An Analytical Study of Vedic Mathematics: Theoretical Foundations and Applications

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Introduction

The old mathematical theory that Sri Bharati Krsna Tirthaji (1884-1960) found from the Vedas between 1911 and 1918 is called Vedic Mathematics. His findings suggest that sixteen sutras, or word-formulae, are the basis of mathematics. Its consistency is one of the most remarkable aspects of the Vedic system. Mathematics as a whole is remarkably coherent and interconnected. It promotes creativity while making mathematics accessible and fun. In many cases, the Vedic approach may instantly resolve complex issues or large quantities of money. A significantly more comprehensive and methodical system of mathematics existed long before the contemporary system, of which these stunning and lovely approaches are a component. There is a complimentary, direct, and straightforward structure to mathematics in Vedic mathematics, and the approaches are also unified and cohesive. Due to its inherent simplicity, Vedic mathematics allows for mental computations (though the techniques may also be recorded in writing). Using a mental system that is adaptable has several benefits. Students are not confined to just one right way but are encouraged to come up with their own approaches. Students become more engaged, smart, and creative as a result.

Mathematical Traditions in Vedic India

In the years 1911 and 1918, the mathematician, historian, philosopher, and Sanskrit scholar Sri Bharati Krsna Tirthaji (1884–1960) found Vedic mathematics in the ancient Indian texts. In the end, after much research into these old writings, he was able to piece together a set of mathematical equations known as sutras. The foundational work on Vedic Mathematics, Vedic Mathematics (1965), by Bharati Krsna Tirthaji, who was also the former Shankaracharya (great religious leader) of Puri, India, delves into the ancient Vedic texts and lays out the methods of the system. Supposedly, Bharati Krsna's work elucidating the Vedic system was originally published as a single book rather than the usual sixteen. It took five years until it was published.

Mathematics from the Vedas: Sutras and Sub-Sutras

The term "Sutra" translates to "Thread of Knowledge" in Sanskrit, an old Indian language. Thread used for sewing wounds together is called suture in English, which comes from the Sanskrit word sutra. Each of the sutras represents a strand of knowledge, and together they form the subject's foundation. A total of sixteen Vedic Main-Sutras and fourteen Sub-Sutras constitute the basis of the

system. These sutras provide natural solutions to various mathematical difficulties. You may answer lengthy mathematical problems fast by memorising these 16 one-line equations originally published in Sanskrit.

Every single chapter of every single discipline of mathematics is covered by the Sutras. This includes arithmetic, algebra, plane and solid geometry, spherical and geometric trigonometry, analytical and geometric conics, astronomy, differential and integral calculus, and every single chapter of conics. The following tables display the names and meanings of the sutras and sub-sutras of Vedic mathematics.

Table 1: Name and Meaning of Sutras of Vedic Mathematics

S. No.	Name	Meaning
1	Ekadhikina Purvena	By one more than the previous one
2	Nikhilam Navatashcaramam Dashatah	All from 9 and the last from 10
3	Urdhva-Tiryagbyham	Vertically and crosswise
4	Paraavartya Yojayet	Transpose and adjust
5	Shunyam Saamyasamuccaye	When the sum is the same that sum is zero
6	(Anurupye) Shunyamanyat	If one is in ratio, the other is zero
7	Sankalana-vyavakalanabhyam	By Addition and by Subtraction
8	Puranapuranabyham	By the completion or non-completion
9	Chalana-Kalanabyham	Differences and Similarities
10	Yaavadunam	Whatever the extent of its deficiency
11	Vyashtisamanstih	Part and Whole
12	Shesanyankena Charamena	The remainders by the last digit
13	Sopaantyadvayamantyam	The ultimate and twice the penultimate
14	Ekanyunena Purvena	By one less than the previous one
15	Gunitasamuchyah	The product of the sum is equal to the sum of the product
16	Gunakasamuchyah	The factors of the sum is equal to the sum of the factors

Table 2: Name and Meaning of Sub-Sutras of Vedic Mathematics

S. No.	Name	Meaning
1	Anurupyena	Proportionately
2	Sisyate Sesasamjna	The Remainder Remains Constant
3	Adyamadnyenantya-mantyena	The First by the First and the Last by the Last
4	Kevalaih Saptakam Gunyat	For 7 the Multiplicand is 143
5	Vestanam	By Osculation
6	Yavadunam Tavadunam	Lessen by the Deficiency
7	YavadunamTavadunikrtya Varganca Yojayet	Whatever the Deficiency Lessen by that amount and set up the Square of the Deficiency
8	Antyayordasake'pi	Last Totalling 10
9	Antyayoreva	Only the Last Terms
10	Samuccayagunitah	The Sum of the Products
11	Lopanasthapanabhyam	By Alternative Elimination and Retention
12	Vilokanam	By Mere Observation
13	Gunitamuccayah Samuccayagunitah	The Product of the Sums is the Sum of the Products
14	Dhwajanka	On the Flag

Progress in Vedic Mathematics

An early edition of Sri Bharati Krsna's "Vedic Mathematics" was greeted with great enthusiasm as a promising new approach to mathematics.

By the late 1960s, Tirthaji had made it to London. The new approach piqued the curiosity of a few British mathematicians, such as Jeremy Pickles, Andrew Nicholas, and Kenneth Williams. After giving talks on Bharati Krsna's work in London, they expanded upon its introduction. A book titled Introductory Lectures in Vedic Mathematics was published in 1981 that compiled all of this. Andrew Nicholas reignited interest in Vedic mathematics over a series of three visits to India in 1981–1987.

A Curriculum Based on Vedic Mathematics

A number of prestigious London institutions, including St. James', started successfully teaching the Vedic method some time ago. Countless educational institutions in India and beyond now teach this extraordinary method. Vedic mathematics is taught even to economics and MBA students. The globe over, Maharishi Schools began including Vedic Mathematics in their curricula the year Maharishi Mahesh Yogi revealed its wonders. As Mahesh Yogi phrased it, "The sutras of Vedic Mathematics are the software for the cosmic computer that runs this universe." Cambridge School, Amity

International, DAV Public School, and Tagore International School are among the Delhi schools that have hosted lectures on Vedic Mathematics since 1999. The lectures are organised by the International Research Foundation for Vedic Mathematics and Indian Heritage, a forum that promotes value-based education.

Why Vedic Mathematics is Still Relevant Today

It is well-known that India has produced several renowned mathematicians, including Ramanujan, and has led the world in mathematics. Indian mathematicians not only popularised the concept of zero and decimals, but they also paved the way for the creation of sophisticated mathematical computations that are essential to modern science, technology, and computing. An intriguing, easy, and logical way to solve complicated mathematical problems is the subject of Vedic mathematics, which elucidates the basic procedures found in the Vedas. Theoretically sound and filled with example problems and explanatory comments, Vedic Mathematics makes it easy to learn the important mathematical concepts laid forth in the Sutras.

This method of teaching mathematics is cohesive. Many individuals nowadays have avoided practicing mental arithmetic because they feel it is unnecessary in this era of computers and calculators. An appealing aspect of Vedic mathematics is given the abundance of factors. It has a satisfying simplicity, is effective, and is quite simple to master. Vedic mathematics could seem like a bunch of tricks at first look, more suited to traditional memorization than to gaining a deeper comprehension of the subject. The true power of Vedic Mathematics lies in the fact that it entices aspiring mathematicians to examine their sums and discover the simplest answer by providing an abundance of options.

Finding the best strategy to nudge the student towards a mathematical mindset is more important than providing them with a set of predetermined answers to problems. The goal of Vedic mathematics is to find patterns and simplify problems in an open and non-restrictive manner. A more adaptable mindset and the ability to think laterally are the results. Students love discovering connections to more conventional forms of mental mathematics in the West, and the 16 Sutras and 14 Corollaries provide a solid foundation for greatly accelerating these computations. Everyone who uses mathematics in their daily work, from students to instructors to professionals, finds Vedic mathematics to be very helpful. More self-assurance is brought about by Vedic mathematics. In an engaging style, it presents the sixteen Sutras of Vedic Mathematics with accompanying pictures, strong nine, series, square rules, and preceding conversation. Therefore, it is crucial in the modern world.

Uses of Vedic Mathematics

Some examples of competitive examinations that make use of Vedic mathematics include the following: MSPC, UPSC, GMAT, MBA –CAT, CET, RAILWAY RECRUITMENT, banking, Staff Selection Commission (SSC), and many more. A fear of mathematics often manifests between the ages of 9 and

Thirteen. There are a lot of reasons behind it. Typically, students choose for a different subject of study after the tenth grade, one that does not need mathematics. If you suffer from a phobia of numbers, you may find that Vedic mathematics helps.

Benefits of Ancient Vedic Mathematics

Vedic mathematics can turn mathematics into a joyful and carefree topic that anybody can study and master in a short amount of time with little effort. Perhaps the current world could benefit from Vedic mathematics.

- There are several benefits to Vedic mathematics, including:
- It's simple, straightforward, completely novel, unique, and unambiguous.
- Maths may be turned from a painful topic into a fun and enjoyable one, one that can be studied with happiness and delight.
- There are evident connections and continuity between many fields of mathematics, which are enhanced by Vedic mathematics, which in turn enhances our knowledge and comprehension of mathematics.
- Because it only necessitates knowing multiplication tables up to 5, it lessens the load of retaining a significant quantity of information.
- It allows for quicker computations in comparison to the traditional way. Because of the time saved, more queries may be answered.
- It's a useful tool for cutting down on tedious tasks like counting fingers and scratching.
- Improving attention and self-assurance are two of its significant functions.
- It helps to deepen our comprehension of mathematics and makes it easier to see connections and relationships among various areas of the subject.
- For independent cross-checking, the Vedic mathematics system additionally provides a set of checking processes.
- Because of the aspect of choice and flexibility, it keeps the mind attentive.
- Vedic mathematics and multi-dimensional thinking contribute to the holistic development of the human brain.
- A person's spiritual side may be developed to a great degree with the aid of the Vedic mathematics method.
- While helping kids who study at a slower pace understand the fundamentals of mathematics, it has the potential to inspire creativity in bright and talented individuals.
- Vedic mathematics, which is increasingly being used, may undeniably pique children's interest in a topic that is often feared by them.
- Therefore, all of mankind benefits from Vedic mathematics, which is a gift from the Vedas.

The Importance of Teaching Children Vedic Mathematics

A child's test scores can suffer if they struggle with mathematics. When a student begins to do poorly on tests, they often tune out their teachers and eventually stop participating in class. Ignoring the instructor becomes the child's new normal. This has a domino impact on the child's development as they are less likely to participate in class activities. The pupil's self-assurance plummets. Because of this, the pupil has a fear of mathematics. A person's focus should be on mathematics. When students use lengthy methods to solve problems, they slow down the process and, in most cases, they fail to finish the test within the allotted time because of careless calculations that cost them marks. Because they lack familiarity with key components of the Vedic mathematical system, students also struggle to determine if their answers are correct. When contrasted with the conventional approach, the Vedic mathematical system is very simple. There is harmony and interconnection throughout the Vedic mathematical system. Learning to solve complex equations, including square roots, reciprocals, cubic equations, and other high-level problems, is an important and effective part of Vedic mathematics. In addition to enhancing knowledge and comprehension of Mathematics, it plays a major role in presenting a fresh perspective to the subject. Mathematical and algebraic problems are also readily solved. With these approaches, you have greater leeway and simplicity. We can solve even the most difficult difficulties. Students who are having difficulty studying mathematics via more conventional means may benefit from learning Vedic mathematics.

Conclusion

The pupils' lives are not complete without mathematics. It has a negative impact on children' self-esteem, academic performance, and character development if it is not nurtured beginning in elementary school. According to the research, traditional teaching methods in mathematics do not work, whereas the Vedic approach may help students overcome their mathematical learning obstacles. Vedic mathematics is an innovative approach to teaching mathematics that draws in students and gets rid of the problems they have with the subject. Therefore, research into the efficacy of Vedic Mathematics as a teaching tool has the potential to guarantee high quality and higher test scores for students.

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