

In class 4 we have already learnt to find out the addition and subtraction upto 3 digits, through Vedic Methods. In this lesson we will learn the addition and subtraction of more than 3 digits and learn to find the LCM and the HCF through Vedic Method.

Addition

Purana Puranabhyam Complementary Method- This method is useful for big calculations. Vedic formula is based on completing or not completing of a base number which is a multiple of 10. Calculation is made easy (especially big calculation) by adding numbers which complete a base (i.e. a multiple of 10). If you remember the complement of digits coupling becomes easy. Here, a list has been given of those pairs which are complements of each other and which are called complementary numbers. For example-

Number	0	1	2	3	4	5	6	7	8	9
Complementary Number	10	9	8	7	6	5	4	3	2	1

In the process of summing up those numbers will be paired whose sum is the multiple of 10 (or 100, 1000)

Example- add $26 + 59 + 11 + 14$.

Solution-

$$\begin{aligned}
 & 26 + 59 + 11 + 14 \\
 = & (26 + 14) + (59 + 11) \\
 = & 40 + 70 \\
 = & 110
 \end{aligned}$$



Example- add $24 + 61 + 394 + 66 + 16 + 19$.

Solution-

$$\begin{aligned} & 24 + 61 + 394 + 66 + 16 + 19 \\ = & (24 + 16) + (61 + 19) + (394 + 66) \\ = & 40 + 80 + 460 \\ = & 580 \end{aligned}$$

Example- add $74 + 69$.

Solution-

$$\begin{aligned} & 74 + 69 \\ = & (70 + 4) + (70 - 1) \\ = & (70 + 70) + (4 - 1) \\ = & 140 + 3 \\ = & 143 \end{aligned}$$

Ekadhiken Purven-

The following steps will be taken to find out the sum through this method-

- Add the first column or the column of the unit.
- When the sum is more than 10 put a dot (.) above the digit on the left side and add the number of the unit with the next number of the unit.
- Same process will be repeated in the next column and the dots (.) will be assumed as 1 digit and these will be added with those numbers.
- The dots (.) that come in the last will be counted and written.

Example- Add $486 + 654 + 987$.



Solution-

$$\begin{array}{r} \\ \\ \\ \\ \hline \\ \hline \end{array}$$

First Column- $6 + 4 = 10$ (put as a dot (.) the 1 of tens above the number on left side)

$$0 + 7 = 7$$

Second Column- $8 + 5 = 8 + 6 = 14$ (put as a dot (.) the 1 of tens above the digit 6 on left side).

Third Column- $4 + 6 + 7 = 11$ (put as a dot (.) the 1 of tens on left side).

$$1 + 9 = 1 + 10 = 11 \text{ (put a dot (.) the 1 of tens on left side).}$$

The dots(.) coming in the last will be written after adding them.

Example- Add $6489 + 5642 + 3241$.

Solution-

$$\begin{array}{r} \\ \\ \\ \\ \hline \\ \hline \end{array}$$

First Column- $9 + 2 = 11$ (put as a dot (.) the 1 of tens above the digit 4 on left side)

$$1 + 1 = 2$$



Second Column- $8 + 4 = 8 + 5 = 13$ (put as a dot (.) the 1 of tens above the digit 6 on left side).

$$3 + 4 = 7$$

Third Column- $4 + 6 = 4 + 7 = 11$ (put as a dot (.) the 1 of tens above the digit 5 on left side)

$$1 + 2 = 3$$

Fourth Column- $6 + 5 = 6 + 6 = 12$ (put as a dot (.) the 1 of tens on left side)

$$2 + 3 = 5$$

The dots (.) coming in the last will be written after adding them.

Subtraction

In the previous class we have already learnt the subtraction through Vedic Maths. In the continuation of that we will learn to solve difficult questions through Complementary formula (Parammitra Sutra) in this chapter.

Example- Subtract 3489 from 5432.

$$\begin{array}{r}
 \text{Solution-} \quad 5 \quad 4 \quad 3 \quad 2 \\
 - \quad 3 \quad 4 \quad 8 \quad 9 \\
 \hline
 1 \quad 9 \quad 4 \quad 3
 \end{array}$$

First Column- To subtract the digit 9 from the above digit 2 the complementary no. 1 of the digit 9 is added to the digit 2 and a dot (.) is put above the digit on left side of the digit 9.

$$1 + 2 = 3$$

Second Column- To subtract the digit 8 i.e. $8 + 1 = 9$ from the above digit 3

the complementary no. 1 of the digit 9 is added to the digit 3 and a dot (.) is put above the digit on left side of the digit 8.

$$1 + 3 = 4$$

Third Column- Done as above.

$$5 + 4 = 9$$

Fourth Column- Complementary no. is not required for subtracting 3 that is $3 + 1 = 4$ from the above digit 5. So $5 - 4 = 1$

Example-

7	8	9	2	4
-	6	9	8	1 6

Solution-

7	8	9	2	4
6	9	8	1	6
0	9	1	0	8

First Column- To subtract the digit 6 from the above digit 4 the complementary no. 4 of the digit 6 is added to the digit 4 and a dot (.) is put above the digit on left side of the digit 6.

$$4 + 4 = 8$$

Second Column- After subtracting 1 that is $1 + 1 = 2$ from the above digit 2 = 0.

Third Column- After subtracting 8 from 9, $9 - 8 = 1$.

Fourth Column- For subtracting 9 from 8 the Complementary no. 1 of 9 is added to 8 and a dot (.) is put above the digit that is on the left side of 9.

$$1 - 8 = 9$$

Fifth Column- After subtracting 6 i.e. $6 + 1 = 7$ from 7, $7 - 7 = 0$



To find the LCM and HCF

We can find out the L.C.M. and the H.C.F. quickly and simply by our Ancient Indian Method.

Let's understand the method of finding the L.C.M. of two numbers –

The numbers are – 48 and 80

First step – First we write the numbers in the form of fraction – $\frac{48}{80}$

Second step – We find out the simplest form of the fraction – $\frac{\cancel{48}^3}{\cancel{80}_5} = \frac{3}{5}$

Third step – Write the equivalent fractions obtained from

the above two steps in this way

$$- \frac{48}{80} = \frac{3}{5}$$

Fourth step – Cross multiply

$$\frac{48}{80} \times \frac{3}{5}$$

$$3 \times 80 = 240$$

$$5 \times 48 = 240$$

Hence, 240 is the L.C.M. of the numbers.

To find out the L.C.M. of three numbers –

Let's find out the L.C.M. of 12, 16 and 24.

First step– Find out the L.C.M. by writing the first two numbers in the form of fractions–

$$\frac{12}{16} = \frac{3}{4}$$

$$16 \times 3 = 12 \times 4 = 48$$

48 is the L.C.M. of 12 and 16.

Second step – Now write the L.C.M. 48 obtained in the first step and the third

number 24 in the form of fractions. Then find out the L.C.M.– $\frac{48^1}{48_2} = \frac{1}{2}$

$$24 \times 2 = 48 \times 1 = 48$$

Hence, the L.C.M. of three given numbers is 48.

Method to find the H.C.F. of three numbers

We have to find out the H.C.F. of 15, 30 and 45.

First step— First we find out the mutual difference between the given numbers.

$$30 - 15 = 15,$$

$$45 - 30 = 15,$$

$$45 - 15 = 30$$

Here, the difference 15 is the least. It means the H.C.F. of above three numbers will be 15 or less than 15 - $\text{H.C.F.} \leq 15$

Second step—We divide all the three numbers one by one by the least difference which is obtained in the first step.

$$15 \overline{)15} (1$$

$$\begin{array}{r} -15 \\ \hline 00 \end{array}$$

$$15 \overline{)30} (2$$

$$\begin{array}{r} -30 \\ \hline 00 \end{array}$$

$$15 \overline{)45} (3$$

$$\begin{array}{r} -45 \\ \hline 00 \end{array}$$

Hence, the least difference 15 will be the H.C.F. of the given three numbers.

Let's see this too—

H.C.F. of 306, 360 and 630

First step — $360 - 306 = 54,$ $630 - 360 = 270,$ $630 - 306 = 324$

Second step — The least difference is 54.

$$54 \overline{)306} (5$$

$$\begin{array}{r} -270 \\ \hline 36 \end{array}$$

$$54 \overline{)360} (6$$

$$\begin{array}{r} -324 \\ \hline 036 \end{array}$$

$$54 \overline{)630} (11$$

$$\begin{array}{r} -594 \\ \hline 036 \end{array}$$

Here, the number 306 is not divisible by 54.

Hence, 54 is not the H.C.F. of the given numbers.

Third step — Now, subtract the remainder 36 of the second step from the least difference of the first step — $54 - 36 = 18$

Fourth step — Divide the given numbers by 18

$$18 \overline{)630} (35$$

$$\begin{array}{r} -54 \\ \hline 90 \\ -90 \\ \hline 00 \end{array}$$

$$18 \overline{)360} (20$$

$$\begin{array}{r} -360 \\ \hline 000 \end{array}$$

$$18 \overline{)306} (17$$

$$\begin{array}{r} -18 \\ \hline 126 \\ -126 \\ \hline 000 \end{array}$$

Hence, 18 is the H.C.F. of all the given numbers.

We have learnt-

- Students have learnt addition and subtraction by using dots (.)



- Students can solve the questions of additions through Purana Puranabhyam and Ekadhiken Purven Methods.
- Students have learnt the subtraction of big numbers through Complementary formula (Parammitra Sutra)

Exercise

1. Find out the sum of the following questions through Ekadhiken Purven Method.

i.
$$\begin{array}{rcccc} 4 & 3 & 2 & 5 \\ 1 & 5 & 6 & 3 \\ 5 & 4 & 3 & 7 \\ \hline \hline \end{array}$$

ii.
$$\begin{array}{rcccc} 5 & 6 & 8 & 9 \\ 4 & 3 & 0 & 5 \\ 8 & 2 & 1 & 4 \\ \hline \hline \end{array}$$

iii. $57213 + 23487 + 94151$

iv. $14898 + 23056 + 67823$

2. Subtract these questions through Ekadhiken Purven Method.

i.
$$\begin{array}{rccccc} 7 & 8 & 9 & 1 & 2 \\ - 5 & 9 & 8 & 7 & 5 \\ \hline \hline \end{array}$$

ii.
$$\begin{array}{rcccccc} 9 & 2 & 1 & 3 & 4 & 5 \\ - 7 & 4 & 8 & 9 & 7 & 6 \\ \hline \hline \end{array}$$

iii. $5400135 - 3498909$

iv. $9820001 - 4329928$

v. $69245617 - 54327192$

3. Find out the LCM and HCF of the following numbers through Vedic Method.

i. 54 and 72

ii. 210 and 180

