

Application of Vedic Mathematics in Present Scenario

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Abstract:

Vedic mathematics is an ancient Indian mathematical system, or a set of precise rules, that may be applied to any trigonometric, algebraic, arithmetic, or geometric problem. The technique is based on 16 Vedic sutras, which are a collection of word equations that explain the steps or reasoning involved in solving a variety of mathematical problems that are difficult and time consuming to answer using traditional methods. Beginning with the foundations of Vedic mathematics, such as the meaning of Vedic mathematics, this article examines mathematical operations using Vedic mathematics.

Here, discuss some applications of Vedic mathematics in one of its field. Vedic mathematics is found to be very effective and sound for mental calculations in mathematics. Sutras and sub sutras have beautiful and striking tricks for fast and easy for mathematical calculations. In this article, we explore on importance of Vedic Mathematics. Vedic Math provides more systematic, simplified, unified and faster than the conventional system. A significant and interesting invention which has led to various applications in all the disciplines is the development of Vedic Math approach.

Keywords: Vedas, Vedic mathematics, Sutras, Sub –Sutras, Algebra, Atharva.

INTRODUCTION

Vedic Mathematics is a collection of Techniques/Sutras to solve mathematical arithmetic's in easy and faster way. It consists of 16 Sutras (Formulae) and 13 sub-sutras (Sub Formulae) which can be used for problems involved in arithmetic, algebra, geometry, calculus, conics. Vedic Mathematics is a system of mathematics which was discovered by Indian mathematician Jagadguru Shri Bharathi Krishna Tirthaji in the period between A.D. 1911 and 1918 and published his findings in a Vedic Mathematics Book by Tirthaji Maharaj.

Veda is a Sanskrit word which means 'Knowledge'. Using regular mathematical steps, solving problems sometimes are complex and time consuming. But using Vedic Mathematics' General Techniques (applicable to all sets of given data) and Specific Techniques (applicable to specific sets of given data), numerical calculations can be done very fast. Mathematics enthusiastic always have the questions **What is Vedic Mathematics** and **What are the Techniques/Sutras in Vedic Mathematics**. But when they try to go through the Vedic Mathematics books they get confused for some of the techniques, concepts and to understand this they search on internet. I found that not much information of Vedic Mathematics Sutras/Techniques is present over the internet.

Shri Bharathi Krishna Tirthaji Maharaj was born in March 1884 in the Puri village of Orissa state. He was very good in subjects like mathematics, science, humanities and was excellent in Sanskrit language. His interests were also in spiritualism and mediation. In fact when he was practicing meditation in the forest near Sringeri, he rediscovered the Vedic sutras. He claims that these sutras/techniques he learnt from the Vedas especially 'Rig-Veda' directly or indirectly and he intuitively rediscovered them when he was practicing meditation for 8 years.

Later he wrote the sutras on the manuscripts but was lost. Finally in year 1957, he wrote introductory volume of 16 sutras which is called as Vedic Mathematics and planned to write other sutras later. But soon he developed cataract in both of his eyes and passed away in year 1960.

REVIEW OF LITERATURE

By reviewing the related literature, the problem becomes clear and it directs the researcher to proceed in this subject. The Vedic mathematics techniques have become popular not only in India but also in abroad. Some foreign mathematicians like Andrew Nicholas ,Mark Gaskell, Jeremy Pickles and Kenneth Williams expressed their interest and delivered lectures by extending the Bharathi Krishna Thirthaji introductory book. It is usually introduced in syllabi followed at educational institutes worldwide because the system is versatile in nature. Moreover, the scientists working in NASA also use some principles in the sphere of artificial intelligence.

NEED OF THE STUDY

Mathematics is very important for our children, high profile personalities and labourers. Therefore everyone should have the knowledge of mathematics upto some extent. Holistic development of the human brain (left and right side both) along with multidimensional thinking takes place through Vedic Mathematics. With the help of Vedic Maths, one can learn and become master with minimum efforts in a very short span of time and can convert into a playful and an enjoyable subject. So it is our teacher's duty to preserve our traditions. The student can save a second answering a math problem, he can attempt more questions within the stipulated time. Ancient Indian Vedic civilizations are known for being skilled in algebra, computational mathematics and geometry, complex enough to include other topics like irrational numbers. Many schools and universities use Vedic mathematics as an alternative system of mathematics in modern mathematics today. It encourages mental calculations without the use of slate, paper, pen or pencil which develops the concentration as well as confidence abilities.

USES OF VEDIC MATHEMATICS

- More than 1700% times faster than normal Math: this makes it the World's Fastest.
- Eradicates fear of Math completely. So if your child has Math-Phobia High Speed Vedic Math is a Fun-Filled way to do Math and arises interest in your child.
- Much Improved Academic Performance in School and Instant Results. Just see the first exercise and believe it for yourself. Go over the examples given in the tutorials you would be amazed.
- Sharpens your mind, increases mental agility and intelligence.
- Increases your speed and accuracy. Become a Mental Calculator yourself.
- Improves memory and boosts self confidence.
- Cultivates an Interest in your for numbers.
- Develops your left and right sides of your brain hence using intuition and innovation. It has been noted that Geniuses have been using the right side of the brain to achieve exceptional results.
- Easy to master and apply. You just need the knowledge of tables to learn this.
- It helps a person to solve mathematical problems 10-15 times faster.
- It helps m Intelligent Guessing
- It reduces burden (need to learn tables up to 9 only)

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- It is a magical tool to reduce scratch work and finger counting.
- It increases concentration.
- It helps in reducing silly mistakes

In Vedic maths System a manual approach is preferred. The simplicity of Vedic Mathematics encourages most calculations to be carried out without the use of paper and pen. Methods like Shudh Method are applicable in statistics. This mental approach sharpens the mind, improves memory and concentration and also encourages innovation.

The Vedas are a collection of texts that have recently been found to be highly organized both internally and in their relationships with one another. Krishna spend 8 years in the Shringari pine forest Shringari Moth practicing Brahma Sadhana and learning advanced Vedanta Theory between 1911 and 1918. According to him, one of the results of his dedication was the discovery and reconstruction of Vedic from stray allusions inside the Atharvaveda's appendix sections. As illustrated in Figure 1, Vedic Mathematics is a logic and math system based on sixteen formulae and thirteen sub formulas with a basic idea and rule. The Vedic mathematical processes are based on both contemporary and ancient mathematical systems. Each formula describes a mental working concept that may be used to solve a variety of mathematical problems.

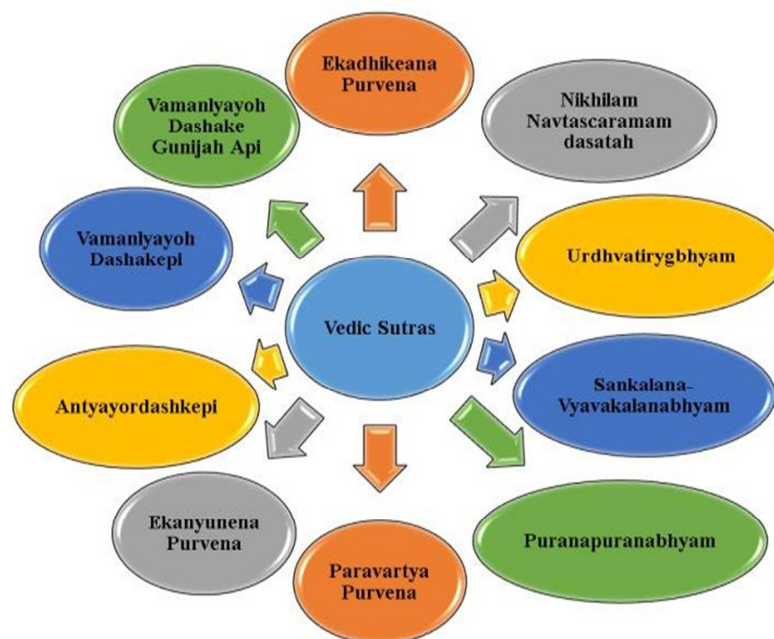


Figure 1: The Sixteen Formulas and Thirteen Sub Formulas with the Simple Rules and Concepts

16 slokas has been compiled from stray references. Each slokas gives one or more mathematical theories formulated by Bharati Krishna Tirthaji. A major part of the body of mathematical knowledge from the Vedic period that has come down to us is from the Sulvasutras. The Sulvasutras are compositions aimed at providing instruction on the principles involved and procedures of construction of the vedis (altars) and agnis (fireplaces) for performing the yajnas, which were a key feature of the Vedic culture. The fireplaces were constructed in a variety of shapes such as falcons, tortoise, chariot wheels, circular trough with a handle, pyre, etc (depending on the context and purpose of the particular yajna) with sizes of the order of 20 to 25 feet in length and width, and there is a component of the Sulvasutras describing the setting up of such platforms with tiles of moderate sizes, of simple shapes like squares, triangles, and occasionally special ones

like pentagons. Many of the vedis involved, especially for the yajnas for special occasions had dimensions of the order of 50 to 100 feet, and making the overall plan involved being able to draw perpendiculars in that setting. This was accomplished both through the method that is now taught in schools, involving perpendicularity of the line joining the centres of two intersecting circles with the line joining the two points of intersection, as also via the use of the converse of "Pythagoras theorem"; they were familiar with the "Pythagoras theorem", and explicit statement of the theorem is found in all the four major Sulvasutras. The Sulvasutras also contain descriptions of various geometric principles and constructions, including procedures for converting a square into a circle with equal area and vice versa and a good approximation to the square root of 2.

The Sulvasutras, like other Vedic knowledge, were transmitted only orally over a long period. There have also been commentaries on some of the Sulvasutras in Sanskrit, but their period remains uncertain. When the first written versions of the Sulvasutras came up is unclear. The text versions with modern commentaries were brought out by European scholars (Thibaut, Burk, van Gelder and others) starting from the second half of the nineteenth century. With regard to genesis of his study of the Sulvasutras Thibaut mentions that the first to direct attention to the importance of the Sulvasutras was Mr. A.C. Burnell, who in his Catalogue of a Collection of Sanskrit Manuscripts, remarks that we must look to the Sulva portions of the Kalpasutras for the earliest beginnings among the Brahman. While the current translations are reasonably complete, some parts have eluded the translators, especially in the case of Manava Sulvasutra which turns out to be terser than the others. New results have been brought to light by R.G. Gupta, Takao Hayashi and perhaps also by others, not recognised by the original translators. Lack of adequate mathematical background on the part of the translators could be one of the factors in this respect. There is a case for a relook on a substantial scale to put the mathematical knowledge in the Sulvasutras on a comprehensive footing. There is also scope for work in the nature of interrelating in a cohesive manner the results described in the various Sulvasutras. The ritual context of the Sulvasutras lends itself also to the issue of interrelating the ritual and mathematical aspects, and correlating with other similar situations from other cultures; for a perspective on this the reader may refer Seidenberg.

Another natural question that suggests itself in the context of the Sulvasutras is whether there are any of the fireplaces from the old times to be found. From the description of the brick construction it would seem that they would have been too fragile to withstand the elements for long; it should be borne in mind that the purpose involved did not warrant a long-lasting construction. Nevertheless, excavations at an archaeological site at Singhol in Panjab have revealed one large brick platform in the traditional shape of a bird with outstretched wings, dated to be from the second century BCE; it however differs markedly from the numerical specifications described in the Sulvasutras. This leaves open the possibility of finding other sites, though presumably not a very promising one. Apart from the Sulvasutras, mathematical studies have also been carried out in respect of the Vedas, mainly concerning understanding of the numbers. For a composition with a broad scope, including spiritual and secular, the Rig-Veda shows considerable preoccupation with numbers, with numbers up to 10,000 occurring, and the decimal representation of numbers is seen to be rooted there. The Yajurveda introduces names for powers of 10 upto 10^{12} and various simple properties of numbers are seen to be involved in various contexts for instance. There is scope for further work in understanding the development as a whole; this would involve familiarity with mathematics on the one hand and knowledge of Vedic Sanskrit on the other hand.

THE SUTRA: NIKHILAM NAVATAŚCARAMAM DAŚATAH

The sutra reads "Nikhilam Navataścaramam Daśatah", which literally translated means: all from 9 and the last from 10". We shall presently give the detailed explanation presently of the meaning

and applications of this cryptical - sounding formula and then give details about the three corollaries.

He has given a very simple multiplication.

Suppose we have to multiply 9 by 7

1. We should take, as base for our calculations that power of 10 which is nearest to the numbers to be multiplied. In this case 10 itself is that power.

(10)

9 – 1

7 – 3

6 / 3

2. Put the numbers 9 and 7 above and below on the left hand side (as shown in the working alongside here on the right hand side margin)

3. Subtract each of them from the base (10) and write down the remainders (1 and 3) on the right hand side with a connecting minus sign (–) between them, to show that the numbers to be multiplied are both of them less than 10.

4. The product will have two parts, one on the left side and one on the right. A vertical dividing line may be drawn for the purpose of demarcation of the two parts.

5. Now, the left hand side digit can be arrived at in one of the 4 ways,

a. Subtract the base 10 from the sum of the given numbers (9 and 7 i.e. 16). And put (16 – 10) i.e. 6 as the left hand part of the answer or

$$9 + 7 - 10 = 6$$

b. Subtract the sum of two deficiencies (1 + 3 = 4) from the base (10) we get the same answer (6) again or

$$10 - 1 - 3 = 6$$

c. Cross subtract deficiency 3 on the second row from the original number 9 in the first row. And you find that you have got (9 – 3) i.e. 6 again

$$9 - 3 = 6$$

d. Cross subtract in the converse way (i.e. 1 from 7), and you get 6 again as the left hand side portion of the required answer

$$7 - 1 = 6$$

This availability of the same result in several easy ways is a very common feature of the Vedic system and is great advantage and help to the student as it enables him to test and verify the correctness of his answer step by step.

6. Now vertically multiply the two deficit figures (1 and 3). The product is 3. And this is the right hand side portion of the answer

(10)

9 – 1

7 – 3

6 / 3

7. Thus $9 \times 7 = 63$

This method holds well in all cases and is therefore capable of infinite application.

RESULTS

- Vedic Math provides more systematic, simplified, unified & faster than the conventional system.
- Vedic Math gives the flexibility, fun and immense satisfaction and converts a tedious subject into a playful and blissful one which anyone can learn with smiles.
- Vedic Math with its special features has the inbuilt potential to solve the psychological problem of Mathematics anxiety.
- Vedic Math increases speed and accuracy. Mathematics, derived from the Veda, provides one line, mental and super-fast methods along with quick cross checking systems.
- Vedic mathematics provides the integrated structure of mathematics that is complementary, direct and easy.
- A significant and interesting invention which has led to various applications in all the disciplines is the development of Vedic mathematics approach.

CONCLUSION

Thus, Vedic Mathematics is a unique technique of calculations that is based on simple principles and rules, applying which, any kind of mathematical problems can be solved orally

Therefore, while applying Vedic mathematics one can versatility in solving problems and at the same time, this helps to decide on the best method possible in solving a particular type of problem. The beauty of Vedic mathematics is in its inventiveness, which one experiences while applying. As one can see in the above methods that with good practice of the Vedic mathematics one can do time consuming complex Problems far more easily and faster.

Vedic mathematical methods are derived from ancient systems of computations, now made available to everyone through the great work of Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja, who published a book on Vedic mathematics in 1965. Compared to conventional mathematical methods, these are computationally faster and easy to perform. In this paper we have shown the second sutras of Bharati Krishna Tirthaji which is applicable for multiplication only. Vedic Mathematics mainly deals with various Vedic mathematical formulas and their applications of carrying out tedious and cumbersome arithmetical operations, and to a very large extent executing them mentally.

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