Chapter 13
Basic Operations on Large Numbers

ADDITION

In the previous class we have learnt the addition of 4 and 5-digit numbers. In the same manner, we add the numbers of 6 or more digits.

Example 1 : Add 259418 and 368341.

Solution   : Putting the digits of the given numbers in the column form and then adding columnwise, we get:

L	T-Th	Th	H	T	O
1	1				
2	5	9	4	1	8
+ 3	6	8	3	4	1
6	2	7	7	5	9

Example 2 : Add 652468, 5230752, and 70357264.

Solution   : Putting the digits of the given numbers in the column form and then adding columnwise, we get:

C	T-L	L	T-TH	TH	H	T	O
	1	1	1	1	1	1	
		6	5	2	4	6	8
+		5	2	3	0	7	5	2
+	7	0	3	5	7	2	6	4
7	6	2	4	0	4	8	4

Hence, the sum of 552468, 5230751, and 60357264 is 66140483.

Example 3 : A pen factory produced 442572 pens in 1st year, 443792 pens in 2nd year and 296504 pens in 3rd year. How many pens were produced by the factory in these three years?

Solution   :

Pens produced in 1st year	=	442572
Pens produced in 2nd year	=	443792
Pens produced in 3rd year	=	296504
Then, total production in three years	=	1182868

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

Hence, factory produced 1182868 pens in three years.

Testing Time 13.1

1. **Add :**

(a)
```
  5 3 8 1 8 6
+ 7 4 7 0 1 0
```

(b)
```
  5 6 2 9 3 9 3
+ 3 5 1 6 1 5 5
```

(c)
```
  3 5 9 6 3 2 1 4
+ 1 2 3 4 0 0 1 0
+ 1 4 2 8 0 1 5 2
```

(d)
```
  3 7 5 0 0 2 9
+ 2 4 3 1 0 6 1 5
+ 4 7 1 3 0 1 0 6
```

(e)
```
  5 1 3 8 7 2 5 7
+ 4 1 0 1 0 2 5 0
+ 2 2 3 6 1 7 2 8
```

(f)
```
  1 2 7 3 1 9 3 0
+ 2 8 0 0 0 0 0 1
+ 5 3 0 0 9 6 0 4
```

(g)
```
  3 7 5 6 7 8 7 1
+   1 4 8 9 3 4 9 7
+ 6 3 5 3 8 8 5 5 7
```

(h)
```
  2 4 5 9 9 7 5 5
+ 4 3 3 0 8 5 2 9 7
+ 2 1 4 8 8 7 6 6 2
```

2. **Write in columns and then add :**

(a) 512320 + 251621

(b) 2163328 + 1645273

(c) 16582612 + 19150123 + 57623002

(d) 10513262 + 2805620 + 321290

(e) 359601187 + 47778888 + 297366674

3. In an election three candidates got 551250, 614106 and 603944 votes respectively and 2576 votes were invalid. Find the total number of votes polled.

4. In three consecutive years a country produced 927507 tonnes, 476246 tonnes and 716402 tonnes of onions respectively. How much onion did the country produce in all in 3 years ?

5. In a country there are 3276788 male teachers and 2112901 female teachers in the government schools and 1674536 teachers (both male and female) in private schools. How many teachers are there in that country ?

6. The population of three cities X, Y and Z in 2019 were 2752473, 3168912 and 3805694 respectively. What was the total population of the three cities altogether in 2019?

7. The number of visitors who visited the Taj Mahal in three consecutive years are 927197, 1235237 and 1127543. Find the total number of visitors who visited the Taj Mahal in these 4 years.

8. A state produces 6607657 tons of rice and 7579102 tons of wheat. What is the total production of that state?

9. The profit of a company in the years 2017, 2018 and 2019 were ₹ 1612876, ₹ 2431980 and ₹ 2625193 respectively. Find the total profit of the company in these three years.

SUBTRACTION

In the previous class we have learnt the method of subtracting 4 and 5-digit numbers. In the same manner we subtract the numbers having more than 5 digits.

Example 1 : Subtract 550317 from 872145.

Solution : Putting the digits of the given numbers in place value chart and then subtracting column-wise, we get:

L	T-TH	TH	H	T	O
		[1]	[11]	[3]	[15]
8	7	2̶	1	4̶	5
− 5	5	0	3	1	7
3	2	1	8	2	8

Since, sum of subtrahend and difference is equal to minuend, the answer is correct.

Example 2 : Find the difference between 63069438 and 82954986.

Solution : Here, both the numbers have 8 digits.

∵ 6 < 8

∴ 63069438 < 82954986.

So, we subtract 63069438 from 829549863.

C	T-L	L	T-TH	TH	H	T	O
[7]	[12]		[14]	[14]		[7]	[16]
		8	✱				
8̶	2̶	9̶	5̶	4̶	9	8̶	6̶
− 6	3	0	6	9	4	3	8
1	9	8	8	5	5	4	8

Hence, the difference of the given numbers is 19885548.

Example 3 : Find the difference between the numbers 236452 and 631648.

Solution : Both 236452 and 631648 are 6-digit numbers.

$\because$ $2 < 6$

$\therefore$ $236452 < 631648.$

Therefore, to find the difference,

we subtract 236452 from 631648.

Hence, the difference is 395196.

L	T-TH	TH	H	T	O
	12				
5	X	11	5	14	
6	3	X	6	4	8
− 2	3	6	4	5	2
3	9	5	1	9	6

Example 4 : A person earn a profit of ₹ 4952467 in his business in year 2017. If he earn a profit of ₹ 5639754 in year 2007 in the same, find the increase in profit.

Solution :

T-L	L	T-TH	TH	H	T	O
	15				14	14
4	5	13		6	4	
5	6	3	9	7	5	4
− 4	9	5	2	4	6	7
0	6	8	7	2	8	7

Hence, the increase in profit is ₹ 687287.

Example 5 : Evaluate : 49350 + 93087632 − 6832694

Solution : 49350 + 93087632 − 6832694

= 93136982 − 6832694   = 86304288

Testing Time 13.2

1. Subtract :

(a)
```
    6 4 1 7 4 6
  − 5 6 5 4 2 4
  ─────────────
```

(b)
```
    8 1 3 3 5 1
  − 4 8 7 2 2 0
  ─────────────
```

(c)
```
    9 3 5 9 8 6
  − 6 4 4 8 5 7
  ─────────────
```

(d)
```
    6 1 4 4 9 7 7
  − 1 0 4 7 5 6 4
  ───────────────
```

(e)
```
    1 9 6 9 7 6 0 4
  − 1 7 0 0 9 5 7 6
  ─────────────────
```

(f)
```
    6 9 3 7 1 5 0 2
  − 6 3 1 9 0 8 7 4
  ─────────────────
```

2. **Write in the columns and find the difference :**

   (a) 619234 − 208130   (b) 2352898 − 1449699   (c) 7070000 − 6196963

3. What must be added to 567834 to get 843563?

4. What should be subtracted from 83134252 to get 61987568?

5. **Evaluate :**

   (a) 2421768 − 1498168   (b) 98930081 − 25697884   (c) 78386196 − 53995669

6. **Simplify :**

   (a) 67812389 − 12626121 + 21238161   (b) 66123816 + 100023 − 61035216

7. The sum of two numbers is 2754605. If the first number is 987953 then find the second number.

8. The difference of two numbers is 2576190. If one number is 7175460, what is the other number ?

9. A company produced 21976193 ball pens in year 2004 and 21796194 toys in 2005. In which year did the company produce more toys and by how much?

10. The total population of a town is 475989. The number of men is 160190 and the number of women is 100570, find the number of children.

11. The sum of two numbers is 459693478, if the first number is 356547568, then find the second number.

12. What should be subtracted from 98386186 to get the sum of 12867812 and 32861619 ?

13 A cloth mill produced 246054320 m cloth in year 2017 and 343526140 m cloth in year 2018. How much less cloth did it produce in year 2017 than in year 2018 ?

14. A businessman spent ₹ 73561610 to set up a factory. He spent ₹ 46575000 for purchasing machines and purchasing land and the remaining amount for construction of the factory's building. Find the investment in the construction of the factory's building.

MULTIPLICATION

In the previous classes we have learnt that multiplication is the short way to do the repeated addition of the same number. Let us first revise.

The number to be multiplied is called **multiplicand** and the number by which we multiply is called **multiplier**. The result of multiplication is called **product**.

In $342 \times 2 = 684$, we have

multiplicand = 342, multiplier = 2 and product = 684.

1. **Order Property of Multiplication :** The product of two numbers does not change when the order of the numbers is changed.

   Examples : $5 \times 7 = 7 \times 5$; $41 \times 7 = 7 \times 41$; $32965 \times 109 = 109 \times 32965$

2. **Grouping Property of Multiplication :** The product of three numbers does not change when the grouping of the numbers is changed.

   Examples : $6 \times (23 \times 81) = (6 \times 23) \times 81;$ $15 \times (39 \times 52) = (15 \times 39) \times 52$ etc.

3. **Distributive Property of Multiplication over Addition :** We have,

   $153 \times (85 + 417) = (153 \times 85) + (153 \times 417)$ etc.

   The above property is known as Distributive Property of Multiplication over Addition.

4. **Multiplicative Property of 0 :** The product of a number and zero is always zero.

   Examples : $192 \times 0 = 0;$ $2256 \times 0 = 0;$ $30593 \times 0 = 0$ etc.

5. **Multiplicative Property of 1:** The product of a number and 1 is the number itself.

   Examples : $52 \times 1 = 52;$ $746 \times 1 = 746;$ $80461 \times 1 = 80461$ etc.

Multiplication of a Number By 10, 100 and 1000

Rule : To multiply a number by 10, 100 and 1000, we insert one zero, two zeros and three zeroes respectively on the right of the given number. eg:

   (a) $52 \times 10 = 520;$ (b) $79 \times 100 = 7900;$

   $409 \times 1000 = 409000$ etc.

Multiplication of a Number by Multiples of 10, 100, 1000 etc.

Study the following examples:

Example 1 : Find the products : 245×70

Solution : $245 \times 70 = 245 \times 7 \times 10$

                $= 1715 \times 10 = 17150$

Example 2 : Multiply : 6529 by 500

Solution : $6529 \times 500 = 6529 \times 5 \times 100$

                $= 32645 \times 100 = 3264500$

Example 3 : Find the products: 9643×3000

Solution : $9643 \times 3000 = 9643 \times 3 \times 1000$

                $= 28929 \times 1000 = 28929000$

Look at the following example based on the properties discussed earlier.

Example 4 : Multiply : 6805 by 295

Solution : $6805 \times 295 = 6805 \times (200 + 90 + 5)$

                $= 6805 \times 200 + 6805 \times 90 + 6805 \times 5$

                $= 1361000 + 612450 + 34025$

                $= 2007475.$

Testing Time 13.3

1. **Fill in the blanks using the properties of multiplication:**

   (a) $8 \times 5 = ... \times 8$

   (b) $68 \times 30 = 68 \times ...$

   (c) $165 \times ... = 165$

   (d) $247 \times ..... = 0$

   (e) $32 \times (15 + ...) = 32 \times 15 + 32 \times 9$

   (f) $516 \times (... + ...) = 516 \times 82 + 516 \times 108$

   (g) $2954 \times 300 = ...$

   (h) $... \times 2000 = 4264000$

2. **Find the products:**

   (a) 284×10

   (b) 1056×20

   (c) 4956×300

   (d) 4158×500

   (e) 7045×6000

   (f) 9999×8000

3. **Multiply the following orally:**

   (a) 49 by 30

   (b) 748 by 200

   (c) 1568 by 1000

   (d) 20695 by 6000

4. **Find the following products by using suitable grouping:**

   (a) $5 \times 85 \times 2$

   (b) $8 \times 362 \times 25$

   (c) $2056 \times 125 \times 4$

   (d) $476 \times 200 \times 50$

5. **Fill in the blanks:**

   (a) $3852 \times 543 = 3852 \times (500 + ... + 3)$

   (b) $1763 \times 825 = 1763 \times (... + 20 + ...)$

   (c) $4682 \times 875 = 4682 \times (... + ... + 5)$

MULTIPLICATION OF LARGE NUMBERS

In the previous class, we have learnt the multiplication of a number by a 2-digit or 3-digit number.

Now, we shall learn multiplication with larger numbers.

Example 5 : Multiply 70342 by 3943.

Solution :

$$
\begin{array}{r}
70342 \\
\times 3943 \\
\hline
211026 \\
2813680 \\
63307800 \\
211026000 \\
\hline
277358506 \\
\hline
\end{array}
$$

$211026 \leftarrow (70342 \times 3)$

$2813680 \leftarrow (70342 \times 40)$

$63307800 \leftarrow (70342 \times 900)$

$211026000 \leftarrow (70342 \times 3000)$

$277358506 \leftarrow (70342 \times 3943)$

Hence, $70342 \times 3943 = 277358506$

Testing Time 13.4

1. **Multiply :**

(a)
```
    3 2 3 4
  × 2 1 4
```

(b)
```
    4 1 0 6
  × 4 3 7
```

(c)
```
    7 0 5 9
  × 6 5 6
```

(d)
```
    2 1 6 3
  × 7 4 9 5
```

(e)
```
    8 0 1 6 3
  × 5 2 1 4
```

(f)
```
    8 0 0 3 2
  × 6 0 5 9
```

2. **Write in columns and find the products :**

(a) 3359×213 (b) 5908×346 (c) 2563×8314 (d) 6254×9408

(e) 50082×953 (f) 63297×1258

3. **Find the continued product of the following:**

(a) $315 \times 36 \times 8$ (b) $5032 \times 200 \times 59$ (c) $183 \times 56 \times 12$ (d) $419 \times 302 \times 7$

PROBLEMS ON MULTIPLICATION

Example 6 : The cost of a washing television is ₹ 7385. What will be the cost of 285 such television ?

Solution : The cost of a television   =   ₹ 7385

∴ The cost of 285 television   =   ₹ (7385×285)

```
        7 3 8 5
    ×   2 8 5
    ─────────────
        3 6 9 2 5
      5 9 0 8 0 0
    1 4 7 7 0 0 0
    ─────────────
    2 1 0 4 7 2 5
```

Hence, the cost of 285 television = ₹ 2104725.

Testing Time 13.5

1. The weight of a box is 562 kg. What is the weight of 246 such boxes?

2. Find the product of the greatest 5-digit number and 222 .

3. Find the product of the least number formed by the digits 2,3, 0 and 5 and the greatest 3-digit number.

4. The cost of a refrigerator is Rs 8625. What is the cost of 437 such refrigerators ?

5. A car can travel 1752 metres in a minute. How far can it travel in four hours?

6. There are 4358 primary schools in a state. If the average number of students in each school is 1056, then find the total number of students in that state.

7. Parul can read 143 words in a minute. How many words will be read by her in the month of July if, she reads daily for 5 hours 40 minutes?

DIVISION

In the previous classes we have learnt about division also. Let us first revise about division and terms related with division.

The number which divide is called divisor.

The number that is divided is called the **dividend**.

The number of times the divisor is contained in the dividend is called the **quotient**.

The left over number is called the **remainder**.

Example 1 : Divide 325627 by 43.

Solution : **Explanation :**

Step 1. Here, the divisor is a 2-digit number.

So, consider the number formed by 2 extreme left digits of the dividend. It is 32. But 32 < 43.

So, take the number formed by 3 leftmost digits of the dividend.

It is 325. Let us see how many times 43 is contained in 325.

$43 \times 7 = 301$ and $43 \times 8 = 344$

Clearly, 301 < 325 and 344 > 325.

∴ 43 is contained 7 times in 325.

Write 7 in the quotient just above 5 as shown in the solution.

Write 301 below 325 and subtract.

$325 - 301 = 24.$

```
Dividend
   ↑           7 5 7 2 ← Quotient
 4 3 ) 3 2 5 6 2 7 ← Dividend
      − 3 0 1
        2 4 6
      − 2 1 5
          3 1 2
        − 3 0 1
            1 1 7
          −  8 6
              3 1  ← Remainder
```

Step 2. Bring down the next digit, i.e., 6 from the dividend to make 246.

Now, $43 \times 5 = 215$ and $43 \times 6 = 258$

Clearly, $215 < 246$ and $258 > 246$.

∴ 43 is contained 5 times in 246.

Write 5 in the quotient just next to 7 as shown in the solution.

Write 215 below 246 and subtract.

$246 - 215 = 31$.

Step 3. Bring down the next digit, i.e., 2 from the dividend to make 312.

Now, $43 \times 7 = 301$ and $43 \times 8 = 344$.

Clearly, $301 < 312$ and $344 > 312$.

∴ 43 is contained 7 times in 312.

Write 7 in the quotient just next to 5 as shown in the solution.

Write 301 below 312 and subtract.

$312 - 301 = 11$.

Step 4. Bring down the next digit, i.e., 7 to make 117.

Now, $43 \times 2 = 86$ and $43 \times 3 = 129$.

Clearly, $86 < 117$ and $129 > 117$.

∴ 43 is contained 2 times in 117.

Write 2 in the quotient just next to 7 as shown in the solution.

Write 86 below 117 and subtract.

$117 - 86 = 31$.

Thus, quotient $= 7572$ and remainder $= 31$.

Testing Time 13.6

1. Divide and find the quotient and the remainder:

(a) 4362 by 18   (b) 8672 by 37   (c) 20581 by 73   (d) 615738 by 82

(e) 369052 by 123   (f) 700598 by 355   (g) 1058732 by 247   (h) 8400567 by 731

(i) 59603741 by 645   (j) 48627509 by 526

2. Find the dividend when:

(a) Divisor = 236, quotient = 8352, remainder = 158.

(b) Divisor = 163, quotient = 10056, remainder = 26.

(c) Divisor = 235, quotient = 96320, remainder = 15.

3. Write down the greatest number of 7-digit and divide it by the smallest number of 3-digit.

4. Find the quotient and the remainder when the largest 8-digit number is divided by the largest 4-digit number.

5. **Replace * by a suitable digit in the following :**

(a)
```
              2 0 * 4 *
      263 ) 5 4 3 * 5 * 9
            - 5 * 6
            ─────────
              1 7 * 5
            - 1 5 7 8
            ─────────
              1 2 7 *
            - 1 0 5 2
            ─────────
                * 2 7 9
              - 2 1 0 4
            ─────────
                  1 * 5
```
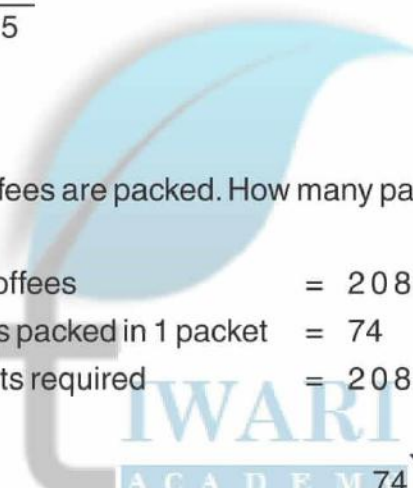
(b)
```
              2 * 9 8 *
      185 ) 4 * 6 * 9 8 7
            - 3 7 0
            ─────────
              3 6 *
            - 1 8 5
            ─────────
              1 8 1 9
            - 1 * * 5
            ─────────
                1 * 4 8
              - 1 4 * 0
            ─────────
                  6 8 7
                - 5 * 5
              ─────────
                    * 2
```

PROBLEMS ON DIVISION

Example 2 : In a packet 74 toffees are packed. How many packets are needed to pack 208384 toffees ?

Solution : Total number of toffees   = 208384

Number of toffees packed in 1 packet   = 74

Number of packets required   = 208384 ÷ 74

```
              2 8 1 6
      74 ) 2 0 8 3 8 4
          - 1 4 8
          ─────────
            6 0 3
          - 5 9 2
          ─────────
              1 1 8
            - 7 4
          ─────────
              4 4 4
            - 4 4 4
          ─────────
                  0
```

Thus, 2816 packets are required.

Example 3 : The product of two numbers is 437995 and one of them is 251. Find the other.

Solution : Product of the numbers = 437995

One number = 251

Other number = 437995 ÷ 251

```
            1 7 4 5
      251 ) 4 3 7 9 9 5
           -2 5 1
            1 8 6 9
           -1 7 5 7
            1 1 2 9
           -1 0 0 4
              1 2 5 5
             -1 2 5 5
                    0
```

Thus, the required number = 1745.

Testing Time 13.7

1. 946580 books are to be arranged equally in shelves. If 265 books are arranged in each shelf, how many shelves will be needed?

2. 941718 persons visited a museum in a leap year. How many persons on an average visited museum in one day?

3. A company manufactures 23316217 scooters in 463 days. How many scooters are manufactured in a day?

4. 826084 apples are packed equally in 2534 boxes. How many apples are there in each box?

5. In the month of March, April, May and June the total sale of a milk depot was 3134668 litres. How much milk does it sell everyday ?

6. How many hours are there in 293520 minutes?

7. An egg-seller bought 264054 eggs. Out of these 159 eggs were found rotten. The remaining eggs were equally packed in 723 boxes. Find the number of eggs in each box.

8. Find the dividend when the divisor is 532, quotient is 247 and the remainder is 96.

9. What least number should be subtracted from 350826 so that the difference is exactly divisible by 392 ?

10. Find the least number to be added to 856057 so that the result is exactly divisible by 461.