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Analysis and Importance of Vedic Mathematics

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ABSTRACT:

The most important goal of this articles is to offer a preferred evaluate of the foundation and improvement of Vedic arithmetic and its epistemological function withinside the extraordinary mathematical colleges of India. Vedic arithmetic had been held because the number one supply of a computing. The numerous ideas and doctrines of the Vedas can locate its relevance in today's global. In this paper, we will in short examine the Vedic literature and its ideas. So that we must be capable of advantage a preferred concept of the Vedic literature and their content to apprehend the ancient boom of arithmetic practices withinside the Vedic heritage in addition to to examine the critical ideas that brought about the upward thrust of Indian arithmetic structures to understand the applicable ideas of the Vedas and admire its relevance withinside the present day global.

Keywords: Pure, applied, logic and vedic mathematics

1. Introduction:

Mathematical technology could be very vital in our daily existence and we can't consider even a second of the day without maths because of its treasured contributions, mainly with inside the discipline of engineering and generation and extraordinary sort of Industries.

Mathematics is the technology of structure, order and relation that offers with the good judgment of form and their operations of portions and arrangement. The term "MATHEMATICS" is derived from Greek words "manthanein" this means that mastering and "techne" an artwork of technique. Therefore, arithmetic way the artwork of mastering associated with disciplines, are seeking for out patterns, creates new conjectures. There are most important branches from the simple to the superior degree.

Mathematical science is very essential in our day-to-day life and we can't imagine even a moment of the day without maths due to its valuable contributions, especially in the field of engineering and technology and different kind of Industries.

Mathematics is the science of structure, order and relation that deals with the logic of shape and their operations of quantities and arrangement. The term "MATHEMATICS" is derived from two Greek words "manthanein" which means learning and "techne" an art of technique. Therefore, mathematics means the art of learning related to disciplines, seek out patterns, formulate new conjectures, and establish truth by rigorous deduction from appropriately chosen axioms and definitions. There are two main branches from the basic to the advanced level.

1.1 Pure Mathematics:

The branch of the mathematics science in which we studies the mathematical notions that are only based on mathematics without related to any other concept. Pure mathematics applies the maths concepts in the real world situations. Some of sub branches are below of pure mathematics:

- Arithmetic
- Algebra
- Geometry
- Number theory
- Mathematical analysis
- Topology

1.2 Applied Mathematics:

Applied mathematics combines mathematical concepts with the applications of various other fields. The branches of applied mathematics are as follows:

- Set theory
- Statistics and probability

- Calculus
- Trigonometry

1.3. Advanced Branches of Mathematics:

It is the significant branches of both, pure and applied and studied at a high level and need solid computational abilities. Some of the more advanced branches of mathematics are below

- Complex numbers
- Operations research
- Numerical analysis
- Matrix algebra
- Game theory
- Set theory
- Calculus
- Cartesian geometry
- Analysis

2. Vedic Mathematics:

Human mind have an countless cappotential and is able to doing miracles and wonders in every discipline, like running memory, computation, logical reasoning, games, coding, synthetic intelligence, robotics and others cognitive parameters. A principal a part of the frame of mathematical know-how is from the Vedic period, that has come right all the way down to us is from the "Sulvasutras". The "Sulvasutras" are compositions geared toward offering guidance at the standards concerned and strategies of creation of the vedis (altars) and agnis (fireplaces) for the overall performance of the yajnas, which have been a key characteristic of the Vedic culture.

Vedic arithmetic or Vedic hints simplifies the Addition, Subtraction, Multiplication and Division for all training in addition to banking area and extraordinary aggressive exam with a device of reasoning. These works are primarily based totally at the historic Indian teachings known as "Veda" and it's miles fast, efficient, clean to doing, clean to jot down and clean to examine.

The "Vedic Mathematics" is known as so due to its foundation from Vedas. To be greater specific, it has originated from "Atharva Vedas" the fourth Veda. "Atharva Veda" offers with the branches like engineering, arithmetic, medicine, sculpture, and all different sciences. The Sanskrit phrase "Veda" is derived from the foundation Vid. The phrase Veda covers all Veda-Sakhas recognised to humanity and is a repository of all know-how, fathness, ever revealing as it's miles added deeper. Vedic Mathematics introduces the superb packages to Arithmetical computations, the idea of numbers, compound multiplications, algebraic operations, factorisations, easy quadratic and better order equations, simultaneous quadratic equations, partial fractions, calculus, squaring, cubing, rectangular root, dice root and coordinate geometry etc.

Vedic Maths is a set of hints, strategies/sutras to resolve mathematical hassle units in a quick and really clean way. These strategies introduce superb packages of Arithmetical computation, mathematical and algebraic operations, calculus and coordinate geometry, idea of numbers, better-degree arithmetic, etc.

3. What is Vedic Mathematics:

Ancient device of Indian arithmetic gave the call recognised as "Vedic Mathematics" ,which become rediscovered from the Vedas among 1911 and 1918 via way of means of Sri Bharati Krsna Tirthaji. According to Tirthaji 's studies all of arithmetic is primarily based totally on 16 Sutras(or sixteen phrase-formulae) and thirteen subsutras.

Each sutras serves because the primary factor from which many extraordinary algorithms emerge and primarily based totally computation cultures and the cappotential of the thoughts to characteristic from the extent of natural, self-referral consciousness.

S.N	Sutras Name	Corollary/Sub sutras	Meaning
1	Ekadhikina Purvena	Anurupyena	By one more than the previous one
2	Nikhilam Navatashcaramam Dashatah	Sisyate Sesasamjnah	All from 9 and the last from 10
3	Urdhva-Tiryagbyham	Adyamadyenantyamantyena	Vertically and crosswise
4	Paraavartya Yojayet	Kevalaih Saptakam Gunyat	Transpose and adjust
5	Shunyam Saamyasamuccaye	Vestanam	When the sum is the same that sum is zero
6	(Anurupye) Shunyamanyat	Yavadunam Tavadunam	If one is in ratio, the other is zero
7	Sankalana-vyavakalanabhyam	Yavadunam Tavadunikritya Varga Yojayet	By addition and by subtraction
8	Puranapuranabyham	Antyayordashake'pi	By the completion or non-completion

9	Chalana-Kalanabyham	Antyayoreva	Differences and Similarities
10	Yaavadunam	Samuccayagunitah	Whatever the extent of its deficiency
11	Vyashtisamanstih	Lopanasthapanabhyam	Part and Whole
12	Shesanyankena Charamena	Vilokanam	The remainders by the last digit
13	Sopaantyadvayamantyam	Gunitasamuccayah Samuccayagunitah	The ultimate and twice the penultimate
14	Ekanyunena Purvena	Dhvajanka	By one less than the previous one
15	Gunitasamuchyah	Dwandwa Yoga	The product of the sum is equal to the sum of the product
16	Gunakasamuchyah	Adyam Antyam Madhyam	The factors of the sum is equal to the sum of the factors

Table 1. The 16 Sutras of Vedic Math with meaning

S.N	**Sub-Sutras Name**	**Meaning**
1	Anurupyena	Proportionately
2	Sisyate Sesasamjnah	Remainder remains constant
3	Adyamdyenantya-mantye-na	First by first and last by last
4	Kevalaih Saptakam Gunyat	For 7 the Multiplicand is 143
5	Vestanam	By Osculation
6	Yavadunam Tavadunam	Lessen by the Deficiency
7	Yavadunam Tavadunam Varganca Yojayet	Whatever the Deficiency lessen by that amount and set up the Square of the Deficiency
8	Antyayordasake	Last Totalling 10
9	Antyayoreva	Only the Last Terms
10	Samuccayagunitah	The Sum of the coefficients in the product
11	Lopanasthapanabhyam	By Alternate Elimination and Retention
12	Vilokanam	By Mere Observation
13	Gunitasmuccayah Samuccayagunitah	The Product of the Sum is the Sum of the Products

Table 2. The 13Sub- Sutras of Vedic Math with meaning

For example, 'Vertically and Crosswise` is one of these Sutras. These formulae describe the way the mind naturally works and are therefore a great help in directing the student to the appropriate method of solution.

There is only few study literature available related to Vedic Mathematics to improves the speed of calculations of basic mathematical operations. Some British mathematician like Andrew Nicholas, Kenneth Williams and Jeremy Pickles shown interest and delivered lectures on vedic maths by extending the Bharathi Krishna Thirthaji introductory book. The Vedic mathematics techniques help in rapid or fast calculations in some situations. It improves the concentration and logical thinking Vedic mathematics techniques are the one of the stream, when attaining proficiency in rapid arithmetic and aptitude or reasoning. The Trachtenberg speed arithmetic, Lester Meyers' arithmetic are some other techniques or methods also helps to improve or increase the proficiency in rapid arithmetic.

Some relevant examples and explanations are given below to discusse some of the most basic Vedic maths tricks for beginners under different categories.

3.1 Ekadhikena Purvena :

This Sutra helps in finding out the square of a number ending with 5.

Example 1: Find the square of 35.
Solution:
Step 1: The last part of the answer has to be 25
Step 2: Multiply the remaining number (excluding 5) in the original number by its successor. So, in this case, we multiply 3 and 4. This gives us 12.
Step 3: Join the numbers obtained in step 2 and step 1, in that order we get the answer 125.

Example 2: Find the square of 115.
Solution:
Step 1: The last part of the answer has to be 25
Step 2: Multiply the remaining number (excluding 5) in the original number by its successor. So, in this case, we multiply 11 and 12. This gives us 132.
Step 3: Join the numbers obtained in step 2 and step 1, in that order we get the answer
13225.

3.2 Nikhilam Navatashcaramam :

Sutra helps in finding the product of two numbers closer to 10 or to any power of 10.

Example 3: Find the product of 95 and 96.
Solution:
Step 1: Find the difference between the numbers and their closest multiple of 10.105
we get,
100 – 95 = 5
100 – 96 = 4
Step 2: Multiply the 2 numbers obtained in step 1.
5 × 4 = 20
Step 3: Find the difference between one of the given numbers and the result obtained in step1 for the second number. we get,
95 – 4 = 91
or
96 – 5 = 91
Step 4: Join the numbers obtained in step 3 and step 2, in that order we get 9120.

Example 3: Find the product of 103 and 105.
Conventional method Traditional Methods/Numerical Methods :

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

Vedic Methods:

103	+03
105	+05
108	+15
103×105=10815	

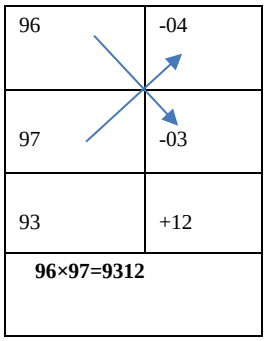
Step 1: Find the difference between the numbers and their closest multiple of 10.
we get,
103-100 = +03
105-100 = +05
Step 2: Multiply the 2 numbers obtained in step 1.
(+03) × (+05) =(+15)
Step 3: Find the sum between one of the given numbers and the result obtained in step1 for the second number.
we get,
103 + (+05) = 108

or
105 + (+03) = 108
Step 4: Join the numbers (108 and (+15)) obtained in step 3 and step 2, in that order we get the product 10815.

Example 4: Find the product of 96 and 97.
Conventional method Traditional MethodS/Numerical Methods :

96
×97
9312

Vedic Methods:



Step 1: Find the difference between the numbers and their closest multiple of 10.
we get,
96 -100 = (-04)
97 -100 = (-03)
Step 2: Multiply the 2 numbers obtained in step 1.
-04 × (-03) =(+12)
Step 3: Find the sum between one of the given numbers and the result obtained in step1 for the second number.
we get,
96-03 = 93
or
97-04= 93
Step 4: Join the numbers (93 and (+12)) obtained in step 3 and step 2, in that order we get the product 9312.

3.3 Urdhva-Tiryagbyham :

Sutra helps in finding the product of two numbers vertical and crosswise step.
(Two-digit number multiplication with two digit number).

Example 5: Find the product of 95 and 46.
Traditional Methods :

95
×46
4370

Vedic Methods:
Let us suppose a=9, b=5, c =4 and d =6

×	C_1	C_2
R_1	a	b
R_2	c	d

×	C_1	C_2
R_1	9	5
R_2	4	6

Step 1. Multiply the first column vertically (Right end b and d), we get the result b.d=30,
Step 2. Completion of multiplication of first column crosswise with the second column digit and added up (a.d + b.c),we get the result b.d=74,

Step 3. Multiply the second column vertically (Right end a and c), we get the result b.d=36,

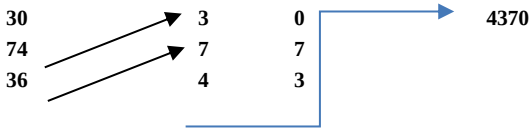
Step Diagrams:

Step 1. **9 5**
4 6 **=30**

Step 2. **9 5**
4 6 **=54+20=74**

Step 3. **9 5**
4 6 **=36**

Step 4.Putting down the values of above steps individually in one line as shown



Step 5. Product of 95 and 96 is 4370

3.4 Three digit number multiplication with three digit number by Vertically and crosswise trick.

Example 6: Find the product of 321 and 451.

Traditional Methods :

321
×451
321
1605+
1284++
144771

Vedic Methods:

Let us suppose a=9, b=5, c =4 and d =6

Step 1. Multiply the first column vertically (Right end 1 and 1), we get the result 1.1=1,

Step 2. Completion of multiplication of first column crosswise with the second column digit and added up give the result 1.2 +5.1=7,

Step 3. Completion of multiplication of first column crosswise with the third column digit(1×3+4×1=7) and added up with product of second column vertically (2×5=10),we get the result 7+10=17,

Step 4. Completion of multiplication of third column crosswise with the second column digit and added up give the result 3×5+4×2=23,

Step 5. Multiply the third column vertically (Left end), we get the result 4×3=12,

Step Diagrams:

Step 1. **3 2 1**
4 5 1 **=01**

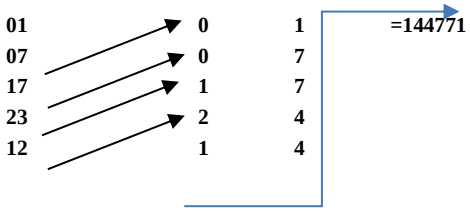
Step 2. **3 2 1**
4 5 1 **=02+05=07**

Step 3. **3 2 1**
4 5 1 **=1×3+4×1+2×5=17**

Step 4. **3 2 1**
4 5 1 **=3×5+4×2=23**

Step 5. **3 2 1**
4 5 1 **=3×4=12**

Step 6. Putting down the values of above steps individually in one line as shown



Step 5. Product of 321 and 451 is 14471

1.8 Finding square of any number in Vedic maths is extremely easy. Just follow the given steps:

Step 1. Choose a base closer to the number whose square is to be found.

Step 2. Find the difference of the number from its base.

Step 3. Add the difference with the number.

Step 4. Multiply the result with the base.

Step 5. Add the product of the square of the difference with the result of the above point.

Let's take an example to understand this:

Example 7: $(99)^2$ =?

Step 1. Choose 100 as base.

Step 2. Difference =99-100 = -1

Step 3. Number + difference = 99 + (-1) = 98

Step 4. Multiplying result with base = 98*100 = 9800

Step 5. Adding result with square of difference= 9800 + $(-1)^2$ = **9801**

4. Contribution of Vedic Maths to Research

An important contribution to mathematical research has been done by the launch of vedic maths and tricks. India has the largest number of researcher in different fields and engineering colleges among developing countries in the world. There are many reasons for the gloomy scenario and it is essential that relevant mathematics research provides the quick solutions for many of these problems with the help of vedic maths.

5. Importance of Vedic Math:

Vedic Math has numerous techniques and rules that help us perform various arithmetic calculations in time. It is useful not only for increases concentration but also helps in reducing silly mistakes and helps a person to solve mathematical problems within a second and reduces the calculating time from 4 -5 minutes to very few seconds. Vedic mathematics reduces burden and is a magical tool to reduce scratch work and finger counting which are the crucial need in respect of the mathematical training of competitive examination writing students.

6. Conclusion:

Vedic Maths is a gift given to this world by the ancient scholars of India. The name Vedic Maths is derived from a Sanskrit word 'Veda' which means 'Knowledge'. It is a collection of techniques to solve maths problems in an easy and faster way. By Vedic methods, 'difficult' problems or long sums can be solved immediately. The simplicity of Vedic mathematics means that calculations can be carried out mentally. It also lends a helping hand as you progress to higher classes because Vedic Maths always has a shorter way for solving quadratic and other polynomial functions and equations that one would encounter in higher classes.

References:

1. The Concept of Vedic Maths (2015) https://www.walnutexcellence.com/the-concept-of-vedic-maths/
2. Jagadguru Swami Sri Bharathi Krishna Tirthaji Maharaja, Vedic Mathematics: Sixteen Simple Mathematical Formulae from the Veda. Delhi (1965).
3. www.quickrmaths.com
4. Bajaj, R. (2005) Vedic mathematics: The Problem Solver. Black Rose Publications.
5. http://www.mathmonkeybrunei.com/vedic_math.php
6. Das, S. The History & Future of Vedic Maths.
7. Acharya, E.R. (2015) Mathematics Hundred Years Before and Now. History Research, 3, 41-47. https://doi.org/10.11648/j.history.20150303.11
8. www.thehindu.com
9. VedicMaths.Org (2004), http://www.vedicmaths.org