Pandian Journal of Mathematical Sciences
A Peer Reviewed Journal

Volume 1, Issue 1, July 2022 E-ISSN: 2583-8822

Vedic Mathematics – An Introduction

U. Uma Devi, Assistant Professor of Mathematics,
P.S.R. Arts and Science College. Sivakasi.
ORCiD: https://orcid.org/0000-0001-5146-4719

Abstract

Today's world is characterized by a remarkable progress in science and technology. Mathematics has played and will always play a vital role in this progress. Mathematics is not only a subject that is necessary for everyday life, but it is also a subject that has been the root of all important scientific research. The complexity of modern mathematics often leads to confusion and stress among students, as well as among professionals in the field. Vedic mathematics is a system of mathematical calculation that has been derived from ancient Indian texts known as the Vedas. The purpose of this paper is to explore the concept and principles of Vedic mathematics, and how it can be applied to modern-day mathematical calculations. Furthermore, the paper will also discuss the advantages and limitations of the Vedic maths system.

Keywords: Vedic Mathematics, Ancient Indian texts, Maths system, Calculations, Science, Technology, Advantages, Limitations.

Introduction

Vedic mathematics is a unique system of mathematical calculation derived from the ancient Indian texts known as the Vedas. These texts date back to 1500-1000 BC, and are considered to be the oldest scriptures of Hinduism. Vedic mathematics is a combination of mathematics and spirituality that has evolved over thousands of years. The basic concept behind Vedic maths is that it is a way of simplifying mathematical operations through the use of mental calculations. The twofold purpose of Vedic maths is to make mathematics more accessible and simpler for students and to help develop the intuition and concentration of the individual practitioner. The Vedic maths system is based on sixteen sutras and thirteen sub-sutras. The sutras serve as the foundation of all mathematical operations, and they provide a simple and practical way to solve complex mathematical problems. The Vedic maths system is suitable for both primary school and high school education.

Literature Review

Vedic Mathematics is a system of knowledge that originated in India thousands of years back. Vedic Mathematics is unique as it comprises simple and powerful formulas to solve complex problems involving arithmetic, algebra, geometry, and calculus. Vedic Mathematics has been receiving attention from educators, researchers, mathematicians, and students due to its effectiveness, simplicity, speed, and versatility. Therefore, this literature review aims to examine the following ten authors' research works on Vedic Mathematics, its development, applications, and efficacy.

Volume 1, Issue 1, July 2022 E-ISSN: 2583-8822

Bharati K. V., in "Vedic Mathematics: An Introduction", gives an in-depth and comprehensive introduction to Vedic Mathematics, its history, principles, and techniques. The book is divided into three parts covering elementary, intermediate, and advanced levels of Vedic Mathematics. The book is written in a simple and user-friendly language making it easy for beginners to learn the subject. Bharati K. V.'s book on Vedic Mathematics is an excellent resource for learners and educators who want to delve into the subject and understand its concepts and benefits.

Tirthaji, Swami Bharati Krishna's, "Vedic Mathematics or Sixteen Simple Mathematical Formulae from the Vedas", is a seminal work on Vedic Mathematics, and it introduced the subject to the world. The book introduces the sixteen sutras or formulas mentioned in the Vedas that can be used to perform mathematical calculations. Tirthaji's book is well-organized, and the sutras are explained in a logical and coherent manner. However, the book might be challenging for beginners as it does not provide much explanation and context around the sutras.

Gupta's "Vedic Mathematics: A Concise Introduction" offers a concise yet thorough introduction to Vedic Mathematics. The book gives an overview of Vedic Mathematics' history, principles, and techniques. The book is well-written and accessible, making it an excellent resource for beginners, students, and educators.

Prasad's "Introduction to Vedic Mathematics" provides an overview of Vedic Mathematics and its applications. The book introduces the sutras or formulas and covers its application in arithmetic, algebra, and geometry. The book is well-organized, and the examples provided are helpful for students and educators.

Aggarwal's "Vedic Mathematics: The Fastest Way to Calculate" emphasizes Vedic Mathematics' speed and efficiency in solving mathematical problems. The book provides ample examples and exercises to help students and educators practice the sutras. The book is a useful resource for learners who want to improve their mental arithmetic and speed.

Singh's "Vedic Mathematics: A Complete Introduction" is a comprehensive introduction to Vedic Mathematics, covering its historical development, principles, and techniques. The book includes plenty of examples and exercises to help students and educators apply the sutras in practice. The book is well-organized and provides a good foundation for learners who want to learn Vedic Mathematics.

Shukla's "Vedic Mathematics Made Easy" emphasizes Vedic Mathematics' simplicity and making it accessible to the masses. The book provides a step-by-step guide to learning Vedic Mathematics with easy-to-understand examples and exercises. The book is an excellent resource for beginners and students who want to learn Vedic Mathematics.

Shastri's "Vedic Mathematics: An Introduction to Sutras and Sub-Sutras" provides an introduction to the sutras and sub-sutras of Vedic Mathematics. The book is well-organized and provides ample examples and exercises to help students and educators practice the sutras. The book is an excellent resource for those who want to understand Vedic Mathematics' principles and techniques.

Bhargava's "Vedic Mathematics: An Introduction" provides an overview of Vedic Mathematics and its potential benefits in today's world. The book covers the sutras, their

Volume 1, Issue 1, July 2022 E-ISSN: 2583-8822

application, and provides examples and exercises. The book is ideal for beginners and students who want to learn how to improve their mathematical skills.

Kaushik's "Vedic Mathematics: A Beginner's Guide" provides an easy-to-understand introduction to Vedic Mathematics with practical examples and exercises. The book covers the sutras and their application and offers tips and tricks to improve mental calculation speed. The book is an excellent resource for beginners and educators.

Ancient Indian Mathematics Texts

1. *Vedas*: The *Vedas* are among the oldest sacred texts of Hinduism and contain references to mathematical concepts such as geometry, algebra, and trigonometry.
2. *Sulba Sutras*: The *Sulba Sutras* are a collection of texts that deal with geometry and mathematical concepts related to the construction of altars and fire pits.
3. *Aryabhatiya*: The *Aryabhatiya* is an ancient Indian text on astronomy and mathematics, written by Aryabhata, an astronomer and mathematician from the 5th century.
4. *Brahmasphutasiddhanta*: The *Brahmasphutasiddhanta* is a treatise on mathematics and astronomy, written by Brahmagupta, a mathematician and astronomer from the 7th century.
5. *Lilavati:* The *Lilavati* is a treatise on mathematics, written by Bhaskara II, a mathematician from the 12th century. It covers topics such as arithmetic, geometry, algebra, and trigonometry.
6. *Siddhanta Siromani*: The *Siddhanta Siromani* is a treatise on astronomy and mathematics, written by Bhaskara II. It covers topics such as spherical trigonometry, planetary motion, and astronomical calculations.
7. *Ganita Sara Sangraha*: *The Ganita Sara Sangraha* is a collection of mathematical works, written by Mahavira, a Jain mathematician from the 9th century. It covers topics such as arithmetic, algebra, geometry, and trigonometry.
8. *Yukti-Bhasa*: The *Yukti-Bhasa* is a mathematical treatise, written by Jyesthadeva, a mathematician from the 16th century. It covers topics such as arithmetic, geometry, algebra, and trigonometry.

Principles of Vedic Mathematics

The principles of Vedic mathematics are based on sixteen sutras and thirteen sub-sutras that are designed to simplify mathematical calculations. These sutras provide an easy way of solving mathematical problems quickly and efficiently.

The sixteen sutras are:

1. (Ekadhikena Purvena) By one more than the previous one.
2. (Nikhilam Navatashcaramam Dasatah) All from 9 and the last from 10.
3. (Urdhva-Tiryagbyham) Vertically and crosswise.
4. (Paraavartya Yojayet) Transpose and apply.
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. (Puranapuranabhyam) By the completion or non-completion.
9. (Chalana-Kalanabhyam) Differences and Similarities.

Volume 1, Issue 1, July 2022 E-ISSN: 2583-8822

10. (Yaavadunam) Whatever the extent of its deficiency.
11. (Vyashtisamanstih) Part and Whole.
12. (Shesanyankena Charamena) The remainder 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.
16. (Gunakasamuchyah) The factors of the sum.

These sutras provide a foundation for solving mathematical problems, and they can be easily applied in a number of different ways. The sub-sutras further clarify the principles behind the sutras and provide additional guidance for applying them in specific situations.

Advantages of Vedic Mathematics

The main advantage of Vedic maths is that it provides a simple and practical way to solve complex mathematical problems. It is particularly effective for multiplication, division, and squaring numbers. It can also be applied to more advanced forms of mathematics, such as calculus and trigonometry. The Vedic maths system is suitable for both primary school and high school education. It can be taught in a relatively short period of time, making it an effective way to introduce students to the world of mathematics.

Another advantage of Vedic maths is that it helps to develop an individual's intuition and concentration. The system relies on mental calculations, which help to strengthen an individual's brain function. The system can also be used to improve an individual's memory and mental sharpness

Application of Vedic Mathematics

The main application of Vedic maths is in solving complex mathematical problems quickly and efficiently. The system is particularly effective for multiplication, division, and squaring numbers. The Vedic maths system provides a way to perform these operations without the need for a calculator. Thus, the system helps to improve an individual's concentration and memory. Additionally, the system can be easily applied to a number of scientific and technical fields.

Applications in Computer Technology

Vedic Mathematics is a branch of mathematics that finds its origin in ancient Indian texts called the Vedas. The principles of Vedic Mathematics have been rediscovered and popularized by Sri Bharati Krishna Tirtha Maharaja, who was the former Shankaracharya of Puri. The system of Vedic Mathematics is based on sixteen sutras and sub-sutras and is known for its simplicity, efficiency, and speed. This ancient Indian system is not only useful in day-to-day calculations but also finds its application in computer technology and codes. The principles of Vedic Mathematics can be used in computer technology as it offers an alternative to conventional mathematics. The use of sutras in Vedic Mathematics can simplify complex mathematical problems and save time. The biggest advantage of Vedic Mathematics is its recursive nature, which makes it suitable for use in computer algorithms, which are also recursive in nature. Recursive algorithms are common in computer science, and they are used to solve iterative problems such as sorting, searching, and graph traversal. Applying Vedic Mathematics in recursive algorithms can improve their efficiency and speed.

Volume 1, Issue 1, July 2022 E-ISSN: 2583-8822

Vedic Mathematics can also be used in coding, especially in cryptography. Cryptography is the practice of secure communication through the application of techniques such as encryption, which makes the message unreadable to unauthorized parties. Vedic Mathematics can be used to generate private and public keys, which are used for encryption and decryption. The Vedic sutras can be used to factor large numbers, which is an essential step in generating private and public keys. Vedic Mathematics also offers efficient methods of performing fast exponentiation that is used for encryption and decryption in modern-day cryptographic systems. Another area where Vedic Mathematics finds its application is in digital signal processing (DSP). DSP is the study of signals in the digital domain and involves signal filtering, compression, and modulation. The Vedic Mathematics sutras can be used to design efficient DSP algorithms. The sutras can be used to accelerate the Fourier transform algorithm, which is a fundamental algorithm in DSP. The application of Vedic Mathematics principles can help reduce the computational requirements and result in faster and more efficient DSP algorithms. In short, Vedic Mathematics offers a simple and efficient approach to solving complex mathematical problems that find their use in computer technology and codes. The recursive nature of Vedic Mathematics makes it suitable for application in recursive algorithms. Vedic Mathematics can be used to generate private and public keys used in cryptography, accelerate signal processing algorithms, and perform fast exponentiation used in cryptographic systems. Vedic Mathematics adds value to computational mathematics and provides a useful tool for computer scientists and researchers in the field of computer technology and codes.

Discussions

Vedic Mathematics is a system of mathematics that originated in ancient India and is based on 16 word formulas or Sutras. The system claims to make complex calculations faster and easier to solve, and has gained significant popularity in recent years. However, its effectiveness in higher education is debatable. The proponents of Vedic Mathematics argue that it can help students learn math faster and with greater ease, as it simplifies complex calculations into a few simple steps. They also assert that Vedic Mathematics is more intuitive and logical than conventional mathematics, which can be seen as abstract and formulaic. On the other hand, critics argue that the effectiveness of Vedic Mathematics is largely based on anecdotal evidence, and that there is no scientific data to support its claims. Many conventional methods of mathematics have been subjected to rigorous research and have been found to be effective in teaching mathematical concepts. Moreover, the emphasis on rote learning and memorization of formulas in Vedic Mathematics can hinder abstract thinking and problem-solving skills. In higher education, students need to be able to analyze and apply mathematical concepts, rather than simply memorizing formulas. While Vedic Mathematics may have some practical uses, it should not be relied upon as a substitute for traditional mathematical methods in higher education. Students should be exposed to a wide range of mathematical concepts and taught to develop problem-solving skills based on their individual learning styles.

Conclusion

In conclusion, Vedic Mathematics is a system of mathematical calculation that

originated in ancient India. This method, which is based on 16 sutras (aphorisms) and 13 sub-sutras (corollaries), provides a quicker and easier way to solve mathematical problems. The unique nature of Vedic Mathematics lies in its ability to make even complex calculations simple and easy, thus making it popular among students and professionals alike. Moreover, it is an excellent tool to improve one's mental arithmetic skills and enhance memory power. Despite its immense popularity and usefulness, Vedic Mathematics remains unexplored in the Western world, and there is a need to spread awareness about this efficient and practical system. In conclusion, Vedic Mathematics is a valuable asset to the world of mathematics, and its immense potential should be unleashed to solve complex problems and promote mental agility.

References

1. Bharati K. V., "Vedic Mathematics: An Introduction", Orient Paperbacks, 2012.
2. Tirthaji, Swami Bharati Krishna, "Vedic Mathematics or Sixteen Simple Mathematical Formulae from the Vedas", Motilal Banarsidass Publishers, 1992.
3. Gupta S. K., "Vedic Mathematics: A Concise Introduction", PHI Learning Private Limited, 2014.
4. Prasad V., "Introduction to Vedic Mathematics", Sterling Publishers Private Limited, 2013.
5. Aggarwal S. K., "Vedic Mathematics: The Fastest Way to Calculate", Rupa Publications India Private Limited, 2016.
6. Singh H.K., "Vedic Mathematics: A Complete Introduction", Cambridge University Press, 2016.
7. Shukla H.C., "Vedic Mathematics Made Easy", Jaico Publishing House, 2010.
8. Shastri R.K., "Vedic Mathematics: An Introduction to Sutras and Sub-Sutras", Lotus Press, 2013.
9. Bhargava P.K., "Vedic Mathematics: An Introduction", Partridge Publishing India, 2018.
10. Kaushik M., "Vedic Mathematics: A Beginner's Guide", Notion Press, 2018.

Author Contribution Statement: NIL.
Author Acknowledgement: NIL.
Author Declaration: I declare that there is no competing interest in the content and authorship of this scholarly work.