

Vedic Mathematics- a compendium of Sutras

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“A single sutra of Vedic Mathematics generally encompasses a varied and wide range of particular applications and may be likened to a programmed chip of our computer age”.

-Dr.L.M. Shinghvi

Former High Commissioner of India in U.K

Vedic Mathematics was deciphered in the beginning of the 20th century. A Sanskrit text of that time “**Ganit Sutra**” contained mathematical deductions but no one could understand the mathematics in it so it was buried in debris for centuries. This text laid the foundation of Vedic Mathematics.

In today world of fierce competition knowledge of Vedic Mathematics shall prove to be very beneficial for it increases accuracy and speed of calculation.

As the name suggests the basic principles of Vedic Mathematics lie in Vedas which was written in 1500-900 B.C. Vedic Mathematics is based on simple rules and principles, with which mathematical problems of arithmetic, algebra, geometry and trigonometry can be solved easily. Today it is an accepted fact that the roots of mathematics lie in Vedic Mathematics

The revival of Vedic Mathematics is no less than a miracle. Extracting theorems and corollaries from the Vedas required not only understanding of the religious scriptures but also mathematical intelligence. The credit of rediscovering Vedic Mathematics goes to Sri Bharati Krsna Tirthaji, a scholar of mathematics, history and philosophy.

Sri Bharati Krsna Tirthaji (1884-1960) spent eight years between 1911 and 1918 in the forest in solitude in his attempt to interpret Sanskrit texts that his predecessors had dismissed. His relentless efforts paved the discovery of a new mathematical system called the Vedic Mathematics which is based on Sixteen Sutras.

Sri Bharati Krsna Tirthaji led a remarkable and exemplary life. Later he became Shankaracarya of Puri. After rigorous study he reconstructed a series of mathematical formulas called Sutras.

It is said that originally he wrote 16 volumes which were lost. A book was published five years after his death written by him in his last days. It contains 16 Sutras and 13 Subsutras. Word Formulae or Sutras are based on the natural thinking pattern of human mind, thus are easy to understand, apply and remember. They provide appropriate solutions to intricate mathematical problems quickly. It is easy to apply these Sutras to arithmetic, algebra, geometry calculus and trigonometry

Vedic mathematics is a coherent system in which there is a beautiful unification of all the procedures. It is beneficial for competitive and recruitment exam aspirants, engineers, professionals, teachers, executives, small children, and parents. The main advantage of Vedic Mathematics is that it has an inbuilt system of checks.

Following are the sixteen Sutras:

The Sixteen Sutras

- Sutra 1. Ekadhikena Purvena
- Sutra 2. Nikhilam Navatas' caramam Dasatah
- Sutra 3. Urdhva-tiryagbhyam
- Sutra 4. Paravartya Yojayet
- Sutra 5. Shunyam Samyasamuchchaye
- Sutra 6. Aanyarupaye Sunyamanyat
- Sutra 7. Sankalana Vyavakalanabhyam
- Sutra 8. Purna Puranabhyam
- Sutra 9. Chalana-kalanabhyam
- Sutra 10. Yavadunam
- Sutra 11. Vyasti Samastih
- Sutra 12. Sesanyankena Caramena
- Sutra 13. Sopantyadvayamantyam
- Sutra 14. Ekanyunena Purvena
- Sutra 15. Gunitasamuchchaya
- Sutra 16. Gunakasamuchchaya

In this paper a detailed illustration of the use of Sutra 1 and Sutra 10 ie; ‘Yavadunam’ Sutra and ‘Ekadhikena Poorvena’ Sutra is dealt with.

Square using ‘Yavadunam’ Sutra

✚ **Case 1:** When the number is surplus from the base

Follow the following steps

- **Step I:** First find surplus of number from nearer base.
- **Step II:** Add this surplus to the number.
- **Step III:** Square the surplus number and deduce the result

Example 1: Find the square of 107.

Solution: Nearest base is 100.

- ✓ Surplus of the number from 100 is 7.
- ✓ Left block of resultant = $107 + 7 = 114$
- ✓ And right block of resultant = $7^2 = 49$
- ✓ Thus $107^2 = 114!49 = 11449$

✚ **Case 2:** When the number is less than the base

Follow the following steps

- **Step I:** First find deficit of number from nearer base.
- **Step II:** Subtract this base from the number .
- **Step III:** Square the deficit number and deduce the result

Example: Find the square of 98.

Solution: Nearest base is 100.

- ✓ Deficit of the number from 100 is 2.
- ✓ Left block of resultant = $98 - 2 = 96$
- ✓ And right block of resultant = $2^2 = 04$
- ✓ Thus $98^2 = 96!04 = 9604$

✚ **Case 3:** When the surplus or deficit is a very large value from nearest base.

Follow the following steps

- **Step I:** Take a base which is a multiple of nearer base.
- **Step II:** Find the surplus or deficit
- **Step III:** Add or subtract this base from the number and multiply with the multiple base number
- **Step IV:** Square the surplus or deficit number and deduce the result

Example: Find the square of 29.

Solution: Nearest base is 30 which is three times of base 10.

- ✓ Deficit of the number from 30 is 1.
- ✓ Left block of resultant = $3 \times (29 - 1) = 3 \times 28 = 84$
- ✓ And right block of resultant = $1^2 = 1$
- ✓ Thus $29^2 = 84!1 = 841$

Square using ‘Ekadhikena Poorvena’ Sutra

This method is useful for all those numbers which end with digits 5. The method is as follows.

- Let number be xxx5 say, then the square is $x(x+1)!25$.

Example: Square of 135.

Solution: The square of 135 is $13!14!25$.

Thus $135^2 = 182!25 \ 18225$

References

Pandit Ramnandan Shashtri, Vedic Mathematics made easy, 2011

Jagadguru Swami Sri Bharati Krsna Tirthaji Maharaja, edited by Dr V.S. Agrawal, 2003

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