

GOVERNMENT DEGREE COLLEGE GAMBHIRAOPET
DEPARTMENT OF MATHEMATICS STUDY PROJECT

ON

'VEDIC MATHEMATICS'

Submitted by:

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Project on
VEDIC MATHEMATICS



Abstract :

Vedic Mathematics is the the name given to the ancient Indian system of Mathematics that was rediscovered in the early 20th Century from ancient Vedas. The algorithms based on conventional Mathematics can be simplified and even optimized by the use of Vedic Mathematics.

Objectives:

- It helps a person to solve the problems 10-15 times faster.
- It reduces burden(need to learn tables up to 9 only).
- It is a magical tool to reduce scratch work and finger counting.
- It increases concentration .
- Time saved can be used to answer more questions.
- Logical thinking process gets enhanced.
- It provides one line answer.


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SQUARING OF NUMBERS ENDING WITH 5 (Last digits add to ten)

Conventional Method

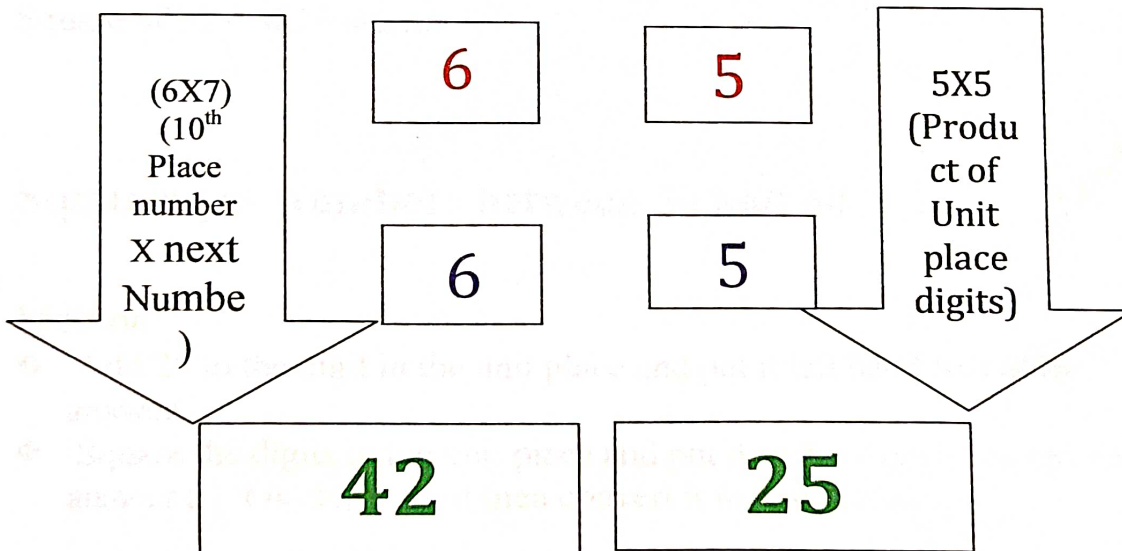
$$\begin{array}{r}
 65 \times 65 \\
 \quad 65 \\
 \underline{\times 65} \\
 \quad 325 \\
 390 \underline{} \\
 \hline
 4225
 \end{array}$$


Vedic Mathematics

$$65 \times 65 = 4225$$

Multiply the previous digit 6 by one more than itself.

Multiply last digits viz. (5X5) and write down 25 to the right of 42 viz. (6X7).




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Examples:

$$\text{Square of } 15 = 225$$

$$\text{Square of } 25 = 625$$

$$\text{Square of } 35 = 1225$$

$$\text{Square of } 45 = 2025$$

$$\text{Square of } 55 = 3025$$

$$\text{Square of } 65 = 4225$$

$$\text{Square of } 75 = 5625$$

$$\text{Square of } 85 = 7225$$

$$\text{Square of } 95 = 9025 \text{ etc....}$$



Squaring of Numbers between 50 and 60

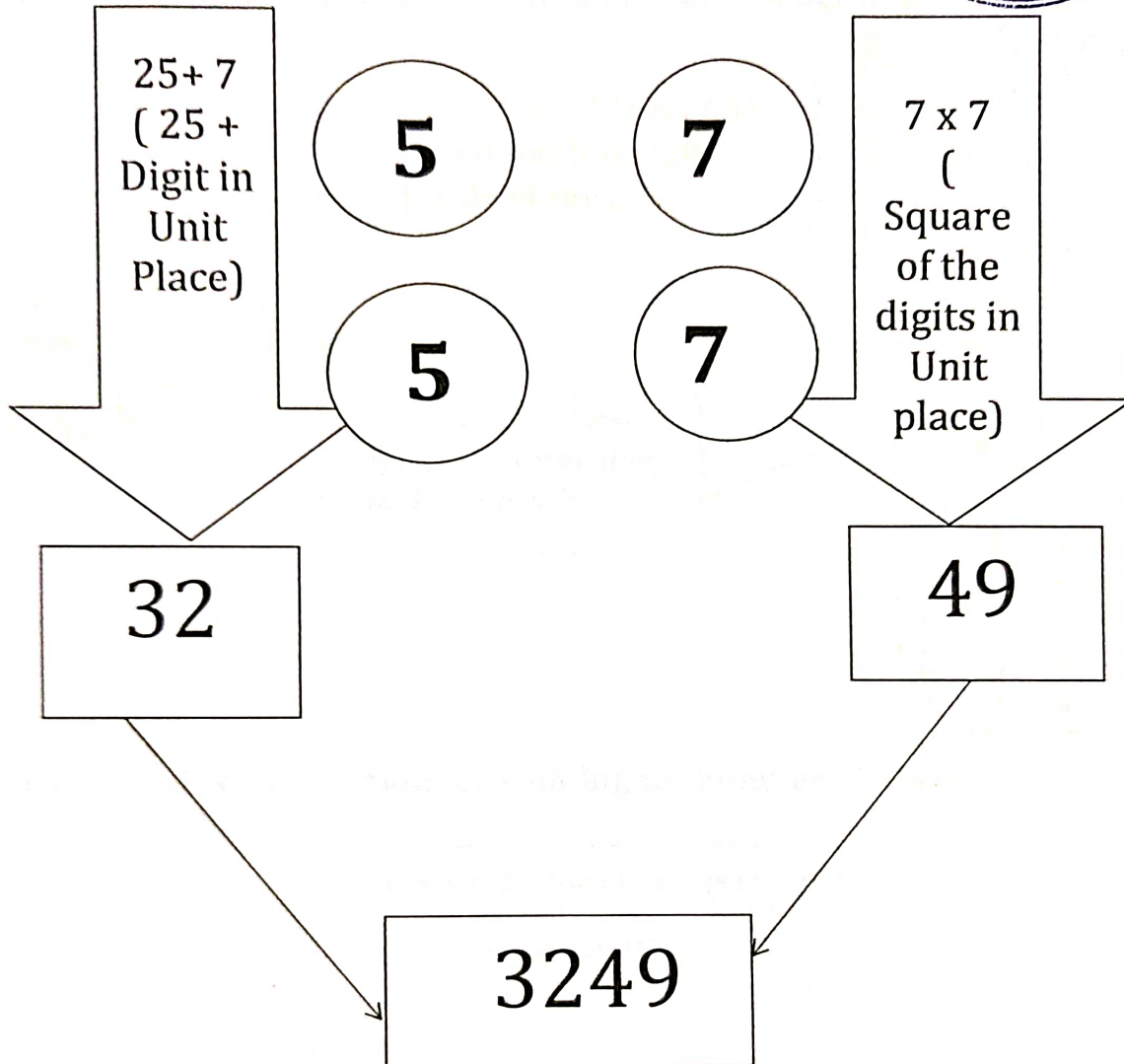
Method:

- Add 25 to the digit in the unit place and put it left hand part of the answer.
- Square the digits in the unit place and put it as the right hand part of the answer (if it is single digit then convert it to two digits)


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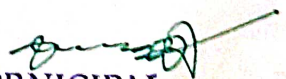


Example: Finding square of 57.



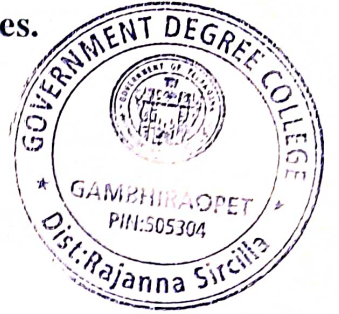
More Examples:

- Square of 52 = (25+2=27, 2x2=04) = 2704
- Square of 53 = (25+3=28, 3x3=09) = 2809
- Square of 54 = (25+4=29, 4x4=16) = 2916
- Square of 56 = (25+6=31, 6x6=36) = 3136 etc....


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MULTIPLICATION OF NUMBERS WITH A SERIE OF 9'S

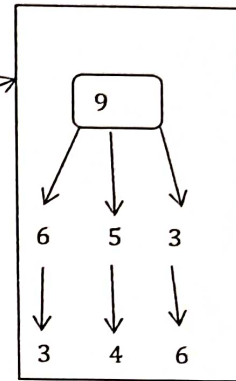
Case: 1. multiplying a number with an equal number of nines.



$$\begin{array}{r} 654 \\ \times 999 \\ \hline 653346 \end{array}$$

Subtract 1 from 654 and put it on left side of the answer

Subtract each of the Digit (653) from nine viz. 9-6, 9-5, 9-3

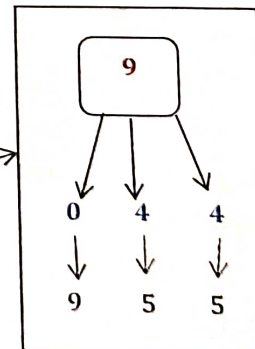


Case: 2. multiplying a number with higher number of nines.

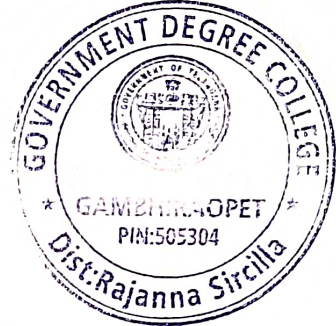
$$\begin{array}{r} 045 \\ \times 999 \\ \hline 044955 \end{array}$$

Subtract 1 from 45 and put it on left side of the answer (add 0 to 45 & write it as 045)

Subtract each of the Digit (044) from nine viz. 9-0, 9-4, 9-4



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Multiplication of numbers with a series of 1's :

Case - 1 : Multiplying equal Digit number with 11

Example:
$$\begin{array}{r} 32 \\ \times 11 \\ \hline 352 \end{array}$$

- First we write the right - hand most digit 2 of first numbers as it is.
(Answer = _____ 2).
- Next , we add 2 to number in left 3 and write 5.
Answer = _____ 52).
- Last, we write the left - hand most Digit 3 as it is(answer= 352).


Case - 2: Multiplication three digit number with 11:

Example:
$$\begin{array}{r} 652 \\ \times 11 \\ \hline 7172 \end{array}$$

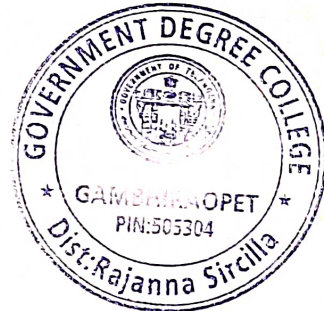
- First we write the right - hand most digit 2 of first number as it is.
(Answer =----- 2).
- Next , we add 2 to 5 and write 7.
(Answer = _____ 72).
- Then next, we add 5 to 6 and make it 11. we write down 1 and carry over 1. (Answer = _____ 172).
- Last, we take 6 and add the one carried over to mke it 7.
(Final answer = 7172)

Case - 3: Multiplication four digit number with 11:

Example:
$$\begin{array}{r} 3102 \\ \times 11 \\ \hline 34122 \end{array}$$


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- We write down 2 as it is. (Answer=_____2).
- We add 2 to 0 and make it 2. (Answer is _____22).
- We add 0 to 1 and make it 1. (Answer is _____122).
- We add 1 to 3 and make it 4. (Answer is _____4122).
- We write first digit 3 as it is. (Final Answer is 34122).



Case - 4: Multiplication six digit number with 111:

Example: 201432

 X 111

22358952

- We write down 2 in the unit place as it is. (2)
- We move to the left and add(2+3) and write 5.
- We move to the left and add(2+3+4) and write 9.
- We move to the left and add(3+4+1) and write 8.
- We move to the left and add(4+1+0) and write 5.
- We move to the left and add(1+0+2) and write 3.
- We move to the left and add(0+2) and write 2.
- We move to the left and write single digit 2 as it is.
- Final answer 22358952.


Case - 5: Multiplication six digit number with 1111:

Example: 201232

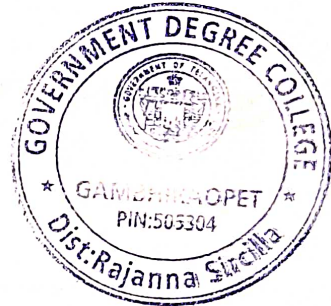
 X 1111

223568752

- We write down 2 in the unit place as it is. (2)
- We move to the left and add(2+3) and write 5.
- We move to the left and add(2+3+2) and write 7.
- We move to the left and add(2+3+2+1) and write 8.
- We move to the left and add(3+2+1+0) and write 6.


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- We move to the left and add(2+1+0+2) and write 5.
- We move to the left and add(1+0+2) and write 3.
- We move to the left and add(0+2) and write 2.
- We move to the left and write single digit 2 as it is.
- Final answer 223568752.



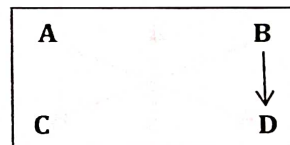
CRISS-CROSS SYSTEM OF MULTIPLICATION.

- This is the general formula applicable to all cases of multiplication.
- It means 'Vertically and Cross-Wise'.

Case - 1: Multiplication two digit number with two digit number:

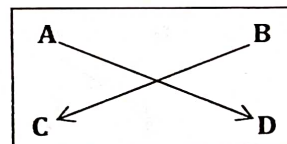
Example:
$$\begin{array}{r} 46 \\ \times 43 \\ \hline 1978 \end{array}$$

Step 1: $6 \times 3 = 18$, Write down 8 and Carry 1.



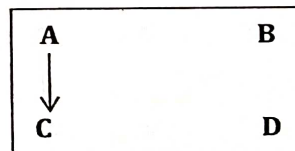
Step 1: $B \times D$

Step 2: $4 \times 3 + 6 \times 4 = 12 + 24 = 36$, add to it
Previous carry over value 1, so we have 37,
Now write down 7 and carry 3.




Step 2: $A \times D$
 $+ B \times C$

Step 3: $4 \times 4 = 16$, add previous carry over value
of 3 to get 19, write it down.
So we have 1978 as the answer.



Step 3: $A \times C$


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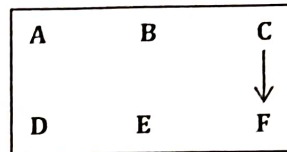


Case - 2: Multiplication three digit number with three digit number

Example:

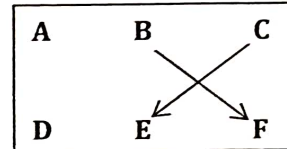
$$\begin{array}{r} 103 \\ \times 105 \\ \hline 10815 \end{array}$$

Step 1: $3 \times 5 = 15$, Write down 5 and Carry 1.



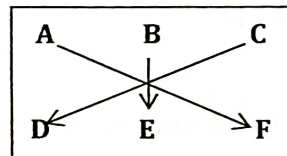
Step 1: C x F

Step 2: $0 \times 5 + 3 \times 0 = 0 + 0 = 0$, add to it
Previous carry over value 1, so we have 1,
Now write down 1.



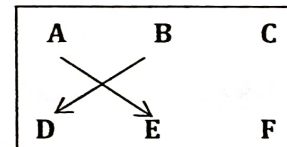
Step 2: B x F
+ C x E

Step 3: $1 \times 5 + 3 \times 1 + 0 \times 0 = 5 + 3 + 0 = 8$
write it down as 8.



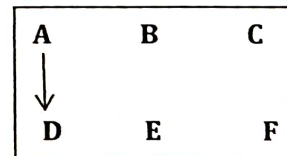
Step 3: A x F
+ C x D
+ B x E

Step 4: $1 \times 0 + 0 \times 1 = 0 + 0 = 0$,
Now write it down as 0.

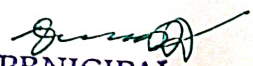


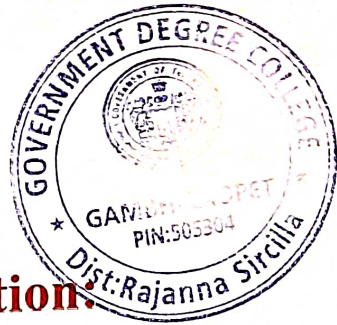
Step 2: A x E
+ B x D

Step 5: $1 \times 1 = 1$,
Write it down as 1.
So we have 10815 as the answer.



Step 3: A x D


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Characteristics of Criss-Cross multiplication.

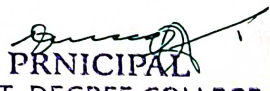
- The number of steps used for any multiplication can be found using the formula $(2 \times \text{no. of digits}) - 1$.
- If there are unequal no. of digits in multiplicand and in multiplier, they should be made equal by inserting 0's at the appropriate places.
- The no. of steps used will be always an odd number.
- In this first and last step, second and second-to-last and so on are mirror images of each other.

CONCLUSION:

- To root out of fear of mathematics with short-cut techniques in Mathematics.
- To improve the quantitative and reasoning ability of all types competitive examination aspirants.
- To improve the speed of Mathematical calculations in not only competitive examination but also all levels of professionals in their daily life.

Reference:

- 1) VEDIC MATHEMATICS Text book by Jagadguru Swami BHRATI KRISNA TIRTHAJI MAHARAJA - Sankaracharya of Govardhana Matha, Puri.


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