THE NATURAL CALCULATOR

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Abstract
Vedic (pronounced 'Vaydik') mathematics is an ancient system of Mathematics originating in India in Vedic times. It was re-discovered between 1911 and 1918 by Jagadguru Swami Sri Bharati Krsna Tirthaji Maharaja (1884-1960), who studied the ancient Sanskrit texts called 'The Vedas'. The Vedas are said to cover every area and aspect of knowledge . The word 'Veda' literally means 'all-encompassing knowledge'. Since the publication of his book, 'Vedic Mathematics' (reference 1) in 1965, interest has been growing in this system. The Vedic system is attractive to teachers and pupils because it has many striking advantages over the mathematics currently taught. The most significant of these are the coherence of the system, the easy and simple Vedic methods, the emphasis on mental calculation, the use of basic principles or Sutras, the use of a unified field chart, its effectiveness over all ability ranges. The Vedic system is extremely refined. The methods are simple and complementary. For e.g. long division is a simple reversal of the one-line multiplication process; similarly with squaring and square roots.

VEDIC MATHEMATICS

We have probably been taught methods, which require pencil and paper or calculator, to work out because of the difficulty and a lack of encouragement for mental calculation, which have prevented us form becoming efficient mental calculators. Though mathematics has applications at many levels, it is primarily a mental subject. A system of mental mathematics could provide students with a lasting link with the realm of mathematics and also engender a deeper understanding of the structure and processes of mathematics. The beautiful system of Vedic Mathematics is far more unified and direct than conventional mathematics. It is so easy that it is really a system of mental mathematics, and this combined with the coherence and flexibility of the system, encourages the

development and use of intuition and creativity. These features make Vedic Mathematics very attractive. Vedic Mathematics deals with all the fields in Mathematics. The simplicity of Vedic Mathematics means that calculations can be carried out mentally and this is very much encouraged in the Vedic system. Being naturally creative students is to devise their own methods of solution. The Vedic system seeks to cultivate intuition having a conscious proof or explanation of a method beforehand is not considered essential in the Vedic methodology. Students are shown general methods and also special methods, which apply in special cases. This means they do not rigidly have to follow a certain procedure but have a choice and are encouraged to invent their own methods. Every problem is unique and invites its own style of solution. The Vedic system does not impose any unnecessary constraints. For e.g. we can work from left to right or vice-versa with both positive and negative numbers; more than two numbers can be operated simultaneously.

The Vedic system uses a collection of sixteen Sutras (or formulae), given in word form, and some sub-Sutras. They express fundamental principles, which run like threads ('Sutra' means 'thread') through the hole of mathematics, unifying diverse topics. They are extremely useful in education for this reason. We use our mind in certain specific ways – we might extend an idea or reverse it or compare or combine it with another.

Each of these types of mental activity is described by one of the Vedic Sutras. They describe the ways in which the mind can work and so they tell the student, how to go about solving a problem. It is not necessary for the teacher to be familiar with these. It is best not to stress the Sutras. They become familiar as you go through and seem quite natural.

The best part of Vedic Mathematics is revealed in it's applications. Let us consider one of the applications using "Nikhilam Navatascaramam

Dasatah". 'Nikhilam Navatascaramam Dasatah', literally translated in English, means 'All from nine and last from ten'. This means that we are supposed to take into consideration, the base to be that power of ten, which is closest to the number.

Everyone knows the universal fact that for multiplication and division, by the current method, a pupil of mathematics is forced to learn the multiplication tables of 20*20 and so on. But, according to Vedic System, the multiplication required to be learnt is maximum 5*5 and all that he has to know more than this is simple addition and subtraction (of single-digit numbers). So these formulae enable him to get at the required products, very easily and speedily, practically and immediately.

The important applications of this Sutra are: Multiplication and Division.

Since examples would make things clearer, let us consider multiplication first.

Say we have to multiply 9 by 7.

Here, we consider 10 (that power of ten, which is closest to the number to be multiplied – 9 – in this case). The modus-operandi chart is as shown, where the method is clearly understood.

The base will be that power of 10 which is closest to 9. Therefore the base is 10.	10
Put the numbers 9 and 7 above and below on the left-hand side.	9 7
Connecting with a minus sign on the right-hand side is the 10's complement of the corresponding left-hand side number.	9-(10-9) = 9-1 7-(10-7) =7-3
The left digit is obtained by adding the above 2 left-hand side numbers and subtracting 10 from this sum.	A = (9+7)-10 =6

Vertical multiplication of the two deficit right-side numbers gives the right-side result.	B = 1*3 =3 Ans: AB = 63

REFERENCES

- VEDIC MATHEMATICS Author: Jagadguru Swami Sri Bharati Krsna Tirthaji Maharaja, 1965 (various reprints)
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