

Learning objectives

1.1 Numerals and Number Names

1.2 Place value and Face value

1.3 Roman Numbers

1.4 Estimation

1.5 Formation of Numbers

1.6 Ascending and Descending order

1.1 NUMERALS AND NUMBER NAMES**Indian System of Numeration**

Period →	Crores		Lakhs		Thousands		Ones		
Number ↓	Ten crores	Crores	Ten lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones
72053419		7	2	0	5	3	4	1	9
154039846	1	5	4	0	3	9	8	4	6

The table shows the different periods. (ones period, thousands period, lakhs period and crores period.)

The number and number name for the number in the table are :

N numeral	Number name
7,20,53,419	Seven crore twenty lakh fifty three thousand four hundred nineteen
15,40,39,846	Fifteen crore forty lakh thirty nine thousand eight hundred forty six

**Olympiad Bite**

- The digits in the same period are read together.
- Commas are inserted after each period.

International System of Numeration

Period →	Millions			Thousands			Ones		
Number ↓	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
72053419		7	2	0	5	3	4	1	9
154039846	1	5	4	0	3	9	8	4	6

The table shows the different periods (ones period, thousands period and millions period)

The numbers and number names for the numbers in the table are as follows :

Numerals	Number names
72,053,419	Seventy two million fifty three thousand four hundred nineteen
154,039,846	One hundred fifty four million thirty nine thousand eight hundred forty six

1.2 PLACE VALUE AND FACE VALUE

Consider the number 72053419

The place value and face value of each digit in the above number is as follows :



Olympiad Bite

- 1 crore = 100 lakhs = 10 millions
- 10 crores = 100 millions
- 10 lakhs = 1 million
- Predecessor = Given number - 1
- Successor = Given number + 1

Indian System

	Crores		Lakhs		Thousands		Ones		
	Ten crores	Crores	Ten lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones
Place value		70000000	2000000	0	50000	3000	400	10	9
Face value		7	2	0	5	3	4	1	9

International System

	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	Place value		70000000	2000000	0	50000	3000	400	10
Face value		7	2	0	5	3	4	1	9

Expanded Form and Short Form

$$\underbrace{24680590}_{\text{Short form}} = \underbrace{20000000 + 4000000 + 600000 + 80000 + 500 + 90}_{\text{Expanded form}}$$

SELF TEST - 1

- The place value of the digit '5' in the number 2560712 is _____.
 (A) 5000 (B) 500000
 (C) 5 (D) 500
- 10 millions = _____ lakhs.
 (A) 100 (B) 10
 (C) 1 (D) 1000
- In which of the following numbers, commas are inserted according to international place value chart?
 (A) 6,03,53,252 (B) 6,03,35,252
 (C) 6,30,35,252 (D) 6,03,53,522
- The predecessor of 14031091 is _____.
 (A) 14031093 (B) 14031090
 (C) 14031089 (D) 14031092
- Six crore three lakh thirty five thousand two hundred fifty two is written as _____.
 (A) 6,03,53,252 (B) 6,03,35,252
 (C) 6,30,35,252 (D) 6,03,53,522

1.3 ROMAN NUMBERS

Roman Numbers	I	V	X	L	C	D	M
Hindu Arabic Numerals	1	5	10	50	100	500	1000

Following are the rules used while writing the numerals in Roman system :

1. I, X, C and M can be repeated to represent a number.
2. A smaller numeral written to the right of a numeral of greater value is always added to the greater numeral.
3. A smaller numeral written to the left of a numeral of greater value is always subtracted from the greater numeral.



Olympiad Bite

- No symbol can repeat more than 3 times.
- There is no symbol in Roman system to represent zero (0).

1.4 ESTIMATION

Nearest Tens

42568 $\boxed{9}$ 2 is rounded off to 4256890.

Nearest Hundreds

4256 $\boxed{8}$ 92 is rounded off to 4256900.

SELF TEST - 2

1. MCDXLIX = _____.
(A) 1478 (B) 1659
(C) 1449 (D) 1649
2. The number 54689124 when rounded off to the nearest thousands gives _____.
(A) 54689200 (B) 54689100
(C) 54680000 (D) 54689000
3. The greatest 7 - digit number that can be formed by using the digits 2, 0, 1, 5 and 6 (using each digit atleast once) is _____.
(A) 6665201 (B) 6665210
(C) 6005612 (D) 6500126
4. A number when rounded off to the nearest hundreds gives 35000. Find the smallest possible value of the number.
(A) 33999 (B) 34950
(C) 34600 (D) 34550
5. Roman numeral for 3589 is _____.
(A) MMMDLXXXIX (B) MMCMDLXXIX
(C) MMCMDLXIX (D) MMMCDLXXIX

Nearest Thousands

425 $\boxed{6}$ 892 is rounded off to 4257000.

1.5 FORMATION OF NUMBERS

Form the greatest and the smallest 7 - digit numbers with the digits 5, 2, 4, 0, 1, 3 and 6.

Without Repetition

Greatest number formed = 6543210

Smallest number formed = 1023456

With Repetition

Greatest number formed = 6666666

Smallest number formed = 1000000

1.6 ASCENDING AND DESCENDING ORDER

Consider the numbers

4567251, 5210768 and 3459612

Ascending order (smallest to greatest) is,

3459612, 4567251, 5210768

Descending order (greatest to smallest) is,

5210768, 4567251, 3459612

EXERCISE

1. Which of the following options makes the given expression true?

$$302568 \square 108256$$

- (A) > (B) <
(C) = (D) Can't be determined

2. The number 52612 when rounded off to the nearest tens becomes _____.

- (A) 52500 (B) 52610
(C) 52600 (D) 52000

3. If the number of trees in a plantation is 4200 when rounded off to the nearest hundreds, then what is the greatest number of trees in the plantation?

- (A) 4199 (B) 4159
(C) 4059 (D) 4099

4. Numeral for seven million three hundred eighty three thousand four hundred ninety five is _____.

- (A) 7,384,395 (B) 7,833,495
(C) 7,383,495 (D) 73,83,495

5. Form the greatest 6-digit odd number, using all the given below digits at least once.

5 3 1 0

- (A) 555310 (B) 500531
(C) 505331 (D) 555301

6. 252,105 written in words as _____.

- (A) Two hundred fifty-two one hundred and five
(B) Two hundred and fifty-two hundred one hundred and five
(C) Two hundred fifty two thousand one hundred and five
(D) Two hundred and fifty thousand twenty hundred and five

7. What is the missing number in the box?

$$300 \text{ thousands} + 100 \text{ hundreds} + 520 \text{ tens} = \square$$

- (A) 300152 (B) 301520
(C) 310520 (D) 315200

8. The sum of the face values of all the digits of 546823 is _____.

- (A) 28 (B) 25
(C) 22 (D) None of these

9. In the number 7468937, the digit 4 stands for _____.

- (A) 4 hundred thousands (B) 4 thousands
(C) 40 thousands (D) 40 lakhs

10. Which of the following is the greatest?

- (A) CMX (B) CDXL
(C) MMX (D) MCM

11. Place value and face value of a number is always equal at _____.

- (A) Ones place (B) Tens place
(C) Hundreds place (D) Thousands place

12. The value of MMDCCCLXXIII = _____.

- (A) 2653 (B) 2753
(C) 2773 (D) 2673

13. The greatest 6-digit number formed by the given digits (using each digit only once) is _____.

4 1 3 0 5 6

- (A) 654310 (B) 546310
(C) 653410 (D) 654301

14. _____ is rounded off to the nearest thousands gives 60000.

- (A) 54999 (B) 58999
(C) 59199 (D) 59999

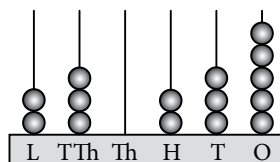
15. Hindu Arabic numeral for DCLXXIV is _____.

- (A) 684 (B) 674
(C) 604 (D) 584

16. Which digit will come in place of thousands in the product of 250 and 45?

- (A) 1 (B) 2
(C) 8 (D) 5

17. The number shown by the given abacus is _____.



- (A) 230325 (B) 230235
(C) 320235 (D) 231325

18. In 7,543,258 the digit 4 stands for _____.

- (A) 4 thousand (B) 4 ten thousand
(C) 4 hundred (D) 4 million

19. The best estimate for 8045×302 is _____.

- (A) 8000×300 (B) 8000×350
(C) 9000×300 (D) 9000×350

20. Which of the following options is arranged in descending order?

- (A) 5034; 7056; 80431; 10569
(B) 82540; 72042; 42035; 10568
(C) 6051; 10,268; 24561; 54685
(D) 1029; 50552; 30251; 44162

21. Compare and fill the box.

CMLXV MCCXLV

- (A) > (B) <
(C) = (D) Can't be determined

22. Find the missing value.

$5765403 = 57$ lakhs + _____ thousands + 4 hundred + 3

- (A) 56 (B) 6
(C) 65 (D) 54

23. Eighty million two hundred forty seven thousand five hundred sixty one is written in numerals as _____.

- (A) 80,247,561 (B) 82,047,561
(C) 80,427,561 (D) 8,042,756,1

24. NGO P collected 72,53,052 books and NGO Q collected 45,56,759 books at a charity drive. Which NGO collected more number of books?

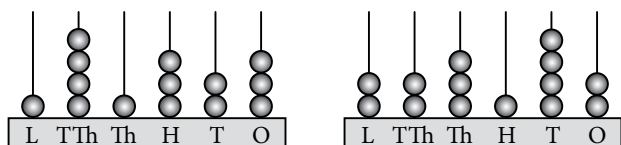
- (A) NGO Q (B) NGO P
(C) Both collected equal books
(D) Can't be determined

25. The correct descending order of the given roman numbers is _____.

CMXV CDLII DCCXV
P Q R

- (A) P, Q, R (B) P, R, Q
(C) Q, R, P (D) R, P, Q

26. The sum of the numbers on the given two abacuses is _____.



- (A) 364465 (B) 264460
(C) 300565 (D) 365460

27. Add 1 to the largest 5-digit number gives _____.

- (A) 10000 (B) 100000
(C) 99998 (D) 1000000

28. Abhinav scored MMCCCIX runs in a year. What is the Hindu-Arabic number for this Roman number?

- (A) 2211 (B) 2209
(C) 2311 (D) 2309

29. The sum of place value and face value of the digit '6' in the number 728649 is _____.

- (A) 606 (B) 66
(C) 660 (D) 600

30. Predecessor of greatest 7-digit even number is _____.

- (A) 9999999 (B) 9999996
(C) 9999997 (D) None of these

31. Sum of place values of the digits in 750640 is _____.

- (A) 0 (B) 22
(C) 750640 (D) None of these

32. Successor of greatest 5-digit number formed from the digits 2, 3, 5, 1, 4 (using all digits) is _____.

- (A) 53420 (B) 53422
(C) 54320 (D) 54322

33. The maximum number of times a roman symbol repeats is _____.

- (A) 1 (B) 2
(C) 3 (D) 4

34. The expanded form of 5678910 is

- (A) $5000000 + 600000 + 70000 + 8000 + 900 + 10$
(B) $500000 + 600000 + 70000 + 8000 + 900 + 10$
(C) $5000000 + 60000 + 70000 + 8000 + 910$
(D) $5000000 + 6000 + 700000 + 8000 + 900 + 10$

35. Hundred lakhs = _____

- (A) 10 millions (B) 1 million
(C) 100 millions (D) 10 crores

36. Successor of 3008999 is _____.

- (A) 3008989 (B) 3009000
(C) 30008998 (D) 30009001

37. Sum of place values of digits 4, 3 and 5 in the number 3564210 is _____.

- (A) 3504000 (B) 3500400
(C) 3500 (D) 35400

38. Predecessor of CMLXIX is _____.

- (A) 870 (B) 970
(C) 968 (D) 869

39. Nakul wrote a number in words as follows.
Eleven lakh fifteen thousand one hundred and eleven.
Which of the following represents Nakul's number?

- (A) 1105111 (B) 1125111
(C) 1115111 (D) None of these

40. Which of the following roman numerals cannot be subtracted?

- (A) C (B) I
(C) V (D) X

41. A number when rounded off to the nearest thousands becomes 15000. Which of the following could be the number?

- (A) 15525 (B) 14280
(C) 15969 (D) 14675

42. Which of the following roman numeral is smallest?

P : CDXVI; Q : DCCVII; R : CCLXII

- (A) P (B) Q
(C) R (D) Can't be determined

43. Using all the digits given below, form the greatest possible 7-digit even number where repetition of digit is allowed.

8 3 1 9

- (A) 9888319 (B) 9999831
(C) 9999318 (D) None of these

44. Roman numeral for the predecessor of the smallest 4-digit number is _____.

- (A) CMXC (B) CMXCIX
(C) MCXI (D) MI

45. The sum of the face values of the encircled digits of the number 5④68⑨71, is _____.

- (A) 13 (B) 12
(C) 400900 (D) None of these

Achievers Section (HOTS)

46. Read the statements carefully and state 'T' for true and 'F' for false.

- (a) The face value of '5' in the number 65490 is 5000.
(b) Successor of smallest 5 - digit number is 9999.
(c) The place value of the digit '7' in the number '85705' is 700.

- | (a) | (b) | (c) |
|-------|-----|-----|
| (A) T | T | F |
| (B) F | F | T |
| (C) F | T | T |
| (D) T | F | T |

47. Match the following and select the correct option.

Column A

Column B

- | | |
|-------------------------------------|----------|
| (a) MMCDLX | (p) 947 |
| (b) CMXLVII | (q) 424 |
| (c) CDXXIV | (r) 2460 |
| (A) (a) → (p); (b) → (r); (c) → (q) | |
| (B) (a) → (r); (b) → (q); (c) → (p) | |
| (C) (a) → (q); (b) → (r); (c) → (p) | |
| (D) (a) → (r); (b) → (p); (c) → (q) | |

48. Identify the 6-digit number using the given clues.

- Its hundreds place digit is smallest prime number.
- Its ten thousands place digit is thrice of its ones digit.
- It ones digit is predecessor of its hundreds digit.
- It thousands place digit is largest one-digit number.
- Its lakhs place digit is successor of tens place digit.

- (A) 539241 (B) 639241
(C) 539242 (D) 639421

49. Select the incorrect match.

- (A) Thirty seven lakh three hundred - 3700300.
(B) Fifty lakh nine hundred five - 5009005.
(C) Two crore twenty lakh eighty thousand ten - 22080010.
(D) None of these

50. Fill in the blanks and select the correct option.

- (a) 54679 when rounded off to the nearest thousands gives _____.
(b) 82465 when rounded off to nearest tens gives _____.
(c) 64850 when rounded off to the nearest hundreds gives _____.

- | | (a) | (b) | (c) |
|-----|-------|-------|-------|
| (A) | 54000 | 82470 | 65000 |
| (B) | 55000 | 82470 | 64900 |
| (C) | 56000 | 82400 | 64000 |
| (D) | 55000 | 82500 | 65000 |

SOF IMO 2019 QUESTIONS

1. Which of the following roman numerals shows the sum of the smallest four digit number and the greatest three digit number?

- (A) MCMIX (B) CMXCIX
(C) MCMXCIX (D) MXCIX (Level-1)

2. In 636250, the place value of 6 at the thousands place is _____ times the place value of 6 at the lakhs place.

- (A) 6 (B) $\frac{1}{1000}$
 (C) $\frac{1}{100}$ (D) 100 (Level-1)

3. Which of the following statement(s) is/are true?
 (i) Predecessor of 6 millions is fifty nine lakh ninety nine thousand nine hundred and ninety nine.
 (ii) Estimated value of largest 6-digit number rounded to the nearest hundreds is smallest 7-digit number.
 (A) Only (i) (B) Only (ii)
 (C) Both (i) and (ii) (D) Neither (i) nor (ii) (Level-1)

4. Read the given statements carefully and state 'T' for True and 'F' for False.
 (i) While writing a number in Indian System of numeration, commas are inserted after each digit.
 (ii) There is no roman numeral to represent 0.
 (iii) Greatest 6-digit odd number that can be formed using the digits 8, 3, 0, 2, 4 and 5 (using each digit only once) is 854023.
 (i) (ii) (iii)
 (A) T F T
 (B) F T T
 (C) T F F
 (D) F T F (Level-1)

5. Three Roman numerals A, B and C, each having "V" only once in the place shown. Other two Roman numerals are either I or X or both.

A :

V		
---	--	--

B :

	V	
--	---	--

C :

		V
--	--	---

Which of the following statements is true?

- (A) The smallest number is A.
 (B) Difference between A and B is 8.
 (C) B and C represents same number.
 (D) None of these (Level-2)

6. Shikha makes a profit of rupees eighty five crore three lakh fifty five thousand thirty nine. Her profit can be written in numerals as

- (A) ₹ 850,355,039 (B) ₹ 85,03,55,039
 (C) ₹ 85,03,55,390 (D) ₹ 8,53,67,249 (Level-2)

7. Which of the following statements is/are false?

- P. Successor of largest 7-digit number is 10 million.
 Q. Estimated value of largest 6-digit number rounded to the nearest hundreds is the smallest 6-digit number.
 (A) Only P (B) Only Q
 (C) Both P and Q (D) Neither P nor Q (Level-2)

HINTS & EXPLANATIONS

SELF TEST - 1

- (B)
- (A)
- (C)
- (B) : Predecessor of 14031091 = $14031091 - 1$
= 14031090
- (B)

SELF TEST - 2

- (C) : $MCDXLIX = 1000 + 400 + 40 + 9$
= 1449
- (D) : Rounding off 54689124 to the nearest thousands gives 54689000.
- (B) : Greatest 7 - digit number formed
= 6665210
- (B) : 34950 when rounding off to the nearest hundreds gives 35000.
- (A) : Roman numeral for 3589 is MMMDLXXXIX.

EXERCISE

- (A)
 - (B) : 52612 rounded off to nearest tens = 52610
 - (A) : As 4199 when rounded off to nearest hundreds gives 4200.
So, the greatest possible number of trees in the plantation = 4199
 - (C) : Seven million three hundred eighty three thousand four hundred ninety five = 7,383,495
 - (D) : Greatest 6-digit odd number formed from 5, 3, 1, 0 = 555301
 - (C)
 - (D) : 300 thousands + 100 hundreds + 520 tens
= $300000 + 10000 + 5200 = 315200$
 - (A) : Required sum = $5 + 4 + 6 + 8 + 2 + 3 = 28$
 - (A) :

M	HTh	TTh	Th	H	T	O
TL	L	TTh	Th	H	T	O
7	4	6	8	9	3	7
- Here, 4 stands for 4 hundred thousands.
- (C) : (A) $CMX = 910$
(B) $CDXL = 440$
(C) $MMX = 2010$
(D) $MCM = 1900$
 - (A)
 - (C) : $MMDCCCLXXIII = 1000 + 1000 + 500 + 100 + 100 + 50 + 10 + 10 + 3$
= 2773

13. (A) : Greatest 6 - digit number formed from the given digits = 654310

14. (D) : (A) 54999 when rounded off to nearest thousands gives 55000.

(B) 58999 when rounded off to nearest thousands gives 59000.

(C) 59199 when rounded off to nearest thousands gives 59000.

(D) 59999 when rounded off to nearest thousands gives 60000.

15. (B) : $DCLXXIV = 500 + 100 + 50 + 10 + 10 + 4$
= 674

16. (A) : $250 \times 45 = 11250$

So, 1 comes at thousands place.

17. (B)

18. (B) :

M	HTh	TTh	Th	H	T	O
7	4	4	3	2	5	8

Here, 4 stands for 4 ten thousand.

19. (A)

20. (B) : $82540 > 72042 > 42035 > 10568$

21. (B) : $CMLXV = 965$

$MCCXLV = 1245$

And $965 < 1245$

22. (C)

23. (A)

24. (B) : Number of books collected by NGO P

= 72,53,052

Number of books collected by NGO Q = 45,56,759

As, $72,53,052 > 45,56,759$

So, NGO P collected more number of books.

25. (B) : P. $CMXV = 915$; Q. $CDLII = 452$

R. $DCCXV = 715$

As, $915 > 715 > 452$

So, correct descending order is : P, R, Q

26. (A) : Required sum = $141323 + 223142 = 364465$

27. (B) : Largest 5 - digit number = 99999

Required sum = $99999 + 1 = 100000$

28. (D) : Runs scored by Abhinav = $MMCCCIX$
= 2309

29. (A) : Place value of 6 = 600

Face value of 6 = 6

\therefore Sum = $600 + 6 = 606$

30. (C) : Greatest 7 - digit even number = 9999998
Predecessor of 9999998 = $9999998 - 1 = 9999997$
31. (C) : Sum of place values of the digits in
 $750640 = 700000 + 50000 + 600 + 40$
 $= 750640$
32. (D) : Greatest 5 - digit number formed from the given digits = 54321
 \therefore Successor of 54321 = $54321 + 1 = 54322$
33. (C)
34. (A) : $5678910 = 5000000 + 600000 + 70000 + 8000 + 900 + 10$
35. (A)
36. (B) : Successor of 3008999 = $3008999 + 1 = 3009000$
37. (A) : Required sum = $3000000 + 500000 + 4000 = 3504000$
38. (C) : $CMLXIX = 900 + 50 + 10 + 9 = 969$
Predecessor of 969 = $969 - 1 = 968$
39. (C)
40. (C)
41. (D) : 14675 when rounded off to nearest thousands gives 15000.
42. (C) : P. $CDXVI = 400 + 10 + 6 = 416$
Q. $DCCVII = 500 + 100 + 100 + 7 = 707$
R. $CCLXII = 100 + 100 + 50 + 10 + 2 = 262$
Now, $707 > 416 > 262$
So, 262 is the smallest.
43. (C) : Greatest possible 7 - digit even number formed from the given digits = 9999318
44. (B) : Smallest 4 - digit number = 1000
Predecessor of 1000 = $1000 - 1 = 999$
So, roman numeral of 999 = $CMXCIX$
45. (A) : Sum = $4 + 9 = 13$
46. (B) : (a) False; The face value of 5 in the number 65490 is 5.
(b) False; Smallest 5 - digit number = 10000
Successor of 10000 = $10000 + 1 = 10001$
(c) True
47. (D) : (a) $MMCDLX = 1000 + 1000 + 400 + 50 + 10 = 2460$

- (b) $CMXLVII = 900 + 40 + 7 = 947$
(c) $CDXXIV = 400 + 20 + 4 = 424$
48. (A)
49. (B)
50. (B) : (a) 54679 when rounded off to nearest thousands = 55000
(b) 82465 when rounded off to nearest tens = 82470
(c) 64850 when rounded off to nearest hundreds = 64900

SOF IMO 2019 QUESTIONS

1. (C) : Smallest 4 - digit number = 1000
Greatest 3 - digit number = 999
Their sum = $1000 + 999 = 1999$ *i.e.*, $MCMXCIX$
2. (C) : Place value of 6 at thousands place = 6000
Place value of 6 at lakhs place = 600000
As, $6000 = \frac{1}{100} (600000)$
3. (C) : (i) 6 millions = 6000000
Predecessor of 6000000 = $6000000 - 1 = 5999999$
i.e., Fifty nine lakh ninety nine thousand nine hundred and ninety nine.
(ii) Largest 6 - digit number = 999999
999999 rounded off to nearest hundreds = 1000000 *i.e.*, smallest 7 - digit number.
4. (D) : (i) False; In Indian System of numeration, commas are inserted after each period.
(ii) True
(iii) False; Greatest 6 - digit odd number formed using the given digits = 854203
5. (A) : A : VII = 7
B : XVI = 16
C : XIV = 14 or XXV = 25
6. (B) : Eighty five crore three lakh fifty five thousand thirty nine = 85,03,55,039
7. (B) : (P). Largest 7 - digit number = 9999999
Successor of 9999999 = $9999999 + 1 = 10000000$ or 10 million
(Q). Largest 6 - digit number = 999999
Estimated value = 1000000 *i.e.*, smallest 7 - digit number
So, Q is false.