

Numbers

- **Comparing numbers**

Numbers with same number of digits can be compared by placing them in a place value table and then comparing the digits at each place. For example, consider 2952 and 2748.

Thousands	Hundreds	Tens	Ones
2	9	5	2
2	7	4	8

The digits at thousands place are equal.

At hundreds place, $9 > 7$

Therefore, $2952 > 2748$

- Ascending order means arranging the numbers from smallest to greatest.

Descending order means arranging the numbers from greatest to smallest.

- The greatest and smallest number without repetition can be formed using any number of digits by arranging them in descending and ascending order respectively.

For example, a 4-digit number from the digits 9, 2, 7, 3.

Greatest number = 9732

Smallest number = 2379

- When repetition of digits is allowed, then the greatest number can be formed by writing the greatest digit as many times as the number is required. Similarly,

smallest number can be formed by writing the smallest digit as many times as required.

Greatest number (with repetition) = 9999

Smallest number (with repetition) = 2222

- Conversions of some units are given below:

10 millimetres = 1 centimetre

1 metre = 100 centimetres

1 kilometre = 1000 metres

1 gram = 1000 milligrams

1 litre = 1000 millilitres

Example: How many grams are there in 50,000 centigrams?

Solution: We know that, 1 gram = 100 centigrams

$$\begin{aligned}\therefore 50,000 \text{ centigrams} &= (50,000 \div 100) \text{ grams} \\ &= 500 \text{ grams}\end{aligned}$$

- To ease the reading and writing of larger numbers, commas are used.
 - In Indian system of numeration, first comma is used after hundreds place, second comma comes after two digits from the first comma to the left, i.e. after ten thousands, then the third comma is placed after another two digits and so on.

For example, 3067843 can be written as 30,67,843 and hence read as thirty lakh sixty seven thousand eight hundred and forty three.

- In International system of numeration, ones, tens, hundreds, thousands, millions, and billions are used.

1 million = 1000 thousands = 10 lakhs

1 billion = 1000 millions

In this system, first comma comes after hundreds place and the next after three digits.

For example, 72453276 can be written as 72,453,276 and hence read as seventy two million four hundred fifty three thousand two hundred and seventy six.

- In a number, **face value** of each digit is the actual value of that digit and it never changes whether the number is written according to any numeral system.

For example, in the number 3,69,821, face values of different digits are as follows:

Face value of 3 = 3

Face value of 6 = 6

Face value of 9 = 9

Face value of 8 = 8

Face value of 2 = 2

Face value of 1 = 1

- The smallest 5-digit number is 10000.

$$10000 = 9999 + 1$$

Therefore, smallest 5-digit number = Greatest 4-digit number + 1

Similarly, $100000 = 99999 + 1$

Also, smallest 6-digit number = Greatest 5-digit number + 1

This pattern follows for higher numbers also.

- A number, for example 48735, can be written in expanded form as:

$$48735 = 4 \times 10000 + 8 \times 1000 + 7 \times 100 + 3 \times 10 + 5 \times 1$$

Similarly, any number can be written in the expanded form.

- The **place value** of digits in the number 48735 are:

Place value of 4 = ten thousand

Place value of 8 = thousand

Place value of 7 = hundred

Place value of 3 = ten

Place value of 5 = one