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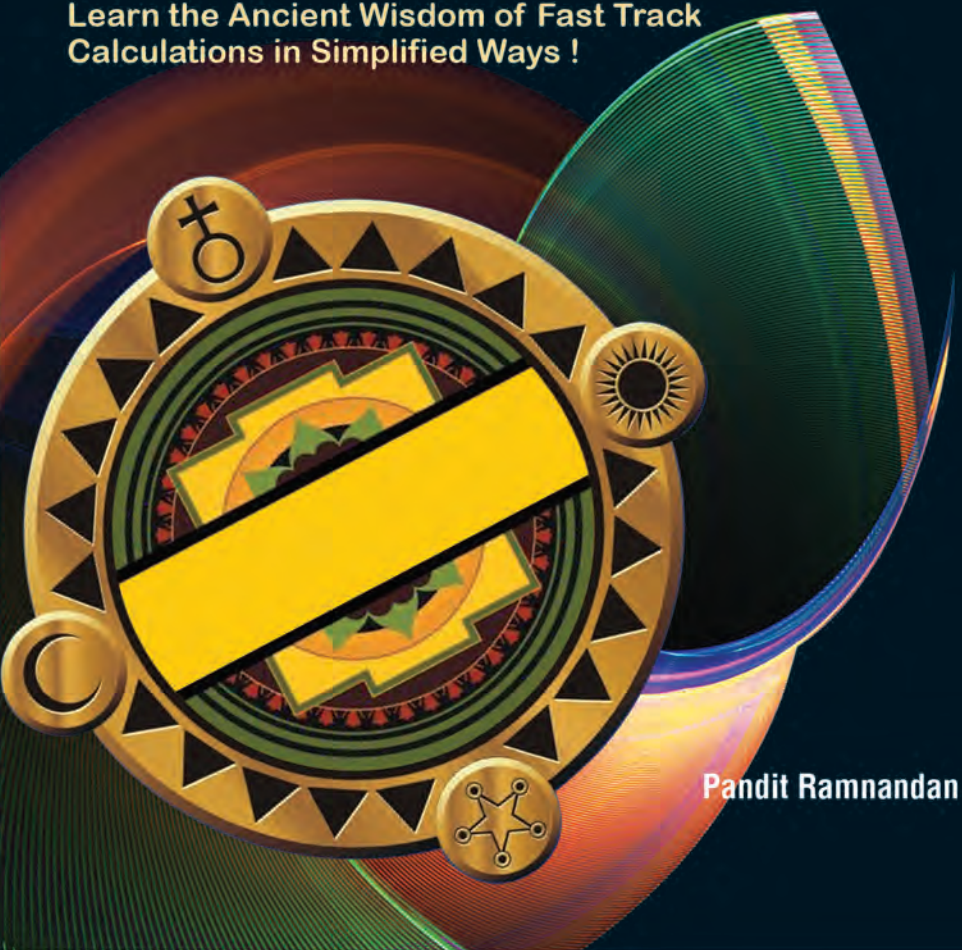

Pandit Ramnandan Shashtri

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preface

'Vedic Mathematics' is the ancient system of mathematics; a unique technique of calculations based on simple rules and principles, with which any mathematical problem - be it arithmetic, algebra, geometry or trigonometry–can be solved, ORALLY !! According to Clive Middleton, a vedic maths enthusiast, "These formulas describe the way the mind naturally works, and are therefore a great help in directing the student to the appropriate method of solution."

In today's system of competitive examinations where speed with accuracy is the calling shot, a mastery & practice of vedic maths can work wonder for the aspirants. Not only the students or the aspirants of various competitive exams, even the professionals, like, engineers, teachers, executives, or businessmen can benefit immensely from Vedic Mathematics.

Divided into 21 chapters, this book is the outcome of a thorough research on Vedic Maths, its 'Sutras' and their best possible applications, which has been scientifically synchronized with the learning pace & pattern of different categories of readers. Each of the chapters is followed by two exercises, one with questions on the topics taught in the chapter along with their hints & solutions; and the other exercise comprises questions from various competitive and management entrances, the solutions for which has been given at the end of the chapters, together. Approach and language of the book is simple & lucid, and the format of presenting texts is attractive enough to keep the mind of the readers engrossed.

The book bears all the hallmarks of brand Arihant & its years of experience as leading publisher in competitive examination segment.

We invite and welcome any feedback/suggestion for improvement of this book in subsequent editions.

Varanasi, 2011 **Pt. Ramnandan Shastri**

contents

|| vedic mathematics ||

what is it ?

Born in the Vedic Age, but buried under centuries of debris, this remarkable system of calculation was deciphered towards the beginning of the 20th century, when there was a great interest in ancient Sanskrit texts, especially in Europe. However, certain texts called Ganita Sutras, which contained mathematical deductions, were ignored, because no one could find any mathematics in them. These texts, it's believed, bore the germs of what we now know as Vedic Mathematics.

What is Vedic Mathematics?

'Vedic Mathematics' is the name given to the ancient system of mathematics, or, to be precise, a unique technique of calculations based on simple rules and principles, with which any mathematical problem - be it arithmetic, algebra, geometry or trigonometry - can be solved, ORALLY !!

Some may wonder why it is called “vedic” . Just as the basic principles of Hinduism lie in the Vedas, so do the roots of mathematics. The Vedas, written around 1500-900 BCE, are ancient Indian texts containing a record of human experience and

knowledge. Thousands of years ago, Vedic mathematicians authored various theses and dissertations on mathematics. It is now commonly believed and widely accepted that these treatises laid down the foundations of algebra, algorithm, square roots, cube roots, various methods of calculation, and the concept of zero.

The system is based on 16 Vedic sutras or aphorisms, which are actually word-formulae describing natural ways of solving a whole range of mathematical problems. Some examples of Sutras are "By one more than the one before", "All from 9 & the last from 10", and "Vertically & Crosswise". These 16 one-line formulae originally written in Sanskrit, which can be easily memorized, enables one to solve long mathematical problems quickly.

Bharati Krishna Tirtha ji & Vedic Math


Bharati Krishna Tirtha ji

The revival of Vedic Mathematics is no less than a miracle. Extracting the theorems and corollaries from religious texts requires not only an understanding of the scriptures but also a genuinely intelligent mind.

Credit of rediscovering Vedic maths (between 1911 and 1918) from the ancient Indian scriptures goes to Sri Bharati Krishna Tirthaji (1884-1960), a scholar of Sanskrit, Mathematics, History and Philosophy. He studied these ancient texts for years, and after careful investigation was able to reconstruct a series of mathematical formulae called Sutras.

Bharati Krishna Tirthaji, who was also the former Shankaracharya (major religious leader) of Puri, India, delved into the ancient Vedic texts and established the techniques of this system in his pioneering work - Vedic Mathematics (1965), which is considered the starting point for all work on Vedic math. It is said that after Bharati Krishna's original 16 volumes of work expounding the Vedic system were lost, in his final years he wrote this single volume, which was published five years after his death.

Development of Vedic Math

Vedic math was immediately hailed as a new alternative system of mathematics, when a copy of the book reached London in the late 1960s. Some British mathematicians, including Kenneth Williams, Andrew Nicholas and Jeremy Pickles took interest in this new system. They extended the introductory material of Bharati Krishna's book, and delivered lectures on it in London. In 1981, this was collated into a book entitled Introductory Lectures on Vedic Mathematics. A few successive trips to India by Andrew Nicholas between 1981 and 1987, renewed the interest on Vedic math, and scholars and teachers in India started taking it seriously.

The Sutras (aphorisms) apply to and cover each and every part of each and every chapter of each and every branch of mathematics (including arithmetic, algebra, geometry – plane and solid, trigonometry – plane and spherical, conics- geometrical and analytical, astronomy, calculus – differential and integral etc., etc. In fact, there is no part of mathematics, pure or applied, which is beyond their jurisdiction;

The Sutras are easy to understand, easy to apply and easy to remember; and the whole work can be truthfully summarised in one word “mental”!

Dr L M Singhvi, the former High Commissioner of India in the UK, also an avid endorser of the system says: "A single sutra would generally encompass a varied and wide range of particular applications and may be likened to a programmed chip of our computer age".

Another Vedic maths enthusiast, Clive Middleton feels, "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."

The Sub Sutras

Together with the sixteen Sutras ,Sri Bharati Krishna Tirthaji lists thirteen sub-Sutras. For example Proportionately, By Alternate Elimination and Retention and By Mere Observation are three of them. Two of the sixteen Sutras (By One More than the One Before and By Addition and By Subtraction) are indicated to be sub-Sutras also. However it is believed that although there are exactly sixteen Sutras, the sub-Sutras are not fixed in number.

The Growing Interest in Vedic Math

Quite a few years ago, a few schools in Europe started teaching Vedic Maths on experimental basis. Today this remarkable system is taught in many schools and institutes in India and abroad, and even to MBA and economics students. Interest in Vedic maths is growing in the field of education where mathematics students are looking for a new and better approach to the subject. Even students at the Indian Institute of Technology (IIT) are said to be using this ancient technique for quick calculations. No wonder, in a Convocation speech addressed to the students of IIT, Delhi, by Dr. Murli Manohar Joshi, former Union Minister for Science & Technology, stressed the significance of Vedic maths, while pointing out the important contributions of India in the realm of Mathematics, such as Aryabhatta, who laid the foundations of algebra, Baudhayan, the great geometer, and Medhatithi and Madhyatithi, the saint duo, who formulated the basic framework for numerals

Researches are being undertaken in many areas, including the effects of learning Vedic maths on children. A great deal of research is also being done on how to develop more powerful and easy applications of the Vedic sutras in geometry, calculus, and computing.

Vedic Maths
(Some FAQs)

Q. Can Vedic Maths be used to facilitate the students of higher classes to remember complicated Maths formulae?

A. Yes. Concepts such as Quadratic Equations, Simultaneous Equations, Trigonometry, Even Calculus has been made simple and easier in Vedic Mathematics.

Q. How does knowledge in Vedic Math help a student to minimize careless mistakes?

A. In Vedic Mathematics, the mental one-line formulae are such that it has an inbuilt system of series of checks. The student can't go wrong. Failure is not an option in Vedic Mathematics. Hence Vedic Mathematics helps to boost the confidence of the student as success leads to success and this brings out the true potential of the student.

Q. To whom Vedic Maths is beneficial?

A. Students, Competitive exam aspirants, Engineers, Professionals, Teachers, Executives, Parents and even Businessmen can benefit from Vedic Mathematics.

Vedic Maths is helpful to software developers as it helps them to do their coding and programming as it is more scientific than the normal system of mathematics

Q. Some critics feel that 'arithmetic as is speeded up by application of the sutras can be performed on a computer or calculator anyway, making their knowledge rather irrelevant in the modern world'.

A. According to a study conducted some years ago by a university in the United States, the constant use of calculators for more than twenty years by person atrophies his brain significantly. We have all met shopkeepers who use calculators to determine what 10+5 is. Don't you find it silly?

Our Brain is a muscle. Just like the body needs exercise the brain needs it too. Through Vedic mathematics you use both the parts of your brain- the left and the right hence keeping you mentally agile even in your old age when the brain functions less.

Moreover I would like to add that some calculators are even prone to errors. Try this on your calculator 2+3 x 4 and get an answer. If your calculator shows 20 and not 14 your answer is incorrect. J Any Guesses Why?

How Vedic Maths could be useful to students preparing for competitive exams?

Vedic Mathematics is emerging as a useful tool for students appearing in competitive examinations like SAT, iSAT, CAT,MAT,XAT, GRE, Engineering Entrance examinations.... where speed and accuracy plays a crucial role.

A system of mental calculation based on the Atharvaveda, an ancient Vedic text, Vedic mathematics can speed up arithmetic calculation and has applications to more advanced mathematics, such as calculus and linear algebra. Calculations are carried out mentally — students can invent their own methods, there is no one 'correct' method.

Can you find out how many matches are played during the Wimbledon tennis championship, based on the information that the first round has 64 games, the next 32 until you reach the quarter-finals, semi-finals and the final?

The conventional approach is to add the number of games: 64+ 32+16+8+4+2+1 to get to the answer, 127. Try the Vedic approach: Since there are 128 players (2 x 64) and only one person wins the competition, there must be 127 losers and for each loser there is a match, so there are 127 matches.

Vedic Mathematics simplifies the four basic mathematical operations like addition, subtraction, multiplication and division. This will reduce the time to solve a mathematical problem, especially in examination halls.

For example, if we have to multiply 86 and 98, the conventional method is

$$\begin{array}{r} 86 \\ \times 98 \\ \hline 688 \\ 774 \\ \hline 8428 \end{array}$$

But by the method of Vedic Mathematics we can do it in a simple way. The two numbers are set down (Here numbers are 86 and 98) and their difference from a suitable base are written (Here we can take the base 100) down to the right (that is 100-86 = 14 and 100-98 = 02).

athematics we can do it in a simple way. The two numbers are set down (Here numbers are 86 and 98) and their difference from a suitable base are written (Here we can take the base 100) down to the right (that is 100-86 = 14 and 100-98 = 02).

$$\begin{array}{r} 86 - 14 \\ 98 - 02 \\ \hline 84/28 \end{array}$$

Ans: 8428

The answer comes out in two parts. The sign"/" is used here to separate these two parts. To get the first part, cross subtract, either 86-2=84 or 98-14 To get the second part multiply the difference of the number from the base chosen. ie 14×2=28. Now 28 is the second part of the answer. Hence the answer is 8428.

It is a useful tool in finding squeres and cubes of number. In Vedic Mathematics there is a fantastic method to square numbers ending in 5. Competitive examinations. In the final analysis we can see that the real losers in the competitive examination are persons without any systematic time management. On the other hand the performers overcome "Time factor" through the systematic tackling of time traps". To hear the news of victory, to conqurer tomorrow, to keep the presence in the current and upcoming cutthroat competitions, we can find a good companion in Vedic Mathematics.

In a talk in 1958 at the Institute of Technology, Pasadena, California, USA Sri Bharati Krishna Tirthaji said: “People who have practical knowledge of the application of the sutras, need not go in for the theory side of it at all”. This fascinating comment makes a clear distinction between those who learn to do mathematics by just practising the Sutras and those who can also learn the theory of it as well. The non-mathematician and the applied mathematician just want to use mathematics. There are those of us who just want to get on and do the job and those who want to understand the details.

Anyone familiar with Vedic system will know that it is more integrated, more efficient and more fun than conventional mathematics. It leads to greater flexibility of mind, increased mental agility and stimulates the creative faculty that is in all students. However, further research is needed to establish the nature of the Sutras and their full range of application.