

# The Brief Study of the Algebraic Operation in Vedic Mathematics

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## ABSTRACT

Vedic Mathematics was written by Krishna, an Indian monk, and was first published in 1965. It contains lists of mathematical techniques that the author says were derived from the Vedas, which he claims contain all mathematical knowledge. This article examines mathematical processes utilizing Vedic mathematics, starting with the basics of vedas mathematics, such as the meaning of vedas mathematics and the meanings of 16 formulas. The four Vedas are the Yajurveda, Rigveda, Atharvaveda, and Samaveda.) Another option is to use Vedic equations (Vedic Mathematics is a logic and math system based on sixteen formulas and thirteen sub formulas with simple principles and concepts). In addition, the many operations in Vedas mathematics, such as addition, subtraction, multiplication, and so on, as well as the formulas and examples utilized in the Vedas, are covered in this review article. They have a bright future ahead of them, and straightforward explanations will help kid's better grasp mathematics. Because it is now required reading in all high schools.

## Keywords

Digit, Formula, Mathematics, Operation, Vedas.

## 1. INTRODUCTION

Vedic mathematics is found in four Vedas. It is a part of the Upa Veda of the Atharva Veda, the Sthapatya Vedas. Geometry, arithmetic, quadratic, trigonometry, factorization, and calculus are some of the most modern mathematical terms covered [1]. His sanctity is that of a saint. Krishna collected the whole work and provided a mathematical explanation while addressing its many applications [2]. Swahiji composed 16 sutras and 16 Upa sutras after extensive study in the Atharva Veda, some of which are shown in Figure 1. Because these equations were developed by Swamiji himself, they are not included in the current Tamara Veda book. Vedic mathematics is not only a mathematical wonder, but it is also logical [3]. VM (Vedas Mathematics) has already gone beyond India's boundaries, becoming a popular study topic in other nations [4]. VM can do both basic and complex mathematical calculations. [5]. In instance, basic arithmetic methods are both strong and easy. The name Vedic comes from the word Veda, which means "all knowledge reservoir." Vedic mathematics is based on the 16 Sutra, which include a wide range of topics in mathematics such as geometry, algebra, and arithmetic [6]. These Sutras are presented alphabetically below, along with a short explanation of what they represent [7].

- i. Shunyamanyat: If one ratio is 0, the other must be 0.
- ii. Chalana-Kalanabyham: Similarities and Differences
- iii. EkadhikinaPurvena: By a factor of one greater than the previous.
- iv. EkanyunenaPurvena: By one less than the one before it.
- v. Gunakasamuchyah: Sums of factors are equivalent to sums of factors.
- vi. Gunitasamuchyah: The total of products equals the sum of products.
- vii. NikhilamNavatashcaramamDashatah: All beginning with 9 and ending with 10.
- viii. ParaavartyaYojayet: Transpose and Adjust
- ix. Puranapurabyham: By completion or non-completion.
- x. Sankalana-vyavakalanabhyam: By adding and subtracting.
- xi. ShesanyankenaCharamena: By the final digits, the remainder.
- xii. ShunyamSaamyasamuccaye&ShunyamSaamyasam
- xiii. Sopaantyadvayamantyam: The ultimate penultimate and twice.
- xiv. Urdhva-tiryakbhyam: Vertically and across.
- xv. Vyashtisamanstih (Part and Whole)
- xvi. Yaavadunam: Regardless of the severity of their insufficiency.



Figure 1: The 16 Sutras and 16 Upa Sutras after Extensive Research in Atharva Veda Some of the Sutras

### 1.1. Addition

In Vedic mathematics, adding is one of the most basic processes.

(8). According to it,

(!) Finds number which near to 10s multiples because it's easier for add that numbers.

Example:

9, 8, 7 near to number 10

23, 22, 21 near to number 20

69, 68, 67 near to number 70

99, 98, 97 are near to the number 100 and many more.

(2) Add the number that multiple of 10.

(3) Subtract / Add deficiency of the numbers.

Example1:

Assume an example of additions 98 and 27. So, according to Vedic math, add 100 and 30 to get 130, then subtract (2+3) to get the deficit from 130. As a result, the final score will be 125. In the same way, if we had to add 576 and 66. So, according to Vedic math, we add 580 and 70, which becomes 650, and then remove (4+4), or the shortfall, from 650. As a result, the answer will be 642. Another method for performing addition by means of Vedic maths is to add 100 to 100, 10 to 10, and 1 to 1, and further on.

Example 2:

The 2nd example consist of  $18 + 44 + 364 + 220$

$300 + 200 = 500$

$10 + 40 + 60 + 20 = 130$

$8 + 4 + 8 = 16$

Repeat process:

$100 + 500 = 600$

$10 + 30 = 40$

And at units places the value is 6.

Now perform,  $6 + 40 + 600 = 646$

### 1.2. Subtraction

According to Vedic math, we should add 1 to 10 place of preceding numbers, reduce previous numbers by the one, and then subtract[9].

An example:

For example subtraction of 47 from the 98 then,

(1) Decrease the 9 by the 1 that becomes 8 and then add tens places to the 8 and makes it 18.

(2) Do  $18 - 7 = 11$  as well as  $8 - 4 = 4$ .

(3) So the solution is 49.

Another instance may,  $896 - 239$

(1) Reduce the 9 by the 1 that become 8 and then converts 6 into the 16.

(2) Now performs  $16 - 9 = 7$ ,  $8 - 4 = 4$  as well as  $8 - 2 = 6$

(3) So the solution is 647.

### 1.3. Multiplication

Using Vedic math's tactics, there're a variety of technique for performing various type of the multiplication computations(10). The following are a few of the more helpful and simple ones as shown in the Figure 2, Figure 3, Figure 4 Figure 5, Figure 6, Figure 7:-

Step 1: Split total into the two part.

Step 2: Combine two elements that make up the middle number.

Let's break it down with the help of an example to dispel any doubts.

Let's pretend we need to multiply 32 by 11.

Step 1: Divide 32 into the 3 and the 2 equal halves.

Step 2:  $3 + 2 = 5$  will be the middle.

As a result, our solution to 32 11 is 352.

$75 \times 11 = 7, 7 + 5, 5$  in the same way. Because  $7 + 5 = 12$ , we'll add one to the previous digit, resulting in an answer of 825.

Multiplying numbers that are close to tenths of a tenth of a tenth of a tenth of

It would be simple to go right into the example and learn this topic that way. Let's say we have two questions:

1. Multiply  $99 \times 97$

2. Multiply  $103 \times 105$



Figure 2: Calculate How Much Less or More than the Power of 100 the Number is and Write it on the Right Side of the Vertical Line



Figure 3: Cross Subtract or Cross Add are the Two Options. The First Portion of the Final answer will be this

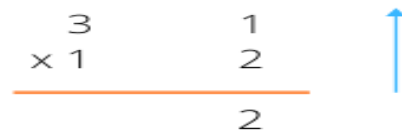


Figure 4: Multiply the Right Side of the Vertical Line and This Shall Form the Right Side of the Result

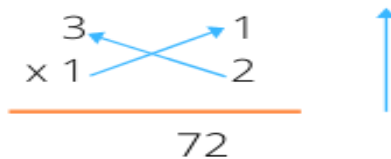


Figure 5: Suppose multiply the two numbers 997 and 996

### 1.3.1. Multiplying 2 Digit Numbers

This would again be simple if followed by a step approach through what is displayed in the picture. Suppose, we have to multiply  $12 \times 31$

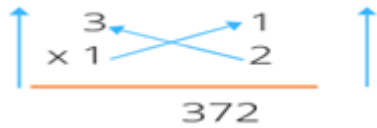


Figure 6: Multiplying Vertically the Units Place

Similarly, find  $34 \times 12$  the method will as given below:

Firstly, multiply  $4 \times 2 = 8$

Then,  $(2 \times 3) + (1 \times 4) = 10$ . The zero remain and the 1 is carry to left.

Finally,  $(1 \times 3) = 3$ . Add it carried numbers so it become,  $(1+3) = 4$ .

Our final answer would 408.

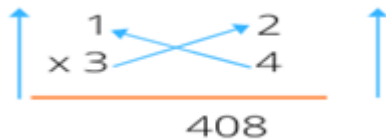


Figure 7: Multiplying in Cross Pattern and Adding the Results. For Instance,  $2 \times 3 = 6$  and  $1 \times 1 = 1$  and  $6 + 1 = 7$

## 2. LITERATURE REVIEW

There are a number of researchers who use Vedic mathematics to study and evaluate mathematical processes. Below are a few of them. Vedic Mathematics is the term given to the system of mathematics that Krishna claims to have discovered from the Vedas, according to Sutras et al. It is based on the novel by Bharti Krishna Tirtha, which was published in 1965. Vedic Mathematics is made up of 16 Sanskrit sutras and 13 sub sutras that are claimed to solve all contemporary mathematical problems. These sutras help in fast computations in high school arithmetic. These sutras may be utilized to solve equations and decimals that repeat themselves. Although the sutras' applicability in other fields have not been questioned, critics of Vedic Mathematics have raised questions regarding the sutras' nomenclature and provenance (11). K. Mounika et al. investigate the need for a compact footprint and quick speed. As the need for high-speed CPUs increases, multiplier is becoming increasingly common. Architecture in cube and square multipliers must be more efficient in terms of speed and space. To achieve efficient results, they utilize a multiplier based on the UT and Nikhilam sutra in their work [12].

AmandeepKaur is a student. India has every reason to be proud of its centuries-old cultural, intellectual, and scientific legacy. In mathematics, which is one of the areas of expertise, ancient Indians not only made significant advances long before the arrival of the Greeks, which is a standard reference point in Western historical perspective, but they also enriched that for a long time, creating important contributions such as place value systems for writing numbers, which we have today, and the

introduction of 0. They said he had recreated the sixteen mathematical formulae from the Atharveda after 8 years of assiduous study and 'Tapas' in the woods around Sringeri [13].

Dhara R. Joshi is a researcher. Vedic mathematics is a multi-thousand-year-old 16-formula system. These are simple and easy-to-use mental calculating methods. It has attracted the attention of many academics because to its possible uses in areas like as mathematics, astronomy, and engineering. Their research is a comprehensive review of the literature based on Vedic mathematics. It shows how Vedic mathematics may be used in the contemporary day to the world's fastest changing and developing surroundings. For mental competitive and computational exams, the Vedic mathematic method has been proven to be successful [14].

## 3. DISCUSSION

This paper examines Vedic mathematics operations, starting with the fundamentals of vedas mathematics, such as the meaning of vedas mathematics and the meanings of 16 formulas, such as Shunyamanyat, which means if one ratio is 0, the other is 0, and Chalana-Kalanabyham, which means Differences and Similarities. EkadhikinaPurvena translates to "by one more than the previous once," whereas EkanyunenaPurvena translates to "by one less than the previous time." Gunakasamuchyah, the total of factors equals the sum of factors. (The most common definition of Veda is "knowledge.") It is the earliest stratum of Ancient Indian civilization as well as the oldest Hindu texts. The Vedas are believed to be divine revelations from God and are of divine origin. The Yajurveda, Rigveda, Atharvaveda, and Samaveda are the four Vedas.) The Vedic equations offer another option (Vedic Mathematics is a logic and math system based on sixteen formulas and thirteen sub formulas with simple principles and concepts). Vedic mathematics employs both modern and ancient mathematical systems. Each formula demonstrates a mental working concept that may be applied to a wide range of arithmetic issues.) In addition, this review article covers the many operations in Vedas mathematics, such as addition, subtraction, multiplication, and so on, as well as the formulae and examples used in the Vedas.

## 4. CONCLUSION

This study came to the conclusion that Vedic mathematics is required for a full understanding of mathematics. It comprises of many Vedas that originated in Indian agriculture, and these vedas assist in the execution of many kinds of mathematical operations, including subtraction, addition, division, and multiplication, among others, by providing the different 16 vedas mathematics equations. Vedic arithmetic is a basic type of mathematics that, despite its simplicity, provides a more sophisticated approach to problem solving. They have a bright future ahead of them, and straightforward explanations will help kid's better grasp mathematics. Because it is now required reading in all high schools.

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