

1 - NUMBER SENSE & NUMERATIONS

NUMBERS

Number are mathematical symbol by which we express date, time, distance, position, quantity etc.

We use ten symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) to write any number.

Like 346562232, 3465452155, 4003444656 etc.

NUMBERS SYSTEM

Number System deals with the study of different types of numbers. In this chapter, we will study about the categorization of different types of numbers.

- Natural Numbers :**

Counting starts with 1 and continue till infinite. Counting numbers are called natural numbers.

For example, 1, 2, 3, 4, 5, 6, 7 etc.

- Whole Numbers :**

When 0 is included with natural numbers, they are called whole number. In other words “Natural numbers together with zero are called whole numbers.”

For example, 0, 1, 2, 3, 4, 5, 6, 7 ... etc.

SYSTEM OF NUMERATION

Mathematical notation of numbers is called numeration. Let us know about two types of numeration.

(A) Indian system of numeration

It is a positional decimal number system.

Look at the following place value chart.

Period	Arab		Crores		Lakhs		Thousand		Ones		
Places	Ten Arab (T-A) 10000000000	Arab (A) 1000000000	Ten Crores (T-C) 100000000	Crores (C) 10000000	Ten Lakhs (T-L) 1000000	Lakhs (L) 100000	Ten thousands (T-TH) 10000	Thousand (TH) 1000	Hundreds (H) 100	Tens (T) 10	Ones (O) 0

Ex.1 Name the number, indicated in the place value chart :

Period	Arab		Crores		Lakhs		Thousand		Ones		
Places	Ten Arab (T-A) 10000000000	Arab (A) 1000000000	Ten Crores (T-C) 100000000	Crores (C) 10000000	Ten Lakhs (T-L) 1000000	Lakhs (L) 100000	Ten thousands (T-TH) 10000	Thousand (TH) 1000	Hundreds (H) 100	Tens (T) 10	Ones (O) 0
	0	2	6	5	2	1	0	3	2	5	3

Sol. Two arab sixty five crore twenty one lakh three thousand two hundred fifty three.

(B) International system of numeration

Period	Billions			Millions			Thousand			Ones		
Places	Hundred billions 100000000000	Ten billions 10000000000	Billions 1000000000	Hundred Millions 100000000	Ten millions 10000000	Million 1000000	Hundred thousands 100000	Ten thousands 10000	Thousands 1000	Hundred 100	Tens 10	Ones 0

Ex.2 Name the number indicated in the place value chart.

Period	Billions			Millions			Thousand			Ones		
Places	Hundred billions 100000000000	Ten billions 10000000000	Billions 1000000000	Hundred Millions 100000000	Ten millions 10000000	Million 1000000	Hundred thousands 100000	Ten thousands 10000	Thousands 1000	Hundred 100	Tens 10	Ones 0
	5	6	8	0	2	2	0	6	5	2	1	5

Sol. Five hundred sixty eight billion twenty two million sixty five thousand two hundred fifteen.

• **Place Value:**

Place value of a digit in a number is the position it occupies according to the place value chart.

Ex.3 Find the place value of 5 in the number 646568232.

Sol. 500000

• **Face Value:**

Face value of a number is the number itself.

Ex.4 Find the value of 3 in the number 451453282.

Sol. 3

BUILDING GREATEST & SMALLEST NUMBERS

- To get the greatest number, we arrange the given digits in the descending order.
- To get the smallest number, we arrange the given digits in the ascending order, keeping in mind that we **never write 0 in the extreme left position.**

Ex.5 Write the greatest and the smallest 7-digit numbers (without repeating a digit) using the following digits :

(a) 4,7,6,3,1,2 and 9

(b) 2,5,6,4,0,3 and 7

Sol.

(a) Arranging the given digits. i.e., **4,7,6,3,1,2** and **9** in descending order, we get **97,64,321**. Thus, the greatest number is **97,64,321**. Similarly, by arranging the given digits in ascending order, we get the smallest number is **12,34,679**.

(b) Here, the, greater number is **76,54,320**. To get the smallest number, if we arrange the given digits in descending order, we get to 0 at the extreme left. But 0 at extreme left has no meaning. So, we put 0 at the second place from the left. Hence, the smallest number is **20,34,567**.

• **Successor:**

The number which comes just after a number is called successor of that number.

Ex.6 Find the successor of 54564446.

Sol. $54564446 + 1 = 54564447$

• **Predecessor:**

Predecessor of a number just comes before the number.

Ex.7 Find the predecessor of 4665655416.

Sol. $4665655416 - 1 = 4665655415$

ROUNDING OFF NUMBERS

Rounding off to the Nearest ten

Look at the number given below :

We see that the numbers 1, 2, 3 and 4 are nearer to 0 than 10. So, we round off 1, 2, 3 and 4 as 0.

Also, the numbers 6, 7, 8 and 9 are nearer to 10 than 0.

Ex.8 Round off to the nearest ten :

(a) 73 (b) 145

Sol. (a) 73 when rounded off to the nearest 10
becomes 70
(b) 145 becomes 150.

Rounding Off to the Nearest Hundreds

- We see that 1, 2, ..., 49 are nearer to 0 than 100. So, we take such numbers as 0.
i.e., 201, 304 are rounded off to the nearest hundred as 200, 300 respectively.
- From 51, 52, ... , 99 are nearer to 100 than 0. So we take such numbers as 100. 50 is at equal distance from 100 and 0. So, 50 is also taken as 100.
i.e., For example, 150, 259 are rounded off to the nearest hundred as 200, 300, respectively.

Ex.9 Round off to the nearest hundred :

(a) 263 (b) 1,350

Sol. (a) 263 becomes 300.
(b) 1,350 becomes 1,400.

WORKSHEET

1. What do you mean by natural numbers ?
2. What is the difference between smallest natural and whole number ?
3. Find the place value of 6 in the numeral which is 5453445565 more than 64445563230.
4. Find the successor of the number which is equal to the product of 4354565 and 5798.
5. Steve has 3 million and 4 hundred thousand rupees. What is the worth of his money as per Indian system of numeration?
6. In the number 2, 75, 465, what is the difference between the place value of 5 ?
7. Find the predecessor of the number which is 454412 less than X. X is the seven digit smallest number.
(A) 545587 (B) 545588
(C) 545589 (D) 545590
8. Name the period which is just right to the period "Arabs" in the Indian place value chart.
(A) Kharabs (B) Lakhs
(C) Ten Crores (D) Thousands
9. Which one of the following is the correct number for $7000000000 + 500000000 + 800000 + 600 + 9$?

- (A) 7500800609
(B) 7508000609
(C) 7500080609
(D) 7500806009

10. Name the number, indicated in the International place value chart, as per the Indian system of numeration.

Period	Trillions			Billions			Millions			Thousand			Ones		
Places	Hundred Trillions	Ten Trillions	Trillions	Hundred billions	Ten billions	Billions	Hundred Millions	Ten millions	Million	thousands	Ten thousands	Thousands	Hundred	Tens	Ones
	0	0	3	6	9	8	0	0	4	0	5	6	4	5	0

- (A) Thirty six kharab ninety eight arab four lakh fifty six thousand four hundred fifty.
(B) Thirty six kharab ninety eight arab forty lakh fifty six thousand four hundred fifty.
(C) Three kharab sixty nine arab eighty crore forty lakh fifty six thousand four hundred fifty
(D) Thrity six arab ninety eight crore forty lakh fifty six thousand four hundred fifty
(E) None of these

11. Which one of the following is not a member of natural numbers.
(A) 0
(B) 10000000000000000
(C) 9999999999999999
(D) 111111111111111111

- 12.** Write the number nineteen trillion seven hundred thirty five million eight hundred in expanded form.
- (A) $1000000000000 + 90000000000 + 700000000 + 30000000 + 5000000 + 800$
- (B) $10000000000000 + 9000000000000 + 700000000 + 30000000 + 5000000 + 800$
- (C) $10000000000000 + 9000000000000 + 70000000 + 30000000 + 5000000 + 800$
- (D) $10000000000000 + 9000000000000 + 700000000 + 30000000 + 50000 + 800$
- (E) None of these
- 13.** X represents the five digit greatest number and Y represents 6 digit greatest number. Find the sum of X and Y.
- (A) 1009998 (B) 1099999
- (C) 1999998 (D) 1099998
- 14.** Find the place value of 6 in the numeral which is 6456565 more than 97885665495.
- (A) Sixty (B) Sixty Thousand
- (C) Sixty Lakh (D) Sixty Crore
- 15.** X is natural number. When X is divided by 5, it gives the quotient 4998521.
- (A) 24992604 (B) 24992605
- (C) 24992606 (D) 24992607
- 16.** When 7 is multiplied by 10000000, we get the place value of 7 in a numeral. Which one of the following places does 7 occupy in the numeral ?
- (A) Ten Millions
- (B) Hundred Millions
- (C) Billions
- (D) Hundred Billions
- 17.** Find the predecessor of the number which is the product of 656 and 3659879.
- (A) 2400880623 (B) 2400880624
- (C) 2400880625 (D) 2400880626
- 18.** Write the greatest and the smallest 8-digit numbers using all the following digits (you may repeat the digits) : 7, 2, 0, 1, 8, 3, 4
- 19.** Round off to the nearest ten :
- (a) 295 (b) 3,244 (c) 51,766
- 20.** Round off to the nearest hundred :
- (a) 4,731 (b) 5,660
- (c) 32, 892 (d) 53, 960

SOLUTION SHEET

Sol.1 (A) Counting numbers

Sol.2 (B) 1. Smallest natural number = 1.

Smallest whole number = 0.

Difference = $1 - 0 = 1$.

Sol.3 $5453445565 + 64445563230$

= 69,899,008,795

Place Value of 6 is 6×10000000000

= 60000000000

Sol.4 Product of 4354565 and 5798

is $4354565 \times 5798 = 25,247,767,870$

Successor of 25,247,767,870 is

$25,247,767,870 + 1 = 25,247,767,871$

Sol.5 3 Million = 30,00,000 lakhs

4 hundred thousand = 4,00,000 lakhs

Total = 34,00,000

Sol.6 Place value of 5 which is left side of 4 =

5,000.

Place value of 5 right side 6 = 5.

Difference = $5,000 - 5 = 4,995$.

Sol.7 7 digits smallest number = 1000000

$x = 1000000$

$x - 454412$

= $1000000 - 454412 = 545588$

Predecessor = $545588 - 1 = 545587$

Sol.8 Ten Crores

Sol.9 (A) 7500800609

Sol.10 3 6 9 8 0 0 4 0 5 6 4 5 0

TK K TA A TC C TLLTTHTHHTO

(B) Thirty six kharab ninety eight arab

forty lakh fifty six thousand four

hundred fifty.

Sol.11 (A) 0 is not a natural number

Sol.12 (B)

Sol.13 $X = 99999$

$Y = 999999$

$X + Y = 99999 + 999999 = 1099998$

Sol.14 (A) $97885665495 + 6456565$

= 97832122060

Place value of 6 = $6 \times 10 = 60$.

Sol.15 $\frac{X}{5} = 4998521$

$X = 5 \times 4998521$

$X = 24992605$

Sol.16 7×10000000

= 7,00,00,000

Ten millions

Sol.17 (A) $\Rightarrow 656 \times 3659879$

= 2400880624

Predecessor = $2400880624 - 1$

= 2400880623

Sol.18 The greatest number using the given digits

is 8,87,43,210.

The smallest number using the given digits

is 1,00,23,473.

Sol.19 (a) 295 becomes 300.

(Hence, $9 + 1 = 10$, so 2 in their hundreds place becomes 3)

(b) 3,244 becomes 3,240.

(c) 51, 766 becomes 51, 770.

Ans.20 (a) 4,731 becomes 4,700.

(b) 5,660 becomes 5,700.

(c) 32,892 becomes 32,900.

(d) 53,960 becomes 54,000 because 960 becomes 1,000 and $53,000 + 1,000 = 54,000$