Vedic Mathematics

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References

- 1) Vedic Mathematics or Sixteen Simple Mathematical Formulae from the Vedas (For one-line answers to all mathematical problems), Motilal Banarsidass Publishers, Delhi, 1965. ISBN 81-208-0164-4
- 2) History of Hindu Mathematics - A source Book Parts 1&2 B. Datta and A. N. Singh, Asia Publishing House, Bombay, 1935.

Outline of the Course

- Introduction and Multiplication Sutra (chapter 3) 2/2/97
- Practical Applications of Multiplication and Division Sutra (chapter 4) 2/9/97
- Argumental Division (chapter 1) 2/16/97
- Recapitulation and More exercises 2/23/97
- Factorization of Simple Quadratics (chapter 7) 3/2/97

Summary of Course

- Considers the origin of different methods used in Vedic Mathematics
- Learn Sutras to know how to do calculations in a different (faster/more efficient manner).
- Usefulness of these methods in a calculator/computer age.

About Students

- Find out any relevant background and interest of the audience
- What do they understand by vedic mathematics?
- Why one should do mathematics in the 20th/21st century?
- Can you name a famous 20th century Indian Mathematician?

Agenda for Today

- Brief History Vedas, Vedangas and Upavedas
- Why did the vedic people do mathematics?
- Some of the mathematical inventions that were attributed to India. -
- Famous Indian mathematicians of the bygone and their writings
- Sutras for Multiplication and Examples

Overview

Let us say that you want to multiply

1) 1257 * 1001

2) 777 * 999

3) 113 * 108

HISTORY

Explain how all the individual topics fit together

Period of Vedic Mathematics

This is a book by Shankaracharya (1884-1960) of Puri. It was meant to be the first of 16 volumes covering aspects of mathematics by explaining the use of 16 sutras from the Vedas. All of these volumes were lost. Before he dies, he rewrote Vol. 1 from his memory. This volume covers quick methods for doing arithmetic.

Other Claims

Some others claim that this book is about Hindu Mathematics between Aryabhatta and Bhaskara - that is roughly between 500 and 1100 AD.

Chandogya Upanishad - Story about Narada and Sage Sanatkumara.

Vedas, Vedangas and Upangas

Fourteen-fold Vedic Knowledge:

1) 4 Vedas (Rg, Yajur, Sama and Atharva) - originally oral in nature.

2) 6 Vedangas (phonetics, grammar, etymology, metronomy(chandas), Astronomy and Astrology, and Kalpa)

4) 4 Upavedas (Analysis, Logic, Puranic Literature) and Darma Sastra

Upavedas

4 Upavedas (Ayurveda, Gandharvaveda, Dhanurveda and Sthapatyaveda)

Vedas refer to a body of knowledge that reveals different means and ends available to the human being.

Vedic Mathematics

Most important sources for Vedic Mathematics are found in Astronomy &Astrology and Kalpa (rules for rituals and ceremonies).

Evidence is usually in the form of sutras (a peculiar form of writing which is very concise and often uses a poetic style to capture the essence of argument or result.

Uses of Mathematics

- Kalpasutras gave directions for conducting sacrificial fires at different times of the year. So they need to calculate the planetary positions which needed mathematics. They also need to construct calendars/panchangas for lunar as well solar months. Astrology also needed considerable mathematical calculations.

Sutras

- Condensation of sutras so that minimal writing material is used. This was the form in which the contents of Brahmanas were preserved. This was later used by various philosophical and scientific schools such as statecraft (arthasasastra). A concise Sanskrit statement that gives a rule or principle to be followed, for example, in grammar, in ritual or in mathematics

Examples

Sutra can be thought of Sanskrit equivalent of something like: “i” before “e” except after “c”.

Example: Nikhilam Navatashcaramam Dashatah

All from nine and the last from 10.

Uses of that sutra

Multiplication

8 x	7 x
9	8
8 -2	7 -3
9 -1	8 -2
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7 2	5 6

More Examples

7 x 9

9 x 9

12 x 13

14 x 17

19 x 19

Why does it work?

(x-a) * (x-b) = x^2 -x(a+b) + ab

= x(x-a-b) + ab

In 8 x 9

x-a = 8, x-b=9 and x is taken to be 10.

Upasutra

There is a upasutra (subsutra) of one word anurupyena which means "Proportionately".

In other words, one can take any base that is suitable.

Before I explain what is meant by base:

91 -9

89 -11

80 99.

Base

The base we choose in the previous example is 100. (or x in the formula is 100).

Bases can be understood from the positional number system (again this system is believed to be the invention of Indians.

Normally, numbers are represented in base 10 notation. Computers use binary numbers or numbers represented in base 2.

Examples

56 6	45 -5	211 11
54 4	47 -3	209 09
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60/2 24	21 15	440 99
3024		

Summary

- History of Vedic Mathematics
- Multiplication using sutras

Where to get more information

- Do more examples.
- Look at the Internet under altavista, search with vedic-mathematics
- Go to local library/Barnes Nobles/Borders read a book titled “The Man Who Knew Infinity”

Feedback

- Please give me feed back from both parents and students. If something goes above your head, please do not worry. Once you have an adequate background, read the material again. It took me many attempts to understand the material.