Importance of Vedic Mantras in Mathematics

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[*Vedic mathematics is a collection of important methods or formulas to solve numerical calculation. quickly. In which there are total 16 sutras and 13 sub-sutras. Which can be used to easily solv problems in arithmetic, algebra, geometry, calculus, conics etc. Vedic Mathematics is a boo written by Jagadguru Swami Bharati Krishna Tirtha in 1965, in which alternative and concis methods of arithmetic calculations are given. In this paper we have discussed some special type of multiplication. In which Vedic sutras are mentioned with some examples.*]

Vedic mathematics is the gift of ancient Indian texts, which were rediscovered from the Vedas by the most revered Shri Bharati Krishna Tirthaji between 1911 and 1918. And according to his study of Vedas, sixteen sutras and 13 sub-sutras have been discovered in the Vedas for mathematics. Which are used for important calculations of mathematics. All these formulas contribute significantly to increasing the logical and intellectual level of the students. Using these formulas, addition, subtraction, multiplication, division, square root, cube root etc. can be calculated very easily. The most important feature of the Vedic system is its simplicity and coherence. In general multiplication method, multiplication takes plac in very less time by using important formula like Antyayoreva and Sopantyadamantyam.

Researchers in Vedic Mathematics have provide formulas and methods to solve mathematic problems by using Veda Sutras for subtractio Divisibility, Matrix Multiplication, Solution Linear equation, base multiplication, digital roo and finding the square. In this article we hav given the method of multiplication.

Vedic Maths Sutras: Vedic formulas and su sutras used in mathematical calculations, usir which mathematical problems are solved, a given in the following table.

The list of Vadic Sutras and Subsutras

S.No	Sutras	Sub-sutras
1	Ekadhiken Purvena	Anurupyena
2	Nikhil am Navatacharamam Dasatah	Sisyate Sesajnah
3	Urdhva-tiryagbhyam	Adyamadyenantya-mantyena
4	Paravartya Yojayet	Kevalaih Saptakam Gunyat
5	Sunyma Samyasamuchaye	Vestanam
6	(Anurupye) Sunyamanyat	Yavadunam Tavadunam

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7	Rudkalana vyavdchlanadyam	Vyashyam Tavadvktya Vagavi Vagavi
8	Puranapuranabhyam	Antyayatdakepi
9	Chalana Kalanabhyam	Antyayeva
10	Yavadunam	Antyayeva
11	Vyashtamaath	Lopanaataparabhyam
12	Accanrakena Churamena	Vilokaam
13	Aspantyadvayamantyam	Guntasamuccayah Samuccayagatah
14	Ekanyurena Purvena	
15	Guntasamuccayah	
16	Gunaksamuccayah	

Benefits and uses of Vedic mathematics

The importance of Vedic mathematics can be understood through the solution of numerical problems and by comparing them with modern calculation methods. Along with this, it can also be seen that sometimes the Vedic formula for simplifying large numerical calculations can be easily derived verbally.

Some important benefits of Vedic mathematics formulas are as follows:

- Mathematical calculations are done easily and briefly.

- Vedic formulas reduce the time for mathematical calculations.

- Creates interest in students and removes fear of mathematics from their mind

- Eliminates mental stress of students

- The results obtained based on the formula can be easily verified by the general method.

Types and method of multiplication

Multiplication by 9; we use the vedic sutra (No. 1) Ekanyunenapurvena. And sutra (No. 2) Nikhilam Navatacharanam Dasatah. The application of both Vedic Mantra is very easy, the meaning of both the mantras mentioned above is as follows

- Ekanyunenapurvena: by one less than one before

- Nikhilam Navatacharanam Dasatah: All from nine and last from ten

There are three different types of methods for multiplying by number 9;

- Case -1: when the number of digit in multiplicand and multiplier are same

Example 1: 543×999= 542457= (543-1) (Complement of 543) =542457

Step I: Divide the answer into two part say "R" and "S" where R is less than the one of multiplicand and S is compliment of multiplicand

Step II: By writing together all the digits from R and S we get the answer (RS)

Example 2: 867×999= (867-1) (Complement of 867)=866133

Example 3- 8345×9999= (8345-1) (Complement of 8345)=83441655

- Case II-In this case the number of digit in multiplier are more than the total digit in the multiplicand

Example 4- 24×999= (024-1) (Complement of 024)=23976

Step I- Make our number of digit in multiplicand and multiplier are same (replacing 23 by 023)

Step II- Divide the answer into two part say "R" and "S" where R is less than the one of multiplicand and S is compliment of multiplicand

Step III- By writing together all the digits from R and S we get the answer (RS)

Example 5- 325×9999= (0325-1) (Complement of 0325)=3249675

Example 6- 6789×99999= (06789-1) (Complement of 06789)=678893211

- Case III- In this case the number of digit in multiplier are less than the total digit in the multiplicand

Example 7- 532×99=52668

Step I- we divide multiplicand into two part say "L" and "R".

Step II- In "R" has the same number of digits as the number of 9's in multiplier (532=L|R=5|32)

Step III- We add 1 in L (L+1=5+1=6)

Step IV- Subtract above number from the whole multiplicand (532-6=526)

Step V- We write the complement of the R (100-32=68)

Answer: 52668

Example 8- 8465×999=8456535

Step I- we divide multiplicand into two part say "L" and "R".

Step II- In "R" has the same number of digits as the number of 9's in multiplier (8465=L|R=8|465)

Step III- We add 1 in L (L+1=8+1=9)

Step IV- Subtract above number from the whole multiplicand (8465-9=8456)

Step V- We write the complement of the R (1000-465=535)

Answer: 8456535

Multiplication by 11: we use the vadic sub- sutra (No.-9) Antyayoreva. The application of this Vedic Sab Mantra is very easy, we just need to add the last two digits, and we get the same answer as we would get by multiplying the number by 11. Will try to understand through example-

Example 9- 2568×11=28248

Let us understand the above multiplication step by step.

Step I- We put a star on both ends of our numbers and turn it into a star, and while adding, solve the problem by considering the star as zero.

2568=   *+8=8, 8+6=14(carry 1)=4, 6+5=11(+1 carry over)=12(carry 1)=2, 5+2(+1carry over)=8, *+2=2

Step II- By writing together all the digits from the last digit to the first digit, we get the answer

Example 10- 3764897×11=41413867

Let us understand the above multiplication step by step.

Step I- We put a star on both ends of our numbers and turn it into a star, and while adding, solve the problem by considering the star as zero.

3764897= *+7=7, 9+7=16(carry 1)=6, 9+8=17(+1 carry over)=18(carry 1)=8, 8+4(+1carry over)=13(1carry)=3,6+4+(1 carry over)=11(1 carry)=1,7+6+(1 carry over)=14(1 carry)=4,7+3+(1carry over)=11(1 carry)=1, *+3+(1carry over)=4

Step II- By writing together all the digits from the last digit to the first digit, we get the answer

Multiplication by 12: we use the vadic sutra (No.-13) Sopantyadvayamantyam: Using this Vedic mantra we are doing addition here instead of multiplication and we will still get the same answer as we would have got if we had multiplied the number by 12.we make a star sandwich and then just add the last digit and twice the second digit. Let us understand this with the help of example.

Example 11- 326×12= 3912

Step I- We put a star on both ends of our numbers and turn it into a star, and while adding, solve the problem by considering the star as zero

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Step II- we add the last digit (*=0) + (twice the second digit 6)=0+12=12=2 (carry 1)

Again 6+ (twice of second digit 2)=6+4 +(1 carry over)=11=1 (carry 1), 2+(twice of second digit 3)=2+6 +(1 carry over)=9, 3 + (twice of second digit *=0)=3

Step III- By writing together all the digits from the last digit to the first digit, we get the answer

Conclusion

Through the multiplication method given in this paper, we can see how Vedic Mantra is useful.In this paper Ekanyunenapurvena, Nikhil am Navatacharamam Dasatah, Antyayoreva. And Sopantyadvayamantyam mantras have been used which makes every type of multiplication easy. The method given in this paper is useful only for multiples of 11, 9, 12, but in future research can be done for different types of multipliers and multiplicands.

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