Chapter 7

Vedic Mathematics

7.1 Till now we have learned addition, subtraction, multiplication by Vedic maths. In this chapter we will study about these in detail. It includes; one more (Ekadhiken), one less(eknunen), absolute, deviation, absolute friend digit, inverse numbers, Addition of inverse numbers, subtraction, multiplication etc. except this we shall know about base of formula and shall learn about multiplication and division by 10 and 100

7.2 Next (One more) Ekadhiken

Chandra Shekhar has a magic box. If anyone speaks any number in front of this box. Then this box shows one more than the spoken number. When Anand speaks 8, this box says 9.

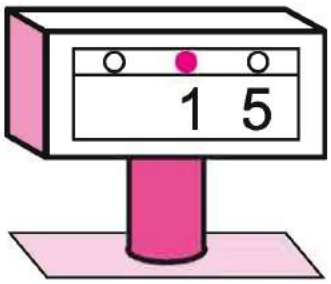
When Karan says 6, this box says 7.So box was telling the next number but when Leelavati told 15, this box said 25.

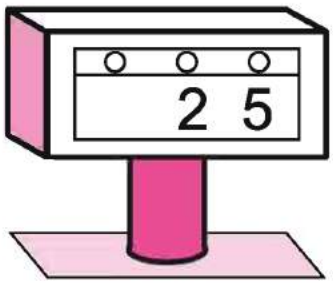
All the children started to think why this time box said 25? When next number after 15 is 16.

Similarly whenever a two digit number was spoken the box said next number for only the digit at the place of tens. Now children understood that at which number the point on the box get darker, shows the one more number.

i.e It shows the next one number for darker point .

Thus we have to show this special number a bit darker.





In the above diagram if the darker point would be on 5. The box would have shown the next one more number as 16. But it is on 1 therefore it showed 25. Practice these with more examples and fill in the blanks:

Ekadhik = Find out one more

One more = One more than the previous

One more of 3 = $\dot{3}$ = 4

One more of 7 = $\dot{7}$ = 8

One more of 9 = $\dot{9}$ = 10

One more of 12 = $1\dot{2}$ = 13

One more of 28 = $2\dot{8}$ = 29

One more of 32 = $3\dot{2}$ = 33 (one more of unit digit 2)

One more of digit 1 in number 14 = $\dot{1}4$ = 24 (one more of the digit at tens place i.e one more of 1 = 2)

One more of 2 for number 25 = $\dot{2}5$ = 35

One more of digit 9 for 98 = $\dot{9}8$ = 108 (one more of 9 = $\dot{9}$ = 10)

Number	One more hint	New number
4	$\dot{4}$	5
6	.....	.....
11	$1\dot{1}$	12
18	.....	.....
96	.....	.....
In 125 of digit 2	$1\dot{2}5$	135
In 354 of digit 3	.....	.....
In 648 of digit 8	.....	.....
In 985 of digit 9	.....	.....
In 1459 of digit 1	.....	.....

7.2.1 (Poorven)Before

In vedic maths ekadhiken poorven (before) word is also in trend with ekadhiken (one more) .Thus meaning of poorven is prior means the just one digit before ...

In 13, the poorven digit of 3 = 1 The number before 3(at the place of tens)-1

In 59, poorven digit of 9 = 5 The number before 9(at the place of tens)-5

In 286, poorven digit of 8 = 2 The number before 8(at the place of hundreds) -2

In 435, poorven digit of 4 = 0 The number before 4 (at the place of thousands)-0

Therefore for which digit poorven is asked, we just take its just previous digit Such as ekadhiken poorven of 6 is $\dot{0}$ 6 and new number is 16. Poorven digit of 6 will be 0. The number without any poorven digit is supposed to have '0' as its poorven.

Number	Ekadhiken poorven	New number
7	$\dot{0}7$	17
9	.....	
In 16 of digit 6	$\dot{1}6$	26
In 42 of digit 2	.....	.....
In 96 of digit 9	$\dot{0}96$	196
In 87, of digit 8	.....	.....
In 134 , of digit 3	$\dot{1}34$	.....
In 273, of digit 7	.....	.....
In 819, of digit 1	.....	.....
In 827, of digit 8	.....	.....

7.3 Addition by Ekadhikenpoorven

We will learn addition using Ekadhiken poorven.

Example 1

$$\begin{array}{r} 78 \\ \dot{0}\dot{6}5 \\ \hline 143 \\ \hline \end{array}$$

Hints

1) Addition of digits at unit's place 8+5 =13.Thus we will mark the one more sign on poorven digit of 6
2) And we will put 3 below whole sum (at the place of unit)
3) In the addition digits at tens place $7 + \dot{6} = 14$ (where $\dot{6} = 7$)
4) Therefore mark one more sign on poorven digit of 6 i.e 0(the number without any poorven digit is supposed to have 0 as its poorven)
5) Write the remainder 4 at the place of addition(tens place)
6) $\dot{0} = 1$ shall be written at hundreds place .

Example-2

$$\begin{array}{r} 98 \\ \dot{0}\dot{6}9 \\ \dot{0}\dot{8}5 \\ \hline 252 \\ \hline \end{array}$$

Hints

1) Addition of digits at the units place 8+9=17therefore one more sign at poorven digit of 9 i.e. 6
2) Left7+5=12 therefore one more sign would be at poorven digit of 5 i.e. 8
3) Remainder 2 shall be at the place of addition (in unit)
4) In the addition of tens place $9+\dot{6}=16$ therefore one more sign is on the poorven of 6 i.e. 0
5) Remainder $6+\dot{8}=15$ therefore put one more sign on poorven of 8 i. e. 0 and write remainder 5 in place of addition.
6) At the end $\dot{0}+\dot{0}=2$ at the place of hundreds.

Example-3

$$\begin{array}{rr} 7 & 60 \\ 1\dot{3} & 45 \\ 38 & 50 \\ \hline 59 & 55 \\ \hline \end{array}$$

Hints

1) 0+5=5 written at unit"s place below
2) 6+4 =10 therefore we mark the sign of one more on 3 (Poorven of 4)
3) Remainder 0+5= 5 wrote in the sum at the place of tens.
4) $7+\dot{3}=11$ Therefore one more sign will be on 1(poorven of 3)
5) Remainder 1+8 =9 written below in sum at the place of hundreds.
6) $\dot{1}+3=5$ Written below at the place of addition.

Example-4

$$\begin{array}{rr} 26 & 386 \\ \dot{0}9\dot{7} & \dot{8}\dot{6}5 \\ \hline 124 & 251 \\ \hline \end{array}$$

Hints

1) 6+5=11 Therefore one more sign on poorven digit of 5 i.e 6; remainder 1 in meter in the addition at the place of unit
2) $8+\dot{6}=15$ Therefore one more sign will be on the poorven digit of 6 i.e 8. Remainder 5 in addition under meter at the place of tens.
3) $3+\dot{8}=12$ therefore one more sign will be on poorven digit of $\dot{8}$ i.e 7 remainder 2 in addition under meter at the place of addition.
4) $6+\dot{7}=14$. Therefore one more sign on 9 the poorven digit of $\dot{7}$
5) Remainder 4 in the addition under kilometer
6) $2+\dot{9}=12$ therefore one more sign on 0 i.e poorven of digit $\dot{9}$.
7) $\dot{0}=1$ at the place sum.

Exercise 7.1

1. Find out the addition by formula of Ekadhiken poorven-

(i) 96 + 68

(ii) 98 + 49 + 35

(iii) 327 + 496 + 528

(iv)

RS	P
418	75
+ 395	36

(v)

Km	M
86	786
+ 75	345

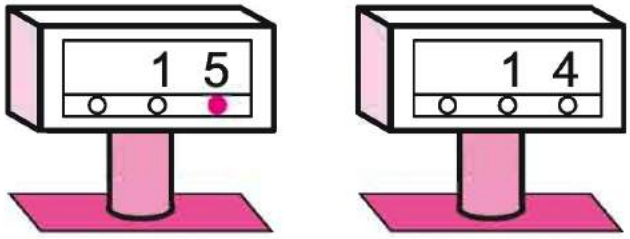
(vi)

Kg	gm
139	65
+ 87	83

7.4 Eknunen (one less than previous)

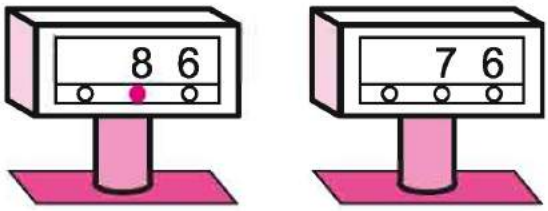
Didi as we were learning to find out the number written on box by the method of one more, then why not we make a box which can tell us the number less than 1.Let us see by subtracting 1 number.

If we speak 15 on the box, the box tells us the number 14



Less than one means to subtract 1. For showing less 1 we denote it by (•)

Similarly Pushkar spoke the number 86 then box told 76 by formula of less 1



Thus it shows less than one digit of the darker dotted number. In the second box darker dot is below 8 of 86.Therefore the box shows number 76. Therefore eknunen poorven is one less than of the previous digit. Thus in 19 one less than previous is 09.

Some more examples are given below. Fill in the blanks:

Do and learn

Number	Ekadhiken poorven sign	New number
In 15 of digit 5	1̣5	05
In 23, of digit 3	.....	.....
In 47, of digit 4	.....	.....
In 159, of digit 9	15̣9	149
In 351, of digit 1	.....	.....
In 524, of digit 2	.....	.....
In 1675, of digit 6	.....	.....
In 8963, of digit 9	.....	.....

7.5 Complementy Digit (Parammitra ank)

Sulochna didi brings a box in the class. There are 10 marbels in the box. didi asks to take out marble from the box then tej singh takes out 9 marbels. Then didi asks about remaining marbles in the box. The answer is1.

Similarly other children also take out marbles from the box. One student took out 6 marbles then ;how many marbles left in the box. The answer is 4 marbles. Thus sum of taken out and left over marbles is 10 therefore we get the amount of left marbles by subtracting the number of marbles taken out. Thus if base number is 10 and one number is given then remainder is the parammitra of that number.

Complementry digit of 1 (Parammitra ank) = 9 (10-1=9)

Complementry digit of 2 Parammitra ank) = 8 (10-8=2)

Complementry digit of 3 (Parammitra ank = 7

Complementry digit of 4 (Parammitra ank) = 6

Complementry digit of 5 (Parammitra ank) = 5

Complementry digit of $\dot{9}$ = 0

($\dot{9}$ = ekadhik of 9)

Therefore the sum of both numbers is 10.

Formula: Subtraction from sum of eknunen + prammitra ank

Example 5 Solve 52-27

$$\begin{array}{r} 52 \\ -\ 27 \\ \hline 25 \end{array}$$

Hint

(i) 7 can not be subtracted from 2. Therefore we add the Complementry digit of 7 , the digit 3 to 2
2+3= 5 write below the sum.
(ii) Put a sign of less than on the poorven digit of 2 i.e 5 such as $\dot{5} = 4$
(iii) subtract 2 from $\dot{5}$ (4-2=2) and write remainder 2 below.
Thus 52-27=25 is the answer.

Example 6 subtract 359 from 643

$$\begin{array}{r} 643 \\ -\ 359 \\ \hline 284 \end{array}$$

Hint

1. 9 can not be subtracted from 3.Therefore we will add Complementri digit of 9 i.e 1 to 3. Then sum 3+1 = 4
2. we put sign of one lesser on the poorven of 3 i.e $\dot{4}$
3. 5 can not be subtracted from $\dot{4} = 3$. Therefore we added Complementry digit of 5 i.e 5 to the digit 3. Hence sum is 5+3=8
4. Put a sign of one lesser with the poorven number of 4.i.e $\dot{6}$
5. $\dot{6} = 5, 5-3=2$.
Hence 643-359= 284 answer.

Example 6 subtract

Rs.	Paisa
$\dot{8}\dot{1}$	$\dot{8}5$
− 24	96
56	89

Hint

(1) 6 Can not be subtracted from 5.Therefore 4, the Complementri digit of 6 would be add to 5. Then write 5+4 =9
(2) put –sign with the poorven ank of 5 i.e $\dot{8}$
(3) 9 can not be subtracted from $\dot{8} = 7$. Therefore we add digit 1 (param mitra of 9) to the sum $\dot{8}+1=8$
(4) Put the one lesser sign with 1(Poorven ank of $\dot{8}$) such as $\dot{1}$
(5) 4 can not be subtracted from $\dot{1} = 0$.Therefore we add 6 to the number $\dot{1}$ i.e $6+\dot{1} = 6$
(6)Put one lesser sign with 8 (The poorven of $\dot{1}$) such as $\dot{8}$
(7) Subtracrting 2 from $\dot{8} = 7$ then $\dot{8} - 2 = 5$
Thus subtracting Rs 24.96 from 81.25= Rs 56 and 89 p.

Example 8

Kms.	Metre
3$\dot{7}$	6$\dot{7}$0
28	890
08	780

Hint

(1) Subtracting 0 from 0=0

(2) 9 can not be subtracted from 7.We add parammitra digit of 9 i.e 1 to 7. Hence 7+1=8

(3) Put one lesser sign on the poorven of 7 i.e 6 Such as 6$\dot{}$

(4) 8 can not be subtracted from 6$\dot{}$, Therefore we add param mitra digit of 8 i.e 2 to 6$\dot{}$. Hence 6$\dot{}$ + 2 = 7

(5) We put one lesser sign with the poorven digit of 6$\dot{}$ i.e 7$\dot{}$

(6) 8 can not be subtracted from 7$\dot{}$ = 6, Complementri digit of 8 is 2 and adding 2 to 7$\dot{}$ i.e 7$\dot{}$ +2= 8

(7) put one lesser sign with poorven digit of 7 i.e 3 such as 3$\dot{}$

(8) Subtracting 2 from 3$\dot{}$ = 2 Write 2-2 = 0

Exercise 7.2

1. Subtract by the formula of eknunen poorven & "Parammitra ank".

(i) 75 − 27

(ii) 84 − 56

(iii) 435 − 146

(iv) 840 − 573

(v)

Rs	P
75	40
− 56	73

(vi)

M	Cm
134	40
− 65	85

(vii)

Kg	gm
235	125
− 79	238

7.6 Deviation

Chetan went to a shop to bring packet of match boxes. Shop keeper told its price Rs 7. Chetan gave rs. 10 to shop keeper. Then shopkeeper returns Rs 3 to him. Shiva reached at shop, takes a packet of salt and its price is Rs 15.Shiva gave one note of rs10 and one of Rs 5.

In the above two examples transaction was based on digit 10.

Kapil bought a packet of 200 ml of milk for Rs 8. Durga bought a coco nut for Rs 12. Therefore the shop keeper returned Rs 2 to Kapil and durga gave Rs. 2 more to the shop keeper. If Kapil would have purchased both the things, then how much of money he had given to the shop keeper. Must be Rs. 20.In vedic maths calculation are generally done on the base of number 10, its multiple and raised power.

Therefore the value more or less than the base is called deviation. Lesser value than base is called negative deviation and more value than base is called positive deviation.

Do and learn

Number 9	How much less than 10 …(-1)
Number 6	Deviation from 10……
Number 14	How much more than 10 .....
Number 85	How much less then 100 .....
Number 89	How much more than 100 .....
Number 94	Deviation from 100 .....
Number 102	How much more than 100…….+2
Number 105	How much more than 100……
Number 113	Deviation from 100 .....

7.7 Inverse "Vinkulum"

We learned about Param mitra where sum of 2 digits is equal to 10.Then these digits are param mitra of each other. How much the number is smaller than the base. To show negative form of it we put a line over the number and it is called Vinkulum. Here we will convert number greater them 5.

$8 = 10 - 2$

$= 10 + \bar{2}$ We write -2 as inverse i.e $\bar{2}$

$= 1\bar{2}$

Example 9 Convert 7 into its Vinkulum.

7

$= \dot{0}\bar{3}$

$= 1\bar{3}$

Hint

1. Vinkulum line on the param mitra digit of 7 i.e 3
2. one more sign on poorven digit of 7 i.e 0
3. $\dot{0} = 1$

Example 10 convert 9 into its vinkulum

9

$= \dot{0}\bar{1}$

$= 1\bar{1}$

Hint

(1) Vinkulum line on the Param mitra digit of 9 i.e 1
(2) one more sign on the poorven of 9 i.e. 0
(3) Write $\dot{0} = 1$

Example 11 convert 64 into its vinkulum

$6\ 4$

$= \dot{0}\ \bar{4}\ 4$

$= 1\bar{4}\ 4$

Hint

(1) digit 4 would be as it is and Vinkulum line would be on 4, the Param mitra digit of 6
(2) one more sign on 0, the poorven digit of 4
(3) Write $\dot{0} = 1$

Example 12 convert 079 into its vinkulum

079

$= \dot{7}\bar{1}$

$= 8\bar{1}$

$= \dot{0}\bar{2}\bar{1}$

$= 1\bar{2}\bar{1}$

Hint

1) Inverse line on 1, the param mitra digit of 9.
2) One more sign on poorven digit of $7 = \dot{7}$
3) Hence vinkulum line on 2, the param mitra digit of 8.
4) One more sign on poorven digit of 8. i.e 0
5) Write $\dot{0} = 1$

Exercise 7.3

1. Convert the general numbers into its vinkulum.

(i) 8 (ii) 27

(iii) 82 (iv) 78 (v) 96

7.7.1 Convert the Vinkulum number into the general number

(i) To convert inverse into general number. Assume that number is a positive number.

(ii) Write the Param mitra of this assumed number.

(iii) Put a one lesser sign with poorven digit of the vinkulum number.

(iv) If there are three digits in vinkulum number, then we will first convert the digit at tens place and then units place.

Example 13 Convert $2\bar{4}$ into general numbers.

$2\bar{4}$

$\dot{2}6$

16

Hint

(1) Write the param mitra digit 6 of the positive value of $\bar{4}$ i.e 4

(2) Put one less than sign on 2 i.e poorven of $\bar{4}$

(3) Write $\dot{2}=1$

Example 14 Convert $5\bar{3}\ \bar{2}$ into general numbers

Hint

$5\ \bar{3}\ \bar{2}$

(1) write param mitra digit of positive value 3 of $\bar{3}$ (at the tens place) i.e 7

$= 5\ \dot{7}\ \bar{2}$

(2) Put a one less than sign on poorven digit of $\bar{3}$ i.e 5. Such as $\dot{5}=4$

$= 4\ 7\ \bar{2}$

(3) Write the param mitra digit of positive value of $\bar{2}$ i.e. 8 on units place.

$= 4\ \dot{7}\ 8$

(4) put one less than sign on 7 (poorven of $\bar{2}$) $=\dot{7}$

(5) Write $\dot{7}=6$

$= 4\ 6\ 8$

Exercise 7.4

1. Convert the vinkulum number into general number.

(i) $3\ \bar{5}$ (ii) $5\ \bar{4}$ (iii) $13\bar{2}$ (iv) $5\ \bar{4}\ \bar{2}$ (v) $6\ \bar{2}\ \bar{3}$

7.7.2 Addition by vinkulam

Addition of vinkulam numbers is done like general numbers. In vinkoolam addition we write addition of units at the place of unit and sum of the tens digit is written at the place of tens.

Add the following:

(i) $\bar{2} + \bar{3} = \bar{5}$

(ii) $\bar{1}\,\bar{3} + \bar{2}\,\bar{4} = \bar{3}\,\bar{7}$

(iii) $2 + \bar{2} = 0$

(iv) $8 + \bar{3} = 5 + 3 + \bar{3} = 5$ ($8=5+3$ and $3+\bar{3}=0$)

(v) $\bar{6} + 2 = \bar{4} + \bar{2} + 2 = \bar{4}$

It is clear from the above example that addition of vinkulam numbersis vinkulam number. Addition of a number with its inverse =0 Addition shall be in the form of a number which is greater.

Example 15 Add by vinkulam method

$$\begin{array}{r} \bar{1}2 \\ 1\bar{2} \\ \hline 00 \\ \hline \end{array}$$

Hint

(1) In the unit number $2+\bar{2}=0$

(2) $1+1=0$

Example 16 Add by vinkulam method

$$\begin{array}{r} 6\bar{4} \\ \bar{3}\bar{2} \\ \hline 3\bar{6} \\ \hline = \underset{.}{3}4 \\ = 24 \end{array}$$

Hint

(i) in the unit digit $\bar{4}+\bar{2}=\bar{6}$

(ii) in the digit at tens $6+\bar{3}=3$

(iii)convert $3\bar{6}$ into general number.

(iv) Param mitra of $\bar{6}$ is 4 and digit 3 is here with one lesser sign.Such as $\underset{.}{3}$

(v)Write $\underset{.}{3} = 2$

Exercise 7.5

1. Find the sum of vinkulam numbers.

(i)	(ii)	(iii)	(iv)	(v)
$6\,\bar{3}$	$7\,3$	$8\,\bar{2}$	$8\,\bar{9}$	$5\,\bar{3}$
$\bar{4}\,\bar{3}$	$\bar{4}\,\bar{2}$	$\bar{5}\,\bar{5}$	$\bar{7}\,8$	$\bar{2}\,1$
____	____	____	____	____

7.7.3 Subtraction using vinkoolam numbers

Subtraction is done using vinkulam numbers like we do with general numbers. Write the subtraction of unit digit at the place of unit. Similarly subtraction of tens digit is written below the tens place. As well as the digits which are subtracted again added with its vinkulum to the above numbers.

Subtract the following:

(i) $\bar{2} - 3 = \bar{2} + \bar{3} = \bar{5}$

(ii) $\bar{1}\,\bar{3} - 24 = \bar{1}\,\bar{3} + \bar{2}\,\bar{4} = \bar{3}\,\bar{7}$

In the above example we see subtraction of vinukulam numbers is vinkoolam.

Example 17 Subtract 45 from 83

$$\begin{array}{r} 83 \\ -\ 45 \\ \hline \\ 83 \\ +\ \bar{4}\bar{5} \\ \hline 4\bar{2} \\ \hline = 48 \\ = 38 \end{array}$$

Hint

(1) Changing the sign of -45 into + write 4 and 5 with their vinkulam lines.

(2) Write $3+\bar{5}=\bar{2}$ in the units place.

(3) Write $8+\bar{4}=4$ on tens place.

(4) Convert $4\bar{2}$ into general number.

Example 18 Subtract 426 from 793

$$\begin{array}{r} 793 \\ -\ 426 \\ \hline \\ 793 \\ +\bar{4}\bar{2}\bar{6} \\ \hline 37\bar{3} \\ \hline = 377 \\ = 367 \end{array}$$

Hints

(i) Changing the signs -426 into + and draw vinkulam line over 4,2 and 6

(ii) Write $3+\bar{6}=\bar{3}$

(iii) Write $9+\bar{2}=7$

(iv) Write $7+\bar{4}=3$

(v) Convert $37\bar{3}$ into general number.

Exercise 7.6

1. Find out difference using vinkulam:

(i) 96 − 49

(ii) 932 − 245

(iii) 952 − 788

(iv) 834 − 547

7.8 Write methematical table using vedic maths method.

(1) Change the number into vinkulam to write table

(2) Identify the digits at units and tens place in vinkulam.

(3) according to instruction given keep adding to vinkulam digits.

Example 19. Write table of 9

Vinkulam of 09 = 10-1 = $1\bar{1}$

Here in $1\bar{1}$ unit digit is one less i.e $\bar{1}$ thus one lesser and tens digit is one more

09
$1\bar{1}$
09
(0 + 1) → 18 ← (9 − 1)
(1 + 1) → 27 ← (8 − 1)
(2 + 1) → 36 ← (7 − 1)
(3 + 1) → 45 ← (6 − 1)
54 and so on.
63
72
81
90

Example 20. Write table of 8.

Since Inverse of 08 is $1\bar{2}$ Therefore here unit digit would be reduced by 2 and tens digit would be increased by 1

$$\begin{array}{r} 08 \\ 1\bar{2} \\ \hline 08 \end{array}$$

$$\begin{array}{lcll} (0+1) & \longrightarrow & 16 & \longleftarrow (8-2) \\ (1+1) & \longrightarrow & 24 & \longleftarrow (6-2) \\ (2+1) & \longrightarrow & 32 & \longleftarrow (4-2) \\ (3+1) & \longrightarrow & 40 & \longleftarrow (2-2) \\ (4+1) & \longrightarrow & 5\bar{2} = 48 & (0-2=\bar{2}) \\ (4+1) & \longrightarrow & 56 & \longleftarrow (8-2=6) \\ & & 64 & \text{and so on.} \\ & & 72 & \\ & & 80 & \end{array}$$

General form of $5\,\bar{2}$ is 48.

Now we can make tables of many numbers.

Do and learn

Make table of following tables.

(i) 99 (ii) 98 (iii) 89 (vi) 999

7.9 Multiplication calculation (By formula of nikhilam) When base is 10 or 100.

We have learned about deviation, which was in the form of base 10 or power of 10. If a deviation is calculated by subtracting base from a number, that deviation is positive or negative.

Lets look at the method of formula of nikhilam for multiplication.

1. Take nearest base of given two numbers which are to be multiplied either 10 or 100
2. Now write respective deviations from base in front of those numbers.
3. Now divide the multiplication product place into two parts by a slanting line.
4. Multiply deviation in right side .
5. In left side calculate deviation of any given number +another number
6. In right side multiplication of deviation:
   (i) If base is 10 then there will be one digit in the right side. If there are two digits then add digits at tens place to the left side.

(ii) If base is 100. Then product shall be of digit two as well. If it is only one than write zero before it.

7. If product of the deviation is negative then take one number from Left side (the base) and convert it into positive form.
Let"s multiply by Nikhilam formula

Example 21

13 x 12

Number	Deviation
13	+ 3
x 12	+ 2

= (13 +2) / (+3 x +2)
(12 + 3)

= 15 / 6

= 156

Hint

1. Multiple number 13=10+3 which is 3 more than 10 and 12 =10+2, 2 more than 10. we will write it as +2, +3 in form of deviation.
2. Write the numbers up and down and deviation in front of them.
3. Product of deviations (+2) × (+3) = +6 is written on the right side of the diagonal line.
4. Write in the left side 13+2 or 12+3 =15
5. Product is 156 after removing the diagonal line.

Example 22

15 x 17

Number	Deviation
15	+ 5
x 17	+ 7

= (15 + 7) / (+ 5 x + 7)
(17 + 5)

= 22 / 35

= 22 / 5
+3

= 25 / 5

= 255

Hint

1. Multiplier 15=10+5, which is 5 more than 10 and 17 =10+7, seven more than 10, we write it as +5 and +7
2. Write the numbers up and down and deviation in front of them.
3. Product of the deviation (+5) × (+7) = +35 would be written on the right side of slanted line.
4. Write 15+7 or 17+5=22
5. There will be only one number on the right hand side because in base 10 , there is one zero.
6. In the product of deviation (35) unit digit 5 on R.H.S and add 3 on the left side.(In form of base 10)
7. on L.H.S 22+3=25
8. on removing slanted line product is 255.

Example 23

8 X 7

Number	Deviation
8	− 2
x 7	− 3

= (8 − 3) / (−2 X − 3)
(7 − 2)

= 5 / 6

= 56

Hint

1. Multipliers 8 = 10-2 which is 2 less than 10, and 7 = 10-3 which is 3 less than 10, are written in the form of deviation as -2 and -3.
2. Write the numbers one below the other and the deviations opposite to them.
3. The product of the deviations (–2) × (-3) = +6 is written on the right side of the slanted line.
4. On the left hand side write 8-3 or 7-2 = 5.
5. On removing the slanted line, the product is 56.

Example 24

6 X 9

Number	Deviation
6	− 4
x 9	− 1

= (6 − 1) / (−4 X − 1)
(9 − 4)

= 5 / 4

= 54

Hint

1. Multipliers 6 = 10-4 which is 4 less than 10, and 9 = 10-1 which is 1 less than 10, are written in the form of deviation as -4 and -1.
2. Write the numbers one below the other and the deviations opposite to them.
3. The product of the deviations (–4) × (-1) = +4 is written on the right side of the slanted line.
4. On the left hand side write 6-1 or 9-4 = 5.
5. On removing the slanted line, the product is 54.

Example 25

6 X 7

Number	Deviation
6	− 4
x 7	− 3

$= (6 - 3) \,/\, (-4 \times -3)$

$(7 - 4)$

$= 3 \,/\, 12$

$= 3 \,/\, 1\,2$

$= 4/2$

$= 42$

Hint

1. Multipliers 6 = 10 - 4 which is 4 less than 10, and 7 = 10 – 3, are written in the form of deviation as -4 and -3.
2. Write the numbers one below the other and the deviations opposite to them.
3. The product of the deviations (–4) X (-3) = +12 is written on the right side of the slanted line.
4. On the left hand side write 6-3 or 7-4 = 3.
5. One number will remain on the right hand side because the base number 10 has one zero.
6. The units digit of the product of deviations i.e. 12 is written in the right hand side while the tens digit i.e. 1 is added to the left hand side.
7. There is 3 on the left hand side
8. 3+1=4. On the left hand side.
9. Product is 12 on removing diagonal line.

Example 26

8 X 13

Number	Deviation
8	− 2
x 13	+ 3

$= (8 + 3) \,/\, (-2 \times +3)$

$(13 - 2)$

$= 11 \,/\, -6$

$= 10 \,/\, 1\,-6$

$= 10/10 - 6$

$= 10/4$

$= 104$

Hint

1. Multiplication number 8=10-2, which is 2 less than 10. And 13 =13-10=3 which is 3 more than 10.So it would be written as -2+3 as deviation
2. Write the numbers up and down and their deviations in front of them
3. Write the multiplication -2x+3=-6 would be written on the rightb side of the diagonal line
4. on left side write 8+3 OR 13-2=11
5. The multiplication product of deviation is negative on the right hand side.for converting it into positive take 1 as 1x10 towards right hand side.
6. there would be 11-1=10 on the left hand side.
7. on right hand side 10-6=4
8. Multiplication product on removing diagonal line is 104

Example 27

7 X 16

Number	Deviation
7	− 3
x 16	+ 6

= (7 + 6) / (−3 X +6)
(16 − 3)

= 13 / − 18

= 11 / −18
(2)

= 11/20 − 18

= 11/2

= 112

Hint

1. Multiplication number 7=10-3, which is 3 less than 10 and 16 =10+6 which is 6 more than 10, which is written as -3 and +6
2. Write numbers up and down and their deviation on right hand side.
3. write the multiplication product of (-3)x (+6)=-18 on right hand side of the diagonal line
4. On left side write 7+6 or 16-3=13
5. Multiplication of deviation is negative on right hand side. For converting it into positive, take 2 form left side in form of 2x10=20 towards right hand side.
6. 13-2=11 would be remainder in left side
7. on right hand side 20-18=2(in base 10, one digit is zero. therefore 1 digit)
8. The multiplication is 112 on removing diagonal line.

Example 28

103 X 104

Number	Deviation
103	+03
x 104	+04

= (103 + 04) / (+03 X +04)
(104 +03)

= 107 / 12

= 10712

Hint

1. Multiplication number 103=100+3 and which is 3 more than 100 and 104=100+4 which is 4 more than 100 and it is written as +03 and +04 in the form of deviation
2. Write the numbers up and down and their deviation in front of them
3. Write multiplication product of deviations +03x+04=+12 on right hand side of the diagonal line.
4. On the left side write 103+04 or 104+03=107.
5. Product of multiplication of deviation on the right hand side is +12 and there are two zeroes in base number 100.Therefore two digits on the right hand side.
6. The product of multiplication on removing diagonal line is 10712.

Example 29

101 X 108

Number	Deviation
101	+01
x 108	+08

= (101 + 08) / (+01 X +08)
(108 +01)

= 109 / 08

= 10908

Hint

1. Multiplication number 101=100+1 which is 1 more than 100 and 108= 100+8 which is 8 more than 100. We write it as +01 and +08 as deviation
2. Write the numbers up and down and their deviations in front of them.
3. Write the multiplication of +01×+08=+8 on the right side of diagonal line.
4. Write 101+08 or 108 +01=109 on the left side.
5. Multiplication of deviation is +8 on the right hand side (two zeroes in100. Therefore there must be 2 digits on right side) So write 08 instead of +8
6. Multiplication on removing diagonal line is 10908

Example 30

92 X 87

Number	Deviation
92	−08
x 87	−13

= (92 − 13) / (− 08 X −13)
(87 − 08)

= 79 / 104

= 79 / 04

= 80 / 04

= 8004

Hint

1. Multiplication number 92=100-8. which is 8 less than 100 and 87=100-13 which is 13 less than 100.Write the numbers up and down and their deviation in front of them.
2. Multiplication of deviation -08×-13= +104 would be written on the right side of diagonal line.
3. On left side write 92-13 or 87-08=79
4. On the right side multiplication of deviation is 104 (two zeroes in base 100) therefore there will be two digits in right side. i.e 04. Add 1 to the left side.
5. Now on left side 79+1= 80
6. On removing diagonal line multiplication product 8004

Exercise 7.7

1. Multiply (Using formula of nikhilam)
   - (i) 12 x 13
   - (ii) 11 x 19
   - (iii) 13 x 15
   - (iv) 8 x 7
   - (v) 6 x 9
   - (vi) 8 x 12
   - (vii) 102 x 104
   - (viii) 106 x 107
   - (ix) 112 x 109
   - (x) 91 x 98
   - (xi) 96 x 94
   - (xii) 98 x 104
   - (xiii) 85 x 93

7.10 Division by nikhilam

Previously we multiplied by nikhilam which is easier than the general method. Similarly division by nikhilam is also very simple.

Repeated subtraction is done till we get 0 as answer. How many times subtraction is done? This is a long procedure. Today division is done by a certain method or by cramed mathematical tables. But in Vedic maths, division can also be done as in multiplication by assuming 10 or 100 as base

Method

1. Decide nearest base number of divisibility, Then find out its complementary number (Param Mitra).
2. In the procedure of division on a certain point divide into three section by two vertical lines.
3. Write divisor and its complementary number below it in the first section on left side.
4. Write the last digits of divisible in the same numbers equal to the number of zeroes in the base.
5. Remainder of divisible would be written in the middle section.

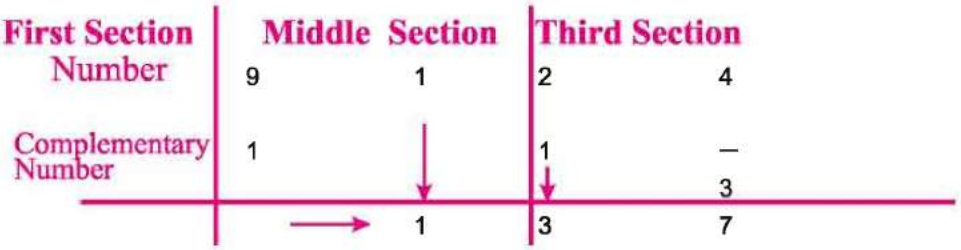
Example 31

124 ÷ 9

Here Divisor = nearest base of nine = 10

Complementary number=1

Here in base 10. There is only a single 0.Therefore write 4 of divisor in the third section. In the middle section digit of divisible is 12.



Hint

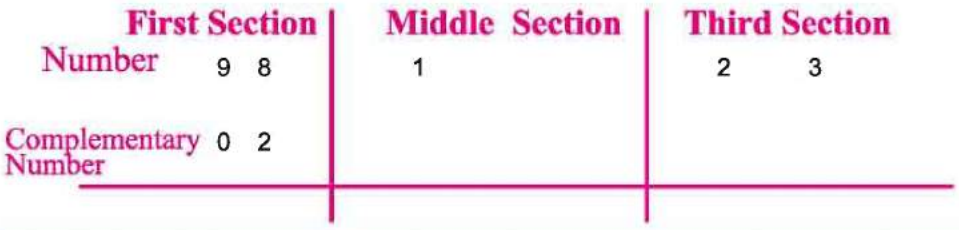
1. We write 1 at the place of sum below in middle section.
2. This digit 1 x complementry 1=1 is written below 2 and – in the third section
3. Sum 2+1=3 at the place of sum below.
4. Again product 3xcomplementry number 1=3.
5. Write product 3 in third section below 4, sum 4+3=7.
6. Hence divisor=9, quotient=13 and remainder=7.

Similarly taking 100.Let we practise.

Example 32 123÷98

Divisor=98, complementry number=100-98 =02

Again distribute in three sections



Taking base 100 there are two zeroes in base number. Therefore remainder should also be of maximum two digits. For this we drew a straight line from right side leaving 2 digits. We drew one more straight line on the left side. Now divisor 98 on the left side of this line and write complementary number 02 below this. process of solution is like this:

	First Section		Middle Section	Third Section	
Number	9	8	1	2	3
Complementary Number	0	2	↓	0	2
			1	2	5

First of all write divisor, then digit 1 under middle section .Then after multiplying this by complementary number, write below the divisor. Now add the digits on right side. Middle section is quotient and third section is remainder. We repeat the process till we get smaller number than divisor in the third section.

Note: In this procedure we do not have to subtract, in fact we get the answers by addition only.

Example 33

1004 ÷ 87

	First Section		Middle Section		Third Section	
Number	8	7	1	0	0	4
Complementary Number	1	3	↓	1	3	—
				↓	1	3
			1	1	4	7

Hints

1. If base is 100 means there are two digits written on the right side.
2. Complementry number of 87 on the base is 13
3. Wrote 1 below and multiply 1 by complementary.
4. After addition, again received 1.Therefore again multiplied 1 by complementary number
5. After addition we got quotient 11 and remainder 47

Example 34

199 ÷ 97

	First Section		Middle Section	Third Section	
Number	9	7	1	9	9
Complementary Number	0	3	↓	0	3
			1	10	2
				0	2
			↑ 1		
			1	0	3
			2	0	5

Hints

1. Base is 100. Therefore there are written two digits on right side.
2. Complementary number of 97 on the base 100 is 03
3. Write 1 and multiplied it by complementary number.
4. Remainder was 102 but here shall be two digits in the third section.(Since base =100).Therefore we will add 102 and 02 in third section, add 1 in middle section and multiply 1with the complementary number and write it in the third section and add the numbers in middle section and third section.
5. Hence quotient and remainder are 2 and 5 respectively.

Example 35

2345 ÷ 78

	First Section		Middle Section		Third Section	
Number	7	8	2	3	4	5
Complementary Number	2	2	↓	4	4	—
			↓		5	4
					1	
			2	7	3	9
					2	
				2	4	4
			2	9	8	3
				+1	−7	8
			3	0	0	5

Hint

1. Complementary of 78 on base 100 is 22
2. Wrote 2 below multiply it with complementary number and add.
3. We got 7 below. Then multiply it by complementary number and we got 239 after addition.
4. After adding 2 to the numbers written below we get quotient 29 and remainder 83.
5. Remainder 83 which is greater than divisor 78. Therefore quotient=29+1=30

Remainder =83-78=5

Exercise 7.8

1. Divide by formula of nikhilam
   (i) 124 ÷ 89
   (ii) 406 ÷ 9
   (iii) 298 ÷ 96
   (iv) 1358 ÷ 113
   (v) 1234 ÷ 112
   (vi) 306 ÷ 8

We Learnt

1. Ekadhiken (one moe) means +1
2. Eknunen (one less) means -1.
3. EKadhik poorven means one more than the previous
4. Eknunen poorven means one less than the previous.
5. Complementary digit-Two numbers whose addition is 10 are complementary to each other.
6. Deviation=Number -base
7. Inverse- To write negative numbers into positive numbers.
8. Addition of a number and its inverse is always o.
9. Addition of two inverse numbers is again an inverse number.
10. Inverse application is the simplest method of Subtraction.
11. Write tables using inverse.
12. Multiply and divide by formula of nikhilam.