3 Operations Involving Large Numbers

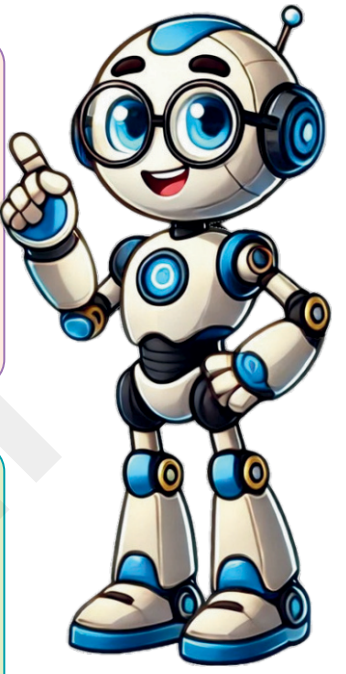
We'll cover the following key points:

→Addition

→Subtraction

→Multiplication

→Division



EeeBee

Do you Remember fundamental concept in previous class.
In class 4th we learnt

→Addition - With carrying

→Subtraction - With Borrowing

→Multiplication by 3-digit Number

→Division By 2-Digit Number

Still curious? Talk to me by scanning the QR code.

Learning Outcomes

By the end of this chapter, students will be able to:

- Perform addition of large numbers accurately, including carrying over digits.
- Solve subtraction problems involving large numbers, including borrowing techniques.
- Multiply large numbers efficiently using standard multiplication algorithms.
- Divide large numbers by single-digit and multi-digit divisors using long division methods.
- Understand and apply the properties of addition, subtraction, multiplication, and division (e.g., commutative and associative properties).
- Solve real-life word problems involving addition, subtraction, multiplication, and division of large numbers.
- Verify results of operations using estimation and rounding off techniques.
- Identify and correct errors in calculations involving large numbers.

The following four candidates are talking about the number of votes they have got in an election:

Election Results

Candidate 1 – 350 votes
Candidate 2 – 4,51,785 votes
Candidate 3 – 6,53,145 votes
Candidate 4 – 94,412 votes

I got only 350 votes.
I needed _____
More votes to be a winner.

I got 4,51,785 votes.
I got _____
more votes than the candidate who secured the least votes.

I got 6,53,145 votes.
I won by _____
votes.

I got 94,412 votes I lost by _____ votes.

Each picture below stands for a different number from 1 to 4. The numbers given outside are the total of the numbers in each row or column. Can you try to find the value of each picture to match the total?

My Number

 = ☐

 = ☐

 = ☐

 = ☐

Let us Revise

The methods of addition, subtraction, multiplication and division of large numbers are exactly the same as with smaller numbers.

In our previous classes, we have learnt that :

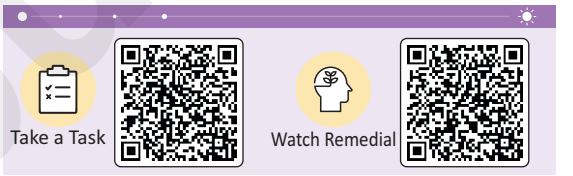
(i) to add or subtract two or more numbers, we arrange them in columns as per the place-value chart.

(ii) to add or subtract, we begin from the right with ones, tens, hundreds, thousands and so on.

(iii) in addition problems, the numerals which are to be added are called **addends**, and the result is called the **sum**.

(iv) in problems of subtraction, the number to be subtracted is known as the **subtrahend** and the number from which it is to be subtracted is called the **minuend**, and the result is called as the **difference**.

We shall now learn more about these basic operations on large numbers.



Addition

Example 1: Add 725321, 28254 and 3728348.

Solution: First, we arrange the digits of the addends in columns and then add.

	1		2		1	1		← Carry
		7	2	5	3	2	1	
+			2	8	2	5	4	← Addends
+	3	7	2	8	3	4	8	
	4	4	8	1	9	2	3	← Sum

Thus, the required sum is 4481923.

Problem Solving

Example 2: A toy factory manufactured 25454015 toys in the year 2019, 27257528 toys in year 2020 and 27895432 toys in the year 2021. How many toys were manufactured during the three years?

Solution : Number of toys manufactured in 2019

= 25454015

Number of toys manufactured in 2020

= 27257528

	2	1	2	1			1	
	2	5	4	5	4	0	1	5
+	2	7	2	5	7	5	2	8
+	2	7	8	9	5	4	3	2
	8	0	6	0	6	9	7	5

Number of toys manufactured in 2021

= 27895432

Total number of toys manufactured

= 25454015 + 27257528 + 27895432 = 80606975

Thus, the total **80606975** toys were manufactured in the three years.

Properties of Addition

Order Property : When the order of the addends is changed, the sum remains the same.

For example : 2,38, 667 + 6,75,993 = 9,14,660

and 6,75,993 + 2, 38, 667 = 9,14,660

Zero Property : The sum of zero and the number is the number itself.

For example : 6,75,319 + 0 = 6,75,319 or 0 + 6, 75, 319 = 6, 75, 319

Grouping property : If the grouping of addends is changed, the sum remains the same.

For example : (3,57,289 + 2, 99, 093) + 1,99,887 = 8,56, 269

3,57,289 + (2,99,093 + 1, 99, 887) = 8,56,269

(3, 57, 289 + 1, 99, 887) + 2, 99, 093 = 8, 56, 269

Exercise 3.1 Knowledge Application

1. Multiple Choice Questions (MCQs). Choose the correct option.

(a) The numerals, which are to be added, are called

(i) addends ☐ (ii) sum ☐ (iii) carry ☐

(b) The number to be subtracted from another number is called

(i) minuend ☐ (ii) subtrahend ☐ (ii) difference ☐

(c) The result we get after subtraction is called the

(i) sum ☐ (ii) difference ☐ (iii) minuend ☐

2. Add the following :

(a)
$$\begin{array}{r} 1\,2\,3\,4\,5\,3 \\ +\ 2\,3\,4\,5\,6\,2 \\ +\ 3\,4\,5\,6\,7\,0 \\ \hline \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 6\,0\,1\,0\,1\,0\,3 \\ +\ 1\,3\,4\,5\,6\,7\,9 \\ +\ 1\,4\,5\,6\,7\,8\,6 \\ +\ 1\,1\,8\,7\,4\,3\,5 \\ \hline \\ \hline \end{array}$$

3. Find the sum of the following :

(a) 2539208, 8795972 and 3986534

(b) 99945, 45928 and 327549

(c) 2345676, 97842 and 7257281

(d) 72578, 782953, 7125440 and 12353

(e) 35468, 20074, 8789 and 35371

(f) 5207568, 673451 and 356783

Solved the following questions:

4. In a town there are 675283 men, 723506 women and 260576 children. Find the population of that town.

5. A cloth-mill made 2540568 m cloth in 2019, 2748667 m in 2020 and 3134547 m in 2021. How many metres of cloth did the mill make in three years?

6. Ajay travelled a distance of 98786 km by car, 48459 km by train and 325983 km by bus. Find the total distance travelled by Ajay .

HOTS (Higher Order Thinking Skills)

Critical Thinking

A factory manufactures bulbs. Its year-wise production is given below :

In 2017-18 : 946678 bulbs

In 2018-19 : 828456 bulbs

In 2019-20 : 702234 bulbs

In 2020-21 : 698123 bulbs

Find the total number of bulbs manufactured by the factory during the period 2017-21

Take a Task

Watch Remedial

Subtraction

Subtracting larger number is very similar to subtracting smaller numbers. We subtract to find what is left over or to find out what is missing.

Example 3: Subtract 6459686 from 8843576.

Solution : First, we arrange the digits of minuend and subtrahend in columns and then subtract.

7 13 12 14 17	←	After borrowing
8 8 4 3 5 7 6	←	Minuend
– 6 4 5 9 6 8 6	←	Subtrahend
2 3 8 3 8 9 0	←	Difference

Thus, the required difference is 2383890.

Example 4: What must be added to 72543213 to get the sum as the greatest 8-digit number?

Solution : We know that the greatest 8-digit number = 99999999.

Therefore, the required number must be equal to the difference between 99999999 and 72543213.

Thus, the required number

= 99999999 – 72543213

= 27456786

Hence, the required number is 27456786.

Properties of subtraction

- The order of numbers involved in subtraction cannot be changed.
- When a number is subtracted from itself, the difference is zero.

  For example : 67,29,579 – 67,29,579 = 0
- When zero is subtracted from the number, the difference is the number itself

  For example : 65,28,335 – 0 = 65,28, 335

Exercise 3.2 Knowledge Application

1. Find the difference :

(a)
$$\begin{array}{r} 9\,8\,1\,2\,6\,2\,1 \\ -\ 3\,7\,0\,9\,5\,3\,4 \\ \hline \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 6\,3\,5\,3\,4\,3\,9 \\ -\ 2\,8\,4\,9\,4\,5\,6 \\ \hline \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 9\,6\,9\,6\,9\,0\,2 \\ -\ 5\,5\,4\,5\,4\,5\,5 \\ \hline \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 9\,5\,7\,5\,7\,5\,3 \\ -\ 9\,9\,9\,9\,9\,8 \\ \hline \\ \hline \end{array}$$

2. Find the difference :

(a) 9222224 – 3333338

(b) 8888882 – 5999993

(c) 3900002 – 1770013

(d) 5429989 – 1999999

(e) 9654321 – 6123456

(f) 6976432 – 3354257

Answer the following question: Problem Solving

3. Find the difference between the greatest and the smallest number that can be formed using the digits 4, 2, 5, 7, 9, 0 only once.

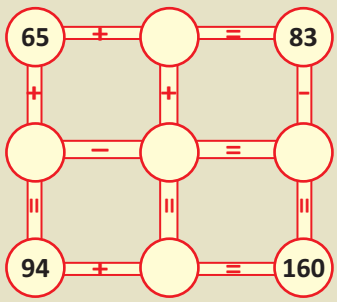
4. What is the difference between the greatest and the smallest numbers that can be formed using the digits 0, 7, 2, 3, 4, 6 only once?

5. What must be added to the smallest 8-digit number to get the greatest 8-digit number?

6. The population of a city is 78932541. Before ten years, it was 65364541. Find the increase in the population of the city during the ten years.

Project Work

Solve the given puzzle.



Conceptual Learning

Take a Task

Watch Remedial

Multiplication

Multiplication is the short way to do repeated addition of the same number. The number by which any number is multiplied is known as the multiplier and the number which is to be multiplied is known as the multiplicand. The result of the multiplication is known as the product of the multiplier and the multiplicand.

We already know the facts:

(i) To multiply a number by 1000, we put three zeroes to the right of the number . For example : $29 \times 1000 = 29000$.

(ii) To multiply a number by 2000, 3000, 4000 and so on, we multiply the number by the digit in the thousands place of the multiplier and put three zeroes to the right of the product.

For example : $339 \times 8000 = (339 \times 8) \times 1000 = (2712 \times 1000) = 2712000$

Example 5: Multiply 84326 by 226

Solution :

8 4 3 2 6	← Multiplicand
× 2 2 6	← Multiplier
5 0 5 9 5 6	← 84326×6
1 6 8 6 5 2 0	← 84326×20
+ 1 6 8 6 5 2 0 0	← 84326×200
1 9 0 5 7 6 7 6	← Product

Thus, the product of 84326 and 226 is 19057676.

Example 6: The cost of a chair is ₹385. Find the cost of 346 such chairs.

Solution: Cost of one chair = ₹385

So, cost of 346 chairs

= ₹385 × 346

Thus, the cost of 346 chairs is **₹133210**.

```
    3 8 5
  × 3 4 6
-----------
  2 3 1 0   ← 385 × 6
+ 1 5 4 0 0 ← 385 × 40
+ 1 1 5 5 0 0 ← 385 × 300
-------------
1 3 3 2 1 0 ← 385 × 346
```

Properties of multiplication

Conceptual Learning

- The product does not change even if the order changes.

  For Example : 393 × 227 = 89,211 or 227 × 393 = 89,211

- The product of any number and 1 is the number itself.

  For example : 93,253 × 1 = 93, 253 or 1 × 93, 253 = 93, 253

- The product of any number and zero is zero.

  For example : 29, 289 × 0 = 0 or 0 × 29, 289 = 0

Exercise 3.3

Knowledge Application

1. Multiple Choice Questions (MCQs). Choose the correct option.

(a) When we multiply 103 by 7000, we get

(i) 710200 ☐ (ii) 712000 ☐ (iii) 721000 ☐

(b) The product of 55555 and 22 is

(i) 1222210 ☐ (ii) 2222110 ☐ (iii) 1222120 ☐

2. Multiply :

(a) 32 by 10 (b) 119 by 100 (c) 69 by 1000

(d) 29 by 200 (e) 289 by 300 (f) 127 by 4000

3. Find the product :

(a) 265 × 83 (b) 81908 × 226 (c) 6789 × 208

(d) 4234×561 (e) 18357×328 (f) 4708×814

4. In a factory, 23250 pens are made daily. How many pens will be made in 21 working days?
5. The cost of a computer is ₹63728. Find the cost of 89 such computers.
6. There are 240 pages in a book. Find the total number of pages in such 3268 books.

HOTS (Higher Order Thinking Skills)

Critical Thinking

1. Find the product of the smallest number formed by using the digits 6, 7, 0 and the greatest 3-digit number. (each digit to be used once only).
2. Subtract the product of 23357 and 84 from the greatest number formed by using the digits 2, 3, 4, 5, 6, 8, 9 (each digit to be used once only).

Take a Task Watch Remedial

Division

We have learnt the division of a number by a 2-digit number in previous classes. The method of division of a large number by a 3-digit number is the same as that of division by 2-digit number.

The number to be divided is called dividend. The number by which we divide is called divisor. The number obtained after division is called quotient. The number left over is known as the remainder.

REMEMBER

Dividend = Quotient × Divisor + Remainder

Example 7: Divide 7253892 by 286.

Solution:

```
          2 5 3 6 3
      ┌─────────────
2 8 6 ) 7 2 5 3 8 9 2
      − 5 7 2                ← 286 × 2
        1 5 3 3
      − 1 4 3 0              ← 286 × 5
          1 0 3 8
        − 8 5 8              ← 286 × 3
            1 8 0 9
          − 1 7 1 6          ← 286 × 6
              9 3 2
            − 8 5 8          ← 286 × 3
              7 4            Remainder
```

Thus, 7253892 ÷ 286 gives **25363** as the quotient and **74** as the remainder.

Example 8: Divide 7256798 by 325 to find the quotient and remainder.

Also verify the answer.

Solution:

```
             2 2 3 2 8
325 ) 7 2 5 6 7 9 8
     - 6 5 0
         7 5 6
       - 6 5 0
         1 0 6 7
         - 9 7 5
             9 2 9
           - 6 5 0
             2 7 9 8
           - 2 6 0 0
               1 9 8
```

Hence, dividend = 725698, divisor = 325,

quotient = **22328**, remainder = **198**.

Check For Example 8 : Divisor × quotient + remainder = dividend

i.e. 325 × 22328 + 198 = 7256600 + 198 = 7256798 = dividend

Hence verified.

Example 9: A carton contains 256 balls. How many cartons are required to pack 821760 balls ?

Solution : Total number of balls = 821760

Number of balls that can be packed in one carton = 256

Numbers of cartons required to pack 821760 balls = 821760 ÷ 256 = 3210

```
            3 2 1 0
256 ) 8 2 1 7 6 0
    - 7 6 8
        5 3 7
      - 5 1 2
          2 5 6
        - 2 5 6
              0 0
```

Thus, the required number of cartons are 3210.

Conceptual Learning

Properties of Division

- If we divide a number by 1, the quotient is the number itself

  For Example : 6,935 ÷ 1 = 6,935

- If we divide a number by itself, the quotient is 1.

  For Example : 5, 975 ÷ 5, 975 = 1

- If we divide 0 by a number, the quotient is 0.

- Dividing a number by 0 is meaningless.

Exercise 3.4

Knowledge Application

1. Multiple Choice Questions (MCQs). Choose the correct option.

(a) The number to be divided is called

(i) divisor ☐ (ii) dividend ☐ (iii) quotient ☐

(b) What will be the quotient when we divide 384696 by 124?

(i) 3110 ☐ (ii) 3011 ☐ (iii) 3102 ☐

2. Find the quotient and remainder :

(a) 675933 ÷ 235 (b) 952683 ÷ 118 (c) 752142 ÷ 256

(d) 82756 ÷ 421 (e) 9766503 ÷ 245 (f) 347364 ÷ 315

Answer the following questions.

Problem Solving

3. 216 apples can be packed in a carton. How many cartons are required to pack 3699216 apples?

4. A car covers a distance of 175 km in one hour. How many hours will it take to cover a distance of 56875 km at the same speed ?

5. A customer paid ₹31000 for 248 copies. Find the cost of one copy.

6. Find the greatest 7-digit number which is exactly divisible by the greatest 2-digit number.

Think Tank

Gap Analyzer™
Take a Test

1. Tick (✓) the correct answer.

(a) 70815261 + 38935216 is equal to :

(i) 109760477 ☐ (ii) 119750477 ☐

(iii) 109750477 ☐ (iv) 109850477 ☐

(b) 7839516 – 6311192 = _____ .

(i) 1528324 ☐ (ii) 1527224 ☐

(iii) 1538324 ☐ (iv) 1538424 ☐

(c) 25896 × 398 = _____ .

(i) 11336688 ☐ (ii) 10306618 ☐

(iii) 11306618 ☐ (iv) 10306608 ☐

2. Fill in the blanks:

(a) $72 \times 10 \times 1 \times 0 =$ _____ .

(b) $32 \times$ _____ $= 32000$

(c) _____ $\div 9389 = 15$

(d) $3186 + 36294 =$ _____ .

(e) $928375 - 762250 =$ _____ .

(f) $75083 \times 339 =$ _____ .

3. Match the following:

Column A	Column B
(a) $3 \times 7 \times 10$	(i) $600 + 400 + 500$
(b) $400 + 500 + 600$	(ii) $10 \times 440 \times 550$
(c) $950 - 350$	(iii) 10
(d) $110 \div 11$	(iv) $1200 - 600$
(e) $440 \times 550 \times 10$	(v) $3 \times 7 \times 10$

Custom Learning Path

Scan to Create Your Own Learning Path

Puzzle

Conceptual Learning

Solve the Puzzles.

A.

42	X	23	=	966
÷		×		÷
21		7		
=		=		=
	×		=	322

B.

58	÷	29	=	
÷		×		×
29				464
=		=		=
		464	=	928

Mental Math

Critical Thinking

Fill in the blanks:

1. The product of 504 and 733 is _____. (odd/even)
2. 50 less than the product of 6 and 150 is _____.
3. 25 more than the product of 305 and 15 is _____.

Fun Time Activity

Conceptual Learning

Fill in the even numbers from 20 to 36, one in each square, such that the sum along each row, each column and each diagonal is the same.

HOTS

Critical Thinking

1. A total of 10992 tiles were used for decorating the rooms, 1 kitchen and 2 bathrooms. T h e number of tiles used are given below:

   Kitchen = 45 tiles 1 Room = 60 tiles 1 Bathroom = 32 tiles

   Find the number of apartments in the building.

2. Three mini vans contain cartons of noodles packets with 24 packets arranged in each carton. Find the number of cartons in each van if the total number of noodles packets is 18288.