

Now, descending order is just the opposite: greatest to smallest.

75298643, 52672456, 24762587, 19072478



Exercise 1

1. Make the place value chart for both Indian and International systems of numeration of the following numbers.
 - a) 4376521
 - b) 3724902
 - c) 9754632
 - d) 75896432
 - e) 86410576
2. Write the following numbers in figures.
 - a) five crore forty-three lakh seventy-two thousand two hundred three
 - b) six million nine hundred twenty thousand seven hundred five
 - c) twenty-three crore twenty-four lakh twenty-five thousand five hundred five
 - d) forty-seven million fifty-three thousand nine hundred nine
 - e) seventy-five lakh seventy-six thousand seven hundred eighty-three
 - f) ten million six hundred three
3. Write the expanded notation for the following numbers.
 - a) 2,47,79,508
 - b) 56,213,724
 - c) 23,56,948
 - d) 72,547,825
 - e) 9,23,47,256
 - f) 9,628,958
4. Compare the numbers using $<$ or $>$.
 - a) 9725461 and 23456789
 - b) 6789054 and 67891782
 - c) 4567890 and 4569807
 - d) 12345678 and 1234567
 - e) 87253426 and 87253462
5. Form the smallest and the largest possible numbers with the following digits.
 - a) 9, 8, 7, 6, 5, 4, 3
 - b) 4, 7, 0, 2, 5, 3, 6, 8
 - c) 3, 0, 5, 9, 2, 8, 7
 - d) 3, 5, 7, 9, 2, 1, 4, 6

6. Write the successor and the predecessor of the following numbers.

- a) 4678543 b) 87250000 c) 9999999 d) 10000000

7. Write the following numbers in ascending and descending orders.

- a) 3825431, 4926795, 1729385, 8526475
b) 41924562, 72645942, 95432784, 85692475
c) 6257089, 95342781, 7659432, 57289643
d) 567894, 23456789, 4678539, 72345690

Spot Check

1. Make the place value chart for both Indian and International systems of numeration of 61597423.
2. Write the expanded notation for the following numbers.
a) 65,27,269 b) 567,432
3. Compare the numbers using $<$ or $>$.
7294685 and 7294865
4. Form the smallest and the largest possible numbers with the following digits.
a) 8, 2, 5, 7, 6, 5, 0 b) 8, 6, 4, 2, 9, 0, 7, 6
5. Write the successor and the predecessor of the following.
a) 2497254 b) 2000999

Rounding off numbers

Sometimes we do not need to know the exact numerical value. A number close to the actual numerical value serves the purpose. The approximate value is enough to give an idea about the actual value. About or around indicates close by value.

Example: Actual distance from Delhi to Chandigarh is 275 km, but to get an idea we generally say it is approx 300 km. This approximation is called rounding off. This is for the convenience to understand better.

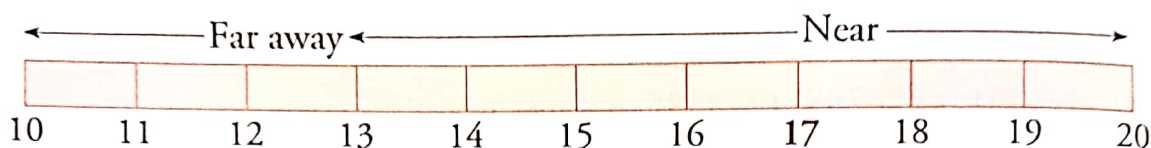
Numbers can be rounded off nearest to 10, 100, 1000 and so on.

Rounding off to the nearest 10

To round off a number to the nearest 10, we have to first find out between which two tens the number lies. Look at the digit on the extreme right. If the digit is less than 5 it is rounded off to the previous 10 and if the digit is equal to or greater than 5 then it is rounded off to the next 10.

Example: Round off 17 to the nearest 10.

Draw a number line from 10 to 20.



Step 1: To round off to the nearest 10, find between which 2 multiples of 10, the number lies.

Step 2: The number lies between 10 and 20.

Step 3: Find out that the number is close to which multiple of 10.

Step 4: Number 17 is nearer to 20.

Step 5: So, number 17 is rounded off to 20.

Example: Round off 73 to the nearest 10.

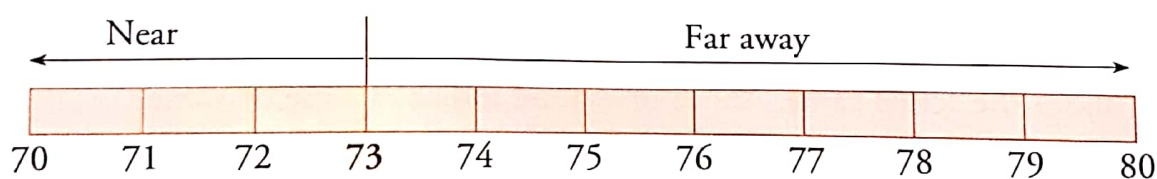
Step 1: To round off to the nearest 10, find between which 2 multiples of 10, the number lies.

Step 2: The number lies between 70 and 80.

Step 3: Find out that the number is close to which multiple of 10.

Step 4: The number 73 is closer to number 70.

Step 5: So, number 73 is rounded off to 70.



Rounding off to the nearest 100

To round off a number to the nearest 100, we have to first find out between which two hundreds the number lies. Look at the two digits on the extreme right. If the number formed by the two digits is less than 50 it is rounded off to the previous 100 and if the number formed by the two digits is equal to or greater than 50 then it is rounded off to the next 100.

Example:

- a) The number 6254 lies between 6200 and 6300. The number formed by the two digits on the extreme right is 54. $54 > 50$. Therefore, the number is rounded off to the next 100, that is, 6300.
So, the number 6254 is rounded off to 6300.
- b) The number 7521 lies between 7500 and 7600.
Number formed by 2 digits on the extreme right is 21.
 $21 < 50$
So, the number is rounded off to the previous 100, that is, 7500.
So, the number 7521 is rounded off to 7500.
- c) The number 6750 lies between 6700 and 6800.
Number formed by 2 digits on the extreme right is 50.
 $50 = 50$.
Number is rounded off to the next, 100, that is, 6800.
So, the number 6750 is rounded off to 6800.

Rounding off to the nearest 1000

The method is similar to rounding off to nearest 10 and 100. Here, you have to look at the number formed by the three digits on the extreme right.

- a) If the number is less than 500, it is rounded off to the previous 1000.
b) If the number is equal to or greater than 500, it is rounded off to the next 1000.

Example:

1. The number 9470 lies between 9000 and 10,000.
Number formed by the 3 digits on the extreme right is 470.
 $470 < 500$
So, the number is rounded off to the previous 1000, that is, 9000.
Therefore number 9470 is rounded off to 9000.
2. The number 7620 lies between 7000 and 8000.
Number formed by the 3 digits on the extreme right is 620.
 $620 > 500$
So, the number is rounded off to the next 1000, that is, 8000.
Therefore, number 7620 is rounded off to 8000.
3. The number 4500 lies between 4000 and 5000.
Number formed by the 3 digits on the extreme right is 500. $500 = 500$.
So, the number is rounded off to the next 1000, that is, 5000.

Maths Tip

Date and time cannot be rounded off.

**Exercise 2**

Round off the numbers to the nearest 10, 100 and 1000.

- | | | | |
|-------------|-------------|-------------|-------------|
| a) 2456782 | b) 5678948 | c) 9764325 | d) 7312677 |
| e) 39472954 | f) 47295679 | g) 82571745 | h) 62579828 |

Place value and face value

We have studied earlier that the place value of a digit is decided by its position in the number. The face value is the value of the digit by itself.

Place value can also be defined as the product of the place and the face value.

Let us take the number 1234567.

We know that the face value is the value of the digit itself. So, face value of 1 is 1, face value of 2 is 2, face value of 3 is 3, face value of 4 is 4 and so on.

Face value of any digit does not depend on the position in the number whether expressed in the Indian or the International systems of numeration.

However, place value is different. To understand the place value we have to arrange the numbers in a place value chart, both in the Indian and the International systems of numeration.

Example: Find the place value of 1234567 in the Indian and International system of numeration.

The Indian system of numeration

Lakhs		Thousands		Hundred	Tens	Ones
TL	L	TTh	Th	H	T	O
1	2	3	4	5	6	7
12 lakhs		34 thousands		5 hundreds	6 tens	7 ones

The International system of numeration

Millions	Thousands			Ones		
M	TTh	Th	Th	H	T	O
1	2	3	4	5	6	7
↓	↓			↓	↓	↓
1 million	234 thousands			5 hundreds	6 tens	7 ones

We know,

$$\text{Place value} = \text{Face value} \times \text{Place of the digit}$$

Place value in the Indian system

Digit	Place value
1	$1 \times 10,00,000 = 10,00,000$
2	$2 \times 1,00,000 = 2,00,000$
3	$3 \times 10,000 = 30,000$
4	$4 \times 1000 = 4000$
5	$5 \times 100 = 500$
6	$6 \times 10 = 60$
7	$7 \times 1 = 7$

Place value in the International system

Digit	Place value
1	$1 \times 1,000,000 = 1,000,000$
2	$2 \times 100,000 = 200,000$
3	$3 \times 10,000 = 30,000$
4	$4 \times 1000 = 4000$
5	$5 \times 100 = 500$
6	$6 \times 10 = 60$
7	$7 \times 1 = 7$

We notice that the place value of any digit remains same regardless of the system of numeration (Indian/International). Of course when we write in words, the expression is different and in figures the position of commas are different.

Example:

In figures (Indian system)

10,00,000

In figures (International system)

1,000,000

In the Indian system – ten lakh

In the International system – one million

Activity

Read the clues and identify the correct number from the given options:

- ❖ I am an odd number.
- ❖ I am less than half a million.
- ❖ Three times of me will be more than a million.

3,04,583; 4,00,001; 3,05,674

**Exercise 3**

1. Write the place value of the circled digits. While writing the place value put commas as per both the Indian and International systems of numeration.

a) 123④678

b) 987⑥5432

c) 65497⑧25

d) 7⑨65421

e) ②3456789

f) 68432①7

2. Write the face value of the circled digits.

a) 59④52

b) 69⑤432

c) 735④32

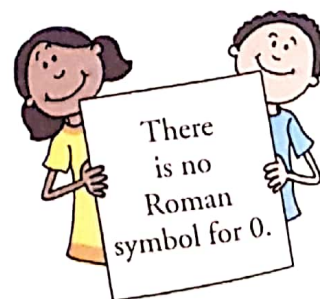
d) 6②54305

e) 2③456789

Roman numerals

We have studied about Roman numerals in earlier classes.

Roman numerals/symbols	Hindu-Arabic numerals
I	1
V	5
X	10
L	50
C	100
D	500
M	1000



Think and Answer

A fifteen-storey hotel with floors G, 1, 2,, 14 has no accommodation on the ground floor. On the even numbered floors (2, 4, 6,) there are 27 guest rooms and on the odd numbered floors there are 21 guest rooms on each floor. How many guest rooms are there in the hotel?

Now to write the numbers, let us remember the rules.

1. *The letters I, X, C and M can be repeated not more than 3 times.*

Examples: II = 2 XX = 20 III = 3 XXX = 30

We cannot write IIII and XXXX to express 4 and 40 respectively.

2. *When one or more symbols are placed after the symbol of a greater value, the values are added.*

Examples: VI $\xrightarrow{5+1}$ 6 VIII $\xrightarrow{5+1+1+1}$ 8
XV $\xrightarrow{10+5}$ 15 LX $\xrightarrow{50+10}$ 60
CL $\xrightarrow{100+50}$ 150 DC $\xrightarrow{500+100}$ 600
MD $\xrightarrow{1000+500}$ 1500 MCC $\xrightarrow{1000+100+100}$ 1200

3. *When a symbol is placed before the symbol of a greater value, the value of the symbol is subtracted.*

Examples:

a) IX = 10 - 1 = 9 b) CM = 1000 - 100 = 900 c) CD = 500 - 100 = 400



Exercise 4

1. Write the following in Hindu-Arabic numerals.

a) XVIII

b) XXXVI

c) LXXXVII

d) LXV

e) DCC

f) DCVII

2. Write the following in Roman numerals.

a) 56

b) 102

c) 26

d) 59

e) 67

f) 400

3. Find out the answers for the following.
 - a) XCV is lesser or greater than 90.
 - b) DL is lesser or greater than 595.
 - c) DCCIX is lesser or greater than 700.
 - d) CDLXX is lesser or greater than 525.
 - e) CXLVI is lesser or greater than 60.
 - f) CCXL is lesser or greater than 210.
4. Write the number names of the following numbers in both the Indian and the International systems of numeration.

a) 76854320	b) 6954321	c) 95642378
d) 8572986	e) 59278431	f) 4729574
5. Write in figures using commas at appropriate places.
 - a) ten million seven hundred thousand two hundred seven
 - b) five crore ninety-nine lakh ninety thousand five hundred seventy-eight
 - c) seventy million eight hundred thousand nine hundred ninety-nine
 - d) nine crore eighty-seven lakh seventy thousand eight hundred seventy-five
 - e) ninety-seven million five hundred thousand six hundred seventy-five
 - f) seven crore sixty-nine lakh ninety-six thousand two hundred fifty-six
6. Arrange the following numbers both in ascending and descending orders.
 - a) 72937456, 6995727, 53142729, 9475278
 - b) 97356829, 79528436, 82759431, 53132348
 - c) 7965432, 8256731, 9476543, 2795684
7. Write the following numbers in expanded form.

a) 24978999	b) 69995000	c) 1234567	d) 6543218
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8. Write the predecessor and the successor of the following numbers.

a) 24978999	b) 7564379	c) 89257900
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9. Form the greatest and the smallest numbers with the following digits.

a) 2, 5, 6, 0, 7, 8, 9	b) 3, 7, 0, 9, 8, 6, 5, 4
c) 7, 9, 5, 3, 6, 2, 8	d) 9, 2, 8, 6, 7, 4, 3, 5

10. Round off the following numbers as directed.

- a) 27985673 \rightarrow to the nearest 10
- b) 4956788 \rightarrow to the nearest 100
- c) 9875463 \rightarrow to the nearest 1000

11. Write the place value and the face value of the circled digits.

- a) 925⑦6543 b) 7②54583 c) 854639⑥ d) ⑤489753

12. Write the following numbers in Roman numerals.

- a) 456 b) 333 c) 786

13. Write the following numbers in Hindu-Arabic numerals.

- a) LXV b) XCIX c) LXXXVIII



Mental Maths

EXPERIENTIAL LEARNING

Solve the following.

1. Circle two adjacent numbers that should be interchanged so that the following numbers are in the correct ascending order:
4547353, 5893834, 5987928, 7898988, 6873883, 8543433
2. How many zeros will be there in the rounded off form of the number 8543455 when rounded off to the nearest 1000?
3. The numbers in a clock are written in the form of Roman numerals. How many times will X be used in the clock?
4. How many different 7-digit numbers can be formed from the digits 0, 0, 0, 0, 0, 0 and 1?
5. Write $<$, $>$ or $=$ in the blanks.
 - (a) one lakh _____ one million
 - (b) ten thousand _____ ten million
 - (c) ten lakh _____ one million

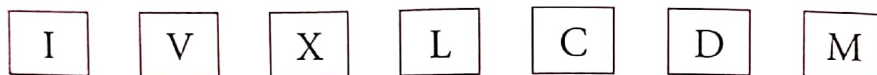


Maths Lab Activity

EXPERIENTIAL LEARNING

Objective: to play with Roman numerals

Material needed: 5 packs of Roman numeral cards



Steps: 1. Write your name in capital letters. **Example:** SOURAV

2. Give numeral values to each alphabet like A = 1, B = 2, C = 3 Z = 26.

3. Find the numeral value of SOURAV.

$$\begin{array}{|c|} \hline S \\ \hline 19 \\ \hline \end{array} + \begin{array}{|c|} \hline O \\ \hline 15 \\ \hline \end{array} + \begin{array}{|c|} \hline U \\ \hline 21 \\ \hline \end{array} + \begin{array}{|c|} \hline R \\ \hline 18 \\ \hline \end{array} + \begin{array}{|c|} \hline A \\ \hline 1 \\ \hline \end{array} + \begin{array}{|c|} \hline V \\ \hline 22 \\ \hline \end{array} = \begin{array}{|c|} \hline 96 \\ \hline \end{array}$$

4. Use Roman numeral cards and express 96 in Roman numerals. 96 = XCVI



Worksheet

EXPERIENTIAL LEARNING

1. Tick (✓) the correct option.

a) The place value of 8 in 86,04,600 is

i) lakhs

ii) eighty lakhs

iii) eight ten lakhs

iv) both (ii) and (iii)

b) The numeral for ninety crore nine hundred is

i) 90,00,90,000

ii) 90,00,900

iii) 90,00,00,900

iv) none of these

- c) The number name of 160,045,310 is
- sixteen million forty five thousand three hundred ten
 - one hundred sixteen million four hundred five thousand three
 - one hundred sixty million forty-five thousand three hundred ten
 - none of these
- d) 80808080 is the successor of
- 80808099
 - 80808081
 - 80808079
 - 80808001
- e) 965345 when rounded off to the nearest thousand gives
- 965000
 - 966000
 - 970000
 - none of these
- f) The Roman numeral for 869 is
- DCCCLXIX
 - DDCXLIX
 - MLXIX
 - CCCDIX
- g) The smallest 7-digit number is
- 1000000
 - 1 + greatest 6-digit number
 - both (a) and (b)
 - 1000001
- h) The numeral for sixty million sixty-six is
- 60000060
 - 600000666
 - 60000066
 - 600066
- i) The number of zeros in 100 million are
- 7
 - 8
 - 9
 - 6
- j) The face value of 3 in 31005660 is
- 3 crores
 - 30 lakhs
 - 3
 - none of these